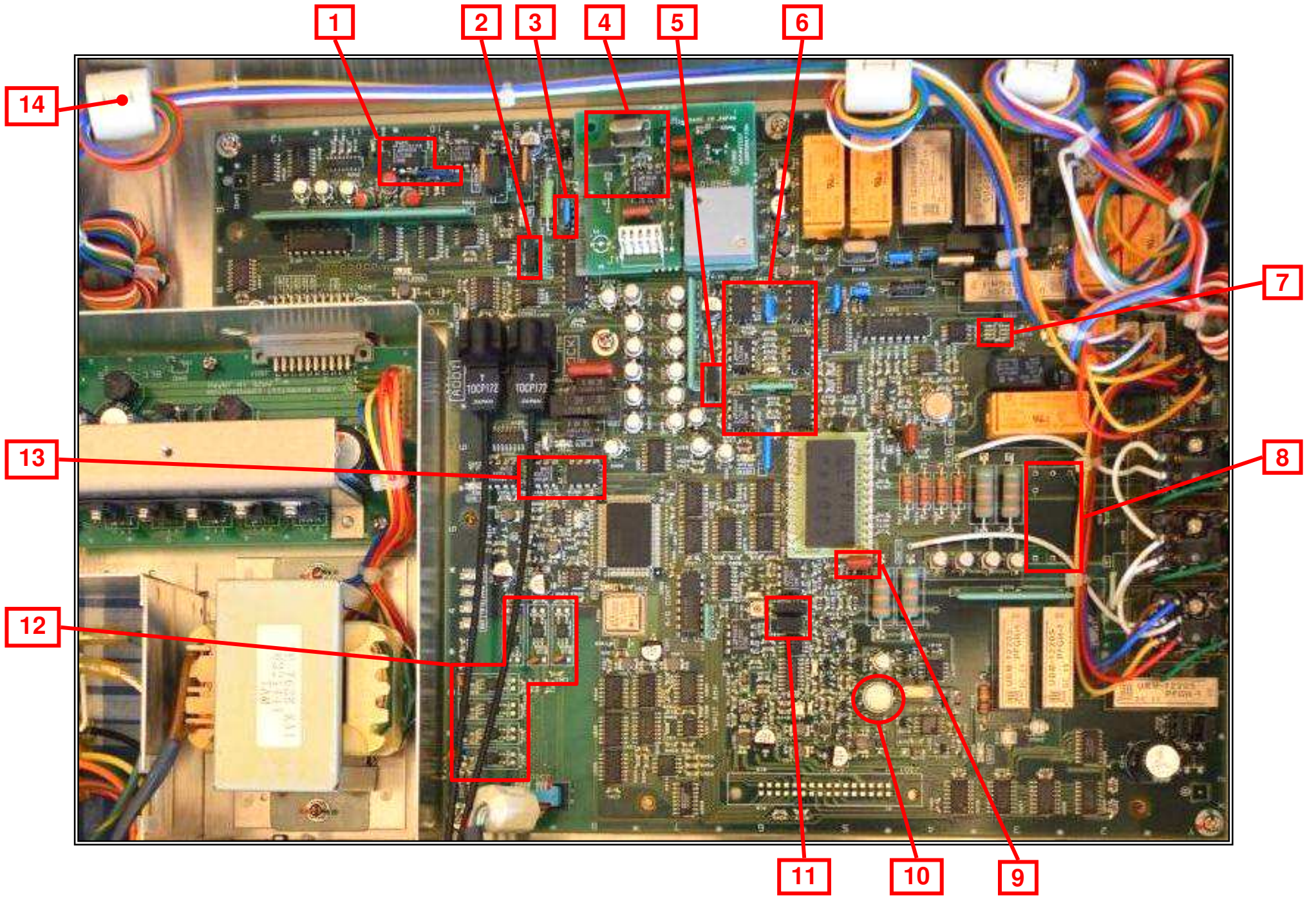


R6581(D,T) Changes History

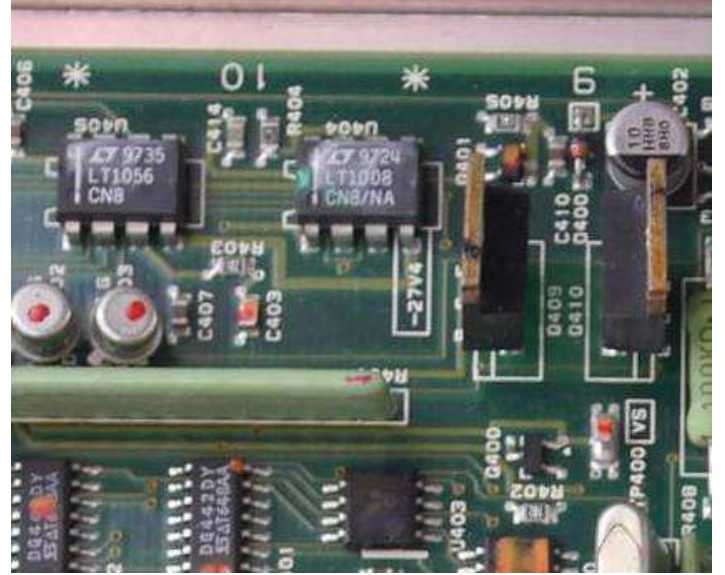


1 Ohms Current Source Op-amps

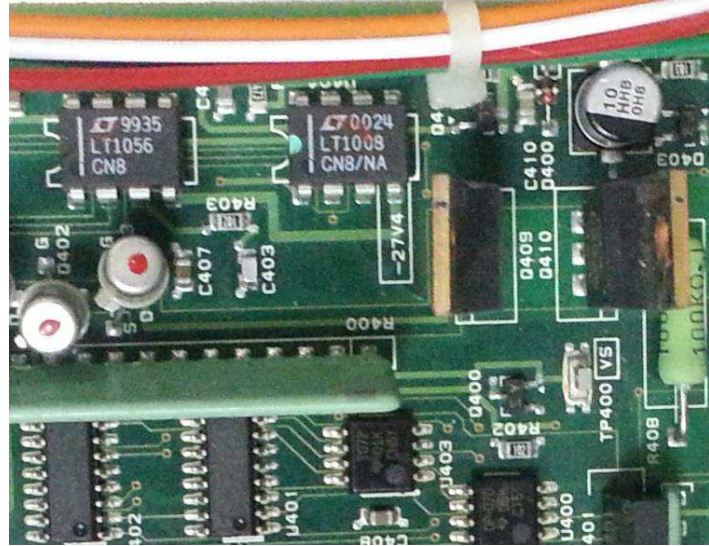
1995



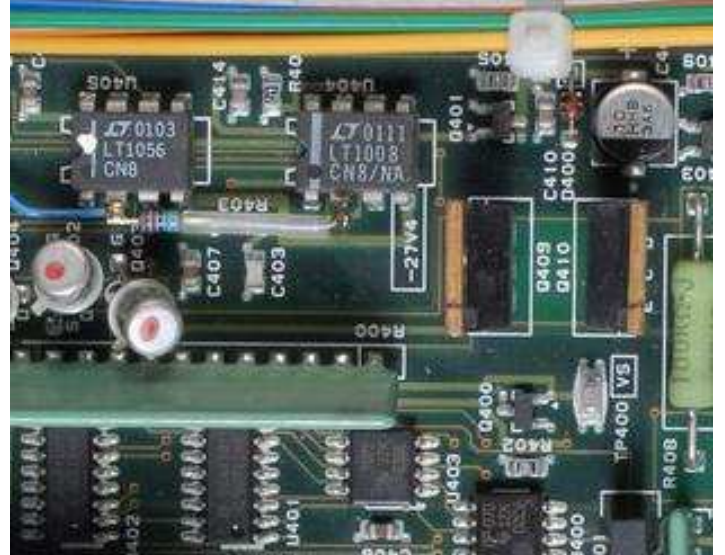
1998



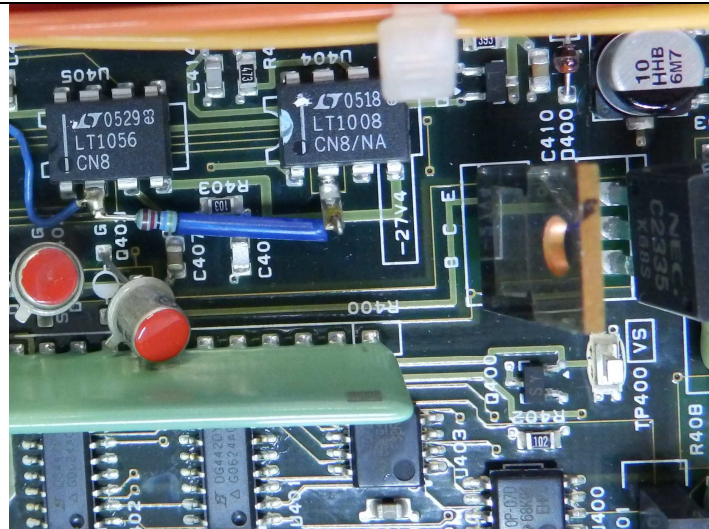
2000



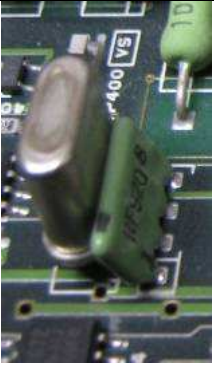

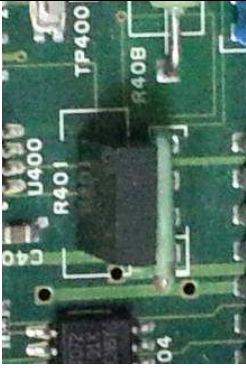

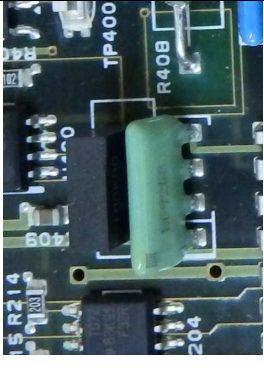



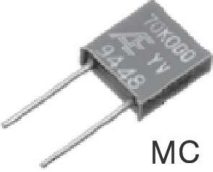
2003



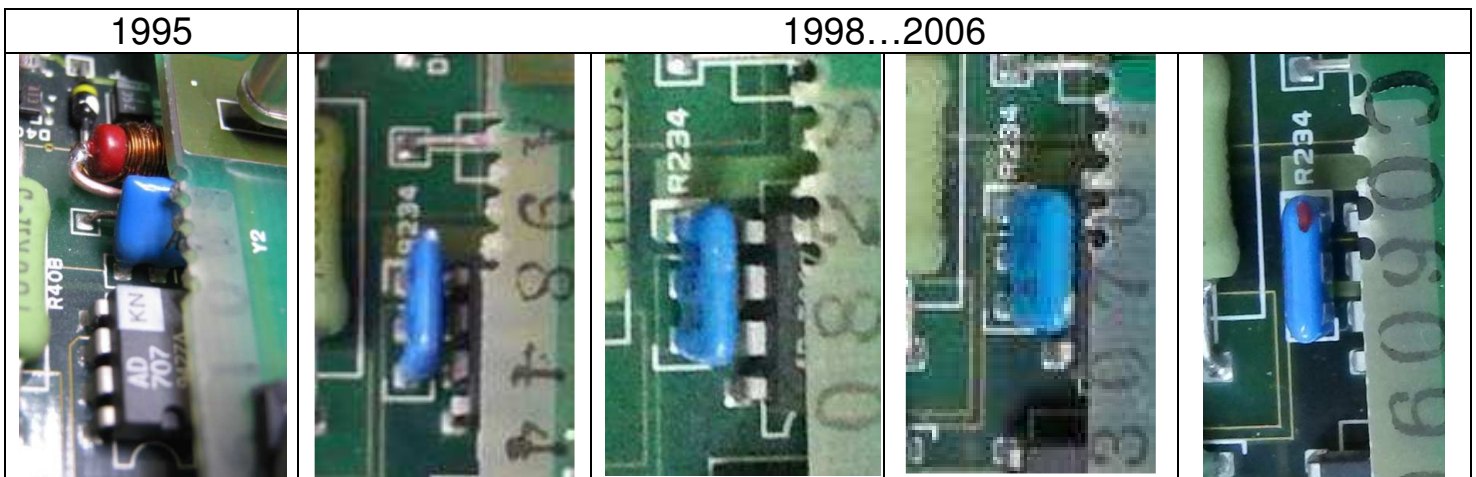
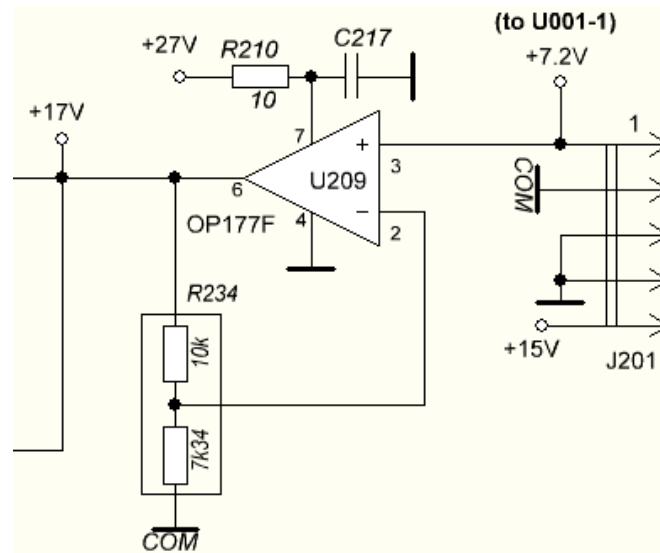
2006



2 Ohms Current Source Setting Resistor R401 100k

| 1995 | 1998 | 2000 | 2003 | 2006 | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|--|---|----|-----------|------------|---|--|--|---|--|--|--|--|------|----------------------------------|----------------------|-----------------------------|--------------------------|----|-----------|------------|--|---------------------------------|
|  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | |
