

MULTIMASTER G7104A

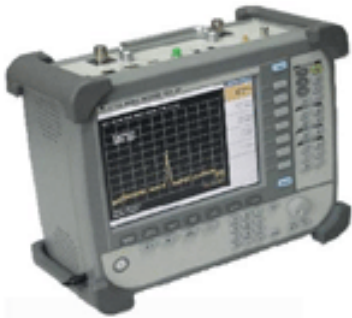
**Multi Purpose
Base Station
Tester**



MultiMaster

Introduction

The GenComm MultiMaster is a comprehensive and cost effective solution for performing base station and repeater maintenance in any environment covering all CDMA Standards including cdmaOne, cdma2000 1x RTT, cdma2000 1xEV-DO, and W-CDMA. MultiMaster eliminates the need for engineers to carry a multitude of separate instruments such as Spectrum Analyzer, CSTS, Power Meter, Signal Generator, Antenna Tester, Optical Power Meter and E1/T1 Analyzer to perform BTS maintenance. MultiMaster has integrated all of these instruments into one box. Additionally, the unique feature of multi-tasking screens and auto measure and test capability increases user productivity dramatically.



Feature

Integration of Multi-function

MultiMaster has integrated all necessary functions to test and measure CDMA Systems in one box without the need for additional sensors or options.

High Accuracy & Reliability

MultiMaster provides fully compatible accuracy and reliability compared with current stand alone testing tools commonly available for base station maintenance.

Easy-to-use User Interface

MultiMaster uses a menu structure that is easy to learn and enables engineers to set complicated radio configurations quickly. By pressing a single button, engineers can move to the pre-defined Service Provider specific set-up in no time.

Auto Measure and Error Logging

The Auto Measure function is used to test the system and save the result to either internal or external memory devices under specified measurement conditions and schedule. This function is very effective for tracking, monitoring and isolating intermittent problems.

Compact and Lightweight Design

MultiMaster is compact and portable for engineers to perform outdoor maintenance jobs. The built in high capacity Li-ion battery allows jobs at remote sites without being restricted by power cords.

On line Firmware Upgrade

MultiMaster automatically checks the latest firmware version and performs remote download & upgrade if necessary when it is connected to network via an Ethernet Port. The user can also easily perform firmware upgrades using a USB Memory Stick.

