Instruction Manual

Tektronix

ECO170A
Synchronous Changeover Unit

070-6113-03

Warning
The servicing instructions are for use by qualified personnel only. To avoid personal injury, do not perform any servicing unless you are qualified to do so. Refer to all safety summaries prior to performing service.

www.tektronix.com

Tektronix, Inc., P.O. Box 500, Beaverton, OR 97077

WARRANTY

Tektronix warrants that this product will be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. If any such product proves defective during this warranty period, Tektronix, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by Tektronix, with shipping charges prepaid. Tektronix shall pay for the return of the product to Customer if the shipment is to a location within the country in which the Tektronix service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Tektronix shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than Tektronix representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; or c) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

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* **This phone number is toll free in North America. After office hours, please leave a voice mail message.**
Outside North America, contact a Tektronix sales office or distributor; see the Tektronix web site for a list of offices.

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GENERAL SAFETY SUMMARY

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

Only qualified personnel should perform service procedures.

TO AVOID FIRE OR PERSONAL INJURY

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

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

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

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

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

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

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

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

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

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

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in an Explosive Atmosphere.

Keep Product Surfaces Clean and Dry.

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

SYMBOLS AND TERMS

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

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

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

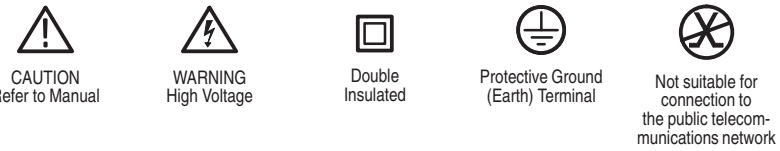
Terms on the Product. These terms may appear on the product:

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

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

CAUTION indicates a hazard to property including the product.

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



SERVICE SAFETY SUMMARY

Only qualified personnel should perform service procedures. Read this *Service Safety Summary* and the *General Safety Summary* before performing any service procedures.

Do Not Service Alone. Do not perform internal service or adjustments of this product unless another person capable of rendering first aid and resuscitation is present.

Disconnect Power. To avoid electric shock, switch off the instrument power, then disconnect the power cord from the mains power.

Use Care When Servicing With Power On. Dangerous voltages or currents may exist in this product. Disconnect power, remove battery (if applicable), and disconnect test leads before removing protective panels, soldering, or replacing components.

To avoid electric shock, do not touch exposed connections.

SECTION 1

OPERATING INSTRUCTIONS

This section explains how to operate the ECO–170A, and describes the front panel controls and the rear panel connectors.

Introduction

The ECO–170A is a Synchronous Changeover unit which provides transparent, automatic selection of sync sources. Changeover occurs upon fault detection of the source in use. Electronic sync transfer ensures uninterrupted sync for critical applications; the ECO–170A uses relay switching only to switch to bypass in case of power failure, or if one of the input amplifiers fail.

The ECO–170A tests both pulse amplitude and pulse timing, providing two methods of error checking for your sync system. When the ECO–170A detects a fault it automatically switches to the backup generator, unless that, too, has a fault. Separate indicators on the front panel display faults for each generator. These indicators remain on until cleared by an operator.

Description

Fig. 1-1 shows how the ECO–170A is typically connected, at the outputs of two sync generators. Note that of each input pair, the channel A input is connected to a bypass relay, while the channel B input is connected directly to the electronic switch. Further, note that the ECO–170A is powered by the same source as the backup generator, while the primary generator is powered by a separate source.

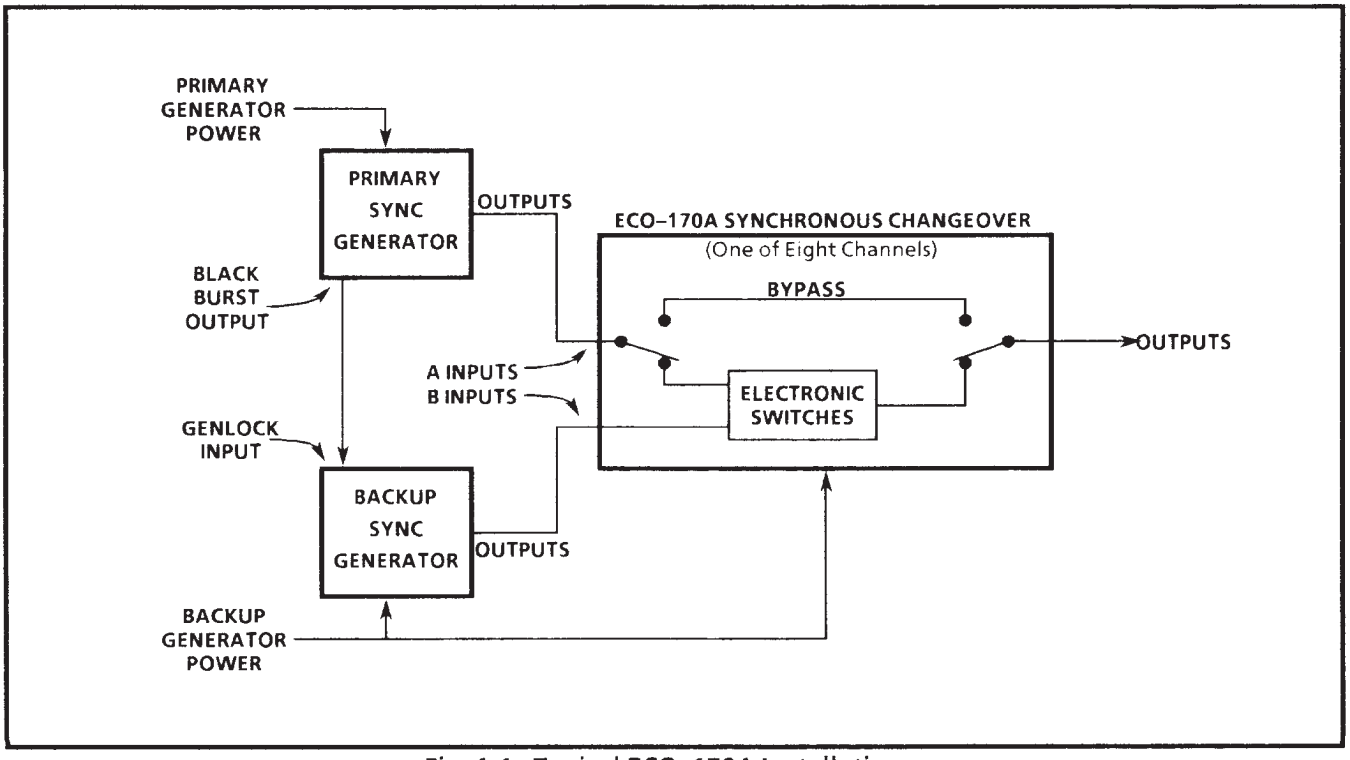
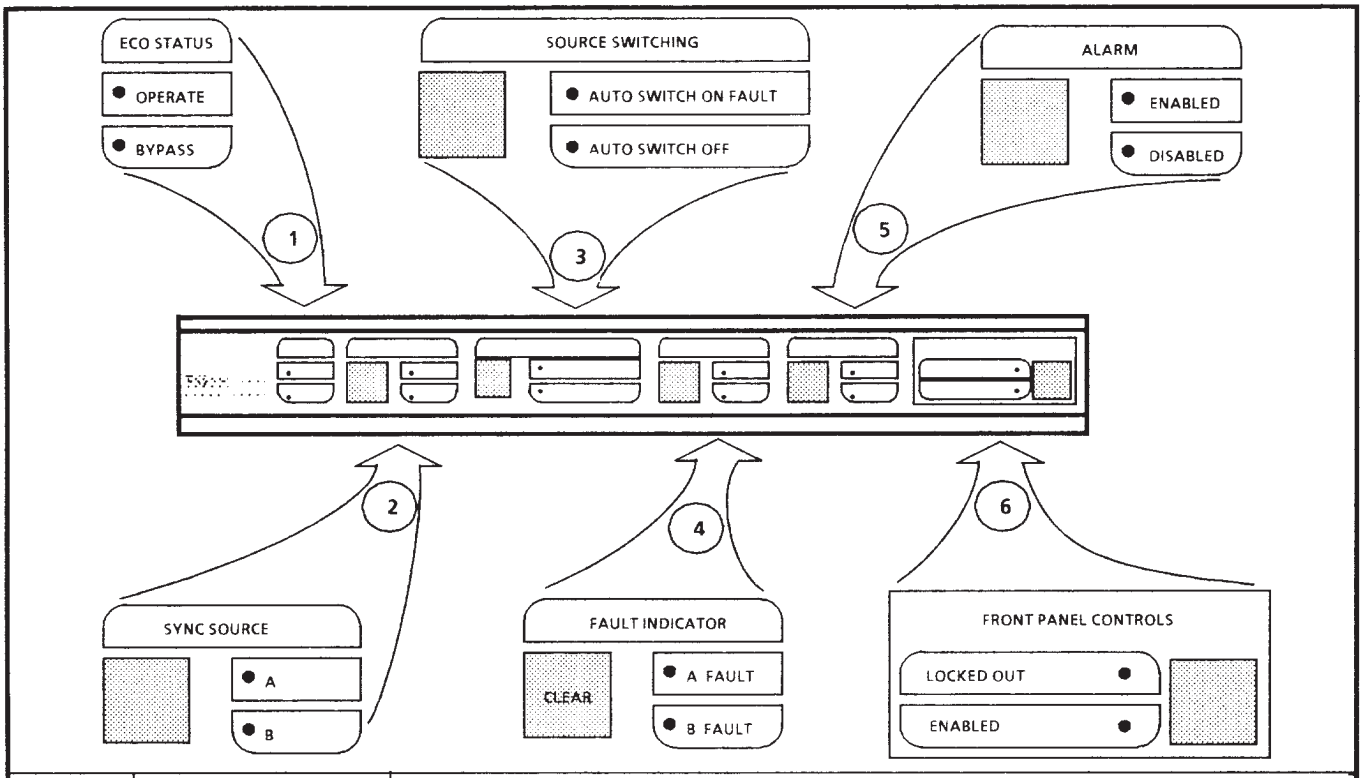


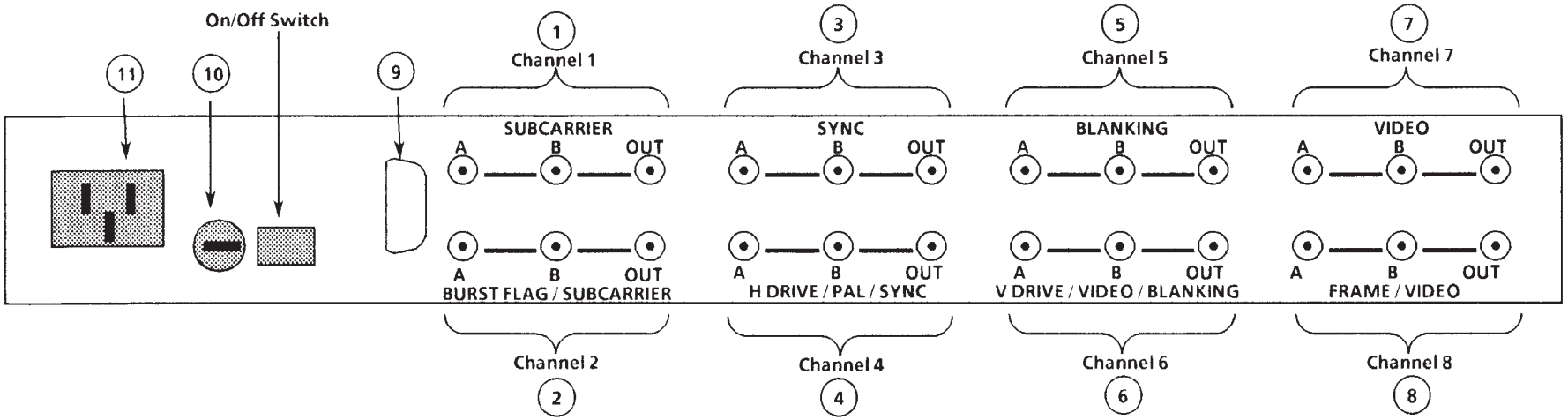
Fig. 1-1. Typical ECO–170A Installation.



Key #	Control/Indicator Name	Description
1	ECO STATUS	The LEDs light to indicate whether the ECO-170A is in the OPERATE or the BYPASS mode of operation. In BYPASS, the A inputs are connected directly to the outputs.
2	SYNC SOURCE	When the FRONT PANEL CONTROLS are ENABLED this push button allows manual selection of the SYNC SOURCE to be used. The LEDs light to indicate the current selection, source A or source B.
3	SOURCE SWITCHING	When the FRONT PANEL CONTROLS are ENABLED the SOURCE SWITCHING push button toggles between the AUTO SWITCH ON FAULT and the AUTO SWITCH OFF selections.
4	FAULT INDICATOR	When a fault is detected, the appropriate LED lights to indicate which source has the fault. The CLEAR push button will clear this indication only when the FRONT PANEL CONTROLS are ENABLED.
5	ALARM	When the FRONT PANEL CONTROLS are ENABLED this push button alternately ENABLES and DISABLES the audio alarm. The LEDs indicate the current selection. Once tripped, the alarm will continue to sound until cleared by the FAULT INDICATOR CLEAR or ALARM DISABLED push buttons.
6	FRONT PANEL CONTROLS	This push button controls the rest of the front panel controls, toggling them between the LOCKED OUT and the ENABLED states. The LEDs indicate the current state.

Fig. 1-2. ECO–170A Front Panel Controls

In this way, both power sources would have to fail before sync would be lost. If the power to the primary generator fails, the ECO–170A and the backup generator continue to operate; if the power to the ECO–170A and backup generator fails, the ECO–170A switches to bypass mode and the primary generator signals are passed directly through to the output.



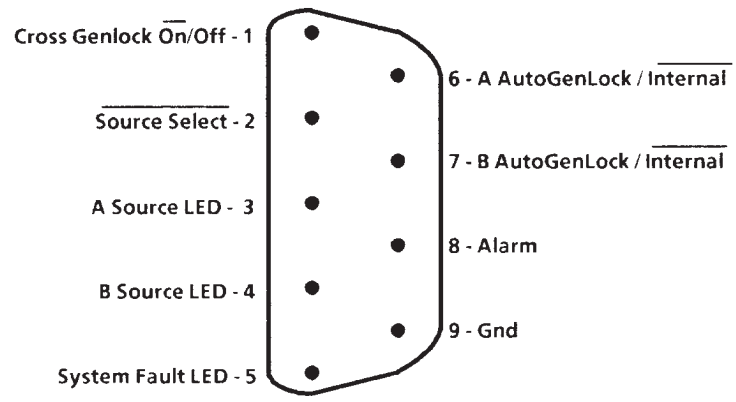
Key #	Name	Function	Factory Signal Settings	
			NTSC	PAL
1	Subcarrier ***REQUIRED***[3]	Dedicated connectors for Subcarrier, no selection except frequency.	3.58 MHz	4.43 MHz
2	Burst Flag / Subcarrier	May be configured for either Burst Flag or Subcarrier.[1]	Burst Flag	Burst Flag
3	Sync ***REQUIRED***[3]	Dedicated connectors for Sync pulse, no selection of signal.	Sync	Sync
4	H Drive / PAL Pulse / Sync	May be configured for H Drive, Sync, or PAL Pulse (or Square) signals.[1]	H Drive	PAL Pulse
5	Blanking	Dedicated connectors for Blanking, no signal selection.	Blanking	Blanking
6	V Drive / Video / Blanking	May be configured for either V Drive, Video, or Blanking.[1]	V Drive	Video
7	Video	Dedicated connectors for Video, no selection of signal.	Video	Video
8	Frame/Video	May be configured for either Frame Pulse (or Square) or Video.[1,2]	Frame Pulse	Frame Pulse
9	Remote Control Connector	See Fig. 1-4 for details on Remote Connector.	NA	NA
10	Fuse	Line Fuse.	2A Med Blo	1A Med Blo
11	Power	115/230 VAC Input.	115 VAC	230 VAC

Fig. 1-3. ECO-170A Rear Panel Connectors

[1] See Table 1-1 for signal selection jumper and switch settings.

[2] Frame Pulse must be negative-going, not TTL, such as that supplied by a TEKTRONIX TSG–170A or SPG–170A.

[3] SUBCARRIER and SYNC are required from both Generators, for both Pulse Width Detection and to have manual switching of sync sources occur during the vertical interval.



Pin #	Name	Function
1	Cross Genlock On / Off	Ground closure to enable (low) or disable (high) the Cross Genlock function.
2	Source Select	Ground closure to manually select the sync source. Toggles between A and B each time pin 2 is pulled low.
3	A Source LED	Output to light an LED at the remote when sync source A is selected. Capable of supplying 15 mA at TTL levels.
4	B Source LED	Output to light an LED at the remote when sync source B is selected. Capable of supplying 15 mA at TTL levels.
5	System Fault LED	Output to light an LED when the ECO–170A front panel displays an A Fault, B Fault, or Bypass indication. Capable of supplying 15 mA.
6	A AutoGenLock/Internal	
7	B AutoGenLock/Internal	
8	Alarm	Output to sound an alarm at the remote. Capable of supplying 50 mA at TTL levels.
9	Ground	Common return for Remote connector.

Fig. 1-4. ECO–170A Remote Connector

Fig. 1-2 describes the Front Panel Controls of the ECO–170A, and Fig. 1-3 describes the Rear Panel. Fig. 1-4 describes the Remote Connector details.

Configuration

As shipped from Tektronix, the ECO–170A will be configured to accept either NTSC or PAL signals, depending on the power cord option ordered. An instrument with a standard power cord will be configured for NTSC; if ordered with any of the option power cords (A1, A2, or A3), the ECO–170A will be set up for PAL.

The following table provides information on switch and jumper settings for changing the factory selections.

Table 1-1. ECO–170A Factory Configuration [a]

Channel	Selections Available	Factory Settings	
		NTSC	PAL
General			
Line Voltage	110V/220V	110V	220V
NTSC/PAL	NTSC/PAL	NTSC	PAL
PulseWidth Detection [b]	Enabled/Disabled	Enabled	Enabled
Pulse Amplitude	4 Volt/ 2 Volt	4 Volt	2 Volt
Subcarrier (Channel 1)	Fault Detection - Enable/Disable [b] 3.58 MHz/4.43 MHz	Enabled 3.58 MHz	Enabled 4.43 MHz
Burst Flag/Subcarrier (Channel 2)	Fault Detection - Enable/Disable Burst Flag/Subcarrier (Subcarrier) 3.58 MHz/4.43 MHz	Enabled Burst Flag 3.58 MHz	Enabled Burst Flag 4.43 MHz
Sync (Channel 3)	Fault Detection - Enable/Disable [b]	Enabled	Enabled
H Drive/PAL/Sync (Channel 4)	Fault Detection - Enable/Disable H Drive/PAL Pulse/PAL Square/Sync	Enabled H Drive	Enabled PAL Pulse
Blanking (Channel 5)	Fault Detection - Enable/Disable	Enabled	Enabled
V Drive/Video/Blanking (Channel 6)	Fault Detection - Enable/Disable V Drive/Video/Blanking	Enabled V Drive	Enabled Video
Video (Channel 7)	Fault Detection - Enable/Disable	Enabled	Enabled
Frame/Video (Channel 8)	Fault Detection - Enable/Disable Frame Pulse/Frame Square/ Video	Enabled Frame Pulse	Enabled Frame Pulse

[a] Qualified service personnel may refer to Section 3, INSTALLATION, for information on changing the ECO–170A Configuration.

[b] If fault detection for either channel 1 or 3 is disabled, all Pulse Width Detection will be disabled as well.

SECTION 2

SPECIFICATION and PERFORMANCE CHECK

PERFORMANCE CONDITIONS

Electrical Characteristics: The Performance Requirements listed in the Electrical Specification apply over an ambient temperature range of 0°C to +50°C. The rated accuracies are valid when the instrument is calibrated at an ambient temperature range of +20°C to +30°C, after a warm-up time of 20 minutes. Test equipment used to verify Performance Requirements must be calibrated and working within the limits specified under the Equipment Required list.

Table 2-1. General Information

Characteristic	Specification	Supplemental Information
Input Impedence		
Bypass		Direct connection in Bypass,
A Inputs	Unterminated	A Inputs to Outputs.
B Inputs	75Ω	B Inputs not specified unless power is turned on.
Operate	75Ω	Inputs and Outputs
Return Loss		
Input	≥ 36 dB to 5 MHz	
Output	≥ 36 dB to 5 MHz	
DC Offset	0 V ± 50 mV	

Table 2-2. Video Channel Characteristics

Characteristic	Specification	Supplemental Information
Gain	Unity ± 2%	
Chrom/Lum Gain	≤ 2% to F_{SC}	
Maximum Input Amplitude	1.4 V p-p	
Diff Phase	≤ 2°	
Diff Gain	≤ 2%	
Ringing and Tilt	≤ 2%	
Channel to Channel Delay	≤ 10 ns	
Crosstalk		
Channel to Channel		
Input to Input	-55 dB @ F_{SC}	
Residual Noise	≤ 2 mV	To 5 MHz

Table 2-3. Subcarrier Channel Characteristics

Characteristic	Specification	Supplemental Information
Gain	Unity ± 4%	
Maximum Input Amplitude	2.5 V p-p + 100 mV, centered around 0 V	
Channel to Channel Delay	≤ 10 ns	
Crosstalk Channel to Channel Input to Input	≤ –55 dB @ F_{SC}	
Residual Noise	≤ 2 mV	To 5 MHz

Table 2-4. Pulse Channel Characteristics

Characteristic	Specification	Supplemental Information
Gain	Unity ± 2%	
Maximum Input Amplitude	+ 1 V to –5 V, terminated into 75Ω	
Crosstalk Channel to Channel Input to Input	–40 dB @ F_{SC}	
Residual Noise	≤ 4 mV	To 5 MHz

Table 2-5. Error Detection

Characteristic	Specification		Supplemental Information
Type of Detection:			
Video Channels			Sync Amplitude and Width
Subcarrier Channels			Amplitude
Pulse Channels			Pulse Amplitude and Width
Amplitude Criteria			
Time			
Subcarrier	≤ 20 μs		
Video	2 Faulty Pulses		Video, V Drive, Sync, H Drive,
Pulse	2 Faulty Pulses		and PAL Pulse only
Level			
Video	Video Sync	(–3 ± 1) dB	
Subcarrier	2 Volt p–p	(–3 ± 1) dB	
Pulse	2 Volt or 4 Volt	(–3 ± 1) dB	–2 V or –4 V — Internally Selectable
	NTSC	**PAL**	
Timing Fault Criteria			
Video	4.7 μs ± 0.56 μs	4.7 μs ± 0.45 μs	Video Sync
Subcarrier	----	----	Pulse Width Detector Clock
Pulse Width			
Sync	4.7 μs ± 0.56 μs	4.7 μs ± 0.45 μs	
Blanking	10.9 μs ± 0.84 μs	11.85 μs ± 0.9 μs	
Burst Flag	2.51 μs ± 0.84 μs	2.25 μs ± 0.9 μs	
H Drive	6.2 μs ± 0.84 μs	----	
V Drive	572 μs ± 0.84 μs	400.8 μs ± 83.45 μs	
PAL Pulse			
Pulse	----	4.7 μs ± 0.9 μs	
Square Wave	----	64 μs ± 0.9 μs	
Color Frame			
Pulse	63.55 μs ± 0.84 μs	64 μs ± 0.9 μs	
Square Wave	33.367 ms ± 0.8 μs	80 ms ± 0.9 μs	

Table 2-6. Power Supply Characteristics

Characteristics	Performance Requirements	Supplemental Information
Supply Accuracy + 12 V + 5 V –5.2 V –12 V		 12 V ± 300 mV. 5 V ± 100 mV. –5.2 V ± 300 mV. –12 V ± 300 mV.
Current Limit + 12 V + 5 V –5.2 V –12 V		Total power limited to 75W.
Hum + 12 V + 5 V –5.1 V –12 V		Typical 10 mV. 10 mV. 20 mV. 10 mV.
Noise + 12 V + 5 V –5.1 V –12 V		 ≤ 50 mV (5 MHz bandwidth). ≤ 50 mV (5 MHz bandwidth). ≤ 50 mV (5 MHz bandwidth). ≤ 50 mV (5 MHz bandwidth).
Line Voltage Range 110 Vac 220 Vac	 90 – 132 Vac 180 – 250 Vac	
Crest Factor		≥ 1.35.
Fuse Data 115 V Setting 230 V Setting		 2 A, 250 V Med-Blow. 1 A, 250 V Med-Blow.
Power Consumption Typical Maximum		 20 W. 40 W.
Line Frequency		48 Hz to 62 Hz.

Table 2-7. PHYSICAL CHARACTERISTICS

Characteristics	Information
Dimensions	
Height	4.4 cm (1.734 inches).
Width	48.3 cm (19.0 inches).
Length	56.1 cm (22.1 inches).
Weight	
Net	5.7 kg (12.5 lbs).
Shipping	10.4 kg (22.9 lbs).

Table 2-8. ENVIRONMENTAL CHARACTERISTICS

Characteristics	Information
Instrument Class	The ECO–170A is a Class 3 instrument as defined in Tektronix Standard 062-2853-00, Product Classification Environmental Test Summary.
Temperature	
Operating	0°C to + 50°C.
Storage	–40°C to + 65°C.
Altitude	
Operating	To 15,000 feet.
Storage	To 50,000 feet.
Vibration (Operating)	15 minutes each axis at 0.025 inch, frequency varied from 10–55–10 Hz in 1-minute cycles with instrument secured to vibration platform. Ten minutes each axis at any resonant point or at 55 Hz.
Shock (Non-Operating)	50 g's, 1/2 sine, 11 ms duration, 3 guillotine-type shocks per axis.
Transportation	Qualified under NTSC Test Procedure IA, Category II (24-inch drop).

Table 2–8A: CERTIFICATIONS AND COMPLIANCES

Category	Standards or description
EC Declaration of Conformity – EMC [1]	Meets intent of Directive 89/336/EEC for Electromagnetic Compatibility. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Union: EN 50081-1 Emissions: EN 55022 Class B Radiated and Conducted Emissions EN 50082-1 Immunity: IEC 801-2 Electrostatic Discharge Immunity IEC 801-3 RF Electromagnetic Field Immunity IEC 801-4 Electrical Fast Transient/Burst Immunity [1] High-quality shielded cables must be used to ensure compliance to the above listed standards.
FCC Compliance	Emissions comply with FCC Code of Federal Regulations 47, Part 15, Subpart B, Class A Limits.
Australia/New Zealand Declaration of Conformity – EMC	Complies with EMC provision of Radiocommunications Act per the following standard(s): AN/NZS 2064.1/2 Industrial, Scientific, and Medical Equipment: 1992
Installation (Overvoltage) Category	Terminals on this product may have different installation (overvoltage) category designations. The installation categories are: CAT III Distribution-level mains (usually permanently connected). Equipment at this level is typically in a fixed industrial location. CAT II Local-level mains (wall sockets). Equipment at this level includes appliances, portable tools, and similar products. Equipment is usually cord-connected. CAT I Secondary (signal level) or battery operated circuits of electronic equipment.
Pollution Degree	A measure of the contaminates that could occur in the environment around and within a product. Typically the internal environment inside a product is considered to be the same as the external. Products should be used only in the environment for which they are rated. Pollution Degree 1 No pollution or only dry, nonconductive pollution occurs. Products in this category are generally encapsulated, hermetically sealed, or located in clean rooms. Pollution Degree 2 Normally only dry, nonconductive pollution occurs. Occasionally a temporary conductivity that is caused by condensation must be expected. This location is a typical office/home environment. Temporary condensation occurs only when the product is out of service. Pollution Degree 3 Conductive pollution, or dry, nonconductive pollution that becomes conductive due to condensation. These are sheltered locations where neither temperature nor humidity is controlled. The area is protected from direct sunshine, rain, or direct wind. Pollution Degree 4 Pollution that generates persistent conductivity through conductive dust, rain, or snow. Typical outdoor locations.
Safety Standards	
U.S. Nationally Recognized Testing Laboratory Listing	UL1244 Standard for electrical and electronic measuring and test equipment.

Table 2–8A: CERTIFICATIONS AND COMPLIANCES (cont.)

Category	Standards or description	
Canadian Certification	CAN/CSA C22.2 No. 231 and	CSA safety requirements for electrical and electronic measuring test equipment.
European Union Compliance	Low Voltage Directive 73/23/EEC, amended by 93/69/EEC	
	EN 61010-1	Safety requirements for electrical equipment for measurement, control, and laboratory use.
Additional Compliance	IEC61010-1	Safety requirements for electrical equipment for measurement, control, and laboratory use.
Safety Certification Compliance		
Temperature, operating	+5 to +40° C	
Altitude (maximum operating)	2000 meters	
Equipment Type	Test and measuring	
Safety Class	Class 1 (as defined in IEC 1010-1, Annex H) – grounded product	
Overvoltage Category	Overvoltage Category II (as defined in IEC 1010-1, Annex J)	
Pollution Degree	Pollution Degree 2 (as defined in IEC 1010-1). Note: Rated for indoor use only.	

PERFORMANCE CHECK

This section gives the procedures for checking your ECO–170A. There are both short and long form procedures here. The short form procedure provides a quick reference for experienced technicians. The long form procedure gives more detailed steps.

Table 2-9 lists the equipment you will need. If you use alternate equipment, make sure it meets the specifications given in this table.

Table 2–9. Recommended Test Equipment (Including Accessories)

Test Equipment	Minimum Specifications	Equipment Examples
Test Oscilloscope Mainframe	At least 50 MHz bandwidth with dual-trace plug-in and 10X probe.	TEKTRONIX 7603.
Test Oscilloscope Differential Comparator Plug-In	Minimum deflection factor 10 mV/div with 10X probe.	TEKTRONIX 7A13; plugs into 7603 mainframe.
Test Oscilloscope Dual-Trace Amplifier Plug-In	Minimum deflection factor 50 mV/div with 10X probe.	TEKTRONIX 7A26; plugs into 7603 mainframe.
Test Oscilloscope Dual Time Base Plug-In	Sweep rate 5 ns/div to 5 μs/div.	TEKTRONIX 7B53A; plugs into 7603 mainframe.
Spectrum Analyzer	Capable of measuring to at least 5 MHz.	TEKTRONIX 7L12; plugs into TEKTRONIX 7603 mainframe.
Low Pass Filter	5 MHz.	Tektronix Part No. 015-0213-00.
Test Signal Generator (Qty 2)	Provides the following test signals: black burst, flat field, staircase, pulse & bar, H Drive, V drive, and subcarrier output.	TEKTRONIX TSG–170A (NTSC) or TEKTRONIX TSG–271 (PAL)
Waveform Monitor	For displaying and measuring field-rate and line-rate waveforms.	TEKTRONIX 1485 MOD W5F.
Vectorscope	For measuring differential phase and gain.	TEKTRONIX 520A (NTSC) or TEKTRONIX 521A (PAL).
Video Amplitude Calibration Fixture (VAC)	Provides a chopped voltage reference accurate to $\pm$0.05% from 0 to 1 V in 0.1 mV increments. (Used with the TEKTRONIX 1480 MOD W5F Waveform Monitor.)	Tektronix Part No. 067-0916-00. Plugs into a TEKTRONIX TM 503 Power Mainframe.
Leveled Sine Wave Generator	250 kHz to 5 MHz.	TEKTRONIX SG 503A; plugs into TM 503 Power Mainframe.
Return Loss Bridge	At least 54 dB, dc to 10 MHz; 75Ω inputs.	Tektronix Part No. 015-0149-00.
Low Loss Coaxial Cable (Qty 4)	Belden 8281 video cable. Impedance, 75Ω; length, 6 feet. Equipped with bnc connectors.	Tektronix Part No. 012-0159-01.

Table 2-9 (cont.) Recommended Test Equipment (Including Accessories)

Test Equipment	Minimum Specifications	Equipment Examples
RG59/U Coaxial Cables (Qty 3)	Impedance, 75Ω; length, 42 inches. Equipped with BNC connectors.	Tektronix Part No. 012-0074-00.
RG58C/U Coaxial Cables (Qty 16)	Impedance, 75Ω; length, 10 inches. Equipped with BNC connectors.	Tektronix Part No. 012-0208-00
End-Line Termination (Qty 3)	Impedance, 75Ω. Equipped with BNC connectors.	Tektronix Part No. 011-0102-00.
Feed-Through Termination (Qty 2)	Impedance, 75Ω. Equipped with BNC connectors.	Tektronix Part No. 011-0103-02.
50Ω to 75Ω Minimum Loss Attenuator	Equipped with BNC connectors.	Tektronix Part No. 011-0057-00.
10X 75Ω Attenuator	Equipped with BNC connectors.	Tektronix Part No. 011-0061-00.
DC Block	None.	Tektronix Part No. 015-0221-00.
BNC Female-to-BNC Female Adapter	None.	Tektronix Part No. 103-0028-00.
50Ω Coaxial Cable	Length, 42 inches. Equipped with BNC connectors. For use with the spectrum analyzer and SG 503.	Tektronix Part No. 012-0057-01.
Variable Resistor Test Fixture	0–200 Ω, equipped with BNC connectors. Locally constructed.	See Fig. 2-1
Variable Autotransformer		General Radio Model W10MT3W.

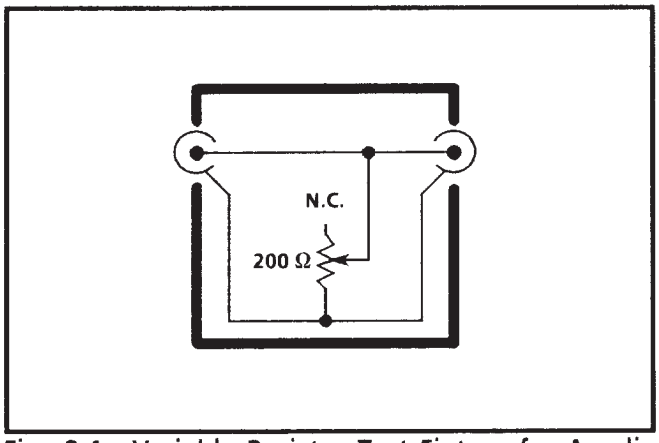


Fig. 2-1. Variable Resistor Test Fixture for Amplitude Error Detection tests.

SHORT FORM
PERFORMANCE CHECK

1. **Return Loss**
   250 kHz – 5 MHz
   Inputs ≥30 dB
   Outputs ≥36 dB

2. **Crosstalk (Operate Mode)**
   Drive each input in turn
   Check all outputs for each driven input
   Subcarrier and Video channels ≥55 dB
   Pulse channels ≥40 dB

3. **Crosstalk (Bypass Mode)**
   Power Off
   Drive each A Input in turn
   Check all outputs for each driven input
   Subcarrier and Video channels ≥55 dB
   Pulse channels ≥40 dB

4. **DC Offfset and Residual Noise**
   Check each channel (terminate input)
   DC Level 0V ±50 mV
   Residual Noise
   ≤2 mV (Subcarrier and Video channels)
   ≤4 mV (Pulse channels)

5. **Amplitude Error Detection**
   For each channel in turn, reduce the signal amplitude until the FAULT LED comes on. Check that the signal amplitude at fault is:

Signal Type	Fault Between
Video (Sync)	189 mV - 226 mV
Subcarrier	1.26 V - 1.58 V
Pulse	
4 Volt	2.52 V - 3.17 V
2 Volt	1.26 V - 1.58 V

6. **Op Amp Bad Detection**
   Ground each of the following Test Points in turn:

TP282	TP382	TP563	TP368
TP564	TP755	TP954	TP768

   CHECK — as each TP is grounded: the relays click, the STATUS LED switches to BYPASS, and the FAULT LEDs remain off.

   CHECK — as the ground is removed: the relays click, the STATUS LED switches to OPERATE, and the FAULT LEDs remain off.

7. **Gain - Subcarrier channels**
   Check gain with VAC
   200 mV ±8 mV

8. **Gain - Pulse channels**
   Check gain with VAC
   4 Volt - 400 mV ±8 mV
   2 Volt - 200 mV ±4 mV

9. **Gain, Chrominance to Luminence Gain, Ringing and Tilt - Video**
   Check with VAC:
   Gain
   714.3 mV ±14.2 mV
   Chrominance to Luminance Gain
   Mod Pulse = Bar ± 7.14 mV
   Ringing
   ≤14.2 mV

   Check with Waveform Monitor:
   Line Tilt
   ±14.2 mV
   Check Field Tilt
   ±14.2 mV

10. **Differential Gain and Phase - Video Channels**
    Check Differential Gain
    ≤2%
    Check Differential Phase
    ≤2°

11. **Pulse Width Fault Detection**
    Pulse Width On - No Fault indication
    Pulse Width Off - No Fault indication
    Swap BLANKING and BURST FLAG inputs
    Clear Fault
    Pulse Width On - Fault indication

LONG FORM
PERFORMANCE CHECK

1. Return Loss

a. Connect test equipment as in Fig. 2-2.

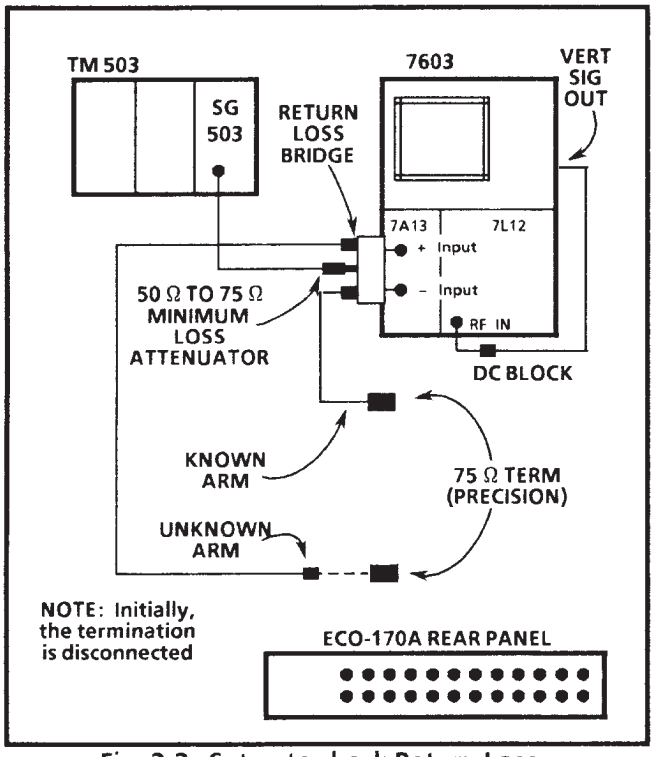


Fig. 2-2. Setup to check Return Loss.

b. Set the following controls:

ECO–170A:
SYNC SOURCE A
AUTO SWITCH OFF

7A13:

+Input	DC
–Input	DC
BW	Full
Volts/Div	50 mV

7603:

Vert Mode	Right
Trig Source	Left

SG503:

Amplitude	250 mV

7L12:

Freq	0 MHz
Time/Div	5 ms
Ref Level	–20 dB
Display Mode	10 dB/Div.
Gain Selector	CCW
Freq Span/Div	1 MHz
Resolution	300 kHz

c. Set the SG503 to 5 MHz.

d. With both precision terminators connected, adjust the Return Loss Bridge to null the 5 MHz response displayed on the spectrum analyzer.

e. Remove the precision 75Ω terminator from the UNKNOWN cable.

f. Place the peak of the displayed 5 MHz to be at the top line of the graticule by adjusting the spectrum analyzer Vertical Position controls.

Parts g through l are repeated for each channel in turn:

- ☐ *SUBCARRIER*
- ☐ *BURST FLAG / SUBCARRIER*
- ☐ *SYNC*
- ☐ *H DRIVE / PAL PULSE / SYNC*
- ☐ *BLANKING*
- ☐ *V DRIVE / VIDEO / BLANKING*
- ☐ *VIDEO*
- ☐ *FRAME/VIDEO*

g. Connect the UNKNOWN cable to the A IN connector for the current channel, and select SYNC SOURCE A.

h. **CHECK** — that the return loss is ≥30 dB (3 major divisions) as you vary the SG503 frequency between 5 MHz and 250 kHz.

i. Connect the UNKNOWN terminator to the OUT connector for that channel, and turn the ECO–170A off, to put it into the Bypass mode of operation.

j. **CHECK** — that the return loss is ≥36 dB (3.6 major divisions) as you vary the SG503 frequency between 5 MHz and 250 kHz.

k. Remove the UNKNOWN terminator and turn the instrument back on. Move the UNKNOWN cable to the B IN connector for that channel, and select SYNC SOURCE B. Repeat part h of this step.

l. Move the UNKNOWN cable to the OUT connector for that channel, and repeat part j of this step.

m. Return to part g and repeat these steps for the next channel.

n. After checking all channels, remove the coax from the 7L12 RF IN connector, and remove the Return Loss Bridge from the 7A13.

2. Crosstalk (Operate Mode)

NOTE

The Spectrum Analyzer must be calibrated to the 7603 mainframe. See the Spectrum Analyzer manual for details.

a. Connect a 75 Ω coax and 10X 75Ω Attenuator to the Subcarrier output of the primary generator (Subcarrier coax). Connect a 50Ω coax with a 50/75Ω MIN LOSS Network on the end of it to the Spectrum Analyzer RF Input (Spectrum Analyzer coax).

Connect both of these to the ECO–170A SUBCARRIER channel and terminate the SUBCARRIER B IN connector with a 75Ω terminator, as shown in Fig. 2-3.

b. Set the following controls:

7L12:

Freq	0 MHz
Time/Div	5 ms
Ref Level	–20 dBm
Display Mode	10 dB/Div.
Gain Selector	CCW
Freq Span/Div	1 MHz
Resolution	300 kHz
Video Filter	30 kHz

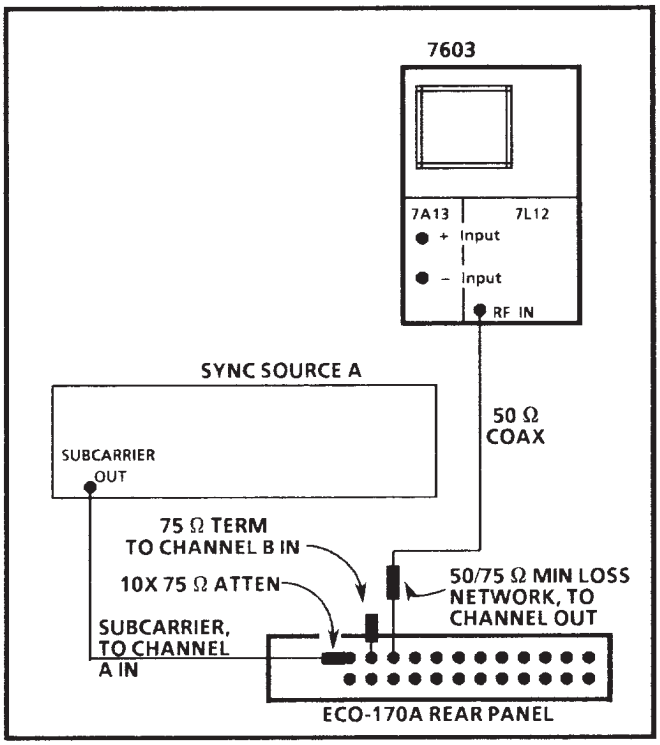


Fig. 2-3. Initial setup to check Crosstalk.

ECO–170A:
SYNC SOURCE A
AUTO SWITCH OFF

c. Place the peak of the displayed response at the top line of the graticule, by adjusting the Vertical Position controls on the Spectrum Analyzer.

d. Change the Spectrum Analyzer Freq Span/Div to 500 kHz, and depress the Freq Start push button.

e. Set the ECO–170A so the FRONT PANEL CONTROLS are ENABLED, and select SYNC SOURCE B.

f. **CHECK** — that the Spectrum Analyzer response is ≥55 dB down (5.5 major divisions).

Move the Spectrum Analyzer coax from the SUBCARRIER OUT connector to the BURST FLAG/SUBCARRIER OUT connector.

g. **GO TO** part j of this step.

After the initial time through this step, parts h through y are repeated for each of the following channels:

- ☐ *BURST FLAG/SUBCARRIER*
- ☐ *SYNC*
- ☐ *H DRIVE/PAL PULSE/SYNC*
- ☐ *BLANKING*
- ☐ *V DRIVE/VIDEO/BLANKING*
- ☐ *VIDEO*
- ☐ *FRAME/VIDEO*

NOTE

If any channels output (except the driven channel) does not meet the specification, it may be necessary to terminate both of the inputs for that channel and the output of the driven channel in 75Ω.

h. Connect Subcarrier from the primary generator to the A IN connector for the channel to be tested. Terminate the B IN connector for that channel with a 75Ω terminator.

Move the Spectrum Analyzer coax from the FRAME/VIDEO OUT connector to the SUBCARRIER OUT connector.

i. **CHECK** — for both SYNC SOURCE A and SYNC SOURCE B that the Spectrum Analyzer response is ≥55 dB down.

Move the Spectrum Analyzer coax from the SUBCARRIER OUT connector to the BURST FLAG/SUBCARRIER OUT connector.

j. **CHECK** — for both SYNC SOURCE A and SYNC SOURCE B that the Spectrum Analyzer response is ≥55 dB down (when BURST FLAG/SUBCARRIER is the driven channel, check SYNC SOURCE B only).

Move the Spectrum Analyzer coax from the BURST FLAG/SUBCARRIER OUT connector to the SYNC OUT connector.

k. **CHECK** — for both SYNC SOURCE A and SYNC SOURCE B that the Spectrum Analyzer response is ≥40 dB down (when SYNC is the driven channel, check SYNC SOURCE B only).

Move the Spectrum Analyzer coax from the SYNC OUT connector to the H DRIVE/PAL PULSE/SYNC OUT connector.

l. **CHECK** — for both SYNC SOURCE A and SYNC SOURCE B that the Spectrum Analyzer response is ≥40 dB down (when H DRIVE/PAL PULSE/SYNC is the driven channel, check SYNC SOURCE B only).

Move the Spectrum Analyzer coax from the H DRIVE/PAL PULSE/SYNC OUT connector to the BLANKING OUT connector.

m. **CHECK** — for both SYNC SOURCE A and SYNC SOURCE B that the Spectrum Analyzer response is ≥40 dB down (when BLANKING is the driven channel, check SYNC SOURCE B only).

Move the Spectrum Analyzer coax from the BLANKING OUT connector to the V DRIVE/VIDEO/BLANKING OUT connector.

n. **CHECK** — for both SYNC SOURCE A and SYNC SOURCE B that the Spectrum Analyzer response is ≥55 dB down (when V DRIVE/VIDEO/BLANKING is the driven channel, check SYNC SOURCE B only).