| <p style="text-align: center;"> Alpha Electronics</p> <div style="display: flex; align-items: center;">  <table border="1" data-bbox="312 775 635 909"> <thead> <tr> <th>Type</th> <th>TCR (ppm/°C) -55°C to +125°C*</th> <th>Resistance Range (Ω)</th> </tr> </thead> <tbody> <tr> <td>HD</td> <td>0±2.5 (Y)</td> <td>30 to 120k</td> </tr> </tbody> </table> </div> <p>Moisture Resistance $\pm 0.0025\%$ Storage Life $\pm 0.0005\%$ / 10,000 hrs. Thermal EMF $0.1 \mu\text{V}/^\circ\text{C}$</p> | | Type | TCR (ppm/°C) -55°C to +125°C* | Resistance Range (Ω) | HD | 0±2.5 (Y) | 30 to 120k | <p style="text-align: center;"> Alpha Electronics</p> <div style="display: flex; align-items: center;">  <table border="1" data-bbox="928 725 1487 940"> <thead> <tr> <th colspan="5">TCR, RESISTANCE RANGE, TOLERANCE, RATED POWER</th> </tr> <tr> <th>Type</th> <th>TCR (ppm/°C) -55°C to +125°C*</th> <th>Resistance Range (Ω)</th> <th>Resistance Tolerance (%)**†</th> <th>Rated Power (W) at 125°C</th> </tr> </thead> <tbody> <tr> <td>MC</td> <td>0±2.5 (Y)</td> <td>30 to 200k</td> <td>±0.005 (V) ±0.01 (T) ±0.02 (Q) ±0.05 (A) ±0.1 (B) ±0.5 (D) ±1 (F)</td> <td>0.3 (0.2 at 150 kΩ or