Contents contains

Service Manual for

for

SIGNAL GENERATOR
2030 series

Part number 46880-047U
Issue 1

comprising
Operating manual 46881-976P and
Maintenance manual 46881-978M

Creation date 31-Oct-94

Contains pages for

Maintenance Manual

for

2030 SERIES
AM/FM SIGNAL GENERATOR

2030 10 kHz to 1.35 GHz
2031 10 kHz to 2.7 GHz
2032 10 kHz to 5.4 GHz

Includes information on:
Option 001 - Second modulation oscillator
Option 002 - Pulse modulation
Option 003 - High output power
Option 005 - GMSK Bt 0.3
Option 006 - Avionics
Option 008 - RF profiles and complex sweep
Option 009 - Pulse generator
Option 010 - DME modulator
Option 100 - Single fuse version
Option 105 - Modified pulse modulator
Option 112 - EXT MOD 2 input 600 Ω

Part number 46881-978M
Issue 13

Creation date 22 December 1998

Please open and fit to the supplied Ring Binder

2030 SERIES
AM/FM SIGNAL GENERATOR

2030 10 kHz to 1.35 GHz
2031 10 kHz to 2.7 GHz
2032 10 kHz to 5.4 GHz

Includes information on:
Option 001 - Second modulation oscillator
Option 002 - Pulse modulation
Option 003 - High output power
Option 005 - GMSK Bt 0.3
Option 006 - Avionics
Option 008 - RF profiles and complex sweep
Option 009 - Pulse generator
Option 010 - DME modulator
Option 100 - Single fuse version
Option 105 - Modified pulse modulator
Option 112 - EXT MOD 2 input 600 Ω

Printed in the UK

Manual part no. 46881-978M
Issue 13

22 December 1998

CONTENTS

PRECAUTIONS

WARNINGS, CAUTIONS AND NOTES

These terms have specific meanings in this manual:-

WARNINGS contain information to prevent personal injury.
CAUTIONS contain information to prevent damage to the equipment.
Notes contain important general information.

HAZARD SYMBOLS

The meaning of hazard symbols appearing on the equipment is as follows:

Symbol	Nature of hazard
	General hazards
	Dangerous voltages
	Toxic hazard
	Static sensitive components

GENERAL CONDITIONS OF USE

This product is designed and tested to comply with the requirements of IEC/EN61010-1 'Safety requirements for electrical equipment for measurement, control and laboratory use', for Class I, portable equipment and is for use in a pollution degree 2 environment. The equipment is designed to operate from an installation category II supply.

Equipment should be protected from the ingress of liquids and precipitation such as rain, snow, etc. When moving the equipment from a cold to a hot environment, it is important to allow the temperature of the equipment to stabilise before it is connected to the supply to avoid condensation forming. The equipment must only be operated within the environmental conditions specified in Chapter 1 'Performance data' in the Operating/Instruction manual, otherwise the protection provided by the equipment may be impaired.

This product is not approved for use in hazardous atmospheres or medical applications. If the equipment is to be used in a safety-related application, e.g. avionics or military applications, the suitability of the product must be assessed and approved for use by a competent person.

⚠ WARNING - Electrical hazards (AC supply voltage)

This equipment conforms with IEC Safety Class I, meaning that it is provided with a protective grounding lead. To maintain this protection the supply lead must always be connected to the source of supply via a socket with a grounded contact.

Be aware that the supply filter contains capacitors that may remain charged after the equipment is disconnected from the supply. Although the stored energy is within the approved safety requirements, a slight shock may be felt if the plug pins are touched immediately after removal.

Fuses

Note that there are supply fuses in both the live and neutral wires of the supply lead. If only one of these fuses should rupture, certain parts of the equipment could remain at supply potential.

Single fuse Option

Note that the internal supply fuse is in series with the live (brown) conductor of the supply lead. If connection is made to a 2-pin unpolarized supply socket, it is possible for the fuse to become transposed to the neutral conductor, in which case, parts of the equipment could remain at supply potential even after the fuse has ruptured.

Removal of covers

Disconnect the supply before removing the covers so as to avoid the risk of exposing high voltage parts. If any internal adjustment or servicing has to be carried out with the supply on, it must only be performed by a skilled person who is aware of the hazard involved.

The LCD Inverter fitted to the rear of the front panel has a high voltage output. Care should be taken when handling the Inverter which provides approx. 1 kV to drive the LCD backlight.

⚠ WARNING - Fire hazard

Make sure that only fuses of the correct rating and type are used for replacement.

If an integrally fused plug is used on the supply lead, ensure that the fuse rating is commensurate with the with current requirements of this equipment. See under 'Performance Data' in Chapter 1 for power requirements.

⚠ WARNING - Toxic hazards

Some of the components used in this equipment may include resins and other materials which give off toxic fumes if incinerated. Take appropriate precautions, therefore, in the disposal of these items.

⚠ WARNING - Beryllia

Beryllia (beryllium oxide) is used in the construction of the following components in this equipment:

Board AB3/5 (2031): TR2 & TR3
Board AB3/4 (2032): TR111, TR206 to TR209, TR402, D405 & D406
Board AB2/2 (2030,2031,2032): TR315

Board AB3/3 (2030 fitted with Option 003): TR5 & TR7

This material, when in the form of fine dust or vapour and inhaled into the lungs, can cause a respiratory disease. In its solid form, as used here, it can be handled quite safely although it is prudent to avoid handling conditions which promote dust formation by surface abrasion.

Because of this hazard you are advised to be very careful in removing and disposing of these components. Do not put them in the general industrial or domestic waste or dispatch them by post. They should be separately and securely packed and clearly identified to show the nature of the hazard and then disposed of in a safe manner by an authorised toxic waste contractor.

WARNING - Lithium

A lithium battery is used for the Real Time Clock and fitted on the rear panel. The battery presents two hazards:-

(1) As lithium is a toxic substance the battery should in no circumstances be crushed, incinerated or disposed of in normal waste.

(2) Do not attempt to recharge this type of battery. Do not short circuit or force discharge since this might cause the battery to vent, overheat or explode.

The replacement battery should be SAFT L56 or equivalent. This is a lithium 3.5 V type, rated at 1800 mAH, size AA. If a lithium battery is unobtainable an alkaline battery can be used but it will have a shorter life. A suitable battery can be obtained from IFR (Part Number 23711-106Z).

WARNING - Liquid crystal display module

Do not dismantle the display module.

The Liquid Crystal substance within the display panel used in this equipment is a toxic substance. If the display panel is damaged and any of the Liquid Crystal substance leaks out, do not allow it to come into contact with your mouth. If the substance comes into contact with your skin, immediately wash the affected areas with soap and water, and seek medical advice.

The display illumination is produced by a Cold Cathode Fluorescent Tube (CCFT). This contains a small amount of mercury gas which is a toxic substance.

Both the display panel and the CCFT are made of glass. Therefore do not subject the module to mechanical shocks which might cause fractures.

Do not dispose of these modules, or any part of them, in domestic waste. Use only approved waste disposal methods.

WARNING - Beryllium copper

Some mechanical components within this instrument are manufactured from beryllium copper. This is an alloy with a beryllium content of approximately 5%. It represents no risk in normal use.

The material should not be machined, welded or subjected to any process where heat is involved.

It must be disposed of as "special waste".

It must NOT be disposed of by incineration.

WARNING - Heavy instrument

The weight of this instrument exceeds the 18 kg (40 lb) guideline for manual handling by a single person. To avoid the risk of injury, an assessment should be carried out prior to handling which takes account of the load, workplace environment and individual capability, in accordance with European Directive 90/269/EEC and associated National Regulations.

WARNING - Tilt facility

When the instrument is in the tilt position, it is advisable, for stability reasons, not to stack other instruments on top of it.

CAUTION - Static sensitive components

The presence of static sensitive components is indicated in the equipment by yellow discs, flags or labels bearing the symbol ⚠. Certain handling precautions should be observed to prevent these components being permanently damaged by static charges or fast surges.

(1) If a printed board containing static sensitive components (as indicated by a warning disc or flag) is removed, it must be temporarily stored in a conductive plastic bag.

(2) If a static sensitive component is to be removed or replaced the following anti-static equipment must be used.

A **work bench** with a grounded conductive surface.

Metallic tools grounded either permanently or by repeated discharges.

A **low-voltage** grounded soldering iron.
A **grounded wrist strap** and a conductive **grounded seat cover** for the operator, whose outer clothing must not be of man-made fibre.

(3) As a general precaution, avoid touching the leads of a static sensitive component. When handling a new one, leave it in its conducting mount until it is required for use.

(4) If using a freezer aerosol in fault finding, take care not to spray programmable ICs as this may affect their contents.

CAUTION - IC removal

Damage can be caused if an IC mounted in a PLCC (Plastic Leaded Chip Carrier) is removed without the use of a special tool, Part Number WP02, available from IFR Service Division (address at rear of manual).

PRECAUTIONS

WARNINGS, CAUTIONS AND NOTES

Les termes suivants ont, dans ce manuel, des significations particulières:

WARNINGS contient des informations pour éviter toute blessure au personnel.
CAUTIONS contient des informations pour éviter les dommages aux équipements.
Notes contient d'importantes informations d'ordre général.

SYMBOLES SIGNALANT UN RISQUE

La signification des symboles liés à cet équipement est la suivante:

Symbole	Nature du risque
	Risques généraux
	Tension dangereuse
	Danger produits toxiques

CONDITIONS GÉNÉRALES D'UTILISATION

Ce produit a été conçu et testé pour être conforme aux exigences des normes CEI/EN61010-1 "Règles de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire", pour des équipements Classe I, portables et pour une utilisation dans un environnement de pollution de niveau 2. Cet équipement est conçu pour fonctionner à partir d'une alimentation de catégorie II.

Cet équipement doit être protégé de l'introduction de liquides ainsi que des précipitations d'eau, de neige, etc... Lorsqu'on transporte cet équipement d'un environnement chaud vers un environnement froid, il est important de laisser l'équipement se stabiliser en température avant de le connecter à une alimentation afin d'éviter toute formation de condensation. L'appareil doit être utilisé uniquement dans le cadre des conditions d'environnement spécifiées au chapitre 1 "Performance data" du manuel d'utilisation, toute autre utilisation peut endommager les systèmes de protection.

Ce produit n'est pas garanti pour fonctionner dans des atmosphères dangereuses ou pour un usage médical. Si l'équipement doit être utilisé pour des applications en relation avec la sécurité, par exemple des applications militaires ou aéronautiques, la compatibilité du produit doit être établie et approuvée par une personne compétente.

⚠ WARNING - Sécurité électrique (tension d'alimentation alternative)

Cet appareil est protégé conformément à la norme CEI de sécurité Classe 1, c'est-à-dire que sa prise secteur comporte un fil de protection à la terre. Pour maintenir cette protection, le câble d'alimentation doit toujours être branché à la source d'alimentation par l'intermédiaire d'une prise comportant une borne de terre.

Notez que les filtres d'alimentation contiennent des condensateurs qui peuvent encore être chargés lorsque l'appareil est débranché. Bien que l'énergie contenue soit conforme aux exigences de sécurité, il est possible de ressentir un léger choc si l'on touche les bornes sitôt après débranchement.

Fusibles

Notez qu'il y a deux fusibles, l'un pour la phase et l'autre pour le neutre du câble d'alimentation. Si un seul fusible est coupé, certaines parties de l'appareil peuvent rester au potentiel d'alimentation.

Option fusible simple

Notez que le fusible d'alimentation interne est en série avec la phase (fil brun) du câble d'alimentation. Si la prise d'alimentation comporte deux bornes non polarisées, il est possible de connecter le fusible au neutre. Dans ce cas, certaines parties de l'appareil peuvent rester à un certain potentiel même après coupure du fusible.

Retrait des couvercles

L'appareil doit être débranché avant de retirer les couvercles afin d'éviter tout contact avec les éléments haute tension. Si toutefois un réglage interne ou une réparation nécessitent la présence de l'alimentation, ils devront être effectués par une personne qualifiée et avisée des risques encourus.

Le convertisseur de l'écran LCD situé derrière la panneau avant possède une sortie haute tension. Il faut ainsi manipuler le convertisseur avec précautions, sachant qu'il fournit des tensions jusqu'à 1kV pour piloter l'écran LCD.

⚠ WARNING - Risque lié au feu

Lors du remplacement des fusibles vérifiez l'exactitude de leur type et de leur valeur.

Si le câble d'alimentation comporte une prise avec fusible intégré, assurez vous que sa valeur est compatible avec les besoins en courant de l'appareil. Pour la consommation, reportez-vous au "Performance data" dans le chapitre 1 du manuel d'utilisation.

⚠ WARNING - Danger produits toxiques

Certains composants utilisés dans cet appareil peuvent contenir des résines et d'autres matières qui dégagent des fumées toxiques lors de leur incinération. Les précautions d'usages doivent donc être prises lorsqu'on se débarrasse de ce type de composant.

⚠ WARNING - Le Béryllia

Le Béryllia (oxyde de Béryllium) entre dans la composition des composants suivants:

Board AB3/5 (2031): TR2 & TR3
Board AB3/4 (2032): TR111, TR206 to TR209, TR402, D405 & D406
Board AB2/2 (2030,2031,2032): TR315
Board AB3/3 (2030 fitted with Option 003): TR5 & TR7

Cette matière peut, lorsqu'elle est inhalée sous forme de vapeur ou de fine poussière, être la cause de maladies respiratoires. Sous sa forme solide, comme c'est le cas ici, cette matière peut être manipulée sans risque, bien qu'il soit conseillé d'éviter toute manipulation pouvant entraîner la formation de poussière par abrasion de la surface.

Il est donc conseillé, pour éviter ce risque, de prendre les précautions requises pour retirer ces composants et s'en débarrasser. Ne les jetez pas avec les déchets industriels ou domestiques ou ne les envoyez pas par la poste. Il faut les emballer séparément et solidement et bien indiquer la nature du risque avant de les céder, avec précautions, à une entreprise spécialisée dans le traitement de déchets toxiques.

⚠ WARNING - Lithium

Une batterie au Lithium est utilisée pour l'horloge temps réel et se trouve sur le panneau arrière. La pile présente deux risques:

(1) Le Lithium étant une substance toxique, il ne faut en aucun cas l'écraser, l'incinérer ou le jeter avec des déchets normaux.

(2) N'essayez pas de recharger ce type de pile. Ne court-circuitez pas ou ne forcez pas la décharge de la pile car cela pourrait causer une fuite, une surchauffe ou une explosion.

La pile de remplacement doit être une SAFT L56 ou équivalente. C'est une pile au Lithium de 3.5V,de puissance 1800mAH et de taille AA. Si la pile au Lithium n'est pas disponible, elle peut être remplacée par une pile Alkaline mais sa durée de vie sera inférieure. La pile adéquate est disponible chez IFR (Référence 23711-106Z).

⚠ WARNING - Module d'affichage à cristaux liquides.

Ne pas démonter le module d'affichage à cristaux liquides.

La matière contenue dans l'afficheur à cristaux liquides utilisé dans cet appareil est une substance toxique. Si l'afficheur est endommagé ou si la matière des cristaux liquides s'écoule, il faut éviter de la mettre en contact avec sa bouche. En cas de contact avec la peau, laver immédiatement la surface touchée avec de l'eau et du savon et s'adresser à un service médical.

L'éclairage de l'afficheur provient d'un tube cathodique fluorescent (CCFT). Celui-ci contient une petite quantité de gaz mercure, qui est une substance toxique.

L'afficheur ainsi que le tube CCFT sont en verre. Il faut donc éviter de leur faire subir des chocs mécaniques pouvant causer des dégâts.

Ne pas se débarrasser de ces modules ni d'aucun de leurs composants dans une poubelle à usage domestique. Utilisez uniquement les containers à déchets appropriés.

⚠ WARNING - Bronze au béryllium

Dans cet équipement,certaines pièces mécaniques sont à base de bronze au béryllium. Il s'agit d'un alliage dans lequel le pourcentage de béryllium ne dépasse pas 5%. Il ne présente aucun danger en utilisation normale.

Toutefois, cet alliage ne doit pas être travaillé, soudé ou soumis à un processus qui implique l'utilisation d'une source de chaleur.

En cas de destruction, il sera entreposé dans un container spécial. IL ne devra pas être détruit par incinération

⚠ WARNING - Equipement lourd

Le poids de cet appareil est supérieur à la limite de 18 kg (40 lb), fixée pour le transport par une seule personne. Afin d'éviter tout risque de blessure, il est nécessaire de faire, avant le transport, une évaluation de la charge, des contraintes de l'environnement et des capacités de l'individu, en conformité avec la Directive Européenne 90/269/EEC ainsi que les recommandations Nationales concernées.

⚠ WARNING - Position inclinee

Lorsque l'appareil est dans une position inclinée, il est recommandé, pour des raisons des stabilité, de ne pas y empiler d'autres appareils.

VORSICHTSMASSNAHMEN

WARNINGS, CAUTIONS AND NOTES

Diese Hinweise haben eine bestimmte Bedeutung in diesem Handbuch:

WARNINGS dienen zur Vermeidung von Verletzungsrisiken.
CAUTIONS dienen dem Schutz der Geräte.
Notes enthalten wichtige Informationen.

GEFAHRENSYMBOLE

Die Gefahrensymbole auf den Geräten sind wie folgt:

Symbol	Gefahrenart
	Allgemeine Gefahr
	Gefährliche Spannung
	Warnung vor giftigen Substanzen

ALLGEMEINE HINWEISE ZUR VERWENDUNG

Dieses Produkt wurde entsprechend den Anforderungen von IEC/EN61010-1 "Sicherheitsanforderungen für elektrische Ausrüstung für Meßaufgaben, Steuerung und Laborbedarf", Klasse I, transportabel zur Verwendung in einer Grad 2 verunreinigten Umgebung, entwickelt und getestet. Dieses Gerät ist für Netzversorgung Klasse II zugelassen.

Das Gerät sollte vor dem Eindringen von Flüssigkeiten sowie vor Regen, Schnee etc. geschützt werden. Bei Standortänderung von kalter in wärmere Umgebung sollte das Gerät wegen der Kondensation erst nach Anpassung an die wärmere Umgebung mit dem Netz verbunden werden. Das Gerät darf nur in Umgebungsbedingungen wie in Kapitel 1 "Leistungsdaten (Performance data)" der Bedienungsanleitung beschrieben, betrieben werden; ansonsten wird der vom Gerät vorgesehene Schutz des Anwenders beeinträchtigt.

Dieses Produkt ist nicht für den Einsatz in gefährlicher Umgebung (z.B. Ex-Bereich) und für medizinische Anwendungen geprüft. Sollte das Gerät für den Einsatz in sicherheitsrelevanten Anwendungen wie z.B. im Flugverkehr oder bei militaerischen Anwendungen vorgesehen sein, so ist dieser von einer für diesen Bereich zuständigen Person zu beurteilen und genehmigen.

⚠ WARNING - Elektrische Schläge (Wechselspannungsversorgung)

Das Gerät entspricht IEC Sicherheitsklasse 1 mit einem Schutzleiter nach Erde. Das Netzkabel muß stets an eine Steckdose mit Erdkontakt angeschlossen werden.

Filterkondensatoren in der internen Spannungsversorgung können auch nach Unterbrechung der Spannungszuführung noch geladen sein. Obwohl die darin gespeicherte Energie innerhalb der Sicherheitsmargen liegt, kann ein leichter Spannungsschlag bei Berührung kurz nach der Unterbrechung erfolgen.

Sicherungen

Es ist zu beachten, daß es Sicherungen in beiden (spannunsführenden und neutralen) Zuleitungen gibt. Wenn nur eine von diesen Sicherungen schmilzt, so bleiben einige Geräteteile immer noch auf Spannungspotential.

Einsicherungs-Option

Die interne Sicherung in der Spannungszuführung ist in Reihe mit der spannungsführenden Zuleitung (braun) geschaltet. Bei Verbindung mit einer zweiadrigen, nicht gepolten Steckdose kann die Sicherung in der Masseleitung liegen, so daß auch bei geschmolzener Sicherung Geräteteile immer noch auf Spannungspotential sind.

Abnahme von Abdeckungen

Die Spannungsversorgung muß vor Abnahme von Gehäuseabdeckungen unterbrochen sein, damit hochspannungsführende Teile gefahrlos zugänglich sind. Falls Abgleiche oder Servicearbeiten unter Spannung notwendig werden, dürfen solche Arbeiten nur von fachkundigem Personal durchgeführt werden, das die Gefahren kennt.

Der LDC Inverter an der Rückseite der Frontplatte besitzt einen Hochspannungsausgang. Da dieser zur Erzeugung der Hintergrundbeleuchtung der LCD-Anzeige ca. 1 kV Spannung erzeugt ist bei der Handhabung des Inverters Vorsicht geboten.

⚠ WARNING - Feuergefahr

Es dürfen nur Ersatzsicherungen vom gleichen Typ mit den korrekten Spezifikationen entsprechend der Stromaufnahme des Gerätes verwendet werden. Siehe hierzu die Leistungsdaten (Performance Data) in Kapitel 1.

⚠ WARNING - Warnung vor giftigen Substanzen

In einigen Bauelementen dieses Geräts können Epoxyharze oder andere Materialien enthalten sein, die im Brandfall giftige Gase erzeugen. Bei der Entsorgung müssen deshalb entsprechende Vorsichtsmaßnahmen getroffen werden.

⚠ WARNING - Beryllium Oxid

Beryllium Oxid wird in den folgenden Bauelementen dieses Geräts verwendet:

Board AB3/5 (2031): TR2 & TR3
Board AB3/4 (2032): TR111, TR206 to TR209, TR402, D405 & D406
Board AB2/2 (2030,2031,2032): TR315
Board AB3/3 (2030 fitted with Option 003): TR5 & TR7

Als Staub inhaliert kann Beryllium zu Schädigungen der Atemwege führen. In fester Form kann es ohne Gefahr gehandhabt werden, wobei Staubabrieb vermieden werden sollte.

Wegen dieser Gefahren dürfen diese Bauelemente nur mit der entsprechenden Vorsicht ausgebaut und entsorgt werden. Sie dürfen nicht mit Industrie oder Hausmüll vermengt oder per Post versandt werden. Sie müssen separat verpackt und entsprechend der Gefährdung markiert werden. Die Entsorgung muß über einen autorisierten Fachbetrieb erfolgen.

WARNING - Lithium

Die für die Echtzeituhr erforderliche Lithiumbatterie ist an der Geräterückseite eingebaut. Die Battterie weist zwei Gefahren auf:

(1) Da Lithium giftig ist, darf die Batterie niemals geöffnet, zerstört oder verbrannt und mit normalem Müll entsorgt werden.

(2) Die Batterie darf nicht aufgeladen werden. Kurzschließen der Batterie kann zu Überhitzung, Öffnung der Explosion führen.

Die Ersatzbatterie sollte vom Typ SAFT L56 sein. Dies ist eine 3.5 Volt Lithiumbatterie, mit einer Kapazität von 1800 mAh und der Größe AA.

Sollte eine Lithiumbatterie nicht verfügbar sein, so kann auch eine Alkaline Batterie verwendet werden. Diese besitzt jedoch eine kürzere Lebensdauer. Eine passende Batterie kann auch von IFR (Bestellnr. 23711-106Z) bezogen werden.

WARNING - Das LCD Modul

Demontieren Sie in keinem Fall das LCD Modul.

Die Flüssigkristallsubstanz, die im Displaymodul dieses Gerätes enthalten ist, enthält giftige Substanzen. Falls das Displaymodul beschädigt wird und die darin enthaltene Flüssigkristall-substanz entweicht, so achten Sie darauf, daß diese Substanz in keinem Fall mit Schleimhäuten in Berührung kommt. Sollte die Substanz mit Ihrer Haut in Berührung kommen, so waschen Sie die betroffenen Hautpartien mit Wasser und Seife ab und geben sich in ärztliche Behandlung.

Die Hintergrundbeleuchtung des Displays besteht aus einer CCFT (Cold Cathode Fluorescent Tube). Dieses enthält kleine Mengen Quecksilbergas. Dieses Gas ist giftig.

Sowohl das Display als auch die Hintergrundbeleuchtung bestehen aus Glas. Mechanische Einwirkungen können diese Gläser zerstören.

Entsorgen Sie diese Module oder Teile davon nicht über den normalen Hausmüll, sondern über eine geeignete Sondermüllverwertung.

WARNING - Beryllium Kupfer

In diesem Gerät sind einige mechanische Komponenten aus Berylium Kupfer gefertigt. Dies ist eine Verbindung welche aus einem Berylliumanteil von ca. 5 % besteht. Bei normaler Verwendung besteht kein Gesundheitsrisiko.

Das Metall darf nicht bearbeitet, geschweißt oder sonstiger Wärmebehandlung ausgesetzt werden.

Es muß als Sondermüll entsorgt werden.

Es darf nicht durch Verbrennung entsorgt werden.

WARNING - Schweres Gerät

Das Gewicht dieses Geräts liegt über der 18 kg (40 lb) Grenze für Transport durch eine einzelne Person. Zur Vermeidung von Verletzungen sollten vor einem Transport die Arbeitsumgebung und die persönlichen Möglichkeiten im Verhältnis zur Last abgewogen werden, wie in der EU-Regelung 90/269/EEC und nationalen Normen beschrieben.

WARNING - Schrägstellung

Bei Schrägstellung des Geräts sollten aus Stabilitätsgründen keine anderen Geräte darauf gestellt werden.

Precauzioni

WARNINGS, CAUTIONS AND NOTES

Questi termini vengono utilizzati in questo manuale con significati specifici:

WARNINGS riportano informazioni atte ad evitare possibili pericoli alla persona.
CAUTIONS riportano informazioni per evitare possibili pericoli all'apparecchiatura.
Notes riportano importanti informazioni di carattere generale.

SIMBOLI DI PERICOLO

Significato dei simboli di pericolo utilizzati nell'apparato:

Simbolo	Tipo di pericolo
	Pericolo generico
	Tensione pericolosa
	Pericolo sostanze tossiche

CONDIZIONI GENERALI D'USO

Questo prodotto è stato progettato e collaudato per rispondere ai requisiti della direttiva IEC/EN61010-1 'Safety requirements for electrical equipment for measurement, control and laboratory use' per apparati di classe I, portatili e per l'uso in un ambiente inquinato di grado 2. L'apparato è stato progettato per essere alimentato da un alimentatore di categoria II.

Lo strumento deve essere protetto dal possibile ingresso di liquidi quali, ad es., acqua, pioggia, neve, ecc. Qualora lo strumento venga portato da un ambiente freddo ad uno caldo, è importante lasciare che la temperatura all'interno dello strumento si stabilizzi prima di alimentarlo per evitare formazione di condense. Lo strumento deve essere utilizzato esclusivamente nelle condizioni ambientali descritte nel capitolo 1 'Performance data' del manuale operativo, in caso contrario le protezioni previste nello strumento potrebbero risultare non sufficienti.

Questo prodotto non è stato approvato per essere usato in ambienti pericolosi o applicazioni medicali. Se lo strumento deve essere usato per applicazioni particolari collegate alla sicurezza (per esempio applicazioni militari o avioniche), occorre che una persona o un istituto competente ne certifichi l'uso.

⚠ WARNING - Pericoli da elettricità (alimentazione c.a.)

Quest 'apparato è provvisto del collegamento di protezione di terra e rispetta le norme di sicurezza IEC, classe 1. Per mantenere questa protezione è necessario che il cavo, la spina e la presa d'alimentazione siano tutti provvisti di terra.

Il circuito d'alimentazione contiene dei filtri i cui condensatori possono restare carichi anche dopo aver rimosso l'alimentazione. Sebbene l'energia immagazzinata è entro i limiti di sicurezza, purtuttavia una leggera scossa può essere avvertita toccando i capi della spina subito dopo averla rimossa.

Fusibili

Notare che entrambi i capi del cavo d'alimentazione sono provvisti di fusibili. In caso di rottura di uno solo dei due fusibili, alcune parti dello strumento potrebbero restare sotto tensione.

Opzione singolo fusibile

Se hace notar que el fusible de alimentación interno está enserie con el activo (marrón) del cable de alimentación a red. Si la clavija de alimentación de red cuenta con sólo dos terminales sin polaridad, el fusible puede pasar a estar en serie con el neutro, en cuyo caso existen partes del equipo que permanecerían a tensión de red incluso después de que el fusible haya fundido.

Rimozione dei coperchi

Prima di rimuovere i coperchi occorre scollegare la spina d'alimentazione onde evitare il rischio di esposizione di parti ad alta tensione. Eventuali operazioni di manutenzione che richiedono la presenza dell'alimentazione dovranno essere eseguite solo da parte di personale specializzato ed a conoscenza dei pericoli coinvolti.

L'inverter LCD montato sul retro del pannello frontale ha un'uscita ad alta tensione. Fare attenzione nel maneggiare tale inverter il quale fornisce un'uscita di circa 1 kV per alimentare lo schermo LCD retroilluminato.

⚠ WARNING - Pericolo d'incendio

Assicurarsi che, in caso di sostituzione, vengano utilizzati solo fusibili della portata e del tipo prescritti.

Se viene usata una spina con fusibili, assicurarsi che questi siano di portata adeguata ai requisiti di alimentazione richiesti dallo strumento. Tali requisiti sono riportati nel cap. 1 "Performance data".

⚠ WARNING - Pericolo sostanze tossiche

Alcuni dei componenti usati in questo strumento possono contenere resine o altri materiali che, se bruciati, possono emettere fumi tossici. Prendere quindi le opportune precauzioni nell'uso di tali parti.

⚠ WARNING - Berillio

Berillio (ossido di berillio) è utilizzato nella costruzione dei seguenti componenti di quest'apparato:

Board AB3/5 (2031): TR2 & TR3
Board AB3/4 (2032): TR111, TR206 to TR209, TR402, D405 & D406
Board AB2/2 (2030,2031,2032): TR315
Board AB3/3 (2030 fitted with Option 003): TR5 & TR7

Questo materiale, se inalato sotto forma di polvere fine o vapore, può causare malattie respiratorie. Allo stato solido, come è usato qui, può essere maneggiato con sufficiente sicurezza anche se è prudente evitare condizioni che provochino la formazione di polveri tramite abrasioni superficiali.

A cause di questi pericoli occorre essere molto prudenti nella rimozione e nella locazione di questi componenti. Questi non devono essere gettati tra i rifiuti domestici o industriali né. vanno spediti per posta. Essi devono essere impacchettati separatamente ed in modo sicuro e devono indicare chiaramente la natura del pericolo e quindi affidate a personale autorizzato.

WARNING - Litio

Una batteria al litio, alloggiata nel pannello posteriore, è utilizzata per alimentare il "Real Time Clock". Le pile al litio presentano due pericoli:

(1) Poiché il litio è una sostanza tossica, la batteria non deve mai essere rotta, bruciata o gettata tra I rifiuti normali.

(2) Questo tipo di batteria non deve mai essere sottoposta a ricarica né va cortocircuitata o sottoposta a scarica violenta in quanto ciò potrebbe comportare fumi surriscaldamento o esplosione.

La batteria da sostituire dovrebbe essere del tipo "SAFT L56" o equivalente. Questa è una batteria al litio da 3,5 V, 1800 mAH, misura AA. Se non è possibile reperire una batteria al litio, si può usare una batteria alcalina, la cui vita sarà però inferiore. Una batteria di scorta potrà essere comunque fornita dalla IFR (Part Number 23711-106Z).

WARNING - Schermo a cristalli liquidi (LCD - Liquid Crystal Display)

Non disassemblare il modulo LCD.

La sostanza contenuta nello schermo LCD è tossica. Se il modulo LCD viene danneggiato e si ha una perdita di liquido, occorre evitarne il contatto con la bocca. In caso di contatto con la pelle, lavare immediatamente le aree interessate con acqua e sapone e contattare un medico.

L'illuminazione dello schermo è prodotta tramite un tubo fluorescente a catodo freddo (CCFT - Cold Cathode Fluorescent Tube) che contiene una piccola quantità di gas mercurio, anch'esso tossico.

Sia lo schermo LCD sia il tubo CCFT sono di vetro, per cui non devono essere sottoposti a shock meccanici che possono causarne la rottura.

Il modulo LCD, il tubo CCFT o i loro residui vanno eliminati come residui speciali secondo la normativa vigente.

WARNING - Rame berillio

Alcuni componenti meccanici in questo strumento sono realizzati in rame berillio. Si tratta di una lega con contenuto di berillio di circa il 5%, che non presenta alcun rischio in usi normali.

Questo materiale non deve essere lavorato, saldato o subire qualsiasi processo che coinvolge alte temperature.

Deve essere eliminato come "rifiuto speciale". Non deve essere eliminato tramite "inceneritore".

WARNING - Strumento pesante

Il peso di questo strumento supera i 18 kg (40 lb) raccomandati come limite per il trasporto manuale da parte di singola persona. Per evitare rischi di danni fisici è bene quindi considerare il carico complessivo, le condizioni del trasporto e le capacità individuali in accordo con la direttiva comunitaria 90/269/EEC e con eventuali regolamenti locali.

WARNING - Posizionamento inclinato

Quando lo strumento è in posizione inclinata è raccomandato, per motivi di stabilità, non sovrapporre altri strumenti.

PRECAUCIONES

WARNINGS, CAUTIONS AND NOTES

Estos términos tienen significados específicos en este manual:

WARNINGS contienen información referente a prevención de daños personales.
CAUTIONS contienen información referente a prevención de daños en equipos.
Notes contienen información general importante.

SÍMBOLOS DE PELIGRO

Los significados de los símbolos de peligro que aparecen en los equipos son los siguientes:

Símbolo	Naturaleza del peligro
	Peligro general
	Voltaje peligroso
	Aviso de toxicidad

CONDICIONES GENERALES DE USO

Este producto ha sido diseñado y probado para cumplir los requerimientos de la normativa IEC/EN61010-1 "Requerimientos de la normativa para equipos eléctricos de medida, control y uso en laboratorio", para equipos clase I, portátiles y para uso en un ambiente con un grado de contaminación 2. El equipo ha sido diseñado para funcionar sobre una instalación de alimentación de categorías II.

Debe protegerse el equipo de la entrada de líquidos y precipitaciones como nieve, lluvia, etc. Cuando se traslada el equipo de entorno frío a un entorno caliente, es importante aguardar la estabilización el equipo para evitar la condensación. Sólo debe utilizarse el aparato en las condiciones ambientales especificadas en el capítulo 1 "Especificaciones" o "Performance data" del Manual de Instrucciones/Manual de Operación/Funcionamiento, en caso contrario la propia protección del equipo puede resultar dañada.

Este producto no ha sido aprobado para su utilización en entornos peligrosos o en aplicaciones médicas. Si se va a utilizar el equipo en una aplicación con implicaciones en cuanto a seguridad, como por ejemplo aplicaciones de aviónica o militares, es preciso que un experto competente en materia de seguridad apruebe su uso.

⚠ WARNING - Nivel peligroso de electricidad (tensión de red)

Este equipo cumple las normas IEC Seguridad Clase 1, lo que significa que va provisto de un cable de protección de masa. Para mantener esta protección, el cable de alimentación de red debe de conectarse siempre a una clavija con terminal de masa.

Tenga en cuenta que el filtro de red contiene condensadores que pueden almacenar carga una vez desconectado el equipo. Aunque la energía almacenada está dentro de los requisitos de seguridad, pudiera sentirse una ligera descarga al tocar la clavija de alimentación inmediatamente después de su desconexión de red.

Fusibles

Se hace notar que el Equipo está dotado de fusibles tanto en el activo como el neutro de alimentación. Si sólo uno de estos fusibles fundiera, existen partes del equipo que pudieran permanecer a tensión de red.

Opción fusible único

Se hace notar que el fusible de alimentación interno está enserie con el activo (marrón) del cable de alimentación a red. Si la clavija de alimentación de red cuenta con sólo dos terminales sin polaridad, el fusible puede pasar a estar en serie con el neutro, en cuyo caso existen partes del equipo que permanecerían a tensión de red incluso después de que el fusible haya fundido.

Para retirar las tapas

Desconectar de red antes de retirar las tapas para evitar el riesgo que supone tener accesibles aquellas partes del equipo expuestas a alta tensión. Aquellas operaciones que requieran tener alimentación con las tapas abiertas para mantenimiento o ajuste deben de ser realizadas por personal cualificado, que esté al tanto de los riesgos implicados.

El inversor LCD instalado en la parte trasera del panel frontal tiene salida de alta tensión. Deberá tenerse al manejar el inversor que proporciona aproximadamente 1Kv para alimentar la luz posterior del LCD.

⚠ WARNING - Peligro de incendio

Asegúrese de utilizar sólo fusibles del tipo y valores especificados como repuesto.

Si se utiliza una clavija con fusible incorporado, asegúrese de que los valores del fusible corresponden a los requeridos por el equipo. Ver sección de especificaciones del capítulo 1 para comprobar los requisitos de alimentación.

⚠ WARNING - Aviso de toxicidad

Alguno de los componentes utilizados en este equipo pudieran incluir resinas u otro tipo de materiales que al arder produjeran sustancias tóxicas. Por tanto, tome las debidas precauciones en la manipulación de esas piezas.

⚠ WARNING - Berilio

Berilio (óxido de berilio), se ha utilizado en la fabricación de los siguientes componentes del equipo:

Board AB3/5 (2031): TR2 & TR3
Board AB3/4 (2032): TR111, TR206 to TR209, TR402, D405 & D406
Board AB2/2 (2030,2031,2032): TR315
Board AB3/3 (2030 fitted with Option 003): TR5 & TR7

La inhalación de este material, en forma de polvo fino o vapor, entrando en los pulmones, puede ser causa de enfermedades respiratorias. En forma sólida, como se utiliza en este caso, puede manipularse con bastante seguridad, aunque se recomienda no manejarlo en aquellas condiciones que pudieran favorecer la aparición de polvo por abrasión de la superficie.

Por todo lo anterior, se recomienda tener el máximo cuidado al reemplazar o deshacerse de estos componentes, no tirándolos en basuras industriales o domésticas y no utilizar el correo para su envío. Deben, ser empaquetados de forma segura y separada, y el paquete debidamente etiquetado e identificado, señalando claramente la naturaleza del riesgo y ponerlo a disposición de un destructor autorizado de productos tóxicos.

WARNING - Litio

Se utiliza una batería de Litio para mantener el reloj en tiempo real y se halla ubicada en el panel trasero. La batería presenta dos peligros:

(1) Debido a que el \litio es una substancia tóxica, en ninguna circunstancia deberá ser aplastada, incinerada o desechada con basura normal.

(2) No intente recargar este tipo de batería. No cortocircuito o fuerce la descarga ya que esto podría motivar la destrucción, sobrecalentamiento o explosión de la batería.

La batería de reemplazo debiera ser SAFT L56 o equivalente. Se trata de una batería de litio de 3.5V y 18000mAH, tamaño AA. En caso de no disponer de una batería de litio, puede emplearse una batería alcalina aunque con una vida más corta. La batería de reemplazo adecuada puede obtenerse de IFR (Ref. 23711-106Z).

WARNING - Módulo de visualizador de cristal liquido

No desmonte el módulo del Visualizador.

La sustancia que forma el Cristal Liquido del panel de visualización es tóxica. En caso de dañarse el visualizador y salir a exterior dicha sustancia, no permita que la misma entre en contacto con su boca. Si la sustancia se pusiera en contacto con su piel, lave inmediatamente las áreas afectadas con agua y jabón y busque asistencia médica.

La iluminación del visualizador se efectúa mediante un Tubo Fluorescente de Cátodo Frío (CCFT). Este tubo contiene una pequeña cantidad de gas de mercurio que es una sustancia tóxica.

Tanto el visualizador como el tubo fluorescente están hechos de vidrio. Por tanto no les someta a golpes que puedan romperlos.

No tire estos módulos, ni parte de ellos a la basura doméstica. Deshágase de ellos con métodos aprobados para residuos industriales.

WARNING - Berilio-cobre

Algunos componentes mecánicos contenidos en este instrumento incorporan berilio-cobre en su proceso de fabricación. Se trata de una aleación con un contenido aproximado de berilio del 5%, lo que no representa ningún riesgo durante su uso normal.

El material no debe ser manipulado, soldado, ni sometido a ningún proceso que implique la aplicación de calor.

Para su eliminación debe tratarse como un "residuo especial". El material NO DEBE eliminarse mediante incineración.

WARNING - Instrumento pesado

El peso de este equipo excede de los 18 kg (40 lb), lo que debe tenerse en cuenta si va ser transportado manualmente por una sola persona. Para evitar el riesgo de lesiones, antes de mover el equipo deberá evaluar la carga, el entorno de trabajo y la propia capacidad, de acuerdo con la Directiva Europea 90/269/EEC y el Reglamento Nacional Asociado.

WARNING - Tener en cuenta con el equipo inclinado

Si utiliza el equipo en posición inclinada, se recomienda, por razones de estabilidad, no apilar otros equipos encima de él.

Chapter 4-2
TECHNICAL DESCRIPTION

CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

The 2030 series signal generators cover the frequency range 10 kHz to 5.4 GHz with three models: 2030 (10 kHz to 1.35 GHz), 2031 (10 kHz to 2.7 GHz) and 2032 (10 kHz to 5.4 GHz). Output levels from -144 dBm to 13 dBm are available (extended to +19 dBm on the 2030 model fitted with Option 003). Fig. 4-2-1 is a block diagram of the frequency synthesis and signal processing circuits.

Synthesizer

The VCXO operating at 104.8576 MHz is phase locked to the internal (or external) frequency standard using a phase comparator at 1 MHz on AA1/3. The VCXO signal is divided by 62.5 to give a 1.6777216 MHz (0.1 Hz x 2^{24}) reference frequency for the output loop phase comparator.

A Fractional N loop is used to lock a VCO, one of four oscillators covering a range of 675 MHz-1350 MHz, to the reference with a resolution of less than 0.1 Hz. A high speed programmable divider is used to divide the VCO frequency down to 1.6777216 MHz and a phase comparator compares this signal with the reference derived from the VCXO. The output from the phase comparator corrects the VCO frequency. In order to provide the required division ratio, the programmable divider is required to act as Fractional Divider. The Fractional N gate array controls the division ratio of the programmable divider. The variation of this division ratio by the controller enables the loop to lock, with non-integer division ratios, to the reference with the resolution of less than 0.1 Hz without introducing spurious signals.

FM is produced using a two point modulation scheme. The FM signal is inserted into the loop by summing the FM signal with the VCO tune line (on AB2/2) to modulate the VCOs directly. Simultaneously, the FM signal is fed to the Fractional N Controller via a 1-bit oversampled A-D converter which converts an analogue input into a bit stream of '1's and '0's. The controller uses this input to modulate the division ratio in sympathy with the modulation. This allows frequencies less than the loop bandwidth, including DC, to modulate the output frequency.

In order to maintain good FM performance of the two point modulation system, the VCO FM tracking characteristics are required to be known. The sensitivity of the FM system via the 1-bit oversampled A-D converter is VCO independent and accurately calibrated by a DC calibration system. The VCO tracking is derived by an automatic FM SELFCAL routine during calibration. During an FM SELFCAL, the error signal on the tune line, for a frequency near the loop bandwidth, is monitored while varying the FM calibration numbers, allowing the variation in VCO sensitivities to be calibrated out. This will remove any perturbation of FM flatness near the loop bandwidth due to mismatch of two modulation paths.

The Fractional N output loop has three available bandwidths which are used according to the instrument state:

3 kHz for CW mode 300 Hz for FM mode	Controlled on AA1/3 by changing phase comparator gain and the loop filter values on AB2/2.
10 kHz for sweep mode	Controlled by changing loop filter values on AB2/2.

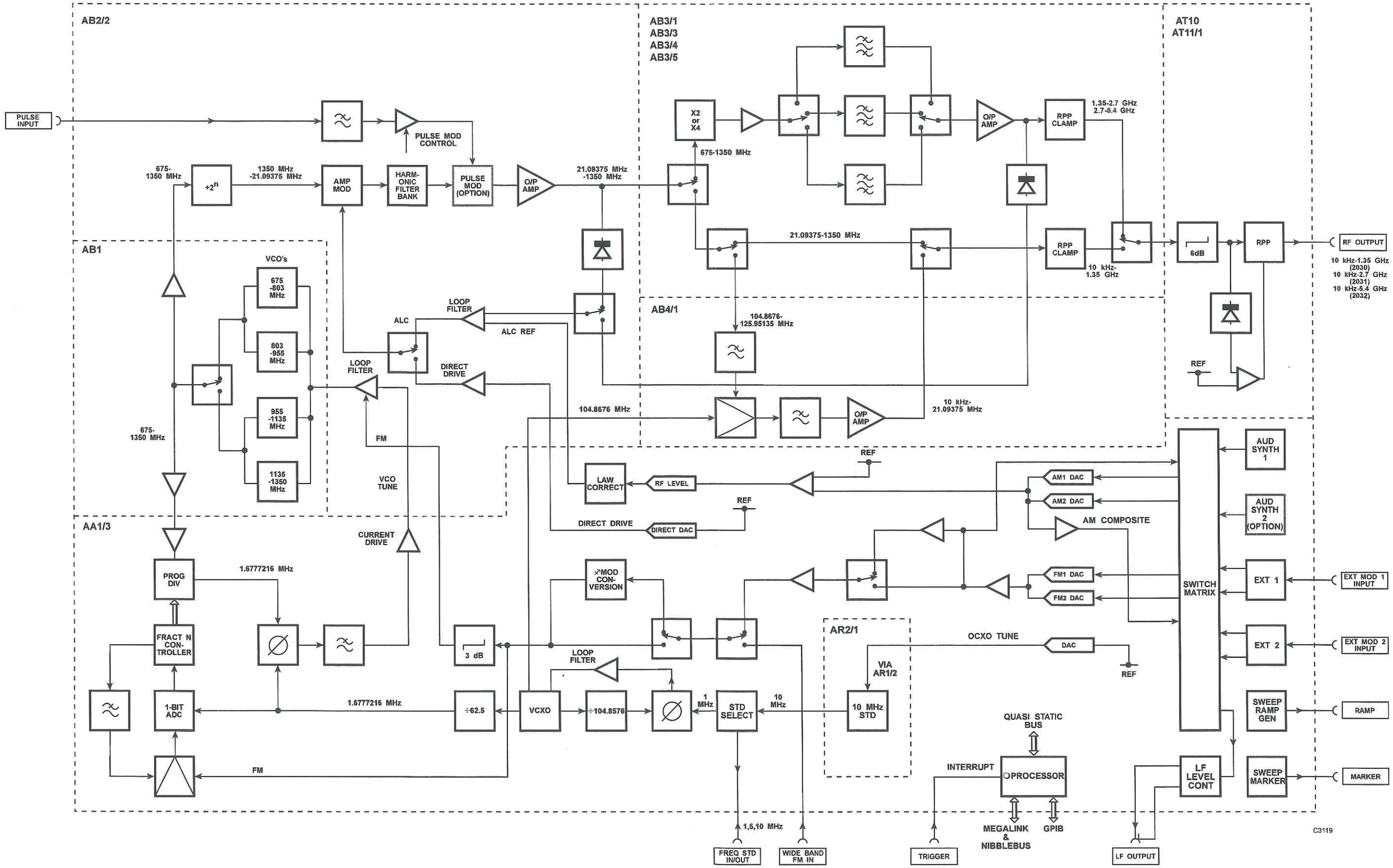


Fig. 4-2-1 Signal generator block schematic

Signal generator block schematic

RF processing

The four quarter octave VCOs on AB1 provide a frequency in the range 675 MHz to 1350 MHz. This is passed onto AB2/2 where the signal is divided by factors of 2 to give frequencies in the range 21.09375 MHz to 1350 MHz.

This signal passes through the amplitude modulator where the output level envelope is controlled. After passing through a bank of switched half octave harmonic filters and, optionally, the pulse modulator, the signal passes to the output amplifier. This provides, at the output of AB2/2, signals in the range 21.09375 MHz to 1350 MHz at a level sufficient to give an output of between 0 dBm and 13 dBm at the front panel. The signal level at the output of AB2/2 is peak to peak detected.

The ALC system on AB2/2 compares the detected signal with the ALC reference voltage and controls the amplitude modulator. The ALC reference is varied to compensate for insertion losses between AB2/2 and the front panel (including variation in attenuator pad values). The ALC reference voltage also has the AM envelope superimposed on it and the modulation waveform is corrected for the diode law of the detectors.

When pulse modulation is selected, the amplitude modulator is controlled by the Direct Drive. This DC voltage from a D-A converter on AA1/3 is set whenever the pulse modulation is selected or any RF parameter is varied while in pulse mode. The Direct Drive voltage is set to be the same as the voltage drive to the modulator when the ALC is operating. The pulse modulation signal is fed through a filter (to prevent RF radiation at the PULSE INPUT socket) and amplitude limited on AB2/2 before being used to drive the pulse modulator module.

The signal from AB2/2 passes onto an AB3 board (in 2030, AB3/1; in 2031, AB3/5 and in 2032, AB3/4). If the requested output frequency is in the range 21.09375 MHz to 1350 MHz the relays route the signal out of the RF box to the step attenuator.

Beat frequency oscillator (BFO)

For frequencies less than 21.09375 MHz, an AB3 board routes the signal from AB2/2 to AB4/1 where it is mixed with a 104.8576 MHz local oscillator, (driven from the VCXO on AA1/3), filtered, amplified and routed out to the attenuator via an AB3 board. The BFO system output level is controlled by using the normal ALC system to control the level of the 104.8676 MHz to 125.95135 MHz signal from AB2/2. The gain of the BFO system is well controlled by using negative feedback around the BFO amplifier. The remaining small errors in BFO gain are calibrated out during routine calibration.

Frequency doubler AB3/5

In the 2031, when frequencies greater than 1350 MHz are requested, the AB2/2 board generates a signal in its top octave and the AB3/5 board routes the signal through a doubler, third octave filters and an amplifier. This output is peak detected and routed to the attenuator. The detected voltage is now used instead of the detected voltage on AB2/2 as the feedback in the ALC control loop.

Frequency quadrupler AB3/4

In the 2032, board AB3/4 operates similarly to AB3/5 in the 2031, except that it has two doublers, the second of which produces quadrupled frequencies in the range 2.7 to 5.4 GHz.

Attenuator

Attenuator AT10 provides attenuation in 6 dB steps controlled by relays. Correction numbers for the individual pads are stored along with the attenuator serial number and other details on an EEROM (Electrically Erasable Read Only Memory) situated on the attenuator control board AT11/1. This complete module communicates with the main processor via the nibble bus. The attenuator also includes an RPP (Reverse Power Protection) system to protect the instrument from accidental application of reverse power.

LF processing

The LF processing all takes place on the control board, AA1/3, and may be conveniently subdivided into the following major functional elements.

LF synthesizer(s)

The internal LF synthesizer and the optional second internal LF synthesizer are both direct digital synthesizers using PROM look up tables and are driven by a 1.6777216 MHz clock from the reference divider of the RF synthesizer. The PROM contains both sine and triangular waveforms.

LF switch matrix

Each external modulation input may be AC or DC coupled and has its own associated ALC using JFETs to level the applied signal to give calibrated modulation. The switch matrix allows any of the four modulation channels to use any of the sources available. It also allows the LF output to be used as a LF generator with variable output level, using an internal LF synthesizer or to monitor points through the modulation paths with fixed output level.

AM and level control

The amplitude modulation signal is formed by summing the two AM channels, the AM depth being determined by the amplitude of these signals, and a DC reference. This signal passes through a 12-bit D-A converter, which controls the RF output level, and a law correction circuit to produce the ALC reference for the AB2/2 board.

FM

The FM drive is the sum of the two FM channels whose amplitude controls the FM deviation over a 3 dB range. For phase modulation this signal passes through a passive high-pass network to give the equivalent FM drive signal.

This signal is used as the input to the 1-bit oversampled A-D converter to inject the FM into the digital path and as the drive for the VCOs directly via the 50 Ω step attenuator. The step attenuator allows the FM deviation to be varied over the range of the instrument with attenuation

available up to 93 dB in 3.02 dB steps. The Fractional N controller scales the A-D converter input internally by digital means.

Wideband FM

The Wide Band FM input allows an external signal to be injected at the input to the FM step attenuator to enable the signal to be used on both modulation paths. This gives high bandwidth by virtue of the passive step attenuator and DC coupling via the 1-bit oversampled A-D converter. The sensitivity of this FM port can only be controlled in 3.02 dB steps and is frequency dependent.

CONTROL BOARD - AA1/3

Servicing diagrams: Figs. 7-2 to 7-19.

This board contains the main processor and memory, as well as the carrier and audio frequency synthesizers and the GPIB interface. It also controls the audio, frequency and phase modulation operations.

CONTROL: PROCESSOR AND MEMORY (AA1/3 sheet 1)

Circuit diagram: Fig. 7-4.

Microprocessor

Microprocessor IC101 is an Intel 80C188 and is the main processor (there is another in the Display Unit). It contains the CPU (Central Processor Unit) and several peripheral devices including an interrupt controller, DMA (Direct Memory Access) controller, timers and programmable chip select outputs. The microprocessor uses an 8-bit data and a 20-bit address bus to address 1 Mbyte of memory. The data bus is multiplexed to provide either 8 bits of data or the lower 8 bits of the address.

Control signals TI0 and TI1 for the internal programmable timer and ARDY and SRDY for asynchronous/synchronous data transfer are tied high, the functions unused. TEST is held low, also unused. NMI, HOLD and DRQ1 are disabled by being held low. The clock input on X1 is from 16 MHz crystal XL101, the frequency of which is divided by 2 internally to generate the 8 MHz clock signal. At the RES input (protected by D101) a reset is generated by R103 and C130 whenever the power is switched on. This signal is fed via Schmitt inverters to the RESET input and used as the system reset. WR (write) and RD (read) asserted low enable the memory or I/O device selected by the address bus to be written into or read out from respectively. DT/R (Data Transmit/Receive) via IC102 is used to control the direction of data flow through data bus buffer IC118 (sheet 2); this line is taken low for a data read operation and high for a write operation. Also associated with this signal is DEN, the data enable for buffer IC118. This signal is active low but is taken high to disable the buffer whenever DT/R changes state. PCS0 to PCS5 provide active-low Peripheral Chip Select signals. Similarly LCS, MCS and UCS provide Lower, Middle and Upper Chip Select signals for the memory bank. Output TO0 provides a timing signal for ULA IC209 (sheet 3).

The processor uses a multiplexed data bus to accommodate the 20-bit address. Output lines A8 to A19 carry the high order memory address. Input/output lines AD0 to AD7 carry the low order memory address during the first clock cycle and then carry data during the second and third machine state clock cycles. ALE (Address Latch Enable) is used to differentiate between data and address; when it is taken high the contents of the data bus are treated as part of the address and latched into IC103. ALE also latches A16-A19 into IC102 in order to complete the 20-bit address. When ALE is taken low lines AD0 to AD7 carry data.

Interrupts

The 80188 has four interrupt request inputs, INT0 to INT3. Interrupt INT0, the highest priority interrupt, is supplied by GPIB INT from GPIB controller IC113. INT1 operates in conjunction with DRQ0 (DMA channel 0) to perform data transfers between this board and front panel control board AF2/2. INT2 is from status interrupt detector IC108. The interrupt is applied via a deglitcher formed by IC121b and R109 and C134. It ensures that only if the interrupt has been asserted for long enough for the capacitor to charge through the resistor, and thus produce a high output from the AND-gate, will the interrupt be accepted as valid. INT3 from EXT TRIG INT is requested when an external trigger signal is applied to the SWEEP TRIG socket on the rear panel. R107 and C131 filter out glitches. R108 permits operation by the closing of a simple external switch. IC131a converts to TTL while IC122f inverts the signal to form the high EXT TRIG INT signal.

Memory bank

The operating program is contained in two EPROMs (ultra-violet Erasable Programmable Read Only Memories) IC109.and IC111 which together provide 512 kbytes of memory. IC120 is a 128 kbyte RAM (Random Access Memory) used for scratch-pad read write operations. Unlike the other memory ICs which are non-volatile, the contents of the RAM are lost when the instrument is switched off. EAROM (Electrically Alterable ROM) IC114 provides 8 to 32 kbytes of non-volatile storage for calibration data, user stores, etc. These four ICs are connected to programmable chip select lines LCS, MCS and UCS from the processor. By this means, the exact locations in the address space are determined by the initialisation software which is executed at switch-on. When the onset of a power failure (a brown-out) is detected by AR1/2 it pulls PLAA to +26 V which, via IC127, prevents any further write operations until after the EAROM is disabled. Earlier boards contained another EPROM, IC112, and less memory.

Communication interface

The main microprocessor communicates with the front panel microprocessor on AF2/2 via a serial link. Data input consists of information relating to key presses, knob rotation, faults etc. Data output is mostly display information.

Data in

Data input is accomplished on this board using SIPO (serial-in, parallel-out converter) IC126, decoder IC123 and an R-S bistable used for interrupt request formed by NAND-gates IC124c and d. The SIPO is an 8-bit serial-in, parallel-out shift register with internal latches and tri-state outputs.

The data transfer process starts with the front panel processor taking TX/RX high to enable the AF2/1 send buffers. It then uses SCL to serially clock 8 bits of data into the shift register of the SIPO.

When the complete data byte has been transmitted, the front panel processor pulses BTF low. BTF is inverted by IC122d then ANDed with TX/RX by IC121d. This provides an enable signal for the SIPO's internal latches which then accept the data. BTF pulsed low with TX/RX low sets the R-S bistable and a main processor interrupt is requested on INT1.

When it services the INT1 interrupt, the main processor reads the data latched in the SIPO. The I/O address formed by A5, A6 and PCS5 causes pin 5 of decoder IC123 to pulse low, this is gated with RD by OR-gate IC127b to provide output enable EN3 for the SIPO. This action has two further effects: the decoder output resets the bistable, removing the interrupt; and the output enable provides RACK (Receipt ACKnowledge) for the front panel processor. RACK tells the front panel that it is free to send another byte by repeating the data input process.

Data out

Data output is accomplished on this board using PISO (parallel-in, serial-out converter) IC125, decoder IC123 and an R-S bistable used for DMA request formed by NAND gates IC124a and b.

The process starts with the main processor writing the first byte of the message into PISO IC125. The I/O address formed by A5, A6 and PCS5 causes pin 4 of the decoder to pulse low. This is gated with WR by OR-gate IC27a to latch the data into the PISO by taking its pin 1 low. At the same time, the DMA request bistable is cleared and RRQST (Receipt ReQueST) informs the front panel processor that data is available to be read.

The front panel processor responds by sending TX/RX low, enabling the PISO clock on pin 15. The parallel data is then serially shifted out onto the TX data line by the serial clock SCL to pin 2, and sent to board AF2/2.

When the byte has been received, the front panel processor pulses BTF low which enables the decoder. With TX/RX also low, pin 12 is taken low which sets the bistable output high to request DMA on the main processor DRQ0 input.

The DMA channel uses its source pointer to address the memory to obtain the next byte of data, and its destination pointer to select the PISO for storing the obtained byte. Data transfer continues using the DMA process until the required number of bytes has been sent.

Status interrupts

IC108 is a magnitude comparator that detects any change in the status of certain control lines. These lines, there are 8 of them, monitor fault conditions such as ALC high or low, VCO out of lock etc. The states of these lines are held latched in IC107 and applied to one half of the comparator. The same lines in a 'live' condition, i.e. able to indicate a change of state, are applied to the other half of the comparator via IC110. The comparator compares the two sets of lines for equality; when they are the same output pin 19 is low. But if a change of state is detected, e.g. a VCO goes out of lock, comparator pin 19 is taken high to cause a status interrupt at the processor INT2 input. Interrupts thus occur not only when an error is caused but also when an error is rectified.

To service the interrupt the processor addresses buffer IC110 with PCS1 then pulses RD low. This enables the buffer's tristate outputs and the processor reads the status byte. The processor writes this data into D-type bistable IC107. With both sets of inputs again the same, comparator output returns low and the interrupt request is removed ready for the next change in the status line.

Nibble bus

The nibble bus circuit performs two functions. For the first function tristate buffer IC104a is disabled by IC105 pin 9 being taken high. This allows comparator IC106, D-type bistable IC105 and buffer IC104b together to perform a similar function to the status interrupts circuit. In this case however, the lower 4-bits of data on AD0 to AD3 are compared for equality and IC106 output pin 6 is taken high if true. This output is fed to pin 18 of the status comparator. IC108 thus uses one input to check the states of four lines. When an interrupt is serviced, and the processor finds bit 7 of the status byte changed, it uses PCS2 and RD to read the nibble then pulses WR to relatch IC105.

For the second function, the circuit performs as an interface to devices outside the RF tray; these being an attenuator assembly and an optional second RF tray. The interface functions using 4 quasi-bidirectional data/address lines, AD0 to AD3 and the STROBE line. But first, to disable the status interrupts function, IC106 pin 3 is taken low.

To send data the 4-bit address is placed on the nibble bus and STROBE taken high, latching this address at the destination. The data is then put on the bus and the STROBE taken low latching the data at the address previously selected.

The nibble bus can also be used to receive data. A nibble of data at the remote node is connected to the bus via resistors of suitable value (a few kilohms). While the main processor is sending, the low output impedance of the driver controls the bus, but if the tristate sender is sent open circuit the remote data is seen on the bus via the resistors which are now of small impedance compared to the input. If needed, one of a number of remote drivers may be selected by writing to a suitable latch. In this condition, the bus lines are connected to an interrupt line so as to monitor external events such as a reverse power protection trip.

CONTROL: BUFFERS AND INTERFACE (AA1/3 sheet 2)

Cicuit diagram: Fig. 7-5.

Quasi-static bus

Both address and data buses are buffered so as to free the I/O bus wiring from the normally continuous trains of pulses from the processor area. The I/O address is buffered by octal latch IC117 while the two-way data is buffered by octal transceiver IC118. For the latter, data direction is determined by pin 1. When this is taken low data is received onto the processor bus, and when taken high data is sent out on the I/O bus. When IC121a pin 3 is taken high both buffers are disabled and the two buses are isolated.

GPIB interface

The function of IC113 is to provide communication between the instrument and the General Purpose Interface Bus (GPIB). The IC is a talker/listener which, in conjunction with transceivers IC115 and IC116, implements all the necessary GPIB functions for the instrument. (Details of the functions are given in Chap. 3-2 of the Operating Manual.) It is processor controlled and has capabilities which include data transfer, handshake protocol, talker/listener address recognition, service request and serial poll.

The interface takes care of data transfer as well as decoding control messages. Control messages and addresses are passed on the data bus by means of the handshaking process with ATN (attention) asserted to differentiate them from data. The IC also performs address recognition. When its own address is recognized (set from the front panel and then via the RS0 to RS2 inputs), the data on DIO lines 6 and 7 is decoded to determine whether the instrument is being addressed as a talker or a listener. When designated a talker, the interface transfers data from the processor by means of a talk handshake to listeners via an internal register to the transceivers configured to send. When designated a listener, data is received via the transceivers by means of the listen handshake and stored in an internal data register.

Data outputs and inputs are via transceivers IC115 and IC116 with the direction of data transfer controlled by the T/R1 line being taken high for outputs and low for inputs. The sole function of T/R2 is to set the bus management EOI line low for reception or high for transmission. The GPIB clock for the interface is supplied by invertor IC129a, R124 and C137. The CR time constant sets the frequency to 1 MHz while the on/off thresholds of the Schmitt provide a square wave which is further shaped by IC129b.

CONTROL: AUDIO SYNTHESIZER (AA1/3 sheet 3)

Circuit diagram: Fig. 7-6.

The instrument is provided with the facility to generate a single tone (two tones if the second LF oscillator option is fitted) at any frequency from 0.1 Hz up to the band limit of 500 kHz in 0.1 Hz increments.

Two different normalised waveforms are stored in an EPROM look-up table which, under the control of a custom ASIC, is periodically addressed to regenerate the waveform in discrete steps via a D-A converter. Simple interpolation between the quantized levels is done by a low-pass filter which also helps to reject high order harmonics. The block diagram of the audio synthesizer is shown in Fig. 4-2-2.

Controller and waveform store

The internal audio source is controlled by ASIC IC201 (IC209 for osc 2). This coordinates the addressing of the waveform store EPROM with the generation of the required waveform and frequency. IC202 is a 256 kbyte 16-bit EPROM which holds digitized complete cycles of two normalised periodic waveforms. The three sections of multiplexer IC208 are each 1 of 2 channel selectors. Channel selection is by the logic levels on pins 9, 10 and 11 which, when taken high, select the channels connected to pins 3, 1 and 13 respectively. One section selects which waveform is obtained from the EPROM by modifying the most significant bit of the address. By using the 1.6777216 MHz REF clock normally to IC209 and inverted to IC201 there are no conflicts in waveform selection (see Table 4-2-1).

Because the technique is totally digital and is clocked synchronously from the 104.8576 MHz on-board reference, the audio frequency generated has the same frequency stability as the selected standard.

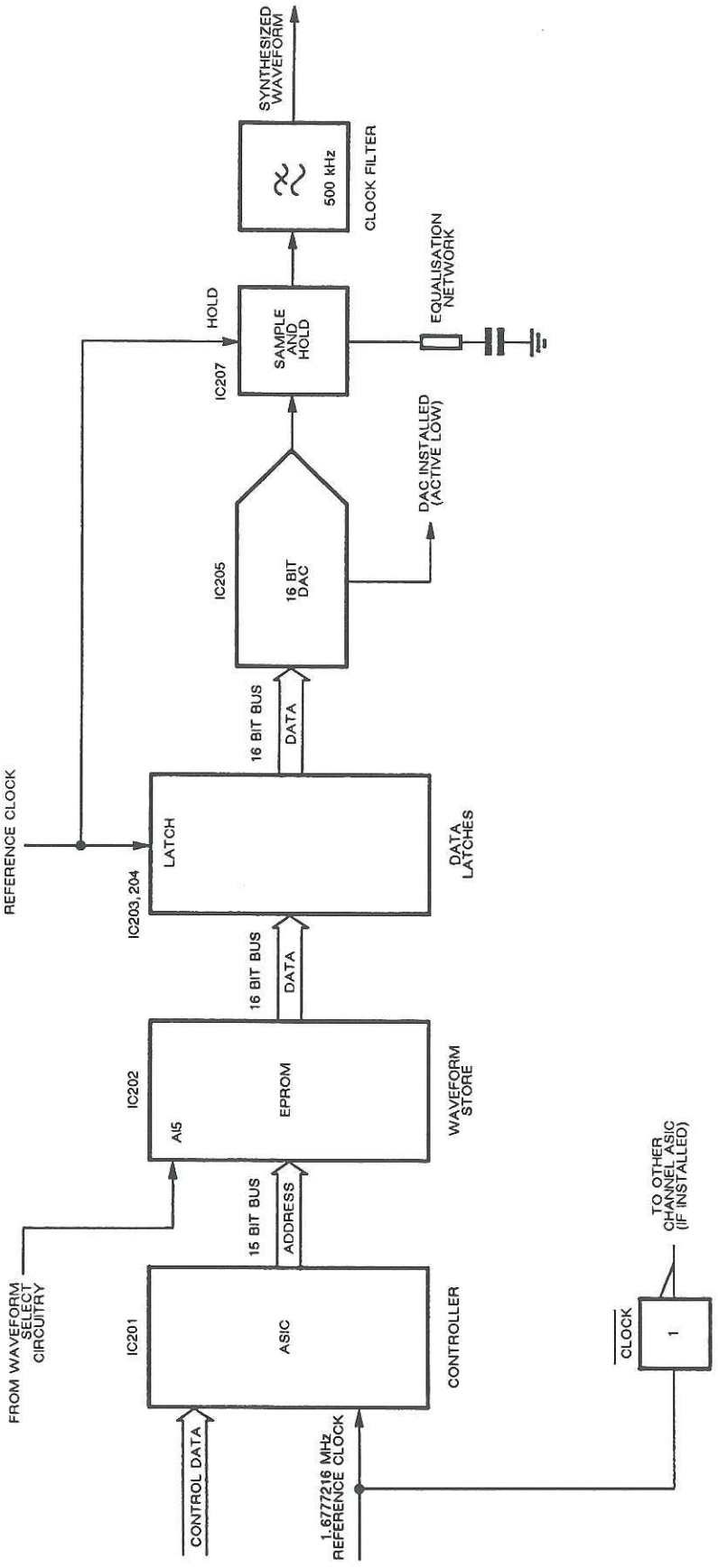


Fig. 4-2-2 Audio synthesizer

TABLE 4-2-1 WAVEFORM ADDRESS SELECTION - AA1/3

IC208 pin 1 (9)	IC208 pin 2 (5)	Effect
0	-	Waveform 1 on internal audio osc 1
1	-	Waveform 2 on internal audio osc 1
-	0	(Waveform 1 on internal audio osc 2)
-	1	(Waveform 2 on internal audio osc 2)

Pin numbers in brackets refer to board AA1.

Note...

Internal audio osc 2 is only available when the correct components e.g. IC209, IC212, have been loaded into the sockets on the boards.

Audio D-As and clock filter

The data from the EPROM is held for one clock cycle by latches IC203 and IC204 (IC210 and IC211 for osc 2) to allow the 16-bit D-A converter IC205 (IC212) to operate. Holding the data presented to each D-A converter in turn enables the ASICs to work on the opposite edges of the REF clock. This therefore enables the simultaneous generation of two independent frequencies and waveforms. Buffer IC206 (IC213) feeds to the output deglitcher.

A sample and hold gate IC207 (IC214) is used to deglitch the output from the D-A converter which is prone to generating glitches as the data patterns change on its inputs. R220, R223 and C243 (R221, R222 and C244) provide a degree of equalization at the top frequency which otherwise falls off due to the limited bandwidth of IC205 (IC212). R217 and R218 limit the device dissipation of IC207 (IC214).

The following 500 kHz low-pass clock filter is provided to remove the clock frequency and its harmonics from the final signal. The filter is designed to be -80 dBc down on the audio frequency above 1.6 MHz. R204 and R205 (R209 and R210) terminate the filter in the required load impedances. Filter output is fed to the audio multiplexers (sheet 4).

CONTROL: EXT MOD AND AUDIO OUTPUT (AA1/3 sheet 4)

Circuit diagram: Fig. 7-7.

Two external inputs, EXT MOD 1 and EXT MOD 2 are provided which, together with the two internal sources, allow up to four independent tones to be superimposed on the carrier. This facility is made use of in the dual composite modulation mode. The two direct paths are user-selectable. Choosing the AC route allows operation down to 10 Hz while the DC route enables operation to DC. The ALC (Automatic Levelling Control) enables the instrument to accept a wide range of input modulating waveform amplitudes without losing calibration. The block diagram for the EXT MOD 1 conditioning circuit is shown in Fig. 4-2-3. EXT MOD 2 is similar.

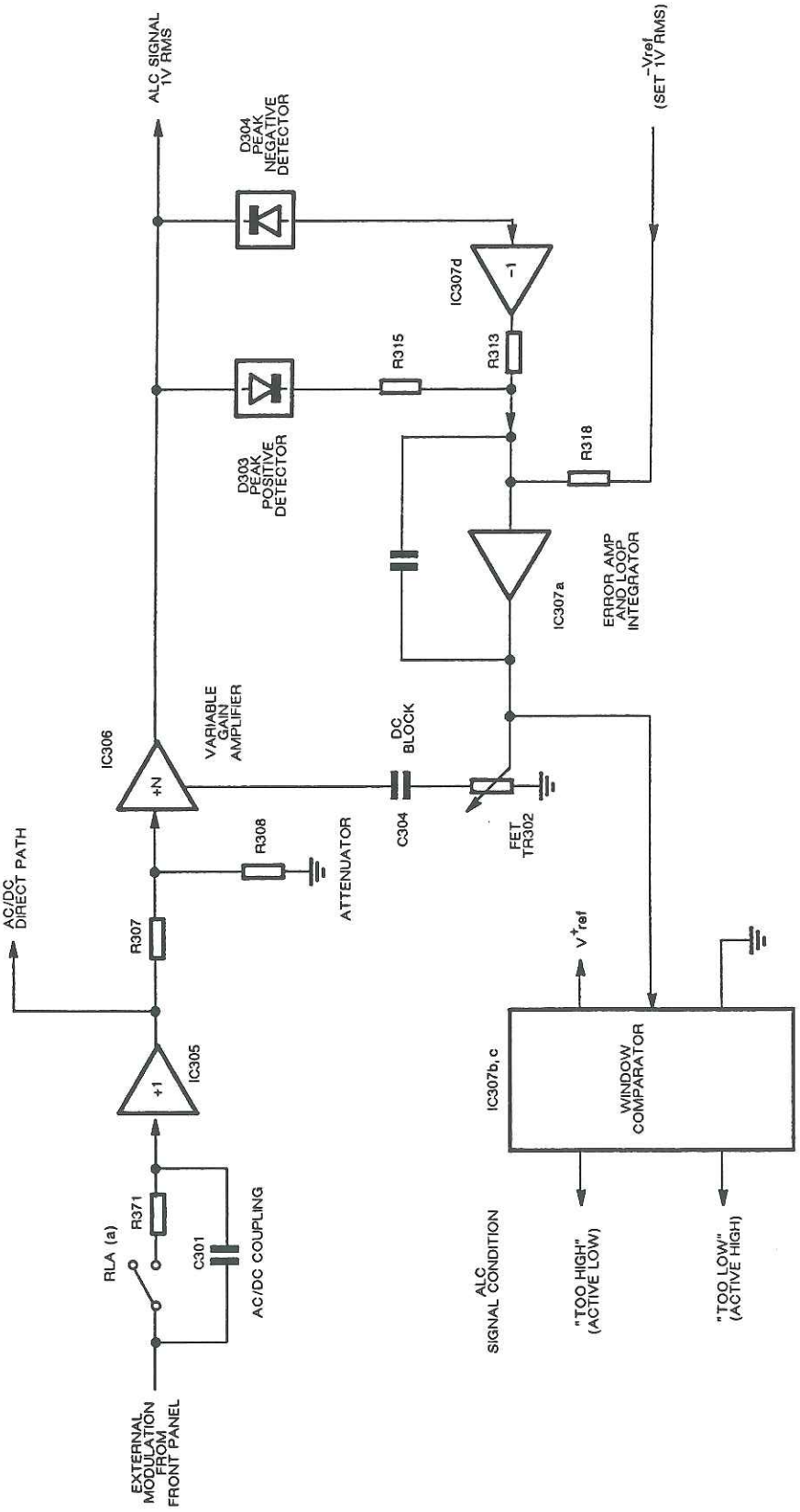


Fig. 4-2-3 EXT MOD 1 conditioning circuit

Modulation channels

As the two modulation channels are identical in operation, only one is described below in detail, that connected to the EXT MOD 1 INPUT. The only difference between the two channels is in component numbering.

External modulation enters the board on contact 2 of PLAJ. With RLA(a) contacts open the AC path through C301 is selected, when closed the capacitor is by-passed and operation down to DC is enabled. R371 prevents contact failure during the switching operations. Relay selection is shown in Table 4-2-5.

The DIRECT 1 PATH is buffered by IC305 to provide a low drive impedance for the ALC and the analogue multiplexer array IC311 to IC315. Diodes D317 and D318 protect the input of the multiplexers from excessive voltage excursions above +5 V or below -5 V. The input impedance can be set to 600 Ω by fitting resistors R381 and R382.

For an AC coupled signal, automatic levelling to 1 V RMS is achieved by modifying the gain around non-inverting amplifier IC306 by using FET TR302. The buffered signal is attenuated by R307 and R308 to bring it within the operating range of the ALC.

The output is then sampled by peak-positive (D303 and C305) and peak-negative (D304 and C306) detectors. A measure of the peak-to-peak level is obtained by inverting the voltage from peak-negative detector IC307d and summing this with the peak-positive voltage at pin 2 of IC307a which also acts as the error amplifier/integrator for the levelling loop. D301 prevents error integration in the wrong direction.

The voltage from the error amplifier is used to drive the gate of FET TR302 to a point where the current flowing through diode D302 equals the sum of the currents through R313 and R315 which correspond to the peak detected levels. D319 and D320 on the ALC 1 PATH protect the inputs of the analogue multiplexers against excessive signal levels which may be generated while the loop is settling.

R373 and R310 provide a common AC signal between the gate and the drain to linearise the FET characteristics at high drain-source resistance. R312 prevents the loop from becoming unstable for closed loop gains of less than 10. C304 acts as a DC block to suppress any unwanted DC offset injection into the loop.

IC307b and c form a window comparator which detects when the error amplifier output exceeds the boundary set by the maximum pinch-off voltage of the FET. R321 and R322 provide hysteresis around the comparator to prevent multiple-edge generation. The outputs from detectors D305 and D306 on the ALC HIGH and ALC LOW lines are attenuated to logic levels by R323, R324 and R325, R326 respectively to provide status interrupts to the main processor via IC108 and IC110 (sheet 1).

LF multiplexers

LF multiplexers IC311 to IC315 allow each of the FM, AM and audio output chains to connect to one of many user-selectable internal sources. This gives the user maximum flexibility in configuring and monitoring the sources of modulation within the instrument.

The analogue multiplexers are controlled by D-type latches IC302, IC303 and IC304. The latch decoding is shown in Table 4-2-2 together with the source selection decoding shown in Tables 4-2-3 and 4-2-4. IC316, IC317 and IC318 buffer the signals from multiplexers IC311 to IC315 and provide a low drive impedance to IC402 (sheet 5) and IC502 (sheet 6).

TABLE 4-2-2 LATCH DECODING - AA1/3

Destination	Select table	IC and control lines used
Audio output	3	IC304 D0 > D2
FM1	4	IC302 D0 > D2
FM2	4	IC302 D3 > D5
AM1	4	IC303 D0 > D2
AM2	4	IC303 D3 > D5

TABLE 4-2-3 SOURCE SELECTION DECODING - AA1/3

IC304 D2	IC304 D1	IC304 D0	Source selected
0	0	0	Int audio gen 1
0	0	1	Int audio gen 2
0	1	0	Ext 1 ALC coupled
0	1	1	Ext 2 ALC coupled
1	0	0	FM composite
1	0	1	AM composite
1	1	0	Earth
1	1	1	Earth

TABLE 4-2-4 SOURCE SELECTION DECODING - AA1/3

IC302 and IC303 D2/D5	IC302 and IC303 D1/D4	IC302 and IC303 D0/D3	Source selected
0	0	0	Int audio gen 1
0	0	1	Int audio gen 2
0	1	0	Ext 1 ALC coupled
0	1	1	Ext 2 ALC coupled
1	0	0	FM composite
1	0	1	AM composite
1	1	0	Earth
1	1	1	Earth

TABLE 4-2-5 RELAY CONTROL - AA1/3

IC number and data line	Relay operated	Function when contact closed
IC303 D6	RLA	Ext 1 DC coupling
IC303 D7	RLB	Ext 2 DC coupling
IC304 D5	RLC	Inserts 48 dB into LF output circuit

LF output

The audio to the LF OUTPUT socket is provided to enable the state of the modulation within the instrument be monitored. When in LF generator mode, this output is adjustable from 5 V down to 100 µV into a nominal 600 Ω load impedance (less into 50 Ω). A floating earth is provided to break up any hum loop which may be present between the instrument and any external measuring devices. The block diagram for the audio output stage is shown in Fig. 4-2-4.

IC319 is a 12-bit multiplying D-A converter which together with IC320 gives fine adjustment for the eventual audio output from the front panel. R354 and C313 form a lead network to improve high frequency stability. R335, R356, R357 and R358 form a coarse attenuator network which is tapped at 0, 12, 24 and 36 dB attenuations by IC321 pins 13, 14, 15, and 12 respectively. The audio signal is then buffered by IC322 and fed into the low impedance driver.

IC324 is a current buffer which boosts the output drive capabilities of IC323. The DC offset and gain variations of IC324 are corrected by enclosing the device within the feedback loop of IC323. R361 sets the output characteristics of the device.

R365 and R366 form a 48 dB L-pad which is used together with the fixed 12, 24 and 36 dB pads to set coarse attenuation of the eventual output level. R362 and R363 form a floating earth guard (PLAJ contact 9) to facilitate the reduction of earth loop generated signals that may be present between the instrument and external measuring devices. Note that this works in conjunction with a 1 Ω resistor positioned on the earth of the LF OUTPUT socket on the front panel.

Sweep functions

The sweep facility of the instrument allows discrete increments of the RF frequency, RF level or audio level over user-specified limits and time. The block diagram of the sweep function is shown in Fig. 4-2-5.

All sweeps are digitally based and therefore each selected parameter changes in a discrete step for a unit length of time. The greater the number of steps over the preset limits, the smoother the sweep becomes.

Sweep ramp and markers are provided to give a degree of synchronisation to an external measuring device such as an XY display or plotter. Again the ramp is digitally generated, each step corresponding to an increment of a parameter.

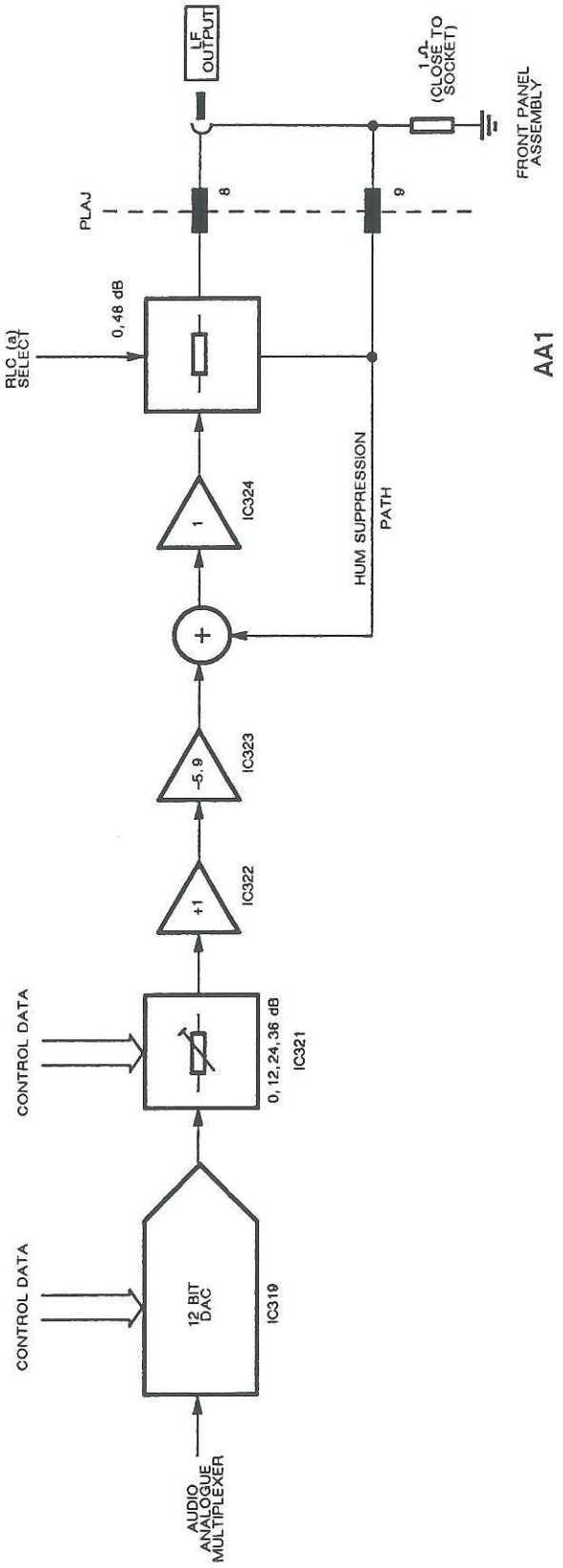


Fig. 4-2-4 LF output stage

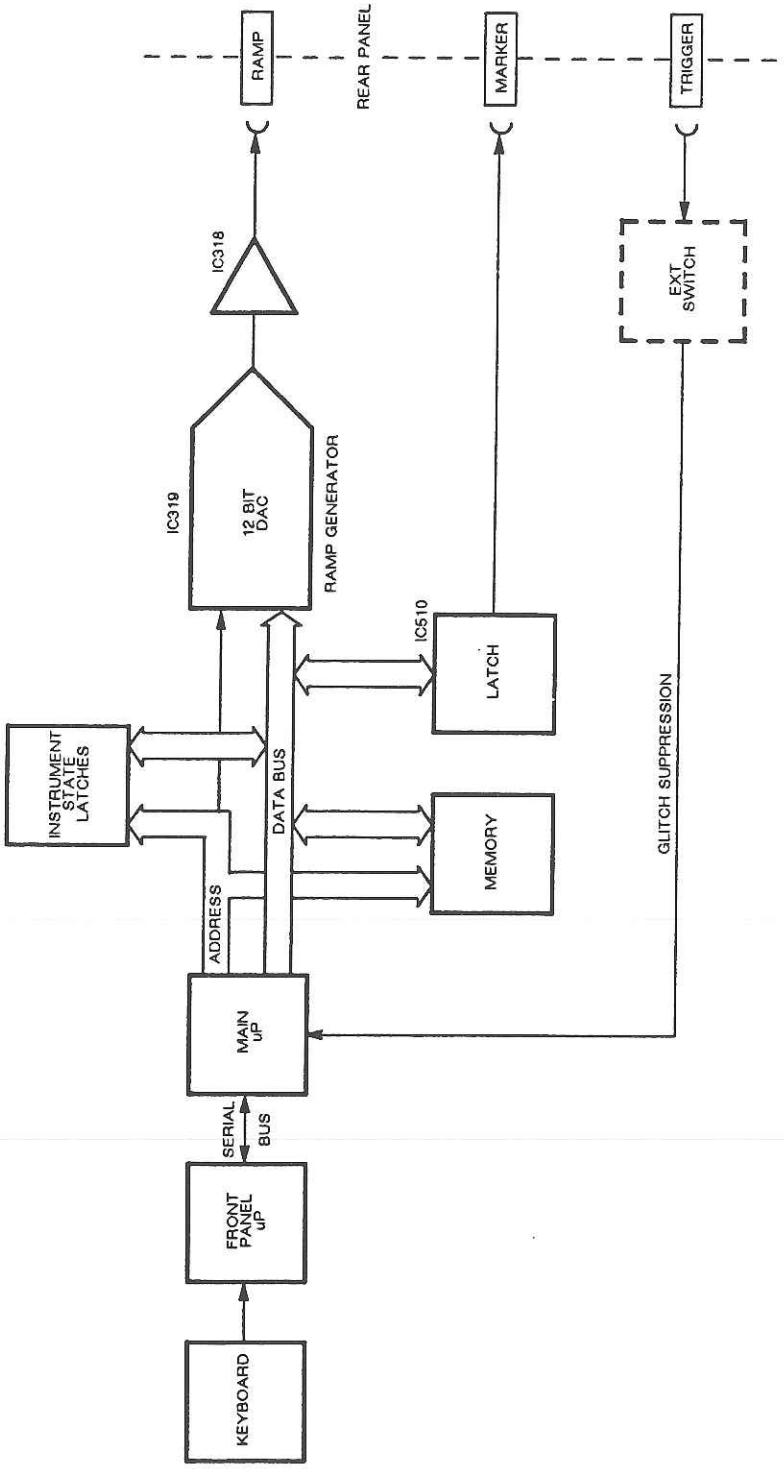


Fig. 4-2-5 Sweep function

The rear panel SWEEP TRIGGER input is used as a general 'start event' input. This facility allows the start of the sweep to be synchronised with an external device. The default is SINGLE SWEEP triggered from a screen menu soft key.

The sweep ramp is generated by IC319 to IC318b pin 6. As the requested sweep parameter is changed internally the D-A converter is updated to the next appropriate value to maintain synchronisation. The sweep is complete when the ramp output reaches +10 V. The magnitude of the steps in the ramp is governed by the number of steps requested by the user. R549 protects the SWEEP RAMP output against excessive input voltages and sets an output impedance of 600 Ω.

The sweep marker is generated by IC510 pin 6 (sheet 7). This line pulses high as the sweep passes through the selected marker point set up by the user. R550 protects the output against incorrect connection to other devices.

External sweep trigger (sheet 1) interrupts main processor IC101 (via INT3) which then takes the necessary action to initiate the requested function. When selected, a logical low triggers the instrument. R107 and C131 prevent spurious triggering due to glitches and noise. R108 permits operation by the closing of a simple external switch (e.g. a footswitch).

CONTROL: FM AND ΦM DRIVE (AA1/3 sheet 5)

Circuit diagram: Fig. 7- 8.

FM adjusts the instantaneous RF frequency in direct sympathy with the modulating signal. The amount of frequency deviation is directly proportional to the magnitude of the modulation source. With phase modulation the frequency deviation is also proportional to the frequency of modulation. The block diagram of the FM and ΦM drive is shown in Fig. 4-2-6.

For moderate modulation rates the signal is injected straight onto the VCO tune line after suitable scaling by D-A converters (giving fine control) and fixed attenuators (giving coarse control).

Inside the loop bandwidth this method is not valid as the loop cannot distinguish between FM and other VCO frequency errors. It would therefore try to compensate for the modulation tone by returning the carrier back to the original requested frequency. A digital system is used to overcome this effect which also has the benefit of extending the modulation range down to DC.

The modulation is sampled by a 1-bit oversampling A-D converter whose output controls the synthesizer gate array controller ASIC in such a way as to offset the carrier frequency in proportion to the magnitude of the modulation. The speed at which the ASIC can perform this function sets a limit to the overall bandwidth of the system. At frequencies above the loop bandwidth the analogue system dominates, see Fig. 4-2-7.

In both systems phase modulation is provided by a passive high-pass integration network which effectively increases the drive to the varactor with increasing modulation frequency.

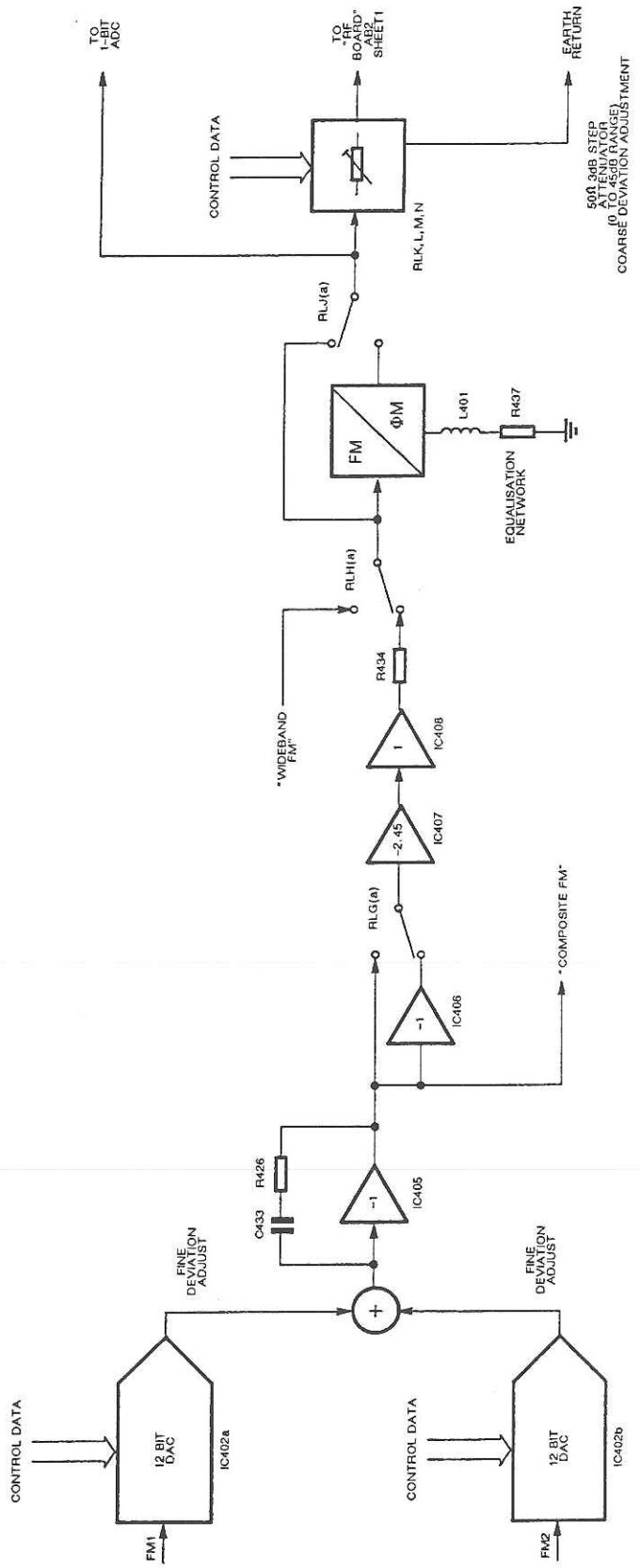


Fig. 4-2-6 FM and ΦM drive chain

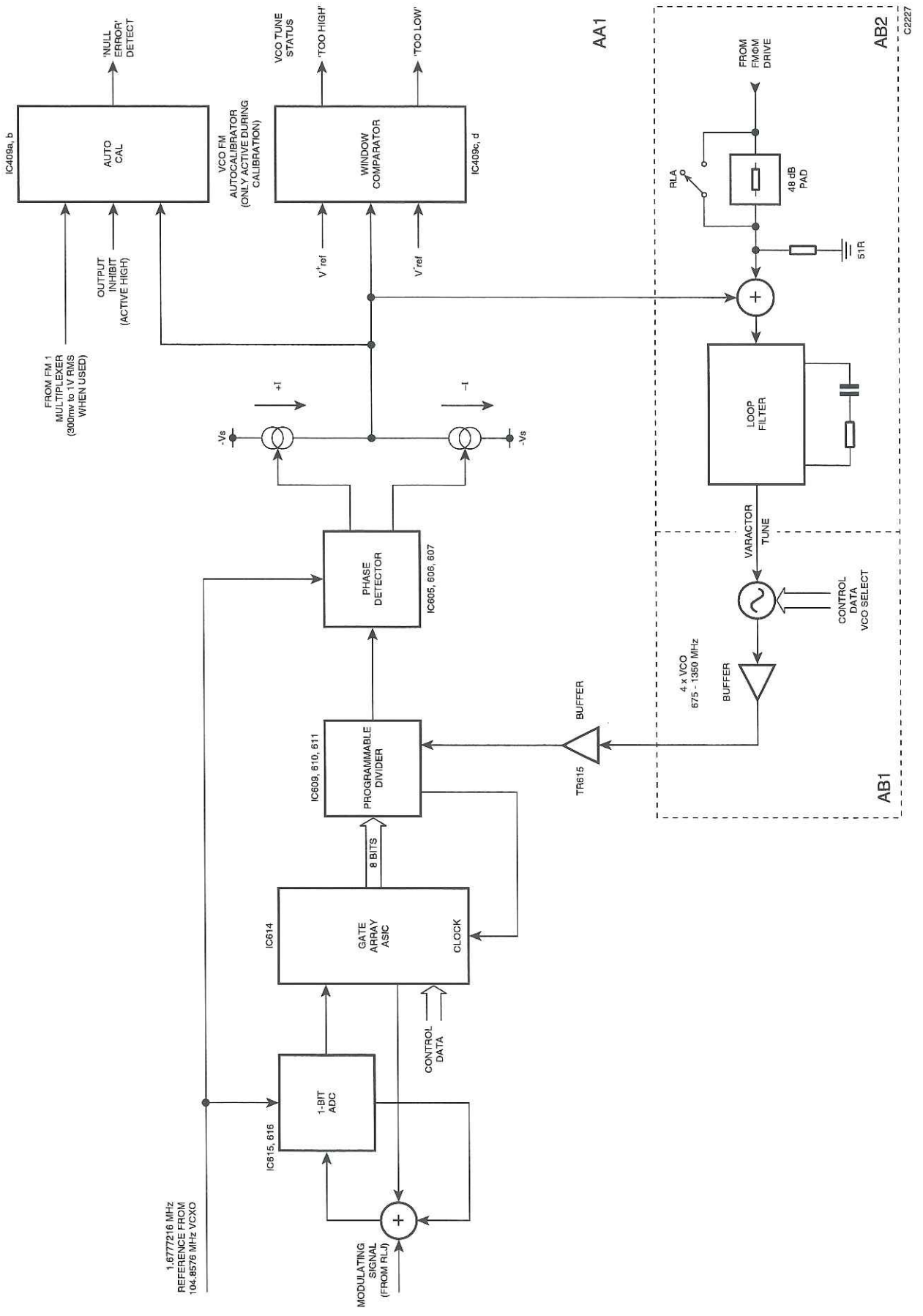


Fig. 4-2-7 Frequency synthesis with FM/ΦM and autocalibrator

Operation

Outputs from analogue multiplexers IC312 for the FM1 signal and IC313 for the FM2 signal (sheet 4) are fed to IC402, a dual 12-bit multiplying D-A converter, which together with IC403 and IC404 acts as a fine level control. Coarse setting is achieved by a group of fixed passive pads giving attenuation on this board of up to a maximum of 45 dB. R463 and C455 act as a local supply line filter which is also used by IC319 (sheet 4).

Composite FM (the algebraic sum of FM1 and FM2) is derived by the addition of two signals, at pin 2 of IC405, by resistors R424 and R425. Since these resistors are of equal value, each channel has an equal weighting on the eventual FM output. R426 and C433 are used to improve the HF stability. IC406 is a signal invertor which corrects the phase relationship between the incoming modulating signal and the eventual output. Relay contact RLG(a) selects the appropriate path. C434 reduces the noise bandwidth of the drive chain by dropping the gain at high frequencies.

Conversion to a low impedance (to drive into the 50 Ω coarse step attenuator) is achieved by IC407 and IC408. IC407 is a current buffer and is used to boost the output drive to IC408. Any errors due to DC offset and gain variations within IC408 are accommodated by enclosing it within the feedback loop of IC407. R431 and C435 improve HF stability within the loop.

Coarse attenuation is set in 3 dB steps by R438 to R449 (and R34 to R36 on AB2/2, sheet 1). Relays RLK to RLN (and RLA on AB2/2) are used to select the appropriate values. Each pad is a pi-configuration which maintains a 50 Ω impedance to ensure wide band operation into many megahertz. R436 and R437 form a pseudo-floating earth to reduce any hum-related signals which may be present on the earth of the attenuator on the board. It operates by feeding a common mode signal back onto the output of IC408 to cancel that present on the floating earth. IC411 controls the relays by means of data from latch IC412. R450 limits the current flowing through the coils. The earth for the 24 dB pad is split between the AA1/3 and AB2/2 boards to reduce effects of hum loops within the instrument chassis. C446 helps to linearise the 24 dB pad at HF by compensating for the inductance incurred by the cable length between PLAN contact 33 and PLBJ contact 15 (AB2/2).

Wideband FM comes onto AA1/3 on PLAR contact 2 and is selected by operation of relay contact RLH(a). Since the passive attenuator can only be adjusted in 3.01 dB steps, the requested WBFM deviation is adjustable in equivalent steps.

FM to ΦM conversion is achieved by C436 and R437 which form a high-pass 6 dB/octave equalization network. L401 extends the linearity of the converter by peaking the response close to 20 kHz. Using a totally passive network helps to reduce any distortion products which may be generated by an equivalent active network.

VCO FM tracking autocalibration is performed by IC409a and b and associated circuitry (see 'Synthesizer operation' for details). Forward biasing D409 suppresses the operation of the autocalibrator and prevents unnecessary interruption of the main processor.

Digital FM and ΦM at low modulation frequencies is achieved by the combination of the 1-bit oversampled A-D converter formed by IC615, IC616 (sheet 8) and the synthesizer ASIC IC614. The A-D converter samples the modulation source at a high rate and passes the information to the gate array controller in a high speed serial data stream. The ASIC then modifies the ECL counters to change the instantaneous frequency of the carrier.

CONTROL: AM DRIVE AND RF LEVEL (AA1/3 sheet 6)

Circuit diagram: Fig. 7-9.

The amplitude modulator adjusts the magnitude of the RF carrier in direct sympathy with a modulating signal. The block diagram of the RF level setting is shown in Fig. 4-2-8. It is also used to provide electronic attenuation of the RF output of the generator.

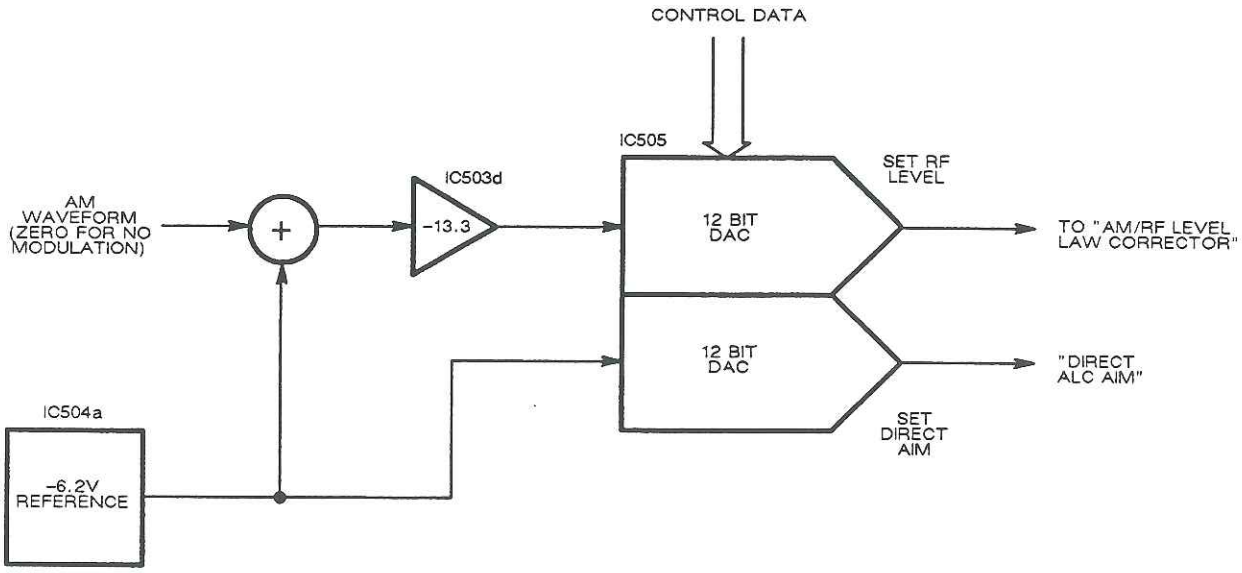


Fig. 4-2-8 RF level setting

The AM drive therefore provides a DC level corresponding to the average RF level with the AC modulation superimposed. The AM drive circuit produces a waveform with independent control of both parameters. The block diagram of the AM control is shown in Fig. 4-2-9.

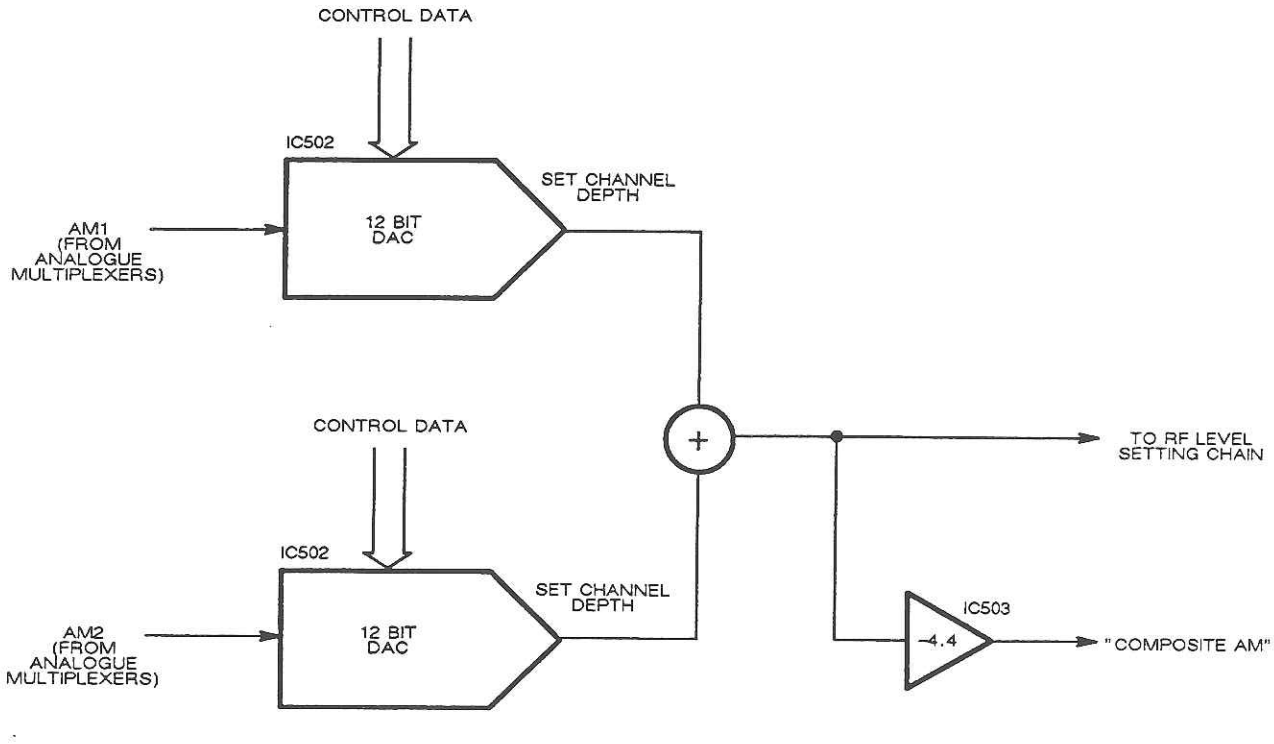


Fig. 4-2-9 AM control

Modulation depth

Outputs from the analogue multiplexers IC314 for the AM1 signal (sheet 4) and IC315 for the AM2 signal are directed to IC502, a dual 12-bit multiplying D-A converter which controls the depth of modulation imparted to the RF carrier. AM composite (the algebraic sum of AM1 and AM2) is generated by adding the two signals from IC503a and b using resistors R501 and R502. Since these resistors are of equal value each channel is given equal weighting. IC503d sums and inverts the signals to maintain the correct phase relationship between the envelope on the carrier and the selected modulation source.

Overmodulation, i.e. depth in excess of 100%, is suppressed in normal operation by software limiting. However, this does not protect against over-modulation due to overloading the drive chain. It is important to bear this in mind when using composite or quadruple modulation where the indexes and depths can easily exceed the capabilities of the measuring receiver, if due care is not taken. Maximum depth of modulation for each type is shown in Table 4-2-6.

The RF level is set by a DC level from 12-bit D-A converter IC505 which eventually controls the amount to attenuation set within the AM modulator, which also acts as the electronic attenuator for the RF carrier on the AB2/2 board.

TABLE 4-2-6 MODULATION TYPE VERSUS MAXIMUM DEPTH - AA1/3

Modulation scheme	Normal maximum depth of modulation	
	AM1	AM2
Single	0 - 99.9%	Not used
Dual	0 - 99.9%	Not used
Composite	0 - 99.9%	99.9 - 0%
Quad	0 - 99.9%	99.9 - 0%

A -6.2 V reference voltage is derived from IC504a. This IC is configured to provide a fixed amount of current flowing through Zener diode D502 thus reducing the influences of Zener voltage drift with temperature. Working from this reference, the AM signal is mixed with the DC reference (which governs the average RF level) at pin 13 of IC503d.

Programming D-A converter IC505 enables attenuation of both the AM and DC simultaneously, keeping the ratio between the two constant. This is important as the depth of modulation is defined as:

$$\text{AM depth} = \frac{\text{Peak to peak of RF envelope}}{\text{Trough to trough of RF envelope}} \times 100\%$$

$$= \frac{\text{Magnitude of modulation of the RF envelope}}{\text{Magnitude of the average RF envelope}} \times 100\%$$

By using two separate D-A converters, IC502 and IC505, control of the depth of modulation can be performed independently of the requested RF level. By injecting a fixed current from IC507 pin 23, any accumulated offset voltages can be cancelled at the input of IC506b pin 6. This therefore corrects the denominator term in the above equations for the depth of modulation. R515 provides a negative bias to IC506b to allow for bipolar correction from IC507 pin 23.

IC505 pin 22 also produces a direct ALC aim signal, from the same voltage reference, which is used to hold the RF ALC loop. This facility is only used when the pulse modulator is operating as otherwise the loop would try to compensate for the lack of RF level during the off period.

CONTROL: AM AND RF LAW CORRECTION (AA1/3 sheet 6)

Circuit diagram: Fig. 7-9.

The generation of a perfectly undistorted AM carrier requires a perfectly linear detector which detects the magnitude of the carrier. In practice no such device exists and all schemes are prone to becoming non-linear at some operating level. The purpose of this circuit is to predistort the ALC REF signal to compensate for the diode law of the detector at low RF levels. The transfer function is shown in Fig. 4-2-10.

Normal carrier levels can be considered to be an AM envelope which is controlled by a DC modulating voltage. Therefore the corrector is also used when setting a carrier level but without any set amplitude modulation. Fig. 4-2-11 shows the block diagram of the law correction.

Operation

The drive waveform for the amplitude modulator is pre-distorted by IC506b, IC507 and IC508. The circuit compensates for the square law characteristics of the diode detector scheme at low RF levels. This results in a slightly distorted envelope at the troughs of the AM carrier which corresponds to the points of minimum RF level.

The transistor in IC508 shown at the right-hand side (pins 6, 7 and 8) provides the required pre-distortion by injecting additional drive current to the AM drive at low levels. At higher levels this current (set by R519 and pin 24 IC507) is swamped by the natural action of the transistors. The left-hand transistor (pins 1, 2 and 3) compensates for temperature effects within the base-emitter junctions of the transistors. Since both devices are fabricated within in a single package, good temperature tracking is assured.

Envelope feedback is through R516 and R517. The ratio of these resistors ensures that the average envelope is sampled from both transistors. IC506b is the error amplifier which closes the pre-distortion loop. C561, in conjunction with R516, provides an improvement in HF stability. R520 and R518 provide the necessary bias conditions for correct operation of the transistors within IC508.

The RF/AM drive signal is bandwidth limited by L506 and C423 before being sent via contact 28 of PLAN as the ALC reference signal to RF board AB2/2.

CONTROL: REFERENCE PLL (AA1/3 sheet 7)

Circuit diagram: Fig. 7-10.

The frequency standard provides an accurate and stable frequency reference for the instrument. This is used to phase lock the internal 104.8576 MHz VCXO from which all internal clock signals and the RF output frequency are derived.

The internal oven-controlled crystal standard is factory set to 10 MHz which is divided to 1 MHz and used to lock the 104.8576 MHz VCXO. The FREQ STD IN/OUT socket on the rear panel then operates as an output port providing a user-selectable 1, 5 or 10 MHz to synchronize any external measuring equipment. The block diagram of internal standard operation is shown in Fig. 4-2-12.

The instrument can accept a user-selectable 1, 5 or 10 MHz external signal as a frequency standard. Each frequency is divided to the required 1 MHz necessary to lock the VCXO. In this mode the FREQ STD IN/OUT socket on the rear panel becomes an input port accepting a waveform of suitable drive levels. The internal standard is also switched off in this mode to prevent any unnecessary crosstalk or beating occurring which would otherwise impair the short term stability of the standard signal. The block diagram of external standard operation is shown in Fig. 4-2-13.

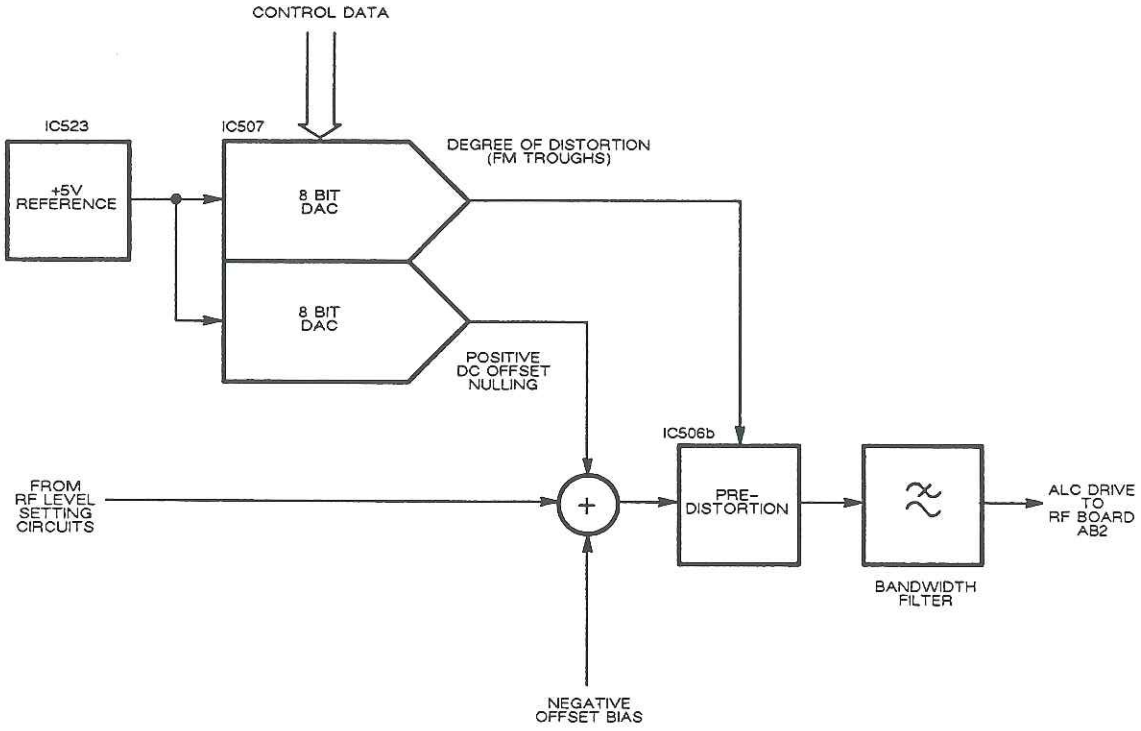


Fig. 4-2-10 Amplitude modulator/electronic attenuator transfer function

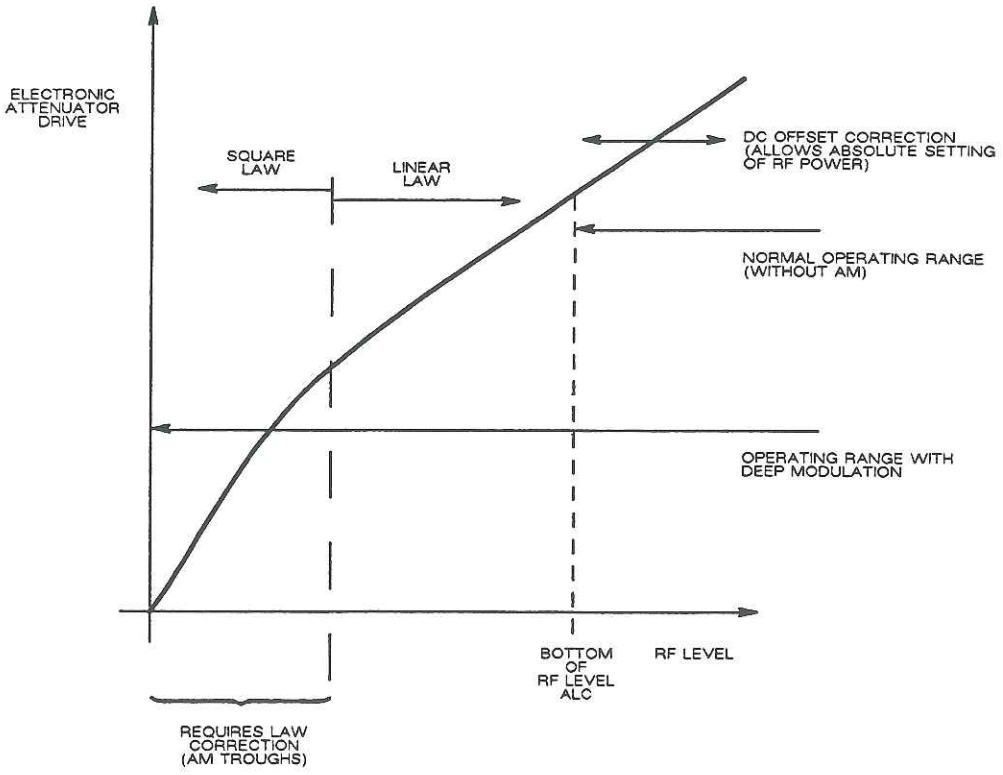


Fig. 4-2-11 Law correction

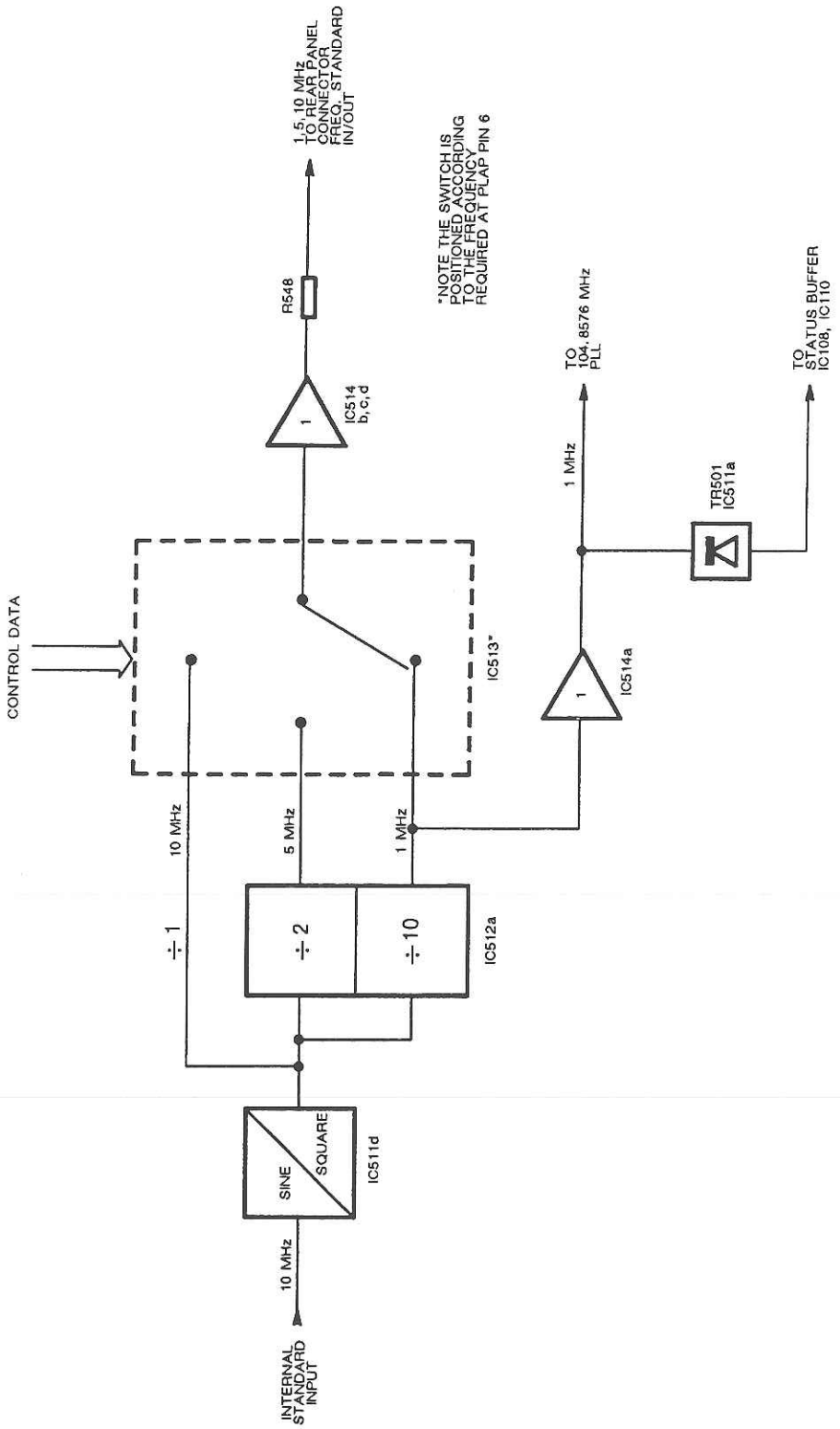


Fig. 4-2-12 Internal standard operation

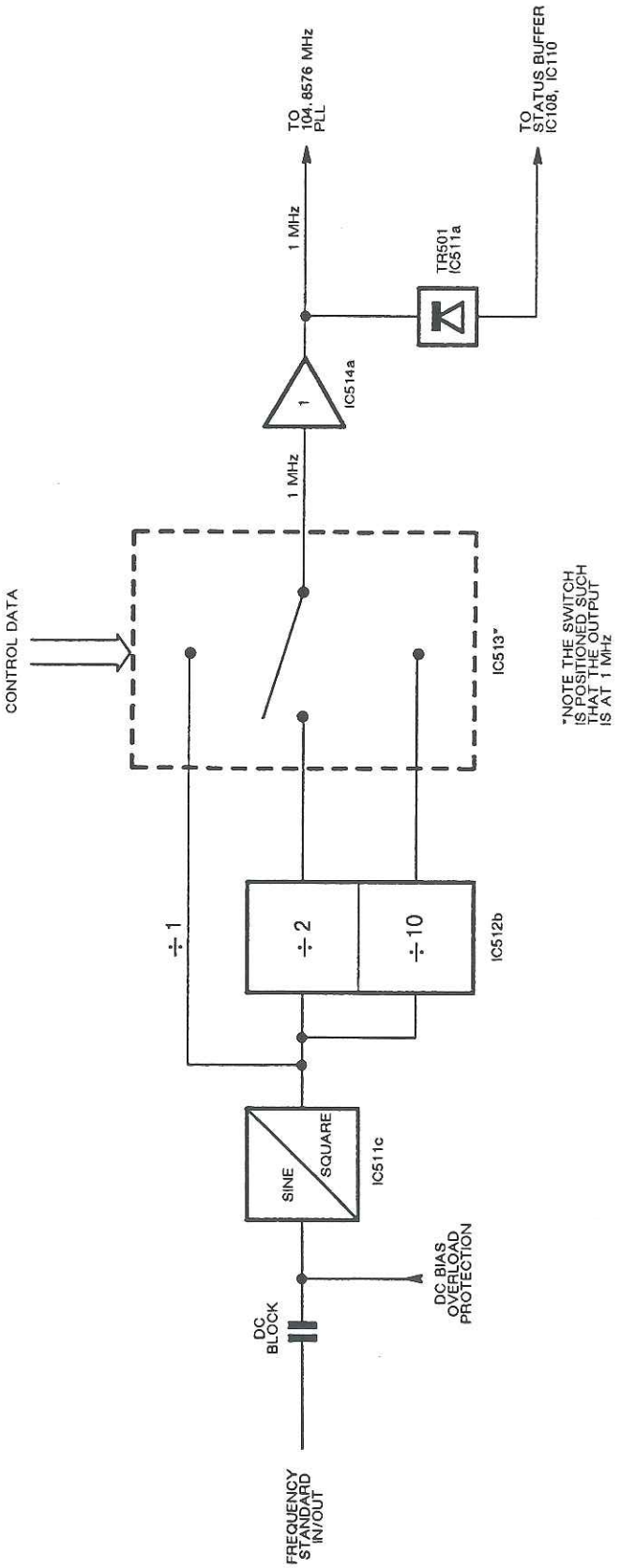


Fig. 4-2-13 External standard operation

Operation

The external standard is fed in on the EXT STD line from PLAP contact 6, amplified by TR502 and TR503, and is squared to logic levels by IC511c. (On earlier boards resistors R521 and R522 provide DC bias to the AC coupled signal to ensure efficient switching at moderate input levels. Diodes D510 and D511 protect the input against adverse signal levels.)

The internal standard is fed in on the INT STD line from PLAP contact 8. No DC biasing is required for this signal as the waveform from the OCXO (located on AR2/1) swings about TTL levels. This frequency is divided by IC512a to 5 MHz at pin 3 and to 1 MHz at pin 7. IC513 selects which of the divided frequencies is sent to the rear panel via PLAP contact 6. IC514 provides output buffering while R548 limits the current flow.

Internal/external standard selection is by the INT/EXT line from IC510 pin 2. When the line is taken high the external input is disabled via D513 (not fitted to earlier boards).

The presence of either an internal or external standard is reported on the STD SENSE line to the main processor as a status interrupt. The 1 MHz signal is buffered by TR501, smoothed by C542 and detected by IC511a. A logical high on the STD SENSE line indicates the presence of a signal but does not indicate whether it is the correct frequency. This is done later by the VCXO out of tune indicators.

Fine tuning of the internal reference (an oven controlled crystal oscillator) is achieved electronically by two separate 8-bit D-A converters in IC507 (AA1/3 sheet 6). Coarse control is provided from pin 2 via R511 and fine from pin 1 via R512. Due to the ratio of the resistors the effect of the fine control is 100 times less than that of the coarse tuning.

IC523 (sheet 6) provides a very stable +5 V reference for the D-A converters within IC507 and IC509.

The OCXO is switched off by taking the OCXO POWER ON line high from IC510 pin 15 which turns off the +5 V power to the oscillator. This does not suppress the operation of the heater circuits as this could cause large frequency transients due to the thermal inertia of the oven as it heats and cools when the standard is switched between internal and external.

CONTROL: RF PROCESSING (AA1/3 sheet 7)

Circuit diagram: Fig. 7-10.

104.8576 MHz phase locked loop

The VCXO must be locked to the frequency standard selected by the user to guarantee its frequency stability. This is achieved by a phase locked loop (PLL) running at a reference frequency of 1 MHz (1.6 kHz for board AA1). Additional loop filtering is provided by an active 60 Hz low-pass filter which ensures the removal of the reference from the VCXO tune line. A window comparator monitors the VCXO tune line to detect when the oscillator is outside its normal operating range. The block diagram of the phase locked loop is shown in Fig. 4-2-14.

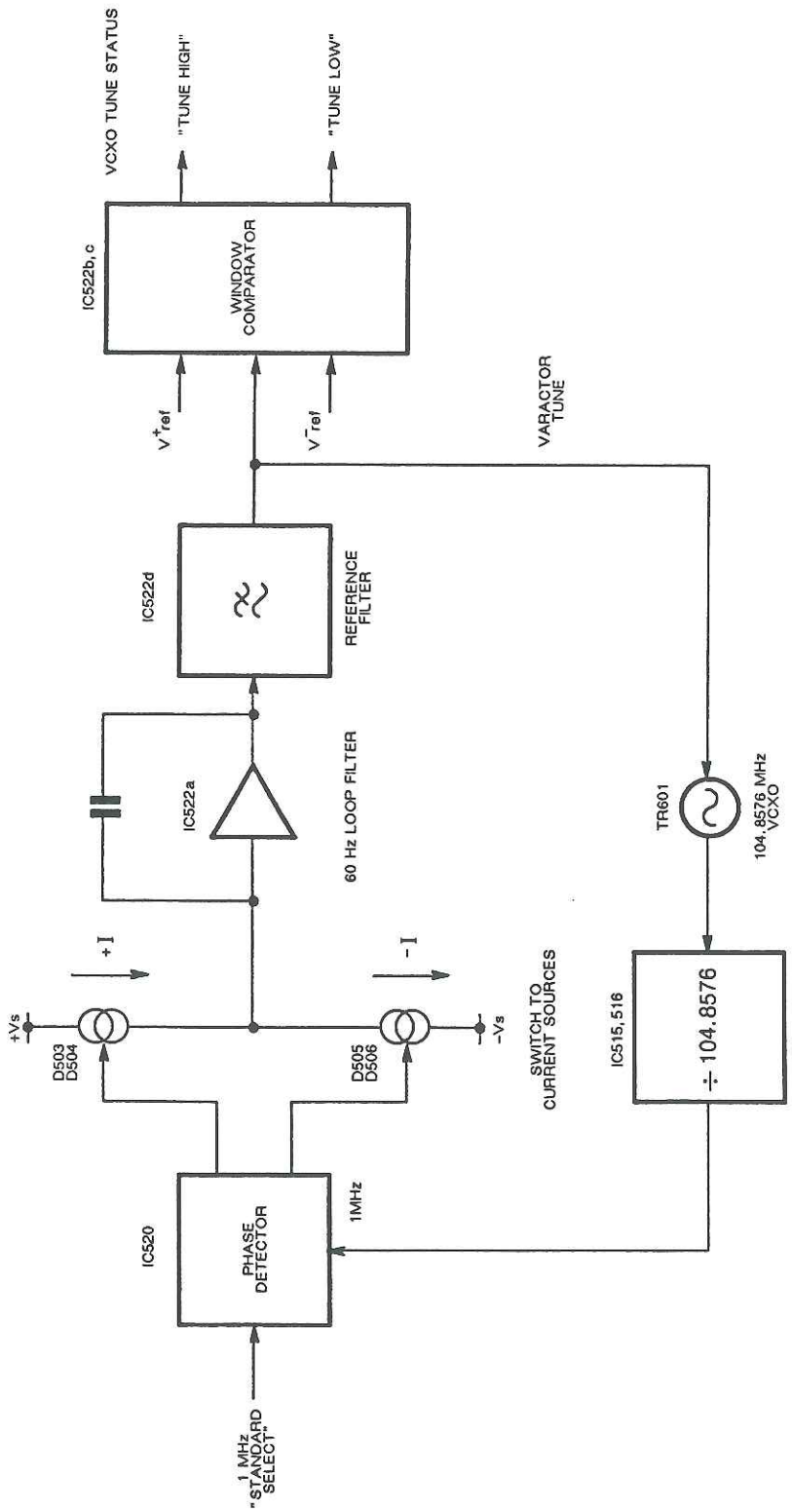


Fig. 4-2-14 104.8576 MHz phase locked loop

Loop operation

The 104.8576 MHz from the VCXO is fed to dual modulus prescaler IC515 and divider IC516. IC516 is a PLA (Programmable Logic Array) which has a controller function to enable it to set the prescaler's division ratios of either 20 or 21 when appropriate to divide the input from the VCXO by 104.8576 so as to produce a 1 MHz output at its pin 21. The divided reference frequency is fed together with the selected internal or external frequency standard to the PLL phase comparator, IC520a and b.

The reference frequency of 1 MHz, in conjunction with a narrow loop bandwidth, optimises the noise suppression and settling time of the loop. It allows the use of an active loop filter to set the narrow loop bandwidth.

Phase comparator IC520 is in a tristate dual D-type bistable configuration. IC521c generates the reset signals for the bistables at the appropriate times, while R525 and C507 extend the reset pulse to ensure that the bistables reset.

Diode bridge D503, D504, D505 and D506 sinks and sources current into loop filter IC522a depending on the drive waveforms from the phase comparator. Current is sourced into the loop filter when D503 is reverse-biased and sunk when D503 is forward-biased.

Components C512, C511 and R530 determine the main loop characteristics. The 60 Hz low-pass filter formed by R545, R533, R534, C543, C514, C550 and IC522d has some additional effects due to phase shifts within the filter response but these are minimal. D509 prevents varactor diode D601 (sheet 9) from being forward biased, while R547 (sheet 7) provides a discharge path for the varactor filter network R601 and C601 (sheet 9). R552 prevents instability by adding an additional break point at 160 kHz well outside the operating loop bandwidth.

IC522b and c form a window comparator which detects when the VCXO tuning voltage is exceeded. The outputs from detectors D507 and D508 on the VCXO TUNE HIGH & LOW lines are attenuated to logic levels by R538, R539 and R540, R541 to provide status interrupts to the main processor via IC414 (sheet 5) and IC108 and IC110 (sheet 1).

AA1 loop operation (AA1 sheet 6)

Servicing diagrams: Figs. 7-11 to 13.

PLL operation is similar to that described above for board AA1/3 except for the following significant differences.

The 104.8576 MHz from the VCXO is divided by IC515 to IC518 to the reference frequency of 1.6 kHz (a division of 65536). Similarly the selected frequency standard is divided by IC517 and IC518 to the same reference frequency (a division of 625). IC519a and IC520a provide edge re-timing before the signal is fed to the PLL phase comparator. Phase comparator IC519b and IC520b is in a tristate dual D-type bistable configuration. IC521c generates the reset signals for the bistables at the appropriate times, while R525 and C507 extend the reset pulse to ensure that the bistables reset.

The PLL BOOT line from pin 12 of IC510 is used to reset the initial starting phase of the counters at switch on and when changing between standards. When this line is pulsed high it resets the counters to zero returning the accumulated phase error to a small amount for a faster lock-in time.

CONTROL: CARRIER SYNTHESIZER (AA1/3 sheet 8)

Circuit diagram: Fig. 7-14.

The RF carrier of the instrument should be as clean in frequency (and level) as possible. To achieve this goal the instrument relies on a single loop synthesizer scheme based on four UHF oscillators covering the fundamental range from 675 to 1350 MHz. Utilising such high frequencies minimises the RF processing circuitry normally associated with conventional frequency doubling or mixing schemes. Four UHF oscillators (in quarter octave bands) are used for good FM linearity.

A carrier frequency resolution of 0.1 Hz cannot be achieved easily without the use of non-integer division. In this instrument this operation is controlled by a dedicated ASIC which modifies the division ratio of a programmable divider so that the average frequency is a non-integer division of the input.

The RF carrier can operate in one of three modes of operation which effects the instantaneous frequency. These are CW, FM/ΦM and SWEEP. Each mode puts different requirements on the loop characteristics which must be modified accordingly to suit.

The sweep mode forces rapid re-programming of the controller IC providing discrete steps in the carrier frequency and is therefore not truly continuous. The block diagram of the synthesizer is shown in Fig. 4-2-15.

Note...

The synthesizer is split over the three boards AA1/3, AB1 and AB2/2 to provide signal isolation and ease of maintenance.

Synthesizer operation

Frequency synthesis control is performed by a dedicated ASIC, IC614. This generates all of the necessary signal division ratios for divider IC610 to eventually synthesize any frequency within the range of just over 675 to 1350 MHz.

The incoming signal on the 1350-675 MHz RF SYNC line from the main VCOs on AB1 is buffered by TR615 to prevent divider backfire (from IC610) onto the VCO board which could otherwise be superimposed on the eventual RF carrier. TR616 and associated circuitry provide active bias for TR615 to ensure correct operation over the whole temperature range of the instrument.

The incoming signal is connected to pin 8 of programmable divider IC610. This is an ECL divider to provide the required speed of operation. The resulting divided ECL output is converted to TTL levels by TR618 to TR620. Buffers IC611a and IC611d feed to frequency doublers IC611b and IC611c which respectively supply a clock signal to ASIC IC614 and an output to the following phase comparator.

The divided frequency is compared with a reference frequency of 1.6777216 MHz, derived from the 104.8576 MHz on-board VCXO, by four-state phase comparator IC605a, IC606 and IC607a which has the property of being extremely linear with minimal dead zone. This prevents the loop from 'hunting' within the lock range of the PLL.

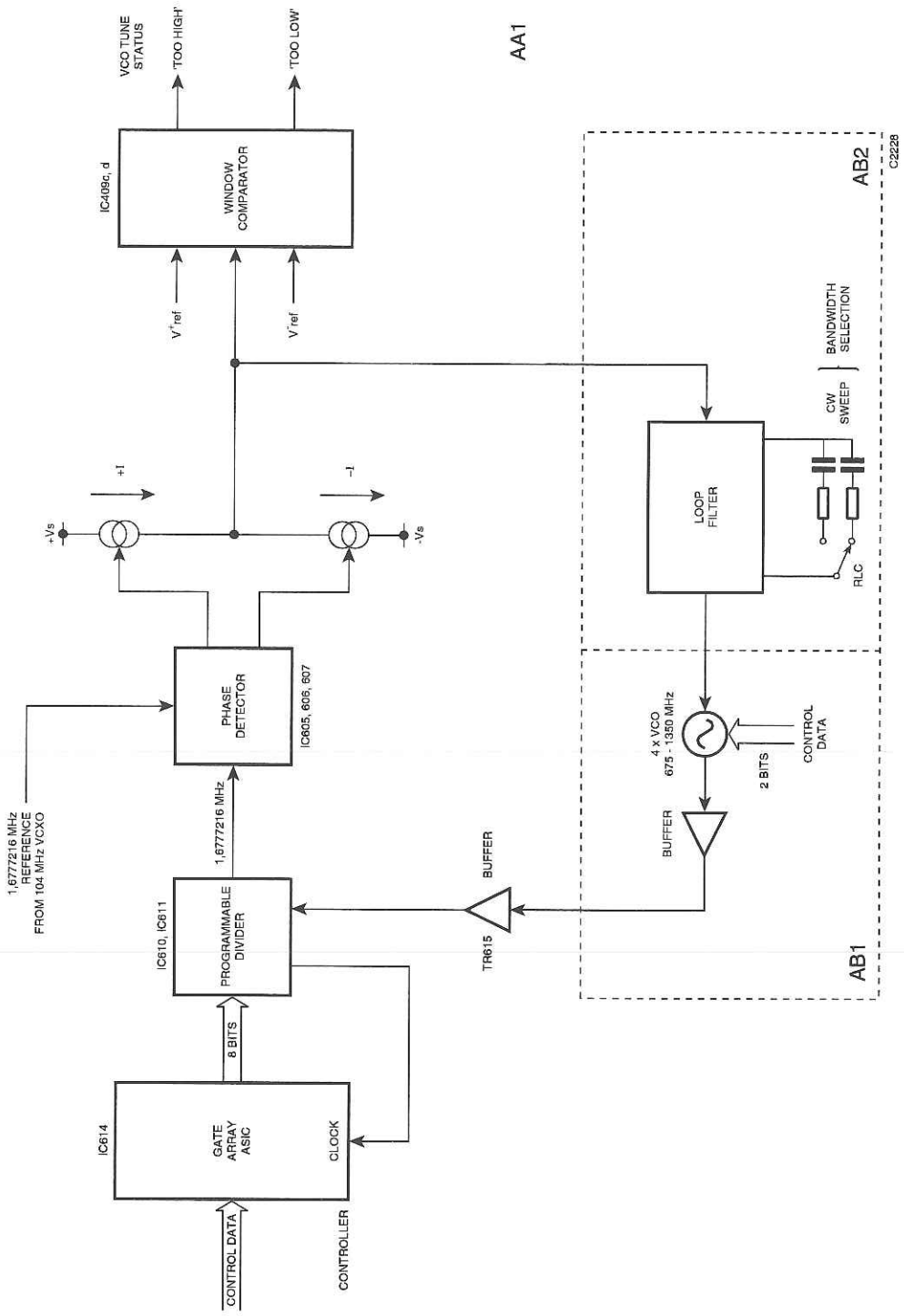


Fig. 4-2-15 Carrier frequency synthesizer

The output waveforms are voltage translated by TR605 to TR610 and filtered by C615 and L605 plus C420 (sheet 5) and C616 and L606 plus C421 before being converted to current to drive into the loop filter by TR401 and TR402. TR403 to TR406 modify the current transfer function of the voltage to current converter which together with a change in the integration capacitor (C31 and C32 on AB2/2) provides the necessary changes to the loop characteristics for the three operating modes of the carrier. (For RF loop filters see under 'VCO drive, loop filter & FM' below.) Output is on the VCO TUNE line to AB2/2.

The main PLL is continuously monitored by IC409c and d (TR408 is reserved for future use) which detects when the varactor tune range is exceeded. D407, D406 and R456 prevent the varactor from being forward biased when the loop loses lock temporarily during changes in the requested frequency. The detected outputs from D405 and D408 on the VCO TUNE HIGH & LOW lines are attenuated to logic levels by R454, R455 and R457. From IC414 they cause a status interrupt to the main processor on the VCO OUT OF LOCK line via IC108 and IC110 (sheet 1).

1-bit A-D converter

The DC input path to the synthesizer consists of a third order, single bit, oversampling A-D converter, whose bit stream output is used to dynamically control the synthesizer frequency via the synthesizer ASIC.

Pin 6 of IC615b is used as the summing junction for four currents. These are: the input current via R671; a bipolar offset current via R670; the bit stream feedback via R674; and the DC nulling offset current via R672. IC615b integrates the sum of these currents, and its output is further integrated by broken integrators IC615c and d. In these, when the frequency rises to a point where C629 and C630 are at low impedance, the ICs act as unity-gain amplifiers. Diodes D605 and D606, D613 and D614 are used to enable the converter to recover from overload cleanly.

The output from the last integrator is fed via comparator TR617, which converts the input to TTL levels, to D-latch IC616a, which is clocked at the same rate as the synthesizer ASIC. NOR-gate IC618a is used to produce a uniform length output pulse from the D-latch, this is fed back into the summing junction to close the converter control loop. The digital input to IC614 pin 54 is a bit stream whose logic levels are determined by the state of the output from IC618a at the instant that the ASIC is clocked.

The DC nulling offset current is supplied from a 1-bit oversampling D-A converter in the synthesizer ASIC. This balances the input current to make the converter read zero when DC nulling and when in AC coupled FM mode.

Board AA1 converter

Circuit diagram: Fig. 7-13.

The converter for board AA1 is similar to that for board AA1/2 except for the loop D-A reconversion process. Pull-up resistor R687 and pull-down resistor R678 together with D611, D612 and R675 convert the 0 to 4 V bit stream input to ±2 V prior to feeding it to the D-A converter. This is formed from D607 to D610 with R674 and R676. The bit stream input biases the diodes so that current is sourced and sunk to and from C627 to provide the required analogue feedback.

CONTROL: VCXO AND DIVIDER (AA1/3 sheet 9)

Circuit diagram: Fig. 7-15.

The 104.8576 MHz VCXO is used to derive all of the clock signals necessary to drive the ASICs on the control board. Using a high operating frequency eliminates the need for a second phase locked oscillator to generate the necessary local oscillator frequency for BFO board AB4/1. The 62.5 divider provides the 1.6777216 MHz drive signals for the RF synthesizer, the FM A-D converter and the audio synthesizer.

VCXO operation

The 104.8576 MHz oscillator is built around TR601. Crystal XL601 together with L601 and D601 provide a series resonant circuit in the emitter circuit of TR601. At resonance it increases the gain of the common emitter stage and together with 180 degree phase shift network L604, C603, C604 and L602 connected between the base and collector of TR601 provides the necessary conditions for oscillation. L603 tunes out the parasitic capacitance of the crystal package and prevents other spurious oscillations from occurring.

A facility to fine tune the phase shift network is provided by C604. At the resonant frequency the circuit operates at maximum power levels when the correct phase shift is achieved around the transistor.

TR602 buffers the signal. Local oscillator drive (at typically +6 dBm) to the BFO is derived from the collector, and a suitable drive level for limiter/level translator TR603 and TR604 from the emitter.

Divider operation

The 1.6777216 MHz clock signal is produced by dividing the 104.8576 MHz output from the VCXO by 62.5. This is done by the fractional divider formed by ICs 601 to 604 and IC617. Dual modulus prescaler IC601 is controlled by the gates of IC602 and IC604 so that it divides by either 10 or 11 at the appropriate phases. It divides in the sequence 10,10,11,10,10,11 for 62 cycles, and 10,10,11,10,11,11 for 63 cycles. A period of 6 cycles is counted by the divide-by-6 section of IC603, and alternate 62 and 63 cycles are counted by the divide-by-2 section.

AA1/2 synthesizer operation (AA1/2 sheet 7)

Servicing diagrams: Figs. 7-16 to 7-19.

Synthesizer operation is similar to that described above for board AA1/3 except for the following significant differences:

The incoming signal is first pre-scaled by divide-by-four divider IC613 to bring the frequency down to the operating range of the programmable divider. IC612 is a dual modulus divider (divide by 8/9) which together with the programmable divider (IC608 to IC611) provides an integer division ratio in the range from 100 to 202. This ratio ensures that the ASIC always receives an acceptable clock frequency to work from. Fractional division is achieved by the modification of the integer division ratios, under the control of the ASIC, in such a way that the average frequency over time is not an integer division ratio of the original. The divider is made from ECL components due to the required speed of operation.

TTL to ECL conversion is provided by a resistor network. Resistor packages R684 and R685 set up the initial DC offset condition which is then modified by IC614 through R692 to

R699 and R701 to R708. The impedance of the network is such that the 5 V from the ASIC is not seen by the ECL counters. ECL to TTL voltage translation is performed by TR611 to TR614. This cannot be done by a passive network since voltage swing needs to be increased.

VCO BOARD - AB1

Servicing diagrams: Figs. 7-20, 21.

Four oscillators are used to cover the basic frequency range, each VCO covering one quarter octave. Selection of the oscillators is carried out by IC1 and switches TR5 to TR8. These switch the oscillator currents allowing only one to operate at any one time. Binary decoder IC1 is controlled by the two control lines FC1 and FC2 from AB2/2 (see Table 4-2-7 below).

TABLE 4-2-7 IC1 VCO SELECTION LOGIC - AB1

FC2	FC1	VCO selected	Frequency range (MHz)
0	0	0	675 to 803
0	1	1	803 to 955
1	0	2	955 to 1135
1	1	3	1135 to 1350

Each VCO operates in a similar manner, with the tuning voltage from the VARACTOR TUNE line on AB2/2 varying the four varactor diodes, D1 to D4, in parallel. The nominal range for all four oscillators is 3 V to 13 V giving the required FM linearity. Taking VCO 0 as an example, the lowest quarter octave is generated by the tuned circuit formed by D1 and C4 and the two inductors formed by lengths of PCB track. The necessary positive feedback is provided by TR1 whose base is driven from a tap on one inductor and whose collector is connected via R8 and C5 to the other inductor. The damped emitter decoupling is arranged to give correct flat oscillation over the required range.

Pairs of oscillators VCO0, VCO1 and VCO2, VCO3 are connected via quarter wavelength lines to ensure that one oscillator does not load the other. The two half octaves are combined by D5 whose control current is sourced either from D6 for the lower half octave or from D7 for the upper half. This operation is controlled by IC1.

The selected signal is buffered by IC2 and then split into three parallel paths which are further buffered by ICs 3 to 5. One output is routed to the RF board AB2/2 RF INPUT line while the second is routed to the synthesizer on AA1/3 on its 1350 - 675 MHz RF SYNC line. The third output is not used.