MultiMaster

One-box Solution for BTS Maintenance

Spectrum Analyzer
100kHz ~ 2,985MHz

Signal Generator
Single Carrier Generator over
800MHz ~ 2.7GHz

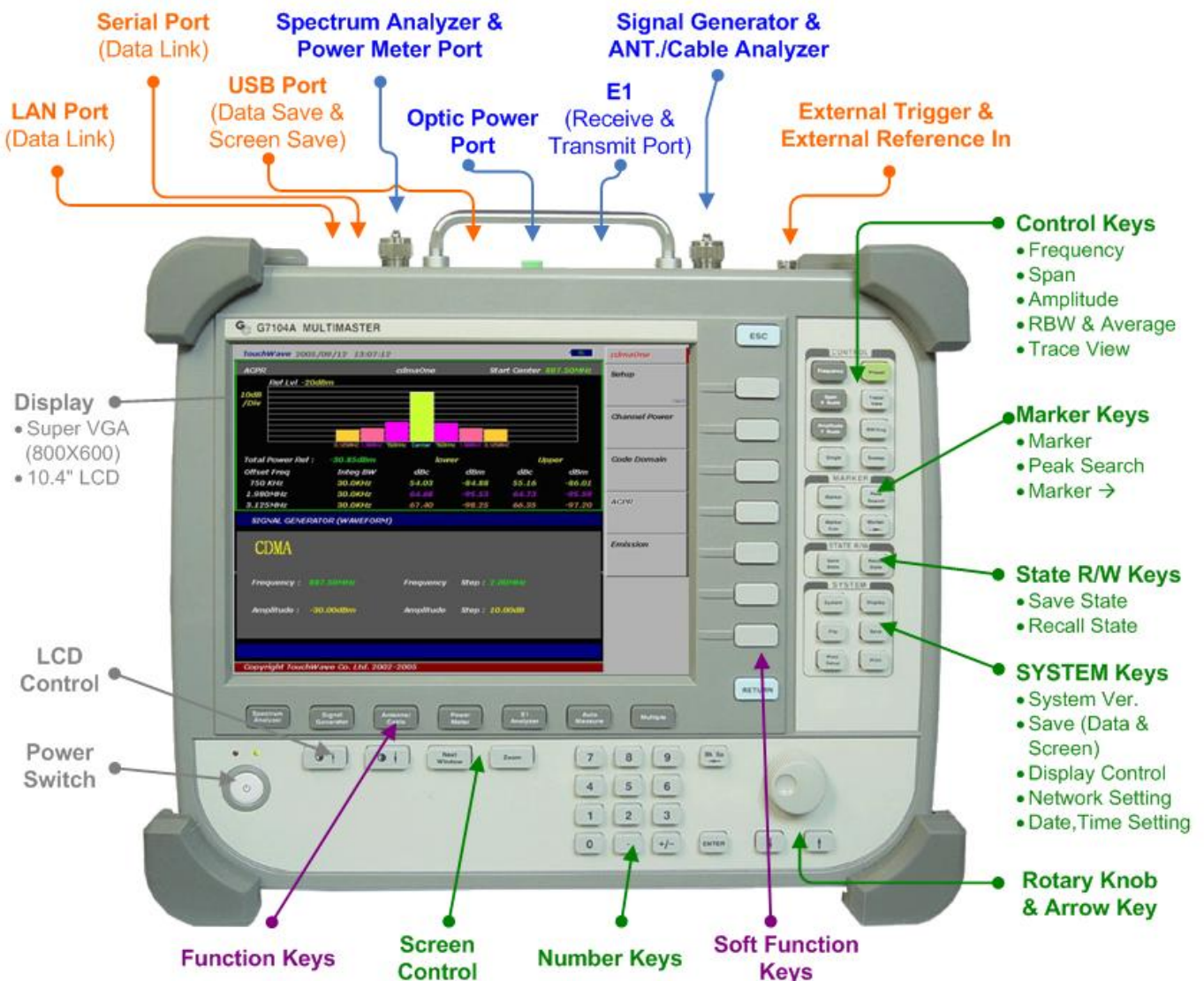
RF Power Meter

Optical Power Meter

TX Analyzer
cdmaOne ,cdma2000, 1X EV-DO,
WCDMA
(Code Domain Analysis, Channel
Power, ACP(L)R Emission Mask,
Occupied BW, Over The Air)

Antenna/Cable Analyzer
Cable Loss , DTF
Antenna VSWR
(In Service , Out of Service)

E1/T1 Analyzer

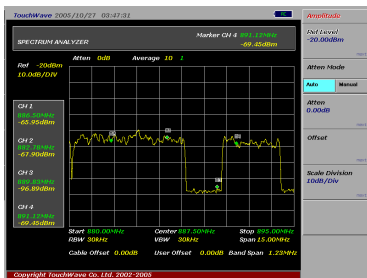


MultiMaster

Main Function

o Spectrum Analyzer

MultiMaster has the function of 3GHz Spectrum Analyzer to provide field engineers and service technicians with excellent performance of a desktop analyzer.



o TX Analyzer

MultiMaster has the function of powerful TX Analyzer to test and measure all current CDMA Systems including cdmaOne, cdma2000, 1xEV-DO and WCDMA.

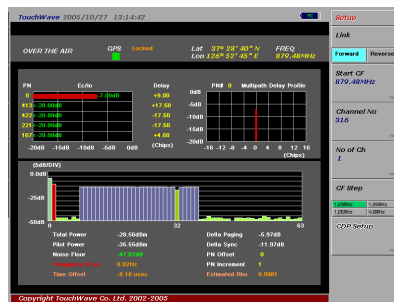
- ▷ Code Domain Analyzer
 - Code Domain Power
 - Frequency Error
 - Time Error
 - Waveform Quality
 - PN Searcher
 - EVM, PCDE (WCDMA)
- ▷ Multi-FA Channel Power
- ▷ ACP(L)R
- ▷ Spurious Emission
- ▷ Occupied BW



o Over The Air

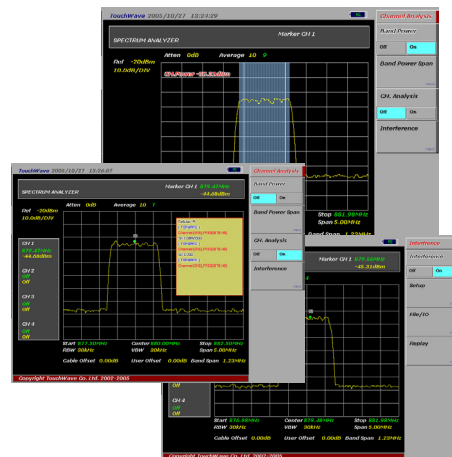
MultiMaster provides Over The Air measurement for quickly identifying the performance of the base station transmitter.

