Tektronix®

650HR-SERIES
COLOR PICTURE MONITORS

INSTRUCTION MANUAL

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650HR-SERIES
COLOR PICTURE MONITORS

INSTRUCTION MANUAL

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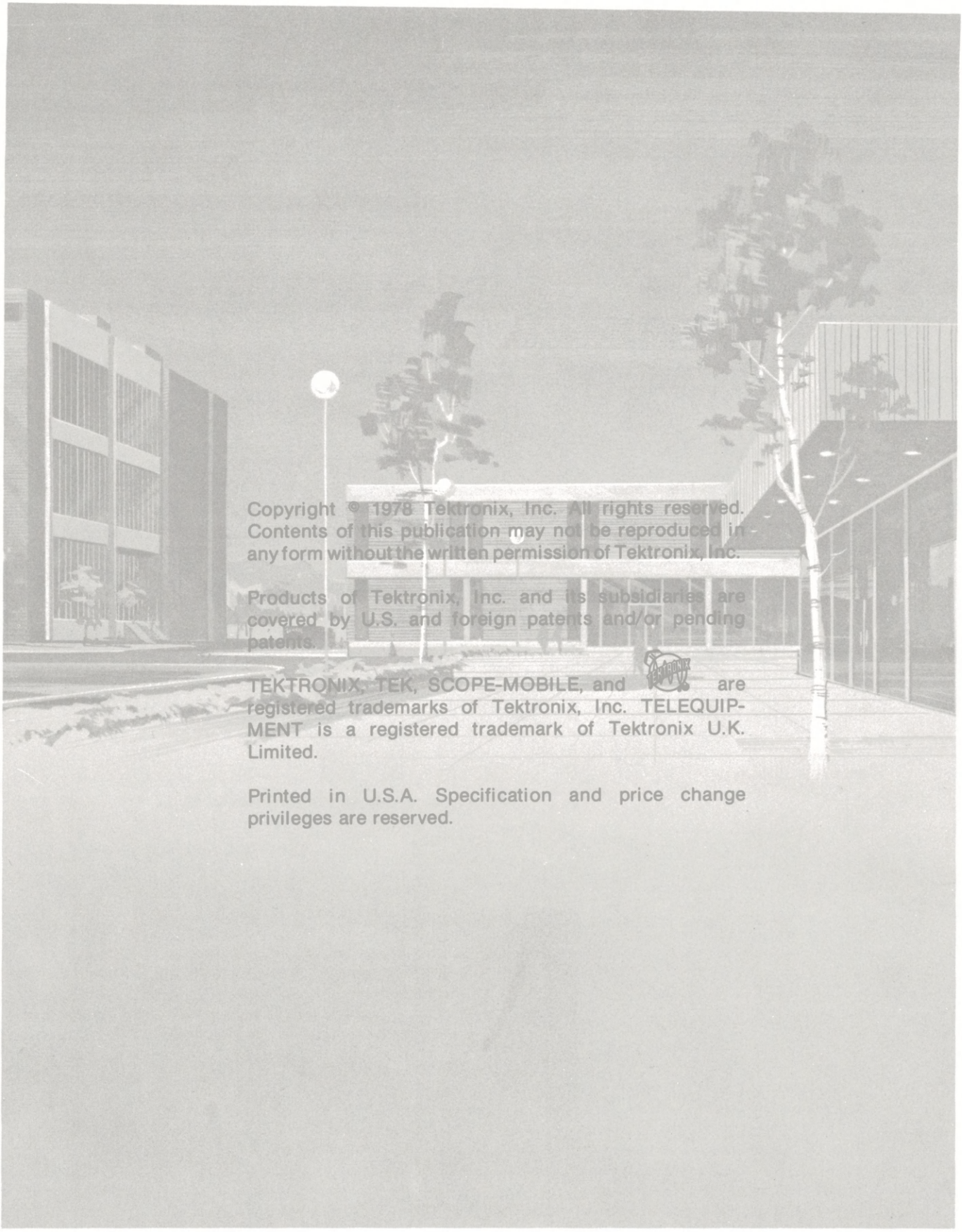

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PART I — OPERATOR'S INFORMATION

WARNING

THE REMAINING PORTION OF THIS TABLE OF CONTENTS LISTS THE SERVICING AND INSTALLATION INSTRUCTIONS. THESE INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID PERSONAL INJURY, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN THE OPERATOR'S INFORMATION UNLESS YOU ARE QUALIFIED TO DO SO.

PART II — SERVICE & INSTALLATION

650HR-SERIES COLOR PICTURE MONITORS (SUPPLEMENTAL TO STANDARD 650A-SERIES MANUAL)

This supplementary manual contains information that pertains specifically to the 650HR-Series Color Picture Monitors. The information is intended to supplement the information included in the standard 650A-Series Instruction Manual.

The text pages in this supplement are direct replacements for pages in the 650A-Series manual.

Information given here covers the following instruments:

NEW COLOR PICTURE MONITORS	MODIFICATION OF
650HR (NTSC)	650A
650HR-1 (NTSC + RGB)	650A-1
651HR (50-Hz PAL)	651A
651HR-1 (50-Hz PAL + RGB)	651A-1
655HR (NTSC + 50-Hz PAL)	655A
655HR-1 (NTSC + 50-Hz PAL + RGB)	655A-1

This new color picture monitor series, hereafter referred to as the 650HR-Series Monitor, has a new Trinitron ® SD-97 kinescope that has 50% more phosphor stripes to provide a high-resolution display. In order to realize the increased resolution possible with the new kinescope, the electrical characteristics of the Z-axis output, NTSC decoder, and variable aperture corrector have been changed. Also, color resolution has been improved by increasing the bandwidth of the baseband filters in the NTSC decoder.

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USING THIS SUPPLEMENT

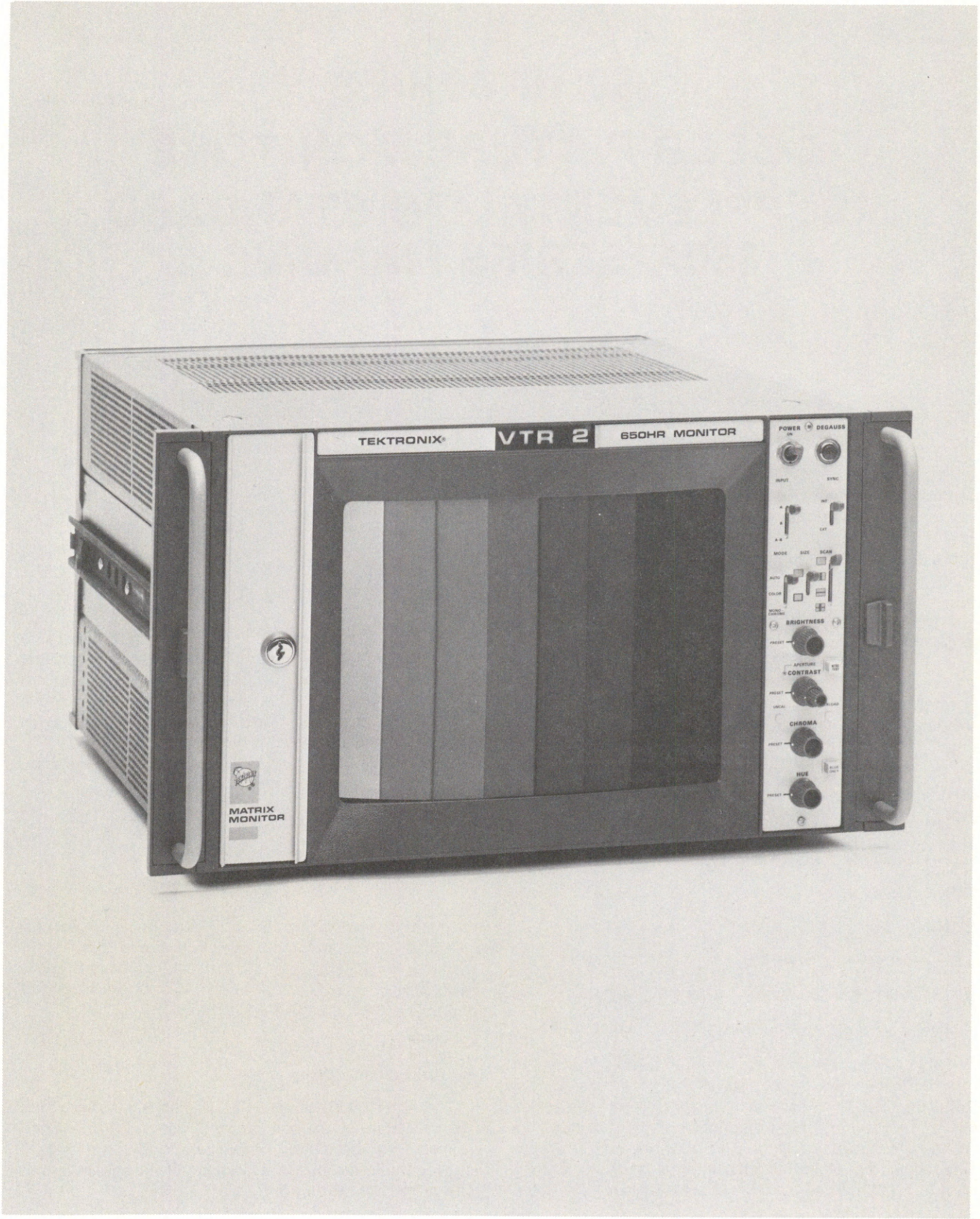
Text pages in this supplement are numbered the same as the pages in the 650A-Series manual that they replace. Modified or added waveforms and other illustrations are located at the back of this supplement. An add-remove Replaceable Electrical Parts list for the 650HR-Series Monitors is also included in this supplement.

TEXT CHANGES

In addition to the text pages, illustrations, and parts list included in this supplement, all references to 650A-Series Monitors in the 650A-Series manual should be changed to read 650HR-Series Monitors. Delete all references to 652A and 652A-1 in the 650A-Series manual.

Product Description

The TEKTRONIX 650HR-Series High Resolution Color Picture Monitors are compact instruments that utilize a 12-inch high-resolution Trinitron ® picture display kinescope. Screen size is approximately 70 square inches with an aspect ratio of 3:4.



The 650HR Color Picture Monitor. Other 650HR-Series Monitors appear similar to this instrument except for right front-panel control changes.

PART I
OPERATOR'S INFORMATION

INTRODUCTION

This manual is divided into two parts. Part I is intended for use by operating and service personnel. Part II is to be used by qualified service personnel only, since servicing exposes personnel to hazardous voltages.

INCOMING INSPECTION

Safety Summary

This portion of the manual contains safety information which the operator and service technician must follow to avoid hazardous voltages to ensure safe operation of this instrument.

WARNING information in this manual is intended to protect personnel from hazardous voltages.

CAUTION information is intended to protect the instrument from damage.

The following are general safety precautions that must be observed during all phases of operation.

WARNING

To reduce the electrical shock hazard, the instrument chassis must be properly grounded. Refer to the following for more information.

The 650A-Series Color Picture Monitor operates from a single-phase power source with one of the current-carrying conductors (neutral conductor) at ground (earth) potential. Operation from power sources where both current-carrying conductors are live with respect to ground (such as phase-to-phase on a 3-wire system) is not recommended, since only the line conductor has over-current (fuse) protection within the instrument.

The color monitor has a 3-wire cord with a 3 terminal polarized plug for connection to the power source and earth ground. The earth ground terminal of the plug is directly connected to the metal parts of the instrument. For electric-shock protection, insert the power plug in a mating outlet with an earth ground contact. Table 1-1 gives the conductor color codes of power cords used in Tektronix instruments.

If a 3- or 2-wire adapter is used to connect the color monitor to a 2-wire ac power system, be sure to connect the ground lead of the adapter to a conductor that connects to earth ground. Failure to complete the grounding system may allow the metal parts of this instrument to be elevated above ground potential and create a shock hazard.

Table 1-1

POWER CORD COLOR IDENTIFICATION

Conductor	Color	Alternate Color
Ungrounded (Line)	Brown	Black
Grounded (Neutral)	Blue	White
Grounding (Earth)	Green-Yellow	Green-Yellow

WARNING

Electrical shock hazards are present inside this instrument. Only qualified service personnel should remove the instrument cover.

Repackaging for Shipment:

If the Tektronix instrument is to be shipped to a Tektronix Service Center for service or repair, attach a tag showing: owner (with address) and the name of an individual at your firm that can be contacted, complete instrument serial number and a description of the service required.

Save and re-use the package in which your instrument was shipped. If the original packaging is unfit for use or not available, repackage the instrument as follows:

1. **Obtain a 375 pound test-strength carton of corrugated cardboard having inside dimensions of no less than six inches more than the instrument dimensions; this will allow for cushioning.**
2. **Surround the instrument with polyethylene sheeting to protect the finish of the instrument.**
3. **Use sheets of heavy cardboard to protect face of instrument. Cushion the instrument on all sides by tightly packing dunnage or urethane foam between carton and instrument, allowing three inches on all sides.**
4. **Seal carton with glass-reinforced shipping tape or industrial stapler.**

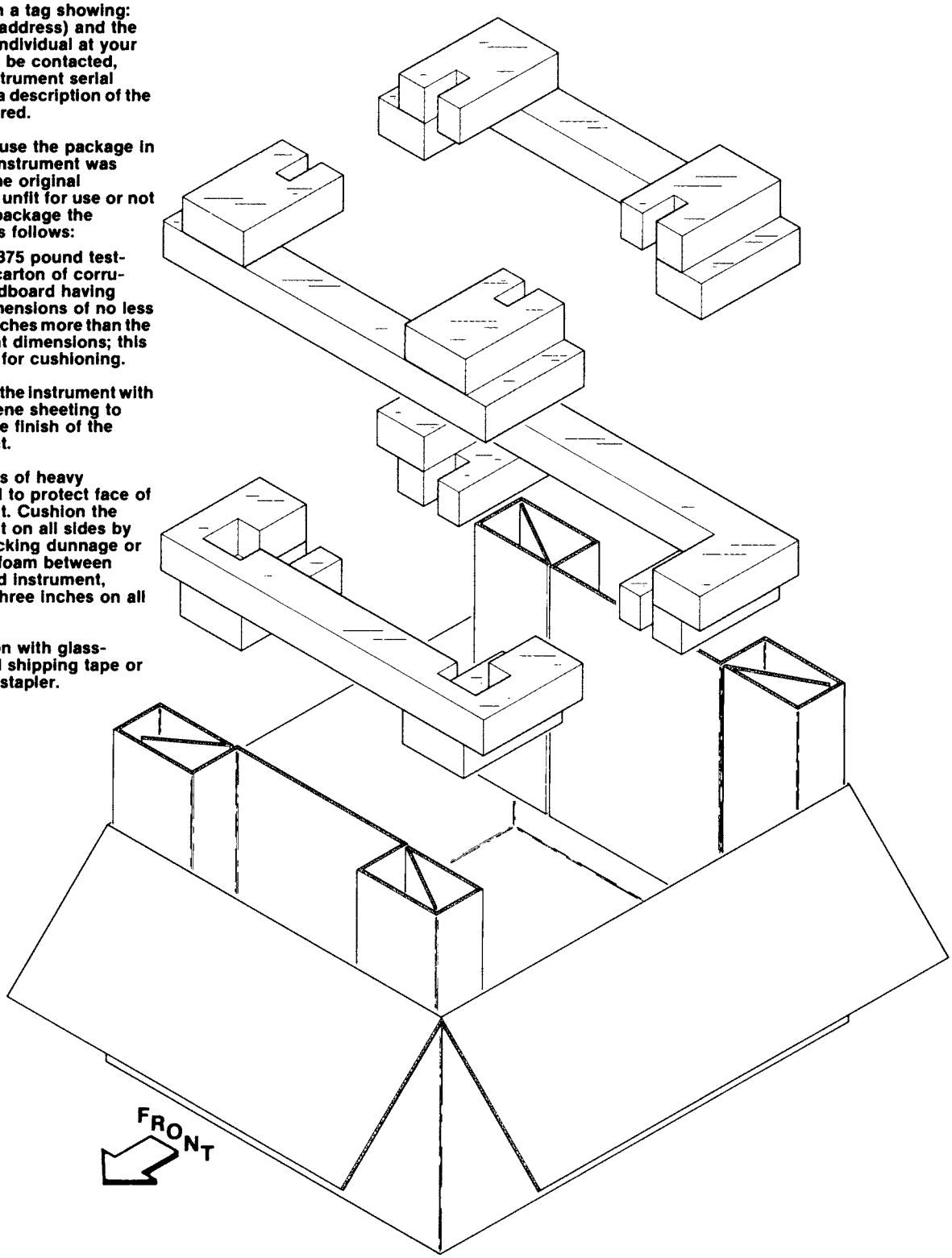


Fig. 1-2. Repackaging the instrument for shipment.

Damage Inspection

After carefully removing the picture monitor from the shipping carton, inspect the instrument for possible damage incurred during shipment. Report any shortage or damage to the carrier.

Accessories List

Standard accessories supplied with this instrument can be found on the last page of the Replaceable Mechanical Parts list illustrations. For additional accessories, see the current Tektronix, Inc. Television Products Catalog.

Repackaging

If this instrument is to be shipped long distances by commercial transportation, repackage it in the original manner for maximum protection. The original shipping carton can be saved and used for this purpose. Fig. 1-2 shows how to repackage the instrument. Contact your local Tektronix Field Office, Service Center, or Representative for shipping instructions.

OPERATING INSTRUCTIONS

Product Description

The TEKTRONIX 650HR-Series Color Television Picture Monitors are compact instruments that utilize a 12-inch high-resolution Trinitron ® picture display kinescope. Screen size is approximately 70 square inches with an aspect ratio of 3:4.

Several unique features in addition to the Trinitron ® kinescope set the instrument aside from other picture monitors intended for professional use in broadcast closed circuit, industrial, and educational fields.

Two inputs are provided for encoded video signals. Each input can be isolated from the chassis to prevent ground current-induced hum. Each input is also isolated from all others. Hum is at least 50 dB down for up to 4 V rms mains hum signal.

The picture may be shifted either horizontally or vertically or both together (pulse cross). This permits monitoring sync, burst, blanking, vertical interval test and reference signals. When the monitor is operating in any of these shifted display modes, brightness is automatically advanced to permit observing the sync pulses. Expansion of the vertical scan is provided in pulse cross and vertical delay to view individual lines in the vertical blanking interval.

The video inputs may be used differentially to display the difference between the video signals. This is especially useful when timing two signals relative to each other. In this case the pulse cross feature may be used to observe sync detail. The differential input performance is excellent throughout the entire video frequency band. Thus, it is also possible to accurately observe the relative phase of two color bursts. This is an extension of the usual timing capability of the picture monitor as a measuring instrument. While using the differential mode, the hum rejection feature is still available, even in the typical case of unequal hum levels.

Two external composite sync inputs are provided with the capability of automatically switching between two external sync signal sources as the video input is switched, or for obtaining sync for both video inputs from one sync source. The sync inputs are also isolated from each other and the chassis.

The color monitor is a calibrated measuring instrument. Chrominance gain and phase (hue) controls, video gain, contrast, and brightness controls are all provided with preset detent positions. In these positions the instrument produces a picture in accordance with system standards.

Residual color subcarrier, present as a CW signal component of the encoded signal, causes a change in the colorimetry of the reproduced picture on home receivers. This occurs because the CW subcarrier is present on neutral shades of gray and white. Even subcarrier amplitudes too small to be easily noticed on the waveform monitor or vectorscope can change the observed color. The 650HR-Series Monitor is designed to detect residual subcarrier signals under these conditions and will display a significantly different color picture in certain cases than other monitors. This feature may be eliminated if desired. However, as a measuring instrument, it is intended to display the true signal, and not compensate for signal errors.

When monitoring color signals, it is essential that the chrominance subcarrier does not reach the kinescope. If it does, the effects are as follows:

1. Objectionable dot structure crawling vertically.

2. Gamma characteristics of the display will be altered by the chrominance subcarrier. The result is that highly saturated areas, especially dark areas, will be substantially increased in brightness with a consequent decrease in saturation and contrast.

A practical solution is to reduce the luminance amplifier frequency response in the vicinity of the color subcarrier. A chroma trap is provided in the luminance channel to accomplish this objective.

The MODE switch controls whether or not the chrominance channel is activated. In the NTSC version only, the MODE switch also controls whether or not the chroma trap is present.

In NTSC and PAL color monitors, the color subcarrier is regenerated from burst with great accuracy, despite the many possible errors which may occur in burst itself with regard to timing, amplitude or transients (quadrature components). Burst itself is often regenerated in TV transmission; hence, this instrument should not exhibit any sensitivity to the peculiarities of the color burst component of the picture signal.

Picture sharpness in the 650HR-Series Monitor is enhanced by variable-aperture correction in the luminance channel. You can choose the amount of correction desired by means of a continuously-variable front panel APERTURE control, or use the PRESET position for factory-set nominal correction.

The Sony Corporation Trinitron ® kinescope has many advantages over currently available shadow mask color picture tubes. Outstanding among them is the simplicity of its convergence adjustment. After the yoke has been positioned properly, convergence is adjusted by means of four front-panel controls located behind a lockable door. Not only are there far fewer controls, but their operation is much simpler. Basic to the Trinitron ® gun is the arrangement of the red and blue cathodes on the same (horizontal) plane as the green cathode which is located on the kinescope axis between the red and blue cathodes. Thus, convergence is primarily a matter of modulating the horizontal deflection component of the red and blue beams in opposite manner, but nearly equal amounts. The green beam, being on axis, is not affected by convergence adjustments. Since the eye perceives green best, the green cathode is located in the center, which affords it the best focus of all three beams.

Reference white for the monitor is illuminant D, whose color temperature is approximately 6500° K. The monitor is calibrated at the time of manufacture using a white comparator. Since the screen color temperature is highly critical in accurate color reproduction and does vary with aging of the picture tube, regardless of design, this parameter cannot be guaranteed. Slight differences in color temperature between various monitors in a given broadcasting facility are far more serious than an absolute error in color temperature of all monitors at that facility. Thus, each facility will desire to maintain all monitors to match the same reference white standard that is used at the facility.

The kinescope operates at 19 kV from a regulated EHT (Extremely High Tension) supply which is interlocked with the horizontal and vertical deflection circuits to avoid possible damage to the picture tube in the event of a deflection failure.

During an EHT current overload condition, certain calibrated characteristics of the monitor are altered; therefore, a front-panel OVERLOAD indicator is provided.

All components in the instrument are solid state except for the kinescope. All transistors and diodes are silicon devices. Most transistors and integrated circuits are socketed for ease in servicing. Semi-modular construction is used with the glass-epoxy etched circuit boards readily removable for repair or replacement.

Mains Operating Voltage

Before connecting the instrument to a power source, (also referred to as the "mains"), be sure to look at the rear panel to find the operating voltage for which the instrument has been set (see Fig. 2-1).

CAUTION

You can damage the picture monitor if you operate it from a 230 V ac line voltage when the instrument has been set for 115 V ac operation.

Any changes must be made by qualified service personnel only. Instructions for changing the operating voltage and fuse are provided in Part II—Service & Installation portion of this manual.

Rear Panel Fuse Replacement

WARNING

Disconnect the picture monitor from the power source before checking or replacing the rear-panel fuse.

If you need to replace the fuse for the mains operating voltage used and for which the picture monitor is set, be sure to use the correct fuse for continued fire protection. Refer to the Replaceable Electrical Parts list for fuse data.

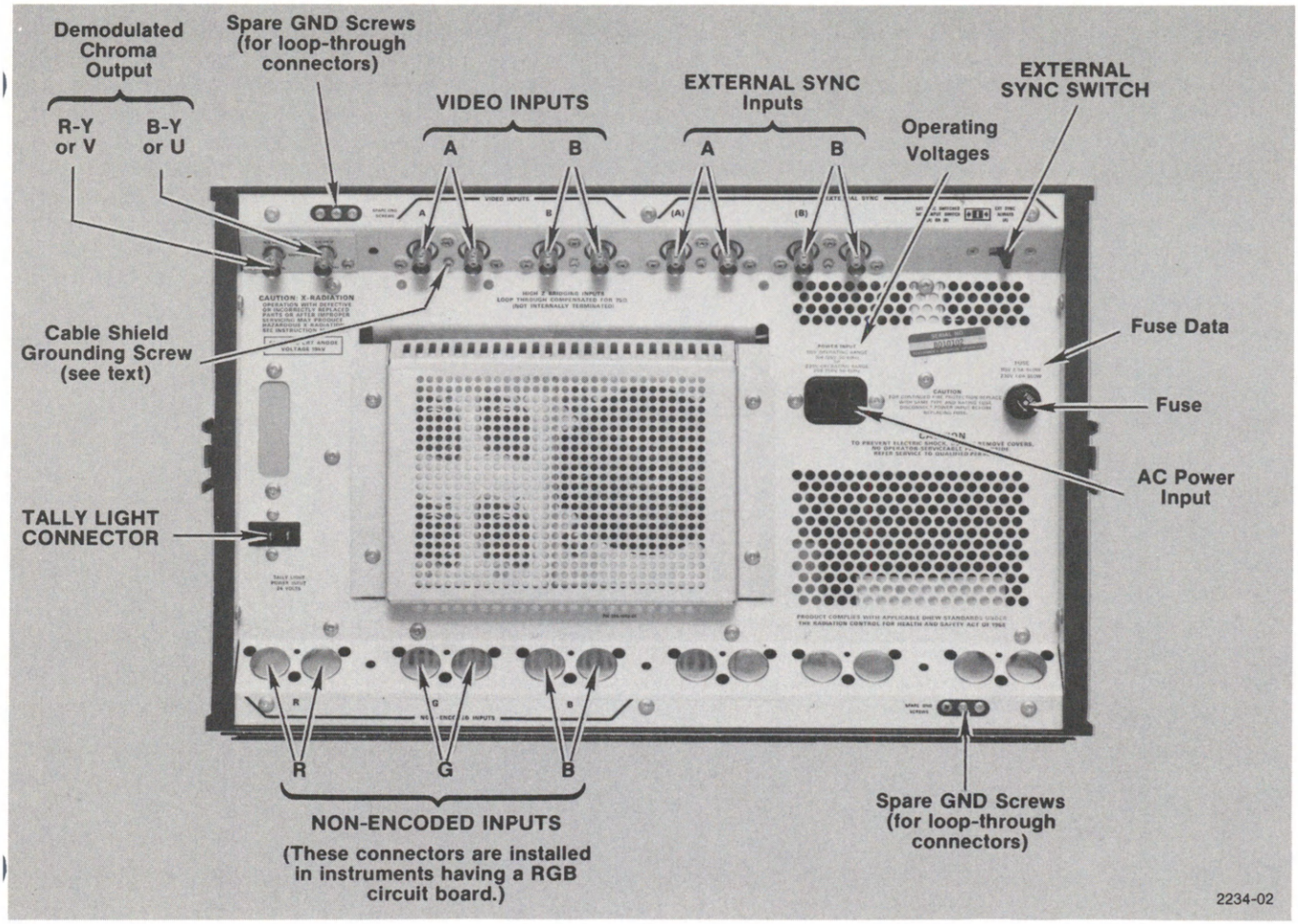


Fig. 2-1. Rear panel view of the picture monitor.

FUNCTION OF FRONT-PANEL CONTROLS & LIGHTS

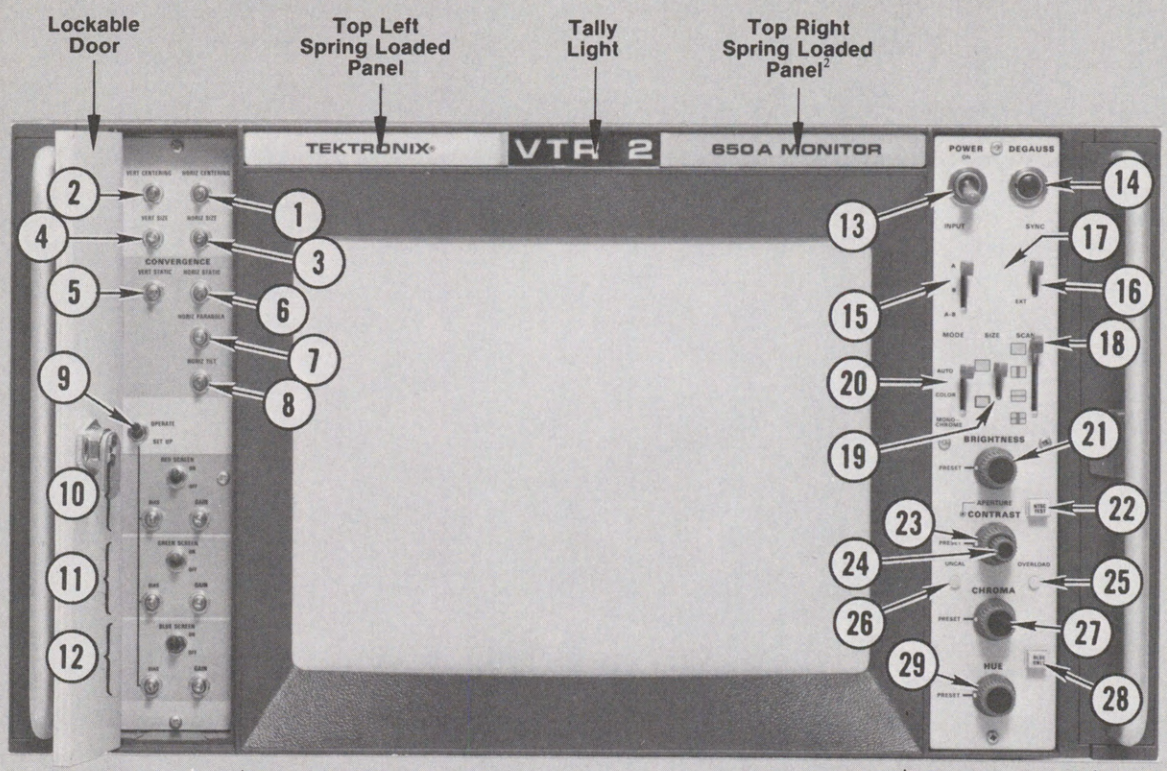
The following is a brief description of the operation or function of the front-panel controls and lights (see Fig. 2-2).

Upper Top Center Front Panel Light

Tally Light	Two series-connected 14 V incandescent lamps that are remotely powered through a 24 V rear-panel connector.

Left Front Panel Controls (located behind a lockable door)

VERT CENTERING	Controls vertical position of the display.
HORIZ CENTERING	Controls horizontal position of the display.
VERT SIZE	Provides adjustment of picture height.
HORIZ SIZE	Provides adjustment of picture width.
VERT STATIC	Adjusts for vertical convergence of the display.



LEFT FRONT PANEL

Picture Position & Size:

1. HORIZONTAL CENTERING
2. VERTICAL CENTERING
3. HORIZONTAL SIZE
4. VERTICAL SIZE

Convergence Adjustments:

5. VERTICAL STATIC
6. HORIZONTAL STATIC
7. HORIZONTAL PARABOLA
8. HORIZONTAL TILT

Screens:

9. OPERATE AFC FAST/OPERATE/SETUP
10. RED SCREEN[1]
11. GREEN SCREEN[1]
12. BLUE SCREEN[1]

RIGHT FRONT PANEL

13. POWER
14. DEGAUSS
15. INPUT
16. SYNC
17. STANDARD[3]
18. SCAN
19. SIZE
20. MODE
21. BRIGHTNESS
22. NTSC TEST[4]
23. CONTRAST
24. APERTURE
25. OVERLOAD Light
26. UNCAL Light
27. CHROMA
28. BLUE ONLY
29. HUE[4]

[1]Each screen has an ON-OFF switch, BIAS and GAIN adjustments.
[2]This easily-changed panel indicates instrument model number.
[3]STANDARD switch is located here on all monitors except 650A.
[4]Present on monitors having a NTSC decoder.

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Fig. 2-2. Front view of 650A NTSC Picture Monitor showing location of adjustments, controls, and lights. Other models are identical except for slight control changes made to the right front panel and the installation of an appropriate top right spring-loaded panel to indicate the model number.

HORIZ STATIC	Adjusts for horizontal convergence of the display.
HORIZ PARABOLA	Balances horizontal convergence at the left and right sides of the display.
HORIZ TILT	Eliminates the possible imbalance in the HORIZ PARABOLA adjustment.
OPERATE AFC FAST/OPERATE/ SETUP	Three-position switch to select the following: OPERATE AFC FAST: Provides fast AFC operation, eliminating incoming sync errors from the kinescope display. OPERATE: Normal vertical scan operation. Incoming sync errors (if any) are displayed; particularly those at 60 Hz and 240 Hz. SETUP: Reduces the vertical scan to 10% of full size to facilitate checking and adjusting kinescope low-light color temperature.
RED, GREEN, and BLUE SCREEN	The following switches and adjustments facilitate checking and adjusting gray scale tracking: ON-OFF—Allows the appropriate beam to be turned on or off. BIAS—Adjusts low-light color balance. GAIN—Adjusts high-light color balance.

Right Front Panel Controls

POWER	Connects or interrupts mains voltage to the transformer primary circuit.
DEGAUSS	Pushbutton operation for demagnetizing the metal parts of the picture tube.
INPUT	Three-position lever switch for selecting the A, B, or A-B encoded video input signals.
STANDARD	Two- or more-position lever switch, depending on model of instrument, for selecting the television standard. This switch is present on all models except 650A.
SYNC	Two-position lever switch for selecting INTernal or EXTernal synchronizing signal.
MODE	Three-position switch to select the following: AUTO—In NTSC versions, presence of color burst enables the chrominance channel and inserts a notch filter into the luminance channel. Absence of burst causes the chrominance channel to be disabled and the notch filter is automatically removed, thus increasing the bandwidth to 6 MHz. In PAL versions, the notch filter remains in the luminance channel for all settings of the MODE switch unless removed by means of an internal jumper. COLOR—In NTSC versions, the chrominance channel is activated and the notch filter remains inserted regardless of burst presence or absence. In PAL versions, the chrominance channel is activated regardless of the presence or absence of burst. MONOCHROME—In NTSC versions, the chrominance channel is deactivated and the notch filter is removed regardless of the presence or absence of burst. The picture will be displayed in monochrome and the bandwidth is increased to 6 MHz. In PAL versions, the chrominance channel is deactivated regardless of the presence or absence of burst.

SIZE

Two-position lever switch to select a normal size or reduced size picture.

SCAN

Four-position lever switch to select various picture scanning modes of operation. Starting with the top position, the picture scan modes are as follows:

Normal—Picture is properly centered.

Horiz Delay—Picture is shifted horizontally; brightness is automatically increased so that blanking, sync, and burst may be observed.

Vert Delay—Picture is shifted vertically and brightness is automatically increased so that the vertical blanking interval details may be observed. Picture is expanded 5X if SIZE switch is set to Normal.

Pulse Cross—Picture is shifted both horizontally and vertically. Brightness is automatically increased and the picture is vertically expanded 5X. Vertical expansion occurs only when the SIZE switch is set to Normal.

BRIGHTNESS

Controls picture brightness. The PRESET position is fixed by an internal adjustment.

NTSC TEST	Pushbutton switch, when set to the 'out' position, modifies the matrix in the NTSC decoder to largely compensate for colorimetric errors. These errors are due to the differences between the taking (e.g., camera) and display primary colors. When the switch is depressed, the UNCAL light illuminates dimly and the matrix returns to strict NTSC values to allow test and setup to be performed using a standard NTSC color bar signal. The NTSC TEST pushbutton is installed on all models having a NTSC decoder.
CONTRAST	Controls picture contrast. The PRESET position is fixed by an internal adjustment.
APERTURE	Provides a variable amount of mid-frequency boost in the luminance channel to enhance picture sharpness. The PRESET position is fixed by an internal adjustment. If the user prefers more or less aperture correction, a qualified service technician can reset this adjustment to the desired setting.
UNCAL Light	Illuminates brightly when the CONTRAST, CHROMA, or HUE control is not in the PRESET position. This light has medium brightness when the BRIGHTNESS control is not set to PRESET or the BLUE ONLY pushbutton is pressed in. Illuminates dimly when the NTSC TEST pushbutton is pressed in and the STANDARD switch, if present is set to NTSC.
OVERLOAD Light	Illuminates whenever the kinescope overdrive protection circuit is in operation.
CHROMA	Controls color saturation. A PRESET position is provided to obtain an internally-calibrated chroma setting.
HUE	Controls hue or phase angle of the demodulated subcarrier. A PRESET position is provided to obtain an internally-calibrated hue setting. The HUE control is present on all models having a NTSC decoder.
BLUE ONLY	Pushbutton switch, when pressed in, routes the decoded blue signal to all three (red, green, and blue) output amplifiers in the instrument. This mode of operation produces a monochrome picture which is used for observing headbanding and other associated VTR problems. If a TEKTRONIX 1480-Series Waveform Monitor, operating in the 15-line mode, is used with the picture monitor, a troublesome VTR head can be identified.

REAR-PANEL CONNECTORS AND EXTERNAL SYNC SWITCH

General Information

All signal connections to the picture monitor are made through BNC coaxial connectors located on the rear-panel of the instrument (see Fig. 2-1). A pair of connectors for each input provides compensated loop-through connections so that the instrument can be connected into any part of a 75-ohm unbalanced coaxial cable video transmission system.

Using VIDEO INPUT A as an example, a loop-through connection is made as follows:

1. Connect incoming video to one of the VIDEO INPUT A connectors.

2. Connect the outgoing video cable to the other VIDEO INPUT A connector.

If you are not using the loop-through method for signal connections but would prefer to connect a television test signal generator or the end of a video transmission cable directly to the picture monitor, proceed as follows:

1. Connect the video signal to one of the VIDEO INPUT A connectors.

2. Connect a 75-ohm termination to the other VIDEO INPUT A connector.

Loop-Through Connector Shield Connection

The instrument is shipped with the shield connection of the input loop-through connectors grounded to the chassis so that a useful picture is obtained when the monitor is operating in the presence of a strong RF field. These connectors can be ungrounded (floating); that is, the outer conductor or shield connection of the connectors can be isolated from the chassis.

Floating the connectors prevents ground currents (mains hum, for example) from interfering with the display. To unground the shield connection of a loop-through connector, remove the 4-40 X 0.312 inch PNH screw with lockwasher. This screw does not have an insulating washer and is located between the pair of connectors to be ungrounded. Fig. 2-1 shows the grounding screw for the VIDEO INPUT A connector. The others are located in a similar location.

VIDEO INPUT A and B Connectors

Two sync-negative (black negative) composite or non-composite video signal can be connected to the VIDEO INPUT A and B loop-through connectors. Use the right front-panel INPUT switch to select the desired input signal.

If non-composite video signals are applied to the VIDEO INPUT A and B connectors, apply an external synchronizing signal to the appropriate rear-panel EXTERNAL SYNC input connector and set the right front-panel SYNC switch to EXT.

For differential mode of operation, the video signal source is applied to the VIDEO INPUT A connector and the signal to be compared is applied to the VIDEO INPUT B connector or vice versa. Then the front-panel INPUT switch is set to the A-B position so the difference signal can be observed. In this mode of operation, the display is internally synchronized by the VIDEO INPUT A signal when the front-panel SYNC switch is set to INT.

Table 2-1 lists the switch and signal-source combinations that synchronize the display.

EXTERNAL SYNC Connectors and EXTERNAL SYNC Switch

The EXTERNAL SYNC connectors accept external signals for synchronizing the color monitor. With the rear-panel EXTERNAL SYNC switch set to the left (A or B) position and the front-panel SYNC switch to EXT, the external sync signal is selected by means of the front-panel INPUT switch when set to the A or B position (see Table 2-1).

If the rear-panel EXTERNAL SYNC switch is set to the right (ALWAYS A) position, then the monitor is always synchronized by the external sync channel A signal.

The external sync signal must be 0.5 V to 2 V peak-to-peak sync-negative composite video or 0.5 V to 8 V peak-to-peak negative composite sync.

Table 2-1

SYNCHRONIZING THE MONITOR DISPLAY

INPUT Switch Position	STANDARD	SYNC Switch (Front Panel)	EXTERNAL SYNC Switch (Rear Panel)	Monitor is synchronized by signal applied to the following rear-panel connector:
A, A-B	Encoded	INT	Not applicable	VIDEO INPUT A
B	Encoded	INT	Not applicable	VIDEO INPUT B
A, B, A-B	Encoded	EXT	ALWAYS A position	EXTERNAL SYNC A
A, A-B	Encoded	EXT	A or B position	
B	Encoded	EXT	A or B position	EXTERNAL SYNC B
Not Applicable	RGB (non-encoded)	INT	Not applicable	NON-ENCODED GREEN INPUT

RGB NON-ENCODED INPUT Connectors

The information that follows applies to color monitors that have a RGB circuit board with associated wiring installed. These monitors are: 650A-1, 651A-1, 652A-1, and 655A-1.

Three pairs of loop-through input connectors, marked R, G, and B, are used for processing RGB non-encoded input signals. These signals are displayed when the STANDARD switch is set to the RGB position. In this mode of operation, RGB internal sync is taken from the green composite signal when the front-panel SYNC switch is set to INT. Otherwise external composite sync must be provided.

If external sync is used, the external composite sync signal must be applied to the EXTERNAL SYNC A or B connector and the front-panel SYNC switch must be set to EXT. Since the INPUT switch controls the sync signal routing, the INPUT switch must be set to the position that corresponds to the EXT SYNC connectors being used. If you prefer, you can loop the external sync signal through the EXT SYNC A and B connectors. Then, either the A or B position of the INPUT switch provides synchronization from the external source.

RGB inputs permit monitoring the camera signal before the encoding process. Thus colorimetric errors may be readily observed. This may be of particular value for accurate camera matching.

Tally Light Power Input Connector

This connector provides remote operation of the front-panel tally light when an external 24 V ac or dc source is applied. A qualified service person can make the proper electrical connections to this connector.

Instructions for ordering a connector plug and wiring it are provided in Part II—Service & Installation portion of this manual.

R-Y (or V) and B-Y (or U) Demodulated Chroma Output Connectors

These connectors provide high-impedance output from the R-Y (or V) and B-Y (or U) demodulated circuits for driving the TEKTRONIX 602 or 604, Option 5, Display Unit to produce vector displays. The 602 and 604 have an internal multistandard vector-display graticule so they can be driven by a multistandard color picture monitor.

The TEKTRONIX 602 or 604, Option 5, Display Unit is not only useful for monitoring color television signals being applied to the picture monitor. It is also useful for evaluating the effects of adjustments that are made when recalibrating the color monitor.

LEFT-FRONT-PANEL ADJUSTMENT PROCEDURE

Use the following procedure to check and adjust your monitor for optimum performance. This procedure applies to all monitors described in this manual.

TEST EQUIPMENT

1. Television Test Signal Generator. One volt peak-to-peak output signal into 75 ohms as follows:

a. Encoded color bar signal. 100% saturated, 75% amplitude color bars, 75% or 100% white reference. Setup: 7.5% for NTSC models; 0% (blanking) for 50-Hz PAL models; 50 mV for 60-Hz PAL models.

b. Convergence crosshatch pattern. For NTSC and 60-Hz PAL monitors: 17 vertical lines; 14 horizontal lines. For 50-Hz PAL monitors: 20 vertical lines; 15 horizontal lines.

c. Full screen flat field signal.

For NTSC models: 10 IRE, 20 IRE, and 100 IRE flat field signals.

For 50-Hz and 60-Hz PAL models: Blanking (0% peak white), 10%, and 100% flat field signals.

Signal generators that are available from Tektronix, Inc. are listed in Table 2-2.

Table 2-2

TELEVISION TEST SIGNAL GENERATORS

Television Standard	Tektronix Test Signal Generator
NTSC	140, 144, 149, 1470, or 1410/TSG1/TSG2/TSG3
50-Hz PAL	141A Option 1 or 145
60-Hz PAL	142 or 145-M

NOTE

The 1470 Generator does not produce 10 IRE and 20 IRE flat field signals. These signals are needed if you intend to match several monitors using the J16 Photometer.

2. Linearity Graticule. Full screen film positive that is positioned directly over the viewing area (see Fig. 2-3). Tektronix Part No. 331-0305-00 for a graticule that is compatible with the NTSC and 60-Hz PAL Tektronix generators. Tektronix Part No. 331-0359-00 for a graticule that is compatible with the 50-Hz PAL Tektronix generators.

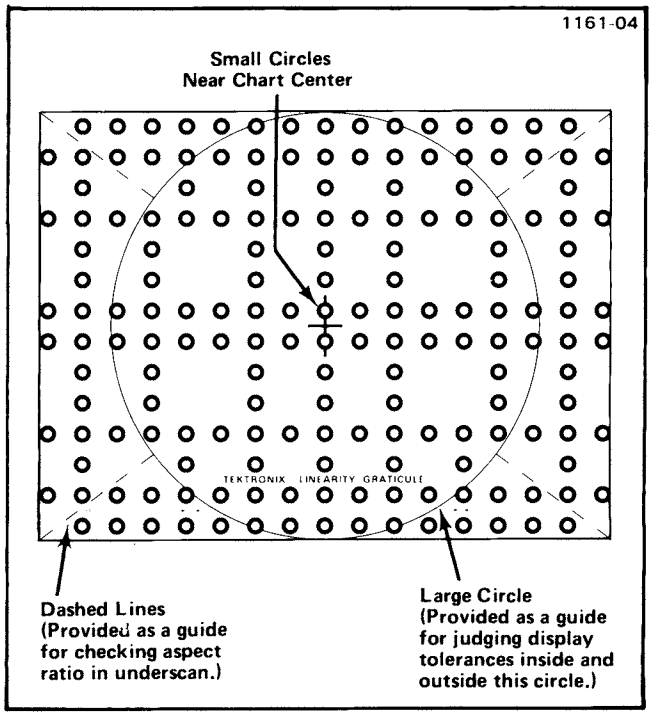


Fig. 2-3. Tektronix Linearity Graticule.

3. Light Source for Linearity Graticule. 60-watt incandescent light placed two feet in front of monitor to project a shadow from the linearity graticule on the screen phosphor.

4. Reference Light Source (Optical Comparator). For use as a "primary" standard to recalibrate the monitor high-light color temperature to 6500° K at 30 foot lamberts. Also, the light source reference field must be adjustable to a very low light level for setting the low light color balance when a low-brightness flat field signal is displayed.

A Grafikon, or other similar device, such as a Hellige IRT or Macbeth can be used.

5. (Optional) Photometer or Luminance Meter. Useful for measuring luminance in a footlamberts or candelas/m^2. A description of the TEKTRONIX J16 Digital Photometer follows:

For NTSC and 60-Hz PAL color monitors, use a TEKTRONIX J16 Digital Photometer with a J6503 Luminance Probe to measure footlamberts. For 50-Hz PAL color monitors, use the J16 Option 2 Photometer with a J6503 Option 2 Luminance Probe to measure in candelas/m^2 if metric units are preferred.

Another feature of the J16 Photometer is that it can be used with a J6502 Irradiance Probe to derive low and high light-output readings for the red, green, and blue screen displays. These readings can be recorded and used again when rechecking the color monitor. They can also be used to quickly readjust other Tektronix color monitors to match the one selected to be the "standard".

The J6502 Irradiance Probe measures irradiance in US units (microwatts/cm^2). To measure irradiance in metric units (milliwatts/m^2), use a J6502 Option 2 with a J16 Option 2 Photometer.

6. Coaxial Cable. Impedance, 75 ohms; length, 42 inches; equipped with BNC connectors. Tektronix Part No. 012-0074-00.

7. 75-Ohm Termination. Equipped with BNC connectors. Use an end-line termination (Tektronix Part No. 011-0102-00). A feed-through termination (Tektronix Part No. 011-0102-02) can be used as a substitute.

PRELIMINARY PROCEDURE

1. Apply a standard color bar signal from a television test signal generator through a 75-ohm coaxial cable to the monitor VIDEO INPUT A connector. Terminate the other VIDEO INPUT A connector into 75 ohms.

2. Set all the front-panel toggle and lever switches to the up position. Set the right front-panel variable controls to the PRESET position. Check that the pushbuttons are set to the out position except for NTSC instruments. For these, press in the NTSC TEST pushbutton.

3. Allow at least 30 minutes warmup at 25° C, ±5° C, before proceeding with the adjustments.

4. Depress the DEGAUSS pushbutton for at least 5 seconds.

5. Decrease the room lighting to semi-darkness.

PURITY
Equipment Needed: 1, 6, and 7

1. Check Purity

a. Display a 100 IRE or 100% flat field signal.

b. Set the monitor GREEN and BLUE SCREEN switches to OFF. Depress the DEGAUSS pushbutton for at least 5 seconds.

c. CHECK—That the display is uniformly red. If any impurity is observed, use a hand-held degaussing coil to demagnetize the surrounding metal parts. This is especially necessary if the monitor is installed in a cabinet rack.

If impurity is still present, check for excessive misconvergence. A quick check can be made by performing steps 4 and 5 in this procedure before going to part d of this step.

NOTE

If impurity is present after degaussing the monitor and converging the beams, a qualified service technician must follow the service instructions for purity given in Part II—Service & Installation portion of this manual.

d. Set the RED SCREEN switch to OFF and the GREEN SCREEN switch to ON.

e. CHECK—For a uniformly green screen display.

f. Set the GREEN SCREEN switch to OFF and the BLUE SCREEN switch to ON.

g. CHECK—For a uniformly blue screen display.

NOTE

If impurity is present when performing parts e and g of this step, refer servicing to a qualified service technician.

h. Set the RED and GREEN SCREEN switches to ON.

PICTURE POSITION AND SIZE ADJUSTMENTS
Equipment Needed: Items 1, 2, 3, 6, and 7

2. Vertical and Horizontal Centering

a. Display a convergence crosshatch pattern.

b. Set the RED and BLUE SCREEN switches to OFF so that a green screen crosshatch pattern is displayed.

c. Set the SIZE switch to Underscan.

d. If your test signal generator has Convergence Vert and Horiz Position controls, set these controls, so that the crosshatch pattern is properly centered. That is, the vertical lines at the left and right sides of the display should be positioned equal distance from the edges of video blanking (not the bezel or screen edges); the horizontal lines at the top and bottom sides of the display should be positioned equal distance from the edges of video blanking.

e. Set the SIZE switch to the Normal position.

f. Place the linearity graticule directly over the viewing screen of the monitor. After properly centering the graticule over the screen, tape the graticule in a few places to hold it in position.

g. Place an incandescent light source 2 feet away from the front of the monitor and aimed at the center of the screen.

h. ADJUST—The monitor VERT and HORIZ CENTERING adjustments to center the display at the center of the graticule area.

3. Vertical and Horizontal Size

a. CHECK—After completing step 2, check that the crosshatch pattern intersections are located in the small circles projected on the screen. The tolerance is ±1% of picture height within the central area bounded by a circle whose diameter equals the picture height. This is the area within the large circle pointed out in Fig. 2-3. Outside of the central area, the tolerance is ±2% of picture height.

b. ADJUST—The monitor VERT and HORIZ SIZE adjustments for the best size that places the intersections of the crosshatch pattern within the tolerances described in part a of this step.

NOTE

If the display is tilted, yoke adjustment must be made by a qualified service technician. Instructions are provided in Part II—Service & Installation portion of this manual.

c. Remove the linearity graticule and light source.

d. Set the RED and BLUE SCREEN switches to ON.

CONVERGENCE ADJUSTMENTS
Equipment Needed: Items 1, 6, and 7

4. Vertical and Horizontal Static

a. Using the same setup as described in step 2a, check that a convergence crosshatch pattern is displayed.

b. ADJUST—The monitor VERT and HORIZ STATIC adjustments to converge the center area of the display.

5. Horizontal Parabola and Tilt

a. ADJUST—The monitor HORIZ PARABOLA and TILT adjustments for best convergence near the edges of the display.

b. INTERACTION—Slight readjustment of the HORIZ STATIC adjustment may be necessary while adjusting the HORIZ PARABOLA and TILT adjustments. Optimize the adjustments between full size scan and underscan.

NOTE

HORIZ TILT adjustment converges left side opposite to right side. HORIZ PARABOLA adjustment converges left and right sides opposite to center.

SCREEN ADJUSTMENTS
Equipment Needed: Items 1, 4, 6, and 7

6. Check Screen Bias

a. Apply a standard color bar signal from a television test signal generator through a 75-ohm coaxial cable to the monitor VIDEO INPUT A connector. Terminate the other VIDEO INPUT A connector into 75 ohms.

b. Check that the room lighting is at a similar level to that where the monitor will be used. Also, check that the front-panel controls are set as described in step 2 of the Preliminary Procedure.

c. Set the monitor OPERATE AFC FAST/OPERATE/SETUP switch to SETUP and the MODE switch to MONOCHROME.

d. CHECK—The black bar at the right side of the display. This black bar should appear dark gray due to the increased display brightness in this mode of operation. If the bar is dark gray, go to part e of this step.

If the black bar is not dark gray (black, light gray, or a color shade) go to step 7.

e. Set the OPERATE AFC FAST/OPERATE/SETUP switch to OPERATE.

f. CHECK—That a proper gray scale display is obtained. If the display shows the proper shades of gray, go to step 11; if not, go to step 10.

7. Adjust Red Screen Bias

a. Set the GREEN and BLUE SCREEN switches to OFF. Set the OPERATE AFC FAST/OPERATE/SETUP switch to SETUP and the MODE switch to AUTO.

b. ADJUST—The RED SCREEN BIAS adjustment so that the black bar areas just become black. This is accomplished by turning the adjustment clockwise until the black areas become dimly red. Then, turn the adjustment slowly counterclockwise until the dimly red areas just become extinguished.

NOTE

If one or more of the left front-panel SCREEN BIAS adjustments are presently at the same extreme end of their adjustment range, a qualified service technician must follow the Screen Volts R6293 adjustment procedure given in Part II—Service & Installation portion of this manual before going to step 8.

8. Adjust Green Screen Bias

a. Set the monitor RED SCREEN switch to OFF and the GREEN SCREEN switch to ON.

b. ADJUST—The GREEN SCREEN BIAS adjustment so that the black bar areas just become black. Use a procedure similar to the one described in step 7b.

9. Adjust Blue Screen Bias

a. Set the monitor GREEN SCREEN switch to OFF and the BLUE SCREEN switch to ON.

b. ADJUST—The BLUE SCREEN BIAS adjustment so that the black bar areas just become black. Use a procedure similar to the one described in step 7b.

10. Final Settings for Screen Bias Adjustments

a. Set the OPERATE AFC FAST/OPERATE/SETUP switch to OPERATE. Set the RED and GREEN SCREEN switches to ON. Check that the BLUE SCREEN switch is set to ON.

b. Set the test signal generator for a white flat field output signal as follows: 20 IRE for NTSC monitor; 10% for 50-Hz and 60-Hz PAL models.

NOTE

If your test signal generator does not have this capability, leave it at 100 IRE or 100% white flat field output. Use the color monitor variable CONTRAST control to reduce the display to a very low light level equivalent to approximately 20 IRE or 10% white flat field.

c. Hold the reference light-source so the light pipe is placed against the monitor faceplate at the center of the screen. Adjust the brightness of the light-source reference field to match the brightness of the test spot.

NOTE

Be sure that the ambient lighting in the room is sufficiently low and the proper color, so that the light-source reference field is not affected. This check can be made by turning off the room lights or using a black cloth as a cover to block out extraneous room lighting.

d. CHECK—Low light color balance. The color of the test spot (all beams on) should match the color of the light-source reference field.

e. ADJUST—The appropriate SCREEN BIAS adjustments to make the color of the test spot match the light-source reference field. Slight readjustment of the reference field brightness may be necessary to match the brightness of the test spot.

f. If the CONTRAST control setting was changed as described in part b of this step, return the control to PRESET.

11. Red, Green, and Blue Screen Gain

a. Set the test signal generator for a white flat field output signal as follows: 100 IRE for NTSC monitor; 100% for 50-Hz and 60-Hz PAL models.

b. Set the reference light-source to 30 footlamberts. If the reference light-source cannot be set this high, set the generator white flat field output to be within the range of the reference light-source.

c. CHECK—High light color balance. The color of the test spot should match the color of the light-source reference field.

d. ADJUST—The left front panel RED, GREEN, and BLUE SCREEN GAIN adjustments so that the color and brightness of the test spot matches the light-source reference field.

e. INTERACTION—Repeat steps 10b through 11d until proper matching of test spot and light-source reference field is obtained at both light levels.

f. (Optional) CHECK & ADJUST—With the test signal generator set for full (100 IRE or 100%) white flat field output, measure the monitor's display brightness (all beams on) using a photometer or luminance meter. The brightness of the display should be 30 footlamberts within the tolerance of the measuring device. If necessary, repeat part d of this step using a reference field brightness that will enable you to obtain the desired color monitor brightness and high light color balance. Then, recheck low light color balance by repeating step 10b through 10e.

12. (Optional) Color Balance Matching Procedure

The following procedure describes how to derive low- and high-light color balance readings for the red, green, and blue screens. Once these readings are derived, they can be recorded for use when rechecking the calibration of the color monitor anytime and to readjust other TEKTRONIX 650A-Series Monitors to match the one chosen to be the "standard".

After first recalibrating the picture monitor low- and high-light color balance using a reference light-source (optical comparator), proceed as follows:

a. Connect a J6502 Irradiance Probe to the J16 Digital Photometer. Depress the J16 Power and X0.1 pushbuttons.

NOTE

The J16 Photometer X0.1 and X10 pushbuttons are used in this procedure when measuring irradiance in microwatts/cm^2. If you are using a J16 Option 2 Photometer with a J6502 Option 2 Probe to measure irradiance in milliwatts/m^2, use the X1 and X100 pushbuttons to obtain the proper readout ranges.

b. With no light entering the J6502 Probe, zero the J16 Photometer.

c. Set the test signal generator for a white flat field output as follows: 10 IRE for NTSC monitor; blanking (0% peak white) for 50-Hz and 60-Hz PAL models.

d. Press the DEGAUSS pushbutton for at least 5 seconds.

e. Using the setup shown in Fig. 2-4, take individual low-light output readings for the red, green, and blue screens. Record these readings in Table 2-3.

Table 2-3

PHOTOMETER READINGS

Test Signal Generator Output		J16 Photometer Readout		
To NTSC Monitor	To 50-Hz or 60-Hz PAL Monitor	Red	Green	Blue
10 IRE	Blanking (0% Peak White)			
100 IRE	100% Peak White			

f. Connect a J6503 Luminance Probe in place of the J6502 Probe to the J16 Photometer. Depress the J16 Photometer X1 pushbutton. Set the test signal generator for full (100 IRE or 100%) white flat field output. Set the monitor CONTRAST control to obtain a reading of 30 footlamberts (or 103 candelas/m^2 if a J6503 Option 2 Probe is used on a J16 Option 2 Photometer).

g. Connect a J6502 Irradiance Probe in place of the J6503 Probe to the J16 Photometer. Depress the X10 pushbutton. Take individual screen high-light output readings. Record these readings in Table 2-3.

h. Return the CONTRAST control to PRESET. Adjust the monitor left front panel RED, GREEN, and BLUE SCREEN GAIN adjustments to obtain the same light-output readings as those obtained in part g of this procedure.

i. Repeat part c. Adjust the monitor RED, GREEN, and BLUE SCREEN BIAS adjustments to obtain the same low-light output readings as those previously recorded in part e of this step. Set the generator for full (100 IRE or 100%) white flat field output and repeat part h. Do this as often as necessary to obtain the same low- and high-light output readings as those recorded in Table 2-3. This completes the procedure for calibrating a 650A-Series Monitor that will be used as a "standard".

j. Use the recorded light output readings in Table 2-3 to "standardize" other TEKTRONIX 650A-Series Monitors that are operating under the same ambient light conditions.

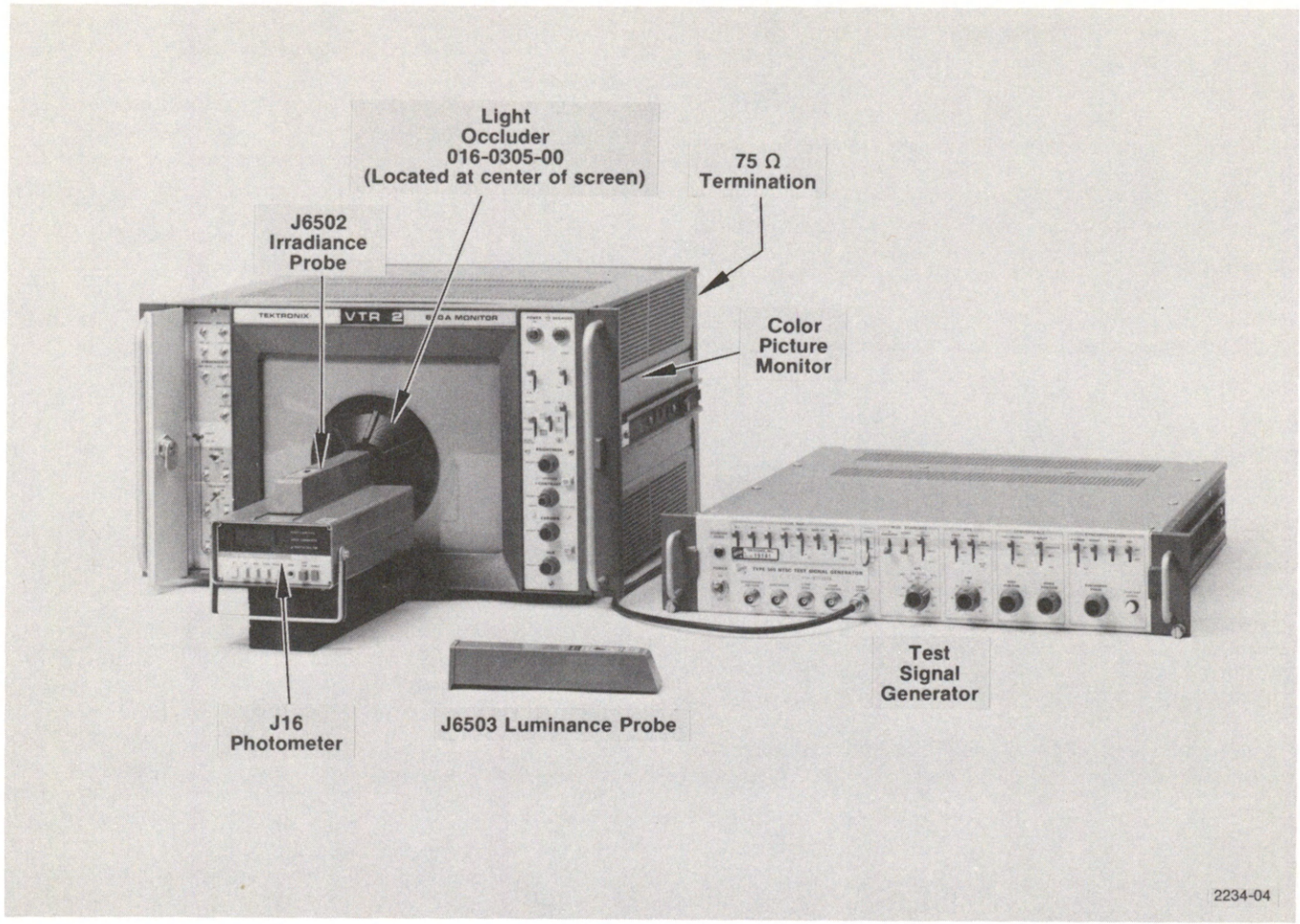


Fig. 2-4. Equipment setup when using the TEKTRONIX J16 Digital Photometer to derive readings for matching monitors.

TALLY SYMBOL INSTALLATION

There are two spring-loaded panels on the front of the instrument. These are located to the left and right sides of the tally light (see Fig. 2-2). To install a tally identification symbol that will be illuminated by the tally light, slide one of the spring-loaded panels inward slightly. Lift the panel sufficiently to clear the frame and then slide the panel outward over the frame.

NOTE

The tally identification set is shipped in the same carton as the instrument. Cut out the symbols to be installed.

The sequence for mounting the parts in the tally window is as follows:

1. Install the light diffuser in front of the lamps.

2. Place the tally number or letter in front of the light diffuser.

3. Install the tally word.

4. Install the clear plastic window.

5. Slide the spring-loaded panel to its original position.

SPECIFICATION

ELECTRICAL CHARACTERISTICS

Performance Conditions

Meeting performance requirements listed in this section assures accurate instrument performance. Where we have deemed it necessary, these performance requirements are specifically tested by the Performance Check/Calibration Procedure found in Section 6. When the Performance Check/Calibration Procedure is satisfied, whether through initial factory calibration or readjustment, all performance requirements will be met.

In some specific cases where a requirement is not checked, the equipment needed to make the check may be extremely expensive, not readily available, or the procedure necessary to verify performance is very exacting. Under these circumstances sampling and repetitive testing is done at the factory to ensure that these performance requirements will continue within stated limits.

The specified limits of the instrument calibration characteristics are valid with the following conditions: The instrument must have been calibrated at an ambient temperature between +20° C and +30° C, operated within an ambient temperature of 0° C to +50° C, and must have a warm-up period of at least 30 minutes.

NTSC PERFORMANCE

CONNECTORS: BNC.

SIGNAL LEVEL: 0.5 V peak-to-peak minimum composite video; 2 V peak-to-peak maximum.

IMPEDANCE

UNTERMINATED: High Z bridging inputs loop-through compensated for 75 ohms (not internally terminated).

RETURN LOSS: At least 46 dB to 5 MHz, power on or off, input in use or not.

MAXIMUM SAFE INPUT: Exceeds CCIR Recommendation 451-2 (±5 V peak).

HUM REJECTION: Hum is at least 50 dB down when 4 V maximum rms mains hum signal is applied to the monitor in floating ground mode.

DIFFERENTIAL A-B INPUT COMMON MODE REJECTION: 46 dB, or greater, up to 4.43 MHz.

LUMINANCE CHANNEL

DC RESTORATION: Back porch type; not affected by burst. Mains hum reduction due to dc restorer is less than 6 dB.

AMPLITUDE LINEARITY: Within 2%.

BANDPASS: Approximately 6 MHz with variable APERTURE control set fully counterclockwise but not in the detent position, and MODE switch set to MONOCHROME.

APERTURE CORRECTOR RANGE: 0 dB to approximately 10 dB boost at 2.5 MHz. Preset aperture correction may be adjusted within this range according to user preference or application.

CHROMINANCE CHANNEL

DEMODULATION AXIS: R-Y, B-Y.

BANDPASS: 1.3 MHz equiband.

GAIN RANGE: Preset at 0 dB; adjustable from −6 dB to +10 dB.

RESIDUAL SUBCARRIER DETECTION (on applied signal): Color of displayed picture will shift due to any residual subcarrier. This feature can be inhibited by a jumper on the Decoder board.

CHROMINANCE/LUMINANCE

TIME ERROR: Less than 30 nanoseconds.

GAIN ERROR: Less than 3%.

DELAY: Red to green to blue is less than 50 nanoseconds.

SUBCARRIER REGENERATION

PHASE ERROR: Within 1° with input burst variation of ±10 Hz from 3.579545 MHz, nominal burst level.

WITH TEMPERATURE VARIATION: Within 5° with ambient temperature variation from 0° C to 50° C; within 1° for an 10° C increment within the range 0° C to 50° C.

WITH INPUT SIGNAL VARIATION: Within 1° with input signal variation of ±3 dB from 1.0 V. Within 3° with variation of burst/sync ratio of −6 dB to +10 dB.

BREEZEWAY STABILITY: 0.2° or less for burst timing errors including burst width variance (8-11 cycles), and breezeway variance ±0.28 μs.

PHASE ERROR DUE TO NOISE: Within 1° with rms white noise at −24 dB (0 dB = 700 mV rms).

PAL PERFORMANCE

CONNECTORS: BNC.

SIGNAL LEVEL: 0.5 V peak-to-peak minimum composite video; 2 V peak-to-peak maximum.

IMPEDANCE

UNTERMINATED: High Z bridging inputs loop-through compensated for 75 ohms (not internally terminated).

RETURN LOSS: At least 46 dB to 5 MHz, power on or off, input in use or not.

MAXIMUM SAFE INPUT: Exceeds CCIR Recommendation 451-2 (±5 V peak).

HUM REJECTION: Hum is at least 50 dB down when 4 V maximum rms mains hum signal is applied to the monitor in floating ground mode.

DIFFERENTIAL A-B INPUT COMMON MODE REJECTION: 46:dB, or greater, up to 4.43 MHz.

LUMINANCE CHANNEL

DC RESTORATION: Back porch type; not affected by burst. Mains hum reduction due to dc restorer is less than 6 dB.

AMPLITUDE LINEARITY: Within 2%.

BANDPASS: Approximately 6 MHz with variable APERTURE control set fully counterclockwise but not in the detent position, and the internal Bandpass jumper set to Wideband.

APERTURE CORRECTOR RANGE: 0 dB to approximately 10 dB boost at 2.5 MHz. Preset aperture correction may be adjusted within this range according to user preference or application.

CHROMINANCE CHANNEL

DEMODULATION AXIS: U, V.

BANDPASS: Approximately 1.2 MHz.

GAIN RANGE: Preset at 0 dB; adjustable from −6 dB to +10 dB.

RESIDUAL SUBCARRIER DETECTION (on applied signal): Color or displayed picture will shift due to any residual subcarrier. This feature can be inhibited by a jumper on the Decoder board.

CHROMINANCE/LUMINANCE

TIME/ERROR: Less than 30 nanoseconds.

GAIN ERROR: Less than 3%.

DELAY: Red to green to blue is less than 50 nanoseconds.

SUBCARRIER REGENERATION

PHASE ERROR: Within 1° with input burst variation of ±10 Hz from 4.433619 MHz, nominal burst level.

WITH TEMPERATURE VARIATION: Within 5° with ambient temperature variation from 0° C to 50° C; within 1° for any 10°C increment within the range 0°C to 50°C.

WITH INPUT SIGNAL VARIATION: Within 1° with input signal variation of ±3 dB from 1.0 V. Within 3° with variation of burst/sync ratio of −6 dB to +10 dB.

BREEZEWAY STABILITY: 0.2° or less for burst timing errors including burst width variance (8-11 cycles), and breezeway variance ±0.28 μs.

PHASE ERROR DUE TO NOISE: Within 1° with rms white noise at −24 dB (0 dB = 700 mV rms).

RGB PERFORMANCE

CONNECTORS: BNC.

SIGNAL LEVEL: 0.5 V to 2 V peak-to-peak.

IMPEDANCE

UNTERMINATED: High Z bridging inputs loop-through compensated for 75 ohms (not internally terminated).

RETURN LOSS: At least 46 dB to 5 MHz, power on or off, input in use or not.

MAXIMUM SAFE INPUT: Exceeds CCIR Recommendation 451-2 (±5 V peak).

HUM REJECTION: Hum is at least 50 dB down when 4 V maximum rms mains hum signal is applied to the monitor in floating ground mode.

INTERNAL SYNC: Obtained from green channel composite signal.

LUMINANCE CHANNEL

DC RESTORATION: Back porch type; not affected by burst. Mains hum reduction due to dc restorer is less than 6 dB. Shift in blanking level due to APL variations from 10% to 90% is less than 2 IRE.

AMPLITUDE LINEARITY: Within 2%.

BANDPASS: Approximately 6 MHz.

PICTURE

HEIGHT: 7.23 inches or 184 mm.

WIDTH: 9.64 inches or 244 mm.

UNDERSCAN: Approximately 20% reduction in both height and width.

ASPECT RATIO: 3:4.

DEFLECTION LINEARITY (Vertical and Horizontal): ±1% within a central area bounded by a circle whose diameter equals picture height; ±2% outside of the central area.

CONVERGENCE ERROR: Less than 1 mm within the central area. Outside of the central area, color separation (misconvergence) is less than 2 mm.

UNBLANKING: All active picture elements are displayed. (Horizontal retrace is accomplished within 10 μs).

COLOR TEMPERATURE: 6500°K. Adjustable to other standards.

CALIBRATED CONTRAST: 30 footlamberts at peak white of standard 1 V signal.

CALIBRATED BRIGHTNESS: Displayed black may be adjusted to black level of input signal.

EHT (Extremely High Tension): 19 kV nominal, regulated. Load variations cause less than 1% picture height variation. Monitor complies with DHEW standards under Radiation Control for Health and Safety Act of 1968, applicable at date instrument was manufactured.

KINESCOPE PROTECTION: Failure of horizontal and vertical scanning shuts off the EHT. Failure of H.V. Regulator circuit does not cause EHT to soar excessively. EHT supply is current limited.

HEATER VOLTAGE: Regulated dc.

SYNC & TIMING

CONNECTORS: BNC.

SIGNAL RANGE: Composite sync 0.5 V peak-to-peak to 8 V peak-to-peak or composite video 0.5 V peak-to-peak to 2 V peak-to-peak.

IMPEDANCE

UNTERMINATED: High Z bridging inputs loop-through compensated for 75 ohms (not internally terminated).

TERMINATED: 75 ohms.

RETURN LOSS: At least 46 dB to 5 MHz with respect to 75 ohms.

HUM REJECTION: Hum is at least 50 dB down when 4 V maximum rms mains hum signal is applied to the monitor in floating ground mode.

SYNCHRONIZATION: Stable subcarrier regeneration, limited by line sync performance. Line sync white noise immunity is 20 dB. Field sync white noise immunity is 20 dB. Field sync will remain stable with tilt equal to 100% of sync amplitude in vertical blanking or with 20 IRE mains hum.

AFC: Two-loop AFC type.

PHASE CORRECTOR: Corrects for phase errors due to side pin cushion correction and other effects within the monitor.

SLOW AFC: Displays timing errors of incoming sync; particularly, 60 Hz or 240 Hz timing errors. Bandwidth is approximately 25 Hz.

FAST AFC: Largely corrects for incoming sync errors; approximately 2 kHz bandwidth.

SCAN DELAY

HORIZONTAL DELAY: Approximately 1/4 line; displays burst.

VERTICAL DELAY: Approximately one-half field; vertical scan is expanded unless underscan is activated.

PULSE CROSS: Displays horizontal and vertical blanking intervals; vertical blanking is expanded unless underscan is activated. All equalizing pulses are displayed.

POWER SUPPLY ELECTRICAL CHARACTERISTICS

This instrument is designed for operation from a power source with its neutral at or near ground (earth) potential. It is not intended for operation from two phases of a multiphase system, or across the legs of a single-phase, three-wire system.

It is provided with a three-wire power cord with a three-terminal polarized plug for connection to the power source. The third wire is directly connected to the instrument frame, and is intended to ground the instrument to protect operating personnel, as recommended by national and international safety codes.

POWER INPUT

LINE VOLTAGE RANGE

115 V: Within 10% (104 Vac to 126 Vac).

230 V: Within 10% (207 Vac to 253 Vac).

CREST FACTOR: At least 1.3.

LINE CURRENT: 1.5 A rms maximum at 115 V, 60 Hz. 0.75 A maximum at 230 V, 50 Hz. Current is substantially higher during degaussing.

DEGAUSSING SURGE CURRENT: 5 A rms.

POWER CONSUMPTION: 150 W maximum, 110 W typical.

LINE FREQUENCY: 48 Hz to 66 Hz.

PHYSICAL CHARACTERISTICS

FINISH: Anodized aluminum front panel.

DIMENSIONS (Overall)	Cabinet Version	Rackmount Version
Height	11 inches (27.940 cm)	10.46 inches (26.568 cm)
Width	16.75 inches (42.545 cm)	19 inches (48.260 cm)
Length	16.5 inches (41.910 cm)	18.25 inches (46.355 cm)
WEIGHTS		
Net Weight	50 lbs (22.7 kg)	52 lbs (23.6 kg)
Domestic Shipping Weight	≈65 lbs (≈29.5 kg)	≈67 lbs (≈30.4 kg)
Export-Packed Weight	≈80 lbs (≈36.3 kg)	≈82 lbs (≈37.2 kg)

ENVIRONMENTAL CHARACTERISTICS

The following environmental test limits apply when tested in accordance with the recommended test procedure. This instrument will meet the electrical performance requirements given in this section following an environmental test.

TEMPERATURE

NON-OPERATING: −40°C to +65°C.

OPERATING RANGE: 0°C to +50°C.

ALTITUDE

NON-OPERATING: To 50,000 feet.

OPERATING RANGE: To 15,000 feet.

VIBRATION: To 0.015 inch peak-to-peak displacement at 50 Hz.

SHOCK: To 30 g's, 1/2 sine, 11 ms duration.

ACCESSORIES

Standard accessories supplied with this instrument can be found on the last page of the Replaceable Mechanical Parts list illustrations. For additional accessories, see the current Tektronix, Inc. catalog.

WARNING

THE FOLLOWING SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID PERSONAL INJURY, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO.

PART II
SERVICE & SETUP INFORMATION

WARNING

SERVICE INSTRUCTIONS ARE INTENDED FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID ELECTRIC SHOCK DO NOT ATTEMPT ANY SERVICING OTHER THAN THAT CONTAINED IN THE OPERATOR'S INFORMATION PORTION UNLESS YOU ARE QUALIFIED TO DO SO.

INTRODUCTION

This part of the manual is to be used by qualified personnel only. In addition to the Safety Information that follows, please read the Safety Summary located at the start of "Part I—Operator's Information."

INSTALLATION

Safety Information

The following are general safety precautions that must be observed during all phases of operation and maintenance.

WARNING

Do not service or make internal adjustments to this instrument unless another person, capable of giving first aid and resuscitation, is present.

Avoid live circuits. Electrical shock hazards are present in the instrument. To avoid electrical shock, disconnect the instrument from the power source before touching components or soldering.

Avoid coming in contact with components that are operating at a high temperature, such as the high wattage resistors spaced above the board, power transistors, and some of the metal case transistors.

Handle silicone grease with care. Avoid getting silicone grease in the eyes. Wash hands thoroughly after use.

Power Transformer and Fuse

The instrument is delivered wired for either 115 Vac or 230 Vac operation, with a proper fuse installed. The line voltage for which the instrument is wired is indicated on the rear panel adjacent to the power receptacle.

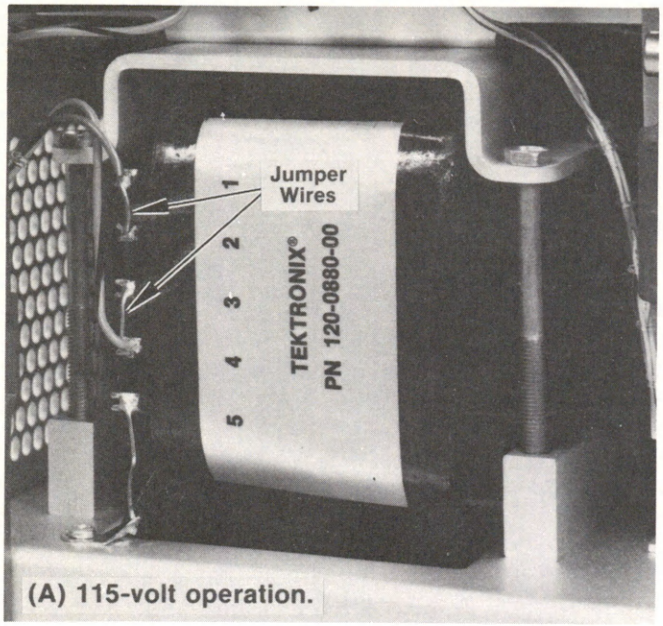
To change the operating voltage of the instrument, use the following procedure:

1. Disconnect the power cord. Remove the top and bottom dust covers from the instrument.

2. Remove the left chassis section of the the slide-out tracks and the rack release latch assembly by removing four 8-32 X 0.312 inch PNH screws and a spacer washer.

3. Remove the left frame section by removing four 8-32 X 0.375 inch PNH screws and two 8-32 X 0.312 inch FHS screws.

4. Slide the clear-plastic split tubing off the transformer primary winding terminals.



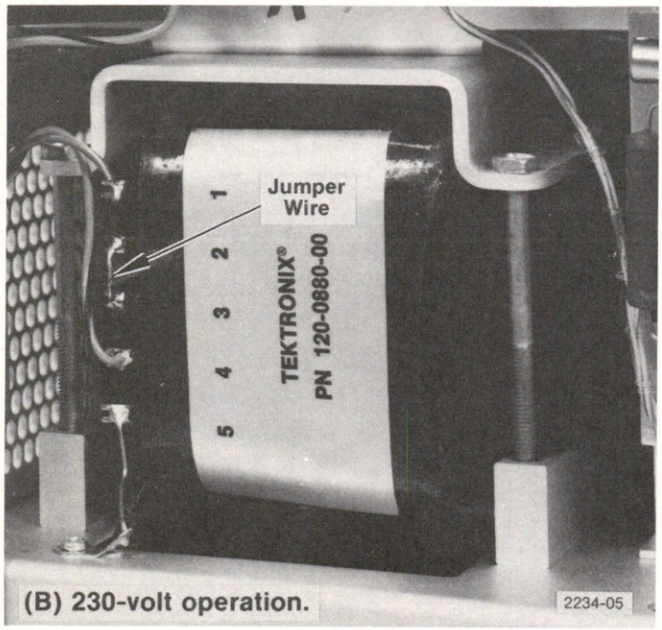


Fig. 4-1. Left side rear portion of the instrument with left frame section removed to show location of the LV power transformer primary connections.

5. Change the transformer jumper wiring.

a. For 115-volt operation the jumper wires are connected between terminals 1 and 2, and terminals 3 and 4 as shown in Fig. 4-1A.

b. For 230-volt operation only one jumper wire is used. This jumper connects between terminals 2 and 3 as shown in Fig. 4-1B.

6. Reinstall the plastic tubing, left frame section, slide-out track chassis section with rack release latch assembly and dust covers.

7. Move the silver adhesive tape, located adjacent to the power receptacle to expose the new operating voltage and cover the former voltage.

8. Change the fuse. The fuse holder and data is located on the rear panel near the power receptacle. Additional fuse information is given in Section 2—Rear Panel Fuse Replacement.

Tally Light Power Input 24 V Connector

This connector provides remote operation of the front-panel tally light when an external 24-Vac or dc source is applied to two pins of the 3-pin connector. The tally light circuit is not grounded and consists of two 14 V incandescent lamps connected in series.

Refer to Fig. 4-2 and the L.V. Power Supply diagram when wiring the plug (not supplied) that mates with the TALLY LIGHT POWER INPUT 24 VOLTS connector.

If you need to order a plug, the description is as follows: Connector, female, with cable clamp; Cinch-Jones S-303-CCT; Tektronix Part No. 131-1328-00.

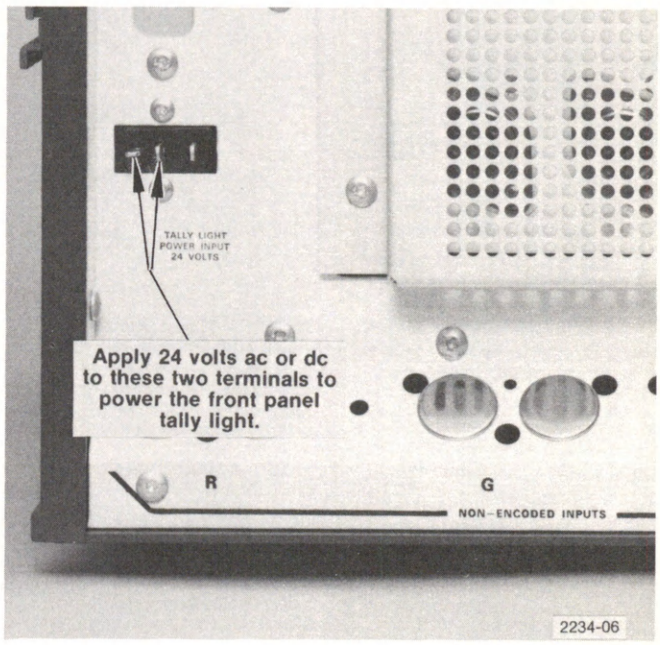


Fig. 4-2. Tally light external power connections.

Left Front-Panel Door Removal

The left front-panel lockable door can be removed, if desired, for easier access to the switches and adjustments.

To remove the door, use a pointed tool to press in on the top spring-loaded hinge pin. While pressing on the pin, move the top of the door slowly outward. Be prepared to catch the top and bottom hinge pins and springs as the door is removed. Place the small parts in a container and attach the container to the door to prevent losing these parts.

OPERATING CHANGES

Introduction

Two of the circuit boards have jumper connectors that can be moved to change the operation of the monitor. This portion of the manual describes these changes and shows the location of the jumpers.

Chroma Zero Reference Jumpers P2097 and P3090

A Chroma Zero Reference (Residual Subcarrier) jumper is provided on the Decoder board. For monitors with NTSC decoder, this jumper is P2097 (see Fig. 4-3A); for monitors with a 50-Hz PAL decoder, this jumper is P3090 (see Fig. 4-3B).

As connected at the factory, the jumper is set to the Residual Subcarrier Displayed position; that is, pins 1 and 2 are jumpered. This position enables the monitor to display the effects of residual subcarrier that may be present in the composite video color signal applied to the monitor. Residual subcarrier, if present, causes the displayed colors to shift.

If you prefer to remove the effects of residual subcarrier from the displayed picture, move the jumper connector to the Residual Subcarrier Removed position so that pins 2 and 3 are jumpered.

The Residual Subcarrier Removed position of the Chroma Zero Reference jumper is also useful for displaying velocity error, if present, when operating a VTR (video tape recorder). Velocity error consists of two major chroma distortions:

1. Chroma amplitude or saturation errors due to minute head-to-head differences, compensation for incorrect guide height settings, and non-uniform coating of the magnetic recording tape.

2. Chroma phase caused by incorrect guide height or head-to-head scanning differences between record and playback.

Bandpass Jumper P3790

As shown in Fig. 4-3B, the Bandpass jumper for monitors with a 50-Hz PAL decoder is P3790. Check that this jumper is set to the Narrow position; that is, pins 1 and 2 are jumpered as shown in Fig. 4-3B. This is the factory-set normal operating position.

The Bandpass jumper controls the bandwidth and delay time of the luminance signal in the Luminance Processing circuit on the PAL Decoder board. In the Narrow position, the luminance signal is delayed to compensate for circuit delays in chrominance processing. Also, a chroma trap removes unwanted chrominance information from the luminance channel.

In the Wide position of the jumper, pins 2 and 3 are jumpered to allow the delay line and chroma trap to be bypassed so that full bandwidth signals are applied to the luminance processing circuits. This position is useful when checking A-B common-mode rejection, viewing monochrome displays, and troubleshooting the luminance channel including the output amplifier circuitry.

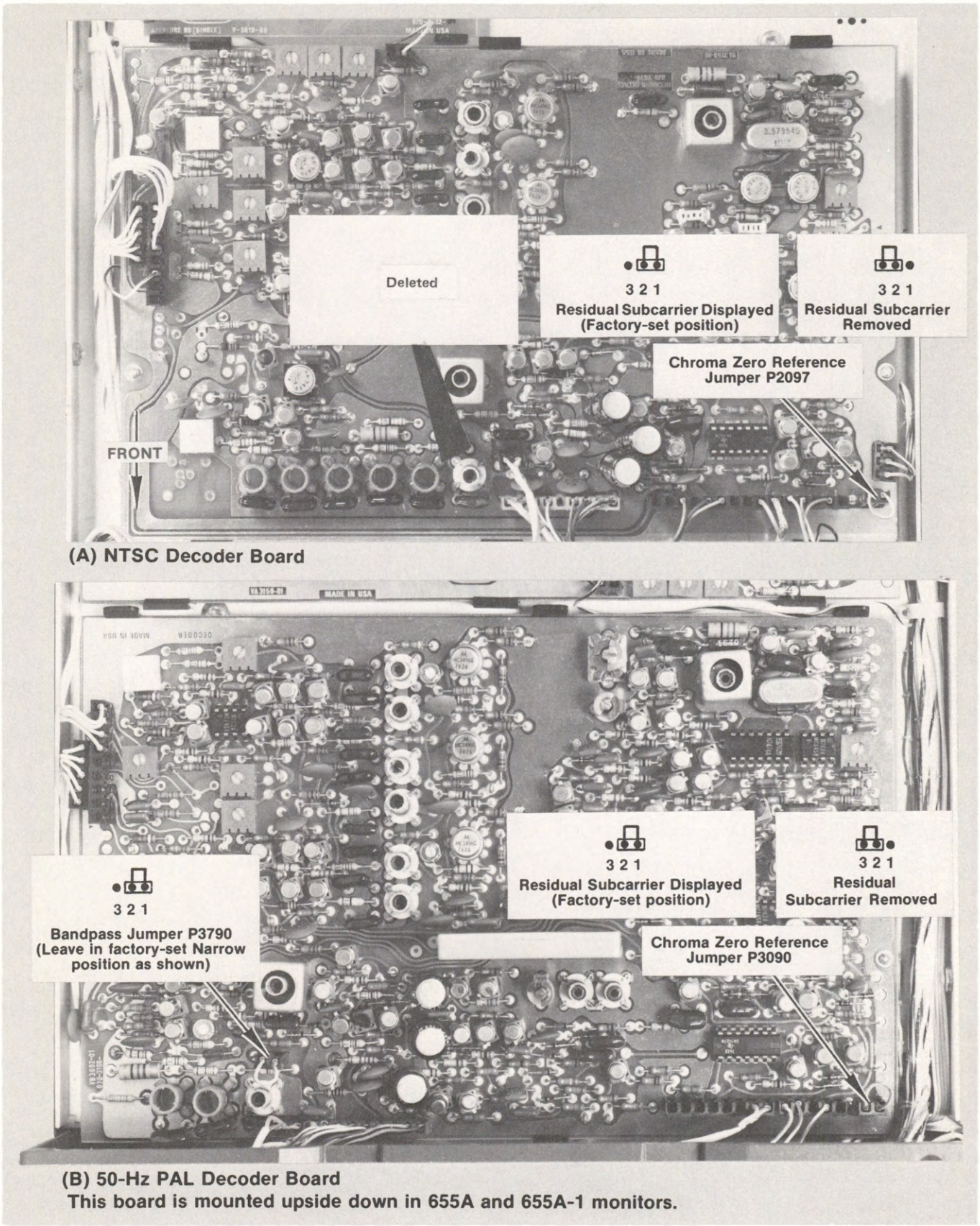


Fig. 4-3. Right side view showing locations of the Decoder circuit board jumpers. Right frame section was removed to provide a clear view.

RGB Operation P1950

A jumper is provided on the Sync & Timing board to properly center the picture for RGB operation. This jumper (P1950) is located on the rear two pins (see Fig. 4-4) for instruments containing both decoder and RGB capability to permit automatic delay change as the front-panel STANDARD switch is operated.

For special monitors having RGB only capability the jumper should be placed on the front two pins since these instruments do not have a Decoder board.

RACKMOUNT TO CABINET CONVERSION

The picture monitor, as shipped from the factory, is a rackmount version that can be converted for bench use as follows:

Remove the bottom dust cover from the monitor and install the four feet on the cover. Reinstall the bottom cover.

NOTE

The four feet with screws are shipped in the same carton with the instrument.

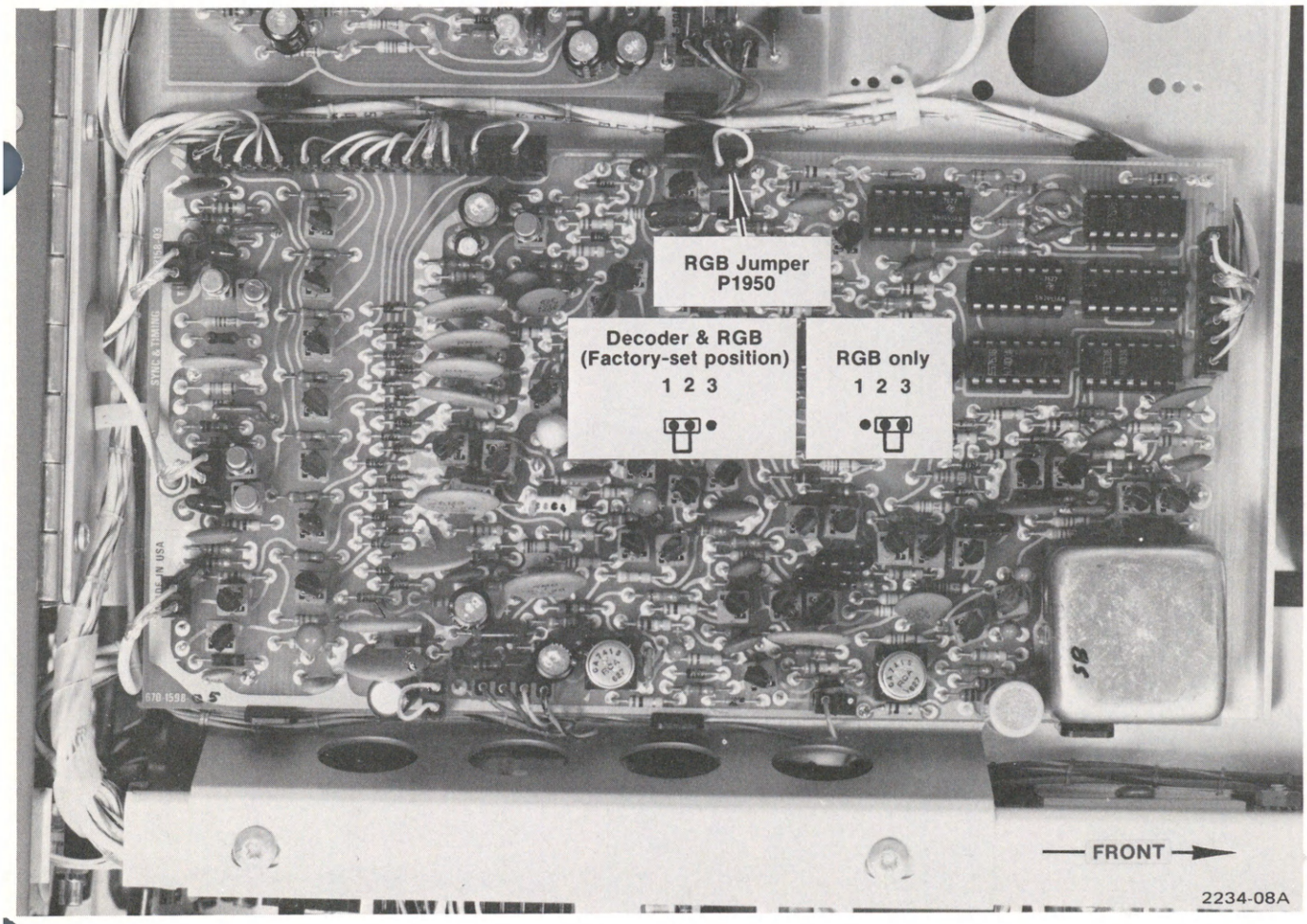


Fig. 4-4. Partial Sync & Timing board showing location of the RGB jumper connector. This board is mounted on the Sync chassis located on the top side of the instrument.

RACKMOUNTING

Description of Slide-Out Track Assemblies

The slide-out tracks consist of two assemblies, one for the left side of the monitor and one for the right side. Each assembly consists of three sections as illustrated in Fig. 4-5. The stationary section with its intermediate section attaches to the front and rear rails of the rack with inside dimensions as indicated in Fig. 4-6. The chassis sections are mounted to the left and right sides of the instrument at the factory.

The stationary and intermediate sections are shipped as a matched set as shown in Fig. 4-5, and should not be interchanged. Extra hardware is provided with the slide-out track assemblies. The hardware enables the slide-out tracks to be mounted in a variety of cabinet racks. Since not all the hardware will be used for rackmounting the instrument, some parts will be left over.

Latching. The 650A-Series monitor incorporates a new spring-latch design built into the rack handle system. This "quick release" feature is actuated by grasping the handles, pressing the latch bars toward the center of the instrument, and pulling the monitor forward until the intermdeiate slide sections automatically lock. To push the monitor into the rack, press the stop latches on the sides of the extended intermediate slide sections, and push the monitor back until the rack release latches catch.

NOTE

Because of the spring-latch feature, the monitor will not latch to already installed stationary slide sections. Therefore, the supplied slide-out track assemblies (351-0301-01) must be used. These new assemblies provide a square cut-out hole in the stationary section to catch the shoulder of the rack release latch.

Rack Width

The picture monitor fits most 19-inch wide cabinet racks and consoles whose front and rear rails conform to the rack rail hole spacing shown in Fig. 4-7.

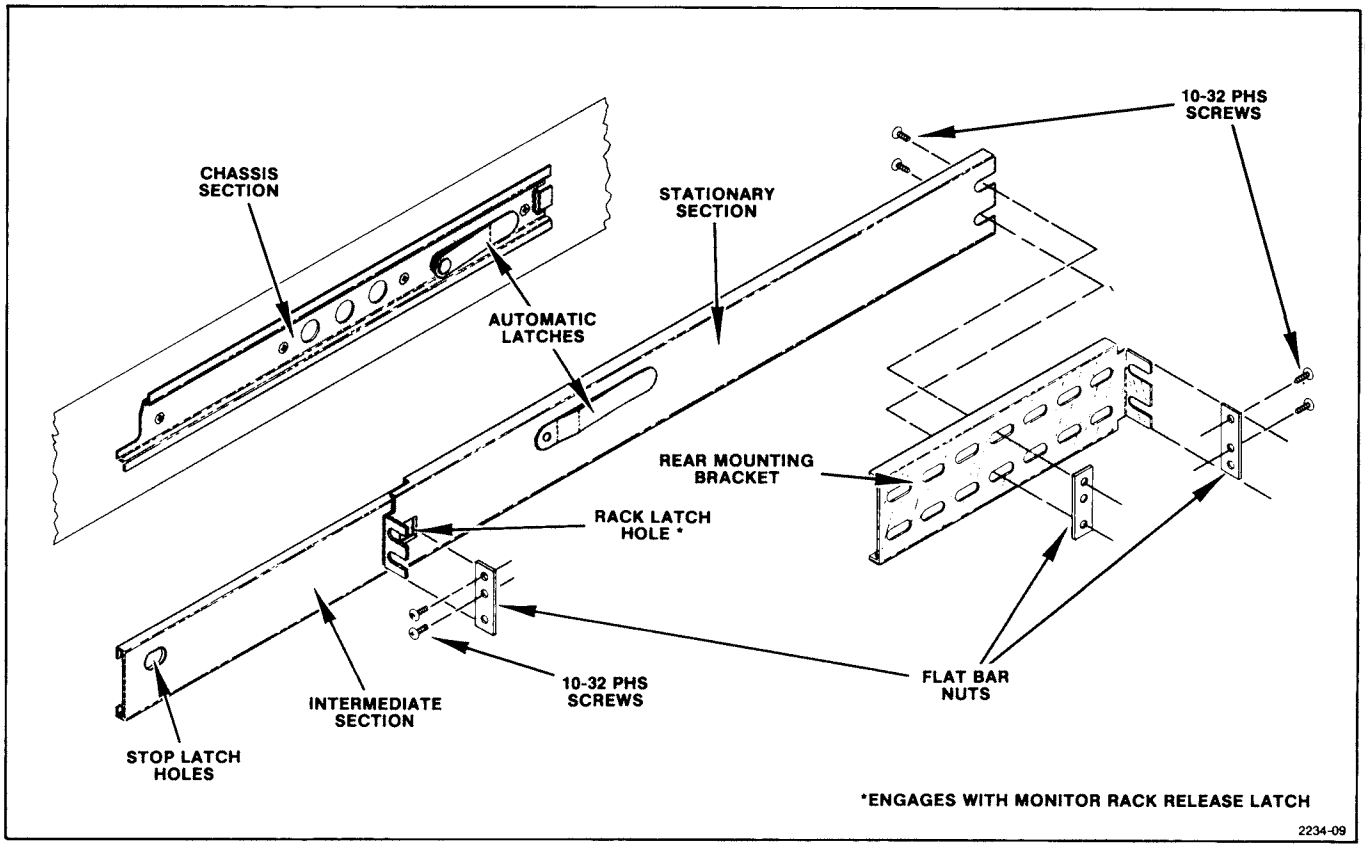


Fig. 4-5. Rackmounting hardware for the right side.

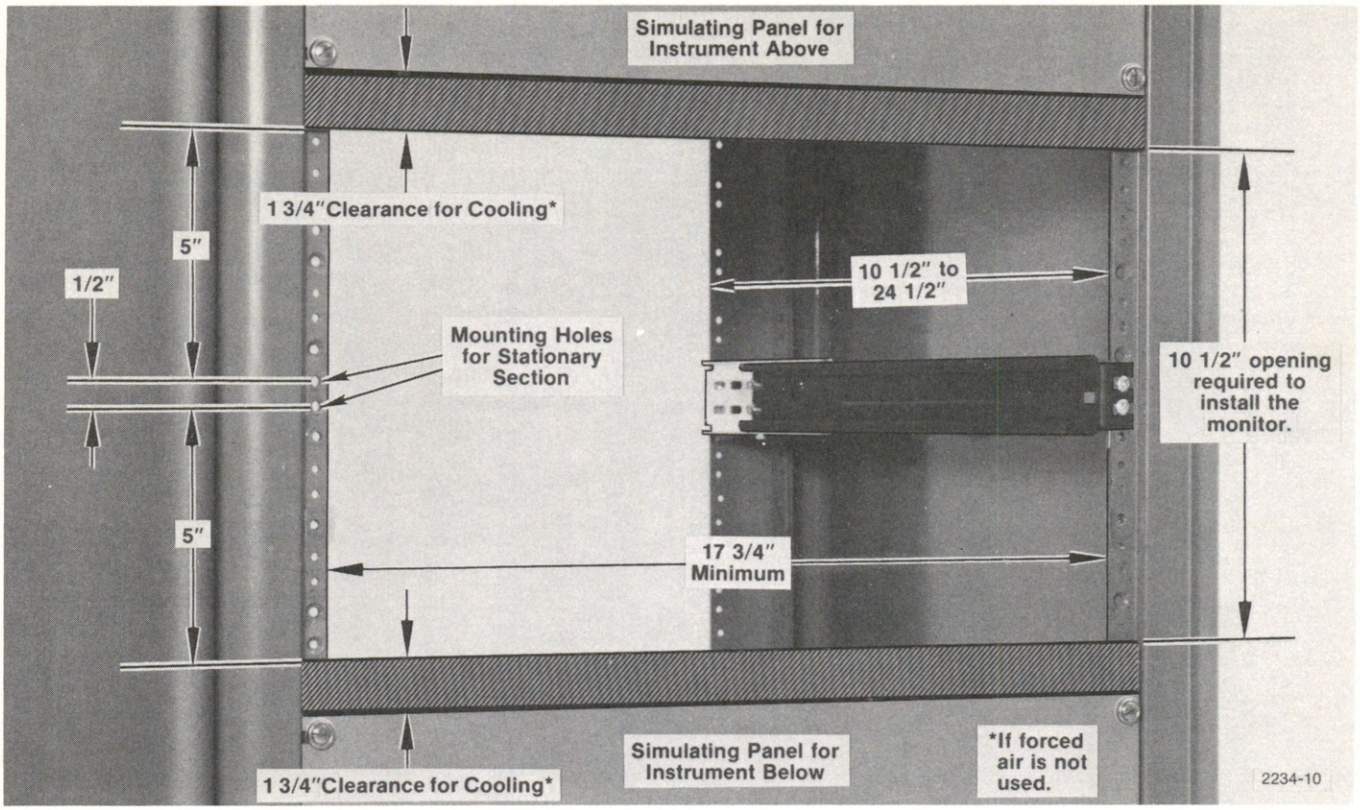


Fig. 4-6. Vertical mounting position of the left stationary section. These same dimensions apply to the right front rail.

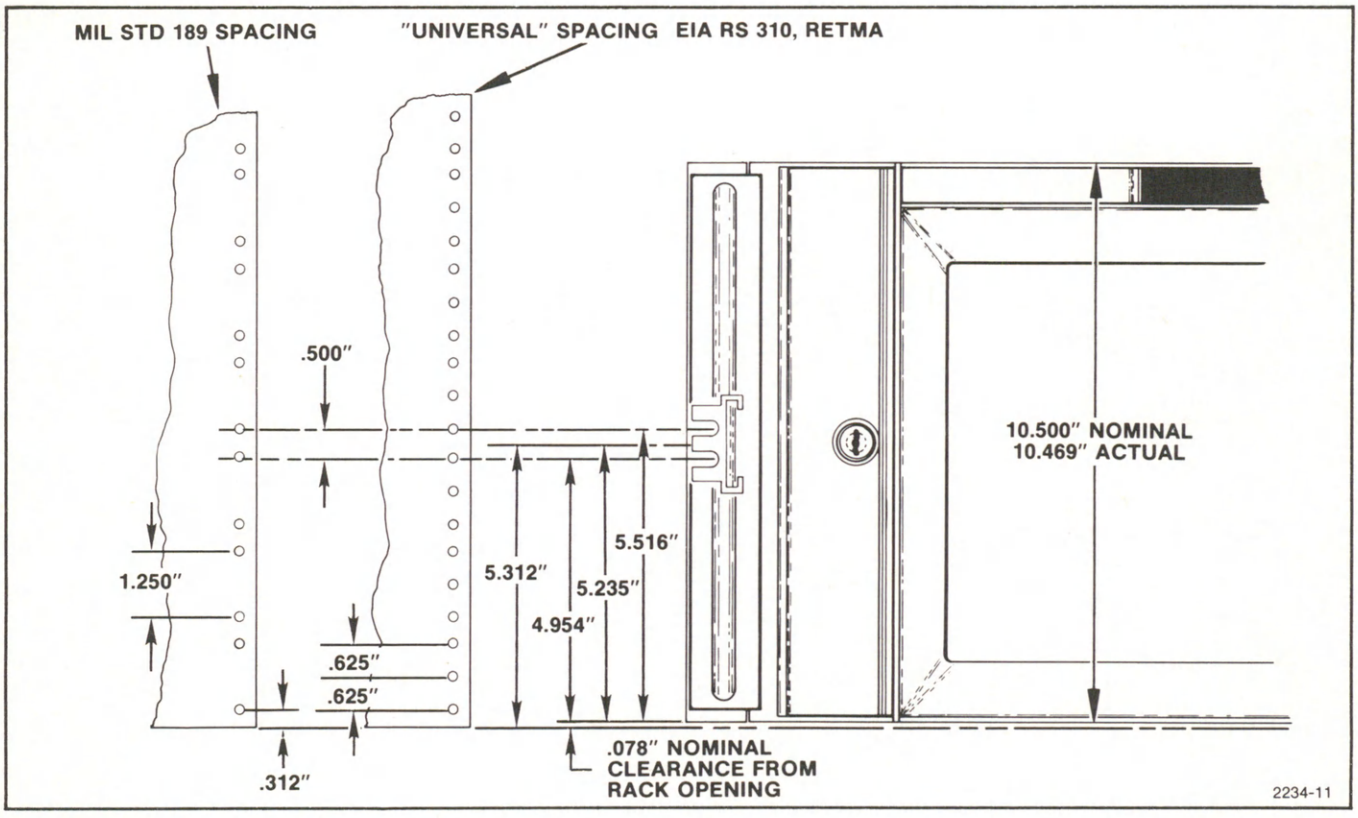


Fig. 4-7. Rack rail hole spacing. Dimensions above are given in inches.

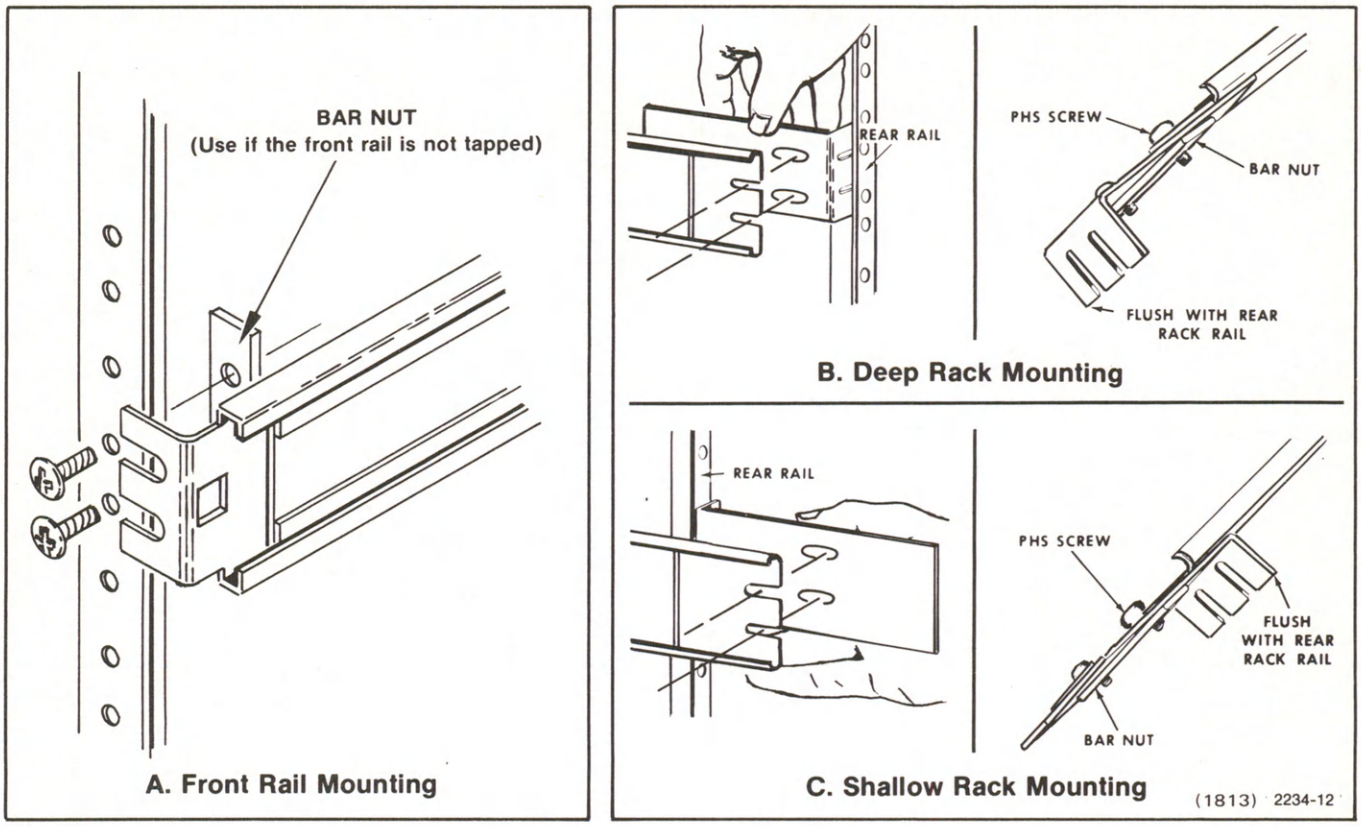


Fig. 4-8. Rackmounting details.

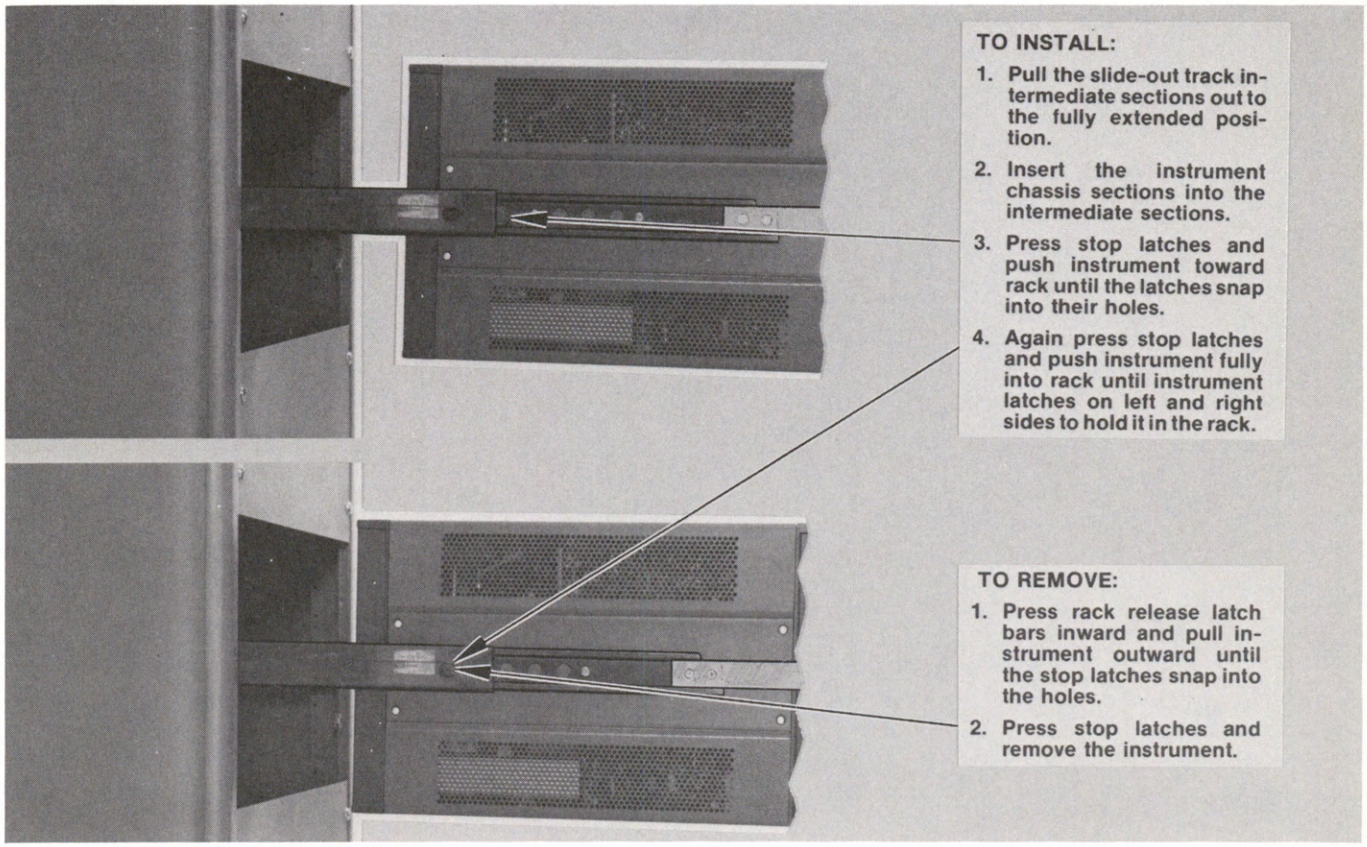


Fig. 4-9. Installing and removing the instrument.

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The dimension or opening between the front rails must be at least 17-3/4 inches (see Fig. 4-6) for a rack in which the front lip of the slide-out track stationary section mounts in front of the rail as shown in Fig. 4-8. This dimension allows space on each side of the instrument for the slide-out tracks to operate freely.

Rack Depth

Allow at least 2 inches clearance behind the rear of the instrument and any enclosure of the rack for sufficient cool air circulation. Allow 1-3/4 inches at the top and bottom of the instrument for air circulation if forced air cooling is **not** used. The dimensional illustrations (Figs. 4-10 and 4-11) show the ventilation areas for the monitor.

The slide-out tracks easily mount to the cabinet-rack front and rear mounting rails if the inside distance between the front and rear rails is within 10-1/2 to 24-1/2 inches (see Fig. 4-6).

NOTE

This procedure describes mounting the slide-out tracks in a cabinet rack that has **tapped** *rails. Only two bar nuts are needed. These are used to mount the rear mounting brackets to the stationary sections. However, if your rack has* **untapped** *rails, then you will need all the bar nuts supplied.*

Mounting Procedure

To mount the instrument directly above or below another instrument in the cabinet rack, select the appropriate holes in the front rack rails for the stationary sections. Use Fig. 4-6 as a guide.

Mount the left stationary slide-out track section to the front rack rail using the pan head screws as shown in Fig. 4-8A. Mount this same section to the rear rail using one of the methods shown in Fig. 4-8B and C. Note that the rear mounting bracket can be installed either way so the slide-out tracks will fit a deep or shallow cabinet rack. Use the illustrations as a guide for mounting the right stationary section. Make sure that the stationary sections are horizontally aligned so they are level and parallel with each other.

Adjustments

To adjust the slide-out tracks for smooth operation, proceed as follows:

1. Insert the instrument into the rack as described and shown in steps 1 through 4 of the "TO INSTALL" procedure given in Fig. 4-9.

2. Adjust the slide-out tracks for proper spacing by pulling the instrument outward until the front of the instrument protrudes about 10 inches from the rack. Then, slightly loosen the screws that fasten the slide-out track stationary sections to the front rails of the rack. Allow the slides to seek their proper width. Check that the instrument is centered and retighten the screws.

Maintenance

The slide-out tracks do not require lubrication. The special dark gray finish on the sliding parts is a permanent lubricative coating.

Dimensional Illustrations

Refer to Figs. 4-10 and 4-11 for dimensional illustrations of the instrument.

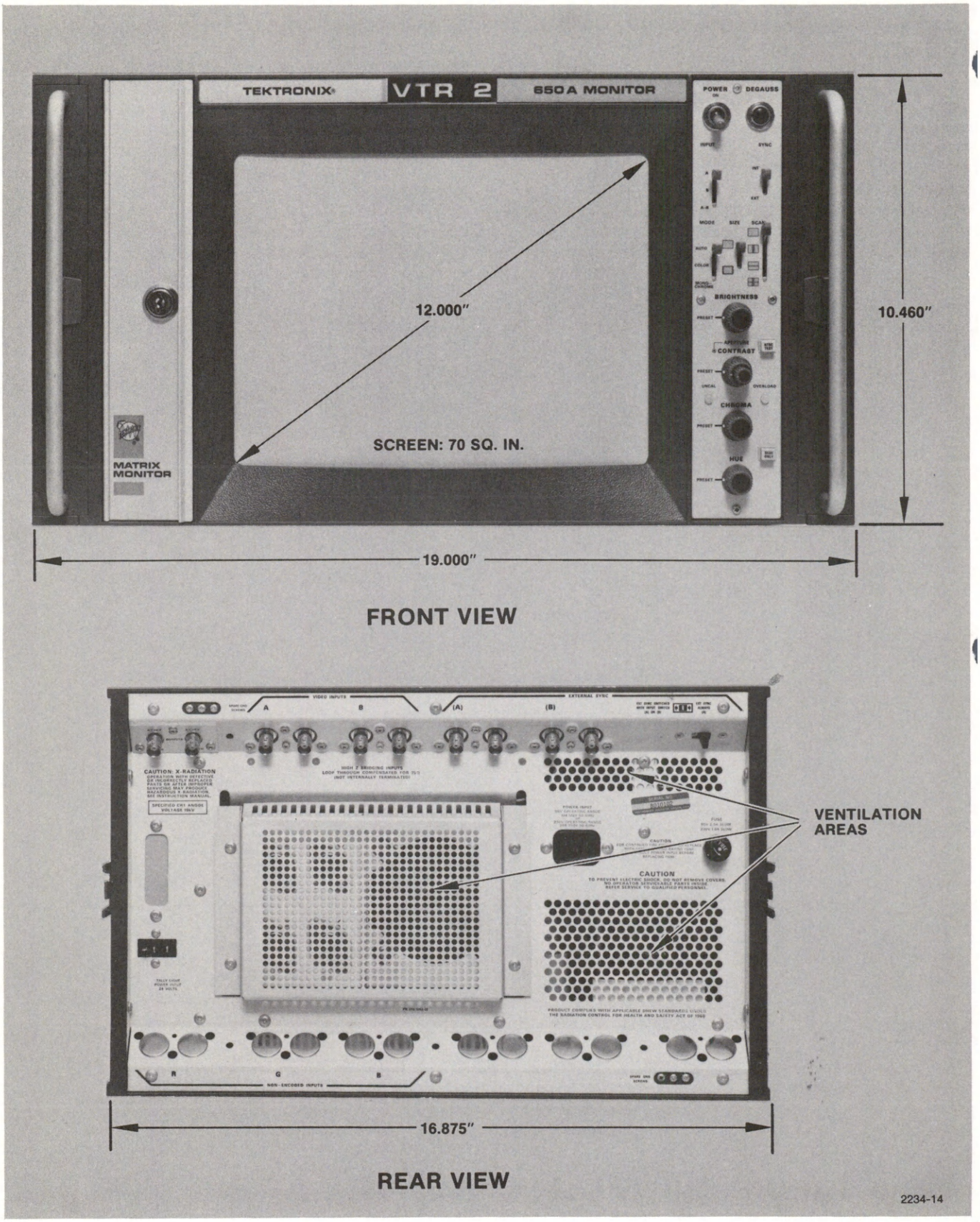


Fig. 4-10. Dimensional illustrations for front and rear of instrument.

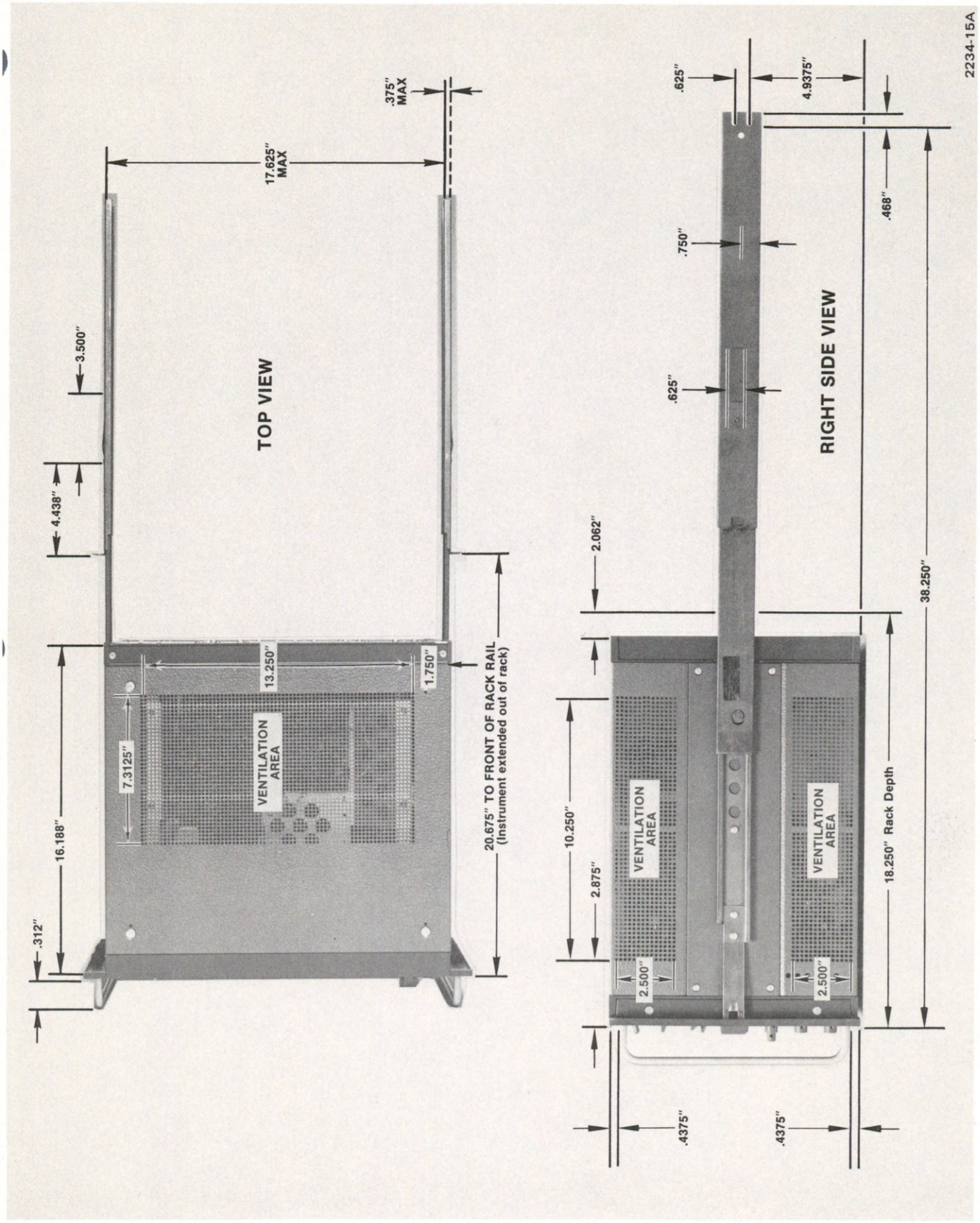


Fig. 4-11. Dimensional illustrations for top and right side of instrument.

MAINTENANCE

The maintenance information contained in this section falls into three categories: Preventive Maintenance, Troubleshooting, and Corrective Maintenance.

Preventive Maintenance includes inspection, cleaning, lubrication, and recalibration. Troubleshooting contains information for isolating a trouble to a component. Corrective Maintenance includes procedures for removing and replacing components.

PREVENTIVE MAINTENANCE

A regular schedule of preventive maintenance can improve instrument reliablity. How often the preventive maintenance schedule is performed should be determined by the severity of the operating environment.

Visual Inspection

Visually inspect the instrument during the preventive maintenance routine for such defects as broken connectors, loose or disconnected pin connectors, improperly seated transistors and integrated circuits, and damaged components.

The corrective procedure for most visible defects is obvious; however, care must be taken to determine and correct the cause of the heat-damaged components. Heat damage is frequently an indication of trouble elsewhere in the instrument.