Move the Spectrum Analyzer coax from the V DRIVE/VIDEO/BLANKING OUT connector to the VIDEO OUT connector.

o. **CHECK** — for both SYNC SOURCE A and SYNC SOURCE B that the Spectrum Analyzer response is ≥55 dB down (when VIDEO is the driven channel, check SYNC SOURCE B only).

Move the Spectrum Analyzer coax from the VIDEO OUT connector to the FRAME/VIDEO OUT connector.

p. **CHECK** — for both SYNC SOURCE A and SYNC SOURCE B that the Spectrum Analyzer response is ≥55 dB down (when FRAME/VIDEO is the driven channel, check SYNC SOURCE B only).

q. Exchange the Subcarrier coax and the terminator, so that the Subcarrier coax is now connected to the B IN connector and the terminator is connected to the A IN connector for the channel being tested.

Move the Spectrum Analyzer coax from the FRAME/VIDEO OUT connector to the SUBCARRIER OUT connector.

r. **CHECK** — for both SYNC SOURCE A and SYNC SOURCE B that the Spectrum Analyzer response is ≥55 dB down (when SUBCARRIER is the driven channel, check SYNC SOURCE A only).

Move the Spectrum Analyzer coax from the SUBCARRIER OUT connector to the BURST FLAG/SUBCARRIER OUT connector.

s. **CHECK** — for both SYNC SOURCE A and SYNC SOURCE B that the Spectrum Analyzer response is ≥55 dB down (when BURST FLAG/SUBCARRIER is the driven channel, check SYNC SOURCE A only).

Move the Spectrum Analyzer coax from the BURST FLAG/SUBCARRIER OUT connector to the SYNC OUT connector.

t. **CHECK** — for both SYNC SOURCE A and SYNC SOURCE B that the Spectrum Analyzer response is ≥40 dB down (when SYNC is the driven channel, check SYNC SOURCE A only).

Move the Spectrum Analyzer coax from the SYNC OUT connector to the H DRIVE/PAL PULSE/SYNC OUT connector.

u. **CHECK** — for both SYNC SOURCE A and SYNC SOURCE B that the Spectrum Analyzer response is ≥40 dB down (when H DRIVE/PAL PULSE/SYNC is the driven channel, check SYNC SOURCE A only).

Move the Spectrum Analyzer coax from the H DRIVE/PAL PULSE/SYNC OUT connector to the BLANKING OUT connector.

v. **CHECK** — for both SYNC SOURCE A and SYNC SOURCE B that the Spectrum Analyzer response is ≥40 dB down (when BLANKING is the driven channel, check SYNC SOURCE A only).

Move the Spectrum Analyzer coax from the BLANKING OUT connector to the V DRIVE/VIDEO/BLANKING OUT connector.

w. **CHECK** — for both SYNC SOURCE A and SYNC SOURCE B that the Spectrum Analyzer response is ≥55 dB down (when V DRIVE/VIDEO/BLANKING is the driven channel, check SYNC SOURCE A only).

Move the Spectrum Analyzer coax from the V DRIVE/VIDEO/BLANKING OUT connector to the VIDEO OUT connector.

x. **CHECK** — for both SYNC SOURCE A and SYNC SOURCE B that the Spectrum Analyzer response is ≥55 dB down (when VIDEO is the driven channel, check SYNC SOURCE A only).

Move the Spectrum Analyzer coax from the VIDEO OUT connector to the FRAME/VIDEO OUT connector.

y. **CHECK** — for both SYNC SOURCE A and SYNC SOURCE B that the Spectrum Analyzer response is ≥55 dB down (when FRAME/VIDEO is the driven channel, check SYNC SOURCE A only).

z. **RETURN** — to part i of this step, and repeat for the next channel.

3. Crosstalk (Bypass Mode)

a. Continuing from the previous step, turn off the power to the ECO–170A. Move the Subcarrier coax to the SUBCARRIER A IN connector, and move the 75Ω terminator to the SUBCARRIER B IN connector. Move the Spectrum Analyzer coax to the BURST FLAG/SUBCARRIER OUT connector.

b. **CHECK** — that the Spectrum Analyzer response is ≥55 dB down.

Move the Subcarrier coax to the BURST FLAG/SUBCARRIER A IN connector, move the 75Ω terminator to the BURST FLAG/SUBCARRIER B IN connector, and move the Spectrum Analyzer coax to the SUBCARRIER OUT connector.

c. **CHECK** — that the Spectrum Analyzer response is ≥55 dB down.

Move the Subcarrier coax to the SYNC A IN connector, move the 75Ω terminator to the SYNC B IN connector, and move the Spectrum Analyzer coax to the H DRIVE/PAL PULSE/SYNC OUT connector.

d. **CHECK** — that the Spectrum Analyzer response is ≥40 dB down.

Move the Subcarrier coax to the H DRIVE/PAL PULSE/SYNC A IN connector, move the 75Ω terminator to the H DRIVE/PAL PULSE/SYNC B IN connector, and move the Spectrum Analyzer coax to the SYNC OUT connector.

e. **CHECK** — that the Spectrum Analyzer response is ≥40 dB down.

Move the Subcarrier coax to the BLANKING A IN connector, move the 75Ω terminator to the BLANKING B IN connector, and move the Spectrum Analyzer coax to the V DRIVE/VIDEO/BLANKING OUT connector.

f. **CHECK** — that the Spectrum Analyzer response is ≥55 dB down.

Move the Subcarrier coax to the V DRIVE/VIDEO/BLANKING A IN connector, move the 75Ω terminator to the V DRIVE/VIDEO/BLANKING B IN connector, and move the Spectrum Analyzer coax to the BLANKING OUT connector.

g. **CHECK** — that the Spectrum Analyzer response is ≥55 dB down.

Move the Subcarrier coax to the VIDEO A IN connector, move the 75Ω terminator to the VIDEO IN B connector, and move the Spectrum Analyzer coax to the V DRIVE/VIDEO/BLANKING OUT connector.

h. **CHECK** — that the Spectrum Analyzer response is ≥55 dB down.

Move the Subcarrier coax to the FRAME/VIDEO A IN connector, move the 75Ω terminator to the FRAME/VIDEO B IN connector, and move the Spectrum Analyzer coax to the VIDEO OUT connector.

i. **CHECK** — that the Spectrum Analyzer response is ≥55 dB down.

j. Disconnect all connections, and turn on the ECO–170A power.

4. DC Offset and Residual Noise

NOTE

Perform this step for each channel:

- ☐ *VIDEO*
- ☐ *FRAME/VIDEO*
- ☐ *BLANKING*
- ☐ *V DRIVE / VIDEO / BLANKING*
- ☐ *SYNC*
- ☐ *H DRIVE / PAL PULSE / SYNC*
- ☐ *SUBCARRIER*
- ☐ *BURST FLAG / SUBCARRIER*

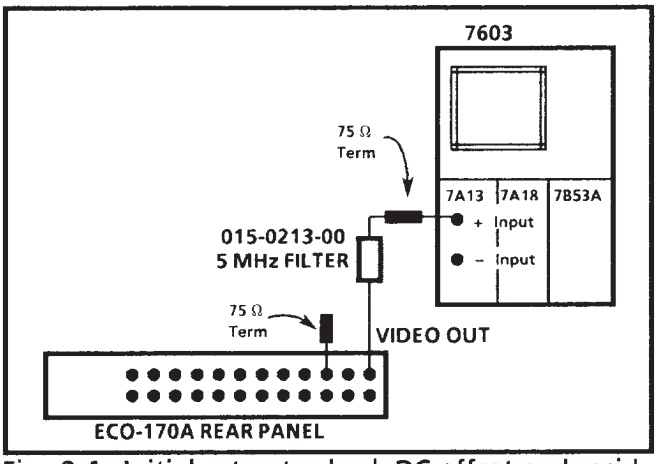


Fig. 2-4. Initial setup to check DC offset and residual noise.

a. Set the following controls:

Test Oscilloscope

Vertical Mode	7A13
Trigger Source	7B53A

7A13	**Setting**
Volts/Div	20 mV
+ Input Coupling	DC
– Input Coupling	GND
BW	Full

7B53A

Mode	AUTO
Coupling	AC
Source	INT
Time/Div	10 μS

b. Connect a 75Ω terminator to the ECO–170A A IN connector for the channel under test. Connect the ECO–170A OUT connector for the channel under test to the Test Oscilloscope Differential Comparator + Input, using an external 5 MHz filter and a 75Ω feed through terminator (see Fig. 2-4). Select SYNC SOURCE A on the ECO–170A Front Panel.

c. **CHECK** — that the blanking level is at 0 V ±50 mV.

d. Change the Test Oscilloscope Vertical Deflection to 2 mV/Div.

e. **CHECK** — that there is ≤2 mV (Subcarrier or Video channels) or ≤4 mV (Pulse channels) of noise present on the output for that channel.

Move the 75Ω terminator to the ECO–170A B IN connector for the channel under test, and select SYNC SOURCE B on the ECO–170A.

f. **CHECK** — that there is ≤2 mV (Subcarrier or Video channels) or ≤4 mV (Pulse channels) of noise present on the output for that channel.

Change the Test Oscilloscope Vertical Deflection to 20 mV/Div.

g. **CHECK** — that the blanking level is at 0 V ±50 mV.

h. **RETURN** — to part b and repeat this entire step for the next channel configured for VIDEO.

5. Amplitude Error Detection

NOTE

Perform this step for each channel:

- ☐ *VIDEO*
- ☐ *FRAME/VIDEO*
- ☐ *BLANKING*
- ☐ *V DRIVE/VIDEO/BLANKING*
- ☐ *SYNC*
- ☐ *H DRIVE/PAL PULSE/SYNC*
- ☐ *SUBCARRIER*
- ☐ *BURST FLAG/SUBCARRIER*

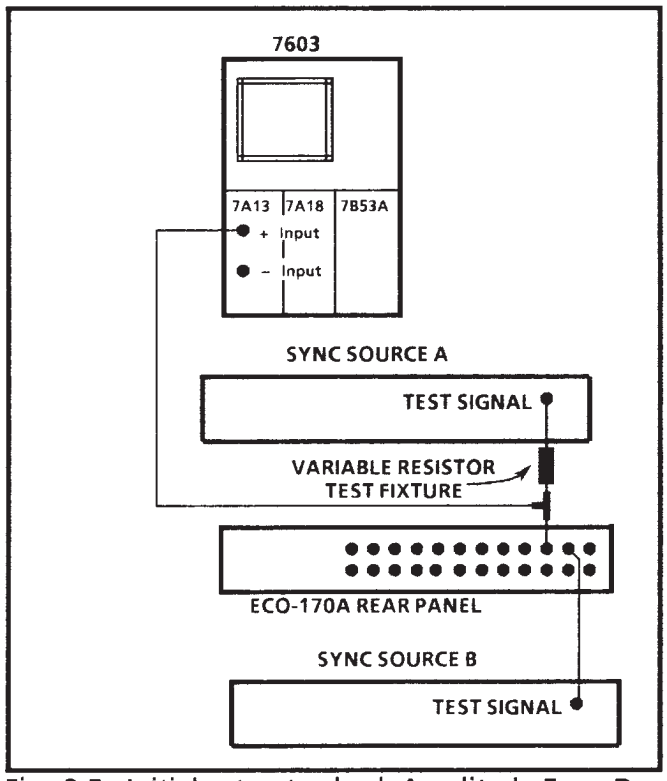


Fig. 2-5. Initial setup to check Amplitude Error Detection.

a. Connect all of the signals from the two Sync Sources to the ECO–170A inputs, according to the configuration of the instrument. Select SYNC SOURCE A with the front panel controls.

b. Insert the Variable Resistor test fixture (shown in Fig. 2-1) at the ECO–170A A IN connector for the channel under test, using a BNC T-connector to run a coax to the test oscilloscope vertical input as shown in Fig. 2-5. Set the oscilloscope to view the video sync, subcarrier, or pulses, depending on what that channel is configured for.

c. Use the variable resistor test fixture to reduce the amplitude of the signal, while watching the front panel FAULT INDICATOR LEDs. As soon as the FAULT LED for the channel comes on, stop turning the variable resistor.

d. **CHECK** — on the oscilloscope that the video sync, subcarrier, or pulse amplitude is within the limits of that signal type, shown in Table 2-10, when the FAULT LED comes on.

e. Return the signal to full amplitude, and move the variable resistor test fixture and BNC T-connector to the B INPUT connector for the channel. Use the front panel controls to clear the fault indication, and to select SYNC SOURCE B.

Table 2-10 Amplitude Fault Detection Limits

SIGNAL TYPE	Fault when signal is	
	less than	but at least
VIDEO (sync only)	226 mV	189 mV
SUBCARRIER	1.58 V	1.26 V
PULSE		
4 Volt	3.17 V	2.52 V
2 Volt	1.58 V	1.26 V

f. **REPEAT** — parts c and d of this step for the B INPUT of the channel under test.

g. **REPEAT** — this entire step for the next channel configured for VIDEO.

6. Op Amp Bad Detection

a. Continuing from the previous step, remove the variable resistor test fixture and BNC T-connector, and re-connect the coax from the Sync Source to the ECO–170A input.

b. Select SYNC SOURCE B at the ECO–170A front panel.

c. Use a test lead to ground the appropriate test point:

TP282	(Video)
TP382	(Frame/Video)
TP563	(Blanking)
TP368	(V Drive/Video/Blanking)
TP564	(Sync)
TP755	(H Drive/PAL Pulse/Sync)
TP954	(Subcarrier)
TP768	(Burst Flag/Subcarrier)

d. **CHECK** — as each test point is grounded, that the relays click and the ECO STATUS LEDs switch from OPERATE to BYPASS. The FAULT INDICATOR LEDs should remain off.

e. Remove the ground from the test point.

f. **CHECK** — that the relays click and the ECO STATUS LEDs switch from BYPASS to OPERATE. The FAULT INDICATOR LEDs should still remain off.

g. Apply the ground to the next test point listed in part c.

7. Gain – Subcarrier Channels

NOTE

Perform this step for the following channel:

☐ Subcarrier

This step must be repeated for the BURST FLAG/SUBCARRIER channel, if it is configured for SUBCARRIER.

a. Connect the test equipment as shown in Fig. 2-6.

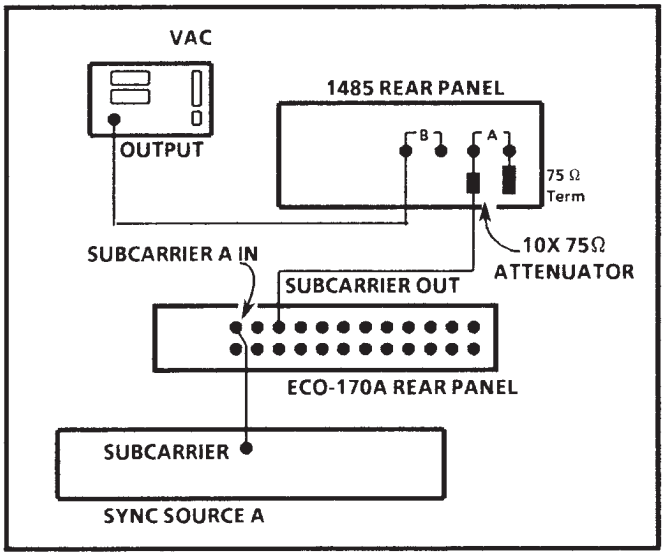


Fig. 2-6. Initial setup to check SUBCARRIER Channels gain.

b. Set the following controls:

1485:

Input	A–B, DC Coupled
Response	FLAT
Volts Full Scale	0.2
DC Restorer	OFF
Oper/Cal	OPER
Sync	INT, DIRECT
All Fields	OFF
Display	10 μs/Div
Magnifier	X1

ECO–170A:
Select SYNC SOURCE A.

c. With all of the VAC push buttons out, set the VAC lever switches for 200.0 mV.

d. Calibrate the test setup by connecting the coax from Sync Source A directly to the coax to the Waveform Monitor with a barrel connector. Then pull out the VAC tolerance control and adjust it so that the waveforms displayed on the 1485 just touch.

NOTE
DO NOT change the setting of the VAC Tolerance control for the remainder of this step.

e. Remove the barrel connector and re-connect the two cables to the ECO–170A.

f. Adjust the VAC Variable control so that the two waveforms on the 1485 just touch.

g. **CHECK** — using the VAC, that the displayed subcarrier amplitude is 200 mV ± 8 mV.

h. Turn off the ECO–170A power, to force it into BYPASS mode, and repeat parts f and g of this step.

i. Turn the ECO–170A power back on, move the Subcarrier coax from the A IN connector to the B IN connector, and select SYNC SOURCE B with the ECO–170A.

j. **REPEAT** — parts f and g of this step.

k. **REPEAT** — parts f through j of this step for the BURST FLAG/SUBCARRIER channel, if it is configured for subcarrier.

8. Gain – Pulse Channels

NOTE
Perform this step for the following channels:

- ☐ SYNC
- ☐ BLANKING
- ☐ H DRIVE/ PAL PULSE/ SYNC

This step must be repeated for each of the following channels, if they are configured for PULSE signals:

- ☐ V DRIVE/ BLANKING/ VIDEO
- ☐ FRAME/ VIDEO
- ☐ BURST FLAG/ SUBCARRIER

a. Connect the test equipment as shown in Fig. 2-7.

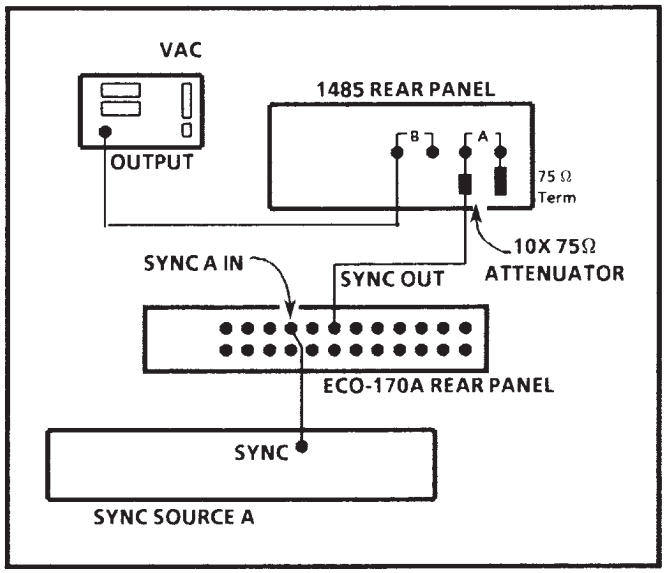


Fig. 2-7. Initial setup to check SUBCARRIER Channels gains, ringing, and tilt.

b. Set the following controls:

ECO–170A:
Select SYNC SOURCE A.

1485:

Input	A–B, DC Coupled
Response	FLAT
Volts Full Scale	0.2
DC Restorer	OFF
Oper/Cal	OPER
Sync	INT, DIRECT
All Fields	OFF
Display	10 μs/Div
Magnifier	X1

c. With all of the VAC push buttons out, set the VAC lever switches for 400.0 mV (NTSC) or 200.0 mV (PAL).

d. Calibrate the test setup by connecting the coax from Sync Source A directly to the coax to the Waveform Monitor with a barrel connector. Then pull out the VAC tolerance control and adjust it so that the waveforms displayed on the 1485 just touch.

NOTE

DO NOT change the setting of the VAC Tolerance control for the remainder of this step.

e. Remove the barrel connector and re-connect the two cables to the ECO–170A.

f. Adjust the VAC Variable control so that the two waveforms on the 1485 just touch.

g. **CHECK** -- using the VAC, that the displayed pulse amplitude is:

NTSC	400 mV ± 8 mV
PAL	200 mV ± 4 mV

h. Turn off the ECO–170A power, to force it into BYPASS mode, and repeat parts f and g of this step.

i. Turn the ECO–170A power back on, move the SYNC coax from the A IN connector to the B IN connector, and select SYNC SOURCE B with the ECO–170A.

j. **REPEAT** — parts f and g of this step.

k. **REPEAT** — parts f through j of this step for the next channel configured for pulse signals.

9. Gain, Chrominance to Luminance Gain, Ringing, and Tilt – Video Channels

NOTE

Perform this step for the following channel:

☐ VIDEO

This step must be repeated for each of the following channels, if they are configured for VIDEO:

☐ V DRIVE/ BLANKING/ VIDEO
☐ FRAME/ VIDEO

a. Connect the test equipment as shown in Fig. 2-8. If continuing from the previous step, be sure to remove the 10X 75Ω attenuator from the cable from the ECO–170A to the Waveform Monitor.

b. Set the following controls:

ECO–170A:
Select SYNC SOURCE A.

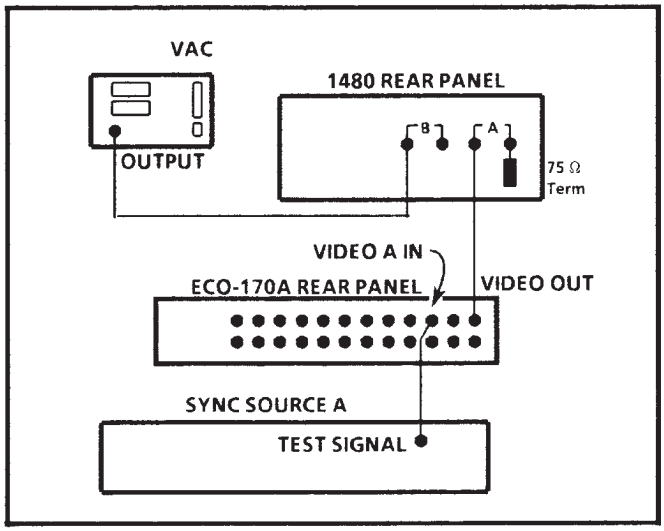


Fig. 2-8. Initial setup to check VIDEO Channels gains, ringing, and tilt.

SYNC SOURCE A:
Select Pulse and Bar as test signal.

1485:

Input	A–B, DC Coupled
Response	FLAT
Volts Full Scale	0.2
DC Restorer	OFF
Oper/Cal	OPER
Sync	INT, DIRECT
All Fields	OFF
Magnifier	X1
Display	10 μS/Div

c. Set the VAC lever switches for 714.3 mV, with all push buttons out.

d. Calibrate the test setup by connecting the coax from Sync Source A directly to the coax to the Waveform Monitor with a barrel connector. Then pull out the VAC tolerance control and adjust it so that the waveforms displayed on the 1485 just touch.

NOTE

DO NOT change the setting of the VAC Tolerance control for the remainder of this step.

e. Remove the barrel connector and re-connect the two cables to the ECO–170A.

f. **CHECK** — using the VAC, that the bar amplitude is 714.3 mV ±14.2 mV.

g. **CHECK** — using the VAC, that amplitude of the tallest displayed Mod Pulse matches the Bar amplitude ±7.14 mV.

h. **CHECK** — using the VAC, for less than 14.2 mV ringing on the inverted pulse.

i. **CHECK** — using the VAC, for less than 14.2 mV ringing at blanking level on the 2T Pulse.

Set the VAC lever switches to 000.0 mV, and change the 1485 Display setting to 5 μS/Div. Select the 100 IRE signal as the test signal from SYNC SOURCE A.

j. **CHECK** — that the line tilt of the display is ≤14.2 mV.

Change the 1485 Display setting to 2 Field.

k. **CHECK** — that the field tilt of the display is ≤14.2 mV.

l. Turn the ECO–170A power off.

m. **REPEAT** — parts f through k of this step.

Turn the ECO–170A power back on, and move the test signal coax from the A IN connector to the B IN connector of the channel being tested. Select SYNC SOURCE B on the ECO–170A.

n. **REPEAT** — parts f through k of this step.

o. **REPEAT** — parts f through n of this step for the next channel configured for VIDEO.

10. Differential Gain and Phase - Video Channels

NOTE

Perform this step for the following channel:

☐ VIDEO

This step must be repeated for each of the following channels, <u>if they are configured for VIDEO</u>:

☐ V DRIVE/ BLANKING/ VIDEO
☐ FRAME/ VIDEO

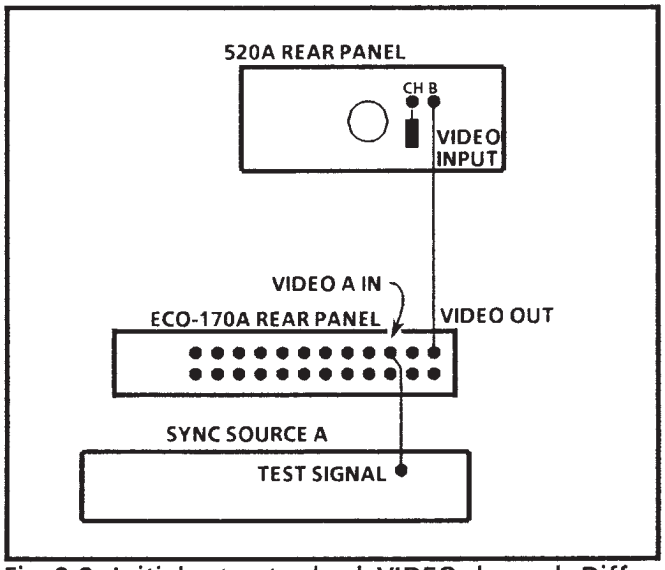


Fig. 2-9. Initial setup to check VIDEO channels Diff Gain and Diff Phase.

a. Set the following controls:

VECTORSCOPE

Channel B	IN
B Phase	IN
Full Field	IN
Phase Ref	BURST
Vector	IN
Sync	INT
Diff Phase	DOUBLE

b. Connect the SYNC SOURCE A test signal to the ECO–170A A IN connector for the channel under test, and select Mod Ramp as the test signal out of SYNC SOURCE A. Connect the ECO–170A OUT connector for the channel under test to the Vectorscope Channel B Input, and terminate the Channel B loop-through in 75Ω (see Fig. 2-9). Select SYNC SOURCE A on the ECO–170A.

c. Normalize the burst vector on the Vectorscope, and set it to 180°. Set the Vectorscope for Diff Gain.

d. **CHECK** — for Diff Gain of ≤ 2%.

Set the Vectorscope to measure Diff Phase.

e. **CHECK** — for Diff Phase of ≤ 2°.

Turn the ECO–170A power off. Set the Vectorscope to display a vector pattern.

f. **CHECK** — Diff Gain and Diff Phase with the ECO–170A in BYPASS Mode by repeating parts c through e of this step.

Turn the ECO–170A power back on, and move the SYNC SOURCE A Test Signal coax from the A IN connector to the B IN connector of the channel under test. Select SYNC SOURCE B on the ECO–170A.

g. **CHECK** — Diff Gain and Diff Phase for the B INPUT of the channel under test by repeating parts c through e of this step.

h. **RETURN** — to part b and repeat this entire step for the next channel configured for VIDEO.

11. Pulse Width Fault Detection

a. Connect all of the signals from the two Sync Sources to the ECO–170A inputs, according to the configuration of the instrument. Select SYNC SOURCE A with the front panel controls.

b. **CHECK** — that neither of the FAULT INDICATOR LEDs are lighted.

c. Turn off Pulse Width Detection by opening S715 segment 2.

d. **CHECK** — that neither of the FAULT INDICATOR LEDs are lighted.

e. Exchange the Burst Flag A coax and the Blanking A coax, connecting Burst Flag to the BLANKING A IN connector, and Blanking to the BURST FLAG A IN connector. Clear the fault caused by moving the cables

f. **CHECK** — that neither of the FAULT INDICATOR LEDs are lighted.

g. Turn on Pulse Width Detection by closing S715 segment 2.

h. **CHECK** — that the A FAULT INDICATOR LED is lighted.

This completes the Performance Check procedure. The Pulse Width Counter accuracy may be verified, and several other tests performed, with the built-in Diagnostic routines. See Section 5, Maintenance, for details of the Diagnostic tests.

CALIBRATION

Power Supply Adjustment

a. Apply power to the ECO–170A through the Variable Autotransformer, and set it to apply 90 V as the input voltage. Set R415 (current limit) 1/4 turn from its counterclockwise limit.

b. CHECK/ADJUST — for +5 V ±100 mV at the +5 V test point on the power board. Use R510 to adjust, if necessary. Set R415 (current limit) to its clockwise limit.

c. CHECK — to see if the LED (DS670) is flashing or not. If the LED is flashing, then the supply is current limiting. If the LED is not flashing, go to part e.

d. ADJUST — R415 slowly counterclockwise until the supply stops current limiting (the LED stops flashing).

e. ADJUST — R415 counterclockwise 1/4 turn from the point where the LED stops flashing.

f. CHECK — that the +5 V test point is still at +5 V ±100 mV.

WARNING

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

SECTION 3
INSTALLATION

PACKAGING

At installation time, save the shipping carton and packaging materials for repackaging in case reshipment becomes necessary. See Fig. 3-1.

ELECTRICAL INSTALLATION

Power Supply Frequency and Voltage Ranges

The power supply in this instrument operates over a line frequency range of 48 to 62 Hz and is set (by jumper P810) to receive a nominal line voltage of 115 V. Its installed line fuse is rated for 250 V and 2 Amps. To set the power supply to receive a nominal line voltage of 230 V, move P810 as shown in Table 3-3 and replace the line fuse with one rated for 250 V and 1 Amp.

Securing Power Cord

Plug in power cable, then mount to extreme left of the line filter using one of the screws (on the instrument), loop clamp, and washer. See Fig. 3-2.

Required Signals

SYNC and SUBCARRIER signals **MUST** be applied from both Generators in order for the Pulse Width Detection to work, and to ensure that manual switching of sync sources occurs during the vertical interval.

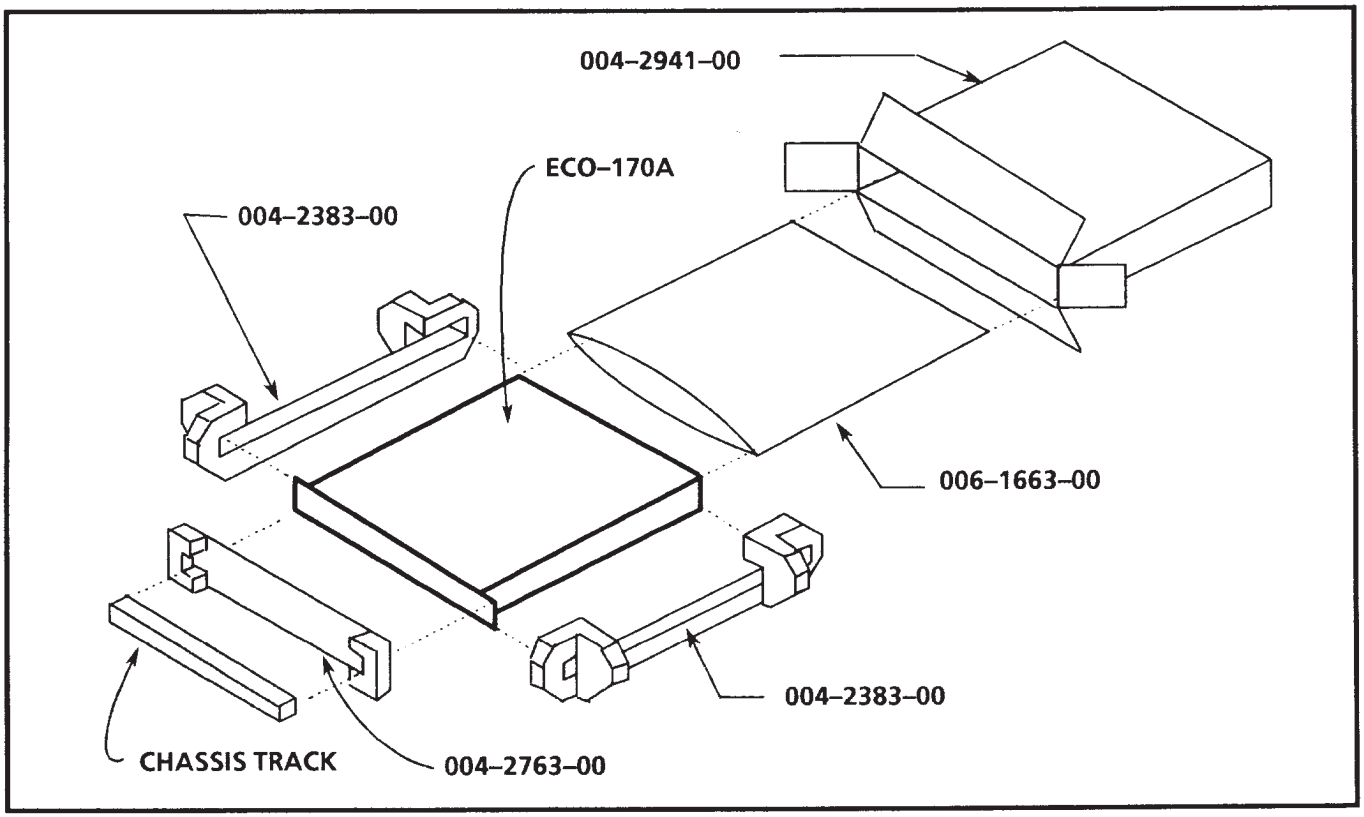


Fig. 3-1. Repacking instructions.

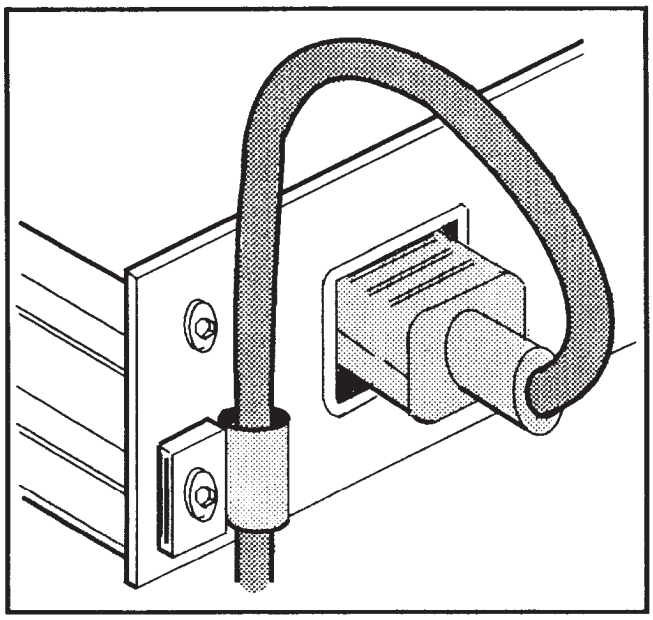


Fig. 3-2. Mounting the power cord.

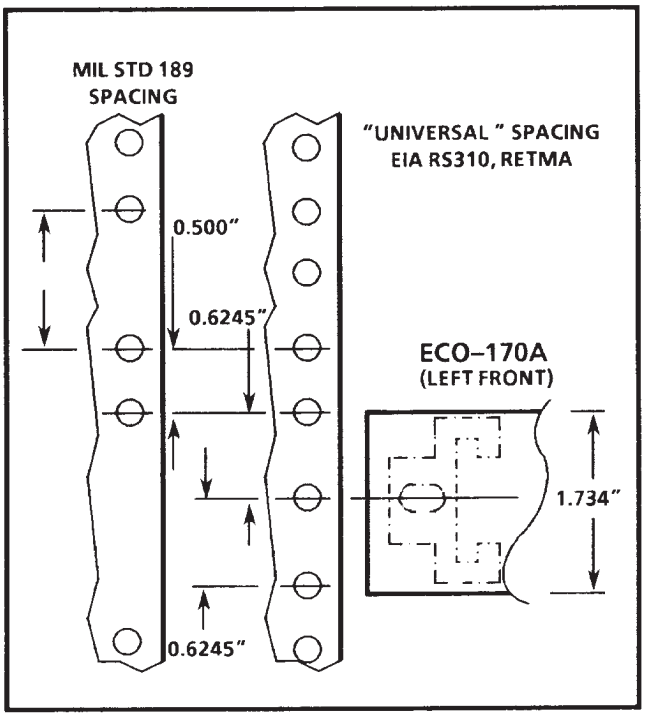


Fig. 3-3. Rail detail for mounting slide tracks.

MECHANICAL INSTALLATION

Rack Mounting

The ECO–170A is shipped with hardware for rackmounting. The instrument fits in a standard 19-inch rack. Spacing between the front rails of the rack must be at least 17–3/4 inches to allow clearance for the slide-out tracks.

Rack slides conveniently mount in any rack that has a front-to-rear rail spacing between 15–1/2 and 28 inches.

Mounting the Slide Tracks

Locate the proper rack holes as shown in Fig. 3-3. Notice that the hole spacing varies with the type of rack. When installing the slides in EIA-type racks, make certain that the slides are attached to the 1/2–inch-spaced holes.

Mount the rails using enclosed hardware as shown in Fig. 3-4. Fig. 3-5 shows the rail mounting details for both deep and shallow racks. Make sure the stationary sections are horizontally aligned and are level and parallel.

Installing the Instrument

Install the instrument in the rack, as shown in Fig. 3-6. Table 3-1 lists the signals available at the rear-panel connectors.

Rack Adjustments

After installation, the slide tracks may bind if they are not properly adjusted. To adjust the tracks, slide the instrument out about 10 inches, slightly loosen the screws holding the tracks to the front rails, and allow the tracks to seek an unbound position. Retighten the screws and check the tracks for smooth operation by sliding the instrument in and out of the rack several times.

Once the instrument is in place within the rack, tighten the knurled retaining screw to fasten it securely into the rack.

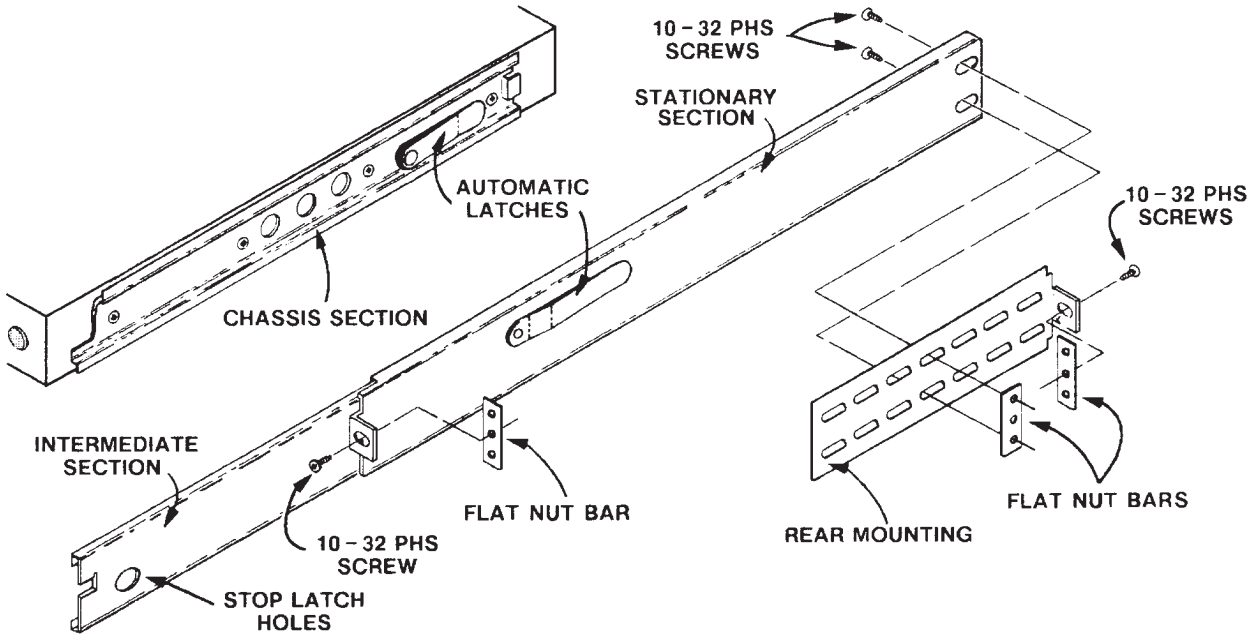
Rack Slide Maintenance

The slide-out tracks do not require lubrication. The dark gray finish on the tracks is a permanent, lubricated coating.

Removing the Instrument

First, loosen the front-panel knurled retaining screw. See Fig. 3-6. Grasp the front handles and pull the instrument out until all three slide sections latch. The instrument is firmly held in this position.

To completely remove the instrument, press both release-latch buttons (visible in the stop-latch holes) and carefully slide the instrument free from the tracks. Be sure that all cabling is disconnected before removing the instrument.



NOTE:

Right hand and left hand stationary section is designated by the RH and the LH marked on the rails. Stop latch holes should be towards the bottom when slides are in place. (The right hand rail is shown above.)

Fig. 3-4. Assembly of rack mounting hardware.

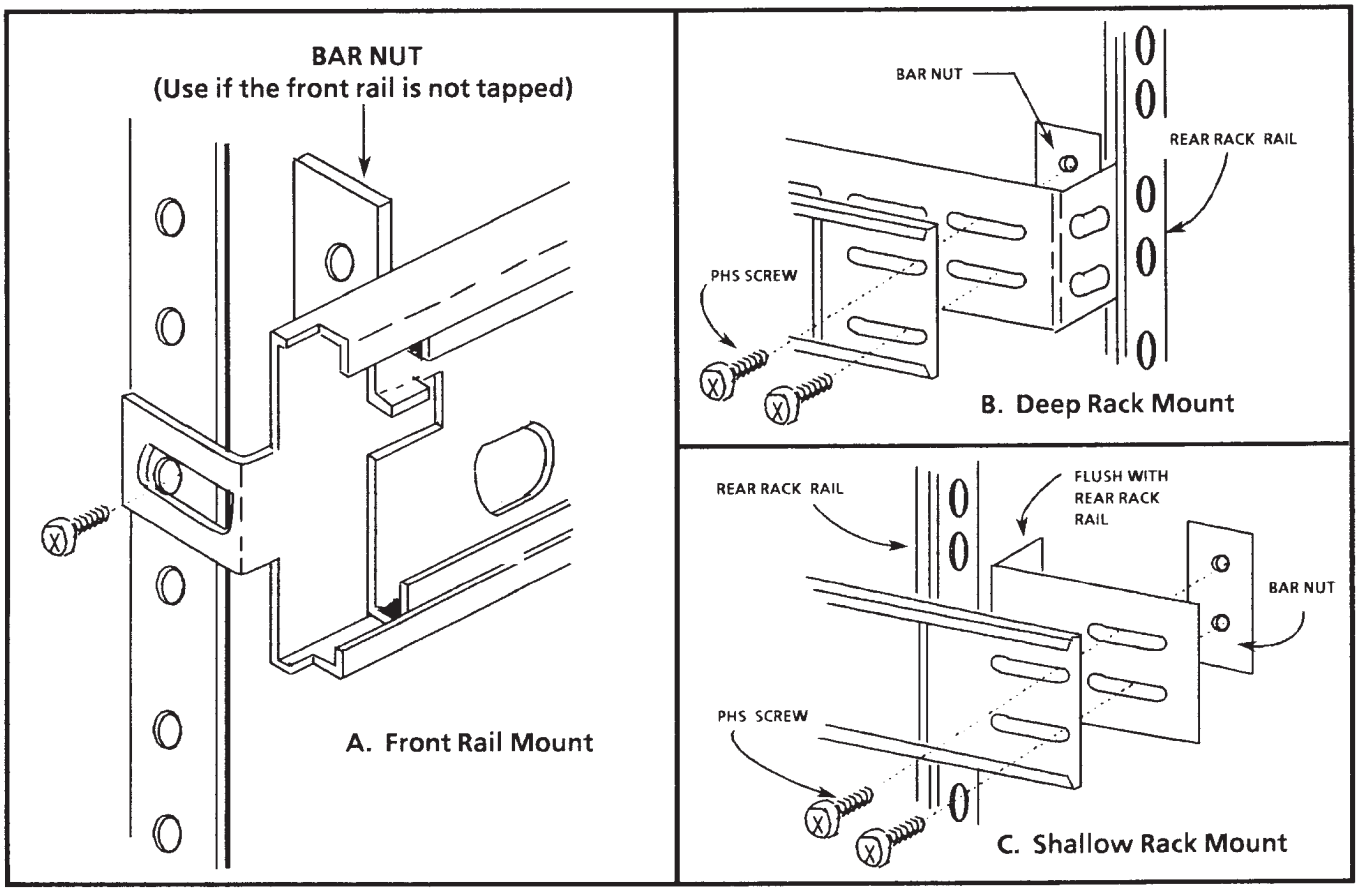


Fig. 3-5. Mounting stationary track sections.

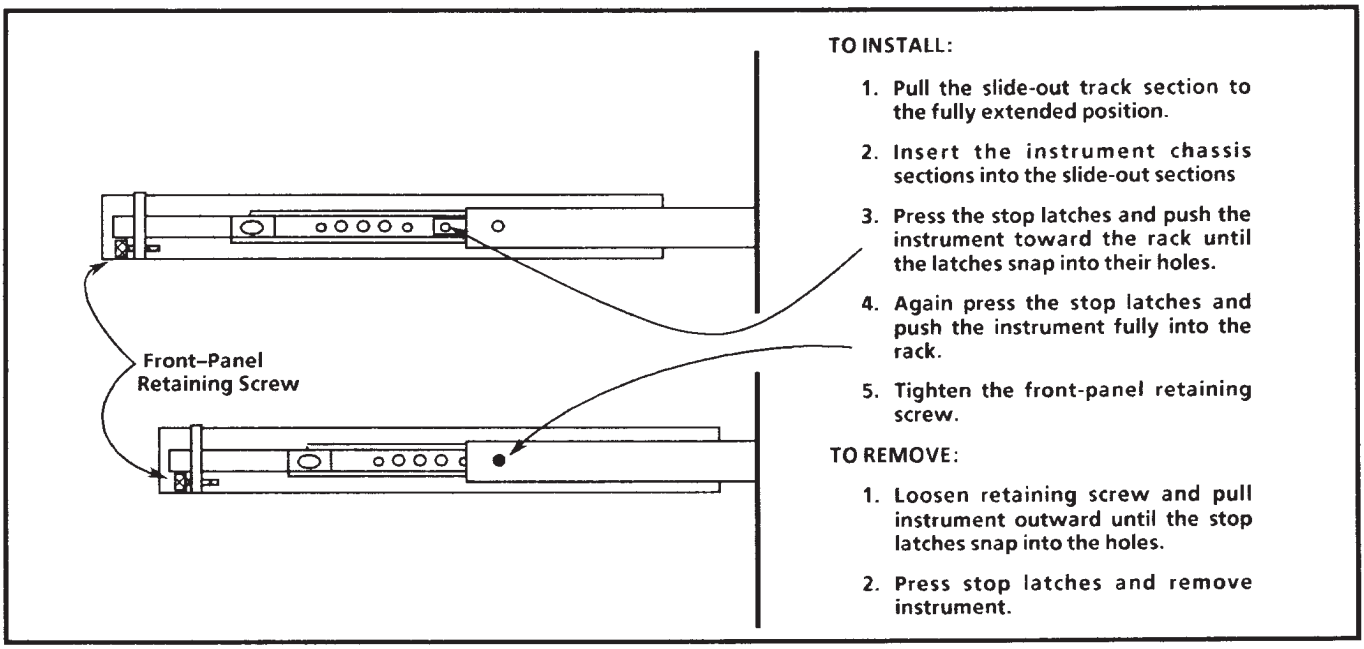


Fig. 3-6. Racking and unracking the ECO–170A.

