

# **Instruction Manual**



**TSG 120  
YC / NTSC Signal Generator  
S/N B020765 and Above  
070-8003-02**

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| City, State, Postal code | Calibration Services (1,2,3,4, or 5 years) |
| Country                  | Instrument model and serial number         |
| Phone                    | Instrument purchase date                   |



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# General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use this product only as specified.

*Only qualified personnel should perform service procedures.*

## To Avoid Fire or Personal Injury

**Use Proper Power Cord.** Use only the power cord specified for this product and certified for the country of use.

**Use Proper Voltage Setting.** Before applying power, ensure that the line selector is in the proper position for the power source being used.

**Connect and Disconnect Properly.** Do not connect or disconnect probes or test leads while they are connected to a voltage source.

**Ground the Product.** This product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded.

**Observe All Terminal Ratings.** To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

Do not apply a potential to any terminal, including the common terminal, that exceeds the maximum rating of that terminal.

**Do Not Operate Without Covers.** Do not operate this product with covers or panels removed.

**Use Proper Fuse.** Use only the fuse type and rating specified for this product.

**Avoid Exposed Circuitry.** Do not touch exposed connections and components when power is present.

**Wear Eye Protection.** Wear eye protection if exposure to high-intensity rays or laser radiation exists.

**Do Not Operate With Suspected Failures.** If you suspect there is damage to this product, have it inspected by qualified service personnel.

**Do Not Operate in Wet/Damp Conditions.**

**Do Not Operate in an Explosive Atmosphere.**

**Keep Product Surfaces Clean and Dry.**

**Provide Proper Ventilation.** Refer to the manual's installation instructions for details on installing the product so it has proper ventilation.

## Symbols and Terms

**Terms in this Manual.** These terms may appear in this manual:



---

**WARNING.** *Warning statements identify conditions or practices that could result in injury or loss of life.*

---



---

**CAUTION.** *Caution statements identify conditions or practices that could result in damage to this product or other property.*

---

**Terms on the Product.** These terms may appear on the product:

DANGER indicates an injury hazard immediately accessible as you read the marking.

WARNING indicates an injury hazard not immediately accessible as you read the marking.

CAUTION indicates a hazard to property including the product.

**Symbols on the Product.** The following symbols may appear on the product:



WARNING  
High Voltage



Protective Ground  
(Earth) Terminal



CAUTION  
Refer to Manual



Double  
Insulated



# Getting Started



# Getting Started

The TSG 120 YC/NTSC Signal Generator is a simple, cost-effective test signal generator designed for the service environment. The TSG 120 digitally generates NTSC and YC test signals simultaneously.

Table 1–1 lists the test signals supplied by the standard generator.

**Table 1–1: Standard instrument test signal summary**

| Format  | Standard Test Signals |             |                 |
|---------|-----------------------|-------------|-----------------|
| YC/NTSC | SMPTE Bars            | Red Field   | 50% Flat Field  |
|         | Convergence           | Green Field | 100% Flat Field |
|         | Chrominance Noise     | Blue Field  | 0% Flat Field   |
|         | Chrominance Re-sponse | 5 Step      | Pulse & Bar     |
|         | Matrix                | Multiburst  | Mod Ramp        |
|         |                       |             | Bounce          |

Besides a complement of video signals, this test signal generator supplies two channels of a balanced 1 kHz XLR-audio tone with jumper-selectable ID click in Channel 1. The frequency of the ID click is adjustable.

## Option 01

Option 01 adds a dedicated black burst output, utilizing the OPTION connector on the rear panel. After S/N B010287, this output includes a Field Reference pulse on field 1 line 10.

## Option 02

Option 02 adds a special signal for the cable TV industry.

Table 1–2 lists the test signals supplied by the TSG 120 Option 02.

**Table 1–2: Option 02 test signal summary**

| Format  | Opt 02 Test Signals          |                     |
|---------|------------------------------|---------------------|
| YC/NTSC | SMPTE Bars                   | 75% Bars            |
|         | Cable Sweep                  | Cable Multiburst    |
|         | (Sin x)/x<br>3 dB = 4.75 MHz | 0% Field            |
|         | 50% Field                    | 100% Field          |
|         | Cable Matrix                 | Transmission Matrix |
|         | NTC7 Matrix                  | 5-Step              |
|         | FCC Composite                | Multiburst          |
|         | Field Square                 | Bounce              |

## Audio Tone ID

The generators audio tone output is a balanced 1 kHz XLR audio tone. Audio output gain is adjustable via R123 (Channel 1) and R122 (Channel 2).

A channel ID click is provided on Channel 1. The frequency of the ID click may be changed, or the click may be disabled. To change the frequency of the ID click, adjust R126. To disable the ID click, move jumper J12 from position 1-2 to position 2-3.

## Physical Description

The TSG 120 YC/NTSC Signal Generator consists of four circuit boards and three cables in a rectangular sheet-aluminum chassis with a removeable top cover. The major internal components are:

- A main board that performs most of the generators functions.
- A front panel board that decodes front-panel button selections.
- A ribbon cable that feeds decoded front-panel information to the main board.
- Two BNC connector mounting boards: the top board contains one SVHS and three BNC connectors; the bottom board contains two BNC connectors.
- A ribbon cable that supplies signals from the main board to the top BNC connector mounting board.
- A ribbon cable that supplies signals from the main board to the bottom BNC connector mounting board.

## Controls, Connections, and Jumpers

This section describes the front and rear panel controls.



**CAUTION.** This instrument is shipped from the factory configured for 115 VAC, 60 Hz operation. Attempting to operate the instrument at any other voltage without reconfiguring the power supply may cause damage. Refer to the Section 5, Maintenance for information on configuring the power supply.

### Front Panel Controls

The front panel contains eight test-signal selection buttons. Above the buttons are two rows of test signal selections. On the left side are two LEDs, one for each row. These LEDs indicate the test signal row selected.

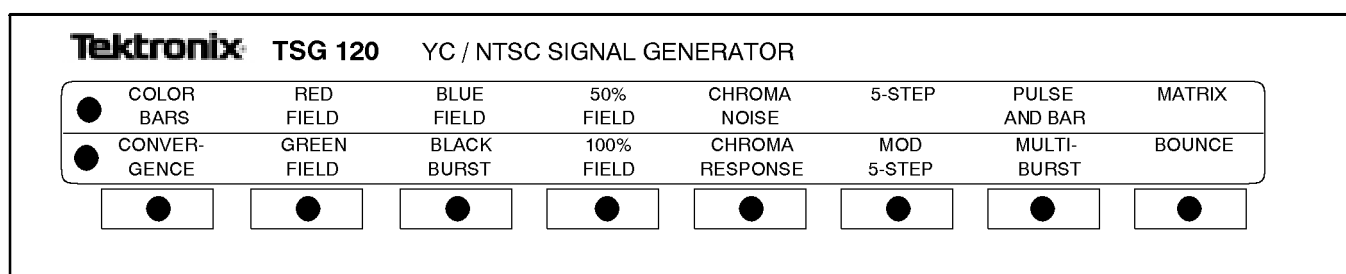


Figure 1-1: Standard Front Panel and Controls

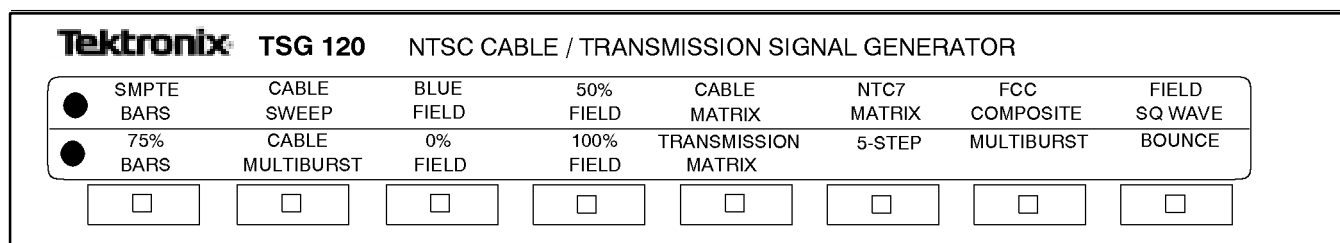
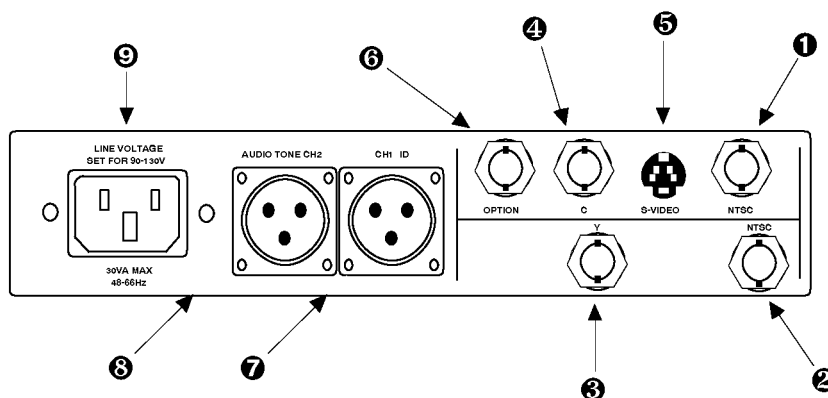


Figure 1-2: Option 02 Front Panel and Controls

Pressing a test-signal button lights the top-row LED and the LED in the button. Successive presses of the same button toggles between the selections above that button (for example, between Color Bars and Convergence).

## Rear Panel Connections

The Rear Panel connections, shown in Figure 1–3, are described below.



**Figure 1–3: Rear Panel and Connections**

1. NTSC test signal output.
2. NTSC test signal output.
3. Luminance output. (Y)
4. Chrominance output. (C)
5. Y/C output.



**CAUTION.** Do not use the S-Video output simultaneously with the Y and C BNC outputs. Using the S-Video output while also using the Y and C BNC outputs will degrade output accuracy.

6. Option 01 (Black Burst output).
7. 1 kHz audio tone output with jumper-selectable ID click (see jumper table and calibration procedure).
8. 1 kHz audio tone output in phase with Channel 1.
9. Electrical mains input, factory set for 115 VAC (to change the power supply operating voltage, see Configuring the Power Supply in Section 5).

**Jumpers** Table 1–3 describes the jumper settings and their functions.

**Table 1–3: Jumper position and function summary.**

| Jumper                   | Position | Function                                                                                  |
|--------------------------|----------|-------------------------------------------------------------------------------------------|
| J2                       | 1–2      | Service jumper, factory setting                                                           |
|                          | 2–3      | Diagnostic test signals enabled                                                           |
| J3                       | TBD      | For future use                                                                            |
| J6                       | 1–2      | C/B–Y channel test signal enabled (factory setting)                                       |
|                          | 2–3      | C/B–Y channel test signal disabled                                                        |
| J7                       | 1–2      | Y channel test signal enabled (factory setting)                                           |
|                          | 2–3      | Y channel test signal disabled                                                            |
| J8                       | 1–2      | CTDM/R–Y channel test signal enabled (Option 01 only)                                     |
|                          | 2–3      | CTDM/R–Y channel test signal disabled                                                     |
| J12                      | 1–2      | Test jumper. ID click enabled (factory setting)                                           |
|                          | 2–3      | ID click disabled (factory setting)                                                       |
| J30                      | 1–2      | Test jumper. Power supply circuit testing (removing this jumper disables the –5 V supply) |
| J31                      | 1–2      | Test jumper. Power supply circuit testing (removing this jumper disables the +5 V supply) |
| J108<br>(Option 01 only) | 1–2      | Field 1 Line 10 pulse enabled (black burst output)                                        |
|                          | 2–3      | Field 1 Line 10 pulse disabled                                                            |





# Specifications



# Specifications

The material in this section is organized into two main groupings: the specification tables and the supporting figures. The specification tables include:

- NTSC/YC general and test signal specifications
- Signal level specifications
- Power supply, physical, and environmental specifications

The supporting figures (waveform diagrams and related data) follow the specification tables.

The performance requirements listed in this section apply over an ambient temperature range of +5 to +35°C after a 20-minute warmup. The rated accuracies are valid when this instrument is calibrated at +20 to +30°C.

**Table 2–1: General NTSC/YC test signal characteristics**

| Characteristics                  | Performance requirements       | Supplemental information                  |
|----------------------------------|--------------------------------|-------------------------------------------|
| Luminance Amplitude Accuracy     | $\pm 1\%$                      | Measured at 100 IRE                       |
| Chrominance-to-Luminance Gain    | $\pm 1\%$                      |                                           |
| Chrominance Accuracy on C Output | $\pm 1\%$                      | Measured with Chroma Noise signal         |
| Blanking Level                   | 0 VDC $\pm 50$ mV              |                                           |
| Luminance Rise Time              | 250 ns $\pm 25$ ns             | Except as otherwise specified             |
| Chrominance Rise Time            | 400 ns $\pm 40$ ns             |                                           |
| Burst Amplitude                  | 285.7 mV (40 IRE) $\pm 2\%$    |                                           |
| Burst Rise Time                  | 400 ns $\pm 40$ ns             |                                           |
| Sync Amplitude                   | 285.7 mV $\pm 2\%$             |                                           |
| Sync Rise Time                   | 140 ns $\pm 20$ ns             |                                           |
| Line Timing                      | See Figures 2–1 to 2–12        |                                           |
| Front Porch Duration             | 1.5 $\mu$ s $\pm 0.1$ $\mu$ s  |                                           |
| Line Blanking Interval           | 10.9 $\mu$ s $\pm 0.2$ $\mu$ s | Measured at 20 IRE points of active video |
| Breezeway Duration               | 600 ns $\pm 100$ ns            |                                           |
| Line Sync Duration               | 4.7 $\mu$ s $\pm 0.1$ $\mu$ s  | 50% amplitude point                       |
| Vertical Serration Duration      | 4.7 $\mu$ s $\pm 0.1$ $\mu$ s  | 50% amplitude point                       |
| Equalizing Pulse Duration        | 2.3 $\mu$ s $\pm 0.1$ $\mu$ s  | 50% amplitude point                       |

**Table 2–1: General NTSC/YC test signal characteristics (Cont.)**

| Characteristics                            | Performance requirements                                                           | Supplemental information                                                                                         |
|--------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Burst<br>Delay from Sync<br>Burst Duration | 5.308 $\mu\text{s} \pm 0.35 \mu\text{s}$<br>2.51 $\mu\text{s} \pm 0.1 \mu\text{s}$ | 19 cycles of subcarrier<br>9 cycles of subcarrier                                                                |
| Output Impedance                           |                                                                                    | 75 $\Omega$                                                                                                      |
| Return Loss                                |                                                                                    | $\geq 36 \text{ dB}$ to 4.2 MHz                                                                                  |
| Crosstalk                                  | $\geq 60 \text{ dB}$ down                                                          |                                                                                                                  |
| SNR to 5 MHz                               | $\geq 60 \text{ dB}$                                                               |                                                                                                                  |
| Oscillator Frequency Stability             | 14.31818 MHz $\pm 28 \text{ Hz}$                                                   | 5 – 35° C temperature range. Oscillator to be adjusted annually (divide by 4 to obtain subcarrier specification) |
| SCH Accuracy                               | 0° $\pm 5^\circ$                                                                   |                                                                                                                  |
| Chrominance-to-Luminance Delay             | $\leq 12 \text{ ns}$                                                               |                                                                                                                  |
| Frequency Response<br>NTSC (Multiburst)    | Flat to 4.2 MHz $\pm 2\%$                                                          |                                                                                                                  |

**Table 2–2: NTSC/YC test signals**

| Characteristics                                                                 | Performance requirements                                  | Supplemental information                                                        |
|---------------------------------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------|
| Color Bars                                                                      | SMPTE Bars                                                | See Figures 2–1, 2–2, 2–3                                                       |
| Convergence<br>Amplitude<br>Pattern<br><br>Pulse HAD                            | 549.1 mV (76.9 IRE)<br><br><br>225 ns $\pm 25 \text{ ns}$ | See Figure 2–12<br><br>Crosshatch-14 horizontal and 17 vertical lines per field |
| Red Field<br>Luminance Pedestal<br>Chrominance Amplitude<br>Chrominance Phase   | 201.74 mV<br>626.66 mV p-p<br>103.5°                      | See Figure 2–4                                                                  |
| Green Field<br>Luminance Pedestal<br>Chrominance Amplitude<br>Chrominance Phase | 344.45 mV<br>585.28 mV p-p<br>240.7°                      | See Figure 2–5                                                                  |
| Blue Field<br>Luminance Pedestal<br>Chrominance Amplitude<br>Chrominance Phase  | 110.06 mV<br>443.76 mV p-p<br>347.1°                      | See Figure 2–6                                                                  |

**Table 2-2: NTSC/YC test signals (Cont.)**

| Characteristics                                                                                                                                           | Performance requirements                                                                                                                          | Supplemental information                                                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Flat Fields<br>50%<br>100%<br>0%                                                                                                                          | Amplitudes:<br>357.14 mV (50 IRE)<br>714.29 mV (100 IRE)<br>0.0 mV (0 IRE)                                                                        | See Figure 2-7<br>See Figure 2-8<br>See Figure 2-9                                                                                                  |
| Chrominance Noise<br>Luminance Pedestal<br>Chrominance Amplitude<br>Chrominance Phase                                                                     | 357.14 mV<br>714.29 mV p-p<br>103.5°                                                                                                              | See Figure 2-10                                                                                                                                     |
| Chrominance Response<br>C-channel output                                                                                                                  | Flat from 2.58 MHz to 4.58 MHz $\pm$ 1%                                                                                                           | See Figure 2-11                                                                                                                                     |
| 5-Step (Gray Scale)<br>Amplitude<br>Linearity Error                                                                                                       | 714.3 mV (100 IRE)<br>$\leq$ 1%                                                                                                                   | See Figure 2-13<br>Relative step matching                                                                                                           |
| Modulated Ramp<br>Luminance Amplitude<br>Chrominance Amplitude<br>Differential Gain<br>Differential Phase                                                 | 714.3 mV (100 IRE)<br>285.7 mV (40 IRE)<br>0.3% maximum<br>0.3° maximum                                                                           | See Figure 2-14<br><br><0.1% Typical<br><0.1° Typical                                                                                               |
| Pulse & Bar with Window<br>2T Pulse HAD<br>White Bar Amplitude<br>Field Tilt<br>Line Tilt<br>Field Timing<br>Pulse-to-Bar Ratio<br>Ringing                | 250 ns $\pm$ 25 ns<br>100 IRE<br>$\leq$ 0.5%<br>$\leq$ 0.5%<br>Lines 72 - 202<br>1:1 $\pm$ 1%<br>$\leq$ 1% peak                                   | See Figure 2-15                                                                                                                                     |
| Multiburst<br>White Reference Bar Amplitude<br>Packet Amplitudes<br>Pedestal<br>Burst Frequencies<br><br>Packet Rise Time<br>500 kHz<br><br>Other Packets | 500 mV (70 IRE)<br>428.6 mV (60 IRE) p-p<br>258.7 mV (40 IRE)<br>500 kHz, 1.0 MHz, 2.0 MHz, 3.0 MHz,<br>3.58 MHz, 4.2 MHz<br><br><br><br><br><br> | See Figure 2-16<br><br><br><br><br><br><br><br><br><br>140 ns typical (sine-squared shaped packets)<br>400 ns typical (sine-squared shaped packets) |
| Matrix                                                                                                                                                    | Convergence, Color Bars, Reverse Bars,<br>Convergence, IWQB, and convergence                                                                      | See Figure 2-17                                                                                                                                     |

**Table 2–3: NTSC/YC test signals Option 02**

| Characteristics                                              | Performance requirements                                                                                                                                                                                                                                                                                                                                                                                   | Supplemental information                       |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|---------------|--------|------------------|-----------------|------------------|---------|----------------|---------|-----------|---------|---------------|---------|----------------------------------------------------------------|--|
| Cable Sweep                                                  | 0.1 – 4.2 MHz<br>Markers at 1, 2, 3, 3.75 and 4.0 MHz<br>Sweep on Lines 22–221<br>Markers on Lines 222–262                                                                                                                                                                                                                                                                                                 | See Figures 2–23, 2–22, & 2–21                 |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| (Sin x)/x<br>Peak<br>Pedestal<br>Reference flag<br>Frequency | 351.1 mV<br>219.3 & 495.0 mV<br>428.6 mVp-p<br>4.75 MHz                                                                                                                                                                                                                                                                                                                                                    | 3 dB = 4.75 MHz<br><br>See Figures 2–21 & 2–26 |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| FCC Composite                                                | Modulated Staircase, 2T Pulse, Modulated Pulse, and 100 IRE Bar.                                                                                                                                                                                                                                                                                                                                           | See Figures 2–24 & 2–25                        |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| Field Square Wave                                            | <table><tr><td><i>Line</i></td><td><i>Signal</i></td></tr><tr><td>72–202</td><td>Black lines</td></tr><tr><td>21–71 &amp; 203–262</td><td>White Lines</td></tr></table>                                                                                                                                                                                                                                    | <i>Line</i>                                    | <i>Signal</i> | 72–202 | Black lines      | 21–71 & 203–262 | White Lines      |         |                |         |           |         |               |         |                                                                |  |
| <i>Line</i>                                                  | <i>Signal</i>                                                                                                                                                                                                                                                                                                                                                                                              |                                                |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| 72–202                                                       | Black lines                                                                                                                                                                                                                                                                                                                                                                                                |                                                |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| 21–71 & 203–262                                              | White Lines                                                                                                                                                                                                                                                                                                                                                                                                |                                                |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| 75% Color Bars                                               | 75% Color Bars with 100% Flag and 7.5% Setup.                                                                                                                                                                                                                                                                                                                                                              | See Figures 2–18 & 2–19                        |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| Cable Multiburst                                             | 60 IRE White Reference Pulse with 428.6 mV (60 IRE Packet Amplitudes of 0.75, 1.25, 2.0, 3.0, 3.75, and 4.0 MHz equal energy packets                                                                                                                                                                                                                                                                       | See Figures 2–20 & 2–21                        |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| Ghost Canceling Check Pulse                                  | 2T Pulse at start and end of horizontal blanking                                                                                                                                                                                                                                                                                                                                                           | See Figures 2–21 & 2–27                        |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| NTC7 Composite                                               | 100 IRE bar (with 125 ns rise time), 2T and 12.5T mod pulse, 90 IRE 5-Step staircase with 40 IRE subcarrier.                                                                                                                                                                                                                                                                                               | See Figures 2–28 & 2–29                        |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| NTC7 Combination                                             | Multiburst (0.5, 1.0, 2.0, 3.0, 3.57954, and 4.2 MHz) and VIRS.                                                                                                                                                                                                                                                                                                                                            | See Figures 2–30 & 2–31                        |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| Transmission Matrix                                          | <table><tr><td><i>Line</i></td><td><i>Signal</i></td></tr><tr><td>21–61</td><td>NTC7 Composite</td></tr><tr><td>62–101</td><td>NTC7 Combination</td></tr><tr><td>102–141</td><td>75% Color Bars</td></tr><tr><td>142–181</td><td>(Sin x)/x</td></tr><tr><td>182–221</td><td>50% Gray</td></tr><tr><td>222–262</td><td>Ghost Canceling Check Pulse &amp; Horizontal Blanking Check Signal</td></tr></table> | <i>Line</i>                                    | <i>Signal</i> | 21–61  | NTC7 Composite   | 62–101          | NTC7 Combination | 102–141 | 75% Color Bars | 142–181 | (Sin x)/x | 182–221 | 50% Gray      | 222–262 | Ghost Canceling Check Pulse & Horizontal Blanking Check Signal |  |
| <i>Line</i>                                                  | <i>Signal</i>                                                                                                                                                                                                                                                                                                                                                                                              |                                                |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| 21–61                                                        | NTC7 Composite                                                                                                                                                                                                                                                                                                                                                                                             |                                                |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| 62–101                                                       | NTC7 Combination                                                                                                                                                                                                                                                                                                                                                                                           |                                                |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| 102–141                                                      | 75% Color Bars                                                                                                                                                                                                                                                                                                                                                                                             |                                                |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| 142–181                                                      | (Sin x)/x                                                                                                                                                                                                                                                                                                                                                                                                  |                                                |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| 182–221                                                      | 50% Gray                                                                                                                                                                                                                                                                                                                                                                                                   |                                                |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| 222–262                                                      | Ghost Canceling Check Pulse & Horizontal Blanking Check Signal                                                                                                                                                                                                                                                                                                                                             |                                                |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| Cable Matrix                                                 | <table><tr><td><i>Line</i></td><td><i>Signal</i></td></tr><tr><td>21–61</td><td>Cable Multiburst</td></tr><tr><td>62–101</td><td>Cable Sweep</td></tr><tr><td>102–141</td><td>Cable Markers</td></tr><tr><td>142–181</td><td>(Sin x)/x</td></tr><tr><td>182–221</td><td>FCC Composite</td></tr><tr><td>222–262</td><td>5-Step</td></tr></table>                                                            | <i>Line</i>                                    | <i>Signal</i> | 21–61  | Cable Multiburst | 62–101          | Cable Sweep      | 102–141 | Cable Markers  | 142–181 | (Sin x)/x | 182–221 | FCC Composite | 222–262 | 5-Step                                                         |  |
| <i>Line</i>                                                  | <i>Signal</i>                                                                                                                                                                                                                                                                                                                                                                                              |                                                |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| 21–61                                                        | Cable Multiburst                                                                                                                                                                                                                                                                                                                                                                                           |                                                |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| 62–101                                                       | Cable Sweep                                                                                                                                                                                                                                                                                                                                                                                                |                                                |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| 102–141                                                      | Cable Markers                                                                                                                                                                                                                                                                                                                                                                                              |                                                |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| 142–181                                                      | (Sin x)/x                                                                                                                                                                                                                                                                                                                                                                                                  |                                                |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| 182–221                                                      | FCC Composite                                                                                                                                                                                                                                                                                                                                                                                              |                                                |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |
| 222–262                                                      | 5-Step                                                                                                                                                                                                                                                                                                                                                                                                     |                                                |               |        |                  |                 |                  |         |                |         |           |         |               |         |                                                                |  |

Table 2–3: NTSC/YC test signals Option 02 (Cont.)

| Characteristics                                                                                                                                           | Performance requirements                                                                                                                                            | Supplemental information                                                                                                                |               |        |                |         |                  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|---------|------------------|--|
| NTC7 Matrix                                                                                                                                               | <table><tr><td><i>Line</i></td><td><i>Signal</i></td></tr><tr><td>21–141</td><td>NTC7 Composite</td></tr><tr><td>143–262</td><td>NTC7 Combination</td></tr></table> | <i>Line</i>                                                                                                                             | <i>Signal</i> | 21–141 | NTC7 Composite | 143–262 | NTC7 Combination |  |
| <i>Line</i>                                                                                                                                               | <i>Signal</i>                                                                                                                                                       |                                                                                                                                         |               |        |                |         |                  |  |
| 21–141                                                                                                                                                    | NTC7 Composite                                                                                                                                                      |                                                                                                                                         |               |        |                |         |                  |  |
| 143–262                                                                                                                                                   | NTC7 Combination                                                                                                                                                    |                                                                                                                                         |               |        |                |         |                  |  |
| Flat Fields<br>50%<br>100%<br>0%                                                                                                                          | Amplitudes:<br>357.14 mV (50 IRE)<br>714.29 mV (100 IRE)<br>0.0 mV (0 IRE)                                                                                          | See Figure 2–7<br>See Figure 2–8<br>See Figure 2–9                                                                                      |               |        |                |         |                  |  |
| Bounce<br>Amplitude<br>Rate                                                                                                                               | 0 or 100 IRE flat field<br>1 second high, 1 second low                                                                                                              |                                                                                                                                         |               |        |                |         |                  |  |
| 5-Step (Gray Scale)<br>Amplitude<br>Linearity Error                                                                                                       | 714.3 mV (100 IRE)<br>31%                                                                                                                                           | See Figure 2–13<br><br>Relative step matching                                                                                           |               |        |                |         |                  |  |
| Multiburst<br>White Reference Bar Amplitude<br>Packet Amplitudes<br>Pedestal<br>Burst Frequencies<br><br>Packet Rise Time<br>500 kHz<br><br>Other Packets | 500 mV (70 IRE)<br>428.6 mV (60 IRE) p-p<br>258.7 mV (40 IRE)<br>500 kHz, 1.0 MHz, 2.0 MHz, 3.0 MHz, 3.58 MHz, 4.2 MHz                                              | See Figure 2–16<br><br><br><br><br><br>140 ns typical (sine-squared shaped packets)<br><br>400 ns typical (sine-squared shaped packets) |               |        |                |         |                  |  |