Multi-pin Connector Identification

Most inter-circuit connections between the circuit boards or between boards and chassis-mounted components are made through multi-pin connectors. The connector holder has identification numbers that identify terminal connector No. 2 and up. A triangular key symbol is used to identify terminal connector No. 1. This symbol is also located on the circuit board to identify pin No. 1 (see Fig. 5-1) so that the connector holder can be properly orientated.

Cleaning

Dust accumulating in the instrument acts as an insulating blanket, preventing heat dissipation, and possibly causing overheating and component breakdown. Accumulated dust can also provide an electrical conduction path, especially under high humidity conditions.

CAUTION

Avoid the use of chemical cleaning agents that might damage the plastics used in this instrument. Avoid chemicals that contain benzene, toluene, xylene, or similar solvents.

Exterior. Remove accumulated dust with a soft cloth or small paint brush. The brush is particularly useful around the front-panel controls.

The remaining dust can be removed with a soft cloth, dampened in a mild detergent and water solution. Do not use abrasive cleaners.

Kinescope. Clean the kinescope face and bezel with a soft, lint-free cloth dampened with mild detergent and water. Repeat with a cloth dampened with water only.

Interior. The best way to remove accumulated dust inside the instrument is to blow it off with dry, low-velocity air. Remaining dust can be removed with a small paint brush followed by a soft cloth dampened in a mild detergent and water solution. A cotton-tipped applicator is useful in tight places.

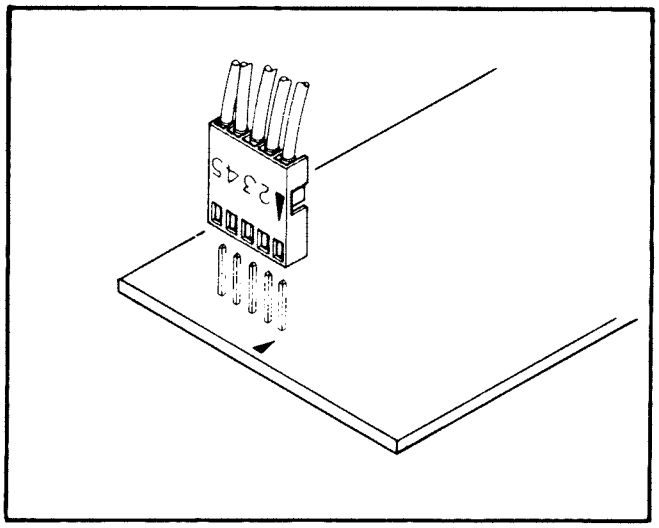


Fig. 5-1. Multi-pin circuit board connector.

Transistor and Integrated Circuit Checks

Periodic transistor and integrated circuit checks are not recommended. The best performance check for these devices is actual operation of the instrument. Performance of the circuit is thoroughly checked during the performance check or calibration procedure. Any sub-standard transistors or integrated circuits will usually be detected at that time.

Recalibration

The length of time between recalibration depends on the amount of use the instrument receives, the nature of the environment, and the change in performance when some components are replaced.

In general, a partial recalibration is necessary if the components replaced affect the calibration of a portion of the instrument. Complete recalibration is recommended if the instrument is not operating at its full capability, or if the kinescope or power transformer is replaced. To ensure correct and accurate instrument operation the instrument performance should be checked at regular intervals; for example after 1000 hours of operation if used continuously or every 6 months if used infrequently.

The Calibration Procedure is given in Section 6.

Internal Fuses

There are three fuses (located internally) in the instrument as follows:

1. F4280. This is a +100-volt supply fuse to the horizontal deflection yoke supply and is located on the Main Deflection board (see Fig. 5-7A).

2. F8320. This is a +100-volt power-supply fuse, located toward the front of the instrument on the LV & HV Power board (see Fig. 5-7C).

3. F8290. This is a +5-volt power-supply fuse, located near the rear panel on the LV & HV Power board (see Fig. 5-7C).

To remove a fuse, push on one end so that the fuse will slide out of its holder (see Fig. 5-2).

See the Replaceable Electrical Parts list for fuse description and current Tektronix Part Number.

Service Available

Tektronix, Inc. provides complete instrument repair and calibration at Field Service Centers and at the Factory Service Center. Contact your nearest Tektronix Field Office or representative for further information.

TROUBLESHOOTING

The following is provided to augment information contained in other sections of this manual when troubleshooting a 650A-Series instrument. The schematic diagrams, circuit description, and calibration sections should be used to full advantage.

Troubleshooting Aids

Circuit Description. The circuit description for each schematic diagram is provided in Section 8 and the circuit board illustrations are provided in Section 10. Used in conjunction with the block diagram and test point waveforms, the information provided is helpful when analyzing circuit operation.

Diagrams. Circuit diagrams are given on the foldout pages in Section 10. The circuit number and electrical value of each component in this instrument are shown on the diagrams. Important waveforms are also shown.

Circuit Boards. The circuit boards used in the 650A-Series instrument are outlined on the schematic diagrams. Circuit board illustrations are provided on the back of the foldout pages that precede the relevant diagrams. The assembly number assigned to the circuit board is an abbreviated method for identifying the boards. Figs. 5-6 and 5-7 show the physical location of the boards along with the assembly numbers.

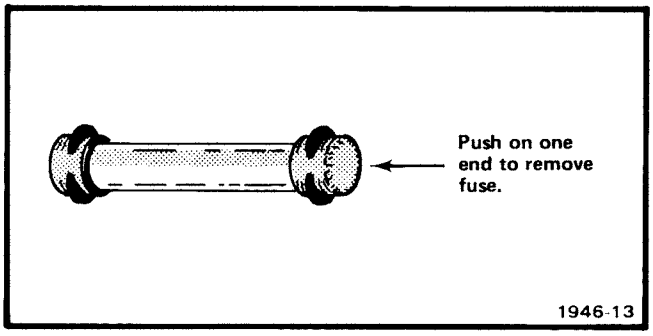


Fig. 5-2. Removing an internal fuse.

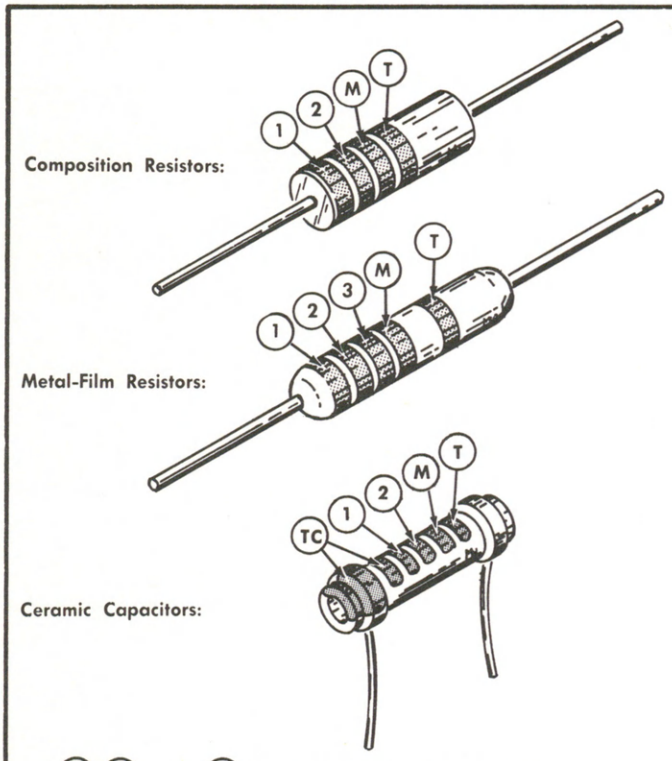
Circuit Board Illustrations. Each circuit board is illustrated in the Diagrams section.

For an example, refer to the NTSC Decoder circuit board which is illustrated on the back of the Aperture circuit (diagram 4) foldout page. Circuit numbers for this board are assigned on a grid system. The lower left corner of this board has been assigned numbers around 2001 proceeding from left to right, the numbers increase toward 2900. From left to right across the top of the board, the numbers increase from around 2090 toward 2990. Using this method, the physical location of each component can be found quickly.

Chassis-Mounted Components. Figs. 5-6 and 5-7 show the location of the following chassis-mounted components: Q8410, Q8420, Q8430, Q8440, T8385, R4050, Q4050, Q4090, and Q8682.

Wire Color Code. All insulated wires used for interconnection in the instrument are color-coded to facilitate tracing a wire from one point to another.

Resistor Color Code. Colored stripes on resistors signify electrical values, tolerances, etc. according to the EIA standard color code (see Fig. 5-3). Resistors not color coded usually have the value imprinted on the body.



(1) (2) and (3) —1st, 2nd and 3rd significant figures;
(M) —multiplier; (T) —tolerance;
(TC) —temperature coefficient.

Resistor and Capacitor Color Code

Color	Significant Figures	Multiplier		Tolerance	
		Resistors	Capacitors	Resistors	Capacitors
Silver	---	10^{-2}	---	±10%	---
Gold	---	10^{-1}	---	±5%	---
Black	0	1	1	---	±20% or 2 pF*
Brown	1	10	10	±1%	±1% or 0.1 pF*
Red	2	10^{2}	10^{2}	±2%	±2%
Orange	3	10^{3}	10^{3}	±3%	±3%
Yellow	4	10^{4}	10^{4}	±4%	+100% −0%
Green	5	10^{5}	10^{5}	±0.5%	±5% or 0.5 pF*
Blue	6	10^{6}	10^{6}	---	---
Violet	7	---	---	---	---
Gray	8	---	10^{-2}	---	+80% −20% or 0.25 pF*
White	9	---	10^{-1}	---	±10% or 1 pF*
(none)	---	---	---	±20%	±10% or 1 pF*

*For capacitance of 10 pF or less.

NOTE: (T) and/or (TC) color code for capacitors depends upon manufacturer and capacitor type. May not be present in some cases.

Fig. 5-3. Color code for resistors and ceramic capacitors.

Capacitor Markings. The capacitance value of a common disc capacitor or small electrolytic is usually marked in microfarads on the side of the component body. The white ceramic capacitors used in the instrument are color-coded in picofarads using a modified EIA code (see Fig. 5-3). The "tear drop" capacitors are color-coded in picofarads using a modified EIA code, with the dot indicating both temperature and positive (+) side. See Fig. 5-4.

Transistor and Integrated Circuit Lead Configurations. Fig. 5-5 illustrates the lead configurations for the socket-mounted transistors, field effect transistors (FET's) and integrated circuits (IC's) used in the instrument.

IC Diagrams. The IC diagrams illustrate the positive logic function of the IC's. These diagrams are located in Section 10 of this manual.

Troubleshooting Equipment

The following signals and equipment are useful for troubleshooting the 650A-Series instrument.

1. Signal. 1-V peak-to-peak composite video test signal—NTSC, 50 Hz PAL, 60 Hz PAL, or RGB, whichever is applicable for your picture monitor.

2. Test Oscilloscope. For viewing waveforms at various test points in the circuit. Frequency response: dc to at least 10 MHz. It should be equipped with a 10X probe.

3. DVM and Ohmmeter. For measuring dc voltages and resistances accurately. A TEKTRONIX DM 502 in a TM 500 Series mainframe, or equivalent, is recommended for measuring voltages. The ohmmeter is required for checking continuity and resistance.

4. Semiconductor Tester. Some means of testing the transistors, diodes, and FET's used in this instrument is helpful. A transistor-curve tracer such as the TEKTRONIX Type 576 will give the most complete information.

Rated Voltage VDC 25°C	Color	CODE FOR CAPACITANCE IN PICOFARADS		
		1st Figure	2nd Figure	Multiplier—pF
4	Black	0	0	None
6	Brown	1	1	X 10
10	Red	2	2	X 10^2
15	Orange	3	3	X 10^3
20	Yellow	4	4	X 10^4
25	Green	5	5	X 10^5
35	Blue	6	6	X 10^6
50	Violet	7	7	X 10^7
	Gray	8	8	
3	White	9	9	

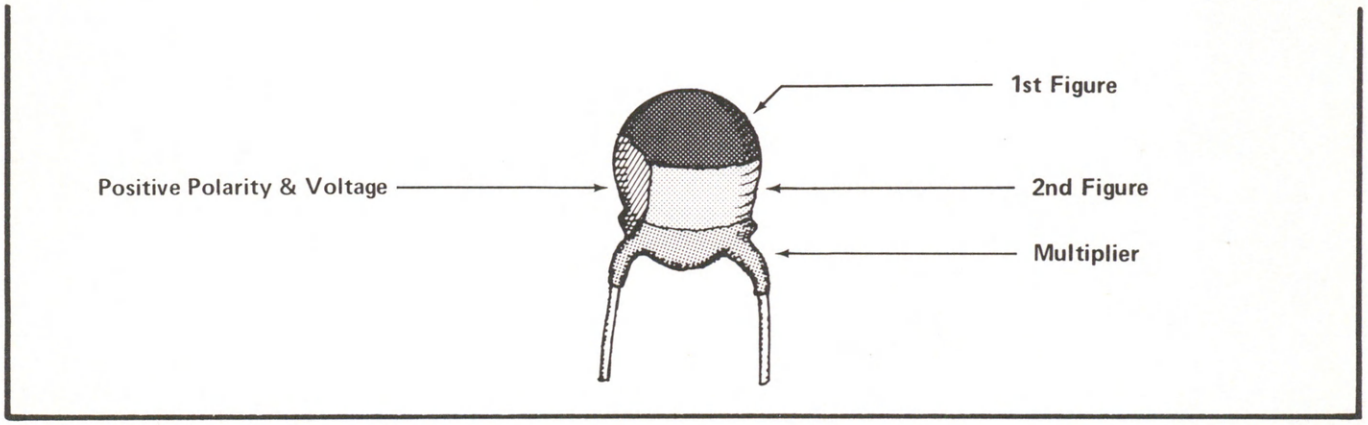


Fig. 5-4. Color coding for dipped tantalum "tear drop" capacitors.

Troubleshooting Procedure

This procedure is arranged in a sequence that checks the simple trouble possiblities first.

1. Check Control Settings. Incorrect control settings or wrong internal jumper positions can indicate a trouble that does not exist. If there is any question about the correct function or operation of any control or jumper, refer to the Operating Instructions (Section 2) and Installation (Section 4).

2. Check Associated Equipment. Before troubleshooting the instrument, check that the applied signal is correct and properly connected. Check that the probe, if used, is properly compensated and not defective.

3. Isolate Trouble to a Circuit. If the 650A-Series instrument is at fault, isolate the trouble to a circuit by noting the trouble symptoms. This can be accomplished by using the front panel controls and observing the crt display to identify the nature of the trouble. Then, use steps 4 through 6 to isolate the trouble to the probable cause such as a defective component or connection.

4. Visual Check. Visually check the portion of the instrument in which the trouble is suspected. Some troubles can be located by checking for unsoldered connections, broken wire, loosely-seated transistors, loose-fitting connectors, damaged components, or damaged circuit boards.

5. Check Voltages and Waveforms. Often the defective component or stage can be located by checking for correct voltage or waveform in the circuit. Typical waveforms are given near the diagrams. To obtain operating conditions similar to those used to take these waveforms, refer to the instructions at the start of the Diagrams section.

CAUTION

Because of component density on circuit boards, care should be taken with meter leads and probe tips. Accidental shorts can cause abnormal voltages or transients that may destroy components. "Ground Lugs" are not always at ground potential. Check the diagrams before using such connections as ground for meter prods or oscilloscope probes. Some transistor cases may be elevated.

6. Check Individual Components. When you have isolated the trouble to one circuit or stage, the next step is isolate the trouble to one component or part. Components that are soldered in place are best checked by disconnecting one end to isolate the measurement from the effects of surrounding circuitry. The following methods are provided for checking individual electrical components in the instrument.

a. Transistors. The best check of transistor operation is actual performance under operating conditions. If a transistor is suspected of being defective, it can be checked by substituting a new component or one which has been checked previously. However, be sure that the circuit conditions are not such that a replacement transistor might also be damaged. If substitute transistors are not available, use a dynamic tester (such as the TEKTRONIX Type 576) to check the transistor.

b. Integrated Circuits. Integrated circuits should not be replaced unless they are actually defective. The best method for checking these devices is by direct substitution with a new component or one which is known to be good. Be sure that circuit conditions are not such that a replacement component might be damaged.

c. Diodes. All diodes can be checked for an open or shorted condition by measuring the resistance between terminals. Use an ohmmeter, set to the 1 K scale to keep from damaging the diode, for measuring the diode resistance. The resistance should be very high in one direction and very low when the ohmmeter leads are reversed.

d. Resistors. Resistors can be checked with an ohmmeter. Check the Replaceable Electrical Parts list for the tolerance of the resistors used in the instrument. Resistors normally do not need to be replaced unless the measured value varies widely from the specified value.

e. Inductors & Switch Contacts. Check for an open circuit (that should normally be closed) by checking continuity with an ohmmeter.

f. Capacitors. A leaky or shorted capacitor can best be detected by checking the resistance with an ohmmeter on the highest scale. Do not exceed the voltage rating of the capacitor. An open capacitor can best be detected with a capacitance meter or by checking whether the capacitor passes ac signals.

CORRECTIVE MAINTENANCE

Corrective maintenance consists of component replacement and instrument repair. Special techniques required to replace components in this instrument are given here.

Soldering Techniques

WARNING

Disconnect the instrument from the power source before soldering.

Reliability and optimum performance of this instrument can be maintained only if proper soldering techniques are used when repairing or replacing parts. Soldering techniques that apply to maintenance of precision electronic equipment should be used when working on this instrument. Use only 60/40 rosin-core, electronic grade solder. The choice of soldering iron is determined by the repair to be made. When soldering on circuit boards, use a 10-to-25-watt pencil-type soldering iron with a 1/8-inch wide, wedge-shaped tip. Keep the tip properly tinned for best heat transfer to the solder joint. A higher wattage soldering iron may separate the etched wiring from the base material. Avoid excessive heat; apply only enough heat to remove the component or to make a good solder joint. Also, apply only enough solder to make a firm solder joint; do not apply too much solder. Use a desoldering tool or other device when it is necessary to remove excess solder.

The pencil-type soldering iron used on the circuit boards can be used for soldering to switch terminals, potentiometers, or metal terminals mounted in plastic holders. For ground lugs that are connected to the chassis, or other metal terminals that are connected to a large heat-radiating surface, use a high-wattage-rating soldering iron with a larger tip.

After soldering is completed, clean the area around the solder connection with a flux-remover solvent. Be careful not to remove any information printed in the area.

Location Guide for Replacing Parts

The exploded-view drawings associated with the Replaceable Mechanical Parts list (located at the rear of the manual) are helpful in the removal or disassembly of individual components or subassemblies. Circuit board illustrations are provided on the backs of foldout pages in the Diagrams section of this manual.

Semiconductor Replacement

Semiconductors should not be replaced unless they are actually defective.

CAUTION

The POWER switch must be turned off before removing or replacing semiconductors.

If the semiconductors are removed from their sockets during routine maintenance, return them to their original sockets. Unnecessary replacement of semiconductors may affect the calibration of this instrument. When semiconductors are replaced, check the operation of the parts of the instrument whose calibration may be affected.

Replacement semiconductors should be of the original type or a direct replacement. Fig. 5-5 shows the lead configuration of the semiconductors used in this instrument. Some plastic-cased transisitors have lead configuration that do not agree with those shown here. If a replacement transistor is made by a different manufacturer than the original, check the manufacturer's basing diagram for correct basing. All transistor sockets in this instrument are wired for the standard basing as used for metal-cased transistors. Power transistors. that are mounted on the chassis use silicone grease to increase heat transfer. Replace the silicone grease when replacing these transistors.

WARNING

Handle silicone grease with care. Avoid getting silicone grease in the eyes. Wash hands thoroughly after use.

An extracting tool should be used to remove the 8-, 14-, and 16-pin integrated circuits to prevent damage to the pins. This tool is available from Tektronix, Inc. Order Tektronix Part Number 003-0619-00. If an extracting tool is not available when removing one of these integrated circuits, pull slowly and evenly on both ends of the device. Try to avoid having one end of the integrated circuit disengage from the socket before the other, as this may damage the pins.

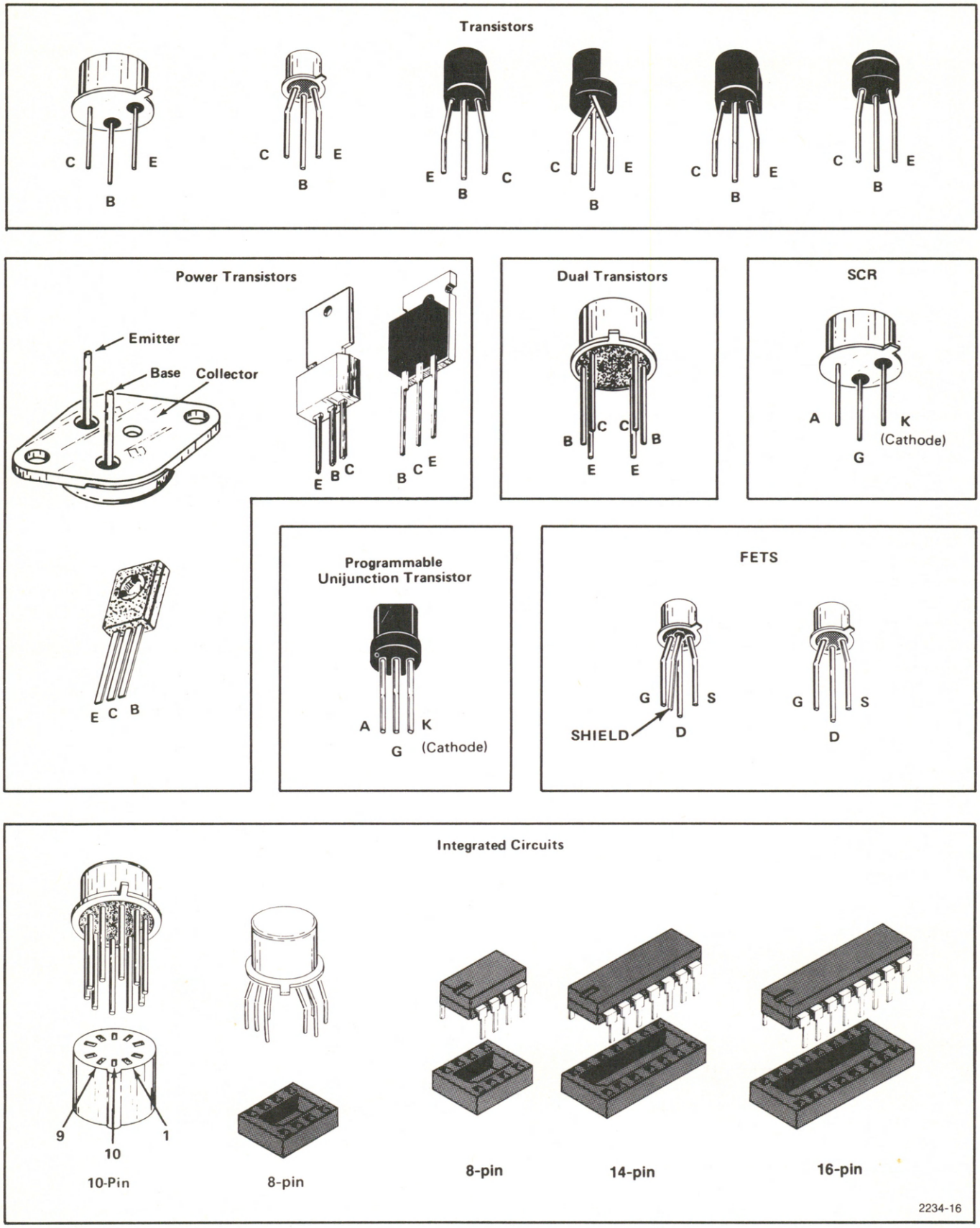


Fig. 5-5. Basing diagram for semiconductors.

Pin Connector Replacements

Circuit board pins, end-lead pin connectors, and multi-pin connectors are used to interconnect the circuit boards and power transistors in the instrument.

NOTE

A circuit-board pin replacement kit including necessary tools, instructions and replacement pins is available from Tektronix, Inc. Order Tektronix Part Number 040-0542-00.

Circuit Board Pins. To replace a pin that is mounted on a circuit board, first disconnect the multi-pin connector. Then, unsolder the damaged pin and pull it out of the circuit board with a pair of pliers. Be careful not to damage the etched wiring on the board with too much heat. Ream out the hole in the circuit board with a 0.031-inch drill. Press the new pin into the hole in the circuit board. Position the pin in the same manner as the old pin. Then, solder the pin on both sides of the circuit board.

End-Lead Pin Connectors. End-lead pin connectors are used at the ends of the wire leads that mate with circuit board pins and power transistor leads. When several end-lead pin connectors are mounted in a plastic holder, this arrangement is called a multi-pin connector. Table 5-1 lists three basic sizes of end-lead pin connectors for replacement use in the instrument.

Table 5-1

END-LEAD PIN CONNECTORS

Description	Tektronix Part No.
Used with 0.150-inch pin spacing connector holder:	
For 28 to 32 AWG wire.	131-0622-00
For 22 to 26 AWG wire and 50 Ω or 75 Ω subminiature coaxial cable braid and center conductor.	131-0621-00
For 18 AWG wire	131-0792-00

To replace a damaged end-lead pin connector, remove the old pin connector by cutting the connector where the bare (stripped portion) wire is clamped. By doing this, you can avoid making the wire too short. Then, pull the wire out of the remaining attached portion of the connector. Cut the excessive material from the replacement connector. Clamp the replacement connector securely to the lead and insert the connector in its holder.

Circuit Board Replacement

If the circuit board is damaged beyond repair, replacement can be made of the entire assembly including all soldered-on components. Part numbers are given in the Replaceable Electrical Parts list of Section 9 for the completely wired board.

The following removal procedures are given for boards that are the most difficult to remove.

LV & HV Power Board Removal

1. Lay the instrument upside down.

2. Remove the bottom frame section from the rear end of the instrument by removing four 8-32 X 3/8 FLH screws and five 6-32 X 1/4 TRH screws.

3. Unsolder the low-voltage power transformer secondary wires where they connect to the board. Table 5-2 lists the wires.

Table 5-2

LV POWER TRANSFORMER SECONDARY WIRES

Wire Color Code for LV Power Transformer Secondary Wires	Terminal Number on LV & HV Power Board	Provides Power for:
Orange	1	+15 V Supply
Red	2	
Brown	3	−15 V Supply
Black	4	
White	5	+15 V Supply
Gray	6	
Violet	7	+100 V Supply
Blue	8	

4. Disconnect all the multi-pin connectors from the LV & HV Power board. Disconnect the brown wire where it connects to a pin terminal on the encapsulated EHT Supply Board. This wire comes from the high-voltage output transformer T8620 on the LV & HV Power board.

5. Remove the screws in the ground lug near the front left corner of the LV & HV Power board. Remove three 6-32 X 1/2 TRH screws from the full-wave rectifiers (CR8340, CR8360, and CR8380).

6. Remove four 6-32 hex nuts that hold the board to the chassis.

7. Lay the instrument on its right side.

8. Remove four 6-32 X 1/4 TRH screws from the Sync (swing-up) chassis. Swing the chassis back.

9. Remove the LV & HV Power board by pushing on the filter capacitors.

10. Re-install the board by reversing the order of the procedure. Be sure that the board is properly seated on the shoulders of the full-wave rectifier heat sinks.

EHT Supply Board Removal

1. Leave the instrument in the upright position.

2. Remove the rear panel heat-sink shield by removing four 6-32 X 0.312 inch TRH screws.

3. Disconnect the two multi-pin connectors from the Kinescope Socket board.

4. Remove four 6-32 X 1/4 TRH screws that hold the kinescope neck shield to the heat-sink bracket on the rear panel. Remove the neck shield.

5. Remove four 6-32 X 1/4 TRH screws from the Sync (swing-up) chassis. Swing the Sync chassis back.

6. A magnetic convergence holder is installed over the convergence boot. Unsnap the holder and remove it. Then, remove two 4-40 X 9/16 sleeve nuts and two 4-40 X 5/8 PNH screws from the convergence boot. Remove the boot with attached lead from the neck of the kinescope.

7. (SN B039999 & below.) Unplug the EHT (kinescope anode) spring clip lead by lifting one edge of the spring clip cover and sliding the cover to one side (90° with respect to the position of the lead). The spring clip will unhook from the kinescope anode using this method.

(SN B040000 & up.) Unplug the kinescope anode spring clip lead by sliding the wedge-shaped plastic tool under the washer as shown in Fig. 5-6. This tool is stored on the Sync chassis.

8. Remove the 6-32 X 1/4 TRH screw from the bracket at the top of the EHT supply. Remove the bracket. Close the Sync chassis and apply some tape to hold it closed temporarily.

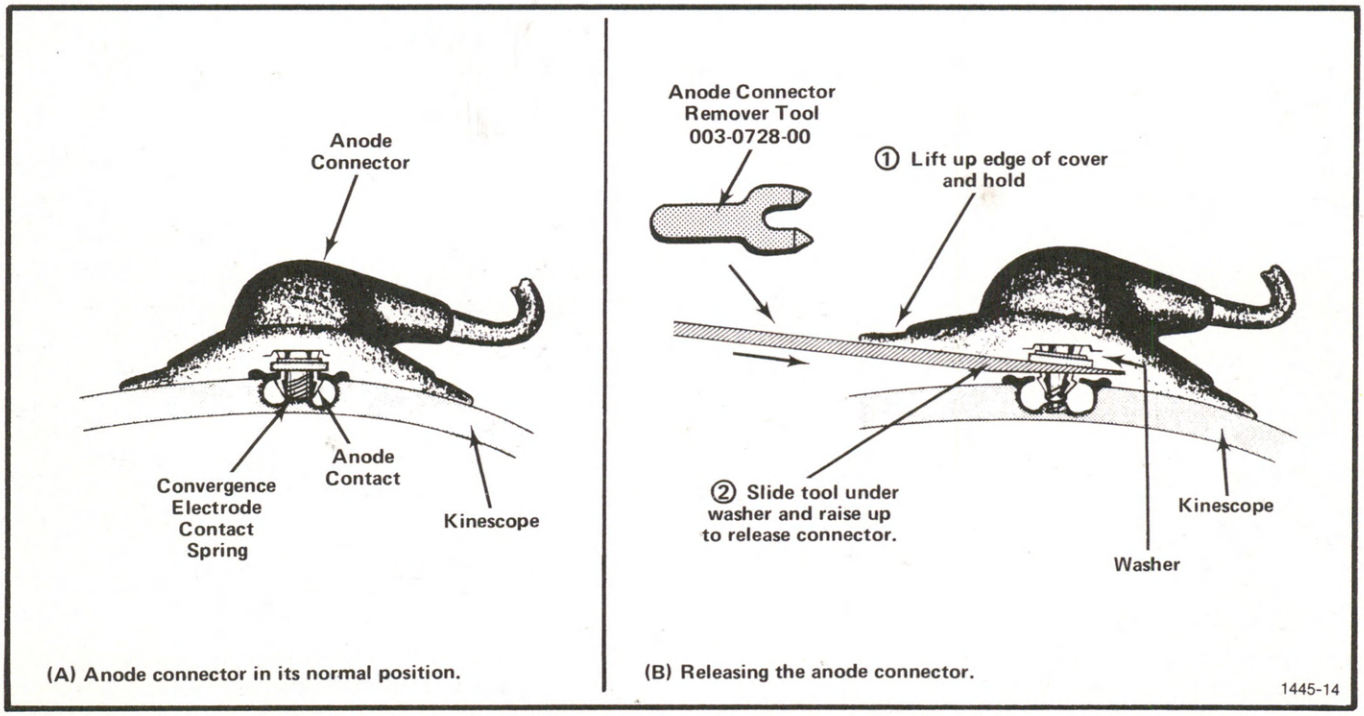


Fig. 5-6. Cross section view of kinescope anode connector. A special plastic tool with a wedge-shaped tip is used to release the anode connector.

9. Lay the instrument on its left side. Unplug the multi-pin connector from the EHT Supply board. Unplug the brown lead from the pin terminal on the encapsulated EHT supply. This wire comes from the high voltage output transformer T8620 on the LV & HV Power board.

10. Remove two 6-32 nuts from the lower end of the EHT Supply board.

11. Install the EHT Supply board by reversing the order of the removal procedure.

NOTE

When connecting the anode connector to the kinescope, be sure that the convergence electrode contact spring is properly centered inside the connector as shown in Fig. 5-6. If the spring shorts to the anode contact, the display will be extremely misconverged and correct purity cannot be achieved. Also, only one color may appear to be displayed though all colors are present.

Deflection Yoke Replacement

Use the following procedure to remove and replace the deflection yoke.

1. Disconnect Kinescope Socket Board. Leave the instrument in the upright position. Remove the rear panel heat-sink shield by removing four 6-32 X 0.312 inch TRH screws.

Disconnect the two multi-pin connectors from the Kinescope Socket board. Leave the braided ground wire soldered to the board. Disconnect the board from the kinescope. Leave the socket orientation key on the kinescope neck pins.

2. Remove Neck Shield & Heat Sink Assembly. Remove four 6-32 X 1/4 THS screws from the Sync (swing-up) chassis. Swing the chassis back.

Remove two 6-32 X 0.312 inch FLH screws that hold the transistor mounting plate and heat-sink assembly to the rear panel. Remove the assembly with neck shield attached off the neck of the kinescope. Leave the wiring connected to the assembly.

3. Remove Convergence Boot. (SN B039999 & below only.) A magnetic convergence holder is installed on the convergence boot. Unsnap the holder and remove it. Remove the two 4-40 X 9/16 sleeve nuts and two 4-40- X 5/8 PNH screws from the convergence boot. Remove the convergence boot.

4. Loosen Front Panel Casting & Convergence Coil Clamp. Lay the monitor on its left side and remove the 3/8 inch nut from the bottom right-front corner of the kinescope shield.

Place the monitor in the upright position. Loosen the left and right frame sections by removing four 8-32 X 3/8 PNH and two 8-32 X 0.132 inch FLH screws.

Remove two 6-32 X 1/4 TRH screws from the top-right support plate where the plate attaches to the Video chassis. Remove one 6-32 X 1/4 TRH screw from the rear end of the top-left support plate. The support plates are the triangle shaped gussets that join the front subpanel casting to the left and right chassis (see Fig. 5-6 upper illustration).

Loosen the convergence coil clamp.

5. Remove Deflection Yoke. Disconnect the deflection yoke multi-pin connectors. They connect to the Horizontal Output, Deflection, and Pin Cushion circuit boards.

Remove two screws and flat washers that mount the yoke to the yoke adjustment support. Loosen the yoke clamp.

Slide the convergence coil and yoke off the neck of the kinescope. The yoke will slide past the filter capacitor if the rear portion of the instrument is shifted to the left with respect to the front portion.

6. Install Replacement Yoke. Install the replacement yoke by reversing the order of the removal procedure. Perform steps 22, 24, and 29 in the NTSC Calibration Procedure. This procedure is located in Section 6 of this manual. Also, refer to P8680 and R8651 in Table 5-3 selected components.

Convergence Coil Replacement (L8705 and L8707)

When replacing the convergence coil located on the neck of the kinescope, L8705 winding is not used. Therefore, pins 3 and 4 on the coil are jumpered together or L8705 winding is bypassed. See Partial Deflection Output diagram 14 in this insert.

Kinescope (CRT) Replacement

Remove and replace the kinescope using the following procedure.

WARNING

Use care when handling the kinescope. Protective clothing and safety glasses should be worn. Avoid striking it on any object which might cause it to crack or implode. When storing the kinescope, place it in a protective carton or set it face down in a protected location on a smooth surface with a soft mat under the face to protect it from scratches.

1. Disconnect Connectors from Kinescope Socket Board. Leave the instrument in the upright position. Remove the rear-panel heat-sink shield by removing four 6-32 X 0.312 inch TRH screws. Disconnect the two multi-pin connectors from the Kinescope Socket board.

2. Remove Neck Shield. Remove four 6-32 X 1/4 TRH screws from the Sync (swing-up) chassis. Swing the chassis back. Remove four 6-32 X 1/4 TRH screws that hold the kinescope neck shield to the heat-sink bracket on the rear panel. Remove the neck shield.

3. Disconnect Front Panel Connectors. Disconnect the multi-pin connectors from the Left and Right Front Panel Control boards. Disconnect the multi-pin connectors from the DEGAUSS switch and push these connectors through the upper-left corner hole notched in the Video chassis. Tape the connectors with their leads to the kinescope shield.

Remove the front-panel POWER switch mounting nut and washer.

4. Disconnect Yoke Connectors. Disconnect the deflection yoke multi-pin connectors. They connect to the Horizontal Output, Deflection, and Pin Cushion circuit boards.

Remove Convergence Boot. (SN B-039999 & below only.) A magnetic convergence holder is installed on the convergence boot. Unsnap the holder and remove it. Next, remove two 4-40 X 9/16 sleeve nuts and two 4-40 X 5/8 PNH screws from the convergence boot. Remove the convergence boot.

5. Disconnect Kinescope Anode Lead. (SN B039999 & below.) Unplug the EHT (kinescope anode) spring-clip lead by lifting one edge of the spring-clip cover and sliding the cover to one side (90° with respect to the position of the lead). The spring clip will unhook from the kinescope anode using this method.

(SN B040000 & up.) Unplug the kinescope anode spring clip lead by sliding the wedge-shaped plastic tool under the washer as shown in Fig. 5-6. This tool is stored on the Sync chassis.

6. Remove Front-Panel Casting with Kinescope Assembly. Lay the instrument rear side down. Remove four 6-32 X 0.312 inch FLH screws and two Tally Light 4-40 X 1/4 FLH screws from the top of the front-subpanel casing.

Remove two 3/8 inch nuts from the bottom-front corners of the kinescope shield. Remove the braided ground wire and lockwasher from the bottom-left corner stud going through the kinescope shield.

Remove two 8-32 X 3/8 PNH and one 8-32 X 0.0312 inch FLH screws from the rear end of each left and right frame section. (Leave the frame sections attached to the front-subpanel casting to protect the kinescope neck when the assembly is removed, and to maintain proper alignment of mechanical parts during re-assembly.)

Gently lift the front-subpanel casting with kinescope assembly upward to remove this assembly from the remaining portion of the instrument. Lay the front-panel casting with kinescope assembly face down on a soft pad.

7. Remove Kinescope. Disconnect the Kinescope Socket board from the kinescope. Remove two 3/8 inch nuts and washers from the top left and right corners of the kinescope shield.

Loosen the deflection yoke rear clamp. Loosen the convergence coil neck clamp.

Carefully lift the shield with yoke and convergence coil off the kinescope.

Carefully lift the kinescope by holding the base of the neck with one hand until the other hand can be placed under the face of the screen. Lay the kinescope face down on a soft pad.

8. Install New Kinescope. Remove the replacement kinescope from its carton. Place the replacement kinescope on the workbench next to the removed kinescope.

(SN B039999 & below only.) Remove the aquadag grounding spring and braided wires from the used kinescope. Install these parts in the same location on the replacement kinescope. The spring should lay across the aquadag coating over the lower portion of the kinescope about 3 inches from the bottom.

Lay the replacement kinescope face down in the front-subpanel casting with the anode connector facing the top of the casting. Align the kinescope to fit the mask. In some cases, you may have to file the bottom of the metal shield if it protrudes.

Install the shield with the yoke and convergence coil assembly on the kinescope. Be sure that the opening in the shield faces the top of the front casting. Mount the shield to the casting using the two 3/8 inch nuts and washers removed in step 7.

Re-tighten the deflection yoke clamp.

Temporarily position the convergence coil about 2-7/8 inches from the yoke clamp with terminals 3 or 4 of the coil facing the top of the instrument. Tighten the coil clamp snugly to hold the coil in this position on the neck of the kinescope.

Connect the kinescope socket board to the kinescope.

(SN B039999 & below only.) Reverse the order of steps 1 through 6 to complete the replacement procedure. When the convergence boot is installed on the neck of the kinescope, (if necessary) loosen the convergence coil clamp and slide the coil against the edge of the boot and retighten the clamp.

(SN B040000 & up). Reverse the order of steps 1 through 6 to complete the replacement procedure.

NOTE

When connecting the anode connector to the kinescope be sure that the convergence electrode contact spring is properly centered inside the connector as shown in Fig. 5-6. If the spring shorts to anode contact, the display will be extremely misconverged and correct purity cannot be achieved. Also, only one color may appear to be displayed though all colors are present.

Perform steps 21 through 30 in the NTSC Calibration Procedure (Section 6). Also, refer to P8680, R8651, and R8653 in Table 5-3 selected components.

Power Transformer Replacement (T8395)

Removal of the low-voltage power transformer necessitates removal of the LV & HV Power board to obtain access to the nuts for the mounting screws. The procedure is as follows:

1. Leave the instrument in its upright position.

2. Remove the left chassis section of the slide-out tracks and the rack-release latch assembly by removing four 8-32 X 0.312 inch PNH screws and a washer. Remove the left frame section by removing four 8-32 X 3/8 PNH screws and two 8-32 X 0.312 inch FHS screws.

3. Slide the clear-plastic split tubing from the low-voltage power transformer primary winding terminals. Unsolder the brown-white on gray wire from terminal 1 on the transformer, yellow-black on gray wire from terminal 4, and the ground strap from terminal 5.

4. Perform steps 1 through 9 of the LV & HV Power Board Removal procedure.

5. Remove two 6-32 X 3/8 TRH screws that go through the Deflection chassis into the transformer bracket.

6. Remove the nuts from the four 10-32 X 3.250 inch mounting screws for the transformer.

7. Place the instrument in its upright position. Referring to the four mounting screws described in step 6 of this procedure, remove those screws that can be easily removed. The remaining screws can be lifted high enough to clear the power chassis and then taped into position.

8. Slide the low-voltage power transformer out of the left side of the instrument.

9. Install the replacement transformer by reversing the order of the removal procedure.

Selected Components

Table 5-3 lists the selected components that are not included in the calibration procedures provided in Section 6 of this manual.

The components listed in Table 5-3 are selected when the instrument is calibrated at the factory. These components do not have to be reselected unless a transistor, high-voltage power transformer T8620, EHT Supply board, or kinescope affecting the associated circuit is replaced and the new part affects calibration of the instrument.

Table 5-3 briefly summarizes the reason for selecting the component. The table also gives the nominal value and the range limits to prevent selecting a value outside of these limits that could cause abnormal operation or a component failure in the associated circuit.

Table 5-3

SELECTED COMPONENTS

Circuit Number	Circuit Board	Diagram Number	Nominal Value	Value Range	Select
R3586	A4-2 or A4-3 PAL Decoder	8	2.2 kΩ	2.0 kΩ to 2.7 kΩ	For a dc voltage at TP3290 that is within 10 V of chassis ground. Increase the value of R3586 to decrease the voltage. Can be selected after performing step 20h in the PAL Calibration Procedure. Dependent on transfer loss in acoustical delay line DL3480.
R3686	A4-2 or A4-3 PAL Decoder	8	40.2 kΩ	30.9 kΩ to 45 kΩ. Normally not changed	For more Chroma Preset R7888 or R7883 range, if needed, when Q3682 is replaced. May be selected when performing step 14 in the PAL Calibration Procedure.
R1529	A6 Sync & Timing	12	28.7 kΩ	27.4 kΩ to 30.1 kΩ. (Applies to NTSC only monitors)	To change picture delay with respect to monitor deflection when horizontal deflection output transistor Q4090 is replaced. Useful for adjusting horizontal linearity when performing step 24c in the NTSC Calibration Procedure.
R1602	A6 Sync & Timing	12	180 kΩ	Normally not changed	Rarely changed. Varies the dc level of the waveform at the collector of Q1619.
R4361 or R4367	A8 Main Deflection	13	See NOTE in procedure following this table	R4361: 300 kΩ to 360 kΩ (R4367 normally not used)	To obtain a dc difference voltage of ±0.2 V at the ramp tips (TP4450) compared to the dc trace level at TP4452 when 60 Hz and 50 Hz composite video signal are applied to the monitor. Refer to the procedure that follows this table.
R4337	A8 Main Deflection	14	11.8 kΩ	8.2 kΩ or higher	To improve horizontal linearity when performing step 24c in the NTSC Calibration Procedure. Never choose a value lower than 8.2 kΩ.
C4248	A8 Main Deflection	14	Normally not needed	Normally not needed	For additional horizontal 'S' correction, if needed. Has same purpose as C4254. Holes are provided in the board to add C4248, if needed, in parallel with C4254. C4254 is a selected component described in step 24c of the NTSC Calibration Procedure.

Table 5-3 (cont)

Circuit Number	Circuit Board	Diagram Number	Nominal Value	Value Range	Select
R4779 R4795	A9 Deflection Heat Sink	14	200 Ω 750 Ω	Normally not changed	R4779 to assure full-size picture and R4795 to assure proper underscan size with sufficient dynamic range for Q4770 to provide side pin modulation.
VR6261	A11 Blanking	15	140 V	Normally not changed	To assure that Q6241 is not saturated when Screen Volts R6293 has been set.
C8600	A12 LV & HV Power Supply	17	0.1 μF	0.1 μF to 0.147 μF (Total parallel capacitance)	To obtain a clean waveform at TP29 when the high-voltage power transformer T8620 is replaced. The waveform should not be erratic. Also, to center the pulse at TP28 with respect to the horizontal rate trigger waveform at TP29 over the BRIGHTNESS control R7541 range.
P8680	A12 LV & HV Power Supply	17	Not applicable	Not applicable	Vertical parabola or vertical sawtooth to improve convergence when the yoke and/or kinescope are replaced. The input to P8680-1 is selectable to apply either a parabola or a sawtooth signal.
R8651	A12 LV & HV Power Supply	17	120 kΩ	120 kΩ to 200 kΩ	To obtain proper amplitude vertical parabola or vertical sawtooth when the yoke and/or kinescope are replaced. Select R8651 for best convergence by varying the vertical-rate horizontal convergence.
R8653	A12 LV & HV Power Supply	17	150 kΩ	Normally not changed	For sufficient HORIZ STATIC R7470 range when the EHT Supply board and/or kinescope are replaced.

Select R4361 or R4367 for 50-60 Hz Switcher

NOTE

R4361 or R4367 is selected, if needed. Some instruments may not have either resistor.

a. Apply a 60 Hz composite video signal to the VIDEO INPUT A connector. Apply a 50 Hz composite video signal to the VIDEO INPUT B connector. Terminate the loop-through connectors into 75 ohms.

b. CHECK—Using the oscilloscope, note the dc level of the ramp tips at TP4450 on the Main Deflection board and the dc trace level at TP4452 when the INPUT switch is set to A and then to B. With the INPUT switch at A, the dc trace level at TP4452 should be approximately one volt **more** positive than the ramp tips at TP4450. With the INPUT switch set to B, the dc trace level at TP4452 should be approximately one volt **less** positive than the ramp tip dc level at TP4450.

c. SELECT—If the voltage difference noted when the INPUT switch is set to A does not equal the dc voltage difference noted when the INPUT switch is set to B within a tolerance of ±0.2 volt, select R4361 or R4367 but not both.

d. Disconnect the oscilloscope probe from the monitor.

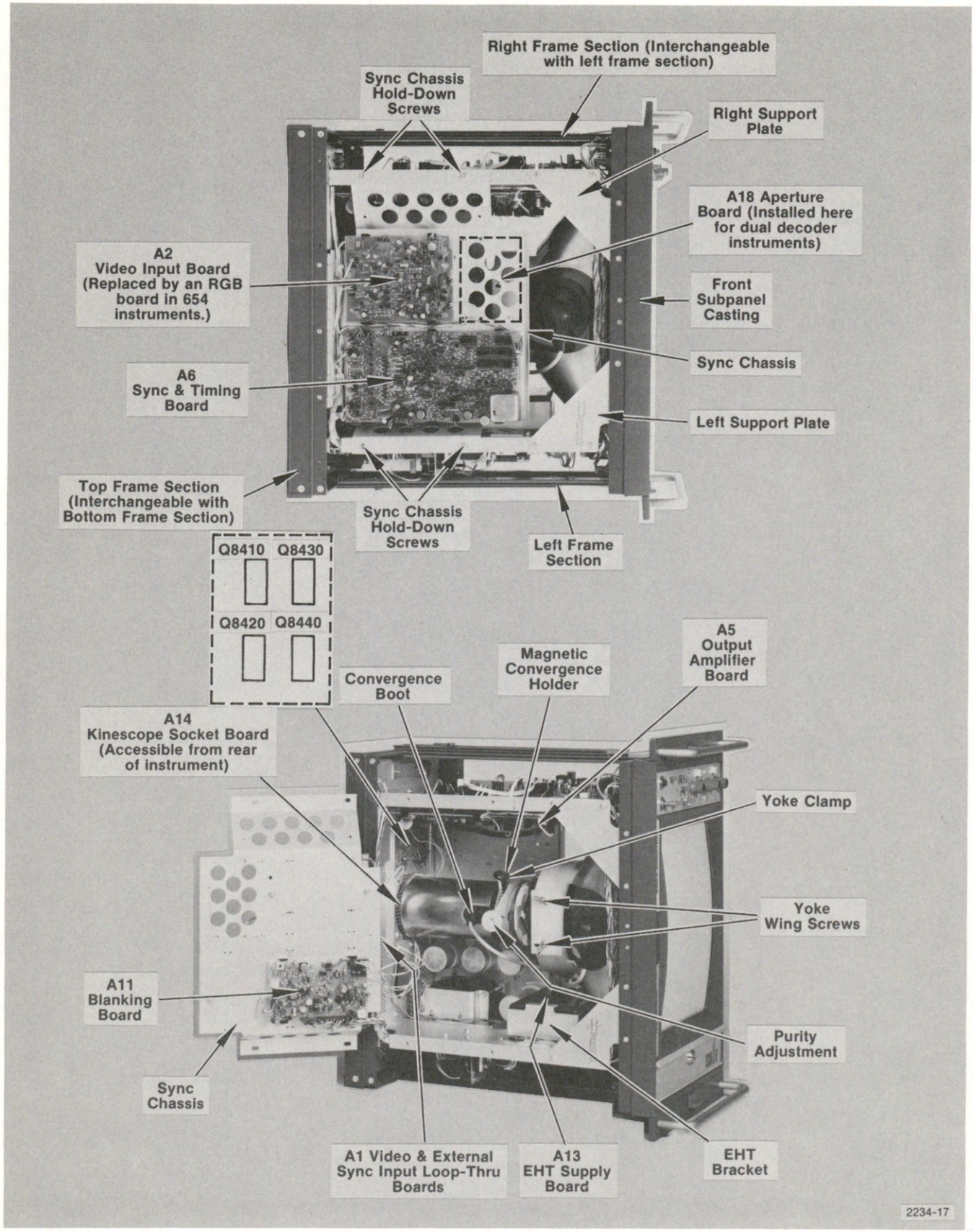


Fig. 5-7. Top views showing location of the circuit boards. Some mechanical parts are identified as an aid when using the component replacement procedures.

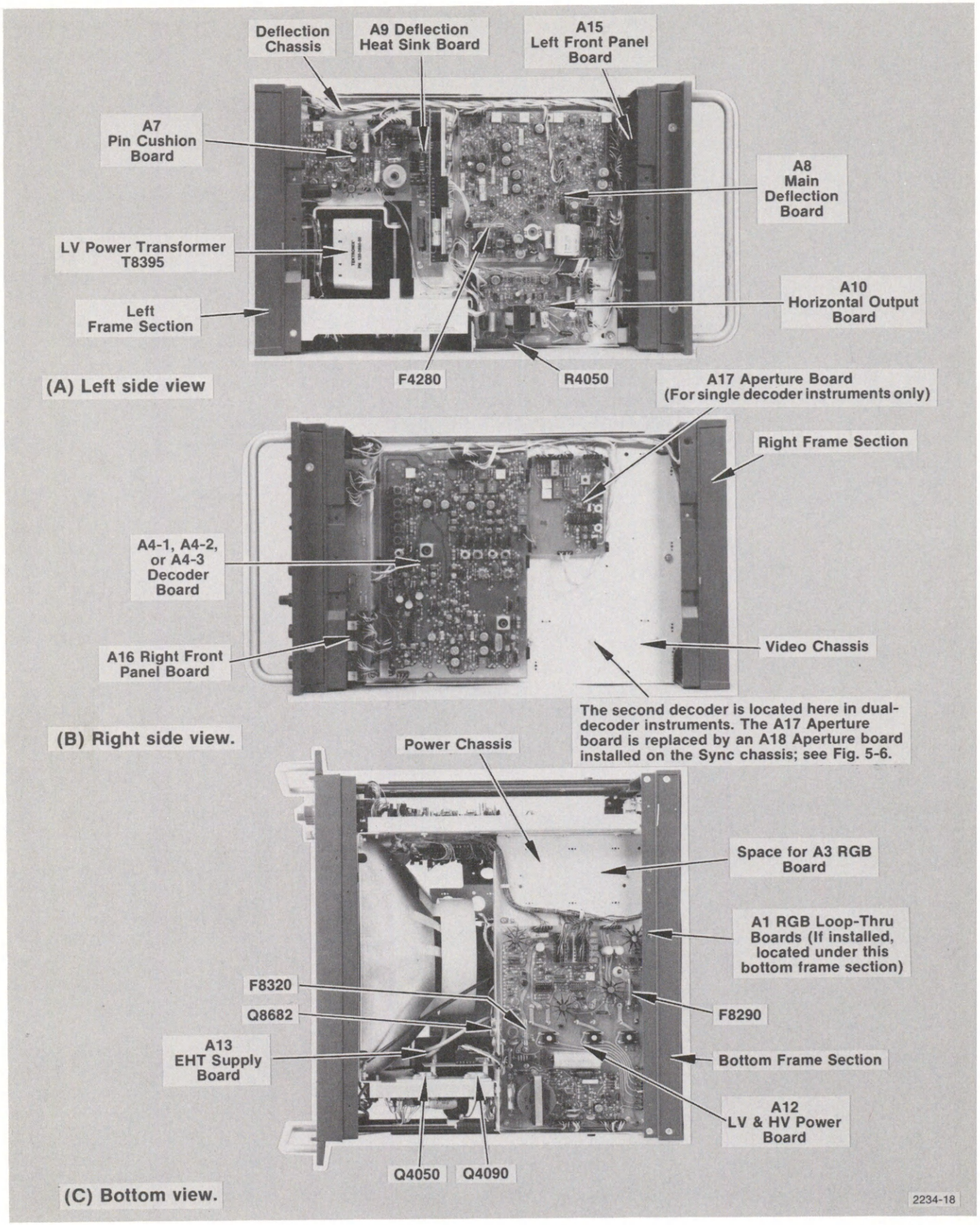


Fig. 5-8. Left side, right side, and bottom views showing location of circuit boards and chassis-mounted components. Some mechanical parts are identified. Left and right frame sections have been removed to provide unobstructed views of left and right sides.

PERFORMANCE CHECK/CALIBRATION

Introduction

This section of the manual contains two main calibration procedures: (1) NTSC for instruments containing an NTSC decoder, and (2) PAL for instruments containing a 50-Hz or 60-Hz PAL decoder. If your instrument contains both decoders (NTSC and PAL), follow the NTSC procedure to completely calibrate the instrument using the NTSC decoder. This procedure also includes some optional 50-Hz mode of operation adjustments. Then go to the PAL procedure and perform only those steps that contain adjustments for the PAL Decoder board., plus these remaining adjustments: Aperture Preset R7878, Chroma Preset R7883, and Aperture board adjustments R140, R141, R162, and R180.

A third procedure is provided in this section. This is a procedure for the RGB board only. If your instrument contains an RGB board, and you are completely calibrating the monitor, perform the procedure for this board after you have completed either the NTSC or PAL Calibration Procedure.

The shaded area on the edge of each page allows you to "thumb" to the procedure you intend to use. These procedures can be used as a performance check by performing the step without making the adjustment.

650A front-panel names, when used in the procedure are all capitalized (i.e., BRIGHTNESS control); internal adjustments are initially capitalized (i.e., Brightness Preset, R7863).

Front-panel controls for auxiliary test equipment are initially capitalized.

Recalibration Interval

The length of time between recalibration depends on the amount of use the instrument receives, nature of environment, and the change in performance when some components are replaced.

In general, partial recalibration is required if the components replaced affect the calibration of the instrument. Complete recalibration is recommended if the instrument is not operating at its full capacity. To ensure correct and accurate instrument operation, the instrument performance should be checked at regular intervals; for example, after 1000 hours of operation if used continuously or every 6 months if used infrequently.

General Instructions

When applying the generator signal to a loop-through connector on the picture monitor, the connector must be terminated into 75 ohms except when performing steps 37 and 38 of the NTSC Calibration Procedure.

For access to all the internal adjustments and test points, remove the top and bottom covers from the instrument. Also, remove the left and right frame sections.

Use the generator Comp Sync Output to externally trigger the oscilloscope time base when viewing waveforms during calibration or performance check. External triggering is especially important when performing steps 8, 20, and 31 in the NTSC Calibration Procedure; steps 8, 22, and 23 in the PAL Calibration Procedure.

NTSC CALIBRATION PROCEDURE

TEST EQUIPMENT

Items 1 through 10 are needed to perform all the 'Adjust' steps 1 through 30. Items 2, 3, 7, 8, 11, 12, and 13 are needed to perform the 'Optional Check' steps 31 through 39.

1. DC Voltmeter. For adjusting −15 V power supply.

2. Test Oscilloscope with 10X Probe. For displaying waveforms and establishing dc levels. Minimum characteristics: bandwidth, dc to at least 10 MHz; vertical deflection factor, 1 mV/div; sweep rate, to at least 1 μs/div using a X10 magnifier for the adjustment procedure, 50-ns/div delayed sweep required when checking chrominance to luminance delay. (TEKTRONIX 7603/7A13/7B53A combination is required to work with the 015-0149-00 Return Loss Bridge.)

3. Composite Video Signal Source. Signals: Standard NTSC color bars (1 V p-p, 100% saturated, 75% amplitude, 7.5% setup, selectable 75% and 100% white reference), staircase, crosshatch pattern, and flat field. For dual decoder (NTSC + 50-Hz PAL) monitors, a 50-Hz PAL composite video signal is also needed for performing the last portion of steps 26 and 28.

NOTE

Steps 2 and 3 in the NTSC Calibration Procedure require the use of a crosshatch pattern with vertical pulses that are shaped similar to a 2T pulse (half amplitude = 250 ns, ±15%) and have the same amplitude as the horizontal bar. Tektronix generators have this capability. If your generator does not meet this requirement, use a 2T sin^2 pulse and bar signal.

4. Reference Light-Source or Optical Comparator. Required when adjusting low- and high-light color temperature. Refer to the Test Equipment list in the Operating Instructions (Section 2) for a full description.

5. Linearity Graticule. For checking picture size and linearity. Tektronix Part No. 331-0305-00.

6. Light Source for Linearity Graticule. 60 W incandescent lamp for projecting the linearity graticule onto the screen of the picture monitor.

7. Coaxial Cable. Impedance, 75 ohms; length, 42 inches; equipped with BNC connectors. At least two cables are needed. Tektronix Part No. 012-0074-00.

8. End-Line Termination. Impedance, 75 ohms. Equipped with BNC connectors. Two terminations are needed. Tektronix Part No. 011-0102-00.

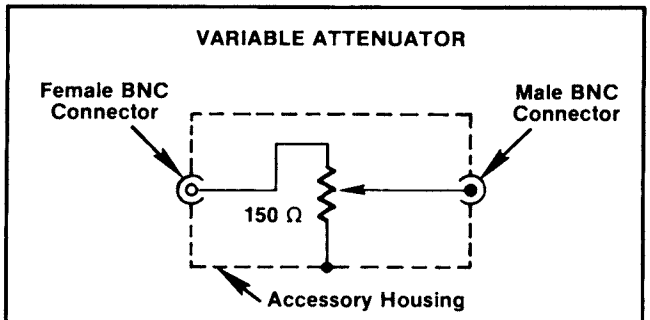
9. Feed-Through Termination. Impedance, 75 ohms. Equipped with BNC connectors. One needed. Tektronix Part No. 011-0103-02.

10. Dual-Input Coupler. For checking channel A and B input compensation and common-mode rejection in steps 2 and 6. Equipped with BNC connectors. Tektronix Part No. 067-0525-01.

11. BNC T Connector. Tektronix Part No. 103-0030-00.

12. Variable Attenuator. For varying the generator output signal amplitude when checking the sync stripper circuit operation in steps 36 and 37. Fig. 6-1 shows how to construct this test fixture.

13. Return Loss Bridge and Signal Generator. For checking return loss in step 39. Use a 015-0149-00 Return Loss Bridge and an SG 503 Constant Amplitude Signal Generator in a TM 500-Series mainframe, or equivalent. If this equipment is not available, use a setup similar to the one shown in Fig. 6-2.



PARTS LIST

Tektronix Part No.	Description
011-0081-00	Accessory housing without electrical components. Equipped with BNC connectors.
311-0482-00	Resistor, 150 ohms, variable, comp, miniature, ±20%.
366-0497-00	Knob (optional), small, gray.

1946-24B

Fig. 6-1. Test fixture for varying the generator output signal amplitude.

Table 6-1

ADJUSTMENTS & SELECTED COMPONENTS
FOR NTSC PICTURE MONITOR

Step No.	Adjustment Name	Circuit No.
	LV POWER SUPPLY	
1	−15 V Adjust	R8170
	VIDEO CHANNEL	
2	Ch A Input Comp	C1375
	Ch B Input Comp	C1331
3	Aperture Zero	R123
	Aperture Preset	R7873
4	Luminance Gain	R2977
5	Chroma Trap	L2581
6	A-B Common-Mode Rejection	C1181, C1131, R1131
7	Chroma Filter	L2655
8	R-Y Chroma Filters	L2535, L2529
	B-Y Chroma Filters	L2507, L2513
9	Red DC Level	R2830
	Brightness Preset	R7863
	Contrast Preset	R7868
10	Red Amp White Ref Limit	R5782
	Red Gain Cell Adj	R5784
11	Hue Preset	R7896
	Error Amp DC Balance	R2025
	Chroma Preset	R7888
12	Red Matrix DC Bal	R2600
13	Blue DC Level	R2815
	Blue Matrix DC Bal	R2700
14	Blue Amp White Ref Limit	R5722
	Blue Gain Cell Adj	R5724
15	B-Y Phase	L2205
	B-Y Gain	R2917
16	Green DC Level	R2820
	Green Matrix DC Bal	R2800
17	Green Amp White Ref Limit	R5752
	Green Gain Cell Adj	R5754
18	G-Y Phase	R2407
	G-Y Gain	R2929
19	Green DC Bal	R117
	Red DC Bal	R118
	Bandpass	C5722, C5752, C5782
20	B-Y or U	R160
	R-Y or V	R182
	DEFLECTION	
21	Focus	R6243
22	Deflection Yoke and Purity	Refer to Procedure
23	VERT CENTERING	R7290
	HORIZ CENTERING	R7490
24	HORIZ SIZE	R7480
	Horiz Linearity	P4265 (jumper); select C4254
25	VERT SIZE	R7280
	Vert S Correction	R4676
	Vert Lin Bal	R4658

Table 6-1 (cont)

Step No.	Adjustment Name	Circuit No.
26	Side Pin	R4642
	Side Tilt	R4624
	Underscan Side Pin	R4664
	Underscan Width	R4602
	50-Hz Side Pin	R4636
27	Top/Bot Pin Ampl	R4973
	Top/Bot Pin Phasing	T4810
	Top/Bot Pin Bal	R4971
28	Side Tilt/V Expand	R6005
	Side Pin Cushion/V Expand	R6041
	CONVERGENCE	
29	VERT STATIC	R7270
	HORIZ STATIC	R7470
	Convergence Magnets	Refer to Procedure
	HORIZ PARABOLA	R7460
	HORIZ TILT	R7450
	COLORIMETRY	
30	RED SCREEN BIAS	R7230
	GREEN SCREEN BIAS	R7220
	BLUE SCREEN BIAS	R7210
	Screen Volts	R6293
	RED SCREEN GAIN	R7430
	GREEN SCREEN GAIN	R7420
	BLUE SCREEN GAIN	R7410

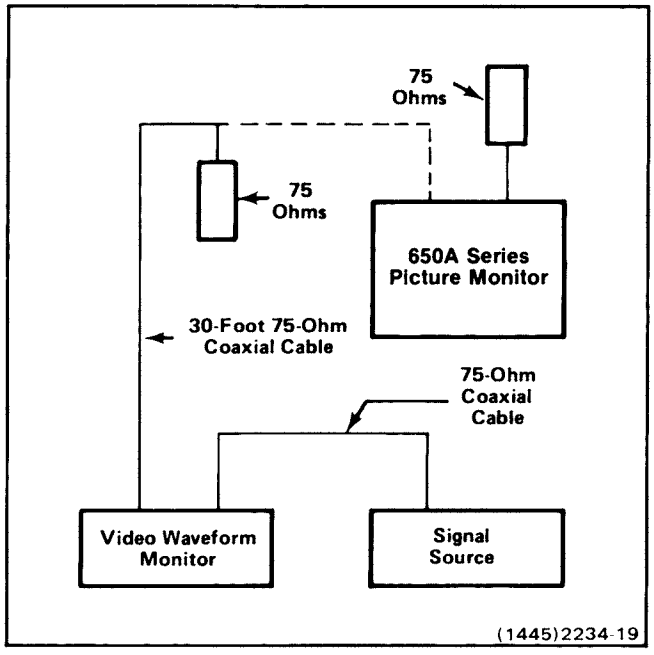


Fig. 6-2. Setup for measuring return loss.

NTSC CALIBRATION INDEX

Tables 6-1 and 6-2 serve as an index to the NTSC Calibration Procedure. Table 6-1 also includes some optional 50 Hz mode of operation adjustments; for example, adjusting 50 Hz Side Pin R4636 in step 26i.

Table 6-2

OPTIONAL CHECKS FOR NTSC PICTURE MONITOR

Step No.	Check
31	Chrominance to Luminance Delay
32	CONTRAST and BRIGHTNESS Control Ranges
33	Luminance Channel Amplitude Linearity
34	MODE Switch
35	Sync and Timing
36	Check Residual Subcarrier
37	Sync Stripper
38	High Voltage Regulation
39	Return Loss

PRELIMINARY

Set the picture monitor left and right front-panel lever and toggle switches to the up position (except, SN B030100 & up, set the OPERATE AFC FAST/ OPERATE/SETUP switch to OPERATE). If your instrument has a STANDARD switch, set it to the NTSC position. Set the right front-panel variable controls to PRESET. Press in the NTSC TEST pushbutton and check that the BLUE ONLY pushbutton is set to the out position. Leave the left front-panel adjustments as they are.

Check that the jumper connectors on the NTSC Decoder and the Sync & Timing boards are set to their factory-set positions as shown in Figs. 4-3 and 4-4 of the Operating Changes portion of the Installation section.

Since the 650A Series Monitor has vector signal output, monitoring these signals on a suitable X-Y display unit is useful for analyzing the success of the adjustments performed when calibrating the instrument.

Apply a crosshatch pattern and power to the monitor. Allow 30 minutes warmup at 25°C, ±5°C, before calibrating the instrument.

LV POWER SUPPLY

1. Adjust −15 Volt Power Supply (R8170)

a. Connect an accurate dc voltmeter to TP1 (see Fig. 6-3).

b. CHECK—For a meter reading of −15 volts within a tolerance of ±1% (−14.85 V to −15.15 V).

c. ADJUST—The −15 V Adjust (R8170) control (see Fig. 6-3) to obtain a meter reading of −15 volts, ±0.5%.

NOTE

The −15 V Power Supply is the reference supply for the other supplies in the instrument. These supplies should have the following tolerances: +5 V, ±3.5%; +15 V, ±3.5%; +100 V, ±3.5%; anode supply 19 kV, ±1 kV.

WARNING

Measurement of the anode supply is difficult to achieve safely and is not recommended.

d. Disconnect the voltmeter.

VIDEO CHANNEL

2. Adjust Channel A and B Input Compensation (C1375, C1331); Adjust Crosstalk Null (C1270)

a. Apply the crosshatch pattern through a feed-through termination and a dual-input coupler to the monitor VIDEO INPUT A and B connectors. Check that the INPUT switch is set to A.

b. Ac couple the oscilloscope probe to TP1151 (see Fig. 6-4) on the Video Input board. Externally trigger the test oscilloscope from the generator Comp Sync output.

c. CHECK/ADJUST—With the monitor INPUT switch set to A, adjust C1375 so the pulses (vertical crosshatch lines) are the same amplitude as the bar (horizontal crosshatch line) as shown in Fig. 6-5. Set the INPUT switch to B, adjust C1331 for the same results.

NOTE

Double check that C1375 and C1331 have been properly adjusted by setting the generator Convergence switch to the Dots (only) position. Dc couple the test oscilloscope probe to P1361-2 (see Fig. 6-4) and the probe ground lead to P1361-1. Note the flat-top shape of the dot pulse as shown in Fig. 1A of this insert. Ac couple the probe to TP1151 and check that the inverted dot pulse has an approximately flat top (see Fig. 1B). If necessary, slightly re-adjust C1331 (INPUT B) and C1375 (INPUT A). Return the generator Convergence switch to the Crosshatch position.

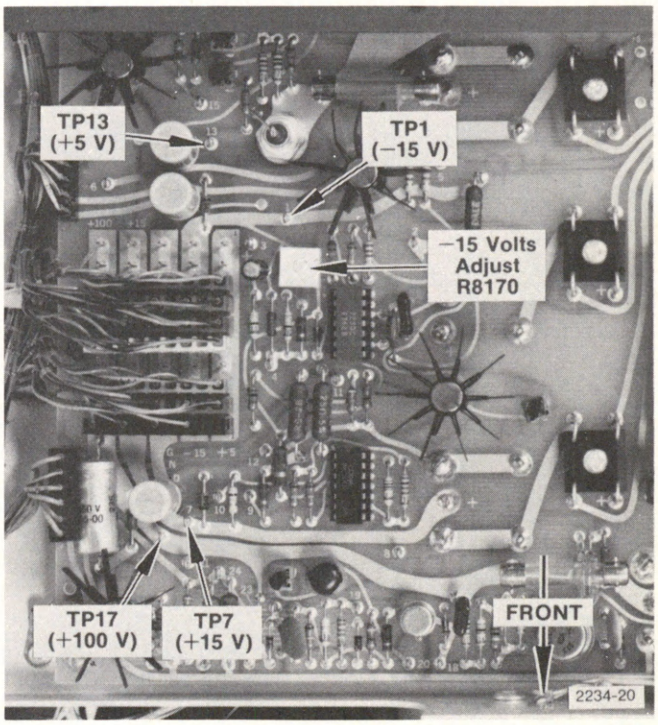


Fig. 6-3. Partial LV & HV Power board showing test point and adjustment locations.

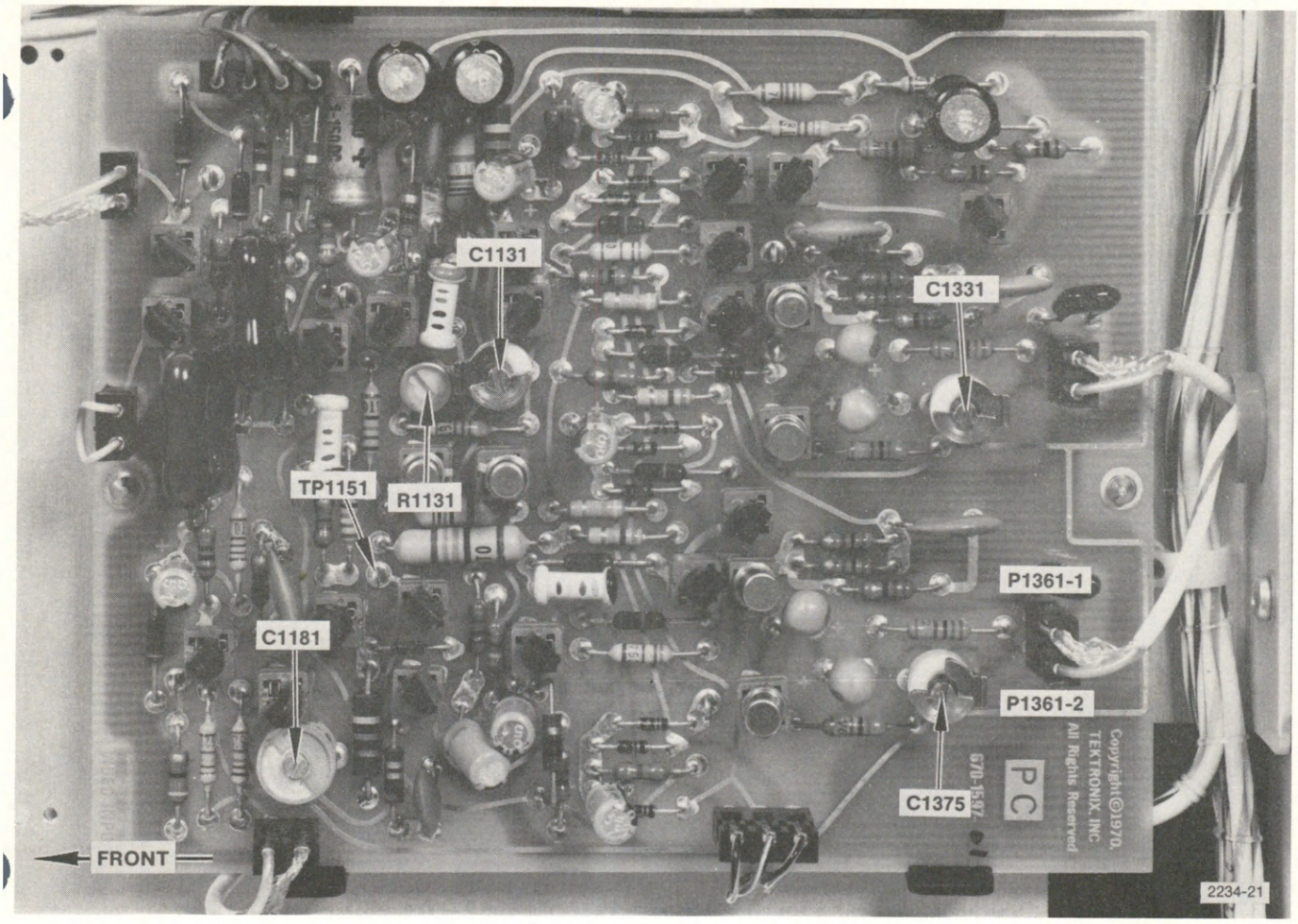


Fig. 6-4. Video Input board test point and adjustment locations.

d. Remove the dual-input coupler and feed-through termination. Apply the crosshatch pattern directly to VIDEO INPUT A. Connect an end-line termination to the other VIDEO INPUT A connector. Set the INPUT switch to A.

3. Adjust Aperture Zero and Preset (R123, R7873)

a. Check that the crosshatch pattern is applied to the monitor. Dc couple the oscilloscope probe to TP2865 (see Fig. 6-6).

b. Set the picture monitor MODE switch to MONOCHROME.

c. Set the right front-panel APERTURE control just out of the PRESET detent position (minimum aperture correction).

d. CHECK/ADJUST—The Aperture Zero (R123) adjustment (see Fig. 6-7) so that the vertical crosshatch lines are the same amplitude as the horizontal crosshatch line as observed on the oscilloscope (see Fig. 6-8A).

e. Set the picture monitor MODE switch to COLOR and the APERTURE control to PRESET.

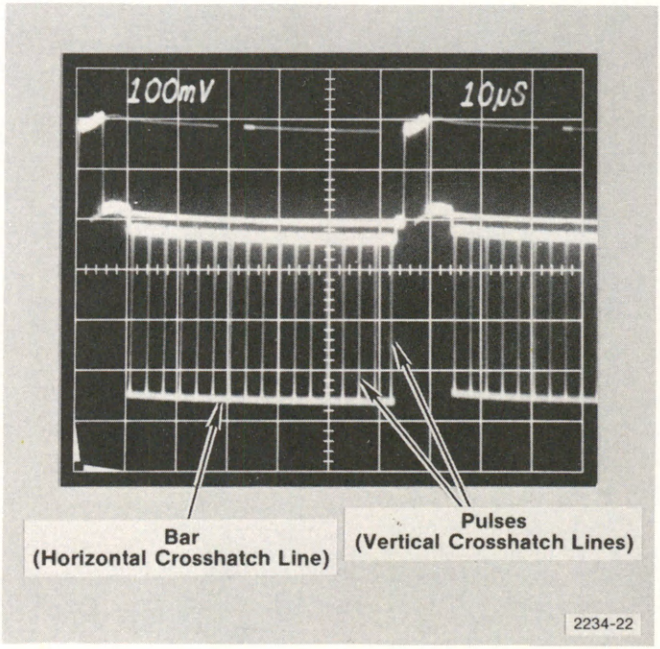


Fig. 6-5. Properly compensated crosshatch waveform at TP1151.

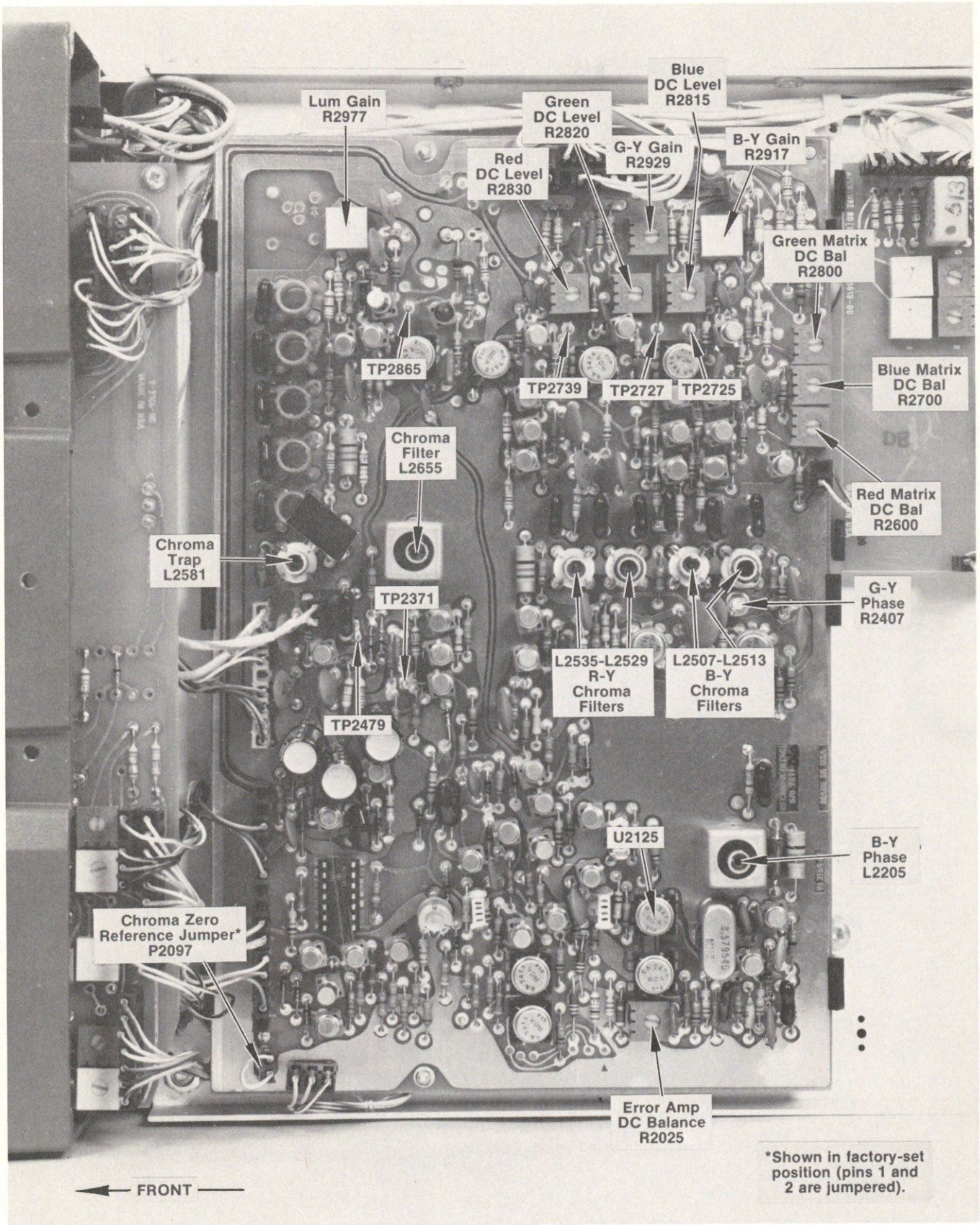


Fig. 6-6. NTSC Decoder board test point and component locations.

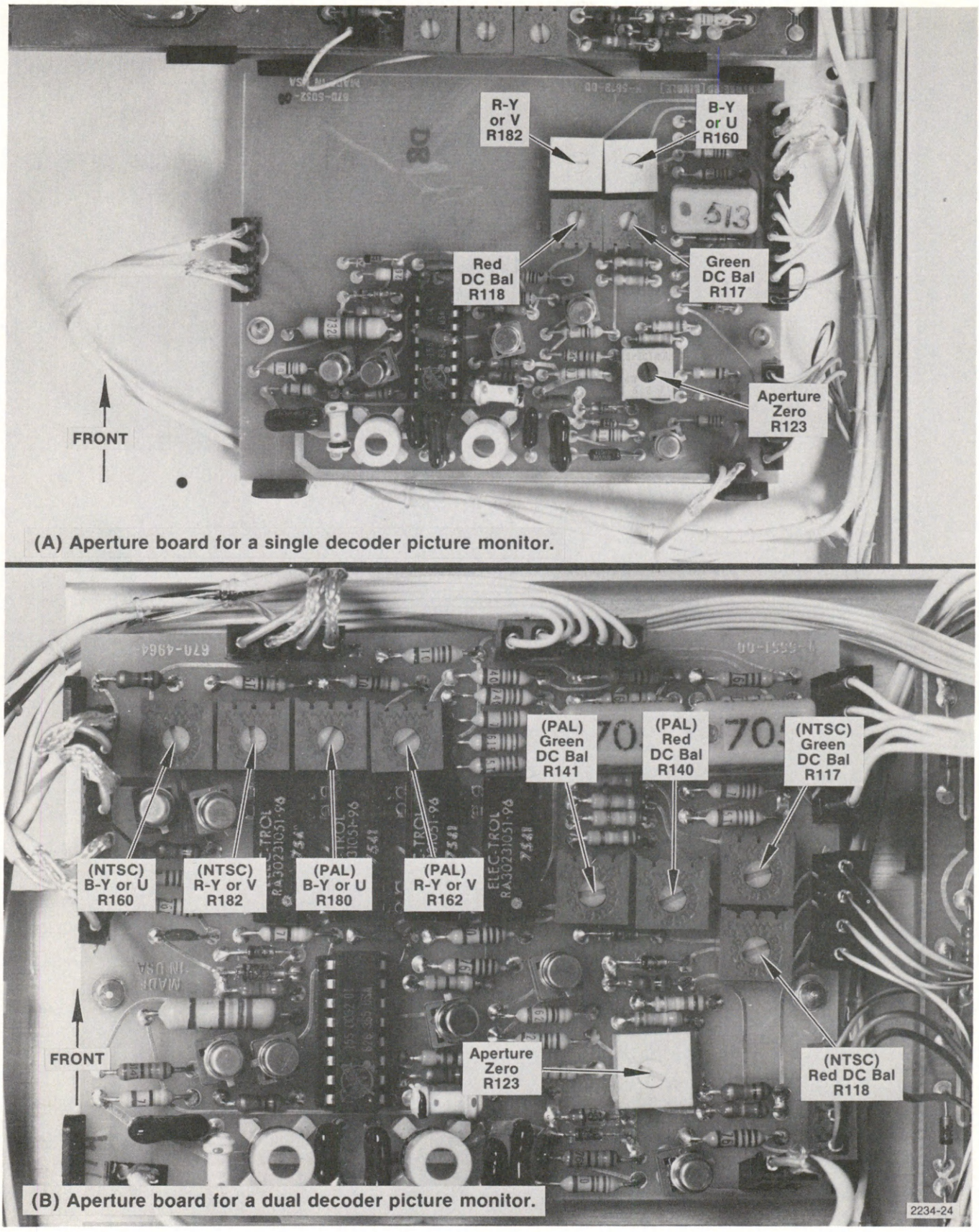


Fig. 6-7. Aperture board adjustment locations.

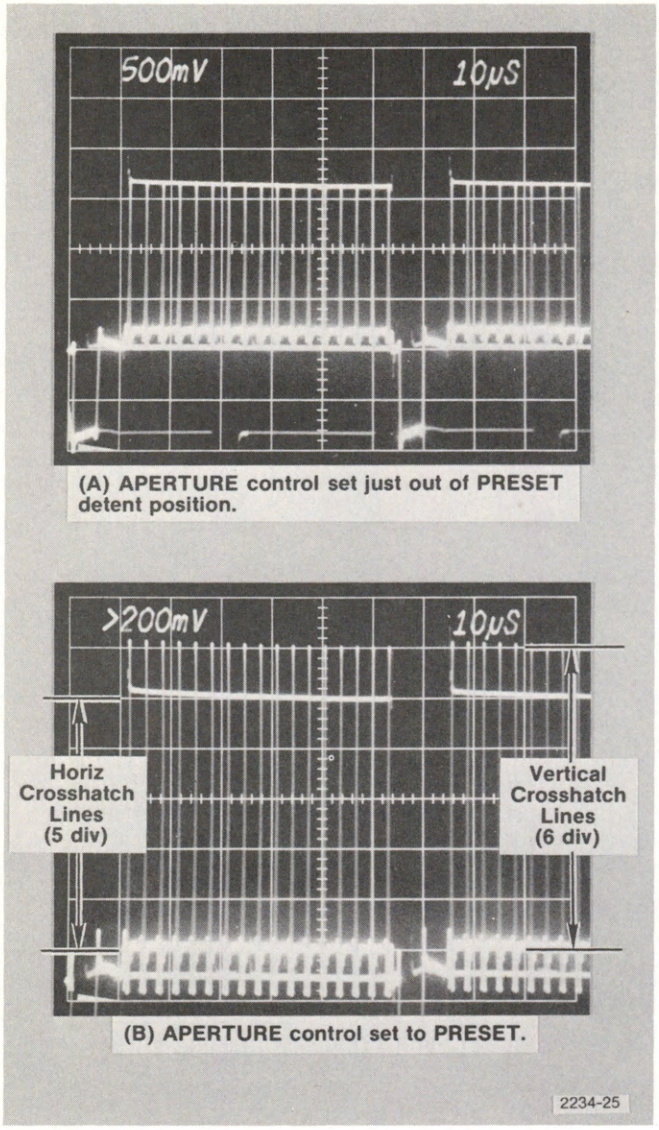


Fig. 6-8. Crosshatch waveforms at TP2865 when performing step 3.

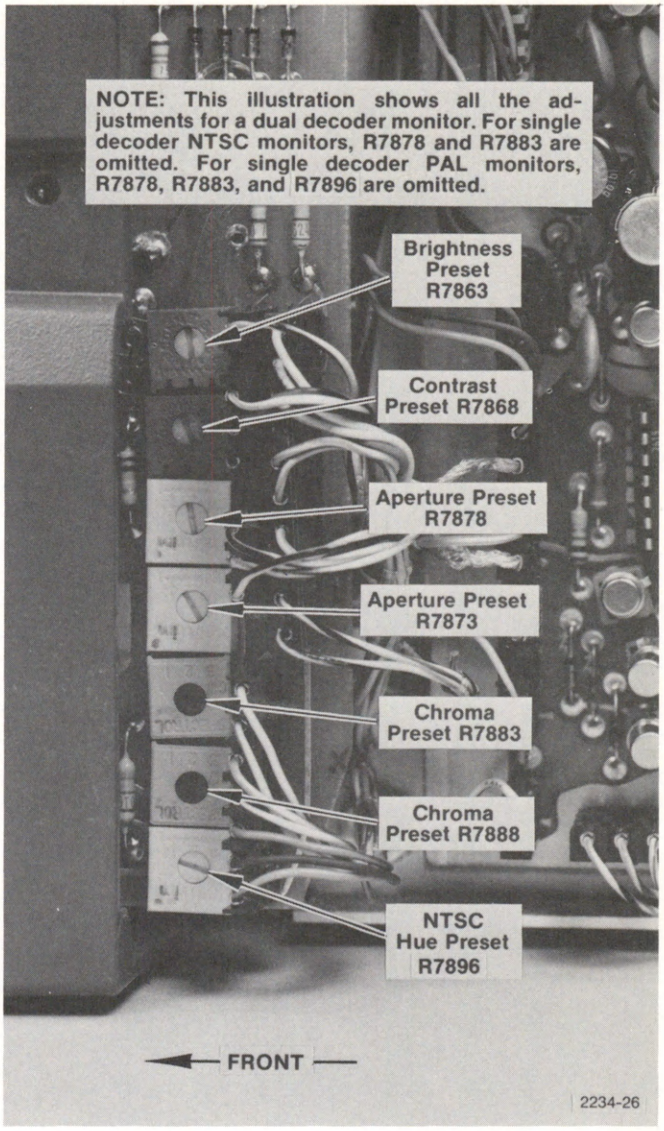


Fig. 6-9. Partial Right Front-Panel board showing location of the preset adjustments.

f. CHECK/ADJUST—The Aperture Preset (R7873) adjustment (see Fig. 6-9) so that the vertical crosshatch lines are 20% greater in amplitude than the horizontal crosshatch line (see Fig. 6-8B). NOTE: The user may prefer to have R7873 adjusted to some other level than described here.

g. Disconnect the crosshatch pattern signal from the picture monitor.

4. Adjust Luminance Gain (R2977)

a. Apply a standard color bar signal with 100% white reference and 7.5% setup to the picture monitor VIDEO INPUT A connector.

b. Check that the oscilloscope probe is connected to TP2865.

c. CHECK/ADJUST—The Lum Gain (R2977) adjustment (see Fig. 6-6) so the waveform amplitude is 2 V from 7.5% setup to the 100% white level (see Fig. 6-10).

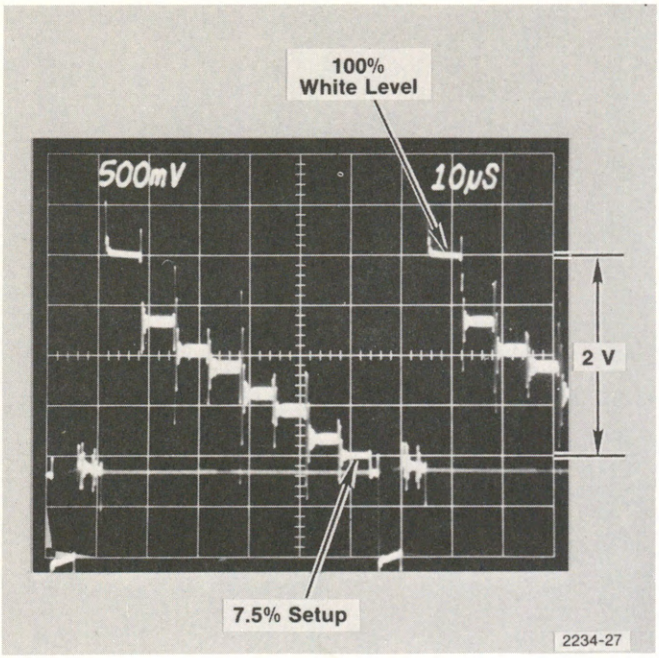


Fig. 6-10. Color bar luminance waveform at TP2865.

NOTE

If the generator is set for 75% white reference, the waveform amplitude should be 1.5 V from 7.5% setup to the 75% white level.

5. Adjust Chroma Trap (L2581)

a. Use the equipment setup as described in parts a and b of step 4.

b. Set the APERTURE control just out of the PRESET detent position (zero aperture correction). Check that the MODE switch is set to COLOR.

c. CHECK/ADJUST—Chroma Trap L2581 (see Fig. 6-6) for minimum chrominance amplitude on the luminance steps; typically 125 mV or less.

d. Return the APERTURE control to the PRESET position.

6. Adjust A-B Common-Mode Rejection (C1181, C1131, R1131)

a. Using the same color bar signal described in step 4a, apply this signal through a feed-through termination and dual-input coupler to the monitor VIDEO INPUT A and B connectors. Remove the 75-ohm end-line termination used in the previous steps.

b. Set the INPUT switch to A-B and the MODE switch to MONOCHROME. Check that the oscilloscope probe is connected to TP2865.

c. CHECK/ADJUST—C1181 and C1131 (see Fig. 6-4) for minimum chrominance amplitude using Fig. 6-11A as a guide. Typical amplitude is approximately 30 mV or less.

d. Set the SCAN switch to HORIZ DELAY.

e. CHECK/ADJUST—R1131 so that the level on the right side of the flyback glitch is positioned to the location shown in Fig. 6-11B.

f. Set the INPUT switch to A, MODE switch to AUTO, and the SCAN switch to its Normal (up) position.

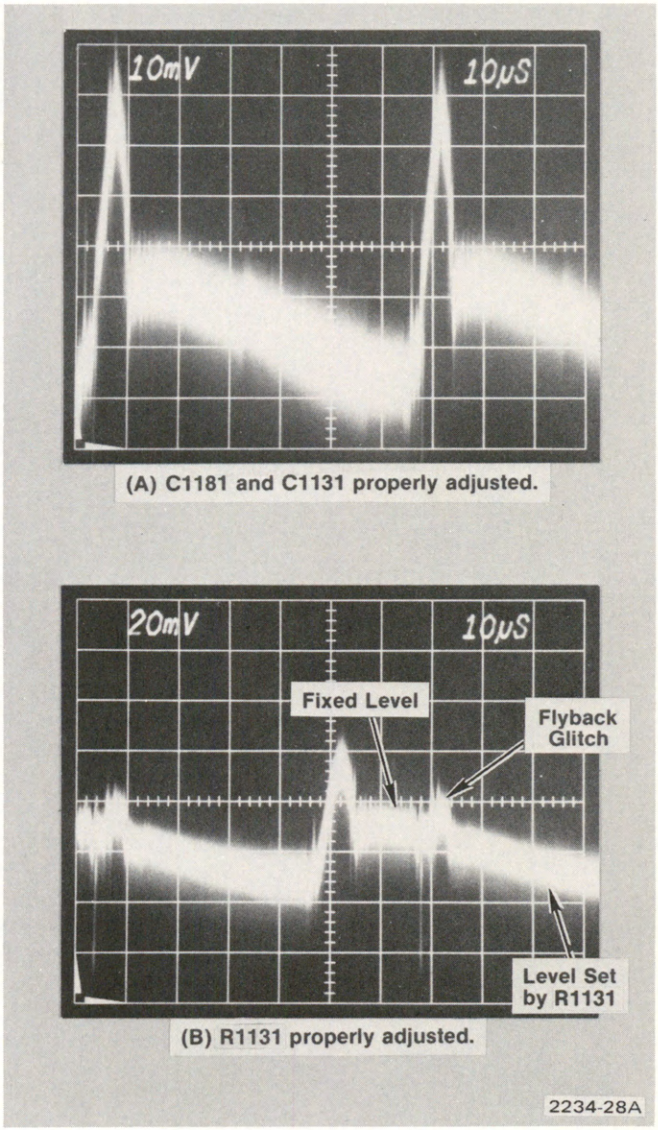


Fig. 6-11. Common-mode rejection waveform at TP2865 when performing step 6.

7. Adjust Chroma Filter (L2655)

a. Remove the dual-input coupler and feed-through termination. Apply the color bar signal to the VIDEO INPUT A connector. Terminate the other VIDEO INPUT A connector.

b. Ac couple the oscilloscope probe to TP2479 (see Fig. 6-6).

c. CHECK/ADJUST—The Chroma Filter (L2655) adjustment for minimum chrominance amplitude on the luminance steps; typically 30 mV or less.

8. Adjust R-Y and B-Y Chroma Filters (L2535, L2529, L2507, L2513)

a. Use the same setup as described in step 7a.

b. Turn the monitor off and remove U2125 (see Fig. 6-6). Turn the monitor on and set the MODE switch to COLOR.

NOTE

If your generator has a Burst Synchronization switch; turn this switch off instead of removing U2125.

c. Ac couple the oscilloscope probe to TP2739. Check that the oscilloscope is externally triggered from the generator Comp Sync Signal. Locate the green-magenta transition as shown in Fig. 6-12A.

NOTE

If the chroma filters in this step are adjusted, check chrominance to luminance delay as described in step 31.

d. CHECK/ADJUST—L2535 and L2529 for best transient response at the green-magenta transition as shown in Fig. 6-12B.

e. Ac couple the oscilloscope probe to TP2725.

f. CHECK/ADJUST—L2507 and L2513 for best transient response at the green-magenta transition.

g. Turn the monitor off, install U2125, and then turn on the monitor. Set the MODE switch to AUTO.

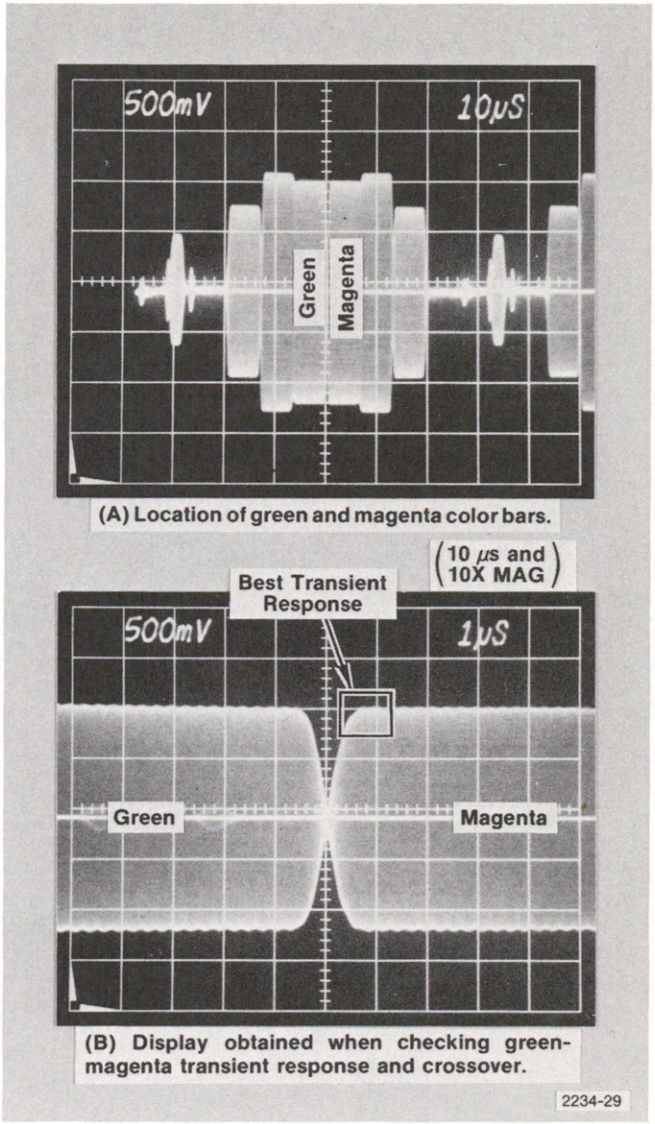


Fig. 6-12. Typical waveforms obtained at TP2739 when performing step 8. The test oscilloscope is externally triggered from the generator Comp Sync output.

9. Adjust Red DC Level (R2830), Brightness Preset (R7863), and Contrast Preset (R7868)

a. Use the same setup as described in step 7a.

b. Dc couple the oscilloscope probe to red output TP5760 (see Fig. 6-13). Use dc offset or the Vertical Position control to position the waveform onto the oscilloscope crt.

c. Check that the generator standard color bar signal is set for 100% white reference. Check that the picture monitor NTSC TEST pushbutton is pressed in.

@

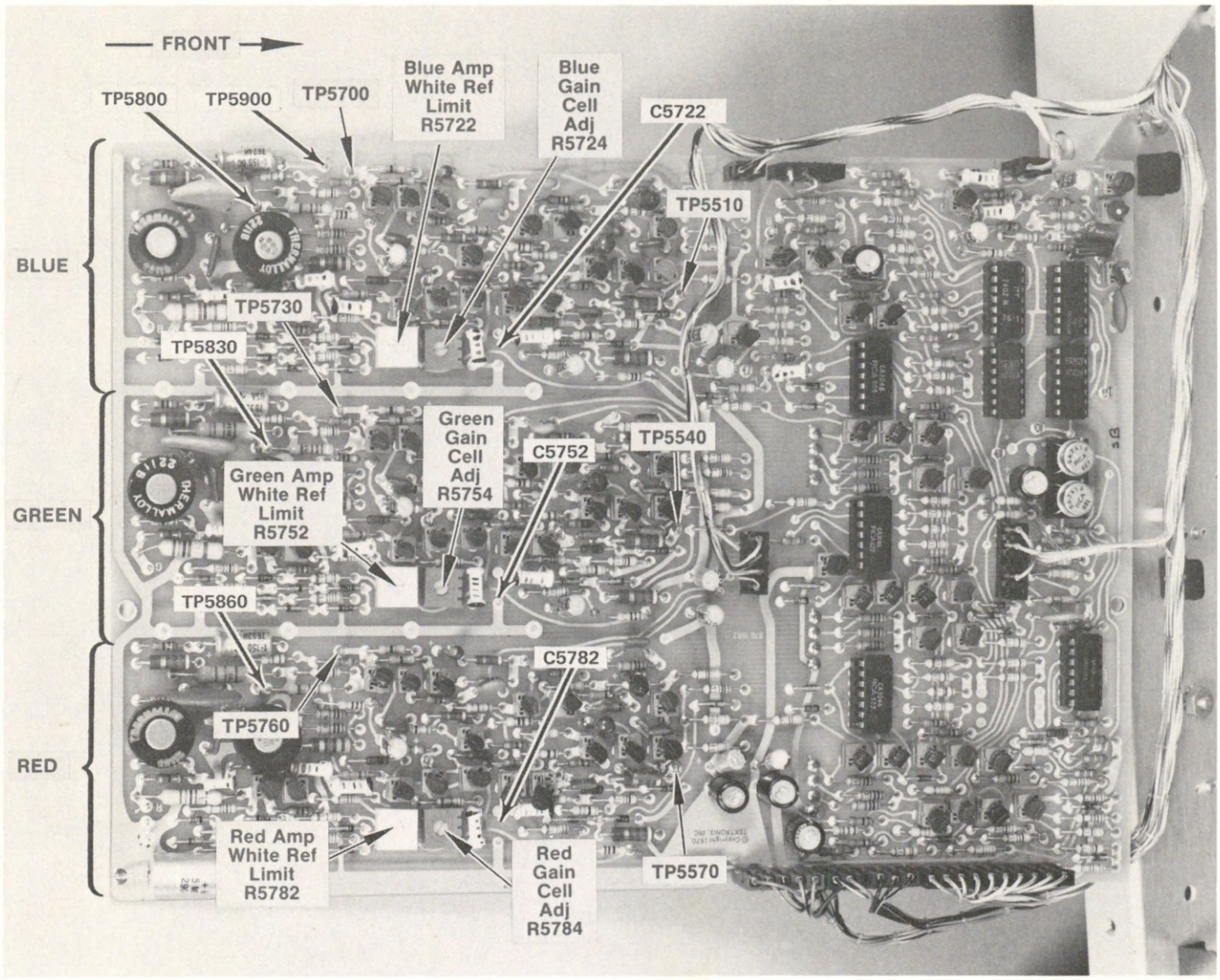


Fig. 6-13. Output Amplifier board test point and adjustment locations. (This board has been partially removed from the instrument to provide a clear view.)

d. CHECK/ADJUST—Red DC Level R2830 (see Fig. 6-6) for no dc shift of the signal black level with respect to the black reference pulse (see Fig. 6-14) as the CONTRAST control is varied. Set the CONTRAST control to PRESET. Set the Brightness Preset (R7863) adjustment (see Fig. 6-9) so that the signal black level matches the black reference pulse level as shown in Fig. 6-14. Set the Contrast Preset (R7868) adjustment so the 100% white level matches the white reference pulse level.

10. Adjust Red Amp White Ref Limit (R5782) and Red Gain Cell Adj (R5784)

a. Check that a standard color bar signal with 100% white reference is applied to the monitor. Check that the NTSC TEST pushbutton is pressed in and the oscilloscope is dc-coupled to TP5760.

b. Set the SCAN switch to HORIZ DELAY. Rotate the BRIGHTNESS and CONTRAST controls fully clockwise.

c. CHECK—That, as the CONTRAST control is turned clockwise, the 100% white level limits at +3 volts.

d. ADJUST—Red Amp White Ref Limit R5782 (see Fig. 6-13) to limit the waveform as described in part c of this step.

e. Set the SCAN switch to Normal and the BRIGHTNESS control to PRESET.

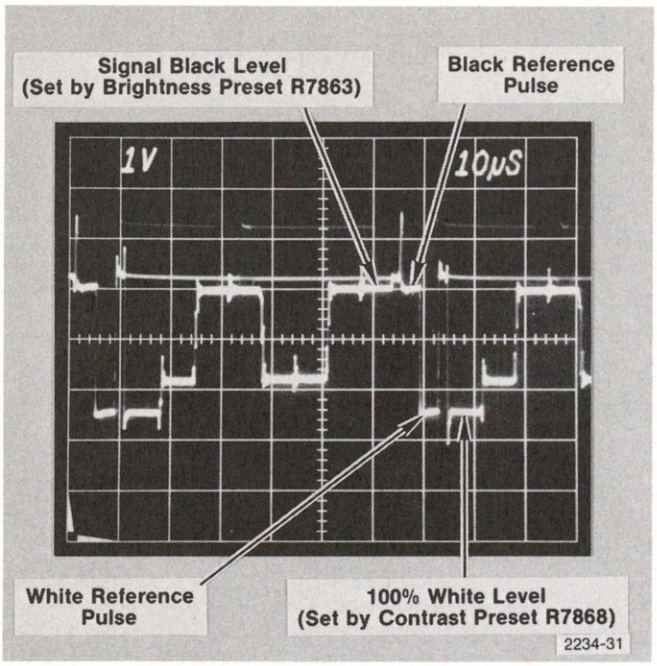


Fig. 6-14. Typical waveform obtained at the red output test point TP5760 when steps 9 through 11 have been properly performed.

f. Dc couple the oscilloscope probe to TP5570 (see Fig. 6-13). Check that the CONTRAST control is set fully clockwise.

g. CHECK—That the oscilloscope trace is located 0.6 V to 0.8 V above ground reference.

h. ADJUST—Rotate the Red Gain Cell Adj (R5784) fully counterclockwise (lowest dc level). Note this dc level. Turn R5784 slowly clockwise until the trace jumps upward quickly. Continue to rotate the adjustment clockwise until the trace is located 40 mV to 60 mV above the jump-up point. If there is no jump-up point, adjust R5784 so the trace is located 40 mV to 60 mV above the lowest dc level noted earlier.

i. INTERACTION—Dc couple the oscilloscope to TP5760 and repeat parts b through e of this step.

j. Set the CONTRAST control to PRESET.

11. Adjust Hue Preset (R7896), Error Amp DC Balance (R2025), and Chroma Preset (R7888)

a. Check that a standard color bar signal with 100% white reference is applied to the monitor VIDEO INPUT A connector and the NTSC TEST pushbutton is pressed in.

b. Dc couple the oscilloscope probe to TP2739.

c. Note the location of burst as shown in Fig. 6-15A. The exact location of burst can be determined by rotating the front-panel HUE control. Return the HUE control to PRESET after locating burst.

d. Turn the front-panel CHROMA control fully clockwise and magnify the oscilloscope display as shown in Fig. 6-15B.

e. CHECK/ADJUST—Hue Preset R7896 (see Fig. 6-9) so that the burst portion of the waveform coincides with the video signal blanking level. Fig. 6-15B shows the proper waveform that should be obtained.

f. Turn the front-panel CHROMA control to its minimum chroma position; that is, just out of the detent PRESET position. Set the oscilloscope vertical deflection factor to 50 mV as shown in Fig. 6-15C.

g. CHECK/ADJUST—Error Amp DC Balance R2025 (see Fig. 6-6) so that the burst portion of the waveform coincides with the video blanking level as shown in Fig. 6-15C.

h. INTERACTION—Repeat parts d through g of this step to minimize any interaction.

NOTE

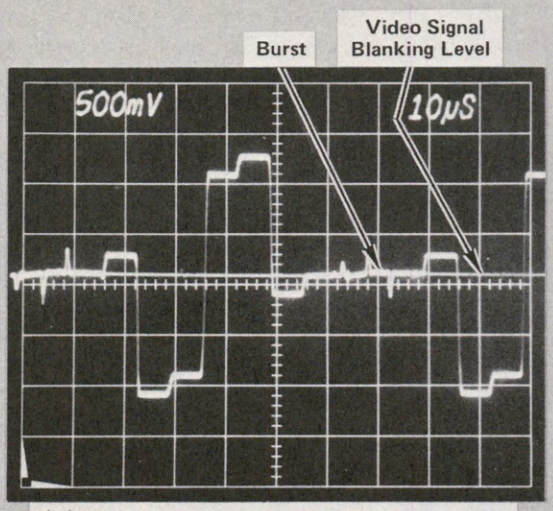
Another method for adjusting R7896 and R2025 accurately is to turn off the generator R-Y switch and adjust for a nulled demodulator color bar output waveform as shown in Fig. 6-15D. Adjust R7896 when the CHROMA control is fully clockwise and adjust R2025 when the CHROMA control is set to minimum. Repeat this procedure until interaction is minimized.

i. Set the CHROMA control to PRESET.

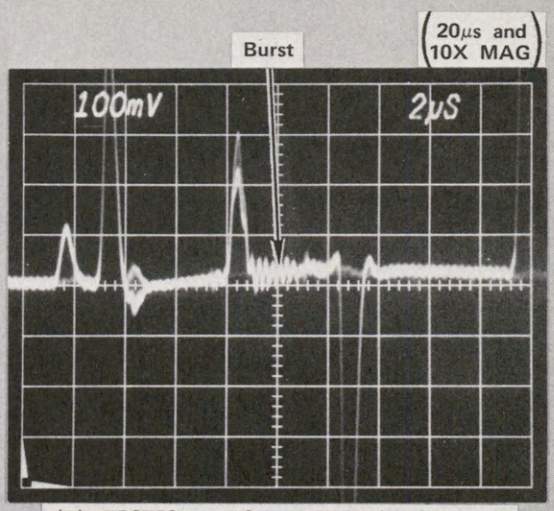
j. Ac couple the oscilloscope probe to TP5760 and set the generator standard color bar signal for 75% white reference.

k. CHECK—For proper color bar decoding as shown in Fig. 6-15E. The color bar signal black level should be parallel to the video signal blanking level.

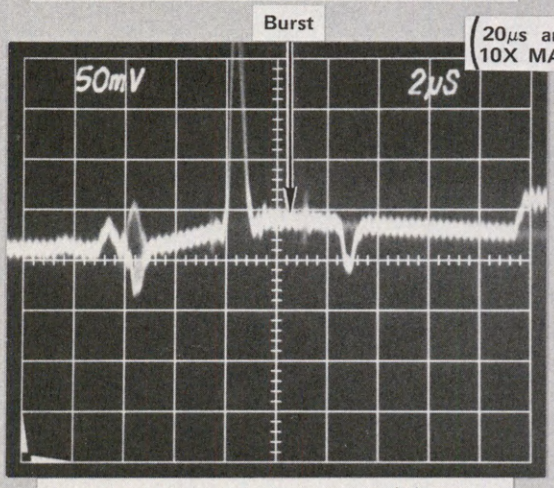
l. ADJUST—Chroma Preset R7888 for proper color bar decoding.



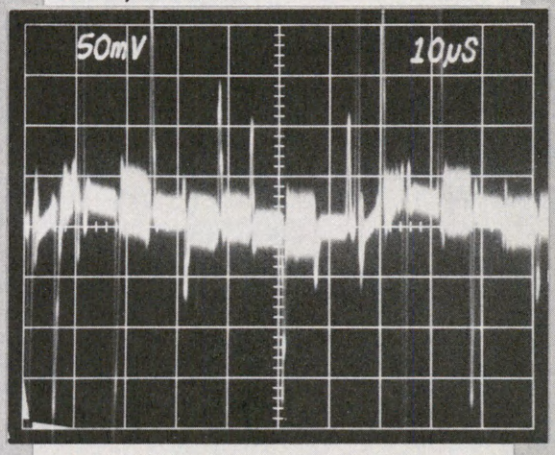
(A) TP2739 waveform showing location of burst. CHROMA control set to PRESET.



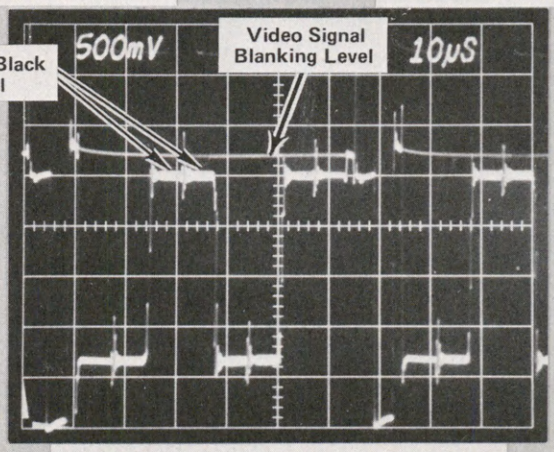
(B) TP2739 waveform obtained when oscilloscope controls are set to magnify waveform vertically and horizontally. CHROMA control set fully clockwise.



(C) TP2739 waveform similar to (B) except oscilloscope vertical deflection factor is 50 mV/div and CHROMA control is set to minimum.



(D) TP2739 waveform obtained when using an alternative method. Generator R-Y switch is set to off; see text. CHROMA control is set fully clockwise.



(E) Red output test point TP5760 waveform showing proper color bar decoding.

2234-32B

Fig. 6-15. Typical waveforms obtained at TP2739 and TP5760 when performing step 11.

12. Adjust Red Matrix DC Bal (R2600)

a. Check that a standard color bar signal with 75% white reference is applied to the monitor VIDEO INPUT A connector. Set the NTSC TEST pushbutton to the out position.

b. Check that the oscilloscope is ac-coupled to TP5760.

c. CHECK—For no dc shift of the signal black level with respect to the black reference pulse (see Fig. 6-16) as the NTSC TEST pushbutton is pressed in and out. Set the NTSC TEST pushbutton to the out position.

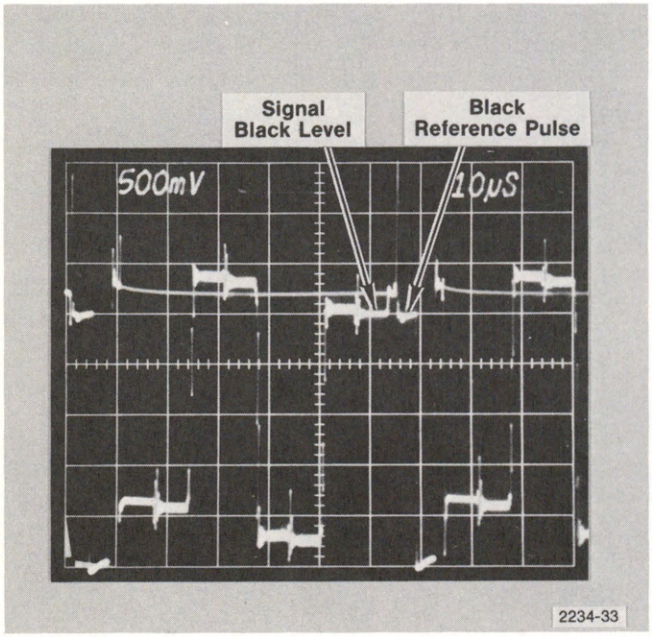


Fig. 6-16. Waveform obtained at TP5760. NTSC TEST pushbutton set to the out position.

d. ADJUST—Red Matrix DC Bal R2600 (see Fig. 6-6) to match the signal black level to the black reference pulse as shown in Fig. 6-16. Repeat part c of this step. If necessary, readjust R2600 for no dc shift of the signal black level.

13. Adjust Blue DC Level (R2815) and Blue Matrix DC Level (R2700)

a. Check that a standard color bar signal is applied to the monitor VIDEO INPUT A connector. Set the generator signal for 100% white reference. Set the monitor NTSC TEST pushbutton to the in position.

b. Dc couple the oscilloscope probe to blue output TP5700 (see Fig. 6-13). Use dc offset or the Vertical Position control to position the waveform onto the oscilloscope crt.

c. CHECK/ADJUST—Blue DC Level R2815 (see Fig. 6-6) for no dc shift of the signal black level with respect to the black reference pulse (see Fig. 6-17A) as the CONTRAST control is varied.

d. Set the CONTRAST control to PRESET and the oscilloscope Input Coupling switch to AC.

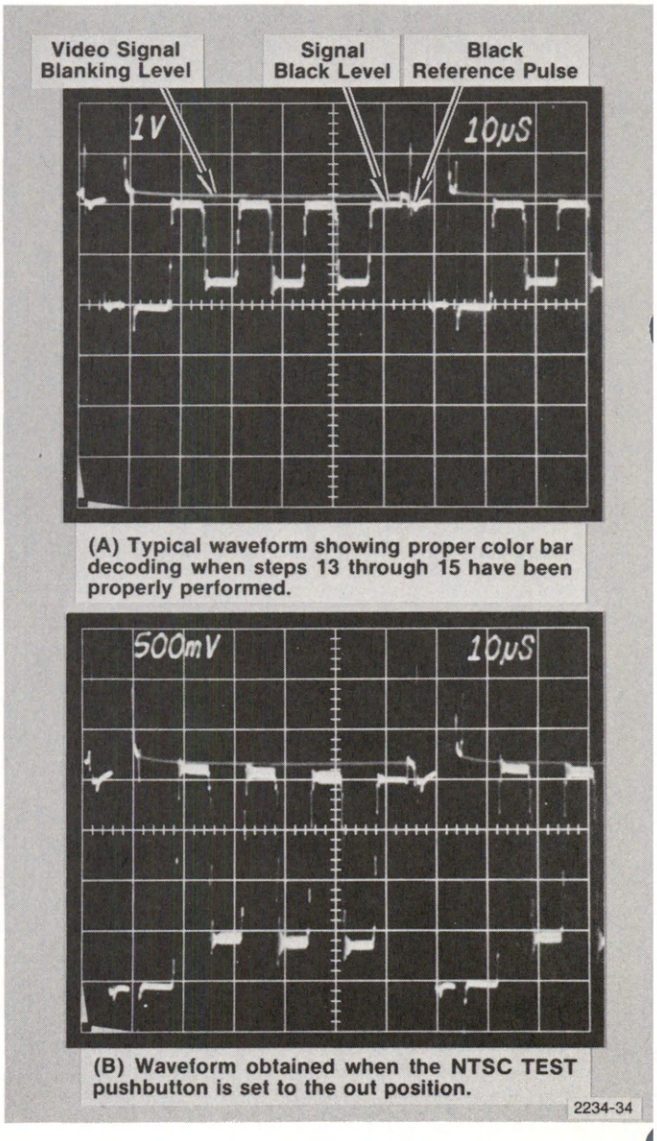


Fig. 6-17. Waveforms obtained at blue output TP5700.

e. CHECK—For no dc shift of the signal black level with respect to the black reference pulse as the NTSC TEST pushbutton is pressed in and out. Set the NTSC TEST pushbutton to the out position.

f. ADJUST—Blue Matrix DC Bal R2700 (see Fig. 6-6) to match the signal black level to the black reference pulse as shown in Fig. 6-17B. Repeat part e of this step. If necessary, readjust R2700 for no dc shift of the signal black level.

14. Adjust Blue Amp White Ref Limit (R5722) and Blue Gain Cell Adj (R5724)

a. Use same setup as given in parts a and b of step 13.

b. CHECK/ADJUST—Blue Amp White Ref Limit R5722 and Blue Gain Cell Adj R5724 using parts b through j of step 10 as a guide. Use TP5510 (see Fig. 6-13) when performing parts f through h of step 10; use TP5700 when performing part i.

15. Adjust B-Y Phase and Gain (L2205, R2917)

a. Check that a standard color bar signal is applied to the monitor and the NTSC TEST pushbutton is pressed in. The generator can be set for either 75% or 100% white reference.

b. Check that the oscilloscope probe is connected to TP5700. Set the oscilloscope Input Coupling switch to AC.

c. CHECK/ADJUST—B-Y Phase L2205 and B-Y Gain R2917 (see Fig. 6-6) for proper bar decoding similar to the waveform shown in Fig. 6-17A. The signal black level of the color bars should be parallel to the video signal blanking level.

16. Adjust Green DC Level (R2820) and Green Matrix DC Bal (R2800)

a. Check that a standard color bar signal is applied to the monitor and the NTSC TEST pushbutton is pressed in. Set the generator signal for 100% white reference.

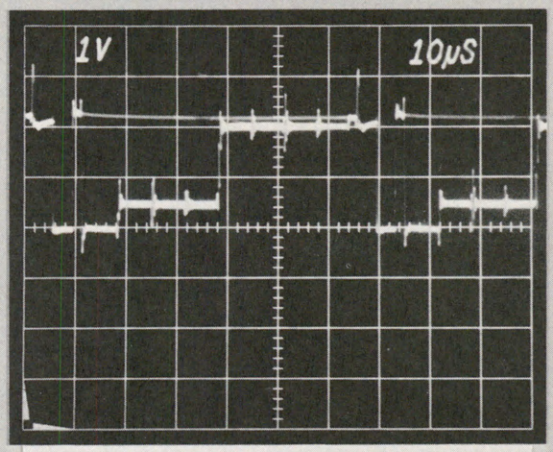
b. Dc couple the oscilloscope probe to green output TP5730 (see Fig. 6-13). Use dc offset or the Vertical Position control to position the waveform into view on the oscilloscope crt.

c. CHECK/ADJUST—Green DC Level R2820 (see Fig. 6-6) for no dc shift of the signal black level with respect to the black reference pulse (see Fig. 6-18A) as the CONTRAST control is varied.

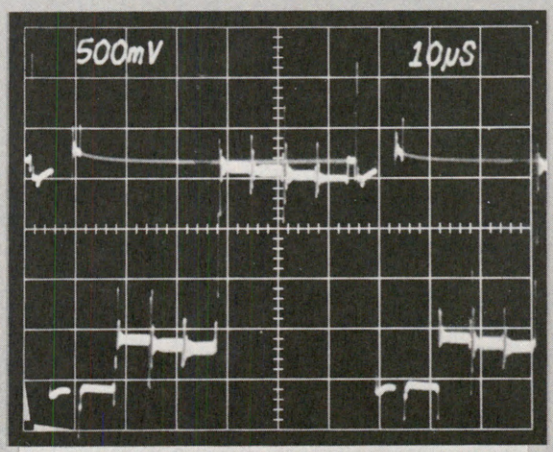
d. Set the CONTRAST control to PRESET and the oscilloscope Input Coupling switch to AC.

e. CHECK—For no dc shift of the signal black level with respect to the black reference pulse as the NTSC TEST pushbutton is pressed in and out. Set the NTSC TEST pushbutton to the out position.

f. ADJUST—Green Matrix DC Bal R2800 (see Fig. 6-6) to match the signal black level to the black reference pulse as shown in Fig. 6-18B. Repeat part e of this step. If necessary, readjust R2800 for no dc shift of the signal black level.



(A) Waveform showing proper color bar decoding when steps 16 through 18 have been properly performed.



(B) Waveform obtained when the NTSC pushbutton is set to the out position.

2234-35

Fig. 6-18. Waveforms obtained at green output TP5730.

17. Adjust Green Amp White Ref Limit (R5752) and Green Gain Cell Adj (R5754)

a. Use the same setup as given in parts a and b of step 16.

b. CHECK/ADJUST—Green Amp White Ref Limit R5752 and Green Gain Cell Adj R5754 using parts b through j of step 10 as a guide. Use TP5540 (see Fig. 6-13) when performing parts f through h of step 10; use TP5730 when performing part i.

18. Adjust G-Y Phase and Gain (R2407, R2929)

a. Check that a standard color bar signal is applied to the monitor and the NTSC TEST pushbutton is pressed in. The generator can be set for either 75% or 100% white reference.

b. Check that the oscilloscope probe is connected to TP5730. Set the oscilloscope Input Coupling switch to AC.

c. CHECK/ADJUST—G-Y Phase R2407 and G-Y Gain R2929 (see Fig. 6-6) for proper color bar decoding similar to the waveform shown in Fig. 6-18A. The signal black level of the color bars should be parallel to the video signal blanking level.