Operating and Test Mode Selection

This section explains the jumper and switch settings to select the various operating and test modes for the entire instrument. In all cases, the ▶ symbol on the circuit boards denotes pin 1. Green jumpers are for selecting operating modes. Red jumpers are for testing the instrument. The red jumpers should be used only by qualified service personnel.

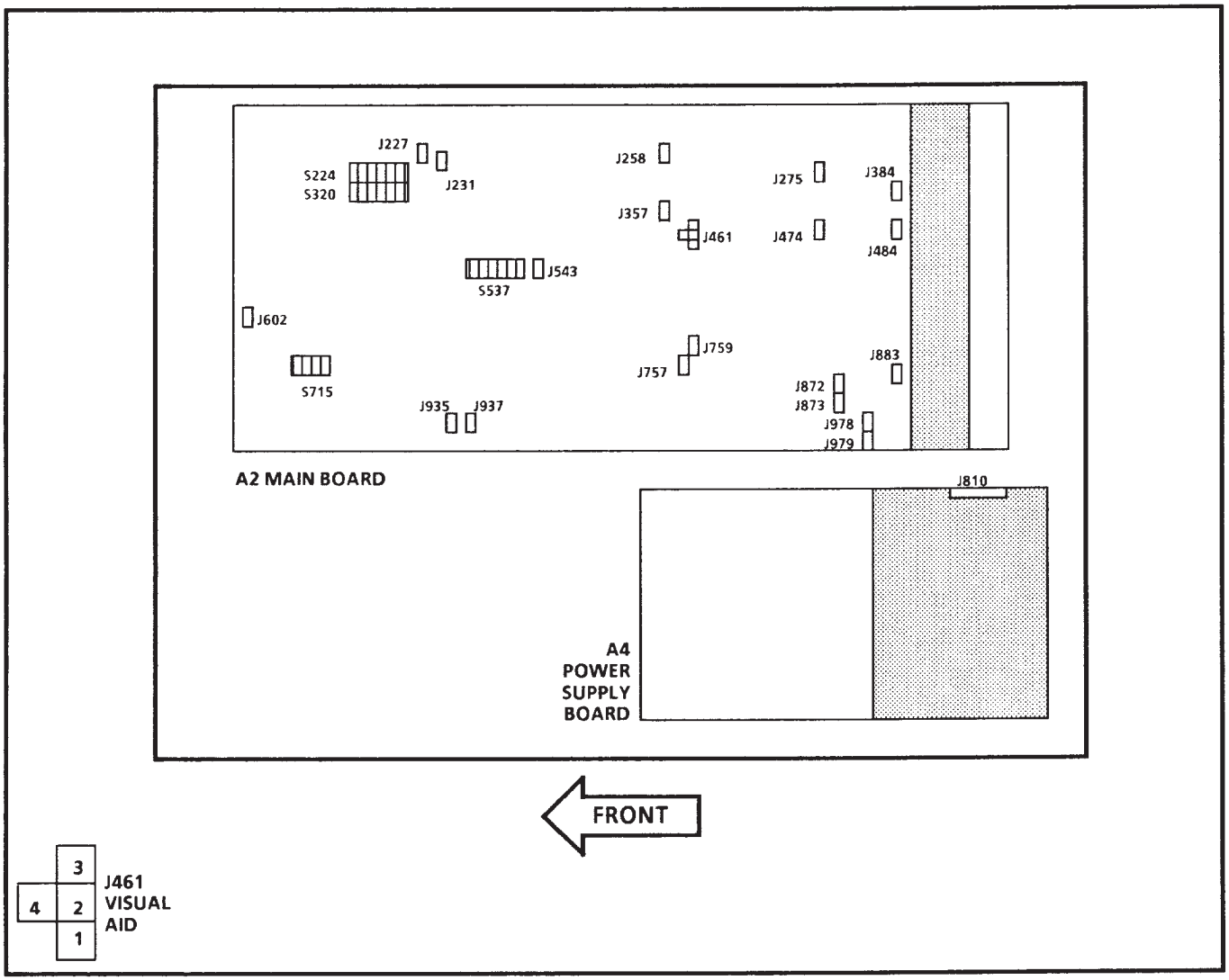


Fig. 3-7. ECO–170A jumper and switch locations.

Table 3-1. ECO–170A Main Board (A2) Configuration

Channel Switch / Jumper	Selection	Factory Settings	
		NTSC	PAL
General			
S715 (Misc)			
Sw 1 PAL/NTSC	Closed - NTSC, Open - PAL	Closed	Open
Sw 2 Pulse Width Detection [a]	Closed - Enable, Open - Disable	Closed	Closed
Sw 3 A or B	Used with Diagnostics only. See Section 5	Closed	Closed
Sw 4 PWPOL	Used with Diagnostics only. See Section 5	Closed	Closed
S224 (Diagnostics)	**See Section 5 MAINTENANCE for details**		
Sw 8	Closed - Normal, Open - Run Diagnostics	Closed	Closed
J543 Pulse Amplitude	1&2 – 4 Volt, 2&3 – 2 Volt	1&2	2&3
Subcarrier (Channel 1)		3.58 MHz	4.43 MHz
S537 (Configure) Sw 1 [a,b]	Open - Enable, Closed - Disable	Open	Open
J978 J979	1&2 – 3.58 MHz, 2&3 – 4.43 MHz	1&2	2&3
Burst Flag/Subcarrier (Channel 2)		Burst Flag	Burst Flag
S320 (Signal Set) Sw 1	Closed - Burst Flag, Open - Subcarrier	Closed	Closed
S537 (Configure) Sw 2 [b]	Open - Enable, Closed - Disable	Open	Open
J757 J883 J935 J937	1&2 – Burst Flag, 2&3 – Subcarrier	1&2	1&2
J872 J873	1&2 – 3.58 MHz, 2&3 – 4.43 MHz	1&2	2&3
Sync (Channel 3)			
S537 (Configure) Sw 3 [a,b]	Open - Enable, Closed - Disable	Open	Open

[a] If either channel 1 or 3 is disabled (S537 Sw 1 or 3 closed), all Pulse Width Detection will be disabled as well.

[b] The Configure switch, S537, enables/disables the amplitude and pulse width detection for the named channel.

Table 3-1. ECO–170A Main Board (A2) Configuration (Cont)

Channel Switch / Jumper	Selection	Factory Settings	
		NTSC	PAL
H Drive/PAL/Sync (Channel 4)		H Drive	PAL Pulse
S320 (Signal Set)			
Sw 2	Closed - H Drive/PAL, Open - Sync	Closed	Closed
Sw 3	Closed - PAL Pulse, Open - PAL Square	Closed	Closed
S537 (Configure)			
Sw 4 [b]	Open - Enable, Closed - Disable	Open	Open
J759	1&2 – H Drive/Sync, 2&3 – PAL	1&2	2&3
Blanking (Channel 5)			
S537 (Configure)			
Sw 5 [b]	Open - Enable, Closed - Disable	Open	Open
V Drive/Video/Blanking (Channel 6)		V Drive	Video
S320 (Signal Set)			
Sw 4 [b]	Closed - V Drive/Blanking, Open - Video	Closed	Open
Sw 5 [b]	Closed - V Drive, Open - Blanking	Closed	Closed
S537 (Configure)			
Sw 6	Open - Enable, Closed - Disable	Open	Open
J357	1&2 – Video,2&3 – Blanking/V Drive	2&3	1&2
J484 J474	1&2 – Blanking/V Drive, 2&3 – Video	1&2	2&3
J461	1&2 – V Drive, 2&3 – Blanking, 2&4 – Video	1&2	2&4
Video (Channel 7)			
S537 (Configure)			
Sw 7 [b]	Open - Enable, Closed - Disable	Open	Open
Frame/Video (Channel 8)		Frame Pulse	Frame Pulse
S320 (Signal Set)			
Sw 6	Closed - Frame, Open - Video	Closed	Closed
Sw 7	Closed - Frame Pulse, Open - Frame Square	Closed	Closed
S537 (Configure)			
Sw 8 [b]	Open - Enable, Closed - Disable	Open	Open
J384 J275 J258	1&2 – Frame, 2&3 – Video	1&2	1&2

[b] The Configure switch, S537, enables/disables the amplitude and pulse width detection for the named channel.

Table 3-2. Power Supply Board (A4) Operating Mode Selection Jumpers

FUNCTION	JUMPER #	DESCRIPTION	FACTORY SET
115 V/230 V Line Voltage Select	P810	Pin 1 aligned with 115 V: Power Supply accepts 115 V line voltage. Fuse rating must be 2 A, medium blow. Pin 1 aligned with 230 V: Power Supply accepts 230 V line voltage. Fuse rating must be 1 A, medium blow.	115 V

Table 3-3. Main Board (A2) Test Jumpers

FUNCTION	JUMPER #	DESCRIPTION	FACTORY SET
Manual Reset	J227	1&2 Operate; 2&3 Reset	1&2
Watchdog Timer	J231	1&2 Wtchdg Enabled; 2&3 Wtchdg Disabled	1&2

Table 3-4. Power Supply Board (A4) Test Jumpers

FUNCTION	JUMPER #	DESCRIPTION	FACTORY SET
Overvolts Sensor Test (–5 V)	J120	Jacks 1 and 2 unshorted: Normal operation (voltage at pin 9 of U220B should be about + 0.3 V). Jacks 1 and 2 shorted: Shuts down Power Supply.	Unshorted
Overvolts Sensor Test (+ 5 V)	J242	Jacks 1 and 2 unshorted: Normal operation (voltage at pin 10 of U335B should be about + 2.1 V). Jacks 1 and 2 shorted: Shuts down Power Supply.	Unshorted

SECTION 4
THEORY OF OPERATION

INTRODUCTION

This section of the manual begins with a functional block diagram description of the ECO–170A, followed by a more detailed description of each circuit block. The detailed discussion is arranged to follow the same order that the circuit blocks appear in the schematic diagrams. While using this Theory of Operation, refer to the Block Diagram and the Schematic Diagrams located in the foldout pages at the rear of the manual.

BLOCK DIAGRAM DESCRIPTION

The A and B inputs for each channel are applied to the Input Amps and Switches block, which affects the selection of which input (A or B) to apply to the input amplifier.

Input Amps and Switches

Each input channel accepts an A input from the primary generator and a B input from the backup generator. The A input is applied to the bypass relay which, in turn, applies it to an electronic switch. The B inputs in each channel are applied directly to the electronic switch. This electronic switch selects either the A or B input to apply to that channel's amplifier. The outputs of these eight amplifiers (one for each channel) are applied to the rear panel outputs, and to the Peak Detectors.

Peak Detectors

Each channel's input amplifier drives a peak detector whose output is applied to a comparator. If the Peak Detector output falls below the comparator's reference voltage, indicating that there is a problem with the signal, an $\overline{\text{OPBAD}}$ flag is placed on the EDBUS. This will cause the ECO–170A to evaluate whether there is a problem with the signal path, and, if there is, switch into the BYPASS mode of operation.

Pulse Detectors

All the Primary generator inputs are applied to the A Pulse Detectors, and all the Backup generator inputs are applied to the B Pulse Detectors. The Pulse Detectors check the amplitude and period of all the signal inputs. If there is a fault with any signal from the primary generator, the A Pulse Detectors force the APRES line low; for a fault with a backup generator signal, the B Pulse Detectors force the BPRES line low.

These flags are applied to the source switching circuitry, to effect a switch if needed, and are also placed on the EDBUS.

Pulse Width Detector

The pulse inputs are applied to a multiplexer, which passes them one at a time to a counter control circuit. This control circuit starts and stops a counter at the beginning and end of the pulse, and places the result on the EDBUS for the μP to compare against the stored value for that pulse type.

Voltage References

The Voltage References, located on Schematic 2, develop all of the reference voltages for the comparators in the Peak Detectors, Pulse Detectors, and the Pulse Width Detector.

Source Switching Logic

The Source Switching Logic contains the circuitry which determines whether to switch automatically on detection of a fault, or manually on the push of a front-panel button, and when to do the switch.

Configure Switch

The Configure Switch, an eight-segment DIP switch, is used to turn off the detectors on a channel-by-channel basis. The switch segments correspond to the channel numbers; segment 1 turns off detection for channel 1 when closed. The Configure Switch setting is also placed on the EDBUS when the μP asserts $\overline{\text{CONFIG}}$.

Miscellaneous Switch

The Miscellaneous Switch is a four-segment DIP switch, with only three of its segments used. It is used to select NTSC or PAL, to enable or disable Pulse Width Detection, and in diagnostics. The switch settings are transferred to the EDBUS when $\overline{\text{MISC}}$ is asserted.

Signal Set Switch

The Signal Set Switch is used to inform the μP of which of the selectable signals to be testing for at the Pulse Width Detector.

Timing Counters

The Timing Counters are driven by the 4 MHz μP clock, which they divide down to provide all the timing reference signals for the Pulse Detectors and the Pulse Width Detectors, as well as the WatchDog Reset pulse to the μP.

Remote Logic

The Remote Logic circuitry inputs the information from Remote Connector pins 1 and 2 to $\overline{\text{ED1}}$ and ED0, respectively, when the μP asserts $\overline{\text{REMI}}$. It also places the information from ED0 – ED5 onto pins 3 through 8 of the Remote Connector, when the μP asserts $\overline{\text{REMO}}$.

Data I/O

The Data I/O port consists of U317, an octal bus transceiver which controls communication between the Kernel Data Bus and the External Data Bus.

μP Kernel

The μP Kernel controls the whole instrument, containing the μP and the instructions to run it. The μP asserts its control through the EDBUS and the various Control Bus outputs from the Decoder.

Front Panel & Front Panel Logic

The Front Panel consists of a Lexan™ face permanently bonded to a printed circuit board. There are five push buttons molded into the assembly to provide manual control of the instrument functions, and 12 LEDs used to indicate the operating status of the instrument and current operator selections.

The Front Panel Logic encodes the push button selections, placing the data on the EDBUS when $\overline{\text{KEYBRD}}$ is asserted; and it loads the EDBUS data into the buffers which drive the LEDs when $\overline{\text{FPLEDA}}$ and $\overline{\text{FPLEDB}}$ are asserted.

One of the LED buffers also provides the drive for the Aural Alarm circuitry and the Bypass Relay Drive.

VERTPR

The Vertical Preset circuitry provides identification of the Vertical Interval, pulling $\overline{\text{VERTPR}}$ low to indicate the Vertical Interval has been detected. $\overline{\text{VERTPR}}$ is applied to the EDBUS when the μP asserts $\overline{\text{MISC}}$.

DETAILED CIRCUIT DESCRIPTION

INPUT AMPLIFIERS
Schematics 1 & 2

The ECO–170A uses eight amplifiers of almost identical design, one for each channel. This discussion will center on the general form of these amplifiers, which is shown in Fig. 4-1. The differences between the individual amplifiers are primarily selections for reference voltages, and a different CONfigure input, applied to U5 in Fig. 4-1, to tailor the amplifier to the signal it will be processing. Also, those channels which handle signals containing subcarrier components have an additional electronic switch, shown as U2 in Fig. 4-1b. The purpose of this switch is to provide extra isolation.

The signal from Generator A is input to a relay (K1a). When de-energized, the relay is in the bypass position, connecting the Generator A inputs directly to the outputs. The relay goes into bypass mode if the ECO–170A loses power, or if one of the Input Amps goes bad. The energized position of the relay applies the Generator A input to U1, and also applies the Generator A input to the A Pulse Detectors and the Pulse Width Detectors. The Generator B signal is connected to the other input of U1.

U1 is configured as a DPDT switch, controlled by the μP. Each switch segment is closed when its associated control line goes low. Normally, the $\overline{A}$ line is low, and $\overline{B}$ is high, so the Generator A signal is passed through U1. If the μP detects a failure in any of the signals from Generator A, the control lines change states. U1 then switches, passing the Generator B signal instead of the Generator A signal.

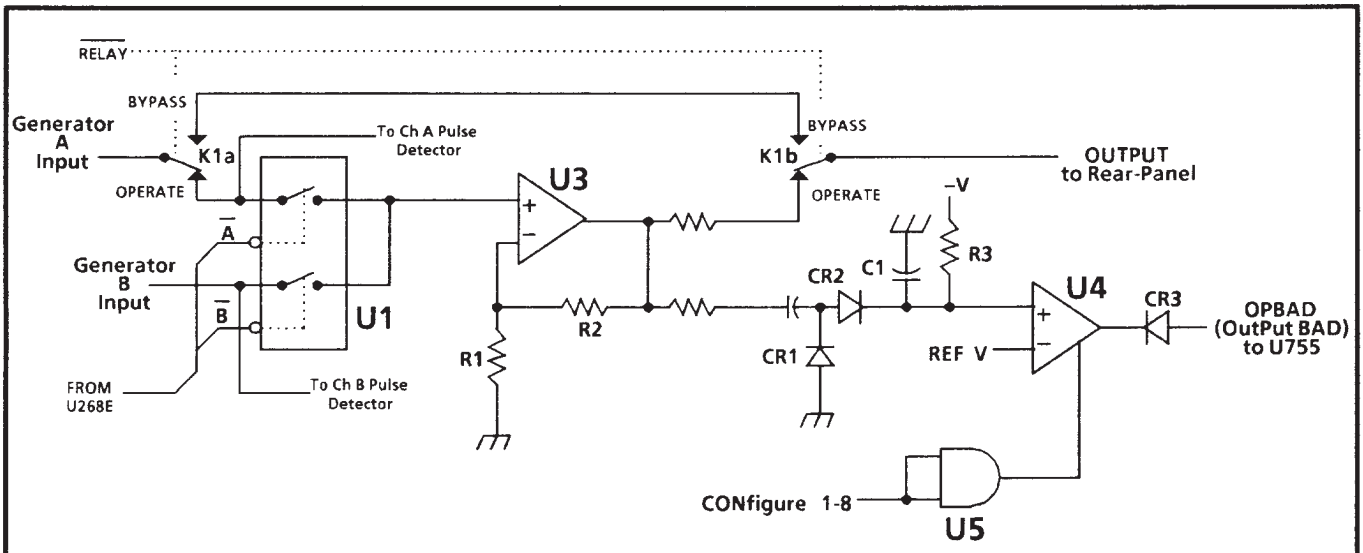


Fig. 4–1a. General form of the Input Amplifiers and Peak Detectors.

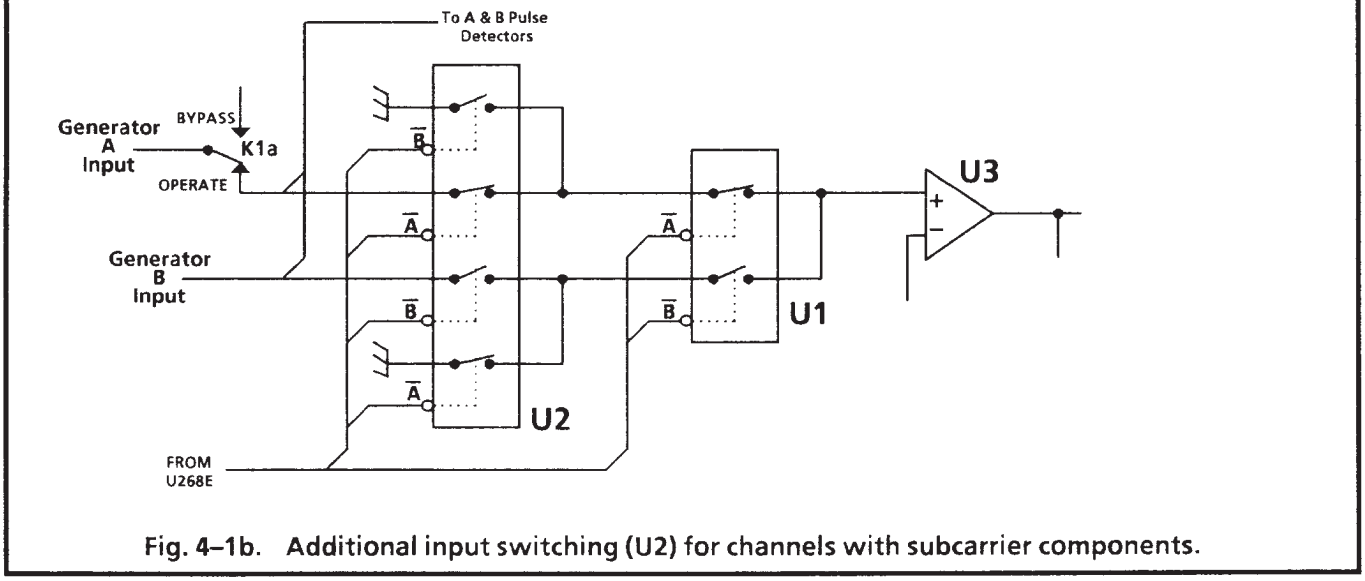


Fig. 4–1b. Additional input switching (U2) for channels with subcarrier components.

Fig. 4–1. ECO–170A Input Amplifier circuitry.

The output of U1 is applied to an amplifier (U3), which drives the operate position of the output side of the bypass relay (K1b), and a peak detector.

The peak detector, comprised of CR1, CR2, C1, and R3, provides a dc level to comparator U4, representing the peak amplitude of the input signal. The reference voltage applied to the comparator is selected according to the signal that particular channel is processing. As long as the peak detector output exceeds the reference voltage, the comparator output will be high, indicating that the amplifier is working correctly. If the peak detector output falls below the reference voltage level, the comparator output goes low, turning on CR3. The anodes of these diodes (one for each amplifier) are summed at the input of another comparator, U755 on Schematic 1. If the summation node is pulled low by any of the amplifiers, U755's output goes low. This puts an OutPut BAD flag on the EDBUS (External Data Bus), alerting the μP of an amplifier failure.

AND gate U5 is essentially a buffer between the CONFIGURE switch (Schematic 5) and the strobe input on comparator U4. The purpose of this is so the comparator can be disabled if the signal assigned to that channel is not available, preventing a false OPBAD flag from being generated.

REFERENCE VOLTAGE SUPPLIES
Schematic 2

The reference voltages provide an assortment of six voltage levels; a pulse detector and a peak detector reference for each of the pulse, video, and subcarrier channels.

U547A and B provide the pulse detector reference (PMREF) and the peak detector reference (PPDREF) for the pulse channels. The voltage provided by these two depends on the setting of P543. If set to pins 1 & 2, PMREF will be 2.5 V and PPDREF will be about 1.5 V. If set to 2 & 3, PMREF will be about 1.25 V and PPDREF will be around 0.3 V. This accommodates the variations between NTSC and PAL pulse amplitude levels.

U450A and B provide the pulse detector reference (VMREF) and peak detector reference (VPDREF) for the video channels. VMREF is about −200 mV, and VPDREF is around −50 mV.

U647A and B provide the pulse detector reference (SMREF) and peak detector reference (SPDREF) for the subcarrier channels SMREF is about 0.8 V, and SPDREF is set for 1.5 V.

A and B PULSE DETECTORS
Schematics 3 & 4

Schematic 3, A PULSE DETECTOR, contains circuitry to check the amplitude and timing for the A Inputs for each channel. There are two basic types of detectors: Pulse Detectors, for the pulse signals (Burst Flag, Blanking, Sync, etc.), and Periodic Detectors for Subcarrier. The Channel 2 A Input, BURST FLAG/SUBCARRIER, is applied to both a pulse and a periodic detector, with a jumper (J935 for A, J937 for B) that selects which of their outputs to use. The circuitry on Schematic 4, B PULSE DETECTOR, is the same as that on Schematic 3, but handles the B Inputs.

The primary differences between the individual detectors are the Reference Voltages, the Configure switch segment, and (for the Pulse Detectors) the clock timing for the counter; these will all be selected according to the signal being processed. As the detectors are so similar, this discussion will focus on the general form of each of the two types.

Pulse Detectors (see Fig. 4-2)

U5 is a divide-by-16 counter, which is set to ripple count as long as its Ripple Carry Output (Rco) is low, pulling the ENP pin high. The clock rate for this counter is selected to be less than 15 times the input pulse frequency. If the input pulse arrives on time, and with sufficient amplitude to pass comparator U1, it will then clear U5 before the Rco goes high. If the input pulse amplitude is too low, or the pulse is missing or late, U5 is allowed to complete its count and drive the Rco high. This is inverted by U6, driving the $\overline{\text{ERROR}}$ line low.

This low stops U5 from counting by pulling the ENP pin low, so the Rco remains high until U5 is cleared; it also holds U2 in preset, through U3, so that the input pulse cannot clock through to clear the counter. This locks the low on the $\overline{\text{ERROR}}$ line, so that only the $\overline{\text{CLEAR}}$ signal applied through U4 is able to clear U5.

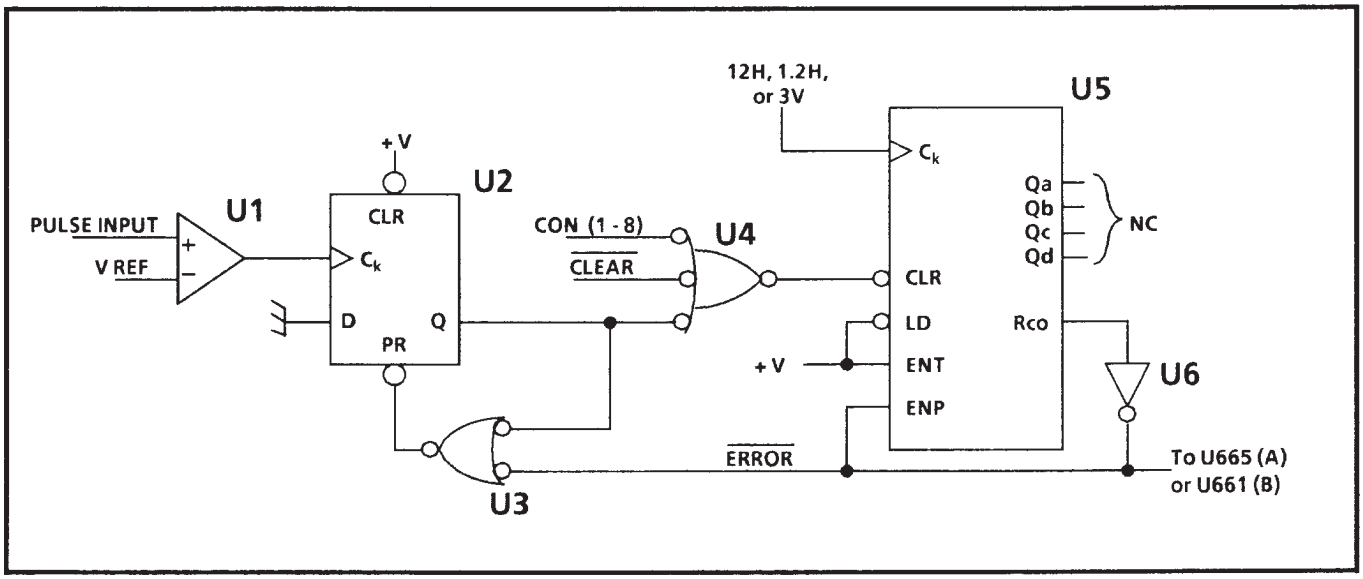


Fig. 4-2. Pulse Signal Detector configuration.

The Configure switch, on Schematic 5, can disable these detectors by holding a clear on U5, through U4, when the appropriate switch segment is closed. This keeps the Rco at a low state, so U6's output stays high.

Periodic Detectors (See Fig. 4-3)

The Periodic Detectors operate in a slightly different manner. The subcarrier signal is input to buffer amp Q1, which passes it along to L1 and C1 (or C1/C2), forming a bandpass filter tuned to subcarrier frequency. J1 selects between NTSC and PAL subcarrier settings. Q2 provides isolation to a peak detector, comprised of CR1, CR2, C4, and R6.

As long as the peak voltage stored in C4 exceeds the voltage reference (SMREF) applied to the other input of comparator U1, then U1's output will be high. As U3 is initially preset by a $\overline{\text{CLEAR}}$ signal from the μP, its Q output is high. If the subcarrier signal fails, through reduced input signal amplitude or drifting out of the filter's bandpass range, the peak detector output will fall below the reference voltage for U1. U1's output then goes low, and is

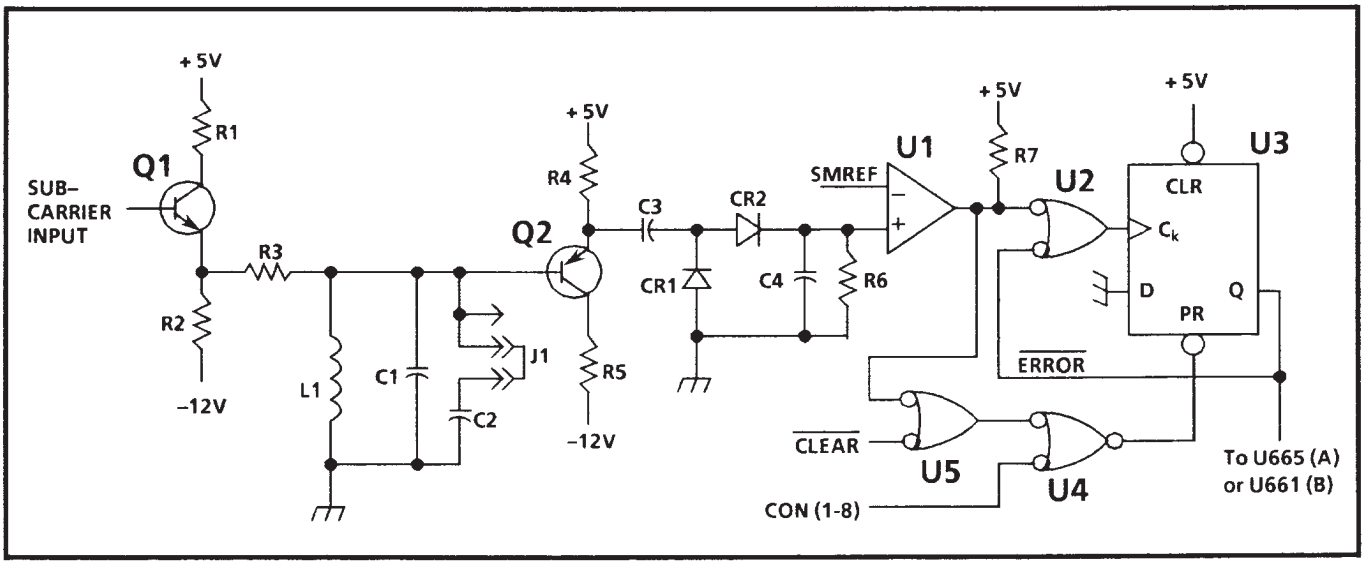


Fig. 4-3. Periodic Signal Detector configuration.

gated through U2 to clock U3. U3 then passes the low applied to its D input through to the Q output, which is fed back to U2 to lock out any further changes from U1. U3's Q output will then remain low, to indicate a failure, until U3 is again preset, by a $\overline{\text{CLEAR}}$ signal through U5 and U4.

The Configure switch, on Schematic 5, disables these detectors by applying a preset to U3, through U4, when the appropriate switch segment is closed. This forces the Q output to remain at a high state.

Detector Output

The outputs of all the detectors on each page are applied to an eight input NAND gate, U655 for the A detectors or U661 for the B detectors. The outputs of these gates are inverted, producing the APRES and BPRES flags, respectively. If any of the detector outputs goes low, indicating a failure of that signal, the appropriate flag (APRES or BPRES) will go low as well. These flags are routed to Schematic 6, where they are used by the switching logic, and are also applied to the EDBUS.

PULSE WIDTH DETECTORS Schematic 5

Schematic 5, Pulse Width Detectors, consists of five main blocks: the Multiplexer, Pulse Width Counter Control, Pulse Width Counters, Vertical Preset, and the Configuration Switch.

Multiplexer

When the μP asserts $\overline{\text{MUX}}$, U529 passes the EDBUS information to two 8-to-1 multiplexers, U637 and U629, to select which of the input signals is to be measured.

U637 is addressed by ED0 - ED2, with ED3 being applied to the inhibit line. The inputs that it has to select from are the Generator A signals (except Channel 1, SUBCARRIER), and the 6H timing reference from Schematic 7.

U629 is addressed by ED4 - ED6, with ED7 to the inhibit. Its inputs are the Generator B signals, except Channel 1, and the 0.6H timing reference from Schematic 7.

The outputs of U637 and U629 are summed together and applied to two comparators, U249 and U348. U249 has the multiplexer output applied to its negative input, and +2.5 V at its positive input. U348 is the opposite, with the multiplexer output applied to its positive input and PMREF (–2.5 or –1.25 V) applied to its negative input. The comparator outputs drive a NOR gate, U349A.

In this way when the multiplexer outputs are at 0 V, U349A's output will be high. Then, no matter whether the multiplexer output goes positive or negative the output of U349A will go low, so long as the pulse amplitude exceeds the appropriate reference voltage.

Pulse Width Counter Control

U349A and U344A are configured so that the input to U344B-5 consists of negative-going pulses. U344A will invert the signal to achieve this, if needed; if PWPOL (Pulse Width Polarity) is high, the signal will be inverted. See Fig. 4-4.

U344B and U343B are configured so that after $\overline{\text{PWCLR}}$ goes low, the next pulse will clock U343B with both its falling and its rising edges. $\overline{\text{PWCLR}}$ then clears both U343A and B, which causes pins 6 (PULSDN) & 8 to go high. The high from U343B is applied to its D input and to U344B-4.

As U344B-5 is also high until the arrival of the input pulse, its output will be low. When the input pulse goes low at U344-5 its output goes high, clocking U343B. This makes pin 9 go high (starting the Pulse Width Counters) and pin 8 go low. The low at pin 8 is applied to the D input and to U344B.

When U344B-5 goes positive again at the end of the pulse, its output will go positive too, clocking U343B again. Pin 9 goes low (stopping the counters), and pin 8 goes high, which clocks U343A. This makes U343A-6 (PULSDN) go low, which applies a low to the clear input of U343B, locking pin 9 low and pin 8 high until the next $\overline{\text{PWCLR}}$ pulse comes along to restart the process.

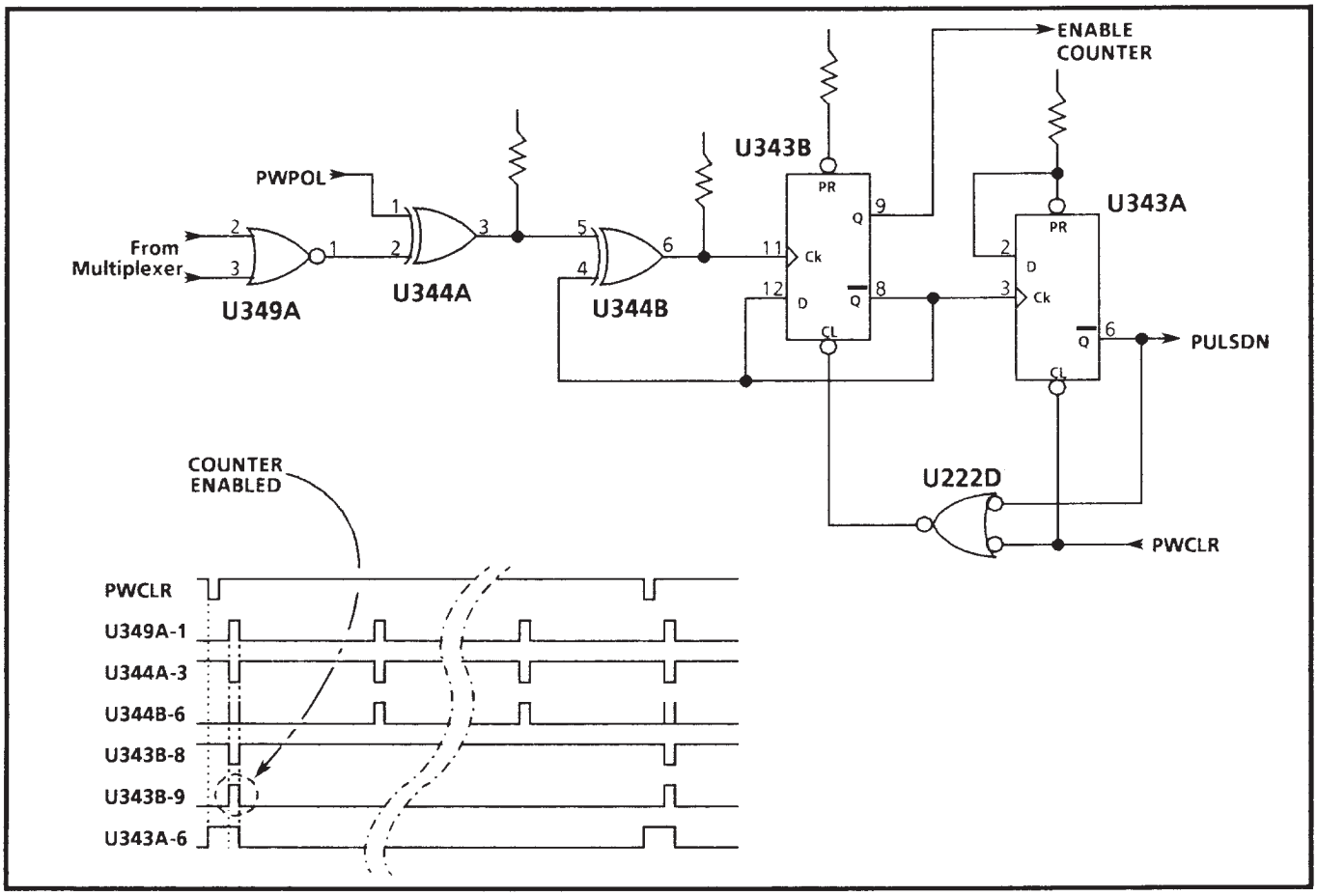


Fig. 4-4. Pulse Width Counter Control circuitry.

Pulse Width Counters

When U343B-9 goes high, in the Pulse Width Counter Control circuitry, it enables both enable inputs on U525, and one of the two enable inputs each on U514, U614, and U615. The second enable input on each of these three counters is connected to the carry output of the preceding counter. In this manner they will count sequentially, but only during the one pulse width that U343B-9 is high.

All four counters are clocked simultaneously by subcarrier from the sync source in use. U742 selects between the Generator A or the Generator B subcarrier, and U741 converts it to a positive-going pulse.

The counter output, is the number of cycles of subcarrier occurring during the one pulse that the counters are enabled, expressed in binary. The outputs of U525 and U514 are applied to U521, the LSB buffer, and U614 and U615 are applied to U621, the MSB buffer. These are transferred to the EDBUS when $\overline{\text{PWLSB}}$ and $\overline{\text{PWMSB}}$ are asserted.

Vertical Preset

U729 is a counter which counts subcarrier ÷ 4, provided by U736, only while enabled (when sync is low), and after U732A times out. U732A is a one-shot which is triggered by sync and then holds U729 in a clear state for approximately 3.5 μs following the start of sync. This prevents U729 from attaining a count of four during H sync and equalizing pulses. During Vertical sync, however, there is sufficient time for U729 to count to four, causing pin 12 to go high. This is inverted by U837C and used to disable U729, which then holds its current state.

At the start of the second V Sync pulse, U729 is again cleared for $\approx$3.5 μs by U732A, which makes pin 12 return low. This transition triggers U732B, which removes the clear state from U827 for $\approx$300 μs (long enough to enable the counter for the remaining V Sync period). U729-12 going low is also

inverted by U837C, to re-enable U729. It would also clock U827, but it occurs just prior to the clear state being removed from U827, so it has no effect.

U827, is not clocked until the start of the third V Sync pulse, and is clocked at the beginning of each V Sync pulse after that, when U729-12 goes low, until it reaches a count of four. This would be at the start of the sixth Vertical Sync pulse. U827-12 then goes high, which is inverted by U837D to pull $\overline{\text{VERTPR}}$ low. This, applied to pin 7, prevents U827 from counting, so $\overline{\text{VERTPR}}$ remains low until U827 is cleared by U832B timing out. $\overline{\text{VERTPR}}$ is applied to U421 on Diagram 6, for placement on the EDBUS when the μP requests $\overline{\text{MISC}}$ through decoder U334.

Configure Switch

The Configure Switch, S537, is an eight segment DIP switch. Each segment of the switch corresponds to one of the eight input channels, segment 1 controls channel 1, segment 2 controls channel 2, and so on.

When a switch segment is closed, that line will be grounded, which disables error detection for that channel. When the segment is open, the line is at +5 V, enabling the channel. These eight lines (CON 1 through CON 8) are applied to the Peak Detectors on Schematics 1 and 2, and the Pulse Detectors on Schematics 3 and 4. They also address buffer U521, to be transferred to the EDBUS when $\overline{\text{CONFIG}}$ is asserted.

MICROPROCESSOR KERNEL

Schematic 6

Schematic 6, Microprocessor Kernel, consists of 6 blocks. These blocks are the Microprocessor, Microprocessor Memory, Decoder, Source Switching Logic, Diagnostics Switch and Readout, and the Signal Set Switch. For a description of the diagnostics performed, refer to Section 5 Maintenance.

Microprocessor

The μP, U110, controls the kernel. Its control lines, $\overline{\text{RD}}$, $\overline{\text{WR}}$, $\overline{\text{MREQ}}$, $\overline{\text{I/OREQ}}$, and $\overline{\text{M1}}$ enable the various devices in the kernel such as the Diagnostics Switch buffer and the Decoder. Its address lines (A0 – A15) are used to address the Memory and the Decoder, and its Data lines (D0 – D7) receive information from throughout the instrument.

There are three ways to reset the μP. When the instrument is first turned on the Power Supply provides the $\overline{\text{PWRRST}}$ pulse, which is gated through U222C and A to the μP. While the instrument is operating, if the μP does not assert $\overline{\text{AWAKE}}$ on time the Timing Counters on Schematic 7 will send a $\overline{\text{WTCHDG}}$ pulse, which is also gated through U222C & A. The third method of resetting the μP is by manually moving jumper J227 to pins 2 & 3 momentarily, grounding U222A-1. **Make sure to return J227 to its 1 & 2 position, or the μP will not be allowed to operate.**

The μP clock, U134, is a crystal controlled oscillator which runs at 4 MHz. This is picked off to drive the Timing Counters, and is wave shaped by U139B, C, and Q136 for use by the μP.

Microprocessor Memory

The μP memory consists of a memory decoder, U133, the EPROM, U210, and the RAM, U125.

Address lines A13 – A15 are used only to address U133, the memory decoder. When the μP asserts $\overline{\text{MREQ}}$, U133 decodes these three address lines to determine whether to enable the PROM or the RAM, and to disable the DATA I/O port, U317, during that time.

The EPROM, U210, contains the micro-instructions which control the μP. It is enabled when $\overline{\text{ROMEN}}$ and RD are asserted at the same time. The RAM, U125, is used to store temporary data, such as the output for the Diagnostic LEDs. It is enabled when $\overline{\text{RAMEN}}$ is asserted at the same time as $\overline{\text{RD}}$ or $\overline{\text{WR}}$.

Decoder

When enabled by $\overline{\text{I/OREQ}}$ being asserted only when $\overline{\text{M1}}$ is not asserted, U334 decodes address lines A0 – A3 to provide 15 different enable signals for use throughout the instrument.

Source Switching Logic

U434 produces the $\overline{A}$/B signal, which is applied to the switches in the Input Amplifiers to switch the sync source between Generator A or Generator B. When clocked by sync through U440C, U434 passes the dc level applied at pin 15 to pin 13. If the dc level is low, Generator A is selected; if high, Generator B.

U428B, which applies the dc level to U434-15, is driven by U427C, for manual switching, or U427D, for automatic switching. Which of these two is to drive U428B is determined by the level of the $\overline{\text{AUTOMAN}}$ signal from U420. When low, this signal prevents U427C from passing the MAN $\overline{A}$/B signal from U420-9, but is inverted by U439D to enable U427D to pass the output of U433B. When the FRONT PANEL CONTROLS are ENABLED, the $\overline{\text{AUTOMAN}}$ signal toggles every time the SOURCE SWITCHING push button is depressed.

U433B is controlled by U427A and B, which are used as negative-input NOR gates. These two gates are applied to the preset and clear inputs of U433B. U427A, applied to the preset input, is driven by the $\overline{\text{APRES}}$ signal from the A Pulse Detector and by the $\overline{\text{AUTOB}}$ signal from U420. The APRES signal is normally high, going low if the A Pulse Detector detects a loss of any of the eight channels' A inputs. The $\overline{\text{AUTOB}}$ signal is also normally high, going low if the μP detects any other Generator A problem. Either signal going low presets U433B, forcing its Q output high.

U427B operates in an identical manner, using BPRES or $\overline{\text{AUTOA}}$ going low to apply a low to the clear input of U433B, forcing the Q output low.

When the $\overline{\text{AUTOMAN}}$ output from U420 goes high, U427C is enabled, so it can pass the MAN $\overline{A}$/B signal output by U420; at the same time U427D is disabled, so it cannot pass the auto switch. The AUTO SWITCH toggles each time the SYNC SOURCE push button is depressed (again, only when the FRONT PANEL CONTROLS are ENABLED). The MAN $\overline{A}$/B signal is then gated through U427C and U428B to U434.

U428A and C are used to disable U440C so that it cannot pass the ASNK and BSNK pulses which clock U434. This occurs when the $\overline{\text{AUTOMAN}}$ signal is low (allowing auto switching), and both the APRES and the BPRES signals go low, indicating a pulse detector fault for both generators.

The APRES, BPRES, and $\overline{A}$/B signals are placed on the EDBUS by U421B when the μP asserts $\overline{\text{MISC}}$.

Data I/O

U317 is a transceiver to allow communication between the EDBUS and the Kernel DATA BUS, unless $\overline{\text{RAMEN}}$, $\overline{\text{ROMEN}}$, $\overline{\text{DIAGSW}}$, or $\overline{\text{DIAGLED}}$ are asserted. The direction of communication is controlled by the $\overline{\text{WR}}$ signal from the μP; when $\overline{\text{WR}}$ is high data flows from the EDBUS to the Kernel DATA BUS, and when $\overline{\text{WR}}$ is low the data flow is reversed.

Signal Set Switch

The Signal Set Switch (S320) is used to inform the μP of particular signal characteristics for the selected signal set See Table 1-1, ECO–170A Configuration, for details of the signal selection settings. The switch settings are transferred to the EDBUS when $\overline{\text{SIGSET}}$ is asserted.