Over the air measurements are especially useful in testing the performance of the cell sites which are not directly accessible.



o Channel Analysis

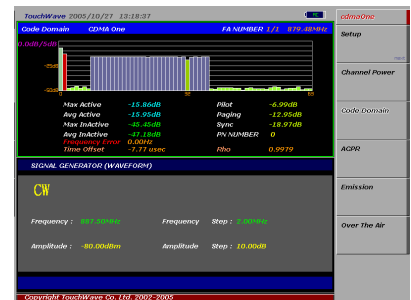
MultiMaster has the functions of assigned channel analyzer. It will help the user find out the intermittent signal, check and monitor the channel characteristics. The result of the Interference Analysis can be saved as the frame based screen into the internal or external memory, and then can be replayed just like the real signal.



o Signal Generator

MultiMaster has the functions of CW, CDMA and WCDMA single carrier generator. Combining this with other functions like spectrum analyzer or RF Power Meter, the user can easily isolate faults on the RF path.

- ▷ Frequency Range : 800 ~ 2,700MHz
 - ▷ Output Dynamic Range : -30(-10) ~ -80(-90)dBm
- Values in parenthesis () is the CW signal output range*



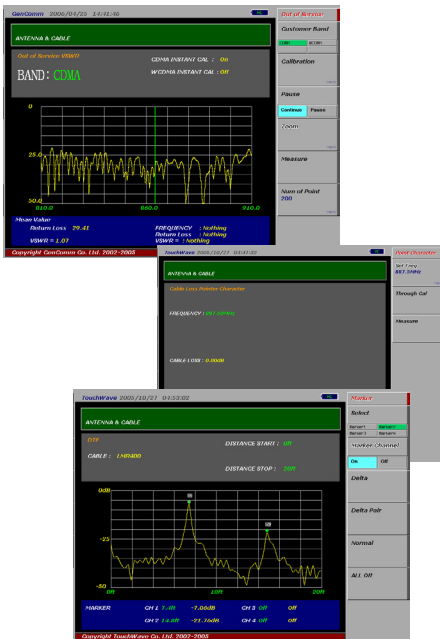
MultiMaster

Main Function

o Antenna/Cable Analyzer

MultiMaster has the functions of antenna and cable test for measuring Cable Loss, DTF (Distance To Fault) and VSWR. Since MultiMaster can measure the VSWR while the system is In-Service, it does not interrupt Service, thereby maximizing air time and minimizing subscribers' complaints.

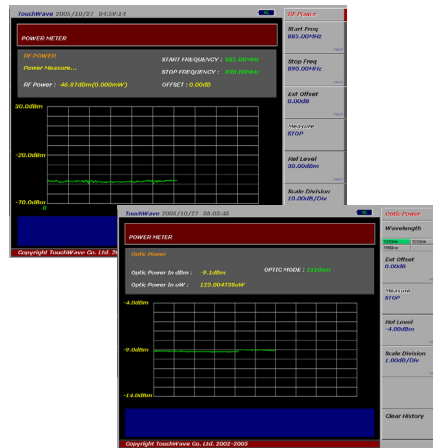
- ▷ Cable Loss: Up to 30 dB
- ▷ VSWR Analyzer
 - o 800 ~ 2,700 MHz
- ▷ In Service VSWR (T/Rx, Rx Only Antenna)
 - o VSWR Range: Up to 8.5
- ▷ Out of Service VSWR
 - o VSWR Range: 1.07 ~ 15
- ▷ DTF Analyzer
 - o Distance: up to 300m
 - o Resolution: 0.5% of measuring distance.



o Power Meter

Power Meter consists of two functions as below.

- ▷ RF Power Meter
 - Without external sensors, MultiMaster can measure RF output power transmitted from an antenna.
 - o Dynamic Range: 100kHz~ 2.985MHz
 - o Power Dynamic Range: +30~-80 dBm
- ▷ Optical Power Meter
 - With a built in Optical Power Meter, the user can measure the optical power transmitted between the Master and Slave units of Repeater.
 - o Display Unit: dBm, uW



o E1/T1 Analyzer

MultiMaster provides a testing solution for a user's E1/T1 transmission line. Various test modes are available for the user to select.