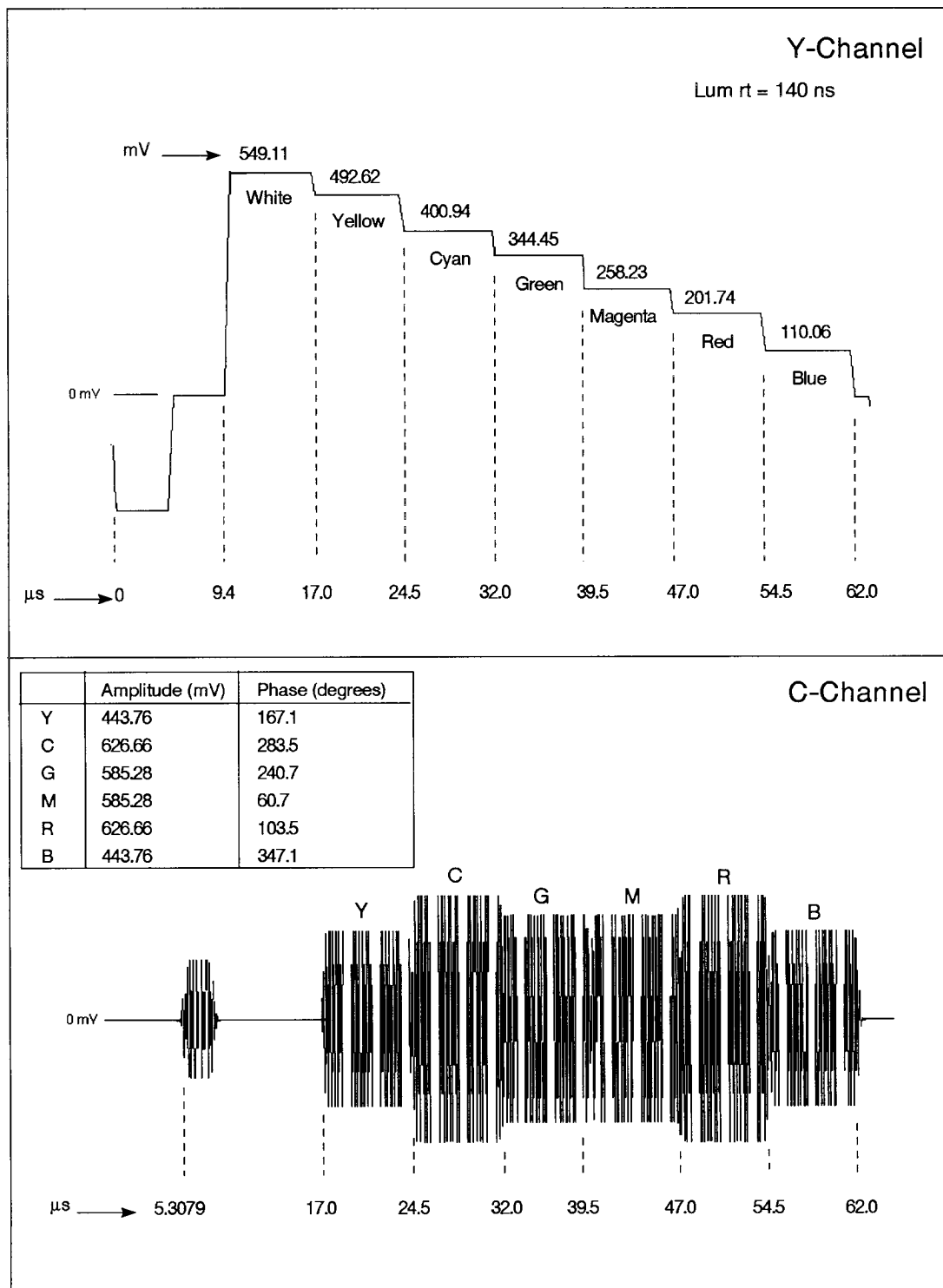


Figure 2-1: Color bars component of SMPTE bars

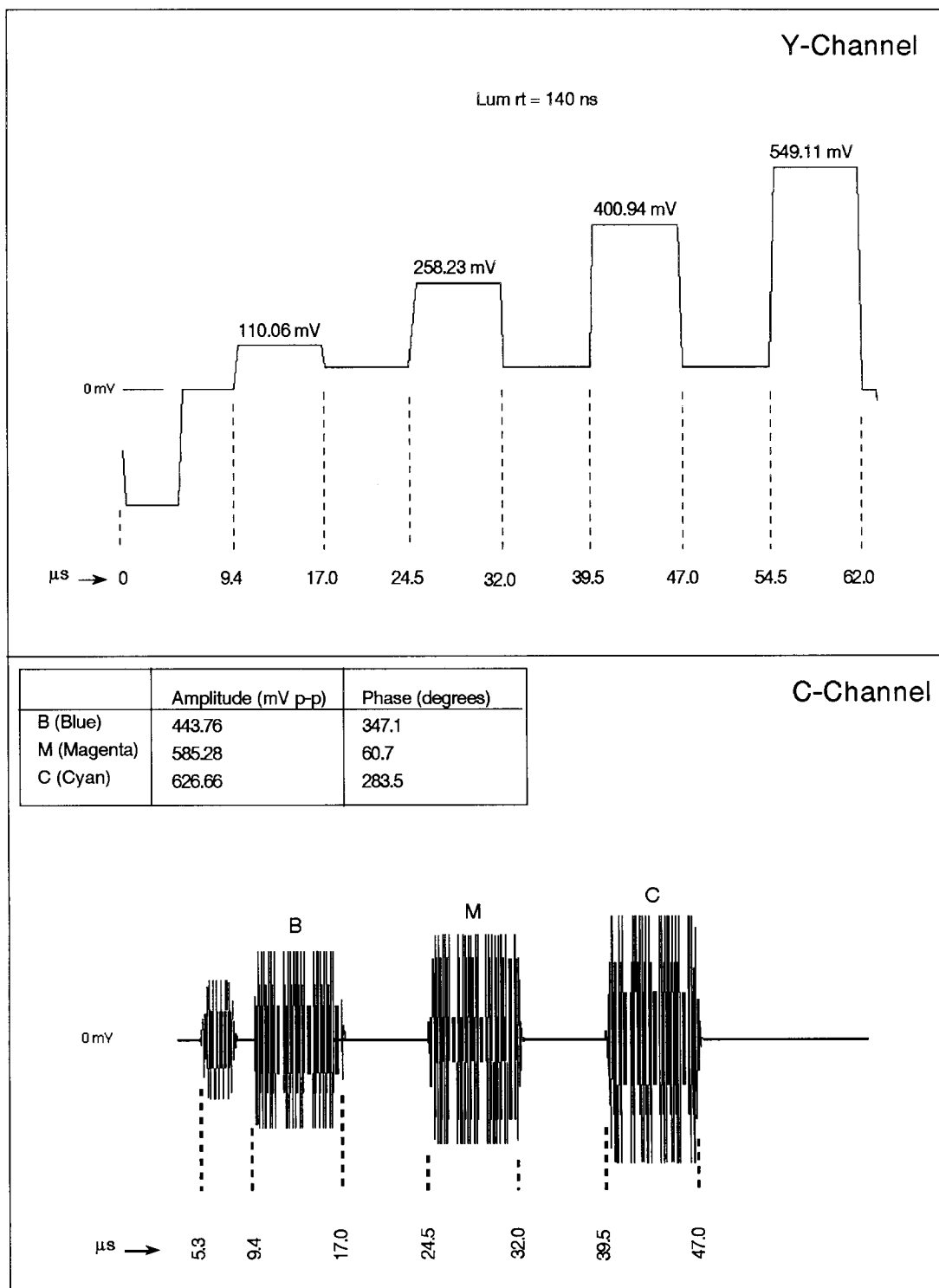


Figure 2-2: Reverse blue bars component of SMPTE bars

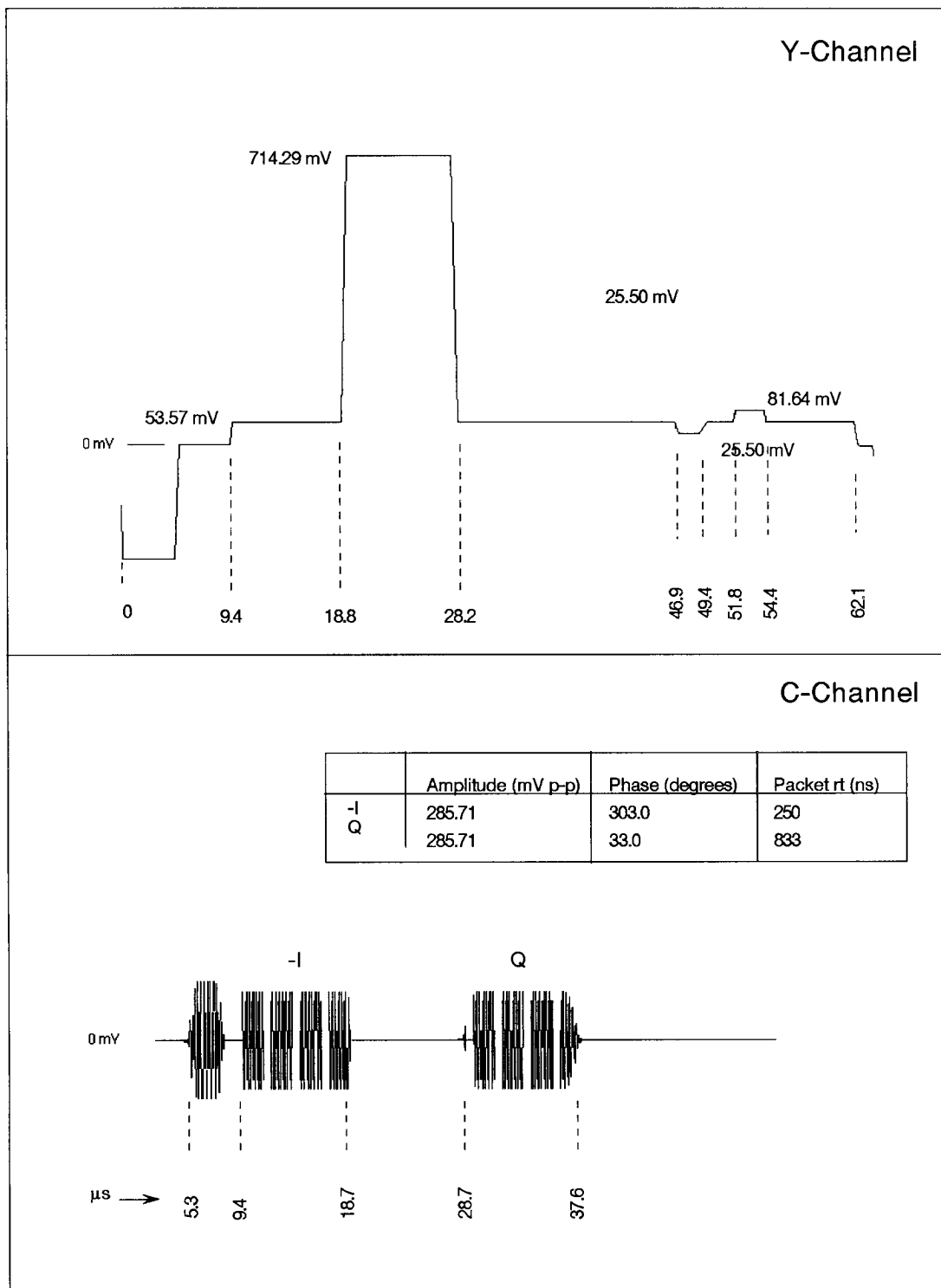


Figure 2-3: IYQB component of SMPTE bars

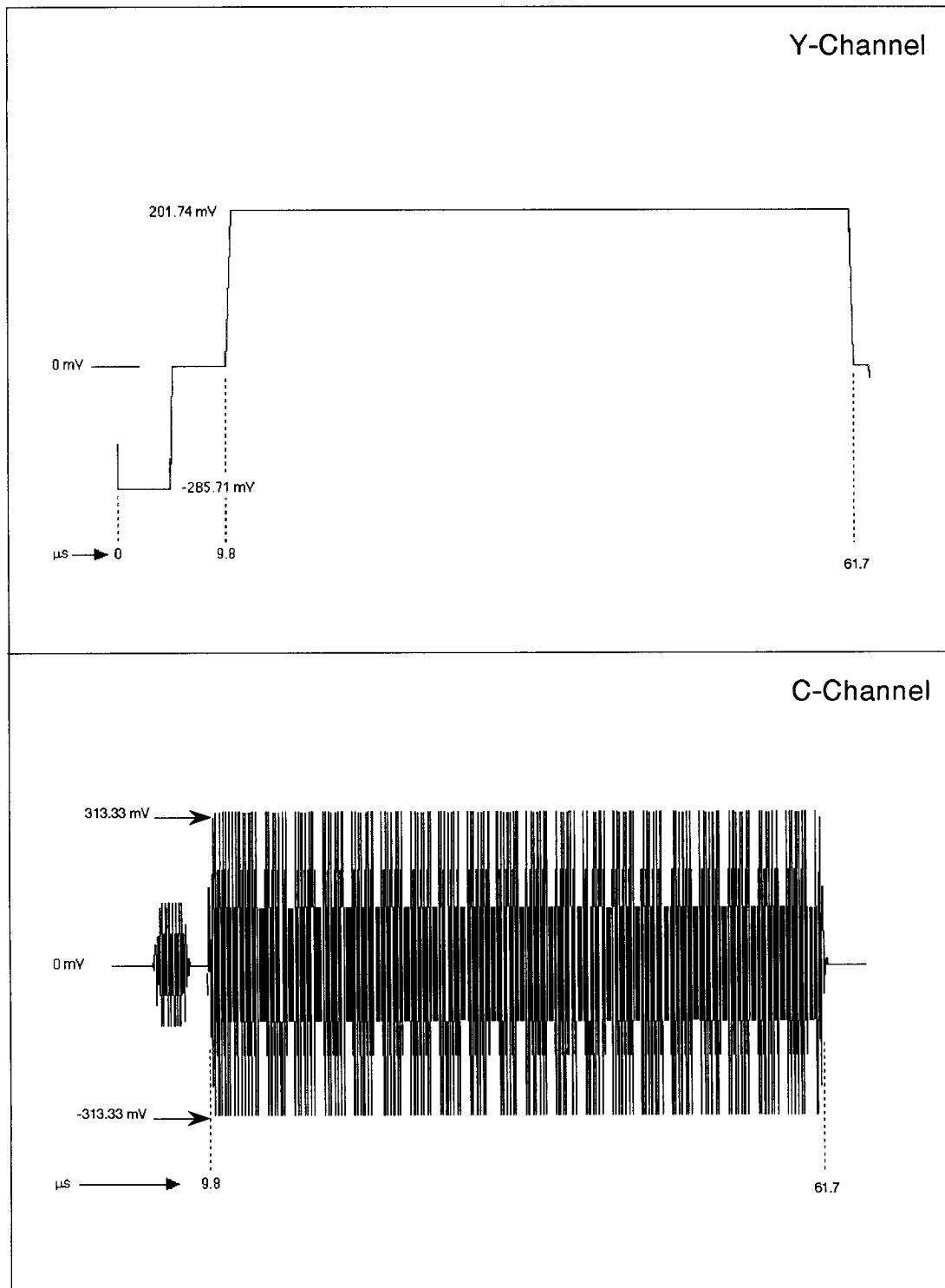


Figure 2-4: Red field

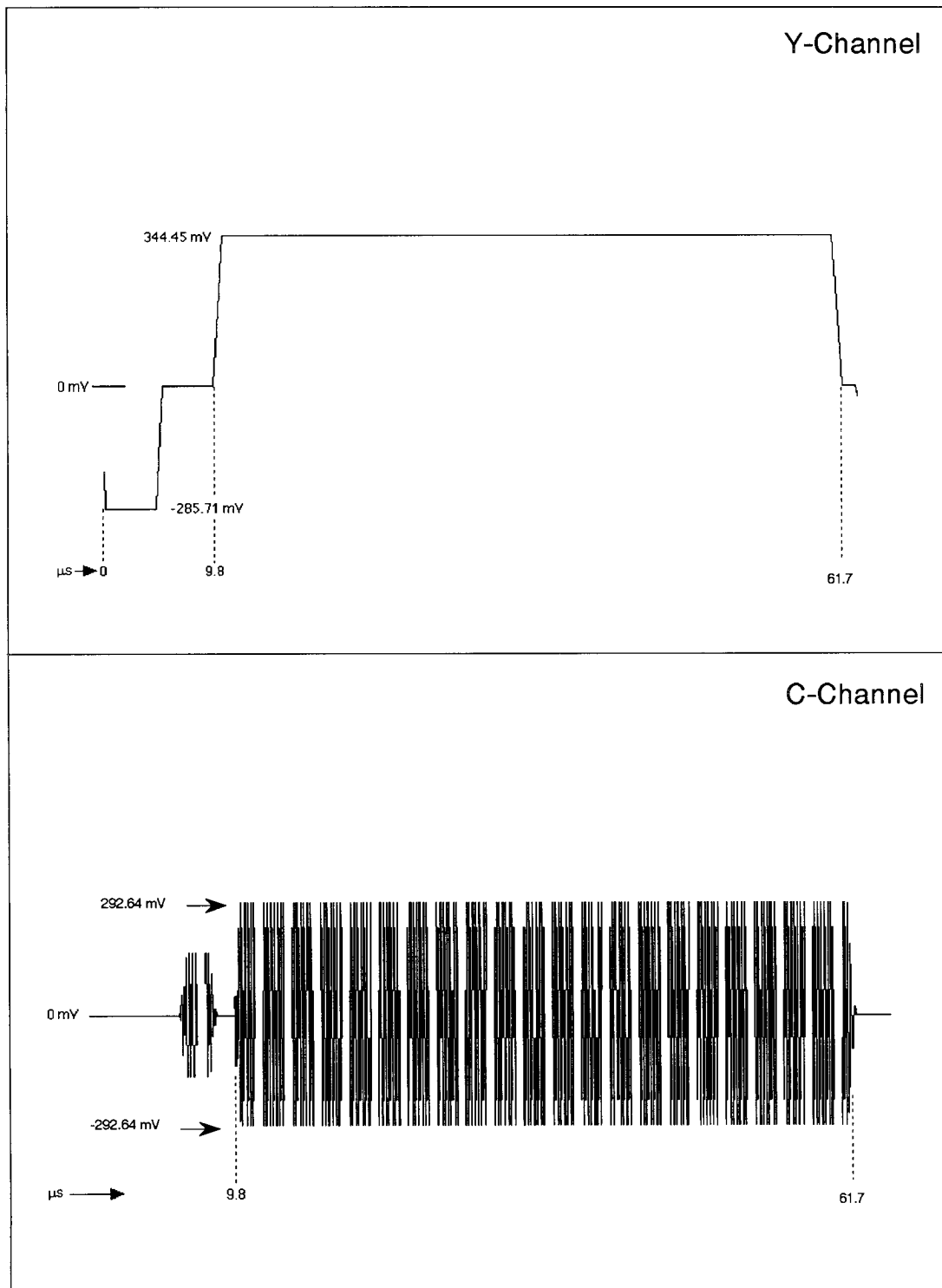


Figure 2-5: Green field

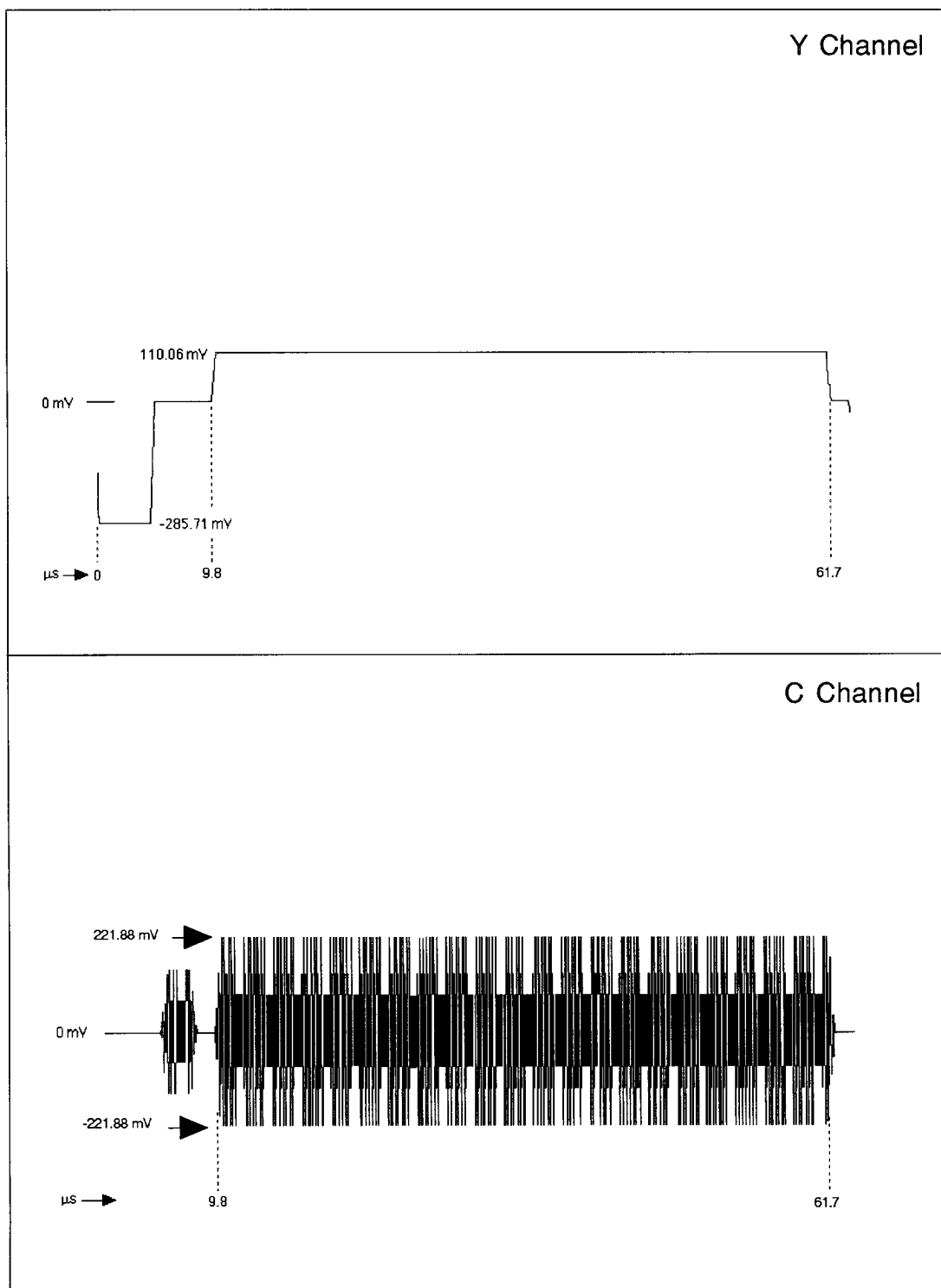


Figure 2-6: Blue field

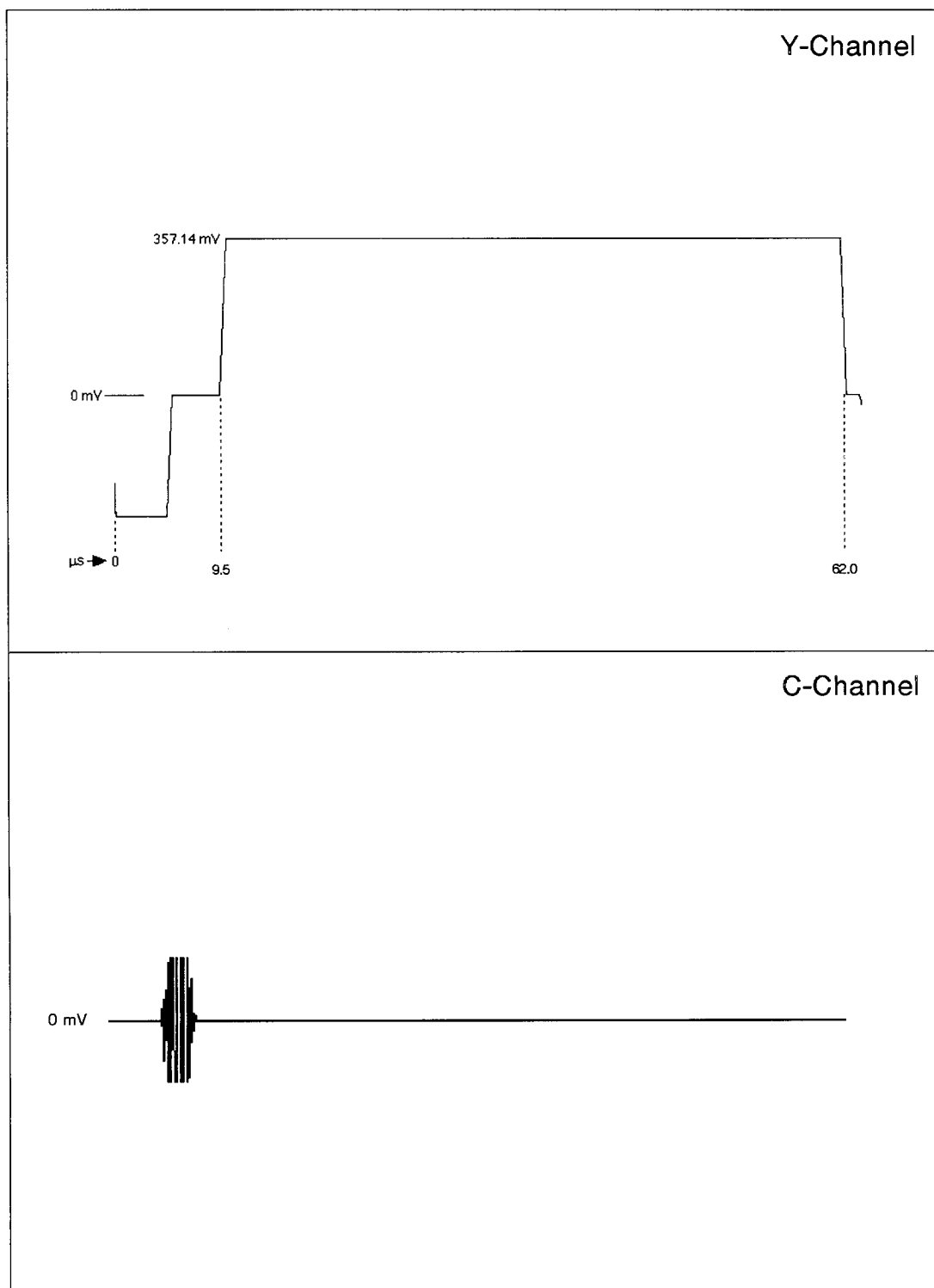


Figure 2-7: 50% flat field

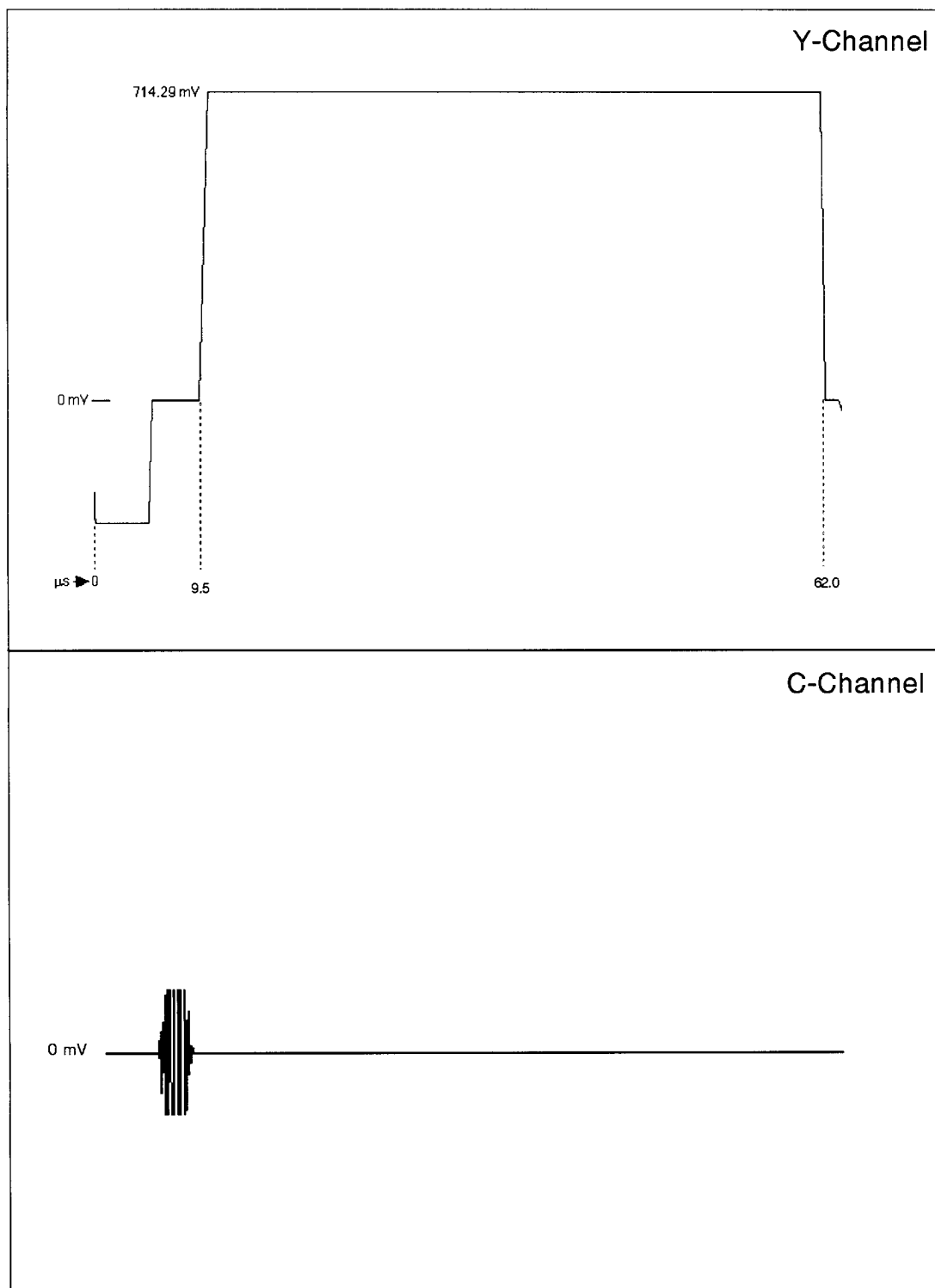


Figure 2-8: 100% flat field

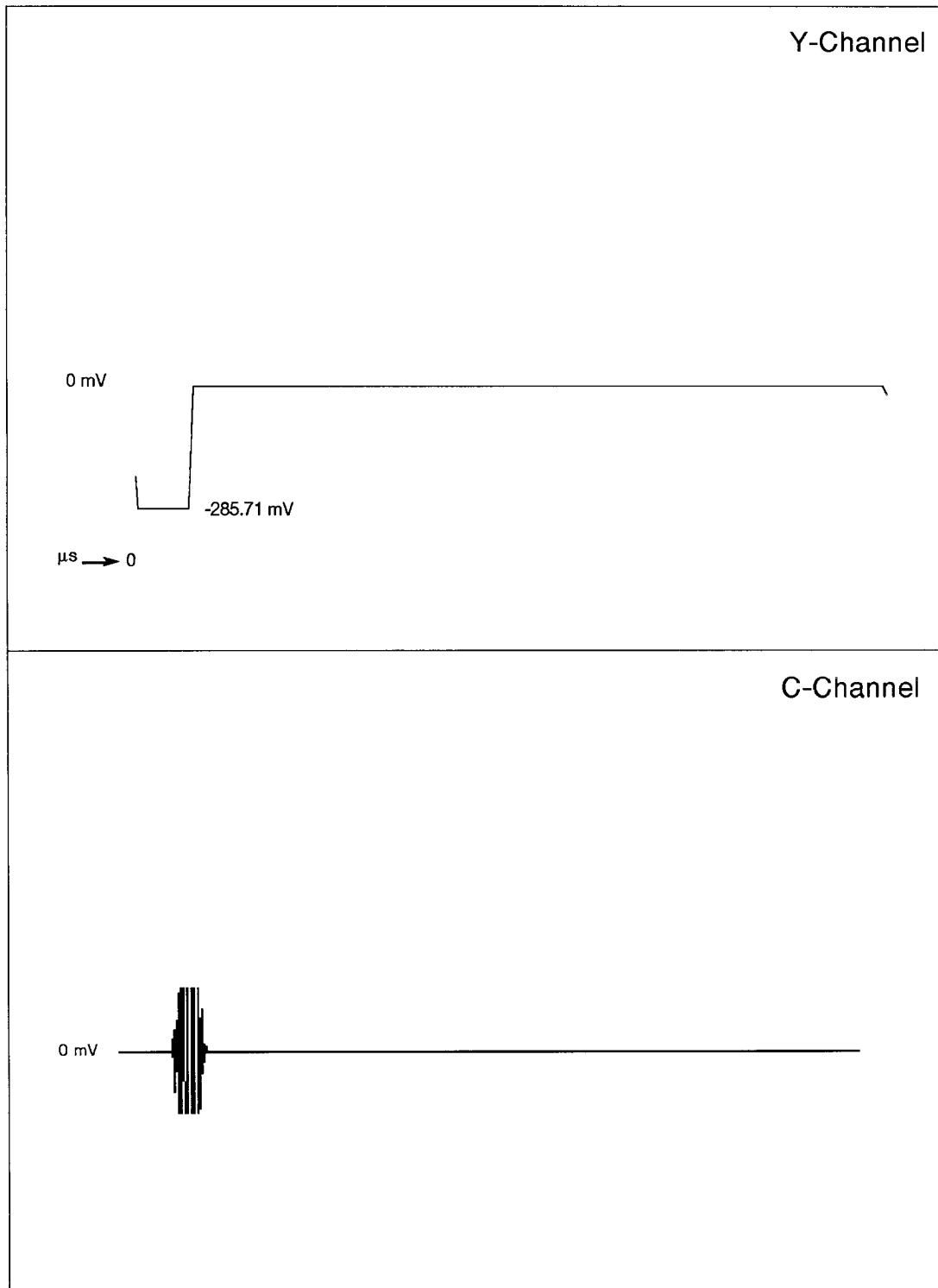


Figure 2-9: 0% flat field

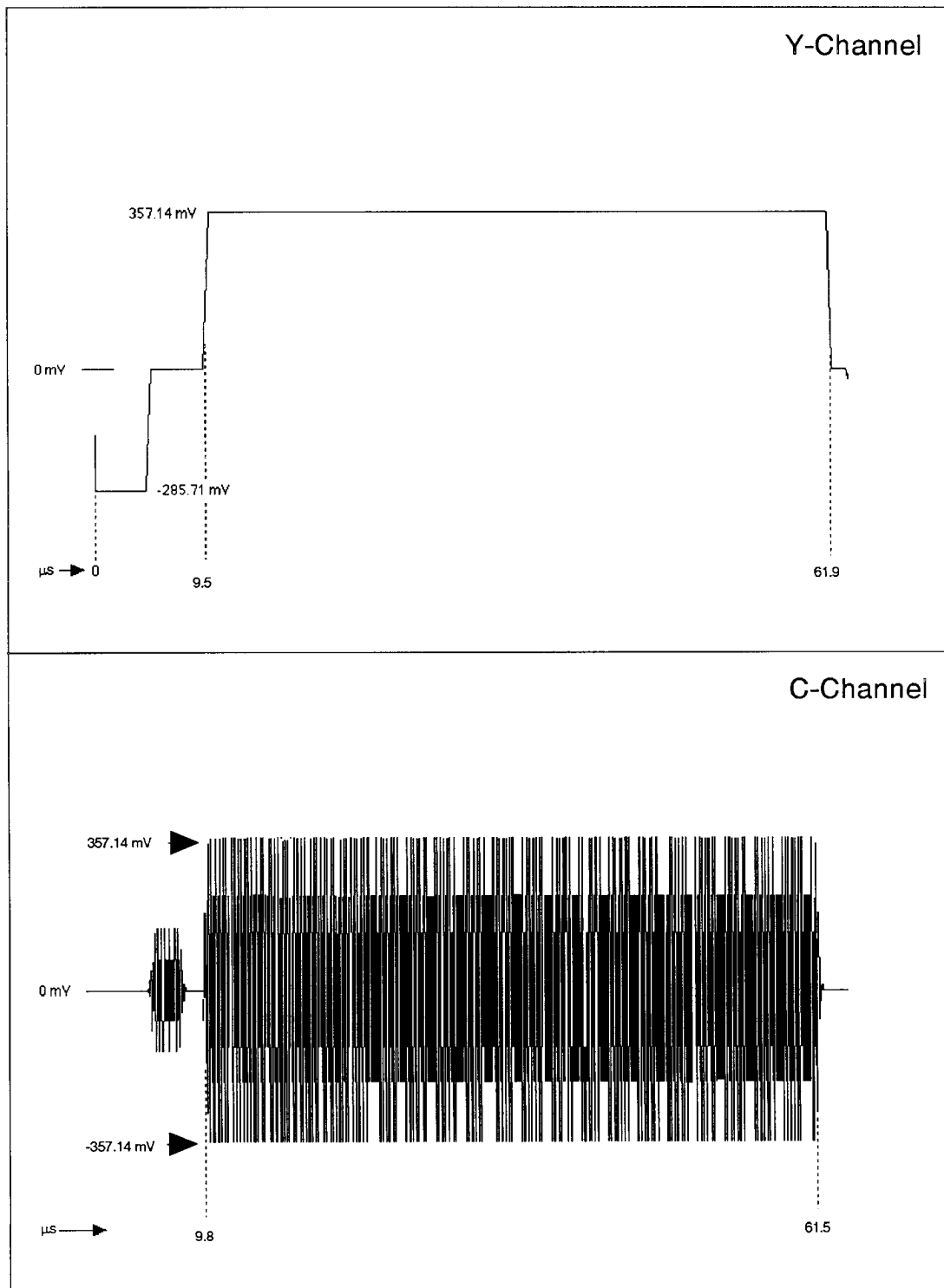


Figure 2-10: Chroma noise

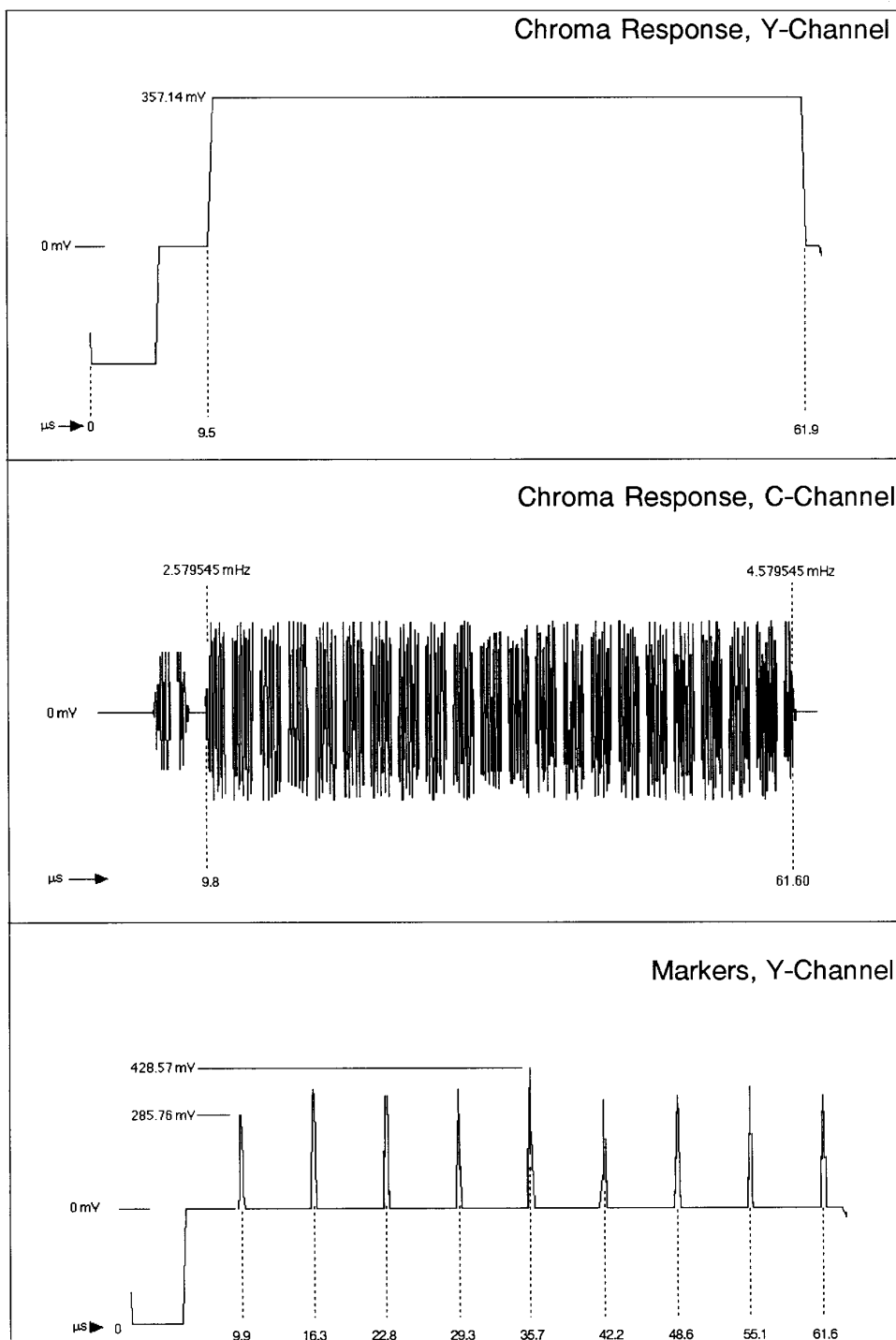


Figure 2-11: Chroma response and markers

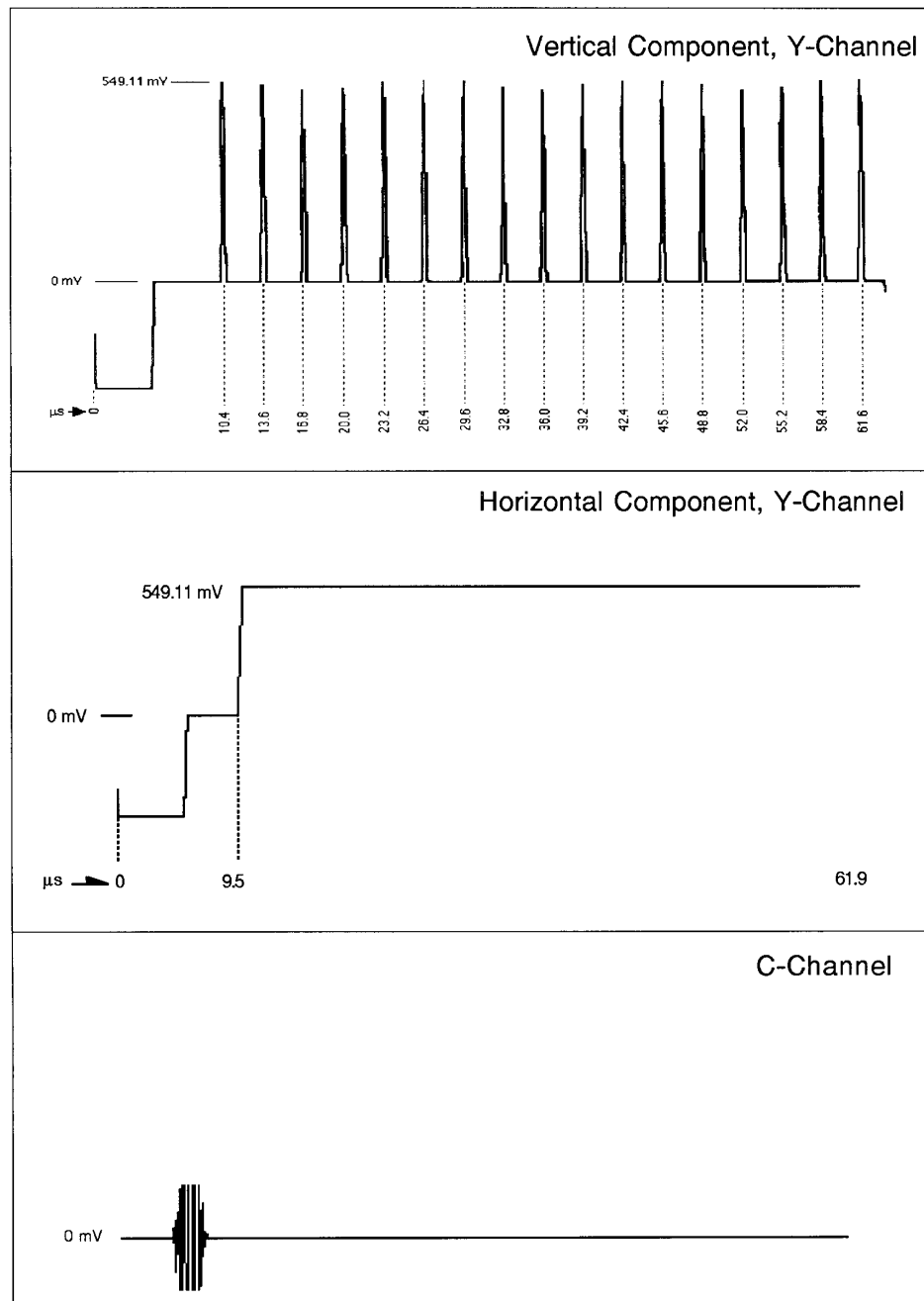


Figure 2-12: Convergence

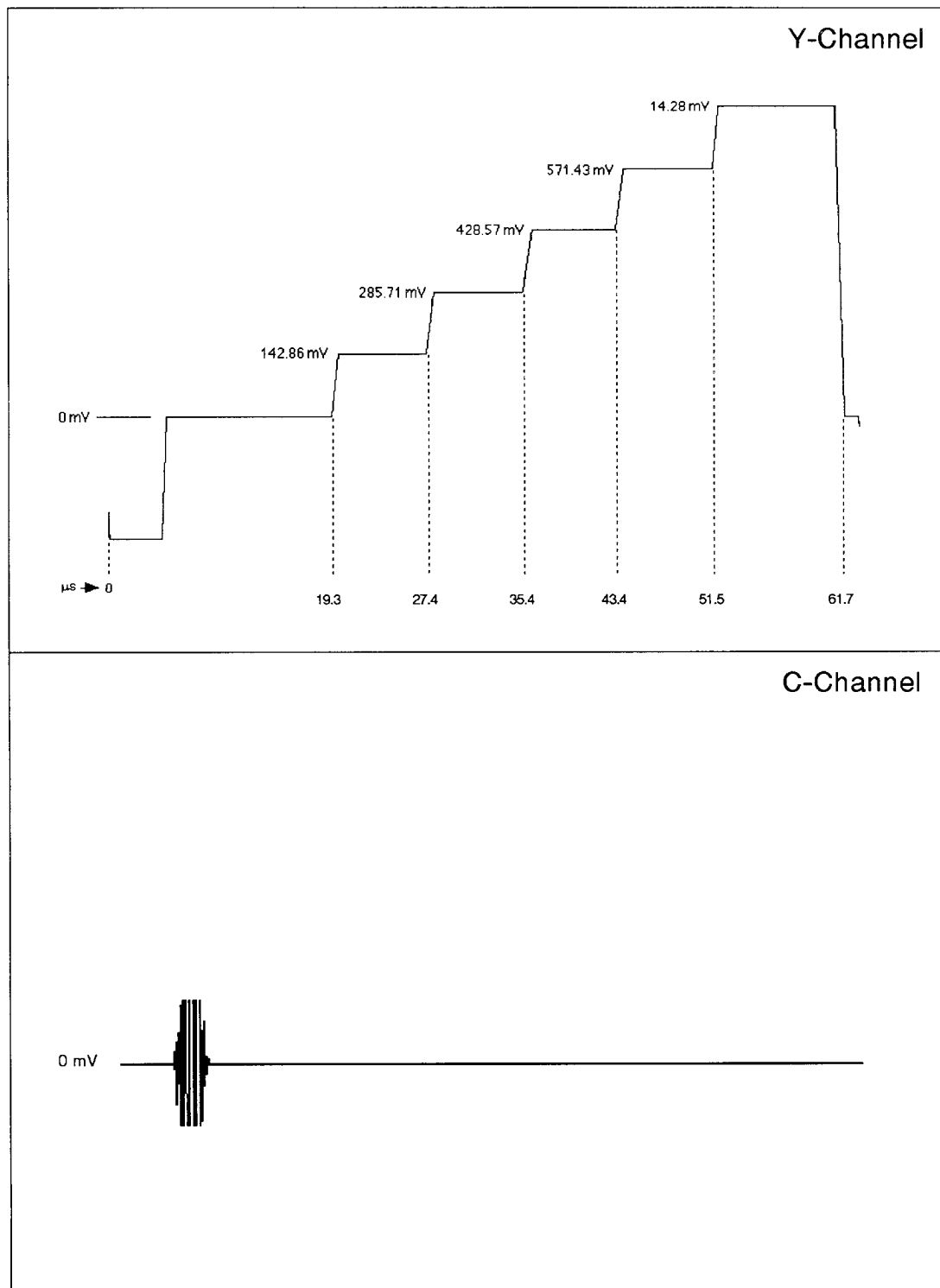


Figure 2-13: 5 step

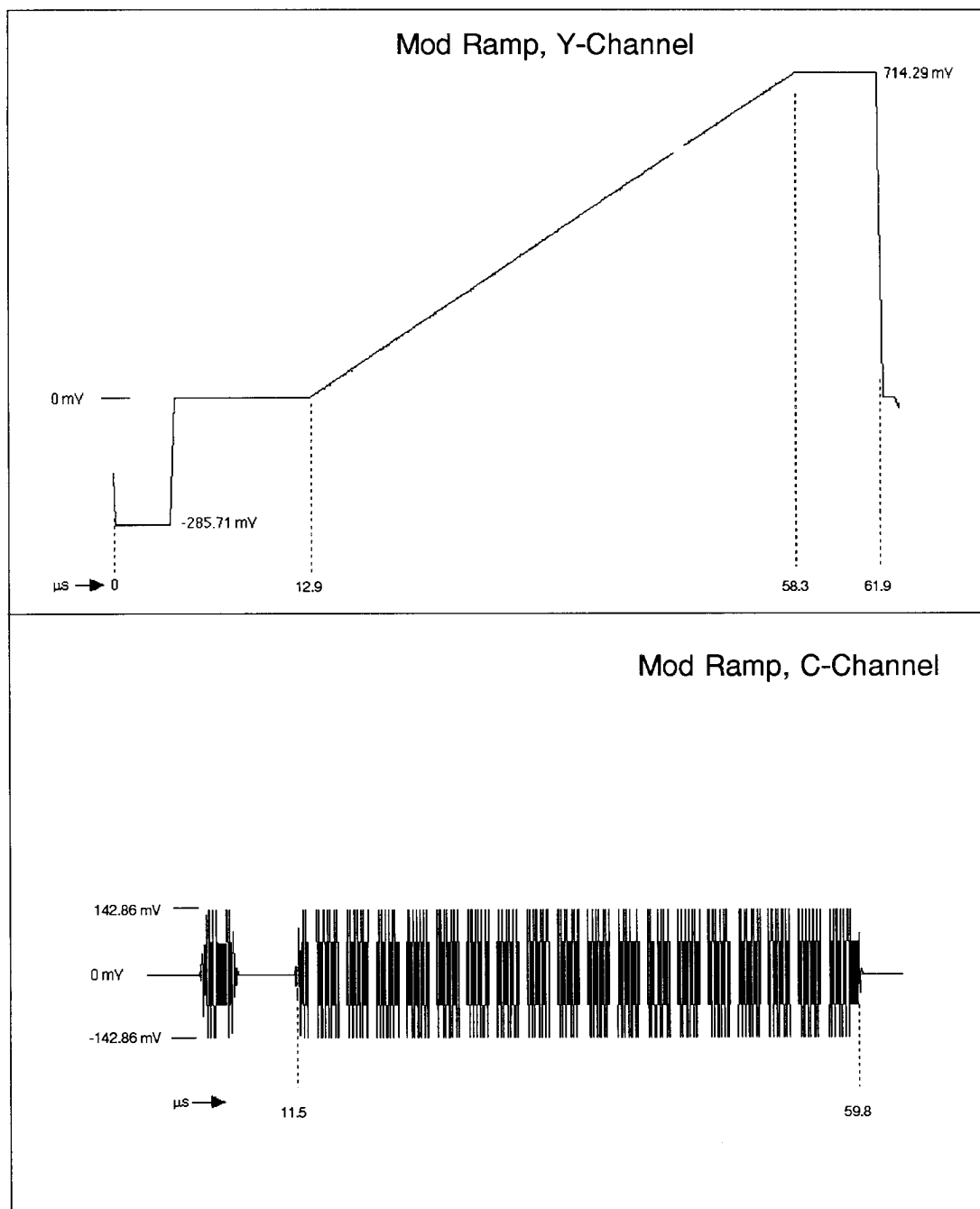


Figure 2-14: Mod ramp

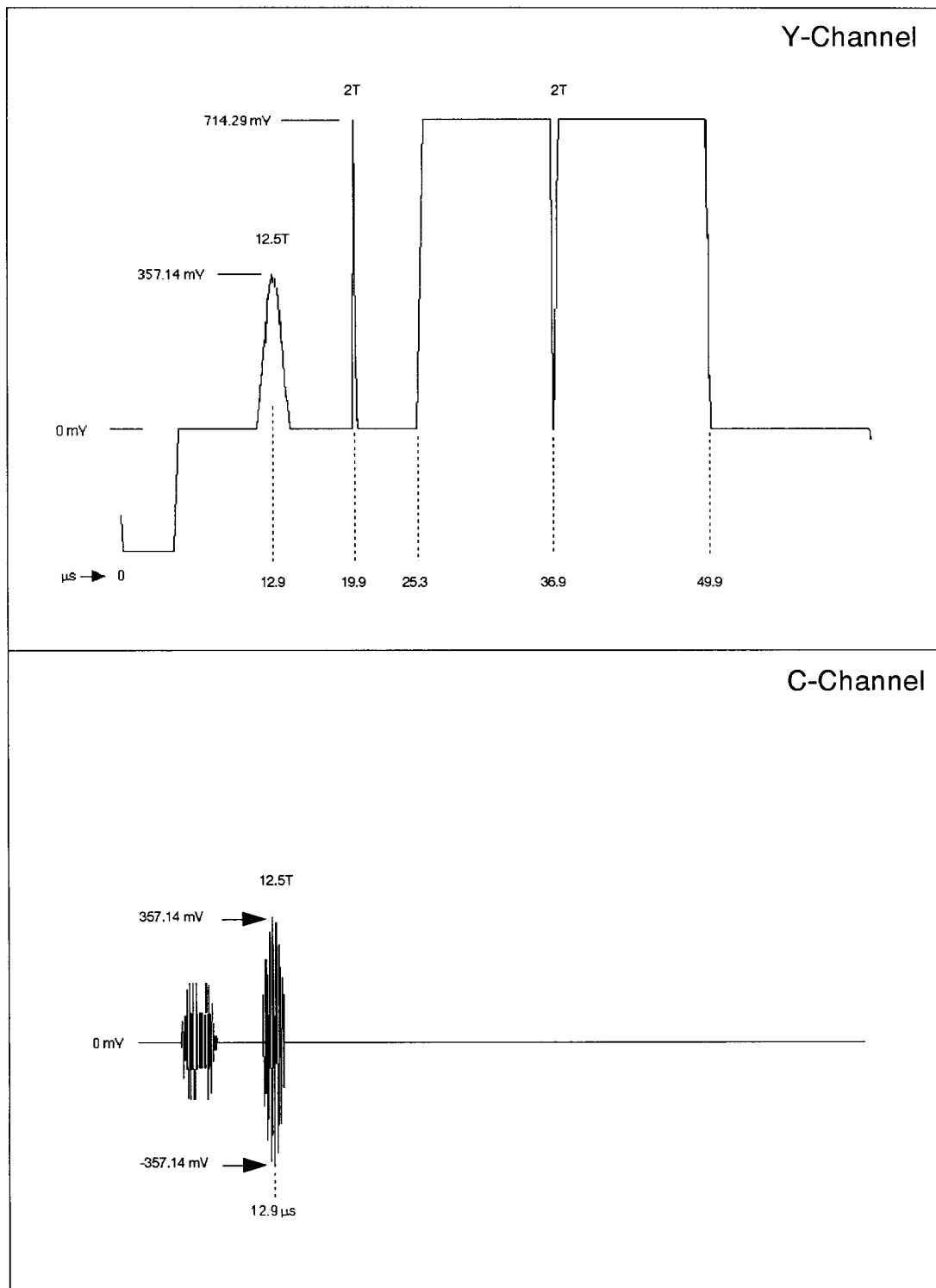


Figure 2-15: Pulse and bar

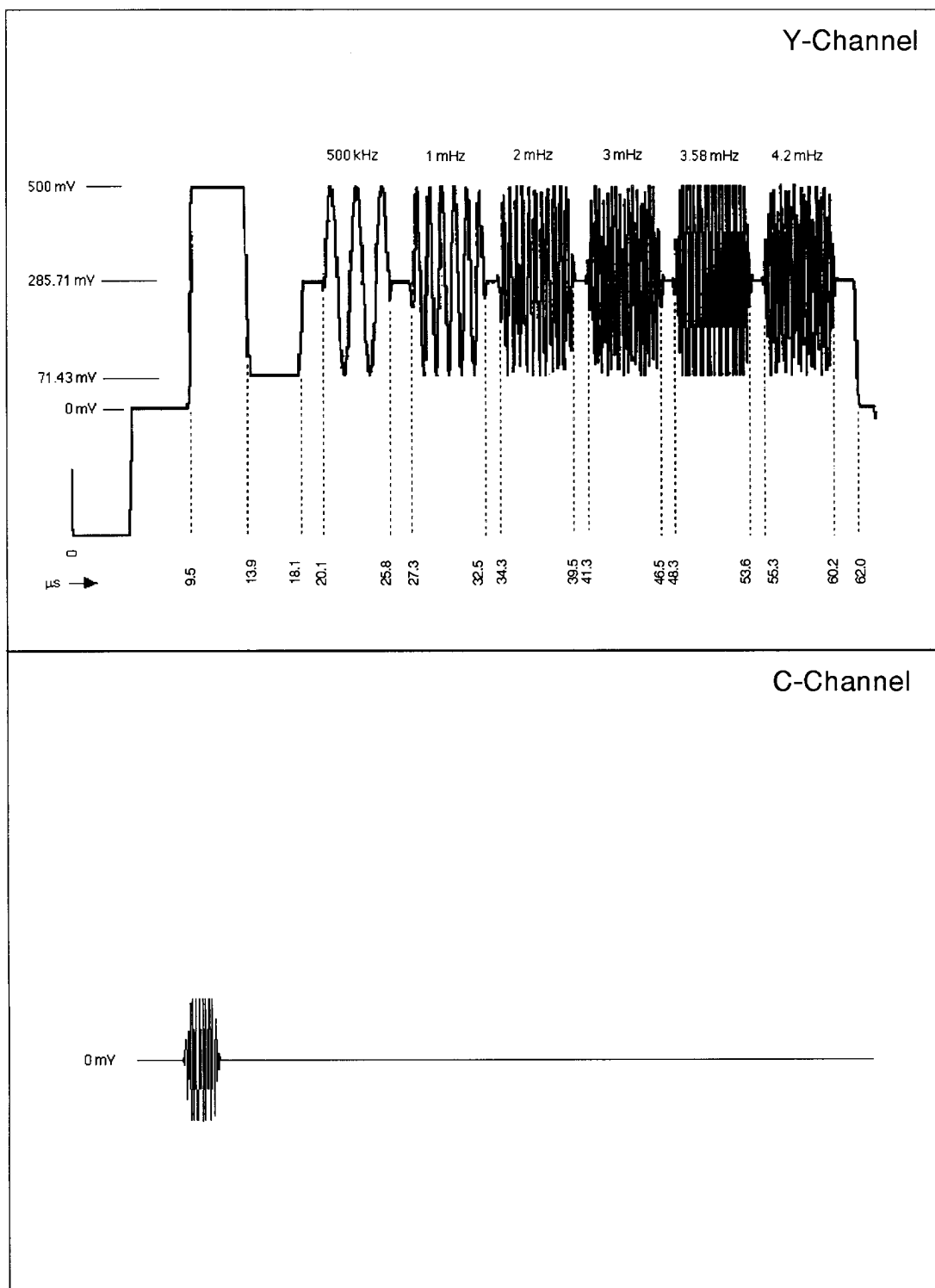


Figure 2-16: Multiburst

| Line |                   |
|------|-------------------|
| 21   | Muliburst         |
| 62   | Chroma Sweep      |
| 102  | 50 IRE Flat Field |
| 142  | Chroma Noise      |
| 182  | 75% Color Bar     |
| 222  | NTC7 Composite    |
| 262  |                   |