Diagnostics Switch and Readout

The Diagnostics Switch and Readout are used to initiate and evaluate a variety of diagnostic routines for an operational check of the ECO–170A. See Section 5 Maintenance for details on the individual tests. Buffer U316 places the switch settings on the kernel DATA BUS when the μP asserts $\overline{\text{DIAGSW}}$.

The Diagnostics Readout is a set of eight LEDs, arranged on the circuit board in two groups of four. These LEDs are used to evaluate the diagnostic tests initiated by the Diagnostics Switch. The LEDs are addressed by the Kernel DATA BUS through U306, when $\overline{\text{DIAGLED}}$ is asserted.

TIMING and REMOTE LOGIC Schematic 7

Schematic 7, Timing and Remote Logic, has three main blocks; the Timing Counters, Remote Control Logic, and the Miscellaneous Switch.

Timing Counters

The 4 MHz μP clock (U134 on Schematic 6) drives U145A which, along with U148 and U145B, divide it down to 100 kHz (6H). This 100 kHz is applied to two counter chains, which provide the H and V timing signals used in the Pulse Detectors and the Pulse Width Multiplexer.

U154 provides the 3H (50 kHz), and 0.6H (10 kHz) pulses, and U254A the 0.3H (5 kHz), while U159, U248 and U241 provide the 6 V (390 Hz) and 1.5 V (97 Hz) pulses.

The 1.5 V pulses drive U235, the Watchdog counter. If the $\overline{\text{AWAKE}}$ pulse does not clear this counter in time it is assumed that the μP is caught in a loop, so U235 is allowed to count out and its Rco output goes high. This is inverted by U223A and applied back to U222C on Schematic 6 to reset the μP. J231 allows you to disable this if you would rather not have the μP reset in this manner.

Miscellaneous Switch

S715, the Miscellaneous Switch, is used to select NTSC or PAL, to enable or disable Pulse Width Detection, and in diagnostics (see Section 5 Maintenance). See Table 1-1 ECO–170A Configuration for details on switch settings.

The switch settings are applied to the EDBUS by U622 when the μP asserts $\overline{\text{MISC}}$.

Remote Control Logic

The rear panel REMOTE CONTROL connector is a 9-pin connector used to provide limited control and operational indications at a remote location. See Fig. 1-4 for details of the remote connector.

Pins 1 & 2 of the connector are used for input to the ECO–170A, and are applied to the EDBUS by U622 when $\overline{\text{REMI}}$ is asserted. Pins 3 through 8 are used for output to the remote. $\overline{\text{ED0}}$ – ED5 is clocked through latch U721 when $\overline{\text{REMO}}$ is asserted, and gated through U722. Q824 is used to increase the current capability for pin 8, used for driving an alarm at the remote location.

FRONT PANEL LOGIC and POWER DISTRIBUTION Schematic 8

Schematic 8 shows the front panel and its logic, the ALARM and RELAY DRIVE circuitry, and the power distribution for the instrument.

Front Panel

The front panel consist of 5 momentary-closed push buttons, which are molded into the front panel assembly, and 12 LEDs which are soldered to the rear of the front panel board.

Front Panel Logic

The separate and common inputs from the front panel switches are applied to U508, a keyboard decoder, which converts any keypush into a 3-bit word and applies it to buffer U421A. This 3-bit word is passed through the buffer to the EDBUS when the $\overline{\text{KEYBRD}}$ signal is asserted, along with the output of U516A, which is used to inform the μP if a selection has been made at the front panel since it was last polled. U516A-5 will go high if a selection is made at the front panel, just long enough to be placed on ED3 when $\overline{\text{KEYBRD}}$ is next asserted.

U412 and U413 are the latches used to drive the front panel LEDs. U412 clocks the $\overline{\text{EDBUS}}$ information through to its Q outputs when $\overline{\text{FPLEDA}}$ is asserted, to drive the SYNC SOURCE A, SYNC SOURCE B, AUTO SWITCH ON FAULT, AUTO SWITCH OFF, A FAULT, B FAULT, FRONT PANEL CONTROLS LOCKED OUT, and FRONT PANEL CONTROLS ENABLED LEDs.

When $\overline{\text{FPLEDB}}$ is asserted, U413 clocks the EDBUS information through to drive the ALARM ENABLED, ALARM DISABLED, OPERATE, and BYPASS LEDs. It also drives the ALARM and the RELAY DRIVE circuitry.

Alarm

If ED4 is high when $\overline{\text{FPLEDB}}$ is asserted, indicating a signal fault has been detected, then U223F starts U505, an NE555 timer. U505 is used to provide a pulsed output for the alarm. This drives LS603, a speaker, which sounds to alert the operator that an error has been detected. DS605, an internal LED in parallel with LS603, lights at the same time. LS603 may be disabled, for troubleshooting, by moving J602 to its pins 2 & 3 position. DS605 will still light to inform the technician of a fault.

Relay Drive

If ED5 is high when $\overline{\text{FPLEDB}}$ is asserted, indicating that the $\overline{\text{OPBAD}}$ flag has been asserted, then there has been a failure with one of the amplifiers shown on Schematics 1 and 2. This high is used to turn Q798 off, which allows the $\overline{\text{REL}}$ line to go high; this is routed to all the input relays, which then switch to BYPASS.

Power Distribution

Power Distribution shows all the power supply connections between the Power Supply board (A4) & the Main board (A2), and between the Main board (A2) & the Front Panel board (A1).

POWER SUPPLY
Schematic 9

Overview

The ECO–170A Power Supply consists of a Buck-type switching power supply that generates two regulated voltages (±5 V) and a linear supply that uses outputs from the switching supply (±15 V) to generate ±12 V. The Power Supply circuitry is contained on one board (A4). Fig. 4-5 shows a functional block diagram of the Power Supply.

The AC line voltage enters the Power Supply through the Line Filter, where an EMI filter removes noise. The 300 V supply rectifies and filters the line voltage to provide +300 V to the Switching circuit.

Using the 300 V supply, the Switching circuits provide the current from which the regulated ±5 V and ±12 V supplies are generated. The Pulse Width Modulator regulates the ±5 V output, and the Linear Supply regulates the ±12 V supply.

Line Filter

The Line Filter (LF950) isolates the instrument from the power line. This prevents noise on the power lines from affecting the instrument's performance and, conversely, prevents any noise generated by the instrument from reaching the power lines.

300 V Supply

CAUTION

When modulator operation is in doubt, protect the FETs from high voltage by removing the jumper (J950) that connects them to the 300 V supply.

The purpose of the 300 V supply is to convert the AC line voltage to 300 V for use in the Switching circuit.

Jumper J810 allows the Power Supply to accept either 115 or 230 Vac line voltage. When the arrow of the jumper plug is lined up with the **115** arrow on the circuit board, the two primary windings of T610 are in parallel and bridge rectifier CR810 acts as a full wave voltage doubler. When the jumper housing is rotated 180° so that its arrow is lined up with the **230** arrow, the windings of T610 are in series and CR810 acts as a full wave bridge rectifier.

Housekeeping Supplies

The Housekeeping Supply provides the Power Supply with a precision +2.5 V reference, a regulated ±8 V, and also a +14.4 V supply. The +2.5 V reference is used as a yardstick against which all other voltages that the Power Supply generates can be measured. The ±8 V supplies the regulation and protection circuits throughout the Power Supply.

From the +8 V supply, the +5 V Housekeeping Supply (+5 V_{ref}) is derived. This +5 V_{ref} supply is generated across a 5 V Zener diode connected to pin 18 inside U435. Current to the Zener diode is from the +8 V supply. The +14.4 V supply provides power to the Pulse Width Modulator output buffer, U525.

When the instrument is first powered up, the secondary of T610 provides power for the Housekeeping Supply. Bridge rectifier CR510 converts the filtered line voltage to ±14.4 Vdc. C412 averages the positive output of CR510. U310 regulates this averaged output to generate the +8 V housekeeping voltage. U210 then accurately regulates the +8 V to produce the +2.5 V reference.

C410 averages the negative output of CR510, and U212 regulates it to provide the -8 V reference.

Once the instrument is powered up, T610 no longer provides power for the housekeeping and reference voltages. Instead, the ±15 V at the input of the Linear Supply provides the power. This ±15 V supply is stepped down to ±14.4 V by diodes CR420 and 410. The presence of ±14.4 V at the outputs of CR510 shuts CR510 off by reverse biasing its diodes.

Having two power sources for the Housekeeping Supply — one during power-up and one after power-up — makes the Housekeeping Supply independent of the regulated supplies that power the rest of the instrument. The Housekeeping Supply will always be powered up even if the rest of the regulated power supplies are shut down.

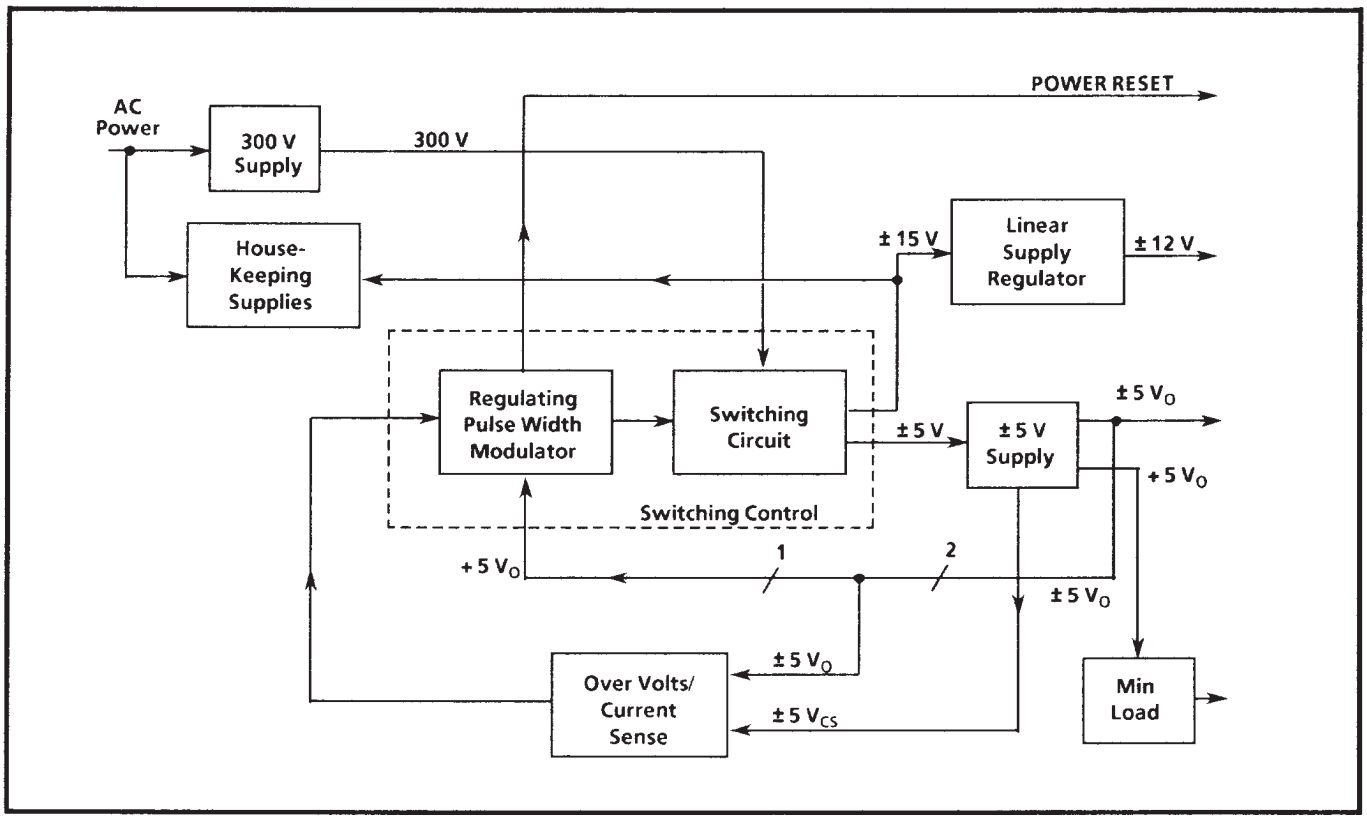


Fig. 4-5. Block diagram of Power Supply.

Switching Control (Pulse Width Modulator and Switching Circuit)

WARNING

When replacing the FETs (Q660 and Q661), be sure to replace the FET shield before powering up the supply. This shield is a protection from flying fragments should an FET explode.

The heart of the Switching Control circuit is the Pulse Width Modulator and the Switching circuit. Their combined purpose is to convert the 300 Vdc supply to a high frequency supply and then to a lower voltage supply that can be efficiently stepped down to generate the regulated supplies (±12 V and ±5 V).

The main purpose of the Pulse Width Modulator (U435) is to provide and control the switching pulses for the FET gates (Q660 and Q661) in the Switching circuit. An oscillator inside the Modulator generates the switching pulses. This oscillator is set at 47 kHz by the RC network connected to pins 9-11. The duty cycle of the switching pulses will vary in proportion to the load at the output and line voltage into the Power Supply. The output pulses from U435 are buffered by U525 and combined in the primary of T735 to form a signal that drives the FET gates on and off, one at a time.

The primary current for the main power transformer (T650) is gated by the FETs (Q660 and Q661) switching the 300 V supply on and off at a 47 kHz rate across the primary windings. C766 and C768 isolate DC voltage from the primary of the transformer.

When the Power Supply is first starting, U435 is not operational until the Housekeeping Supply reaches +8 V. Once U435 is operational, C433 charges, and the output duty cycle of U435 increases from minimum until the power requirements of the instrument are met. This process of increasing the duty cycle from minimum to meet the power demand is called "Soft Start." It prevents the FETs from being damaged as the supply charges the filter capacitors and attempts to regulate.

As the Power Supply is starting up, comparator U325B holds the POWER RESET line ($\overline{\text{PWRRST}}$) low. This disables the μP on the Main board until the Power Supply is powered up and operating at proper voltage levels. Even after the voltage is up to the proper level, U325B will continue to hold the POWER RESET line low for a few more moments to wait until the voltage has stabilized.

Troubleshooting Notes — When the FETs (Q660 and 661) fail, the gate resistors (R750 and R751) also fail, so both the FETs and resistors should be replaced.

To ensure sufficient heat transfer, be sure that heat-sink-mounted components are screwed down with 4 inch-lbs torque.

± 12 V Linear Supply

The ±12 V supply is derived from the line-regulated ±15 V generated by one of the secondaries of T650. The secondary voltage is rectified by CR533-CR536 and applied to L435. This inductor acts as a current storage device. During the first part of each switching cycle, the inductor current increases from zero, storing energy taken from the input. During the second part, the stored energy discharges into the load, pumping energy from input to output. C156 and C176 filter the inductor output and then pass it to U360 and U260 (monolithic voltage regulators), which regulate it down to ±12 V. The nominal tolerance on the ±12 V supplies is 1%. If the current drawn from the ±12 V supply exceeds approximately 2 A, the monolithic regulators shut down to protect the regulators and the circuits they supply.

The ±15 V also powers the Housekeeping Supply once the Power Supply is powered up, providing a more regulated voltage than CR510 provides.

± 5 V Supply

The ±5 V supply is regulated by the Pulse Width Modulator (U435). The output from the secondary of T650 (pins 15 and 18) is rectified by CR460 and CR360, then applied to L451, which "pumps" the current to the load as described above. C235-C351 filter the inductor output to provide the ±5 V supply.

The Pulse Width Modulator samples the +5 V (+5 V_0) and compares it at the Voltage Sense circuit (U331B) to a precise 2.5 V reference generated by the Housekeeping Supply. The difference is applied to the positive error input of U435. In response, U435 varies the duty cycle of the Switching Regulator, which, in turn, corrects the voltage of the ±5 V supply. This also causes a corresponding change to the other secondaries.

Overvolt Sensing

Comparators U335B and U220B monitor the regulated ±5 V power supply. If one of the supplies increases in magnitude by more than approximately 1 V, the output of one of the comparators will pull the input to timer U133 low and shut down U435. The normal operating voltages at pin 10 of U335B is +2.1 V, and at pin 9 of U220B is +0.3 V. Jumpers J242 and J120 provide easy testing of the sensors. When pins 1 & 2 of either jumper are shorted together, the Power Supply should shut down.

Overcurrent Sensing

Comparators U335A and U220A monitor the current output from the ±5 V supplies. If current flow from the +5 V supply exceeds approximately 8 A, or if the current flow from the -5 V supply exceeds approximately -4 A, the comparators shut down U435 in the same manner as do the Overvolt Sensors.

+5 Undervolt Reset

Comparator U331A monitors the +5 V (V_0) which holds U331A-2 at about 2.8 V. If the +5 V supply decreases in magnitude by more than approximately 0.6 V, U331A-1 will go high. This causes U325B-7 to pull $\overline{\text{PWRRST}}$ low; resetting the μP on the Main board.

Minimum Load

This circuit ensures the Power Supply always has the minimum load required to keep it operational. When the Main board is connected to the supply, the base of Q160 is grounded and the transistor draws no current. But if the Main board is disconnected, the 5 V supply at the base of Q160 switches on the transistor, which draws current.

Indicator Lights

The Power Supply has two indicator lights. The first is the neon safety light (DS810) located in the 300 V supply. This light flashes when it has at least 70 V across it. When the mains power is switched off, the light will still remain flashing for about 30 seconds to indicate that the neighboring capacitors still have a residual charge.

The second light is a two-color LED (DS112) that indicates with a red LED when the instrument is in power-reset mode, and with a green LED when the instrument has powered up.

When the instrument is powering up, the POWER RESET line is low and the +5 V_{ref} supply lights the red LED. Shortly after, power reaches the +12 V supply and it lights the green LED. For a brief moment, both LEDs are on. Finally, as full power is reached, the POWER RESET line is pulled high and the red LED switches off.

POWER SUPPLY CIRCUIT DESCRIPTION (Schematic 9) B020000 & Above

This type of power supply is called a current-mode-controlled, discontinuous, flyback, switching power supply. The current output is distributed between the four supplies as follows:

+12 V	0.5 Amps max
+5 V	7 Amps max
-5 V	2 Amps max
-12 V	0.5 Amps max

The maximum power is limited by the maximum current in the primary of T440. This is also the only current limit for the ±5 V supplies, as they have no secondary current limit. The ±12 V supplies are current limited on the secondaries by the ±12 V linear regulators, U176 and U276.

The power inductor, T440, is driven by switching the current to its primary on and off. T440 is not used as a transformer, but as an energy storage device, storing the energy in the primary while the current is being applied. On the second half of the switching cycle the current to the primary is switched off, and

the energy stored in the primary is transferred to the secondaries (flyback). Regulation is accomplished by applying feedback from the +5 V supply to the pulse width modulator controlling the current to the primary. This varies the length of time that the current is applied to the primary, causing it to store either more or less energy.

There is also circuitry to provide for operation from both 110 and 220 Vac supplies, under-voltage shutdown if the ac input is too low, overvoltage protection (crowbar) on the +5 V supply, and shutdown circuitry which forces a restart of the supply if it remains in current limit for more than a short period of time (<1 second).

WARNING

All primary voltages are referenced to a floating ground, not chassis ground. An isolation transformer or a differential amplifier is therefore needed in order to troubleshoot the circuitry in the primary and the pulse width modulator, and in their supporting circuitry.

As current never flows simultaneously in both the primary and the secondary, there is never any actual transformer action. As the magnetic flux in the inductor goes to zero at the end of each switching cycle, it is discontinuous.

Input, AC to DC Converter, and Voltage Doubler

This circuitry filters and rectifies the input ac voltage, placing a charge of approximately 320 Vdc across capacitors C845 and C865.

The line current passes through line filter LF950, fuse F940, and power switch S930, and is applied to rectifier CR820. At the input of CR820, J810 is used to select between 110 V and 220 V operation. If set to 220 V, CR820 works as a full-wave rectifier and C845 and C865 act in series, charging to the peak voltage (approximately 320 Vdc) during the first part of each one-half cycle. They then maintain that voltage through the rest of the cycle, as the input voltage and current fall to zero.

If, on the other hand, J810 is set for 110 V operation, CR820, C845, and C865 act as a half-wave rectifier and voltage doubler. During the positive half-cycle of the ac input only one of the diodes within CR820 conducts, charging C865 to the peak positive voltage. A different diode within CR820 conducts during the negative half-cycle, and charges C845 to the negative peak. The total voltage across C845 and C865 is then approximately 320 Vdc.

RV920 and RV820 limit voltage surges on the input which might pass the line filter, while R831 and R830 discharge C865 and C845 when the power is off. C830 and C730 bypass switching noise to ground, keeping it out of the input power line. DS720 and associated parts form a relaxation oscillator, so DS720 blinks when the instrument is powered up.

Kick Starter, Housekeeping Supply, and Undervoltage Lockout Circuits

These circuits supply the power to start and maintain oscillation of the Pulse Width Modulator, so long as the input ac voltage is sufficient to maintain regulation. The primary purpose of the undervoltage lockout circuit is to prevent the supply from starting up when set for 220 V operation and 110 Vac is applied instead, but it will stop the oscillation in the Pulse Width Modulator whenever the voltage across C845 and C865 (normally at 320 V) falls below approximately 200 V.

VR765 holds the emitter of Q755 at about 20 V, while the base is controlled by a divider comprised of R766, R767, and R768. So long as the charge across C845 and C865 remains around 320 V, Q755's base is held at approximately +30 V, and the transistor is off. As the voltage across C845 and C865 decreases, the base voltage does as well; when the voltage across the caps is down to approximately 200 V, Q755's base is at about +19 V, and Q755 is turned on. This, in turn, turns on Q727, applying the +5 V reference from U722-8 to U722-2. This disables the Pulse Width Modulator.

When the input voltage is sufficient to maintain the charge across C845 and C865 above 200 V, Q755 is off. This allows the Kick Start circuit to operate, providing the initial power to start up the Pulse Width Modulator. It does this by charging up C656 through Q667 and R560. During start-up, the +5 V reference output of U722 is at 0 V, and Q660 is off. The base current for Q667 during this time is supplied by R667.

When the charge across C656 reaches approximately 16 V, U722 starts to operate. It switches Q638 on and off through the base drive circuitry (Q741, Q750, Q648, and associated circuitry). The +5 V reference voltage at U722-8 is developed, which turns Q660 on. This diverts the base current from Q667, so it turns off and DS670 turns on to indicate normal operation.

The power to maintain the +16 V charge on C656 is now provided by the housekeeping winding of T440, pins 5 and 6, through CR556. If there is insufficient power to maintain the charge on C656 for any reason, such as the removal of J660, then the charge on C656 is quickly depleted. This stops the operation of U772, and the kick start sequence is repeated.

Power Inductor Operation

The heart of this power supply is T440, the multiwinding power inductor. The operation of T440 is as follows (see Fig. 4-6). Inductor T440 is initially uncharged (has zero magnetic flux). Q638, acting as a switch, is turned on by the base drive from U722. This places the charge developed on C845 and C865 (approximately 320 V) across the primary winding. The polarity of this charge is such that the voltages induced in the secondaries all reverse bias their respective diodes (note the polarity dots). In this way, there is no current flowing in the secondaries while it is flowing in the primary.

The primary current builds a linear ramp, storing the energy in T440 according to the relation $E = \frac{1}{2}Li^2$, where L is the primary inductance and i is the current flowing through it.

The current path is broken when Q638 is switched off, so current stops flowing in the primary. The flyback action of T440 then causes the voltages in the secondaries to reverse polarities, and all their diodes to turn on. The current in the secondaries linearly ramps down to zero as the energy which was stored in T440's primary is delivered to the load, charging the output capacitors.

When all of the energy which was stored in T440 during the first half of this cycle is delivered to the load, the current in the secondaries is at zero, and the diodes turn off. There is no current flowing in either the primary or the secondaries until Q638 is turned back on to start the next cycle. As there is not a continuous flow of energy in T440, this is called discontinuous flyback operation.

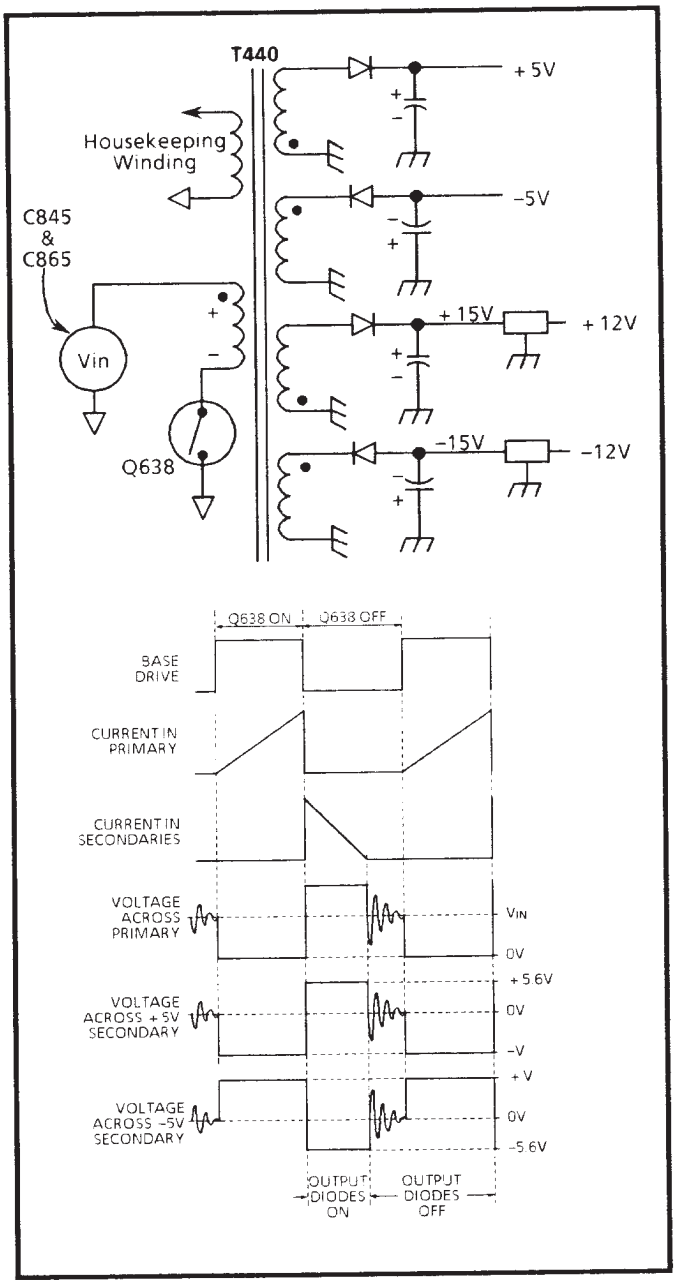


Fig. 4-6. Basic operation of T440

Load regulation is provided by sensing the +5 V supply with a divider comprised by R314, R315, and R415, and using U410 to convert this to an error signal. This error signal is optically coupled through U520 back to the Pulse Width Modulator, U722. U722 uses the error signal to vary the width of the pulse which drives Q638.

When the +5 V goes too high, U722 narrows the pulse width. This reduces the amount of energy stored in T440, and therefore the amount transferred to the load, so the +5 V goes down. Contrariwise, when the +5 V is too low, the pulse width is increased, increasing the amount of energy stored in T440 and then transferred to the load, so the voltage goes up.

Pulse Width Modulator and Error Amp

The Pulse Width Modulator, U722, is a current–mode controller. It uses inputs from the primary circuit and from the +5 V output to vary the width of the pulse which controls Q638, as mentioned above. This regulates the secondary voltages throughout variations of input voltage, output load, temperature, etc.

Current mode control works by allowing the current flowing in the primary to reach a peak level that is set by the output of the error amp, which is controlled by the +5 V output (see Fig. 4-7). The current in the primary winding is sensed by R630, and applied to U722-3 as a voltage. At the start of the cycle the oscillator sets the flip-flop within U722, which turns Q638 on. The primary current, and therefore the voltage to U722-3, ramp up until the I SENSE level is sufficient to trip the comparator. This resets the flip-flop, ending the drive pulse to Q638, and the energy stored in the transformer is transferred to the secondaries.

Line regulation, then, is a function of line voltage. As the line voltage varies, so will the primary current. An increase in line voltage causes an increase in primary current, so the slope of the ramp increases and the trip point is reached sooner. This results in a shorter pulse width. A decrease in line voltage causes a decrease in primary current, the slope of the ramp decreases, and it takes longer to reach the trip point. The same peak current is reached in both cases, however, so the same amount of energy is transferred to the load. Line regulation,

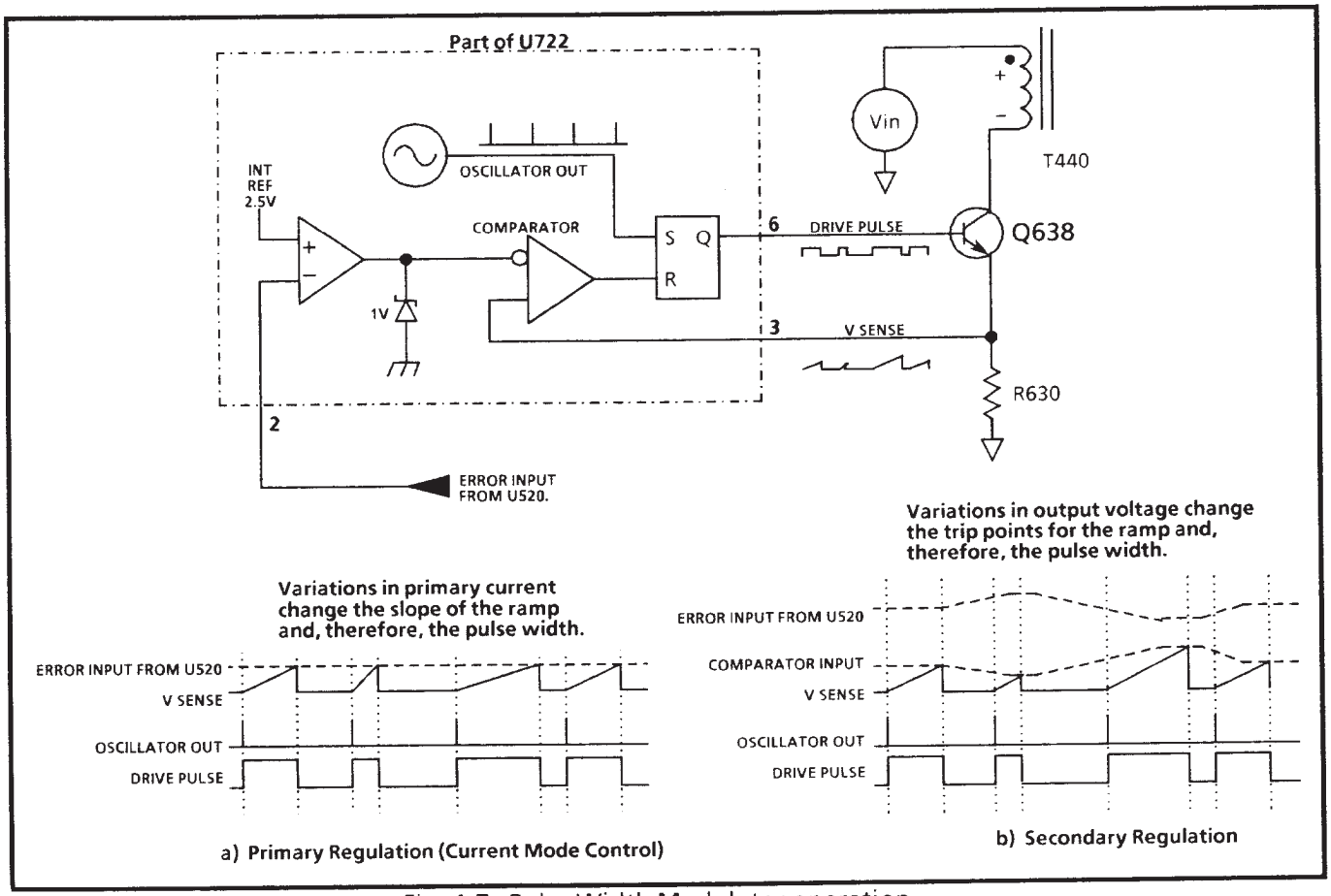


Fig. 4-7. Pulse Width Modulator operation.

then, is achieved without having to wait for output voltage variations.

Load regulation is accomplished by sensing the output voltage of the +5 V supply, and applying an error signal through opto-isolator U520 to U722–2. If the load increases, the supply voltage decreases, and so does the error signal at U722–2. This has the following results:

1. The comparator input increases, due to inversion of the IC.
2. The output pulse width increases, keeping Q638 on for a longer time.
3. I_p increases.
4. Power flow increases.

On the other hand, if the load decreases, the +5 V increases, so the output pulse width decreases along with I_p, and less power is transferred to the secondaries. In this way, the +5 V is kept constant through changes in the load, and, as it varies the amount of energy transferred to the other secondaries too, it regulates them as well.

The error amplifier is U410, a band-gap reference. It keeps the voltage at its cathode at a constant 2.5 V, set by the voltage applied to its reference, pin 2. This reference is set by R314, R315, and R415. R415 is also used to adjust the +5 V supply.

As U410s cathode is held at 2.5 V, the current through R416 will vary with changes in the output voltage, as will the current through the LED within opto–isolator U520. This changes the conductance of the transistor element of the opto-isolator, which then varies the voltage applied to the feedback input, U722-2.

Current Limit

Current limit is provided for the primary circuit by the internal circuitry of U722. As the ramp voltage at U722-2 reaches 1 V, the output drive pulse ends. This shuts Q638 off, so no further current is supplied. The maximum primary current is approximately 1.5 Amps, which corresponds to a maximum power level of approximately 75 Watts.

As the supply goes into current limit, U615A and Q717 come into play. U615A starts to turn on as the ramp voltage passes ≈900 mV, and starts to charge C717. If the current limit condition persists long enough for the charge on C717 to reach 700 or 800 mV, Q717 is turned on. This applies the reference voltage from U722-8 directly to U722-3, shutting down the supply and forcing a kick start. The supply will then cycle through kick start, current limit, and shut down until the problem is corrected.

Base Drive and Snubber

The pulse width modulated drive pulse from U722-6 is amplified by emitter followers Q741 and Q750. When the drive pulse is positive, Q750 is on and Q741 is off. Current flows through R746 and R747, through Q648 and CR649, and turns Q638 on. CR640, CR648, and CR649 form a Baker clamp to keep Q638 out of hard saturation.

As Q638 approaches saturation its collector–emitter voltage differential falls, and it needs less base current to maintain the same collector current. As saturation is approached, CR640 starts to conduct, providing a path for the excess base current.

When U722-6 goes to zero volts, Q750 is shut off and Q741 is turned on, so current is shunted to ground through CR651. C648 and VR650 speed up the switching off of Q638. The driven side of C648 is charged to approximately 5 V during the positive input half–cycle; then, when Q741 is turned on, C648's driven side is pulled down to +0.7 V by CR651, which pulls the base of Q638 down to approximately –3.3 V, through CR684. This abrupt transition draws a large current spike from the base momentarily (approximately 1 A for <0.3 μs), turning off Q638 very rapidly, along with CR640 and CR649.

When Q638 is turned off, there is a voltage spike applied to its collector. A combination of reflected secondary voltages, input voltage, and transformer leakage inductance can combine to produce a spike of over a thousand volts. As this can exceed the ratings of Q638, a snubber circuit, consisting of C540, CR545, and R647, limits the spike to approximately 800 V.

Secondary Circuits

The secondary circuits all work in the same manner. As mentioned earlier, under basic operation, during the first half of the cycle, all their diodes are reverse-biased, so there is no current flow.

On the second half of the cycle, when Q638 is shut off, the flyback action reverses the polarities of the secondaries, and the diodes are forward biased. This allows the energy stored within T440 to charge up the capacitors in the secondaries.

The +5 V and the -5 V supplies use LC filters from this point, to further smooth the voltage and eliminate most of the ripple.

The +12 V and -12 V supplies actually start as +15 V and -15 V, at the transformer. These voltages are used for the fan, B100 (-15 V), and for the opto-isolator U520 (+15 V) only. Then they are filtered and applied to linear regulators, U176 and U276. These provide clean +12 V and -12 V outputs, respectively. CR169 prevents the +12 V from going negative, while CR170 keeps it from exceeding +15.7 V. CR269 and CR369 perform identical functions for the -12 V output.

Overvoltage Protection

Overvoltage protection is provided on the +5 V output by a crowbar circuit comprised by Q127, VR120, and R120. If the +5 V output exceeds approximately +5.5 V, VR120 will start to conduct. When VR120 is drawing enough current through R120 to raise SCR Q127's gate voltage above its cathode, Q127 will turn on. This shorts the +5 V output to ground, forcing the primary circuit into current limit.

SECTION 5
MAINTENANCE

INTRODUCTION

This section has four main parts: preventive maintenance, troubleshooting aids, diagnostics, and corrective maintenance.

PREVENTIVE MAINTENANCE

Under average environmental conditions, preventive maintenance should be done about every 2000 hours. This includes cleaning, visual inspection, and a performance check. See Section 3 for performance check procedures.

Cleaning

Clean the instrument often enough to prevent dust or dirt from accumulating in or on it. Dirt prevents efficient heat dissipation. It also provides high-resistance electrical leakage paths between conductors or components in a humid environment.

CAUTION

The front panel is molded plastic. Do not allow water to get inside any enclosed assembly or component. Do not clean any plastic materials with organic cleaning solvents, such as benzene, toluene, xylene, acetone, or similar compounds, because they may damage the plastic.

Static-Sensitive Components

CAUTION

Static discharge can damage any semiconductor component in this instrument.

This instrument contains electrical components that are susceptible to damage from static discharge. Static voltages of 1 kV to 30 kV are common in unprotected environments.

Observe the following precautions to avoid damage:

1. Minimize handling of static-sensitive components.
2. Transport and store static-sensitive components or assemblies in their original containers, on a metal rail, or on conductive foam. Label any package that contains static-sensitive assemblies or components.
3. Discharge the static voltage from your body by wearing a wrist strap while handling these components. Servicing static-sensitive assemblies or components should be performed only at a static-free work station by qualified personnel.
4. Nothing capable of generating or holding a static charge should be allowed on the work station surface.
5. Keep the component leads shorted together whenever possible.
6. Pick up components by the body, never by the leads.
7. Do not slide the components over any surface.
8. Avoid handling components in areas that have a floor or work surface covering capable of generating a static charge.
9. Use a soldering iron that is connected to earth ground.
10. Use only special antistatic, suction-type or wick-type desoldering tools.

TROUBLESHOOTING AIDS

The following is miscellaneous information about schematics, circuit board illustrations, component numbering, and assembly numbering.

NOTE

No repair should be attempted during the warranty period.

Foldout Pages

The foldout pages at the back of the manual give block and schematic diagrams and circuit board illustrations. See Fig. 5-1.

Diagrams

The circuit number and electrical value of each component is shown on the diagrams. The first page in the Diagrams section explains the schematic symbols. The Replaceable Electrical Parts list gives a complete description of each component. Those portions of the circuit that are mounted on circuit boards or assemblies are enclosed in a gray border, with the name and assembly number shown on the border.

NOTE

Check the Change Information section at the rear of the manual for inserts describing corrections and modifications to the instrument and manual.

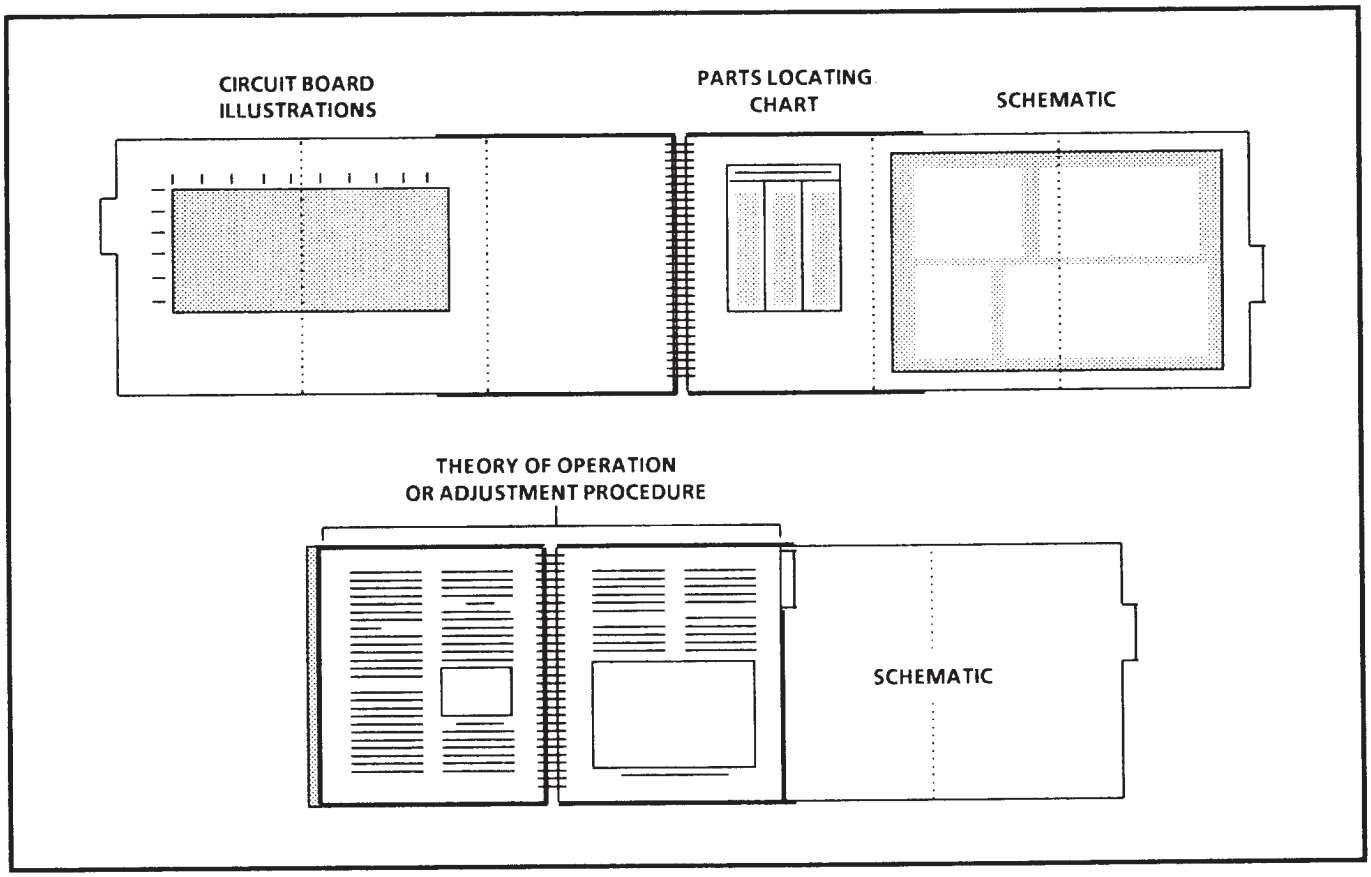


Fig. 5-1. Using the foldout pages.

Circuit Board Illustrations

Electrical components, connectors, and test points are identified on circuit board illustrations located on the inside fold of the corresponding circuit diagram or the back of the preceding diagram.

Assembly and Circuit Numbering

The circuit board assemblies are assigned assembly numbers starting with A1. Fig. 5-2 shows the location of the circuit board assemblies in the instrument. This illustration also shows the location of chassis-mounted components.

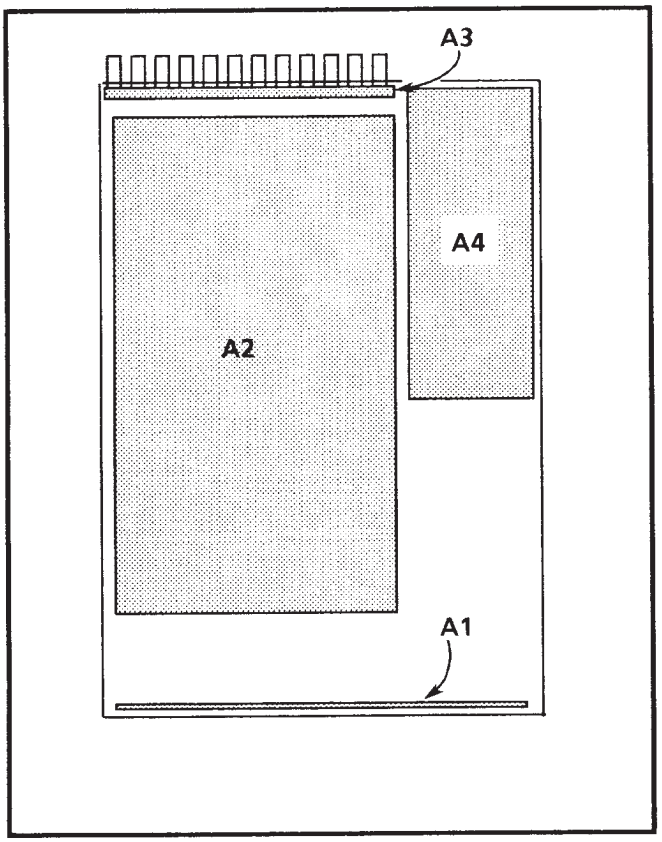


Fig. 5-2. Circuit board assembly locations.

Circuit boards have been assigned an assembly number so that they may be ordered from Tektronix, Inc. They are as follows:

A1	Front Panel Board Assembly
A2	Main Board Assembly
A3	BNC Board Assembly
A4	Power Supply Board

The part numbers for ordering these boards are given on the first page of the Replaceable Electrical Parts list in Section 9.

Each component is assigned a circuit number according to its location within an assembly. Component circuit numbers increase in units from left to right, and in hundreds from top to bottom on the circuit board.

The Replaceable Electrical Parts list is arranged in assembly-by-assembly order, as designated by ANSI Standard Y32.16-1975. The circuit number in the parts list is made up by combining the assembly number and the circuit number.

EXAMPLE: R123 on A2 would be listed in the Replaceable Parts list as A2R123.

In the Replaceable Electrical Parts list, assemblies are listed first, followed by circuit board-mounted parts in alpha numeric order.

NOTE

The parts list number should be used when ordering replacement parts.

DIAGNOSTICS

Two Types of Diagnostics

EPROM U210 (Schematic 6) stores diagnostic programs that check both the μP kernel and external data paths that interface with the kernal. Table 5-1 describes the tests and how to interpret the results.

The μP automatically executes Power-up Diagnostics once each time the instrument is powered up or reset. The μP indicates detected failures in these tests by flashing all the front-panel LEDs on and off.

Selecting Diagnostics

All Diagnostics tests are selected through the Diagnostic switch (S224, Schematic 6). Table 5-1 is a switch guide for the tests. Segment 8 of S224 must be in the open position for Diagnostics to operate, and J231 (WTCHDG ENABLE) must be set to its pins 2 & 3 position.