RF BOARD - AB2/2

Servicing diagrams: Figs. 7-22 to 7-26.

This board processes the signal from the VCOs on board AB1. The signal is divided to the required frequency, then filtered and amplified. The amplified signal is detected and then level corrected by the ALC to provide the correct voltage behind a 50 Ω sourcing resistor. All input to the RF deck comes via PLBK and PLBJ from board AA1/3. AB2/2 routes control and power to the other boards on the RF deck, AB1, AB3/1 and AB4/1.

RF BOARD: DIVIDERS AND FM DRIVE (AB2/2 sheet 1)

Circuit diagram: Fig. 7-23.

Decoding

Two latches control operation of the RF deck while a shift register is used to read RF board status information back to the processor.

IC7 latches the frequency word used by the VCOs, divider and filters using BD7 to BD3. BD7 and BD6 are used to select the VCO to be used (see Table 4-2-8 below), and BD5 to BD3 select the division ratio (see Table 4-2-9 below). BD6 to BD3 are also used to select the required low-pass filter. IC7 uses the LOOP SWITCHING lines to select the ALC mode (see Table 4-2-10 below).

TABLE 4-2-8 IC7 VCO SELECTION LOGIC - AB2/2

BD7	BD6	VCO frequency
0	0	675 - 803 MHz
0	1	803 - 955 MHz
1	0	955 - 1135 MHz
1	1	1135 - 1350 MHz

IC9 latches selection data for AB3/4 or AB3/5 using BD1 to BD5. BD7 supplies the logic for the AB3 DETECTOR line to relay RLB which is used to select the required detector from AB2/2, AB3/4 or AB3/5. BD0 supplies the logic for the SWEEP BANDWIDTH CONTROL line to RLC which is used to select the appropriate filter path for the VCO tuning voltage.

TABLE 4-2-9 IC7 VCO DIVISION LOGIC - AB2/2

D5	BD4	BD3	Division ratio
1	1	1	No division
0	0	0	2
1	0	0	4
0	1	0	8
1	1	0	16
0	0	1	32

TABLE 4-2-10 ALC MODE LOGIC - AB2/2

BD2	BD1	ALC mode
0	0	Normal ALC
0	1	Levelling phase
1	0	Frozen loop
1	1	Pulse enabled

Shift register IC8 is used to report the board status on the RF STATUS line to the Readback Status Buffer on AA1/3. PULSE MOD SENSE checks for the presence of the pulse modulator option. When the option is fitted, the status line is pulled high by a pull-up resistor. When not fitted, a 1.8 dB pad is inserted in its place and the line is earthed. BOARD SENSE is used to check that the board +5 V logic supply is present. ALC STATUS, used in pulse levelling phase mode only, reports ALC high or low and is supplied by IC10 (sheet 2).

Dividers and straight-through path

For frequencies above 675 MHz the signal on the RF INPUT line from AB1 is routed directly through diodes D2 to D5. This route is selected by switching off TR10 thereby reverse biasing D1 and D11 so that the divider and level restoring amplifier are switched out of circuit. Bias, supplied by IC1a, is also removed from IC2 to prevent it from oscillating.

For frequencies below 675 MHz TR10 is switched on, diodes D2 to D5 are reverse biased, and the signal is routed to programmable divider IC2. Control bits FC3 to FC5 from IC7 determine whether a division ratio of 2, 4, 8, 16 or 32 (see Table 4-2-9) is selected by IC2. Levelling amplifier TR1 compensates for the slope of the divider frequency response, restoring the signal to a nominal 0 dBm.

VCO drive, loop filter & FM

The VARACTOR TUNE line to VCO board AB1 is controlled by the VCO TUNE line from AA1/3. During CW operation the tuning voltage is fed in via RLC contacts 6 and 3 with the loop filter provided by R31 and C32. For sweep operation the SWEEP BANDWIDTH CONTROL line from IC9 is taken high which switches on driver TR12. This energises RLC which causes the tuning voltage to be routed via contacts 5 and 4, with the loop filter now provided by R96, C85, C86 and R95.

For FM the audio drive is fed in on the FM line from AA1/3 via RLA contacts 5 and 4. If the signal is to be attenuated, the 48dB PAD line is taken low to energise RLA which then selects the route via contacts 6 and 3 and the pad formed by R34, C88, R35 and R36. For FM operation the BW CONTROL line is also taken high which switches on FET TR2. This modifies the CW filter and applies the modulating signal via C31 to the VARACTOR TUNE line.

Driver TR13, relays RLD and RLE and the associated IF VCO TUNE and LOCK lines perform no function in the 2030 series signal generators (note that these components do not appear on the AB2 board). The circuit diagram shows the contacts of these relays in their normal, unused, positions.

RF BOARD: MODULATOR AND DECODING (AB2/2 sheet 2)

Circuit diagram: Fig. 7-24.

Amplitude modulator

The amplitude modulator acts both as the variable gain element of the ALC and to provide the amplitude modulation of the carrier. It comprises two similar RF attenuators R21 with R23 and R26 with R28 each followed by a buffer, IC6 and IC100 (sheet 3). High-pass filter C21, L7 and C22 removes audio. Modulator drive is described below.

Automatic level control (ALC)

Two distinct methods of level control are used. For normal operation an ALC circuit is used. However, for pulse modulation, the ALC loop is broken and the drive level is frozen.

With ALC the output level is detected by positive- and negative-peak detectors and compared with a reference signal (which includes any AM required). The error is integrated to provide a current drive for the amplitude modulator.

For pulse modulation, the ALC error output is mimicked by a D-A converter driven voltage source. This is then used to provide current drive into the amplitude modulator.

ALC operation

For signals up to 1350 MHz the ALC REF input from AA1/3, comprising DC plus AM, is low-pass filtered by L21 and C99 and fed to non-inverting amplifier IC3a. The signal is then AC-coupled by C40 (after inversion by IC3b) to the positive peak detector path, and by C39 to the negative peak detector path. At these points the positive and negative detected outputs from the output amplifier are fed in via D306 (sheet 4). The signals then provide offsets against the positive and negative voltages produced by R49 with R50, and R52 with R53 respectively. Temperature compensation is provided by D305 which produces an offset to the negative voltage produced by R59 and R60 which is then applied to the non-inverting input of IC3d. IC3d and IC4a are output buffers which respectively feed out the negative and positive peak detected signals. When selected by RLB these signals are summed with the ALC REF signal from the input by integrator IC5c. If the result of the summation is not zero pin 8 will ramp up or down charging or discharging C41 until level is correct.

For operation above 1350 MHz where either the frequency doubler or frequency quadrupler board is involved, RLB breaks the ALC loop and the inputs to be summed by IC5c are ALC REF from AA1/3, and COMP DIODE and -DET from the levelling detector on either AB3/5 or AB3/4. Since these inputs are from a single (negative) detector, summing resistors R81 and R82 are half the value of the Detector Summing resistors R54 and R62.

Output from the integrator is then used to provide a current input to the Modulator Drive circuit.

Modulator drive

There are two modes of operation, normal and pulsed.

Normal operation

During normal operation, i.e. pulse modulation is not enabled, the error voltage to integrator IC5c controls the voltage to IC5d. IC5d and TR6 act as a voltage to current converter which controls the attenuation of the Amplitude Modulator diodes and hence the signal level of the RF chain. The voltage to current converter has a standing current drawn through R71 to allow charge to be drawn quickly from the modulator diodes to ensure deep amplitude modulation performance. Also during normal operation, the OPEN LOOP REF line is held at earth potential to prevent false triggering of ALC status comparator IC10.

Pulse operation

For pulse modulation the above levelling system cannot be used since the integrator output would be uncontrolled when the RF was switched off by the pulse. To overcome this the integrator output is replaced by a DC voltage.

Whenever pulse mode is selected, or when in pulse mode the ALC REF is changed, the instrument goes through a levelling phase in which the voltage on the OPEN LOOP REF line is set so that the output from IC5b is the same as the output from integrator IC5c. The modulator drive is then switched from the integrator to the OPEN LOOP REF line which now holds the frozen ALC reference, and pulse modulation can be enabled.

For pulse mode the standing current to TR6 is not required so R71 is switched out of circuit. The voltage on the OPEN LOOP REF line is scaled and referenced to the +15 V rail by IC5a and TR4. This ensures that the output from voltage follower IC5b will track any fluctuations in the +15 V rail.

The levelling phase consists of removing R71 using switch IC11d and then adjusting the open loop reference D-A converter on AA1/3. A successive approximation process is used in which the output from IC5b is continually monitored until it is the same as the output from IC5c. Monitoring is by comparator IC10; any detected output from D19 on the ALC STATUS line is attenuated to logic levels by R48 and R51 and sent by IC8 (sheet 1) as part of the status word. Once both outputs are the same, the input to IC5d is switched from the integrator to the OPEN LOOP REF line.

Since the current drive is required to vary over a wide dynamic range, the open loop reference scaling has a range switch TR5 which has a ratio of 5:1. It ensures that the resolution of the 12-bit D-A converter on AA1/3 maintains the output level in pulse mode accurately over the full range of the instrument. The power range is selected during the successive approximation routine. To increase the range the OPEN LOOP POWER RANGE line is taken high which switches on TR5 to connect R72 in parallel with R73.

Loop switching

Selection logic (see Table 4-2-10) for control lines LOOP SWITCHING A and LOOP SWITCHING B is supplied by latch IC7 (sheet 1). The logic controls four switching diodes D22 to D25 and four inverting switches forming IC11, with IC11c ensuring that IC11b operates in the opposite manner to IC11a. In normal operation both lines are low, IC11a is switched on, and the integrator supplies the modulator drive. Only in this mode are both diodes D22 and D23 reverse biased enabling R71 to be in circuit. In levelling mode the LOOP SWITCHING B line is taken high which causes IC11d to switch on to remove R71. For pulse mode but with pulse modulation off, LOOP SWITCHING A is taken high with LOOP SWITCHING B low and the output level is determined by the OPEN LOOP REF line. For pulse modulation both LOOP SWITCHING lines are taken high which reverse biases D24 and D25 allowing pull-up resistor R66 to take the PULSE ENABLE line high to open the gate to the PULSE MOD INPUT line (sheet 4).

TR401, controlling the ALC SLUG line, and associated components perform no function in the 2030 series signal generators (these components do not appear on the AB2 and AB2/1 boards).

RF BOARD: HARMONIC FILTERS (AB2/2 sheet 3)

Circuit diagram: Fig. 7-25.

These filters are arranged in three banks. Each bank has four low-pass filters set at half octave intervals. They are selected by diode switches so that any filter in the selected bank with cut-off above the desired frequency is switched in and the remainder bypassed.

Operation

Filter selection is controlled by decoders IC101 and IC102 which decode the FC2 to FC5 and FC5(L) lines from IC7 (sheet 1). The low-pass filters are arranged in three banks, with the bank and filter being selected by the decoders taking the appropriate line low. This forward biases the selection diodes for one bank while taking the other lines high to reverse bias the remaining selection diodes. When for example, IC102 pin 9 is taken low it forward biases D100, D140 and D141 at the input and D110, D142 and D143 at the output and the low-pass filter selected is the 1350 MHz printed filter. If instead, IC101 pin 6 is taken low to select the 169 MHz filter, input diodes D113 and D144 at the input and D123, D145 and D146 at the output are forward biased so that the 239 MHz and 169 MHz filters are enabled. Pull-up resistors R111 to R113 ensure that each filter bank is securely shut off when not required.

RF BOARD: PULSE MOD AND O/P AMP (AB2/2 sheet 4)

Circuit diagram: Fig. 7-26.

Pulse modulator option

The pulse modulator receives a digital modulating signal from PLBP on the PULSE MOD I/P line. The signal is high-pass filtered by C309, L301, C308, L300 and C307, limited by D302 and D303 and squared by Schmitt gates IC300a and c. When PULSE ENABLE is taken high by the Modulator Drive circuit (sheet 2) it opens gate IC300c allowing IC302 to be switched by the modulating signal. IC302 is configured as a 2-channel switch which alternately switches between its channel 0 and channel 1 inputs. When pin 10 is taken low, channel 0 inputs are selected and output pins 3 and 13 are taken high and low respectively. And when pin 10 is taken high, channel 1 inputs are selected and the output logic levels are reversed. These outputs control pulse modulator IC301 (fitted in place of the 1.8 dB pad).

Output amplifier

This is a three stage wide-band amplifier based on TR311, TR313 and TR315 with TR310, TR312 and TR314 respectively controlling the bias. The latter sense the collector currents through R326, R337 and R349. 20 dB of gain is provided to a maximum of +19 dBm after a 50 Ω sourcing resistor. Output level is positive- and negative-peak detected by D306 with a dummy detector giving a thermal reference.

Switched attenuator driver

Attenuator IC401 and associated components perform no function in the 2030 series signal generators (these components do not appear on the AB2 and AB2/1 boards).

Board AB2 differences (AB2 sheet 4)

Servicing diagrams: Figs. 7-27, 28.

Pulse modulator operation is similar to the above except that when PULSE ENABLE is taken high by the Modulator Drive circuit (sheet 2) it opens gate IC300b allowing TR302 to be switched by the modulating signal. TR302 then drives complementary switching transistors TR300 and TR301 controlling pulse modulator IC301 (fitted in place of the 1.8 dB pad). On board AB2/1, TR300 and TR301 are replaced by IC302c and d.

BFO SWITCH AND RPP BOARD - AB3/1

Servicing diagrams: Figs. 7-29, 30.

Board AB3/1 is used for the 2030 instrument in place of Doubler AB3/5 or Quadrupler AB3/4. Its purpose is the selection of either Beat Frequency Oscillator board AB4/1 for frequencies from 10 kHz to 21.09375 MHz or a straight through path to the output attenuators for frequencies from 21.09375 to 1350 MHz.

Signal routeing

Signal routeing is carried out by two relays RLA and RLB. The relays operate in conjunction with, and are controlled by, the BFO line from AB2/2. With the relay solenoids unenergized the RF INPUT line from AB2/2 is connected directly to the RF OUTPUT line. But when the BFO line is taken low, TR1 switches on. This causes RLA to connect the RF INPUT line to the BFO OUTPUT line to AB4/1 while simultaneously RLB connects the BFO INPUT line from AB4/1 via low-pass filter C10, L3 and C11 to the RF OUTPUT line.

Reverse power protection

Signal level on the RF OUTPUT line is monitored by a reverse power protection circuit. This has both positive and negative arms with the stand-off voltages set by Zener diodes D3 and D2 respectively. When the output voltage swing rises sufficiently to cause either D4 or D5 to be forward biased it conducts and so limits that voltage peak.

HIGH POWER AMPLIFIER BOARD AB3/3

Servicing diagrams: Figs. 7-31, 32.

This board is an option (Option 003) used to provide an RF signal output at a level of up to +19 dBm across the frequency range 10 kHz to 1.35 GHz. Board AB3/3 is used only in the 2030 instrument where it replaces BFO switch and RPP board AB3/1.

The overall operation of the board is to amplify the RF signal from AB2/2 and direct it either straight to the output attenuator for the range 21.09375 to 1350 MHz, or to BFO board AB4/1 for the range 10 kHz to 21.09375 MHz.

Attenuator and amplifier

The signal from AB2/2 on the RF INPUT line is first of all fed to a pin diode attenuator based on D6 which varies the overall gain of the board. Bias is controlled by TR3 driven by attenuator driver IC2c and d whose output is a DC offset added to the ALC reference. The purpose of this is to maintain the RF signal at a high level on RF board AB2/2 when lower output levels are required. This is accomplished by increasing the attenuation at low ALC requests and thus reducing the overall gain of the board. Consistent high levels on board AB2/2 help to maintain the noise performance of the instrument and the dynamic range of the modulator.

The high power amplifier which follows has a typical gain of 10 dB and consists of two stages; a medium power driver stage based around TR5 and a high power output stage based around TR7. Both stages employ resistive feedback and have active bias controlled by TR4 on the driver stage and TR6 on the output stage. The active bias circuits sense the collector currents in the transistors and guarantee the stability of their operating points with temperature.

Levelling detector

Board AB3/3 provides all the RF levelling for the signal generator and overrides the detector on board AB2/2. Levelling is accomplished by having negative detectors (D8 and D9) each side of a 25.5 Ω sourcing resistance (R58 and R27). The detected levels are then controlled using IC1 and its associated components. This makes the detected voltage at pin 8 of IC1c the same level as is it were the voltage obtained from a single negative detector behind a 50 Ω sourcing resistor. This voltage is then fed back to the ALC on board AB2/2 through R4 which forms part of a summing junction on AB2/2. Temperature compensation for the detector diodes is also fed back to the ALC on AB2/2. The compensation is provided by D10 and IC2b.

When the instrument is generating AM the detector is aided by AM bootstrap IC2a which uses the AM request on the ALC REF line to drive the detected voltages at pin 3 of IC1a and at pin 5 of IC1b.

Signal routeing

Signal routeing is carried out by two relays, RLB and RLC. These select the path to either the output attenuators or BFO board AB4/1. To select the BFO route the BFO SELECT line from AB2/2 is taken low which switches on driver TR1 to energize the relays. This connects the signal from the levelling detector to the BFO BAND RF OUTPUT line to AB4/1,

and from AB4/1 on the BFO BAND LF INPUT line via low-pass filter C7, L7 and C8 to the output attenuators on AT1.

Reverse power protection

Signal level on the RF output line is monitored by a reverse power protection (RPP) circuit. This has both positive and negative arms with the stand-off voltages set by Zener diodes D2 and D1 respectively. When the RF level rises sufficiently to cause either D4 or D5 to be forward biased it conducts and so limits that voltage peak.

QUADRUPLER BOARD - AB3/4

Servicing diagrams: Figs. 7-33 to 7-37.

Board AB3/4 is used for the 2032 instrument in place of AB3/1 for the 2030, or AB3/5 for the 2031. The purpose of the quadrupler board is to take the top octave from RF board AB2/2 in the range 675 to 1350 MHz and double it to produce an output at 1350 to 2700 MHz, or double it again to produce a quadrupled output at 2700 to 5400 MHz. When the doubler/quadrupler path is selected, the signal is applied to the first doubler which produces the desired doubled signal at 2f plus unwanted harmonics. The doubler output is then amplified, amplitude modulated, amplified again and then passed through one of three band pass filters (BPF), at between 1.35 and 2.7 GHz. A much cleaner 2f signal is then switched either to go through the second doubler stage or to bypass it and go directly to the output stages. Note that for these higher frequencies this board supplies modulation in addition to that provided by RF board AB2/2.

If signal quadrupling is selected the signal is amplified and fed into the second doubler. The doubler output, as before, is rich in harmonics and is therefore amplified and passed through the second set of BPF, between 2.7 and 5.4 GHz. The doubler/quadrupler outputs are then combined, power amplified, switched and passed through a 5.5 GHz low-pass filter. The output is finally passed through step attenuator AT10 and then to the output connector. The output stages also incorporate level detection circuitry and reverse power protection (RPP) of up to 50 W.

A secondary function, for frequencies from 10 kHz to 21.09375 MHz, is the selection of the path to BFO board AB4/1. For frequencies from 21.09375 to 1350 MHz the doubler/quadrupler path is bypassed. Fig. 4-2-16 summarises board AB3/4 operation where it can be seen that the physical layout of the board is divided into four areas which are screened to reduce subharmonic levels. These areas are numbered in sequence to the RF signal flow.

Signal routeing

RF signal routeing is carried out by four relays, RLA and RLB in board area 1 and RLC and RLD in board area 4. The two outer relays RLA and RLD select either the straight through or the frequency doubler/quadrupler path. Relays RLB and RLC are used to switch in/out the BFO (Beat Frequency Oscillator). Dual relays are used for RLB in the input and RLC at the output in order to achieve sufficient isolation in the unwanted signal path. The relays are controlled by TR101 and TR104. To select the straight through, unmultiplied, route the relays connect the RF input from AB2/2 via a 1.38 GHz low-pass filter directly to the output. To select the BFO route the BFO SELECT line from AB2/2 is taken low which switches on BFO driver

TR104 to energize relays RLB and RLC. IC101a pin 7 is also taken low which switches on TR102 to energize RLD. This connects the RF input line to AB4/1, and then from AB4/1 via low-pass filter C432, L401 and C433 to the output. To select the frequency multiplied route decoder IC101 switches driver TR103 off and driver TR102 on which control RLA and RLD. Relay operation is summarized in Table 4-2-11.

TABLE 4-2-11 RELAY CONTACTS MADE - AB3/4

Selection	RLA	RLB	RLC	RLD
Straight through	7-5	1-3 7-5	7-5 1-3	8-7*
Doubler	7-6*	7-6 * 1-2	7-6 * 1-2	8-6
Quadrupler	7-6*	7-6 * 1-2	7-6 * 1-2	8-6
BFO band	7-5	7-6 1-2	1-2 7-6	8-7*

* energized position

QUADRUPLER: FIRST DOUBLER & MODULATOR (AB3/4 sheet 1)

Circuit diagram: Fig. 7-34.

The frequency doubler/quadrupler path is selected by relays RLA and RLD which are controlled by decoder IC101a. When IC101a pin 7 is taken high, complementary solenoid drivers TR102 and TR103 are switched off and on respectively. Relay contacts are then as shown in Table 4-2-11 above and the signal from AB2/2 enters via the 1.38 GHz low-pass filter to the doubler/quadrupler and then out to step attenuator AT10. The incoming signal is fed in via transformer T101 which provides a balanced signal for the following frequency doubler. Frequency doubling is achieved by full-wave rectification by diode bridge D103. To increase conversion efficiency the diode bridge is biased to bring the operating point closer to the 'knee' and this is provided by the temperature compensated DC bias network of D102 and IC102a. A fixed current is passed through D102 (which is physically close to D103) and the corresponding voltage across it is measured by IC102a. Small value resistor R113 is placed in series with D102 to allow for small variations in diode current so as to compensate for small differences in temperature coefficient between D102 and D103. The resulting voltage is applied to D103 bridge via a quarter-wave stub which provides high impedance to RF signals. The quarter-wave stub isolation technique is used extensively in other parts of the circuitry for applying DC biasing.

The doubled signal is then fed into the recovery amplifier based around TR105. Transistor TR105 has active DC biasing provided by IC102b. The potential divider network of resistors R124 and R125 sets the voltage on pin 5 of IC102b to 0.59 V, which in turn controls the emitter voltage of TR105 via R122. Assuming initially TR105 is switched off, the voltage on pin 6 will be 0 V, causing IC102b output to go high and thereby switch TR105 on. At equilibrium IC102b pin 6 voltage is also at 0.59 V which in turn sets TR105 emitter voltage to 0.59 V and current to 35 mA. Resistor R118 and C106 network has the effect of flattening the frequency response.

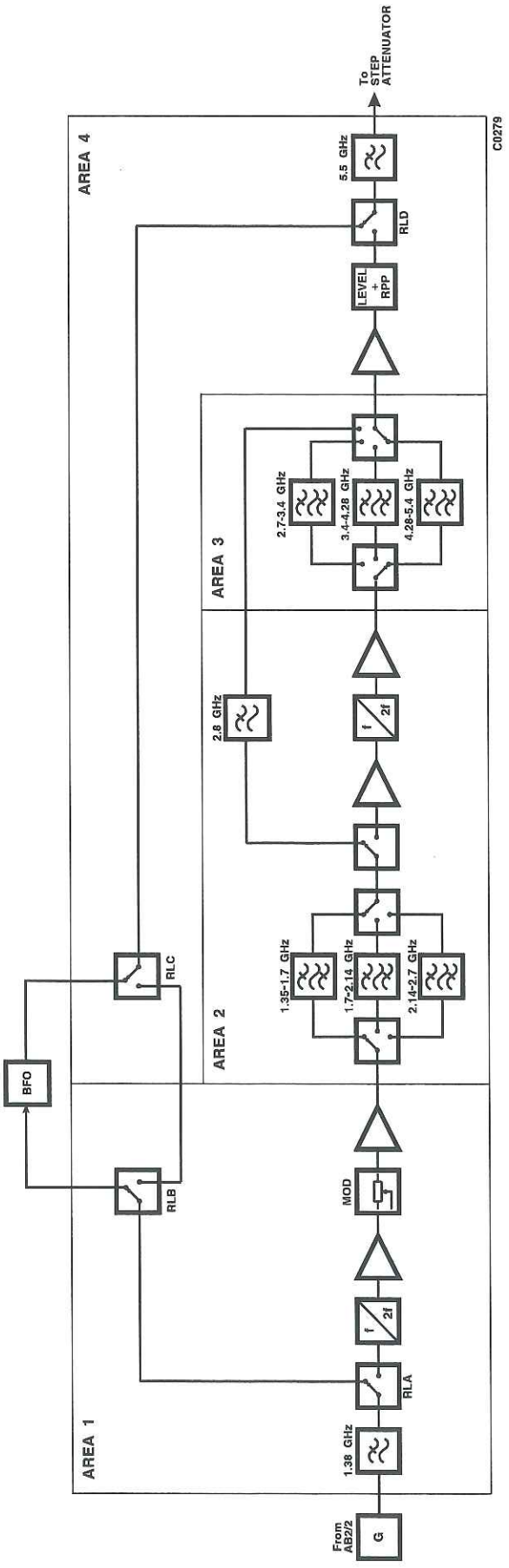


Fig. 4-2-16 Quadrupler board operating summary - AB3/4

The amplified output is then amplitude modulated by diodes D105 and D106 which are biased to the 'knee' points by the R126 and R127 combination. The modulating currents return to earth via D107 and R129; the series R128 and diode network biases the D107 series diode to its knee point. Modulation drive is applied to IC102d, with offset generated by the R132 and R133 network, followed by the class-AB power amplifier formed by TR108 and TR109. The output is then applied to modulating diodes D105 and D106. Whenever the doubler/quadrupler path is selected, IC101a pin 7 goes high switching TR101 on which has the effect of attenuating the high frequency signals to earth; R102, R103 and C101 act as a lead-lag network. TR107 and associated components play no part in the operation of 2030 series instruments. The modulated signal is then further amplified by TR106 and TR111. Transistor TR106 has a similar biasing arrangement to TR105. Transistor TR111 is biased by the current source arrangement based on TR110. Resistors R150 and R151 set the TR110 base voltage, which in turn sets the emitter voltage to 11 V. The current is set to 60 mA by resistor R152.

All external AB3/4 board connections are made via the SKBR connector. IC101a decodes the BPF and or doubler/quadrupler path switching logic, with TR104 switching the BFO in/out.

QUADRUPLER: BPF & SECOND DOUBLER (AB3/4 sheet 2)

Circuit diagram: Fig. 7-35.

The doubled signal, from area 1, contains harmonics due to the very nature of the full-wave rectification technique. To remove these unwanted harmonics, the signal is passed through one of three third octave BP filters. The switching of these filters is achieved by using pin diode switches (which are also extensively used elsewhere on the board). Filter pin diode pairs D201 with D204, D202 with D205 and D203 with D206 are switched by transistors TR201, TR202 and TR203 respectively. When the input logic is low (0 V) the associated transistor is switched on, forward biasing the series diode and reverse biasing the two shunt diodes, allowing RF power to pass through. With input logic high (+5 V) the transistor is switched off and the series diode is now reverse biased by -15 V and the shunt diodes are now forward biased shunting the RF signal to earth.

The filtered output at 1.35 to 2.7 GHz is then either taken straight to the output stages or passed on to the second doubling section for quadrupled output. Doubler/quadrupler selection is by pin diodes D207, D208 and D209 which are switched by TR204. When the input logic on the D2 line is low, the transistor switches on, biasing the diodes so as to select the quadrupler path. When the logic is high, the transistor is switched off and bias is applied to the diodes so that the doubler path is selected. When quadrupling is selected the signal is amplified by TR206 and then applied to a similar balanced doubler, formed by D211, to the one used in the first doubling stage. Note that the transistor TR206 is biased by a current source based around TR205.

The quadrupled output at 2.7 to 5.4 GHz is amplified by TR207 and then split by the first Wilkinson divider. The two halves are then applied to transistors TR208 and TR209. The outputs from the two transistors are then recombined by the second Wilkinson divider. This technique of signal splitting, amplifying and recombining gives 3 dB higher maximum output power. The input path lengths are adjusted such that any reflected signals, due to mismatch, are 180 degrees out of phase and therefore cancel, resulting in better input matching. A similar

arrangement is also used on the outputs of TR208 and TR209 to the same effect, resulting in good output match.

Transistor amplifying stages TR207, TR208 and TR209 are all active DC biased, similar to the configuration used for TR105. The TR210, TR211 and D212 network prevents +5 V from being applied before the -15 V rail becomes active, in order to avoid damage to the RF transistors. Zener diodes D213 and D214 limit the FET transistor gate voltage to 3.3 V, and thereby prevent gate-source breakdown damage. The divider network of R235 and R236 also provides protection for TR207 by limiting the base voltage to +3.2 V.

QUADRUPLER: BAND-PASS FILTERS (AB3/4 sheet 3)

Circuit diagram: Fig. 7-36.

The amplified quadrupled signal in the range 2.7 to 5.4 GHz coming from area 2 is rich in harmonics, as before. To eliminate these unwanted harmonics the signal is passed through one of the three third octave BP filters, similar to the ones used in the first doubling stage (see sheet 2). Transistors TR302, TR303 and TR304 are used to switch in/out each filter band, which are in turn controlled by TR301. Transistor TR301 selects either the doubler band or the quadrupler band signal to pass through to the next stage. When line D2 is taken low, TR301 switches on and the quadrupler path is enabled. When D2 is taken high, TR301 switches off enabling TR305 to switch on. This forward biases the series diode and reverse biases the shunt diodes in D307 and the doubler path via the 2.8 GHz LP filter is selected for output instead.

The DC bias current setting for pin diodes D304 and D305 is provided by R318 and R319 plus the resistor combinations of R401 to R404 (sheet 4), which add up to about 120 Ω. Diode D306 has a high forward biasing current in order to compensate for higher insertion loss at that frequency band. The doubled and quadrupled outputs are then combined by D308 and D309 and passed onto the output power amplification stages. Diodes D308 and D309 are used to combine signals, instead of a star connection, to achieve higher isolation in the off state; but this also increases the insertion loss.

QUADRUPLER: OUTPUT AMP, LEVELLING & RPP (AB3/4 sheet 4)

Circuit diagram: Fig. 7-37.

Output amplifier

The combined doubled/quadrupled signal passes through the attenuator network of R401 to R404 and into first amplifying stage TR402. The R401 to R404 network plus quarter wave stubs on R401 and R404 reduce attenuation at higher frequencies (4 dB at 1.35 GHz and 2 dB at 5.4 GHz) to compensate for top end frequency losses. Transistor TR403 with R415, R416 and D402 sets the TR402 DC bias source voltage to 0.27 V, which in turn sets the drain current to approx. 50 mA. The combination of TR401 and D401 prevents the connection of the +5 V supply before the -15 V one becomes active which would otherwise damage TR402.

The output power stages based around TR406 and TR410, both have identical biasing networks. Transistors TR405 and TR409 are connected in a 'current mirror' configuration, acting as current sources for TR406 and TR410 respectively. Resistors R423 to R424, R426 and D404 form a potential divider network which sets the base and hence the emitter voltage of TR405 and TR409. The current is set by resistors R422 and R433. The base voltage of transistors TR404 and TR408 is set to approx. 7 V via R425. When TR409 collector potential is less than 7.5 V, TR408 is off and TR410 gate potential is set to -6 V by R427 and R428, turning TR410 off. But when TR409 collector voltage rises above 7.5 V TR408 starts conducting thereby raising the gate potential of TR410, which then starts conducting. When equilibrium is reached, TR410 drain is at approx. 8 V with 350 mA flowing through it. Similarly, TR406 drain is set to 8 V and current to 250 mA. The output signal is passed through a 5.5 GHz LP filter to attenuate the higher harmonics.

Levelling detector

For operations above 1350 MHz where frequency multiplication takes place, the levelling detector on this board replaces that on AB2/2. This is a negative detector and comprises D407 and IC402b. The output power level is detected by detector diode D407, which is biased to its knee point by R443 and R440, with R439 added to flatten the frequency response. Resistor R445 is used to rapidly discharge C426. Op-amp IC402b is configured as a unity gain follower. The output from IC402b is fed out on the DETECTOR line to RF board AB2/2. Temperature compensation for this levelling path is provided by diode D408 and IC402a whose output, on the DETECTOR TEMP COMPENSATE line, is also fed to AB2/2. Output from IC402b is also used to trip the reverse power protection (RPP) circuit.

Reverse power protection

Comparator IC401 non-inverting input (pin 2) is initially set to -3.65 V by resistor chain R435 to R438. When the detected level exceeds -4.8 V, the comparator inverting input (pin 3) is less negative than -3.65 V, and the output goes high (+0.5 V) which reverse biases D405 and D406 and switches off TR407. But when IC401 pin 3 becomes more negative than -3.65 V comparator output goes low (-2 V) thereby forward biasing D405 and D406 which then shunt the RF power to earth. TR407 also is switched on, earthing TR410 gate and thereby turning the transistor 'hard-on', shorting RF power to earth. This action protects the output transistor from high level reverse power damage. The increased current flowing through R437 to R438 has the effect of increasing the potential at pin 3 of IC401 so that the comparator output will now switch back to high level at a higher voltage (on pin 3) than before, i.e. hysteresis effect. The circuit trips after 5 microseconds of reverse power, and remains so until 35 ms after it is removed by the step attenuator RPP trip.

FREQUENCY DOUBLER BOARD - AB3/5

Servicing diagrams: Figs. 7-38, 39.

Board AB3/5 is used for the 2031 instrument in place of AB3/1 for the 2030, or AB3/4 for the 2032. The purpose of the doubler board is to take the top octave from RF board AB2/2 in the range 675 to 1350 MHz and double this frequency to produce an output at 1350 to 2700 MHz. Whilst doing this it must preserve any modulation, both in frequency and amplitude, that may be present on the signal. A secondary function, for frequencies from 10 kHz to

21.09375 MHz, is the selection of the path to BFO board AB4/1. For frequencies from 21.09375 to 1350 MHz the doubler path is bypassed. The output stages also incorporate level detection and reverse power protection circuitry.

Signal routeing

The signal routeing is carried out by four relays. Two relays, RLA and RLD, select either the straight through or the doubled frequency path while RLB and RLC are used by the BFO. Two relays are used for each of the functions in order to achieve sufficient isolation in the unwanted signal path. The relays are controlled by TR4, TR5 and TR6. The doubler selection via TR5 and TR6 is an intrinsic part of the decoding logic which provides filter selection. To select the straight through, undoubled, route the relays connect the RF I/P line directly to the output. To select the BFO route the BFO SELECT line from AB2/2 is taken low which switches on BFO Switch Driver TR4 to energize relays RLB and RLC. This connects the RF I/P line via the BFO BAND O/P line to AB4/1, and then from AB4/1 on the BFO BAND I/P line via low-pass filter C44, L14 and C45 to the output. To select the frequency doubled route Doubler Switch Driver TR5 controls relays RLA and RLD. During doubler operation, RLB and RLC are set to the BFO position to isolate the fundamental. Relay operation is summarised in Table 4-2-12.

TABLE 4-2-12 RELAY CONTACTS MADE - AB3/5

Selection	RLA	RLB	RLC	RLD
Straight through	7-5 1-3	7-5 1-3	7-5 1-3	7-5 1-3
Doubler	7-6 * 1-2	7-6 * 1-2	7-6 * 1-2	7-6 * 1-2
BFO band	7-5 1-3	7-6 * 1-2	7-6 * 1-2	7-5 1-3

*energized position

Doubler

The frequency doubler path is selected by relays RLA and RLD which are controlled by decoder IC3a. When IC3 pin 7 is taken high, TR6 is switched on which switches solenoid driver TR5 on. RLA and RLD are then energized as shown in Table 4-2-12 above and the signal on the RF I/P line from AB2/2 is fed into the doubler and then out to step attenuator AT10. The incoming signal is fed in via transformer T1 which provides a balanced signal for the following frequency doubler. Frequency doubling is achieved by full-wave rectification by diode bridge D5. To increase conversion efficiency the diode bridge is biased to bring the operating point closer to the 'knee' and this is provided by the temperature compensated DC bias network of D6 and IC1a. A fixed current is passed through D6 (which is physically close to D5) and the corresponding voltage across it is measured by IC1a. Small value resistor R20 is placed in series with D6 to allow for small variations in diode current so as to compensate for small differences in temperature coefficient between D6 and D5. The resulting voltage is applied to D5 bridge via a quarter-wave stub which provides high impedance to RF signals. The quarter-wave stub isolation technique is used extensively in other parts of the circuitry for applying DC biasing. To counter any instability, TR8 switches on the bandwidth modifying network formed by C62 and R81 whenever the doubler is selected. TR7 provides gain to overcome the 11 dB loss of the doubler. The resulting doubled frequency is fed to the following third-octave filters.

Third-octave filters

Frequency doubling at these frequencies results in considerable amounts of RF power remaining at f/2 (the undoubled frequency) and at 3f/2. To remove these unwanted products, the signal is routed through one of three third-octave filters. Frequency coverage of the filters is: 1.35 - 1.7 GHz; 1.7 - 2.1 GHz; 2.1 - 2.7 GHz.

Filters are selected by PIN diode switches D7 to D12 which are controlled by Filter Switch Drivers IC2 and IC4. These drivers are comparators whose reference thresholds are set by components of R41. Decoder IC3a drives the comparators. To select, for example, the lowest range filter path, IC3 pin 4 is taken low causing IC4c and IC2c outputs in turn to go low. This forward biases the diodes on pins 1 and 2 of D7 and D10 while reverse biasing the diodes on pins 4. This causes the incoming signal to be routed via the 1.35 to 1.7 GHz band-pass filter to the output amplifier.

Output amplifier

TR1 to TR3 provide the power amplification needed to give the 13 dBm output level demanded by the specification. Active DC bias is used on these transistors to guarantee stability of their operating point and hence of linearity. DC bias is supplied by a feedback system based on IC1b, c and d. R40, R42 and R48 are the current sensing resistors for the system. A constant voltage is maintained across each of them by the feedback loop. Because of the power output of the final transistor TR3 it is flange mounted and bolted to the floor of the RF casing for heat dissipation.

Signal levelling

For operation above 1350 MHz where frequency doubling takes place, the Levelling Detector circuit on this board replaces that on board AB2/2. This is a negative detector and comprises D19 and source follower IC5b. The output from IC5b is fed out on the DETECT line to RF board AB2/2. Temperature compensation for this levelling path is supplied by D17 and IC5a, whose output is also fed to AB2/2.

Non-doubled protection

For frequencies below 1350 MHz the signal output level is monitored by the non-doubled RPP (Reverse Power Protection) circuit. This has both positive and negative arms with the stand-off voltages set by Zener diodes D3 and D4 respectively. When the output voltage swing rises sufficiently to cause either D1 or D2 to be forward biased it conducts and so limits that voltage peak.

Board AB3/2 differences (AB3/2 sheet 1)

Servicing diagrams: Figs. 7-40, 41.

Board operation is similar to that described above for board AB3/5, the main differences being that the component references are different and that the doubler path has reverse power protection.

Doubler path protection

For the doubled frequencies the output is monitored by the Doubler RPP circuit. The positive arm is formed by diodes D13 and D14 while the negative arm is provided by TR3. Operation is similar to that of the Non-doubled RPP circuit described above.

BEAT FREQUENCY OSCILLATOR BOARD - AB4/1

Servicing diagrams: Figs. 7-42, 43.

Board AB4/1 generates the signal generator low frequency band in the range 10 kHz to 21.09375 MHz. It does this by mixing a reference local oscillator (LO) signal at 104.8576 MHz with an RF signal in the range 104.8676 to 125.96135 MHz.

The reference signal on the LO IN line from control board AA1/3 is fed from PLBM to the tuned LO amplifier. This is based upon TR1 with tuning elements L10 and C14. The amplifier delivers the LO signal at around 17 dBm to the LO port of mixer X1.

The RF signal from one of the AB3 boards (AB3/1, AB3/3, AB3/4 or AB3/5) on the BFO BAND RF IN line is passed through the 135 MHz elliptic low-pass filter formed by C1 to C5 and L1 to L4. This reduces the input harmonic content to the RF port of the mixer. The signal is then attenuated by R1, R2, R3, R26 and R27 to reduce the RF drive level to mixer X1 and thereby reduce the output intermodulation products. Thermal compensation is included in the attenuator using thermistor R27 to counteract drift in RF output level.

Mixer output is low-pass filtered at 35 MHz to reduce harmonic content and is diplexed to absorb the intermodulation products generated by the mixer. The low-pass arm is formed by L5 to L8 and C6 to C8 while the high-pass arm formed by C9, L9 and C10 is terminated in the characteristic impedance of the system to absorb maximum high frequency power.

The low frequency signal is then fed to the 28 dB output amplifier formed by TR2 and TR4. TR4 is a medium power device capable of delivering up to 19 dBm and has active bias using TR3. Output on the BFO BAND OUT line is back to one of the AB3 boards.

The +15 V supply is taken from RF processing board AB2/2 at PLBV and is supplied via the low-pass filter formed by L11, C11 and C12.

FRONT PANEL CONTROL BOARD - AF2/2 & KEY MATRIX BOARD - AF1

Servicing diagrams: Figs. 7-44 to 7-48.

Front Panel Control board AF2/2 contains its own microprocessor (a second, main processor is on board AA1/3) plus memory, as well as interface circuitry which controls the front panel functions of display and data entry. Data entry is via keyboard AF1.

FRONT PANEL CONTROL: PROCESSOR AND MEMORY (AF2/2 sheet 1)

Circuit diagram: Fig. 7-47.

Microprocessor and memory

Front panel microprocessor IC2 is an 80C31 which uses an 8-bit data bus and a 16-bit address bus to address its memory and to control the output latch. It derives its clock from 10 MHz crystal XL1. At power on, a reset pulse is provided by R1 and C3. This is inverted by IC10a to provide a reset pulse for LCD controller IC13 (sheet 2).

The processor executes code contained in IC12, a 64 kbyte EPROM containing the operating program. PSEN provides the active low read strobe for IC12, and is equivalent to RD for the screen memory. The 128 bytes of RAM contained within the 80C31 (giving fast access) and used for scratch-pad purposes are supplemented by 8 kbytes in RAM IC15.

The processor uses a multiplexed data bus to accommodate the 16-bit address. Output lines A8 to A15 on port P2 carry the high order memory address. Input/output lines D0 to D7 on port P0 carry either the low order memory address or the data. ALE (Address Latch Enable) is used to differentiate between data and address; when it is taken high the contents of the data bus are treated as part of the address and latched in IC4. The high order address bits on port P2 are decoded by IC3 to provide chip select signals for the RAM and for the various peripheral devices on the board. WR (write) and RD (read) come from two lines of Port 3.

Key matrix AF1 is an 8x5 matrix of 40 keys connected to the Keyboard Column Driver latch IC1 (AF2/2 sheet 2) and 5 lines of Port P1 on the microprocessor configured as inputs. When no key is pressed, all latch outputs are low and P1.2 to P1.6 are pulled high by internal pull-up resistors. Any key press will cause one of these inputs to be taken low. This is detected by software which initiates a scan of the keyboard to determine which key has been pressed.

Ports P1.0 and P1.1 form a two-line interface to the real time clock on power supply board AR1/2. When not in use, both ports are held logically high.

The control knob is connected to a shaft encoder which generates two trains of pulses, X and Y, which are interfaced with the microprocessor at Port P3. As the shaft is rotated the pulses generated are decoded by the processor to determine the direction and rate of movement of the control. P3.4 is an input from the X train, while the Y train is an input which generates interrupt signal INT1. IC9a is an EX-or gate which is used to invert the interrupt signal under the control of output P3.5. When the knob is not being turned, the INT1 input will be logically high.

Communication interface

The overall operation of the communication interface is covered in the description for AA1/3 sheet 1. The following describes the operation of the interface performed by the front panel processor.

The front panel microprocessor communicates with the main microprocessor via a serial link. The serial interface in IC2 is used in shift register mode. In this mode, RX/TX on pin 10 is used to transmit or receive data, while SERIAL CLOCK on pin 11 is the clocking output. The

bidirectional data is split onto separately buffered transmit (TX) and receive (RX) lines by IC10b and IC9b. The direction is controlled by port P1.7 (pin 8). This control line is buffered by IC9d and sent to the main processor together with a serial clock on the SCL line, buffered by IC9c.

Three further lines are concerned with synchronization. Two inputs, RRQST (Receipt ReQueST) and RACK (Receipt ACKnowledge) are used to set and reset two R-S bistables formed from the gates of IC7. The RRQST bistable output generates interrupt INT0 to the microprocessor. When required, the states of the outputs are read using the Interrupt Readback Buffers IC10c and d to produce data bits D0 and D1. A write to the same address generates the BTF (Byte To Follow) pulse. The bistable are cleared by the processor using IC8a and b.

FRONT PANEL CONTROL: LCD CONTROLLER (AF2/2 sheet 2)

Circuit diagram: Fig. 7-48.

Contrast and brightness control

The data written to Contrast Control latch IC5 is used to control the LCD contrast and backlight brightness. The three least significant bits control the current supplied to the display backlighting invertor at PLFM contact 2. Current from the +24 V rail of the power supply passes through interference filter L1, C19 and C20 to the current invertor and then to earth via Brightness Control IC19. When bit 2 of the data to IC5 is set, the resistors on the outputs of IC19 are by-passed and full brightness is obtained. When bit 2 is low, bits 0 and 1 are used to enable two sets of series resistors, R16 to R19 and R20 to R23 to be interposed either singly or in parallel giving three lesser stages of brightness. If all three bits are low, the backlight is turned off. The remaining data bits to IC5 control a 5-bit D-A converter formed by R9 to R13 and IC6. This provides a voltage, of approximately -11 V to the LCD, which is adjusted to set the contrast and viewing angle. This output may be disabled by TR2 (see below). Thermistor R3 provides temperature compensation to match the LCD characteristics over the temperature range of the instrument.

LCD controller and screen memory

The LCD (Liquid Crystal Display) unit is driven by LCD Controller IC13 which provides the necessary signals on connector PLFG to the LCD unit. The controller has a 10 MHz clock derived from crystal oscillator XL2. At power-on the RST input is supplied with an active-low reset pulse from IC10a (sheet 1). Inputs SEL1 and SEL2 are tied low to select operation under control of the 8031 microprocessor. Lines D0 to D7 convey data to and from the front panel processor when addressed on chip select line CS3. A0 operates in conjunction with the active-low RD and WR signals. For a read, either data or the status flag is read from Screen Memory IC14. For a write, either commands or data are strobed into memory.

The controller is connected to IC14, a 32 kbyte RAM which stores the screen data. Outputs A0 to A14 convey the 15-bit address which is latched into the memory on the trailing edge of the pulse from VCE. VD0 to VD7 are tristate outputs connected to the 8-bit bi-directional data bus. The data is controlled by VR/W which is taken high or low respectively to indicate when the read or write data is settled and valid.

XD0 to XD4 supplies the 4-2-bit data word for the display module. The trailing edge of the XSCL signal causes the pixel data to be stored in the display. LP supplies the line synch pulse while YD supplies the frame synch pulse. WF is active high for the duration of a frame which has a frequency of 70 Hz.

Were the LCD controller to become disabled, output YD15 would go low which would switch off TR1 supplying base current to TR2. This in turn would switch off to remove the VLCD signal so as to disable the display.

LCD column corrector

The circuitry comprising IC16, IC17, IC18 and IC11 inhibits 12 pulses of the XSCL control line to match the controller to the LCD unit. IC16 is configured as an 8-bit binary counter which counts the XSCL pulses from the LCD controller. The ongoing count is supplied in parallel to comparators IC17 and IC18. IC18 compares this data with 100 while IC17 compares it with 112. When no match is found both output pins 19 are logically high. But when a count of 100 is reached, IC18 outputs a low pulse. This takes IC11 pin 2 high and, with pin 1 already high, a low is output to pin 9 which gates off the XSCL pulses. Not until a count of 112 is reached, when IC17 pin 19 goes low, is the gate reopened. By this means only 400 pixels are displayed per line as required.

Board AF2 differences

This board is very similar to AF2/2 except that the RRQST and RACK R-S bistables are ORed together to generate processor interrupt INT0. Also TR1 and TR2 are not present.

PSU BOARD - AR1/2

Servicing diagrams: Figs. 7-49, 50.

Board AR1/2 provides the power supply voltages of +5 V, +15 V, -15 V, +24 V and +26 V for the instrument, the edgeline attenuator coil drive, the real time clock and the brown-out circuitry. The unit has current limiting on the voltage rails and thermal shut-down in case of overheating. TR1, TR2, TR3, IC2, IC3 and thermistor R12 are all mounted on an aluminium heatsink which is cooled by a fan on the rear panel assembly. The power supply voltage rails are derived from the mains transformer four secondary voltages which are connected to the board at PLRB and PLRR. This board also contains the real time clock and the internal standard disable switch.

Power supplies

The +24 V secondary on PLRB contacts 1 and 2 is rectified by D1 and smoothed by C3. This voltage is then used to supply the instrument's +24 V and +26 V voltage rails.

The +24 V rail supply is generated by a specific monolithic regulator, IC2, and is used to drive the invertor on the front panel from PLRG.

The +26 V rail supply is generated using a standard monolithic regulator, IC3. It is obtained using a feedback loop where the rail voltage is potentially divided by R6 and R7 and is

compared on pins 2 and 3 of IC4a with the precision +5 V reference from IC5. Op-amp output is then used to drive adjustment pin 1 of IC3 and so regulate the rail.

The -15 V secondary is connected to contacts 3 and 4 of PLRB and is rectified by D4 and smoothed by C8. The -15 V rail voltage is potentially divided with the precision +5 V reference from IC5 by R18 and R19. The divided voltage on pin 3 of IC6 is compared with 0 V on pin 2 and the difference is amplified and used to drive the gate of the regulating MOSFET TR1. R13 is the current sensing resistor which, when the current limit is exceeded, turns on TR5 to reduce the TR1 gate-source voltage and so turn it off.

The rectified +15 V secondary is connected to contacts 1 and 2 of PLRR and is smoothed by C12. This voltage is used for the regulated +15 V rail, the edgeline attenuator coil drive and the fan.

The regulated +15 V rail is obtained using a feedback loop where the rail voltage is potentially divided by R30 and R31 and is compared by IC9b pin 6 with the precision +5 V reference on pin 5 from IC5. The difference is then amplified and used to drive the gate of the regulating MOSFET TR2. R25 is the current sensing resistor which, when the current limit is exceeded, causes the output of IC9a to go low turning off TR2 and hence limiting the current.

The rectified +5 V secondary connected to contacts 3 and 4 of PLRR is smoothed by C17. This voltage is used for the +5 V regulated supply and to provide an input to the brown-out circuitry. The +5 V regulated supply is obtained by using a feedback loop where the rail voltage is compared by IC9d pin 13 directly with the +5 V reference on pin 12 from IC5. The difference is amplified and used to drive the gate of TR3. R36 is the current sensing resistor which, when the current limit is exceeded, causes the output of IC9c to go low turning off TR3 and so limiting the current.

IC5 supplies the +5 V reference for the board and is driven by IC4b. The thermal shut-down of the PSU is controlled by this IC. When the difference in sensed temperature between the ambient thermistor, R10, and the heatsink-mounted thermistor, R12, causes the output of IC4b to go low, it turns off the +5 V reference and thus all of the power supply voltage rails.

IC7, IC8 and IC10 are run off the unregulated +15 V supply. IC10 is used as a current source to drive the edgeline attenuator reverse power protection (RPP) relay while ICs 7 and 8 are used to provide a +5 V supply to the relays on the edgeline attenuator.

When the +5 V unregulated supply falls below the +5 V reference, the output of IC4c goes high and this is taken off the board at PLRD and PLRE to indicate a brown-out (incipient power supply failure). When this happens a pulse is generated by the timing components C22 and R44 causing IC4d to transmit this pulse to the edgeline attenuator to trip the RPP relay.

The fan is driven by the unregulated +15 V rail and this is taken from the board at PLRC.

Real time clock

Real time clock IC1 is located on this board and its output is taken to the front panel at PLRG. The timing is derived from 32.768 kHz crystal XL1. The operation of the IC is maintained by a battery mounted on the rear panel and connected to PLRH.

Internal standard disable switch

Transistor switch TR4 supplies +5 V power to the internal standard OCXO on board AR2/1. TR4 is used to disable the internal standard when the external standard is selected. Control is exercised by AA1/3 which takes PLRD contact 4 high to switch off the transistor.

Board AR1 differences

On this board the -15 V secondary is connected to contacts 3 and 5 of PLBR, and the rectified +5 V secondary is connected to contacts 3 and 5 of PLRR.

INTERNAL FREQUENCY STANDARD BOARD - AR2/1

Servicing diagrams: Fig. 7-51, 52.

Board AR2/1 contains the 10 MHz OCXO (oven controlled crystal oscillator) which provides the internal frequency standard for the instrument. Overall operation of the frequency standard (both internal and external) is explained under AA1/3 sheet 7.

The +15 V power for the OCXO is supplied from PSU board AR1/2 to PLRL contact 1 with additional smoothing provided by C1. The line to the OCXO is via +12 V regulator IC1 and C5. A control line from AR1/2 is fed to the relay drive circuit formed by TR1 and TR2. When INT STD is selected on the instrument this control line is taken high (+5 V) which causes the RLA contacts to close. Conversely when EXT STD is selected the line is taken low and the relay contacts open. This disconnects the 10 MHz OCXO signal in order to prevent crosstalk or beating occurring. The switching signal is OCXO POWER ON from board AA1/3 which controls switching transistor TR4 on board AR1/2. PLRL contact 9 carries the OCXO TUNE signal from AA1/3 via AR1/2. Output at TTL levels to PLRM supplies the internal standard to AA1/3.

Board AR2 differences (AR2 sheet 1)

Servicing diagrams: Fig. 7-53, 54.

The +5 V power for the OCXO is supplied from AR1 and fed in from PLRL contact 2 via a low-pass filter formed by C2, L1 and C3. This power is switched off during external standard operation.

EDGELINE CONTROLLER BOARD - AT11/1 & ATTENUATOR UNIT - AT10

Servicing diagrams: Figs. 7-55, 56.

Edgeline controller board AT11/1 performs three basic functions. It enables any desired attenuator pad configuration to be set, it holds on-board calibration data for each pad in an EEPROM, and it provides the detection and tripping circuits for the reverse power protection facility for the RF output of the instrument.

Communication with the main processor on AA1/3 is via PLTC which is connected to the 4-bit nibble bus to AA1/3. It uses front panel control board AF2/1 as a mini-motherboard to establish this link. Address information from buffer IC2 is latched into IC9 before being decoded by IC10. IC10 is used to clock valid data into the appropriate latches.

Attenuator operation

The pad selection data is expanded to an 8-bit byte to reduce circuit complexity as the attenuator contains 12 pad-driving solenoids (one each for inserting and removing a pad). This expansion is done by using IC5 to hold one 4-bit nibble (the least significant) and using the current valid data as the most significant nibble. The full 8-bit byte is then loaded into either Pad Insert Latch IC6 or Pad Removal Latch IC7. These devices control the switching of the pads by means of TR1 to TR12. Resistor packs R6 and R7 set the base current for the transistor switches, while R22a and b pull the latches' tristated outputs down to earth when they are in the high impedance state.

To reduce power consumption the solenoids are pulsed. The pulses are provided by Timing Monostables built around IC11a and IC12a, b and c. Three pulses are generated, one to activate the insertion of the pads, one for the removal and then a gap between these to ensure that they are inserted before any are removed. This ensures that there is always a drop in the output RF level whenever the attenuation is changed. Schmitt invertor IC12a with timing components C1 and R3 generates the first 20 ms pulse for Pad Insert Latch IC6. IC12c with C3 and R5 generates the final 20 ms pulse to Pad Removal Latch IC7 while IC12b with C2 and R4 generates a 10 ms delay between these two events.

Calibration data for each pad is held on-board in serial input EEPROM IC4. Information is written to this device during the factory calibration of the attenuator unit. However, the device is addressed each time the instrument is switched on to transfer the data to the more local, high speed, memory on processor board AA1/3. The EEPROM is under the control of latch IC3.

Reverse power protection

The RPP (Reverse Power Protection) trip facility is provided by IC14. The signal level at the output of the attenuator is sensed by two diodes within the attenuator assembly which make contact with PLTE contacts 1 and 2. If this level exceeds the predefined level set by R16, R18, R19 and R21 the window comparator formed by IC14a and b trips. Schmitt invertor IC12e, using timing components C6 and R10, then generates a 20 ms pulse via IC12f and D11 which turns on TR13. This transistor drives solenoid RLG2 so disconnecting the damaging signal from the rest of the instrument. To restore the RPP, the appropriate address is selected by IC10 which resets IC13a. This causes IC12d with C4 and R8 to generate another 20 ms pulse, switching on TR14 which energizes relay RLG1, so restoring normal operation.

IC1c prevents this relay stage from resetting should a request to reset the RPP be received while the overload condition persists. To ensure that the RPP relay is forced open when the instrument is powered down, a SHUT-DOWN signal (PLTD contact 3) from PSU board AR1/1 is wire OR-ed by D11 with the existing on-board signal.

The pad relays are driven from the +5V(H) rail (PLTD contact 8) while the RPP stage is driven from a separate rail which is current limited to 0.5 A (PLTD contact 6). The latter rail

runs from the +15 V reservoir capacitor on the PSU board to ensure that a pulse of duration greater than 20 ms is delivered to the RPP relay during the power down of the instrument.

The 4-bit nibble bus is bi-directional so allowing the microprocessor on AA1/3 to read back the data from cal EEPROM IC4 as well the current status of the RPP circuit from IC13a. This function is selected by enabling either IC1a or IC1b which then presents the data on nibble bus line D1 or D0 respectively. Resistors R1 and R2 prevent bus contention should the board be addressed while IC1a or IC1b is still active.

Chapter 5-0
MAINTENANCE

CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

This chapter provides servicing support information for the three chapters which follow:

5-1: PERFORMANCE TESTING - procedures for verifying that the equipment complies with the Performance Data in Chap. 1.

5-2: ADJUSTMENT AND CALIBRATION - tests and adjustments for restoring the equipment to peak performance.

5-3: FAULT DIAGNOSIS - procedures for localizing faults to at least sub-assembly level (normally a printed circuit board), together with information on repair and replacement.

In case of difficulties which cannot be resolved with the aid of this manual, please contact our Service Division at the address at the rear of the manual for your nearest IFR representative. Always quote the type number and serial number found on the instrument data plate.

SAFETY PRECAUTIONS

Although this equipment has been designed and constructed in accordance with international safety standards, it is important that the advice given under 'Servicing Precautions' at the front of this manual should be observed in all maintenance procedures to ensure safe working practices. In addition to these precautions, special handling techniques are required for certain items, as below.

ROUTINE MAINTENANCE

Safety testing and inspection

In the UK, the 'Electricity at Work Regulations' (1989) section 4(2) places a requirement on the users of equipment to maintain it in a safe condition. The explanatory notes call for regular inspections and tests together with a need to keep records.

The following electrical tests and inspection information is provided for guidance purposes and involves the use of voltages and currents that can cause injury. It is important that these tests are only performed by competent personnel.

Prior to carrying out any inspection and tests, the instruments must be disconnected from the mains supply and all external signal connections removed. All tests should include the instrument's own supply lead, all covers must be fitted and the equipment supply switch must be in the 'ON' position.

The recommended inspection and tests fall into three categories and should be carried out in the following sequence:-

1. Visual inspection
2. Earth bonding tests (Class I equipment only)
3. Insulation resistance test

1. Visual inspection

A visual inspection should be carried out on a periodic basis. This interval is dependent on the operating environment, maintenance and use, and should be assessed in accordance with guidelines issued by the Health and Safety Executive (HSE). As a guide, this instrument when used indoors in a relatively clean environment would be classified as 'low risk' equipment and hence should be subject to safety inspections on an annual basis. If the use of the equipment is contrary to the conditions specified, you should review the safety re-test interval.

As a guide, the visual inspection should include the following where appropriate:

Check that the equipment has been installed in accordance with the instructions provided (e.g. that ventilation is adequate, supply isolators are accessible, supply wiring is adequate and properly routed).

The condition of the mains supply lead and supply connector(s).
Check that the mains supply switch isolates the instrument from the supply.
The correct rating and type of supply fuses.
Security and condition of covers and handles.
Check the supply indicator functions (if fitted).
Check the presence and condition of all warning labels and markings and supplied safety information.
Check the wiring in re-wireable plugs and appliance connectors.
If any defect is noted this should be rectified before proceeding with the following electrical tests.

2. Earth bonding tests

Earth bonding tests should be carried out using a 25 A (12 V maximum open circuit voltage) DC source. Tests should be limited to a maximum duration of 5 seconds and have a pass limit of 0.1 Ω after allowing for the resistance of the supply lead. Exceeding the test duration can cause damage to the equipment. The tests should be carried out between the supply earth and exposed case metalwork, no attempt should be made to perform the tests on functional earths (e.g. signal carrying connector shells or screen connections) as this will result in damage to the equipment.

3. Insulation tests

A 500 V DC test should be applied between the protective earth connection and combined live and neutral supply connections with the equipment supply switch in the 'on' position. It is advisable to make the live/neutral link on the appliance tester or its connector to avoid the possibility of returning the equipment to the user with the live and neutral poles linked with an ad-hoc strap. The test voltage should be applied for 5 seconds before taking the measurement.

IFR Ltd employs reinforced insulation in the construction of its products and hence a minimum pass limit of 7 MΩ should be achieved during this test.

Where a DC power adapter is provided with the equipment, the adapter must pass the 7 MΩ test limit.

We do not recommend dielectric flash testing during routine safety tests. Most portable appliance testers use AC for the dielectric strength test which can cause damage to the supply input filter capacitors.

4. Rectification

It is recommended that the results of the above tests are recorded and checked during each repeat test. Significant differences between the previous readings and measured values should be investigated.

If any failure is detected during the above visual inspection or tests, the equipment should be disabled and the fault should be rectified by an experienced Service Engineer who is familiar with the hazards involved in carrying out such repairs.

Safety critical components should only be replaced with equivalent parts, using techniques and procedures recommended by IFR Ltd.

The above information is provided for guidance only. IFR Ltd designs and constructs its products in accordance with International Safety Standards such that in normal use they represent no hazard to the operator. IFR Ltd reserves the right to amend the above information in the course of its continuing commitment to product safety.

General precautions

Chip components. Numerous chip capacitors and resistors are fitted in this instrument. These have silver palladium end cap terminations with nickel barriers. When soldering these devices the following precautions should be observed.

(i) Use a low melting point solder, and a soldering iron set to 315°C (600°F). The use of a high wattage soldering iron will minimize the time taken to solder the device.

(ii) Take care to avoid mechanical damage from flexing the PCB.

Static sensitive components. The CMOS integrated circuits used in this instrument have extremely high input resistance and can be damaged by accumulation of static charges (see preliminary pages, 'Servicing Precautions'). Boards that have such integrated circuits all carry warning notices against damage by static discharge. Take care also when using freezer sprays to aid fault finding. These can create a static charge likely to change the programmed memory of (E)PROMS.

Bulkhead connectors and gaskets. To ensure that no RF leakage occurs all bulkhead connectors and lid sealing gaskets must be securely fitted. It is essential that the unit lids are correctly relocated in their slotted recesses after removal and all the screw type connectors are tightened up to their specified torque (see 'Torque setting' below).

Torque setting. When replacing semi-rigid pipe connections it is imperative that the following torque setting is used:-

SMA : 99 to 106 N-cm

TEST EQUIPMENT

The test equipment for use in Chaps. 5-1 and 5-2 is shown in Table 5-0-1. Alternative equipment may be used provided it complies with the stated minimum specification.

TABLE 5-0-1 TEST EQUIPMENT

Description	Minimum specification	Example	Use@
Power meter and Sensor	±0.1 dB from 10 kHz to 5.4 GHz	IFR* 6960B and 6910 or 6912 sensor	PA
Measuring receiver	0 dBm to -127 dBm; 2.5 MHz to 1300 MHz	HP8902A and 11722A sensor and 11793A down converter	P
Signal generator	8 dBm from 1.3 to 5.4 GHz	IFR* 2032	P
Frequency counter	10 Hz to 2.7 GHz	EIP535B or IFR* 2440	P
Audio analyzer	Capable of measuring THD below 0.03% from 100 Hz to 20 kHz. Capable of measuring 0.5 mV ±3% and levels at 10 Hz	HP8903B Rhode & Schwarz UPA3	P
Digital multimeter	DC to 500 kHz, 1 mV to 5 V	Datron 1061A	P
Digital voltmeter (DVM)	DC to 100 kHz	Solatron 7150+	A
Modulation meter	AM, FM and ΦM. 1.5 MHz to 1 GHz. Accuracy better than 1.1%. Modulation freqs from 30 Hz to 50 kHz	IFR* 2305 plus distortion option*	PA
Spectrum analyzers	10 kHz to 8 GHz	IFR* 2390	P
	10 kHz to 1.35 GHz	IFR* 2392	A
Function generator	DC to 500 kHz sine wave ±0.6 dB flatness	HP3325B	PA
DC source	-1.5 V DC ±0.1 V		A

@ P = Performance testing A = Adjustment and calibration

*IFR Ltd was previously known as Marconi Instruments Ltd

* The distortion option of the 2305 Modulation Meter allows modulation distortion tests to be carried out with greater ease. If a 2305 with a distortion option is not available, the Audio Analyzer may be connected to the Modulation Meter LF output and set to measure distortion.

ACCESS TO UNITS AND BOARDS

The procedures below follow the order of access for servicing, removal of units and boards and operation with RF tray removed.

ACCESS FOR SERVICING

Removal of outer covers

To remove either the top or bottom outer cover it is first of all necessary to remove the 2 rear support feet. This involves prising off the 2 plastic plugs in each of the feet and removing the screws and feet. Next remove the single retaining screw at the centre rear of the cover. Slide the cover slightly to the rear then lift off.

Most servicing is performed commencing with removal of the top outer cover. However, removal of the bottom outer cover enables the RF attenuator to be taken out as a unit and also enables the power supply board to be removed.

Access to board AA1/3

Remove the top outer cover which reveals the top of the RF tray. Remove the top tray cover after removal of 33 M4 and 4 M3 screws to gain access to the board (see Fig. 5-0-1).

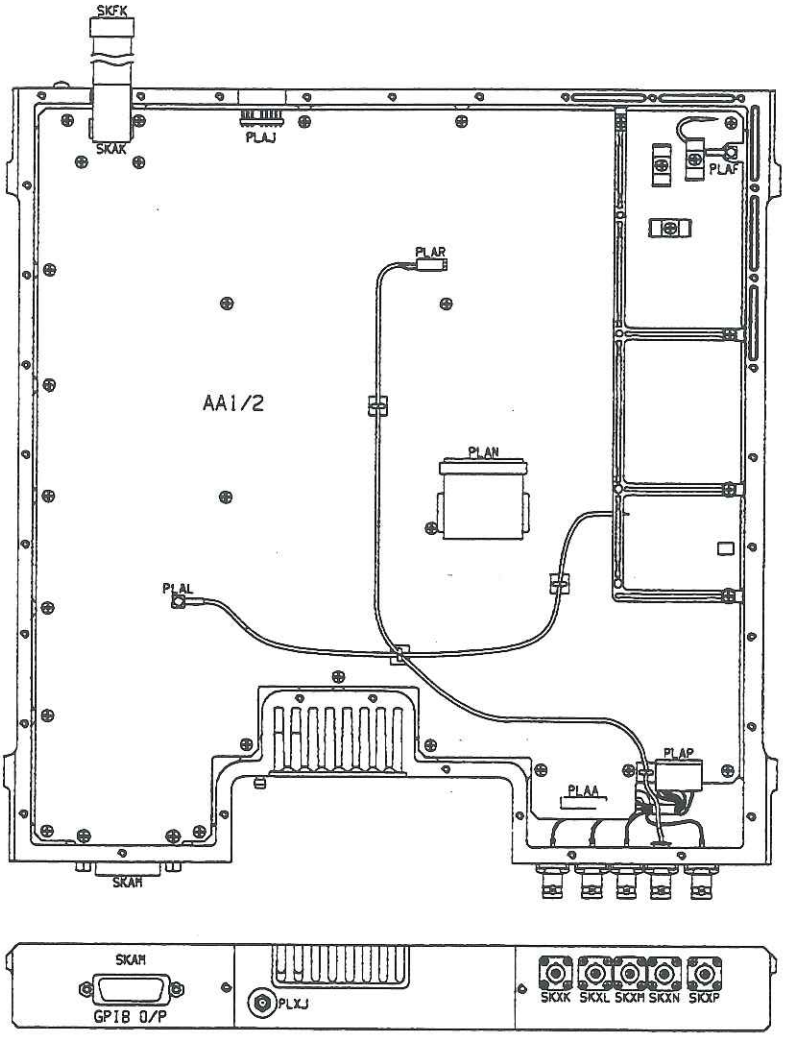


Fig. 5-0-1 RF tray from above and rear with tray cover removed showing board and locations of connectors

Access to boards AB1, AB2/2, AB3/x and AB4/1

Remove the top outer cover and the RF tray (see 'Removal of RF tray' below). Turn the tray upside down to gain access to the underside. Remove the bottom tray cover after removal of up to 35 M4 and up to 19 M3 screws (depending on version of instrument) to gain access to the boards. Note that any screws which are blue varnished are not to be removed. Only one of boards AB3/1, AB3/3, AB3/4, AB3/5 is fitted depending on version of instrument. An internal view of the RF tray from below for the standard non-filter wall version is shown in Fig. 5-0-2 and for the filter wall version in Fig. 5-0-3.

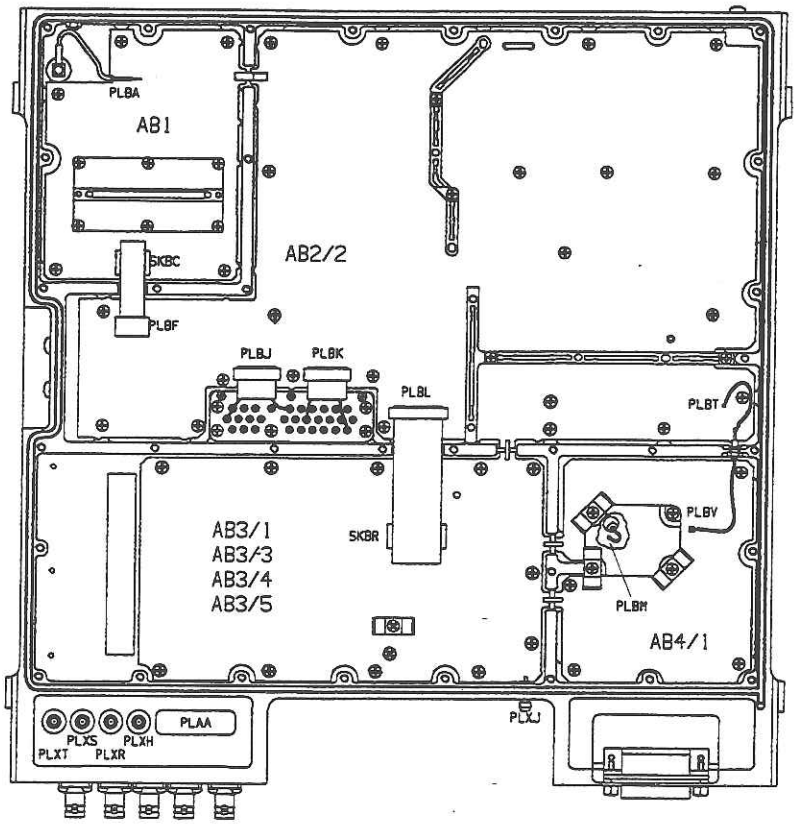


Fig. 5-0-2 RF tray from below with tray cover removed showing locations of boards and connectors (non-filter wall version)

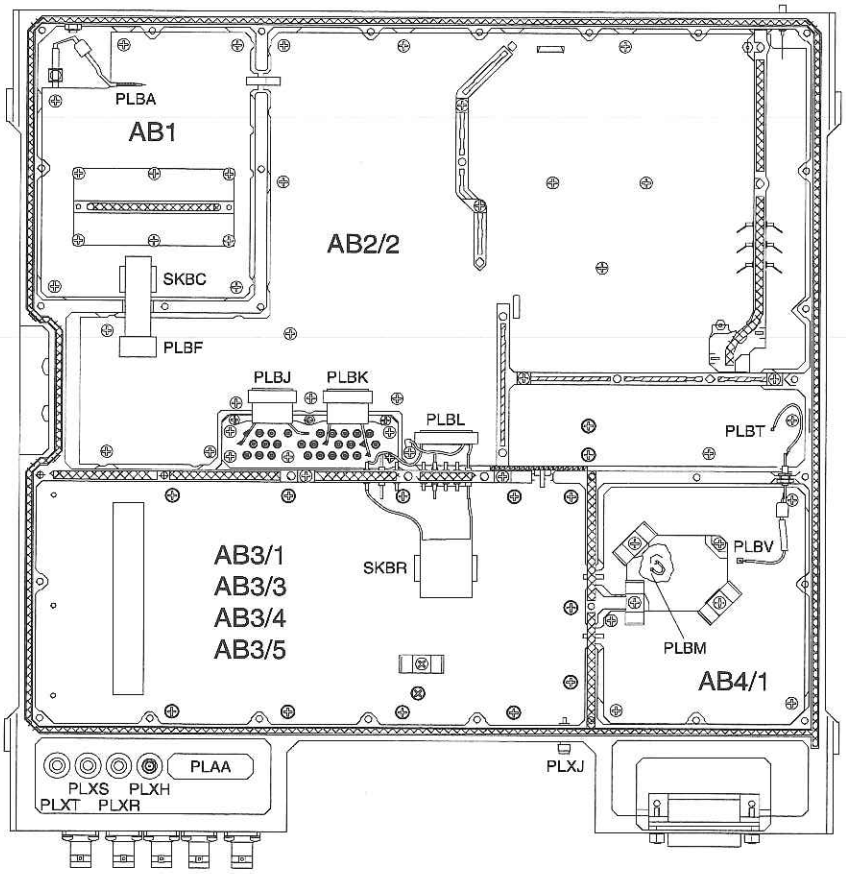


Fig. 5-0-3 RF tray from below with tray cover removed showing locations of boards and connectors (filter wall version)

Access to boards AF1 and AF2/2

To access these boards the complete front panel assembly containing the boards must be removed (see 'Removal of front panel assembly' below). Having done this, further disassembly is necessary (see 'Removal of boards AF1 and AF2/2 from front panel assembly' below).

Access to power supply and boards AR1/2 and AR2/1

Remove the top outer cover and the RF tray (see 'Removal of RF tray' below). This gives access to the power supply unit and boards, which are mounted at the rear of the instrument, from above. If required, the power supply board may be removed (see 'Removal of power supply board AR1/2' below).

Access to board AT11/1

Remove the top outer cover and the RF tray (see 'Removal of RF tray' below). This gives access to the board, which is mounted on the attenuator, from above. For greater access the complete attenuator must be removed (see 'Removal of attenuator unit' below).

REMOVAL OF UNITS AND BOARDS

Removal of RF tray

Most servicing requires removal of the RF tray. This is a machining which rests on lugs at the sides and is held in place by 8 M4 panhead screws. Proceed as follows:

(1) Unscrew semi-rigid SMA output cable to the right of the fan.

(2) Pull off the connector containing 3 coaxial cables in a black housing at the front right (viewed from the front) of the tray.

(3) If pulse modulation (Option 002) is fitted pull off flexible SMB cable to front right bottom corner of the tray.

(4) Remove 3 screws each side (2 at front, 1 at rear) and 2 on the back panel (mid-upper of panel at sides of fan).

(5) Lift front of RF tray just enough to gain access to the connectors at the rear left of the underside of the tray. Pull off a flexible coaxial cable and an 11-way multiple cable.

(6) Lift the RF tray directly upwards and remove.

Replacement is generally a reversal of the above removal procedure. Ensure that the correct torque setting is used when replacing the semi-rigid cable connection (see 'Torque setting' above). An internal view from above with the RF tray removed is shown in Fig. 5-0-4.

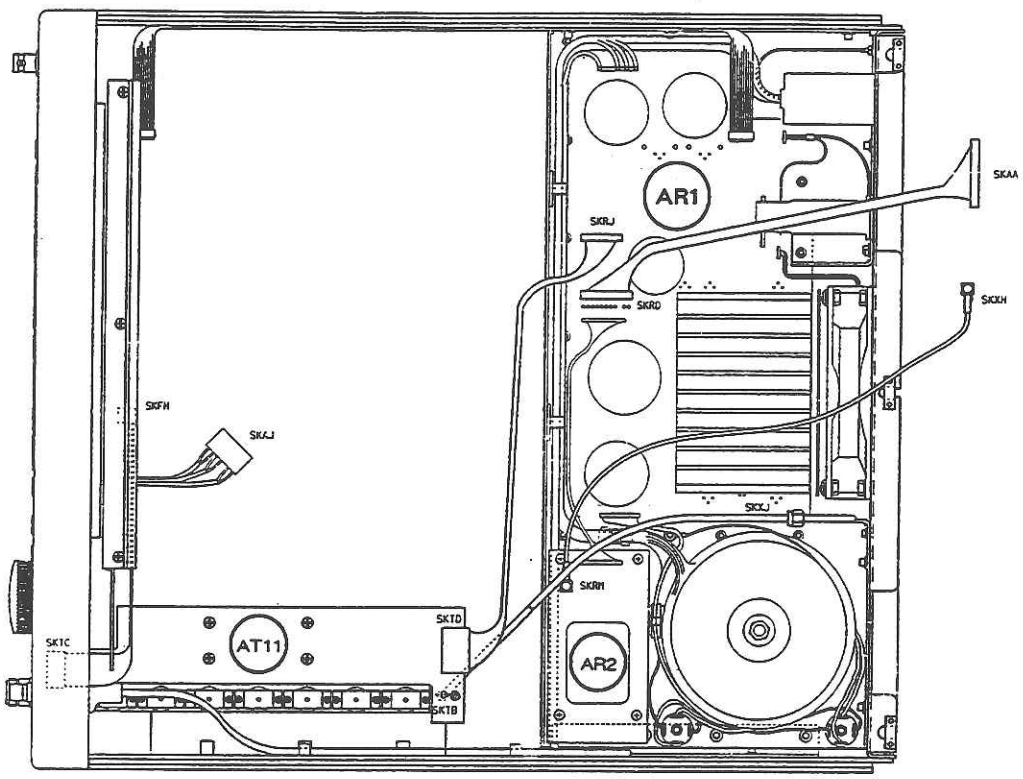


Fig. 5-0-4 Instrument from above with RF tray removed showing locations of boards and connectors

Removal of front panel assembly

Proceed as follows:

(1) Using a screwdriver blade prise off the plastic infills in each of the front panel handles. Remove the 2 M4 panhead screws securing each handle and remove the handles.

(2) Remove the 2 M4 countersunk screws holding the front panel assembly to the mainframe.

(3) Pull off the front panel power supply cable at left-hand rear (viewed from the front) of the panel.

(4) Gently pull the front panel unit away from the mainframe whilst easing the RF OUTPUT socket through the plastic grommet. When able to do so, pull off the remaining connectors. Note the positions of these connectors for later reconnection.

(5) Undo the 2 screws at the right-hand rear of the panel to release the SUPPLY switch.

Replacement is generally a reversal of the above removal procedure. For the locations of the connectors refer to the component layout for AF2/2 in Chap. 7.

Removal of attenuator unit

Proceed as follows:

(1) Turn the instrument upside down and remove the bottom outer cover.

(2) Unscrew the SMA cable facing upwards (viewed from underside of instrument) at the rear of the attenuator.

(3) Remove 2 countersunk M4 screws from the right sidewall of the mainframe. These are at either end of the cut-out in the frame.

(4) Pull off backwards the 8-way supply connector from the rear of board AT11/1.

(5) While supporting the attenuator, push against the front of the RF OUTPUT socket so that it is eased through the plastic grommet.

(6) Pull down and off the 10-way ribbon cable from the front of board AT11/1. Remove the attenuator unit.

Replacement is generally a reversal of the above removal procedure. Ensure that the correct torque setting is used when replacing the semi-rigid cable connection (see 'Torque settings' above).

Removal of board AA1/3

Remove the RF tray and gain access to the board. Then proceed as follows:

(1) Pull off the following connectors:-

9-way connector PLAP,
SMB connector PLAF,
SMB connector PLAL,
34-way ribbon connector PLAN,
3-way coaxial connector PLAR and disengage from cable clips.

(2) Remove the 2 fixing studs on rear face of tray for GPIB connector SKAM.

(3) Unscrew and remove the spring finger and round spacer adjacent to SMB connector PLAF.

(4) Remove all M3 recessed panhead screws (24 peripheral - including 4 in the screen - and 4 inboard). Leave the 2 screws fixing the spring fingers, front left.

(6) Lift the board up by the plastic loop at the front, just enough to clear the side wall, and pull the board out forwards to disengage the GPIB connector from the rear wall opening. Remove the board.

Removal of board AB1

This is the only double-sided board in the instrument. Having gained access to the board proceed as follows:-

(1) Pull off the following connectors:-

SMB connector PLBB,
10-way ribbon connector PLBC.

(2) Unsolder the board link to AB2/2.

(3) Remove all M3 screws, take away cover, and remove the board.

Removal of board AB2/2

Having gained access to the board proceed as follows:-

(1) Pull off the following connectors:-

10-way ribbon connector PLBF,
20-way ribbon cable PLBL,
two 16-way ribbon cable PLBJ, PLBK.

(2) Unsolder PLBT. Unsolder links to AB1 and to AB3/x. If pulse mod is fitted unsolder PLPB.

(3) Remove all M3 screws and take away 2 screens.

(4) Remove 2 M2.5 screws adjacent to R/F OUTPUT and remove the board. Note that on the rear of the board, under IC2, there is a 2-leaf spring which must be protected following board removal.

Removal of boards AB3/1, AB3/3, AB3/4 and AB3/5

Having gained access to the board proceed as follows:-

(1) Pull off 20-way ribbon connector from board AB2/2. If a filter wall is fitted, remove 2 screws holding the wall section in place. This will be removed with the board.

(2) Unsolder 2 links to AB4/1. Unsolder link to AB2/2.

(3) Remove peripheral M3 screws. Remove M2.5 screws.

(4) Unsolder RF output connection and unscrew SMA connector PLXJ from the RF tray. For AB3/4 the SMA connector is fitted in a square brass bush which is to be unscrewed complete.

(5) Remove the board whilst protecting relays on the back of board.

Removal of board AB4/1

Having gained access to the board proceed as follows:-

(1) Unsolder 2 links to AB3/x. Unsolder PLBV.

(2) Remove 4 cover fixing screws and remove cover.

(3) Unsolder PLBM.

(4) Remove M3 screws and remove board.

Removal of boards AF1 and AF2/2 from front panel assembly

Proceed as follows:

(1) Unplug PLFF from board AF1. Unplug PLFL, PLFM and PLFG from AF2/2.

(2) Undo the 6 screws holding the rear cover and remove. This enables the rear of board AF2/2 to be accessed.

(3) Undo 2 screws from the inverter box and pull the box aside.

(4) Remove 6 screws from the support plate to remove AF2/2.

Further disassembly is inadvisable due to the likelihood of dust contamination. If necessary, continue as follows:

5) Undo 4 screws from the support plate and remove.

(6) Undo 4 screws at the corners of the display unit and remove. This gives access to the rear of keyboard AF1.

(7) Pull off the control knob. Remove the block after loosening the self-tapping screw and remove washer.

(8) Unscrew all hexagonal pillars, remove 3 slotted panhead screws and 4 recessed panhead screws. Board AF1 may now be removed.

Replacement is generally a reversal of the above removal procedure. But note that the screen glass window and the face of the display must be cleaned by an anti-static cleaner before reassembly.

Removal of power supply board AR1/2

Proceed as follows:

(1) Turn the instrument upside down and remove the bottom outer cover.

(2) Remove 15 M3 screws from the board (do not disturb the remaining 6 screws which are for the heatsink). Gently lift the board from the mainframe while pulling off 8 connectors. Note the positions of these connectors for later reconnection.

(3) Left within the mainframe are the mains transformer, rectifiers, battery holder, mains inlet and cooling fan.

Replacement is a reversal of the above removal procedure. For the locations of the connectors refer to the component layout for AR1/2 in Chap. 7.

Removal of board AR2/1

Having gained access to the board proceed as follows:-

(1) Pull off the following connectors:-

10-way ribbon connector PLRL,
SMB connector PLRM.

(2) Remove M3 screws and remove board.

Removal of board AT11/1

Having gained access to the board proceed as follows:-

(1) Pull off 3-way connector PLTE.

(2) Unsolder 3 solder joints for each solenoid.

(3) Remove all board screws and remove board.

RF TRAY OPERATION REMOVED FROM MAIN UNIT

For servicing purposes the RF tray may be removed and operated, connected to the instrument by a number of cables. Lay the RF tray to either side of the instrument and facing the same way. Note that cables numbered in brackets below are supplied in the optional Maintenance Kit, 46884-444G.

The following cables are required between the named connectors:-

(1) SKTB on attenuator to SKXJ on the RF tray:
SMA-SMA flexible coax, 0.8 m (43137-785T).

(2) PLRM on frequency standard AR2/1 to PLXH on the RF tray:
SMB-SMB flexible coax, 0.75 m (43137-786P).

(3) PLRD on power supply AR1/2 to PLAA on AA1/3:
Female-female 11-way individual wires, 0.65 m (43137-787X).

(4) SKAJ to PLAJ on AA1/3:
Three coax extension cable, male to female, 9-way housings, 0.8 m (43137-788M).

(5) PLFK front panel AF2/2 to SKAK on AA1/3:
Female-male 16-way extension cable, 0.5 m (43137-789C).

(6) If pulse option fitted, PLXA to SKXA:
SMB-SMB, female to male flexible coax extension cable, 0.5 m (43137-790X).

Chapter 5-1
PERFORMANCE TESTING

For these tests refer to Chap. 5-1 Acceptance Testing, in the Operating Manual.

Blank page.

Chapter 5-2
ADJUSTMENT

CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

This chapter describes adjustments which will restore the instrument to its peak operating condition. Test equipment recommended for this purpose is listed in Chap. 5-0 and summarized for each test procedure. All of the adjustments for the instrument can be carried out from the front panel. Note that for an instrument fitted with the Pulse Modulation Option (Option 002) the additional adjustment procedures given in Appendix B must be carried out.

Test equipment

During the adjustment of the instrument ensure that all the test equipment used is calibrated. Correction figures should be applied where necessary and instruments zeroed if required.

Warm-up time

Allow the instrument to warm-up for at least 15 minutes before calibration.

Key symbols

Note that the **[HARD]** keys are shown in capitals in square brackets and the *[soft]* keys in italics with square brackets.

Unlocking procedure

In order to access the calibration routines it is necessary to unlock the instrument to level 2. First obtain the Fuction Unlocking Facility menu by entering the following:-

[UTIL] *[Utils. Menu 2] [Lock & Unlock]*

Then press *[Unlock Level 2]*. Ceck that he display confirms that the instrument has been unlocked to Level 2, key in the password (the default password to unlock to Level 2 is 123456) and terminate by [enter].

Resetting the password

To reset the password unlock the instrument, then press *[Set Lvl2 Password]* followed by the 6 digit password, and terminate by [enter].

Ensure that a record of the modified password is kept.

For this purpose it is recommended that the adjustment form at the end of this Chapter is duplicated and the modified password recorded on the duplicate.

ADJUSTMENT AREAS

There are 4 areas of the instrument that require adjustment using the software adjustment procedures:

(1) Source and path
(2) RF level
(3) Modulation
(4) Frequency standard

To ensure that the adjustment remains in specification over the calibration period it is advisable to ensure that the figures remain within the +5% and +95% limits stated at the beginning of each section.

Where the instrument is fitted with an option, the procedures described in the appropriate Appendix to this Chapter may add to, or replace, the procedures described below.

Date stamping of adjustments

After each adjustment has been carried out, the new values are saved and the date of adjustment is recorded on the Calibration Utilities Menu. For this reason it is important that the time and date is correct before undertaking adjustments. Time and date can be checked by selecting the Utilities Selection Menu 2 and pressing the *[Set Time & Date]* key. If incorrect, the date can be reset using the *[Set Time]* and *[Set Date]* keys.

Last complete check date

On completion of the adjustment routine or of a calibration check, the date can be recorded. To do this, unlock the instrument to level 2, select the Calibration Utilities Menu, then press the *[Checks Complete]* key. This will result in the *Last Complete Check* date being updated to the current date.

Calibration due date

The date of the next calibration check can be entered from the Calibration Utilities Menu by pressing the *[Set Next Cal Date]* key. On reaching the calibration date, the instrument will display an error message indicating that it should be returned for a calibration check. The recommended calibration interval is 2 years.

Real time clock battery

The real time clock uses a lithium battery to provide uninterrupted power regardless of whether the instrument is switched on or off. Although the estimated life of this battery is 4 years, customers may wish to replace it every 2 years.

PROTECTED USER DATA

The Protected User Data function allows the user to store and retrieve, via the GPIB, up to 64 bytes of data in non-volatile memory. A typical use might be tagging an instrument with an inventory number.

The IEEE 488.2 common command *PUD is used to store data which may be read by the Common Command query *PUD? Stored data is protected against inadvertent change by a simple locking mechanism. The command UNLOCK allows data to be stored, LOCK prevents data from being stored. At power-on the function is locked.

Stored bytes may have any 8-bit value, so the Arbitrary Block Program Data format must be used:-

#<bytecountsize><bytecount...><databytes....>

The data element starts with #, followed by a single decimal digit which specifies the number of decimal digits in the following byte count. Then follow the data bytes as specified in the byte count.

An alternative format is:-

#0<databytes....><Newline+EOI>

The number of data bytes need not be specified but must be terminated by Newline with EOI asserted. This is the only valid termination, Newline is not stored as part of the data, this will also terminate the Program Message.

The response to the *PUD? query is Definite Length Arbitrary Block Response Data which is the same as the first data format described above.

Example:
To store the text 'Signal Generator' (16 characters) send:

```
UNLOCK;*PUD #216Signal Generator;LOCK
```

The response to *PUD? would be:-

```
#216Signal Generator
```

TEST PROCEDURES

1 SOURCE AND PATH ADJUSTMENT

	TEST EQUIPMENT	
Description	**Minimum specification**	**Example**
Digital volt meter (DVM)		Solatron 7150+
AF source	1 kHz sine wave	HP 3325B

ADJUSTMENT	
Source path/calibration	
Source	Path
External Mod 1 (reference)	AM 1
External Mod 1 ALC	AM 2
External Mod 2	FM 1
External Mod 2 ALC	FM 2
	LF
Internal Source 1	
Internal Source 2	
Full calibration figure range:	0 to 65535
5% to 95% calibration figure range:	1638 to 63898

Setting the reference voltage

(1) Connect the AF source output and the DVM input via a T-connector to the EXT MOD 1 INPUT on the UUT. Equipment configuration is shown Fig. 5-2-1.

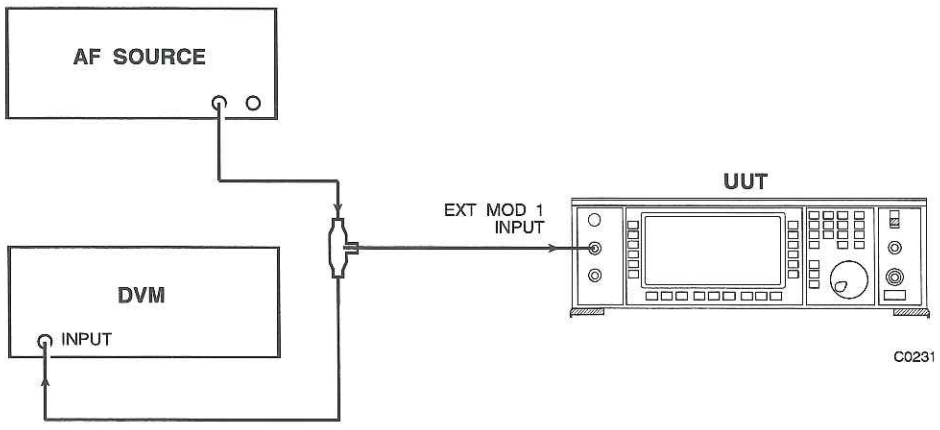


Fig. 5-2-1 Equipment configuration to set the reference voltage

(2) Unlock the instrument to level 2 then select source/path cal as follows:

[UTIL] *[Utils. Menu 2] [Cal. Value] [Source/Path]*

(3) Set the AF source to 1 kHz and adjust the output level until the DVM reads 1 V ±0.08 V RMS.

Measuring the LF output level

(1) Connect the AF source to the EXT MOD 1 INPUT on the UUT. Connect the LF OUTPUT on the UUT to the DVM input. Equipment configuration is shown in Fig. 5-2-2.

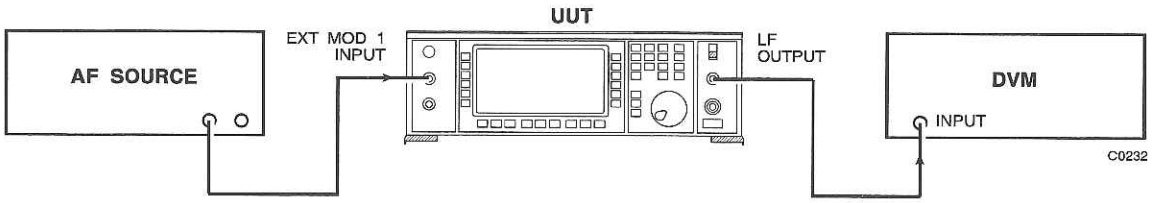


Fig. 5-2-2 Equipment configuration to measure the LF output level

(2) Measure the voltage at the UUT's LF OUTPUT socket on the DVM (and note it as V1).

The EXT 1 source calibration screen should be shown together with the reference calibration figure of 32768.

(3) On the UUT select the *[Next Source]* - EXT 1 ALC.

(4) Adjust the correction figure (using either the keyboard or the knob) until the signal at the LF OUTPUT socket is equal to V1 ±0.02 V.

(5) Connect the AF source to the UUT's EXT MOD 2 INPUT socket.

(6) Repeat steps (2) and (3) for the remaining sources (EXT 2, EXT 2 ALC, INT 1, INT 2) by selecting *[Next Source]*.

(7) When each of the sources has been calibrated, select *[Path Calib.]* and measure the LF output on the DVM (and note it as V1).

The AM 1 path calibration screen should be shown. This sets a reference calibration figure of 32768.

(8) On the UUT select the *[Next Path]* - AM 2.

(9) Adjust the correction figure (using either the keyboard or the knob) until the LF output is the same as V1.

(10) Repeat steps (2) and (3) for the remaining paths AM 2, FM 1 and FM 2.

(11) Select *[Next Path]*. Adjust the output for the LF path to 1 V RMS ±0.02 V.

(12) Save the calibration figures by using *[EXIT], [EXIT], [Save Calib.]*.

2 RF LEVEL ADJUSTMENT

Note that for a 2030 instrument fitted with the High Power Option (Option 003), do not follow the RF level adjustment procedure given below. Instead follow the adjustment procedure given in Appendix A.

TEST EQUIPMENT		
Description	**Minimum specification**	**Example**
Modulation meter	AM accuracy ±1%	IFR 2305
Digital volt-meter (DVM)	DC to 50 kHz	Solatron 7150+
Power meter and Sensor	300 kHz to 4.2 GHz	IFR 6960B & 6912
Power meter and Sensor	10 MHz to 5.4 GHz	IFR 6960B & 6910
Spectrum analyzer	Frequency to 1.35 GHz	IFR 2392
DC source	-1.5 V DC	

ADJUSTMENT

RF Level calibration

(a) **21 MHz to 1350 MHz** (2030, 2031 & 2032)

Process 0 - AM trough nulling
Process 1 - DC offset

Process 2 - RF level calibration 0 dBm and 10 dBm

Cal point 0 - 30 MHz	Cal point 5 - 750 MHz
Cal point 1 - 150 MHz	Cal point 6 - 900 MHz
Cal point 2 - 300 MHz	Cal point 7 - 1050 MHz
Cal point 3 - 450 MHz	Cal point 8 - 1200 MHz
Cal point 4 - 600 MHz	Cal point 9 - 1350 MHz

(b) **1350 MHz - 2700 MHz** (2031 & 2032 only)

Process 0 - AM trough nulling
Process 1 - DC offset

Process 2 - RF level calibration 0 dBm and 10 dBm

Cal point 0 - 1350 MHz	Cal point 5 - 2100 MHz
Cal point 1 - 1500 MHz	Cal point 6 - 2245 MHz
Cal point 2 - 1650 MHz	Cal point 7 - 2400 MHz
Cal point 3 - 1800 MHz	Cal point 8 - 2500 MHz
Cal point 4 - 1950 MHz	Cal point 9 - 2700 MHz

ADJUSTMENT (contd.)

c) **2700 MHz - 4050 MHz** (2032 only)

Process 0 - AM trough nulling
Process 1 - DC offset

Process 2 - RF level calibration 0 dBm and 10 dBm

Cal point 0 - 2700 MHz	Cal point 5 - 3450 MHz
Cal point 1 - 2850 MHz	Cal point 6 - 3600 MHz
Cal point 2 - 3000 MHz	Cal point 7 - 3750 MHz
Cal point 3 - 3150 MHz	Cal point 8 - 3900 MHz
Cal point 4 - 3300 MHz	Cal point 9 - 4050 MHz

(d) **4050 MHz - 5400 MHz** (2032 only)

Process 0 - AM trough nulling
Process 1 - DC offset

Process 2 - RF level calibration 0 dBm and 10 dBm

Cal point 0 - 4050 MHz	Cal point 5 - 4800 MHz
Cal point 1 - 4200 MHz	Cal point 6 - 4950 MHz
Cal point 2 - 4350 MHz	Cal point 7 - 5100 MHz
Cal point 3 - 4580 MHz	Cal point 8 - 5250 MHz
Cal point 4 - 4650 MHz	Cal point 9 - 5400 MHz

(e) **10 kHz - 21 MHz** (2030, 2031 & 2032)

Process 2 - RF level calibration 10 dBm

Cal point 0 - 10 kHz
Cal point 1 -100 kHz
Cal point 2 - 1 MHz
Cal point 3 - 10.546875 MHz
Cal point 4 - 15 MHz
Cal point 5 - 21.0937 MHz

21 MHz to 1350 MHz (2030, 2031 & 2032)

(1) **AM trough nulling** (Process 0) is performed as follows:

(a) Connect the DC source to the EXT MOD 1 INPUT on the UUT. Connect the RF OUTPUT on the UUT to the spectrum analyzer RF input. Equipment configuration is shown in Fig. 5-2-3.

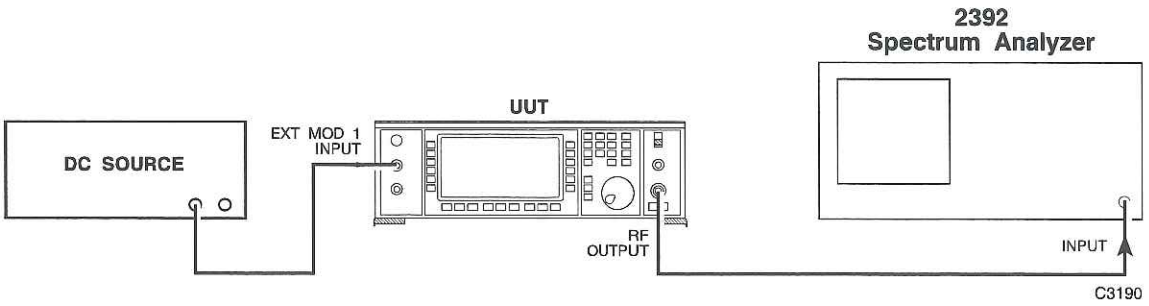


Fig. 5-2-3 Equipment configuration for AM trough nulling

(b) Set up the equipment as follows:

(i) Unlock the UUT to level 2 and select RF level cal as follows:

[UTIL] *[Utils. Menu 2] [Cal. Value] [RF Level] [21 MHz - 1.35 GHz] [Start RF Calib.]*

(ii) Tune the spectrum analyzer to 30 MHz, span 1 MHz.

(c) Apply -1.5 V ±0.08 V DC to the EXT MOD 1 INPUT.

(d) Adjust the correction figure until the carrier signal just reaches a minimum.

(e) Press *[Data Entry]* then *[Next Process]*.

(2) **AM DC offset** (Process 1) is performed as follows:

(a) Connect the RF OUTPUT on the UUT to the RF input on the modulation meter. Equipment configuration is shown in Fig. 5-2-4.

Fig. 5-2-4 Equipment configuration for AM DC offset

(b) Set up the modulation meter as follows:

Autotune
AM measurement
300 Hz to 3.4 kHz filter

(c) Select in turn *[0 dBm Level]* and *[7 dBm Level]* and adjust the correction figure until they give equal AM readings on the 2305.

(d) Press *[Data Entry]* then *[Next Process]*.

(3) **RF level check** is performed as follows:

(a) Connect a suitable power meter to the RF OUTPUT socket of the UUT.

(b) Adjust the correction figures so that the power meter reads 0 dBm ±0.01 dB.

(c) Select *[10 dBm Level]*.

(d) Adjust the calibration figure so that the power meter reads 10 dBm ±0.01 dB.

(e) Select in turn 0 dBm and 10 dBm adjusting for correct RF power at both levels.

(f) Select *[Next Cal Point]*. Repeat steps (a) to (e) until the menu returns to cal point 0.

(g) Press *[EXIT]*, *[EXIT]* and *[Save Calib.]*

1350 MHz to 2700 MHz (2031 & 2032)

(1) **AM Trough Nulling** (Process 0) is performed as follows:

(a) Connect the DC source output to the EXT MOD 1 INPUT on the UUT. Connect the RF OUTPUT on the UUT to the spectrum analyzer RF input. Equipment configuration is shown in Fig. 5-2-5.

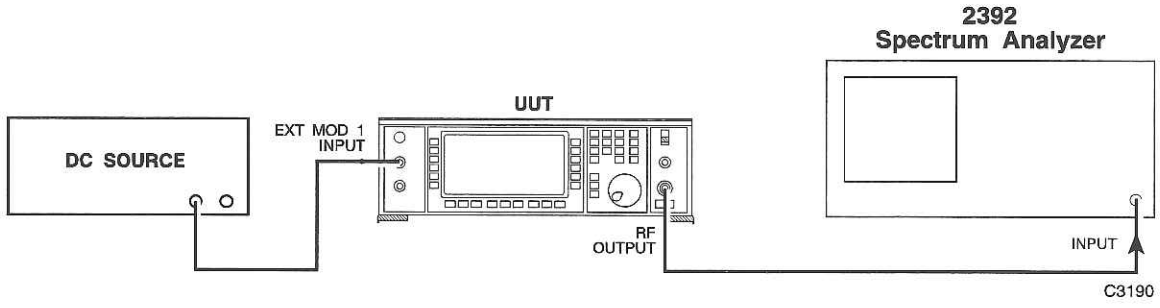


Fig. 5-2-5 Equipment configuration for AM trough nulling

(b) Set up the equipment as follows:

(i) Unlock the UUT to level 2 and select RF level cal as follows:

[UTIL] *[Utils. Menu 2] [Cal. Value] [RF Level] [1.35 GHz - 2.7 GHz] [Start RF Calib.]*

(ii) Tune the spectrum analyzer to 1.35 GHz, span 1 MHz.

(c) Apply -1.5 V ±0.08 V DC to the EXT MOD 1 INPUT.

(d) Adjust the correction figure until the carrier signal is at a minimum.

(e) Note the correction figure:-

AM trough nulling correction figure .....

(f) Press *[Data Entry]* then *[Next Process]*.

(2) **AM DC offset** (Process 1) is performed as follows:

(a) Connect the RF OUTPUT on the UUT to the RF input on the modulation meter. Equipment configuration is shown in Fig. 5-2-6.

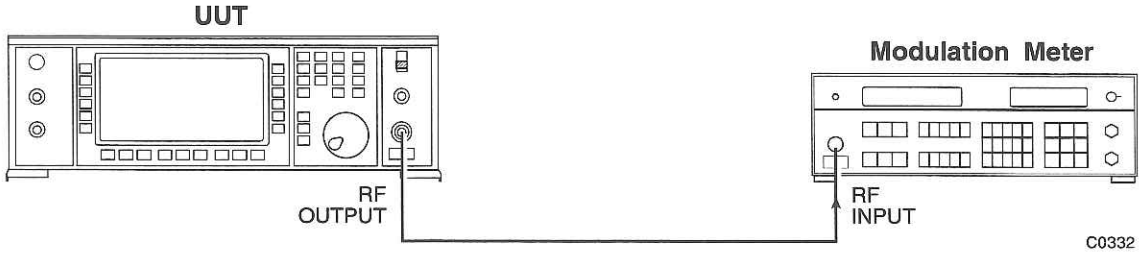


Fig. 5-2-6 Equipment configuration for AM DC offset

(b) Set up the modulation meter as follows:

Autotune
AM measurement
300 Hz to 3.4 kHz filter

(c) Select in turn *[0 dBm Level]* and *[7 dBm Level]* and adjust the correction figure until they both give equal AM readings on the 2305.

(d) Note the correction figure:-

AM DC offset correction figure .....

(e) Press *[Data Entry]* then *[Next Process]*.

(3) **RF level check** is performed as follows:

(a) Connect a suitable power meter to the RF OUTPUT of the UUT.

(b) Adjust the correction figure so that the power meter reads 0 dBm ±0.01 dB.

(c) Select *[10 dBm Level]*.

(d) Adjust the calibration figure so that the power meter reads 10 dBm ±0.01 dB.

(e) Select in turn 0 dBm and 10 dBm adjusting for correct RF power at both levels.

(f) Select *[Next Cal Point]*. Repeat steps (a) to (e) until the menu returns to cal point 0.

(g) Select *[EXIT]*, *[EXIT]* and *[Save Calib.]*.

2700 MHz to 4005 MHz (2032 only)

(1) **AM Trough Nulling** (Process 0) is performed as follows:

(a) Set the correction figure to that recorded for the AM trough nulling in the 1350 to 2700 MHz calibration.

(2) **AM DC offset** (Process 1) is performed as follows:

(a) Set the correction figure to that recorded for the AM DC offset in the 1350 to 2700 MHz calibration.

(3) **RF level check** is performed as follows:

(a) Connect a suitable power meter to the RF OUTPUT of the UUT.

(b) Adjust the correction figure so that the power meter reads 0 dBm ±0.01 dB.

(c) Select *[10 dB Level]*.

(d) Adjust the calibration figure so that the power meter reads 10 dBm ±0.01 dB.

(e) Select in turn 0 dBm and 10 dBm adjusting for correct RF power at both levels.

(f) Select *[Next Cal Point]*. Repeat steps (a) to (e) until the menu returns to cal point 0.

(g) Select *[EXIT]*, *[EXIT]* and *[Save Calib.]*.

4005 MHz to 5400 MHz (2032 only)

(1) **AM Trough Nulling** (Process 0) is performed as follows:

(a) Set the correction figure to that recorded for the AM trough nulling in the 1350 to 2700 MHz calibration.

(2) **AM DC offset** (Process 1) is performed as follows:

(a) Set the correction figure to that recorded for the AM DC offset in the 1350 to 2700 MHz calibration.

(3) **RF level check** is performed as follows:

(a) Connect a suitable power meter to the RF OUTPUT of the UUT.

(b) Adjust the correction figure so that the power meter reads 0 dBm ±0.01 dB.

(c) Select *[10 dBm Level].*

(d) Adjust the calibration figure so that the power meter reads 10 dBm ±0.01 dB.

(e) Select in turn 0 dBm and 10 dBm adjusting for correct RF power.

(f) Select *[Next Cal Point].* Repeat steps (a) to (e) until the menu returns to cal point 0.

(g) Select *[EXIT], [EXIT]* and *[Save Calib.].*

BFO band 10 kHz to 21 MHz (2030, 2031 & 2032)

(1) Unlock the instrument to level 2 and select RF level cal as follows:

[UTIL] *[Utils. Menu 2] [Cal. Value] [RF Level] [BFO Band] [Start RF Calib.]*

(2) **RF level check** is performed as follows:

(a) Connect a suitable power meter to the RF OUTPUT of the UUT.

Note...

It will be necessary to use the DVM and a 50 Ω load for the 10 kHz reading. Adjust the calibration figure until the DVM reads 0.7071 V ±1 mV.

(b) For each of the calibration points it is necessary to adjust the correction figures so that the power meter reads 10 dBm ±0.01 dB.

(c) Select *[Next Cal Point].* Repeat until the menu returns to cal point 0.

(d) Select *[EXIT], [EXIT]* and *[Save Calib.]*

3 MODULATION ADJUSTMENT

TEST EQUIPMENT		
Description	**Minimum specification**	**Example**
Modulation meter	AM accuracy ±1% FM accuracy ±0.5% Carrier freq capability	IFR 2305
Digital volt meter (DVM)		Solatron 7150+

ADJUSTMENT
Modulation calibration Frequency modulation Amplitude modulation Phase modulation Wide band FM Full calibration figure range: 0 to 65535 5% to 95% calibration figure range: 1638 to 63898

Frequency modulation adjustment

(1) Connect the UUT rear panel SWEEP RAMP output via a T-connector to the DVM input and to the EXT MOD 1 INPUT on the UUT. Connect the RF OUTPUT on the UUT to the modulation meter RF input. Connect an external standard to the modulation meter. Equipment configuration is shown in Fig. 5-2-7.

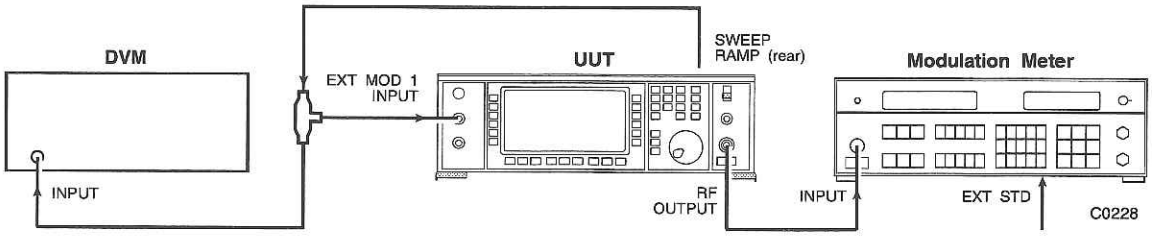


Fig. 5-2-7 Equipment configuration for the FM tests

(2) Set up the equipment as follows:

(a) Unlock the UUT to level 2 and select FM cal as follows:

[UTIL] *[Utils. Menu 2] [Cal. Value] [Mod'n] [FM Calib.] [Select Mod Cal.]*

(b) Set the modulation meter as follows:-

Autotune
Carrier frequency
Carrier error

(c) Set the DVM as follows:-

DC measurement

(3) Press *[Cont FM Cal.]*.

(4) Measure the DC voltage at the EXT MOD 1 INPUT (and note as V0).

(5) Press *[Cont FM Cal.]*.

(6) Enter the voltage measured on the DVM into the UUT (V0).

(7) Press *[Cont FM Cal.]*.

(8) Enter the frequency error in kHz (minimum delta frequency 100 kHz, maximum 500 kHz). Press *[Cont FM Cal.]*. The new correction figure is calculated and displayed.

(9) Press *[EXIT]*. This returns to the modulation calibration menu. Press *[EXIT]* then *[Save Cal.]*. The main calibration menu is displayed.

(10) The FM self cal must be carried out for each VCO. Press *[FM self cal]*, select (VCO 0), (VCO 1,), (VC0 2) and (VCO 3) in sequence using the *[Select VCO]* and *[Start Calib.]* keys. (Each VCO takes about 1 minute to calibrate.)

(11) Press *[EXIT]*, *[EXIT]* and *[Save Calib.]*

Amplitude modulation adjustment

(1) Connect the RF OUTPUT on the UUT to the RF input on the modulation meter. Equipment configuration is shown in Fig. 5-2-3.

Fig. 5-2-8 Equipment configuration for the AM tests

(2) Unlock the UUT to level 2 and select AM cal as follows:

[UTIL] *[Utils. Menu 2] [Cal. Value] [Mod'n] [AM Calib.] [Select Mod Cal.]*

(3) Set up the modulation meter as follows:-

Autotune
AM measurement
300 Hz to 3.4 kHz filter

(4) In the AM calibration mode the UUT's output is set to about 300 MHz and AM is applied with a nominal 50% depth and a modulation frequency of 1 kHz. Adjust the calibration figure until the modulation depth measured on the modulation meter reads 50% ±0.15%.

Phase modulation adjustment

(1) Connect the RF OUTPUT on the UUT to the RF input on the modulation meter. Connect an external standard to the modulation meter. Equipment configuration is shown in Fig. 5-2-9.

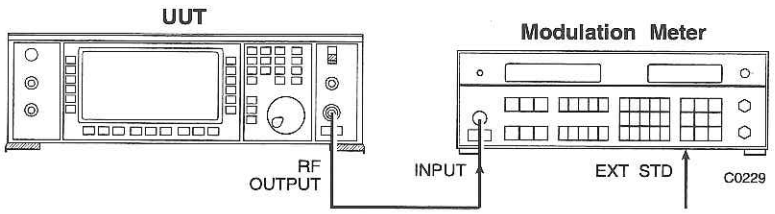


Fig. 5-2-9 Equipment configuration for the phase modulation tests

(2) Set up the equipment as follows:

(a) Unlock the UUT to level 2 and select phase mod cal as follows:

[UTIL] *[Utils. Menu 2] [Cal. Value] [Mod'n] [Phase Calib.] [Select Mod Cal.]*

(b) Set the modulation meter as follows:

Autotune
FM measurement
300 Hz to 3.4 kHz filter
P-P/2

(3) Adjust the calibration figure until the deviation on the modulation meter is 5 kHz ±0.05 kHz. Press *[Exit]*.

Wide band frequency modulation adjustment

(1) Connect the AF source via a T-connector to the WIDE BAND FM IN on the UUT and to the DVM. Connect the RF OUTPUT on the UUT to the modulation meter. Equipment configuration is shown in Fig. 5-2-10.

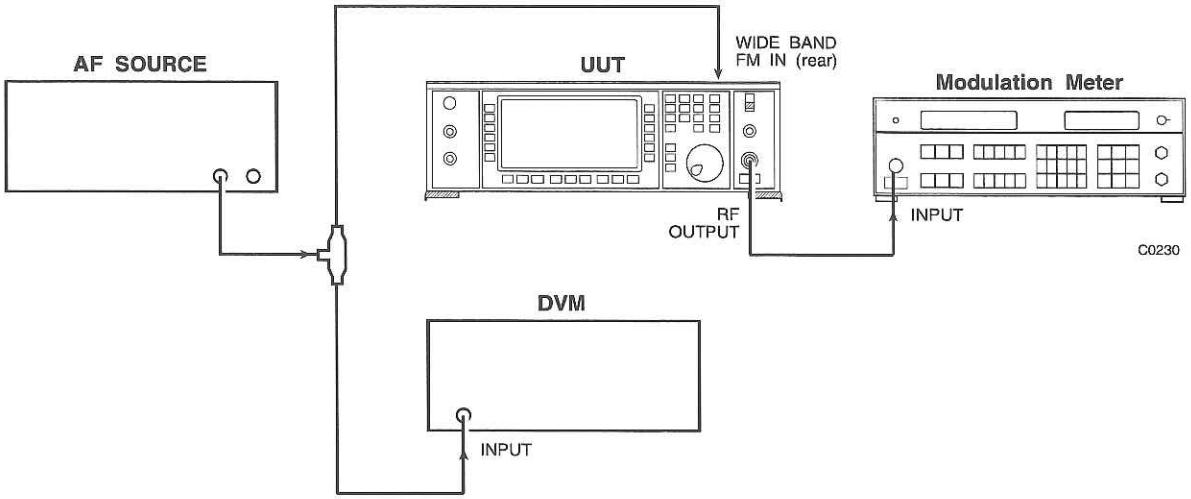


Fig. 5-2-10 Equipment configuration for the WBFM tests

(2) Set the AF source to 1 kHz and adjust the output level to 1 V RMS (and note as V1).

(3) Set up the equipment as follows:

(a) Unlock the UUT to level 2 and select WBFM cal as follows:

[UTIL] *[Utils. Menu 2] [Cal. Value] [Mod'n] [WBFM Calib.] [Select Mod Cal.]*

(b) Set the modulation meter as follows:

Autotune
FM measurement
300 Hz to 3.4 kHz filter
P-P/2

(4) Set the AF source as follows:

1 kHz
1 V RMS

(5) Enter the voltage measured on the DVM. Press *[Cont WBFM cal.]*.

(6) Measure the deviation and enter the value in kHz (minimum 100 kHz, maximum 500 kHz). Press *[Cont WBFM cal]*.

(7) The new WBFM correction figure should be displayed. Press *[EXIT]*.

4 FREQUENCY STANDARD ADJUSTMENT

TEST EQUIPMENT		
Description	**Minimum specification**	**Example**
Modulation meter	Carrier freq capability	IFR 2305

ADJUSTMENT
Frequency standard calibration Coarse tune Fine tune Full calibration figure range: 0 to 255 5% to 95% calibration figure range: 13 to 243

(1) Connect the RF OUTPUT on the UUT to the RF input on the modulation meter. Connect an external standard to the modulation meter. Equipment configuration is shown in Fig. 5-2-11.

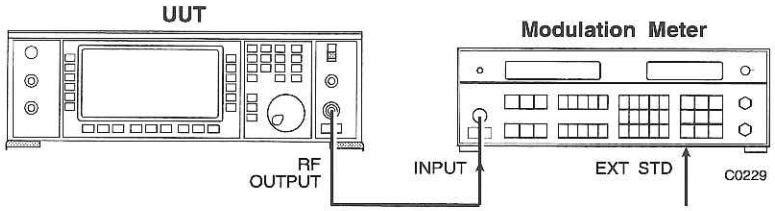


Fig. 5-2-11 Equipment configuration for the frequency standard

(2) Set up the equipment as follows:

(a) Set the frequency and level as follows:

[SIG GEN] *[Carrier Freq]* 1 GHz *[RF Level]* 0 dBm

(b) Unlock the instrument to level 2 and select freq std cal as follows:-

[UTIL] *[Utils. Menu 2] [Cal. Value] [Freq Std]*

(c) Set the modulation meter to the following:-

Auto tune
Carrier frequency

(3) Adjust the coarse frequency standard until the frequency measured on the modulation meter is 1000 MHz ±10 Hz.

(4) Adjust the fine tune until the modulation meter reads 1000 MHz ±1 Hz.

(5) Select *[EXIT], [EXIT]* then *[Save Calib].*

(6) Select *[Checks Complete]* and set *[Next Cal Date]* for 2 years time.

-ADJUSTMENT FORM-

TABLE 5-2-1 ADJUSTMENT FORM

Calibration figures for Serial No. _____

Date _____
Instrument type _____
Options fitted _____
Software passwords
Level 1 _____
Level 2 _____

(1) Source/Path calibration

	Source calibration		**Path calibration**
External 1	_____	AM 1	_____
External 1 ALC	_____	AM 2	_____
External 2	_____	FM 1	_____
External 2 ALC	_____	FM 2	_____
Internal 1 *001	_____	LF	_____
Internal 2 *001	_____		

(2) RF calibration

(a) **21 MHz to 1.35 GHz (2030, 2031 & 2032)**

AM trough _____
DC offset _____

RF level Cal point	0 dBm 6 dBm *003	10 dBm 16 dBm *003
0	_____	_____
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
7	_____	_____
8	_____	_____
9	_____	_____

Page 1 of 3

TABLE 5-2-1 ADJUSTMENT FORM (contd.)

(b) **1.35 GHz to 2.7 GHz (2030 & 2031)**

AM trough _____
DC offset _____

RF level Cal point	0 dBm	10 dBm
0	_____	_____
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
7	_____	_____
8	_____	_____
9	_____	_____

where * = Option no.

(c) **2.7 GHz to 4.050 GHz (2032 only)**

AM trough _____
DC offset _____

RF level Cal point	0 dBm	10 dBm
0	_____	_____
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
7	_____	_____
8	_____	_____
9	_____	_____

(d) **4.050 GHz to 5.4 GHz (2032 only)**

AM trough _____
DC offset _____

RF level Cal point	0 dBm	10 dBm
0	_____	_____
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
7	_____	_____
8	_____	_____
9	_____	_____

TABLE 5-2-1 ADJUSTMENT FORM (contd.)

(e) 10 kHz to 21 MHz (2030, 2031 & 2032)

RF level

Cal point	10 dBm 16 dBm *003
0	_____
1	_____
2	_____
3	_____
4	_____
5	_____
6	_____
7	_____
8	_____
9	_____

(3) Modulation calibration

AM	_____
FM1	_____
ΦM	_____
WBFM	_____
Pulse *002	_____

(4) Frequency standard calibration

Coarse	_____
Fine	_____

where * = Option no.

Page 3 of 3

Blank Page

-ADJUSTMENT FORM-

Appendix A

ADJUSTMENT
- +19 dBm HIGH POWER OPTION -

CONTENTS

LIST OF FIGURES

+19 dBm HIGH POWER (Option 003)

The following adjustment procedure is for a 2030 with the +19 dBm high power option fitted, and is used in place of the RF level adjustment procedure given in Chap. 5-2.

1 RF LEVEL ADJUSTMENT

TEST EQUIPMENT		
Description	**Minimum specification**	**Example**
Modulation meter	AM accuracy ±1%	IFR 2305
Digital volt-meter (DVM)	DC to 50 kHz	Solatron 7150+
Power meter and Sensor	300 kHz to 4.2 GHz	IFR 6960B & 6912
DC source	–1.5 V DC	
Spectrum analyzer	Frequency to 1.35 GHz	IFR 2392

ADJUSTMENT

RF level calibration

(a) **21 MHz to 1350 MHz**

Process 0 - AM trough nulling
Process 1 - DC offset

Process 2 - RF level calibration 6 dBm and 16 dBm

Cal point 0 - 30 MHz	Cal point 5 - 750 MHz
Cal point 1 - 150 MHz	Cal point 6 - 900 MHz
Cal point 2 - 300 MHz	Cal point 7 - 1050 MHz
Cal point 3 - 450 MHz	Cal point 8 - 1200 MHz
Cal point 4 - 600 MHz	Cal point 9 - 1350 MHz

ADJUSTMENT (contd.)
(b) **10 kHz - 21 MHz** Process 2 - RF level calibration 16 dBm Cal point 0 - 10 kHz Cal point 1 - 100 kHz Cal point 2 - 1 MHz Cal point 3 - 10.546875 MHz Cal point 4 - 15 MHz Cal point 5 - 21.0937 MHz

21 MHz to 1350 MHz

(1) **AM trough nulling** (Process 0) is performed as follows:

(a) Connect the DC source to the EXT MOD 1 INPUT socket on the UUT. Connect the RF OUTPUT socket on the UUT to the spectrum analyzer RF input. Equipment configuration is shown in Fig. A-1.

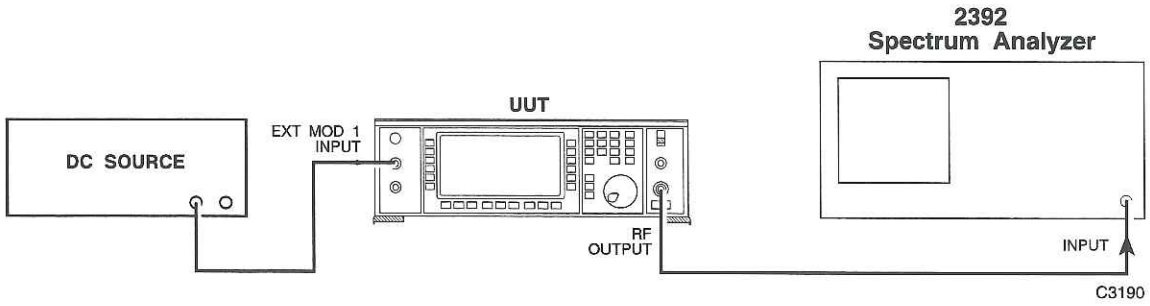


Fig. A-1 Equipment configuration for AM trough nulling

(b) Set up the equipment as follows:

(i) Unlock the UUT to level 2 and select RF level cal as follows:

[UTIL] *[Utils. Menu 2] [Cal. Value] [RF Level] [21 MHz - 1.35 GHz] [Start RF Calib.]*

(ii) Tune the spectrum analyzer to 30 MHz, span 1 MHz.

(c) Apply -1.5 V ±0.08 V DC to the EXT MOD 1 INPUT.

(d) Adjust the correction figure until the carrier signal just reaches a minimum.

(e) Press *[Data Entry]* then *[Next Process]*.

(2) **AM DC offset** (Process 1) is performed as follows:

(a) Connect the RF OUTPUT socket on the UUT to the modulation meter RF input. Equipment configuration is shown in Fig. A-2.

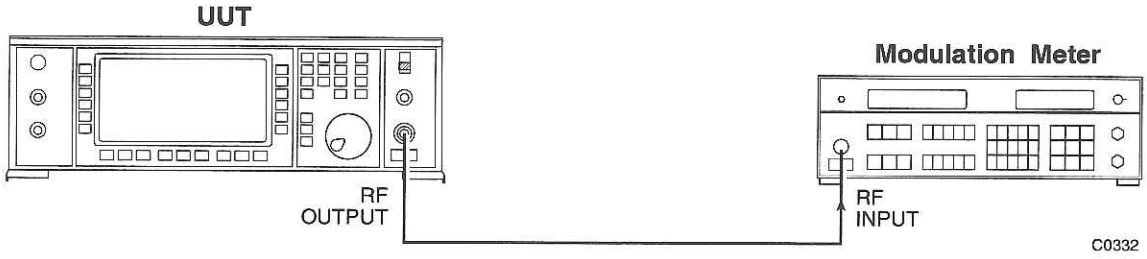


Fig. A-2 Equipment configuration for AM DC offset

(b) Set up the modulation meter as follows:

Autotune
AM measurement
300 Hz to 3.4 kHz filter

(c) Select in turn *[6 dBm Level]* and *[16 dBm Level]* and adjust the correction figure until they both give equal AM readings on the 2305.

(d) Press *[Next Process]*.

(3) **RF level check** is performed as follows:

(a) Connect the power meter to the RF OUTPUT socket of the UUT.

(b) Adjust the correction figure so that the power meter reads 6 dBm ±0.01 dB.

(c) Select *[16 dBm Level]*.

(d) Adjust the calibration figure so that the power meter reads 16 dBm ±0.01 dB.

(e) Select in turn 6 dBm and 16 dBm adjusting for correct RF power.

(f) Select *[Next Cal Point]*. Repeat until the menu returns to cal point 0.

(g) Press *[EXIT]*, *[EXIT]* and *[Save Calib.]*

BFO band 10 kHz to 21 MHz

(1) Unlock the instrument to level 2 and select RF level cal as follows:

[UTIL] *[Utils. Menu 2] [Cal. Value] [RF Level] [BFO Band] [Start RF Calib.]*

(2) **RF level check** is performed as follows:

(a) Connect the power meter to the RF OUTPUT socket of the UUT.

Note...

It will be necessary to use the DVM and a 50 Ω load for the 10 kHz reading. Adjust the calibration figure until the DVM reads 0.7071 V ±1 mV.

(b) For each of the calibration points it is necessary to adjust the correction figures so that the power meter reads 16 dBm ±0.01 dB.

(c) Select *[Next Cal Point].* Repeat until the menu returns to cal point 0.

(d) Select *[EXIT], [EXIT]* and *[Save Calib.]*

2 AMPLITUDE MODULATION CALIBRATION

(1) Connect the RF OUTPUT on the UUT to the RF input on the modulation meter. Equipment configuration is shown in Fig. A-3.

Fig. A-3 Equipment configuration for the AM tests

(2) Unlock the UUT to level 2 and select AM cal as follows:

[UTIL] *[Utils. Menu 2] [Cal. Value] [Mod'n] [AM Calib.] [Select Mod Cal.]*

(3) Set up the modulation meter as follows:-

Autotune
AM measurement
300 Hz to 3.4 kHz filter

(4) In the AM calibration mode the UUT's output is set to about 300 MHz and AM is applied with a nominal 50% depth and a modulation frequency of 1 kHz. Adjust the calibration figure until the modulation depth measured on the modulation meter reads 50% ±0.15%.

Appendix B

ADJUSTMENT
- PULSE MODULATION OPTION -

CONTENTS

LIST OF FIGURES

PULSE MODULATION (Option 002)

The following calibration procedure is for an instrument with the pulse modulation option fitted. This procedure is in addition to the adjustment procedures given in Chap. 5-2.

1 PULSE MODULATION ADJUSTMENT

TEST EQUIPMENT		
Description	**Minimum specification**	**Example**
Power meter and Sensor	300 kHz to 4.2 GHz	Marconi 6960B and 6912

ADJUSTMENT
Pulse modulation calibration Relative RF level adjustment between pulse modulation disabled and pulse modulation enabled.

Adjustment

(1) Connect the RF OUTPUT socket on the UUT to the sensor input. Connect the sensor output to the power meter input. Equipment configuration is shown in Fig. B-1.

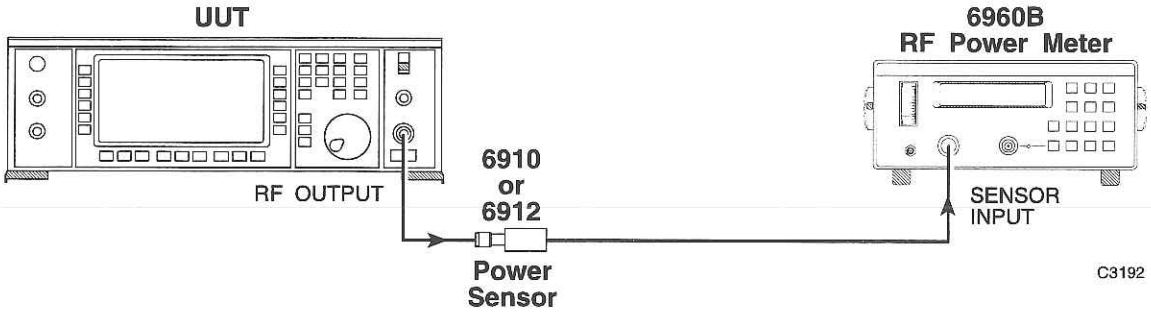


Fig. B-1 Equipment configuration for pulse modulation adjustment

(2) Set up the equipment as follows:

(a) Unlock the UUT to level 2 and select pulse mod cal as follows:

[UTIL] *[Utils. Menu 2] [Cal. Value] [Mod'n] [Pulse Mod. Cal.] [Select Mod. Cal.]*

(3) Measure the RF level on the power meter (and note as L1). This should be nominally 0 dBm.

(4) Press *[Continue Calib.]*.

(5) Adjust the correction figure until the RF OUTPUT equals L1 as measured in step (3) above.

(6) Press *[EXIT]*, *[EXIT]* and *[Save Calib.]*.

Chapter 5-3
FAULT DIAGNOSIS

CONTENTS

LIST OF TABLES

GENERAL PROCEDURE

If an error message is displayed, first of all check for additional information in Tables 5-3-1 and 5-3-2. Then, or if a fault is otherwise suspected, go to the top level Fault Symptom Key Chart. This will indicate, by reference to the symptoms, which function is suspect. This will lead you to one or more lower level flow charts which will enable the fault to be located in a relatively small group of components or functional area. Note that where board AA1 is mentioned, it applies to all versions, e.g. AA1/2, AA1/3.

For a complete understanding of the fault you should read the relevant part of the Technical Description in Chap. 4-2 in conjunction with the Servicing Diagrams in Chap. 7.

A further guide to detailed fault location is provided by the component layout drawings shown opposite the circuit diagrams in Chap. 7.

Note that performance limits quoted in this chapter are for guidance only and should not be taken as guaranteed performance specifications unless they also appear in the Performance Data in Chap. 1 of the Operating Manual.

FUSE REPLACEMENT

Either one or two cartridge-types fuses are located on the signal generator rear panel. These main supply fuses are double time lag, 1.6 A for 90 to 123 V AC and 1 A for 188 to 242 V AC. Always switch off the power supply when replacing a fuse.

ERROR MESSAGES ON 2030 SERIES INSTRUMENTS

Hints on methods of rectifying faults in response to displayed error messages are given in Tables 5-3-1 and 5-3-2.

Note that the instrument will not power up on detecting one of the fatal errors shown in Table 5-3-2.

TABLE 5-3-1 BACKGROUND ERROR MESSAGES

No.	Message	Helpful hint
1	RPP Tripped	Remove reverse power and press *[reset]* key.
2	Fractional N Out of Lock	VCO tune volts are outside normal range of operation, indicating that synthesizer is faulty. Refer to fault finding flowchart for Frequency Error Fault.
3	Int. Standard Failure	No standard signal passing to VCXO phase comparator. Check connector PLAP is fitted and trace standard signal through to TR501. If no 10 MHz on connector, check power to AR2 (note that oscillator power is switched on AR1).
4	Ext. Standard Failure	As for int. Check signal voltage is 2 V pk-pk on ext. standard. Check operation with int. standard selected.
5	Incorrect Ext. Standard	Check ext. standard frequency. Check no errors using int. standard before tracing signal from PLAP to output IC514.
6	VCXO Out of Lock	104.8576 MHz VCXO tune volts is outside normal range. Check that output on flying lead to PLAL is adjusted for maximum using C604. Trace operation of reference loop on AA1.
24	FM Selfcal Error	During the FM selfcal an extreme correction number was required. Check frequency synthesis on VCO in question and deal with frequency errors. Look at FM path if frequency OK.
26	Real Time Clock Problem	Either power for clock was interrupted or processor cannot talk to clock. Reset time and, if required, date; if cannot, check battery connected and battery voltage. Check operation of Real Time Clock on AR1.
27	Calibration Date Expired	First check that time and date are correct, then recalibrate as detailed in Chap. 5-2.

continued/...

TABLE 5-3-1 BACKGROUND ERROR MESSAGES (contd.)

No.	Message	Helpful hint
28	Pad Calibration Checksum	Calibration numbers for attenuator stored on EAROM on attenuator assembly AT10 require recalibration. Recalibrate as detailed in Chap. 5-2.
29 30 31 32 33	RF Calibration Checksum FM Calibration Checksum Path/Source Calibration Absolute Mod. Calibration Freq. Std. Calibration	Data in EAROMs corrupted and requires recalibration. If *[Continue]* pressed, instrument will operate but parameters covered by checksum in question will not be calibrated.

TABLE 5-3-2 FATAL ERROR MESSAGES

No.	Message	Helpful hint
171 172	Main RAM Faulty Main PROM Faulty	Ensure device is correctly fitted. Try another chip, then check address decoding and data bus on AA1.
173	Microwave Board Error	Cannot read back a recognised board type. Check data bus working.
174	Attenuator Type Unknown	Does not read back correct attenuator type. Switch off, disconnect attenuator and power up again to see if nibble bus or attenuator module is at fault.

FAULT FINDING FLOW CHARTS

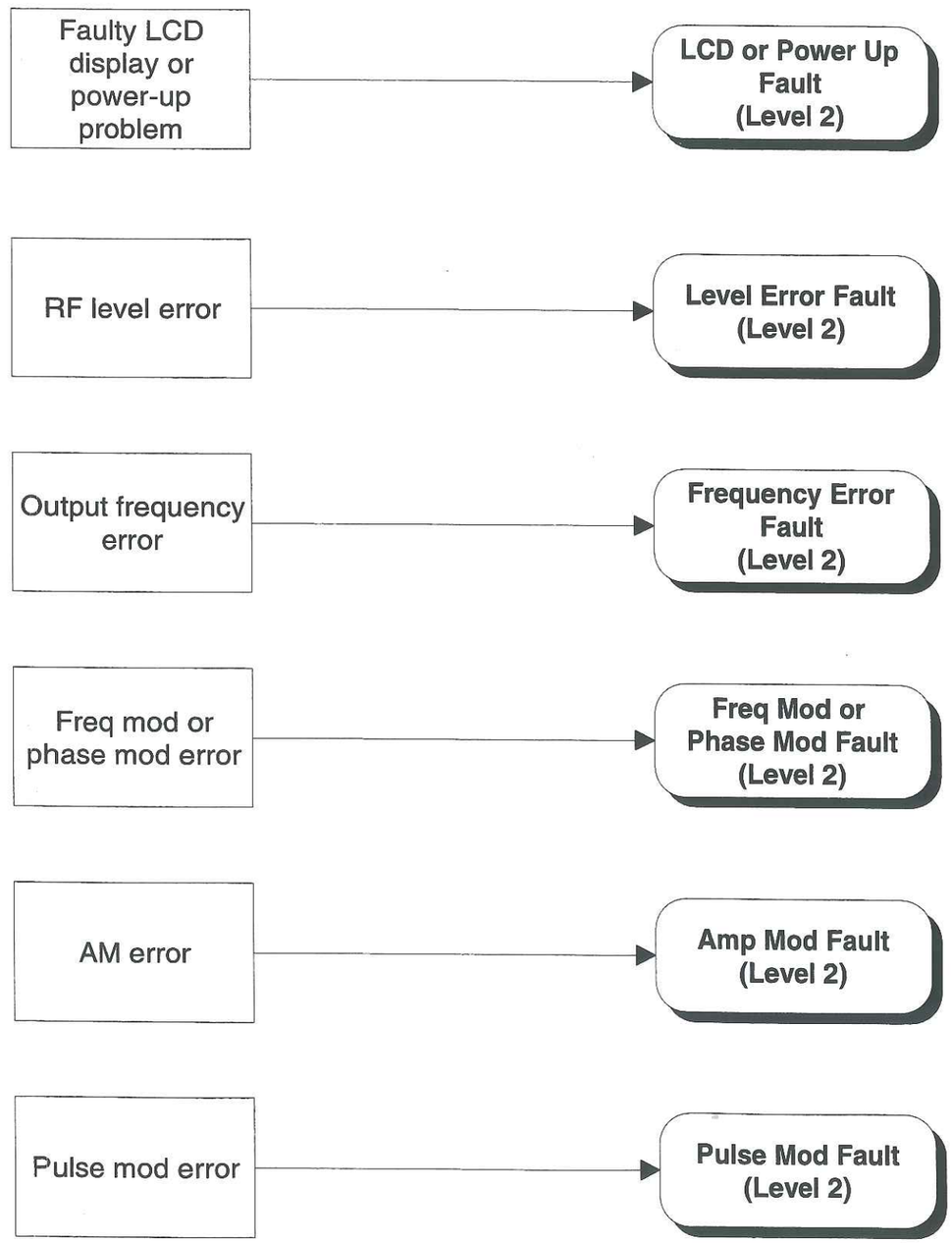
Note...

If Option 005, GMSK Bt 0.3 is fitted do not use these flowcharts. Use instead those given in Annex A.

Blank Page

Fault Symptom Key (Level 1)

IDENTIFY FAULT SYMPTOM AND PROCEED TO FAULT FINDING CHART



Front Panel Processor Tests
(use in conjunction with next page)

Hold down required key during power-up.

'0' → Initial sequence → Exit

A 3-digit number may be incremented/decremented by rotation of the knob to confirm correct operation.

As each key is pressed, it is highlighted on the diagram to show it has been pressed. If all keys have been pressed '0000' will move to next test. If one or more are faulty use one of the other tests to check other functions.

'1' → Initial sequence → Knob test and keyboard test → Display pixel test → Contrast and backlight test → Exit

A vertical stripe may be moved across the display using the rotary knob to check that all pixels may be set to 'on' and 'off'. Press '00' to proceed to next test.

The knob allows contrast/viewing angle setting to be run over its full range. The backlight can be set to four brightness levels and 'off' using the left hand side soft keys.

'2' → Initial sequence → Display pixel test

'3' → Initial sequence → Contrast and backlight test

Any non-numeric key → Initial sequence → Automatic pixel test → Automatic contrast and backlight test → Exit

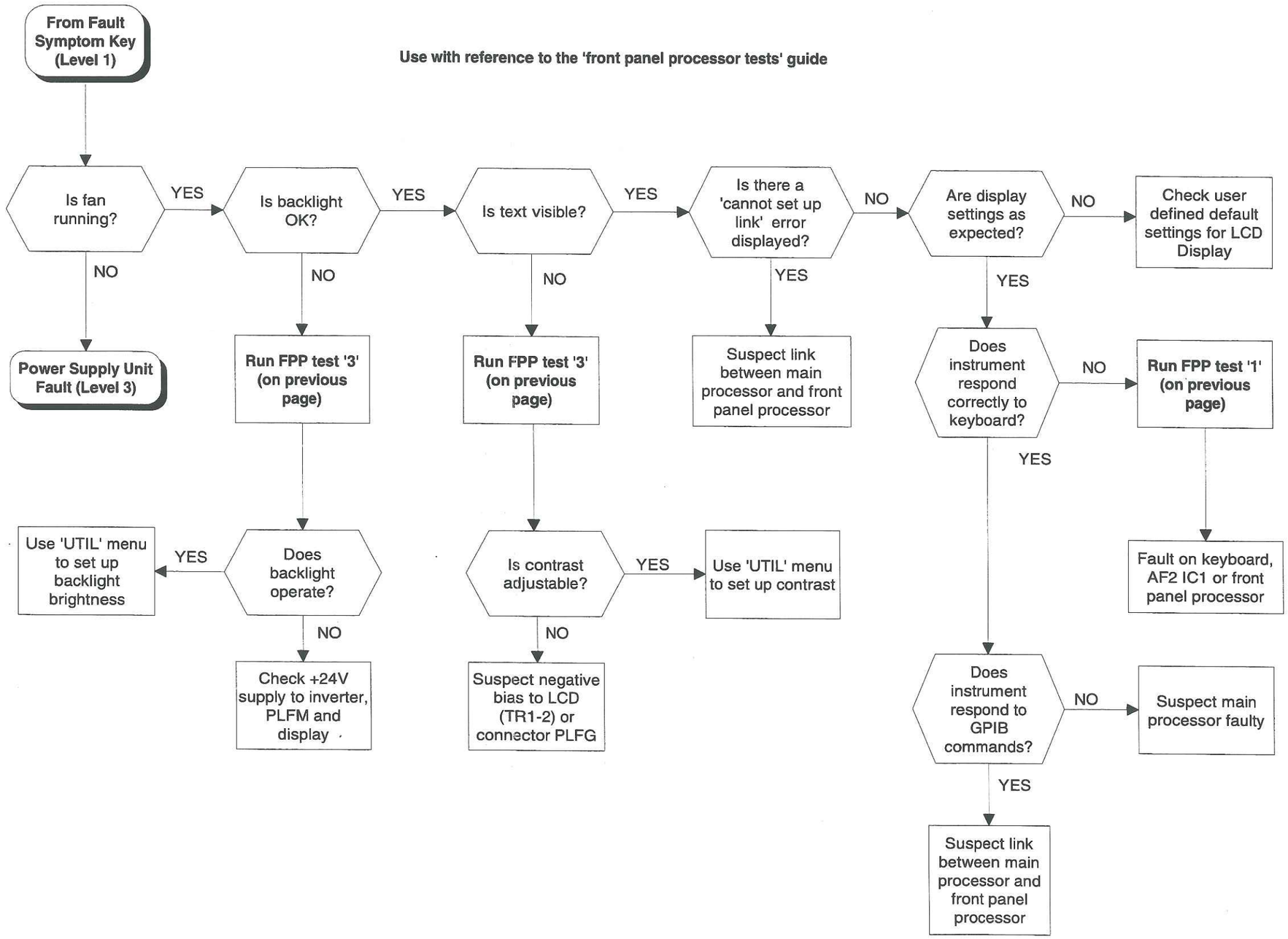
In auto mode the bar does one screen and then moves onto the next test.

In auto mode the brightness is cycled through its four possible levels several times.

Notes:

For all of the initial sequences the contrast is set to a nominal value and the backlight turned on. The screen is cleared and then a "walking man" appears.

LCD or Power Up Fault (Level 2)



LCD or Power Up Fault (Level 2)

Level Error Fault (Level 2)

A level error fault is where (with the RF offset facility disabled) the RF level is out of specification while the carrier frequency is correct and the output is not unduly distorted. It is assumed that the error is such that the instrument does not just require recalibrating.

If an attempt at RF level calibration is successful but then the instrument displays an RF level Checksum error this implies a fault in reading or writing to the EAROM on AA1. If the RF level calibration fails only on process 0 or 1 while the remainder of the calibration routine is successful, it implies an error with the detector diodes or with the law correct circuits on AA1. (Note that these two processes are repeated for the detector diodes on AB3/5 in the case of the 2031, and on AB3/4 in the case of the 2032).

To help locate a fault on AB2 use the sweep facility with the RF output connected to a spectrum analyzer on max hold. This will identify the frequency range where level faults occur and hence locate the RF path giving rise to the level errors.