**Figure 2–17: Matrix**

## Option 02 Signals

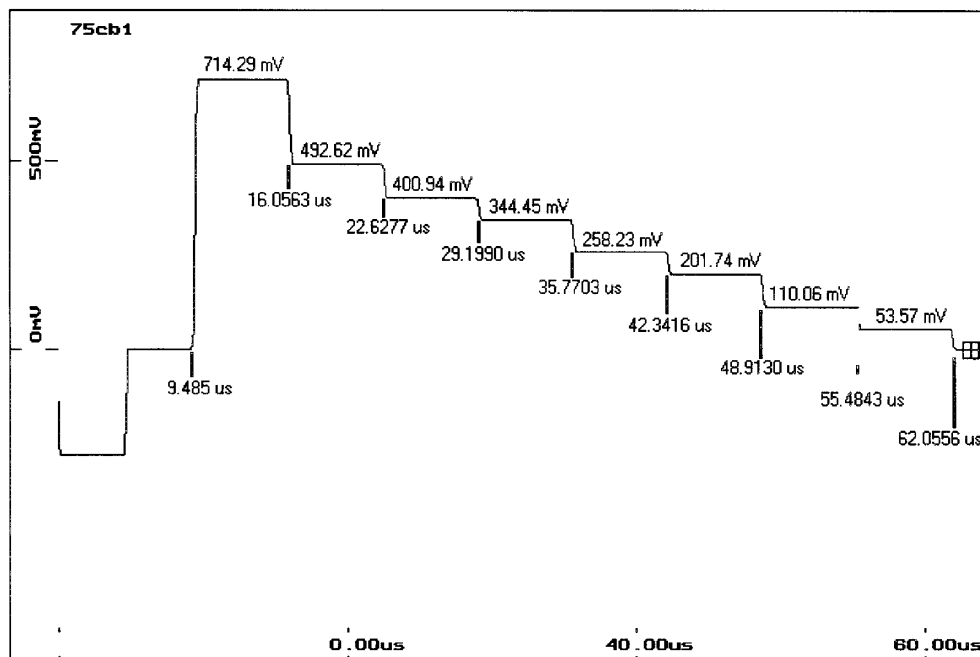


Figure 2-18: Y channel 75% color bars

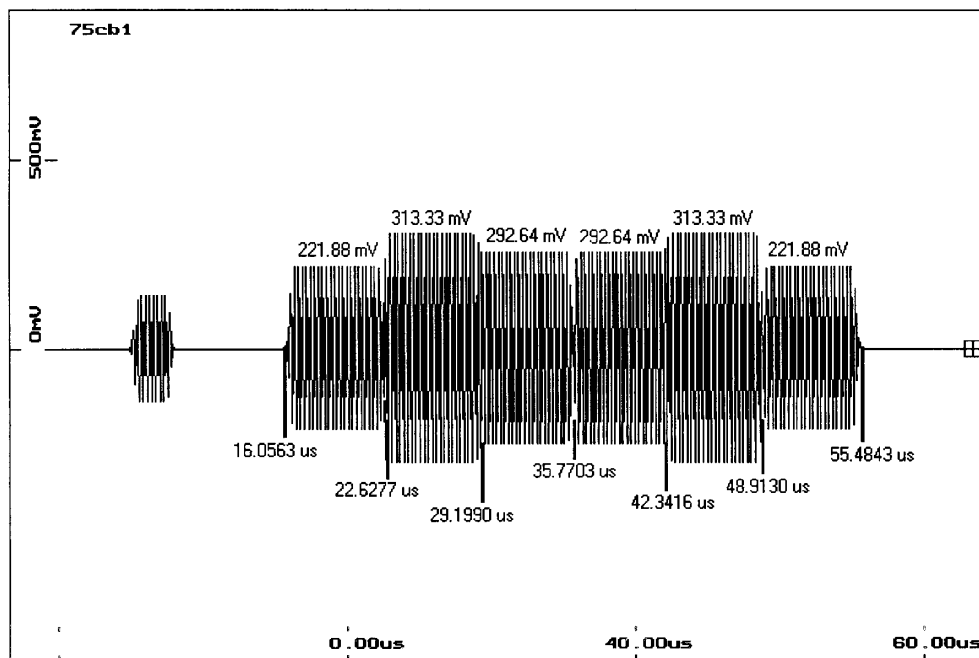


Figure 2-19: C channel 75% color bars

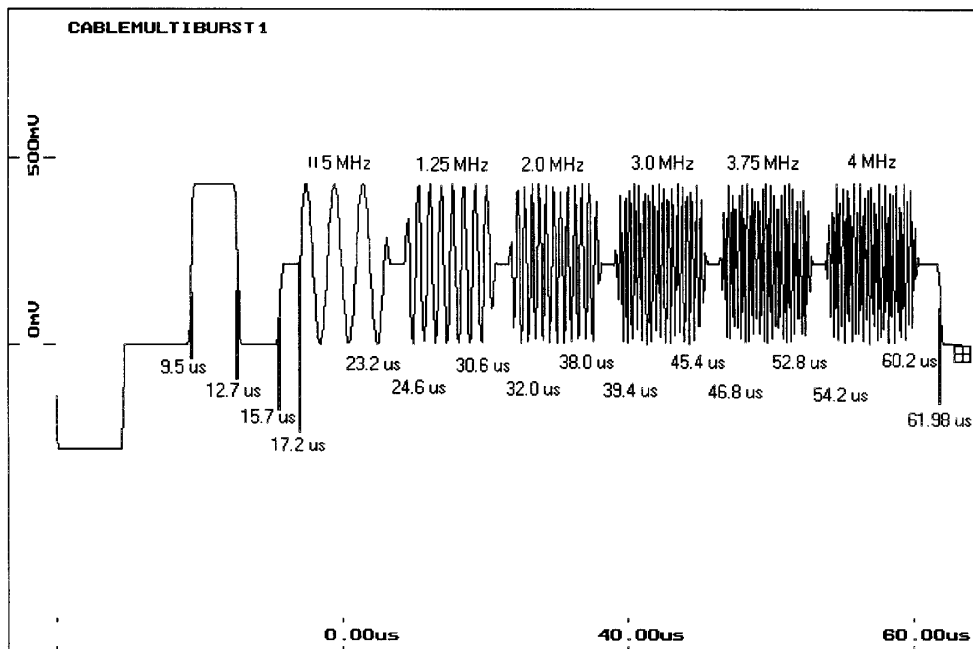


Figure 2-20: Y channel cable multiburst signal

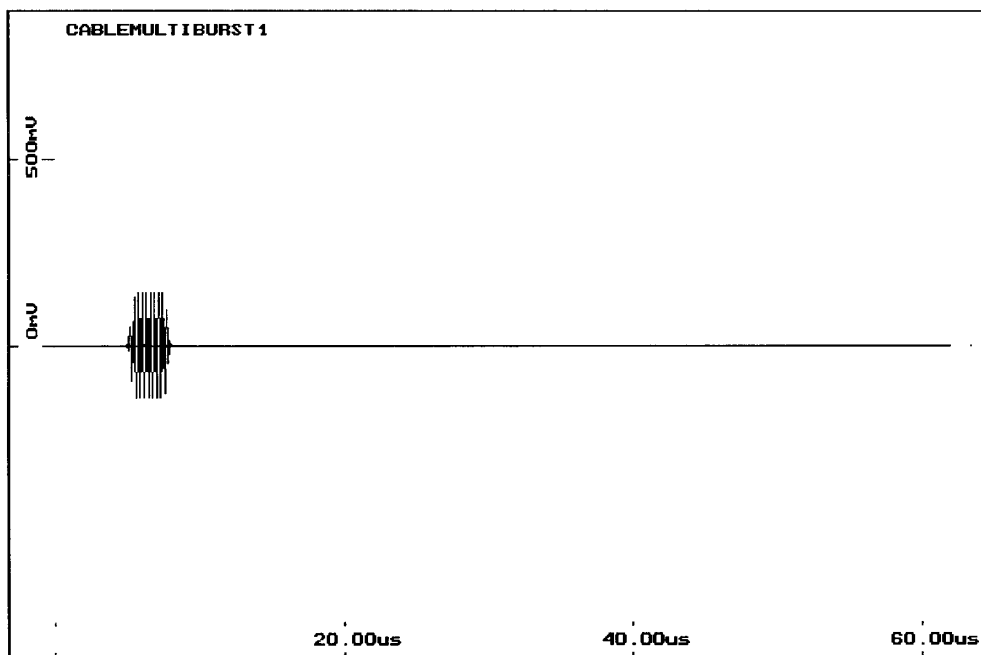


Figure 2-21: C channel for the following signals: cable multiburst, cable sweep, (Sin x)/x, and ghost canceling

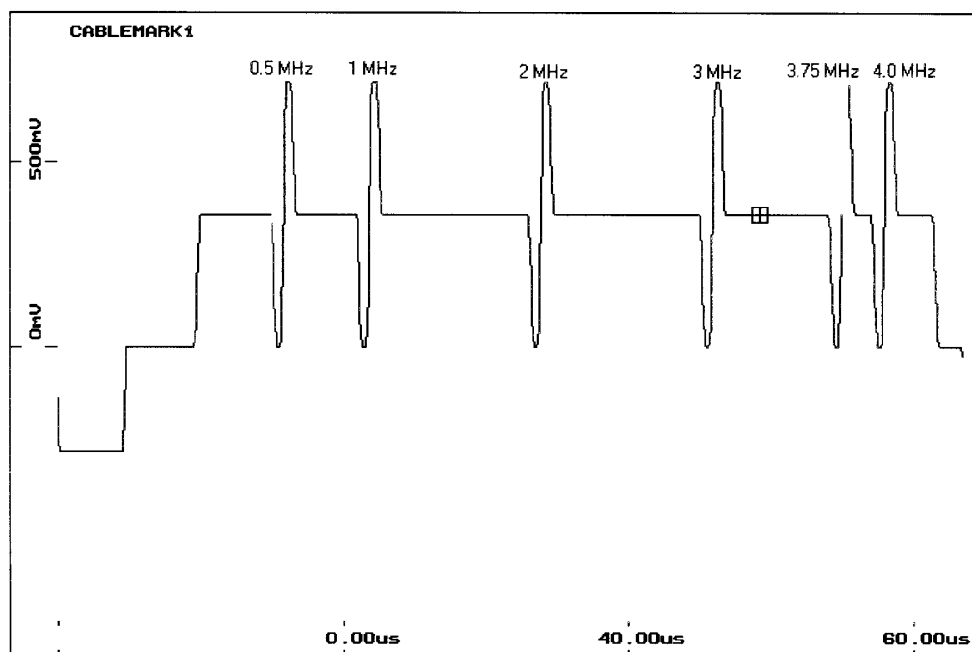


Figure 2-22: Y channel cable sweep markers

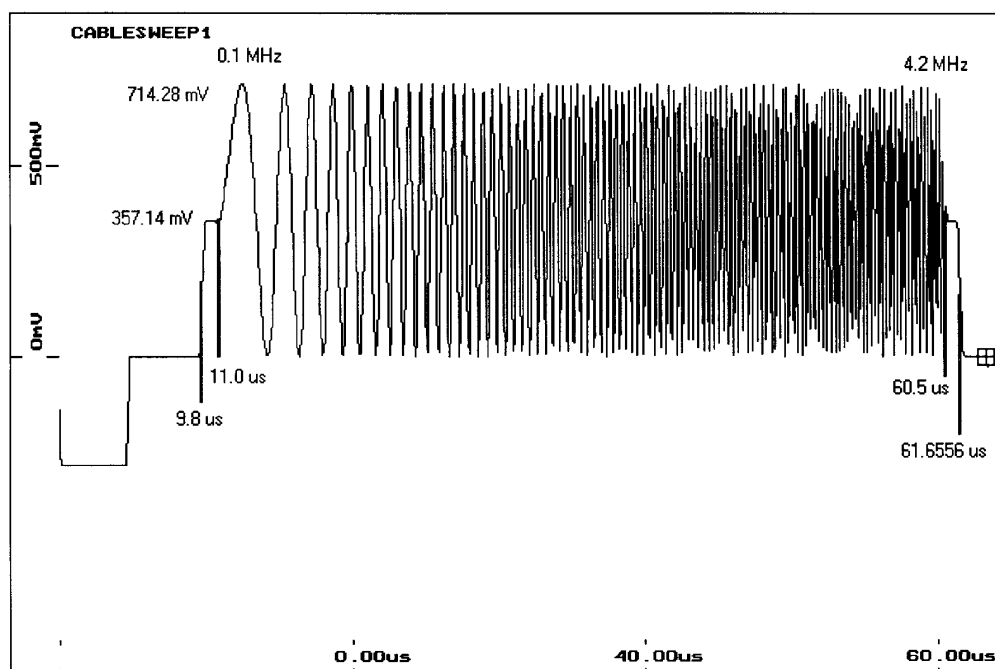


Figure 2-23: Y channel cable sweep signal

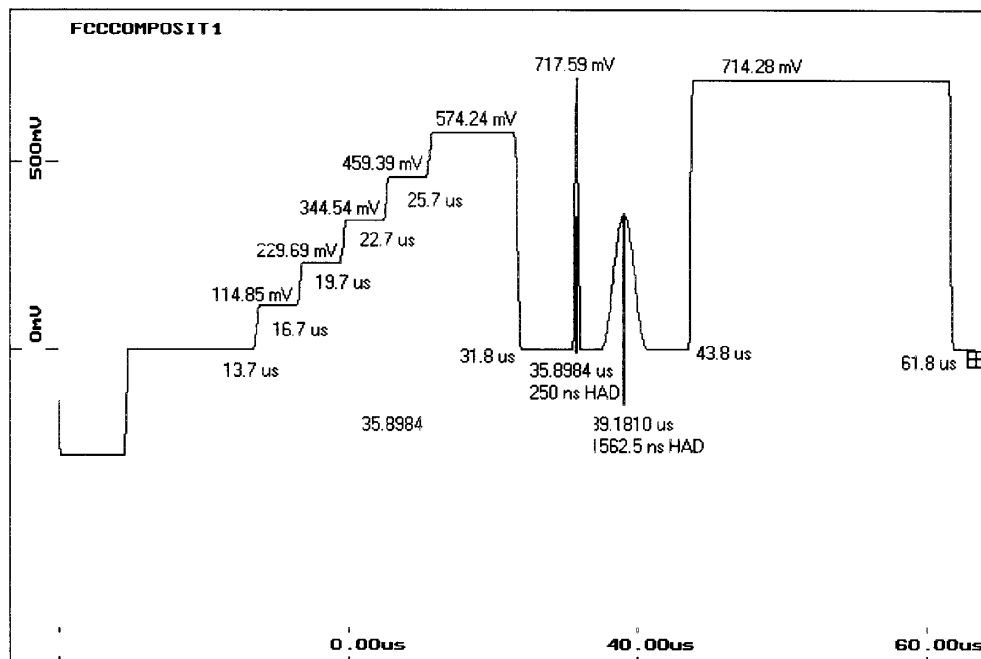


Figure 2-24: Y channel FCC test signal

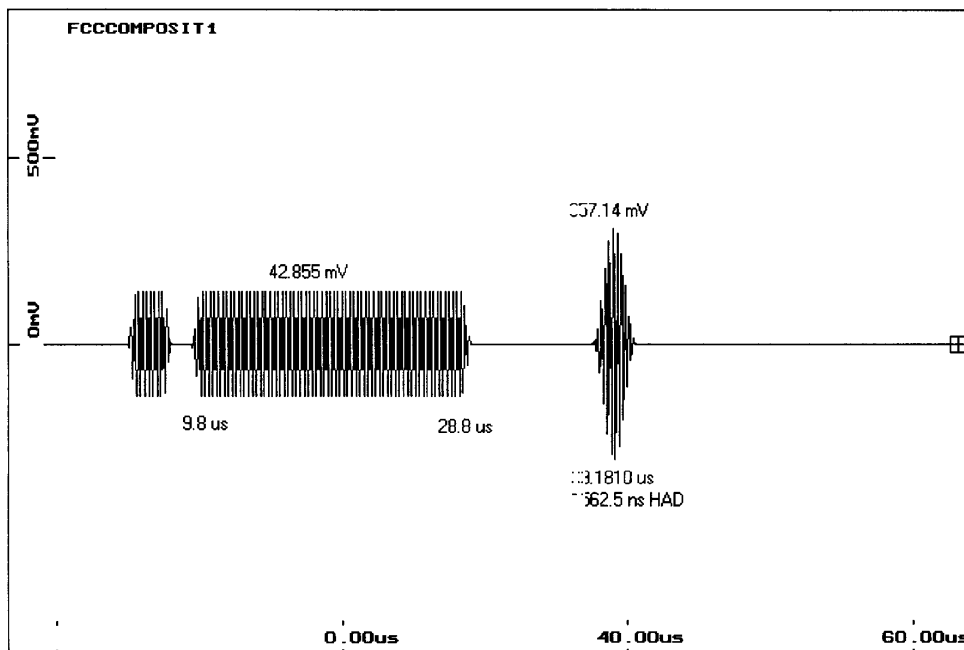


Figure 2-25: C channel FCC test signal

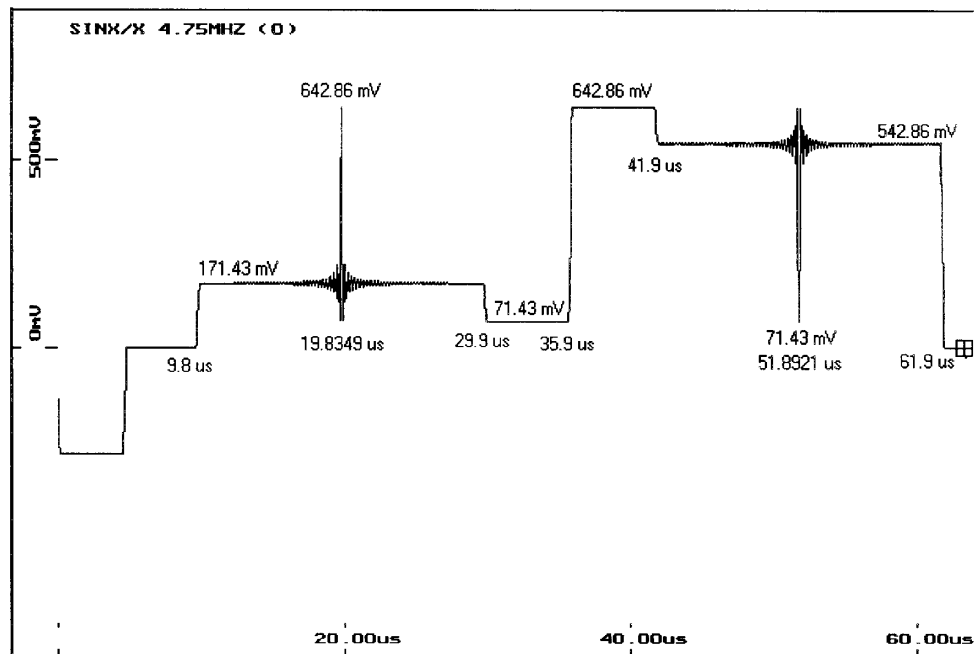


Figure 2-26: Y channel of the (Sin x)/x test signal

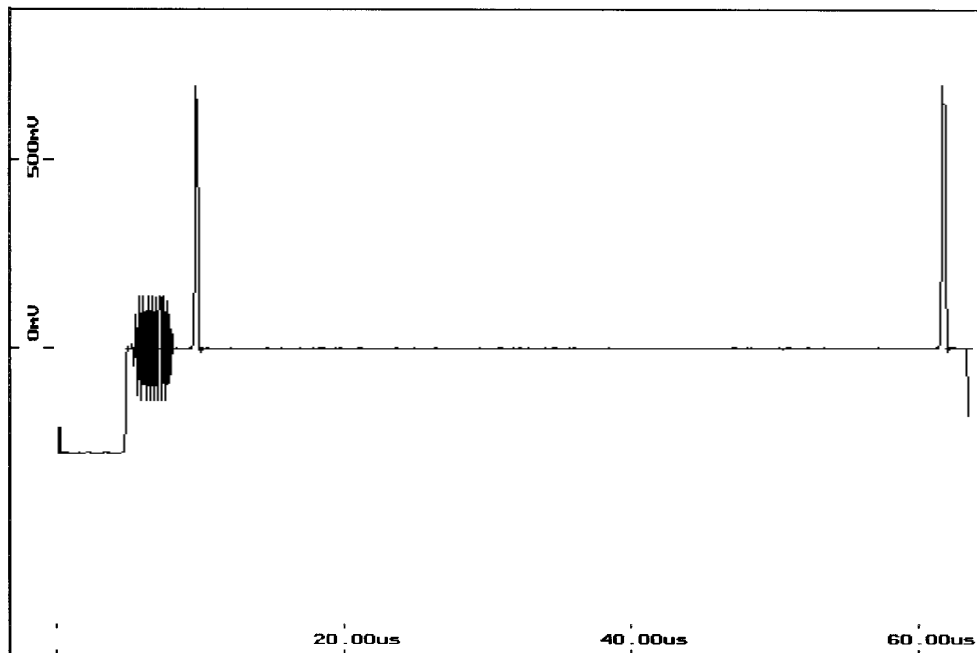


Figure 2-27: Y channel for ghost canceling

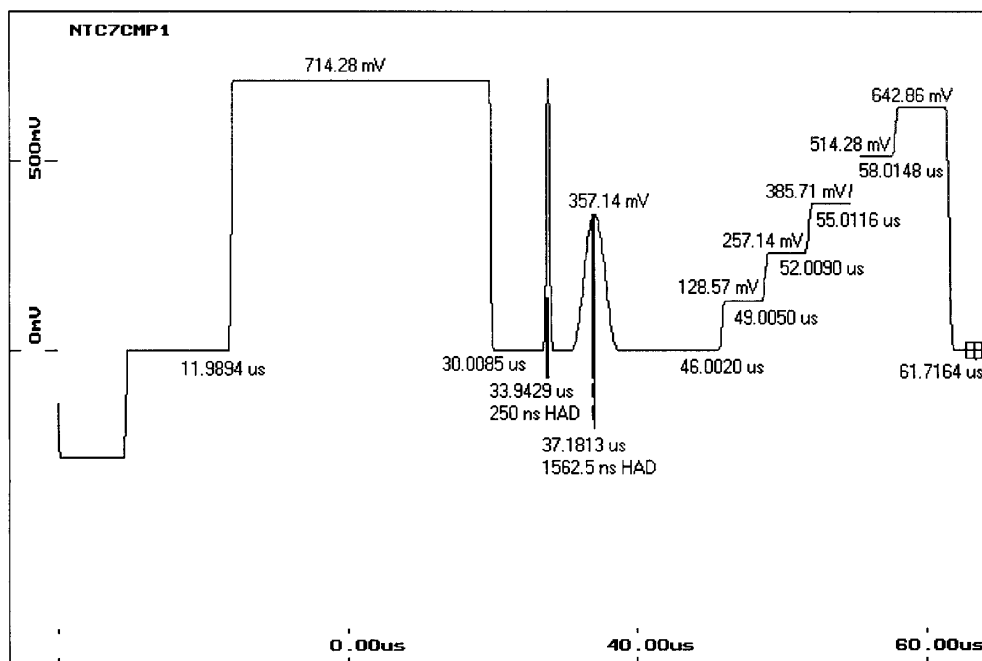


Figure 2-28: Y channel NTC7 test signal

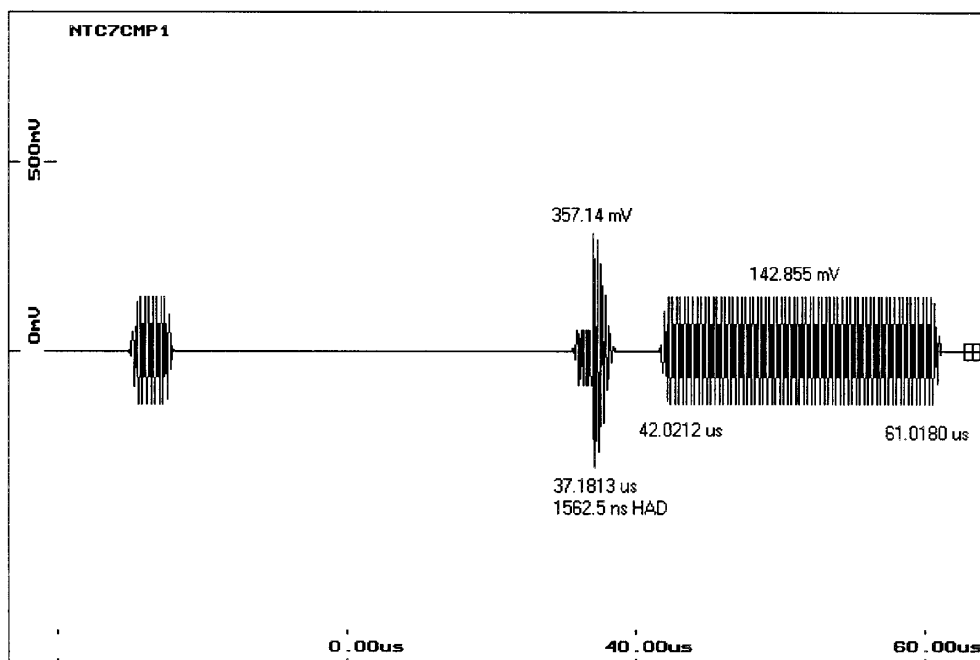


Figure 2-29: C channel NTC7 test signal

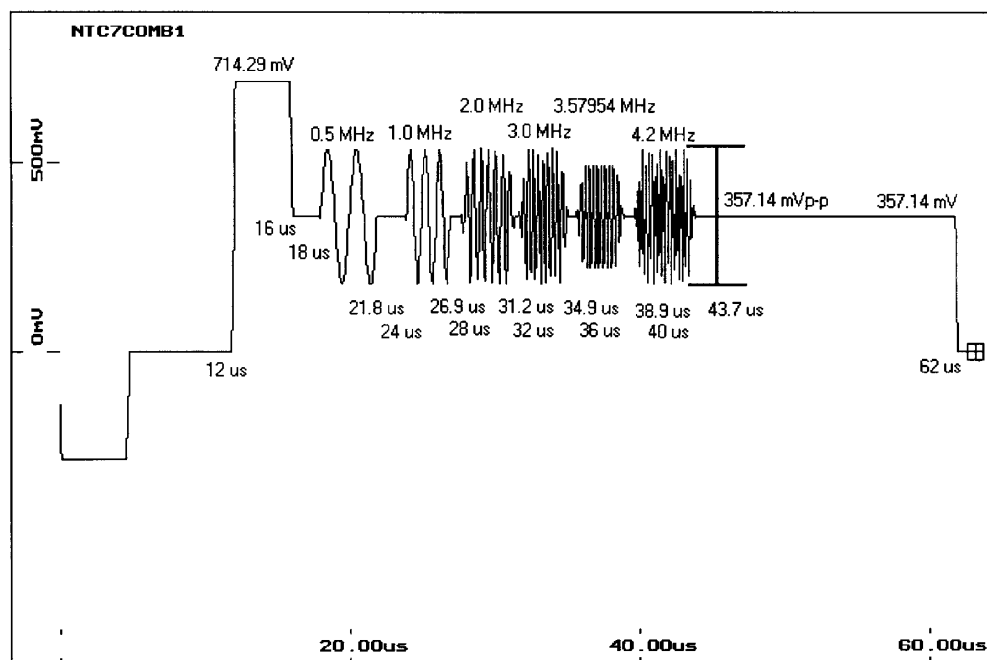


Figure 2-30: Y channel NTC7 Combination signal

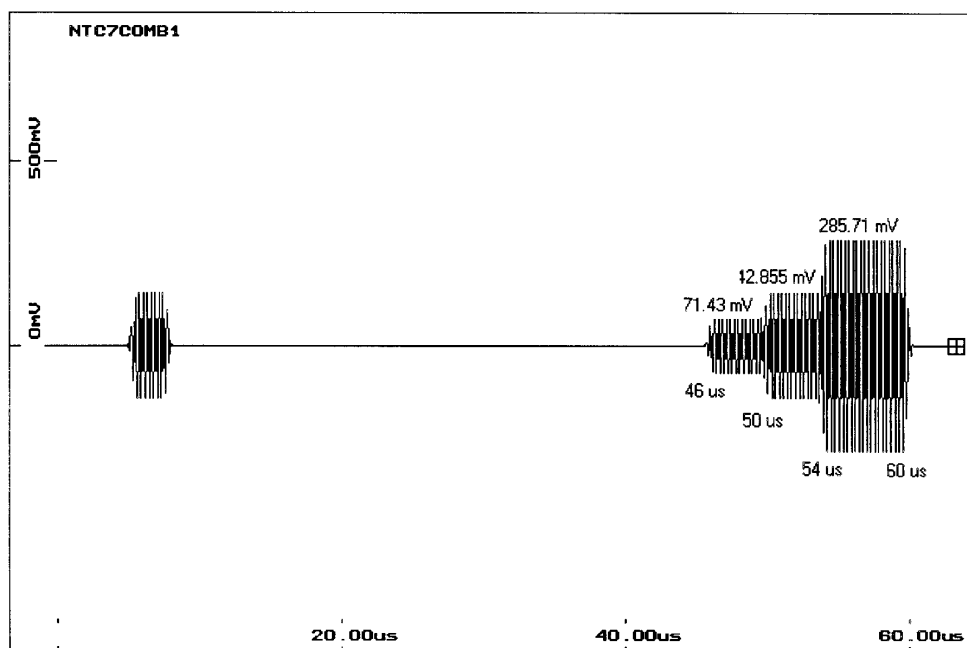


Figure 2-31: C channel NTC7 Combination signal

**Table 2–4: Audio tone characteristics**

| Characteristics                                     | Performance requirements | Supplemental information                                                                |
|-----------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------------|
| Audio Tone<br>Amplitude                             | 0 to +8 dBu adjustable   | 50 $\Omega$ output balanced XLR impedance to drive 600 $\Omega$ or high-impedance load. |
| Frequency                                           | 1 kHz                    |                                                                                         |
| Distortion (THD)                                    | $\leq 0.5\%$             |                                                                                         |
| Audio ID "click" frequency range (channel one only) | 5 – 0.2 Hz.              |                                                                                         |

**Table 2–5: Power supply specifications**

| Characteristics                             | Performance requirements      | Supplemental information                                                                           |
|---------------------------------------------|-------------------------------|----------------------------------------------------------------------------------------------------|
| Supply Accuracy<br>+5 V<br>–5.1 V<br>–10 V  |                               | 5 V $\pm 250$ mV<br>–5.2 V +300 mV –500 mV<br>–10 V $\pm 600$ mV                                   |
| Power Limit                                 |                               | 18 Watts                                                                                           |
| Hum<br>+12 V<br>+5 V<br>–5.2 V<br>–12 V     |                               | Typical<br>10 mV<br>10 mV<br>20 mV<br>10 mV                                                        |
| Noise<br>+5 V<br>–5.2 V<br>–10 V            |                               | $\leq 50$ mV (5 MHz bandwidth)<br>$\leq 50$ mV (5 MHz bandwidth)<br>$\leq 50$ mV (5 MHz bandwidth) |
| Line Voltage Range<br>115 VAC<br>240 VAC    | 90 – 130 VAC<br>180 – 250 VAC |                                                                                                    |
| Fuse Data<br>115 V Setting<br>230 V Setting |                               | .5 A Med Blow<br>.25 A Med Blow                                                                    |
| Power Consumption, Typical                  |                               | 15 Watts                                                                                           |
| Line Frequency                              |                               | 48 – 62 Hz                                                                                         |

**Table 2–6: Physical characteristics**

| Characteristics | Supplemental information |
|-----------------|--------------------------|
| Dimensions      |                          |
| Height          | 1.71 in. (4.34 cm)       |
| Width           | 8.1 in. (20.6 cm)        |
| Length          | 15.0 in (38.1 cm)        |
| Net Weight      | 4 lbs., 6 oz. (1.98 kg)  |
| Shipping Weight | 7 lbs., 1 oz.            |

**Table 2–7: Environmental characteristics**

| Characteristics                       | Supplemental information                                                                                                                                                                                                            |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature                           |                                                                                                                                                                                                                                     |
| Non-Operating                         | –40 to +65° C (–40 to +149° F)                                                                                                                                                                                                      |
| Operating                             | 5 to +35° C (+41 to +104° F)                                                                                                                                                                                                        |
| Altitude                              |                                                                                                                                                                                                                                     |
| Non-Operating                         | To 50,000 feet                                                                                                                                                                                                                      |
| Operating                             | To 2000 feet                                                                                                                                                                                                                        |
| Vibration (Operating)                 | 15 minutes each axis at 0.025 inch, with frequency varied from 10-55-10 cycles per second in 4-minute cycles with instrument secured to vibration platform. Ten minutes each axis at any resonant point or at 55 cycles per second. |
| Shock                                 | 50 g, 1/2 sine, 11 ms duration, 3 guillotine-type shocks per side.                                                                                                                                                                  |
| Transportation                        | Qualified under NTSB Test Procedure 1A, Category II (24-inch drop)                                                                                                                                                                  |
| Relative Humidity (maximum operating) | 80% for temperatures up to 31° C, decreasing linearly to 50% at 40° C                                                                                                                                                               |
| Equipment Type                        | Test and Measuring                                                                                                                                                                                                                  |
| Safety Class                          | Class I (as defined in IEC 1010–1, Annex H) – grounded product                                                                                                                                                                      |
| Overvoltage Category                  | Overvoltage Category II (as defined in IEC 1010–1, Annex J).                                                                                                                                                                        |
| Pollution Degree                      | Pollution Degree 2 (as defined in IEC 1010–1).<br>Note – Rated for indoor use only.                                                                                                                                                 |

**Table 2–8: Certifications and compliances**

| Category                                              | Standards or description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                            |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| FCC Compliance                                        | Emissions comply with FCC Code of Federal Regulations 47, Part 15, Subpart B, Class A Limits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                            |
| Installation (Overvoltage) Category                   | Terminals on this product may have different installation (overvoltage) category designations. The installation categories are:<br><br>CAT III    Distribution-level mains (usually permanently connected). Equipment at this level is typically in a fixed industrial location.<br><br>CAT II    Local-level mains (wall sockets). Equipment at this level includes appliances, portable tools, and similar products. Equipment is usually cord-connected.<br><br>CAT I    Secondary (signal level) or battery operated circuits of electronic equipment.                                     |                                                                                            |
| Pollution Degree                                      | A measure of the contaminates that could occur in the environment around and within a product. Typically the internal environment inside a product is considered to be the same as the external. Products should be used only in the environment for which they are rated.<br><br>Pollution Degree 2                      Normally only dry, nonconductive pollution occurs. Occasionally a temporary conductivity that is caused by condensation must be expected. This location is a typical office/home environment. Temporary condensation occurs only when the product is out of service. |                                                                                            |
| Safety Standards                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                            |
| U.S. Nationally Recognized Testing Laboratory Listing | UL1244                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Standard for electrical and electronic measuring and test equipment.                       |
| Canadian Certification                                | CAN/CSA C22.2 No. 231                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CSA safety requirements for electrical and electronic measuring and test equipment.        |
| European Union Compliance                             | Low Voltage Directive 73/23/EEC, amended by 93/69/EEC<br><br>EN 61010-1                      Safety requirements for electrical equipment for measurement, control, and laboratory use.                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                            |
| Additional Compliance                                 | IEC61010-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Safety requirements for electrical equipment for measurement, control, and laboratory use. |
| Safety Certification Compliance                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                            |
| Temperature, operating                                | +5 to +40° C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                            |
| Altitude (maximum operating)                          | 2000 meters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                            |
| Equipment Type                                        | Test and measuring                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                            |
| Safety Class                                          | Class 1 (as defined in IEC 1010-1, Annex H) – grounded product                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                            |
| Overvoltage Category                                  | Overvoltage Category II (as defined in IEC 1010-1, Annex J)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                            |
| Pollution Degree                                      | Pollution Degree 2 (as defined in IEC 1010-1). Note: Rated for indoor use only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                            |



**WARNING**

*The following servicing instructions are for use only by qualified personnel. To avoid injury, do not perform any servicing other than that stated in the operating instructions unless you are qualified to do so. Refer to all safety summaries before performing any service.*





# Performance Verification



# Performance Verification

This section consists of checklists and detailed procedures to use in verifying the instruments performance parameters.

This procedure is intended to be done in sequence. If only selected parameters are to be checked or adjusted, always begin at a step with a setup illustration.

The following is a list of equipment required for performance verification and calibration. If alternate equipment is used, make sure that it meets the minimum requirements given. Use of inadequate equipment may result in inaccurate measurements or calibration.

1. NTSC Video Measurement Set. For measuring and displaying field-rate and line-rate waveforms, differential phase and gain, and SCH phase. Example: Tektronix 1780R NTSC Video Measurement Set.
2. Instead of the Video Measurement Set, you may substitute the following test equipment:
  - a. NTSC Waveform Monitor. For displaying and measuring field-rate and line-rate waveforms. Example: Tektronix 1480 Mod W5F.
  - b. NTSC Vectorscope. With specific modes for measuring differential phase and gain. Example: Tektronix 520A.
  - c. Video Amplitude Calibration Fixture (VAC). Provides a chopped voltage reference accurate to  $\pm 0.05\%$  from 0 to 1 V in 0.1 mV increments. This fixture is used with the waveform monitor. Example: Tektronix part number 067-0916-00 (plugs into Tektronix TM 503 Power Mainframe).
  - d. Test Oscilloscope. With the following vertical amplifiers:
    1. 50 MHz bandwidth, 1 mV sensitivity, 5 MHz switchable bandwidth, DC offset.
    2. Dual trace with minimum deflection factor of 50 mV/div with 10x probe.
    3. Time Base: 5 ns/div to 5  $\mu$ s/div sweep speeds, triggering to 5 MHz, and capable of accepting both direct and delayed external triggers. Example: Tektronix 7603 Oscilloscope with a 7A13 Differential Comparator, 7A26 Dual Trace Amplifier, and 7B53A Dual Time Base. Use with P6106 10x probes (part number 010-610-03).
4. Frequency Counter. Must be accurate to within 2.5 Hz out of 5 MHz. Example: Tektronix DC 501, Option 01: plugs into a TM 503 Power Mainframe.

5. Distortion Analyzer. Must test power output over range of 0 – 8 dBm and be capable detecting THD of 0.01% or less. Example: Tektronix AA501.
6. Audio Amplifier. 600  $\Omega$  impedance.
7. BNC Coax Cables. 75  $\Omega$  impedance. Example: Tektronix part number 012-0074-00.
8. End-Line Termination. 75  $\Omega$  termination equipped with a BNC connector. Example: Tektronix part number 011-0102-00.
9. Feed-Through Termination. 75  $\Omega$  termination equipped with BNC connectors. Example: Tektronix part number 011-0103-00.
10. Audio Connector-to-Triple Banana Cable. Must be configured to match the generators audio output. Pin 1, shield; pin 2, +; pin 3, -. Example: ITT Pamona Electronics, Model 4953-J-36.

## Performance Verification Checklist

**Table 3–1: NTSC test signal output**

| No. | Procedure                                     | Limits                                       |
|-----|-----------------------------------------------|----------------------------------------------|
| 1   | Blanking Level                                | 0 V $\pm$ 50 mV                              |
| 2   | Sync Amplitude                                | 40 IRE $\pm$ 0.8 IRE/285.7 mV $\pm$ 5.7 mV   |
| 3   | Burst Amplitude                               | 40 IRE $\pm$ 0.8 IRE/285.7 mV $\pm$ 5.7 mV   |
| 4   | 5-Step Staircase Linearity                    | Within 1%                                    |
| 5   | Luminance Amplitude                           | 100 IRE $\pm$ 1.0 IRE/714.3 mV $\pm$ 7.14 mV |
| 6   | Chrominance Amplitude                         | 100 IRE $\pm$ 1.0 IRE/714.3 mV $\pm$ 7.14 mV |
| 7   | Chrominance-to-Luminance Gain                 | $\pm$ 1%                                     |
| 8   | Line Tilt                                     | < 0.5%/0.5 IRE/3.6 mV                        |
| 9   | Field Tilt                                    | < 0.5%/0.5 IRE/3.6 mV                        |
| 10  | Chrominance-Luminance Delay                   | < 10 ns                                      |
| 11  | Ringings                                      | < 1.5 IRE/10.7 mV                            |
| 12  | Pulse-to-Bar Ratio                            | 1:1 $\pm$ 1%                                 |
| 13  | Sync Rise and Fall Times                      | 140 ns $\pm$ 20 ns                           |
| 14  | Sync Timing<br>H Sync and Vertical Serrations | 4.7 $\mu$ s $\pm$ 0.1 $\mu$ s                |
|     | Equalizing Pulses                             | 2.3 $\mu$ s $\pm$ 0.1 $\mu$ s                |
| 15  | Horizontal Blanking Interval                  | 10.9 $\mu$ s $\pm$ 0.1 $\mu$ s               |
| 16  | Multiburst Frequency Response                 | $\pm$ 2%/1.2 IRE/8.6 mV                      |

**Table 3–1: NTSC test signal output (Cont.)**

| No. | Procedure                   | Limits                    |
|-----|-----------------------------|---------------------------|
| 17  | Differential Phase and Gain | $< 3^\circ$ and $< 0.3\%$ |
| 18  | SCH Accuracy                | $0^\circ \pm 5^\circ$     |

**Table 3–2: Y and C test signal output**

| No. | Procedure                     | Limits                                       |
|-----|-------------------------------|----------------------------------------------|
| 19  | Luminance Blanking Level      | 0 V $\pm$ 50 mV)                             |
| 20  | Luminance Amplitude           | 100 IRE $\pm$ 1.0 IRE/714.3 mV $\pm$ 7.14 mV |
| 21  | Sync Amplitude                | 40 IRE $\pm$ 0.8 IRE/285.7 mV $\pm$ 5.7 mV   |
| 22  | 5-Step Staircase Linearity    | within 1%                                    |
| 23  | Line Tilt                     | $< 0.5\%/0.5$ IRE/3.6 mV                     |
| 24  | Field Tilt                    | $< 0.5\%/0.5$ IRE/3.6 mV                     |
| 25  | Ringings                      | $< 1.5$ IRE/10.7 mV                          |
| 26  | Pulse-to-Bar Ratio            | 1:1 $\pm$ 1%                                 |
| 27  | Multiburst Frequency Response | $\pm 2\%$                                    |
| 28  | Chrominance Blanking Level    | 0 V $\pm$ 50 mV                              |
| 29  | Chrominance Response          | $\pm 1\%$ to 5MHz                            |
| 30  | Burst Amplitude               | 40 IRE $\pm$ 0.8 IRE/285.7 mV $\pm$ 5.7 mV   |
| 31  | Chrominance Amplitude         | 100 IRE $\pm$ 1.0 IRE/714.3 mV $\pm$ 7.14 mV |
| 32  | Chrominance-to-Luminance Gain | $\pm 1\%$                                    |
| 33  | Chrominance-Luminance Delay   | $< 12$ ns                                    |

**Table 3–3: Audio output and subcarrier frequency**

| No. | Procedure                       | Limits                                                                                            |
|-----|---------------------------------|---------------------------------------------------------------------------------------------------|
| 34  | Total Harmonic Distortion       | $< 0.5\%$                                                                                         |
| 35  | Subcarrier Oscillator Frequency | 14.31818 MHz $\pm$ 28 Hz, 5 to 35° C.<br>Typical is 14.31818 MHz $\pm$ 15 Hz at room temperature. |

## Performance Verification Procedures

### NTSC Test Signal Output Test Procedures

1. Blanking Level
  - a. Connect the equipment as shown in Figure 3–1 or 3–2.
  - b. Select the 5-Step signal.
  - c. Confirm that any DC-Restorer feature of the monitor or oscilloscope is OFF.
  - d. Toggle the display between DC coupled and ground reference.
  - e. Check that the blanking level is  $0\text{ V} \pm 50\text{ mV}$ .