To select a diagnostic test, set the Diagnostic switch for the desired test, then reset the μP by switching power off and on, or by momentarily moving jumper J227 (Schematic 6) to the 2 &3 position. Immediately after the reset, the μP polls the Diagnostic switch port (U316, Schematic 6) and performs the routine selected at switch S224.

Once the μP enters Diagnostics (except Power-up Diagnostics) you can move from test to test by changing the Diagnostic Switch setting, with two exceptions. These are the Port Test (10000000) and the Diagnostics Test (10000001). To exit these two tests, or to leave Diagnostics altogether, you must execute another reset.

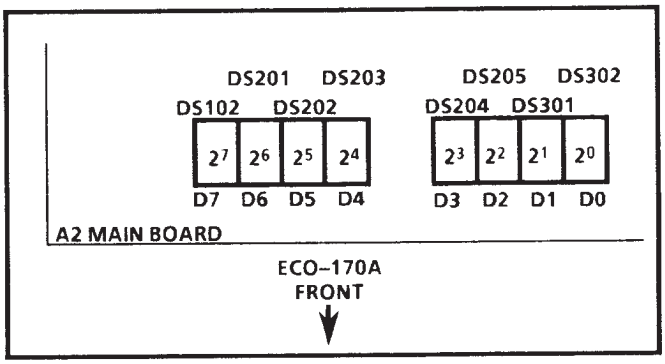


Fig. 5-3. ECO–170A Diagnostic LEDs.

Reading the Diagnostic LEDs

Many of the Diagnostic tests provide a readout on the Diagnostic LEDs DS102, DS201 – DS205, DS301, and DS302. These eight LEDs are arranged into two groups of four, as shown in Fig. 5-3.

Most of the tests which use these LEDs for output either light or extinguish a particular LED in response to a particular switch segment being opened or closed. In the Pulse Width Detector test, however, they present a binary number which is the measured width of the pulse, expressed in cycles of subcarrier.

Table 5-1. Diagnostic Tests

Switch Setting (S224) 87654321	Test	Test Function	Pass/Fail Indication
10000000	Port Test	Verifies that all I/O ports are operational by enabling each one in turn.	Trigger oscilloscope from U334 pin 18, check all U334 output pins (1–16) for an ≈ 600 ns pulse, offset ≈ 11μs from any adjacent output pin.
10000001	Diagnostic switch and LEDs.	Reads the setting of the Diagnostics switch (S224) and transfers it directly to the Diagnostic LEDs. Closed = LED off.	Pass - Diagnostic LEDs display pattern corresponding to Diagnostic switch settings.
10000010	Configure switch	Reads the setting of the Configure switch (S537) and transfers it directly to the Diagnostic LEDs. Closed = LED off.	Pass - Diagnostic LEDs display pattern corresponding to Configure switch settings.

Table 5-1. Diagnostic Tests (Cont.)

Switch Setting (S224) 87654321	Test	Test Function	Pass/Fail Indication
10000011	Front Panel Keyboard	Reads the Keyboard decoder (U508), and displays it on the four LSB Diagnostic LEDs. Other four LEDs are on.	When This Button is Pressed –You should see– Binary Number Displayed ALARM 0000 FAULT INDICATOR 0001 SOURCE SELECTION 0010 SYNC SOURCE 0011 FRONT-PANEL CONTROLS 0100
10000100	Front Panel LEDs	Checks the two front-panel output ports (U412 and U413) and the front-panel LEDs. Lights each LED in turn, beeps the alarm, and puts the ECO–170A momentarily into Bypass mode.	Fail - LED(s) do not light, alarm fails to sound, or Bypass relays fail to click.
10000101	Remote Input	Reads the Remote Input port and transfers it to the four LSB Diagnostics LEDs. Low = LED off. If one or more of these TPs fail to turn D2 off, check the peak detectors.	Ground This Pin –You should see– This LED Turn Off Remote pin 1 D0 Remote pin 2 D1 TP282, TP382, TP563, TP368, TP564, TP755, TP954, or TP768 D2 TP241 D3
10000110	Remote Output	Reads the Configure switch settings and transfers them to the Remote Connector output port (U721). Closed = high, except segment 6 (Remote pin 8) where Closed = low.	Configure Switch Segment Affects Remote Connector Pin 1 3 2 4 3 5 4 6 5 7 6 8
10000111	Automan Port	Reads the Configure switch settings and transfers them to the Automan Port.	See Table 5-2 for AUTOMAN Port Diagnostic Tests
10001000	Misc switch	Reads the Misc switch settings and transfers them to the Diagnostic LEDs. Closed = LED off.	Misc Switch Segment Affects This LED 1 D4 2 D5 3 D6 4 D7

Table 5-1. Diagnostic Tests (Cont.)

Switch Setting (S224) 87654321	Test	Test Function	Pass/Fail Indication
10001001	RAM Read / Write Test	Writes to and reads from all RAM locations. Checks for match between data written to and read from RAM.	Pass - Diagnostic LEDs flash, alternating LSB and MSB. Fail - all Diagnostic LEDs flash together.
10001010	Signal Set Switch	Reads the Signal Set switch (S320) and transfers it to the Diagnostic LEDs. Closed = LED off.	Pass - Diagnostic LEDs display pattern corresponding to Signal Set switch settings.
10001011	Front Panel LEDs	Turns on all of the Front Panel LEDs at the same time.	Fail - one or more LEDs do not light.
10001100	Pulse Width Detector	The Configure switch is used to address the multiplexers (U629 and U637) and select a signal. MISC switch (S715) segment 3 determines whether the signal is from Generator A or B, and segment 4 acts as PWPOL control. The Pulse Width Detector measures the pulse in cycles of subcarrier and outputs (in Binary) to Diagnostic LEDs; MSB then LSB.	See Table 5-3 for Pulse Width Detector Diagnostic tests

Automan Port Diagnostics

The Automan Port Diagnostics are used to check the operation of the Automan Port, U420, and the Source Switching Logic, all of which is located on Schematic 6. Table 5-2 gives a brief description of the circuit responses to the various segments of the Configure switch for this Diagnostic.

Pulse Width Detector Diagnostics

The Pulse Width Detector Diagnostics tests allow the operator to select the signal to be measured by the Pulse Width Detector. The measured pulse width is then displayed on the Diagnostic LEDs, in cycles-of-subcarrier.

This number is presented in several stages: first, the four MSB LEDs (D7 through D4) are sequentially turned on, to indicate that the following number is the MSB. The MSB is then displayed for approximately five seconds. The four LSB LEDs (D0 through D3) are sequentially turned on, to indicate that the following number is the LSB. The LSB is then displayed for approximately five seconds. This entire sequence takes approximately 13 seconds, repeating until another test is selected.

To determine the actual pulse width, you must multiply this count of subcarrier cycles by the subcarrier period which, if expressed in μs, converts cycles-of-subcarrier to μs. That's 0.2793 for NTSC, or 0.2256 for PAL.

The signal to be measured is selected with the Configure switch and the Misc switch. Each segment of the Configure switch, when closed, enables the Multiplexer to pass the corresponding channels' signal through to the Pulse Width Counters (i.e. closing segment 2 applies channel 2 to the MUX, segment 3 applies channel 3, etc.). The Channel 1 signal (Subcarrier) is replaced with one of the internal timing reference signals: 6H for the Generator A inputs, 0.6H for the Generator B inputs. Segment 3 of the Misc switch (S715) selects between the Generator A inputs (closed) or the Generator B inputs (open). Segment 4 of the Misc switch acts as the PWPOL signal when the pulse needs to be inverted; see Table 5-3.

An oscilloscope may be used to measure the actual signal being applied to the Pulse Width Counters, at TP245. This can then be compared to the readout on the Diagnostic LEDs to determine whether the Pulse Width Counters are working properly.

Table 5-2. AUTOMAN Port Diagnostics

S537 SEG	SIGNAL NAME	DESCRIPTION
1	$\overline{\text{AUTOMAN}}$	Sets circuitry to switch automatically when low (closed), or manually when high (open).
2	$\overline{\text{AUTOA}}$	When the AUTOMAN line is **low**, pulsing this line low (switching segment 2 closed & then open) sets U434-13 low.
3	$\overline{\text{AUTOB}}$	When the AUTOMAN line is **low**, pulsing this line low (switching segment 3 closed & then open) sets U434-13 high.
4	MAN $\overline{\text{A}}$/B	When the AUTOMAN line is **high**, closing this segment sets U434-13 low, opening this segment sets U434-13 high.
5	$\overline{\text{CLEAR}}$	When this segment is closed, U420-12 should be low.
6	$\overline{\text{PWCLR}}$	When this segment is closed, U420-15 should be low.
7	$\overline{\text{PWPOL}}$	As this segment is closed and opened, the level at TP245 should change states (alternates between + 5 and 0).
8	$\overline{\text{A}}$/BSS	When this segment is closed U420-19 should be low.

Table 5-3. Pulse Width Detector Diagnostic Tests

Switch Settings		Signal (CH.) Applied to P.W. Counter, Through Multiplexer (Schematic 5)
Config (S537) 87654321	Misc (S715) 3 4	
00000001	0 1	6H (REF)
00000010	0 0	ABF/SUB (2)
00000100	0 1	ASYNC (3)
00001000	0 0	AHD/SYNC/PAL (4)
00010000	0 0	ABLANK (5)
00100000	0 1	AVDBV (6)
01000000	0 1	AV (7)
10000000	0 1	AF V (8)
00000001	1 1	0.6H (REF)
00000010	1 0	BBF/SUB (2)
00000100	1 1	BSYNC (3)
00001000	1 0	BHD/SYNC/PAL (4)
00010000	1 0	BBLANK (5)
00100000	1 1	BVDBV (6)
01000000	1 1	BF V (7)
10000000	1 1	BV (8)

The following example shows the steps to run the Pulse Width Detector Diagnostics for the A SYNC input, with an NTSC system.

1. Set the Diagnostic switch to 10001100 (1 = open), and set J231 (WTCHDG ENABLE) to its pins 2 & 3 position. Reset the ECO–170A, by turning the power off and on, or by moving J227 (MANUAL RESET) momentarily to its pins 2 & 3 position.

2. Set the Configure switch to 00000100 (ch. 3), close (0) segment 3 & open (1) segment 4 of the Misc switch, as shown in Table 5-3. This step can be done either before or after resetting the ECO–170A.

3. The Diagnostic LEDs turn on each of the four MSB LEDs in turn, D7 to D4, and then all eight LEDs display the MSB for about five seconds. The four LSB LEDs then light in turn, D0 to D3, and then all eight LEDs display the LSB for about five seconds. In this case, the MSB is all zeros (blank) and the LSB is 0001 0001. The LEDs will sequence through these states until a different test is selected.

4. Convert this binary number to decimal ($2^4 + 2^0 = 16 + 1 = 17$), and multiply by the subcarrier period. For an NTSC system, $17 \times 0.2793 = 4.748\ \mu s$; well within the specified limits for NTSC sync width ($4.7\ \mu s \pm 0.56\ \mu s$). This same readout would be out of

the specified limits for PAL sync width though (4.7 μs $\pm$0.45 μs), as 17 $\times$ 0.2256 = 3.835 μs.

5. To check a different signal's pulse width, reset the Configure and Misc switches for the new signal, as shown in Table 5-3, and let the Diagnostic LEDs go through at least one complete sequence before reading them.

CORRECTIVE MAINTENANCE

Corrective maintenance deals with obtaining replacement parts, torque specifications, and component replacement.

Obtaining Replacement Parts

Replacement parts are available from or through the local Tektronix, Inc., field office or representative.

When ordering parts be sure to **include the following information** in your order:

1. Instrument type (and option numbers, if any)
2. Instrument serial number
3. Description of the part, as it appears in the Replaceable Electrical or Mechanical Parts list
4. The Tektronix part number

If a part that has been ordered is replaced with a new or improved part, the local Tektronix field office or representative will contact you concerning any change in the part number.

Torque Specifications

Only #4, #6, and #8 screws are used in the ECO–170A. Table 5-4 shows the torque ranges for these.

Correct torque is critical on the screws holding the devices to the Power Supply heat sink.

Table 5-4. Torque Specifications for ECO–170A

Screw #	Torque Range (in inch pounds)
4	3½–5
6	7–9
8	14–18

Replacing Circuit Assemblies

WARNING

Disconnect the instrument power cord before replacing components.

Use the following procedures to remove circuit board assemblies. Reverse the order of the removal procedures to reinstall or replace an assembly.

Power Supply Board Removal

1. Remove the main power connector and disconnect the Main board ribbon connector.
2. Remove the nuts and screws attaching the line filter to the rear panel.
3. Remove the four screws attaching the shield and circuit board to the bottom pan.
4. Remove the three screws attaching the heat sink to the bottom pan.
5. Remove the remaining two mounting screws.

Main Board Removal

1. Disconnect all seven ribbon connectors from the Main board.
2. Remove the eight mounting screws and the two mounting posts.

Front Panel Removal

1. Disconnect the Main board ribbon connector from the front-panel.

2. Remove the two nuts from the front panel.

3. Making sure to avoid pushing on the front-panel LEDs, push the front panel away from the front panel frame to break the glue which holds them together. Avoid bending the front panel any more than necessary.

BNC Board Removal

1. Remove the four Main board ribbon cable connectors.

2. Unsolder the BNC board from the twenty four center connector lugs and the four terminal lugs.

3. Pull BNC board away from the lugs.

BNC Removal

1. To remove any of the top twelve BNC connectors, unsolder the center connector lug and the terminal lug (if attached). For the lower row of BNCs, first remove the three BNC connectors above the one you're trying to remove; the one directly above, and one on either side of it.

2. Unbolt the BNC connector from the rear panel and pull out the connector.

EPROM Replacement Procedure

1. Making sure the power is switched off, remove the old EPROM (U210) from the Main board and replace it with the new EPROM.

2. Switch on power.

Section 6
Replaceable Electrical Parts

This section contains a list of the components that are replaceable for the ECO–170A. Use this list to identify and order replacement parts. There is a separate Replaceable Electrical Parts list for each instrument.

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. Therefore, when ordering parts, it is important to include the following information in your order.

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

If 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.

Using the Replaceable Electrical Parts List

The tabular information in the Replaceable Electrical Parts list is arranged for quick retrieval. Understanding the structure and features of the list will help you find all of the information you need for ordering replaceable parts.

Cross Index–Mfr. Code Number to Manufacturer

The Mfg. Code Number to Manufacturer Cross Index for the electrical parts list is located immediately after this page. The cross index provides codes, names, and addresses of manufacturers of components listed in the electrical parts list.

Abbreviations

Abbreviations conform to American National Standards Institute (ANSI) standard Y1.1.

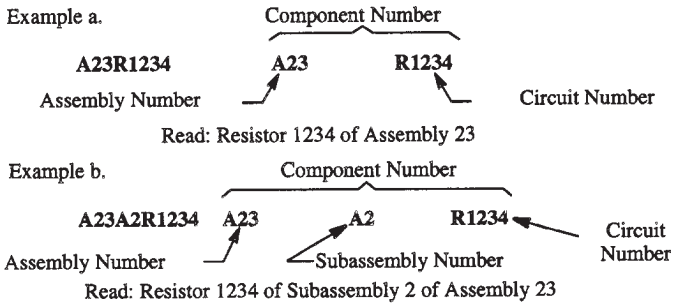
List of Assemblies

A list of assemblies can be found at the beginning of the electrical parts list. The assemblies are listed in numerical order. When the complete component number of a part is known, this list will identify the assembly in which the part is located.

Column Descriptions

Component No. (Column 1)

The component circuit number appears on the diagrams and circuit board illustrations, located in the diagrams section. Assembly numbers are also marked on each diagram and circuit board illustration, in the Diagram section and on the mechanical exploded views, in the mechanical parts list. The component number is obtained by adding the assembly number prefix to the circuit number.



The electrical parts list is arranged by assemblies in numerical sequence (A1, with its subassemblies and parts, precedes A2, with its subassemblies and parts).

Mechanical subparts to the circuit boards are listed in the electrical parts list. These mechanical subparts are listed with their associated electrical part (for example, fuse holder follows fuse).

Chassis-mounted parts and cable assemblies have no assembly number prefix and are located at the end of the electrical parts list.

Tektronix Part No. (Column 2)

Indicates part number to be used when ordering replacement part from Tektronix.

Serial/Assembly No. (Column 3 and 4)

Column three (3) indicates the serial or assembly number at which the part was first used. Column four (4) indicates the serial or assembly number at which the part was removed. No serial or assembly number entered indicates part is good for all serial numbers.

Name and Description (Column 5)

An item name is separated from the description by a colon (:). Because of space limitations, an item name may sometimes appear as incomplete. Use the U.S. Federal Catalog handbook H6-1 for further item name identification.

The mechanical subparts are shown as *ATTACHED PARTS* / *END ATTACHED PARTS* or *MOUNTING PARTS* / *END MOUNTING PARTS* in column five (5).

Mfr. Code (Column 6)

Indicates the code number of the actual manufacturer of the part. (Code to name and address cross reference can be found immediately after this page.)

Mfr. Part No. (Column 7)

Indicates actual manufacturer's part number.

CROSS INDEX – MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code.	Manufacturer	Address	City, State, Zip Code
00779	AMP INC	2800 FULLING MILL PO BOX 3608	HARRISBURG PA 17105
01121	ALLEN–BRADLEY CO INDUSTRIAL CONTROL PRODUCTS	1201 S 2ND ST	MILWAUKEE WI 53204–2410
01295	TEXAS INSTRUMENTS INC SEMICONDUCTOR GROUP	13500 N CENTRAL EXPY PO BOX 655012	DALLAS TX 75265
03508	GENERAL ELECTRIC CO SEMI–CONDUCTOR PRODUCTS DEPT	W GENESEE ST	AUBURN NY 13021
04222	AVX CERAMICS DIV OF AVX CORP	19TH AVE SOUTH P O BOX 867	MYRTLE BEACH SC 29577
04713	MOTOROLA INC SEMICONDUCTOR PRODUCTS SECTOR	5005 E MCDOWELL RD	PHOENIX AZ 85008–4229
05292	ITT COMPONENTS DIV		CLIFTON NJ
05397	UNION CARBIDE CORP MATERIALS SYSTEMS DIV	11901 MADISON AVE	CLEVELAND OH 44101
05464	INDUSTRIAL ELECTRONIC ENGINEERS INC	7440 LEMONA AVE	VAN NUYS CA 91405–1136
05828	GENERAL INSTRUMENT CORP GOVERNMENT SYSTEMS DIV	600 W JOHN ST	HICKSVILLE NY 11802
07088	KELVIN ELECTRIC CO	5907 NOBLE AVE	VAN NUYS CA 91411
07716	TRW INC TRW IRC FIXED RESISTORS/BURLINGTON	2850 MT PLEASANT AVE	BURLINGTON IA 52601
11236	CTS CORP BERNE DIV THICK FILM PRODUCTS GROUP	406 PARR ROAD	BERNE IN 46711–9506
12969	MICROSEMI CORPORATION WATERTOWN DIVISION	530 PLEASANT STREET	WATERTOWN MA 02172
14433	ITT SEMICONDUCTORS DIV		WEST PALM BEACH FL
14552	MICROSEMI CORP	2830 S FAIRVIEW ST	SANTA ANA CA 92704–5948
14936	GENERAL INSTRUMENT CORP POWER SEMICONDUCTOR DIV	600 W JOHN ST	HICKSVILLE NY 11802–0709
17856	SILICONIX INC	2201 LAURELWOOD RD	SANTA CLARA CA 95054–1516
19701	PHILIPS COMPONENTS DISCRETE PRODUCTS DIV RESISTIVE PRODUCTS FACILITY AIRPORT ROAD	PO BOX 760	MINERAL WELLS TX 76067–0760
22929	DALE ELECTRONICS CORP FREQUENCY CONTROL GROUP	1155 W 23RD ST	TEMPE AZ 85282–1822
24165	SPRAGUE ELECTRIC CO	267 LOWELL ROAD	HUDSON NH 03051
26364	COMPONENTS CORP	6 KINSEY PLACE	DENVILLE NJ 07834–2611
27014	NATIONAL SEMICONDUCTOR CORP	2900 SEMICONDUCTOR DR	SANTA CLARA CA 95051–0606
32997	BOURNS INC TRIMPOT DIV	1200 COLUMBIA AVE	RIVERSIDE CA 92507–2114
34333	SILICON GENERAL INC	11651 MONARCH ST	GARDEN GROVE CA 92641–1816
37942	NORTH AMERICAN CAPACITOR CO MALLORY DIVISION	INDIANAPOLIS ROAD, HWY 240 PO BOX 240	GREEN CASTLE IN 46135 1
50434	HEWLETT–PACKARD CO OPTOELECTRONICS DIV	370 W TRIMBLE RD	SAN JOSE CA 95131–1008
55680	NICHICON /AMERICA/ CORP	927 E STATE PKY	SCHAUMBURG IL 60195–4526
56708	ZILOG INC	1315 DELL AVE	CAMPBELL CA 95008–6609
57027	INTERNATIONAL RESISTIVE PRODUCTS INC	4222 S STAPLES	CORPUS CHRISTI TX 78411–2702
57668	ROHM CORP	8 WHATNEY PO BOX 19515	IRVINE CA 92713
61529	AROMAT CORP	629 CENTRAL AVE	NEW PROVIDENCE NJ 07974
71400	BUSSMANN DIV OF COOPER INDUSTRIES INC	114 OLD STATE RD PO BOX 14460	ST LOUIS MO 63178
71744	CHICAGO MINIATURE LAMP INC	CHEVY CHASE BUSINESS PARK 1080 JOHNSON DRIVE	BUFFALO GROVE IL 60089
76493	BELL INDUSTRIES INC JW MILLER DIV	19070 REYES AVE PO BOX 5825	COMPTON CA 90224–5825
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077–0001
81073	GRAYHILL INC	561 HILLGROVE AVE PO BOX 10373	LA GRANGE IL 60525–5914
81483	INTERNATIONAL RECTIFIER	9220 SUNSET BLVD	LOS ANGELES CA 90069–3501
84411	AMERICAN SHIZUKI CORP OGALLALA OPERATIONS	301 WEST O ST	OGALLALA NE 69153–1844
91637	DALE ELECTRONICS INC	2064 12TH AVE PO BOX 609	COLUMBUS NE 68601–3632
S4307	SCHAFFNER ELECTRONIK AG		LUTERBACH SWITZERLAND
TK0435	LEWIS SCREW CO	4300 S RACINE AVE	CHICAGO IL 60609–3320
TK0858	STAUFFER SUPPLY CO (DIST)		
TK1134	TUSONIX INC	2155 N FORBES BLVD	TUCSON AZ 85705
TK1339	PREM MAGNETICS INC	3521 N CHAPEL HILL RD	MCHENRY IL 60050
TK1345	ZMAN & ASSOCIATES		

Mfr. Code.	Manufacturer	Address	City, State, Zip Code
TK1424 TK1573	MARCON AMERICA CORP WILHELM WESTERMAN	PO BOX 2345 AUGUSTA–ANLAGE 56	6800 MANNHEIM 1 WEST GERMANY

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A1	333-3422-00			PANEL,FRONT:	80009	333-3422-00
A2	670-9838-00	B010100	B010119	CIRCUIT BD ASSY:MAIN	80009	670-9838-00
A2	670-9838-01	B010120	B010148	CIRCUIT BD ASSY:MAIN	80009	670-9838-01
A2	670-9838-02	B010149	B010264	CIRCUIT BD ASSY:MAIN	80009	670-9838-02
A2	670-9838-03	B010265	B010271	CIRCUIT BD ASSY:MAIN	80009	670-9838-03
A2	670-9838-04	B010272	B010292	CIRCUIT BD ASSY:MAIN	80009	670-9838-04
A2	670-9838-05	B010293	B020399	CIRCUIT BD ASSY:MAIN	80009	670-9838-05
A2	670-9838-06	B020400	B020432	CIRCUIT BD ASSY:MAIN	80009	670-9838-06
A2	670-9838-07	B020433	B020520	CIRCUIT BD ASSY:MAIN	80009	670-9838-07
A2	670-9838-08	B020521	B021125	CIRCUIT BD ASSY:MAIN	80009	670-9838-08
A2	670-9838-09	B021126	B021140	CIRCUIT BD ASSY:MAIN	80009	670-9838-09
A2	670-9838-10	B021141	B021279	CIRCUIT BD ASSY:MAIN	80009	670-9838-10
A2	670-9838-11	B021280	B021291	CIRCUIT BD ASSY:MAIN	80009	670-9838-11
A2	670-9838-12	B021292		CIRCUIT BD ASSY:MAIN	80009	670-9838-12
A3	670-9839-00			CIRCUIT BD ASSY:BNC	80009	670-9839-00
A4	670-9113-02	B010100	B010172	CIRCUIT BD ASSY:POWER SUPPLY	80009	670-9113-02
A4	670-9113-03	B010173	B010188	CIRCUIT BD ASSY:POWER SUPPLY	80009	670-9113-03
A4	670-9113-04	B010189	B010230	CIRCUIT BD ASSY:POWER SUPPLY	80009	670-9113-04
A4	670-9113-05	B010231	B010261	CIRCUIT BD ASSY:POWER SUPPLY	80009	670-9113-05
A4	670-9113-06	B010262	B019999	CIRCUIT BD ASSY:POWER SUPPLY	80009	670-9113-06
A4	671-0572-00	B020000	B020453	CIRCUIT BD ASSY:POWER SUPPLY	80009	671-0572-00
A4	671-0572-01	B020454	B020707	CIRCUIT BD ASSY:POWER SUPPLY	80009	671-0572-01
A4	671-0572-02	B020708	B020841	CIRCUIT BD ASSY:POWER SUPPLY	80009	671-0572-02
A4	671-0572-03	B020842	B021071	CIRCUIT BD ASSY:POWER SUPPLY	80009	671-0572-03
A4	671-0572-04	B021072	B021129	CIRCUIT BD ASSY:POWER SUPPLY	80009	671-0572-04
A4	671-0572-05	B021130	B021171	CIRCUIT BD ASSY:POWER SUPPLY	80009	671-0572-05
A4	671-0572-06	B021172		CIRCUIT BD ASSY:POWER SUPPLY	80009	671-0572-06
A1	333-3422-00			PANEL,FRONT:	80009	333-3422-00
A1DS210	150-5004-00			DIO,OPTO:LED;HI EFFIC RED,635NM,1.0 MCD AT 10MA,YOKE LEAD BEND;HLMP-6300-021,12MM	80009	150-5004-00
A1DS212	150-5003-00			DIO,OPTO:LED;GRN,569NM,1MCD AT 10MA,90 DEG VIEW ANGL,YOKE LEAD-BEND;HLMP-6500-T21,T&R	80009	150-5003-00
A1DS310	150-5003-00			DIO,OPTO:LED;GRN,569NM,1MCD AT 10MA,90 DEG VIEW ANGL,YOKE LEAD-BEND;HLMP-6500-T21,T&R	80009	150-5003-00
A1DS312	150-5003-00			DIO,OPTO:LED;GRN,569NM,1MCD AT 10MA,90 DEG VIEW ANGL,YOKE LEAD-BEND;HLMP-6500-T21,T&R	80009	150-5003-00
A1DS410	150-5004-00			DIO,OPTO:LED;HI EFFIC RED,635NM,1.0 MCD AT 10MA,YOKE LEAD BEND;HLMP-6300-021,12MM	80009	150-5004-00
A1DS412	150-5003-00			DIO,OPTO:LED;GRN,569NM,1MCD AT 10MA,90 DEG VIEW ANGL,YOKE LEAD-BEND;HLMP-6500-T21,T&R	80009	150-5003-00
A1DS510	150-5004-00			DIO,OPTO:LED;HI EFFIC RED,635NM,1.0 MCD AT 10MA,YOKE LEAD BEND;HLMP-6300-021,12MM	80009	150-5004-00
A1DS512	150-5004-00			DIO,OPTO:LED;HI EFFIC RED,635NM,1.0 MCD AT 10MA,YOKE LEAD BEND;HLMP-6300-021,12MM	80009	150-5004-00
A1DS610	150-5004-00			DIO,OPTO:LED;HI EFFIC RED,635NM,1.0 MCD AT 10MA,YOKE LEAD BEND;HLMP-6300-021,12MM	80009	150-5004-00
A1DS612	150-5003-00			DIO,OPTO:LED;GRN,569NM,1MCD AT 10MA,90 DEG VIEW ANGL,YOKE LEAD-BEND;HLMP-6500-T21,T&R	80009	150-5003-00
A1DS710	150-5004-00			DIO,OPTO:LED;HI EFFIC RED,635NM,1.0 MCD AT 10MA,YOKE LEAD BEND;HLMP-6300-021,12MM	80009	150-5004-00
A1DS712	150-5003-00			DIO,OPTO:LED;GRN,569NM,1MCD AT 10MA,90 DEG VIEW ANGL,YOKE LEAD-BEND;HLMP-6500-T21,T&R	80009	150-5003-00
A1S310	——— ———			(PART OF A1)		

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A1S410	—— ——			(PART OF A1)		
A1S510	—— ——			(PART OF A1)		
A1S610	—— ——			(PART OF A1)		
A1S710	—— ——			(PART OF A1)		
A2	670-9838-00	B010100	B010119	CIRCUIT BD ASSY:MAIN	80009	670-9838-00
A2	670-9838-01	B010120	B010148	CIRCUIT BD ASSY:MAIN	80009	670-9838-01
A2	670-9838-02	B010149	B010264	CIRCUIT BD ASSY:MAIN	80009	670-9838-02
A2	670-9838-03	B010265	B010271	CIRCUIT BD ASSY:MAIN	80009	670-9838-03
A2	670-9838-04	B010272	B010292	CIRCUIT BD ASSY:MAIN	80009	670-9838-04
A2	670-9838-05	B010293	B020399	CIRCUIT BD ASSY:MAIN	80009	670-9838-05
A2	670-9838-06	B020400	B020432	CIRCUIT BD ASSY:MAIN	80009	670-9838-06
A2	670-9838-07	B020433	B020520	CIRCUIT BD ASSY:MAIN	80009	670-9838-07
A2	670-9838-08	B020521	B021125	CIRCUIT BD ASSY:MAIN	80009	670-9838-08
A2	670-9838-09	B021126	B021140	CIRCUIT BD ASSY:MAIN	80009	670-9838-09
A2	670-9838-10	B021141	B021279	CIRCUIT BD ASSY:MAIN	80009	670-9838-10
A2	670-9838-11	B021280	B021291	CIRCUIT BD ASSY:MAIN	80009	670-9838-11
A2	670-9838-12	B021292		CIRCUIT BD ASSY:MAIN	80009	670-9838-12
A2C118	283-0421-00	670-9838-00	670-9838-04	CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	MD015C104MAB
A2C118	281-0775-01	670-9838-05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C136	283-0421-00	670-9838-00	670-9838-04	CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	MD015C104MAB
A2C136	281-0775-01	670-9838-05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C140	283-0629-00			CAP,FXD,MICA DI:62PF,1%,500V	80009	283-0629-00
A2C145	283-0421-00	670-9838-00	670-9838-04	CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	MD015C104MAB
A2C145	281-0775-01	670-9838-05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C156	283-0421-00	670-9838-00	670-9838-04	CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	MD015C104MAB
A2C156	281-0775-01	670-9838-05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C157	283-0421-00	670-9838-00	670-9838-04	CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	MD015C104MAB
A2C157	281-0775-01	670-9838-05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C168	283-0421-00	670-9838-00	670-9838-04	CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	MD015C104MAB
A2C168	281-0775-01	670-9838-05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C169	283-0421-00	670-9838-00	670-9838-04	CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	MD015C104MAB
A2C169	281-0775-01	670-9838-05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C175	283-0421-00	670-9838-00	670-9838-04	CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	MD015C104MAB
A2C175	281-0775-01	670-9838-05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C176	283-0421-00	670-9838-00	670-9838-04	CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	MD015C104MAB
A2C176	281-0775-01	670-9838-05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C182	283-0421-00	670-9838-00	670-9838-04	CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	MD015C104MAB
A2C182	281-0775-01	670-9838-05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C183	283-0421-00	670-9838-00	670-9838-04	CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	MD015C104MAB
A2C183	281-0775-01	670-9838-05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C184	283-0421-00	670-9838-00	670-9838-04	CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	MD015C104MAB
A2C184	281-0775-01	670-9838-05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C192	283-0421-00	670-9838-00	670-9838-04	CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	MD015C104MAB
A2C192	281-0775-01	670-9838-05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C193	283-0421-00	670-9838-00	670-9838-04	CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	MD015C104MAB

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A2C193	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C195	281–0727–00			CAP,FXD,CER DI:12.8PF,1%,500V	TK1134	374 018COGO1289F
A2C196	281–0810–00	670–9838–11		CAP,FXD,CER:MLC;5.6PF,+/–0.5PF,100V,0.100 X 0.170;AXIAL,MI	04222	SA101A5R6DAA
A2C198	283–0648–00			CAP,FXD,MICA DI:10PF,+/–0.5PF,500V	80009	283–0648–00
A2C199	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C199	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C226	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C226	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C232	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C232	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C236	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C236	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C245	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C245	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C247	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C247	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C254	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C254	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C256	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C256	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C268	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C268	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C270	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C270	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C274	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C274	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C275	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C275	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C276	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C276	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C277	283–0059–00			CAP,FXD,CER DI:1UF,+80–20%,50V	04222	SR305C105MAA
A2C278	283–0111–00	670–9838–10	670–9838–10	CAP,FXD,CER DI:0.1UF,20%,50V	80009	283–0111–00
A2C278	281–0775–01	670–9838–11		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C280	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C280	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C282	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C282	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C283	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C283	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C284	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A2C284	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C287	283–0140–00	670–9838–05	670–9838–10	CAP,FXD,CER DI:4.7PF,+/–0.25PF,50V	80009	283–0140–00
A2C290	281–0727–00	670–9838–00	670–9838–10	CAP,FXD,CER DI:12.8PF,1%,500V	TK1134	374 018COGO1289F
A2C290	281–0810–00	670–9838–11		CAP,FXD,CER:MLC;5.6PF,+/–0.5PF,100V,0.100 X 0.170;AXIAL,MI	04222	SA101A5R6DAA
A2C291	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C291	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C296	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C296	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C299	283–0648–00			CAP,FXD,MICA DI:10PF,+/–0.5PF,500V	80009	283–0648–00
A2C312	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C312	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C320	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C320	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C338	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C338	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C339	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C339	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C347	283–0421–00	670–9838–00	670–9838–02	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C347	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C354	283–0421–00	670–9838–00	670–9838–02	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C354	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C356	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C356	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C357	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C357	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C359	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C359	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C364	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C364	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C365	283–0059–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:1UF,+80–20%,50V	04222	SR305C105MAA
A2C365	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C367	283–0059–00			CAP,FXD,CER DI:1UF,+80–20%,50V	04222	SR305C105MAA
A2C369	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C369	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C374	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C374	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C375	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C375	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C376	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C376	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C377	283–0059–00			CAP,FXD,CER DI:1UF,+80–20%,50V	04222	SR305C105MAA

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A2C381	283–0059–00			CAP,FXD,CER DI:1UF,+80–20%,50V	04222	SR305C105MAA
A2C382	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C382	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C383	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C383	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C384	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C384	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C387	283–0140–00	670–9838–05	670–9838–10	CAP,FXD,CER DI:4.7PF,+/–0.25PF,50V	80009	283–0140–00
A2C394	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C394	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C395	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C395	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C398	283–0648–00			CAP,FXD,MICA DI:10PF,+/–0.5PF,500V	80009	283–0648–00
A2C399	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C399	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C416	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C416	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C417	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C417	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C431	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C431	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C432	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C432	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C448	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C448	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C451	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C451	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C452	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C452	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C454	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C454	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C457	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C457	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C467	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C467	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C468	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C468	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C475	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C475	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C476	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C476	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A2C482	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C482	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C483	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C483	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C484	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C484	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C487	283–0140–00	670–9838–05	670–9838–10	CAP,FXD,CER DI:4.7PF,+/–0.25PF,50V	80009	283–0140–00
A2C493	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C493	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C494	281–0727–00	670–9838–00	670–9838–10	CAP,FXD,CER DI:12.8PF,1%,500V	TK1134	374 018COGO1289F
A2C494	281–0810–00	670–9838–11		CAP,FXD,CER:MLC;5.6PF,+/–0.5PF,100V,0.100 X 0.170;AXIAL,MI	04222	SA101A5R6DAA
A2C502	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C502	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C503	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C503	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C504	283–0811–00	670–9838–00	670–9838–10	CAP,FXD,CER DI:0.01UF,20%,100V	80009	283–0811–00
A2C504	281–0773–00	670–9838–11		CAP,FXD,CER:MLC;0.01UF,10%,100V,SAF,0.100 X 0.170;AXIAL,MI	80009	281–0773–00
A2C505	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C505	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C508	283–0423–00	670–9838–00	670–9838–10	CAP,FXD,CER DI:0.22UF,+80–20%,50V	04222	MD015E224ZAA
A2C508	283–0198–02	670–9838–11		CAP,FXD,CER DI:0.22UF,20%,50V	05397	C330C224M5U5CA
A2C510	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C510	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C522	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C522	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C525	283–0421–00	670–9835–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C525	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C544	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C544	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C548	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C548	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C550	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C550	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C551	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C551	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C553	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C553	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C554	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C554	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C555	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C555	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A2C558	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C558	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C559	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C559	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C560	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C560	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C561	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C561	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C563	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C563	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C564	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C564	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C566	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C566	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C567	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C567	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C577	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C577	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C578	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C578	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C582	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C582	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C583	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C583	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C584	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C584	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C585	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C585	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C586	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C586	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C587	283–0140–00	670–9838–04	670–9838–10	CAP,FXD,CER DI:4.7PF,+/–0.25PF,50V	80009	283–0140–00
A2C592	281–0727–00	670–9838–00	670–9838–10	CAP,FXD,CER DI:12.8PF,1%,500V	TK1134	374 018COGO1289F
A2C592	281–0810–00	670–9838–11		CAP,FXD,CER:MLC;5.6PF,+/–0.5PF,100V,0.100 X 0.170;AXIAL,MI	04222	SA101A5R6DAA
A2C593	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C593	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C597	283–0648–00			CAP,FXD,MICA DI:10PF,+/–0.5PF,500V	80009	283–0648–00
A2C610	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C610	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C611	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C611	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C625	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A2C625	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C626	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C626	281–0775–01	670–9838–05	670–9838–08	CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C633	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C633	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C644	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C644	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C645	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C645	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C646	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C646	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C647	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C647	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C649	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C649	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C651	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C651	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C657	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C657	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C658	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C658	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C668	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C668	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C669	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C669	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C675	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C675	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C676	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C676	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C682	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C682	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C683	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C683	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C684	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C684	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C685	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C685	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C687	283–0140–00	670–9838–04	670–9838–10	CAP,FXD,CER DI:4.7PF,+/–0.25PF,50V	80009	283–0140–00
A2C691	281–0727–00	670–9838–00	670–9838–01	CAP,FXD,CER DI:12.8PF,1%,500V	TK1134	374 018COGO1289F
A2C691	281–0645–00	670–9838–02	670–9838–02	CAP,FXD,CER DI:8.2PF,+/–0.25PF,500V	TK1134	374–018–COHO829C
A2C691	281–0727–00	670–9838–03	670–9838–10	CAP,FXD,CER DI:12.8PF,1%,500V	TK1134	374 018COGO1289F

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A2C691	281–0810–00	670–9838–11		CAP,FXD,CER:MLC;5.6PF,+/–0.5PF,100V,0.100 X 0.170;AXIAL,MI	04222	SA101A5R6DAA
A2C692	281–0727–00	670–9838–00	670–9838–10	CAP,FXD,CER DI:12.8PF,1%,500V	TK1134	374 018COGO1289F
A2C692	281–0810–00	670–9838–11		CAP,FXD,CER:MLC;5.6PF,+/–0.5PF,100V,0.100 X 0.170;AXIAL,MI	04222	SA101A5R6DAA
A2C693	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C693	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C694	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C694	281–0775–01	670–9838–05	670–9838–05	CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C694	290–0990–00	670–9838–06	670–9838–10	CAP,FXD,ELCTLT:10UF,20%,50V	80009	290–0990–00
A2C694	290–0942–00	670–9838–11		CAP,FXD,ELCTLT:100UF,+100–10%,25V	24165	672D107H025CG2C
A2C695	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C695	281–0775–01	670–9838–05	670–9838–05	CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C695	290–0990–00	670–9838–06	670–9838–10	CAP,FXD,ELCTLT:10UF,20%,50V	80009	290–0990–00
A2C695	290–0942–00	670–9838–11		CAP,FXD,ELCTLT:100UF,+100–10%,25V	24165	672D107H025CG2C
A2C698	283–0648–00			CAP,FXD,MICA DI:10PF,+/–0.5PF,500V	80009	283–0648–00
A2C699	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C699	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C716	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C716	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C717	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C717	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C727	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C727	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C729	283–0421–00			CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C733	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C733	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C736	283–0492–00	670–9838–00	670–9838–10	CAP,FXD,CER DI:1000PF,20%	80009	283–0492–00
A2C736	281–0862–00	670–9838–11		CAP,FXD,CER DI:0.001UF,+80–20%,100V	04222	SA101C102MAA
A2C738	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C738	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C741	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C741	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C744	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C744	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C745	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C745	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C746	283–0421–00	670–9838–03		CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C748	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C748	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C751	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C751	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C752	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C752	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C753	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB

Replaceable Electrical Parts

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A2C753	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C756	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C756	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C757	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C757	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C760	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C760	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C764	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C764	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C765	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C765	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C766	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C766	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C768	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C768	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C771	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C771	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C778	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C778	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C779	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C779	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C781	283–0111–00	670–9838–10	670–9838–10	CAP,FXD,CER DI:0.1UF,20%,50V	80009	283–0111–00
A2C781	281–0775–01	670–9838–11		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C782	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C782	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C783	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C783	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C784	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C784	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C785	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C785	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C787	283–0140–00	670–9838–04	670–9838–10	CAP,FXD,CER DI:4.7PF,+/–0.25PF,50V	80009	283–0140–00
A2C797	283–0648–00			CAP,FXD,MICA DI:10PF,+/–0.5PF,500V	80009	283–0648–00
A2C813	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C813	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C814	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C814	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C815	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C815	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C816	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A2C816	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C817	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C817	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C819	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C819	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C820	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C820	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C830	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C830	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C831	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C831	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C841	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C841	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C842	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C842	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C854	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C854	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C855	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C855	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C857	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C857	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C858	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C858	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C862	283–0728–00			CAP,FXD,MICA DI:120PF,1%,500V	80009	283–0728–00
A2C863	283–0728–00			CAP,FXD,MICA DI:120PF,1%,500V	80009	283–0728–00
A2C864	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C864	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C865	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C865	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C867	283–0644–00			CAP,FXD,MICA DI:150PF,1%,500V	80009	283–0644–00
A2C868	283–0647–00			CAP,FXD,MICA DI:70PF,1%,100V	80009	283–0647–00
A2C869	283–0644–00			CAP,FXD,MICA DI:150PF,1%,500V	80009	283–0644–00
A2C870	283–0647–00			CAP,FXD,MICA DI:70PF,1%,100V	80009	283–0647–00
A2C878	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C878	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C879	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C879	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C882	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C882	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C883	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C883	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C884	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A2C884	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C885	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C885	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C887	283–0140–00	670–9838–05	670–9838–10	CAP,FXD,CER DI:4.7PF,+/–0.25PF,50V	80009	283–0140–00
A2C889	283–0140–00	670–9838–05	670–9838–10	CAP,FXD,CER DI:4.7PF,+/–0.25PF,50V	80009	283–0140–00
A2C892	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C892	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C893	281–0727–00	670–9838–00	670–9838–10	CAP,FXD,CER DI:12.8PF,1%,500V	TK1134	374 018COGO1289F
A2C893	281–0810–00	670–9838–11		CAP,FXD,CER:MLC;5.6PF,+/–0.5PF,100V,0.100 X 0.170;AXIAL,MI	04222	SA101A5R6DAA
A2C894	281–0727–00	670–9838–00	670–9838–10	CAP,FXD,CER DI:12.8PF,1%,500V	TK1134	374 018COGO1289F
A2C894	281–0810–00	670–9838–11		CAP,FXD,CER:MLC;5.6PF,+/–0.5PF,100V,0.100 X 0.170;AXIAL,MI	04222	SA101A5R6DAA
A2C895	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C895	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C896	283–0648–00			CAP,FXD,MICA DI:10PF,+/–0.5PF,500V	80009	283–0648–00
A2C897	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C897	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C899	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C899	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C937	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C937	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C945	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C945	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C948	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C948	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C949	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C949	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C950	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C950	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C954	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C954	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C960	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C960	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C961	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C961	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C962	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C962	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C963	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C963	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C964	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C964	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C965	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A2C965	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C966	283–0728–00			CAP,FXD,MICA DI:120PF,1%,500V	80009	283–0728–00
A2C967	283–0728–00			CAP,FXD,MICA DI:120PF,1%,500V	80009	283–0728–00
A2C970	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C970	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C971	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C971	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C975	283–0644–00			CAP,FXD,MICA DI:150PF,1%,500V	80009	283–0644–00
A2C976	283–0647–00			CAP,FXD,MICA DI:70PF,1%,100V	80009	283–0647–00
A2C977	283–0644–00			CAP,FXD,MICA DI:150PF,1%,500V	80009	283–0644–00
A2C978	283–0647–00			CAP,FXD,MICA DI:70PF,1%,100V	80009	283–0647–00
A2C985	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C985	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C990	283–0421–00	670–9838–00	670–9838–04	CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A2C990	281–0775–01	670–9838–05		CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C998	283–0648–00			CAP,FXD,MICA DI:10PF,+/–0.5PF,500V	80009	283–0648–00
A2CR219	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A2CR220	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A2CR271	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A2CR279	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR279	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR280	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR280	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR357	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A2CR365	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR365	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR366	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR366	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR372	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A2CR379	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR379	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR380	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR380	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR454	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR454	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR455	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR455	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR458	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR548	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR549	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A2CR550	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A2CR553	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A2CR554	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A2CR560	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A2CR561	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A2CR562	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A2CR563	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A2CR643	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR643	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR644	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR644	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR650	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR650	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR746	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A2CR754	152–0141–02	670–9838–00	670–9838–10	DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A2CR754	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR755	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A2CR758	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A2CR766	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR766	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR767	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR767	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR862	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR862	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR863	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR863	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR864	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR864	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR865	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR865	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR898	152–0066–00			DIO,RECT:400V,1A,IFSM=30A,1.2VF,2US;GP10G/1 N5060,T&R,SAF CONT	05828	GP10G–020
A2CR944	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A2CR952	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR952	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR953	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR953	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00