Note 1

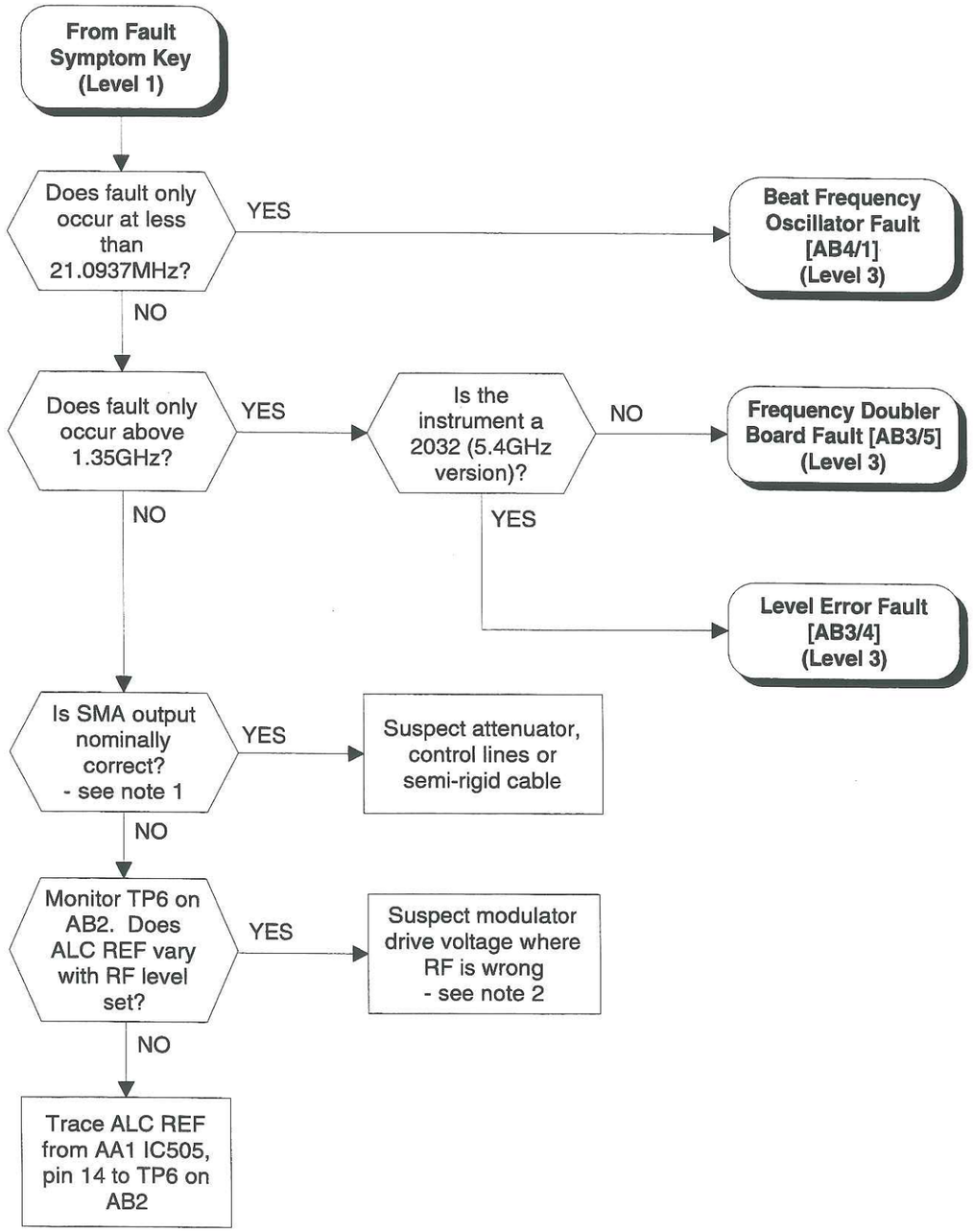
SMA output SKXJ on AB3/*x* should be 1 dBm ±0.5 dB.

Note 2

Modulator drive:

Monitor the modulator drive voltage at TP3 on AB2. The nominal range for the drive voltage is between 0.7 and 2 V.

Modulator voltage	Instrument state
Less than 0.7 V	Modulator fully off. Fault in ALC circuits or maybe RF oscillation in RF path.
Between 0.7 and 2 V	Normal state for ALC drive voltage.
Between 2 and 5 V	Modulator being driven hard, probably excess loss through the RF path.
Greater than 5 V	Modulator fully on. Excess loss through RF path or, if RF level much too high, a fault in the ALC circuits.



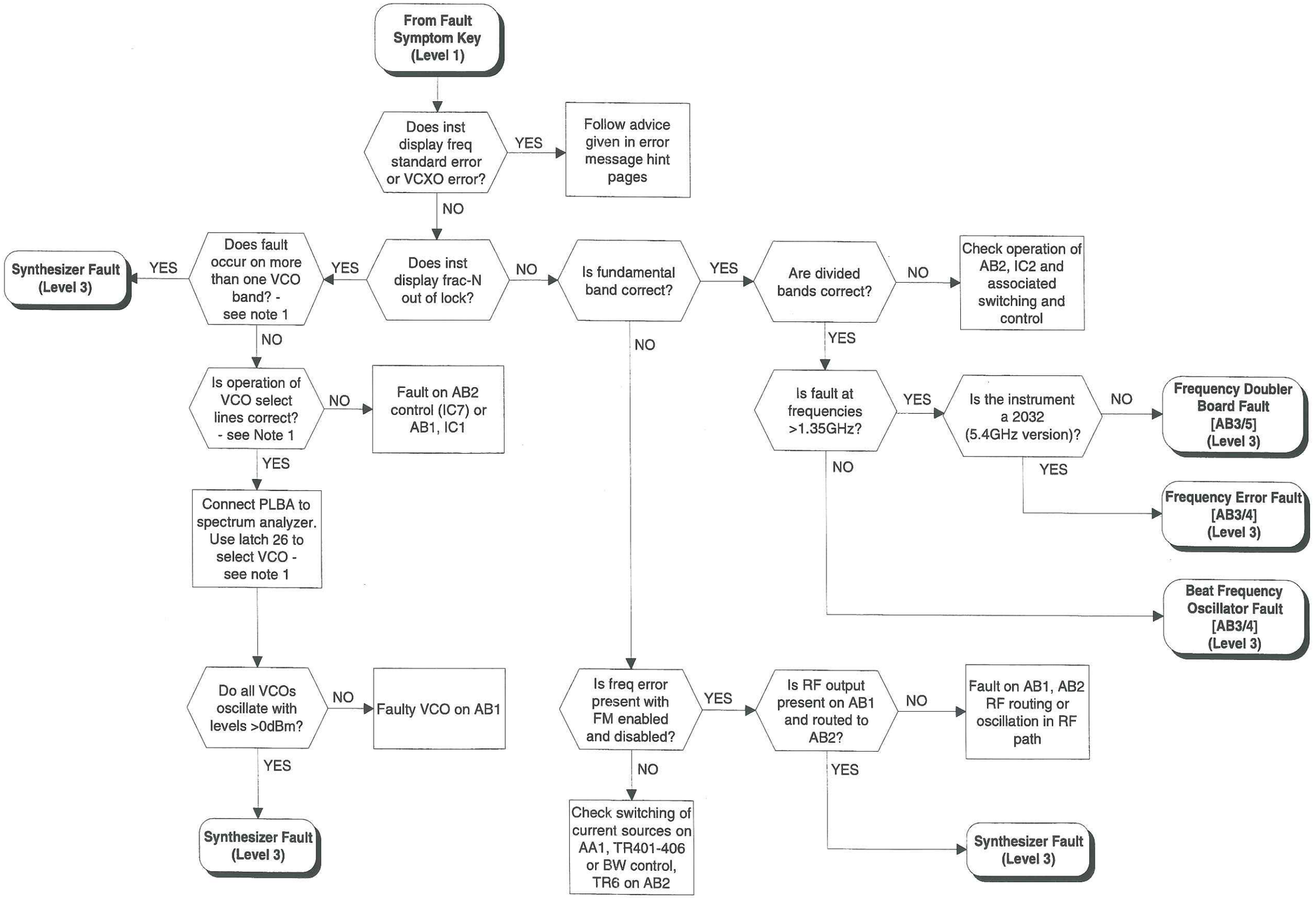
Note 1

VCO band and Range				Latch 26						AB1 collectors at -3 V (others > 0 V)
		B7	B6	B5	B4	B3	B2	B1	B0	
0	675 - 803 MHz	0	0	X	X	X	X	X	X	TR5
1	803 - 955 MHz	1	0	X	X	X	X	X	X	TR6
2	955 - 1135 MHz	0	1	X	X	X	X	X	X	TR7
3	1135 - 1350 MHz	1	1	X	X	X	X	X	X	TR8

where: X = don't care

Level Error Fault (Level 2)

Frequency Error Fault (Level 2)



Frequency Error Fault (Level 2)

It is assumed here that the fault occurs on internal mod. source if not then the audio multiplexers and the LF input circuits should be inspected for faults. Also assumed is that a recalibration of the FM (both DC cal and selfcal) will not cure the problem. For faults only on Wideband FM, trace the signal path through to the VCOs.

Note 1

Testing the 3 dB Step Attenuator: Set the instrument to a carrier frequency of 1 GHz with 100 kHz deviation using the internal modulation oscillator set to 10 kHz. The mod rate must be high to be outside the loop bandwidth of the synthesizer. Monitor the FM on a modulation meter set to relative mode. Use latch poke in binary format to alter contents of the FM control latch (latch 24). A '0' inserts the pad in question increasing the attenuation in the analogue path and so reducing the FM deviation.

	B7	B6	B5	B4	B3	B2	B1	B0
Latch 24:	P	P	P	P	P	0	0	1
Pad value (dB):	48	24	12	6	3			

where: P=0 to insert pad and 1 to remove it.

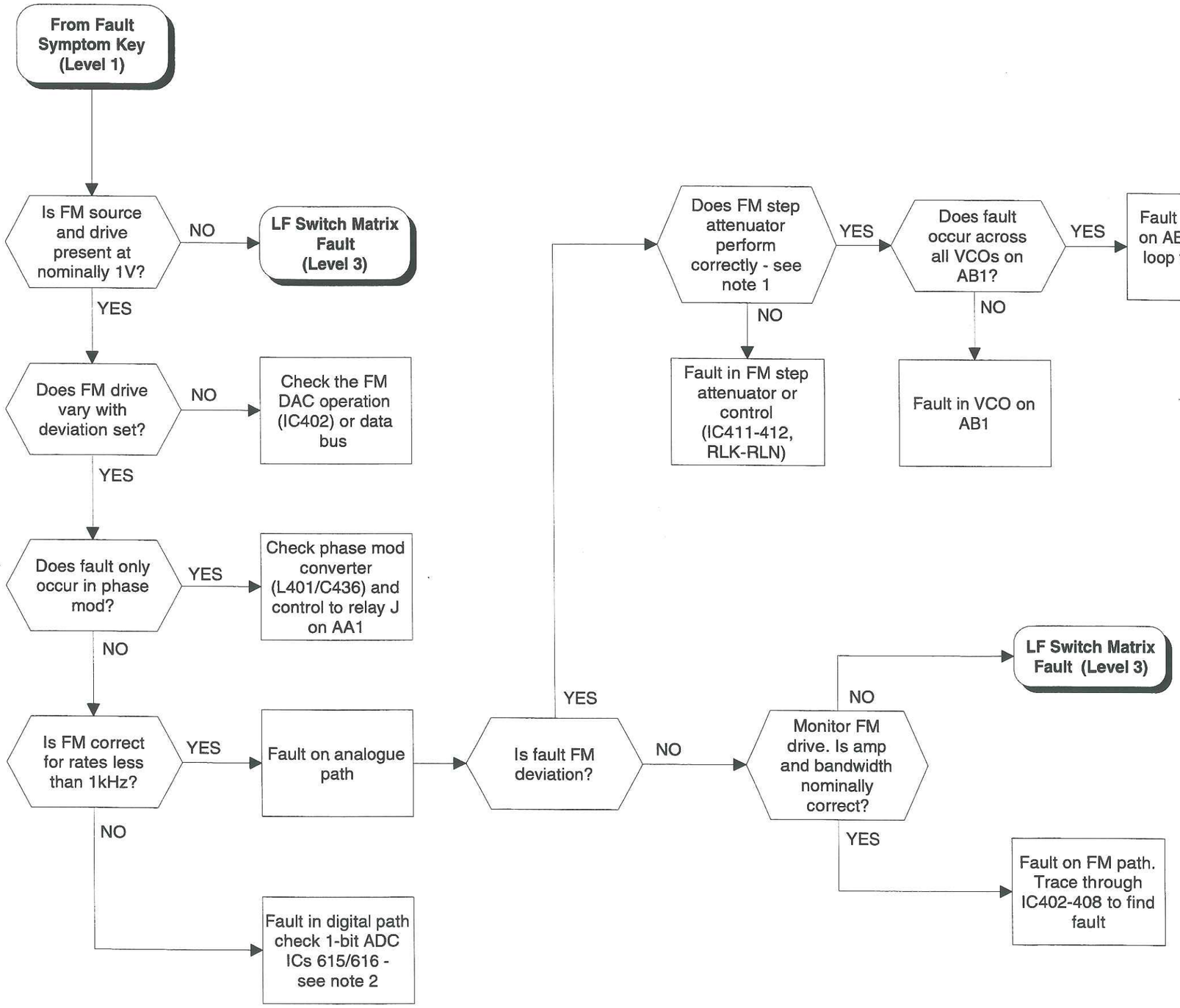
Alter the pad combinations to ensure the modulation changes in multiples of 3 dB. The 48 dB pad will need to be tested in combination with other pads to overcome the dynamic range required in the mod meter (i.e. measure the change in deviation switching between 48 dB and 36 dB of attenuation).

Note 2

Testing the 1-bit ADC: To confirm normal operation is very difficult since the ADC output is chaotic. To test, overload the converter by selecting external DC coupled FM and apply ±2 V while monitoring the output at IC614 pin 54 for the following:

Applied voltage	Expected 1-bit ADC
+2 V	Output mainly high
0 V	Output equally in high and low state
-2 V	Output mainly low

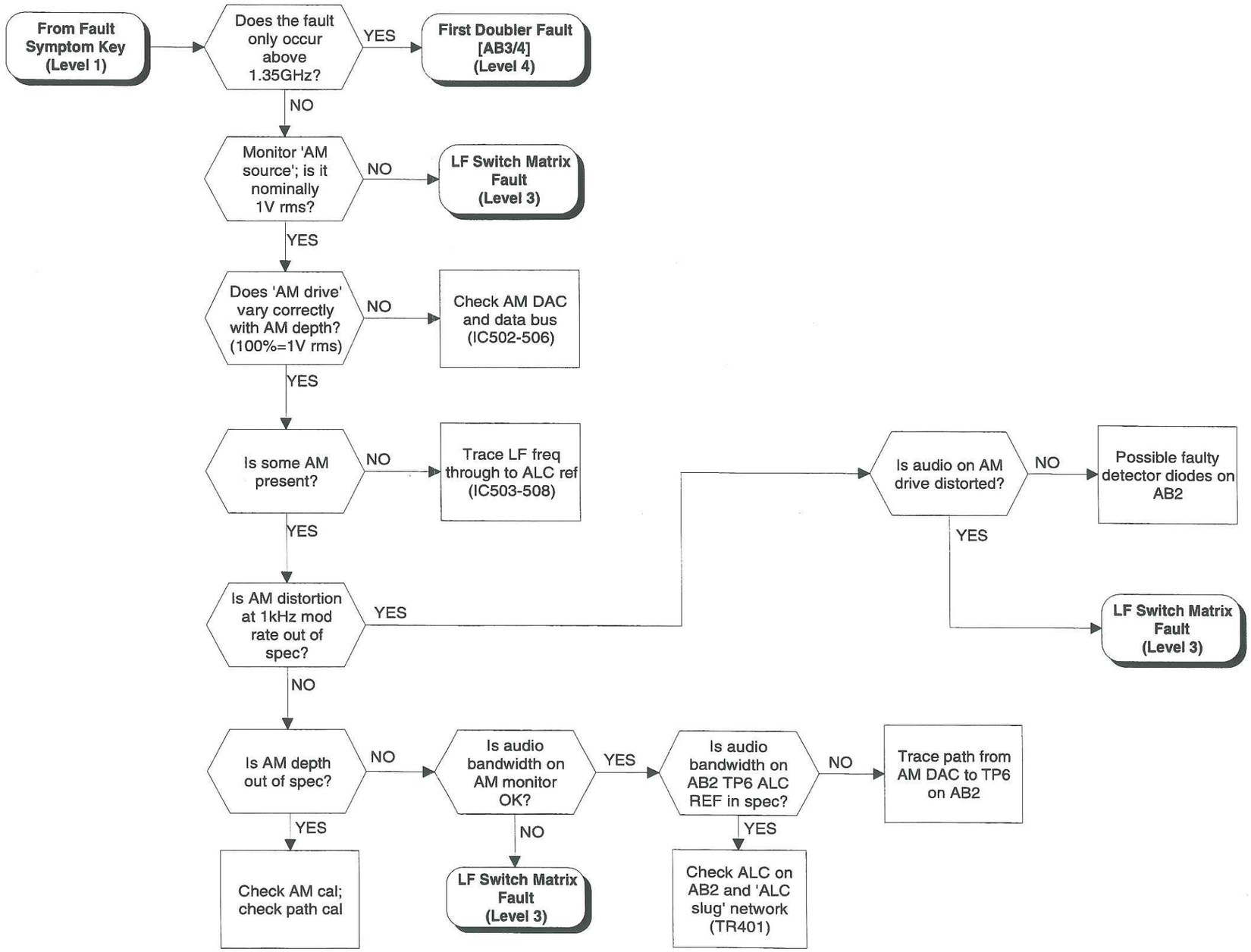
Freq Mod or Phase Mod Fault (Level 2)



Freq Mod or Phase Mod Fault (Level 2)

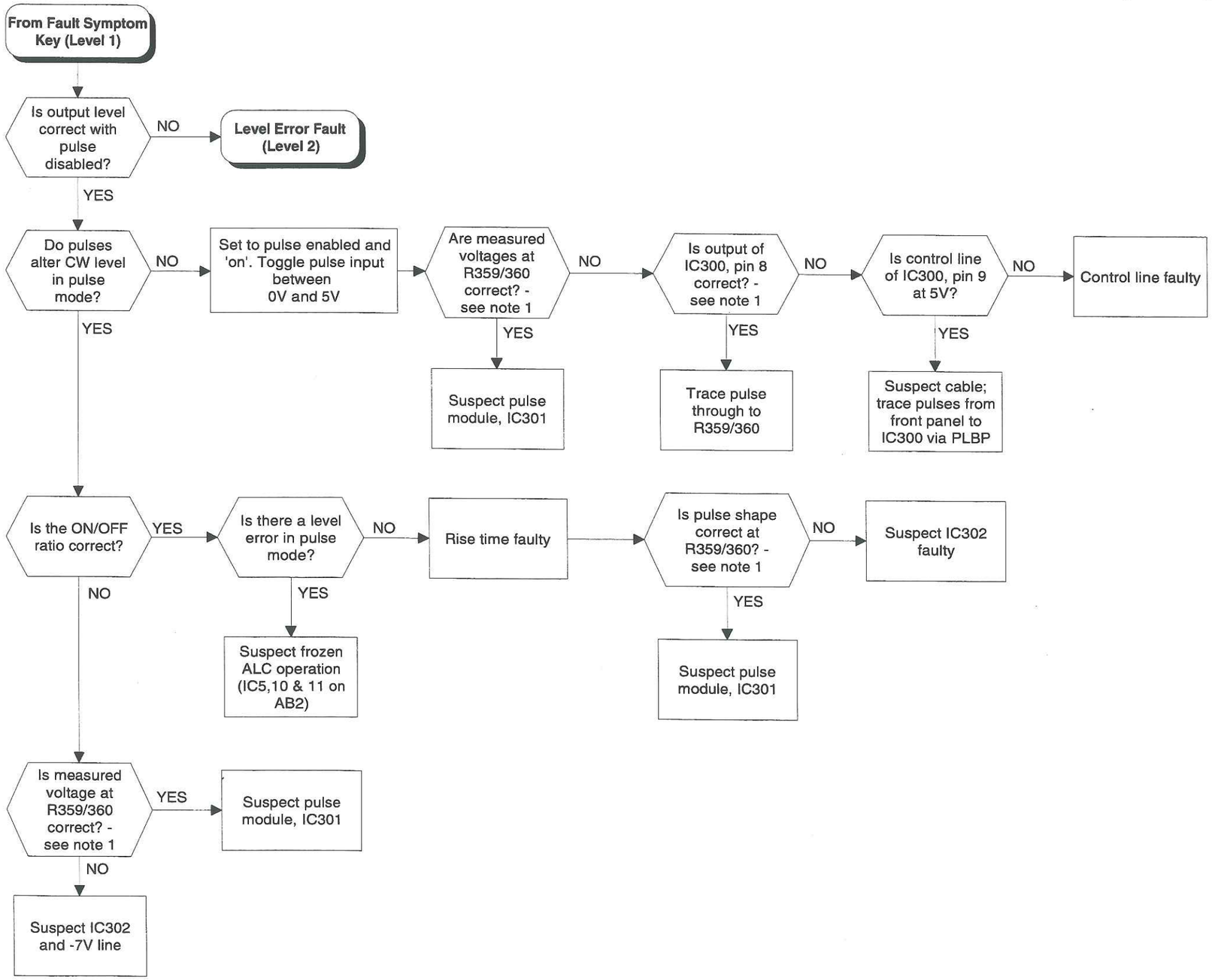
Amp Mod Fault (Level 2)

It is assumed that, with the instrument set to internal AM, the output frequency is correct and the RF level accuracy (without AM) and the harmonic distortion are within specification. The algorithm checks the AM path for faults, using the internal LF synthesizer; if no faults can be found look for errors in the audio multiplexers on AA1.



Amp Mod Fault
(Level 2)

Pulse Mod Fault (Level 2)

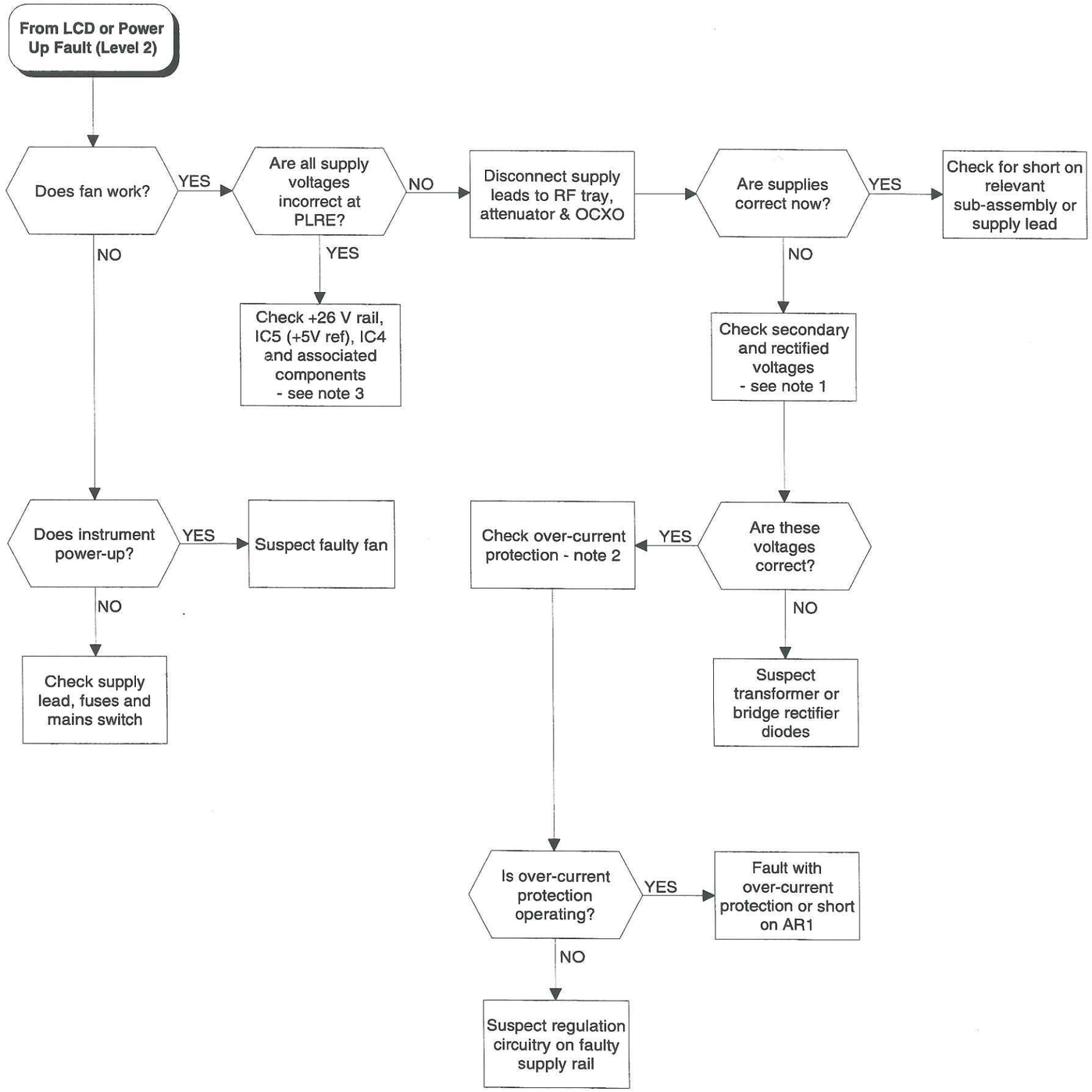


Note 1

Pulse enabled	Nominal volts (V) Input (BNC)	R359	R360	IC300, pin 8
Pulse on	5	0	-7	5
Pulse off	0	-7	0	0

Pulse Mod Fault (Level 2)

Power Supply Unit Fault (Level 3)



Note 1

Supply rail (VDC)	+26/24	-15	+15	+5
Secondary voltage (VAC)	30	19	19	8
Rectified voltage (VDC)	+38	-24	+24	+9

Note 2

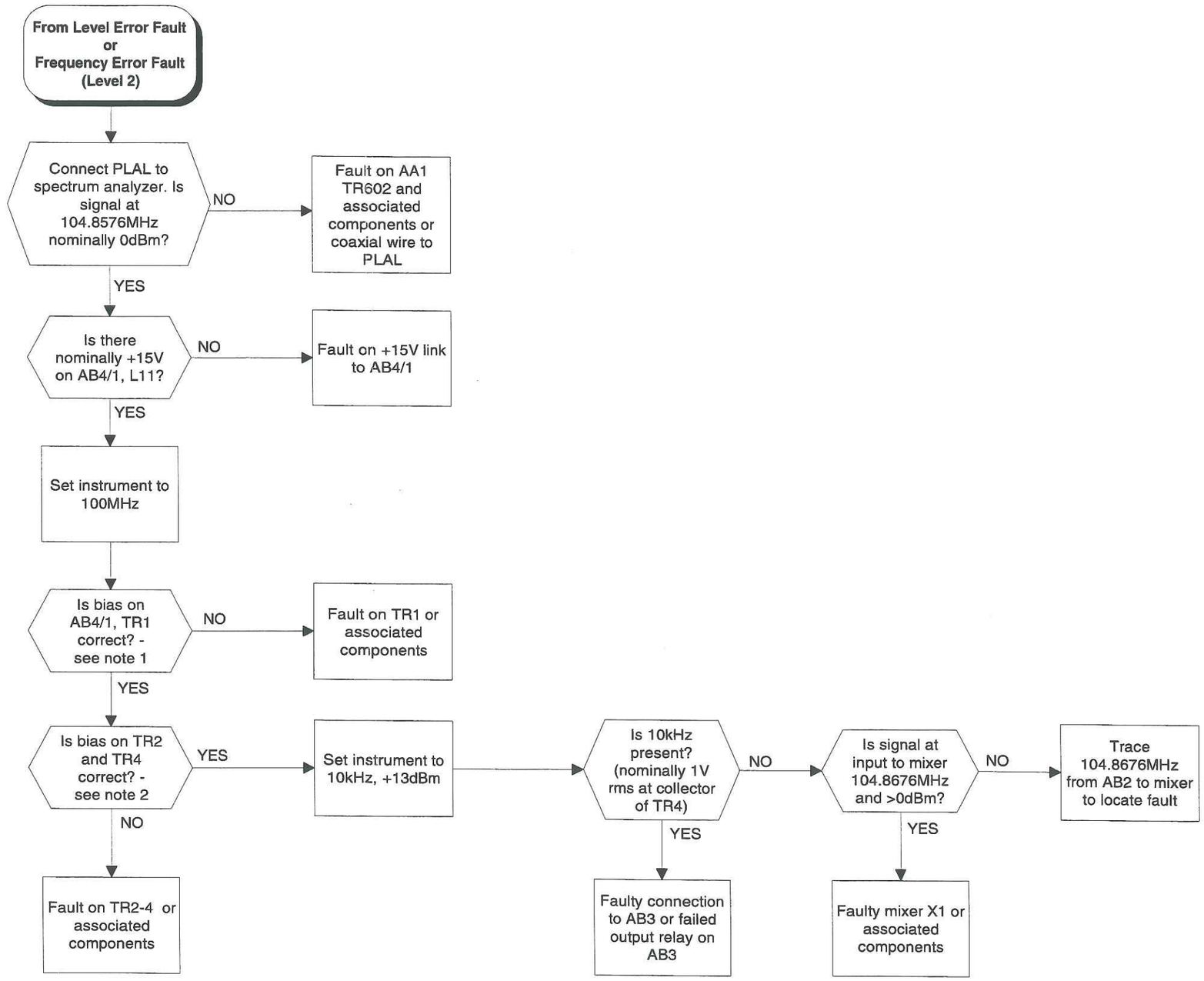
Supply rail	Over-current protection operating if:
+5 V	IC9, pin 8 at 0 V
+15 V	IC9, pin 1 at 0 V
-15 V	TR5c at-24 V
+24 V	IC2, pin 3 at 0 V
+26 V	IC3, pin 2 at 0 V

Note 3

IC4, pin 7	Supply condition
+24 V	PSU operating
0 V	Thermal shutdown

Power Supply Unit Fault (Level 3)

Beat Frequency Oscillator Fault (Level 3)



Note 1

Bias volts on TR1:

collector	13 V
base	5.3 V

Note 2

Bias volts on TR2:

collector	10 V
base	3.3 V

Bias volts on TR4:

collector	10 V
base	0.9 V

Beat Frequency Oscillator Fault (Level 3)

Note 1

AB3 filter bands (GHz):

1.35 - 1.70
1.70 - 2.10
2.10 - 2.70

Note 2

DC bias for amps/doubler:

	VB (volts DC)	VC (volts DC)	VE(volts DC)
TR1	1.2 V	5.8 V	0.6 V
TR2	2.0 V	8.0 V	1.4 V
TR3	0.6 V	13.5 V	0 V
TR7	0.9 V	5.8 V	0.3 V

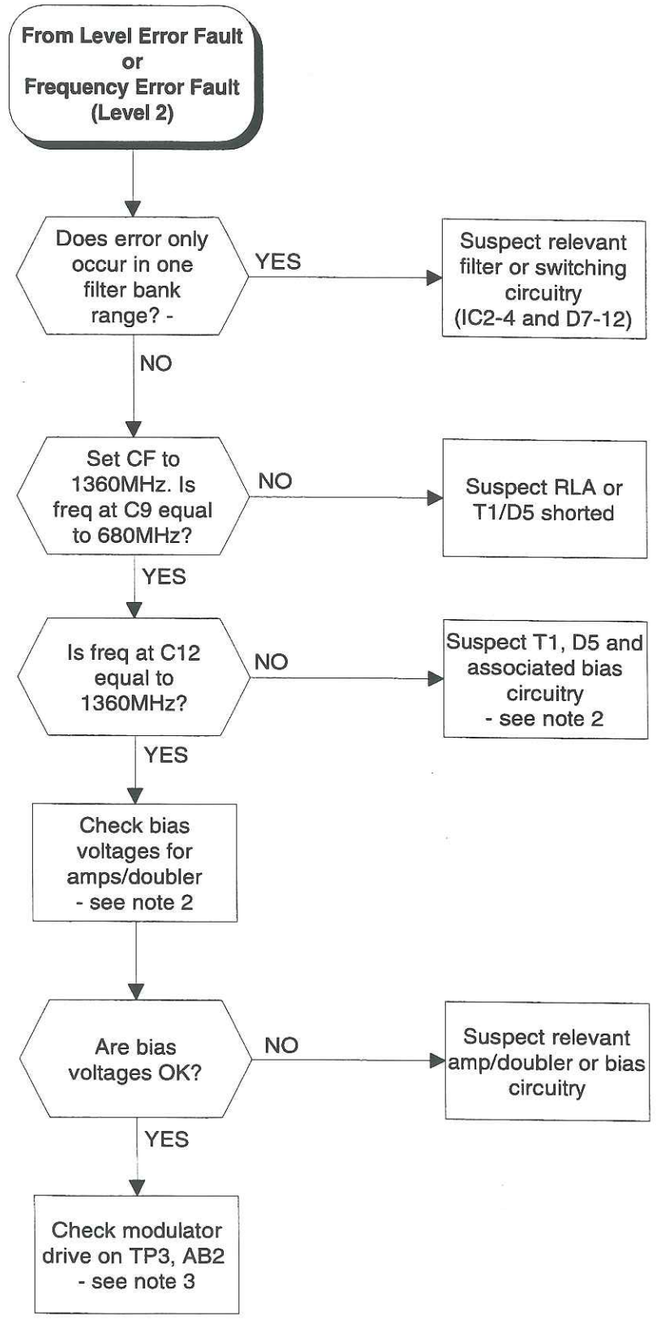
Doubler bias 1.2 V

Note 3

Modulator drive: Monitor the modulator drive voltage at TP3 on AB2. The nominal range for the drive voltage is between 0.7 and 2 V.

Modulator voltage	Instrument state
Less than 0.7 V	Modulator fully off. Fault in ALC circuits or maybe RF oscillation in RF path.
Between 0.7 and 2 V	Normal state for ALC drive voltage.
Between 2 and 5 V	Modulator being driven hard, probably excess loss through the RF path.
Greater than 5 V	Modulator fully on. Excess loss through RF path or, if RF level much too high, a fault in the ALC circuits.

Frequency Doubler Board Fault [AB3/5] (Level 3)



Frequency Doubler Board Fault [AB3/5] (Level 3)

A synthesizer fault is where the output frequency measured by a counter using the same frequency standard indicates that the output frequency differs from the set value.

Synthesizer: Errors within the synthesizer require breaking the loop to trace the error. Break the loop by disconnecting PLAE, the RF input to the synthesizer, and connecting an external synthesizer covering the fundamental range of the sig gen (675 MHz - 1350 MHz). Set external synthesizer to a nominal 2 dBm.

Note 1

Set the instrument to a carrier frequency in the fundamental range with the modulation disabled. Monitor the voltage on cathode D406 (tune volts) and the waveform on TP5 (phase comparator output). Set the external synthesizer to the set frequency plus 10 MHz and minus 10 MHz and check for the following:

Frequency	TP5 waveform	D406 Voltage
f + 10 MHz	mainly high	approx. 1 V
f - 10 MHz	mainly low	>20 V

The points should monitor the same with FM enabled but off. If the waveform at TP5 is incorrect check the operation of the programmable divider and its control lines. If TP5 is correct but the tune volts are not, look at the current sources.

Synthesizer Fault (Level 3)

Note 2

Programmable divider: Connect PLAE to an external synthesizer set to 1 GHz with a nominal 2 dBm output. Use latch poke to set latch 76 to 128, which sets the output of the ULA to request the maximum division ratio (all control lines high). Monitor the signal at R757 with a counter. If all operating correctly should measure 484.967 kHz i.e $\frac{1\text{GHz}}{2(1023+8)}$. Reconnect PLAE

Note 3

To check the correct action of the control lines to the programmable divider set the carrier frequency to 675 MHz, and to 675 MHz plus 1 Hz. With the FM disabled, monitor the control lines on IC609 to IC611 using an oscilloscope and check for the following:

	CONTROL LINE NUMBER									
Carrier frequency	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
675 MHz	±ve	±ve	±ve	±ve	±ve	±ve	H	H	L	L
675.000 001 MHz	±ve	±ve	±ve	±ve	H	H	H	L	L	H

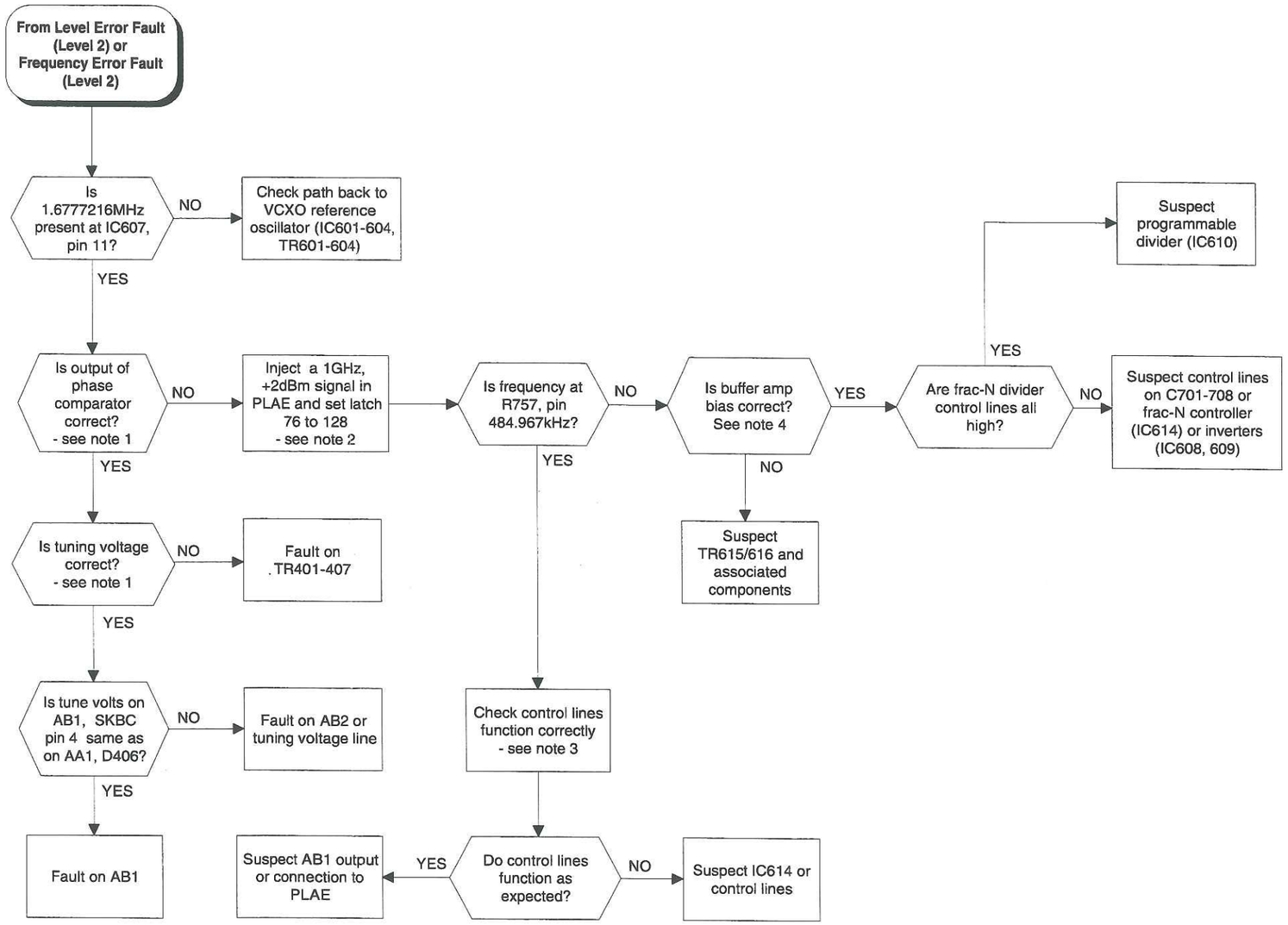
where: L = low (0 V)
H = high (5 V)
±ve = pos/neg transitions

Current Sources:

Nominal voltages	TR401 base	23 V
	TR402 base	-12 V

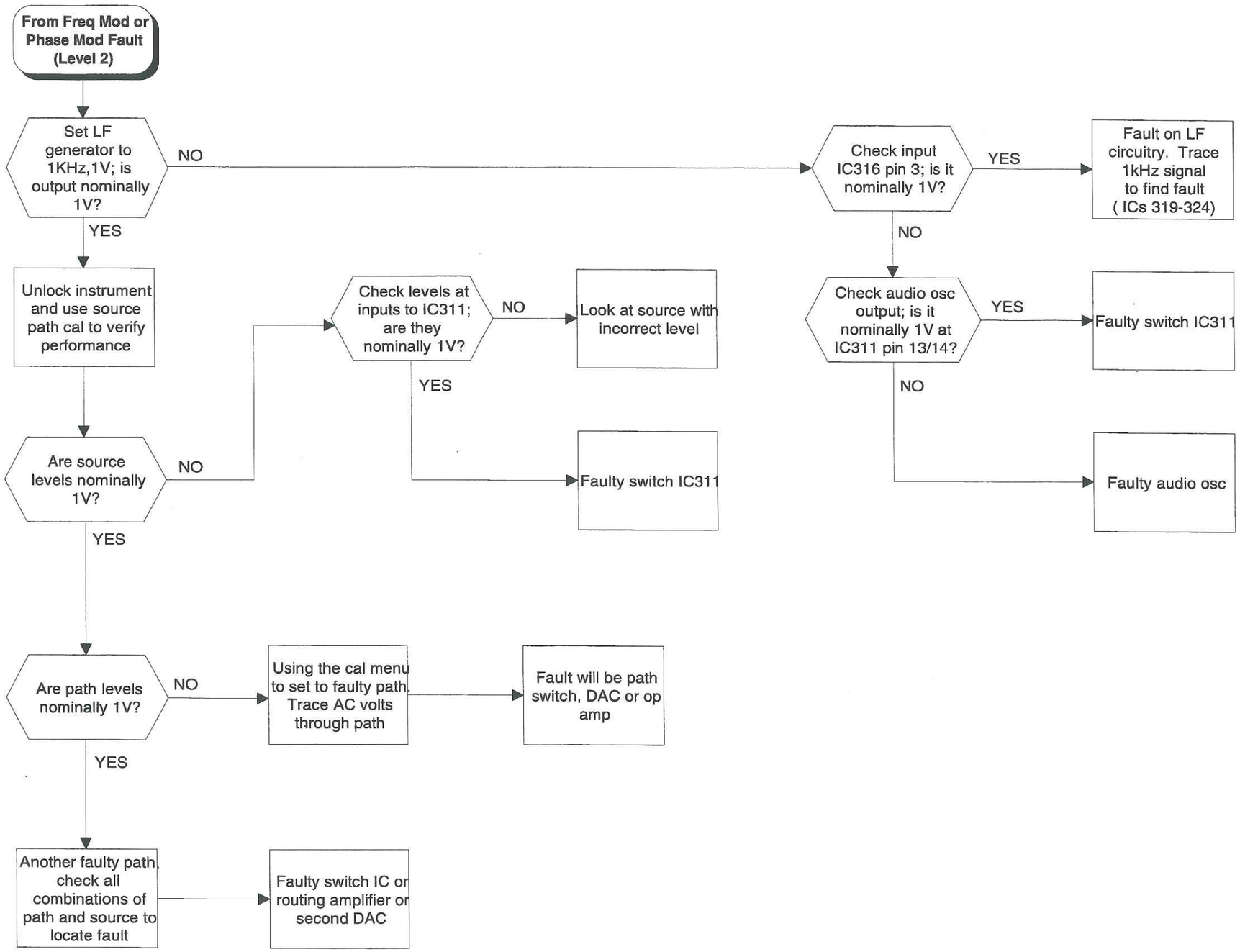
Note 4

TR615 base = 0.7 V
collector = 4 V



Synthesizer Fault (Level 3)

LF Switch Matrix Fault (Level 3)



LF Switch Matrix Fault (Level 3)

Level Error Fault [AB3/4] (Level 3)

Note 1

The comparator (IC401) is used to bias the reverse power protection (RPP) diodes. Normally the RPP diodes are reverse biased by a potential of +0.5 V on the cathode. But if TR410 produces unusually high RF power it could trip IC401 output and forward bias the RPP diodes, shunting RF power to ground. With RF shunted to ground the RPP circuit resets and reverse biases the RPP diodes again. This results in RF being switched ON and OFF periodically.

Note 2

The voltages on either side of the first set of three filters should be the same. The actual values depend on whether a filter is selected or deselected. The values are given below.

Filter Selected	+0.9 V (±0.1 V)
Filter Deselected	−0.7 V (±0.1 V)

Note 3

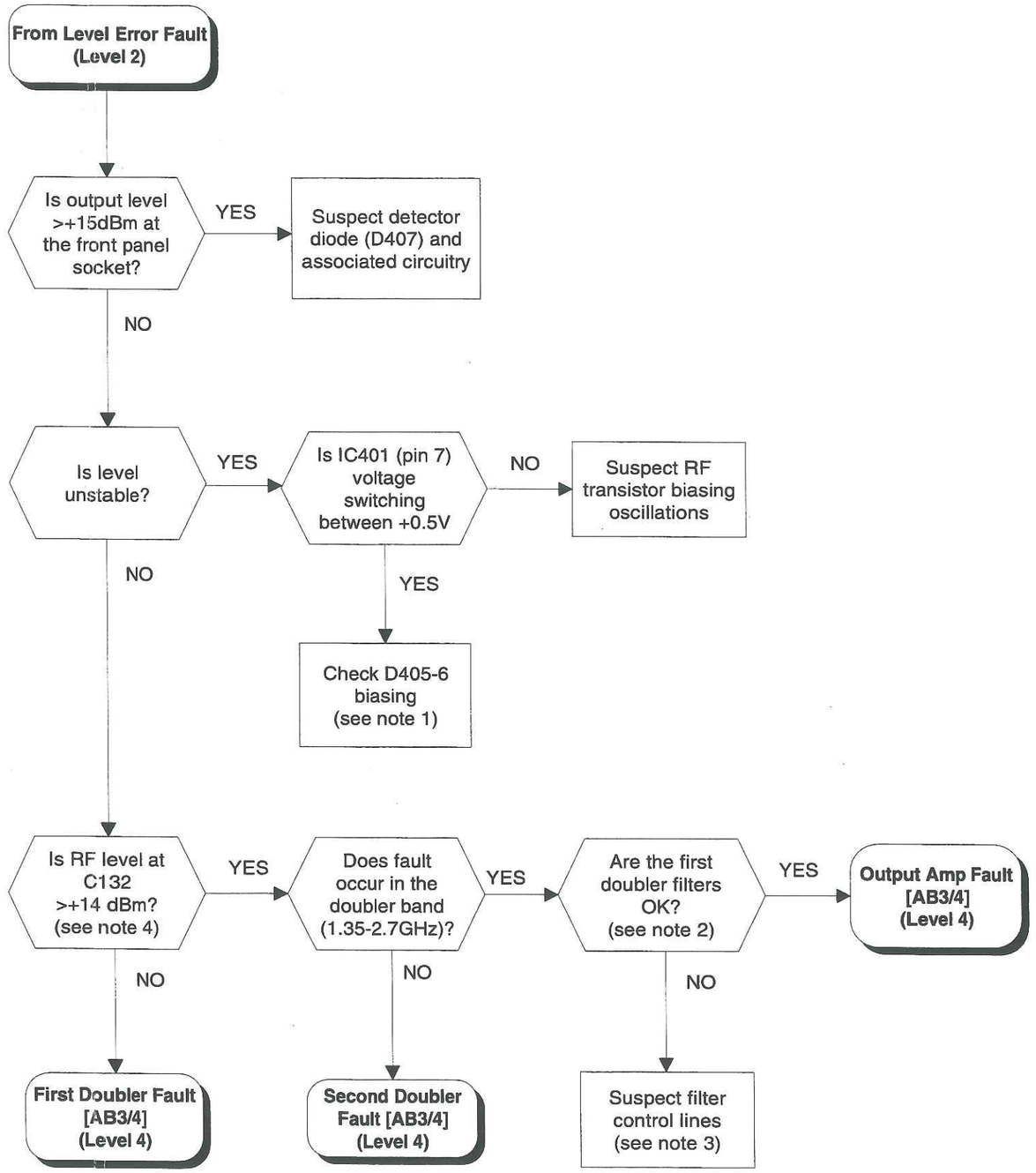
Check the filter control line (LO/MID/HI) voltages on the output side of the IC101(a) and trace them through to the filters. The filter switching table is given below.

Control Line (input)		Switching Line (output)		
µW–CTL1	µW–CTL2	LO	MID	HI
0	0	0	1	1
1	0	1	0	1
0	1	1	1	0
1	1	1	1	1

where: 1 is high logic (+5 V)
0 is low logic (0 V)

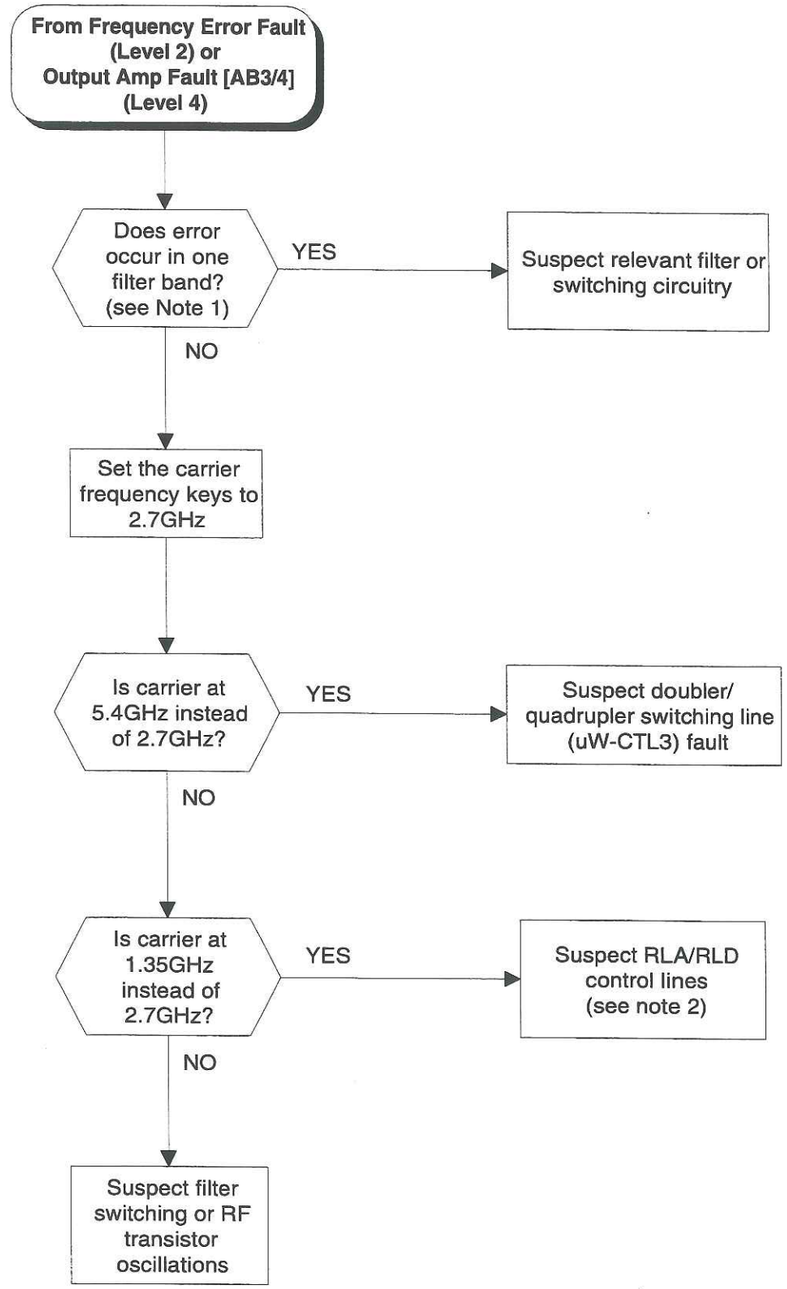
Note 4

Solder 50 Ω semi-rigid cable between output side of C132 and the provided ground pad. Then measure the signal level with a power meter.



Level Error Fault [AB3/4] (Level 3)

Frequency Error Fault [AB3/4] (Level 3)



Note 1

The following table details the filter band frequencies:

Filter Band	Doubler Section (GHz)	Quadrupler Section (GHz)
1	1.35 - 1.70	2.70 - 3.40
2	1.70 - 2.10	3.40 - 4.20
3	2.10 - 2.70	4.20 - 5.40

Note 2

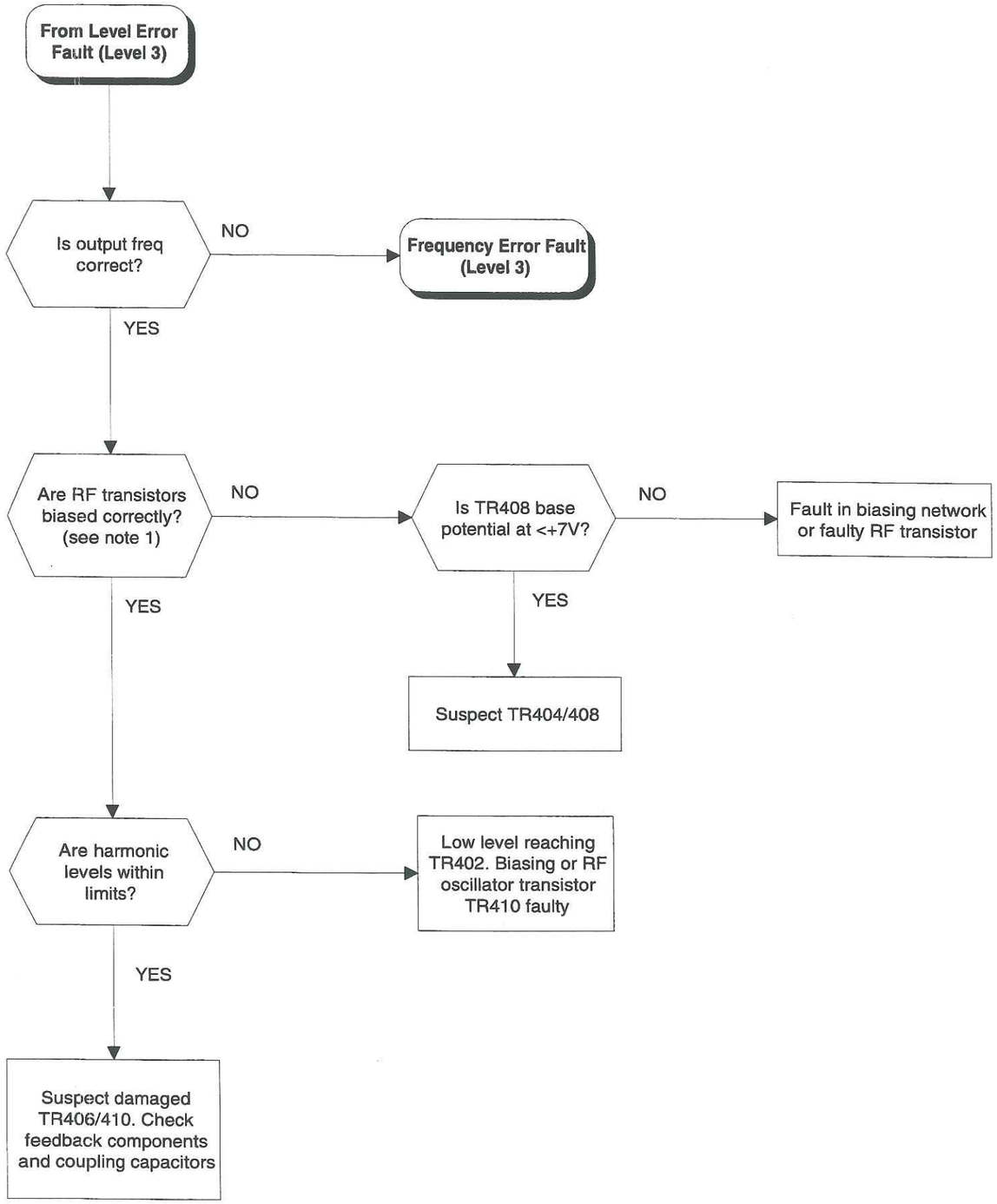
The relay RLA and RLD switching action is controlled by IC101(a) pin(7), which is set by control lines µW–CTL1 and µW–CTL2. The table below gives the switching combinations:

µW–CTL		IC101(a)	Relay	
1	2	Pin(7)	RLA	RLD
1	1	0	OFF	ON
X	X	1	ON	OFF

where X Don't care states
ON Relay energised
OFF Relay unenergised

Frequency Error Fault [AB3/4] (Level 3)

Output Amp Fault [AB3/4] (Level 4)



Note 1

The RF transistors TR402, TR406 and TR410 should be biased according to the following table.

Device	Voltage (V)			Emitter Resistance (Ohms)
	Vd	Vs	Vg	
TR402	4.6	0.5	–0.2	8.2
TR406	8.6	0	–2.0	0
TR410	8.6	0	–2.0	0

Output Amp Fault [AB3/4] (Level 4)

First Doubler Fault [AB3/4] (Level 4)

Note 1

The RF transistor stages in the first doubler section, TR105-106 & TR111, should be biased as shown below.

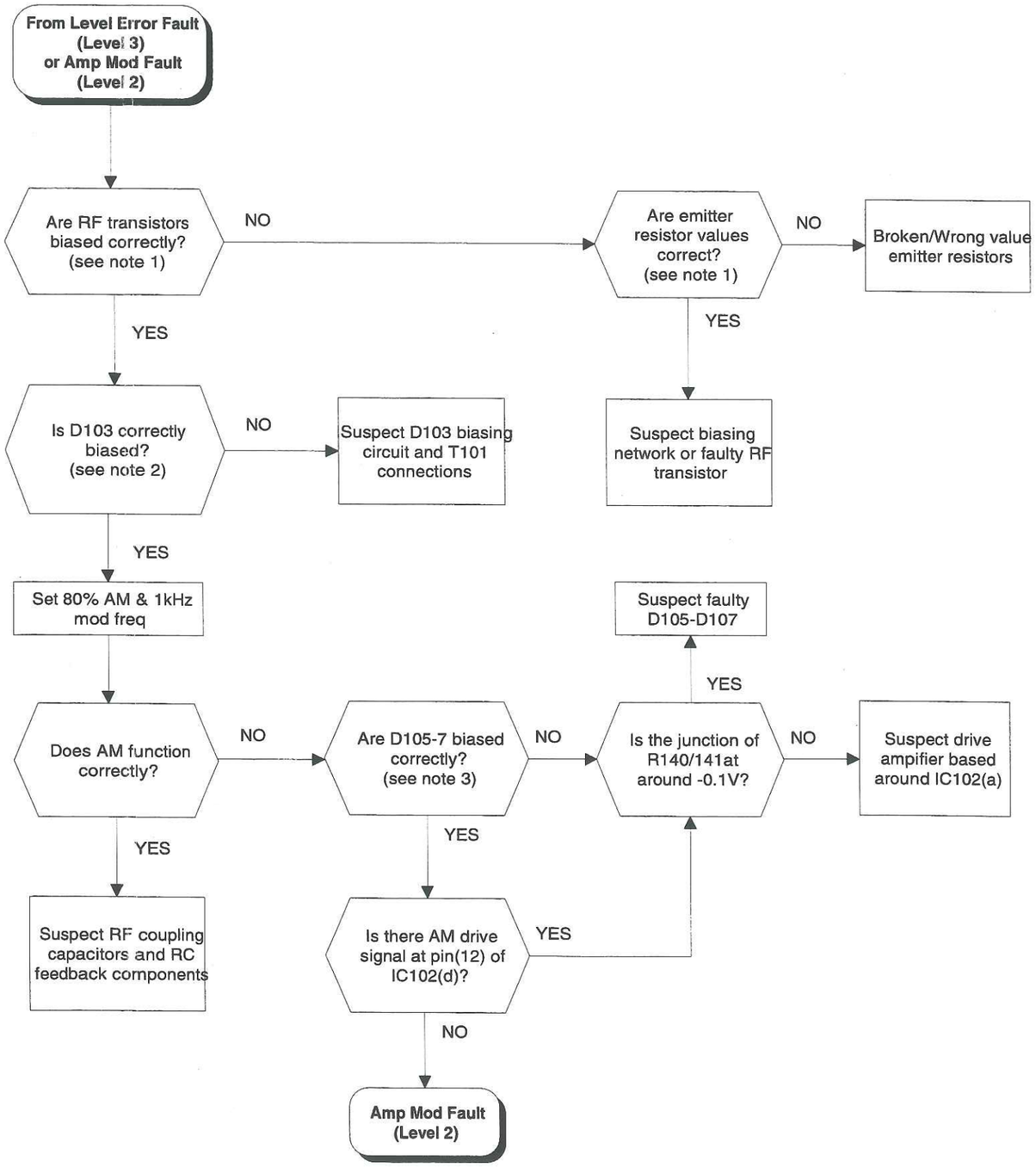
Device	Voltage (V)			Emitter Resistance (Ohms)
	Vd	Vs	Vg	
TR105	4.7	0.6	1.3	17
TR106	4.7	0.6	1.3	17.5
TR111	10	0.5	1.3	8

Note 2

The cathode terminal of D103 should be at ground potential and the anode terminal should be between –0.1 V and +0.5 V.

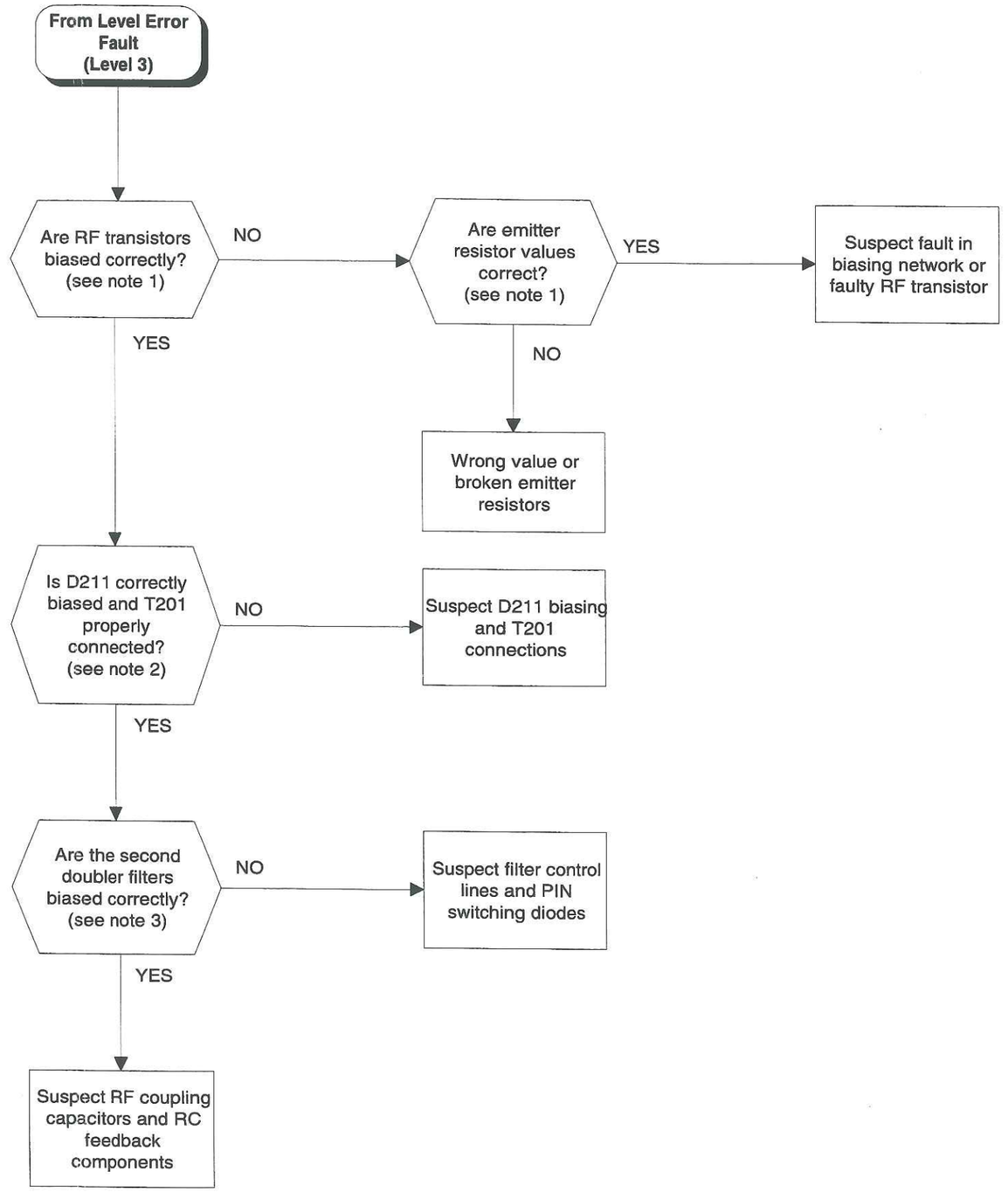
Note 3

The AM modulating diodes (D105/106) are biased to their "knee" point by R126/127. The common anode and cathode terminals of D105/106 should be at –0.7 V and –1.4 V respectively. Also pin 2 & 3 of D107 should be –1 V and –1.7 V respectively.



First Doubler Fault [AB3/4] (Level 4)

Second Doubler Fault [AB3/4] (Level 4)



Note 1

The second doubler section RF transistors (TR206-209) should be biased as shown in the table below:

Device	Voltage (V)			Emitter Resistance (Ohms)
	Vd	Vs	Vg	
TR206	10.6	0.6	1.4	11
TR207	4.6	0.8	0.2	16.5
TR208	4.6	0.4	<0	5
TR209	4.6	0.4	<0	5

Note 2

The cathode terminal of D211 should be at ground potential and the anode should be between –0.1 V and +0.5 V.

Note 3

The voltages on either side of the second set of three filters, after the second doubler, should be as given below. Note filter input/output side is a reference to the direction of RF signal flow.

Side	Filter Selected (V)	Filter Deselected (V)
Input side	1 ±0.2	–0.75 ±0.1
Output side	3 ±0.3	–0.75 ±0.1

Second Doubler Fault [AB3/4] (Level 4)

RESIDUAL FM PROBLEMS

Residual FM problems are due to the spurious modulation of the VCOs on AB1. These VCOs are very sensitive with a varactor diode sensitivity of about 20 MHz/V, hence very low level signals may give rise to spurious modulation of the carrier frequency.

If the fault only arises on one of the VCOs on AB1, the fault can be located on that VCO on AB1. Monitoring the LF output using a modulation monitor (e.g. an IFR 2305) with a loudspeaker output will help locate faulty components within the oscillator.

If the residual FM only occurs when FM is enabled (even if off), the current sources on AA1 should be checked along with the bandwidth selection on AB2/2 (refer to the fault finding flow chart for Frequency Error Fault).

Residual FM which is dependant on the deviation set implies a fault either in the analogue path (check the FM drive and the FM signal passed to AB2/2), or the digital path (check the 1-bit ADC and synthesizer control lines).

Instability in the synthesizer loop may give rise to coherent spurious modulation. Monitoring the TUNE line for coherent signals will detect this. This form of residual FM may give rise to large excursions while the average frequency is maintained at that requested. Similar residual FM arises if the programmable divider control lines are not all operating correctly (refer to the fault finding flow chart for Frequency Error Fault).

LATCH DATA UTILITY

The Latch Data Utility provides a means of inspecting the data that has been sent to the various latches within the instrument and allows the user to send alternative data to specified latches. This is primarily intended as a diagnostic aid to assist in fault identification.

Operation

Operation is as follows:

Press **[UTIL]** , *[Utils Menu 2]*. Press *[Latch Data]* to bring up the Latch Data Menu.

[Restore On/Off] selects Restoring or Non-Restoring Mode. Restoring/Non-Restoring Status is displayed on the upper right of the menu screen.

In Restoring mode latches whose values have been changed by the user are restored to their previous value when ANY latch is updated outside the utility (i.e. by changing any parameter). This allows the user to select for example the Sig Gen menu to inspect the settings and return to the Latch Data utility without restoring, but ensures that the instrument will operate in the correct manner after using this utility.

In Non-Restoring mode the modified latch will not be restored until that particular latch requires updating because of a changed parameter. The user should be aware that changing a parameter may affect latches associated with other functions, in particular changing the carrier

frequency is likely to update latches associated with modulation and RF level as well as the ones associated with frequency.

[Latch Number] is a function to specify the index number of the latch to be inspected or set. Press numeric keys and terminate with *[Enter]*. Information about the selected latch is displayed on the screen, this includes the board designation, the IC designation and a brief description of the function of the latch e.g. Latch 0 - *AA1/2 IC402 12 bit FM CH1 DAC (low byte)*. Latch numbers are indicated in a box adjacent to the appropriate IC on the circuit diagrams.

[1,2,3,5 Latches] allows groups of consecutive latches to be treated as a single number. The 2 latches setting is useful for the various 12-bit DACS, the 3 latches setting for the 24-bit numbers used for the modulation oscillators and the 5 latches setting for the 40-bit numbers used in the fractional-N controller. Each press of this key advances the selection in the sequence 1-2-3-5-1... Information about the selected number of latches (starting at the chosen Latch Number) is displayed.

[Decimal/Binary] selects whether latch data is displayed or entered in decimal or binary format. Binary is only available when the number of latches selected is 1 or 2.

In Decimal Mode:-

[Latch Data] is a function key that allows decimal data to be written to the selected latch or latches. When this key is highlighted the user may enter a number in the ranges 0 to 255, 0 to 65535, 0 to 16777215 or 0 to 1099511627775 (for 1, 2, 3 or 5 latches) terminated with *[Enter]*, at which time the data is written to the latch.

In Binary Mode:-

[Cursor Left], [Cursor Right] moves the cursor (underscore) left or right along the 8 or 16 displayed bits.

[Toggle Bit] changes the state of the bit at the cursor from 1 to 0, or 0 to 1, the new 8- or 16-bit value is written to the latch/latches immediately.

[Next Latch], [Previous Latch] increments/decrements the Latch Number by 1, 2, 3 or 5 (as selected by *[1,2,3,5 Latches]*).

A list of hardware latches is given in Table 5-3-3.

Notes...

Certain latches are read-only, this is usually obvious from the latch description. If this is the case entered data has no effect and the old value is redisplayed.

Changes to the GPIB write latches (112 to 119) can only be restored by switching the instrument Off and On again, so should be used with caution.

The Nibble Bus Protocol Latch (111) is always restored.

TABLE 5-3-3 HARDWARE LATCHES

Latch	Board	IC	Bits	Description
000	AA1	IC402	12	FM CH1 DAC (low byte)
001	AA1	IC402	12	FM CH1 DAC (high nibble)
002	AA1	IC402	12	FM CH2 DAC (low byte)
003	AA1	IC402	12	FM CH2 DAC (high nibble)
004	AA1	IC319	12	SWEEP DAC (low byte)
005	AA1	IC319	12	SWEEP DAC (high nibble)
006	AA1	IC319	12	AUDIO DAC (low byte)
007	AA1	IC319	12	AUDIO DAC (high nibble)
008	AA1	IC507	8	FREQ. STD. FINE DAC
009	AA1	IC507	8	FREQ. STD. COARSE DAC
010	AA1	IC507	8	LAW CORR DAC(AM TROUGHS)
011	AA1	IC507	8	LAW CORR DAC(DC OFFSETS)
012	AA1	IC502	12	AM CH1 DAC (low byte)
013	AA1	IC502	12	AM CH1 DAC (high nibble)
014	AA1	IC502	12	AM CH2 DAC (low byte)
015	AA1	IC502	12	AM CH2 DAC (high nibble)
016	AA1	IC505	12	RF LEVEL DAC (low byte)
017	AA1	IC505	12	RF LEVEL DAC (high nibble)
018	AA1	IC505	12	DIR AIM DAC (low byte)
019	AA1	IC505	12	DIR AIM DAC (high nibble)
020	RESERVED FOR FUTURE USE			
021	RESERVED FOR FUTURE USE			
022	RESERVED FOR FUTURE USE			
023	AA1	IC509	8	Auxiliary control latch
024	AA1	IC412	8	FM controlling latch
025	AB2	IC009	8	RF controlling latch
026	AB2	IC007	8	RF controlling latch
027	AA1	IC303	8	AM controlling latch
028	AA1	IC302	8	FM controlling latch
029	AA1	IC304	8	AF controlling latch
030	AA1	IC510	8	Misc. controlling latch
031	AA1	IC614		FN FREQ. WORD 0 BYTE 0 (lsb)
032	AA1	IC614		FN FREQ. WORD 0 BYTE 1
033	AA1	IC614		FN FREQ. WORD 0 BYTE 2
034	AA1	IC614		FN FREQ. WORD 0 BYTE 3
035	AA1	IC614		FN FREQ. WORD 0 BYTE 4 (msb)
036	AA1	IC614		FN FREQ. WORD 1 BYTE 0 (lsb)
037	AA1	IC614		FN FREQ. WORD 1 BYTE 1
038	AA1	IC614		FN FREQ. WORD 1 BYTE 2
039	AA1	IC614		FN FREQ. WORD 1 BYTE 3
040	AA1	IC614		FN FREQ. WORD 1 BYTE 4 (msb)
041	AA1	IC614		FN FREQ. WORD 2 BYTE 0 (lsb)
042	AA1	IC614		FN FREQ. WORD 2 BYTE 1
043	AA1	IC614		FN FREQ. WORD 2 BYTE 2
044	AA1	IC614		FN FREQ. WORD 2 BYTE 3
045	AA1	IC614		FN FREQ. WORD 2 BYTE 4 (msb)
046	AA1	IC614		FN FREQ. WORD 3 BYTE 0 (lsb)
047	AA1	IC614		FN FREQ. WORD 3 BYTE 1
048	AA1	IC614		FN FREQ. WORD 3 BYTE 2
049	AA1	IC614		FN FREQ. WORD 3 BYTE 3
050	AA1	IC614		FN FREQ. WORD 3 BYTE 4 (msb)
051	AA1	IC614		FN FREQ. WORD 4 BYTE 0 (lsb)
052	AA1	IC614		FN FREQ. WORD 4 BYTE 1
053	AA1	IC614		FN FREQ. WORD 4 BYTE 2
054	AA1	IC614		FN FREQ. WORD 4 BYTE 3
055	AA1	IC614		FN FREQ. WORD 4 BYTE 4 (msb)
056	AA1	IC614		FN FREQ. WORD 5 BYTE 0 (lsb)
057	AA1	IC614		FN FREQ. WORD 5 BYTE 1
058	AA1	IC614		FN FREQ. WORD 5 BYTE 2
059	AA1	IC614		FN FREQ. WORD 5 BYTE 3
060	AA1	IC614		FN FREQ. WORD 5 BYTE 4 (msb)
061	AA1	IC614		FN FREQ. WORD 6 BYTE 0 (lsb)
062	AA1	IC614		FN FREQ. WORD 6 BYTE 1
063	AA1	IC614		FN FREQ. WORD 6 BYTE 2

contd./...

Latch	Board	IC	Bits	Description
064	AA1	IC614		FN FREQ. WORD 6 BYTE 3
065	AA1	IC614		FN FREQ. WORD 6 BYTE 4 (msb)
066	AA1	IC614		FN FREQ. WORD 7 BYTE 0 (lsb)
067	AA1	IC614		FN FREQ. WORD 7 BYTE 1
068	AA1	IC614		FN FREQ. WORD 7 BYTE 2
069	AA1	IC614		FN FREQ. WORD 7 BYTE 3
070	AA1	IC614		FN FREQ. WORD 7 BYTE 4 (msb)
071	AA1	IC614		FN CTRL. REG 1
072	AA1	IC614		FN CTRL. REG 2
073	AA1	IC614		FN CTRL. REG 0
074	AA1	IC614		FN CTRL. REG 3
075	AA1	IC614		FN CTRL. REG 4
076	AA1	IC614		FN CTRL. REG 5
077	AA1	IC614		FN CTRL. REG 6
078	AA1	IC614		FN CTRL. REG 7
079	AA1	IC201		AO1 BANK A REG 0
080	AA1	IC201		AO1 BANK A REG 1
081	AA1	IC201		AO1 BANK A REG 2
082	AA1	IC201		AO1 BANK B REG 0
083	AA1	IC201		AO1 BANK B REG 1
084	AA1	IC201		AO1 BANK B REG 2
085	AA1	IC201		AO1 CTRL REG 0
086	AA1	IC201		AO1 CTRL REG 1
087	AA1	IC209		AO2 BANK A REG 0(option)
088	AA1	IC209		AO2 BANK A REG 1(option)
089	AA1	IC209		AO2 BANK A REG 2(option)
090	AA1	IC209		AO2 BANK B REG 0(option)
091	AA1	IC209		AO2 BANK B REG 1(option)
092	AA1	IC209		AO2 BANK B REG 2(option)
093	AA1	IC209		AO2 CTRL REG 0 (option)
094	AA1	IC209		AO2 CTRL REG 1 (option)
095				RF ATTENUATOR CONTROL
096	AC1	IC007	8	LNB O/P loop presteer DAC
097	AC1	IC007	8	LNB Harmonic select DAC
098	AC1	IC007	8	LNB Harmonic select DAC
099	AC1	IC007	8	LNB Harmonic presteer DAC
100	AC1	IC008	8	LNB O/P loop control latch
101	AC1	IC009	8	LNB Harmonic control latch
102	AE1	IC008	8	GSM control latch
103	AE1	IC012	8	GSM control latch
104	AE1	IC011	8	GSM control latch
105	AE1	IC009	8	GSM control latch
106	AE2	IC002	12	GSM LVL. DAC (low byte)
107	AE2	IC002	12	GSM LVL. DAC (high nibble)
108	AG1	IC010	8	AUXILIARY OUTPUT CONTROL
109	AG1	IC017	8	IQ modulator control latch
110	AG1	IC008	8	IQ modulator control latch
111	AH1	IC017	8	IQ modulator control latch
112	AH1	IC051	8	IQ modulator control latch
113	AH1	IC046	8	IQ modulator control latch
114	AH1	IC032	8	IQ modulator control latch
115	RESERVED FOR FUTURE USE			
116	AH1	IC054	8	IQ modulator control latch
117	AH1	IC049	8	DIFF. PHASE FINE DAC
118	AH1	IC049	8	DIFF. PHASE COARSE DAC
119	AH1	IC049	8	DIFF. GAIN FINE DAC
120	AH1	IC049	8	DIFF. GAIN COARSE DAC
121	AH1	IC049	8	Q OFFSET FINE DAC
122	AH1	IC049	8	Q OFFSET COARSE DAC
123	AH1	IC049	8	I OFFSET FINE DAC
124	AH1	IC049	8	I OFFSET COARSE DAC
125	AH1	IC050	12	RF LEVEL DAC (low byte)
126	AH1	IC050	12	RF LEVEL DAC (high nibble)
127	AH1	IC050	12	RF LEVEL DAC (low byte)
128	AH1	IC050	12	RF LEVEL DAC (high nibble)
129	RESERVED FOR FUTURE USE			
130	RESERVED FOR FUTURE USE			

contd./...

Latch	Board	IC	Bits	Description
131	RESERVED FOR FUTURE USE			
132	RESERVED FOR FUTURE USE			
133	RESERVED FOR FUTURE USE			
134	RESERVED FOR FUTURE USE			
135	RESERVED FOR FUTURE USE			
136	RESERVED FOR FUTURE USE			
137	RESERVED FOR FUTURE USE			
138	RESERVED FOR FUTURE USE			
139	RESERVED FOR FUTURE USE			
140	RESERVED FOR FUTURE USE			
141	RESERVED FOR FUTURE USE			
142	RESERVED FOR FUTURE USE			
143	RESERVED FOR FUTURE USE			
144	RESERVED FOR FUTURE USE			
145	RESERVED FOR FUTURE USE			
146	RESERVED FOR FUTURE USE			
147	RESERVED FOR FUTURE USE			
148	RESERVED FOR FUTURE USE			
149	RESERVED FOR FUTURE USE			
150	AA1	IC107		INTERRUPT MASK/UNMASK LATCH
151	AA1	IC105		NIBBLE BUS WRITE CONTROL LATCH
152	AA1	IC113		GPIB INTERNAL WRITE REGISTER 0
153	AA1	IC113		GPIB INTERNAL WRITE REGISTER 1
154	AA1	IC113		GPIB INTERNAL WRITE REGISTER 2
155	AA1	IC113		GPIB INTERNAL WRITE REGISTER 3
156	AA1	IC113		GPIB INTERNAL WRITE REGISTER 4
157	AA1	IC113		GPIB INTERNAL WRITE REGISTER 5
158	AA1	IC113		GPIB INTERNAL WRITE REGISTER 6
159	AA1	IC113		GPIB INTERNAL WRITE REGISTER 7
160	AA1	IC113		GPIB INTERNAL READ REGISTER 0
161	AA1	IC113		GPIB INTERNAL READ REGISTER 1
162	AA1	IC113		GPIB INTERNAL READ REGISTER 2
163	AA1	IC113		GPIB INTERNAL READ REGISTER 3
164	AA1	IC113		GPIB INTERNAL READ REGISTER 4
165	AA1	IC113		GPIB INTERNAL READ REGISTER 5
166	AA1	IC113		GPIB INTERNAL READ REGISTER 6
167	AA1	IC113		GPIB INTERNAL READ REGISTER 7
168	AA1	IC110		INSTRUMENT INT. DETECT BUFFER
169	AA1	IC104		NIBBLE BUS INT. DETECT BUFFER
170	AB2	IC008		INST. RF STATUS READ BACK
171	AA1	IC413		INST. STATUS READ BACK BUFFER
172	AC1	IC010		INST. LNB STATUS READ BACK
173	AE1	IC010		INST. GSM STATUS READ BACK
174	AE1	IC007		GSM READ BUFFER (low nibble)
175	AE1	IC006		GSM READ BUFFER (high nibble)
176	AH1	IC010		IQ Mod. ADC0809 input 0 status
177	AH1	IC010		IQ Mod. ADC0809 input 1 status
178	AH1	IC010		IQ Mod. ADC0809 input 2 status
179	AH1	IC010		IQ Mod. ADC0809 input 3 status
180	AH1	IC010		IQ Mod. ADC0809 input 4 status
181	AH1	IC010		IQ Mod. ADC0809 input 5 status
182	AH1	IC010		IQ Mod. ADC0809 input 6 status
183	AH1	IC010		IQ Mod. ADC0809 input 7 status
184	AH1	IC008		IQ Modulator STATUS READ BACK
185	AH1	IC016		IQ Mod. READ BUFFER(low nibble)
186	AH1	IC015		IQ Mod. READ BUFFER(high nibble)

GPIB Operation

The following commands are used for the Latch Data Utility:

PORT

:ADDR Set Latch Number

Data type: Decimal Numeric Program Data

Suffix: None

:ONE Write 1 byte data to selected Latch, N

:TWO Write 2 bytes to Selected Latches N, N+1

:THREE Write 3 bytes to Selected Latches N...N+2

:FIVE Write 5 bytes to Selected Latches N...N+4

Data type: Decimal Numeric Program Data

Suffix: None

Examples:

```
PORT:ADDR 8;ONE 17
PORT:FIVE 1.2e10
```

PORT

:ONE?
:TWO?
:THREE?
:FIVE?

Prepares message containing information on Latch data in the format:

:PORT:ADDR <nr1>;<latches> <nr1>
where: <latches> is ONE or TWO or THREE or FIVE

Examples:

```
PORT:TWO?
:PORT:ADDR 24;TWO 3147
```

Chapter 6
REPLACEABLE PARTS

CONTENTS

LIST OF FIGURES

INTRODUCTION

Each sub-assembly or printed circuit board in this equipment has been allocated a reference designator code, e.g. A0, A1, A2 etc.

The complete component reference includes its reference designator as a prefix e.g. A2C1 (capacitor C1 on sub-assembly A2) but for convenience in the text and diagrams the prefix is omitted unless it is needed to avoid confusion. However when ordering replacements or in correspondence the complete component reference should be quoted.

PARTS LISTS

The replaceable parts lists for the 2030 series of signal generators are arranged in the following order:

(a) A top level parts list, A1, showing parts common to all instruments in the series.

(b) Three lists of parts, A2, used to make the three different versions of the instrument, i.e. the 2030, 2031 and 2032.

(c) Lists of parts, A3 to A10, providing the various options, e.g A3 is the 2nd modulation oscillator option.

(d) Lists of components used on individual boards AA1/3 onwards in alphanumerical order.

BOARDS AND UNITS

To find out which boards and units are fitted in your instrument refer to Fig. 6-1 which shows the various versions and options for the 2030 Signal Generator series.

COMPONENT VALUES

One or more of the components fitted in the equipment may differ from those listed in this chapter for any of the following reasons:-

(a) Components indicated by a * have their values selected during test to achieve particular performance limits.

(b) Owing to supply difficulties, components of different value or type may be substituted provided the overall performance of the equipment is maintained.

(c) As part of a policy of continuous development, components may be changed in value or type to obtain detailed improvements in performance.

When there is a difference between the component fitted and the one listed, always use as a replacement the same type and value as found in the equipment.

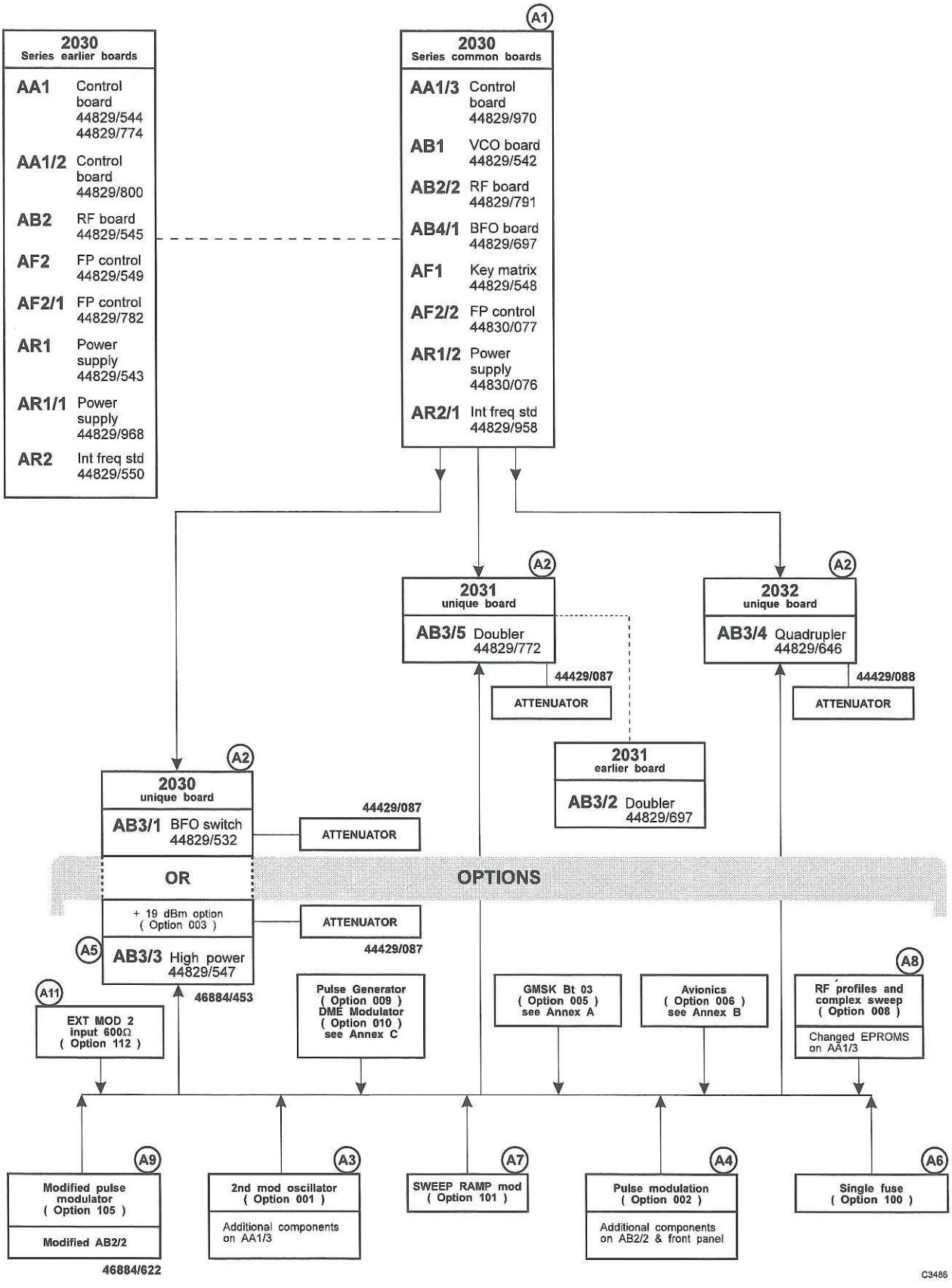


Fig. 6-1 Boards and units fitted to the 2030 series Signal Generators

The Component List includes information about one source of manufacture for each part along with that manufacturer's part number. Sources other than those listed may have been used to supply parts used in your equipment. Alternative replacement devices can often be obtained from other manufacturers but the user must satisfy himself that the items are equivalent in all significant parameters before fitting to the equipment. Where the manufacturer is listed as Marconi Instruments, the part can only be obtained from our Service Division or your nearest Agent.

ORDERING

When ordering replacements, address the order to our Service Division (address at rear of manual) or nearest agent and specify the following for each component required:-

(1) Type and serial number of equipment, as given on the serial number label at the rear of the equipment. If this is superseded by a model number label, quote the model number instead of the type number.

(2) Complete circuit reference.

(3) Description.

(4) Part number.

ELECTRICAL COMPONENTS

A1 2030 series common parts

Issue 125

Refer to Fig. 7-1, 2031 interconnections.

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
C31	26373/714	CAPACITOR FIXED CERAMIC 1nF -20/+80% 500V K2600 FEED-THROUGH, SCREW-IN MOUNTING, 2BA THREAD WITH	MIDLAND CAPACITORS	361/K2600-1000pF
C32	26343/433	CAPACITOR FIXED CERAMIC 47pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-678-34479
C33	26343/433	CAPACITOR FIXED CERAMIC 47pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-678-34479
C34	26343/433	CAPACITOR FIXED CERAMIC 47pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-678-34479
D1	28359/191	DIODE RECTIFIER, BY261-200... BRIDGE, 200V 25A 2.3Vf @ 12A, ENCAPSULATED, 29mm SQUARE.	INTERNAT RECTIFIER	26MB20A
D2	28359/191	DIODE RECTIFIER, BY261-200... BRIDGE, 200V 25A 2.3Vf @ 12A, ENCAPSULATED, 29mm SQUARE.	INTERNAT RECTIFIER	26MB20A
PLAF	23444/302	CONNECTOR-RF ADAPTOR 50 OHMS, SMB MALE TO MALE, BULKHEAD, GOLD OR NICKEL PLATED BODY.	SUHNER ELECTRONICS	34SMB-50-0-2
PLAL	23444/331	CONNECTOR-RF SMB-TYPE MALE, RECEPTACLE, 50 OHMS, BULKHEAD, SOLDER-BUCKET, FRONT MOUNTING, NICKEL	GREENPAR (DUBILIER)	B65M19J999X02
PLXH	23444/331	CONNECTOR-RF SMB-TYPE MALE, RECEPTACLE, 50 OHMS, BULKHEAD, SOLDER-BUCKET, FRONT MOUNTING, NICKEL	GREENPAR (DUBILIER)	B65M19J999X02
PLXJ	23444/512	CONNECTOR-RF SMA-TYPE FEMALE, JACK, 50 OHMS, BULKHEAD, SOLDER-BUCKET, REAR MOUNTING, STAINLESS	OMNI SPECTRA LTD	2058-0000-02
R1	24773/201	RESISTOR FIXED METAL-FILM 1R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	PHILIPS	ES-SFR25-1R-2
SKXK	23443/406	CONNECTOR-RF BNC-TYPE FEMALE, RECEPTACLE, 50 OHMS, FLANGED, SOLDER-BUCKET, 17.5mm SQUARE FLANGE WITH **MARKER**	GREENPAR (DUBILIER)	B35K07H999H02
SKXL	23443/406	CONNECTOR-RF BNC-TYPE FEMALE, RECEPTACLE, 50 OHMS, FLANGED, SOLDER-BUCKET, 17.5mm SQUARE FLANGE WITH **RAMP**	GREENPAR (DUBILIER)	B35K07H999H02

REPLACEABLE PARTS

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
A1	**2030 series common parts (contd.)**			
SKXM	23443/406	CONNECTOR-RF BNC-TYPE FEMALE, RECEPTACLE, 50 OHMS, FLANGED, SOLDER-BUCKET, 17.5mm SQUARE FLANGE WITH **TRIGGER**	GREENPAR (DUBILIER)	B35K07H999H02
SKXP	23443/406	CONNECTOR-RF BNC-TYPE FEMALE, RECEPTACLE, 50 OHMS, FLANGED, SOLDER-BUCKET, 17.5mm SQUARE FLANGE WITH **FREQ STD IN/OUT**	GREENPAR (DUBILIER)	B35K07H999H02
	23423/171	CONNECTOR MAINS, PLUG, 3 WAY, RF FILTER, DUAL (REPLACED BY 23423/174 WHEN OPTION 100 FITTED)	SCHAFFNER EMC LTD	FN378-6/21
	23443/442	CONNECTOR-RF BNC-TYPE FEMALE, RECEPTACLE, 50 OHMS, **EXT MOD 1 INPUT**	GREENPAR (DUBILIER)	B35M53H999X02
	23443/442	CONNECTOR-RF BNC-TYPE FEMALE, RECEPTACLE, 50 OHMS, **EXT MOD 2 INPUT**	GREENPAR (DUBILIER)	B35M53H999X02
	23443/449	CONNECTOR-RF BNC-TYPE FEMALE, RECEPTACLE, 50 OHMS, **LF OUTPUT**	AMPHENOL LTD	31-10
	43137/303	WIRE-LEAD-CRIMPED 4 WIRE, 7/0.2mm, CRIMP HOUSING 5 **SHAFT ENCODER TO PLFL, AF2/X**	MARCONI INSTRUMENTS LTD	
	43137/305	WIRE-LEAD-CRIMPED 5 WIRE, 7/0.2mm, CRIMP HOUSING **PLRL, AR2 TO PLRK, AR1**	MARCONI INSTRUMENTS LTD	
	43137/340	RF-CABLE FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **FLYING LEAD FROM PLBA, AB1**	MARCONI INSTRUMENTS LTD	
	43137/345	WIRE-LEAD-CRIMPED 5 WIRE, 7/0.2mm, CRIMP HOUSING 9 **PLAP, AA1/X TO VARIOUS**	MARCONI INSTRUMENTS LTD	
	43137/348	RF-CABLE FLEXIBLE RG178B/U, 50 OHMS, BNC FEMALE **WIDE BAND FM IN, SKXN TO PLAR, AA1/X**	MARCONI INSTRUMENTS LTD	
	43137/375	WIRE-LEAD-CRIMPED 9 WIRE, 7 & 16/0.2mm, CRIMP **PLRD, AR1 TO PLAA, AA1/X**	MARCONI INSTRUMENTS LTD	
	43137/377	RF-CABLE FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **SKRM, AR2 TO SKXH, AA1/X**	MARCONI INSTRUMENTS LTD	
	43137/379	RIBBON-LEAD 10 WAY, SOCKET 10 WAY, - SOCKET 10 **PLFJ, AF2/X TO PLRG, AR1**	MARCONI INSTRUMENTS LTD	
	43137/380	WIRE-LEAD-CRIMPED 9 WIRE, 7 & 16/0.2mm, CRIMP **PLRJ, AR1 TO PLTD, AT11**	MARCONI INSTRUMENTS LTD	
	43137/382	RIBBON-LEAD 10 WAY, SOCKET 10 WAY, - SOCKET 10 **PLTC, AT11 TO PLFH, AF2/X**	MARCONI INSTRUMENTS LTD	
	43137/519	WIRE-LEAD-CRIMPED 2 WIRE, 7/0.2mm, CRIMP HOUSING 3 **BATTERY HOLDER TO PLRH, AR1**	MARCONI INSTRUMENTS LTD	
	43138/372	WIRE-LEAD-CRIMPED 4 WIRE, 24/0.2mm, 1.6mm TERM **RECTIFIERS TO PLRA, AR1**	MARCONI INSTRUMENTS LTD	
	43137/524	WIRE-LEAD-SOLDERED 4 WIRE, 16/0.2mm, ROCKER SWITCH	MARCONI INSTRUMENTS LTD	
	43137/531	RF-CABLE FLEXIBLE RG178B/U, 50 OHMS, CRIMP SKT **EXT MOD 1, EXT MOD 2, LF OUTPUT TO PKAJ, AA1/X**	MARCONI INSTRUMENTS LTD	
	43137/653	RIBBON-LEAD 34 WAY, SOCKET 34 WAY, KEY POS 16, - **PLAN, AA1/X TO CAPACITOR FIELD**	MARCONI INSTRUMENTS LTD	
	43137/654	RIBBON-LEAD 32 WAY, SOCKET 16 WAY, 2-OFF, 1-KEY **PLBJ AND PLBK, AB2/X TO FILTER ASSEMBLY**	MARCONI INSTRUMENTS LTD	
	43137/847	RF-CABLE FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **PULSE INPUT (WHEN OPTION 002 FITTED)**	MARCONI INSTRUMENTS LTD	
	43129/003	CABLE-ASSEMBLY MAINS LEAD, SIDE ENTRY, BLACK, 2.5M	MARCONI INSTRUMENTS LTD	

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
A1	**2030 series common parts (contd.)**			
	44990/976	FILTER ASSY **BETWEEN PLAN, AA1/3 AND PLBJ, PLBK ON AB2/2**	MARCONI INSTRUMENTS LTD	
	23411/066	FUSE TIME-LAG 1A RATING, 20mm LONG x 5mm DIA 220 - 240 V	SCHURTER SWITZERLAND	FTT TYPE-0034.5043
	23411/072	FUSE TIME-LAG 1.6A RATING, 20mm LONG x 5mm DIA 110 - 120 V	SCHURTER SWITZERLAND	FTT TYPE-0034.5045
	23467/260	MODULE OPTO SHAFT ENCODER, 64 CYCLES/REV, 5V 26mA 0.25in DIA PLAIN SHAFT, 0.625in LONG, 3/8"-32UNEF	BOURNS ELECTRONICS	ENA1J-B20-L00064 5
X13	23711/106	BATTERY PRIMARY 1 CELL, 3.5V LITHIUM-THIONYLCHLR, 1.8 AMP-HRS, SIZE-AA, STANDARD PRESSURE CONTACTS.	(STD.CONTACT) SAFT (UK) LTD	LS6 AA
X14	23711/194	BATTERY HOLDER 1 CELL, SIZE-AA, PANEL MOUNTING, BAYONET CAP WITH COIN SLOT, BLACK, 2.8mm TABS.	A.F. BULGIN & CO PLCD	BX0011/1
	28624/308	DISPLAY LIQUID CRYSTAL, BLUE, 400 x 200 DOT MATRIX, 162mm x 84mm VIEWING AREA, GRAPHIC MODULE	EPSON (UK) LTD	ECM-A0310
	43137/520	FAN AXIAL-FLOW, BRUSHLESS, ASSEMBLY, 24V DC, WITH	MARCONI INSTRUMENTS LTD	
	43138/371	TRANSFORMER MAINS, TOROIDAL TYPE, 2x 120V PRIMARY,	MARCONI INSTRUMENTS LTD	
	44829/542	PCB ASSEMBLY MIXED TECHNOLOGY, AB1, VCO	MARCONI INSTRUMENTS LTD	
	44830/076	PCB ASSEMBLY CONVENTIONAL, AR1/2, PSU	MARCONI INSTRUMENTS LTD	
	44829/970	PCB ASSEMBLY MIXED TECHNOLOGY, AA1/3, CONTROL	MARCONI INSTRUMENTS LTD	
	44829/791	PCB ASSEMBLY MIXED TECHNOLOGY, AB2/2, RF	MARCONI INSTRUMENTS LTD	
	44829/548	PCB ASSEMBLY CONVENTIONAL, AF1, KEY MATRIX	MARCONI INSTRUMENTS LTD	
	44830/077	PCB ASSEMBLY MIXED TECHNOLOGY, AF2/2, FRONT PANEL	MARCONI INSTRUMENTS LTD	
	44829/958	PCB ASSEMBLY CONVENTIONAL, AR2/1, INT FREQ STANDARD	MARCONI INSTRUMENTS LTD	
	44829/697	PCB ASSEMBLY CONVENTIONAL, AB4/1, BFO	MARCONI INSTRUMENTS LTD	

A2 2030 version additional components

Issue 4

	43137/634	RF-CABLE SEMI-RIGID UT141, 50 OHMS, SMA MALE **PLXJ ON RF TRAY TO PLTB ON ATTENUATOR**	MARCONI INSTRUMENTS LTD
	44429/087	ATTENUATOR ASSY - SEVEN STAGE EDGELINE, AT10	MARCONI INSTRUMENTS LTD
	44829/532	PCB ASSEMBLY SURFACE MOUNT, AB3/1, **BFO SWITCH AND RPP**	MARCONI INSTRUMENTS LTD

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
A2	**2031 version additional components**			**Issue 6**
	43137/634	RF-CABLE SEMI-RIGID UT141, 50 OHMS, SMA MALE **PLXJ ON RF TRAY TO PLTB ON ATTENUATOR**	MARCONI INSTRUMENTS LTD	
	44429/087	ATTENUATOR ASSY - SEVEN STAGE EDGELINE, AT10.	MARCONI INSTRUMENTS LTD	
	44829/772	PCB ASSEMBLY SURFACE MOUNT, AB3/5, FREQUENCY DOUBLER	MARCONI INSTRUMENTS LTD	
A2	**2032 version additional components**			**Issue 8**
	43137/879	RF-CABLE SEMI-RIGID UT85, 50 OHMS, SMA FEMALE **RF OUTPUT TO PLXJ**	MARCONI INSTRUMENTS LTD	
	43137/974	RF-CABLE SEMI-RIGID UT141, 50 OHMS, SMA MALE **PLXJ ON RF TRAY TO PLTB ON ATTENUATOR**	MARCONI INSTRUMENTS LTD	
	43137/848	RIBBON-LEAD 20 WAY, SOCKET 20 WAY, KEY POS 16, - **PLBL ON AB2/2 TO FILTER WALL**	MARCONI INSTRUMENTS LTD	
	44429/088	ATTENUATOR ASSY 7-STAGE EDGELINE, AT10	MARCONI INSTRUMENTS LTD	
	44829/646	PCB ASSEMBLY SURFACE MOUNT, AB3/4, QUADRUPLER	MARCONI INSTRUMENTS LTD	
A3	**Option 001, 2nd mod osc**			**Issue 1**
IC209	28469/508	IC DIGITAL ARRAY-LOGIC L5A0586.. AUDIO SYNTHESIZER TO MI CUSTOM SPEC, CMOS, 68 PIN, PLCC.	LSI LOGIC LTD	L5A0586
IC212	28461/981	IC ANALOGUE D/A-CONVERTER PCM54... 16 BIT, BIPOLAR, MONOLITHIC, 28 PIN, DUAL-IN-LINE.	BURR-BROWN INTERNAT	PCM54JP
IC213	28461/399	IC ANALOGUE OPERATIONAL AMP OP42FZ... HIGH SPEED, FAST SETTLING 1uS, 8 PIN, DUAL-IN-LINE.	ANALOG DEVICES LTD	OP42EZ
IC214	28461/424	IC ANALOGUE SAMPLE/HOLD AMP HA5330... 2 INPUT, SINGLE, 20V PRECISION, VERY HIGH SPEED,	HARRIS SEMICONDUCTOR	HA1-5330-5
A4	**Option 002, pulse mod**			**Issue 11**
C303	26386/818	CAPACITOR FIXED CERAMIC 33pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805 5A 330 JAT 00 J
C310	26386/818	CAPACITOR FIXED CERAMIC 33pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805 5A 330 JAT 00 J
R359	24321/737	RESISTOR FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	DALE ELECTROSIL LTD	CRCW-1206-33R2-FT
R360	24321/737	RESISTOR FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	DALE ELECTROSIL LTD	CRCW-1206-33R2-FT

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
A4 Option 002, pulse mod (contd.)				
	43137/848	RIBBON-LEAD 20 WAY, SOCKET 20 WAY, KEY POS 16, - **PLBL ON AB2/2 TO FILTER WALL**	MARCONI INSTRUMENTS LTD	
	46884/600	PULSE SCREEN ASSEMBLY	MARCONI INSTRUMENTS LTD	
	23444/331	CONNECTOR-RF SMB-TYPE MALE, RECEPTACLE, 50 OHMS, **PLXA TO PLBP**	GREENPAR (DUBILIER)	B65M19J999X02
	43137/847	RF-CABLE FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **PULSE INPUT**	MARCONI INSTRUMENTS LTD	
A5 Option 003, high output power				**Issue 4**
	43137/634	RF-CABLE SEMI-RIGID UT141, 50 OHMS, SMA MALE **PLXJ ON RF TRAY TO PLTB ON ATTENUATOR**	MARCONI INSTRUMENTS LTD	
	43137/848	RIBBON LEAD 20-WAY, SOCKET 20-WAY, KEY POS 16	MARCONI INSTRUMENTS LTD	
	44429/061	ATTENUATOR ASSY - SEVEN STAGE EDGELINE, AT10	MARCONI INSTRUMENTS LTD	
	44829/547	PCB ASSEMBLY SURFACE MOUNT, AB3/3, HIGH POWER AMP	MARCONI INSTRUMENTS LTD	
A6 Option 100, single fuse				**Issue 4**
	23423/174	CONNECTOR MAINS, PLUG, 3 WAY, RF FILTER, SINGLE (FITTED IN PLACE OF 23423/171 ON UNIT A1)	SCHAFFNER EMC LTD	FN376-6/21
A7 Option 101, modified sweep ramp				**Issue 10**
	44533/388	IC PROGRAMMED EPROM, SET OF 4	MARCONI INSTRUMENTS LTD	
A8 Option 008, RF profiles and complex sweep				**Issue 03**
		IC PROGRAMMED EPROM, SET OF 1, INITIALISED IC114 ON 44829/800 (AA1/3)	MARCONI INSTRUMENTS LTD	
		IC PROGRAMMED EPROM, SET OF 1, IC202 ON 44829/800 (AA1/3)	MARCONI INSTRUMENTS LTD	

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
A9	**Option 105, modified pulse modulator**		**Issue 03**	
	44829/960	PCB-ASSEMBLY 44829/791 MODIFIED AB2/2 INITIALISED	MARCONI INSTRUMENTS LTD	
C303	26386/871	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-472-KAT-00-J
C310	26386/871	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-472-KAT-00-J
R306	24773/225	RESISTOR-FIXED METAL-FILM 10R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	ROHM ELECTRONICS LTD	CRB25-G-X-10R
R309	24773/299	RESISTOR-FIXED METAL-FILM 12K +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	ROHM ELECTRONICS LTD	CRB25-G-X-12K
R808	24773/277	RESISTOR-FIXED METAL-FILM 1K5 +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	ROHM ELECTRONICS LTD	CRB25-G-X-1K5
R809	24773/277	RESISTOR-FIXED METAL-FILM 1K5 +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	ROHM ELECTRONICS LTD	CRB25-G-X-1K5
A10	**Filter wall assembly**		**Issue 04**	
C32	26333/229	CAPACITOR-FIXED CERAMIC 50pf +/-10% 300V N 1500 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	50pF 112,24XXX-94499
C33	26333/229	CAPACITOR-FIXED CERAMIC 50pf +/-10% 300V N 1500 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	50pF 112,24XXX-94499
C34	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C35	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C36	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C37	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C38	26333/229	CAPACITOR-FIXED CERAMIC 50pf +/-10% 300V N 1500 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	50pF 112,24XXX-94499
C39	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C40	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C41	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000	FERROPERM UK LTD	1NF138,24XXX-94467/1
C42	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C43	26333/229	CAPACITOR-FIXED CERAMIC 50pf +/-10% 300V N 1500 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	50pF 112,24XXX-94499
C44	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
A11	**EXT MOD 2 input 600 Ω**		**Issue 01**	
R383	24772/075	RESISTOR-FIXED METAL-FILM 1K2 +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	PANASONIC INDUSTRIAL	ERO-10PKF1211
R384	24772/075	RESISTOR-FIXED METAL-FILM 1K2 +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	PANASONIC INDUSTRIAL	ERO-10PKF1211

AA1/3 Control board

Issue 05

When ordering, prefix circuit reference with AA1/3

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
	44829/970	Complete unit		
C101	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C102	26582/431	CAPACITOR-FIXED POLYESTER 22nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-322/015
C103	26582/431	CAPACITOR-FIXED POLYESTER 22nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-322/015
C104	26582/431	CAPACITOR-FIXED POLYESTER 22nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-322/015
C105	26582/431	CAPACITOR-FIXED POLYESTER 22nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-322/015
C106	26421/106	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-K-010-B
C107	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C108	26582/431	CAPACITOR-FIXED POLYESTER 22nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-322/015
C109	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C110	26582/431	CAPACITOR-FIXED POLYESTER 22nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-322/015
C111	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C113	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C114	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C115	26582/431	CAPACITOR-FIXED POLYESTER 22nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-322/015
C116	26582/431	CAPACITOR-FIXED POLYESTER 22nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-322/015
C117	26582/431	CAPACITOR-FIXED POLYESTER 22nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-322/015
C118	26582/431	CAPACITOR-FIXED POLYESTER 22nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-322/015
C119	26582/431	CAPACITOR-FIXED POLYESTER 22nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-322/015
C120	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C121	26582/431	CAPACITOR-FIXED POLYESTER 22nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-322/015
C122	26582/431	CAPACITOR-FIXED POLYESTER 22nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-322/015
C123	26582/431	CAPACITOR-FIXED POLYESTER 22nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-322/015
C124	26582/431	CAPACITOR-FIXED POLYESTER 22nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-322/015

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
C125	26582/431	CAPACITOR-FIXED POLYESTER 22nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-322/015
C126	26582/431	CAPACITOR-FIXED POLYESTER 22nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-322/015
C127	26343/435	CAPACITOR-FIXED CERAMIC 220pF +/-2% 63V N750 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROU-221-GAK-ACR-J
C130	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-100-B
C131	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C132	26343/489	CAPACITOR-FIXED CERAMIC 22pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-220-GAK-ACR-J
C133	26343/489	CAPACITOR-FIXED CERAMIC 22pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-220-GAK-ACR-J
C134	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C135	26421/122	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEB-100/35
C136	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C137	26383/587	CAPACITOR-FIXED CERAMIC 2.2nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51222
C138	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C139	26343/767	CAPACITOR-FIXED CERAMIC 10pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-100-JAT-00-J
C201	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C204	26538/910	CAPACITOR-FIXED POLYSTYRENE 2.2nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-2200pF-63V
C205	26538/918	CAPACITOR-FIXED POLYSTYRENE 4.7nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-4700pF-63V
C207	26538/912	CAPACITOR-FIXED POLYSTYRENE 2.7nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-2700pF-63V
C208	26538/910	CAPACITOR-FIXED POLYSTYRENE 2.2nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-2200pF-63V
C209	26538/918	CAPACITOR-FIXED POLYSTYRENE 4.7nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-4700pF-63V
C211	26538/910	CAPACITOR-FIXED POLYSTYRENE 2.2nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-2200pF-63V
C212	26343/489	CAPACITOR-FIXED CERAMIC 22pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-220-GAK-ACR-J
C215	26538/910	CAPACITOR-FIXED POLYSTYRENE 2.2nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-2200pF-63V
C216	26538/918	CAPACITOR-FIXED POLYSTYRENE 4.7nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-4700pF-63V
C218	26538/912	CAPACITOR-FIXED POLYSTYRENE 2.7nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-2700pF-63V
C219	26538/910	CAPACITOR-FIXED POLYSTYRENE 2.2nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-2200pF-63V
C220	26538/918	CAPACITOR-FIXED POLYSTYRENE 4.7nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-4700pF-63V

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
C222	26538/910	CAPACITOR-FIXED POLYSTYRENE 2.2nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-2200pF-63V
C223	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C224	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C226	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C227	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C228	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C230	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C231	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C232	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C233	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C234	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C235	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C236	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C237	26582/438	CAPACITOR-FIXED POLYESTER 330nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-433/065
C238	26582/438	CAPACITOR-FIXED POLYESTER 330nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-433/065
C239	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C240	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C241	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C242	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C243	26343/447	CAPACITOR-FIXED CERAMIC 330pF +/-2% 63V N750 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROU-331-GAK-ACR-J
C244	26343/447	CAPACITOR-FIXED CERAMIC 330pF +/-2% 63V N750 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROU-331-GAK-ACR-J
C245	26582/438	CAPACITOR-FIXED POLYESTER 330nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-433/065
C246	26582/438	CAPACITOR-FIXED POLYESTER 330nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-433/065
C301	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C302	26582/430	CAPACITOR-FIXED POLYESTER 220nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-422/065
C304	26421/124	CAPACITOR-FIXED ALUMINIUM 220uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, 13mm HIGH MAX,	DUBILIER CAPACITORS	CEB-220/16

AA1/3 Control board (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
C305	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C306	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C307	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C308	26582/430	CAPACITOR-FIXED POLYESTER 220nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-422/065
C310	26421/124	CAPACITOR-FIXED ALUMINIUM 220uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, 13mm HIGH MAX,	DUBILIER CAPACITORS	CEB-220/16
C311	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C312	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C313	26343/497	CAPACITOR-FIXED CERAMIC 12pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-120-GAK-ACR-J
C314	26343/497	CAPACITOR-FIXED CERAMIC 12pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-120-GAK-ACR-J
C315	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C316	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C317	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C318	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C319	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C320	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C321	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C322	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C323	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C324	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C325	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C326	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C327	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C328	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C329	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C330	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C331	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
C332	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C333	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C334	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C335	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C336	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C337	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C338	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C339	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C340	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C341	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C342	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C343	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C344	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C345	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C346	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C347	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C348	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C349	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C350	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C351	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C352	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C353	26421/106	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-K-010-B
C354	26421/106	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-K-010-B
C355	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C356	26343/489	CAPACITOR-FIXED CERAMIC 22pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-220-GAK-ACR-J
C357	26343/489	CAPACITOR-FIXED CERAMIC 22pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-220-GAK-ACR-J

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
C358	26582/430	CAPACITOR-FIXED POLYESTER 220nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-422/065
C359	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C360	26343/433	CAPACITOR-FIXED CERAMIC 47pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-470-GAK-ACR-J
C363	26343/499	CAPACITOR-FIXED CERAMIC 27pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-270-GAK-ACR-J
C365	26421/124	CAPACITOR-FIXED ALUMINIUM 220uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, 13mm HIGH MAX,	DUBILIER CAPACITORS	CEB-220/16
C366	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C401	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C402	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C403	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C404	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C405	26421/106	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-K-010-B
C406	26421/106	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-K-010-B
C407	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C408	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C409	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C410	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C411	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C412	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C413	26421/116	CAPACITOR-FIXED ALUMINIUM 47uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	PANASONIC INDUSTRIAL	ECE-A-1C-K-470-B
C414	26421/106	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-K-010-B
C415	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C416	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C417	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C420	26582/428	CAPACITOR-FIXED POLYESTER 47nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-347/065TA18
C421	26582/428	CAPACITOR-FIXED POLYESTER 47nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-347/065TA18
C422	26383/582	CAPACITOR-FIXED CERAMIC 470pF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51471

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
C423	26343/447	CAPACITOR-FIXED CERAMIC 330pF +/-2% 63V N750 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROU-331-GAK-ACR-J
C428	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C429	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C430	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C431	26343/488	CAPACITOR-FIXED CERAMIC 8.2pF +/-0.25pF 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-982-CAK-ACR-J
C432	26343/488	CAPACITOR-FIXED CERAMIC 8.2pF +/-0.25pF 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-982-CAK-ACR-J
C433	26343/492	CAPACITOR-FIXED CERAMIC 10pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-100-GOK-ACR-J
C434	26343/489	CAPACITOR-FIXED CERAMIC 22pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-220-GAK-ACR-J
C435	26343/492	CAPACITOR-FIXED CERAMIC 10pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-100-GOK-ACR-J
C436	26582/437	CAPACITOR-FIXED POLYESTER 150nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-415/065
C437	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C438	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C439	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C440	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C441	26343/433	CAPACITOR-FIXED CERAMIC 47pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-470-GAK-ACR-J
C442	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C443	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C445	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C446	26343/434	CAPACITOR-FIXED CERAMIC 68pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-680-GAK-ACR-J
C447	26421/106	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-K-010-B
C448	26582/438	CAPACITOR-FIXED POLYESTER 330nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-433/065
C501	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-100-B
C502	26343/492	CAPACITOR-FIXED CERAMIC 10pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-100-GOK-ACR-J
C503	26421/106	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-K-010-B
C505	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C506	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
C507	26383/582	CAPACITOR-FIXED CERAMIC 470pF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51471
C508	26421/114	CAPACITOR-FIXED ALUMINIUM 22uF +/-20% 25V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1E-K-220-B
C509	26421/114	CAPACITOR-FIXED ALUMINIUM 22uF +/-20% 25V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1E-K-220-B
C510	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C511	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C512	26582/428	CAPACITOR-FIXED POLYESTER 47nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-347/065TA18
C513	26421/118	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-0J-K-101-B
C514	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C515	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C516	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C517	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C518	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C519	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C520	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C521	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C522	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C523	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C524	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C525	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C526	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C528	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C529	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C530	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C531	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C532	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C533	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
C534	26343/484	CAPACITOR-FIXED CERAMIC 2.7pF +/-0.25pF 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-927-CAK-ACR-J
C537	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C538	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C539	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C540	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C541	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C542	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C543	26582/437	CAPACITOR-FIXED POLYESTER 150nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-415/065
C544	26421/124	CAPACITOR-FIXED ALUMINIUM 220uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, 13mm HIGH MAX,	DUBILIER CAPACITORS	CEB-220/16
C545	26421/124	CAPACITOR-FIXED ALUMINIUM 220uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, 13mm HIGH MAX,	DUBILIER CAPACITORS	CEB-220/16
C546	26421/122	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEB-100/35
C547	26421/126	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEB-470/6V3
C548	26421/126	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEB-470/6V3
C549	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C550	26383/590	CAPACITOR-FIXED CERAMIC 3.9nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51392
C552	26421/114	CAPACITOR-FIXED ALUMINIUM 22uF +/-20% 25V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1E-K-220-B
C553	26421/114	CAPACITOR-FIXED ALUMINIUM 22uF +/-20% 25V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1E-K-220-B
C554	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-100-B
C555	26421/118	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-0J-K-101-B
C556	26421/118	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-0J-K-101-B
C557	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C558	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C559	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C560	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C561	26343/434	CAPACITOR-FIXED CERAMIC 68pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-680-GAK-ACR-J
C562	26343/433	CAPACITOR-FIXED CERAMIC 47pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-470-GAK-ACR-J

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
C563	26343/433	CAPACITOR-FIXED CERAMIC 47pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-470-GAK-ACR-J
C564	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C565	26343/437	CAPACITOR-FIXED CERAMIC 100pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-101-GAK-ACR-J
C566	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C567	26346/120	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R MULTILAYER, AXIAL, EPOXY COVERED BODY, (TAPED).	PHILIPS	A41C 103K-DRM
C568	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C601	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C602	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C603	26343/489	CAPACITOR-FIXED CERAMIC 22pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-220-GAK-ACR-J
C604	26878/407	CAPACITOR-VARIABLE POLYPROPYLENE 2pF to 22pF 100V VERTICAL-PCB MOUNT, 7.5mm DIA, 10mm LONG, 3 PIN,	PHILIPS	2222-808-11229
C605	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C606	26421/124	CAPACITOR-FIXED ALUMINIUM 220uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, 13mm HIGH MAX,	DUBILIER CAPACITORS	CEB-220/16
C607	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C608	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C609	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C610	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C611	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C612	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C613	26343/437	CAPACITOR-FIXED CERAMIC 100pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-101-GAK-ACR-J
C615	26582/436	CAPACITOR-FIXED POLYESTER 68nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-368/015
C616	26582/436	CAPACITOR-FIXED POLYESTER 68nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-368/015
C619	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C620	26343/484	CAPACITOR-FIXED CERAMIC 2.7pF +/-0.25pF 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-927-CAK-ACR-J
C621	26343/484	CAPACITOR-FIXED CERAMIC 2.7pF +/-0.25pF 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-927-CAK-ACR-J
C622	26421/106	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-K-010-B
C623	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102

AA1/3 Control board (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
C624	26421/122	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEB-100/35
C625	26421/122	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEB-100/35
C626	26383/587	CAPACITOR-FIXED CERAMIC 2.2nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51222
C627	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C628	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C629	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C630	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C631	26421/126	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEB-470/6V3
C633	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C634	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C635	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C644	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C647	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C649	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C650	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C651	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C652	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C653	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C654	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C655	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C656	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C658	26582/426	CAPACITOR-FIXED POLYESTER 10nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	EVOX-RIFA	MMK5-103K100-TR18
C659	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C660	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C664	26386/777	CAPACITOR-FIXED CERAMIC 47nF +/-20% 63V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	PHILIPS	1206-2R-473-K9-BB
C665	26386/777	CAPACITOR-FIXED CERAMIC 47nF +/-20% 63V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	PHILIPS	1206-2R-473-K9-BB

AA1/3 Control board (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
C666	26386/777	CAPACITOR-FIXED CERAMIC 47nF +/-20% 63V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	PHILIPS	1206-2R-473-K9-BB
C668	26421/126	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEB-470/6V3
C669	26421/126	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEB-470/6V3
C673	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C674	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C675	26343/437	CAPACITOR-FIXED CERAMIC 100pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-101-GAK-ACR-J
C677	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C678	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C679	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C680	26386/803	CAPACITOR-FIXED CERAMIC 1.8pF +/-0.5pF 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-1R8-DAT-00-J
C681	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C682	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C683	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C684	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C685	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C686	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C687	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C688	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C689	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C690	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C691	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C692	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C693	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C694	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5C-104-KAT-00-J
C695	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C696	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
C697	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C698	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C699	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C700	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C701	26333/229	CAPACITOR-FIXED CERAMIC 50pF +/-10% 300V N1500 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	50pF 112,24XXX-94499
C702	26333/229	CAPACITOR-FIXED CERAMIC 50pF +/-10% 300V N1500 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	50pF 112,24XXX-94499
C703	26333/229	CAPACITOR-FIXED CERAMIC 50pF +/-10% 300V N1500 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	50pF 112,24XXX-94499
C704	26333/229	CAPACITOR-FIXED CERAMIC 50pF +/-10% 300V N1500 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	50pF 112,24XXX-94499
C705	26333/229	CAPACITOR-FIXED CERAMIC 50pF +/-10% 300V N1500 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	50pF 112,24XXX-94499
C706	26333/229	CAPACITOR-FIXED CERAMIC 50pF +/-10% 300V N1500 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	50pF 112,24XXX-94499
C707	26333/229	CAPACITOR-FIXED CERAMIC 50pF +/-10% 300V N1500 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	50pF 112,24XXX-94499
C708	26333/229	CAPACITOR-FIXED CERAMIC 50pF +/-10% 300V N1500 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	50pF 112,24XXX-94499
C709	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C710	26333/229	CAPACITOR-FIXED CERAMIC 50pF +/-10% 300V N1500 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	50pF 112,24XXX-94499
C711	26333/229	CAPACITOR-FIXED CERAMIC 50pF +/-10% 300V N1500 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	50pF 112,24XXX-94499
C712	26421/126	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEB-470/6V3
C713	26421/126	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEB-470/6V3
C714	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
D101	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D301	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D302	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D303	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D304	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D305	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D306	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148

AA1/3 Control board (contd.)

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
D307	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D308	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D309	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D310	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D311	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D312	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D313	28371/844	DIODE ZENER, BZX79-C10... 500mW 10V 5% 250mA AXIAL, DO-35, (TAPED).	PHILIPS	BZX79-C10
D314	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D315	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D316	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D317	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D318	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D319	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D320	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D321	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D322	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D323	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D324	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D401	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D402	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D403	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D404	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D405	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D406	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D407	28371/224	DIODE ZENER, BZX79-C3V6... 500mW 3.6V 5% 250mA AXIAL, DO-35, (TAPED).	PHILIPS	BZX79-C3V6
D408	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
D409	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D502	28371/494	DIODE VOLTAGE REFERENCE, 1N825... 250mW 6.2V 5% 50mA 20ppm/DEG.C, AXIAL, DO-35, (TAPED).	PHILIPS	1N825
D503	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D504	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D505	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D506	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D507	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D508	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D509	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D512	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D513	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D601	28381/101	DIODE VARIABLE CAPACITNCE, BB405B... 30V 20mA 11.5pF @ 3V, CAPAC RATIO 4.8 MIN, AXIAL, DO-34,	PHILIPS	BB405B
D605	28371/401	DIODE ZENER, BZX79-C5V1... 500mW 5.1V 5% 250mA AXIAL, DO-35, (TAPED).	PHILIPS	BZX79-C5V1
D606	28371/401	DIODE ZENER, BZX79-C5V1... 500mW 5.1V 5% 250mA AXIAL, DO-35, (TAPED).	PHILIPS	BZX79-C5V1
D613	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D614	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D616	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D617	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D618	28349/032	DIODE SMALL-SIGNAL, SCHOTTKY, HSMS-2820... 250mW 8V 1pF 0.5Vf @ 1mA, MARKNG CODE C0, LOW PROFILE,	HEWLETT-PACKARD	HSMS-2820-L31
D619	28349/032	DIODE SMALL-SIGNAL, SCHOTTKY, HSMS-2820... 250mW 8V 1pF 0.5Vf @ 1mA, MARKNG CODE C0, LOW PROFILE,	HEWLETT-PACKARD	HSMS-2820-L31
IC101	28467/133	IC-MICRO PROCESSOR, 80C188... 16 BIT, 12.5MHz, CHMOS, 68 PIN, PLCC.	ADVANCED MICRO DEV	N80C188-12
IC102	28462/428	IC-DIGITAL LATCH 74HC573... OCTAL, TRI-STATE, NON-INVERTING, TRANSPARENT, D-TYPE, CMOS-H/SPEED,	PHILIPS	74HC573N
IC103	28462/428	IC-DIGITAL LATCH 74HC573... OCTAL, TRI-STATE, NON-INVERTING, TRANSPARENT, D-TYPE, CMOS-H/SPEED,	PHILIPS	74HC573N
IC104	28469/128	IC-DIGITAL BUFFER/LINE-DRIVER 74HC244... 1 INPUT, OCTAL, NON-INVERTING, TRI-STATE BUS, CMOS-H/SPEED,	PHILIPS	74HC244N
IC105	28462/625	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC377... OCTAL, POS EDGE TRIGGER WITH DATA ENABLE, CMOS-H/SPEED, 20	PHILIPS	74HC377N

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
IC106	28461/689	IC-DIGITAL COMPARATOR 74HC85... 4 BIT, MAGNITUDE, CMOS-H/SPEED, 16 PIN, DUAL-IN-LINE.	PHILIPS	74HC85N
IC107	28462/625	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC377... OCTAL, POS EDGE TRIGGER WITH DATA ENABLE, CMOS-H/SPEED, 20	PHILIPS	74HC377N
IC108	28461/672	IC-DIGITAL COMPARATOR 74HC688... SINGLE, 2 x 8 BIT WORDS, CMOS-H/SPEED, 20 PIN, DUAL-IN-LINE.	PHILIPS	74HC688N
IC109	44533/441	IC PROGRAMMED EPROM (A), 1 OF SET OF 3	MARCONI INSTRUMENTS LTD	
IC110	28469/132	IC-DIGITAL BUFFER/LINE-DRIVER 74HC541... OCTAL, TRI-STATE, NON-INVERTING, CMOS-H/SPEED, 20 PIN,	PHILIPS	74HC541N
IC111	44533/441	IC PROGRAMMED EPROM (B), 1 OF SET OF 3	MARCONI INSTRUMENTS LTD	
IC113	28467/025	IC-MICRO CONTROLLER, 7210... INTERFACE BUS TALK/LISTEN/CONTROL, NMOS, 40 PIN, DUAL-IN-LINE.	NEC ELECTRONICS LTD	uPD7210C
IC114	44533/368	INITIALISED EEPROM	MARCONI INSTRUMENTS LTD	
IC115	28469/114	IC-DIGITAL TRANSCEIVER 75160... OCTAL, GPIB DATA, TTL-SCHOTTKY-L/PWR, 20 PIN, DUAL-IN-LINE.	NAT. SEMICONDUCTOR	DS75160AN
IC116	28469/115	IC-DIGITAL TRANSCEIVER 75161... OCTAL, GPIB-CONTROLLER, TTL-SCHOTTKY-L/PWR, 20 PIN,	NAT. SEMICONDUCTOR	DS75161AN
IC117	28462/428	IC-DIGITAL LATCH 74HC573... OCTAL, TRI-STATE, NON-INVERTING, TRANSPARENT, D-TYPE, CMOS-H/SPEED,	PHILIPS	74HC573N
IC118	28469/129	IC-DIGITAL TRANSCEIVER 74HC245... OCTAL, TRI-STATE, NON-INVERTING, BI-DIRECTIONAL,	PHILIPS	74HC245N
IC119	28466/112	IC-DIGITAL OR-GATE 74HC32... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, DUAL-IN-LINE.	PHILIPS	74HC32N
IC120	28467/134	IC-MICRO STATIC-RAM, 128K x 8 BIT, HM628128... 5V, 100nS, 100uA MAX STANDBY CURRENT, CMOS, 32 PIN,	TOSHIBA (UK) LTD	TC551001BPL-10
IC121	28466/020	IC-DIGITAL AND-GATE 74HC08... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, DUAL-IN-LINE.	PHILIPS	74HC08N
IC122	28469/137	IC-DIGITAL INVERTER 74HC04... HEX, CMOS-H/SPEED, 14 PIN, DUAL-IN-LINE.	PHILIPS	74HC04N
IC123	28465/041	IC-DIGITAL DECODER/DEMULTIPLEX 74HC139... 2 INPUT, 4 BIT, DUAL, INVERTING, 1 BIT ADDRESS,	PHILIPS	74HC139N
IC124	28466/365	IC-DIGITAL NAND-GATE 74HC00... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, DUAL-IN-LINE.	PHILIPS	74HC00N
IC125	28467/546	IC-DIGITAL SHIFT-REGISTER 74HCT165... 8 BIT, PARALLEL-IN SERIAL-OUT, CMOS-H/SPEED+TTL, 16 PIN,	PHILIPS	74HCT165N
IC126	28467/547	IC-DIGITAL SHIFT-REGISTER 74HC595... 8 BIT, SINGLE, TRI-STATE, CMOS-H/SPEED, 16 PIN,	PHILIPS	74HC595N
IC127	28466/112	IC-DIGITAL OR-GATE 74HC32... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, DUAL-IN-LINE.	PHILIPS	74HC32N
IC129	28469/176	IC-DIGITAL INVERTER 74LS14... HEX, SCHMITT-TRIGGER OPERATION, TTL-SCHOTTKY-L/PWR, 14 PIN,	NAT. SEMICONDUCTOR	DM74LS14N
IC130	28469/119	IC-DIGITAL INVERTER 74HC14... HEX, SCHMITT-TRIGGER OPERATION, CMOS-H/SPEED, 14 PIN, DUAL-IN-LINE.	PHILIPS	74HC14N
IC131	28466/112	IC-DIGITAL OR-GATE 74HC32... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, DUAL-IN-LINE.	PHILIPS	74HC32N
IC201	28469/508	IC-DIGITAL ARRAY-LOGIC L5A0586... AUDIO SYNTHESIZR TO MI CUSTOM SPEC, CMOS, 68 PIN, PLCC.	LSI LOGIC LTD	L5A0586
IC202	44533/430	WAVEFORM GENERATOR	MARCONI INSTRUMENTS LTD	
IC203	28462/138	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC574... OCTAL, TRI-STATE, NON-INVERTING, POS EDGE TRIGGER,	PHILIPS	74HC574N
IC204	28462/138	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC574... OCTAL, TRI-STATE, NON-INVERTING, POS EDGE TRIGGER,	PHILIPS	74HC574N

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
IC205	28461/981	IC-ANALOGUE D/A-CONVERTER PCM54... 16 BIT, BIPOLAR, MONOLITHIC, 28 PIN, DUAL-IN-LINE.	BURR-BROWN INTERNAT	PCM54JP
IC206	28461/471	IC-ANALOGUE OPERATIONAL AMP OP42... SINGLE, 15V SLEW RATE 40V/uS MIN, SETTLNG TIME 1.2uS TO 0.01%,	ANALOG DEVICES LTD	OP42GP
IC207	28461/424	IC-ANALOGUE SAMPLE/HOLD AMP HA5330... 2 INPUT, SINGLE, 20V PRECISION, VERY HIGH SPEED,	HARRIS SEMICONDUCTOR	HA1-5330-5
IC208	28469/739	IC-ANALOGUE MULTIPLEXER 74HC4053... TRIPLE, 2 CHANNEL, 1 SELECT INPUT PLUS ENABLE, CMOS-H/SPEED,	PHILIPS	74HC4053N
IC210	28462/138	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC574... OCTAL, TRI-STATE, NON-INVERTING, POS EDGE TRIGGER,	PHILIPS	74HC574N
IC211	28462/138	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC574... OCTAL, TRI-STATE, NON-INVERTING, POS EDGE TRIGGER,	PHILIPS	74HC574N
IC215	44535/291	IC-PROGRAMMED FSK MODIFICATION (2030 CONTROL BD)	MARCONI INSTRUMENTS LTD	
IC301	28465/040	IC-DIGITAL DECODER/DEMULTIPLEX 74HC138... 3 INPUT, 8 BIT, SINGLE, INVERTING, 3 BIT ADDRESS,	PHILIPS	74HC138N
IC302	28462/625	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC377... OCTAL, POS EDGE TRIGGER WITH DATA ENABLE, CMOS-H/SPEED, 20	PHILIPS	74HC377N
IC303	28462/625	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC377... OCTAL, POS EDGE TRIGGER WITH DATA ENABLE, CMOS-H/SPEED, 20	PHILIPS	74HC377N
IC304	28462/625	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC377... OCTAL, POS EDGE TRIGGER WITH DATA ENABLE, CMOS-H/SPEED, 20	PHILIPS	74HC377N
IC305	28461/347	IC-ANALOGUE OPERATIONAL AMP TL071C... SINGLE, JFET-INPUT, LINEAR, SLEW-RATE 13V/uS TYP, 8 PIN,	MOTOROLA INC.	TL071CP
IC306	28461/423	IC-ANALOGUE OPERATIONAL AMP HA5147... 2 INPUT, SINGLE, 22V ULTRA LOW NOISE, HIGH SLEW RATE,	HARRIS SEMICONDUCTOR	HA1-5147-5
IC307	28461/349	IC-ANALOGUE OPERATIONAL AMP TL074CN... QUAD, JFET-INPUT, LINEAR, 14 PIN, DUAL-IN-LINE.	MOTOROLA INC.	TL074CN
IC308	28461/347	IC-ANALOGUE OPERATIONAL AMP TL071C... SINGLE, JFET-INPUT, LINEAR, SLEW-RATE 13V/uS TYP, 8 PIN,	MOTOROLA INC.	TL071CP
IC309	28461/423	IC-ANALOGUE OPERATIONAL AMP HA5147... 2 INPUT, SINGLE, 22V ULTRA LOW NOISE, HIGH SLEW RATE,	HARRIS SEMICONDUCTOR	HA1-5147-5
IC310	28461/349	IC-ANALOGUE OPERATIONAL AMP TL074CN... QUAD, JFET-INPUT, LINEAR, 14 PIN, DUAL-IN-LINE.	MOTOROLA INC.	TL074CN
IC311	28469/737	IC-ANALOGUE MULTIPLEXER 74HC4051... SINGLE, 8 CHANNEL, 3 SELECT INPUTS PLUS ENABLE,	PHILIPS	74HC4051N
IC312	28469/737	IC-ANALOGUE MULTIPLEXER 74HC4051... SINGLE, 8 CHANNEL, 3 SELECT INPUTS PLUS ENABLE,	PHILIPS	74HC4051N
IC313	28469/737	IC-ANALOGUE MULTIPLEXER 74HC4051... SINGLE, 8 CHANNEL, 3 SELECT INPUTS PLUS ENABLE,	PHILIPS	74HC4051N
IC314	28469/737	IC-ANALOGUE MULTIPLEXER 74HC4051... SINGLE, 8 CHANNEL, 3 SELECT INPUTS PLUS ENABLE,	PHILIPS	74HC4051N
IC315	28469/737	IC-ANALOGUE MULTIPLEXER 74HC4051... SINGLE, 8 CHANNEL, 3 SELECT INPUTS PLUS ENABLE,	PHILIPS	74HC4051N
IC316	28461/347	IC-ANALOGUE OPERATIONAL AMP TL071C... SINGLE, JFET-INPUT, LINEAR, SLEW-RATE 13V/uS TYP, 8 PIN,	MOTOROLA INC.	TL071CP
IC317	28461/348	IC-ANALOGUE OPERATIONAL AMP TL072CP... DUAL, JFET-INPUT, LINEAR, SLEW-RATE 13V/uS TYP, 8 PIN,	MOTOROLA INC.	TL072CP
IC318	28461/349	IC-ANALOGUE OPERATIONAL AMP TL074CN... QUAD, JFET-INPUT, LINEAR, 14 PIN, DUAL-IN-LINE.	MOTOROLA INC.	TL074CN
IC319	28461/976	IC-ANALOGUE D/A-CONVERTER 7537... DUAL, 15V 12 BIT, 8+4 LOADING, REL-ACC +/-1/2 LSB, GAIN-ERR	ANALOG DEVICES LTD	AD7537KN

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
IC320	28461/471	IC-ANALOGUE OPERATIONAL AMP OP42... SINGLE, 15V SLEW RATE 40V/uS MIN, SETTLNG TIME 1.2uS TO 0.01%,	ANALOG DEVICES LTD	OP42GP
IC321	28469/737	IC-ANALOGUE MULTIPLEXER 74HC4051... SINGLE, 8 CHANNEL, 3 SELECT INPUTS PLUS ENABLE,	PHILIPS	74HC4051N
IC322	28461/471	IC-ANALOGUE OPERATIONAL AMP OP42... SINGLE, 15V SLEW RATE 40V/uS MIN, SETTLNG TIME 1.2uS TO 0.01%,	ANALOG DEVICES LTD	OP42GP
IC323	28461/471	IC-ANALOGUE OPERATIONAL AMP OP42... SINGLE, 15V SLEW RATE 40V/uS MIN, SETTLNG TIME 1.2uS TO 0.01%,	ANALOG DEVICES LTD	OP42GP
IC324	28461/494	IC-ANALOGUE BUFFER-AMPLIFIER LT1010... 22V UNITY GAIN, SLEW-RATE 75 V/uS MIN, BANDWIDTH 20MHz @	LINEAR TECHNOLOGY	LT1010CT
IC325	28461/736	IC-ANALOGUE VOLTAGE-REGULATOR 79L05AC... 5V 100mA NEGATIVE, OUTPUT VOLTAGE ERROR <5% OVERLOAD,	NAT. SEMICONDUCTOR	LM79L05ACZ
IC401	28465/040	IC-DIGITAL DECODER/DEMULTIPLEX 74HC138... 3 INPUT, 8 BIT, SINGLE, INVERTING, 3 BIT ADDRESS,	PHILIPS	74HC138N
IC402	28461/976	IC-ANALOGUE D/A-CONVERTER 7537... DUAL, 15V 12 BIT, 8+4 LOADING, REL-ACC +/-1/2 LSB, GAIN-ERR	ANALOG DEVICES LTD	AD7537KN
IC403	28461/442	IC-ANALOGUE OPERATIONAL AMP AD845... SINGLE, 18V SLEW RATE 96V/uS MIN, HIGH SPEED, PRECISION, JFET,	ANALOG DEVICES LTD	AD845-KN
IC404	28461/442	IC-ANALOGUE OPERATIONAL AMP AD845... SINGLE, 18V SLEW RATE 96V/uS MIN, HIGH SPEED, PRECISION, JFET,	ANALOG DEVICES LTD	AD845-KN
IC405	28461/471	IC-ANALOGUE OPERATIONAL AMP OP42... SINGLE, 15V SLEW RATE 40V/uS MIN, SETTLNG TIME 1.2uS TO 0.01%,	ANALOG DEVICES LTD	OP42GP
IC406	28461/471	IC-ANALOGUE OPERATIONAL AMP OP42... SINGLE, 15V SLEW RATE 40V/uS MIN, SETTLNG TIME 1.2uS TO 0.01%,	ANALOG DEVICES LTD	OP42GP
IC407	28461/471	IC-ANALOGUE OPERATIONAL AMP OP42... SINGLE, 15V SLEW RATE 40V/uS MIN, SETTLNG TIME 1.2uS TO 0.01%,	ANALOG DEVICES LTD	OP42GP
IC408	28461/494	IC-ANALOGUE BUFFER-AMPLIFIER LT1010... 22V UNITY GAIN, SLEW-RATE 75 V/uS MIN, BANDWIDTH 20MHz @	LINEAR TECHNOLOGY	LT1010CT
IC409	28461/349	IC-ANALOGUE OPERATIONAL AMP TL074CN... QUAD, JFET-INPUT, LINEAR, 14 PIN, DUAL-IN-LINE.	MOTOROLA INC.	TL074CN
IC411	28469/447	IC-DIGITAL DRIVER ULN2803... 8 DARLINGTON ARRAYS, 50V, 500mA, BIPOLAR, 18 PIN, DUAL-IN-LINE.	MOTOROLA INC.	ULN2803A
IC412	28462/625	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC377... OCTAL, POS EDGE TRIGGER WITH DATA ENABLE, CMOS-H/SPEED, 20	PHILIPS	74HC377N
IC413	28469/132	IC-DIGITAL BUFFER/LINE-DRIVER 74HC541... OCTAL, TRI-STATE, NON-INVERTING, CMOS-H/SPEED, 20 PIN,	PHILIPS	74HC541N
IC414	28466/227	IC-DIGITAL NOR-GATE 74HC02... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, DUAL-IN-LINE.	PHILIPS	74HC02N
IC501	28465/040	IC-DIGITAL DECODER/DEMULTIPLEX 74HC138... 3 INPUT, 8 BIT, SINGLE, INVERTING, 3 BIT ADDRESS,	PHILIPS	74HC138N
IC502	28461/976	IC-ANALOGUE D/A-CONVERTER 7537... DUAL, 15V 12 BIT, 8+4 LOADING, REL-ACC +/-1/2 LSB, GAIN-ERR	ANALOG DEVICES LTD	AD7537KN
IC503	28461/349	IC-ANALOGUE OPERATIONAL AMP TL074CN... QUAD, JFET-INPUT, LINEAR, 14 PIN, DUAL-IN-LINE.	MOTOROLA INC.	TL074CN
IC504	28461/348	IC-ANALOGUE OPERATIONAL AMP TL072CP... DUAL, JFET-INPUT, LINEAR, SLEW-RATE 13V/uS TYP, 8 PIN,	MOTOROLA INC.	TL072CP
IC505	28461/976	IC-ANALOGUE D/A-CONVERTER 7537... DUAL, 15V 12 BIT, 8+4 LOADING, REL-ACC +/-1/2 LSB, GAIN-ERR	ANALOG DEVICES LTD	AD7537KN
IC506	28461/407	IC-ANALOGUE OPERATIONAL AMP AD712... DUAL, 15V PWR BANDWDTH 200kHz, SLEW-RATE 20V/uS TYP, I/P OFFSET	ANALOG DEVICES LTD	AD712JN
IC507	28461/984	IC-ANALOGUE D/A-CONVERTER AD7225... QUAD, 8 BIT, SEPERATE REFERENCE INPUTS, CMOS, 24 PIN,	ANALOG DEVICES LTD	AD7225KN