19. Adjust Green and Red DC Bal (R117, R118); Adjust Bandpass (C5722, C5752, C5782)

a. Use the same setup as described in parts a and b of step 18. (The NTSC TEST pushbutton can be either in or out.)

b. CHECK—For no dc shift of the signal black level with respect to the black reference pulse as the BLUE ONLY pushbutton is pressed in and out. Set the BLUE ONLY pushbutton to the in position.

c. ADJUST—Green DC Bal R117 (see Fig. 6-7) to match the signal black level to the black reference pulse. Repeat part b of this step. If necessary, readjust R117 for no dc shift of the signal black level.

d. Ac couple the oscilloscope probe to red output TP5760.

e. CHECK/ADJUST—Red DC Bal R118 for the same results as obtained with R117. Use parts b and c of this step as a guide.

f. Set the BLUE ONLY pushbutton to the out position.

g. Set the picture monitor MODE switch to MONOCHROME and the APERTURE control just out of the PRESET detent position (zero aperture correction). Set the generator color bar signal for 100% (100 IRE) white reference amplitude.

h. Ac couple the test oscilloscope probe to TP5800. Refer to the Output Amplifier board illustration in this insert. Use a short ground lead on the probe. Connect the ground lead to TP5900.

i. CHECK/ADJUST—C5722 so that the yellow color bar chrominance packet is the same peak amplitude as the 100 IRE white level as shown in Fig. 2B of this insert. Note that the red and blue color bar chrominance packets are the same amplitude; see Fig. 2B. This waveform should appear similar to the input waveform obtained at P1361-2 except that it is inverted; see Fig. 2A.

j. CHECK/ADJUST—C5752 and C5782, using the same technique as described in parts h and i of this step. Ac couple the probe to TP5830 when adjusting C5752. Use TP5860 when adjusting C5782.

NOTE

If a multiburst signal and a wideband test oscilloscope (dc to 50 MHz) are available, double check the accuracy of C5722, C5752, and C5782 Bandpass adjustments by checking the multiburst waveforms obtained at the test points given in parts i and j of this step. Compare these waveforms to see that they are similar to the waveform obtained at P1361-2 on the Video Input board. See Fig. 3 in this insert.

k. Set the APERTURE control to PRESET and disconnect the oscilloscope probe from the test point.

20. Adjust B-Y or U and R-Y or V (R160, R182)

a. Check that a standard color bar signal is applied to the monitor.

b. Set the MODE switch to COLOR. Check that the CHROMA control is set to PRESET.

c. Turn the monitor off. Remove U2125 (see Fig. 6-6). Turn on the monitor. Dc couple the oscilloscope probe to the rear-panel B-Y or U connector. Check that the oscilloscope time-base is externally triggered from the generator Comp Sync connector.

NOTE

If your generator has a Burst Synchronization switch. Turn this switch off instead of removing U2125.

d. CHECK/ADJUST—B-Y or U (R160) see Fig. 6-7, to obtain a red color bar amplitude of 700 mV p-p as shown in Fig. 6-19. This corresponds to a vector graticule compass rose diameter of 0.8 volt.

e. Dc couple the oscilloscope probe to the rear-panel R-Y or V connector.

f. CHECK/ADJUST—R-Y or V (R182), see Fig. 6-7, to obtain a red color bar amplitude of 700 mV p-p as described in part d of this step.

g. Turn off the monitor, reinstall U2125, and turn on the monitor. Set the MODE switch to AUTO and disconnect the oscilloscope probe from the monitor.

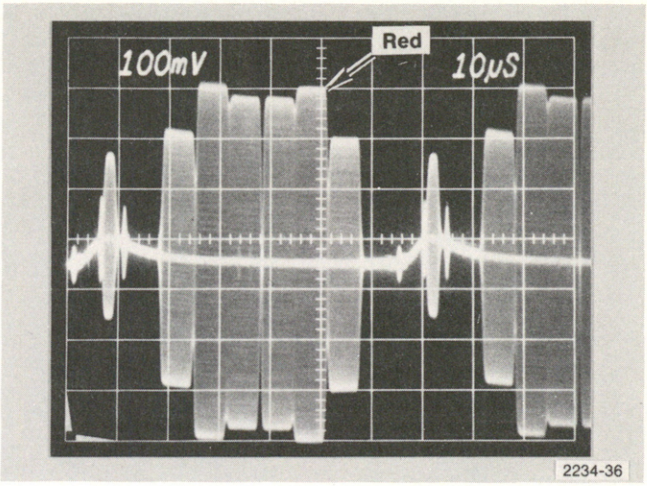


Fig. 6-19. Checking the red color bar for 700 mV p-p amplitude at the rear panel B-Y or U and R-Y or V OUTPUT connectors. The test oscilloscope is externally triggered from the generator Comp Sync output.

DEFLECTION

21. Adjust Focus (R6243)

a. Display a convergence crosshatch pattern on the monitor.

b. Set the RED and BLUE SCREEN switches to OFF.

c. CHECK/ADJUST—Focus R6243, (see Fig. 6-20) for best focus of the horizontal crosshatch line at the center of the monitor display.

d. Set the RED and BLUE SCREEN switches to ON.

22. Adjust Deflection Yoke and Purity

a. Use the same setup as given in step 21a.

b. CHECK—Since misconvergence can affect purity, check the convergence of the monitor crosshatch display. Convergence error within the central area should be less than 1 mm. The central area is equivalent to an area bounded by a circle whose diameter equals the picture height as indicated by the large circle shown in Fig. 2-3 in the Operating Instructions section.

c. ADJUST—If convergence needs to be improved, adjust the front-panel CONVERGENCE controls.

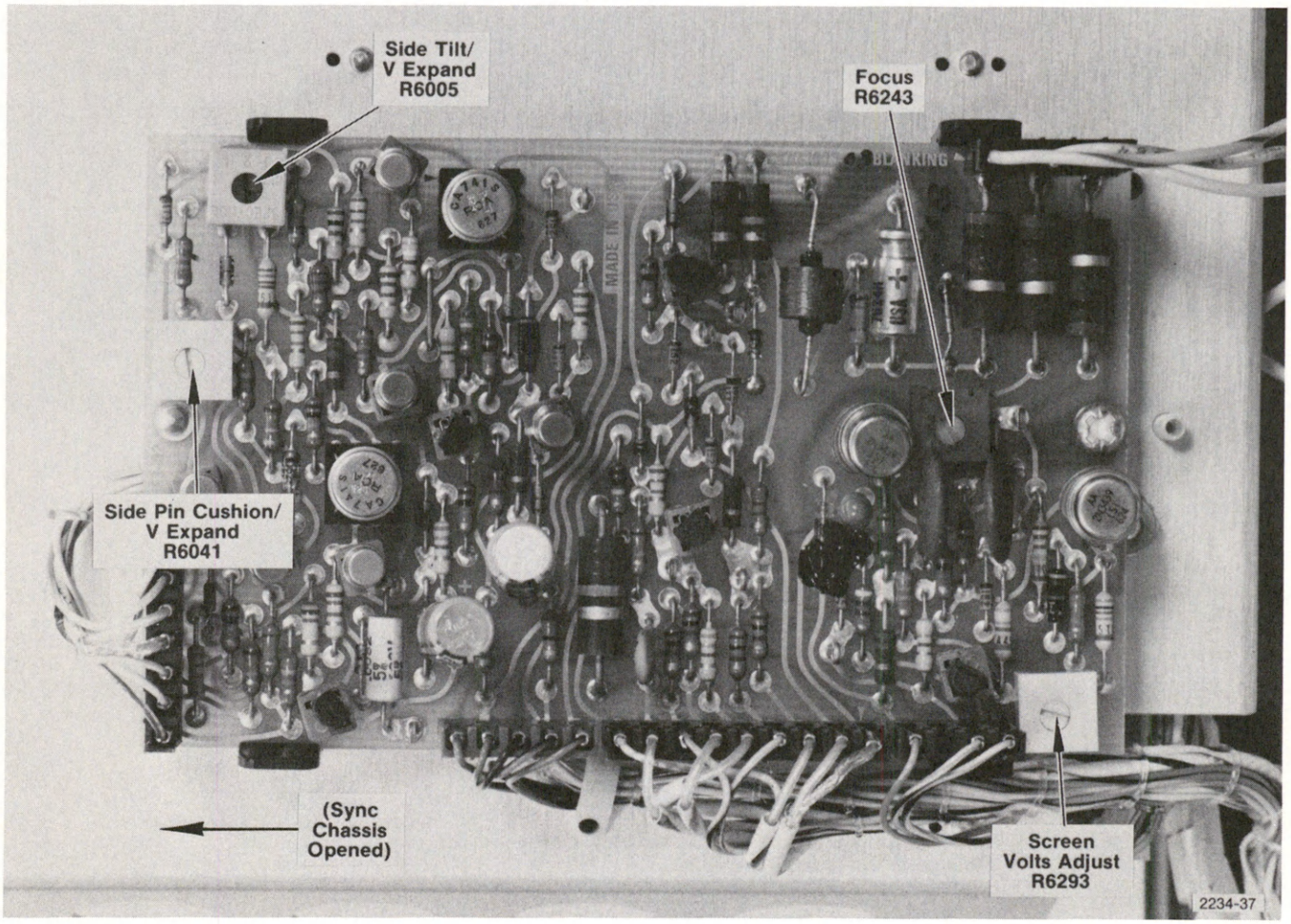


Fig. 6-20. Blanking board test point and adjustment locations.

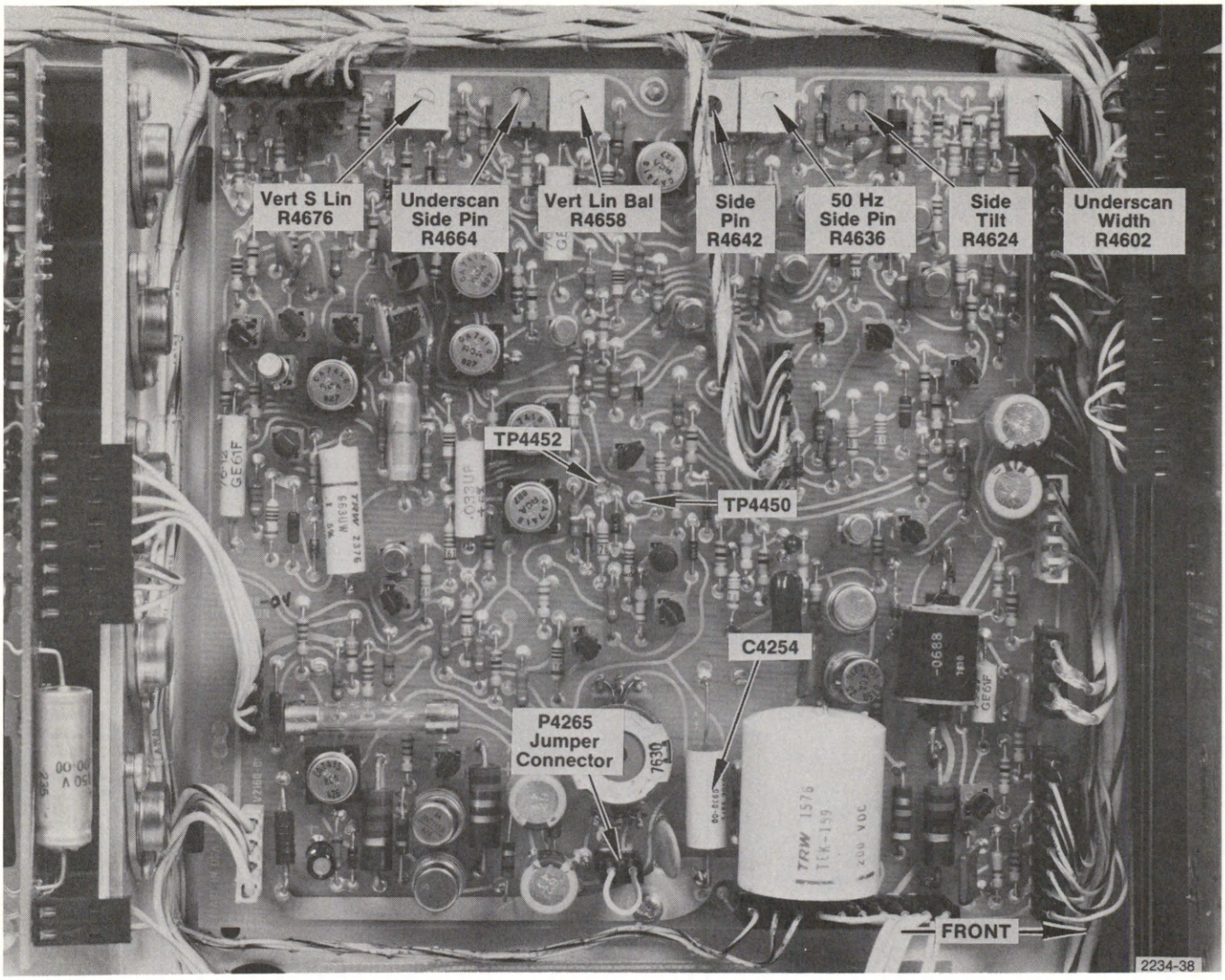


Fig. 6-21. Main Deflection board test point and component locations for the calibration procedure.

d. Display a 100 IRE flat field signal. Set the GREEN and BLUE SCREEN switches to OFF. Depress the DEGUASS pushbutton for at least 5 seconds.

e. CHECK—Monitor for uniformly red display.

f. ADJUST—Turn the Purity adjustment (see Fig. 6-22) to obtain a uniformly red display. If further improvement is necessary, loosen the yoke clamp and wing screws. Slide the yoke forward or back to obtain best red screen display. Display a convergence crosshatch pattern. Rotate the yoke so that the center vertical line is vertical. Retighten the yoke clamp and wing screws. Display a 100 IRE flat field signal. If necessary, readjust the Purity adjustment. If there is still some impurity, use a hand-held degaussing coil to completely degauss the monitor.

g. Set the GREEN SCREEN switch to ON and the RED SCREEN switch to OFF. Check purity of green only display. If necessary, readjust the Purity adjustment.

h. Set the BLUE SCREEN switch to ON and the GREEN SCREEN switch to OFF. Check purity of blue only display. If necessary, readjust the Purity statement.

i. Set the RED SCREEN switch to ON and the BLUE SCREEN switch to OFF. Repeat parts e through h for best compromise purity adjustment.

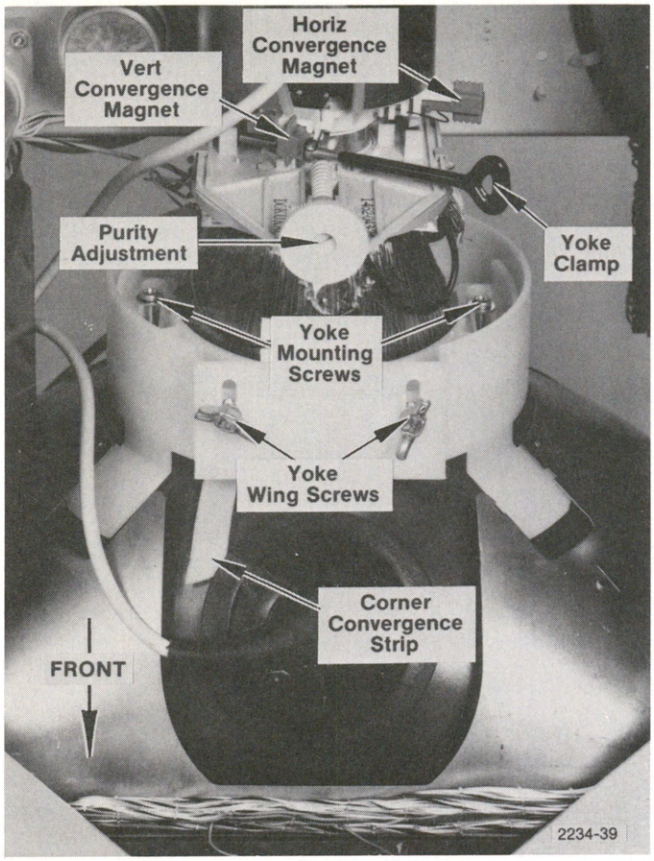


Fig. 6-22. Kinescope neck components.

23. Adjust Vertical and Horizontal Centering (R7290, R7490)

a. Display a convergence crosshatch pattern on the monitor.

b. Set the GREEN SCREEN switch to ON and the BLUE SCREEN switch to OFF. Check that the RED SCREEN switch is set to OFF.

c. Set the SIZE switch to UNDERSCAN. Adjust the test signal generator Convergence Vert and Horiz Position controls so that the crosshatch pattern is properly centered. The vertical lines at the left and right sides of the display should be positioned equal distance from the edges of video blanking (not the bezel or screen edges). The horizontal lines at the top and bottom sides of the display should be positioned equal distance from the edges of video blanking.

d. Set the SIZE switch to Normal. Place a linearity graticule directly over the viewing screen of the monitor. After properly centering the graticule within the viewing area of the screen, tape the graticule in a few places to hold it in position.

e. Place a 60-watt incandescent light source 24 inches away from the screen of the monitor and aimed at the center of the screen. The light source, at this distance, projects a proper size linearity graticule on the screen of the monitor.

f. CHECK/ADJUST—Left front-panel VERT CENTERING (R7290) and HORIZ CENTERING (R7490) adjustments to center the crosshatch pattern display.

24. Adjust Horizontal Size (R7480) and Horizontal Linearity (P4265; select C4254)

a. Use the same setup as described in parts a, b, d, and e in step 23.

b. CHECK—That the vertical lines are centered within their associated small circles projected by the linearity graticule. Use the two horizontal rows of small circles across the middle of the screen for this check. Linearity tolerance is ±1% within the central area bounded by the circle whose diameter equals the picture height; tolerance is ±2% outside of this central area.

c. ADJUST—Left front-panel HORIZ SIZE (R7480). If horizontal linearity is not within specification, move jumper connector P4265 (see Fig. 6-21) to different pins. If necessary, select value of C4254.

NOTE

If the displayed pattern moves off center while performing part c, readjust HORIZ CENTERING control to maintain a centered pattern. Selecting P4265 pin connections affects horizontal linearity balance; that is, the center of the display moves with respect to the sides. C4254 affects horizontal 'S' correction. The value of C4254 affects horizontal linearity from one edge to the center symmetrical with the other half of the display. The vertical linearity adjustments that follow have a similar affect on vertical linearity.

25. Adjust Vertical Size (R7280), Vert S Correction (R4676), and Vert Lin Bal (R4658)

a. Use the same setup as described in parts, a, b, d, and e in step 23.

b. CHECK—That the horizontal lines are centered within their associated small circles projected by the linearity graticule along the center vertical line. Tolerance is ±1% within the central area bounded by a circle whose diameter equals picture height; ±2% outside of the central area.

c. ADJUST—Left front-panel VERT SIZE (R7280). If vertical linearity is not within specification, adjust Vert S Correction R4676 and Vert Lin Bal R4658 (see Fig. 6-21). Readjust the VERT CENTERING adjustment to maintain a centered pattern.

26. Adjust Side Pin Cushion, Tilt, and Aspect Ratio (R4602, R4624, R4636, R4642, R4664)

a. Use the same setup as described in parts a, b, d, and e in step 23.

b. CHECK—That the left and right vertical lines are vertical.

c. ADJUST—Side Pin R4642 to minimize bowing and Side Tilt R4624 to minimize tilt. Fig. 6-21 shows the adjustment locations for this step.

d. Set the SIZE switch to UNDERSCAN.

e. CHECK—That the left and right vertical lines are vertical; no bowing. Check that the display aspect ratio is 3:4.

f. ADJUST—The Underscan Side Pin (R4664) to obtain straight vertical lines and the Underscan Width (R4602) to obtain a display aspect ratio of 3:4.

g. Set the SIZE switch to NORMAL.

NOTE

Omit parts h and i of this step if the monitor is used for 60 Hz only signal operation.

h. Apply a 50 Hz composite video signal to the VIDEO INPUT B connector. Set the monitor INPUT switch to B and the SCAN switch to HORIZ DELAY.

i. CHECK/ADJUST—50 Hz Side Pin R4636 so that the left and right portions of the display are vertical. Set the monitor INPUT switch to A and the SCAN switch to NORMAL. Disconnect the 50 Hz signal.

27. Adjust Top and Bottom Pin Cushion (R4971, R4973, T4810)

a. Use the same setup as described in parts a, b, d, and e in step 23.

b. CHECK—That the horizontal lines at the top and bottom portions of the monitor display are within the specification given in step 25b.

c. Dc couple the oscilloscope probe to TP4831 (see Fig. 6-23). The dc level at the center of the waveform should be +100 volts within ±5%. Set the oscilloscope Input Coupling switch to AC. Fig. 6-24 shows the waveform characteristics. Use this waveform as a guide when performing the adjustments.

d. ADJUST—Top/Bot Pin Ampl R4973 (see Fig. 6-24) to make the top horizontal line bow upward as displayed by the monitor. Adjust Top/Bot Pin Phasing T4810 so that the bow in the top line is moved to the center of the line. Readjust R4973 to minimize bowing of the horizontal lines.

If the horizontal lines at the top and bottom portions of the monitor display are not straight, adjust Top/Bot Pin Bal R4971. Readjust R4973, R4971 and, if necessary, T4810 to obtain straight horizontal lines while monitoring the waveform on the oscilloscope crt.

e. Disconnect the oscilloscope probe from TP4831.

28. Adjust Side Tilt/Vertical Expand (R6005, R6041)

a. Use the same setup as described in parts a, b, d, and e of step 23.

b. Set the monitor SCAN switch to VERT DELAY.

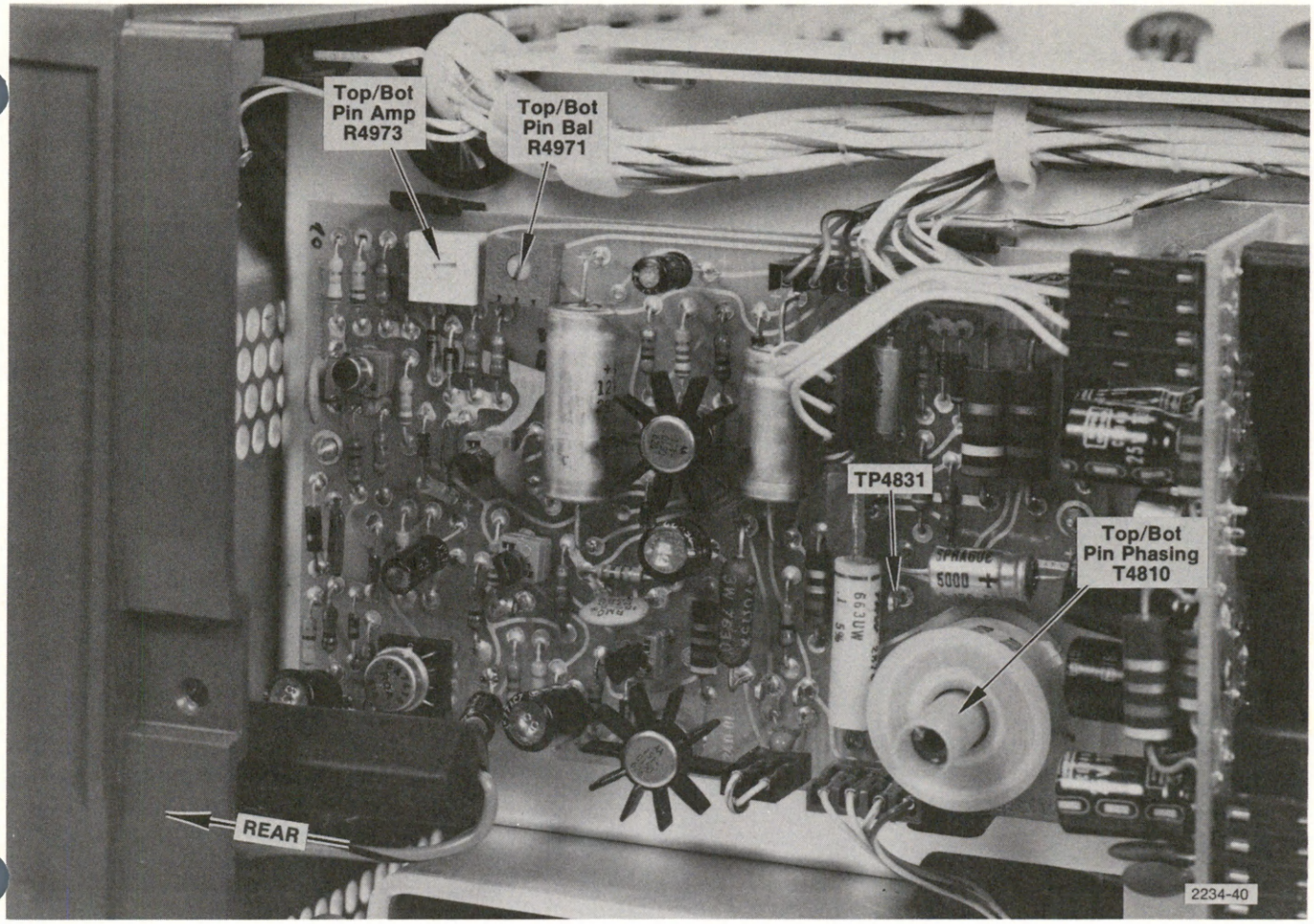


Fig. 6-23. Pin Cushion board test point and adjustment locations.

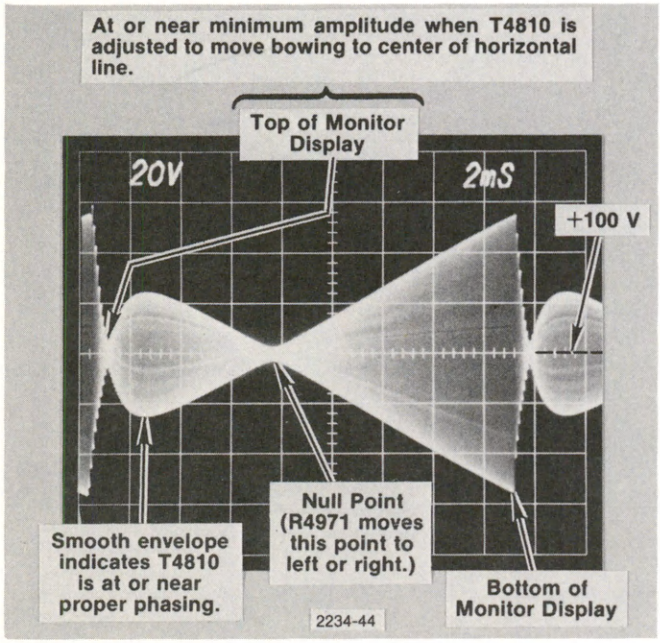


Fig. 6-24. Typical test oscilloscope display obtained at TP4831 on the Pin Cushion board when checking top and bottom pin cushion. R4973 determines waveform amplitude.

c. CHECK/ADJUST—Side Tilt/V Expand R6005 (see Fig. 6-20) for straight vertical lines at the left and right sides of the monitor display; that is, minimum tilt. Adjust Side Pin Cushion/V Expand R6041 for minimum bowing.

NOTE

Omit parts d and e of this step if the monitor is used for 60 Hz only signal operation.

d. Apply a 50 Hz composite video signal to VIDEO INPUT B. Set the monitor INPUT switch to B. Repeat part c of this step to obtain best compromise display.

e. Set the monitor INPUT switch to A and disconnect the 50 Hz signal.

f. Set the monitor SCAN switch to Normal, turn off the 60-watt light, and remove the linearity graticule.

CONVERGENCE

29. Adjust Convergence (R7270, R7450, R7460, R7470)

a. Display a convergence crosshatch pattern on the monitor.

b. Set the RED and BLUE SCREEN switches to ON. Check that the GREEN SCREEN switch is set to ON.

c. CHECK—That the convergence error is less than 1 mm within the central area. Outside the central area, color separation (misconvergence) is less than 2 mm. Measurement is made from the center of one color line to the center of the other color line.

d. ADJUST—Left front-panel VERT STATIC R7270 and HORIZ STATIC R7470 for proper convergence within the central area. Adjust the vertical and horizontal convergence magnets (see Fig. 6-22). The magnet can be pulled out part way and rotated to obtain best convergence. The magnet has least affect on convergence if the magnet is oriented so that the tabs are aligned parallel with the neck of the kinescope; see horiz convergence magnet in Fig. 6-22.

To converge the pattern ouside the central area, adjust the left front-panel HORIZ PARABOLA R7460 and HORIZ TILT R7450 adjustments. To converge the corners of the display, insert corner convergence strips (Tektronix Part No. 124-0267-00) between the yoke and kinescope. Use one strip per corner, as necessary.

COLORIMETRY

30. Adjust Screen Bias (R7210, R7220, R7230), Screen Volts (R6293), and Screen Gain (R7410, R7420, R7430)

a. Check that the NTSC TEST pushbutton is pressed in.

b. Perform steps 6 and 7 of the Left Front-Panel Adjustment Procedure in the Operating Instructions, Section 2.

c. If the left front-panel SCREEN BIAS adjustments have sufficient range, continue on with steps 8 through 12 of the Left Front-Panel Adjustment Procedure given in the Operating Instructions, Section 2. Step 12 in the Operating Instructions is an optional procedure that can be performed if desired.

d. ADJUST—If the SCREEN BIAS adjustments are near the end of their range, preset these adjustments to midrange. Adjust Screen Volts R6293 (see Fig. 6-20) so that the black bar areas just become black as described in step 7 of the Left Front-Panel Adjustment Procedure in Section 2. Continue on with steps 8 through 12 in the Section 2 procedure.

e. This completes the adjustment procedure for completely recalibrating a picture monitor that has a NTSC decoder.

OPTIONAL CHECKS (NTSC Decoder)

31. Check Chrominance to Luminance Delay (NTSC Decoder)

a. Display a standard color bar signal on the monitor.

b. Set the MODE switch to COLOR.

c. CHECK—Using the oscilloscope, measure the delay time between the green-magenta luminance transition at TP2865 (see Fig. 6-6) and the green-magenta transition at each of these test points: TP2739, TP2727, and TP2725. The chrominance to luminance delay should be within 50 ns for each measurement and the delay of the color difference signals should be within 50 ns of each other.

NOTE

When the oscilloscope probe is connected to TP2865, set the test signal generator R-Y and B-Y Color Bar switches to Off. After positioning the green-magenta transition to a reference point on the oscilloscope crt, set the generator R-Y and B-Y switches to On and the Y (Luminance) switch to Off. Then, connect the oscilloscope probe to each of the remaining test points given in part c of this step to measure delay time.

d. If the delay time for each measurement is not within the delay time described in part c of this step, adjust the R-Y and B-Y Filters on the NTSC Decoder board as described in step 8 of the NTSC Calibration Procedure.

e. Set the generator Y (Luminance) switch to On.

32. Check CONTRAST and BRIGHTNESS Control Ranges

a. Check that a standard color bar signal is displayed on the monitor. Set the test signal for 75% white reference.

b. Note the waveform amplitude between signal black level and the color bar 75% white level.

c. CHECK—That the CONTRAST control has range of at least 0.5X to 2X the waveform amplitude noted in part b of this step.

d. Set the CONTRAST control to PRESET. Set the test signal generator color bar signal for 100% white reference.

e. Note the waveform amplitude between the black reference pulse level and the white reference pulse level.

f. CHECK—That the BRIGHTNESS control has a dc range of at least 20% of the waveform amplitude noted in part e of this step. This range applies to the movement of the signal black level with respect to the black reference pulse.

g. Set the BRIGHTNESS control to PRESET.

33. Check Luminance Channel Amplitude Linearity

a. Display an unmodulated staircase or a color bar signal with chrominance turned off.

b. Set the monitor MODE switch to MONOCHROME.

c. Connect the oscilloscope probe to the signal source. Adjust the oscilloscope vertical controls to align the first and last steps with the graticule lines for use as a reference. Note the amplitude of each step.

d. CHECK—Connect the oscilloscope probe to each of these test points: TP5700, TP5730, and TP5760 (see Fig. 6-13). At each test, use the oscilloscope vertical controls to align the first and last steps with the graticule lines used in part c of this step. Check that the amplitude of each step matches the signal-source step amplitude within a tolerance of 2%.

e. Set the MODE switch to AUTO.

34. Check MODE switch

a. Display a 1 volt p-p standard color bar signal on the monitor. Check that the monitor MODE switch is set to AUTO.

b. Connect the oscilloscope probe to TP2371 (see Fig. 6-6).

c. Set the monitor CHROMA control just out of the detent position and then rotate the control slowly clockwise until the color bars displayed by the monitor have color.

d. CHECK—The oscilloscope display. The burst amplitude should be approximately 100 mV to 120 mV.

e. Rotate the CHROMA control slowly counterclockwise until a point is reached where the color bars do not have any color.

f. CHECK—The oscilloscope display. The burst amplitude should be approximately 60 mV to 70 mV. Set the MODE switch to COLOR and check that the color bars have color. Set the MODE switch to MONOCHROME and the CHROMA control to PRESET. Check that the color bars do not have any color.

g. Set the MODE switch to AUTO. Disconnect the oscilloscope probe from the test point.

h. Dc couple the test oscilloscope probe to TP2865.

i. CHECK—the oscilloscope display. The color bar chrominance packets should be **absent** when the generator Burst switch is set to On. The chrominance packets should be **present** when the generator Burst switch is set to Off.

j. Set the MODE switch to COLOR.

k. CHECK—the oscilloscope display. The color bar chrominance packets should be **absent** when the generator Burst switch is set to On or Off.

l. Set the MODE switch to MONOCHROME.

m. CHECK—the oscilloscope display. The color bar chrominance packets should be **present** when the generator Burst switch is set to On or Off.

n. Set the MODE switch to AUTO and the generator Burst switch to On. Disconnect the oscilloscope probe from the test point.

35. Check Sync and Timing

a. Use the same setup as described in step 34a.

b. Set the front-panel SYNC switch to EXT for several seconds and then back to INT.

c. CHECK—That the monitor display locks in quickly.

36. Check Residual Subcarrier

a. Display a standard color bar signal on the monitor. The generator can be set for either 75% or 100% white reference.

b. Insert a BNC T connector between the generator and the coaxial cable going to the picture monitor. Connect the generator subcarrier signal through a variable attenuator to the BNC T connector. Use the oscilloscope to monitor the composite video signal applied to the monitor. Fig. 6-25 illustrates the setup.

c. CHECK—With the Chroma Zero Reference jumper P2097 (see Fig. 6-6) set to the Residual Subcarrier Displayed position (pins 1 and 2 jumpered), the colors displayed by the monitor should change as the residual subcarrier amplitude is varied from 10 mV to 50 mV. This amplitude variation can be determined by observing the subcarrier component on the white reference portion of the oscilloscope displayed waveform as the variable attenuator is varied.

d. Move the Chroma Zero Reference jumper to the Residual Subcarrier Removed position (pins 2 and 3 jumpered).

e. CHECK—That the colors displayed by the monitor do not change as the residual subcarrier amplitude is varied within the range described in part c of this step.

f. Return jumper P2097 to the Residual Subcarrier Displayed position. Disconnect the generator signals and the oscilloscope probe from the monitor.

37. Check Sync Stripper

a. Display a 100 IRE flat field composite video signal on the monitor.

b. Connect the oscilloscope probe to TP1760 (see Fig. 6-26).

c. CHECK—That the blanking and sync tip dc levels do not change as the signal applied to the monitor is varied from 0.5 V p-p to 2 V p-p.

d. Loop the 100 IRE flat field signal through the monitor EXTERNAL SYNC A connector to the VIDEO INPUT A connector. Set the monitor front-panel SYNC switch to EXT.

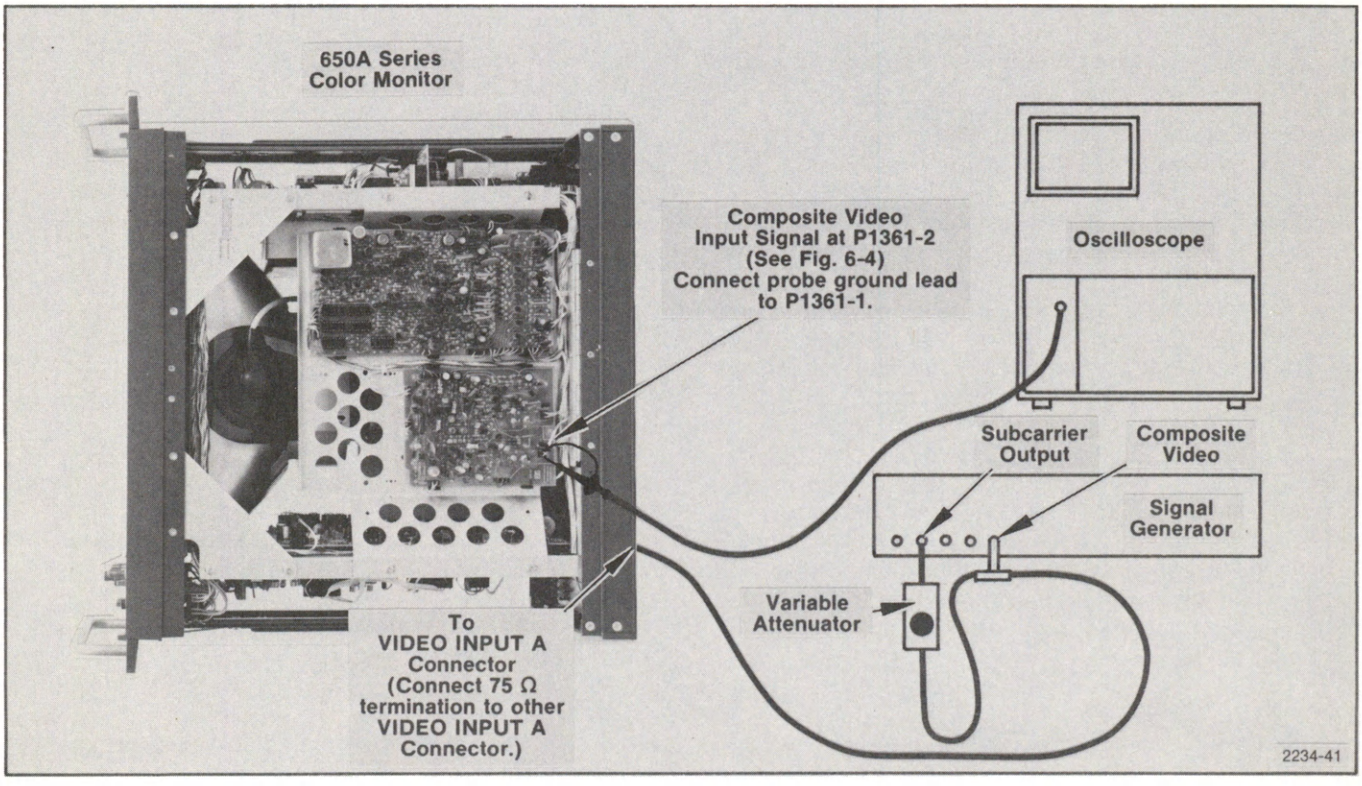


Fig. 6-25. Setup for checking residual subcarrier.

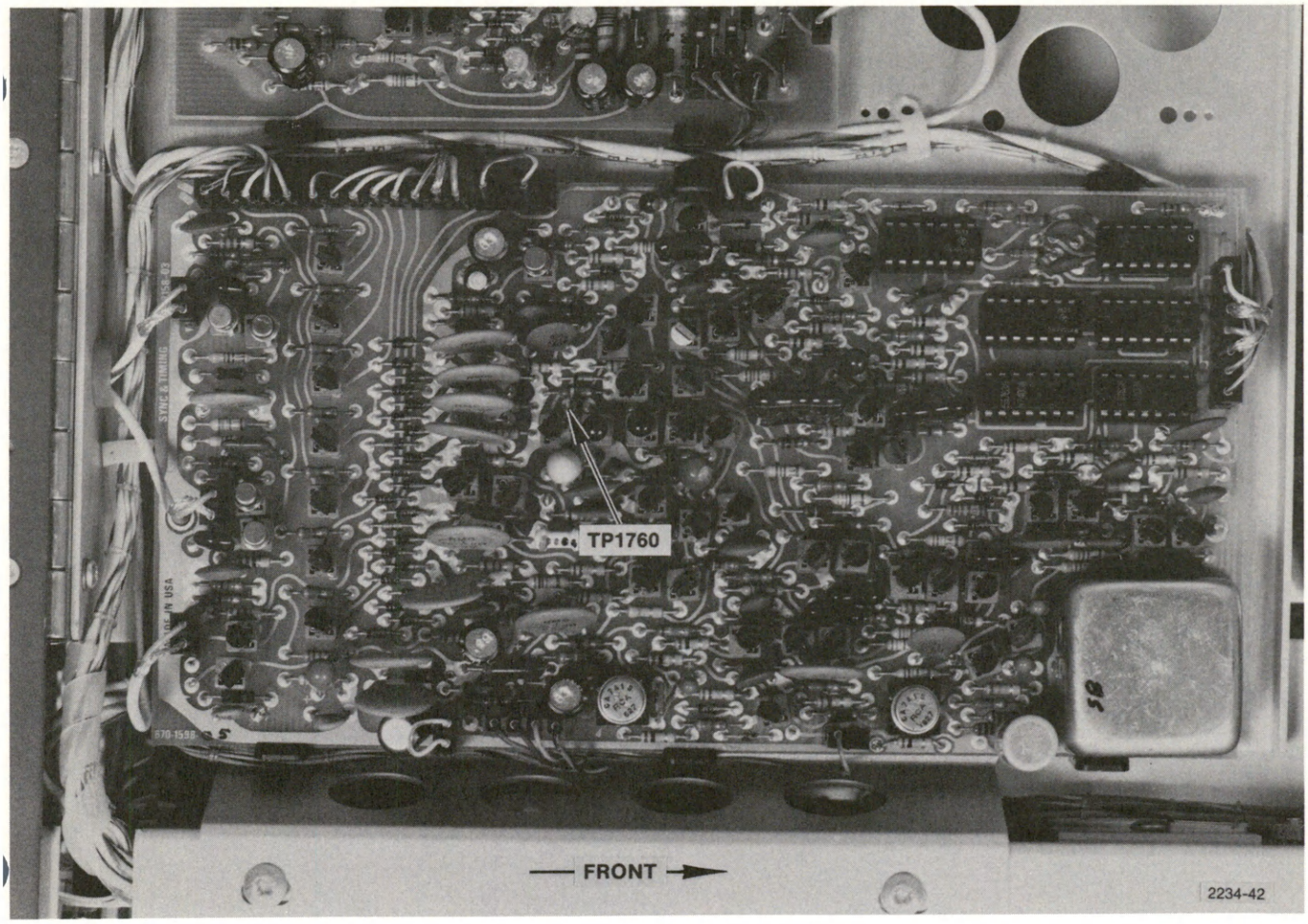


Fig. 6-26. Sync & Timing board showing test point location.

e. CHECK—Same as described in part c of this step.

f. Disconnect the flat field signal from the EXTERNAL SYNC A connector. Connect this signal to VIDEO INPUT A and terminate the connector. Apply composite sync to the EXTERNAL SYNC A connector.

g. CHECK—That the blanking and sync tip levels do not change, within a tolerance of ±0.1 V, as the composite sync signal applied to the EXTERNAL SYNC A connector is varied from 0.5 V p-p to 8 V p-p.

h. Set the SYNC switch to INT and disconnect the composite sync signal from the monitor.

i. Disconnect the oscilloscope probe from TP1760.

38. Check High-Voltage Regulation

a. Display a combined signal consisting of a 100 IRE flat field signal applied to one of the VIDEO INPUT A connectors and a convergence crosshatch signal applied to the other VIDEO INPUT A connector.

b. Set the CONTRAST control to a point just before the OVERLOAD light turns on. If desired, place the linearity graticule over the face of the kinescope. Note the size of the display.

c. CHECK—Turn the CONTRAST control slowly counterclockwise and check for less than 1% change in display size.

d. Set the CONTRAST control to PRESET. Remove the linearity graticule, if used, and the signals.

39. Check Return Loss

CHECK—Return loss at each pair of loop-through connectors for at least 46 dB return loss to 5 MHz, power on or off, input in use or not.

One method for measuring return loss is to use a device such as Tektronix 015-0149-00 Return Loss Bridge. The instruction manual supplied with the bridge describes the measurement procedure.

Another method for measuring return loss is to use a setup similar to the one shown in Fig. 6-2. To use this setup, note the amplitude of the waveform on a video waveform monitor when the 650A-Series Monitor is not connected to the end of the 30-foot 75-ohm coaxial cable. Then, note the waveform amplitude when the 650A-Series Monitor is connected to the cable. The waveform amplitude displayed by the video waveform monitor should be within ±0.5% of the amplitude noted when the 650A-Series Monitor is disconnected.

PAL CALIBRATION PROCEDURE
(For Monitors with 50 Hz or 60 Hz PAL Decoders)

The calibration procedure for 50 Hz and 60 Hz PAL monitors is a combined procedure since the decoders used in these instruments are similar. The differences to keep in mind is to use an appropriate signal source and linearity graticule as described in the Test Equipment list that follows.

TEST EQUIPMENT

Items 1 through 10 are needed to perform all the 'Adjust' steps. Items 2, 3, 7, 8, 11, 12, and 13 are needed to perform the 'Optional Checks' steps.

1. **DC Voltmeter.** For adjusting −15 V power supply.

2. **Test Oscilloscope with 10X Probe.** For displaying waveforms and establishing dc levels. Minimum characteristics: bandwidth, dc to at least 10 MHz; vertical deflection factor, 1 mV/div; sweep rate, to at least 1 μs/div using a X10 magnifier for the adjustment procedure; 50 ns/div delayed sweep required when checking chrominance to luminance delay. (TEKTRONIX 7603/7A13/7B53A combination is required to work with the 015-0149-00 Return Loss Bridge.)

3. **Composite Video Signal Source.** Signals: Standard PAL color bars (1 V p-p, 100% saturated, 75% amplitude, selectable 75% and 100% white reference), 0% setup for 50 Hz PAL, 50 mV setup for 60 Hz PAL), staircase, crosshatch pattern, and flat field.

NOTE

Steps 2 and 3 in the PAL Calibration Procedure require the use of a crosshatch pattern with vertical pulses that are shaped similar to a 2T pulse (half amplitude = 250 ns, ±15%) and have the same amplitude as the horizontal bar. Tektronix generators have this capability. If your generator does not meet this requirement, use a 2T $\sin^2$ pulse and bar signal.

4. **Reference Light-Source or Optical Comparator.** Required when adjusting low- and high-light color temperature. Refer to the Test Equipment list in the Operating Instructions (Section 2) for a full description.

5. **Linearity Graticule.** For checking picture size and linearity. Tektronix Part No. 331-0359-00 for a graticule that is compatible with the 50-Hz PAL Tektronix generators. Tektronix Part No. 331-0305-00 for a graticule that is compatible with the 60-Hz PAL Tektronix generators.

6. **Light Source for Linearity Graticule.** 60 W incandescent lamp for projecting the linearity graticule onto the screen of the picture monitor.

7. **Coaxial Cable.** Impedance, 75 ohms; length, 42 inches; equipped with BNC connectors. At least two cables are needed. Tektronix Part No. 012-0074-00.

8. **End-Line Termination.** Impedance, 75 ohms. Equipped with BNC connectors. Two terminations are needed. Tektronix Part No. 011-0102-00.

9. **Feed-Through Termination.** Impedance , 75 ohms. Equipped with BNC connectors. One needed. Tektronix Part No. 011-0103-02.

10. **Dual-Input Coupler.** For checking channel A and B input compensation and common-mode rejection in steps 2 and 6. Equipped with BNC connectors. Tektronix Part No. 067-0525-01.

11. **BNC T Connector.** Tektronix Part No. 103-0030-00.

12. **Variable Attenuator.** For varying the generator output signal amplitude in steps 36 and 37 of the NTSC Calibration Procedure. Fig. 6-1 shows how to construct this test fixture.

13. Return Loss Bridge and Signal Generator. For checking return loss in step 39 of the NTSC Calibration Procedure. Use a 015-0149-00 Return Loss Bridge and an SG 503 Constant Amplitude Signal Generator in a TM 500-Series mainframe, or equivalent. If this equipment is not available, use a setup similar to the one shown in Fig. 6-2.

PAL CALIBRATION INDEX

Table 6-3 serves as an index to the PAL Calibration procedure.

Table 6-3

ADJUSTMENTS FOR PAL PICTURE MONITOR

Step No.	Adjustment Name	Circuit No.
	LV POWER SUPPLY	
1	−15 V Adjust	R8170
	VIDEO CHANNEL	
2	Ch A Input Comp	C1375
	Ch B Input Comp	C1331
3	Aperture Zero	R123
	Aperture Preset	R7873[a] or R7878[b]
4	Luminance Gain	R3880
5	Chroma Trap	L3790
6	A-B Common-Mode Rejection	C1181, C1131, R1131
7	Chroma Filter	L3770
8	U Filters	L3608, L3610
	V Filters	L3630, L3640
	Alt V Filters	L3644, L3650
9	Error Amp DC Bal	R3030
	V Phase	C3314
	V Tilt	C3310
10	Quad Phase	L3110
11	Red DC Level	R3843
12	Brightness Preset	R7863
	Contrast Preset	R7868
13	Red Amp White Ref Limit	R5782
	Red Gain Cell Adj	R5724
14	Chroma Preset	R7888[a], R7883[b]
15	Blue DC Level	R3807
	B-Y Gain	R3910
16	Blue Amp White Ref Limit	R5722
	Blue Gain Cell Adj	R5724
17	Green DC Level	R3831
	G-Y Gain	R3930
	U Gain	R3510
18	Green Amp White Limit	R5752
	Green Gain Cell Adj	R5754
19	Delay Line Gain	R3544
	Transducer Peaking	L3380, L3480
	Delay Line Quad Phase	C3480
20	Low Amp Delay Line Phase	R3054
	Low Amp Delay Line Gain	R3052
21	Green DC Bal	R117[c], R141[d]
	Red DC Bal	R118[c], R140[d]
	Bandpass	C5722, C5752, C5782

See footnotes at end of table.

Table 6-3 (cont)

Step No.	Adjustment Name	Circuit No.
22	B-Y or U R-Y or V	R160[c], R180[d] R182[c], R162[d]
	DEFLECTION, CONVERGENCE, and COLORIMETERY ADJUSTMENTS Refer to steps 21 through 30 in the NTSC Calibration Procedure	
23	OPTIONAL CHECKS Check Chrominance to Luminance Delay. For additional checks, refer to steps 32 through 39 in the NTSC Calibration Procedure	

[a]For single decoder instruments.

[b]For dual decoder instruments (655A or 655A-1).

[c]For single-decoder instruments; see Fig. 6-7A.

[d]For dual-decoder instruments (655A or 655A-1); see Fig. 6-7B.

[e]For instruments SN B041393 and up.

PAL

PRELIMINARY

Set the picture monitor left and right front-panel lever and toggle switches to the up position (except, SN B030100 & up, set the OPERATE AFC FAST/ OPERATE/SETUP switch to OPERATE). Set the right front-panel variable controls to PRESET. Check that the BLUE ONLY pushbutton is set to the out position. Leave the left front-panel adjustments as they are.

Check that the jumper connectors on the PAL Decoder and the Sync & Timing boards are set to their factory-set positions as shown in Figs. 4-3 and 4-4 of the Operating Changes portion of the Installation section.

Apply a crosshatch pattern and power to the monitor. Allow 30 minutes warmup at 25°C, ±5°C, before calibrating the instrument.

The procedure that follows refers you to the illustrations provided in the NTSC Calibration Procedure for test point and adjustment locations on all circuit boards except the PAL Decoder. Use the waveforms in the NTSC Calibration Procedure as a guide. Since a 0% setup color bar signal is applied to a 50 Hz PAL monitor, the signal black level will be equal to the video signal blanking level when viewing these waveforms on the oscilloscope crt. For 60 Hz PAL monitors, 50 mV setup is used and the signal black level will be parallel to the video signal blanking level similar to the NTSC-decoded color bar waveforms.

Since the 650A-Series Monitor has vector signal outputs, monitoring these signals on a suitable X-Y display unit is useful for analyzing the success of the adjustments performed when calibrating the instrument.

LV POWER SUPPLY

1. Adjust −15 Volt Power Supply (R8170)

a. Connect an accurate dc voltmeter to TP1 (see Fig. 6-3).

b. CHECK—For a meter reading of −15 volts within a tolerance of ±1% (−14.85 V to −15.15 V.)

c. ADJUST—The −15 V Adjust (R8170) control (see Fig. 6-3) to obtain a meter reading of −15 V, ±0.5%.

NOTE

The −15 V Power Supply is the reference supply for the other supplies in the instrument. These supplies should have the following tolerances: +5 V, ±3.5%; +15 V, ±3.5%; +100 V, ±3.5%; anode supply 19 kV, ±1 kV.

WARNING

Measurement of the anode supply is difficult to achieve safely and is not recommended.

d. Disconnect the voltmeter.

VIDEO CHANNEL

2. Adjust Channel A and B Input Compensation (C1375, C1331): adjust Crosstalk Null (C1270)

a. Apply the crosshatch pattern through a feed-through termination and a dual-input coupler to the monitor VIDEO INPUT A and B connectors. Check that the INPUT switch is set to A.

b. Ac couple the oscilloscope probe to TP1151 (see Fig. 6-4) on the Video Input board. Externally trigger the oscilloscope from the generator Comp Sync output.

c. CHECK/ADJUST—With the monitor INPUT switch set to A, adjust C1375 so the pulses (vertical crosshatch lines) are the same amplitude as the bar (horizontal crosshatch line) similar to the waveform shown in Fig. 6-5. Set the INPUT switch to B, adjust C1331 for the same results. For instruments SN B041393-up, set Crosstalk Null (C1270) to midrange. C1270 is adjusted in SECAM instruments; for example, 653A.

NOTE

Double check that C1375 and C1331 have been properly adjusted by setting the generator Convergence switch to the Dots (only) position. Dc couple the test oscilloscope probe to P1361-2 (see Fig. 6-4) and the probe ground lead to P1361-1. Note the flat-top shape of the dot pulse as shown in Fig. 1A of this insert. Ac couple the probe to TP1151 and check that the inverted dot pulse has an approximately flat top (see Fig. 1B). If necessary, slightly re-adjust C1331 (INPUT B) and C1375 (INPUT A). Return the generator Convergence switch to the Crosshatch position.

d. Remove the dual-input coupler and feed-through termination. Apply the crosshatch pattern directly to VIDEO INPUT A. Connect an end-line termination to the other VIDEO INPUT A connector. Set the INPUT switch to A.

3. Adjust Aperture Zero and Preset (R123 & R7873 or R7878)

a. Check that the crosshatch pattern is applied to the monitor. Dc couple the oscilloscope probe to TP3960 (see Fig. 6-27).

b. Set the Bandpass jumper P3790 (see Fig. 6-27) to the Wideband position; pins 2 and 3 are jumpered.

c. Set the right front-panel APERTURE control just out of the PRESET detent position (minimum aperture correction).

d. CHECK/ADJUST—The Aperture (R123) adjustment (see Fig. 6-7) so that the vertical crosshatch lines are the same amplitude as the horizontal crosshatch line as observed on the oscilloscope, similar to the waveform shown in Fig. 6-8A.

NOTE

For dual-decoder instruments, R123 is only adjusted when performing parts a through d in step 3 of the NTSC Calibration Procedure.

e. Place the Bandpass jumper to the Narrow position; pins 1 and 2 are jumpered. Set the front-panel APERTURE control to the PRESET position.

f. CHECK/ADJUST—Aperture Preset R7873 or R7878 (see Table 6-3 and Fig. 6-9) so that the vertical crosshatch lines are 20% greater in amplitude than the horizontal crosshatch line (see Fig. 6-8B).

NOTE

The user may prefer to have R7873 or R7878 adjusted to some other level than described here.

g. Disconnect the crosshatch signal.

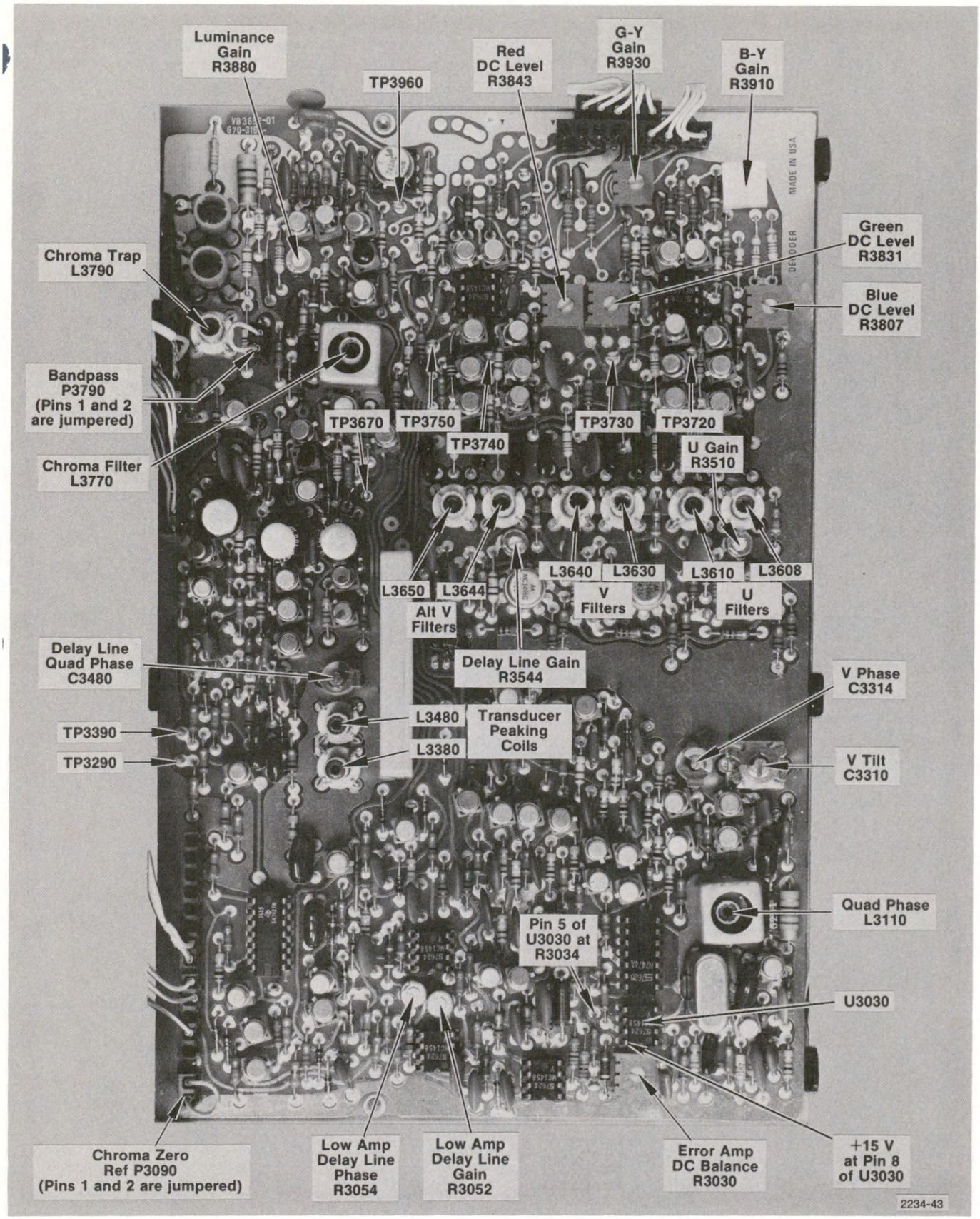


Fig. 6-27. 50 Hz or 60 Hz PAL Decoder board test point and component locations. (This board is mounted upside down in 655A and 655A-1 monitors.)

4. Adjust the Luminance Gain (R3880)

a. Apply a standard color bar signal with 100% white reference to the picture monitor VIDEO INPUT A connector.

b. Check that the oscilloscope probe is connected to TP3960.

c. CHECK/ADJUST—Luminance Gain R3880 (see Fig. 6-27) so the waveform amplitude is 2 V from setup (black level) to the 100% white level.

5. Adjust Chroma Trap (L3790)

a. Use the same equipment setup as described in parts a and b of step 4.

b. Set the APERTURE control just out of the PRESET detent position (zero aperture correction). Check that the MODE switch is set to AUTO.

c. CHECK/ADJUST—Chroma Trap L3790 (see Fig. 6-27) for minimum chrominance amplitude on the luminance steps; typically 100 mV or less.

d. Return the APERTURE control to PRESET.

6. Adjust A-B Common-Mode Rejection (C1181, C1131, R1131)

a. Using the color bar signal described in step 4a, apply this signal through a feed-through termination and dual-input coupler to the monitor VIDEO INPUT A and B connectors. Remove the 75-ohm end-line termination used in the previous steps.

b. Set the INPUT switch to A-B. Set Bandpass jumper R3790 (see Fig. 6-27) to the Wideband position (pins 2 and 3 are jumpered). Check that the oscilloscope probe is connected to TP3960.

c. CHECK/ADJUST—C1181 and C1131 (see Fig. 6-4) for minimum chrominance amplitude using Fig. 6-11A as a guide. Typical amplitude is approximately 30 mV or less.

d. Set the SCAN switch to Horiz Delay.

e. CHECK/ADJUST—R1131 so that the level on the right side of the flyback glitch is positioned to the location shown in Fig. 6-11B.

f. Set the INPUT switch to A and the SCAN switch to Normal. Place the Bandpass Jumper (P3790) to the Narrow position (pins 1 and 2 are jumpered).

7. Adjust Chroma Filter (L3770)

a. Remove the dual-input coupler and feed-through termination. Apply the color bar signal to the VIDEO INPUT A connector. Terminate the other VIDEO INPUT A connector.

b. Ac couple the oscilloscope probe to TP3670 (see Fig. 6-27).

c. CHECK/ADJUST—Chroma Filter L3770 for maximum chrominance amplitude.

8. Adjust U, V, and Alt V Filters (L3608, L3610, L3630, L3640, L3644, L3650)

a. Use the same setup as described in step 7a.

b. Turn the monitor off and remove U3030 (see Fig. 6-27). Turn the monitor on and set the MODE switch to COLOR. Check that the STANDARD switch is set to PAL SIMPLE.

NOTE

If your generator has U and V Burst switches, turn these switches off instead of removing U3030.

c. Ac couple the oscilloscope probe to TP3720. Check that the oscilloscope time base is externally triggered from the generator Comp Sync signal. Locate the green-magenta transition as shown in Fig. 6-12A.

NOTE

If the filters in this step are adjusted, check chrominance to luminance delay as described in step 23 of this procedure.

d. CHECK/ADJUST—U Filters L3608 and L3610 for best transient response at the green-magenta transition, similar to the waveform shown in Fig. 6-12B.

e. Ac couple the oscilloscope probe to TP3740.

f. CHECK/ADJUST—V Filters L3630 and L3640 for best transient response at the green-magenta transition.

g. Ac couple the oscilloscope probe to TP3750.

h. CHECK/ADJUST—Alt V Filters L3644 and L3650 for best transient response at the green-magenta transition.

i. Turn the monitor off, install U3030, and then turn on the monitor.

9. Adjust Error Amp DC Bal (R3030), V Phase (C3314), and V Tilt (C3310)

a. Check that a standard color bar signal with 100% white reference is applied to the monitor VIDEO INPUT A connector. Check that the MODE switch is set to COLOR.

b. Ac couple the oscilloscope probe to TP3670 and set the front-panel CHROMA control to obtain 0.5X the PRESET chrominance amplitude. Ac couple the oscilloscope probe to TP3740.

c. Check that the STANDARD switch is set to PAL SIMPLE and the MODE switch is set to COLOR.

d. CHECK/ADJUST—Error amp DC Bal R3030 (see Fig. 6-27) for best overlay of color bars; that is, the color bar levels should be superimposed as shown in Fig. 6-28B.

NOTE

To display PAL overlay of color bars, set the oscilloscope Variable Time/Div so that the alternating chrominance lines are superimposed as shown in Fig. 6-28. Thus, any separation of the color bar levels due to an incorrect adjustment can be easily seen as shown in Fig. 6-28A.

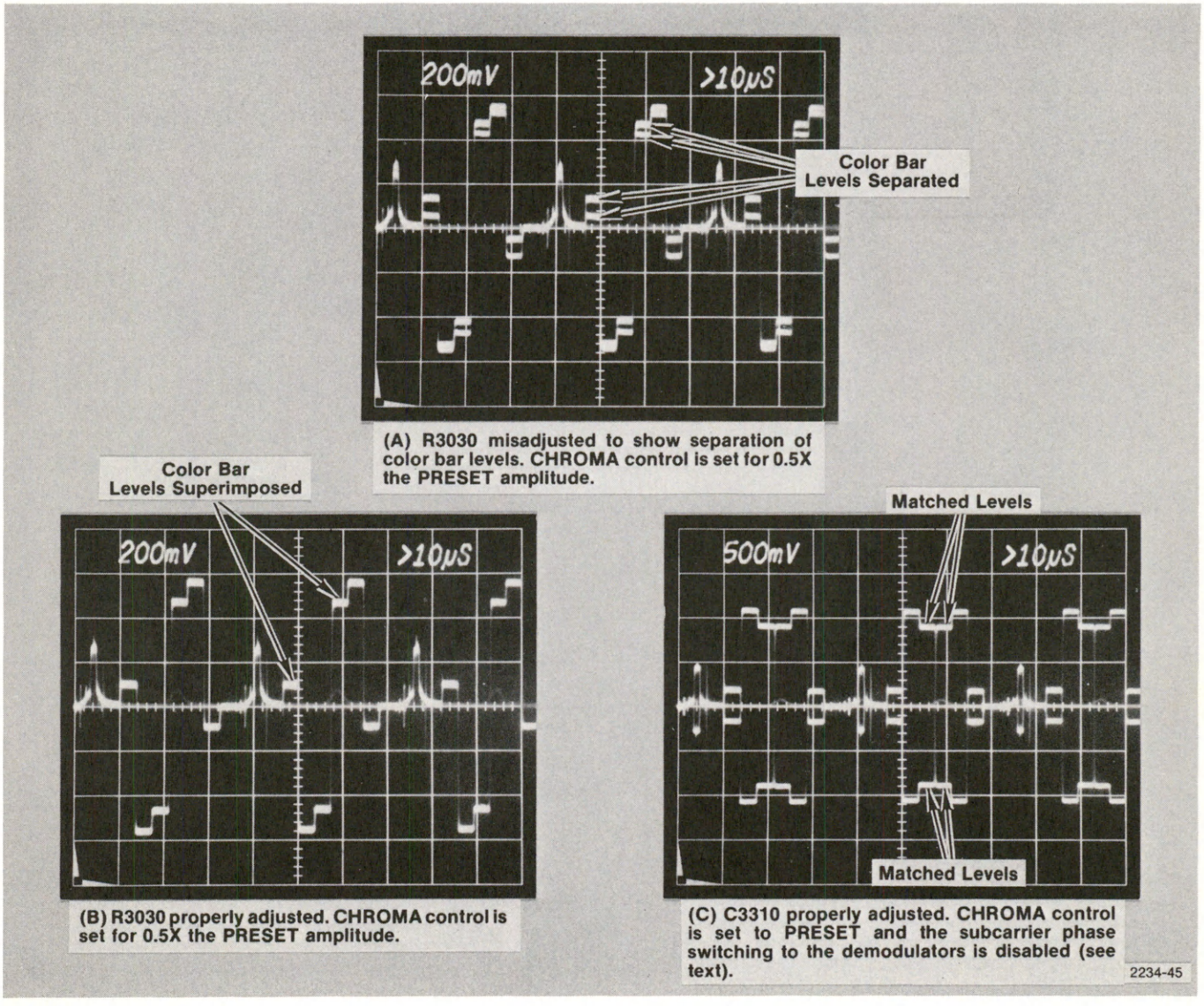


Fig. 6-28. Typical waveforms obtained at TP3740.

e. Reconnect the oscilloscope probe to TP3670 and set the CHROMA control to obtain 3X the PRESET chrominance amplitude. Connect the oscilloscope probe to TP3740.

f. CHECK/ADJUST—V Phase C3314 for best overlay of color bars.

g. INTERACTION—Repeat parts b through f in this step.

h. Set the CHROMA control to PRESET. Turn the monitor off. Connect a 4.3 kΩ, 1/4 watt, resistor between pin 5 of U3030 and +15 V (see Fig. 6-27). Turn the monitor on. If the oscilloscope display is jittery, momentarily set the front-panel SYNC switch to EXT and then back to INT. The resistor disables the subcarrier phase switching to the demodulators.

NOTE

Another method is to set the generator Color Bar V switch to Off instead of using the resistor. Set the monitor CHROMA control fully clockwise and adjust C3310 for a null oscilloscope display. C3314 can also be adjusted at this time. Return the generator Color Bar V switch to On and set the monitor CHROMA control to PRESET.

i. CHECK/ADJUST—V Tilt C3310 for best matching of the green-magenta bars as shown in Fig. 6-28C.

j. Turn the monitor off and disconnect the 4.3 kΩ resistor. Turn the monitor on.

10. Adjust Quad Phase (L3110)

a. Use the same setup as described in parts a and c of step 9. Check that the CHROMA control is set to PRESET.

b. Ac couple the oscilloscope probe to the U output TP3720.

c. CHECK/ADJUST—Quad Phase L3110 for best overlay of color bars.

11. Adjust Red DC Level (R3843)

a. Check that a standard color bar signal with 100% white reference is applied to the monitor. Check that the STANDARD switch is set to PAL SIMPLE, the MODE switch is set to COLOR, and the CHROMA control is set to PRESET.

b. Dc couple the oscilloscope probe to red output TP5760 (see Fig. 6-13). Use dc offset or the Vertical Position control to position the waveform onto the oscilloscope crt.

c. CHECK/ADJUST—Red DC Level R3843 (see Fig. 6-27) for no dc shift of the signal black level with respect to the black reference pulse as the CONTRAST control is varied. Use Fig. 6-14 as a guide.

d. Set the CONTRAST control to PRESET.

12. Adjust Brightness Preset (R7863) and Contrast Preset (R7868)

a. Use the same setup as described in parts a and b of step 11.

b. CHECK/ADJUST—Brightness Preset R7863 (see Fig. 6-9) so that the signal black level matches the black reference pulse level similar to the waveform shown in Fig. 6-14. Adjust Contrast Preset R7868 so that the 100% white level matches the white reference pulse level.

13. Adjust Red Amp White Ref Limit (R5782) and Red Gain Cell Adj (R5784)

a. Use the same setup as described in parts a and b of step 11.

b. Set the SCAN switch to Horiz Delay. Rotate the BRIGHTNESS and CONTRAST controls fully clockwise.

c. CHECK—That, as the CONTRAST control is turned clockwise, the 100% white level limits at +3 volts.

d. ADJUST—Red Amp White Ref Limit R5782 (see Fig. 6-13) to limit the waveform as described in part c of this step.

e. Set the SCAN switch to Normal and the BRIGHTNESS control to PRESET.

f. Dc couple the oscilloscope probe to TP5570 (see Fig. 6-13). Check the CONTRAST control is set fully clockwise.

g. CHECK—That the oscilloscope trace is located 0.6 V to 0.8 V above ground reference.

h. ADJUST—Rotate the Red Gain Cell Adj R5784 fully counterclockwise (lowest dc level). Note this dc level. Turn R5784 slowly clockwise until the trace jumps upward quickly. Continue to rotate the adjustment clockwise until the trace is located 40 mV to 60 mV above the jump-up point. If there is no jump-up point, adjust R5784 so the trace is located 40 mV to 60 mV above the lowest dc level noted earlier.

i. INTERACTION—Dc couple the oscilloscope to TP5760 and repeat parts b through e of this step.

j. Set the CONTRAST control to PRESET.

14. Adjust Chroma Preset (R7888 or R7883)

a. Check that a standard color bar signal is applied to the monitor. Set the generator color bar signal for 75% white reference.

NOTE

Leave the STANDARD switch in the PAL SIMPLE position and the MODE switch in COLOR for steps 14 through 17.

b. Ac couple the oscilloscope probe to TP5760.

c. CHECK—For proper color bar decoding, similar to the waveform shown in Fig. 6-15E.

NOTE

When checking for proper color bar decoding, the color bar signal black level should coincide with the video blanking level for 50 Hz PAL monitors. For 60 Hz PAL monitors, the signal black level (50 mV setup) should be parallel to the video signal blanking level.

d. ADJUST—Chroma Preset R7888 or R7883 (see Table 6-3 and Fig. 6-9) for proper color bar decoding.

15. Adjust Blue DC Level (R3807) and B-Y Gain (R3910)

a. Check that a standard color bar signal is applied to the monitor.

b. Dc couple the oscilloscope probe to blue output TP5700 (see Fig. 6-13). Use dc offset or the Vertical Position control to position the waveform onto the oscilloscope crt.

c. CHECK/ADJUST—Blue DC Level R3807 (see Fig. 6-27) for no dc shift of the signal black level with respect to the black reference pulse as the CONTRAST control is varied. Set the oscilloscope Input Coupling switch to AC. Adjust B-Y Gain R3910 for proper color bar decoding. Refer to Fig. 6-17A and the NOTE given in step 14c.

16. Adjust Blue Amp White Ref Limit (R5722) and Blue Gain Cell Adj (R5724)

a. Use the same setup as given in parts a and b of step 15.

b. Set the generator color bar signal for 100% white reference.

c. CHECK/ADJUST—Blue Amp White Ref Limit R5722 and Blue Gain Cell Adj R5724 using parts b through j of step 13 as a guide. Use TP5510 (see Fig. 6-13) when performing parts f through h of step 13; use TP5700 when performing part i.

17. Adjust Green DC Level (R3831), G-Y Gain (R3930), and U Gain (R3510)

a. Check that a standard color bar signal is applied to the monitor. The generator can be set for either 75% or 100% white reference.

b. Dc couple the oscilloscope probe to green output TP5730 (see Fig. 6-13). Use dc offset or the Vertical Position control to position the waveform into view on the oscilloscope crt.

c. CHECK/ADJUST—Green DC Level R3831 (see Fig. 6-27) for no dc shift of the signal black level with respect to the black reference pulse as the CONTRAST control is varied.

d. Set the oscilloscope Input Coupling switch to AC.

e. CHECK/ADJUST—G-Y Gain R3930 and U Gain R3510 (see Fig. 6-27) for proper color bar decoding. Refer to Fig. 6-18A and the NOTE given in step 14c.

18. Adjust Green Amp White Limit (R5752) and Green Gain Cell Adj (R5754)

a. Use the same setup as given in parts a and b of step 17 except the generator must be set for 100% white reference.

b. CHECK/ADJUST—Green Amp White Ref Limit R5752 and Green Gain Cell Adj R5754 using parts b through j of step 13 as a guide. Use TP5540 (see Fig. 6-13) when performing parts f through h of step 13; use TP5730 when performing part i.

19. Adjust Delay Line Gain (R3544), Transducer Peaking (L3380, L3480), and Delay Line Quad Phase (C3480)

a. Check that a standard color bar signal is applied to the monitor. The generator can be set for either 75% or 100% white reference.

b. Set the STANDARD switch to DELUXE. Check that the MODE switch is set to COLOR.

c. Ac couple the oscilloscope probe to TP5700.

d. CHECK/ADJUST—Delay Line Gain R3544 for best match of Deluxe color bar decoding to Simple decoding. A comparison can be made by setting the STANDARD switch to SIMPLE and then back to DELUXE.

NOTE

When checking the decoded color bar waveforms obtained at the test points given in this step, check both top and bottom of the color bars for a decoding accuracy of ±3%.

e. INTERACTION—Repeat step 10; Quad Phase L3110.

f. CHECK—Deluxe PAL color bar decoding at TP5730. If necessary, repeat step 17e. Check Deluxe PAL color bar decoding at TP5760. If necessary, repeat step 14d.

g. Dc couple the oscilloscope probe to TP3390 (see Fig. 6-27). Check that the monitor STANDARD switch is set to DELUXE.

h. CHECK—That the dc level at TP3390 is within ±5 V of zero. If the dc level exceeds ±5 V due to delay-line age or environment, the dc level can be returned very close to zero (within ±0.2 V) by completing this step and parts a through e of step 20. If the dc level is already within ±5 V of zero, go to part m of this step.

i. Turn the monitor off. Connect TP3290 and TP3390 to the chassis ground. (If these connections are made when the monitor is on, U3050 or U3156 may be damaged.) Turn the monitor on.

j. Ac couple the oscilloscope probe to the V output TP3740.

k. CHECK/ADJUST—Transducer Peaking coils L3380 and L3480 (see Fig. 6-27) for best overlay of the color bars. Use the overlaying technique described in the NOTE given in step 9d. Adjust the slugs in equal increments so that the peaking coils will be at approximately the same inductance when finished.

l. Turn the monitor off and remove the jumper connections that were connected in part i of this step. Turn the monitor on.

m. Ac couple the oscilloscope probe to the U output TP3720.

n. CHECK/ADJUST—Delay Line Quad Phase C3480 (see Fig. 6-27) for best overlay of the color bars.

o. INTERACTION—Recheck the dc level at TP3390. If necessary, repeat parts i through l of this step.

20. Adjust Low Amplitude Delay Line Phase (R3054) and Gain (R3052)

a. Check that a standard color bar signal is applied to the monitor. The generator can be set for either 75% or 100% white reference.

b. Check that the STANDARD switch is set to DELUXE and the MODE switch is set to COLOR.

c. Ac couple the oscilloscope probe to TP3670 and note the amplitude of the chrominance waveform with the CHROMA control at PRESET. Then, note the CHROMA control knob settings when it is set to 0.5X and 3X the PRESET amplitude.

d. Dc couple the oscilloscope probe to TP3390.

e. CHECK/ADJUST—Low Amp Delay Line Phase R3054 (see Fig. 6-27) for minimum dc level change as the CHROMA control is varied within the 0.5X to 3X amplitude range. The change in dc level can be minimized to within ±100 mV by adjusting R3054 when the CHROMA control is set to 0.5X. Match this dc level to the dc level obtained when the CHROMA control is set to 3X.

f. Dc couple the oscilloscope probe to TP3290.

g. CHECK/ADJUST—Low Amp Delay Line Gain R3052 (see Fig. 6-27) to minimize the change in dc level as the CHROMA control is varied within the 0.5X to 3X amplitude range. The change in dc level can be minimized to within ±1 V by using the technique described in part e of this step.

h. Set the CHROMA control to PRESET.

21. Adjust Green and Red DC Bal (R117 & R118, or R141 & R140); Adjust Bandpass (C5722, C5752, C5782)

a. Use the same setup as described in step 20a. Ac couple the probe to TP5730.

b. Set the STANDARD switch to PAL SIMPLE and check that the MODE switch is set to COLOR.

c. CHECK—For no dc shift of the signal black level with respect to the black reference pulse as the BLUE ONLY pushbutton is pressed in and out. Set the BLUE ONLY pushbutton to the in position.

d. ADJUST—Green DC Bal R117 or R141 (see Table 6-3 and Fig. 6-7) to match the signal black level to the black reference pulse. Repeat part c of this step. If necessary, readjust R117 or R141 for no dc shift of the signal black level.

e. Ac couple the oscilloscope probe to red output TP5760.

f. CHECK/ADJUST—Red DC Bal R118 or R140 (see Table 6-3 and Fig. 6-7) for the same results as described in parts c and d of this step.

g. Set the BLUE ONLY pushbutton to the out position.

h. Set the APERTURE control just out of the PRESET detent position (zero aperture correction). Set the Bandpass jumper P3790 (see Fig. 6-27) to the Wideband position; pins 2 and 3 are jumpered. Set the generator color bar signal for 100% white reference amplitude.

i. Ac couple the test oscilloscope probe to TP5800. See the Output Amplifier board illustration in this insert. Use a short ground lead on the probe. Connect the ground lead to TP5900.

j. CHECK/ADJUST—C5722 so that the yellow color bar chrominance packet is the same peak amplitude as the 100% white level, similar to Fig. 2B waveform shown in this insert. Note that the red and blue color bar chrominance packets are the same amplitude; see Fig. 2B. This waveform should resemble the input waveform obtained at P1361-2 except that it is inverted; see Fig. 2A.

k. CHECK/ADJUST—C5752 and C5782, using the same technique as described in parts i and j of this step. Compare these waveforms to see that they are similar to the waveform obtained at P1361-2; use Fig. 2A as a guide.

NOTE

If a multiburst signal and a wideband test oscilloscope (dc to 50 MHz) are available, double check the accuracy of C5722, C5752, and C5782 Bandpass adjustments by checking the multiburst waveforms obtained at the test points given in parts j and k of this step. Compare these waveforms to see that they are similar to the waveform obtained at P1361-2 on the Video Input board. Use Fig. 3 in this insert as a guide.

l. Set the MODE switch to COLOR and the APERTURE control to PRESET. Set the Bandpass jumper P3790 to the Narrow position; pins 1 and 2 are jumpered.

22. Adjust B-Y or U and R-Y or V (R160 & R182 or R180 & R162)

a. Check that a standard color bar signal is applied to the monitor.

b. Check that the STANDARD switch is set to PAL SIMPLE, the MODE switch is set to COLOR, and the CHROMA control is set to PRESET.

c. Turn the monitor off. Remove U3030 (see Fig. 6-27). Turn on the monitor. Dc couple the oscilloscope probe to the rear-panel B-Y or U connector. Check that the oscilloscope time-base is externally triggered from the generator Comp Sync signal.

NOTE

If the generator has U and V Burst switches, turn these switches off instead of removing U3030.

d. CHECK/ADJUST—B-Y or U (R160 or R180; see Table 6-3 and Fig. 6-7) to obtain a red color bar amplitude of 700 mV p-p as shown in Fig. 6-19. This corresponds to a vector graticule compass rose diameter of 0.8 volt.

e. Dc couple the oscilloscope probe to the rear-panel R-Y or V connector.

f. CHECK/ADJUST—R-Y or V (R182 or R162; see Table 6-3 and Fig. 6-7) to obtain a red color bar amplitude of 700 mV p-p as described in part d of this step.

g. Turn off the monitor, reinstall U3030, and turn on the monitor. Set the MODE switch to AUTO and disconnect the oscilloscope probe from the monitor.

DEFLECTION, CONVERGENCE, AND COLORIMETRY ADJUSTMENTS

To complete the PAL Calibration Procedure for a PAL color picture monitor, use steps 21 through 30 in the NTSC Calibration Procedure as a guide. For 50 Hz PAL monitors, substitute blanking level (0% peak white), 10%, and 100% white for 10 IRE, 20 IRE, and 100 IRE flat field signals when performing the SCREEN adjustments in step 30 of the NTSC Calibration Procedure.

OPTIONAL CHECKS (PAL Decoder)

23. Check Chrominance to Luminance Delay

a. Display a standard color bar signal on the monitor.

b. Set the MODE switch to COLOR and check that the STANDARD switch is set to PAL SIMPLE.

c. CHECK—Using the oscilloscope, measure the delay time between the green-magenta luminance transition at TP3960 (see Fig. 6-27) and the green-magenta chrominance transition at each of these test points: TP3720, TP3740, and TP3750. The chrominance to luminance delay should be within 50 ns for each measurement and the delay of the color difference signals should be within 50 ns of each other.

NOTE

When the oscilloscope probe is connected to TP3960, set the test signal generator U and V Color Bar switches to Off. After positioning the green-magenta transition to a reference point on the oscilloscope crt, set the generator U and V Color Bar switches to On and the U and V Burst switches to Off. Then, connect the oscilloscope probe to each of the remaining test points given in part d of this step to measure delay time.

d. If the delay time for each measurement is not within 50 ns when performing part c of this step, repeat step 8 in this PAL Calibration Procedure. Step 8 gives the procedure for adjusting the U, V, and Alt V Filters on the PAL Decoder board.

e. Set the generator U and V Burst switches to On.

NOTE

For additional optional checks, perform Steps 32 through 39 in the NTSC Calibration Procedure. When performing Step 34, use TP3670 (see Fig. 6-27) as the test point and do parts a through g only. In Step 36, the Chroma Reference jumper is P3090. In Steps 37 and 38, substitute 100% white for 100 IRE.

RGB CALIBRATION PROCEDURE

This procedure calibrates the RGB circuit board. If you are completely calibrating the color picture monitor, be sure to complete the NTSC or PAL Calibration Procedure first before starting the RGB Calibration Procedure.

TEST EQUIPMENT

1. Test Oscilloscope with 10X Probe.

2. Standard Color Bar Signal with 100% White Reference.

3. Coaxial Cable. Impedance, 75 ohms. Equipped with BNC connectors. At least four cables are needed. Tektronix Part No. 012-0074-00 for 42-inch cables.

4. End-Line Termination. Impedance, 75 ohms. Equipped with BNC connectors. Tektronix Part No. 011-0102-00.

RGB CHANNEL

1. Adjust RGB Input Compensation (C9372, C9342, C9306)

NOTE

Refer to Fig. 6-29 for RGB board test point and adjustment locations.

a. Loop the standard color bar signal through VIDEO INPUT A and the NON-ENCODED RGB VIDEO INPUT connectors. Terminate the last loop-through connector.

b. Set the generator standard color bar signal for 100% white reference.

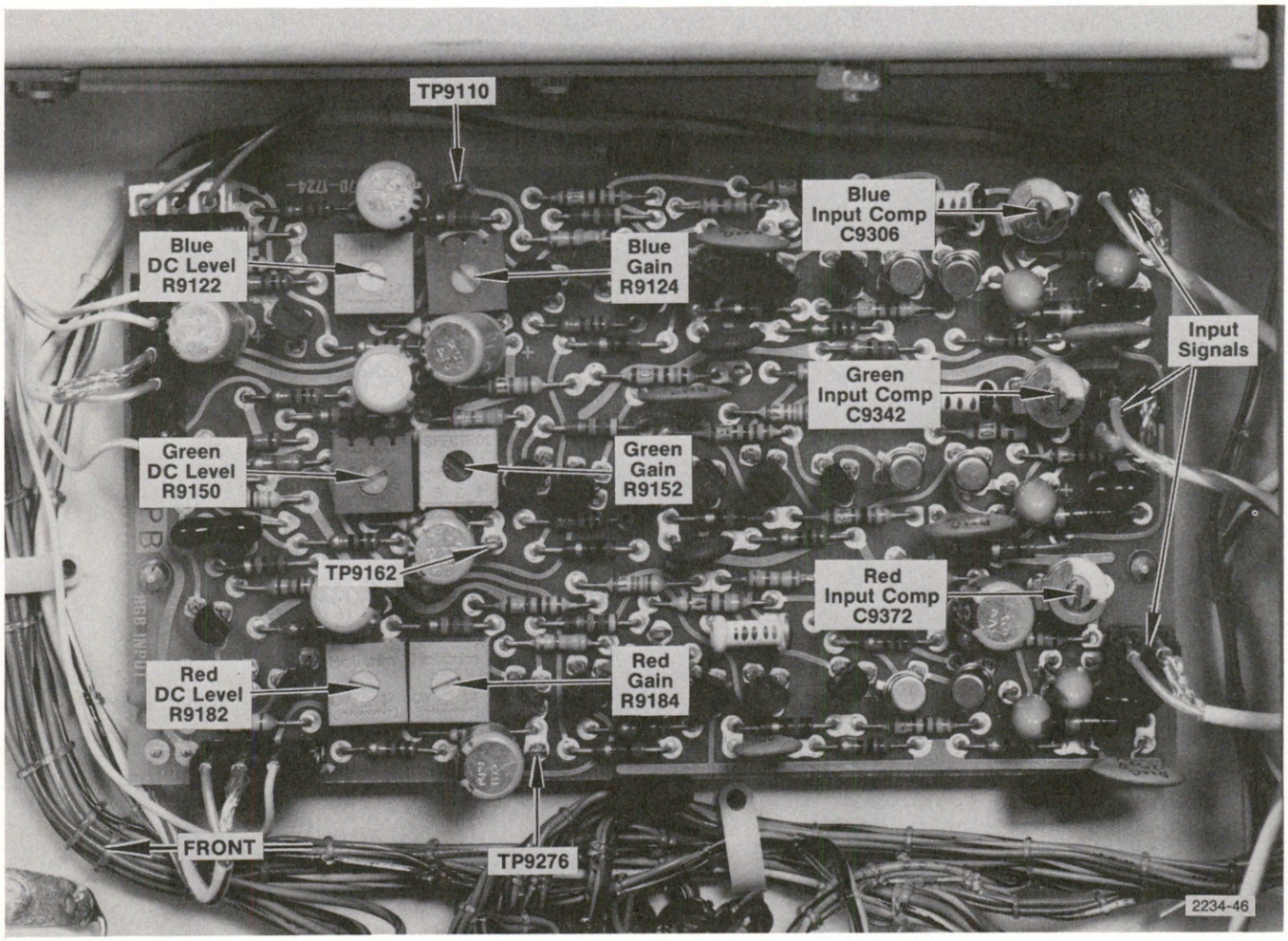


Fig. 6-29. RGB board test point and adjustment locations.

c. Set the STANDARD switch to the RGB position.

d. CHECK—For best response by using an oscilloscope to compare the RGB output signals at test points TP9276, TP9162, and TP9110 with the input signals applied to the RGB board. That is, compare the tops of the 100% white level, yellow, and cyan bars of the waveform at the output signal test point with the waveform obtained at the input signal connector.

e. ADJUST—Red Input Comp C9372 when the oscilloscope is connected to TP9276, Green Input Comp C9342 when the oscilloscope is connected to TP9162, and Blue Input Comp C9306 when the oscilloscope is connected to TP9110. Adjust for best response as described in part d of this step.

2. Adjust RGB DC Level (R9182, R9150, R9122) and Gain (R9184, R9152, R9124)

a. Use the same setup as described in parts a and b of step 1.

b. Ac couple the oscilloscope probe to red output TP5760 (see Fig. 6-13).

c. CHECK/ADJUST—Red DC Level R9182 to match the signal black level to the black reference pulse. Adjust Red Gain R9184 to match the 100% white level to the white reference pulse. The matching of these levels can be compared to the decoded waveform by setting the STANDARD switch to NTSC or PAL SIMPLE. Check that the NTSC TEST pushbutton is pressed in if the NTSC standard is used. Set the STANDARD switch to RGB.

d. Ac couple the oscilloscope probe to green output TP5730 (see Fig. 6-13).

e. CHECK/ADJUST—Green DC Level R9150 and Green Gain R9152 for the same results as described in part c of this step.

f. Ac couple the oscilloscope probe to blue output TP5700 (see Fig. 6-13).

g. CHECK/ADJUST—Blue DC Level R9122 and Blue Gain R9124 for the same results as described in part c of this step.

h. This completes the RGB board adjustment procedure. Disconnect the oscilloscope probe from the monitor.

OPTIONS

This section provides for documenting catalog options offered for the 650A-Series Color Television Picture Monitors. Custom modifications are negotiated and documented separately.

OPTION 4—RACKMOUNT MECHANICAL PARTS

This option deletes the rackmount handles. Refer to the Replaceable Mechanical Parts list for ordering information.

Fig. & Index No.	Qty	Name & Description
CHANGE TO:		
1-50	1	STRIP, TRIM: RACKMOUNT LEFT
1-50	1	STRIP, TRIM: RACKMOUNT RIGHT
DELETE:		
1-47	2	HANDLE, BOW, 0.375 INCH DIA, NKL-CRM PLATED
1-48	2	SCREW, SLFLKG: 10-32 X 0.375, 100 DEG FLH, STL

CIRCUIT DESCRIPTION

This section provides a circuit description for each schematic diagram located on the foldout pages in Section 10. The diagrams are blocked off according to circuit function. The circuit function titles in the blocked-off areas are used as headings in this circuit description to make it easier for you to refer to the circuit being described.

VIDEO INPUT (Diagram 1)

Receive composite video signals, with minimum return loss, when used in a 75-ohm environment. Either A or B signal can be displayed or added algebraically to display the difference signal.

Video Input Connectors and Amplifiers

Composite video signals are picked off low return loss, feed-thru coils. The input connectors are isolated from the chassis to aid in hum rejection. The cable shields are connected to the bases of the input transistors, Q1361 and Q1322. The hum signal on the shield is in phase with the hum component of the composite video signal applied to the emitters. The hum signal is then rejected differentially.

Channel Switching and Operational Amplifiers

To facilitate remote switching, a ground closure switching system is used. When the INPUT switch is set to A, the channel A signal is fed to the upper operational amplifier, Q1271, Q1171, and Q1163. When the input is switched to B, the A signal is essentially switched to ground and the channel B signal is applied to the upper operational amplifier. When operating in either A or B, Q1311 and Q1313 are a current source for the lower operational amplifier, Q1221, Q1111, and Q1121. The current from this source keeps the push-pull cascode amplifier balanced.

When A-B is used, the channel A signal is applied to the upper operational amplifier while the channel B signal is applied to the lower operational amplifier. The current source, Q1311 and Q1313, is not used in A-B mode of operation.

Push-Pull Cascode Amplifier

The push-pull cascode output amplifier is driven differentially by the operational amplifiers. The output is used to drive the color decoders. Q1009 and Q1021 provide isolation between the outputs. Q1170 is the internal sync pick off stage.

RGB (Diagram 2)

Purpose

Receive and process non-encoded color signals.

RGB Input Connectors and Amplifiers

The Red, Green, and Blue signals are picked off low return loss, feed-thru coils. The input connectors are isolated from the chassis to aid in hum rejection. The cable shields are connected to the bases of the input transistors, Q9376, Q9350, and Q9328. The hum signal on the shield is in phase with the hum component of the color signal applied to the emitters. The hum signal is then rejected differentially. The input signal is applied to an input operational amplifier, using the Red channel for example, Q9376, Q9286, Q9280, Q9363, and Q9288, Q9032 is a voltage source for the three similar operational amplifiers.

The output of the Green signal operational amplifier is used to provide internal sync for the instrument.

Temperature compensation results from using a pair of emitter followers for each output.

Sync Input

Q9072 and Q9082 form a monostable multivibrator that drives the back porch clamp. The clamp transistors effectively clamp the outputs at ground during the interval of the sync pulse back porch. The burst signal, however, will be passed.

APERTURE
(Diagrams 3 and 4)

Purpose

Provide a variable amount of phase-linear mid-frequency boost in the luminance channel which partly compensates for the high-frequency rolloff in the kinescope. This increase in mid-frequency response enhances picture sharpness.

Route the decoded blue signal to the red, green, and blue channels on the Output Amplifier board when the BLUE ONLY pushbutton is pressed in. This mode of operation produces a monochrome picture for checking VTR performance.

Allow display of the demodulated chroma, as vectors, in an external display.

Aperture Corrector

The composite video signal from the Video Input Amplifier (diagram 1) is coupled through grounded-base input stage Q128 to a 200 ns delay line consisting of L175, L180, L190, and associated capacitors. The delay line is made up of three complex conjugate m-derived sections, source terminated by R153, CR153, and R154. The delay line is unterminated at its output. The nature of this delay line is such that the frequency response of the aperture corrector circuitry is broadly peaked at 2.5 MHz.

The input and output signals of the delay line are coupled to pins 3 and 14 (respectively) of monolithic transconductance amplifier U175. Pins 3 and 14 function similarly to the input connections of a differential amplifier, in that only the difference signal is amplified. The difference between input and output signals of the delay line is a frequency spectrum from dc to 6 MHz, with maximum boost at 2.5 MHz and nulls at dc and 5 MHz.

The unboosted output of the delay line is coupled through Q180 to the base of Q190. The amplified 2.5 MHz signal is also coupled directly from the output of U175 (pin 9) to the base of Q190. The output from Q190 is coupled to the luminance input amplifier on the NTSC or PAL Lum Proc & Control diagram 5 or 7.

U175, the Aperture Preset (R7873 or R7878) adjustment, and the front-panel APERTURE control comprise the gain control portion of the aperture corrector circuitry. U175 is a monolithic transconductance amplifier that functions as follows:

Pins 3 & 14—Differential inputs.

Pins 8 and 9—Output terminals (only pin 9 is used in this case).

Pin 11—+Vcc.

Pin 5—−Vcc (Q170, connected to pin 5, is a current limiting FET).

Pin 13—+9 V (Set by VR190).

Pin 12—Variable gain control input terminal. The current at pin 12 controls the current at pin 5, thus controlling the gain of U175.

Pin 4—Bias connection for input levels.

Pins 6, 7, and 10—Grounded in this application.

Pins 1 & 2, 15 & 16—Current input terminals. R146 and R145 are fixed gain-setting resistors. Q146 is a constant-current source.

Aperture Zero R123 is adjusted to approximate a flat response in the 0 MHz to 2.5 MHz portion of the luminance channel passband. This response can be obtained by applying a Tektronix crosshatch convergence signal (or equivalent) to the picture monitor, connecting an oscilloscope probe to TP2865 on diagram 5 or TP3960 on diagram 7, and setting the front panel APERTURE control just out of the PRESET position. Then, R123 is adjusted to make the vertical crosshatch lines be the same amplitude as the horizontal crosshatch line as displayed on the oscilloscope. The procedure is the same for dual-decoder instruments except the adjustment is performed when TP2865 only is used as the test point.

The setting of the variable-aperture corrector, in the zero aperture correction mode (just out of detent), is defined as the variable-aperture corrector having no effect on the frequency response of the luminance channel.

Aperture Preset R7873 or R7878 is adjusted when the front-panel variable APERTURE control is set to the PRESET (detent) position and the oscilloscope is con-

nected to TP2865 or TP3960. Then, R7873 or R7878 is adjusted for approximately 120% pulse-to-bar ratio. This response produces approximately equal brightness of the vertical and horizontal crosshatch lines displayed on the picture monitor screen.

The setting of the variable-aperture corrector in the PRESET (detent) mode is defined as providing an approximately flat response between the incoming electrical signal to the picture monitor and the light output of the kinescope (excluding cross color effects). The circuit is optimized so that the definition for the PRESET mode is valid when the picture monitor is in its most widely-used mode; i.e., trap and luminance delay line are inserted into the luminance channel. For example, when displaying a crosshatch pattern, proper aperture correction causes the vertical lines to be the same brightness as the horizontal lines.

Blue Only (Diagram 3)

When the BLUE ONLY pushbutton is pressed in, pin 10 of P121 is grounded and armature-type relay K133 is energized to apply the decoded blue only signal to the red, green, and blue channels on the Output Amplifier board.

Green DC Bal R117 is adjusted to make the signal black level match the black reference pulse. This adjustment is made when the BLUE ONLY pushbutton is pressed in and the oscilloscope probe is connected to green output TP5730 on the Output Amplifier board. Red DC Bal R118 is adjusted when the oscilloscope probe is connected to red output TP5760 on the Output Amplifier board.

Blue Only (Diagram 4)

When the BLUE ONLY pushbutton is pressed in, pin 1 of P125 is grounded and armature-type relays K113 and K133 are energized. These relays route the decoded blue only signal from the decoder selected by the STANDARD switch to the red, green, and blue channels on the Output Amplifier board.

Green DC Bal R117 and Red DC Bal R118 are adjusted when the STANDARD switch is set to NTSC. The adjustment procedure is the same as described for R117 and R118 on diagram 3. Green DC Bal R141 and Red DC Bal R140 are adjusted when the STANDARD switch is set to PAL SIMPLE.

Demodulated Chroma Output (Diagram 3)

The single-decoder demodulated chroma output is connected directly from the Decoder board via voltage dividers on the Aperture board to the rear panel R-Y (or V) and B-Y (or U) output connectors.

The B-Y (or U) R160 adjustment is set to make the red color bar amplitude be 700 mV p-p at the B-Y (or U) output connector. Similarly, R-Y (or V) R182 adjustment is set for 700 mV p-p red color bar amplitude at the R-Y (or V) output connector. These are the correct amplitudes for driving the TEKTRONIX 602 or 604, Option 5, Display Unit to produce a vector display.

Demodulated Chroma Output (Diagram 4)

Selection for the decoder-demodulated chroma outputs is made by DIP (Dual In-Line Package) relays K143, K153, K163, K173. These relays are controlled by the front-panel STANDARD switch. When the STANDARD switch is set to NTSC, pin 3 of P125 is grounded, causing K163 and K173 to be energized.

With K163 and K173 energized, the NTSC-demodulated chroma output signals are applied to the rear-panel R-Y (or V) and B-Y (or U) output connectors. Adjustments R160 and R182 set the amplitude of the signals applied to these rear panel connectors.

When the STANDARD switch is set to PAL SIMPLE or DELUXE, pin 2 or P125 becomes grounded. This ground causes K143 and K153 to be energized and the PAL-decoded chroma output signals are applied to the rear panel R-Y (or V) and B-Y (or U) output connectors. Adjustments R162 and R180 set the amplitude of the V and U signals respectively.

NTSC COLOR DECODER (Diagrams 5 and 6)

Purpose

This circuitry reduces color encoded signals to basic color voltages for the kinescope display.

Input Signal

The composite video signal from the aperture circuit (diagram 3 or 4) is divided; half of the signal current flows in the luminance processing circuits, the other half is used in chrominance processing.

Luminance Input Amplifier

The luminance signal is delayed by 475 ns to compensate for delays in chrominance processing. The aperture-correction circuit provides 200 ns delay and the luminance processing provides 275 ns delay. The delay line is made up of three complex conjugate m-derived sections, source terminated by R2590. R2885 is the output termination for the delay line.

The chroma trap circuit, consisting of L2581, C2581, and Q2584, is isolated from the Aperture board and luminance delay line by Q2577 and Q2590. The chroma trap is switched in and out of the luminance channel by turning Q2584 on and off respectively. The burst present signal from pin 6 of U2053 is applied through R2491 to the base of Q2584. This signal turns Q2584 on and off, depending on the presence of burst when in the AUTO mode. To turn Q2584 on and off properly when in the COLOR or MONOCHROME position of the MODE switch, a signal from the MODE switch is applied to the base of

Q2584 from P2099-5 through CR2491 and R2584. L2581 is adjusted for minimum chrominance on luminance at TP2865 when the MODE switch is set to COLOR. The Q and peak attenuation of the trap is determined by R2582.

Q2785, Q2779, and Q2875 form an operational amplifier that provides a low source impedance for terminating the delay line. Lum Gain control R2977 is adjusted so that the luminance amplitude at TP2865 is 2 V from video black to the 100 IRE white level.

Luminance Feedback Clamp

Purpose of the luminance feedback clamp circuit, Q2861 and U2861, is to maintain luminance at a level directly proportional to the level set by the BRIGHTNESS control circuit.

During burst, a 15 V positive-going pulse is applied to the gate of Q2861. The FET turns on and samples the output of the luminance amplifier at TP2865. This sampled voltage is applied to pin 2 of U2861 and compared with the voltage applied to pin 3 from the BRIGHTNESS control circuit. Any difference voltage between pins 2 and 3 of U2861 is applied to the input of the luminance amplifier, causing the output to move to a level that will make the difference voltage zero. C2759 retains the sampled voltage level until the next sample is taken.

H-Rate Sync

This circuit eliminates the 2H rate vertical interval information and sound in sync encoding to provide regenerated H-rate sync pulses. These pulses are applied to various gate and clamp circuits in the decoder.

Q2083 accepts positive-going 2.5 μs horizontal blanking pulses from P1438-2 on the Sync & Timing board. Q2183 accepts negative-going composite sync from P1980-8 on the same board. These pulses are used to gate on U2181, an RS flip-flop. The purpose of the flip-flop is to eliminate the 2H rate pulses from the composite sync signal so only H-rate pulses are obtained at the output (pin 8) of U2181.

U2181 is held on, until almost to the trailing edge of sync, by the one-shot action of Q2289. Then, the trailing edge of sync resets the flip-flop. The negative-going pulse from pin 8 of U2181 turns off CR2283 and Q2375. A positive-going gate, having a delay of 0.5 μs, is generated at the collector of Q2375 during sync time. This gate is used to dc restore the R-Y, G-Y, and B-Y amplifiers.

Burst Pulse Gate

Q2269 and Q2351, with associated circuitry, form the burst gate generator for driving the luminance feedback clamp and burst gate amplifier. Q2253, Q2251, Q2257, Q2155, and Q2141 form the burst gate amplifier circuit. This circuit applies a positive-going 15 V gate to Q2233 and Q2135 when burst is present and is the correct phase.

Q2269 is normally on and Q2351 is normally off. The end of the H-rate sync pulse turns off Q2269, producing a negative-going pulse at its collector. This pulse becomes a ramp that allows Q2351 to turn on and a positive-going delay pulse, occurring during back porch (burst) time, is produced at the collector. A negative-going pulse is developed at the emitter of Q2351.

The positive-going pulse from the collector of Q2351 is used to drive Q2861 in the luminance feedback circuit. The negative-going pulse from the emitter of Q2351 is applied to the emitter of Q2253.

The normal conditions for the transistors in the burst gate amplifier circuit are as follows: Q2253 is on; Q2251, Q2155, and Q2141 are off; Q2257 is an emitter follower. Q2253 and CR2325 form an AND gate that requires two simultaneous low input signals to obtain a low at the output for turning on Q2251. One of the low input signals is obtained by applying a negative-going back porch pulse from the emitter of Q2351 to the emitter, of Q2253. The other low input is the negative-going B-Y burst signal. These pulses turn on Q2251 to provide a burst tip clamp signal.

A negative-going pulse occurs at the collector of Q2251 and is applied through Q2257 to Q2155. Transistors Q2155 and Q2141 turn on to apply a positive-going 15 V burst pulse gate to Q2233 and Q2135.

Phase Control

The phase control circuit provides an error voltage, if present, to the subcarrier oscillator. Then, the oscillator changes frequency and phase in a direction that eliminates the error. Other functions of the phase control circuit are: To provide a turn-on voltage to the burst present detector stage when burst is present. To allow the HUE control to change the phase of the subcarrier oscillator and alter the hue of the display.

If burst is present and is the correct phase, the burst pulse gate circuit supplies a positive-going 15 V gate that turns on Q2233 and Q2135. These FET transistors sample the B-Y and R-Y signals at this time and the sampled voltages charge holding capacitors C2225 and C2133.

The sampled R-Y signal, which may be + or −, is compared with the setting of the HUE control at the input (pins 2 and 3) of U2125. If there is a difference, an error voltage will be present at the output (pin 6) of U2125. This voltage controls the dc bias applied to varactor diode CR2009 in the subcarrier oscillator circuit. CR2009 changes the oscillator frequency and phase in a direction that makes U2125 pin 3 voltage equal to pin 2.

The Error Amp DC Balance adjustment (R2025) supplies an offset current to compensate for circuit imbalances. This control is adjusted so that the burst portion of the video waveform at TP2739 on diagram 6 coincides with the video blanking level when the CHROMA control is set to its minimum position.

The B-Y sampled voltage from Q2135 has a negative polarity and is applied to an emitter follower, U2051. The negative polarity voltage from the output of U2051 is applied to one side of the HUE control. The other side of the HUE control receives a positive voltage from inverter U2027. Thus, the HUE control can be varied from one polarity to the other or set at 0 V.

If burst is present, the negative voltage output from U2051 is used as a turn-on voltage for the burst present detector stage.

Burst Present Detector

U2053 is a positive feedback amplifier that acts like a Schmitt level detector. If burst is present and is the correct phase, the output of U2053 is −15 V. If burst is not the correct phase or is not present, the output of U2053 is +15 V.

Chroma Zero Reference Clamp

The error, caused by residual subcarrier on the video signal applied to the monitor, can be displayed as a color shift. It is displayed by using jumper P2097 to connect the standardized horizontal sync pulses to Q2177, which turns on Q2453 and Q2451 to provide a real zero reference point at the inputs to the demodulators during sync time.

The chroma zero reference clamp circuit has four other major functions:

1. In AUTO mode, this circuit unclamps during back porch time so that burst, if present, turns on the chroma channel for color operation. If burst is absent, the clamp circuit turns off the chroma channel.

2. In COLOR mode, the clamp circuit unclamps to turn on the chroma channel all the time whether burst is present or not.

3. In MONOCHROME mode, the clamp circuit turns off the chroma channel to produce a monochrome display.

4. In horizontal delay of scan mode, the clamp circuit turns off the chroma channel during the kinescope blanking interval so that the auto black level circuitry in the output amplifier can operate.

Table 8-1 is a circuit description of the chroma zero reference clamp circuit arranged in chart form.

Subcarrier Oscillator

The subcarrier oscillator, Q2111 and Q2105, is a varactor-diode-controlled, crystal oscillator that can be varied about 200 Hz either side of 3.58 MHz. L2203, C2109, and C2113 are a low pass filter for the 3.58 MHz signal.

Demodulators

The demodulators, U2425 and U2405, are differential devices, single-end driven, with the other input biased to a dc level. The demodulators require input chrominance and regenerated subcarrier to operate.

The regenerated subcarrier differentially drives the demodulators through R2415 and R2401. B-Y Phase L2205, together with C2301 and R2309, form the quadrature phase-shift network. U2405 is driven 90° out of phase from U2425. The output from the demodulators is applied to chroma response filters that limit the bandwidth to approximately 1.3 MHz.

G-Y Phase control R2407 is adjusted for proper color decoding when the oscilloscope is connected to TP5730 on the Output Amplifier board. The signal black level of the color bars should be parallel to the video signal blanking level.

Chroma Input Amplifier

The purpose of the chroma input amplifier is to allow only the chrominance component of the composite video signal to pass through the amplifier. Amplitude of the chrominance signal can be varied by the CHROMA control circuit and turned on or off by a clamping stage driven by the chroma zero reference clamp circuit.

Q2485 is a grounded-base input stage for the composite video signal. C2481 and L2655 form a series resonant circuit with a center frequency of 3.58 MHz. Bandwidth is determined by R2483. A gain cell, CR2475 and CR2477, drives the operational amplifier consisting of Q2467, Q2459, and Q2367. Gain of the cell is determined by the dc current split between the series and shunt diodes.

The Chroma Preset (R7888) and CHROMA controls set the ratio of the dc currents in the gain cell which, in turn, set the ratio of the ac signal currents. The ac and dc current ratios are equal. The input to the demodulators is clamped to ground by Q2453 and Q2451 when no chrominance is desired.

Table 8-1

CHROMA ZERO REFERENCE CLAMP CIRCUIT

Chroma Zero Reference Jumper P2097	MODE	Burst[a]	Q2085	Q2087	Q2177	Chroma Zero Reference Clamp to Q2453 & Q2451[b]
Set to Residual Subcarrier Displayed position. (Negative-going horizontal sync pulse is applied from pin 8 of U2181 through CR2093 and P2097 jumper to Q2177.)	AUTO	Present	Turned off by U2053	Turned off by MODE switch.	Turned on during horizontal sync time by pulse from U2181.	Clamps during horizontal sync time.[c]
		Absent	Turned on by U2053. Turned off during sync and back porch by U2181 & Q2269.	Turned off by MODE switch.	Turned on all the time except during back porch. Controlled by Q2085 and sync pulse from U2181.	Clamps all the time except during back porch.[c]
	COLOR	Either	Turned off by MODE switch.	Turned off by MODE switch.	Turned on during horizontal sync time by pulse from U2181.	Clamps during horizontal sync time.[c]
	MONO-CHROME	Either	Controlled by U2053 & Q2269 but does not affect Q2087 & Q2177.	Turned on by MODE switch.	Q2087 turns on Q2177 all the time.	Clamps all the time.
Set to Residual Subcarrier Removed position. (Negative-going horizontal sync pulse from pin 8 of U2181 is applied through CR2093 & P2097 jumper to Q2085 base. Q2085 inverts pulse and applies it to Q2177 in AUTO, burst-absent, mode.)	AUTO	Present	Turned off by U2053.	Turned off by MODE switch.	Turned off all the time by U2053.	Unclamps all the time.
		Absent	Turned on by U2053. Turned off during sync and back porch by U2181 & Q2269.	Turned off by MODE switch.	Turned on all the time except during sync and back porch. Controlled by Q2085.	Clamps all the time except during sync and back porch.
	COLOR	Either	Turned off by MODE switch.	Turned off by MODE switch.	Turned off all the time by MODE switch.	Unclamps all the time.
	MONO-CHROME	Either	Controlled by U2053 & Q2269 but does not affect Q2087 & Q2177.	Turned on by MODE switch.	Q2087 turns on Q2177 all the time.	Clamps all the time.

[a]Definition of burst absent: No burst or burst is out of phase.

[b]When Q2177 is on, Q2453 and Q2451 turn on and clamp the inputs to the demodulators to ground; thus, turning off the chrominance component during this time.

[c]Clamping to ground during horizontal sync time in the AUTO and COLOR modes provides absolute zero chroma reference for displaying residual subcarrier.

R-Y, G-Y, and B-Y Signal Amplifiers

The R-Y and B-Y signals from the demodulators drive the R-Y, G-Y, and B-Y operational amplifiers. The R-Y and B-Y signals are amplified by non-inverting, feedback-stabilized, voltage amplifiers. The input voltage signals are developed across the filter terminating resistors, R2537 and R2527. The R-Y gain is set by the ratio of demodulator gain resistor R2427 to the filter terminating resistor (R2537), the amplifier gain determining resistors (R2553 and R2657), and the Chroma Preset adjustment (R7888) with R2465.

The G-Y signal is formed by the sum of the R-Y and B-Y currents through filter terminating resistors R2537 and R2527. The signal is amplified and inverted by the operational amplifier to provide the G-Y output voltage. Gain is set by the ratio of demodulator gain resistors R2427, R2409 and R2407, to G-Y operational amplifier feedback resistor R2627.

The dc voltage at the outputs of the operational amplifiers is controlled by the sampled feedback clamps. Using R-Y circuit as an example, the main components are Q2745, U2755, and C2751. Sampling occurs during horizontal sync time. The stabilizing feedback loops are interdependent.

RGB Matrix

The gain and level set signals, R-Y, G-Y, and B-Y from the operational amplifiers are resistively added to the luminance, Y, that was delayed to allow for the chroma processing. The resultant signals are decoded color currents (RGB) that drive the output amplifiers.

NTSC TEST Pushbutton

When the NTSC TEST pushbutton switch is set to the out position, the RGB matrix circuit is modified to largely compensate for limitations in available color phosphors. When the pushbutton is pressed in, the RGB matrix reverts to strict NTSC values to allow test and setup to be performed using a standard NTSC color bar signal.

Insertion of the chroma correction matrix is controlled by transistor Q2601. With the NTSC TEST pushbutton set to the out position as shown on diagram 6, Q2601 is turned on. This transistor turns on FET's Q2925, Q2919, and Q2915 to connect the chroma correction matrix resistors in the NTSC decoder RGB matrix circuit. Using R-Y as an example, the correction resistors are R2905 and R2803. Red Matrix DC Bal R2600 is adjusted for no dc shift in signal black level with respect to the black reference pulse as the NTSC pushbutton is pressed in and out. The oscilloscope probe is connected to TP5760 on the Output Amplifier board when performing this adjustment.

If the NTSC TEST pushbutton is pushed in, Q2601 turns off. The FET's turn off and the chroma correction matrix resistors are disconnected from the RGB matrix circuit. Red DC Bal R2830 is adjusted for no dc shift of the signal black level with respect to the black reference pulse as the CONTRAST control is varied. TP5760 on the Output Amplifier board is used as the test point.

The demodulated chroma outputs on the Aperture circuit board (see diagram 3 or 4) are taken off ahead of the chroma correction matrix resistors. These signals are not affected by the switching in or out of the correction resistors.

PAL COLOR DECODER
(Diagrams ◇7◇ and ◇8◇)

Purpose

The PAL Color Decoder reduces color encoded signals to basic color drive voltages for the kinescope display.

Luminance Processing

Half of the signal current from the Aperture circuit (diagram 3 or 4) flows in the luminance processing circuit while the other half is used in chrominance processing.

The luminance signal is delayed to compensate for the circuit delays in chrominance processing. The delay line used for this purpose consists of two T sections with a chroma trap (L3790 and C3796) to remove the unwanted chrominance information. L3790 is adjusted for minimum chrominance on luminance at TP3960. The output of the delay line is terminated by R3990, and the Q of the chroma trap is determined by R3790.

The jumper on P3790 in the wide bandpass position allows the delay line to be bypassed so that full bandwidth signals can be applied through the luminance channel to the output amplifier. This position of the jumper is useful for checking circuit operation when troubleshooting.

An operational amplifier (Q3984, Q3980, and Q3864) provides the low impedance required to terminate the delay line. Dc restoration is provided by Q3866 and U3957. The back porch voltage level at the output of the luminance amplifier is switched by Q3866 to U3957. U3957 operates as an integrator. As long as the back porch level is not zero, the integrator output moves to reduce the back porch level to 0 V at the luminance amplifier output; thus, completing the feedback loop. Luminance Gain control R3880 is adjusted so that the luminance amplitude at TP3960 is 2 V from setup level to the 100% white level.

Circuit time constants in the operational amplifier are slow enough to display about 70% of any mains frequency hum present. If the back porch clamp signal is lost, Q3866 turns on and forces the average output level of the luminance amplifier to 0 V via the feedback loop.

The reference for U3957 is set by the front-panel BRIGHTNESS control so that the dc level of the signal at TP3960 can be varied. Q3862 is a clamp during the horizontal blanking interval for the luminance signal so that, during clamping time, the auto dc level controls of the output amplifier can operate.

Sync Processing & Chroma Clamp Driver

These circuits convert composite sync into standardized horizontal rate sync pulses. Sound-in-sync or noise in the pulses and 2H rate vertical information are eliminated. The H-rate sync pulses provide clamp drive for the decoded signals in the chroma processing circuit. They are also applied to the back porch gate generator and chroma zero reference clamp driver circuits.

U3180B and C, an RS flip-flop, is gated on by ANDing composite sync and regenerated H pulses in U3180A. The flip-flop is held on, until almost the trailing edge of sync, by the one-shot action of Q3270. The trailing edge of sync resets the flip-flop.

The negative-going pulse from pin 8 of U3180B turns off CR3368 and Q3368. A positive-going gate, having a delay of 0.5 μs is generated at the collector of Q3368 during sync time. This gate is used to dc restore the decoded signals in the chroma processing circuit.

Back Porch Gate Generator

Q3074 and Q3446 are the back porch gate generator. These transistors drive the luminance back porch clamp and the burst gate/amp circuits.

Burst Gate/Amp

This circuit provides a 0.5 V positive-going pedestal to the peak detector stage if burst is absent. If burst is present a negative-going 1.5 V pulse is produced.

Q3444 is normally on and Q3440 is off. Demodulated U (B-Y) signal is applied through CR3442 and R3440 to the emitter of Q3440. At burst time Q3444 is turned off. Q3440 becomes a grounded-base amplifier, gating a positive burst pulse of about 2 V through Q3434, an emitter follower, to the peak detector. Q3440 amplifies only positive pulses, clipping above 7 V. Negative pulses are clipped. A pedestal of about 0.5 V is applied to the detector if burst is not present.

Peak Detectors

The output pulse from the burst gate/amp is applied to the bases of Q3232 and Q3236. These transistors are fast, low-collector-voltage-rated devices that are operated in cascode with Q3342 and Q3340.

When the peak detectors are alternately gated on by the line rate flip-flop, they conduct on about the top 40% of the burst gate pulse, even when the burst pulse amplitude varies between about 0.5 V and 7 V as the CHROMA control is varied. The output of Q3342 and Q3340 is a positive pulse of about 20 V.

Phase Control

The phase control circuit provides an error voltage, if present, to the subcarrier oscillator. Then, the oscillator changes its frequency and phase in a direction that eliminates the error. The phase control circuit also provides a turn-on voltage to the burst present stage when burst is present.

When the peak detectors operate at burst time, the phase control sampling gates, Q3146 and Q3150, are alternately opened, gating through demodulated Alt V burst pulse voltage. The gated voltages charge holding capacitors C3042 at the minus amplifier and C3044 at the plus amplifier. The outputs of the minus amplifier U3040A and the plus amplifier U3040B are compared at the minus input of the error amplifier U3030A. If the voltages cancel, no error correction voltage is generated.

The presence of a voltage at the input to U3030A indicates a phase error, and the output changes to provide the correct polarity voltage to the subcarrier oscillator varactor diode, changing the oscillator frequency until no error voltage is present at the output of the error amplifier.

The Error Amp DC Bal adjustment, R3030, is provided to supply an offset current to compensate for circuit imbalances. This control is adjusted to overlay the color bar levels at the V (R-Y) output TP3740.

Burst Present

The output of the plus phase control amplifier (normally about 350 mV) is applied to the minus input of the burst present Schmitt, U3050B. If the burst signal is present, the output of U3050B is negative. The Schmitt switches states at about 50 mV (off) and 100 mV (on) with the output going positive when the burst signal is missing.

Chroma Zero Reference Clamp Driver

The error, caused by residual subcarrier on the video signal applied to the monitor, can be displayed as a color shift. It is displayed by using jumper P3090 to connect the standardized horizontal sync pulses to Q3072, which turns on Q3674 and Q3868 in the chroma input amplifier circuit to provide a real zero reference point for the demodulators during sync time.

The chroma zero reference clamp driver circuit has four other major functions:

1. In AUTO mode, this circuit unclamps during back porch time so that burst, if present, turns on the chroma channel for color operation. If burst is absent, the clamp circuit turns off the chroma channel.

2. In COLOR mode the clamp circuit unclamps to turn on the chroma channel all the time, whether burst is present or not.

3. In MONOCHROME mode, the clamp circuit turns off the chroma channel to produce a monochrome display.

4. In horizontal delay of scan mode, the clamp circuit turns off the chroma channel during the kinescope blanking interval so that the auto black level circuitry in the output amplifier can operate.

Table 8-2 is a circuit description of the chroma zero reference clamp driver circuit arranged in chart form.

Delay Line Control

In DELUXE mode of operation, the demodulated V (R-Y) signal is applied to the delay line sampling gates, Q3344 and Q3350. If the amplitudes of the R-Y components of the bursts on alternate lines are not equal, due to incorrect delay line phase, the dc voltages applied to the inputs of U3156B will not be equal. A delay correction voltage is applied to the gain cells in the one-line chroma delay circuit to compensate for those differences.

The amplitudes of the demodulated V and the demodulated Alt V signals are compared in U3050A. If the amplitudes are not equal, a gain correction signal is sent to the one-line chroma delay circuit. Samples are taken, compared, and correction signals are generated until the phase and gain errors are corrected. This is the automatic compensation for temperature and time dependent drift in the glass delay line.

Low Amp Delay Line Phase control R3054 is adjusted for minimum dc level change of the waveform at TP3390 as the CHROMA control is varied from 0.5X to 3X. Similarly, Low Amp Delay Line Gain control R3052 is adjusted for minimum dc level change of the waveform at TP3290 as the CHROMA control is varied.

Line Rate Flip-Flop

The regenerated H pulse from the sync and timing circuit is applied to Q3142, amplified, and inverted to provide the line rate flip-flop clock pulse. Flip-flop U3130 toggles on each clock pulse, providing alternate plus and minus output pulses to drive the PAL 180° switcher, peak detector, delay line gain control sampling gates, and the phase control sampling gates.

Flip-Flop Correction

If the output of U3040A goes positive, due to incorrect phase of the line rate flip-flop, the output of U3030B, a Schmitt, goes positive and charges C3040. When the charge reaches 5 V, the PUT (programmable unijunction transistor) Q3140, fires and turns on Q3142, generating a clock pulse. The clock pulse toggles the flip-flop, changing its state between the regular clock pulses, and the output of U3040A goes back to its normal negative state. If the correction is not made for some reason, the capacitor will again charge and fire Q3140 in about 20 ms.

One Line Chroma Delay

In DELUXE mode of operation, a signal of one-half amplitude from the center of T3446 primary windings is sent through the one-line chroma delay circuit. R3570 provides a low impedance source termination for the delay line, DL3480. Compensation for the input and output capacitance of the delay line transducer is provided by transducer peaking coils L3480 and L3380. Some of the signal is directly coupled around the delay line. This non-delayed signal is normalized by Delay Line Quad Phase adjustment C3480, and then canceled by the negative direct signal provided by the inductive coupling of the transducer peaking coils.

The delay line is terminated by the effective impedance (200 Ω resistive) of the paralleled, series RC networks. The total impedance of each parallel branch is equal to the other, making the current at the output of the networks equal.

Table 8-2

CHROMA ZERO REFERENCE CLAMP DRIVER CIRCUIT

Chroma Zero Reference Jumper P3090	MODE	Burst[d]	Q3090	Q3092	Q3072	Chroma Zero Reference Clamp to Q3674 & Q3868[e]
Set to Residual Subcarrier Displayed position. (Negative-going horizontal sync pulse is applied from pin 8 of U3180B through CR3096 and P3090 jumper to Q3072.)	AUTO	Present	Turned off by U3050B.	Turned off by MODE switch.	Turned on during horizontal sync time by U3180B.	Clamps during horizontal sync time.[f]
		Absent	Turned on by U3050B. Turned off during sync and back porch by U3080B & Q3074.	Turned off by MODE switch.	Turned on all the time except during back porch. Controlled by Q3090 and sync pulse from U3180B.	Clamps all the time except during back porch.[f]
	COLOR	Either	Turned off by MODE switch.	Turned off by MODE switch.	Turned off during horizontal sync time by pulse from U3180B.	Clamps during horizontal sync time.[f]
	MONO-CHROME	Either	Controlled by U3050B & Q3074 but does not affect Q3092 & Q3072.	Turned on by MODE switch.	Q3092 turns on Q3072 all the time.	Clamps all the time.
Set to Residual Subcarrier Removed position. (Negative-going horizontal sync pulse from pin 8 of U3180B is applied through CR3096 and P3090 jumper to Q3090 base. Q3090 inverts the pulse and applies it to Q3072 in AUTO, burst-absent, mode.)	AUTO	Present	Turned off by U3050B.	Turned off by MODE switch.	Turned off all the time by U3050B.	Unclamps all the time.
		Absent	Turned on by U3050B. Turned off during sync and back porch by U3180B & Q3074.	Turned off by MODE switch.	Turned on all the time except during sync and back porch. Controlled by Q3090.	Clamps all the time except during sync and back porch.
	COLOR	Either	Turned off by MODE switch.	Turned off by MODE switch.	Turned off all the time by MODE switch.	Unclamps all the time.
	MONO-CHROME	Either	Controlled by U3050B & Q3074 but does not affect Q3092 & Q3072.	Turned on by MODE switch.	Q3092 turns on Q3072 all the time.	Clamps all the time.