- ▷ Mode: Term, Monitor, Bridge, Loop
- ▷ Frame: PCM30, PCM31, Unframed
- ▷ Code: AMI, HDB3, B8ZS
- ▷ TX Pattern: 1-8, 1-16, ALL0, ALL1, 0101, 2E20
- ▷ E1/T1 Pulse Mask
- ▷ Alarm, Error Count and Logging



Base Station Test Tools

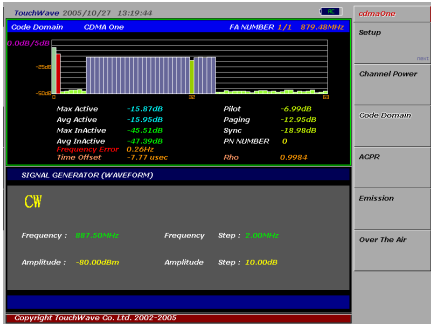
Multi Purpose Base Station Tester

MultiMaster

Main Function

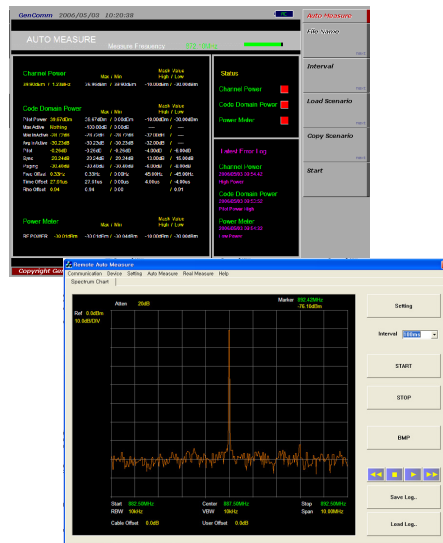
Multiple Test Screen

Since MultiMaster supports multi tasking, performing more than two main functions simultaneously is possible. By using Multiple functions, the user can select a proper combination of functions and perform multiple tests at different points at the same time.



Auto Measure

System malfunctions sometimes appear irregularly and it is hard to isolate them quickly. In such case, the user needs a tool to monitor the system for a long enough time to detect the exact symptoms and figure out the problem. By using the Auto Measure function, the user can easily set up the testing schedule such as starting time, duration, measuring interval and parameters. Based on the user defined conditions, MultiMaster performs the test and records the results by itself.



<Available set of multiple windows>

△: Not available for WCDMA Test Mode

Win1	Win2	Spectrum	Channel Power	CDP	ACPR	Emission	Optic Power	S/G	E1
Spectrum		○	○	○	△	△	○	○	○
Channel Power		○	○	○	△	△	○	○	○
CDP		○	○	○	△	△	○	○	○
ACPR		△	△	△	△	△	○	○	○
Emission		△	△	△	△	△	○	○	○
Optic Power		○	○	○	○	○	○	○	○
S/G		○	○	○	○	○	○	○	○
E1		○	○	○	○	○	○	○	○



MultiMaster

Specifications

Standard

Frequency Accuracy	±0.05ppm/Internal
Frequency Aging	±0.5ppm/yr
Display	10.4" TFT LCD 800 x 600 mode

Frequency and Time Reference

Even Second	TTL
10 ms	TTL
10 MHz	-10 ~ +10 dBm

Spectrum Analyzer

Input Frequency Range	100kHz~2,985MHz
Maximum Input level	+30 dBm(1W)
Amplitude Accuracy	± 1dB
Resolution Bandwidth	100Hz, 300Hz, 1kHz, 3kHz, 10kHz, 30kHz, 100kHz, 300kHz
Dynamic Range	>85dB/Inpurt
Attenuation	0~50dB(Step 5dB)
SSB Phase Noise	≤-90dBc/Hz
DANL	<-125dBm @100Hz RBW
Port 1 VSWR	<1.5

CdmaOne/cdma2000/cdma200 EV-DO/W-CDMA Tx Analyzer

Input Dynamic range	> -40 dBm
Waveform Quality (ρ)	± 0.005 for 0.9 < ρ < 1
Code domain power	± 0.5 dB (Rel.)
Channel Power	± 1 dB
Adjacent channel power	± 0.75 dB
Pilot Time Alignment Error	± 1 us
EVM(W-CDMA only)	± 2.5% (Range:15~20%)
PCDE(W-CDMA only)	± 1.0%

Over The Air PN Scanner & Analysis

(except in EV-DO and W-CDMA)

PN Scanner	Ec/Io, Delay
(Max 5 PN analysis)	Multi path Profile
Analysis Parameter	Channel Power
	Pilot Power
	Noise Floor
	Delta Paging Power
	Delta Sync Power
	PN Offset
	Estimated Rho