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A2CR966	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR966	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR967	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR967	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR968	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR968	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2CR969	152–0322–00	670–9838–00	670–9838–10	DIO,SIG:SCHTKY;15V,410MVF AT 1MA,1.2PF;5082–2811,T&R	80009	152–0322–00
A2CR969	152–0951–00	670–9838–11		DIO,SIG:SCHTKY;60V,2.25PF;1N6263,DO–35,T&R	80009	152–0951–00
A2DS102	150–1070–00	670–9838–00	670–9838–10	LT EMITTING DIO:RED,635NM,35MA MAX	05464	LL 7124R
A2DS102	150–1171–00	670–9838–11		DIO,OPTO:LED;RED,626NM,3MCD AT 10MA,60 DEG VIEW ANGL;HLMP–1302–002,T1,T&R	50434	HLMP–1302–002
A2DS201	150–1070–00	670–9838–00	670–9838–10	LT EMITTING DIO:RED,635NM,35MA MAX	05464	LL 7124R
A2DS201	150–1171–00	670–9838–11		DIO,OPTO:LED;RED,626NM,3MCD AT 10MA,60 DEG VIEW ANGL;HLMP–1302–002,T1,T&R	50434	HLMP–1302–002
A2DS202	150–1070–00	670–9838–00	670–9838–10	LT EMITTING DIO:RED,635NM,35MA MAX	05464	LL 7124R
A2DS202	150–1171–00	670–9838–11		DIO,OPTO:LED;RED,626NM,3MCD AT 10MA,60 DEG VIEW ANGL;HLMP–1302–002,T1,T&R	50434	HLMP–1302–002
A2DS203	150–1070–00	670–9838–00	670–9838–10	LT EMITTING DIO:RED,635NM,35MA MAX	05464	LL 7124R
A2DS203	150–1171–00	670–9838–11		DIO,OPTO:LED;RED,626NM,3MCD AT 10MA,60 DEG VIEW ANGL;HLMP–1302–002,T1,T&R	50434	HLMP–1302–002
A2DS204	150–1070–00	670–9838–00	670–9838–10	LT EMITTING DIO:RED,635NM,35MA MAX	05464	LL 7124R
A2DS204	150–1171–00	670–9838–11		DIO,OPTO:LED;RED,626NM,3MCD AT 10MA,60 DEG VIEW ANGL;HLMP–1302–002,T1,T&R	50434	HLMP–1302–002
A2DS205	150–1070–00	670–9838–00	670–9838–10	LT EMITTING DIO:RED,635NM,35MA MAX	05464	LL 7124R
A2DS205	150–1171–00	670–9838–11		DIO,OPTO:LED;RED,626NM,3MCD AT 10MA,60 DEG VIEW ANGL;HLMP–1302–002,T1,T&R	50434	HLMP–1302–002
A2DS301	150–1070–00	670–9838–00	670–9838–10	LT EMITTING DIO:RED,635NM,35MA MAX	05464	LL 7124R
A2DS301	150–1171–00	670–9838–11		DIO,OPTO:LED;RED,626NM,3MCD AT 10MA,60 DEG VIEW ANGL;HLMP–1302–002,T1,T&R	50434	HLMP–1302–002
A2DS302	150–1070–00	670–9838–00	670–9838–10	LT EMITTING DIO:RED,635NM,35MA MAX	05464	LL 7124R
A2DS302	150–1171–00	670–9838–11		DIO,OPTO:LED;RED,626NM,3MCD AT 10MA,60 DEG VIEW ANGL;HLMP–1302–002,T1,T&R	50434	HLMP–1302–002
A2DS605	150–1070–00	670–9838–00	670–9838–10	LT EMITTING DIO:RED,635NM,35MA MAX	05464	LL 7124R
A2DS605	150–1171–00	670–9838–11		DIO,OPTO:LED;RED,626NM,3MCD AT 10MA,60 DEG VIEW ANGL;HLMP–1302–002,T1,T&R	50434	HLMP–1302–002
A2J227	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A2J231	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A2J258	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A2J275	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A2J298	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A2J302	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A2J357	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A2J384	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A2J461	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A2J474	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A2J484	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A2J498	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A2J543	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A2J602	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A2J757	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A2J759	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A2J798	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A2J872	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A2J873	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A2J883	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A2J910	131-0608-00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131-0608-00
A2J925	131-0608-00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131-0608-00
A2J935	131-0608-00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131-0608-00
A2J937	131-0608-00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131-0608-00
A2J948	131-0608-00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131-0608-00
A2J978	131-0608-00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131-0608-00
A2J979	131-0608-00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131-0608-00
A2J998	131-0608-00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131-0608-00
A2K197	148-0163-00			RLY,ARM:4 FORM C,2A,30V,COIL 5VDC,62.5 OHM	61529	DS4E-M-DC5V
A2K397	148-0163-00			RLY,ARM:4 FORM C,2A,30V,COIL 5VDC,62.5 OHM	61529	DS4E-M-DC5V
A2K697	148-0163-00			RLY,ARM:4 FORM C,2A,30V,COIL 5VDC,62.5 OHM	61529	DS4E-M-DC5V
A2K897	148-0163-00			RLY,ARM:4 FORM C,2A,30V,COIL 5VDC,62.5 OHM	61529	DS4E-M-DC5V
A2L185	108-0170-01			COIL,RF:FXD,360NH	TK1345	108-0170-01
A2L190	108-0170-01			COIL,RF:FXD,360NH	TK1345	108-0170-01
A2L296	108-0170-01			COIL,RF:FXD,360NH	TK1345	108-0170-01
A2L297	108-0170-01			COIL,RF:FXD,360NH	TK1345	108-0170-01
A2L394	108-0170-01			COIL,RF:FXD,360NH	TK1345	108-0170-01
A2L396	108-0170-01			COIL,RF:FXD,360NH	TK1345	108-0170-01
A2L596	108-0170-01	670-9838-00	670-9838-02	COIL,RF:FXD,360NH	TK1345	108-0170-01
A2L596	108-0328-00	670-9838-03	670-9838-10	COIL,RF:	TK1345	108-0328-00
A2L596	108-0181-00	670-9838-11		COIL,RF:FXD,0.2UH	80009	108-0181-00
A2L599	108-0170-01	670-9838-00	670-9838-02	COIL,RF:FXD,360NH	TK1345	108-0170-01
A2L599	108-0328-00	670-9838-03	670-9838-10	COIL,RF:	TK1345	108-0328-00
A2L599	108-0170-01	670-9838-11		COIL,RF:FXD,360NH	TK1345	108-0170-01
A2L695	108-0328-00	670-9838-00	670-9838-10	COIL,RF:	TK1345	108-0328-00
A2L695	108-0170-01	670-9838-11		COIL,RF:FXD,360NH	TK1345	108-0170-01
A2L697	108-0328-00	670-9838-00	670-9838-10	COIL,RF:	TK1345	108-0328-00
A2L697	108-0170-01	670-9838-11		COIL,RF:FXD,360NH	TK1345	108-0170-01
A2L794	108-0735-00	670-9838-00	670-9838-02	COIL,RF:FXD,584NH	80009	108-0735-00
A2L794	108-0328-00	670-9838-03	670-9838-10	COIL,RF:	TK1345	108-0328-00
A2L794	108-0181-01	670-9838-11		COIL,RF:FXD,165NH	TK1345	108-0181-01
A2L797	108-0735-00	670-9838-00	670-9838-02	COIL,RF:FXD,584NH	80009	108-0735-00
A2L797	108-0328-00	670-9838-03	670-9838-10	COIL,RF:	TK1345	108-0328-00
A2L797	108-0181-01	670-9838-11		COIL,RF:FXD,165NH	TK1345	108-0181-01
A2L867	108-1212-00	670-9838-00	670-9838-09	COIL,RF:FXD,9UH,2%	TK1345	108-1212-00
A2L867	108-1491-00	670-9838-10		COIL,RF:FXD,TOROIDAL,9.0UH,5.5%	TK1345	108-1491-00
A2L869	108-1212-00	670-9838-00	670-9838-09	COIL,RF:FXD,9UH,2%	TK1345	108-1212-00
A2L869	108-1491-00	670-9838-10		COIL,RF:FXD,TOROIDAL,9.0UH,5.5%	TK1345	108-1491-00
A2L895	108-0170-01	670-9838-00	670-9838-10	COIL,RF:FXD,360NH	TK1345	108-0170-01
A2L895	108-0212-00	670-9838-11		COIL,RF:FXD,495NH	80009	108-0212-00
A2L899	108-0170-01			COIL,RF:FXD,360NH	TK1345	108-0170-01
A2L975	108-1212-00	670-9838-00	670-9838-09	COIL,RF:FXD,9UH,2%	TK1345	108-1212-00
A2L975	108-1491-00	670-9838-10		COIL,RF:FXD,TOROIDAL,9.0UH,5.5%	TK1345	108-1491-00
A2L977	108-1212-00	670-9838-00	670-9838-09	COIL,RF:FXD,9UH,2%	TK1345	108-1212-00
A2L977	108-1491-00	670-9838-10		COIL,RF:FXD,TOROIDAL,9.0UH,5.5%	TK1345	108-1491-00
A2L993	108-0170-01			COIL,RF:FXD,360NH	TK1345	108-0170-01
A2L994	108-0170-01			COIL,RF:FXD,360NH	TK1345	108-0170-01
A2LS603	119-2520-00			XDCR:AUDIO,2.2KHZ,W/DRV CKT	80009	119-2520-00
A2P227	131-0993-02			BUS,CNDCT:SHUNT ASSY,RED	00779	1-850100-O
A2P231	131-0993-02			BUS,CNDCT:SHUNT ASSY,RED	00779	1-850100-O
A2P258	131-0993-05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100-5
A2P275	131-0993-05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100-5
A2P357	131-0993-05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100-5
A2P384	131-0993-05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100-5
A2P461	131-0993-05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100-5
A2P474	131-0993-05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100-5
A2P484	131-0993-05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100-5
A2P543	131-0993-05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100-5

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A2P602	131–0993–05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100–5
A2P757	131–0993–05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100–5
A2P759	131–0993–05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100–5
A2P872	131–0993–05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100–5
A2P873	131–0993–05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100–5
A2P883	131–0993–05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100–5
A2P935	131–0993–05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100–5
A2P937	131–0993–05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100–5
A2P978	131–0993–05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100–5
A2P979	131–0993–05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100–5
A2Q136	151–0199–00			XSTR,SIG:BIPO-LAR,PNP;12V,80MA,SWING;MPS3640,TO–92 EBC	80009	151–0199–00
A2Q603	151–0736–00			XSTR,SIG:BIPOLAR,NPN;40V,600MA,250MHZ, AMPL;2N4401,TO–92 EBC	80009	151–0736–00
A2Q798	151–0656–00			XSTR,PWR:BIPOLAR,NPN;80V,8.0A,4.0MHZ,DAR-LINGTON,AMPL;2N6044,TO–220	80009	151–0656–00
A2Q824	151–0164–00			XSTR,SIG:BIPOLAR,PNP;60V,600MA,200MHZ, AMPL;MPS2907A,TO–92 EBC	04713	MPS2907A
A2Q866	151–0220–00			XSTR,SIG:BIPOLAR,PNP;40V,200MA,400MHZ, AMPL;2N3906(SEL),TO–92 EBC	80009	151–0220–00
A2Q867	151–0220–00			XSTR,SIG:BIPOLAR,PNP;40V,200MA,400MHZ, AMPL;2N3906(SEL),TO–92 EBC	80009	151–0220–00
A2Q876	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A2Q877	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A2Q974	151–0220–00			XSTR,SIG:BIPOLAR,PNP;40V,200MA,400MHZ, AMPL;2N3906(SEL),TO–92 EBC	80009	151–0220–00
A2Q975	151–0220–00			XSTR,SIG:BIPOLAR,PNP;40V,200MA,400MHZ, AMPL;2N3906(SEL),TO–92 EBC	80009	151–0220–00
A2Q985	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A2Q986	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A2R135	322–3235–00	670–9838–11		RES,FXD:MET FILM;2.74K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 2K74
A2R136	315–0100–00	670–9838–00	670–9838–10	RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
A2R136	322–3001–00	670–9838–11		RES,FXD,FILM:10OHM,1%,0.2W,TC=100 PPM;AX-IAL	80009	322–3001–00
A2R137	315–0151–00			RES,FXD,FILM:150 OHM,5%,0.25W	80009	315–0151–00
A2R138	315–0152–00			RES,FXD,FILM:1.5K OHM,5%,0.25W	80009	315–0152–00
A2R144	315–0272–00			RES,FXD,FILM:2.7K OHM,5%,0.25W	80009	315–0272–00
A2R153	307–0650–00			RES NTWK,FXD,FI:9,2.7K OHM,5%,0.150W	11236	750–101–R2.7K
A2R175	315–0202–00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315–0202–00
A2R176	315–0202–00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315–0202–00
A2R184	321–0085–07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321–0085–07
A2R190	321–0085–07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321–0085–07
A2R191	315–0200–00			RES,FXD,FILM:20 OHM,5%,0.25W	80009	315–0200–00
A2R192	321–0143–07	670–9838–00	670–9838–10	RES,FXD,FILM:301 OHM,0.1%,0.125W,TC=T9	80009	321–0143–07
A2R192	322–3193–00	670–9838–11		RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R193	321–0143–07	670–9838–00	670–9838–10	RES,FXD,FILM:301 OHM,0.1%,0.125W,TC=T9	80009	321–0143–07
A2R193	322–3192–00	670–9838–11		RES,FXD,FILM:976 OHM,1%,0.2W,TC=T0	80009	322–3192–00
A2R195	315–0102–00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315–0102–00
A2R198	321–0085–07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321–0085–07
A2R225	307–0650–00			RES NTWK,FXD,FI:9,2.7K OHM,5%,0.150W	11236	750–101–R2.7K
A2R226	315–0103–00			RES,FXD,FILM:10K OHM,5%,0.25W	80009	315–0103–00
A2R239	315–0202–00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315–0202–00
A2R243	315–0272–00			RES,FXD,FILM:2.7K OHM,5%,0.25W	80009	315–0272–00
A2R246	315–0202–00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315–0202–00

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A2R273	315–0102–00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315–0102–00
A2R275	315–0202–00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315–0202–00
A2R276	322–3481–00	670–9838–10		RES,FXD,FILM:1M OHM.1%,0.2W,TC=T0	80009	322–3481–00
A2R278	315–0105–00			RES,FXD,FILM:1M OHM,5%,0.25W	80009	315–0105–00
A2R281	315–0101–00			RES,FXD,FILM:100 OHM,5%,0.25W	80009	315–0101–00
A2R290	315–0102–00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315–0102–00
A2R296	321–0085–07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321–0085–07
A2R297	321–0085–07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321–0085–07
A2R298	315–0200–00			RES,FXD,FILM:20 OHM,5%,0.25W	80009	315–0200–00
A2R299	321–0085–07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321–0085–07
A2R302	315–0621–00			RES,FXD,FILM:620 OHM,5%,0.25W	80009	315–0621–00
A2R303	315–0331–00			RES,FXD,FILM:330 OHM,5%,0.25W	80009	315–0331–00
A2R304	315–0331–00			RES,FXD,FILM:330 OHM,5%,0.25W	80009	315–0331–00
A2R305	315–0331–00			RES,FXD,FILM:330 OHM,5%,0.25W	80009	315–0331–00
A2R306	307–0695–00			RES NTWK,FXD,FI:9,150 OHM,2%,0.2W EA	11236	750–101–R150 OHM
A2R307	315–0331–00			RES,FXD,FILM:330 OHM,5%,0.25W	80009	315–0331–00
A2R308	315–0621–00			RES,FXD,FILM:620 OHM,5%,0.25W	80009	315–0621–00
A2R321	307–0650–00			RES NTWK,FXD,FI:9,2.7K OHM,5%,0.150W	11236	750–101–R2.7K
A2R345	315–0202–00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315–0202–00
A2R346	315–0202–00	670–9838–00	670–9838–02	RES,FXD,FILM:2K OHM,5%,0.25W	80009	315–0202–00
A2R359	315–0102–00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315–0102–00
A2R362	322–3481–00	670–9838–10		RES,FXD,FILM:1M OHM.1%,0.2W,TC=T0	80009	322–3481–00
A2R365	315–0105–00			RES,FXD,FILM:1M OHM,5%,0.25W	80009	315–0105–00
A2R366	307–0650–00			RES NTWK,FXD,FI:9,2.7K OHM,5%,0.150W	11236	750–101–R2.7K
A2R369	315–0101–00			RES,FXD,FILM:100 OHM,5%,0.25W	80009	315–0101–00
A2R372	315–0102–00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315–0102–00
A2R375	315–0202–00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315–0202–00
A2R376	322–3481–00	670–9838–10		RES,FXD,FILM:1M OHM.1%,0.2W,TC=T0	80009	322–3481–00
A2R378	315–0205–00	670–9838–00	670–9838–10	RES,FXD,FILM:2M OHM,5%,0.25W	80009	315–0205–00
A2R378	321–0510–07	670–9838–11		RES,FXD,FILM:2.00 MEG OHM,0.1%,0.125W,TC=T9	80009	321–0510–07
A2R381	322–3101–00			RES,FXD,FILM:110 OHM,1%,0.2W,TC=TO	91637	CCF50–2G110R0F
A2R392	321–0143–07	670–9838–00	670–9838–10	RES,FXD,FILM:301 OHM,0.1%,0.125W,TC=T9	80009	321–0143–07
A2R392	322–3193–00	670–9838–11		RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R393	321–0143–07	670–9838–00	670–9838–10	RES,FXD,FILM:301 OHM,0.1%,0.125W,TC=T9	80009	321–0143–07
A2R393	322–3192–00	670–9838–11		RES,FXD,FILM:976 OHM,1%,0.2W,TC=T0	80009	322–3192–00
A2R394	321–0085–07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321–0085–07
A2R395	315–0200–00			RES,FXD,FILM:20 OHM,5%,0.25W	80009	315–0200–00
A2R396	321–0085–07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321–0085–07
A2R397	321–0085–07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321–0085–07
A2R403	315–0331–00			RES,FXD,FILM:330 OHM,5%,0.25W	80009	315–0331–00
A2R404	315–0621–00			RES,FXD,FILM:620 OHM,5%,0.25W	80009	315–0621–00
A2R405	315–0331–00			RES,FXD,FILM:330 OHM,5%,0.25W	80009	315–0331–00
A2R406	315–0621–00			RES,FXD,FILM:620 OHM,5%,0.25W	80009	315–0621–00
A2R407	315–0621–00			RES,FXD,FILM:620 OHM,5%,0.25W	80009	315–0621–00
A2R408	315–0621–00			RES,FXD,FILM:620 OHM,5%,0.25W	80009	315–0621–00
A2R445	321–1289–07			RES,FXD,FILM:10.1K OHM,0.1%,0.125W,TC=T9	80009	321–1289–07
A2R446	321–1289–07			RES,FXD,FILM:10.1K OHM,0.1%,0.125W,TC=T9	80009	321–1289–07
A2R447	315–0270–00			RES,FXD,FILM:27 OHM,5%,0.25W	80009	315–0270–00
A2R448	322–3226–00			RES,FXD:MET FILM;2.21K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 2K21
A2R449	322–3193–07			RES,FXD,FILM:1K OHM,0.1%,0.2W,TC=T9	80009	322–3193–07
A2R450	321–0632–00			RES,FXD,FILM:9.41K OHM,0.5%,0.125W,TC=T2	80009	321–0632–00
A2R451	321–0342–07			RES,FXD,FILM:35.7K OHM,0.1%,0.125W,TC=T9	91637	CMF55116C35701B
A2R452	315–0270–00			RES,FXD,FILM:27 OHM,5%,0.25W	80009	315–0270–00
A2R453	321–0666–07			RES,FXD,FILM:3.04K OHM,0.1%,0.125W,TC=T9	80009	321–0666–07
A2R454	321–0189–00			RES,FXD,FILM:909 OHM,1%,0.125W,TC=T0	80009	321–0189–00

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A2R455	315–0105–00			RES,FXD,FILM:1M OHM,5%,0.25W	80009	315–0105–00
A2R475	315–0202–00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315–0202–00
A2R476	315–0202–00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315–0202–00
A2R492	321–0143–07	670–9838–00	670–9838–10	RES,FXD,FILM:301 OHM,0.1%,0.125W,TC=T9	80009	321–0143–07
A2R492	322–3193–00	670–9838–11		RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R493	321–0143–07	670–9838–00	670–9838–10	RES,FXD,FILM:301 OHM,0.1%,0.125W,TC=T9	80009	321–0143–07
A2R493	322–3192–00	670–9838–11		RES,FXD,FILM:976 OHM,1%,0.2W,TC=T0	80009	322–3192–00
A2R494	315–0102–00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315–0102–00
A2R503	315–0102–00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315–0102–00
A2R537	307–0650–00			RES NTWK,FXD,FI:9,2.7K OHM,5%,0.150W	11236	750–101–R2.7K
A2R544	321–1650–07			RES,FXD,FILM:8.99K OHM,0.1%,0.125W,TC=T9	07716	CEAE89900B
A2R545	321–0816–07			RES,FXD,FILM:5K OHM,0.1%,0.125W,TC=T9	80009	321–0816–07
A2R546	321–0816–07			RES,FXD,FILM:5K OHM,0.1%,0.125W,TC=T9	80009	321–0816–07
A2R547	322–3243–00			RES,FXD:MET FILM;3.32K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	91637	CCF50–1–G33200F
A2R548	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R549	321–0932–00			RES,FXD,FILM:2.5K OHM,1%,0.125W,TC=T0	01121	
A2R550	315–0105–00			RES,FXD,FILM:1M OHM,5%,0.25W	80009	315–0105–00
A2R551	322–3193–00	670–9838–03		RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R554	315–0102–00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315–0102–00
A2R555	315–0102–00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315–0102–00
A2R556	322–3481–00	670–9838–10		RES,FXD,FILM:1M OHM.1%,0.2W,TC=T0	80009	322–3481–00
A2R557	322–3481–00	670–9838–10		RES,FXD,FILM:1M OHM.1%,0.2W,TC=T0	80009	322–3481–00
A2R560	315–0105–00			RES,FXD,FILM:1M OHM,5%,0.25W	80009	315–0105–00
A2R561	315–0105–00			RES,FXD,FILM:1M OHM,5%,0.25W	80009	315–0105–00
A2R564	315–0101–00			RES,FXD,FILM:100 OHM,5%,0.25W	80009	315–0101–00
A2R565	315–0101–00			RES,FXD,FILM:100 OHM,5%,0.25W	80009	315–0101–00
A2R566	315–0272–00			RES,FXD,FILM:2.7K OHM,5%,0.25W	80009	315–0272–00
A2R576	315–0202–00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315–0202–00
A2R577	315–0202–00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315–0202–00
A2R591	321–0143–07	670–9838–00	670–9838–10	RES,FXD,FILM:301 OHM,0.1%,0.125W,TC=T9	80009	321–0143–07
A2R591	322–3193–00	670–9838–11		RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R592	321–0143–07	670–9838–00	670–9838–10	RES,FXD,FILM:301 OHM,0.1%,0.125W,TC=T9	80009	321–0143–07
A2R592	322–3192–00	670–9838–11		RES,FXD,FILM:976 OHM,1%,0.2W,TC=T0	80009	322–3192–00
A2R593	322–3193–00	670–9838–11		RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R596	321–0085–07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321–0085–07
A2R597	321–0085–07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321–0085–07
A2R598	315–0200–00			RES,FXD,FILM:20 OHM,5%,0.25W	80009	315–0200–00
A2R599	321–0085–07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321–0085–07
A2R604	315–0102–00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315–0102–00
A2R605	315–0105–00			RES,FXD,FILM:1M OHM,5%,0.25W	80009	315–0105–00
A2R606	315–0205–00	670–9838–00	670–9838–10	RES,FXD,FILM:2M OHM,5%,0.25W	80009	315–0205–00
A2R606	321–0510–07	670–9838–11		RES,FXD,FILM:2.00 MEG OHM,0.1%,0.125W,TC=T9	80009	321–0510–07
A2R626	301–0101–00	670–9838–09		RES,FXD,FILM:100 OHM,5%,0.5W	01121	EB1015
A2R630	307–0719–00	670–9838–00	670–9838–10	RES NTWK,FXD,FI:9,1.5K OHM,2%,0.15W EACH	32997	4310R101152
A2R630	307–0650–00	670–9838–11		RES NTWK,FXD,FI:9,2.7K OHM,5%,0.150W	11236	750–101–R2.7K
A2R635	322–3200–00			RES,FXD,FILM:1.18K OHM,1%,0.2W,TC=T0	80009	322–3200–00
A2R638	322–3200–00			RES,FXD,FILM:1.18K OHM,1%,0.2W,TC=T0	80009	322–3200–00
A2R643	315–0200–00			RES,FXD,FILM:20 OHM,5%,0.25W	80009	315–0200–00
A2R644	322–3164–00			RES,FXD,FILM:499 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 499E
A2R645	321–0919–03			RES,FXD,FILM:1.107K OHM,0.25%,0.125W,TC=T2	19701	5033RC1K107C
A2R646	321–1718–07	670–9838–00	670–9838–09	RES,FXD,FILM:1.111K OHM,0.1%,0.125W,TC=T9	19701	5033RE1K111B
A2R646	322–3204–00	670–9838–10	670–9838–10	RES,FXD,FILM:1.3K OHM,1%,0.2W,TC=T0	80009	322–3204–00

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A2R646	322-3210-00	670-9838-11		RES,FXD:MET FILM;1.5K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K50
A2R651	315-0105-00			RES,FXD,FILM:1M OHM,5%,0.25W	80009	315-0105-00
A2R673	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	80009	315-0272-00
A2R674	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315-0202-00
A2R675	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315-0202-00
A2R691	322-3193-00	670-9838-11		RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R692	321-0143-07	670-9838-00	670-9838-10	RES,FXD,FILM:301 OHM,0.1%,0.125W,TC=T9	80009	321-0143-07
A2R692	322-3193-00	670-9838-11		RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R693	321-0143-07	670-9838-00	670-9838-10	RES,FXD,FILM:301 OHM,0.1%,0.125W,TC=T9	80009	321-0143-07
A2R693	322-3192-00	670-9838-11		RES,FXD,FILM:976 OHM,1%,0.2W,TC=T0	80009	322-3192-00
A2R695	321-0085-07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321-0085-07
A2R696	315-0200-00			RES,FXD,FILM:20 OHM,5%,0.25W	80009	315-0200-00
A2R697	321-0085-07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321-0085-07
A2R698	321-0085-07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321-0085-07
A2R715	307-0650-00			RES NTWK,FXD,FI:9,2.7K OHM,5%,0.150W	11236	750-101-R2.7K
A2R728	322-3289-00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322-3289-00
A2R736	322-3289-00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322-3289-00
A2R737	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315-0202-00
A2R741	315-0102-00	670-9838-03		RES,FXD,FILM:1K OHM,5%,0.25W	80009	315-0102-00
A2R747	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315-0102-00
A2R749	322-3481-00	670-9838-10		RES,FXD,FILM:1M OHM.1%,0.2W,TC=T0	80009	322-3481-00
A2R750	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315-0102-00
A2R751	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315-0102-00
A2R752	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315-0202-00
A2R753	315-0105-00			RES,FXD,FILM:1M OHM,5%,0.25W	80009	315-0105-00
A2R756	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	80009	315-0101-00
A2R757	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	80009	315-0272-00
A2R759	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315-0102-00
A2R764	322-3481-00	670-9838-10		RES,FXD,FILM:1M OHM.1%,0.2W,TC=T0	80009	322-3481-00
A2R765	315-0105-00			RES,FXD,FILM:1M OHM,5%,0.25W	80009	315-0105-00
A2R769	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	80009	315-0101-00
A2R770	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	80009	315-0272-00
A2R776	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315-0202-00
A2R777	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315-0202-00
A2R791	322-3200-00			RES,FXD,FILM:1.18K OHM,1%,0.2W,TC=T0	80009	322-3200-00
A2R792	321-0143-07	670-9838-00	670-9838-10	RES,FXD,FILM:301 OHM,0.1%,0.125W,TC=T9	80009	321-0143-07
A2R792	322-3193-00	670-9838-11		RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R793	321-0143-07	670-9838-00	670-9838-10	RES,FXD,FILM:301 OHM,0.1%,0.125W,TC=T9	80009	321-0143-07
A2R793	322-3192-00	670-9838-11		RES,FXD,FILM:976 OHM,1%,0.2W,TC=T0	80009	322-3192-00
A2R794	321-0085-07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321-0085-07
A2R795	315-0200-00			RES,FXD,FILM:20 OHM,5%,0.25W	80009	315-0200-00
A2R797	321-0085-07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321-0085-07
A2R798	321-0085-07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321-0085-07
A2R799	322-3193-00	670-9838-11		RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R821	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315-0102-00
A2R822	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315-0102-00
A2R823	315-0200-00			RES,FXD,FILM:20 OHM,5%,0.25W	80009	315-0200-00
A2R827	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	80009	315-0272-00
A2R830	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	80009	315-0272-00
A2R854	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315-0202-00
A2R855	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315-0202-00
A2R857	322-3481-00	670-9838-10		RES,FXD,FILM:1M OHM.1%,0.2W,TC=T0	80009	322-3481-00

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A2R858	322-3481-00	670-9838-10		RES,FXD,FILM:1M OHM,1%,0.2W,TC=T0	80009	322-3481-00
A2R860	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	80009	315-0272-00
A2R861	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	80009	315-0104-00
A2R862	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	80009	315-0104-00
A2R864	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	80009	315-0272-00
A2R865	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	80009	315-0272-00
A2R866	315-0331-00			RES,FXD,FILM:330 OHM,5%,0.25W	80009	315-0331-00
A2R867	315-0331-00			RES,FXD,FILM:330 OHM,5%,0.25W	80009	315-0331-00
A2R872	322-3193-00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R873	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315-0102-00
A2R874	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315-0102-00
A2R875	322-3193-00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R876	315-0331-00			RES,FXD,FILM:330 OHM,5%,0.25W	80009	315-0331-00
A2R877	315-0331-00			RES,FXD,FILM:330 OHM,5%,0.25W	80009	315-0331-00
A2R878	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315-0202-00
A2R879	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315-0202-00
A2R889	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315-0102-00
A2R890	321-0143-07	670-9838-00	670-9838-10	RES,FXD,FILM:301 OHM,0.1%,0.125W,TC=T9	80009	321-0143-07
A2R890	322-3193-00	670-9838-11		RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R891	321-0143-07	670-9838-00	670-9838-10	RES,FXD,FILM:301 OHM,0.1%,0.125W,TC=T9	80009	321-0143-07
A2R891	322-3192-00	670-9838-11		RES,FXD,FILM:976 OHM,1%,0.2W,TC=T0	80009	322-3192-00
A2R892	321-0143-07	670-9838-00	670-9838-10	RES,FXD,FILM:301 OHM,0.1%,0.125W,TC=T9	80009	321-0143-07
A2R892	322-3193-00	670-9838-11		RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R893	321-0143-07	670-9838-00	670-9838-10	RES,FXD,FILM:301 OHM,0.1%,0.125W,TC=T9	80009	321-0143-07
A2R893	322-3192-00	670-9838-11		RES,FXD,FILM:976 OHM,1%,0.2W,TC=T0	80009	322-3192-00
A2R894	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315-0102-00
A2R895	321-0085-07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321-0085-07
A2R896	321-0085-07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321-0085-07
A2R897	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315-0102-00
A2R898	315-0200-00			RES,FXD,FILM:20 OHM,5%,0.25W	80009	315-0200-00
A2R899	321-0085-07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321-0085-07
A2R944	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315-0102-00
A2R947	322-3481-00	670-9838-10		RES,FXD,FILM:1M OHM,1%,0.2W,TC=T0	80009	322-3481-00
A2R951	315-0105-00			RES,FXD,FILM:1M OHM,5%,0.25W	80009	315-0105-00
A2R954	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	80009	315-0101-00
A2R960	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315-0202-00
A2R962	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315-0202-00
A2R963	322-3481-00	670-9838-10		RES,FXD,FILM:1M OHM,1%,0.2W,TC=T0	80009	322-3481-00
A2R964	322-3481-00	670-9838-10		RES,FXD,FILM:1M OHM,1%,0.2W,TC=T0	80009	322-3481-00
A2R965	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	80009	315-0104-00
A2R966	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	80009	315-0104-00
A2R971	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	80009	315-0272-00
A2R972	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	80009	315-0272-00
A2R973	315-0331-00			RES,FXD,FILM:330 OHM,5%,0.25W	80009	315-0331-00
A2R974	315-0331-00			RES,FXD,FILM:330 OHM,5%,0.25W	80009	315-0331-00
A2R980	322-3193-00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R981	315-0682-00	670-9838-00	670-9838-02	RES,FXD,FILM:6.8K OHM,5%,0.25W	80009	315-0682-00
A2R981	322-3193-00	670-9838-03		RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R982	315-0682-00	670-9838-00	670-9838-02	RES,FXD,FILM:6.8K OHM,5%,0.25W	80009	315-0682-00
A2R982	322-3193-00	670-9838-03		RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R983	322-3193-00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00

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A2R984	315–0331–00	670–9838–00	670–9838–07	RES,FXD,FILM:330 OHM,5%,0.25W	80009	315–0331–00
A2R984	315–0330–00	670–9838–08		RES,FXD,FILM:33 OHM,5%,0.25W	80009	315–0330–00
A2R986	315–0331–00	670–9838–00	670–9838–07	RES,FXD,FILM:330 OHM,5%,0.25W	80009	315–0331–00
A2R986	315–0330–00	670–9838–08		RES,FXD,FILM:33 OHM,5%,0.25W	80009	315–0330–00
A2R992	315–0200–00			RES,FXD,FILM:20 OHM,5%,0.25W	80009	315–0200–00
A2R993	321–0085–07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321–0085–07
A2R994	321–0085–07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321–0085–07
A2R998	321–0085–07			RES,FXD,FILM:75 OHM,0.1%,0.125W,TC=T9	80009	321–0085–07
A2S224	260–1721–00			SW,RKR:8,SPST,125MA,30VDC	81073	76SB08S
A2S320	260–1721–00			SW,RKR:8,SPST,125MA,30VDC	81073	76SB08S
A2S537	260–1721–00			SW,RKR:8,SPST,125MA,30VDC	81073	76SB08S
A2S715	260–1965–00			SW,RKR:DIP;RSD RKR,4 POSN,TOP SLD,150MA 30VDC;76SBO4S	80009	260–1965–00
A2TP102	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP150	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP185	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP195	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP241	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP245	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP282	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP357	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP368	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP382	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP396	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP397	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP398	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP433	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP452	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP453	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP503	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP550	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP551	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP552	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP563	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP564	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP593	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP594	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP595	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP643	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP644	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP755	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP768	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP793	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP795	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP823	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP898	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP913	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP954	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP987	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2TP992	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A2U110	156–0983–03			IC,PROCESSOR:NMOS,MICROPROCESSOR;8–BIT;Z80B,DIP40.6	56708	Z80BCPUDS
A2U125	156–1632–00			MICROCKT,DGTL:CMOS,2048 X 8 SRAM	80009	156–1632–00
A2U133	156–0469–02			IC,DGTL:LSTTL,DEMUX/DCDR;DUPLICATE OF 156–0469–00;74LS138,DIP16.3,TUBE	80009	156–0469–02
A2U134	119–1555–00			OSCILLATOR,RF:4MHZ,0.01%,CRYSTAL	22929	X0–33D
A2U135	156–3050–00	670–9838–11		IC,MISC:	80009	156–3050–00
A2U139	156–0724–02			IC,DGTL:LSTTL,GATES;74LS05,DIP14.3	80009	156–0724–02

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A2U145	156-1756-00			IC,DGTL:ALSTTL,FLIP FLOP;DUAL D-TYPE W/ CLR;74ALS74,DIP14.3	01295	SN74ALS74NP3/JP4
A2U148	156-0788-01			IC,DGTL:LSTTL,CNTR;74LS162,DIP16.3,TUBE	80009	156-0788-01
A2U154	156-0788-01			IC,DGTL:LSTTL,CNTR;74LS162,DIP16.3,TUBE	80009	156-0788-01
A2U159	156-0784-02			IC,DGTL:LSTTL,CNTR;74LS163,DIP16.3,TUBE	80009	156-0784-02
A2U161	156-2251-00			IC,DGTL:FTTL,CNTR;SYNCH 4-BIT BIN, WITH / MR;74F161,DIP16.3,TUBE	04713	MC74F161AN
A2U166	156-2251-00			IC,DGTL:FTTL,CNTR;SYNCH 4-BIT BIN, WITH / MR;74F161,DIP16.3,TUBE	04713	MC74F161AN
A2U167	156-0481-02			IC,DGTL:LSTTL,GATES;74LS11,DIP14.3,TUBE	80009	156-0481-02
A2U173	156-1756-00			IC,DGTL:ALSTTL,FLIP FLOP;DUAL D-TYPE W/ CLR;74ALS74,DIP14.3	01295	SN74ALS74NP3/JP4
A2U174	156-2113-00			IC,DGTL:ALSTTL,GATE;QUAD 2-IN AND;74ALS08,DIP14.3,TUBE	01295	SN74ALS08N3
A2U178	156-1324-00			IC,LIN:BIPOLAR,COMPTR;TTL,20NS,COMPLEMENTARY OUT,W/STROBES;LM361N,DIP14.3	27014	LM361N/GLAA054
A2U179	156-1324-00			IC,LIN:BIPOLAR,COMPTR;TTL,20NS,COMPLEMENTARY OUT,W/STROBES;LM361N,DIP14.3	27014	LM361N/GLAA054
A2U194	156-1850-00			IC,MISC:CMOS,ANALOG SW;QUAD;DG211,DIP16.3	17856	SDG21107
A2U198	156-1850-00			IC,MISC:CMOS,ANALOG SW;QUAD;DG211,DIP16.3	17856	SDG21107
A2U210	160-4339-00	670-9838-00	670-9838-02	MICROCKT,DGTL:NMOS,8192 X 8 EPROM,W/3 STATE OUT,PRGM	80009	160-4339-00
A2U210	160-4339-01	670-9838-03	670-9838-03	MICROCKT,DGTL:NCMOS,8192 X 8 EPROM,PRGM	80009	160-4339-01
A2U210	160-4339-02	670-9838-04	670-9838-06	MICROCKT,DGTL:NCMOS,8192 X 8 EPROM,PRGM	80009	160-4339-02
A2U210	160-4339-03	670-9838-07	670-9838-09	MICROCKT,DGTL:NCMOS,8192 X 8 EPROM,PRGM	80009	160-4339-03
A2U210	160-4339-04	670-9838-10	670-9838-11	IC,DGTL:NCMOS,8192 X 8 EPROM,2764A-25,DIP28	80009	160-4339-04
A2U210	160-4339-05	670-9838-12		IC,MEM:NCMOS,EPROM;8192 X 8 EPROM,PRGM	80009	160-4339-05
A2U222	156-2113-00			IC,DGTL:ALSTTL,GATE;QUAD 2-IN &;74ALS08,DIP14.3,TUBE	01295	SN74ALS08N3
A2U223	156-0385-02			IC,DGTL:LSTTL,GATES;74LS04,DIP14.3,TUBE	80009	156-0385-02
A2U234	156-0464-02			IC,DGTL:LSTTL,GATES;74LS20,DIP14.3,TUBE	80009	156-0464-02
A2U235	156-0844-02			IC,DGTL:LSTTL,CNTR;74LS161,DIP16.3,TUBE	80009	156-0844-02
A2U241	156-0784-02			IC,DGTL:LSTTL,CNTR;74LS163,DIP16.3,TUBE	80009	156-0784-02
A2U248	156-0784-02			IC,DGTL:LSTTL,CNTR;74LS163,DIP16.3,TUBE	80009	156-0784-02
A2U249	156-1324-00			IC,LIN:BIPOLAR,COMPTR;TTL,20NS,COMPLEMENTARY OUT,W/STROBES;LM361N,DIP14.3	27014	LM361N/GLAA054
A2U254	156-1756-00			IC,DGTL:ALSTTL,FLIP FLOP;DUAL D-TYPE W/ CLR;74ALS74,DIP14.3	01295	SN74ALS74NP3/JP4
A2U263	156-2251-00			IC,DGTL:FTTL,CNTR;SYNCH 4-BIT BIN, WITH / MR;74F161,DIP16.3,TUBE	04713	MC74F161AN
A2U265	156-2251-00			IC,DGTL:FTTL,CNTR;SYNCH 4-BIT BIN, WITH / MR;74F161,DIP16.3,TUBE	04713	MC74F161AN
A2U268	156-0385-02			IC,DGTL:LSTTL,GATES;74LS04,DIP14.3,TUBE	80009	156-0385-02
A2U272	156-1756-00			IC,DGTL:ALSTTL,FLIP FLOP;DUAL D-TYPE W/ CLR;74ALS74,DIP14.3	01295	SN74ALS74NP3/JP4
A2U275	156-1126-03			IC,LIN:BIPOLAR,COMPTR;TI ONLY,NOT FOR NEW DESIGN,DO NOT USE;LM311P,DIP08.3	80009	156-1126-03
A2U278	156-1324-00			IC,LIN:BIPOLAR,COMPTR;TTL,20NS,COMPLEMENTARY OUT,W/STROBES;LM361N,DIP14.3	27014	LM361N/GLAA054
A2U287	156-3005-00	670-9838-00	670-9838-10	IC,LIN:	80009	156-3005-00
A2U287	156-4228-00	670-9838-11		IC,LIN:	80009	156-4228-00
A2U290	156-1850-00			IC,MISC:CMOS,ANALOG SW;QUAD;DG211,DIP16.3	17856	SDG21107
A2U306	156-0865-02			IC,DGTL:LSTTL,FLIP FLOP;74LS273,DIP20.3,TUBE	80009	156-0865-02
A2U316	156-0956-02			IC,DGTL:LSTTL,BFR/DRVR;74LS244,DIP20.3,TUBE	80009	156-0956-02
A2U317	156-1111-02			IC,DGTL:LSTTL,XCVR;74LS245,DIP20.3,TUBE	80009	156-1111-02
A2U322	156-0956-02			IC,DGTL:LSTTL,BFR/DRVR;74LS244,DIP20.3,TUBE	80009	156-0956-02
A2U334	156-1026-00			IC,DGTL:LSTTL,DEMUX;4-TO16 DCDR;74LS154,DIP24.6,TUBE	27014	DM74LS154N

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A2U343	156–1756–00			IC,DGTL:ALSTTL,FLIP FLOP;DUAL D–TYPE W/ CLR;74ALS74,DIP14.3	01295	SN74ALS74NP3/JP4
A2U344	156–0381–00			IC,DGTL:LSTTL,GATES;QUAD 2–IN XOR;74LS86,DIP14.3,TUBE	80009	156–0381–00
A2U348	156–1324–00	670–9838–00	670–9838–02	IC,LIN:BIPOLAR,COMPTR;TTL,20NS,COMPLEMENTARY OUT,W/STROBES;LM361N,DIP14.3	27014	LM361N/GLAA054
A2U349	156–0383–02	670–9838–00	670–9838–02	IC,DGTL:LSTTL,GATES;74LS02,DIP14.3,TUBE	80009	156–0383–02
A2U362	156–1126–03			IC,LIN:BIPOLAR,COMPTR;TI ONLY,NOT FOR NEW DESIGN,DO NOT USE;LM311P,DIP08.3	80009	156–1126–03
A2U373	156–0481–02			IC,DGTL:LSTTL,GATES;74LS11,DIP14.3,TUBE	80009	156–0481–02
A2U375	156–1126–03			IC,LIN:BIPOLAR,COMPTR;TI ONLY,NOT FOR NEW DESIGN,DO NOT USE;LM311P,DIP08.3	80009	156–1126–03
A2U378	156–1324–00			IC,LIN:BIPOLAR,COMPTR;TTL,20NS,COMPLEMENTARY OUT,W/STROBES;LM361N,DIP14.3	27014	LM361N/GLAA054
A2U387	156–3005–00	670–9838–00	670–9838–10	IC,LIN:	80009	156–3005–00
A2U387	156–4228–00	670–9838–11		IC,LIN:	80009	156–4228–00
A2U412	156–0865–02			IC,DGTL:LSTTL,FLIP FLOP;74LS273,DIP20.3,TUBE	80009	156–0865–02
A2U413	156–0865–02			IC,DGTL:LSTTL,FLIP FLOP;74LS273,DIP20.3,TUBE	80009	156–0865–02
A2U420	156–0865–02			IC,DGTL:LSTTL,FLIP FLOP;74LS273,DIP20.3,TUBE	80009	156–0865–02
A2U421	156–0956–02			IC,DGTL:LSTTL,BFR/DRVR;74LS244,DIP20.3,TUBE	80009	156–0956–02
A2U427	156–2113–00			IC,DGTL:ALSTTL,GATE;QUAD 2–IN AND;74ALS08,DIP14.3,TUBE	01295	SN74ALS08N3
A2U428	156–0479–02			IC,DGTL:LSTTL,GATE;74LS32,DIP14.3,TUBE	80009	156–0479–02
A2U433	156–1756–00			IC,DGTL:ALSTTL,FLIP FLOP;DUAL D–TYPE W/ CLR;74ALS74,DIP14.3	01295	SN74ALS74NP3/JP4
A2U434	156–1318–00			IC,DGTL:LSTTL,LCH;4–BIT BISTABLE;74LS375,DIP16.3,TUBE	01295	SN74LS375NP3
A2U439	156–0385–02			IC,DGTL:LSTTL,GATES;74LS04,DIP14.3,TUBE	80009	156–0385–02
A2U440	156–0481–02			IC,DGTL:LSTTL,GATES;74LS11,DIP14.3,TUBE	80009	156–0481–02
A2U450	156–0158–07			IC,LIN:BIPOLAR,OP–AMP;MC1458P1,DIP08.3	80009	156–0158–07
A2U456	156–0728–02			IC,DGTL:LSTTL,GATES;74LS09,DIP14.3,TUBE	80009	156–0728–02
A2U461	156–2251–00			IC,DGTL:FTTL,CNTR;SYNCH 4–BIT BIN, WITH / MR;74F161,DIP16.3,TUBE	04713	MC74F161AN
A2U465	156–2251–00			IC,DGTL:FTTL,CNTR;SYNCH 4–BIT BIN, WITH / MR;74F161,DIP16.3,TUBE	04713	MC74F161AN
A2U466	156–0385–02			IC,DGTL:LSTTL,GATES;74LS04,DIP14.3,TUBE	80009	156–0385–02
A2U472	156–1756–00			IC,DGTL:ALSTTL,FLIP FLOP;DUAL D–TYPE W/ CLR;74ALS74,DIP14.3	01295	SN74ALS74NP3/JP4
A2U473	156–2113–00			IC,DGTL:ALSTTL,GATE;QUAD 2–IN AND;74ALS08,DIP14.3,TUBE	01295	SN74ALS08N3
A2U478	156–1324–00			IC,LIN:BIPOLAR,COMPTR;TTL,20NS,COMPLEMENTARY OUT,W/STROBES;LM361N,DIP14.3	27014	LM361N/GLAA054
A2U479	156–1324–00			IC,LIN:BIPOLAR,COMPTR;TTL,20NS,COMPLEMENTARY OUT,W/STROBES;LM361N,DIP14.3	27014	LM361N/GLAA054
A2U487	156–3005–00	670–9838–00	670–9838–10	IC,LIN:	80009	156–3005–00
A2U487	156–4228–00	670–9838–11		IC,LIN:	80009	156–4228–00
A2U494	156–1850–00			IC,MISC:CMOS,ANALOG SW;QUAD;DG211,DIP16.3	17856	SDG21107
A2U496	156–1850–00			IC,MISC:CMOS,ANALOG SW;QUAD;DG211,DIP16.3	17856	SDG21107
A2U505	156–0402–02	670–9838–00	670–9838–02	IC,MISC:BIPOLAR,TMR;LM555CN,DIP08.3	27014	LM555CN/A+
A2U505	156–0402–00	670–9838–03		IC,MISC:BIPOLAR,TMR;LM555CN,DIP08.3	80009	156–0402–00
A2U508	156–1215–01			IC,DGTL:CMOS,MUX/ ENCDR;74C923,DIP18.3,TUBE	27014	MM74C923JA+
A2U514	156–0784–02			IC,DGTL:LSTTL,CNTR;74LS163,DIP16.3,TUBE	80009	156–0784–02
A2U516	156–1756–00			IC,DGTL:ALSTTL,FLIP FLOP;DUAL D–TYPE W/ CLR;74ALS74,DIP14.3	01295	SN74ALS74NP3/JP4
A2U521	156–0956–02			IC,DGTL:LSTTL,BFR/DRVR;74LS244,DIP20.3,TUBE	80009	156–0956–02
A2U525	156–0784–02			IC,DGTL:LSTTL,CNTR;74LS163,DIP16.3,TUBE	80009	156–0784–02
A2U529	156–0865–02			IC,DGTL:LSTTL,FLIP FLOP;74LS273,DIP20.3,TUBE	80009	156–0865–02
A2U531	156–0956–02			IC,DGTL:LSTTL,BFR/DRVR;74LS244,DIP20.3,TUBE	80009	156–0956–02
A2U547	156–0158–07			IC,LIN:BIPOLAR,OP–AMP;MC1458P1,DIP08.3	80009	156–0158–07