[d]Definition of burst absent: No burst or burst is out of phase.

[e]When Q3072 is on, Q3674 and Q3868 turn on and clamp the inputs to the demodulators to ground; thus, turning off the chrominance component during this time.

[f]Clamping to ground during horizontal sync time in the AUTO and COLOR modes provides absolute zero chroma reference for displaying residual subcarrier.

The output of the RC networks is applied to complementary gain cells. When a phase adjustment is made, one gain cell is turned on, and the other off. The phase shift in the R3380-C3382 network is about 5°, with about 60° in the other network, making the correction range from +5° to +60°, dependent on the gain cell current split. The phase advance is needed to make up for the phase delay in the post delay line operational amplifier. The gain of the gain cells is adjusted in parallel to compensate for changing losses in the delay line, and to finely adjust the gain cells for the total circuit gain.

The post delay operational amplifier (Q3482, Q3582, and Q3584) provides the low input impedance the gain cells require and the low output impedance to drive the center tap of the PAL simple-deluxe switching transformer. The half-amplitude signal through the one-line delay is added to the half-amplitude direct signal. In one half of the transformer secondary the R-Y components of the signals cancel and the B-Y add to provide a full amplitude signal to U3510, the B-Y demodulator. In the other half of the secondary, the delayed signal is subtracted from the direct signal. The B-Y components cancel and the alternating R-Y components add, and a full amplitude signal is applied to U3526, the R-Y demodulator.

Chroma Input Amplifier

The chroma input amplifier has two shunt clamps (Q3674 and Q3865) to remove chrominance during monochrome, or to provide an absolute zero chroma reference when displaying residual subcarrier, L3770 and the series equivalent of C3782 and C3780 form a series-resonant circuit, tuned to the chroma center frequency when the oscilloscope is connected to TP3670.

CR3780 and CR3782 are a gain cell. The gain of the cell is determined by the current split between the series and shunt diodes. The Chroma Preset (R7883 or R7888) and CHROMA controls set the ratio of the dc currents in the gain cell which, in turn, set the ratio of the ac signal currents. The ac and dc current ratios are equal.

The output of the gain cell drives the operational amplifier (Q3684, Q3682, and Q3680) which then drives emitter follower Q3668. Q3668 drives the Alt V demodulator and the PAL simple-deluxe switching transformer.

PAL Simple-Deluxe Switching

When the front-panel PAL switch is set to the SIMPLE position, Q3590 and Q3580 are on, grounding the center of T3446's primary. The chroma signal is impressed across two separate secondaries to drive U3526 and U3510 with opposite phase chroma information of equal amplitude.

When the PAL switch is set to DELUXE, Q3592 and Q3578 are switched on; Q3590 and Q3580 are turned off. The primary of T3446 consists of both windings in series, and the chroma information across either secondary winding is one half amplitude.

PAL 180° Switcher

Because of the line by line inversion of the R-Y axis in the PAL system, it is necessary to switch the phase of the subcarrier applied to the V (R-Y) demodulator. This is accomplished by switching the subcarrier signal between the differential inputs of U3526. The output of the line rate flip-flop drives the PAL 180° switcher.

The switching signal grounds and un-grounds the differential inputs of the demodulator, alternately allowing the opposite input to be driven with the subcarrier signal. The input to the demodulator is grounded by turning on either Q3212 or Q3210. The V Tilt adjustment C3310 is a differential capacitor provided to ensure exact 180° switching.

Quad Phase

The quad phase network, consisting of L3110, C3206, and the switcher grounded 90.9 Ω resistor (R3202 or R3208), provides 90° shifted subcarrier between the U and V demodulators. The V Phase adjustment C3314 located in the Alt V demodulator circuit, matches the demodulation axes of V (R-Y) and Alt V channels.

Subcarrier Oscillator

The subcarrier oscillator is a varactor-diode-controlled crystal oscillator, which can be varied about 200 Hz either side of 4.433619 MHz. L3104, C3108, and C3110 are a low pass filter for the 4.433619 MHz regenerated subcarrier.

Demodulators

The demodulators, U3544, U3526, and U3510, are differential devices driven single ended with the other input biased to a dc level. The demodulators require both input chrominance and regenerated subcarrier to operate. The output of the demodulators is applied to response filters, whose bandwidths are about 1.2 MHz.

V Phase C3314 is adjusted for best overlay of the color bars at TP3740 with MODE switch set to COLOR and the PAL pushbutton set to SIMPLE. V Tilt C3310 is adjusted to match the green-magenta color bar levels at the same test point (TP3740). The U Gain control R3510 is adjusted for proper color bar decoding at the green output TP5730 on the Output Amplifier board. The filters (L3644, L3650, L3630, L3640, L3608, and L3610) are adjusted for best green-magenta transition at their respective test points: TP3720, TP3740, and TP3750.

Alt V Signal Amplifier

The Alt V signal output operational amplifier (Q3750, Q3752 and Q3754) has its gain set by the ratio of the amplifier feedback resistor (R3752) to the demodulator gain resistors R3544 and R3546. If the operational amplifier output is not 0 V at horizontal sync time (no chroma should be present at this time), the sampling feedback clamp (Q3852 and U3950B) modifies demodulator U3544 bias current until the Alt V output is 0 V at sync time.

R-Y, G-Y, and B-Y Signal Amplifiers

The U and V signals from the demodulators drive the R-Y, G-Y, and B-Y operational amplifiers. The R-Y and B-Y signals are amplified by non-inverting, feedback-stabilized, voltage amplifiers. The input voltage signals are developed across filter terminating resistors R3640 and R3624. The R-Y gain is set by the ratio of demodulator gain resistor R3530 to filter terminating resistor R3640 and amplifier gain-determining resistors R3648 and R3746.

The G-Y signal is formed by the sum of the U and V signal currents through terminating resistors R3640 and R3624. The G-Y signal is amplified and inverted by the inverting operational amplifier to provide the G-Y output voltage. The G-Y gain is set by the ratio of demodulator gain resistors R3530, R3510, and R3512 to operational feedback resistor R3724.

The dc voltage at the output of the amplifiers is controlled by the sampled feedback clamps, operating at horizontal sync time (the stabilizing feedback loops are interdependent).

The G-Y Gain R3930 and B-Y Gain R3910 controls are adjusted for proper color bar decoding at their respective test points on the Output Amplifier board: TP5730 and TP5700.

RGB Matrix

The demodulated signals from the R-Y, G-Y, and B-Y operational amplifiers are resistively added to the luminance, Y, that was delayed to allow for chroma processing. The resultant output signals are decoded color (RGB) currents for driving the output amplifiers.

Adjustments are provided to compensate for any dc offsets between the decoder and the output amplifiers. Referring to the red output, for example, Red DC Bal R3843 is adjusted for no dc shift of the signal black level with respect to the black reference pulse as the CONTRAST control is varied. The oscilloscope probe is connected to TP5760 on the Output Amplifier board to monitor the waveform when adjusting R3843.

OUTPUT AMPLIFIERS (Diagrams 9 and 10)

Purpose

Drive the red, blue, and green kinescope cathodes with decoded color signals. One of three possible sources may be selected.

Pulse Timing

The blanking signal drives an oscillator that consists of Q5000, Q5002, and Q5010. The oscillator controls a four stage counter and gating circuits. These circuits generate the signals that control the output amplifier as follows.

A blanking pulse from U5060B is applied to U5100, Input Selection, to blank the incoming signals. During this blanked interval the control signals are added to the three channels.

During the second half of this blanked period the output of U5020C, through Q5252, Q5250, and Q5240, sets the white level of the output drive. Contrast Preset Adj and CONTRAST determine the amplitude of the white pulse compared to the blanking pulse.

Signal Inputs, Inputs Selection, and Beam Killers

Up to three separate inputs can be used to drive the output amplifier. The inputs are applied directly to the input signal amplifiers, U5260, U5340, and U5220. The input selection is accomplished by ground closure at U5100.

The beam killer circuit also operates by ground closure. Kinescope cathodes can be turned off as desired by turning on Q5230, Q5232, or Q5270 through U5060A, C, or D to sink away the drive signal at the red, green, or blue output amplifiers.

Brightness Control and Brightness Advance

U5030 and U5040 convert the voltage signal from the BRIGHTNESS control or the brightness advance circuit to collector current for the input signal amplifiers. In delayed scan mode the black level needs to be advanced to allow the viewing of the burst and sync transition in relatively high ambient light levels. This is accomplished by opening the ground closure on the base of Q5282, changing the input voltage level applied to the brightness control circuit.

Auto Brightness and Auto Gain

The black pulse drives Q5312 to control the gating transistors, Q5702, Q5732, and Q5762. When these transistors are gated on, the signal present on the emitters of Q5704, Q5734, and Q5764 is stored in C5710, C5740, and C5770. The voltage is compared to the level set by the front panel BIAS control. The output is the auto brightness signal, taken from the collector of Q5514 (blue), Q5544 (green), and Q5574 (red).

Operation of the auto gain circuit is similar to auto brightness. The white pulse is used to drive Q5420 and the gating transistors, Q5700, Q5730, and Q5760. The auto gain signal is taken from the collector of Q5510 (blue), Q5540 (green), Q5570 (red), and drives the amplifier gain cell (for example, CR5520 and CR5620, blue).

Input Amplifiers

The input signals are applied to the gain cells (CR5520 and CR5620, blue), CR5550 and CR5650, green), and (CR5580 and CR5680, red). The gain of the gain cells is determined by the auto gain circuit, described previously. For simplicity the operation of the blue amplifier will be described; the red and green amplifiers are identical to it.

The auto brightness circuit controls the bias for Q5620; this, in conjunction with the auto gain circuit, sets the gain operating points for the amplifier. Five stages of amplification, Q5620, Q5622, Q5720, Q5722, and Q5724, follow the gain cell.

The bandwidth of the amplifier can be adjusted with C5722 for the blue channel, C5752 for the green channel, and C5782 for the red channel. Proper settings of these adjustments yield a nearly flat response for the video output amplifier as monitored at the respective test points: TP5800, TP5830, and TP5860.

White Reference Limit and Limiting Stage

A diode bridge, composed of CR5820, CR5824, CR5826, and CR5830, is the main limiting circuit. The input and output of the bridge are identical, with the maximum excursions limited by the current established in the resistor string, R5722, R5822, and R5824. R5722 is the White Reference Limit adjustment. By limiting the black and white levels at this point the output amplifier is not over driven.

Output Amplifiers

The output amplifier is an operational amplifier whose output swings between 20 V and 90 V. The output level is sampled, and used as a reference for the auto brightness and auto gain circuits.

SYNC AND TIMING (Diagrams 11 and 12)

Purpose

Phase locks the horizontal blanking interval to the incoming video sync, ensuring that sync will be displayed in the correct time relationship to the kinescope blanking.

Apply phase correction to the horizontal scan so that the center of the picture is straight.

Provide time shift of the horizontal scan to display the input signal horizontal blanking interval when the SCAN switch is set to horizontal delay or pulse cross.

Allows display of the effects of random jitter and periodic changes in sync timing when they are present in the monitor input signal.

Input Selector and Input & Chroma Filter

Sync input signals may be internally derived from either of two inputs, or from a choice of two external inputs. Selection is controlled by a ground closure switching system that is activated from the front-panel SYNC switch.

External sync input connectors are isolated from the chassis to reject unwanted hum signals that may be on the coax shields. The signal is picked off the return loss coils and applied to the emitter of either Q1895 or Q1690. The hum on the coax shield is in phase with the hum component of the sync signal on the center conductor, and is applied to the base of Q1895 or Q1690. Hum is rejected by the differential characteristics of the transistor circuit.

The output of the input selector drives the input and chroma filter circuit, Q1672 and Q1669.

Sync Stripper

Q1748 is the dc restorer for the sync stripper circuit. The output of Q1748 and Q1669 drive Q1555 which is the amplifier input. Q1653 is a variable collector load for Q1555 and provides the agc for the circuit. Q1656 and Q1752 form a cascode amplifier; Q1756 is the output stage. The signal at the emitter of Q1756 is dc restored and agc'd composite video.

Q1858, Q1855, and Q1758 are voltage comparators. The voltage at the emitter of Q1756 is compared to the dc levels set by the voltage divider composed of R1871, R1859, R1759, and R1769. Sync is positive going at this point. The sync tip turns on Q1858 and current is transferred to C1863. The voltage on C1863 is coupled through Q1750 and Q1752 to Q1748, and provides sync tip dc restoration.

When Q1758 is turned on, its collector current charges C1860. Capacitor C1860 is continuously discharged by R1642. Charge on C1860 equals its discharge when Q1758 is switching at back porch level. The voltage on C1860 determines the emitter impedance of Q1653 which controls the gain of Q1555. Thus, the gain adjusts until the back porch level of the composite video signal equals the base voltage of Q1758.

Vertical Sync Recognition

The serrated vertical sync pulse is integrated by Q1950. The peak of the integrated waveform turns on Q1838, providing one pulse per field to the vertical counter.

Vertical Counter and Delay

Two signals are applied to the vertical counter to generate the timing signals for the vertical sweep. One is the vertical sync recognition pulse applied from Q1838 collector to an AND gate U1910A. The other is the 31 kHz signal applied from the collector of Q1601 to pin 14 of U1820. The vertical sync recognition pulse allows the vertical counter to be clocked by the 31 kHz signal. This clocking ensures proper interlace and jitter-free delay. The vertical counter provides a vertical drive signal from pin 8 of U1910 to the vertical deflection circuits.

Vertical delay is controlled by a front-panel switch, S7520. If the switch is set to either pulse cross or vertical delay, the counter delays the vertical drive signal for one-half field.

31 kHz Lockout, Truncated Ramp, and Sample & Hold

Composite sync drives Q1729 and Q1741, a Bowes oscillator that runs at 15 kHz and is triggered by the negative-going edge of the sync pulse. The half-cycle transition occurs just before the 50% point in time.

Q1743 stops the oscillator 4.5 μs before the next sync pulse. Q1743 then allows a sync pulse to pass Q1744, triggering the Bowes oscillator through CR1821. When the oscillator starts, Q1742 turns off, allowing a sample of the truncated ramp to be taken by Q1631. This prevents false samples from being taken when a sync pulse is missing. The action of Q1743 and Q1744 keeps the vertical interval 2H rate sync pulses and many noise pulses from triggering the oscillator.

The current at the output of the oscillator is converted to an up-down truncated ramp at the collector of Q1740. The width of the ramp transition is 4 μs.

The voltage on the ramp is sampled by a pulse derived from blanking. This sample is driven by U1710D and Q1520 delaying circuitry. A 0.5 μs sample, generated by Q1639 turns on Q1631 in the middle of the negative-going ramp, and the voltage at that point is transferred to C1534. Any difference in time between the incoming sync and blanking will change the voltage on C1534, and the sample pulse moves up or down the ramp. The voltage on C1534 is applied to Q1530 and Q1525, a voltage follower.

Error Amplifier and 2H Rate VCO

The output of the voltage follower is applied to the error amplifier whose bandwidth is determined by its feedback capacitors C1420 and C1519 and input resistors R1432 and R1434. Resistor R1434 can be shorted by Q1442 to provide wide bandwidth for fast afc operation.

The output of the error amplifier controls the frequency of the 2H rate vco, Q1511 and Q1502, by affecting the voltage swing at the collector of Q1511. The main frequency-determining components of the vco are C1505 and R1410. The 31 kHz signal at the collector of Q1502 drives the blanking signal via the phase correction and horizontal drive circuitry. If the blanking signal is incorrrectly timed to incoming sync, an error signal is generated to correct the phase of the vco and provide correct timing.

Phase Correction

This circuit corrects for drive-dependent delay in the horizontal deflection circuitry so that the picture is straight vertically.

U1710A and B are connected as an RS flip-flop. The trailing edge of the horizontal blanking pulse sets the output positive. The negative-going edge of the vco output resets the output to negative. U1710A gates an up-down integrator whose output is the collector of Q1619. The average level of this signal is converted to a current by the resistors in a 1 kHz filter; C1602 charge time is governed by this current. When the output of the vco goes negative, Q1609 turns off and remains off until C1602 recharges and turns on Q1609. When Q1609 turns on again, the transition is applied through Q1601 to pin 3 of U1810, the horizontal drive divide-by-two flip-flop.

The phase correction circuit has now measured the timing difference between the trailing edge of the horizontal blanking pulse and the negative-going edge of the vco output, regulating the difference to 10 μs. Thus, the stability of the vco is transferred to the blanking pulse.

Lockup Detector & Fast/Slow AFC Switch

The afc circuit has a fast and slow mode of operation. In the fast mode the circuit has wide pull-in range and quickly locks. It then automatically switches to the slow mode. The slow mode of operation readily shows sync timing errors in the 60 Hz to 240 Hz frequency range; for example, an incorrectly running video tape recorder. Jumper P1470 can be used to keep the circuit in the fast mode to correct for most sync timing errors and stabilize the picture.

During lockup, Q1539 randomly samples the truncated ramp. Its average output is a positive voltage which is filtered by R1446 and C1452. This voltage is applied to U1456, driving the output of U1456 negative and turning on Q1442. Transistor Q1442 shorts R1434; thus, switching the afc into the fast mode.

After lockup has been achieved, Q1539 samples only the most negative portion of the truncated ramp because of the one-fourth line delay provided by Q1542. The averaged signal applied to U1456 is only a few tenths of a volt positive, but it is more negative than the voltage at pin 3 of U1456. As a result, the output of U1456 switches positive and turns off Q1442. This makes R1434 the input resistor to the error amplifier, thus switching the afc loop to the slow mode.

Since the output of Q1539 can never reach 0 V, the afc circuit can be kept in the fast mode by grounding pin 3 of U1456. Jumper P1470 is provided for this purpose.

Sample Pulse Delay and Horizontal Delay Control

When decoder boards are used, the filters add delay to the video information. The sync and timing signals must then be changed proportionally about 700 ns. Q1520 delays the sampling pulse generator Q1639 while Q1422 and Q1519 provide the proper timing to the blanking and sync signals.

When the delay in the video circuitry of the instrument is changed, due to the 700 ns more delay when using a decoder than when using RGB inputs, the horizontal timing must also be changed to keep the picture framed. To remove the delay when using RGB inputs, P1950-2 is grounded, causing a change in voltage to appear at the emitter of Q1519.

To display the horizontal interval, SCAN switch S7520 located on the front panel, turns off U1710D and U1720B which turns on U1710C. This phase locks the Bowes oscillator transition, instead of kinescope blanking, to the incoming sync.

DEFLECTION CIRCUITS
(Diagrams 13 and 14)

Purpose

Deflect the electron beam and provide correction signals to compensate for deflection distortion.

Vertical Ramp Generator

The gating circuit, Q4596 and Q4686, is driven by the gate signal from the vertical counter (diagram 11). The vertical ramp generator, Q4476 and U4460, provides a positive-going sawtooth waveform which is approximately 10 V in amplitude. The peak ramp voltage is controlled by the 50/60 Hz switcher, Q4358, Q4456, Q4450, and Q4442. Q4442 is a programmable unijunction transistor, a four layer switch, triggered by negatively biasing the anode gate in respect to the anode. It is commonly referred to as the "PUT".

The 10 V ramp is applied to the anode of Q4442. The anode gate remains positive with respect to the anode, and the "PUT" does not conduct during 60 Hz operation. Q4456 is on and turns on Q4358. Transistor Q4358 supplies current to limit the ramp to 10 V. Q4532 is on and the 50 Hz correction circuits are disabled.

If the vertical gate from the vertical counter switches to 50 Hz operation, the ramp at U4460 will rise beyond 11 V. The increased ramp voltage appears on the anode of Q4442. Q4442 now conducts and saturates, lowering the anode gate of Q4442 to 9 V. Q4456 and Q4358 turn off and the ramp returns to 10 V. The anode gate of Q4442 is now at 9 V and Q4442 will continue to turn on at the 90% point on the ramp. This keeps the switcher from returning to 60 Hz operation.

During 50 Hz operation, CR4452 and Q4532 are off, allowing the 50 Hz correction circuits to operate. Q4374, in the S integrator circuit, is on, and the signal to U4568 is attenuated. When the vertical gate is not present, Q4494 generates a gate to maintain a ramp. Vertical sawtooth signal path is through the blanking board. The waveforms at P4245-2 and P4245-4 are identical except for dc level.

Vertical Parabola Generator

The vertical parabola generator consists of Q4578, U4462, Q4576, Q4574, U4566, and associated circuitry. During the active part of the ramp, Q4576 is on; Q4574 and Q4578 are off, and the ramp is integrated by C4562. During vertical retrace, the charge on C4562 is coupled through Q4578 to C4466. Q4578 and Q4574 are on; Q4576 is off. A dc voltage is present in the output of U4462, causing the output of U4566 to return to zero, forming the parabola waveform.

Vert S Generator

The output of the vertical parabola generator is integrated by the S generator circuit to provide the S correction to the vertical scan signal. The integrator action of the S generator is identical to the parabola generator, described earlier.

Vert Ramp Atten

Vertical-rate sawtooth current ramps of different amplitudes are required for the different scan sizes. Q4532, Q4518, Q4522, Q4530, Q4548, Q4420, and Q4508 provide the different attenuated ramp waveforms required.

Horiz Underscan

Operation in underscan is accomplished primarily through switching and current sinking. When the SIZE switch is set to the underscan position, Q4560 and Q4608 turn off, canceling the vertical parabola current through R4662. When Q4608 turns off, a voltage change occurs in the horizontal deflection circuit to reduce horizontal scan. Q4608 also inhibits the vertical expand circuit.

In SET UP Q4420 and Q4508 are turned on, and the vertical scan is reduced. Enough vertical sawtooth is present in the vertical sense signal to keep the high voltage from being disabled while operating in SET UP. The signal through CR4251 inhibits the vertical waveshaping circuits in SET UP.

Scan Failure Protection

The scan failure protection circuit, U4883 and Q4871, protects the kinescope from damage due to deflection circuit failure. The vertical-rate ramp from the yoke return is applied to U4883 + input. The squarewave output of U4883 (at the vertical rate) charges C4873 to approximately +10 V, keeping Q4871 off. CR4887 rectifies the horizontal parabola signal, preventing CR4895 from conducting and forcing the output of U4883 negative. If either scan signal is missing, the output of U4883 goes negative, Q4871 is no longer held off, and the horizontal blanking signal that drives the high-voltage oscillator is inhibited.

Horiz Linearity Ramp

The horizontal-rate ramp generator, Q4422, Q4352, and Q4338, driven by the horizontal blanking pulse from Q6381, produces the horizontal linearity ramp. The vertical-rate parabola from U4566 is applied to the horizontal-rate ramp generator to provide additional side pin cushion correction at the center of vertical deflection. The linearity ramp is limited during underscan by an attenuating signal from Q4608.

The ramp drives a non-inverting operational amplifier, Q4759, Q4790, Q4755, and Q4750. The output of the operational amplifier drives T4266, supplying a sawtooth voltage in series with the horizontal yoke. The linearity ramp expands the scan at the right side of the screen and compresses it at the left side to compensate for the resistive losses in the yoke.

Horiz Parabola and S Correction

The horizontal-rate sawtooth signal in the yoke is integrated by the S correction capacitors, C4236 and C4248, providing a parabola waveform in series with the yoke. The parabola signal causes the sawtooth ramp in the yoke to have a slight S shape. The S correction signal expands the scan at the center of the screen, while compressing the ends, to compensate for geometric distortion of the scan.

Horiz Convergence

The parabola waveform from the horizontal S capacitors is applied to Q4208 as a differentiated ramp. The polarity and amplitude of the ramp are determined by the HORIZ TILT control. The ramp is added to the parabola signal from the HORIZ PARABOLA control. The resultant signal is coupled through Q4863 and Q4861 to the convergence transformer, T8708/T8704, on diagram 17.

Top and Bottom Pin Cushion

The horizontal-rate parabola is modulated by the vertical sawtooth. A balanced modulator, Q4981, CR4883, CR4885, CR4983, and CR4981, is used to obtain the pin-cushion correction waveform. The pin-cushion effect is greatest at the top and bottom of the screen. The pin-cushion correction waveform, applied to the vertical yoke through T4810, bows the scan lines up at the top of the screen. Bowing of the scanning lines reduces, then inverts at mid screen. Maximum bowing down of the scanning lines is at the bottom of the screen.

Neck Twist

The neck-twist coil, L8707, is provided for vertical static convergence. The dc convergence current is controlled by the VERT STATIC control.

Horiz Output

The horizontal output circuit is driven by Q4000, Q4050, and Q4090. Q4090 is on and serves as a damper during the first half-cycle, saturates during the second half-cycle, and is off during flyback time.

U4190, Q4160, and Q4770 are the width control regulator, powering the horizontal output. A correction voltage from the 50/60 Hz switcher is applied to U4190 during 50 Hz operation.

Horiz Centering

The secondary circuit of the flyback transformer, T4060, consisting of CR4163, CR4147, U4150, Q4120, Q4130, and Q4140, comprise an isolated power supply and regulator for the horizontal centering current. Horizontal centering current flows in the secondary of the horizontal linearity transformer T4266, purity improvement coil L8705, horizontal yoke L8703, the primary of the flyback transformer, and back through the sampling resistor R4175.

Vertical Output Amplifiers

The S waveform, vertical parabola, centering current, and vertical-rate sawtooth are applied to an operational amplifier, U4380. A 1 Ω resistor samples the vertical deflection yoke current, setting a feedback current at the + input of U4380. The output of U4380 is the base current for Q4286 which drives one side of the vertical output amplifier.

The vertical output amplifier, Q4723, Q4725, Q4730, Q4720, and Q4729, is an operational amplifier. Q4720 and Q4730 operate on different halves of the deflection waveform, with both conducting partially when the beam is at mid screen. During vertical retrace, Q4841 conducts and the collector supply for Q4720 changes to 100 V, allowing rapid retrace.

BLANKING CIRCUITS (Diagram 15)

Purpose

Provide normal blanking signal and expanded vertical scan.

Provide screen voltage and over-current protection for the kinescope anode supply.

Blanking

The flyback pulse from the horizontal deflection circuit drives Q6175. The collector signal of Q6175 drives the high-voltage supply and the pulse timing for the output amplifier. The emitter signal is used to drive horizontal afc, horizontal ramp generator, and Q6137, the kinescope control-grid driver.

P6187-5 is the drive to the high-voltage supply. If scan failure occurs, the scan-failure output transistor Q4871 (on diagram 13) conducts and effectively shorts out the high-voltage supply drive through P6187-7. The lack of drive shuts down the high voltage supply and provides protection against damage to the kinescope.

The junction of CR6157 and CR6135 is the summing point for the horizontal and vertical blanking signals, providing composite blanking to the base of Q6137.

Screen Voltage Regulator

A feedback amplifier, Q6241 and Q6279, regulates screen voltage. The screen voltage is adjusted for centered kinescope cathode-bias controls and a displayed black level.

When anode current exceeds 1 mA, CR6277 and CR6263 turn on, the screen voltage is pulled down, and Q6289 turns on lighting the front panel OVERLOAD indicator. This circuit protects the high-voltage power supply from high power-dissipation damage.

Vertical Expand

The input U6101 is the vertical-rate sawtooth. In normal scan, Q6011 is off and the gain of U6101 is on. In vertical delay, with normal picture size, Q6011 is turned on, the gain of U6101 increases, and the monitor operates in the expanded mode. The collector of Q6061 goes high, and the normal-scan waveshaping circuits are inhibited during expanded operation. Q6065 ensures that the vertical scan is expanded from the center of the screen during 50 Hz operation.

Vertical blanking during expanded vertical scan is provided by Q6141 and Q6145. The kinescope is blanked when the signal is off the screen to minimize flare.

U6101 also drives an operational amplifier, U6067. U6067 and C6097 are an integrator, integrating the vertical sawtooth waveform to provide the expanded scan parabola for side pin-cushion correction.

LV POWER SUPPLY
(Diagram 16)

Purpose

To provide the regulated low-voltage power required to operate the instrument.

−15 Volt Supply

The −15 volt supply is the reference supply for all the other power supplies. The −15 V supply attains its low impedance, stability and accuracy from a monolithic precision-voltage regulator, U8260. This device consists of a temperature-compensated reference amplifier, error amplifier, output driver, and a current limiter.

The −15 V Adj control, R8170, adjusts the −15 V supply. This control sets the voltage on pin 4, which is the inverting input of U8260. This voltage is compared with the voltage on pin 5, which is the non-inverting input. The reference voltage from pin 6 is supplied to pin 5 through R8160. The output from pin 11 drives Q8280. Q8280 drives the series-regulator transistor, Q8410.

Current limit is achieved by applying the voltage developed across R8270 to pin 2 (current limit) and pin 3 (current sense) of U8260. When the voltage from pin 3 to pin 2 increases to 0.6 volt, the −15 V supply goes into current limit.

R8260 and C8260, connected from pin 11 to pin 13 of U8260, compensate the high-frequency gain of the −15 V supply.

+5 Volt Supply

The +5 V supply is the V_{cc} for the IC's used in the instrument and the horizontal sweep. This supply is fused by F8290 and given additional protection by a zener diode, VR8170, connected to ground.

+15 Volt Supply

The +15 V supply utilizes a 5-transistor array type of IC, U8240, for use as a voltage-error amplifier and series-regulator transistor driver.

In U8240 (see Fig. 8-1), Q1 and Q2 comprise the voltage comparator; Q3 and Q4 are emitter followers; Q5 is not used. Q2 receives an error signal from the precision voltage-divider, R8230 and R8232. Q2 compares this signal to the voltage set on the base of Q1 which is set by Q3. Q3 is referenced to ground. Q1 drives Q8350 which, in turn, drives the series-regulator transistor, Q8430.

Transistor Q8250 is the current-limit amplifier. As current flows through R8152, a voltage is applied to the base of Q8250. When Q8250 conducts, a portion of the drive current from Q8350 flows through Q8250, thus turning off the +15 V supply.

+100 Volt Supply

The +100 V supply is primarily used by the deflection and high-voltage circuits. Comparator Q8210 amplifies the error voltage developed by the precision voltage-divider, R8300 and R8302. Q8210 drives the base of Q8220 which drives the base of Q8000. Q8000 drives the series-regular transistor, Q8440.

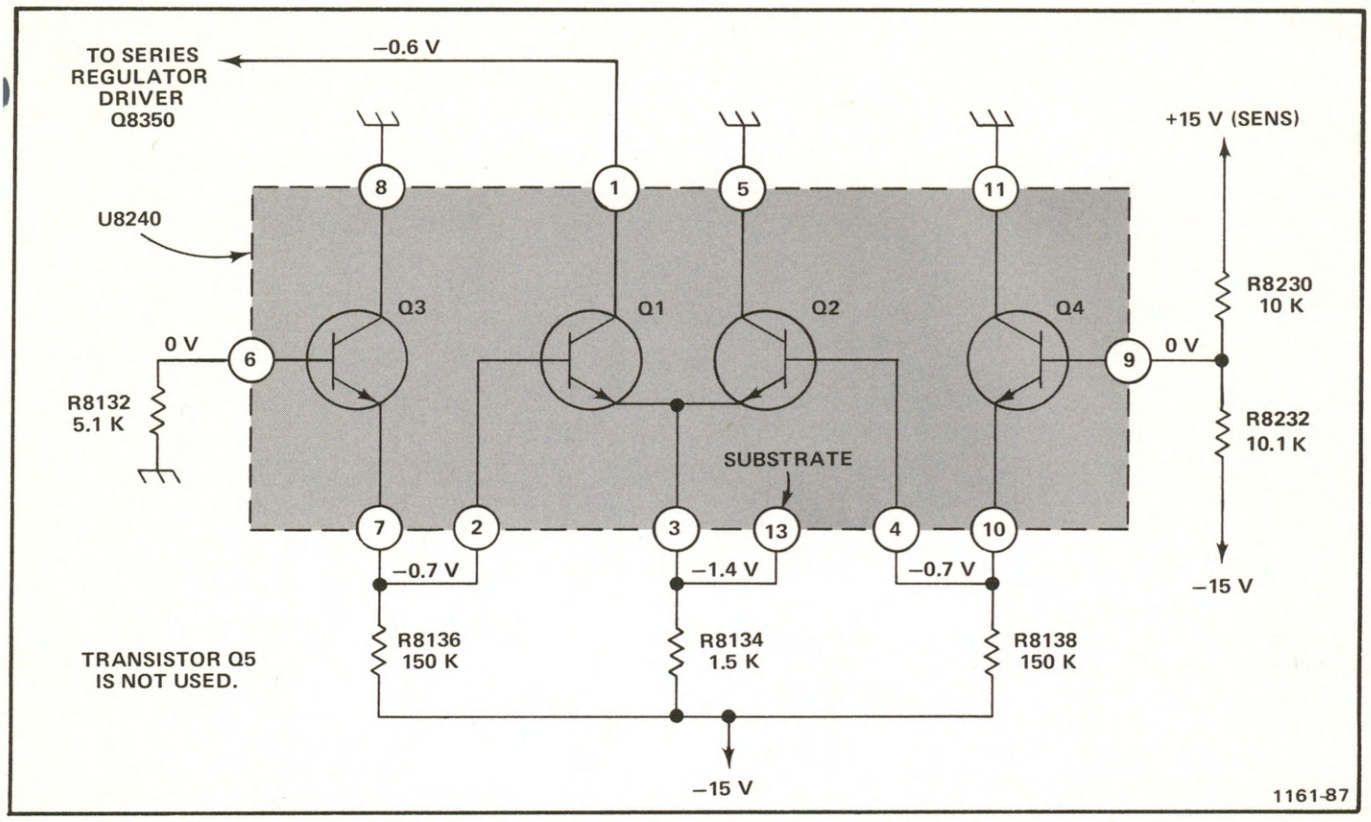


Fig. 8-1. Circuitry of U8240 used in the +15 V supply.

The +100 V supply is designed to current-foldback when excessive current is drawn. Current-foldback limiting protects the series-regular transistor from second break-down and over-dissipation. The current-foldback error voltage is developed across R8010. When the voltage across R8010 increases to about 0.7 volt, Q8210 conducts and a portion of Q8210 emitter current flows through Q8120. As a result, drive current from Q8220 is removed and the +100 V supply starts to shut down.

When the +100 V supply approaches zero, the current through R8102 that was supplied by R8104 is reduced to zero. Thus, no voltage is developed across R8102. The voltage, that appears across R8010 to keep Q8120 on, is the difference between the voltage across CR8100 and the base-emitter drop of Q8120. The difference voltage is 0.2 volt or about 0.2 A through R8010.

Over-voltage protection is required to prevent the high-voltage supply from soaring. If the +100 V supply attempts to go above +110 volts, VR8300 conducts. VR8300 supplies gate-current to SCR Q8310, thus shorting the +100 V supply to ground. As a result, the +100 V supply will go into current-foldback and remain in this condition until the line voltage is removed to turn off SCR Q8310. Should the series-regulator transistor become shorted, or the current foldback not operate, fuse F8320 will blow and fuse indicator DS8330 will light.

Degauss

A degaussing coil, L7501, is used to demagnetize the metal parts of the kinescope and is driven from the +100 V supply secondary winding of T8395 when the DEGAUSS switch S7501 is actuated. Degaussing current decreases to zero as the thermistor, RT8395, heats.

Tally Light

The 650A-Series Monitors are equipped with externally powered tally lights, DS7302 and DS7402, that require 24 volts to operate.

HIGH VOLTAGE AND EHT SUPPLIES (Diagram 17)

Purpose

Provide the anode and convergence voltages to the kinescope.

High Voltage and EHT Supplies

The high-voltage supply is basically a pulse amplitude modulated (PAM) supply. Horizontal-rate pulses from the flyback transformer, rectified by CR4040 (P4040-2 on diagram 14), are shaped by Q6175 (P6187-8 and P6187-5) on diagram 15 and applied to Q8670. Q8670 clamps C8662 to ground at the horizontal rate. The amount of drive to Q8680 depends on how far positive U8660 allows this point to move.

U8660 is connected with its non-inverting input referenced to ground and the inverting input receiving the error signal. The error signal is developed across a thick-film resistor, R8721, referenced to −15 V. If the voltage at the junction of R8721A and R8724 of the thick-film resistor tries to go more positive, the positive-error signal causes the output of U8660 to go negative and reduces the drive to Q8680.

Q8680, a darlington-connected amplifier, drives Q8602. The primary of T8620 is resonated near the horizontal rate by C8600, causing the collector signal of Q8602 to be a horizontal-rate sine wave, whose amplitude is controlled by the horizontal drive signal.

T8620 has two secondaries. One supplies an unregulated +500 V for focus and the screen regulator circuit on the blanking diagram (15). The other develops about 5 kV to drive the EHT 8X multiplier, providing the 19 kV dc for the kinescope.

Convergence voltage is developed by a peak-to-peak detector CR8711, CR8712, C8722, and C8723 with variable-amplitude horizontal-rate pulses coupled to it by R8719, C8718, C8717, C8715, and C8714. The horizontal-rate pulses are clipped sine waves from the 500 V secondary of T8620, that are amplitude-controlled by Q8650.

DS8766 is the EHT presence indicator.

Certain failures in the high-voltage supply can cause the kinescope anode supply to increase and become unregulated. Indications of this possiblity are inadequate horizontal size or a change in the horizontal static convergence range. Caution should be used when measuring the anode supply to prevent electrical shock to yourself and prevent accidental circuit failures.

FRONT PANEL CONTROLS (Diagram 18)

Purpose

To provide a convenient grouping of the switches and controls that are most frequently used.

Left Front Panel

The controls and switches located on the left front panel are primarily calibration adjustments. These controls are protected from accidental misadjustment by a lockable door. Controls located here are the GAIN and BIAS adjustments for the three color cathodes, along with the switches to operate each cathode independently.

The OPERATE-SET UP switch in SET UP compresses the vertical scan to permit adjustment of the color cathodes. The VERT SIZE, VERT CENTERING, HORIZ SIZE, HORIZ CENTERING, and CONVERGENCE controls are also located on the left front panel.

Right Front Panel

The controls located on the right front panel are the ones used most frequently in everyday operation. This grouping usually includes POWER, DEGAUSS, INPUT, SYNC, MODE, SCAN, STANDARD, NTSC TEST, and BLUE ONLY switches, along with BRIGHTNESS, CONTRAST, APERTURE, CHROMA, and HUE controls. The make up of the right front panel is dependent on the Decoder board and the RGB board (if installed) incorporated in the monitor.

Two indicator lamps, DS7561 and DS7661, are located on the right front panel. DS7661 is the OVERLOAD lamp which lights whenever the kinescope overdrive protection circuit is in operation. DS7561 is the UNCAL light which turns on whenever the BRIGHTNESS, CONTRAST, CHROMA, HUE, or a combination of these controls are out of the PRESET position. The UNCAL light also illuminates whenever the NTSC TEST (with STANDARD switch, if present, set to NTSC) or BLUE ONLY pushbutton is pressed in.

BRIGHTNESS, CONTRAST, APERTURE, and CHROMA controls have preset adjustments. These are located on the circuit board behind the right front panel. The HUE control also has a preset adjustment; this adjustment is present in monitors having a NTSC decoder.

REPLACEABLE ELECTRICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. 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.

SPECIAL NOTES AND SYMBOLS

X000	Part first added at this serial number
00X	Part removed after this serial number

ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

ABBREVIATIONS

ACTR	ACTUATOR	PLSTC	PLASTIC
ASSY	ASSEMBLY	QTZ	QUARTZ
CAP	CAPACITOR	RECP	RECEPTACLE
CER	CERAMIC	RES	RESISTOR
CKT	CIRCUIT	RF	RADIO FREQUENCY
COMP	COMPOSITION	SEL	SELECTED
CONN	CONNECTOR	SEMICOND	SEMICONDUCTOR
ELCTLT	ELECTROLYTIC	SENS	SENSITIVE
ELEC	ELECTRICAL	VAR	VARIABLE
INCAND	INCANDESCENT	WW	WIREWOUND
LED	LIGHT EMITTING DIODE	XFMR	TRANSFORMER
NONWIR	NON WIREWOUND	XTAL	CRYSTAL

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
00853	SANGAMO ELECTRIC CO., S. CAROLINA DIV.	P O BOX 128	PICKENS, SC 29671
01002	GENERAL ELECTRIC COMPANY, INDUSTRIAL AND POWER CAPACITOR PRODUCTS DEPARTMENT	JOHN STREET	HUDSON FALLS, NY 12839
01121	ALLEN-BRADLEY COMPANY	1201 2ND STREET SOUTH	MILWAUKEE, WI 53204
01295	TEXAS INSTRUMENTS, INC., SEMICONDUCTOR GROUP	P O BOX 5012, 13500 N CENTRAL EXPRESSWAY	DALLAS, TX 75222
01686	RCL ELECTRONICS, INC.	195 MC GREGOR STREET	MANCHESTER, NH 03102
02735	RCA CORPORATION, SOLID STATE DIVISION	ROUTE 202	SOMERVILLE, NY 08876
03508	GENERAL ELECTRIC COMPANY, SEMI-CONDUCTOR PRODUCTS DEPARTMENT	ELECTRONICS PARK	SYRACUSE, NY 13201
04222	AVX CERAMICS, DIVISION OF AVX CORP.	P O BOX 867, 19TH AVE. SOUTH	MYRTLE BEACH, SC 29577
04713	MOTOROLA, INC., SEMICONDUCTOR PROD. DIV.	5005 E MCDOWELL RD,PO BOX 20923	PHOENIX, AZ 85036
05397	UNION CARBIDE CORPORATION, MATERIALS SYSTEMS DIVISION	11901 MADISON AVENUE	CLEVELAND, OH 44101
07263	FAIRCHILD SEMICONDUCTOR, A DIV. OF FAIRCHILD CAMERA AND INSTRUMENT CORP.	464 ELLIS STREET	MOUNTAIN VIEW, CA 94042
08806	GENERAL ELECTRIC CO., MINIATURE LAMP PRODUCTS DEPARTMENT	NELA PARK	CLEVELAND, OH 44112
09023	CORNELL-DUBILIER ELECTRONIC DIVISION FEDERAL PACIFIC ELECTRIC CO.	2652 DALRYMPLE ST.	SANFORD, NC 27330
09353	C AND K COMPONENTS, INC.	103 MORSE STREET	WATERTOWN, MA 02172
12954	SIEMENS CORPORATION, COMPONENTS GROUP	8700 E THOMAS RD, P O BOX 1390	SCOTTSDALE, AZ 85252
14193	CAL-R, INC.	1601 OLYMPIC BLVD.	SANTA MONICA, CA 90404
14433	ITT SEMICONDUCTORS	3301 ELECTRONICS WAY P O BOX 3049	WEST PALM BEACH, FL 33402
14752	ELECTRO CUBE INC.	1710 S. DEL MAR AVE.	SAN GABRIEL, CA 91776
15238	ITT SEMICONDUCTORS, A DIVISION OF INTER NATIONAL TELEPHONE AND TELEGRAPH CORP.	P.O. BOX 168, 500 BROADWAY	LAWRENCE, MA 01841
18324	SIGNETICS CORP.	811 E. ARQUES	SUNNYVALE, CA 94086
22229	SOLITRON DEVICES, INC., SEMICONDUCTOR GROUP	8808 BALBOA AVENUE	SAN DIEGO OPERS, CA 92123
24546	CORNING GLASS WORKS, ELECTRONIC COMPONENTS DIVISION	550 HIGH STREET	BRADFORD, PA 16701
25403	AMPEREX ELECTRONIC CORP., SEMICONDUCTOR AND MICROCIRCUITS DIV.	PROVIDENCE PIKE	SLATERSVILLE, RI 02876
27014	NATIONAL SEMICONDUCTOR CORP.	2900 SEMICONDUCTOR DR.	SANTA CLARA, CA 95051
27193	CUTLER-HAMMER, INC. SPECIALTY PRODUCTS DIVISION	4201 N. 27TH ST.	MILWAUKEE, WI 53216
32159	WEST-CAP ARIZONA	2201 E. ELVIRA ROAD	TUCSON, AZ 85706
32997	BOURNS, INC., TRIMPOT PRODUCTS DIV.	1200 COLUMBIA AVE.	RIVERSIDE, CA 92507
50157	MIDWEST COMPONENTS INC.	P. O. BOX 787 1981 PORT CITY BLVD.	MUSKEGON, MI 49443
52306	HIGH VOLTAGE DEVICES, INC.	7485 AVENUE 304	VISALIA, CA 93277
55292	LEDCO DIV., WILBRECHT ELECTRONICS, INC.	240 EAST PLATO BLVD.	ST. PAUL, MN 55107
55680	NICHICON/AMERICA/CORP.	6435 N PROESEL AVENUE	CHICAGO, IL 60645
56289	SPRAGUE ELECTRIC CO.	87 MARSHALL ST.	NORTH ADAMS, MA 01247
59660	TUSONIX INC.	2155 N FORBES BLVD	TUCSON, AZ 85705
71400	BUSSMAN MFG., DIVISION OF MCGRAW-EDISON CO.	2536 W. UNIVERSITY ST.	ST. LOUIS, MO 63107
72982	ERIE TECHNOLOGICAL PRODUCTS, INC.	644 W. 12TH ST.	ERIE, PA 16512
73138	BECKMAN INSTRUMENTS, INC., HELIPOT DIV.	2500 HARBOR BLVD.	FULLERTON, CA 92634
74276	SIGNALITE DIV., GENERAL INSTRUMENT CORP.	1933 HECK AVE.	NEPTUNE, NJ 07753
74970	JOHNSON, E. F., CO.	299 10TH AVE. S. W.	WASECA, MN 56093
75042	TRW ELECTRONIC COMPONENTS, IRC FIXED RESISTORS, PHILADELPHIA DIVISION	401 N. BROAD ST.	PHILADELPHIA, PA 19108
75378	CTS KNIGHTS, INC.	400 REIMANN AVE.	SANDWICH, IL 60548
76493	BELL INDUSTRIES, INC., MILLER, J. W., DIV.	19070 REYES AVE., P O BOX 5825	COMPTON, CA 90224
80009	TEKTRONIX, INC.	P O BOX 500	BEAVERTON, OR 97077
82389	SWITCHCRAFT, INC.	5555 N. ELSTON AVE.	CHICAGO, IL 60630
84411	TRW ELECTRONIC COMPONENTS, TRW CAPACITORS	112 W. FIRST ST.	OGALLALA, NE 69153
90201	MALLORY CAPACITOR CO., DIV. OF P. R. MALLORY AND CO., INC.	3029 E. WASHINGTON STREET P. O. BOX 372	INDIANAPOLIS, IN 46206
91418	RADIO MATERIALS COMPANY, DIV. OF P.R. MALLORY AND COMPANY, INC.	4242 W BRYN MAWR	CHICAGO, IL 60646
91637	DALE ELECTRONICS, INC.	P. O. BOX 609	COLUMBUS, NE 68601
95348	GORDOS CORPORATION	250 GLENWOOD AVENUE	BLOOMFIELD, NJ 07003

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A1	670-1740-00			CKT BOARD ASSY:LOOP THRU	80009	670-1740-00
A2	670-1597-03			CKT BOARD ASSY:VIDEO INPUT	80009	670-1597-03
A3	670-1724-02			CKT BOARD ASSY:RGB INPUT	80009	670-1724-02
	----- -----			(A3, 650HR-1, 651HR-1, 655HR-1 ONLY)		
A4-1	670-2611-07			CKT BOARD ASSY:NTSC DECODER	80009	670-2611-07
	----- -----			(A4-1, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
A4-2	670-3166-10			CKT BOARD ASSY:PAL DECODER	80009	670-3166-10
	----- -----			(A4-2, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
A5	670-1602-02	B010100	B020749	CKT BOARD ASSY:OUTPUT AMP	80009	670-1602-02
A5	670-1602-03	B020750	B039999	CKT BOARD ASSY:OUTPUT AMP	80009	670-1602-03
A5	670-1602-04	B040000		CKT BOARD ASSY:OUTPUT AMP	80009	670-1602-04
A6	670-1598-05			CKT BOARD ASSY:SYNC & TIMING	80009	670-1598-05
A7	670-1849-03			CKT BOARD ASSY:PIN CUSHION	80009	670-1849-03
A8	670-1600-04			CKT BOARD ASSY:DEFLECTION		OBD
A9	670-1850-02			CKT BOARD ASSY:DEFLECTION HEAT SINK	80009	670-1850-02
A10	670-1601-03			CKT BOARD ASSY:HORIZONTAL OUTPUT	80009	670-1601-03
A11	670-1603-03			CKT BOARD ASSY:BLANKING	80009	670-1603-03
A11A1	670-6588-00	XB030000		CKT BOARD ASSY:BLANKING CORRECTION	80009	670-6588-00
A12	670-1606-04			CKT BOARD ASSY:LV & HV POWER	80009	670-1606-04
A13	119-0320-04	B010100	B033109	POWER SUPPLY:	80009	119-0320-04
A13	119-0320-06	B033110	B042757	POWER SUPPLY:	80009	119-0320-06
A13	119-0320-07	B042758		POWER SUPPLY:	80009	119-0320-07
A14	670-1608-01			CKT BOARD ASSY:CRT SOCKET	80009	670-1608-01
A15	614-0111-00			SUBPANEL ASSY:FRONT,LEFT	80009	614-0111-00
A16	614-0579-00			FRONT PNL ASSY:650HR	80009	614-0579-00
A16	614-0582-00			FRONT PNL ASSY:651HR	80009	614-0582-00
A16	614-0583-00			FRONT PNL ASSY:655HR	80009	614-0583-00
A16	614-0588-00			FRONT PNL ASSY:650HR-1	80009	614-0588-00
A16	614-0591-00			FRONT PNL ASSY:651HR-1	80009	614-0591-00
A16	614-0586-00			FRONT PNL ASSY:655HR-1	80009	614-0586-00
A17	670-5032-01			CKT BOARD ASSY:SINGLE APERATURE	80009	670-5032-01
	----- -----			(A17, 650HR, 650HR-1, 651HR, 651HR-1 ONLY)		
A18	670-4964-04			CKT BOARD ASSY:APERTURE CORRECTION	80009	670-4964-04
	----- -----			(A18, 655HR, 655HR-1 ONLY)		
C102	281-0508-00			CAP.,FXD,CER DI:12PF,+/-0.6PF,500V	59660	301-000C0G0120J
C103	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-519-Z5U-102P
C151	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M
C153	283-0647-00			CAP.,FXD,MICA D:70PF,1%,100V	00853	D151E700F0
C154	283-0788-00			CAP.,FXD,MICA D:267PF,1%,500V	09023	CD15F0(267)F03
C160	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M
C162	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M
C174	281-0547-00			CAP.,FXD,CER DI:2.7PF,10%,500V	04222	7001-1321
C175	283-0644-00			CAP.,FXD,MICA D:150PF,1%,500V	00853	D155E151F0
C180	283-0788-00			CAP.,FXD,MICA D:267PF,1%,500V	09023	CD15F0(267)F03
C186	283-0647-00			CAP.,FXD,MICA D:70PF,1%,100V	00853	D151E700F0
	----- -----			(C186, 650HR, 650HR-1, 651HR, 651HR-1 ONLY)		
C186	283-0788-00			CAP.,FXD,MICA D:267PF,1%,500V	09023	CD15F0(267)F03
	----- -----			(C186, 655HR, 655HR-1 ONLY)		
C187	283-0615-00			CAP.,FXD,MICA D:33PF,5%,500V	00853	D155E330J0
	----- -----			(C187, 655HR, 655HR-1 ONLY)		
C188	281-0547-00			CAP.,FXD,CER DI:2.7PF,10%,500V	04222	7001-1321
	----- -----			(C188, 650HR, 650HR-1, 651HR, 651HR-1 ONLY)		
C188	283-0647-00			CAP.,FXD,MICA D:70PF,1%,100V	00853	D151E700F0
	----- -----			(C188, 655HR, 655HR-1 ONLY)		
C189	281-0547-00			CAP.,FXD,CER DI:2.7PF,10%,500V	04222	7001-1321
	----- -----			(C189, 655HR, 655HR-1 ONLY)		
C190	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M
C195	283-0615-00			CAP.,FXD,MICA D:33PF,5%,500V	00853	D155E330J0
	----- -----			(C195, 650HR, 650HR-1, 651HR, 651HR-1 ONLY)		

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
C196	283-0788-00			CAP.,FXD,MICA D:267PF,1%,500V	09023	CD15F0(267)F03
	----- -----			(C196, 650HR, 650HR-1, 651HR, 651HR-1 ONLY)		
C197	283-0644-00			CAP.,FXD,MICA D:150PF,1%,500V	00853	D155E151F0
C198	281-0547-00			CAP.,FXD,CER DI:2.7PF,10%,500V	04222	7001-1321
C1001	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
C1020	283-0593-00			CAP.,FXD,MICA D:0.01UF,1%,100V	00853	D301F103F0
C1021	283-0593-00			CAP.,FXD,MICA D:0.01UF,1%,100V	00853	D301F103F0
C1053	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C1061	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
C1101	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
C1103	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-518-Z5D0102J
C1111	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C1120	290-0164-00			CAP.,FXD,ELCTLT:1UF,+50-10%,150V	56289	500D105F150BA7
C1121	281-0513-00			CAP.,FXD,CER DI:27PF,+/-5.4PF,500V	59660	301-055P2G0270M
C1131	281-0153-00			CAP.,VAR,AIR DI:1.7-10PF,250V	74970	187-0106-005
C1141	281-0511-00			CAP.,FXD,CER DI:22PF,+/-2.2PF,500V	72982	301-000C0G0220K
C1181	281-0092-00			CAP.,VAR,CER DI:9-35PF,200V	72982	538-011 D9-35
C1183	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C1191	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-518-Z5D0102J
C1201	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C1211	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C1251	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C1261	281-0592-00			CAP.,FXD,CER DI:4.7PF,+/-0.5PF,500V	59660	301-023C0H0479D
C1270	281-0077-00			CAP.,VAR,AIR DI:1.3-5.4PF,800V	74970	189-0502-075
C1271	281-0782-00			CAP.,FXD,CER DI:33PF,10%,500V	59660	301-000N4700330K
C1281	281-0782-00			CAP.,FXD,CER DI:33PF,10%,500V	59660	301-000N4700330K
C1304	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
C1312	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M
C1313	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
C1322	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
C1323	290-0722-00			CAP.,FXD,ELCTLT:100UF,20%,10V	56289	196D107X0010PE3
C1324	290-0722-00			CAP.,FXD,ELCTLT:100UF,20%,10V	56289	196D107X0010PE3
C1325	283-0600-00			CAP.,FXD,MICA D:43PF,5%,500V	00853	D105E430J0
C1331	281-0168-00			CAP.,VAR,AIR DI:1.3-5.4PF,250V	74970	187-0103-035
C1340	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M
C1353	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
C1364	283-0600-00			CAP.,FXD,MICA D:43PF,5%,500V	00853	D105E430J0
C1371	290-0722-00			CAP.,FXD,ELCTLT:100UF,20%,10V	56289	196D107X0010PE3
C1372	290-0722-00			CAP.,FXD,ELCTLT:100UF,20%,10V	56289	196D107X0010PE3
C1375	281-0168-00			CAP.,VAR,AIR DI:1.3-5.4PF,250V	74970	187-0103-035
C1376	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M
C1383	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-518-Z5D0102J
C1385	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-518-Z5D0102J
C1391	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-518-Z5D0102J
C1407	290-0534-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	196D105X0035HA1
C1410	283-0198-00			CAP.,FXD,CER DI:0.22UF,20%,50V	72982	8121N083Z5U0224M
C1412	283-0198-00			CAP.,FXD,CER DI:0.22UF,20%,50V	72982	8121N083Z5U0224M
C1415	290-0770-00			CAP.,FXD,ELCTLT:100UF,+50-10%,25V	56289	502D230
C1420	290-0523-00			CAP.,FXD,ELCTLT:2.2UF,20%,20V	56289	196D225X0020HA1
C1438	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C1446	283-0116-00			CAP.,FXD,CER DI:820PF,5%,500V	72982	801-547B821J
C1452	290-0534-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	196D105X0035HA1
C1456	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M
C1460	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
C1470	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
C1472	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C1474	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C1480	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-519-Z5U-102P
C1482	290-0517-00			CAP.,FXD,ELCTLT:6.8UF,20%,35V	56289	196D685X0035KA1
C1490	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-519-Z5U-102P

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
C1505	283-0593-00			CAP.,FXD,MICA D:0.01UF,1%,100V	00853	D301F103F0
C1512	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-519-Z5U-102P
C1518	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
C1519	290-0523-00			CAP.,FXD,ELCTLT:2.2UF,20%,20V	56289	196D225X0020HA1
C1534	283-0594-00			CAP.,FXD,MICA D:0.001UF,1%,100V	00853	D151F102F0
C1535	283-0597-00			CAP.,FXD,MICA D:470PF,10%,300V	00853	D153E471K0
C1546	283-0084-00			CAP.,FXD,CER DI:270PF,5%,1000V	72982	838-533B271J
C1566	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
C1567	283-0080-00			CAP.,FXD,CER DI:0.022UF,+80-20%,25V	56289	19C611
C1570	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C1596	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
C1602	283-0594-00			CAP.,FXD,MICA D:0.001UF,1%,100V	00853	D151F102F0
C1613	283-0010-00			CAP.,FXD,CER DI:0.05UF,+100-20%,50V	56289	273C20
C1619	283-0104-00			CAP.,FXD,CER DI:2000PF,5%,500V	72982	811-565B202J
C1620	283-0620-00			CAP.,FXD,MICA D:470PF,1%,300V	00853	D153F471F0
C1652	290-0517-00			CAP.,FXD,ELCTLT:6.8UF,20%,35V	56289	196D685X0035KA1
C1653	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
C1656	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
C1657	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
C1660	281-0513-00			CAP.,FXD,CER DI:27PF,+/-5.4PF,500V	59660	301-055P2G0270M
C1664	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C1667	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C1669	281-0504-00			CAP.,FXD,CER DI:10PF,+/-1PF,500V	59660	301-055C0G0100F
C1691	283-0600-00			CAP.,FXD,MICA D:43PF,5%,500V	00853	D105E430J0
C1697	283-0059-00			CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N031Z5U0105Z
C1700	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
C1701	283-0087-00			CAP.,FXD,CER DI:300PF,10%,1000V	56289	403637
C1711	283-0103-00			CAP.,FXD,CER DI:180PF,5%,500V	59660	831-518-Z5D0181J
C1730	283-0593-00			CAP.,FXD,MICA D:0.01UF,1%,100V	00853	D301F103F0
C1738	283-0627-00			CAP.,FXD,MICA D:0.0033UF,5%,500V	00853	D195E332J0
C1739	290-0536-00			CAP.,FXD,ELCTLT:10UF,20%,25V	90201	TDC106M025FL
C1760	290-0529-00			CAP.,FXD,ELCTLT:47UF,20%,20V	05397	T368C476M020AZ
C1761	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C1763	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C1765	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C1792	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C1829	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-519-Z5U-102P
C1849	283-0032-00			CAP.,FXD,CER DI:470PF,5%,500V	72982	0831085Z5E00471J
C1860	290-0512-00			CAP.,FXD,ELCTLT:22UF,20%,15V	56289	196D226X0015KA1
C1861	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
C1863	283-0080-00			CAP.,FXD,CER DI:0.022UF,+80-20%,25V	56289	19C611
C1870	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C1917	283-0103-00			CAP.,FXD,CER DI:180PF,5%,500V	59660	831-518-Z5D0181J
C1918	283-0103-00			CAP.,FXD,CER DI:180PF,5%,500V	59660	831-518-Z5D0181J
C1939	285-0598-00			CAP.,FXD,PLSTC:0.01UF,5%,100V	01002	61F10AC103
C1950	283-0594-00			CAP.,FXD,MICA D:0.001UF,1%,100V	00853	D151F102F0
C1958	290-0534-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	196D105X0035HA1
C1968	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C1969	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
C1990	283-0600-00			CAP.,FXD,MICA D:43PF,5%,500V	00853	D105E430J0
C1992	283-0059-00			CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N031Z5U0105Z
C1998	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
C2003	283-0620-00			CAP.,FXD,MICA D:470PF,1%,300V	00853	D153F471F0
	----- -----			(C2003, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2005	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
	----- -----			(C2005, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2013	283-0615-00			CAP.,FXD,MICA D:33PF,5%,500V	00853	D155E330J0
	----- -----			(C2013, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2023	283-0178-00			CAP.,FXD,CER DI:0.1UF,+80-20%,100V	72982	8131N145651 104Z
	----- -----			(C2023, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		

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C2103	283-0028-00			CAP.,FXD,CER DI:0.0022UF,20%,50V	56289	19C606
	----- -----			(C2103, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2109	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-518-Z5D0102J
	----- -----			(C2109, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2113	283-0114-00			CAP.,FXD,CER DI:0.0015UF,5%,200V	72982	805-509B152J
	----- -----			(C2113, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2131	283-0060-00			CAP.,FXD,CER DI:100PF,5%,200V	72982	855-535U2J101J
	----- -----			(C2131, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2133	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C2133, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2161	283-0178-00			CAP.,FXD,CER DI:0.1UF,+80-20%,100V	72982	8131N145651 104Z
	----- -----			(C2161, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2165	283-0060-00			CAP.,FXD,CER DI:100PF,5%,200V	72982	855-535U2J101J
	----- -----			(C2165, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2173	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
	----- -----			(C2173, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2191	283-0116-00			CAP.,FXD,CER DI:820PF,5%,500V	72982	801-547B821J
	----- -----			(C2191, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2225	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C2225, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2227	283-0060-00			CAP.,FXD,CER DI:100PF,5%,200V	72982	855-535U2J101J
	----- -----			(C2227, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2265	283-0103-00			CAP.,FXD,CER DI:180PF,5%,500V	59660	831-518-Z5D0181J
	----- -----			(C2265, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2271	283-0628-00			CAP.,FXD,MICA D:410PF,1%,500V	00853	D155F411F0
	----- -----			(C2271, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2287	283-0628-00			CAP.,FXD,MICA D:410PF,1%,500V	00853	D155F411F0
	----- -----			(C2287, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2301	283-0660-00			CAP.,FXD,MICA D:510PF,2%,500V	00853	D155F511G0
	----- -----			(C2301, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2361	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
	----- -----			(C2361, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2377	290-0770-00			CAP.,FXD,ELCTLT:100UF,+50-10%,25V	56289	502D230
	----- -----			(C2377, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2383	290-0770-00			CAP.,FXD,ELCTLT:100UF,+50-10%,25V	56289	502D230
	----- -----			(C2383, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2385	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C2385, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2387	290-0770-00			CAP.,FXD,ELCTLT:100UF,+50-10%,25V	56289	502D230
	----- -----			(C2387, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2389	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C2389, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2413	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C2413, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2419	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
	----- -----			(C2419, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2433	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C2433, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2437	283-0638-00			CAP.,FXD,MICA D:130PF,1%,100V	00853	D151F131F0
	----- -----			(C2437, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2467	283-0198-00			CAP.,FXD,CER DI:0.22UF,20%,50V	72982	8121N083Z5U0224M
	----- -----			(C2467, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2481	283-0674-00			CAP.,FXD,MICA D:85PF,1%,500V	00853	D155F850F0
	----- -----			(C2481, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2491	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M
	----- -----			(C2491, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2501	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C2501, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2509	283-0698-00			CAP.,FXD,MICA D:390PF,1%,500V	09023	CD15ED391F03
	----- -----			(C2509, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		

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C2511	283-0665-00			CAP.,FXD,MICA D:190PF,1%,100V	00853	D151F19F0
	----- -----			(C2511, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2519	283-0600-00			CAP.,FXD,MICA D:43PF,5%,500V	00853	D105E430J0
	----- -----			(C2519, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2531	283-0698-00			CAP.,FXD,MICA D:390PF,1%,500V	09023	CD15ED391F03
	----- -----			(C2531, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2533	283-0665-00			CAP.,FXD,MICA D:190PF,1%,100V	00853	D151F19F0
	----- -----			(C2533, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2539	283-0600-00			CAP.,FXD,MICA D:43PF,5%,500V	00853	D105E430J0
	----- -----			(C2539, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2581	283-0636-00			CAP.,FXD,MICA D:36PF,1.4%,100V	00853	D155F360G0
	----- -----			(C2581, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2584	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M
	----- -----			(C2584, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2601	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
	----- -----			(C2601, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2621	283-0260-00			CAP.,FXD,CER DI:5.6PF,5%,200V	72982	8111B200C0G569C
	----- -----			(C2621, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2633	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C2633, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2637	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C2637, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2641	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C2641, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2661	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-518-Z5D0102J
	----- -----			(C2661, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2675	283-0625-00			CAP.,FXD,MICA D:220PF,1%,500V	00853	D105F221F0
	----- -----			(C2675, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2681	281-0544-00			CAP.,FXD,CER DI:5.6PF,10%,500V	59660	301-000C0H0569D
	----- -----			(C2681, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2682	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M
	----- -----			(C2682, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2685	281-0544-00			CAP.,FXD,CER DI:5.6PF,10%,500V	59660	301-000C0H0569D
	----- -----			(C2685, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2688	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M
	----- -----			(C2688, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2689	283-0651-00			CAP.,FXD,MICA D:430PF,1%,500V	00853	D155F431F0
	----- -----			(C2689, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2692	283-0728-00			CAP.,FXD,MICA D:120PF,1%,500V	00853	D155F121F03
	----- -----			(C2692, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2707	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C2707, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2715	283-0178-00			CAP.,FXD,CER DI:0.1UF,+80-20%,100V	72982	8131N145651 104Z
	----- -----			(C2715, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2733	283-0059-00			CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N031Z5U0105Z
	----- -----			(C2733, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2751	283-0178-00			CAP.,FXD,CER DI:0.1UF,+80-20%,100V	72982	8131N145651 104Z
	----- -----			(C2751, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2759	283-0059-00			CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N031Z5U0105Z
	----- -----			(C2759, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2789	283-0651-00			CAP.,FXD,MICA D:430PF,1%,500V	00853	D155F431F0
	----- -----			(C2789, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2793	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C2793, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2811	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-518-Z5D0102J
	----- -----			(C2811, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2829	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-518-Z5D0102J
	----- -----			(C2829, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		

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C2833	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-518-Z5D0102J
	----- -----			(C2833, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2885	283-0625-00			CAP.,FXD,MICA D:220PF,1%,500V	00853	D105F221F0
	----- -----			(C2885, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2887	281-0544-00			CAP.,FXD,CER DI:5.6PF,10%,500V	59660	301-000C0H0569D
	----- -----			(C2887, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2891	283-0651-00			CAP.,FXD,MICA D:430PF,1%,500V	00853	D155F431F0
	----- -----			(C2891, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2937	283-0178-00			CAP.,FXD,CER DI:0.1UF,+80-20%,100V	72982	8131N145651 104Z
	----- -----			(C2937, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2939	283-0178-00			CAP.,FXD,CER DI:0.1UF,+80-20%,100V	72982	8131N145651 104Z
	----- -----			(C2939, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2961	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C2961, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2971	283-0728-00			CAP.,FXD,MICA D:120PF,1%,500V	00853	D155F121F03
	----- -----			(C2971, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C2975	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C2975, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
C3006	283-0032-00			CAP.,FXD,CER DI:470PF,5%,500V	72982	0831085Z5E00471J
	----- -----			(C3006, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3008	283-0028-00			CAP.,FXD,CER DI:0.0022UF,20%,50V	56289	19C606
	----- -----			(C3008, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3010	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
	----- -----			(C3010, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3012	283-0615-00			CAP.,FXD,MICA D:33PF,5%,500V	00853	D155E330J0
	----- -----			(C3012, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3028	283-0167-00			CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
	----- -----			(C3028, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3040	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
	----- -----			(C3040, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3042	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3042, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3044	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3044, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3048	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3048, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3050	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3050, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3108	283-0628-00			CAP.,FXD,MICA D:410PF,1%,500V	00853	D155F411F0
	----- -----			(C3108, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3110	283-0114-00			CAP.,FXD,CER DI:0.0015UF,5%,200V	72982	805-509B152J
	----- -----			(C3110, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3146	283-0060-00			CAP.,FXD,CER DI:100PF,5%,200V	72982	855-535U2J101J
	----- -----			(C3146, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3150	283-0060-00			CAP.,FXD,CER DI:100PF,5%,200V	72982	855-535U2J101J
	----- -----			(C3150, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3160	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3160, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3176	283-0628-00			CAP.,FXD,MICA D:410PF,1%,500V	00853	D155F411F0
	----- -----			(C3176, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3204	283-0167-00			CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
	----- -----			(C3204, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3206	283-0628-00			CAP.,FXD,MICA D:410PF,1%,500V	00853	D155F411F0
	----- -----			(C3206, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3208	283-0167-00			CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
	----- -----			(C3208, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		

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C3244	283-0060-00			CAP.,FXD,CER DI:100PF,5%,200V	72982	855-535U2J101J
	----- -----			(C3244, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3250	283-0060-00			CAP.,FXD,CER DI:100PF,5%,200V	72982	855-535U2J101J
	----- -----			(C3250, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3254	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3254, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3260	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3260, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3264	283-0116-00			CAP.,FXD,CER DI:820PF,5%,500V	72982	801-547B821J
	----- -----			(C3264, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3276	283-0628-00			CAP.,FXD,MICA D:410PF,1%,500V	00853	D155F411F0
	----- -----			(C3276, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3310	281-0116-00			CAP.,VAR,AIR DI:1.6-9.1PF,425V	74970	OBD
	----- -----			(C3310, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3314	281-0166-00			CAP.,VAR,AIR DI:1.9-15.7PF,250V	74970	187-0109-005
	----- -----			(C3314, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3322	283-0167-00			CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
	----- -----			(C3322, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3324	283-0167-00			CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
	----- -----			(C3324, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3326	283-0060-00			CAP.,FXD,CER DI:100PF,5%,200V	72982	855-535U2J101J
	----- -----			(C3326, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3334	283-0060-00			CAP.,FXD,CER DI:100PF,5%,200V	72982	855-535U2J101J
	----- -----			(C3334, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3336	283-0167-00			CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
	----- -----			(C3336, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3339	283-0167-00			CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
	----- -----			(C3339, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3346	283-0103-00			CAP.,FXD,CER DI:180PF,5%,500V	59660	831-518-Z5D0181J
	----- -----			(C3346, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3382	283-0644-00			CAP.,FXD,MICA D:150PF,1%,500V	00853	D155E151F0
	----- -----			(C3382, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3384	283-0594-00			CAP.,FXD,MICA D:0.001UF,1%,100V	00853	D151F102F0
	----- -----			(C3384, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3398	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-518-Z5D0102J
	----- -----			(C3398, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3480	281-0153-00			CAP.,VAR,AIR DI:1.7-10PF,250V	74970	187-0106-005
	----- -----			(C3480, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3482	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3482, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3484	283-0167-00			CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
	----- -----			(C3484, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3490	283-0167-00			CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
	----- -----			(C3490, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3498	283-0167-00			CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
	----- -----			(C3498, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3518	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3518, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3540	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3540, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3552	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3552, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3556	283-0059-00			CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N031Z5U0105Z
	----- -----			(C3556, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3558	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3558, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
C3582	290-0770-00			CAP.,FXD,ELCTLT:100UF,+50-10%,25V	56289	502D230
	----- -----			(C3582, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3584	283-0167-00			CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
	----- -----			(C3584, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3586	290-0770-00			CAP.,FXD,ELCTLT:100UF,+50-10%,25V	56289	502D230
	----- -----			(C3586, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3590	290-0770-00			CAP.,FXD,ELCTLT:100UF,+50-10%,25V	56289	502D230
	----- -----			(C3590, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3608	283-0680-00			CAP.,FXD,MICA D:330PF,1%,500V	00853	D155E331F0
	----- -----			(C3608, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3610	283-0640-00			CAP.,FXD,MICA D:160PF,1%,100V	00853	D151E161F0
	----- -----			(C3610, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3620	283-0615-00			CAP.,FXD,MICA D:33PF,5%,500V	00853	D155E330J0
	----- -----			(C3620, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3628	283-0680-00			CAP.,FXD,MICA D:330PF,1%,500V	00853	D155E331F0
	----- -----			(C3628, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3630	283-0640-00			CAP.,FXD,MICA D:160PF,1%,100V	00853	D151E161F0
	----- -----			(C3630, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3636	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3636, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3642	283-0615-00			CAP.,FXD,MICA D:33PF,5%,500V	00853	D155E330J0
	----- -----			(C3642, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3644	283-0680-00			CAP.,FXD,MICA D:330PF,1%,500V	00853	D155E331F0
	----- -----			(C3644, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3650	283-0640-00			CAP.,FXD,MICA D:160PF,1%,100V	00853	D151E161F0
	----- -----			(C3650, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3654	283-0615-00			CAP.,FXD,MICA D:33PF,5%,500V	00853	D155E330J0
	----- -----			(C3654, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3676	283-0198-00			CAP.,FXD,CER DI:0.22UF,20%,50V	72982	8121N083Z5U0224M
	----- -----			(C3676, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3692	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3692, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3694	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3694, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3696	283-0167-00			CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
	----- -----			(C3696, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3702	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3702, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3730	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3730, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3738	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3738, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3754	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3754, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3780	283-0644-00			CAP.,FXD,MICA D:150PF,1%,500V	00853	D155E151F0
	----- -----			(C3780, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3782	283-0644-00			CAP.,FXD,MICA D:150PF,1%,500V	00853	D155E151F0
	----- -----			(C3782, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3796	283-0602-00			CAP.,FXD,MICA D:53PF,5%,300V	00853	D153E530J0
	----- -----			(C3796, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3814	283-0167-00			CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
	----- -----			(C3814, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3826	283-0059-00			CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N031Z5U0105Z
	----- -----			(C3826, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3846	283-0167-00			CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
	----- -----			(C3846, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3852	283-0167-00			CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
	----- -----			(C3852, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
C3860	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-518-Z5D0102J
	----- -----			(C3860, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3863	283-0167-00			CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
	----- -----			(C3863, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3896	283-0598-00			CAP.,FXD,MICA D:253PF,5%,300V	09023	CD15EC(253)J03
	----- -----			(C3896, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3920	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-518-Z5D0102J
	----- -----			(C3920, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3924	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-518-Z5D0102J
	----- -----			(C3924, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3934	283-0167-00			CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
	----- -----			(C3934, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3940	283-0167-00			CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
	----- -----			(C3940, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3948	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-518-Z5D0102J
	----- -----			(C3948, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3952	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-518-Z5D0102J
	----- -----			(C3952, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3954	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3954, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3956	283-0059-00			CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N031Z5U0105Z
	----- -----			(C3956, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3966	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3966, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3986	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
	----- -----			(C3986, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C3994	283-0598-00			CAP.,FXD,MICA D:253PF,5%,300V	09023	CD15EC(253)J03
	----- -----			(C3994, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
C4000	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
C4010	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
C4030	285-0898-00			CAP.,FXD,PLSTC:0.47UF,10%,100V	56289	LP66A1B474K
C4050	285-0931-00			CAP.,FXD,PLSTC:0.005UF,5%,2000V	56289	715P184
C4070	283-0167-00			CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
C4080	290-0138-00			CAP.,FXD,ELCTLT:330UF,20%,6V	05397	T110D337M006AS
C4120	290-0289-00			CAP.,FXD,ELCTLT:1UF,100-20%,25V	56289	30D495
C4130	283-0027-00			CAP.,FXD,CER DI:0.02UF,20%,50V	56289	273C32
C4140	283-0110-00			CAP.,FXD,CER DI:0.005UF,+80-20%,150V	56289	19C242B
C4160	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C4165	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C4192	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M
C4195	290-0517-00			CAP.,FXD,ELCTLT:6.8UF,20%,35V	56289	196D685X0035KA1
C4200	283-0057-00			CAP.,FXD,CER DI:0.1UF,+80-20%,200V	56289	274C10
C4236	285-1147-00			CAP.,FXD,PLSTC:0.82UF,5%,200VDC	84411	TEK 159-82452
C4248	SELECTED					
C4254	285-1148-00			CAP.,FXD,PLSTC:0.22UF,5%,200VDC	84411	TEK 165
C4278	290-0770-00			CAP.,FXD,ELCTLT:100UF,+50-10%,25V	56289	502D230
C4292	290-0770-00			CAP.,FXD,ELCTLT:100UF,+50-10%,25V	56289	502D230
C4294	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
C4300	283-0057-00			CAP.,FXD,CER DI:0.1UF,+80-20%,200V	56289	274C10
C4308	285-0627-00			CAP.,FXD,PLSTC:0.0033UF,5%,100V	56289	410P33251
C4360	283-0655-00			CAP.,FXD,MICA D:0.0033UF,1%,500V	00853	D195E332F0
C4386	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C4390	283-0057-00			CAP.,FXD,CER DI:0.1UF,+80-20%,200V	56289	274C10
C4400	290-0770-00			CAP.,FXD,ELCTLT:100UF,+50-10%,25V	56289	502D230
C4410	290-0770-00			CAP.,FXD,ELCTLT:100UF,+50-10%,25V	56289	502D230
C4426	290-0534-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	196D105X0035HA1

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C4466	285-0702-00			CAP.,FXD,PLSTC:0.033UF,5%,100V	56289	410P33351
C4476	285-0686-00			CAP.,FXD,PLSTC:0.068UF,10%,100V	56289	410P68391
C4480	285-0703-00			CAP.,FXD,PLSTC:0.1UF,5%,100V	56289	410P10451
C4498	285-0683-00			CAP.,FXD,PLSTC:0.022UF,5%,100V	56289	410P22351
C4562	285-0702-00			CAP.,FXD,PLSTC:0.033UF,5%,100V	56289	410P33351
C4580	283-0060-00			CAP.,FXD,CER DI:100PF,5%,200V	72982	855-535U2J101J
C4588	283-0060-00			CAP.,FXD,CER DI:100PF,5%,200V	72982	855-535U2J101J
C4594	283-0084-00			CAP.,FXD,CER DI:270PF,5%,1000V	72982	838-533B271J
C4624	290-0523-00			CAP.,FXD,ELCTLT:2.2UF,20%,20V	56289	196D225X0020HA1
C4688	283-0060-00			CAP.,FXD,CER DI:100PF,5%,200V	72982	855-535U2J101J
C4715	290-0770-00			CAP.,FXD,ELCTLT:100UF,+50-10%,25V	56289	502D230
C4719	290-0770-00			CAP.,FXD,ELCTLT:100UF,+50-10%,25V	56289	502D230
C4733	283-0067-00			CAP.,FXD,CER DI:0.001UF,10%,200V	72982	835-515B102K
C4734	283-0026-00			CAP.,FXD,CER DI:0.2UF,+80-20%,25V	56289	274C3
C4735	290-0770-00			CAP.,FXD,ELCTLT:100UF,+50-10%,25V	56289	502D230
C4736	290-0770-00			CAP.,FXD,ELCTLT:100UF,+50-10%,25V	56289	502D230
C4746	283-0067-00			CAP.,FXD,CER DI:0.001UF,10%,200V	72982	835-515B102K
C4749	290-0770-00			CAP.,FXD,ELCTLT:100UF,+50-10%,25V	56289	502D230
C4756	283-0067-00			CAP.,FXD,CER DI:0.001UF,10%,200V	72982	835-515B102K
C4788	283-0057-00			CAP.,FXD,CER DI:0.1UF,+80-20%,200V	56289	274C10
C4789	290-0200-00			CAP.,FXD,ELCTLT:12UF,+50-10%,150V	56289	30D2858
C4831	290-0164-00			CAP.,FXD,ELCTLT:1UF,+50-10%,150V	56289	500D105F150BA7
C4833	285-1066-00			CAP.,FXD,PLSTC:0.05UF,1%,200V	14752	230B1C503F
C4851	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C4853	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
C4863	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
C4867	283-0054-00			CAP.,FXD,CER DI:150PF,5%,200V	59660	855-535U2J151J
C4871	283-0077-00			CAP.,FXD,CER DI:330PF,5%,500V	59660	831-500B331J
C4873	290-0534-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	196D105X0035HA1
C4875	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C4879	283-0249-00			CAP.,FXD,CER DI:0.068UF,10%,50V	72982	8131N075 C 683K
C4887	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
C4889	283-0057-00			CAP.,FXD,CER DI:0.1UF,+80-20%,200V	56289	274C10
C4951	290-0149-00			CAP.,FXD,ELCTLT:5UF,+75-10%,150V	56289	30D505G150DD4
C4961	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C4963	290-0200-00			CAP.,FXD,ELCTLT:12UF,+50-10%,150V	56289	30D2858
C4980	290-0167-00			CAP.,FXD,ELCTLT:10UF,20%,15V	56289	150D106X0015B2
C4991	283-0054-00			CAP.,FXD,CER DI:150PF,5%,200V	59660	855-535U2J151J
C5000	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C5008	283-0239-00			CAP.,FXD,CER DI:0.022UF,10%,50V	72982	8121N083X7R0223K
C5010	283-0628-00			CAP.,FXD,MICA D:410PF,1%,500V	00853	D155F411F0
C5020	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
C5054	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
C5100	281-0549-00			CAP.,FXD,CER DI:68PF,10%,500V	59660	301-000U2J0680K
C5102	281-0549-00			CAP.,FXD,CER DI:68PF,10%,500V	59660	301-000U2J0680K
C5104	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C5132	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
C5224	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
C5310	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
C5312	281-0518-00			CAP.,FXD,CER DI:47PF,+/-9.4PF,500V	59660	301-000U2J0470M
C5314	283-0026-00			CAP.,FXD,CER DI:0.2UF,+80-20%,25V	56289	274C3
C5320	281-0518-00			CAP.,FXD,CER DI:47PF,+/-9.4PF,500V	59660	301-000U2J0470M
C5380	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
C5420	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C5450	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C5474	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
C5476	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225

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C5480	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C5500	283-0027-00			CAP.,FXD,CER DI:0.02UF,20%,50V	56289	273C32
C5502	290-0536-00			CAP.,FXD,ELCTLT:10UF,20%,25V	90201	TDC106M025FL
C5510	283-0024-00			CAP.,FXD,CER DI:0.1UF,+80-20%,50V	72982	8121N083Z5U0104Z
C5512	290-0536-00			CAP.,FXD,ELCTLT:10UF,20%,25V	90201	TDC106M025FL
C5514	283-0027-00			CAP.,FXD,CER DI:0.02UF,20%,50V	56289	273C32
C5516	283-0024-00			CAP.,FXD,CER DI:0.1UF,+80-20%,50V	72982	8121N083Z5U0104Z
C5520	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C5530	283-0027-00			CAP.,FXD,CER DI:0.02UF,20%,50V	56289	273C32
C5532	290-0536-00			CAP.,FXD,ELCTLT:10UF,20%,25V	90201	TDC106M025FL
C5540	283-0024-00			CAP.,FXD,CER DI:0.1UF,+80-20%,50V	72982	8121N083Z5U0104Z
C5542	290-0536-00			CAP.,FXD,ELCTLT:10UF,20%,25V	90201	TDC106M025FL
C5544	283-0027-00			CAP.,FXD,CER DI:0.02UF,20%,50V	56289	273C32
C5546	283-0024-00			CAP.,FXD,CER DI:0.1UF,+80-20%,50V	72982	8121N083Z5U0104Z
C5550	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C5560	283-0027-00			CAP.,FXD,CER DI:0.02UF,20%,50V	56289	273C32
C5562	290-0536-00			CAP.,FXD,ELCTLT:10UF,20%,25V	90201	TDC106M025FL
C5570	283-0024-00			CAP.,FXD,CER DI:0.1UF,+80-20%,50V	72982	8121N083Z5U0104Z
C5572	290-0536-00			CAP.,FXD,ELCTLT:10UF,20%,25V	90201	TDC106M025FL
C5574	283-0027-00			CAP.,FXD,CER DI:0.02UF,20%,50V	56289	273C32
C5576	283-0024-00			CAP.,FXD,CER DI:0.1UF,+80-20%,50V	72982	8121N083Z5U0104Z
C5580	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C5600	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-519-Z5U-102P
C5604	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-519-Z5U-102P
C5620	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C5622	281-0547-00			CAP.,FXD,CER DI:2.7PF,10%,500V	04222	7001-1321
C5630	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-519-Z5U-102P
C5634	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-519-Z5U-102P
C5650	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C5652	281-0547-00			CAP.,FXD,CER DI:2.7PF,10%,500V	04222	7001-1321
C5660	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-519-Z5U-102P
C5664	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-519-Z5U-102P
C5680	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C5682	281-0547-00			CAP.,FXD,CER DI:2.7PF,10%,500V	04222	7001-1321
C5700	290-0534-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	196D105X0035HA1
C5710	283-0024-00			CAP.,FXD,CER DI:0.1UF,+80-20%,50V	72982	8121N083Z5U0104Z
C5712	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C5720	281-0662-00			CAP.,FXD,CER DI:10PF,+/-0.5PF,500V	59660	301-000H3M0100D
C5722	281-0167-00			CAP.,VAR,CER DI:9-45PF,200V	72982	538-011-D 9-45
C5730	290-0534-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	196D105X0035HA1
C5740	283-0024-00			CAP.,FXD,CER DI:0.1UF,+80-20%,50V	72982	8121N083Z5U0104Z
C5742	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C5750	281-0662-00			CAP.,FXD,CER DI:10PF,+/-0.5PF,500V	59660	301-000H3M0100D
C5752	281-0167-00			CAP.,VAR,CER DI:9-45PF,200V	72982	538-011-D 9-45
C5760	290-0534-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	196D105X0035HA1
C5770	283-0024-00			CAP.,FXD,CER DI:0.1UF,+80-20%,50V	72982	8121N083Z5U0104Z
C5772	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C5780	281-0622-00			CAP.,FXD,CER DI:47PF,1%,500V	72982	308-000C0G0470F
C5782	281-0167-00			CAP.,VAR,CER DI:9-45PF,200V	72982	538-011-D 9-45
C5814	281-0549-00			CAP.,FXD,CER DI:68PF,10%,500V	59660	301-000U2J0680K
C5844	281-0549-00			CAP.,FXD,CER DI:68PF,10%,500V	59660	301-000U2J0680K
C5874	281-0549-00			CAP.,FXD,CER DI:68PF,10%,500V	59660	301-000U2J0680K
C5900	290-0164-00			CAP.,FXD,ELCTLT:1UF,+50-10%,150V	56289	500D105F150BA7
C5902	283-0029-00			CAP.,FXD,CER DI:0.005UF,5%,500V	72982	821-000B502J
C5910	283-0057-00			CAP.,FXD,CER DI:0.1UF,+80-20%,200V	56289	274C10
C5912	281-0599-00			CAP.,FXD,CER DI:1PF,+/-0.25PF,500V	04222	7040-C0K-1R0C
C5930	290-0164-00			CAP.,FXD,ELCTLT:1UF,+50-10%,150V	56289	500D105F150BA7

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C5932	283-0029-00			CAP.,FXD,CER DI:0.005UF,5%,500V	72982	821-000B502J
C5940	283-0057-00			CAP.,FXD,CER DI:0.1UF,+80-20%,200V	56289	274C10
C5942	281-0599-00			CAP.,FXD,CER DI:1PF,+/-0.25PF,500V	04222	7040-C0K-1R0C
C5960	290-0164-00			CAP.,FXD,ELCTLT:1UF,+50-10%,150V	56289	500D105F150BA7
C5962	283-0029-00			CAP.,FXD,CER DI:0.005UF,5%,500V	72982	821-000B502J
C5970	283-0057-00			CAP.,FXD,CER DI:0.1UF,+80-20%,200V	56289	274C10
C5972	281-0599-00			CAP.,FXD,CER DI:1PF,+/-0.25PF,500V	04222	7040-C0K-1R0C
C5990	290-0149-00			CAP.,FXD,ELCTLT:5UF,+75-10%,150V	56289	30D505G150DD4
C6097	285-0698-00			CAP.,FXD,PLSTC:0.0082UF,5%,100V	56289	410P82251
C6167	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
C6181	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
C6183	283-0067-00	XB030000		CAP.,FXD,CER DI:0.001UF,10%,200V	72982	835-515B102K
C6184	290-0745-00	XB030000		CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
C6189	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-519-Z5U-102P
C6203	290-0164-00			CAP.,FXD,ELCTLT:1UF,+50-10%,150V	56289	500D105F150BA7
C6247	283-0013-00			CAP.,FXD,CER DI:0.01UF,+100-0%,1000V	56289	33C29A7
C6265	290-0517-00			CAP.,FXD,ELCTLT:6.8UF,20%,35V	56289	196D685X0035KA1
C6271	283-0013-00			CAP.,FXD,CER DI:0.01UF,+100-0%,1000V	56289	33C29A7
C7501	283-0013-00			CAP.,FXD,CER DI:0.01UF,+100-0%,1000V	56289	33C29A7
C8030	290-0405-00			CAP.,FXD,ELCTLT:10UF,+50-10%,150V	56289	30D106F150DD4
C8040	290-0770-00			CAP.,FXD,ELCTLT:100UF,+50-10%,25V	56289	502D230
C8060	290-0770-00			CAP.,FXD,ELCTLT:100UF,+50-10%,25V	56289	502D230
C8070	290-0770-00			CAP.,FXD,ELCTLT:100UF,+50-10%,25V	56289	502D230
C8100	283-0068-00			CAP.,FXD,CER DI:0.01UF,+100-0%,500V	56289	19C241
C8160	290-0782-00			CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
C8260	283-0630-00			CAP.,FXD,MICA D:110PF,1%,100V	00853	D151E111F0
C8261	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M
C8300	283-0648-00			CAP.,FXD,MICA D:10PF,5%,100V	00853	D151C100D0
C8302	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
C8310	290-0521-00			CAP.,FXD,ELCTLT:1300UF,+75-10%,150V	56289	68D10475
C8330	290-0520-00			CAP.,FXD,ELCTLT:4500UF,+100-0%,40V	56289	68D10474
C8360	290-0520-00			CAP.,FXD,ELCTLT:4500UF,+100-0%,40V	56289	68D10474
C8390	290-0508-00			CAP.,FXD,ELCTLT:18,000UF,+100-10%,15V	56289	68D10444
C8600	285-0647-00			CAP.,FXD,PLSTC:0.1UF,3.5%,400V	80009	285-0647-00
C8601	285-0628-00			CAP.,FXD,PLSTC:0.033UF,20%,300V	56289	410P33303
C8630	283-0013-00			CAP.,FXD,CER DI:0.01UF,+100-0%,1000V	56289	33C29A7
C8641	283-0006-00			CAP.,FXD,CER DI:0.02UF,+80-20%,500V	72982	0841545Z5V00203Z
C8650	290-0442-00			CAP.,FXD,ELCTLT:120UF,+75-10%,150V	56289	39D127G150GL4
C8651	283-0177-00			CAP.,FXD,CER DI:1UF,+80-20%,25V	56289	273C5
C8652	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-519-Z5U-102P
C8654	283-0068-00			CAP.,FXD,CER DI:0.01UF,+100-0%,500V	56289	19C241
C8656	283-0089-00			CAP.,FXD,CER DI:82PF,5%,100V	72982	818-000P2G820J
C8657	283-0089-00			CAP.,FXD,CER DI:82PF,5%,100V	72982	818-000P2G820J
C8662	285-0629-00			CAP.,FXD,PLSTC:0.047UF,20%,100V	56289	410P47301
C8664	283-0068-00			CAP.,FXD,CER DI:0.01UF,+100-0%,500V	56289	19C241
C8665	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-518-Z5D0102J
C8666	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M
C8668	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	91418	SP103Z151-4R9
C8682	283-0032-00			CAP.,FXD,CER DI:470PF,5%,500V	72982	0831085Z5E00471J
C8717	283-0105-00			CAP.,FXD,CER DI:0.01UF,+80-20%,2000V	56289	41C316
C8778	285-0919-00			CAP.,FXD,PLSTC:0.22UF,10%,100V	56289	LP66A1B224K002
C8789	290-0135-00			CAP.,FXD,ELCTLT:15UF,20%,20V	56289	150D156X0020B2
C9030	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
	----- -----			(C9030, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9070	283-0594-00			CAP.,FXD,MICA D:0.001UF,1%,100V	00853	D151F102F0
	----- -----			(C9070, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9080	281-0509-00			CAP.,FXD,CER DI:15PF,+/-1.5PF,500V	72982	301-000C0G0150K
	----- -----			(C9080, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9104	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
	----- -----			(C9104, 650HR-1, 651HR-1, 655HR-1 ONLY)		

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C9136	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
	----- -----			(C9136, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9140	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
	----- -----			(C9140, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9162	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
	----- -----			(C9162, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9172	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
	----- -----			(C9172, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9194	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
	----- -----			(C9194, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9206	281-0524-00			CAP.,FXD,CER DI:150PF,+/-30PF,500V	04222	7001-1381
	----- -----			(C9206, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9210	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
	----- -----			(C9210, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9232	283-0078-00			CAP.,FXD,CER DI:0.001UF,20%,500V	56289	20C114A8
	----- -----			(C9232, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9244	281-0524-00			CAP.,FXD,CER DI:150PF,+/-30PF,500V	04222	7001-1381
	----- -----			(C9244, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9246	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
	----- -----			(C9246, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9254	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
	----- -----			(C9254, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9262	283-0078-00			CAP.,FXD,CER DI:0.001UF,20%,500V	56289	20C114A8
	----- -----			(C9262, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9272	281-0524-00			CAP.,FXD,CER DI:150PF,+/-30PF,500V	04222	7001-1381
	----- -----			(C9272, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9274	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
	----- -----			(C9274, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9292	283-0078-00			CAP.,FXD,CER DI:0.001UF,20%,500V	56289	20C114A8
	----- -----			(C2929, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9304	281-0509-00			CAP.,FXD,CER DI:15PF,+/-1.5PF,500V	72982	301-000C0G0150K
	----- -----			(C9304, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9306	281-0168-00			CAP.,VAR,AIR DI:1.3-5.4PF,250V	74970	187-0103-035
	----- -----			(C9306, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9316	290-0535-00			CAP.,FXD,ELCTLT:33UF,20%,10V	56289	196D336X0010KA1
	----- -----			(C9316, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9326	290-0535-00			CAP.,FXD,ELCTLT:33UF,20%,10V	56289	196D336X0010KA1
	----- -----			(C9326, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9328	283-0600-00			CAP.,FXD,MICA D:43PF,5%,500V	00853	D105E430J0
	----- -----			(C9328, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9336	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
	----- -----			(C9336, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9340	281-0576-00			CAP.,FXD,CER DI:11PF,5%,500V	59660	301-000C0G0110J
	----- -----			(C9340, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9342	281-0168-00			CAP.,VAR,AIR DI:1.3-5.4PF,250V	74970	187-0103-035
	----- -----			(C9342, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9346	290-0535-00			CAP.,FXD,ELCTLT:33UF,20%,10V	56289	196D336X0010KA1
	----- -----			(C9346, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9354	290-0535-00			CAP.,FXD,ELCTLT:33UF,20%,10V	56289	196D336X0010KA1
	----- -----			(C9354, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9356	283-0600-00			CAP.,FXD,MICA D:43PF,5%,500V	00853	D105E430J0
	----- -----			(C9356, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9366	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
	----- -----			(C9366, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9370	281-0592-00			CAP.,FXD,CER DI:4.7PF,+/-0.5PF,500V	59660	301-023C0H0479D
	----- -----			(C9370, 650HR-1, 651HR-1, 655HR-1 ONLY)		

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
C9371	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
	----- -----			(C9370, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9372	281-0168-00			CAP.,VAR,AIR DI:1.3-5.4PF,250V	74970	187-0103-035
	----- -----			(C9372, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9378	290-0535-00			CAP.,FXD,ELCTLT:33UF,20%,10V	56289	196D336X0010KA1
	----- -----			(C9378, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9380	290-0535-00			CAP.,FXD,ELCTLT:33UF,20%,10V	56289	196D336X0010KA1
	----- -----			(C9380, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9382	283-0600-00			CAP.,FXD,MICA D:43PF,5%,500V	00853	D105E430J0
	----- -----			(C9382, 650HR-1, 651HR-1, 655HR-1 ONLY)		
C9390	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	91418	SP203Z151-4R9
	----- -----			(C9390, 650HR-1, 651HR-1, 655HR-1 ONLY)		
CR140	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR141	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR141, 655HR, 655HR-1 ONLY)		
CR153	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR189	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1161	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1201	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1203	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1205	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1211	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1231	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1241	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1243	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1245	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1253	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1281	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1283	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1291	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1439	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1450	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1509	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1571	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1573	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1575	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1576	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1578	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1579	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1623	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1625	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1627	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1671	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1672	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1673	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1675	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1676	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1677	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1679	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1719	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1724	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1740	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1763	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1771	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1772	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1773	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1774	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
CR1776	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1778	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1779	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1821	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1859	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1877	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1878	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1930	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1945	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1948	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1958	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1959	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR1969	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR2009	152-0269-01			SEMICOND DEVICE:VVC,SI,33PF,5%,35V	80009	152-0269-01
	----- -----			(CR2009, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR2091	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR2091, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR2093	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR2093, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR2095	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR2095, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR2155	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR2155, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR2169	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR2169, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR2171	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR2171, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR2261	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR2261, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR2263	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR2263, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR2273	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR2273, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR2279	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR2279, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR2283	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR2283, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR2285	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR2285, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR2293	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR2293, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR2325	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR2325, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR2369	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR2369, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR2475	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR2475, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR2477	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR2477, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR2491	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR2491, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR2584	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR2584, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
CR3010	152-0269-01			SEMICOND DEVICE:VVC,SI,33PF,5%,35V	80009	152-0269-01
	----- -----			(CR3010, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3046	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3046, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
CR3064	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3064, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3072	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3072, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3074	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3074, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3096	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3096, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3098	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3098, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3170	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3170, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3172	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3172, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3176	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3176, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3262	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3262, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3326	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3326, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3352	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3352, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3356	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3356, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3368	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3368, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3382	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3382, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3394	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3394, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3442	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3442, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3482	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3482, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3484	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3484, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3486	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3486, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3490	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3490, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3780	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3780, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR3782	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR3782, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
CR4015	152-0107-00	XB030000		SEMICOND DEVICE:SILICON,400V,400MA	01295	G727
CR4020	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4040	152-0170-00			SEMICOND DEVICE:SILICON,1500V,10UA	52306	CX342
CR4147	152-0107-00			SEMICOND DEVICE:SILICON,400V,400MA	01295	G727
CR4163	152-0107-00			SEMICOND DEVICE:SILICON,400V,400MA	01295	G727
CR4231	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4233	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4251	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4256	152-0040-00			SEMICOND DEVICE:SILICON,600V,1A	15238	LG109
CR4258	152-0040-00			SEMICOND DEVICE:SILICON,600V,1A	15238	LG109
CR4336	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4356	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4388	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4436	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
CR4452	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4454	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4488	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4520	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4521	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4608	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4674	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4678	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4680	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4700	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4702	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4709	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4719	152-0040-00			SEMICOND DEVICE:SILICON,600V,1A	15238	LG109
CR4855	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4861	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4863	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4881	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4883	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4885	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4887	152-0061-00			SEMICOND DEVICE:SILICON,175V,100MA	07263	FDH2161
CR4895	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4931	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4951	152-0061-00			SEMICOND DEVICE:SILICON,175V,100MA	07263	FDH2161
CR4981	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR4983	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5080	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5082	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5150	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5152	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5154	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5170	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5172	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5230	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5240	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5270	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5280	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5320	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5322	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5340	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5342	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5360	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5362	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5420	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5450	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5480	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5518	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5519	152-0141-02	XB020750		SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5520	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5548	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5550	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5559	152-0141-02	XB020750		SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5578	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5579	152-0141-02	XB020750		SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5580	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5620	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5650	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5680	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5820	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5822	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5824	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
CR5826	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5828	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5830	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5850	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5852	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5854	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5856	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5858	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5860	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5880	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5882	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5884	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5886	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5888	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5890	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR5924	152-0061-00			SEMICOND DEVICE:SILICON,175V,100MA	07263	FDH2161
CR5926	152-0061-00			SEMICOND DEVICE:SILICON,175V,100MA	07263	FDH2161
CR5954	152-0061-00			SEMICOND DEVICE:SILICON,175V,100MA	07263	FDH2161
CR5956	152-0061-00			SEMICOND DEVICE:SILICON,175V,100MA	07263	FDH2161
CR5984	152-0061-00			SEMICOND DEVICE:SILICON,175V,100MA	07263	FDH2161
CR5986	152-0061-00			SEMICOND DEVICE:SILICON,175V,100MA	07263	FDH2161
CR6001	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR6005	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR6063	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR6071	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR6097	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR6103	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR6109	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR6127	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR6131	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR6135	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR6139	152-0061-00			SEMICOND DEVICE:SILICON,175V,100MA	07263	FDH2161
CR6149	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR6153	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR6155	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR6157	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR6169	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR6184	152-0141-02	XB030000		SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR6223	152-0242-00			SEMICOND DEVICE:SILICON,225V,200MA	07263	FDH5004
CR6245	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR6263	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR6277	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR6279	152-0107-00			SEMICOND DEVICE:SILICON,400V,400MA	01295	G727
CR6375	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR7550	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR7550, 655HR, 655HR-1 ONLY)		
CR7552	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR7552, 655HR, 655HR-1 ONLY)		
CR7560	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR7560, 655HR, 655HR-1 ONLY)		
CR7562	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR7562, 655HR, 655HR-1 ONLY)		
CR7650	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR7652	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR7654	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR7747	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR7848	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR7849	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR7850	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR7950	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
CR8030	152-0040-00			SEMICOND DEVICE:SILICON,600V,1A	15238	LG109
CR8040	152-0040-00			SEMICOND DEVICE:SILICON,600V,1A	15238	LG109
CR8070	152-0040-00			SEMICOND DEVICE:SILICON,600V,1A	15238	LG109
CR8100	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR8200	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR8201	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR8205	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR8305	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR8311	152-0066-00			SEMICOND DEVICE:SILICON,400V,750MA	14433	LG4016
CR8330	152-0462-00			SEMICOND DEVICE:RECT,SI,200V,2.5A	04713	SDA10228
CR8340	152-0406-00			SEMICOND DEVICE:SILICON,200V,3A	80009	152-0406-00
CR8360	152-0406-00			SEMICOND DEVICE:SILICON,200V,3A	80009	152-0406-00
CR8380	152-0406-00			SEMICOND DEVICE:SILICON,200V,3A	80009	152-0406-00
CR8640	152-0107-00			SEMICOND DEVICE:SILICON,400V,400MA	01295	G727
CR8641	152-0107-00			SEMICOND DEVICE:SILICON,400V,400MA	01295	G727
CR8642	152-0170-00			SEMICOND DEVICE:SILICON,1500V,10UA	52306	CX342
CR8650	152-0107-00			SEMICOND DEVICE:SILICON,400V,400MA	01295	G727
CR8652	152-0107-00			SEMICOND DEVICE:SILICON,400V,400MA	01295	G727
CR8660	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR8663	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR8664	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR8680	152-0107-00			SEMICOND DEVICE:SILICON,400V,400MA	01295	G727
CR8681	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR8682	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR8683	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
CR9064	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR9064, 650HR-1, 651HR-1, 655HR-1 ONLY)		
CR9084	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
	----- -----			(CR9084, 650HR-1, 651HR-1, 655HR-1 ONLY)		
DL3480	119-0416-00			DELAY LINE,ELEC:63.5USEC,60HZ	25403	DL53
	----- -----			(DL3480, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
DS7302	150-0059-00			LAMP,INCAND:14V,0.08A	08806	386
DS7402	150-0059-00			LAMP,INCAND:14V,0.08A	08806	386
DS7561	150-0121-00			LAMP,CARTRIDGE:5V,60MA,WHITE	55292	71320-01
DS7661	150-0121-00			LAMP,CARTRIDGE:5V,60MA,WHITE	55292	71320-01
DS8330	150-0030-00			LAMP,GLOW:NEON,T-2,60 TO 90 VOLTS	74276	NE2V-T
DS8766	150-0050-00			LAMP,GLOW:135V MAX,1.9MA	74276	LT2-24-2(NE2H)
E8701	119-0284-00			ARSR,ELEC SURGE:1.5KV,+/-500VD	91418	SCQR75Y152-1R0
E8711	119-0284-00			ARSR,ELEC SURGE:1.5KV,+/-500VD	91418	SCQR75Y152-1R0
E8713	119-0284-00			ARSR,ELEC SURGE:1.5KV,+/-500VD	91418	SCQR75Y152-1R0
E8715	119-0284-00			ARSR,ELEC SURGE:1.5KV,+/-500VD	91418	SCQR75Y152-1R0
E8771	119-0284-00			ARSR,ELEC SURGE:1.5KV,+/-500VD	91418	SCQR75Y152-1R0
E8781	119-0284-00			ARSR,ELEC SURGE:1.5KV,+/-500VD	91418	SCQR75Y152-1R0
E8791	119-0284-00			ARSR,ELEC SURGE:1.5KV,+/-500VD	91418	SCQR75Y152-1R0
F4280	159-0028-00			FUSE,CARTRIDGE:3AG,0.25A,250V,FAST-BLOW	71400	AGC 1/4
F7701	159-0023-00			FUSE,CARTRIDGE:3AG,2A,250V,5SEC	71400	MDX-2
	----- -----			(115VAC)		
F7701	159-0019-00			FUSE,CARTRIDGE:3AG,1A,250V,SLOW BLOW	71400	MDL1
	----- -----			(230VAC)		
F8290	159-0021-00			FUSE,CARTRIDGE:3AG,2A,250V,FAST-BLOW	71400	AGC 2
F8320	159-0042-00			FUSE,CARTRIDGE:3AG,0.75A,250V,FAST-BLOW	71400	AGC 3/4
K113	148-0080-00			RELAY,ARMATURE:DPDT,5VDC,200MW	80009	148-0080-00
	----- -----			(K113, 655HR, 655HR-1 ONLY)		
K133	148-0080-00			RELAY,ARMATURE:DPDT,5VDC,200MW	80009	148-0080-00
	----- -----			(K133, 650HR, 650HR-1, 651HR, 651HR-1 ONLY)		
K143	148-0064-00			RELAY,REED:SPST	95348	CB-831A-26
	----- -----			(K143, 655HR, 655HR-1 ONLY)		

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
K153	148-0064-00			RELAY,REED:SPST	95348	CB-831A-26
	----- -----			(K153, 655HR, 655HR-1 ONLY)		
K163	148-0064-00			RELAY,REED:SPST	95348	CB-831A-26
	----- -----			(K163, 655HR, 655HR-1 ONLY)		
K173	148-0064-00			RELAY,REED:SPST	95348	CB-831A-26
	----- -----			(K173, 655HR, 655HR-1 ONLY)		
L101	----- -----			(FURN AS A UNIT WITH THE INPUT LOOP THRU BOARD)		
L175	120-1190-00			TRANSFORMER,RF:DELAY LINE	80009	120-1190-00
L180	120-1190-00			TRANSFORMER,RF:DELAY LINE	80009	120-1190-00
L190	120-1190-00			TRANSFORMER,RF:DELAY LINE	80009	120-1190-00
L2201	108-0317-00			COIL,RF:FIXED,15UH	32159	71501M
	----- -----			(L2201, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
L2203	108-0231-00			COIL,RF:4.5UH	80009	108-0231-00
	----- -----			(L2203, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
L2205	114-0222-00			COIL,RF:2-6UH,CORE 276-0568-00	80009	114-0222-00
	----- -----			(L2205, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
L2507	114-0310-00			COIL,RF:22-80UH	80009	114-0310-00
	----- -----			(L2507, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
L2513	114-0280-00			COIL,RF:12-43UH,CORE 276-0568-00	80009	114-0280-00
	----- -----			(L2513, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
L2529	114-0310-00			COIL,RF:22-80UH	80009	114-0310-00
	----- -----			(L2529, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
L2535	114-0280-00			COIL,RF:12-43UH,CORE 276-0568-00	80009	114-0280-00
	----- -----			(L2535, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
L2551	108-0317-00			COIL,RF:FIXED,15UH	32159	71501M
	----- -----			(L2551, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
L2581	114-0310-00			COIL,RF:22-80UH	80009	114-0310-00
	----- -----			(L2581, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
L2655	114-0280-00			COIL,RF:12-43UH,CORE 276-0568-00	80009	114-0280-00
	----- -----			(L2655, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
L2685	120-1190-00			TRANSFORMER,RF:DELAY LINE	80009	120-1190-00
	----- -----			(L2685, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
L2787	120-1190-00			TRANSFORMER,RF:DELAY LINE	80009	120-1190-00
	----- -----			(L2787, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
L2887	120-1190-00			TRANSFORMER,RF:DELAY LINE	80009	120-1190-00
	----- -----			(L2887, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
L3040	108-0368-00			COIL,RF:10UH	80009	108-0368-00
	----- -----			(L3040, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
L3102	108-0317-00			COIL,RF:FIXED,15UH	32159	71501M
	----- -----			(L3102, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
L3104	108-0231-00			COIL,RF:4.5UH	80009	108-0231-00
	----- -----			(L3104, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
L3110	114-0222-00			COIL,RF:2-6UH,CORE 276-0568-00	80009	114-0222-00
	----- -----			(L3110, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
L3380	114-0278-00			COIL,RF:4.6-16.7UH,CORE 276-0568-00	80009	114-0278-00
	----- -----			(L3380, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
L3480	114-0278-00			COIL,RF:4.6-16.7UH,CORE 276-0568-00	80009	114-0278-00
	----- -----			(L3480, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
L3608	114-0310-00			COIL,RF:22-80UH	80009	114-0310-00
	----- -----			(L3608, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
L3610	114-0280-00			COIL,RF:12-43UH,CORE 276-0568-00	80009	114-0280-00
	----- -----			(L3610, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
L3630	114-0310-00			COIL,RF:22-80UH	80009	114-0310-00
	----- -----			(L3630, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
L3640	114-0280-00			COIL,RF:12-43UH,CORE 276-0568-00	80009	114-0280-00
	----- -----			(L3640, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
L3644	114-0310-00			COIL,RF:22-80UH	80009	114-0310-00
	----- -----			(L3644, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
L3650	114-0280-00			COIL,RF:12-43UH,CORE 276-0568-00	80009	114-0280-00
	----- -----			(L3650, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
L3770	114-0280-00			COIL,RF:12-43UH,CORE 276-0568-00	80009	114-0280-00
	----- -----			(L3770, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
L3790	114-0280-00			COIL,RF:12-43UH,CORE 276-0568-00	80009	114-0280-00
	----- -----			(L3790, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
L3890	108-0687-00			COIL,RF:25UH	80009	108-0687-00
	----- -----			(L3890, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
L3990	108-0687-00			COIL,RF:25UH	80009	108-0687-00
	----- -----			(L3990, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
L3994	108-0317-00			COIL,RF:FIXED,15UH	32159	71501M
	----- -----			(L3994, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
L4090	108-0422-00			COIL,RF:FIXED,82UH	80009	108-0422-00
L4322	108-0688-00			COIL,RF:3.5MH	80009	108-0688-00
L6201	108-0324-00			COIL,RF:10MH	76493	70F102A1
L7501	108-0696-00			COIL,RF:6.3MH,DEGAUSSING	80009	108-0696-00
L8660	108-0336-00			COIL,RF:100UH	80009	108-0336-00
L8703	108-0651-01	B010100	B020799	COIL,TUBE DEFLE:X-Y AXIS	80009	108-0651-01
L8703	108-0651-02	B020800		COIL,TUBE DEFL:X-Y AXIS	80009	108-0651-02
	----- -----			(L8703 FURNISHED AS A UNIT WITH L8709)		
L8705	108-0653-00			COIL,TUBE DEFL:BEAM ALIGNMENT	80009	108-0653-00
L8707	108-0653-00			COIL,TUBE DEFL:BEAM ALIGNMENT	80009	108-0653-00
L8709	108-0651-01	B010100	B020799	COIL,TUBE DEFLE:X-Y AXIS	80009	108-0651-01
L8709	108-0651-02	B020800		COIL,TUBE DEFL:X-Y AXIS	80009	108-0651-02
	----- -----			(L8709 FURNISHED AS A UNIT WITH L8703)		
LR1460	108-0111-00			COIL,RF:5.5UH	80009	108-0111-00
LR3040	108-0368-00			COIL,RF:10UH	80009	108-0368-00
	----- -----			(LR3040, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
LR3994	108-0317-00			COIL,RF:FIXED,15UH	32159	71501M
	----- -----			(LR3994, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
LR4160	108-0111-00			COIL,RF:5.5UH	80009	108-0111-00
Q111	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q128	151-0301-00			TRANSISTOR:SILICON,PNP	27014	2N2907A
Q146	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q170	151-1012-00			TRANSISTOR:SILICON,FE,N-CHANNEL	80009	151-1012-00
Q180	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q181	151-0301-00			TRANSISTOR:SILICON,PNP	27014	2N2907A
	----- -----			(Q181, 655HR, 655HR-1 ONLY)		
Q190	151-0301-00			TRANSISTOR:SILICON,PNP	27014	2N2907A
	----- -----			(Q190, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q1009	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q1021	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q1071	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q1121	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q1131	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q1141	151-0301-00			TRANSISTOR:SILICON,PNP	27014	2N2907A
Q1142	151-0301-00			TRANSISTOR:SILICON,PNP	27014	2N2907A
Q1161	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q1163	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q1170	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q1171	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1221	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1261	151-0369-00	B010100	B042876	TRANSISTOR:SILICON,PNP	01295	SKA6664
Q1261	151-0369-02	B042877		TRANSISTOR:SILICON,PNP,SCREENED	80009	151-0369-02
Q1271	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1311	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1313	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1314	151-0369-00	B010100	B042876	TRANSISTOR:SILICON,PNP	01295	SKA6664
Q1314	151-0369-02	B042877		TRANSISTOR:SILICON,PNP,SCREENED	80009	151-0369-02
Q1315	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
Q1321	151-0369-00	B010100	B042876	TRANSISTOR:SILICON,PNP	01295	SKA6664
Q1321	151-0369-02	B042877		TRANSISTOR:SILICON,PNP,SCREENED	80009	151-0369-02
Q1322	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q1341	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q1351	151-0369-00	B010100	B042876	TRANSISTOR:SILICON,PNP	01295	SKA6664
Q1351	151-0369-02	B042877		TRANSISTOR:SILICON,PNP,SCREENED	80009	151-0369-02
Q1361	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q1371	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q1422	151-0341-00			TRANSISTOR:SILICON,NPN	07263	S040065
Q1442	151-0221-00			TRANSISTOR:SILICON,PNP	04713	SPS246
Q1492	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1502	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1511	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1519	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q1520	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q1525	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q1530	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1539	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q1540	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q1542	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q1550	151-0341-00			TRANSISTOR:SILICON,NPN	07263	S040065
Q1555	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q1580	151-0341-00			TRANSISTOR:SILICON,NPN	07263	S040065
Q1588	151-0341-00			TRANSISTOR:SILICON,NPN	07263	S040065
Q1590	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1601	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q1609	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q1614	151-0221-00			TRANSISTOR:SILICON,PNP	04713	SPS246
Q1619	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1631	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q1639	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q1643	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1653	151-0216-00			TRANSISTOR:SILICON,PNP	04713	SPS8803
Q1656	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1669	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1672	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q1685	151-0341-00			TRANSISTOR:SILICON,NPN	07263	S040065
Q1690	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q1695	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q1729	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1735	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q1740	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1741	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1742	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q1743	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
Q1744	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
Q1748	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1750	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1752	151-0225-00			TRANSISTOR:SILICON,NPN	07263	S39291
Q1756	151-0225-00			TRANSISTOR:SILICON,NPN	07263	S39291
Q1758	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q1760	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1783	151-0341-00			TRANSISTOR:SILICON,NPN	07263	S040065
Q1789	151-0341-00			TRANSISTOR:SILICON,NPN	07263	S040065
Q1838	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1855	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q1858	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q1885	151-0341-00			TRANSISTOR:SILICON,NPN	07263	S040065
Q1893	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
Q1895	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q1950	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q1960	151-0127-00			TRANSISTOR:SILICON,NPN	07263	S006075
Q1982	151-0341-00			TRANSISTOR:SILICON,NPN	07263	S040065
Q2083	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q2083, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2085	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q2085, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2087	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q2087, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2105	151-0457-00			TRANSISTOR:SILICON,NPN	07263	S39649
	----- -----			(Q2105, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2111	151-0457-00			TRANSISTOR:SILICON,NPN	07263	S39649
	----- -----			(Q2111, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2135	151-1015-00			TRANSISTOR:SILICON,FE,N-CHANNEL	22229	F1499
	----- -----			(Q2135, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2141	151-0458-00			TRANSISTOR:SILICON,PNP	80009	151-0458-00
	----- -----			(Q2141, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2155	151-0458-00			TRANSISTOR:SILICON,PNP	80009	151-0458-00
	----- -----			(Q2155, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2177	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q2177, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2183	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q2183, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2233	151-1015-00			TRANSISTOR:SILICON,FE,N-CHANNEL	22229	F1499
	----- -----			(Q2233, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2251	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q2251, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2253	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q2253, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2257	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q2257, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2269	151-0458-00			TRANSISTOR:SILICON,PNP	80009	151-0458-00
	----- -----			(Q2269, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2289	151-0457-00			TRANSISTOR:SILICON,NPN	07263	S39649
	----- -----			(Q2289, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2351	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q2351, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2367	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q2367, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2375	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q2375, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2451	151-0457-00			TRANSISTOR:SILICON,NPN	07263	S39649
	----- -----			(Q2451, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2453	151-0457-00			TRANSISTOR:SILICON,NPN	07263	S39649
	----- -----			(Q2453, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2459	151-0434-00			TRANSISTOR:SILICON,PNP	04713	SS7144
	----- -----			(Q2459, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2467	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q2467, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2485	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q2485, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2577	151-0301-00			TRANSISTOR:SILICON,PNP	27014	2N2907A
	----- -----			(Q2577, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2584	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
	----- -----			(Q2584, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2590	151-0301-00			TRANSISTOR:SILICON,PNP	27014	2N2907A
	----- -----			(Q2590, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
Q2601	151-0301-00			TRANSISTOR:SILICON,PNP	27014	2N2907A
	----- -----			(Q2601, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2613	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q2613, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2615	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q2615, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2623	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q2623, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2625	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q2625, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2651	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q2651, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2653	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q2653, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2655	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q2655, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2713	151-1015-00			TRANSISTOR:SILICON,FE,N-CHANNEL	22229	F1499
	----- -----			(Q2713, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2717	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q2717, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2721	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q2721, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2735	151-1015-00			TRANSISTOR:SILICON,FE,N-CHANNEL	22229	F1499
	----- -----			(Q2735, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2745	151-1015-00			TRANSISTOR:SILICON,FE,N-CHANNEL	22229	F1499
	----- -----			(Q2745, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2779	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q2779, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2785	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q2785, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2861	151-1026-00			TRANSISTOR:FET,N-CHAN,SI	80009	151-1026-00
	----- -----			(Q2861, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2875	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q2875, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2915	151-1015-00			TRANSISTOR:SILICON,FE,N-CHANNEL	22229	F1499
	----- -----			(Q2915, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2919	151-1015-00			TRANSISTOR:SILICON,FE,N-CHANNEL	22229	F1499
	----- -----			(Q2919, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q2925	151-1015-00			TRANSISTOR:SILICON,FE,N-CHANNEL	22229	F1499
	----- -----			(Q2925, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Q3010	151-0457-00			TRANSISTOR:SILICON,NPN	07263	S39649
	----- -----			(Q3010, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3072	151-0458-00			TRANSISTOR:SILICON,PNP	80009	151-0458-00
	----- -----			(Q3072, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3074	151-0458-00			TRANSISTOR:SILICON,PNP	80009	151-0458-00
	----- -----			(Q3074, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3090	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q3090, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3092	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q3092, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3094	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q3094, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3104	151-0457-00			TRANSISTOR:SILICON,NPN	07263	S39649
	----- -----			(Q3104, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3140	151-0508-00			TRANSISTOR:UJT,SI,2N6027,TO-98	03508	2N6027
	----- -----			(Q3140, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
Q3142	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q3142, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3146	151-1015-00			TRANSISTOR:SILICON,FE,N-CHANNEL	22229	F1499
	----- -----			(Q3146, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3150	151-1015-00			TRANSISTOR:SILICON,FE,N-CHANNEL	22229	F1499
	----- -----			(Q3150, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3210	151-0457-00			TRANSISTOR:SILICON,NPN	07263	S39649
	----- -----			(Q3210, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3212	151-0457-00			TRANSISTOR:SILICON,NPN	07263	S39649
	----- -----			(Q3212, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3216	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q3216, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3218	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q3218, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3230	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q3230, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3232	151-0458-00			TRANSISTOR:SILICON,PNP	80009	151-0458-00
	----- -----			(Q3232, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3234	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q3234, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3236	151-0458-00			TRANSISTOR:SILICON,PNP	80009	151-0458-00
	----- -----			(Q3236, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3270	151-0457-00			TRANSISTOR:SILICON,NPN	07263	S39649
	----- -----			(Q3270, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3290	151-0301-00			TRANSISTOR:SILICON,PNP	27014	2N2907A
	----- -----			(Q3290, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3340	151-0458-00			TRANSISTOR:SILICON,PNP	80009	151-0458-00
	----- -----			(Q3340, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3342	151-0458-00			TRANSISTOR:SILICON,PNP	80009	151-0458-00
	----- -----			(Q3342, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3344	151-1015-00			TRANSISTOR:SILICON,FE,N-CHANNEL	22229	F1499
	----- -----			(Q3344, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3350	151-1015-00			TRANSISTOR:SILICON,FE,N-CHANNEL	22229	F1499
	----- -----			(Q3350, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3368	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q3368, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3434	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q3434, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3440	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q3440, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3444	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q3444, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3446	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q3446, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3482	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q3482, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3578	151-0460-00			TRANSISTOR:SILICON,NPN	80009	151-0460-00
	----- -----			(Q3578, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3580	151-0460-00			TRANSISTOR:SILICON,NPN	80009	151-0460-00
	----- -----			(Q3580, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3582	151-0458-00			TRANSISTOR:SILICON,PNP	80009	151-0458-00
	----- -----			(Q3582, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3584	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q3584, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3590	151-0301-00			TRANSISTOR:SILICON,PNP	27014	2N2907A
	----- -----			(Q3590, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3592	151-0301-00			TRANSISTOR:SILICON,PNP	27014	2N2907A
	----- -----			(Q3592, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
Q3668	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q3668, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3674	151-0457-00			TRANSISTOR:SILICON,NPN	07263	S39649
	----- -----			(Q3674, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3680	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q3680, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3682	151-0438-00			TRANSISTOR:SILICON,PNP,SEL FROM SPS6927	80009	151-0438-00
	----- -----			(Q3682, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3684	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q3684, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3694	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q3694, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3710	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q3710, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3712	151-0458-00			TRANSISTOR:SILICON,PNP	80009	151-0458-00
	----- -----			(Q3712, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3714	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q3714, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3720	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q3720, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3722	151-0301-00			TRANSISTOR:SILICON,PNP	27014	2N2907A
	----- -----			(Q3722, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3724	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q3724, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3742	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q3742, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3744	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q3744, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3746	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q3746, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3750	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q3750, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3752	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q3752, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3754	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q3754, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3820	151-1015-00			TRANSISTOR:SILICON,FE,N-CHANNEL	22229	F1499
	----- -----			(Q3820, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3824	151-1015-00			TRANSISTOR:SILICON,FE,N-CHANNEL	22229	F1499
	----- -----			(Q3824, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3850	151-1015-00			TRANSISTOR:SILICON,FE,N-CHANNEL	22229	F1499
	----- -----			(Q3850, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3852	151-1015-00			TRANSISTOR:SILICON,FE,N-CHANNEL	22229	F1499
	----- -----			(Q3852, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3864	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q3864, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3865	151-0457-00			TRANSISTOR:SILICON,NPN	07263	S39649
	----- -----			(Q3865, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3866	151-1026-00			TRANSISTOR:FET,N-CHAN,SI	80009	151-1026-00
	----- -----			(Q3866, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3980	151-0459-00			TRANSISTOR:SILICON,PNP	80009	151-0459-00
	----- -----			(Q3980, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q3984	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q3984, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
Q4000	151-0208-00			TRANSISTOR:SILICON,PNP	80009	151-0208-00
Q4050	151-0239-00			TRANSISTOR:SILICON,NPN	80009	151-0239-00