Signal Generator

CW Signal

Frequency Range	800 ~ 2,700MHz
CW Output Level	-10 ~ -90dBm
Level Accuracy	± 1 dB

cdmaOne/cdma2000/W-CDMA Signal

Frequency Range	800 ~ 2,700MHz
Output Level	-30 ~ -80dBm
Level Accuracy	± 1.5dB
Filter Type	IS-95B, 3GPP standard
No of Carrier	1
Assigned Walsh Code	CDMA: W64.1 WCDMA: W256,1

Antenna/Cable

Maximum Input Power without Damage	0.1W
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Cable Loss

Dynamic Range	0 ~ 33dB
Accuracy	0.1dB
Resolution	0.01dB

VSWR

Frequency Range	800 ~ 2,700MHz
Directivity	> 1.07
VSWR Range	1.07 ~ 15

DTF

Range (m)	0.1 ~ 300m
Accuracy	< 10m: ±0.3m, > 10m: ± 3%
Resolution	0.5% of measuring distance

Power Meter

Maximum Input Power without damage	0.1W
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RF Power

Frequency Range	0.1 ~ 2,985MHz
Accuracy	±0.2dB

Optical Power

Wavelength	1310nm,1510nm 1550nm
Accuracy	±1dB
Measurement Range	-30 ~ +15dBm
Display Units	dBm, uW

T1 Analyzer

Error Detect Code (BPV), Alarm Detect	FAS, CRC-4 Red Alarm, Yellow Alarm, AIS Alarm
Receive Level	+6 ~ -36dB DSX

Electrical Interface

Connectors, Rx, Tx Output	Bantam(120ohm) 0 dB, -7.5dB, and -15dB
Line Code Impedance	AMI, B8ZS 100 or 1000 ohm
Input Term/Bridge/Monitor/Loop	0 ~ -20dB

Transmitter and Receiver Framing

Channel Formats Test Pattern	Super frame, ESF, SLC-96, T1DM Full T1 1-8, 1-16, ALL1, ALL0, 0101, 3E-24, QRSS, 2E-23, 2E-15, 2E-23 inverse, 2E-15 inverse
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Additional Functions

Reference Clock	Received or Internal
Event Log Capability	Internal memory or External USB
Error Insertion	1E-5, 1E-6, 1E-7
Error Rate Count	CRC, Frame, Code, Calculated BER

Pulse Mask Checking

E1 Analyzer

Error Detect Code (BPV) Alarm Detect	FAS, CRC-4 FAS RAI, MFAS RAI, AIS
Receive Level	+6 ~ -36dB DSX

Input

Term/Bridge/Monitor	0 ~ -20dB
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Transmitter and Receiver Framing

Channel Formats Test Pattern	Unframed,PCM-30 PCM-30 with CRC PCM-31, PCM-31 with CRC Full E1/T1 1-8, 1-16, ALL1, ALL0, 0101, 20ITU
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MultiMaster

Specifications

Additional Functions

Reference Clock	Received or Internal
Event Log Capability	Internal memory or External USB
Error Insertion	1, 1E-5, 1E-6, 1E-7
Error Rate Count	CRC, Frame, Code, Calculated BER
Pulse Mask Checking	

Battery (Internal Lithium Ion)

Nominal Voltage	14.8V
Nominal Capacity	4,400mA
Maximum Charge Voltage	16.8V
Minimum Charge Voltage	12.0V

Electrical Interface

Connectors, Rx, Tx	Bantam(120)
Output	0 dB, -6dB
	Conforms to ITU-T Rec.G.703
Line Code	AMI, HDB3
Impedance(ohm)	Term, Monitor: 120 Bridge > 1,000



External Reference Clock

10MHz External Reference

Input Power	-10 ~ +10dBm
Connector Type	BNC

Even Second & 10ms

Connector Type	SMA
Input Level	TTL compatible

Miscellaneous

Interface Ports

RS-232(DB-9)	1 port
USB 1.1	1 port
10Mbps LAN	1 port
GPS Antenna	1 port

Built-in Speaker

Dimension

Weight	10.2Kg (Include Battery)
Size (cm)	31 X 36 X 15

Environmental Condition

Operating Temperature	-5 °C ~ +50 °C
Storage Temperature	-20 °C ~ +70 °C
Calibration Cycle	1 year

Power Supply

AC Input	100~240V 2.5A, 50~60Hz
DC Output	18~24V, 6A 120W Max