#### NTSC Measurement Set

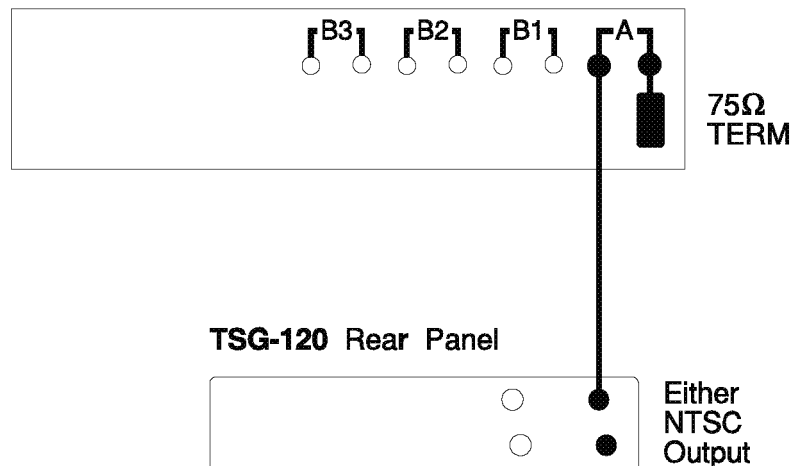


Figure 3–1: Blanking level verification test setup (video measurement set)

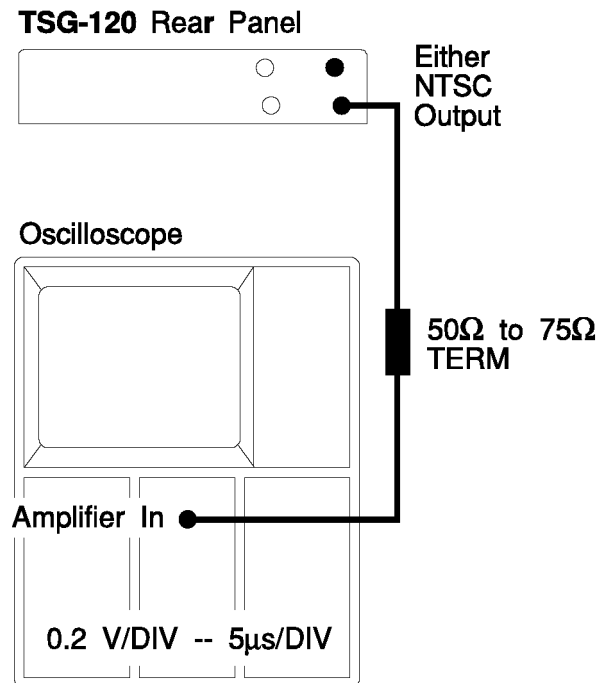


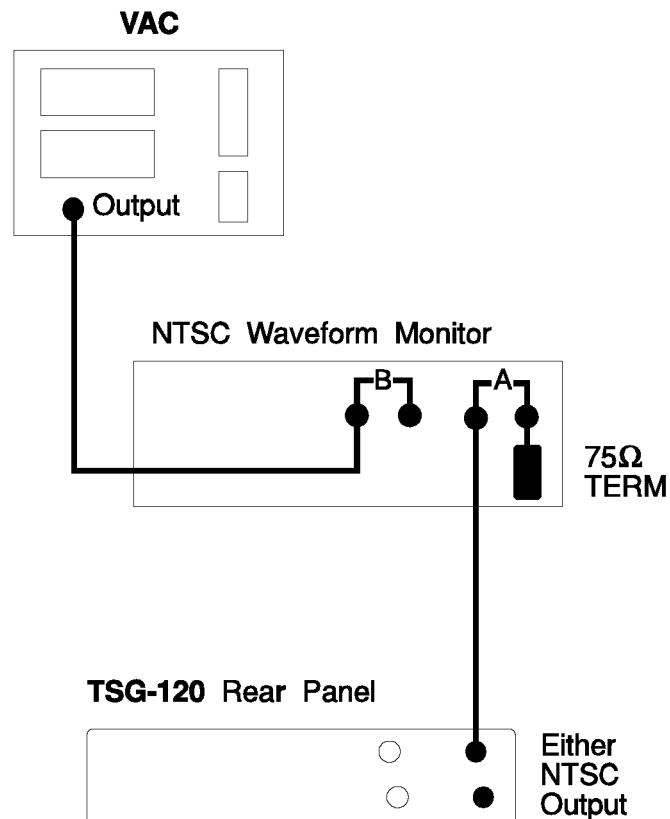
Figure 3–2: Blanking level verification test setup (oscilloscope)

2. Sync Amplitude

- a. Connect the test equipment as shown in Figure 3–1 or 3–3.
- b. Select 5-Step signal.
- c. With the Waveform + CAL function of the measurement set, or with the VAC, match the blanking level of the lower waveform to the sync tip of the upper waveform.
- d. Check that the sync amplitude is  $40 \text{ IRE} \pm 0.8 \text{ IRE}/285.7 \text{ mV} \pm 5.7 \text{ mV}$ .

3. Burst Amplitude

- a. If necessary, adjust the measurement set or VAC to match the top of the lower burst to the bottom of the upper burst.
- b. Check for a burst amplitude of  $40 \text{ IRE} \pm 0.8 \text{ IRE}/285.7 \text{ mV} \pm 5.7 \text{ mV}$ .



**Figure 3-3: Sync amplitude verification test setup**

#### 4. 5-Step Staircase Linearity

- a. With the 5-Step signal still selected, set the test equipment to view the signal through a Differentiated Step filter.
- b. Check that the difference between the highest and lowest spikes (differentiated steps) is no greater than 1%.

(Or, use a VAC to measure the amplitude of each signal step. Check that the variation between the largest and smallest steps is no greater than 0.2 IRE/0.14 mV.)

#### 5. Luminance Amplitude

- a. Set the test equipment to match the top of the lower 5-Step waveform with the blanking level of the upper waveform.
- b. Check that the 5-Step amplitude is  $100 \text{ IRE} \pm 1.0 \text{ IRE}/714.3 \text{ mV} \pm 7.14 \text{ mV}$ .

**6. Chrominance Amplitude**

- a. Select the Chroma Noise signal.

**Option 02.** Select the NTC7 Combination (in NTC7 Matrix) signal.

- b. If necessary, adjust the test equipment to match the top of the lower waveform with the blanking level of the upper.
- c. Check that the chrominance amplitude is  $100 \text{ IRE} \pm 1.0 \text{ IRE}/714.3 \text{ mV} \pm 7.14 \text{ mV}$ .

**7. Chrominance-to-Luminance Gain**

Check that the measured values for Luminance and Chrominance amplitude are equal within  $1.0 \text{ IRE}/7.14 \text{ mV}$ .

**8. Line Time Distortion (Line Tilt)**

- a. Select the Matrix signal.

**Option 02.** Select the Field Square Wave.

- b. Set the test equipment to view the signal through a luminance filter.
- c. If necessary, normalize the signal gain so that blanking level of the waveform is on the baseline and the top of the  $18 \mu\text{s}$  line bar (or the pulse and bar part of the signal) passes through 100 IRE at its midpoint.
- d. Center the bar horizontally over the L.D. graticule, if the monitor has one.
- e. Check that the line bar tilts no more than  $0.5\%/0.5 \text{ IRE}/3.6 \text{ mV}$  over its length. Ignore the first microsecond and last microsecond of the bar.

**9. Field Time Distortion (Field Tilt)**

- a. Select the 100% Field signal.
- b. Set the test equipment to view one field of the signal.
- c. Check that the field bar tilts no more than  $0.5\%/0.5 \text{ IRE}/3.6 \text{ mV}$  over its length. Ignore the first and last 0.2 milliseconds (about 3 lines) of the bar.

**10. Chrominance-Luminance Delay**

- a. Select the Pulse and Bar signal.

**Option 02.** Select the NTC7 Combination (in NTC7 Matrix) signal.

- b. Set the waveform monitor to view the bottom of the 12.5T modulated pulse.

- c. Check (with the voltage cursors of the measurement set, or with a VAC) that the envelope at the base of the modulated pulse is no more than 1.2 IRE p-p/8.6 mV p-p, equivalent to 12 ns delay.

(Or, use the Chroma/Luma measurement mode of the Tek 1780 to get an estimate of both C/Y delay and gain. Check that delay is no greater than 12 ns.)

#### 11. Ringing

- a. With the Pulse and Bar still selected, set the waveform monitor to display the bottom of the 2T pulse.

**Option 02.** With the NTC7 Combination (in NTC7 Matrix) still selected, set the waveform monitor to display the bottom of the 2T pulse.

- b. Check (with voltage cursors or graticule) that after-pulse ringing is no greater than 1%/1.0 IRE/7.14 mV peak.

#### 12. Pulse-to-Bar Ratio

- a. Set the waveform monitor to display the tip of the inverted pulse of the Pulse and Bar signal.

**Option 02.** Set the waveform monitor to display the tip of the inverted pulse of the NTC7 Combination (in NTC7 Matrix) signal.

- b. Check with voltage cursors or graticule - that the inverted pulse tip is within 1%/1.0 IRE/7.14 mV of blanking level.

(Or, use a VAC and match the tip of the inverted pulse of one waveform to the blanking level of the other. Check that the inverted pulse is within 7.14 mV of the bar amplitude.)

#### 13. Sync Rise and Fall Times

- a. Set the Waveform Monitor to display the sync on any test signal from the generator.
- b. Identify the 10% and 90% points of the sync transitions. This can be done with voltage cursors or graticule, and may be aided by using variable gain to normalize the sync to 100 IRE.
- c. Check with time cursors or graticule - that rise and fall times between 10% and 90% are 140 ns  $\pm$  20 ns.

**14. Sync Timing**

- a. Check that horizontal sync duration between 50% points is  $4.7\ \mu\text{s} \pm 0.1\ \mu\text{s}$ .
- b. Set the waveform monitor to display the serrations and equalizing pulses in the vertical interval.
- c. Check that the half-amplitude duration of the vertical serrations is  $4.7\ \mu\text{s} \pm 0.1\ \mu\text{s}$ .
- d. Check that the half-amplitude duration of the equalizing pulses is  $2.3\ \mu\text{s} \pm 0.1\ \mu\text{s}$ .

**15. Horizontal Blanking Interval**

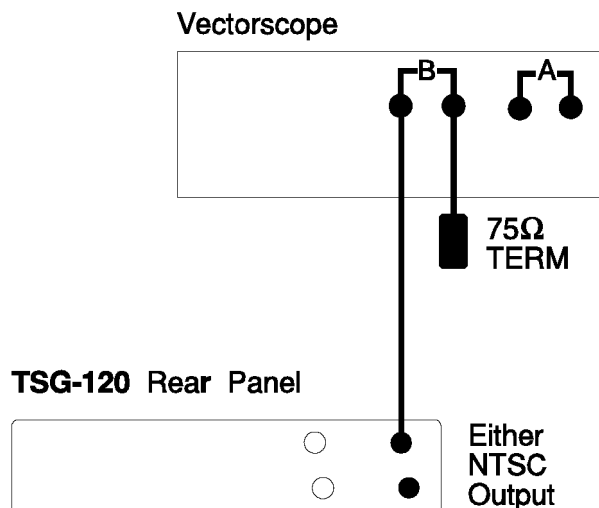
- a. Select the 100% Field signal.
- b. Set the waveform monitor to display horizontal blanking.
- c. Check that the horizontal blanking interval is  $10.9\ \mu\text{s} \pm 0.2\ \mu\text{s}$  between 20 IRE signal levels.

**16. Multiburst Frequency Response**

- a. Select the Multiburst signal.
- b. Check with the Waveform + CAL function of the measurement set, or with a VAC -- that the white flag and burst packets are equal in amplitude within  $\pm 2\%/1.2\ \text{IRE}/8.6\ \text{mV}$  peak-to-peak.

**17. Differential Phase and Gain**

- a. Connect the test equipment as shown in Figure 3–1 or 3–4.
- b. Select the Modulated Ramp signal.  
**Option 02.** Select the NTC7 Combination (in NTC7 Matrix) signal.
- c. Set the measurement set or vectorscope to measure differential phase using the double trace method, if available.
- d. Check for differential phase of no greater than  $0.3^\circ$ .



**Figure 3-4: Differential Gain test setup**

- e. Set the test equipment to measure differential gain. Use a double trace if possible.
- f. Check that the differential gain of the Modulated Ramp is < 0.3% from 0 IRE to 100 IRE.

**Option 02.** Check that the differential gain of the NTC7 Combination (in NTC7 Matrix) is < 0.3% from 0 IRE to 100 IRE.

#### 18. SCH Phase

**NOTE.** Accurate Subcarrier-to-Horizontal Phase measurements may be difficult without test equipment having modes intended for that purpose. The SCH phase error in the test signals is typically less than one degree.

- a. Select any test signal from the instrument.
- b. Confirm that the measurement set is internally referenced and set it to display the SCH phase of the signal.
- c. Check that the SCH phase error is no greater than 5°.

#### Y and C Test Signal Output Test Procedures

#### 19. Luminance Blanking Level

- a. Connect the equipment as shown in Figure 3-5 (and select channel B1 at the front panel of the measurement set) or Figure 3-6.
- b. Select the 5-Step signal.

## NTSC Measurement Set

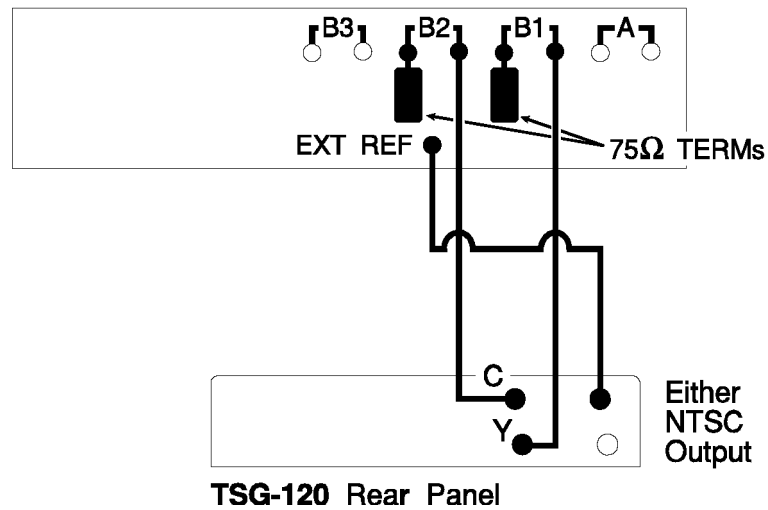


Figure 3–5: Blanking level or amplitude test setup (video measurement set)

## TSG-120 Rear Panel

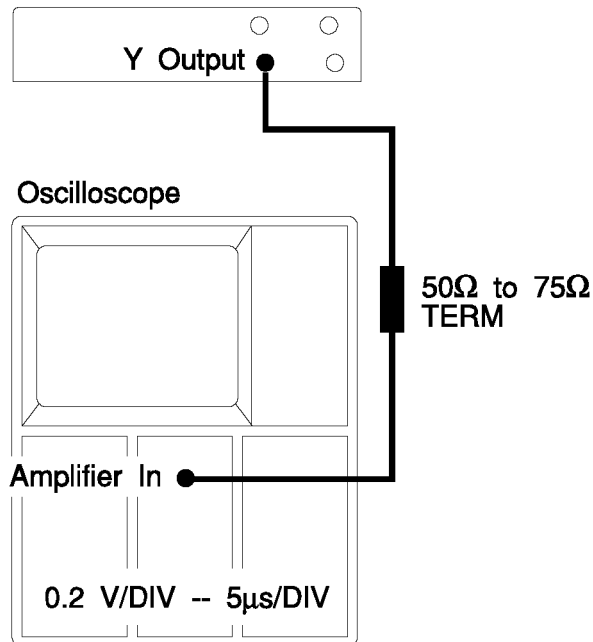


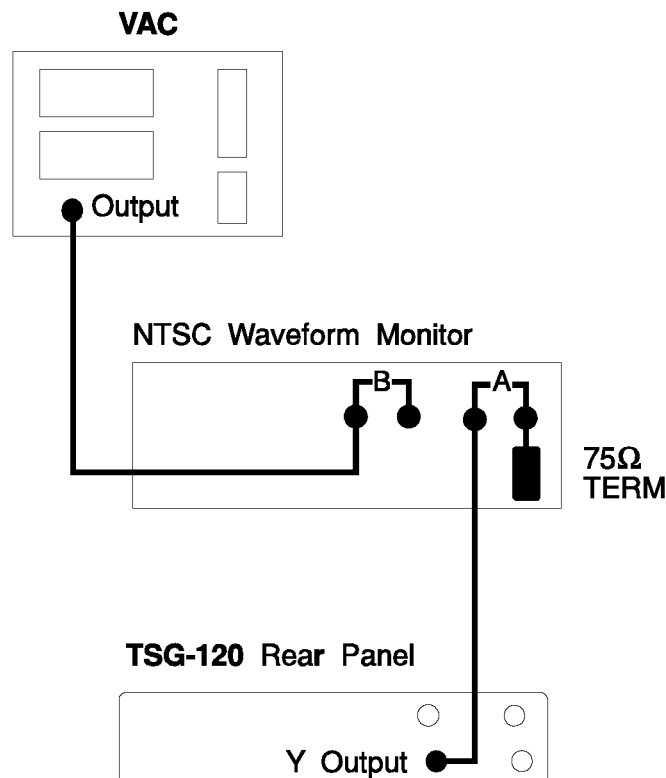
Figure 3–6: Blanking level or amplitude test setup (oscilloscope)

- c. Confirm that any DC-Restorer feature of the monitor or oscilloscope is OFF.

- d. Toggle the display between DC coupled and ground reference.
- e. Check that the blanking level is  $0\text{ V} \pm 50\text{ mV}$ .

## 20. Luminance Amplitude

- a. Connect the test equipment as shown in Figure 3–5 (channel B1 selected at the front panel of the measurement set) or Figure 3–7.



**Figure 3–7: Luminance amplitude test setup**

- b. Select the 5-Step signal.
- c. With the Waveform + CAL function of the measurement set, or with the VAC, match the top of the lower 5-Step waveform with the blanking level of the upper waveform.
- d. Check that the 5-Step amplitude is  $100\text{ IRE} \pm 1.0\text{ IRE}/714.3\text{ mV} \pm 7.14\text{ mV}$ .
- e. Note the luminance amplitude for use in step 32 of this procedure.

**21. Sync Amplitude**

- a. Match the blanking level of the lower waveform to the sync tip of the upper waveform.
- b. Check that the sync amplitude is  $40 \text{ IRE} \pm 0.8 \text{ IRE}/285.7 \text{ mV} \pm 2.9 \text{ mV}$ .

**22. 5-Step Staircase Linearity**

- a. With the 5-Step signal still selected, set the test equipment to view the Y output through a Differentiated Step filter.
- b. Check that the difference between the highest and lowest spikes (steps) is no greater than 1%.

(Or, use a VAC to measure the amplitude of each signal step. Check that the variation between the largest and smallest steps is no greater than 0.2 IRE/0.14 mV.)

**23. Line Time Distortion (Line Tilt)**

- a. Select the Matrix signal.
- b. If necessary, normalize the signal gain so that blanking level of the waveform is on the baseline and the top of the  $18 \mu\text{s}$  line bar (of the pulse and bar part of the signal) passes through 100 IRE at its midpoint.
- c. Center the bar horizontally over the L.D. graticule, if the monitor has one.
- d. Check that the line bar tilts no more than  $0.5\%/0.5 \text{ IRE}/3.6 \text{ mV}$  over its length. Ignore the first microsecond and last microsecond of the bar.

**24. Field Time Distortion (Field Tilt)**

- a. Select the 100% Field signal.
- b. Set the test equipment to view one field of the signal.
- c. Check that the field bar tilts no more than  $0.5\%/0.5 \text{ IRE}/3.6 \text{ mV}$  over its length. Ignore the first and last 0.2 milliseconds (about 3 lines) of the bar.

**25. Ringing**

- a. Select the Pulse and Bar signal.  
**Option 02.** Select the NTC7 Combination (in NTC7 Matrix) signal.
- b. Set the equipment to display the bottom of the 2T pulse at line rate.
- c. Check with voltage cursors or graticule - that after-pulse ringing is no greater than  $1\%/1.0 \text{ IRE}/7.14 \text{ mV}$  peak.

**26. Pulse-to-Bar Ratio**

- a. Set the waveform monitor to display the tip of the inverted pulse of the Pulse and Bar signal.

**Option 02.** Set the waveform monitor to display the tip of the inverted pulse of the NTC7 Combination (in NTC7 Matrix) signal.

- b. Check with voltage cursors or graticule - that the inverted pulse tip is within 1%/1.0 IRE/7.14 mV of blanking level.

(Or, use the VAC and match the tip of the inverted pulse of the lower waveform to the blanking level of the upper waveform. Check that the inverted pulse is within 7.14 mV of the bar amplitude.)

**27. Multiburst Frequency Response**

- a. Select the Multiburst signal.
- b. Check with the Waveform + CAL function of the measurement set, or with a VAC - that the white flag and burst packets are equal in amplitude within  $\pm 2\%/1.2$  IRE/8.6 mV peak-to-peak.

**28. Chrominance Blanking Level**

- a. Connect the equipment as shown in Figure 3–5 (and select channel B2 at the front panel of the measurement set) or Figure 3–8.
- b. Select external reference or sync at the monitor or oscilloscope and confirm that any DC-Restorer feature is OFF.
- c. Select the Chroma Response signal.  
**Option 02.** Select the NTC7 Combination (in NTC7 Matrix) signal.
- d. Switch the display between DC coupled and ground reference.
- e. Check that the blanking level is  $0\text{ V} \pm 50\text{ mV}$ .

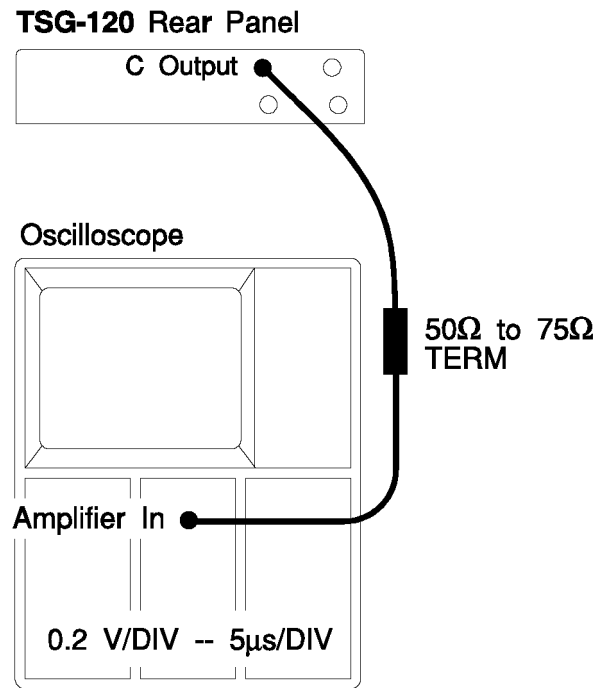


Figure 3–8: Chrominance blanking level test setup

## 29. Chrominance Response

- a. Connect the equipment as shown in Figure 3–5 (with channel B2 selected at the front panel of the measurement set) or Figure 3–9.
- b. Set the test equipment to external reference or sync.
- c. Select the Chroma Response signal.

**Option 02.** Select the NTC7 Combination (in NTC7 Matrix) signal.

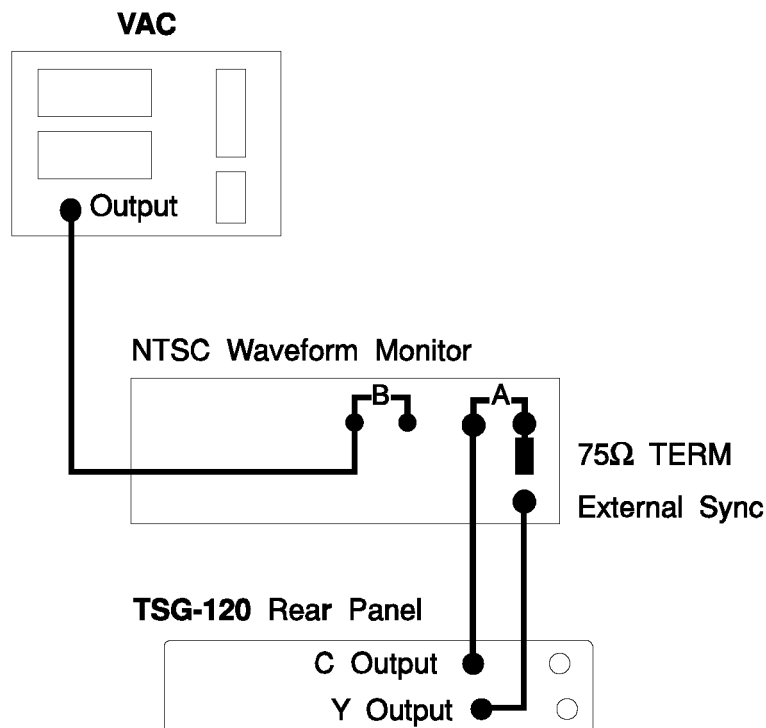


Figure 3-9: Chrominance response test setup

- d. Check with voltage cursors, graticule, or a VAC - that the amplitude of the Chrominance portion is constant, within 1%/0.6 IRE/4.3 mV<sub>p-p</sub>, from end to end.

### 30. Burst Amplitude

- a. Use the Waveform + CAL feature or the VAC to match the top of the lower burst with the bottom of the upper.
- b. Check that burst amplitude is 40 IRE  $\pm$  0.8 IRE<sub>p-p</sub>/287.5 mV  $\pm$  5.7 mV<sub>p-p</sub>.

### 31. Chrominance Amplitude

- a. Select the Chroma Noise signal.
 

**Option 02.** Select the NTC7 Combination (in NTC7 Matrix) signal.
- b. Adjust the test equipment to match the top of the lower waveform with the bottom of the upper.
- c. Check that the chrominance amplitude is 100 IRE  $\pm$  1.0 IRE<sub>p-p</sub> /714.3 mV  $\pm$  7.14 mV<sub>p-p</sub>.

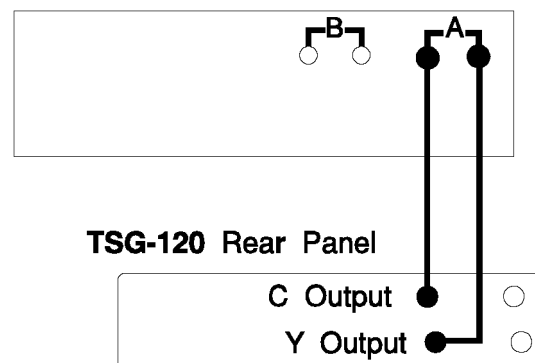
**32. Chrominance-to-Luminance Gain**

Check that the chrominance amplitude and the previously noted luminance amplitude (step 20) are equal within 1.0 IRE/7.14 mV.

**33. Chrominance-Luminance Delay**

- a. Connect the equipment as shown in Figure 3–10.

**NTSC Measurement Set  
or Waveform Monitor**



**Figure 3–10: Chrominance-luminance delay test setup**

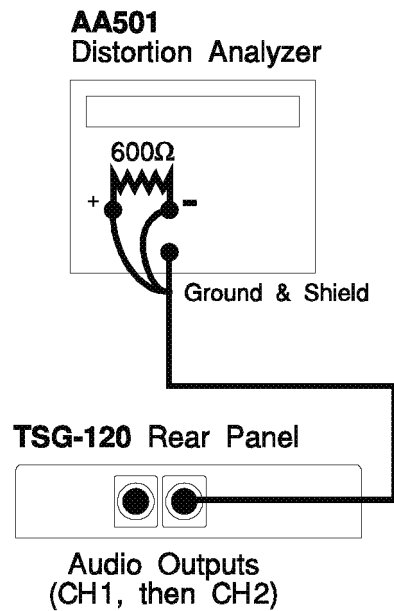
- b. Select the Pulse and Bar signal.
- c. Set the equipment to view the bottom of the 12.5T modulated pulse.
- d. Check with graticule or voltage cursors - that the envelope at the base of the modulated pulse is no more than 1.2 IREp-p/8.6 mVp-p, equivalent to 12 ns delay.

(Or, use the Chroma/Luma measurement mode of the Tek 1780 to get an estimate of both C/Y delay and gain. Check that delay is no greater than 12 ns.)

**Audio Output and  
Subcarrier Frequency Test  
Procedures**

**34. Total Harmonic Distortion**

- a. Disable the channel one ID click by moving jumper J12 to pins 2 and 3.
- b. Connect the equipment as in Figure 3–11, placing a 600 Ohm resistor (to represent the load of your system) across the analyzer's + and - terminals.



**Figure 3–11: Total harmonic distortion test setup**

- c. Set the distortion analyzer to measure THD.
- d. Check that THD on channel one is no more than 0.5%.
- e. Return jumper J12 to pins 1 and 2.
- f. Move the cable from audio channel 1 to audio channel 2.
- g. Check that THD on channel two is no more than 0.5%.

### 35. Free-Running Frequency

**NOTE.** After initial delivery or long storage, allow a two-hour warm-up to re-age the crystal. Thereafter, 30 minutes warm-up is sufficient.

- a. Remove the cover from the generator and connect the equipment as shown in Figure 3–12.

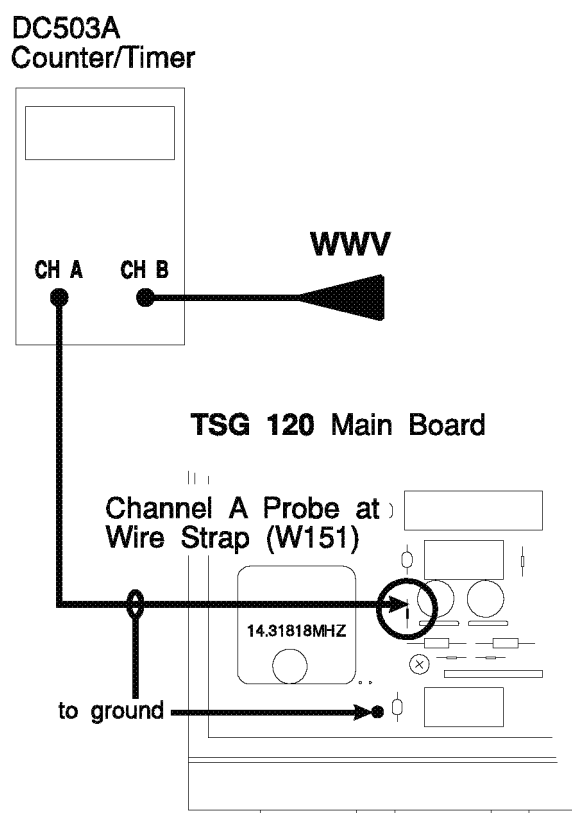


Figure 3–12: Free-running frequency test setup

- b. Set the frequency counter to count at a 4x-subcarrier rate.
- c. Check that the measured oscillator frequency is within 15 Hz of 14.31818 MHz at normal operating temperature.





# Adjustment Procedure



# Adjustment Procedure

This section consists of checklists and detailed procedures to use in adjusting performance parameters for the TSG 120 YC/NTSC Signal Generator.

This procedure is intended to be done in sequence. If only selected parameters are to be checked or adjusted, always begin at a step with a setup illustration.

The following is a list of equipment required for performance verification and calibration. If alternate equipment is used, make sure that it meets the minimum requirements given. Use of inadequate equipment may result in inaccurate measurements or calibration.

1. NTSC Video Measurement Set. For measuring and displaying field-rate and line-rate waveforms, differential phase and gain, and SCH phase. Example: Tektronix 1780R NTSC Video Measurement Set.
2. Instead of the Video Measurement Set, you may substitute the following test equipment:
  - a. NTSC Waveform Monitor. For displaying and measuring field-rate and line-rate waveforms. Example: Tektronix 1480 Waveform Monitor, Mod W5F.
  - b. NTSC Vectorscope. With specific modes for measuring differential phase and gain. Example: Tektronix 520A.
  - c. Video Amplitude Calibration Fixture (VAC). Provides a chopped voltage reference accurate to  $\pm 0.05\%$  from 0 to 1 V in 0.1 mV increments. This fixture is used with the waveform monitor. Example: Tektronix part number 067-0916-00 (plugs into Tektronix TM 503 Power Mainframe).
  - d. Test Oscilloscope. With the following vertical amplifiers:
    1. 50 MHz bandwidth, 1 mV sensitivity, 5 MHz switchable bandwidth, DC offset.
    2. Dual trace with minimum deflection factor of 50 mV/div with 10x probe.
    3. Time Base: 5 ns/div to 5  $\mu$ s/div sweep speeds, triggering to 5 MHz, and capable of accepting both direct and delayed external triggers. Example: Tektronix 7603 Oscilloscope with a 7A13 Differential Comparator, 7A26 Dual Trace Amplifier, and 7B53A Dual Time Base. Use with P6106 10x probes (part number 010-610-03).

4. Frequency Counter. Must be accurate to within 2.5 Hz out of 5 MHz. Example: Tektronix DC 501, Option 01: plugs into a TM 503 Power Mainframe.
5. Distortion Analyzer. Must test power output over range of 0 – 8 dBm and be capable of detecting THD of 0.01% or less. Example: Tektronix AA501.
6. Audio Amplifier. 600  $\Omega$  impedance.
7. BNC Coax Cables. 75  $\Omega$  impedance. Example: Tektronix part number 012-0074-00.
8. End-Line Termination. 75  $\Omega$  termination equipped with a BNC connector. Example: Tektronix part number 011-0102-00.
9. Feed-Through Termination. 75  $\Omega$  termination equipped with BNC connectors. Example: Tektronix part number 011-0103-00.
10. Audio Connector-to-Triple Banana Cable. Must be configured to match the generator's audio output. Pin 1, shield; pin 2, +; pin 3, -. Example: ITT Pamona Electronics, Model 4953-J-36.

## Adjustment Check List

**Table 4–1: List of adjustment procedures**

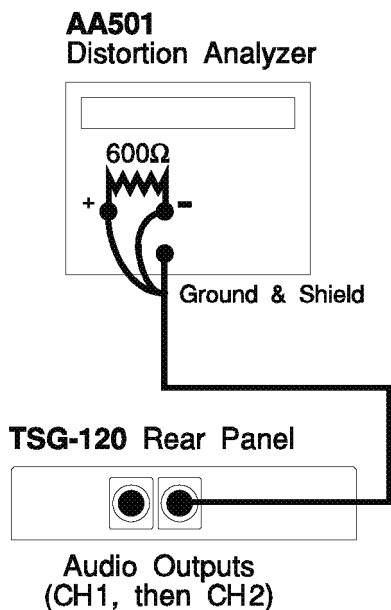
| Steps                                                                                                | Procedure                  | Adjustment            |
|------------------------------------------------------------------------------------------------------|----------------------------|-----------------------|
| 1                                                                                                    | Audio Tone Levels          | R122 and R123         |
| 2                                                                                                    | Audio ID Frequency         | R126                  |
| 3                                                                                                    | Oscillator Frequency       | Oscillator adjustment |
| Steps 4 – 11 are interactive. Repeat them in sequence until the best possible results are obtained.  |                            |                       |
| 4                                                                                                    | NTSC Sync Amplitude        | R18                   |
| 5                                                                                                    | NTSC Luminance Gain        | R18                   |
| 6                                                                                                    | NTSC Chrominance Gain      | R23                   |
| 7                                                                                                    | Y Signal Gain              | R79                   |
| 8                                                                                                    | C Signal Gain              | R60                   |
| 9                                                                                                    | NTSC Signal Blanking Level | R20                   |
| 10                                                                                                   | Y signal Blanking Level    | R82                   |
| 11                                                                                                   | C signal Blanking Level    | R63                   |
| Steps 12 – 17 are interactive. Repeat them in sequence until the best possible results are obtained. |                            |                       |

**Table 4–1: List of adjustment procedures (Cont.)**

| Steps | Procedure                                      | Adjustment                 |
|-------|------------------------------------------------|----------------------------|
| 12    | NTSC Multiburst (luminance) Frequency Response | L14, L15, L16, L17 and L18 |
| 13    | NTSC (Sin X)/X Compensation                    | C19 and C21                |
| 14    | Y Signal (Sin X)/X Compensation                | C69                        |
| 15    | NTSC Chrominance Frequency Response            | L8, L9, L10, L11 and L12   |
| 16    | C Signal (Sin X)/X Compensation                | C47                        |
| 17    | NTSC Chrominance-to-Luminance Delay            | L8 & L9 and L14 & L15      |

## Adjustment Procedures

### 1. Audio Tone Level



**Figure 4-1: Audio tone level test setup**

- a. Connect the equipment as shown in Figure 4-1 with the following settings:

AA501 (Distortion Analyzer):

| Function            | Setting    |
|---------------------|------------|
| Input Level Range   | Auto range |
| dBm Switch          | In         |
| Level Switch        | In         |
| All Filter Switches | Out        |

- b. Disable the channel 1 ID click by moving jumper J12 to pins 2 and 3.
- c. Adjust R123 to obtain the desired dB output for Audio 1. (Factory setting is + 8 dBm.)
- d. Return jumper J12 to the 1-2 position.
- e. Move the audio cable from Audio channel 1 to Audio channel 2.

- f. Adjust R122 to obtain the desired output level for Audio 2. (Factory setting is + 8 dBm.)
2. ID Click Frequency
- a. Connect the equipment as shown in Figure 4-2.

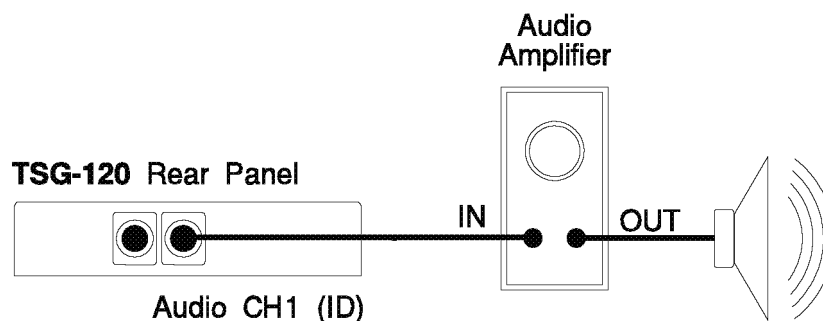


Figure 4-2: ID click frequency test setup

- b. Adjust R126 for the desired interval between ID clicks. The range of adjustment is from approximately 0.2 seconds to over 4 seconds.
3. Oscillator Frequency
- a. Connect the equipment as shown in Figure 4-3.
  - b. Set the DC503A to count a frequency of 14.31818 MHz.
  - c. Remove the round plastic cap from the top of the oscillator.
  - d. Fine-adjust the oscillator frequency to bring  $4 F_{sc}$  to  $14.31818 \text{ MHz} \pm 15 \text{ Hz}$ .
  - e. Reinstall the plastic cap.

---

**NOTE.** Steps 4 – 11 are interactive. Repeat them, in sequence, until the best possible results are obtained.

---

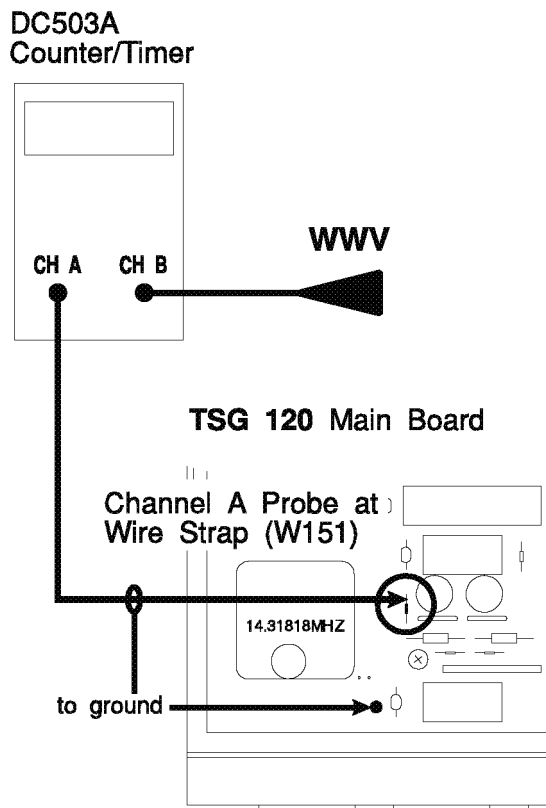


Figure 4-3: Oscillator frequency test setup

4. NTSC Sync Amplitude
  - a. Connect the equipment as shown in Figure 4-4 or 4-5.
  - b. Select the 5 Step signal.
  - c. Select the Slow DC Restorer feature of the test equipment.
  - d. Use the Waveform + CAL feature of the measurement set (or use a VAC) to add a second waveform 40 IRE/285.7 mV above (or below) the original.
  - e. Adjust R18 to match the sync tip of the upper waveform to the blanking level of the lower within  $\pm 0.8$  IRE/5.7 mV.

## NTSC Measurement Set

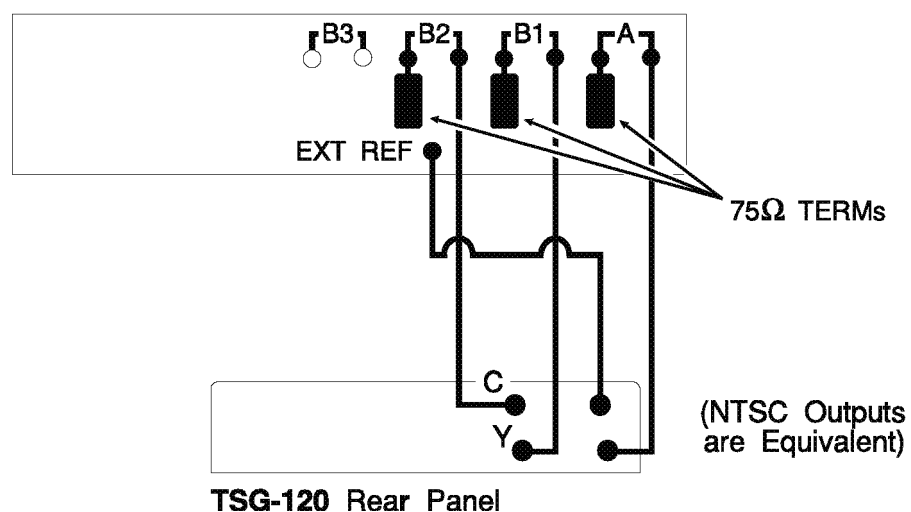


Figure 4-4: NTSC sync amplitude test setup (video measurement set)

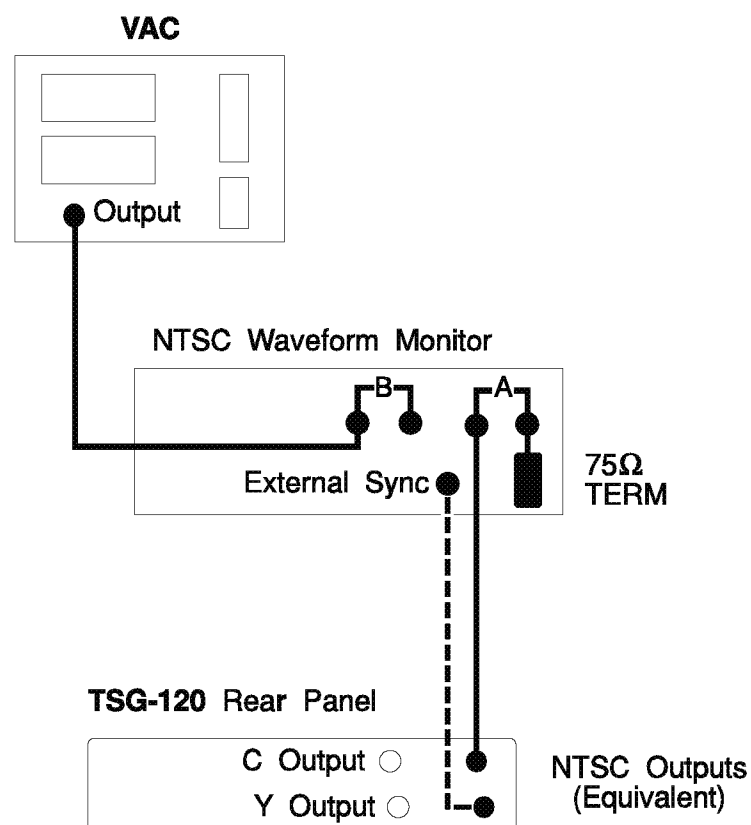


Figure 4-5: NTSC sync amplitude test setup (vac and waveform monitor)

**5. NTSC Luminance Gain**

- a.** Use the Waveform + CAL feature of the measurement set (or use a VAC) to move the second waveform to 100 IRE/714.3 mV above (or below) the original.
- b.** Adjust R18 to match the top of the lower waveform to the blanking level of the upper within  $\pm 1.0$  IRE/7.14 mV.