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A2U556	156–1126–03			IC,LIN:BIPOLAR,COMPTR;TI ONLY,NOT FOR NEW DESIGN,DO NOT USE;LM311P,DIP08.3	80009	156–1126–03
A2U557	156–1126–03			IC,LIN:BIPOLAR,COMPTR;TI ONLY,NOT FOR NEW DESIGN,DO NOT USE;LM311P,DIP08.3	80009	156–1126–03
A2U568	156–2251–00			IC,DGTL:FTTL,CNTR;SYNCH 4–BIT BIN, WITH / MR;74F161,DIP16.3,TUBE	04713	MC74F161AN
A2U569	156–2251–00			IC,DGTL:FTTL,CNTR;SYNCH 4–BIT BIN, WITH / MR;74F161,DIP16.3,TUBE	04713	MC74F161AN
A2U574	156–1756–00			IC,DGTL:ALSTTL,FLIP FLOP;DUAL D–TYPE W/ CLR;74ALS74,DIP14.3	01295	SN74ALS74NP3/JP4
A2U575	156–0481–02			IC,DGTL:LSTTL,GATES;74LS11,DIP14.3,TUBE	80009	156–0481–02
A2U578	156–1324–00	670–9838–03		IC,LIN:BIPOLAR,COMPTR;TTL,20NS,COMPLEMENTARY OUT,W/STROBES;LM361N,DIP14.3	27014	LM361N/GLAA054
A2U580	156–1126–03	670–9838–00	670–9838–02	IC,LIN:BIPOLAR,COMPTR;TI ONLY,NOT FOR NEW DESIGN,DO NOT USE;LM311P,DIP08.3	80009	156–1126–03
A2U581	156–1126–03	670–9838–00	670–9838–02	IC,LIN:BIPOLAR,COMPTR;TI ONLY,NOT FOR NEW DESIGN,DO NOT USE;LM311P,DIP08.3	80009	156–1126–03
A2U581	156–1324–00	670–9838–03		IC,LIN:BIPOLAR,COMPTR;TTL,20NS,COMPLEMENTARY OUT,W/STROBES;LM361N,DIP14.3	27014	LM361N/GLAA054
A2U587	156–3005–00	670–9838–00	670–9838–10	IC,LIN:	80009	156–3005–00
A2U587	156–4228–00	670–9838–11		IC,LIN:	80009	156–4228–00
A2U614	156–0784–02			IC,DGTL:LSTTL,CNTR;74LS163,DIP16.3,TUBE	80009	156–0784–02
A2U615	156–0784–02			IC,DGTL:LSTTL,CNTR;74LS163,DIP16.3,TUBE	80009	156–0784–02
A2U621	156–0956–02			IC,DGTL:LSTTL,BFR/DRVR;74LS244,DIP20.3,TUBE	80009	156–0956–02
A2U622	156–0956–02			IC,DGTL:LSTTL,BFR/DRVR;74LS244,DIP20.3,TUBE	80009	156–0956–02
A2U629	156–2605–00			IC,MISC:HCMOS,ANALOG MUX;8 CHAN,125 OHM,–/+6V;74HC4051,DIP16.3	80009	156–2605–00
A2U637	156–2605–00			IC,MISC:HCMOS,ANALOG MUX;8 CHAN,125 OHM,–/+6V;74HC4051,DIP16.3	80009	156–2605–00
A2U647	156–0158–07			IC,LIN:BIPOLAR,OP–AMP;MC1458P1,DIP08.3	80009	156–0158–07
A2U649	156–1173–00			IC,LIN:BIPOLAR,V REF;POS,2.5V,1.0%,40PPM,SER;MC1403U,DIP08.3	80009	156–1173–00
A2U655	156–0465–02			IC,DGTL:LSTTL,GATES;74LS30,DIP14.3,TUBE	80009	156–0465–02
A2U656	156–0728–02			IC,DGTL:LSTTL,GATES;74LS09,DIP14.3,TUBE	80009	156–0728–02
A2U661	156–0465–02			IC,DGTL:LSTTL,GATES;74LS30,DIP14.3,TUBE	80009	156–0465–02
A2U662	156–2251–00			IC,DGTL:FTTL,CNTR;SYNCH 4–BIT BIN, WITH / MR;74F161,DIP16.3,TUBE	04713	MC74F161AN
A2U666	156–2251–00			IC,DGTL:FTTL,CNTR;SYNCH 4–BIT BIN, WITH / MR;74F161,DIP16.3,TUBE	04713	MC74F161AN
A2U667	156–0481–02			IC,DGTL:LSTTL,GATES;74LS11,DIP14.3,TUBE	80009	156–0481–02
A2U673	156–1756–00			IC,DGTL:ALSTTL,FLIP FLOP;DUAL D–TYPE W/ CLR;74ALS74,DIP14.3	01295	SN74ALS74NP3/JP4
A2U674	156–2113–00			IC,DGTL:ALSTTL,GATE;QUAD 2–IN AND;74ALS08,DIP14.3,TUBE	01295	SN74ALS08N3
A2U678	156–1324–00			IC,LIN:BIPOLAR,COMPTR;TTL,20NS,COMPLEMENTARY OUT,W/STROBES;LM361N,DIP14.3	27014	LM361N/GLAA054
A2U679	156–1324–00			IC,LIN:BIPOLAR,COMPTR;TTL,20NS,COMPLEMENTARY OUT,W/STROBES;LM361N,DIP14.3	27014	LM361N/GLAA054
A2U687	156–3005–00	670–9838–00	670–9838–10	IC,LIN:	80009	156–3005–00
A2U687	156–4228–00	670–9838–11		IC,LIN:	80009	156–4228–00
A2U694	156–1850–00			IC,MISC:CMOS,ANALOG SW;QUAD;DG211,DIP16.3	17856	SDG21107
A2U721	156–0391–02			IC,DGTL:LSTTL,FLIP FLOP;DUPLICATE OF 156–0391–00;74LS174,DIP16.3,TUBE	80009	156–0391–02
A2U722	156–0956–02			IC,DGTL:LSTTL,BFR/DRVR;74LS244,DIP20.3,TUBE	80009	156–0956–02
A2U729	156–0784–02			IC,DGTL:LSTTL,CNTR;74LS163,DIP16.3,TUBE	80009	156–0784–02
A2U732	156–1335–00			IC,DGTL:LSTTL,MULTIVIBRATOR;DUAL RETRIG MONOSTABLE;96LS02,DIP16.3	80009	156–1335–00
A2U736	156–0784–02			IC,DGTL:LSTTL,CNTR;74LS163,DIP16.3,TUBE	80009	156–0784–02
A2U741	156–1324–00			IC,LIN:BIPOLAR,COMPTR;TTL,20NS,COMPLEMENTARY OUT,W/STROBES;LM361N,DIP14.3	27014	LM361N/GLAA054

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A2U742	156–1850–00			IC,MISC:CMOS,ANALOG SW;QUAD;DG211,DIP16.3	17856	SDG21107
A2U750	156–1126–03			IC,LIN:BIPOLAR,COMPTR;TI ONLY,NOT FOR NEW DESIGN,DO NOT USE;LM311P,DIP08.3	80009	156–1126–03
A2U755	156–1126–03			IC,LIN:BIPOLAR,COMPTR;TI ONLY,NOT FOR NEW DESIGN,DO NOT USE;LM311P,DIP08.3	80009	156–1126–03
A2U763	156–2251–00			IC,DGTL:FTTL,CNTR;SYNCH 4–BIT BIN, WITH / MR;74F161,DIP16.3,TUBE	04713	MC74F161AN
A2U764	156–1126–03			IC,LIN:BIPOLAR,COMPTR;TI ONLY,NOT FOR NEW DESIGN,DO NOT USE;LM311P,DIP08.3	80009	156–1126–03
A2U768	156–0385–02			IC,DGTL:LSTTL,GATES;74LS04,DIP14.3,TUBE	80009	156–0385–02
A2U774	156–1756–00			IC,DGTL:ALSTTL,FLIP FLOP;DUAL D–TYPE W/ CLR;74ALS74,DIP14.3	01295	SN74ALS74NP3/JP4
A2U775	156–2251–00			IC,DGTL:FTTL,CNTR;SYNCH 4–BIT BIN, WITH / MR;74F161,DIP16.3,TUBE	04713	MC74F161AN
A2U780	156–1126–03	670–9838–00	670–9838–02	IC,LIN:BIPOLAR,COMPTR;TI ONLY,NOT FOR NEW DESIGN,DO NOT USE;LM311P,DIP08.3	80009	156–1126–03
A2U780	156–1324–00	670–9838–03		IC,LIN:BIPOLAR,COMPTR;TTL,20NS,COMPLEMENTARY OUT,W/STROBES;LM361N,DIP14.3	27014	LM361N/GLAA054
A2U781	156–1126–03	670–9838–00	670–9838–02	IC,LIN:BIPOLAR,COMPTR;TI ONLY,NOT FOR NEW DESIGN,DO NOT USE;LM311P,DIP08.3	80009	156–1126–03
A2U781	156–1324–00	670–9838–03		IC,LIN:BIPOLAR,COMPTR;TTL,20NS,COMPLEMENTARY OUT,W/STROBES;LM361N,DIP14.3	27014	LM361N/GLAA054
A2U787	156–3005–00	670–9838–00	670–9838–10	IC,LIN:	80009	156–3005–00
A2U787	156–4228–00	670–9838–11		IC,LIN:	80009	156–4228–00
A2U827	156–0784–02			IC,DGTL:LSTTL,CNTR;74LS163,DIP16.3,TUBE	80009	156–0784–02
A2U833	156–2251–00			IC,DGTL:FTTL,CNTR;SYNCH 4–BIT BIN, WITH / MR;74F161,DIP16.3,TUBE	04713	MC74F161AN
A2U834	156–2113–00			IC,DGTL:ALSTTL,GATE;QUAD 2–IN AND;74ALS08,DIP14.3,TUBE	01295	SN74ALS08N3
A2U837	156–0385–02			IC,DGTL:LSTTL,GATES;74LS04,DIP14.3,TUBE	80009	156–0385–02
A2U838	156–0481–02			IC,DGTL:LSTTL,GATES;74LS11,DIP14.3,TUBE	80009	156–0481–02
A2U844	156–2251–00			IC,DGTL:FTTL,CNTR;SYNCH 4–BIT BIN, WITH / MR;74F161,DIP16.3,TUBE	04713	MC74F161AN
A2U845	156–2113–00			IC,DGTL:ALSTTL,GATE;QUAD 2–IN AND;74ALS08,DIP14.3,TUBE	01295	SN74ALS08N3
A2U850	156–1756–00			IC,DGTL:ALSTTL,FLIP FLOP;DUAL D–TYPE W/ CLR;74ALS74,DIP14.3	01295	SN74ALS74NP3/JP4
A2U851	156–0382–00			IC,DGTL:LSTTL,GATE;QUAD 2–IN NAND;74LS00,DIP14.3,TUBE	80009	156–0382–00
A2U857	156–1126–03			IC,LIN:BIPOLAR,COMPTR;TI ONLY,NOT FOR NEW DESIGN,DO NOT USE;LM311P,DIP08.3	80009	156–1126–03
A2U858	156–1126–03			IC,LIN:BIPOLAR,COMPTR;TI ONLY,NOT FOR NEW DESIGN,DO NOT USE;LM311P,DIP08.3	80009	156–1126–03
A2U880	156–1126–03	670–9838–00	670–9838–02	IC,LIN:BIPOLAR,COMPTR;TI ONLY,NOT FOR NEW DESIGN,DO NOT USE;LM311P,DIP08.3	80009	156–1126–03
A2U880	156–1324–00	670–9838–03		IC,LIN:BIPOLAR,COMPTR;TTL,20NS,COMPLEMENTARY OUT,W/STROBES;LM361N,DIP14.3	27014	LM361N/GLAA054
A2U881	156–1126–03	670–9838–00	670–9838–02	IC,LIN:BIPOLAR,COMPTR;TI ONLY,NOT FOR NEW DESIGN,DO NOT USE;LM311P,DIP08.3	80009	156–1126–03
A2U881	156–1324–00	670–9838–03		IC,LIN:BIPOLAR,COMPTR;TTL,20NS,COMPLEMENTARY OUT,W/STROBES;LM361N,DIP14.3	27014	LM361N/GLAA054
A2U887	156–3005–00	670–9838–00	670–9838–10	IC,LIN:	80009	156–3005–00
A2U887	156–4228–00	670–9838–11		IC,LIN:	80009	156–4228–00
A2U889	156–3005–00	670–9838–00	670–9838–10	IC,LIN:	80009	156–3005–00
A2U889	156–4228–00	670–9838–11		IC,LIN:	80009	156–4228–00
A2U894	156–1850–00			IC,MISC:CMOS,ANALOG SW;QUAD;DG211,DIP16.3	17856	SDG21107
A2U896	156–1850–00			IC,MISC:CMOS,ANALOG SW;QUAD;DG211,DIP16.3	17856	SDG21107
A2U940	156–1756–00			IC,DGTL:ALSTTL,FLIP FLOP;DUAL D–TYPE W/ CLR;74ALS74,DIP14.3	01295	SN74ALS74NP3/JP4

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A2U947	156–1126–03			IC,LIN:BIPOLAR,COMPTR;TI ONLY,NOT FOR NEW DESIGN,DO NOT USE;LM311P,DIP08.3	80009	156–1126–03
A2U956	156–0382–00			IC,DGTL:LSTTL,GATE;QUAD 2–IN NAND;74LS00,DIP14.3,TUBE	80009	156–0382–00
A2U957	156–1756–00			IC,DGTL:ALSTTL,FLIP FLOP;DUAL D–TYPE W/ CLR;74ALS74,DIP14.3	01295	SN74ALS74NP3/JP4
A2U964	156–1126–03			IC,LIN:BIPOLAR,COMPTR;TI ONLY,NOT FOR NEW DESIGN,DO NOT USE;LM311P,DIP08.3	80009	156–1126–03
A2U965	156–1126–03			IC,LIN:BIPOLAR,COMPTR;TI ONLY,NOT FOR NEW DESIGN,DO NOT USE;LM311P,DIP08.3	80009	156–1126–03
A2U990	156–1850–00			IC,MISC:CMOS,ANALOG SW;QUAD;DG211,DIP16.3	17856	SDG21107
A3	670–9839–00			CIRCUIT BD ASSY:BNC	80009	670–9839–00
A3J220	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A3J240	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A3J260	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A3J280	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A4	670–9113–02	B010100	B010172	CIRCUIT BD ASSY:POWER SUPPLY	80009	670–9113–02
A4	670–9113–03	B010173	B010188	CIRCUIT BD ASSY:POWER SUPPLY	80009	670–9113–03
A4	670–9113–04	B010189	B010230	CIRCUIT BD ASSY:POWER SUPPLY	80009	670–9113–04
A4	670–9113–05	B010231	B010261	CIRCUIT BD ASSY:POWER SUPPLY	80009	670–9113–05
A4	670–9113–06	B010262	B019999	CIRCUIT BD ASSY:POWER SUPPLY	80009	670–9113–06
A4C130	283–0421–00			CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A4C133	283–0212–00			CAP,FXD,CER DI:2UF,20%,50V	05397	C340C205M5U1CA
A4C155	290–1069–00			CAP,FXD,ELCTLT:1000UF,20%,6.3V	80009	290–1069–00
A4C156	290–0798–00			CAP,FXD,ELCTLT:180UF,+100–10%,40V	24165	672D187H040DM5C
A4C160	283–0059–00			CAP,FXD,CER DI:1UF,+80–20%,50V	04222	SR305C105MAA
A4C175	283–0423–00			CAP,FXD,CER DI:0.22UF,+80–20%,50V	04222	MD015E224ZAA
A4C176	283–0423–00			CAP,FXD,CER DI:0.22UF,+80–20%,50V	04222	MD015E224ZAA
A4C210	283–0421–00			CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A4C212	290–0804–00			CAP,FXD,ELCTLT:10UF,+50–20%,25V	80009	290–0804–00
A4C213	290–0804–00			CAP,FXD,ELCTLT:10UF,+50–20%,25V	80009	290–0804–00
A4C220	290–0804–00			CAP,FXD,ELCTLT:10UF,+50–20%,25V	80009	290–0804–00
A4C221	283–0421–00			CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A4C224	283–0811–00			CAP,FXD,CER DI:0.01UF,20%,100V	80009	283–0811–00
A4C230	283–0114–00			CAP,FXD,CER DI:1500PF,5%,200V	80009	283–0114–00
A4C235	290–1069–00			CAP,FXD,ELCTLT:1000UF,20%,6.3V	80009	290–1069–00
A4C250	290–1069–00			CAP,FXD,ELCTLT:1000UF,20%,6.3V	80009	290–1069–00
A4C254	283–0211–00			CAP,FXD,CER DI:0.1UF,10%,200V	80009	283–0211–00
A4C256	290–0798–00			CAP,FXD,ELCTLT:180UF,+100–10%,40V	24165	672D187H040DM5C
A4C317	283–0328–00			CAP,FXD,CER DI:0.03UF,+80–20%,200V	80009	283–0328–00
A4C320	283–0605–00			CAP,FXD,MICA DI:678PF,1%,300V	80009	283–0605–00
A4C322	283–0421–00			CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A4C323	283–0421–00			CAP,FXD,CER DI:0.1UF,+80–20%,50V	04222	MD015C104MAB
A4C335	283–0059–00			CAP,FXD,CER DI:1UF,+80–20%,50V	04222	SR305C105MAA
A4C345	290–1069–00			CAP,FXD,ELCTLT:1000UF,20%,6.3V	80009	290–1069–00
A4C346	290–1069–00			CAP,FXD,ELCTLT:1000UF,20%,6.3V	80009	290–1069–00
A4C350	290–1069–00			CAP,FXD,ELCTLT:1000UF,20%,6.3V	80009	290–1069–00
A4C351	290–1069–00			CAP,FXD,ELCTLT:1000UF,20%,6.3V	80009	290–1069–00
A4C410	290–0919–00			CAP,FXD,ALUM:470UF,+50–20%,35V;10 X 20MM;RDL	55680	UVX1V471MPA
A4C412	290–0919–00			CAP,FXD,ALUM:470UF,+50–20%,35V;10 X 20MM;RDL	55680	UVX1V471MPA
A4C420	283–0594–00			CAP,FXD,MICA DI:0.001UF,1%,100V	80009	283–0594–00
A4C422	283–0330–00			CAP,FXD,CER DI:100PF,5%,50V	80009	283–0330–00
A4C429	283–0169–00			CAP,FXD,CER DI:0.022UF,10%,200V	80009	283–0169–00
A4C430	283–0220–00			CAP,FXD,CER:MLC;0.01UF,20%,50V,X7R,0.20 X 0.20;RDL	04222	SR155C103MAA

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A4C433	290–0776–00			CAP,FXD,ELCTLT:22UF,+50–20 %,10V	55680	UVX1A220MAA
A4C434	283–0330–00			CAP,FXD,CER DI:100PF,5%,50V	80009	283–0330–00
A4C460	283–0079–00	670–9113–06		CAP,FXD,CER DI:0.01UF,20%,250V	80009	283–0079–00
A4C520	283–0220–00			CAP,FXD,CER:MLC;0.01UF,20%,50V,X7R,0.20 X 0.20;RDL	04222	SR155C103MAA
A4C532	283–0203–00			CAP,FXD,CER DI:0.47UF,20%,50V	80009	283–0203–00
A4C550	283–0786–00			CAP,FXD,MICA DI:745PF,1%,500V	80009	283–0786–00
A4C750	283–0625–00			CAP,FXD,MICA DI:220PF,1%,500V	80009	283–0625–00
A4C766	285–1278–00			CAP,FXD,PLSTC:2.2UF,10%,250V	84411	X661 2.2 10 250
A4C768	285–1278–00			CAP,FXD,PLSTC:2.2UF,10%,250V	84411	X661 2.2 10 250
A4C810	283–0211–00			CAP,FXD,CER DI:0.1UF,10%,200V	80009	283–0211–00
A4C822	285–1222–00			CAP,FXD,PLSTC:0.068UF,20%,250V	37942	158/.068/M/250/H
A4C845	290–1106–01			CAP,FXD,ELCTLT:470UF,20%,200VDC	80009	290–1106–01
A4C854	285–1246–00			CAP,FXD,PPR DI:0.022UF,20%,250VAC	80009	285–1246–00
A4C865	290–1106–01			CAP,FXD,ELCTLT:470UF,20%,200VDC	80009	290–1106–01
A4C910	285–1222–00			CAP,FXD,PLSTC:0.068UF,20%,250V	37942	158/.068/M/250/H
A4C911	285–1222–00			CAP,FXD,PLSTC:0.068UF,20%,250V	37942	158/.068/M/250/H
A4C919	285–1222–00			CAP,FXD,PLSTC:0.068UF,20%,250V	37942	158/.068/M/250/H
A4C970	285–1246–00			CAP,FXD,PPR DI:0.022UF,20%,250VAC	80009	285–1246–00
A4CR119	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A4CR121	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A4CR140	152–0198–02			SEMICOND DVC,DI:RECT,SI,200V,3A,A249G	80009	152–0198–02
A4CR145	152–0198–02			SEMICOND DVC,DI:RECT,SI,200V,3A,A249G	80009	152–0198–02
A4CR160	152–0198–02			SEMICOND DVC,DI:RECT,SI,200V,3A,A249G	80009	152–0198–02
A4CR161	152–0066–03			DIO,RECT:400V,1A,1.1VF AT 1A,30A IFSM,2US;1N4004GP,DO–41,T&R	14433	LG4017
A4CR162	152–0066–03			DIO,RECT:400V,1A,1.1VF AT 1A,30A IFSM,2US;1N4004GP,DO–41,T&R	14433	LG4017
A4CR175	152–0066–03			DIO,RECT:400V,1A,1.1VF AT 1A,30A IFSM,2US;1N4004GP,DO–41,T&R	14433	LG4017
A4CR225	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A4CR226	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A4CR228	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A4CR345	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A4CR360	152–0867–00	670–9113–02	670–9113–03	SEMICOND DVC,DI:DUAL RECT,SCHOTT-KY,SI,30V,8A,TO–220	80009	152–0867–00
A4CR360	152–0905–00	670–9113–04	670–9113–04	SEMICOND DVC,DI:DUAL RECT,SCHOTT-KY,40V,8A	80009	152–0905–00
A4CR360	152–0914–00	670–9113–05	670–9113–05	SEMICOND DVC,DI:DUAL RECT,SCHOTT-KY,SI,60V,8A,TO–220	80009	152–0914–00
A4CR360	152–0905–00	670–9113–06		SEMICOND DVC,DI:DUAL RECT,SCHOTT-KY,40V,8A	80009	152–0905–00
A4CR409	152–0066–03			DIO,RECT:400V,1A,1.1VF AT 1A,30A IFSM,2US;1N4004GP,DO–41,T&R	14433	LG4017
A4CR410	152–0066–03			DIO,RECT:400V,1A,1.1VF AT 1A,30A IFSM,2US;1N4004GP,DO–41,T&R	14433	LG4017
A4CR420	152–0066–03			DIO,RECT:400V,1A,1.1VF AT 1A,30A IFSM,2US;1N4004GP,DO–41,T&R	14433	LG4017
A4CR421	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A4CR422	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A4CR460	152–0793–00			SEMICOND DVC,DI:DUAL RECT,SI,40V,25A	81483	28CPQ040

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A4CR510	152–0585–00			DIO,RECT:BRDG,200V,1A,50A IFSM,1.0VF AT 1A;W02G	14936	W02M–30
A4CR533	152–0864–00			DIO,RECT:ULTRA FAST;150V,2A,25NS,IFSM=50A,SOFT REC;BYV–150	80009	152–0864–00
A4CR534	152–0864–00			DIO,RECT:ULTRA FAST;150V,2A,25NS,IFSM=50A,SOFT REC;BYV–150	80009	152–0864–00
A4CR535	152–0864–00			DIO,RECT:ULTRA FAST;150V,2A,25NS,IFSM=50A,SOFT REC;BYV–150	80009	152–0864–00
A4CR536	152–0864–00			DIO,RECT:ULTRA FAST;150V,2A,25NS,IFSM=50A,SOFT REC;BYV–150	80009	152–0864–00
A4CR810	152–0602–00			DIO,RECT:BRDG,600V,6A,IFSM=100A;RKBPC806	80009	152–0602–00
A4DS112	150–1049–00			DIO,OPTO:LED;RED/GRN,BI–CLR;T1 3/4,SPR 54MVW	80009	150–1049–00
A4DS810	150–0035–00			LAMP,GLOW:NEON;90V,0.3MA,AID–T,WIRE LD;NE–2B TYPE	71744	A1B–120
A4F940	159–0023–00			FUSE,CRTG:3AG,2A,250V,SLOW BLOW	71400	MDX2
A4J120	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A4J160	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A4J242	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A4J310	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A4J810	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A4J950	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
A4L435	120–1668–00			XFMR,RF:TOROIDAL,265UH,1.5 AMPS	80009	120–1668–00
A4L451	120–1669–00			XFMR,RF:TOROIDAL,65UH,10 AMPS	80009	120–1669–00
A4L950	108–0959–00			COIL,RF:FXD,150UH	TK1345	108–0959–00
A4LF950	119–1946–00			FLTR,RFI:1A,250V,400HZ W/PC TERM	S4307	FN326–1/02–K–D–T
A4P950	131–0993–02			BUS,CNDCT:SHUNT ASSY,RED	00779	1–850100–O
A4Q160	151–0736–00			XSTR,SIG:BIPOLAR,NPN;40V,600MA,250MHZ, AMPL;2N4401,TO–92 EBC	80009	151–0736–00
A4Q230	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A4Q331	151–0482–00			XSTR,PWR:BIPOLAR,PNP;100V,3.0A,3.0MHZ, AMPL;TIP32C,TO–220	80009	151–0482–00
A4Q340	151–0435–00			XSTR:DARLINGTON,PNP,SI,TO–92	80009	151–0435–00
A4Q660	151–1141–01			XSTR,PWR:MOS,N–CH;IRF730/MTP5N40E,TO–220	80009	151–1141–01
A4Q661	151–1141–01			XSTR,PWR:MOS,N–CH;IRF730/MTP5N40E,TO–220	80009	151–1141–01
A4R112	321–0206–02			RES,FXD,FILM:1.37K OHM,0.5%,0.125W,TC=T2	80009	321–0206–02
A4R114	315–0821–00			RES,FXD,FILM:820 OHM,5%,0.25W	80009	315–0821–00
A4R118	315–0561–00			RES,FXD,FILM:560 OHM,5%,0.25W	80009	315–0561–00
A4R119	321–0932–00			RES,FXD,FILM:2.5K OHM,1%,0.125W,TC=T0	01121	
A4R120	321–1696–07			RES,FXD,FILM:6K OHM,0.1%,0.125W,TC=T9	19701	5033RE6K00B
A4R121	321–0001–01			RES,FXD,FILM:10.0 OHM,0.5%,0.125W,TC=T0	80009	321–0001–01
A4R122	321–0194–00			RES,FXD,FILM:1.02K OHM,1%,0.125W,TC=T0	07716	CEAD10200F
A4R160	308–0297–00			RES,FXD,WW:24.7 OHM,1%,3W	07088	
A4R161	315–0102–00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315–0102–00
A4R162	315–0361–00			RES,FXD,FILM:360 OHM,5%,0.25W	80009	315–0361–00
A4R215	321–1133–02			RES,FXD,FILM:240 OHM,0.5%,0.125W,TC=T2	07716	
A4R218	315–0224–00			RES,FXD,FILM:220K OHM,5%,0.25W	80009	315–0224–00
A4R219	315–0472–00			RES,FXD,FILM:4.7K OHM,5%,0.25W	80009	315–0472–00
A4R220	315–0272–00			RES,FXD,FILM:2.7K OHM,5%,0.25W	80009	315–0272–00
A4R222	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3289–00
A4R223	321–0253–00			RES,FXD,FILM:4.22K OHM,1%,0.125W,TC=T0	19701	5033ED 4K 220F
A4R224	321–0452–00			RES,FXD,FILM:499K OHM,1%,0.125W,TC=T0	80009	321–0452–00
A4R225	315–0202–00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315–0202–00

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A4R226	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3289–00
A4R227	315–0561–00			RES,FXD,FILM:560 OHM,5%,0.25W	80009	315–0561–00
A4R228	321–0932–00			RES,FXD,FILM:2.5K OHM,1%,0.125W,TC=T0	01121	
A4R230	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A4R233	321–0245–00			RES,FXD,FILM:3.48K OHM,1%,0.125W,TC=T0	80009	321–0245–00
A4R234	321–0168–00			RES,FXD,FILM:549 OHM,1%,0.125W,TC=T0	07716	CEAD549R0F
A4R235	321–0001–01			RES,FXD,FILM:10.0 OHM,0.5%,0.125W,TC=T0	80009	321–0001–01
A4R245	308–0802–00			RES,FXD,WW:0.01 OHM,5%,5W	07088	KM500–4T
A4R246	308–0802–00			RES,FXD,WW:0.01 OHM,5%,5W	07088	KM500–4T
A4R314	321–1133–02			RES,FXD,FILM:240 OHM,0.5%,0.125W,TC=T2	07716	
A4R315	321–0206–02			RES,FXD,FILM:1.37K OHM,0.5%,0.125W,TC=T2	80009	321–0206–02
A4R316	321–0612–07			RES,FXD,FILM:500 OHM,0.1%,0.125W,TC=T9	80009	321–0612–07
A4R317	321–0612–07			RES,FXD,FILM:500 OHM,0.1%,0.125W,TC=T9	80009	321–0612–07
A4R318	315–0752–00			RES,FXD,FILM:7.5K OHM,5%,0.25W	80009	315–0752–00
A4R319	315–0752–00			RES,FXD,FILM:7.5K OHM,5%,0.25W	80009	315–0752–00
A4R320	321–0452–00			RES,FXD,FILM:499K OHM,1%,0.125W,TC=T0	80009	321–0452–00
A4R321	322–3383–00			RES,FXD,FILM:95.3K OHM,1%,0.2W,TC=T0	80009	322–3383–00
A4R322	315–0223–00			RES,FXD,FILM:22K OHM,5%,0.25W	80009	315–0223–00
A4R340	315–0472–00			RES,FXD,FILM:4.7K OHM,5%,0.25W	80009	315–0472–00
A4R410	315–0102–00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315–0102–00
A4R411	321–0312–00			RES,FXD,FILM:17.4K OHM,1%,0.125W,TC=T0	80009	321–0312–00
A4R413	315–0100–02			RES,FXD,CMPSN:10 OHM,5%,0.25W	80009	315–0100–02
A4R420	315–0473–00			RES,FXD,FILM:47K OHM,5%,0.25W	80009	315–0473–00
A4R434	315–0270–00			RES,FXD,FILM:27 OHM,5%,0.25W	80009	315–0270–00
A4R460	315–0100–00	670–9113–06		RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
A4R522	315–0101–00			RES,FXD,FILM:100 OHM,5%,0.25W	80009	315–0101–00
A4R523	315–0101–00			RES,FXD,FILM:100 OHM,5%,0.25W	80009	315–0101–00
A4R536	303–0360–00			RES,FXD,CMPSN:36 OHM,5%,1W	80009	303–0360–00
A4R735	315–0511–00			RES,FXD,FILM:510 OHM,5%,0.25W	80009	315–0511–00
A4R736	315–0511–00			RES,FXD,FILM:510 OHM,5%,0.25W	80009	315–0511–00
A4R750	308–0874–00			RES,FXD,WW:10 OHM,5%,1W	57027	BW–20F–10–5%
A4R751	308–0874–00			RES,FXD,WW:10 OHM,5%,1W	57027	BW–20F–10–5%
A4R810	315–0221–00			RES,FXD,FILM:220 OHM,5%,0.25W	80009	315–0221–00
A4R811	315–0106–00			RES,FXD,FILM:10M OHM,5%,0.25W	01121	CB1065
A4R820	301–0154–00			RES,FXD,FILM:150K OHM,5%,0.5W	80009	301–0154–00
A4R821	301–0154–00			RES,FXD,FILM:150K OHM,5%,0.5W	80009	301–0154–00
A4R850	301–0101–00			RES,FXD,FILM:100 OHM,5%,0.5W	01121	EB1015
A4R852	315–0220–00			RES,FXD,FILM:22 OHM,5%,0.25W	80009	315–0220–00
A4R910	301–0105–00			RES,FXD,FILM:1M OHM,5%,0.50W	19701	5053CX1M000J
A4R950	315–0226–00			RES,FXD,FILM:22M OHM,5%,0.25W	80009	315–0226–00
A4RV852	307–0638–00			RES,V SENS:18V,20%,0.5 W	80009	307–0638–00
A4RV915	307–0449–00			RES,V SENS:1900PF,100A,130V,MET OXD SAF CONT	03508	V130LA20A
A4RV917	307–0449–00			RES,V SENS:1900PF,100A,130V,MET OXD SAF CONT	03508	V130LA20A
A4S930	260–1849–07			SW,PUSH:DPST,4A,250VAC	80009	260–1849–07
A4T610	120–1667–00			XFMR,PWR,STPDN:60HZ	TK1339	SPW053
A4T650	120–1666–00			XFMR,PWR,STPDN:50KHZ	80009	120–1666–00
A4T735	120–1472–00			XFMR,PWR,STPDN:GATE DRV HF	80009	120–1472–00
A4TP212	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A4TP234	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A4TP510	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A4TP534	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A4TP535	214–0579–00			TERM,TEST POINT:	TK0858	ORDER BY DESCR
A4U133	156–1408–01			IC,MISC:CMOS,TMR;TLC555CP/ ICM7555IPA,DIP08.3	80009	156–1408–01

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A4U210	156–1173–00			IC,LIN:BIPOLAR,V REF;POS,2.5V,1.0%,40PPM,SER;MC1403U,DIP08.3	80009	156–1173–00
A4U212	156–1451–00			IC,LIN:BIPOLAR,VR;NEG,AD-JUST,1.5A,4%;LM337T,TO–220	80009	156–1451–00
A4U220	156–1226–01			IC,LIN:BIPOLAR,COMPTR;LM319N,DIP14.3	80009	156–1226–01
A4U260	156–2559–00			IC,LIN:BIPO-LAR,VR;NEG,–12V,1.5A,2%;MC7912ACT,TO–220	80009	156–2559–00
A4U310	156–1161–00			IC,LIN:BIPOLAR,VR;POS,AD-JUST,1.5A,4%;LM317T,TO–220	04713	LM317T
A4U325	156–1226–01			IC,LIN:BIPOLAR,COMPTR;LM319N,DIP14.3	80009	156–1226–01
A4U331	156–0853–02			IC,LIN:BIPOLAR,OP–AMP;LM358N,DIP08.3	80009	156–0853–02
A4U335	156–1226–01			IC,LIN:BIPOLAR,COMPTR;LM319N,DIP14.3	80009	156–1226–01
A4U360	156–2558–00			IC,LIN:BIPO-LAR,VR;POS,12V,1.5A,2%;MC7812ACT,TO–220	80009	156–2558–00
A4U435	156–1585–02			IC,LIN:BIPOLAR,SW–RGLTR;3526,DIP18.3	34333	SG2526BJ/11589
A4U525	156–0328–00			IC,DGTL:MOS,DRVR;DUAL CLK DRVR;0026,DIP8.3	04713	MMH0026CP1D
A4VR120	152–0175–00			DIO,ZENER:5.6V,5%,0.4W;1N752A,DO–7 OR 35,TR	14552	TD3810976
A4VR130	152–0662–00			DIO,ZENER:5V,1%,0.4W;1N751 FMLY,DO–7 OR 35,TR	04713	SZG195RL
A4VR233	152–0175–00			DIO,ZENER:5.6V,5%,0.4W;1N752A,DO–7 OR 35,TR	14552	TD3810976
A4	671–0572–00	B020000	B020453	CIRCUIT BD ASSY:POWER SUPPLY	80009	671–0572–00
A4	671–0572–01	B020454	B020707	CIRCUIT BD ASSY:POWER SUPPLY	80009	671–0572–01
A4	671–0572–02	B020708	B020841	CIRCUIT BD ASSY:POWER SUPPLY	80009	671–0572–02
A4	671–0572–03	B020842	B021071	CIRCUIT BD ASSY:POWER SUPPLY	80009	671–0572–03
A4	671–0572–04	B021072	B021129	CIRCUIT BD ASSY:POWER SUPPLY	80009	671–0572–04
A4	671–0572–05	B021130	B021171	CIRCUIT BD ASSY:POWER SUPPLY	80009	671–0572–05
A4	671–0572–06	B021172		CIRCUIT BD ASSY:POWER SUPPLY	80009	671–0572–06
A4C142	290–1069–00	671–0572–00	671–0572–03	CAP,FXD,ELCTLT:1000UF,20%,6.3V	80009	290–1069–00
A4C142	290–1301–00	671–0572–04		CAP,FXD,ALUM:2700UF,20%,10V,12.5 X 30MM(0.492 X 1.180);RDL,LOWIMP,1.95A RIP-PLE,BULK	80009	290–1301–00
A4C161	290–0804–00	671–0572–00	671–0572–03	CAP,FXD,ELCTLT:10UF,+50–20%,25V	80009	290–0804–00
A4C161	290–0943–00	671–0572–04		CAP,FXD,ALUM:47UF,+50–20%,25V,6 X 11MM;RDL	55680	UVX1V470MPA
A4C169	283–0423–00			CAP,FXD,CER DI:0.22UF,+80–20%,50V	04222	MD015E224ZAA
A4C225	290–1069–00	671–0572–00	671–0572–03	CAP,FXD,ELCTLT:1000UF,20%,6.3V	80009	290–1069–00
A4C225	290–1301–00	671–0572–04		CAP,FXD,ALUM:2700UF,20%,10V,12.5 X 30MM(0.492 X 1.180);RDL,LOWIMP,1.95A RIP-PLE,BULK	80009	290–1301–00
A4C241	290–1034–00	671–0572–00	671–0572–03	CAP,FXD,ALUM:330UF,20%,25V,13 X 25MM;RDL	TK1424	CEUFM1E331
A4C241	290–1302–00	671–0572–04		CAP,FXD,ALUM:1000UF,20%,35V,12.5 X 30MM(0.492 X 1.180);RDL,LOWIMP,1.95A RIP-PLE,BULK	80009	290–1302–00
A4C250	290–1034–00	671–0572–00	671–0572–03	CAP,FXD,ALUM:330UF,20%,25V,13 X 25MM;RDL	TK1424	CEUFM1E331
A4C250	290–1302–00	671–0572–04		CAP,FXD,ALUM:1000UF,20%,35V,12.5 X 30MM(0.492 X 1.180);RDL,LOWIMP,1.95A RIP-PLE,BULK	80009	290–1302–00
A4C258	290–1069–00	671–0572–00	671–0572–03	CAP,FXD,ELCTLT:1000UF,20%,6.3V	80009	290–1069–00
A4C258	290–1301–00	671–0572–04		CAP,FXD,ALUM:2700UF,20%,10V,12.5 X 30MM(0.492 X 1.180);RDL,LOWIMP,1.95A RIP-PLE,BULK	80009	290–1301–00
A4C269	283–0423–00			CAP,FXD,CER DI:0.22UF,+80–20%,50V	04222	MD015E224ZAA
A4C270	283–0423–00			CAP,FXD,CER DI:0.22UF,+80–20%,50V	04222	MD015E224ZAA
A4C320	283–0423–00			CAP,FXD,CER DI:0.22UF,+80–20%,50V	04222	MD015E224ZAA
A4C321	283–0005–00	671–0572–01		CAP,FXD,CER DI:0.01UF,+100–0%,250V	04222	SR30VE103ZAA
A4C325	290–1069–00	671–0572–00	671–0572–03	CAP,FXD,ELCTLT:1000UF,20%,6.3V	80009	290–1069–00
A4C325	290–1301–00	671–0572–04		CAP,FXD,ALUM:2700UF,20%,10V,12.5 X 30MM(0.492 X 1.180);RDL,LOWIMP,1.95A RIP-PLE,BULK	80009	290–1301–00
A4C358	290–1069–00	671–0572–00	671–0572–03	CAP,FXD,ELCTLT:1000UF,20%,6.3V	80009	290–1069–00

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A4C358	290–1301–00	671–0572–04		CAP,FXD,ALUM:2700UF,20%,10V,12.5 X 30MM(0.492 X 1.180);RDL,LOWIMP,1.95A RIPPLE,BULK	80009	290–1301–00
A4C360	290–1069–00	671–0572–00	671–0572–03	CAP,FXD,ELCTLT:1000UF,20%,6.3V	80009	290–1069–00
A4C360	290–1301–00	671–0572–04		CAP,FXD,ALUM:2700UF,20%,10V,12.5 X 30MM(0.492 X 1.180);RDL,LOWIMP,1.95A RIPPLE,BULK	80009	290–1301–00
A4C361	290–0804–00	671–0572–00	671–0572–03	CAP,FXD,ELCTLT:10UF,+50–20%,25V	80009	290–0804–00
A4C361	290–0943–00	671–0572–04		CAP,FXD,ALUM:47UF,+50–20%,25V,6 X 11MM;RDL	55680	UVX1V470MPA
A4C370	290–1069–00	671–0572–00	671–0572–03	CAP,FXD,ELCTLT:1000UF,20%,6.3V	80009	290–1069–00
A4C370	290–1301–00	671–0572–04		CAP,FXD,ALUM:2700UF,20%,10V,12.5 X 30MM(0.492 X 1.180);RDL,LOWIMP,1.95A RIPPLE,BULK	80009	290–1301–00
A4C371	283–0423–00			CAP,FXD,CER DI:0.22UF,+80–20%,50V	04222	MD015E224ZAA
A4C415	283–0268–00			CAP,FXD,CER DI:0.015UF,20%,50V	80009	283–0268–00
A4C464	290–1069–00	671–0572–00	671–0572–03	CAP,FXD,ELCTLT:1000UF,20%,6.3V	80009	290–1069–00
A4C464	290–1301–00	671–0572–04		CAP,FXD,ALUM:2700UF,20%,10V,12.5 X 30MM(0.492 X 1.180);RDL,LOWIMP,1.95A RIPPLE,BULK	80009	290–1301–00
A4C475	290–1069–00	671–0572–00	671–0572–03	CAP,FXD,ELCTLT:1000UF,20%,6.3V	80009	290–1069–00
A4C475	290–1301–00	671–0572–04		CAP,FXD,ALUM:2700UF,20%,10V,12.5 X 30MM(0.492 X 1.180);RDL,LOWIMP,1.95A RIPPLE,BULK	80009	290–1301–00
A4C521	283–0672–00			CAP,FXD,MICA DI:200PF,1%,500V	80009	283–0672–00
A4C525	285–1196–00			CAP,FXD,PPR DI:0.01UF,20%,250V	80009	285–1196–00
A4C540	285–1329–00			CAP,FXD,PLSTC:MTLZD FILM;680PF,10%,1600V,POLYPROPYLENE,.70X.43;RDL,T/A	80009	285–1329–00
A4C548	285–1331–00			CAP,FXD,MTLZD:0.47UF,5%,400V	TK1573	MKS4 .47/400/5
A4C575	283–0005–00	671–0572–01		CAP,FXD,CER DI:0.01UF,+100–0%,250V	04222	SR30VE103ZAA
A4C621	283–0051–00			CAP,FXD,CER DI:0.0033UF,5%,100V	80009	283–0051–00
A4C648	285–1187–00			CAP,FXD,MTLZD:0.47 UF,10%,100 V	05292	PMT 3R .47K 100
A4C656	290–0844–00			CAP,FXD,ELCTLT:100UF,+75–20%,35WVDC	24165	513D107M035CC4D
A4C717	290–0804–00			CAP,FXD,ELCTLT:10UF,+50–20%,25V	80009	290–0804–00
A4C718	283–0211–00			CAP,FXD,CER DI:0.1UF,10%,200V	80009	283–0211–00
A4C722	283–0032–00			CAP,FXD,CER DI:470PF,5%,500V	80009	283–0032–00
A4C727	283–0423–00			CAP,FXD,CER DI:0.22UF,+80–20%,50V	04222	MD015E224ZAA
A4C730	285–1196–00			CAP,FXD,PPR DI:0.01UF,20%,250V	80009	285–1196–00
A4C830	285–1196–00			CAP,FXD,PPR DI:0.01UF,20%,250V	80009	285–1196–00
A4C845	290–1070–00	671–0572–00	671–0572–04	CAP,FXD,ELCTLT:220UF,20%,200V	80009	290–1070–00
A4C845	290–1293–00	671–0572–05		CAP,FXD,ALUM:390UF,20%,200V,25 X 30MM;SNAP IN,105 DEG,BULK	80009	290–1293–00
A4C865	290–1070–00	671–0572–00	671–0572–04	CAP,FXD,ELCTLT:220UF,20%,200V	80009	290–1070–00
A4C865	290–1293–00	671–0572–05		CAP,FXD,ALUM:390UF,20%,200V,25 X 30MM;SNAP IN,105 DEG,BULK	80009	290–1293–00
A4C920	285–1323–00			CAP,FXD,MTLZD:0.22UF,250V,X	80009	285–1323–00
A4CR169	152–0198–00			DIO,RECT:200V,3A,125A IFSM,1VF AT 3A,SAF CONT;1N5624	80009	152–0198–00
A4CR170	152–0066–00			DIO,RECT:400V,1A,IFSM=30A,1.2VF,2US;GP10G/1N5060,T&R,SAF CONT	05828	GP10G–020
A4CR215	152–0066–00			DIO,RECT:400V,1A,IFSM=30A,1.2VF,2US;GP10G/1N5060,T&R,SAF CONT	05828	GP10G–020
A4CR269	152–0198–00			DIO,RECT:200V,3A,125A IFSM,1VF AT 3A,SAF CONT;1N5624	80009	152–0198–00
A4CR320	152–0884–00			DIO,RECT:SCHTKY;35V,16A,150A IFSM,630MVF AT 16A;MBR1635,TO–220	04713	MBR1635
A4CR340	152–0601–01			DIO,RECT:ULTRA FAST;150V,25NS,35A IFSM;MUR115,T&R	04713	MUR115RL
A4CR348	152–0601–01			DIO,RECT:ULTRA FAST;150V,25NS,35A IFSM;MUR115,T&R	04713	MUR115RL