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
IC508	28452/869	TRANSISTOR NPN BIPOLAR LM394CN... MONOLITHIC PAIR, 20V 200MHz 500mW 20mA MATCHED, PLUS BASE/EMITTER	NAT. SEMICONDUCTOR	LM394CN
IC509	28462/625	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC377... OCTAL, POS EDGE TRIGGER WITH DATA ENABLE, CMOS-H/SPEED, 20	PHILIPS	74HC377N
IC510	28462/625	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC377... OCTAL, POS EDGE TRIGGER WITH DATA ENABLE, CMOS-H/SPEED, 20	PHILIPS	74HC377N
IC511	28466/364	IC-DIGITAL NAND-GATE 74HC132... 2 INPUT, QUAD, SCHMITT TRIGGER, CMOS-H/SPEED, 14 PIN,	PHILIPS	74HC132N
IC512	28464/030	IC-DIGITAL COUNTER 74HC390... 4 BIT, DUAL, DECADE RIPPLE, CMOS-H/SPEED, 16 PIN, DUAL-IN-LINE.	PHILIPS	74HC390N
IC513	28469/732	IC-DIGITAL MULTIPLEXER 74HC253... 4 INPUT, 1 BIT, DUAL, TRI-STATE, NON-INVERTING, CMOS-H/SPEED, 16	PHILIPS	74HC253BN
IC514	28469/031	IC-DIGITAL BUFFER/LINE-DRIVER 74HC126... QUAD, TRI-STATE, HIGH-ENABLE, CMOS-H/SPEED, 14 PIN,	PHILIPS	74HC126N
IC515	28464/034	IC-DIGITAL DIVIDER SP8789... DIVIDE BY 20/21, 225MHz, TWO MODULUS, ECL, 8 PIN, DUAL-IN-LINE.	GEC PLESSEY SEMICOND	SP8789DP
IC516	44535/191	IC-PROGRAMMED PAL, SET OF 1, 2031, 104.8576MHz DIVIDER.		
IC520	28462/622	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-H/SPEED,	PHILIPS	74HC74N
IC521	28466/364	IC-DIGITAL NAND-GATE 74HC132... 2 INPUT, QUAD, SCHMITT TRIGGER, CMOS-H/SPEED, 14 PIN,	PHILIPS	74HC132N
IC522	28461/349	IC-ANALOGUE OPERATIONAL AMP TL074CN... QUAD, JFET-INPUT, LINEAR, 14 PIN, DUAL-IN-LINE.	MOTOROLA INC.	TL074CN
IC523	28461/757	IC-ANALOGUE VOLTAGE-REFERENCE AD586... 36V 5V REF +/- 0.020V, OUTPUT DRIFT 25ppm, MONOLITHIC, 8 PIN,	ANALOG DEVICES LTD	AD586JN
IC601	28469/567	IC-DIGITAL DIVIDER SP8401... DIVIDE BY 10/11, 300MHz PRESCALER, PHASE NOISE < 160dBc/Hz, ECL, 28	GEC PLESSEY SEMICOND	SP8401-KG-MPES
IC602	28464/186	IC-DIGITAL COUNTER 74HC163... 4 BIT, BINARY, SYNCHRONOUS, PRESETTABLE, CMOS-H/SPEED, 16 PIN,	PHILIPS	74HC163D
IC603	28466/241	IC-DIGITAL NOR-GATE 74HC02... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC02D
IC604	28466/390	IC-DIGITAL NAND-GATE 74HC00... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC00D
IC605	28462/146	IC-DIGITAL FLIP-FLOP/D-TYPE 74AC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-ADVANCED,	NAT. SEMICONDUCTOR	74AC74SC
IC606	28466/390	IC-DIGITAL NAND-GATE 74HC00... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC00D
IC607	28462/146	IC-DIGITAL FLIP-FLOP/D-TYPE 74AC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-ADVANCED,	NAT. SEMICONDUCTOR	74AC74SC
IC608	28469/057	IC-DIGITAL INVERTER 74HC04... HEX, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC04D
IC609	28469/057	IC-DIGITAL INVERTER 74HC04... HEX, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC04D
IC610	28469/568	IC-DIGITAL DIVIDER SP8400... DIVIDE BY 8/9, 1.5GHz PRESCALER, PHASE NOISE < 160dBc/Hz, 3 BIT A & 9	GEC PLESSEY SEMICOND	SP8400
IC611	28466/414	IC-DIGITAL EXCLUSIVE-OR 74HC86... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC86D
IC614	28469/621	IC-DIGITAL ARRAY-LOGIC L5A1579... FRACTIONAL N CONTROL CHIP TO MI CUSTOM SPEC, CMOS, 68 PIN,	LSI LOGIC LTD	L5A1579
IC615	28461/349	IC-ANALOGUE OPERATIONAL AMP TL074CN... QUAD, JFET-INPUT, LINEAR, 14 PIN, DUAL-IN-LINE.	MOTOROLA INC.	TL074CN

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
IC614	28469/621	IC-DIGITAL ARRAY-LOGIC L5A1579... FRACTIONAL N CONTROL CHIP TO IFR CUS TOM SPEC, CMOS, 68 PIN,	LSI LOGIC LTD	L5A1579
IC615	28461/349	IC-ANALOGUE OPERATIONAL AMP TL074CN... QUAD, JFET-INPUT, LINEAR, 14 PIN, DUAL-IN-LINE.	MOTOROLA INC.	TL074CN
IC616	28462/622	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-H/SPEED,	PHILIPS	74HC74N
IC617	28466/020	IC-DIGITAL AND-GATE 74HC08... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, DUAL-IN-LINE.	PHILIPS	74HC08N
IC618	28466/227	IC-DIGITAL NOR-GATE 74HC02... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, DUAL-IN-LINE.	PHILIPS	74HC02N
L101	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
L201	23642/721	INDUCTOR-FIXED 39uH +/- 5% SCREENED, MOULDED-EPOXY, 205mA 1R93 MAX, 50 Q @ 2.5 MHz, 29	VISHAY COMPONENTS	IMS-5 39uH 5%
L202	23642/722	INDUCTOR-FIXED 47uH +/- 5% SCREENED, MOULDED-EPOXY, 195mA 2R11 MAX, 50 Q @ 2.5 MHz, 27	VISHAY COMPONENTS	IMS-5 47uH 5%
L203	23642/722	INDUCTOR-FIXED 47uH +/- 5% SCREENED, MOULDED-EPOXY, 195mA 2R11 MAX, 50 Q @ 2.5 MHz, 27	VISHAY COMPONENTS	IMS-5 47uH 5%
L204	23642/721	INDUCTOR-FIXED 39uH +/- 5% SCREENED, MOULDED-EPOXY, 205mA 1R93 MAX, 50 Q @ 2.5 MHz, 29	VISHAY COMPONENTS	IMS-5 39uH 5%
L205	23642/721	INDUCTOR-FIXED 39uH +/- 5% SCREENED, MOULDED-EPOXY, 205mA 1R93 MAX, 50 Q @ 2.5 MHz, 29	VISHAY COMPONENTS	IMS-5 39uH 5%
L206	23642/722	INDUCTOR-FIXED 47uH +/- 5% SCREENED, MOULDED-EPOXY, 195mA 2R11 MAX, 50 Q @ 2.5 MHz, 27	VISHAY COMPONENTS	IMS-5 47uH 5%
L207	23642/722	INDUCTOR-FIXED 47uH +/- 5% SCREENED, MOULDED-EPOXY, 195mA 2R11 MAX, 50 Q @ 2.5 MHz, 27	VISHAY COMPONENTS	IMS-5 47uH 5%
L208	23642/721	INDUCTOR-FIXED 39uH +/- 5% SCREENED, MOULDED-EPOXY, 205mA 1R93 MAX, 50 Q @ 2.5 MHz, 29	VISHAY COMPONENTS	IMS-5 39uH 5%
L401	23642/052	INDUCTOR-FIXED 470uH +/- 5% MOULDED-EPOXY, 95mA 11R1 MAX, 65 Q @ 0.79 MHz, 4 MHz SRF, AXIAL,	VISHAY COMPONENTS	IM-6 470uH 5%
L501	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
L502	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
L503	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
L504	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
L505	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
L506	23642/566	INDUCTOR-FIXED 680uH +/- 10% COATED-LACQUER, MINIATURE, 78mA 33R MAX, 45 Q @ 0.79 MHz, 2.5 MHz	MEGGITT ELECTRONICS	C12-406/8/27471/014
L601	23642/481	INDUCTOR-FIXED 0.15uH +/- 10% MOULDED-EPOXY, 2.45A 0R3 MAX, 50 Q @ 25 MHz, 525 MHz SRF, AXIAL,	MEGGITT ELECTRONICS	C20M-406/8/27484/002
L603	23642/492	INDUCTOR-FIXED 0.47uH +/- 5% MOULDED-EPOXY, 1.225A 0R12 MAX, 45 Q @ 25 MHz, 310 MHz SRF, AXIAL,	MEGGITT ELECTRONICS	C20M-406/8/27484/005
L605	23642/362	INDUCTOR-FIXED 10mH +/- 10% SCREENED, MOULDED-EPOXY, 69mA 75R MAX, 70 Q @ 0.25 MHz, 0.7	INTERCONNECTION PROD	553-3635-49-02-00
L606	23642/362	INDUCTOR-FIXED 10mH +/- 10% SCREENED, MOULDED-EPOXY, 69mA 75R MAX, 70 Q @ 0.25 MHz, 0.7	INTERCONNECTION PROD	553-3635-49-02-00

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
L607	23642/543	INDUCTOR-FIXED 0.1uH +/- 10% COATED-LACQUER, MINIATURE, 2.8A 0R03 MAX, 50 Q @ 25 MHz, 500 MHz	SIGMA PRODUCTS LTD	10-10-0501-10
L608	23642/549	INDUCTOR-FIXED 1uH +/- 10% COATED-LACQUER, MINIATURE, 820mA 0R3 MAX, 45 Q @ 25 MHz, 210 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/010
L609	23642/549	INDUCTOR-FIXED 1uH +/- 10% COATED-LACQUER, MINIATURE, 820mA 0R3 MAX, 45 Q @ 25 MHz, 210 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/010
L610	23642/549	INDUCTOR-FIXED 1uH +/- 10% COATED-LACQUER, MINIATURE, 820mA 0R3 MAX, 45 Q @ 25 MHz, 210 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/010
L611	23642/549	INDUCTOR-FIXED 1uH +/- 10% COATED-LACQUER, MINIATURE, 820mA 0R3 MAX, 45 Q @ 25 MHz, 210 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/010
L612	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
L613	23642/555	INDUCTOR-FIXED 10uH +/- 10% COATED-LACQUER, MINIATURE, 470mA 0R9 MAX, 45 Q @ 7.9 MHz, 45 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/006
L614	23642/555	INDUCTOR-FIXED 10uH +/- 10% COATED-LACQUER, MINIATURE, 470mA 0R9 MAX, 45 Q @ 7.9 MHz, 45 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/006
R101	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R102	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R103	24772/107	RESISTOR-FIXED METAL-FILM 27K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-27K-2%
R104	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R105	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R106	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R107	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R108	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R109	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R110	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R111	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R112	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R113	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R114	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R115	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R116	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R118	24681/655	RESISTOR-NETWORK BUSSED, THICK-FILM, 2K2 2% 1W 50V 100 ppm/DEG.C, 9 RESISTORS, LOW PROFILE, 10 PIN,	VISHAY COMPONENTS	LC0-001-2201G

AA1/3 Control board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R119	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R120	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R121	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R122	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R123	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R124	24772/061	RESISTOR-FIXED METAL-FILM 330R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-330R-2%
R125	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R126	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R201	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R204	24772/051	RESISTOR-FIXED METAL-FILM 120R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-120R-2%
R205	24772/051	RESISTOR-FIXED METAL-FILM 120R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-120R-2%
R206	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R209	24772/051	RESISTOR-FIXED METAL-FILM 120R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-120R-2%
R210	24772/052	RESISTOR-FIXED METAL-FILM 130R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	NK3-130R-2%
R211	24772/113	RESISTOR-FIXED METAL-FILM 47K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-47K-2%
R212	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R213	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R214	24772/113	RESISTOR-FIXED METAL-FILM 47K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-47K-2%
R217	24772/042	RESISTOR-FIXED METAL-FILM 51R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-51R-2%
R218	24772/042	RESISTOR-FIXED METAL-FILM 51R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-51R-2%
R219	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R220	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R221	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R222	24772/066	RESISTOR-FIXED METAL-FILM 510R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-510R-2%
R223	24772/066	RESISTOR-FIXED METAL-FILM 510R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-510R-2%
R224	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
R225	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R228	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R229	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R301	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R302	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R303	24772/141	RESISTOR-FIXED METAL-FILM 1M +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-1M-2%
R304	24772/122	RESISTOR-FIXED METAL-FILM 110K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-110K-2%
R307	24724/001	RESISTOR-FIXED METAL-FILM 1K2 +/- 0.1% 100mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.05-1K2-B-T-2
R308	24724/004	RESISTOR-FIXED METAL-FILM 68R +/- 0.1% 100mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.05-68R-B-T-2
R309	24772/103	RESISTOR-FIXED METAL-FILM 18K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-18K-2%
R310	24724/002	RESISTOR-FIXED METAL-FILM 910R +/- 0.1% 100mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.05-910R-B-T-2
R312	24772/082	RESISTOR-FIXED METAL-FILM 2K4 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K4-2%
R313	24772/134	RESISTOR-FIXED METAL-FILM 360K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-360K-2%
R314	24772/134	RESISTOR-FIXED METAL-FILM 360K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-360K-2%
R315	24772/134	RESISTOR-FIXED METAL-FILM 360K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-360K-2%
R316	24772/134	RESISTOR-FIXED METAL-FILM 360K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-360K-2%
R317	24772/135	RESISTOR-FIXED METAL-FILM 390K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-390K-2%
R318	24772/141	RESISTOR-FIXED METAL-FILM 1M +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-1M-2%
R319	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R321	24772/141	RESISTOR-FIXED METAL-FILM 1M +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-1M-2%
R322	24772/141	RESISTOR-FIXED METAL-FILM 1M +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-1M-2%
R323	24772/101	RESISTOR-FIXED METAL-FILM 15K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-15K-2%
R324	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R325	24772/101	RESISTOR-FIXED METAL-FILM 15K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-15K-2%
R326	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R327	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
R328	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R329	24772/141	RESISTOR-FIXED METAL-FILM 1M +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-1M-2%
R330	24772/122	RESISTOR-FIXED METAL-FILM 110K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-110K-2%
R333	24724/001	RESISTOR-FIXED METAL-FILM 1K2 +/- 0.1% 100mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.05-1K2-B-T-2
R334	24724/004	RESISTOR-FIXED METAL-FILM 68R +/- 0.1% 100mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.05-68R-B-T-2
R335	24772/103	RESISTOR-FIXED METAL-FILM 18K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-18K-2%
R336	24724/002	RESISTOR-FIXED METAL-FILM 910R +/- 0.1% 100mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.05-910R-B-T-2
R338	24772/082	RESISTOR-FIXED METAL-FILM 2K4 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K4-2%
R339	24772/134	RESISTOR-FIXED METAL-FILM 360K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-360K-2%
R340	24772/134	RESISTOR-FIXED METAL-FILM 360K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-360K-2%
R341	24772/134	RESISTOR-FIXED METAL-FILM 360K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-360K-2%
R342	24772/134	RESISTOR-FIXED METAL-FILM 360K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-360K-2%
R343	24772/135	RESISTOR-FIXED METAL-FILM 390K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-390K-2%
R344	24772/141	RESISTOR-FIXED METAL-FILM 1M +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-1M-2%
R345	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R347	24772/141	RESISTOR-FIXED METAL-FILM 1M +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-1M-2%
R348	24772/141	RESISTOR-FIXED METAL-FILM 1M +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-1M-2%
R349	24772/101	RESISTOR-FIXED METAL-FILM 15K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-15K-2%
R350	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R351	24772/101	RESISTOR-FIXED METAL-FILM 15K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-15K-2%
R352	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R353	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R354	24772/075	RESISTOR-FIXED METAL-FILM 1K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K2-2%
R355	24723/334	RESISTOR-FIXED METAL-FILM 1K18 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-1K18-B-T-2
R356	24723/452	RESISTOR-FIXED METAL-FILM 298R +/- 0.1% 250mW 200V 25 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-298R-B-T-9
R357	24723/390	RESISTOR-FIXED METAL-FILM 75R +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-75R-B-T-10

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
R358	24723/453	RESISTOR-FIXED METAL-FILM 25R2 +/- 0.1% 250mW 200V 25 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-25R2-B-T-9
R359	24772/059	RESISTOR-FIXED METAL-FILM 270R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-270R-2%
R360	24772/078	RESISTOR-FIXED METAL-FILM 1K6 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K6-2%
R361	24772/042	RESISTOR-FIXED METAL-FILM 51R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-51R-2%
R362	24772/033	RESISTOR-FIXED METAL-FILM 22R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-22R-2%
R363	24772/052	RESISTOR-FIXED METAL-FILM 130R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	NK3-130R-2%
R364	24772/019	RESISTOR-FIXED METAL-FILM 5R6 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-5R6-2%
R365	24753/334	RESISTOR-FIXED METAL-FILM 1K4 +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-1K4-D-T-2
R366	24772/019	RESISTOR-FIXED METAL-FILM 5R6 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-5R6-2%
R367	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R368	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R369	24772/053	RESISTOR-FIXED METAL-FILM 150R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-150R-2%
R371	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R372	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R373	24724/003	RESISTOR-FIXED METAL-FILM 33K +/- 0.1% 100mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.05-33K-B-T-2
R375	24724/003	RESISTOR-FIXED METAL-FILM 33K +/- 0.1% 100mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.05-33K-B-T-2
R377	24772/033	RESISTOR-FIXED METAL-FILM 22R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-22R-2%
R378	24772/033	RESISTOR-FIXED METAL-FILM 22R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-22R-2%
R379	24723/306	RESISTOR-FIXED METAL-FILM 1K +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K0-B-T-10
R380	24723/437	RESISTOR-FIXED METAL-FILM 250R +/- 0.1% 250mW 200V 15 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	EE.10-250R-B-T-10
R381	24772/075	RESISTOR-FIXED METAL-FILM 1K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K2-2%
R382	24772/075	RESISTOR-FIXED METAL-FILM 1K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K2-2%
R383	24772/075	RESISTOR-FIXED METAL-FILM 1K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K2-2%
R384	24772/075	RESISTOR-FIXED METAL-FILM 1K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K2-2%
R401	24772/065	RESISTOR-FIXED METAL-FILM 470R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-470R-2%
R402	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
R403	24772/113	RESISTOR-FIXED METAL-FILM 47K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-47K-2%
R404	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R405	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R406	24772/065	RESISTOR-FIXED METAL-FILM 470R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-470R-2%
R407	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R408	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R409	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R410	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R411	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R412	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R413	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R414	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R415	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R416	24772/101	RESISTOR-FIXED METAL-FILM 15K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-15K-2%
R417	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R418	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R419	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R420	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R421	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R422	24772/089	RESISTOR-FIXED METAL-FILM 4K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K7-2%
R423	24772/089	RESISTOR-FIXED METAL-FILM 4K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K7-2%
R424	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R425	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R426	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R427	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R428	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
R429	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R430	24772/074	RESISTOR-FIXED METAL-FILM 1K1 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K1-2%
R431	24772/107	RESISTOR-FIXED METAL-FILM 27K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-27K-2%
R432	24772/083	RESISTOR-FIXED METAL-FILM 2K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K7-2%
R433	24772/042	RESISTOR-FIXED METAL-FILM 51R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-51R-2%
R434	24772/042	RESISTOR-FIXED METAL-FILM 51R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-51R-2%
R435	24772/033	RESISTOR-FIXED METAL-FILM 22R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-22R-2%
R437	24772/040	RESISTOR-FIXED METAL-FILM 43R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	NK3-43R-2%
R438	24723/485	RESISTOR-FIXED METAL-FILM 291R +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	RC55-C291R-B
R439	24723/485	RESISTOR-FIXED METAL-FILM 291R +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	RC55-C291R-B
R440	24723/479	RESISTOR-FIXED METAL-FILM 17R7 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	RC55-C-17R7-B
R441	24723/488	RESISTOR-FIXED METAL-FILM 150R +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	RC55-C-150R-B
R442	24723/488	RESISTOR-FIXED METAL-FILM 150R +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	RC55-C-150R-B
R443	24723/480	RESISTOR-FIXED METAL-FILM 37R5 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	RC55-C37R5-B
R444	24723/483	RESISTOR-FIXED METAL-FILM 83R3 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	RC55-C-83R3-B
R445	24723/483	RESISTOR-FIXED METAL-FILM 83R3 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	RC55-C-83R3-B
R446	24723/484	RESISTOR-FIXED METAL-FILM 93R8 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	RC55-C93R8-B
R447	24723/482	RESISTOR-FIXED METAL-FILM 56R7 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	RC55-C56R7-B
R448	24723/482	RESISTOR-FIXED METAL-FILM 56R7 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	RC55-C56R7-B
R449	24723/486	RESISTOR-FIXED METAL-FILM 398R4 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	RC55-C398R4-B
R450	24681/650	RESISTOR-NETWORK BUSSED, THICK-FILM, 100R 2% 1W 50V 100 ppm/DEG.C, 9 RESISTORS, LOW PROFILE, 10	VISHAY COMPONENTS	LC0-001-1000G
R451	24772/107	RESISTOR-FIXED METAL-FILM 27K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-27K-2%
R452	24772/122	RESISTOR-FIXED METAL-FILM 110K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-110K-2%
R453	24772/104	RESISTOR-FIXED METAL-FILM 20K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-20K-2%
R454	24772/104	RESISTOR-FIXED METAL-FILM 20K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-20K-2%
R455	24772/089	RESISTOR-FIXED METAL-FILM 4K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K7-2%

AA1/3 Control board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R456	24772/065	RESISTOR-FIXED METAL-FILM 470R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-470R-2%
R457	24772/089	RESISTOR-FIXED METAL-FILM 4K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K7-2%
R458	24772/104	RESISTOR-FIXED METAL-FILM 20K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-20K-2%
R459	24772/089	RESISTOR-FIXED METAL-FILM 4K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K7-2%
R461	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R462	24772/053	RESISTOR-FIXED METAL-FILM 150R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-150R-2%
R463	24772/042	RESISTOR-FIXED METAL-FILM 51R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-51R-2%
R464	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R465	24772/109	RESISTOR-FIXED METAL-FILM 33K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-33K-2%
R470	24772/115	RESISTOR-FIXED METAL-FILM 56K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-56K-2%
R471	24772/101	RESISTOR-FIXED METAL-FILM 15K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-15K-2%
R472	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R501	24772/070	RESISTOR-FIXED METAL-FILM 750R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-750R-2%
R502	24772/070	RESISTOR-FIXED METAL-FILM 750R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-750R-2%
R503	24772/070	RESISTOR-FIXED METAL-FILM 750R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-750R-2%
R504	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R505	24772/101	RESISTOR-FIXED METAL-FILM 15K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-15K-2%
R506	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R507	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R508	24772/070	RESISTOR-FIXED METAL-FILM 750R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-750R-2%
R509	24772/085	RESISTOR-FIXED METAL-FILM 3K3 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-3K3-2%
R511	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R512	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R513	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R514	24772/117	RESISTOR-FIXED METAL-FILM 68K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-68K-2%
R515	24772/141	RESISTOR-FIXED METAL-FILM 1M +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-1M-2%

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
R516	24772/093	RESISTOR-FIXED METAL-FILM 6K8 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-6K8-2%
R517	24772/093	RESISTOR-FIXED METAL-FILM 6K8 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-6K8-2%
R518	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R519	24772/107	RESISTOR-FIXED METAL-FILM 27K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-27K-2%
R520	24772/113	RESISTOR-FIXED METAL-FILM 47K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-47K-2%
R523	24772/125	RESISTOR-FIXED METAL-FILM 150K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-150K-2%
R524	24772/089	RESISTOR-FIXED METAL-FILM 4K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K7-2%
R525	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R526	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R527	24772/123	RESISTOR-FIXED METAL-FILM 120K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-120K-2%
R528	24772/125	RESISTOR-FIXED METAL-FILM 150K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-150K-2%
R529	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R530	24772/117	RESISTOR-FIXED METAL-FILM 68K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-68K-2%
R531	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R532	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R533	24772/107	RESISTOR-FIXED METAL-FILM 27K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-27K-2%
R534	24772/107	RESISTOR-FIXED METAL-FILM 27K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-27K-2%
R535	24772/093	RESISTOR-FIXED METAL-FILM 6K8 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-6K8-2%
R536	24772/103	RESISTOR-FIXED METAL-FILM 18K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-18K-2%
R537	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R538	24772/104	RESISTOR-FIXED METAL-FILM 20K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-20K-2%
R539	24772/089	RESISTOR-FIXED METAL-FILM 4K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K7-2%
R540	24772/104	RESISTOR-FIXED METAL-FILM 20K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-20K-2%
R541	24772/089	RESISTOR-FIXED METAL-FILM 4K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K7-2%
R542	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R544	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
R545	24772/107	RESISTOR-FIXED METAL-FILM 27K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-27K-2%
R546	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R547	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R548	24772/036	RESISTOR-FIXED METAL-FILM 30R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-30R-2%
R549	24772/068	RESISTOR-FIXED METAL-FILM 620R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-620R-2%
R550	24772/065	RESISTOR-FIXED METAL-FILM 470R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-470R-2%
R551	24772/042	RESISTOR-FIXED METAL-FILM 51R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-51R-2%
R552	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R553	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R554	24811/201	RESISTOR-FIXED METAL-FILM 15K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-15K-1%50ppm
R555	24811/163	RESISTOR-FIXED METAL-FILM 392R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-392R-1%50ppm
R556	24811/145	RESISTOR-FIXED METAL-FILM 68R1 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-68R1-1%50ppm
R557	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R558	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R559	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R560	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R601	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R603	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R604	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R605	24773/245	RESISTOR-FIXED METAL-FILM 68R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-68R-G-T-1
R606	24772/085	RESISTOR-FIXED METAL-FILM 3K3 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-3K3-2%
R607	24772/061	RESISTOR-FIXED METAL-FILM 330R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-330R-2%
R608	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R609	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R610	24772/042	RESISTOR-FIXED METAL-FILM 51R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-51R-2%
R611	24772/029	RESISTOR-FIXED METAL-FILM 15R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-15R-2%

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
R612	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R613	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R614	24772/042	RESISTOR-FIXED METAL-FILM 51R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-51R-2%
R615	24772/065	RESISTOR-FIXED METAL-FILM 470R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-470R-2%
R616	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R617	24772/042	RESISTOR-FIXED METAL-FILM 51R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-51R-2%
R618	24772/065	RESISTOR-FIXED METAL-FILM 470R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-470R-2%
R619	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R620	24772/089	RESISTOR-FIXED METAL-FILM 4K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K7-2%
R621	24772/089	RESISTOR-FIXED METAL-FILM 4K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K7-2%
R624	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R625	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R626	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R627	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R628	24811/149	RESISTOR-FIXED METAL-FILM 100R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100R-1%50ppm
R629	24811/149	RESISTOR-FIXED METAL-FILM 100R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100R-1%50ppm
R630	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R631	24811/149	RESISTOR-FIXED METAL-FILM 100R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100R-1%50ppm
R632	24811/149	RESISTOR-FIXED METAL-FILM 100R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100R-1%50ppm
R653	24811/135	RESISTOR-FIXED METAL-FILM 27R4 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-27R4-1%50ppm
R657	24811/915	RESISTOR-FIXED METAL-FILM 150R +/- 1% 250mW 200V 50 ppm/DEG.C, LOW-INDUCTANCE, SURFACE MOUNTED,	VISHAY COMPONENTS	SMM0204-HF-150R-1%
R658	24811/915	RESISTOR-FIXED METAL-FILM 150R +/- 1% 250mW 200V 50 ppm/DEG.C, LOW-INDUCTANCE, SURFACE MOUNTED,	VISHAY COMPONENTS	SMM0204-HF-150R-1%
R659	24811/906	RESISTOR-FIXED METAL-FILM 36R5 +/- 1% 250mW 200V 50 ppm/DEG.C, LOW-INDUCTANCE, SURFACE MOUNTED,	VISHAY COMPONENTS	SMM0204-HF-36R5-1%
R660	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R661	24811/177	RESISTOR-FIXED METAL-FILM 1K5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K5-1%50ppm
R662	24811/185	RESISTOR-FIXED METAL-FILM 3K32 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-3K32-1%50ppm

AA1/3 Control board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R663	24811/915	RESISTOR-FIXED METAL-FILM 150R +/- 1% 250mW 200V 50 ppm/DEG.C, LOW-INDUCTANCE, SURFACE MOUNTED,	VISHAY COMPONENTS	SMM0204-HF-150R-1%
R664	24811/915	RESISTOR-FIXED METAL-FILM 150R +/- 1% 250mW 200V 50 ppm/DEG.C, LOW-INDUCTANCE, SURFACE MOUNTED,	VISHAY COMPONENTS	SMM0204-HF-150R-1%
R665	24811/906	RESISTOR-FIXED METAL-FILM 36R5 +/- 1% 250mW 200V 50 ppm/DEG.C, LOW-INDUCTANCE, SURFACE MOUNTED,	VISHAY COMPONENTS	SMM0204-HF-36R5-1%
R666	24772/074	RESISTOR-FIXED METAL-FILM 1K1 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K1-2%
R668	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R669	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R670	24772/074	RESISTOR-FIXED METAL-FILM 1K1 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K1-2%
R671	24772/080	RESISTOR-FIXED METAL-FILM 2K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K-2%
R672	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R673	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R674	24772/082	RESISTOR-FIXED METAL-FILM 2K4 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K4-2%
R679	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R680	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R681	24772/087	RESISTOR-FIXED METAL-FILM 3K9 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-3K9-2%
R682	24772/087	RESISTOR-FIXED METAL-FILM 3K9 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-3K9-2%
R686	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R691	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R701	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R702	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R703	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R704	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R705	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R706	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R707	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R708	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R709	24772/065	RESISTOR-FIXED METAL-FILM 470R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-470R-2%

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
R710	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R711	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R712	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R721	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R722	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R723	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R724	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R725	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R726	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R727	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R728	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R729	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R730	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R751	24811/161	RESISTOR-FIXED METAL-FILM 332R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-332R-1%50ppm
R752	24811/161	RESISTOR-FIXED METAL-FILM 332R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-332R-1%50ppm
R753	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R754	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R755	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R756	24811/153	RESISTOR-FIXED METAL-FILM 150R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-150R-1%50ppm
R757	24811/157	RESISTOR-FIXED METAL-FILM 221R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221R-1%50ppm
R758	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R759	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R760	24811/161	RESISTOR-FIXED METAL-FILM 332R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-332R-1%50ppm
R761	24811/161	RESISTOR-FIXED METAL-FILM 332R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-332R-1%50ppm
R762	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R763	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
R764	24811/161	RESISTOR-FIXED METAL-FILM 332R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-332R-1%50ppm
R765	24811/149	RESISTOR-FIXED METAL-FILM 100R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100R-1%50ppm
R766	24811/153	RESISTOR-FIXED METAL-FILM 150R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-150R-1%50ppm
R767	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R768	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R769	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R770	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R771	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R772	24811/149	RESISTOR-FIXED METAL-FILM 100R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100R-1%50ppm
RLA	23486/166	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 12V COIL, 720R - CONTACTS 1A, 125V, MAX LOAD 30W, PCB	FUJITSU LTD	FBR46-N-D012-P
RLB	23486/166	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 12V COIL, 720R - CONTACTS 1A, 125V, MAX LOAD 30W, PCB	FUJITSU LTD	FBR46-N-D012-P
RLC	23486/166	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 12V COIL, 720R - CONTACTS 1A, 125V, MAX LOAD 30W, PCB	FUJITSU LTD	FBR46-N-D012-P
RLG	23486/166	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 12V COIL, 720R - CONTACTS 1A, 125V, MAX LOAD 30W, PCB	FUJITSU LTD	FBR46-N-D012-P
RLH	23486/166	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 12V COIL, 720R - CONTACTS 1A, 125V, MAX LOAD 30W, PCB	FUJITSU LTD	FBR46-N-D012-P
RLJ	23486/166	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 12V COIL, 720R - CONTACTS 1A, 125V, MAX LOAD 30W, PCB	FUJITSU LTD	FBR46-N-D012-P
RLK	23486/166	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 12V COIL, 720R - CONTACTS 1A, 125V, MAX LOAD 30W, PCB	FUJITSU LTD	FBR46-N-D012-P
RLL	23486/166	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 12V COIL, 720R - CONTACTS 1A, 125V, MAX LOAD 30W, PCB	FUJITSU LTD	FBR46-N-D012-P
RLM	23486/166	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 12V COIL, 720R - CONTACTS 1A, 125V, MAX LOAD 30W, PCB	FUJITSU LTD	FBR46-N-D012-P
RLN	23486/166	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 12V COIL, 720R - CONTACTS 1A, 125V, MAX LOAD 30W, PCB	FUJITSU LTD	FBR46-N-D012-P
TR301	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B
TR302	28459/071	TRANSISTOR N-CHANNEL-DEPLETION JFET VCR4N... 15V 300mW VOLTAGE CONTROLLED RESISTOR, TO-18.	SILICONIX LTD	VCR4N
TR303	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B
TR304	28459/071	TRANSISTOR N-CHANNEL-DEPLETION JFET VCR4N... 15V 300mW VOLTAGE CONTROLLED RESISTOR, TO-18.	SILICONIX LTD	VCR4N

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
TR305	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B
TR401	28435/227	TRANSISTOR PNP BIPOLAR BC307A,B... 45V 130MHz 200mW 100mA 180hFE @ 2mA, TO-92, (LOOSE).	NAT. SEMICONDUCTOR	BC307A OR B
TR402	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B
TR403	28435/227	TRANSISTOR PNP BIPOLAR BC307A,B... 45V 130MHz 200mW 100mA 180hFE @ 2mA, TO-92, (LOOSE).	NAT. SEMICONDUCTOR	BC307A OR B
TR404	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B
TR405	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B
TR406	28435/227	TRANSISTOR PNP BIPOLAR BC307A,B... 45V 130MHz 200mW 100mA 180hFE @ 2mA, TO-92, (LOOSE).	NAT. SEMICONDUCTOR	BC307A OR B
TR407	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B
TR408	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B
TR501	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B
TR502	28459/097	TRANSISTOR N-CHANNEL-DEPLETION JFET MMBFJ310... 25V 350mW 60mA POWER GAIN 11.5dB @ 450MHz, MARKING	MOTOROLA INC.	MMBFJ310LT1
TR503	28487/810	TRANSISTOR NPN BIPOLAR BSV52... 12V 400MHz 250mW 100mA MARKING CODE B2, SURFACE MOUNTED, SOT-23,	PHILIPS	BSV-52
TR601	28487/809	TRANSISTOR NPN BIPOLAR BFR93A... 12V 5GHz 250mW 35mA MARKING CODE R2, SURFACE MOUNTED, SOT-23,	PHILIPS	BFR93A
TR602	28487/809	TRANSISTOR NPN BIPOLAR BFR93A... 12V 5GHz 250mW 35mA MARKING CODE R2, SURFACE MOUNTED, SOT-23,	PHILIPS	BFR93A
TR603	28487/809	TRANSISTOR NPN BIPOLAR BFR93A... 12V 5GHz 250mW 35mA MARKING CODE R2, SURFACE MOUNTED, SOT-23,	PHILIPS	BFR93A
TR604	28487/809	TRANSISTOR NPN BIPOLAR BFR93A... 12V 5GHz 250mW 35mA MARKING CODE R2, SURFACE MOUNTED, SOT-23,	PHILIPS	BFR93A
TR605	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE TYP @ 2mA, NOISE 2dB @ 1KHz, MARKING	PHILIPS	BC848B
TR606	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE TYP @ 2mA, NOISE 2dB @ 1KHz, MARKING	PHILIPS	BC848B
TR607	28487/818	TRANSISTOR NPN BIPOLAR BFS20... 20V 450MHz 200mW 25mA 40hFE MIN @ 7mA, MARKING CODE G1, SURFACE	PHILIPS	BFS20
TR608	28487/818	TRANSISTOR NPN BIPOLAR BFS20... 20V 450MHz 200mW 25mA 40hFE MIN @ 7mA, MARKING CODE G1, SURFACE	PHILIPS	BFS20
TR609	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR610	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR615	28487/807	TRANSISTOR NPN BIPOLAR 42085... 12V 6GHz 500mW 80mA 30hFE @ 35mA, 20dBm, SURFACE MOUNTED,	HEWLETT-PACKARD	AT-42085
TR616	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR617	28487/818	TRANSISTOR NPN BIPOLAR BFS20... 20V 450MHz 200mW 25mA 40hFE MIN @ 7mA, MARKING CODE G1, SURFACE	PHILIPS	BFS20
TR618	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE TYP @ 2mA, NOISE 2dB @ 1KHz, MARKING	PHILIPS	BC848B

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AA1/3 Control board (contd.)				
TR619	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE TYP @ 2mA, NOISE 2dB @ 1KHz, MARKING	PHILIPS	BC848B
TR620	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR621	28487/818	TRANSISTOR NPN BIPOLAR BFS20... 20V 450MHz 200mW 25mA 40hFE MIN @ 7mA, MARKING CODE G1, SURFACE	PHILIPS	BFS20
TR622	28487/818	TRANSISTOR NPN BIPOLAR BFS20... 20V 450MHz 200mW 25mA 40hFE MIN @ 7mA, MARKING CODE G1, SURFACE	PHILIPS	BFS20
TR623	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
X1	23635/833	CORE BEAD, 4.2mm DIA, 5.5mm LONG, 1.8mm I/DIA, FERRITE, GRADE 3B1, SINGLE HOLE.	PHILIPS	4313-020-1517
X2	23635/833	CORE BEAD, 4.2mm DIA, 5.5mm LONG, 1.8mm I/DIA, FERRITE, GRADE 3B1, SINGLE HOLE.	PHILIPS	4313-020-1517
X3	23635/833	CORE BEAD, 4.2mm DIA, 5.5mm LONG, 1.8mm I/DIA, FERRITE, GRADE 3B1, SINGLE HOLE.	PHILIPS	4313-020-1517
X4	23635/833	CORE BEAD, 4.2mm DIA, 5.5mm LONG, 1.8mm I/DIA, FERRITE, GRADE 3B1, SINGLE HOLE.	PHILIPS	4313-020-1517
X5	23635/833	CORE BEAD, 4.2mm DIA, 5.5mm LONG, 1.8mm I/DIA, FERRITE, GRADE 3B1, SINGLE HOLE.	PHILIPS	4313-020-1517
X6	23635/833	CORE BEAD, 4.2mm DIA, 5.5mm LONG, 1.8mm I/DIA, FERRITE, GRADE 3B1, SINGLE HOLE.	PHILIPS	4313-020-1517
X7	23635/833	CORE BEAD, 4.2mm DIA, 5.5mm LONG, 1.8mm I/DIA, FERRITE, GRADE 3B1, SINGLE HOLE.	PHILIPS	4313-020-1517
X8	23635/833	CORE BEAD, 4.2mm DIA, 5.5mm LONG, 1.8mm I/DIA, FERRITE, GRADE 3B1, SINGLE HOLE.	PHILIPS	4313-020-1517
X9	23635/833	CORE BEAD, 4.2mm DIA, 5.5mm LONG, 1.8mm I/DIA, FERRITE, GRADE 3B1, SINGLE HOLE.	PHILIPS	4313-020-1517
X10	23635/833	CORE BEAD, 4.2mm DIA, 5.5mm LONG, 1.8mm I/DIA, FERRITE, GRADE 3B1, SINGLE HOLE.	PHILIPS	4313-020-1517
XL101	28312/100	CRYSTAL 16 MHz +/- 20 ppm, 30pF PARALLEL RESONANCE, 25R ESR MAX, FREQ STABILITY +/-75ppm	SALFORD ELECTRICAL	P01600AB2
XL601	28312/116	CRYSTAL 0 MHz +/- 10 ppm, SEE IFR DRG, SERIES RESONANCE, 2.3mH - 40R ESR MAX, EXACT FREQ	HY-Q INTERNATIONAL	EG05S-QC45/A3
	43137/339	RE-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **PLAL 104.8576 MHz to PLBM, AB4/1**	IFR LTD	
	43137/996	RE-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **SKAF to AB1**	IFR LTD	
	43137/341	RIBBON-LEAD 16 WAY, SOCKET 16 WAY, - DIL PLUG 16 **SKAK to AF2/X.**	IFR LTD	
	23435/120	CONNECTOR MULTIWAY, PCB HEADER, 36 WAY, RIGHT **PLAJ**	BERG ELECTRONICS	75168-101-36
	23435/121	CONNECTOR MULTIWAY, PCB HEADER, 36 WAY, STRAIGHT, **PLAA**	BERG ELECTRONICS	75160-102-36
	23435/529	CONNECTOR TYPE-57, SOCKET, 24 WAY, RIGHT ANGLED, **SKAM**	AMP (GB) LTD	552791-4

AB1 VCO board

Issue 11

When ordering, prefix circuit reference with AB1.

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
	44829/542	Complete unit		
C1	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C2	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C3	26386/818	CAPACITOR-FIXED CERAMIC 33pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-330-JAT-00-J
C4	26386/898	CAPACITOR-FIXED CERAMIC 5.6pF +/-0.1pF 50V 60 ppm/DEG.C, HIGH-Q, MULTILAYER, SURFACE-MOUNTED,	AVX LTD	0805-5K5R6-BAW-TR
C5	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C6	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-150-JAT-00-J
C7	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C8	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C9	26386/898	CAPACITOR-FIXED CERAMIC 5.6pF +/-0.1pF 50V 60 ppm/DEG.C, HIGH-Q, MULTILAYER, SURFACE-MOUNTED,	AVX LTD	0805-5K5R6-BAW-TR
C10	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C11	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-150-JAT-00-J
C12	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C13	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C14	26386/897	CAPACITOR-FIXED CERAMIC 4.7pF +/-0.1pF 50V 60 ppm/DEG.C, HIGH-Q, MULTILAYER, SURFACE-MOUNTED,	AVX LTD	0805-5K4R7-BAW-TR
C15	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C16	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C17	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C18	26386/808	CAPACITOR-FIXED CERAMIC 4.7pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-4R7-DAT-00-J
C19	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C20	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C21	26386/897	CAPACITOR-FIXED CERAMIC 4.7pF +/-0.1pF 50V 60 ppm/DEG.C, HIGH-Q, MULTILAYER, SURFACE-MOUNTED,	AVX LTD	0805-5K4R7-BAW-TR
C22	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C23	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB1	**VCO board (contd.)**			
C24	26343/753	CAPACITOR-FIXED CERAMIC 6.8pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-6R8-DAT-00-J
C25	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C26	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C27	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C28	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C29	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C30	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C31	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C32	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C33	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C34	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C35	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C36	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C37	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C38	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C39	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C40	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C42	26386/818	CAPACITOR-FIXED CERAMIC 33pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-330-JAT-00-J
C43	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C44	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C45	26386/818	CAPACITOR-FIXED CERAMIC 33pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-330-JAT-00-J
C46	26386/818	CAPACITOR-FIXED CERAMIC 33pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-330-JAT-00-J
C47	26386/818	CAPACITOR-FIXED CERAMIC 33pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-330-JAT-00-J
C48	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C49	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C50	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB1	**VCO board (contd.)**			
D1	28381/133	DIODE VARIABLE CAPACITNCE, BB515... 30V 11.5pF @ 3V, CAPAC RATIO 8.0 MIN, SURFACE MOUNTED, SOD-123,	SIEMENS LTD	BB515-B
D2	28381/133	DIODE VARIABLE CAPACITNCE, BB515... 30V 11.5pF @ 3V, CAPAC RATIO 8.0 MIN, SURFACE MOUNTED, SOD-123,	SIEMENS LTD	BB515-B
D3	28381/133	DIODE VARIABLE CAPACITNCE, BB515... 30V 11.5pF @ 3V, CAPAC RATIO 8.0 MIN, SURFACE MOUNTED, SOD-123,	SIEMENS LTD	BB515-B
D4	28381/133	DIODE VARIABLE CAPACITNCE, BB515... 30V 11.5pF @ 3V, CAPAC RATIO 8.0 MIN, SURFACE MOUNTED, SOD-123,	SIEMENS LTD	BB515-B
D5	28383/961	DIODE PIN, BAR16-1... DUAL, 140mW 100V 100mA 0.5pF 1.25Vf @ 100mA, COMMON ANODE, MARKING CODE L9,	SIEMENS LTD	BAR16-1
D6	28383/910	DIODE SMALL-SIGNAL, BAS28... DUAL, 330mW 75V 250mA ELECTRICALLY ISOLATED, MARKING CODE A61 OR JT,	PHILIPS	BAS28
D7	28383/910	DIODE SMALL-SIGNAL, BAS28... DUAL, 330mW 75V 250mA ELECTRICALLY ISOLATED, MARKING CODE A61 OR JT,	PHILIPS	BAS28
IC1	28469/756	IC-ANALOGUE MULTIPLEXER 74HC4051... SINGLE, 8 CHANNEL, 3 SELECT INPUTS PLUS ENABLE,	PHILIPS	74HC4051D
IC2	28461/419	IC-ANALOGUE MICROWAVE-AMPLIFIER MSA-0285... 5V 25mA GAIN 12dB TYP @ 1.0GHz, 3dB BANDWIDTH DC -	HEWLETT-PACKARD	MSA-0285
IC3	28461/419	IC-ANALOGUE MICROWAVE-AMPLIFIER MSA-0285... 5V 25mA GAIN 12dB TYP @ 1.0GHz, 3dB BANDWIDTH DC -	HEWLETT-PACKARD	MSA-0285
IC4	28461/419	IC-ANALOGUE MICROWAVE-AMPLIFIER MSA-0285... 5V 25mA GAIN 12dB TYP @ 1.0GHz, 3dB BANDWIDTH DC -	HEWLETT-PACKARD	MSA-0285
IC5	28461/419	IC-ANALOGUE MICROWAVE-AMPLIFIER MSA-0285... 5V 25mA GAIN 12dB TYP @ 1.0GHz, 3dB BANDWIDTH DC -	HEWLETT-PACKARD	MSA-0285
L1	44291/017	WOUND-PART INDUCTOR, BEAD-CORE, 7 TURNS, UNMOUNTED, VARNISHED.	AMETHYST DESIGNS LTD	AD5033
L2	44291/017	WOUND-PART INDUCTOR, BEAD-CORE, 7 TURNS, UNMOUNTED, VARNISHED.	AMETHYST DESIGNS LTD	AD5033
L3	44291/017	WOUND-PART INDUCTOR, BEAD-CORE, 7 TURNS, UNMOUNTED, VARNISHED.	AMETHYST DESIGNS LTD	AD5033
L4	44291/017	WOUND-PART INDUCTOR, BEAD-CORE, 7 TURNS, UNMOUNTED, VARNISHED.	AMETHYST DESIGNS LTD	AD5033
R1	24321/804	RESISTOR-FIXED METAL-GLAZE 20K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-20K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2002-FT
R2	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R3	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R4	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R5	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB1	**VCO board (contd.)**			
R6	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R7	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R8	24321/604	RESISTOR-FIXED METAL-GLAZE 10R +/- 5% 60mW 100V 200 ppm/DEG.C, SURFACE MOUNTED, SIZE 0805, (8mm	VISHAY COMPONENTS	CRCW-0805-100-JT1
R9	24764/701	RESISTOR-FIXED METAL-FILM 100R +/- 2% 400mW 200V 50 ppm/DEG.C, LOW-INDUCTANCE, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204HF-50-100R-2%
R10	24321/604	RESISTOR-FIXED METAL-GLAZE 10R +/- 5% 60mW 100V 200 ppm/DEG.C, SURFACE MOUNTED, SIZE 0805, (8mm	VISHAY COMPONENTS	CRCW-0805-100-JT1
R11	24764/701	RESISTOR-FIXED METAL-FILM 100R +/- 2% 400mW 200V 50 ppm/DEG.C, LOW-INDUCTANCE, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204HF-50-100R-2%
R12	24321/604	RESISTOR-FIXED METAL-GLAZE 10R +/- 5% 60mW 100V 200 ppm/DEG.C, SURFACE MOUNTED, SIZE 0805, (8mm	VISHAY COMPONENTS	CRCW-0805-100-JT1
R13	24764/701	RESISTOR-FIXED METAL-FILM 100R +/- 2% 400mW 200V 50 ppm/DEG.C, LOW-INDUCTANCE, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204HF-50-100R-2%
R14	24321/604	RESISTOR-FIXED METAL-GLAZE 10R +/- 5% 60mW 100V 200 ppm/DEG.C, SURFACE MOUNTED, SIZE 0805, (8mm	VISHAY COMPONENTS	CRCW-0805-100-JT1
R15	24764/703	RESISTOR-FIXED METAL-FILM 160R +/- 2% 400mW 200V 50 ppm/DEG.C, LOW-INDUCTANCE, AXIAL, (LOOSE OR	VISHAY COMPONENTS	SMA0204HF-50-160R-2%
R16	24321/604	RESISTOR-FIXED METAL-GLAZE 10R +/- 5% 60mW 100V 200 ppm/DEG.C, SURFACE MOUNTED, SIZE 0805, (8mm	VISHAY COMPONENTS	CRCW-0805-100-JT1
R17	24764/701	RESISTOR-FIXED METAL-FILM 100R +/- 2% 400mW 200V 50 ppm/DEG.C, LOW-INDUCTANCE, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204HF-50-100R-2%
R18	24321/606	RESISTOR-FIXED METAL-GLAZE 20R +/- 5% 60mW 100V 200 ppm/DEG.C, SURFACE MOUNTED, SIZE 0805, (8mm	VISHAY COMPONENTS	CRCW-0805-200-JRT1
R19	24321/604	RESISTOR-FIXED METAL-GLAZE 10R +/- 5% 60mW 100V 200 ppm/DEG.C, SURFACE MOUNTED, SIZE 0805, (8mm	VISHAY COMPONENTS	CRCW-0805-100-JT1
R20	24764/701	RESISTOR-FIXED METAL-FILM 100R +/- 2% 400mW 200V 50 ppm/DEG.C, LOW-INDUCTANCE, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204HF-50-100R-2%
R21	24764/701	RESISTOR-FIXED METAL-FILM 100R +/- 2% 400mW 200V 50 ppm/DEG.C, LOW-INDUCTANCE, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204HF-50-100R-2%
R22	24321/605	RESISTOR-FIXED METAL-GLAZE 15R +/- 5% 60mW 100V 200 ppm/DEG.C, SURFACE MOUNTED, SIZE 0805, (8mm	VISHAY COMPONENTS	CRCW-0805-150-JRT1
R23	24764/703	RESISTOR-FIXED METAL-FILM 160R +/- 2% 400mW 200V 50 ppm/DEG.C, LOW-INDUCTANCE, AXIAL, (LOOSE OR	VISHAY COMPONENTS	SMA0204HF-50-160R-2%
R24	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R25	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R26	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R27	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R28	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R29	24321/757	RESISTOR-FIXED METAL-GLAZE 220R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-221R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2210-FT
R30	24321/757	RESISTOR-FIXED METAL-GLAZE 220R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-221R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2210-FT
R31	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB1	**VCO board (contd.)**			
R32	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R33	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R34	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R35	24321/757	RESISTOR-FIXED METAL-GLAZE 220R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-221R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2210-FT
R36	24321/757	RESISTOR-FIXED METAL-GLAZE 220R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-221R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2210-FT
R37	24321/757	RESISTOR-FIXED METAL-GLAZE 220R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-221R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2210-FT
R38	24321/757	RESISTOR-FIXED METAL-GLAZE 220R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-221R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2210-FT
R39	24321/757	RESISTOR-FIXED METAL-GLAZE 220R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-221R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2210-FT
R40	24321/757	RESISTOR-FIXED METAL-GLAZE 220R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-221R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2210-FT
R41	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R42	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R43	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
TR1	28487/809	TRANSISTOR NPN BIPOLAR BFR93A... 12V 5GHz 250mW 35mA MARKING CODE R2, SURFACE MOUNTED, SOT-23,	PHILIPS	BFR93A
TR2	28487/809	TRANSISTOR NPN BIPOLAR BFR93A... 12V 5GHz 250mW 35mA MARKING CODE R2, SURFACE MOUNTED, SOT-23,	PHILIPS	BFR93A
TR3	28487/809	TRANSISTOR NPN BIPOLAR BFR93A... 12V 5GHz 250mW 35mA MARKING CODE R2, SURFACE MOUNTED, SOT-23,	PHILIPS	BFR93A
TR4	28487/809	TRANSISTOR NPN BIPOLAR BFR93A... 12V 5GHz 250mW 35mA MARKING CODE R2, SURFACE MOUNTED, SOT-23,	PHILIPS	BFR93A
TR5	28487/810	TRANSISTOR NPN BIPOLAR BSV52... 12V 400MHz 250mW 100mA MARKING CODE B2, SURFACE MOUNTED, SOT-23,	PHILIPS	BSV-52
TR6	28487/810	TRANSISTOR NPN BIPOLAR BSV52... 12V 400MHz 250mW 100mA MARKING CODE B2, SURFACE MOUNTED, SOT-23,	PHILIPS	BSV-52
TR7	28487/810	TRANSISTOR NPN BIPOLAR BSV52... 12V 400MHz 250mW 100mA MARKING CODE B2, SURFACE MOUNTED, SOT-23,	PHILIPS	BSV-52
TR8	28487/810	TRANSISTOR NPN BIPOLAR BSV52... 12V 400MHz 250mW 100mA MARKING CODE B2, SURFACE MOUNTED, SOT-23,	PHILIPS	BSV-52
	43137/344	RIBBON-LEAD 10 WAY , SOCKET 10 WAY, KEY POS 5, - **SKBC to PLBF, AB2/2**	IFR LTD.	

AB2/2 RF board

Issue 28

When ordering, prefix circuit reference with AB2/2.

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
	44829/791	Complete unit		
C1	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C2	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C3	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C4	26343/487	CAPACITOR-FIXED CERAMIC 6.8pF +/-0.25pF 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-968-CAK-ACR-J
C5	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C6	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C7	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C8	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C9	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C10	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C11	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C12	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C13	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C14	26343/488	CAPACITOR-FIXED CERAMIC 8.2pF +/-0.25pF 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-982-CAK-ACR-J
C15	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C16	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C17	26386/950	CAPACITOR-FIXED CERAMIC 1nF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5A-102-JAT-00-J
C18	26386/950	CAPACITOR-FIXED CERAMIC 1nF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5A-102-JAT-00-J
C19	26386/950	CAPACITOR-FIXED CERAMIC 1nF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5A-102-JAT-00-J
C20	26343/487	CAPACITOR-FIXED CERAMIC 6.8pF +/-0.25pF 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-968-CAK-ACR-J
C21	26386/950	CAPACITOR-FIXED CERAMIC 1nF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5A-102-JAT-00-J
C22	26386/950	CAPACITOR-FIXED CERAMIC 1nF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5A-102-JAT-00-J
C23	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB2/2 RF board (contd.)				
C24	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C25	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C26	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C27	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C28	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C29	26421/152	CAPACITOR-FIXED ALUMINIUM 220uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, 9mm MAX BODY DIA,	VISHAY COMPONENTS	EKS-00-CC-322-D-C9
C30	26421/152	CAPACITOR-FIXED ALUMINIUM 220uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, 9mm MAX BODY DIA,	VISHAY COMPONENTS	EKS-00-CC-322-D-C9
C31	26486/225	CAPACITOR-FIXED TANTALUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	AVX LTD	TAG-10-M-35-CRW
C32	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C34	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C35	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C36	26421/152	CAPACITOR-FIXED ALUMINIUM 220uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, 9mm MAX BODY DIA,	VISHAY COMPONENTS	EKS-00-CC-322-D-C9
C37	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C38	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C39	26343/434	CAPACITOR-FIXED CERAMIC 68pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-680-GAK-ACR-J
C40	26343/434	CAPACITOR-FIXED CERAMIC 68pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-680-GAK-ACR-J
C41	26538/918	CAPACITOR-FIXED POLYSTYRENE 4.7nF +/-1% 63V 125 ppm/DEG.C, RADIAL, 5.08mm PWP, SQUARE, WIRES ON	LCR COMPONENTS	EXFS/HR-4700pF-63V
C42	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C43	26421/152	CAPACITOR-FIXED ALUMINIUM 220uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, 9mm MAX BODY DIA,	VISHAY COMPONENTS	EKS-00-CC-322-D-C9
C44	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C45	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C46	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C47	26421/151	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, 9mm MAX BODY DIA,	VISHAY COMPONENTS	EKS-00-CC-310-G-C9
C48	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C49	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C50	26343/492	CAPACITOR-FIXED CERAMIC 10pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-100-GOK-ACR-J

AB2/2 RF board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
C51	26343/497	CAPACITOR-FIXED CERAMIC 12pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-120-GAK-ACR-J
C52	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C53	26421/116	CAPACITOR-FIXED ALUMINIUM 47uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	PANASONIC INDUSTRIAL	ECE-A-1C-K-470-B
C54	26343/433	CAPACITOR-FIXED CERAMIC 47pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-470-GAK-ACR-J
C55	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C56	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C57	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C58	26343/433	CAPACITOR-FIXED CERAMIC 47pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-470-GAK-ACR-J
C59	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C60	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C62	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C63	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C64	26582/439	CAPACITOR-FIXED POLYESTER 680nF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-468/065
C65	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C66	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C67	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C68	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C69	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C70	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C71	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C72	26486/214	CAPACITOR-FIXED TANTALUM 2.2uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	AVX LTD	TAG-2R2-M-35-CRW
C73	26486/225	CAPACITOR-FIXED TANTALUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	AVX LTD	TAG-10-M-35-CRW
C74	26343/487	CAPACITOR-FIXED CERAMIC 6.8pF +/-0.25pF 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-968-CAK-ACR-J
C81	26343/493	CAPACITOR-FIXED CERAMIC 15pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-150-GAK-ACR-J
C84	26582/439	CAPACITOR-FIXED POLYESTER 680nF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-468/065
C85	26582/439	CAPACITOR-FIXED POLYESTER 680nF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-468/065

AB2/2 RF board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
C86	26582/439	CAPACITOR-FIXED POLYESTER 680nF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-468/065
C88	26343/434	CAPACITOR-FIXED CERAMIC 68pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-680-GAK-ACR-J
C89	26343/487	CAPACITOR-FIXED CERAMIC 6.8pF +/-0.25pF 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-968-CAK-ACR-J
C91	26343/433	CAPACITOR-FIXED CERAMIC 47pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-470-GAK-ACR-J
C97	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C99	26343/432	CAPACITOR-FIXED CERAMIC 150pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	RPO-151-GAK-ACR-J
C100	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C101	26383/581	CAPACITOR-FIXED CERAMIC 560pF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51561
C102	26383/581	CAPACITOR-FIXED CERAMIC 560pF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51561
C103	26383/581	CAPACITOR-FIXED CERAMIC 560pF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51561
C104	26383/581	CAPACITOR-FIXED CERAMIC 560pF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51561
C105	26343/491	CAPACITOR-FIXED CERAMIC 2.2pF +/-0.25pF 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-922-CAK-ACR-J
C106	26386/804	CAPACITOR-FIXED CERAMIC 2.2pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-2R2-DAT-00-J
C107	26383/581	CAPACITOR-FIXED CERAMIC 560pF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51561
C108	26383/581	CAPACITOR-FIXED CERAMIC 560pF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51561
C109	26343/753	CAPACITOR-FIXED CERAMIC 6.8pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-6R8-DAT-00-J
C110	26343/757	CAPACITOR-FIXED CERAMIC 3.3pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-3R3-DAT-00-J
C111	26383/581	CAPACITOR-FIXED CERAMIC 560pF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51561
C112	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C113	26383/587	CAPACITOR-FIXED CERAMIC 2.2nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51222
C114	26383/587	CAPACITOR-FIXED CERAMIC 2.2nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51222
C115	26343/493	CAPACITOR-FIXED CERAMIC 15pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-150-GAK-ACR-J
C116	26343/493	CAPACITOR-FIXED CERAMIC 15pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-150-GAK-ACR-J
C117	26383/587	CAPACITOR-FIXED CERAMIC 2.2nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51222
C118	26383/587	CAPACITOR-FIXED CERAMIC 2.2nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51222
C119	26343/494	CAPACITOR-FIXED CERAMIC 33pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-330-GAK-ACR-J

AB2/2 RF board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
C120	26343/489	CAPACITOR-FIXED CERAMIC 22pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-220-GAK-ACR-J
C121	26383/587	CAPACITOR-FIXED CERAMIC 2.2nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51222
C122	26383/587	CAPACITOR-FIXED CERAMIC 2.2nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51222
C123	26343/430	CAPACITOR-FIXED CERAMIC 39pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-390-GAK-ACR-J
C124	26343/493	CAPACITOR-FIXED CERAMIC 15pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-150-GAK-ACR-J
C125	26383/587	CAPACITOR-FIXED CERAMIC 2.2nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51222
C126	26343/493	CAPACITOR-FIXED CERAMIC 15pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-150-GAK-ACR-J
C127	26343/498	CAPACITOR-FIXED CERAMIC 18pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-180-GAK-ACR-J
C128	26343/492	CAPACITOR-FIXED CERAMIC 10pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-100-GOK-ACR-J
C129	26383/591	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51472
C130	26383/591	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51472
C131	26343/499	CAPACITOR-FIXED CERAMIC 27pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-270-GAK-ACR-J
C132	26343/430	CAPACITOR-FIXED CERAMIC 39pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-390-GAK-ACR-J
C133	26383/591	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51472
C134	26383/591	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51472
C135	26343/444	CAPACITOR-FIXED CERAMIC 56pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-560-GAK-ACR-J
C136	26343/444	CAPACITOR-FIXED CERAMIC 56pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-560-GAK-ACR-J
C137	26383/591	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51472
C138	26383/591	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51472
C139	26343/431	CAPACITOR-FIXED CERAMIC 82pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-820-GAK-ACR-J
C140	26343/444	CAPACITOR-FIXED CERAMIC 56pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-560-GAK-ACR-J
C141	26383/591	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51472
C142	26343/430	CAPACITOR-FIXED CERAMIC 39pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-390-GAK-ACR-J
C143	26343/434	CAPACITOR-FIXED CERAMIC 68pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-680-GAK-ACR-J
C144	26343/489	CAPACITOR-FIXED CERAMIC 22pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-220-GAK-ACR-J
C153	26383/591	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51472

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB2/2 RF board (contd.)				
C154	26383/591	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51472
C155	26383/591	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51472
C160	26343/502	CAPACITOR-FIXED CERAMIC 1pF +/-0.5pF 63V P100 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROA-910-CAK-ACR-J
C163	26343/502	CAPACITOR-FIXED CERAMIC 1pF +/-0.5pF 63V P100 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROA-910-CAK-ACR-J
C168	26383/587	CAPACITOR-FIXED CERAMIC 2.2nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51222
C169	26383/591	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51472
C174	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C175	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C176	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C201	26421/118	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-0J-K-101-B
C301	26421/153	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, 9mm MAX BODY DIA,	VISHAY COMPONENTS	EKS-00-CC-347-B-C9
C302	26421/153	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, 9mm MAX BODY DIA,	VISHAY COMPONENTS	EKS-00-CC-347-B-C9
C303	26386/818	CAPACITOR-FIXED CERAMIC 33pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-330-JAT-00-J
C304	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C306	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C307	26343/438	CAPACITOR-FIXED CERAMIC 120pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-121-GAK-ACR-J
C308	26343/444	CAPACITOR-FIXED CERAMIC 56pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-560-GAK-ACR-J
C309	26343/489	CAPACITOR-FIXED CERAMIC 22pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-220-GAK-ACR-J
C310	26386/818	CAPACITOR-FIXED CERAMIC 33pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-330-JAT-00-J
C311	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C312	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C313	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C314	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C320	26421/115	CAPACITOR-FIXED ALUMINIUM 33uF +/-20% 25V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1E-K-330-B
C321	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C322	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102

AB2/2 RF board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
C324	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C325	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C326	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C327	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C328	26386/950	CAPACITOR-FIXED CERAMIC 1nF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5A-102-JAT-00-J
C329	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C330	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C331	26383/017	CAPACITOR-FIXED CERAMIC 47nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-473-Z-AF-BRE-K
C332	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C334	26386/987	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R MULTILAYER, AXIAL, GLASS COATED BODY, (LOOSE OR	PHILIPS	C41C103K-DRM
C335	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C336	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C337	26386/819	CAPACITOR-FIXED CERAMIC 39pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-390-JAT-00-J
C338	26386/819	CAPACITOR-FIXED CERAMIC 39pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-390-JAT-00-J
C339	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C340	26386/819	CAPACITOR-FIXED CERAMIC 39pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-390-JAT-00-J
C341	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-150-JAT-00-J
C342	26343/493	CAPACITOR-FIXED CERAMIC 15pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-150-GAK-ACR-J
C343	26386/814	CAPACITOR-FIXED CERAMIC 15pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-150-JAT-00-J
C344	26343/493	CAPACITOR-FIXED CERAMIC 15pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-150-GAK-ACR-J
C345	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C346	26343/493	CAPACITOR-FIXED CERAMIC 15pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-150-GAK-ACR-J
C347	26343/493	CAPACITOR-FIXED CERAMIC 15pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-150-GAK-ACR-J
C401	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C402	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C403	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB2/2 RF board (contd.)				
C404	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C405	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C407	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C408	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C409	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C410	26386/800	CAPACITOR-FIXED CERAMIC 1pF +/-0.5pF 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-1R0-DAT-00-J
C420	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
D1	28383/997	DIODE PIN, 5082-3379... 250mW 50V 0.4pF VHF/UHF SWITCHING, AXIAL, HP-OUTLINE-15, (TAPED).	HEWLETT-PACKARD	5082-3379-T25
D2	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D3	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D4	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D5	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D6	28383/997	DIODE PIN, 5082-3379... 250mW 50V 0.4pF VHF/UHF SWITCHING, AXIAL, HP-OUTLINE-15, (TAPED).	HEWLETT-PACKARD	5082-3379-T25
D7	28383/997	DIODE PIN, 5082-3379... 250mW 50V 0.4pF VHF/UHF SWITCHING, AXIAL, HP-OUTLINE-15, (TAPED).	HEWLETT-PACKARD	5082-3379-T25
D8	28383/997	DIODE PIN, 5082-3379... 250mW 50V 0.4pF VHF/UHF SWITCHING, AXIAL, HP-OUTLINE-15, (TAPED).	HEWLETT-PACKARD	5082-3379-T25
D9	28383/997	DIODE PIN, 5082-3379... 250mW 50V 0.4pF VHF/UHF SWITCHING, AXIAL, HP-OUTLINE-15, (TAPED).	HEWLETT-PACKARD	5082-3379-T25
D10	28383/997	DIODE PIN, 5082-3379... 250mW 50V 0.4pF VHF/UHF SWITCHING, AXIAL, HP-OUTLINE-15, (TAPED).	HEWLETT-PACKARD	5082-3379-T25
D11	28383/997	DIODE PIN, 5082-3379... 250mW 50V 0.4pF VHF/UHF SWITCHING, AXIAL, HP-OUTLINE-15, (TAPED).	HEWLETT-PACKARD	5082-3379-T25
D12	28383/963	DIODE PIN, 1N5719... 250mW 150V 0.3pF AXIAL, HP-OUTLINE-15, (LOOSE).	HEWLETT-PACKARD	1N5719
D13	28383/963	DIODE PIN, 1N5719... 250mW 150V 0.3pF AXIAL, HP-OUTLINE-15, (LOOSE).	HEWLETT-PACKARD	1N5719
D14	28383/963	DIODE PIN, 1N5719... 250mW 150V 0.3pF AXIAL, HP-OUTLINE-15, (LOOSE).	HEWLETT-PACKARD	1N5719
D15	28383/963	DIODE PIN, 1N5719... 250mW 150V 0.3pF AXIAL, HP-OUTLINE-15, (LOOSE).	HEWLETT-PACKARD	1N5719
D17	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D18	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148

AB2/2 RF board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
D19	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D20	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D21	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D22	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D23	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D24	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D25	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D26	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D27	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D28	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D29	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D30	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D31	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D100	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D101	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D102	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D103	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D104	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D105	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D106	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D107	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D108	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D109	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D110	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D113	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D114	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482

AB2/2 RF board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
D115	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D116	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D117	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D118	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D119	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D120	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D121	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D122	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D123	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D124	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D125	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D126	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D127	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D128	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D129	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D130	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D131	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D132	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D133	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D134	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D140	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D141	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D142	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D143	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D144	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D145	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482

REPLACEABLE PARTS

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB2/2 RF board (contd.)				
D146	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D148	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D153	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D154	28335/675	DIODE BAND SWITCHING, BA482... 35V 100mA 1.2pF MAX @ 3V, 1.2Vf @ 100mA, AXIAL, DO-34, (TAPED).	PHILIPS	BA482
D300	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D301	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D302	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D303	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D304	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D305	28349/022	DIODE SMALL-SIGNAL, SCHOTTKY, HSMS-2812... DUAL, 20V 1A 0.41Vf @ 1mA, IN SERIES, MARKING CODE B2,	HEWLETT-PACKARD	HSMS-2812-L31
D306	28349/022	DIODE SMALL-SIGNAL, SCHOTTKY, HSMS-2812... DUAL, 20V 1A 0.41Vf @ 1mA, IN SERIES, MARKING CODE B2,	HEWLETT-PACKARD	HSMS-2812-L31
D307	28371/371	DIODE ZENER, BZX79-C4V7... 500mW 4.7V 5% 250mA AXIAL, DO-35, (TAPED).	PHILIPS	BZX79-C4V7
D308	28371/371	DIODE ZENER, BZX79-C4V7... 500mW 4.7V 5% 250mA AXIAL, DO-35, (TAPED).	PHILIPS	BZX79-C4V7
D309	28371/371	DIODE ZENER, BZX79-C4V7... 500mW 4.7V 5% 250mA AXIAL, DO-35, (TAPED).	PHILIPS	BZX79-C4V7
D401	28383/997	DIODE PIN, 5082-3379... 250mW 50V 0.4pF VHF/UHF SWITCHING, AXIAL, HP-OUTLINE-15, (TAPED).	HEWLETT-PACKARD	5082-3379-T25
D402	28383/997	DIODE PIN, 5082-3379... 250mW 50V 0.4pF VHF/UHF SWITCHING, AXIAL, HP-OUTLINE-15, (TAPED).	HEWLETT-PACKARD	5082-3379-T25
IC1	28466/378	IC-DIGITAL NAND-BUFFER 74F38... 2 INPUT, QUAD, OPEN-COLLECTOR, TTL-SCHOTTKY-FAST, 14 PIN,	PHILIPS	N74F38N
IC2	44529/115	IC-DIGITAL DIVIDER MARKED 44529/115... 5 STAGE BINARY, PROGRAMMABLE, 1.5GHz, PACKED IN BOXES OF	MTL MICROTECH	#
IC3	28461/349	IC-ANALOGUE OPERATIONAL AMP TL074CN... QUAD, JFET-INPUT, LINEAR, 14 PIN, DUAL-IN-LINE.	MOTOROLA INC.	TL074CN
IC4	28461/348	IC-ANALOGUE OPERATIONAL AMP TL072CP... DUAL, JFET-INPUT, LINEAR, SLEW-RATE 13V/uS TYP, 8 PIN,	MOTOROLA INC.	TL072CP
IC5	28461/349	IC-ANALOGUE OPERATIONAL AMP TL074CN... QUAD, JFET-INPUT, LINEAR, 14 PIN, DUAL-IN-LINE.	MOTOROLA INC.	TL074CN
IC6	28461/410	IC-ANALOGUE MICROWAVE-AMPLIFIER MSA-0485... 5.25V 50mA GAIN 8.0dB @ 1GHz, 3dB BANDWIDTH DC - 3.6GHz,	HEWLETT-PACKARD	MSA-0485
IC7	28462/625	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC377... OCTAL, POS EDGE TRIGGER WITH DATA ENABLE, CMOS-H/SPEED, 20	PHILIPS	74HC377N
IC8	28467/536	IC-DIGITAL SHIFT-REGISTER 74HC166... 8 BIT, PARALLEL-IN SERIAL-OUT, CMOS-H/SPEED, 16 PIN,	PHILIPS	74HC166N
IC9	28462/625	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC377... OCTAL, POS EDGE TRIGGER WITH DATA ENABLE, CMOS-H/SPEED, 20	PHILIPS	74HC377N

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB2/2 RF board (contd.)				
IC10	28461/310	IC-ANALOGUE OPERATIONAL AMP 748... SINGLE, GENERAL-PURPOSE, LINEAR, SLEW-RATE 0.5V/uS TYP, 8	NAT. SEMICONDUCTOR	LM748CN
IC11	28461/978	IC-ANALOGUE SWITCH DG411... QUAD, 15V SPST, ON-RESISTANCE<35R, 4 x N/O @ LOGIC 1, TTL	ANALOG DEVICES LTD	ADG411BN
IC100	28461/410	IC-ANALOGUE MICROWAVE-AMPLIFIER MSA-0485... 5.25V 50mA GAIN 8.0dB @ 1GHz, 3dB BANDWIDTH DC - 3.6GHz,	HEWLETT-PACKARD	MSA-0485
IC101	28465/050	IC-DIGITAL DECODER 74LS145... BCD TO DECIMAL, OPEN-COLLECTOR, TTL-SCHOTTKY-L/PWR, 16 PIN,	MOTOROLA INC.	SN74LS145N
IC102	28465/050	IC-DIGITAL DECODER 74LS145... BCD TO DECIMAL, OPEN-COLLECTOR, TTL-SCHOTTKY-L/PWR, 16 PIN,	MOTOROLA INC.	SN74LS145N
IC300	28466/364	IC-DIGITAL NAND-GATE 74HC132... 2 INPUT, QUAD, SCHMITT TRIGGER, CMOS-H/SPEED, 14 PIN,	PHILIPS	74HC132N
IC301	28531/034	MODULE SWITCH, MICROWAVE, DC - 1.5GHz, UNDRIVEN SPST, ISOLATION 80dB @ 1.5GHz, ABSORPTIVE,	M/A COM LTD	DC1/1189/49 issue C
IC302	28469/738	IC-ANALOGUE MULTIPLEXER 74HC4052... DUAL, 4 CHANNEL, 2 SELECT INPUTS PLUS ENABLE,	PHILIPS	74HC4052N
IC401	28461/347	IC-ANALOGUE OPERATIONAL AMP TL071C... SINGLE, JFET-INPUT, LINEAR, SLEW-RATE 13V/uS TYP, 8 PIN,	MOTOROLA INC.	TL071CP
L1	23642/551	INDUCTOR-FIXED 2.2uH +/- 10% COATED-LACQUER, MINIATURE, 470mA 0R9 MAX, 32 Q @ 7.9 MHz, 140 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/014
L2	23642/551	INDUCTOR-FIXED 2.2uH +/- 10% COATED-LACQUER, MINIATURE, 470mA 0R9 MAX, 32 Q @ 7.9 MHz, 140 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/014
L3	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L5	23642/551	INDUCTOR-FIXED 2.2uH +/- 10% COATED-LACQUER, MINIATURE, 470mA 0R9 MAX, 32 Q @ 7.9 MHz, 140 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/014
L6	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L7	23642/551	INDUCTOR-FIXED 2.2uH +/- 10% COATED-LACQUER, MINIATURE, 470mA 0R9 MAX, 32 Q @ 7.9 MHz, 140 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/014
L8	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L10	23642/551	INDUCTOR-FIXED 2.2uH +/- 10% COATED-LACQUER, MINIATURE, 470mA 0R9 MAX, 32 Q @ 7.9 MHz, 140 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/014
L11	23642/481	INDUCTOR-FIXED 0.15uH +/- 10% MOULDED-EPOXY, 2.45A 0R3 MAX, 50 Q @ 25 MHz, 525 MHz SRF, AXIAL,	MEGGITT ELECTRONICS	C20M-406/8/27484/002
L12	23642/481	INDUCTOR-FIXED 0.15uH +/- 10% MOULDED-EPOXY, 2.45A 0R3 MAX, 50 Q @ 25 MHz, 525 MHz SRF, AXIAL,	MEGGITT ELECTRONICS	C20M-406/8/27484/002
L13	23642/551	INDUCTOR-FIXED 2.2uH +/- 10% COATED-LACQUER, MINIATURE, 470mA 0R9 MAX, 32 Q @ 7.9 MHz, 140 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/014
L15	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
L16	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
L17	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
L18	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB2/2 RF board (contd.)				
L20	23642/426	INDUCTOR-FIXED 0.33uH +/- 10% MOULDED-EPOXY, MINIATURE, 750mA 0R22 MAX, 30 Q @ 25 MHz, 380 MHz	INTERCONNECTION PROD	550-3399-07-02-00
L21	23642/566	INDUCTOR-FIXED 680uH +/- 10% COATED-LACQUER, MINIATURE, 78mA 33R MAX, 45 Q @ 0.79 MHz, 2.5 MHz	MEGGITT ELECTRONICS	C12-406/8/27471/014
L100	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L101	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L103	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L104	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L107	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L108	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L111	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L112	23642/556	INDUCTOR-FIXED 15uH +/- 10% COATED-LACQUER, MINIATURE, 370mA 1R5 MAX, 55 Q @ 2.5 MHz, 30 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/008
L114	23642/556	INDUCTOR-FIXED 15uH +/- 10% COATED-LACQUER, MINIATURE, 370mA 1R5 MAX, 55 Q @ 2.5 MHz, 30 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/008
L117	23642/556	INDUCTOR-FIXED 15uH +/- 10% COATED-LACQUER, MINIATURE, 370mA 1R5 MAX, 55 Q @ 2.5 MHz, 30 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/008
L119	23642/556	INDUCTOR-FIXED 15uH +/- 10% COATED-LACQUER, MINIATURE, 370mA 1R5 MAX, 55 Q @ 2.5 MHz, 30 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/008
L122	23642/556	INDUCTOR-FIXED 15uH +/- 10% COATED-LACQUER, MINIATURE, 370mA 1R5 MAX, 55 Q @ 2.5 MHz, 30 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/008
L124	23642/556	INDUCTOR-FIXED 15uH +/- 10% COATED-LACQUER, MINIATURE, 370mA 1R5 MAX, 55 Q @ 2.5 MHz, 30 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/008
L127	23642/556	INDUCTOR-FIXED 15uH +/- 10% COATED-LACQUER, MINIATURE, 370mA 1R5 MAX, 55 Q @ 2.5 MHz, 30 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/008
L132	23642/559	INDUCTOR-FIXED 47uH +/- 10% COATED-LACQUER, MINIATURE, 140mA 9R6 MAX, 55 Q @ 2.5 MHz, 15 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/014
L134	23642/559	INDUCTOR-FIXED 47uH +/- 10% COATED-LACQUER, MINIATURE, 140mA 9R6 MAX, 55 Q @ 2.5 MHz, 15 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/014
L137	23642/559	INDUCTOR-FIXED 47uH +/- 10% COATED-LACQUER, MINIATURE, 140mA 9R6 MAX, 55 Q @ 2.5 MHz, 15 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/014
L138	23642/481	INDUCTOR-FIXED 0.15uH +/- 10% MOULDED-EPOXY, 2.45A 0R3 MAX, 50 Q @ 25 MHz, 525 MHz SRF, AXIAL,	MEGGITT ELECTRONICS	C20M-406/8/27484/002
L139	23642/559	INDUCTOR-FIXED 47uH +/- 10% COATED-LACQUER, MINIATURE, 140mA 9R6 MAX, 55 Q @ 2.5 MHz, 15 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/014
L142	23642/559	INDUCTOR-FIXED 47uH +/- 10% COATED-LACQUER, MINIATURE, 140mA 9R6 MAX, 55 Q @ 2.5 MHz, 15 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/014
L143	23642/424	INDUCTOR-FIXED 0.22uH +/- 10% MOULDED-EPOXY, MINIATURE, 940mA 0R14 MAX, 33 Q @ 25 MHz, 470 MHz	VISHAY COMPONENTS	IM-2/0.22uH 10%
L144	23642/559	INDUCTOR-FIXED 47uH +/- 10% COATED-LACQUER, MINIATURE, 140mA 9R6 MAX, 55 Q @ 2.5 MHz, 15 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/014
L147	23642/559	INDUCTOR-FIXED 47uH +/- 10% COATED-LACQUER, MINIATURE, 140mA 9R6 MAX, 55 Q @ 2.5 MHz, 15 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/014
L310	23642/423	INDUCTOR-FIXED 10uH +/- 10% MOULDED-EPOXY, MINIATURE, 180mA 3R7 MAX, 55 Q @ 7.9 MHz, 46 MHz	INTERCONNECTION PROD	550-3399-25-02-00

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB2/2 RF board (contd.)				
L312	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L313	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
L314	23642/909	WOUND-PART INDUCTOR, WIDEBAND HF CHOKE, BEAD-CORE, 4B1 GRADE MATERIAL, 2.5 TURNS, TINNED COPPER WIRE.	PHILIPS	4312-020-36700
L315	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L401	23642/423	INDUCTOR-FIXED 10uH +/- 10% MOULDED-EPOXY, MINIATURE, 180mA 3R7 MAX, 55 Q @ 7.9 MHz, 46 MHz	INTERCONNECTION PROD	550-3399-25-02-00
R1	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R2	24772/065	RESISTOR-FIXED METAL-FILM 470R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-470R-2%
R3	24772/087	RESISTOR-FIXED METAL-FILM 3K9 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-3K9-2%
R4	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R5	24772/087	RESISTOR-FIXED METAL-FILM 3K9 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-3K9-2%
R6	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R7	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R8	24772/090	RESISTOR-FIXED METAL-FILM 5K1 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-5K1-2%
R9	24772/065	RESISTOR-FIXED METAL-FILM 470R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-470R-2%
R10	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R11	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R12	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R13	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R14	24772/065	RESISTOR-FIXED METAL-FILM 470R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-470R-2%
R15	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R16	24772/053	RESISTOR-FIXED METAL-FILM 150R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-150R-2%
R17	24321/731	RESISTOR-FIXED METAL-GLAZE 18R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-18R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-18R2-FT
R18	24772/059	RESISTOR-FIXED METAL-FILM 270R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-270R-2%
R19	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%

AB2/2 RF board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R20	24773/273	RESISTOR-FIXED METAL-FILM 1K +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K-G-T-1
R21	24772/065	RESISTOR-FIXED METAL-FILM 470R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-470R-2%
R22	24772/063	RESISTOR-FIXED METAL-FILM 390R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-390R-2%
R23	24772/065	RESISTOR-FIXED METAL-FILM 470R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-470R-2%
R24	24772/042	RESISTOR-FIXED METAL-FILM 51R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-51R-2%
R25	24573/056	RESISTOR-FIXED METAL-OXIDE 200R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	TR5-200R-2%
R26	24772/065	RESISTOR-FIXED METAL-FILM 470R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-470R-2%
R27	24773/263	RESISTOR-FIXED METAL-FILM 390R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-390R-G-T-1
R28	24772/065	RESISTOR-FIXED METAL-FILM 470R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-470R-2%
R29	24773/251	RESISTOR-FIXED METAL-FILM 120R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-120R-G-T-1
R30	24573/067	RESISTOR-FIXED METAL-OXIDE 560R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	TR5-560R-2%
R31	24772/066	RESISTOR-FIXED METAL-FILM 510R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-510R-2%
R32	24772/034	RESISTOR-FIXED METAL-FILM 24R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-24R-2%
R33	24753/653	RESISTOR-FIXED METAL-FILM 50R +/- 0.5% 250mW 200V 50 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-50R-D-T-2
R34	24723/481	RESISTOR-FIXED METAL-FILM 50R39 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (TAPED).	WELWYN ELECTRONICS	RC55-C50R39-B
R35	24723/481	RESISTOR-FIXED METAL-FILM 50R39 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (TAPED).	WELWYN ELECTRONICS	RC55-C50R39-B
R36	24723/487	RESISTOR-FIXED METAL-FILM 6K4 +/- 0.1% 250mW 200V 50 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	RC55-C6K4-B
R37	24772/105	RESISTOR-FIXED METAL-FILM 22K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-22K-2%
R38	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R39	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R40	24772/053	RESISTOR-FIXED METAL-FILM 150R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-150R-2%
R41	24772/104	RESISTOR-FIXED METAL-FILM 20K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-20K-2%
R42	24772/108	RESISTOR-FIXED METAL-FILM 30K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-30K-2%
R43	24772/099	RESISTOR-FIXED METAL-FILM 12K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-12K-2%
R44	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R45	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB2/2 RF board (contd.)				
R46	24772/098	RESISTOR-FIXED METAL-FILM 11K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-11K-2%
R47	24772/098	RESISTOR-FIXED METAL-FILM 11K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-11K-2%
R48	24772/104	RESISTOR-FIXED METAL-FILM 20K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-20K-2%
R49	24772/137	RESISTOR-FIXED METAL-FILM 470K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-470K-2%
R50	24772/116	RESISTOR-FIXED METAL-FILM 62K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-62K-2%
R51	24772/089	RESISTOR-FIXED METAL-FILM 4K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K7-2%
R52	24772/116	RESISTOR-FIXED METAL-FILM 62K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-62K-2%
R53	24772/137	RESISTOR-FIXED METAL-FILM 470K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-470K-2%
R54	24772/084	RESISTOR-FIXED METAL-FILM 3K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-3K-2%
R55	24772/077	RESISTOR-FIXED METAL-FILM 1K5 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K5-2%
R56	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R57	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R58	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R59	24772/116	RESISTOR-FIXED METAL-FILM 62K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-62K-2%
R60	24772/137	RESISTOR-FIXED METAL-FILM 470K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-470K-2%
R61	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R62	24772/084	RESISTOR-FIXED METAL-FILM 3K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-3K-2%
R63	24772/053	RESISTOR-FIXED METAL-FILM 150R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-150R-2%
R64	24772/025	RESISTOR-FIXED METAL-FILM 10R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10R-2%
R65	24772/056	RESISTOR-FIXED METAL-FILM 200R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-200R-2%
R66	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R67	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R69	24773/263	RESISTOR-FIXED METAL-FILM 390R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-390R-G-T-1
R70	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R71	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R72	24772/092	RESISTOR-FIXED METAL-FILM 6K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-6K2-2%

AB2/2 RF board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R73	24772/109	RESISTOR-FIXED METAL-FILM 33K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-33K-2%
R74	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R75	24772/087	RESISTOR-FIXED METAL-FILM 3K9 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-3K9-2%
R76	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R77	24773/246	RESISTOR-FIXED METAL-FILM 75R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-75R-G-T-1
R78	24772/085	RESISTOR-FIXED METAL-FILM 3K3 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-3K3-2%
R79	24772/089	RESISTOR-FIXED METAL-FILM 4K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K7-2%
R80	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R81	24772/075	RESISTOR-FIXED METAL-FILM 1K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K2-2%
R82	24772/077	RESISTOR-FIXED METAL-FILM 1K5 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K5-2%
R83	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R84	24772/063	RESISTOR-FIXED METAL-FILM 390R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-390R-2%
R85	24681/521	RESISTOR-NETWORK ISOLATED, THICK-FILM, 1K 2% 1.5W 500 ppm/DEG.C, 8 RESISTORS, LOW PROFILE, 16 PIN,	VISHAY COMPONENTS	MDP16-03-102G
R86	24772/113	RESISTOR-FIXED METAL-FILM 47K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-47K-2%
R87	24772/113	RESISTOR-FIXED METAL-FILM 47K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-47K-2%
R88	24772/113	RESISTOR-FIXED METAL-FILM 47K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-47K-2%
R89	24772/113	RESISTOR-FIXED METAL-FILM 47K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-47K-2%
R90	24772/056	RESISTOR-FIXED METAL-FILM 200R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-200R-2%
R91	24681/521	RESISTOR-NETWORK ISOLATED, THICK-FILM, 1K 2% 1.5W 500 ppm/DEG.C, 8 RESISTORS, LOW PROFILE, 16 PIN,	VISHAY COMPONENTS	MDP16-03-102G
R92	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R93	24321/730	RESISTOR-FIXED METAL-GLAZE 16R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-16R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-16R2-FT
R94	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R95	24772/058	RESISTOR-FIXED METAL-FILM 240R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-240R-2%
R96	24772/042	RESISTOR-FIXED METAL-FILM 51R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-51R-2%
R97	24772/053	RESISTOR-FIXED METAL-FILM 150R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-150R-2%
R98	24772/084	RESISTOR-FIXED METAL-FILM 3K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-3K-2%

AB2/2 RF board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R99	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R100	24573/055	RESISTOR-FIXED METAL-OXIDE 180R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	TR5-180R-2%
R101	24773/273	RESISTOR-FIXED METAL-FILM 1K +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-1K-G-T-1
R102	24321/777	RESISTOR-FIXED METAL-GLAZE 1K5 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K50-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1501-FT
R103	24772/026	RESISTOR-FIXED METAL-FILM 11R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	NK3-11R-2%
R104	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R105	24772/026	RESISTOR-FIXED METAL-FILM 11R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	NK3-11R-2%
R107	24772/050	RESISTOR-FIXED METAL-FILM 110R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-110R-2%
R111	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R112	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R113	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R114	24772/075	RESISTOR-FIXED METAL-FILM 1K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K2-2%
R115	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R116	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R200	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R206	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R207	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R208	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R209	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R210	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R300	24773/265	RESISTOR-FIXED METAL-FILM 470R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-470R-G-T-1
R301	24773/225	RESISTOR-FIXED METAL-FILM 10R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-10R-G-T-1
R306	24772/075	RESISTOR-FIXED METAL-FILM 1K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K2-2%
R308	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R309	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R310	24773/249	RESISTOR-FIXED METAL-FILM 100R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-100R-G-T-1

AB2/2 RF board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R311	24773/249	RESISTOR-FIXED METAL-FILM 100R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-100R-G-T-1
R312	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R320	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R321	24772/094	RESISTOR-FIXED METAL-FILM 7K5 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-7K5-2%
R322	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R324	24321/780	RESISTOR-FIXED METAL-GLAZE 2K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2001-FT
R325	24772/055	RESISTOR-FIXED METAL-FILM 180R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-180R-2%
R326	24772/039	RESISTOR-FIXED METAL-FILM 39R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-39R-2%
R327	24773/253	RESISTOR-FIXED METAL-FILM 150R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-150R-G-T-1
R328	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R329	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R330	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R331	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R332	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R333	24772/094	RESISTOR-FIXED METAL-FILM 7K5 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-7K5-2%
R334	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R335	24321/780	RESISTOR-FIXED METAL-GLAZE 2K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2001-FT
R336	24772/055	RESISTOR-FIXED METAL-FILM 180R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-180R-2%
R337	24772/039	RESISTOR-FIXED METAL-FILM 39R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-39R-2%
R338	24773/253	RESISTOR-FIXED METAL-FILM 150R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-150R-G-T-1
R339	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R340	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R341	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R342	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R343	24772/062	RESISTOR-FIXED METAL-FILM 360R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-360R-2%
R344	24772/089	RESISTOR-FIXED METAL-FILM 4K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K7-2%

AB2/2 RF board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R345	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R346	24321/780	RESISTOR-FIXED METAL-GLAZE 2K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2001-FT
R347	24321/727	RESISTOR-FIXED METAL-GLAZE 12R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-12R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-12R1-FT
R348	24772/051	RESISTOR-FIXED METAL-FILM 120R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-120R-2%
R349	24772/025	RESISTOR-FIXED METAL-FILM 10R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10R-2%
R350	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R351	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R352	24772/074	RESISTOR-FIXED METAL-FILM 1K1 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K1-2%
R353	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R354	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R355	24321/766	RESISTOR-FIXED METAL-GLAZE 510R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-511R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-5110-FT
R356	24321/766	RESISTOR-FIXED METAL-GLAZE 510R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-511R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-5110-FT
R357	24772/066	RESISTOR-FIXED METAL-FILM 510R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-510R-2%
R358	24772/066	RESISTOR-FIXED METAL-FILM 510R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-510R-2%
R359	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R360	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R361	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R362	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R363	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R364	24772/116	RESISTOR-FIXED METAL-FILM 62K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-62K-2%
R401	24772/035	RESISTOR-FIXED METAL-FILM 27R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-27R-2%
R402	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R403	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R404	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R405	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R406	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%

AB2/2 RF board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R407	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R410	24321/731	RESISTOR-FIXED METAL-GLAZE 18R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-18R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-18R2-FT
R413	24772/099	RESISTOR-FIXED METAL-FILM 12K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-12K-2%
R420	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R421	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R422	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R423	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R424	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R425	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R426	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
RLA	23486/166	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 12V COIL, 720R - CONTACTS 1A, 125V, MAX LOAD 30W, PCB	FUJITSU LTD	FBR46-N-D012-P
RLB	23486/166	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 12V COIL, 720R - CONTACTS 1A, 125V, MAX LOAD 30W, PCB	FUJITSU LTD	FBR46-N-D012-P
RLC	23486/166	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 12V COIL, 720R - CONTACTS 1A, 125V, MAX LOAD 30W, PCB	FUJITSU LTD	FBR46-N-D012-P
RLD	23486/166	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 12V COIL, 720R - CONTACTS 1A, 125V, MAX LOAD 30W, PCB	FUJITSU LTD	FBR46-N-D012-P
RLE	23486/166	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 12V COIL, 720R - CONTACTS 1A, 125V, MAX LOAD 30W, PCB	FUJITSU LTD	FBR46-N-D012-P
TR1	28451/694	TRANSISTOR NPN BIPOLAR BFR91A... 12V 6GHz 300mW 35mA 40hFE @ 30mA, SURFACE MOUNTED, SOT-37.	PHILIPS	BFR91A
TR2	28459/068	TRANSISTOR N-CHANNEL-ENHANCE MOSFET BST70A... 80V 1W 500mA 2R TO-92, (LOOSE).	PHILIPS	BST70A
TR3	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B
TR4	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B
TR5	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B
TR6	28435/868	TRANSISTOR PNP BIPOLAR 2N2905A... 60V 200MHz 600mW 600mA 100hFE @ 150mA, TO-39.	PHILIPS	2N2905A
TR10	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B
TR11	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB2/2 RF board (contd.)				
TR12	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B
TR13	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B
TR310	28433/455	TRANSISTOR PNP BIPOLAR BC308B... 20V 130MHz 200mW 100mA 200hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	NAT. SEMICONDUCTOR	BC307B(T/R EMTR 1st)
TR311	28487/807	TRANSISTOR NPN BIPOLAR 42085... 12V 6GHz 500mW 80mA 30hFE @ 35mA, 20dBm, SURFACE MOUNTED,	HEWLETT-PACKARD	AT-42085
TR312	28433/455	TRANSISTOR PNP BIPOLAR BC308B... 20V 130MHz 200mW 100mA 200hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	NAT. SEMICONDUCTOR	BC307B(T/R EMTR 1st)
TR313	28487/807	TRANSISTOR NPN BIPOLAR 42085... 12V 6GHz 500mW 80mA 30hFE @ 35mA, 20dBm, SURFACE MOUNTED,	HEWLETT-PACKARD	AT-42085
TR314	28433/455	TRANSISTOR PNP BIPOLAR BC308B... 20V 130MHz 200mW 100mA 200hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	NAT. SEMICONDUCTOR	BC307B(T/R EMTR 1st)
TR315	28452/210	TRANSISTOR NPN BIPOLAR LTE21009R... 16V 4W 250mA GAIN 8.5dB @ 2.1GHz, SURFACE MOUNTED, CASE-FO-41B.	PHILIPS	LTE21009R
TR401	28459/068	TRANSISTOR N-CHANNEL-ENHANCE MOSFET BST70A... 80V 1W 500mA 2R TO-92, (LOOSE).	PHILIPS	BST70A

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.

AB3/1 BFO switch and RPP board

Issue 05

When ordering, prefix circuit reference with AB3/1.

	44829-532Z	Complete unit		
C1	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C2	26421/115	CAPACITOR-FIXED ALUMINIUM 33uF +/-20% 25V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1E-K-330-B
C3	26421/115	CAPACITOR-FIXED ALUMINIUM 33uF +/-20% 25V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1E-K-330-B
C4	26386/777	CAPACITOR-FIXED CERAMIC 47nF +/-20% 63V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	PHILIPS	1206-2R-473-K9-BB
C5	26386/865	CAPACITOR-FIXED CERAMIC 1.5nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-152-KAT-00-J
C6	26386/851	CAPACITOR-FIXED CERAMIC 100pF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	SYFER TECHNOLOGY LTD	0805-J-050-0101K-X-T
C7	26386/851	CAPACITOR-FIXED CERAMIC 100pF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	SYFER TECHNOLOGY LTD	0805-J-050-0101K-X-T
C8	26386/865	CAPACITOR-FIXED CERAMIC 1.5nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-152-KAT-00-J
C9	26386/777	CAPACITOR-FIXED CERAMIC 47nF +/-20% 63V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	PHILIPS	1206-2R-473-K9-BB
C10	26343/784	CAPACITOR-FIXED CERAMIC 68pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-680-JAT-00-J
C11	26343/784	CAPACITOR-FIXED CERAMIC 68pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-680-JAT-00-J
D1	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D2	28371/602	DIODE ZENER, BZX79-C7V5... 500mW 7.5V 5% 250mA AXIAL, DO-35, (TAPED).	PHILIPS	BZX79-C7V5
D3	28371/602	DIODE ZENER, BZX79-C7V5... 500mW 7.5V 5% 250mA AXIAL, DO-35, (TAPED).	PHILIPS	BZX79-C7V5
D4	28335/670	DIODE BAND SWITCHING, BAT18... 35V 100mA 1pF MAX @ 20V, 1.2Vf @ 100mA, MARKING CODE A2, SURFACE	PHILIPS	BAT18/T1
D5	28335/670	DIODE BAND SWITCHING, BAT18... 35V 100mA 1pF MAX @ 20V, 1.2Vf @ 100mA, MARKING CODE A2, SURFACE	PHILIPS	BAT18/T1
L1	23642/555	INDUCTOR-FIXED 10uH +/- 10% COATED-LACQUER, MINIATURE, 470mA 0R9 MAX, 45 Q @ 7.9 MHz, 45 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/006
L2	23642/555	INDUCTOR-FIXED 10uH +/- 10% COATED-LACQUER, MINIATURE, 470mA 0R9 MAX, 45 Q @ 7.9 MHz, 45 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/006
L3	23642/500	INDUCTOR-FIXED 0.22uH +/- 20% MOULDED-EPOXY, 710mA 0R1 MAX, 40 Q @ 25.2 MHz, 150 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3613-A-R22-M

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB3/1 BFO switch and RPP board (contd.)				
R1	24773/265	RESISTOR-FIXED METAL-FILM 470R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-470R-G-T-1
R2	24773/289	RESISTOR-FIXED METAL-FILM 4K7 +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-4K7-G-T-1
R3	24773/289	RESISTOR-FIXED METAL-FILM 4K7 +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-4K7-G-T-1
RLA	23486/101	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 5V COIL, 62R - CONTACTS 1A @ 28VDC, 9.5mmSQ, 9.6mm HIGH,	TELEDYNE LTD	172-5
RLB	23486/101	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 5V COIL, 62R - CONTACTS 1A @ 28VDC, 9.5mmSQ, 9.6mm HIGH,	TELEDYNE LTD	172-5
TR1	28434/827	TRANSISTOR PNP BIPOLAR MPS6534... 40V 250MHz 625mW 600mA 90hFE @ 100mA, TO-92, (LOOSE).	NAT. SEMICONDUCTOR	MPS6534
	43137/318	RIBBON-LEAD 20 WAY , SOCKET 20 WAY, KEY POS 5, - **PLBR to SKBL, AB2/2**	IFR LTD.	

AB3/3 High power amplifier board

Issue 13

When ordering, prefix circuit reference with AB3/3.

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
	44829/547	Complete unit		
C1	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C2	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C3	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C4	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C5	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C6	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C7	26343/784	CAPACITOR-FIXED CERAMIC 68pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-680-JAT-00-J
C8	26343/784	CAPACITOR-FIXED CERAMIC 68pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-680-JAT-00-J
C9	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C10	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C11	26386/865	CAPACITOR-FIXED CERAMIC 1.5nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-152-KAT-00-J
C12	26386/865	CAPACITOR-FIXED CERAMIC 1.5nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-152-KAT-00-J
C13	26386/777	CAPACITOR-FIXED CERAMIC 47nF +/-20% 63V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	PHILIPS	1206-2R-473-K9-BB
C14	26386/777	CAPACITOR-FIXED CERAMIC 47nF +/-20% 63V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	PHILIPS	1206-2R-473-K9-BB
C15	26451/002	CAPACITOR-FIXED ALUMINIUM 4.7uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 4.3 x 4.3mm,	PANASONIC INDUSTRIAL	ECE-V-1VA-4R7R
C16	26451/002	CAPACITOR-FIXED ALUMINIUM 4.7uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 4.3 x 4.3mm,	PANASONIC INDUSTRIAL	ECE-V-1VA-4R7R
C17	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C18	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C19	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C20	26451/002	CAPACITOR-FIXED ALUMINIUM 4.7uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 4.3 x 4.3mm,	PANASONIC INDUSTRIAL	ECE-V-1VA-4R7R
C21	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C22	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C23	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C24	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB3/3 High power amplifier board (contd.)				
C25	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C26	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C27	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C28	26343/784	CAPACITOR-FIXED CERAMIC 68pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-680-JAT-00-J
C31	26343/784	CAPACITOR-FIXED CERAMIC 68pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-680-JAT-00-J
C34	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C35	26343/784	CAPACITOR-FIXED CERAMIC 68pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-680-JAT-00-J
C36	26343/784	CAPACITOR-FIXED CERAMIC 68pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-680-JAT-00-J
C37	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C38	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C39	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C40	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C41	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C42	26386/754	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-103-K9-BB
C43	26386/887	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	AVX LTD	1210-5C-104-KAT-00-J
C44	26386/777	CAPACITOR-FIXED CERAMIC 47nF +/-20% 63V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	PHILIPS	1206-2R-473-K9-BB
D1	28371/735	DIODE ZENER, BZX84-C8V2... 350mW 8.2V 5% 250mA MARKING CODE Z7, SURFACE MOUNTED, SOT-23, (TAPED).	PHILIPS	BZX84-C8V2
D2	28371/735	DIODE ZENER, BZX84-C8V2... 350mW 8.2V 5% 250mA MARKING CODE Z7, SURFACE MOUNTED, SOT-23, (TAPED).	PHILIPS	BZX84-C8V2
D3	28383/902	DIODE SMALL-SIGNAL, BAW56... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON ANODE, MARKING CODE A1, SURFACE	PHILIPS	BAW56 (A1)
D4	28335/670	DIODE BAND SWITCHING, BAT18... 35V 100mA 1pF MAX @ 20V, 1.2Vf @ 100mA, MARKING CODE A2, SURFACE	PHILIPS	BAT18/T1
D5	28335/670	DIODE BAND SWITCHING, BAT18... 35V 100mA 1pF MAX @ 20V, 1.2Vf @ 100mA, MARKING CODE A2, SURFACE	PHILIPS	BAT18/T1
D6	28383/916	DIODE PIN, BAR61... TRIPLE, 100V 1A 0.25pF 1Vf @ 100mA, PI-CIRCUIT, MARKING CODE 61, SURFACE	SIEMENS LTD	BAR61
D7	28383/902	DIODE SMALL-SIGNAL, BAW56... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON ANODE, MARKING CODE A1, SURFACE	PHILIPS	BAW56 (A1)
D8	28349/029	DIODE SMALL-SIGNAL, SCHOTTKY, HSMS-2810... 250mW 20V 1.2pF 1Vf @ 35mA, MARKNG CODE B0, LOW PROFILE,	HEWLETT-PACKARD	HSMS-2810-L31

AB3/3 High power amplifier board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
D9	28349/029	DIODE SMALL-SIGNAL, SCHOTTKY, HSMS-2810... 250mW 20V 1.2pF 1Vf @ 35mA, MARKNG CODE B0, LOW PROFILE,	HEWLETT-PACKARD	HSMS-2810-L31
D10	28349/029	DIODE SMALL-SIGNAL, SCHOTTKY, HSMS-2810... 250mW 20V 1.2pF 1Vf @ 35mA, MARKNG CODE B0, LOW PROFILE,	HEWLETT-PACKARD	HSMS-2810-L31
IC1	28461/413	IC-ANALOGUE OPERATIONAL AMP TL074... QUAD, JFET INPUT, LOW NOISE, SLEW RATE 8V/uS MIN, GAIN	MOTOROLA INC.	TL074CD
IC2	28461/413	IC-ANALOGUE OPERATIONAL AMP TL074... QUAD, JFET INPUT, LOW NOISE, SLEW RATE 8V/uS MIN, GAIN	MOTOROLA INC.	TL074CD
L1	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L2	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L3	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L4	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L5	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L6	23642/419	INDUCTOR-FIXED 1uH +/- 10% MOULDED-EPOXY, MINIATURE, 350mA 1R MAX, 25 Q @ 25 MHz, 210 MHz	INTERCONNECTION PROD	550-3399-13-02-00
L7	23642/500	INDUCTOR-FIXED 0.22uH +/- 20% MOULDED-EPOXY, 710mA 0R1 MAX, 40 Q @ 25.2 MHz, 150 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3613-A-R22-M
R1	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R2	24321/775	RESISTOR-FIXED METAL-GLAZE 1K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1211-FT
R3	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R4	24321/760	RESISTOR-FIXED METAL-GLAZE 300R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-301R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3010-FT
R5	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R6	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R7	24321/779	RESISTOR-FIXED METAL-GLAZE 1K8 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K82-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1821-FT
R8	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R9	24321/791	RESISTOR-FIXED METAL-GLAZE 5K6 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-5K62-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-5621-FT
R10	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT

AB3/3 High power amplifier board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R11	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R12	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R13	24321/793	RESISTOR-FIXED METAL-GLAZE 6K8 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-6K81-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-6811-FT
R14	24321/794	RESISTOR-FIXED METAL-GLAZE 7K5 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-7K50-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-7501-FT
R15	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R16	24331/998	RESISTOR-FIXED CARBON-COMPOSITION 120R +/- 5% 125mW 150V AXIAL, (LOOSE OR TAPED).	ALLEN-BRADLEY ELECT.	BB1215
R17	24573/053	RESISTOR-FIXED METAL-OXIDE 150R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	TR5-150R-2%
R18	24573/053	RESISTOR-FIXED METAL-OXIDE 150R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	TR5-150R-2%
R19	24321/736	RESISTOR-FIXED METAL-GLAZE 30R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-30R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-30R1-FT
R20	24321/736	RESISTOR-FIXED METAL-GLAZE 30R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-30R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-30R1-FT
R21	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R22	24321/800	RESISTOR-FIXED METAL-GLAZE 13K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-13K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1302-FT
R23	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R24	24331/997	RESISTOR-FIXED CARBON-COMPOSITION 100R +/- 5% 125mW 150V AXIAL, (LOOSE OR TAPED).	ALLEN-BRADLEY ELECT.	BB1015
R25	24321/758	RESISTOR-FIXED METAL-GLAZE 240R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-243R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2430-FT
R26	24552/012	RESISTOR-FIXED METAL-OXIDE 4R7 +/- 5% 500mW 350V 250 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	TR5-4R7-5%
R27	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R28	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R29	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R30	24321/837	RESISTOR-FIXED METAL-GLAZE 470K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4753-FT
R31	24321/837	RESISTOR-FIXED METAL-GLAZE 470K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4753-FT
R32	24321/816	RESISTOR-FIXED METAL-GLAZE 62K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-61K9-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-6192-FT
R33	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R34	24321/816	RESISTOR-FIXED METAL-GLAZE 62K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-61K9-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-6192-FT
R35	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R36	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT

AB3/3 High power amplifier board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R37	24321/790	RESISTOR-FIXED METAL-GLAZE 5K1 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-5K11-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-5111-FT
R38	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R39	24321/790	RESISTOR-FIXED METAL-GLAZE 5K1 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-5K11-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-5111-FT
R40	24321/837	RESISTOR-FIXED METAL-GLAZE 470K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4753-FT
R41	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R42	24321/814	RESISTOR-FIXED METAL-GLAZE 51K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51K1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-5112-FT
R43	24321/804	RESISTOR-FIXED METAL-GLAZE 20K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-20K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2002-FT
R44	24321/804	RESISTOR-FIXED METAL-GLAZE 20K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-20K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2002-FT
R45	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R46	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R47	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R48	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R49	24321/821	RESISTOR-FIXED METAL-GLAZE 100K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1003-FT
R50	24321/804	RESISTOR-FIXED METAL-GLAZE 20K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-20K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2002-FT
R51	24321/821	RESISTOR-FIXED METAL-GLAZE 100K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1003-FT
R52	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R53	24321/804	RESISTOR-FIXED METAL-GLAZE 20K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-20K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2002-FT
R54	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R55	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R56	24321/816	RESISTOR-FIXED METAL-GLAZE 62K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-61K9-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-6192-FT
R57	24321/756	RESISTOR-FIXED METAL-GLAZE 200R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-200R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2000-FT
R58	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R59	24321/761	RESISTOR-FIXED METAL-GLAZE 330R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-332R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3320-FT
RLB	23486/101	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 5V COIL, 62R - CONTACTS 1A @ 28VDC, 9.5mmSQ, 9.6mm HIGH,	TELEDYNE LTD	172-5

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB3/3 High power amplifier board (contd.)				
RLC	23486/101	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 5V COIL, 62R - CONTACTS 1A @ 28VDC, 9.5mmSQ, 9.6mm HIGH,	TELEDYNE LTD	172-5
TR1	28435/241	TRANSISTOR PNP BIPOLAR BCX17... 45V 100MHz 425mW 500mA 100hFE MIN @ 100mA, MARKING CODE T1, SURFACE	PHILIPS	BCX17
TR3	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE TYP @ 2mA, NOISE 2dB @ 1KHz, MARKING	PHILIPS	BC848B
TR4	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR5	28487/823	TRANSISTOR NPN BIPOLAR AT-64020... 20V 4.0GHz 200mA GAIN 10dB @ 2GHz, 28dBm O/P POWR, SURFACE	HEWLETT-PACKARD	AT-64020
TR6	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR7	28487/821	TRANSISTOR NPN BIPOLAR LTE21015R... 20V 2.1GHz 1.6W 450mA GAIN 8dB @ 2.1GHz, SURFACE MOUNTED,	PHILIPS	LTE21015R
	43137/318	RIBBON-LEAD 20 WAY , SOCKET 20 WAY, KEY POS 5, - **SKBR to filter wall**	IFR LTD.	

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.

AB3/4 Quadrupler board

Issue 21

When ordering, prefix circuit reference with AB3/4. This board must only be transported when enclosed within Packing Box 37136-647F.

	44829/646	Complete unit		
C1	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C2	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C3	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C4	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C5	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C6	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C7	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C8	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C9	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C10	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C11	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C12	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C13	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C14	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C15	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C16	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C17	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C18	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C19	26373/733	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
C101	26386/887	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	AVX LTD	1210-5C-104-KAT-00-J
C102	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C103	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C104	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB3/4 Quadrupler board (contd.)				
C105	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C106	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C107	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C108	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C109	26386/950	CAPACITOR-FIXED CERAMIC 1nF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5A-102-JAT-00-J
C110	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C111	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C112	26386/950	CAPACITOR-FIXED CERAMIC 1nF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5A-102-JAT-00-J
C113	26386/883	CAPACITOR-FIXED CERAMIC 47nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	SYFER TECHNOLOGY LTD	1210-J-050-0473K-X-T
C114	26386/883	CAPACITOR-FIXED CERAMIC 47nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	SYFER TECHNOLOGY LTD	1210-J-050-0473K-X-T
C115	26386/883	CAPACITOR-FIXED CERAMIC 47nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	SYFER TECHNOLOGY LTD	1210-J-050-0473K-X-T
C116	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C117	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C118	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C119	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C120	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C121	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C122	26386/883	CAPACITOR-FIXED CERAMIC 47nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	SYFER TECHNOLOGY LTD	1210-J-050-0473K-X-T
C123	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C124	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C125	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C126	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C127	26386/950	CAPACITOR-FIXED CERAMIC 1nF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5A-102-JAT-00-J
C128	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C129	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C130	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J

AB3/4 Quadrupler board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
C131	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C132	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C201	26386/950	CAPACITOR-FIXED CERAMIC 1nF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5A-102-JAT-00-J
C202	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C203	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C204	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C205	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C206	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C207	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C208	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C209	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C210	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C211	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C212	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C213	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C214	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C216	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C217	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C218	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C219	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C220	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C221	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C222	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C223	26386/950	CAPACITOR-FIXED CERAMIC 1nF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5A-102-JAT-00-J
C224	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C225	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J

AB3/4 Quadrupler board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
C226	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C227	26386/883	CAPACITOR-FIXED CERAMIC 47nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	SYFER TECHNOLOGY LTD	1210-J-050-0473K-X-T
C228	26386/883	CAPACITOR-FIXED CERAMIC 47nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	SYFER TECHNOLOGY LTD	1210-J-050-0473K-X-T
C229	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C230	26386/950	CAPACITOR-FIXED CERAMIC 1nF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5A-102-JAT-00-J
C231	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C232	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C233	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C234	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C235	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C236	26386/950	CAPACITOR-FIXED CERAMIC 1nF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5A-102-JAT-00-J
C237	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C238	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C239	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C240	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C241	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C242	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C301	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C302	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C303	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C304	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C305	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C306	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C307	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C308	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C309	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J

AB3/4 Quadrupler board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
C310	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C311	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C312	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C313	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C314	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C315	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C316	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C317	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C318	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C401	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C402	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C403	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C404	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C405	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C406	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C407	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C408	26386/883	CAPACITOR-FIXED CERAMIC 47nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	SYFER TECHNOLOGY LTD	1210-J-050-0473K-X-T
C409	26386/883	CAPACITOR-FIXED CERAMIC 47nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	SYFER TECHNOLOGY LTD	1210-J-050-0473K-X-T
C410	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C411	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C412	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C413	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C414	26386/883	CAPACITOR-FIXED CERAMIC 47nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	SYFER TECHNOLOGY LTD	1210-J-050-0473K-X-T
C415	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C416	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C417	26386/883	CAPACITOR-FIXED CERAMIC 47nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	SYFER TECHNOLOGY LTD	1210-J-050-0473K-X-T

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB3/4 Quadrupler board (contd.)				
C418	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C419	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C420	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C421	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C422	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C423	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C424	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C425	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C426	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C427	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C428	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C429	26386/950	CAPACITOR-FIXED CERAMIC 1nF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5A-102-JAT-00-J
C430	26386/950	CAPACITOR-FIXED CERAMIC 1nF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5A-102-JAT-00-J
C431	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C432	26343/784	CAPACITOR-FIXED CERAMIC 68pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-680-JAT-00-J
C433	26343/784	CAPACITOR-FIXED CERAMIC 68pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-680-JAT-00-J
C435	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C436	26386/830	CAPACITOR-FIXED CERAMIC 330pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-331-JAT-00-J
C437	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C438	26386/951	CAPACITOR-FIXED CERAMIC 47nF -20/+80% 50V Z5U/2F4 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5G-473-ZAT-00-J
D101	28383/902	DIODE SMALL-SIGNAL, BAW56... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON ANODE, MARKING CODE A1, SURFACE	PHILIPS	BAW56 (A1)
D103	28349/024	DIODE MIXER/DETECTOR, SCHOTTKY, DME3040... QUAD, 0.5pF 0.4Vf @ 1mA, S-BAND, MEDIUM-DRIVE, RING CCT,	ALPHA INDUSTRIES INC	DME3040-000/132-004
D104	28383/902	DIODE SMALL-SIGNAL, BAW56... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON ANODE, MARKING CODE A1, SURFACE	PHILIPS	BAW56 (A1)
D105	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB3/4 Quadrupler board (contd.)				
D106	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D107	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D108	28335/670	DIODE BAND SWITCHING, BAT18... 35V 100mA 1pF MAX @ 20V, 1.2Vf @ 100mA, MARKING CODE A2, SURFACE	PHILIPS	BAT18/T1
D109	28335/670	DIODE BAND SWITCHING, BAT18... 35V 100mA 1pF MAX @ 20V, 1.2Vf @ 100mA, MARKING CODE A2, SURFACE	PHILIPS	BAT18/T1
D201	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D202	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D203	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D204	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D205	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D206	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D207	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D208	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D209	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D211	28349/024	DIODE MIXER/DETECTOR, SCHOTTKY, DME3040... QUAD, 0.5pF 0.4Vf @ 1mA, S-BAND, MEDIUM-DRIVE, RING CCT,	ALPHA INDUSTRIES INC	DME3040-000/132-004
D212	28372/471	DIODE ZENER, BZX84-C15... 350mW 15V 5% 250mA MARKING CODE Y4, SURFACE MOUNTED, SOT-23, (TAPED).	PHILIPS	BZX84-C15
D213	28371/216	DIODE ZENER, BZX84-C3V3... 350mW 3.3V 5% 250mA MARKING CODE Z14/W6, SURFACE MOUNTED, SOT-23,	PHILIPS	BZX84-C3V3
D214	28371/216	DIODE ZENER, BZX84-C3V3... 350mW 3.3V 5% 250mA MARKING CODE Z14/W6, SURFACE MOUNTED, SOT-23,	PHILIPS	BZX84-C3V3
D301	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D302	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D303	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D304	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D305	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D306	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D307	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D308	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D309	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB3/4 Quadrupler board (contd.)				
D401	28372/471	DIODE ZENER, BZX84-C15... 350mW 15V 5% 250mA MARKING CODE Y4, SURFACE MOUNTED, SOT-23, (TAPED).	PHILIPS	BZX84-C15
D402	28335/670	DIODE BAND SWITCHING, BAT18... 35V 100mA 1pF MAX @ 20V, 1.2Vf @ 100mA, MARKING CODE A2, SURFACE	PHILIPS	BAT18/T1
D403	28383/902	DIODE SMALL-SIGNAL, BAW56... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON ANODE, MARKING CODE A1, SURFACE	PHILIPS	BAW56 (A1)
D404	28335/670	DIODE BAND SWITCHING, BAT18... 35V 100mA 1pF MAX @ 20V, 1.2Vf @ 100mA, MARKING CODE A2, SURFACE	PHILIPS	BAT18/T1
D405	28383/917	DIODE PIN, CSB7003-01... 100V 100mA 0.08pF MAX @ 50V/1MHz, THERMAL IMPEDANCE 80 DEG.C/W, SUBSTRATE	ALPHA INDUSTRIES INC	CSB7003-01/320-001
D406	28383/917	DIODE PIN, CSB7003-01... 100V 100mA 0.08pF MAX @ 50V/1MHz, THERMAL IMPEDANCE 80 DEG.C/W, SUBSTRATE	ALPHA INDUSTRIES INC	CSB7003-01/320-001
D407	28349/025	DIODE MIXER/DETECTOR, SCHOTTKY, 5082-2209... 125mW 4V MEDIUM BARRIER, STRIPLINE TYPE, X-BAND,	HEWLETT-PACKARD	5082-2209
D408	28349/022	DIODE SMALL-SIGNAL, SCHOTTKY, HSMS-2812... DUAL, 20V 1A 0.41Vf @ 1mA, IN SERIES, MARKING CODE B2,	HEWLETT-PACKARD	HSMS-2812-L31
D409	28335/670	DIODE BAND SWITCHING, BAT18... 35V 100mA 1pF MAX @ 20V, 1.2Vf @ 100mA, MARKING CODE A2, SURFACE	PHILIPS	BAT18/T1
D410	28371/216	DIODE ZENER, BZX84-C3V3... 350mW 3.3V 5% 250mA MARKING CODE Z14/W6, SURFACE MOUNTED, SOT-23,	PHILIPS	BZX84-C3V3
IC101	28465/056	IC-DIGITAL DECODER/DEMULTIPLEX 74HC139... 2 INPUT, 4 BIT, DUAL, INVERTING, 1 BIT ADDRESS,	PHILIPS	74HC139D
IC102	28461/413	IC-ANALOGUE OPERATIONAL AMP TL074... QUAD, JFET INPUT, LOW NOISE, SLEW RATE 8V/uS MIN, GAIN	MOTOROLA INC.	TL074CD
IC201	28461/413	IC-ANALOGUE OPERATIONAL AMP TL074... QUAD, JFET INPUT, LOW NOISE, SLEW RATE 8V/uS MIN, GAIN	MOTOROLA INC.	TL074CD
IC401	28461/676	IC-ANALOGUE COMPARATOR LM311... 2 INPUT, SINGLE, 15V I/P-OFFSET 7.5mV MAX, RESPONSE-TIME 200nS TYP,	PHILIPS	LM311D
IC402	28461/412	IC-ANALOGUE OPERATIONAL AMP TL072... DUAL, 18V UNITY GAIN BNDWDTH 3MHz, OFFSET VOLTAGE 10mV, SLEW	MOTOROLA INC.	TL072CD
L101	23642/500	INDUCTOR-FIXED 0.22uH +/- 20% MOULDED-EPOXY, 710mA 0R1 MAX, 40 Q @ 25.2 MHz, 150 MHz SRF, SURFACE	MEGGITT ELECTRONICS ,	3613-A-R22-M
L102	23642/500	INDUCTOR-FIXED 0.22uH +/- 20% MOULDED-EPOXY, 710mA 0R1 MAX, 40 Q @ 25.2 MHz, 150 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3613-A-R22-M
L103	23642/500	INDUCTOR-FIXED 0.22uH +/- 20% MOULDED-EPOXY, 710mA 0R1 MAX, 40 Q @ 25.2 MHz, 150 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3613-A-R22-M
L401	23642/500	INDUCTOR-FIXED 0.22uH +/- 20% MOULDED-EPOXY, 710mA 0R1 MAX, 40 Q @ 25.2 MHz, 150 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3613-A-R22-M
L402	23642/418	INDUCTOR-FIXED 0.1uH +/- 10% MOULDED-EPOXY, MINIATURE, 1.24A 0R08 MAX, 35 Q @ 25 MHz, 625 MHz	INTERCONNECTION PROD	550-3399-01-02-00
R101	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT

AB3/4 Quadrupler board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R102	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R103	24321/769	RESISTOR-FIXED METAL-GLAZE 680R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-681R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-6810-FT
R104	24321/815	RESISTOR-FIXED METAL-GLAZE 56K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-56K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-5622-FT
R105	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R106	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R107	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R108	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R109	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R110	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R111	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R114	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R115	24321/731	RESISTOR-FIXED METAL-GLAZE 18R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-18R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-18R2-FT
R116	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R117	24321/760	RESISTOR-FIXED METAL-GLAZE 300R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-301R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3010-FT
R118	24331/961	RESISTOR-FIXED CARBON-COMPOSITION 180R +/- 5% 125mW 150V AXIAL, (LOOSE OR TAPED).	ALLEN-BRADLEY ELECT.	BB1815
R119	24321/745	RESISTOR-FIXED METAL-GLAZE 68R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-68R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-68R1-FT
R120	24321/745	RESISTOR-FIXED METAL-GLAZE 68R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-68R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-68R1-FT
R121	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R122	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R123	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R124	24321/801	RESISTOR-FIXED METAL-GLAZE 15K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-15K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1502-FT
R125	24321/780	RESISTOR-FIXED METAL-GLAZE 2K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2001-FT
R126	24321/803	RESISTOR-FIXED METAL-GLAZE 18K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-18K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1822-FT
R127	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R128	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R129	24321/777	RESISTOR-FIXED METAL-GLAZE 1K5 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K50-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1501-FT

AB3/4 Quadrupler board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R130	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R131	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R132	24321/777	RESISTOR-FIXED METAL-GLAZE 1K5 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K50-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1501-FT
R133	24321/767	RESISTOR-FIXED METAL-GLAZE 560R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-562R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-5620-FT
R134	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R135	24321/811	RESISTOR-FIXED METAL-GLAZE 39K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-39K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3922-FT
R136	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R137	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R138	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R139	24321/777	RESISTOR-FIXED METAL-GLAZE 1K5 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K50-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1501-FT
R140	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R141	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R142	24331/961	RESISTOR-FIXED CARBON-COMPOSITION 180R +/- 5% 125mW 150V AXIAL, (LOOSE OR TAPED).	ALLEN-BRADLEY ELECT.	BB1815
R143	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R144	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R145	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R146	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R147	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R148	24321/803	RESISTOR-FIXED METAL-GLAZE 18K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-18K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1822-FT
R149	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R150	24321/790	RESISTOR-FIXED METAL-GLAZE 5K1 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-5K11-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-5111-FT
R151	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R152	24681/085	RESISTOR-FIXED METAL-GLAZE 68R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-68R-5%-P4
R153	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R154	24331/998	RESISTOR-FIXED CARBON-COMPOSITION 120R +/- 5% 125mW 150V AXIAL, (LOOSE OR TAPED).	ALLEN-BRADLEY ELECT.	BB1215
R155	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT

AB3/4 Quadrupler board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R156	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R157	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R158	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R159	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R160	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R161	24321/760	RESISTOR-FIXED METAL-GLAZE 300R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-301R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3010-FT
R162	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R201	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R202	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R203	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R204	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R205	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R206	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R207	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R208	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R209	24321/751	RESISTOR-FIXED METAL-GLAZE 120R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-121R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1210-FT
R210	24321/751	RESISTOR-FIXED METAL-GLAZE 120R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-121R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1210-FT
R211	24321/751	RESISTOR-FIXED METAL-GLAZE 120R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-121R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1210-FT
R212	24321/751	RESISTOR-FIXED METAL-GLAZE 120R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-121R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1210-FT
R213	24321/751	RESISTOR-FIXED METAL-GLAZE 120R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-121R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1210-FT
R214	24321/751	RESISTOR-FIXED METAL-GLAZE 120R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-121R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1210-FT
R215	24321/751	RESISTOR-FIXED METAL-GLAZE 120R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-121R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1210-FT
R216	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R217	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R218	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R219	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT

AB3/4 Quadrupler board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R220	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R221	24331/961	RESISTOR-FIXED CARBON-COMPOSITION 180R +/- 5% 125mW 150V AXIAL, (LOOSE OR TAPED).	ALLEN-BRADLEY ELECT.	BB1815
R222	24681/085	RESISTOR-FIXED METAL-GLAZE 68R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-68R-5%-P4
R223	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R224	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R225	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R228	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R229	24321/731	RESISTOR-FIXED METAL-GLAZE 18R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-18R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-18R2-FT
R230	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R231	24321/761	RESISTOR-FIXED METAL-GLAZE 330R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-332R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3320-FT
R232	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R233	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R234	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R235	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R236	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R237	24321/745	RESISTOR-FIXED METAL-GLAZE 68R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-68R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-68R1-FT
R238	24321/745	RESISTOR-FIXED METAL-GLAZE 68R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-68R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-68R1-FT
R239	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R240	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R241	24321/805	RESISTOR-FIXED METAL-GLAZE 22K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-22K1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2212-FT
R242	24321/790	RESISTOR-FIXED METAL-GLAZE 5K1 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-5K11-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-5111-FT
R243	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R244	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R245	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R246	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R247	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT

AB3/4 Quadrupler board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R248	24321/813	RESISTOR-FIXED METAL-GLAZE 47K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47K5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4752-FT
R249	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R250	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R251	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R252	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R253	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R254	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R255	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R256	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R257	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R258	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R259	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R260	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R261	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R262	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R263	24321/813	RESISTOR-FIXED METAL-GLAZE 47K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47K5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4752-FT
R264	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R265	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R266	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R267	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R268	24321/745	RESISTOR-FIXED METAL-GLAZE 68R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-68R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-68R1-FT
R269	24321/745	RESISTOR-FIXED METAL-GLAZE 68R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-68R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-68R1-FT
R301	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R302	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R303	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R304	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT

AB3/4 Quadrupler board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R305	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R306	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R307	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R308	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R309	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R310	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R311	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R312	24321/751	RESISTOR-FIXED METAL-GLAZE 120R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-121R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1210-FT
R313	24321/760	RESISTOR-FIXED METAL-GLAZE 300R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-301R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3010-FT
R314	24321/730	RESISTOR-FIXED METAL-GLAZE 16R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-16R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-16R2-FT
R315	24321/760	RESISTOR-FIXED METAL-GLAZE 300R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-301R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3010-FT
R316	24321/751	RESISTOR-FIXED METAL-GLAZE 120R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-121R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1210-FT
R317	24321/751	RESISTOR-FIXED METAL-GLAZE 120R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-121R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1210-FT
R318	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R319	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R401	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R402	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R403	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R404	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R405	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R406	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R407	24321/730	RESISTOR-FIXED METAL-GLAZE 16R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-16R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-16R2-FT
R408	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R409	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R410	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R412	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT

AB3/4 Quadrupler board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R413	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R415	24321/763	RESISTOR-FIXED METAL-GLAZE 390R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-392R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3920-FT
R416	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R417	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R418	24321/787	RESISTOR-FIXED METAL-GLAZE 3K9 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K92-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3921-FT
R419	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R420	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R421	24321/755	RESISTOR-FIXED METAL-GLAZE 180R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-182R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1820-FT
R422	24681/086	RESISTOR-FIXED METAL-GLAZE 8R2 +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CRCW-2512-8R2-J-RT2
R423	24321/745	RESISTOR-FIXED METAL-GLAZE 68R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-68R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-68R1-FT
R424	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R425	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R426	24321/757	RESISTOR-FIXED METAL-GLAZE 220R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-221R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2210-FT
R427	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R428	24321/787	RESISTOR-FIXED METAL-GLAZE 3K9 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K92-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3921-FT
R429	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R430	24321/787	RESISTOR-FIXED METAL-GLAZE 3K9 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K92-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3921-FT
R431	24321/755	RESISTOR-FIXED METAL-GLAZE 180R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-182R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1820-FT
R432	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R433	24681/087	RESISTOR-FIXED METAL-GLAZE 5R6 +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CRCW-2512-5R6-J-RT2
R434	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R435	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R436	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R437	24321/751	RESISTOR-FIXED METAL-GLAZE 120R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-121R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1210-FT
R438	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R439	24321/751	RESISTOR-FIXED METAL-GLAZE 120R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-121R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1210-FT

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB3/4 Quadrupler board (contd.)				
R440	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R441	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R442	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R443	24321/833	RESISTOR-FIXED METAL-GLAZE 330K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-332K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3323-FT
R444	24321/741	RESISTOR-FIXED METAL-GLAZE 47R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-47R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-47R5-FT
R445	24321/809	RESISTOR-FIXED METAL-GLAZE 33K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3322-FT
R446	24321/608	RESISTOR-FIXED METAL-GLAZE 10M +/- 10% 125mW 200V 500 ppm/DEG.C, SURFACE MOUNTED, SIZE 1206, (LOOSE	PANASONIC INDUSTRIAL	ERJ-8GEK106V
R447	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R448	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R449	24321/809	RESISTOR-FIXED METAL-GLAZE 33K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3322-FT
R450	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R451	24321/760	RESISTOR-FIXED METAL-GLAZE 300R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-301R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3010-FT
R452	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R453	24321/815	RESISTOR-FIXED METAL-GLAZE 56K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-56K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-5622-FT
R454	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
RLA	23486/101	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 5V COIL, 62R - CONTACTS 1A @ 28VDC, 9.5mmSQ, 9.6mm HIGH,	TELEDYNE LTD	172-5
RLB	23486/101	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 5V COIL, 62R - CONTACTS 1A @ 28VDC, 9.5mmSQ, 9.6mm HIGH,	TELEDYNE LTD	172-5
RLC	23486/101	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 5V COIL, 62R - CONTACTS 1A @ 28VDC, 9.5mmSQ, 9.6mm HIGH,	TELEDYNE LTD	172-5
RLD	23486/156	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 5V COIL, 100R - CONTACTS 1A @ 28VDC, 200mA @ 115VAC, PCB	TELEDYNE LTD	732-5
T101	43590/209	WOUND-PART TRANSFORMER, RING-CORE, 12:12 TURNS, TWISTED BIFILAR WOUND, UNMOUNTED.	AMETHYST DESIGNS LTD	AD5118
T201	43590/228	WOUND-PART TRANSFORMER, RING-CORE, 7:7 TURNS, TWISTED BIFILAR WOUND, UNMOUNTED.	AMETHYST DESIGNS LTD	AD5282

AB3/4 Quadrupler board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
TR101	28487/811	TRANSISTOR NPN BIPOLAR BC818-40... 25V 170MHz 330mW 500mA 250hFE MIN @ 100mA, MARKING CODE 6G,	PHILIPS	BC818-40
TR102	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR103	28435/241	TRANSISTOR PNP BIPOLAR BCX17... 45V 100MHz 425mW 500mA 100hFE MIN @ 100mA, MARKING CODE T1, SURFACE	PHILIPS	BCX17
TR104	28435/241	TRANSISTOR PNP BIPOLAR BCX17... 45V 100MHz 425mW 500mA 100hFE MIN @ 100mA, MARKING CODE T1, SURFACE	PHILIPS	BCX17
TR105	28487/807	TRANSISTOR NPN BIPOLAR 42085... 12V 6GHz 500mW 80mA 30hFE @ 35mA, 20dBm, SURFACE MOUNTED,	HEWLETT-PACKARD	AT-42085
TR106	28487/807	TRANSISTOR NPN BIPOLAR 42085... 12V 6GHz 500mW 80mA 30hFE @ 35mA, 20dBm, SURFACE MOUNTED,	HEWLETT-PACKARD	AT-42085
TR107	28487/811	TRANSISTOR NPN BIPOLAR BC818-40... 25V 170MHz 330mW 500mA 250hFE MIN @ 100mA, MARKING CODE 6G,	PHILIPS	BC818-40
TR108	28487/811	TRANSISTOR NPN BIPOLAR BC818-40... 25V 170MHz 330mW 500mA 250hFE MIN @ 100mA, MARKING CODE 6G,	PHILIPS	BC818-40
TR109	28435/241	TRANSISTOR PNP BIPOLAR BCX17... 45V 100MHz 425mW 500mA 100hFE MIN @ 100mA, MARKING CODE T1, SURFACE	PHILIPS	BCX17
TR110	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR111	28487/823	TRANSISTOR NPN BIPOLAR AT-64020... 20V 4.0GHz 200mA GAIN 10dB @ 2GHz, 28dBm O/P POWR, SURFACE	HEWLETT-PACKARD	AT-64020
TR201	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR202	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR203	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR204	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR205	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR206	28487/823	TRANSISTOR NPN BIPOLAR AT-64020... 20V 4.0GHz 200mA GAIN 10dB @ 2GHz, 28dBm O/P POWR, SURFACE	HEWLETT-PACKARD	AT-64020
TR207	28459/211	TRANSISTOR GALLIUM-ARSENIDE MESFET ATF10736... 5V 0.5-12GHz, 100mW 130mA 12.5dB GAIN,	HEWLETT-PACKARD	ATF-10736
TR208	28459/211	TRANSISTOR GALLIUM-ARSENIDE MESFET ATF10736... 5V 0.5-12GHz, 100mW 130mA 12.5dB GAIN,	HEWLETT-PACKARD	ATF-10736
TR209	28459/211	TRANSISTOR GALLIUM-ARSENIDE MESFET ATF10736... 5V 0.5-12GHz, 100mW 130mA 12.5dB GAIN,	HEWLETT-PACKARD	ATF-10736
TR210	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR211	28435/241	TRANSISTOR PNP BIPOLAR BCX17... 45V 100MHz 425mW 500mA 100hFE MIN @ 100mA, MARKING CODE T1, SURFACE	PHILIPS	BCX17
TR301	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR302	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR303	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR304	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB3/4 Quadrupler board (contd.)				
TR305	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR401	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR402	28459/211	TRANSISTOR GALLIUM-ARSENIDE MESFET ATF10736... 5V 0.5-12GHz, 100mW 130mA 12.5dB GAIN,	HEWLETT-PACKARD	ATF-10736
TR403	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR404	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR405	28435/238	TRANSISTOR PNP BIPOLAR BD136... 45V 75MHz 8W 1.5A 25hFE @ 5mA, TO-126.	PHILIPS	BD136
TR406	28459/207	TRANSISTOR GALLIUM-ARSENIDE FET ATF-45101... 9V 2-8GHz 3.6W 9dB GAIN @ 4GHz, 28dBm O/P PWR @ 4GHz,	HEWLETT-PACKARD	ATF-45101
TR407	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR408	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE MIN @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR409	28435/238	TRANSISTOR PNP BIPOLAR BD136... 45V 75MHz 8W 1.5A 25hFE @ 5mA, TO-126.	PHILIPS	BD136
TR410	28459/206	TRANSISTOR GALLIUM-ARSENIDE FET STF91-3078... 3V 2-8GHz 1W SPECIAL IFR SELECTED WAFER F10-1059C,	HEWLETT-PACKARD	STF 91-3078
	43137/318	RIBBON-LEAD 20 WAY , SOCKET 20 WAY, KEY POS 5, - **SKBR to PLBL, AB2/2**	IFR LTD.	
	43137/962	RF-CABLE SEMI-RIGID UT85, 50 OHMS, UNTERMINATED **AREA 1 to AREA 2**	IFR LTD.	

AB3/5 Frequency doubler board

Issue 16

When ordering, prefix circuit reference with AB3/5.

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
	44829/772	Complete unit		
C1	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C2	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C3	26386/838	CAPACITOR-FIXED CERAMIC 1.5nF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	SYFER TECHNOLOGY LTD	1210-J-050-0152J-C-T
C4	26386/838	CAPACITOR-FIXED CERAMIC 1.5nF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	SYFER TECHNOLOGY LTD	1210-J-050-0152J-C-T
C5	26386/883	CAPACITOR-FIXED CERAMIC 47nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	SYFER TECHNOLOGY LTD	1210-J-050-0473K-X-T
C6	26386/883	CAPACITOR-FIXED CERAMIC 47nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	SYFER TECHNOLOGY LTD	1210-J-050-0473K-X-T
C7	26451/002	CAPACITOR-FIXED ALUMINIUM 4.7uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 4.3 x 4.3mm,	PANASONIC INDUSTRIAL	ECE-V-1VA-4R7R
C8	26451/002	CAPACITOR-FIXED ALUMINIUM 4.7uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 4.3 x 4.3mm,	PANASONIC INDUSTRIAL	ECE-V-1VA-4R7R
C9	26386/950	CAPACITOR-FIXED CERAMIC 1nF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5A-102-JAT-00-J
C10	26386/950	CAPACITOR-FIXED CERAMIC 1nF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	AVX LTD	1206-5A-102-JAT-00-J
C11	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C12	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C13	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C14	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C15	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C16	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C17	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C18	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C19	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C20	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C21	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C24	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C25	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C26	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J

AB3/5 Frequency doubler board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
C27	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C28	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C29	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C30	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C31	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C32	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C33	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C34	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C35	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C36	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C37	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C38	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C39	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C41	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-220-JAT-00-J
C44	26343/784	CAPACITOR-FIXED CERAMIC 68pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-680-JAT-00-J
C45	26343/784	CAPACITOR-FIXED CERAMIC 68pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-680-JAT-00-J
C46	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C47	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C50	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C51	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C53	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C54	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C55	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C56	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C57	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C58	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB3/5 Frequency doubler board (contd.)				
C59	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C61	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C62	26386/883	CAPACITOR-FIXED CERAMIC 47nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	SYFER TECHNOLOGY LTD	1210-J-050-0473K-X-T
C63	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C64	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C65	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C66	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C67	26386/800	CAPACITOR-FIXED CERAMIC 1pF +/-0.5pF 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-1R0-DAT-00-J
C68	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C69	26343/755	CAPACITOR-FIXED CERAMIC 1.5pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-1R5-DAT-00-J
D1	28335/670	DIODE BAND SWITCHING, BAT18... 35V 100mA 1pF MAX @ 20V, 1.2Vf @ 100mA, MARKING CODE A2, SURFACE	PHILIPS	BAT18/T1
D2	28335/670	DIODE BAND SWITCHING, BAT18... 35V 100mA 1pF MAX @ 20V, 1.2Vf @ 100mA, MARKING CODE A2, SURFACE	PHILIPS	BAT18/T1
D3	28371/602	DIODE ZENER, BZX79-C7V5... 500mW 7.5V 5% 250mA AXIAL, DO-35, (TAPED).	PHILIPS	BZX79-C7V5
D4	28371/602	DIODE ZENER, BZX79-C7V5... 500mW 7.5V 5% 250mA AXIAL, DO-35, (TAPED).	PHILIPS	BZX79-C7V5
D5	28349/024	DIODE MIXER/DETECTOR, SCHOTTKY, DME3040... QUAD, 0.5pF 0.4Vf @ 1mA, S-BAND, MEDIUM-DRIVE, RING CCT,	ALPHA INDUSTRIES INC	DME3040-000/132-004
D7	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D8	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D9	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D10	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D11	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D12	28383/962	DIODE PIN, BAR60... TRIPLE, 100V 0.25pF 1.05Vf @ 100mA, T-CIRCUIT, MARKING CODE 60, SURFACE	SIEMENS LTD	BAR60
D16	28383/902	DIODE SMALL-SIGNAL, BAW56... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON ANODE, MARKING CODE A1, SURFACE	PHILIPS	BAW56 (A1)
D17	28349/022	DIODE SMALL-SIGNAL, SCHOTTKY, HSMS-2812... DUAL, 20V 1A 0.41Vf @ 1mA, IN SERIES, MARKING CODE B2,	HEWLETT-PACKARD	HSMS-2812-L31
D19	28349/025	DIODE MIXER/DETECTOR, SCHOTTKY, 5082-2209... 125mW 4V MEDIUM BARRIER, STRIPLINE TYPE, X-BAND,	HEWLETT-PACKARD	5082-2209
IC1	28461/388	IC-ANALOGUE OPERATIONAL AMP LM324D... QUAD, GEN-PURPOSE, SLEW RATE 0.2V/uS MIN, GAIN BANDWIDTH	PHILIPS	LM324D

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB3/5 Frequency doubler board (contd.)				
IC2	28461/388	IC-ANALOGUE OPERATIONAL AMP LM324D... QUAD, GEN-PURPOSE, SLEW RATE 0.2V/uS MIN, GAIN BANDWIDTH	PHILIPS	LM324D
IC3	28465/056	IC-DIGITAL DECODER/DEMULTIPLEX 74HC139... 2 INPUT, 4 BIT, DUAL, INVERTING, 1 BIT ADDRESS,	PHILIPS	74HC139D
IC4	28461/388	IC-ANALOGUE OPERATIONAL AMP LM324D... QUAD, GEN-PURPOSE, SLEW RATE 0.2V/uS MIN, GAIN BANDWIDTH	PHILIPS	LM324D
IC5	28461/412	IC-ANALOGUE OPERATIONAL AMP TL072... DUAL, 18V UNITY GAIN BNDWDTH 3MHz, OFFSET VOLTAGE 10mV, SLEW	MOTOROLA INC.	TL072CD
L10	23642/423	INDUCTOR-FIXED 10uH +/- 10% MOULDED-EPOXY, MINIATURE, 180mA 3R7 MAX, 55 Q @ 7.9 MHz, 46 MHz	INTERCONNECTION PROD	550-3399-25-02-00
L11	23642/423	INDUCTOR-FIXED 10uH +/- 10% MOULDED-EPOXY, MINIATURE, 180mA 3R7 MAX, 55 Q @ 7.9 MHz, 46 MHz	INTERCONNECTION PROD	550-3399-25-02-00
L12	23642/418	INDUCTOR-FIXED 0.1uH +/- 10% MOULDED-EPOXY, MINIATURE, 1.24A 0R08 MAX, 35 Q @ 25 MHz, 625 MHz	INTERCONNECTION PROD	550-3399-01-02-00
L13	23642/418	INDUCTOR-FIXED 0.1uH +/- 10% MOULDED-EPOXY, MINIATURE, 1.24A 0R08 MAX, 35 Q @ 25 MHz, 625 MHz	INTERCONNECTION PROD	550-3399-01-02-00
L14	23642/500	INDUCTOR-FIXED 0.22uH +/- 20% MOULDED-EPOXY, 710mA 0R1 MAX, 40 Q @ 25.2 MHz, 150 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3613-A-R22-M
R1	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R2	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R3	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R4	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R5	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R6	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R7	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R8	24338/006	RESISTOR-FIXED METAL-GLAZE 220R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-220R-5%-P4
R9	24764/702	RESISTOR-FIXED METAL-FILM 180R +/- 2% 400mW 200V 50 ppm/DEG.C, LOW-INDUCTANCE, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204HF-50-180R-2%
R10	24321/805	RESISTOR-FIXED METAL-GLAZE 22K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-22K1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2212-FT
R11	24321/745	RESISTOR-FIXED METAL-GLAZE 68R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-68R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-68R1-FT
R12	24321/745	RESISTOR-FIXED METAL-GLAZE 68R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-68R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-68R1-FT
R13	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R14	24321/731	RESISTOR-FIXED METAL-GLAZE 18R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-18R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-18R2-FT
R15	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT

AB3/5 Frequency doubler board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R16	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R17	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R18	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R21	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R22	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R23	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R24	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R25	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R26	24338/002	RESISTOR-FIXED METAL-GLAZE 100R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-100R-5%-P4
R27	24764/702	RESISTOR-FIXED METAL-FILM 180R +/- 2% 400mW 200V 50 ppm/DEG.C, LOW-INDUCTANCE, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204HF-50-180R-2%
R28	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R29	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R30	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R31	24321/805	RESISTOR-FIXED METAL-GLAZE 22K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-22K1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2212-FT
R32	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R33	24764/702	RESISTOR-FIXED METAL-FILM 180R +/- 2% 400mW 200V 50 ppm/DEG.C, LOW-INDUCTANCE, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204HF-50-180R-2%
R34	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R35	24321/796	RESISTOR-FIXED METAL-GLAZE 9K1 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-9K09-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-9091-FT
R36	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R37	24321/809	RESISTOR-FIXED METAL-GLAZE 33K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3322-FT
R38	24321/837	RESISTOR-FIXED METAL-GLAZE 470K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4753-FT
R39	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R40	24321/740	RESISTOR-FIXED METAL-GLAZE 43R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-43R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-43R2-FT
R41	24681/528	RESISTOR-NETWORK ISOLATED, THICK-FILM, 10K 2% 600mW 50V 200 ppm/DEG.C, 8 RESISTORS, SURFACE	VISHAY COMPONENTS	836C-103-X2-SR
R42	24321/735	RESISTOR-FIXED METAL-GLAZE 27R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-27R4-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-27R4-FT
R43	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT

AB3/5 Frequency doubler board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R44	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R45	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R46	24681/526	RESISTOR-NETWORK ISOLATED, THICK-FILM, 100R 2% 500mW 25V 200 ppm/DEG.C, 7 RESISTORS, SURFACE	VISHAY COMPONENTS	834C-101-X2-SR
R48	24321/733	RESISTOR-FIXED METAL-GLAZE 22R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-22R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-22R1-FT
R49	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R50	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R51	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R52	24321/740	RESISTOR-FIXED METAL-GLAZE 43R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-43R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-43R2-FT
R53	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R54	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R55	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R56	24321/750	RESISTOR-FIXED METAL-GLAZE 110R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-110R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1100-FT
R57	24321/745	RESISTOR-FIXED METAL-GLAZE 68R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-68R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-68R1-FT
R58	24321/745	RESISTOR-FIXED METAL-GLAZE 68R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-68R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-68R1-FT
R61	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R63	24764/702	RESISTOR-FIXED METAL-FILM 180R +/- 2% 400mW 200V 50 ppm/DEG.C, LOW-INDUCTANCE, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204HF-50-180R-2%
R64	24338/006	RESISTOR-FIXED METAL-GLAZE 220R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-220R-5%-P4
R65	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R66	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R67	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R68	24321/737	RESISTOR-FIXED METAL-GLAZE 33R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33R2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-33R2-FT
R72	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R73	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R76	24321/760	RESISTOR-FIXED METAL-GLAZE 300R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-301R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3010-FT
R77	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R78	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%

REPLACEABLE PARTS

AB3/5 Frequency doubler board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R79	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R80	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R81	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R82	24321/735	RESISTOR-FIXED METAL-GLAZE 27R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-27R4-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-27R4-FT
R83	24321/751	RESISTOR-FIXED METAL-GLAZE 120R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-121R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1210-FT
R84	24321/753	RESISTOR-FIXED METAL-GLAZE 150R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1500-FT
R85	24321/751	RESISTOR-FIXED METAL-GLAZE 120R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-121R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1210-FT
R86	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R87	24321/733	RESISTOR-FIXED METAL-GLAZE 22R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-22R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-22R1-FT
R88	24321/815	RESISTOR-FIXED METAL-GLAZE 56K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-56K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-5622-FT
RLA	23486/101	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 5V COIL, 62R - CONTACTS 1A @ 28VDC, 9.5mmSQ, 9.6mm HIGH,	TELEDYNE LTD	172-5
RLB	23486/101	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 5V COIL, 62R - CONTACTS 1A @ 28VDC, 9.5mmSQ, 9.6mm HIGH,	TELEDYNE LTD	172-5
RLC	23486/101	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 5V COIL, 62R - CONTACTS 1A @ 28VDC, 9.5mmSQ, 9.6mm HIGH,	TELEDYNE LTD	172-5
RLD	23486/101	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 5V COIL, 62R - CONTACTS 1A @ 28VDC, 9.5mmSQ, 9.6mm HIGH,	TELEDYNE LTD	172-5
TR1	28487/807	TRANSISTOR NPN BIPOLAR 42085... 12V 6GHz 500mW 80mA 30hFE @ 35mA, 20dBm, SURFACE MOUNTED,	HEWLETT-PACKARD	AT-42085
TR2	28487/823	TRANSISTOR NPN BIPOLAR AT-64020... 20V 4.0GHz 200mA GAIN 10dB @ 2GHz, 28dBm O/P POWR, SURFACE	HEWLETT-PACKARD	AT-64020
TR3	28487/822	TRANSISTOR NPN BIPOLAR LTE42005S... 18V 4.2GHz 550mW 110mA 7.2dB, SURFACE MOUNTED, CASE-FO-41B.	PHILIPS	LTE42005S
TR4	28435/241	TRANSISTOR PNP BIPOLAR BCX17... 45V 100MHz 425mW 500mA 100hFE MIN @ 100mA, MARKING CODE T1, SURFACE	PHILIPS	BCX17
TR5	28435/241	TRANSISTOR PNP BIPOLAR BCX17... 45V 100MHz 425mW 500mA 100hFE MIN @ 100mA, MARKING CODE T1, SURFACE	PHILIPS	BCX17
TR6	28487/811	TRANSISTOR NPN BIPOLAR BC818-40... 25V 170MHz 330mW 500mA 250hFE MIN @ 100mA, MARKING CODE 6G,	PHILIPS	BC818-40
TR7	28487/807	TRANSISTOR NPN BIPOLAR 42085... 12V 6GHz 500mW 80mA 30hFE @ 35mA, 20dBm, SURFACE MOUNTED,	HEWLETT-PACKARD	AT-42085
TR8	28487/811	TRANSISTOR NPN BIPOLAR BC818-40... 25V 170MHz 330mW 500mA 250hFE MIN @ 100mA, MARKING CODE 6G,	PHILIPS	BC818-40
	43590/209	WOUND-PART TRANSFORMER, RING-CORE, 12:12 TURNS, TWISTED BIFILAR WOUND, UNMOUNTED.	IFR LTD	
	43137/318	RIBBON-LEAD 20 WAY, SOCKET 20 WAY, KEY POS 5,- **SKBR TO PLBL OR TO FILTER WALL**	IFR LTD	

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.