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
Q4090	151-0346-00			TRANSISTOR:NPN,SI,A705 FAMILY,TO-3	80009	151-0346-00
Q4120	151-0358-00	B010100	B042876	TRANSISTOR:SILICON,NPN,SEL FROM D44R4	80009	151-0358-00
Q4120	151-0358-01	B042877		TRANSISTOR:SILICON,NPN,SCREENED	80009	151-0358-01
Q4130	151-0358-00	B010100	B042876	TRANSISTOR:SILICON,NPN,SEL FROM D44R4	80009	151-0358-00
Q4130	151-0358-01	B042877		TRANSISTOR:SILICON,NPN,SCREENED	80009	151-0358-01
Q4140	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q4160	151-0150-00			TRANSISTOR:SILICON,NPN	80009	151-0150-00
Q4208	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q4286	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q4288	151-0103-00			TRANSISTOR:SILICON,NPN	80009	151-0103-00
Q4338	151-0150-00			TRANSISTOR:SILICON,NPN	80009	151-0150-00
Q4352	151-0103-00			TRANSISTOR:SILICON,NPN	80009	151-0103-00
Q4358	151-0341-00			TRANSISTOR:SILICON,NPN	07263	S040065
Q4374	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q4420	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q4422	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q4442	151-0508-00			TRANSISTOR:UJT,SI,2N6027,TO-98	03508	2N6027
Q4450	151-0254-00			TRANSISTOR:SILICON,NPN	03508	X38L3118
Q4456	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q4476	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q4494	151-0508-00			TRANSISTOR:UJT,SI,2N6027,TO-98	03508	2N6027
Q4508	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q4518	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q4522	151-0216-00			TRANSISTOR:SILICON,PNP	04713	SPS8803
Q4530	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q4532	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q4548	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q4560	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q4574	151-0341-00			TRANSISTOR:SILICON,NPN	07263	S040065
Q4576	151-1005-00			TRANSISTOR:SILICON,JFE,N-CHANNEL	80009	151-1005-00
Q4578	151-1005-00			TRANSISTOR:SILICON,JFE,N-CHANNEL	80009	151-1005-00
Q4580	151-0341-00			TRANSISTOR:SILICON,NPN	07263	S040065
Q4594	151-1005-00			TRANSISTOR:SILICON,JFE,N-CHANNEL	80009	151-1005-00
Q4596	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q4598	151-1005-00			TRANSISTOR:SILICON,JFE,N-CHANNEL	80009	151-1005-00
Q4608	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q4668	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q4686	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q4720	151-0149-00			TRANSISTOR:SILICON,NPN	80009	151-0149-00
Q4723	151-0150-00			TRANSISTOR:SILICON,NPN	80009	151-0150-00
Q4725	151-0280-00			TRANSISTOR:SILICON,PNP	04713	SS8065
Q4729	151-0103-00			TRANSISTOR:SILICON,NPN	80009	151-0103-00
Q4730	151-0149-00			TRANSISTOR:SILICON,NPN	80009	151-0149-00
Q4750	151-0148-00			TRANSISTOR:SILICON,NPN	02735	36568
Q4755	151-0134-00			TRANSISTOR:SILICON,PNP	80009	151-0134-00
Q4759	151-0103-00			TRANSISTOR:SILICON,NPN	80009	151-0103-00
Q4770	151-0227-00			TRANSISTOR:SILICON,PNP	04713	2N3741
Q4790	151-0148-00			TRANSISTOR:SILICON,NPN	02735	36568
Q4841	151-0358-00	B010100	B042876	TRANSISTOR:SILICON,NPN,SEL FROM D44R4	80009	151-0358-00
Q4841	151-0358-01	B042877		TRANSISTOR:SILICON,NPN,SCREENED	80009	151-0358-01
Q4851	151-0150-00			TRANSISTOR:SILICON,NPN	80009	151-0150-00
Q4861	151-0150-00			TRANSISTOR:SILICON,NPN	80009	151-0150-00
Q4863	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
Q4871	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q4873	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
Q4981	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q5000	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q5002	151-0221-00			TRANSISTOR:SILICON,PNP	04713	SPS246
Q5010	151-0221-00			TRANSISTOR:SILICON,PNP	04713	SPS246
Q5100	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
Q5170	151-0219-00			TRANSISTOR:SILICON,PNP	07263	S022650
Q5180	151-0219-00			TRANSISTOR:SILICON,PNP	07263	S022650
Q5182	151-0219-00			TRANSISTOR:SILICON,PNP	07263	S022650
Q5220	151-0221-00			TRANSISTOR:SILICON,PNP	04713	SPS246
Q5222	151-0221-00			TRANSISTOR:SILICON,PNP	04713	SPS246
Q5230	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q5232	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q5240	151-0219-00			TRANSISTOR:SILICON,PNP	07263	S022650
Q5242	153-0602-00			SEMICOND DVC SE:MPS6521,THREEMATCHED	80009	153-0602-00
	----- -----			(Q5242,Q5340,Q5342 FURN AS A MATCHED TRIO)		
Q5250	151-0219-00			TRANSISTOR:SILICON,PNP	07263	S022650
Q5252	151-0219-00			TRANSISTOR:SILICON,PNP	07263	S022650
Q5270	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q5272	153-0602-00			SEMICOND DVC SE:MPS6521,THREEMATCHED	80009	153-0602-00
	----- -----			(Q5272,Q5370,Q5372 FURN AS A MATCHED TRIO)		
Q5280	151-0219-00			TRANSISTOR:SILICON,PNP	07263	S022650
Q5282	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q5310	151-0221-00			TRANSISTOR:SILICON,PNP	04713	SPS246
Q5312	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q5330	153-0602-00			SEMICOND DVC SE:MPS6521,THREEMATCHED	80009	153-0602-00
	----- -----			(Q5330,Q5332,Q5334 FURN AS A MATCHED TRIO)		
Q5332	153-0602-00			SEMICOND DVC SE:MPS6521,THREEMATCHED	80009	153-0602-00
	----- -----			(Q5330,Q5332,Q5334 FURN AS A MATCHED TRIO)		
Q5334	153-0602-00			SEMICOND DVC SE:MPS6521,THREEMATCHED	80009	153-0602-00
	----- -----			(Q5330,Q5332,Q5334 FURN AS A MATCHED TRIO)		
Q5340	153-0602-00			SEMICOND DVC SE:MPS6521,THREEMATCHED	80009	153-0602-00
	----- -----			(Q5242,Q5340,Q5342 FURN AS A MATCHED TRIO)		
Q5342	153-0602-00			SEMICOND DVC SE:MPS6521,THREEMATCHED	80009	153-0602-00
	----- -----			(Q5242,Q5340,Q5342 FURN AS A MATCHED TRIO)		
Q5344	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q5370	153-0602-00			SEMICOND DVC SE:MPS6521,THREEMATCHED	80009	153-0602-00
	----- -----			(Q5272,Q5370,Q5372 FURN AS A MATCHED TRIO)		
Q5372	153-0602-00			SEMICOND DVC SE:MPS6521,THREEMATCHED	80009	153-0602-00
	----- -----			(Q5272,Q5370,Q5372 FURN AS A MATCHED TRIO)		
Q5420	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q5500	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q5510	151-0164-00			TRANSISTOR:SILICON,PNP	01295	SKB3334
Q5512	151-0216-00			TRANSISTOR:SILICON,PNP	04713	SPS8803
Q5514	151-0216-00			TRANSISTOR:SILICON,PNP	04713	SPS8803
Q5530	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q5540	151-0164-00			TRANSISTOR:SILICON,PNP	01295	SKB3334
Q5542	151-0216-00			TRANSISTOR:SILICON,PNP	04713	SPS8803
Q5544	151-0216-00			TRANSISTOR:SILICON,PNP	04713	SPS8803
Q5560	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q5570	151-0164-00			TRANSISTOR:SILICON,PNP	01295	SKB3334
Q5572	151-0216-00			TRANSISTOR:SILICON,PNP	04713	SPS8803
Q5574	151-0216-00			TRANSISTOR:SILICON,PNP	04713	SPS8803
Q5600	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q5602	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q5620	151-0427-00			TRANSISTOR:SILICON,NPN	80009	151-0427-00
Q5622	151-0427-00			TRANSISTOR:SILICON,NPN	80009	151-0427-00
Q5630	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q5632	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q5650	151-0427-00			TRANSISTOR:SILICON,NPN	80009	151-0427-00
Q5652	151-0427-00			TRANSISTOR:SILICON,NPN	80009	151-0427-00
Q5660	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q5662	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
Q5680	151-0427-00			TRANSISTOR:SILICON,NPN	80009	151-0427-00
Q5682	151-0427-00			TRANSISTOR:SILICON,NPN	80009	151-0427-00
Q5700	151-1005-00			TRANSISTOR:SILICON,JFE,N-CHANNEL	80009	151-1005-00
Q5702	151-1005-00			TRANSISTOR:SILICON,JFE,N-CHANNEL	80009	151-1005-00
Q5704	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q5710	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q5720	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q5722	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q5724	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q5730	151-1005-00			TRANSISTOR:SILICON,JFE,N-CHANNEL	80009	151-1005-00
Q5732	151-1005-00			TRANSISTOR:SILICON,JFE,N-CHANNEL	80009	151-1005-00
Q5734	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q5740	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q5750	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q5752	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q5754	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q5760	151-1005-00			TRANSISTOR:SILICON,JFE,N-CHANNEL	80009	151-1005-00
Q5762	151-1005-00			TRANSISTOR:SILICON,JFE,N-CHANNEL	80009	151-1005-00
Q5764	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q5770	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q5780	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q5782	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q5784	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q5800	151-0124-00			TRANSISTOR:SILICON,NPN,SEL FROM 2N3501	04713	SM8138
Q5820	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q5830	151-0124-00			TRANSISTOR:SILICON,NPN,SEL FROM 2N3501	04713	SM8138
Q5850	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q5860	151-0124-00			TRANSISTOR:SILICON,NPN,SEL FROM 2N3501	04713	SM8138
Q5880	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q5900	151-0270-00			TRANSISTOR:SILICON,PNP	04713	OBD
Q5920	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q5930	151-0270-00			TRANSISTOR:SILICON,PNP	04713	OBD
Q5950	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q5960	151-0270-00			TRANSISTOR:SILICON,PNP	04713	OBD
Q5980	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
Q6011	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q6051	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q6061	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q6065	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q6069	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q6091	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q6137	151-0292-00	B010100	B042291	TRANSISTOR:SILICON,NPN	80009	151-0292-00
Q6137	151-0444-03	B042292		TRANSISTOR:SILICON,NPN	80009	151-0444-03
Q6141	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
Q6145	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q6175	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q6184	151-0444-00	XB030000		TRANSISTOR:SILICON,NPN	80009	151-0444-00
Q6241	151-0169-00			TRANSISTOR:SILICON,NPN	80009	151-0169-00
Q6279	151-0169-00			TRANSISTOR:SILICON,NPN	80009	151-0169-00
Q6289	151-0207-00			TRANSISTOR:SILICON,NPN	03508	X32D6191
Q7560	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
Q7771	151-0224-00			TRANSISTOR:SILICON,NPN	07263	S24850
Q8000	151-0150-00			TRANSISTOR:SILICON,NPN	80009	151-0150-00
Q8090	151-0103-00			TRANSISTOR:SILICON,NPN	80009	151-0103-00
Q8120	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
Q8180	151-0164-00			TRANSISTOR:SILICON,PNP	01295	SKB3334
Q8190	151-0164-00			TRANSISTOR:SILICON,PNP	01295	SKB3334
Q8210	151-0232-00			TRANSISTOR:SILICON,NPN,DUAL	80009	151-0232-00
Q8220	151-0385-00			TRANSISTOR:SILICON,PNP	02735	2N5416

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
Q8250	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
Q8280	151-0208-00			TRANSISTOR:SILICON,PNP	80009	151-0208-00
Q8310	151-0514-00			TRANSISTOR:SILICON,SCR	02735	2N3528
Q8350	151-0208-00			TRANSISTOR:SILICON,PNP	80009	151-0208-00
Q8410	151-0337-00			TRANSISTOR:SILICON,NPN	02735	61443
Q8420	151-0337-00			TRANSISTOR:SILICON,NPN	02735	61443
Q8430	151-0337-00			TRANSISTOR:SILICON,NPN	02735	61443
Q8440	151-0291-00			TRANSISTOR:SILICON,NPN	02735	60156
Q8602	151-0316-00			TRANSISTOR:SILICON,NPN	80009	151-0316-00
Q8640	151-0341-00			TRANSISTOR:SILICON,NPN	07263	S040065
Q8650	151-0613-00			TRANSISTOR:NPN,SI,SJE1657,TO-126	80009	151-0613-00
Q8670	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
Q8672	151-0224-00			TRANSISTOR:SILICON,NPN	07263	S24850
Q8680	151-0390-00			TRANSISTOR:SILICON,NPN	04713	SPS3414
Q9032	151-0224-00			TRANSISTOR:SILICON,NPN	07263	S24850
	----- -----			(Q9032, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9072	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
	----- -----			(Q9072, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9082	151-0224-00			TRANSISTOR:SILICON,NPN	07263	S24850
	----- -----			(Q9082, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9126	151-0224-00			TRANSISTOR:SILICON,NPN	07263	S24850
	----- -----			(Q9126, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9128	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
	----- -----			(Q9128, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9154	151-0224-00			TRANSISTOR:SILICON,NPN	07263	S24850
	----- -----			(Q9154, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9156	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
	----- -----			(Q9156, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9186	151-0224-00			TRANSISTOR:SILICON,NPN	07263	S24850
	----- -----			(Q9186, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9188	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
	----- -----			(Q9188, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9220	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
	----- -----			(Q9220, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9222	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
	----- -----			(Q9222, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9224	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
	----- -----			(Q9224, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9226	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
	----- -----			(Q9226, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9227	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q9227, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9250	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
	----- -----			(Q9250, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9252	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
	----- -----			(Q9252, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9254	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
	----- -----			(Q9254, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9256	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
	----- -----			(Q9256, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9278	151-0223-00			TRANSISTOR:SILICON,NPN	04713	SPS8026
	----- -----			(Q9278, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9280	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
	----- -----			(Q9280, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9286	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
	----- -----			(Q9286, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9288	151-0192-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS6521	04713	SPS8801
	----- -----			(Q9288, 650HR-1, 651HR-1, 655HR-1 ONLY)		

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Q9328	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q9328, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9340	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q9340, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9350	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q9350, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9363	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q9363, 650HR-1, 651HR-1, 655HR-1 ONLY)		
Q9376	151-0302-00			TRANSISTOR:SILICON,NPN	07263	S038487
	----- -----			(Q9376, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R111	321-0256-00			RES.,FXD,FILM:4.53K OHM,1%,0.125W	91637	MFF1816G45300F
	----- -----			(R111, 655HR, 655HR-1 ONLY)		
R112	321-0269-00			RES.,FXD,FILM:6.19K OHM,1%,0.125W	91637	MFF1816G61900F
	----- -----			(R112, 655HR, 655HR-1 ONLY)		
R114	321-0232-00			RES.,FXD,FILM:2.55K OHM,1%,0.125W	91637	MFF1816G25500F
	----- -----			(R114, 655HR, 655HR-1 ONLY)		
R115	321-0232-00			RES.,FXD,FILM:2.55K OHM,1%,0.125W	91637	MFF1816G25500F
	----- -----			(R115, 655HR, 655HR-1 ONLY)		
R117	311-1232-00			RES.,VAR,NONWIR:50K OHM,20%,0.50W	32997	3386F-T04-503
R118	311-1232-00			RES.,VAR,NONWIR:50K OHM,20%,0.50W	32997	3386F-T04-503
R119	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R119, 655HR, 655HR-1 ONLY)		
R120	315-0564-00			RES.,FXD,CMPSN:560K OHM,5%,0.25W	01121	CB5645
R121	315-0394-00			RES.,FXD,CMPSN:390K OHM,5%,0.25W	01121	CB3945
R123	311-1228-00			RES.,VAR,NONWIR:10K OHM,20%,0.50W	32997	3386F-T04-103
R125	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R126	315-0154-00			RES.,FXD,CMPSN:150K OHM,5%,0.25W	01121	CB1545
R128	321-0097-00			RES.,FXD,FILM:100 OHM,1%,0.125W	91637	MFF1816G100R0F
	----- -----			(R128, 650HR, 650HR-1, 651HR, 651HR-1 ONLY)		
R131	321-0256-00			RES.,FXD,FILM:4.53K OHM,1%,0.125W	91637	MFF1816G45300F
R132	321-0269-00			RES.,FXD,FILM:6.19K OHM,1%,0.125W	91637	MFF1816G61900F
R133	321-0198-00			RES.,FXD,FILM:1.13K OHM,1%,0.125W	91637	MFF1816G11300F
R134	315-0274-00			RES.,FXD,CMPSN:270K OHM,5%,0.25W	01121	CB2745
R135	315-0274-00			RES.,FXD,CMPSN:270K OHM,5%,0.25W	01121	CB2745
R136	321-0198-00			RES.,FXD,FILM:1.13K OHM,1%,0.125W	91637	MFF1816G11300F
R137	315-0274-00			RES.,FXD,CMPSN:270K OHM,5%,0.25W	01121	CB2745
	----- -----			(R137, 655HR, 655HR-1 ONLY)		
R138	315-0274-00			RES.,FXD,CMPSN:270K OHM,5%,0.25W	01121	CB2745
	----- -----			(R138, 655HR, 655HR-1 ONLY)		
R139	321-0198-00			RES.,FXD,FILM:1.13K OHM,1%,0.125W	91637	MFF1816G11300F
	----- -----			(R139, 655HR, 655HR-1 ONLY)		
R140	311-1232-00			RES.,VAR,NONWIR:50K OHM,20%,0.50W	32997	3386F-T04-503
	----- -----			(R140, 655HR, 655HR-1 ONLY)		
R141	311-1232-00			RES.,VAR,NONWIR:50K OHM,20%,0.50W	32997	3386F-T04-503
	----- -----			(R141, 655HR, 655HR-1 ONLY)		
R142	321-0232-00			RES.,FXD,FILM:2.55K OHM,1%,0.125W	91637	MFF1816G25500F
R143	321-0232-00			RES.,FXD,FILM:2.55K OHM,1%,0.125W	91637	MFF1816G25500F
R145	321-0097-00			RES.,FXD,FILM:100 OHM,1%,0.125W	91637	MFF1816G100R0F
R146	321-0097-00			RES.,FXD,FILM:100 OHM,1%,0.125W	91637	MFF1816G100R0F
R148	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
R149	321-0277-00			RES.,FXD,FILM:7.5K OHM,1%,0.125W	91637	MFF1816G75000F
R150	321-0210-00			RES.,FXD,FILM:1.5K OHM,1%,0.125W	91637	MFF1816G15000F
R151	321-0269-00			RES.,FXD,FILM:6.19K OHM,1%,0.125W	91637	MFF1816G61900F
R153	321-0113-00			RES.,FXD,FILM:147 OHM,1%,0.125W	91637	MFF1816G147R0F
R154	321-0275-00			RES.,FXD,FILM:7.15K OHM,1%,0.125W	91637	MFF1816G71500F
R156	321-0198-00			RES.,FXD,FILM:1.13K OHM,1%,0.125W	91637	MFF1816G11300F
	----- -----			(R156, 655HR, 655HR-1 ONLY)		

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R158	321-0169-00			RES.,FXD,FILM:562 OHM,1%,0.125W	91637	MFF1816G562R0F
R160	311-1224-00			RES.,VAR,NONWIR:500 OHM,20%,0.50W	32997	3386F-T04-501
R162	311-1224-00			RES.,VAR,NONWIR:500 OHM,20%,0.50W	32997	3386F-T04-501
	----- -----			(R162, 655HR, 655HR-1 ONLY)		
R163	321-0164-00			RES.,FXD,FILM:499 OHM,1%,0.125W	91637	MFF1816G499R0F
R170	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R172	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R178	321-0169-00			RES.,FXD,FILM:562 OHM,1%,0.125W	91637	MFF1816G562R0F
R179	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R179, 655HR, 655HR-1 ONLY)		
R180	311-1224-00			RES.,VAR,NONWIR:500 OHM,20%,0.50W	32997	3386F-T04-501
	----- -----			(R180, 655HR, 655HR-1 ONLY)		
R182	311-1224-00			RES.,VAR,NONWIR:500 OHM,20%,0.50W	32997	3386F-T04-501
R187	321-0097-00			RES.,FXD,FILM:100 OHM,1%,0.125W	91637	MFF1816G100R0F
	----- -----			(R187, 655HR, 655HR-1 ONLY)		
R190	315-0681-00			RES.,FXD,CMPSN:680 OHM,5%,0.25W	01121	CB6815
R194	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R194, 650HR, 650HR-1, 651HR, 651HR-1 ONLY)		
R195	308-0300-00			RES.,FXD,WW:1.75K OHM,1%,3W	91637	RS2B-B17500F
R197	321-0094-00			RES.,FXD,FILM:93.1 OHM,1%,0.125W	91637	MFF1816G93R10F
R198	321-0164-00			RES.,FXD,FILM:499 OHM,1%,0.125W	91637	MFF1816G499R0F
R199	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R1009	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	91637	MFF1816G40200F
R1010	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	91637	MFF1816G40200F
R1011	316-0100-00			RES.,FXD,CMPSN:10 OHM,10%,0.25W	01121	CB1001
R1012	316-0100-00			RES.,FXD,CMPSN:10 OHM,10%,0.25W	01121	CB1001
R1013	316-0101-00			RES.,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
R1019	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R1020	321-0097-00			RES.,FXD,FILM:100 OHM,1%,0.125W	91637	MFF1816G100R0F
R1021	321-0097-00			RES.,FXD,FILM:100 OHM,1%,0.125W	91637	MFF1816G100R0F
R1031	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R1041	321-0318-00			RES.,FXD,FILM:20K OHM,1%,0.125W	91637	MFF1816G20001F
R1043	321-0239-00			RES.,FXD,FILM:3.01K OHM,1%,0.125W	91637	MFF1816G30100F
R1061	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R1063	315-0510-00			RES.,FXD,CMPSN:51 OHM,5%,0.25W	01121	CB5105
R1081	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R1101	316-0100-00			RES.,FXD,CMPSN:10 OHM,10%,0.25W	01121	CB1001
R1102	301-0243-00			RES.,FXD,CMPSN:24K OHM,5%,0.50W	01121	EB2435
R1103	322-0647-00			RES.,FXD,FILM:106 OHM,0.5%,0.25W	75042	CEBT0-1060D
R1121	315-0392-00			RES.,FXD,CMPSN:3.9K OHM,5%,0.25W	01121	CB3925
R1123	307-0115-00			RES.,FXD,CMPSN:7.5 OHM,5%,0.25W	01121	CB75G5
R1131	311-1263-00			RES.,VAR,NONWIR:1K OHM,10%,0.50W	32997	3329P-L58-102
R1141	321-0287-00			RES.,FXD,FILM:9.53K OHM,1%,0.125W	91637	MFF1816G95300F
R1143	321-0103-00			RES.,FXD,FILM:115 OHM,1%,0.125W	91637	MFF1816G115R0F
R1151	315-0511-00			RES.,FXD,CMPSN:510 OHM,5%,0.25W	01121	CB5115
R1152	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
R1153	321-0103-00			RES.,FXD,FILM:115 OHM,1%,0.125W	91637	MFF1816G115R0F
R1154	321-0128-00			RES.,FXD,FILM:210 OHM,1%,0.125W	91637	MFF1816G210R0F
R1155	315-0753-00			RES.,FXD,CMPSN:75K OHM,5%,0.25W	01121	CB7535
R1157	323-0170-00			RES.,FXD,FILM:576 OHM,1%,0.50W	91637	MFF1226G576R0F
R1161	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R1163	315-0392-00			RES.,FXD,CMPSN:3.9K OHM,5%,0.25W	01121	CB3925
R1170	321-0242-00			RES.,FXD,FILM:3.24K OHM,1%,0.125W	91637	MFF1816G32400F
R1171	321-0225-00			RES.,FXD,FILM:2.15K OHM,1%,0.125W	91637	MFF1816G21500F
R1181	301-0243-00			RES.,FXD,CMPSN:24K OHM,5%,0.50W	01121	EB2435
R1191	307-0115-00			RES.,FXD,CMPSN:7.5 OHM,5%,0.25W	01121	CB75G5

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R1201	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R1203	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R1211	321-0385-00			RES.,FXD,FILM:100K OHM,1%,0.125W	91637	MFF1816G10002F
R1220	321-0269-00			RES.,FXD,FILM:6.19K OHM,1%,0.125W	91637	MFF1816G61900F
R1221	315-0302-00			RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
R1223	321-0385-00			RES.,FXD,FILM:100K OHM,1%,0.125W	91637	MFF1816G10002F
R1241	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
R1243	315-0753-00			RES.,FXD,CMPSN:75K OHM,5%,0.25W	01121	CB7535
R1245	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R1251	321-0385-00			RES.,FXD,FILM:100K OHM,1%,0.125W	91637	MFF1816G10002F
R1261	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
R1263	321-0385-00			RES.,FXD,FILM:100K OHM,1%,0.125W	91637	MFF1816G10002F
R1265	321-0269-00			RES.,FXD,FILM:6.19K OHM,1%,0.125W	91637	MFF1816G61900F
R1281	315-0100-00			RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
R1283	315-0302-00			RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
R1285	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R1301	321-0275-00			RES.,FXD,FILM:7.15K OHM,1%,0.125W	91637	MFF1816G71500F
R1302	321-0326-00			RES.,FXD,FILM:24.3K OHM,1%,0.125W	91637	MFF1816G24301F
R1303	321-0273-00			RES.,FXD,FILM:6.81K OHM,1%,0.125W	91637	MFF1816G68100F
R1305	321-0774-03			RES.,FXD,FILM:4.5K OHM,0.25%,0.125W	91637	MFF1816D45000C
R1306	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
R1307	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R1312	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R1313	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R1321	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R1323	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R1326	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
R1327	321-0603-00			RES.,FXD,FILM:15K OHM,0.25%,0.125W	91637	MFF1816D15001C
R1343	321-0774-03			RES.,FXD,FILM:4.5K OHM,0.25%,0.125W	91637	MFF1816D45000C
R1361	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R1363	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R1365	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R1370	321-0603-00			RES.,FXD,FILM:15K OHM,0.25%,0.125W	91637	MFF1816D15001C
R1381	321-0774-03			RES.,FXD,FILM:4.5K OHM,0.25%,0.125W	91637	MFF1816D45000C
R1407	321-0273-00			RES.,FXD,FILM:6.81K OHM,1%,0.125W	91637	MFF1816G68100F
R1408	321-0277-00			RES.,FXD,FILM:7.5K OHM,1%,0.125W	91637	MFF1816G75000F
R1409	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
R1410	321-0201-00			RES.,FXD,FILM:1.21K OHM,1%,0.125W	91637	MFF1816G12100F
R1412	321-0279-00			RES.,FXD,FILM:7.87K OHM,1%,0.125W	91637	MFF1816G78700F
R1413	315-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.25W	01121	CB8225
R1420	316-0101-00			RES.,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
R1421	316-0101-00			RES.,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
R1422	315-0752-00			RES.,FXD,CMPSN:7.5K OHM,5%,0.25W	01121	CB7525
R1423	315-0273-00			RES.,FXD,CMPSN:27K OHM,5%,0.25W	01121	CB2735
R1427	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R1430	321-0296-00			RES.,FXD,FILM:11.8K OHM,1%,0.125W	91637	MFF1816G11801F
R1432	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R1434	315-0683-00			RES.,FXD,CMPSN:68K OHM,5%,0.25W	01121	CB6835
R1436	315-0162-00			RES.,FXD,CMPSN:1.6K OHM,5%,0.25W	01121	CB1625
R1446	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
R1448	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
R1449	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R1450	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R1458	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R1460	315-0824-00			RES.,FXD,CMPSN:820K OHM,5%,0.25W	01121	CB8245
R1462	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
R1463	316-0100-00			RES.,FXD,CMPSN:10 OHM,10%,0.25W	01121	CB1001

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R1472	316-0562-00			RES.,FXD,CMPSN:5.6K OHM,10%,0.25W	01121	CB5621
R1474	316-0562-00			RES.,FXD,CMPSN:5.6K OHM,10%,0.25W	01121	CB5621
R1481	315-0621-00			RES.,FXD,CMPSN:620 OHM,5%,0.25W	01121	CB6215
R1486	315-0622-00			RES.,FXD,CMPSN:6.2K OHM,5%,0.25W	01121	CB6225
R1491	316-0220-00			RES.,FXD,CMPSN:22 OHM,10%,0.25W	01121	CB2201
R1513	315-0273-00			RES.,FXD,CMPSN:27K OHM,5%,0.25W	01121	CB2735
R1521	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
R1528	321-0235-00			RES.,FXD,FILM:2.74K OHM,1%,0.125W	91637	MFF1816G27400F
R1529	321-0333-00			RES.,FXD,FILM:28.7K OHM,1%,0.125W	91637	MFF1816G28701F
R1530	315-0683-00			RES.,FXD,CMPSN:68K OHM,5%,0.25W	01121	CB6835
R1534	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R1545	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
R1548	321-0335-00			RES.,FXD,FILM:30.1K OHM,1%,0.125W	91637	MFF1816G30101F
R1549	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R1550	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
R1551	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R1553	315-0183-00			RES.,FXD,CMPSN:18K OHM,5%,0.25W	01121	CB1835
R1554	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
R1555	315-0155-00	XB033110		RES.,FXD,CMPSN:1.5M OHM,5%,0.25W	01121	CB1555
R1556	316-0473-00			RES.,FXD,CMPSN:47K OHM,10%,0.25W	01121	CB4731
R1558	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
R1559	315-0512-00			RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125
R1560	315-0106-00			RES.,FXD,CMPSN:10M OHM,5%,0.25W	01121	CB1065
R1562	316-0274-00			RES.,FXD,CMPSN:270K OHM,10%,0.25W	01121	CB2741
R1564	321-0325-00			RES.,FXD,FILM:23.7K OHM,1%,0.125W	91637	MFF1816G23701F
R1567	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R1568	321-0319-00			RES.,FXD,FILM:20.5K OHM,1%,0.125W	91637	MFF1816G20501F
R1569	316-0562-00			RES.,FXD,CMPSN:5.6K OHM,10%,0.25W	01121	CB5621
R1582	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R1591	316-0220-00			RES.,FXD,CMPSN:22 OHM,10%,0.25W	01121	CB2201
R1593	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R1594	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R1597	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R1602	315-0184-00			RES.,FXD,CMPSN:180K OHM,5%,0.25W	01121	CB1845
R1609	315-0623-00			RES.,FXD,CMPSN:62K OHM,5%,0.25W	01121	CB6235
R1610	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R1611	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
R1612	321-0273-00			RES.,FXD,FILM:6.81K OHM,1%,0.125W	91637	MFF1816G68100F
R1613	321-0273-00			RES.,FXD,FILM:6.81K OHM,1%,0.125W	91637	MFF1816G68100F
R1614	315-0512-00			RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125
R1622	321-0403-00			RES.,FXD,FILM:154K OHM,1%,0.125W	91637	MFF1816G15402F
R1624	321-0321-00			RES.,FXD,FILM:21.5K OHM,1%,0.125W	91637	MFF1816G21501F
R1626	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R1630	316-0333-00			RES.,FXD,CMPSN:33K OHM,10%,0.25W	01121	CB3331
R1631	316-0126-00			RES.,FXD,CMPSN:12M OHM,10%,0.25W	01121	CB1261
R1633	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R1634	321-0252-00			RES.,FXD,FILM:4.12K OHM,1%,0.125W	91637	MFF1816G41200F
R1637	321-0172-00			RES.,FXD,FILM:604 OHM,1%,0.125W	91637	MFF1816G604R0F
R1638	321-0180-00			RES.,FXD,FILM:732 OHM,1%,0.125W	91637	MFF1816G732R0F
R1639	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R1640	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R1642	315-0914-00			RES.,FXD,CMPSN:910K OHM,5%,0.25W	01121	CB9145
R1643	315-0274-00			RES.,FXD,CMPSN:270K OHM,5%,0.25W	01121	CB2745
R1651	315-0241-00			RES.,FXD,CMPSN:240 OHM,5%,0.25W	01121	CB2415
R1653	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
R1658	315-0301-00			RES.,FXD,CMPSN:300 OHM,5%,0.25W	01121	CB3015
R1659	315-0100-00			RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
R1660	316-0562-00			RES.,FXD,CMPSN:5.6K OHM,10%,0.25W	01121	CB5621

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R1667	316-0562-00			RES.,FXD,CMPSN:5.6K OHM,10%,0.25W	01121	CB5621
R1668	321-0261-00			RES.,FXD,FILM:5.11K OHM,1%,0.125W	91637	MFF1816G51100F
R1669	321-0247-00			RES.,FXD,FILM:3.65K OHM,1%,0.125W	91637	MFF1816G36500F
R1680	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R1688	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R1696	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
R1697	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R1701	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R1702	316-0153-00			RES.,FXD,CMPSN:15K OHM,10%,0.25W	01121	CB1531
R1708	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
R1716	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R1718	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R1720	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
R1725	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R1729	316-0103-00			RES.,FXD,CMPSN:10K OHM,10%,0.25W	01121	CB1031
R1731	321-0302-00			RES.,FXD,FILM:13.7K OHM,1%,0.125W	91637	MFF1816G13701F
R1732	315-0303-00			RES.,FXD,CMPSN:30K OHM,5%,0.25W	01121	CB3035
R1733	321-0229-00			RES.,FXD,FILM:2.37K OHM,1%,0.125W	91637	MFF1816G23700F
R1738	316-0470-00			RES.,FXD,CMPSN:47 OHM,10%,0.25W	01121	CB4701
R1739	321-0299-00			RES.,FXD,FILM:12.7K OHM,1%,0.125W	91637	MFF1816G12701F
R1740	321-0301-00			RES.,FXD,FILM:13.3K OHM,1%,0.125W	91637	MFF1816G13301F
R1741	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
R1752	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R1754	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R1759	315-0561-00			RES.,FXD,CMPSN:560 OHM,5%,0.25W	01121	CB5615
R1761	316-0562-00			RES.,FXD,CMPSN:5.6K OHM,10%,0.25W	01121	CB5621
R1762	315-0393-00			RES.,FXD,CMPSN:39K OHM,5%,0.25W	01121	CB3935
R1763	316-0562-00			RES.,FXD,CMPSN:5.6K OHM,10%,0.25W	01121	CB5621
R1765	316-0562-00			RES.,FXD,CMPSN:5.6K OHM,10%,0.25W	01121	CB5621
R1767	316-0562-00			RES.,FXD,CMPSN:5.6K OHM,10%,0.25W	01121	CB5621
R1769	315-0113-00			RES.,FXD,CMPSN:11K OHM,5%,0.25W	01121	CB1135
R1788	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R1790	321-0254-00			RES.,FXD,FILM:4.32K OHM,1%,0.125W	91637	MFF1816G43200F
R1792	321-0302-00			RES.,FXD,FILM:13.7K OHM,1%,0.125W	91637	MFF1816G13701F
R1796	321-0331-00			RES.,FXD,FILM:27.4K OHM,1%,0.125W	91637	MFF1816G27401F
R1798	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R1825	316-0103-00			RES.,FXD,CMPSN:10K OHM,10%,0.25W	01121	CB1031
R1826	316-0103-00			RES.,FXD,CMPSN:10K OHM,10%,0.25W	01121	CB1031
R1827	316-0223-00			RES.,FXD,CMPSN:22K OHM,10%,0.25W	01121	CB2231
R1828	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R1829	316-0223-00			RES.,FXD,CMPSN:22K OHM,10%,0.25W	01121	CB2231
R1863	315-0155-00	XB033110		RES.,FXD,CMPSN:1.5M OHM,5%,0.25W	01121	CB1555
R1838	316-0222-00			RES.,FXD,CMPSN:2.2K OHM,10%,0.25W	01121	CB2221
R1842	315-0752-00			RES.,FXD,CMPSN:7.5K OHM,5%,0.25W	01121	CB7525
R1843	316-0103-00			RES.,FXD,CMPSN:10K OHM,10%,0.25W	01121	CB1031
R1847	316-0822-00			RES.,FXD,CMPSN:8.2K OHM,10%,0.25W	01121	CB8221
R1848	316-0273-00			RES.,FXD,CMPSN:27K OHM,10%,0.25W	01121	CB2731
R1849	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R1850	315-0623-00			RES.,FXD,CMPSN:62K OHM,5%,0.25W	01121	CB6235
R1859	315-0361-00			RES.,FXD,CMPSN:360 OHM,5%,0.25W	01121	CB3615
R1862	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
R1871	315-0332-00			RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
R1873	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
R1874	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
R1882	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R1888	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R1890	321-0254-00			RES.,FXD,FILM:4.32K OHM,1%,0.125W	91637	MFF1816G43200F
R1910	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015

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R1917	316-0223-00			RES.,FXD,CMPSN:22K OHM,10%,0.25W	01121	CB2231
R1918	316-0223-00			RES.,FXD,CMPSN:22K OHM,10%,0.25W	01121	CB2231
R1919	316-0223-00			RES.,FXD,CMPSN:22K OHM,10%,0.25W	01121	CB2231
R1920	316-0223-00			RES.,FXD,CMPSN:22K OHM,10%,0.25W	01121	CB2231
R1937	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R1938	315-0184-00			RES.,FXD,CMPSN:180K OHM,5%,0.25W	01121	CB1845
R1941	316-0126-00			RES.,FXD,CMPSN:12M OHM,10%,0.25W	01121	CB1261
R1946	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R1956	321-0357-00			RES.,FXD,FILM:51.1K OHM,1%,0.125W	91637	MFF1816G51101F
R1958	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
R1962	315-0155-00			RES.,FXD,CMPSN:1.5M OHM,5%,0.25W	01121	CB1555
R1965	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
R1988	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R1990	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
R1994	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R1996	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
R1997	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R2001	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
	----- -----			(R2001, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2007	315-0124-00			RES.,FXD,CMPSN:120K OHM,5%,0.25W	01121	CB1245
	----- -----			(R2007, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2011	315-0154-00			RES.,FXD,CMPSN:150K OHM,5%,0.25W	01121	CB1545
	----- -----			(R2011, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2015	315-0753-00			RES.,FXD,CMPSN:75K OHM,5%,0.25W	01121	CB7535
	----- -----			(R2015, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2017	315-0124-00			RES.,FXD,CMPSN:120K OHM,5%,0.25W	01121	CB1245
	----- -----			(R2017, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2019	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R2019, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2021	315-0273-00			RES.,FXD,CMPSN:27K OHM,5%,0.25W	01121	CB2735
	----- -----			(R2021, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2025	311-1232-00			RES.,VAR,NONWIR:50K OHM,20%,0.50W	32997	3386F-T04-503
	----- -----			(R2025, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2027	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
	----- -----			(R2027, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2029	315-0475-00			RES.,FXD,CMPSN:4.7M OHM,5%,0.25W	01121	CB4755
	----- -----			(R2029, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2031	315-0752-00			RES.,FXD,CMPSN:7.5K OHM,5%,0.25W	01121	CB7525
	----- -----			(R2031, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2035	321-0306-00			RES.,FXD,FILM:15K OHM,1%,0.125W	91637	MFF1816G15001F
	----- -----			(R2035, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2037	321-0260-00			RES.,FXD,FILM:4.99K OHM,1%,0.125W	91637	MFF1816G49900F
	----- -----			(R2037, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2039	321-0260-00			RES.,FXD,FILM:4.99K OHM,1%,0.125W	91637	MFF1816G49900F
	----- -----			(R2039, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2040	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
	----- -----			(R2040, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2052	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
	----- -----			(R2050, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2055	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
	----- -----			(R2055, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2057	315-0275-00			RES.,FXD,CMPSN:2.7M OHM,5%,0.25W	01121	CB2755
	----- -----			(R2057, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2059	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R2059, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2061	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
	----- -----			(R2061, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2065	315-0432-00			RES.,FXD,CMPSN:4.3K OHM,5%,0.25W	01121	CB4325
	----- -----			(R2065, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		

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R2067	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R2067, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2069	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
	----- -----			(R2069, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2071	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
	----- -----			(R2071, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2073	315-0681-00			RES.,FXD,CMPSN:680 OHM,5%,0.25W	01121	CB6815
	----- -----			(R2073, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2075	315-0361-00			RES.,FXD,CMPSN:360 OHM,5%,0.25W	01121	CB3615
	----- -----			(R2075, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2077	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
	----- -----			(R2077, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2079	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
	----- -----			(R2079, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2081	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
	----- -----			(R2081, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2101	315-0750-00			RES.,FXD,CMPSN:75 OHM,5%,0.25W	01121	CB7505
	----- -----			(R2101, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2107	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
	----- -----			(R2107, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2125	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
	----- -----			(R2125, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2127	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R2127, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2129	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
	----- -----			(R2129, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2137	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R2137, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2151	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R2151, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2153	315-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.25W	01121	CB8225
	----- -----			(R2153, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2157	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
	----- -----			(R2157, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2159	315-0105-00			RES.,FXD,CMPSN:1M OHM,5%,0.25W	01121	CB1055
	----- -----			(R2159, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2163	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R2163, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2167	315-0433-00			RES.,FXD,CMPSN:43K OHM,5%,0.25W	01121	CB4335
	----- -----			(R2167, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2175	315-0512-00			RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125
	----- -----			(R2175, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2179	315-0242-00			RES.,FXD,CMPSN:2.4K OHM,5%,0.25W	01121	CB2425
	----- -----			(R2179, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2185	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
	----- -----			(R2185, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2187	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R2187, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2189	321-0335-00			RES.,FXD,FILM:30.1K OHM,1%,0.125W	91637	MFF1816G30101F
	----- -----			(R2189, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2227	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R2227, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2231	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
	----- -----			(R2231, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2235	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R2235, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		

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R2237	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
	----- -----			(R2237, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2259	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R2259, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2277	321-0349-00			RES.,FXD,FILM:42.2K OHM,1%,0.125W	91637	MFF1816G42201F
	----- -----			(R2277, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2281	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
	----- -----			(R2281, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2291	315-0332-00			RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
	----- -----			(R2291, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2295	315-0682-00			RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
	----- -----			(R2295, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2303	321-0093-00			RES.,FXD,FILM:90.9 OHM,1%,0.125W	91637	MFF1816G90R90F
	----- -----			(R2303, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2327	315-0271-00			RES.,FXD,CMPSN:270 OHM,5%,0.25W	01121	CB2715
	----- -----			(R2327, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2329	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R2329, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2335	315-0682-00			RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
	----- -----			(R2335, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2355	315-0433-00			RES.,FXD,CMPSN:43K OHM,5%,0.25W	01121	CB4335
	----- -----			(R2355, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2357	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R2357, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2359	315-0391-00			RES.,FXD,CMPSN:390 OHM,5%,0.25W	01121	CB3915
	----- -----			(R2359, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2363	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R2363, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2365	315-0273-00			RES.,FXD,CMPSN:27K OHM,5%,0.25W	01121	CB2735
	----- -----			(R2365, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2369	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
	----- -----			(R2369, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2373	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
	----- -----			(R2373, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2379	321-0328-00			RES.,FXD,FILM:25.5K OHM,1%,0.125W	91637	MFF1816G25501F
	----- -----			(R2379, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2381	321-0287-00			RES.,FXD,FILM:9.53K OHM,1%,0.125W	91637	MFF1816G95300F
	----- -----			(R2381, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2401	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R2401, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2403	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R2403, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2407	311-1260-00			RES.,VAR,NONWIR:250 OHM,10%,0.50W	32997	3329P-L58-251
	----- -----			(R2407, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2409	321-0207-00			RES.,FXD,FILM:1.4K OHM,1%,0.125W	91637	MFF1816G14000F
	----- -----			(R2409, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2411	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
	----- -----			(R2411, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2415	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R2415, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2417	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R2417, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2427	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
	----- -----			(R2427, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2429	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
	----- -----			(R2429, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2431	315-0682-00			RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
	----- -----			(R2431, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		

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R2435	321-0164-00			RES.,FXD,FILM:499 OHM,1%,0.125W	91637	MFF1816G499R0F
	----- -----			(R2435, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2439	315-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.25W	01121	CB8225
	----- -----			(R2439, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2441	315-0391-00			RES.,FXD,CMPSN:390 OHM,5%,0.25W	01121	CB3915
	----- -----			(R2441, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2455	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R2455, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2457	315-0113-00			RES.,FXD,CMPSN:11K OHM,5%,0.25W	01121	CB1135
	----- -----			(R2457, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2465	321-0306-00			RES.,FXD,FILM:15K OHM,1%,0.125W	91637	MFF1816G15001F
	----- -----			(R2465, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2469	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R2469, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2483	315-0751-00			RES.,FXD,CMPSN:750 OHM,5%,0.25W	01121	CB7515
	----- -----			(R2483, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2489	321-0097-00			RES.,FXD,FILM:100 OHM,1%,0.125W	91637	MFF1816G100R0F
	----- -----			(R2489, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2491	315-0333-00			RES.,FXD,CMPSN:33K OHM,5%,0.25W	01121	CB3335
	----- -----			(R2491, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2503	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R2503, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2505	315-0432-00			RES.,FXD,CMPSN:4.3K OHM,5%,0.25W	01121	CB4325
	----- -----			(R2505, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2515	321-0175-00			RES.,FXD,FILM:649 OHM,1%,0.125W	91637	MFF1816G649R0F
	----- -----			(R2515, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2517	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
	----- -----			(R2517, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2525	315-0432-00			RES.,FXD,CMPSN:4.3K OHM,5%,0.25W	01121	CB4325
	----- -----			(R2525, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2527	321-0162-00			RES.,FXD,FILM:475 OHM,1%,0.125W	91637	MFF1816G475R0F
	----- -----			(R2527, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2537	321-0162-00			RES.,FXD,FILM:475 OHM,1%,0.125W	91637	MFF1816G475R0F
	----- -----			(R2537, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2541	315-0105-00			RES.,FXD,CMPSN:1M OHM,5%,0.25W	01121	CB1055
	----- -----			(R2541, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2553	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
	----- -----			(R2553, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2575	321-0275-00			RES.,FXD,FILM:7.15K OHM,1%,0.125W	91637	MFF1816G71500F
	----- -----			(R2575, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2577	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
	----- -----			(R2577, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2580	321-0097-00			RES.,FXD,FILM:100 OHM,1%,0.125W	91637	MFF1816G100R0F
	----- -----			(R2580, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2582	321-0159-00			RES.,FXD,FILM:442 OHM,1%,0.125W	91637	MFF1816G442R0F
	----- -----			(R2582, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2584	315-0752-00			RES.,FXD,CMPSN:7.5K OHM,5%,0.25W	01121	CB7525
	----- -----			(R2584, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2586	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
	----- -----			(R2586, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2588	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
	----- -----			(R2588, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2590	321-0108-00			RES.,FXD,FILM:130 OHM,1%,0.125W	91637	MFF1816G130R0F
	----- -----			(R2590, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2600	311-1232-00			RES.,VAR,NONWIR:50K OHM,20%,0.50W	32997	3386F-T04-503
	----- -----			(R2600, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		

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R2603	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
	----- -----			(R2603, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2609	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
	----- -----			(R2609, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2611	315-0332-00			RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
	----- -----			(R2611, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2617	321-0285-00			RES.,FXD,FILM:9.09K OHM,1%,0.125W	91637	MFF1816G90900F
	----- -----			(R2617, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2619	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R2619, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2627	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	91637	MFF1816G40200F
	----- -----			(R2627, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2629	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
	----- -----			(R2629, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2635	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R2635, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2637	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R2637, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2643	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
	----- -----			(R2643, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2645	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
	----- -----			(R2645, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2647	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R2647, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2657	321-0285-00			RES.,FXD,FILM:9.09K OHM,1%,0.125W	91637	MFF1816G90900F
	----- -----			(R2657, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2700	311-1232-00			RES.,VAR,NONWIR:50K OHM,20%,0.50W	32997	3386F-T04-503
	----- -----			(R2700, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2701	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R2701, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R2703	315-0106-00			RES.,FXD,CMPSN:10M OHM,5%,0.25W	01121	CB1065
	----- -----			(R2703, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2704	315-0274-00			RES.,FXD,CMPSN:270K OHM,5%,0.25W	01121	CB2745
	----- -----			(R2704, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2705	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
	----- -----			(R2705, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2706	315-0274-00			RES.,FXD,CMPSN:270K OHM,5%,0.25W	01121	CB2745
	----- -----			(R2706, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2707	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
	----- -----			(R2707, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2709	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R2709, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2711	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R2711, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2719	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R2719, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2729	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
	----- -----			(R2729, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2731	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R2731, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2739	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R2739, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2741	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
	----- -----			(R2741, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2743	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R2743, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2753	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R2753, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		

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R2757	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R2757, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2775	315-0682-00			RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
	----- -----			(R2775, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2777	315-0682-00			RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
	----- -----			(R2777, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2781	315-0122-00			RES.,FXD,CMPSN:1.2K OHM,5%,0.25W	01121	CB1225
	----- -----			(R2781, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2800	311-1232-00			RES.,VAR,NONWIR:50K OHM,20%,0.50W	32997	3386F-T04-503
	----- -----			(R2800, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2801	315-0106-00			RES.,FXD,CMPSN:10M OHM,5%,0.25W	01121	CB1065
	----- -----			(R2801, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2802	315-0274-00			RES.,FXD,CMPSN:270K OHM,5%,0.25W	01121	CB2745
	----- -----			(R2802, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2805	321-0411-00			RES.,FXD,FILM:187K OHM,1%,0.125W	91637	MFF1816G18702F
	----- -----			(R2805, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2807	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
	----- -----			(R2807, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2809	315-0106-00			RES.,FXD,CMPSN:10M OHM,5%,0.25W	01121	CB1065
	----- -----			(R2809, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2813	315-0396-00			RES.,FXD,CMPSN:39M OHM,5%,0.25W	01121	CB3965
	----- -----			(R2813, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2815	311-1232-00			RES.,VAR,NONWIR:50K OHM,20%,0.50W	32997	3386F-T04-503
	----- -----			(R2815, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2820	311-1232-00			RES.,VAR,NONWIR:50K OHM,20%,0.50W	32997	3386F-T04-503
	----- -----			(R2820, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2829	315-0396-00			RES.,FXD,CMPSN:39M OHM,5%,0.25W	01121	CB3965
	----- -----			(R2829, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2830	311-1232-00			RES.,VAR,NONWIR:50K OHM,20%,0.50W	32997	3386F-T04-503
	----- -----			(R2830, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2851	315-0396-00			RES.,FXD,CMPSN:39M OHM,5%,0.25W	01121	CB3965
	----- -----			(R2851, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2853	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
	----- -----			(R2853, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2857	315-0396-00			RES.,FXD,CMPSN:39M OHM,5%,0.25W	01121	CB3965
	----- -----			(R2857, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2859	321-0183-00			RES.,FXD,FILM:787 OHM,1%,0.125W	91637	MFF1816G787R0F
	----- -----			(R2859, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2867	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R2867, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2877	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
	----- -----			(R2877, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2881	315-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.25W	01121	CB8225
	----- -----			(R2881, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2883	321-0258-00			RES.,FXD,FILM:4.75K OHM,1%,0.125W	91637	MFF1816G47500F
	----- -----			(R2883, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2885	321-0108-00			RES.,FXD,FILM:130 OHM,1%,0.125W	91637	MFF1816G130R0F
	----- -----			(R2885, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2903	321-0395-00			RES.,FXD,FILM:127K OHM,1%,0.125W	91637	MFF1816G12702F
	----- -----			(R2903, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2905	321-0306-00			RES.,FXD,FILM:15K OHM,1%,0.125W	91637	MFF1816G15001F
	----- -----			(R2905, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2907	321-0351-00			RES.,FXD,FILM:44.2K OHM,1%,0.125W	91637	MFF1816G44201F
	----- -----			(R2907, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2913	321-0335-00			RES.,FXD,FILM:30.1K OHM,1%,0.125W	91637	MFF1816G30101F
	----- -----			(R2913, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		

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R2915	321-0452-00			RES.,FXD,FILM:499K OHM,1%,0.125W	91637	MFF1816G49902F
	----- -----			(R2915, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2917	311-1225-00			RES.,VAR,NONWIR:1K OHM,20%,0.50W	32997	3386F-T04-102
	----- -----			(R2917, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2921	321-0226-00			RES.,FXD,FILM:2.21K OHM,1%,0.125W	91637	MFF1816G22100F
	----- -----			(R2921, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2925	315-0124-00			RES.,FXD,CMPSN:120K OHM,5%,0.25W	01121	CB1245
	----- -----			(R2925, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2927	321-0213-00			RES.,FXD,FILM:1.62K OHM,1%,0.125W	91637	MFF1816G16200F
	----- -----			(R2927, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2929	311-1226-00			RES.,VAR,NONWIR:2.5K OHM,20%,0.50W	32997	3386F-T04-252
	----- -----			(R2929, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2933	315-0124-00			RES.,FXD,CMPSN:120K OHM,5%,0.25W	01121	CB1245
	----- -----			(R2933, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2935	321-0213-00			RES.,FXD,FILM:1.62K OHM,1%,0.125W	91637	MFF1816G16200F
	----- -----			(R2935, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2943	315-0124-00			RES.,FXD,CMPSN:120K OHM,5%,0.25W	01121	CB1245
	----- -----			(R2943, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2945	321-0213-00			RES.,FXD,FILM:1.62K OHM,1%,0.125W	91637	MFF1816G16200F
	----- -----			(R2945, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R2977	311-1226-00			RES.,VAR,NONWIR:2.5K OHM,20%,0.50W	32997	3386F-T04-252
	----- -----			(R2977, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
R3002	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
	----- -----			(R3002, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3004	315-0750-00			RES.,FXD,CMPSN:75 OHM,5%,0.25W	01121	CB7505
	----- -----			(R3004, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3006	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
	----- -----			(R3006, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3008	315-0124-00			RES.,FXD,CMPSN:120K OHM,5%,0.25W	01121	CB1245
	----- -----			(R3008, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3010	315-0753-00			RES.,FXD,CMPSN:75K OHM,5%,0.25W	01121	CB7535
	----- -----			(R3010, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3012	315-0753-00			RES.,FXD,CMPSN:75K OHM,5%,0.25W	01121	CB7535
	----- -----			(R3012, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3014	315-0124-00			RES.,FXD,CMPSN:120K OHM,5%,0.25W	01121	CB1245
	----- -----			(R3014, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3016	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3016, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3020	315-0273-00			RES.,FXD,CMPSN:27K OHM,5%,0.25W	01121	CB2735
	----- -----			(R3020, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3030	311-1232-00			RES.,VAR,NONWIR:50K OHM,20%,0.50W	32997	3386F-T04-503
	----- -----			(R3030, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3032	315-0475-00			RES.,FXD,CMPSN:4.7M OHM,5%,0.25W	01121	CB4755
	----- -----			(R3032, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3034	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
	----- -----			(R3034, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3036	321-0603-07			RES.,FXD,FILM:15K OHM,0.1%,0.125W	91637	MFF1816C15001B
	----- -----			(R3036, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3038	321-0603-07			RES.,FXD,FILM:15K OHM,0.1%,0.125W	91637	MFF1816C15001B
	----- -----			(R3038, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3042	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3042, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3044	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3044, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3047	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3047, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3048	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
	----- -----			(R3048, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		

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R3050	315-0275-00			RES.,FXD,CMPSN:2.7M OHM,5%,0.25W	01121	CB2755
	----- -----			(R3050, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3052	311-1035-00			RES.,VAR,NONWIR:50K OHM,10%,0.50W	73138	82-40-0
	----- -----			(R3052, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3054	311-1035-00			RES.,VAR,NONWIR:50K OHM,10%,0.50W	73138	82-40-0
	----- -----			(R3054, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3056	315-0105-00			RES.,FXD,CMPSN:1M OHM,5%,0.25W	01121	CB1055
	----- -----			(R3056, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3058	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
	----- -----			(R3058, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3060	315-0275-00			RES.,FXD,CMPSN:2.7M OHM,5%,0.25W	01121	CB2755
	----- -----			(R3060, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3062	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
	----- -----			(R3062, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3064	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R3064, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3070	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R3070, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3072	315-0682-00			RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
	----- -----			(R3072, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3074	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
	----- -----			(R3074, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3078	315-0361-00			RES.,FXD,CMPSN:360 OHM,5%,0.25W	01121	CB3615
	----- -----			(R3078, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3080	315-0681-00			RES.,FXD,CMPSN:680 OHM,5%,0.25W	01121	CB6815
	----- -----			(R3080, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3082	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
	----- -----			(R3082, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3132	315-0275-00			RES.,FXD,CMPSN:2.7M OHM,5%,0.25W	01121	CB2755
	----- -----			(R3132, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3134	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
	----- -----			(R3134, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3136	315-0275-00			RES.,FXD,CMPSN:2.7M OHM,5%,0.25W	01121	CB2755
	----- -----			(R3136, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3138	315-0185-00			RES.,FXD,CMPSN:1.8M OHM,5%,0.25W	01121	CB1855
	----- -----			(R3138, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3140	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
	----- -----			(R3140, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3142	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
	----- -----			(R3142, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3144	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
	----- -----			(R3144, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3146	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
	----- -----			(R3146, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3148	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
	----- -----			(R3148, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3150	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
	----- -----			(R3150, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3152	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
	----- -----			(R3152, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3158	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
	----- -----			(R3158, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3160	315-0475-00			RES.,FXD,CMPSN:4.7M OHM,5%,0.25W	01121	CB4755
	----- -----			(R3160, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3164	321-0349-00			RES.,FXD,FILM:42.2K OHM,1%,0.125W	91637	MFF1816G42201F
	----- -----			(R3164, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		

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R3170	315-0273-00			RES.,FXD,CMPSN:27K OHM,5%,0.25W	01121	CB2735
	----- -----			(R3170, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3176	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
	----- -----			(R3176, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3186	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
	----- -----			(R3186, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3190	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3190, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3202	321-0093-00			RES.,FXD,FILM:90.9 OHM,1%,0.125W	91637	MFF1816G90R90F
	----- -----			(R3202, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3208	321-0093-00			RES.,FXD,FILM:90.9 OHM,1%,0.125W	91637	MFF1816G90R90F
	----- -----			(R3208, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3212	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R3212, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3214	315-0750-00			RES.,FXD,CMPSN:75 OHM,5%,0.25W	01121	CB7505
	----- -----			(R3214, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3216	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R3216, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3220	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3220, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3222	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3222, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3230	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
	----- -----			(R3230, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3240	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3240, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3242	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R3242, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3244	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3244, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3246	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R3246, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3248	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
	----- -----			(R3248, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3250	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
	----- -----			(R3250, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3252	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R3252, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3254	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3254, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3256	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3256, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3258	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
	----- -----			(R3258, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3260	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
	----- -----			(R3260, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3270	315-0682-00			RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
	----- -----			(R3270, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3272	315-0332-00			RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
	----- -----			(R3272, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3276	321-0335-00			RES.,FXD,FILM:30.1K OHM,1%,0.125W	91637	MFF1816G30101F
	----- -----			(R3276, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3280	315-0241-00			RES.,FXD,CMPSN:240 OHM,5%,0.25W	01121	CB2415
	----- -----			(R3280, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3290	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R3290, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3292	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
	----- -----			(R3292, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
R3294	315-0332-00			RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
	----- -----			(R3294, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3296	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R3296, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3298	315-0243-00			RES.,FXD,CMPSN:24K OHM,5%,0.25W	01121	CB2435
	----- -----			(R3298, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3322	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3322, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3324	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3324, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3326	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3326, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3328	315-0184-00			RES.,FXD,CMPSN:180K OHM,5%,0.25W	01121	CB1845
	----- -----			(R3328, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3330	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3330, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3334	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
	----- -----			(R3334, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3338	315-0184-00			RES.,FXD,CMPSN:180K OHM,5%,0.25W	01121	CB1845
	----- -----			(R3338, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3340	315-0432-00			RES.,FXD,CMPSN:4.3K OHM,5%,0.25W	01121	CB4325
	----- -----			(R3340, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3342	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
	----- -----			(R3342, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3344	315-0682-00			RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
	----- -----			(R3344, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3346	315-0433-00			RES.,FXD,CMPSN:43K OHM,5%,0.25W	01121	CB4335
	----- -----			(R3346, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3348	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R3348, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3380	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3380, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3390	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
	----- -----			(R3390, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3392	315-0243-00			RES.,FXD,CMPSN:24K OHM,5%,0.25W	01121	CB2435
	----- -----			(R3392, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3394	315-0243-00			RES.,FXD,CMPSN:24K OHM,5%,0.25W	01121	CB2435
	----- -----			(R3394, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3396	315-0243-00			RES.,FXD,CMPSN:24K OHM,5%,0.25W	01121	CB2435
	----- -----			(R3396, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3440	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
	----- -----			(R3440, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3442	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R3442, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3490	315-0303-00			RES.,FXD,CMPSN:30K OHM,5%,0.25W	01121	CB3035
	----- -----			(R3490, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3494	315-0303-00			RES.,FXD,CMPSN:30K OHM,5%,0.25W	01121	CB3035
	----- -----			(R3494, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3496	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
	----- -----			(R3496, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3502	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3502, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3504	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3504, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3506	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3506, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
R3510	311-0978-00			RES.,VAR,NONWIR:250 OHM,10%,0.50W	73138	82-4-2
	----- -----			(R3510, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3512	321-0206-00			RES.,FXD,FILM:1.37K OHM,1%,0.125W	91637	MFF1816G13700F
	----- -----			(R3512, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3514	315-0112-00			RES.,FXD,CMPSN:1.1K OHM,5%,0.25W	01121	CB1125
	----- -----			(R3514, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3516	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3516, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3518	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3518, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3520	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3520, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3524	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3524, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3530	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
	----- -----			(R3530, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3532	315-0112-00			RES.,FXD,CMPSN:1.1K OHM,5%,0.25W	01121	CB1125
	----- -----			(R3532, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3534	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3534, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3536	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3536, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3540	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3540, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3542	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3542, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3544	311-0978-00			RES.,VAR,NONWIR:250 OHM,10%,0.50W	73138	82-4-2
	----- -----			(R3544, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3546	321-0189-00			RES.,FXD,FILM:909 OHM,1%,0.125W	91637	MFF1816G909R0F
	----- -----			(R3546, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3548	315-0112-00			RES.,FXD,CMPSN:1.1K OHM,5%,0.25W	01121	CB1125
	----- -----			(R3548, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3550	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3550, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3554	315-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.25W	01121	CB8225
	----- -----			(R3554, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3556	315-0682-00			RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
	----- -----			(R3556, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3560	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3560, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3570	315-0201-00			RES.,FXD,CMPSN:200 OHM,5%,0.25W	01121	CB2015
	----- -----			(R3570, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3572	315-0302-00			RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
	----- -----			(R3572, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3580	315-0221-00			RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215
	----- -----			(R3580, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3582	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R3582, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3584	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
	----- -----			(R3584, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3586	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
	----- -----			(R3586, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3588	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R3588, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3590	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
	----- -----			(R3590, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3592	315-0333-00			RES.,FXD,CMPSN:33K OHM,5%,0.25W	01121	CB3335
	----- -----			(R3592, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
R3594	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
	----- -----			(R3594, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3596	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
	----- -----			(R3596, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3597	315-0332-00			RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
	----- -----			(R3597, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3598	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
	----- -----			(R3598, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3599	315-0302-00			RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
	----- -----			(R3599, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3606	315-0432-00			RES.,FXD,CMPSN:4.3K OHM,5%,0.25W	01121	CB4325
	----- -----			(R3606, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3616	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
	----- -----			(R3616, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3620	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
	----- -----			(R3620, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3622	315-0432-00			RES.,FXD,CMPSN:4.3K OHM,5%,0.25W	01121	CB4325
	----- -----			(R3622, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3624	321-0166-00			RES.,FXD,FILM:523 OHM,1%,0.125W	91637	MFF1816G523R0F
	----- -----			(R3624, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3640	321-0166-00			RES.,FXD,FILM:523 OHM,1%,0.125W	91637	MFF1816G523R0F
	----- -----			(R3640, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3646	315-0432-00			RES.,FXD,CMPSN:4.3K OHM,5%,0.25W	01121	CB4325
	----- -----			(R3646, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3648	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
	----- -----			(R3648, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3652	321-0164-00			RES.,FXD,FILM:499 OHM,1%,0.125W	91637	MFF1816G499R0F
	----- -----			(R3652, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3670	315-0105-00			RES.,FXD,CMPSN:1M OHM,5%,0.25W	01121	CB1055
	----- -----			(R3670, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3672	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3672, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3674	315-0333-00			RES.,FXD,CMPSN:33K OHM,5%,0.25W	01121	CB3335
	----- -----			(R3674, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3676	321-0306-00			RES.,FXD,FILM:15K OHM,1%,0.125W	91637	MFF1816G15001F
	----- -----			(R3676, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3684	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R3684, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3686	321-0347-00			RES.,FXD,FILM:40.2K OHM,1%,0.125W	91637	MFF1816G40201F
	----- -----			(R3686, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3688	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R3688, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3690	321-0295-00			RES.,FXD,FILM:11.5K OHM,1%,0.125W	91637	MFF1816G11501F
	----- -----			(R3690, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3692	321-0097-00			RES.,FXD,FILM:100 OHM,1%,0.125W	91637	MFF1816G100R0F
	----- -----			(R3692, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3702	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3702, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3710	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
	----- -----			(R3710, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3712	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
	----- -----			(R3712, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3714	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R3714, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3716	321-0303-00			RES.,FXD,FILM:14K OHM,1%,0.125W	91637	MFF1816G14001F
	----- -----			(R3716, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		

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R3720	315-0122-00			RES.,FXD,CMPSN:1.2K OHM,5%,0.25W	01121	CB1225
	----- -----			(R3720, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3724	321-0254-00			RES.,FXD,FILM:4.32K OHM,1%,0.125W	91637	MFF1816G43200F
	----- -----			(R3724, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3726	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
	----- -----			(R3726, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3728	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R3728, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3730	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3730, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3738	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3738, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3740	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
	----- -----			(R3740, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3742	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
	----- -----			(R3742, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3744	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R3744, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3746	321-0285-00			RES.,FXD,FILM:9.09K OHM,1%,0.125W	91637	MFF1816G90900F
	----- -----			(R3746, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3748	315-0182-00			RES.,FXD,CMPSN:1.8K OHM,5%,0.25W	01121	CB1825
	----- -----			(R3748, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3752	321-0260-00			RES.,FXD,FILM:4.99K OHM,1%,0.125W	91637	MFF1816G49900F
	----- -----			(R3752, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3754	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R3754, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3756	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3756, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3758	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3758, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3760	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3760, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3780	321-0275-00			RES.,FXD,FILM:7.15K OHM,1%,0.125W	91637	MFF1816G71500F
	----- -----			(R3780, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3786	315-0751-00			RES.,FXD,CMPSN:750 OHM,5%,0.25W	01121	CB7515
	----- -----			(R3786, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3790	321-0122-00			RES.,FXD,FILM:182 OHM,1%,0.125W	91637	MFF1816G182R0F
	----- -----			(R3790, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3801	311-1232-00			RES.,VAR,NONWIR:50K OHM,20%,0.50W	32997	3386F-T04-503
	----- -----			(R3801, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3808	321-0226-00			RES.,FXD,FILM:2.21K OHM,1%,0.125W	91637	MFF1816G22100F
	----- -----			(R3808, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3810	321-0214-00			RES.,FXD,FILM:1.65K OHM,1%,0.125W	91637	MFF1816G16500F
	----- -----			(R3810, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3812	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3812, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3814	315-0124-00			RES.,FXD,CMPSN:120K OHM,5%,0.25W	01121	CB1245
	----- -----			(R3814, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3816	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3816, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3826	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3826, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3828	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3828, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3830	315-0124-00			RES.,FXD,CMPSN:120K OHM,5%,0.25W	01121	CB1245
	----- -----			(R3830, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3831	311-1232-00			RES.,VAR,NONWIR:50K OHM,20%,0.50W	32997	3386F-T04-503
	----- -----			(R3831, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		

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R3843	311-1232-00			RES.,VAR,NONWIR:50K OHM,20%,0.50W	32997	3386F-T04-503
	----- -----			(R3843, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3844	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3844, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3846	315-0124-00			RES.,FXD,CMPSN:120K OHM,5%,0.25W	01121	CB1245
	----- -----			(R3846, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3848	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3848, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3854	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3854, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3856	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3856, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3862	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3862, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3864	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3864, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3870	315-0105-00			RES.,FXD,CMPSN:1M OHM,5%,0.25W	01121	CB1055
	----- -----			(R3870, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3874	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3874, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3876	315-0396-00			RES.,FXD,CMPSN:39M OHM,5%,0.25W	01121	CB3965
	----- -----			(R3876, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3880	311-1266-00			RES.,VAR,NONWIR:2.5K OHM,10%,0.50W	32997	3329P-L58-252
	----- -----			(R3880, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3884	321-0258-00			RES.,FXD,FILM:4.75K OHM,1%,0.125W	91637	MFF1816G47500F
	----- -----			(R3884, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3890	321-0145-00			RES.,FXD,FILM:316 OHM,1%,0.125W	91637	MFF1816G316R0F
	----- -----			(R3890, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3892	321-0109-00			RES.,FXD,FILM:133 OHM,1%,0.125W	91637	MFF1816G133R0F
	----- -----			(R3892, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3910	311-1225-00			RES.,VAR,NONWIR:1K OHM,20%,0.50W	32997	3386F-T04-102
	----- -----			(R3910, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3916	315-0396-00			RES.,FXD,CMPSN:39M OHM,5%,0.25W	01121	CB3965
	----- -----			(R3916, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3920	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
	----- -----			(R3920, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3922	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
	----- -----			(R3922, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3924	315-0396-00			RES.,FXD,CMPSN:39M OHM,5%,0.25W	01121	CB3965
	----- -----			(R3924, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3930	311-1226-00			RES.,VAR,NONWIR:2.5K OHM,20%,0.50W	32997	3386F-T04-252
	----- -----			(R3930, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3934	321-0214-00			RES.,FXD,FILM:1.65K OHM,1%,0.125W	91637	MFF1816G16500F
	----- -----			(R3934, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3940	321-0214-00			RES.,FXD,FILM:1.65K OHM,1%,0.125W	91637	MFF1816G16500F
	----- -----			(R3940, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3944	315-0396-00			RES.,FXD,CMPSN:39M OHM,5%,0.25W	01121	CB3965
	----- -----			(R3944, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3948	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
	----- -----			(R3948, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3950	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
	----- -----			(R3950, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3952	315-0396-00			RES.,FXD,CMPSN:39M OHM,5%,0.25W	01121	CB3965
	----- -----			(R3952, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3960	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
	----- -----			(R3960, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		

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R3962	321-0184-00			RES.,FXD,FILM:806 OHM,1%,0.125W	91637	MFF1816G806R0F
	----- -----			(R3962, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3966	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R3966, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3970	315-0332-00			RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
	----- -----			(R3970, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3982	315-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.25W	01121	CB8225
	----- -----			(R3982, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3986	315-0122-00			RES.,FXD,CMPSN:1.2K OHM,5%,0.25W	01121	CB1225
	----- -----			(R3986, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3990	321-0110-00			RES.,FXD,FILM:137 OHM,1%,0.125W	91637	MFF1816G137R0F
	----- -----			(R3990, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3992	321-0140-00			RES.,FXD,FILM:280 OHM,1%,0.125W	91637	MFF1816G280R0F
	----- -----			(R3992, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R3996	321-0086-00			RES.,FXD,FILM:76.8 OHM,1%,0.125W	91637	MFF1816G76R80F
	----- -----			(R3996, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
R4000	316-0681-00			RES.,FXD,CMPSN:680 OHM,10%,0.25W	01121	CB6811
R4010	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R4020	316-0100-00			RES.,FXD,CMPSN:10 OHM,10%,0.25W	01121	CB1001
R4030	308-0075-00			RES.,FXD,WW:100 OHM,5%,3W	91637	CW2B-100R0J
R4035	316-0564-00			RES.,FXD,CMPSN:560K OHM,10%,0.25	01121	CB5641
R4040	316-0151-00			RES.,FXD,CMPSN:150 OHM,10%,0.25W	01121	CB1511
R4050	308-0204-00			RES.,FXD,WW:1 OHM,10W,5%	91637	HL12-02Z-7-1R00J
R4135	316-0681-00			RES.,FXD,CMPSN:680 OHM,10%,0.25W	01121	CB6811
R4140	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R4145	315-0363-00			RES.,FXD,CMPSN:36K OHM,5%,0.25W	01121	CB3635
R4150	316-0272-00			RES.,FXD,CMPSN:2.7K OHM,10%,0.25W	01121	CB2721
R4155	316-0181-00			RES.,FXD,CMPSN:180 OHM,10%,0.25W	01121	CB1811
R4160	316-0181-00			RES.,FXD,CMPSN:180 OHM,10%,0.25W	01121	CB1811
R4165	315-0301-00			RES.,FXD,CMPSN:300 OHM,5%,0.25W	01121	CB3015
R4170	315-0302-00			RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
R4175	307-0051-00			RES.,FXD,CMPSN:2.7 OHM,5%,0.50W	01121	EB27G5
R4180	316-0822-00			RES.,FXD,CMPSN:8.2K OHM,10%,0.25W	01121	CB8221
R4184	316-0473-00			RES.,FXD,CMPSN:47K OHM,10%,0.25W	01121	CB4731
R4186	316-0474-00			RES.,FXD,CMPSN:470K OHM,10%,0.25W	01121	CB4741
R4188	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R4190	323-0350-00			RES.,FXD,FILM:43.2K OHM,1%,0.50W	75042	CECT0-4322F
R4191	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R4192	322-0292-00			RES.,FXD,FILM:10.7K OHM,1%,0.25W	91637	MFF1421G10701F
R4194	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R4200	316-0682-00			RES.,FXD,CMPSN:6.8K OHM,10%,0.25W	01121	CB6821
R4202	316-0682-00			RES.,FXD,CMPSN:6.8K OHM,10%,0.25W	01121	CB6821
R4204	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R4206	316-0332-00			RES.,FXD,CMPSN:3.3K OHM,10%,0.25W	01121	CB3321
R4208	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R4210	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R4218	304-0180-00			RES.,FXD,CMPSN:18 OHM,10%,1W	01121	GB1801
R4233	316-0473-00			RES.,FXD,CMPSN:47K OHM,10%,0.25W	01121	CB4731
R4268	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R4270	307-0007-00			RES.,FXD,CMPSN:2.7 OHM,10%,2W	01121	GB27G1
R4280	304-0181-00			RES.,FXD,CMPSN:180 OHM,10%,1W	01121	GB1811
R4281	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R4290	316-0101-00			RES.,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
R4306	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R4310	316-0471-00			RES.,FXD,CMPSN:470 OHM,10%,0.25W	01121	CB4711
R4326	316-0181-00			RES.,FXD,CMPSN:180 OHM,10%,0.25W	01121	CB1811
R4328	316-0471-00			RES.,FXD,CMPSN:470 OHM,10%,0.25W	01121	CB4711

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R4330	302-0473-00			RES.,FXD,CMPSN:47K OHM,10%,0.50W	01121	EB4731
R4334	316-0474-00			RES.,FXD,CMPSN:470K OHM,10%,0.25W	01121	CB4741
R4335	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R4337	SELECTED					
R4339	316-0474-00			RES.,FXD,CMPSN:470K OHM,10%,0.25W	01121	CB4741
R4344	316-0104-00			RES.,FXD,CMPSN:100K OHM,10%,0.25W	01121	CB1041
R4360	316-0563-00			RES.,FXD,CMPSN:56K OHM,10%,0.25W	01121	CB5631
R4361	SELECTED					
R4362	321-0481-00			RES.,FXD,FILM:1M OHM,1%,0.125W	24546	NA4D1004F
R4363	316-0683-00			RES.,FXD,CMPSN:68K OHM,10%,0.25W	01121	CB6831
R4364	316-0683-00			RES.,FXD,CMPSN:68K OHM,10%,0.25W	01121	CB6831
R4365	315-0105-00			RES.,FXD,CMPSN:1M OHM,5%,0.25W	01121	CB1055
R4366	321-1449-00			RES.,FXD,FILM:470K OHM,1%,0.125W	91637	MFF1816G47002F
R4367	SELECTED					
R4368	316-0683-00			RES.,FXD,CMPSN:68K OHM,10%,0.25W	01121	CB6831
R4370	321-0430-00			RES.,FXD,FILM:294K OHM,1%,0.125W	91637	MFF1816G29402F
R4372	315-0162-00			RES.,FXD,CMPSN:1.6K OHM,5%,0.25W	01121	CB1625
R4374	315-0151-00			RES.,FXD,CMPSN:150 OHM,5%,0.25W	01121	CB1515
R4375	316-0330-00			RES.,FXD,CMPSN:33 OHM,10%,0.25W	01121	CB3301
R4377	315-0512-00			RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125
R4380	316-0101-00			RES.,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
R4390	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
R4391	316-0101-00			RES.,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
R4394	308-0141-00			RES.,FXD,WW:1 OHM,5%,0.5W	80009	308-0141-00
R4396	316-0561-00			RES.,FXD,CMPSN:560 OHM,10%,0.25W	01121	CB5611
R4398	316-0471-00			RES.,FXD,CMPSN:470 OHM,10%,0.25W	01121	CB4711
R4399	315-0512-00			RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125
R4410	315-0274-00			RES.,FXD,CMPSN:270K OHM,5%,0.25W	01121	CB2745
R4411	315-0304-00			RES.,FXD,CMPSN:300K OHM,5%,0.25W	01121	CB3045
R4412	315-0162-00			RES.,FXD,CMPSN:1.6K OHM,5%,0.25W	01121	CB1625
R4416	315-0241-00			RES.,FXD,CMPSN:240 OHM,5%,0.25W	01121	CB2415
R4418	321-0231-00			RES.,FXD,FILM:2.49K OHM,1%,0.125W	91637	MFF1816G24900F
R4420	321-0201-00			RES.,FXD,FILM:1.21K OHM,1%,0.125W	91637	MFF1816G12100F
R4422	321-0259-00			RES.,FXD,FILM:4.87K OHM,1%,0.125W	91637	MFF1816G48700F
R4430	316-0684-00			RES.,FXD,CMPSN:680K OHM,10%,0.25W	01121	CB6841
R4432	316-0333-00			RES.,FXD,CMPSN:33K OHM,10%,0.25W	01121	CB3331
R4436	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R4438	316-0103-00			RES.,FXD,CMPSN:10K OHM,10%,0.25W	01121	CB1031
R4442	321-0243-00			RES.,FXD,FILM:3.32K OHM,1%,0.125W	91637	MFF1816G33200F
R4450	321-0200-00			RES.,FXD,FILM:1.18K OHM,1%,0.125W	91637	MFF1816G11800F
R4452	321-0252-00			RES.,FXD,FILM:4.12K OHM,1%,0.125W	91637	MFF1816G41200F
R4453	316-0392-00			RES.,FXD,CMPSN:3.9K OHM,10%,0.25W	01121	CB3921
R4458	321-0356-00			RES.,FXD,FILM:49.9K OHM,1%,0.125W	91637	MFF1816G49901F
R4462	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R4464	315-0623-00			RES.,FXD,CMPSN:62K OHM,5%,0.25W	01121	CB6235
R4466	321-0371-00			RES.,FXD,FILM:71.5K OHM,1%,0.125W	91637	MFF1816G71501F
R4468	321-0318-00			RES.,FXD,FILM:20K OHM,1%,0.125W	91637	MFF1816G20001F
R4472	315-0364-00			RES.,FXD,CMPSN:360K OHM,5%,0.25W	01121	CB3645
R4478	316-0224-00			RES.,FXD,CMPSN:220K OHM,10%,0.25W	01121	CB2241
R4480	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R4488	316-0684-00			RES.,FXD,CMPSN:680K OHM,10%,0.25W	01121	CB6841
R4490	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
R4494	321-0261-00			RES.,FXD,FILM:5.11K OHM,1%,0.125W	91637	MFF1816G51100F
R4496	316-0122-00			RES.,FXD,CMPSN:1.2K OHM,10%.0.25W	01121	CB1221
R4500	316-0103-00			RES.,FXD,CMPSN:10K OHM,10%,0.25W	01121	CB1031
R4502	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R4504	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721

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R4506	315-0622-00			RES.,FXD,CMPSN:6.2K OHM,5%,0.25W	01121	CB6225
R4508	316-0122-00			RES.,FXD,CMPSN:1.2K OHM,10%.0.25W	01121	CB1221
R4510	316-0152-00			RES.,FXD,CMPSN:1.5K OHM,10%,0.25W	01121	CB1521
R4511	316-0104-00			RES.,FXD,CMPSN:100K OHM,10%,0.25W	01121	CB1041
R4512	321-0288-00			RES.,FXD,FILM:9.76K OHM,1%,0.125W	91637	MFF1816G97600F
R4516	316-0104-00			RES.,FXD,CMPSN:100K OHM,10%,0.25W	01121	CB1041
R4518	315-0433-00			RES.,FXD,CMPSN:43K OHM,5%,0.25W	01121	CB4335
R4522	321-0294-00			RES.,FXD,FILM:11.3K OHM,1%,0.125W	91637	MFF1816G11301F
R4526	321-0231-00			RES.,FXD,FILM:2.49K OHM,1%,0.125W	91637	MFF1816G24900F
R4528	316-0124-00			RES.,FXD,CMPSN:120K OHM,10%,0.25W	01121	CB1241
R4538	315-0513-00			RES.,FXD,CMPSN:51K OHM,5%,0.25W	01121	CB5135
R4540	321-0381-00			RES.,FXD,FILM:90.9K OHM,1%,0.125W	91637	MFF1816G90901F
R4544	316-0123-00			RES.,FXD,CMPSN:12K OHM,10%,0.25W	01121	CB1231
R4550	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R4552	316-0184-00			RES.,FXD,CMPSN:180K OHM,10%,0.25W	01121	CB1841
R4553	315-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.25W	01121	CB8225
R4554	321-0318-00			RES.,FXD,FILM:20K OHM,1%,0.125W	91637	MFF1816G20001F
R4555	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R4556	316-0823-00			RES.,FXD,CMPSN:82K OHM,10%,0.25W	01121	CB8231
R4558	315-0363-00			RES.,FXD,CMPSN:36K OHM,5%,0.25W	01121	CB3635
R4560	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R4562	315-0203-00			RES.,FXD,CMPSN:20K OHM,5%,0.25W	01121	CB2035
R4567	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R4570	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R4572	315-0434-00			RES.,FXD,CMPSN:430K OHM,5%,0.25W	01121	CB4345
R4578	316-0105-00			RES.,FXD,CMPSN:1M OHM,10%,0.25W	01121	CB1051
R4586	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R4592	316-0105-00			RES.,FXD,CMPSN:1M OHM,10%,0.25W	01121	CB1051
R4594	316-0104-00			RES.,FXD,CMPSN:100K OHM,10%,0.25W	01121	CB1041
R4596	316-0103-00			RES.,FXD,CMPSN:10K OHM,10%,0.25W	01121	CB1031
R4598	316-0683-00			RES.,FXD,CMPSN:68K OHM,10%,0.25W	01121	CB6831
R4600	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R4602	311-1235-00			RES.,VAR,NONWIR:100K OHM,20%,0.50W	32997	3386F-T04-104
R4604	316-0823-00			RES.,FXD,CMPSN:82K OHM,10%,0.25W	01121	CB8231
R4608	315-0333-00			RES.,FXD,CMPSN:33K OHM,5%,0.25W	01121	CB3335
R4610	315-0204-00			RES.,FXD,CMPSN:200K OHM,5%,0.25W	01121	CB2045
R4611	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R4612	316-0273-00			RES.,FXD,CMPSN:27K OHM,10%,0.25W	01121	CB2731
R4614	316-0684-00			RES.,FXD,CMPSN:680K OHM,10%,0.25W	01121	CB6841
R4616	302-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.50W	01121	EB1021
R4618	316-0563-00			RES.,FXD,CMPSN:56K OHM,10%,0.25W	01121	CB5631
R4624	311-1235-00			RES.,VAR,NONWIR:100K OHM,20%,0.50W	32997	3386F-T04-104
R4628	316-0333-00			RES.,FXD,CMPSN:33K OHM,10%,0.25W	01121	CB3331
R4634	316-0823-00			RES.,FXD,CMPSN:82K OHM,10%,0.25W	01121	CB8231
R4636	311-1235-00			RES.,VAR,NONWIR:100K OHM,20%,0.50W	32997	3386F-T04-104
R4638	316-0333-00			RES.,FXD,CMPSN:33K OHM,10%,0.25W	01121	CB3331
R4640	316-0223-00			RES.,FXD,CMPSN:22K OHM,10%,0.25W	01121	CB2231
R4642	311-1227-00			RES.,VAR,NONWIR:5K OHM,20%,0.50W	32997	3386F-T04-502
R4644	316-0222-00			RES.,FXD,CMPSN:2.2K OHM,10%,0.25W	01121	CB2221
R4648	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R4654	321-0318-00			RES.,FXD,FILM:20K OHM,1%,0.125W	91637	MFF1816G20001F
R4656	316-0154-00			RES.,FXD,CMPSN:150K OHM,10%,0.25W	01121	CB1541
R4658	311-1228-00			RES.,VAR,NONWIR:10K OHM,20%,0.50W	32997	3386F-T04-103
R4660	316-0183-00			RES.,FXD,CMPSN:18K OHM,10%,0.25W	01121	CB1831
R4662	316-0223-00			RES.,FXD,CMPSN:22K OHM,10%,0.25W	01121	CB2231
R4664	311-1232-00			RES.,VAR,NONWIR:50K OHM,20%,0.50W	32997	3386F-T04-503
R4666	315-0332-00			RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325

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R4668	316-0184-00			RES.,FXD,CMPSN:180K OHM,10%,0.25W	01121	CB1841
R4670	316-0183-00			RES.,FXD,CMPSN:18K OHM,10%,0.25W	01121	CB1831
R4672	316-0333-00			RES.,FXD,CMPSN:33K OHM,10%,0.25W	01121	CB3331
R4676	311-1235-00			RES.,VAR,NONWIR:100K OHM,20%,0.50W	32997	3386F-T04-104
R4678	315-0563-00			RES.,FXD,CMPSN:56K OHM,5%,0.25W	01121	CB5635
R4684	315-0563-00			RES.,FXD,CMPSN:56K OHM,5%,0.25W	01121	CB5635
R4686	316-0105-00			RES.,FXD,CMPSN:1M OHM,10%,0.25W	01121	CB1051
R4688	316-0105-00			RES.,FXD,CMPSN:1M OHM,10%,0.25W	01121	CB1051
R4690	316-0561-00			RES.,FXD,CMPSN:560 OHM,10%,0.25W	01121	CB5611
R4692	316-0682-00			RES.,FXD,CMPSN:6.8K OHM,10%,0.25W	01121	CB6821
R4694	316-0124-00			RES.,FXD,CMPSN:120K OHM,10%,0.25W	01121	CB1241
R4696	316-0123-00			RES.,FXD,CMPSN:12K OHM,10%,0.25W	01121	CB1231
R4698	316-0222-00			RES.,FXD,CMPSN:2.2K OHM,10%,0.25W	01121	CB2221
R4700	316-0101-00			RES.,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
R4701	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R4709	307-0050-00			RES.,FXD,CMPSN:5.6 OHM,10%,0.5W	01121	EB56G1
R4710	315-0681-00			RES.,FXD,CMPSN:680 OHM,5%,0.25W	01121	CB6815
R4716	316-0471-00			RES.,FXD,CMPSN:470 OHM,10%,0.25W	01121	CB4711
R4726	316-0471-00			RES.,FXD,CMPSN:470 OHM,10%,0.25W	01121	CB4711
R4731	315-0681-00			RES.,FXD,CMPSN:680 OHM,5%,0.25W	01121	CB6815
R4733	316-0473-00			RES.,FXD,CMPSN:47K OHM,10%,0.25W	01121	CB4731
R4735	307-0007-00			RES.,FXD,CMPSN:2.7 OHM,10%,2W	01121	GB27G1
R4737	307-0023-00			RES.,FXD,CMPSN:4.7 OHM,10%,0.50W	01121	EB47G1
R4738	307-0009-00			RES.,FXD,CMPSN:4.7 OHM,10%,2W	01121	GB47G1
R4739	307-0023-00			RES.,FXD,CMPSN:4.7 OHM,10%,0.50W	01121	EB47G1
R4749	316-0103-00			RES.,FXD,CMPSN:10K OHM,10%,0.25W	01121	CB1031
R4758	316-0560-00			RES.,FXD,CMPSN:56 OHM,10%,0.25W	01121	CB5601
R4759	316-0680-00			RES.,FXD,CMPSN:68 OHM,10%,0.25W	01121	CB6801
R4772	316-0680-00			RES.,FXD,CMPSN:68 OHM,10%,0.25W	01121	CB6801
R4777	316-0471-00			RES.,FXD,CMPSN:470 OHM,10%,0.25W	01121	CB4711
R4779	308-0337-00			RES.,FXD,WW:200 OHM,5%,7W	91637	CW7-200R0J
R4795	308-0067-00			RES.,FXD,WW:750 OHM,5%,5W	91637	CW 53750R0J
R4800	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R4811	316-0470-00			RES.,FXD,CMPSN:47 OHM,10%,0.25W	01121	CB4701
R4821	301-0221-00			RES.,FXD,CMPSN:220 OHM,5%,0.50W	01121	EB2215
R4823	301-0221-00			RES.,FXD,CMPSN:220 OHM,5%,0.50W	01121	EB2215
R4843	316-0220-00			RES.,FXD,CMPSN:22 OHM,10%,0.25W	01121	CB2201
R4845	308-0426-00			RES.,FXD,WW:470 OHM,5%,3W	91637	CW2B-470R0J
R4847	302-0473-00			RES.,FXD,CMPSN:47K OHM,10%,0.50W	01121	EB4731
R4863	315-0682-00			RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
R4865	316-0220-00			RES.,FXD,CMPSN:22 OHM,10%,0.25W	01121	CB2201
R4867	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
R4871	315-0513-00			RES.,FXD,CMPSN:51K OHM,5%,0.25W	01121	CB5135
R4873	302-0473-00			RES.,FXD,CMPSN:47K OHM,10%,0.50W	01121	EB4731
R4875	316-0822-00			RES.,FXD,CMPSN:8.2K OHM,10%,0.25W	01121	CB8221
R4876	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R4877	316-0563-00			RES.,FXD,CMPSN:56K OHM,10%,0.25W	01121	CB5631
R4879	315-0513-00			RES.,FXD,CMPSN:51K OHM,5%,0.25W	01121	CB5135
R4881	315-0512-00			RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125
R4883	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R4884	315-0273-00			RES.,FXD,CMPSN:27K OHM,5%,0.25W	01121	CB2735
R4885	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R4891	316-0823-00			RES.,FXD,CMPSN:82K OHM,10%,0.25W	01121	CB8231
R4892	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R4895	316-0331-00			RES.,FXD,CMPSN:330 OHM,10%,0.25W	01121	CB3311
R4897	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R4911	303-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,1W	01121	GB4725
R4913	303-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,1W	01121	GB5625

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R4915	304-0391-00			RES.,FXD,CMPSN:390 OHM,10%,1W	01121	GB3911
R4931	307-0024-00			RES.,FXD,CMPSN:2.7 OHM,10%,0.50W	01121	EB27G1
R4932	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R4933	316-0681-00			RES.,FXD,CMPSN:680 OHM,10%,0.25W	01121	CB6811
R4935	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R4951	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R4952	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
R4953	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
R4971	311-1230-00			RES.,VAR,NONWIR:20K OHM,20%,0.50W	32997	3386F-T04-203
R4973	311-1227-00			RES.,VAR,NONWIR:5K OHM,20%,0.50W	32997	3386F-T04-502
R4981	316-0223-00			RES.,FXD,CMPSN:22K OHM,10%,0.25W	01121	CB2231
R4983	316-0272-00			RES.,FXD,CMPSN:2.7K OHM,10%,0.25W	01121	CB2721
R4985	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R4987	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R4989	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
R4991	315-0243-00			RES.,FXD,CMPSN:24K OHM,5%,0.25W	01121	CB2435
R5000	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R5002	315-0392-00			RES.,FXD,CMPSN:3.9K OHM,5%,0.25W	01121	CB3925
R5004	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R5006	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R5008	315-0432-00			RES.,FXD,CMPSN:4.3K OHM,5%,0.25W	01121	CB4325
R5010	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R5040	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R5042	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R5044	321-0260-00			RES.,FXD,FILM:4.99K OHM,1%,0.125W	91637	MFF1816G49900F
R5046	321-0260-00			RES.,FXD,FILM:4.99K OHM,1%,0.125W	91637	MFF1816G49900F
R5048	321-0260-00			RES.,FXD,FILM:4.99K OHM,1%,0.125W	91637	MFF1816G49900F
R5052	321-0260-00			RES.,FXD,FILM:4.99K OHM,1%,0.125W	91637	MFF1816G49900F
R5054	321-0318-00			RES.,FXD,FILM:20K OHM,1%,0.125W	91637	MFF1816G20001F
R5056	315-0564-00			RES.,FXD,CMPSN:560K OHM,5%,0.25W	01121	CB5645
R5060	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R5070	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
R5072	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
R5074	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
R5076	321-0335-00			RES.,FXD,FILM:30.1K OHM,1%,0.125W	91637	MFF1816G30101F
R5080	321-0210-00			RES.,FXD,FILM:1.5K OHM,1%,0.125W	91637	MFF1816G15000F
R5082	321-0335-00			RES.,FXD,FILM:30.1K OHM,1%,0.125W	91637	MFF1816G30101F
R5084	321-0180-00			RES.,FXD,FILM:732 OHM,1%,0.125W	91637	MFF1816G732R0F
R5086	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	91637	MFF1816G40200F
R5088	321-0210-00			RES.,FXD,FILM:1.5K OHM,1%,0.125W	91637	MFF1816G15000F
R5100	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R5102	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R5104	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
R5106	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
R5108	315-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.25W	01121	CB8225
R5110	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
R5131	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R5137	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R5140	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
R5142	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
R5154	321-0268-00			RES.,FXD,FILM:6.04K OHM,1%,0.125W	91637	MFF1816G60400F
R5160	321-0268-00			RES.,FXD,FILM:6.04K OHM,1%,0.125W	91637	MFF1816G60400F
R5162	321-0268-00			RES.,FXD,FILM:6.04K OHM,1%,0.125W	91637	MFF1816G60400F
R5170	321-0126-00			RES.,FXD,FILM:200 OHM,1%,0.125W	91637	MFF1816G200R0F
R5172	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
R5174	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
R5180	321-0236-00			RES.,FXD,FILM:2.8K OHM,1%,0.125W	91637	MFF1816G28000F

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R5182	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	91637	MFF1816G40200F
R5184	321-0284-00			RES.,FXD,FILM:8.87K OHM,1%,0.125W	91637	MFF1816G88700F
R5200	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
R5202	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
R5204	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
R5206	321-0213-00			RES.,FXD,FILM:1.62K OHM,1%,0.125W	91637	MFF1816G16200F
R5208	321-0155-00			RES.,FXD,FILM:402 OHM,1%,0.125W	91637	MFF1816G402R0F
R5210	321-0259-00			RES.,FXD,FILM:4.87K OHM,1%,0.125W	91637	MFF1816G48700F
R5212	321-0213-00			RES.,FXD,FILM:1.62K OHM,1%,0.125W	91637	MFF1816G16200F
R5214	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R5216	321-0155-00			RES.,FXD,FILM:402 OHM,1%,0.125W	91637	MFF1816G402R0F
R5218	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R5220	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
R5222	321-0213-00			RES.,FXD,FILM:1.62K OHM,1%,0.125W	91637	MFF1816G16200F
R5223	321-0259-00			RES.,FXD,FILM:4.87K OHM,1%,0.125W	91637	MFF1816G48700F
R5224	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
R5225	321-0255-00			RES.,FXD,FILM:4.42K OHM,1%,0.125W	91637	MFF1816G44200F
R5226	321-0240-00			RES.,FXD,FILM:3.09K OHM,1%,0.125W	91637	MFF1816G30900F
R5227	321-0267-00			RES.,FXD,FILM:5.9K OHM,1%,0.125W	91637	MFF1816G59000F
R5228	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R5229	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R5230	321-0255-00			RES.,FXD,FILM:4.42K OHM,1%,0.125W	91637	MFF1816G44200F
R5232	321-0240-00			RES.,FXD,FILM:3.09K OHM,1%,0.125W	91637	MFF1816G30900F
R5234	321-0267-00			RES.,FXD,FILM:5.9K OHM,1%,0.125W	91637	MFF1816G59000F
R5236	321-0180-00			RES.,FXD,FILM:732 OHM,1%,0.125W	91637	MFF1816G732R0F
R5240	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R5248	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R5260	321-0255-00			RES.,FXD,FILM:4.42K OHM,1%,0.125W	91637	MFF1816G44200F
R5262	321-0240-00			RES.,FXD,FILM:3.09K OHM,1%,0.125W	91637	MFF1816G30900F
R5264	321-0267-00			RES.,FXD,FILM:5.9K OHM,1%,0.125W	91637	MFF1816G59000F
R5266	321-0255-00			RES.,FXD,FILM:4.42K OHM,1%,0.125W	91637	MFF1816G44200F
R5268	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R5270	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R5280	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
R5282	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
R5284	321-0215-00			RES.,FXD,FILM:1.69K OHM,1%,0.125W	91637	MFF1816G16900F
R5300	321-0155-00			RES.,FXD,FILM:402 OHM,1%,0.125W	91637	MFF1816G402R0F
R5302	321-0259-00			RES.,FXD,FILM:4.87K OHM,1%,0.125W	91637	MFF1816G48700F
R5304	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
R5310	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R5312	316-0103-00			RES.,FXD,CMPSN:10K OHM,10%,0.25W	01121	CB1031
R5314	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R5316	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R5320	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R5322	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R5330	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
R5332	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
R5334	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
R5336	321-0255-00			RES.,FXD,FILM:4.42K OHM,1%,0.125W	91637	MFF1816G44200F
R5338	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
R5340	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
R5342	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
R5344	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
R5360	321-0255-00			RES.,FXD,FILM:4.42K OHM,1%,0.125W	91637	MFF1816G44200F
R5370	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
R5372	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
R5374	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F

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R5376	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R5380	315-0182-00			RES.,FXD,CMPSN:1.8K OHM,5%,0.25W	01121	CB1825
R5382	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R5384	315-0682-00			RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
R5400	321-0277-00			RES.,FXD,FILM:7.5K OHM,1%,0.125W	91637	MFF1816G75000F
R5402	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
R5404	321-0248-00			RES.,FXD,FILM:3.74K OHM,1%,0.125W	91637	MFF1816G37400F
R5410	321-0248-00			RES.,FXD,FILM:3.74K OHM,1%,0.125W	91637	MFF1816G37400F
R5420	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R5422	321-0255-00			RES.,FXD,FILM:4.42K OHM,1%,0.125W	91637	MFF1816G44200F
R5430	321-0277-00			RES.,FXD,FILM:7.5K OHM,1%,0.125W	91637	MFF1816G75000F
R5432	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
R5434	321-0248-00			RES.,FXD,FILM:3.74K OHM,1%,0.125W	91637	MFF1816G37400F
R5440	321-0248-00			RES.,FXD,FILM:3.74K OHM,1%,0.125W	91637	MFF1816G37400F
R5460	321-0277-00			RES.,FXD,FILM:7.5K OHM,1%,0.125W	91637	MFF1816G75000F
R5462	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
R5464	321-0248-00			RES.,FXD,FILM:3.74K OHM,1%,0.125W	91637	MFF1816G37400F
R5470	321-0248-00			RES.,FXD,FILM:3.74K OHM,1%,0.125W	91637	MFF1816G37400F
R5490	301-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.50W	01121	EB2205
R5500	321-0231-00	B010100	B020749	RES.,FXD,FILM:2.49K OHM,1%,0.125W	91637	MFF1816G24900F
R5500	321-0245-00	B020750		RES.,FXD,FILM:3.48K OHM,1%,0.125W	91637	MFF1816G34800F
R5502	321-0267-00			RES.,FXD,FILM:5.9K OHM,1%,0.125W	91637	MFF1816G59000F
R5504	315-0105-00			RES.,FXD,CMPSN:1M OHM,5%,0.25W	01121	CB1055
R5506	315-0183-00			RES.,FXD,CMPSN:18K OHM,5%,0.25W	01121	CB1835
R5514	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R5516	301-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.50W	01121	EB4715
R5518	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
R5520	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	91637	MFF1816G40200F
R5522	315-0303-00			RES.,FXD,CMPSN:30K OHM,5%,0.25W	01121	CB3035
R5524	301-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.50W	01121	EB4715
R5526	315-0100-00			RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
R5530	321-0231-00	B010100	B020749	RES.,FXD,FILM:2.49K OHM,1%,0.125W	91637	MFF1816G24900F
R5530	321-0245-00	B020750		RES.,FXD,FILM:3.48K OHM,1%,0.125W	91637	MFF1816G34800F
R5532	321-0267-00			RES.,FXD,FILM:5.9K OHM,1%,0.125W	91637	MFF1816G59000F
R5534	315-0105-00			RES.,FXD,CMPSN:1M OHM,5%,0.25W	01121	CB1055
R5536	315-0183-00			RES.,FXD,CMPSN:18K OHM,5%,0.25W	01121	CB1835
R5544	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R5546	301-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.50W	01121	EB4715
R5548	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
R5550	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	91637	MFF1816G40200F
R5552	315-0303-00			RES.,FXD,CMPSN:30K OHM,5%,0.25W	01121	CB3035
R5554	301-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.50W	01121	EB4715
R5556	315-0100-00			RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
R5560	321-0222-00	B010100	B020749	RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
R5560	321-0236-00	B020750		RES.,FXD,FILM:2.8K OHM,1%,0.125W	91637	MFF1816G28000F
R5562	321-0267-00			RES.,FXD,FILM:5.9K OHM,1%,0.125W	91637	MFF1816G59000F
R5564	315-0105-00			RES.,FXD,CMPSN:1M OHM,5%,0.25W	01121	CB1055
R5566	315-0183-00			RES.,FXD,CMPSN:18K OHM,5%,0.25W	01121	CB1835
R5574	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R5576	301-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.50W	01121	EB4715
R5578	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
R5580	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	91637	MFF1816G40200F
R5582	315-0303-00			RES.,FXD,CMPSN:30K OHM,5%,0.25W	01121	CB3035
R5584	301-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.50W	01121	EB4715
R5586	315-0100-00			RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
R5600	315-0475-00			RES.,FXD,CMPSN:4.7M OHM,5%,0.25W	01121	CB4755
R5602	315-0100-00			RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
R5604	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R5606	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R5610	315-0150-00			RES.,FXD,CMPSN:15 OHM,5%,0.25W	01121	CB1505

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R5612	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R5614	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R5616	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
R5618	315-0752-00			RES.,FXD,CMPSN:7.5K OHM,5%,0.25W	01121	CB7525
R5620	321-0258-00			RES.,FXD,FILM:4.75K OHM,1%,0.125W	91637	MFF1816G47500F
R5622	321-0227-00			RES.,FXD,FILM:2.26K OHM,1%,0.125W	91637	MFF1816G22600F
R5630	315-0475-00			RES.,FXD,CMPSN:4.7M OHM,5%,0.25W	01121	CB4755
R5632	315-0100-00			RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
R5634	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R5636	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R5640	315-0150-00			RES.,FXD,CMPSN:15 OHM,5%,0.25W	01121	CB1505
R5642	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R5644	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R5646	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
R5648	315-0752-00			RES.,FXD,CMPSN:7.5K OHM,5%,0.25W	01121	CB7525
R5650	321-0258-00			RES.,FXD,FILM:4.75K OHM,1%,0.125W	91637	MFF1816G47500F
R5652	321-0227-00			RES.,FXD,FILM:2.26K OHM,1%,0.125W	91637	MFF1816G22600F
R5660	315-0475-00			RES.,FXD,CMPSN:4.7M OHM,5%,0.25W	01121	CB4755
R5662	315-0100-00			RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
R5664	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R5666	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R5670	315-0150-00			RES.,FXD,CMPSN:15 OHM,5%,0.25W	01121	CB1505
R5672	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R5674	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R5676	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
R5678	315-0752-00			RES.,FXD,CMPSN:7.5K OHM,5%,0.25W	01121	CB7525
R5680	321-0258-00			RES.,FXD,FILM:4.75K OHM,1%,0.125W	91637	MFF1816G47500F
R5682	321-0227-00			RES.,FXD,FILM:2.26K OHM,1%,0.125W	91637	MFF1816G22600F
R5700	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R5702	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R5704	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R5706	315-0271-00			RES.,FXD,CMPSN:270 OHM,5%,0.25W	01121	CB2715
R5710	315-0475-00			RES.,FXD,CMPSN:4.7M OHM,5%,0.25W	01121	CB4755
R5712	315-0270-00			RES.,FXD,CMPSN:27 OHM,5%,0.25W	01121	CB2705
R5714	315-0392-00			RES.,FXD,CMPSN:3.9K OHM,5%,0.25W	01121	CB3925
R5716	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
R5718	315-0752-00			RES.,FXD,CMPSN:7.5K OHM,5%,0.25W	01121	CB7525
R5720	321-0210-00			RES.,FXD,FILM:1.5K OHM,1%,0.125W	91637	MFF1816G15000F
R5722	311-1230-00			RES.,VAR,NONWIR:20K OHM,20%,0.50W	32997	3386F-T04-203
R5724	311-1226-00			RES.,VAR,NONWIR:2.5K OHM,20%,0.50W	32997	3386F-T04-252
R5730	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R5732	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R5734	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R5736	315-0271-00			RES.,FXD,CMPSN:270 OHM,5%,0.25W	01121	CB2715
R5740	315-0475-00			RES.,FXD,CMPSN:4.7M OHM,5%,0.25W	01121	CB4755
R5742	315-0270-00			RES.,FXD,CMPSN:27 OHM,5%,0.25W	01121	CB2705
R5744	315-0392-00			RES.,FXD,CMPSN:3.9K OHM,5%,0.25W	01121	CB3925
R5746	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
R5748	315-0752-00			RES.,FXD,CMPSN:7.5K OHM,5%,0.25W	01121	CB7525
R5750	321-0210-00			RES.,FXD,FILM:1.5K OHM,1%,0.125W	91637	MFF1816G15000F
R5752	311-1230-00			RES.,VAR,NONWIR:20K OHM,20%,0.50W	32997	3386F-T04-203
R5754	311-1226-00			RES.,VAR,NONWIR:2.5K OHM,20%,0.50W	32997	3386F-T04-252
R5760	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R5762	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R5764	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R5766	315-0271-00			RES.,FXD,CMPSN:270 OHM,5%,0.25W	01121	CB2715
R5770	315-0475-00			RES.,FXD,CMPSN:4.7M OHM,5%,0.25W	01121	CB4755

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R5772	315-0270-00			RES.,FXD,CMPSN:27 OHM,5%,0.25W	01121	CB2705
R5774	315-0392-00			RES.,FXD,CMPSN:3.9K OHM,5%,0.25W	01121	CB3925
R5776	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
R5778	315-0752-00			RES.,FXD,CMPSN:7.5K OHM,5%,0.25W	01121	CB7525
R5780	321-0216-00			RES.,FXD,FILM:1.74K OHM,1%,0.125W	91637	MFF1816G17400F
R5782	311-1230-00			RES.,VAR,NONWIR:20K OHM,20%,0.50W	32997	3386F-T04-203
R5784	311-1226-00			RES.,VAR,NONWIR:2.5K OHM,20%,0.50W	32997	3386F-T04-252
R5800	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
R5801	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R5802	321-0291-00			RES.,FXD,FILM:10.5K OHM,1%,0.125W	91637	MFF1816G10501F
R5804	322-0382-00			RES.,FXD,FILM:93.1K OHM,1%,0.25W	91637	MFF1421G93101F
R5806	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R5808	315-0100-00			RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
R5810	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
R5812	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
R5814	301-0331-00			RES.,FXD,CMPSN:330 OHM,5%,0.50W	01121	EB3315
R5818	321-0243-00			RES.,FXD,FILM:3.32K OHM,1%,0.125W	91637	MFF1816G33200F
R5820	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R5822	321-0298-00			RES.,FXD,FILM:12.4K OHM,1%,0.125W	91637	MFF1816G12401F
R5824	321-0275-00			RES.,FXD,FILM:7.15K OHM,1%,0.125W	91637	MFF1816G71500F
R5830	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
R5831	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R5832	321-0291-00			RES.,FXD,FILM:10.5K OHM,1%,0.125W	91637	MFF1816G10501F
R5834	322-0382-00			RES.,FXD,FILM:93.1K OHM,1%,0.25W	91637	MFF1421G93101F
R5836	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R5838	315-0100-00			RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
R5840	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
R5842	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
R5844	301-0331-00			RES.,FXD,CMPSN:330 OHM,5%,0.50W	01121	EB3315
R5848	321-0243-00			RES.,FXD,FILM:3.32K OHM,1%,0.125W	91637	MFF1816G33200F
R5850	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R5852	321-0298-00			RES.,FXD,FILM:12.4K OHM,1%,0.125W	91637	MFF1816G12401F
R5854	321-0275-00			RES.,FXD,FILM:7.15K OHM,1%,0.125W	91637	MFF1816G71500F
R5860	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
R5861	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R5862	321-0291-00			RES.,FXD,FILM:10.5K OHM,1%,0.125W	91637	MFF1816G10501F
R5864	322-0382-00			RES.,FXD,FILM:93.1K OHM,1%,0.25W	91637	MFF1421G93101F
R5866	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R5868	315-0100-00			RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
R5870	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
R5872	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
R5874	301-0331-00			RES.,FXD,CMPSN:330 OHM,5%,0.50W	01121	EB3315
R5878	321-0243-00			RES.,FXD,FILM:3.32K OHM,1%,0.125W	91637	MFF1816G33200F
R5880	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R5882	321-0298-00			RES.,FXD,FILM:12.4K OHM,1%,0.125W	91637	MFF1816G12401F
R5884	321-0275-00			RES.,FXD,FILM:7.15K OHM,1%,0.125W	91637	MFF1816G71500F
R5900	315-0100-00	B010100	B020749	RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
R5900	315-0100-02	B020750		RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
R5902	301-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.50W	01121	EB4715
R5904	323-0338-00			RES.,FXD,FILM:32.4K OHM,1%,0.50W	75042	CECT0-3242F
R5906	315-0182-00			RES.,FXD,CMPSN:1.8K OHM,5%,0.25W	01121	CB1825
R5910	315-0270-00			RES.,FXD,CMPSN:27 OHM,5%,0.25W	01121	CB2705
R5912	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R5914	315-0151-00			RES.,FXD,CMPSN:150 OHM,5%,0.25W	01121	CB1515
R5920	323-0332-00			RES.,FXD,FILM:28K OHM,1%,0.50W	75042	CECT0-2802F
R5922	321-0239-00			RES.,FXD,FILM:3.01K OHM,1%,0.125W	91637	MFF1816G30100F
R5924	321-0235-00			RES.,FXD,FILM:2.74K OHM,1%,0.125W	91637	MFF1816G27400F
R5926	321-0235-00			RES.,FXD,FILM:2.74K OHM,1%,0.125W	91637	MFF1816G27400F

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R5930	316-0100-00	B010100	B020749	RES.,FXD,CMPSN:10 OHM,10%,0.25W	01121	CB1001
R5930	315-0100-02	B020750		RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
R5932	301-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.50W	01121	EB4715
R5934	322-0338-00			RES.,FXD,FILM:32.4K OHM,1%,0.25W	75042	CEBT0-3242F
R5936	315-0182-00			RES.,FXD,CMPSN:1.8K OHM,5%,0.25W	01121	CB1825
R5940	315-0270-00			RES.,FXD,CMPSN:27 OHM,5%,0.25W	01121	CB2705
R5942	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R5944	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R5950	323-0332-00			RES.,FXD,FILM:28K OHM,1%,0.50W	75042	CECT0-2802F
R5952	321-0239-00			RES.,FXD,FILM:3.01K OHM,1%,0.125W	91637	MFF1816G30100F
R5954	321-0235-00			RES.,FXD,FILM:2.74K OHM,1%,0.125W	91637	MFF1816G27400F
R5956	321-0235-00			RES.,FXD,FILM:2.74K OHM,1%,0.125W	91637	MFF1816G27400F
R5960	315-0100-00	B010100	B020749	RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
R5960	315-0100-02	B020750		RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
R5962	301-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.50W	01121	EB4715
R5964	323-0338-00			RES.,FXD,FILM:32.4K OHM,1%,0.50W	75042	CECT0-3242F
R5966	315-0182-00			RES.,FXD,CMPSN:1.8K OHM,5%,0.25W	01121	CB1825
R5970	315-0270-00			RES.,FXD,CMPSN:27 OHM,5%,0.25W	01121	CB2705
R5972	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R5974	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R5980	323-0332-00			RES.,FXD,FILM:28K OHM,1%,0.50W	75042	CECT0-2802F
R5982	321-0239-00			RES.,FXD,FILM:3.01K OHM,1%,0.125W	91637	MFF1816G30100F
R5984	321-0235-00			RES.,FXD,FILM:2.74K OHM,1%,0.125W	91637	MFF1816G27400F
R5986	321-0235-00			RES.,FXD,FILM:2.74K OHM,1%,0.125W	91637	MFF1816G27400F
R6003	316-0333-00			RES.,FXD,CMPSN:33K OHM,10%,0.25W	01121	CB3331
R6005	311-1230-00			RES.,VAR,NONWIR:20K OHM,20%,0.50W	32997	3386F-T04-203
R6007	315-0821-00			RES.,FXD,CMPSN:820 OHM,5%,0.25W	01121	CB8215
R6009	315-0151-00			RES.,FXD,CMPSN:150 OHM,5%,0.25W	01121	CB1515
R6010	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R6013	315-0392-00			RES.,FXD,CMPSN:3.9K OHM,5%,0.25W	01121	CB3925
R6021	321-0213-00			RES.,FXD,FILM:1.62K OHM,1%,0.125W	91637	MFF1816G16200F
R6023	315-0511-00			RES.,FXD,CMPSN:510 OHM,5%,0.25W	01121	CB5115
R6025	316-0222-00			RES.,FXD,CMPSN:2.2K OHM,10%,0.25W	01121	CB2221
R6027	316-0185-00			RES.,FXD,CMPSN:1.8M OHM,10%,0.25W	01121	CB1851
R6028	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R6029	316-0333-00			RES.,FXD,CMPSN:33K OHM,10%,0.25W	01121	CB3331
R6031	316-0822-00			RES.,FXD,CMPSN:8.2K OHM,10%,0.25W	01121	CB8221
R6041	311-1235-00			RES.,VAR,NONWIR:100K OHM,20%,0.50W	32997	3386F-T04-104
R6043	316-0683-00			RES.,FXD,CMPSN:68K OHM,10%,0.25W	01121	CB6831
R6045	316-0154-00			RES.,FXD,CMPSN:150K OHM,10%,0.25W	01121	CB1541
R6049	315-0513-00			RES.,FXD,CMPSN:51K OHM,5%,0.25W	01121	CB5135
R6081	316-0103-00			RES.,FXD,CMPSN:10K OHM,10%,0.25W	01121	CB1031
R6083	316-0273-00			RES.,FXD,CMPSN:27K OHM,10%,0.25W	01121	CB2731
R6085	316-0153-00			RES.,FXD,CMPSN:15K OHM,10%,0.25W	01121	CB1531
R6087	316-0683-00			RES.,FXD,CMPSN:68K OHM,10%,0.25W	01121	CB6831
R6089	315-0124-00			RES.,FXD,CMPSN:120K OHM,5%,0.25W	01121	CB1245
R6093	316-0822-00			RES.,FXD,CMPSN:8.2K OHM,10%,0.25W	01121	CB8221
R6099	316-0473-00			RES.,FXD,CMPSN:47K OHM,10%,0.25W	01121	CB4731
R6107	316-0103-00			RES.,FXD,CMPSN:10K OHM,10%,0.25W	01121	CB1031
R6111	301-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.50W	01121	EB1025
R6113	302-0103-00			RES.,FXD,CMPSN:10K OHM,10%,0.50W	01121	EB1031
R6121	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R6123	315-0242-00			RES.,FXD,CMPSN:2.4K OHM,5%,0.25W	01121	CB2425
R6125	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R6133	316-0562-00			RES.,FXD,CMPSN:5.6K OHM,10%,0.25W	01121	CB5621
R6143	316-0152-00			RES.,FXD,CMPSN:1.5K OHM,10%,0.25W	01121	CB1521
R6147	316-0104-00			RES.,FXD,CMPSN:100K OHM,10%,0.25W	01121	CB1041
R6151	315-0511-00			RES.,FXD,CMPSN:510 OHM,5%,0.25W	01121	CB5115
R6161	316-0682-00			RES.,FXD,CMPSN:6.8K OHM,10%,0.25W	01121	CB6821

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R6163	316-0103-00			RES.,FXD,CMPSN:10K OHM,10%,0.25W	01121	CB1031
R6165	316-0122-00			RES.,FXD,CMPSN:1.2K OHM,10%.0.25W	01121	CB1221
R6171	316-0153-00			RES.,FXD,CMPSN:15K OHM,10%,0.25W	01121	CB1531
R6177	316-0152-00			RES.,FXD,CMPSN:1.5K OHM,10%,0.25W	01121	CB1521
R6179	315-0622-00			RES.,FXD,CMPSN:6.2K OHM,5%,0.25W	01121	CB6225
R6183	315-0150-00			RES.,FXD,CMPSN:15 OHM,5%,0.25W	01121	CB1505
R6184	315-0512-00	XB030000		RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125
R6185	315-0150-00			RES.,FXD,CMPSN:15 OHM,5%,0.25W	01121	CB1505
R6186	315-0105-00	XB030000		RES.,FXD,CMPSN:1M OHM,5%,0.25W	01121	CB1055
R6187	304-0223-00			RES.,FXD,CMPSN:22K OHM,10%,1W	01121	GB2231
R6191	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R6193	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R6195	316-0682-00			RES.,FXD,CMPSN:6.8K OHM,10%,0.25W	01121	CB6821
R6197	316-0101-00			RES.,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
R6199	316-0101-00			RES.,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
R6205	304-0102-00			RES.,FXD,CMPSN:1K OHM,10%,1W	01121	GB1021
R6207	304-0102-00			RES.,FXD,CMPSN:1K OHM,10%,1W	01121	GB1021
R6209	304-0102-00			RES.,FXD,CMPSN:1K OHM,10%,1W	01121	GB1021
R6221	316-0274-00			RES.,FXD,CMPSN:270K OHM,10%,0.25W	01121	CB2741
R6243	311-1257-00			RES.,VAR,NONWIR:5M OHM,20%,0.50W	32997	3386F-T04-505
R6267	316-0155-00			RES.,FXD,CMPSN:1.5M OHM,10%,0.25W	01121	CB1551
R6269	316-0333-00			RES.,FXD,CMPSN:33K OHM,10%,0.25W	01121	CB3331
R6271	321-0486-00			RES.,FXD,FILM:1.13M OHM,1%,0.125W	91637	HMF188G11303F
R6273	316-0103-00			RES.,FXD,CMPSN:10K OHM,10%,0.25W	01121	CB1031
R6275	316-0105-00			RES.,FXD,CMPSN:1M OHM,10%,0.25W	01121	CB1051
R6283	315-0911-00			RES.,FXD,CMPSN:910 OHM,5%,0.25W	01121	CB9115
R6285	315-0185-00			RES.,FXD,CMPSN:1.8M OHM,5%,0.25W	01121	CB1855
R6287	316-0472-00			RES.,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R6291	321-0370-00			RES.,FXD,FILM:69.8K OHM,1%,0.125W	91637	MFF1816G69801F
R6293	311-1232-00			RES.,VAR,NONWIR:50K OHM,20%,0.50W	32997	3386F-T04-503
R6295	316-0563-00			RES.,FXD,CMPSN:56K OHM,10%,0.25W	01121	CB5631
R6297	321-0431-00			RES.,FXD,FILM:301K OHM,1%,0.125W	91637	MFF1816G30102F
R7210	311-0881-00			RES.,VAR,NONWIR:20K OHM,10%,0.50W	01121	W7674
R7220	311-0881-00			RES.,VAR,NONWIR:20K OHM,10%,0.50W	01121	W7674
R7230	311-0881-00			RES.,VAR,NONWIR:20K OHM,10%,0.50W	01121	W7674
R7270	311-1068-00			RES.,VAR,NONWIR:5K OHM,10%,0.50W	01121	W-7682
R7280	311-1044-00			RES.,VAR,NONWIR:PNL,50K OHM,0.50W	01121	W-7542A
R7290	311-1044-00			RES.,VAR,NONWIR:PNL,50K OHM,0.50W	01121	W-7542A
R7410	311-0881-00			RES.,VAR,NONWIR:20K OHM,10%,0.50W	01121	W7674
R7420	311-0881-00			RES.,VAR,NONWIR:20K OHM,10%,0.50W	01121	W7674
R7430	311-0881-00			RES.,VAR,NONWIR:20K OHM,10%,0.50W	01121	W7674
R7450	311-1068-00			RES.,VAR,NONWIR:5K OHM,10%,0.50W	01121	W-7682
R7460	311-1068-00			RES.,VAR,NONWIR:5K OHM,10%,0.50W	01121	W-7682
R7470	311-1298-00			RES.,VAR,NONWIR:10K OHM,20%,0.50W	01121	W-7909
R7480	311-1044-00			RES.,VAR,NONWIR:PNL,50K OHM,0.50W	01121	W-7542A
R7490	311-1298-00			RES.,VAR,NONWIR:10K OHM,20%,0.50W	01121	W-7909
R7541	311-1297-00			RES.,VAR,NONWIR:10K OHM,20%,1W	01121	11M441
	----- -----			(R7541 FURNISHED AS A UNIT WITH S7641)		
R7551	311-1299-00			RES.,VAR,NONWIR:PNL,2K OHM,1W,W/SW	01121	11M442
	----- -----			(R7551 FURNISHED AS A UNIT WITH S7651)		
R7565	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R7571	311-1297-00			RES.,VAR,NONWIR:10K OHM,20%,1W	01121	11M441
	----- -----			(R7671 FURNISHED AS A UNIT WITH S7671)		
R7591	311-1297-00			RES.,VAR,NONWIR:10K OHM,20%,1W	01121	11M441
	----- -----			(R7591 FURNISHED AS A UNIT WITH S7691)		
R7741	302-0220-00			RES.,FXD,CMPSN:22 OHM,10%,0.50W	01121	EB2201
R7746	301-0430-00			RES.,FXD,CMPSN:43 OHM,5%,0.50W	01121	EB4305

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R7751	311-1937-00			RES.,VAR,NONWIR:2K X 10K OHM,20%,0.50W	01121	OBD
	----- -----			(R7751 FURNISHED AS A UNIT WITH S7751)		
R7771	315-0682-00			RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
R7781	302-0220-00			RES.,FXD,CMPSN:22 OHM,10%,0.50W	01121	EB2201
R7793	321-0260-00			RES.,FXD,FILM:4.99K OHM,1%,0.125W	91637	MFF1816G49900F
R7796	321-0260-00			RES.,FXD,FILM:4.99K OHM,1%,0.125W	91637	MFF1816G49900F
R7848	321-0413-00			RES.,FXD,FILM:196K OHM,1%,0.125W	91637	MFF1816G19602F
R7853	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
R7856	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
R7861	321-0248-00			RES.,FXD,FILM:3.74K OHM,1%,0.125W	91637	MFF1816G37400F
R7862	321-0248-00			RES.,FXD,FILM:3.74K OHM,1%,0.125W	91637	MFF1816G37400F
R7863	311-1226-00			RES.,VAR,NONWIR:2.5K OHM,20%,0.50W	32997	3386F-T04-252
R7868	311-1225-00			RES.,VAR,NONWIR:1K OHM,20%,0.50W	32997	3386F-T04-102
R7873	311-1228-00			RES.,VAR,NONWIR:10K OHM,20%,0.50W	32997	3386F-T04-103
R7878	311-1228-00			RES.,VAR,NONWIR:10K OHM,20%,0.50W	32997	3386F-T04-103
R7881	321-0283-00			RES.,FXD,FILM:8.66K OHM,1%,0.125W	91637	MFF1816G86600F
R7883	311-1230-00			RES.,VAR,NONWIR:20K OHM,20%,0.50W	32997	3386F-T04-203
	----- -----			(R7883, 655HR, 655HR-1 ONLY)		
R7888	311-1230-00			RES.,VAR,NONWIR:20K OHM,20%,0.50W	32997	3386F-T04-203
R7890	321-0283-00			RES.,FXD,FILM:8.66K OHM,1%,0.125W	91637	MFF1816G86600F
R7891	321-0257-00			RES.,FXD,FILM:4.64K OHM,1%,0.125W	91637	MFF1816G46400F
R7893	311-1227-00			RES.,VAR,NONWIR:5K OHM,20%,0.50W	32997	3386F-T04-502
R7896	311-1297-00			RES.,VAR,NONWIR:10K OHM,20%,1W	01121	11M441
R7960	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R8000	315-0271-00			RES.,FXD,CMPSN:270 OHM,5%,0.25W	01121	CB2715
R8005	315-0271-00			RES.,FXD,CMPSN:270 OHM,5%,0.25W	01121	CB2715
R8007	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R8010	308-0459-00			RES.,FXD,WW:1.1 OHM,5%,3W	91637	CW2B-1R100J
R8020	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R8090	315-0681-00			RES.,FXD,CMPSN:680 OHM,5%,0.25W	01121	CB6815
R8095	315-0680-00			RES.,FXD,CMPSN:68 OHM,5%,0.25W	01121	CB6805
R8100	308-0301-00			RES.,FXD,WW:10K OHM,1%,3W	01686	T2A1002F10
R8102	315-0431-00			RES.,FXD,CMPSN:430 OHM,5%,0.25W	01121	CB4315
R8104	315-0753-00			RES.,FXD,CMPSN:75K OHM,5%,0.25W	01121	CB7535
R8106	315-0183-00			RES.,FXD,CMPSN:18K OHM,5%,0.25W	01121	CB1835
R8108	315-0154-00			RES.,FXD,CMPSN:150K OHM,5%,0.25W	01121	CB1545
R8130	315-0303-00			RES.,FXD,CMPSN:30K OHM,5%,0.25W	01121	CB3035
R8132	315-0512-00			RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125
R8134	301-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.50W	01121	EB1525
R8136	315-0154-00			RES.,FXD,CMPSN:150K OHM,5%,0.25W	01121	CB1545
R8138	315-0154-00			RES.,FXD,CMPSN:150K OHM,5%,0.25W	01121	CB1545
R8150	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R8152	308-0590-00			RES.,FXD,WW:0.25 OHM,5%,3W	91637	RS2B-ER2500J
R8153	308-0499-00			RES.,FXD,WW:0.5 OHM,10%,2.5W AXIAL	91637	RS2B-ER5000K
R8160	321-0152-00			RES.,FXD,FILM:374 OHM,1%,0.125W	91637	MFF1816G374R0F
R8162	321-0183-00			RES.,FXD,FILM:787 OHM,1%,0.125W	91637	MFF1816G787R0F
R8164	321-0187-00			RES.,FXD,FILM:866 OHM,1%,0.125W	91637	MFF1816G866R0F
R8166	315-0512-00			RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125
R8170	311-1228-00			RES.,VAR,NONWIR:10K OHM,20%,0.50W	32997	3386F-T04-103
R8180	315-0751-00			RES.,FXD,CMPSN:750 OHM,5%,0.25W	01121	CB7515
R8190	321-0239-00			RES.,FXD,FILM:3.01K OHM,1%,0.125W	91637	MFF1816G30100F
R8192	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
R8193	315-0511-00			RES.,FXD,CMPSN:510 OHM,5%,0.25W	01121	CB5115
R8199	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
R8200	321-0283-00			RES.,FXD,FILM:8.66K OHM,1%,0.125W	91637	MFF1816G86600F
R8201	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
R8202	321-0205-00			RES.,FXD,FILM:1.33K OHM,1%,0.125W	91637	MFF1816G13300F