above)</td> </tr> </tbody> </table> </div> <p>Moisture Resistance $\pm 0.01\%$ Storage Life $\pm 0.0025\%$ / 10,000 hrs. Thermal EMF $1.0 \mu\text{V}/^\circ\text{C} \odot$</p> | | | TCR, RESISTANCE RANGE, TOLERANCE, RATED POWER | | | | | Type | TCR (ppm/°C) -55°C to +125°C* | Resistance Range (Ω) | Resistance Tolerance (%)**† | Rated Power (W) at 125°C | MC | 0±2.5 (Y) | 30 to 200k | ±0.005 (V) ±0.01 (T) ±0.02 (Q) ±0.05 (A) ±0.1 (B) ±0.5 (D) ±1 (F) | 0.3 (0.2 at 150 kΩ or above) |
| Type | TCR (ppm/°C) -55°C to +125°C* | Resistance Range (Ω) | | | | | | | | | | | | | | | | | | | | | | | |
| HD | 0±2.5 (Y) | 30 to 120k | | | | | | | | | | | | | | | | | | | | | | | |
| TCR, RESISTANCE RANGE, TOLERANCE, RATED POWER | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type | TCR (ppm/°C) -55°C to +125°C* | Resistance Range (Ω) | Resistance Tolerance (%)**† | Rated Power (W) at 125°C | | | | | | | | | | | | | | | | | | | | | |
| MC | 0±2.5 (Y) | 30 to 200k | ±0.005 (V) ±0.01 (T) ±0.02 (Q) ±0.05 (A) ±0.1 (B) ±0.5 (D) ±1 (F) | 0.3 (0.2 at 150 kΩ or above) | | | | | | | | | | | | | | | | | | | | | |