AB4/1 Beat frequency oscillator board

Issue 04

When ordering, prefix circuit reference with AB4/1.

	44829/697	Complete unit		
C1	26343/486	CAPACITOR-FIXED CERAMIC 5.6pF +/-0.25pF 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-956-CAK-ACR-J
C2	26343/577	CAPACITOR-FIXED CERAMIC 39pF +/-5% 100V COG/NP0 MULTILAYER, RADIAL, 2.5mm PWP, (LOOSE OR TAPED).	AVX LTD	SR15-1A-390-JAA
C3	26343/578	CAPACITOR-FIXED CERAMIC 47pF +/-5% 100V COG, MULTILAYER, RADIAL, 2.5mm PWP, (LOOSE OR TAPED).	AVX LTD	SR15-1A-470-JAA
C4	26343/576	CAPACITOR-FIXED CERAMIC 27pF +/-5% 100V NP0 MULTILAYER, RADIAL, 2.5mm PWP, (TAPED).	AVX LTD	SR15-1A270-JAA-TR
C5	26343/486	CAPACITOR-FIXED CERAMIC 5.6pF +/-0.25pF 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-956-CAK-ACR-J
C6	26343/432	CAPACITOR-FIXED CERAMIC 150pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	RPO-151-GAK-ACR-J
C7	26343/438	CAPACITOR-FIXED CERAMIC 120pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-121-GAK-ACR-J
C8	26343/431	CAPACITOR-FIXED CERAMIC 82pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-820-GAK-ACR-J
C9	26343/433	CAPACITOR-FIXED CERAMIC 47pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-470-GAK-ACR-J
C10	26343/431	CAPACITOR-FIXED CERAMIC 82pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-820-GAK-ACR-J
C11	26343/499	CAPACITOR-FIXED CERAMIC 27pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-270-GAK-ACR-J
C12	26343/493	CAPACITOR-FIXED CERAMIC 15pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-150-GAK-ACR-J
C13	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C14	26343/489	CAPACITOR-FIXED CERAMIC 22pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-220-GAK-ACR-J
C15	26383/591	CAPACITOR-FIXED CERAMIC 4.7nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51472
C16	26486/233	CAPACITOR-FIXED TANTALUM 47uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	AVX LTD	TAG-47-M-16-CRW
C17	26486/233	CAPACITOR-FIXED TANTALUM 47uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	AVX LTD	TAG-47-M-16-CRW
C18	26486/233	CAPACITOR-FIXED TANTALUM 47uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	AVX LTD	TAG-47-M-16-CRW
C19	26486/233	CAPACITOR-FIXED TANTALUM 47uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	AVX LTD	TAG-47-M-16-CRW
C20	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C21	26486/233	CAPACITOR-FIXED TANTALUM 47uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	AVX LTD	TAG-47-M-16-CRW
C22	26486/233	CAPACITOR-FIXED TANTALUM 47uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	AVX LTD	TAG-47-M-16-CRW
C23	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C24	26421/122	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEB-100/35

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB4/1	**Beat frequency oscillator board (contd.)**			
C25	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C26	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C27	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C28	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C29	26421/115	CAPACITOR-FIXED ALUMINIUM 33uF +/-20% 25V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1E-K-330-B
C30	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
D1	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
L2	23642/046	INDUCTOR-FIXED 0.068uH +/- 10% MOULDED-EPOXY, MINIATURE, 1.94A 0R055 MAX, 33 Q @ 25 MHz, 900 MHz	INTERCONNECTION PROD	551-5172-07-02-00
L3	23642/045	INDUCTOR-FIXED 0.056uH +/- 10% MOULDED-EPOXY, MINIATURE, 2.08A 0R048 MAX, 33 Q @ 25 MHz, 990 MHz	INTERCONNECTION PROD	551-5172-06-02-00
L4	23642/042	INDUCTOR-FIXED 0.033uH +/- 10% MOULDED-EPOXY, MINIATURE, 2.8A 0R0255 MAX, 33 Q @ 30 MHz, 1.175K	INTERCONNECTION PROD	551-5172-03-02-00
L11	23642/552	INDUCTOR-FIXED 3.3uH +/- 10% COATED-LACQUER, MINIATURE, 350mA 1R6 MAX, 32 Q @ 7.9 MHz, 115 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/016
L12	44291/019	WOUND-PART INDUCTOR, 6.5mH, POT-CORE, RM6, 200 TURNS, LABELLED.	AMETHYST DESIGNS LTD	AD5244
L15	23642/422	INDUCTOR-FIXED 0.68uH +/- 10% MOULDED-EPOXY, MINIATURE, 450mA 0R6 MAX, 28 Q @ 25 MHz, 250 MHz	INTERCONNECTION PROD	550-3399-11-02-00
PLBM	23435/188	TERMINAL CONNECTOR-PIN, 0.64mm SQUARE, 5.97mm HIGH, PCB-MOUNTING, SINGLE-ENDED, PHOSPHOR BRONZE,	DU PONT (UK) LTD	75401-001
PLBV	23435/188	TERMINAL CONNECTOR-PIN, 0.64mm SQUARE, 5.97mm HIGH, PCB-MOUNTING, SINGLE-ENDED, PHOSPHOR BRONZE,	DU PONT (UK) LTD	75401-001
R1	24772/043	RESISTOR-FIXED METAL-FILM 56R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-56R-2%
R2	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R3	24772/043	RESISTOR-FIXED METAL-FILM 56R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-56R-2%
R4	24772/042	RESISTOR-FIXED METAL-FILM 51R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-51R-2%
R5	24772/085	RESISTOR-FIXED METAL-FILM 3K3 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-3K3-2%

AB4/1 Beat frequency oscillator board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R6	24772/079	RESISTOR-FIXED METAL-FILM 1K8 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K8-2%
R7	24772/037	RESISTOR-FIXED METAL-FILM 33R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-33R-2%
R8	24772/054	RESISTOR-FIXED METAL-FILM 160R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-160R-2%
R9	24772/054	RESISTOR-FIXED METAL-FILM 160R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-160R-2%
R10	24772/080	RESISTOR-FIXED METAL-FILM 2K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K-2%
R11	24772/067	RESISTOR-FIXED METAL-FILM 560R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-560R-2%
R12	24772/062	RESISTOR-FIXED METAL-FILM 360R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-360R-2%
R13	24573/047	RESISTOR-FIXED METAL-OXIDE 82R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	TR5-82R-2%
R14	24772/025	RESISTOR-FIXED METAL-FILM 10R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10R-2%
R15	24773/239	RESISTOR-FIXED METAL-FILM 39R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-39R-G-T-1
R16	24772/070	RESISTOR-FIXED METAL-FILM 750R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-750R-2%
R17	24772/099	RESISTOR-FIXED METAL-FILM 12K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-12K-2%
R18	24772/025	RESISTOR-FIXED METAL-FILM 10R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10R-2%
R19	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R20	24772/061	RESISTOR-FIXED METAL-FILM 330R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-330R-2%
R21	24772/017	RESISTOR-FIXED METAL-FILM 4R7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-4R7-2%
R22	24772/017	RESISTOR-FIXED METAL-FILM 4R7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-4R7-2%
R23	24772/025	RESISTOR-FIXED METAL-FILM 10R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10R-2%
R24	24772/042	RESISTOR-FIXED METAL-FILM 51R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-51R-2%
R25	24772/025	RESISTOR-FIXED METAL-FILM 10R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10R-2%
R26	24772/065	RESISTOR-FIXED METAL-FILM 470R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-470R-2%
R27	25685/403	THERMISTOR NEGATIVE-TC DISC, 10mm 33R @ 25 DEG.C, 10% RADIAL.	THERMOMETRICS	KED330CY
R28	24573/032	RESISTOR-FIXED METAL-OXIDE 20R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	TR5-20R-2%
R29	24573/032	RESISTOR-FIXED METAL-OXIDE 20R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	TR5-20R-2%

REPLACEABLE PARTS

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AB4/1	**Beat frequency oscillator board (contd.)**			
TR1	28452/172	TRANSISTOR NPN BIPOLAR BFR96S... 15V 5GHz 700mW 100mA 25hFE @ 70mA, SURFACE MOUNTED, SOT-37.	PHILIPS	BFR96S
TR2	28452/172	TRANSISTOR NPN BIPOLAR BFR96S... 15V 5GHz 700mW 100mA 25hFE @ 70mA, SURFACE MOUNTED, SOT-37.	PHILIPS	BFR96S
TR3	28433/455	TRANSISTOR PNP BIPOLAR BC308B... 20V 130MHz 200mW 100mA 200hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	SIEMENS LTD	BC308B-(Q62702-C286)
TR4	28452/248	TRANSISTOR NPN BIPOLAR BFQ34T... 18V 3GHz 1W 150mA 25hFE @ 100mA, SURFACE MOUNTED, SOT-37.	PHILIPS	BFQ34T
X1	28531/008	RF-MIXER DOUBLE-BALANCED, DIODE RING, TAK-1H... 2-500MHz, 50R 15 dBm RF-1dB COMPRESS, 6 dB LOSS,	MINI-CIRCUITS	TAK-1H

AF1 Key matrix board

Issue 05

When ordering, prefix circuit reference with AF1.

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
	44829/548	Complete unit		
SA	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SA	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SB	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SC	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SD	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SE	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SF	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SG	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SH	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SJ	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SK	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SL	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SM	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SN	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SP	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SR	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SS	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
ST	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SU	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SV	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SW	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SX	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SY	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AF1	**Key matrix board (contd.)**			
SZ	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SAA	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SAB	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SAC	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SAD	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SAE	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SAF	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SAG	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SAH	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SAJ	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SAK	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SAL	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SAM	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SAN	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SAP	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SAR	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SAS	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
SAT	23465/211	SWITCH-PART CONTACT-DOME, ELASTOMERIC, WITH CARBON CENTRE, 9.9mm LONG, 9.9mm WIDE, RUBBER.	HARBORO RUBBER LTD	13708 100 KP109 KRY
	37591/358	MOULDED-PART ABS, SWITCH CAP SMALL, MID-GREY, MOULDED-PART ABS, SWITCH CAP SMALL, MID-GREY,	IFR LTD	
	37591/359	SWITCH-CAP-MARKED "1", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 9.75mm WIDE.	IFR LTD	
	37591/360	SWITCH-CAP-MARKED "2", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 9.75mm WIDE.	IFR LTD	
	37591/361	SWITCH-CAP-MARKED "3", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 9.75mm WIDE.	IFR LTD	
	37591/362	SWITCH-CAP-MARKED "4", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 9.75mm WIDE.	IFR LTD	

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AF1	**Key matrix board (contd.)**			
	37591/363	SWITCH-CAP-MARKED "5", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 9.75mm WIDE.	IFR LTD	
	37591/364	SWITCH-CAP-MARKED "6" OR "9", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 9.75mm WIDE.	IFR LTD	
	37591/365	SWITCH-CAP-MARKED "7", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 9.75mm WIDE.	IFR LTD	
	37591/366	SWITCH-CAP-MARKED "8", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 9.75mm WIDE.	IFR LTD	
	37591/367	SWITCH-CAP-MARKED "0", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 9.75mm WIDE.	IFR LTD	
	37591/368	SWITCH-CAP-MARKED ".", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 9.75mm WIDE.	IFR LTD	
	37591/369	SWITCH-CAP-MARKED "-", DARK-GREY ON LIGHT-GREY, 1.14mm LONG, 9.75mm WIDE.	IFR LTD	
	37591/370	SWITCH-CAP-MARKED "GHz V", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 9.75mm WIDE.	IFR LTD	
	37591/371	SWITCH-CAP-MARKED "MHz mV", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 9.75mm WIDE.	IFR LTD	
	37591/372	SWITCH-CAP-MARKED "kHz uV", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 9.75mm WIDE.	IFR LTD	
	37591/373	SWITCH-CAP-MARKED "Hz dB", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 9.75mm WIDE.	IFR LTD	
	37591/374	SWITCH-CAP-MARKED WITH UP OR DOWN ARROW SYMBOL, DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 9.75mm WIDE.	IFR LTD	
	37591/375	SWITCH-CAP-MARKED "KNOB UP-DN", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 9.75mm WIDE.	IFR LTD	
	37591/377	SWITCH-CAP-MARKED "CARR ON-OFF", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 12.5mm WIDE.	IFR LTD	
	37591/378	SWITCH-CAP-MARKED "MOD ON-OFF", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 12.5mm WIDE.	IFR LTD	
	37591/381	SWITCH-CAP-MARKED "SWEEP", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 12.5mm WIDE.	IFR LTD	
	37591/382	SWITCH-CAP-MARKED "MEM", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 12.5mm WIDE.	IFR LTD	
	37591/383	SWITCH-CAP-MARKED "UTIL", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 12.5mm WIDE.	IFR LTD	
	37591/384	SWITCH-CAP-MARKED WITH A TRIANGLE SYMBOL, DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 12.5mm WIDE.	IFR LTD	
	37591/448	SWITCH-CAP-MARKED "LF", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 12.5mm WIDE.	IFR LTD	
	37591/449	SWITCH-CAP-MARKED "LF ON-OFF", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 12.5mm WIDE.	IFR LTD	
	37591/468	SWITCH-CAP-MARKED "SIG GEN", DARK-GREY ON LIGHT-GREY, 11.14mm LONG, 12.5mm WIDE.	IFR LTD	
	37591/560	MOULDED-PART NYLON, KEYCAP HOUSING, LOW PROFILE, NATURAL COLOUR, 11.9mm SQUARE, 9mm HIGH.	IFR LTD	

AF2/2 Front panel control board

Issue 02

When ordering, prefix circuit reference with AF2/2.

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
	44830/077	Complete unit		
C1	26343/493	CAPACITOR-FIXED CERAMIC 15pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-150-GAK-ACR-J
C2	26343/493	CAPACITOR-FIXED CERAMIC 15pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-150-GAK-ACR-J
C3	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C4	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C5	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C6	26343/492	CAPACITOR-FIXED CERAMIC 10pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-100-GOK-ACR-J
C7	26343/492	CAPACITOR-FIXED CERAMIC 10pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-100-GOK-ACR-J
C8	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C9	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C10	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C11	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C12	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C13	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C14	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C15	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C16	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C17	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C18	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C19	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C20	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C21	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C22	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C23	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AF2/2	**Front panel control board (contd.)**			
IC1	28462/625	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC377... OCTAL, POS EDGE TRIGGER WITH DATA ENABLE, CMOS-H/SPEED, 20	PHILIPS	74HC377N
IC2	28467/080	IC-MICRO CONTROLLER, 80C31... 8 BIT, 12MHz, 128 BYTE RAM, ZERO ROM, DUPLEX UART/SERIAL PORT, 4 x 8	PHILIPS	PCB80C31BH2-12P
IC3	28465/040	IC-DIGITAL DECODER/DEMULTIPLEX 74HC138... 3 INPUT, 8 BIT, SINGLE, INVERTING, 3 BIT ADDRESS,	PHILIPS	74HC138N
IC4	28462/428	IC-DIGITAL LATCH 74HC573... OCTAL, TRI-STATE, NON-INVERTING, TRANSPARENT, D-TYPE, CMOS-H/SPEED,	PHILIPS	74HC573N
IC5	28462/625	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC377... OCTAL, POS EDGE TRIGGER WITH DATA ENABLE, CMOS-H/SPEED, 20	PHILIPS	74HC377N
IC6	28461/347	IC-ANALOGUE OPERATIONAL AMP TL071... SINGLE, JFET-INPUT, LINEAR, SLEW-RATE 13V/uS TYP, 8 PIN,	MOTOROLA INC.	TL071CP
IC7	28466/365	IC-DIGITAL NAND-GATE 74HC00... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, DUAL-IN-LINE.	PHILIPS	74HC00N
IC8	28466/112	IC-DIGITAL OR-GATE 74HC32... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, DUAL-IN-LINE.	PHILIPS	74HC32N
IC9	28466/408	IC-DIGITAL EXCLUSIVE-OR 74HC86... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, DUAL-IN-LINE.	PHILIPS	74HC86N
IC10	28469/035	IC-DIGITAL BUFFER/LINE-DRIVER 74HC125... QUAD, TRI-STATE, LOW ENABLE, CMOS-H/SPEED, 14 PIN,	PHILIPS	74HC125N
IC11	28466/365	IC-DIGITAL NAND-GATE 74HC00... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, DUAL-IN-LINE.	PHILIPS	74HC00N
IC12	44533/366	IC-PROGRAMMED EPROM, SET OF 4, 2030.		
IC13	28467/081	IC-MICRO GRAPHICS, 1330... LCD CONTROLLER, CMOS, 60 PIN, FLAT-PACK.	SEIKO-EPSON	SED1330FBA
IC14	28469/323	IC-MICRO STATIC-RAM, 32K x 8 BIT, 43256... 120nS, +5V, STANDBY CURRENT <100uA, NO CLOCK OR TIMING	TOSHIBA (UK) LTD	TC55257BPL-12
IC15	28469/317	IC-MICRO STATIC-RAM, 8K x 8 BIT, HM6264... 150nS, STANDBY CURRENT 100uA, O.6in PITCH, CMOS, 28 PIN,	TOSHIBA (UK) LTD	TC5565APL-15
IC16	28464/143	IC-DIGITAL COUNTER 74HC393... 4 BIT, DUAL, BINARY RIPPLE, CMOS-H/SPEED, 14 PIN, DUAL-IN-LINE.	PHILIPS	74HC393N
IC17	28461/672	IC-DIGITAL COMPARATOR 74HC688... SINGLE, 2 x 8 BIT WORDS, CMOS-H/SPEED, 20 PIN, DUAL-IN-LINE.	PHILIPS	74HC688N
IC18	28461/672	IC-DIGITAL COMPARATOR 74HC688... SINGLE, 2 x 8 BIT WORDS, CMOS-H/SPEED, 20 PIN, DUAL-IN-LINE.	PHILIPS	74HC688N
IC19	28461/921	TRANSISTOR NPN BIPOLAR ULN2001... ARRAY, 50V 500mA 7-DARLINGTON PAIRS, MONOLITHIC, 16 PIN,	SGS-THOMSON	ULN2001A
L1	23642/558	INDUCTOR-FIXED 33uH +/- 10% COATED-LACQUER, MINIATURE, 210mA 5R2 MAX, 55 Q @ 2.5 MHz, 20 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/012
L2	23642/545	INDUCTOR-FIXED 0.22uH +/- 10% COATED-LACQUER, MINIATURE, 2.24A 0R04 MAX, 50 Q @ 25 MHz, 400 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/002
L3	23642/545	INDUCTOR-FIXED 0.22uH +/- 10% COATED-LACQUER, MINIATURE, 2.24A 0R04 MAX, 50 Q @ 25 MHz, 400 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/002
L4	23642/545	INDUCTOR-FIXED 0.22uH +/- 10% COATED-LACQUER, MINIATURE, 2.24A 0R04 MAX, 50 Q @ 25 MHz, 400 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/002

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AF2/2	**Front panel control board (contd.)**			
PLFG	23436/708	CONNECTOR FLEXIBLE CIRCUIT, SOCKET, 14 WAY, RIGHT ANGLED, 1.25mm PITCH, PCB MOUNTING, 2 ROWS OF	MOLEX ELECTRONICS	52044-1410
PLFH	23436/779	CONNECTOR MULTIWAY, PCB HEADER, 10 WAY, STRAIGHT, 2-ROW, 2.54mm GRID, SOLDER PIN TERMS, SIDE	FUJITSU LTD	FCN-744PO10-AU/R
PLFJ	23436/779	CONNECTOR MULTIWAY, PCB HEADER, 10 WAY, STRAIGHT, 2-ROW, 2.54mm GRID, SOLDER PIN TERMS, SIDE	FUJITSU LTD	FCN-744PO10-AU/R
PLFK	23436/780	CONNECTOR MULTIWAY, PCB HEADER, 16 WAY, STRAIGHT, 2-ROW, 2.54mm GRID, SOLDER PIN TERMS, SIDE	FUJITSU LTD	FCN-744PO16-AU/R
PLFL	23435/188	TERMINAL CONNECTOR-PIN, 0.64mm SQUARE, 5.97mm HIGH, PCB-MOUNTING, SINGLE-ENDED, PHOSPHOR BRONZE,	BERG ELECTRONICS	75401-001
PLFM	23436/764	CONNECTOR MULTIWAY, PCB HEADER, 2 WAY, STRAIGHT, 2mm PITCH, NYLON BODY, LIGHT BROWN.	JAE ELECTRONICS	IL-S-2P-S2T2-EF
PLFP	23436/779	CONNECTOR MULTIWAY, PCB HEADER, 10 WAY, STRAIGHT, 2-ROW, 2.54mm GRID, SOLDER PIN TERMS, SIDE	FUJITSU LTD	FCN-744PO10-AU/R
R1	24772/095	RESISTOR-FIXED METAL-FILM 8K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-8K2-2%
R2	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R3	25685/408	THERMISTOR NEGATIVE-TC DISC, 5mm 15K @ 25 DEG.C, 4.7 %/DEG.C +/- 10% 500mW 2.54mm PWP, RADIAL.	PHILIPS	2322-640-63153
R4	24772/101	RESISTOR-FIXED METAL-FILM 15K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-15K-2%
R5	24772/103	RESISTOR-FIXED METAL-FILM 18K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-18K-2%
R6	24772/083	RESISTOR-FIXED METAL-FILM 2K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K7-2%
R7	24772/083	RESISTOR-FIXED METAL-FILM 2K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K7-2%
R8	24772/083	RESISTOR-FIXED METAL-FILM 2K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K7-2%
R9	24772/140	RESISTOR-FIXED METAL-FILM 820K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-820K-2%
R10	24772/136	RESISTOR-FIXED METAL-FILM 430K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-430K-2%
R11	24772/129	RESISTOR-FIXED METAL-FILM 220K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220K-2%
R12	24772/122	RESISTOR-FIXED METAL-FILM 110K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-110K-2%
R13	24772/115	RESISTOR-FIXED METAL-FILM 56K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-56K-2%
R14	24772/100	RESISTOR-FIXED METAL-FILM 13K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-13K-2%
R15	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R16	24573/067	RESISTOR-FIXED METAL-OXIDE 560R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	TR5-560R-2%
R17	24573/067	RESISTOR-FIXED METAL-OXIDE 560R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	TR5-560R-2%
R18	24573/067	RESISTOR-FIXED METAL-OXIDE 560R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	TR5-560R-2%

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AF2/2	**Front panel control board (contd.)**			
R19	24573/067	RESISTOR-FIXED METAL-OXIDE 560R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	TR5-560R-2%
R20	24573/059	RESISTOR-FIXED METAL-OXIDE 270R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	TR5-270R-2%
R21	24573/059	RESISTOR-FIXED METAL-OXIDE 270R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	TR5-270R-2%
R22	24573/059	RESISTOR-FIXED METAL-OXIDE 270R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	TR5-270R-2%
R23	24573/059	RESISTOR-FIXED METAL-OXIDE 270R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	TR5-270R-2%
R24	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R25	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R26	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R27	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R28	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R29	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R30	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
R31	24772/057	RESISTOR-FIXED METAL-FILM 220R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-220R-2%
TR1	28433/455	TRANSISTOR PNP BIPOLAR BC307B... 20V 130MHz 200mW 100mA 200hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	NAT. SEMICONDUCTOR	BC307B(T/R EMTR 1st)
TR2	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B
XL1	28312/047	CRYSTAL 10 MHz +/- 20 ppm, 30pF PARALLEL RESONANCE, 20R ESR MAX, METAL HOLDER, HC-49/U,	C-MAC CRYSTALS LTD	10MHz/20ppm/4703
XL2	28312/047	CRYSTAL 10 MHz +/- 20 ppm, 30pF PARALLEL RESONANCE, 20R ESR MAX, METAL HOLDER, HC-49/U,	C-MAC CRYSTALS LTD	10MHz/20ppm/4703
	43137/381	RIBBON-LEAD 14 WAY, SOCKET 14 WAY, KEY POS 11, - **PLFF to AF1**	IFR LTD	

AR1/2 PSU board

Issue 02

When ordering, prefix circuit reference with AR1/2.

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
	44830/076	Complete unit		
C1	26421/019	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 10V ELECTROLYTIC, RADIAL, 3.5mm PWP, LOW LEAKAGE,	PANASONIC INDUSTRIAL	ECE-A-10-M-101
C2	26343/497	CAPACITOR-FIXED CERAMIC 12pF +/-2% 63V NP0 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROC-120-GAK-ACR-J
C3	26422/343	CAPACITOR-FIXED ALUMINIUM 10000uF +/-20% 63V ELECTROLYTIC, PCB PIN TERMINATION, 4 RADIAL PINS,	PHILIPS	2222-051-58103
C4	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C5	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B
C6	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C7	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C8	26422/342	CAPACITOR-FIXED ALUMINIUM 15000uF +/-20% 40V ELECTROLYTIC, PCB PIN TERMINATION, 4 RADIAL PINS,	PHILIPS	2222-051-57153
C9	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C10	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C11	26421/127	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	PHILIPS	2222-037-50471
C12	26422/342	CAPACITOR-FIXED ALUMINIUM 15000uF +/-20% 40V ELECTROLYTIC, PCB PIN TERMINATION, 4 RADIAL PINS,	PHILIPS	2222-051-57153
C13	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C14	26422/341	CAPACITOR-FIXED ALUMINIUM 6800uF +/-20% 40V ELECTROLYTIC, PCB PIN TERMINATION, 4 RADIAL PINS,	PHILIPS	2222-051-57682
C16	26421/127	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	PHILIPS	2222-037-50471
C17	26422/340	CAPACITOR-FIXED ALUMINIUM 47000uF +/-20% 16V ELECTROLYTIC, PCB PIN TERMINATION, 5 RADIAL PINS,	PHILIPS	2222-051-55473
C18	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C19	26421/131	CAPACITOR-FIXED ALUMINIUM 2200uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	PHILIPS	2222-037-55222
C20	26582/432	CAPACITOR-FIXED POLYESTER 1uF +/-10% 50V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-510/065
C21	26582/427	CAPACITOR-FIXED POLYESTER 470nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-447/065
C22	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C23	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C24	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-KA-100-B

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AR1/2 PSU board (contd.)				
C25	26582/427	CAPACITOR-FIXED POLYESTER 470nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-447/065
C26	26582/427	CAPACITOR-FIXED POLYESTER 470nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-447/065
D1	28359/189	DIODE RECTIFIER, 2KBB20R... BRIDGE, 200V 1.9A 80Vrms @ 1.9A, LEADS ON 5mm PITCH, ENCAPSULATED,	INTERNAT RECTIFIER	2KBB20R
D2	28336/246	DIODE SMALL-SIGNAL, 1N4448... 75V 150mA 1Vf @ 100mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4448
D3	28336/246	DIODE SMALL-SIGNAL, 1N4448... 75V 150mA 1Vf @ 100mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4448
D4	28359/189	DIODE RECTIFIER, 2KBB20R... BRIDGE, 200V 1.9A 80Vrms @ 1.9A, LEADS ON 5mm PITCH, ENCAPSULATED,	INTERNAT RECTIFIER	2KBB20R
D5	28336/246	DIODE SMALL-SIGNAL, 1N4448... 75V 150mA 1Vf @ 100mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4448
D6	28336/246	DIODE SMALL-SIGNAL, 1N4448... 75V 150mA 1Vf @ 100mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4448
D7	28336/246	DIODE SMALL-SIGNAL, 1N4448... 75V 150mA 1Vf @ 100mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4448
D8	28336/246	DIODE SMALL-SIGNAL, 1N4448... 75V 150mA 1Vf@ 100mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4448
D9	28357/028	DIODE RECTIFIER, 1N4004... 400V 1A 1.1Vf @ 1A, AXIAL, SOD-81, (TAPED).	PHILIPS	1N4004
D10	28336/246	DIODE SMALL-SIGNAL, 1N4448... 75V 150mA 1Vf @ 100mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4448
D11	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf@ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D12	28371/417	DIODE ZENER, BZX79-C5V6... 500mW 5.6V 5% 250mA AXIAL, DO-35, (TAPED).	PHILIPS	BZX79-C5V6
D13	28372/584	DIODE ZENER, BZX79-C18... 500mW 18V 5% 250mA AXIAL, DO-35, (TAPED).	PHILIPS	BZX79-C18
IC1	28467/062	IC-MICRO REAL-TIME-CLOCK, PCF8573P... SERIAL INPUT/OUTPUT, CMOS, 16 PIN, DUAL-IN-LINE.	PHILIPS	PCF8573P
IC2	28461/710	IC-ANALOGUE VOLTAGE-REGULATOR 7824... 24V 1A POSITIVE, LINEAR, MONOLITHIC, 3 PIN, TO-220.	NAT. SEMICONDUCTOR	uA7824UC
IC3	28461/726	IC-ANALOGUE VOLTAGE-REGULATOR LM317T... 37V 1.5A POSITIVE ADJUSTABLE, LINEAR, MONOLITHIC, 3 PIN,	NAT. SEMICONDUCTOR	LM317T
IC4	28461/322	IC-ANALOGUE OPERATIONAL AMP LM324... QUAD, LINEAR, MONOLITHIC, 14 PIN, DUAL-IN-LINE.	NAT. SEMICONDUCTOR	LM324N
IC5	28461/757	IC-ANALOGUE VOLTAGE-REFERENCE AD586... 36V 5V REF +/- 20mV, OUTPUT DRIFT 25ppm/DEG.C, MONOLITHIC, 8	ANALOG DEVICES LTD	AD586JN
IC6	28461/384	IC-ANALOGUE OPERATIONAL AMP LF356N... SINGLE, LINEAR, SLEW-RATE 12V/uS TYP, JFET, 8 PIN,	NAT. SEMICONDUCTOR	LF356N
IC7	28461/726	IC-ANALOGUE VOLTAGE-REGULATOR LM317T... 37V 1.5A POSITIVE ADJUSTABLE, LINEAR, MONOLITHIC, 3 PIN,	NAT. SEMICONDUCTOR	LM317T

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AR1/2 PSU board (contd.)				
IC8	28461/726	IC-ANALOGUE VOLTAGE-REGULATOR LM317T... 37V 1.5A POSITIVE ADJUSTABLE, LINEAR, MONOLITHIC, 3 PIN,	NAT. SEMICONDUCTOR	LM317T
IC9	28461/322	IC-ANALOGUE OPERATIONAL AMP LM324... QUAD, LINEAR, MONOLITHIC, 14 PIN, DUAL-IN-LINE.	NAT. SEMICONDUCTOR	LM324N
IC10	28461/726	IC-ANALOGUE VOLTAGE-REGULATOR LM317T... 37V 1.5A POSITIVE ADJUSTABLE, LINEAR, MONOLITHIC, 3 PIN,	NAT. SEMICONDUCTOR	LM317T
PLRG	23436/779	CONNECTOR MULTIWAY, PCB HEADER, 10 WAY, STRAIGHT, 2-ROW, 2.54mm GRID, SOLDER PIN TERMS, SIDE	FUJITSU LTD	FCN-744PO10-AU/R
R1	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R2	24772/092	RESISTOR-FIXED METAL-FILM 6K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-6K2-2%
R3	24772/058	RESISTOR-FIXED METAL-FILM 240R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-240R-2%
R4	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R5	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R6	24772/088	RESISTOR-FIXED METAL-FILM 4K3 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K3-2%
R7	24772/103	RESISTOR-FIXED METAL-FILM 18K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-18K-2%
R8	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R9	24772/109	RESISTOR-FIXED METAL-FILM 33K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-33K-2%
R10	25683/406	THERMISTOR NEGATIVE-TC DISC, 4.6mm 12K @ 25 DEG.C, 4.2 %/DEG.C +/- 7% 250mW 2.5mm PWP, RADIAL.	PHILIPS	2322-640-90004
R11	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%
R12	25683/407	THERMISTOR NEGATIVE-TC DISC, 18.2mm 12K @ 25 DEG.C, 4.2 %/DEG.C +/- 7% 250mW 2.5mm PWP, WITH	PHILIPS	2322-640-98004
R13	25133/033	RESISTOR-FIXED WIREWOUND 0R33 +/- 10% 1.5W 100V 200 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	W21-0R33-10%
R14	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R15	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R16	24772/089	RESISTOR-FIXED METAL-FILM 4K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K7-2%
R17	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R18	24772/108	RESISTOR-FIXED METAL-FILM 30K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-30K-2%
R19	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%

AR1/2 PSU board (contd.)

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
R20	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R21	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R22	24772/059	RESISTOR-FIXED METAL-FILM 270R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-270R-2%
R23	24772/105	RESISTOR-FIXED METAL-FILM 22K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-22K-2%
R24	25123/020	RESISTOR-FIXED WIREWOUND 10R +/- 5% 1.5W 100V 200 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	W21-10R-5%
R25	24784/002	RESISTOR-FIXED METAL-TAPE 0R047 +/- 5% 3W 60V 600 ppm/DEG.C, LOW-INDUCTANCE, AXIAL, (LOOSE OR	VTM (UK) LTD	KN/350-8/0R047-5%
R26	24772/034	RESISTOR-FIXED METAL-FILM 24R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-24R-2%
R27	24772/105	RESISTOR-FIXED METAL-FILM 22K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-22K-2%
R28	24772/044	RESISTOR-FIXED METAL-FILM 62R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-62R-2%
R29	24772/055	RESISTOR-FIXED METAL-FILM 180R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-180R-2%
R30	24772/080	RESISTOR-FIXED METAL-FILM 2K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K-2%
R31	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R32	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R33	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R34	24772/105	RESISTOR-FIXED METAL-FILM 22K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-22K-2%
R35	24772/071	RESISTOR-FIXED METAL-FILM 820R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-820R-2%
R36	24784/002	RESISTOR-FIXED METAL-TAPE 0R047 +/- 5% 3W 60V 600 ppm/DEG.C, LOW-INDUCTANCE, AXIAL, (LOOSE OR	VTM (UK) LTD	KN/350-8/0R047-5%
R37	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R38	24772/105	RESISTOR-FIXED METAL-FILM 22K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-22K-2%
R39	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R40	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R41	24772/088	RESISTOR-FIXED METAL-FILM 4K3 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K3-2%
R42	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R43	24772/080	RESISTOR-FIXED METAL-FILM 2K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K-2%
R44	24772/128	RESISTOR-FIXED METAL-FILM 200K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-200K-2%
R45	24552/006	RESISTOR-FIXED METAL-OXIDE 2R7 +/- 5% 500mW 350V 250 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	TR5-2R7-5%

REPLACEABLE PARTS

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AR1/2 PSU board (contd.)				
R46	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R47	24582/555	RESISTOR-FIXED METAL-OXIDE 1R +/- 10% 500mW 350V 250 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	WELWYN ELECTRONICS	MFR5-1R-5%
R48	24772/088	RESISTOR-FIXED METAL-FILM 4K3 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K3-2%
R49	24772/088	RESISTOR-FIXED METAL-FILM 4K3 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K3-2%
R50	24772/089	RESISTOR-FIXED METAL-FILM 4K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K7-2%
R51	24772/089	RESISTOR-FIXED METAL-FILM 4K7 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-4K7-2%
R55	24773/267	RESISTOR-FIXED METAL-FILM 560R +/- 2% 250mW 250V 100 ppm/DEG.C, 1%-562R-ACCEPTABLE, AXIAL, (TAPED).	VISHAY COMPONENTS	EE.10-560R-G-T-1
TR1	28459/070	TRANSISTOR N-CHANNEL-ENHANCE MOSFET SMP60N06-18... 60V 105W 60A 0R018 TO-220.	SILICONIX LTD	SUP60N06-18
TR2	28459/070	TRANSISTOR N-CHANNEL-ENHANCE MOSFET SMP60N06-18... 60V 105W 60A 0R018 TO-220.	SILICONIX LTD	SUP60N06-18
TR3	28459/070	TRANSISTOR N-CHANNEL-ENHANCE MOSFET SMP60N06-18... 60V 105W 60A 0R018 TO-220.	SILICONIX LTD	SUP60N06-18
TR4	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B
TR5	28452/197	TRANSISTOR NPN BIPOLAR 2N2369... 15V 500MHz 360mW 500mA 40hFE @ 10mA, TO-18.	PHILIPS	BSX20
XL1	28312/050	CRYSTAL 0.032768 MHz +/- 20 ppm, 12.5pF PARALLEL RESONANCE, 35K ESR MAX, WATCH-TYPE, MIN	MOTOROLA INC.	MTF32 CL12 32.768KHZ
	23435/736	CONNECTOR MULTIWAY, PCB HEADER, 16 WAY, STRAIGHT, **PLRA, PLRB SECONDARIES FROM TRANSFORMER**	DU PONT (UK) LTD	75875-101-16

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.

AR2/1 Internal frequency standard board

Issue 4

When ordering, prefix circuit reference with AR2/1.

	44829/958	Complete unit		
C1	26421/108	CAPACITOR-FIXED ALUMINIUM 4.7uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-4R7-B
C2	26582/428	CAPACITOR-FIXED POLYESTER 47nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-347/065TA18
C3	26582/427	CAPACITOR-FIXED POLYESTER 470nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-447/065
C4	26421/106	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-K-010-B
C5	26582/427	CAPACITOR-FIXED POLYESTER 470nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1826-447/065
D1	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
IC1	28461/708	IC-ANALOGUE VOLTAGE-REGULATOR 7812... 12V 1A POSITIVE, LINEAR, MONOLITHIC, 3 PIN, TO-220.	NAT. SEMICONDUCTOR	LM340T-12
L1	23642/555	INDUCTOR-FIXED 10uH +/- 10% COATED-LACQUER, MINIATURE, 470mA 0R9 MAX, 45 Q @ 7.9 MHz, 45 MHz	MEGGITT ELECTRONICS	C11-406/8/27520/006
PLRM	23444/334	CONNECTOR-RF SMB-TYPE MALE, RECEPTACLE, 50 OHMS, PCB-MOUNTING, NICKEL PLATED BODY.	ITT CANNON (UK)	051-051-0000-C90
R1	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R2	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R3	24772/081	RESISTOR-FIXED METAL-FILM 2K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K2-2%
R4	24772/055	RESISTOR-FIXED METAL-FILM 180R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-180R-2%
R5	24772/109	RESISTOR-FIXED METAL-FILM 33K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-33K-2%
R6	24772/121	RESISTOR-FIXED METAL-FILM 100K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100K-2%

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AR2/1 Internal frequency standard board (contd.)				
RLA	23486/166	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 12V COIL, 720R - CONTACTS 1A, 125V, MAX LOAD 30W, PCB	FUJITSU LTD	FBR46-N-D012-P
TR1	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B
TR2	28435/227	TRANSISTOR PNP BIPOLAR BC307A,B... 45V 130MHz 200mW 100mA 180hFE @ 2mA, TO-92, (LOOSE).	NAT. SEMICONDUCTOR	BC307A OR B
X1	28313/883	OSCILLATOR CRYSTAL, 10 MHz +/- 0.1 ppm, OCXO, 12V, 30mm LONG, 30mm WIDE, 26mm HIGH, 5 PIN, MODULE.	NDK CO LTD	END3032A

AT10 Attenuator assembly (for 2030 & 2031)

Issue 09

When ordering, prefix circuit reference with AT10.

44429/087	Complete unit

AT10 Attenuator assembly (for 2032)

Issue 08

When ordering, prefix circuit reference with AT10.

44429/088	Complete unit

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.

AT11/1 Edgeline controller board

Issue 01

Board cannot be ordered separately, part of AT10.

	44830/133	Complete unit		
C1	26386/758	CAPACITOR-FIXED CERAMIC 100nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-104-K9-BB
C2	26386/883	CAPACITOR-FIXED CERAMIC 47nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	ROHM ELECTRONICS LTD	MCH32-5C-473-KP
C3	26386/758	CAPACITOR-FIXED CERAMIC 100nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-104-K9-BB
C4	26386/758	CAPACITOR-FIXED CERAMIC 100nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-104-K9-BB
C5	26386/883	CAPACITOR-FIXED CERAMIC 47nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	ROHM ELECTRONICS LTD	MCH32-5C-473-KP
C6	26386/758	CAPACITOR-FIXED CERAMIC 100nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-104-K9-BB
C7	26386/758	CAPACITOR-FIXED CERAMIC 100nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-104-K9-BB
C8	26386/751	CAPACITOR-FIXED CERAMIC 1nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	PHILIPS	0805-2R-102-K9-BB
C9	26386/758	CAPACITOR-FIXED CERAMIC 100nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-104-K9-BB
C10	26386/751	CAPACITOR-FIXED CERAMIC 1nF +/-20% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	PHILIPS	0805-2R-102-K9-BB
C12	26451/009	CAPACITOR-FIXED ALUMINIUM 47uF +/-20% 16V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 6.6 x 6.6mm,	PANASONIC INDUSTRIAL	ECE-V-1CA-470P
C13	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-101-JP
C14	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C15	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C16	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C17	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C18	26386/881	CAPACITOR-FIXED CERAMIC 33nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	ROHM ELECTRONICS LTD	MCH32-5C-333-KP
D1	28383/902	DIODE SMALL-SIGNAL, BAW56... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON ANODE, MARKING CODE A1, SURFACE	PHILIPS	BAW56 (A1)
D2	28383/902	DIODE SMALL-SIGNAL, BAW56... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON ANODE, MARKING CODE A1, SURFACE	PHILIPS	BAW56 (A1)
D3	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AT11/1	**Edgeline controller board (contd.)**			
D4	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D5	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D6	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D7	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D8	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D9	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
D10	28383/910	DIODE SMALL-SIGNAL, BAS28... DUAL, 330mW 75V 250mA ELECTRICALLY ISOLATED, MARKING CODE A61 OR JT,	PHILIPS	BAS28
D11	28383/901	DIODE SMALL-SIGNAL, BAV70... DUAL, 70V 100mA 1.1Vf @ 50mA, COMMON CATHODE, MARKING CODE A4, SURFACE	PHILIPS	BAV70
IC1	28469/033	IC-DIGITAL BUFFER/LINE-DRIVER 74HCT126... QUAD, TRI-STATE, HIGH-ENABLE, CMOS-H/SPEED+TTL, 14 PIN,	PHILIPS	74HCT126D
IC2	28469/032	IC-DIGITAL INVERTER 74HC14... HEX, SCHMITT-TRIGGER OPERATION, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC14D
IC3	28462/640	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC175... QUAD, POS EDGE TRIGGER, RESET, CMOS-H/SPEED, 16 PIN,	PHILIPS	74HC175D
IC4	28471/036	IC-MICRO EEPROM, 64 x 16 BIT, 93C46... 5V SUPPLY, CMOS, 8 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	NM93C46TM8
IC5	28462/640	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC175... QUAD, POS EDGE TRIGGER, RESET, CMOS-H/SPEED, 16 PIN,	PHILIPS	74HC175D
IC6	28462/639	IC-DIGITAL FLIP-FLOP/D-TYPE 74AC374... OCTAL, NON-INVERTING, POS EDGE TRIGGER, TRI-STATE,	NAT. SEMICONDUCTOR	74AC374SC
IC7	28462/639	IC-DIGITAL FLIP-FLOP/D-TYPE 74AC374... OCTAL, NON-INVERTING, POS EDGE TRIGGER, TRI-STATE,	NAT. SEMICONDUCTOR	74AC374SC
IC9	28462/640	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC175... QUAD, POS EDGE TRIGGER, RESET, CMOS-H/SPEED, 16 PIN,	PHILIPS	74HC175D
IC10	28465/055	IC-DIGITAL DECODER/DEMULTIPLEX 74HC138... 3 INPUT, 8 BIT, SINGLE, INVERTING, 3 BIT ADDRESS,	PHILIPS	74HC138D
IC11	28466/390	IC-DIGITAL NAND-GATE 74HC00... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC00D
IC12	28469/032	IC-DIGITAL INVERTER 74HC14... HEX, SCHMITT-TRIGGER OPERATION, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC14D
IC13	28462/638	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-H/SPEED,	PHILIPS	74HC74D
IC14	28461/673	IC-ANALOGUE COMPARATOR LM339... QUAD, SINGLE SUPPLY, BIPOLAR, 14 PIN, SMALL-OUTLINE.	PHILIPS	LM339D
PLTC	23436/779	CONNECTOR MULTIWAY, PCB HEADER, 10 WAY, STRAIGHT, 2-ROW, 2.54mm GRID, SOLDER PIN TERMS, SIDE	FUJITSU LTD	FCN-744PO10-AU/R
PLTD	23435/120	CONNECTOR MULTIWAY, PCB HEADER, 36 WAY, RIGHT ANGLED, 2.54mm PITCH, PINS GOLD PLATED TO CLASS 2,	BERG ELECTRONICS	75168-101-36

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AT11/1	**Edgeline controller board (contd.)**			
PLTE	23435/120	CONNECTOR MULTIWAY, PCB HEADER, 36 WAY, RIGHT ANGLED, 2.54mm PITCH, PINS GOLD PLATED TO CLASS 2,	BERG ELECTRONICS	75168-101-36
R1	24321/777	RESISTOR-FIXED METAL-GLAZE 1K5 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K50-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1501-FT
R2	24321/777	RESISTOR-FIXED METAL-GLAZE 1K5 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K50-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1501-FT
R3	24321/825	RESISTOR-FIXED METAL-GLAZE 150K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1503-FT
R4	24321/825	RESISTOR-FIXED METAL-GLAZE 150K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1503-FT
R5	24321/825	RESISTOR-FIXED METAL-GLAZE 150K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1503-FT
R6	24681/526	RESISTOR-NETWORK ISOLATED, THICK-FILM, 100R 2% 500mW 25V 200 ppm/DEG.C, 7 RESISTORS, SURFACE	VISHAY COMPONENTS	834C-101-X2-SR-TUBE
R7	24681/526	RESISTOR-NETWORK ISOLATED, THICK-FILM, 100R 2% 500mW 25V 200 ppm/DEG.C, 7 RESISTORS, SURFACE	VISHAY COMPONENTS	834C-101-X2-SR-TUBE
R8	24321/825	RESISTOR-FIXED METAL-GLAZE 150K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1503-FT
R9	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R10	24321/825	RESISTOR-FIXED METAL-GLAZE 150K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-150K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1503-FT
R11	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R14	24321/795	RESISTOR-FIXED METAL-GLAZE 8K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-8K25-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-8251-FT
R15	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R16	24321/823	RESISTOR-FIXED METAL-GLAZE 120K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-121K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1213-FT
R17	24321/839	RESISTOR-FIXED METAL-GLAZE 680K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-681K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-6813-FT
R18	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R19	24321/783	RESISTOR-FIXED METAL-GLAZE 2K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K74-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2741-FT
R20	24321/839	RESISTOR-FIXED METAL-GLAZE 680K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-681K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-6813-FT
R21	24321/823	RESISTOR-FIXED METAL-GLAZE 120K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-121K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1213-FT
R22	24681/527	RESISTOR-NETWORK BUSSED, THICK-FILM, 4K7 2% 600mW 25V 200 ppm/DEG.C, 15 RESISTORS, SURFACE MOUNTED,	VISHAY COMPONENTS	836C-472-X2-PE-TUBE
R23	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R24	24321/777	RESISTOR-FIXED METAL-GLAZE 1K5 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K50-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1501-FT
R25	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT

REPLACEABLE PARTS

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part no.
AT11/1	**Edgeline controller board (contd.)**			
R26	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R28	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R29	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
TR1	28487/811	TRANSISTOR NPN BIPOLAR BC818-40... 25V 170MHz 330mW 500mA 250hFE MIN @ 100mA, MARKING CODE 6G,	PHILIPS	BC818-40
TR2	28487/811	TRANSISTOR NPN BIPOLAR BC818-40... 25V 170MHz 330mW 500mA 250hFE MIN @ 100mA, MARKING CODE 6G,	PHILIPS	BC818-40
TR3	28487/811	TRANSISTOR NPN BIPOLAR BC818-40... 25V 170MHz 330mW 500mA 250hFE MIN @ 100mA, MARKING CODE 6G,	PHILIPS	BC818-40
TR4	28487/811	TRANSISTOR NPN BIPOLAR BC818-40... 25V 170MHz 330mW 500mA 250hFE MIN @ 100mA, MARKING CODE 6G,	PHILIPS	BC818-40
TR5	28487/811	TRANSISTOR NPN BIPOLAR BC818-40... 25V 170MHz 330mW 500mA 250hFE MIN @ 100mA, MARKING CODE 6G,	PHILIPS	BC818-40
TR6	28487/811	TRANSISTOR NPN BIPOLAR BC818-40... 25V 170MHz 330mW 500mA 250hFE MIN @ 100mA, MARKING CODE 6G,	PHILIPS	BC818-40
TR7	28487/811	TRANSISTOR NPN BIPOLAR BC818-40... 25V 170MHz 330mW 500mA 250hFE MIN @ 100mA, MARKING CODE 6G,	PHILIPS	BC818-40
TR8	28487/811	TRANSISTOR NPN BIPOLAR BC818-40... 25V 170MHz 330mW 500mA 250hFE MIN @ 100mA, MARKING CODE 6G,	PHILIPS	BC818-40
TR9	28487/811	TRANSISTOR NPN BIPOLAR BC818-40... 25V 170MHz 330mW 500mA 250hFE MIN @ 100mA, MARKING CODE 6G,	PHILIPS	BC818-40
TR10	28487/811	TRANSISTOR NPN BIPOLAR BC818-40... 25V 170MHz 330mW 500mA 250hFE MIN @ 100mA, MARKING CODE 6G,	PHILIPS	BC818-40
TR11	28487/811	TRANSISTOR NPN BIPOLAR BC818-40... 25V 170MHz 330mW 500mA 250hFE MIN @ 100mA, MARKING CODE 6G,	PHILIPS	BC818-40
TR12	28487/811	TRANSISTOR NPN BIPOLAR BC818-40... 25V 170MHz 330mW 500mA 250hFE MIN @ 100mA, MARKING CODE 6G,	PHILIPS	BC818-40
TR13	28487/812	TRANSISTOR NPN BIPOLAR BST50... DARLINGTON, 60V 1W 500mA MARKING CODE AS1, SURFACE MOUNTED, SOT-89,	PHILIPS	BST50
TR14	28487/812	TRANSISTOR NPN BIPOLAR BST50... DARLINGTON, 60V 1W 500mA MARKING CODE AS1, SURFACE MOUNTED, SOT-89,	PHILIPS	BST50

Blank Page

MISCELLANEOUS MECHANICAL PARTS

Item No.	Description	Part Number
	Order without prefix. Item numbers as shown in Fig. 6-2.	
1	Top cover	35906/561
2	Bottom cover	35906/562
3	Retainer moulding, 1 of 2	37591/453
4	Front panel, marked	35906/904
5	Identity strip, 2030	31739/697
	Identity strip, 2031	31739/698
	Identity strip, 2032	31739/699
6	Rear panel, marked	41590/185
7	Knob, control	37591/397
8	Front panel handle, 1 of 2	37591/350
9	Infill, 1 of 2	37591/356
10	Side handle, 1 of 2	41700/734
11	Cover, 1 of 4	35890/229
12	Foot, right-hand lower, 1 of 2	37591/354
13	Foot, left-hand lower, 1 of 2	37591/355
14	Retaining grommet, 1 of 8	23187/104
15	Rear foot,1 of 2	37591/352
16	Plug, 1 of 4	37591/389
17	Foot, tilt, 1 of 2	37591/439
18	Bezel rim	37591/597
19	Glass window	37441/310
20	Blind grommet	22315/809
21	Plug cap & chain, FREQ STD IN/OUT	23433/592
22	Fan finger guard	23535/115

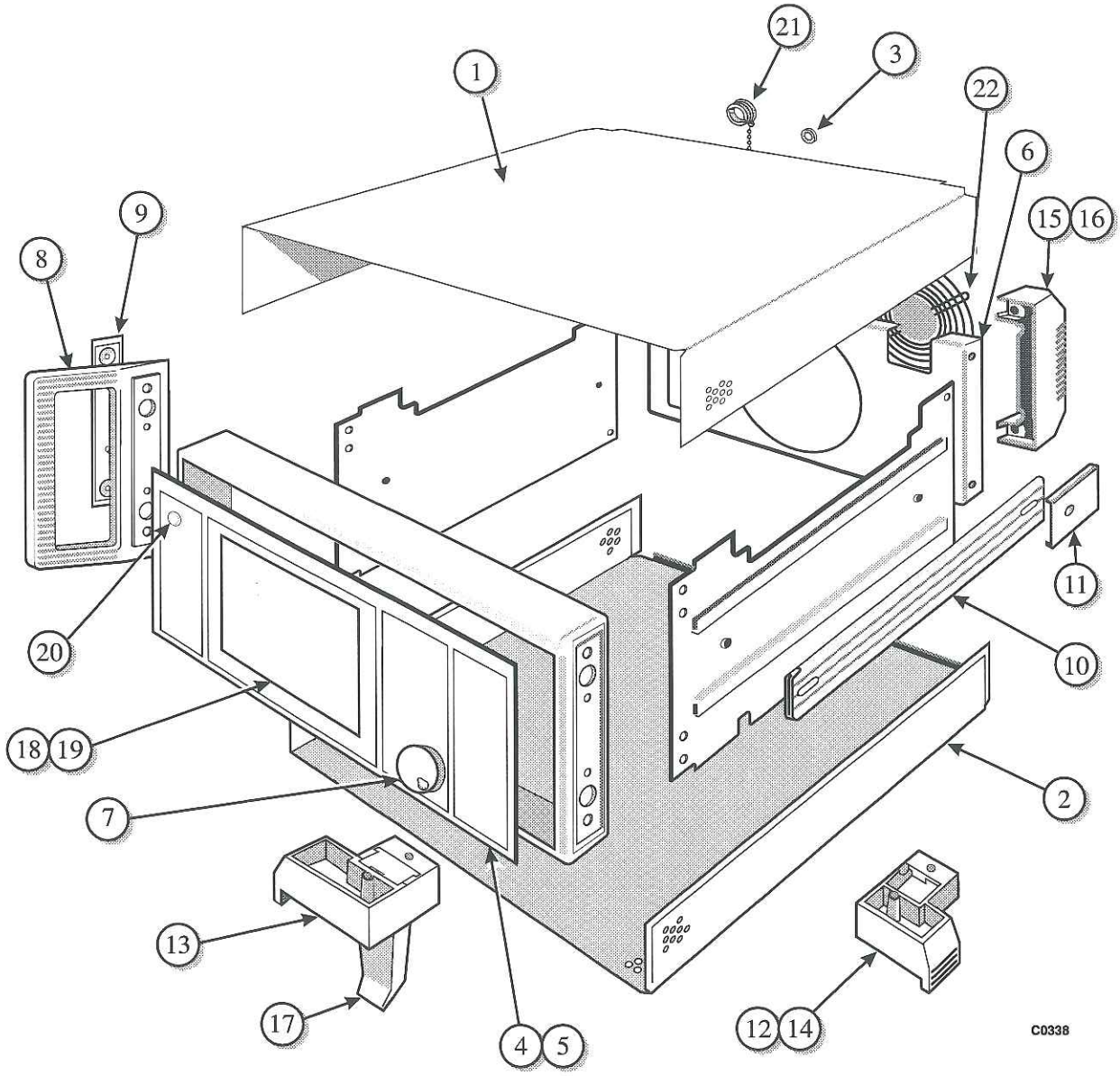


Fig. 6-2 Miscellaneous mechanical parts

Blank Page

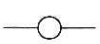
Chapter 7
SERVICING DIAGRAMS

CONTENTS

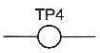
Symbols

Symbols are to BS 3939 with the following additions :

Static sensitive component - see Notes and Cautions, Page iv.



Tag



Test point

Edge connector

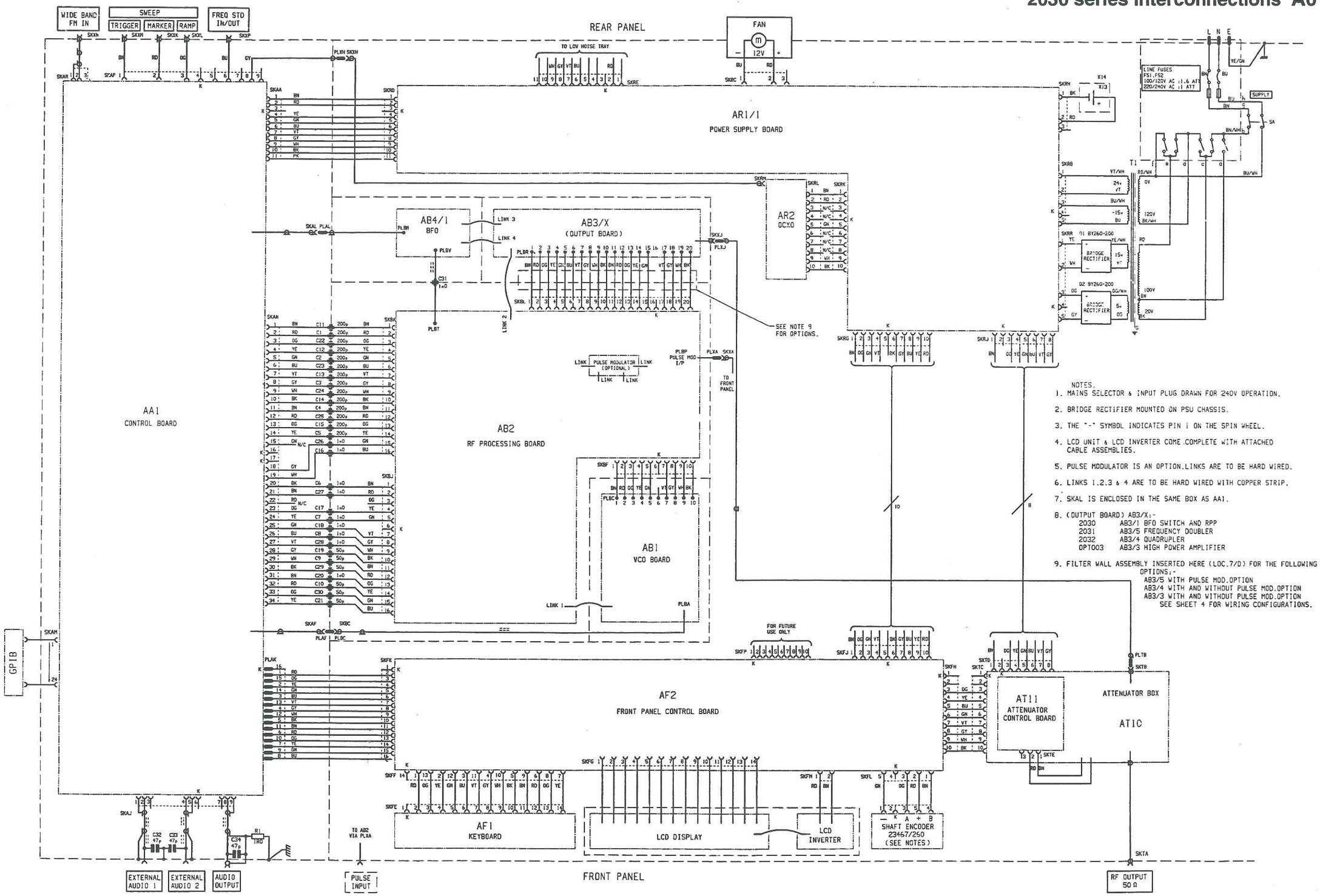
Ferrite bead

Unit identification

PCB layouts

PCB layouts are shown as viewed from the component side.

2030 series interconnections A0



NOTES.

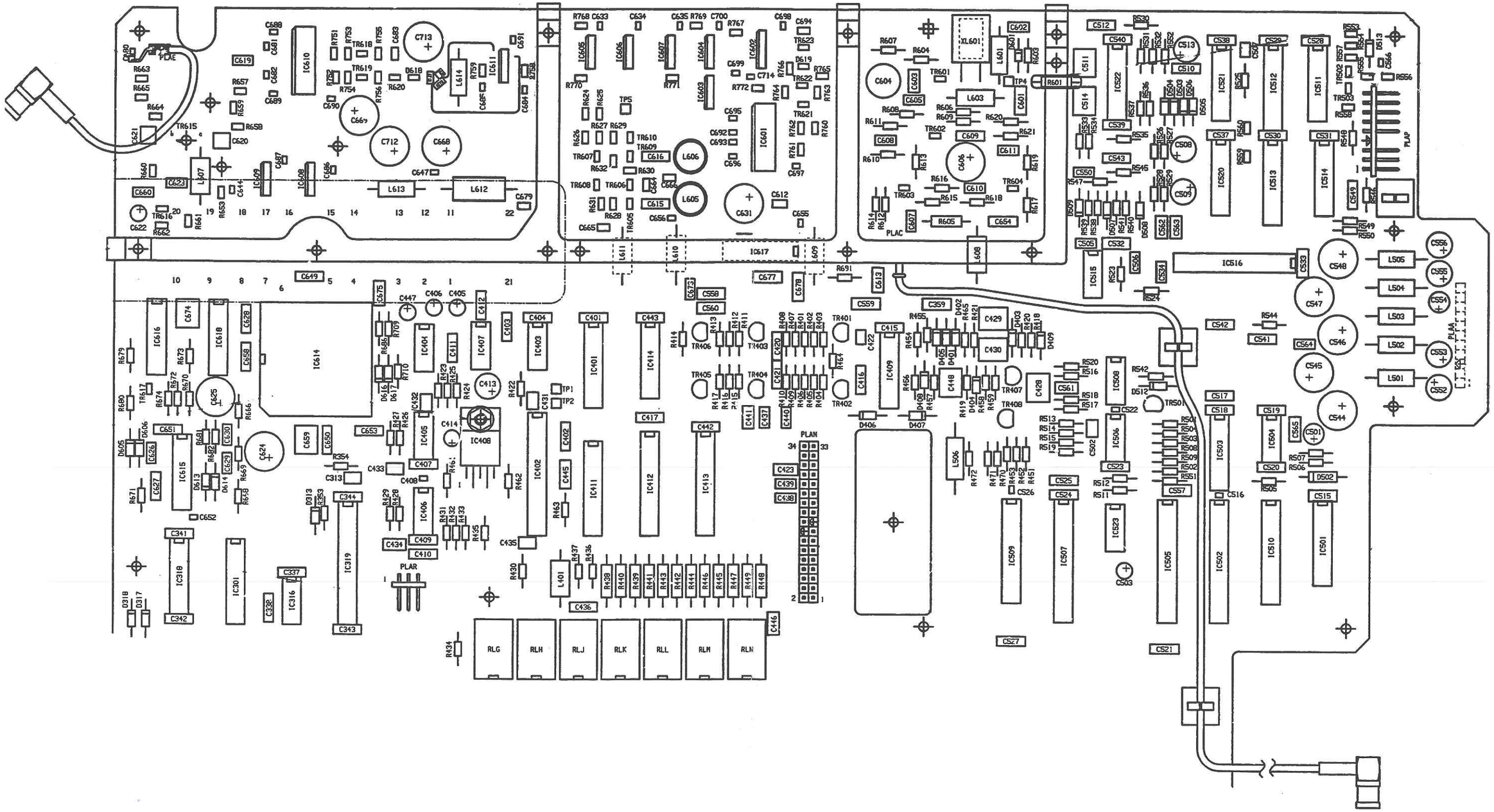
1. MAINS SELECTOR & INPUT PLUG DRAWN FOR 240V OPERATION.
2. BRIDGE RECTIFIER MOUNTED ON PSU CHASSIS.
3. THE "-" SYMBOL INDICATES PIN 1 ON THE SPIN WHEEL.
4. LCD UNIT & LCD INVERTER COME COMPLETE WITH ATTACHED CABLE ASSEMBLIES.
5. PULSE MODULATOR IS AN OPTION. LINKS ARE TO BE HARD WIRED.
6. LINKS 1.2.3 & 4 ARE TO BE HARD WIRED WITH COPPER STRIP.
7. SKAL IS ENCLOSED IN THE SAME BOX AS AA1.
8. (OUTPUT BOARD) AB3/X:-
   - 2030 AB3/1 BFO SWITCH AND RPP
   - 2031 AB3/5 FREQUENCY DOUBLER
   - 2032 AB3/4 QUADRUPLER
   - OPT003 AB3/3 HIGH POWER AMPLIFIER
9. FILTER WALL ASSEMBLY INSERTED HERE (LOC.7/D) FOR THE FOLLOWING OPTIONS:-
   - AB3/5 WITH PULSE MOD.OPTION
   - AB3/4 WITH AND WITHOUT PULSE MOD.OPTION
   - AB3/3 WITH AND WITHOUT PULSE MOD.OPTION

   SEE SHEET 4 FOR WIRING CONFIGURATIONS.

Drg. No. Z 52031/000Y Sheet 1 (Issue 6)

Fig. 7-1 A0 2030 series interconnections

Component layout **AA1/3**

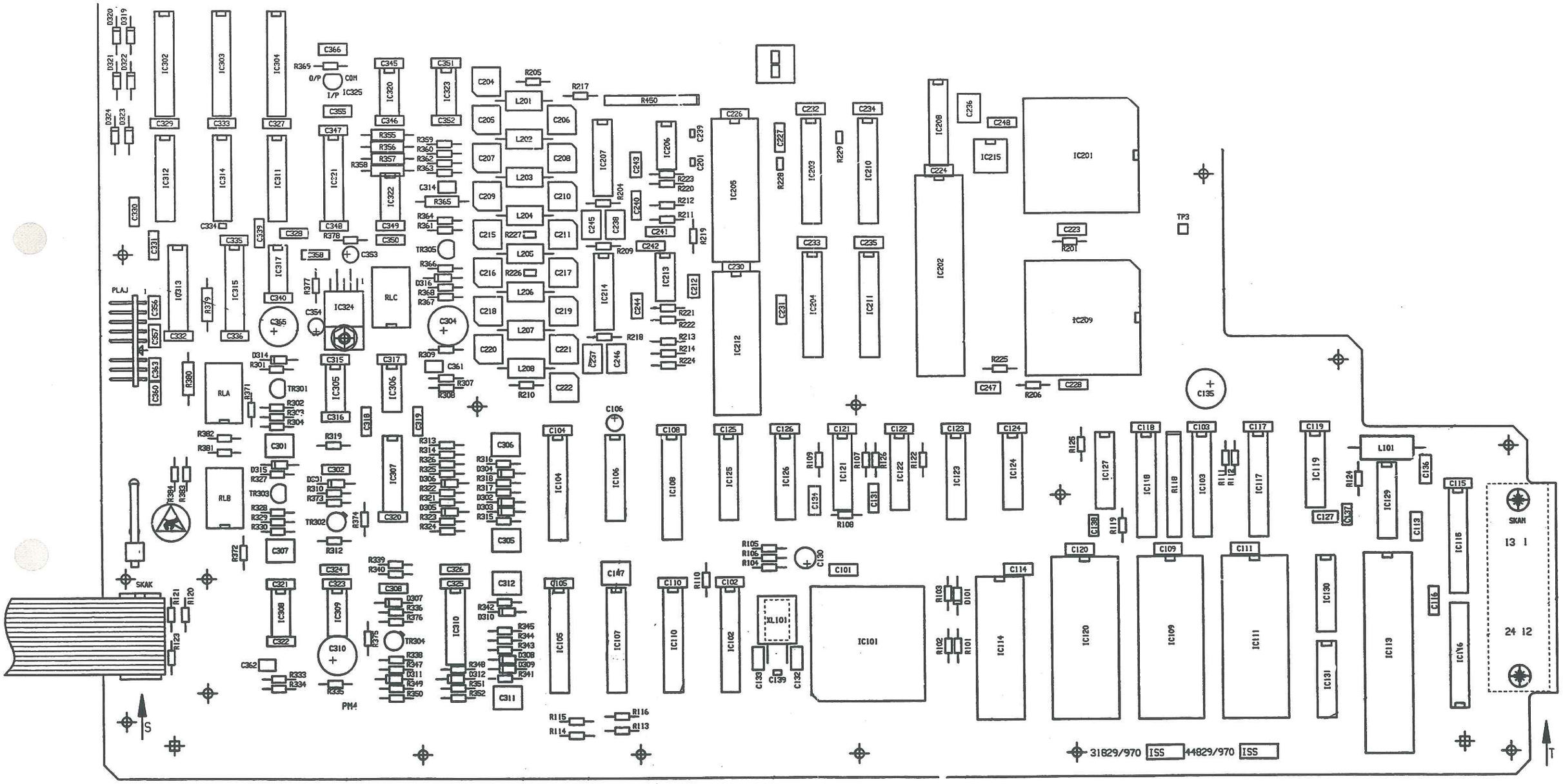


Interconnections **2030 series**

Drg. No. 44829/970C (Issue 4)

Fig. 7-2 AA1/3 Control board component layout (top half)

Component layout **AA1/3**

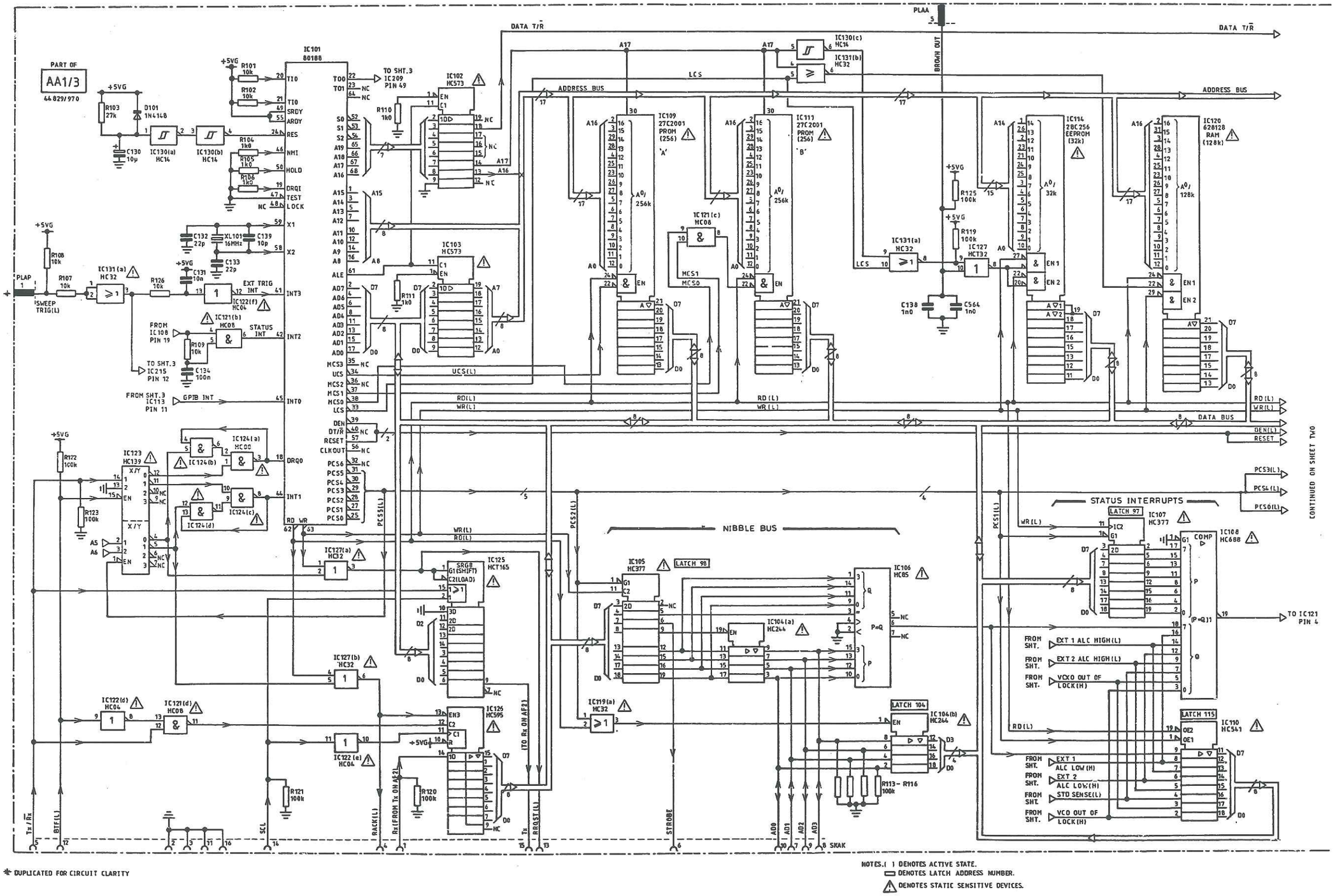


Drg. No. 44829/970C (Issue 4)

Fig. 7-3 AA1/3 Control board component layout (bottom half)

Component layout AA1/3

Processor AA1/3

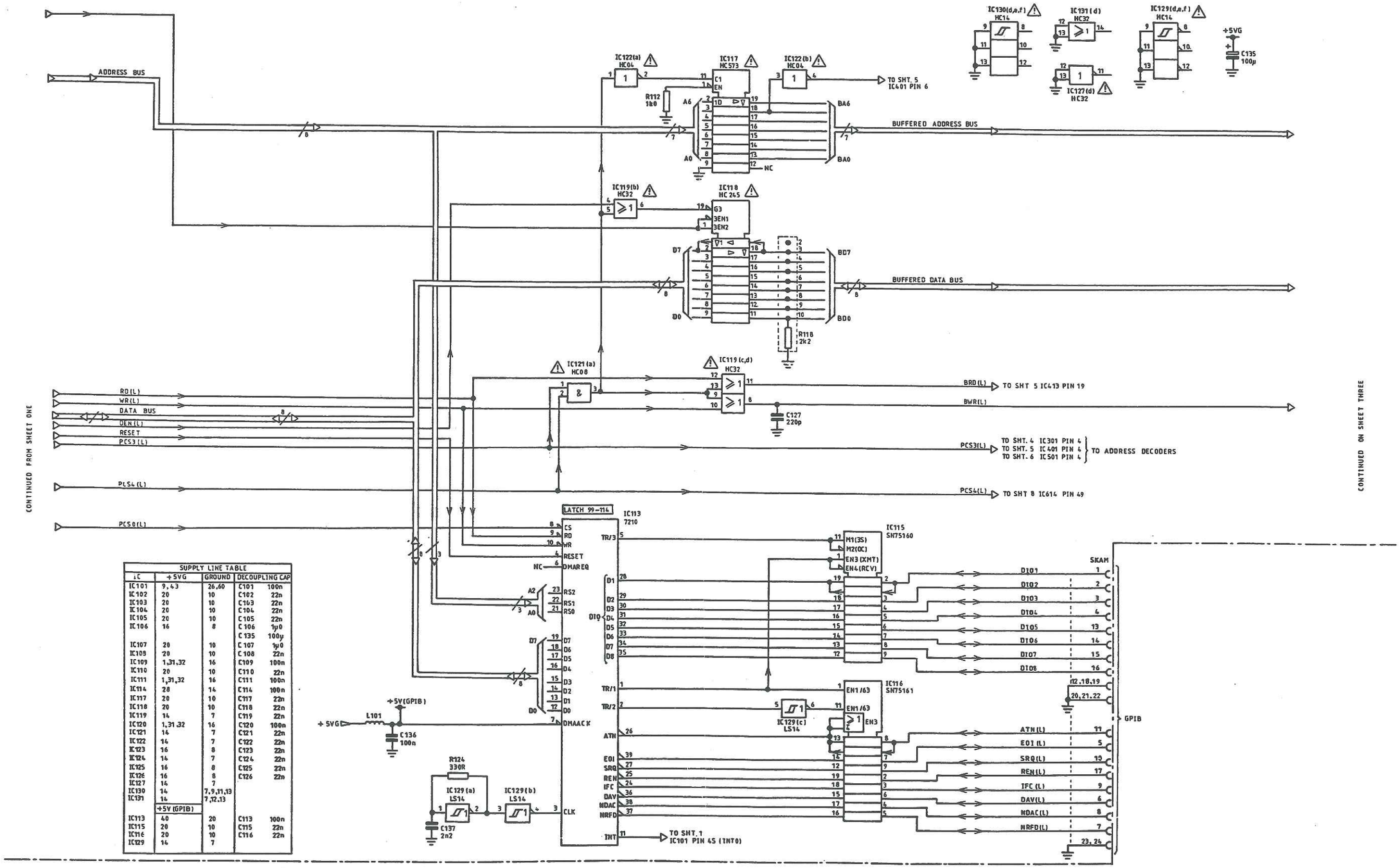


Drg. No. Z 44829/970C, Sheet 1 of 9 (Issue 1)
(In general, this circuit diagram also applies to earlier versions of the board.)

Fig. 7-4 AA1/3 Control board: Processor and memory circuit diagram

Processor AA1/3

Interface AA1/3



SUPPLY LINE TABLE					
IC	+5VG	GROUND	DECOUPLING CAP		
IC101	9,43	26,60	C101	100n	
IC102	20	10	C102	22n	
IC103	20	10	C103	22n	
IC104	20	10	C104	22n	
IC105	20	10	C105	22n	
IC106	16	8	C106	1µ0	
			C135	100µ	
IC107	20	10	C107	1µ0	
IC108	20	10	C108	22n	
IC109	1,31,32	16	C109	100n	
IC110	20	10	C110	22n	
IC111	1,31,32	16	C111	100n	
IC114	28	14	C114	100n	
IC117	20	10	C117	22n	
IC118	20	10	C118	22n	
IC119	14	7	C119	22n	
IC120	1,31,32	16	C120	100n	
IC121	14	7	C121	22n	
IC122	14	7	C122	22n	
IC123	16	8	C123	22n	
IC124	14	7	C124	22n	
IC125	16	8	C125	22n	
IC126	16	8	C126	22n	
IC127	14	7			
IC130	14	7,9,11,13			
IC131	14	7,12,13			
	+5V (GPIB)				
IC113	40	20	C113	100n	
IC115	20	10	C115	22n	
IC116	20	10	C116	22n	
IC129	14	7			

Drg. No. Z 44829/970C, Sheet 2 of 9 (Issue 1)
(In general, this circuit diagram also applies to earlier versions of the board.)

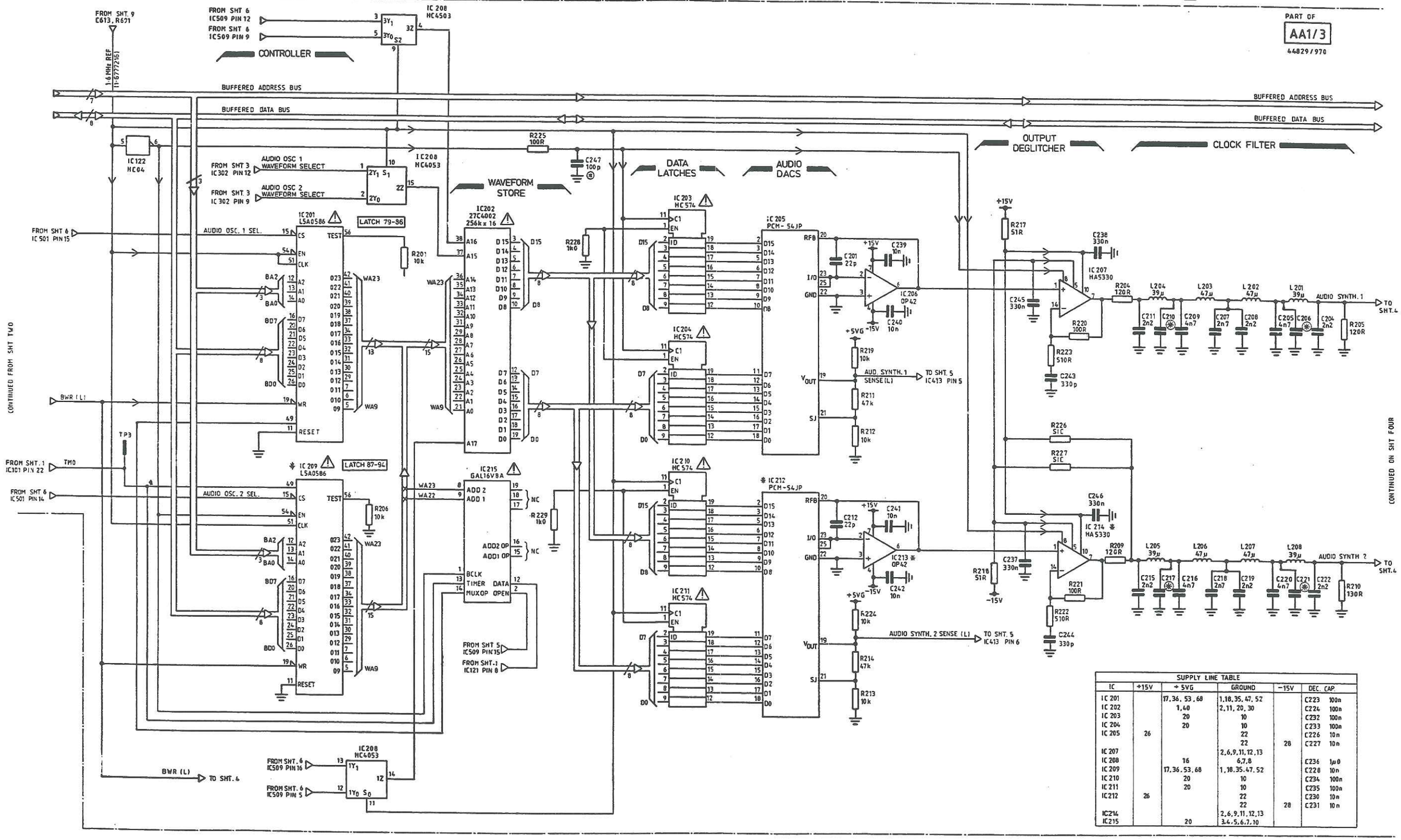
Fig. 7-5 AA1/3 Control board: Buffers and interface circuit diagram

Interface AA1/3

Audio synthesizer AA1/3

NOTE: COMPONENTS MARKED * NOT FITTED WHEN 2nd. SYNTHESIZER NOT REQUIRED.
( ) DENOTE THE ACTIVE STATE.
▭ DENOTES LATCH ADDRESS NUMBER.
⚠ DENOTES STATIC SENSITIVE DEVICES.
Ⓝ NOT FITTED

PART OF AA1/3
44829/970



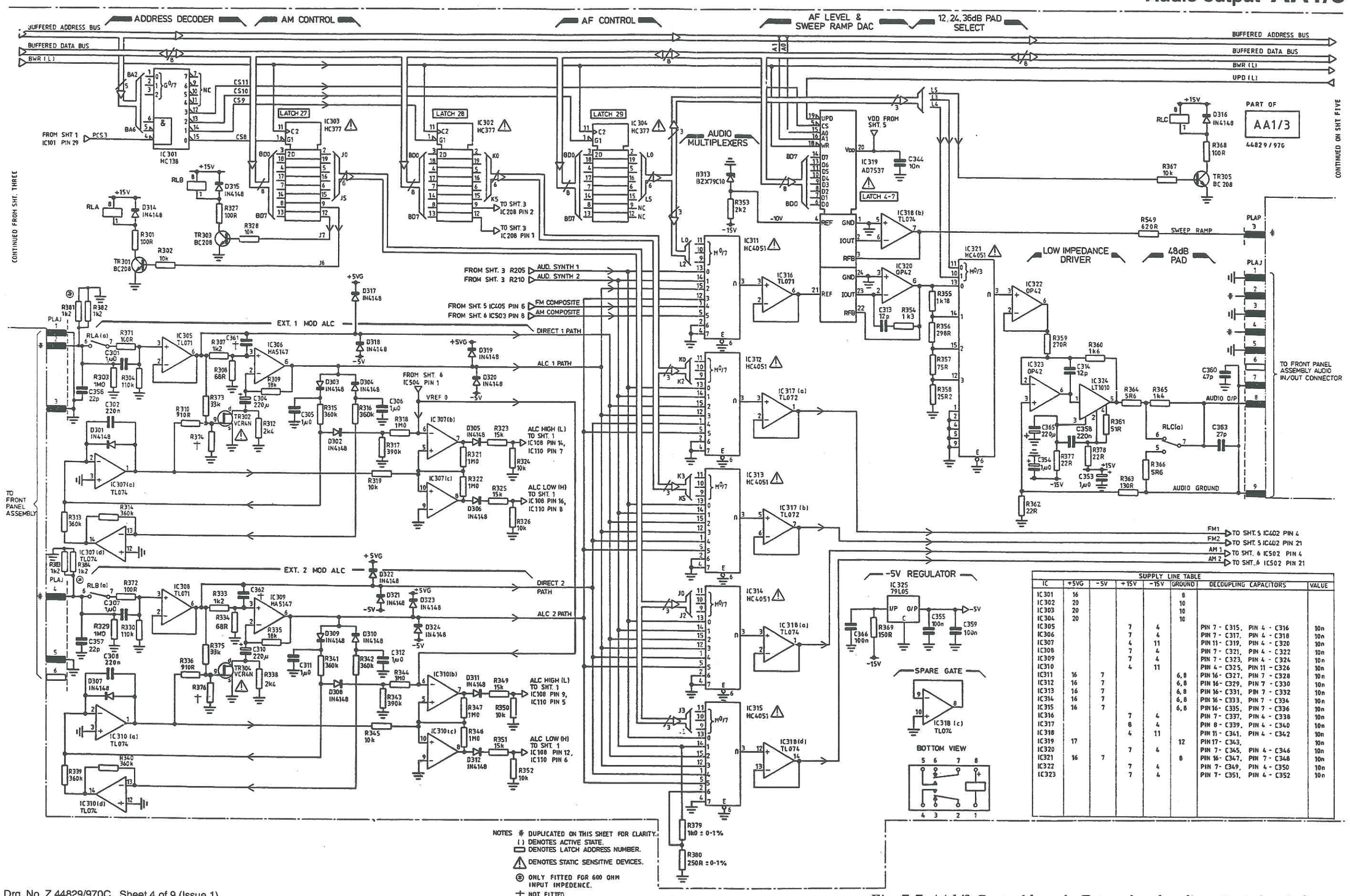
SUPPLY LINE TABLE					
IC	+15V	+5VG	GROUND	-15V	DEC. CAP
IC 201		17,36,53,68	1,18,35,47,52		C223 100n
IC 202		1,40	2,11,20,30		C224 100n
IC 203		20	10		C232 100n
IC 204		20	10		C233 100n
IC 205	26		22		C226 10n
			22	28	C227 10n
IC 207			2,6,9,11,12,13		
IC 208		16	4,7,8		C236 1µ0
IC 209		17,36,53,68	1,18,35,47,52		C228 10n
IC 210		20	10		C234 100n
IC 211		20	10		C235 100n
IC212	26		22		C230 10n
			22	28	C231 10n
IC214			2,6,9,11,12,13		
IC215		20	3,4,5,6,7,10		

Drg. No. Z 44829/970C, Sheet 3 of 9 (Issue 1)
(In general, this circuit diagram also applies to earlier versions of the board.)

Fig. 7-6 AA1/3 Control board: Audio synthesizer circuit diagram

Audio synthesizer AA1/3

Audio output AA1/3

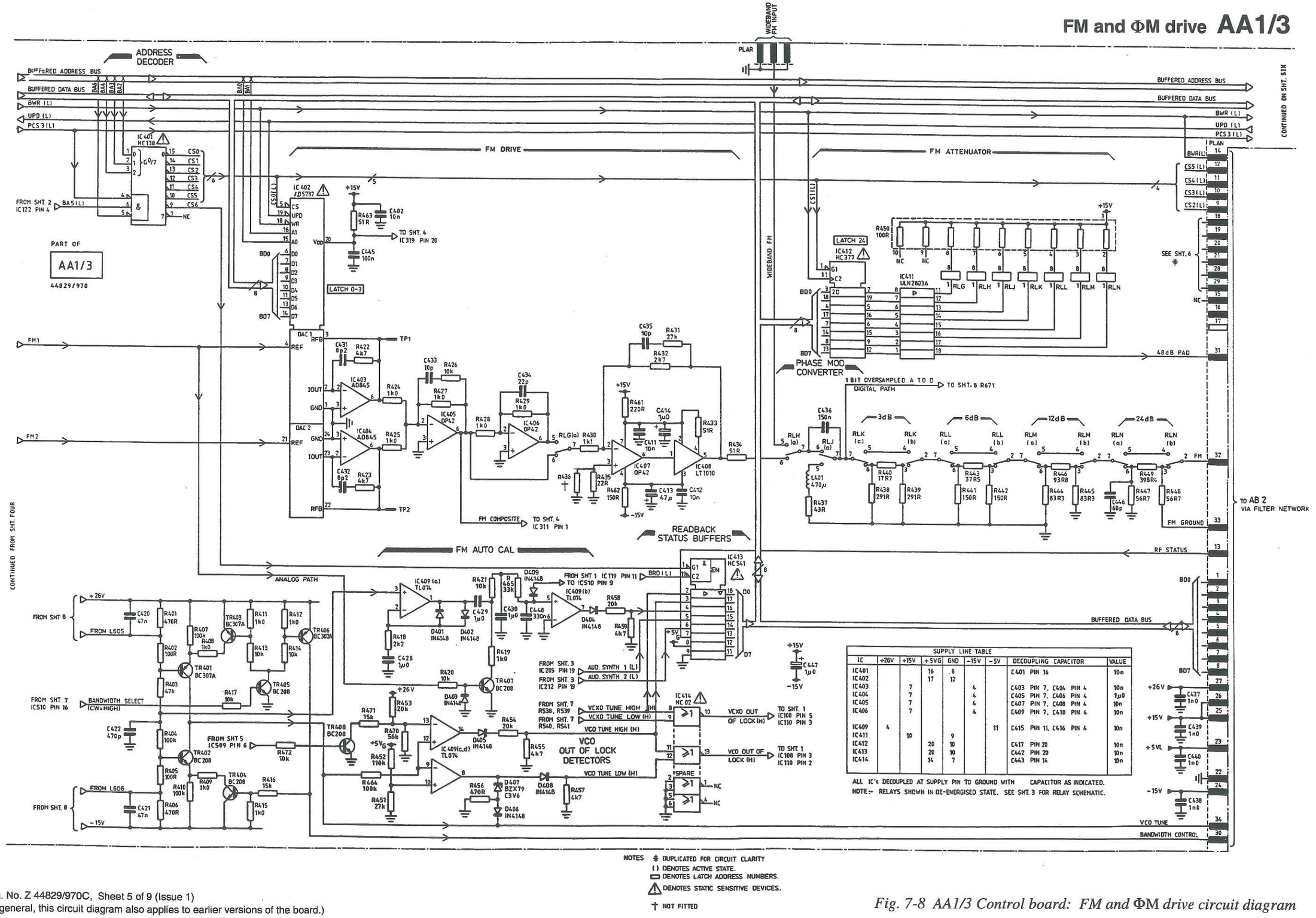


Drg. No. Z 44829/970C, Sheet 4 of 9 (Issue 1)
(In general, this circuit diagram also applies to earlier versions of the board.)

Fig. 7-7 AA1/3 Control board: Ext mod and audio output circuit diagram

Audio output AA1/3

FM and ΦM drive AA1/3



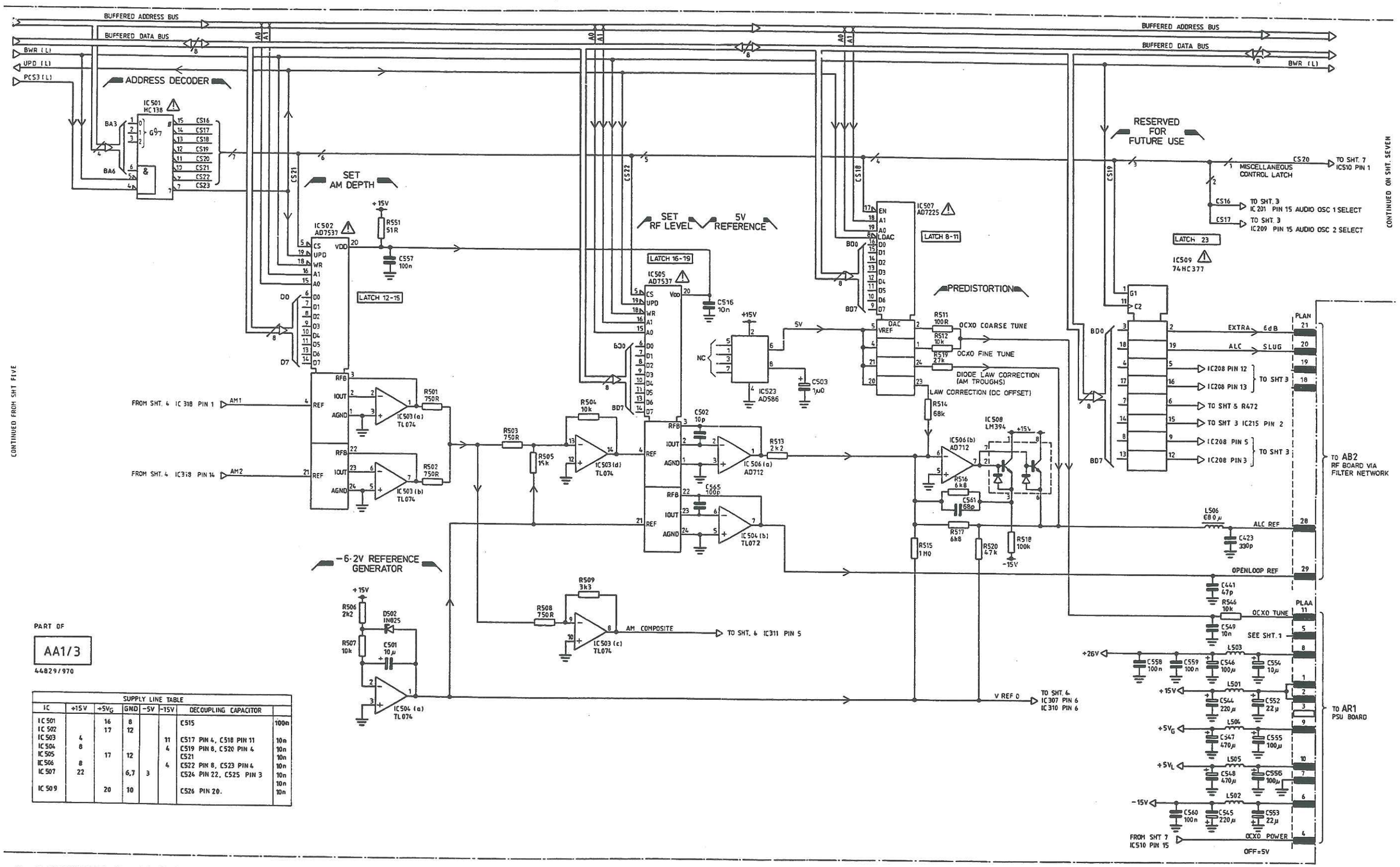
Drg. No. Z 44829/970C, Sheet 5 of 9 (Issue 1)
(In general, this circuit diagram also applies to earlier versions of the board.)

Fig. 7-8 AA1/3 Control board: FM and ΦM drive circuit diagram

FM and ΦM drive AA1/3

AM drive & RF level AA1/3

NOTES: ※ INDICATES COMPONENT ONLY LOADED WHEN REQUIRED.
▭ DENOTES LATCH ADDRESS NUMBER.
⚠ DENOTES STATIC SENSITIVE DEVICES.



PART OF
AA1/3
44829/970

SUPPLY LINE TABLE

IC	+15V	+5VG	GND	-5V	-15V	DECOUPLING CAPACITOR	
IC 501		16	8			C515	100n
IC 502		17	12				
IC 503	4				11	C517 PIN 4, C518 PIN 11	10n
IC 504	8				4	C519 PIN 8, C520 PIN 4	10n
IC 505		17	12			C521	10n
IC 506	8					C522 PIN 8, C523 PIN 4	10n
IC 507	22		6,7	3	4	C524 PIN 22, C525 PIN 3	10n
							10n
IC 509		20	10			C526 PIN 20.	10n

Drg. No. Z 44829/970C, Sheet 6 of 9 (Issue 1)
(In general, this circuit diagram also applies to earlier versions of the board.)

Fig. 7-9 AA1/3 Control board: AM drive and RF level cicuit diagram


AM drive & RF level
AA1/3

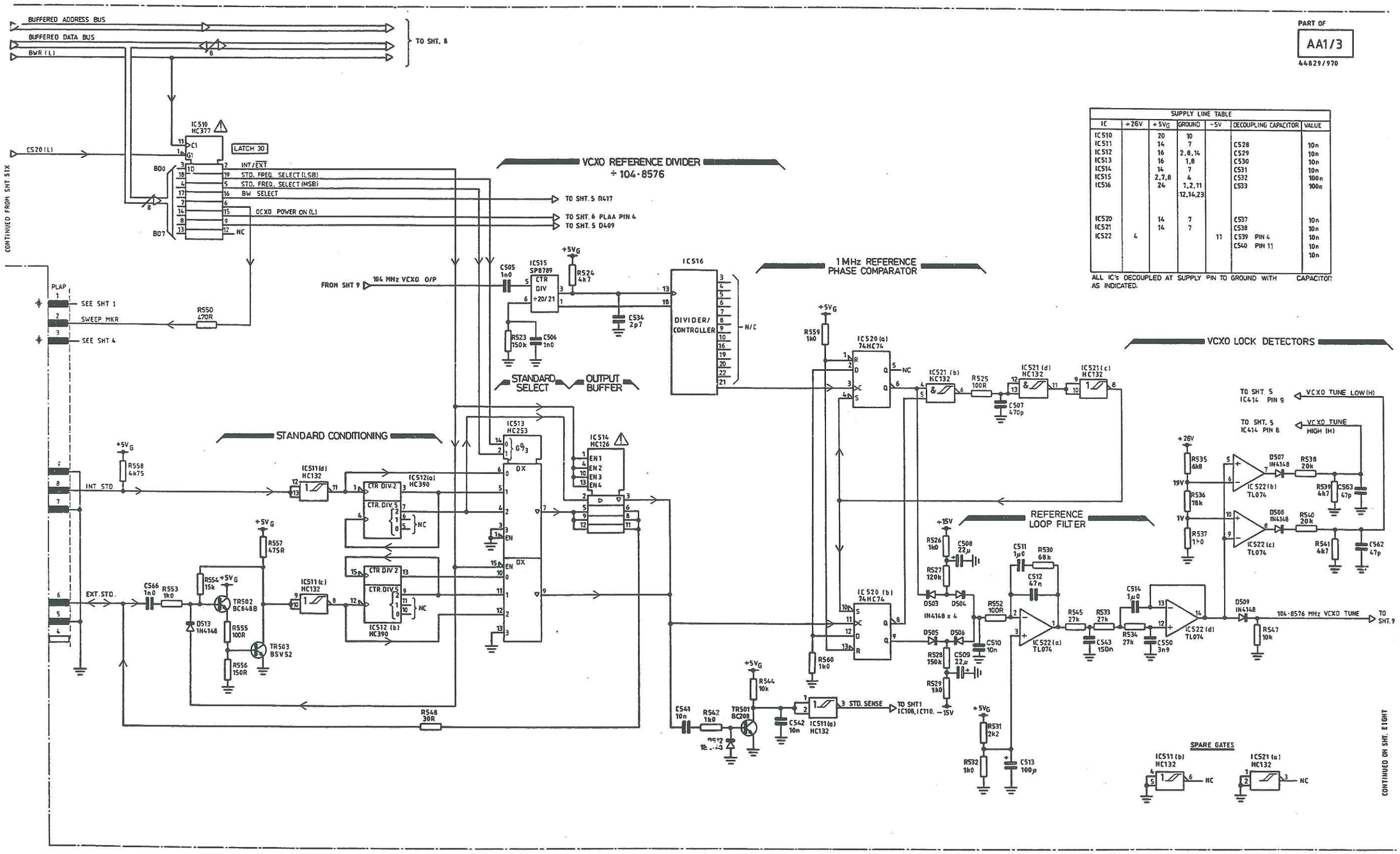
Reference PLL AA1/3

NOTES ( ) DENOTES ACTIVE STATE.
▭ DENOTES LATCH ADDRESS NUMBER.
⚠ DENOTES STATIC SENSITIVE DEVICES.
* DUPLICATED FOR CIRCUIT CLARITY

PART OF AA1/3
44829/970

SUPPLY LINE TABLE						
IC	+26V	+5VG	GROUND	-5V	DECOUPLING CAPACITOR	VALUE
IC510		20	10			
IC511		14	7		C528	10n
IC512		16	2,8,14		C529	10n
IC513		16	1,8		C530	10n
IC514		14	7		C531	10n
IC515		2,7,8	4		C532	100n
IC516		24	1,2,11		C533	100n
			12,14,23			
IC520		14	7		C537	10n
IC521		14	7		C538	10n
IC522	4			11	C539 PIN 4	10n
					C540 PIN 11	10n
						10n

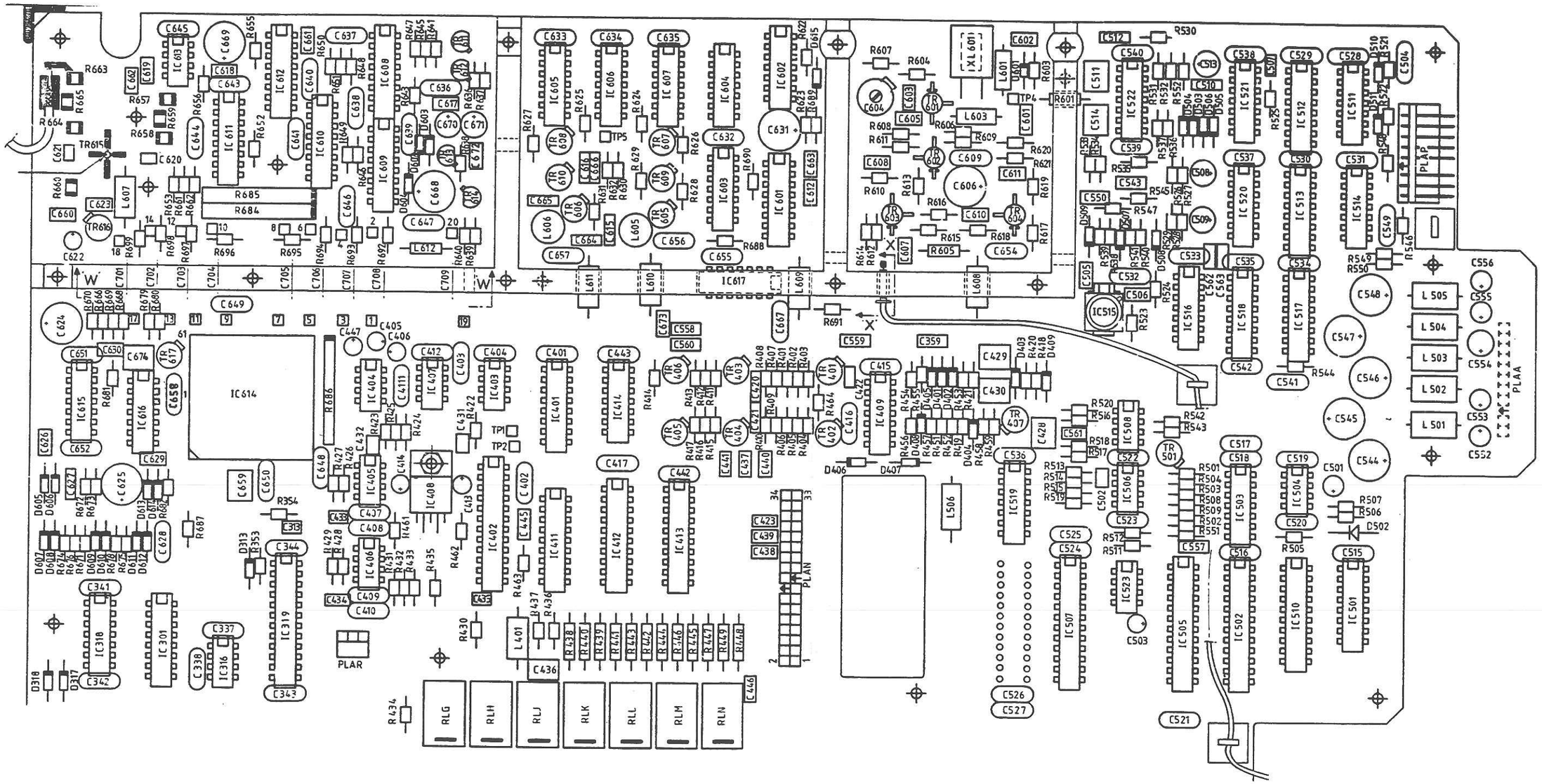
ALL IC's DECOUPLED AT SUPPLY PIN TO GROUND WITH CAPACITOR AS INDICATED.



Drg. No. Z 44829/970C, Sheet 7 of 9 (Issue 1)
(In general, this circuit diagram also applies to earlier versions of the board.)

Fig. 7-10 AA1/3 Control board: Reference PLL circuit diagram

Component layout AA1



Reference PLL AA1/3

Drg. No. 44829/544G (Issue 1)

Fig. 7-11 AA1 Control board component layout (top half)

Component layout **AA1**

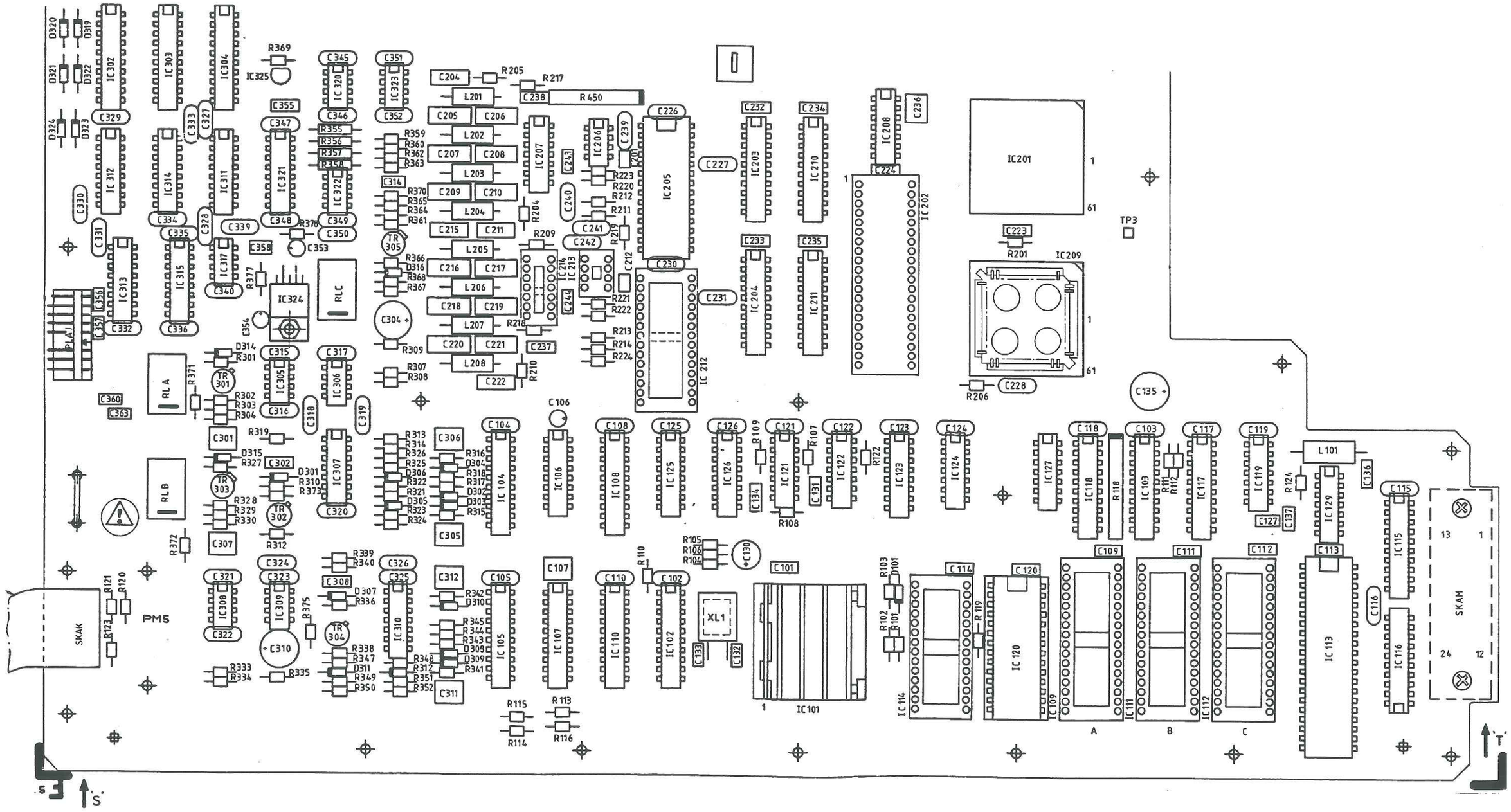


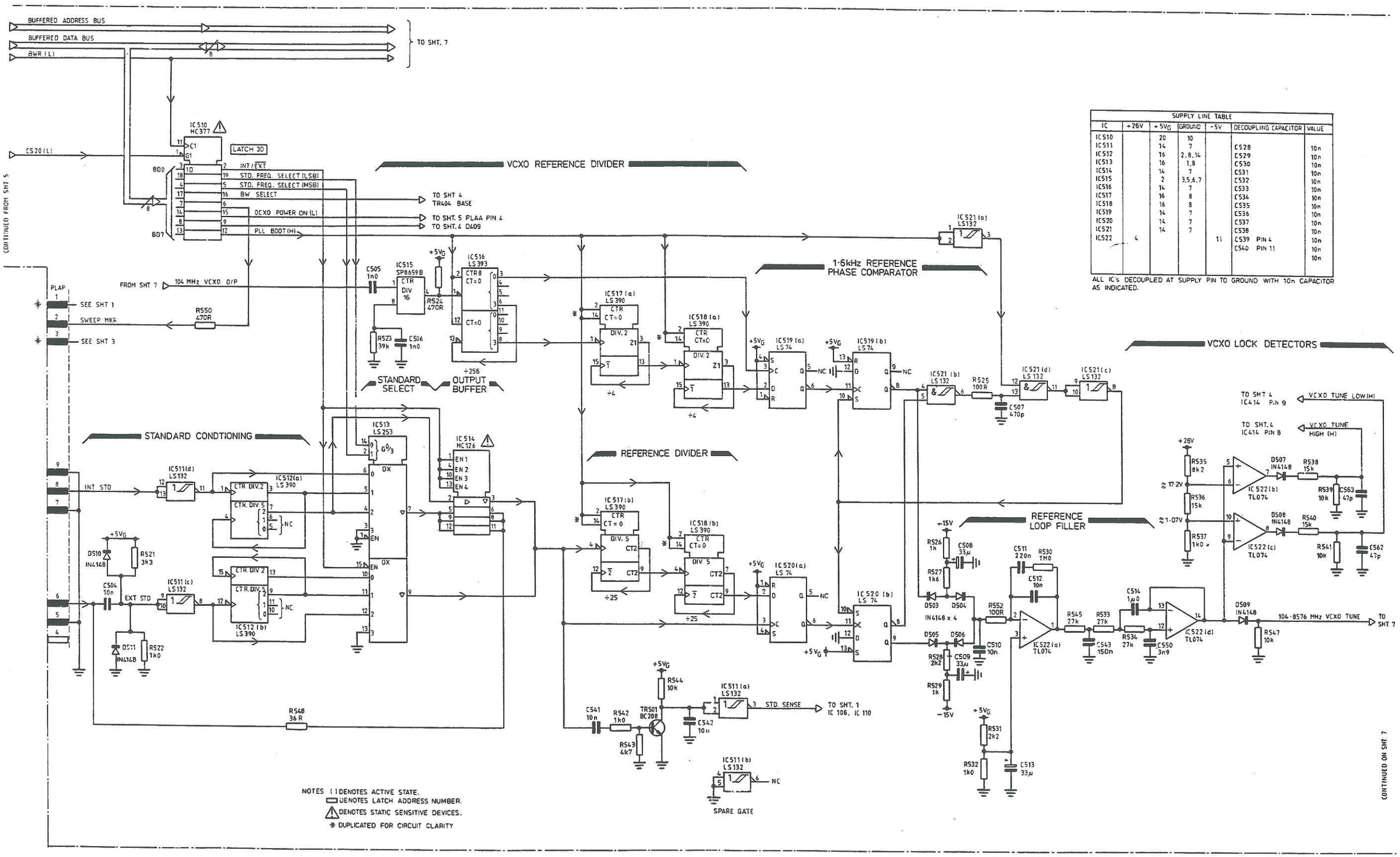
Fig. 7-12 AA1 Control board component layout (bottom half)

Drg. No. 44829/544G (Issue 1)

Component layout AA1

Component layout AA1

Reference PLL AA1



SUPPLY LINE TABLE

IC	+26V	+5VG	GROUND	-5V	DECOUPLING CAPACITOR	VALUE
IC510		20	10			
IC511		14	7		C528	10n
IC512		16	8, 14		C529	10n
IC513		16	1, 8		C530	10n
IC514		14	7		C531	10n
IC515		2	3, 5, 6, 7		C532	10n
IC516		14	7		C533	10n
IC517		16	8		C534	10n
IC518		16	8		C535	10n
IC519		14	7		C536	10n
IC520		14	7		C537	10n
IC521		14	7		C538	10n
IC522	4			11	C539 PIN 4	10n
					C540 PIN 11	10n
						10n

ALL IC's DECOUPLED AT SUPPLY PIN TO GROUND WITH 10n CAPACITOR AS INDICATED.

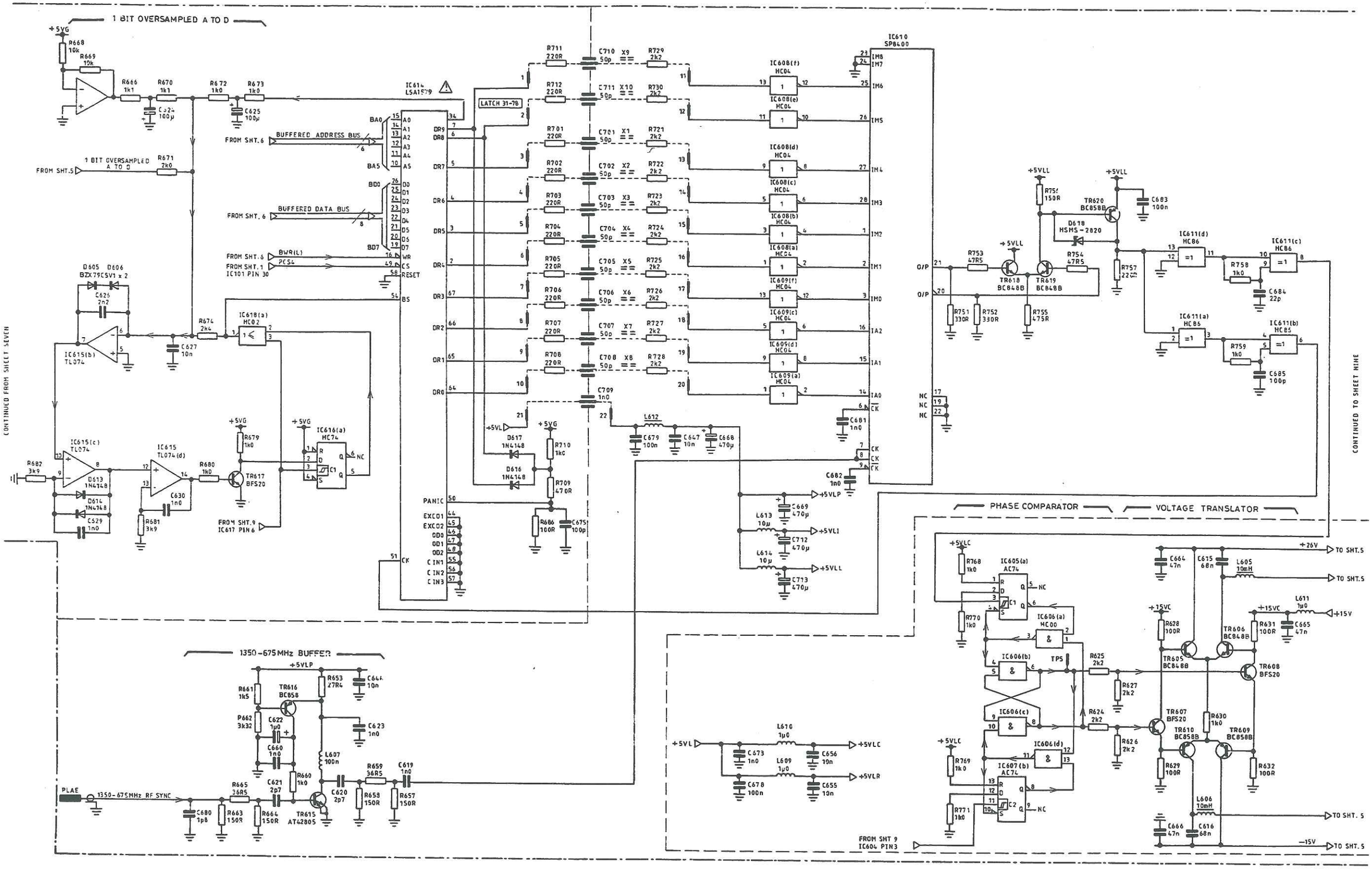
NOTES ( ) DENOTES ACTIVE STATE.
▭ DENOTES LATCH ADDRESS NUMBER.
⚠ DENOTES STATIC SENSITIVE DEVICES.
* DUPLICATED FOR CIRCUIT CLARITY

Drg. No. Z 44829/544G, Sheet 6 of 7 (Issue 4)

Fig. 7-13 AA1 Control board: Reference PLL circuit diagram

Reference PLL **AA1**

Carrier synthesizer AA1/3



NOTES. ( ) DENOTES ACTIVE STATE
□ DENOTES LATCH ADDRESS NUMBERS
⚠ DENOTES STATIC SENSITIVE DEVICES

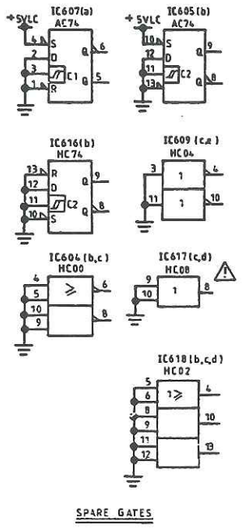
Drg. No. Z 44829/970C, Sheet 8 of 9 (Issue 2)

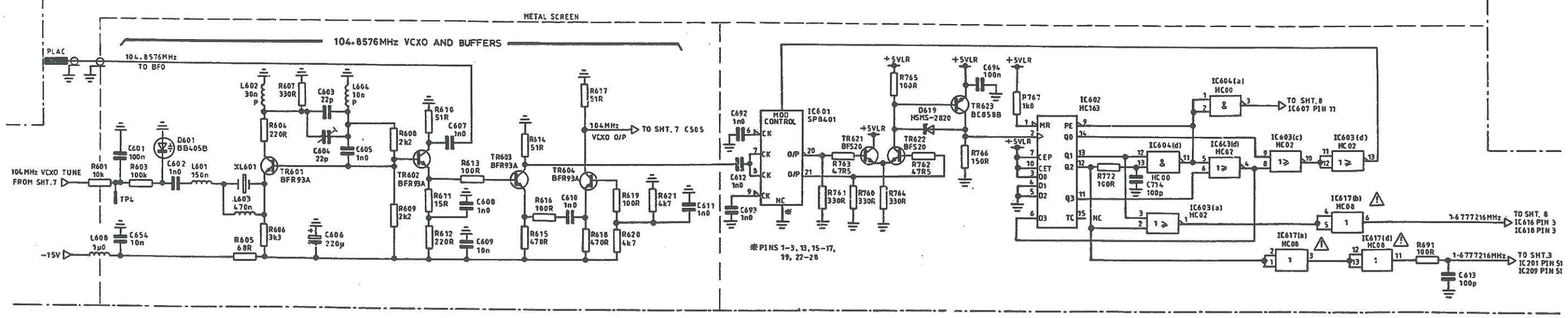
Fig. 7-14 AA1/3 Control board: Carrier synthesizer circuit diagram

Carrier synthesizer **AA1/3**

VCXO & dividers AA1/3

SUPPLY LINE TABLE				
IC	+5VLR	GROUND	DEC CAP	VALUE
IC601	4,11,12,18	5,10	C631 PINS 11,12	470µ
			C695 PIN 4	10n
			C696 PINS 11,12	10n
			C697 PIN 18	10n
IC602	16	8	C698 PIN 16	10n
IC603	14	7	C699 PIN 14	10n
IC604	14	7	C700 PIN 14	10n
	+5VLC			
IC605	14	7	C633 PIN 14	10n
IC606	14	7	C634 PIN 14	10n
IC607	14	7	C635 PIN 14	10n
	+5VL1			
IC608	14	7	C686 PIN 14	10n
IC609	14	7	C687 PIN 14	10n
	+5VLP			
IC610	4,11,12,18	5,10,13	C688 PIN 4	10n
			C689 PINS 11,12	10n
			C690 PIN 18	10n
	+5VLL			
IC611	14	7	C691 PIN 14	10n
	+5VG			
IC614	17,36,53,68	1,18,35,52	C653 PIN 36	10n
			C649 PIN 53	10n
			C650 PIN 17	10n
			C658 PIN 68	10n
			C659 PIN 17	1µ0
IC616	14	7	C674 PIN 14	1µ0
IC617	14 +5VL	7	C677 PIN 14	100n
	+15V	15		
IC615	4	11	C651 PIN 14	10n
			C652 PIN 11	10n
	+5VG	GROUND		
IC618	14	7	C628 PIN 14	10n

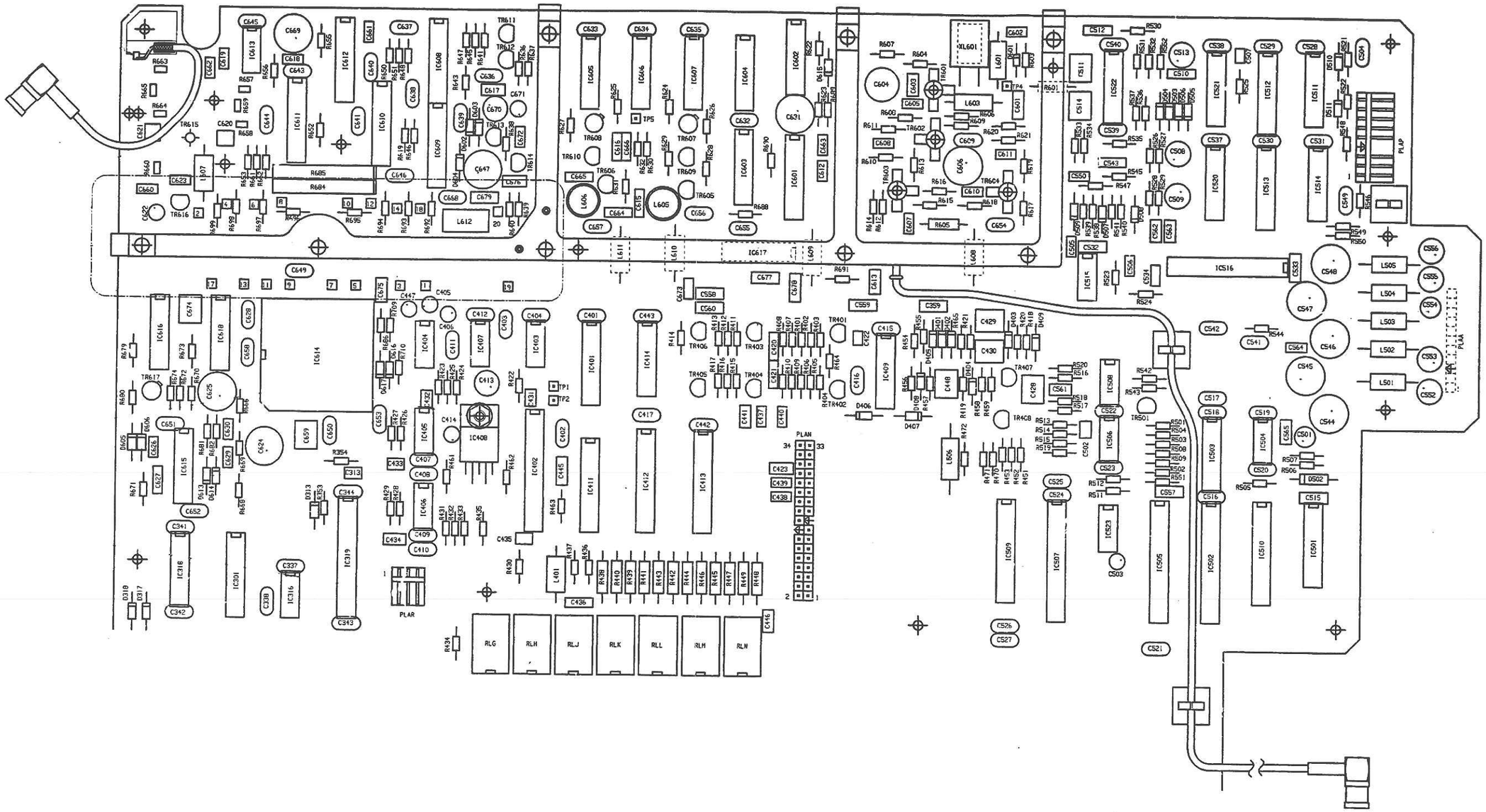




Drg. No. Z 44829/970C, Sheet 9 of 9 (Issue 1)

Fig. 7-15 AA1/3 Control board: VCXO and dividers circuit diagram

Component layout **AA1/2**



VCXO & divider **AA1/3**

Drg. No. 44829/800M (Issue 9)

Fig. 7-16 AA1/2 Control board component layout (top half)

Component layout **AA1/2**

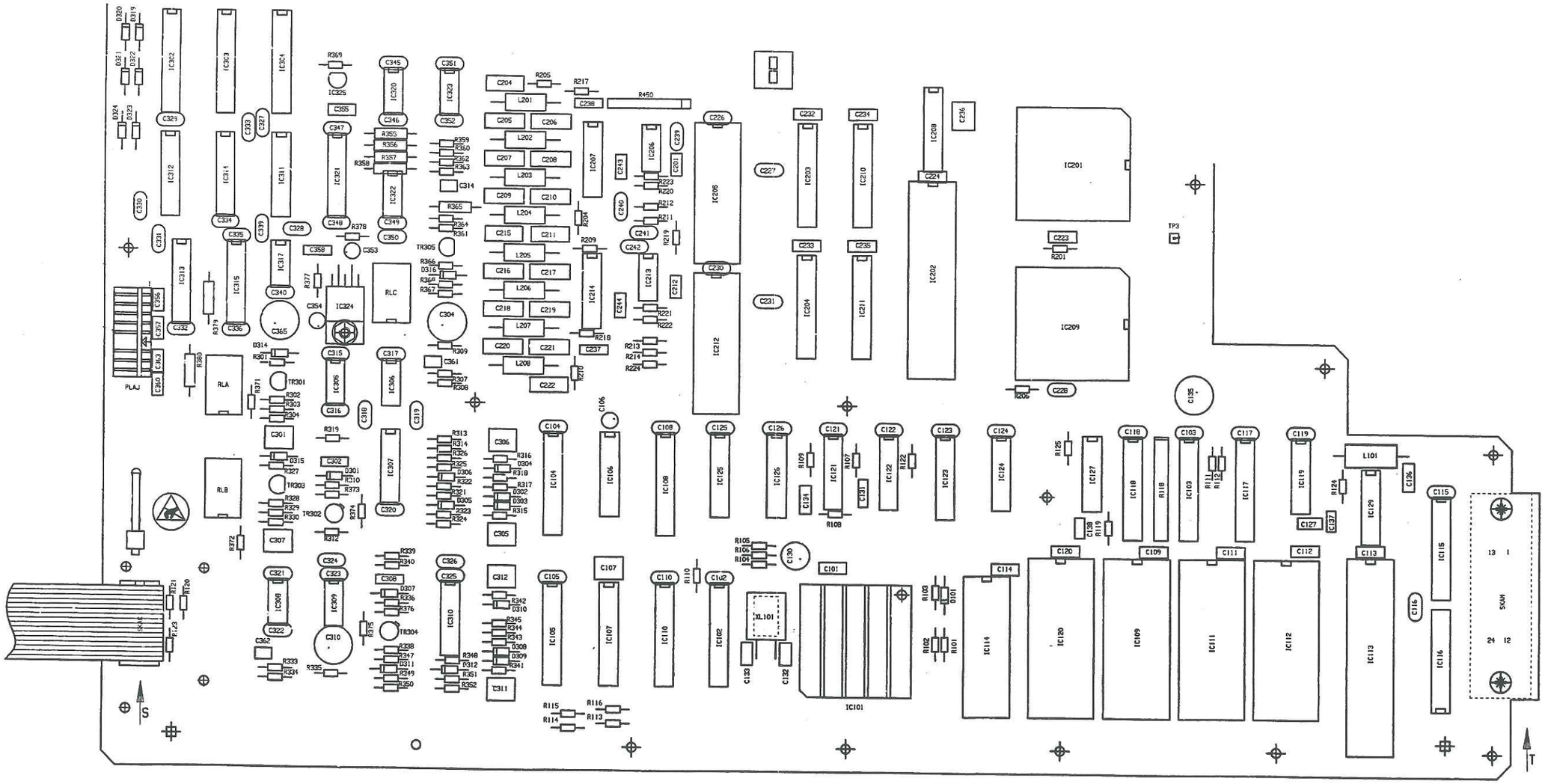
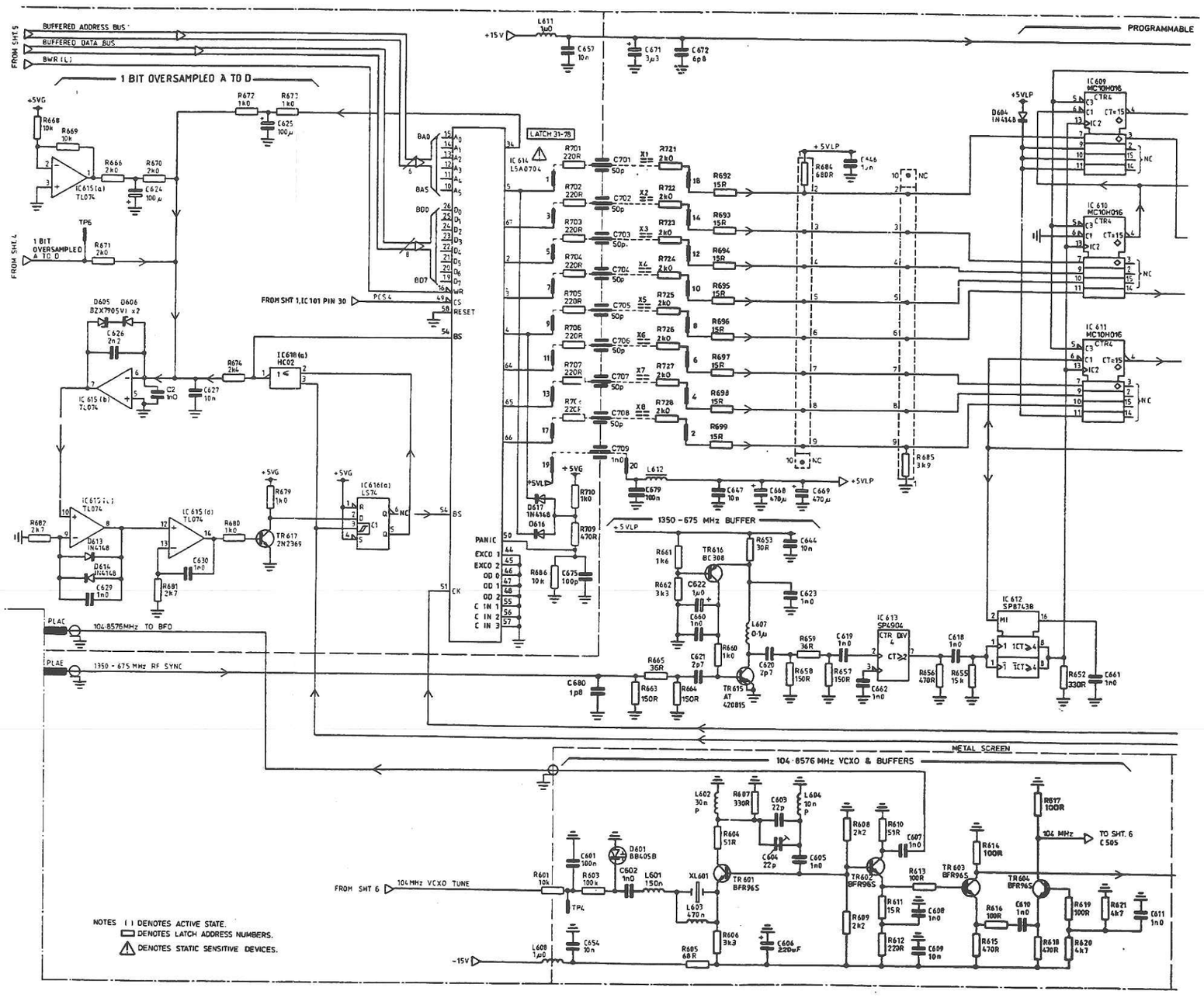


Fig. 7-17 AA1/2 Control board component layout (bottom half)

RF processing AA1/2

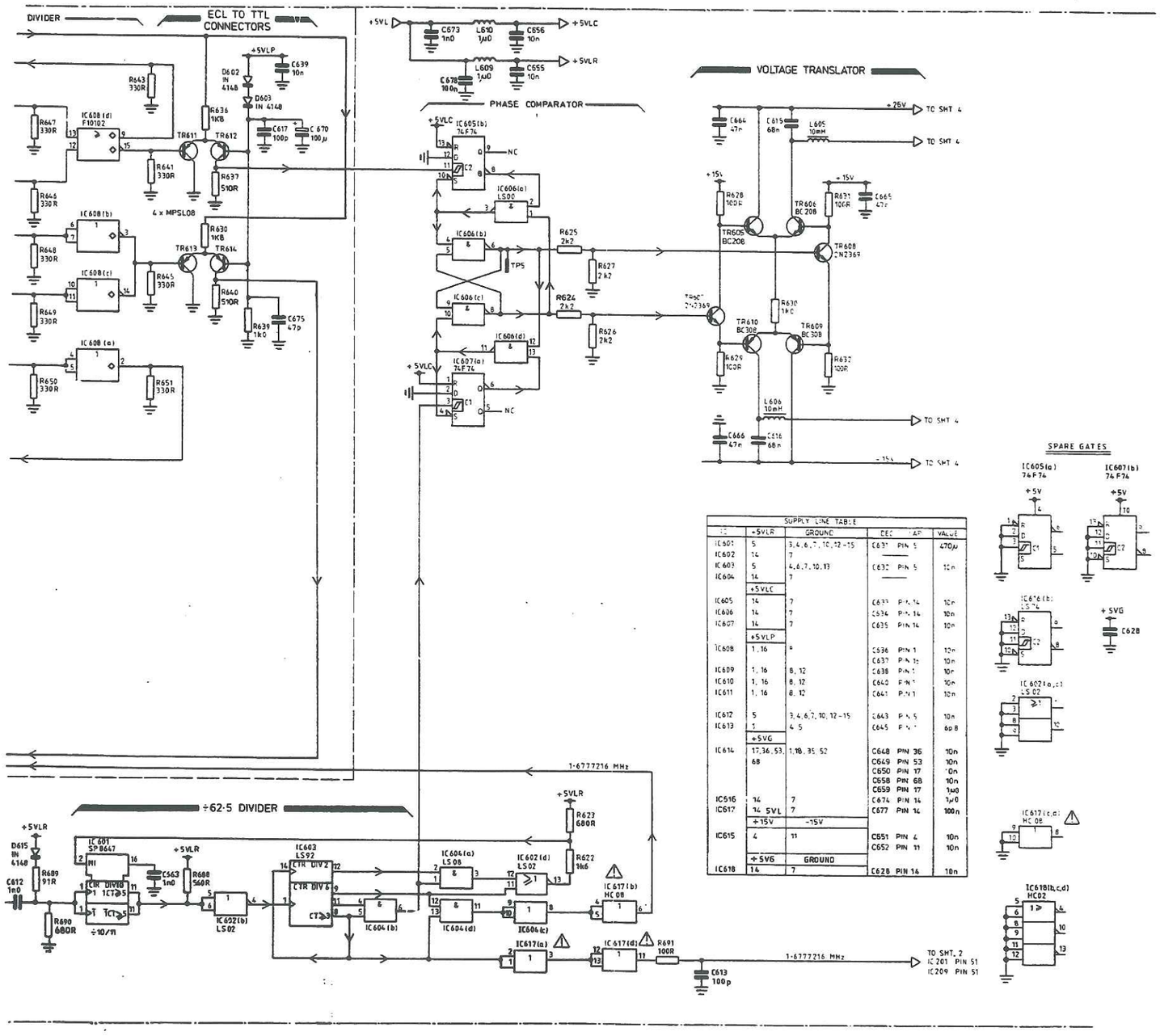


Component layout AA1/2

Drg. No. 44829/800M, Sheet 7 of 7 (Issue 6)
(In general, this circuit diagram also applies to earlier versions of the board.)

Fig. 7-18 AA1/2 Control board: RF processing ciruit diagram (left half)

RF processing AA1/2

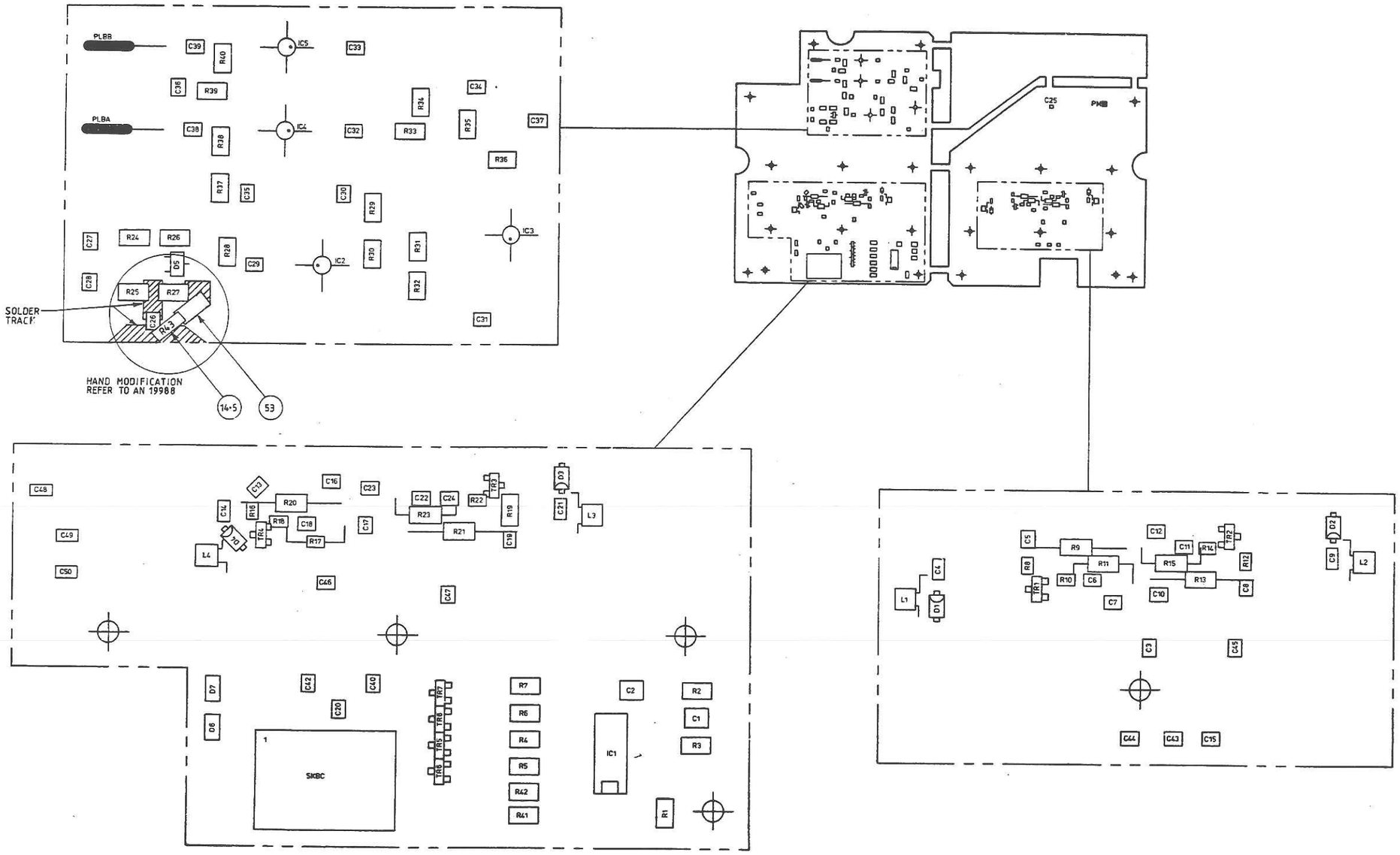


	+5VLR	GROUND	DECOUPLING	VALUE
IC601	5	3,4,6,7,10,12-15	C631 PIN 5	470µ
IC602	14	7		
IC603	5	4,6,7,10,13	C632 PIN 5	10n
IC604	14	7		
	+5VLC			
IC605	14	7	C633 PIN 14	10n
IC606	14	7	C634 PIN 14	10n
IC607	14	7	C635 PIN 14	10n
	+5VLP			
IC608	1,16	8	C636 PIN 1	10n
			C637 PIN 16	10n
IC609	1,16	8,12	C638 PIN 1	10n
IC610	1,16	8,12	C640 PIN 1	10n
IC611	1,16	8,12	C641 PIN 1	10n
IC612	5	3,4,6,7,10,12-15	C643 PIN 5	10n
IC613	1	4,5	C645 PIN 1	68n
	+5VG			
IC614	17,36,53,68	1,18,35,52	C648 PIN 36	10n
			C649 PIN 53	10n
			C650 PIN 17	10n
			C658 PIN 68	10n
			C659 PIN 17	1µ0
IC616	14	7	C674 PIN 14	1µ0
IC617	14 5VL	7	C677 PIN 14	100n
	+15V	-15V		
IC615	4	11	C651 PIN 4	10n
			C652 PIN 11	10n
	+5VG	GROUND		
IC618	14	7	C628 PIN 14	10n

Drg. No. 44829/800M, Sheet 7 of 7 (Issue 6)
(In general, this circuit diagram also applies to earlier versions of the board.)