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R8203	315-0511-00			RES.,FXD,CMPSN:510 OHM,5%,0.25W	01121	CB5115
R8204	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
R8206	315-0512-00			RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125
R8230	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
R8232	321-0614-00			RES.,FXD,FILM:10.1K OHM,1%,0.125W	91637	MFF1816G10101F
R8250	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
R8252	315-0680-00			RES.,FXD,CMPSN:68 OHM,5%,0.25W	01121	CB6805
R8260	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
R8270	308-0463-00			RES.,FXD,WW:0.3 OHM,1%,3W	91637	RS2B-KR3000F
R8280	315-0681-00			RES.,FXD,CMPSN:680 OHM,5%,0.25W	01121	CB6815
R8282	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R8290	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
R8292	308-0125-00			RES.,FXD,FILM:7.5 OHM,5%,10W	14193	SA1007R5J
R8300	321-0386-00			RES.,FXD,FILM:102K OHM,1%,0.125W	91637	MFF1816G10202F
R8302	321-0300-00			RES.,FXD,FILM:13K OHM,1%,0.125W	91637	MFF1816G13001F
R8304	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
R8306	315-0561-00			RES.,FXD,CMPSN:560 OHM,5%,0.25W	01121	CB5615
R8310	305-0333-00			RES.,FXD,CMPSN:33K OHM,5%,2W	01121	HB3335
R8311	308-0459-00			RES.,FXD,WW:1.1 OHM,5%,3W	91637	CW2B-1R100J
R8320	315-0683-00			RES.,FXD,CMPSN:68K OHM,5%,0.25W	01121	CB6835
R8378	315-0154-00			RES.,FXD,CMPSN:150K OHM,5%,0.25W	01121	CB1545
R8600	307-0093-00			RES.,FXD,CMPSN:1.2 OHM,5%,0.50W	01121	EB12G5
R8640	315-0113-00			RES.,FXD,CMPSN:11K OHM,5%,0.25W	01121	CB1135
R8642	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R8644	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
R8646	315-0203-00			RES.,FXD,CMPSN:20K OHM,5%,0.25W	01121	CB2035
R8649	315-0683-00			RES.,FXD,CMPSN:68K OHM,5%,0.25W	01121	CB6835
R8650	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
R8651	315-0124-00			RES.,FXD,CMPSN:120K OHM,5%,0.25W	01121	CB1245
R8652	315-0564-00			RES.,FXD,CMPSN:560K OHM,5%,0.25W	01121	CB5645
R8654	302-0392-00			RES.,FXD,CMPSN:3.9K OHM,10%,0.50W	01121	EB3921
R8659	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R8660	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R8661	321-0648-02			RES.,FXD,FILM:500K OHM,0.5%,0.125W	24546	NC55C5003D
R8662	315-0203-00			RES.,FXD,CMPSN:20K OHM,5%,0.25W	01121	CB2035
R8665	321-0347-00			RES.,FXD,FILM:40.2K OHM,1%,0.125W	91637	MFF1816G40201F
R8666	315-0154-00			RES.,FXD,CMPSN:150K OHM,5%,0.25W	01121	CB1545
R8667	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R8668	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R8669	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R8670	307-0093-00			RES.,FXD,CMPSN:1.2 OHM,5%,0.50W	01121	EB12G5
R8671	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R8672	307-0105-00			RES.,FXD,CMPSN:3.9 OHM,5%,0.25W	01121	CB39G5
R8674	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R8676	315-0123-00			RES.,FXD,CMPSN:12K OHM,5%,0.25W	01121	CB1235
R8678	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R8680	315-0680-00			RES.,FXD,CMPSN:68 OHM,5%,0.25W	01121	CB6805
R8682	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R8714	304-0102-00			RES.,FXD,CMPSN:1K OHM,10%,1W	01121	GB1021
R8718	304-0103-00			RES.,FXD,CMPSN:10K OHM,10%,1W	01121	GB1031
R8778	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
R8781	304-0104-00			RES.,FXD,CMPSN:100K OHM,10%,1W	01121	GB1041
R8786	315-0134-00			RES.,FXD,CMPSN:130K OHM,5%,0.25W	01121	CB1345
R8787	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
R8788	304-0104-00			RES.,FXD,CMPSN:100K OHM,10%,1W	01121	GB1041
R8790	304-0102-00			RES.,FXD,CMPSN:1K OHM,10%,1W	01121	GB1021
R8791	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625

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R9010	316-0101-00			RES.,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
	----- -----			(R9010, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9020	321-0261-00			RES.,FXD,FILM:5.11K OHM,1%,0.125W	91637	MFF1816G51100F
	----- -----			(R9020, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9024	321-0299-00			RES.,FXD,FILM:12.7K OHM,1%,0.125W	91637	MFF1816G12701F
	----- -----			(R9024, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9030	316-0101-00			RES.,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
	----- -----			(R9030, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9032	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
	----- -----			(R9032, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9040	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R9040, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9042	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
	----- -----			(R9042, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9052	315-0362-00			RES.,FXD,CMPSN:3.6K OHM,5%,0.25W	01121	CB3625
	----- -----			(R9052, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9056	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
	----- -----			(R9056, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9062	321-0186-00			RES.,FXD,FILM:845 OHM,1%,0.125W	91637	MFF1816G845R0F
	----- -----			(R9056, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9066	316-0683-00			RES.,FXD,CMPSN:68K OHM,10%,0.25W	01121	CB6831
	----- -----			(R9066, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9074	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
	----- -----			(R9074, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9096	321-0221-00			RES.,FXD,FILM:1.96K OHM,1%,0.125W	91637	MFF1816G19600F
	----- -----			(R9096, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9106	316-0683-00			RES.,FXD,CMPSN:68K OHM,10%,0.25W	01121	CB6831
	----- -----			(R9106, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9108	316-0473-00			RES.,FXD,CMPSN:47K OHM,10%,0.25W	01121	CB4731
	----- -----			(R9108, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9110	316-0332-00			RES.,FXD,CMPSN:3.3K OHM,10%,0.25W	01121	CB3321
	----- -----			(R9110, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9122	311-1230-00			RES.,VAR,NONWIR:20K OHM,20%,0.50W	32997	3386F-T04-203
	----- -----			(R9122, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9124	311-1224-00			RES.,VAR,NONWIR:500 OHM,20%,0.50W	32997	3386F-T04-501
	----- -----			(R9124, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9130	321-0199-00			RES.,FXD,FILM:1.15K OHM,1%,0.125W	91637	MFF1816G11500F
	----- -----			(R9130, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9132	316-0101-00			RES.,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
	----- -----			(R9132, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9134	316-0100-00			RES.,FXD,CMPSN:10 OHM,10%,0.25W	01121	CB1001
	----- -----			(R9134, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9138	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
	----- -----			(R9138, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9142	321-0327-00			RES.,FXD,FILM:24.9K OHM,1%,0.125W	91637	MFF1816G24901F
	----- -----			(R9142, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9144	316-0683-00			RES.,FXD,CMPSN:68K OHM,10%,0.25W	01121	CB6831
	----- -----			(R9144, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9146	316-0473-00			RES.,FXD,CMPSN:47K OHM,10%,0.25W	01121	CB4731
	----- -----			(R9146, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9148	316-0332-00			RES.,FXD,CMPSN:3.3K OHM,10%,0.25W	01121	CB3321
	----- -----			(R9148, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9150	311-1230-00			RES.,VAR,NONWIR:20K OHM,20%,0.50W	32997	3386F-T04-203
	----- -----			(R9150, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9152	311-1224-00			RES.,VAR,NONWIR:500 OHM,20%,0.50W	32997	3386F-T04-501
	----- -----			(R9152, 650HR-1, 651HR-1, 655HR-1 ONLY)		

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R9158	321-0199-00			RES.,FXD,FILM:1.15K OHM,1%,0.125W	91637	MFF1816G11500F
	----- -----			(R9158, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9160	315-0100-00			RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
	----- -----			(R9160, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9164	316-0101-00			RES.,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
	----- -----			(R9164, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9166	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
	----- -----			(R9166, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9170	321-0293-00			RES.,FXD,FILM:11K OHM,1%,0.125W	91637	MFF1816G11001F
	----- -----			(R9170, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9178	316-0473-00			RES.,FXD,CMPSN:47K OHM,10%,0.25W	01121	CB4731
	----- -----			(R9178, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9179	316-0683-00			RES.,FXD,CMPSN:68K OHM,10%,0.25W	01121	CB6831
	----- -----			(R9179, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9180	316-0332-00			RES.,FXD,CMPSN:3.3K OHM,10%,0.25W	01121	CB3321
	----- -----			(R9180, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9182	311-1230-00			RES.,VAR,NONWIR:20K OHM,20%,0.50W	32997	3386F-T04-203
	----- -----			(R9182, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9184	311-1224-00			RES.,VAR,NONWIR:500 OHM,20%,0.50W	32997	3386F-T04-501
	----- -----			(R9184, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9190	321-0199-00			RES.,FXD,FILM:1.15K OHM,1%,0.125W	91637	MFF1816G11500F
	----- -----			(R9190, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9192	315-0100-00			RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
	----- -----			(R9192, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9196	316-0101-00			RES.,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
	----- -----			(R9196, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9198	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
	----- -----			(R9198, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9204	321-0210-00			RES.,FXD,FILM:1.5K OHM,1%,0.125W	91637	MFF1816G15000F
	----- -----			(R9204, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9211	316-0151-00			RES.,FXD,CMPSN:150 OHM,10%,0.25W	01121	CB1511
	----- -----			(R9211, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9216	321-0282-00			RES.,FXD,FILM:8.45K OHM,1%,0.125W	91637	MFF1816G84500F
	----- -----			(R9216, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9227	321-0214-00			RES.,FXD,FILM:1.65K OHM,1%,0.125W	91637	MFF1816G16500F
	----- -----			(R9227, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9230	316-0562-00			RES.,FXD,CMPSN:5.6K OHM,10%,0.25W	01121	CB5621
	----- -----			(R9230, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9234	315-0100-00			RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
	----- -----			(R9234, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9240	321-0306-00			RES.,FXD,FILM:15K OHM,1%,0.125W	91637	MFF1816G15001F
	----- -----			(R9240, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9241	316-0151-00			RES.,FXD,CMPSN:150 OHM,10%,0.25W	01121	CB1511
	----- -----			(R9241, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9242	321-0210-00			RES.,FXD,FILM:1.5K OHM,1%,0.125W	91637	MFF1816G15000F
	----- -----			(R9242, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9243	321-0214-00			RES.,FXD,FILM:1.65K OHM,1%,0.125W	91637	MFF1816G16500F
	----- -----			(R9243, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9248	321-0282-00			RES.,FXD,FILM:8.45K OHM,1%,0.125W	91637	MFF1816G84500F
	----- -----			(R9248, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9260	316-0562-00			RES.,FXD,CMPSN:5.6K OHM,10%,0.25W	01121	CB5621
	----- -----			(R9260, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9264	316-0100-00			RES.,FXD,CMPSN:10 OHM,10%,0.25W	01121	CB1001
	----- -----			(R9264, 650HR-1, 651HR-1, 655HR-1 ONLY)		

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R9270	321-0210-00			RES.,FXD,FILM:1.5K OHM,1%,0.125W	91637	MFF1816G15000F
	----- -----			(R9270, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9271	321-0214-00			RES.,FXD,FILM:1.65K OHM,1%,0.125W	91637	MFF1816G16500F
	----- -----			(R9271, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9273	316-0151-00			RES.,FXD,CMPSN:150 OHM,10%,0.25W	01121	CB1511
	----- -----			(R9273, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9290	316-0562-00			RES.,FXD,CMPSN:5.6K OHM,10%,0.25W	01121	CB5621
	----- -----			(R9290, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9294	316-0100-00			RES.,FXD,CMPSN:10 OHM,10%,0.25W	01121	CB1001
	----- -----			(R9294, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9312	321-0306-00			RES.,FXD,FILM:15K OHM,1%,0.125W	91637	MFF1816G15001F
	----- -----			(R9312, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9327	316-0101-00			RES.,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
	----- -----			(R9327, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9330	321-0277-00			RES.,FXD,FILM:7.5K OHM,1%,0.125W	91637	MFF1816G75000F
	----- -----			(R9330, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9332	301-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.50W	01121	EB1025
	----- -----			(R9332, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9334	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
	----- -----			(R9334, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9344	321-0306-00			RES.,FXD,FILM:15K OHM,1%,0.125W	91637	MFF1816G15001F
	----- -----			(R9344, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9358	321-0277-00			RES.,FXD,FILM:7.5K OHM,1%,0.125W	91637	MFF1816G75000F
	----- -----			(R9358, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9360	301-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.50W	01121	EB1025
	----- -----			(R9360, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9361	321-0277-00			RES.,FXD,FILM:7.5K OHM,1%,0.125W	91637	MFF1816G75000F
	----- -----			(R9361, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9363	316-0101-00			RES.,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
	----- -----			(R9363, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9364	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
	----- -----			(R9364, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9367	316-0101-00			RES.,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
	----- -----			(R9367, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9371	321-0277-00			RES.,FXD,FILM:7.5K OHM,1%,0.125W	91637	MFF1816G75000F
	----- -----			(R9371, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9374	321-0282-00			RES.,FXD,FILM:8.45K OHM,1%,0.125W	91637	MFF1816G84500F
	----- -----			(R9374, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9376	321-0306-00			RES.,FXD,FILM:15K OHM,1%,0.125W	91637	MFF1816G15001F
	----- -----			(R9376, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9384	301-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.50W	01121	EB1025
	----- -----			(R9384, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9386	321-0277-00			RES.,FXD,FILM:7.5K OHM,1%,0.125W	91637	MFF1816G75000F
	----- -----			(R9386, 650HR-1, 651HR-1, 655HR-1 ONLY)		
R9388	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
	----- -----			(R9388, 650HR-1, 651HR-1, 655HR-1 ONLY)		
RT8395	307-0361-00			RES.,THERMAL:25 OHM,20%	50157	165D25001
RT8640	307-0125-00			RES.,THERMAL:500 OHM,10%,25 DEG C	50157	2D1595
S1991	260-0449-00			SWITCH,SLIDE:SPDT,0.5A,125VA-DC	82389	11A-1030A
S7240	260-1809-00			SWITCH,TOGGLE:SPTT,0.4A,20V	09353	7103SYCB8E
S7315	260-1335-00			SWITCH,TOGGLE:SPDT,0.4A,20VDC	09353	7101 SHCB8E
S7325	260-1335-00			SWITCH,TOGGLE:SPDT,0.4A,20VDC	09353	7101 SHCB8E
S7335	260-1335-00			SWITCH,TOGGLE:SPDT,0.4A,20VDC	09353	7101 SHCB8E
S7501	260-0574-01			SWITCH,PUSH:SPDT,10A,250VAC	80009	260-0574-01

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S7510	260-0473-00			SWITCH,ROTARY:1 SECTION,2 POSITION	80009	260-0473-00
S7520	260-1337-00			SWITCH,LEVER:1 SECT,4 POSN	80009	260-1337-00
S7610	260-0473-00			SWITCH,ROTARY:1 SECTION,2 POSITION	80009	260-0473-00
	----- -----			(S7610, 651HR-1 ONLY)		
S7610	260-1339-00			SWITCH,LEVER:1 SECT,2 POSN	80009	260-1339-00
	----- -----			(S7610, 650HR-1 ONLY)		
S7610	260-1415-00			SWITCH,LEVER:1 SECT,3 POSN	80009	260-1415-00
	----- -----			(S7610, 655HR ONLY)		
S7610	260-1416-00			SWITCH,LEVER:1 SECT,3 POSN	80009	260-1416-00
	----- -----			(S7610, 651HR-1 ONLY)		
S7610	260-1417-00			SWITCH,LEVER:1 SECT,4 POSN	80009	260-1417-00
	----- -----			(S7610, 655HR-1 ONLY)		
S7620	260-0473-00			SWITCH,ROTARY:1 SECTION,2 POSITION	80009	260-0473-00
S7641	311-1297-00			RES.,VAR,NONWIR:10K OHM,20%,1W	01121	11M441
	----- -----			(S7641 FURNISHED AS A UNIT WITH R7541)		
S7651	311-1299-00			RES.,VAR,NONWIR:PNL,2K OHM,1W,W/SW	01121	11M442
	----- -----			(S7651 FURNISHED AS A UNIT WITH R7551)		
S7671	311-1297-00			RES.,VAR,NONWIR:10K OHM,20%,1W	01121	11M441
	----- -----			(S7671 FURNISHED AS A UNIT WITH R7571)		
S7691	311-1297-00			RES.,VAR,NONWIR:10K OHM,20%,1W	01121	11M441
	----- -----			(S7691 FURNISHED AS A UNIT WITH R7591)		
S7701	260-1060-01			SWITCH,TOGGLE:DPST,15A,125VAC	27193	8906K-2507
S7710	260-1338-00			SWITCH,LEVER:1 SECT,3 POSN	80009	260-1338-00
S7720	260-1338-00			SWITCH,LEVER:1 SECT,3 POSN	80009	260-1338-00
S7746	260-1132-00			SWITCH,PUSH:DPDT,1A,28VDC1 BUTTON	80009	260-1132-00
S7751	311-1937-00			RES.,VAR,NONWIR:2K X 10K OHM,20%,0.50W	01121	OBD
	----- -----			(S7751 FURNISHED AS A UNIT WITH R7751)		
S7781	260-1132-04			SWITCH,PUSH:DPDT,1A,28VDC,1 BUTTON	80009	260-1132-04
T3446	120-0586-00			XFMR,TOROID:10 TURNS QUADFILAR	80009	120-0586-00
	----- -----			(T3446, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
T4060	120-1129-00			XFMR,FLYBACK:POT CORE	80009	120-1129-00
T4266	120-0754-00			XFMR,PWR,STPDN:LINEARITY POTCORE	80009	120-0754-00
T4810	120-1221-00			TRANSFORMER,RF:VARIABLE,PIN CUSHION	80009	120-1221-00
T8395	120-0880-00			XFMR,PWR,STPDN:	80009	120-0880-00
T8620	120-0752-00			XFMR,PWR,STU:HV	80009	120-0752-00
U175	155-0032-01	B010100	B020818	MICROCIRCUIT,LI:MONOLITHIC,INPUT PRE-AMPL	80009	155-0032-01
U175	155-0216-00	B020819		MICROCIRCUIT,LI:PLRT INV & TRIG PICK OFF	80009	155-0216-00
U1430	156-0700-00			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	18324	UA741T
U1456	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
U1710	156-0030-00			MICROCIRCUIT,DI:QUAD 2-INPUT NAND GATE	01295	SN7400(N OR J)
U1720	156-0030-00			MICROCIRCUIT,DI:QUAD 2-INPUT NAND GATE	01295	SN7400(N OR J)
U1810	156-0041-00			MICROCIRCUIT,DI:DUAL D-TYPE FLIP-FLOP	27014	DM7474N
U1820	156-0032-00			MICROCIRCUIT,DI:4-BIT BINARY COUNTER	80009	156-0032-00
U1910	156-0030-00			MICROCIRCUIT,DI:QUAD 2-INPUT NAND GATE	01295	SN7400(N OR J)
U1930	156-0032-00			MICROCIRCUIT,DI:4-BIT BINARY COUNTER	80009	156-0032-00
U2027	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
	----- -----			(U2027, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
U2051	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
	----- -----			(U2051, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
U2053	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
	----- -----			(U2053, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
U2125	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
	----- -----			(U2125, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
U2181	156-0178-00			MICROCIRCUIT,DI:TRIPLE 3-INPUT NOR GATE	01295	SN7427N
	----- -----			(U2181, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
U2405	156-0130-00			MICROCIRCUIT,LI:MODULATOR/DEMODULATOR	80009	156-0130-00
	----- -----			(U2405, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		

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U2425	156-0130-00			MICROCIRCUIT,LI:MODULATOR/DEMODULATOR	80009	156-0130-00
	----- -----			(U2425, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
U2723	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
	----- -----			(U2723, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
U2737	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
	----- -----			(U2737, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
U2755	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
	----- -----			(U2755, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
U2861	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
	----- -----			(U2861, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
U3030	156-0158-05			MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER	80009	156-0158-05
	----- -----			(U3030, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
U3040	156-0158-05			MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER	80009	156-0158-05
	----- -----			(U3040, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
U3050	156-0158-05			MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER	80009	156-0158-05
	----- -----			(U3050, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
U3130	156-0041-00			MICROCIRCUIT,DI:DUAL D-TYPE FLIP-FLOP	27014	DM7474N
	----- -----			(U3130, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
U3156	156-0158-05			MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER	80009	156-0158-05
	----- -----			(U3156, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
U3180	156-0178-00			MICROCIRCUIT,DI:TRIPLE 3-INPUT NOR GATE	01295	SN7427N
	----- -----			(U3180, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
U3510	156-0130-00			MICROCIRCUIT,LI:MODULATOR/DEMODULATOR	80009	156-0130-00
	----- -----			(U3510, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
U3526	156-0130-00			MICROCIRCUIT,LI:MODULATOR/DEMODULATOR	80009	156-0130-00
	----- -----			(U3526, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
U3544	156-0130-00			MICROCIRCUIT,LI:MODULATOR/DEMODULATOR	80009	156-0130-00
	----- -----			(U3544, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
U3824	156-0158-05			MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER	80009	156-0158-05
	----- -----			(U3824, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
U3850	156-0158-05			MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER	80009	156-0158-05
	----- -----			(U3850, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
U3957	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
	----- -----			(U3957, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
U4150	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
U4190	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
U4380	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
U4460	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
U4462	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
U4566	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
U4568	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
U4580	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
U4650	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
U4883	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
U5000	156-0032-00			MICROCIRCUIT,DI:4-BIT BINARY COUNTER	80009	156-0032-00
U5020	156-0043-00			MICROCIRCUIT,DI:QUAD 2-INPUT POS NOR GATE	80009	156-0043-00
U5030	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
U5040	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
U5060	156-0043-00			MICROCIRCUIT,DI:QUAD 2-INPUT POS NOR GATE	80009	156-0043-00
U5100	156-0043-00			MICROCIRCUIT,DI:QUAD 2-INPUT POS NOR GATE	80009	156-0043-00
U5120	156-0030-00			MICROCIRCUIT,DI:QUAD 2-INPUT NAND GATE	01295	SN7400(N OR J)
U5220	156-0048-00			MICROCIRCUIT,LI:FIVE NPN TRANSISTOR ARRAY	02735	CA3046
U5260	156-0048-00			MICROCIRCUIT,LI:FIVE NPN TRANSISTOR ARRAY	02735	CA3046
U5340	156-0048-00			MICROCIRCUIT,LI:FIVE NPN TRANSISTOR ARRAY	02735	CA3046
U6067	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
U6101	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
U8240	156-0048-00			MICROCIRCUIT,LI:FIVE NPN TRANSISTOR ARRAY	02735	CA3046

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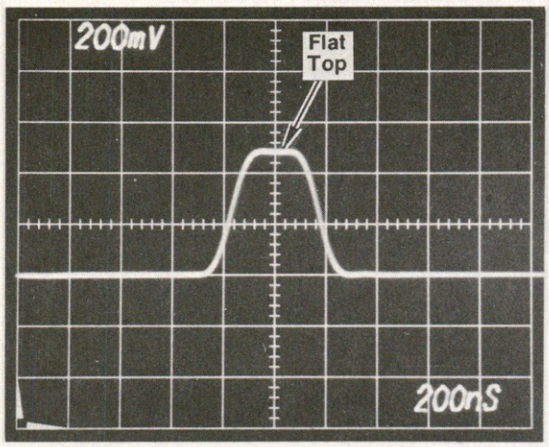
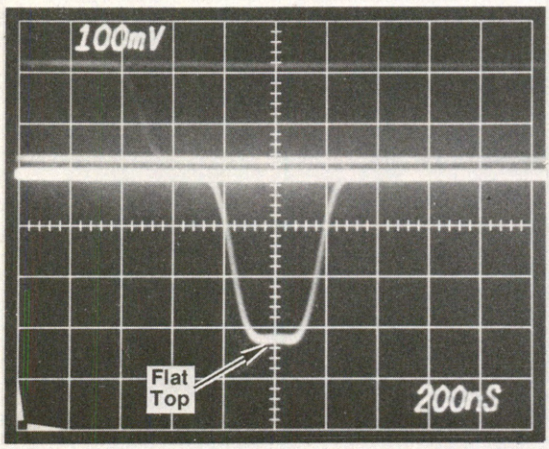
U8260	156-0071-00			MICROCIRCUIT,LI:VOLTAGE REGULATOR	04713	MC1723CL
U8660	156-0700-01			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	CA741S
V8701	154-0803-00			ELECTRON TUBE:12.0,TRINITRON PLUS	80009	154-0803-00
VR152	152-0514-00			SEMICOND DEVICE:ZENER,0.4W,10V,1%	80009	152-0514-00
VR190	152-0212-00			SEMICOND DEVICE:ZENER,0.5W,9V,5%	04713	SZ50646RL
VR2275	152-0166-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	04713	SZ11738
	----- -----			(VR2275, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
VR2463	152-0166-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	04713	SZ11738
	----- -----			(VR2463, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
VR2639	152-0166-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	04713	SZ11738
	----- -----			(VR2639, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
VR2879	152-0166-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	04713	SZ11738
	----- -----			(VR2879, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
VR3174	152-0166-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	04713	SZ11738
	----- -----			(VR3174, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
VR3586	152-0166-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	04713	SZ11738
	----- -----			(VR3586, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
VR3676	152-0166-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	04713	SZ11738
	----- -----			(VR3676, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
VR3738	152-0166-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	04713	SZ11738
	----- -----			(VR3738, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
VR3968	152-0166-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	04713	SZ11738
	----- -----			(VR3968, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		
VR4350	152-0284-00			SEMICOND DEVICE:ZENER,0.4W,47V,5%	80009	152-0284-00
VR4921	152-0278-00			SEMICOND DEVICE:ZENER,0.4W,3V,5%	04713	SZG35009K20
VR5310	152-0278-00			SEMICOND DEVICE:ZENER,0.4W,3V,5%	04713	SZG35009K20
VR6047	152-0166-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	04713	SZ11738
VR6129	152-0168-00			SEMICOND DEVICE:ZENER,0.4W,12V,5%	04713	SZG35009K4
VR6261	152-0288-00			SEMICOND DEVICE:ZENER,0.4W,140V,5%	12954	DZ720717C
VR8170	152-0519-00			SEMICOND DEVICE:ZENER,10W,5.6V,5%	04713	1N3997A
VR8300	152-0287-00			SEMICOND DEVICE:ZENER,0.4W,110V,5%	04713	1N986B
VR8641	152-0306-00			SEMICOND DEVICE:ZENER,0.4W,9.1V,5%	15238	Z5409
Y2115	158-0069-00			XTAL UNIT,QTZ:3.579545 MHZ,+/-0.0035%	75378	TX-005
	----- -----			(Y2115, 650HR, 650HR-1, 655HR, 655HR-1 ONLY)		
Y3114	158-0075-00			XTAL UNIT,QTZ:4.433619 MHZ,+/-0.0035%	75378	TX-007
	----- -----			(Y3114, 651HR, 651HR-1, 655HR, 655HR-1 ONLY)		

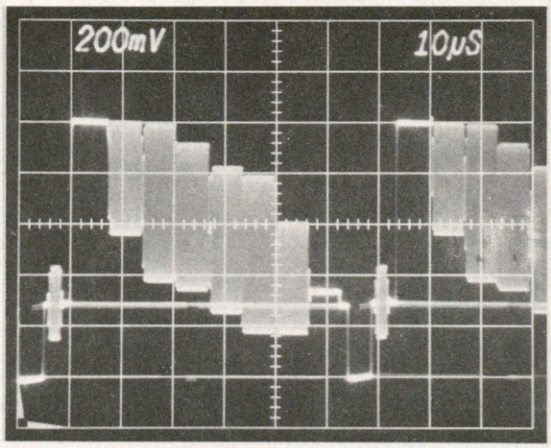


(A) Reference waveform at P1361-2.

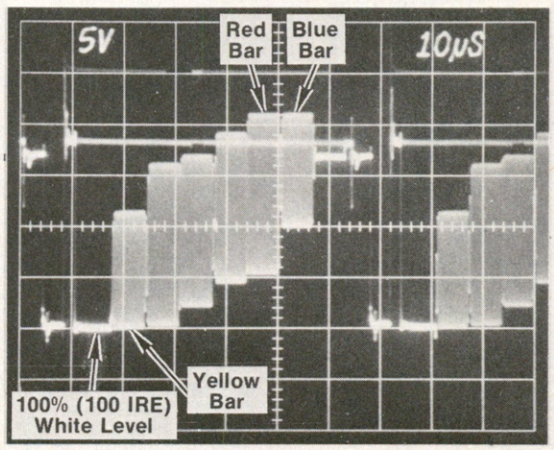


(B) Waveform at TP1151.

Fig. 1. Proper convergence dot waveforms.



(A) Reference waveform at P1361-2.



(B) Waveform at TP5800.

Fig. 2. Proper color bar waveforms.

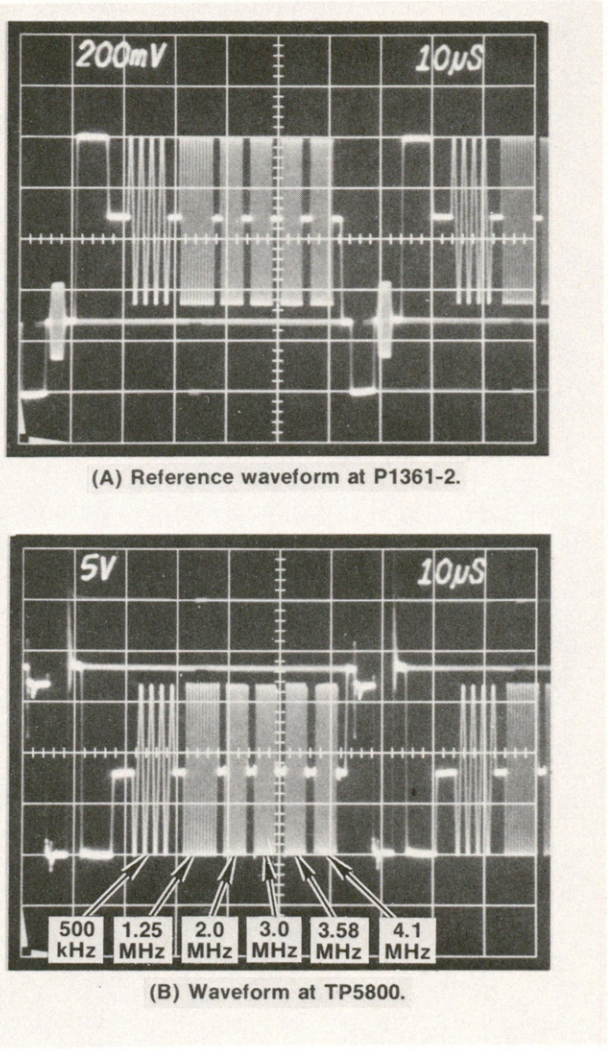
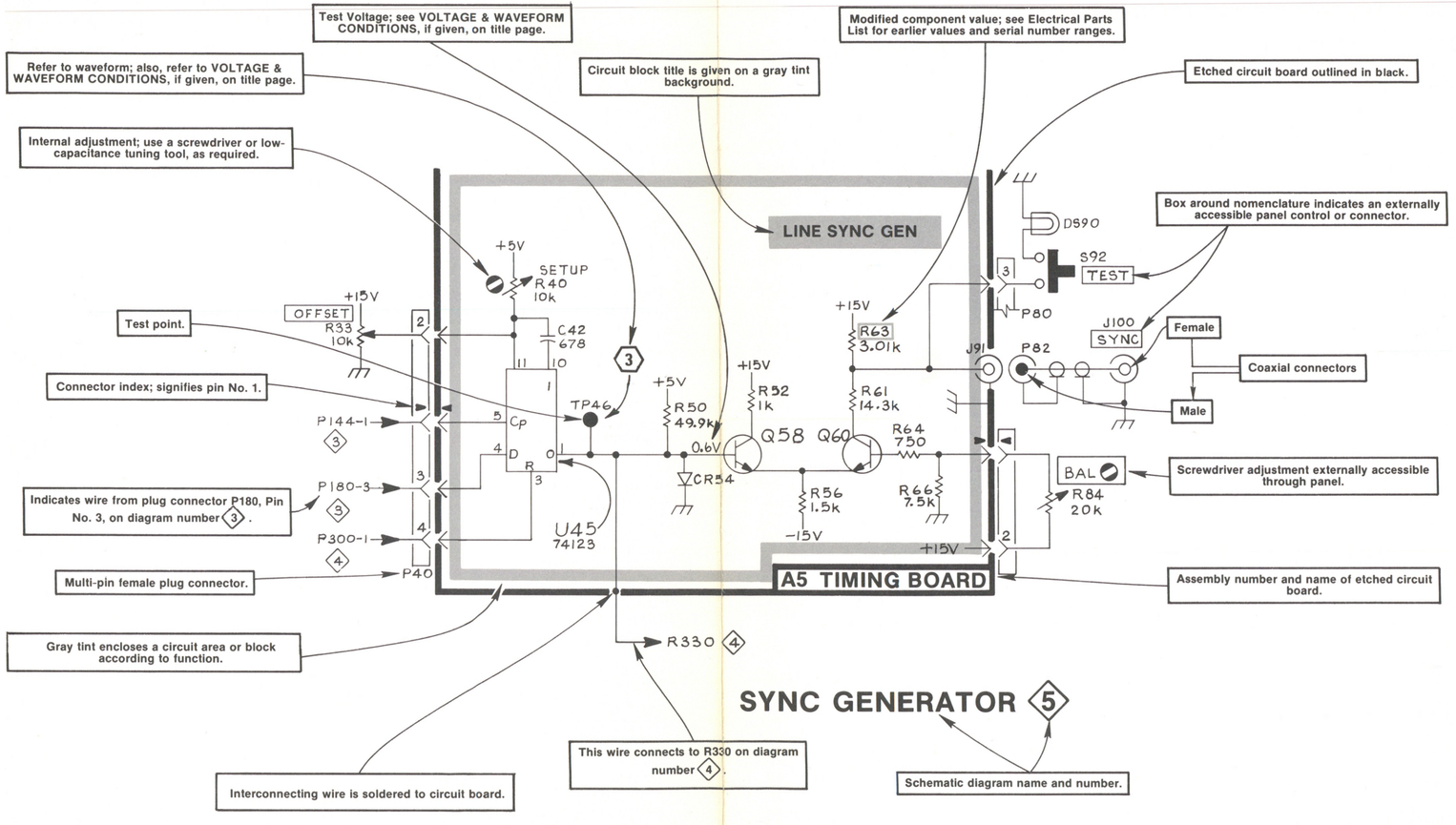


Fig. 3. Proper multiburst waveforms.



SCHEMATIC EXAMPLE

2234-54A

DIAGRAMS & CIRCUIT BOARD ILLUSTRATIONS

This section of the manual contains block and schematic diagrams with waveforms, and etched circuit board illustrations.

Symbols

Symbols used on the diagrams are based on ANSI Y32.2-1970 and IEEE No. 315 March 1971. Logic symbology is based on ANSI Y32.14-1973 (IEEE Std. 91-1973). Logic symbols depict the logic function performed and may differ from the manufacturer's data.

Component Values

Electrical components shown on the diagrams are in the following units unless noted otherwise:

Capacitors = Values one or greater are in picofarads (pF).
Values less than one are in micofarads (μF).

Resistors = Ohms (Ω).

Semiconductor Types

Refer to the Electrical Parts List.

Reference Designators

The following letters are used as reference designators to identify components or assemblies on Tektronix, Inc. schematic diagrams.

A	Assembly, separable or repairable (circuit board, etc.)
AT	Attenuator, fixed or variable
B	Motor
BT	Battery
C	Capacitor, fixed or variable
CR	Diode, signal or rectifier
DH	Decoupling Hybrid
DL	Delay Line
DS	Indicating device (lamp)
E	Spark Gap
F	Fuse
FL	Filter
H	Heat dissipating device (heat sink, heat radiator, etc.)
HR	Heater
J	Connector, stationary portion
K	Relay
L	Inductor, fixed or variable
LR	Inductor/resistor combination
M	Meter
P	Connector, movable portion
Q	Transistor, silicon-controlled rectifier, or programmable unijunction transistor
R	Resistor, fixed or variable
RT	Thermistors
S	Switch
T	Transformer
TC	Thermocouple
TP	Test Point
U	Assembly, inseparable or non-repairable (integrated circuit, etc.)
V	Electron tube
VR	Voltage regulator (zener diode, etc.)
Y	Crystal

Partial Schematic Diagram With Explanations

The partial diagram at the left is an example of the various symbols and other information provided on Tektronix, Inc. diagrams.

VOLTAGE AND WAVEFORM TEST CONDITIONS

A 1-volt p-p 75% amplitude, 7.5% setup, 100% white reference, NTSC standard color bar signal was applied through a 75-ohm coaxial cable to the 650A NTSC Monitor VIDEO INPUT A connector to obtain the waveform photographs for all the circuit boards used (except for aperture circuit) in this instrument. An end-line 75-ohm termination was used to terminate the remaining VIDEO INPUT A connector. A crosshatch signal was used to obtain the aperture circuit waveforms. The waveforms adjacent to the diagrams are not absolute and may vary between instruments because of differing component tolerances and internal calibration.

For 650A-Series instruments containing a 50 Hz PAL Decoder circuit board, the appropriate standard color bar signal was applied to the instrument to obtain the waveforms for this board. Waveforms for the RGB circuit board were obtained by applying a NTSC color bar signal to the R input connector and then looping this same signal to the G and B connectors.

Waveforms shown are actual photographs taken with a Tektronix Oscilloscope Camera System. Readouts in Volts/Div and Time/Div are given within the graticule area. Dc coupling was used to obtain the dc levels that are recorded at the right side of each waveform. Ac coupling, when indicated below the waveform, was used to block the dc component when a higher amplitude display was needed. To indicate time relationship between signals, the test oscilloscope was triggered externally from the generator composite sync signal except as indicated above the waveform.

Dc circuit voltages for the LV Power Supply diagram were measured with a 20,000 Ω/Volt VOM; 115 Vac was applied to the monitor.

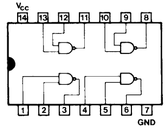
The 650A-Series Monitor controls were set as follows (except as indicated on the individual diagrams):

Left Front-Panel Controls

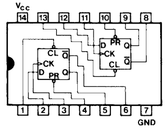
All toggle switches up. All adjustments as set when calibrated.

Right Front-Panel Controls

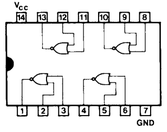
All lever and toggle switches up. All variable controls set to PRESET; BLUE ONLY pushbutton out. For NTSC picture monitors the NTSC TEST pushbutton was pressed in.



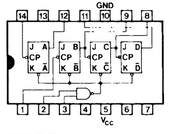
7400



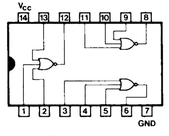
7474



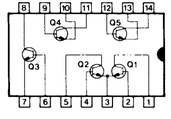
7402



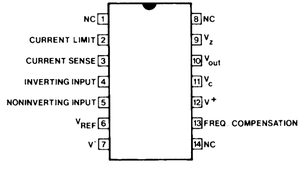
7493



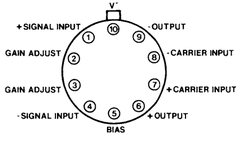
7427



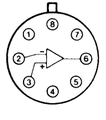
CA3046



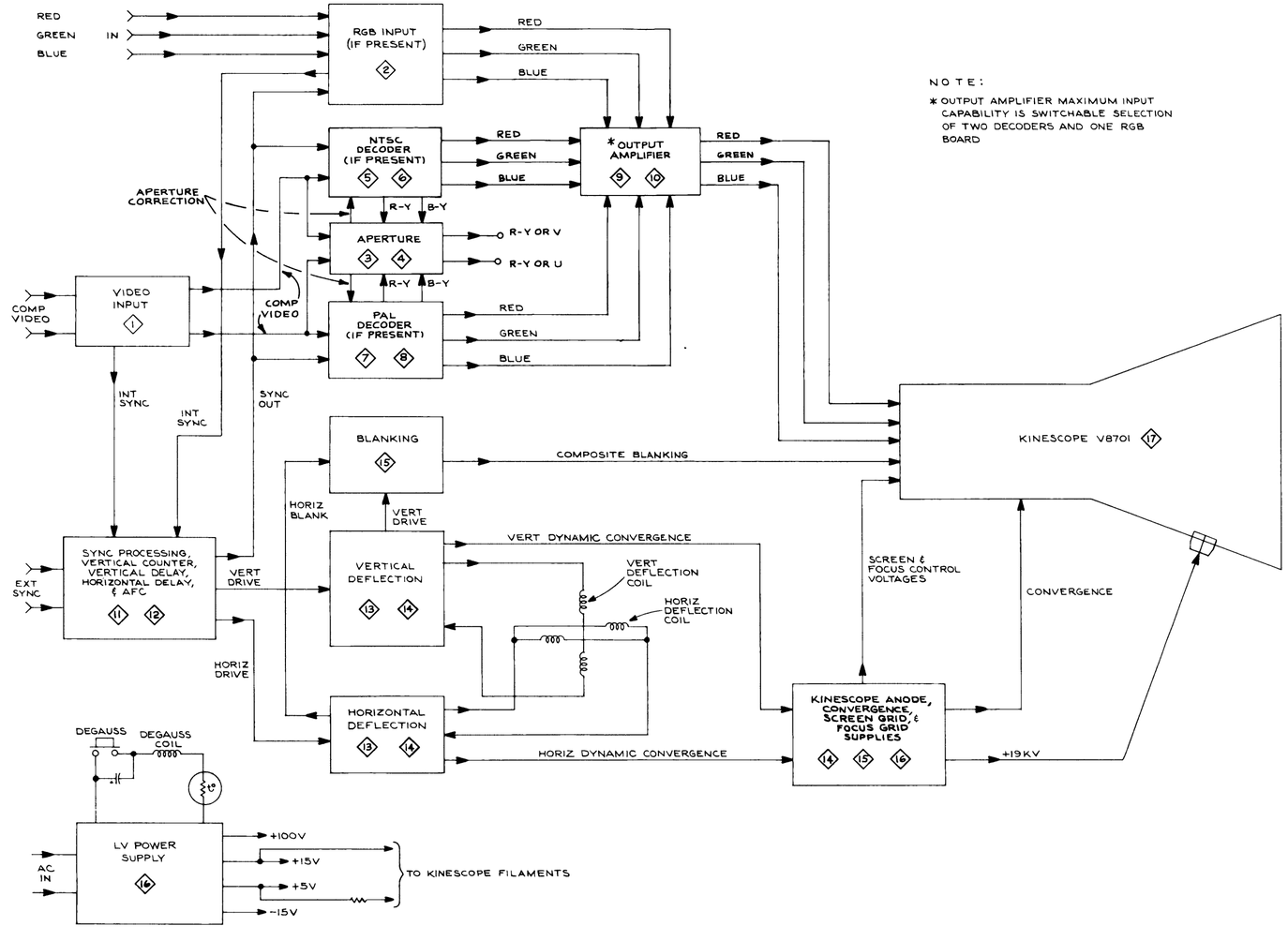
723



MC1496G



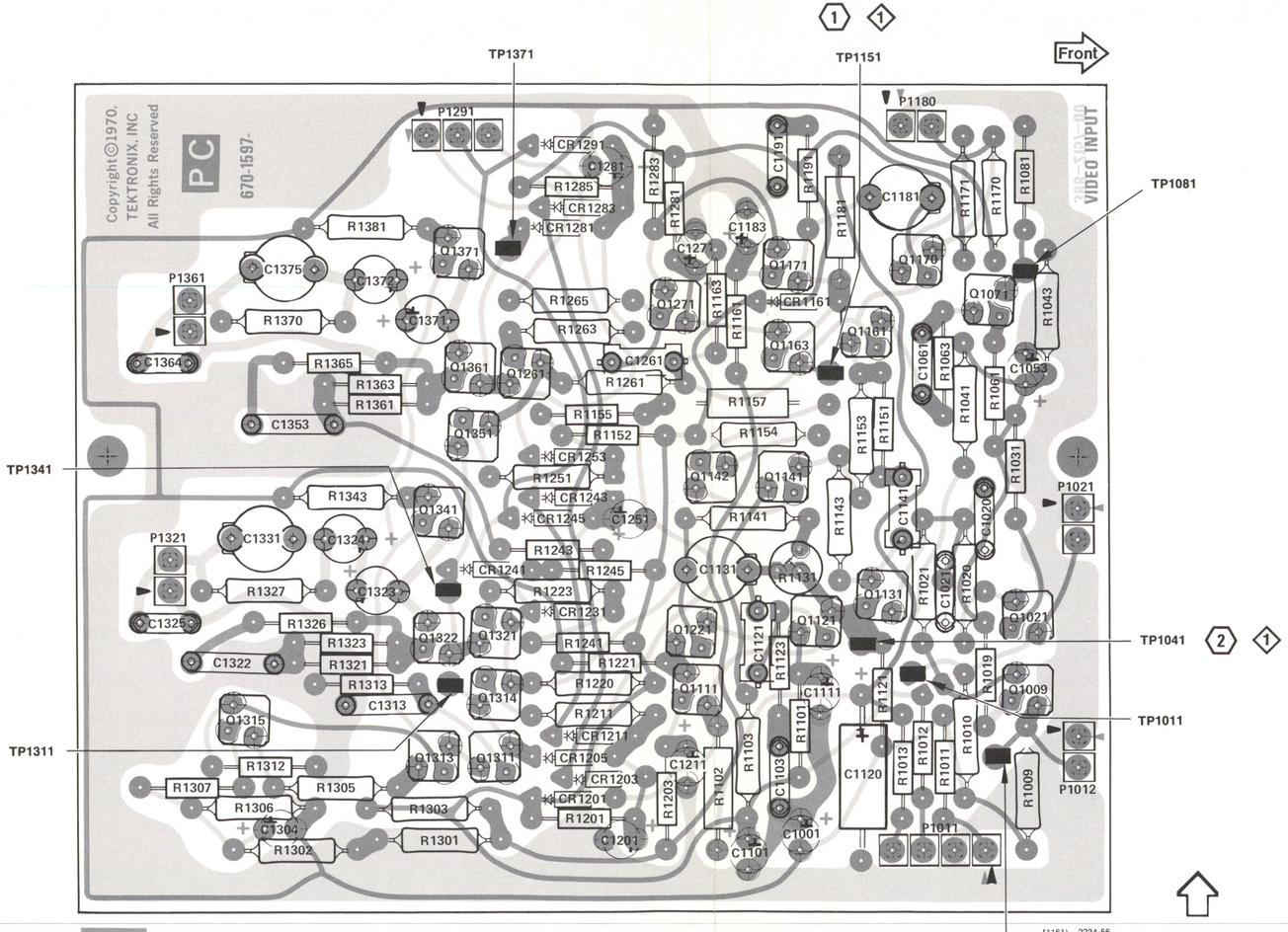
741



650A SERIES

@

BLOCK DIAGRAM



TOP

BOTTOM

A2. VIDEO INPUT CIRCUIT BOARD

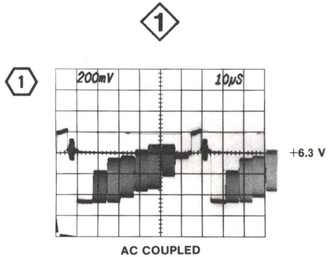
(1161) 2234-56

Circuit Numbering Sequence

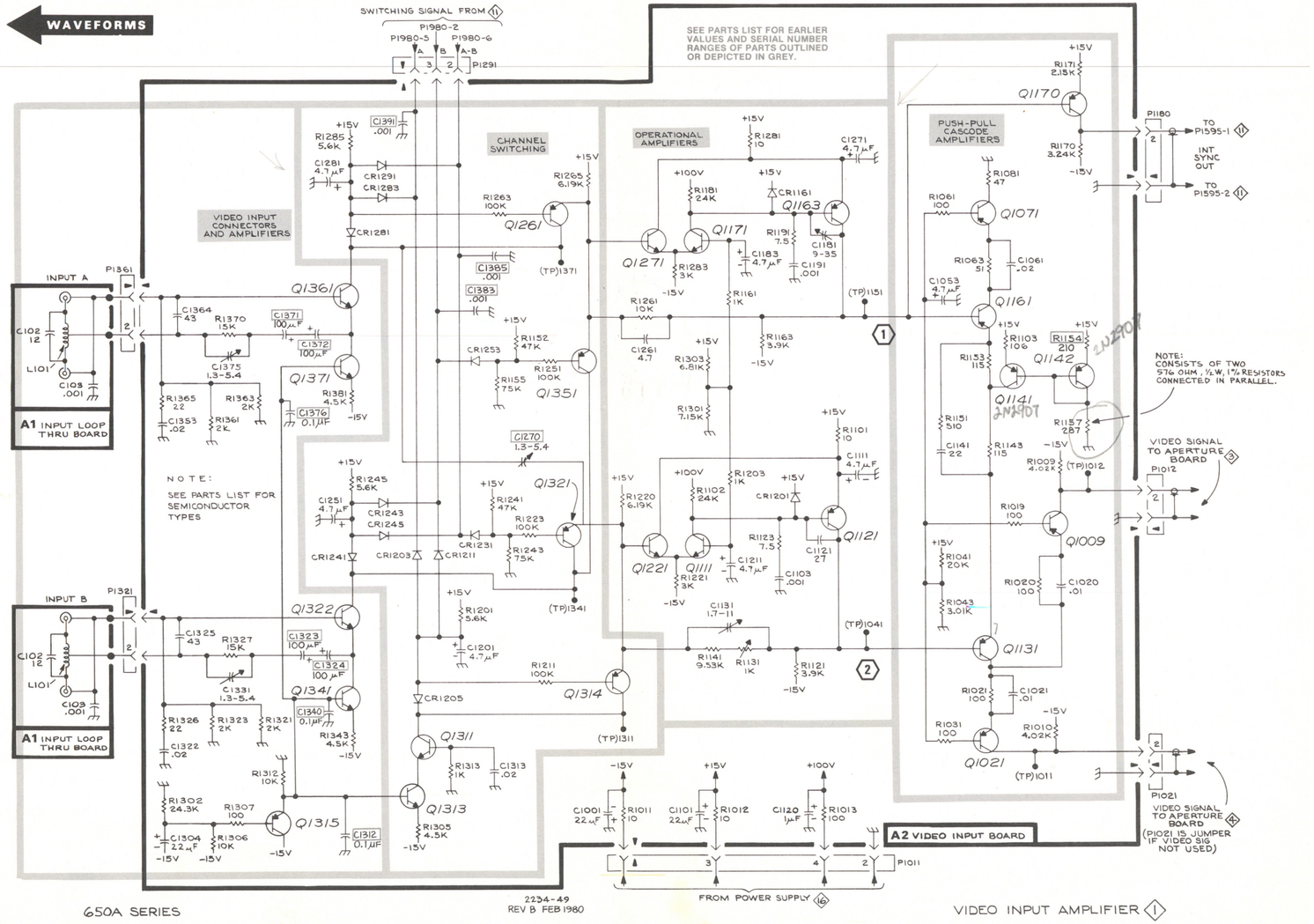
@

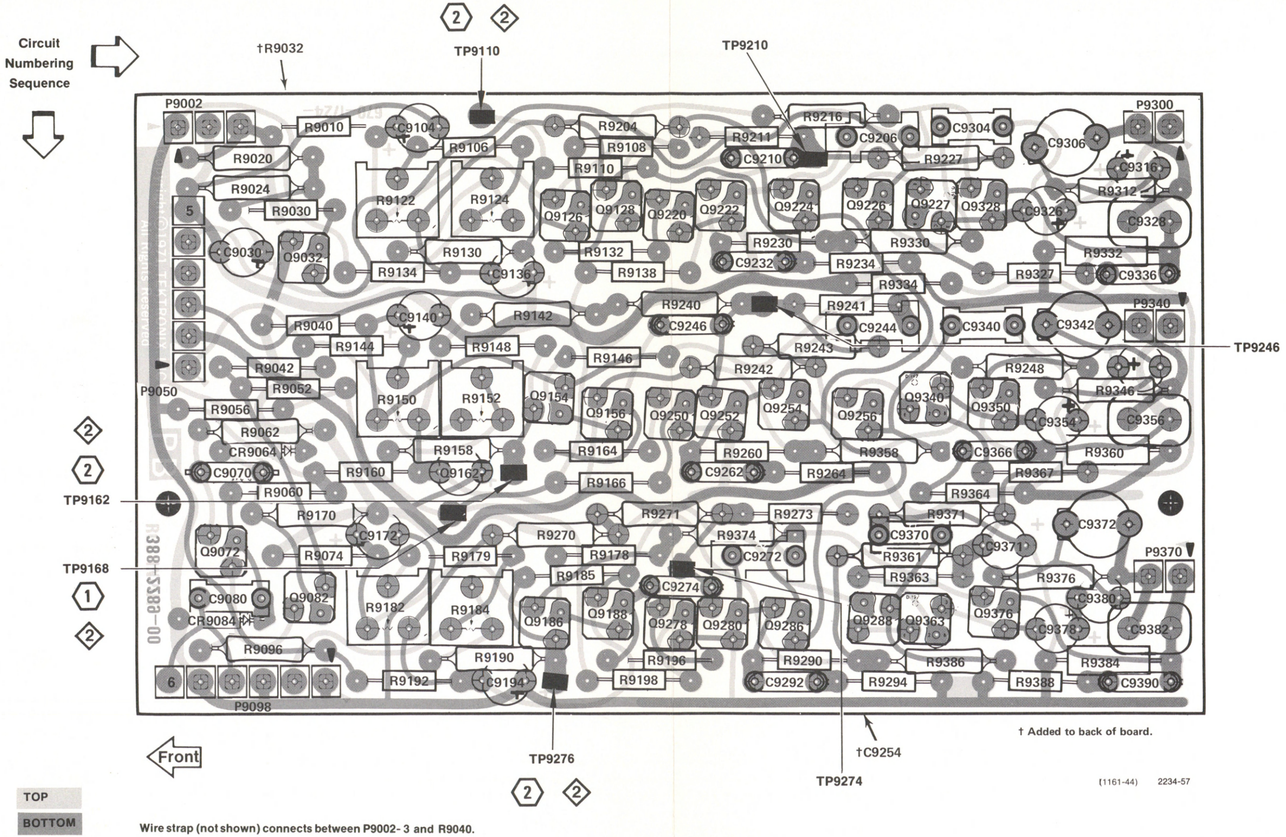
WAVEFORMS

Waveform conditions are given on back of first foldout page.



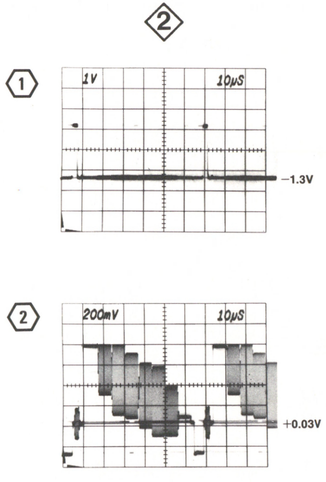
*Signal applied to VIDEO INPUT B. INPUT switch set to A-B.





A3. RGB INPUT CIRCUIT BOARD

Waveform conditions are given on back of first foldout page.



WAVEFORMS

RED INPUT AMPLIFIER

GREEN INPUT AMPLIFIER

BLUE INPUT AMPLIFIER

SYNC INPUT

RED INPUT P9370

GREEN INPUT P9340

BLUE INPUT P9300

A1 INPUT LOOP THRU BOARD

SYNC FROM P1970-4 (1)

P9078

SYNC IN

NOTE:
SEE PARTS LIST FOR SEMICONDUCTOR TYPES

PART OF A3 RGB INPUT BOARD

RED OUT

GREEN OUT

BLUE OUT

RED GAIN

GREEN GAIN

BLUE GAIN

DC LEVEL

P9098

P9050

P9002

RED TO P5330 (3)

GREEN TO P5340 (3)

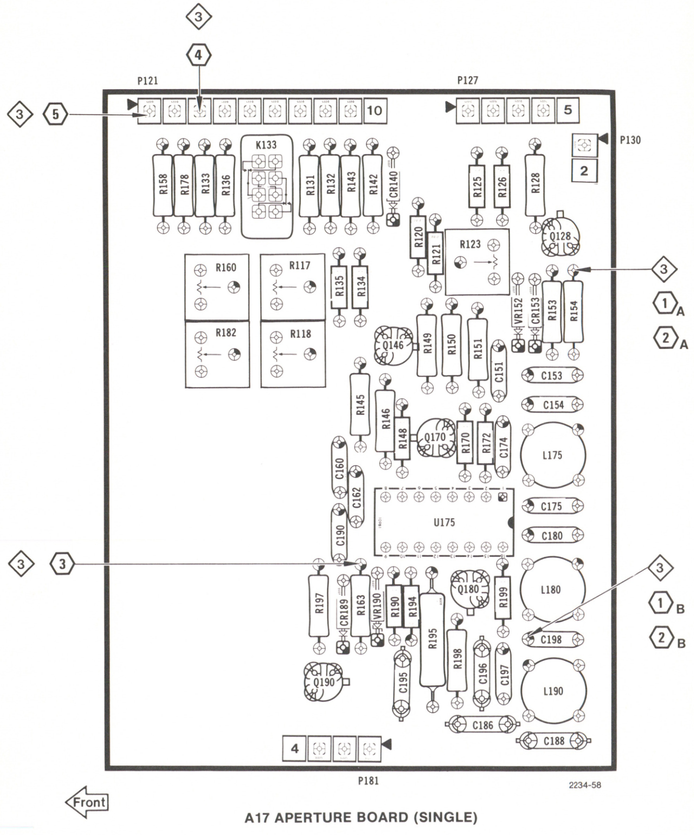
BLUE TO P5370 (3)

INT SYNC TO P5190-2 (11)

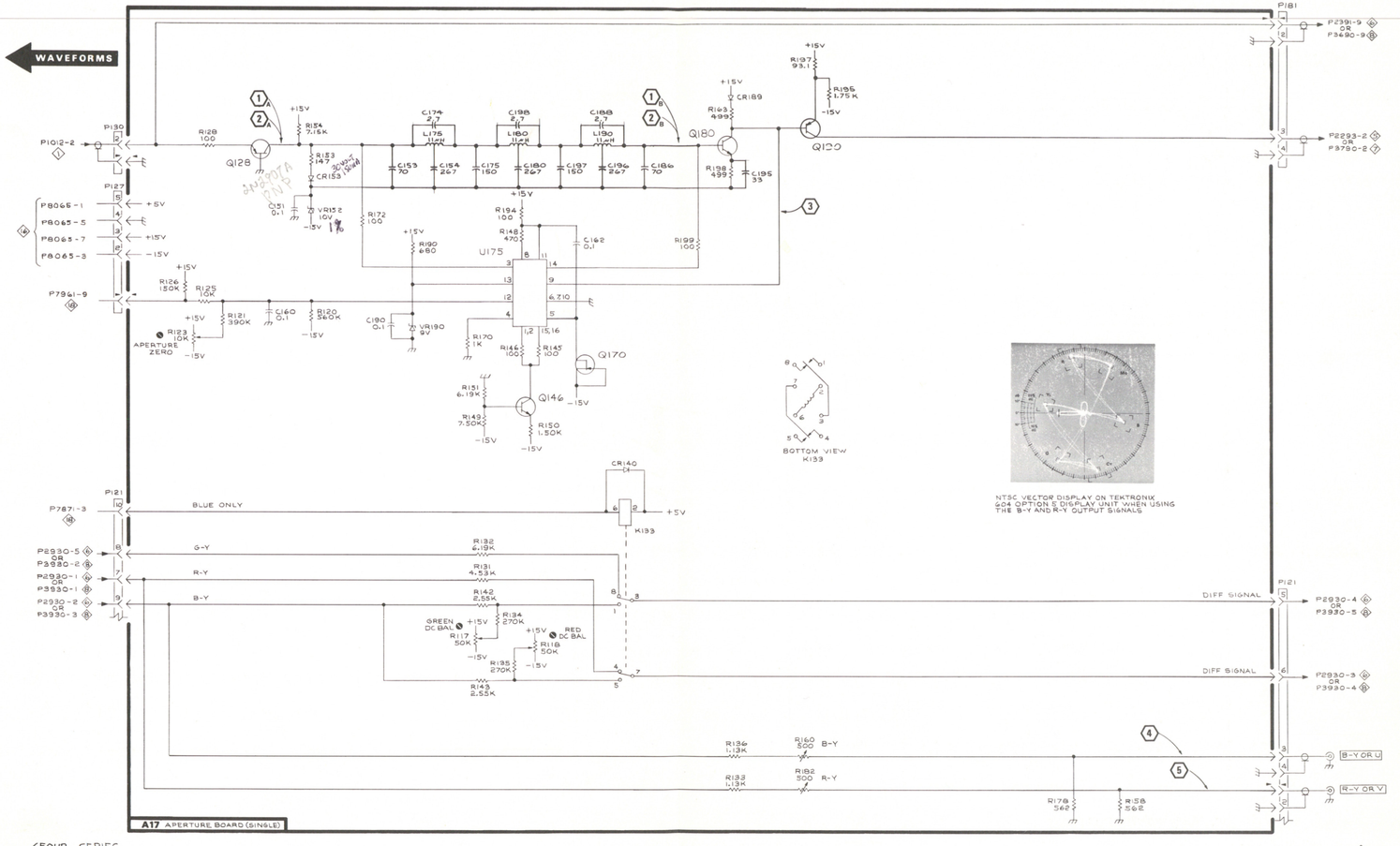
FROM P8075-7 (16)

FROM P8075-3 (16)

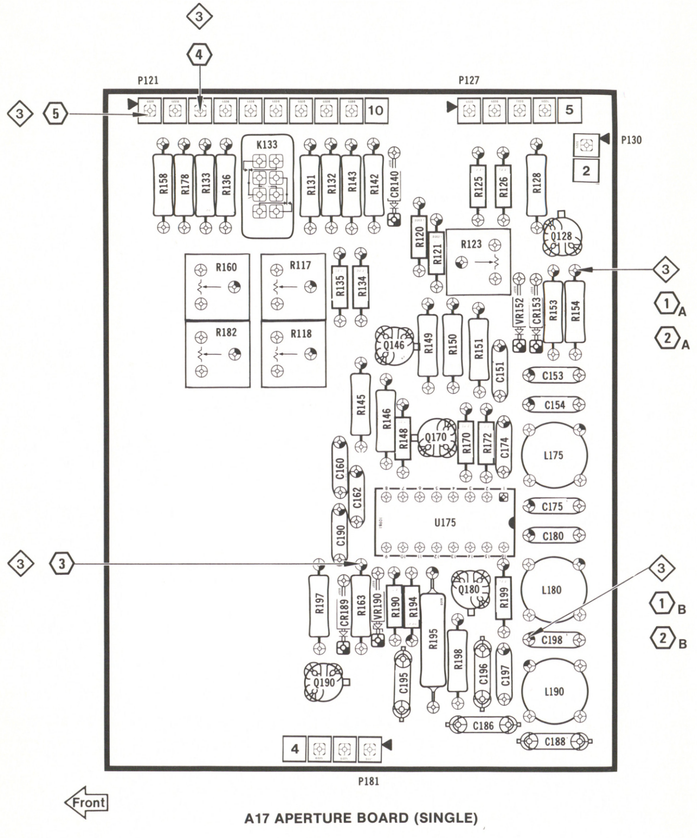
FROM P8075-5 (16)



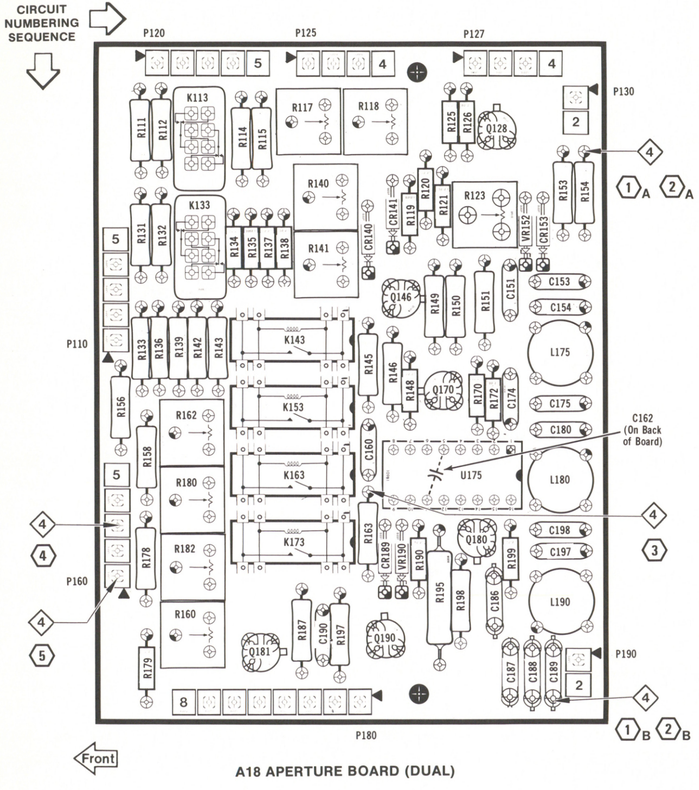
A17 APERTURE BOARD (SINGLE)



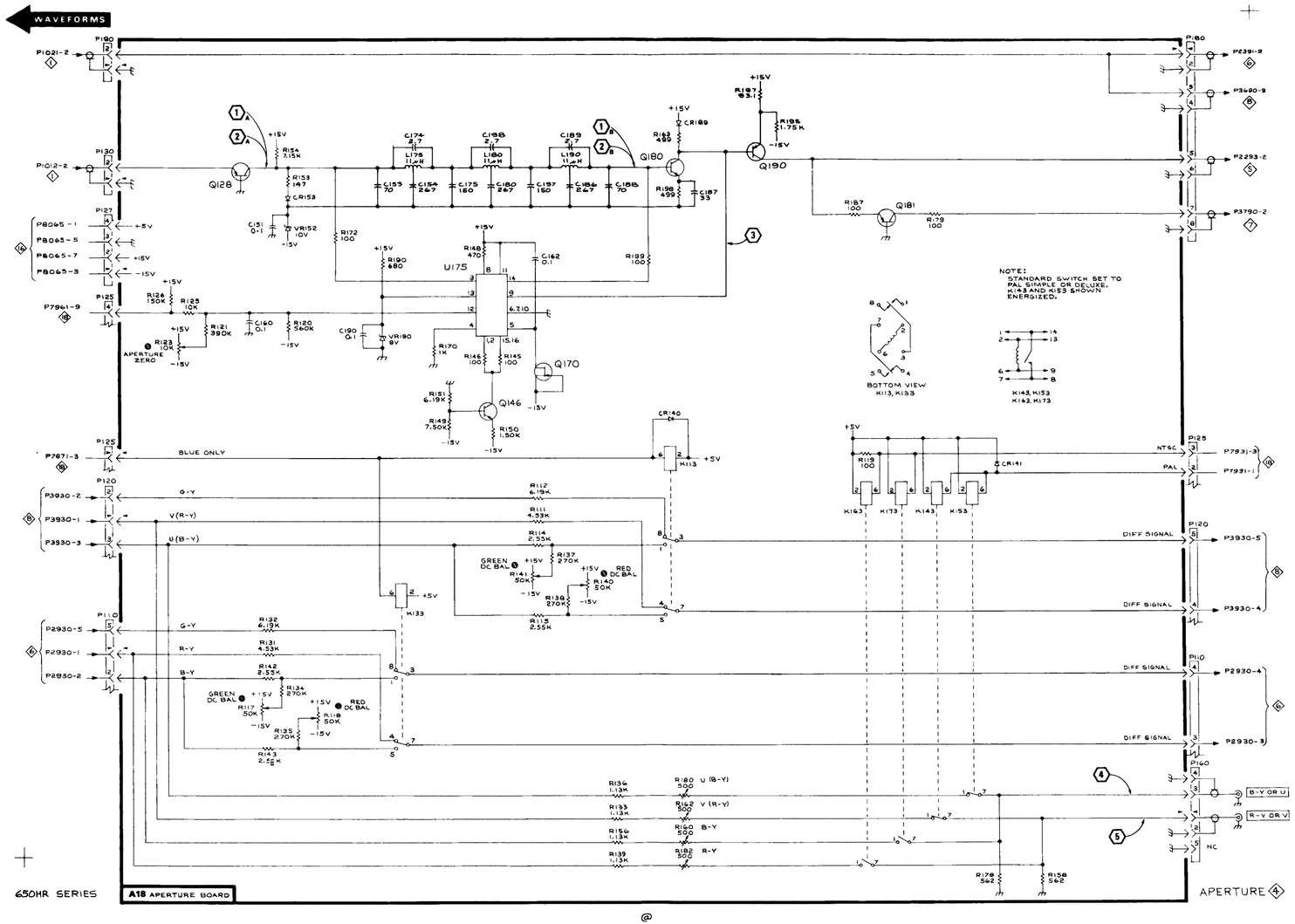
NTSC VECTOR DISPLAY ON TEKTRONIX 604 OPTION 5 DISPLAY UNIT WHEN USING THE B-Y AND R-Y OUTPUT SIGNALS

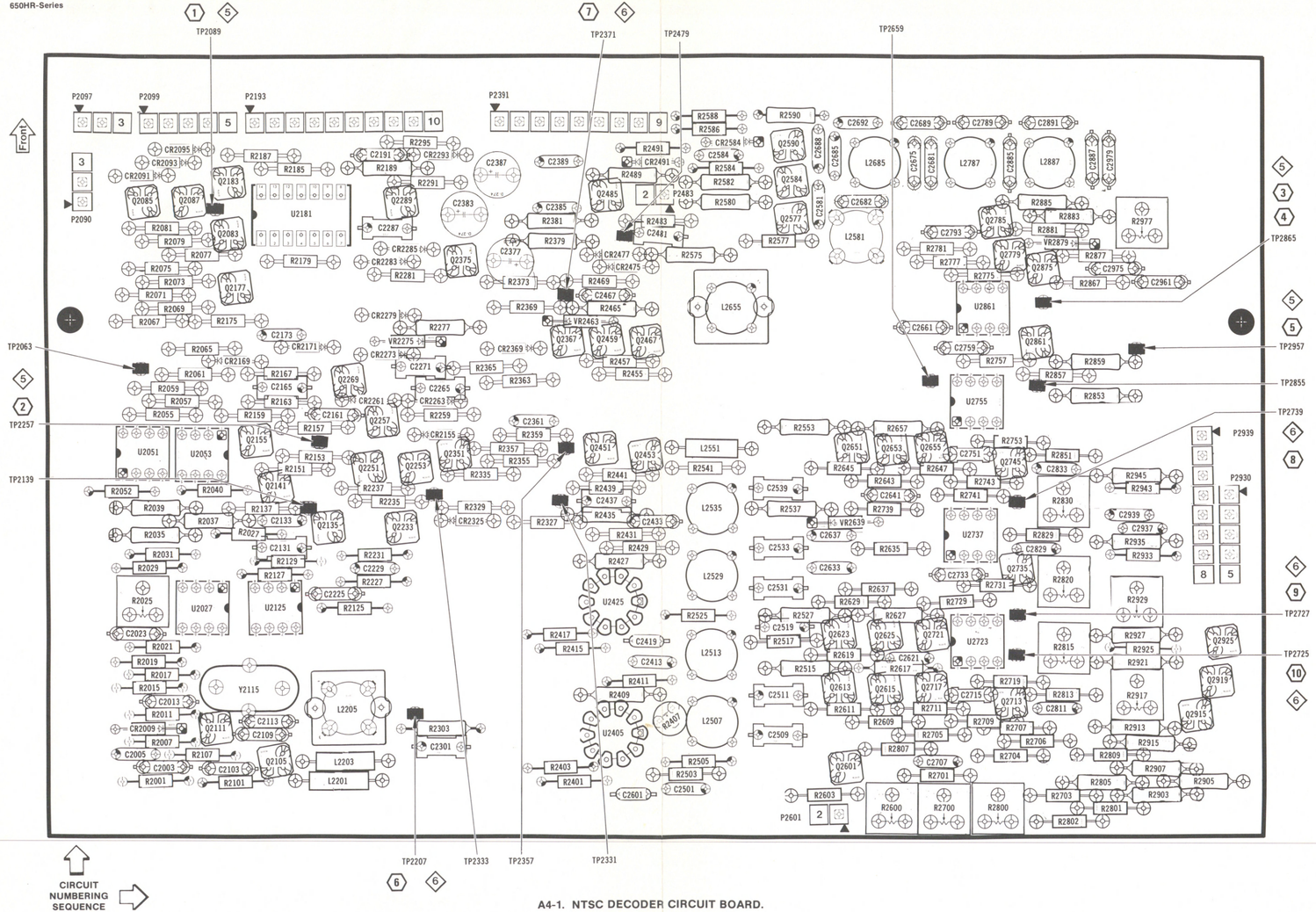


A17 APERTURE BOARD (SINGLE)



A18 APERTURE BOARD (DUAL)


WAVEFORMS
P180
P1021-2
P1012-2
P127
P8065-1
P8065-5
P8065-7
P8065-3
P125
P7961-9
P7871-3
P120
P3930-2
P3930-1
P3930-3
P110
P2930-5
P2930-1
P2930-2
Q128
Q180
Q190
Q181
Q170
Q146
U175
BLUE ONLY
G-Y
V(R-Y)
U(B-Y)
R-Y
B-Y
APERTURE ZERO
GREEN DC BAL
RED DC BAL
NOTE: STANDARD SWITCH SET TO PAL SIMPLE OR DELUXE. K143 AND K153 SHOWN ENERGIZED.
BOTTOM VIEW K113, K133
K143, K153 K163, K173
NTSC
PAL
DIFF SIGNAL
P2391-9
P3490-9
P2293-2
P3790-2
P7931-3
P7931-1
P3930-5
P3930-4
P2930-4
P2930-3
B-Y OR U
R-Y OR V
NC
650HR SERIES
A18 APERTURE BOARD
APERTURE 4

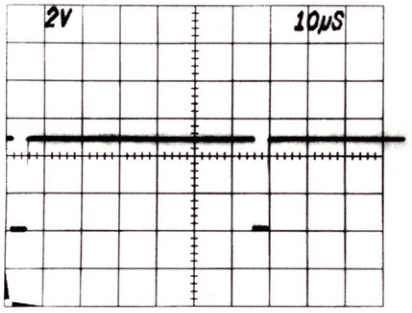


A4-1. NTSC DECODER CIRCUIT BOARD.

Waveform conditions are given on back of first foldout page.

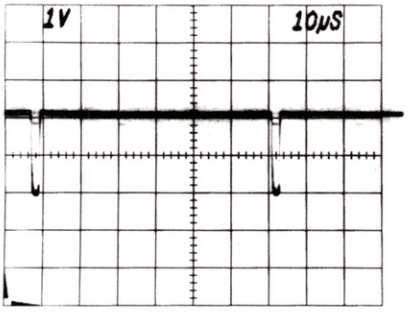
5

1



0 V

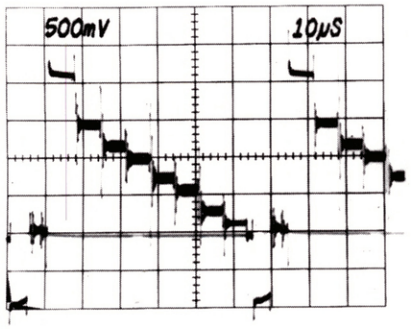
2



+11.6 V

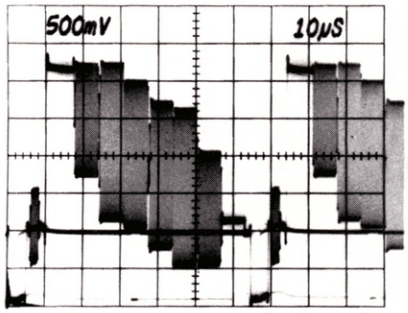
AC COUPLED

3



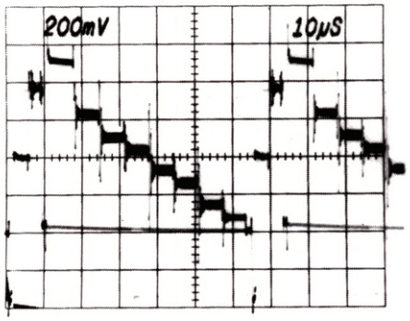
0 V

4*



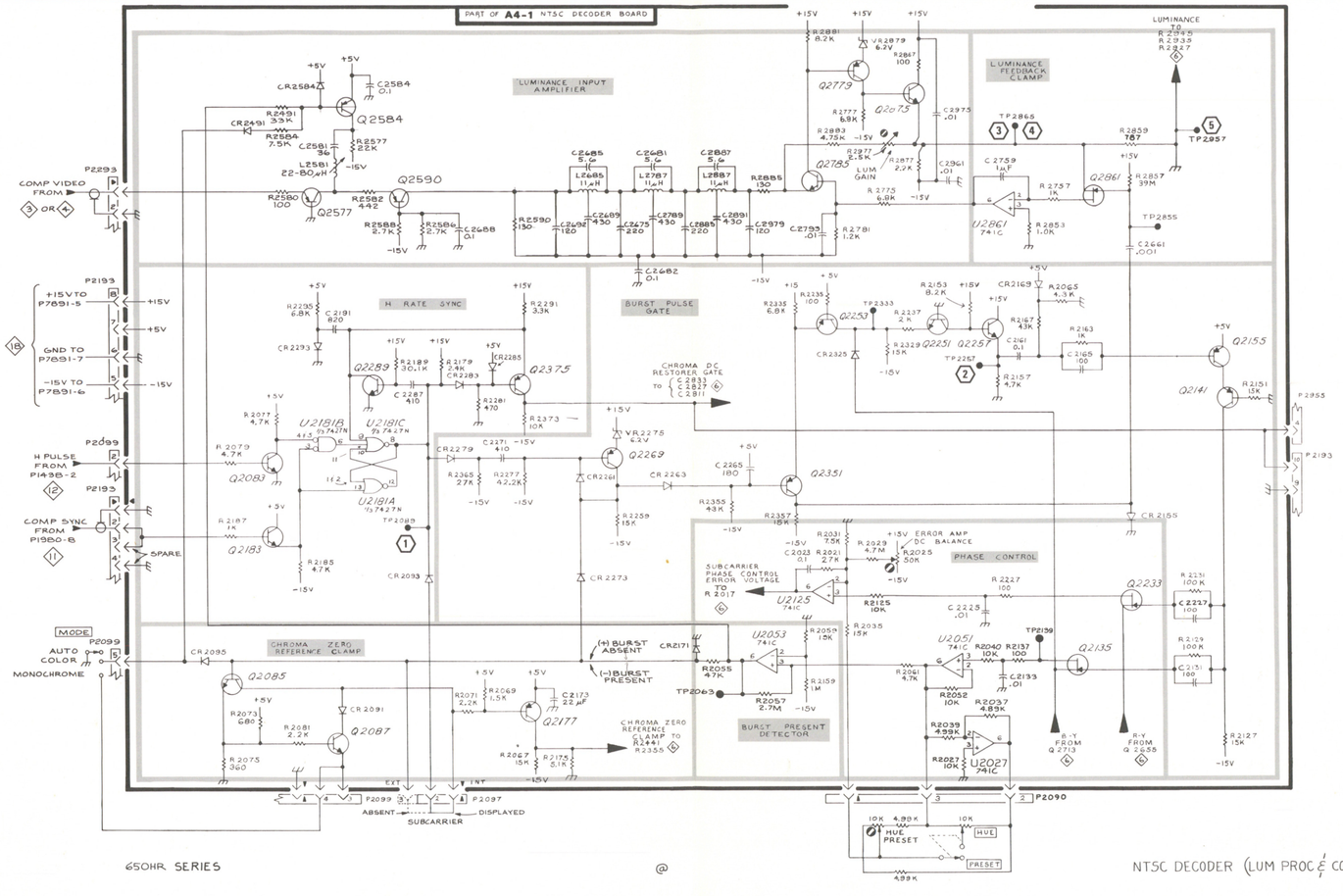
0 V

5



0 V

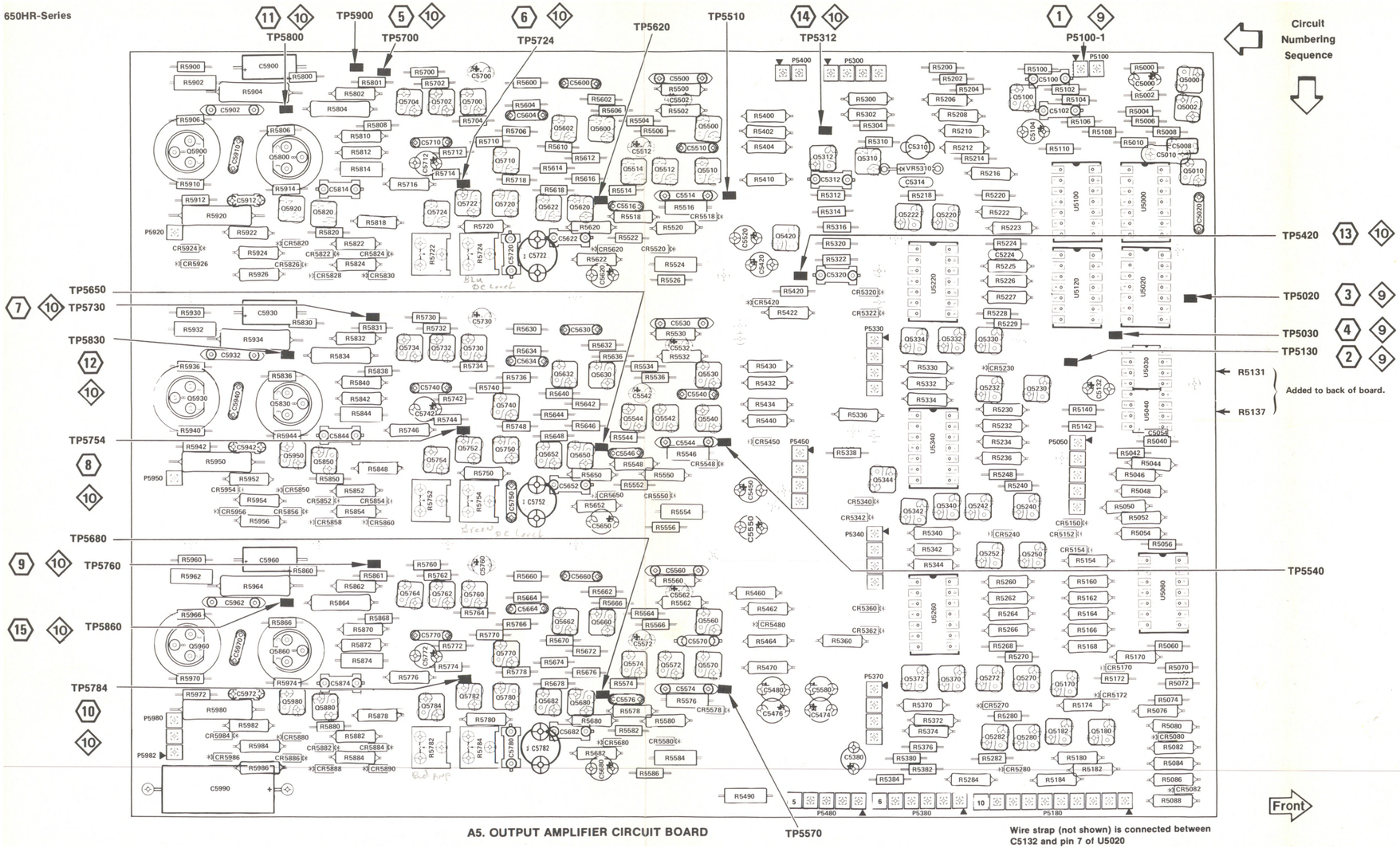
*Bandpass Jumper P2577 set to Wide position.



650HR SERIES

@

NTSC DECODER (LUM PROC & CONTROL) 5



A5. OUTPUT AMPLIFIER CIRCUIT BOARD

Wire strap (not shown) is connected between C5132 and pin 7 of U5020

Waveform conditions are given on back of first foldout page.

6

6 200mV 10µS 0 V

7 200mV 10µS +3.8 V

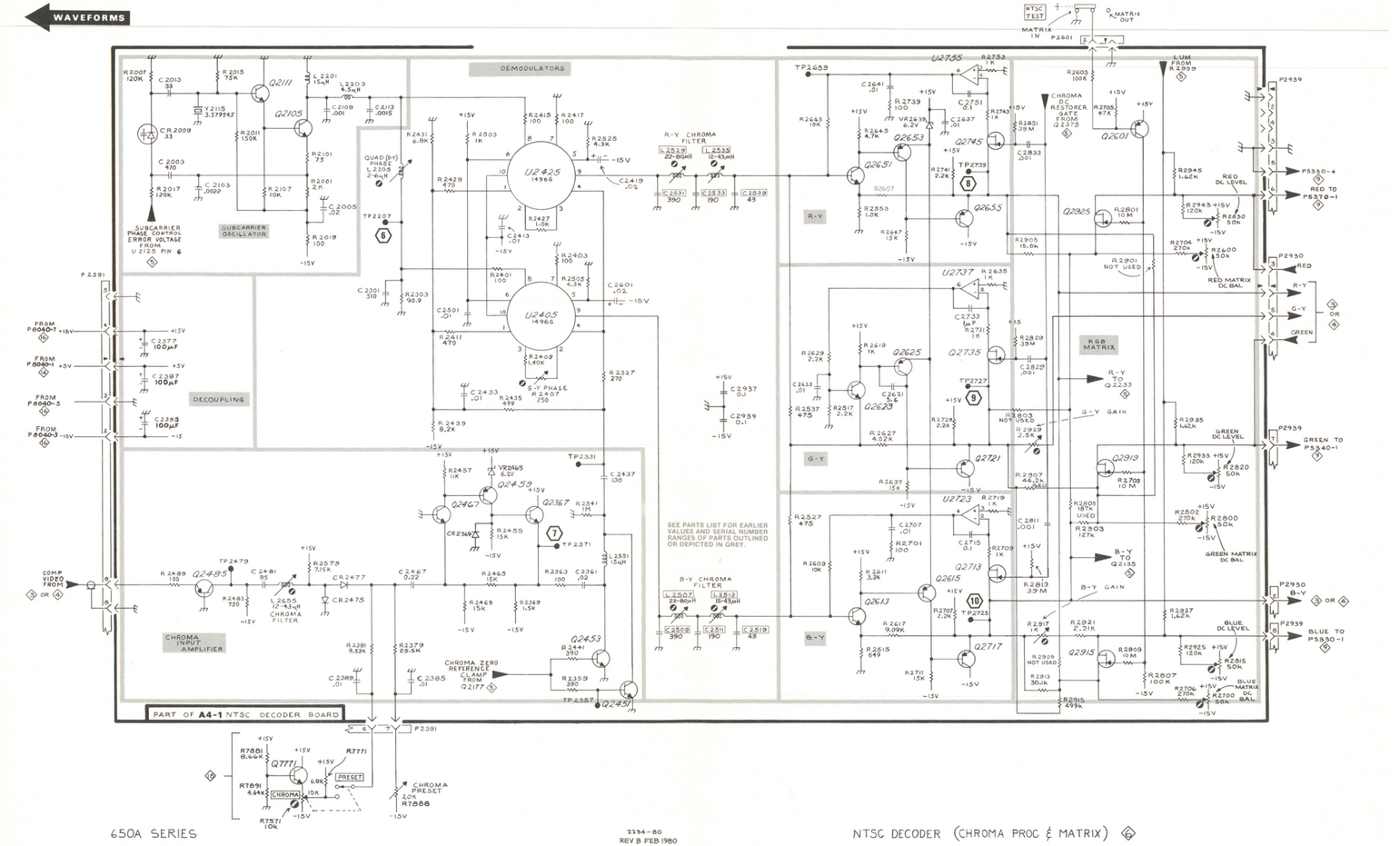
AC COUPLED

8 500mV 10µS 0 V

9 500mV 10µS 0 V

10 500mV 10µS 0 V

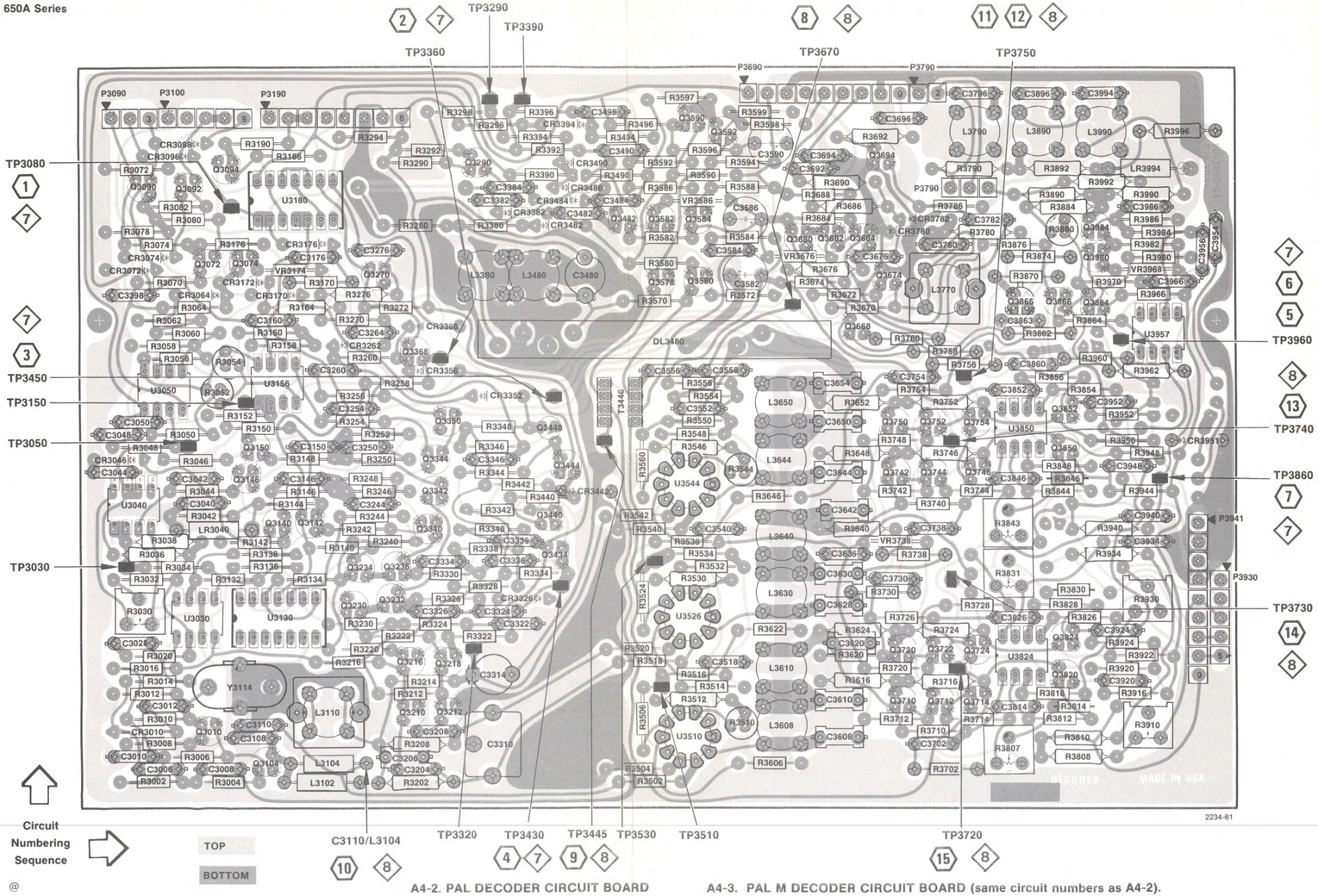
WAVEFORMS



650A SERIES

2334-80
REV B FEB 1980

NTSC DECODER (CHROMA PROC & MATRIX) 6



Circuit Numbering Sequence

TOP

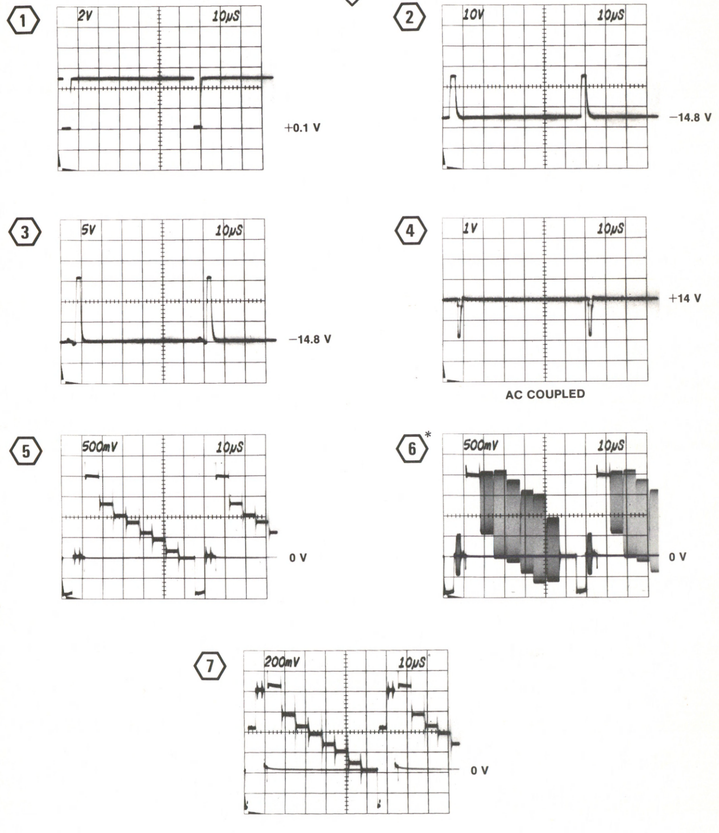
BOTTOM

@

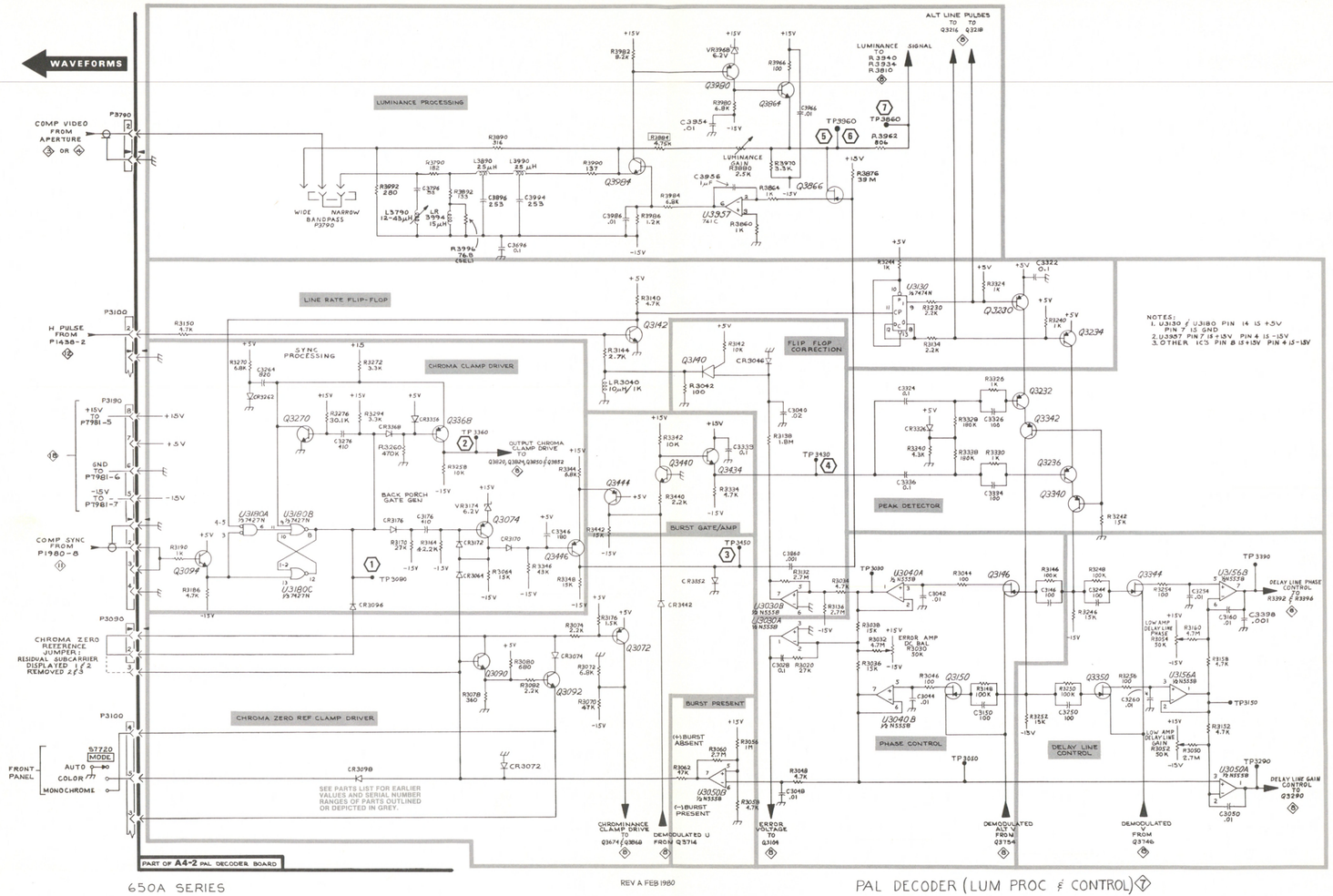
A4-2. PAL DECODER CIRCUIT BOARD

A4-3. PAL M DECODER CIRCUIT BOARD (same circuit numbers as A4-2).

Waveform conditions are given on back of first foldout page.



*Bandpass Jumper P3790 set to Wide position.



650A SERIES

REV A FEB 1980

PAL DECODER (LUM PROC & CONTROL)

Waveform conditions are given on back of first foldout page.

8

8 — 200mV, 10µS — −1.65 V — AC COUPLED

9* — 100mV, 10µS — −8.7 V — AC COUPLED

10 — 500mV, 10µS — 0 V

11 — 500mV, 10µS — 0 V

12** — 500mV, 10µS — 0 V

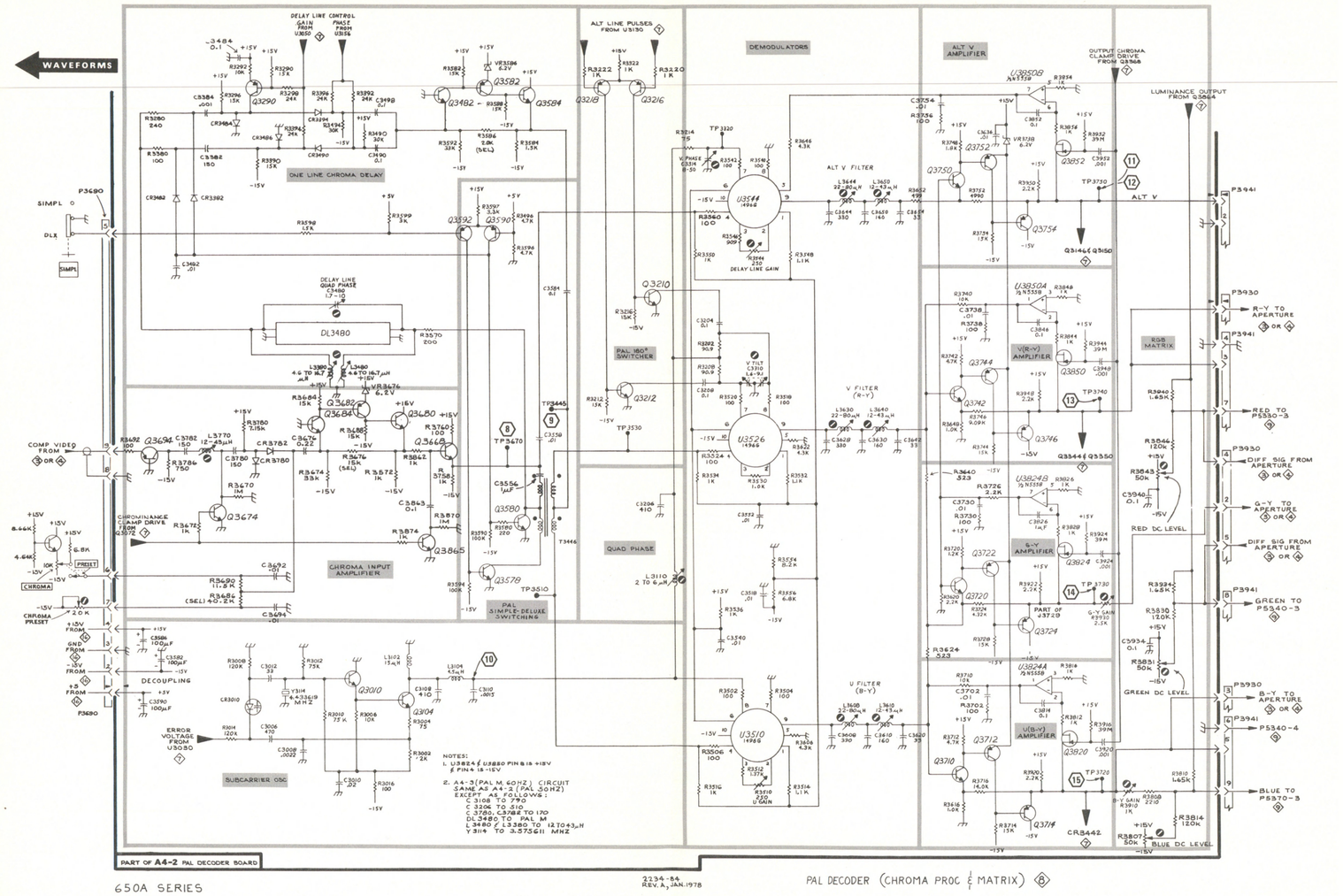
13 — 500mV, 10µS — 0 V

14 — 500mV, 10µS — 0 V

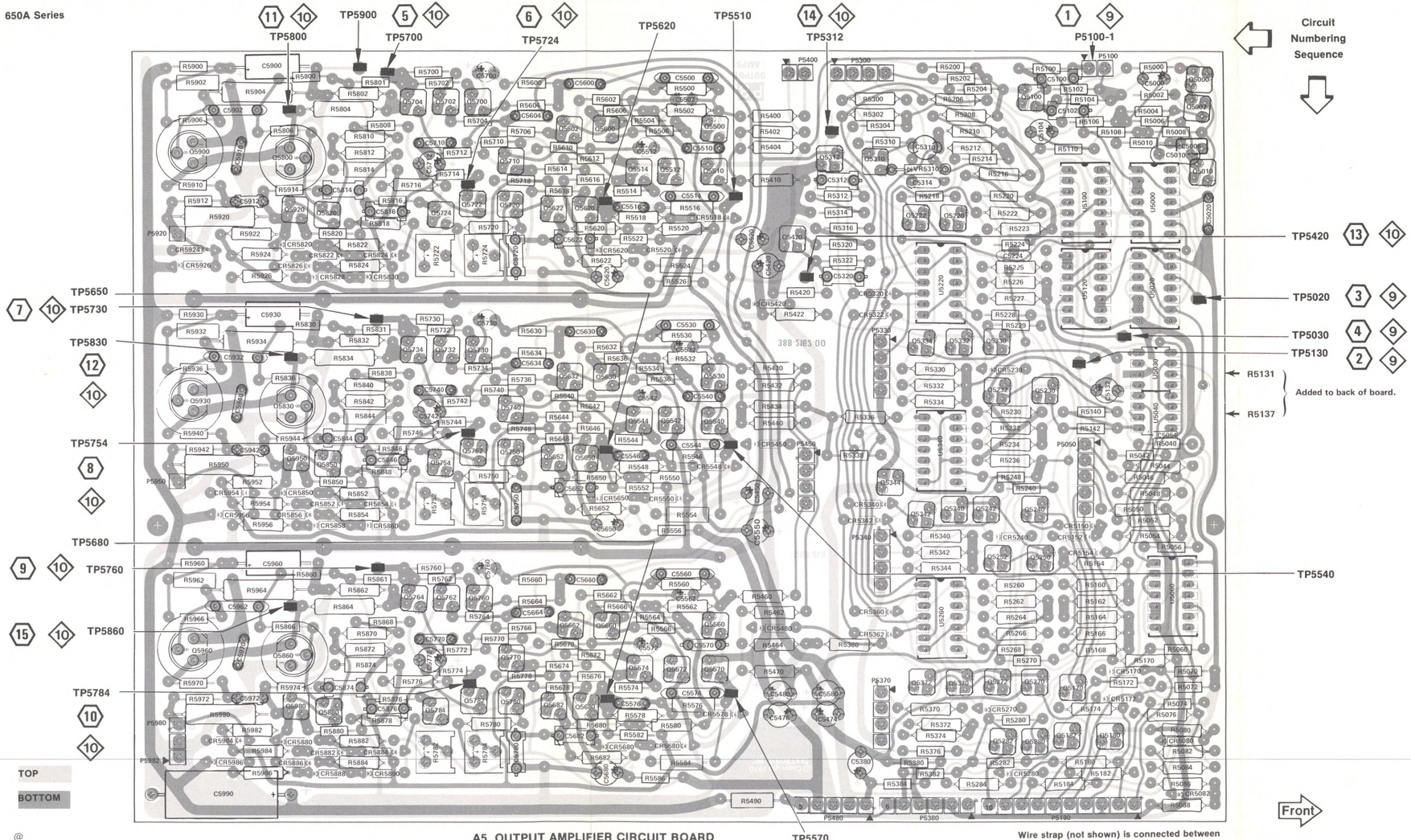
15 — 500mV, 10µS — 0 V

*STANDARD switch set to PAL DELUXE.

**Oscilloscope Trigger Level control set to superimpose even and odd alternate V lines.



650A Series



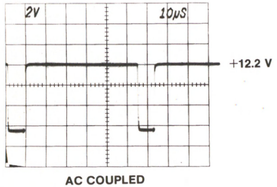
A5. OUTPUT AMPLIFIER CIRCUIT BOARD

Wire strap (not shown) is connected between C5132 and pin 7 of U5020

Waveform conditions are given on back of first foldout page.

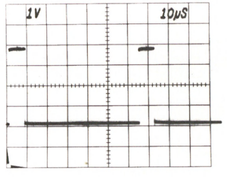
9

1

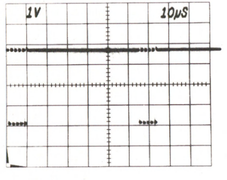


AC COUPLED

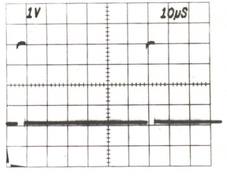
2



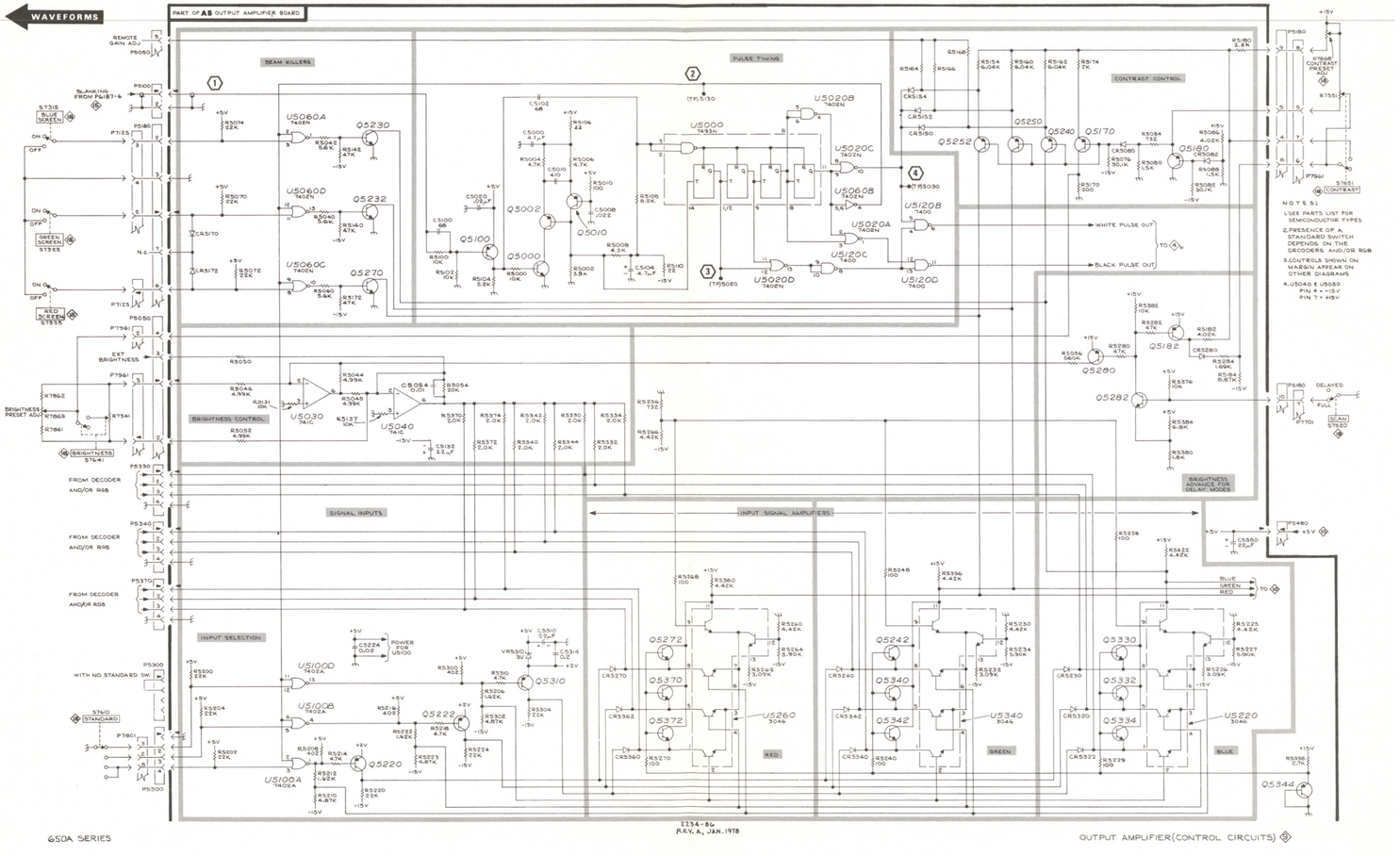
3



4



The number of high-state pulses displayed by waveform 3 may be 4 to 6, depending on blanking pulse width and Q5002/Q5010 oscillator repetition rate. Also, in some instruments, the waveform base line will be the low state if the gate turns off the counter when the last pulse is at its low state. This condition will cause the waveform polarity to be opposite from the one shown here.

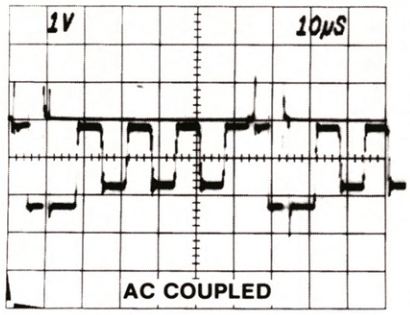


650A SERIES

2334-84
REV. A, JAN. 1978

OUTPUT AMPLIFIER (CONTROL CIRCUITS)

5

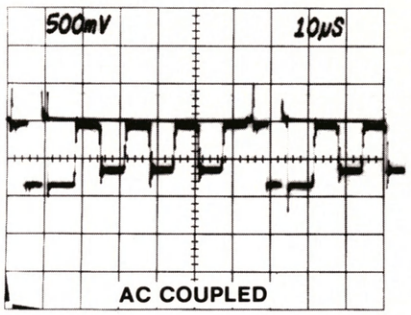


+8.4 V

10

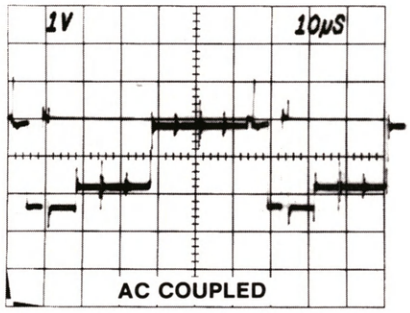
NOTE: NTSC TEST pushbutton is pressed in.

6



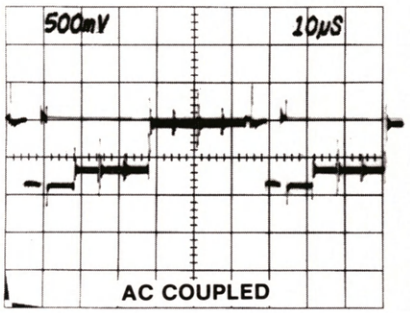
−1.8 V

7



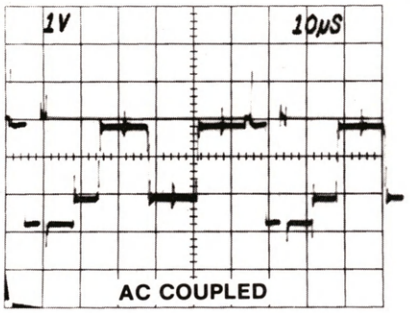
+8.5 V

8



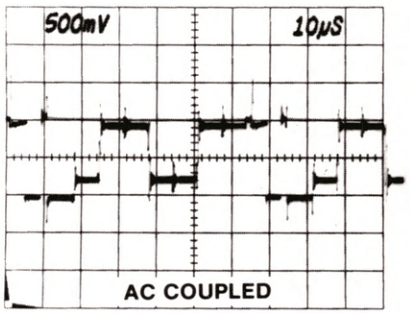
−1.8 V

9



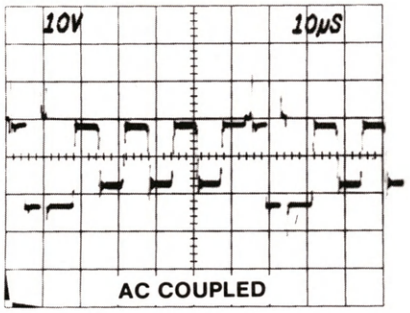
+8.5 V

10



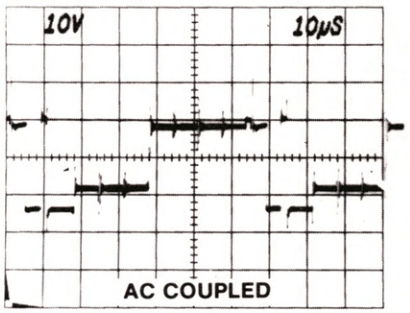
−1.8 V

11



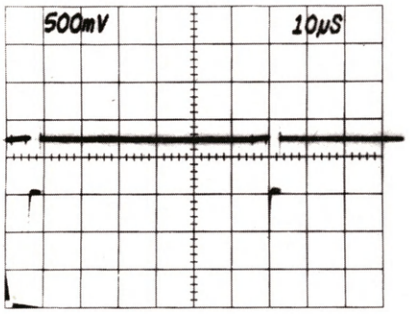
+76 V

12



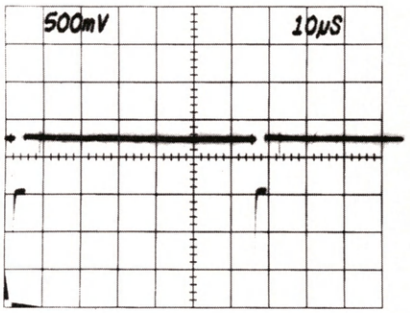
+77 V

13



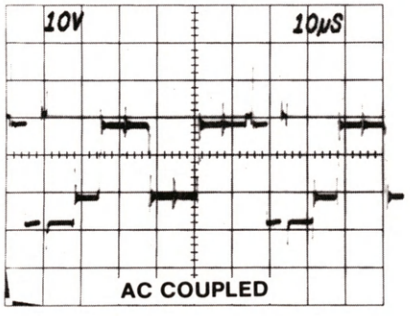
0 V

14



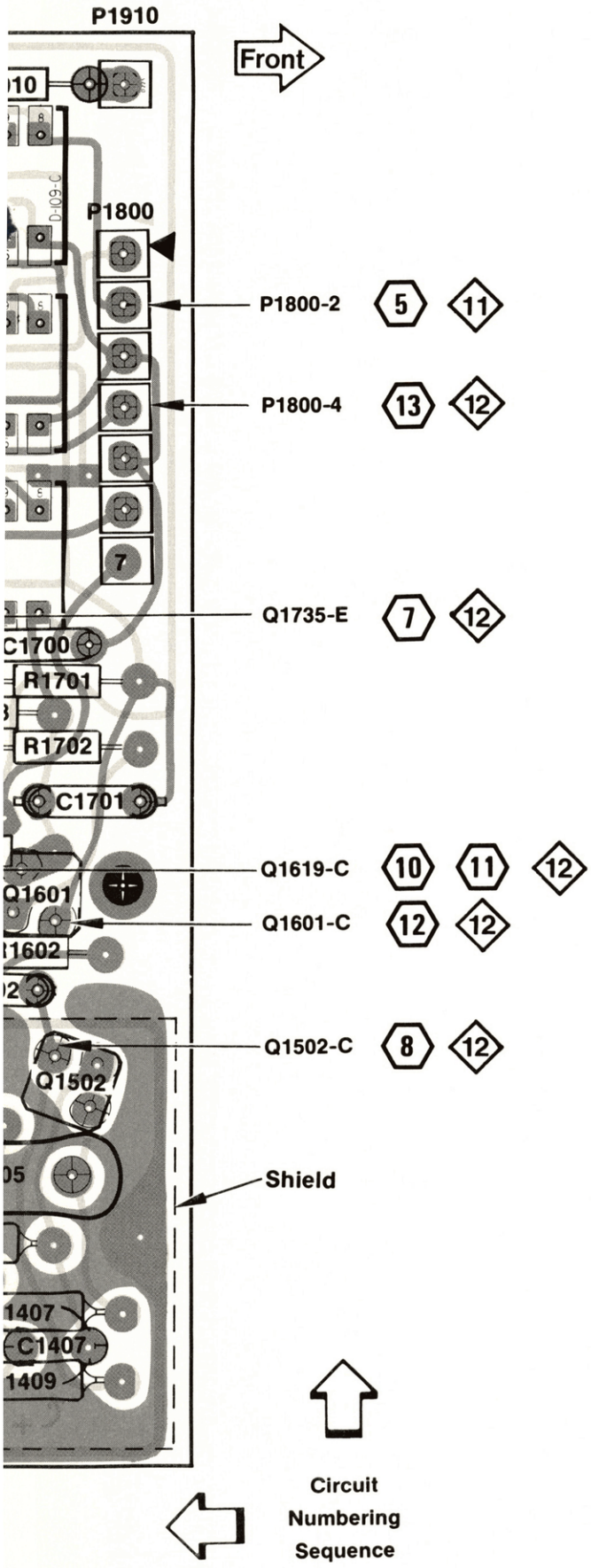
0 V

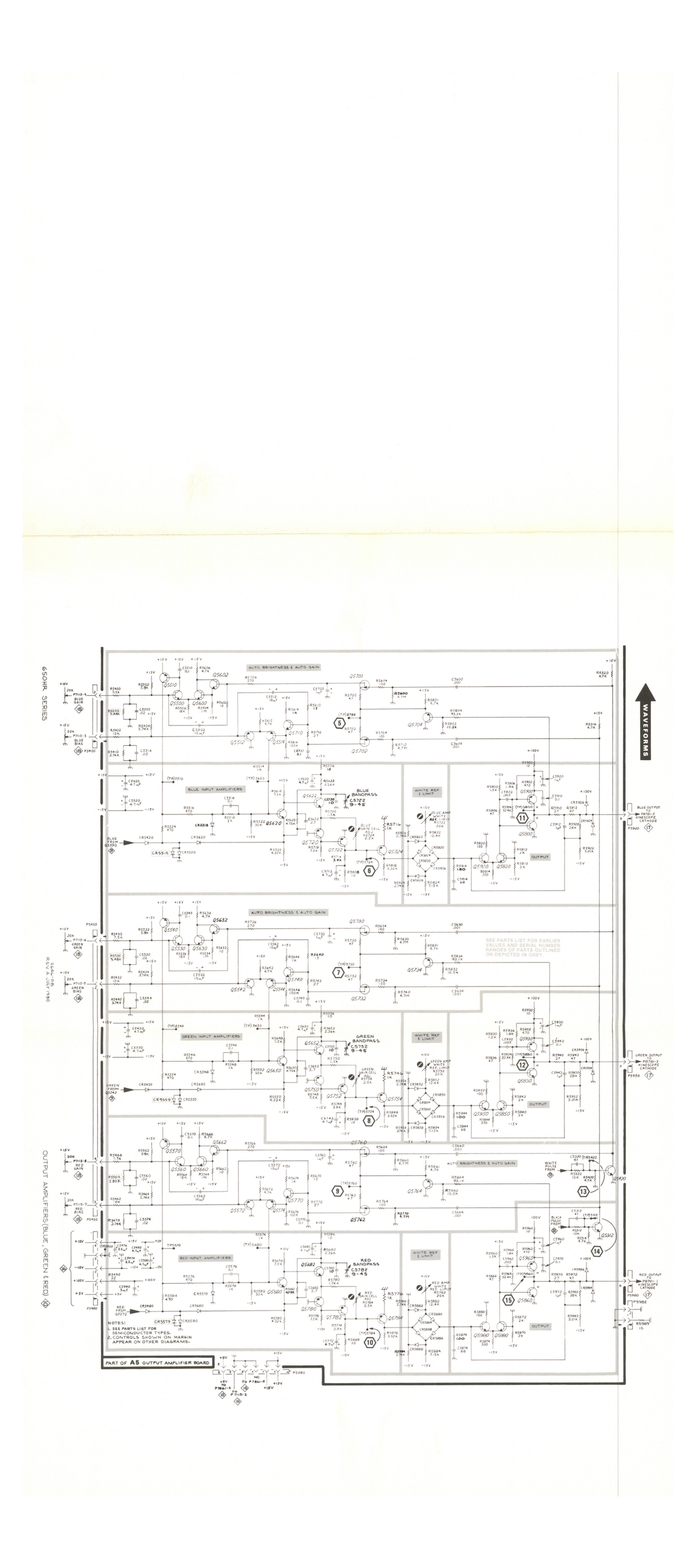
15



+78 V

Waveform conditions are given on back of first foldout page.