3 Voltage Reference Amplifier 7.2 → 17V



 Alpha Electronics

Precision Resistor Network (conformally coated)

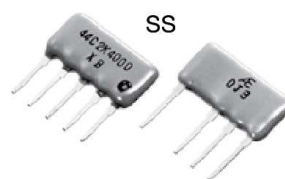
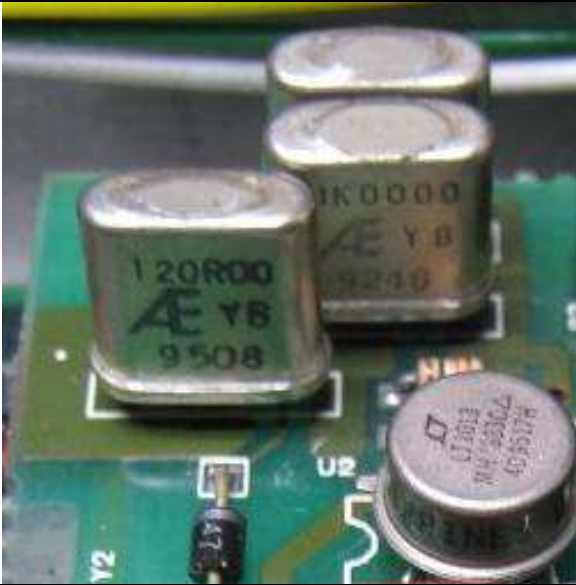


TABLE 1. TEMPERATURE CHARACTERISTICS OF RESISTANCE

| TCR (ppm/°C) -25°C to +125°C | | |
|------------------------------|----------------------------------|------------------------|
| Absolute | Tracking | |
| | Resistance Ratio (R max./R min.) | TCR Tracking Available |
| 0±5 | 1 ≤ R max./R min. ≤ 10 | ±1 |
| | 10 < R max./R min. ≤ 100 | ±2 |
| | 100 < R max./R min. | ±3 |

4 Master Reference Module

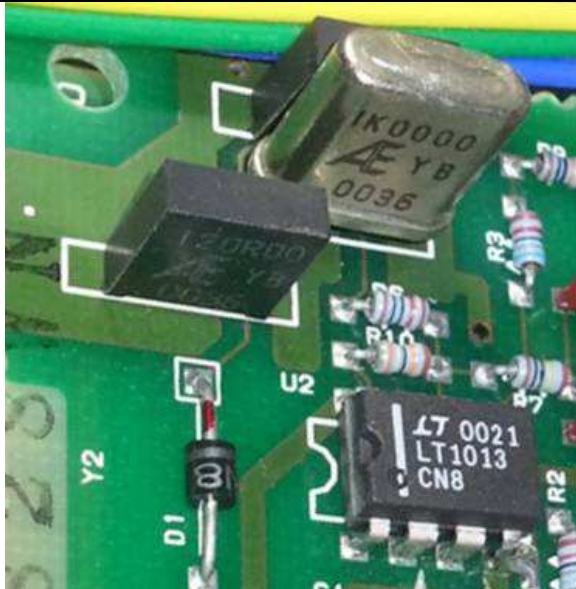
1995



1998



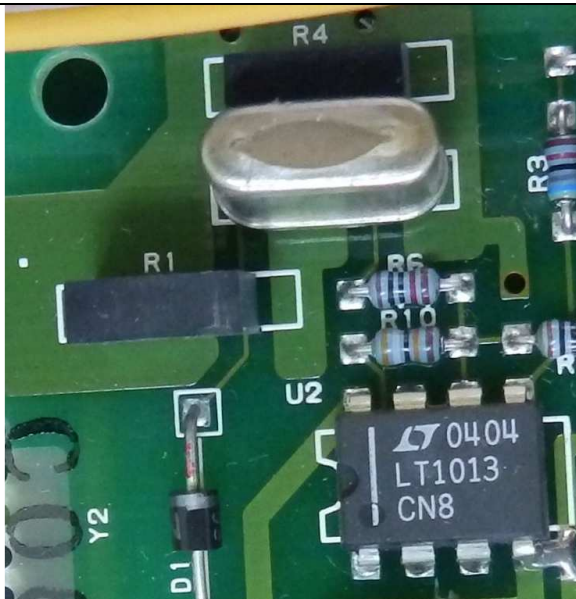
2000



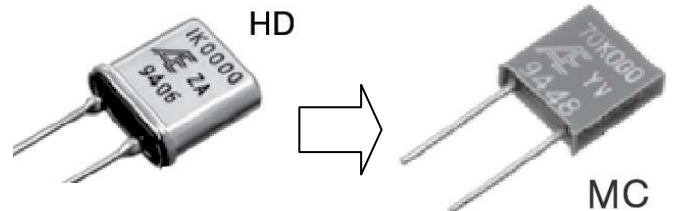
2003



2006





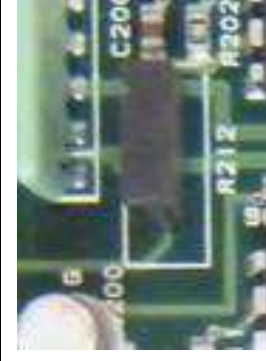
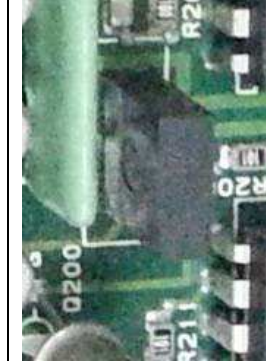