**6. NTSC Chrominance Gain**

- a.** Select the Chroma Noise signal.  
**Option 02.** Select the NTC7 Combination (in NTC7 Matrix) signal.
- b.** Adjust R23 to match the top of the lower waveform to the blanking level of the upper within  $\pm 1.0$  IRE/7.14 mV.

**7. Y Signal Gain**

- a.** Change equipment settings or connections as necessary to view the Y-only output.
- b.** Select the 5-Step signal.
- c.** Adjust R79 to match the top of the lower waveform to the blanking level of the upper within  $\pm 1.0$  IRE/7.14 mV.

**8. C Signal Gain**

- a.** Change equipment settings or connections as necessary to view the C-only output. Use one of the NTSC outputs as an external reference or sync.
- b.** Select the Chroma Noise signal.  
**Option 02.** Select the NTC7 Combination (in NTC7 Matrix) signal.
- c.** Adjust R60 to match the top of the lower waveform to the bottom of the upper within  $\pm 1.0$  IRE/7.14 mV.

### 9. NTSC Signal Blanking Level

- a. Connect the equipment as shown in Figure 4–4 (channel A selected) or 4–6.

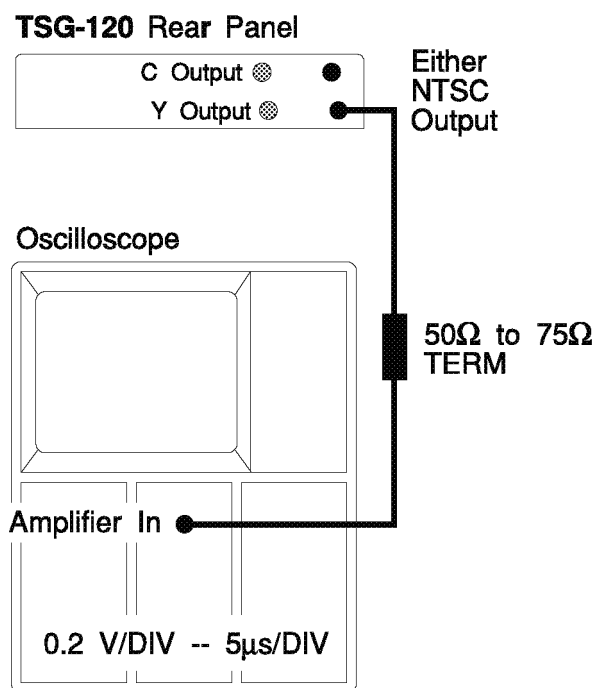


Figure 4–6: NTSC signal blanking level test setup

- b. Select the 5-Step signal.
- c. Switch the DC Restorer feature of the test equipment OFF.
- d. Set the test equipment to view the signal at line rate, then select ground reference. Center the trace on the display graticule.
- e. Switch back to DC coupled and adjust R20 for a blanking level of 0 V  $\pm$  50 mV.

**10. Y Signal Blanking Level**

- a. Change equipment settings or connections as necessary to view the Y-only output.
- b. Set the test equipment to ground reference and center the trace on the display graticule, if necessary.
- c. Switch back to DC coupled. Adjust R82 for a blanking level of  $0\text{ V} \pm 50\text{ mV}$ .

**11. C Signal Blanking Level**

- a. Change equipment settings or connections as necessary to view the C-only output.
- b. Set the test equipment to ground reference and center the trace on the display graticule, if necessary.
- c. Switch back to DC coupled and adjust R63 for a blanking level of  $0\text{ V} \pm 50\text{ mV}$ .
- d. Repeat steps 4 through 11 as necessary to produce the best results.

---

**NOTE.** Steps 12 through 17 are interactive. Repeat them, in sequence, until the best possible results are obtained.

---

**12. Multiburst (Luminance) Frequency Response**

- a. Connect the equipment as shown in Figure 4–4 (channel A selected) or 4–5.
- b. Select the Multiburst signal.
- c. Use the Waveform + CAL feature of the measurement set (or use a VAC) to add a second waveform approximately 60.5 IRE /432 mV above (or below) the original. Set the test equipment to view the bottoms of the upper burst packets and the tops of the lower at greatest magnification. Adjust the CAL or VAC for best comparison of the waveforms; use the double trace to aid adjustment.
- d. Adjust L14, L15, L16, L17, and L18 so that the displayed Multiburst is as flat as possible. (The packets should be equal within 2%/1.2 IRE/8.6 mV.)

**13. NTSC Chrominance to Luminance Gain (Sin X)/X Compensation**

- a. Adjust C19 as needed, using the Multiburst signal from step 12, to make the 3.58 MHz packet amplitude match the 500 kHz packet.

- b. Select a Chroma Response signal.

**Option 02.** Select the NTC7 Matrix signal, and select Line Select to view line 150.

- c. Adjust C21 for as flat a frequency response as possible.
- d. Note that these steps may be interactive with step 12 and may also necessitate readjustment of R23 to return packet amplitude to 60 IRE  $\pm 1.2$  IRE or 428.6 mV  $\pm 8.6$  mV.

#### 14. Y Signal (Sin X)/X Compensation

- a. With Multiburst still selected, change settings or connections as necessary to view the Y-only output.
- b. Adjust C69 to make the 3.58 MHz and 500 kHz packet amplitudes match.

#### 15. Chrominance Frequency Response

- a. Select the Chroma Response signal, and change settings or connections to view the NTSC output.  
  
**Option 02.** Select the NTC7 Combination (in NTC7 Matrix) signal, and change settings or connections to view the NTSC output.
- b. As above, view the top of the bottom chrominance (line) signal with the bottom of the top line signal. Variations in signal amplitude, and the effects of adjustments, will be easier to see.
- c. Adjust L8, L9, L10, L11, and L12 so that the chrominance signal varies no more than 1% in amplitude over its length and is as flat as possible.

#### 16. C Signal (Sin X)/X Compensation

- a. With Chroma Response still selected, change settings or connections as necessary to view the C-only output. Use one of the NTSC outputs as an external reference or sync.  
  
**Option 02.** With NTC7 Combination (in NTC7 Matrix) still selected, change settings or connections as necessary to view the C-only output. Use one of the NTSC outputs as an external reference or sync.
- b. Adjust C47 to make the chrominance line signal as flat as possible. This may necessitate readjustment of R60 to return the signal to 60 IRE  $\pm 0.6$  IRE/428.6 mV  $\pm 4.3$  mV.

**17. Chrominance-to-Luminance Delay**

**a.** Disable the CAL feature or VAC.

**b.** Select the Modulated Pulse and Bar signal.

**Option 02.** Select the NTC7 Combination (in NTC7 Matrix) signal.

**c.** Looking at the bottom of the modulated pulse waveform, adjust L8 & L9 and L14 & L15 for a chrominance response that is as flat as possible.

---

**NOTE.** *There is a trade-off between 2T pulse ringing and chrominance-luminance delay. Check both the 2T and 12.5T pulses as you make this adjustment. Ringing must remain no more than 1.0 IRE/7.14 mV peak.*

---

**d.** Check with voltage cursors or graticule - that the envelope at the bottom of the 12.5T pulse is no more than 1.2 IRE<sub>p-p</sub> (8.6 mV<sub>p-p</sub>).

**e.** Repeat steps 12 through 17 for the best possible results.



# Maintenance



# Maintenance

## Configuring the Power Supply

This section describes configuring the power supply for 230 VAC operation.



---

**WARNING.** *Dangerous voltages are present in the power supply. To ensure safety, only qualified service personnel may perform the following procedure.*

---

## Selecting the Power Supply Mains Voltage

The TSG 120 YC/NTSC Signal Generator is shipped from the factory configured for 115 VAC, 60 Hz operation. To configure the power supply for 230 VAC operation, follow this procedure.



---

**WARNING.** *Dangerous voltages are present in the power supply. Remove the power cord from the electrical mains supply before attempting this procedure. Failure to remove the power cord can result in life-threatening electrical shock.*

---

1. Remove the power cord from the electrical mains supply.
2. Remove the instrument access cover.
3. Locate J11 near the AC line filter and power receptacle at the right rear of the main board.
4. For 115 VAC operation (the factory setting), J11 positions 1–2 and 3–4 are strapped. Remove the straps from these positions.
5. For 230 VAC operation, reinstall the J11 straps in positions 2–3 and 4–5.
6. Reinstall the instrument access cover.
7. For 230 VAC operation, remove the 0.5 Amp fuse F1 and replace it with a 0.25 Amp fuse.

## TSG 120 Block Diagram

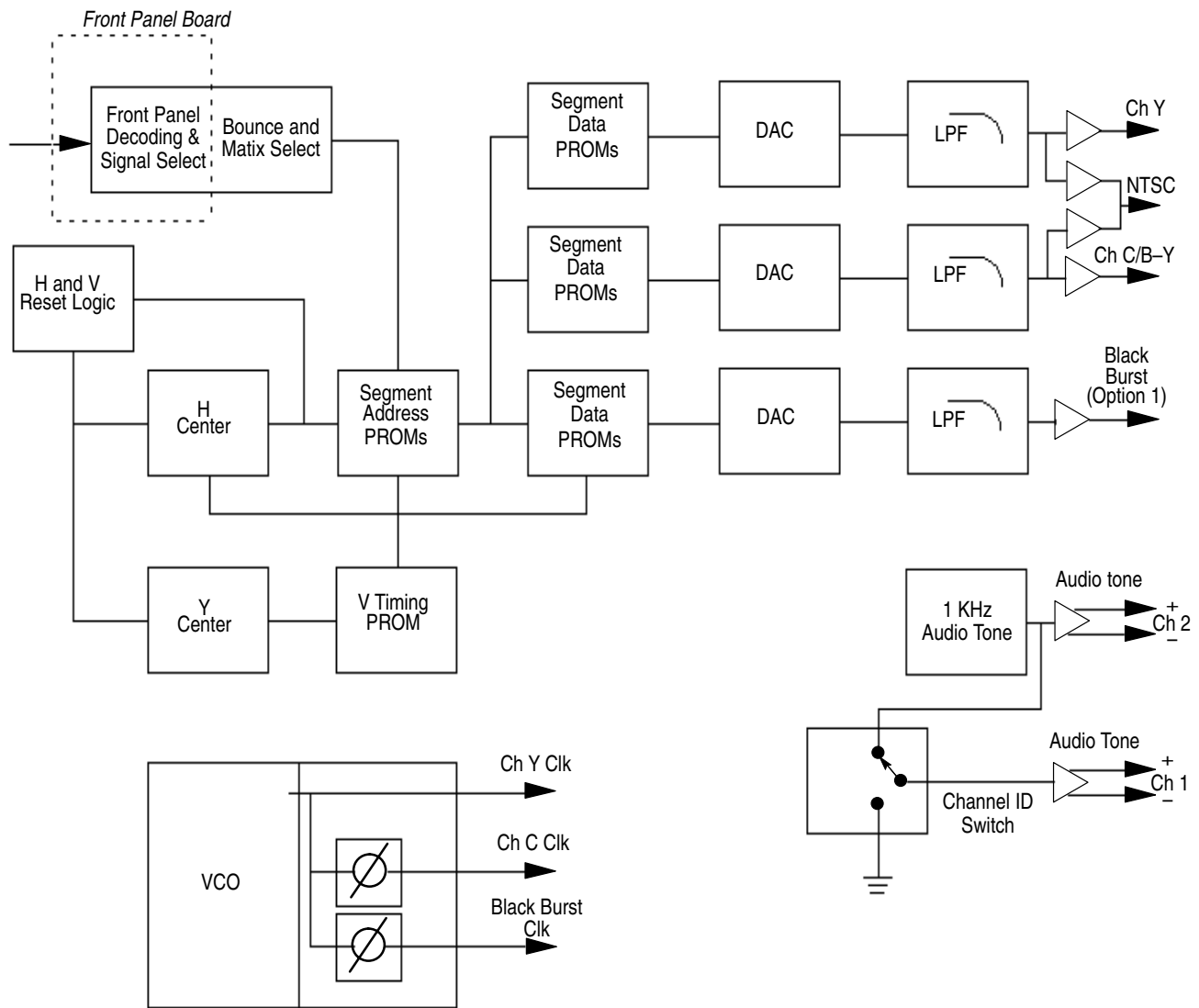


Figure 5-1: TSG 120 Block Diagram



# Replaceable Electrical Parts



# Replaceable Electrical Parts

This section contains a list of the electrical components for the TSG 120 YC/NTSC Signal Generator. Use this list to identify and order replacement parts.

## Parts Ordering Information

Replacement parts are available through your local Tektronix field office or representative.

Changes to Tektronix products are sometimes made to accommodate improved components as they become available and to give you the benefit of the latest improvements. Therefore, when ordering parts, it is important to include the following information in your order:

- Part number
- Instrument type or model number
- Instrument serial number
- Instrument modification number, if applicable

If you order a part that has been replaced with a different or improved part, your local Tektronix field office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

## Using the Replaceable Electrical Parts List

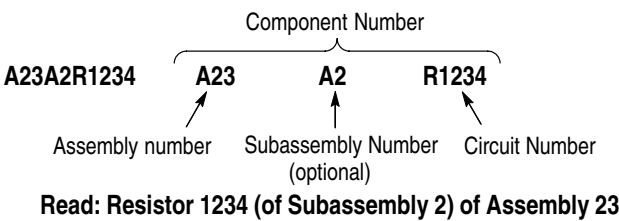
The tabular information in the Replaceable Electrical Parts List is arranged for quick retrieval. Understanding the structure and features of the list will help you find all of the information you need for ordering replacement parts. The following table describes each column of the electrical parts list.

Parts list column descriptions

| Column  | Column name           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | Component number      | <p>The component number appears on diagrams and circuit board illustrations, located in the diagrams section. Assembly numbers are clearly marked on each diagram and circuit board illustration in the <i>Diagrams</i> section, and on the mechanical exploded views in the <i>Replaceable Mechanical Parts</i> list section. The component number is obtained by adding the assembly number prefix to the circuit number (see Component Number illustration following this table).</p> <p>The electrical parts list is arranged by assemblies in numerical sequence (A1, with its subassemblies and parts, precedes A2, with its subassemblies and parts).</p> <p>Chassis-mounted parts have no assembly number prefix, and they are located at the end of the electrical parts list.</p> |
| 2       | Tektronix part number | Use this part number when ordering replacement parts from Tektronix.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 3 and 4 | Serial number         | Column three indicates the serial number at which the part was first effective. Column four indicates the serial number at which the part was discontinued. No entry indicates the part is good for all serial numbers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 5       | Name & description    | An item name is separated from the description by a colon (:). Because of space limitations, an item name may sometimes appear as incomplete. Use the U.S. Federal Catalog handbook H6-1 for further item name identification.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 6       | Mfr. code             | This indicates the code number of the actual manufacturer of the part.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 7       | Mfr. part number      | This indicates the actual manufacturer's or vendor's part number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**Abbreviations**      Abbreviations conform to American National Standard ANSI Y1.1–1972.

**Component Number**



**List of Assemblies**      A list of assemblies is located at the beginning of the electrical parts list. The assemblies are listed in numerical order. When a part's complete component number is known, this list will identify the assembly in which the part is located.

**Chassis Parts**      Chassis-mounted parts and cable assemblies are located at the end of the Replaceable Electrical Parts List.

**Mfr. Code to Manufacturer Cross Index**      The table titled Manufacturers Cross Index shows codes, names, and addresses of manufacturers or vendors of components listed in the parts list.

## Manufacturers cross index

| Mfr. code | Manufacturer                        | Address                                                            | City, state, zip code         |
|-----------|-------------------------------------|--------------------------------------------------------------------|-------------------------------|
| 00779     | AMP INC.                            | CUSTOMER SERVICE DEPT<br>PO BOX 3608                               | HARRISBURG, PA 17105-3608     |
| 01295     | TEXAS INSTRUMENTS INC               | SEMICONDUCTOR GROUP<br>13500 N CENTRAL EXPRESSWAY<br>PO BOX 655303 | DALLAS, TX 75272-5303         |
| 02111     | SPECTROL ELECTRONICS CORP           | 4051 GREYSTONE DRIVE                                               | ONTARIO, CA 91761             |
| 04222     | AVX/KYOCERA                         | PO BOX 867                                                         | MYRTLE BEACH, SC 29577        |
| 04713     | MOTOROLA INC                        | SEMICONDUCTOR PRODUCTS SECTOR<br>5005 E MCDOWELL ROAD              | PHOENIX, AZ 85008-4229        |
| 07263     | FAIRCHILD SEMICONDUCTOR CORPORATION | 333 WESTERN AVE S.                                                 | SOUTH PORTLAND, ME 04106-1705 |
| 07716     | IRC, INC                            | 2850 MT PLEASANT AVE                                               | BURLINGTON, IA 52601          |
| 07933     | RAYTHEON COMPANY                    | SEMICONDUCTOR DIVISION<br>10 GOODYEAR<br>M/S 10A                   | IRVINE, CA 92718              |
| 08779     | SIGNAL TRANSFORMER CO INC           | 500 BAYVIEW AVE                                                    | INWOOD, NY 11096-1792         |
| 09023     | CORNELL-DUBILIER CORPORATION        | C/O EARL & BROWN CO INC<br>7185 SW SANDBURG RD                     | TIGARD, OR 97223              |
| 0AP78     | A C INTERFACE                       | 15560 ROCKFIELD<br>UNIT 1E                                         | IRVINE, CA 92718              |
| 0GV52     | SCHAFFNER EMC INC                   | 9-B FADEM ROAD                                                     | SPRINGFIELD, NJ 07081         |
| 0H1N4     | PREH                                | 470 EAST MAIN STREET                                               | LAKE ZURICH, IL 60047         |
| 0JR03     | ZMAN MAGNETICS INC                  | 7633 S 180TH                                                       | KENT, WA 98032                |
| 0UAU4     | E-SWITCH                            | DIV OF STEIN INDUSTRIES<br>26 NORTH 5TH STREET                     | MINNEAPOLIS, MN 55403         |
| 11236     | CTS CORPORATION                     | 406 PARR ROAD                                                      | BERNE, IN 46711-9506          |
| 12969     | MICROSEMI CORP                      | WATERTOWN DIVISION<br>530 PLEASANT STREET                          | WATERTOWN, MA 02172           |
| 13919     | BURR-BROWN CORPORATION              | CORP OFFICE<br>6730 S TUCSON BLVD<br>PO BOX 11400                  | TUCSON, AZ 85706              |
| 16546     | PHILIPS COMPONENTS                  | CHIP CAP/CHIP RES FACILITY<br>4561 COLORADO BLVD                   | LOS ANGELES, CA 90039-1103    |
| 18796     | MURATA ELECTRONICS N AMERICA        | 1900 WEST COLLEGE AVE.                                             | STATE COLLEGE, PA 16801-2723  |
| 22526     | BERG ELECTRONICS INC                | 825 OLD TRAIL ROAD                                                 | ETTERS, PA 17319              |
| 24355     | ANALOG DEVICES                      | 1 TECHNOLOGY DRIVE                                                 | NORWOOD, MA 02062             |
| 26364     | COMPONENTS CORPORATION              | 6 KINSEY PLACE                                                     | DENVILLE, NJ 07834            |
| 27014     | NATIONAL SEMICONDUCTOR CORP         | 2900 SEMICONDUCTOR DR<br>PO BOX 58090 MS 30-115                    | SANTA CLARA, CA 95051-0606    |
| 32997     | BOURNS INC                          | TRIMPOT DIVISION<br>1200 COLUMBIA AVE                              | RIVERSIDE, CA 92507-2114      |
| 33095     | SPECTRUM CONTROL INC                | 8061 AVONIA RD                                                     | FAIRVIEW, PA 16415            |
| 34335     | ADVANCED MICRO DEVICES INC          | ONE AMD PLACE<br>PO BOX 3453                                       | SUNNYVALE, CA 94088-3453      |

**Manufacturers cross index (Cont.)**

| <b>Mfr.<br/>code</b> | <b>Manufacturer</b>                 | <b>Address</b>                                             | <b>City, state, zip code</b> |
|----------------------|-------------------------------------|------------------------------------------------------------|------------------------------|
| 34899                | FAIR RITE PRODUCTS CORP.            | 1 COMMERCIAL ROW<br>PO BOX J                               | WALLKILL, NY 12589           |
| 50139                | ALLEN-BRADLEY COMPANY INC           | ELECTRONIC COMPONENTS DIVISION<br>1414 ALLEN BRADLEY DRIVE | EL PASO, TX 79936            |
| 54937                | DEYOUNG MFG INC                     | 12920 NE 125TH WAY                                         | KIRKLAND, WA 98034           |
| 55680                | NICHICON (AMERICA) CORP             | 927 E STATE PARKWAY                                        | SCHAUMBURG, IL 60195-4526    |
| 56845                | DALE ELECTRONIC COMPONENTS          | 2300 RIVERSIDE BLVD<br>PO BOX 74                           | NORFOLK, NE 68701            |
| 57027                | IRC INC.                            | 4222 SOUTH STAPLES ST                                      | CORPUS CHRISTI, TX 78411     |
| 57668                | ROHM CORPORATION                    | 15375 BARRANCA PARKWAY<br>SUITE B207                       | IRVINE, CA 92718             |
| 61058                | MATSUSHITA ELECTRIC CORP OF AMERICA | PANASONIC INDUSTRIAL CO DIV<br>TWO PANASONIC WAY           | SECAUCUS, NJ 07094           |
| 61857                | SAN-O INDUSTRIAL CORP               | 91-3 COLIN DRIVE                                           | HOLBROOK, NY 11741           |
| 61964                | OMRON ELECTRONICS                   | CUSTOMEER SERVICE DEPT.<br>1 EAST COMMERCE DRIVE           | SCHAUMBURG, IL 60173         |
| 62643                | UNITED CHEMI-CON INC                | 9801 W HIGGINS RD                                          | ROSEMONT, IL 60018-4771      |
| 65786                | CYPRESS SEMICONDUCTOR CORP          | 3901 N FIRST ST                                            | SAN JOSE, CA 95134-1506      |
| 67183                | ALTERA CORP                         | 2610 ORCHARD PKWY                                          | SAN JOSE, CA 95134-2020      |
| 80009                | TEKTRONIX INC                       | 14150 SW KARL BRAUN DR<br>PO BOX 500                       | BEAVERTON, OR 97077-0001     |
| 82389                | SWITCHCRAFT                         | DIV OF RAYTHEON<br>5555 N. ELSTON AVENUE                   | CHICAGO, IL 60630-1314       |
| 82567                | REEVES-HOFFMAN                      | DIV OF DYNAMICS CORP. AMERICA<br>400 W. NORTH STREET       | CARLISLE, PA 17013           |
| 91637                | DALE ELECTRONIC COMPONENTS          | 1122 23RD ST                                               | COLUMBUS, NE 68601           |
| TK0198               | AVNET INC                           | AVNET ELECTRONICS MARKETING<br>9750 SW NIMBUS AVE          | BEAVERTON, OR 97005          |
| TK2058               | TDK CORPORATION OF AMERICA          | 1600 FEEHANVILLE DRIVE                                     | MOUNT PROSPECT, IL 60056     |
| TK6138               | VANTIS CORPORATION                  | 920 DEGUIGNE DRIVE<br>PO BOX 3755                          | SUNNYVALE, CA 94088          |

### Replaceable electrical parts list

| Component number | Tektronix part number | Serial no. effective | Serial no. discont'd | Name & description                                                                        | Mfr. code | Mfr. part number    |
|------------------|-----------------------|----------------------|----------------------|-------------------------------------------------------------------------------------------|-----------|---------------------|
| A1               | 671-1863-05           |                      |                      | CIRCUIT BD ASSY:FRONT PANEL                                                               | 80009     | 671-1863-05         |
| A2               | 671-1862-04           |                      |                      | CIRCUIT BD ASSY:MAIN (STANDARD)                                                           | 80009     | 671-1862-04         |
| A2               | 671-2089-04           |                      |                      | CIRCUIT BD ASSY:MAIN (OPTION 01)                                                          | 80009     | 671-2089-04         |
| A2               | 671-2950-00           |                      |                      | CIRCUIT BD ASSY:MAIN (OPTION 02)                                                          | 80009     | 671-2050-00         |
| A2               | 671-3464-00           |                      |                      | CIRCUIT BD ASSY:MAIN (OPTION 01 & 02)                                                     | 80009     | 671-2050-00         |
| A3               | 671-1865-00           |                      |                      | CIRCUIT BD ASSY:TOP BNC                                                                   | 80009     | 671-1865-00         |
| A4               | 671-1866-01           |                      |                      | CIRCUIT BD ASSY:BOTTOM BNC                                                                | 80009     | 671-1866-01         |
| A1               | 671-1863-05           |                      |                      | CIRCUIT BD ASSY:FRONT PANEL                                                               | 80009     | 671-1863-05         |
| A1C201           | 281-0775-01           |                      |                      | CAP,FXD,CERAMIC:MCL,0.1UF,20%,50V                                                         | 04222     | SA105E104MAA        |
| A1C202           | 281-0775-01           |                      |                      | CAP,FXD,CERAMIC:MCL,0.1UF,20%,50V                                                         | 04222     | SA105E104MAA        |
| A1C250           | 281-0775-01           |                      |                      | CAP,FXD,CERAMIC:MCL,0.1UF,20%,50V                                                         | 04222     | SA105E104MAA        |
| A1C251           | 281-0775-01           |                      |                      | CAP,FXD,CERAMIC:MCL,0.1UF,20%,50V                                                         | 04222     | SA105E104MAA        |
| A1C252           | 281-0775-01           |                      |                      | CAP,FXD,CERAMIC:MCL,0.1UF,20%,50V                                                         | 04222     | SA105E104MAA        |
| A1C253           | 281-0775-01           |                      |                      | CAP,FXD,CERAMIC:MCL,0.1UF,20%,50V                                                         | 04222     | SA105E104MAA        |
| A1J201           | 150-1029-00           |                      |                      | DIODE,OPTO:LED,GRN,565NM,1MCD AT 20MA                                                     | 0AP78     | SPG3431             |
| A1R201           | 322-3114-00           |                      |                      | RES,FXD,FILM:150 OHM,1%,0.2W,TC=100 PPM,T&R,SMALL BODY                                    | 57668     | CRB20-FX-150E-AXIAL |
| A1R204           | 322-3143-00           |                      |                      | RES,FXD,FILM:301 OHM,1%,0.2W,TC=T0                                                        | 57668     | CRB20 FXE 301E      |
| A1R207           | 322-3143-00           |                      |                      | RES,FXD,FILM:301 OHM,1%,0.2W,TC=T0                                                        | 57668     | CRB20 FXE 301E      |
| A1R208           | 322-3143-00           |                      |                      | RES,FXD,FILM:301 OHM,1%,0.2W,TC=T0                                                        | 57668     | CRB20 FXE 301E      |
| A1S202           | 260-2675-00           |                      |                      | SWITCH,PUSH:SPST,MOM,NO,150 GRM FRC,SEALED,50MA,24VDC,100M OHM, W/GRN LED 20 MA MAX,TL124 | 0UUAU4    | TL1240G-W/RED-DOTS  |
|                  |                       |                      |                      | *ATTACHED PARTS*                                                                          |           |                     |
|                  | 366-0682-01           |                      |                      | PUSH BUTTON:LIGHTED CAP,INSERT ASSY                                                       | 80009     | 366-0682-01         |
|                  |                       |                      |                      | *END ATTACHED PARTS*                                                                      |           |                     |
| A1S203           | 260-2675-00           |                      |                      | SWITCH,PUSH:SPST,MOM,NO,150 GRM FRC,SEALED,50MA,24VDC,100M OHM, W/GRN LED 20 MA MAX,TL124 | 0UUAU4    | TL1240G-W/RED-DOTS  |
|                  |                       |                      |                      | *ATTACHED PARTS*                                                                          |           |                     |
|                  | 366-0682-01           |                      |                      | PUSH BUTTON:LIGHTED CAP,INSERT ASSY                                                       | 80009     | 366-0682-01         |
|                  |                       |                      |                      | *END ATTACHED PARTS*                                                                      |           |                     |
| A1S204           | 260-2675-00           |                      |                      | SWITCH,PUSH:SPST,MOM,NO,150 GRM FRC,SEALED,50MA,24VDC,100M OHM, W/GRN LED 20 MA MAX,TL124 | 0UUAU4    | TL1240G-W/RED-DOTS  |
|                  |                       |                      |                      | *ATTACHED PARTS*                                                                          |           |                     |
|                  | 366-0682-01           |                      |                      | PUSH BUTTON:LIGHTED CAP,INSERT ASSY                                                       | 80009     | 366-0682-01         |
|                  |                       |                      |                      | *END ATTACHED PARTS*                                                                      |           |                     |

Replaceable electrical parts list (Cont.)

| Component number | Tektronix part number | Serial no. effective | Serial no. discount'd | Name & description                                                                         | Mfr. code | Mfr. part number    |
|------------------|-----------------------|----------------------|-----------------------|--------------------------------------------------------------------------------------------|-----------|---------------------|
| A1S205           | 260-2675-00           |                      |                       | SWITCH,PUSH:SPST,MOM,NO,150 GRM FRC,SEA LED,50MA,24VDC,100M OHM, W/GRN LED 20 MA MAX,TL124 | 0UAU4     | TL1240G-W/RED-DO TS |
|                  |                       |                      |                       | *ATTACHED PARTS*                                                                           |           |                     |
|                  | 366-0682-01           |                      |                       | PUSH BUTTON:LIGHTED CAP,INSERT ASSY                                                        | 80009     | 366-0682-01         |
|                  |                       |                      |                       | *END ATTACHED PARTS*                                                                       |           |                     |
| A1S206           | 260-2675-00           |                      |                       | SWITCH,PUSH:SPST,MOM,NO,150 GRM FRC,SEA LED,50MA,24VDC,100M OHM, W/GRN LED 20 MA MAX,TL124 | 0UAU4     | TL1240G-W/RED-DO TS |
|                  |                       |                      |                       | *ATTACHED PARTS*                                                                           |           |                     |
|                  | 366-0682-01           |                      |                       | PUSH BUTTON:LIGHTED CAP,INSERT ASSY                                                        | 80009     | 366-0682-01         |
|                  |                       |                      |                       | *END ATTACHED PARTS*                                                                       |           |                     |
| A1S207           | 260-2675-00           |                      |                       | SWITCH,PUSH:SPST,MOM,NO,150 GRM FRC,SEA LED,50MA,24VDC,100M OHM, W/GRN LED 20 MA MAX,TL124 | 0UAU4     | TL1240G-W/RED-DO TS |
|                  |                       |                      |                       | *ATTACHED PARTS*                                                                           |           |                     |
|                  | 366-0682-01           |                      |                       | PUSH BUTTON:LIGHTED CAP,INSERT ASSY                                                        | 80009     | 366-0682-01         |
|                  |                       |                      |                       | *END ATTACHED PARTS*                                                                       |           |                     |
| A1S208           | 260-2675-00           |                      |                       | SWITCH,PUSH:SPST,MOM,NO,150 GRM FRC,SEA LED,50MA,24VDC,100M OHM, W/GRN LED 20 MA MAX,TL124 | 0UAU4     | TL1240G-W/RED-DO TS |
|                  |                       |                      |                       | *ATTACHED PARTS*                                                                           |           |                     |
|                  | 366-0682-01           |                      |                       | PUSH BUTTON:LIGHTED CAP,INSERT ASSY                                                        | 80009     | 366-0682-01         |
|                  |                       |                      |                       | *END ATTACHED PARTS*                                                                       |           |                     |
| A1S209           | 260-2675-00           |                      |                       | SWITCH,PUSH:SPST,MOM,NO,150 GRM FRC,SEA LED,50MA,24VDC,100M OHM, W/GRN LED 20 MA MAX,TL124 | 0UAU4     | TL1240G-W/RED-DO TS |
|                  |                       |                      |                       | *ATTACHED PARTS*                                                                           |           |                     |
|                  | 366-0682-01           |                      |                       | PUSH BUTTON:LIGHTED CAP,INSERT ASSY                                                        | 80009     | 366-0682-01         |
|                  |                       |                      |                       | *END ATTACHED PARTS*                                                                       |           |                     |
| A1S214           | 361-1593-00           |                      |                       | SPACER,SLEEVE:PLASTIC 0.475 L                                                              | 80009     | 361-1593-00         |
| A1S220           | 150-1029-00           |                      |                       | DIODE,OPTO:LED,GRN,565NM,1MCD AT 20MA                                                      | 0AP78     | SPG3431             |
|                  |                       |                      |                       | *MOUNTING PARTS*                                                                           |           |                     |
|                  | 136-0252-07           |                      |                       | SOCKET,PIN CONN:SINGLE,PCB,T/G,0.030                                                       | 80009     | 136-0252-07         |
|                  | 361-1593-00           |                      |                       | SPACER,SLEEVE:PLASTIC,0.475 L                                                              | 80009     | 131-1593-00         |
|                  | 352-1012-00           |                      |                       | HOLDER LED:BLACK ABS                                                                       | 80009     | 352-1012-00         |
|                  |                       |                      |                       | *END MOUNTING PARTS*                                                                       |           |                     |
| A1S221           | 150-1029-00           |                      |                       | DIODE,OPTO:LED,GRN,565NM,1MCD AT 20MA                                                      | 0AP78     | SPG3431             |
|                  |                       |                      |                       | *MOUNTING PARTS*                                                                           |           |                     |
|                  | 136-0252-07           |                      |                       | SOCKET,PIN CONN:SINGLE,PCB,T/G,0.030                                                       | 80009     | 136-0252-07         |
|                  | 361-1593-00           |                      |                       | SPACER,SLEEVE:PLASTIC,0.475 L                                                              | 80009     | 131-1593-00         |
|                  | 352-1012-00           |                      |                       | HOLDER LED:BLACK ABS                                                                       | 80009     | 352-1012-00         |

Replaceable electrical parts list (Cont.)

| Component number     | Tektronix part number | Serial no. effective | Serial no. discont'd | Name & description                                                                           | Mfr. code | Mfr. part number         |
|----------------------|-----------------------|----------------------|----------------------|----------------------------------------------------------------------------------------------|-----------|--------------------------|
| *END MOUNTING PARTS* |                       |                      |                      |                                                                                              |           |                          |
| A1U204               | 156-1215-01           |                      |                      | IC,DIGITAL:CMOS,MUX/ENCODER<br>156-1215-00,74C923,DIP20.3,TUBE                               | 07263     | MM74C923N                |
| A1U207               | 156-3045-00           |                      |                      | IC,MEMORY:CMOS,PROM,2K X<br>8,REGISTERD,35NS,7C245,DIP24.3                                   | 65786     | CY7C245-35PC             |
| *MOUNTING PARTS*     |                       |                      |                      |                                                                                              |           |                          |
|                      | 136-0925-00           |                      |                      | SOCKET,DIP:                                                                                  | 91506     | 224-AG30D                |
| *END MOUNTING PARTS* |                       |                      |                      |                                                                                              |           |                          |
| A1U209               | 156-2983-00           |                      |                      | IC,DIGITAL:CMOS,PLD,EEPLD,16V8,25NS,90MA,16V8-2<br>5,DIP20.3,TUBE                            | TK6138    | PALCE16V8H-25PC/4        |
| *MOUNTING PARTS*     |                       |                      |                      |                                                                                              |           |                          |
|                      | 136-0752-00           |                      |                      | SKT,PN-IN ELEK:MICROCIRCUIT,20 DIP                                                           | 09922     | DILB20P-106              |
| *END MOUNTING PARTS* |                       |                      |                      |                                                                                              |           |                          |
| A1U210               | 156-4054-00           |                      |                      | IC,DIGITAL:CMOS,PLD,OTP,16,MACROCELL,DUAL<br>CLOCK,25NS,20IN,16,OUTPUT,EP610-30,DIP24.3,TUBE | 67183     | EP610PC-25               |
| *MOUNTING PARTS*     |                       |                      |                      |                                                                                              |           |                          |
|                      | 136-0925-00           |                      |                      | SOCKET,DIP:                                                                                  | 91506     | 224-AG30D                |
| *END MOUNTING PARTS* |                       |                      |                      |                                                                                              |           |                          |
| A2                   | 671-1862-04           |                      |                      | CIRCUIT BD ASSY:MAIN (STANDARD)                                                              | 80009     | 671-1862-04              |
| A2                   | 671-2089-04           |                      |                      | CIRCUIT BD ASSY:MAIN (OPTION 01)                                                             | 80009     | 671-2089-04              |
| A2                   | 671-2950-00           |                      |                      | CIRCUIT BD ASSY:MAIN (OPTION 02)                                                             | 80009     | 671-2050-00              |
| A2                   | 671-3464-00           |                      |                      | CIRCUIT BD ASSY:MAIN (OPTION 01 & 02)                                                        | 80009     | 671-2050-00              |
| *ATTACHED PARTS*     |                       |                      |                      |                                                                                              |           |                          |
|                      | 337-3760-00           |                      |                      | SHEILD,ELECT:TIM PLATED BRS (OPTION 02)                                                      | 80009     | 337-3760-00              |
| *END ATTACHED PARTS* |                       |                      |                      |                                                                                              |           |                          |
| A2C1                 | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V,Z5U,0.170 X<br>0.100,AXIAL                                     | 04222     | SA105E104MAA             |
| A2C2                 | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V,Z5U,0.170 X<br>0.100,AXIAL                                     | 04222     | SA105E104MAA             |
| A2C4                 | 281-0775-01           |                      |                      | CAP,FXD,CERAMIC:MCL,0.1UF,20%,50V,Z5U                                                        | 04222     | SA105E104MAA             |
| A2C9                 | 290-0973-01           |                      |                      | CAP,FXD,ALUM:100UF,20%,25VDC,8X11.5MM,0.2<br>LS,RADIAL,T&A                                   | 62643     | SME35VB101M8X11F<br>T    |
| A2C10                | 290-0973-01           |                      |                      | CAP,FXD,ALUM:100UF,20%,25VDC,8X11.5MM,0.2<br>LS,RADIAL,T&A                                   | 62643     | SME35VB101M8X11F<br>T    |
| A2C13                | 283-0177-05           |                      |                      | CAP,FXD,CER,1UF,+80-20%,25V                                                                  | 20932     | 5030ES25RD105Z           |
| A2C15                | 283-0177-05           |                      |                      | CAP,FXD,CER,1UF,+80-20%,25V                                                                  | 20932     | 5030ES25RD105Z           |
| A2C18                | 281-0797-00           |                      |                      | CAP,FXD,CER:MLC,15PF,5%,100V,SAFETY ,0.100 X<br>0.170,AXIAL,MI                               | 12969     | CGB150KFN                |
| A2C19                | 281-0153-00           |                      |                      | CAP,VAR,AIR,1.7-10PF,150V                                                                    |           | 187-0106-055             |
| A2C20                | 283-0159-02           |                      |                      | CAP,FXD,CER,18PF,5%,50V                                                                      | 18796     | RPE121-911C0G181J<br>50V |
| A2C21                | 281-0153-00           |                      |                      | CAP,VAR,AIR,1.7-10PF,150V                                                                    |           | 187-0106-055             |

Replaceable electrical parts list (Cont.)

| Component number | Tektronix part number | Serial no. effective | Serial no. discount'd | Name & description                                    | Mfr. code | Mfr. part number     |
|------------------|-----------------------|----------------------|-----------------------|-------------------------------------------------------|-----------|----------------------|
| A2C22            | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA         |
| A2C23            | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA         |
| A2C30            | 281-0123-00           |                      |                       | CAP,VAR,CER,5-25PF,100V                               | 59660     | 518-000A5-25         |
| A2C31            | 283-0648-00           |                      |                       | CAP,FXD,MICA,10PF,+/-0.5PF,500V                       | 80009     | 283-0648-00          |
| A2C32            | 281-0123-00           |                      |                       | CAP,VAR,CER,5-25PF,100V                               | 33095     | 281-0123-00          |
| A2C33            | 283-0648-00           |                      |                       | CAP,FXD,MICA,10PF,+/-0.5PF,500V                       | 09023     | CD15CD100D03         |
| A2C37            | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V,Z5U,0.170 X 0.100,AXIAL | 04222     | SA105E104MAA         |
| A2C38            | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V,Z5U,0.170 X 0.100,AXIAL | 04222     | SA105E104MAA         |
| A2C39            | 283-0204-00           |                      |                       | CAP,FXD,CER,0.01UF,20%,50V                            | 51406     | RPE110Z5U103M50V     |
| A2C40            | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V,Z5U,0.170 X 0.100,AXIAL | 04222     | SA105E104MAA         |
| A2C41            | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA         |
| A2C42            | 283-0177-05           |                      |                       | CAP,FXD,CER,1UF,+80-20%,25V                           | 20932     | 5030ES25RD105Z       |
| A2C43            | 283-0220-02           |                      |                       | CAP,FXD,CER,0.01UF,20%,50V                            | 18796     | RPE121-911X7R103M 50 |
| A2C46            | 281-0898-00           |                      |                       | CAP,FXD,CER,7.5PF,+/-0.5PF,500V                       | 04222     | MA107A7R5DAA         |
| A2C47            | 281-0153-00           |                      |                       | CAP,VAR,AIR,1.7-10PF,150V                             |           | 187-0106-055         |
| A2C48            | 283-0788-01           |                      |                       | CAP,FXD,MICA,267PF,1%,500V                            | 09023     | CDA15FD(267)F03      |
| A2C49            | 283-0596-00           |                      |                       | CAP,FXD,MICA,528PF,1%,300V                            | 09023     | CD15FC(528)F03       |
| A2C50            | 283-0688-01           |                      |                       | CAP,FXD,MI CA,464PF,1%,500V                           | 09023     | CDA15FD(464)F03      |
| A2C51            | 283-0638-01           |                      |                       | CAP,FXD,MICA,130PF,1%,500V                            | 09023     | CDA15FD131F03        |
| A2C52            | 283-0594-02           |                      |                       | CAP,FXD,MICA,1000PF,1%,500V                           | 00853     | D155F1250FO          |
| A2C53            | 283-0666-00           |                      |                       | CAP,FXD,MICA,890PF,2%,100V                            | 09023     | CD15FA891G03         |
| A2C54            | 283-0644-01           |                      |                       | CAP,FXD,MICA,150PF,1%,500V                            | TK0891    | ADVISE               |
| A2C55            | 283-0625-01           |                      |                       | CAP,FXD,MICA,220PF,1%,500V                            | 09023     | CDA10FD221F03        |
| A2C56            | 283-0631-01           |                      |                       | CAP,FXD,MICA,95PF,1%,500V                             | TK0891    | RDM15FD950F03        |
| A2C57            | 283-0784-01           |                      |                       | CAP,FXD,MICA,40PF,2%,500V                             | 09023     | CDA15ED400G03        |
| A2C59            | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V,Z5U,0.170 X 0.100,AXIAL | 04222     | SA105E104MAA         |
| A2C60            | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V,Z5U,0.170 X 0.100,AXIAL | 04222     | SA105E104MAA         |
| A2C61            | 283-0220-02           |                      |                       | CAP,FXD,CER,0.01UF,20%,50V                            | 18796     | RPE121-911X7R103M 50 |
| A2C62            | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V,Z5U,0.170 X 0.100,AXIAL | 04222     | SA105E104MAA         |
| A2C63            | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V,Z5U,0.170 X 0.100,AXIAL | 04222     | SA105E104MAA         |
| A2C64            | 283-0177-05           |                      |                       | CAP,FXD,CER,1UF,+80-20%,25V                           | 20932     | 5030ES25RD105Z       |
| A2C65            | 283-0220-02           |                      |                       | CAP,FXD,CER,DI:0.01UF,20%,50V                         | 18796     | RPE121-911X7R103M 50 |

Replaceable electrical parts list (Cont.)