Fig. 7-19 AA1/2 Control board: RF precessing circuit diagram (right half)

Component layout **AB1**

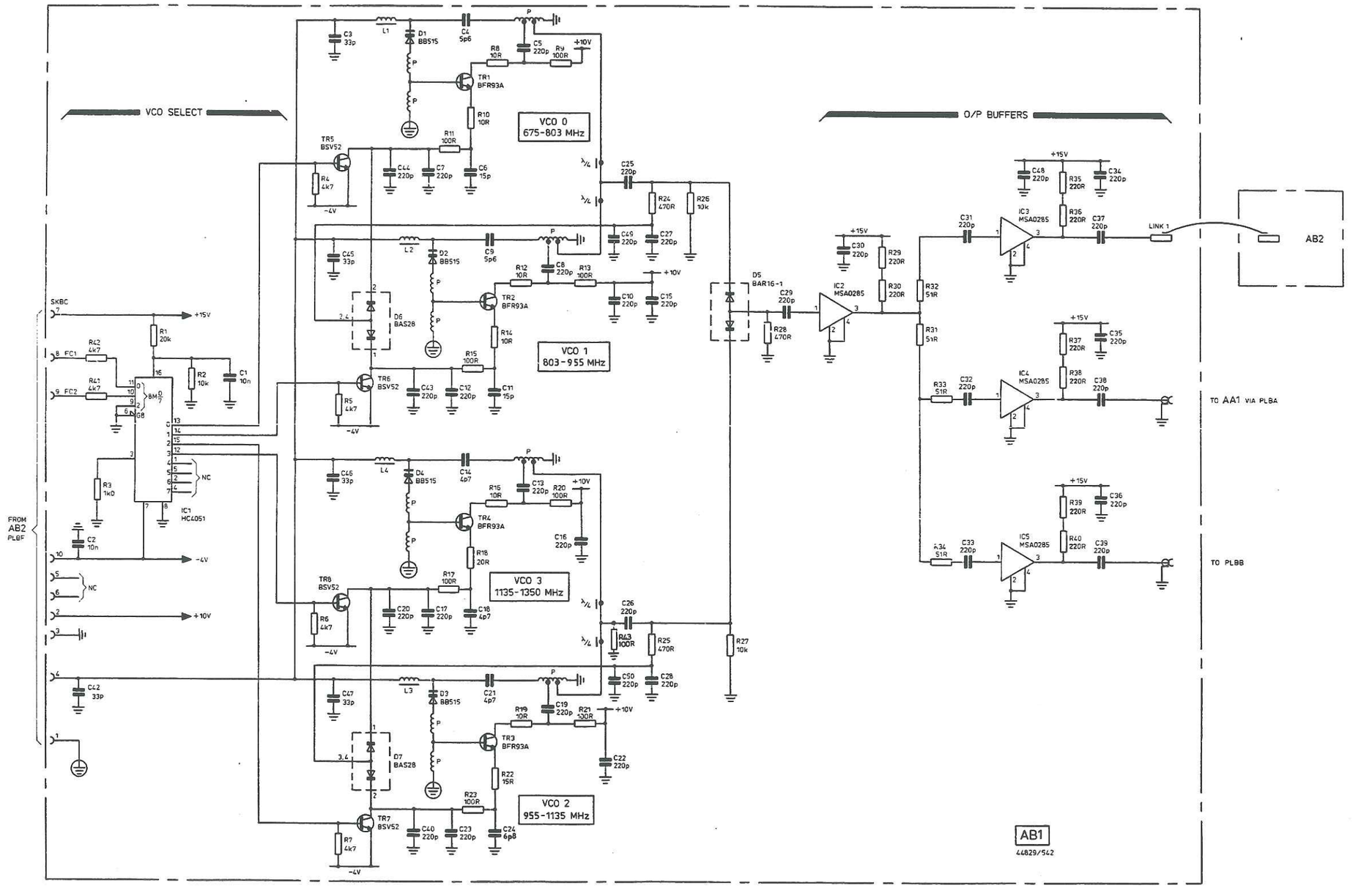


RF processing **AA1/2**

Drg. No. 44829/542J (Issue 2)

Fig. 7-20 AB1 VCO board component layout

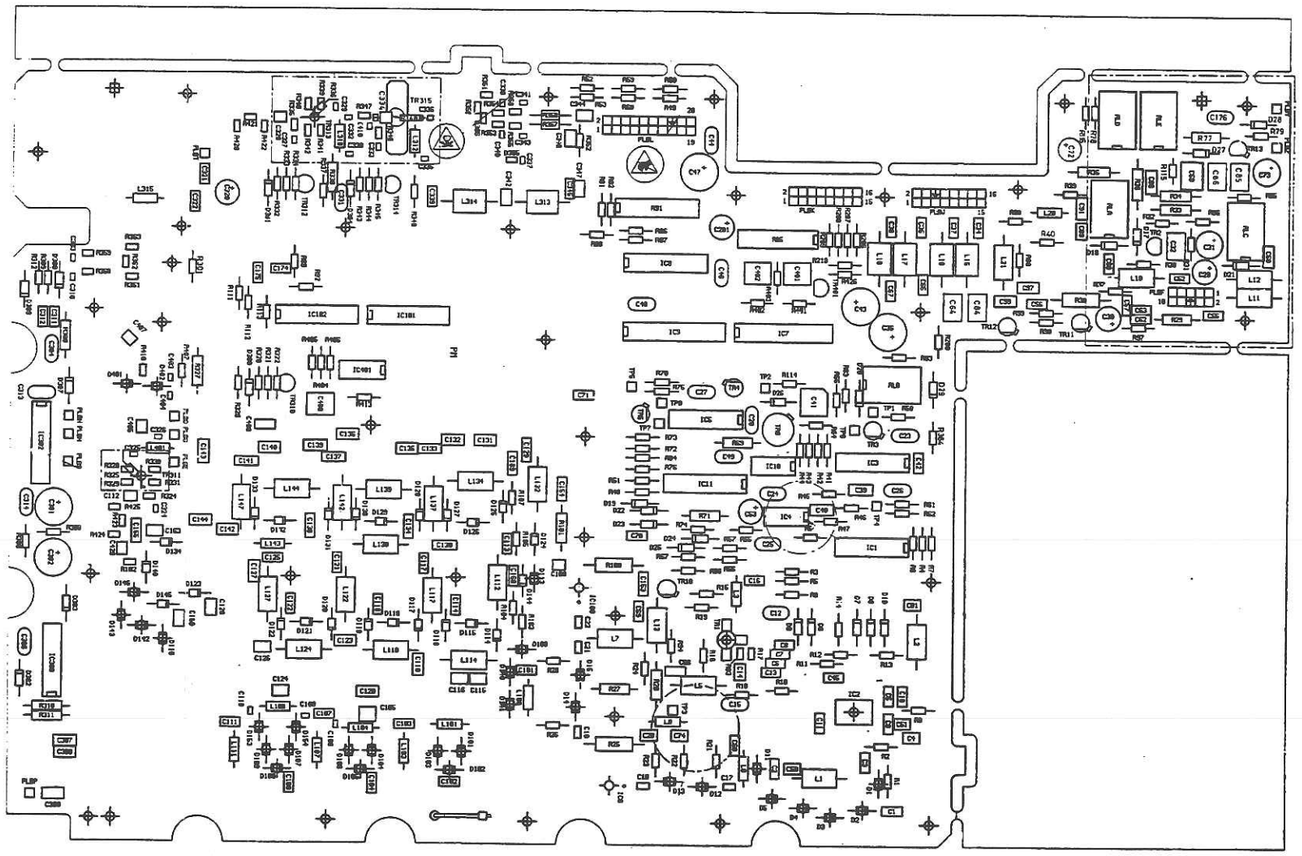
VCO board AB1



Drg. No. Z 44829/542J, Sheet 1 of 1 , (Issue 7)

Fig. 7-21 AB1 VCO board circuit diagram

Component layout **AB2/2**

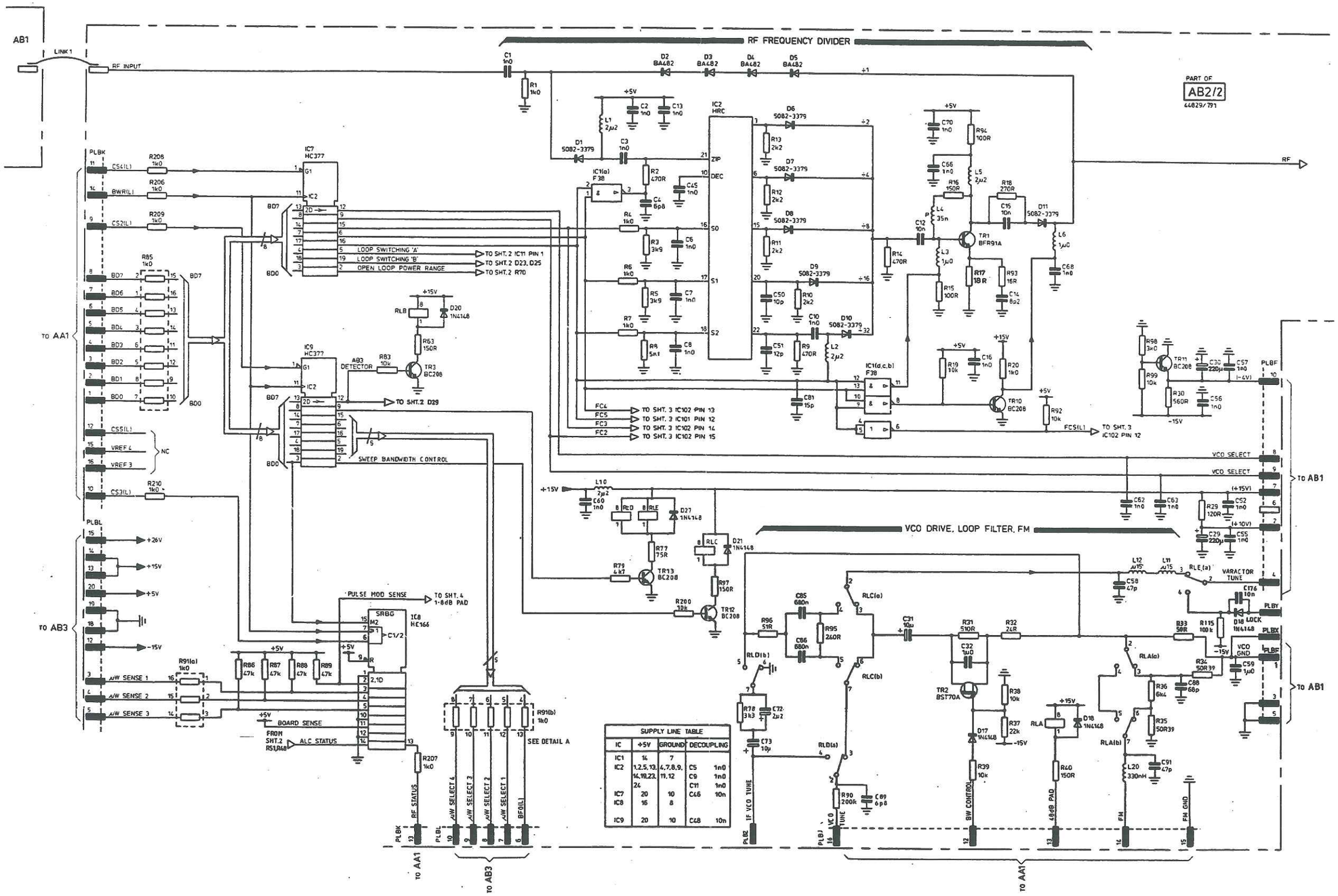


VCO board **AB1**

Drg. No. 44829/791T (Issue 9)

Fig. 7-22 AB2/2 RF board component layout

Dividers & FM drive AB2/2

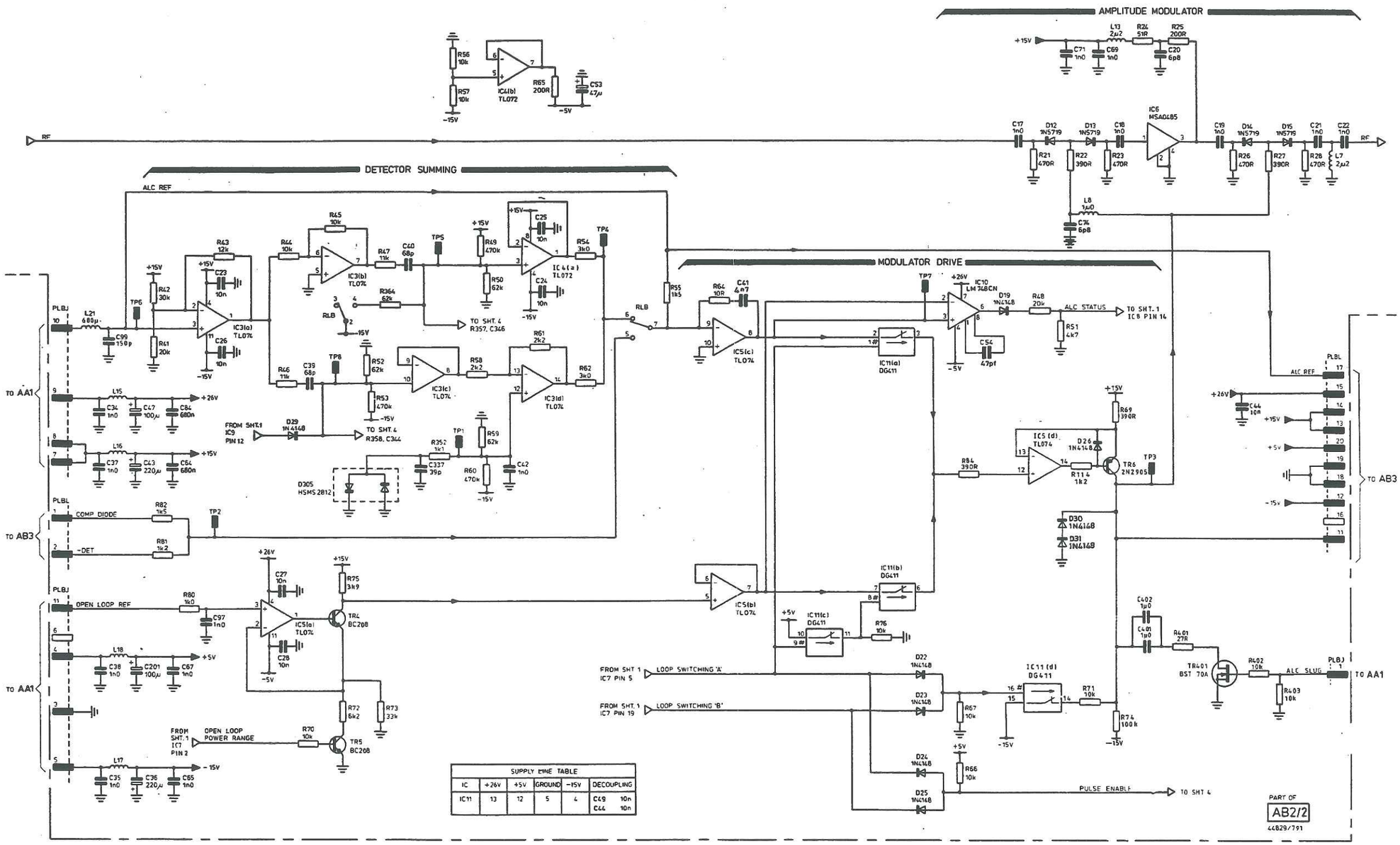


Drg. No. Z 44829/791T, Sheet 1 of 4 (Issue 7)
(In general, this circuit diagram also applies to earlier versions of the board.)

Fig. 7-23 AB2/2 RF board: Dividers and FM drive circuit diagram

Dividers & FM drive AB2/2

Modulator & decoding AB2/2



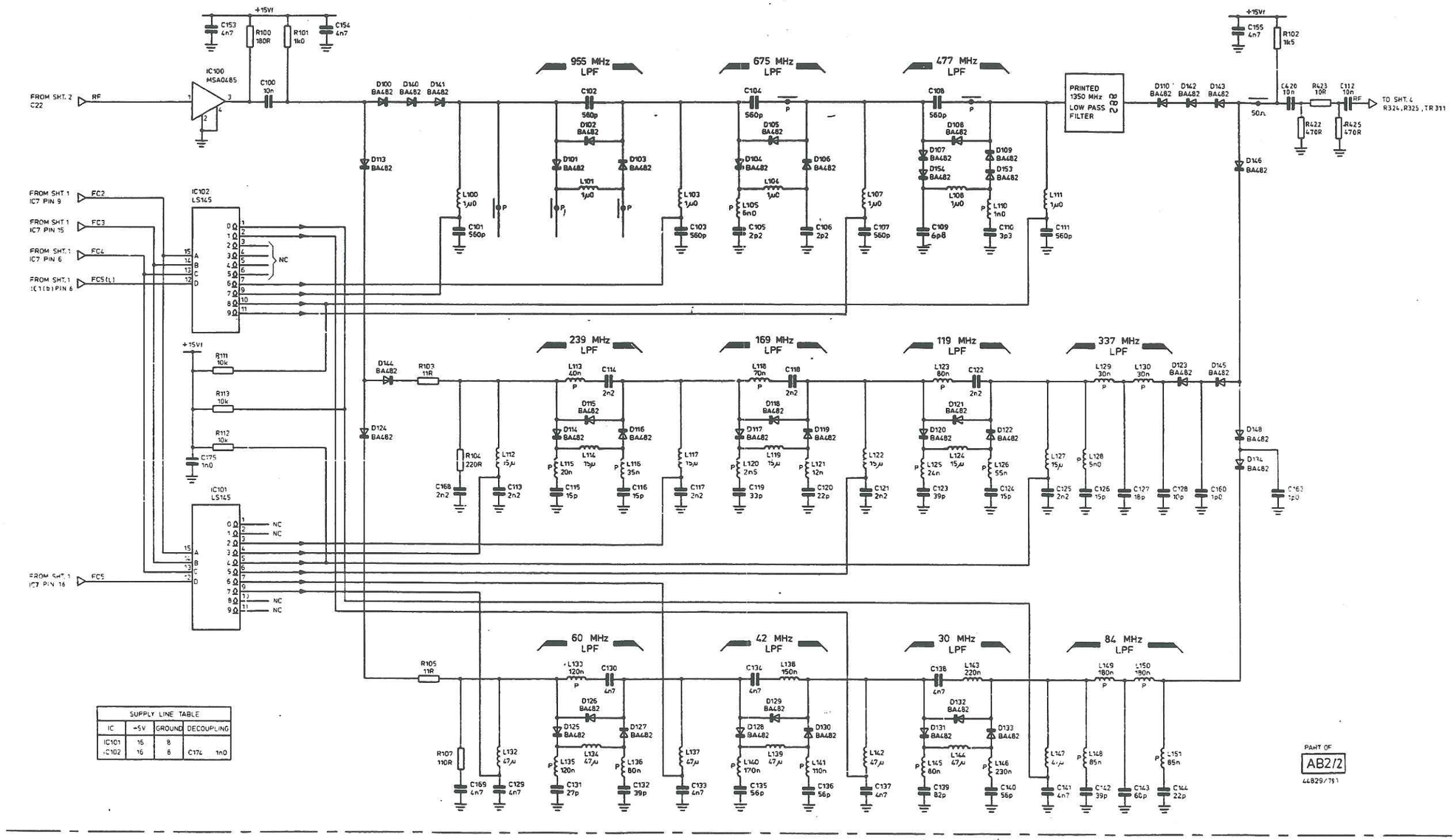
SUPPLY LINE TABLE					
IC	+26V	+5V	GROUND	-15V	DECOUPLING
IC11	13	12	5	4	C49 10n C44 10n

Drg. No. Z 44829/791T, Sheet 2 of 4 (Issue 6)
(In general, this circuit diagram also applies to earlier versions of the board.)

Fig. 7-24 AB2/2 RF board: Modulator and decoding circuit diagram

Modulator & decoding AB2/2

Harmonic filters AB2/2



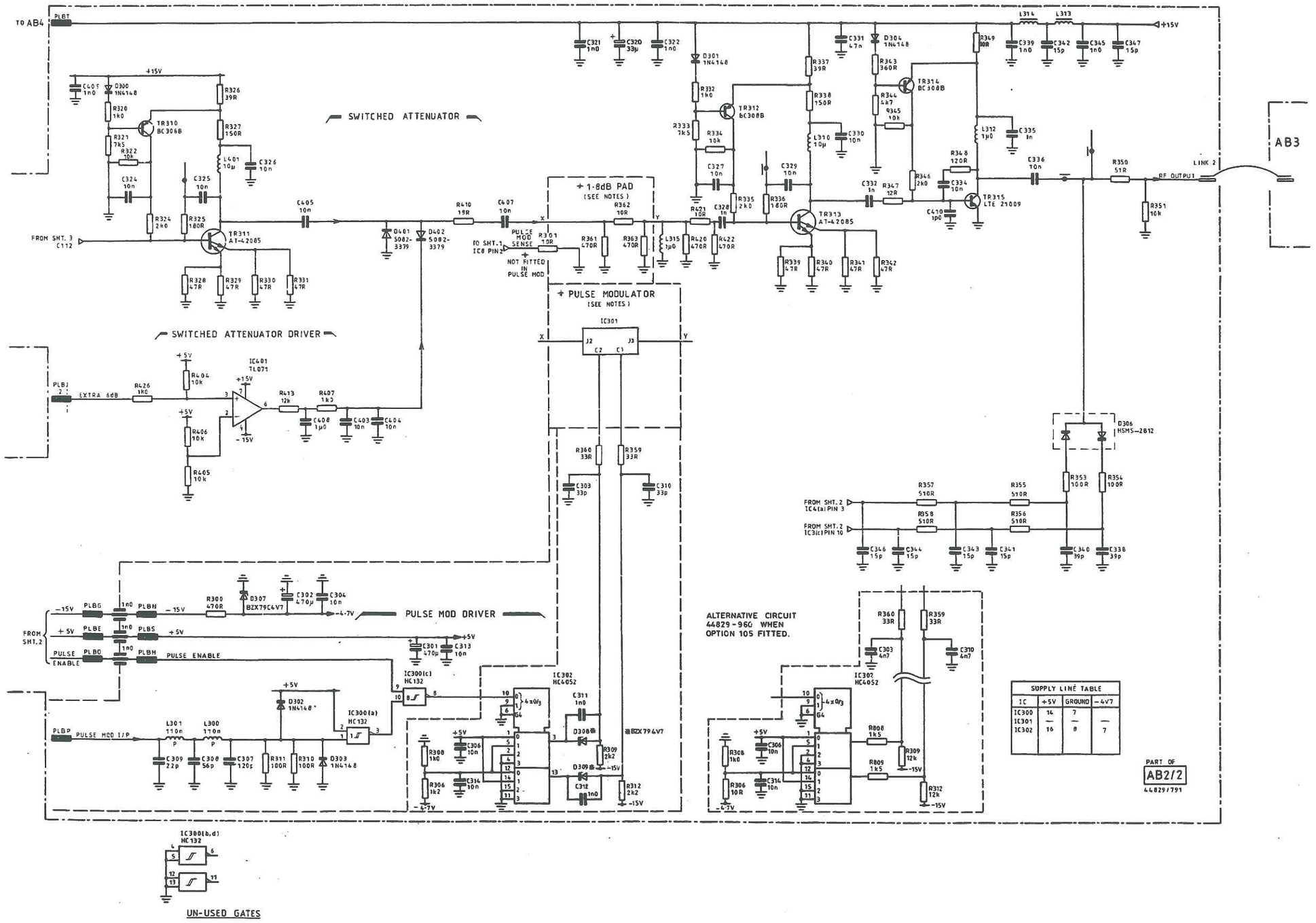
SUPPLY LINE TABLE			
IC	+5V	GROUND	DECOUPLING
IC101	16	8	
IC102	16	8	C174 1n0

Drg. No. Z 44829/791T, Sheet 3 of 4 (Issue 2)
(In general, this circuit diagram also applies to earlier versions of the board.)

Fig. 7-25 AB2/2 RF board: Harmonic filters circuit diagram

Harmonic filters AB2/2

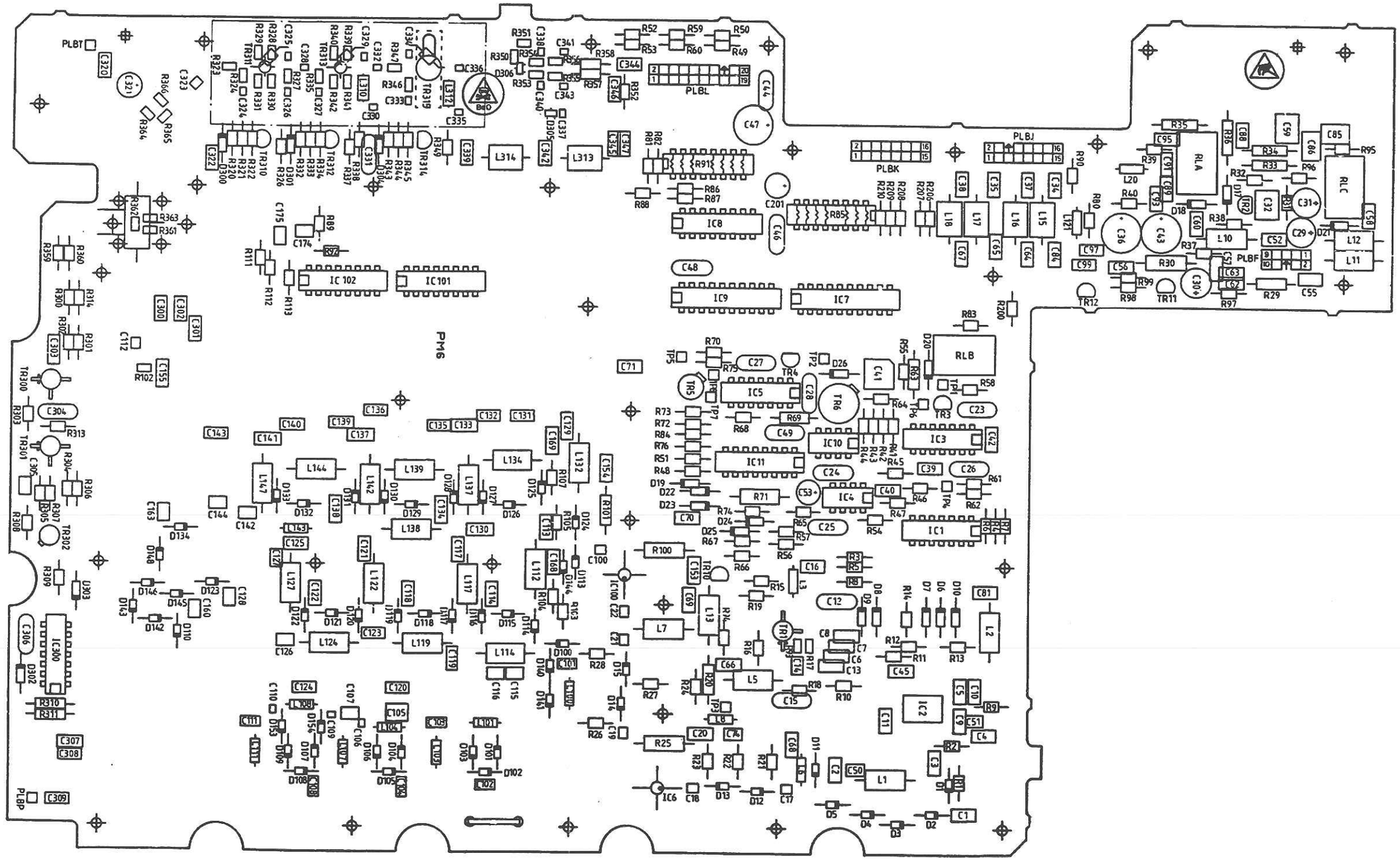
Pulse mod & o/p amp **AB2/2**



Drg. No. Z 44829/791T, Sheet 4 of 4 (Issue 5)
(In general, this circuit diagram also applies to earlier versions of the board.)

Fig. 7-26 AB2/2 RF board: Pulse mod and o/p amp circuit diagram

Component layout **AB2**

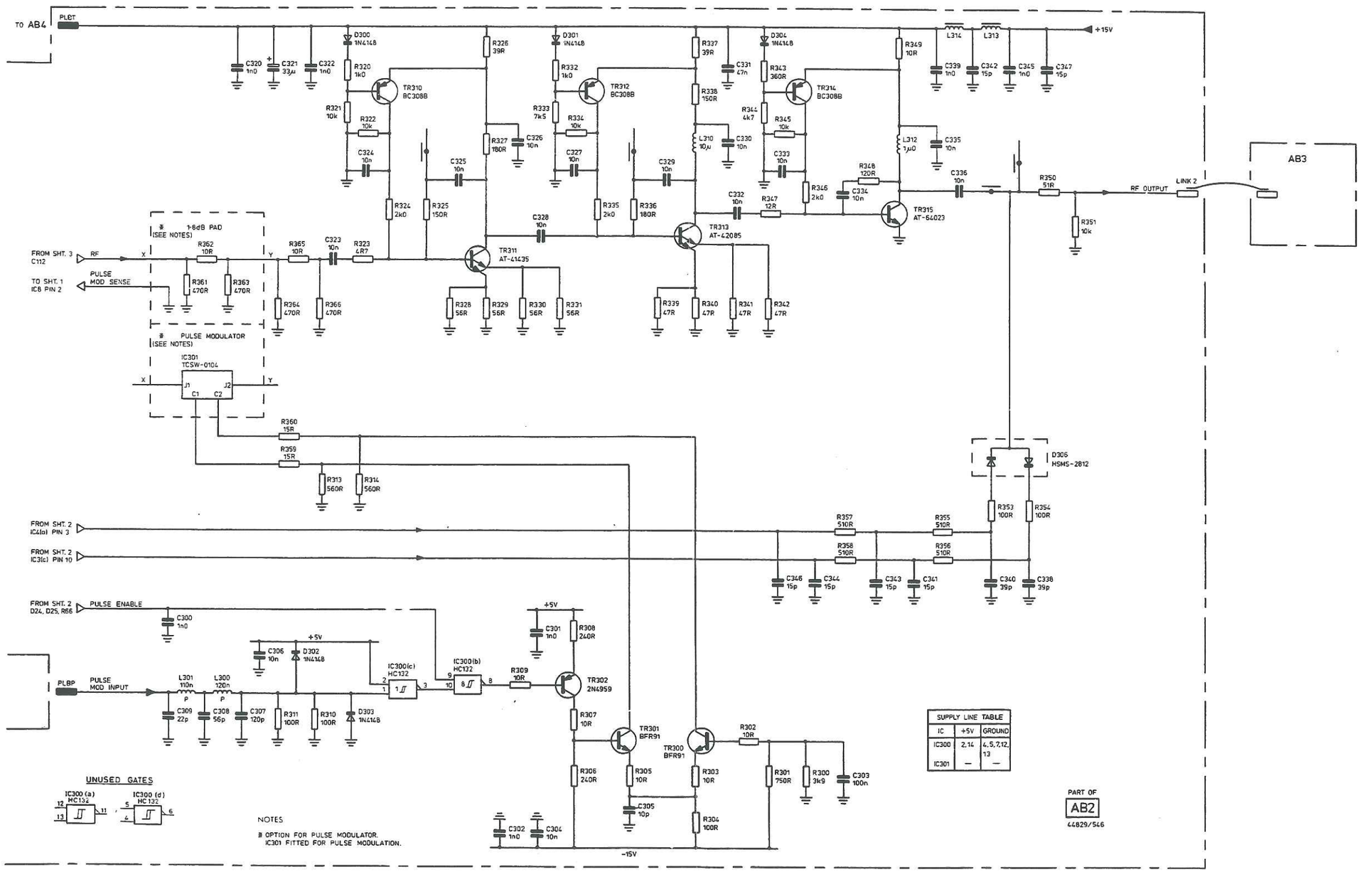


Pulse mod & o/p amp **AB2/2**

Drg. No. 44829/546S (Issue 1)

Fig. 7-27 AB2 RF board component layout

Pulse mod & o/p amp **AB2**



Drg. No. Z 44829/546S, Sheet 4 of 4 (Issue 3)

Fig. 7-28 AB2 RF board: Pulse mod and o/p amp circuit diagram

Component layout **AB3/1**

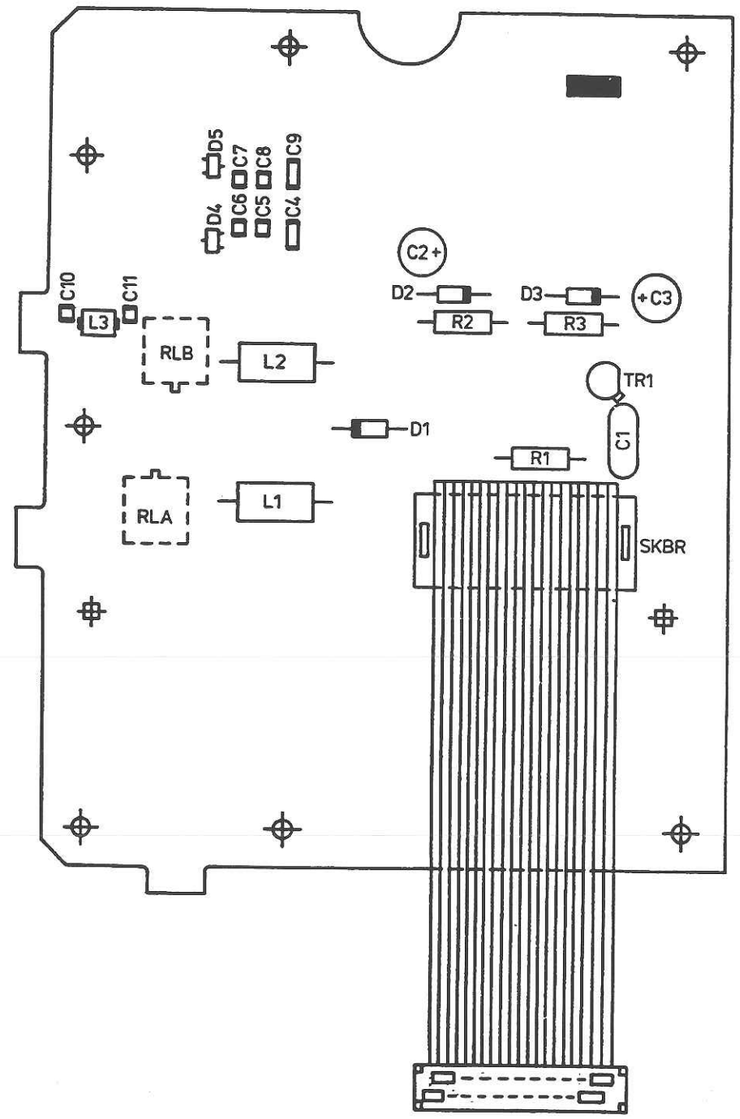


Fig. 7-29 AB3/1 BFO switch and RPP component layout

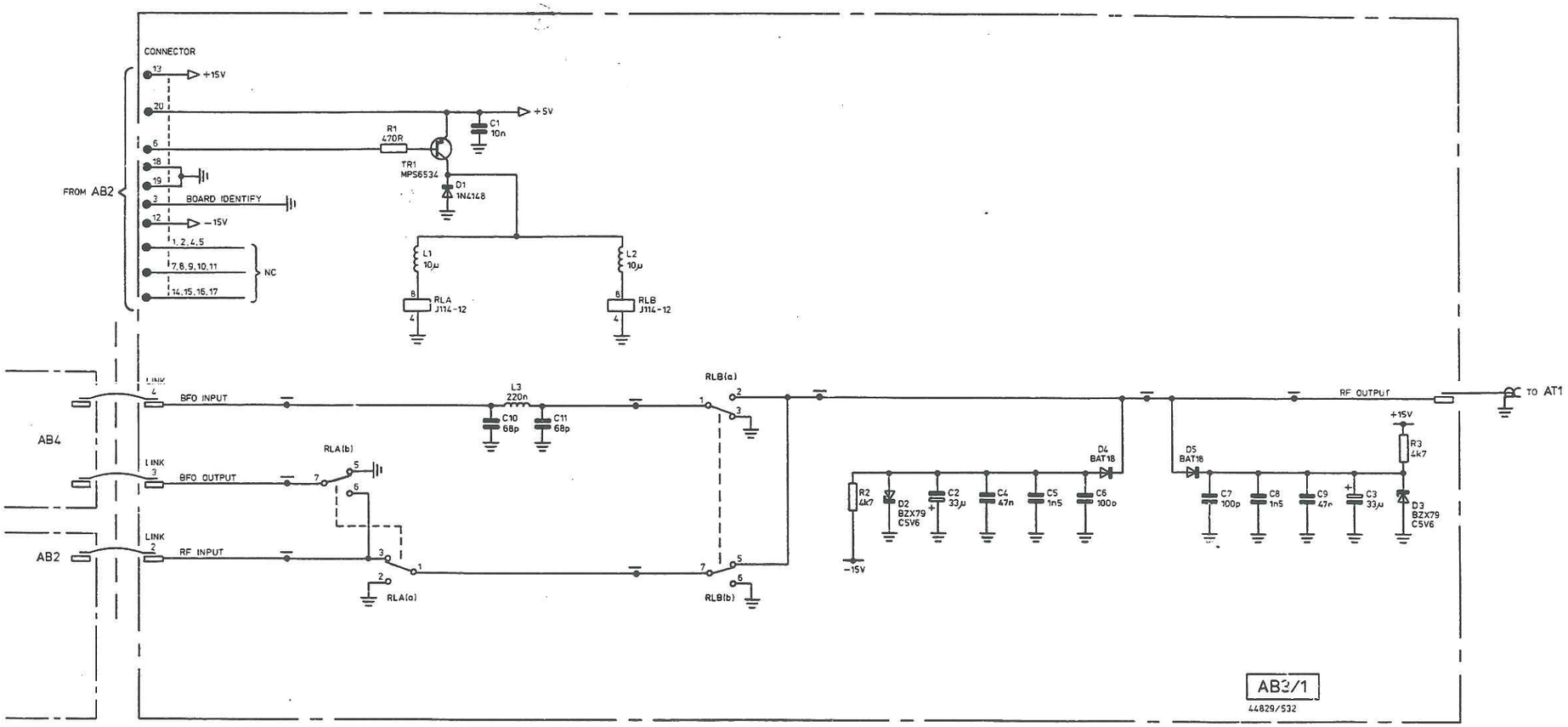
Pulse mod & o/p amp **AB2**

Drg. No. 44829/532Z (Issue 1)

BFO switch & RPP AB3/1

NOTES

1. C4-C11 ARE CHIP CAPACITORS.
2. L3 IS A CHIP INDUCTOR.



Drg. No. Z 44829/532Z, Sheet 1 of 1 (Issue 2)

Fig. 7-30 AB3/1 BFO switch and RPP circuit diagram

Component layout **AB3/3**

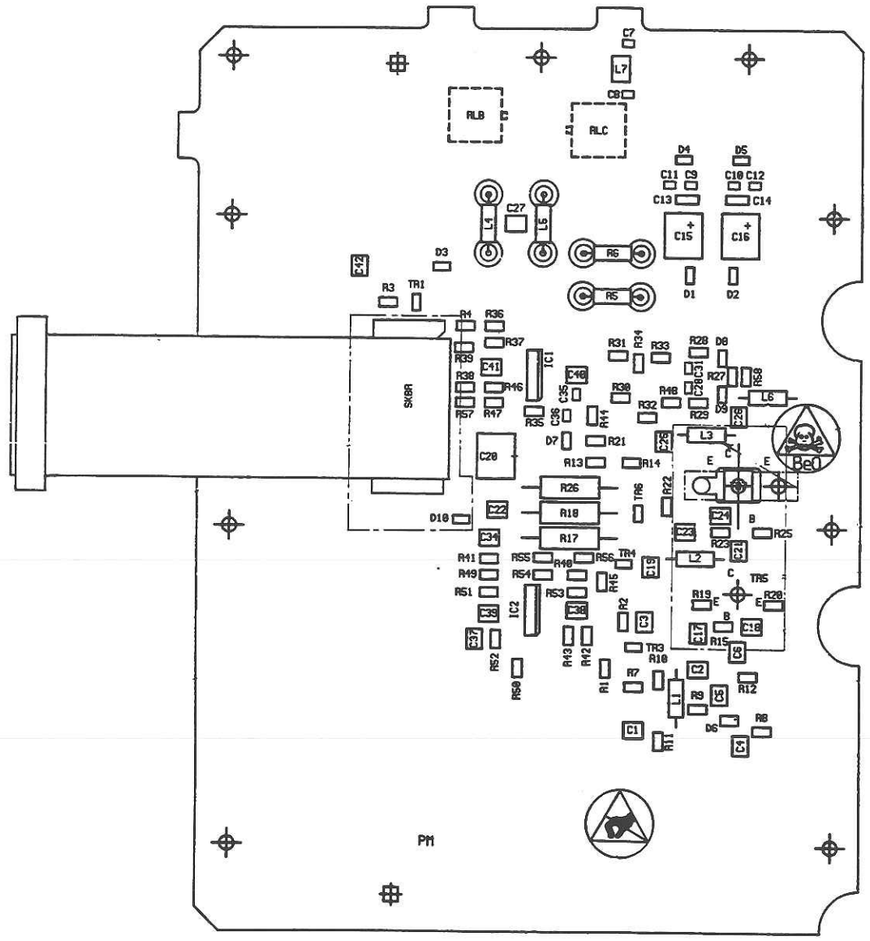
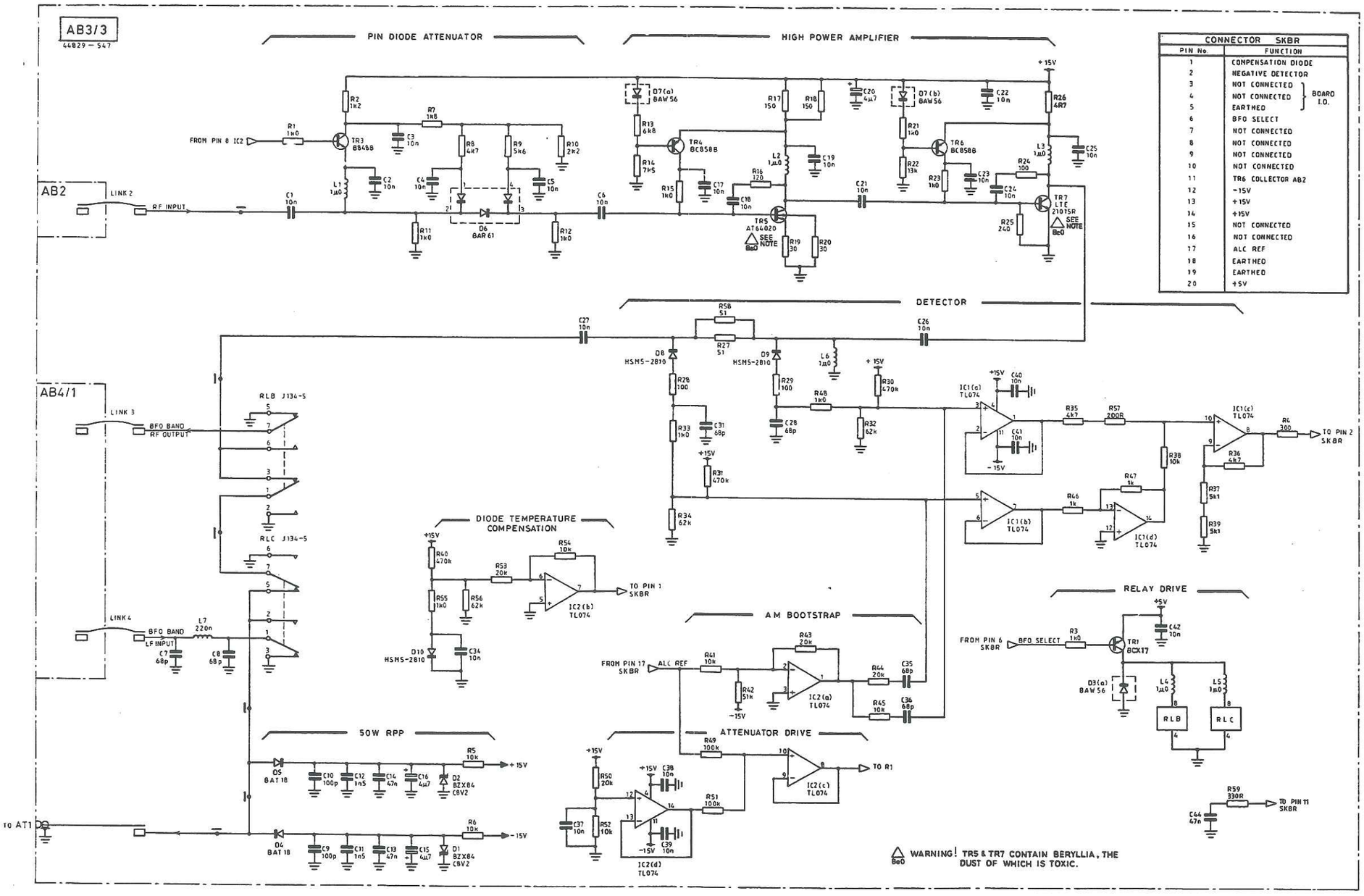


Fig. 7-31 AB3/3 High power amplifier component layout

BFO switch & RPP **AB3/1**

Drg. No. 44829/547W (Issue 4)

High power amp AB3/3

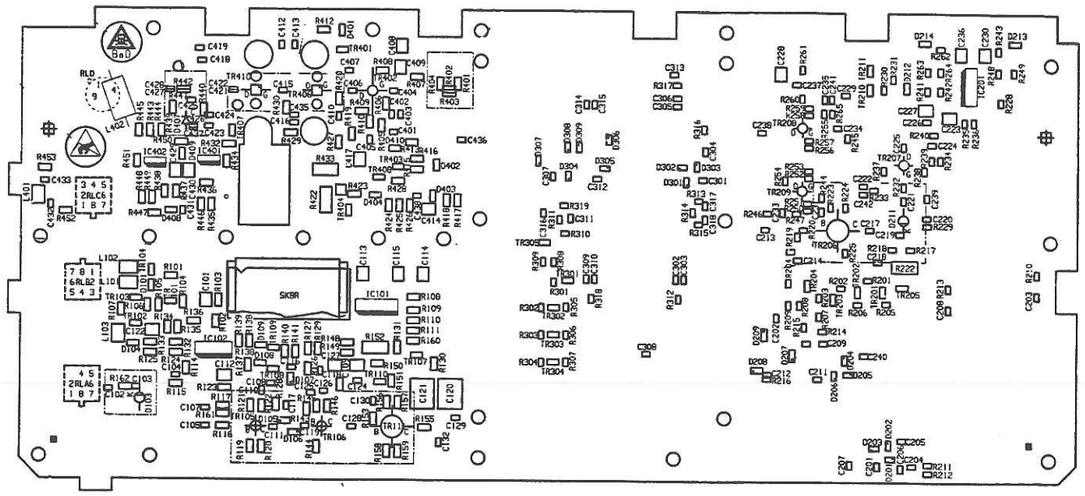


CONNECTOR SKBR	
PIN No.	FUNCTION
1	COMPENSATION DIODE
2	NEGATIVE DETECTOR
3	NOT CONNECTED } BOARD I.O.
4	NOT CONNECTED } BOARD I.O.
5	EARTHED } BOARD I.O.
6	BFO SELECT
7	NOT CONNECTED
8	NOT CONNECTED
9	NOT CONNECTED
10	NOT CONNECTED
11	TR6 COLLECTOR AB2
12	-15V
13	+15V
14	+15V
15	NOT CONNECTED
16	NOT CONNECTED
17	ALC REF
18	EARTHED
19	EARTHED
20	+5V

Drg. No. Z 44829/547W, Sheet 1 of 1 (Issue 5)

Fig. 7-32 AB3/3 High power amplifier circuit diagram

Component layout **AB3/4**

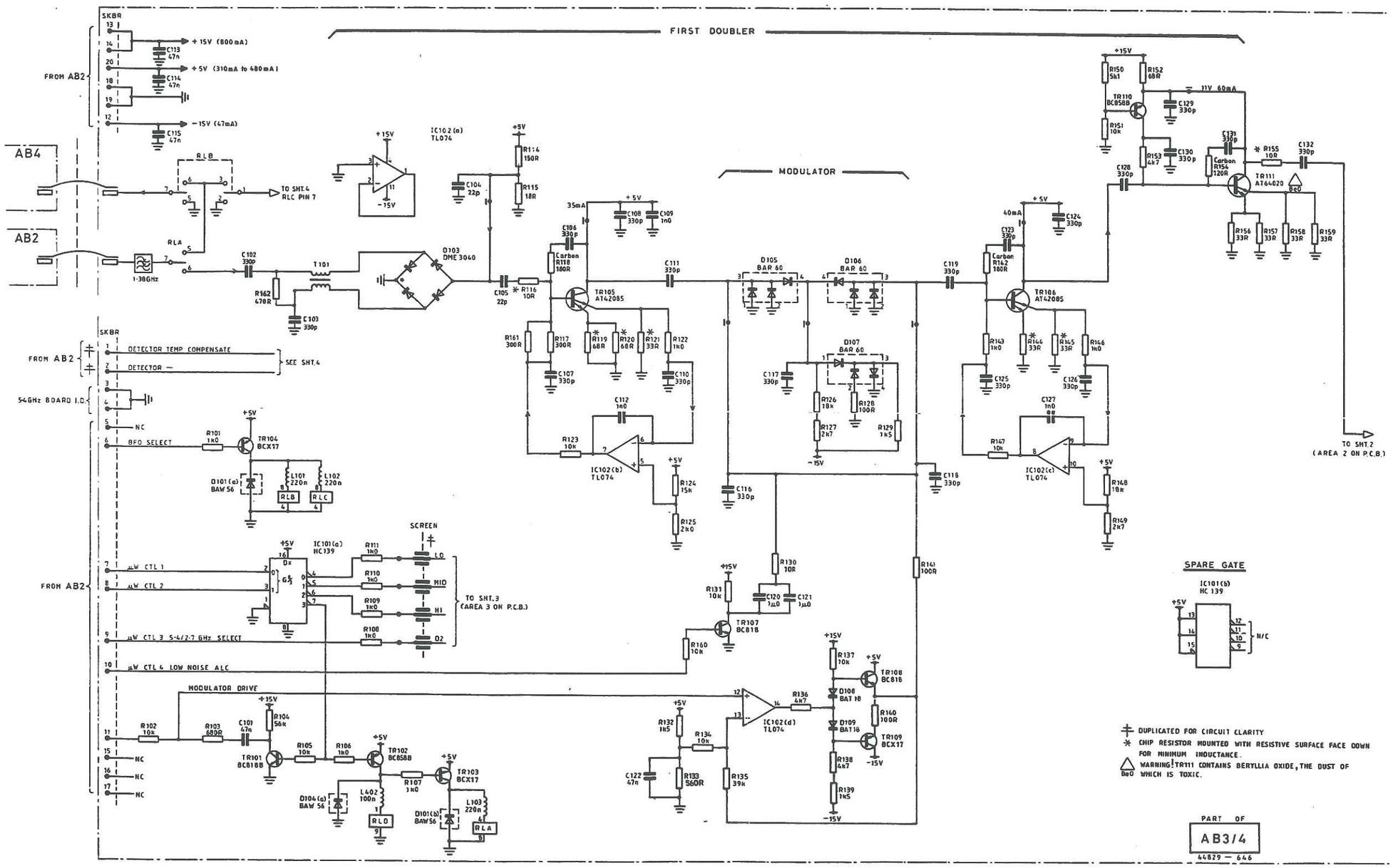


High power amp **AB3/3**

Drg. No. 44829/646G (Issue 7)

Fig. 7-33 AB3/4 Quadrupler component layout

1st doubler & modulator AB3/4

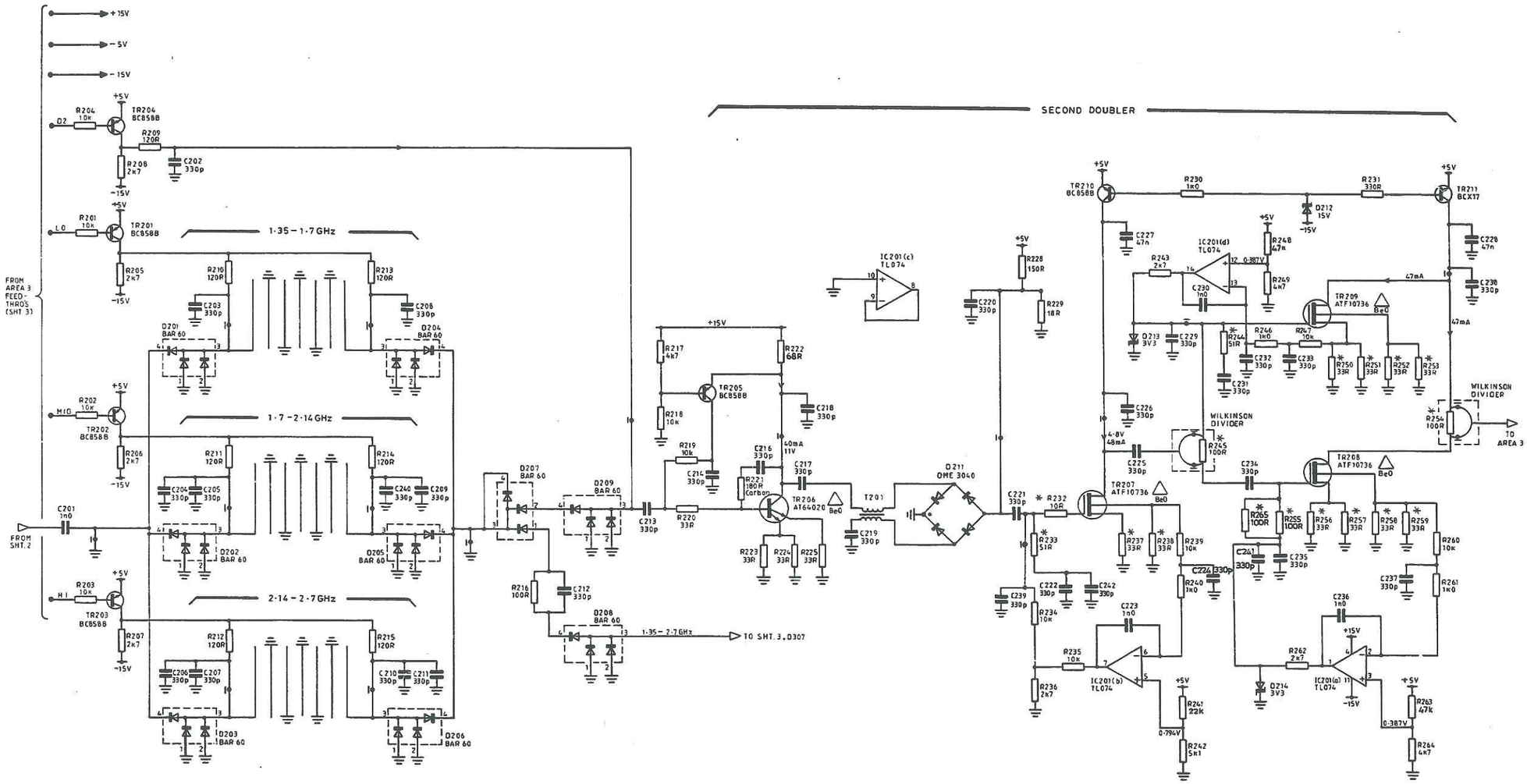


Drg. No. Z 44829/646G, Sheet 1 of 4 (Issue 8)

Fig. 7-34 AB3/4 Quadrupler: First doubler & modulator circuit diagram

1st doubler & modulator AB3/4

BPF & 2nd doubler AB3/4



* CHIP RESISTOR MOUNTED WITH RESISTIVE SURFACE FACE DOWN FOR MINIMUM INDUCTANCE.

△ WARNING! TR206 TO 209 CONTAIN BERYLLIA OXIDE, THE BeO DUST OF WHICH IS TOXIC.

PART OF AB3/4

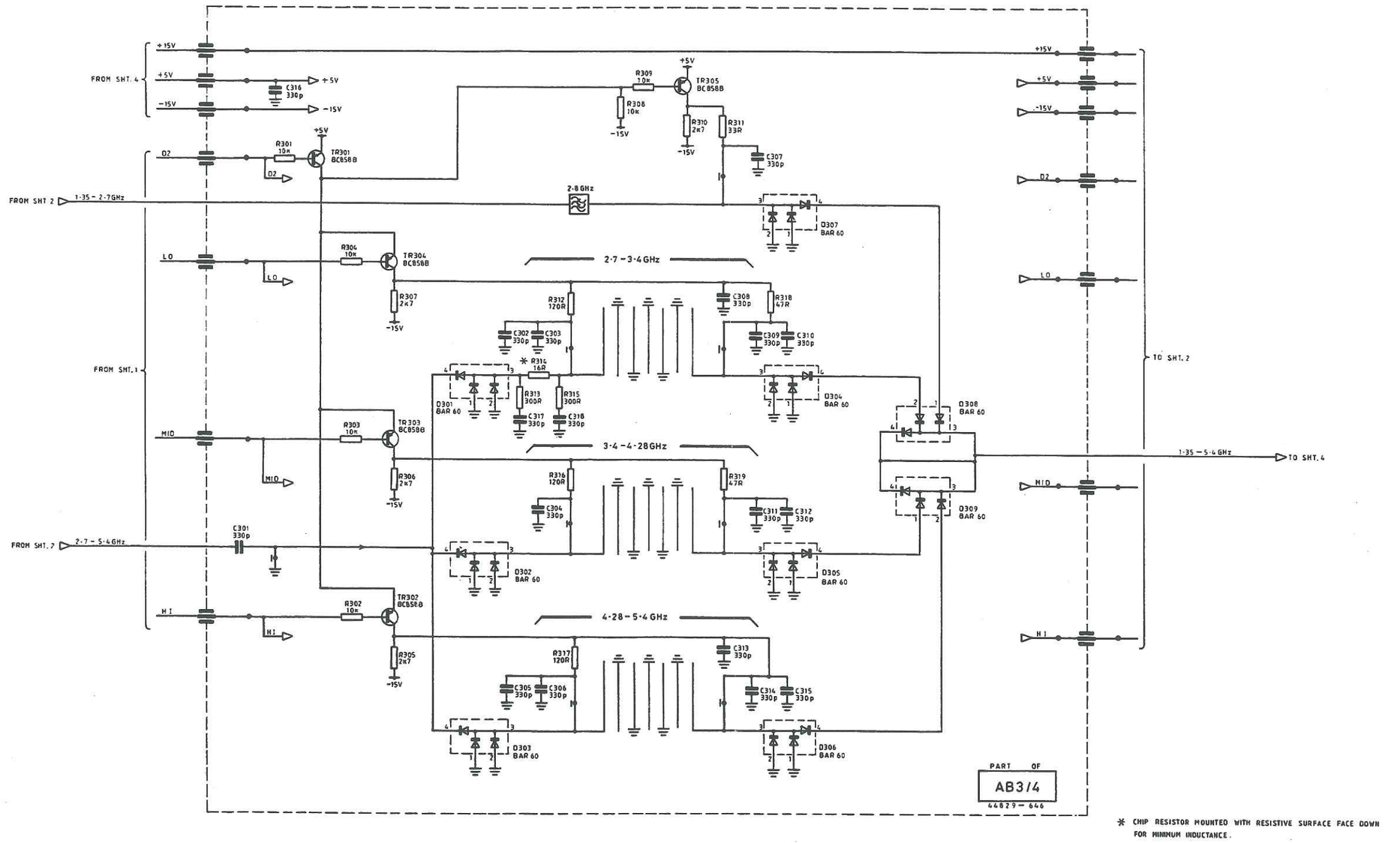
44829 — 646

Drg. No. Z 44829/646G, Sheet 2 of 4 (Issue 9)

Fig. 7-35 AB3/4 Quadrupler: BPF & second doubler circuit diagram

BPF & 2nd doubler AB3/4

Band-pass filters AB3/4

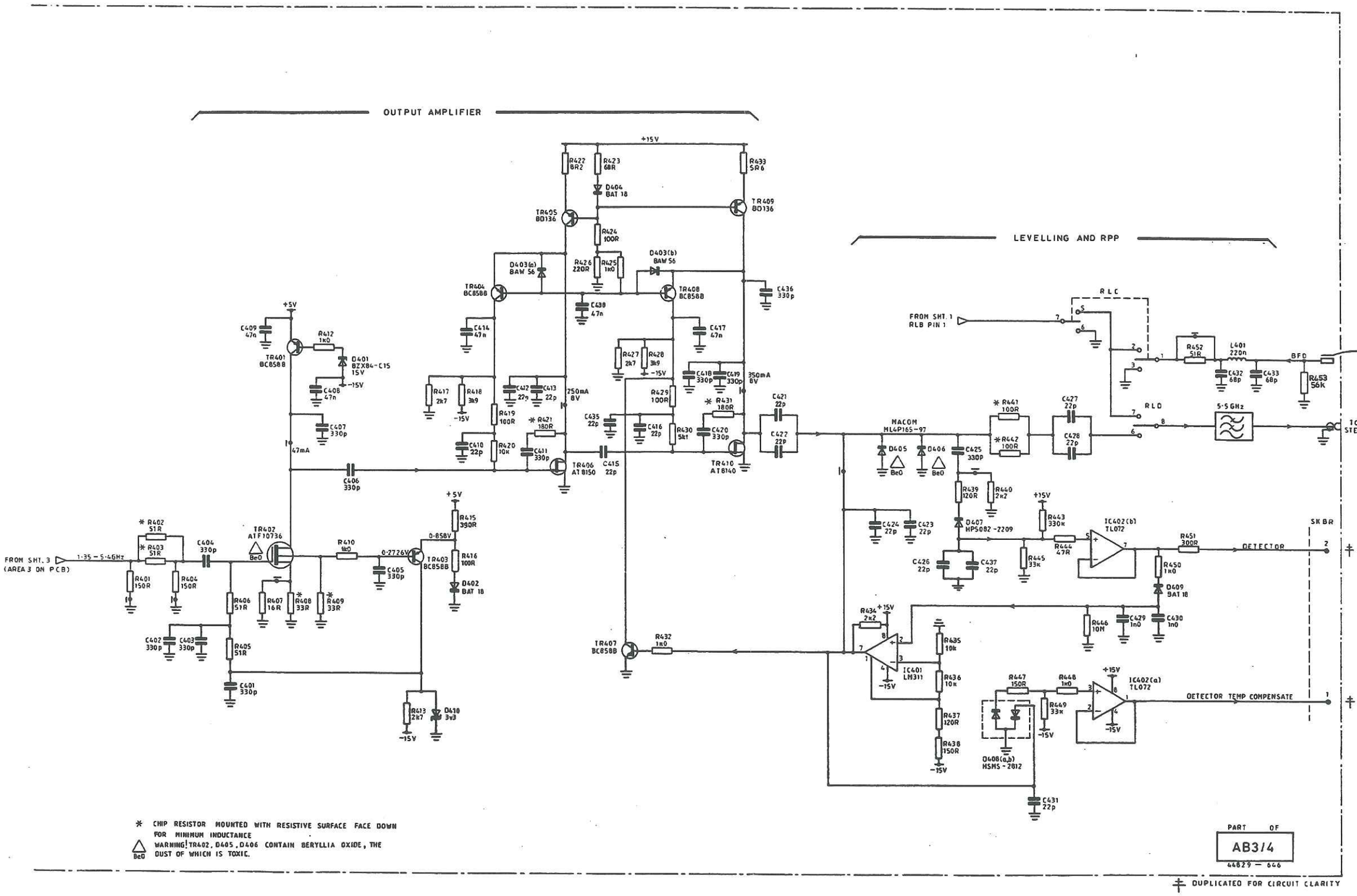


Drg. No. Z 44829/646G, Sheet 3 of 4 (Issue 2)

Fig. 7-36 AB3/4 Quadrupler: Band-pass filters circuit diagram

Band-pass filters AB3/4

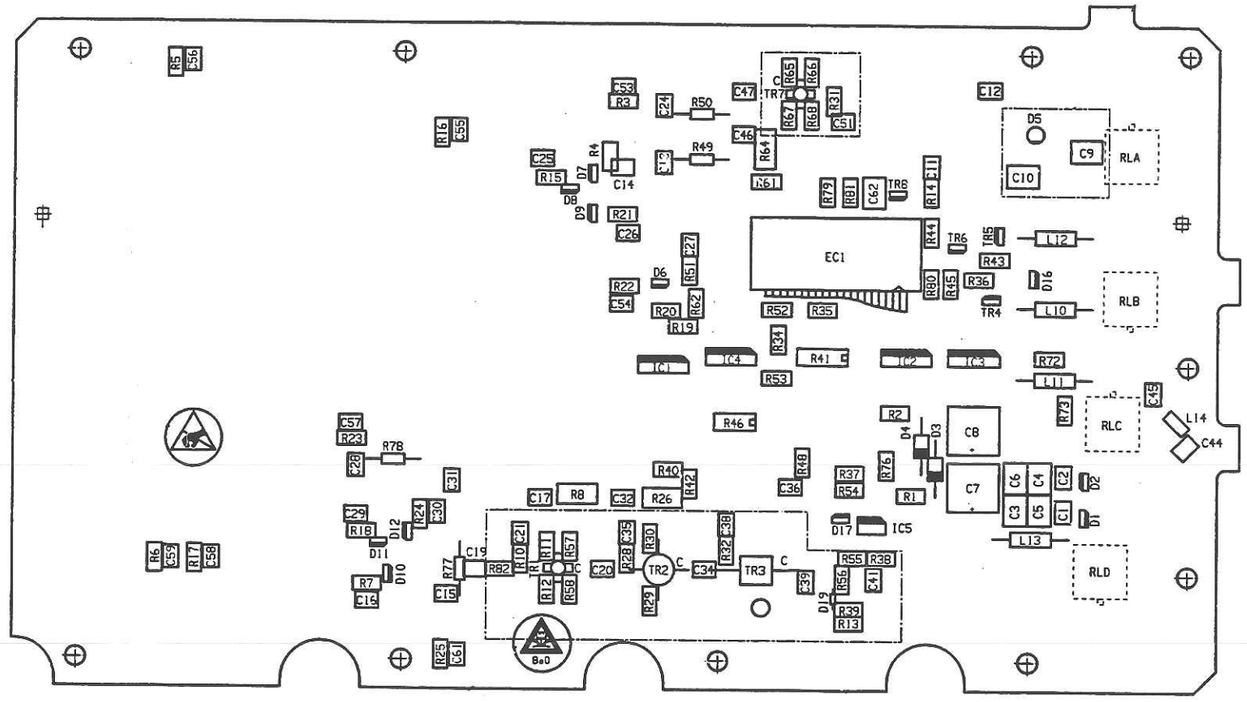
Output amp, levelling & RPP **AB3/4**



Drg. No. Z 44829/646G, Sheet 4 of 4 (Issue 7)

Fig. 7-37 AB3/4 Quadrupler: Output amp, levelling & RPP circuit diagram

Component layout **AB3/5**

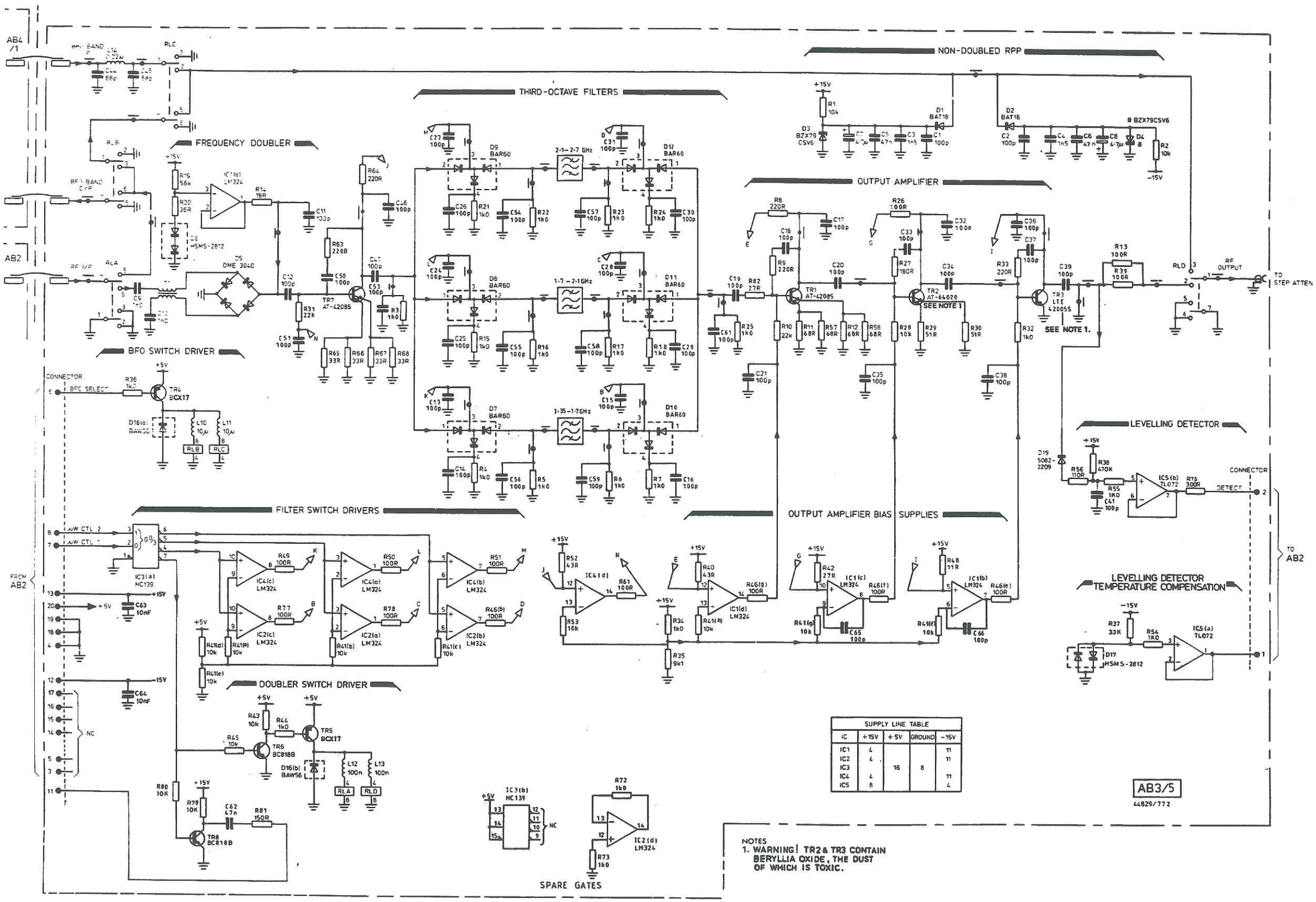


Output amp, levelling & RPP **AB3/4**

Drg. No. 44829/772H (Issue 3)

Fig. 7-38 AB3/5 Frequency doubler board component layout

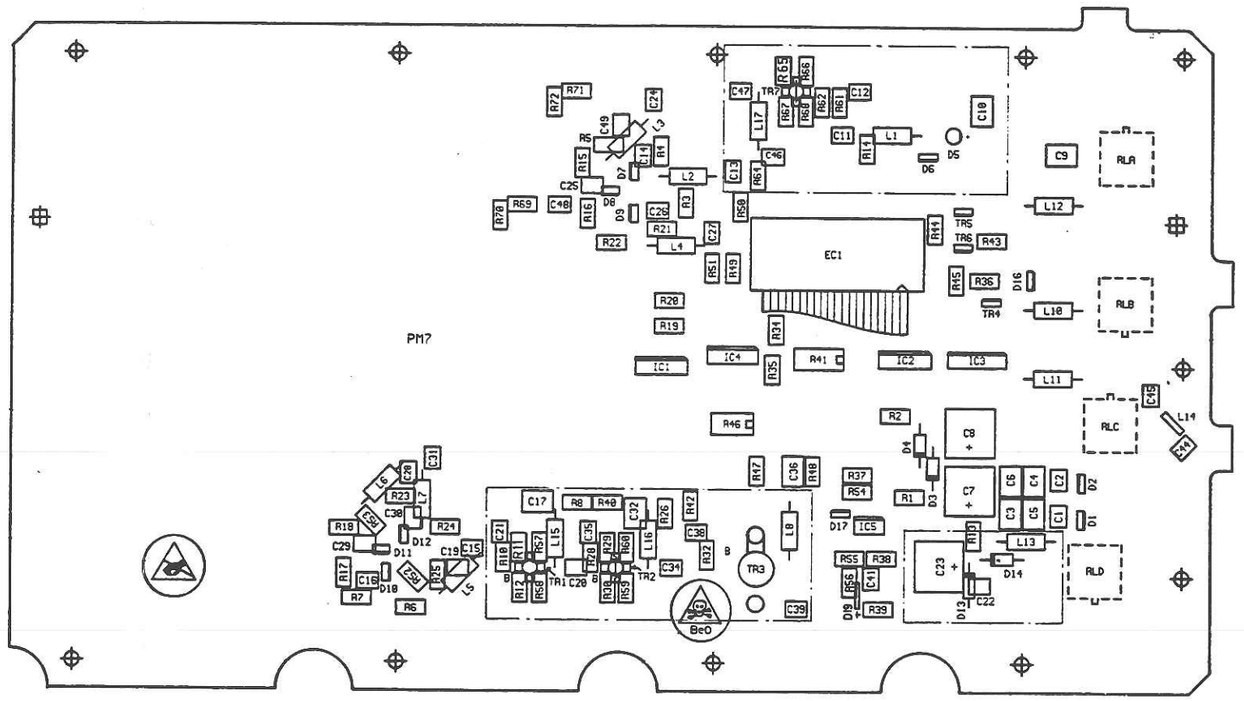
Frequency doubler AB3/5



Drg. No. Z 44829/772H, Sheet 1 of 1 (Issue 7)

Fig. 7-39 AB3/5 Frequency doubler circuit diagram

Component layout **AB3/2**

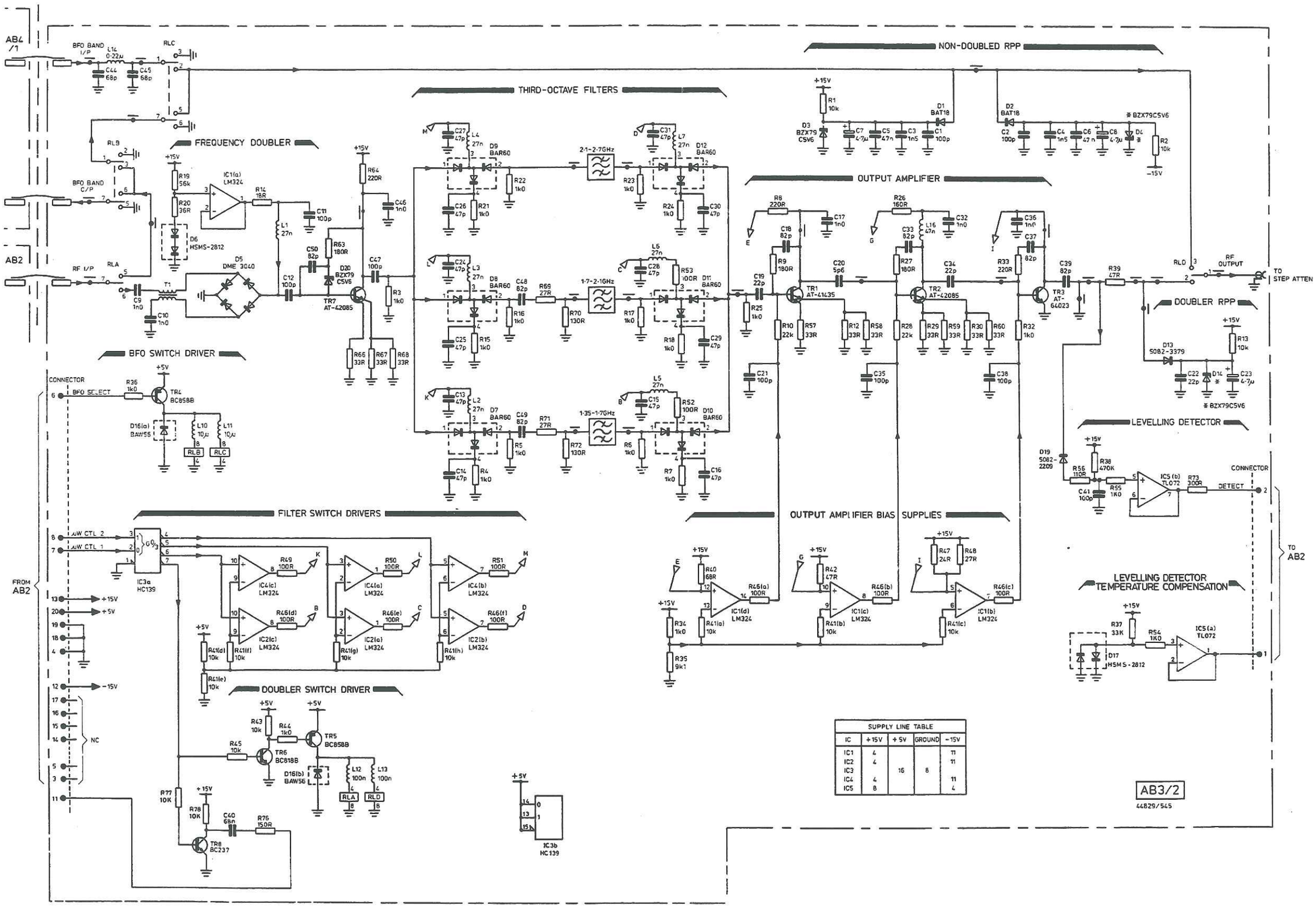


Frequency doubler **AB3/5**

Drg. No. 44829/545V (Issue 1)

Fig. 7-40 AB3/2 Frequency doubler component layout

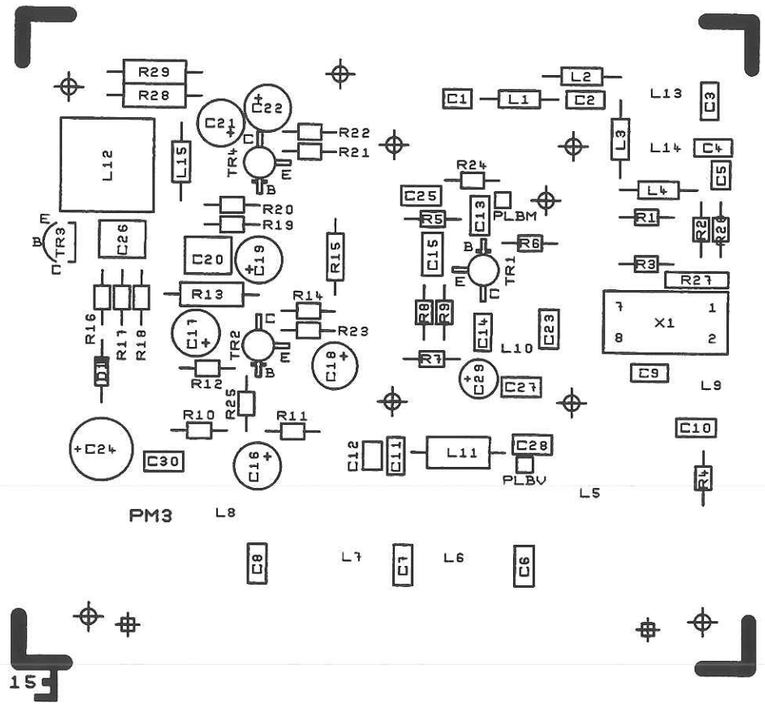
Frequency doubler AB3/2



Drg. No. Z 44829/545V, Sheet 1 of 1 (Issue 6)

Fig. 7-41 AB3/2 Frequency doubler circuit diagram

Component layout **AB4/1**



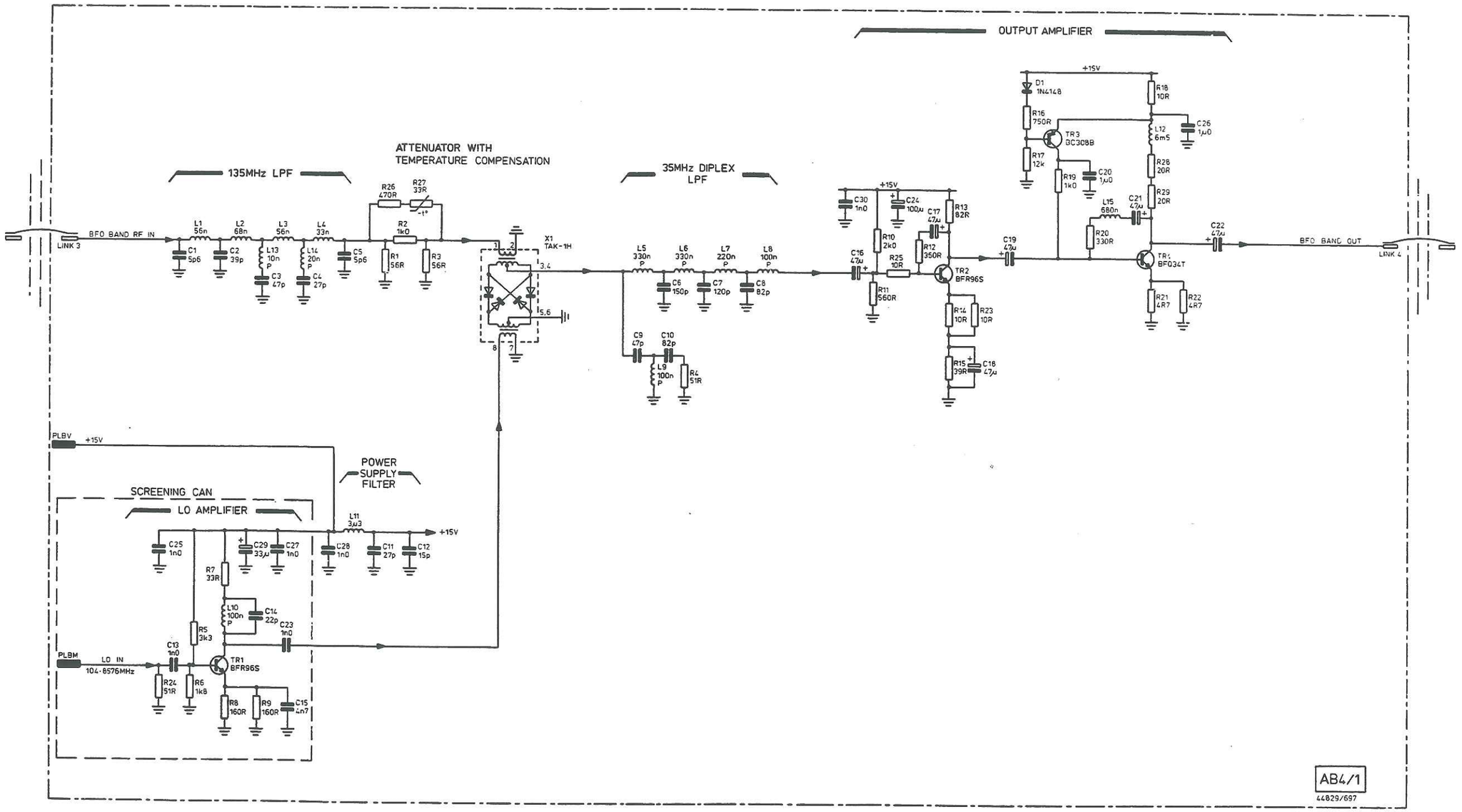
15

Drg. No. 44829/697A (Issue 1)

Fig. 7-42 AB4/1 Beat frequency oscillator component layout

Frequency doubler **AB3/2**

Beat frequency oscillator AB4/1



Drg. No. Z 44829/697A, Sheet 1 of 1 (Issue 1)

Fig. 7-43 AB4/1 Beat frequency oscillator circuit diagram

Component layout AF1

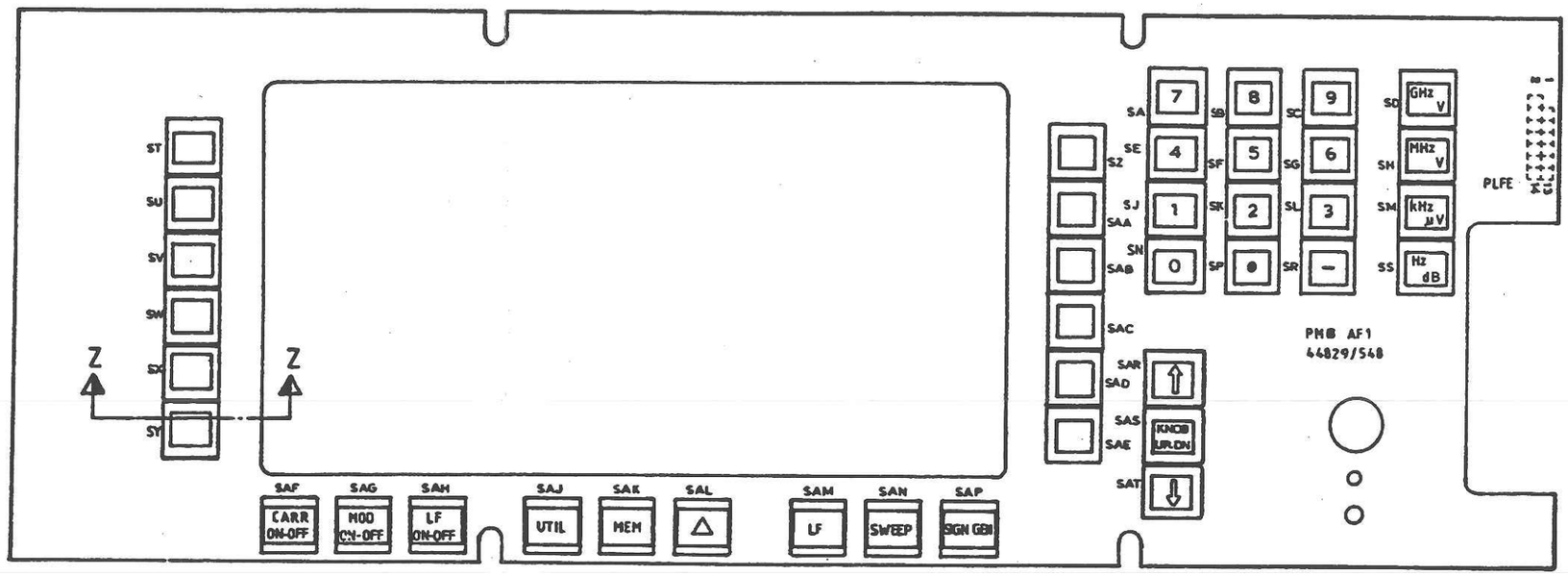
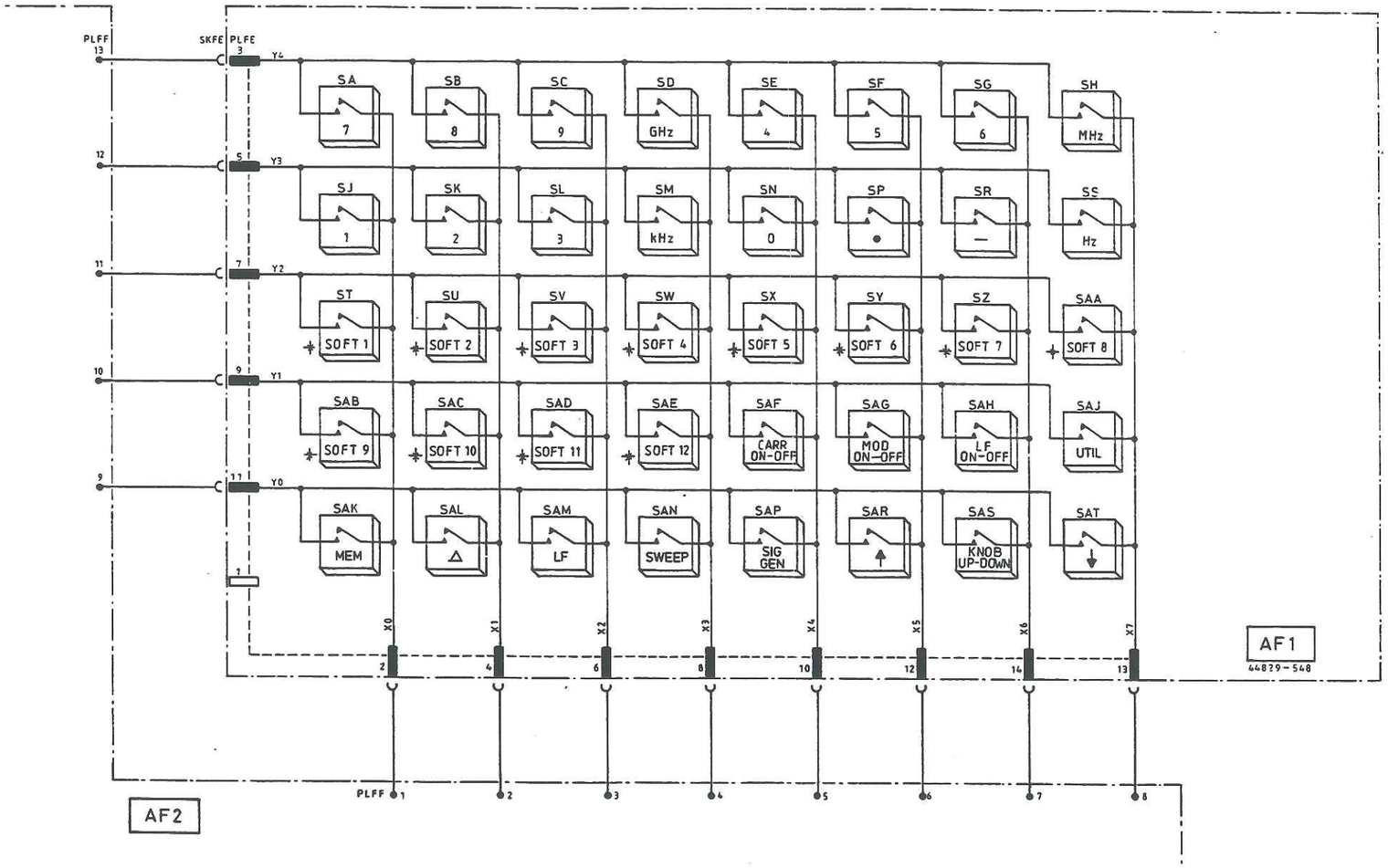


Fig. 7-44 AF1 Key matrix component layout

Beat frequency oscillator AB4/1

Drg. No. 44829/548D (Issue 2)

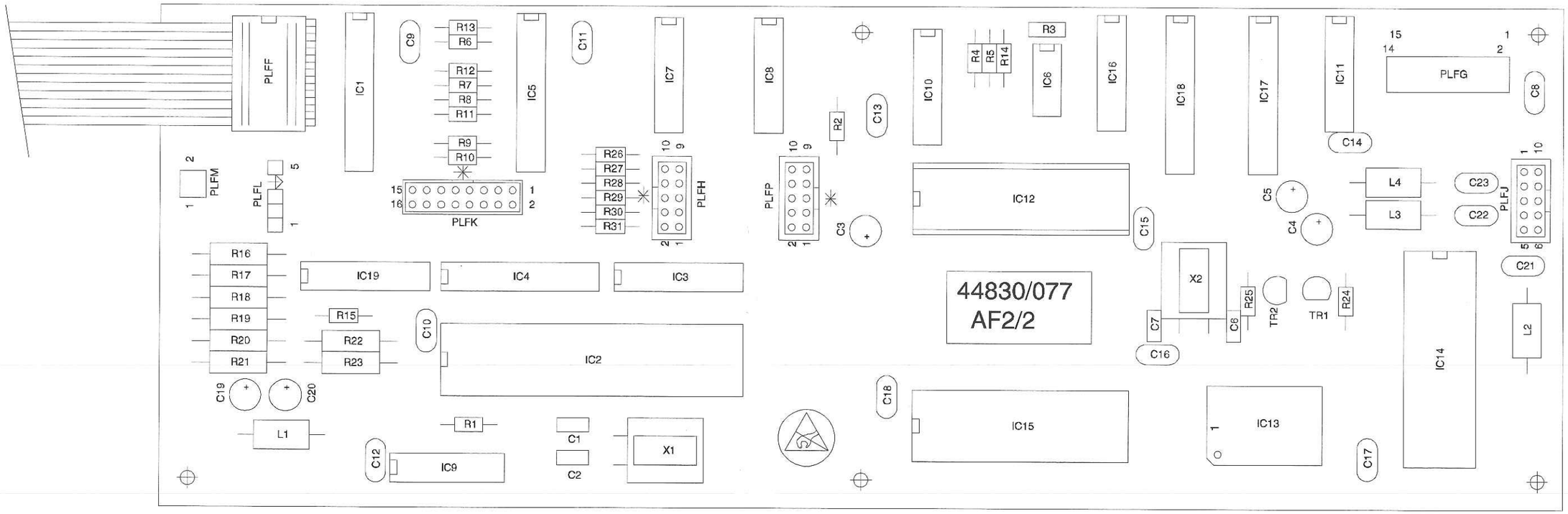
Key matrix AF1



Drg. No. Z 44829/548D, Sheet 1 of 1 (Issue 2)

Fig. 7-45 AF1 Key matrix circuit diagram

Component layout **AF2/2**

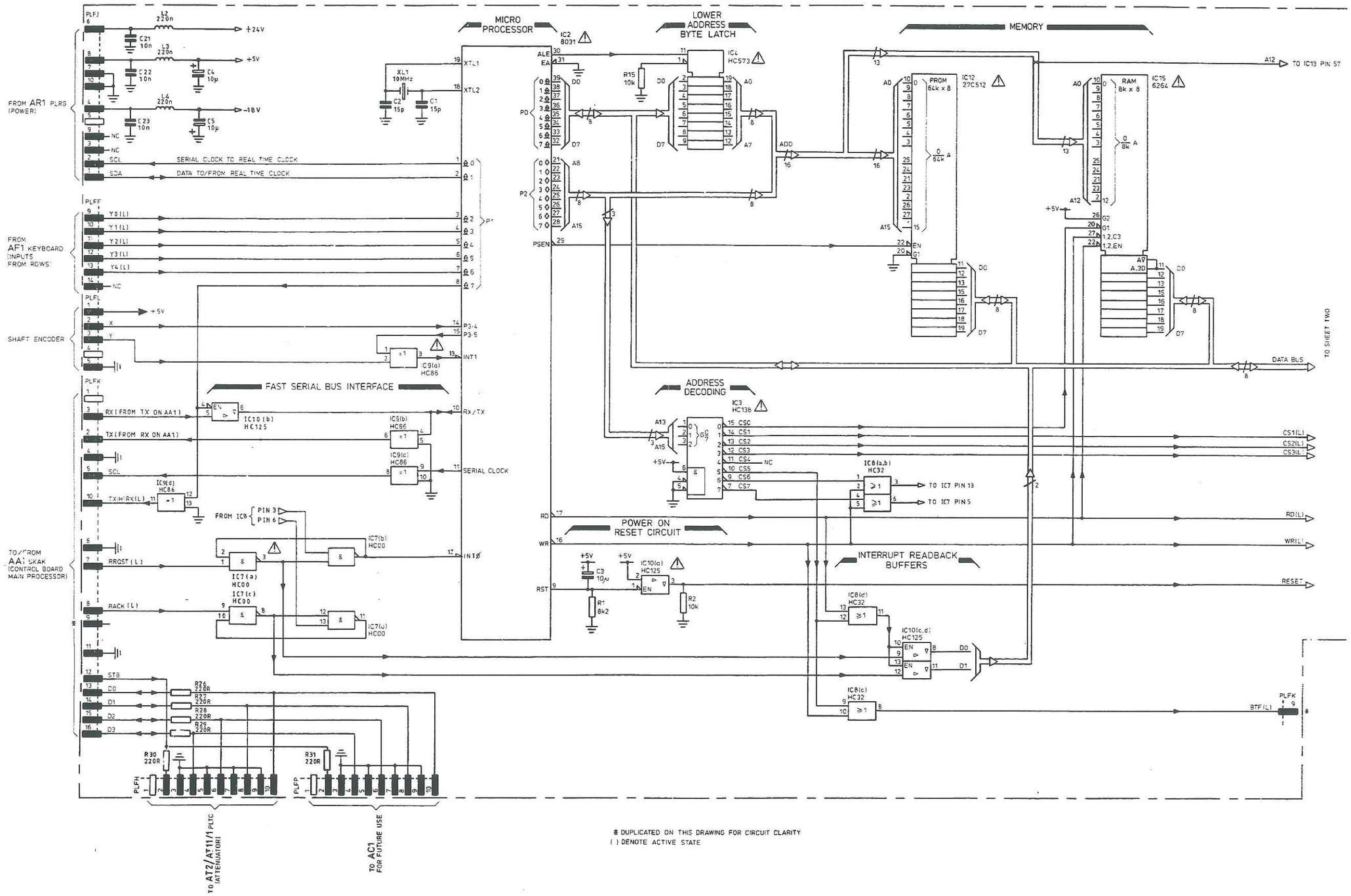


Key matrix **AF1**

Drg. No. 44830/077Z (Issue 1)

Fig. 7-46 AF2/2 Front panel control component layout

Processor & memory AF2/2

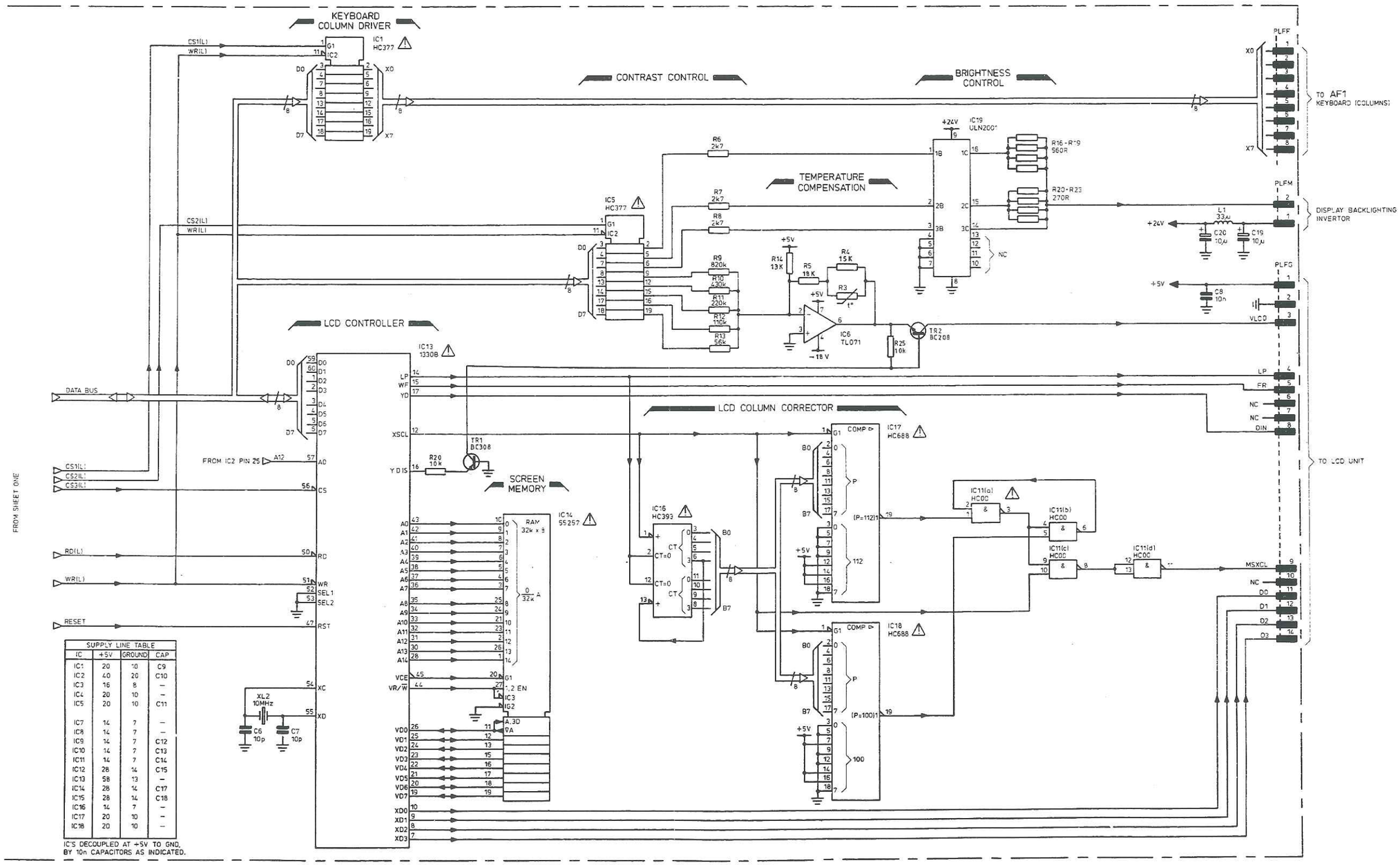


Drg. No. Z 44830/077Z, Sheet 1 of 2 (Issue 2)
(In general, this circuit diagram also applies to earlier versions of the board)

Fig. 7-47 AF2/2 Front panel control: Processor & memory circuit diagram

Processor & memory AF2/2

LCD controller AF2/2

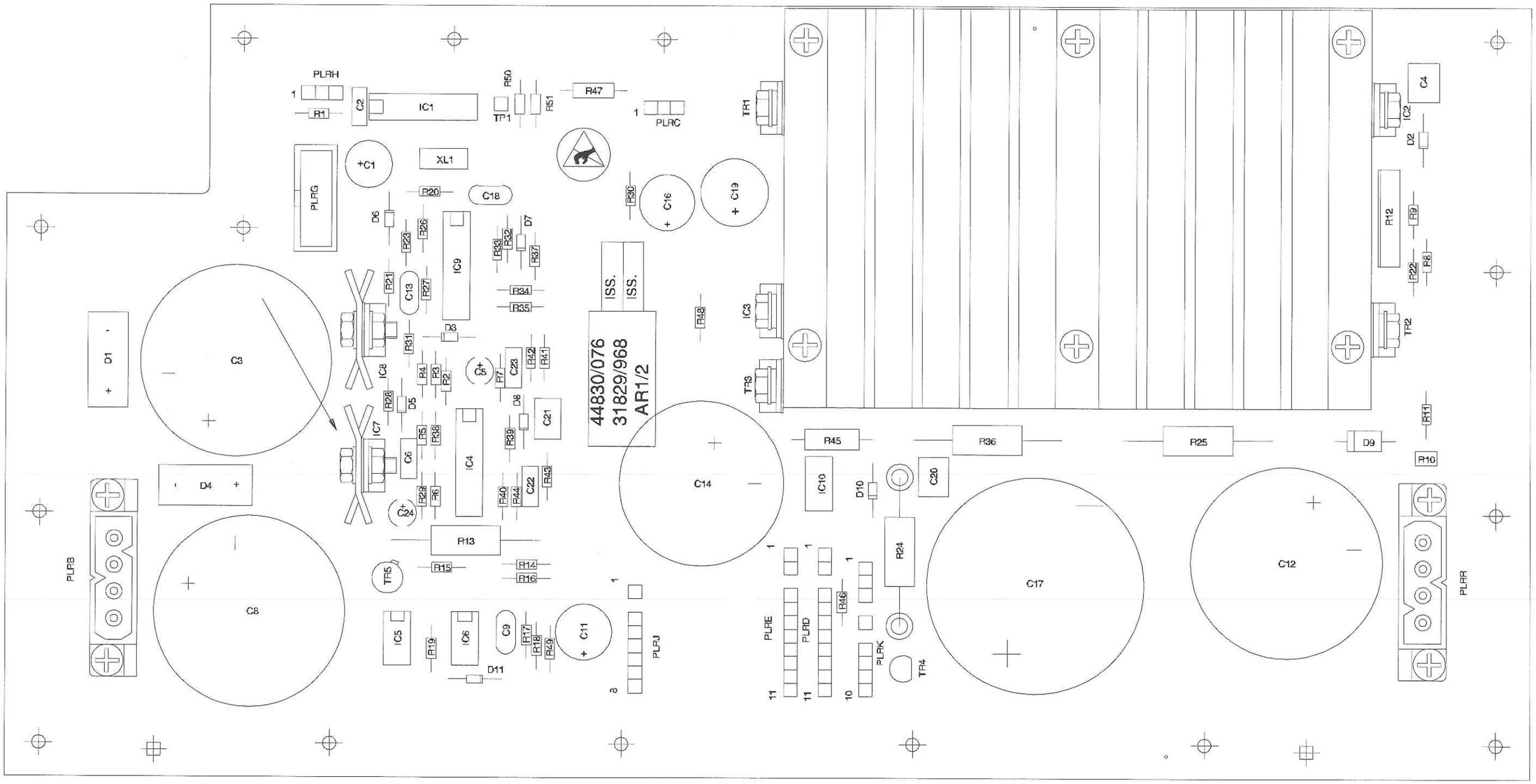


IC	+5V	GROUND	CAP
IC1	20	10	C9
IC2	40	20	C10
IC3	16	8	–
IC4	20	10	–
IC5	20	10	C11
IC7	14	7	–
IC8	14	7	–
IC9	14	7	C12
IC10	14	7	C13
IC11	14	7	C14
IC12	28	14	C15
IC13	58	13	–
IC14	28	14	C17
IC15	28	14	C18
IC16	14	7	–
IC17	20	10	–
IC18	20	10	–

Drg. No. Z 44830/077Z, Sheet 2 of 2 (Issue 1)
(In general, this circuit diagram also applies to earlier versions of the board).

Fig. 7-48 AF2/2 Front panel control: LCD controller circuit diagram

Component layout **AR1/2**

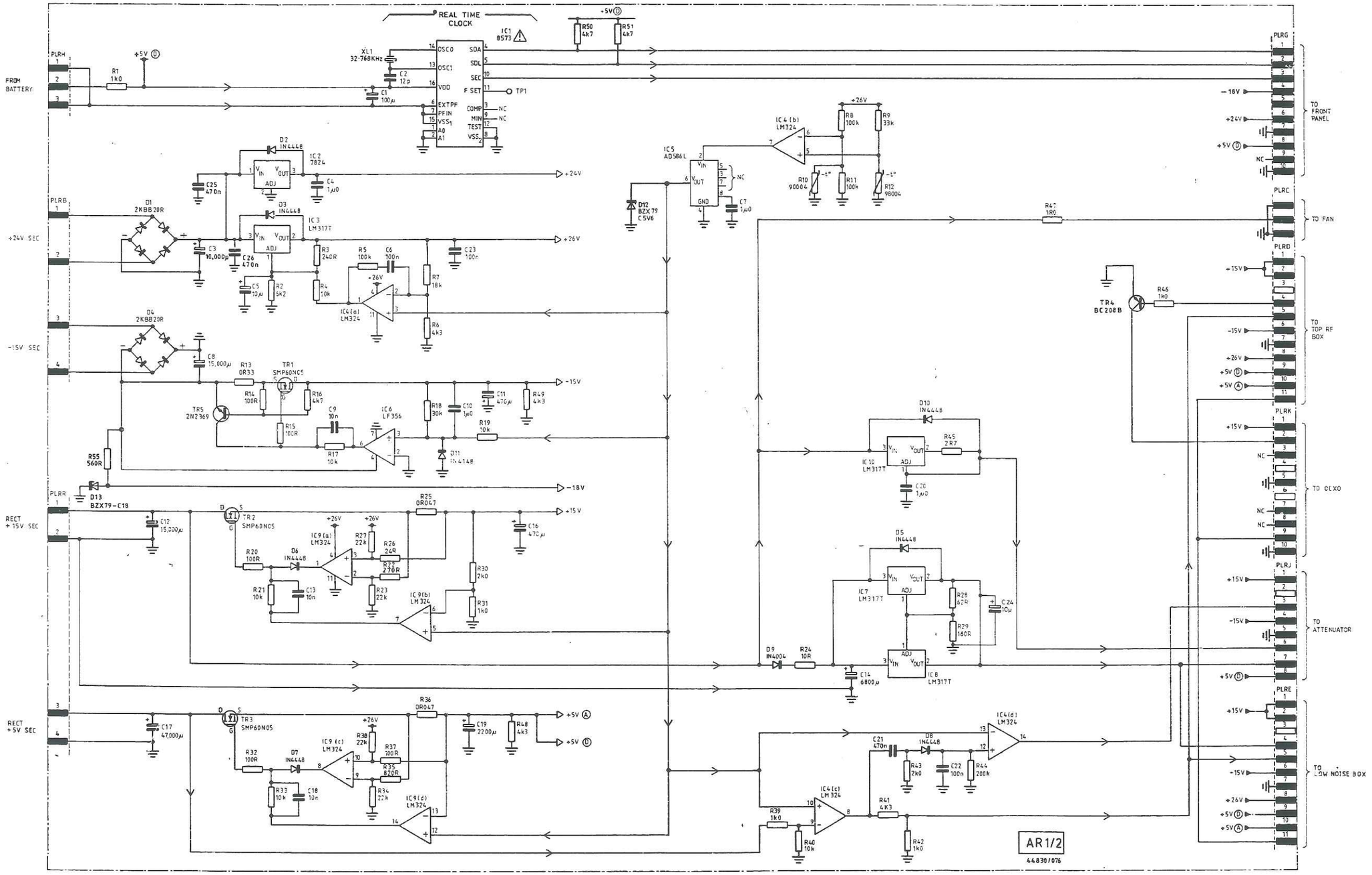


LCD controller **AF2/2**

Drg. No. 44830/076A (Issue 1)

Fig. 7-49 AR1/2 PSU board component layout

PSU AR1/2



Drg. No. Z 44830/076A, Sheet 1 of 1 (Issue 2)
(In general, this circuit diagram also applies to earlier versions of the board).

Fig. 7-50 AR1/2 PSU board circuit diagram

Component layout **AR2/1**

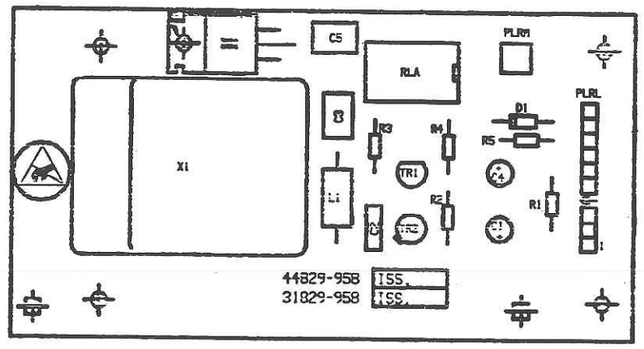
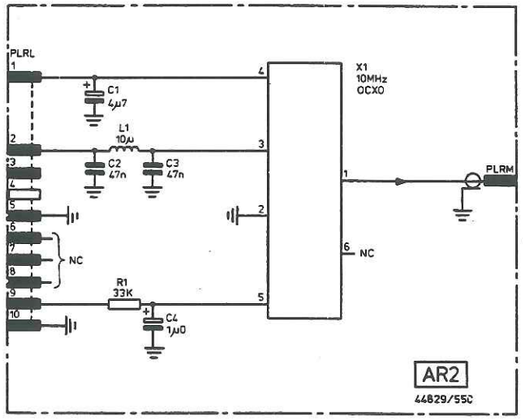


Fig. 7-51 AR2/1 Internal frequency standard component layout

PSU AR1/2

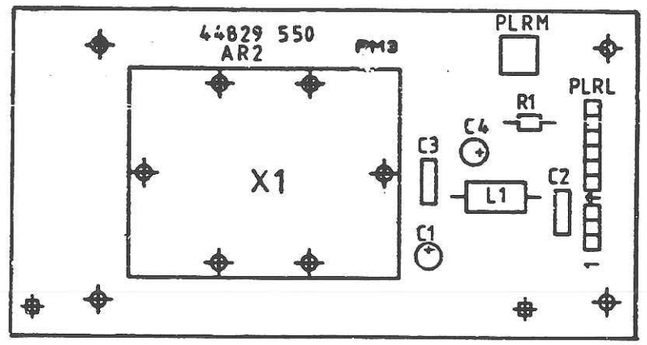
Internal frequency standard AR2/1



Drg. No. Z 44829/958W, Sheet 1 of 1 (Issue 2)

Fig. 7-52 AR2/1 Internal frequency standard circuit diagram

Component layout **AR2**

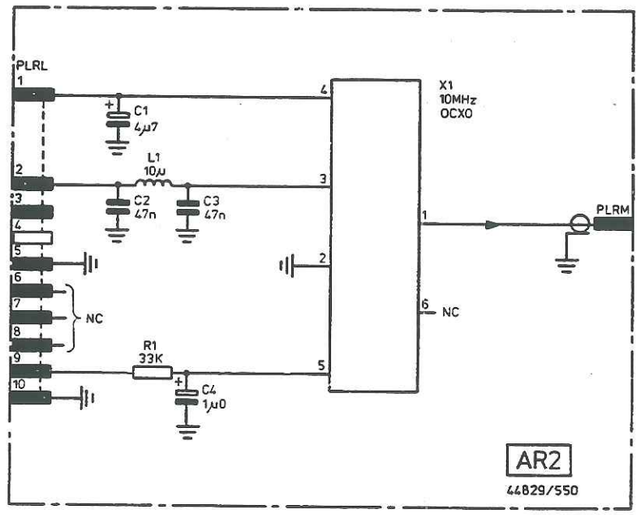


Internal frequency standard **AR2/1**

Drg. No. 44829/550W (Issue 1)

Fig. 7-53 AR2 Internal frequency standard component layout

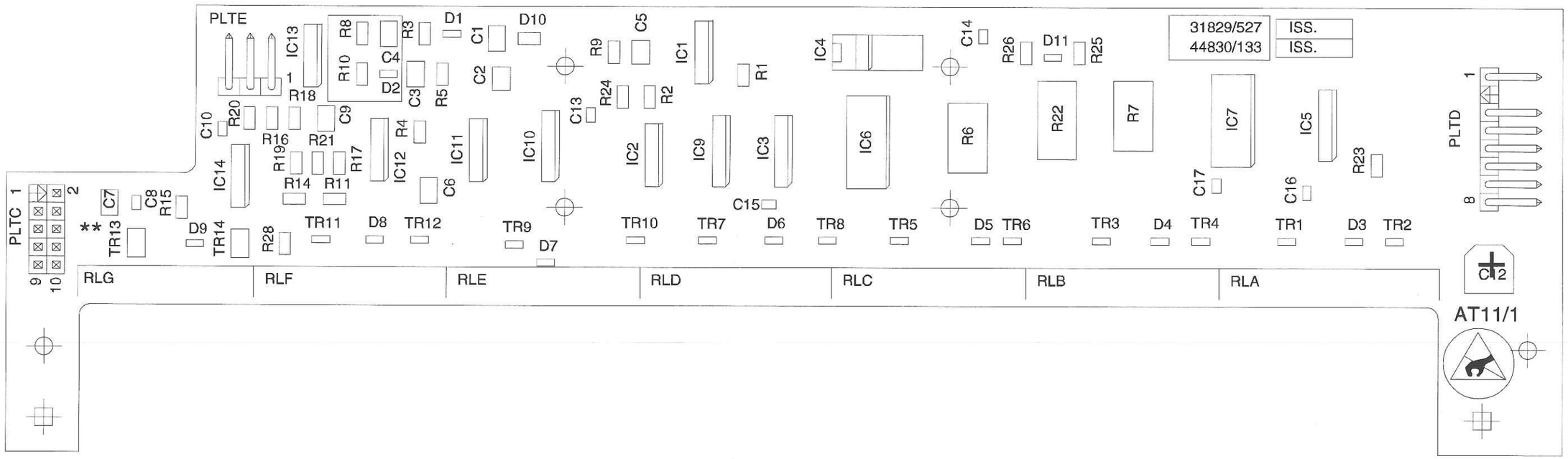
Internal frequency standard AR2



Drg. No. Z 44829/550W, Sheet 1 of 1 (Issue 1)

Fig. 7-54 AR2 Internal frequency standard circuit diagram

Component layout AT11/1



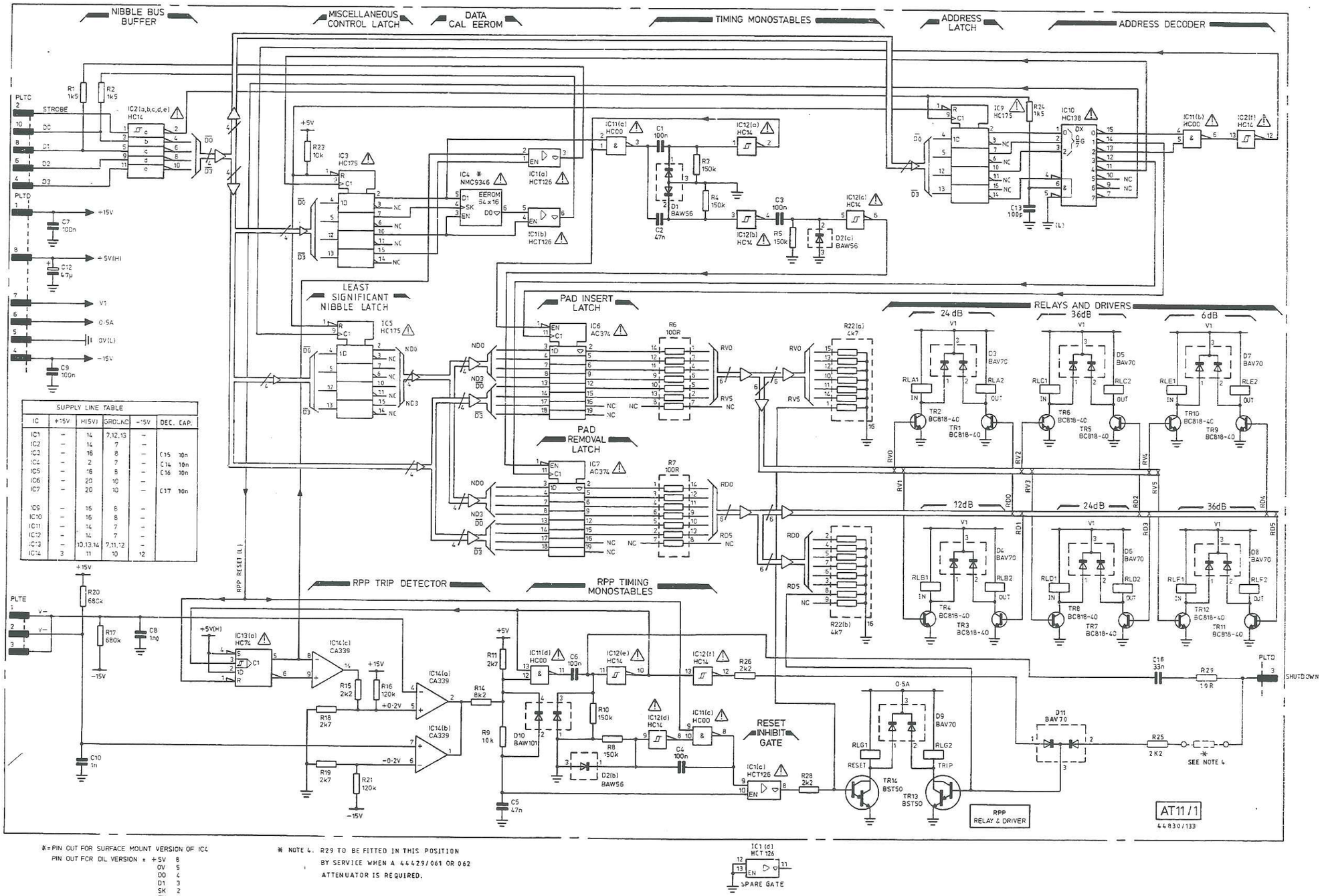
Internal frequency standard **AR2**

Drg. No. 44830/133W (Issue 1)

Fig. 7-55 AT11/1 Edgeline controller component layout

Edgeline controller AT11/1

NOTES
1. PLTC 10 WAY DIL WITH KEY IN POSITION 1.
2. PLTE 3 WAY SIL.
3. PLTD 8 WAY SIL WITH KEY IN POSITION 2.



Drg. No. Z 44830/133W, Sheet 1 of 1 (Issue 1)
(In general, this circuit diagram also applies to earlier versions of the board).

Fig. 7-56 AT11/1 Edgeline controller circuit diagram

Edgeline controller **AT11/1**

Annex A
OPTION 005
GMSK Bt 0.3

CONTENTS

LIST OF TABLES

LIST OF FIGURES

List of figures (contd.)

GENERAL DESCRIPTION

This option adds GMSK (Gaussian Minimum Shift Keying) modulation at a bit rate of 270.833 kHz to the 2030 series. This modulation is used by the GSM (Global System for Mobile communications) and UK PCN (Personal Communications Network) system.

TECHNICAL DESCRIPTION

This technical description is additional to that given in Chap. 4-2 in the main body of the manual for standard instruments.

PRINCIPLES OF OPERATION

GMSK modulation is created by a direct digital synthesizer at an IF of 3.25 MHz. The 2030 is used as the local oscillator input to a mixer to convert this to the desired output frequency. Data for the modulator can be supplied either from an external source or an internal data generator.

All of the extra circuits are contained in an additional module called the GMSK tray. The RF output from the 2030 is intercepted by a bypass switch, which routes the RF either directly to the front panel attenuator for normal operation, or via the mixer in the GMSK tray. In addition, the modulation and standard connections to the main RF tray are intercepted by the GMSK tray. The GMSK tray contains three main boards, AE1, AE2 and AE3 and two daughter boards AE1a and AE3a.

DATA GENERATOR BOARD AE1 & CONTROL BOARD AE1a

Circuit diagrams: Figs. A-6 & A-7

Data Generator board AE1 creates an IF at 3.25 MHz which carries the required GSMK modulation. This IF is modulated according to whether external data or data from the DSP microprocessor is being supplied. The board also supplies the control interface for the rest of the instrument, and controls the switches used for signal routeing etc. Control board AE1a is a daughter board which holds programmed PAL IC92.

Data generator: Interface (AE1 sheet 1)

Circuit diagram: Fig. A-6

Nibble bus interface

The GSMK tray is controlled from the main 2030 processor via the nybble bus to PLEC. This is a low speed, 4-bit multiplexed data and address, bi-directional bus, that is also used to control the RF attenuator. The four bits carry an address when the STROBE line is high, and data when the STROBE line is low.

The data and strobe bits are buffered by IC1. IC2 is a latched decoder which latches the address from the bus on the high to low transition of the strobe, to deliver a strobe output on one of its eight outputs, Q0 to Q7 (Q8 to Q15 addresses are used by the RF attenuator). IC3 is used as a data word expander. When the nybble bus needs to write 8-bit data, the most significant nybble is latched into IC3, and the least significant nybble is written to the required port.

ICs 4 and 10 form the interface used to talk to calibration EAROM IC5. This is a serial EAROM, data is written by manipulating the data, clock and enable lines using IC4, and data is read back via the readbacks multiplexer IC10.

Bridge logic

ICs 6, 7, 8 and 17 form the bidirectional interface between the nybble bus and the DSP (Digital Signal Processor). When the 2030 wants to talk to the DSP, IC8 is loaded with a data byte. Loading IC8 also sends IPINT (InPut INTerrupt) to the IC17 interrupt controller, which interrupts the DSP. The DSP reads the byte in much less time than it takes for the main 2030 to send the next one, hence no handshaking is required. When the DSP wants to talk to the 2030, it sends the first byte to ICs 6 and 7, and sets the OPQNE (OutPut Queue Not Empty) bit on IC17. The 2030 monitors this bit, and when it goes true, reads IC7 followed by IC6 over the nybble bus. The action of reading IC6 sends OPINT (OutPut INTerrupt), which tells the DSP to either drop OPQNE if all the bytes have been sent, or to load the next byte into ICs 6 and 7.

Data generator

The data generator - ICs 13, 14, 15 and 16 - is built around the ADSP2105, using its high processing speed and serial output to simplify the data generator function. IC13 stores the user-programmed data sequences while IC15 stores the program code which is booted into the DSP at reset time. IC14 is used as the address decoder for the system. The BROWN OUT line, from the power supply, enters the address decoder as another enable, to safeguard IC13 from unintentional writes during power glitches.

Data generator: Synthesizer (AE1 sheet 2)

Circuit diagram: Fig. A-7

Direct digital synthesizer

The direct digital synthesiser (DDS), formed from ICs 21, 22, 23, 24, 27 and 92, generates the 3.25 MHz IF signal which is upconverted onto the final output signal. This frequency has been chosen to be exactly 0.25 of the 13 MHz standard used for GSM.

IC21 is built from a PAL. In normal use it implements a 4-bit data shift register, which stores the present and the last three data bits from the input. It also implements a 2-bit state machine, which keeps track of which quadrant the modulation vector is in. There is also a mode input, which optionally differentiates the data, according to the GSM recommendation. The 6-bit output of this multi-function IC is used as part of the address to a fast look-up table, the output represents where the modulation vector started, and where it is going to, for the current data bit.

IC92 is also built from a PAL. In normal use this is a resettable 6-bit counter which counts continuously from 16 to 63, a count of 48. This is the oversampling ratio used in this instrument, and is the ratio of 13 MHz to the data bit rate of 270.833 kHz. The 6 bits from this IC go together with the 6 bits from IC21 to form a 12-bit address into the look-up table, IC23. IC92 also produces a carry output, TC5, which is used as the shift enable to IC21. The SQUEAK input to IC92 allows the divide by 48 counter to be reset to 63, to allow synchronisation with quarter bit clocks (see also Timebase board AE3).

ICs 21 and 92 also have a test mode, controlled by the MODE pin. When this is high, the two ICs ignore the data input, and use the remaining counts available to IC92, i.e. 0 to 15. IC21 changes function, to count by 8. A different carry out, TC3, is now used from IC92 to IC21, which acts on CEN (Count ENable). D2 to D0 inputs now go directly to the waveform look-up table IC23. In this mode, ICs 92 and 21 produce a continuous count of length 128, which addresses some fixed test patterns stored in IC23. There are 8 patterns in all, selected by D2 to D0, which are used for verifying correct operation of the analogue path after the DDS.

The direct digital synthesiser is completed by the DAC, IC24, and its local power supply and reference, IC27. The converter has a complementary current type output, 40 mA full scale per output. The 24 Ω resistors R41 and R42 load the output to 1 V.

There is a disable control for the DDS, which acts on the output enable to IC23. When its output is disabled, all of the output lines are pulled high by R60 to R67.

Frame synchronisation

Frame synchronisation is performed by ICs 22, 25 and 18. IC18 is a PAL programmed to divided by 1250, the number of bits in 8 GSM slots, or one frame. This generates SS (Slot Start) as an interrupt to the data generator, to begin producing data. It also receives envelope signals EE and EB from the DSP, indicating respectively whether the next slot is to be enabled or blanked. These signals are retimed, and the IE (Internal Envelope) signal goes to the envelope shaper on AE2 at the correct time to shape the data burst.

The SYNC input/output pin is used to transmit frame timing information from the instrument, and to allow the instrument to be synchronised to an external source of frame timing.

Relays and switches

Bypass switch driver IC28 is used to drive the RF switch relay. The monostable is used to create a short pulse, which causes TR1 or TR2 to drive the switch coils. The switch itself is bistable, so does not need continuous application of power (in fact, continuous application of 5 V would destroy it).

Relays RLA and RLB (for drivers see Sheet 1) are used to divert the front panel connections for external modulation and LF source through the GSM tray, for alternative use in GSM mode.

MODULATOR BOARD AE2

Circuit diagram: Fig. A-9

Modulator board AE2 mixes the 2030 local oscillator with the IF supplied from the control board. It controls the level of the IF to interpolate the 6 dB steps of the output attenuator for RF level control. It shapes the envelope signal supplied from the control board to ramp the RF up and down.

Envelope shaper

The purpose of the envelope shaper formed by ICs 1, 2, 5, 6 and 11 is to produce two signals. The first controls the IF output level. The second is a kill logic signal, which becomes active as the requested level approaches 0 V.

The IF output level control signal serves two purposes. The first is envelope shaping, whereby either the internal envelope generator (synchronised to the internal data generator via INTERNAL ENVELOPE) or the EXT ENVELOPE signal, is used to shape the RF bursts required by the GSM specification. The second purpose is to control to RF output level that represents full scale, i.e. it has to interpolate the 6 dB gain steps of the instrument's output attenuator.

The internal burst profiler is formed with IC5. INTERNAL ENVELOPE is used to switch 0 V or 5 V into IC5 via analogue switch IC1. The current through R3 and R5 charges C1 in a linear ramp, until it is caught by either TR1 or TR2 at 0 or 5 V. The values of R3, R5 and C1 have been chosen to give a 25 µs ramp time, which meets the GSM ramp time specifications.

This 0 to 5 V signal is reduced to 1 V by R4 and R13. IC1 selects either this internal signal or EXT ENVELOPE as the reference for the multiplying DAC IC2. The DAC is loaded with the output level control data. The output is boosted to a nominal maximum of 3 V by IC6, and applied to the CONTROL input of IC3.

The GSM specification requires a 70 dB dynamic range. This cannot be obtained by IC3 alone. When the control signal goes below 23 mV, IC11 comparator sets the IF KILL signal active, which disables the direct digital synthesizer on AE1, and disables the IF amplifier TR5 to TR8.

Voltage controlled IF filters

The IF signal is taken from board AE1, differentially to reduce logic pickup, and made single ended by TR3 and TR4. The output impedance of this amplifier is 240 Ω, which is the source impedance seen by the first IF filter. The filter is a special linear phase filter, whose amplitude droop is pre-compensated for by the direct digital synthesiser. One IF filter is placed here to attenutate the high frequency components of the DDS before the linear multiplier. The IF signal then goes to linear voltage multiplier IC3 which controls the level for both burst shaping and full scale output level, depending on the voltage on the CONTROL input.

The multiplier output current is turned into voltage by IC7, and then goes through a second IF filter operating in 240 Ω. This filter is used to attenuate the excess noise of the multiplier. A discrete buffer amplifier formed by TR5 to TR8 is used to drive the mixer IF input through a 51 Ω sourcing resistor.

RF section

RF is brought onto the board on the RF IN line at +13 dBm from the main 2030 RF output via the RF changeover switch. The IF input to mixer X1 comes from 51 Ω resistor R14 backed by a capacitor to ground C47, so as to provide a good broadband match to the IF port, and to minimise spurious mixing products. Mixer output is boosted in level by IC4.

RF output protection is obtained from pin diode D2. An overload on the output is rectified by D3. ICs 9 and 10 use this detected signal to drive a large current into the pin diode, clamping the voltage at the output and reflecting excess power back to the output. The detected voltage is sent back as a status signal that can be read over the nybble bus as LEVEL STATUS.

TIMEBASE BOARD AE3 & STANDARD CONDITIONING BOARD AE3a

Circuit diagram: Fig. A-11

The main function of Timebase board AE3 is to provide the 13 MHz signal required by the internal data generator. Additional functions include locking the 13 MHz to the 2030 internal standard, or to the external standard, or to an external bit clock. The board also provides a 13 MHz standard for the 2030. Standard conditioning board AE3a is a daughter board containing the external standard preamplifier.

The timebase board consists of little more than a 13 MHz synthesiser. TR100 implements a Clapp modified Colpitts oscillator, tuned by D106 and D107. During normal 2030 operation, the 13 MHz oscillator is disabled via D105, which removes the oscillator bias. D104 is used to stop the clock output buffer from self-oscillating when the 13 MHz signal is not present.

All of the phase lock circuitry is contained in the PAL, IC100. This contains a divider for the 13 MHz signal, selectable dividers for the external standards, a phase detector and signal routing.

When the 2030 is operating from external data, the 13 MHz VCXO is locked to 48 times the bit clock. The phase detector has a special characteristic that allows it to lock to 1-bit long, or 1.25 bit long clock periods, to allow it to remain locked to a clock signal coming from a 156.25 bits per slot base station. On the occurence of a 1.25 long bit, the SQUEAK signal goes active for one bit time, to reset the phase of the direct digital synthesiser on board AE1.

The external standard is pre-amplified by TR30, to allow operation down to 0 dBm, and then shaped by IC101. IC101 is also used to provide a 50 Ω signal drive capability when the 2030 is on internal standard operation.

MAINTENANCE

This section describes procedures for the access and removal of the GMSK tray and of the boards contained within it. These procedures are additional to those given in Chap. 5-0 in the main body of the manual for standard instruments.

ACCESS FOR SERVICING

Turn the instrument upside down and remove the bottom outer cover which reveals the GMSK tray.

Access to boards AE1, AE1a, AE2, AE3 & AE3a

Remove the GMSK tray cover after removal of 17 M4 screws to gain access to the boards (see Fig. A-1).

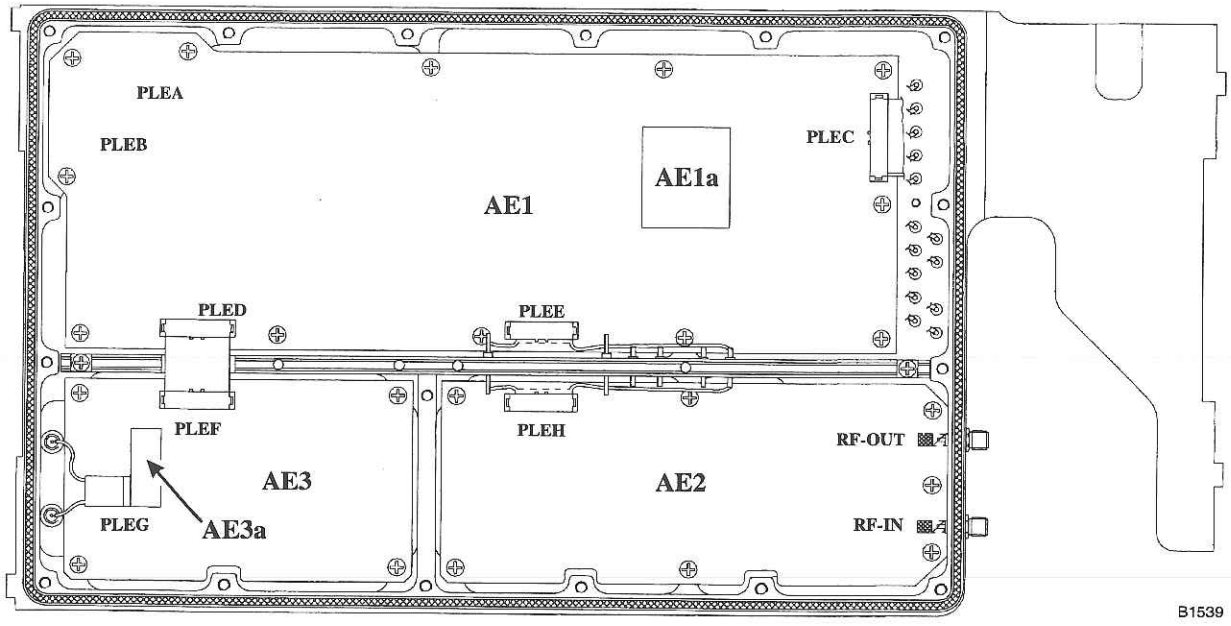


Fig. A-1 GMSK tray from below with tray cover removed showing boards and locations of connectors

REMOVAL OF UNITS AND BOARDS

Removal of board AE1 (with AE1a)

Having gained access to the board proceed as follows:-

(1) Pull off the ribbon cable connectors to PLEC, PLED and PLEE.

(2) Remove 12 M3 screws holding the board in place.

(3) Lift the board ensuring that the pins of connectors PLEA and PLEB on the back of the board are not damaged.

Removal of board AE2

Having gained access to the board proceed as follows:-

(1) Pull off the ribbon cable connector to PLEH.

(2) Unsolder RF-IN and RF-OUT and remove the SMA connectors.

(3) Remove 7 M3 screws holding the board in place.

Removal of board AE3 (with AE3a)

Having gained access to the board proceed as follows:-

(1) Pull off the ribbon cable connector to PLEF.

(2) Pull off the 2-wire connector to PLEG.

(3) Remove 4 M4 screws holding the board in place.

Removal of bypass switch

The bypass switch is mounted on the GMSK tray (see Fig. A-2). Proceed as follows:

(1) Remove the GMSK tray (see 'Removal of GMSK tray' below).

(2) Remove the 2 semi-rigid cables between the bypass switch and the GMSK tray.

(3) Remove 3 M3 screws on the mounting bracket.

(4) Remove 4 M3 screws from the switch cover and take off cover. Unsolder connector on switch board and remove the unit.

Replacement is generally a reversal of the above removal procedure. Ensure that the correct torque setting is used when replacing the semi-rigid cable connections (torque settings are given in Chap. 5-0 of the manual).

Removal of GMSK tray

The GMSK tray is a machining which rests on lugs at the sides and is held in place by 5 M4 panhead screws. Proceed as follows:

(1) Turn the instrument upside down and remove the bottom outer cover.

(2) Disconnect and completely remove the semi-rigid cable between the bypass switch and the attenuator.

(3) Undo the semi-rigid cable between the bypass switch and the RF tray at the bypass switch end.

(4) Remove 6 screws from the side frames.

(5) Lift the tray at the opposite end from the bypass switch enough to pull off 2 SMB connectors (EXT STD and TRAY STD).

(6) Pull out two 11-way crimped wire connectors (MODULATION FRONT PANEL and MODULATION RF TRAY).

(7) Disconnect the 10-way ribbon cable at the front panel nybble bus end.

(8) Disconnect SKRE at power supply board AR1/1.

(9) At bypass switch remove SMB connector (SYNC).

(10) Lift the GMSK tray directly upwards and remove.

Replacement is generally a reversal of the above removal procedure. Ensure that the correct torque settings are used when replacing the semi-rigid cable connections (torque settings are given in Chap. 5-0 of the manual).

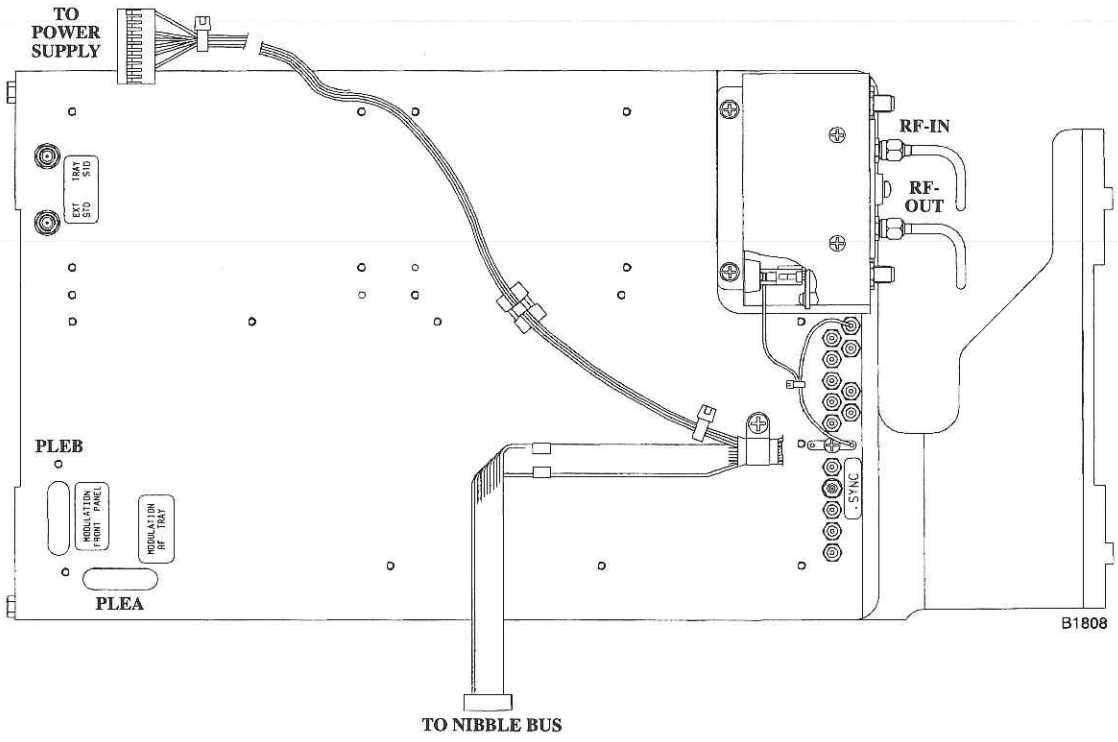


Fig. A-2 GMSK tray viewed from underneath showing bypass switch and connectors

ADJUSTMENT

This section describes adjustments which are additional to those given in Chap. 5-2 in the main body of the manual for standard instruments. The adjustment steps to be carried out depend upon the type of instrument.

GMSK MODULATION

ADJUSTMENT	
BFO band 21 MHz to 1350 MHz 1350 MHz to 2700 MHz	
Full calibration figure range:	0 to 255
5% to 95% calibration figure range:	13 to 242

2030 instrument

For a 2030 fitted with the GSM option carry out steps (1) to (7) and step (10).

2031 instrument

For a 2031 fitted with the GSM option carry out steps (1) to (10).

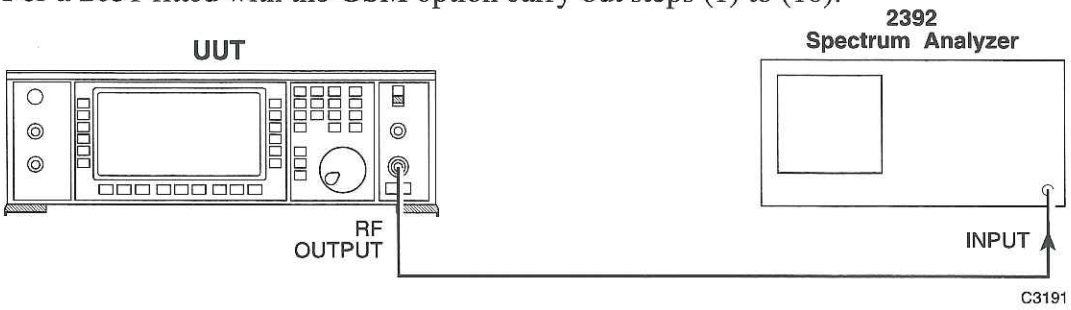


Fig. A-3 GMSK adjustment test set-up

(1) Connect the test equipment as shown in Fig. A-3.

(2) It is necessary to obtain a set a reference levels for the spectrum analyzer. This is done by the following procedure:

Set the spectrum analyzer as follows:-

Preset and calibrate	
Reference level	0 dBm
Span/div	1 kHz

Set the UUT as follows:-

[Carrier Freq.]	as detailed in Table A-1.
[RF Level]	-10 dBm
[MOD]	off

Tune the spectrum analyzer to the same frequency as the UUT. On the spectrum analyzer select:-

Marker peak find

Note the marker level as the reference level. Repeat for all the frequencies in Table A-2, sections a, b and c.

(a) BFO RF level calibration

(3) Unlock the instrument to level 2. Then select :-

[UTIL] *[Utils. Menu 2] [Cal. Value] [GMSK] [RF Level] [BFO Band] [Start RF Calib.]*

Set the spectrum analyzer as follows:-

Reference level	0 dBm
Span/div	1 kHz

(4) On the spectrum analyzer:-

Tune to the carrier frequency for the cal point (as detailed in Table A-3). Select:-

Marker peak find

Adjust the correction figure on the UUT until the marker reads the noted reference level ±0.3 dB.

Note...

If the calibration figure is outside the 5% to 95% limits shown above there may be a fault on the instrument.

(5) On the UUT select the *[Next Cal Point]*. Repeat step (4) above until Cal Point 0 is displayed again, then select *[EXIT]*.

(b) 21 MHz to 1350 MHz RF level calibration

(6) Set the UUT to:-

[21 MHz - 1.35 GHz] [Start RF Calib.]

(7) Repeat steps (4) and (5) above.

(c) 1350 MHz to 2700 MHz RF level calibration (2031 only)

(8) Set the UUT to:-

[1.35 GHz - 2.7 GHz] [Start RF Calib.]

(9) Repeat steps (4) and (5) above.

(10) On the UUT select:-

[EXIT] [EXIT] and *[Save Calib.]*

TABLE A-1 ADJUSTMENT FORM

Adjustment figures for Serial No. _____

Date _____
Instrument type _____
Options fitted _____
Software passwords
Level 1 _____
Level 2 _____

(a) BFO band

Cal point	Carrier frequency	Measured reference level	Cal figure
0	10.0	_____	_____
1	15.0	_____	_____
2	21.09375	_____	_____

Page 1 of 3

TABLE A-1 ADJUSTMENT FORM (contd.)

(b) 21 - 1350 MHz band

Note...

For cal points 1 to 36, both the UUT carrier and the spectrum analyzer frequencies are increased by 37.5 MHz.

Cal point	Carrier frequency	Measured reference level	Cal figure
0	30.0	_____	_____
1	37.5	_____	_____
2	75.0	_____	_____
3	112.5	_____	_____
4	150.0	_____	_____
5	187.5	_____	_____
6	225.0	_____	_____
7	262.5	_____	_____
8	300.0	_____	_____
9	337.5	_____	_____
10	375.0	_____	_____
11	412.5	_____	_____
12	450.0	_____	_____
13	487.5	_____	_____
14	525.0	_____	_____
15	562.5	_____	_____
16	600.0	_____	_____
17	637.5	_____	_____
18	675.0	_____	_____
19	712.5	_____	_____
20	750.0	_____	_____
21	787.5	_____	_____
22	825.0	_____	_____
23	862.5	_____	_____
24	900.0	_____	_____
25	937.5	_____	_____
26	975.0	_____	_____
27	1012.5	_____	_____
28	1050.0	_____	_____
29	1087.5	_____	_____
30	1125.0	_____	_____
31	1162.5	_____	_____
32	1200.0	_____	_____
33	1237.5	_____	_____
34	1275.0	_____	_____
35	1312.5	_____	_____
36	1350.0	_____	_____

TABLE A-1 ADJUSTMENT FORM (contd.)