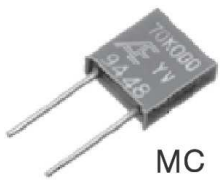
 Alpha Electronics




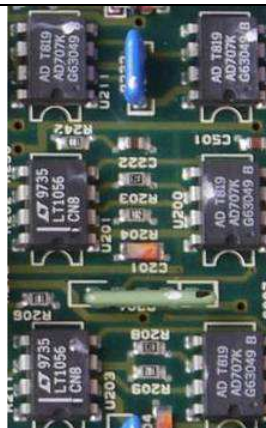
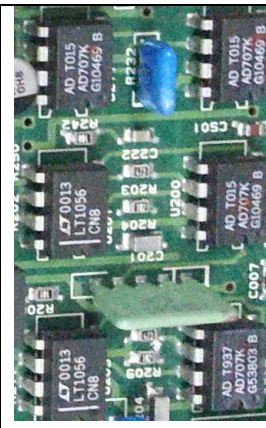
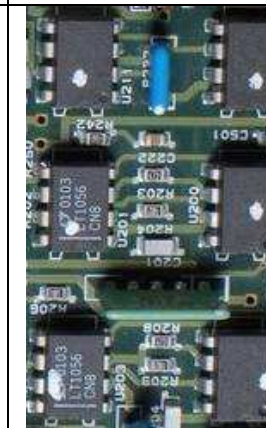
LT1013MH → LT1013CN8



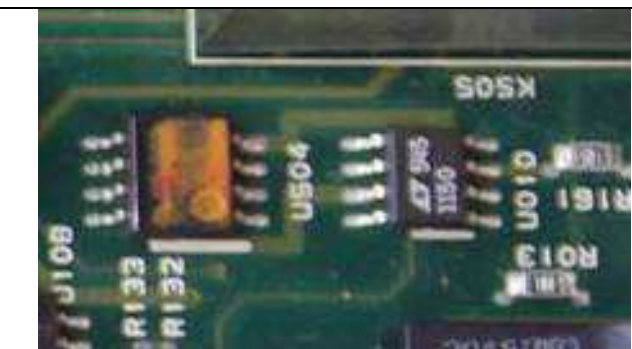
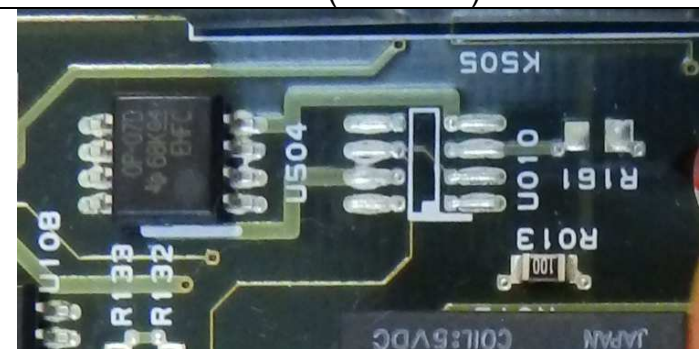
5 Multislope ADC Current Source Setting Resistor R212 26k600

| 1995...1998 | 1999 | 2000 | 2006 | | | | | | | | | | | | | | | | |
|---|---|---|--|---------------------------------|-----------|------------|--|--|--|------|----------------------------------|----------------------|----------------------------|--------------------------|----|-----------|------------|--|---------------------------------|
|  |  |  |  | | | | | | | | | | | | | | | | |
|  <p>Alpha Electronics</p>  <p>HD</p> <table border="1"> <thead> <tr> <th>Type</th> <th>TCR (ppm/°C) -55°C to +125°C*</th> <th>Resistance Range (Ω)</th> </tr> </thead> <tbody> <tr> <td>HD</td> <td>0±2.5 (Y)</td> <td>30 to 120k</td> </tr> </tbody> </table> <p>Moisture Resistance ±0.0025% Storage Life ±0.0005% / 10,000 hrs. Thermal EMF 0.1 μV/°C</p> | Type | TCR (ppm/°C) -55°C to +125°C* | Resistance Range (Ω) | HD | 0±2.5 (Y) | 30 to 120k |  <p>MC</p> <p>Moisture Resistance ±0.01% Storage Life ±0.0025% / 10,000 hrs. Thermal EMF 1.0 μV/°C ☹️</p> | <p>TCR, RESISTANCE RANGE, TOLERANCE, RATED POWER</p> <table border="1"> <thead> <tr> <th>Type</th> <th>TCR (ppm/°C) -55°C to +125°C*</th> <th>Resistance Range (Ω)</th> <th>Resistance Tolerance (%)†‡</th> <th>Rated Power (W) at 125°C</th> </tr> </thead> <tbody> <tr> <td>MC</td> <td>0±2.5 (Y)</td> <td>30 to 200k</td> <td>±0.005 (V) ±0.01 (T) ±0.02 (Q) ±0.05 (A) ±0.1 (B) ±0.5 (D) ±1 (F)</td> <td>0.3 (0.2 at 150 kΩ or above)</td> </tr> </tbody> </table> | | Type | TCR (ppm/°C) -55°C to +125°C* | Resistance Range (Ω) | Resistance Tolerance (%)†‡ | Rated Power (W) at 125°C | MC | 0±2.5 (Y) | 30 to 200k | ±0.005 (V) ±0.01 (T) ±0.02 (Q) ±0.05 (A) ±0.1 (B) ±0.5 (D) ±1 (F) | 0.3 (0.2 at 150 kΩ or above) |
| Type | TCR (ppm/°C) -55°C to +125°C* | Resistance Range (Ω) | | | | | | | | | | | | | | | | | |
| HD | 0±2.5 (Y) | 30 to 120k | | | | | | | | | | | | | | | | | |
| Type | TCR (ppm/°C) -55°C to +125°C* | Resistance Range (Ω) | Resistance Tolerance (%)†‡ | Rated Power (W) at 125°C | | | | | | | | | | | | | | | |
| MC | 0±2.5 (Y) | 30 to 200k | ±0.005 (V) ±0.01 (T) ±0.02 (Q) ±0.05 (A) ±0.1 (B) ±0.5 (D) ±1 (F) | 0.3 (0.2 at 150 kΩ or above) | | | | | | | | | | | | | | | |