| Component number | Tektronix part number | Serial no. effective | Serial no. discont'd | Name & description                                                     | Mfr. code | Mfr. part number        |
|------------------|-----------------------|----------------------|----------------------|------------------------------------------------------------------------|-----------|-------------------------|
| A2C68            | 281-0898-00           |                      |                      | CAP,FXD,CER,DI:7.5PF,+/-0.5PF,500V                                     | 04222     | MA107A7R5DAA            |
| A2C69            | 281-0153-00           |                      |                      | CAP,VAR,AIR,1.7-10PF,150V                                              | ?         | 187-0106-055            |
| A2C70            | 283-0788-01           |                      |                      | CAP,FXD,MICA,DI:267PF,1%,500V                                          | 09023     | CDA15FD(267)F03         |
| A2C71            | 283-0596-00           |                      |                      | CAP,FXD,MICA,DI:528PF,1%,300V                                          | 09023     | CD15FC(528)F03          |
| A2C72            | 283-0688-00           |                      |                      | CAP,FXD,MICA,DI:464PF,1%,300V                                          | 80009     | 283-0688-00             |
| A2C73            | 283-0638-01           |                      |                      | CAP,FXD,MICA,DI:130PF,1%,500V                                          | 09023     | CDA15FD131F03           |
| A2C74            | 283-0594-02           |                      |                      | CAP,FXD,MICA,DI:1000PF,1%,100V                                         | 09023     | CDA15FA102F03           |
| A2C75            | 283-0666-00           |                      |                      | CAP,FXD,MICA,DI:890PF,2%,100V                                          | 09023     | CD15FA891G03            |
| A2C76            | 283-0644-01           |                      |                      | CAP,FXD,MICA,DI:150PF,1%,500V                                          | TK0891    | ADVISE                  |
| A2C77            | 283-0625-01           |                      |                      | CAP,FXD,MICA,DI:220PF,1%,500V                                          | 09023     | CDA10FD221F03           |
| A2C78            | 283-0631-01           |                      |                      | CAP,FXD,MICA,DI:95PF,1%,500V                                           | TK0891    | RDM15FD950F03           |
| A2C79            | 283-0784-01           |                      |                      | CAP,FXD,MICA,DI:40PF,2%,500V                                           | 09023     | CDA15ED400G03           |
| A2C81            | 281-0775-01           |                      |                      | CAP,FXD,CERAMIC:MCL,0.1UF,20%,50V,Z5U                                  | 04222     | SA105E104MAA            |
| A2C82            | 290-0973-01           |                      |                      | CAP,FXD,ALUM:100UF,20%,25VDC                                           | 62643     | SME35VB101M8X11F<br>T   |
| A2C83            | 281-0775-01           |                      |                      | CAP,FXD,CERAMIC:MCL,0.1UF,20%,50V,Z5U                                  | 04222     | SA105E104MAA            |
| A2C84            | 281-0775-01           |                      |                      | CAP,FXD,CERAMIC:MCL,0.1UF,20%,50V,Z5U                                  | 04222     | SA105E104MAA            |
| A2C85            | 281-0775-01           |                      |                      | CAP,FXD,CERAMIC:MCL,0.1UF,20%,50V,Z5U                                  | 04222     | SA105E104MAA            |
| A2C86            | 281-0775-01           |                      |                      | CAP,FXD,CERAMIC:MCL,0.1UF,20%,50V,Z5U                                  | 04222     | SA105E104MAA            |
| A2C87            | 290-0973-01           |                      |                      | CAP,FXD,ALUM:100UF,20%,25VDC                                           | 62643     | SME35VB101M8X11F<br>T   |
| A2C88            | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V,Z5U,0.170 X<br>0.100,AXIAL               | 04222     | SA105E104MAA            |
| A2C89            | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V,Z5U,0.170 X<br>0.100,AXIAL(Opt. 01 Only) | 04222     | SA105E104MAA            |
| A2C90            | 290-0973-01           |                      |                      | CAP,FXD,ALUM:100UF,20%,25VDC                                           | 62643     | SME35VB101M8X11F<br>T   |
| A2C91            | 283-0220-02           |                      |                      | CAP,FXD,CER,DI:0.01UF,20%,50V                                          | 18796     | RPE121-911X7R103M<br>50 |
| A2C92            | 283-0177-05           |                      |                      | CAP,FXD,CER,DI:1UF,+80-20%,25V (Opt. 01 Only)                          | 20932     | 5030ES25RD105Z          |
| A2C93            | 283-0220-02           |                      |                      | CAP,FXD,CER,DI:0.01UF,20%,50V (Opt. 01 Only)                           | 18796     | RPE121-911X7R103M<br>50 |
| A2C94            | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V (Opt. 01 Only)                           | 04222     | SA105E104MAA            |
| A2C95            | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V (Opt. 01 Only)                           | 04222     | SA105E104MAA            |
| A2C96            | 290-0973-01           |                      |                      | CAP,FXD,ALUM:100UF,20%,25VDC (Opt. 01 Only)                            | 62643     | SME35VB101M8X11F<br>T   |
| A2C98            | 281-0898-00           |                      |                      | CAP,FXD,CER,DI:7.5PF,+/-0.5PF,500V (Opt. 01 Only)                      | 04222     | MA107A7R5DAA            |
| A2C99            | 281-0153-00           |                      |                      | CAP,VAR,AIR,1.7-10PF,150V (Opt. 01 Only)                               |           | 187-0106-055            |
| A2C100           | 283-0788-01           |                      |                      | CAP,FXD,MICA,267PF,1%,500V (Opt. 01 Only)                              | 09023     | CDA15FD(267)F03         |
| A2C101           | 283-0596-00           |                      |                      | CAP,FXD,MICA,528PF,1%,300V (Opt. 01 Only)                              | 09023     | CD15FC(528)F03          |
| A2C102           | 283-0688-01           |                      |                      | CAP,FXD,MICA,464PF,1%,500V (Opt. 01 Only)                              | 09023     | CDA15FD(464)F03         |

Replaceable electrical parts list (Cont.)

| Component number | Tektronix part number | Serial no. effective | Serial no. discount'd | Name & description                                    | Mfr. code | Mfr. part number |
|------------------|-----------------------|----------------------|-----------------------|-------------------------------------------------------|-----------|------------------|
| A2C103           | 283-0638-01           |                      |                       | CAP,FXD,MICA,130PF,1%,500V (Opt. 01 Only)             | 09023     | CDA15FD131F03    |
| A2C104           | 283-0594-02           |                      |                       | CAP,FXD,MICA,1000PF,1%,100V (Opt. 01 Only)            | 09023     | CDA15FA102F03    |
| A2C105           | 283-0666-00           |                      |                       | CAP,FXD,MICA,890PF,2%,100V (Opt. 01 Only)             | 09023     | CD15FA891G03     |
| A2C106           | 283-0644-01           |                      |                       | CAP,FXD,MICA,150PF,1%,500V (Opt. 01 Only)             | TK0891    | ADVISE           |
| A2C107           | 283-0625-01           |                      |                       | CAP,FXD,MICA,220PF,1%,500V (Opt. 01 Only)             | 09023     | CDA10FD221F03    |
| A2C108           | 283-0631-01           |                      |                       | CAP,FXD,MICA,95PF,1%,500V (Opt. 01 Only)              | TK0891    | RDM15FD950F03    |
| A2C109           | 283-0784-01           |                      |                       | CAP,FXD,MICA,40PF,2%,500V (Opt. 01 Only)              | 09023     | CDA15ED400G03    |
| A2C110           | 283-0594-00           |                      |                       | CAP,FXD,MICA,DI:0.001UF,1%,100V                       | 80009     | 283-0594-00      |
| A2C111           | 283-0594-00           |                      |                       | CAP,FXD,MICA,DI:0.001UF,1%,100V                       | 80009     | 283-0594-00      |
| A2C112           | 283-0177-00           |                      |                       | CAP,FXD,CER,DI:1UF,+80-20%,25V                        | 04222     | SR303E105ZAA     |
| A2C113           | 283-0175-01           |                      |                       | CAP,FXD,CER,DI:0.1UF,20%,50V                          | 04222     | SR303E105ZAA     |
| A2C114           | 290-0990-00           |                      |                       | CAP,FXD,ELCTLT,DI:10UF,20%,50V                        | 24165     | 502D437          |
| A2C115           | 283-0177-05           |                      |                       | CAP,FXD,CER,1UF,+80-20%,25V                           | 20932     | 5030ES25RD105Z   |
| A2C117           | 281-0788-00           |                      |                       | CAP,FXD,CER:MLC,470PF,10%,100V,0.100 X 0.170,AXIAL,MI | 04222     | SA102C471KAA     |
| A2C118           | 290-0919-00           |                      |                       | CAP,FXD,ALUM:470UF,+50-20%,35V                        | 61058     | ECEA1VFS471      |
| A2C122           | 281-0788-00           |                      |                       | CAP,FXD,CER:MLC,470PF,10%,100V,0.100 X 0.170,AXIAL,MI | 04222     | SA102C471KAA     |
| A2C141           | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C142           | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V,                        | 04222     | SA105E104MAA     |
| A2C150           | 290-0990-00           |                      |                       | CAP,FXD,ELCTLT,20%,10V,50V                            | 24165     | 502D437          |
| A2C151           | 290-1301-00           |                      |                       | CAP,FXD,ALUM:2700UF,20%,10V                           | 62643     | CEEFM1A272M7     |
| A2C152           | 290-1301-00           |                      |                       | CAP,FXD,ALUM:2700UF,20%,10V                           | 62643     | CEEFM1A272M7     |
| A2C153           | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C154           | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C155           | 283-0238-01           |                      |                       | CAP,FXD,CER,0.01UF,10%,50WVDC,X7R                     | 04222     | SR295C103KAAAP1  |
| A2C160           | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C161           | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C162           | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C163           | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C164           | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C165           | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C166           | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C167           | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C168           | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C169           | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C170           | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C172           | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C173           | 281-0775-01           |                      |                       | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |

## Replaceable electrical parts list (Cont.)

| Component number | Tektronix part number | Serial no. effective | Serial no. discont'd | Name & description                                    | Mfr. code | Mfr. part number |
|------------------|-----------------------|----------------------|----------------------|-------------------------------------------------------|-----------|------------------|
| A2C174           | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C175           | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C176           | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C177           | 281-0775-01           |                      |                      | CAP,FXD,CERAMIC:MCL,0.1UF,20%,50V,Z5U                 | 04222     | SA105E104MAA     |
| A2C178           | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C180           | 290-0919-00           |                      |                      | CAP,FXD,ALUM:470UF,+50-20%,35V                        | 61058     | ECEA1VFS471      |
| A2C181           | 290-0919-00           |                      |                      | CAP,FXD,ALUM:470UF,+50-20%,35V                        | 61058     | ECEA1VFS471      |
| A2C182           | 290-0919-00           |                      |                      | CAP,FXD,ALUM:470UF,+50-20%,35V                        | 61058     | ECEA1VFS471      |
| A2C183           | 290-1034-00           |                      |                      | CAP,FXD,ALUM:330UF,20%,25V,13 X 25MM,RADIAL           | 62643     | CEUFM1E331       |
| A2C186           | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C187           | 283-0177-05           |                      |                      | CAP,FXD,CER,1UF,+80-20%,25V                           | 20932     | 5030ES25RD105Z   |
| A2C188           | 290-0943-02           |                      |                      | CAP,FXD,ELCTLT:47UF,20%,25V                           | 62643     | CEUSM1E470-T     |
| A2C189           | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C190           | 283-0177-05           |                      |                      | CAP,FXD,CER,1UF,+80-20%,25V                           | 20932     | 5030ES25RD105Z   |
| A2C191           | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C192           | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C193           | 283-0177-05           |                      |                      | CAP,FXD,CER,1UF,+80-20%,25V                           | 20932     | 5030ES25RD105Z   |
| A2C194           | 283-0177-05           |                      |                      | CAP,FXD,CER,1UF,+80-20%,25V                           | 20932     | 5030ES25RD105Z   |
| A2C195           | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C196           | 290-0845-00           |                      |                      | CAP,FXD,ALUM:330UF,20%,25V                            | 55680     | UVX1H331MPA      |
| A2C197           | 281-0775-01           |                      |                      | CAP,FXD,CERAMIC:MCL,0.1UF,20%,50V,Z5U                 | 04222     | SA105E104MAA     |
| A2C198           | 281-0775-01           |                      |                      | CAP,FXD,CERAMIC:MCL,0.1UF,20%,50V,Z5U                 | 04222     | SA105E104MAA     |
| A2C254           | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C255           | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C257           | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C258           | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C259           | 281-0777-00           |                      |                      | CAP,FXD,CERAMIC:MLC,51PF,5%,200V                      | 04222     | SA102A510JAA     |
| A2C260           | 281-0777-00           |                      |                      | CAP,FXD,CERAMIC:MLC,51PF,5%,200V                      | 04222     | SA102A510JAA     |
| A2C261           | 281-0777-00           |                      |                      | CAP,FXD,CERAMIC:MLC,51PF,5%,200V                      | 04222     | SA102A510JAA     |
| A2C262           | 281-0777-00           |                      |                      | CAP,FXD,CERAMIC:MLC,51PF,5%,200V                      | 04222     | SA102A510JAA     |
| A2C263           | 283-0637-01           |                      |                      | CAP,FXD,MICA,20PF,2.5%,500V                           | TK0891    | RDM15ED200D03    |
| A2C264           | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C265           | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C266           | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2C267           | 281-0775-01           |                      |                      | CAP,FXD,CER:MCL,0.1UF,20%,50V                         | 04222     | SA105E104MAA     |
| A2CR1            | 152-0141-02           |                      |                      | DIODE,SIG:ULTRA FAST,40V,150MA,4NS,2PF,1N4152         | 01295     | 1N4152R          |
| A2CR2            | 152-0141-02           |                      |                      | DIODE,SIG:ULTRA FAST,40V,150MA,4NS,2PF,1N4152         | 01295     | 1N4152R          |
| A2CR4            | 152-0601-01           |                      |                      | DIODE,RECT:ULTRAFAST,150V,25NS,35A<br>IFSM,MUR120,T&R | 12969     | UES1103          |

Replaceable electrical parts list (Cont.)

| Component number | Tektronix part number | Serial no. effective | Serial no. discount'd | Name & description                                                                            | Mfr. code | Mfr. part number |
|------------------|-----------------------|----------------------|-----------------------|-----------------------------------------------------------------------------------------------|-----------|------------------|
| A2CR5            | 152-0601-01           |                      |                       | DIODE,RECT:ULTRAFAST,150V,25NS,35A IFSM,MUR120,T&R                                            | 12969     | UES1103          |
| A2CR6            | 152-0601-01           |                      |                       | DIODE,RECT:ULTRAFAST,150V,25NS,35A IFSM,MUR120,T&R                                            | 12969     | UES1103          |
| A2CR7            | 152-0601-01           |                      |                       | DIODE,RECT:ULTRAFAST,150V,25NS,35A IFSM,MUR120,T&R                                            | 12969     | UES1103          |
| A2CR160          | 152-0582-00           |                      |                       | DIODE,RECT:SCHTKY,20V,3A,.475VF,80A IFSM,1N5820                                               | 04713     | 1N5820           |
| A2CR161          | 152-0582-00           |                      |                       | DIODE,RECT:SCHTKY,20V,3A,.475VF,80A IFSM,1N5820                                               | 04713     | 1N5820           |
| A2CR162          | 152-0582-00           |                      |                       | DIODE,RECT:SCHTKY,20V,3A,.475VF,80A IFSM,1N5820                                               | 04713     | 1N5820           |
| A2CR163          | 152-0141-02           |                      |                       | DIODE,SIG:ULTRA FAST,40V,150MA,4NS,2PF,1N4152,DO-35,T&R                                       | 01295     | 1N4152R          |
| A2E1             | 276-0818-00           |                      |                       | COIL,EM:BEAD ON LEAD,Z=100 OHM (100MHZ,OD=0.138,LENGTH=0.263                                  | 34899     | 2743003112       |
| A2E2             | 276-0818-00           |                      |                       | COIL,EM:BEAD ON LEAD,Z=100 OHM (100MHZ,OD=0.138,LENGTH=0.263                                  | 34899     | 2743003112       |
| A2F1             | 159-0025-00           |                      |                       | FUSE,CARTRIDGE;3AG,0.5A,250V,0.25SEC (FOR 90-250VAC OPERATION)                                | 71400     | AGC-CW-1/2       |
| A2F1             | 159-0028-00           |                      |                       | FUSE,CARTRIDGE;0.25A,250V,FAST BLOW (FOR 180-132VAC OPERATION)                                | 71400     | AGC-1/4          |
|                  |                       |                      |                       | *MOUNTING PARTS*                                                                              |           |                  |
|                  | 344-0329-00           |                      |                       | CLIP,ELECTRICAL: (QUANTITY 2)                                                                 | 61857     | H-0011-2         |
|                  |                       |                      |                       | *END MOUNTING PARTS*                                                                          |           |                  |
| A2FL1            | 119-1946-00           |                      |                       | FILTER,RFI:1A,250V,400HZ W/PC TERMINAL                                                        | 0GV52     | FX326-1/02-K-D-T |
| A2J2             | 131-0608-00           |                      |                       | TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY 3)                                          | 80009     | 131-0608-00      |
| A2J4             | 131-0608-00           |                      |                       | TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY 10)                                         | 80009     | 131-0608-00      |
| A2J6             | 131-0608-00           |                      |                       | TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY 3)                                          | 80009     | 131-0608-00      |
| A2J7             | 131-0608-00           |                      |                       | TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY 3)                                          | 80009     | 131-0608-00      |
| A2J8             | 131-0608-00           |                      |                       | TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY 3) (Opt. 01 Only)                           | 80009     | 131-0608-00      |
| A2J9             | 131-3987-00           |                      |                       | CONN,CIRC AUDIO:PCB/PNL,XLR,MALE,RTANG,3 POS,1.22 H X 1.024 W,CTR PLZ,LATCHING,               | 82389     | E3MRA            |
| A2J10            | 131-3987-00           |                      |                       | CONN,CIRC AUDIO:PCB/PNL,XLR,MALE,RTANG,3 POS,1.22 H X 1.024 W,CTR PLZ,LATCHING,               | 82389     | E3MRA            |
| A2J11            | 131-4566-00           |                      |                       | BUS,CONDUCTOR:0 OHM,300 SPACING,SM BODY MI,DUMMY RES                                          | 91637     | FRJ-50           |
| A2J12            | 131-0608-00           |                      |                       | CONN,TERMINAL:PRESSFIT/PCB,MALE,STR,0.025 SQ,0.248 MLG X 0.137 TAIL,50 GOLD,PHZ BRZ,W/FERRULE | 22526     | 48283-018        |
| A2J30            | 131-0608-00           |                      |                       | TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY 2)                                          | 80009     | 131-0608-00      |

Replaceable electrical parts list (Cont.)

| Component number | Tektronix part number | Serial no. effective | Serial no. discount'd | Name & description                                                                           | Mfr. code | Mfr. part number |
|------------------|-----------------------|----------------------|-----------------------|----------------------------------------------------------------------------------------------|-----------|------------------|
| A2J31            | 131-0608-00           |                      |                       | TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY 2)                                         | 80009     | 131-0608-00      |
| A2J105           | 131-0608-00           |                      |                       | TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY 2)                                         | 80009     | 131-0608-00      |
| A2J106           | 131-0608-00           |                      |                       | TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY 16)                                        | 80009     | 131-0608-00      |
| A2J107           | 131-0608-00           |                      |                       | TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY 16) (Opt. 01 Only)                         | 80009     | 131-0608-00      |
| A2J108           | 131-0608-00           |                      |                       | TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY 3)                                         | 80009     | 131-0608-00      |
| A2L4             | 108-0538-00           |                      |                       | INDUCTOR,FXD:CUSTOM,POWER,2.7UH                                                              | 0JR03     | 108-0538-00      |
| A2L5             | 108-0538-00           |                      |                       | INDUCTOR,FXD:CUSTOM,POWER,2.7UH (Opt.01)                                                     | 0JR03     | 108-0538-00      |
| A2L7             | 108-1491-00           |                      |                       | INDUCTOR,FXD:SIGNAL,9.9UH,5.5%,                                                              | 0JR03     | 108-1491-00      |
| A2L8             | 120-1180-00           |                      |                       | TRANSFORMER,RF:VARIABLE                                                                      | 54937     | 500-3910         |
| A2L9             | 114-0411-00           |                      |                       | INDUCTOR,VAR:0.9-1.0                                                                         | 54937     | 500-3900         |
| A2L10            | 114-0364-00           |                      |                       | INDUCTOR,VAR:1.42-1.68UH,30/46 AWG                                                           | 54937     | 500-3893         |
| A2L11            | 114-0366-00           |                      |                       | INDUCTOR,VAR:2.40-2.70UH,30/46 AWG,Q MIN 190@2.6UH                                           | 54937     | 114-0366-00      |
| A2L12            | 114-0366-00           |                      |                       | INDUCTOR,VAR:2.40-2.70UH,30/46 AWG,Q MIN 190@2.6UH                                           | 54937     | 114-0366-00      |
| A2L13            | 108-1491-00           |                      |                       | INDUCTOR,FXD:SIGNAL,9.9UH,5.5%,                                                              | 0JR03     | 108-1491-00      |
| A2L14            | 120-1180-00           |                      |                       | TRANSFORMER,RF:VARIABLE                                                                      | 54937     | 500-3910         |
| A2L15            | 114-0411-00           |                      |                       | INDUCTOR,VAR:0.9-1.0                                                                         | 54937     | 500-3900         |
| A2L16            | 114-0364-00           |                      |                       | INDUCTOR,VAR:1.42-1.68UH,30/46 AWG                                                           | 54937     | 500-3893         |
| A2L17            | 114-0366-00           |                      |                       | INDUCTOR,VAR:2.40-2.70UH,30/46 AWG,Q MIN 190@2.6UH                                           | 54937     | 114-0366-00      |
| A2L18            | 114-0366-00           |                      |                       | INDUCTOR,VAR:2.40-2.70UH,30/46 AWG,Q MIN 190@2.6UH                                           | 54937     | 114-0366-00      |
| A2L19            | 108-1491-00           |                      |                       | INDUCTOR,FXD:SIGNAL,9.9UH,5.5%, (Opt.01)                                                     | 0JR03     | 108-1491-00      |
| A2L20            | 120-1180-00           |                      |                       | TRANSFORMER,RF:VARIABLE,POTCORE (Opt.01)                                                     | 54937     | 500-3910         |
| A2L21            | 114-0411-00           |                      |                       | INDUCTOR,VAR:0.9-1.0 (Opt.01)                                                                | 54937     | 500-3900         |
| A2L22            | 114-0364-00           |                      |                       | INDUCTOR,VAR:1.42-1.68UH,30/46 AWG, (Opt.01)                                                 | 54937     | 500-3893         |
| A2L23            | 114-0366-00           |                      |                       | INDUCTOR,VAR:2.40-2.70UH,30/46 AWG,Q MIN 190@2.6UH (Opt.01)                                  | 54937     | 114-0366-00      |
| A2L24            | 114-0366-00           |                      |                       | INDUCTOR,VAR:2.40-2.70UH,30/46 AWG,Q MIN 190@2.6UH (Opt.01)                                  | 54937     | 114-0366-00      |
| A2L25            | 120-1889-00           |                      |                       | TRANSFORMER,RF:                                                                              | 0JR03     | 120-1889-00      |
| A2L26            | 108-1263-00           |                      |                       | INDUCTOR,FXD:POWER,10UH,10%,I<2.1A,RDC<0.043 OHM,Q>20,SRF>19MHZ,BOBBIN,RADIAL                | TK2058    | TSL0707-100K1R9  |
| A2L27            | 108-1263-00           |                      |                       | INDUCTOR,FXD:POWER,10UH,10%,I<2.1A,RDC<0.043 OHM,Q>20,SRF>19MHZ,BOBBIN,RADIAL                | TK2058    | TSL0707-100K1R9  |
| A2L28            | 108-0245-01           |                      |                       | INDUCTOR,FXD:CUSTOM,POWER,3.9UH,10%,IDC<800 MA,RDC<0.264OHM,Q>35@7.9MHZ,SRF>61MHZ,AXIAL ,T&R | 0JR03     | 108-0245-01      |

Replaceable electrical parts list (Cont.)

| Component number | Tektronix part number | Serial no. effective | Serial no. discount'd | Name & description                                                                           | Mfr. code | Mfr. part number    |
|------------------|-----------------------|----------------------|-----------------------|----------------------------------------------------------------------------------------------|-----------|---------------------|
| A2L29            | 108-0245-01           |                      |                       | INDUCTOR,FXD:CUSTOM,POWER,3.9UH,10%,IDC<800 MA,RDC<0.264OHM,Q>35@7.9MHZ,SRF>61MHZ,AXIAL ,T&R | 0JR03     | 108-0245-01         |
| A2L30            | 108-0538-00           |                      |                       | INDUCTOR,FXD:CUSTOM,POWER,2.7UH                                                              | 0JR03     | 108-0538-00         |
| A2P2             | 131-0993-02           |                      |                       | CONN,BOX:SHUNT,FEMALE,RED,JUMPER                                                             | 00779     | 1-850100-O          |
| A2P6             | 131-0993-02           |                      |                       | CONN,BOX:SHUNT,FEMALE,RED,JUMPER                                                             | 00779     | 1-850100-O          |
| A2P7             | 131-0993-02           |                      |                       | CONN,BOX:SHUNT,FEMALE,RED,JUMPER                                                             | 00779     | 1-850100-O          |
| A2P8             | 131-0993-02           |                      |                       | CONN,BOX:SHUNT,FEMALE,RED,JUMPER(Opt.01)                                                     | 00779     | 1-850100-O          |
| A2P12            | 131-0993-05           |                      |                       | BUS,CONDUCTOR:SHUNT ASSEMBLY,GREEN                                                           | 00779     | 850100-5            |
| A2P30            | 131-0993-02           |                      |                       | CONN,BOX:SHUNT,FEMALE,RED,JUMPER                                                             | 00779     | 1-850100-O          |
| A2P31            | 131-0993-02           |                      |                       | CONN,BOX:SHUNT,FEMALE,RED,JUMPER                                                             | 00779     | 1-850100-O          |
| A2P108           | 131-0993-05           |                      |                       | BUS,CONDUCTOR:SHUNTASSEMBLY,GREEN                                                            | 00779     | 850100-5            |
| A2Q1             | 151-1045-00           |                      |                       | TRANSISTOR,SIG:JFET,P-CH,4.5V(SELECTED),5MA,1 MS,GENERAL,2N5460_SPECIAL,TO-92                | 04713     | SPF628              |
| A2Q2             | 151-1025-00           |                      |                       | TRANSISTOR,SIG:JFET,N-CH,6V,15MA,4.5MS,AMPLIFIER,J304/PN4416,TO-92 SDG                       | 04713     | SPF3036             |
| A2Q3             | 151-1171-00           |                      |                       | TRANSISTOR,PWR:MOS,N-CH,50V,12A,0.12 OHM,BUZ71A/IRFZ22/MTP15N06V,TO-220                      | 04713     | MTP15N05E           |
| A2Q4             | 151-0188-05           |                      |                       | TRANSISTOR,SIG:BIPOLAR,PNP,40V,200MA,250MHZ,AMPLIFIER,2N3906,TO-92 EBC,T&A                   | 04713     | 2N3906RLRA          |
| A2R3             | 315-0471-00           |                      |                       | RES,FXD,FILM:470 OHM,5%,0.25W                                                                | 50139     | CB4715              |
| A2R4             | 322-3193-00           |                      |                       | RES,FXD:METAL FILM,1K OHM,1%,0.2W,TC=100 PPM                                                 | 57668     | CRB20T68EFX1001     |
| A2R15            | 322-3001-00           |                      |                       | RES,FXD,FILM:10 OHM,1%,0.2W,TC=100 PPM                                                       | 57668     | CRB20T68EFX10R0     |
| A2R16            | 322-3133-00           |                      |                       | RES,FXD,FILM:237 OHM,1%,0.2W,TC=T0,MI,SMALL BODY                                             | 91637     | CCF50-2370F-R36     |
| A2R17            | 322-3193-00           |                      |                       | RES,FXD:METAL FILM,1K OHM,1%,0.2W,TC=100 PPM,AXIAL                                           | 57668     | CRB20T68EFX1001     |
| A2R18            | 311-2230-00           |                      |                       | RES,VAR,TRMR:CERMET,500 OHM,20%,0.5W,0.197 SQ,TOP ADJUST,T&R                                 | TK2073    | GF06UT2 501 M L20   |
| A2R19            | 322-3273-00           |                      |                       | RES,FXD:METAL FILM,6.81K OHM,1%,0.2W,TC=100 PPM,AXIAL                                        | 57668     | CRB20T68EFX6811     |
| A2R20            | 311-2234-00           |                      |                       | RES,VAR,TRMR:CERMET,5K OHM,20%,0.5W,0.197 SQ,TOP ADJUST,T&R                                  | TK2073    | GF06UT2 502 M L20   |
| A2R21            | 322-3133-00           |                      |                       | RES,FXD,FILM:237 OHM,1%,0.2W,TC=T0,MI,SMALL BODY                                             | 91637     | CCF50-2370F-R36     |
| A2R22            | 322-3193-00           |                      |                       | RES,FXD:METAL FILM,1K OHM,1%,0.2W,TC=100 PPM,AXIAL                                           | 57668     | CRB20T68EFX1001     |
| A2R23            | 311-2230-00           |                      |                       | RES,VAR,TRMR:CERMET,500OHM,20%,0.5W,0.197 SQ,TOP ADJUST,T&R                                  | TK2073    | GF06UT2 501 M L20   |
| A2R24            | 322-3277-00           |                      |                       | RES,FXD,FILM:7.5K OHM,1%,0.2W,TC=T0                                                          | 57668     | CRB20 FXE 7K50      |
| A2R29            | 322-3114-00           |                      |                       | RES,FXD,FILM:150 OHM,1%,0.2W,TC=100 PPM                                                      | 57668     | CRB20-FX-150E-AXIAL |
| A2R30            | 322-3114-00           |                      |                       | RES,FXD,FILM:150 OHM,1%,0.2W,TC=100 PPM                                                      | 57668     | CRB20-FX-150E-AXIAL |

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| Component number | Tektronix part number | Serial no. effective | Serial no. discount'd | Name & description                                              | Mfr. code | Mfr. part number   |
|------------------|-----------------------|----------------------|-----------------------|-----------------------------------------------------------------|-----------|--------------------|
| A2R31            | 322-3215-00           |                      |                       | RES,FXD,FILM:1.69K OHM,1%,0.2W,TC=T0 MI,SMALL BODY              | 91637     | CCF50-1691F-R36    |
| A2R32            | 322-3223-00           |                      |                       | RES,FXD,FILM:2.05K OHM,1%,0.2W,TC=T0 MI,SMALL BODY              | 57668     | CRB20 FXE 2K05     |
| A2R40            | 322-3085-07           |                      |                       | RES,FXD:METAL FILM,75 OHM,0.1%,0.2W,TC=25 PPM,AXIAL             | 91637     | CCF502-C75ROOBT    |
| A2R41            | 322-3085-07           |                      |                       | RES,FXD:METAL FILM,75 OHM,0.1%,0.2W,TC=25 PPM,AXIAL             | 91637     | CCF502-C75ROOBT    |
| A2R42            | 322-3193-00           |                      |                       | RES,FXD:METAL FILM,1K OHM,1%,0.2W,TC=100 PPM,AXIAL              | 57668     | CRB20T68EFX1001    |
| A2R45            | 322-3056-01           |                      |                       | RES,FXD,FILM:37.4 OHM,0.5%,0.2W,TC=T0 TAPED & REELED,SMALL BODY | 57668     | CRB20 DXE 37E4     |
| A2R46            | 322-3085-07           |                      |                       | RES,FXD:METAL FILM,75 OHM,0.1%,0.2W,TC=25 PPM,AXIAL             | 91637     | CCF502-C75ROOBT    |
| A2R47            | 322-3001-00           |                      |                       | RES,FXD,FILM:10 OHM,1%,0.2W,TC=100 PPM                          | 57668     | CRB20T68EFX10R0    |
| A2R48            | 317-0036-00           |                      |                       | RES,FXD,FILM:3.6 OHM,5%,0.125W                                  | 50139     | BB36G5             |
| A2R49            | 322-3193-00           |                      |                       | RES,FXD:METAL FILM,1K OHM,1%,0.2W,TC=100 PPM,AXIAL              | 57668     | CRB20T68EFX1001    |
| A2R50            | 322-3126-01           |                      |                       | RES,FXD,FILM:200 OHM,0.5%,0.2W,TC=T0 SMALL BODY                 | 57668     | CRB 20 FXE 200 OHM |
| A2R51            | 322-3226-00           |                      |                       | RES,FXD:METAL FILM,2.21K OHM,1%,0.2W,TC=100 PPM,AXIAL           | 57668     | CRB20T68EFX2211    |
| A2R52            | 322-3213-00           |                      |                       | RES,FXD,FILM:1.62K OHM,1%,0.2W,TC=T0                            | 57668     | CRB20 FXE 1K62     |
| A2R53            | 322-3213-00           |                      |                       | RES,FXD,FILM:1.62K OHM,1%,0.2W,TC=T0                            | 57668     | CRB20 FXE 1K62     |
| A2R54            | 317-0036-00           |                      |                       | RES,FXD,FILM:3.6 OHM,5%,0.125W                                  | 50139     | BB36G5             |
| A2R57            | 322-3133-00           |                      |                       | RES,FXD,FILM:237 OHM,1%,0.2W,TC=T0,MI,SMALL BODY                | 91637     | CCF50-2370F-R36    |
| A2R58            | 322-3193-00           |                      |                       | RES,FXD:METAL FILM,1K OHM,1%,0.2W,TC=100 PPM,AXIAL              | 57668     | CRB20T68EFX1001    |
| A2R59            | 322-3218-00           |                      |                       | RES,FXD:METAL FILM,1.82K OHM,1%,0.2W,TC=100 PPM,AXIAL           | 57668     | CRB20 FXE 1K82     |
| A2R60            | 311-0634-00           |                      |                       | RES,VAR,TRMR:CERMET,500 OHM,20%,0.5W,0.197 SQ,TOP ADJUST,T&R    | 80009     | 311-0634-00        |
| A2R60            | 311-2230-00           |                      |                       | RES,VAR,TRMR:CERMET,500 OHM,20%,0.5W,0.197 SQ,TOP ADJUST,T&R    | TK2073    | GF06UT2 501 M L20  |
| A2R61            | 322-3085-07           |                      |                       | RES,FXD:METAL FILM,75 OHM,0.1%,0.2W,TC=25 PPM,AXIAL             | 91637     | CCF502-C75ROOBT    |
| A2R62            | 322-3311-00           |                      |                       | RES,FXD,FILM:16.9K OHM,1%,0.2W,TC=T0 MI,SMALL BODY              | 56845     | CCF50-1692F-R36    |
| A2R63            | 311-2235-00           |                      |                       | RES,VAR,TRMR:CERMET,10K OHM,20%,0.5W,0.197 SQ,TOP ADJUST,T&R    | TK2073    | GF06UT2 103 M L20  |
| A2R64            | 322-3056-01           |                      |                       | RES,FXD,FILM:37.4 OHM,0.5%,0.2W,TC=T0 TAPED & REELED,SMALL BODY | 57668     | CRB20 DXE 37E4     |
| A2R65            | 322-3085-07           |                      |                       | RES,FXD:METAL FILM,75 OHM,0.1%,0.2W,TC=25 PPM,AXIAL             | 91637     | CCF502-C75ROOBT    |

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| Component number | Tektronix part number | Serial no. effective | Serial no. discount'd | Name & description                                            | Mfr. code | Mfr. part number   |
|------------------|-----------------------|----------------------|-----------------------|---------------------------------------------------------------|-----------|--------------------|
| A2R66            | 322-3001-00           |                      |                       | RES,FXD,FILM:10 OHM,1%,0.2W,TC=100 PPM                        | 57668     | CRB20T68EFX10R0    |
| A2R67            | 317-0036-00           |                      |                       | RES,FXD,FILM:3.6 OHM,5%,0.125W                                | 50139     | BB36G5             |
| A2R68            | 322-3193-00           |                      |                       | RES,FXD:METAL FILM,1K OHM,1%,0.2W,TC=100 PPM,AXIAL            | 57668     | CRB20T68EFX1001    |
| A2R69            | 322-3126-01           |                      |                       | RES,FXD,FILM:200 OHM,0.5%,0.2W,TC=TO SMALL BODY               | 57668     | CRB 20 FXE 200 OHM |
| A2R70            | 322-3226-00           |                      |                       | RES,FXD:METAL FILM,2.21K OHM,1%,0.2W,TC=100 PPM,AXIAL         | 57668     | CRB20T68EFX2211    |
| A2R71            | 322-3213-00           |                      |                       | RES,FXD,FILM:1.62K OHM,1%,0.2W,TC=TO                          | 57668     | CRB20 FXE 1K62     |
| A2R72            | 322-3213-00           |                      |                       | RES,FXD,FILM:1.62K OHM,1%,0.2W,TC=TO                          | 57668     | CRB20 FXE 1K62     |
| A2R73            | 317-0036-00           |                      |                       | RES,FXD,FILM:3.6 OHM,5%,0.125W                                | 50139     | BB36G5             |
| A2R76            | 322-3133-00           |                      |                       | RES,FXD,FILM:237 OHM,1%,0.2W,TC=TO,MI,SMALL BODY              | 91637     | CCF50-2370F-R36    |
| A2R77            | 322-3193-00           |                      |                       | RES,FXD:METAL FILM,1K OHM,1%,0.2W,TC=100 PPM,AXIAL            | 57668     | CRB20T68EFX1001    |
| A2R78            | 322-3212-00           |                      |                       | RES,FXD,FILM:1.58K OHM,1%,0.2W,TC=TO MI,SMALL BODY            | 57668     | CRB20 FXE 1K58     |
| A2R79            | 311-2230-00           |                      |                       | RES,VAR,TRMR:CERMET,500 OHM,20%,0.5W,0.197 SQ,TOP ADJUST,T&R  | TK2073    | GF06UT2 501 M L20  |
| A2R80            | 322-3085-07           |                      |                       | RES,FXD:METAL FILM,75 OHM,0.1%,0.2W,TC=25 PPM,AXIAL           | 91637     | CCF502-C75ROOBT    |
| A2R81            | 322-3284-00           |                      |                       | RES,FXD,FILM:8.87K OHM,1%,0.2W,TC=TO MI,SMALL BODY            | 57668     | CRB20 FXE 8K87     |
| A2R82            | 311-2234-00           |                      |                       | RES,VAR,TRMR:CERMET,5K OHM,20%,0.5W,0.197 SQ,TOP ADJUST,T&R   | TK2073    | GF06UT2 502 M L20  |
| A2R83            | 322-3056-01           |                      |                       | RES,FXD,FILM:37.4 OHM,0.5%,0.2W,TC=TO(Opt01)                  | 57668     | CRB20 DXE 37E4     |
| A2R84            | 322-3213-00           |                      |                       | RES,FXD,FILM:1.62K OHM,1%,0.2W,TC=TO(Opt01)                   | 57668     | CRB20 FXE 1K62     |
| A2R85            | 322-3213-00           |                      |                       | RES,FXD,FILM:1.62K OHM,1%,0.2W,TC=TO (Opt01)                  | 57668     | CRB20 FXE 1K62     |
| A2R86            | 322-3193-00           |                      |                       | RES,FXD:METAL FILM,1K OHM,1%,0.2W,TC=100 PPM,AXIAL, (Opt01)   | 57668     | CRB20T68EFX1001    |
| A2R87            | 322-3126-01           |                      |                       | RES,FXD,FILM:200 OHM,0.5%,0.2W,TC=TO(Opt01)                   | 57668     | CRB 20 FXE 200 OHM |
| A2R88            | 322-3226-00           |                      |                       | RES,FXD:METAL FILM,2.21K OHM,1%,0.2W,TC=100 PPM,AXIAL (Opt01) | 57668     | CRB20T68EFX2211    |
| A2R89            | 317-0036-00           |                      |                       | RES,FXD,FILM:3.6 OHM,5%,0.125W (Opt01)                        | 50139     | BB36G5             |
| A2R90            | 317-0036-00           |                      |                       | RES,FXD,FILM:3.6 OHM,5%,0.125W (Opt01)                        | 50139     | BB36G5             |
| A2R91            | 322-3001-00           |                      |                       | RES,FXD,FILM:10 OHM,1%,0.2W,TC=100 PPM(Opt01)                 | 57668     | CRB20T68EFX10R0    |
| A2R92            | 322-3085-07           |                      |                       | RES,FXD:METAL FILM,75 OHM,0.1%,0.2W,TC=25 PPM,AXIAL (Opt01)   | 91637     | CCF502-C75ROOBT    |
| A2R93            | 322-3056-00           |                      |                       | RES,FXD,FILM:37.4 OHM,1%,0.2W,TC=TO,MI,(Opt01)                | 91637     | CCF50-37R4F-R36    |
| A2R94            | 322-3056-00           |                      |                       | RES,FXD,FILM:37.4 OHM,1%,0.2W,TC=TO,MI,(Opt01)                | 91637     | CCF50-37R4F-R36    |
| A2R95            | 322-3133-00           |                      |                       | RES,FXD,FILM:237 OHM,1%,0.2W,TC=TO,MI,(Opt01)                 | 91637     | CCF50-2370F-R36    |

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| Component number | Tektronix part number | Serial no. effective | Serial no. discount'd | Name & description                                               | Mfr. code | Mfr. part number  |
|------------------|-----------------------|----------------------|-----------------------|------------------------------------------------------------------|-----------|-------------------|
| A2R96            | 322-3193-00           |                      |                       | RES,FXD:METAL FILM,1K OHM,1%,0.2W,TC=100 PPM,AXIAL,(Opt01)       | 57668     | CRB20T68EFX1001   |
| A2R97            | 322-3218-00           |                      |                       | RES,FXD:METAL FILM,1.82K OHM,1%,0.2W,TC=100 PPM,AXIAL (Opt01)    | 57668     | CRB20 FXE 1K82    |
| A2R98            | 311-0634-00           |                      |                       | RES,VAR,NONWW:TRMR,500 OHM,0.5W CERMET                           | 32997     | 3329H-L58-501     |
| A2R99            | 322-3085-07           |                      |                       | RES,FXD:METAL FILM,75 OHM,0.1%,0.2W,TC=25 PPM,AXIAL,(Opt01)      | 91637     | CCF502-C75ROOBT   |
| A2R100           | 322-3311-00           |                      |                       | RES,FXD,FILM:16.9K OHM,1%,0.2W,TC=T0                             | 56845     | CCF50-1692F-R36   |
| A2R101           | 311-2235-00           |                      |                       | RES,VAR,TRMR:CERMET,10K OHM,20%,0.5W,0.197 SQ,TOP ADJUST,(Opt01) | TK2073    | GF06UT2 103 M L20 |
| A2R102           | 322-3039-00           |                      |                       | RES,FXD,FILM:24.9 OHM,1%,0.2W,TC=T0                              | 57668     | CRB20T68EFX24R9   |
| A2R103           | 322-3289-00           |                      |                       | RES,FXD:METAL FILM,10K OHM,1%,0.2W,TC=100 PPM                    | 57668     | CRB20T29EFX1002   |
| A2R104           | 322-3039-00           |                      |                       | RES,FXD,FILM:24.9 OHM,1%,0.2W,TC=T0                              | 57668     | CRB20T68EFX24R9   |
| A2R105           | 322-3222-00           |                      |                       | RES,FXD:METAL FILM,2K OHM,1%,0.2W,TC=100 PPM                     | 57668     | CRB20T68EFX2001   |
| A2R106           | 322-3404-00           |                      |                       | RES,FXD,FILM:158K OHM,1%,0.2W,TC=T0                              | 91637     | CCF50-1583F-R36   |
| A2R107           | 322-3404-00           |                      |                       | RES,FXD,FILM:158K OHM,1%,0.2W,TC=T0                              | 91637     | CCF50-1583F-R36   |
| A2R108           | 322-3260-00           |                      |                       | RES,FXD,FILM:4.99K OHM,1%,0.2W,TC=T0                             | 57668     | CRB20T68EFX4991   |
| A2R109           | 322-3289-00           |                      |                       | RES,FXD:METAL FILM,10K OHM,1%,0.2W,TC=100 PPM                    | 57668     | CRB20T29EFX1002   |
| A2R110           | 322-3318-00           |                      |                       | RES,FXD,FILM:METAL FILM,20K OHM,1%,0.2W,TC=100 PPM               | 57668     | CRB20T68EFX2002   |
| A2R112           | 322-3273-00           |                      |                       | RES,FXD:METAL FILM,6.81K OHM,1%,0.2W,TC=100 PPM                  | 57668     | CRB20T68EFX6811   |
| A2R113           | 322-3239-00           |                      |                       | RES,FXD,FILM:3.01K OHM,1%,0.2W,TC=T0                             | 57668     | CRB20T68EFX3011   |
| A2R114           | 322-3418-00           |                      |                       | RES,FXD:METAL FILM,221K OHM,1%,0.2W,TC=100 PPM                   | 57668     | CRB20 FXE 221K    |
| A2R115           | 322-3039-00           |                      |                       | RES,FXD,FILM:24.9 OHM,1%,0.2W,TC=T0                              | 57668     | CRB20T68EFX24R9   |
| A2R116           | 322-3289-00           |                      |                       | RES,FXD:METAL FILM,10K OHM,1%,0.2W,TC=100 PPM                    | 57668     | CRB20T29EFX1002   |
| A2R117           | 322-3039-00           |                      |                       | RES,FXD,FILM:24.9 OHM,1%,0.2W,TC=T0                              | 57668     | CRB20T68EFX24R9   |
| A2R118           | 322-3289-00           |                      |                       | RES,FXD:METAL FILM,10K OHM,1%,0.2W,TC=100 PPM                    | 57668     | CRB20T29EFX1002   |
| A2R119           | 322-3289-00           |                      |                       | RES,FXD:METAL FILM,10K OHM,1%,0.2W,TC=100 PPM                    | 57668     | CRB20T29EFX1002   |
| A2R120           | 322-3239-00           |                      |                       | RES,FXD,FILM:3.01K OHM,1%,0.2W,TC=T0                             | 57668     | CRB20T68EFX3011   |
| A2R121           | 322-3280-00           |                      |                       | RES,FXD,FILM:8.06K OHM,1%,0.2W,TC=T0                             | 57668     | CRB20T68EFX8061   |
| A2R122           | 311-0644-00           |                      |                       | RES,VAR,NONWW:TRMR,20K OHM,0.5W CERMET                           | 32997     | 3329H-L58-203     |
| A2R123           | 311-0644-00           |                      |                       | RES,VAR,NONWW:TRMR,20K OHM,0.5W CERMET                           | 32997     | 3329H-L58-203     |
| A2R124           | 322-3193-00           |                      |                       | RES,FXD:METAL FILM,1K OHM,1%,0.2W,TC=100 PPM                     | 57668     | CRB20T68EFX1001   |
| A2R125           | 322-3326-00           |                      |                       | RES,FXD,FILM:24.3K OHM,1%,0.2W,TC=T0                             | 91637     | CCF50-2432F-R36   |
| A2R126           | 311-0698-00           |                      |                       | RES,VAR,NONWW:TRMR,1MEG OHM,0.5W CERMET                          | 32997     | 3329H-L58-105     |
| A2R127           | 322-3226-00           |                      |                       | RES,FXD:METAL FILM,2.21K OHM,1%,0.2W,TC=100 PPM                  | 57668     | CRB20T68EFX2211   |
| A2R129           | 322-3132-00           |                      |                       | RES,FXD,FILM:232 OHM,1%,0.2W,TC=150 PPM,MI,AXIAL                 | 91637     | CCF50-2320F-R36   |