(c) 1350 MHz - 2700 MHz band

Note...

For cal points 1 to 36, both the UUT carrier and the spectrum analyzer frequencies are increased by 37.5 MHz.

Cal point	Carrier frequency	Measured reference level	Cal figure
0	1350.0	_____	_____
1	1387.5	_____	_____
2	1425.0	_____	_____
3	1462.0	_____	_____
4	1500.0	_____	_____
5	1537.5	_____	_____
6	1575.0	_____	_____
7	1612.5	_____	_____
8	1650.0	_____	_____
9	1687.5	_____	_____
10	1725.0	_____	_____
11	1762.5	_____	_____
12	1800.0	_____	_____
13	1837.5	_____	_____
14	1875.0	_____	_____
15	1912.5	_____	_____
16	1950.0	_____	_____
17	1987.5	_____	_____
18	2025.0	_____	_____
19	2062.5	_____	_____
20	2100.0	_____	_____
21	2137.5	_____	_____
22	2175.0	_____	_____
23	2212.5	_____	_____
24	2250.0	_____	_____
25	2287.5	_____	_____
26	2325.0	_____	_____
27	2362.5	_____	_____
28	2400.0	_____	_____
29	2437.5	_____	_____
30	2475.0	_____	_____
31	2512.5	_____	_____
32	2550.0	_____	_____
33	2587.5	_____	_____
34	2625.0	_____	_____
35	2662.5	_____	_____
36	2700.0	_____	_____

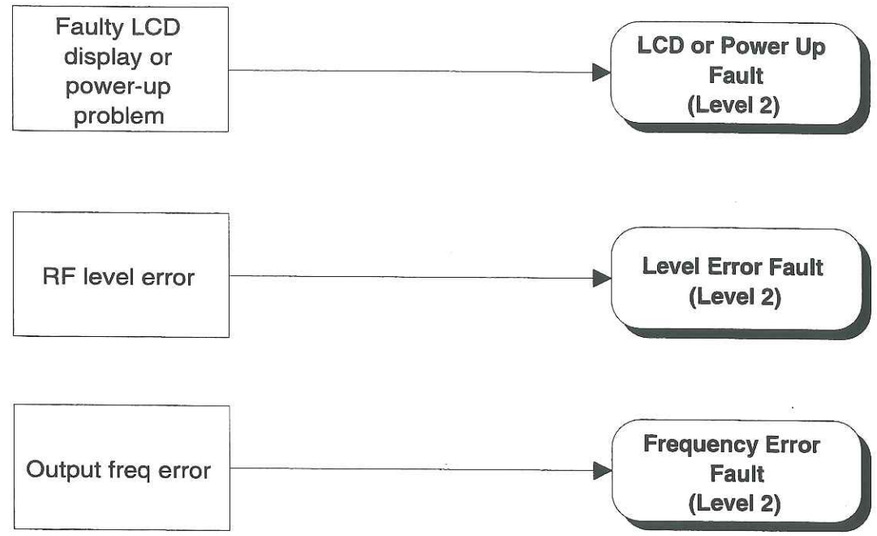
FAULT DIAGNOSIS

FAULT FINDING FLOW CHARTS

The following fault finding flow charts are specifically intended for GMSK instruments and are to be used in place of those given in Chap. 5-3 in the main body of the manual.

Fault Symptom Key (Level 1)

IDENTIFY FAULT SYMPTOM AND PROCEED TO FAULT FINDING CHART



Front Panel Processor Tests
(use in conjunction with next page)

Hold down required key during power-up.

'0' → Initial sequence → Exit

'1' → Initial sequence → Knob test and keyboard test → Display pixel test → Contrast and backlight test → Exit

'2' → Initial sequence → Display pixel test

'3' → Initial sequence → Contrast and backlight test

Any non-numeric key → Initial sequence → Automatic pixel test → Automatic contrast and backlight test → Exit

Notes:

For all of the initial sequences the contrast is set to a nominal value and the backlight turned on. The screen is cleared and then a "walking man" appears.

A 3-digit number may be incremented/decremented by rotation of the knob to confirm correct operation.

As each key is pressed, it is highlighted on the diagram to show it has been pressed. If all keys have been pressed '0000' will move to next test. If one or more are faulty use one of the other tests to check other functions.

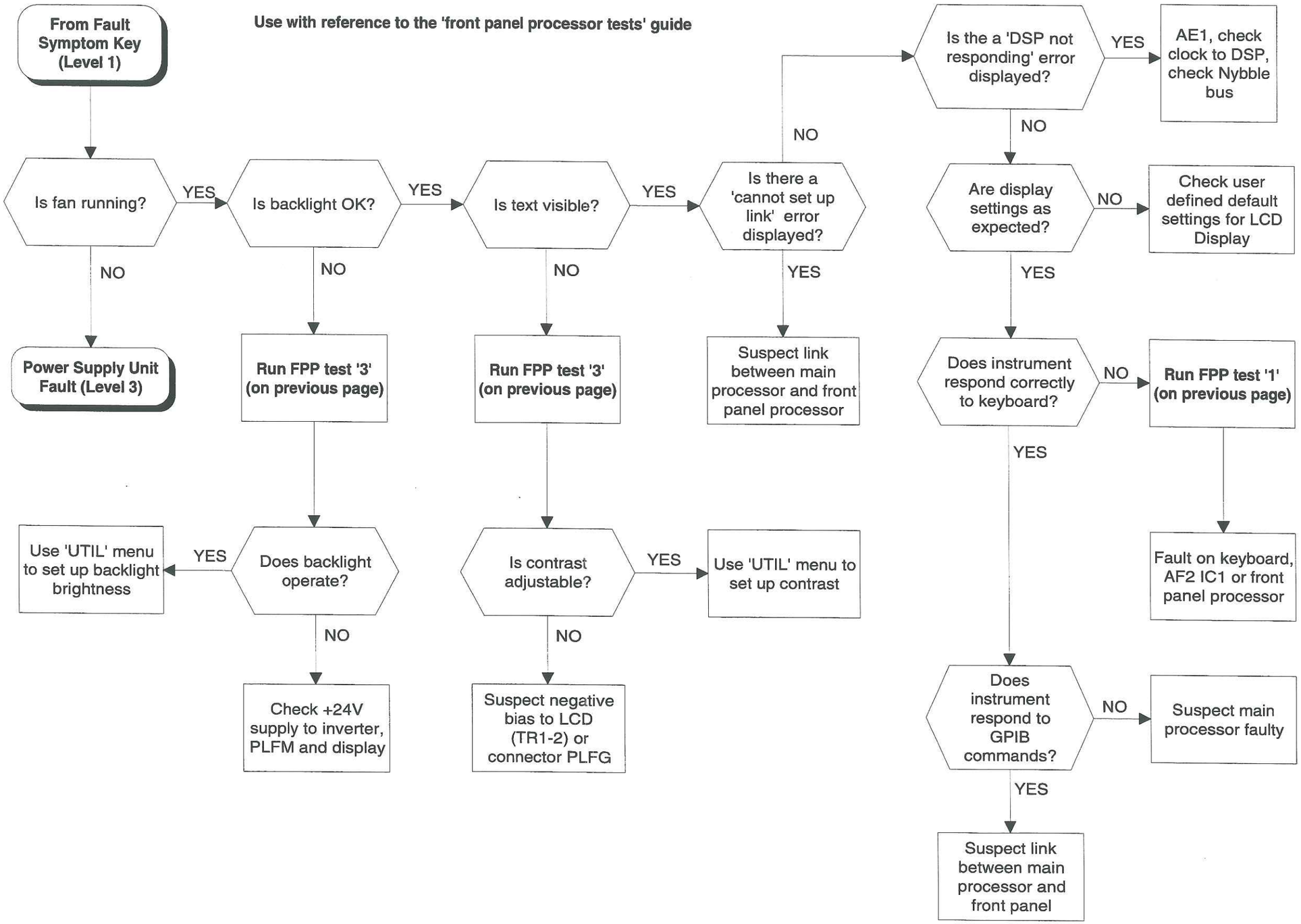
A vertical stripe may be moved across the display using the rotary knob to check that all pixels may be set to 'on' and 'off'. Press '00' to proceed to next test.

The knob allows contrast/viewing angle setting to be run over its full range. The backlight can be set to four brightness levels and 'off' using the left hand side soft keys.

In auto mode the bar does one screen and then moves onto the next test.

In auto mode the brightness is cycled through its four possible levels several times.

LCD or Power Up Fault (Level 2)



OPTION 005 GMSK Bt 0.3

LCD or Power Up Fault (Level 2)

Level Error Fault (Level 2)

A level error fault is where (with the RF offset facility disabled) the RF level is out of specification while the carrier frequency is correct and the output is not unduly distorted. It is assumed that the error is such that the instrument does not just require recalibrating.

If an attempt at RF level calibration is successful but then the instrument displays an RF level Checksum error this implies a fault in reading or writing to the EAROM on AA1. If the RF level calibration fails only on process 0 or 1 while the remainder of the calibration routine is successful, it implies an error with the detector diodes or with the law correct circuits on AA1. (Note that these two processes are repeated for the detector diodes on AB3/5 in the case of the 2031, and on AB3/4 in the case of the 2032).

To help locate a fault on AB2 use the sweep facility with the RF output connected to a spectrum analyzer on max hold. This will identify the frequency range where level faults occur and hence locate the RF path giving rise to the level errors.

Note 1

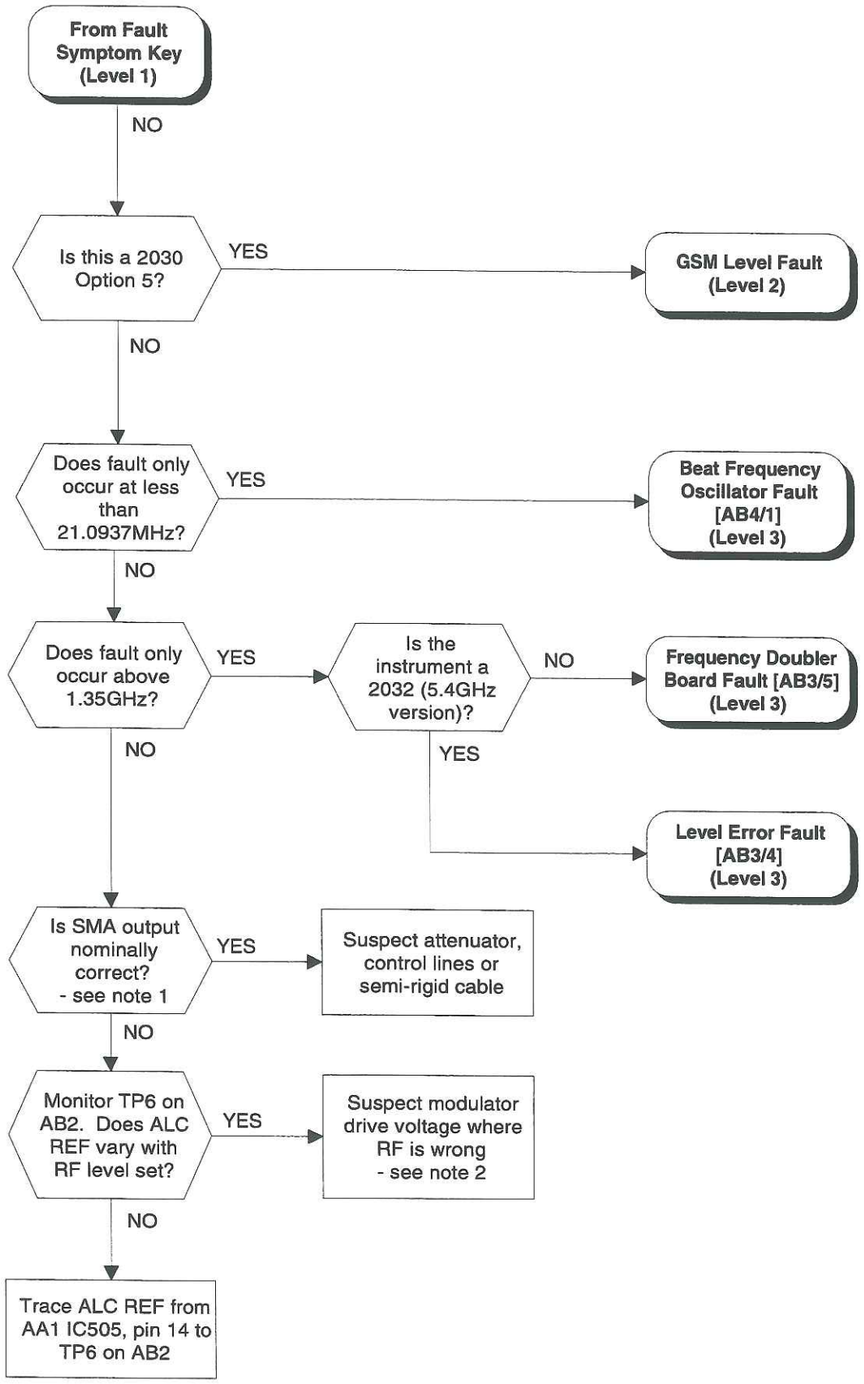
SMA output SKXJ on AB3/*x* should be 1 dBm ±0.5 dB.

Note 2

Modulator drive:

Monitor the modulator drive voltage at TP3 on AB2. The nominal range for the drive voltage is between 0.7 and 2 V.

Modulator voltage	Instrument state
Less than 0.7 V	Modulator fully off. Fault in ALC circuits or maybe RF oscillation in RF path.
Between 0.7 and 2 V	Normal state for ALC drive voltage.
Between 2 and 5 V	Modulator being driven hard, probably excess loss through the RF path.
Greater than 5 V	Modulator fully on. Excess loss through RF path or, if RF level much too high, a fault in the ALC circuits.



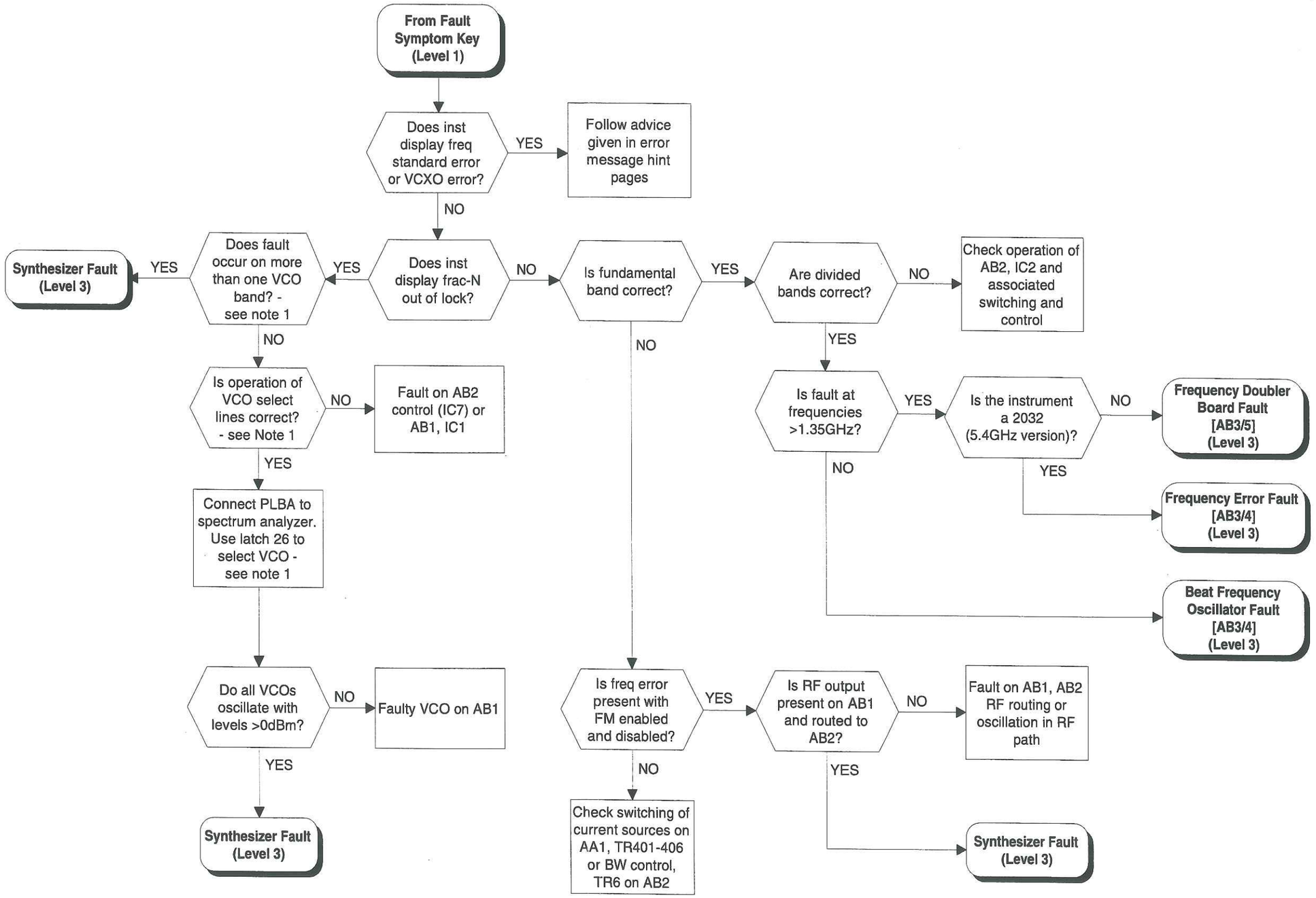
Note 1

VCO band and Range				B7	B6	B5	B4	B3	B2	B1	B0	AB1 collectors at -3 V (others > 0 V)
0	675 -	803 MHz		0	0	X	X	X	X	X	X	TR5
1	803 -	955 MHz		1	0	X	X	X	X	X	X	TR6
2	955 -	1135 MHz		0	1	X	X	X	X	X	X	TR7
3	1135 -	1350 MHz		1	1	X	X	X	X	X	X	TR8

where: X = don't care

Level Error Fault (Level 2)

Frequency Error Fault (Level 2)



It is assumed here that the fault occurs on internal mod. source if not then the audio multiplexers and the LF input circuits should be inspected for faults. Also assumed is that a recalibration of the FM (both DC cal and selfcal) will not cure the problem. For faults only on Wideband FM, trace the signal path through to the VCOs.

Note 1

Testing the 3 dB Step Attenuator: Set the instrument to a carrier frequency of 1 GHz with 100 kHz deviation using the internal modulation oscillator set to 10 kHz. The mod rate must be high to be outside the loop bandwidth of the synthesizer. Monitor the FM on a modulation meter set to relative mode. Use latch poke in binary format to alter contents of the FM control latch (latch 24). A '0' inserts the pad in question increasing the attenuation in the analogue path and so reducing the FM deviation.

	B7	B6	B5	B4	B3	B2	B1	B0
Latch 24:	P	P	P	P	P	0	0	1
Pad value (dB):	48	24	12	6	3			

where: P=0 to insert pad and 1 to remove it.

Alter the pad combinations to ensure the modulation changes in multiples of 3 dB. The 48 dB pad will need to be tested in combination with other pads to overcome the dynamic range required in the mod meter (i.e. measure the change in deviation switching between 48 dB and 36 dB of attenuation).

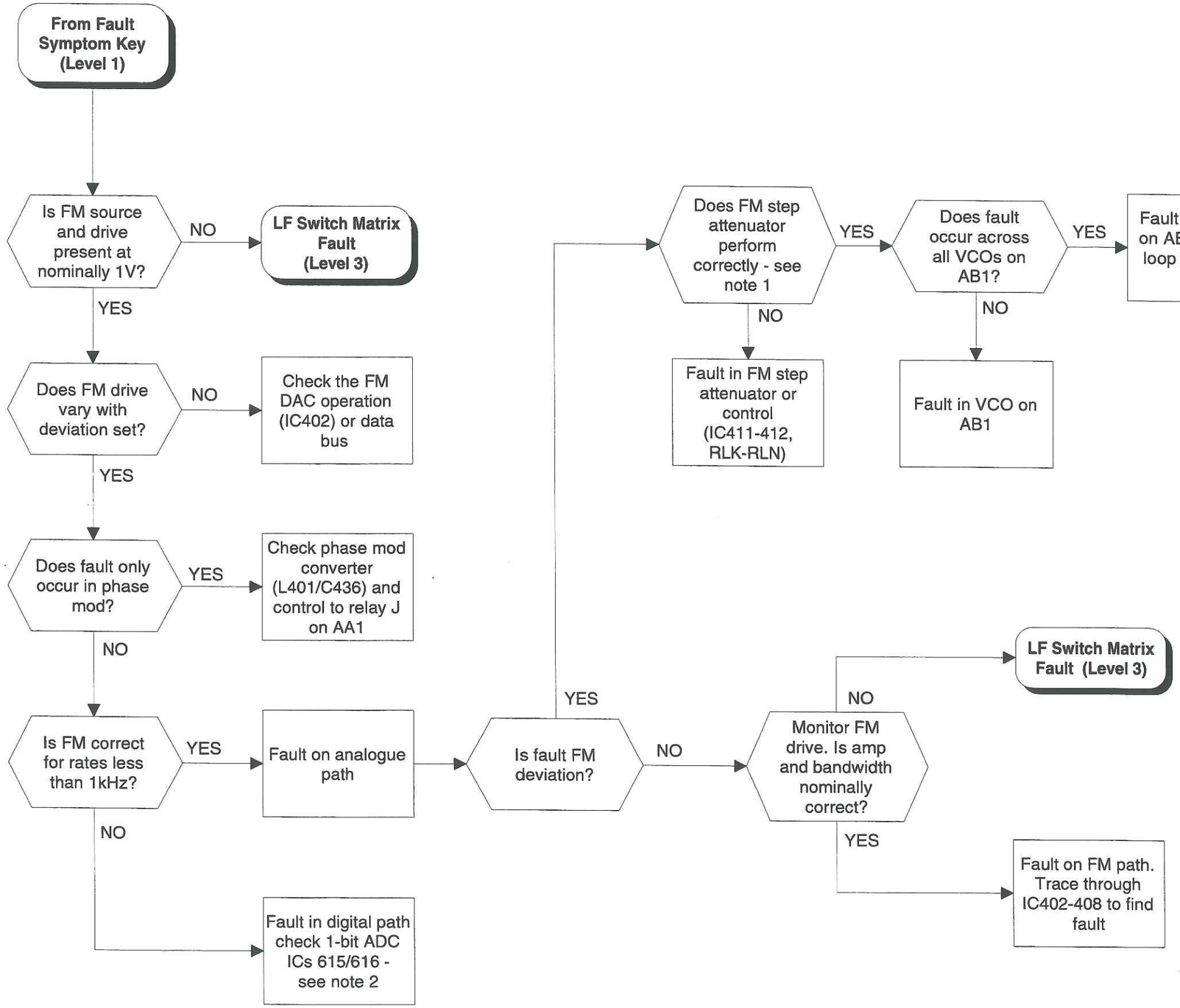
Note 2

Testing the 1-bit ADC: To confirm normal operation is very difficult since the ADC output is chaotic. To test, overload the converter by selecting external DC coupled FM and apply ±2 V while monitoring the output at IC614 pin 54 for the following:

Applied voltage	Expected 1-bit ADC
+2 V	Output mainly high
0 V	Output equally in high and low state
-2 V	Output mainly low

Frequency Error Fault (Level 2)

Freq Mod or Phase Mod Fault (Level 2)

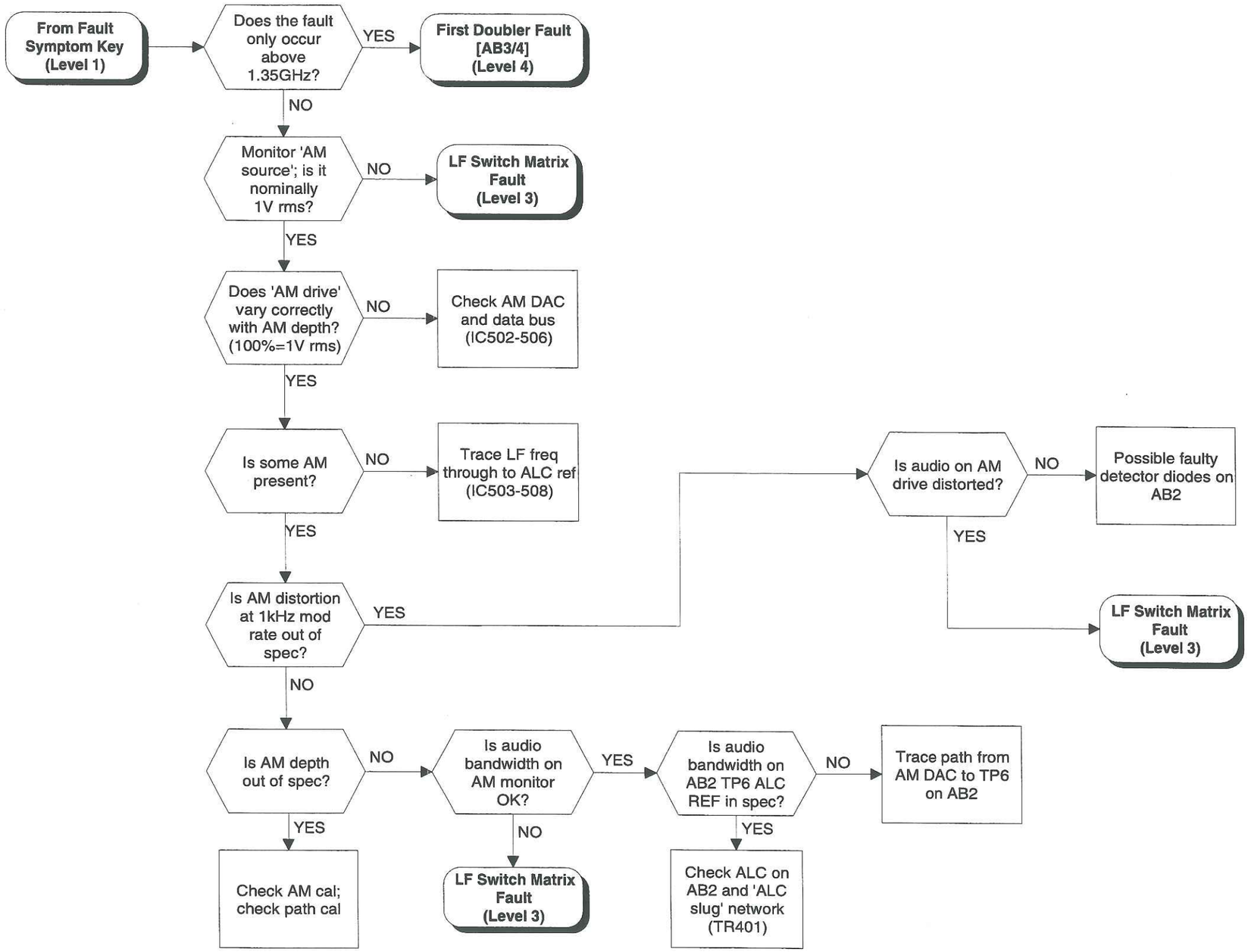


OPTION 005 GMSK Bt 0.3

Freq Mod or Phase Mod Fault (Level 2)

Amp Mod Fault (Level 2)

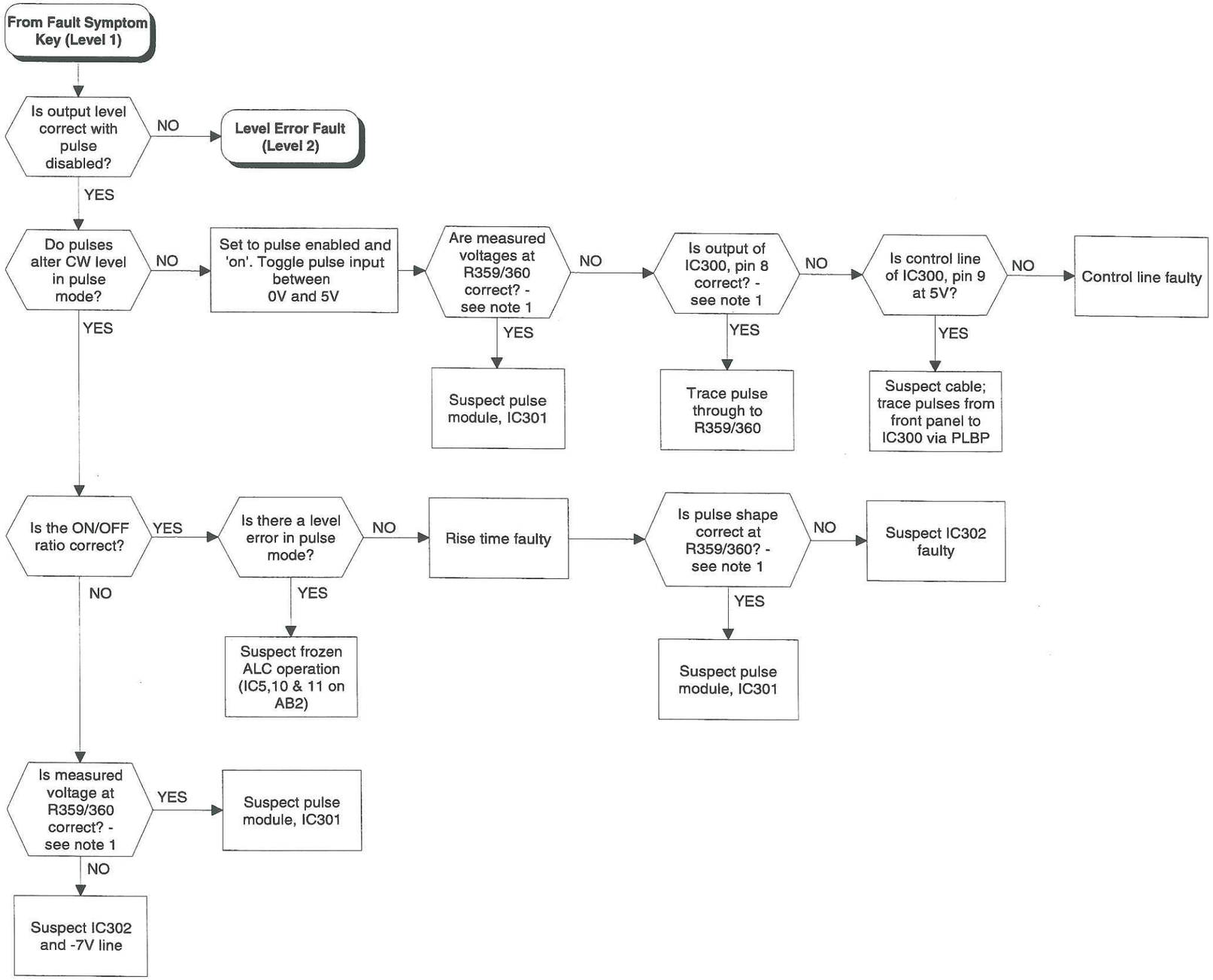
It is assumed that, with the instrument set to internal AM, the output frequency is correct and the RF level accuracy (without AM) and the harmonic distortion are within specification. The algorithm checks the AM path for faults, using the internal LF synthesizer; if no faults can be found look for errors in the audio multiplexers on AA1.



OPTION 005 GMSK Bt 0.3

Amp Mod Fault
(Level 2)

Pulse Mod Fault (Level 2)



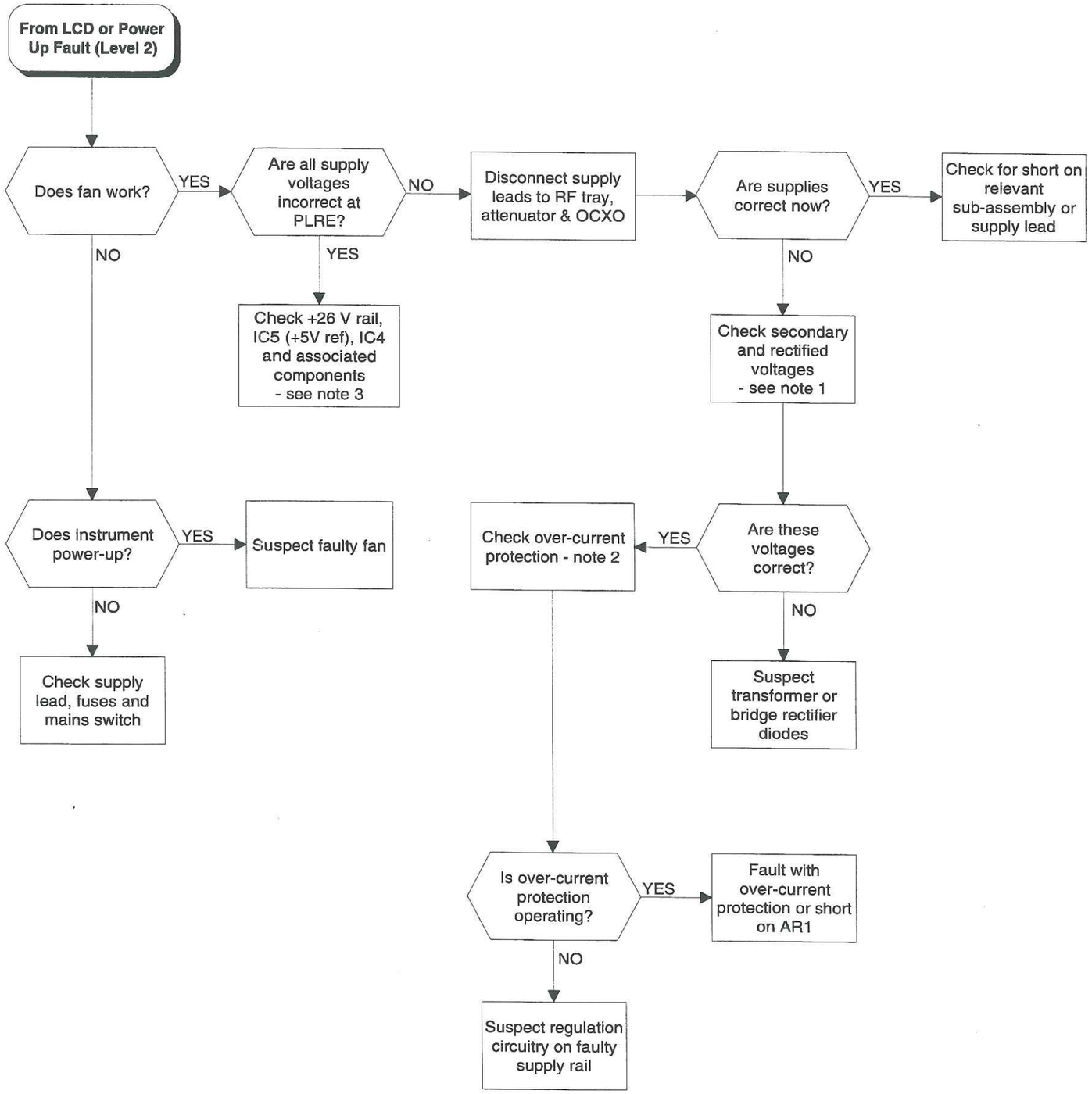
Note 1

Pulse enabled	Nominal volts (V) Input (BNC)	R359	R360	IC300, pin 8
Pulse on	5	0	-7	5
Pulse off	0	-7	0	0

OPTION 005 GMSK Bt 0.3

Pulse Mod Fault
(Level 2)

Power Supply Unit Fault (Level 3)



Note 1

Supply rail (VDC)	+26/24	-15	+15	+5
Secondary voltage (VAC)	30	19	19	8
Rectified voltage (VDC)	+38	-24	+24	+9

Note 2

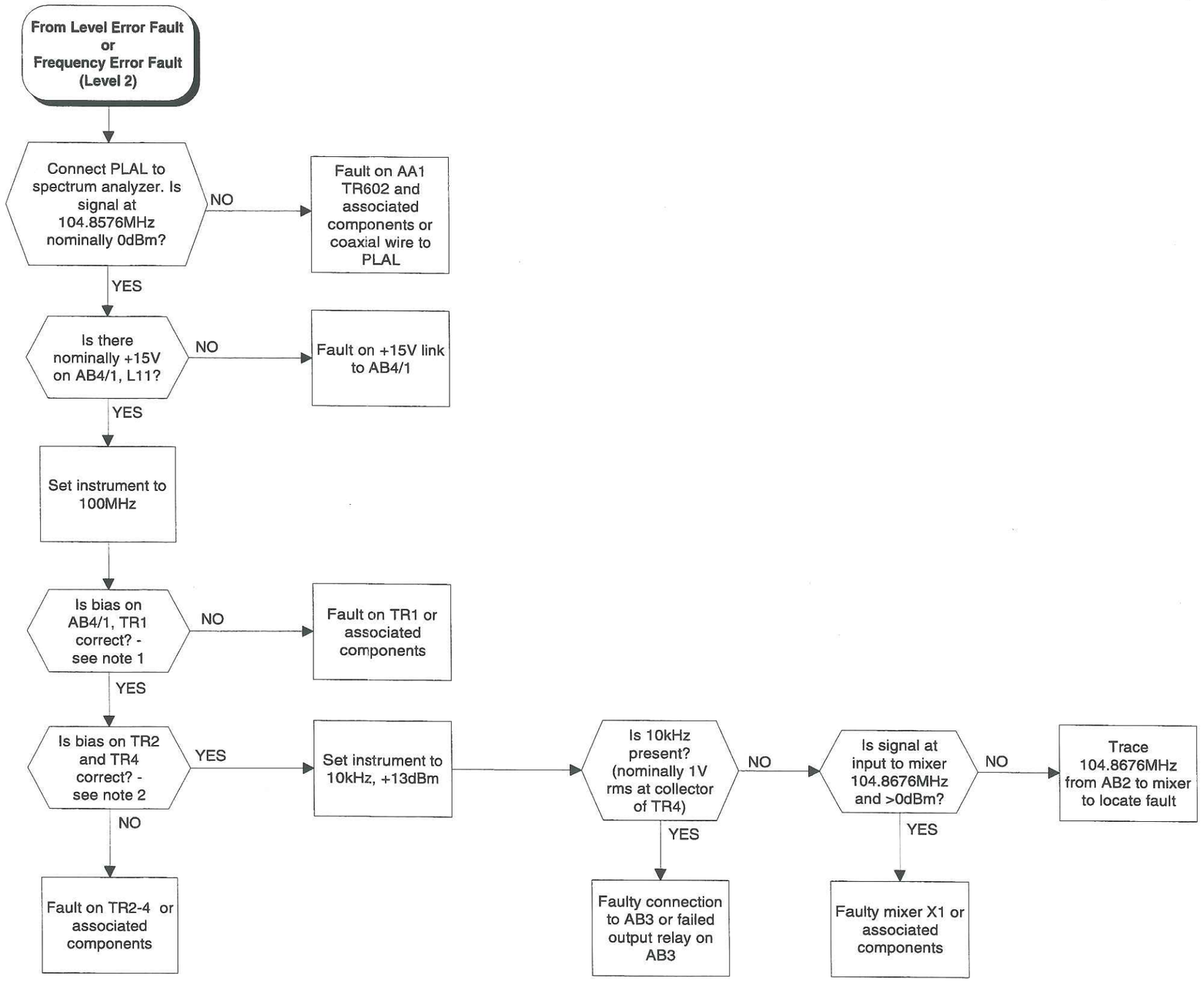
Supply rail	Over-current protection operating if:
+5 V	IC9, pin 8 at 0 V
+15 V	IC9, pin 1 at 0 V
-15 V	TR5c at-24 V
+24 V	IC2, pin 3 at 0 V
+26 V	IC3, pin 2 at 0 V

Note 3

IC4, pin 7	Supply condition
+24 V	PSU operating
0 V	Thermal shutdown

Power Supply Unit Fault (Level 3)

Beat Frequency Oscillator Fault (Level 3)



Note 1

Bias volts on TR1:

collector	13 V
base	5.3 V

Note 2

Bias volts on TR2:

collector	10 V
base	3.3 V

Bias volts on TR4:

collector	10 V
base	0.9 V

Beat Frequency Oscillator Fault (Level 3)

Note 1

AB3 filter bands (GHz):

1.35 - 1.70
1.70 - 2.10
2.10 - 2.70

Note 2

DC bias for amps/doubler:

	VB (volts DC)	VC (volts DC)	VE(volts DC)
TR1	1.2 V	5.8 V	0.6 V
TR2	2.0 V	8.0 V	1.4 V
TR3	0.6 V	13.5 V	0 V
TR7	0.9 V	5.8 V	0.3 V

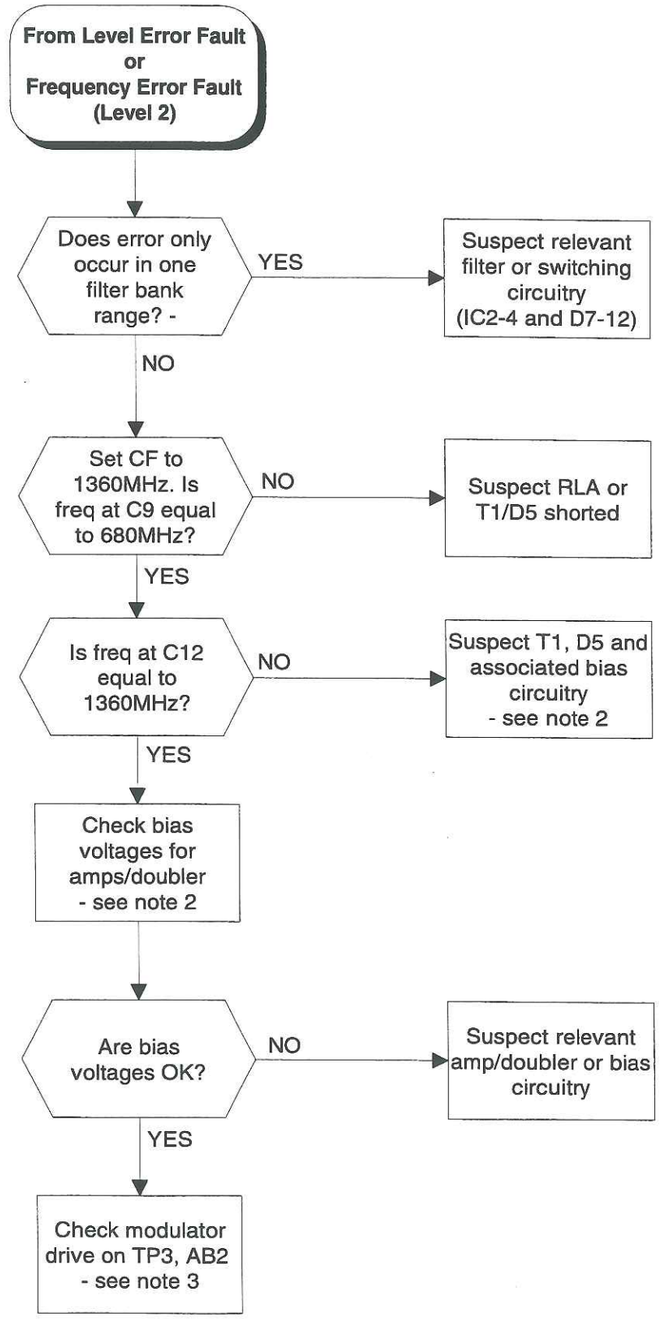
Doubler bias 1.2 V

Note 3

Modulator drive: Monitor the modulator drive voltage at TP3 on AB2. The nominal range for the drive voltage is between 0.7 and 2 V.

Modulator voltage	Instrument state
Less than 0.7 V	Modulator fully off. Fault in ALC circuits or maybe RF oscillation in RF path.
Between 0.7 and 2 V	Normal state for ALC drive voltage.
Between 2 and 5 V	Modulator being driven hard, probably excess loss through the RF path.
Greater than 5 V	Modulator fully on. Excess loss through RF path or, if RF level much too high, a fault in the ALC circuits.

Frequency Doubler Board Fault [AB3/5] (Level 3)



A synthesizer fault is where the output frequency measured by a counter using the same frequency standard indicates that the output frequency differs from the set value.

Synthesizer: Errors within the synthesizer require breaking the loop to trace the error. Break the loop by disconnecting PLAE, the RF input to the synthesizer, and connecting an external synthesizer covering the fundamental range of the sig gen (675 MHz - 1350 MHz). Set external synthesizer to a nominal 2 dBm.

Note 1

Set the instrument to a carrier frequency in the fundamental range with the modulation disabled. Monitor the voltage on cathode D406 (tune volts) and the waveform on TP5 (phase comparator output). Set the external synthesizer to the set frequency plus 10 MHz and minus 10 MHz and check for the following:

Frequency	TP5 waveform	D406 Voltage
f + 10 MHz	mainly high	approx. 1 V
f - 10 MHz	mainly low	>20 V

The points should monitor the same with FM enabled but off. If the waveform at TP5 is incorrect check the operation of the programmable divider and its control lines. If TP5 is correct but the tune volts are not, look at the current sources (AA1 sheets 4 & 7).

Frequency Doubler Board Fault [AB3/5] (Level 3)

Synthesizer Fault (Level 3)

Note 2

Programmable divider: Connect PLAE to an external synthesizer set to 1 GHz with a nominal 2 dBm output. Use latch poke to set latch 76 to 128, which sets the output of the ULA to request the maximum division ratio (all control lines high). Monitor the collector of TR614 with a counter. If all operating correctly should measure 950.574 kHz i.e 1 GHz / (4 × 263).

Note 3

To check the correct action of the control lines to the programmable divider set the carrier frequency to 675 MHz, and to 675 MHz plus 1 Hz. With the FM disabled, monitor the control lines on IC609 to IC611 using an oscilloscope and check for the following:

CONTROL LINE NUMBER

Carrier frequency	**17**	**13**	**11**	**9**	**7**	**5**	**3**	**1**
675 MHz	±ve	±ve	±ve	±ve	±ve	±ve	±ve	L
675.000 001 MHz	±ve	±ve	±ve	L	±ve	±ve	±ve	H

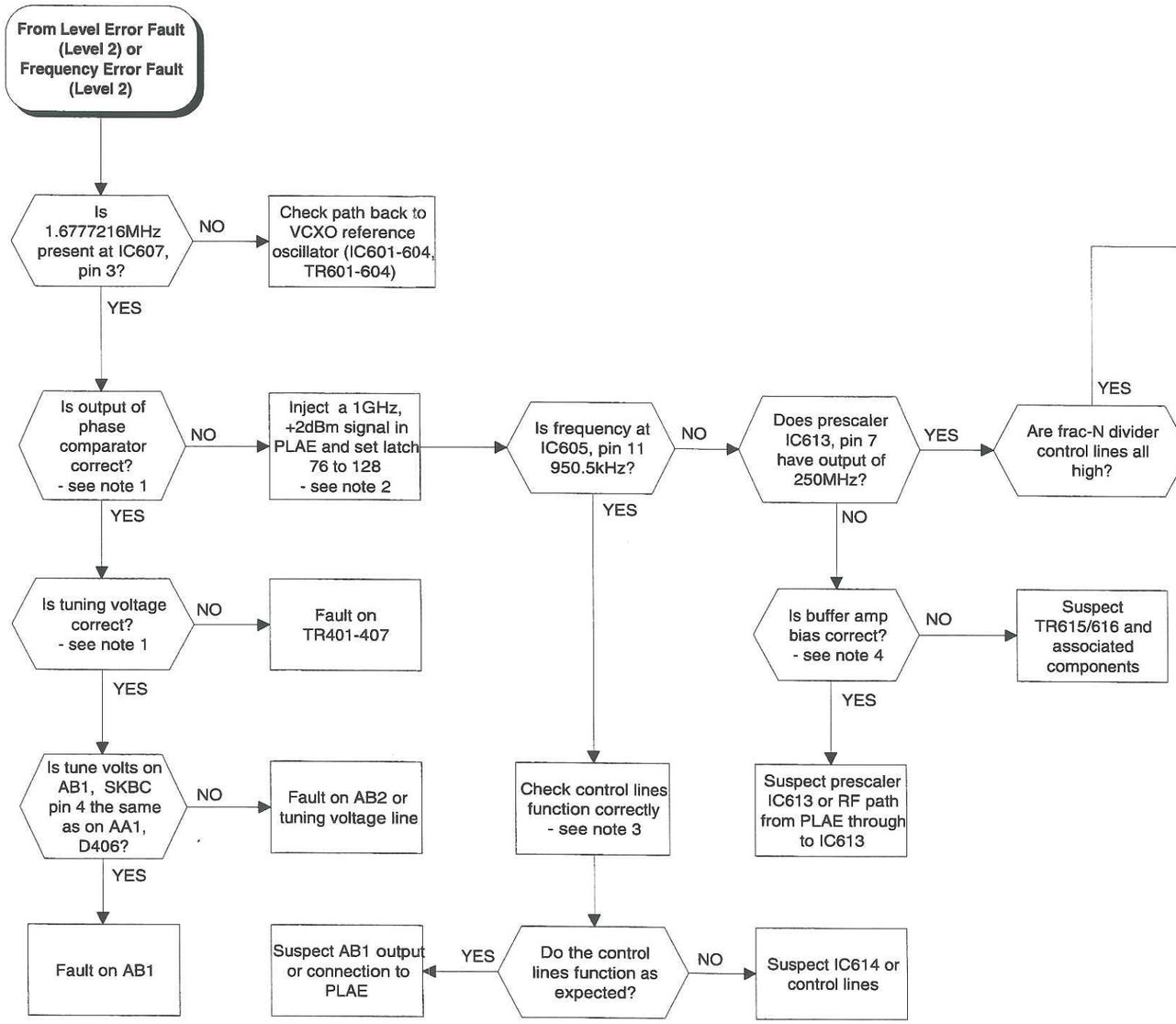
where: L = low (3.2 V)
H = high (4.2 V)
±ve = pos/neg transitions

Current Sources:

Nominal voltages	TR401 base	23 V
	TR402 base	-12 V

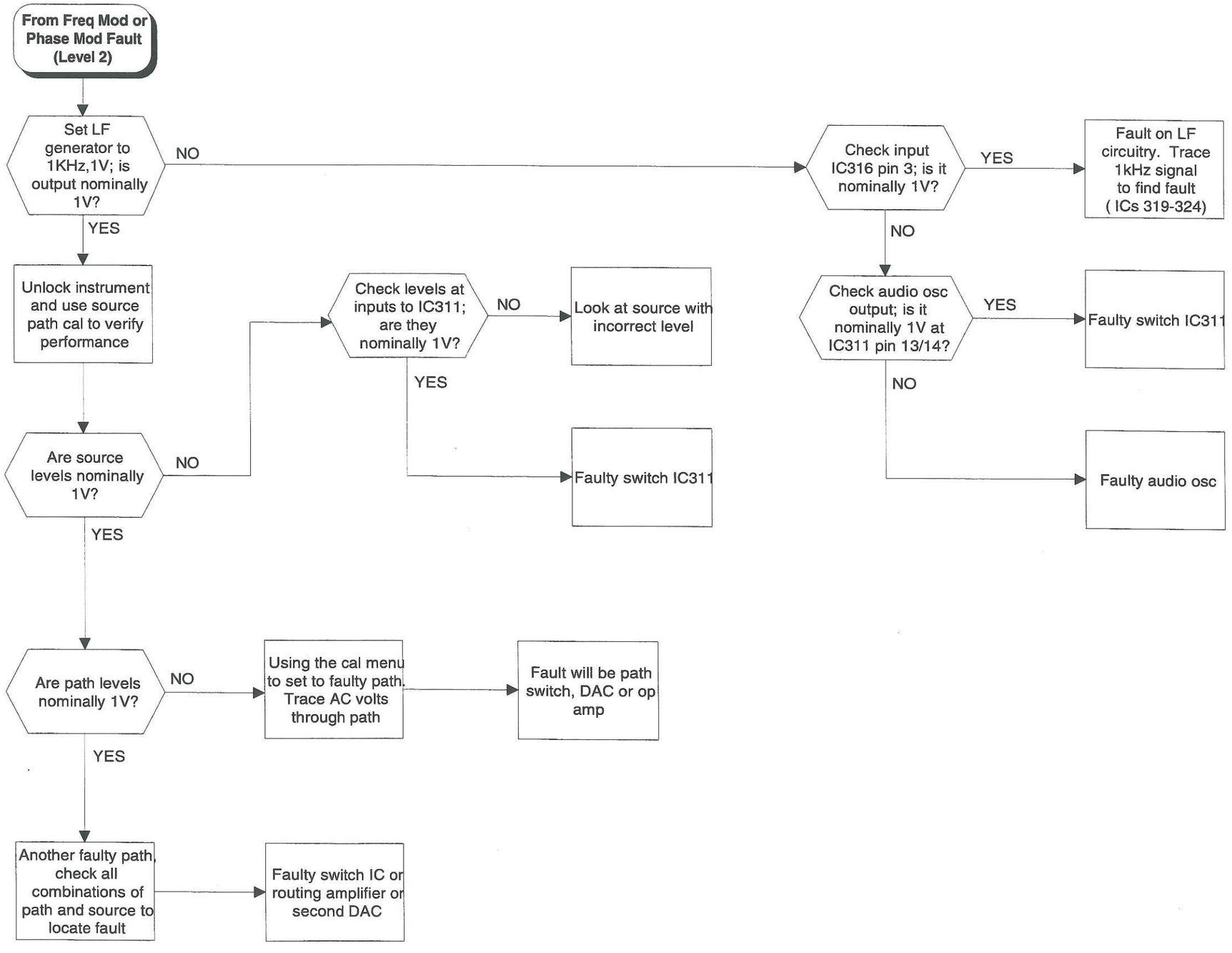
Note 4

TR615 base = 0.7 V
collector = 4 V



Synthesizer Fault (Level 3)

LF Switch Matrix Fault (Level 3)



LF Switch Matrix Fault (Level 3)

Level Error Fault [AB3/4] (Level 3)

Note 1

The comparator (IC401) is used to bias the reverse power protection (RPP) diodes. Normally the RPP diodes are reverse biased by a potential of +0.5 V on the cathode. But if TR410 produces unusually high RF power it could trip IC401 output and forward bias the RPP diodes, shunting RF power to ground. With RF shunted to ground the RPP circuit resets and reverse biases the RPP diodes again. This results in RF being switched ON and OFF periodically.

Note 2

The voltages on either side of the first set of three filters should be the same. The actual values depend on whether a filter is selected or deselected. The values are given below.

Filter Selected	+0.9 V (±0.1 V)
Filter Deselected	–0.7 V (±0.1 V)

Note 3

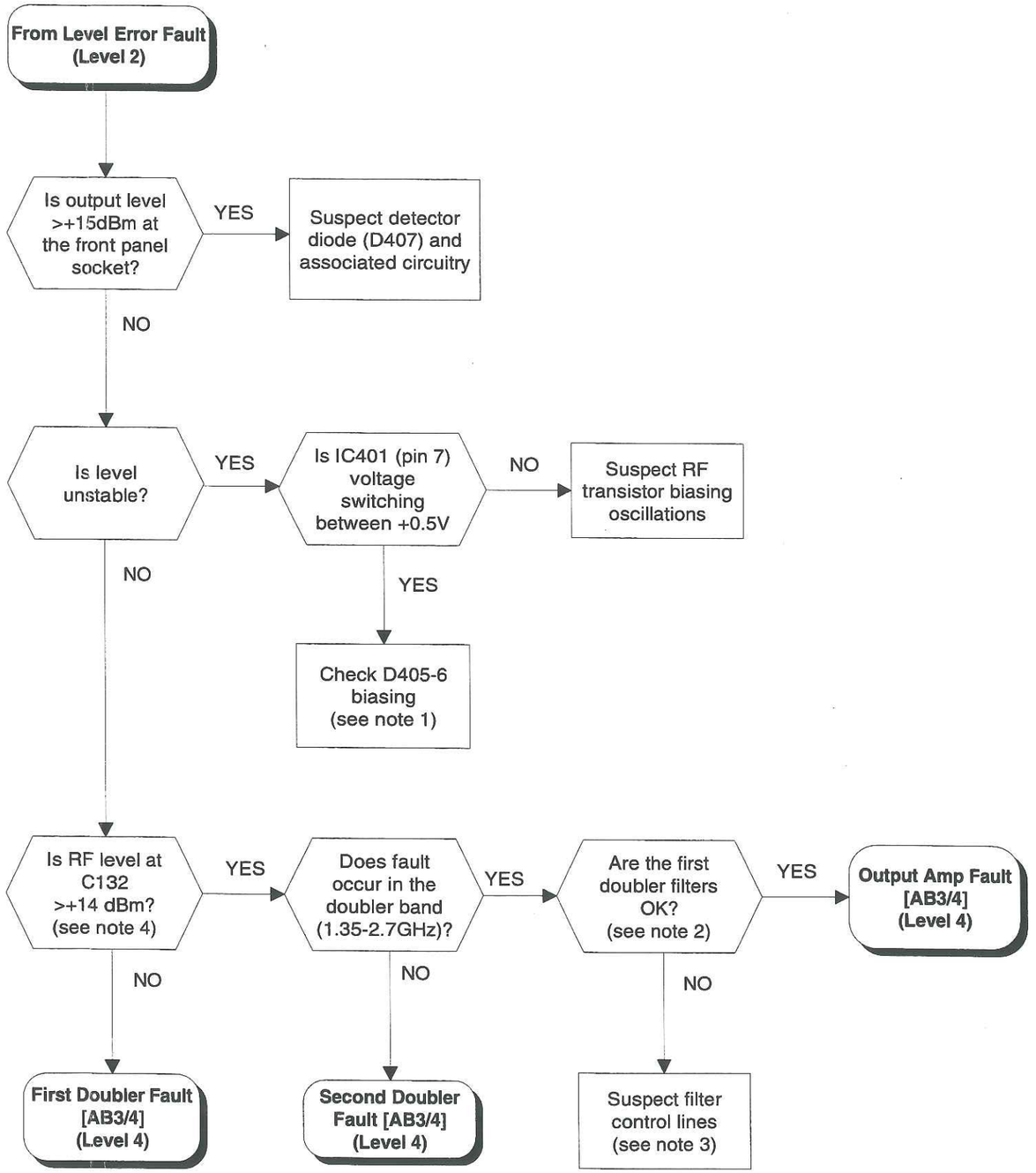
Check the filter control line (LO/MID/HI) voltages on the output side of the IC101(a) and trace them through to the filters. The filter switching table is given below.

Control Line (input)		Switching Line (output)		
µW–CTL1	µW–CTL2	LO	MID	HI
0	0	0	1	1
1	0	1	0	1
0	1	1	1	0
1	1	1	1	1

where: 1 is high logic (+5 V)
0 is low logic (0 V)

Note 4

Solder 50 Ω semi-rigid cable between output side of C132 and the provided ground pad. Then measure the signal level with a power meter.



Level Error Fault [AB3/4]
(Level 3)

Note 1

The following table details the filter band frequencies:

Filter Band	Doubler Section (GHz)	Quadrupler Section (GHz)
1	1.35 - 1.70	2.70 - 3.40
2	1.70 - 2.10	3.40 - 4.20
3	2.10 - 2.70	4.20 - 5.40

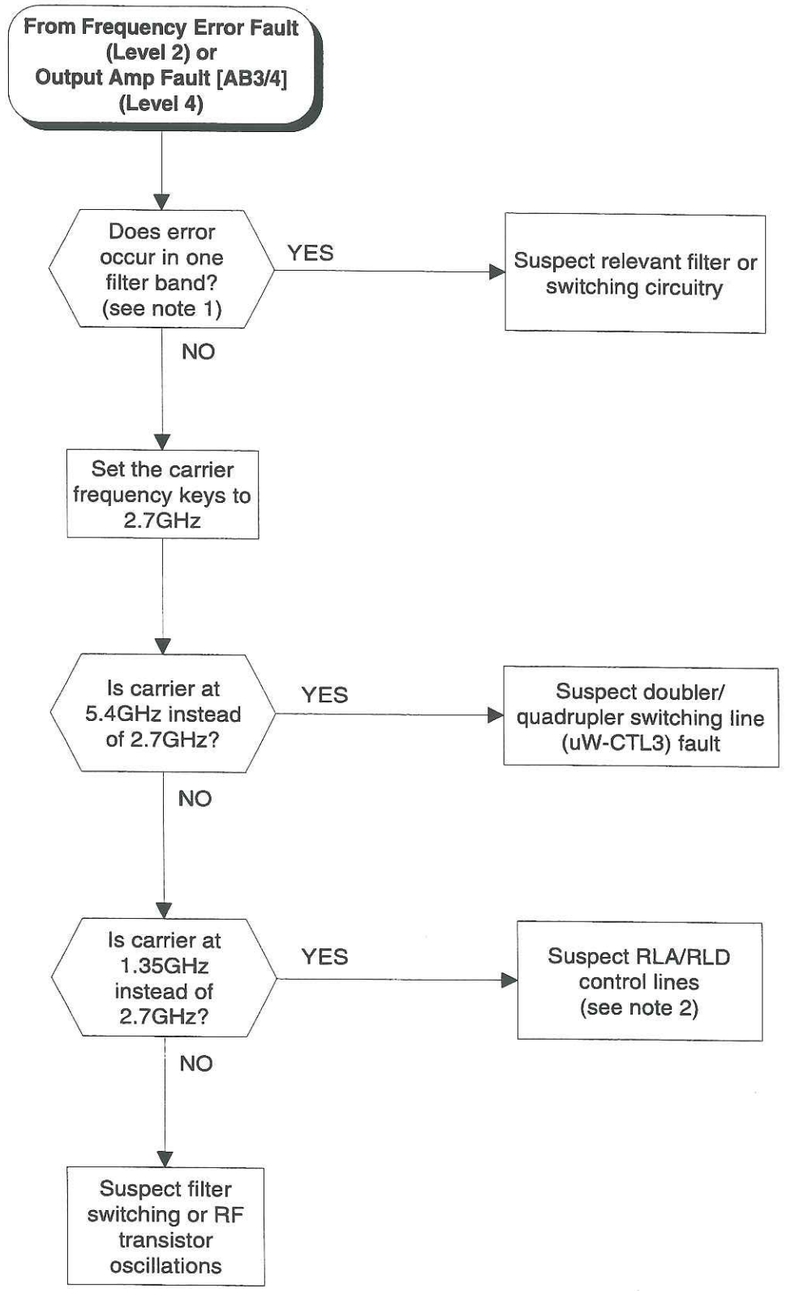
Note 2

The relay RLA and RLD switching action is controlled by IC101(a) pin(7), which is set by control lines µW–CTL1 and µW–CTL2. The table below gives the switching combinations:

µW–CTL		IC101(a)	Relay	
1	2	Pin(7)	RLA	RLD
1	1	0	OFF	ON
X	X	1	ON	OFF

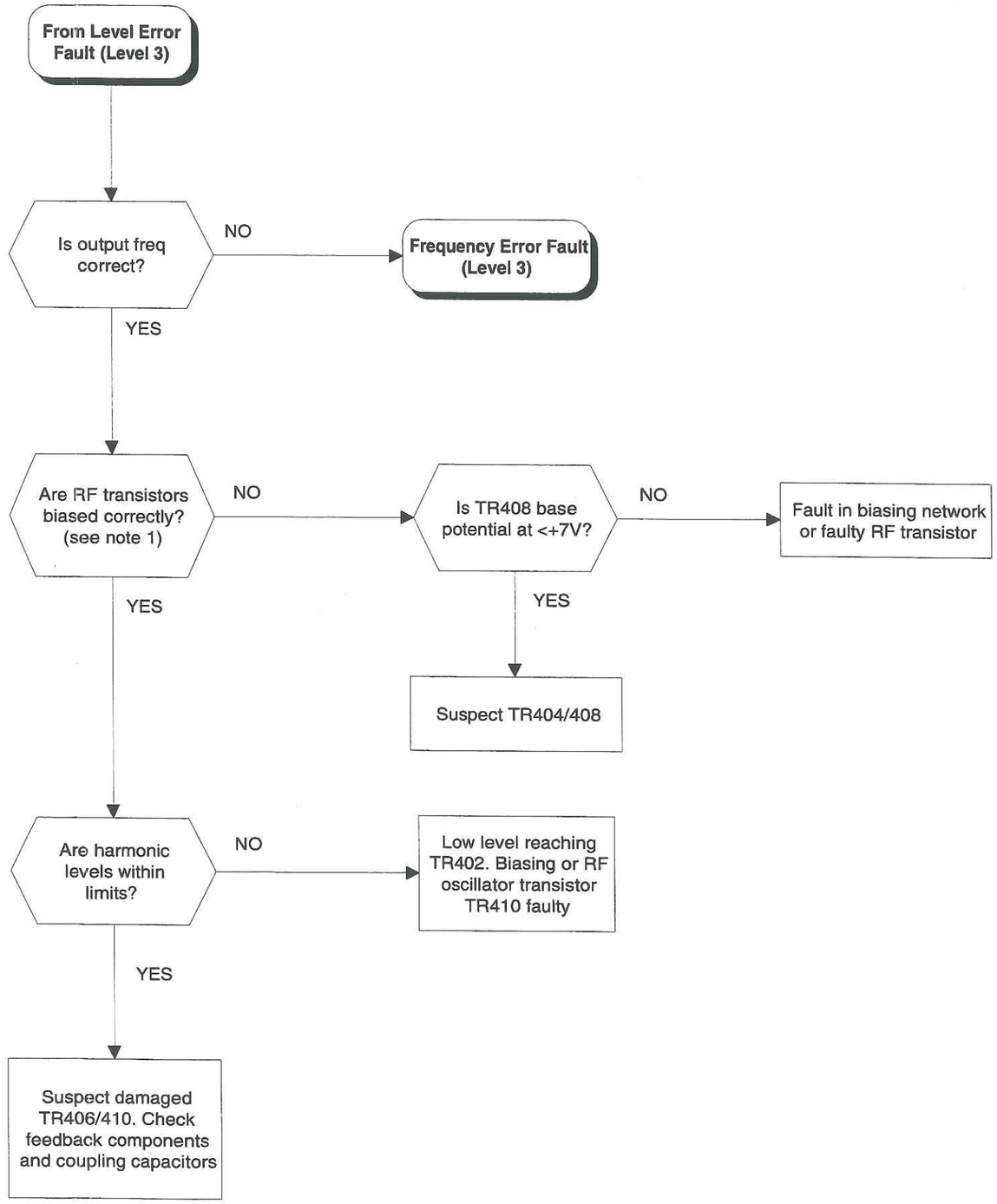
where X Don't care states
ON Relay energised
OFF Relay unenergised

Frequency Error Fault [AB3/4] (Level 3)



Frequency Error Fault [AB3/4] (Level 3)

Output Amp Fault [AB3/4] (Level 4)



Note 1

The RF transistors TR402, TR406 and TR410 should be biased according to the following table.

Device	Voltage (V)			Emitter Resistance (Ohms)
	Vd	Vs	Vg	
TR402	4.6	0.5	–0.2	8.2
TR406	8.6	0	–2.0	0
TR410	8.6	0	–2.0	0

OPTION 005 GMSK Bt 0.3

Output Amp Fault [AB3/4]
(Level 4)

First Doubler Fault [AB3/4] (Level 4)

Note 1

The RF transistor stages in the first doubler section, TR105-106 & TR111, should be biased as shown below.

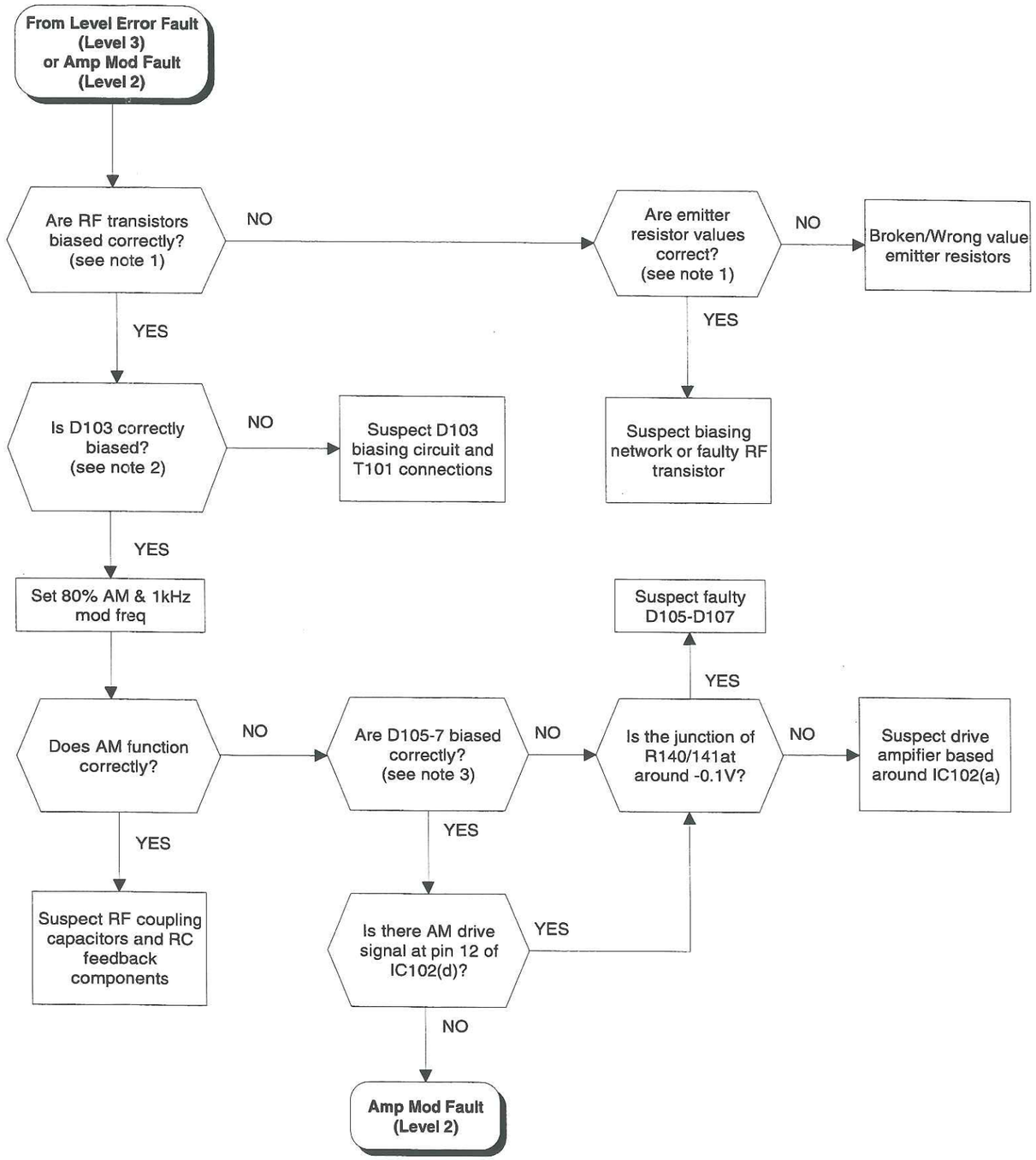
Device	Voltage (V)			Emitter Resistance (Ohms)
	Vd	Vs	Vg	
TR105	4.7	0.6	1.3	17
TR106	4.7	0.6	1.3	17.5
TR111	10	0.5	1.3	8

Note 2

The cathode terminal of D103 should be at ground potential and the anode terminal should be between –0.1 V and +0.5 V.

Note 3

The AM modulating diodes (D105/106) are biased to their "knee" point by R126/127. The common anode and cathode terminals of D105/106 should be at –0.7 V and –1.4 V respectively. Also pin 2 & 3 of D107 should be –1 V and –1.7 V respectively.



First Doubler Fault [AB3/4]
(Level 4)

Second Doubler Fault [AB3/4] (Level 4)

Note 1

The second doubler section RF transistors (TR206-209) should be biased as shown in the table below:

Device	Voltage (V)			Emitter Resistance (Ohms)
	Vd	Vs	Vg	
TR206	10.6	0.6	1.4	11
TR207	4.6	0.8	0.2	16.5
TR208	4.6	0.4	<0	5
TR209	4.6	0.4	<0	5

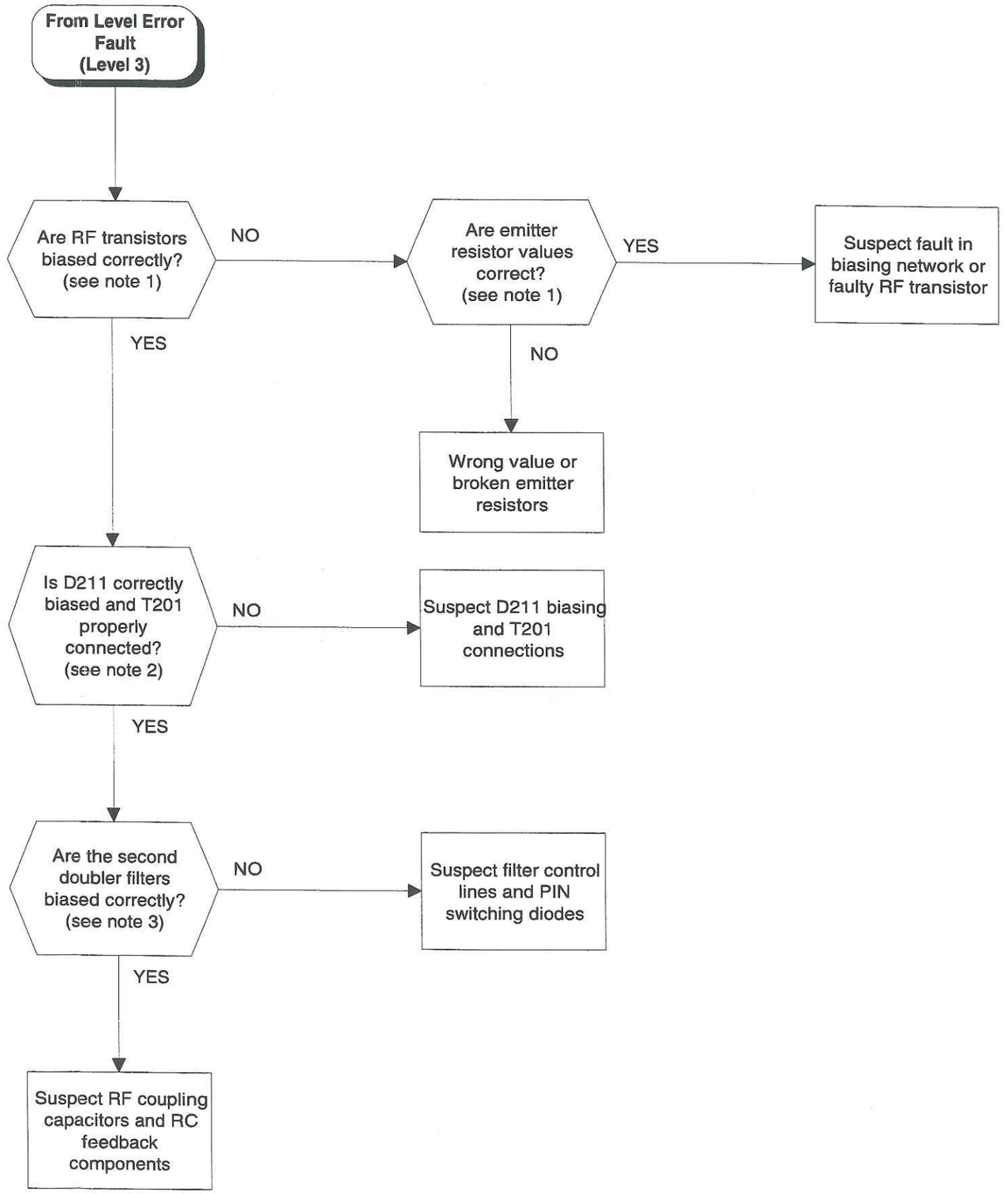
Note 2

The cathode terminal of D211 should be at ground potential and the anode should be between –0.1 V and +0.5 V.

Note 3

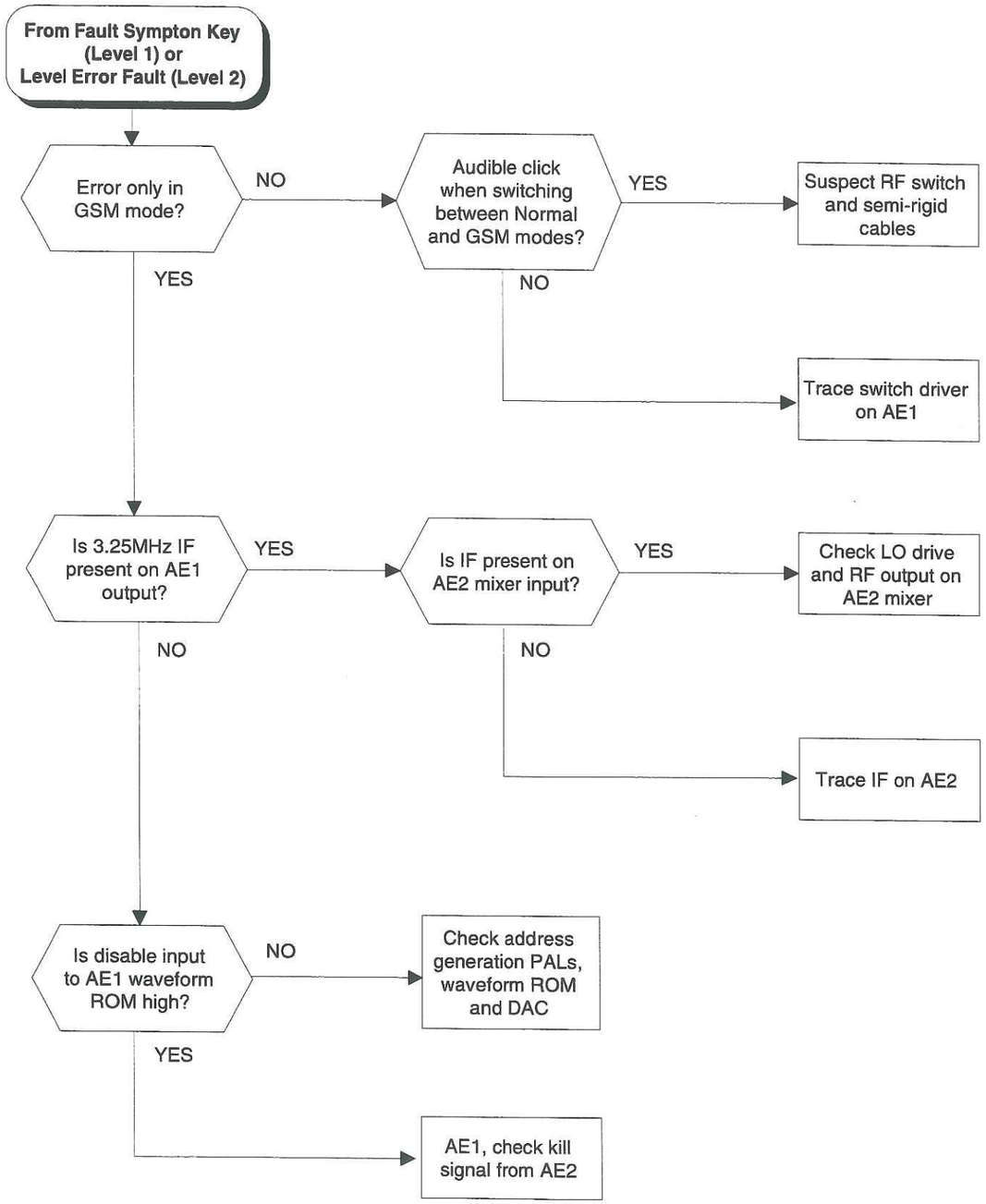
The voltages on either side of the second set of three filters, after the second doubler, should be as given below. Note filter input/output side is a reference to the direction of RF signal flow.

Side	Filter Selected (V)	Filter Deselected (V)
Input side	1 ±0.2	–0.75 ±0.1
Output side	3 ±0.3	–0.75 ±0.1



Second Doubler Fault [AB3/4] (Level 4)

GSM Level Fault (Level 2)



GSM Level Fault (Level 2)

REPLACEABLE PARTS

The components used to make the Option 005 version of the instrument are given below. These components are additional to those given in Chap. 6 in the main body of the manual.

A9 Option 005 common parts

Issue 21

Refer to Fig. A-5 Interconnection diagram

When ordering, prefix circuit reference with A9.

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number
	26373/714	CAPACITOR FIXED CERAMIC, 1 nF -20/+80% 500V, 1 OF 13	MIDLAND CAPACITORS	361/K2600-1000pF
	44531/154	IC-PROGRAMMED PROM NON-ERASABLE, SET OF 1, IC23 ON AE1	IFR LTD	
	44533/387	IC-PROGRAMMED EPROM, SET OF 1, IC15 ON AE1	IFR LTD	
	44533/417	IC-PROGRAMMED EEPROM, SET OF 1, IC13 ON AE1	IFR LTD	
	44533/442	IC-PROGRAMMED EPROM SET OF 3, AF2: IC12 & AA1/2: IC109,111	IFR LTD	
	43137/946	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, CRIMP SKT AE1, PLEA TO RF TRAY PLAJ	IFR LTD	
	43137/947	WIRE-LEAD-CRIMPED 6 WIRE, 7/0.2mm, CRIMP HOUSING TO PLRE ON POWER SUPPLY	IFR LTD	
	43137/949	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE SYNC TO RF TRAY, PLXR	IFR LTD	
	43137/949	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE EXT STD TO RF TRAY, PLXT	IFR LTD	
	43137/949	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE TRAY STD TO RF TRAY, PLXS	IFR LTD	
	43137/951	RF-CABLE SEMI-RIGID UT141, 50 OHMS, SMA MALE BYPASS SWITCH, SKZG TO RF TRAY SKXJ	IFR LTD	
	43137/952	RF-CABLE SEMI-RIGID UT85, 50 OHMS, SMA MALE AE2, RF-OUT TO BYPASS SWITCH, SKZE	IFR LTD	
	43137/952	RF-CABLE SEMI-RIGID UT85, 50 OHMS, SMA MALE AE2, RF-IN TO BYPASS SWITCH, SKZF	IFR LTD	
	43137/953	RF-CABLE SEMI-RIGID UT85, 50 OHMS, SMA MALE BYPASS SWITCH, SKZH TO O/P ATTEN SKTB	IFR LTD	
	43137/956	RIBBON-LEAD 10 WAY, SOCKET 10 WAY, UNTERMINATED TO FRONT PANEL NYBBLE BUS	IFR LTD	
	43137/957	RIBBON-LEAD 16 WAY, SOCKET 16 WAY, KEY POS 5 & 12 AE1, PLED TO AE3, PLEF	IFR LTD	
	43137/959	RIBBON-LEAD 20 WAY, SOCKET 20 WAY, KEY POS 7 & 15 AE1,PLEC TO FEEDTHROUGHS	IFR LTD	

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number
Option 005 common parts (contd.)				
	43137/960	WIRE-LEAD-CRIMPED 2 WIRE, 7/0.2mm, CRIMP HOUSING 4 AE3, PLEG TO EXT STD :AE3, PLEG TO TRAY STD	IFR LTD	
	43138/212	RIBBON-LEAD 16 WAY, SOCKET 16 WAY, KEY POS 5 & 12 AE2, PLEH TO AE1, PLEE VIA FEEDTHROUGHS	IFR LTD	
	23435/120	CONNECTOR MULTIWAY, PCB HEADER, 36 WAY, RIGHT TO AR1	DU PONT (UK) LTD	75168-101-36
	23444/331	CONNECTOR-RF SMB-TYPE MALE, RECEPTACLE, 50 OHMS GSM TRAY: EXT STD	ITT CANNON (UK)	051-045-0000-910
	23444/331	CONNECTOR-RF SMB-TYPE MALE, RECEPTACLE, 50 OHMS GSM TRAY: TRAY STD	ITT CANNON (UK)	051-045-0000-910
	23444/331	CONNECTOR-RF SMB-TYPE MALE, RECEPTACLE, 50 OHMS RF TRAY: EXT STD	ITT CANNON (UK)	051-045-0000-910
	23444/331	CONNECTOR-RF SMB-TYPE MALE, RECEPTACLE, 50 OHMS RF TRAY: TRAY STD	ITT CANNON (UK)	051-045-0000-910
	23444/331	CONNECTOR-RF SMB-TYPE MALE, RECEPTACLE, 50 OHMS RF TRAY: SYNC	ITT CANNON (UK)	051-045-0000-910
	23444/331	CONNECTOR-RF SMB-TYPE MALE, RECEPTACLE, 50 OHMS RF TRAY: SYNC	ITT CANNON (UK)	051-045-0000-910
	23444/512	CONNECTOR-RF SMB-TYPE FEMALE, JACK, 50 OHMS AE2: RF-OUT	ITT CANNON (UK)	
	23444/512	CONNECTOR-RF SMB-TYPE FEMALE, JACK, 50 OHMS AE2: RF-IN	ITT CANNON (UK)	050-645-9039-890
	44829/961	PCB-ASSEMBLY CONVENTIONAL, AE1, DATA GENERATOR	IFR LTD	
	44829/962	PCB-ASSEMBLY CONVENTIONAL, AE3, TIMEBASE	IFR LTD	
	44829/864	PCB-ASSEMBLY MIXED TECHNOLOGY, AE2, MODULATOR.	IFR LTD	
	44829/956	PCB-ASSEMBLY SURFACE MOUNT, AE1a, CONTROL BOARD	IFR LTD	
	44829/957	PCB-ASSEMBLY SURFACE MOUNT, AE3a, STANDARD CONDITIONING BOARD	IFR LTD IFR LTD	
	44338/157	BYPASS SWITCH 2030 GSM	IFR LTD	

AE1 Data generator

Issue 004

When ordering, prefix circuit reference with AE1.

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number
	44829/961	Complete unit		
C1	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C2	26383/585	CAPACITOR-FIXED CERAMIC 1nF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS	2222-630-51102
C3	26421/124	CAPACITOR-FIXED ALUMINIUM 220uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, 13mm HIGH MAX,	PHILIPS	2222-035-55221
C4	26421/124	CAPACITOR-FIXED ALUMINIUM 220uF +/-20% 16V ELECTROLYTIC, RADIAL, 5mm PWP, 13mm HIGH MAX,	PHILIPS	2222-035-55221
C5	26421/126	CAPACITOR-FIXED ALUMINIUM 470uF +/-20% 6.3V ELECTROLYTIC, RADIAL, 5mm PWP, (LOOSE OR TAPED).	DUBILIER CAPACITORS	CEB-470/6V3
C6	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C7	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C8	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C9	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C10	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C11	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C12	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C13	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C14	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C15	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C16	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C17	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C18	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C19	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C20	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C21	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C22	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C23	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K

OPTION 005 GMSK Bt 0.3

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number
AE1		**Data generator (contd.)**		
C24	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C25	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C26	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C27	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C28	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C29	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C30	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C31	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C34	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C35	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C36	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C37	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C38	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C39	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-100-B
C40	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-100-B
C41	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-100-B
C42	26421/106	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-K-010-B
C43	26421/106	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-K-010-B
C44	26421/106	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-K-010-B
C45	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C46	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C47	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C48	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	RFO-103-Z-AF-BRE-K
C49	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-100-B
C50	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-100-B
C51	26343/446	CAPACITOR-FIXED CERAMIC 180pF +/-2% 63V N750 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROU-181-GAK-ACR-J

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number
AE1	**Data generator (contd.)**			
C52	26343/446	CAPACITOR-FIXED CERAMIC 180pF +/-2% 63V N750 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROU-181-GAK-ACR-J
C53	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS	MKT-1817-410/065
C54	26343/489	CAPACITOR-FIXED CERAMIC 22pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-220-GAK-ACR-J
C55	26343/489	CAPACITOR-FIXED CERAMIC 22pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-220-GAK-ACR-J
C56	26343/489	CAPACITOR-FIXED CERAMIC 22pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-220-GAK-ACR-J
C57	26343/489	CAPACITOR-FIXED CERAMIC 22pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS	ROP-220-GAK-ACR-J
C58	26421/106	CAPACITOR-FIXED ALUMINIUM 1uF +/-20% 50V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1H-K-010-B
C60	26346/120	CAPACITOR-FIXED CERAMIC 10nF +/-20% 50V X7R MULTILAYER, AXIAL, EPOXY COVERED BODY, (TAPED).	PHILIPS	A41C 103K-DRM
D1	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D2	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D3	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D4	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D5	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D6	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D7	28357/028	DIODE RECTIFIER, 1N4004... 400V 1A 1.1Vf @ 1A, AXIAL, SOD-81, (TAPED).	PHILIPS	1N4004
D8	28357/028	DIODE RECTIFIER, 1N4004... 400V 1A 1.1Vf @ 1A, AXIAL, SOD-81, (TAPED).	PHILIPS	1N4004
D9	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D10	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D11	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D12	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D13	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D14	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
IC1	28469/119	IC-DIGITAL INVERTER 74HC14... HEX, SCHMITT-TRIGGER OPERATION, CMOS-H/SPEED, 14 PIN, DUAL-IN-LINE.	PHILIPS	74HC14N
IC2	28465/060	IC-DIGITAL DECODER/DEMULTIPLEX 74HC4515... SINGLE, 4 TO 16 LINE, INVERTING, 0.3" LEAD SPACING,	TEXAS INSTRUMENTS	SN74HC4515NT

OPTION 005 GMSK Bt 0.3

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number
AE1	**Data generator (contd.)**			
IC3	28462/631	IC-DIGITAL FLIP-FLOP/D-TYPE 74HCT173... QUAD, POS EDGE TRIGGER, TRI-STATE, CMOS-H/SPEED+TTL, 16 PIN,	PHILIPS	74HCT173N
IC4	28462/631	IC-DIGITAL FLIP-FLOP/D-TYPE 74HCT173... QUAD, POS EDGE TRIGGER, TRI-STATE, CMOS-H/SPEED+TTL, 16 PIN,	PHILIPS	74HCT173N
IC5	28471/037	IC-MICRO EEPROM, 64 x 16 BIT, 93C46... 5V SUPPLY, CMOS, 8 PIN, DUAL-IN-LINE.	NAT. SEMICONDUCTOR	NM93C46N
IC6	28462/631	IC-DIGITAL FLIP-FLOP/D-TYPE 74HCT173... QUAD, POS EDGE TRIGGER, TRI-STATE, CMOS-H/SPEED+TTL, 16 PIN,	PHILIPS	74HCT173N
IC7	28462/631	IC-DIGITAL FLIP-FLOP/D-TYPE 74HCT173... QUAD, POS EDGE TRIGGER, TRI-STATE, CMOS-H/SPEED+TTL, 16 PIN,	PHILIPS	74HCT173N
IC8	28462/629	IC-DIGITAL FLIP-FLOP/D-TYPE 74HCT574... OCTAL, TRI-STATE, NON-INVERTING, POS EDGE TRIGGER,	TEXAS INSTRUMENTS	SN74HCT574N
IC9	28462/629	IC-DIGITAL FLIP-FLOP/D-TYPE 74HCT574... OCTAL, TRI-STATE, NON-INVERTING, POS EDGE TRIGGER,	TEXAS INSTRUMENTS	SN74HCT574N
IC10	28469/766	IC-DIGITAL MULTIPLEXER 74HCT251... 8 INPUT, 1 BIT, SINGLE, TRI-STATE, CMOS-H/SPEED+TTL, 16 PIN,	PHILIPS	74HCT251N
IC11	28462/629	IC-DIGITAL FLIP-FLOP/D-TYPE 74HCT574... OCTAL, TRI-STATE, NON-INVERTING, POS EDGE TRIGGER,	TEXAS INSTRUMENTS	SN74HCT574N
IC12	28462/629	IC-DIGITAL FLIP-FLOP/D-TYPE 74HCT574... OCTAL, TRI-STATE, NON-INVERTING, POS EDGE TRIGGER,	TEXAS INSTRUMENTS	SN74HCT574N
IC13	44533/417	IC-PROGRAMMED EPROM, SET OF 1, 2030, AE1, GSM	IFR LTD	
IC14	28465/037	IC-DIGITAL DECODER/DEMULTIPLEX 74F138... 3 INPUT, 8 BIT, SINGLE, INVERTING, 3 BIT ADDRESS,	PHILIPS	N74F138N
IC15	44533/387	IC-PROGRAMMED EPROM, SET OF 1, 2030, OPTION 5.	IFR LTD	
IC16	28467/120	IC-MICRO DIGIT/SGNL PROCESSR, ADSP2101... 10MHz, DIGITAL SIGNAL PROCESSING, 2K PROGRAM & 0.5K DATA	ANALOG DEVICES LTD	ADSP2101KP-40 REV3+
IC17	44535/269	IC-PROGRAMMED PAL, SET OF 1, 2030, DSP INTERFACE.	IFR LTD	
IC18	44535/213	IC-PROGRAMMED PAL, SET OF 1, 2030, FRAME SYNCHRONISER, AE1, GSM KIT.	IFR LTD	
IC21	44535/215	IC-PROGRAMMED PAL, SET OF 1, 2030, DATA REGISTER, AE1, GSM KIT.	IFR LTD	
IC22	28462/630	IC-DIGITAL FLIP-FLOP/D-TYPE 74HCT74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR,	PHILIPS	74HCT74N
IC23	44531/154	IC-PROGRAMMED PROM, NON-ERASABLE, SET OF 1, 2030	IFR LTD	
IC24	28461/880	IC-ANALOGUE D/A-CONVERTER TDC1012... SINGLE, 5V 40mA OUTPUT, 12 BIT, LOW GLITCH OUTPUT, BIPOLAR,	-	
IC25	28469/184	IC-DIGITAL BUFFER/LINE-DRIVER 74LS125A... QUAD, TRI-STATE, LOW ENABLE, TTL-SCHOTTKY-L/PWR, 14 PIN,	NAT. SEMICONDUCTOR	DM74LS125AN
IC26	28466/459	IC-DIGITAL INVERTER 74F04... HEX, TTL-SCHOTTKY-FAST, 14 PIN, DUAL-IN-LINE.	PHILIPS	N74F04N
IC27	28461/727	IC-ANALOGUE VOLTAGE-REGULATOR LM337T... 37V 1.5A NEGATIVE ADJUSTABLE, LINEAR, MONOLITHIC, 3 PIN,	NAT. SEMICONDUCTOR	LM337T
IC28	28468/315	IC-DIGITAL FLIP-FLOP/MONOSTABLE 74HC123A... DUAL, POS EDGE TRIGGER, tW=RC, CMOS-H/SPEED, 16 PIN,	NAT. SEMICONDUCTOR	MM74HC123AN

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number
AE1	**Data generator (contd.)**			
L1	23642/549	INDUCTOR-FIXED 1uH +/- 10% COATED-LACQUER, MINIATURE, 820mA 0R3 MAX, 45 Q @ 25 MHz, 210 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/010
L2	23642/549	INDUCTOR-FIXED 1uH +/- 10% COATED-LACQUER, MINIATURE, 820mA 0R3 MAX, 45 Q @ 25 MHz, 210 MHz	MEGGITT ELECTRONICS	C10-406/8/27509/010
R1	24772/078	RESISTOR-FIXED METAL-FILM 1K6 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K6-2%
R2	24772/078	RESISTOR-FIXED METAL-FILM 1K6 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K6-2%
R3	24772/078	RESISTOR-FIXED METAL-FILM 1K6 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K6-2%
R4	24772/078	RESISTOR-FIXED METAL-FILM 1K6 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K6-2%
R10	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R11	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R12	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R13	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R14	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R15	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R16	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R18	24772/080	RESISTOR-FIXED METAL-FILM 2K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K-2%
R20	24573/025	RESISTOR-FIXED METAL-OXIDE 10R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	TR5-10R-2%
R21	24573/025	RESISTOR-FIXED METAL-OXIDE 10R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	TR5-10R-2%
R22	24573/025	RESISTOR-FIXED METAL-OXIDE 10R +/- 2% 500mW 350V 250 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	TR5-10R-2%
R23	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R24	24772/095	RESISTOR-FIXED METAL-FILM 8K2 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-8K2-2%
R25	24772/080	RESISTOR-FIXED METAL-FILM 2K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-2K-2%
R26	24772/078	RESISTOR-FIXED METAL-FILM 1K6 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K6-2%
R27	24772/058	RESISTOR-FIXED METAL-FILM 240R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-240R-2%
R28	24772/070	RESISTOR-FIXED METAL-FILM 750R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-750R-2%
R29	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R32	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R34	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%

OPTION 005 GMSK Bt 0.3

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number
AE1		**Data generator (contd.)**		
R35	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R36	24772/049	RESISTOR-FIXED METAL-FILM 100R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-100R-2%
R37	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R38	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R39	24772/133	RESISTOR-FIXED METAL-FILM 330K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-330K-2%
R40	24772/133	RESISTOR-FIXED METAL-FILM 330K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-330K-2%
R41	24772/034	RESISTOR-FIXED METAL-FILM 24R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-24R-2%
R42	24772/034	RESISTOR-FIXED METAL-FILM 24R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-24R-2%
R43	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R44	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R45	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R46	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R47	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R48	24772/073	RESISTOR-FIXED METAL-FILM 1K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K-2%
R49	24772/133	RESISTOR-FIXED METAL-FILM 330K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-330K-2%
R50	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R51	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R52	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R53	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R54	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R55	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R56	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R57	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R58	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R59	24772/078	RESISTOR-FIXED METAL-FILM 1K6 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-1K6-2%
R60	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number
AE1	**Data generator (contd.)**			
R61	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R62	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R63	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R64	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R65	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R66	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R67	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R97	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R98	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R99	24772/133	RESISTOR-FIXED METAL-FILM 330K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	SMA0204-330K-2%
RLA	23486/166	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 12V COIL, 720R - CONTACTS 1A, 125V, MAX LOAD 30W, PCB	FUJITSU LTD	FBR46-N-D012-P
RLB	23486/166	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 12V COIL, 720R - CONTACTS 1A, 125V, MAX LOAD 30W, PCB	FUJITSU LTD	FBR46-N-D012-P
TR1	28455/439	TRANSISTOR NPN BIPOLAR BD131... 45V 60MHz 15W 3A 40hFE @ 500mA, TO-126.	PHILIPS	BD131
TR2	28455/439	TRANSISTOR NPN BIPOLAR BD131... 45V 60MHz 15W 3A 40hFE @ 500mA, TO-126.	PHILIPS	BD131
TR3	28452/781	TRANSISTOR NPN BIPOLAR BC208B... 20V 150MHz 200mW 100mA 290hFE @ 2mA, TO-92, (TAPED EMITR FIRST).	PHILIPS	BC548B

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number

AE1 Data generator (contd.)

AE1a Control board

Issue 001

When ordering, prefix circuit reference with AE1a.

	44829/956	Complete unit		
C91	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C98	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
IC92	44535/270	IC-PROGRAMMED PAL, SET OF 1, 2030, IF SYNTHESIZER	IFR LTD	
R90	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R95	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R96	24811/125	RESISTOR-FIXED METAL-FILM 10R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10R-1%-50ppm

AE2 Modulator board

Issue 004

When ordering, prefix circuit reference with AE2.

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number
	44829/864	Complete unit		
C1	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C2	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C3	26386/887	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	AVX LTD	1210-5C-104-KAT-00-J
C4	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C6	26386/867	CAPACITOR-FIXED CERAMIC 2.2nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-222-KAT-00-J
C7	26386/800	CAPACITOR-FIXED CERAMIC 1pF +/-0.5pF 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-1R0-DAT-00-J
C8	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C9	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C10	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C11	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C12	26343/784	CAPACITOR-FIXED CERAMIC 68pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-680-JAT-00-J
C13	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-100-B
C14	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-100-B
C15	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL	ECE-A-1V-K-100-B
C16	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C17	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C18	26386/887	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	AVX LTD	1210-5C-104-KAT-00-J
C19	26386/887	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	AVX LTD	1210-5C-104-KAT-00-J
C20	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C21	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C22	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C23	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C24	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J

OPTION 005 GMSK Bt 0.3

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number
AE2		**Modulator board (contd.)**		
C25	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C28	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C29	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C30	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C31	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C32	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C33	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C34	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C35	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C36	26343/767	CAPACITOR-FIXED CERAMIC 10pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-100-JAT-00-J
C37	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-102-KAT-00-J
C47	26386/820	CAPACITOR-FIXED CERAMIC 47pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-470-JAT-00-J
C48	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C49	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C50	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C51	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C52	26386/819	CAPACITOR-FIXED CERAMIC 39pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-390-JAT-00-J
C53	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C54	26386/819	CAPACITOR-FIXED CERAMIC 39pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-390-JAT-00-J
C55	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C56	26386/825	CAPACITOR-FIXED CERAMIC 120pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-121-JAT-00-J
C57	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C58	26386/819	CAPACITOR-FIXED CERAMIC 39pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-390-JAT-00-J
C59	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C60	26386/819	CAPACITOR-FIXED CERAMIC 39pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-390-JAT-00-J
C61	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number
AE2	**Modulator board (contd.)**			
C62	26386/825	CAPACITOR-FIXED CERAMIC 120pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-121-JAT-00-J
C64	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C65	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C66	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C67	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-101-JAT-00-J
C68	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C69	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C70	26386/887	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	AVX LTD	1210-5C-104-KAT-00-J
C71	26386/828	CAPACITOR-FIXED CERAMIC 220pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5A-221-JAT-00-J
C72	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
D1	28383/910	DIODE SMALL-SIGNAL, BAS28... DUAL, 330mW 75V 250mA ELECTRICALLY ISOLATED, MARKING CODE A61 OR JT,	PHILIPS	BAS28
D2	28383/917	DIODE PIN, CSB7003-01... 100V 100mA 0.08pF MAX @ 50V/1MHz, THERMAL IMPEDANCE 80 DEG.C/W, SUBSTRATE	ALPHA INDUSTRIES INC	CSB7003-01-320-001
D3	28349/025	DIODE MIXER/DETECTOR, SCHOTTKY, 5082-2209... 125mW 4V MEDIUM BARRIER, STRIPLINE TYPE, X-BAND,	HEWLETT-PACKARD	5082-2209
D4	28349/022	DIODE SMALL-SIGNAL, SCHOTTKY, HSMS-2812... DUAL, 20V 1A 0.41Vf @ 1mA, IN SERIES, MARKING CODE B2,	HEWLETT-PACKARD	HSMS-2812-L31
D5	28383/910	DIODE SMALL-SIGNAL, BAS28... DUAL, 330mW 75V 250mA ELECTRICALLY ISOLATED, MARKING CODE A61 OR JT,	PHILIPS	BAS28
D6	28371/663	DIODE ZENER, BZX84-C7V5... 350mW 7.5V 5% 250mA MARKING CODE Z6, SURFACE MOUNTED, SOT-23, (TAPED).	PHILIPS	BZX84-C7V5
D7	28349/032	DIODE SMALL-SIGNAL, SCHOTTKY, HSMS-2820... 250mW 8V 1pF 0.5Vf @ 1mA, MARKNG CODE C0, LOW PROFILE,	HEWLETT-PACKARD	HSMS-2820-L31
IC1	28469/739	IC-ANALOGUE MULTIPLEXER 74HC4053... TRIPLE, 2 CHANNEL, 1 SELECT INPUT PLUS ENABLE, CMOS-H/SPEED,	PHILIPS	74HC4053N
IC2	28461/931	IC-ANALOGUE D/A-CONVERTER AD7543JN... 12 BIT, SERIAL INPUT, CMOS, 16 PIN, DUAL-IN-LINE.	ANALOG DEVICES LTD	AD7543JN
IC3	28461/955	IC-ANALOGUE MULTIPLIER/DIVIDER AD539J... DUAL-CHANNEL, WIDEBAND, LINEAR, 16 PIN,	ANALOG DEVICES LTD	AD539JN
IC4	28461/450	IC-ANALOGUE MICROWAVE-AMPLIFIER MSA-0486... 5.25V 50mA GAIN 8dB @ 1.0GHz, 3dB BANDWIDTH DC - 3.2GHz,	HEWLETT-PACKARD	MSA-0486
IC5	28461/412	IC-ANALOGUE OPERATIONAL AMP TL072... DUAL, 18V UNITY GAIN BNDWDTH 3MHz, OFFSET VOLTAGE 10mV, SLEW	MOTOROLA INC.	TL072CD
IC6	28461/412	IC-ANALOGUE OPERATIONAL AMP TL072... DUAL, 18V UNITY GAIN BNDWDTH 3MHz, OFFSET VOLTAGE 10mV, SLEW	MOTOROLA INC.	TL072CD

OPTION 005 GMSK Bt 0.3

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number
AE2	**Modulator board (contd.)**			
IC7	28461/453	IC-ANALOGUE OPERATIONAL AMP AD848... 18V 300V/uS SLEW RATE, 175MHz BANDWIDTH, BIPOLAR, 8 PIN,	NAT. SEMICONDUCTOR	LM6364M
IC9	28461/413	IC-ANALOGUE OPERATIONAL AMP TL074... QUAD, JFET INPUT, LOW NOISE, SLEW RATE 8V/uS MIN, GAIN	MOTOROLA INC.	TL074CD
IC10	28461/676	IC-ANALOGUE COMPARATOR LM311... 2 INPUT, SINGLE, 15V I/P-OFFSET 7.5mV MAX, RESPONSE-TIME 200nS TYP,	PHILIPS	LM311D
IC11	28461/676	IC-ANALOGUE COMPARATOR LM311... 2 INPUT, SINGLE, 15V I/P-OFFSET 7.5mV MAX, RESPONSE-TIME 200nS TYP,	PHILIPS	LM311D
L1	23642/512	INDUCTOR-FIXED 22uH +/- 5% MOULDED-EPOXY, 110mA 3R7 MAX, 30 Q @ 2.5 MHz, 25 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-220-J
L2	23642/512	INDUCTOR-FIXED 22uH +/- 5% MOULDED-EPOXY, 110mA 3R7 MAX, 30 Q @ 2.5 MHz, 25 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-220-J
L3	44190/100	WOUND-PART INDUCTOR, AIR-CORE, 1.6mm I/DIA, 100 TURNS, CLOSE WOUND, VARNISHED & COATED WITH		
L4	44190/100	WOUND-PART INDUCTOR, AIR-CORE, 1.6mm I/DIA, 100 TURNS, CLOSE WOUND, VARNISHED & COATED WITH		
L5	23642/512	INDUCTOR-FIXED 22uH +/- 5% MOULDED-EPOXY, 110mA 3R7 MAX, 30 Q @ 2.5 MHz, 25 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-220-J
L6	23642/512	INDUCTOR-FIXED 22uH +/- 5% MOULDED-EPOXY, 110mA 3R7 MAX, 30 Q @ 2.5 MHz, 25 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-220-J
L7	23642/512	INDUCTOR-FIXED 22uH +/- 5% MOULDED-EPOXY, 110mA 3R7 MAX, 30 Q @ 2.5 MHz, 25 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-220-J
L8	23642/512	INDUCTOR-FIXED 22uH +/- 5% MOULDED-EPOXY, 110mA 3R7 MAX, 30 Q @ 2.5 MHz, 25 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-220-J
L9	23642/512	INDUCTOR-FIXED 22uH +/- 5% MOULDED-EPOXY, 110mA 3R7 MAX, 30 Q @ 2.5 MHz, 25 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-220-J
R1	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R2	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R3	24321/784	RESISTOR-FIXED METAL-GLAZE 3K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K01-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3011-FT
R4	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R5	24321/784	RESISTOR-FIXED METAL-GLAZE 3K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K01-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3011-FT
R6	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R7	24321/784	RESISTOR-FIXED METAL-GLAZE 3K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K01-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3011-FT
R8	24321/751	RESISTOR-FIXED METAL-GLAZE 120R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-121R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1210-FT
R9	24321/758	RESISTOR-FIXED METAL-GLAZE 240R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-243R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2430-FT
R13	24321/775	RESISTOR-FIXED METAL-GLAZE 1K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1211-FT

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number
AE2	**Modulator board (contd.)**			
R14	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R15	24338/006	RESISTOR-FIXED METAL-GLAZE 220R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-220R-5%-P4
R16	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R17	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R18	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R19	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R20	24321/837	RESISTOR-FIXED METAL-GLAZE 470K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475K-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4753-FT
R21	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R22	24321/809	RESISTOR-FIXED METAL-GLAZE 33K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3322-FT
R23	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R24	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R25	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R26	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R27	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R28	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R29	24321/804	RESISTOR-FIXED METAL-GLAZE 20K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-20K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2002-FT
R30	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R31	24321/784	RESISTOR-FIXED METAL-GLAZE 3K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-3K01-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3011-FT
R32	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R35	24321/781	RESISTOR-FIXED METAL-GLAZE 2K2 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-2K21-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2211-FT
R36	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R37	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R38	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R39	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R40	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R41	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT

OPTION 005 GMSK Bt 0.3

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number
AE2		**Modulator board (contd.)**		
R42	24321/608	RESISTOR-FIXED METAL-GLAZE 10M +/- 10% 125mW 200V 500 ppm/DEG.C, SURFACE MOUNTED, SIZE 1206, (LOOSE	PANASONIC INDUSTRIAL	ERJ-8GEK106V
R43	24321/816	RESISTOR-FIXED METAL-GLAZE 62K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-61K9-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-6192-FT
R48	24321/747	RESISTOR-FIXED METAL-GLAZE 82R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-82R5-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-82R5-FT
R49	24321/756	RESISTOR-FIXED METAL-GLAZE 200R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-200R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2000-FT
R50	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R51	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R52	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R53	24321/758	RESISTOR-FIXED METAL-GLAZE 240R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-243R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2430-FT
R54	24321/758	RESISTOR-FIXED METAL-GLAZE 240R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-243R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2430-FT
R55	24321/758	RESISTOR-FIXED METAL-GLAZE 240R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-243R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2430-FT
R57	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R58	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R61	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R62	24321/809	RESISTOR-FIXED METAL-GLAZE 33K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3322-FT
R63	24321/742	RESISTOR-FIXED METAL-GLAZE 51R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-51R1-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-51R1-FT
R64	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R65	24321/809	RESISTOR-FIXED METAL-GLAZE 33K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3322-FT
R66	24321/756	RESISTOR-FIXED METAL-GLAZE 200R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-200R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-2000-FT
R67	25685/408	THERMISTOR NEGATIVE-TC DISC, 5mm 15K @ 25 DEG.C, 4.7 %/DEG.C +/- 10% 500mW 2.54mm PWP, RADIAL.	PHILIPS	2322-642-62153
R68	24321/809	RESISTOR-FIXED METAL-GLAZE 33K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-33K2-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3322-FT
R69	24321/789	RESISTOR-FIXED METAL-GLAZE 4K7 +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-4K75-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4751-FT
R70	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R71	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R72	24321/749	RESISTOR-FIXED METAL-GLAZE 100R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-100R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1000-FT
R73	24321/760	RESISTOR-FIXED METAL-GLAZE 300R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-301R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3010-FT
R74	24321/760	RESISTOR-FIXED METAL-GLAZE 300R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-301R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-3010-FT

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number
AE2	**Modulator board (contd.)**			
R75	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R76	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R77	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R78	24321/765	RESISTOR-FIXED METAL-GLAZE 470R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-475R-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-4750-FT
R79	24338/007	RESISTOR-FIXED METAL-GLAZE 270R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-270R-5%-P4
R80	24338/006	RESISTOR-FIXED METAL-GLAZE 220R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-220R-5%-P4
R81	24338/007	RESISTOR-FIXED METAL-GLAZE 270R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-270R-5%-P4
R82	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R83	24321/725	RESISTOR-FIXED METAL-GLAZE 10R +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10R0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-10R0-FT
R84	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R85	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R87	24321/797	RESISTOR-FIXED METAL-GLAZE 10K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-10K0-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1002-FT
R88	24321/773	RESISTOR-FIXED METAL-GLAZE 1K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-1K00-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-1001-FT
R89	24321/816	RESISTOR-FIXED METAL-GLAZE 62K +/- 2% 125mW 200V 200 ppm/DEG.C, 1%-61K9-ACCEPTABLE, SURFACE	VISHAY COMPONENTS	CRCW-1206-6192-FT
TR1	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 520hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR2	28433/828	TRANSISTOR PNP BIPOLAR BC858B... 30V 150MHz 200mW 100mA 220hFE @ 2mA, MARKING CODE 3K, SURFACE	PHILIPS	BC858B
TR3	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 520hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR4	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 520hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR5	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 520hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR6	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 520hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR7	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 520hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR8	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 520hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
X1	28531/009	RF-MIXER DOUBLE-BALANCED, DIODE RING, TFM12MH... 0.5-2000MHz, 50R 9 dBm RF-1dB COMPRESS, 5.8 dB	MINI-CIRCUITS	TFM-12MH

AE3 Timebase board

Issue 002

When ordering, prefix circuit reference with AE3.

	44829/962	Complete unit	
C101	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL ECE-A-1V-K-100-B
C102	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL ECE-A-1V-K-100-B
C103	26421/112	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, RADIAL, 5mm PWP, (TAPED).	PANASONIC INDUSTRIAL ECE-A-1V-K-100-B
C105	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS RFO-103-Z-AF-BRE-K
C106	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS RFO-103-Z-AF-BRE-K
C107	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS RFO-103-Z-AF-BRE-K
C108	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS RFO-103-Z-AF-BRE-K
C109	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS RFO-103-Z-AF-BRE-K
C110	26383/006	CAPACITOR-FIXED CERAMIC 10nF -20/+80% 25V K7004 SINGLELAYER, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS RFO-103-Z-AF-BRE-K
C111	26383/582	CAPACITOR-FIXED CERAMIC 470pF +/-10% 63V 2C2 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	PHILIPS 2222-630-51471
C112	26343/437	CAPACITOR-FIXED CERAMIC 100pF +/-2% 63V N150 SINGLELAYER, RADIAL, 2.5mm PWP, (TAPED).	VISHAY COMPONENTS ROP-101-GAK-ACR-J
C113	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS MKT-1817-410/065
C114	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS MKT-1817-410/065
C115	26582/431	CAPACITOR-FIXED POLYESTER 22nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS MKT-1817-322/015
C116	26582/429	CAPACITOR-FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	VISHAY COMPONENTS MKT-1817-410/065
D100	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS 1N4148
D101	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS 1N4148
D102	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS 1N4148
D103	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS 1N4148
D104	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS 1N4148
D105	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS 1N4148

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number
AE3	**Timebase board (contd.)**			
D106	28381/132	DIODE VARIABLE CAPACITNCE, BB809... 28V 20mA 29pF @ 3V, CAPAC RATIO 5.0 MIN, AXIAL, DO-34, (TAPED).	PHILIPS	BB809
D107	28381/132	DIODE VARIABLE CAPACITNCE, BB809... 28V 20mA 29pF @ 3V, CAPAC RATIO 5.0 MIN, AXIAL, DO-34, (TAPED).	PHILIPS	BB809
D108	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
D109	28336/676	DIODE SMALL-SIGNAL, 1N4148... 75V 110mA 1Vf @ 10mA, AXIAL, DO-35, (TAPED).	PHILIPS	1N4148
IC100	44535/268	IC-PROGRAMMED PAL, SET OF 1, 2030, FREQUENCY SYNTHESIZER.		
IC101	28469/101	IC-DIGITAL BUFFER/LINE-DRIVER 74LS126... QUAD, BUS, TRI-STATE, TTL-SCHOTTKY-L/PWR, 14 PIN,	NAT. SEMICONDUCTOR	DM74LS126AN
IC102	28469/137	IC-DIGITAL INVERTER 74HC04... HEX, CMOS-H/SPEED, 14 PIN, DUAL-IN-LINE.	PHILIPS	74HC04N
IC103	28461/342	IC-ANALOGUE OPERATIONAL AMP LM358... DUAL, 32V 1.0MHz BANDWIDTH, INPUT VOLTAGE RANGE 0 TO	PHILIPS	LM358N
L100	23642/567	INDUCTOR-FIXED 1mH +/- 10% COATED-LACQUER, MINIATURE, 70mA 40R MAX, 40 Q @ 0.79 MHz, 2.2 MHz	MEGGITT ELECTRONICS	C12-406/8/27471/016
PLEG	23435/120	CONNECTOR MULTIWAY, PCB HEADER, 36 WAY, RIGHT ANGLED, 2.54mm PITCH, PINS GOLD PLATED TO CLASS 2,	DU PONT (UK) LTD	75168-101-36
R100	24772/025	RESISTOR-FIXED METAL-FILM 10R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10R-2%
R101	24772/060	RESISTOR-FIXED METAL-FILM 300R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS	NK3-270R-2%
R102	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R103	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R104	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R105	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R106	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R107	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-10K-2%
R108	24772/036	RESISTOR-FIXED METAL-FILM 30R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-30R-2%
R109	24772/065	RESISTOR-FIXED METAL-FILM 470R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS	NK3-470R-2%

AE3 Timebase board (contd.)

R110	24772/085	RESISTOR-FIXED METAL-FILM 3K3 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS NK3-3K3-2%
R111	24773/201	RESISTOR-FIXED METAL-FILM 1R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS MK2-001R-FC-R
R112	24773/201	RESISTOR-FIXED METAL-FILM 1R +/- 2% 250mW 250V 100 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS MK2-001R-FC-R
R113	24772/036	RESISTOR-FIXED METAL-FILM 30R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS NK3-30R-2%
R114	24772/036	RESISTOR-FIXED METAL-FILM 30R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS NK3-30R-2%
R117	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS NK3-10K-2%
R118	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS NK3-10K-2%
R119	24772/133	RESISTOR-FIXED METAL-FILM 330K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS SMA0204-330K-2%
R120	24772/080	RESISTOR-FIXED METAL-FILM 2K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS NK3-2K-2%
R121	24772/060	RESISTOR-FIXED METAL-FILM 300R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (LOOSE OR TAPED).	VISHAY COMPONENTS NK3-270R-2%
R122	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS NK3-10K-2%
R123	24772/085	RESISTOR-FIXED METAL-FILM 3K3 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS NK3-3K3-2%
R124	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS NK3-10K-2%
R125	24772/065	RESISTOR-FIXED METAL-FILM 470R +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS NK3-470R-2%
R126	24772/078	RESISTOR-FIXED METAL-FILM 1K6 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS NK3-1K6-2%
R127	24772/078	RESISTOR-FIXED METAL-FILM 1K6 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS NK3-1K6-2%
R128	24772/078	RESISTOR-FIXED METAL-FILM 1K6 +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS NK3-1K6-2%
R129	24772/133	RESISTOR-FIXED METAL-FILM 330K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS SMA0204-330K-2%
R130	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS NK3-10K-2%
R131	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS NK3-10K-2%
R132	24772/097	RESISTOR-FIXED METAL-FILM 10K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS NK3-10K-2%
R140	24772/133	RESISTOR-FIXED METAL-FILM 330K +/- 2% 125mW 150V 100 ppm/DEG.C, AXIAL, (TAPED).	VISHAY COMPONENTS SMA0204-330K-2%
TR100	28455/437	TRANSISTOR NPN BIPOLAR BC107A,B... 45V 150MHz 300mW 100mA 240hFE @ 2mA, TO-18.	PHILIPS BC107A
XL100	28312/132	CRYSTAL 13 MHZ +/- 10 ppm, 30pf PARALLEL	INTERNATIONAL GE05E QC49/A HY-Q

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number

AE3a Standard conditioning board

Issue 001

When ordering, prefix circuit reference with AE3A.

	44829/957	Complete unit		
C70	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
C71	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	AVX LTD	0805-5C-103-KA6-00-J
R80	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R81	24811/185	RESISTOR-FIXED METAL-FILM 3K32 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-3K32-1%50ppm
R82	24811/178	RESISTOR-FIXED METAL-FILM 1K62 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-1K62-1%50ppm
R83	24811/178	RESISTOR-FIXED METAL-FILM 1K62 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-1K62-1%50ppm
R84	24811/185	RESISTOR-FIXED METAL-FILM 3K32 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-3K32-1%50ppm
TR30	28487/818	TRANSISTOR NPN BIPOLAR BFS20... 20V 450MHz 200mW 25mA 40hFE @ 7mA, MARKING CODE G1, SURFACE	PHILIPS	BFS20

AG1 Bypass switch unit

Issue 004

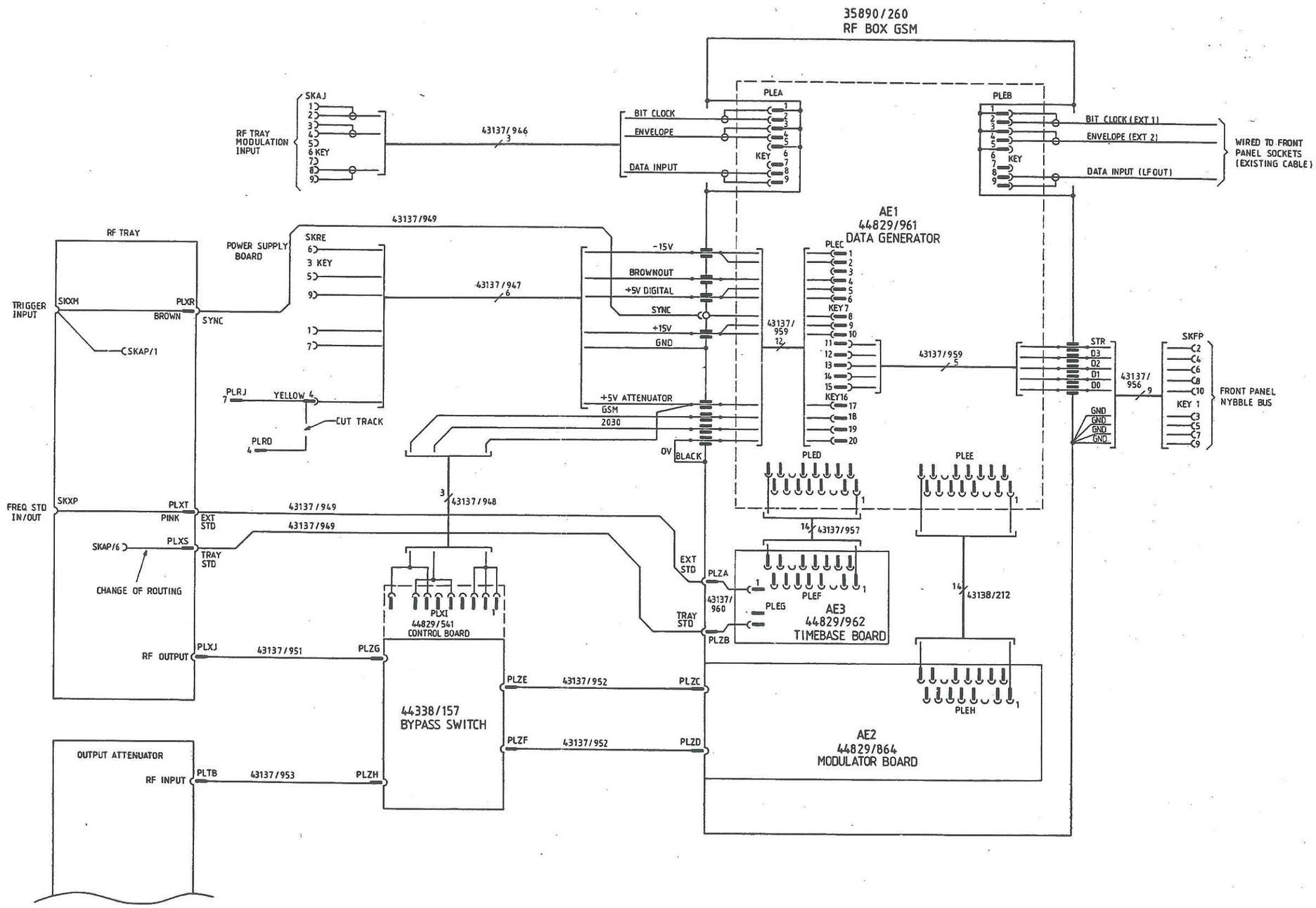
When ordering, prefix circuit reference with AG1.

	44338/157	Complete unit	
	43137/948	RIBBON-LEAD 10 WAY, SOCKET 10 WAY, KEY POS 9 PLXI TO GMSK TRAY	IFR LTD
SKZE	23444/531	CONNECTOR-RF SMA-TYPE FEMALE, RECEPTACLE, 50 OHMS	ITT CANNON (UK) 050-643-9339-890
SKZF	23444/531	CONNECTOR-RF SMA-TYPE FEMALE, RECEPTACLE, 50 OHMS	ITT CANNON (UK) 050-643-9339-890
SKZG	23444/531	CONNECTOR-RF SMA-TYPE FEMALE, RECEPTACLE, 50 OHMS	ITT CANNON (UK) 050-643-9339-890
SKZH	23444/531	CONNECTOR-RF SMA-TYPE FEMALE, RECEPTACLE, 50 OHMS	ITT CANNON (UK) 050-643-9339-890
	44829/759	PCB-ASSEMBLY CONVENTIONAL, ATTENUATOR 2-STAGE, LINK BOARD	IFR LTD

SERVICING DIAGRAMS

The following servicing diagrams used to make the Option 005 version of the instrument are additional to those given in Chap. 7 in the main body of the manual.

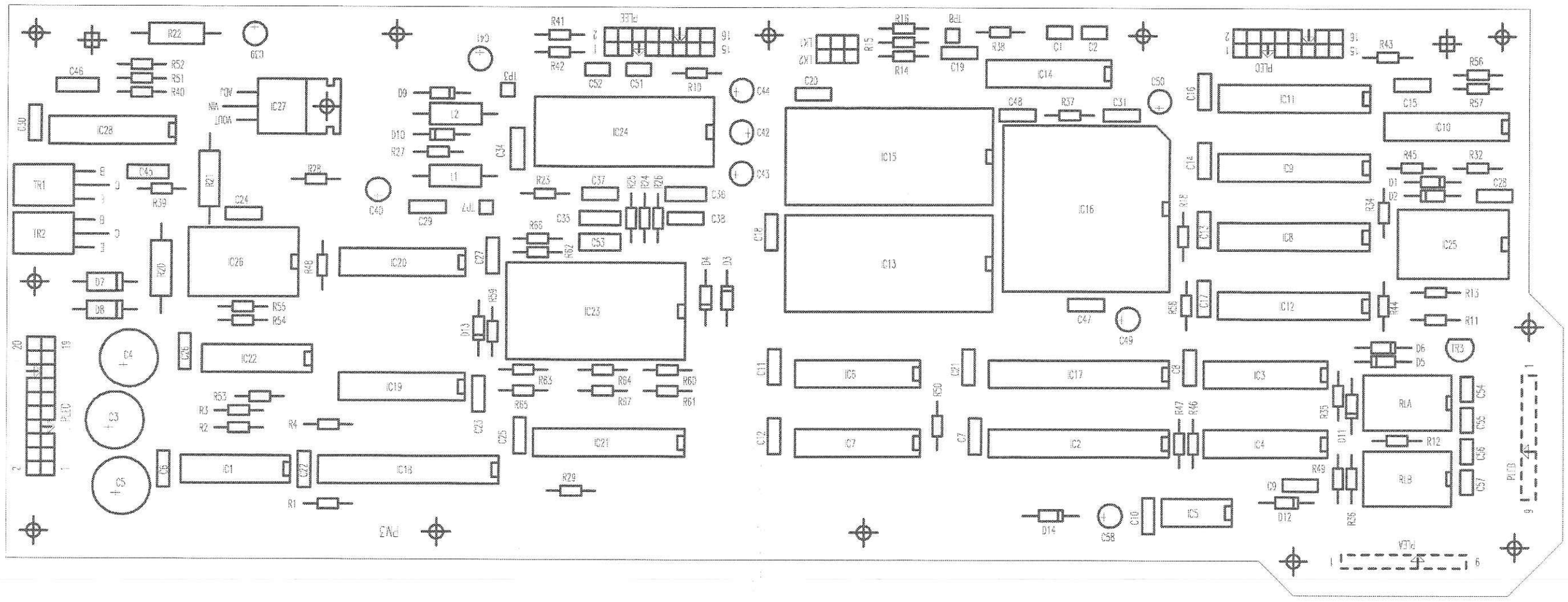
Interconnections A9

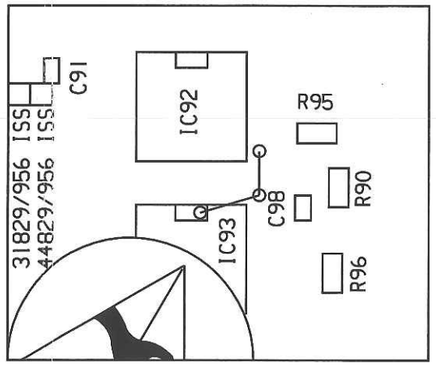


Drg. No. Z 46884/520 Sheet 1 of 1 (Issue 3)

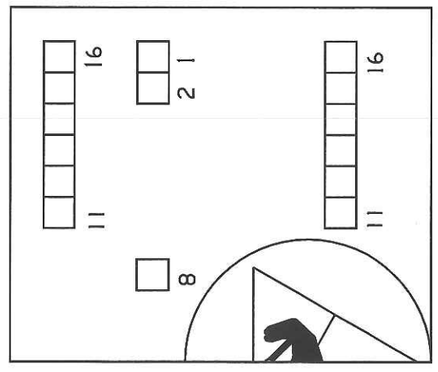
Fig. A-4 Interconnection diagram - GMSK Option 005

Component layout **AE1 & AE1a**





VIEW ON COMPONENT SIDE

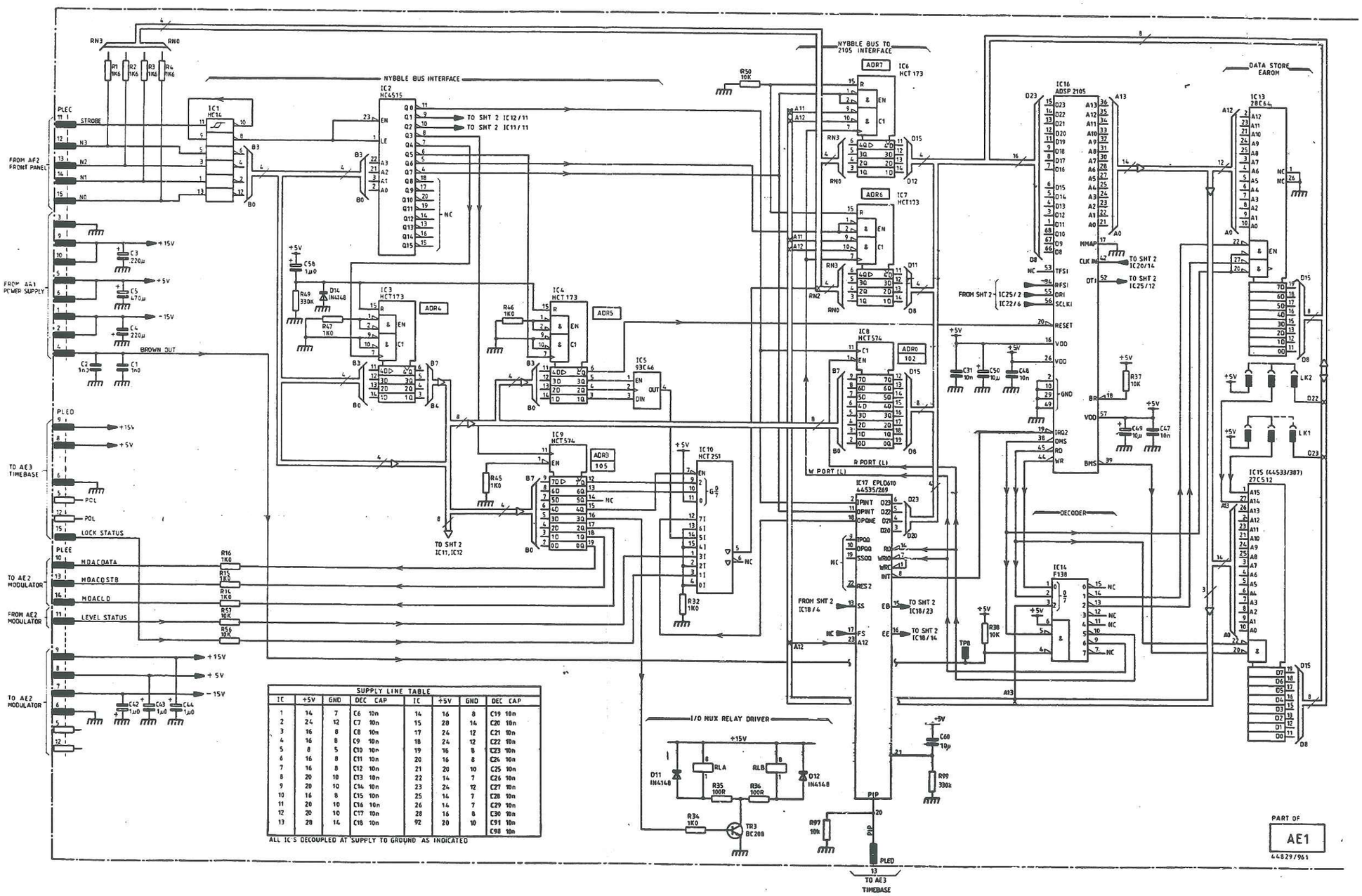


VIEW ON SOLDER SIDE

Drg. No. 44829/961 Sheet 1 of 1 (Issue 1)
Drg. No. 44829/956 Sheet 1 of 1 (Issue 1)

Fig. A-5 Data generator and control board component layouts

Data generator AE1



SUPPLY LINE TABLE								
IC	+5V	GND	DEC CAP	IC	+5V	GND	DEC CAP	
1	14	7	C6 10n	14	16	8	C19 10n	
2	24	12	C7 10n	15	28	14	C20 10n	
3	16	8	C8 10n	17	24	12	C21 10n	
4	16	8	C9 10n	18	24	12	C22 10n	
5	8	5	C10 10n	19	16	8	C23 10n	
6	16	8	C11 10n	20	16	8	C24 10n	
7	16	8	C12 10n	21	20	10	C25 10n	
8	20	10	C13 10n	22	14	7	C26 10n	
9	20	10	C14 10n	23	24	12	C27 10n	
10	16	8	C15 10n	25	14	7	C28 10n	
11	20	10	C16 10n	26	14	7	C29 10n	
12	20	10	C17 10n	28	16	8	C30 10n	
13	28	14	C18 10n	92	20	10	C91 10n	
							C98 10n	

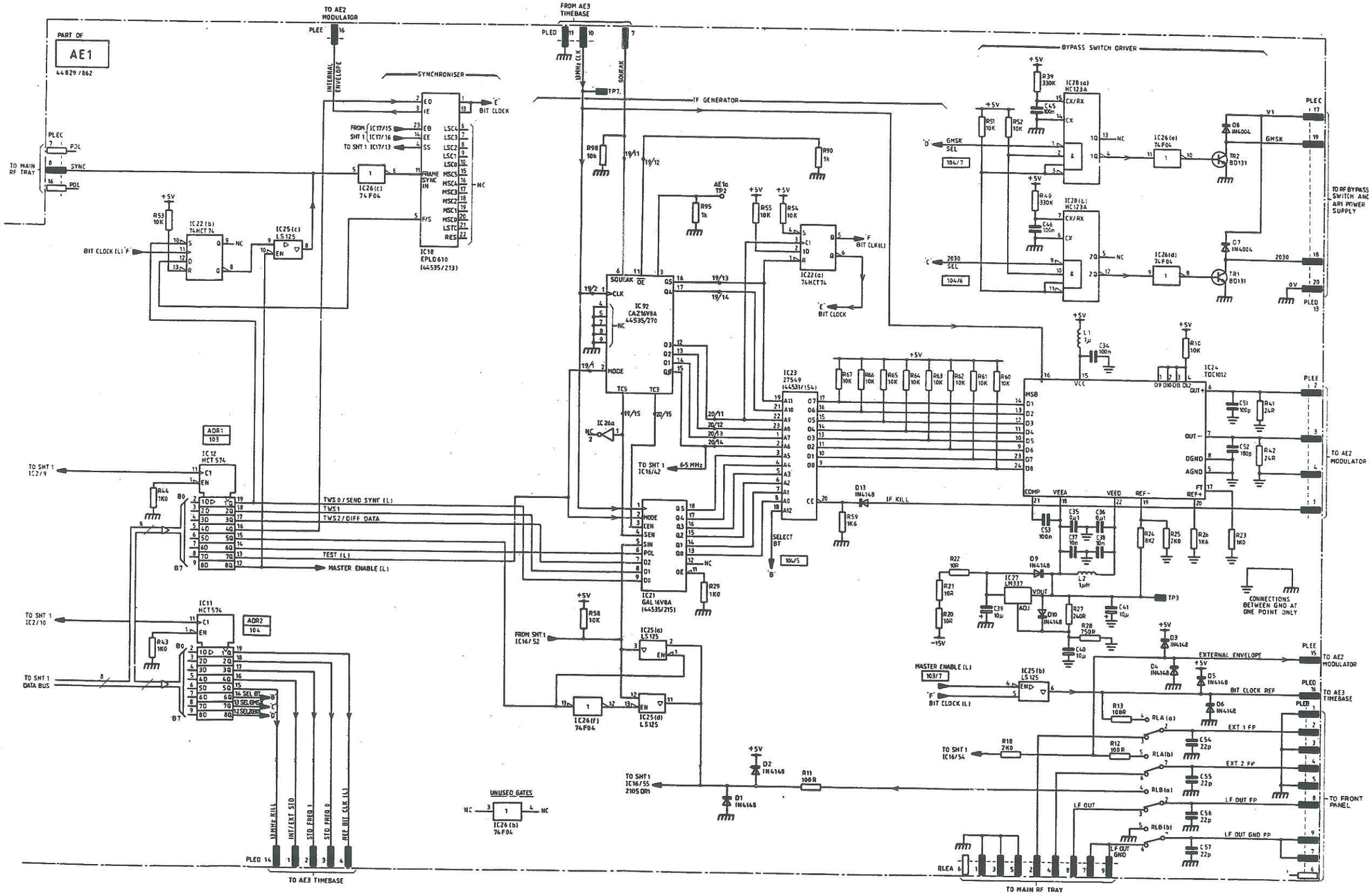
ALL IC'S DECOUPLED AT SUPPLY TO GROUND AS INDICATED

Drg. No. Z 44829/961 Sheet 1 of 2 (Issue 1)

Fig. A-6 Data generator board circuit diagram

OPTION 005 GMSK Bt 0.3

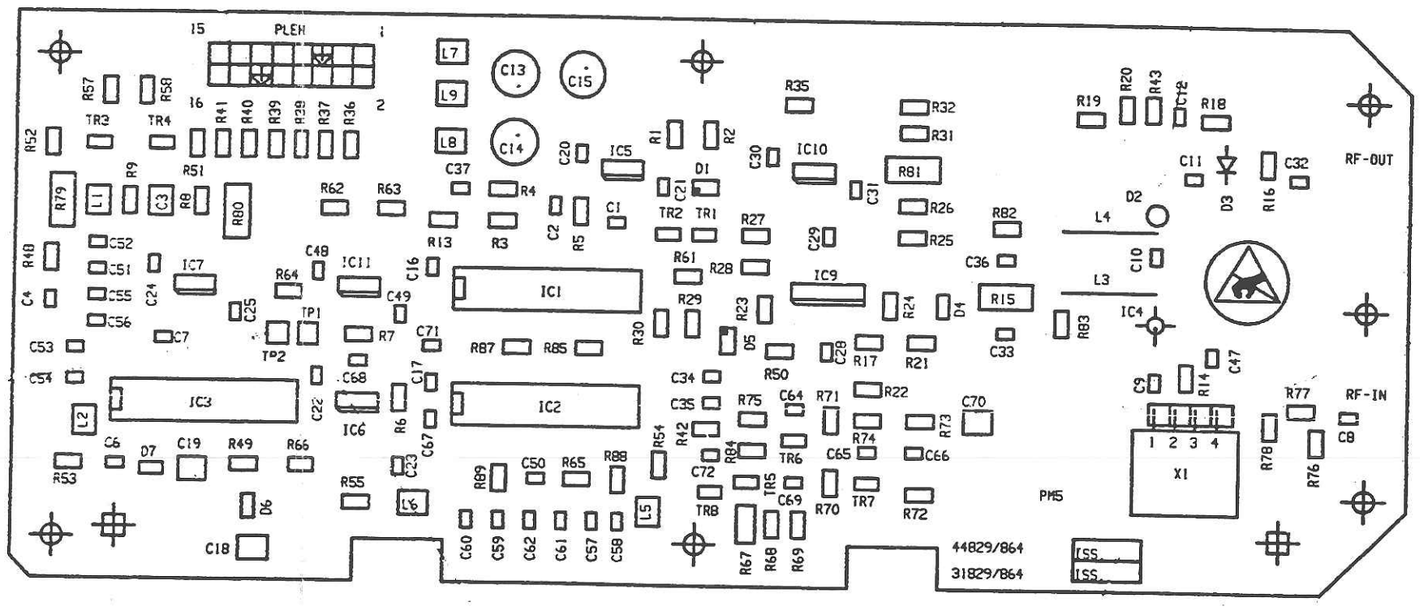
Data generator AE1



Drg. No. Z 44829/961, Sheet 2 of 2 (Issue 1)

Fig. A-7 Data generator board circuit diagram

Component layout **AE2**

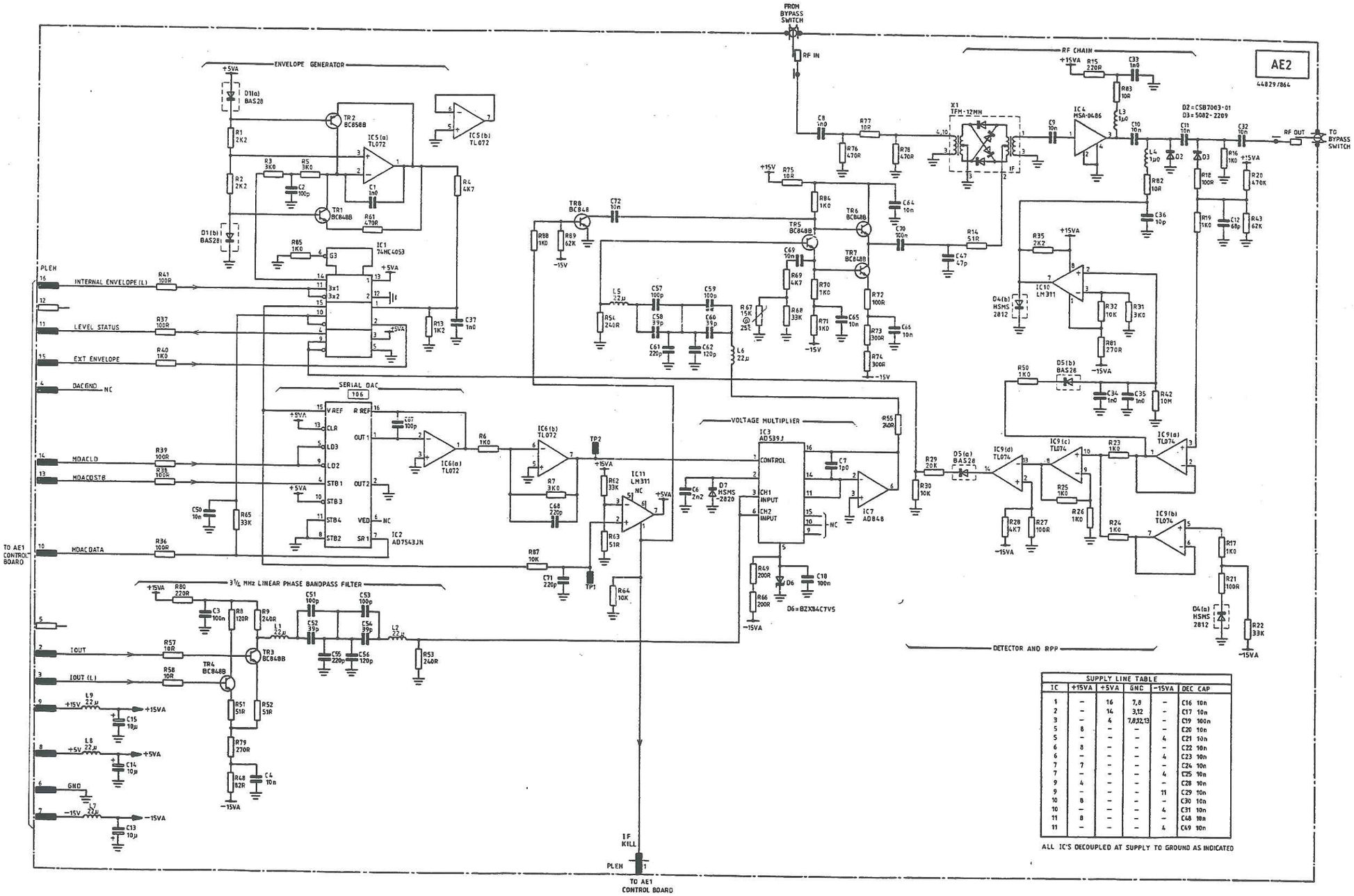


Data generator **AE1**

Drg. No. 44829/864 Sheet 1 of 1 (Issue 13)

Fig. A-8 Modulator board component layout

Modulator AE2



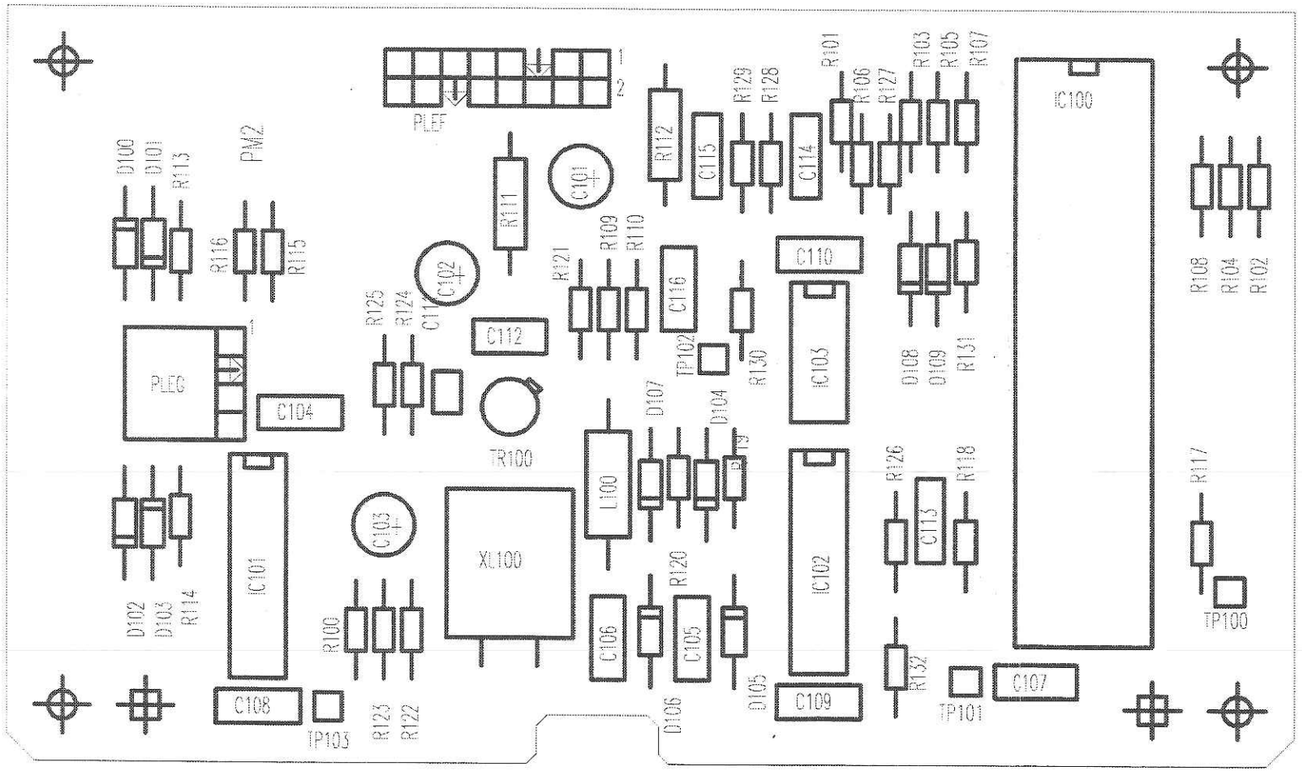
SUPPLY LINE TABLE

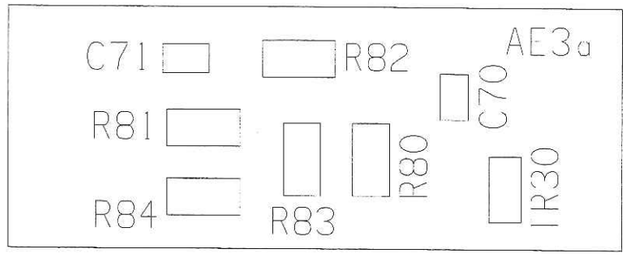
IC	+15VA	+5VA	GNC	-15VA	DEC CAP
1	–	16	7,8	–	C16 10n
2	–	14	3,12	–	C17 10n
3	–	4	7,8,12,13	–	C19 100n
5	8	–	–	–	C20 10n
5	–	–	–	4	C21 10n
6	8	–	–	–	C22 10n
6	–	–	–	4	C23 10n
7	7	–	–	–	C24 10n
7	–	–	–	4	C25 10n
9	4	–	–	–	C28 10n
9	–	–	–	11	C29 10n
10	8	–	–	–	C30 10n
10	–	–	–	4	C31 10n
11	8	–	–	–	C48 10n
11	–	–	–	4	C49 10n

Drg. No. Z 44829/864, Sheet 1 of 1 (Issue 1)

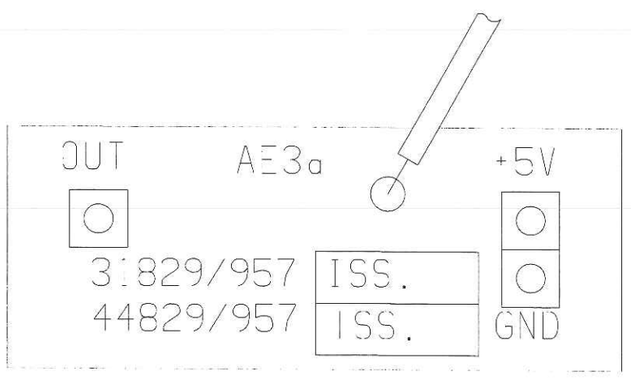
Fig. A-9 Modulator board circuit diagram

Component layouts **AE3 & AEa**





VIEW ON COMPONENT SIDE



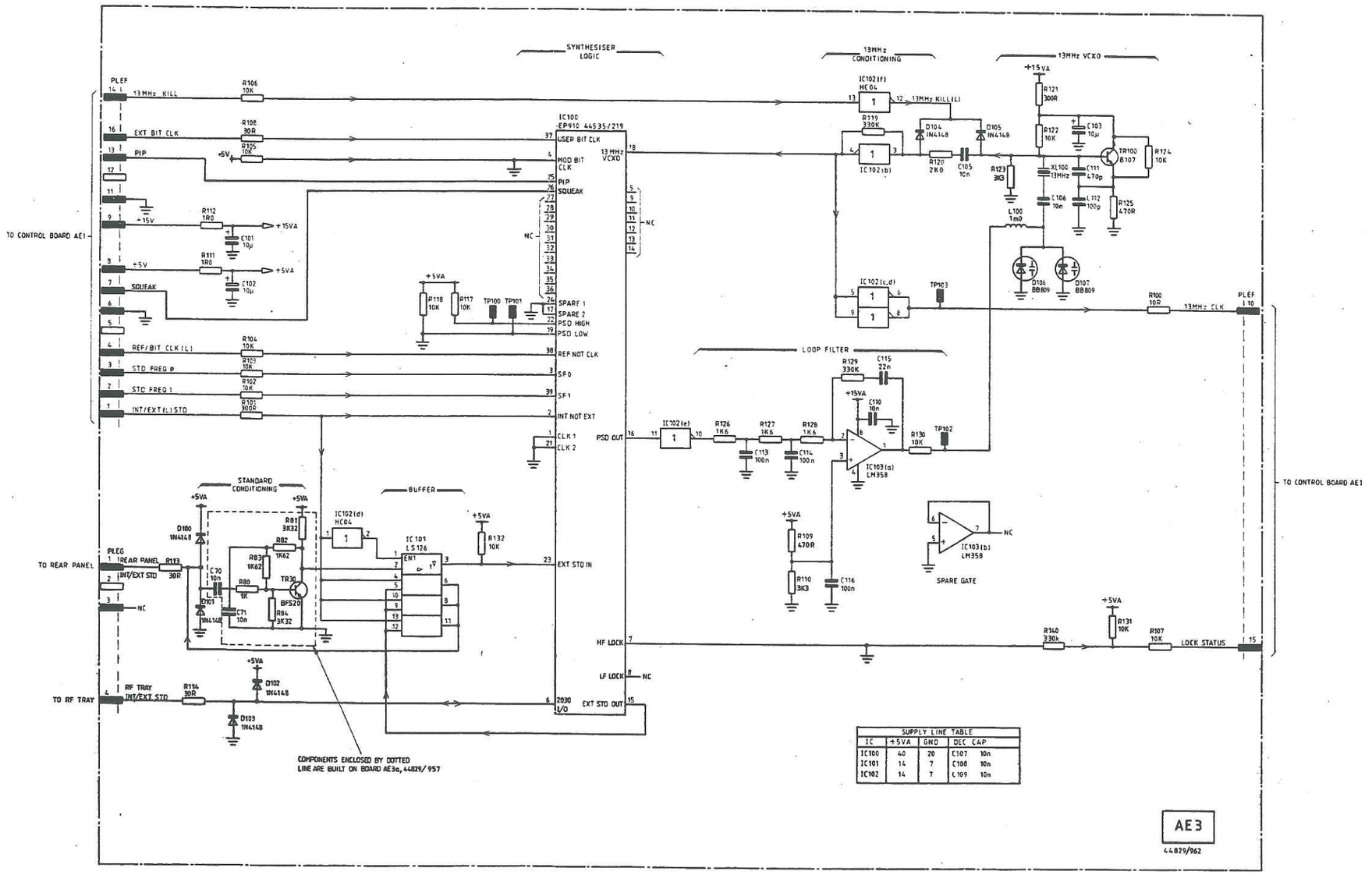
VIEW ON SOLDER SIDE

Modulator **AE2**

Drg. No. 44829/962 Sheet 1 of 1 (Issue 1)
Drg. No. 44829/957 Sheet 1 of 1 (Issue 1)

Fig. A-10 Timebase and standard conditioning board component layouts

Timebase AE3



Drg. No. Z 44829/962, Sheet 1 of 1 (Issue 2)

Fig. A-11 Timebase board circuit diagram

OPTION 005 GMSK Bt 0.3

Timebase **AE3**

Annex B
OPTION 006
AVIONICS

CONTENTS

LIST OF TABLES

LIST OF FIGURES

GENERAL DESCRIPTION

This option provides internal generation of waveforms suitable for testing Instrument Landing Systems (ILS) and VHF Omnidirectional Radio Range (VOR) systems. Option 006 requires Option 001 (Second Modulation Oscillator) to be fitted. The current design makes use of a daughter board to supply the required additional memory.