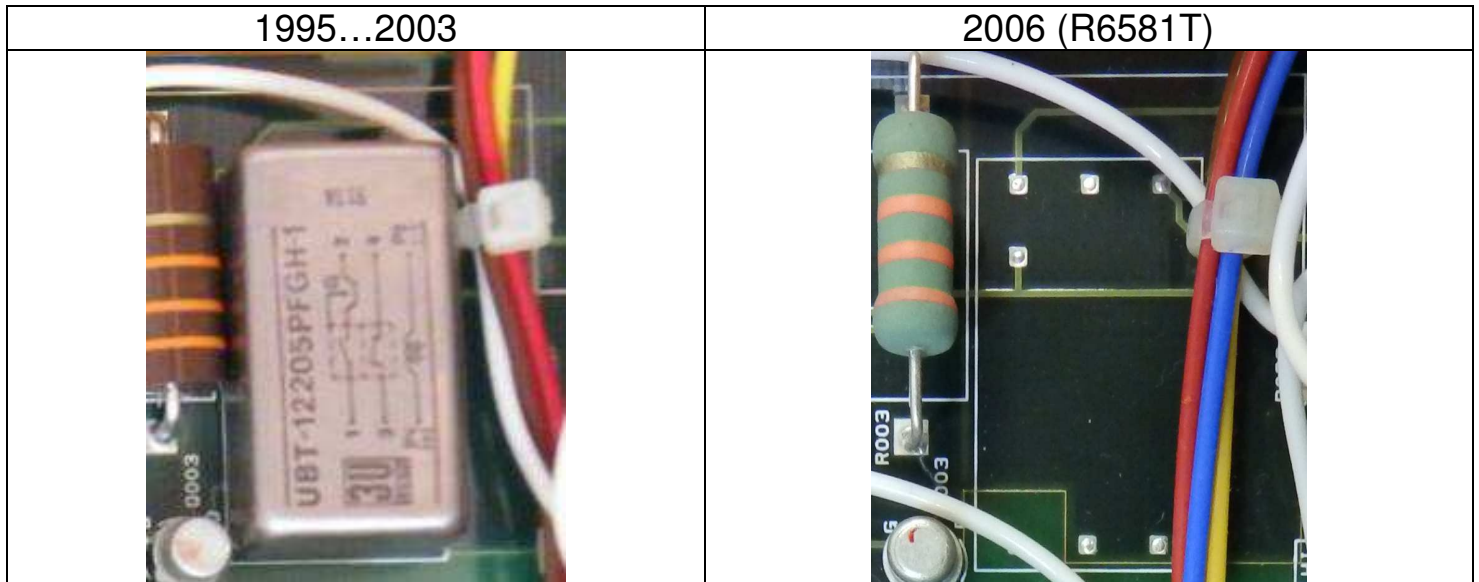
6 Multislope ADC Current Sources Op-amps

| 1995 | 1998...2000 | 2003 | 2006 |
|--|---|---|--|
|  |  |  |  |
| LT1056ACH AD707K | LT1056CN8 AD707K | LT1056CN8 OP177F | LT1056CN8 OP177F |