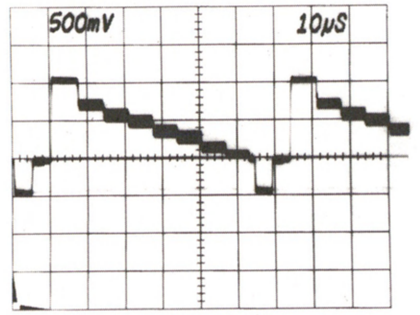

P1910
Front
P1800
P1800-2
5
11
P1800-4
13
12
7
Q1735-E
7
12
C1700
R1701
R1702
C1701
Q1619-C
10
11
12
Q1601
Q1601-C
12
12
1602
Q1502-C
8
12
Q1502
Shield
1407
C1407
1409
Circuit
Numbering
Sequence
2234-63


650HR SERIES
OUTPUT AMPLIFIERS (BLUE, GREEN & RED)
WAVEFORMS
2644-08
REV A JULY 1980
AUTO BRIGHTNESS & AUTO GAIN
BLUE INPUT AMPLIFIERS
BLUE BANDPASS C5722 9-45
WHITE REF & LIMIT
OUTPUT
BLUE OUTPUT TO P8781-5 KINESCOPE CATHODE P5920
GREEN INPUT AMPLIFIERS
GREEN BANDPASS C5752 9-45
GREEN OUTPUT TO P8781-3 KINESCOPE CATHODE P5930
RED INPUT AMPLIFIERS
RED BANDPASS C5782 9-45
RED OUTPUT TO P8781-1 KINESCOPE CATHODE P5940
SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.
NOTES:
1. SEE PARTS LIST FOR SEMICONDUCTOR TYPES.
2. CONTROLS SHOWN IN MARGIN APPEAR ON OTHER DIAGRAMS.
PART OF A5 OUTPUT AMPLIFIER BOARD

Waveform conditions are given on back of first foldout page.

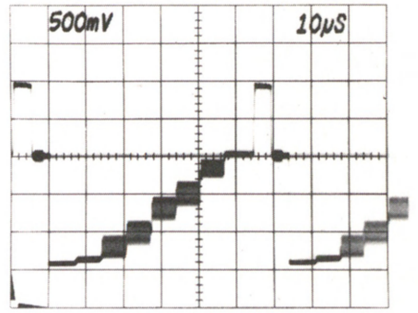
WAVEFORMS

11

1


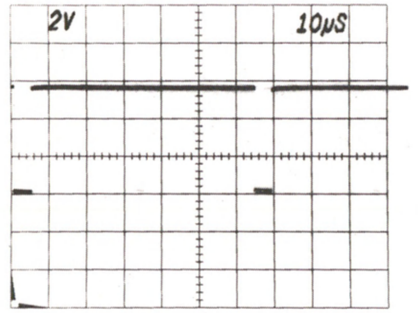
+4.5 V

AC COUPLED

2


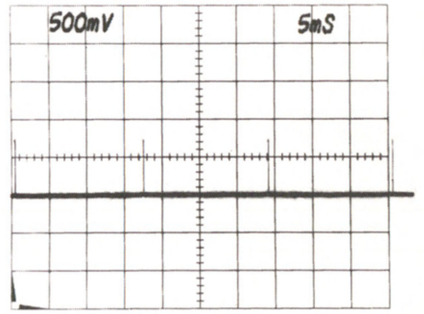
+11.5 V

AC COUPLED

3


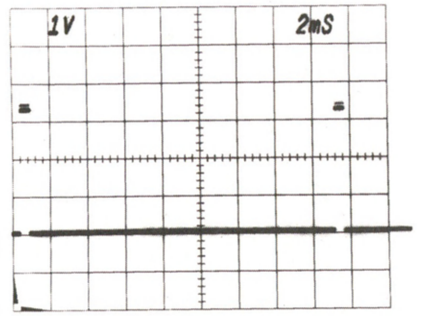
+0.18 V

VERT DRIVE

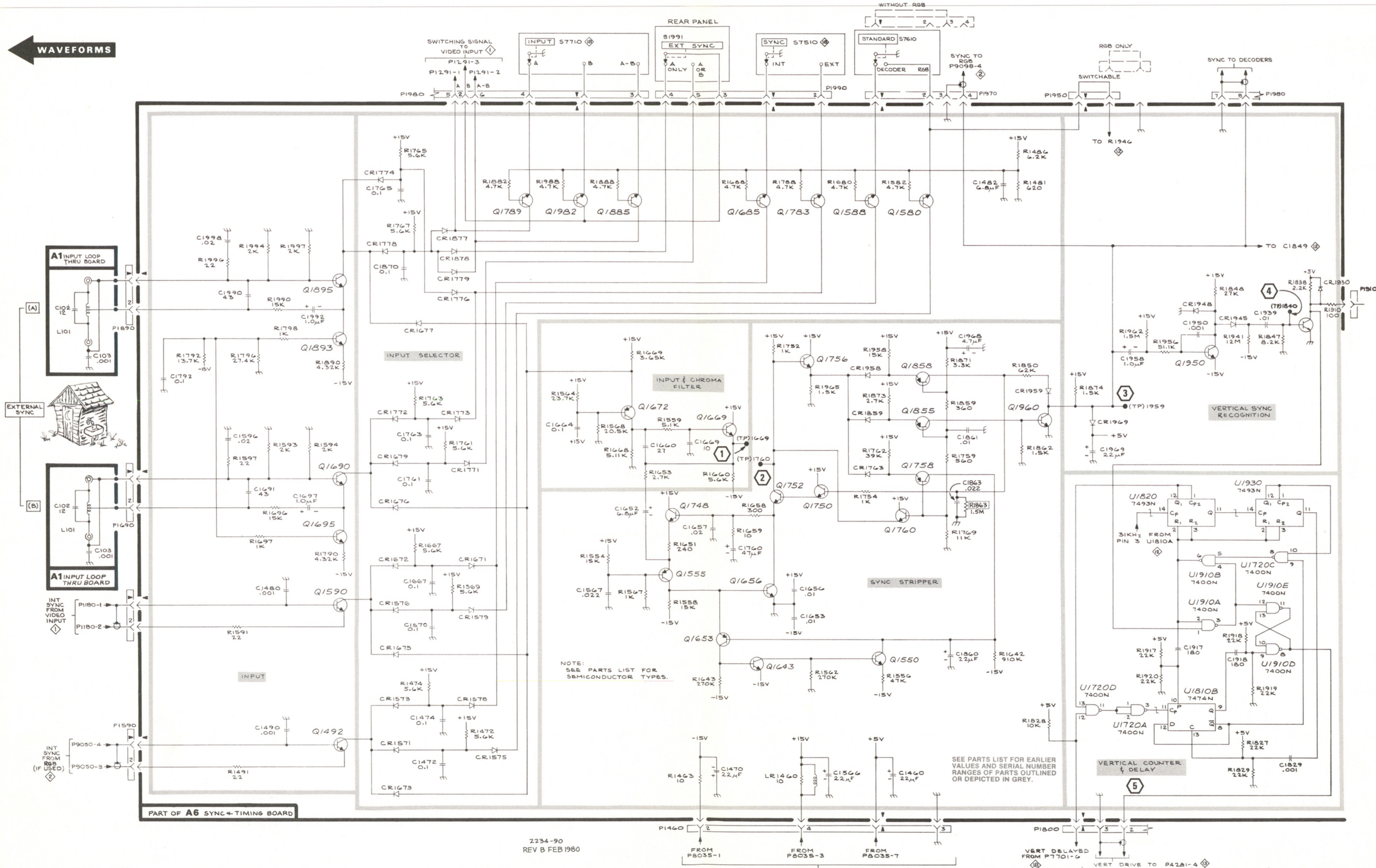
4


0 V

VERT DRIVE

5


0 V



650A SERIES

SYNC & TIMING (SYNC STRIP & VERT DRIVE) 11

Waveform conditions are given on back of first foldout page.

12

6 — 2V, 10µS — +0.18 V

7 — 2V, 10µS — 0 V

8 — 1V, 10µS — +10.4 V

AC COUPLED

9 — 2V, 10µS — +0.15 V

VERT DRIVE

10 — 1V, 5mS — +0.6 V

11 — 1V, 10µS — +0.6 V

12 — 2V, 20µS — +0.13 V

13 — 1V, 20µS — +0.12 V

WAVEFORMS

15KHz TRUNCATED RAMP

SAMPLE & HOLD

OSCILLATOR VOLTAGE CONTROL

2H RATE VCO

LOCK UP DETECTOR & FAST AFC SWITCH

PHASE CORRECTION

SAMPLE PULSE DELAY & HORIZ. DELAY CONTROL

HORIZ DRIVE

31KHz LOCKOUT

SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.

NOTES:

1. SEE PARTS LIST FOR SEMICONDUCTOR TYPES
2. ✱ SWITCH SHOWN SIMPLIFIED

PART OF A6 SYNC & TIMING BOARD

BLANK

P1430

H PULSE TO SECAM DECODER

H PULSE TO P3190-1 PAL DECODER

HORIZ DLY'D

S7520 SCAN

BLANKING FROM P6187-4

P1800

HORIZ DRIVE TO P4040-4

31KHz TO U1820-14

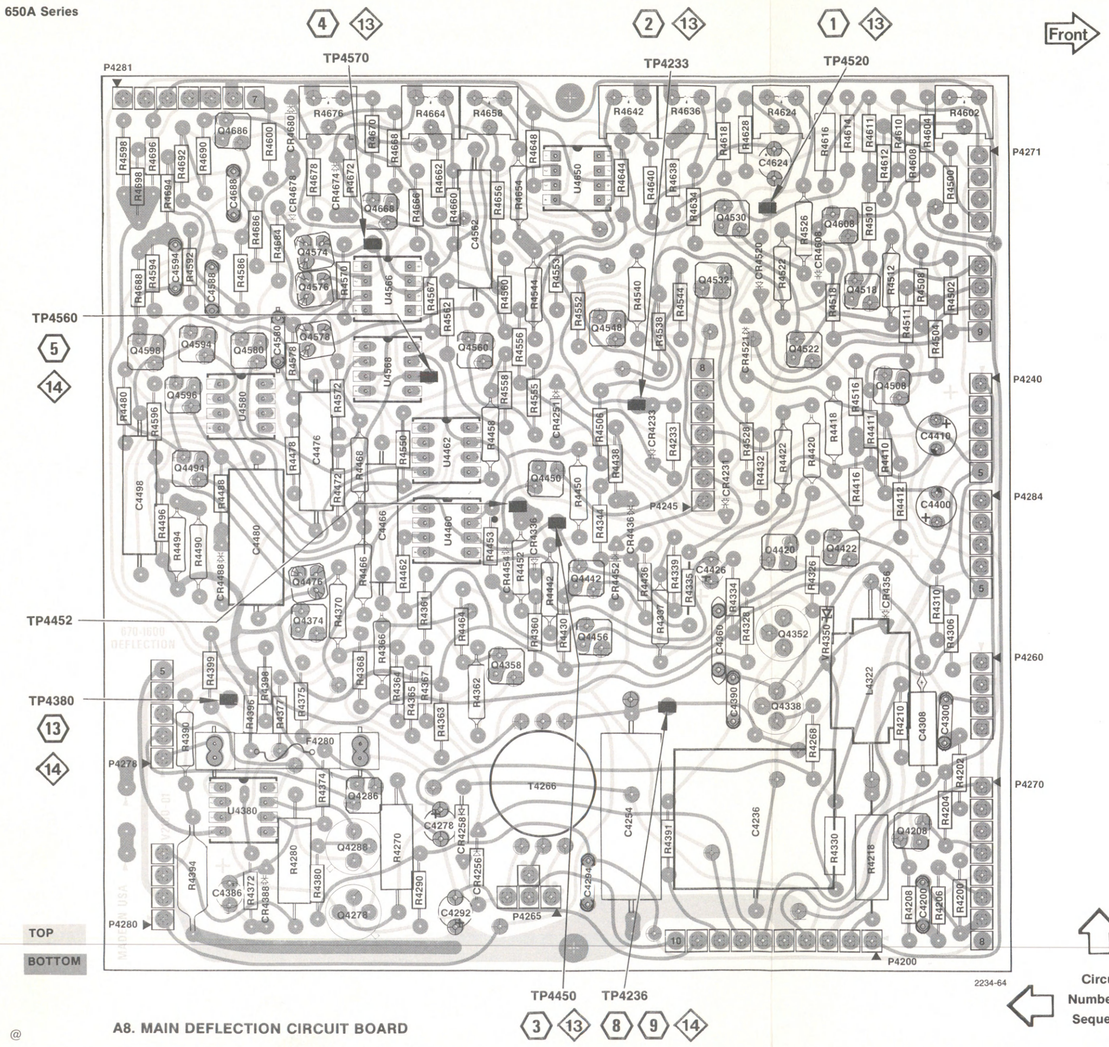
GROUND IF NO VIDEO DELAY LINE SEE P1930

COMP SYNC FROM TP1959

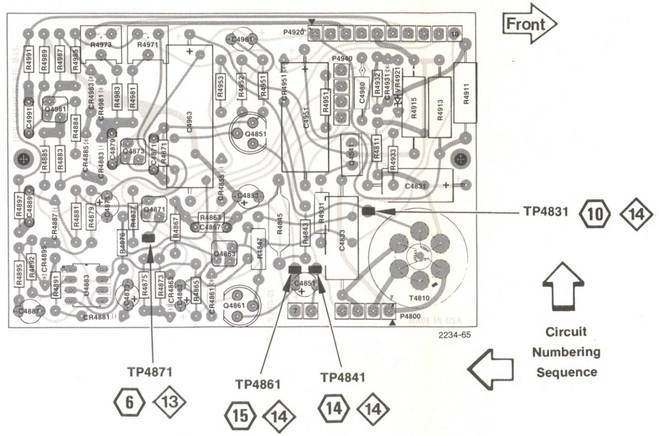
SLOW AFC

FAST AFC

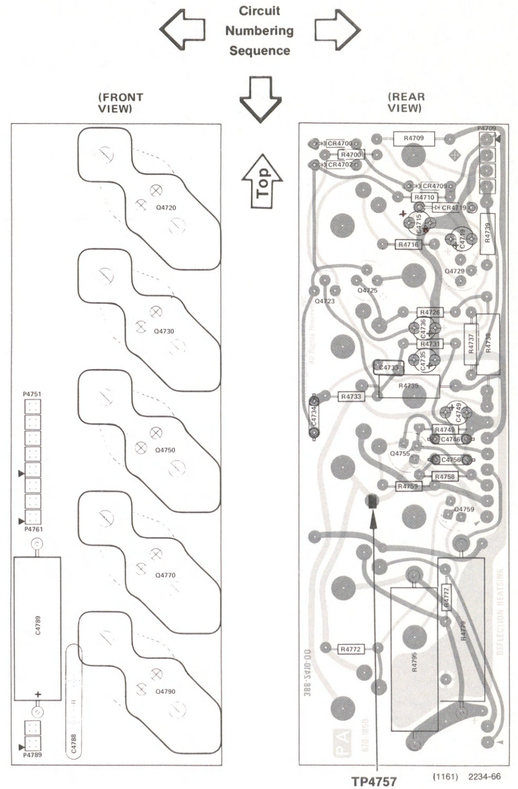
P1470



A8. MAIN DEFLECTION CIRCUIT BOARD



A7. PIN CUSHION CIRCUIT BOARD

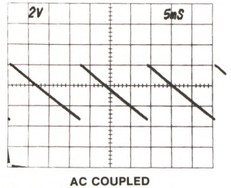


A9. DEFLECTION HEAT SINK CIRCUIT BOARD

Waveform conditions are given on back of first foldout page.

13

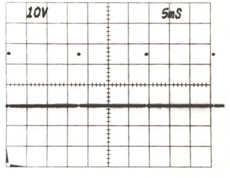
1 VERT DRIVE



−7.3 V

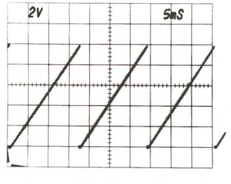
AC COUPLED

2 VERT DRIVE



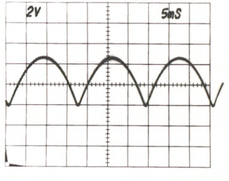
−10.4 V

3 VERT DRIVE



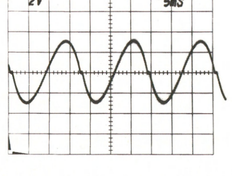
0 V

4 VERT DRIVE



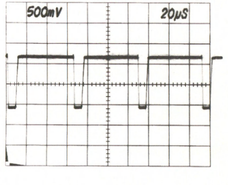
0 V

5 VERT DRIVE



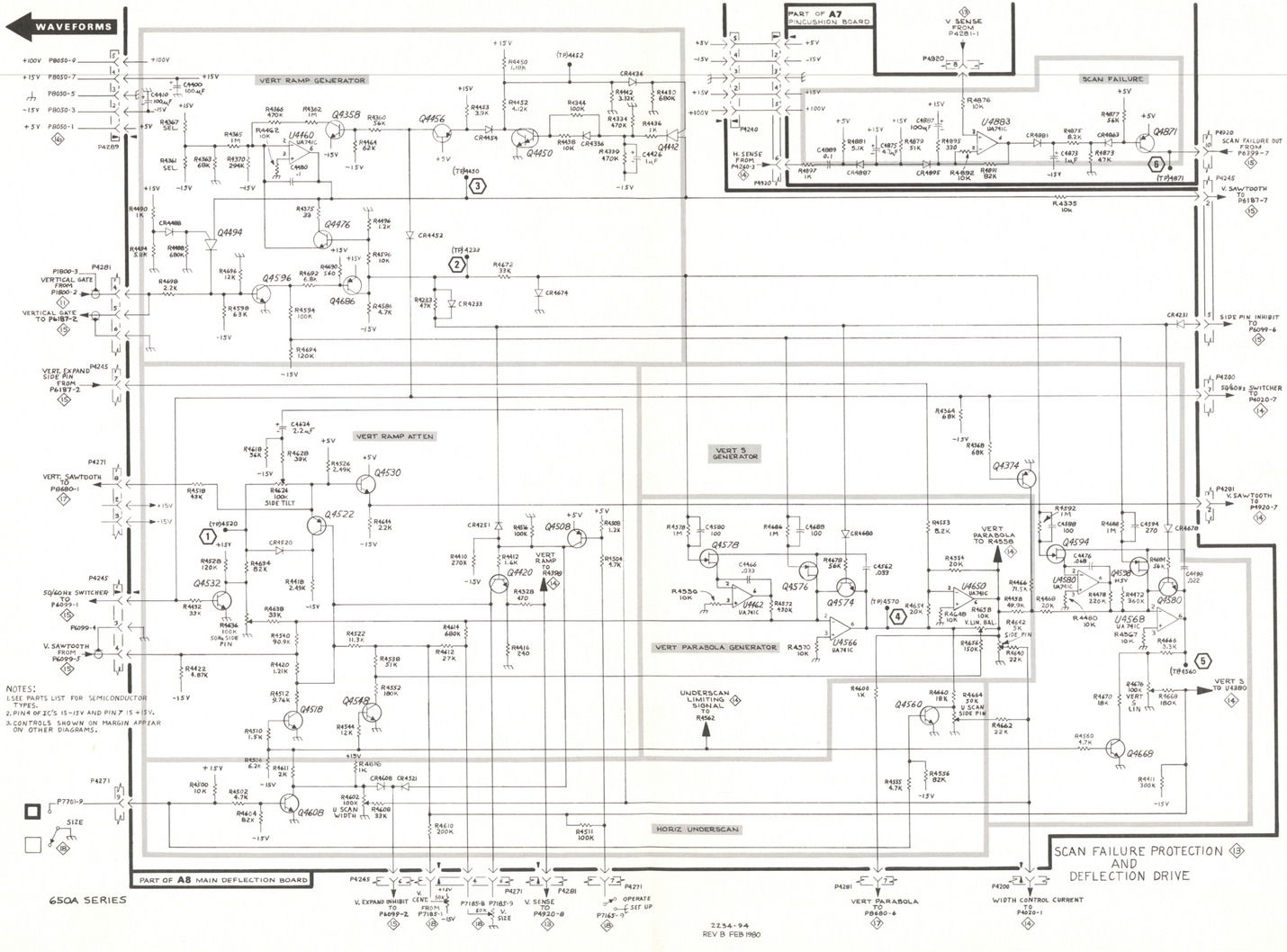
0 V

6

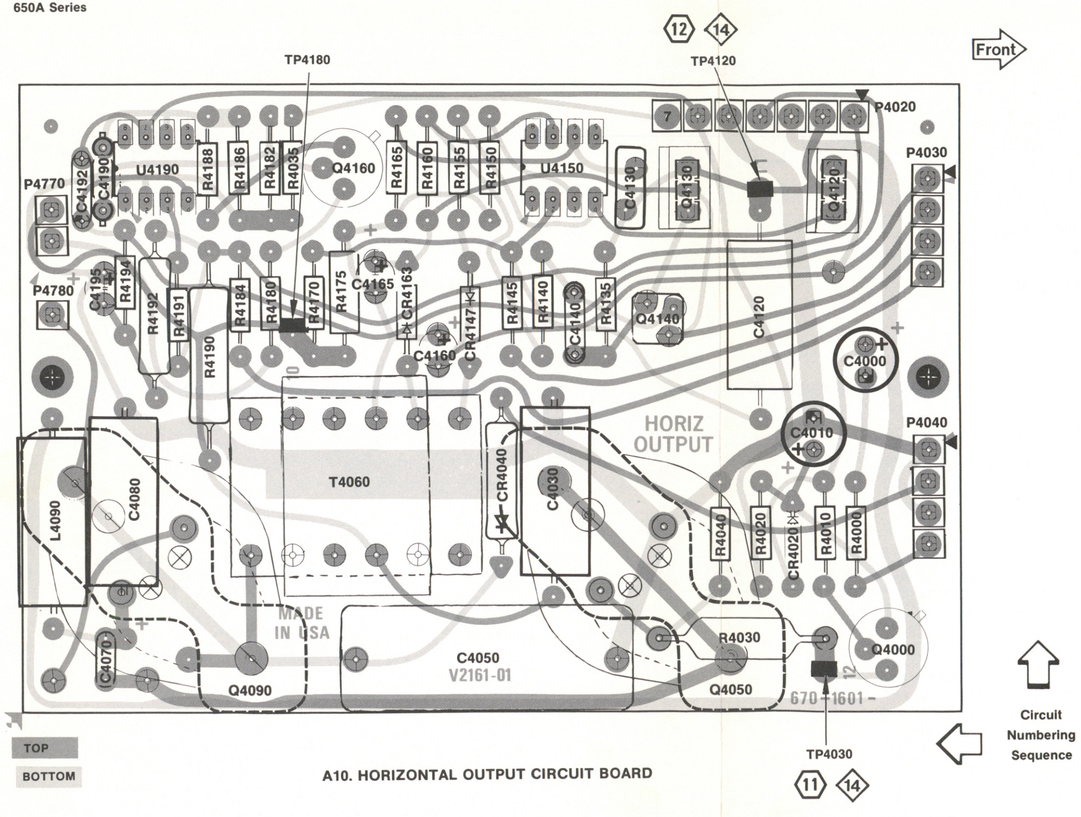


−0.57 V

WAVEFORMS



NOTES:
1. SEE PARTS LIST FOR SEMICONDUCTOR TYPES.
2. PIN 4 OF IC'S IS −15V AND PIN 7 IS +15V.
3. CONTROLS SHOWN ON MARGIN APPEAR ON OTHER DIAGRAMS.



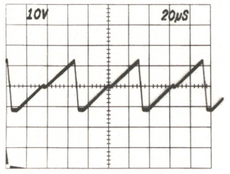
A10. HORIZONTAL OUTPUT CIRCUIT BOARD

Circuit Numbering Sequence

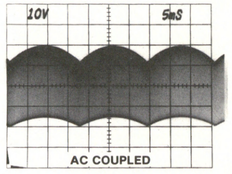
(1161) 2234-67

Waveform conditions are given on back of first foldout page.

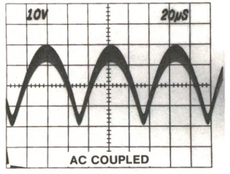
7



8



9



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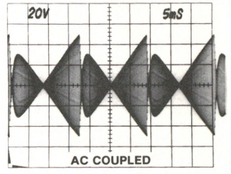
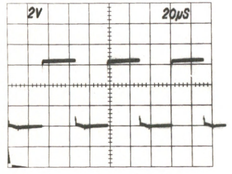
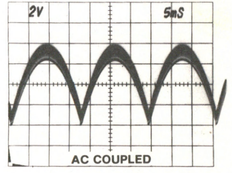


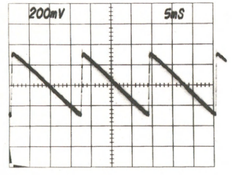
11



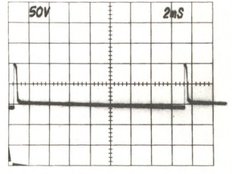
12



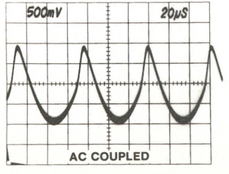
13



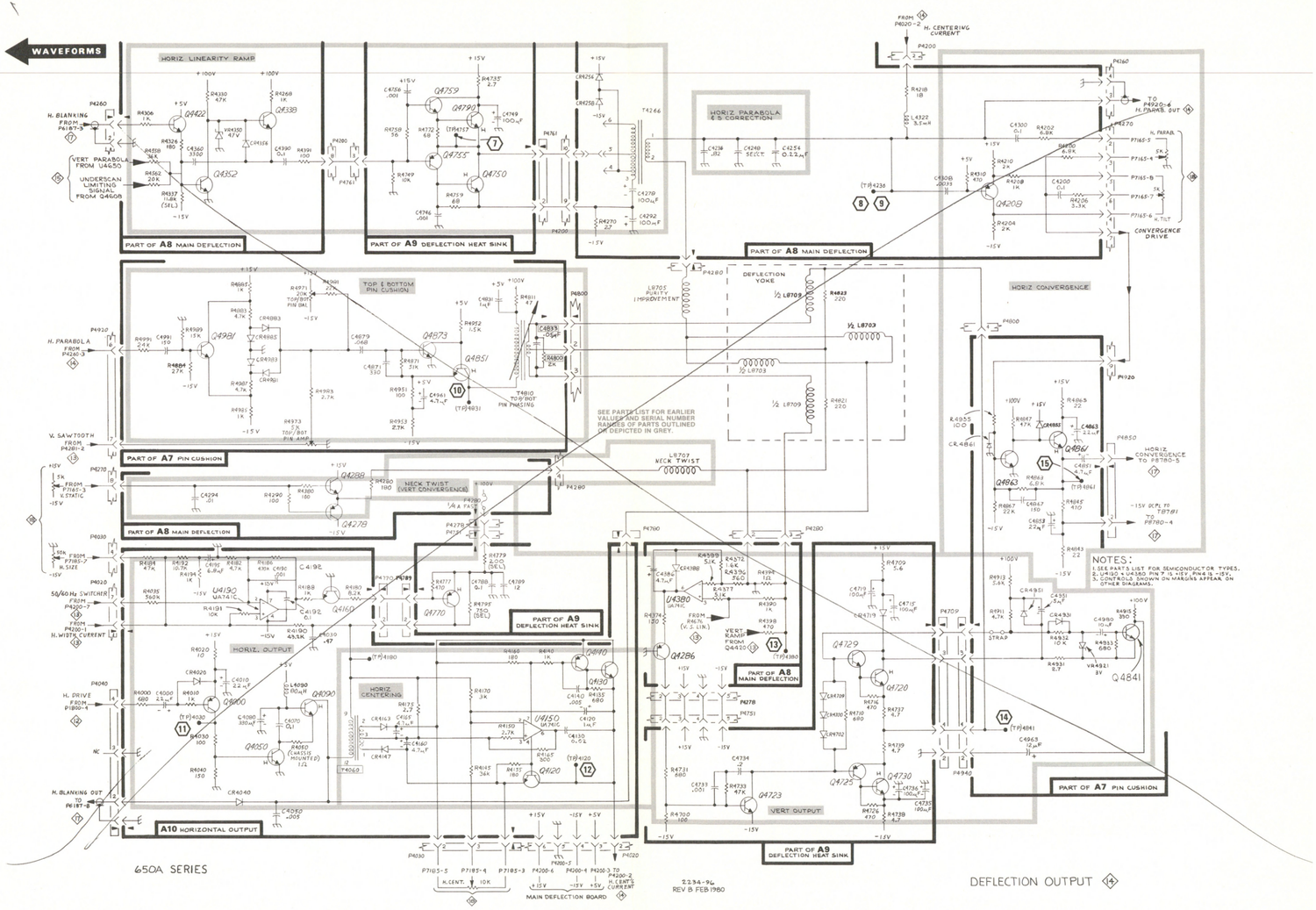
14

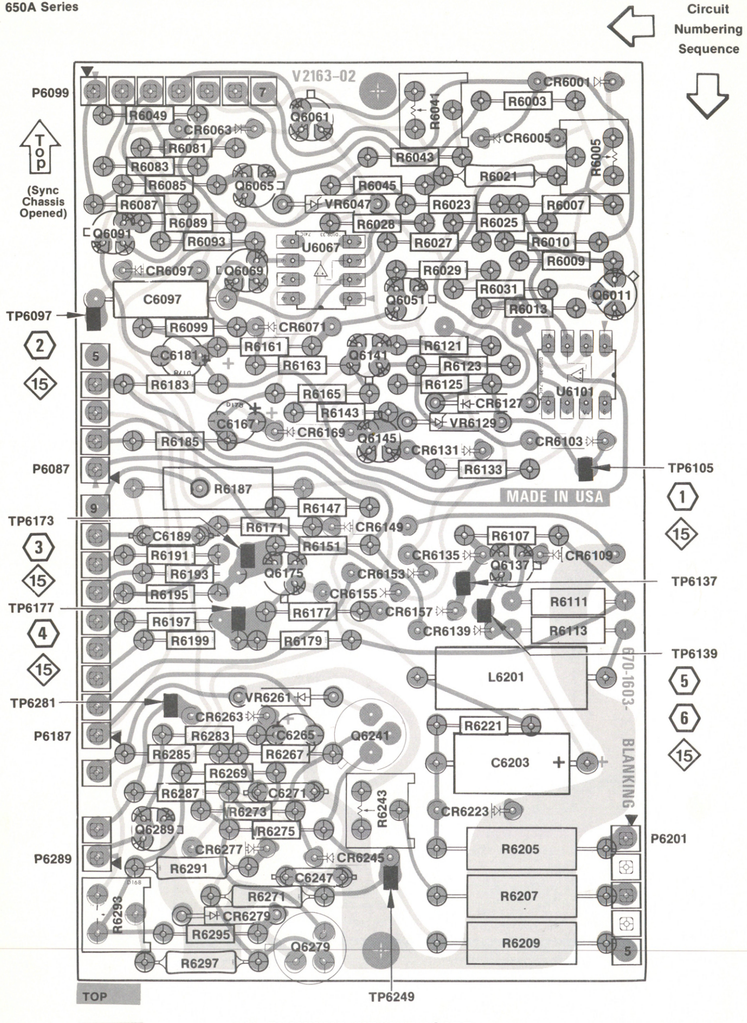


15



WAVEFORMS

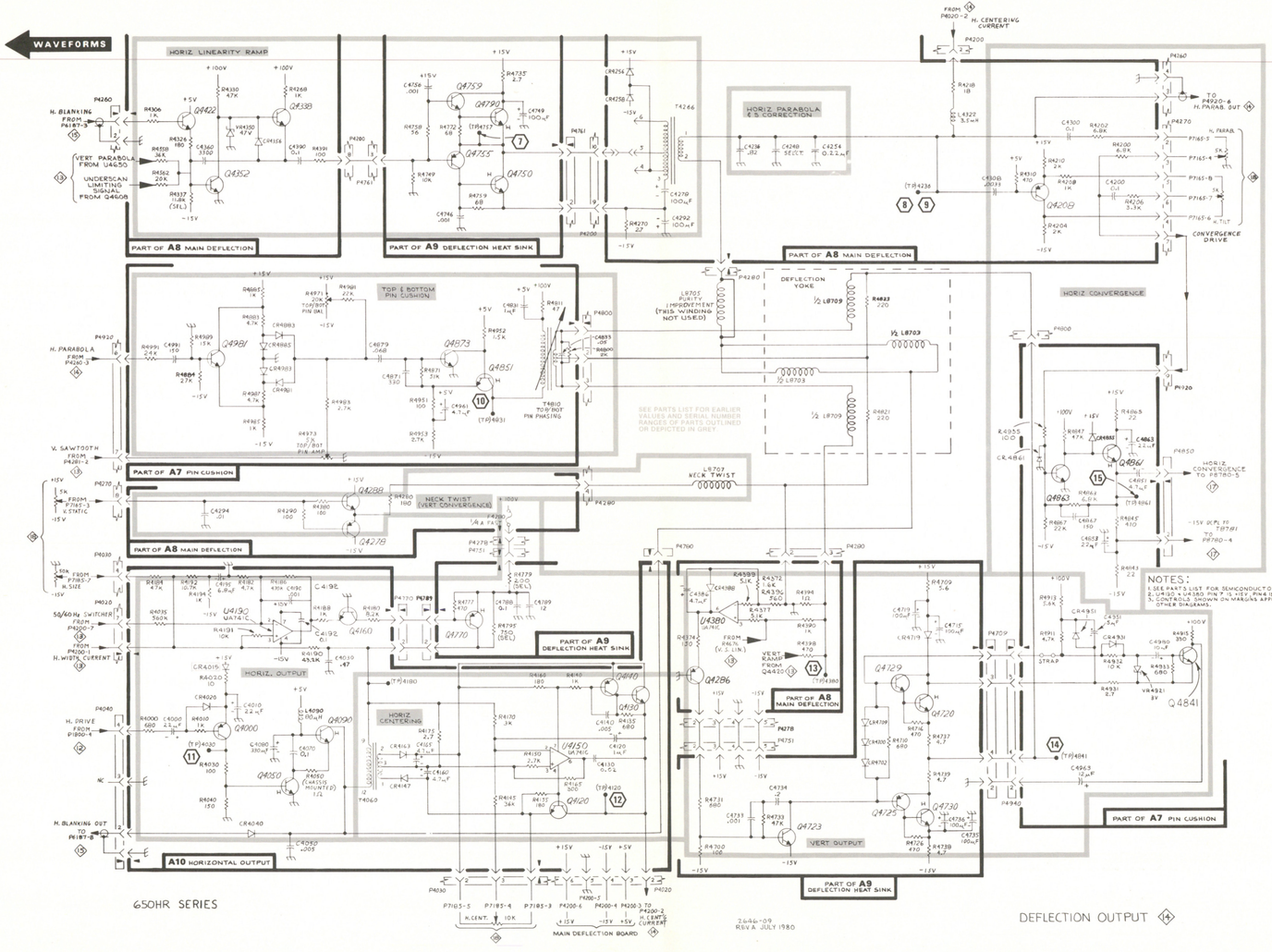




A11. BLANKING CIRCUIT BOARD

2234-68A

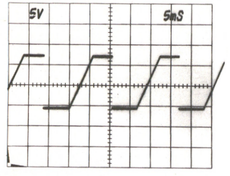
REV. A JAN 1978


WAVEFORMS
HORIZ LINEARITY RAMP
H. BLANKING FROM P6187-3
VERT PARABOLA FROM U4650
UNDERSCAN LIMITING SIGNAL FROM Q4608
PART OF A8 MAIN DEFLECTION
PART OF A9 DEFLECTION HEAT SINK
PART OF A7 PIN CUSHION
TOP & BOTTOM PIN CUSHION
H. PARABOLA FROM P4260-3
V. SAWTOOTH FROM P4281-2
NECK TWIST (VERT CONVERGENCE)
HORIZ PARABOLA E.W. CORRECTION
DEFLECTION YOKE
L8705 PURITY IMPROVEMENT (THIS WINDING NOT USED)
L8703 NECK TWIST
SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY
HORIZ CONVERGENCE
HORIZ CONVERGENCE TO P8780-5
-15V RCTN TO P8791
TO P8780-4
H. CENTERING CURRENT
FROM P4200-2
TO P4920-6 H. PARAB. OUT
H. PARAB.
H. TILT
CONVERGENCE DRIVE
50/60 Hz SWITCHER FROM P4200-7
FROM P4200-1 H. WIDTH CURRENT
H. DRIVE FROM P1800-4
H. BLANKING OUT TO P6187-2
HORIZ. OUTPUT
HORIZ CENTERING
VERT RAMP FROM Q4430
VERT OUTPUT
A10 HORIZONTAL OUTPUT
650HR SERIES
MAIN DEFLECTION BOARD
NOTES:
1. SEE PART'S LIST FOR SEMICONDUCTOR TYPES.
2. CONTROLS SHOWN FOR +15V, PINS 6, +15V, CONTROLS SHOWN ON MARGINS APPEAR ON OTHER DIAGRAMS.
2646-09 REV A JULY 1980
DEFLECTION OUTPUT

Waveform conditions are given on back of first foldout page.

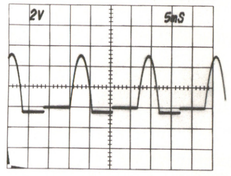
15

1* VERT DRIVE



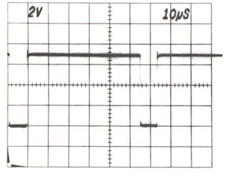
−0.6 V

2* VERT DRIVE



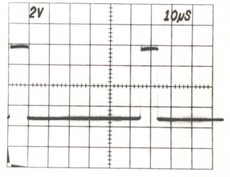
0 V

3



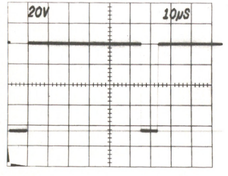
+12.6 V

4



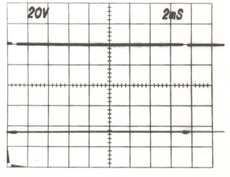
−1.1 V

5



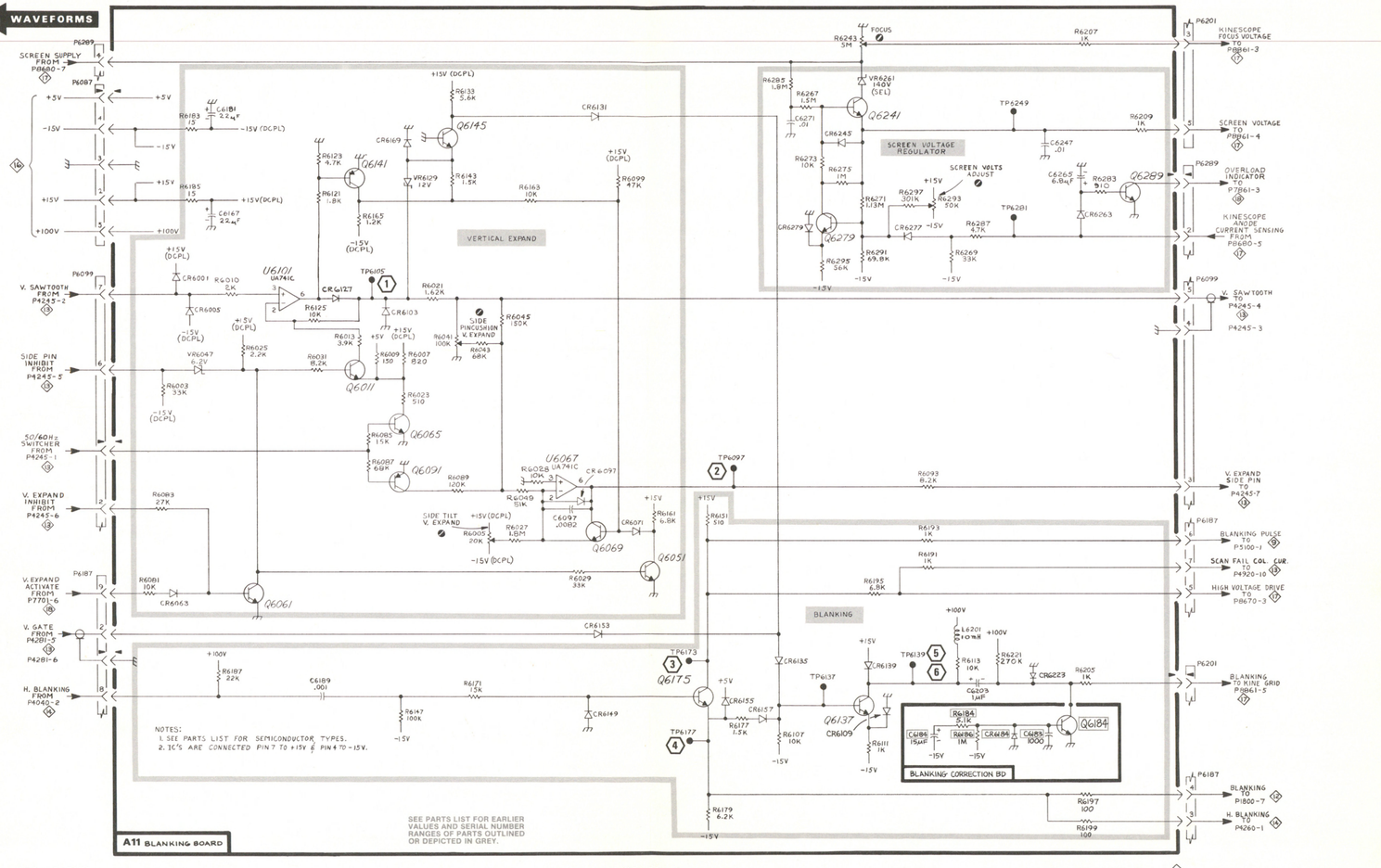
+100 V

6 VERT DRIVE

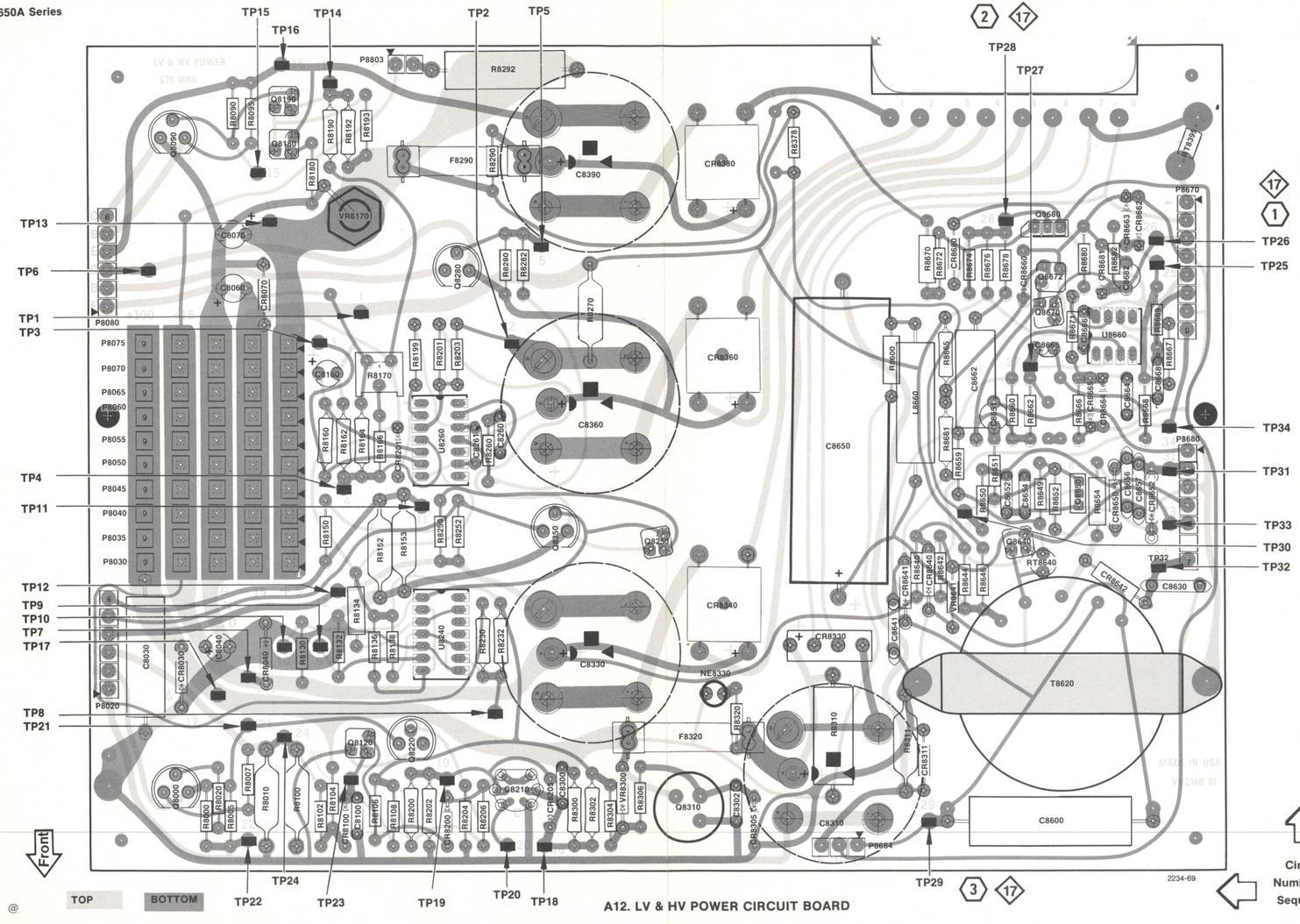


+100 V

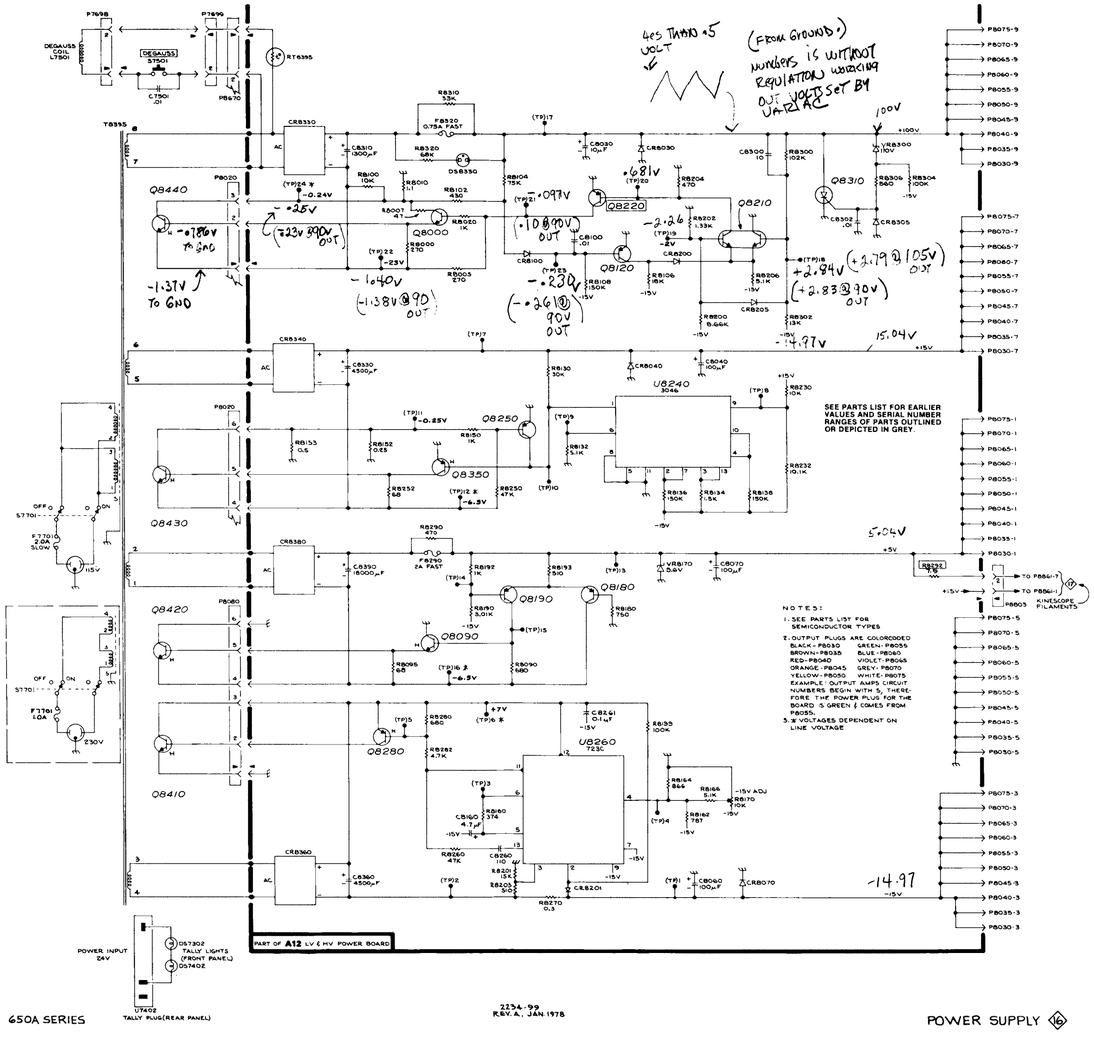
*SCAN switch set to Vert Delay.

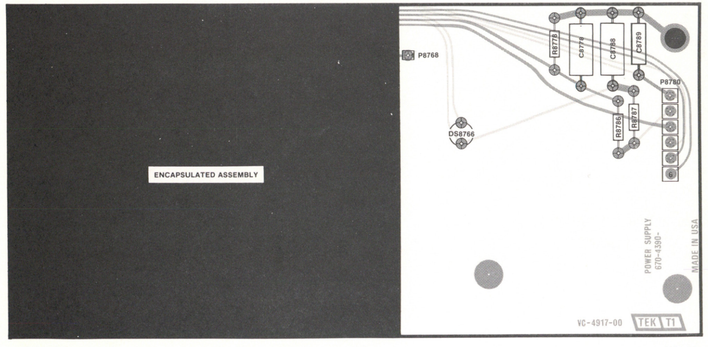


650A Series



A12. LV & HV POWER CIRCUIT BOARD

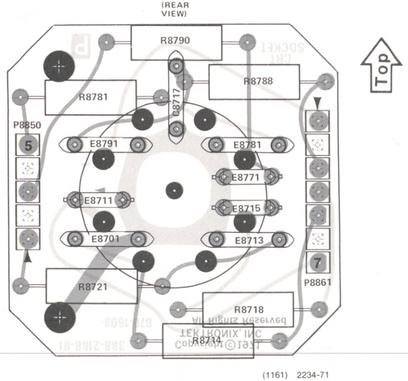

465 THMD ×5 VOLT
(FROM GROUND.)
NUMBERS IS WITHOUT REGULATION WORKING OUT VOLTS SET BY VARIAC
SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.
NOTES:
1. SEE PARTS LIST FOR SEMICONDUCTOR TYPES
2. OUTPUT PLUGS ARE COLORCODED
BLACK - P8030 GREEN - P8055
BROWN - P8035 BLUE - P8060
RED - P8040 VIOLET - P8065
ORANGE - P8045 GREY - P8070
YELLOW - P8050 WHITE - P8075
EXAMPLE: OUTPUT AMPS CIRCUIT NUMBERS BEGIN WITH 5, THEREFORE THE POWER PLUG FOR THE BOARD 5 GREEN (COMES FROM P8055.
3. ※ VOLTAGES DEPENDENT ON LINE VOLTAGE
PART OF A12 LV & HV POWER BOARD
POWER INPUT 24V
TALLY PLUG(REAR PANEL)
TALLY LIGHTS (FRONT PANEL)
TO KINESCOPE FILAMENTS



Circuit Numbering Sequence

Front

A13. EHT SUPPLY CIRCUIT BOARD



Top

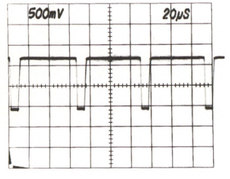
A14. KINESCOPE SOCKET CIRCUIT BOARD

@

Waveform conditions are given on back of first foldout page.

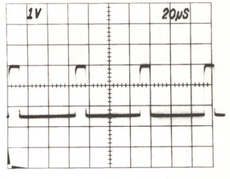
17

1



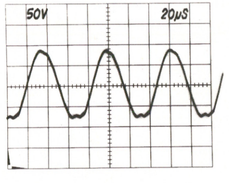
+0.67 V

2



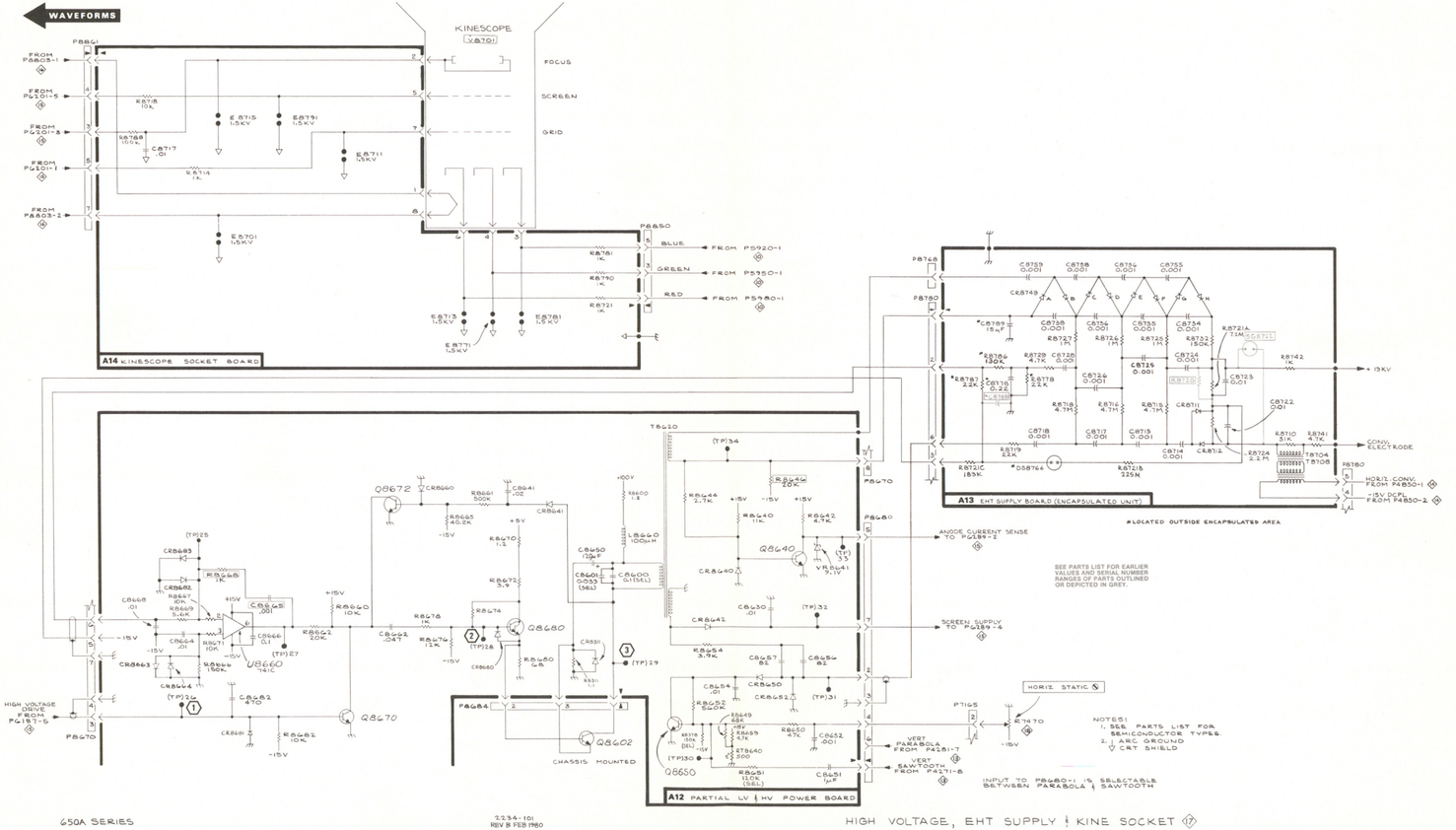
−0.5 V

3



+24 V

WAVEFORMS



650A SERIES

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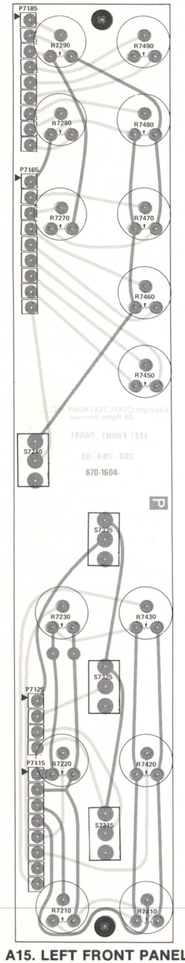
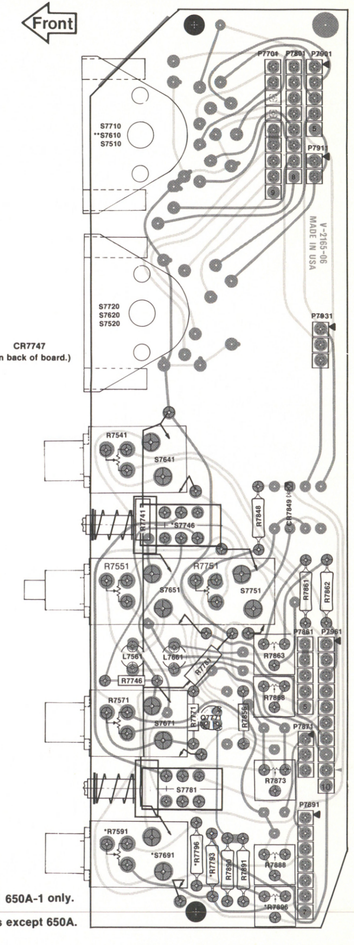
HIGH VOLTAGE, EHT SUPPLY & KINE SOCKET 17

(FRONT VIEW)



Top

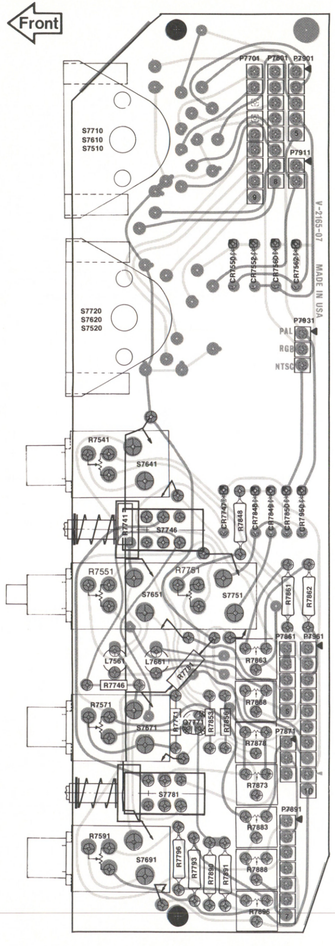
Front



*650A, and 650A-1 only.

**All models except 650A.

Front



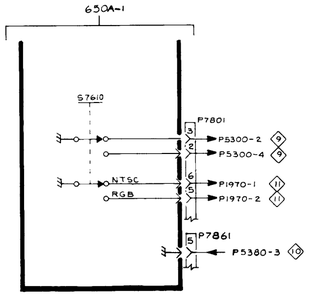
A15. LEFT FRONT PANEL CIRCUIT BOARD

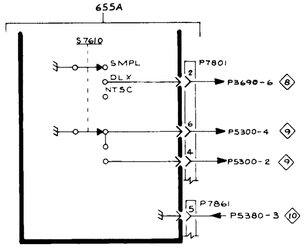
TOP

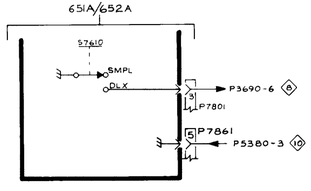
BOTTOM

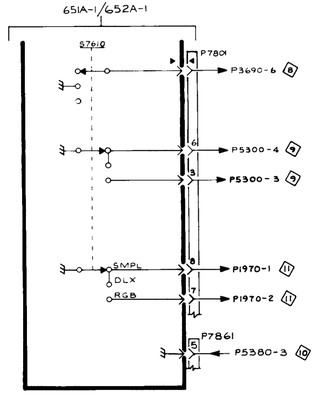
A16. RIGHT FRONT PANEL CIRCUIT BOARD (for all models except 655A and 655A-1)

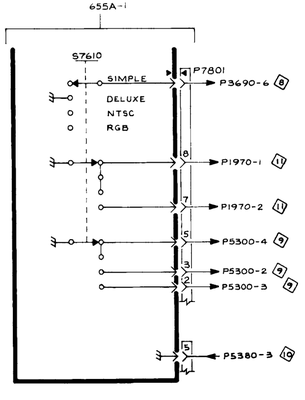
A16. RIGHT FRONT PANEL CIRCUIT BOARD (for 655A and 655A-1 only)



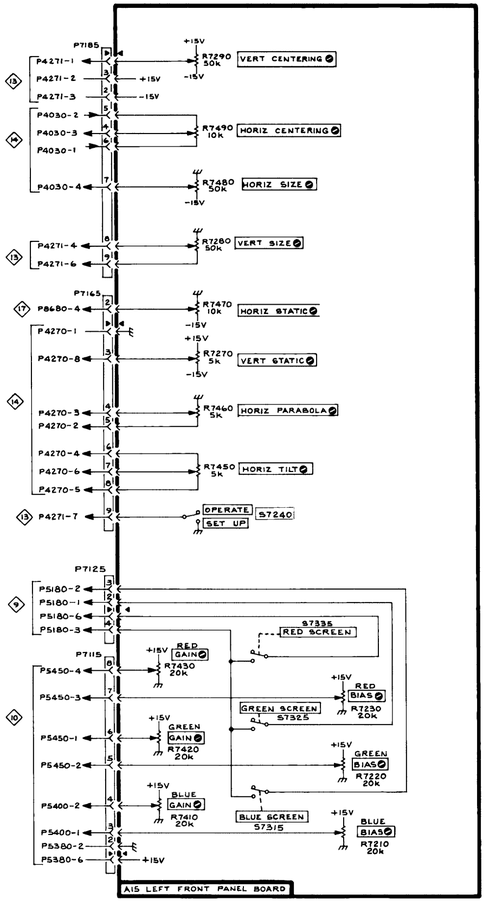




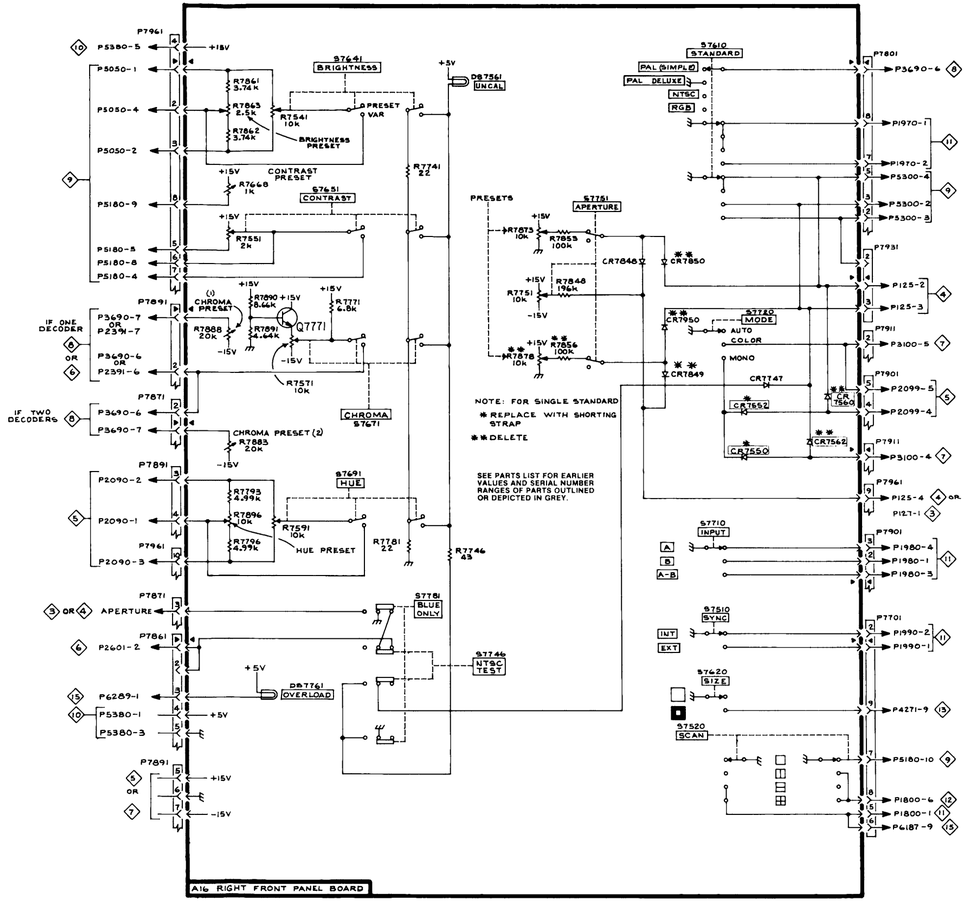




STANDARD SWITCH



650A SERIES



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REV. B, JAN. 1978

FRONT PANEL CONTROLS 18

REPLACEABLE MECHANICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. 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.

SPECIAL NOTES AND SYMBOLS

X000	Part first added at this serial number
00X	Part removed after this serial number

FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentation system used in the description column.

1 2 3 4 5 Name & Description

Assembly and/or Component
Attaching parts for Assembly and/or Component
- - - * - - -
Detail Part of Assembly and/or Component
Attaching parts for Detail Part
- - - * - - -
Parts of Detail Part
Attaching parts for Parts of Detail Part
- - - * - - -

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation. The separation symbol - - - * - - - indicates the end of attaching parts.

Attaching parts must be purchased separately, unless otherwise specified.

ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

ABBREVIATIONS

"	INCH
#	NUMBER SIZE
ACTR	ACTUATOR
ADPTR	ADAPTER
ALIGN	ALIGNMENT
AL	ALUMINUM
ASSEM	ASSEMBLED
ASSY	ASSEMBLY
ATTEN	ATTENUATOR
AWG	AMERICAN WIRE GAGE
BD	BOARD
BRKT	BRACKET
BRS	BRASS
BRZ	BRONZE
BSHG	BUSHING
CAB	CABINET
CAP	CAPACITOR
CER	CERAMIC
CHAS	CHASSIS
CKT	CIRCUIT
COMP	COMPOSITION
CONN	CONNECTOR
COV	COVER
CPLG	COUPLING
CRT	CATHODE RAY TUBE
DEG	DEGREE
DWR	DRAWER
ELCTRN	ELECTRON
ELEC	ELECTRICAL
ELCTLT	ELECTROLYTIC
ELEM	ELEMENT
EPL	ELECTRICAL PARTS LIST
EQPT	EQUIPMENT
EXT	EXTERNAL
FIL	FILLISTER HEAD
FLEX	FLEXIBLE
FLH	FLAT HEAD
FLTR	FILTER
FR	FRAME or FRONT
FSTNR	FASTENER
FT	FOOT
FXD	FIXED
GSKT	GASKET
HDL	HANDLE
HEX	HEXAGON
HEX HD	HEXAGONAL HEAD
HEX SOC	HEXAGONAL SOCKET
HLCPS	HELICAL COMPRESSION
HLEXT	HELICAL EXTENSION
HV	HIGH VOLTAGE
IC	INTEGRATED CIRCUIT
ID	INSIDE DIAMETER
IDENT	IDENTIFICATION
IMPLR	IMPELLER
IN	INCH
INCAND	INCANDESCENT
INSUL	INSULATOR
INTL	INTERNAL
LPHLDR	LAMPHOLDER
MACH	MACHINE
MECH	MECHANICAL
MTG	MOUNTING
NIP	NIPPLE
NON WIRE	NOT WIRE WOUND
OBD	ORDER BY DESCRIPTION
OD	OUTSIDE DIAMETER
OVH	OVAL HEAD
PH BRZ	PHOSPHOR BRONZE
PL	PLAIN or PLATE
PLSTC	PLASTIC
PN	PART NUMBER
PNH	PAN HEAD
PWR	POWER
RCPT	RECEPTACLE
RES	RESISTOR
RGD	RIGID
RLF	RELIEF
RTNR	RETAINER
SCH	SOCKET HEAD
SCOPE	OSCILLOSCOPE
SCR	SCREW
SE	SINGLE END
SECT	SECTION
SEMICOND	SEMICONDUCTOR
SHLD	SHIELD
SHLDR	SHOULDERED
SKT	SOCKET
SL	SLIDE
SLFLKG	SELF-LOCKING
SLVG	SLEEVING
SPR	SPRING
SQ	SQUARE
SST	STAINLESS STEEL
STL	STEEL
SW	SWITCH
T	TUBE
TERM	TERMINAL
THD	THREAD
THK	THICK
TNSN	TENSION
TPG	TAPPING
TRH	TRUSS HEAD
V	VOLTAGE
VAR	VARIABLE
W/	WITH
WSHR	WASHER
XFMR	TRANSFORMER
XSTR	TRANSISTOR

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

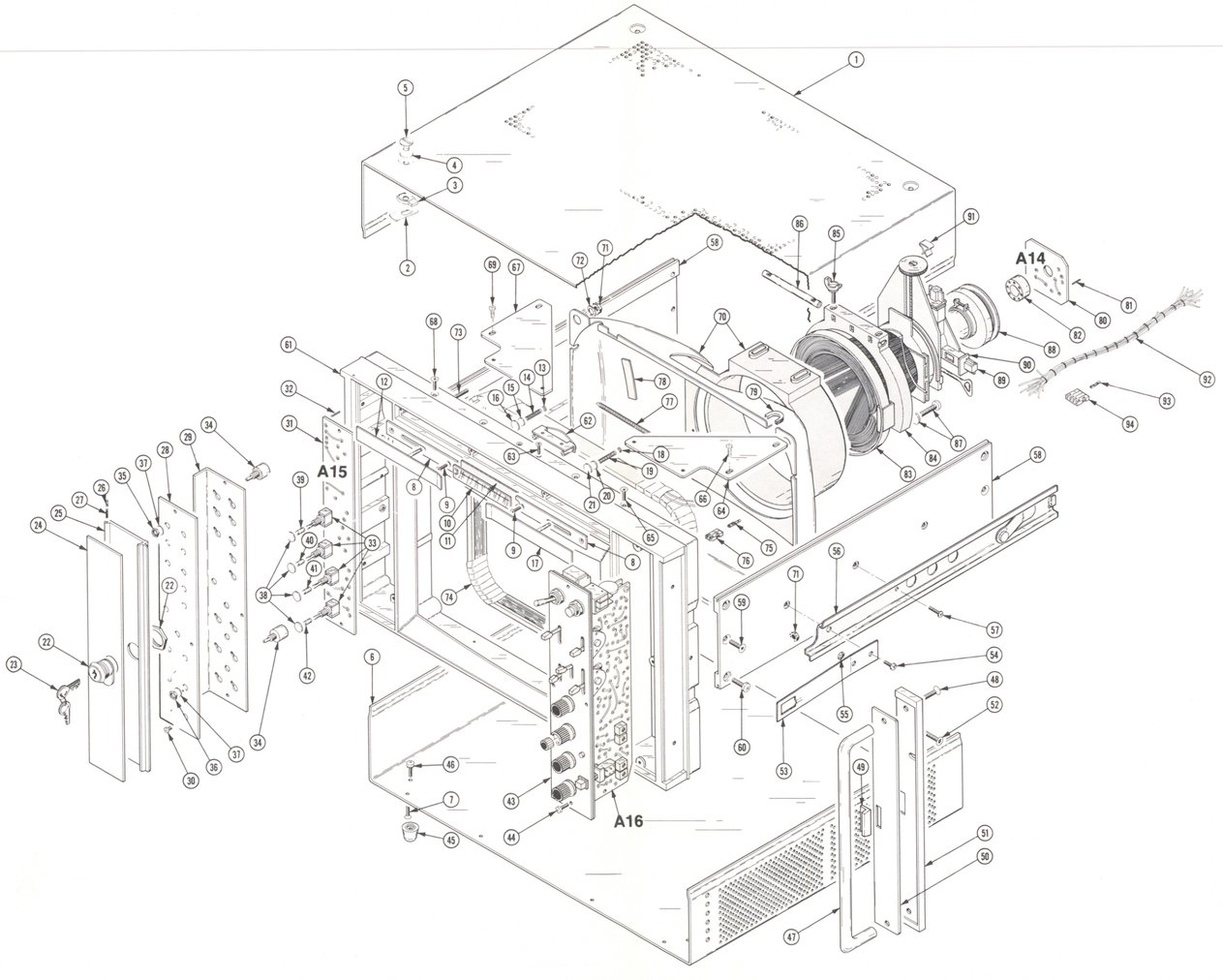
Mfr. Code	Manufacturer	Address	City, State, Zip
00779	AMP, INC.	P O BOX 3608	HARRISBURG, PA 17105
22526	BERG ELECTRONICS, INC.	YOUK EXPRESSWAY	NEW CUMBERLAND, PA 17070
71785	TRW, CINCH CONNECTORS	1501 MORSE AVENUE	ELK GROVE VILLAGE, IL 60007
73803	TEXAS INSTRUMENTS, INC., METALLURGICAL MATERIALS DIV.	34 FOREST STREET	ATTLEBORO, MA 02703
80009	TEKTRONIX, INC.	P O BOX 500	BEAVERTON, OR 97077

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
THE 670-1602-02 IS THE SAME AS THE 670-1602-01 EXCEPT FOR:								
THE 670-1602-03 IS THE SAME AS THE 670-1602-02 EXCEPT FOR:								
REMOVE:								
	136-0260-01			1		SOCKET,PLUG-IN:16 CONTACT,RECT SHAPE	71785	133-51-02-075
	136-0269-00			8		SOCKET,PLUG-IN:14 CONTACT,LOW CLEARANCE	73803	CS9002-14
	136-0252-07			243		SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
	131-0589-00	B010100	B020749	55		TERMINAL,PIN:0.46 L X 0.025 SQ	80009	131-0589-00
	131-0589-00	B020750		7		TERMINAL,PIN:0.46 L X 0.025 SQ	80009	131-0589-00
	136-0260-02			1		SKT,PL-IN ELEK:MICROCIRCUIT,16 DIP,LOW CLE	71785	133-51-92-008
	136-0269-02			8		SKT,PL-IN ELEK:MICROCIRCUIT,14 DIP,LOW CLE	73803	CS9002-14
	131-0589-00	B020750		55		TERMINAL,PIN:0.46 L X 0.025 SQ	80009	131-0589-00
THE 670-2611-07 IS THE SAME AS THE 670-2611-06 EXCEPT FOR: (650HR, 650HR-1, 655HR, 655HR-1 ONLY)								
REMOVE:								
	136-0252-07			201		SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
	136-0590-00			2		SKT,PL-IN ELEK:ELOCTRON TUBE,CRT		
	214-0579-00			7		TERM,TEST POINT:BRS CD PL	80009	214-0579-00
	131-0589-00			18		TERMINAL,PIN:0.46 L X 0.025 SQ	80009	131-0589-00
	136-0220-00			47		SKT,PL-IN ELEK:TRANSISTOR 3 CONTACT,PCB MT	71785	133-23-11-034
	136-0241-00			2		SOCKET,PLUG-IN:10 CONTACT,ROUND	71785	133-99-12-064
	136-0269-00			1		SOCKET,PLUG-IN:14 CONTACT,LOW CLEARANCE	73803	CS9002-14
	136-0514-00			8		SKT,PL-IN ELEC:MICROCIRCUIT,8 DIP	73803	CS9002-8
THE 670-3166-10 IS THE SAME AS THE 670-3166-03 EXCEPT FOR: (651HR, 651HR-1, 655HR, 655HR-1)								
REMOVE:								
	136-0252-07			248		SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
	136-0269-00			2		SOCKET,PLUG-IN:14 CONTACT,LOW CLEARANCE	73803	CS9002-14
	131-1334-00			2		BUS CONDUCTOR:	80009	131-1334-00
	214-0579-00			19		TERM,TEST POINT:BRS CD PL	80009	214-0579-00
	131-0589-00			8		TERMINAL,PIN:0.46 L X 0.025 SQ	80009	131-0589-00
	136-0220-00			64		SKT,PL-IN ELEK:TRANSISTOR 3 CONTACT,PCB MT	71785	133-23-11-034
	136-0234-00			7		SOCKET,PIN TERM:0.088 OD X 0.247 INCH L	00779	380598-1
	136-0269-02			2		SKT,PL-IN ELEK:MICROCIRCUIT,14 DIP,LOW CLE	73803	CS9002-14
	136-0514-00			7		SKT,PL-IN ELEC:MICROCIRCUIT,8 DIP	73803	CS9002-8
REMOVE:								
	334-1810-26			1		PLATE,IDENT:MARKED 650A MONITOR	80009	334-1810-26
	334-1810-27			1		PLATE,IDENT:MARKED 650A-1MONITOR	80009	334-1810-27
	334-1810-28			1		PLATE,IDENT:MARKED 651A MONITOR	80009	334-1810-28
	334-1810-29			1		PLATE,IDENT:MARKED 651A-1MONITOR	80009	334-1810-29
	334-1810-30			1		PLATE,IDENT:MARKED 655A MONITOR	80009	334-1810-30
	334-1810-31			1		PLATE,IDENT:MARKED 655A-1MONITOR	80009	334-1810-31
	334-1810-34			1		PLATE,IDENT:MARKED 650HR MONITOR	80009	334-1810-34
	334-1810-35			1		PLATE,IDENT:MARKED 651HR MONITOR	80009	334-1810-35
	334-1810-36			1		PLATE,IDENT:MARKED 655HR MONITOR	80009	334-1810-36
	334-1810-39			1		PLATE,IDENT:MARKED 650HR-1 MONITOR	80009	334-1810-39
	334-1810-40			1		PLATE,IDENT:MARKED 651HR-1 MONITOR	80009	334-1810-40
	334-1810-42			1		PLATE,IDENT:MARKED 655HR-1 MONITOR	80009	334-1810-42
	070-2646-00			1		MANUAL,TECH:INSTRUCTION FOR 650HR SERIES	80009	070-2646-00

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
1-1	390-0225-00			1		COVER,SCOPE:TOP	80009	390-0225-00
-2	386-1151-00			4		. CLAMP,RIM CLENC:SPG STL CD PL	80009	386-1151-00
-3	386-0227-01			4		. STOP,CLP,RIM CL:BLACK ACETAL	80009	386-0227-01
-4	214-0604-00			4		. WASH.,SPG TNSN:0.26 ID X 0.47 INCH OD	80009	214-0604-00
-5	214-0603-01			4		PIN,SECURING:0.27 INCH LONG	80009	214-0603-01
-6	390-0226-01			1		COVER,MONITOR:BOTTOM	80009	390-0226-01
						(ATTACHING PARTS)		
-7	211-0105-00			8		SCREW,MACHINE:4-40 X 0.188"100 DEG,FLH STL	83385	OBD
						- - - * - - -		
-8	386-2026-00			2		PLATE,SERNO MTG:	80009	386-2026-00
						(ATTACHING PARTS)		
-9	211-0101-00			4		SCREW,MACHINE:4-40 X 0.25" 100 DEG,FLH STL	83385	OBD
						- - - * - - -		
-10	331-0290-00			2		WINDOW,LAMP:CLEAR PLASTIC	80009	331-0290-00
-11	378-0697-01			1		LENS,LIGHT:3.0 X 0.53,WHITE	80009	378-0697-01
-12	334-1810-02			1		PLATE,IDENT:LEFT	80009	334-1810-02
						(ATTACHING PARTS)		
-13	354-0163-00			1		RING,RETAINING:TRUARC,CAD PLATE	79136	5133-12MD
-14	214-1338-00			1		SPRING,HLCPS:0.875 INCH LONG	84830	LC-016B-10-SS
						- - - * - - -		
-15	210-0802-00			1		WASHER,FLAT:0.15 ID X 0.312 INCH OD	12327	OBD
-16	210-1011-00			1		WASHER,NONMETAL:0.13 ID X 0.375 " OD,PLSTC	83309	OBD
-17	334-1810-26			1		PLATE,IDENT:MARKED 650A MONITOR	80009	334-1810-26
	334-1810-27			1		PLATE,IDENT:MARKED 650A-1 MONITOR	80009	334-1810-27
	334-1810-28			1		PLATE,IDENT:MARKED 651A MONITOR	80009	334-1810-28
	334-1810-29			1		PLATE,IDENT:MARKED 651A-1 **MONITOR**	80009	334-1810-29
	334-1810-32			1		PLATE,IDENT:MARKED 652A MONITOR	80009	334-1810-32
	334-1810-33			1		PLATE,IDENT:MARKED 652A-1 **MONITOR**	80009	334-1810-33
	334-1810-30			1		PLATE,IDENT:MARKED 655A MONITOR	80009	334-1810-30
	334-1810-31			1		PLATE,IDENT:MARKED 655A-1 **MONITOR**	80009	334-1810-31
						(ATTACHING PARTS)		
-18	354-0163-00			1		RING,RETAINING:TRUARC,CAD PLATE	79136	5133-12MD
-19	214-1338-00			1		SPRING,HLCPS:0.875 INCH LONG	84830	LC-016B-10-SS
-20	210-0802-00			1		WASHER,FLAT:0.15 ID X 0.312 INCH OD	12327	OBD
-21	210-1011-00			1		WASHER,NONMETAL:0.13 ID X 0.375 " OD,PLSTC	83309	OBD
						- - - * - - -		
-22	105-0270-00			1		LOCK,RIM:	81741	3174-CL
-23	214-1814-00			2		. KEY,LOCK:	81741	OBD
-24	333-1485-00			1		PANEL,FRONT:ACCESS DOOR	80009	333-1485-00
	200-1217-02			1		DOOR,ACCESS:W/FRONT PANEL	80009	200-1217-02
	----- -----			-		(650A, 650A-1, 655A, 655A-1 ONLY)		
	333-1485-01			1		. PANEL,FRONT:ACCESS DOOR	80009	333-1485-01
	----- -----			-		. (650A, 650A-1, 655A, 655A-1 ONLY)		
-25	200-1217-02			1		DOOR,ACCESS:W/FRONT PANEL	80009	200-1217-02
						(ATTACHING PARTS)		
-26	214-1029-00			2		PIN,SHLD,HDLS:0.31 INCH LONG	80009	214-1029-00
-27	214-1028-00			2		SPRING,HLCPS:0.380 INCH LONG	91260	OBD
						- - - * - - -		
-28	333-1437-00	B010100	B019999	1		PANEL,FRONT:LEFT	80009	333-1437-00
	333-1437-01	B020000		1		PANEL,FRONT:LEFT	80009	333-1437-01
-29	386-2004-00			1		SUBPANEL,FRONT:LEFT	80009	386-2004-00
						(ATTACHING PARTS)		
-30	211-0008-00			3		SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
						- - - * - - -		
-31	----- -----			1		SUBPANEL ASSY:FRONT,LEFT(SEE A15 EPL)		
-32	131-0589-00			32		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-33	260-1335-00			4		. SWITCH,TOGGLE:SPDT,0.4A,20VDC	09353	7101 SHCB8E
-34	----- -----			14		. RESISTOR,VAR:(SEE R7290,R7280,R7460,R7420)		
	----- -----			-		. (R7220,R7490,R7470,R7450,R7410,R7210,R7480)		
	----- -----			-		. (R7270,R7430,R7230)		
						(ATTACHING PARTS FOR CKT BD)		
-35	210-0583-00			14		NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS	73743	2X20317-402
-36	210-0562-00			4		NUT,PLAIN,HEX.:0.25-40 X 0.312 INCH,BBS	73743	2X20224-402
-37	210-0940-00			18		WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL	79807	OBD
-38	210-0046-00			4		WASHER,LOCK:0.261 ID,INTL,0.018 THK,BRS	78189	1214-05-00-0541C
						- - - * - - -		

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
1-39	200-1295-00			1		CAP.,SW HANDLE:BLACK	09353	7062-1
-40	200-1292-00			1		CAP.,SW HANDLE:RED	09353	8968-3
-41	200-1294-00			1		CAP.,SW HANDLE:GREEN	09353	8968-6
-42	200-1293-00			1		CAP.,SW HANDLE:BLUE	09353	8968-7
-43	----- -----			1		PANEL ASSY:RIGHT FRONT		
	----- -----			-		(REFER TO FIGURE 4 FOR BREAKDOWN)		
						(ATTACHING PARTS)		
-44	211-0008-00			4		SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
						- - - * - - -		
-45	348-0080-01			4		FOOT,CABINET:BOTTOM	80009	348-0080-01
						(ATTACHING PARTS)		
-46	211-0534-00			4		SCR,ASSEM,WSHR:6-32 X 0.312 INCH,PNH STL	83385	OBD
						- - - * - - -		
-47	367-0149-00			2		HANDLE,BOW:0.375 INCH DIA,NKL-CRM PLATED	80009	367-0149-00
	----- -----			-		(NOT INCLUDED WITH OPTION 4)		
						(ATTACHING PARTS)		
-48	212-0622-00			4		SCREW,SLFLKG:10-32 X 0.375,100 DEG FLH,STL	04866	M39AS1032
	----- -----			-		(NOT INCLUDED WITH OPTION 4)		
						- - - * - - -		
-49	366-1729-00			2		KNOB:GRAY,LATCH	80009	366-1729-00
-50	124-0254-02			2		STRIP,TRIM:RACK MT RIGHT AND LEFT	80009	124-0254-02
	124-0272-01	B010100	B030486	1		STRIP,TRIM:RIGHT	80009	124-0272-01
	----- -----			-		(OPTION 4 ONLY)		
	124-0277-01	B010100	B0304086	1		STRIP,TRIM:LEFT	80009	124-0277-01
	----- -----			-		(OPTION 4 ONLY)		
	124-0277-01	B030487		2		STRIP,TRIM:LEFT	80009	124-0277-01
-51	407-0927-02			2		BRACKET,ANGLE:RACKMOUNT,RIGHT & LEFT,AL	80009	407-0927-02
	348-0090-00	XB010460		2		PAD,CUSHIONING:2.03 X 0.69 X0.312	85471	OBD
	----- -----			-		(REFER TO FIGURE 4 FOR BREAKDOWN)		
						(ATTACHING PARTS)		
-52	212-0574-00			4		SCREW,MACHINE:10-32 X 0.438"100 DEG FLH STL	83385	OBD
						- - - * - - -		
-53	214-2538-00	B010100	B041264	2		SPRING,FLAT:CHASSIS TRACKLOCK	80009	214-2538-00
	214-2538-01	B041265		2		SPRING,FLAT:CHASSIS TRACKLOCK	80009	214-2538-01
						(ATTACHING PARTS)		
-54	212-0004-00			4		SCREW,MACHINE:8-32 X 0.312 INCH,PNH STL	83385	OBD
	212-0023-00	XB041265		4		SCREW,MACHINE:8-32 X 0.375 INCH,PNH STL	83385	OBD
-55	210-1266-00			2		WASHER,FLAT:0.193 ID X 0.475 OD X 0.0075"	86928	5702-79-75
						- - - * - - -		
-56	351-0104-03			1		SLIDE SECT,DWR:12.625 L,W/O HARDWARE	06666	C-720-2
						(ATTACHING PARTS)		
-57	212-0004-00			4		SCREW,MACHINE:8-32 X 0.312 INCH,PNH STL	83385	OBD
						- - - * - - -		
	348-0090-00			1		PAD,CUSHIONING:2.03 X 0.69 X0.312	85471	OBD
	----- -----			-		(651A,651A-1,652A,652A-1,655A,655A-1 ONLY)		
-58	426-0751-01			2		FRAME SECT,CAB.:RIGHT AND LEFT	80009	426-0751-01
						(ATTACHING PARTS)		
-59	212-0070-00			2		SCREW,MACHINE:8-32 X 0.312"100 DEG,FLH STL	83385	OBD
-60	212-0023-00			4		SCREW,MACHINE:8-32 X 0.375 INCH,PNH STL	83385	OBD
						- - - * - - -		
-61	386-1963-01			1		SUBPANEL,FRONT:	80009	386-1963-01
-62	136-0456-00			1		LAMPHOLDER ASSY:2 SUBMIN GROOVED BASE	80009	136-0456-00
						(ATTACHING PARTS)		
-63	211-0101-00			2		SCREW,MACHINE:4-40 X 0.25" 100 DEG,FLH STL	83385	OBD
						- - - * - - -		
-64	386-2064-00			1		PLATE,SUPPORT:RIGHT TOP PANEL	80009	386-2064-00
						(ATTACHING PARTS)		
-65	211-0538-00			2		SCREW,MACHINE:6-32 X 0.312"100 DEG,FLH STL	83385	OBD
-66	211-0565-00			2		SCREW,MACHINE:6-32 X 0.250 INCH,TRH STL	83385	OBD
						- - - * - - -		
-67	386-2065-00			1		PLATE,SUPPORT:LEFT TOP PANEL	80009	386-2065-00
						(ATTACHING PARTS)		
-68	211-0538-00			2		SCREW,MACHINE:6-32 X 0.312"100 DEG,FLH STL	83385	OBD
-69	211-0565-00			2		SCREW,MACHINE:6-32 X 0.250 INCH,TRH STL	83385	OBD
						- - - * - - -		

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
1-70	337-1467-01	B010100	B039999	1		SHLD,ELECTRON T:W/YOKE SUPPORT	80009	337-1467-01
	337-1467-03	B040000		1		SHIELD,ELEC:W/SUPPORT	80009	337-1467-03
						(ATTACHING PARTS)		
-71	210-0410-00			4		NUT,PLAIN,HEX.:10-32 X 0.312 INCH,BRS	73743	2X20003-402
-72	210-1061-00			2		WASHER,FLAT:0.203 ID X 0.062 THK,STL CD	12327	OBD
-73	355-0208-02			4		STUD,STEPPED:0.312-18/10-32 THD,0.935 L	80009	355-0208-02
						- - - * - - -		
-74	----- -----			1		COIL,DEGAUSSING:(SEE L7501 EPL)		
-75	131-0621-00			2		. CONNECTOR,TERM:22-26 AWG,BRS& CU BE GOLD	22526	46231
-76	352-0198-00			1		. HLDR,TERM CONN:2 WIRE BLACK	80009	352-0198-00
-77	214-1699-00			1		SPRING,HLEXT:0.188 OD X 4.0" LONG	000AE	V14C
-78	124-0267-00	B010100	B041599	IN		STRIP,TUNING:CORNER CONVERGENCE 10.0"	S0482	X-43024-01
	124-0267-00	B041600		3		STRIP,TUNING:CORNER CONVERGENCE 10.0"	S0482	X-43024-01
	124-0300-00	XB041600		1		STRIP,TUNING:CORNER CONVERGENCE STRIP	0000M	124-0300-00
-79	348-0085-00			1		GROMMET,PLASTIC:U-SHAPED	80009	348-0085-00
-80	----- -----			1		CKT BOARD ASSY:CRT SOCKET(SEE A14 EPL)		
-81	131-0589-00			8		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-82	136-0460-00			1		. SOCKET,PLUG-IN:CRT	S0482	1-526-086
-83	----- -----			1		COIL,DEFL:(SEE L8703,L8709 EPL)		
-84	386-2201-00			1		SPRT,YOKE ADJ:PLASTIC	S0482	4-302-337-01
						(ATTACHING PARTS)		
-85	213-0286-00			2		WINGSCREW:4MM X 15MM LONG	S0482	3-701-104-02
-86	381-0332-00			1		BAR,MOUNTING:YOKE ADJ SUPPORT	S0482	4-302-338-03
-87	212-0110-00			2		SCREW,MACHINE:4MM X 12MM LONG	S0482	3-701-100-01
						- - - * - - -		
-88	----- -----			1		COIL,BEAM ALIGN:(SEE L8703,L8709 EPL)		
	348-0070-01	XB040000		2		PAD,CUSHIONING:0.69 INCH,RUBBER	80009	348-0070-01
-89	119-0329-01			2		MAGNET,PERM:	S0482	1-452-058-11
-90	352-0305-01			1		HOLDER,MAGNET:HMC	0000M	352-0305-01
-91	344-0240-00			1		CLIP,SPR TNSN:FOR MAGNET HOLDER	S0482	OBD
-92	179-1733-00	B010100	B062899	1		WIRING HARNESS,:CRT YOKE	80009	179-1733-00
	----- -----			-		(650A SERIES ONLY)		
	179-1733-02	B062900		1		WIRING HARNESS,:CRT YOKE	80009	179-1733-02
	----- -----			-		(650A SERIES ONLY)		
	179-1733-00	B010100	B020799	1		WIRING HARNESS,:CRT YOKE	80009	179-1733-00
	----- -----			-		(650HR SERIES ONLY)		
	179-1733-02	B020800		1		WIRING HARNESS,:CRT YOKE	80009	179-1733-02
	----- -----			-		(650HR SERIES ONLY)		
-93	131-0621-00			9		. CONNECTOR,TERM:22-26 AWG,BRS& CU BE GOLD	22526	46231
-94	352-0200-04			1		. HLDR,TERM CONN:4 WIRE YELLOW	80009	352-0200-04
	195-0104-00			1		LEAD ASSY,ELEC:CRT CATHODE	80009	195-0104-00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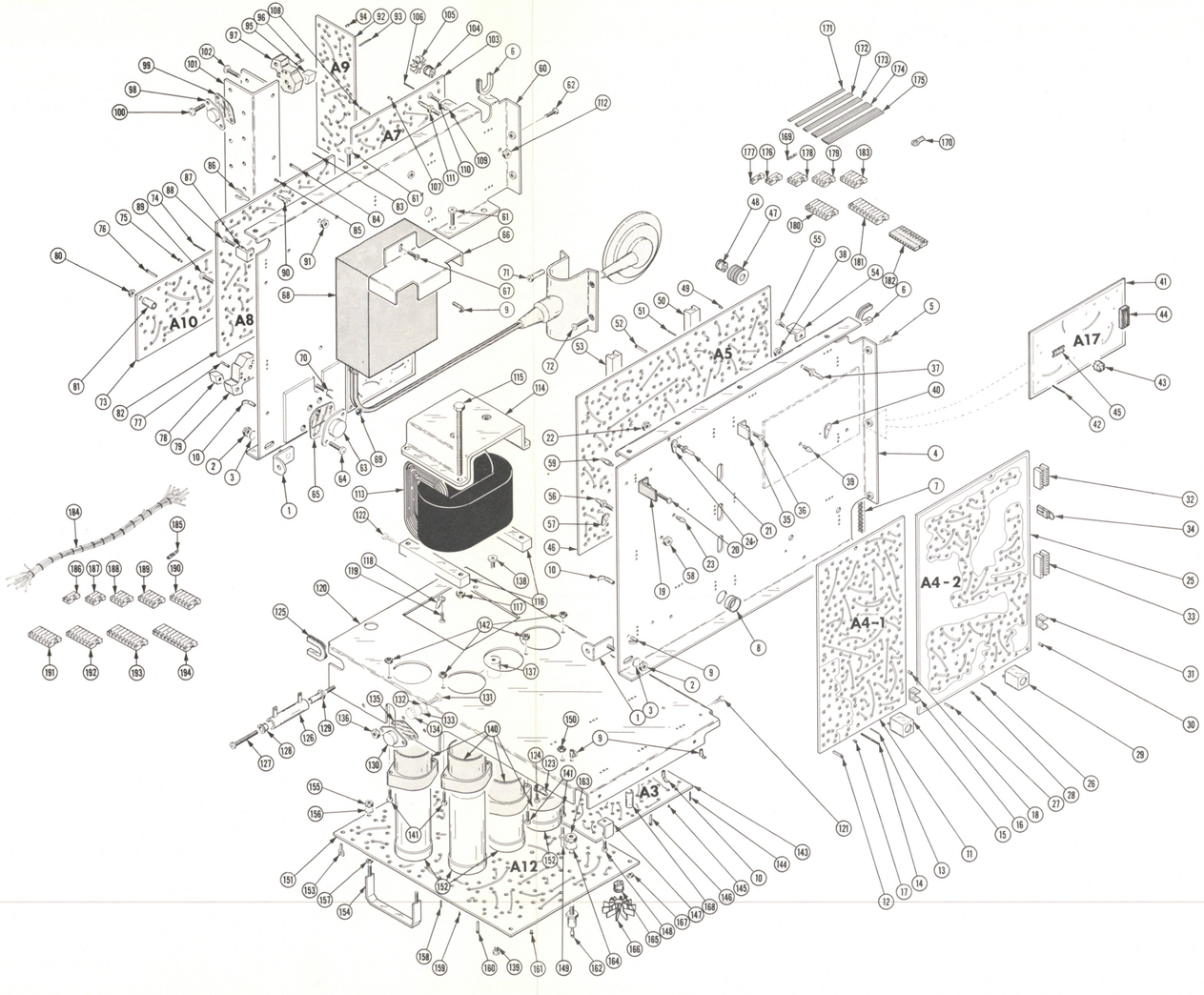
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Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
2-1	407-0983-00	B010100	B039999	2		BRACKET,ANGLE:CRT SHIELD,ALUMINUM	80009	407-0983-00
	407-2045-00	B040000		2		BRACKET,ANGLE:CHAS TO FRONT CASTING,AL	80009	407-2045-00
						(ATTACHING PARTS)		
-2	210-0458-00	B010100	B039999	2		NUT,PL,ASSEM WA:8-32 X 0.344 INCH,STL	78189	511-081800-00
	212-0004-00	B040000		2		SCREW,MACHINE:8-32 X 0.312 INCH,PNH STL	83385	OBD
-3	210-0804-00			2		WASHER,FLAT:0.17 ID X 0.375 INCH OD,STL	12327	OBD
						- - - * - - -		
-4	441-0999-02			1		CHASSIS,TV MON:VIDEO	80009	441-0999-02
						(ATTACHING PARTS)		
-5	211-0565-00			6		SCREW,MACHINE:6-32 X 0.250 INCH,TRH STL	83385	OBD
-6	358-0215-00			5		GROMMET,PLASTIC:U SHAPED	80009	358-0215-00
-7	255-0334-00			FT		PLASTIC CHANNEL:12.75 X 0.175X 0.155,NYL	11897	122-37-2500
-8	348-0063-00			1		GROMMET,PLASTIC:0.50 INCH DIA	80009	348-0063-00
	----- -----			-		(650A-1, 651A-1, 652A-1, 655A-1 ONLY)		
-9	343-0213-00			9		CLAMP,LOOP:PRESS MT,PLASTIC	80009	343-0213-00
-10	343-0089-00			8		CLAMP,LOOP:LARGE	80009	343-0089-00
-11	----- -----			1		CKT BOARD ASSY:NTSC DECODER(SEE A4-1 EPL)		
	----- -----			-		(650A, 650A-1, 655A, 655A-1 ONLY)		
-12	214-0579-00			24		. TERM,TEST POINT:BRS CD PL	80009	214-0579-00
-13	131-0589-00			32		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-14	131-0590-00			2		. CONTACT,ELEC:0.71 INCH LONG	22526	47351
-15	337-1417-00			2		. SHLD,ELECTRICAL:0.55 SQ X 0.685 INCH HIGH	80009	337-1417-00
-16	352-0096-00			1		. CLIP,SPR,TNSN:CRYSTAL	80009	352-0096-00
-17	136-0252-07			201		. SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-18	136-0674-00			2		. SKT,PIN TERM.:FOR 0.048 DIA PIN	00779	1-380758-0
						(ATTACHING PARTS FOR CKT BD)		
-19	344-0132-00			6		CLIP,ELECTRICAL:MOLDED PLSTC	80009	344-0132-00
-20	213-0044-00	B010100	B052398	6		SCR,TPG,THD FOR:5-32 X 0.188 INCH,PNH STL	83385	OBD
	213-0138-00	B052399		6		SCR,TPG,TF:4-24 X 0.188 INCH,PNH STL	83385	OBD
-21	214-2151-00			2		PIN,GUIDE:0.250 HEX,W/4-40 OPP 6-32	80009	214-2151-00
-22	210-0457-00			2		NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL	83385	OBD
						- - - * - - -		
-23	386-1559-00			1		SPACER,CKT BD:0.47 H,ACETAL	80009	386-1559-00
-24	210-0202-00			1		TERMINAL,LUG:0.146 ID,LOCKING,BRZ TINNED	78189	2104-06-00-2520N
-25	----- -----			1		CKT BOARD ASSY:PAL DECODER(SEE A4-2 EPL)		
	----- -----			-		(651A, 651A-1, 655A, 655A-1 ONLY)		
-26	131-0589-00			36		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-27	214-0579-00			19		. TERM,TEST POINT:BRS CD PL	80009	214-0579-00
-28	136-0252-07			248		. SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-29	337-1417-00			2		. SHLD,ELECTRICAL:0.55 SQ X 0.685 INCH HIGH	80009	337-1417-00
-30	136-0674-00			2		. SKT,PIN TERM.:FOR 0.048 DIA PIN	00779	1-380758-0
-31	352-0096-00			1		. CLIP,SPR,TNSN:CRYSTAL	80009	352-0096-00
-32	136-0241-00			3		. SOCKET,PLUG-IN:10 CONTACT,ROUND	71785	133-99-12-064
-33	136-0269-00			2		. SOCKET,PLUG-IN:14 CONTACT,LOW CLEARANCE	73803	CS9002-14
-34	131-1334-00			2		. BUS CONDUCTOR:	80009	131-1334-00
						(ATTACHING PARTS)		
-35	344-0133-00			6		CLIP,SPR,TNSN:CIRCUIT CARD MOUNTING	80009	344-0133-00
-36	213-0044-00	B010100	B052398	6		SCR,TPG,THD FOR:5-32 X 0.188 INCH,PNH STL	83385	OBD
	213-0138-00	B052399		6		SCR,TPG,TF:4-24 X 0.188 INCH,PNH STL	83385	OBD
-37	214-1621-00			2		PIN,GUIDE:0.74 INCH LONG	80009	214-1621-00
-38	210-0457-00			2		NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL	83385	OBD
-39	386-1558-00			1		SPACER,CKT BD:0.335 H,ACETAL	80009	386-1558-00
						- - - * - - -		
-40	210-0202-00			1		TERMINAL,LUG:0.146 ID,LOCKING,BRZ TINNED	78189	2104-06-00-2520N
	----- -----			1		CKT BOARD ASSY:PAL DECODER(SEE A4-2 EPL)		
	----- -----			-		(652A, 652-1 ONLY)		
	131-0589-00			36		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
	136-0674-00			2		. SKT,PIN TERM.:FOR 0.048 DIA PIN	00779	1-380758-0
	136-0241-00			3		. SOCKET,PLUG-IN:10 CONTACT,ROUND	71785	133-99-12-064
	136-0252-07			248		. SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
	136-0269-00			2		. SOCKET,PLUG-IN:14 CONTACT,LOW CLEARANCE	73803	CS9002-14
	214-0579-00			19		. TERM,TEST POINT:BRS CD PL	80009	214-0579-00
	337-1417-00			2		. SHLD,ELECTRICAL:0.55 SQ X 0.685 INCH HIGH	80009	337-1417-00

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
2-	352-0096-00			1		. CLIP,SPR,TNSN:CRYSTAL	80009	352-0096-00
						(ATTACHING PARTS FOR CKT BD)		
	344-0132-00			6		CLIP,ELECTRICAL:MOLDED PLSTC	80009	344-0132-00
	213-0044-00	B010100	B052398	6		SCR,TPG,THD FOR:5-32 X 0.188 INCH,PNH STL	83385	OBD
	213-0138-00	B052399		6		SCR,TPG,TF:4-24 X 0.188 INCH,PNH STL	83385	OBD
	214-2151-00			2		PIN,GUIDE:0.250 HEX,W/4-40 OPP 6-32	80009	214-2151-00
	210-0457-00			2		NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL	83385	OBD
						- - - * - - -		
-41	----- -----			1		CKT BOARD ASSY:SINGLE APERATURE(SEE A17 EPL)		
-42	131-0589-00			21		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-43	136-0220-00			5		. SKT,PL-IN ELEK:TRANSISTOR 3 CONTACT,PCB MT	71785	133-23-11-034
-44	136-0260-02			1		. SKT,PL-IN ELEK:MICROCIRCUIT,16 DIP,LOW CLE	71785	133-51-92-008
-45	136-0337-00			1		. SOCKET,PLUG-IN:8 PIN RELAY	80009	136-0337-00
-46	----- -----			1		CKT BOARD ASSY:OUTPUT AMPLIFIER(SEE A5 EPL)		
	195-0464-00			2		. LEAD,ELECTRICAL:22 AWG,4.5 L,O-N	80009	195-0464-00
	352-0197-00			2		. . CONN BODY,PL,EL:1 WIRE BLACK	80009	352-0197-00
-47	214-0668-00			6		. HEAT SINK,ELEC:FOR TO-5	13103	2211B
-48	136-0183-00			6		. SOCKET,PLUG-IN:3 PIN,ROUND	80009	136-0183-00
-49	136-0252-07			243		. SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-50	136-0260-01			1		. SOCKET,PLUG-IN:16 CONTACT,RECT SHAPE	71785	133-51-02-075
-51	131-0589-00	B010100	B062859	55		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
	131-0589-00	B062860		57		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-52	214-0579-00			21		. TERM,TEST POINT:BRS CD PL	80009	214-0579-00
-53	136-0269-00			8		. SOCKET,PLUG-IN:14 CONTACT,LOW CLEARANCE	73803	CS9002-14
						(ATTACHING PARTS FOR CKT BD)		
-54	344-0133-00			6		CLIP,SPR,TNSN:CIRCUIT CARD MOUNTING	80009	344-0133-00
-55	213-0044-00	B010100	B052398	6		SCR,TPG,THD FOR:5-32 X 0.188 INCH,PNH STL	83385	OBD
	213-0138-00	B052399		6		SCR,TPG,TF:4-24 X 0.188 INCH,PNH STL	83385	OBD
-56	214-1621-00			2		PIN,GUIDE:0.74 INCH LONG	80009	214-1621-00
-57	210-0202-00			1		TERMINAL,LUG:0.146 ID,LOCKING,BRZ TINNED	78189	2104-06-00-2520N
-58	210-0457-00			2		NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL	83385	OBD
-59	386-1558-00			2		SPACER,CKT BD:0.335 H,ACETAL	80009	386-1558-00
						- - - * - - -		
-60	441-1000-00	B010100	B041159	1		CHASSIS,TV MON:DEFLECTION	80009	441-1000-00
	441-1000-01	B041160		1		CHASSIS,MON:DEFLECTION	80009	441-1000-01
						(ATTACHING PARTS)		
-61	211-0565-00			5		SCREW,MACHINE:6-32 X 0.250 INCH,TRH STL	83385	OBD
-62	211-0537-00			2		SCREW,MACHINE:6-32 X 0.375 INCH,TRH STL	83385	OBD
						- - - * - - -		
-63	----- -----			2		TRANSISTOR:(SEE Q4050,Q4090 EPL)		
						(ATTACHING PARTS)		
-64	211-0513-00			4		SCREW,MACHINE:6-32 X 0.625 INCH,PNH STL	83385	OBD
-65	386-0978-00			4		INSULATOR,PLATE:TRANSISTOR,MICA	80009	386-0978-00
						- - - * - - -		
-66	407-0982-02			1		BRKT,POWER SPLY:ALUMINUM	80009	407-0982-02
-67	211-0565-00			1		SCREW,MACHINE:6-32 X 0.250 INCH,TRH STL	83385	OBD
						- - - * - - -		
-68	----- -----			1		POWER SUPPLY:EHT(SEE A13 EPL)		
						(ATTACHING PARTS)		
-69	210-0407-00			2		NUT,PLAIN,HEX.:6-32 X 0.25 INCH,BRS	73743	3038-0228-402
-70	166-0037-00			2		SPACER,SLEEVE:0.180ID X 0.250D X 0.56" LG	80009	166-0037-00
-71	220-0413-00			2		NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
-72	211-0017-00			2		SCREW,MACHINE:4-40 X 0.375 INCH,PNH STL	83385	OBD
						- - - * - - -		
-73	----- -----			1		CKT BOARD ASSY:HORIZONTAL OUTPUT(SEE A10 EPL)		
-74	131-0589-00			18		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-75	136-0252-07			25		. SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-76	214-0579-00			3		. TERM,TEST POINT:BRS CD PL	80009	214-0579-00
-77	136-0383-00			4		. SOCKET,PIN TERM:PIN TERMINAL	00779	332353
-78	131-0847-00			4		. TERMINAL STUD:6-32 X 0.435 INCH LONG	80009	131-0847-00
-79	136-0361-00			2		. SPACER,XSTR:	80009	136-0361-00
						(ATTACHING PARTS FOR CKT BD)		
-80	210-0407-00			2		NUT,PLAIN,HEX.:6-32 X 0.25 INCH,BRS	73743	3038-0228-402
-81	166-0034-00			2		SPACER,SLEEVE:0.438" L X 0.18" ID	80009	166-0034-00
						- - - * - - -		

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
2-82	----- -----			1		CKT BOARD ASSY:DEFLECTION(SEE A8 EPL)		
-83	131-0589-00			67		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-84	214-0579-00			8		. TERM,TEST POINT:BRS CD PL	80009	214-0579-00
-85	136-0252-07			152		. SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-86	344-0154-00			2		. CLIP,ELECTRICAL:FUSE,CKT BD MT	80009	344-0154-00
						(ATTACHING PARTS FOR CKT BD)		
-87	344-0133-00			4		CLIP,SPR,TNSN:CIRCUIT CARD MOUNTING	80009	344-0133-00
-88	213-0044-00	B010100	B052398	4		SCR,TPG,THD FOR:5-32 X 0.188 INCH,PNH STL	83385	OBD
	213-0138-00	B052399		4		SCR,TPG,TF:4-24 X 0.188 INCH,PNH STL	83385	OBD
-89	211-0008-00			1		SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
-90	214-1621-00			1		PIN,GUIDE:0.74 INCH LONG	80009	214-1621-00
-91	210-0457-00			1		NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL	83385	OBD
						- - - * - - -		
-92	----- -----			1		CKT BOARD ASSY:DEFLECTION HEAT SINK(SEE A9 EPL)		
-93	131-0589-00			14		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-94	136-0252-04			15		. SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS	22526	75060-007
-95	131-0847-00	B010100	B039999X	10		. TERMINAL STUD:6-32 X 0.435 INCH LONG	80009	131-0847-00
-96	136-0383-00	B010100	B039999X	10		. SOCKET,PIN TERM:PIN TERMINAL	00779	332353
-97	136-0361-00	B010100	B039999	5		. SPACER,XSTR:	80009	136-0361-00
	136-0270-00	B040000		5		. SOCKET,PLUG-IN:XSTR,2 PIN	22753	03-100-0003
-98	----- -----			5		. TRANSISTOR:(SEE Q4720,4730,4750,4770,4790 EPL)		
						(ATTACHING PARTS)		
-99	386-0143-00			5		. INSULATOR,PLATE:TRANSISTOR MICA	02735	DF31A
-100	211-0511-00	B010100	B039999	10		. SCREW,MACHINE:6-32 X 0.500,PNH,STL,CD PL	83385	OBD
	213-0183-00	B040000		10		. SCR,TPG,THD FOR:6-20 X 0.5 TYPE B,PNH,STL	83385	OBD
	210-1221-00	XB040000		10		. WASHER,FLAT:0.157 ID X 0.281 INCH OD BRS	80009	210-1221-00
						- - - * - - -		
-101	214-1649-01	B010100	B039999	1		. HEAT SINK,XSTR:(5)TO-66,AL W/BRKT	80009	214-1649-01
	214-1649-02	B040000		1		. HEAT SINK,XSTR:W/BRACKET	80009	214-1649-02
	136-0683-00	XB040000		3		. SKT,PL-IN ELEK:CONNECTOR,SINGLE	00779	66461-9
	211-0116-00	XB040000		2		. SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH BRS	83385	OBD
						(ATTACHING PARTS)		
-102	211-0565-00			6		SCREW,MACHINE:6-32 X 0.250 INCH,TRH STL	83385	OBD
						- - - * - - -		
-103	----- -----			1		CKT BOARD ASSY:PIN CUSHION(SEE A7 EPL)		
	----- -----			-		. CKT BOARD ASSEMBLY INCLUDES:		
-104	136-0183-00			2		. SOCKET,PLUG-IN:3 PIN,ROUND	80009	136-0183-00
-105	214-1292-00			2		. HEAT SINK,ELEC:TRANSISTOR	05820	205-AB
-106	131-0589-00			20		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-107	136-0252-07			20		. SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-108	214-0579-00			4		. TERM,TEST POINT:BRS CD PL	80009	214-0579-00
						(ATTACHING PARTS FOR CKT BD)		
-109	344-0133-00			4		CLIP,SPR,TNSN:CIRCUIT CARD MOUNTING	80009	344-0133-00
-110	213-0044-00	B010100	B052398	4		SCR,TPG,THD FOR:5-32 X 0.188 INCH,PNH STL	83385	OBD
	213-0138-00	B052399		4		SCR,TPG,TF:4-24 X 0.188 INCH,PNH STL	83385	OBD
-111	214-1621-00			2		PIN,GUIDE:0.74 INCH LONG	80009	214-1621-00
-112	210-0457-00			2		NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL	83385	OBD
						- - - * - - -		
-113	----- -----			1		TRANSFORMER:(SEE T8395 EPL)		
-114	407-0920-01			1		. BRACKET,XFMR:ALUMINUM	80009	407-0920-01
-115	212-0524-00			4		. SCREW,MACHINE:10-32 X 3.250,HEX HD,STL CD	83385	OBD
-116	361-0403-01			2		. SPACER,XFMR:2.9 INCHES LONG	80009	361-0403-01
						(ATTACHING PARTS FOR XFMR)		
-117	220-0410-00			4		NUT,EXTENDED WA:10-32 X 0.375 INCH,STL	83385	OBD
						- - - * - - -		
	337-2492-00	XB040000		1		SHIELD,ELEC:TRANSFORMER	80009	337-2492-00
-118	210-0202-00			1		TERMINAL,LUG:0.146 ID,LOCKING,BRZ TINNED	78189	2104-06-00-2520N
						(ATTACHING PARTS)		
-119	213-0044-00	B010100	B052398	1		SCR,TPG,THD FOR:5-32 X 0.188 INCH,PNH STL	83385	OBD
	213-0138-00	B052399		1		SCR,TPG,TF:4-24 X 0.188 INCH,PNH STL	83385	OBD
						- - - * - - -		
-120	441-1001-00	B010100	B041159	1		CHASSIS,MON:POWER	80009	441-1001-00
	441-1001-01	B041160		1		CHASSIS,MON:POWER	80009	441-1001-01
-121	211-0565-00			3		SCREW,MACHINE:6-32 X 0.250 INCH,TRH STL	83385	OBD
-122	211-0538-00			1		SCREW,MACHINE:6-32 X 0.312"100 DEG,FLH STL	83385	OBD

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
2-123	210-0201-00			2		TERMINAL,LUG:SE #4	86928	A373-157-2
						(ATTACHING PARTS)		
-124	213-0044-00	B010100	B052398	2		SCR,TPG,THD FOR:5-32 X 0.188 INCH,PNH STL	83385	OBD
	213-0138-00	B052399		2		SCR,TPG,TF:4-24 X 0.188 INCH,PNH STL	83385	OBD
						- - - * - - -		
-125	348-0145-00			2		GROMMET,PLASTIC:U-SHP,1.0 X 0.42 INCH	80009	348-0145-00
-126	----- -----			1		RESISTOR:(SEE R4050 EPL)		
						(ATTACHING PARTS)		
-127	211-0553-00			1		SCREW,MACHINE:6-32 X 1.5 INCH,PNH STL	83385	OBD
-128	210-0601-00			1		EYELET,METALLIC:CAD PLATED	18680	A424
-129	210-0478-00			1		INSERT,SCR THD:0.66" L,W/HEX FLG ONE END	80009	210-0478-00
						- - - * - - -		
-130	----- -----			1		TRANSISTOR:(SEE Q8682 EPL)		
						(ATTACHING PARTS)		
-131	211-0510-00			2		SCREW,MACHINE:6-32 X 0.375 INCH,PNH STL	83385	OBD
-132	210-0202-00			1		TERMINAL,LUG:0.146 ID,LOCKING,BRZ TINNED	78189	2104-06-00-2520N
-133	210-0803-00			1		WASHER,FLAT:0.15 ID X 0.032 THK,STL CD PL	12327	OBD
-134	210-0967-00			2		WSHR,SHOULDERED:0.157 ID X 0.375 INCH OD	80009	210-0967-00
-135	386-0143-00			1		INSULATOR,PLATE:TRANSISTOR MICA	02735	DF31A
-136	210-0457-00			2		NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL	83385	OBD
						- - - * - - -		
-137	361-0431-00			3		SPACER,SLEEVE:6-32 X 0.50 ODX0.73 INCH L	80009	361-0431-00
						(ATTACHING PARTS)		
-138	211-0542-00			3		SCREW,MACHINE:6-32 X 0.312 INCH,TRH STL	83385	OBD
-139	211-0511-00			3		SCREW,MACHINE:6-32 X 0.500,PNH,STL,CD PL	83385	OBD
						- - - * - - -		
-140	432-0048-02			4		BASE,CAP. MTG:1.365 H,PLASTIC	80009	432-0048-02
						(ATTACHING PARTS)		
-141	211-0016-00			8		SCREW,MACHINE:4-40 X 0.625 INCH,PNH STL	83385	OBD
-142	210-0551-00			8		NUT,PLAIN,HEX.:4-40 X 0.25 INCH,STL	83385	OBD
						- - - * - - -		
-143	----- -----			1		CKT BOARD ASSY:RGB INPUT(SEE A3 EPL)		
	----- -----			-		(650A-1, 651A-1, 652A-1, 655A-1 ONLY)		
-144	131-0589-00			5		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-145	136-0252-07			5		. SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-146	214-0579-00			5		. TERM,TEST POINT:BRS CD PL	80009	214-0579-00
						(ATTACHING PARTS FOR CKT BD)		
-147	344-0133-00			6		CLIP,SPR,TNSN:CIRCUIT CARD MOUNTING	80009	344-0133-00
-148	213-0044-00	B010100	B052398	6		SCR,TPG,THD FOR:5-32 X 0.188 INCH,PNH STL	83385	OBD
	213-0138-00	B052399		6		SCR,TPG,TF:4-24 X 0.188 INCH,PNH STL	83385	OBD
-149	214-1621-00			2		PIN,GUIDE:0.74 INCH LONG	80009	214-1621-00
-150	210-0457-00			2		NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL	83385	OBD
						- - - * - - -		
-151	----- -----			1		CKT BD ASSY:LV AND HV POWER SPLY(SEE A12 EPL)		
-152	----- -----			4		. CAPACITOR:(SEE C8310,C8330,C8360,C8390 EPL)		
-153	344-0154-00			4		. CLIP,ELECTRICAL:FUSE,CKT BD MT	80009	344-0154-00
-154	346-0001-00			1		. BAND,RETAINING:XFMR,0.312 X 4.25,AL	80009	346-0001-00
						(ATTACHING PARTS)		
-155	210-0586-00			2		. NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	83385	211-041800-00
-156	210-0994-00			2		. WASHER,FLAT:0.125 ID X 0.25" OD,STL	86928	5714-147-20N
-157	210-0406-00			2		. NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS	73743	2X12161-402
						- - - * - - -		
-158	131-0589-00			81		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-159	136-0338-00			3		. SOCKET,PIN TERM:U/W 0.026-0.033 DIA PINS	00779	1-332075-5
-160	214-0579-00			34		. TERM,TEST POINT:BRS CD PL	80009	214-0579-00
-161	136-0252-07			66		. SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-162	----- -----			1		. DIODE:(SEE VR8170 EPL)		
						(ATTACHING PARTS)		
-163	220-0410-00			1		. NUT,EXTENDED WA:10-32 X 0.375 INCH,STL	83385	OBD
-164	210-0805-00			1		. WASHER,FLAT:0.204 ID X 0.438 INCH OD,STL	12327	OBD
						- - - * - - -		
-165	136-0183-00			4		. SOCKET,PLUG-IN:3 PIN,ROUND	80009	136-0183-00
-166	214-1254-00	B010100	B039999	4		. HEAT SINK,ELEC:0.422 H X 1.240 INCH OD	05820	209-AB
	214-0668-00	B040000		4		. HEAT SINK,ELEC:FOR TO-5	13103	2211B
						(ATTACHING PARTS FOR CKT BD)		
-167	210-0407-00			4		NUT,PLAIN,HEX.:6-32 X 0.25 INCH,BRS	73743	3038-0228-402
-168	166-0037-00			4		SPACER,SLEEVE:0.180ID X 0.250D X 0.56" LG	80009	166-0037-00
						- - - * - - -		

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
2-169	131-0621-00			80		CONNECTOR,TERM:22-26 AWG,BRS& CU BE GOLD	22526	46231
	----- -----			-		(650A, 651A, 655A ONLY)		
	131-0621-00			68		CONNECTOR,TERM:22-26 AWG,BRS& CU BE GOLD	22526	46231
	----- -----			-		(650A-1, 651A-1, 655A-1 ONLY)		
	131-0621-00			78		CONNECTOR,TERM:22-26 AWG,BRS& CU BE GOLD	22526	46231
	----- -----			-		(651A, 651A-1 ONLY)		
	131-0621-00			76		CONNECTOR,TERM:22-26 AWG,BRS& CU BE GOLD	22526	46231
	----- -----			-		(650A-1, 651A-1, 655A-1 ONLY)		
	131-0622-00			4		CONTACT,ELEC:0.577"L,28-32 AWG WIRE	22526	46241
	----- -----			-		(650A, 651A, 655A ONLY)		
	131-0622-00			7		CONTACT,ELEC:0.577"L,28-32 AWG WIRE	22526	46241
	131-0792-00			4		CONNECTOR,TERM:18-20 AWG,CU BE GOLD PL	22526	46221
	----- -----			-		(650A, 651A, 655A ONLY)		
	131-0792-00			7		CONNECTOR,TERM:18-20 AWG,CU BE GOLD PL	22526	46221
-170	210-0247-00			1		TERMINAL,LUG:SOLDERLESS W/#10 HOLE	59730	C26
-171	175-0825-00			IN		WIRE,ELECTRICAL:2 WIRE RIBBON	80009	175-0825-00
	175-0825-00			IN		WIRE,ELECTRICAL:2 WIRE RIBBON	80009	175-0825-00
-172	175-0826-00			IN		WIRE,ELECTRICAL:3 WIRE RIBBON	80009	175-0826-00
-173	175-0827-00			IN		CABLE,SP,ELEC:4,26 AWG,STRD,PVC JKT,RBN	08261	SS04267(1061)0C
-174	175-0828-00			IN		WIRE,ELECTRICAL:5 WIRE RIBBON	08261	SS-0526-710610C
-175	175-0830-00			IN		WIRE,ELECTRICAL:7 WIRE RIBBON	08261	SS-0726-710610C
-176	352-0198-00			12		HLDR,TERM CONN:2 WIRE BLACK	80009	352-0198-00
	----- -----			-		(650A,650A-1,651A,651A-1,655A,655A-1 ONLY)		
	352-0198-00			14		HLDR,TERM CONN:2 WIRE BLACK	80009	352-0198-00
	----- -----			-		(650A, 651A, 655A ONLY)		
	352-0198-00			15		HLDR,TERM CONN:2 WIRE BLACK	80009	352-0198-00
	----- -----			-		(650A-1, 651A-1, 655A-1 ONLY)		
	352-0198-00			9		HLDR,TERM CONN:2 WIRE BLACK	80009	352-0198-00
	----- -----			-		(650A-1, 651A-1, 655A-1 ONLY)		
-177	352-0197-00			5		CONN BODY,PL,EL:1 WIRE BLACK	80009	352-0197-00
-178	352-0199-00			1		CONN BODY,PL,EL:3 WIRE BLACK	80009	352-0199-00
-179	352-0200-00			2		HLDR,TERM CONN:4 WIRE BLACK	80009	352-0200-00
	----- -----			-		(650A-1, 651A, 651A-1 ONLY)		
	352-0200-00			3		HLDR,TERM CONN:4 WIRE BLACK	80009	352-0200-00
	352-0200-00			4		HLDR,TERM CONN:4 WIRE BLACK	80009	352-0200-00
	352-0200-02			1		CONN BODY,PL EL:4 WIRE RED	80009	352-0200-02
	----- -----			-		(650A, 651A, 651A-1, 655A-1 ONLY)		
	352-0200-02			2		CONN BODY,PL EL:4 WIRE RED	80009	352-0200-02
	352-0200-05			1		CONN BODY,PL,EL:4 WIRE GREEN	80009	352-0200-05
	----- -----			-		(650A, 651A, 651A-1, 655A-1 ONLY)		
	352-0200-05			2		CONN BODY,PL,EL:4 WIRE GREEN	80009	352-0200-05
	352-0200-06			1		CONN BODY,PL,EL:4 WIRE BLUE	80009	352-0200-06
	----- -----			-		(650A, 651A, 651A-1, 655A-1 ONLY)		
	352-0200-06			2		CONN BODY,PL,EL:4 WIRE BLUE	80009	352-0200-06
-180	352-0203-00			2		HLDR,TERM CONN:7 WIRE BLACK	80009	352-0203-00
-181	352-0204-00			1		CONN BODY,PL,EL:8 WIRE BLACK	80009	352-0204-00
-182	352-0206-00			1		HLDR,TERM CONN:10 WIRE BLACK	80009	352-0206-00
	----- -----			-		(650A, 651A, 651A-1, 655A-1 ONLY)		
	352-0206-00			2		HLDR,TERM CONN:10 WIRE BLACK	80009	352-0206-00
	----- -----			-		(651A, 651A-1, 655A, 655A-1 ONLY)		
-183	352-0201-00			4		CONN BODY,PL,EL:5 WIRE BLACK	80009	352-0201-00
-184	179-1728-02	B010100	B019999	1		WIRING HARNESS:DEFLECTION CHASSIS	80009	179-1728-02
	179-1728-03	B020000		1		WIRING HARNESS,:DEFLECTION CHASSIS	80009	179-1728-03
-185	131-0621-00			205		. CONNECTOR,TERM:22-26 AWG,BRS& CU BE GOLD	22526	46231
	131-0622-00	B010100	B019999	20		. CONTACT,ELEC:0.577"L,28-32 AWG WIRE	22526	46241
	131-0622-00	B020000		22		. CONTACT,ELEC:0.577"L,28-32 AWG WIRE	22526	46241
	131-0792-00	B010100	B019999	14		. CONNECTOR,TERM:18-20 AWG,CU BE GOLD PL	22526	46221
	131-0792-00	B020000		15		. CONNECTOR,TERM:18-20 AWG,CU BE GOLD PL	22526	46221
-186	352-0198-00	B010100	B019999	5		. HLDR,TERM CONN:2 WIRE BLACK	80009	352-0198-00
	352-0198-00	B020000		6		. HLDR,TERM CONN:2 WIRE BLACK	80009	352-0198-00
-187	352-0199-00			1		. CONN BODY,PL,EL:3 WIRE BLACK	80009	352-0199-00
-188	352-0200-00			5		. HLDR,TERM CONN:4 WIRE BLACK	80009	352-0200-00
-189	352-0201-00			5		. CONN BODY,PL,EL:5 WIRE BLACK	80009	352-0201-00
	352-0201-04			1		. HLDR,TERM CONN:5 WIRE YELLOW	80009	352-0201-04
	352-0201-05			1		. CONN BODY,PL,EL:5 WIRE GREEN	80009	352-0201-05