TECHNICAL DESCRIPTION

The existing 256K by 16-bit waveform store IC202 (AA1/3, sheet 3) is replaced by the Avionics daughter board AA2 which consists of 256K by 16-bit EPROM IC1 and multiplexer 1C2. Multiplexer IC2 on AA2, in conjunction with multiplexer IC208 on the AA1/3 board, selects which waveform is obtained from the EPROM by modifying the most significant bits of the address (A14 to A17). The waveform selection logic and address line identification are shown in Tables B-1 and B-2 respectively below.

A potential divider consisting of precision resistors R379 and R380 is added to the unused channel (Y6) of analogue multiplexer IC315 (AA1/3, sheet 4) for the AM2 signal. This is used to obtain increased resolution for low settings of DDM when in ILS mode. As a result of these resistor additions the value of R210 on the AA1/3 board is modified so that the same load impedance is maintained on the second LF oscillator.

TABLE B-1 AUDIO OSCILLATOR WAVEFORM SELECTION LOGIC - AA1/3

	AUDIO OSCILLATOR 1 IC201				AUDIO OSCILLATOR 2 IC209			
ADDRESS	A17	A16	A15	A14	A17	A16	A15	A14
LATCH No.	23	23	28	29	23	23	28	29
DATA BIT	D3	D7	D7	D7	D2	D6	D6	D6
SINE	0	0	0	0	0	0	0	0
TRIANGLE	0	0	0	1	0	0	0	1
SQUARE	0	0	1	0	0	0	1	0
ILS ZERO DDM	0	0	1	1	0	0	1	1
ILS 90 Hz	0	1	0	0	0	1	0	0
ILS 150 Hz	0	1	0	1	0	1	0	1
VOR 480 Hz	0	1	1	0	0	1	1	0
VOR FIXED	0	1	1	1	0	1	1	1
VOR 420 Hz	1	0	0	0	1	0	0	0
VOR 450 Hz	1	0	0	1	1	0	0	1
VOR 510 Hz	1	0	1	0	1	0	1	0
VOR 540 Hz	1	0	1	1	1	0	1	1

TABLE B-2 ADDRESS LINE IDENTIFICATION - AA1/3

LATCH 23 - IC509		
Pin 12	A16	Audio oscillator 1
Pin 16	A17	Audio oscillator 1
Pin 9	A16	Audio oscillator 2
Pin 5	A17	Audio oscillator 2
LATCH 28 - IC302		
Pin 12	A15	Audio oscillator 1
Pin 16	A15	Audio oscillator 2
LATCH 29 - IC304		
Pin 12	A14	Audio oscillator 1
Pin 16	A14	Audio oscillator 2

REPLACEABLE PARTS

AA2 Avionics board

When ordering, prefix circuit reference with AA2.

Cir. Ref.	IFR part number	Description	Manufacturer	Manufacturer's part number.
	44829/918	Complete unit	Issue 2	
C1	26582/429	CAPACITOR FIXED POLYESTER 100nF +/-10% 63V 330 ppm/DEG.C, RADIAL, 5mm PWP, (TAPED).	THOMSON COMPONENTS	BF014 D 0104 KDC
IC1	44533/454	IC PROGRAMMED EPROM, SET OF 1, 2030, ENHANCED AVIONICS WAVE FORM DATA.	IFR LTD.	
IC2	28466/365	IC DIGITAL NAND-GATE 74HC00... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, DUAL-IN-LINE.	HARRIS SEMICONDUCTOR	CD74HC00E
PLA	23436/788	CONNECTOR MULTIWAY, PCB HEADER, 40 WAY, 2-ROW	DU PONT (UK) LTD	75168-101-36
PLB	23435/120	CONNECTOR MULTIWAY, PCB HEADER, 36 WAY, RIGHT ANGLED	DU PONT (UK) LTD	75168-101-36

EARLIER VERSION

The earlier avionics version used a larger waveform store on board AA1/2 which contained 8 normal periodic waveforms. Waveform selection logic is shown in Table B-3. The address lines are identified in Table B-4.

TABLE B-3 AUDIO OSCILLATOR WAVEFORM SELECTION LOGIC - AA1/2

	AUDIO OSCILLATOR 1 IC201			AUDIO OSCILLATOR 2 IC209		
ADDRESS	A17	A16	A15	A17	A16	A15
LATCH No.	23	23	28	23	23	28
DATA BIT	D3	D7	D7	D2	D6	D6
SINE	0	0	0	0	0	0
TRIANGLE	0	0	1	0	0	1
SQUARE	0	1	0	0	1	0
ILS ZERO DDM	0	1	1	0	1	1
ILS 90 Hz	1	0	0	1	0	0
ILS 150 Hz	1	0	1	1	0	1
VOR REF	1	1	0	1	1	0
VOR FIXED	1	1	1	1	1	1

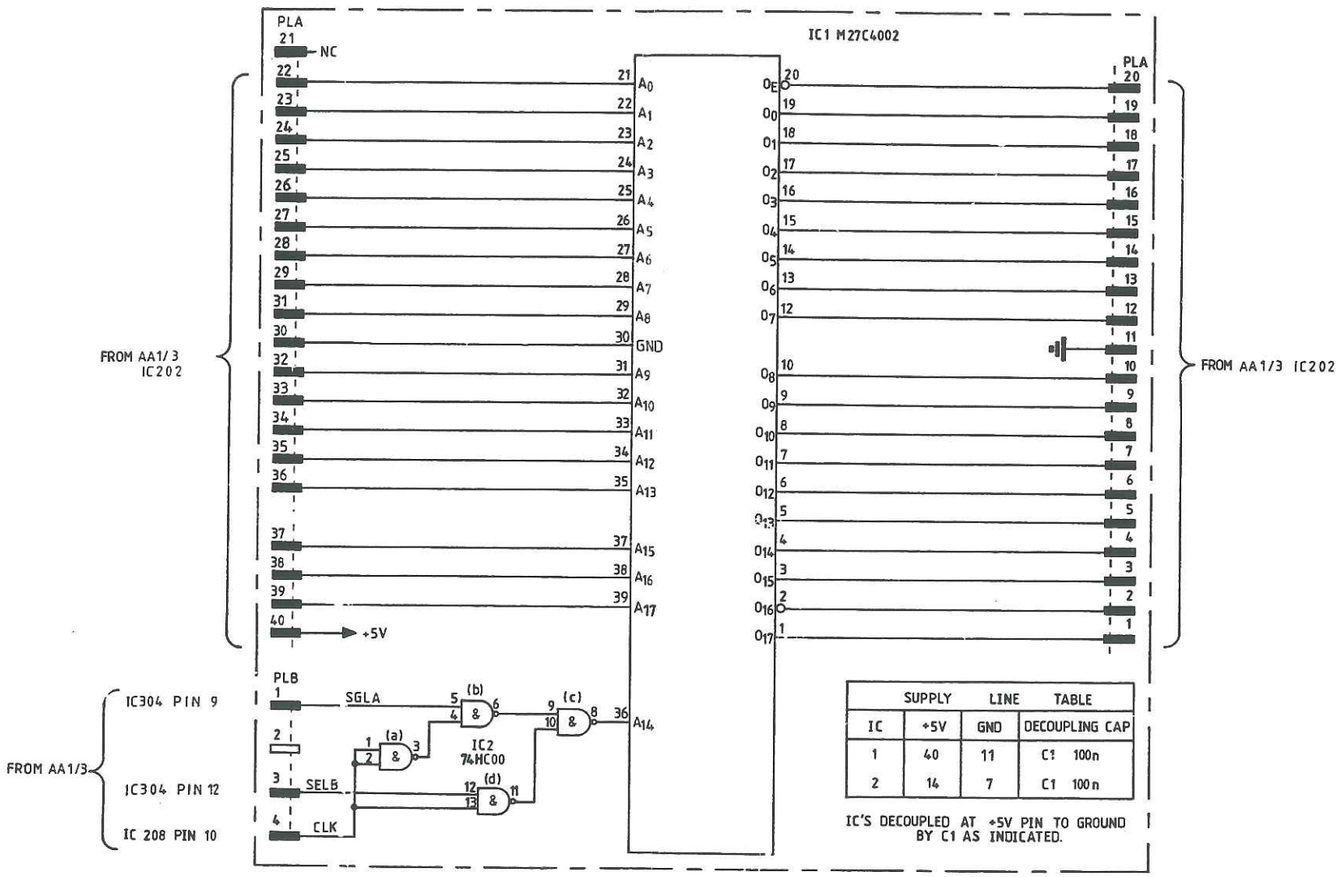
TABLE B-4 ADDRESS LINE IDENTIFICATION - AA1/2

LATCH 23 - IC509		
Pin 12	A16	Audio oscillator 1
Pin 16	A17	Audio oscillator 1
Pin 9	A16	Audio oscillator 2
Pin 5	A17	Audio oscillator 2
LATCH 28 - IC302		
Pin 12	A15	Audio oscillator 1
Pin 16	A15	Audio oscillator 2

SERVICING DIAGRAMS

The circuit diagram of additional board AA2 and its component layout are shown in Figs. B-1 and B-2 respectively.

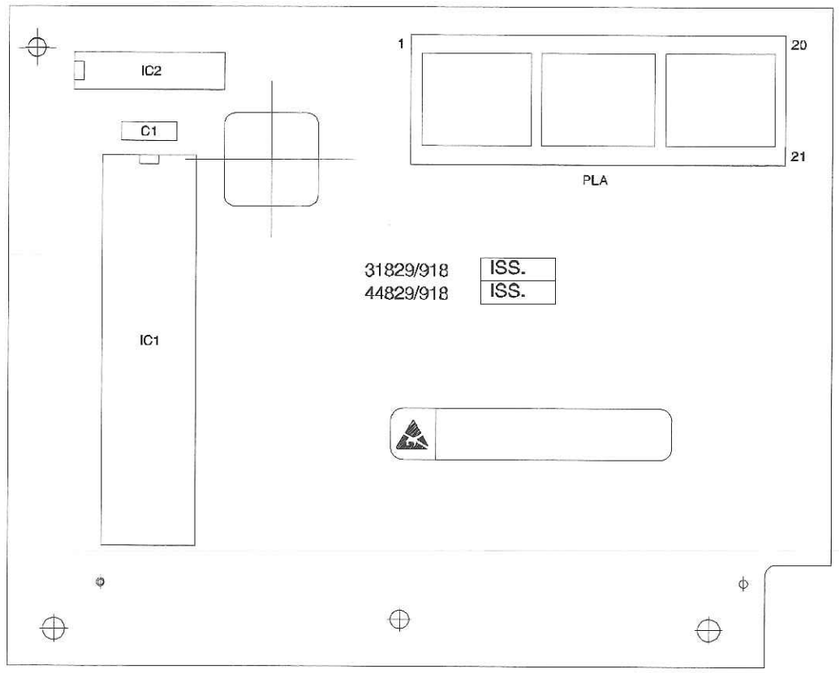
Circuit diagram AA2

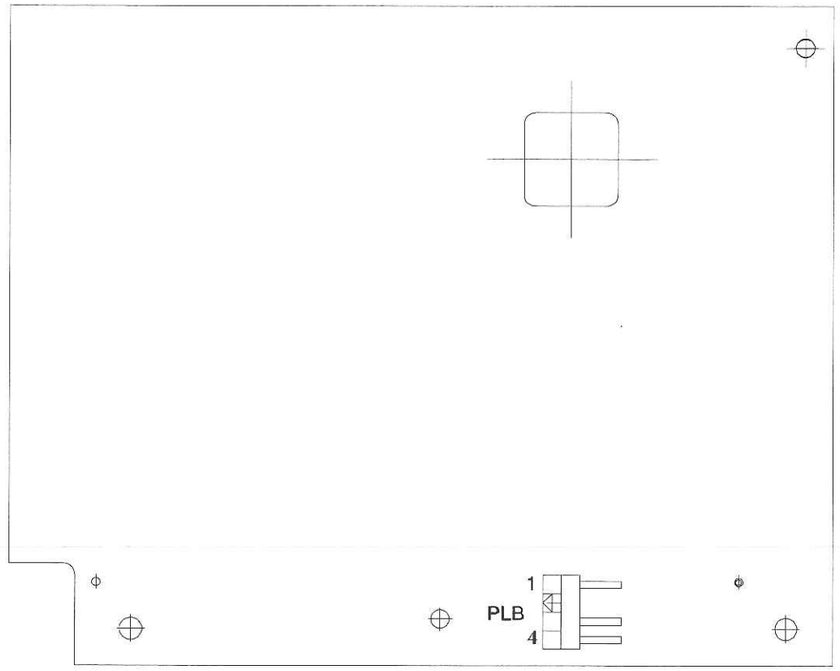


Drg. No. Z 44829/918 Sheet 1 of 1 (Issue 3)

Fig. B-1 AA2 Avionics board circuit diagram

Component layout **AA2**





Circuit diagram **AA2**

Drg. No. 44829/918 Sheet 1 of 1 (Issue 3)

Fig. B-2 AA2 Avionics board component layout

Annex C
OPTION 009 PULSE GENERATOR
OPTION 010 DME MODULATOR

CONTENTS

LIST OF FIGURES

LIST OF FIGURES *(contd.)*

LIST OF TABLES

GENERAL DESCRIPTION

The extra circuits for these options are contained in an additional module called the RF option tray. For Option 009 the PULSE INPUT socket provides the trigger for pulse generator board AJ1 in the RF option tray. For Option 010 the RF output from the 2030 is intercepted by a by-pass switch which routes the RF either directly to the front panel attenuator for normal operation or via DME modulator board AJ2 in the RF option tray for DME operation. Pulse generator board AJ1 supplies the modulator drive. For both options, outputs are obtained from the VIDEO and SYNC sockets on the rear panel.

TECHNICAL DESCRIPTION

This technical description is additional to that given in Chapter 4-2 in the main body of the manual for standard instruments.

AJ1 pulse generator board

This board provides an interface to the 2030, a gate array which is used to generate the pulses, a FIFO register and DAC for DME pulse shaping and a 20 MHz reference clock

Nibble bus interface

Four data/address lines are used along with a strobe in order to communicate with the RF option tray. A 4-bit address is setup, and read on the negative edge of the strobe. The data relevant to that address is then setup, and clocked in on the next positive strobe edge. Consequently, sixteen addresses are possible, with 4 bits of data each. Some are already used (e.g. in the front panel), leaving Q0 to Q7 (from Q0 to Q15) free for use in the RF option tray.

IC3 is a "bus widener", data being clocked in by address Q4. This data forms the least significant 4 bits for IC5 to IC8, which are 8-bit latches and have data clocked through on addresses Q7, Q6, Q2, and Q1 respectively. So, for each 8 bits of data, the most significant 4 bits are always written to address Q4, followed by the least significant 4 bits, written to address Q7, Q6, Q2, or Q1 depending on which 8-bit latch is required.

Calibration and identity EAROM IC9 stores an ID code identifying the RF option tray to the main 2030. IC4 and IC10(a) provide data, clock and enable for the EAROM to be read and written to over the nibble bus. The interface to the EAROM enables it to be software compatible with other options.

A readback interface allows monitoring of error signals via the nibble bus. The address of the required error signal is written to Q4 (again), followed by the readback address (Q0). All error signals are active low and are NANDed together to generate an overall board error signal. This saves processing time, assuming there are no errors, as only this one signal needs to be read.

Gate array

The FPGA is configured automatically at startup by a serial PROM, IC23. Failure to configure correctly will result in D/~P remaining low, which will register as an error via the readback interface. It is configured as a square pulse generator, with a timing resolution of 50 ns.

To generate the pulses, three 21-bit preloadable down counters are used, requiring 63 bits of data in total. Each counter has an associated 21-bit latch, with flip-flops sourced from both combinatorial logic blocks and input/output blocks. The data is input as a 7-bit bus, so 9 latch clock signals must be generated in total. To reduce the inputs further, a 4-to-9 decoder is used for the store address system. A Gray code sequence of SA0 to SA3 is used, the relevant 7-bit byte being setup before each transition of SA0 to SA3.

A 20 MHz clock is used for timing, and a specific reset sequence is required every time data is changed, in order to avoid illegal data entry. GR is a global reset for the FPGA, resetting all internal flip-flops low. LR is a local reset, used to reset specific areas of the pulse generator. CC1 and CC2 and clock control signals, allowing any new data to be preloaded into the counters before the generator output is released.

The counters are synchronous with carry look-ahead operation. Whilst the counters are described as 21-bit, there is an additional 22nd stage which is used to generate an overflow bit. This overflow, acting as a clock enable, is used to synchronously reload the counter, switch its state to 'hold', and switch the state of the next counter needed to 'count', all on the next clock edge.

Clock signals are needed for the FIFO and DAC, and these are generated as functions of the 20 MHz clock and the hold/not count signals. In addition, a retransmit pulse is generated for the FIFO.

The PULSE INPUT connector is used as an external trigger (or external pulse if Options 002 and 009 are fitted). When operating in external trigger mode, the clock input stage is switched on and off according to the state of the pulse generator. The positive edge of an external trigger switches a flip-flop high, the output of which enables the clock signal. When the pulse period is complete, the final overflow bit resets the flip-flop low, disabling the clock once again.

The clock signal frequency is quadrupled inside the FPGA to 80 MHz. This is then input to a pair of flip-flops, one +ve edge triggered and the other -ve edge triggered. The outputs are XORed, followed by a divide-by-4 network. The external trigger clock enable acts as a reset on the complementary flip-flop pair. Consequently, when the trigger switches the control signal, the system only waits until the next clock edge (+ve or -ve) on the 80 MHz clock. This limits the jitter between continuous external trigger pulses and the pulse output.

FIFO and DAC

The AJ1 board must also be capable of generating a shaped output pulse, specifically double gaussian pulses for DME testing. The relevant single pulse waveform is calculated in the software, as a sequence of 8-bit numbers. This sequence is then loaded into the FIFO, using D0 to D7 and ~FW.

Since the FPGA must generate signals to drive the FIFO, an associated double pulse is calculated and loaded into the FPGA as well. CFIFO is the read clock for the FIFO, shifting the read pointer through the waveform data at 20 MHz to generate each pulse. As the data will almost certainly not fill the FIFO totally, a retransmit pulse (RFIFO) is required before every sequence of data to reset the read pointer to zero.

The empty flag output (~EF) is used as an error monitor signal. If no data is loaded into the FIFO after a reset, it will remain active low. Also if retransmission fails, the FIFO will read until empty, again forcing ~EF low.

A high speed 8-bit DAC converts the FIFO output to an analogue waveform. It is also clocked at 20 MHz, the clock signal (CDAC) generated by the FPGA for the duration of each pulse. The output is filtered by a 10 MHz low-pass filter, before being output to the AJ2 board (DME modulator). A separate feed is amplified by an AD811 to 5 V peak level, and a 74HC125 buffer is used to switch the video output between the DME and the radar (FPGA) outputs.

20 MHz clock

In order to provide an accurate 20 MHz clock to drive the pulse generator, a reference is needed which is locked to the 2030's OCXO or an external standard. A reference 1 MHz signal is taken from the AA1/3 board.

The reference then forms one input of a phase locked loop, consisting of a 20 MHz VCXO, buffer amplifier, ÷20 stage, 4-state phase detector, active loop filter, and a lock detect circuit. The output is taken from the collector of the buffer amplifier, and the lock detector output goes to the readback interface for error monitoring.

An RF changeover switch is attached to the RF option tray and used to switch between Option 010 mode and normal 2030 operation. A monostable is used to provide hardware timed pulses for operating the edgeline switch, rather than using software to generate the pulses.

AJ2 DME modulator board

This board is used for Option 010 only. The pulse modulator for DME (Distance Measuring Equipment) is required to operate from 916 MHz to 1216 MHz at levels up to +10 dBm. DME pulses are Gaussian shaped, so the modulator is required to have a certain linearity in order to produce a virtually Gaussian RF spectrum. Whilst the ON/OFF ratio of the modulator should be better than -80 dB, critical parameters for DME are only relevant above 5% of the peak level, and so 30 dB of linear control (approx. 3% of peak) should easily suffice. After the linear region a 'kill' circuit is used to provide the remaining isolation.

The RF attenuator stages are formed using pin diodes. Each stage has an approximately square root response (RF level versus control voltage), so cascading two stages gives a very approximate linear response. The choice of pin diodes is a compromise between carrier lifetime and RF resistance. A low carrier lifetime is required because the fastest pulse expected has a rise time of 0.8 µs, and the resistance is due to the large on/off ratio.

Two monolithic amplifiers are used to compensate for the insertion loss of the system, and go some way to reduce mismatch between input and output.

The control part of the circuit is based on a differential amplifier, one side of the pair drives the series diodes and the other side the shunts. This simple arrangement supplies enough series diode control to give the required 30 dB, a small amount of shunt leakage to improve linearity, and the kill circuit.

Charge storage in the pin diodes slows the response of the modulator, so adding lead compensation in the form of two capacitors speeds up charge dissipation. Bleed resistors in both arms ensure the drive transistors are not switched off, and also set the intercept point for series and shunt currents.

MAINTENANCE

This section describes procedures for the access and removal of the RF option tray and of the boards contained within it. These procedures are additional to those given in Chap. 5-0 in the main body of the manual for standard instruments.

ACCESS FOR SERVICING

Turn the instrument upside down and remove the bottom outer cover which reveals the RF option tray.

Access to boards AJ1 and AJ2

Remove the lower RF tray cover after removal of 17 M4 screws to gain access to the boards (see Fig. C-1).

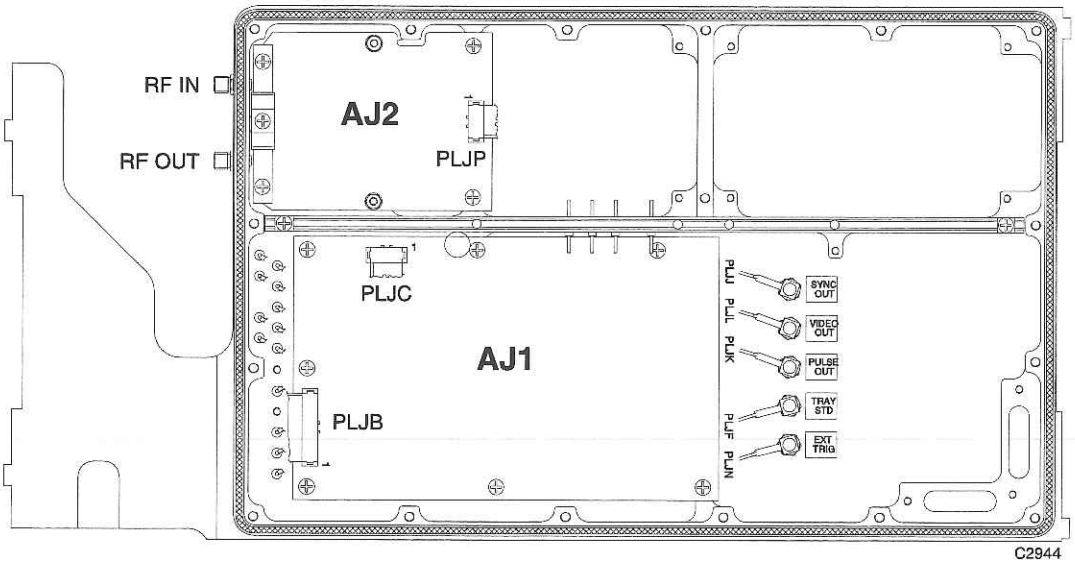


Fig. C-1 RF option tray from below with tray cover removed showing boards and locations of connectors (AJ2 only fitted for Option 010)

REMOVAL OF UNITS AND BOARDS

Removal of board AJ1

Having gained access to the board proceed as follows:-

(1) Pull off the connectors to PLJA, PLJB, PLJC, PLJG, PLJH and PLJM.

(2) Pull off the SMB connectors to PLJF, PLJJ, PLJK, PLJL and PLJN.

(3) Remove 7 M3 screws holding the board in place and lift out the board.

Removal of board AJ2 (Option 010 only)

Having gained access to the board proceed as follows:-

(1) Pull off the ribbon cable connector to PLJP.

(2) Unsolder connectors PLJQ and PLJR.

(3) Remove 2 screws and 2 nuts from the board.

(4) Remove 3 screws holding the screen to the board and lift out the board.

Removal of RF switch

The RF switch (only applicable to Option 010) is mounted on the RF option tray (see Fig. C-2). Proceed as follows:

(1) Remove the RF option tray (see 'Removal of RF option tray' below).

(2) Remove the 2 semi-rigid cables between the RF switch and the RF option tray.

(3) Remove 3 M3 screws on the mounting bracket.

(4) Remove 4 M3 screws from the switch cover and take off cover. Unsolder connector on switch board and remove the unit.

Replacement is generally a reversal of the above removal procedure. Ensure that the correct torque setting is used when replacing the semi-rigid cable connections (torque settings are given in Chap. 5-0 of the manual).

Removal of RF option tray

The RF option tray is a machining which rests on lugs at the sides and is held in place by 5 M4 panhead screws. Proceed as follows:

(1) Turn the instrument upside down and remove the bottom outer cover.

(2) For Option 010 only, disconnect and completely remove the semi-rigid cable between the RF switch and the attenuator.

(3) For Option 010 only, undo the semi-rigid cable between the RF switch and the RF tray at the RF switch end.

(4) Remove 6 screws from the side frames.

(5) Lift the tray at the opposite end from the RF switch enough to pull off 5 SMB connectors (EXT TRIG, TRAY STD, PULSE OUT (Options 002 and 009 only), VIDEO OUT and SYNC OUT).

(6) Disconnect the 10-way ribbon cable at the front panel nybble bus end.

(7) Disconnect SKRE at power supply board AR1/2.

(8) Lift the RF option tray directly upwards and remove.

Replacement is generally a reversal of the above removal procedure. Ensure that the correct torque settings are used when replacing the semi-rigid cable connections (torque settings are given in Chap. 5-0 of the manual).

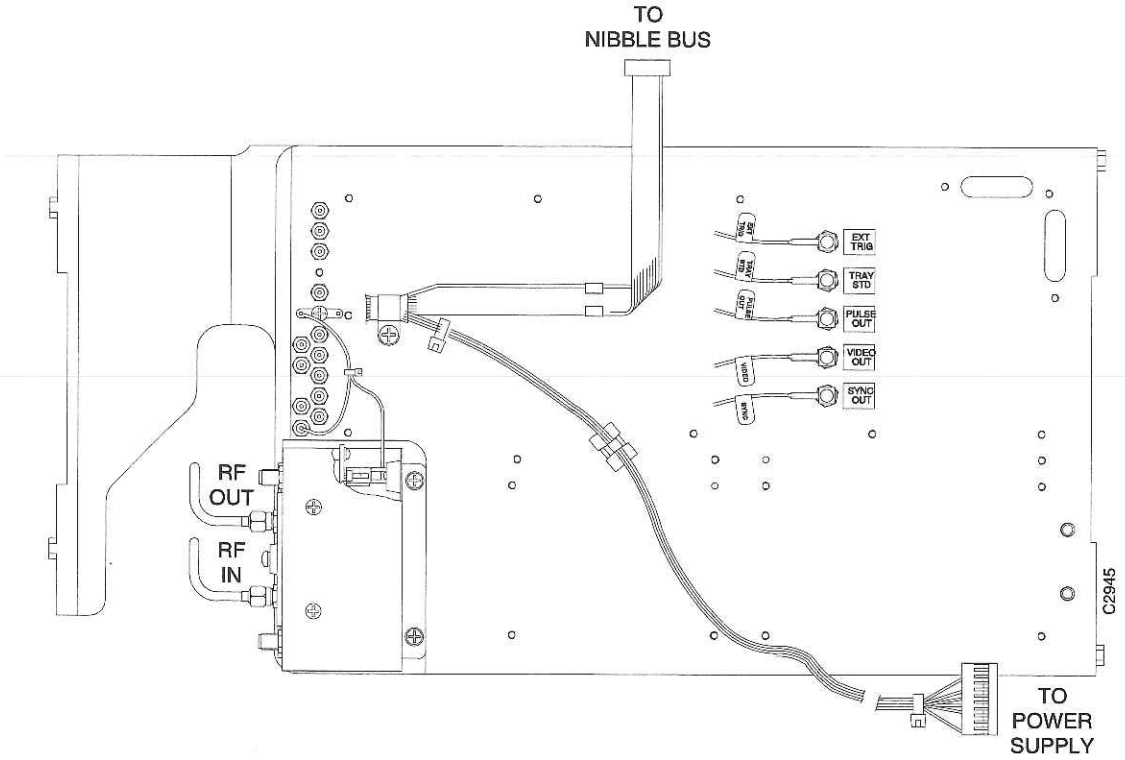


Fig. C-2 RF option tray viewed from underneath showing RF switch and connectors

ADJUSTMENT

Option 009 requires no calibration or adjustment.

This section describes adjustments for Option 010 which are additional to those given in Chap. 5-2 in the main body of the manual for standard instruments. The adjustment steps to be carried out depend upon the type of instrument.

DME MODULATOR ADJUSTMENT

	TEST EQUIPMENT	
Description	**Minimum specification**	**Example**
Digital volt meter (DVM)		Solatron 7150+

Adjustment procedure

Proceed as follows:

(1) Remove the RF option tray lower cover to gain access to board AJ2 and then power up the instrument.

(2) Adjust variable resistor R31 on AJ2 until the voltage across R5 is between 0.10 and 0.12 V.

RF LEVEL CALIBRATION

	TEST EQUIPMENT	
Description	**Minimum specification**	**Example**
Power meter and Sensor)	300 kHz to 4.2 GHz	Marconi 6960B and 6912

ADJUSTMENT	
960 to 1215 MHz	
Full calibration figure range:	0 to 800
5% to 95% calibration figure range:	40 to 760

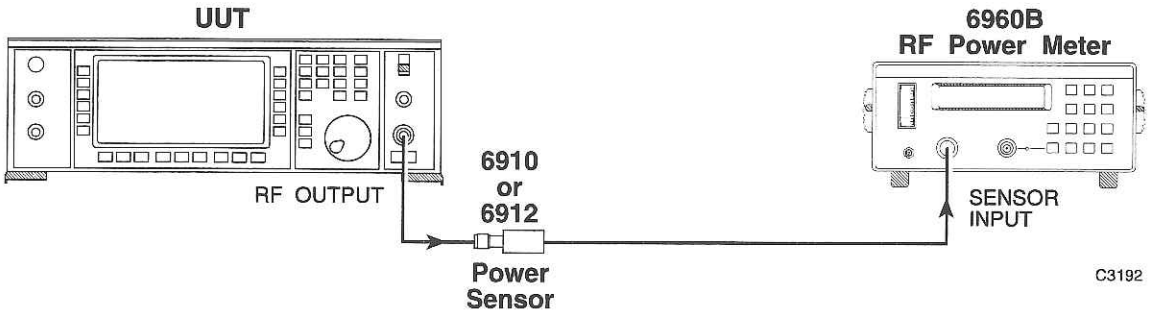


Fig. C-3 Equipment configuration for RF level calibration

(1) Use the [MEM] function to recall memory number 50. This will restore the instrument to factory default settings.

(2) Connect the test equipment as shown in Fig. C-3.

(3) Press [UTIL], *[Utils. Menu 2]*, *[Lock & Unlock]*. Unlock the instrument to level 2, then press [UTIL], *[Cal. Value]*, *[DME RF Level]*. The *DME RF Level Calibration Menu* is displayed.

(4) Using the rotary control adjust the *New Calibration* figure until the level shown for *Cal Point* 0 (960 MHz) on the power meter equals +8.00 dBm. Record the number in the table below.

Frequency (MHz)	**960**	**975**	**990**	**1005**	**1020**	**1035**	**1050**	**1065**	**1080**
Cal number									
Frequency (MHz)	**1095**	**1110**	**1125**	**1140**	**1155**	**1170**	**1185**	**1200**	**1215**
Cal number									

(5) Press *[Next Cal Point]* and repeat step (4) for the new calibration point. Continue this process to complete all 18 calibration points.

(6) With calibration complete, press *[EXIT]* *[Save Calib]*.

FAULT DIAGNOSIS

GENERAL

Option 009 adds a pulse generator to the 2030 range. This is usually purchased with Option 002 (pulse modulator).

Option 010 adds a DME pulse generator and DME pulse modulator.

In order to properly diagnose faults, the option fitted should be noted. Option 002 has its own set of flowcharts. In the following flowcharts 'Switch Fault' and 'DME Modulator Board Fault' do not apply to Option 009 and setups are slightly different depending on the option fitted. See accompanying notes for details.

It is imperative that all power supplies are checked prior the using any fault diagnosis, as faults here can lead to misleading or inconclusive results. PLRE should be disconnected from the rear of the power supply PCB (bottom cover removed) and the following checked with a voltmeter :-

PLRE	pin 1	-	+15 V
	pin 4	-	+5 V
	pin 6	-	-15 V
	pin 7	-	Ground
	pin 9	-	+5 V

These checks should be repeated with PLRE reconnected, in order to identify a power supply fault somewhere in the RF option tray. This must be located and repaired before proceeding.

The most common faults are likely to be broken feedthrough capacitors, trapped or faulty coaxial or ribbon cables or connectors. These should all be checked as a time-saving measure.

ERROR MESSAGES

Methods of rectifying faults in resonse to displayed error messages are given in Table C-1.

TABLE C-1 ERROR MESSAGES AND INFERENCES

No	Message	Inference	Remedy
11	Pulse Mod. I/P Overload (Option 009)	Problem with Option 002 (Pulse Modulator).	Check cables between AJ1, PLJK and AB2/2, PLBP and pulse mod driver.
12	Video Output Overload	Pulse gen has detected excessive load or short on output.	Remove load or short from VIDEO output.
13	20 MHz Loop Out Of Lock	Standard failure or AJ1 synthesizer fault or instrument not warmed up.	Allow 5 minutes warm-up or switch to internal standard or correct external standard or fault-find 20 MHz clock.
14	Pulse Profile Not Valid	Illegal pulse value entered.	See manual for parameter limits and pulse definitions.
15	DME Pulse Not Regenerated (Option 010)	Problem with pulse generator.	See fault-finding flowchart.
16	DME Pulse Not Gaussian (Option 010)	Pulse parameters currently set do not yield a gaussian shaped pulse.	Press *[Select Gaussian]* softkey under DME Config Menu.
34	DME Calibration Checksum	RF option tray EAROM corrupt.	Attempt re-initialisation or see fault-finding flowchart.
77	RF Option Box EAROM Read	Problem with RF option tray.	See fault-finding flowchart.
78	RF Option Box EAROM Write	Problem with RF option tray.	See fault-finding flowchart.

FAULT FINDING FLOW CHARTS

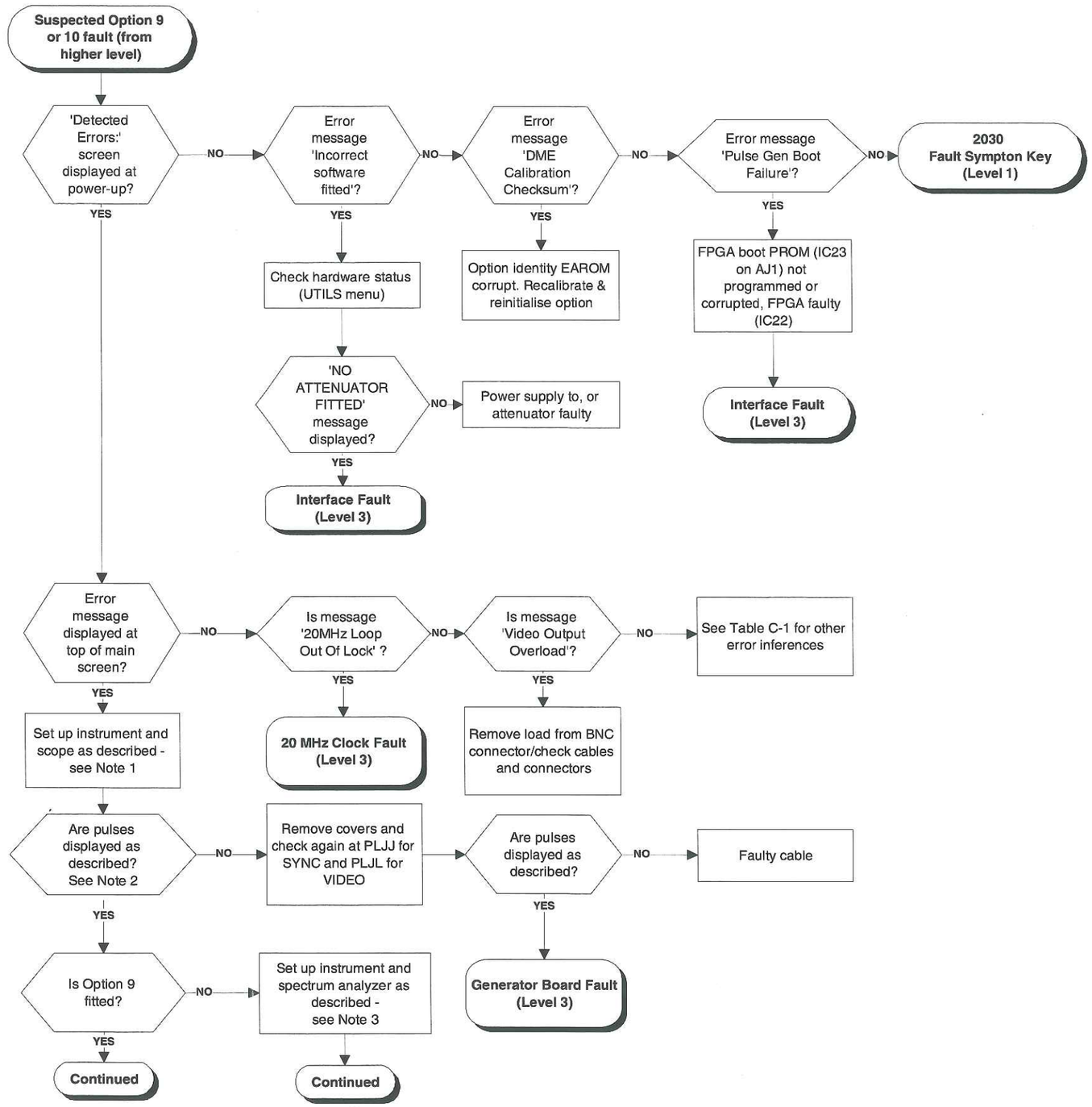
The following fault finding flow charts are specifically intended for instruments fitted with Options 009 and 010 and are to be used in place of those given in Chap. 5-3 in the main body of the manual.

RF Option Tray Fault (Level 2)

Note 1
Connect SYNC and VIDEO outputs to channels A and B of oscilloscope.
Recall default setting: [MEM] 50 [enter].
Option 10: [UTIL], *[Mod/n Mode]*, *[Avionics Modes]*, *[DME]*, [SIG GEN].
Option 9: [UTIL], *[Pulse Gen.]*, *Rate* 10 µs, *Width* 2 µs, *Delay* 5 µs.
Scope: 1 V/div, 1 µs/div, DC coupled, 50 Ω inputs preferred.

Note 2
SYNC pulse (Ch A): 400 ns from 0 V to 4.5 V min.
VIDEO pulse:
Option 9: 2 µs pulse delayed from start of SYNC pulse by 10 µs, > 4.5 V amp.
Options 9 and 10: Smooth Gaussian phased pulse 3.5 µs wide (50%), 2.5 µs rise/fall times (10%/90%), > 4.5 V amp.

Note 3
Connect RF OUTPUT to spectrum analyzer.
Recall default setting: [MEM] 50 [enter].
Frequency 1025 MHz, level 0 dBm, analyzer span 5 MHz.



RF Option Tray Fault (Level 2)

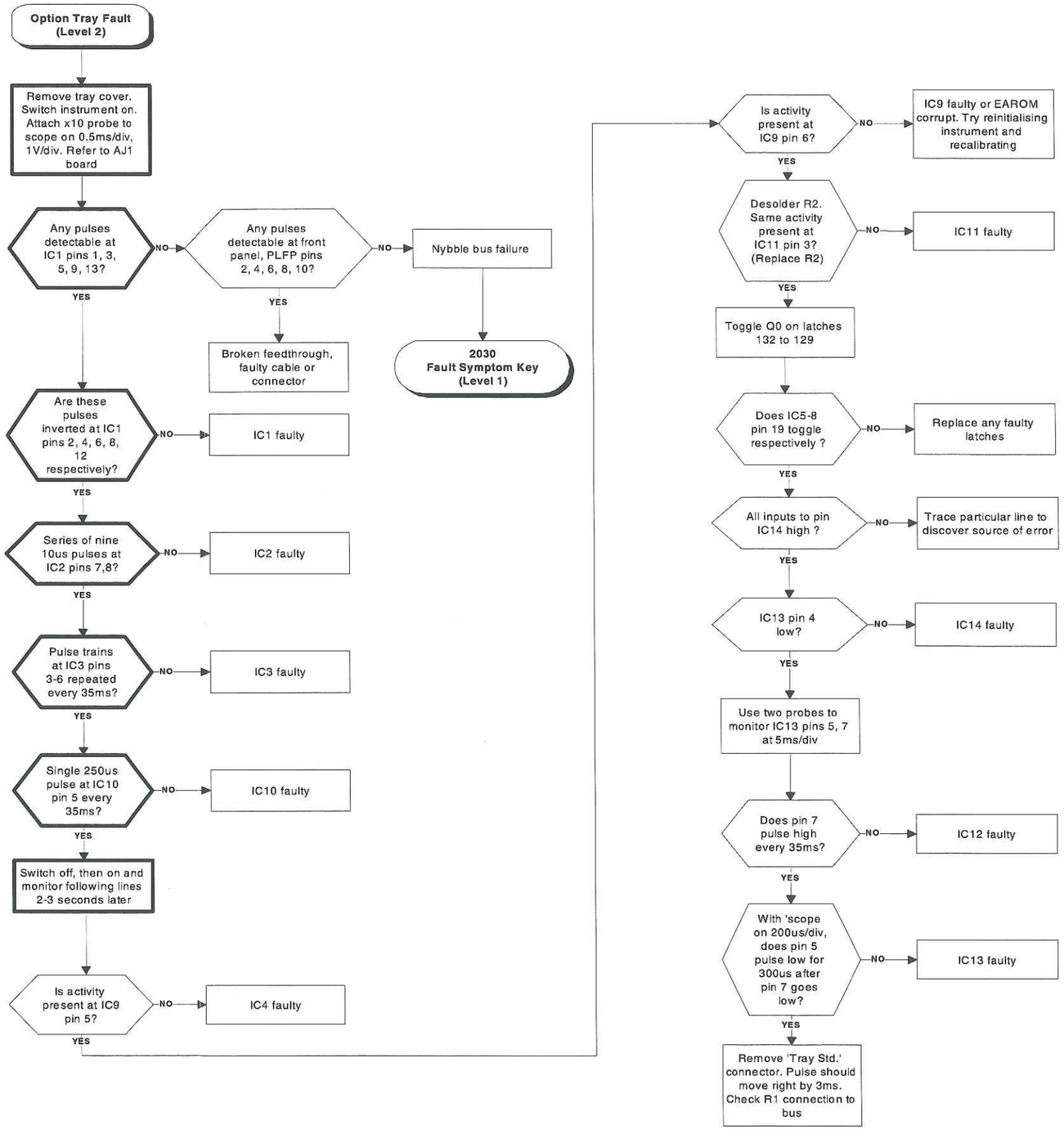
RF Option Tray Fault (Level 2) (Contd.)

Note 4
Pulse generator: 0/5 V into 50 Ω, 10 kHz square wave.
Instrument: Recall default setting: [MEM] 50 [enter].
Option 10: [UTIL], *[Mod'n Mode]*, *[Avionics Modes]*, *[DME]*, [SIG GEN], *[DME Config.]*, *[Trigger Mode]*.
Option 9: [UTIL], *[Pulse Gen.]*, *Rate* 10 µs, *Width* 2 µs, *Delay* 5 µs, *[Trigger Mode]*.
Oscilloscope: 1 V/div, 1 µs/div, DC coupled, 50 Ω inputs preferred.
Connect SYNC and VIDEO outputs to channels A and B of oscilloscope.
Connect pulse generator output to PULSE INPUT.

Note 5
Connect 10 kHz square-wave pulse gen capable of +5 V into 50 Ω to PULSE INPUT.
Set instrument to external trigger using either pulse or DME configuration menus.
Check that adjusting external pulse frequency caused the SYNC and VIDEO signals to change accordingly.
Also check that PULSE INPUT has input impedance of approximately 50 Ω with instrument switched off.

RF Option Tray Fault (Level 2) (Contd.)

Interface Fault (Level 3)



Interface Fault (Level 3)

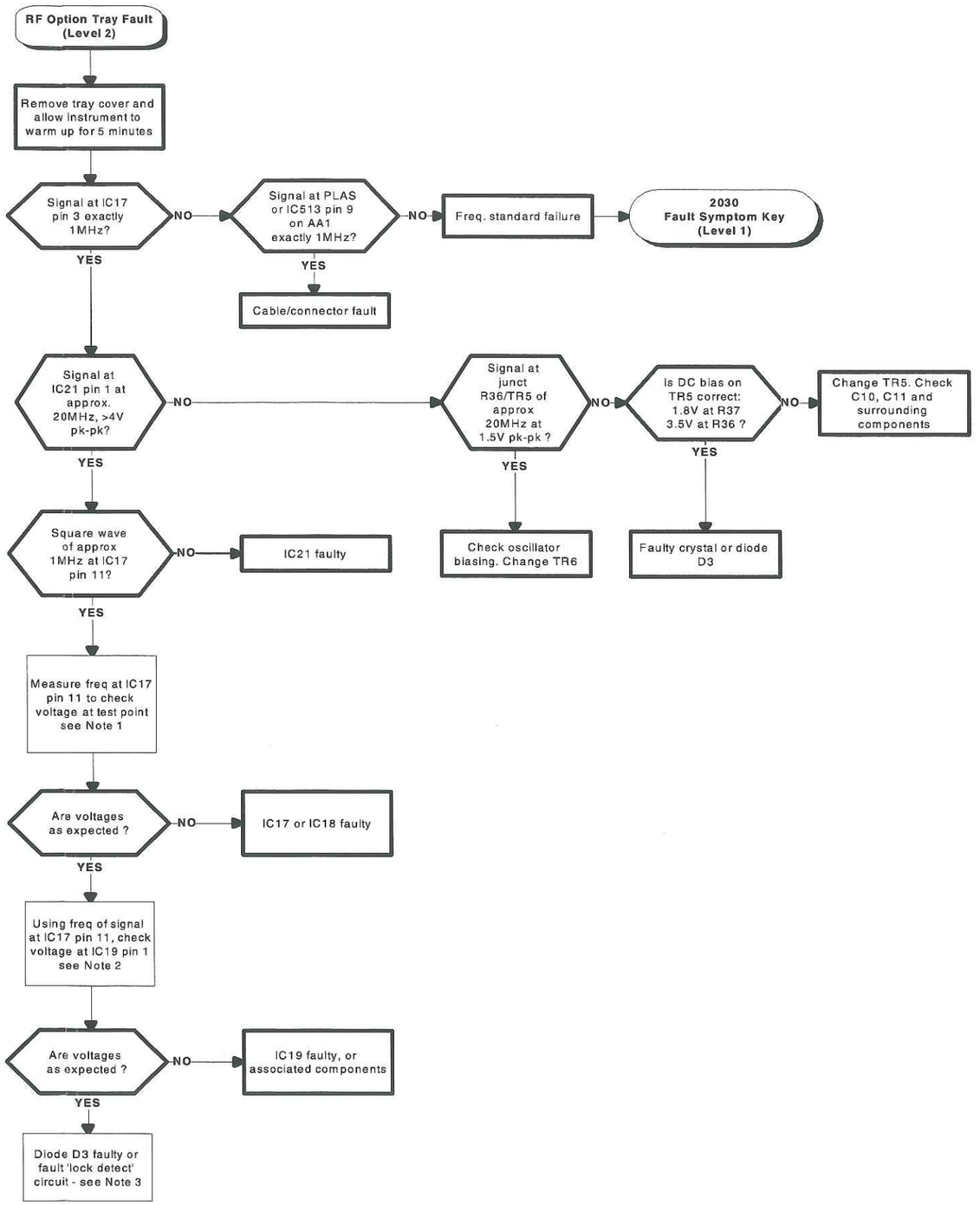
20 MHz Clock Fault (Level 3)

Note 1
Test points: IC17 pin 6, IC17 pin 8, IC18 pin 6.
If freq <1 MHz: * approximately 2.5 V, 0 V, 0 V.
If freq >1 MHz: 0 V, * approximately 2.5 V, 5 V.

* When probed using a scope, these points should appear as a rapidly moving square pulse train. If the freq is exactly 1 MHz, the clock is locked and a steady square pulse train is shown.

Note 2
Test point: IC19 pin 1.
If freq <1 MHz, 3.7 V.
If freq >1 MHz, 0 V.
If freq =1 MHz, 0.6 to 3.6 V.

Note 3
Check that IC20 pin 2 is 0.6 ± 0.1 V.
Check that IC20 pin 5 is 3.6 ± 0.1 V.
If locked, IC20 pin 1 is approximately 5 V and IC13 pin 14 approximately 4 V.
If not locked IC20 pins 1 and 14 are at 0 V.
If any of these conditions is not true, IC20 or TR7 faulty.

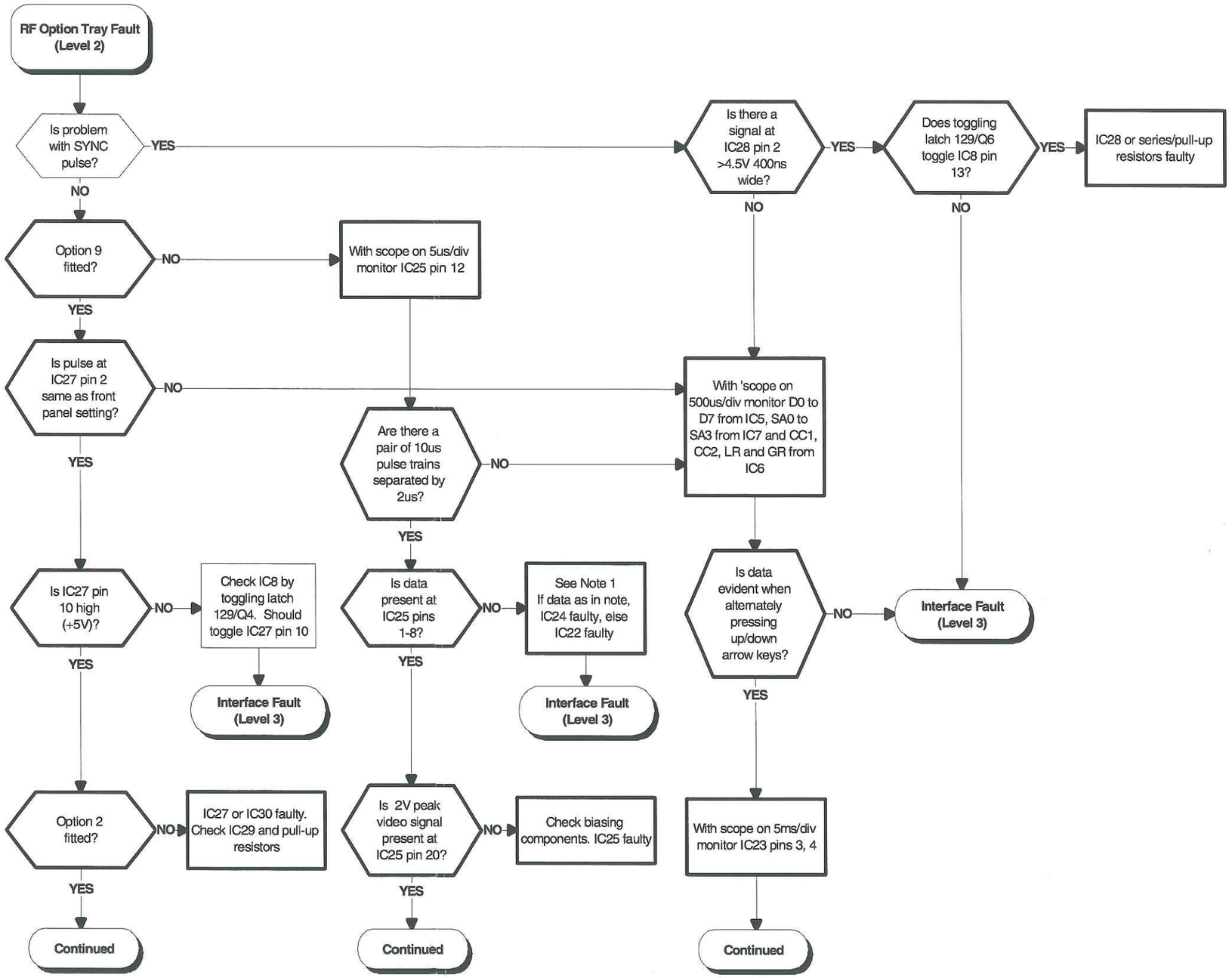


20 MHz Clock Fault (Level 3)

Generator Board Fault (Level 3)

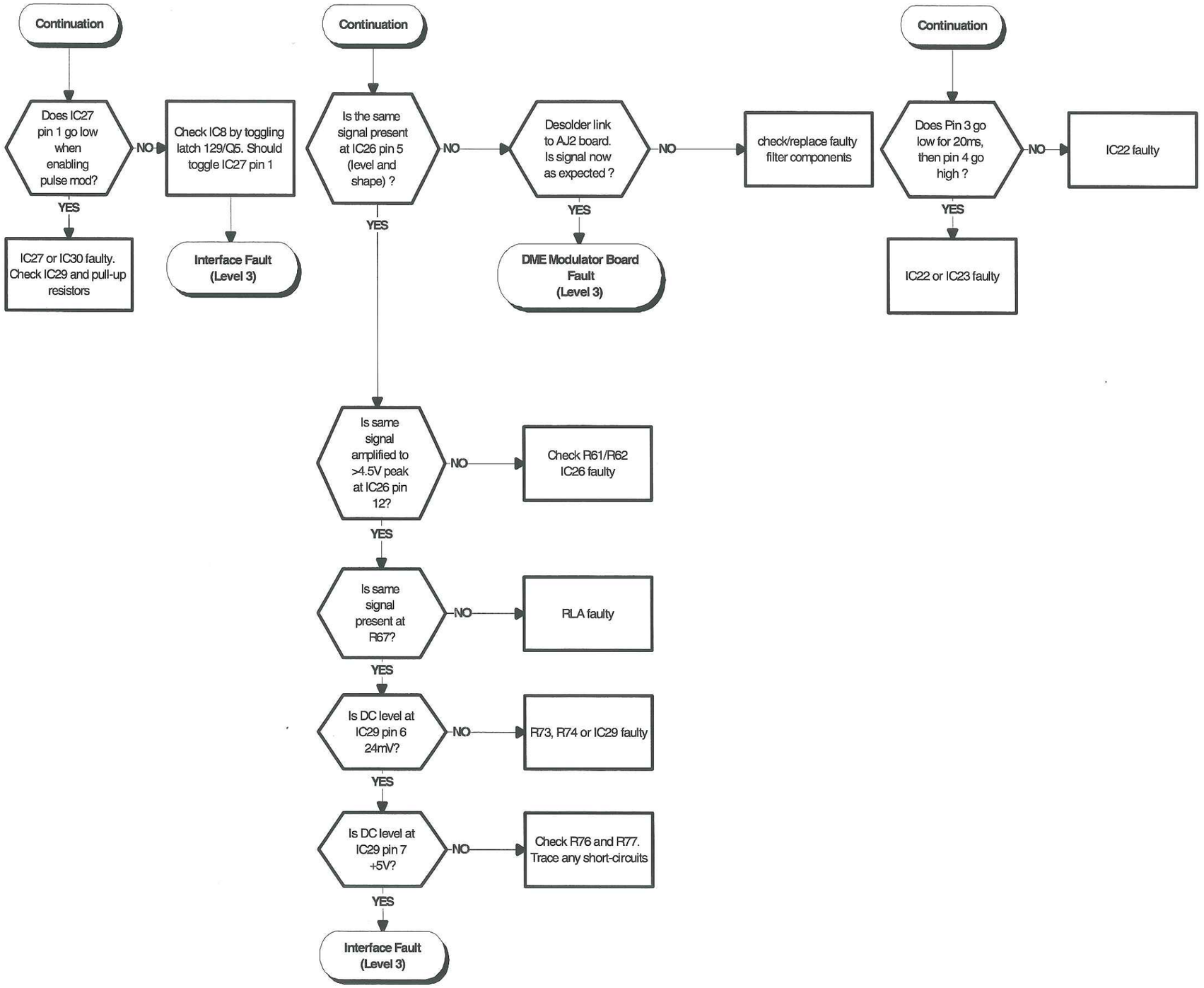
Note 1
Set scope to 500 µs/div. Whilst in DME configuration menu press the up/down arrow keys and monitor:-

IC24 pin 2 for 0.5 s clock pulse.
IC24 data lines for pulses during clock period.
IC24 pin 18 for continuous pairs of burst data.
IC24 pin 26 for a single 50 ns pulse at start of each pair.



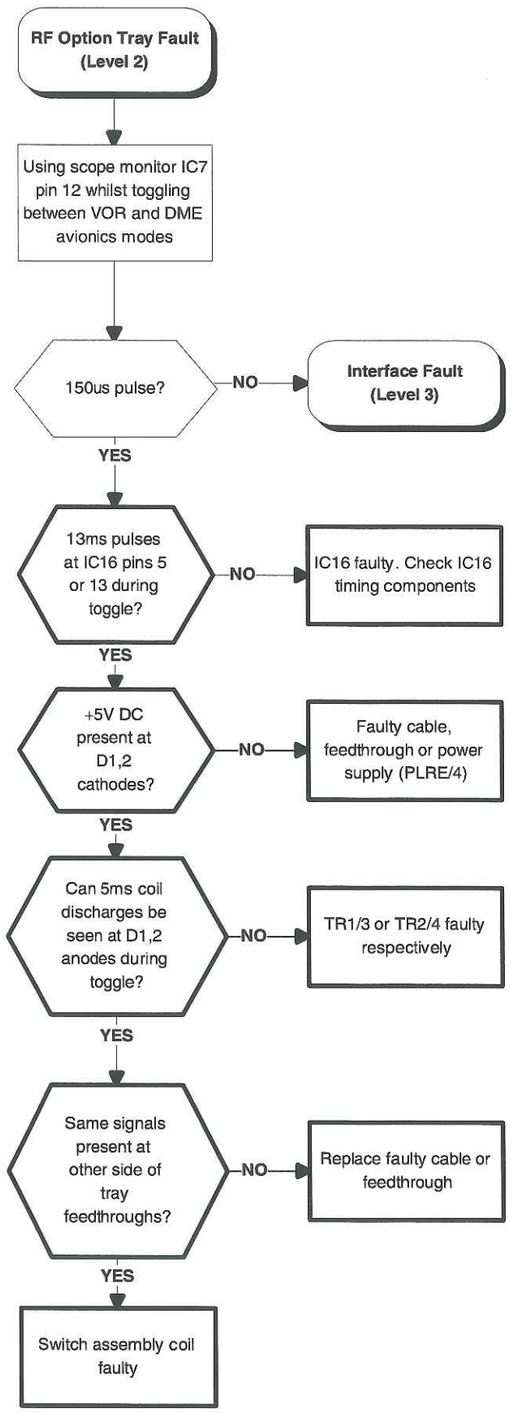
Generator Board Fault (Level 3)

Generator Board Fault (Level 3) (Contd.)



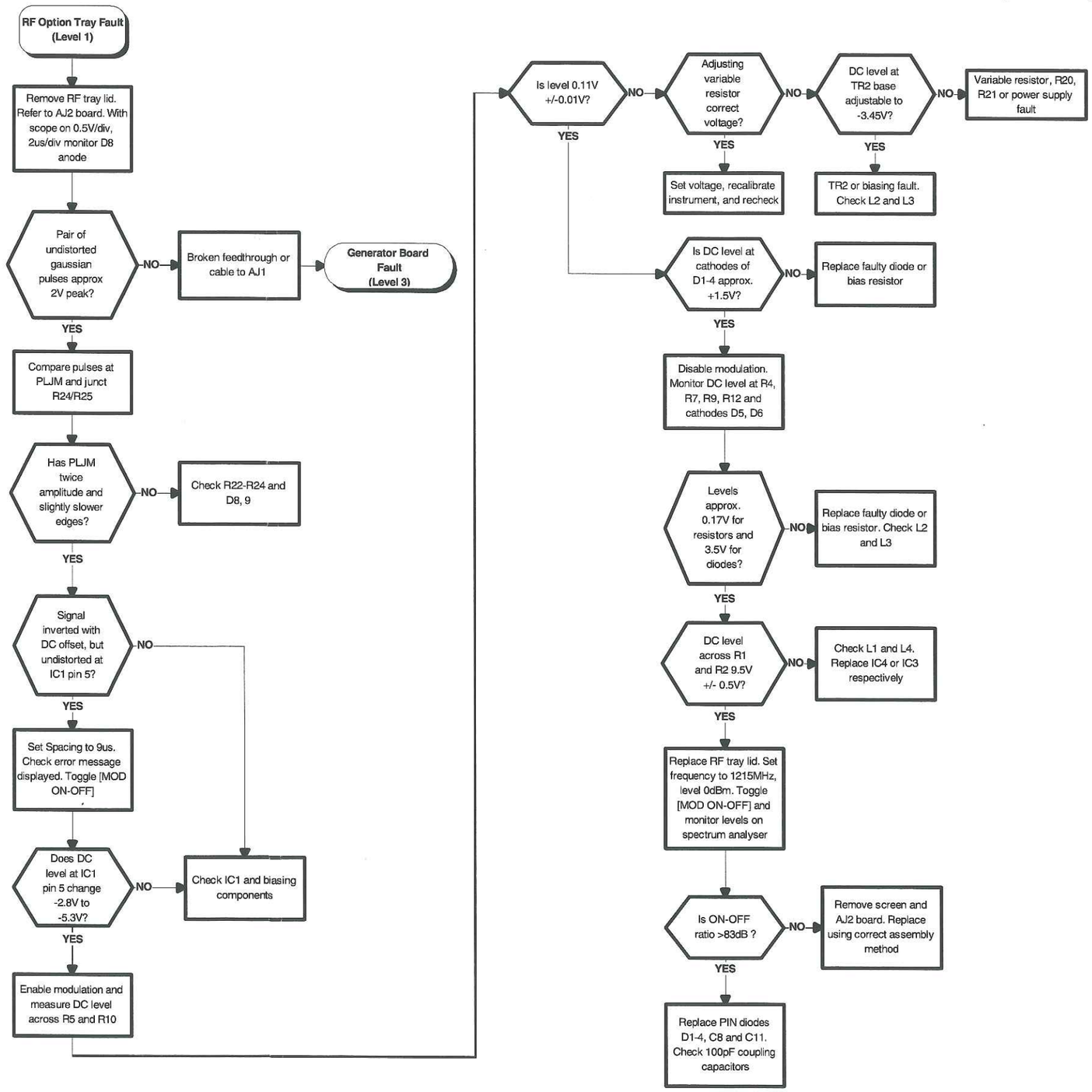
Generator Board Fault (Level 3) (Contd.)

RF Switch Fault (Level 3)



RF Switch Fault (Level 3)

DME Modulator Board Fault (Level 3)



DME Modulator Board Fault (Level 3)

REPLACEABLE PARTS

The components used to make the Option 009 and Option 010 and the combined Options 009 and 010 versions of the instrument are given below. These components are additional to those given in Chap. 6 in the main body of the manual.

A12 Option 009 common parts

Issue 1

Refer to Fig. C-4 Interconnection diagram

When ordering, prefix circuit reference with A12.

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	43137/947	WIRE-LEAD-CRIMPED 6 WIRE, 7/0.2mm, CRIMP HOUSING **TO PLRE ON POWER SUPPLY**	MARCONI INSTRUMENTS LTD	
	43130/884	WIRE-LEAD-CRIMPED 1 WIRE, 7/0.2mm, CRIMP HOUSING **1 MHZ TO PLAS**	MARCONI INSTRUMENTS LTD	
	43137/956	RIBBON-LEAD 10 WAY, SOCKET 10 WAY, UNTERMINATED **TO FRONT PANEL NYBBLE BUS**	MARCONI INSTRUMENTS LTD	
	43137/959	RIBBON-LEAD 20 WAY, SOCKET 20 WAY, KEY POS 7& 15 **AE1, PLJB TO FEEDTHROUGHS**	MARCONI INSTRUMENTS LTD	
	43137/377	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **TRAY STD TO RF TRAY**	MARCONI INSTRUMENTS LTD	
	43137/377	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **PULSE OUT TO RF TRAY**	MARCONI INSTRUMENTS LTD	
	43137/847	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **EXT TRIG TO PULSE INPUT**	MARCONI INSTRUMENTS LTD	
	43137/847	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **SYNC OUT TO R PANEL**	MARCONI INSTRUMENTS LTD	
	43137/847	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **VIDEO OUT TO R PANEL**	MARCONI INSTRUMENTS LTD	
	43138/704	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **EXT TRIG TO AJ1**	MARCONI INSTRUMENTS LTD	
	43138/704	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **TRAY STD TO AJ1**	MARCONI INSTRUMENTS LTD	
	43138/704	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **PULSE OUT TO AJ1**	MARCONI INSTRUMENTS LTD	
	43138/704	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **VIDEO OUT TO AJ1**	MARCONI INSTRUMENTS LTD	
	43138/704	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **SYNC OUT TO AJ1**	MARCONI INSTRUMENTS LTD	
	44531/158	IC-PROGRAMMED PROM NON-ERASABLE, SET OF 1, **IC23 ON AJ1**	MARCONI INSTRUMENTS LTD	
	44533/442	IC-PROGRAMMED EPROM, SET OF 3, OPTION 5, 9 **IC12 ON AF2 & IC109, 111 ON AA1/3**	MARCONI INSTRUMENTS LTD	

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
A12	**Option 009 common parts (contd.)**			
	44830/082	PCB-ASSEMBLY MIXED TECHNOLOGY, 2030, AJ1, PULSE GENERATOR	MARCONI INSTRUMENTS LTD	
	23444/331	CONNECTOR-RF SMB-TYPE MALE, RECEPTACLE, 50 OHMS **RF TRAY 1 MHZ STD**	ITT CANNON (UK)	051-045-0000-910
	23435/120	CONNECTOR-MULTIWAY, PCB HEADER, 36 WAY, RIGHT PLRE, POWER SUPPLY	ITT CANNON (UK)	051-075-0000-910
	23444/302	CONNECTOR-RF ADAPTOR, 50 OHMS SMB MALE TO MALE **EXT TRIG**	ITT CANNON (UK)	051-075-0000-910
	23444/302	CONNECTOR-RF ADAPTOR, 50 OHMS SMB MALE TO MALE **TRAY STD**	ITT CANNON (UK)	051-075-0000-910
	23444/302	CONNECTOR-RF ADAPTOR, 50 OHMS SMB MALE TO MALE **PULSE OUT**	ITT CANNON (UK)	051-075-0000-910
	23444/302	CONNECTOR-RF ADAPTOR, 50 OHMS SMB MALE TO MALE **VIDEO OUT**	ITT CANNON (UK)	051-075-0000-910
	23444/302	CONNECTOR-RF ADAPTOR, 50 OHMS SMB MALE TO MALE **SYNC OUT**	ITT CANNON (UK)	051-075-0000-910
	26373/714 1 of 11	CAPACITOR FIXED CERAMIC 1nF -20/+80% 500V K2600 FEED-THROUGH, SCREW-IN MOUNTING, 2BA THREAD	MIDLAND CAPACITORS	361/K2600-1000pF
	11880/207	GASKET-RF CORED-KNITTED-WIRE, TWO LAYERS TIN-COPPER-STEEL, 3/40/57% WIRE, OVER NEOPRENE	TECKNIT EUROPE LTD	21-43186

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number

A13 Option 010 common parts

Issue 5

Refer to Fig. C-5 Interconnection diagram

When ordering, prefix circuit reference with A13.

43137/947	WIRE-LEAD-CRIMPED 6 WIRE, 7/0.2mm, CRIMP HOUSING **TO PLRE ON POWER SUPPLY**	MARCONI INSTRUMENTS LTD
43130/884	WIRE-LEAD-CRIMPED 1 WIRE, 7/0.2mm, CRIMP HOUSING **1 MHZ TO PLAS**	MARCONI INSTRUMENTS LTD
43137/948	RIBBON-LEAD 10 WAY, SOCKET 10 WAY, KEY POS 9 **BYPASS SWITCH TO OPTION TRAY**	MARCONI INSTRUMENTS LTD
43137/956	RIBBON-LEAD 10 WAY, SOCKET 10 WAY, UNTERMINATED **TO FRONT PANEL NYBBLE BUS**	MARCONI INSTRUMENTS LTD
43137/959	RIBBON-LEAD 20 WAY, SOCKET 20 WAY, KEY POS 7& 15 **AJ1, PLJB TO FEEDTHROUGHS**	MARCONI INSTRUMENTS LTD
43138/706	RIBBON-LEAD 10 WAY, SOCKET 10 WAY, KEY POS 7 **PLJP TO RF SCREEN**	MARCONI INSTRUMENTS LTD
43138/706	RIBBON-LEAD 10 WAY, SOCKET 10 WAY, KEY POS 7 **PLJP, AJ2 TO RF SCREEN**	MARCONI INSTRUMENTS LTD
43137/951	RF-CABLE-SEMI-RIGID UT141, 50 OHMS, SMA MALE **RF SWITCH TO RF TRAY**	MARCONI INSTRUMENTS LTD
43137/952	RF-CABLE-SEMI-RIGID UT85, 50 OHMS, SMA MALE **AJ2, RF OUT TO RF SWITCH**	MARCONI INSTRUMENTS LTD
43137/952	RF-CABLE-SEMI-RIGID UT85, 50 OHMS, SMA MALE **AJ2, RF IN TO RF SWITCH**	MARCONI INSTRUMENTS LTD
43137/953	RF-CABLE-SEMI-RIGID UT85, 50 OHMS, SMA MALE **RF SWITCH TO ATTEN**	MARCONI INSTRUMENTS LTD
43137/377	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **TRAY STD TO RF TRAY**	MARCONI INSTRUMENTS LTD
43137/847	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **EXT TRIG TO PULSE INPUT**	MARCONI INSTRUMENTS LTD
43137/847	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **SYNC OUT TO R PANEL**	MARCONI INSTRUMENTS LTD
43137/847	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **VIDEO OUT TO R PANEL**	MARCONI INSTRUMENTS LTD
43138/704	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **EXT TRIG TO AJ1**	MARCONI INSTRUMENTS LTD
43138/704	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **TRAY STD TO AJ1**	MARCONI INSTRUMENTS LTD
43138/704	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **VIDEO OUT TO AJ1**	MARCONI INSTRUMENTS LTD
43138/704	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **SYNC OUT TO AJ1**	MARCONI INSTRUMENTS LTD
44338/157	2 WAY SWITCH 2030 GSM	MARCONI INSTRUMENTS LTD
44531/158	IC-PROGRAMMED PROM NON-ERASABLE, SET OF 1,	MARCONI INSTRUMENTS LTD
44533/442	IC-PROGRAMMED EPROM, SET OF 3, OPTIONS 5, 9	MARCONI INSTRUMENTS LTD

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
A13	**Option 010 common parts (contd.)**			
	44830/082	PCB-ASSEMBLY MIXED TECHNOLOGY, 2030, AJ1, PULSE GENERATOR	MARCONI INSTRUMENTS LTD	
	44830/083	PCB-ASSEMBLY SURFACE MOUNT, 2030, AJ2 DME MODULATOR	MARCONI INSTRUMENTS LTD	
	23444/512	CONNECTOR-RF SMA-TYPE FEMALE, JACK, 50 OHMS **RF IN**	ITT CANNON (UK)	050-645-9039-890
	23444/512	CONNECTOR-RF SMA-TYPE FEMALE, JACK, 50 OHMS **RF OUT**	ITT CANNON (UK)	050-645-9039-890
	23444/331	CONNECTOR-RF SMB-TYPE MALE, RECEPTACLE, 50 OHMS **RF TRAY: 1 MHZ STD**	ITT CANNON (UK)	051-045-0000-910
	23435/120	CONNECTOR-MULTIWAY, PCB HEADER, 36 WAY, RIGHT **PLRE, POWER SUPPLY**	ITT CANNON (UK)	051-075-0000-910
	23444/302	CONNECTOR-RF ADAPTOR, 50 OHMS SMB MALE TO MALE **EXT TRIG**	ITT CANNON (UK)	051-075-0000-910
	23444/302	CONNECTOR-RF ADAPTOR, 50 OHMS SMB MALE TO MALE **TRAY STD**	ITT CANNON (UK)	051-075-0000-910
	23444/302	CONNECTOR-RF ADAPTOR, 50 OHMS SMB MALE TO MALE **VIDEO OUT**	ITT CANNON (UK)	051-075-0000-910
	23444/302	CONNECTOR-RF ADAPTOR, 50 OHMS SMB MALE TO MALE **SYNC OUT**	ITT CANNON (UK)	051-075-0000-910
	26373/714 1 of 13	CAPACITOR FIXED CERAMIC 1nF -20/+80% 500V K2600 FEED-THROUGH, SCREW-IN MOUNTING, 2BA THREAD WITH	MIDLAND CAPACITORS	361/K2600-1000pF
	26373/733 1 of 3	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
	26333/228	CAPACITOR-FIXED CERAMIC 10pF +/-10% 300V NP0 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	MARCONI INSTRUMENTS LTD	
	11880/207	GASKET-RF CORED-KNITTED-WIRE, TWO LAYERS TIN-COPPER-STEEL, 3/40/57% WIRE, OVER NEOPRENE OR	TECKNIT EUROPE LTD	21-43186
	13860/105	GASKET-RF LINEAR-FINGER-STRIP, SINGLE-EDGED, BERYLLIUM COPPER, BRIGHT, 0.004inTHK, 0.58in WDE,	INSTRUMENT SPECIALIT	0097-0500-02 (24")
	13860/101	GASKET-RF LINEAR-FINGER-STRIP, DOUBLE-EDGED, BERYLLIUM COPPER, BRIGHT FINISH, 0.004in THK, 0.94	INSTRUMENT SPECIALIT	OC97-0436-21 (25ft)

A14 Combined Options 009 & 010 common parts

Issue 5

Refer to Fig. C-4 Interconnection diagram

When ordering, prefix circuit reference with A14.

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	43137/947	WIRE-LEAD-CRIMPED 6 WIRE, 7/0.2mm, CRIMP HOUSING **TO PLRE ON POWER SUPPLY**	MARCONI INSTRUMENTS LTD	
	43130/884	WIRE-LEAD-CRIMPED 1 WIRE, 7/0.2mm, CRIMP HOUSING **1 MHZ TO PLAS**	MARCONI INSTRUMENTS LTD	
	43137/948	RIBBON-LEAD 10 WAY, SOCKET 10 WAY, KEY POS 9 **RF SWITCH TO OPTION TRAY**	MARCONI INSTRUMENTS LTD	
	43137/956	RIBBON-LEAD 10 WAY, SOCKET 10 WAY, UNTERMINATED **TO FRONT PANEL NYBBLE BUS**	MARCONI INSTRUMENTS LTD	
	43137/959	RIBBON-LEAD 20 WAY, SOCKET 20 WAY, KEY POS 7 & 15 **AJ1, PLJB TO FEEDTHROUGHS**	MARCONI INSTRUMENTS LTD	
	43138/706	RIBBON-LEAD 10 WAY, SOCKET 10 WAY, KEY POS 7 **PLJC, AJ1 TO RF SCREEN**	MARCONI INSTRUMENTS LTD	
	43138/706	RIBBON-LEAD 10 WAY, SOCKET 10 WAY, KEY POS 7 **PLJP, AJ2 TO RF SCREEN**	MARCONI INSTRUMENTS LTD	
	43137/951	RF-CABLE-SEMI-RIGID UT141, 50 OHMS, SMA MALE **RF SWITCH TO RF TRAY**	MARCONI INSTRUMENTS LTD	
	43137/952	RF-CABLE-SEMI-RIGID UT85, 50 OHMS, SMA MALE **AJ2, RF OUT TO RF SWITCH**	MARCONI INSTRUMENTS LTD	
	43137/952	RF-CABLE-SEMI-RIGID UT85, 50 OHMS, SMA MALE **AJ2, RF IN TO RF SWITCH**	MARCONI INSTRUMENTS LTD	
	43137/953	RF-CABLE-SEMI-RIGID UT85, 50 OHMS, SMA MALE **RF SWITCH TO ATTEN**	MARCONI INSTRUMENTS LTD	
	43137/377	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **TRAY STD TO RF TRAY**	MARCONI INSTRUMENTS LTD	
	43137/377	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **PULSE OUT TO RF TRAY**	MARCONI INSTRUMENTS LTD	
	43137/847	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **EXT TRIG TO PULSE INPUT**	MARCONI INSTRUMENTS LTD	
	43137/847	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **SYNC OUT TO R PANEL**	MARCONI INSTRUMENTS LTD	
	43137/847	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **VIDEO OUT TO R PANEL**	MARCONI INSTRUMENTS LTD	
	43138/704	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **EXT TRIG TO AJ1**	MARCONI INSTRUMENTS LTD	
	43138/704	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **TRAY STD TO AJ1**	MARCONI INSTRUMENTS LTD	
	43138/704	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **VIDEO OUT TO AJ1**	MARCONI INSTRUMENTS LTD	
	43138/704	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **SYNC OUT TO AJ1**	MARCONI INSTRUMENTS LTD	
	43138/704	RF-CABLE-FLEXIBLE RG178B/U, 50 OHMS, SMB FEMALE **PULSE OUT TO AJ1**	MARCONI INSTRUMENTS LTD	

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
A14		**Combined Option 009 & Option 010 common parts (contd.)**		
	44338/157	2 WAY SWITCH 2030 GSM	MARCONI INSTRUMENTS LTD	
	44531/158	IC-PROGRAMMED PROM NON-ERASABLE, SET OF 1,	MARCONI INSTRUMENTS LTD	
	44533/442	IC-PROGRAMMED EPROM, SET OF 3, OPTION 5, 9	MARCONI INSTRUMENTS LTD	
	44830/082	PCB-ASSEMBLY MIXED TECHNOLOGY, 2030, AJ1, PULSE GENERATOR	MARCONI INSTRUMENTS LTD	
	44830/083	PCB-ASSEMBLY SURFACE MOUNT, 2030, AJ2 DME MODULATOR	MARCONI INSTRUMENTS LTD	
	23444/512	CONNECTOR-RF SMA-TYPE FEMALE, JACK, 50 OHMS **RF IN**	ITT CANNON (UK)	050-645-9039-890
	23444/512	CONNECTOR-RF SMA-TYPE FEMALE, JACK, 50 OHMS **RF OUT**	ITT CANNON (UK)	050-645-9039-890
	23444/331	CONNECTOR-RF SMB-TYPE MALE, RECEPTACLE, 50 OHMS **RF TRAY: 1 MHZ STD**	ITT CANNON (UK)	051-045-0000-910
	23435/120	CONNECTOR-MULTIWAY, PCB HEADER, 36 WAY, RIGHT **PLRE, POWER SUPPLY**	ITT CANNON (UK)	051-075-0000-910
	23444/302	CONNECTOR-RF ADAPTOR, 50 OHMS SMB MALE TO MALE **EXT TRIG**	ITT CANNON (UK)	051-075-0000-910
	23444/302	CONNECTOR-RF ADAPTOR, 50 OHMS SMB MALE TO MALE **TRAY STD**	ITT CANNON (UK)	051-075-0000-910
	23444/302	CONNECTOR-RF ADAPTOR, 50 OHMS SMB MALE TO MALE **VIDEO OUT**	ITT CANNON (UK)	051-075-0000-910
	23444/302	CONNECTOR-RF ADAPTOR, 50 OHMS SMB MALE TO MALE **SYNC OUT**	ITT CANNON (UK)	051-075-0000-910
	23444/302	CONNECTOR-RF ADAPTOR, 50 OHMS SMB MALE TO MALE **PULSE OUT**	ITT CANNON (UK)	051-075-0000-910
	26373/714 1 of 13	CAPACITOR FIXED CERAMIC 1nF -20/+80% 500V K2600 FEED-THROUGH, SCREW-IN MOUNTING, 2BA THREAD WITH	MIDLAND CAPACITORS	361/K2600-1000pF
	26373/733 1 of 3	CAPACITOR-FIXED CERAMIC 1nF -20/+80% 300V K3000 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	FERROPERM UK LTD	1NF138,24XXX-94467/1
	26333/228	CAPACITOR-FIXED CERAMIC 10pF +/-10% 300V NP0 FEED-THROUGH, SOLDER-IN MOUNTING, 3.9mm MOUNTING	MARCONI INSTRUMENTS LTD	
	11880/207	GASKET-RF CORED-KNITTED-WIRE, TWO LAYERS TIN-COPPER-STEEL, 3/40/57% WIRE, OVER NEOPRENE OR	TECKNIT EUROPE LTD	21-43186
	13860/105	GASKET-RF LINEAR-FINGER-STRIP, SINGLE-EDGED, BERYLLIUM COPPER, BRIGHT, 0.004inTHK, 0.58in WDE,	INSTRUMENT SPECIALIT	0097-0500-02 (24")
	13860/101	GASKET-RF LINEAR-FINGER-STRIP, DOUBLE-EDGED, BERYLLIUM COPPER, BRIGHT FINISH, 0.004in THK, 0.94	INSTRUMENT SPECIALIT	OC97-0436-21 (25ft)

AJ1 Pulse generator

Issue 4

When ordering, prefix circuit reference with AJ1.

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	44830-082	Complete unit		
C1	26451/013	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 10.3 x 10.3mm,	PANASONIC INDUSTRIAL	ECE-V-1V-A-101-P
C2	26451/013	CAPACITOR-FIXED ALUMINIUM 100uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 10.3 x 10.3mm,	PANASONIC INDUSTRIAL	ECE-V-1V-A-101-P
C3	26451/014	CAPACITOR-FIXED ALUMINIUM 220uF +/-20% 16V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 10.3 x 10.3mm,	PANASONIC INDUSTRIAL	ECE-V-1E-A-221-P
C4 to C7	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C8	26386/760	CAPACITOR-FIXED CERAMIC 220nF +/-10% 50V X7R MULTILAYER, SURFACE-MOUNTED, SIZE 1210, NICKEL	PHILIPS	1210-2R-224-K9-BBC
C9	26386/823	CAPACITOR-FIXED CERAMIC 82pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-820-JP
C10	26386/825	CAPACITOR-FIXED CERAMIC 120pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-121-JP
C11	26386/825	CAPACITOR-FIXED CERAMIC 120pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-121-JP
C12	26386/863	CAPACITOR-FIXED CERAMIC 1nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-102-KP
C13	26386/825	CAPACITOR-FIXED CERAMIC 120pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-121-JP
C14	26386/821	CAPACITOR-FIXED CERAMIC 56pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-560-JP
C15	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-220-JP
C16 to C35	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C36 to C44	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C45	26451/002	CAPACITOR-FIXED ALUMINIUM 4.7uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 4.3 x 4.3mm,	PANASONIC INDUSTRIAL	ECE-V-1VA-4R7R
C46	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C47	26451/002	CAPACITOR-FIXED ALUMINIUM 4.7uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 4.3 x 4.3mm,	PANASONIC INDUSTRIAL	ECE-V-1VA-4R7R
C48	26386/899	CAPACITOR-FIXED CERAMIC 100nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 1206, NICKEL	ROHM ELECTRONICS LTD	MCH31-5C-104-KP
C49 to C52	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C60	26451/006	CAPACITOR-FIXED ALUMINIUM 22uF +/-20% 16V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 5.3 x 5.3mm,	RUBYCON CAPACITORS	16-REV-22
C61	26451/006	CAPACITOR-FIXED ALUMINIUM 22uF +/-20% 16V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 5.3 x 5.3mm,	RUBYCON CAPACITORS	16-REV-22
D1	28383/936	DIODE SMALL-SIGNAL, SCHOTTKY, LL103B... 300mW 30V 1A 0.7Vf @ 500mA, SURFACE MOUNTED, MINI-MELF, (8mm	SGS-THOMSON	TMMBAT48

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
AJ1	**Pulse generator (contd.)**			
D2	28383/936	DIODE SMALL-SIGNAL, SCHOTTKY, LL103B... 300mW 30V 1A 0.7Vf @ 500mA, SURFACE MOUNTED, MINI-MELF, (8mm	SGS-THOMSON	TMMBAT48
D3	28381/341	DIODE VARIABLE CAPACITNCE, BBY40... 350mW 28V 20mA 4.3pF @ 25V, CAPAC RATIO 5.0 MIN, MARKING CODE S2,	PHILIPS	BBY40
D4	28383/909	DIODE SMALL-SIGNAL, SCHOTTKY, HSMS-2822... DUAL, 8V 1pF 340mVf @ 1mA, IN SERIES, MARKING CODE C2,	HEWLETT-PACKARD	HSMS-2822-L31
D5	28383/903	DIODE SMALL-SIGNAL, BAV99... DUAL, 70V 100mA 1.1Vf @ 50mA, IN SERIES, MARKING CODE A7, SURFACE	PHILIPS	BAV99 (A7)
IC1	28469/032	IC-DIGITAL INVERTER 74HC14... HEX, SCHMITT-TRIGGER OPERATION, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC14D
IC2	28465/068	IC-DIGITAL DECODER/DEMULTIPLEX 74HC4515... SINGLE, 4 TO 16 LINE, INVERTING, CMOS-H/SPEED, 24 PIN,	PHILIPS	74HC4515D
IC3	28462/166	IC-DIGITAL FLIP-FLOP/D-TYPE 74HCT173... QUAD, POS EDGE TRIGGER, TRI-STATE, CMOS-H/SPEED+TTL, 16 PIN,	PHILIPS	74HCT173D
IC4	28462/166	IC-DIGITAL FLIP-FLOP/D-TYPE 74HCT173... QUAD, POS EDGE TRIGGER, TRI-STATE, CMOS-H/SPEED+TTL, 16 PIN,	PHILIPS	74HCT173D
IC5 to IC8	28469/553	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC574... OCTAL, TRI-STATE, NON-INVERTING, POS EDGE TRIGGER,	PHILIPS	74HC574D
IC9	28471/036	IC-MICRO EEPROM, 64 x 16 BIT, 93C46... 5V SUPPLY, SINGLE READ MODE, CMOS, 8 PIN, SMALL-OUTLINE.	NAT. SEMICONDUCTOR	NM93C46TM8
IC10	28462/638	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-H/SPEED,	PHILIPS	74HC74D
IC11	28469/063	IC-DIGITAL BUFFER/LINE-DRIVER 74HC125... QUAD, TRI-STATE, LOW ENABLE, CMOS-H/SPEED, 14 PIN,	PHILIPS	74HC125D
IC12	28462/166	IC-DIGITAL FLIP-FLOP/D-TYPE 74HCT173... QUAD, POS EDGE TRIGGER, TRI-STATE, CMOS-H/SPEED+TTL, 16 PIN,	PHILIPS	74HCT173D
IC13	28469/775	IC-DIGITAL MULTIPLEXER 74HC251... 8 INPUT, 1 BIT, SINGLE, TRI-STATE, CMOS-H/SPEED, 16 PIN,	PHILIPS	74HC251D
IC14	28466/600	IC-DIGITAL NAND-GATE 74HC30... 8 INPUT, SINGLE, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC30D
IC16	28468/321	IC-DIGITAL FLIP-FLOP/MONOSTABLE 74HC123... DUAL, RETRIGGERABLE, tW = 0.45RC, WITH RESET,	PHILIPS	74HC123D
IC17	28462/638	IC-DIGITAL FLIP-FLOP/D-TYPE 74HC74... 2 BIT, DUAL, POS EDGE TRIGGER, PLUS SET & CLEAR, CMOS-H/SPEED,	PHILIPS	74HC74D
IC18	28466/390	IC-DIGITAL NAND-GATE 74HC00... 2 INPUT, QUAD, CMOS-H/SPEED, 14 PIN, SMALL-OUTLINE.	PHILIPS	74HC00D
IC19	28461/469	IC-ANALOGUE OPERATIONAL AMP LM358... DUAL, 32V 1MHz BANDWIDTH, INPUT VOLTAGE RANGE 0 TO Vcc	PHILIPS	LM358D
IC20	28461/613	IC-ANALOGUE COMPARATOR LM393... DUAL, 36V 800uA I/P-OFFSET 5.0mV MAX, RESPONSE TIME 1.3 uS TYP,	PHILIPS	LM393D
IC21	28469/543	IC-DIGITAL COUNTER 74HC390... 4 BIT, DUAL, DECADE RIPPLE, CMOS-H/SPEED, 16 PIN, SMALL-OUTLINE.	PHILIPS	74HC390D
IC22	28469/631	IC-DIGITAL FIELDPROG-GATE-ARRAY XC3142... 4200 GATES, 144 LOGIC BLOCKS, 74 INPUT/OUTPUTS, ZERO	XILINX (USA)	XC3142A-3PC84C
IC23	44531/158	IC-PROGRAMMED PROM NON-ERASABLE, SET OF 1, 2030, OPTIONS 9 & 10, AJ1 FPGA CODE.		
IC24	28469/632	IC-DIGITAL REGISTER 7201... 9 BIT, SINGLE, FIFO 512 WORD, ASYNCHRONOUS & SIMULTANEOUS MODE, 25nS	ADVANCED MICRO DEV	AM7201-25JC
IC25	28461/052	IC-ANALOGUE D/A-CONVERTER 1171... 5V 8 BIT, 40 MSPS, DIFF-LIN ERROR +/-0.25LSB, SETTLING TIME	HARRIS SEMICONDUCTOR	HI1171JCB

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
AJ1	**Pulse generator (contd.)**			
IC26	28461/468	IC-ANALOGUE OPERATIONAL AMP AD811... 18V 2500V/uS SLEW RATE, 140MHz BANDWIDTH, -74dBc THD @ 10MHz,	ANALOG DEVICES LTD	AD811AR-16
IC27	28469/063	IC-DIGITAL BUFFER/LINE-DRIVER 74HC125... QUAD, TRI-STATE, LOW ENABLE, CMOS-H/SPEED, 14 PIN,	PHILIPS	74HC125D
IC28	28469/063	IC-DIGITAL BUFFER/LINE-DRIVER 74HC125... QUAD, TRI-STATE, LOW ENABLE, CMOS-H/SPEED, 14 PIN,	PHILIPS	74HC125D
IC29	28461/613	IC-ANALOGUE COMPARATOR LM393... DUAL, 36V 800uA I/P-OFFSET 5.0mV MAX, RESPONSE TIME 1.3 uS TYP,	PHILIPS	LM393D
IC30	28469/063	IC-DIGITAL BUFFER/LINE-DRIVER 74HC125... QUAD, TRI-STATE, LOW ENABLE, CMOS-H/SPEED, 14 PIN,	PHILIPS	74HC125D
L1	23642/716	INDUCTOR-FIXED 3.3uH +/- 5% EPOXY-MOULD, 260mA 1R2 MAX, 30 Q @ 7.96 MHz, 60 MHz SRF, SURFACE MOUNTED,	MEGGITT ELECTRONICS	3612-T-3R3-J
L2	23642/714	INDUCTOR-FIXED 1.5uH +/- 5% EPOXY-MOULD, 370mA 0R85 MAX, 30 Q @ 7.96 MHz, 85 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-1R5-J
PLJF	23445/501	CONNECTOR-RF MMCX-TYPE FEMALE, JACK, 50 OHMS, SURFACE MOUNTING, VERTICAL, DC-6GHz, GOLD PLATD	HUBER & SUHNER	82MMCX-S50-0-53
PLJJ to PLJL	23445/501	CONNECTOR-RF MMCX-TYPE FEMALE, JACK, 50 OHMS, SURFACE MOUNTING, VERTICAL, DC-6GHz, GOLD PLATD	HUBER & SUHNER	82MMCX-S50-0-53
PLJN	23445/501	CONNECTOR-RF MMCX-TYPE FEMALE, JACK, 50 OHMS, SURFACE MOUNTING, VERTICAL, DC-6GHz, GOLD PLATD	HUBER & SUHNER	82MMCX-S50-0-53
R1	24811/177	RESISTOR-FIXED METAL-FILM 1K5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K5-1%50ppm
R2	24811/177	RESISTOR-FIXED METAL-FILM 1K5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K5-1%50ppm
R3 to R15	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R16	24811/233	RESISTOR-FIXED METAL-FILM 332K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-332K-1%50ppm
R17	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R18	24811/233	RESISTOR-FIXED METAL-FILM 332K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-332K-1%50ppm
R19	24811/149	RESISTOR-FIXED METAL-FILM 100R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100R-1%50ppm
R20	24811/149	RESISTOR-FIXED METAL-FILM 100R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100R-1%50ppm
R21 to R24	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R25	24811/237	RESISTOR-FIXED METAL-FILM 475K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475K-1%50ppm
R26	24811/221	RESISTOR-FIXED METAL-FILM 100K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100K-1%50ppm
R27	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R28	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R29	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
AJ1	**Pulse generator (contd.)**			
R30	24811/205	RESISTOR-FIXED METAL-FILM 22K1 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-22K1-1%50ppm
R31	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R32	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R33	24811/237	RESISTOR-FIXED METAL-FILM 475K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475K-1%50ppm
R34	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R35	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R36	24811/158	RESISTOR-FIXED METAL-FILM 243R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-243R-1%50ppm
R37	24811/160	RESISTOR-FIXED METAL-FILM 301R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-301R-1%50ppm
R38	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R39	24811/157	RESISTOR-FIXED METAL-FILM 221R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221R-1%50ppm
R40	24811/180	RESISTOR-FIXED METAL-FILM 2K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-2K0-1%50ppm
R42 to R44	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R45 to R48	24811/156	RESISTOR-FIXED METAL-FILM 200R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-200R-1%50ppm
R49	24811/142	RESISTOR-FIXED METAL-FILM 51R1 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-51R1-1%50ppm
R50	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R51	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R52	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R54 to R57	24811/149	RESISTOR-FIXED METAL-FILM 100R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-100R-1%50ppm
R58	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R60	24811/156	RESISTOR-FIXED METAL-FILM 200R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-200R-1%50ppm
R61	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R62	24811/185	RESISTOR-FIXED METAL-FILM 3K32 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-3K32-1%50ppm
R63	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R64	24811/185	RESISTOR-FIXED METAL-FILM 3K32 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-3K32-1%50ppm
R65	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R66	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
AJ1	**Pulse generator (contd.)**			
R67	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R68	24811/189	RESISTOR-FIXED METAL-FILM 4K75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4K75-1%50ppm
R69	24811/125	RESISTOR-FIXED METAL-FILM 10R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10R-1%-50ppm
R70 to R72	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R73	24811/197	RESISTOR-FIXED METAL-FILM 10K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10K-1%50ppm
R74	24811/141	RESISTOR-FIXED METAL-FILM 47R5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-47R5-1%50ppm
R75	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R76	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R77	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R78	24811/117	RESISTOR-FIXED METAL-FILM 4R75 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-4R75-1%50ppm
R79 to R88	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R89	24811/185	RESISTOR-FIXED METAL-FILM 3K32 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-3K32-1%50ppm
R90	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
RLA	23486/101	RELAY MAGNETIC, DOUBLE-POLE CHANGEOVER, 5V COIL, 62R - CONTACTS 1A @ 28VDC, 9.5mmSQ, 9.6mm HIGH,	TELEDYNE LTD	172-5
TR1	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR2	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR3	28455/302	TRANSISTOR NPN BIPOLAR BCX54... 45V 130MHz 1W 1A 40hFE MIN @ 150mA, MARKING CODE BA, SURFACE	PHILIPS	BCX54
TR4	28455/302	TRANSISTOR NPN BIPOLAR BCX54... 45V 130MHz 1W 1A 40hFE MIN @ 150mA, MARKING CODE BA, SURFACE	PHILIPS	BCX54
TR5	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR6	28487/810	TRANSISTOR NPN BIPOLAR BSV52... 12V 400MHz 250mW 100mA MARKING CODE B2, SURFACE MOUNTED, SOT-23,	PHILIPS	BSV52
TR7	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR8	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
X1	23642/801	FILTER RFI-SUPPRESSION, 3A RATING, SURFACE MOUNT, MULTILAYER IMPEDER, 95R IMPEDANCE @ 10MHz, 0.04R	TDK UK LTD	HF50ACC-575032-T
XL1	28312/133	CRYSTAL 20 MHz +/- 20 ppm, @ 25 DEG.C, 20pF PARALLEL RESONANCE, 30R ESR MAX, TEMP STABILITY	IQD LTD	A147J

AJ2 DME modulator

Issue 3

When ordering, prefix circuit reference with AJ2.

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
	44830-083	Complete unit		
C1 to C6	26386/824	CAPACITOR-FIXED CERAMIC 100pF +/-5% 50V NP0 MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-101-JP
C7	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-220-JP
C8	26386/954	CAPACITOR-FIXED CERAMIC 8.2pF +/-0.25pF 50V 60 ppm/DEG.C, HIGH-Q, SINGLELAYER, SURFACE-MOUNTED,	AVX LTD	0805-5K-8R2-CAW-TR
C9	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-220-JP
C10	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-220-JP
C11	26343/753	CAPACITOR-FIXED CERAMIC 6.8pF +/-0.5pF 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-6R8-DP
C12	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-220-JP
C13	26386/832	CAPACITOR-FIXED CERAMIC 470pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-471-JP
C14	26386/832	CAPACITOR-FIXED CERAMIC 470pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-471-JP
C15	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 5.3 x 5.3mm,	DUBILIER CAPACITORS	DVC-10/35-T/R
C16	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C17	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 5.3 x 5.3mm,	DUBILIER CAPACITORS	DVC-10/35-T/R
C18	26451/004	CAPACITOR-FIXED ALUMINIUM 10uF +/-20% 35V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 5.3 x 5.3mm,	DUBILIER CAPACITORS	DVC-10/35-T/R
C19	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C20	26451/008	CAPACITOR-FIXED ALUMINIUM 47uF +/-20% 6.3V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 5.3 x 5.3mm,	PANASONIC INDUSTRIAL	ECE-V-0JA-470P
C21 to C26	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C27	26451/008	CAPACITOR-FIXED ALUMINIUM 47uF +/-20% 6.3V ELECTROLYTIC, SURFACE-MOUNTED, SIZE 5.3 x 5.3mm,	PANASONIC INDUSTRIAL	ECE-V-0JA-470P
C28	26386/875	CAPACITOR-FIXED CERAMIC 10nF +/-10% 50V X7R/2C1, MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5C-103-KP
C29	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-220-JP
C30	26386/816	CAPACITOR-FIXED CERAMIC 22pF +/-5% 50V NPO MULTILAYER, SURFACE-MOUNTED, SIZE 0805, NICKEL	ROHM ELECTRONICS LTD	MCH21-5A-220-JP

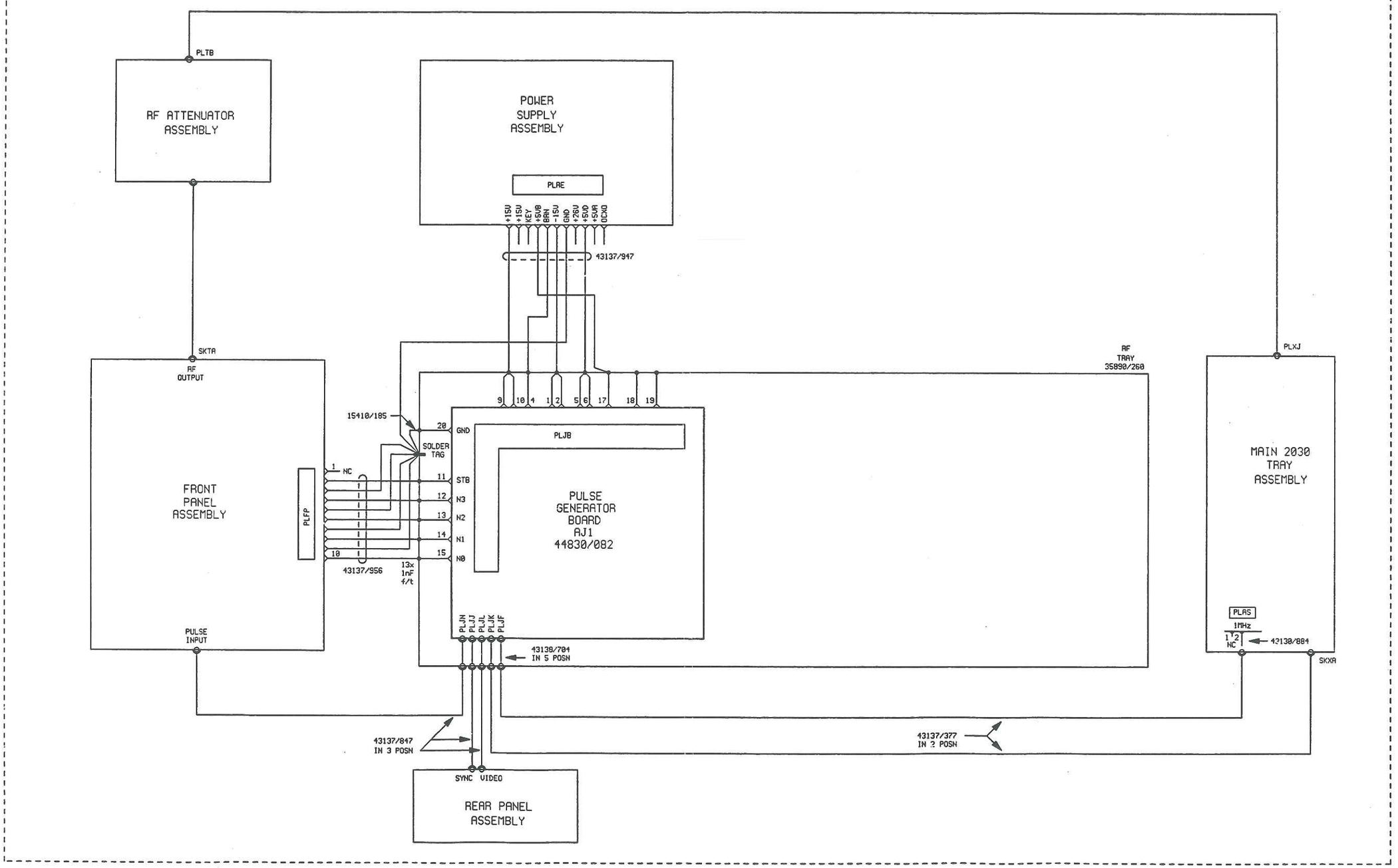
Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
AJ2	**DME modulator (contd.)**			
D1 to D4	28383/943	DIODE PIN, HSMP-3830... 250mW 100V 1A 0.35pF Rs 1R5 MAX @ 100mA, MARKING CODE K0, LOW PROFILE,	HEWLETT-PACKARD	HSMP-3830-L31
D5	28335/670	DIODE BAND SWITCHING, BAT18... 35V 100mA 1pF MAX @ 20V, 1.2Vf @ 100mA, MARKING CODE A2, SURFACE	PHILIPS	BAT18/T1
D6	28335/670	DIODE BAND SWITCHING, BAT18... 35V 100mA 1pF MAX @ 20V, 1.2Vf @ 100mA, MARKING CODE A2, SURFACE	PHILIPS	BAT18/T1
D8	28383/930	DIODE SMALL-SIGNAL, BAS16... 330mW 75V 250mA 2pF 1Vf @ 50mA, MARKING CODE A6, SURFACE MOUNTED,	PHILIPS	BAS16
D9	28383/930	DIODE SMALL-SIGNAL, BAS16... 330mW 75V 250mA 2pF 1Vf @ 50mA, MARKING CODE A6, SURFACE MOUNTED,	PHILIPS	BAS16
D10	28337/126	DIODE SMALL-SIGNAL, BAY72... 500mW 100V 225mA 0.78Vf @ 200mA, AXIAL, DO-35, (TAPED).	NAT. SEMICONDUCTOR	BAY72
IC1	28461/806	IC-ANALOGUE OPERATIONAL AMP OP-249... DUAL, PRECISION HI SPEED, SETTLING TIME-1.2uS, GAIN	ANALOG DEVICES LTD	OP-249GS
IC3	28461/801	IC-ANALOGUE MICROWAVE-AMP MSA-1105... 5.5V 60mA GAIN 10.5dB @1GHz, 3dB B/WTH 0.05-1.3GHz, BIPOLAR,	HEWLETT-PACKARD	MSA-1105
IC4	28461/450	IC-ANALOGUE MICROWAVE-AMP MSA-0486... 5.25V 50mA GAIN 8dB @ 1GHz, 3dB BANDWIDTH DC-3.2GHz, BIPOLAR,	HEWLETT-PACKARD	MSA-0486-TR1
L1	23642/535	INDUCTOR-FIXED 1uH +/- 5% EPOXY-MOULD, 400mA 0R7 MAX, 30 Q @ 7.96 MHz, 120 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-1R0-J
L2	23642/510	INDUCTOR-FIXED 0.1uH +/- 5% EPOXY-MOULD, 450mA 0R44 MAX, 28 Q @ 100 MHz, 700 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-R10-J
L3	23642/510	INDUCTOR-FIXED 0.1uH +/- 5% EPOXY-MOULD, 450mA 0R44 MAX, 28 Q @ 100 MHz, 700 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-R10-J
L4	23642/535	INDUCTOR-FIXED 1uH +/- 5% EPOXY-MOULD, 400mA 0R7 MAX, 30 Q @ 7.96 MHz, 120 MHz SRF, SURFACE	MEGGITT ELECTRONICS	3612-T-1R0-J
R1	24338/005	RESISTOR-FIXED METAL-GLAZE 180R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-180R-5%-P4
R2	24338/005	RESISTOR-FIXED METAL-GLAZE 180R +/- 5% 1W 100V 350 ppm/DEG.C, SURFACE MOUNTED, SIZE 2512, (12mm	VISHAY COMPONENTS	CR2512-180R-5%-P4
R3	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R4	24811/157	RESISTOR-FIXED METAL-FILM 221R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221R-1%50ppm
R5	24811/157	RESISTOR-FIXED METAL-FILM 221R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221R-1%50ppm
R6	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R7	24811/157	RESISTOR-FIXED METAL-FILM 221R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221R-1%50ppm
R8	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R9	24811/157	RESISTOR-FIXED METAL-FILM 221R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221R-1%50ppm
R10	24811/157	RESISTOR-FIXED METAL-FILM 221R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221R-1%50ppm

Cir. Ref.	MI part number	Description	Manufacturer	Manufacturer's part number
AJ2	**DME modulator (contd.)**			
R11	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R12	24811/157	RESISTOR-FIXED METAL-FILM 221R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221R-1%50ppm
R13	24811/125	RESISTOR-FIXED METAL-FILM 10R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-10R-1%-50ppm
R14	24811/172	RESISTOR-FIXED METAL-FILM 909R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-909R-1%50ppm
R16	24811/178	RESISTOR-FIXED METAL-FILM 1K62 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-1K62-1%50ppm
R17	24811/161	RESISTOR-FIXED METAL-FILM 332R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-332R-1%50ppm
R18	24811/161	RESISTOR-FIXED METAL-FILM 332R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-332R-1%50ppm
R19	24811/173	RESISTOR-FIXED METAL-FILM 1K +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-1K0-1%-50ppm
R20	24811/194	RESISTOR-FIXED METAL-FILM 7K5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-7K5-1%50ppm
R21	24811/182	RESISTOR-FIXED METAL-FILM 2K43 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K43-1%50ppm
R22	24811/185	RESISTOR-FIXED METAL-FILM 3K32 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-3K32-1%50ppm
R23	24811/181	RESISTOR-FIXED METAL-FILM 2K21 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-2K21-1%50ppm
R24	24811/194	RESISTOR-FIXED METAL-FILM 7K5 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF, (8mm	VISHAY COMPONENTS	SMM0204-7K5-1%50ppm
R25	24811/195	RESISTOR-FIXED METAL-FILM 8K25 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-8K25-1%50ppm
R26	24811/205	RESISTOR-FIXED METAL-FILM 22K1 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-22K1-1%50ppm
R27	24811/157	RESISTOR-FIXED METAL-FILM 221R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-221R-1%50ppm
R28	24811/165	RESISTOR-FIXED METAL-FILM 475R +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-475R-1%50ppm
R30	24811/211	RESISTOR-FIXED METAL-FILM 39K2 +/- 1% 250mW 200V 50 ppm/DEG.C, SURFACE MOUNTED, SIZE MINI-MELF,	VISHAY COMPONENTS	SMM0204-39K2-1%50ppm
R31	25711/659	RESISTOR-VARIABLE CERMET LINEAR, 1K 30% 100mW 50V 250 ppm/DEG.C, SINGLE-TURN, SURFACE-MOUNTED,	VISHAY COMPONENTS	ST-23A-102-B-W
TR1	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B
TR2	28453/829	TRANSISTOR NPN BIPOLAR BC848B... 30V 200MHz 200mW 100mA 290hFE @ 2mA, NOISE 2dB @ 1KHz, MARKING CODE	PHILIPS	BC848B

SERVICING DIAGRAMS

The following servicing diagrams used to make the Option 009 and Option 010 versions of the instrument are additional to those given in Chap. 7 in the main body of the manual.

Option 009 Interconnections

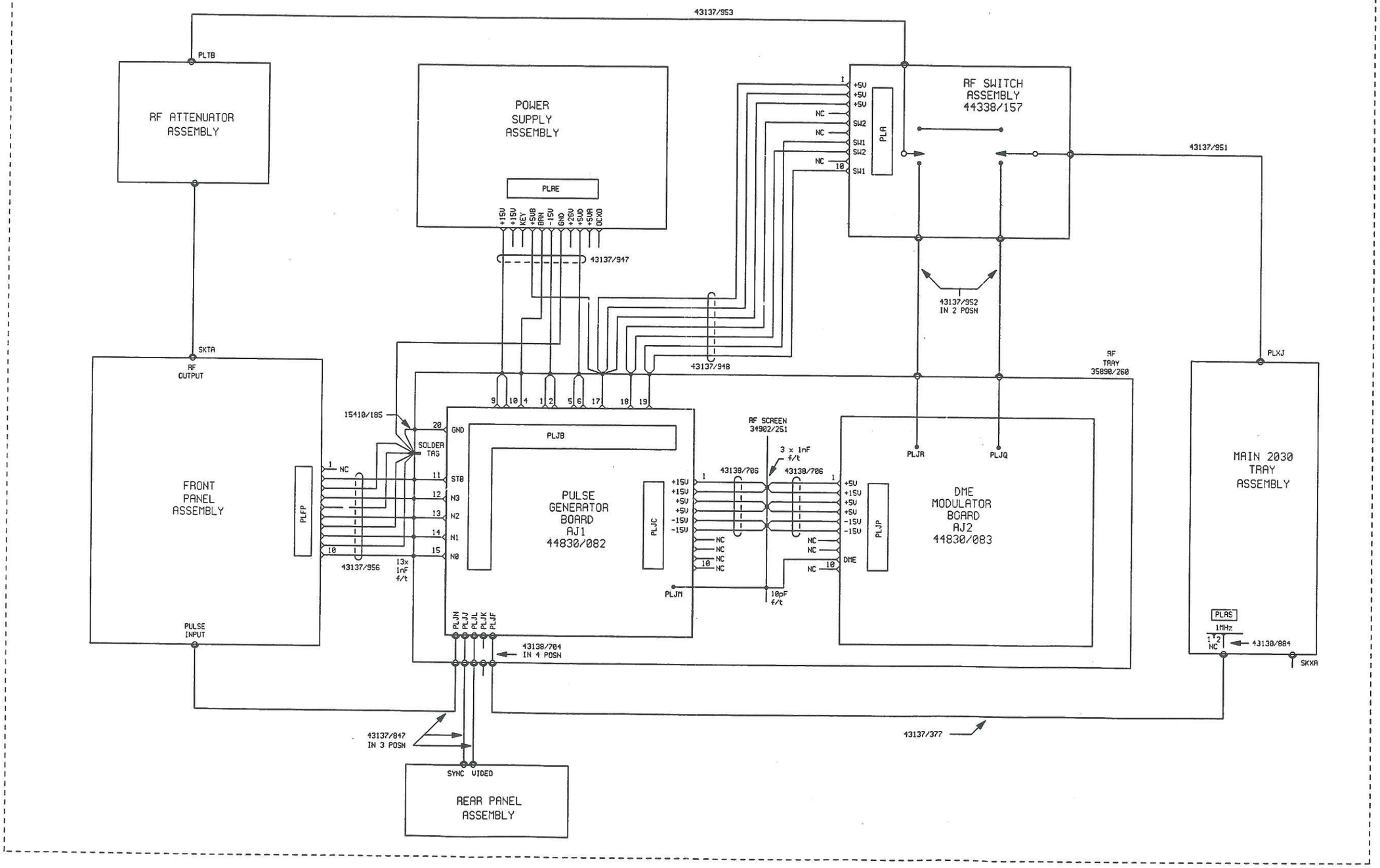


Drg. No. Z 46884/825S Sheet 1 of 1 (Issue 1)

Fig. C-4 Interconnection diagram - Option 009

Interconnection diagram - Option 009

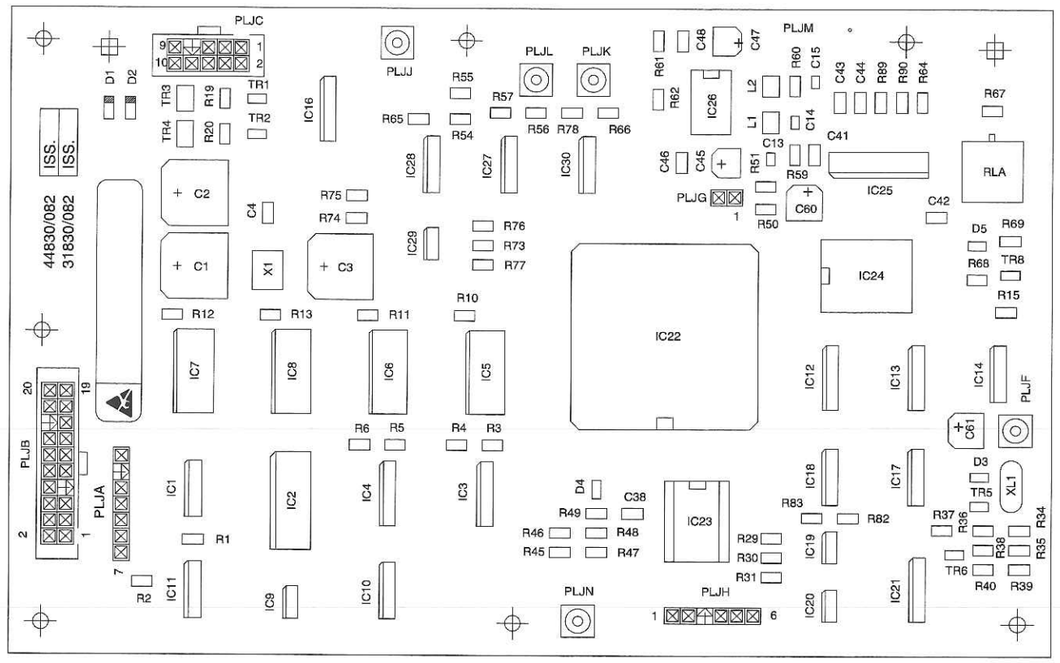
Option 010 Interconnections



Drg. No. Z 46884/787S Sheet 1 of 1 (Issue 1)

Fig. C-5 Interconnection diagram - Option 010

Component layout **AJ1**



View on component side

View on solder side

Interconnection diagram - Option 010

Drg. No. 44830/082E Sheet 1 of 1 (Issue 1)

Fig. C-6 Pulse generator board component layout

Interface AJ1

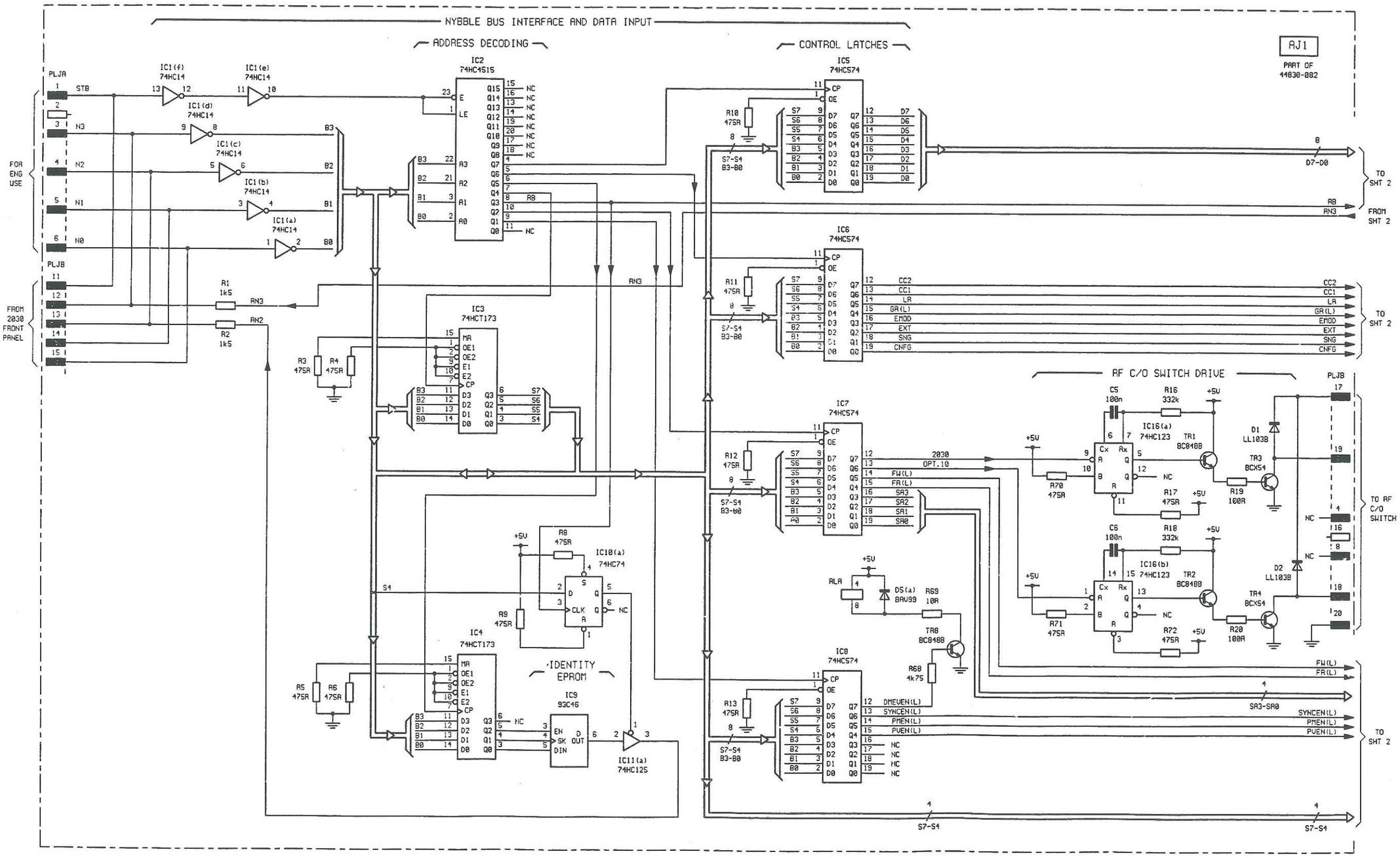


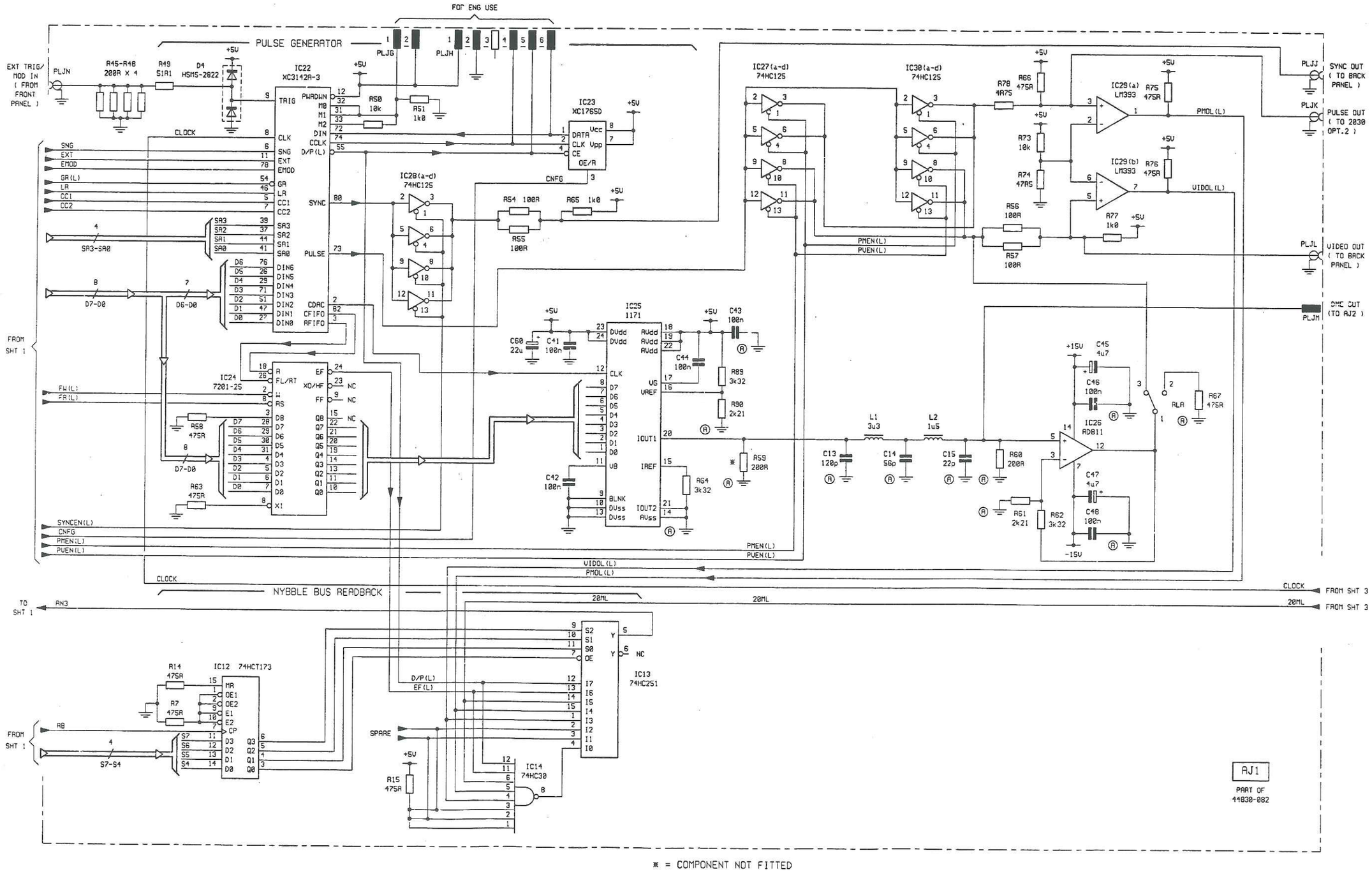
Fig. C-7 Pulse generator board: Interface circuit diagram

Drg. No. Z 44830/082E, Sheet 1 of 3 (Issue 2)

OPTION 009 Pulse Generator
OPTION 010 DME Modulator

Interface **AJ1**

Pulse generator AJ1



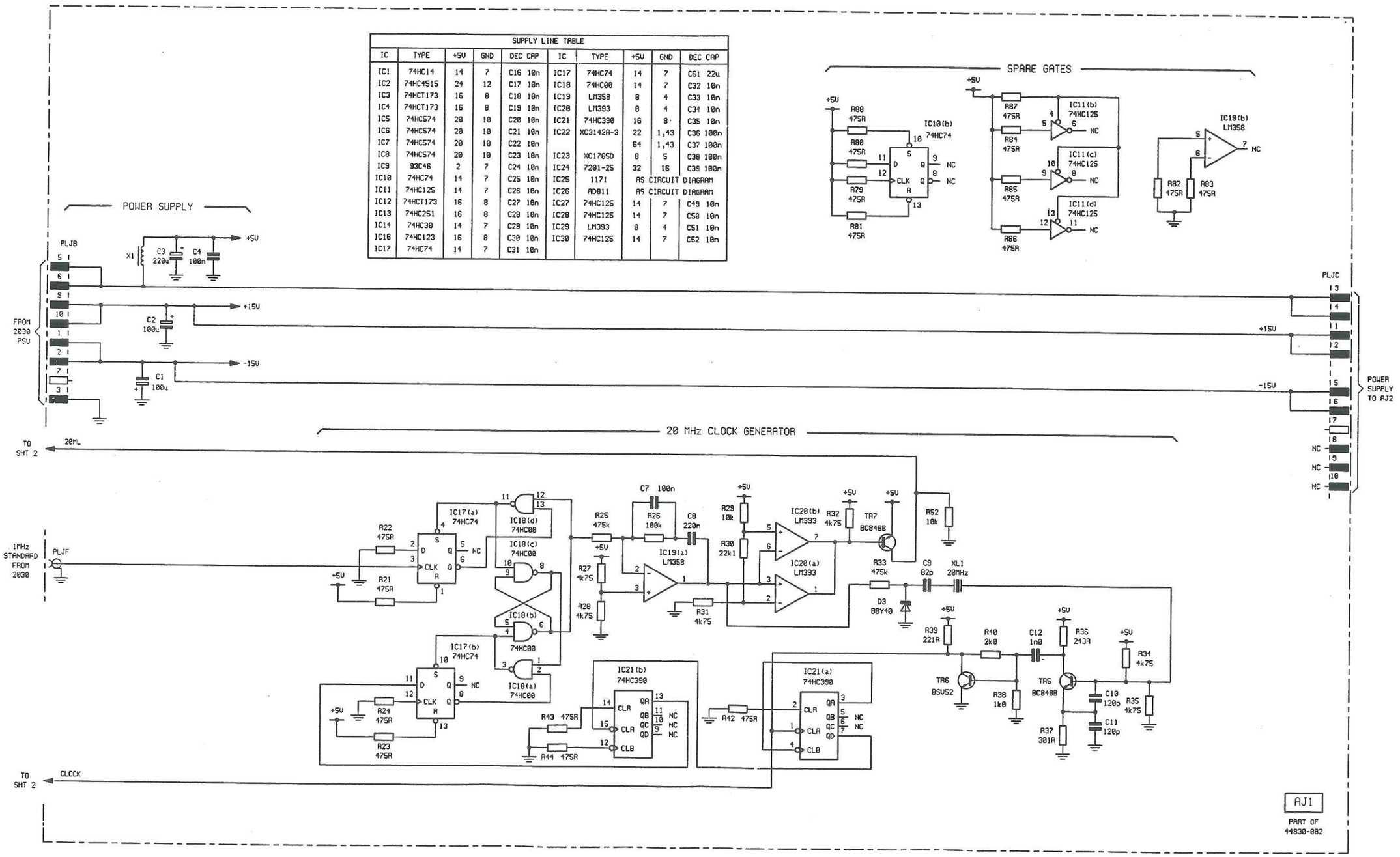
Drg. No. Z 44830/082E, Sheet 2 of 3 (Issue 1)

Fig. C-8 Pulse generator board: Pulse generator circuit diagram

OPTION 009 Pulse Generator
OPTION 010 DME Modulator

Clock generator AJ1

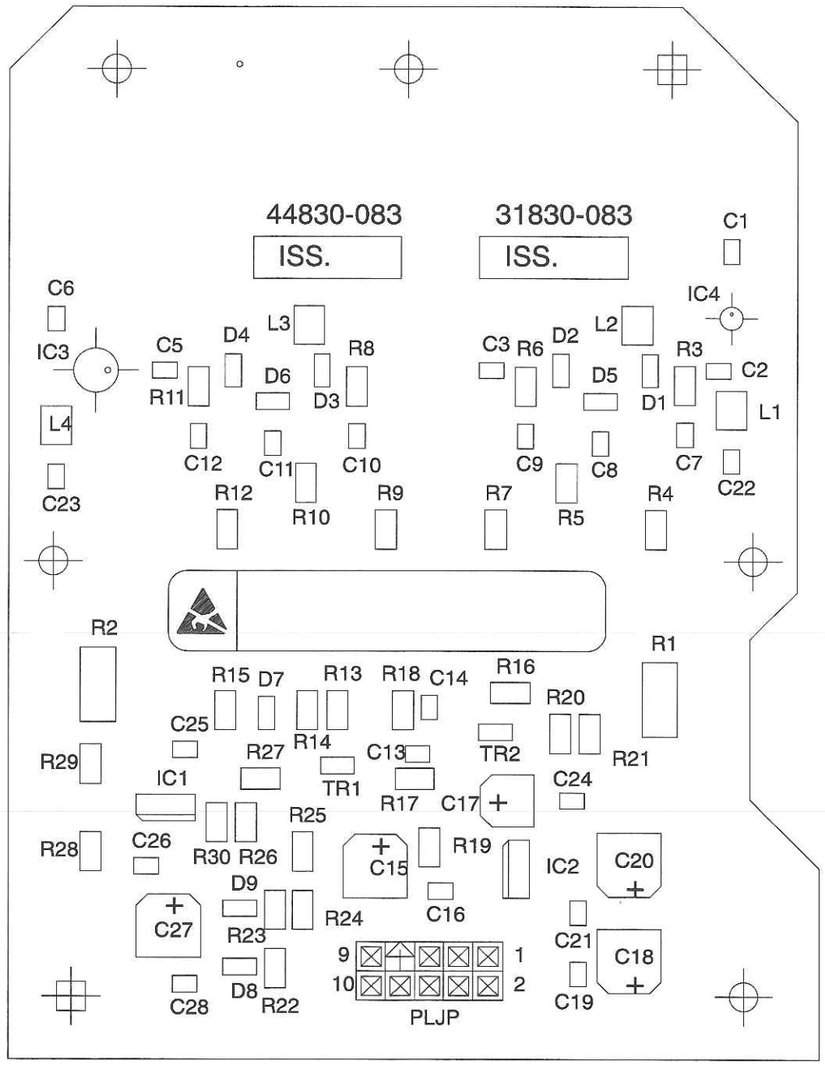
SUPPLY LINE TABLE									
IC	TYPE	+5V	GND	DEC CAP	IC	TYPE	+5V	GND	DEC CAP
IC1	74HC14	14	7	C16 10n	IC17	74HC74	14	7	C61 22u
IC2	74HC4515	24	12	C17 10n	IC18	74HC00	14	7	C32 10n
IC3	74HCT173	16	8	C18 10n	IC19	LM358	8	4	C33 10n
IC4	74HCT173	16	8	C19 10n	IC20	LM393	8	4	C34 10n
IC5	74HC574	20	10	C20 10n	IC21	74HC390	16	8	C35 10n
IC6	74HC574	20	10	C21 10n	IC22	XC3142A-3	22	1,43	C36 100n
IC7	74HC574	20	10	C22 10n			64	1,43	C37 100n
IC8	74HC574	20	10	C23 10n	IC23	XC1765D	8	5	C38 100n
IC9	93C46	2	7	C24 10n	IC24	7201-25	32	16	C39 100n
IC10	74HC74	14	7	C25 10n	IC25	1171	AS CIRCUIT DIAGRAM		
IC11	74HC125	14	7	C26 10n	IC26	AD811	AS CIRCUIT DIAGRAM		
IC12	74HCT173	16	8	C27 10n	IC27	74HC125	14	7	C49 10n
IC13	74HC251	16	8	C28 10n	IC28	74HC125	14	7	C50 10n
IC14	74HC30	14	7	C29 10n	IC29	LM393	8	4	C51 10n
IC16	74HC123	16	8	C30 10n	IC30	74HC125	14	7	C52 10n
IC17	74HC74	14	7	C31 10n					



Drg. No. Z 44830/082E, Sheet 3 of 3 (Issue 3)

Fig. C-9 Pulse generator board: Clock generator circuit diagram

Component layout AJ2

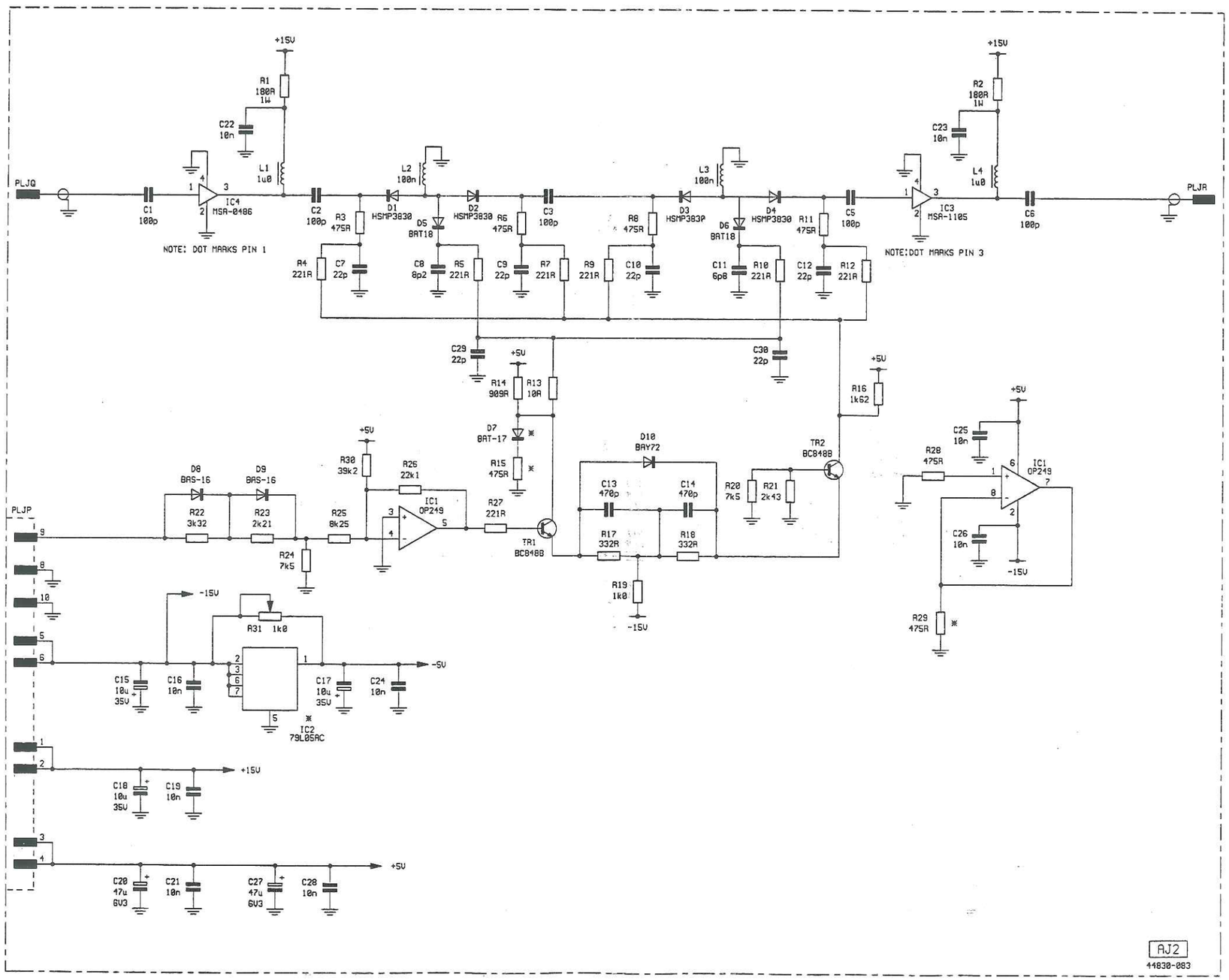


Drg. No. 44830/083U Sheet 1 of 1 (Issue 2)

Fig. C-10 DME modulator board component layout

Clock generator AJ1

DME modulator AJ2



* = COMPONENTS NOT FITTED

Drg. No. Z 44830/083U, Sheet 1 of 1 (Issue 2)

Fig. C-11 DME modulator board circuit diagram

OPTION 009 Pulse Generator
OPTION 010 DME Modulator