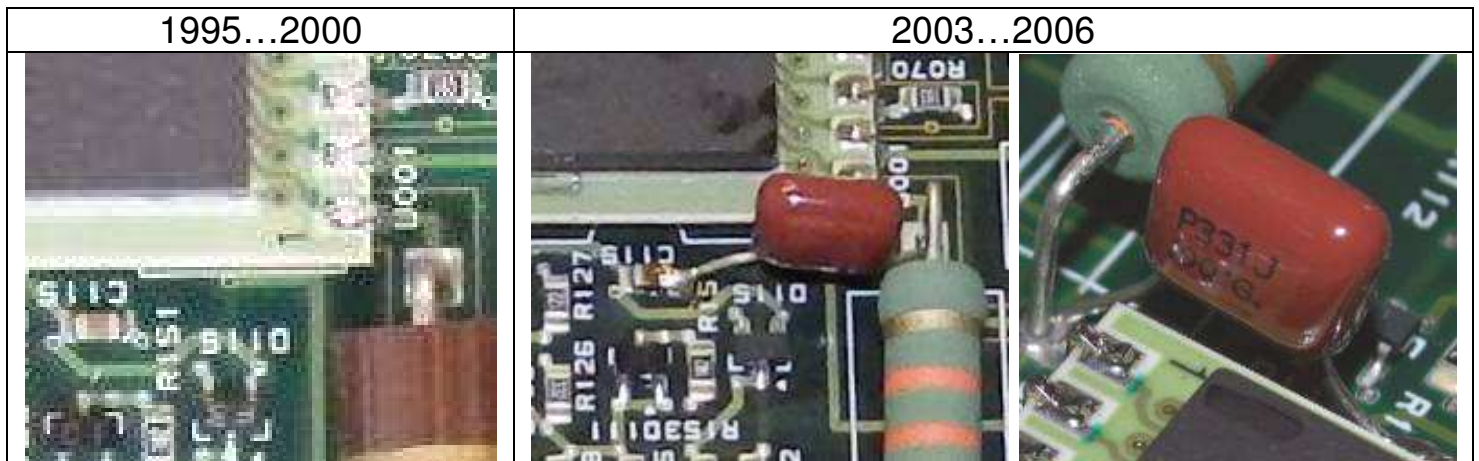
7 ACI Amplifier Op-amp U010 LTC1150

| 1995...2003 | 2006 (R6581T) |
|--|--|
|  |  |

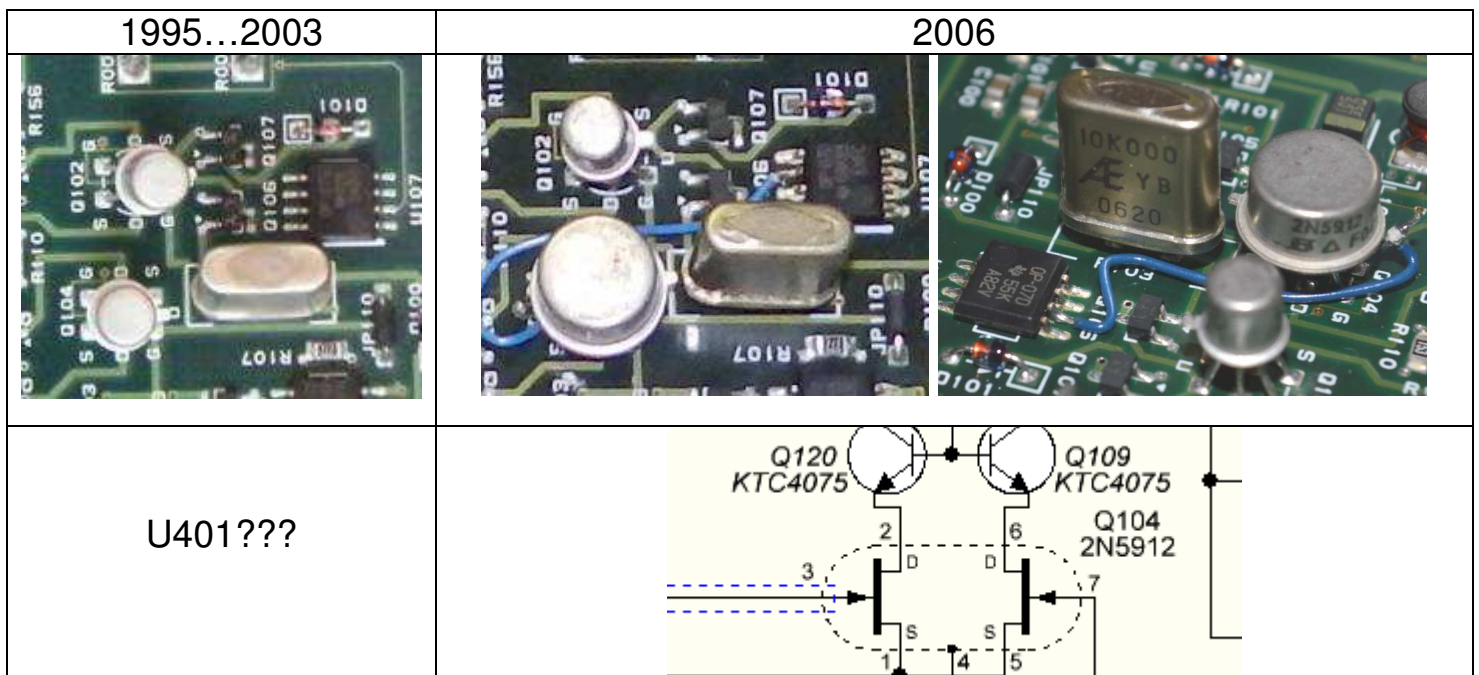
8 ACV/ACI Relay K010




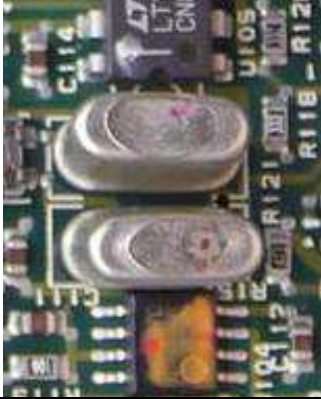
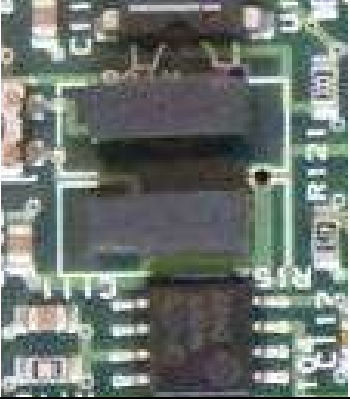
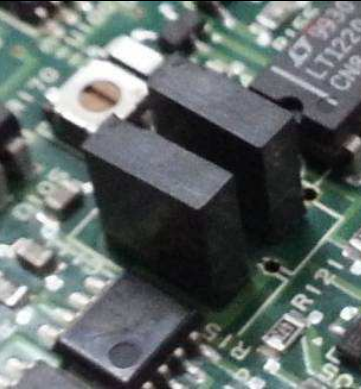
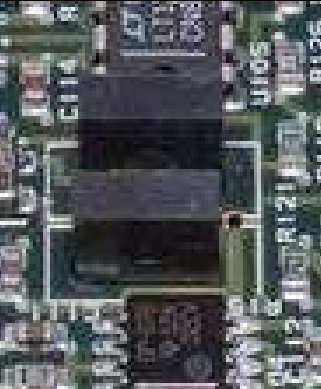
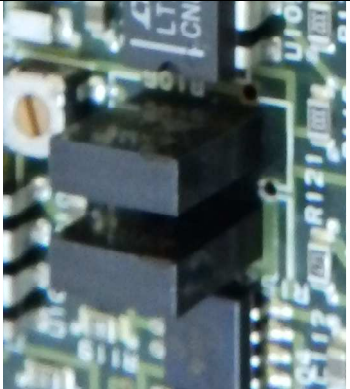