Replaceable electrical parts list (Cont.)

| Component number | Tektronix part number | Serial no. effective | Serial no. discount'd | Name & description                                                                   | Mfr. code | Mfr. part number     |
|------------------|-----------------------|----------------------|-----------------------|--------------------------------------------------------------------------------------|-----------|----------------------|
| A2R130           | 315-0750-00           |                      |                       | RES,FXD,FILM:75 OHM,5%,0.25W MI                                                      | 50139     | CB7505               |
| A2R131           | 308-0702-00           |                      |                       | RES,FXD,WW:0.33 OHM,5%,2W                                                            | 91637     | CPF-2-0R33JT1        |
| A2R135           | 322-3414-00           |                      |                       | RES,FXD:METAL FILM,200K OHM,1%,0.2W,TC=100 PPM,AXIAL                                 | 57668     | CRB 20 FXE 200 K OHM |
| A2R136           | 322-3218-00           |                      |                       | RES,FXD:METAL FILM,1.82K OHM,1%,0.2W,TC=100 PPM,AXIAL                                | 57668     | CRB20 FXE 1K82       |
| A2R137           | 322-3318-00           |                      |                       | RES,FXD,FILM:METAL FILM,20K OHM,1%,0.2W,TC=100 PPM,AXIAL                             | 57668     | CRB20T68EFX2002      |
| A2R150           | 322-3260-00           |                      |                       | RES,FXD,FILM:4.99K OHM,1%,0.2W,TC=T0                                                 | 57668     | CRB20T68EFX4991      |
| A2R151           | 322-3260-00           |                      |                       | RES,FXD,FILM:4.99K OHM,1%,0.2W,TC=T0                                                 | 57668     | CRB20T68EFX4991      |
| A2R152           | 322-3260-00           |                      |                       | RES,FXD,FILM:4.99K OHM,1%,0.2W,TC=T0                                                 | 57668     | CRB20T68EFX4991      |
| A2R153           | 322-3260-00           |                      |                       | RES,FXD,FILM:4.99K OHM,1%,0.2W,TC=T0                                                 | 57668     | CRB20T68EFX4991      |
| A2R154           | 322-3233-00           |                      |                       | RES,FXD,FILM:2.61K OHM,1%,0.2W,TC=T0 MI                                              | 91637     | CCF50-2611F-R36      |
| A2R160           | 322-3109-00           |                      |                       | RES,FXD,FILM:133 OHM,1%,0.2W,TC=T0,MI                                                | 91637     | CCF50-1330F-R36      |
| A2R161           | 322-3235-00           |                      |                       | RES,FXD:METAL FILM,2.74K OHM,1%,0.2W,TC=100 PPM,AXIAL,T&R                            | 57668     | CRB20 FXE 2K74       |
| A2R181           | 322-3056-01           |                      |                       | RES,FXD,FILM:37.4 OHM,1%,0.2W,TC=T0,MI                                               | 91637     | CCF50-37R4F-R36      |
| A2R182           | 322-3056-01           |                      |                       | RES,FXD,FILM:37.4 OHM,1%,0.2W,TC=T0,MI                                               | 91637     | CCF50-37R4F-R36      |
| A2R193           | 322-3012-00           |                      |                       | RES,FXD,FILM:13 OHM,1%,0.2W,TC=T0,MI                                                 | 91637     | CCF50-13R0F-R36      |
| A2R194           | 322-3039-00           |                      |                       | RES,FXD,FILM:24.9 OHM,1%,0.2W,TC=T0,MI                                               | 57668     | CRB20T68EFX24R9      |
| A2R195           | 322-3056-01           |                      |                       | RES,FXD,FILM:37.4 OHM,0.5%,0.2W,TC=T0                                                | 57668     | CRB20 DXE 37E4       |
| A2R196           | 322-3114-00           |                      |                       | RES,FXD,FILM:150 OHM,1%,0.2W,TC=100 PPM                                              | 57668     | CRB20-FX-150E-AXIAL  |
| A2R197           | 322-3114-00           |                      |                       | RES,FXD,FILM:150 OHM,1%,0.2W,TC=100 PPM                                              | 57668     | CRB20-FX-150E-AXIAL  |
| A2R198           | 307-0503-00           |                      |                       | RES NTWK,FXD,FILM:(9)510 OHM,20%,0.125W                                              | 91637     | CSC10A01511GDO3      |
| A2R199           | 322-3193-00           |                      |                       | RES,FXD,METALFILM:1KOHM,1%,0.2WTC=100                                                | 57668     | CRB20FXE1K00         |
| A2R208           | 322-3193-00           |                      |                       | RES,FXD:METAL FILM,1K OHM,1%,0.2W,TC=100 PPM                                         | 57668     | CRB20T68EFX1001      |
| A2R209           | 321-0673-07           |                      |                       | RES,FXD,FILM:17K OHM,0.1%,0.125W,TC=T9 MI                                            | 07716     | CEAE17001B           |
| A2R210           | 321-0962-07           |                      |                       | RES,FXD,FILM:8K OHM,0.1%,0.125W,TC=T9                                                | 57027     | 8.0K                 |
| A2R211           | 322-3085-00           |                      |                       | RES,FXD:METAL FILM,75 OHM,0.1%,0.2W,TC=100 PPM,AXIAL                                 | 57668     | CRB20FXE75E0         |
| A2R212           | 307-0650-00           |                      |                       | RES NTWK,FXD,FILM:9,2.7KOHM,5%,0.150                                                 | 11236     | 750-101-R2.7K        |
| A2R213           | 322-3193-00           |                      |                       | RES,FXD:METAL FILM,1K OHM,1%,0.2W,TC=100 PPM,AXIAL                                   | 57668     | CRB20T68EFX1001      |
| A2R214           | 322-3193-00           |                      |                       | RES,FXD,METAL FILM:1KOHM,1%,0.2WTC=100                                               | 57668     | CRB20FXE1K00         |
| A2R235           | 322-3097-00           |                      |                       | RES,FXD,METAL,FI:100OHM,1%,0.2WTC=100,PPM;AXIAL                                      | 57668     | CRB20FXE100E         |
| A2T1             | 120-1885-01           |                      |                       | TRANSFORMER,PWR:                                                                     | 80009     | 120-1885-01          |
| A2TP1            | 214-4085-00           |                      |                       | TERM , TEST POINT:0.070 ID,0.220H,0.063 DIA PCB,0.015 X 0.032 BRS,W/RED NYLON COLLAR | 26364     | 104-01-02            |

Replaceable electrical parts list (Cont.)

| Component number | Tektronix part number | Serial no. effective | Serial no. discount'd | Name & description                                                                             | Mfr. code | Mfr. part number |
|------------------|-----------------------|----------------------|-----------------------|------------------------------------------------------------------------------------------------|-----------|------------------|
| A2TP2            | 214-4085-00           |                      |                       | TERM,TEST POINT:0.070 ID,0.220H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYLON COLLAR            | 26364     | 104-01-02        |
| A2TP3            | 214-4085-00           |                      |                       | TERM,TEST POINT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRASS,W/ RED NYLON COLLAR         | 26364     | 104-01-02        |
| A2TP4            | 214-4085-00           |                      |                       | TERM,TEST POINT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRASS,W/ RED NYLON COLLAR         | 26364     | TP104-01-02      |
| A2TP5            | 214-4085-00           |                      |                       | TERM,TEST POINT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRASS,W/ RED NYLON COLLAR         | 26364     | TP104-01-02      |
| A2TP6            | 214-4085-00           |                      |                       | TERM,TEST POINT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRASS,W/ RED NYLON COLLAR (Opt01) | 26364     | TP104-01-02      |
| A2TP7            | 214-4085-00           |                      |                       | TERM,TEST POINT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRASS,W/ RED NYLON COLLAR         | 26364     | TP104-01-02      |
| A2TP8            | 214-4085-00           |                      |                       | TERM,TEST POINT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRASS,W/ RED NYLON COLLAR         | 26364     | TP104-01-02      |
| A2TP9            | 214-4085-00           |                      |                       | TERM,TEST POINT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRASS,W/ RED NYLON COLLAR         | 26364     | TP104-01-02      |
| A2TP10           | 214-4085-00           |                      |                       | TERM,TEST POINT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRASS,W/ RED NYLON COLLAR         | 26364     | TP104-01-02      |
| A2TP11           | 214-4085-00           |                      |                       | TERM,TEST POINT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRASS,W/ RED NYLON COLLAR (Opt01) | 26364     | TP104-01-02      |
| A2TP12           | 214-4085-00           |                      |                       | TERM,TEST POINT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRASS,W/ RED NYLON COLLAR         | 26364     | TP104-01-02      |
| A2TP13           | 214-4085-00           |                      |                       | TERM,TEST POINT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRASS,W/ RED NYLON COLLAR         | 26364     | TP104-01-02      |
| A2U1             | 156-4024-00           |                      |                       | IC,LINEAR:BIPOLAR,OP-AMP,190MHZ,CURRENT FEEDBACK,1 TO 40 GAIN RANGE,AD9617JN,DIP08.3           | 24355     | AD9617JN         |
| A2U2             | 156-4024-00           |                      |                       | IC,LINEAR:BIPOLAR,OP-AMP,190MHZ,CURRENT FEEDBACK,1 TO 40 GAIN RANGE,AD9617JN,DIP08.3           | 24355     | AD9617JN         |
| A2U3             | 156-0527-00           |                      |                       | IC,LINEAR:BIPOLAR,VOLTAGE REGULATOR,NEGATIVE,15V,1.0A,4%,MC7915CT,TO-220                       | 01295     | UA7915CKC        |
| A2U4             | 156-4170-00           |                      |                       | IC,LINEAR:BIPOLAR,OP-AMP,CURRENT FEEDBACK,100MHZ,HIGH OUTPUT CURRENT,OPA603AP,DIP08.3 (Opt01)  | 13919     | OPA603AP         |
| A2U5             | 156-6376-00           |                      |                       | IC,CONVERTER:BIPOLAR,D/A,12-BIT,20MHZ,2LSB,CURRENT OUT,LATCHED,TDC1012RSC1,PLCC28.3            | 07933     | TDC1012R3C1      |
| A2U9             | 156-3373-00           |                      |                       | IC,DIGITAL:ACMOS,FLIP FLOP,OCTAL D-TYPE,3-STATE,74AC374,DIP30.3,TUBE                           | 04713     | MC74AC374N       |
| A2U21            | 160-7452-01           | 671-1862-04          |                       | IC,MEMORY:CMOS,PROM 8K X 8,PRGM 156-3836-00,CY7C265-50 (STD)                                   | TK0198    | 160745201        |
| A2U21            | 160-7452-01           | 671-2089-04          |                       | IC,MEMORY:CMOS,PROM 8K X 8,PRGM 156-3836-00,CY7C265-50 (OPT 01)                                | TK0198    | 160745201        |
| A2U21            | 160-9659-00           | 671-2950-00          |                       | IC,MEMORY:CMOS,PROM,8K X 8,PRGM 156-3836-00,CY7C265-50 (OPT 02)                                | TK0198    | 160965900        |
| A2U21            | 160-9659-00           | 671-3464-00          |                       | IC,MEMORY:CMOS,PROM,8K X 8,PRGM 156-3836-00,CY7C265-50 (OPT 01 & 02)                           | TK0198    | 160965900        |

Replaceable electrical parts list (Cont.)

| Component number | Tektronix part number | Serial no. effective | Serial no. discont'd | Name & description                                                                                  | Mfr. code | Mfr. part number |
|------------------|-----------------------|----------------------|----------------------|-----------------------------------------------------------------------------------------------------|-----------|------------------|
| A2U23            | 160-7453-01           | 671-1862-04          |                      | IC, MEMORY: CMOS, PROM 8K X 8, PRGM 156-3836-00, CY7C265-50 (STD)                                   | TK0198    | 160745301        |
| A2U23            | 160-7453-01           | 671-2089-04          |                      | IC, MEMORY: CMOS, PROM 8K X 8, PRGM 156-3836-00, CY7C265-50 (OPT 01)                                | TK0198    | 160745301        |
| A2U23            | 160-9660-00           | 671-2950-00          |                      | IC, MEMORY: CMOS, PROM, 8K X 8, PRGM 156-3836-00, CY7C265-50 (OPT 02)                               | TK0198    | 160966000        |
| A2U23            | 160-9660-00           | 671-3464-00          |                      | IC, MEMORY: CMOS, PROM, 8K X 8, PRGM 156-3836-00, CY7C265-50 (OPT 01 & 02)                          | TK0198    | 160966000        |
|                  |                       |                      |                      | *MOUNTING PARTS*                                                                                    |           |                  |
|                  | 136-1038-00           |                      |                      | SOCKET, DIP:                                                                                        | 00779     | 2-641873-1       |
|                  |                       |                      |                      | *END MOUNTING PARTS*                                                                                |           |                  |
| A2U25            | 160-8247-00           | 671-2089-04          |                      | MICROCKT, DGTL: CYC7C265-50 (OPT 01)                                                                | 80009     | 160-8247-00      |
| A2U25            | 163-0247-00           | 671-3464-00          |                      | MICROCKT, DGTL: CYC7C265-50 (OPT 01 & 02)                                                           | 80009     | 160-8247-00      |
|                  |                       |                      |                      | *MOUNTING PARTS*                                                                                    |           |                  |
|                  | 136-1038-00           |                      |                      | SOCKET, DIP:                                                                                        | 00779     | 2-641873-1       |
|                  |                       |                      |                      | *END MOUNTING PARTS*                                                                                |           |                  |
| A2U27            | 160-7454-01           | 671-1862-04          |                      | IC, MEMORY: CMOS, PROM 8K X 8, PRGM 156-3836-00, CY7C265-50 (STD)                                   | TK0198    | 160745401        |
| A2U27            | 160-7454-01           | 671-2089-04          |                      | IC, MEMORY: CMOS, PROM 8K X 8, PRGM 156-3836-00, CY7C265-50 (OPT 01)                                | TK0198    | 160745401        |
| A2U27            | 160-9661-00           | 671-2950-00          |                      | IC, MEMORY: CMOS, PROM, 8K X 8, PRGM 156-3836-00, CY7C265-50 (OPT 02)                               | TK0198    | 160966100        |
| A2U27            | 160-9661-00           | 671-3464-00          |                      | IC, MEMORY: CMOS, PROM, 8K X 8, PRGM 156-3836-00, CY7C265-50 (OPT 01 & 02)                          | TK0198    | 160966100        |
| A2U29            | 156-3019-00           |                      |                      | IC, LINEAR: BIPOLAR, VOLTAGE REFERENCE, 1.235V, 1.0%, 150PPM, SHUNT, MICROPOWER, LM385BZ-1.2, TO-92 | 27014     | LM385BZ-1.2      |
| A2U30            | 156-4170-00           |                      |                      | IC, LINEAR: BIPOLAR, OP-AMP, CURRENT FEEDBACK, 100MHZ, HIGH OUTPUT CURRENT, OPA603AP, DIP08.3       | 13919     | OPA603AP         |
| A2U31            | 156-6376-00           |                      |                      | IC, CONVERTER: BIPOLAR, D/A, 12-BIT, 20MHZ, 2LSB, CURRENT OUT, LATCHED, TDC1012R3C1, PLCC28.3       | 07933     | TDC1012R3C1      |
|                  |                       |                      |                      | *MOUNTING PARTS*                                                                                    |           |                  |
|                  | 136-1005-00           |                      |                      | SKT, PL-IN ELECK:                                                                                   | 00779     | 3-821581-1       |
|                  |                       |                      |                      | *END MOUNTING PARTS*                                                                                |           |                  |
| A2U32            | 156-3019-00           |                      |                      | IC, LINEAR: BIPOLAR, VOLTAGE REFERENCE, 1.235V, 1.0%, 150PPM, SHUNT, MICROPOWER, LM385BZ-1.2, TO-92 | 27014     | LM385BZ-1.2      |
| A2U33            | 156-4170-00           |                      |                      | IC, LINEAR: BIPOLAR, OP-AMP, CURRENT FEEDBACK, 100MHZ, HIGH OUTPUT CURRENT, OPA603AP, DIP08.3       | 13919     | OPA603AP         |
| A2U34            | 156-6172-00           |                      |                      | IC, CONVERTER: BIPOLAR, D/A, 10 BIT, 20MHZ, CURRENT OUTPUT, 0.5LSBINL, TDC1041R3C1, PLCC28-1, TUBE  | 07933     | TDC1041R3C1      |
|                  |                       |                      |                      | *MOUNTING PARTS*                                                                                    |           |                  |
|                  | 136-1005-00           |                      |                      | SKT, PL-IN ELEK:                                                                                    | 00779     | 3-821581-1       |

Replaceable electrical parts list (Cont.)

| Component number     | Tektronix part number | Serial no. effective | Serial no. discount'd | Name & description                                                                                           | Mfr. code | Mfr. part number |
|----------------------|-----------------------|----------------------|-----------------------|--------------------------------------------------------------------------------------------------------------|-----------|------------------|
| *END MOUNTING PARTS* |                       |                      |                       |                                                                                                              |           |                  |
| A2U37                | 156-3019-00           |                      |                       | IC, LINEAR: BIPOLAR, VOLTAGE REFERENCE, 1.235V, 1.0%, 150PPM, SHUNT, MICROPOWER, LM385BZ-1.2, TO-92 (Opt 01) | 27014     | LM385BZ-1.2      |
| A2U40                | 156-1291-00           |                      |                       | IC, LINEAR: BIFET, OP-AMP, DUAL, LOW POWER, TL062CP, DIP08.3                                                 | 01295     | TL062CP          |
| A2U102               | 160-7155-01           | 671-1862-04          |                       | IC, DIGITAL: CMOS, 2048 X 8, REG PROM, PRGM 156-4025-00, 27C020, DIP24 (STD)                                 | TK0198    | 160715501        |
| A2U102               | 160-7155-01           | 671-2089-04          |                       | IC, DIGITAL: CMOS, 2048 X 8, REG PROM, PRGM 156-4025-00, 27C020, DIP24 (OPT 01)                              | TK0198    | 160715501        |
| A2U102               | 160-9662-00           | 671-2950-00          |                       | IC, MEMORY: CMOS, EPROM, 256K X 8, 200NS, PRGM 156-4025-00, 27C020, DIP32.6 (OPT 02)                         | TK0198    | 160966200        |
| A2U102               | 160-9662-00           | 671-3464-00          |                       | IC, MEMORY: CMOS, EPROM, 256K X 8, 200NS, PRGM 156-4025-00, 27C020, DIP32.6 (OPT 01 & 02)                    | TK0198    | 160966200        |
| *MOUNTING PARTS*     |                       |                      |                       |                                                                                                              |           |                  |
|                      | 136-0963-00           |                      |                       | SKT, PL-IN ELECK: MICROCKT, 32 PIN                                                                           | 00779     | 2-644018-3       |
| *END MOUNTING PARTS* |                       |                      |                       |                                                                                                              |           |                  |
| A2U103               | 156-2951-00           |                      |                       | IC, MEMORY: CMOS, PROM, 1024 X 8, 7C281-45, DIP24.300                                                        | 65786     | CY7C281-45PC     |
| *MOUNTING PARTS*     |                       |                      |                       |                                                                                                              |           |                  |
|                      | 136-0925-00           |                      |                       | SOCKET, DIP:                                                                                                 | 91506     | 224-AG30D        |
| *END MOUNTING PARTS* |                       |                      |                       |                                                                                                              |           |                  |
| A2U104               | 160-6968-01           | 671-1862-04          |                       | IC, MEMORY: CMOS, EPROM, 128K, PRGM (STD)                                                                    | TK0198    | 160696801        |
| A2U104               | 160-6968-01           | 671-2089-04          |                       | IC, MEMORY: CMOS, EPROM, 128K, PRGM (OPT 01)                                                                 | TK0198    | 160696801        |
| A2U104               | 160-9663-00           | 671-2950-00          |                       | IC, MEMORY: CMOS, EPROM, 256K X 8, 200NS, PRGM 156-4025-00, 27C020, DIP32.6 (OPT 02)                         | TK0198    | 160966300        |
| A2U104               | 160-9663-00           | 671-3464-00          |                       | IC, MEMORY: CMOS, EPROM, 256K X 8, 200NS, PRGM 156-4025-00, 27C020, DIP32.6 (OPT 01 & 02)                    | TK0198    | 160966300        |
| *MOUNTING PARTS*     |                       |                      |                       |                                                                                                              |           |                  |
|                      | 136-0963-00           |                      |                       | SKT, PL-IN ELECK: MICROCKT, 32 PIN                                                                           | 00779     | 2-644018-3       |
| *END MOUNTING PARTS* |                       |                      |                       |                                                                                                              |           |                  |
| A2U106               | 156-0368-03           |                      |                       | IC, DIGITAL: ECL, TRANSLATOR, QUAD TTL-TO-ECL, 10124, DIP16.3, TUBE                                          | 04713     | MC10124P         |
| A2U108               | 156-0316-04           |                      |                       | IC, DIGITAL: ECL, TRANSLATOR, QUAD ECL TO TTL, 10125, DIP16.3, TUBE                                          | 04713     | MC10125P         |
| A2U150               | 156-3373-00           |                      |                       | IC, DIGITAL: AC MOS, FLIP FLOP, OCTAL D-TYPE, 3-STATE, 74AC374, DIP30.3, TUBE                                | 04713     | MC74AC374N       |
| A2U160               | 156-4104-00           |                      |                       | IC, LINEAR: BIPOLAR, SW-REGULATOR CONTROLLER, PWM, CURRENT MODE, SINGLE TOTEM POLE OUTPUT, UC3843            | 04713     | UC3843N          |
| A2U161               | 160-9330-00           | 671-1862-04          |                       | IC, DIGITAL: CMOS, PLD, OTP, 5064, 64 MACROCELL, 30NS, PRGM 156-6229-00, 5064-30, PLCC44, TUBE (STD)         | TK0198    | 160933000        |

Replaceable electrical parts list (Cont.)

| Component number | Tektronix part number | Serial no. effective | Serial no. discount'd | Name & description                                                                                      | Mfr. code | Mfr. part number |
|------------------|-----------------------|----------------------|-----------------------|---------------------------------------------------------------------------------------------------------|-----------|------------------|
| A2U161           | 160-9330-00           | 671-2089-04          |                       | IC,DIGITAL:CMOS,PLD,OTP,5064,64<br>MACROCELL,30NS,PRGM<br>156-6229-00,5064-30,PLCC44,TUBE (OPT 01)      | TK0198    | 160933000        |
| A2U161           | 160-9664-00           | 671-2950-00          |                       | IC,DIGITAL:CMOS,PLD,OTP,5064,64<br>MACROCELL,30NS,PRGM<br>156-6229-00,5064-30,PLCC44,TUBE (OPT 02)      | TK0198    | 160966400        |
| A2U161           | 160-9664-00           | 671-3464-00          |                       | IC,DIGITAL:CMOS,PLD,OTP,5064,64<br>MACROCELL,30NS,PRGM<br>156-6229-00,5064-30,PLCC44,TUBE (OPT 01 & 02) | TK0198    | 160966400        |
|                  | 136-1047-00           |                      |                       | *MOUNTING PARTS*<br>SOCKET,PLCC:PCB,44 POS,0.05 CTR,0.360 H X 0.125<br>TAILTIN                          | 80009     | 136-1047-00      |
|                  |                       |                      |                       | *END MOUNTING PARTS*                                                                                    |           |                  |
| A2U164           | 156-3637-00           |                      |                       | IC,DIGITAL:ACTCMOS,FLIP FLOP,HEX<br>D-TYPE,CLEAR,74ACT174,DIP16.3,TUBE                                  | 04713     | MC74ACT174N      |
| A2W151           | 131-4566-00           |                      |                       | BUS,CONDUCTOR:0 OHM,300 SPACING,SM BODY<br>MI,DUMMY RES                                                 | 91637     | FRJ-50           |
| A2W153           | 131-4566-00           |                      |                       | BUS,CONDUCTOR:0 OHM,300 SPACING,SM BODY<br>MI,DUMMY RES                                                 | 91637     | FRJ-50           |
| A2W154           | 131-4566-00           |                      |                       | BUS,CONDUCTOR:0 OHM,300 SPACING,SM BODY<br>MI,DUMMY RES                                                 | 91637     | FRJ-50           |
| A2Y1             | 119-3175-00           |                      |                       | OSCILLATOR:TCXO,14.31818 MHZ                                                                            | 82567     | 03-02155-002     |
| A3               | 671-1865-00           |                      |                       | CIRCUIT BD ASSY:TOP BNC                                                                                 | 80009     | 671-1865-00      |
| A3J401           | 131-3378-00           |                      |                       | CONN,RF JACK:                                                                                           | 00779     | 227677-1         |
| A3J402           | 131-5223-00           |                      |                       | CONN,CIRC::PCB,MINI DIN,FEMALE,RTANG,4<br>POS,0.503 H X 0.137 TAIL,SILVER                               | 0H1N4     | MRP4FS           |
| A3J403           | 131-3378-00           |                      |                       | CONN,RF JACK:                                                                                           | 00779     | 227677-1         |
| A3J404           | 131-3378-00           |                      |                       | CONN,RF JACK:                                                                                           | 00779     | 227677-1         |
| A3J405           | 174-2512-00           |                      |                       | CA ASSY,SP,ELEC:16,28 AWG,1.8L,RIBBON                                                                   | 80009     | 174-2512-00      |
| A4               | 671-1866-00           |                      |                       | CIRCUIT BD ASSY:BOTTOM BNC                                                                              | 80009     | 671-1866-01      |
| A4J501           | 131-3378-00           |                      |                       | CONN,RF JACK                                                                                            | 00779     | 227677-1         |
| A4J502           | 131-3378-00           |                      |                       | CONN,RF JACK                                                                                            | 00779     | 227677-1         |
| A4J503           | 131-3378-00           |                      |                       | CONN,RF JACK                                                                                            | 00779     | 227677-1         |
| A4J504           | 131-3378-00           |                      |                       | CONN,RF JACK                                                                                            | 00779     | 227677-1         |
| A4J505           | 131-3378-00           |                      |                       | CONN,RF JACK                                                                                            | 00779     | 227677-1         |
| A4J506           | 131-3378-00           |                      |                       | CONN,RF JACK                                                                                            | 00779     | 227677-1         |
| A4W4             | 174-2337-01           |                      |                       | CA ASSY,SP,ELEC:3.0L,10.28 AWG,1.6L,RIBBON<br>(CONNECTED FROM A2J4 TO A4J505)                           | 80009     | 174-2337-01      |



# Diagrams/Circuit Board Illustrations



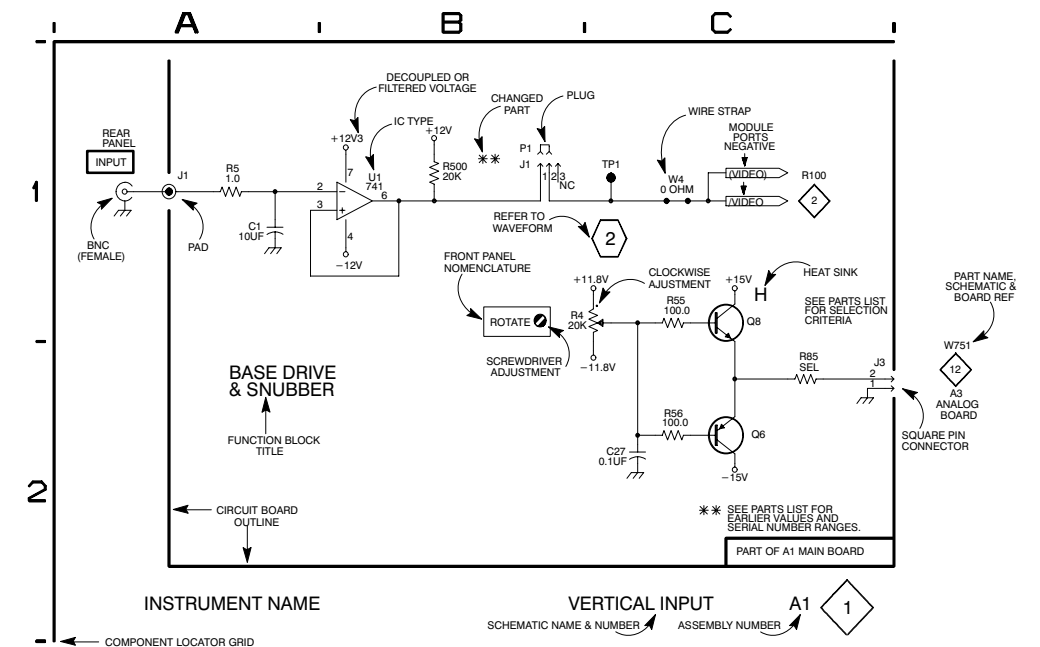
## Symbols

## Component Values

Resistors = Ohms ( $\Omega$ ).

## Assembly Numbers

## Grid Coordinates



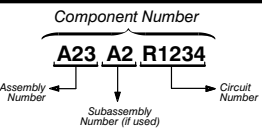
FRONT PANEL BD.  
SCHEMATIC  
DIAGRAM <1>  
LOOK-UP CHART

The schematic diagram has an alpha-numeric grid to assist in locating parts within that diagram. The etched circuit boards follow a numbering sequence starting with the lowest number at the upper left corner, as pictured in this manual.

ASSEMBLY A1

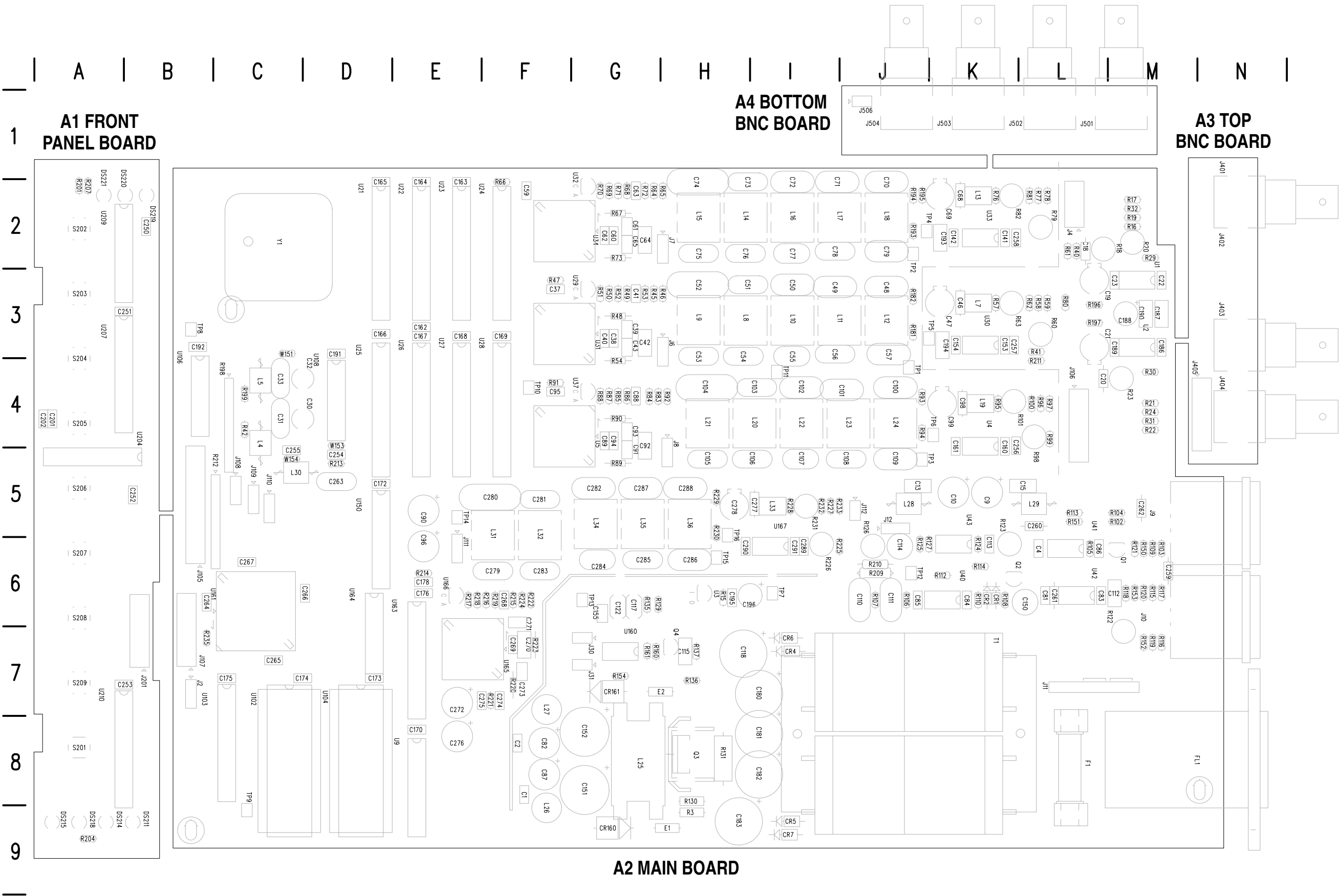
| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION |
|-------------------|-------------------|-------------------|
| C201              | B2                | A5                |
| C202              | B2                | A5                |
| C250              | A5                | A2                |
| C251              | B5                | A3                |
| C252              | B5                | A5                |
| C253              | B5                | A7                |
| DS220             | G2                | A1                |
| DS221             | G3                | A1                |
| J201              | A1                | B7                |
| R201              | G4                | A2                |
| R207              | G2                | A2                |
| S202A             | C4                | A2                |
| S202B             | C4                | A2                |
| S203A             | C4                | A3                |
| S203B             | C4                | A3                |
| S204A             | D4                | A4                |
| S204B             | D4                | A4                |
| S205A             | D4                | A4                |
| S205B             | D4                | A4                |
| S206A             | E4                | A5                |
| S206B             | E4                | A5                |
| S207A             | F4                | A6                |
| S207B             | F4                | A6                |
| S208A             | F4                | A6                |
| S208B             | F4                | A6                |
| S209A             | G4                | A7                |
| S209B             | G4                | A7                |
| U204              | B1                | A5                |
| U207              | E2                | A4                |
| U209              | B4                | A3                |
| U210              | D1                | A8                |

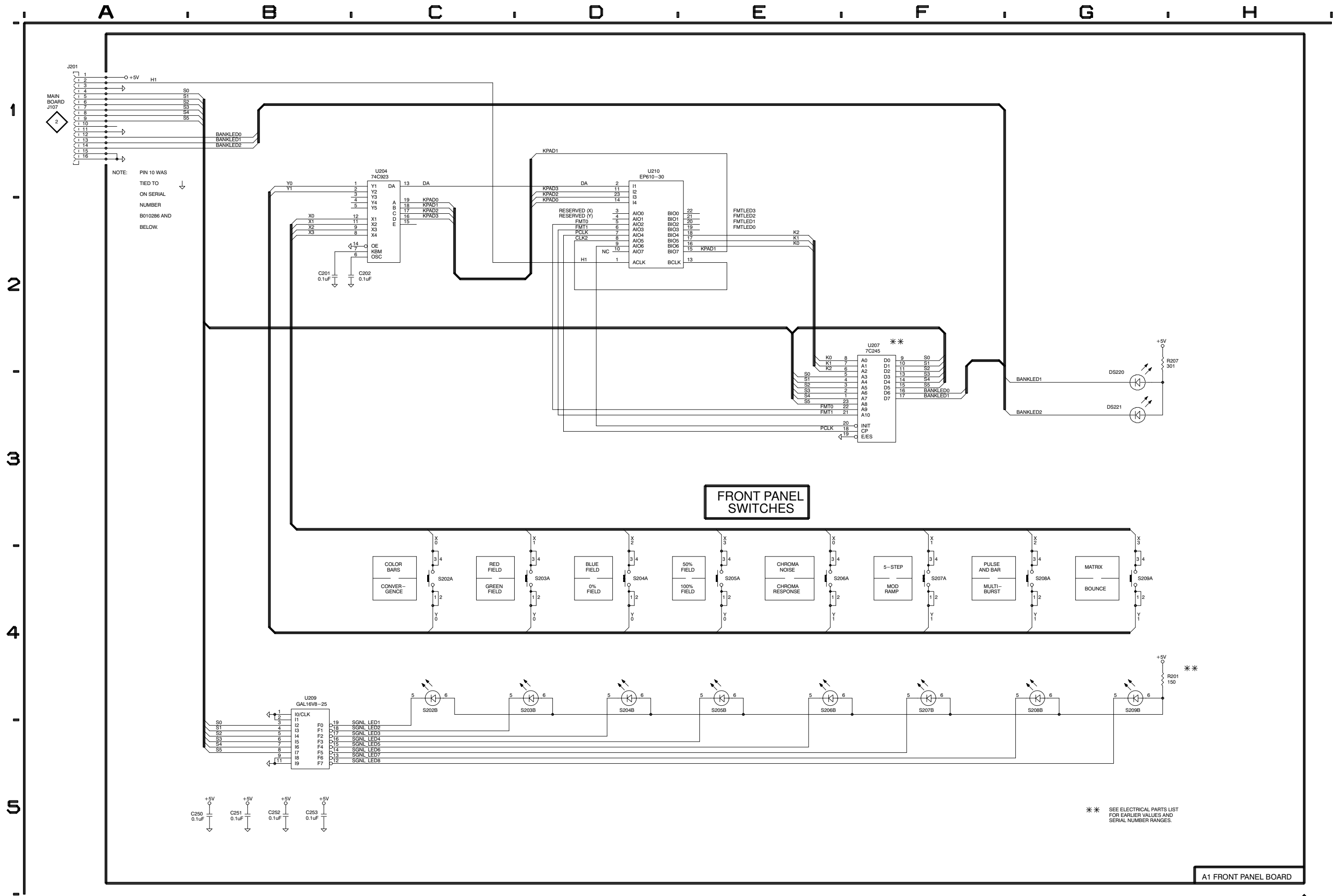
COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

STATIC  
SENSITIVE  
DEVICES





MAIN BOARD  
SCHEMATIC DIAGRAM <2>

LOOK-UP CHART

The schematic diagram has an alpha-numeric grid to assist in locating parts within that diagram. The etched circuit boards follow a numbering sequence starting with the lowest number at the upper left corner, as pictured in this manual.

**ASSEMBLY A2.** Partial Assembly A2 also shown on Schematic Diagrams 3, 4, 5, 6, and 7.

| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION |
|-------------------|-------------------|-------------------|
| C30               | F5                | C4                |
| C31               | F5                | C4                |
| C32               | F5                | C4                |
| C33               | F5                | C4                |
| C191              | G5                | D4                |
| C192              | D5                | B3                |
| C254              | F5                | D5                |
| C255              | G5                | C5                |
| C263              | F4                | D5                |
| C264              | B3                | B6                |
| C265              | B3                | C7                |
| C266              | B3                | D6                |
| C267              | B3                | C6                |
| J2                | E2                | B7                |
| J105              | A2                | B5                |
| J107              | A1                | B7                |
| J108              | D2                |                   |
| L4                | E5                | C4                |
| L5                | E5                | C4                |
| L30               | F5                | C5                |
| R42               | E5                | C4                |
| R198              | E5                | C4                |
| R199              | E5                | C4                |
| R212A             | D2                | B5                |
| R212B             | D3                | B5                |
| R212C             | E3                | B5                |
| R212D             | B2                | B5                |
| R212E             | A2                | B5                |
| R212F             | F2                | B5                |
| R212G             | E1                | B5                |
| R213              | F4                | D5                |
| R235              | C1                | B7                |
| U103              | F1                | D8                |
| U106              | D5                | B4                |
| U108              | G5                | D4                |
| U161              | C2                | D8                |
| W151              | D4                | C4                |
| W153              | D4                | D5                |
| W154              | E3                | C5                |
| Y1                | C4                | C2                |



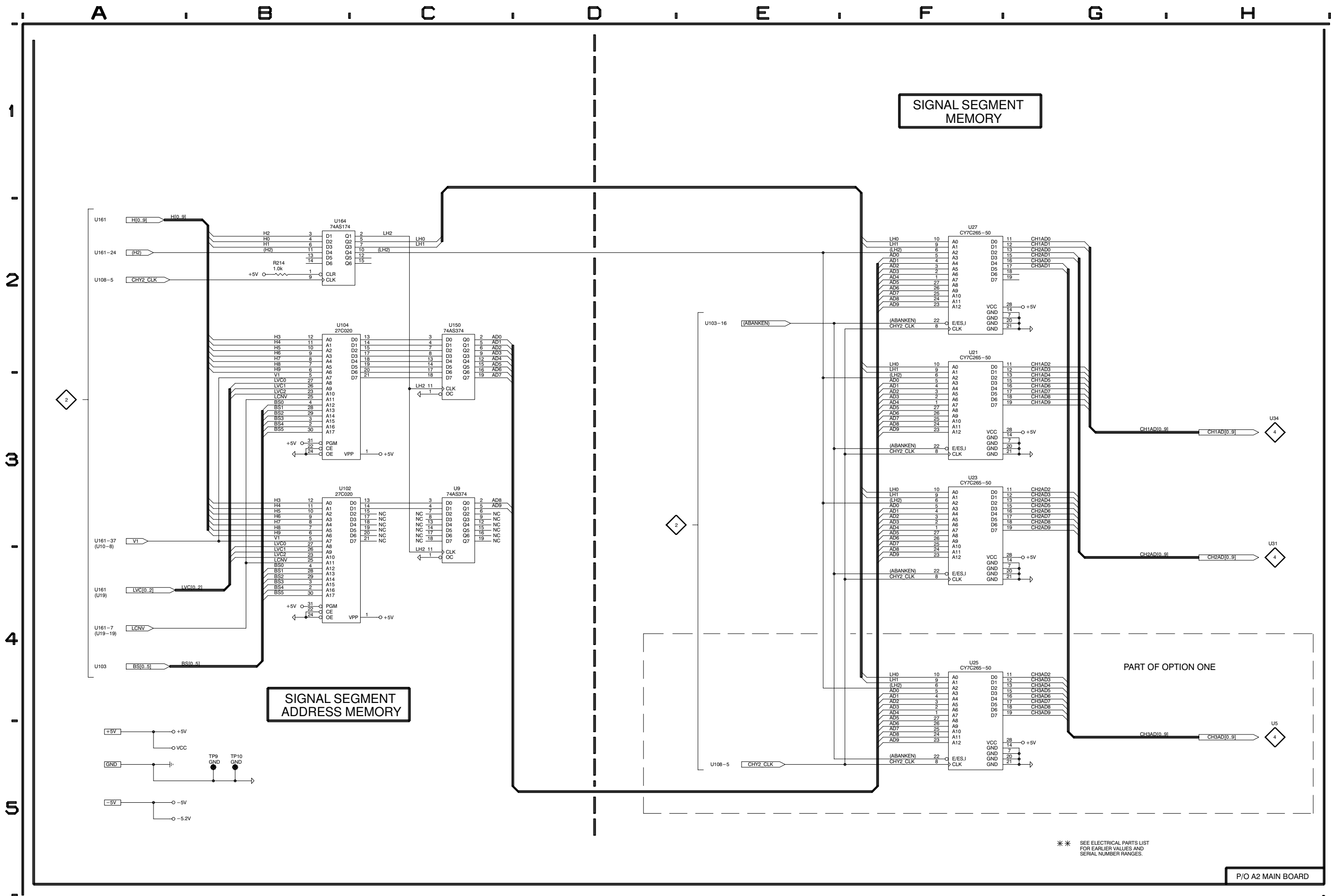
MAIN BOARD  
SCHEMATIC DIAGRAM  
< 3 > LOOK-UP CHART

The schematic diagram has an alpha-numeric grid to assist in locating parts within that diagram. The etched circuit boards follow a numbering sequence starting with the lowest number at the upper left corner, as pictured in this manual.