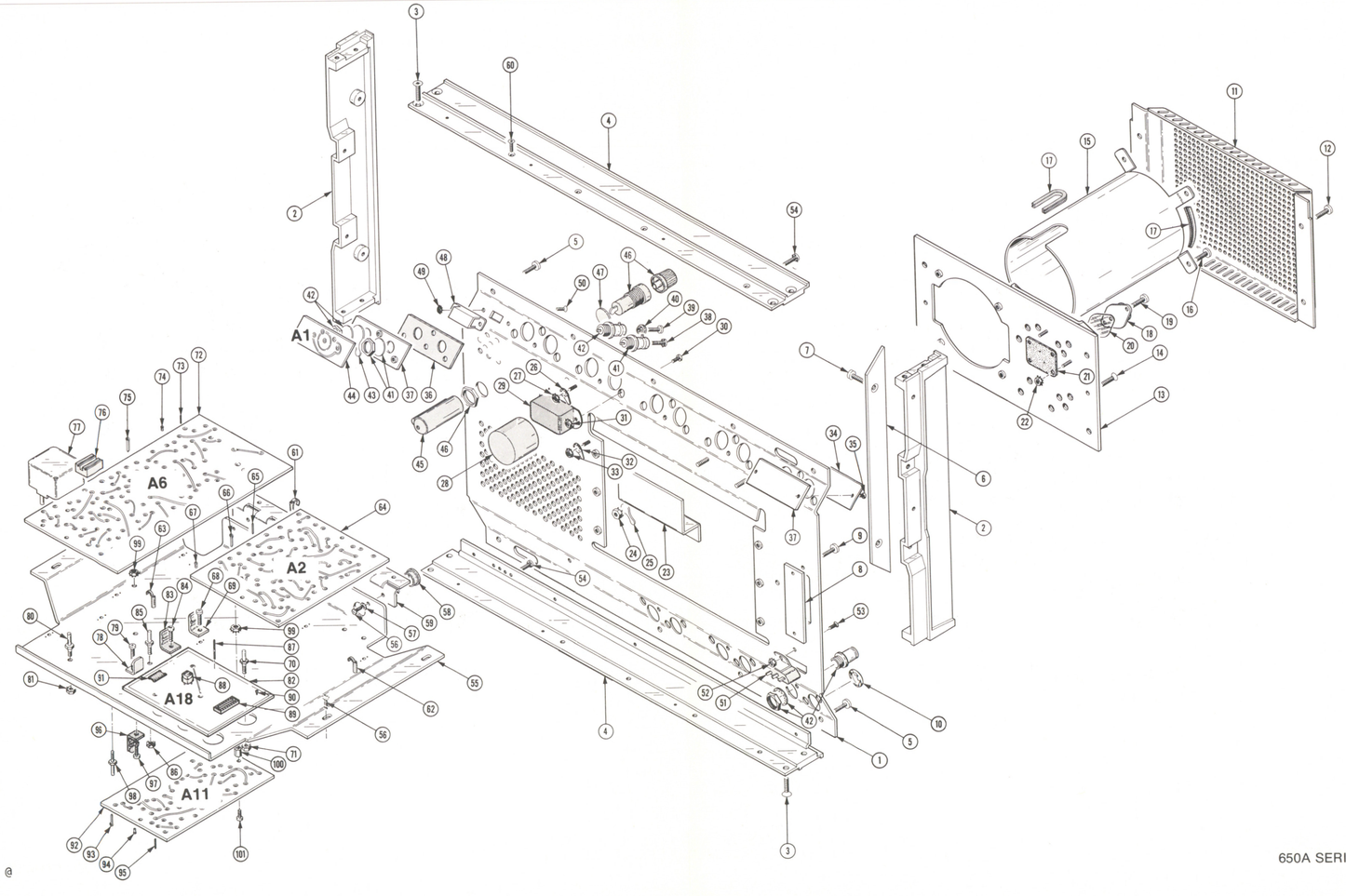
Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
2-	352-0201-06			1		. CONN BODY,PL,EL:5 WIRE BLUE	80009	352-0201-06
-190	352-0202-00			4		. HLDR,TERM CONN:6 WIRE BLACK	80009	352-0202-00
-191	352-0203-00			5		. HLDR,TERM CONN:7 WIRE BLACK	80009	352-0203-00
-192	352-0204-00			3		. CONN BODY,PL,EL:8 WIRE BLACK	80009	352-0204-00
-193	352-0205-00	B010100	B020534X	4		. CONN BODY,PL,EL:9 WIRE BLACK	80009	352-0205-00
	352-0205-04			1		. CONN BODY,PL,EL:9 WIRE YELLOW	80009	352-0205-04
	352-0205-05			1		. HLDR,TERM CONN:9 WIRE GREEN	80009	352-0205-05
	352-0205-06			1		. CONN BODY,PL,EL:9 WIRE BLUE	80009	352-0205-06
-194	352-0206-00	B010100	B019999	3		. HLDR,TERM CONN:10 WIRE BLACK	80009	352-0206-00
	352-0206-00	B020000		1		. HLDR,TERM CONN:10 WIRE BLACK	80009	352-0206-00
	179-1729-01			1		WIRING HARNESS,:AC	80009	179-1729-01
	179-1730-02			1		WIRING HARNESS,:VIDEO CHASSIS	80009	179-1730-02
	131-0621-00			55		. CONNECTOR,TERM:22-26 AWG,BRS& CU BE GOLD	22526	46231
	131-0622-00			6		. CONTACT,ELEC:0.577"L,28-32 AWG WIRE	22526	46241
	131-0792-00			6		. CONNECTOR,TERM:18-20 AWG,CU BE GOLD PL	22526	46221
	352-0198-00			3		. HLDR,TERM CONN:2 WIRE BLACK	80009	352-0198-00
	352-0199-00			1		. CONN BODY,PL,EL:3 WIRE BLACK	80009	352-0199-00
	352-0200-00			2		. HLDR,TERM CONN:4 WIRE BLACK	80009	352-0200-00
	352-0200-01			1		. CONN BODY,PL,EL:4 WIRE BROWN	80009	352-0200-01
	352-0201-00			1		. CONN BODY,PL,EL:5 WIRE BLACK	80009	352-0201-00
	352-0201-02			1		. CONN BODY,PL,EL:5 WIRE RED	80009	352-0201-02
	352-0203-00			1		. HLDR,TERM CONN:7 WIRE BLACK	80009	352-0203-00
	352-0204-00			1		. CONN BODY,PL,EL:8 WIRE BLACK	80009	352-0204-00
	352-0205-00			1		. CONN BODY,PL,EL:9 WIRE BLACK	80009	352-0205-00
	352-0205-01			1		. CONN BODY,PL,EL:9 WIRE BROWN	80009	352-0205-01
	352-0205-02			1		. CONN BODY,PL,EL:9 WIRE RED	80009	352-0205-02
	352-0206-00			1		. HLDR,TERM CONN:10 WIRE BLACK	80009	352-0206-00
	179-1745-00			1		WIRING HARNESS,:OPTION 1	80009	179-1745-00
	131-0621-00			16		. CONNECTOR,TERM:22-26 AWG,BRS& CU BE GOLD	22526	46231
	131-0622-00			4		. CONTACT,ELEC:0.577"L,28-32 AWG WIRE	22526	46241
	131-0792-00			4		. CONNECTOR,TERM:18-20 AWG,CU BE GOLD PL	22526	46221
	352-0198-00			1		. HLDR,TERM CONN:2 WIRE BLACK	80009	352-0198-00
	352-0199-09			1		. HLDR,TERM CONN:3 WIRE WHITE	80009	352-0199-09
	352-0200-00			2		. HLDR,TERM CONN:4 WIRE BLACK	80009	352-0200-00
	352-0200-05			1		. CONN BODY,PL,EL:4 WIRE GREEN	80009	352-0200-05
	352-0202-00			1		. HLDR,TERM CONN:6 WIRE BLACK	80009	352-0202-00
	352-0204-00			1		. CONN BODY,PL,EL:8 WIRE BLACK	80009	352-0204-00
	352-0205-09			1		. HLDR,TERM CONN:9 WIRE WHITE	80009	352-0205-09
	179-1770-01			1		WIRING HARNESS,:VIDEO	80009	179-1770-01
	131-0621-00			55		. CONNECTOR,TERM:22-26 AWG,BRS& CU BE GOLD	22526	46231
	131-0622-00			6		. CONTACT,ELEC:0.577"L,28-32 AWG WIRE	22526	46241
	131-0792-00			6		. CONNECTOR,TERM:18-20 AWG,CU BE GOLD PL	22526	46221
	352-0197-00			5		. CONN BODY,PL,EL:1 WIRE BLACK	80009	352-0197-00
	352-0198-00			2		. HLDR,TERM CONN:2 WIRE BLACK	80009	352-0198-00
	352-0200-00			1		. HLDR,TERM CONN:4 WIRE BLACK	80009	352-0200-00
	352-0200-01			1		. CONN BODY,PL,EL:4 WIRE BROWN	80009	352-0200-01
	352-0201-00			1		. CONN BODY,PL,EL:5 WIRE BLACK	80009	352-0201-00
	352-0203-00			1		. HLDR,TERM CONN:7 WIRE BLACK	80009	352-0203-00
	352-0204-00			1		. CONN BODY,PL,EL:8 WIRE BLACK	80009	352-0204-00
	352-0205-00			1		. CONN BODY,PL,EL:9 WIRE BLACK	80009	352-0205-00
	352-0205-01			1		. CONN BODY,PL,EL:9 WIRE BROWN	80009	352-0205-01
	352-0205-03			1		. CONN BODY,PL,EL:9 WIRE ORANGE	80009	352-0205-03
	352-0206-00			1		. HLDR,TERM CONN:10 WIRE BLACK	80009	352-0206-00
	352-0206-03			1		. HLDR,TERM CONN:10 WIRE ORANGE	80009	352-0206-03
	179-1771-01			1		WIRING HARNESS,:VIDEO	80009	179-1771-01
	131-0621-00			76		. CONNECTOR,TERM:22-26 AWG,BRS& CU BE GOLD	22526	46231
	131-0622-00			8		. CONTACT,ELEC:0.577"L,28-32 AWG WIRE	22526	46241
	131-0792-00			8		. CONNECTOR,TERM:18-20 AWG,CU BE GOLD PL	22526	46221
	352-0197-00			7		. CONN BODY,PL,EL:1 WIRE BLACK	80009	352-0197-00
	352-0198-00			1		. HLDR,TERM CONN:2 WIRE BLACK	80009	352-0198-00
	352-0200-00			2		. HLDR,TERM CONN:4 WIRE BLACK	80009	352-0200-00
	352-0200-01			1		. CONN BODY,PL,EL:4 WIRE BROWN	80009	352-0200-01
	352-0201-00			2		. CONN BODY,PL,EL:5 WIRE BLACK	80009	352-0201-00
	352-0203-00			1		. HLDR,TERM CONN:7 WIRE BLACK	80009	352-0203-00
	352-0204-00			1		. CONN BODY,PL,EL:8 WIRE BLACK	80009	352-0204-00

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
2-	352-0205-00			1	.	CONN BODY,PL,EL:9 WIRE BLACK	80009	352-0205-00
	352-0205-01			1	.	CONN BODY,PL,EL:9 WIRE BROWN	80009	352-0205-01
	352-0205-02			1	.	CONN BODY,PL,EL:9 WIRE RED	80009	352-0205-02
	352-0205-03			1	.	CONN BODY,PL,EL:9 WIRE ORANGE	80009	352-0205-03
	352-0206-00			2	.	HLDR,TERM CONN:10 WIRE BLACK	80009	352-0206-00
	352-0206-03			1	.	HLDR,TERM CONN:10 WIRE ORANGE	80009	352-0206-03

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
3-1	386-1962-01	B010100	B041266	1		PANEL,REAR:	80009	386-1962-01
	386-1962-02	B041267		1		PANEL,REAR:	80009	386-1962-02
	334-2541-00			1		MARKER,IDENT:DHGW STANDARDS	80009	334-2541-00
-2	426-0749-01			2		FR SECT,PLUG-IN:LEFT AND RIGHT	80009	426-0749-01
						(ATTACHING PARTS)		
-3	212-0040-00			8		SCREW,MACHINE:8-32 X 0.375 100 DEG,FLH STL	83385	OBD
						- - - * - - -		
-4	426-0750-00			2		FR SECT,PLUG-IN:TOP & BOTTOM	80009	426-0750-00
						(ATTACHING PARTS)		
-5	211-0565-00			6		SCREW,MACHINE:6-32 X 0.250 INCH,TRH STL	83385	OBD
						- - - * - - -		
-6	124-0249-00			2		STRIP,TRIM:REAR FRAME SECTION	80009	124-0249-00
						(ATTACHING PARTS)		
-7	211-0565-00			4		SCREW,MACHINE:6-32 X 0.250 INCH,TRH STL	83385	OBD
						- - - * - - -		
-8	200-0817-01			1		COVER,CONN MTG:2.812 X 0.75 AL	80009	200-0817-01
						(ATTACHING PARTS)		
-9	213-0104-00			2		SCR,TPG,THD FOR:6-20 X 0.375 INCH,TRH STL	83385	OBD
						- - - * - - -		
-10	134-0138-00			12		BUTTON,PLUG:SNAP-IN	77132	SS48172
	134-0138-00			6		BUTTON,PLUG:SNAP-IN	77132	SS48172
-11	337-1631-00			1		SHLD,ELECTRICAL:HEAT SINK	80009	337-1631-00
						(ATTACHING PARTS)		
-12	211-0542-00			4		SCREW,MACHINE:6-32 X 0.312 INCH,TRH STL	83385	OBD
						- - - * - - -		
-13	386-2020-01			1		PLATE,XSTR MTG:W/HEAT SINK	80009	386-2020-01
						(ATTACHING PARTS)		
-14	211-0538-00			2		SCREW,MACHINE:6-32 X 0.312"100 DEG,FLH STL	83385	OBD
						- - - * - - -		
-15	337-1506-00	B010100	B039999	1		SHIELD,CRT:NECK	80009	337-1506-00
	337-2493-01	B040000		1		SHIELD,ELEC:REAR	80009	337-2493-01
						(ATTACHING PARTS)		
-16	211-0565-00			4		SCREW,MACHINE:6-32 X 0.250 INCH,TRH STL	83385	OBD
						- - - * - - -		
-17	252-0562-00			IN		PLASTIC CHANNEL:0.100 X 0.120,POLYETHYLENE	06229	GS2
-18	----- -----			4		TRANSISTOR:(SEE Q8410,Q8420,Q8430,Q8440 EPL)		
						(ATTACHING PARTS)		
-19	213-0183-00			8		SCR,TPG,THD FOR:6-20 X 0.5 TYPE B,PNH,STL	83385	OBD
						- - - * - - -		
-20	386-0978-00			1		INSULATOR,PLATE:TRANSISTOR,MICA	80009	386-0978-00
-21	136-0280-00			4		SOCKET,PLUG-IN:FOR TO-3	97913	LST 2202-2
						(ATTACHING PARTS)		
-22	210-0586-00			8		NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	83385	211-041800-00
						- - - * - - -		
-23	337-1466-00			1		SHLD,ELECTRICAL:VIDEO INPUT	80009	337-1466-00
						(ATTACHING PARTS)		
-24	210-0457-00			2		NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL	83385	OBD
-25	210-0202-00			1		TERMINAL,LUG:0.146 ID,LOCKING,BRZ TINNED	78189	2104-06-00-2520N
						- - - * - - -		
-26	210-0202-00			1		TERMINAL,LUG:0.146 ID,LOCKING,BRZ TINNED	78189	2104-06-00-2520N
						(ATTACHING PARTS)		
-27	210-0457-00			1		NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL	83385	OBD
						- - - * - - -		
-28	200-1681-00			1		CAP.,PROTECTIVE:	80009	200-1681-00
-29	131-1084-00			1		CONNECTOR,RCPT,:3 BLADE,6A,250V	82389	EAC-302
						(ATTACHING PARTS)		
-30	211-0542-00			2		SCREW,MACHINE:6-32 X 0.312 INCH,TRH STL	83385	OBD
-31	210-0457-00			2		NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL	83385	OBD
						- - - * - - -		
-32	210-0202-00			1		TERMINAL,LUG:0.146 ID,LOCKING,BRZ TINNED	78189	2104-06-00-2520N
						(ATTACHING PARTS)		
-33	210-0457-00			1		NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL	83385	OBD
						- - - * - - -		
-34	334-1942-00	B010100	B020679X	1		PLATE,IDENT:MKD OUTPUTS	80009	334-1942-00
						(ATTACHING PARTS)		
-35	211-0033-00	B010100	B020679X	3		SCR,ASSEM WSHR:4-40 X 0.312 PNH,STL,CD PL	83385	OBD
						- - - * - - -		

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
3-36	342-0097-00			4		INSULATOR,PLATE:BNC	93410	OBD
	342-0097-00			7		INSULATOR,PLATE:BNC	93410	OBD
	----- -----			-		(650A-1, 651A-1, 652A-1, 655A-1 ONLY)		
-37	386-2025-00			4		PLATE,CONN MTG:ALUMINUM	80009	386-2025-00
	386-2025-00			7		PLATE,CONN MTG:ALUMINUM	80009	386-2025-00
	----- -----			-		(650A-1, 651A-1, 652A-1, 655A-1 ONLY)		
						(ATTACHING PARTS)		
-38	211-0033-00			8		SCR,ASSEM WSHR:4-40 X 0.312 PNH,STL,CD PL	83385	OBD
-39	211-0071-00			12		SCREW,MACHINE:4-40 X 0.375 INCH,TRH,STL	83385	OBD
-40	210-1140-00			21		WSHR,SHOULDERED:0.115 ID X 0.375 INCH OD	80009	210-1140-00
						- - - * - - -		
-41	131-0955-00			10		CONNECTOR,RCPT,:CKT BD,28/56 CONTACT	13511	31-279
-42	131-0955-00			16		CONNECTOR,RCPT,:CKT BD,28/56 CONTACT	13511	31-279
	----- -----			-		(650A-1, 651A-1, 652A-1, 655A-1 ONLY)		
	----- -----			-		(650A-1, 651A-1, 652A-2, 655A-1 ONLY)		
-43	210-0255-00			4		TERMINAL,LUG:0.391" ID INT TOOTH	80009	210-0255-00
	210-0255-00			7		TERMINAL,LUG:0.391" ID INT TOOTH	80009	210-0255-00
	----- -----			-		(650A-1, 651A-1, 652A-1, 655A-1 ONLY)		
-44	----- -----			4		CKT BOARD ASSY:INPUT LOOP THRU(SEE A1 EPL)		
	----- -----			-		(650A, 651A,652A, 655A ONLY)		
	----- -----			7		CKT BOARD ASSY:INPUT LOOP THRU(SEE A1 EPL)		
	----- -----			-		(650A-1, 651A-1, 652A-1, 655A-1 ONLY)		
-45	200-0237-03	B010100	B041698	1		COVER,FUSE HLDR:	80009	200-0237-03
	----- -----			-		(650A ,650A-1,651A,651A-1,652A,652-1,655A,655A-1)		
	200-0237-04	B041699		1		COVER,FUSE HLDR:PLASTIC	80009	200-0237-04
	----- -----			-		(650A ,650A-1,651A,651A-1,652A,652-1,655A,655A-1)		
	200-0237-03	B010100	B020142	1		COVER,FUSE HLDR:	80009	200-0237-03
	----- -----			-		(650HR ,650HR-1,651HR,651HR-1,655HR,655HR-1)		
	200-0237-04	B020143		1		COVER,FUSE HLDR:PLASTIC	80009	200-0237-04
	----- -----			-		(650HR ,650HR-1,651HR,651HR-1,655HR,655HR-1)		
-46	352-0076-00	B010100	B051969	1		FUSEHOLDER:W/HARDWARE	75915	342012-L
	204-0833-00	XB051970		1		BODY,FUSEHOLDER:3AG & 5 X 20MM FUSES	S3629	031.1653(MDLFEU)
	200-2264-00	XB051970		1		CAP.,FUSEHOLDER:3AG FUSES	S3629	031.1666(MDLFEU)
	210-1039-00	XB051970		1		WASHER,LOCK:INT,0.521 ID X 0.625 INCH OD	24931	OBD
-47	210-0873-00			1		WASHER,NONMETAL:0.5 ID X 0.688 INCH OD,NPRN	70485	OBD
-48	260-0449-00			1		SWITCH,SLIDE:SPDT,0.5A,125VA-DC	82389	11A-1030A
						(ATTACHING PARTS)		
-49	210-0406-00			2		NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS	73743	2X12161-402
-50	211-0101-00			2		SCREW,MACHINE:4-40 X 0.25" 100 DEG,FLH STL	83385	OBD
						- - - * - - -		
-51	136-0473-01			1		CONNECTOR,RCPT,:3 CONTACT,POLARIZED	71785	P303-AB
						(ATTACHING PARTS)		
-52	210-0586-00			2		NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	83385	211-041800-00
-53	211-0214-00			2		SCREW,MACHINE:4-40 X 0.25 INCH,TRH STL	83385	OBD
						- - - * - - -		
-54	211-0033-00			6		SCR,ASSEM WSHR:4-40 X 0.312 PNH,STL,CD PL	83385	OBD
-55	441-1025-02			1		CHASSIS,TV MON:SYNC	80009	441-1025-02
						(ATTACHING PARTS)		
-56	211-0008-00			3		SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
-57	210-0994-00			3		WASHER,FLAT:0.125 ID X 0.25" OD,STL	86928	5714-147-20N
	211-0565-00			4		SCREW,MACHINE:6-32 X 0.250 INCH,TRH STL	83385	OBD
						- - - * - - -		
-58	348-0063-00			2		GROMMET,PLASTIC:0.50 INCH DIA	80009	348-0063-00
-59	214-1632-01			1		HINGE BUTT:7.0" LONG X 1.062" W	80009	214-1632-01
						(ATTACHING PARTS)		
-60	211-0101-00			3		SCREW,MACHINE:4-40 X 0.25" 100 DEG,FLH STL	83385	OBD
						- - - * - - -		
-61	343-0089-00			1		CLAMP,LOOP:LARGE	80009	343-0089-00
-62	343-0089-00			2		CLAMP,LOOP:LARGE	80009	343-0089-00
-63	343-0213-00			2		CLAMP,LOOP:PRESS MT,PLASTIC	80009	343-0213-00
-64	----- -----			1		CKT BOARD ASSY:VIDEO INPUT(SEE A2 EPL)		
-65	131-0589-00			17		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-66	214-0579-00			8		TERM,TEST POINT:BRS CD PL	80009	214-0579-00
-67	136-0252-07			69		SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
						(ATTACHING PARTS FOR CKT BD)		
-68	344-0133-00			4		CLIP,SPR,TNSN:CIRCUIT CARD MOUNTING	80009	344-0133-00
-69	213-0088-00			4		SCR,TPG,THD CTG:4-24 X 0.25 INCH,PNH STL	83385	OBD
-70	214-1621-00			2		PIN,GUIDE:0.74 INCH LONG	80009	214-1621-00
-71	210-0457-00			2		NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL	83385	OBD
						- - - * - - -		

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
3-72	----- -----			1		CKT BOARD ASSY:SYNC AND TIMING(SEE A6 EPL)		
-73	131-0589-00			45		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-74	136-0252-07			172		. SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-75	214-0579-00			4		. TERM,TEST POINT:BRS CD PL	80009	214-0579-00
-76	136-0269-00			6		. SOCKET,PLUG-IN:14 CONTACT,LOW CLEARANCE	73803	CS9002-14
-77	202-0196-01			1		. CAN,ALUMINUM:1.25 X 0.80 X0.02 INCH THK	0000G	OBD
						(ATTACHING PARTS FOR CKT BD)		
-78	344-0133-00			6		CLIP,SPR,TNSN:CIRCUIT CARD MOUNTING	80009	344-0133-00
-79	213-0044-00	B010100	B052398	6		SCR,TPG,THD FOR:5-32 X 0.188 INCH,PNH STL	83385	OBD
	213-0138-00	B052399		6		SCR,TPG,TF:4-24 X 0.188 INCH,PNH STL	83385	OBD
-80	214-1621-00			2		PIN,GUIDE:0.74 INCH LONG	80009	214-1621-00
-81	210-0457-00			2		NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL	83385	OBD
						- - - * - - -		
-82	----- -----			1		CKT BOARD ASSY:DUAL APERATURE(SEE A18 EPL)		
						(ATTACHING PARTS)		
-83	344-0133-00			4		CLIP,SPR,TNSN:CIRCUIT CARD MOUNTING	80009	344-0133-00
-84	213-0044-00	B010100	B052398	4		SCR,TPG,THD FOR:5-32 X 0.188 INCH,PNH STL	83385	OBD
	213-0138-00	B052399		4		SCR,TPG,TF:4-24 X 0.188 INCH,PNH STL	83385	OBD
-85	214-1621-00			2		PIN,GUIDE:0.74 INCH LONG	80009	214-1621-00
-86	210-0457-00			2		NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL	83385	OBD
						- - - * - - -		
-87	131-0589-00			35		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-88	136-0220-00			7		. SKT,PL-IN ELEK:TRANSISTOR 3 CONTACT,PCB MT	71785	133-23-11-034
-89	136-0260-02			1		. SKT,PL-IN ELEK:MICROCIRCUIT,16 DIP,LOW CLE	71785	133-51-92-008
-90	136-0252-00			32		. SOCKET,PIN TERM:0.145 INCH LONG	00779	2-330808-7
-91	136-0337-00			2		SOCKET,PLUG-IN:8 PIN RELAY	80009	136-0337-00
-92	----- -----			1		CKT BOARD ASSY:BLANKING(SEE A11 EPL)		
-93	214-0579-00			8		. TERM,TEST POINT:BRS CD PL	80009	214-0579-00
-94	136-0252-07			55		. SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-95	131-0589-00			27		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
						(ATTACHING PARTS FOR CKT BD)		
-96	344-0133-00			4		CLIP,SPR,TNSN:CIRCUIT CARD MOUNTING	80009	344-0133-00
-97	213-0044-00	B010100	B052398	4		SCR,TPG,THD FOR:5-32 X 0.188 INCH,PNH STL	83385	OBD
	213-0138-00	B052399		4		SCR,TPG,TF:4-24 X 0.188 INCH,PNH STL	83385	OBD
-98	214-1621-00			1		PIN,GUIDE:0.74 INCH LONG	80009	214-1621-00
-99	210-0457-00			2		NUT,PL,ASSEM WA:6-32 X 0.312 INCH,STL	83385	OBD
-100	129-0208-00			1		SPACER,POST:0.312" LONG,6-32 ONE END	80009	129-0208-00
-101	211-0503-00			1		SCREW,MACHINE:6-32 X 0.188 INCH,PNH STL	83385	OBD
						- - - * - - -		
	003-0728-00	XB040000		1		EXTRACTOR:USE ON ANODE	80009	003-0728-00
						(ATTACHING PARTS)		
	213-0088-00			1		SCR,TPG,THD CTG:4-24 X 0.25 INCH,PNH STL	83385	OBD
	210-1001-00			1		WASHER,FLAT:0.119 ID X 0.375" OD,BRS	12360	OBD
						- - - * - - -		


A1
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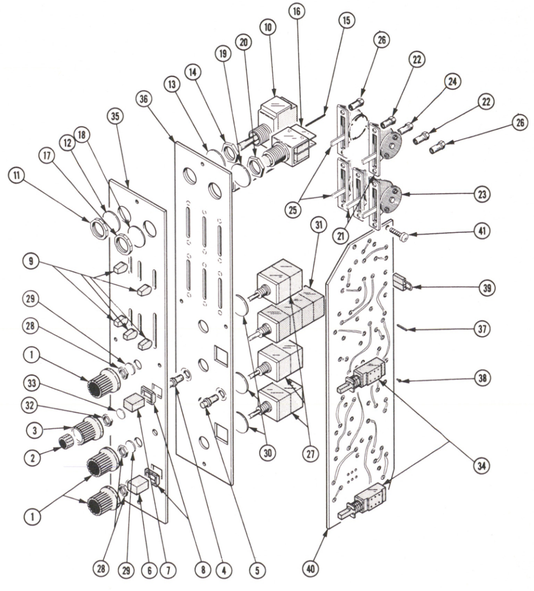
650A



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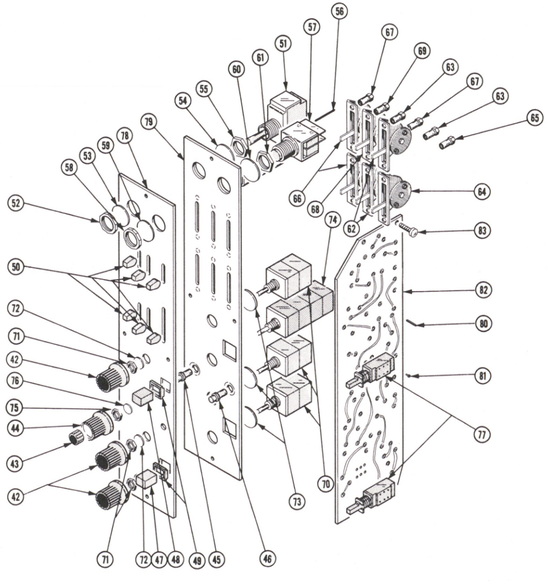

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
4-	614-0578-00			1		FRONT PNL ASSY:(650A)	80009	OBD
-1	366-0497-00			3		. KNOB:GY,0.127 ID X0.706 OD	80009	366-0497-00
	----- -----			-		. . EACH KNOB INCLUDES:		
	213-0153-00			2		. . SETSCREW:5-40 X 0.125,STL BK OXD,HEX	000CY	OBD
-2	366-1023-00			1		. KNOB:GY,0.127 ID X0.392 OD	80009	366-1023-00
	213-0246-00			1		. . SETSCREW:5-40 X 0.093 ITL BK OXD,HEX SKT	71159	OBD
-3	366-1120-00			1		. KNOB:GRAY,0.600 INCH HIGH	80009	366-1120-00
	213-0153-00			1		. . SETSCREW:5-40 X 0.125,STL BK OXD,HEX	000CY	OBD
-4	----- -----			1		. LIGHT,INDICATOR:(SEE DS7561 EPL)		
-5	----- -----			1		. LIGHT,INDICATOR:(SEE DS7661 EPL)		
-6	366-1257-94			1		. PUSH BUTTON:BLUE ONLY	80009	366-1257-94
-7	366-1454-01			1		. PUSH BUTTON:YEL,NTSC TEST	80009	366-1454-01
-8	426-0681-00			2		. FR,PUSH BUTTON:GRAY PLASTIC	80009	426-0681-00
-9	366-0215-02			5		. KNOB:LEVER SWITCH	80009	366-0215-02
-10	260-1060-01			1		. SWITCH,TOGGLE:DPST,15A,125VAC	27193	8906K-2507
						(ATTACHING PARTS)		
-11	210-0473-00			1		. NUT,PLAIN,DODEC:0.469-32 X 0.638 INCH,BRS	80009	210-0473-00
-12	210-0902-00			1		. WASHER,FLAT:0.470 ID X 0.656 INCH OD,STL	12327	OBD
-13	354-0055-00			1		. WASHER,KEY:0.469 ID X 0.688 INCH OD,STL	80009	354-0055-00
-14	210-0414-00			1		. NUT,PLAIN,HEX.:0.468-32 X 0.562 INCH,BRS	73743	3167-402
						- - - * - - -		
-15	131-0787-00			4		. CONTACT,ELEC:0.64 INCH LONG	22526	47359
-16	260-0574-01			1		. SWITCH,PUSH:SPDT,10A,250VAC	80009	260-0574-01
						(ATTACHING PARTS)		
-17	210-0473-00			1		. NUT,PLAIN,DODEC:0.469-32 X 0.638 INCH,BRS	80009	210-0473-00
-18	210-0902-00			1		. WASHER,FLAT:0.470 ID X 0.656 INCH OD,STL	12327	OBD
-19	354-0055-00			1		. WASHER,KEY:0.469 ID X 0.688 INCH OD,STL	80009	354-0055-00
-20	210-0414-00			1		. NUT,PLAIN,HEX.:0.468-32 X 0.562 INCH,BRS	73743	3167-402
						- - - * - - -		
-21	260-0473-00			2		. SWITCH,ROTARY:1 SECTION,2 POSITION	80009	260-0473-00
						(ATTACHING PARTS)		
-22	220-0413-00			4		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-23	260-1337-00			1		. SWITCH,LEVER:1 SECT,4 POSN	80009	260-1337-00
						(ATTACHING PARTS)		
-24	220-0413-00			2		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-25	260-1338-00			2		. SWITCH,LEVER:1 SECT,3 POSN	80009	260-1338-00
						(ATTACHING PARTS)		
-26	220-0413-00			4		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-27	----- -----			3		. RESISTOR,VAR:(SEE R7541,R7571,R7591 EPL)		
						(ATTACHING PARTS)		
-28	210-0583-00			3		. NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS	73743	2X20317-402
-29	210-0940-00			3		. WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL	79807	OBD
-30	210-0807-00			3		. WASHER,FLAT:0.310 ID X 0.630 OD	12327	OBD
						- - - * - - -		
-31	----- -----			1		. RESISTOR,VAR:(SEE R7551 EPL)		
						(ATTACHING PARTS)		
-32	220-0495-00			1		. NUT,PLAIN,HEX.:0.375-32 X 0.438 INCH BRS	73743	OBD
-33	210-0978-00			1		. WASHER,FLAT:0.375 ID X 0.50 INCH OD,STL	78471	OBD
						- - - * - - -		
-34	260-1132-00			2		. SWITCH,PUSH:DPDT,1A,28VDC 1 BUTTON	80009	260-1132-00
-35	333-1438-03			1		. PANEL,FRONT:RIGHT,650A	80009	333-1438-03
-36	386-2003-01			1		. SUBPANEL,FRONT:RIGHT	80009	386-2003-01
-37	131-0589-00			76		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-38	136-0252-07			6		. SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-39	131-1334-00			1		. BUS CONDUCTOR:	80009	131-1334-00
-40	----- -----			1		. CKT BOARD ASSY:RIGHT FRONT PANEL		
						(ATTACHING PARTS)		
-41	211-0008-00			2		. SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
						- - - * - - -		
	614-0587-00			1		FRONT PNL ASSY:(650A-1)	80009	614-0587-00
-42	366-0497-00			3		. KNOB:GY,0.127 ID X0.706 OD	80009	366-0497-00

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
4-	----- -----			-		. . EACH KNOB INCLUDES:		
	213-0153-00			2		. . SETSCREW:5-40 X 0.125,STL BK OXD,HEX	000CY	OBD
-43	366-1023-00			1		. KNOB:GY,0.127 ID X0.392 OD	80009	366-1023-00
	213-0246-00			1		. . SETSCREW:5-40 X 0.093 ITL BK OXD,HEX SKT	71159	OBD
-44	366-1120-00			1		. KNOB:GRAY,0.600 INCH HIGH	80009	366-1120-00
	213-0153-00			1		. SETSCREW:5-40 X 0.125,STL BK OXD,HEX	000CY	OBD
-45	----- -----			1		. LIGHT,INDICATOR:(SEE DS7561 EPL)		
-46	----- -----			1		. LIGHT,INDICATOR:(SEE DS7661 EPL)		
-47	366-1257-94			1		. PUSH BUTTON:BLUE ONLY	80009	366-1257-94
-48	366-1454-01			1		. PUSH BUTTON:YEL,NTSC TEST	80009	366-1454-01
-49	426-0681-00			2		. FR,PUSH BUTTON:GRAY PLASTIC	80009	426-0681-00
-50	366-0215-02			6		. KNOB:LEVER SWITCH	80009	366-0215-02
-51	260-1060-01			1		. SWITCH,TOGGLE:DPST,15A,125VAC	27193	8906K-2507
						(ATTACHING PARTS)		
-52	210-0473-00			1		. NUT,PLAIN,DODEC:0.469-32 X 0.638 INCH,BRS	80009	210-0473-00
-53	210-0902-00			1		. WASHER,FLAT:0.470 ID X 0.656 INCH OD,STL	12327	OBD
-54	354-0055-00			1		. WASHER,KEY:0.469 ID X 0.688 INCH OD,STL	80009	354-0055-00
-55	210-0414-00			1		. NUT,PLAIN,HEX.:0.468-32 X 0.562 INCH,BRS	73743	3167-402
						- - - * - - -		
-56	131-0787-00			4		. CONTACT,ELEC:0.64 INCH LONG	22526	47359
-57	260-0574-01			1		. SWITCH,PUSH:SPDT,10A,250VAC	80009	260-0574-01
						(ATTACHING PARTS)		
-58	210-0473-00			1		. NUT,PLAIN,DODEC:0.469-32 X 0.638 INCH,BRS	80009	210-0473-00
-59	210-0902-00			1		. WASHER,FLAT:0.470 ID X 0.656 INCH OD,STL	12327	OBD
-60	354-0055-00			1		. WASHER,KEY:0.469 ID X 0.688 INCH OD,STL	80009	354-0055-00
-61	210-0414-00			1		. NUT,PLAIN,HEX.:0.468-32 X 0.562 INCH,BRS	73743	3167-402
						- - - * - - -		
-62	260-0473-00			2		. SWITCH,ROTARY:1 SECTION,2 POSITION	80009	260-0473-00
						(ATTACHING PARTS)		
-63	220-0413-00			4		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-64	260-1337-00			1		. SWITCH,LEVER:1 SECT,4 POSN	80009	260-1337-00
						(ATTACHING PARTS)		
-65	220-0413-00			2		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-66	260-1338-00			2		. SWITCH,LEVER:1 SECT,3 POSN	80009	260-1338-00
						(ATTACHING PARTS)		
-67	220-0413-00			4		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-68	260-1339-00			1		. SWITCH,LEVER:1 SECT,2 POSN	80009	260-1339-00
						(ATTACHING PARTS)		
-69	220-0413-00			2		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-70	----- -----			3		. RESISTOR,VAR:(SEE R7541,R7571,R7591 EPL)		
						(ATTACHING PARTS)		
-71	210-0583-00			3		. NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS	73743	2X20317-402
-72	210-0940-00			3		. WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL	79807	OBD
-73	210-0807-00			3		. WASHER,FLAT:0.310 ID X 0.630 OD	12327	OBD
						- - - * - - -		
-74	----- -----			1		. RESISTOR,VAR:(SEE R7551 EPL)		
						(ATTACHING PARTS)		
-75	220-0495-00			1		. NUT,PLAIN,HEX.:0.375-32 X 0.438 INCH BRS	73743	OBD
-76	210-0978-00			1		. WASHER,FLAT:0.375 ID X 0.50 INCH OD,STL	78471	OBD
						- - - * - - -		
-77	260-1132-00			1		. SWITCH,PUSH:DPDT,1A,28VDC 1 BUTTON	80009	260-1132-00
-78	333-1526-03			1		. PANEL,FRONT:RIGHT	80009	333-1526-03
-79	386-2003-01			1		. SUBPANEL,FRONT:RIGHT	80009	386-2003-01
-80	131-0589-00			76		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-81	136-0252-07			3		. SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-82	----- -----			1		. CKT BOARD ASSY:RIGHT FRONT PANEL		
						(ATTACHING PARTS FOR CKT BD)		
-83	211-0008-00			2		. SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
						- - - * - - -		

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
5-	614-0580-00			1		FRONT PNL ASSY:(651A,652A)	80009	614-0580-00
-1	366-0497-00			2		. KNOB:GY,0.127 ID X0.706 OD	80009	366-0497-00
	----- -----			-		. . EACH KNOB INCLUDES:		
	213-0153-00			2		. . SETSCREW:5-40 X 0.125,STL BK OXD,HEX	000CY	OBD
-2	366-1023-00			1		. KNOB:GY,0.127 ID X0.392 OD	80009	366-1023-00
	213-0246-00			1		. . SETSCREW:5-40 X 0.093 ITL BK OXD,HEX SKT	71159	OBD
-3	366-1120-00			1		. KNOB:GRAY,0.600 INCH HIGH	80009	366-1120-00
	213-0153-00			1		. . SETSCREW:5-40 X 0.125,STL BK OXD,HEX	000CY	OBD
-4	----- -----			1		. LIGHT,INDICATOR:(SEE DS7561 EPL)		
-5	----- -----			1		. LIGHT,INDICATOR:(SEE DS7661 EPL)		
-6	366-1257-94			1		. PUSH BUTTON:BLUE ONLY	80009	366-1257-94
-7	426-0681-00			1		. FR,PUSH BUTTON:GRAY PLASTIC	80009	426-0681-00
-8	366-0215-02			6		. KNOB:LEVER SWITCH	80009	366-0215-02
-9	260-1060-01			1		. SWITCH,TOGGLE:DPST,15A,125VAC	27193	8906K-2507
						(ATTACHING PARTS)		
-10	210-0473-00			1		. NUT,PLAIN,DODEC:0.469-32 X 0.638 INCH,BRS	80009	210-0473-00
-11	210-0902-00			1		. WASHER,FLAT:0.470 ID X 0.656 INCH OD,STL	12327	OBD
-12	354-0055-00			1		. WASHER,KEY:0.469 ID X 0.688 INCH OD,STL	80009	354-0055-00
-13	210-0414-00			1		. NUT,PLAIN,HEX.:0.468-32 X 0.562 INCH,BRS	73743	3167-402
						- - - * - - -		
-14	131-0787-00			4		. CONTACT,ELEC:0.64 INCH LONG	22526	47359
-15	260-0574-01			1		. SWITCH,PUSH:SPDT,10A,250VAC	80009	260-0574-01
						(ATTACHING PARTS)		
-16	210-0473-00			1		. NUT,PLAIN,DODEC:0.469-32 X 0.638 INCH,BRS	80009	210-0473-00
-17	210-0902-00			1		. WASHER,FLAT:0.470 ID X 0.656 INCH OD,STL	12327	OBD
-18	354-0055-00			1		. WASHER,KEY:0.469 ID X 0.688 INCH OD,STL	80009	354-0055-00
-19	210-0414-00			1		. NUT,PLAIN,HEX.:0.468-32 X 0.562 INCH,BRS	73743	3167-402
						- - - * - - -		
-20	260-0473-00			3		. SWITCH,ROTARY:1 SECTION,2 POSITION	80009	260-0473-00
						(ATTACHING PARTS)		
-21	220-0413-00			6		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-22	260-1337-00			1		. SWITCH,LEVER:1 SECT,4 POSN	80009	260-1337-00
						(ATTACHING PARTS)		
-23	220-0413-00			2		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-24	260-1338-00			2		. SWITCH,LEVER:1 SECT,3 POSN	80009	260-1338-00
						(ATTACHING PARTS)		
-25	220-0413-00			2		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-26	----- -----			2		. RESISTOR,VAR:(SEE R7541 EPL)		
						(ATTACHING PARTS)		
-27	210-0583-00			2		. NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS	73743	2X20317-402
-28	210-0940-00			2		. WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL	79807	OBD
-29	210-0807-00			2		. WASHER,FLAT:0.310 ID X 0.630 OD	12327	OBD
						- - - * - - -		
-30	----- -----			1		. RESISTOR,VAR:(SEE R7551 EPL)		
						(ATTACHING PARTS)		
-31	220-0495-00			1		. NUT,PLAIN,HEX.:0.375-32 X 0.438 INCH BRS	73743	OBD
-32	210-0978-00			1		. WASHER,FLAT:0.375 ID X 0.50 INCH OD,STL	78471	OBD
						- - - * - - -		
-33	260-1132-00			1		. SWITCH,PUSH:DPDT,1A,28VDC1 BUTTON	80009	260-1132-00
-34	333-1579-03			1		. PANEL,FRONT:RIGHT,651A,652A	80009	333-1579-03
-35	386-2003-01			1		. SUBPANEL,FRONT:RIGHT	80009	386-2003-01
-36	131-0589-00			76		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-37	136-0252-07			3		. SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-38	----- -----			1		. CKT BOARD ASSY:RIGHT FRONT PANEL		
						(ATTACHING PARTS FOR CKT BD)		
-39	211-0008-00			2		. SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
						- - - * - - -		
	614-0589-00			1		FRONT PNL ASSY:(651A-1, 652A-1)	80009	614-0589-00
-40	366-0497-00			2		. KNOB:GY,0.127 ID X0.706 OD	80009	366-0497-00
	----- -----			-		. . EACH KNOB INCLUDES:		
	213-0153-00			2		. . SETSCREW:5-40 X 0.125,STL BK OXD,HEX	000CY	OBD

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
5-41	366-1023-00			1		. KNOB:GY,0.127 ID X0.392 OD	80009	366-1023-00
	213-0246-00			1		. . SETSCREW:5-40 X 0.093 ITL BK OXD,HEX SKT	71159	OBD
-42	366-1120-00			1		. KNOB:GRAY,0.600 INCH HIGH	80009	366-1120-00
	213-0153-00			1		. . SETSCREW:5-40 X 0.125,STL BK OXD,HEX	000CY	OBD
-43	----- -----			1		. LIGHT,INDICATOR:(SEE DS7561 EPL)		
-44	----- -----			1		. LIGHT,INDICATOR:(SEE DS7661 EPL)		
-45	366-1257-94			1		. PUSH BUTTON:BLUE ONLY	80009	366-1257-94
-46	426-0681-00			1		. FR,PUSH BUTTON:GRAY PLASTIC	80009	426-0681-00
-47	366-0215-02			6		. KNOB:LEVER SWITCH	80009	366-0215-02
-48	260-1060-01			1		. SWITCH,TOGGLE:DPST,15A,125VAC	27193	8906K-2507
						(ATTACHING PARTS)		
-49	210-0473-00			1		. NUT,PLAIN,DODEC:0.469-32 X 0.638 INCH,BRS	80009	210-0473-00
-50	210-0902-00			1		. WASHER,FLAT:0.470 ID X 0.656 INCH OD,STL	12327	OBD
-51	354-0055-00			1		. WASHER,KEY:0.469 ID X 0.688 INCH OD,STL	80009	354-0055-00
-52	210-0414-00			1		. NUT,PLAIN,HEX.:0.468-32 X 0.562 INCH,BRS	73743	3167-402
						- - - * - - -		
-53	131-0787-00			4		. CONTACT,ELEC:0.64 INCH LONG	22526	47359
-54	260-0574-01			1		. SWITCH,PUSH:SPDT,10A,250VAC	80009	260-0574-01
						(ATTACHING PARTS)		
-55	210-0473-00			1		. NUT,PLAIN,DODEC:0.469-32 X 0.638 INCH,BRS	80009	210-0473-00
-56	210-0902-00			1		. WASHER,FLAT:0.470 ID X 0.656 INCH OD,STL	12327	OBD
-57	354-0055-00			1		. WASHER,KEY:0.469 ID X 0.688 INCH OD,STL	80009	354-0055-00
-58	210-0414-00			1		. NUT,PLAIN,HEX.:0.468-32 X 0.562 INCH,BRS	73743	3167-402
						- - - * - - -		
-59	260-0473-00			2		. SWITCH,ROTARY:1 SECTION,2 POSITION	80009	260-0473-00
						(ATTACHING PARTS)		
-60	220-0413-00			4		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-61	260-1337-00			1		. SWITCH,LEVER:1 SECT,4 POSN	80009	260-1337-00
						(ATTACHING PARTS)		
-62	220-0413-00			2		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-63	260-1338-00			2		. SWITCH,LEVER:1 SECT,3 POSN	80009	260-1338-00
						(ATTACHING PARTS)		
-64	220-0413-00			4		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-65	260-1416-00			1		. SWITCH,LEVER:1 SECT,3 POSN	80009	260-1416-00
						(ATTACHING PARTS)		
-66	220-0413-00			2		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-67	----- -----			2		. RESISTOR,VAR:(SEE R7541,R7591 EPL)		
						(ATTACHING PARTS)		
-68	210-0583-00			2		. NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS	73743	2X20317-402
-69	210-0940-00			2		. WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL	79807	OBD
-70	210-0807-00			2		. WASHER,FLAT:0.310 ID X 0.630 OD	12327	OBD
						- - - * - - -		
-71	----- -----			1		. RESISTOR,VAR:9SEE R7551 EPL)		
						(ATTACHING PARTS)		
-72	220-0495-00			1		. NUT,PLAIN,HEX.:0.375-32 X 0.438 INCH BRS	73743	OBD
-73	210-0978-00			1		. WASHER,FLAT:0.375 ID X 0.50 INCH OD,STL	78471	OBD
						- - - * - - -		
-74	260-1132-00			1		. SWITCH,PUSH:DPDT,1A,28VDC1 BUTTON	80009	260-1132-00
-75	333-1580-03			1		. PANEL,FRONT:RIGHT,651A-1/652A-1	80009	333-1580-03
-76	386-2003-01			1		. SUBPANEL,FRONT:RIGHT	80009	386-2003-01
-77	131-0589-00			76		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-78	136-0252-07			3		. SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-79	----- -----			1		. CKT BOARD ASSY:RIGHT FRONT PANEL		
						(ATTACHING PARTS FOR CKT BD)		
-80	211-0008-00			2		. SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
						- - - * - - -		

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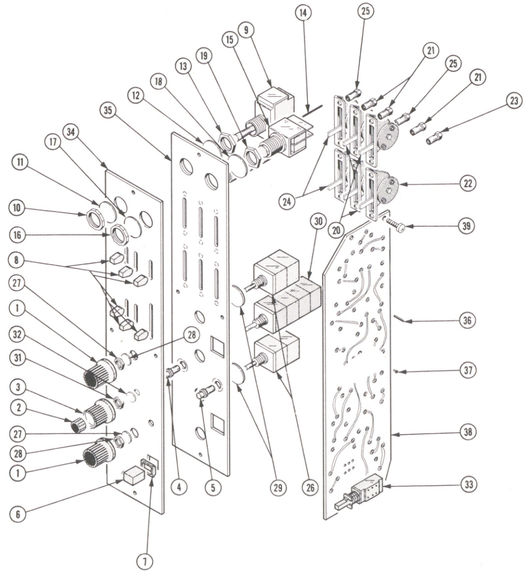

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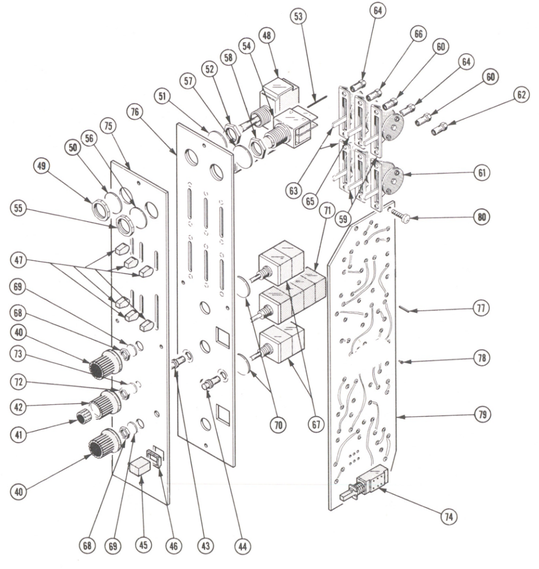

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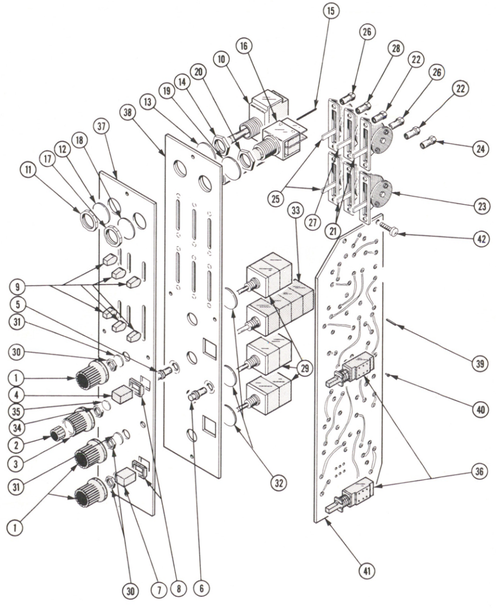
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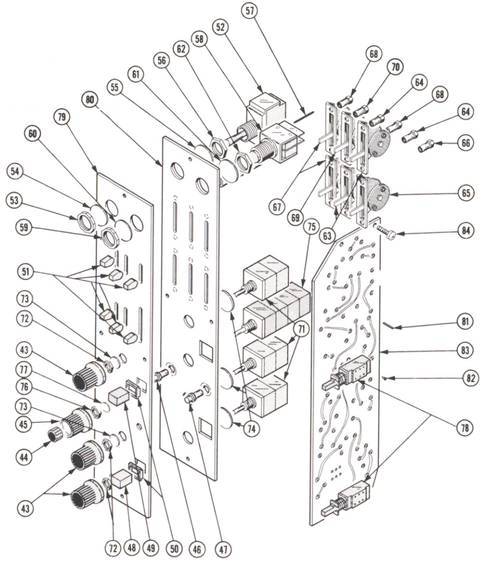
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Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
6-	614-0583-00			1		. FRONT PNL ASSY:(655A)	80009	614-0583-00
-1	366-0497-00			3		. KNOB:GY,0.127 ID X0.706 OD	80009	366-0497-00
	----- -----			-		. . EACH KNOB INCLUDES:		
	213-0153-00			2		. . SETSCREW:5-40 X 0.125,STL BK OXD,HEX	000CY	OBD
-2	366-1023-00			1		. KNOB:GY,0.127 ID X0.392 OD	80009	366-1023-00
	213-0246-00			1		. . SETSCREW:5-40 X 0.093 ITL BK OXD,HEX SKT	71159	OBD
-3	366-1120-00			1		. KNOB:GRAY,0.600 INCH HIGH	80009	366-1120-00
	213-0153-00			1		. . SETSCREW:5-40 X 0.125,STL BK OXD,HEX	000CY	OBD
-4	366-1454-01			1		. PUSH BUTTON:YEL,NTSC TEST	80009	366-1454-01
-5	----- -----			1		. LIGHT,INDICATOR:(SEE DS7561 EPL)		
-6	----- -----			1		. LIGHT,INDICATOR:(SEE DS7661 EPL)		
-7	366-1257-94			1		. PUSH BUTTON:BLUE ONLY	80009	366-1257-94
-8	426-0681-00			2		. FR,PUSH BUTTON:GRAY PLASTIC	80009	426-0681-00
-9	366-0215-02			6		. KNOB:LEVER SWITCH	80009	366-0215-02
-10	260-1060-01			1		. SWITCH,TOGGLE:DPST,15A,125VAC	27193	8906K-2507
						(ATTACHING PARTS)		
-11	210-0473-00			1		. NUT,PLAIN,DODEC:0.469-32 X 0.638 INCH,BRS	80009	210-0473-00
-12	210-0902-00			1		. WASHER,FLAT:0.470 ID X 0.656 INCH OD,STL	12327	OBD
-13	354-0055-00			1		. WASHER,KEY:0.469 ID X 0.688 INCH OD,STL	80009	354-0055-00
-14	210-0414-00			1		. NUT,PLAIN,HEX.:0.468-32 X 0.562 INCH,BRS	73743	3167-402
						- - - * - - -		
-15	131-0787-00			4		. CONTACT,ELEC:0.64 INCH LONG	22526	47359
-16	260-0574-01			1		. SWITCH,PUSH:SPDT,10A,250VAC	80009	260-0574-01
						(ATTACHING PARTS)		
-17	210-0473-00			1		. NUT,PLAIN,DODEC:0.469-32 X 0.638 INCH,BRS	80009	210-0473-00
-18	210-0902-00			1		. WASHER,FLAT:0.470 ID X 0.656 INCH OD,STL	12327	OBD
-19	354-0055-00			1		. WASHER,KEY:0.469 ID X 0.688 INCH OD,STL	80009	354-0055-00
-20	210-0414-00			1		. NUT,PLAIN,HEX.:0.468-32 X 0.562 INCH,BRS	73743	3167-402
						- - - * - - -		
-21	260-0473-00			2		. SWITCH,ROTARY:1 SECTION,2 POSITION	80009	260-0473-00
						(ATTACHING PARTS)		
-22	220-0413-00			4		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-23	260-1337-00			1		. SWITCH,LEVER:1 SECT,4 POSN	80009	260-1337-00
						(ATTACHING PARTS)		
-24	220-0413-00			2		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-25	260-1338-00			2		. SWITCH,LEVER:1 SECT,3 POSN	80009	260-1338-00
						(ATTACHING PARTS)		
-26	220-0413-00			4		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-27	260-1415-00			1		. SWITCH,LEVER:1 SECT,3 POSN	80009	260-1415-00
						(ATTACHING PARTS)		
-28	220-0413-00			2		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-29	----- -----			3		. RESISTOR,VAR:(SEE R7541,R7571,R7591 EPL)		
						(ATTACHING PARTS FOE EACH)		
-30	210-0583-00			3		. NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS	73743	2X20317-402
-31	210-0940-00			3		. WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL	79807	OBD
-32	210-0807-00			3		. WASHER,FLAT:0.310 ID X 0.630 OD	12327	OBD
						- - - * - - -		
-33	----- -----			1		. RESISTOR,VAR:(SEE R7551 EPL)		
						(ATTACHING PARTS)		
-34	220-0495-00			1		. NUT,PLAIN,HEX.:0.375-32 X 0.438 INCH BRS	73743	OBD
-35	210-0978-00			1		. WASHER,FLAT:0.375 ID X 0.50 INCH OD,STL	78471	OBD
						- - - * - - -		
-36	260-1132-00			1		. SWITCH,PUSH:DPDT,1A,28VDC1 BUTTON	80009	260-1132-00
-37	333-1581-03			1		. PANEL,FRONT:RIGHT,655A	80009	333-1581-03
-38	386-2003-01			1		. SUBPANEL,FRONT:RIGHT	80009	386-2003-01
-39	131-0589-00			76		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-40	136-0252-07			3		. SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-41	----- -----			1		. CKT BOARD ASSY:RIGHT FRONT PANEL		
						(ATTACHING PARTS)		
-42	211-0008-00			2		. SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
						- - - * - - -		

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
6-	614-0585-00			1		FRONT PNL ASSY:(655A-1)	80009	614-0585-00
-43	366-0497-00			3		. KNOB:GY,0.127 ID X0.706 OD	80009	366-0497-00
	----- -----			-		. . EACH KNOB INCLUDES:		
	213-0153-00			2		. . SETSCREW:5-40 X 0.125,STL BK OXD,HEX	000CY	OBD
-44	366-1023-00			1		. KNOB:GY,0.127 ID X0.392 OD	80009	366-1023-00
	213-0246-00			1		. . SETSCREW:5-40 X 0.093 ITL BK OXD,HEX SKT	71159	OBD
-45	366-1120-00			1		. KNOB:GRAY,0.600 INCH HIGH	80009	366-1120-00
	213-0153-00			1		. . SETSCREW:5-40 X 0.125,STL BK OXD,HEX	000CY	OBD
-46	----- -----			1		. LIGHT,INDICATOR:(SEE DS7561 EPL)		
-47	----- -----			1		. LIGHT,INDICATOR:(SEE DS7661 EPL)		
-48	366-1257-94			1		. PUSH BUTTON:BLUE ONLY	80009	366-1257-94
-49	366-1454-01			1		. PUSH BUTTON:YEL,NTSC TEST	80009	366-1454-01
-50	426-0681-00			2		. FR,PUSH BUTTON:GRAY PLASTIC	80009	426-0681-00
-51	366-0215-02			6		. KNOB:LEVER SWITCH	80009	366-0215-02
-52	260-1060-01			1		. SWITCH,TOGGLE:DPST,15A,125VAC	27193	8906K-2507
						(ATTACHING PARTS)		
-53	210-0473-00			1		. NUT,PLAIN,DODEC:0.469-32 X 0.638 INCH,BRS	80009	210-0473-00
-54	210-0902-00			1		. WASHER,FLAT:0.470 ID X 0.656 INCH OD,STL	12327	OBD
-55	354-0055-00			1		. WASHER,KEY:0.469 ID X 0.688 INCH OD,STL	80009	354-0055-00
-56	210-0414-00			1		. NUT,PLAIN,HEX.:0.468-32 X 0.562 INCH,BRS	73743	3167-402
						- - - * - - -		
-57	131-0787-00			4		. CONTACT,ELEC:0.64 INCH LONG	22526	47359
-58	260-0574-01			1		. SWITCH,PUSH:SPDT,10A,250VAC	80009	260-0574-01
						(ATTACHING PARTS)		
-59	210-0473-00			1		. NUT,PLAIN,DODEC:0.469-32 X 0.638 INCH,BRS	80009	210-0473-00
-60	210-0902-00			1		. WASHER,FLAT:0.470 ID X 0.656 INCH OD,STL	12327	OBD
-61	354-0055-00			1		. WASHER,KEY:0.469 ID X 0.688 INCH OD,STL	80009	354-0055-00
-62	210-0414-00			1		. NUT,PLAIN,HEX.:0.468-32 X 0.562 INCH,BRS	73743	3167-402
						- - - * - - -		
-63	260-0473-00			2		. SWITCH,ROTARY:1 SECTION,2 POSITION	80009	260-0473-00
						(ATTACHING PARTS)		
-64	220-0413-00			4		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-65	260-1337-00			1		. SWITCH,LEVER:1 SECT,4 POSN	80009	260-1337-00
						(ATTACHING PARTS)		
-66	220-0413-00			2		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-67	260-1338-00			2		. SWITCH,LEVER:1 SECT,3 POSN	80009	260-1338-00
						(ATTACHING PARTS)		
-68	220-0413-00			2		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-69	260-1417-00			1		. SWITCH,LEVER:1 SECT,4 POSN	80009	260-1417-00
						(ATTACHING PARTS)		
-70	220-0413-00			2		. NUT,SLEEVE:4-40 X 0.562 INCH LONG	80009	220-0413-00
						- - - * - - -		
-71	----- -----			3		. RESISTOR,VAR:(SEE R7541,R7571,R7591 EPL)		
						(ATTACHING PARTS)		
-72	210-0583-00			3		. NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS	73743	2X20317-402
-73	210-0940-00			3		. WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL	79807	OBD
-74	210-0807-00			3		. WASHER,FLAT:0.310 ID X 0.630 OD	12327	OBD
						- - - * - - -		
-75	----- -----			1		. RESISTOR,VAR:(SEE R7551 EPL)		
						(ATTACHING PARTS)		
-76	220-0495-00			1		. NUT,PLAIN,HEX.:0.375-32 X 0.438 INCH BRS	73743	OBD
-77	210-0978-00			1		. WASHER,FLAT:0.375 ID X 0.50 INCH OD,STL	78471	OBD
						- - - * - - -		
-78	260-1132-00			1		. SWITCH,PUSH:DPDT,1A,28VDC **1 BUTTON**	80009	260-1132-00
-79	333-1582-03			1		. PANEL,FRONT:RIGHT,655-1	80009	333-1582-03
-80	386-2003-01			1		. SUBPANEL,FRONT:RIGHT	80009	386-2003-01
-81	131-0589-00			76		. TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
-82	136-0252-04			3		. SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS	22526	75060-007
-83	----- -----			1		. CKT BOARD ASSY:RIGHT FRONT PANEL		
						(ATTACHING PARTS)		
-84	211-0008-00			2		. SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
						- - - * - - -		

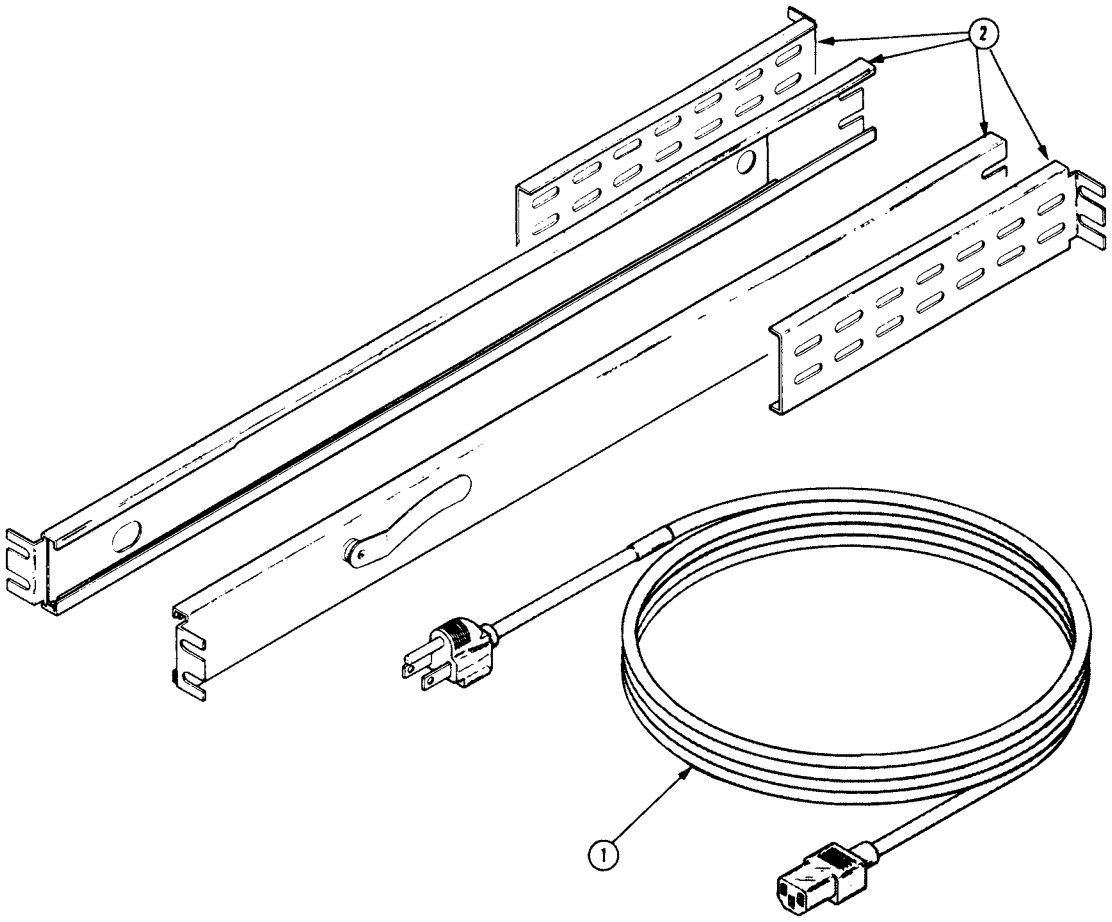

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
-1	161-0066-00			1		CABLE ASSY,PWR,:3 WIRE,98 INCH LONG	80009	161-0066-00
-2	351-0301-03			1		SLIDE,DWR,EXT:W/CLOSED MOUNTING SLOTS	80009	351-0301-03
	348-0080-01			4		FOOT,CABINET:BOTTOM	80009	348-0080-01
	211-0534-00			4		SCR,ASSEM,WSHR:6-32 X 0.312 INCH,PNH STL	83385	OBD
	334-1935-00			1		MKR SET,IDENT:TALLEY	80009	334-1935-00
	070-2234-00			1		MANUAL,TECH:INSTRUCTION	80009	070-2234-00
	----- -----			2		KEY,LOCK,SET:(SEE FIG 1 INDEX #23)		

MANUAL CHANGE INFORMATION

At Tektronix, we continually strive to keep up with latest electronic developments by adding circuit and component improvements to our instruments as soon as they are developed and tested.

Sometimes, due to printing and shipping requirements, we can't get these changes immediately into printed manuals. Hence, your manual may contain new change information on following pages.

A single change may affect several sections. Since the change information sheets are carried in the manual until all changes are permanently entered, some duplication may occur. If no such change pages appear following this page, your manual is correct as printed.

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MANUAL CHANGE INFORMATION

PRODUCT 650A-SERIES
070-2234-00

CHANGE REFERENCE C2/878
DATE 8-31-78 REV.

CHANGE:	DESCRIPTION

TEXT CORRECTIONS

SECTION 3 SPECIFICATION

Page 3-2, left column, CHROMINANCE/LUMINANCE

CHANGE: TIME ERROR to read:

TIME ERROR: Less than 50 nanoseconds.

Page 3-3, left column, CHROMINANCE/LUMINANCE

CHANGE: TIME ERROR to read:

TIME/ERROR: Less than 50 nanoseconds.

SECTION 4 INSTALLATION

Page 4-11, Fig. 4-11

CHANGE: The top cover of the instrument is shown reversed. The cover should be installed with the ventilation area positioned over the top-rear portion of the instrument.

SECTION 5 MAINTENANCE

Page 5-13, Table 5-3, SELECTED COMPONENTS

DELETE: the word "(never)" in the Select column for R1602.

SECTION 6 PERFORMANCE CHECK/CALIBRATION

Page 6-23, OPTIONAL CHECKS (NTSC DECODER), Step 31

CHANGE: part d of step 31 to read as follows:

d. If the delay time for each measurement is not within the delay time described in part c of this step, adjust the R-Y and B-Y Filters on the NTSC Decoder board as described in step 8 of the NTSC Calibration Procedure.

CHANGE:	DESCRIPTION

Page 6-33, Step 6, Adjust A-B Common-Mode Rejection (C1181, C1131, R1131)

CHANGE: R3790 in part b of step 6 to read P3790.

Page 6-39, OPTIONAL CHECKS (PAL Decoder), Step 23

CHANGE: part d of step 23 to read as follows--

d. If the delay time for each measurement is not within the delay time described in part c of this step, adjust the U, V, and Alt V Filters on the PAL Decoder board as described in step 8 of the PAL Calibration Procedure.

SECTION 10 DIAGRAMS & CIRCUIT BOARD ILLUSTRATIONS

CHANGE: CR2639 on A4-1 NTSC Decoder circuit board to read VR2639.

CHANGE: on SYNC & TIMING (HORIZ AFC) ⟨12⟩ diagram the following --

S7520 SCAN switch caption at pin 6 of P1800 should read:

S7520 [SCAN] ⟨20⟩

Leave the caption at pin 7 of P1800 the same except change the diagram reference number to read ⟨17⟩ instead of ⟨15⟩.

CHANGE: on SCAN FAILURE PROTECTION AND DEFLECTION DRIVE ⟨13⟩ diagram the following --

Caption for pin 5 of P4281 should read: VERTICAL GATE TO P6187-2 ⟨15⟩

The waveform reference numbers for TP4450 and TP4233 are reversed. They should be corrected to read as follows:

TP4450 ⟨3⟩ TP4233 ⟨2⟩

CHANGE: on DEFLECTION OUTPUT ⟨14⟩ diagram the following --

Leave the caption at pin 1 of P4260 the same except change the diagram reference number to read ⟨17⟩ instead of ⟨15⟩.

Captions for signals applied to R4558 and R4562 should read the same except change the diagram reference number to read ⟨15⟩ instead of ⟨13⟩.

Leave the caption at pin 2 of P4040 the same except change the diagram reference number to read ⟨17⟩ instead of ⟨15⟩.

MANUAL CHANGE INFORMATION

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Date: 4-10-80 Change Reference: C3/480

Product: 650A SERIES and 650HR SERIES Manual Part No.: see below

DESCRIPTION

650A SERIES (070-2234-00)

650-HR SERIES (070-2646-00)

SCHEMATIC AND ILLUSTRATION CORRECTIONS

DIAGRAM 12 HORIZ AFC - Partial

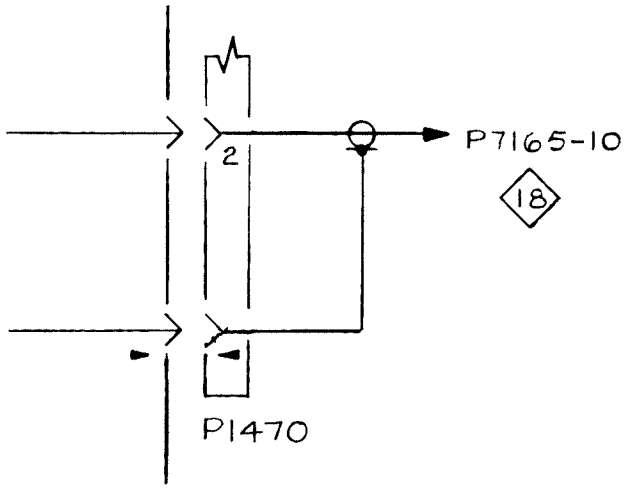
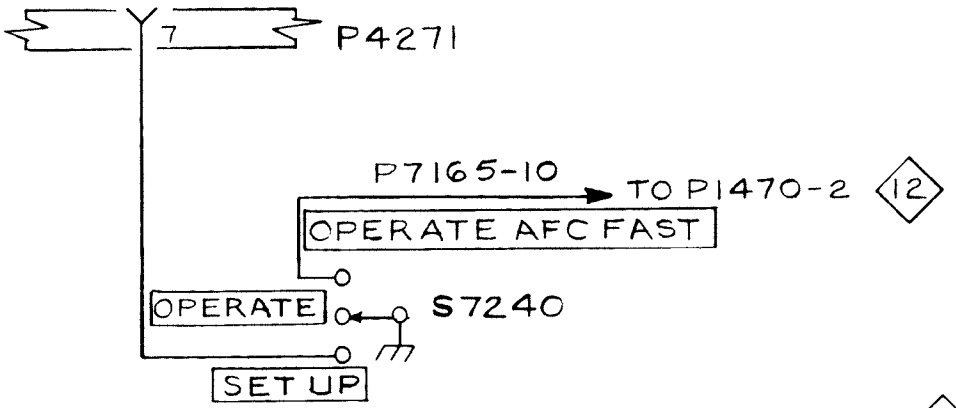
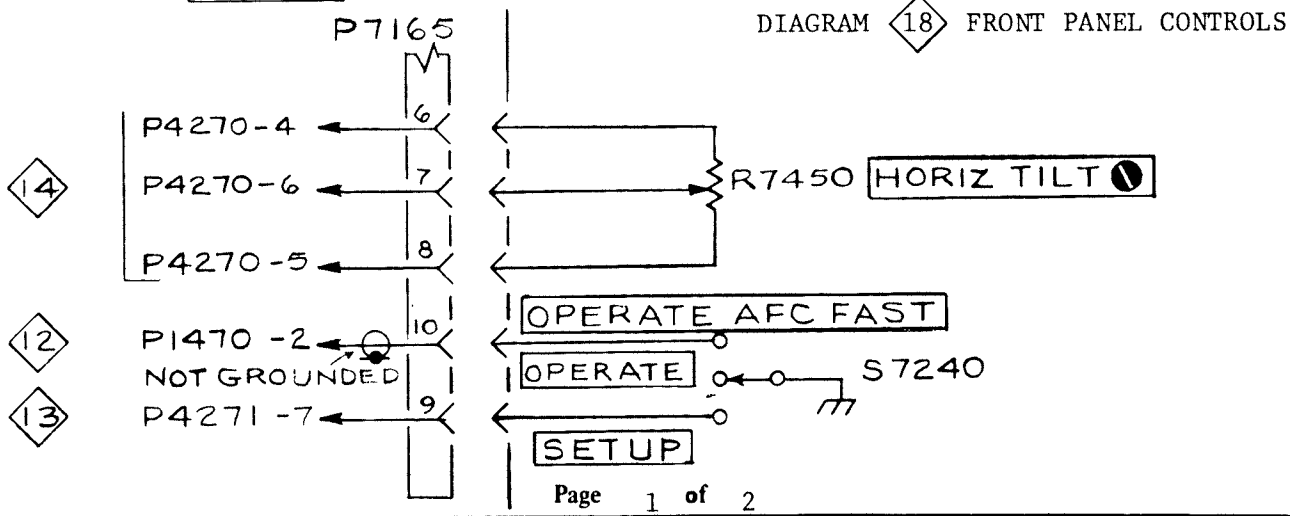


DIAGRAM 13 SCAN FAILURE PROTECTION & DEFLECTION DRIVE - Partial





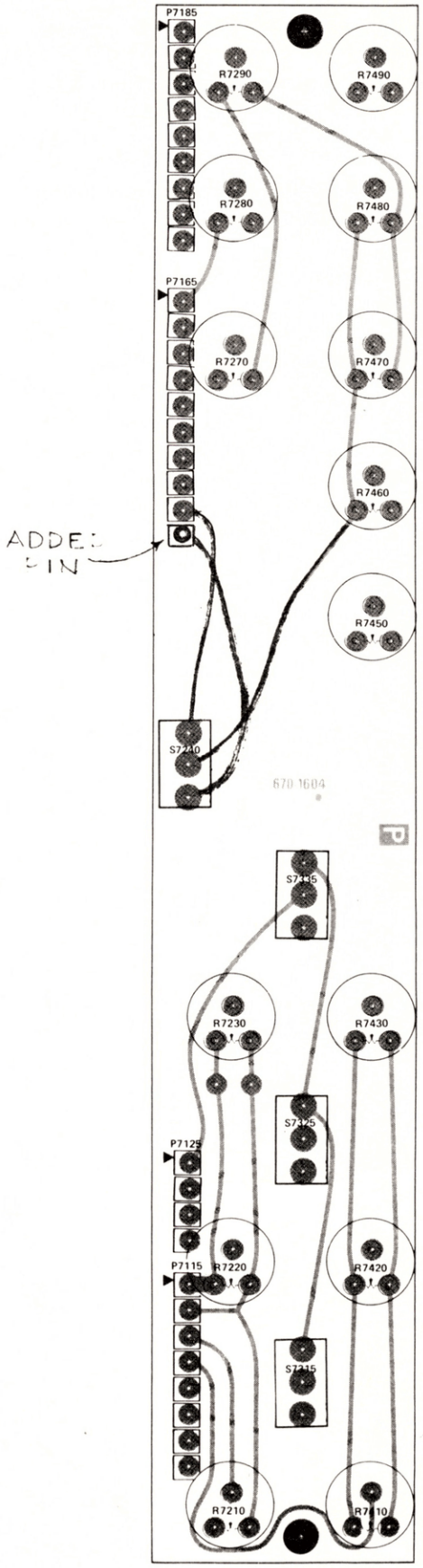
DESCRIPTION

FRONT PANEL BOARDS (back of diagram 17)

A15. LEFT FRONT PANEL CIRCUIT BOARD

Add pin and change runs as shown.

650A Series (FRONT VIEW)



A15. LEFT FRONT PANEL CIRCUIT BOARD

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MANUAL CHANGE INFORMATION

Date: 2-11-81 Change Reference: C100/281

Product: GENERAL Manual Part No.: GENERAL

DESCRIPTION

WARNING

During rackmount installation, interchanging the left and right slide-out track assemblies defeats the extension stop (safety latch) feature of the tracks. Equipment could, when extended, come out of the slides and fall from the rack, possibly causing personal injury and equipment damage.

When mounting the supplied slide-out tracks, inspect both assemblies to find the LH (left hand) and RH (right hand) designations to determine correct placement. Install the LH assembly to your left side as you face the front of the rack and install the RH assembly to your right side. Refer to the rackmounting instructions in this manual for complete information.

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MANUAL CHANGE INFORMATION

Date: 6-10-80 Change Reference: M31985

Product: 650A SERIES AND 653A & 656A Manual Part No.: see below

DESCRIPTION

650A SERIES (070-2234-00)

653A & 656A (070-2337-00)

REPLACEABLE ELECTRICAL PARTS LIST CHANGES

CHANGE TO:

Q1752	151-0225-03	TRANSISTOR:SILICON,NPN
Q1756	151-0225-03	TRANSISTOR:SILICON,NPN
Q2459	151-0434-02	TRANSISTOR:SILICON,PNP (650A, 650A-1, 655A, 655A-1 ONLY)
Q4090	151-0346-01	TRANSISTOR:NPN,SI,A705 FAMILY,TO-3
Q4288	151-0103-02	TRANSISTOR:SILICON,NPN
Q4352	151-0103-02	TRANSISTOR:SILICON,NPN
Q4576	151-1005-02	TRANSISTOR:SILICON,JFE,N-CHANNEL
Q4578	151-1005-02	TRANSISTOR:SILICON,JFE,N-CHANNEL
Q4594	151-1005-02	TRANSISTOR:SILICON,JFE,N-CHANNEL
Q4598	151-1005-02	TRANSISTOR:SILICON,JFE,N-CHANNEL
Q4720	151-0149-01	TRANSISTOR:SILICON,NPN
Q4725	151-0280-01	TRANSISTOR:SILICON,PNP
Q4729	151-0103-01	TRANSISTOR:SILICON,NPN
Q4730	151-0149-01	TRANSISTOR:SILICON,NPN
Q4750	151-0148-02	TRANSISTOR:SILICON,NPN
Q4759	151-0103-01	TRANSISTOR:SILICON,NPN
Q4790	151-0148-02	TRANSISTOR:SILICON,NPN
Q5700	151-1005-02	TRANSISTOR:SILICON,JFE,N-CHANNEL
Q5702	151-1005-02	TRANSISTOR:SILICON,JFE,N-CHANNEL
Q5730	151-1005-02	TRANSISTOR:SILICON,JFE,N-CHANNEL
Q5732	151-1005-02	TRANSISTOR:SILICON,JFE,N-CHANNEL
Q5760	151-1005-02	TRANSISTOR:SILICON,JFE,N-CHANNEL
Q5762	151-1005-02	TRANSISTOR:SILICON,JFE,N-CHANNEL
Q6137	151-0292-01	TRANSISTOR:SILICON,NPN
Q6241	151-0169-01	TRANSISTOR:SILICON,NPN
Q6279	151-0169-01	TRANSISTOR:SILICON,NPN

DESCRIPTION

Q8090	151-0103-02	TRANSISTOR:SILICON,NPN
Q8310	151-0514-01	TRANSISTOR:SILICON,SCR
Q8410	151-0337-01	TRANSISTOR:SILICON,NPN
Q8420	151-0337-01	TRANSISTOR:SILICON,NPN
Q8430	151-0337-01	TRANSISTOR:SILICON,NPN
Q8602	151-0316-01	TRANSISTOR:SILICON,NPN
Q8680	151-0390-01	TRANSISTOR:SILICON,NPN
U1820	156-0032-02	MICROCIRCUIT,DI:4-BIT BINARY COUNTER
U1930	156-0032-02	MICROCIRCUIT,DI:4-BIT BINARY COUNTER
U5000	156-0032-02	MICROCIRCUIT,DI:4-BIT BINARY COUNTER
U5220	156-0048-02	MICROCIRCUIT,LI:FIVE NPN TRANSISTOR ARRAY
U5260	156-0048-02	MICROCIRCUIT,LI:FIVE NPN TRANSISTOR ARRAY
U5340	156-0048-02	MICROCIRCUIT,LI:FIVE NPN TRANSISTOR ARRAY
		(Add to the EPL for the 650A SERIES)
U8240	156-0048-02	MICROCIRCUIT,LI:FIVE NPN TRANSISTOR ARRAY
U8260	156-0071-02	MICROCIRCUIT,LI:VOLTAGE REGULATOR

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MANUAL CHANGE INFORMATION

Date: 8-28-79 Change Reference: M37966 REV.

Product: 650A, 650HR, 653A & 656A, 653HR & 656HR Manual Part No.: see below

DESCRIPTION

650A SERIES (070-2234-00) EFF SN B070000 Revised 10/19/81

650HR SERIES (070-2646-00) EFF SN B030000

653A & 656A (070-2337-00) EFF SN B040000

653HR & 656HR (070-2647-00) EFF SN B030000

ELECTRICAL PARTS LIST AND SCHEMATIC CHANGES

CHANGE TO:

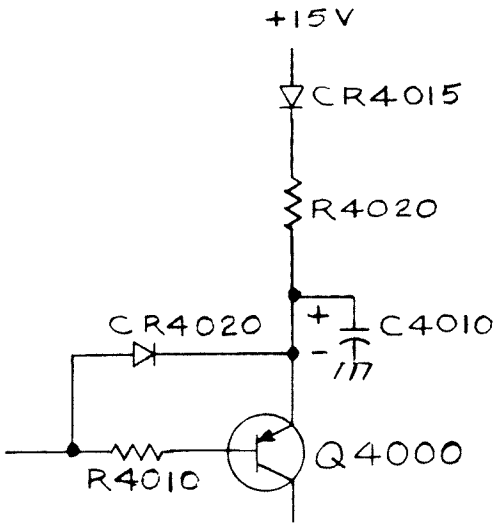
A11	670-1603-04	CKT BOARD ASSY:BLANKING

ADD: (DEFLECTION OUTPUT)

CR4015	152-0107-00	SEMICOND DEVICE:SILICON,400V,400MA,1N647
ADD:	670-6588-00	CKT BOARD ASSY:BLANKING CORRECTION
C6183	283-0067-00	CAP.,FXD,CER DI:1000PF,10%,200V
C6184	290-0745-00	CAP.,FXD,ELCTL:22UF,+50-10%,25V
CR6184	152-0141-02	SEMICOND DEVICE:SILICON,30V,150MA,1N4152
Q6184	151-0444-00	TRANSISTOR:SILICON,NPN,MPSA42
R6184	315-0512-00	RES.,FXD,CMPSN:5.1K OHM,5%,0.25W
R6186	315-0105-00	RES.,FXD,CMPSN:1 M OHM, 5%,0.25W

DIAGRAM 14 DEFLECTION OUTPUT - Partial (650A)

DIAGRAM 16 DEFLECTION OUTPUT - Partial (653A/656A)



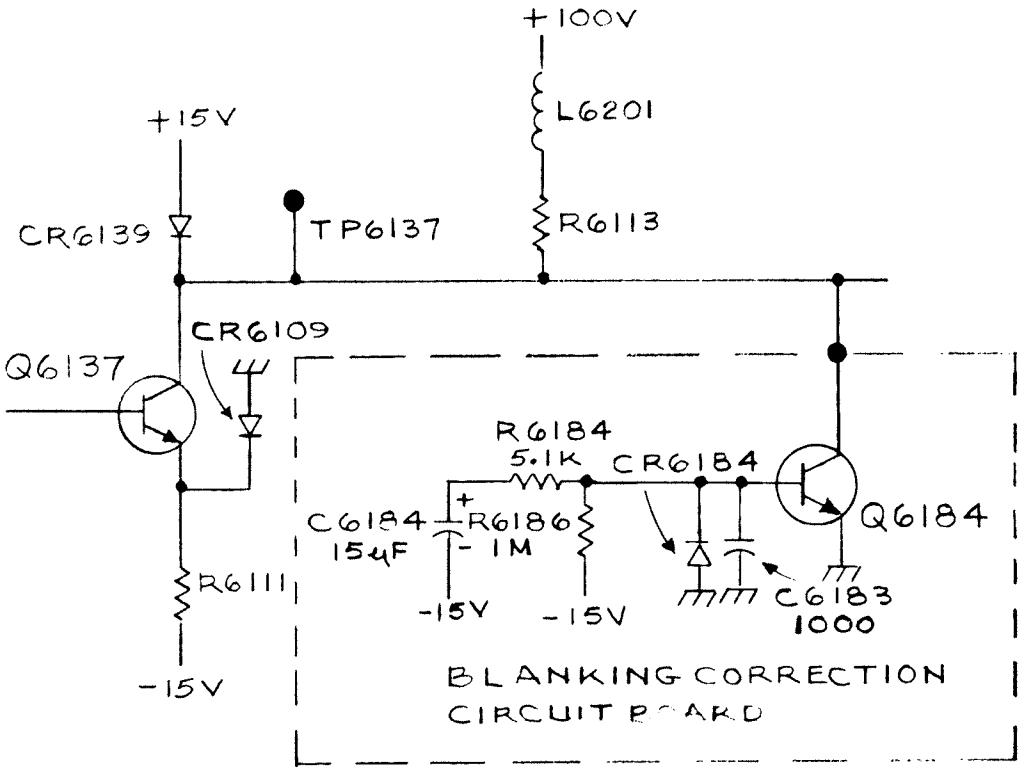
DESCRIPTION

Revised 10/19/81

Schematic Changes

DIAGRAM 15 BLANKING (650A)

DIAGRAM 17 BLANKING (653A/656A)



TEK Product Modification Kit

050-2631-01

Mod No:
M35414, M37917
M37966, M45414, M70912

V8701 REPLACEMENT

FOR THE FOLLOWING INSTRUMENTS:

650A	ALL
653A SERIES	ALL
656A SERIES	ALL

Kinescope 154-0858-00 replaces kinescope 154-0782-00 and 154-0830-00, which are no longer available. Use of the new kinescope requires component and wiring changes.

NOTE

If this kit has previously been installed, disregard the instructions and use pn 154-0858-00 as a direct replacement for V8701.

LATEST PRINT:	10 SEP 1990
SUPERSEDES:	13 FEB 1990
FIRST PRINT:	4 JAN 1990

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For further information, contact: Tektronix, Inc., Corporate Offices, P.O. Box 500, Beaverton, OR 97077. Phone: (503) 627-7111; TLX: 151754; TWX: (910) 467-8708; Cable: TEKWSGT.

Subsidiaries and distributors worldwide.

KIT PARTS LIST:

CKT NO	QUANT.	PART NO.	DESCRIPTION
Q6241	1 EA	151-0708-00	TRANSISTOR, NPN, POWER, 0.1A, 550V
CR4015	1 EA	+ 152-0107-00	SEMICOND DVC, DI:RECT, SI, 400V, 400MA
CR5519 CR5559 CR5579	3 EA	+ 152-0141-02	SEMICOND DVC, DI:SW, SI, 30V, 150MA, DO-35
CR6275 CR6223	2 EA	+ 152-0242-00	SEMICOND DVC, DI:SI, 225V, 0.2A
VR6261	1 EA	+ 152-0286-00	SEMICOND DVC, DI:ZEN, SI, 75V, 5%, 0.4W
VR6273	1 EA	+ 152-0428-00	SEMICOND DVC, DI:ZEN, SI, 120V, 5%, 0.4W
V8701	1 EA	154-0858-00	ELECTRON TUBE
R5900 R5930 R5960	3 EA	315-0100-02	RES, FXD, CMPSN:10 OHM, 5%, 0.25W
R6269	1 EA	315-0563-00	RES, FXD, CMPSN:56K OHM, 5%, 0.25W
R5500 R5530	2 EA	+ 321-0245-00	RES, FILM:3.48K OHM, 1%, 0.125W
R5560	1 EA	+ 321-0236-00	RES, FXD, FILM:2.80K OHM, 1%, 0.125W
R6291	1 EA	+ 321-0362-00	RES, FXD, FILM:57.6K OHM, 1%, 0.125W
R6271 R6274	2 EA	+ 321-0457-00	RES, FXD, FILM:562K OHM, 1%, 0.125W
R6297	1 EA	+ 321-0617-00	RES, FXD, FILM:11K OHM, 1%, 0.125W
A11-1	1 EA	670-6588-00	CKT BD ASSY:BLANKING CORRECTION
	2 EA	195-0464-00	LEAD ELECTRICAL:22AWG, 4.5L, O-N
	1 EA	334-3412-00	MARKER, IDENT:MARKED CAL LEVEL FOR J16
	1 EA	--------	LABEL, IDENT

INSTRUCTIONS:

WARNING

Dangerous shock hazards may be exposed when the instrument covers are removed. Before proceeding, ensure the power switch is in the off position, then disconnect the instrument from the power source. Disassembly should only be attempted by qualified service personnel.

CATHODE-RAY TUBE REPLACEMENT

NOTE

Use care when handling the crt. Protective clothing and safety glasses should be used. Avoid striking it on any object that might cause it to crack or implode. When storing a crt, place it in a protective carton or set it face down in a protected location on a smooth surface with a soft mat under the faceplate.

REMOVAL:

☐ 1. Remove the instrument covers.

☐ 2. Remove the CRT hole cover from the rear panel.

☐ 3. Disconnect the crt-base socket from the rear of the crt.

☐ 4. Loosen the neck-clamp screw.

☐ 5. Disconnect the deflection-plate connectors. Be careful that you do not bend the deflection plate pins or pin connectors.

☑ 6. Disconnect the crt anode lead where it connects to the high voltage connector outside of the crt shield. Ground the crt anode lead to the chassis to "bleed" off any stored charge.

☑ 7. Remove the front-panel bezel mounting nuts. Remove the bezel, rubber washers, filter, external graticule, and the gray plastic graticule-mask.

☑ 8. Hold one hand on the crt faceplate and push on the crt base with the other. As the crt starts moving out of the shield, grasp the crt firmly. If the crt does not budge, loosen the crt-neck positioning screws slightly so the crt can be moved around. Then push on the crt base while moving the base gently from side to side. Guide the anode lead through the hole in the crt shield as the crt is removed.

REPLACEMENT:

☐ 1. Clean the graticule-mask, external graticule, filter, and bezel with a soft, lint-free cloth dampened with mild detergent and water. Dry with a soft, lint-free cloth.

☐ 2. Insert the crt in the shield. Guide the anode lead through the hole in the crt shield.

☑ 3. All instruments except 653A/656A sn above B049999 -- Move the wh-brn-yel wire from terminal #4 of the convergence coil to terminal #3 of the convergence coil (L8705 and L8707).

☐ 4. Align the crt faceplate with the front-panel mask. Keep flush with the mask while tightening the crt-neck clamp and positioning screws. Do not over-tighten neck-clamp screws.

☐ 5. Reinstall the graticule mask, external graticule, filter and bezel.

☑ 6. Reconnect the anode lead and the deflection-plate leads. Be careful not to bend the deflection-plate pins or pin connectors.

☐ 7. Pivot the Sync Chassis away from the mainframe to allow access to the Blanking and Output Amplifier circuit boards.

Make the following changes on the Output Amplifier circuit board (670-1602-02 and below). Refer to fig. 1.

☑ 1. Remove the Output Amplifier circuit board to facilitate component replacement.

☑ 2. To ensure discrete grounding for blue and green output amplifiers, install the two wires (provided in the kit) from the square pins located near R5930 and R5960 (on the Output Amplifier circuit board) to a common ground lug located on one of the circuit board guide pins. NOTE: These wires may have been installed previously.

☑ 3. Replace R5900, R5930 and R5960 (10 ohm) with the 10 ohm resistors provided in the kit. Mount the resistors approximately 1/4 inch above the circuit board.

☐ 4. Add CR5519, provided in the kit, in parallel with CR5520. already done

☐ 5. Add CR5559 in parallel with CR5550. all ready done

☐ 6. Add CR5579 in parallel with CR5580. all ready done

☐ 7. Replace R5500 and R5530 (2.49K ohm) with the two 3.48k ohm resistors provided in the kit.

☐ 8. Replace R5560 (2.00K ohm) with the 2.80k ohm resistor provided in the kit.

☐ 9. Install the Output Amplifier circuit board reversing the removal procedure.

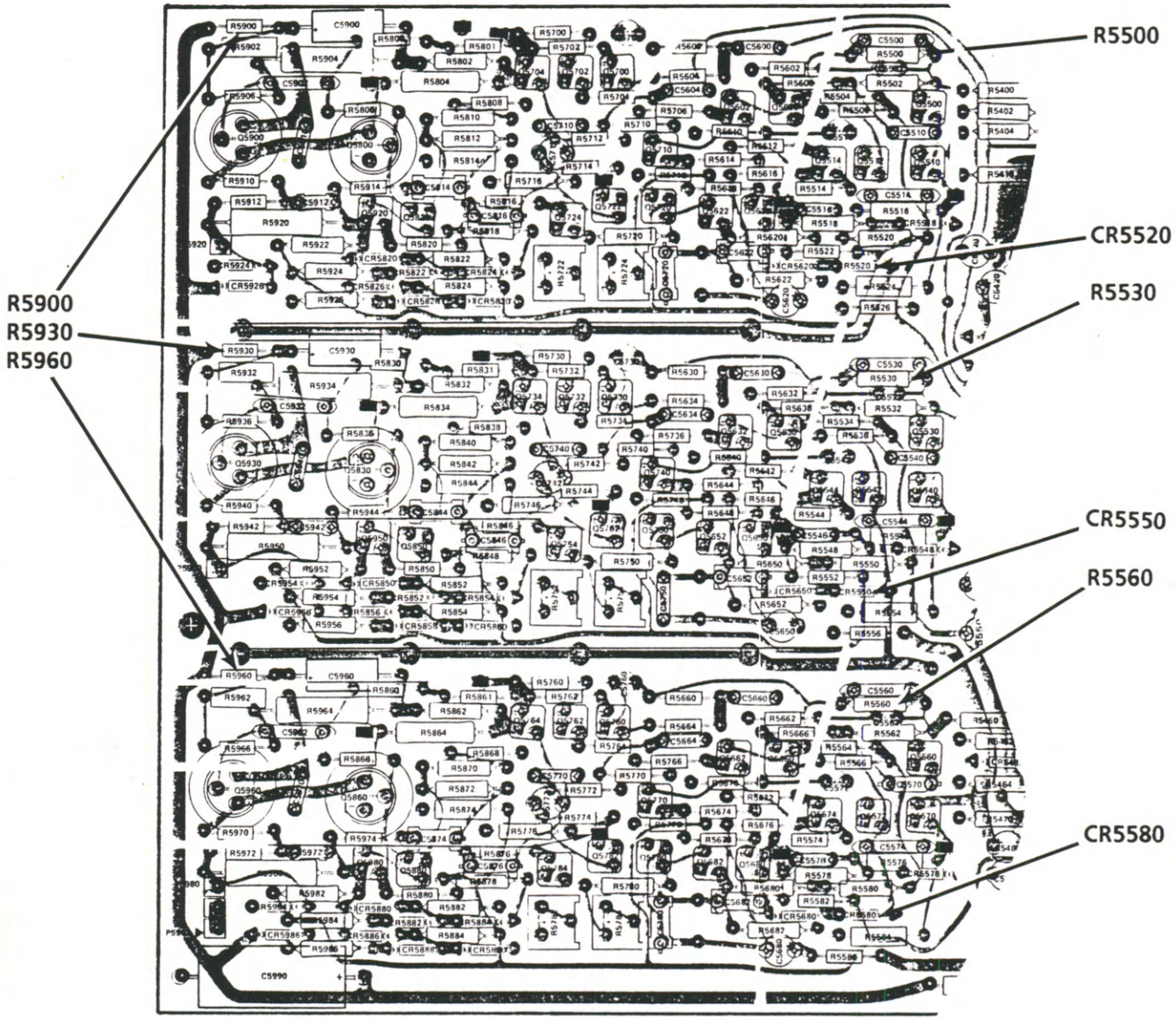

Fig 1. Partial Output Amplifier circuit board (A5) showing component changes.

Make the following changes on the Blanking circuit board (670-1603-04 and below). Refer to Fig. 2, Fig. 3 and the schematic located in the Manual Modification Insert.

- ☐ 1. Remove and discard CR6223.
- ☐ 2. Install the new CR6223, provided in the kit, in the new location shown in Fig. 2.
- ☐ 3. Replace Q6241 with the 151-0708-00 transistor provided in the kit.
- ☐ 4. Replace VR6261 with the 152-0286-00 diode provided in the kit.
- ☐ 5. Replace R6269 with the 315-0563-00 resistor provided in the kit.
- ☐ 6. Replace VR6273/R6273 (10K ohm) with the new VR6273 (152-0428-00). Solder the cathode end to the circuit run that connects with the cathode of CR6245.
- ☐ 7. Replace R6275 (1M ohm) with CR6275 (152-0242-00). Solder the cathode end to the solder pad nearest Q6241. The solder pad connects to the emitter of Q6241.
- ☐ 8. Replace R6291 with the 321-0362-00 resistor provided in the kit.
- ☐ 9. Remove R6271 (1.13M ohm) and install tepee fashion the new R6271 and R6274 (562K ohm resistors) in the solder pads previously used for R6271.
  Note: This tepee may have been installed previously.
- ☐ 10. Replace R6297 with the 321-0617-00 resistor provided in the kit.

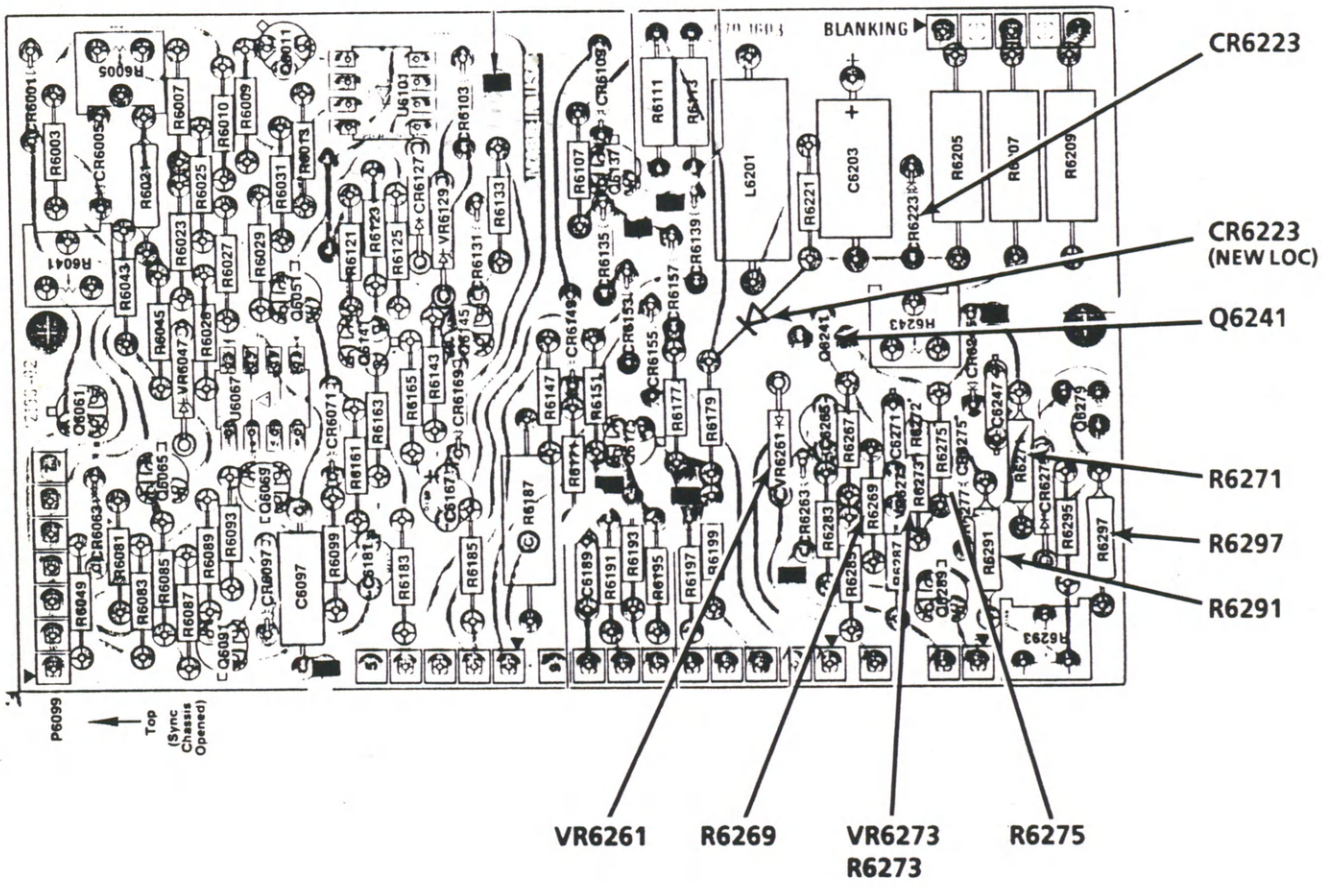

Fig. 2. Partial Blanking circuit board showing component changes.

☑ 11. Install the Blanking Correction circuit board, provided in the kit, as shown in Fig. 3. Solder the interconnecting square pins to the solder pads as indicated. The dotted outline on the Blanking circuit board shows the installed position of the new Blanking Correction circuit board.

NOTE

If the Blanking Correction circuit board was previously installed then it will not be necessary to install the new Blanking Correction circuit board.

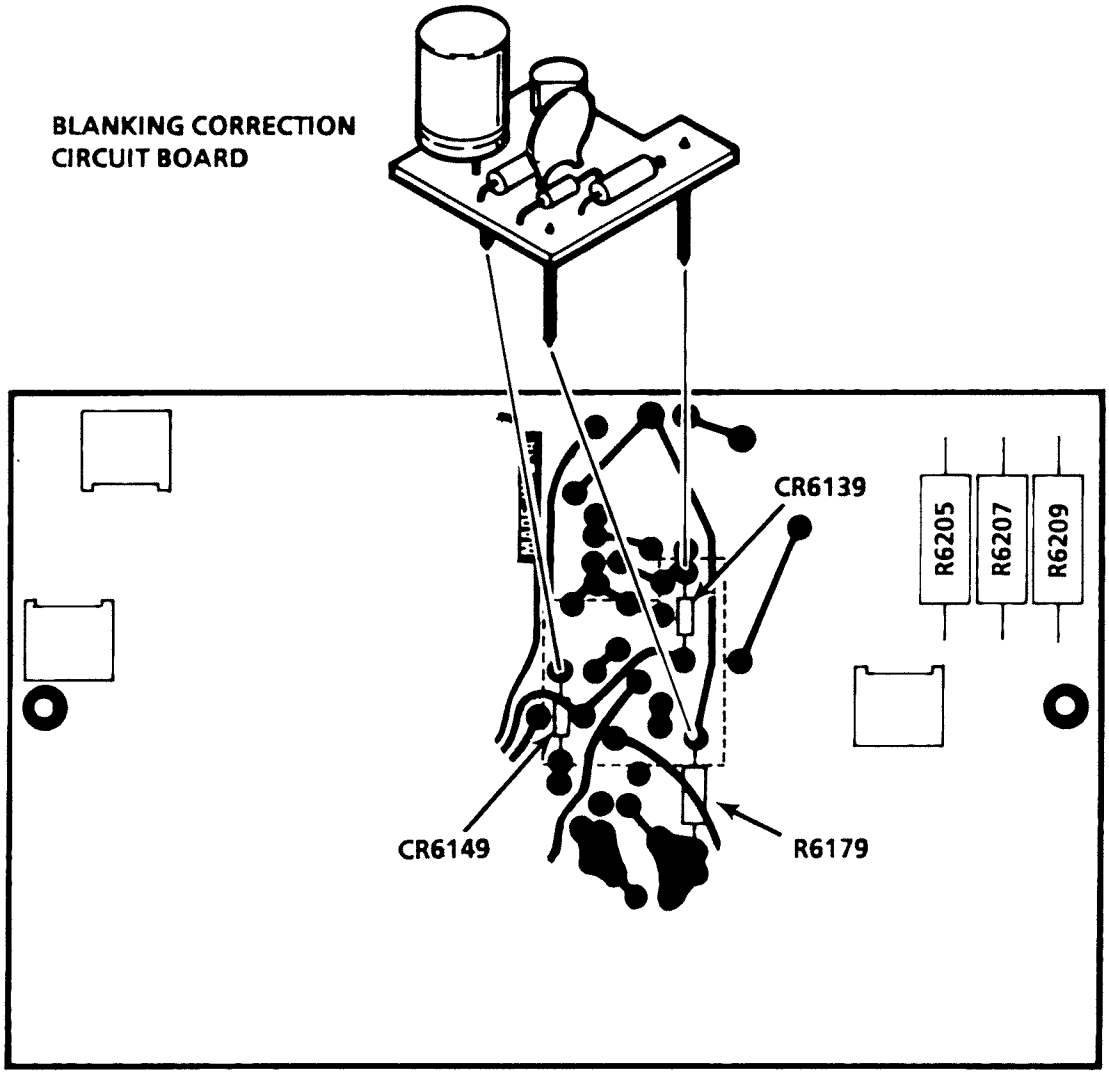

Fig. 3. Illustration showing orientation of Blanking Correction circuit board on the Blanking circuit board.

☑ 12. Pivot the Sync Chassis in position against the mainframe and tighten the securing hardware.

Perform steps 1, 2, and 3 on the HORIZONTAL OUTPUT circuit board (Refer to Fig. 4).

☐ 1. Unsolder (and lift from the circuit board pad) the lead of R4020 that is closest to R4030.

☐ 2. Cut off both leads of the diode, provided in the kit, to about 3/8 of an inch.

☐ 3. Solder the anode of CR4015 to the circuit board pad vacated by R4020. Solder the other lead of CR4015 to the lead of R4020 (tepee fashion) above the circuit board.

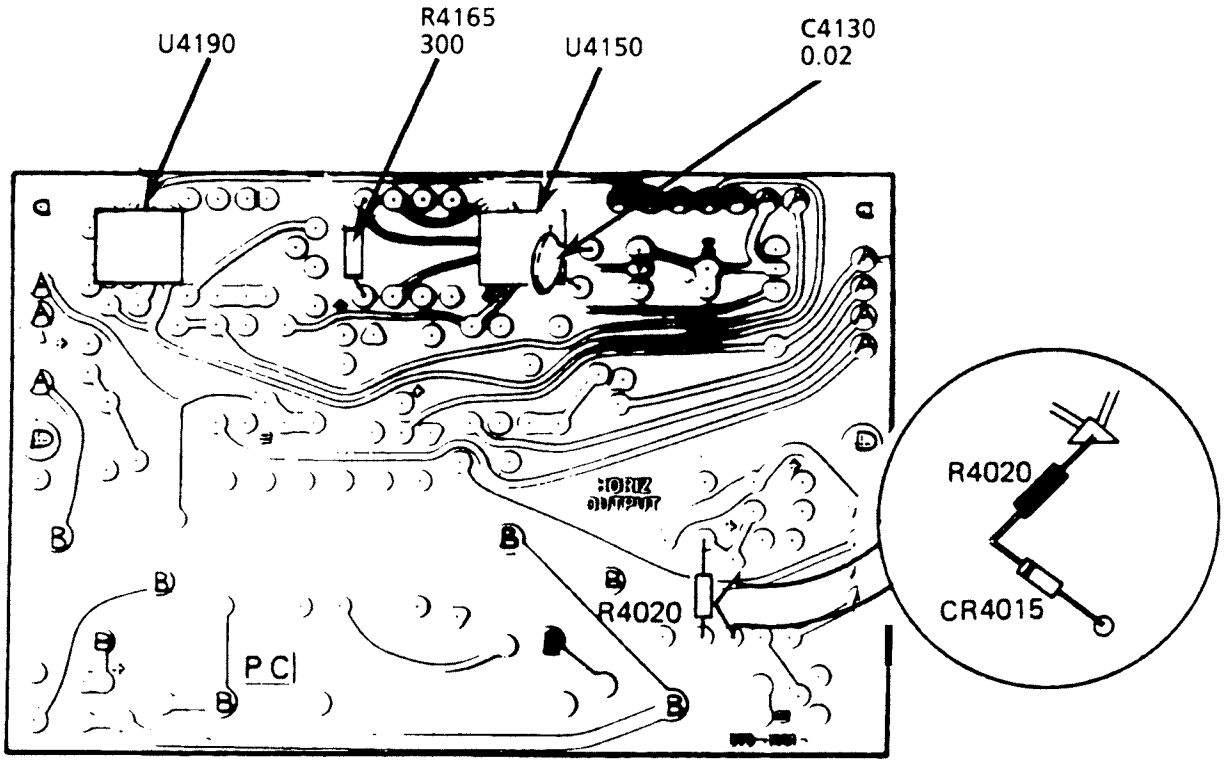

Fig. 4. Horizontal Output circuit board showing component changes.

☐ 4. Replace the rear-panel crt hole cover.

☐ 5. Perform a complete instrument readjustment; instrument calibration is based on the crt operating parameters, which vary slightly from crt to crt.
Preliminary low and high-light color balance readings are given in Table 1. Record the desired readings on the new label provided in the kit. Apply the new label over the existing label.

Table 1. Photometer readings (X10 setting)

	100 IRE	10 IRE
RED	.58	.30
GREEN	.71	.38
BLUE	.46	.24

☐ 6. Install the instrument covers.

☐ 7. Affix the identification label, provided in the kit, to the rear panel to indicate this kit has been installed.

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Product Modification Kit Suggestion/Correction Form

Kit No 050-2631-01

Date _____

Step/Page _____ Figure Number _____ Publication Date _____

Discrepancy _____

_____

_____

_____

_____

Suggested Correction/Comment _____

_____

_____

_____

Suggested By: Name/Organization _____

(Please Type or Print Legibly)

☐ Reply Requested

Return to Local Field Office/Service Center Del Sta. _____

Service Center: Return to TV Field Mods 58-594

REPLY

____Will make change immediately

____Will make change at next printing

____Other _____

_____

_____

_____

Signed _____ Date _____

Tektronix
COMMITTED TO EXCELLENCE

MANUAL MODIFICATION INSERT

V8701 REPLACEMENT

FOR THE FOLLOWING INSTRUMENTS:

650A	**ALL**
653A SERIES	**ALL**
656A SERIES	**ALL**

installed in sn _____ Date _____

GENERAL INFORMATION

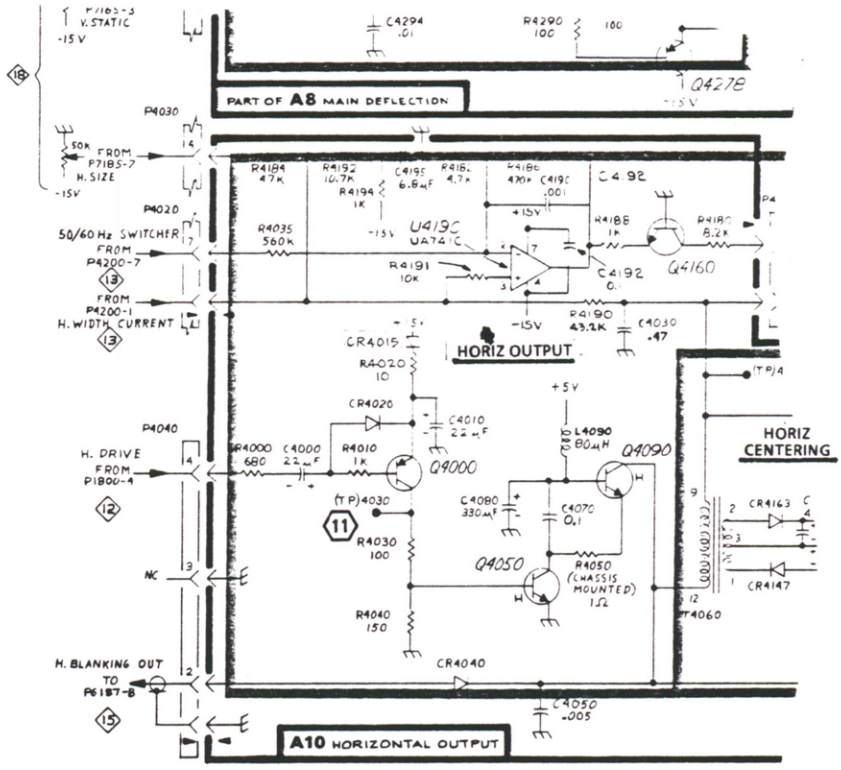
Kinescope 154-0858-00 replaces kinescope 154-0782-00 and 154-0830-00, which are no longer available. Use of the new kinescope requires component and wiring changes to the Blanking, Output Amplifier and Horizontal Output circuit boards.

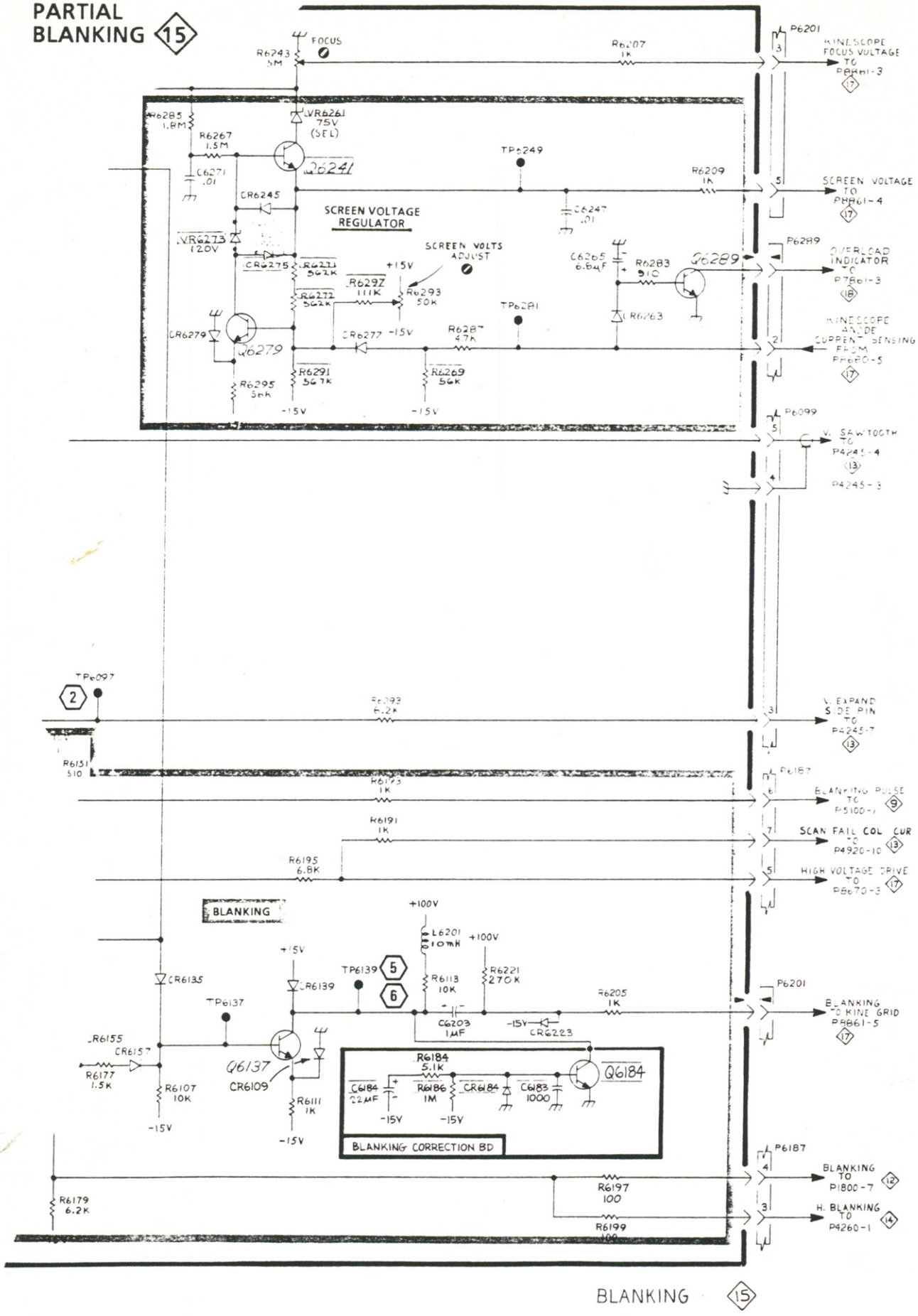
ELECTRICAL PARTS LIST

ADD/CHANGE TO READ:

V8701	154-0858-00	ELECTRON TUBE
A5	670-1602-03	CKT BD ASSY:OUTPUT AMPLIFIER
CR5519	152-0141-02	SEMICOND DVC, DI:SW, SI, 30V, 150MA, DO-35
CR5559	152-0141-02	SEMICOND DVC, DI:SW, SI, 30V, 150MA, DO-35
CR5579	152-0141-02	SEMICOND DVC, DI:SW, SI, 30V, 150MA, DO-35
R5500	321-0245-00	RES, FILM:3.48K OHM, 1%, 0.125W
R5530	321-0245-00	RES, FILM:3.48K OHM, 1%, 0.125W
R5560	321-0236-00	RES, FXD, FILM:2.80K OHM, 1%, 0.125W
R5900	315-0100-02	RES, FXD, CMPSN:10 OHM, 5%, 0.25W
R5930	315-0100-02	RES, FXD, CMPSN:10 OHM, 5%, 0.25W
R5960	315-0100-02	RES, FXD, CMPSN:10 OHM, 5%, 0.25W
A10	670-1601-05	CKT BD ASSY:HORIZONTAL OUTPUT
CR4015	152-0107-00	SEMICOND DVC, DI:RECT, SI, 400V, 400MA
A11	670-1603-07	CKT BD ASSY:BLANKING
Q6241	151-0708-00	TRANSISTOR, NPN, POWER, 0.1A, 550V
CR6275	152-0242-00	SEMICOND DVC, DI:SI, 225V, 0.2A
CR6223	152-0242-00	SEMICOND DVC, DI:SI, 225V, 0.2A
R6271	321-0457-000	RES, FXD, FILM:562K OHM, 1%, 0.125W
R6274	321-0457-000	RES, FXD, FILM:562K OHM, 1%, 0.125W
R6269	315-0563-00	RES, FXD, CMPSN:56K OHM, 5%, 0.25W
R6291	321-0362-00	RES, FXD, FILM:57.6K OHM, 1%, 0.125W
R6297	321-0617-00	RES, FXD, FILM:11K OHM, 1%, 0.125W
VR6261	152-0286-00	SEMICOND DVC, DI:ZEN, SI, 75V, 5%, 0.4W
VR6273	152-0428-00	SEMICOND DVC, DI:ZEN, SI, 120V, 5%, 0.4W
	670-6588-00	CKT BD ASSY:BLANKING CORRECTION (653A/656A)
A11-1	670-6588-00	CKT BD ASSY:BLANKING CORRECTION (650A, 650HR)
C6183	283-0067-00	CAP, FXD, CER DI:0.001UF, 10%, 200V
C6184	290-0745-00	CAP, FXD, ELCTLT:22UF, +50-20%, 25VDC
CR6184	152-0141-02	SEMICOND DVC, DI:SW, SI, 30V, 150MA
Q6184	151-0444-00	TRANSISTOR:NPN, SI, TO-92
R6184	315-0512-00	RES, FXD, FILM:5.1K OHM, 5%, 0.25W
R6186	315-0105-00	RES, FXD, FILM:1M OHM, 5%, 0.25W

PARTIAL HORIZONTAL OUTPUT 14




PARTIAL BLANKING 15
FOCUS
R6243 5M
R6207 1K
P6201
KINESCOPE FOCUS VOLTAGE TO P8861-3 17
R6285 1.8M
VR6261 75V (SEL)
R6267 1.5M
C6271 .01
Q6241
TP6249
R6209 1K
SCREEN VOLTAGE TO P8861-4 17
CR6245
SCREEN VOLTAGE REGULATOR
C6247 .01
VR6273 120V
CR6275
R6271 562K
SCREEN VOLTS ADJUST
+15V
R6297 111K
R6293 50K
R6272 562K
C6265 6.8µF
R6283 910
Q6289
P6289
OVERLOAD INDICATOR TO P7861-3 18
CR6263
TP6281
CR6279
Q6279
CR6277 -15V
R6287 4.7K
KINESCOPE ANODE CURRENT SENSING FROM P8870-5 17
R6295 5ek
R6291 56.7K
R6269 56K
-15V
-15V
P6099
V. SAWTOOTH TO P4245-4 13
P4245-3
TP6097
2
R6093 6.2K
V. EXPAND SIDE PIN TO P4245-7 13
R6151 510
P6187
R6173 1K
BLANKING PULSE TO P5100-1 9
R6191 1K
SCAN FAIL COL CUR TO P4920-10 13
R6195 6.8K
HIGH VOLTAGE DRIVE TO P8870-3 17
BLANKING
+100V
L6201 10mH
+100V
+15V
TP6139 5 6
R6113 10K
R6221 270K
CR6135
CR6139
R6205 1K
P6201
BLANKING TO KINE GRID P8861-5 17
TP6137
C6203 1µF
-15V
CR6223
R6155
CR6157
R6184 5.1K
Q6137
CR6109
Q6184
R6177 1.5K
C6184 22µF
R6186 1M
CR6184
C6183 1000
R6107 10K
R6111 1K
-15V
-15V
-15V
-15V
BLANKING CORRECTION BD
P6187
R6197 100
BLANKING TO P1800-7 12
R6179 6.2K
R6199 100
H. BLANKING TO P4260-1 14
BLANKING 15