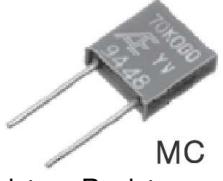
9 Ohms-Hi Protection Capacitor 330pF



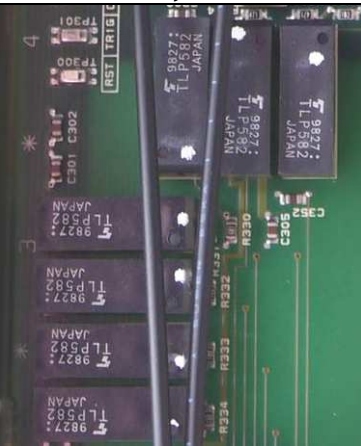
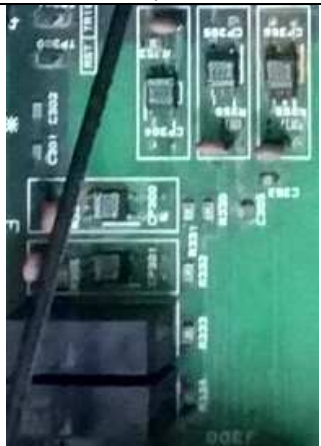
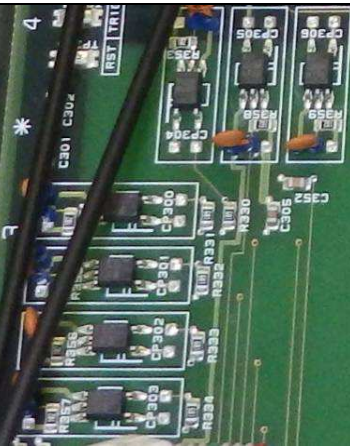
10 Input Amplifier Dual FET Q104








11 Input Amplifier Differential Stage Loads Resistors R152, R106 40k000

| <p>1995</p>  | <p>1998</p>  | <p>1999</p>  | | | | | | | | | | | | | | | | | |
|--|--|--|--|---------------------------------|----|-----------|------------|--|--|------|----------------------------------|----------------------|---------------------------|--------------------------|----|-----------|------------|--|---------------------------------|
| <p>2000</p>  | <p>2003</p>  | <p>2006</p>  | | | | | | | | | | | | | | | | | |
| <p>AE Alpha Electronics</p>  <p>HD</p> <table border="1" data-bbox="311 1115 635 1249"> <thead> <tr> <th>Type</th> <th>TCR (ppm/°C) -55°C to +125°C*</th> <th>Resistance Range (Ω)</th> </tr> </thead> <tbody> <tr> <td>HD</td> <td>0±2.5 (Y)</td> <td>30 to 120k</td> </tr> </tbody> </table> <p>Moisture Resistance ±0.0025% Storage Life ±0.0005% / 10,000 hrs. Thermal EMF 0.1 μV/°C</p> | | Type | TCR (ppm/°C) -55°C to +125°C* | Resistance Range (Ω) | HD | 0±2.5 (Y) | 30 to 120k | <p>TCR, RESISTANCE RANGE, TOLERANCE, RATED POWER</p>  <p>MC</p> <table border="1" data-bbox="933 1097 1484 1265"> <thead> <tr> <th>Type</th> <th>TCR (ppm/°C) -55°C to +125°C*</th> <th>Resistance Range (Ω)</th> <th>Resistance Tolerance (%)†</th> <th>Rated Power (W) at 125°C</th> </tr> </thead> <tbody> <tr> <td>MC</td> <td>0±2.5 (Y)</td> <td>30 to 200k</td> <td>±0.005 (V) ±0.01 (T) ±0.02 (Q) ±0.05 (A) ±0.1 (B) ±0.5 (D) ±1 (F)</td> <td>0.3 (0.2 at 150 kΩ or above)</td> </tr> </tbody> </table> <p>Moisture Resistance ±0.01% Storage Life ±0.0025% / 10,000 hrs. Thermal EMF 1.0 μV/°C ☹</p> | | Type | TCR (ppm/°C) -55°C to +125°C* | Resistance Range (Ω) | Resistance Tolerance (%)† | Rated Power (W) at 125°C | MC | 0±2.5 (Y) | 30 to 200k | ±0.005 (V) ±0.01 (T) ±0.02 (Q) ±0.05 (A) ±0.1 (B) ±0.5 (D) ±1 (F) | 0.3 (0.2 at 150 kΩ or above) |
| Type | TCR (ppm/°C) -55°C to +125°C* | Resistance Range (Ω) | | | | | | | | | | | | | | | | | |
| HD | 0±2.5 (Y) | 30 to 120k | | | | | | | | | | | | | | | | | |
| Type | TCR (ppm/°C) -55°C to +125°C* | Resistance Range (Ω) | Resistance Tolerance (%)† | Rated Power (W) at 125°C | | | | | | | | | | | | | | | |
| MC | 0±2.5 (Y) | 30 to 200k | ±0.005 (V) ±0.01 (T) ±0.02 (Q) ±0.05 (A) ±0.1 (B) ±0.5 (D) ±1 (F) | 0.3 (0.2 at 150 kΩ or above) | | | | | | | | | | | | | | | |

12 Optical Isolators

| | | |
|---|--|---|
| <p>1995, 1998</p>  | <p>2000, 2003</p>  | <p>2006</p>  |
| <p>TLP582 Isolation 5000 V_{RMS} Delay t_{PLH}/t_{PHL} 250/270 ns typ.</p> | <p>TLP582 + PS9701 Isolation 2500 V_{RMS} Delay t_{PLH}/t_{PHL} 50/50 ns typ.</p> | <p>PS9701 Isolation 2500 V_{RMS} Delay t_{PLH}/t_{PHL} 54/51 ns typ.</p> |

13 ADC Integrator Op-amps

| 1995 | 1998...2000 | | 2003, 2006 | |
|--|---|---|--|---|
|  |  |  |  |  |
| <p>LT1056ACH AD707K</p> | <p>LT1056CN8 AD707K</p> | | <p>LT1056CN8 OP177F</p> | |

14 Common Mode Chokes