**ASSEMBLY A2.** *Partial Assembly A2 also shown on Schematic Diagrams 2, 4, 5, 6, and 7.*

| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION |
|-------------------|-------------------|-------------------|
| R214 *            | B2                | E6                |
| U9                | C3                | E6                |
| U14 *             | B2                | D5                |
| U21               | F2                | D2                |
| U23               | F3                | E2                |
| U25               | F4                | D4                |
| U27               | F2                | E4                |
| U102              | B3                | C7                |
| U104              | B2                | C6                |
| U150              | C2                | D5                |
| U164 *            | B2                | D6                |

\*See Parts List for serial number ranges.



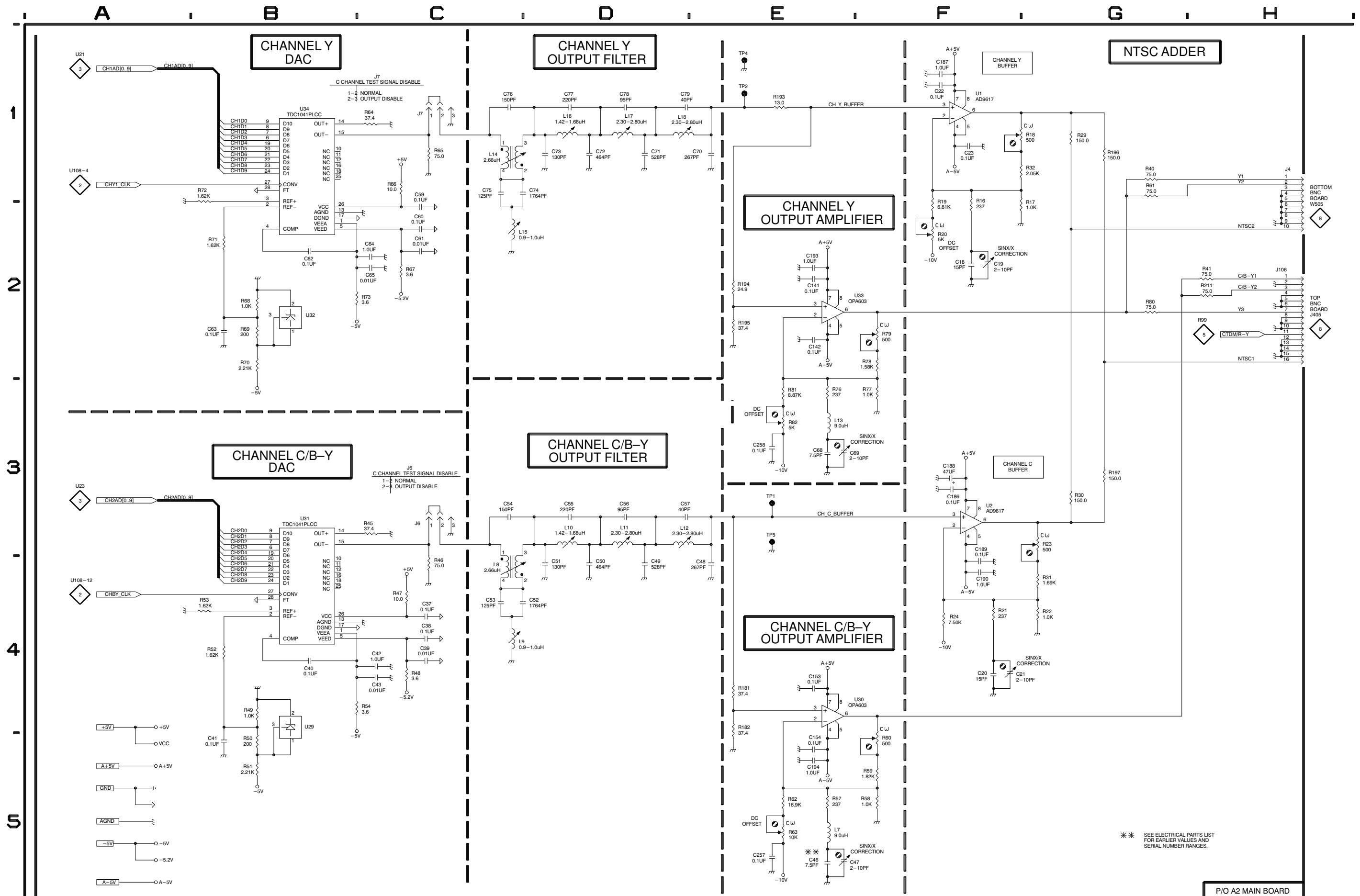
MAIN BOARD  
SCHEMATIC DIAGRAM <4> LOOK-UP CHART

The schematic diagram has an alpha-numeric grid to assist in locating parts within that diagram. The etched circuit boards follow a numbering sequence starting with the lowest number at the upper left corner, as pictured in this manual.

ASSEMBLY A2. Partial Assembly A2 also shown on Diagrams 2, 3, 5, 6, and 7.

| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| C18               | F2                | L2                | C190              | F4                | M3                | R64               | C1                | G2                |
| C19               | F2                | L3                | C193              | E2                | K2                | R65               | C1                | H2                |
| C20               | F4                | L4                | C194              | E5                | K3                | R66               | C1                | F2                |
| C21               | F4                | L3                |                   |                   |                   | R67               | C2                | G2                |
| C22               | F1                | M3                | J4                | H1                | L2                | R68               | B2                | G2                |
|                   |                   |                   | J6                | C3                | H3                |                   |                   |                   |
| C23               | F1                | M3                | J7                | C1                | H2                | R69               | B2                | G2                |
| C37               | C4                | F3                | J106              | H2                | L4                | R70               | B2                | G2                |
| C38               | C4                | G3                |                   |                   |                   | R71               | B2                | G2                |
| C39               | C4                | G3                | L7                | E5                | K3                | R72               | B1                | G2                |
| C40               | B4                | G3                | L8                | C4                | H3                | R73               | B2                | G2                |
|                   |                   |                   | L9                | C4                | H3                |                   |                   |                   |
| C41               | B5                | G3                | L10               | D3                | I3                | R76               | E3                | K2                |
| C42               | C4                | G3                | L11               | D3                | I3                | R77               | F3                | L2                |
| C43               | C4                | G3                |                   |                   |                   | R78               | F2                | L2                |
| C46               | E5                | K3                | L12               | D3                | J3                | R79               | F2                | L2                |
| C47               | E5                | K3                | L13               | E3                | K2                | R80               | G2                | L2                |
|                   |                   |                   | L14               | C1                | H2                |                   |                   |                   |
| C48               | E4                | J3                | L15               | C2                | H2                | R81               | E3                | L2                |
| C49               | D4                | I3                | L16               | D1                | I2                | R82               | E3                | K2                |
| C50               | D4                | I3                |                   |                   |                   | R181              | E4                | J3                |
| C51               | D4                | H3                | L17               | D1                | I2                | R182              | E4                | J3                |
| C52               | C4                | H3                | L18               | D1                | J2                | R194              | E2                | J2                |
|                   |                   |                   |                   |                   |                   |                   |                   |                   |
| C53               | C4                | H3                | R16               | F1                | M2                | R195              | E2                | J2                |
| C54               | C3                | H3                | R17               | F1                | M2                | R196              | G1                | L3                |
| C55               | D3                | I3                | R18               | F1                | L2                | R197              | G3                | L3                |
| C56               | D3                | I3                | R19               | F1                | M2                | R211              | H2                | L4                |
| C57               | D3                | J3                | R20               | F2                | M2                |                   |                   |                   |
|                   |                   |                   |                   |                   |                   | TP1               | E3                | J4                |
| C59               | C2                | F2                | R21               | F4                | M4                | TP2               | E1                | J2                |
| C60               | C2                | G2                | R22               | G4                | M4                | TP4               | E1                | K2                |
| C61               | C2                | G2                | R23               | G3                | M4                | TP5               | E3                | K3                |
| C62               | B2                | G2                | R24               | F4                | M4                |                   |                   |                   |
| C63               | B2                | G2                | R29               | G1                | M2                |                   |                   |                   |
|                   |                   |                   |                   |                   |                   | U1                | F1                | M3                |
| C64               | C2                | G2                | R30               | G3                | M4                | U2                | F3                | M3                |
| C65               | C2                | G2                | R31               | G4                | M4                | U29               | B4                | G3                |
| C68               | E3                | K2                | R32               | F1                | M2                | U30               | E4                | K3                |
| C69               | E3                | K2                | R40               | G1                | L2                |                   |                   |                   |
| C70               | E1                | J2                | R41               | F4                | L4                | U31               | B3                | F3                |
|                   |                   |                   |                   |                   |                   | U32               | B2                | G2                |
| C71               | D1                | I2                | R45               | C3                | G3                | U33               | E2                | K2                |
| C72               | D1                | I2                | R46               | C4                | H3                | U34               | B1                | F2                |
| C73               | D1                | H2                | R47               | C4                | F3                |                   |                   |                   |
| C74               | C1                | H2                | R48               | C4                | G3                |                   |                   |                   |
| C75               | C1                | H2                | R49               | B4                | G3                |                   |                   |                   |
|                   |                   |                   |                   |                   |                   |                   |                   |                   |
| C76               | C1                | H2                | R50               | B5                | G3                |                   |                   |                   |
| C77               | D1                | I2                | R51               | B5                | G3                |                   |                   |                   |
| C78               | D1                | I2                | R52               | B4                | G3                |                   |                   |                   |
| C79               | D1                | J2                | R53               | B4                | G3                |                   |                   |                   |
| C141              | E2                | K2                | R54               | B4                | G4                |                   |                   |                   |
|                   |                   |                   |                   |                   |                   |                   |                   |                   |
| C142              | E2                | K2                | R57               | E5                | K3                |                   |                   |                   |
| C153              | E4                | K3                | R58               | F5                | L3                |                   |                   |                   |
| C154              | E5                | K3                | R59               | F5                | L3                |                   |                   |                   |
| C186              | F3                | M3                | R60               | F4                | L3                |                   |                   |                   |
| C187              | F1                | M3                | R61               | G1                | L2                |                   |                   |                   |
|                   |                   |                   |                   |                   |                   |                   |                   |                   |
| C188              | F3                | M3                | R62               | E5                | L3                |                   |                   |                   |
| C189              | F4                | M3                | R63               | E5                | K3                |                   |                   |                   |

\* See parts list for serial number ranges.



MAIN BOARD  
SCHEMATIC DIAGRAM <5>  
LOOK-UP CHART

The schematic diagram has an alpha-numeric grid to assist in locating parts within that diagram. The etched circuit boards follow a numbering sequence starting with the lowest number at the upper left corner, as pictured in this manual.

**ASSEMBLY A2.** *Partial Assembly A2 also shown on Diagrams 2, 3, 4, 6, and 7.*

| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| C88               | B4                | G4                | R83               | C3                | H4                |
| C89               | B3                | G4                | R84               | B3                | G4                |
| C90               | C4                | G5                | R85               | B3                | G4                |
| C91               | C4                | G5                | R86               | B4                | G4                |
| C92               | C4                | G4                | R87               | B4                | G4                |
| C93               | C3                | G4                | R88               | B4                | G4                |
| C94               | C3                | G4                | R89               | C4                | G5                |
| C95               | C3                | F4                | R90               | C3                | G4                |
| C96               | C3                | G4                | R91               | C3                | F4                |
| C98               | G3                | K4                | R92               | C3                | H4                |
| C99               | G3                | K4                | R93               | F3                | J4                |
| C100              | E3                | J4                | R94               | F3                | J4                |
| C101              | E3                | J4                | R95               | G3                | K4                |
| C102              | E3                | I4                | R96               | G3                | L4                |
| C103              | D3                | I4                | R97               | G3                | L4                |
| C104              | D3                | H4                | R98               | G3                | L4                |
| C105              | D3                | H5                | R99               | G3                | L5                |
| C106              | D3                | I5                | R100              | F3                | L4                |
| C107              | D3                | I5                | R101              | F3                | K4                |
| C108              | E3                | J5                | TP3               | E2                | J5                |
| C109              | E3                | J5                | TP6               | E2                | K4                |
| C160              | G2                | K4                | U4                | G3                | K5                |
| C161              | G3                | K4                | U5                | B3                | F4                |
| J8                | C3                | H5                | U37               | B4                | G4                |
| L19               | G3                | K4                |                   |                   |                   |
| L20               | D3                | I4                |                   |                   |                   |
| L21               | D3                | H4                |                   |                   |                   |
| L22               | D3                | I4                |                   |                   |                   |
| L23               | E3                | J4                |                   |                   |                   |
| L24               | E3                | J4                |                   |                   |                   |



MAIN BOARD  
SCHEMATIC DIAGRAM < 6 >  
LOOK-UP CHART

The schematic diagram has an alpha-numeric grid to assist in locating parts within that diagram. The etched circuit boards follow a numbering sequence starting with the lowest number at the upper left corner, as pictured in this manual.

ASSEMBLY A2. Partial Assembly A2 also shown on Diagrams 2, 3, 4, 5, and 7.

| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| C4                | E4                | L6                | R110              | C2                | K6                |
| C81               | E2                | L6                |                   |                   |                   |
| C83               | E2                | L6                | R112              | C2                | K6                |
| C84               | B2                | K6                | R113              | E3                | L5                |
| C85               | B2                | J6                | R114              | B2                | K6                |
|                   |                   |                   |                   |                   |                   |
| C86               | E3                | L6                | R115              | F2                | M6                |
| C110              | B2                | J6                | R116              | F2                | M7                |
| C111              | B1                | J6                | R117              | G2                | M6                |
| C112              | D2                | M6                | R118              | D2                | M6                |
| C113              | D4                | K6                | R119              | F2                | M7                |
|                   |                   |                   |                   |                   |                   |
| C114              | C4                | J6                | R120              | E1                | M6                |
| C150              | B2                | L6                | R121              | D3                | M6                |
| C184              | F4                | L6                | R122              | E1                | M7                |
| C185              | F2                | L6                | R123              | E3                | K6                |
|                   |                   |                   | R124              | D4                | K6                |
| CR1               | C2                | K6                |                   |                   |                   |
| CR2               | C2                | K6                | R125              | C4                | J6                |
|                   |                   |                   | R126              | C3                | J6                |
| J9                | H4                | M5                | R127              | C4                | J6                |
| J10               | H2                | M6                | R150              | F4                | M6                |
| J12               | B3                | J5                | R151              | E3                | L5                |
|                   |                   |                   |                   |                   |                   |
| Q1                | D4                | M6                | R152              | F2                | M7                |
| Q2                | B2                | K6                | R153              | E2                | M6                |
|                   |                   |                   |                   |                   |                   |
| R102              | F4                | M5                | U40A              | B2                | K6                |
| R103              | F4                | M6                | U40B              | C2                | K6                |
| R104              | G4                | M5                | U41A              | E3                | L6                |
| R105              | D4                | L6                | U41B              | F4                | L6                |
| R106              | B2                | J6                | U42A              | E2                | L6                |
|                   |                   |                   |                   |                   |                   |
| R107              | B1                | J6                | U42B              | F2                | L6                |
| R108              | B2                | K6                | U43               | C4                | K6                |
| R109              | F4                | M6                |                   |                   |                   |

\* See parts list for serial number ranges.

A B C D E F G H

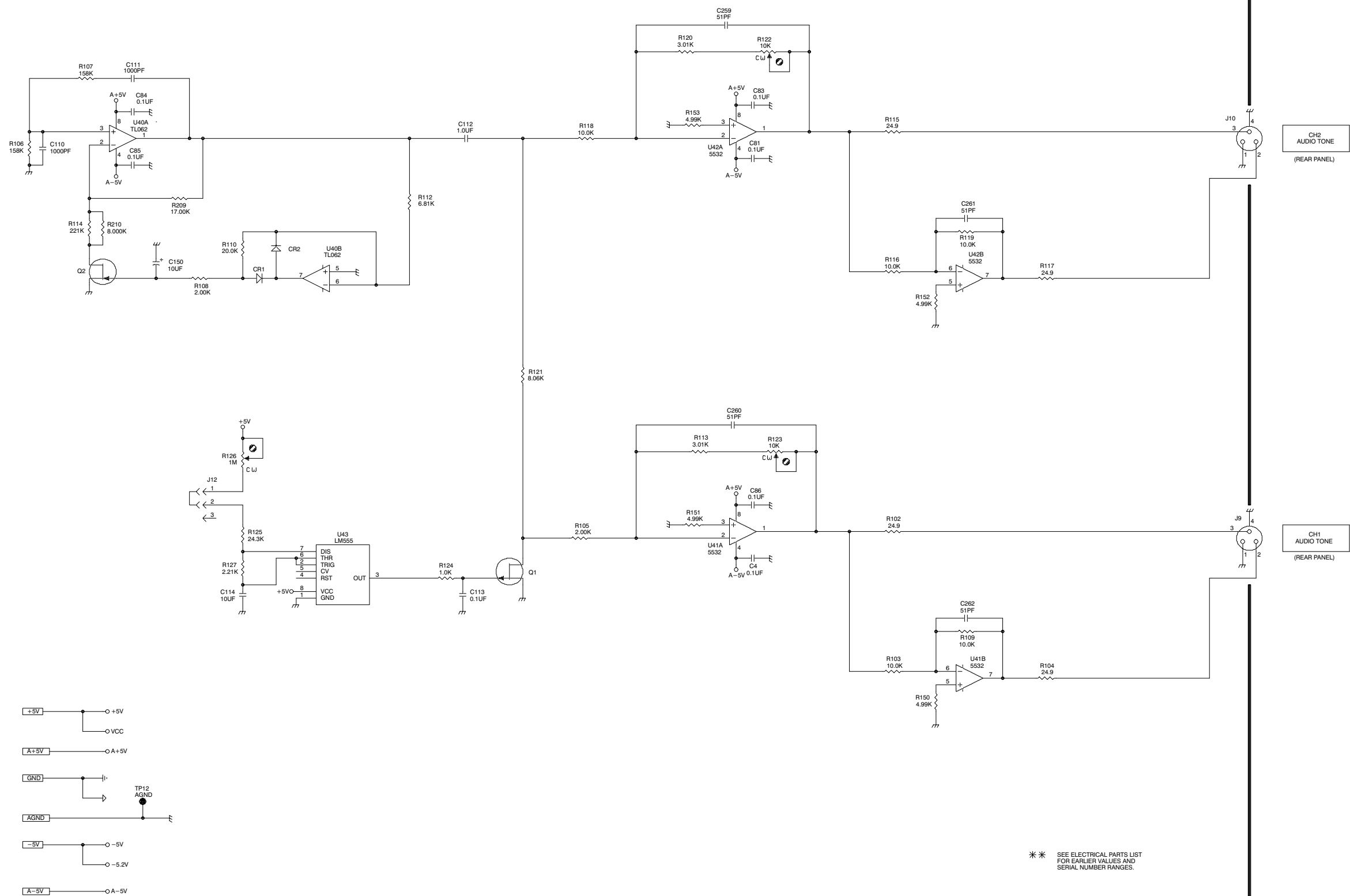
1

2

3

4

5



P/O A2 MAIN BOARD

TSG 120

AUDIO TONE

A2

6

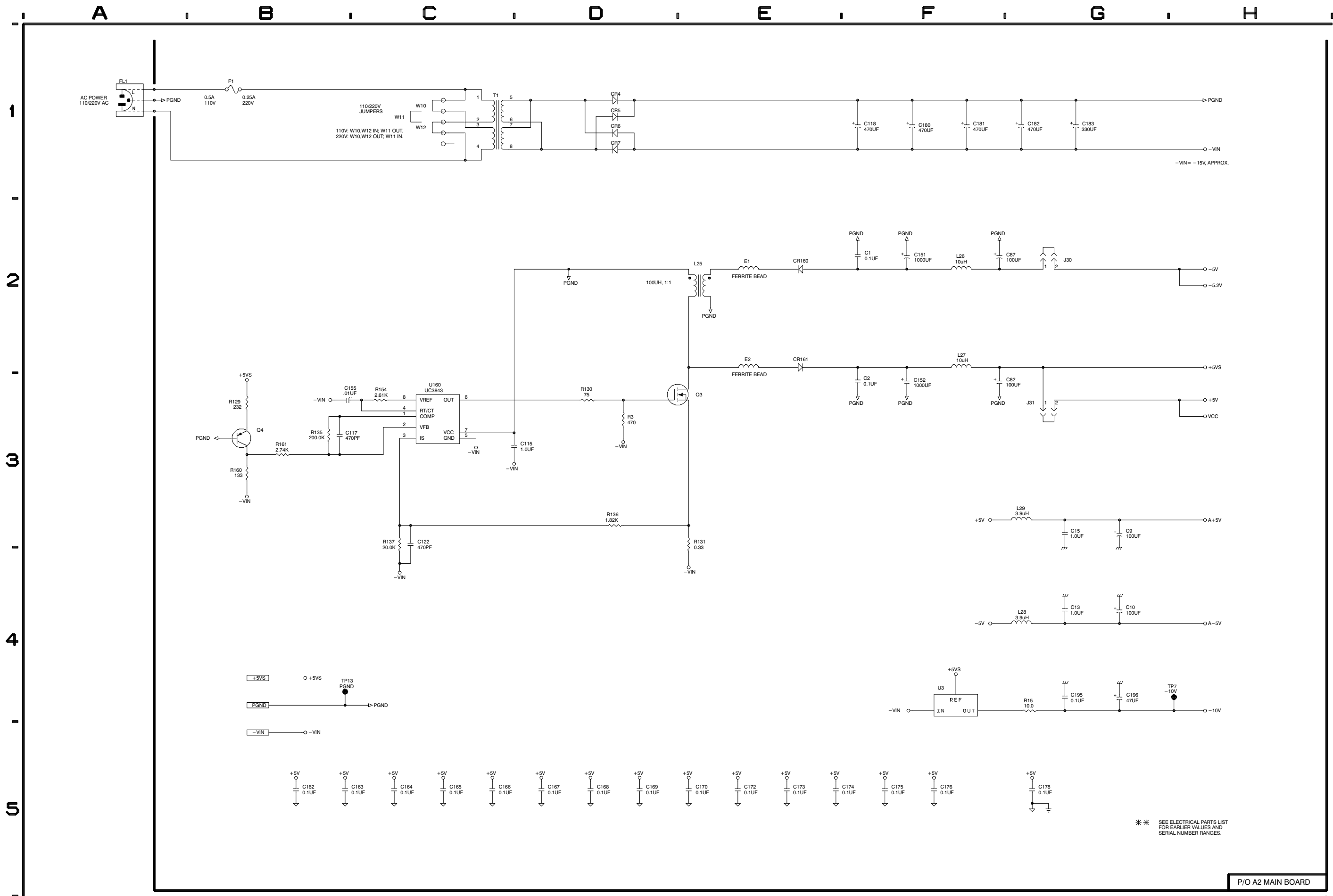
MAIN BOARD  
SCHEMATIC DIAGRAM <7>  
LOOK-UP CHART

The schematic diagram has an alpha-numeric grid to assist in locating parts within that diagram. The etched circuit boards follow a numbering sequence starting with the lowest number at the upper left corner, as pictured in this manual.

**ASSEMBLY A2.** *Partial Assembly A2 also shown on Diagrams 2, 3, 4, 5, and 6.*

| CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION | CIRCUIT<br>NUMBER | SCHEM<br>LOCATION | BOARD<br>LOCATION |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| C9                | G3                | K5                | F1                | B1                | L8                |
| C10               | G4                | K5                |                   |                   |                   |
| C13               | G4                | J5                | FL1               | A1                | M8                |
| C15               | G3                | L5                |                   |                   |                   |
| C82               | F3                | F8                | J11               | C1                | L7                |
|                   |                   |                   | J30               | G2                | G7                |
| C87               | F2                | F8                | J31               | G3                | G7                |
| C115              | C3                | H7                |                   |                   |                   |
| C117              | B3                | G6                | L25               | E2                | H8                |
| C118              | F1                | H7                | L26               | F2                | F9                |
| C122              | C3                | G6                | L27               | F2                | F7                |
|                   |                   |                   |                   |                   |                   |
| C151              | F2                | G8                | Q3                | D3                | H8                |
| C152              | F3                | G8                | Q4                | B3                | H7                |
| C155              | B3                | G6                |                   |                   |                   |
| C162              | B5                | E3                | R3                | D3                | H9                |
| C163              | B5                | E2                | R129              | B3                | G6                |
|                   |                   |                   | R130              | D3                | H9                |
| C164              | C5                | E2                | R131              | E3                | H7                |
| C165              | C5                | D2                | R135              | B3                | G6                |
| C166              | C5                | D3                |                   |                   |                   |
| C167              | D5                | E3                | R136              | D3                | H7                |
| C168              | D5                | E3                | R137              | C3                | H7                |
|                   |                   |                   | R154              | C3                | G7                |
| C169              | D5                | F3                | R160              | B3                | G7                |
| C170              | E5                | E5                | R161              | B3                | G7                |
| C172              | E5                | C5                |                   |                   |                   |
| C173              | E5                | C5                | T1                | C1                | J8                |
| C174              | E5                | C7                |                   |                   |                   |
|                   |                   |                   | U3                | F4                | H7                |
| C175              | F5                | D8                | U160              | C3                | G7                |
| C176              | F5                | E8                |                   |                   |                   |
| C177              | F5                | E6                |                   |                   |                   |
| C178              | G5                | E8                |                   |                   |                   |
| C180              | F1                | I7                |                   |                   |                   |
|                   |                   |                   |                   |                   |                   |
| C181              | F1                | I8                |                   |                   |                   |
| C182              | G1                | I8                |                   |                   |                   |
| C183              | G1                | H9                |                   |                   |                   |
| C195              | G4                | H7                |                   |                   |                   |
| C196              | G4                | H7                |                   |                   |                   |
|                   |                   |                   |                   |                   |                   |
| CR4               | D1                | I7                |                   |                   |                   |
| CR5               | D1                | I9                |                   |                   |                   |
| CR6               | D1                | I7                |                   |                   |                   |
|                   |                   |                   |                   |                   |                   |
| CR7               | D1                | I9                |                   |                   |                   |
| CR160             | E2                | G9                |                   |                   |                   |
| CR161             | E2                | G7                |                   |                   |                   |

\*See Parts List for serial number ranges.

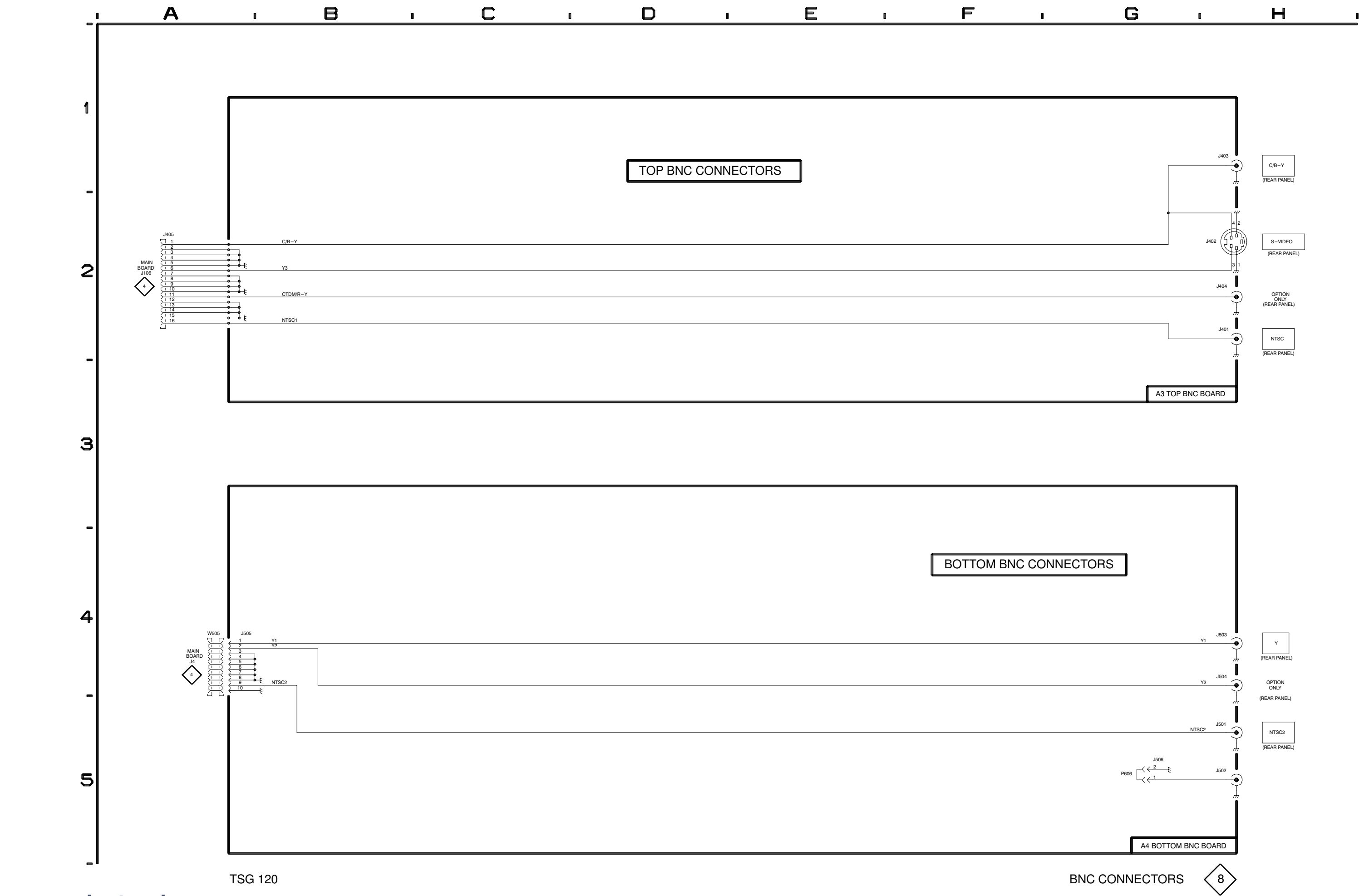


**BNC BOARDS  
SCHEMATIC DIAGRAM  
<8> LOOK-UP CHART**

The schematic diagram has an alpha-numeric grid to assist in locating parts within that diagram. The etched circuit boards follow a numbering sequence starting with the lowest number at the upper left corner, as pictured in this manual.

**ASSEMBLIES A3 AND A4**

| CIRCUIT<br>NUMBER   | SCHEM<br>LOCATION | BOARD<br>LOCATION |
|---------------------|-------------------|-------------------|
| A4 BOTTOM BNC BOARD |                   |                   |
| J501                | H5                | M1                |
| J502                | H5                | L1                |
| J503                | H4                | K1                |
| J504                | H4                | J1                |
| J505                | A4                | M1                |
| J506                | G5                | L1                |
| A3 TOP BNC BOARD    |                   |                   |
| J401                | H2                | N2                |
| J402                | H2                | N3                |
| J403                | H1                | N3                |
| J404                | H2                | N4                |
| J405                | A2                | N4                |







# **Replaceable Mechanical Parts**



# Replaceable Mechanical Parts

This section contains a list of the replaceable mechanical components for the TSG 120 YC/NTSC Signal Generator. Use this list to identify and order replacement parts.

## Parts Ordering Information

Replacement parts are available through your local Tektronix field office or representative.

Changes to Tektronix products are sometimes made to accommodate improved components as they become available and to give you the benefit of the latest improvements. Therefore, when ordering parts, it is important to include the following information in your order:

- Part number
- Instrument type or model number
- Instrument serial number
- Instrument modification number, if applicable

If you order a part that has been replaced with a different or improved part, your local Tektronix field office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

## Using the Replaceable Mechanical Parts List

The tabular information in the Replaceable Mechanical Parts List is arranged for quick retrieval. Understanding the structure and features of the list will help you find all of the information you need for ordering replacement parts. The following table describes the content of each column in the parts list.

### Parts list column descriptions

| Column  | Column name           | Description                                                                                                                                                                                                                    |
|---------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | Figure & index number | Items in this section are referenced by figure and index numbers to the exploded view illustrations that follow.                                                                                                               |
| 2       | Tektronix part number | Use this part number when ordering replacement parts from Tektronix.                                                                                                                                                           |
| 3 and 4 | Serial number         | Column three indicates the serial number at which the part was first effective. Column four indicates the serial number at which the part was discontinued. No entry indicates the part is good for all serial numbers.        |
| 5       | Qty                   | This indicates the quantity of parts used.                                                                                                                                                                                     |
| 6       | Name & description    | An item name is separated from the description by a colon (:). Because of space limitations, an item name may sometimes appear as incomplete. Use the U.S. Federal Catalog handbook H6-1 for further item name identification. |
| 7       | Mfr. code             | This indicates the code of the actual manufacturer of the part.                                                                                                                                                                |
| 8       | Mfr. part number      | This indicates the actual manufacturer's or vendor's part number.                                                                                                                                                              |

**Abbreviations**      Abbreviations conform to American National Standard ANSI Y1.1–1972.

**Chassis Parts**      Chassis-mounted parts and cable assemblies are located at the end of the Replaceable Electrical Parts List.

**Mfr. Code to Manufacturer Cross Index**      The table titled Manufacturers Cross Index shows codes, names, and addresses of manufacturers or vendors of components listed in the parts list.

**Manufacturers cross index**

| <b>Mfr.<br/>code</b> | <b>Manufacturer</b>               | <b>Address</b>                        | <b>City, state, zip code</b> |
|----------------------|-----------------------------------|---------------------------------------|------------------------------|
| 80009                | TEKTRONIX, INC.                   | P.O. BOX 500                          | BEAVERTON, OR, 97077-0001    |
| 01536                | TEXTRON INC                       | 1818 CHRISTINA ST                     | ROCKFORD, IL 61108           |
| 01KV9                | MERIX CORP                        | 1521 POPLAR LANE<br>PO BOX 3000       | FOREST GROVE, OR 97116       |
| 07416                | NELSON NAME PLATE COMPANY         | 3191 CASITAS AVENUE                   | LOS ANGELES, CA 90039-2410   |
| 0B445                | ELECTRI-CORD MFG CO INC           | 312 EAST MAIN STREET                  | WESTFIELD, PA 16950          |
| 0J7N4                | ARCHERS PRECISION SHEET METAL INC | 12700 SW HALL #A                      | TIGARD, OR 97223             |
| 0KB01                | STAUFFER SUPPLY CO                | 810 SE SHERMAN                        | PORTLAND, OR 97214-4657      |
| 0KBZ5                | Q & D PLASTICS INC                | 1812 - 16TH AVENUE<br>PO BOX 487      | FOREST GROVE, OR 97116-0487  |
| 52152                | 3M COMPANY                        | INDUSTRIAL TAPE DIVISION<br>3M CENTER | ST PAUL, MN 55144-1000       |
| 73743                | FISCHER SPECIAL MFG CO            | 111 INDUSTRIAL RD<br>PO BOX 76500     | COLD SPRINGS, KY 41076       |
| 80009                | TEKTRONIX INC                     | 14150 SW KARL BRAUN DR<br>PO BOX 500  | BEAVERTON, OR 97077-0001     |
| 93907                | CAMCAR DIV OF TEXTRON INC         | ATTN: ALICIA SANFORD<br>516 18TH AVE  | ROCKFORD, IL 611045181       |
| TK0435               | LEWIS SCREW CO.                   | 4300 SOUTH RACINE AVENUE              | CHICAGO, IL 60609            |
| TK1295               | DAVIS TOOL INC                    | 215 SW WOOD STREET                    | HILLSBORO, OR 97123          |
| TK1547               | MOORE ELECTRONICS INC             | 19500 SW 90TH CT<br>PO BOX 1030       | TUALATIN, OR 97062           |
| TK1943               | NEILSEN MANUFACTURING INC         | 3501 PORTLAND RD NE                   | SALEM, OR 97303              |
| TK2548               | XEROX CORPORATION                 | 14181 SW MILLIKAN WAY                 | BEAVERTON, OR 97005          |

## Replaceable electrical parts list

| Component number | Tektronix part number | Serial no. effective | Serial no. discont'd | Qty | Name & description                                                              | Mfr. code | Mfr. part number        |
|------------------|-----------------------|----------------------|----------------------|-----|---------------------------------------------------------------------------------|-----------|-------------------------|
| -1               | 200-3898-01           |                      |                      | 1   | COVER,TOP:TSG131A<br>*MOUNTING PARTS*                                           | TK1943    | 200-3898-01             |
| -2               | 211-0119-00           |                      |                      | 8   | SCREW,MACHINE:4-40 X 0.25,FLH,100 DEG,STL BK<br>OXD POZ<br>*END MOUNTING PARTS* | 93907     | ORDER BY<br>DESCRIPTION |
| -3               | 426-2420-01           |                      |                      | 1   | FRAME,FRONT:ALUMINUM<br>*MOUNTING PARTS*                                        | 80009     | 426-2420-01             |
| -4               | 211-0119-00           |                      |                      | 2   | SCREW,MACHINE:4-40 X 0.25,FLH,100 DEG,STL BK<br>OXD POZ<br>*END MOUNTING PARTS* | 93907     | ORDER BY<br>DESCRIPTION |
| -5               | _____                 |                      |                      |     | CIRCUIT BD ASSY:FRONT PANEL<br>(SEE A1 REPL)<br>*MOUNTING PARTS*                |           |                         |
| -6               | 211-0244-00           |                      |                      | 4   | SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL<br>(OPTION 02 ONLY)                         | 01536     | 821-02775               |
|                  | 129-1411-00           |                      |                      | 1   | SPACER,POST:0.280 X 0.200,ABS<br>(OPTION 02 ONLY)<br>*END MOUNTING PARTS*       |           |                         |
| -7               | 333-3910-00           |                      |                      | 1   | PANEL,FRONT:TSG120<br>(STANDARD,OPTION 02 ONLY)                                 | 07416     | 333-3910-00             |
|                  | 333-4090-00           |                      |                      | 1   | PANEL,FRONT:TSG120 OPT 02<br>(OPTION 02 ONLY)                                   | 80009     | 333-4090-00             |
| -8               | _____                 |                      |                      |     | CIRCUIT BD ASSY:MAIN<br>(SEE A2 REPL)<br>*MOUNTING PARTS*                       |           |                         |
| -9               | 211-0244-00           |                      |                      | 6   | SCR,ASSEM WSHR:4-40 X 0.312,PNH                                                 | 01536     | 821-02775               |
| -10              | 211-0025-00           |                      |                      | 2   | SCREW,MACHINE:4-40 X 0.375,FLH,100 DEG                                          | TK0435    | ORDER BY<br>DESCRIPTION |
| -11              | 210-0586-00           |                      |                      | 2   | NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL<br>*END MOUNTING PARTS*                   | 0KB01     | ORDER BY<br>DESCRIPTION |
|                  | 174-2378-00           |                      |                      | 1   | CA ASSY,SP,ELEC:26,28 AWG,23.0 L,RIBBON                                         | TK1547    | 174-2378-00             |
|                  | 174-2512-00           |                      |                      | 1   | CA ASSY,SP,ELEC:16,28 AWG,1.8 L,RIBBON                                          | TK1547    | 174-2512-00             |
| -12              | _____                 |                      |                      |     | CIRCUIT BD ASSY:TOP BNC<br>(SEE A3 REPL)<br>*MOUNTING PARTS*                    |           |                         |
| -13              | 220-0497-00           |                      |                      | 2   | NUT,PLAIN,HEX:0.5-28 X 0.562 HEX,BRS CD PL                                      | 73743     | ORDER BY<br>DESCRIPTION |
| -14              | 210-1039-00           |                      |                      | 2   | WASHER,LOCK:0.521 ID,INT,0.025 THK,SST<br>*END MOUNTING PARTS*                  | 0KB01     | 1224-02-00-0541C        |
| -15              | _____                 |                      |                      | 1   | CIRCUIT BD ASSY:BOTTOM BNC<br>(SEE A4 REPL)<br>*MOUNTING PARTS*                 |           |                         |

Replaceable electrical parts list (Cont.)

| Component number | Tektronix part number | Serial no. effective | Serial no. discount'd | Qty | Name & description                                                                            | Mfr. code | Mfr. part number     |
|------------------|-----------------------|----------------------|-----------------------|-----|-----------------------------------------------------------------------------------------------|-----------|----------------------|
| -16              | 220-0497-00           |                      |                       | 3   | NUT,PLAIN,HEX:0.5-28 X 0.562 HEX,BRS CD PL                                                    | 73743     | ORDER BY DESCRIPTION |
| -17              | 210-1039-00           |                      |                       | 3   | WASHER,LOCK:0.521 ID,INT,0.025 THK,SST                                                        | 0KB01     | 1224-02-00-0541C     |
| -18              | _____                 |                      |                       | 2   | CONN,CIRC:PCB,AU-DIO;MALE,RTANG,3POS,1.22HX1.024W,CTR PLX,LATCHING (SEE ALSO A2J9,A2J10 REPL) |           |                      |
| -19              | 211-0101-00           |                      |                       | 4   | SCREW,MACHINE:4-40 X 0.25,FLH,100 DEG,STL CD PL,POZ                                           | 93907     | ORDER BY DESCRIPTION |
| -20              | 348-0844-00           |                      |                       | 4   | PAD,CUSHIONING:0.05 SQ X 0.23 H,POLYURETHANE,W/PRESSURE SENSIVE ADHESIVE                      | 52152     | SJ5518-GRAY          |
| -20              | _____                 |                      |                       | 2   | PLUG,HOLE COVER: (WAS NOT USED)                                                               |           |                      |
| -22              | 200-3899-02           |                      |                       | 1   | COVER,BOTTOM:TSG120                                                                           | 0J7N4     | 200-3899-02          |
| -23              | 337-3784-01           |                      |                       | 1   | SHIELD,ELEC:TSG131A                                                                           | TK1295    | 337-3784-01          |
| -24              | 161-0066-00           |                      |                       | 1   | CA ASSY,PWR:3,18 AWG,250V/10A,98 INCH,STR,IEC320,RCPT X NEMA 5-15P,US,SAFTEY CONTROLLED       | 0B445     | ECM-161-0066-00      |
|                  | 070-8003-02           |                      |                       | 1   | MANUAL, TECH:USERS, TSG120                                                                    | TK2548    | 070-8003-01          |
|                  | _____                 |                      |                       | 1   | TVGF11A;RACK MOUNT KIT                                                                        |           |                      |