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A4CR369	152–0066–00			DIO,RECT:400V,1A,IFSM=30A,1.2VF,2US;GP10G/1 N5060,T&R,SAF CONT	05828	GP10G–020
A4CR545	152–0897–00			DIO,RECT:FAST RCVRY;1000V,1.5A,300NS,SOFT RCVRY;BYV96E,T&R	80009	152–0897–00
A4CR556	152–0400–00			DIO,RECT:FAST RCVRY;400V,1A,200NS;1N4936,DO–41,T&R	80009	152–0400–00
A4CR575	152–0884–00			DIO,RECT:SCHTKY;35V,16A,150A IFSM,630MVF AT 16A;MBR1635,TO–220	04713	MBR1635
A4CR640	152–0841–00			DIO,RECT:ULTRA FAST;1KV,8A,100NS;MUR8100E,TO–220	80009	152–0841–00
A4CR648	152–0864–00			DIO,RECT:ULTRA FAST;150V,2A,25NS, IFSM=50A,SOFT REC;BYV–150	80009	152–0864–00
A4CR649	152–0864–00			DIO,RECT:ULTRA FAST;150V,2A,25NS,IFSM=50A,SOFT REC;BYV–150	80009	152–0864–00
A4CR651	152–0581–04			DIO,RECT:SCHTKY;20V,1A,.450VF,25A IFSM;1N5817,T&R	04713	1N5817RL
A4CR820	152–0750–00			DIO,RECT:FAST RCVRY;BRDG,600V,3A, IFSM=125A,250NS,SAF CONT;RKBPC606	80009	152–0750–00
A4DS670	150–1017–00			LT EMITTING DIO:GRN,550NM,55MA MAX	80009	150–1017–00
A4DS720	150–0035–00			LAMP,GLOW:NEON;90V,0.3MA,AID–T,WIRE LD;NE–2B TYPE	71744	A1B–120
A4F940	159–0023–00			FUSE,CRTG:3AG,2A,250V,SLOW BLOW (FOR 90–132VAC OPERATION)	71400	MDX2
A4F940	159–0019–00			FUSE,CRTG:3AG,1A,250V,SLOW BLOWSAF CONT (FOR 180–250VAC OPERATION)	71400	MDL 1
A4J160	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY 34)	80009	131–0608–00
A4J310	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY 2)	80009	131–0608–00
A4J556	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY 2)	80009	131–0608–00
A4J660	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY 2)	80009	131–0608–00
A4J720	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY 2)	80009	131–0608–00
A4J810	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY 3)	80009	131–0608–00
A4L230	108–0554–00			COIL,RF:FXD,5UH,+/–20%, 17 1/2 TURNS (2 LAYERS) OF 16AWG,ON FORM 276–0147–00	TK1345	108–0554–00
A4L261	108–1262–00			COIL,RF:FXD,100UH,10%,Q=30,SRF 8.2MHZ,DCR 0.23 OHM,I MAX 0.75ARDL LEAD	80009	108–1262–00
A4L358	108–0554–00			COIL,RF:FXD,5UH,+/–20%, 17 1/2 TURNS (2 LAYERS) OF 16AWG,ON FORM 276–0147–00	TK1345	108–0554–00
A4L361	108–1262–00			COIL,RF:FXD,100UH,10%,Q=30,SRF 8.2MHZ,DCR 0.23 OHM,I MAX 0.75ARDL LEAD	80009	108–1262–00
A4L520	108–1448–00			COIL,RF:TOROID,1MH,+/–30%,AWG #20,PKG 0.65 DIA X 0.6	TK1345	108–1448–00
A4L770	108–0205–00			COIL,RF:INDUCTOR;FXD,1MH,+–5%, DCR 2.12 OHMS, FERRITE CORE	76493	8209
A4LF950	119–1946–00			FLTR,RFI:1A,250V,400HZ W/PC TERM	S4307	FN326–1/02–K–D–T
A4P556	131–0993–02			BUS,CNDCT:SHUNT ASSY,RED	00779	1–850100–O
A4P660	131–0993–02			BUS,CNDCT:SHUNT ASSY,RED	00779	1–850100–O
A4P720	131–0993–02			BUS,CNDCT:SHUNT ASSY,RED	00779	1–850100–O
A4Q127	151–0528–00			THYRISTOR,PWR:BIPOLAR,SCR;50V,16A RMS,PHASE CONTROL;2N6400,TO–220	80009	151–0528–00
A4Q215	151–0435–00			XSTR:DARLINGTON,PNP,SI,TO–92	80009	151–0435–00
A4Q638	151–0908–00			XSTR,PWR:BIPOLAR,NPN;500V VCEO,1000V VCEV,5A,SWING;MJH16002A,TO–218	80009	151–0908–00

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A4Q648	151–0323–00			XSTR,PWR:BIPOLAR,NPN;80V,4.0A,2.0MHZ, AMPL;2N5192,TO–126	80009	151–0323–00
A4Q660	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A4Q667	151–0750–00			XSTR,SIG:BIPOLAR,NPN;400V,300MA,20MHZ, AMPL;MPSA44,TO–92 EBC	80009	151–0750–00
A4Q717	151–0188–00			XSTR,SIG:BIPOLAR,PNP;40V,200MA,250MHZ, AMPL;2N3906,TO–92 EBC	80009	151–0188–00
A4Q727	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A4Q741	151–0324–00			XSTR,PWR:BIPOLAR,PNP;80V,4.0A,2.0MHZ, AMPL;2N5195,TO–126	80009	151–0324–00
A4Q750	151–0323–00			XSTR,PWR:BIPOLAR,NPN;80V,4.0A,2.0MHZ, AMPL;2N5192,TO–126	80009	151–0323–00
A4Q755	151–0188–00			XSTR,SIG:BIPOLAR,PNP;40V,200MA,250MHZ, AMPL;2N3906,TO–92 EBC	80009	151–0188–00
A4R120	315–0101–00			RES,FXD,FILM:100 OHM,5%,0.25W	80009	315–0101–00
A4R215	315–0272–00			RES,FXD,FILM:2.7K OHM,5%,0.25W	80009	315–0272–00
A4R216	315–0472–00			RES,FXD,FILM:4.7K OHM,5%,0.25W	80009	315–0472–00
A4R225	301–0680–00			RES,FXD,FILM:68 OHM,5%,0.5W	80009	301–0680–00
A4R314	315–0202–00			RES,FXD,FILM:2K OHM,5%,0.25W	80009	315–0202–00
A4R315	315–0152–00			RES,FXD,FILM:1.5K OHM,5%,0.25W	80009	315–0152–00
A4R316	315–0163–00	671–0572–00	671–0572–01	RES,FXD,FILM:16K OHM,5%,0.25W	80009	315–0163–00
A4R316	322–3254–00	671–0572–02		RES,FXD,FILM:4.32K OHM,1%,0.2W,TC=T0	80009	322–3254–00
A4R321	315–0100–00	671–0572–01		RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
A4R415	311–1225–00			RES,VAR,NONWW:TRMR,1K OHM,0.5W	80009	311–1225–00
A4R416	315–0102–00			RES,FXD,FILM:1K OHM,5%,0.25W	80009	315–0102–00
A4R510	311–0978–00			RES,VAR,NONWW:TRMR,250 OHM,0.5W	80009	311–0978–00
A4R560	301–0204–00	671–0572–00	671–0572–05	RES,FXD,FILM:200K OHM,5%,0.5W	80009	301–0204–00
A4R560	303–0204–00	671–0572–06		RES,FXD,CMPSN:200K OHM,5%,1W	80009	303–0204–00
A4R575	315–0100–00	671–0572–01		RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
A4R614	315–0152–00			RES,FXD,FILM:1.5K OHM,5%,0.25W	80009	315–0152–00
A4R615	322–3181–00	671–0572–00	671–0572–02	RES,FXD,FILM:750 OHM,1%,0.2W,TC=T0	80009	322–3181–00
A4R615	322–3175–00	671–0572–03		RES,FXD,FILM:649 OHM,1%,0.2W,TC=T0	80009	322–3175–00
A4R616	322–3258–00			RES,FXD:MET FILM;4.75K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3258–00
A4R617	315–0182–00			RES,FXD,FILM:1.8K OHM,5%,0.25W	80009	315–0182–00
A4R619	315–0103–00			RES,FXD,FILM:10K OHM,5%,0.25W	80009	315–0103–00
A4R620	315–0432–00	671–0572–00	671–0572–01	RES,FXD,FILM:4.3K OHM,5%,0.25W	80009	315–0432–00
A4R620	322–3254–00	671–0572–02		RES,FXD,FILM:4.32K OHM,1%,0.2W,TC=T0	80009	322–3254–00
A4R621	315–0103–00			RES,FXD,FILM:10K OHM,5%,0.25W	80009	315–0103–00
A4R622	322–3275–00	671–0572–00	671–0572–03	RES,FXD,FILM:7.15K OHM,1%,0.2W,TC=T0	80009	322–3275–00
A4R622	322–3248–00	671–0572–04		RES,FXD,FILM:3.74K OHM,1%,0.2W,TC=T0	80009	322–3248–00
A4R625	322–3181–00	671–0572–00	671–0572–02	RES,FXD,FILM:750 OHM,1%,0.2W,TC=T0	80009	322–3181–00
A4R625	322–3199–00	671–0572–03		RES,FXD,FILM:1.15K OHM,1%,0.2W,TC=T0	80009	322–3199–00
A4R630	308–0755–00			RES,FXD,WW:0.75 OHM,5%,2W	91637	CPF–1–0R75JT1
A4R647	301–0274–00			RES,FXD,FILM:270K OHM,5%,0.5W	80009	301–0274–00
A4R665	315–0332–00			RES,FXD,FILM:3.3K OHM,5%,0.25W	80009	315–0332–00
A4R666	315–0473–00			RES,FXD,FILM:47K OHM,5%,0.25W	80009	315–0473–00
A4R667	301–0105–00	671–0572–00	671–0572–05	RES,FXD,FILM:1M OHM,5%,0.50W	19701	5053CX1M000J
A4R667	303–0105–00	671–0572–06		RES,FXD,CMPSN:1M OHM,5%,1W	01121	GB1055
A4R717	315–0183–00			RES,FXD,FILM:18K OHM,5%,0.25W	80009	315–0183–00
A4R718	315–0221–00			RES,FXD,FILM:220 OHM,5%,0.25W	80009	315–0221–00
A4R722	315–0103–00			RES,FXD,FILM:10K OHM,5%,0.25W	80009	315–0103–00
A4R723	307–0863–00			RES,THRM:10 OHM,10%,NTC	80009	307–0863–00
A4R731	315–0473–00			RES,FXD,FILM:47K OHM,5%,0.25W	80009	315–0473–00
A4R746	303–0750–00			RES,FXD,CMPSN:75 OHM,5%,1W	80009	303–0750–00
A4R747	303–0750–00			RES,FXD,CMPSN:75 OHM,5%,1W	80009	303–0750–00
A4R765	301–0105–00			RES,FXD,FILM:1M OHM,5%,0.50W	19701	5053CX1M000J

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A4R766	322-3439-00			RES,FXD,FILM:365K OHM,1%,0.2W,TC=T0	80009	322-3439-00
A4R767	322-3439-00			RES,FXD,FILM:365K OHM,1%,0.2W,TC=T0	80009	322-3439-00
A4R768	322-3374-00	671-0572-00	671-0572-03	RES,FXD,FILM:76.8K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE76K8
A4R768	315-0104-00	671-0572-04		RES,FXD,FILM:100K OHM,5%,0.25W	80009	315-0104-00
A4R818	315-0106-00			RES,FXD,FILM:10M OHM,5%,0.25W	01121	CB1065
A4R822	301-0105-00			RES,FXD,FILM:1M OHM,5%,0.50W	19701	5053CX1M000J
A4RV820	307-0449-00			RES,V SENS:1900PF,100A,130V,MET OXD SAF CONT	03508	V130LA20A
A4RV920	307-0449-00			RES,V SENS:1900PF,100A,130V,MET OXD SAF CONT	03508	V130LA20A
A4S930	260-1849-07			SW,PUSH:DPST,4A,250VAC (QUANTITY 2)	80009	260-1849-07
A4T440	120-1782-00			XFMR,RF:	80009	120-1782-00
A4TP133	214-4085-00			TERM,TEST POINT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104-01-02
A4TP137	214-4085-00			TERM,TEST POINT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104-01-02
A4TP140	214-4085-00			TERM,TEST POINT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104-01-02
A4TP173	214-4085-00			TERM,TEST POINT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104-01-02
A4TP341	214-4085-00			TERM,TEST POINT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104-01-02
A4TP350	214-4085-00			TERM,TEST POINT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104-01-02
A4TP667	214-4085-00			TERM,TEST POINT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104-01-02
A4U176	156-3633-00			IC,LIN:BIPOLAR,VR;POS,12V,1A,3%,LOW DROP-OUT;LM2940CT-12,TO-220	80009	156-3633-00
A4U215	156-3217-00			IC,MISC:	80009	156-3217-00
A4U276	156-2559-00			IC,LIN:BIPO-LAR,VR;NEG,-12V,1.5A,2%;MC7912ACT,TO-220	80009	156-2559-00
A4U410	156-1631-00			IC,LIN:BIPOLAR,VR;SHUNT,AD-JUST,100MA;TL431CLP,TO-92	01295	TL431C-LP
A4U520	156-0885-00			CPLR,OPTOELECTR:LED,5KV ISOLATION	04713	SOC 123A
A4U615	156-1225-01			IC,LIN:BIPOLAR,COMPTR;LM393N,DIP08.3	80009	156-1225-01
A4U722	156-2524-00	671-0572-00	671-0572-03	IC,LIN:	12969	UC3842N
A4U722	156-4236-00	671-0572-04		IC,LIN:	80009	156-4236-00
A4VR120	152-0662-00			DIO,ZENER:5V,1%,0.4W;1N751 FMLY,DO-7 OR 35,TR	04713	SZG195RL
A4VR650	152-0395-00			DIO,ZENER:4.3V,5%,0.4W;1N749A,DO-35 OR 7,TR	80009	152-0395-00
A4VR765	152-0304-00			DIO,ZENER:20V,5%,0.4W;1N968B,DO-35 OR 7,TR	80009	152-0304-00
A4W810	198-5653-00			WIRE SET,ELEC:	80009	198-5653-00
J108	131-0955-03			CONN,RF JACK:	80009	131-0955-03
J116	131-0955-03			CONN,RF JACK:	80009	131-0955-03
J123	131-0955-03			CONN,RF JACK:	80009	131-0955-03
J131	131-0955-03			CONN,RF JACK:	80009	131-0955-03
J138	131-0955-03			CONN,RF JACK:	80009	131-0955-03
J146	131-0955-03			CONN,RF JACK:	80009	131-0955-03
J153	131-0955-03			CONN,RF JACK:	80009	131-0955-03
J161	131-0955-03			CONN,RF JACK:	80009	131-0955-03
J168	131-0955-03			CONN,RF JACK:	80009	131-0955-03
J176	131-0955-03			CONN,RF JACK:	80009	131-0955-03
J183	131-0955-03			CONN,RF JACK:	80009	131-0955-03
J191	131-0955-03			CONN,RF JACK:	80009	131-0955-03
J308	131-0955-03			CONN,RF JACK:	80009	131-0955-03
J316	131-0955-03			CONN,RF JACK:	80009	131-0955-03
J323	131-0955-03			CONN,RF JACK:	80009	131-0955-03

Replaceable Electrical Parts

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
J331	131–0955–03			CONN,RF JACK:	80009	131–0955–03
J338	131–0955–03			CONN,RF JACK:	80009	131–0955–03
J346	131–0955–03			CONN,RF JACK:	80009	131–0955–03
J353	131–0955–03			CONN,RF JACK:	80009	131–0955–03
J361	131–0955–03			CONN,RF JACK:	80009	131–0955–03
J368	131–0955–03			CONN,RF JACK:	80009	131–0955–03
J376	131–0955–03			CONN,RF JACK:	80009	131–0955–03
J383	131–0955–03			CONN,RF JACK:	80009	131–0955–03
J391	131–0955–03			CONN,RF JACK:	80009	131–0955–03

Section 7— Diagrams and Circuit Board Illustrations

Symbols

Graphic symbols and class designation letters are based on ANSI Standard Y32.2-1975.

Logic symbology is based on ANSI Y32.14-1973 in terms of positive logic. Logic symbols depict the logic function performed and may differ from the manufacturer's data.

The overline on a signal name indicates that the signal performs its intended function when it is in the low state.

Abbreviations are based on ANSI Y1.1-1972.

Other ANSI standards that are used in the preparation of diagrams by Tektronix, Inc. are:

Y14.15, 1966 Drafting Practices.
Y14.2, 1973 Line Conventions and Lettering.
Y10.5, 1968 Letter Symbols for Quantities Used in Electrical Science and Electrical Engineering.

American National Standard Institute
1430 Broadway
New York, New York 10018

Component Values

Electrical components shown on the diagrams are in the following units unless noted otherwise:

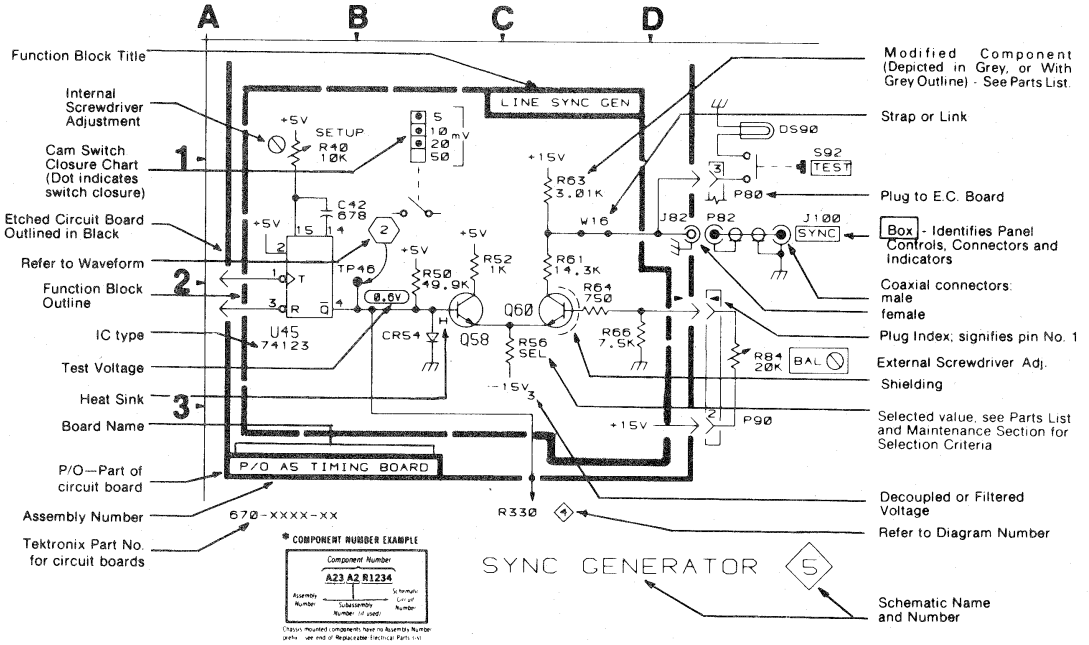
Capacitors = Values one or greater are in picofarads (pF). Values less than one are in microfarads (μF).
Resistors = Ohms (Ω).

The information and special symbols below may appear in this manual.

Assembly Numbers and Grid Coordinates

Each assembly in the instrument is assigned an assembly number (e.g., A20). The assembly number appears on the circuit board outline on the diagram, in the title for the circuit board component location illustration, and in the lookup table for the schematic diagram and corresponding component locator illustration. The Replaceable Electrical Parts list is arranged by assemblies in numerical sequence; the components are listed by component number *(see following illustration for constructing a component number).

The schematic diagram and circuit board component location illustration have grids. A lookup table with the grid coordinates is provided for ease of locating the component. Only the components illustrated on the facing diagram are listed in the lookup table. When more than one schematic diagram is used to illustrate the circuitry on a circuit board, the circuit board illustration may only appear opposite the first diagram on which it was illustrated; the lookup table will list the diagram number of other diagrams that the circuitry of the circuit board appears on.



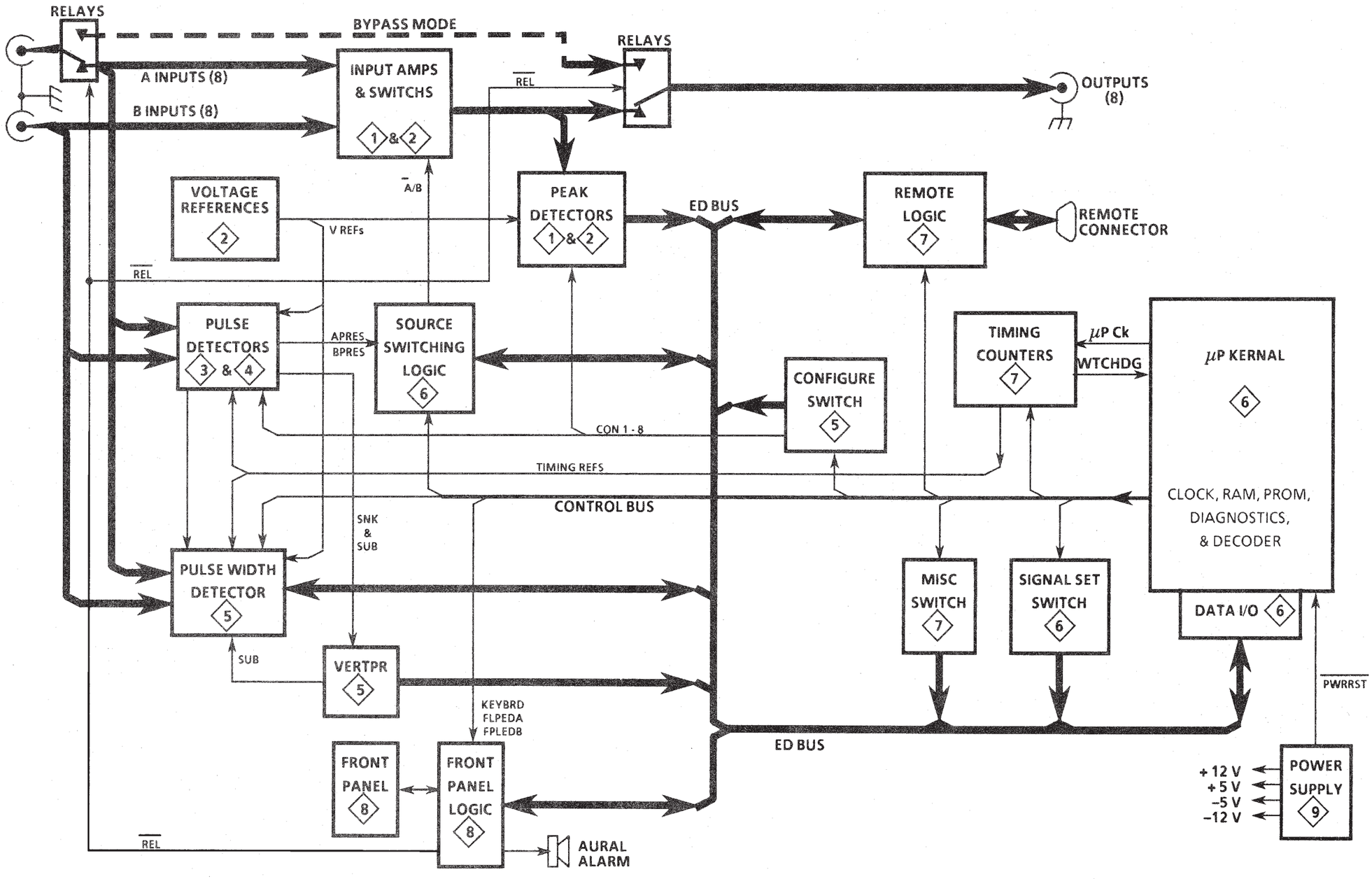


Figure 7-1: EOC–170A Bolck Diagram

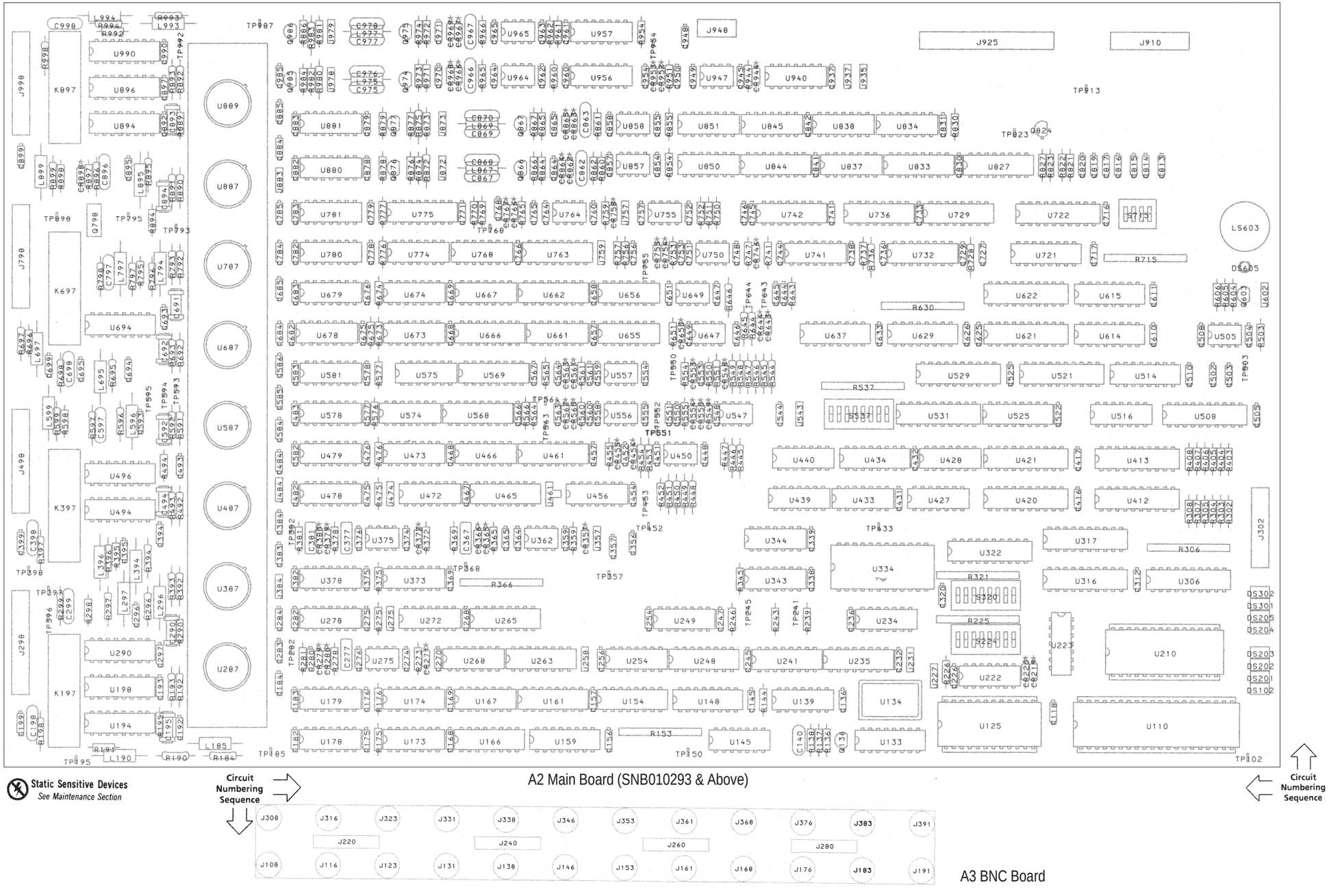


Figure 7-2: A2 Main Board (SNB010293 & Above) and A3 BNC Board

SCHEMATIC 1

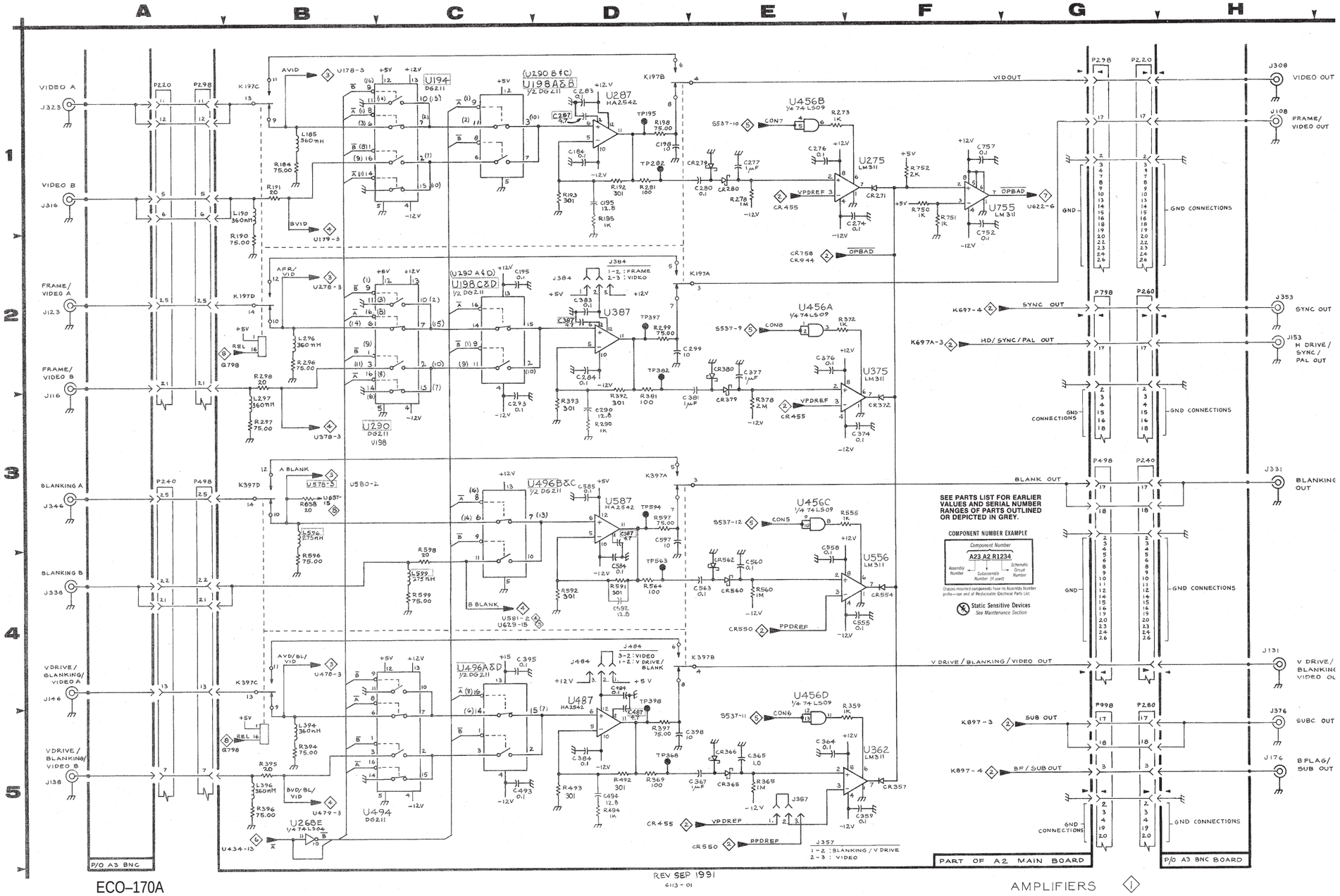
LOOK-UP CHART

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

Circuit Number	Diagram Location
ASSEMBLY A2	
C184	D1
C197	C2
C198	D1
C274	F1
C276	E1
C277	E1
C280	E1
C283	D1
C284	D2
C287 *	D1
C293	C3
C299	D2
C359	F5
C364	E5
C365	E5
C367	E5
C374	F3
C376	E2
C377	E2
C381	E2
C383	D2
C384	D5
C387 *	D3
C395	C4
C398	D5
C484	D4
C487 *	D5
C493	C5
C555	F4
C558	E4
C560	E4
C563	E4
C584	D4
C585	D3
C587 *	D4
C597	D3
C752	F1
C757	F1
CR271	F1
CR279	E1
CR280	E1
CR357	F5
CR365	E5
CR366	E5
CR372	F3
CR379	E2
CR380	E2
CR554	F4
CR560	E4
CR562	E4
J298	A1
J298	G1
J298	G2
J357	E5
J384	D2
J484	D4
J498	A3
J498	G3
J498	G4
J798	G1
J798	G2
J998	G4
J998	G5
K197A	E2
K197B	D1
K197C	B1
K197D	B2
K397A	D3
K397B	D4
K397C	B4
K397D	B3
L185	B1
L190	B1
L296	B2
L297	B3
L394	B5
L396	B5
L596	B3
L599	C4
R184	B1
R190	B2
R191	B1
R192	D1
R193	D1
R198	D1
R273	E1
R278	E1
R281	D1
R296	B2
R297	B3
R298	B2
R299	D2
R359	E5
R365	E5
R369	D5
R372	E2
R378	E3
R381	D2
R392	D2
R393	D3
R394	B5
R395	B5
R396	B5
R397	D5
R492	D5
R493	D5
R555	E3
R560	E4
R564	D4
R591	D4
R592	D4
R596	B4
R597	D3
R598	C4
R599	C4
R750	F1
R751	F1
R752	F1
TP195	D1
TP282	D1
TP368	D5
TP382	D2
TP397	D2
TP398	D4
TP563	D4
TP594	D3
U194 *	C1
U198 *	C3
U268E	B5
U275	F1
U287	D1
U290A *	C2
U290B *	C1
U290C *	C1
U290D *	C2
U362	F5
U375	F2
U387	D2
U456A	E2
U456B	E1
U456C	E3
U456D	E5
U487	D5
U494	C5
U496A *	C4
U496B *	C3
U496C *	C3
U496D *	C4
U556	F4
U587	D3
U755	F1
ASSEMBLY A3	
J108	H1
J116	A3
J123	A2
J131	H4
J138	A5
J146	A4
J153	H2
J176	H5
J220	A1
J220	H1
J220	H2
J240	A3
J240	H3
J240	H4
J260	H1
J260	H2
J280	H4
J280	H5
J308	H1
J316	A1
J323	A1
J331	H3
J338	A4
J346	A3
J353	H2
J376	H5

*See Parts List for serial number ranges.

Figure 7-3: Schematic 1 Look–up Chart



ECO–170A

AMPLIFIERS

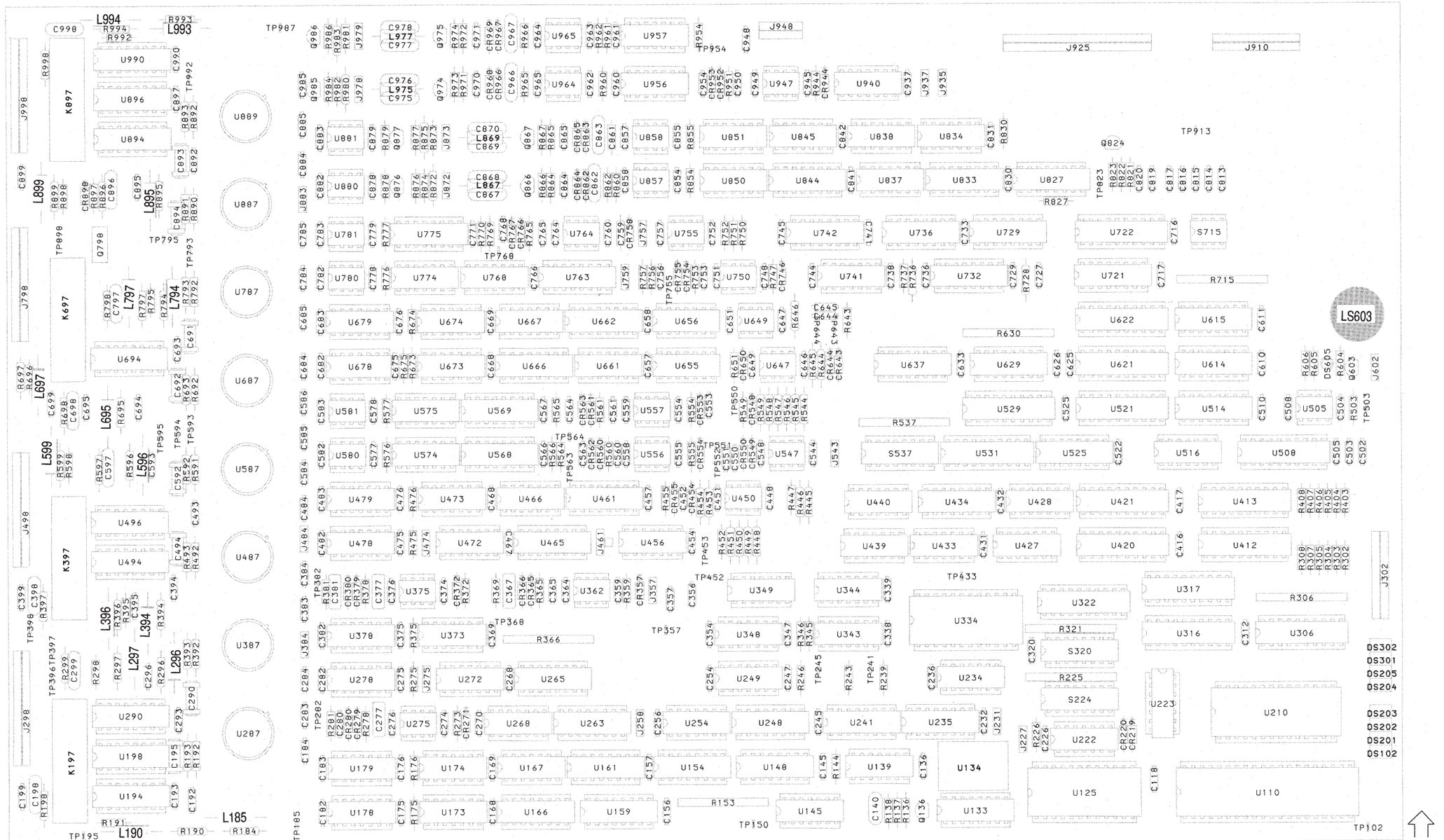


Figure 7-4: A2 Main Board (SNB010292 & Below)

SCHEMATIC 2

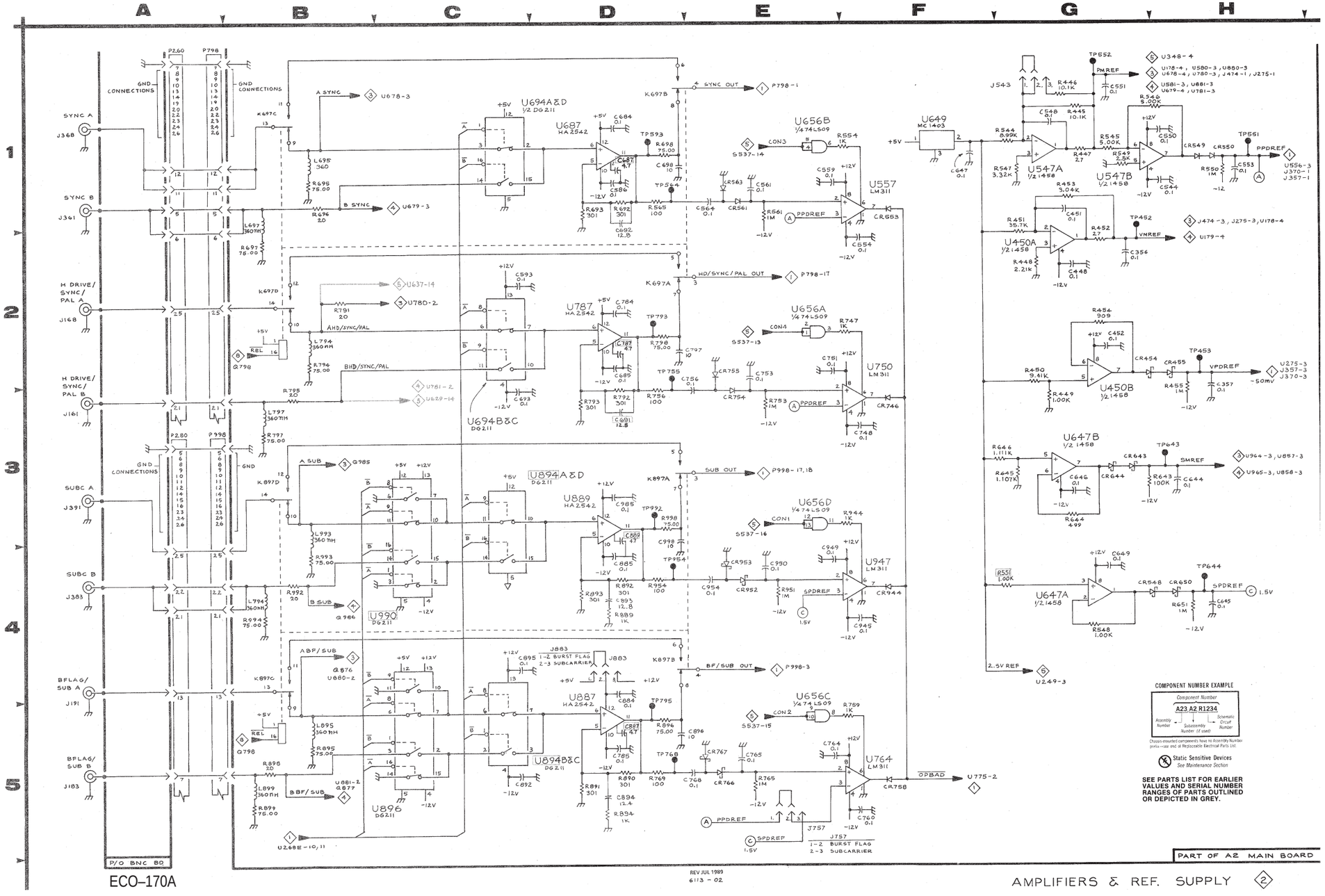
LOOK-UP CHART

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

Circuit Number	Diagram Location
ASSEMBLY A2	
C356	G2
C357	H2
C448	G2
C451	G1
C452	G2
C544	H1
C548	H1
C551	G1
C553	H1
C554	F2
C559	E1
C561	E1
C564	E1
C586	D1
C593	C2
C644	H3
C645	H4
C647	F1
C647	G3
C649	G4
C684	D1
C685	D2
C687 *	D1
C691 *	D3
C692	D2
C693	C3
C698	D1
C748	F3
C751	E2
C753	E2
C756	E3
C760	F5
C764	E5
C765	E5
C768	E5
C784	D2
C785	D5
C787 *	D3
C797	D2
C884	D4
C885	D4
C887 *	D4
C889 *	D5
C892	C5
C895	C4
C896	D5
C945	F4
C949	E4
C950	E4
C954	E4
C985	D3
C998	D3
CR454	G2
CR455	H2
CR548	G4
CR549	H1
CR550	H1
CR553	F1
CR561	E1
CR563	E1
CR643	G3
CR644	G3
CR650	H3
CR650	H4
CR746	F3
CR754	E3
CR755	E2
CR758	F5
CR766	E5
CR767	E5
CR944	F4
CR952	E4
CR953	E4
J543	G1
J757	E5
J798	A1
J883	D4
J998	A3
K697A	D2
K697B	D1
K697C	B1
K697D	B2
K897A	D3
K897B	D4
K897C	B4
K897D	B3
L695	B1
L697	B1
L794	B2
L797	B3
L895	B5
L899	B5
L993	B3
L994	B4
R445	G1
R446	G1
R447	G1
R448	G2
R449	G3
R450	G2
R451	G1
R452	G2
R453	G1
R454	G2
R455	H2
R544	G1
R545	G1
R545	G3
R546	H1
R547	G1
R548	G4
R549	G1
R550	H1
R551 *	G4
R554	F1
R561	E1
R565	D1
R643	G3
R643	H3
R644	G3
R645	G3
R646	G3
R651	H4
R692	D1
R693	D1
R695	B1
R696	B1
R697	B2
R698	D1
R747	F2
R753	E3
R756	D3
R759	F5
R765	E5
R769	D5
R792	D3
R793	D3
R794	B2
R795	B3
R797	B3
R798	D2
R890	D5
R891	D5
R892	D4
R893	D4
R895	B5
R896	D5
R898	B5
R899	B5
R944	F3
R951	E4
R954	D4
R992	B4
R992	D3
R993	B4
R994	B4
R998	D3
TP452	G2
TP453	H2
TP551	H1
TP552	G1
TP564	D1
TP593	D1
TP643	H3
TP644	H4
TP755	D2
TP768	D5
TP793	D2
TP795	D5
TP954	D4
TP992	D3
U450A	G2
U450B	G2
U547A	G1
U547B	G1
U557	F1
U647A	G4
U647B	G3
U649	F1
U656A	E2
U656B	E1
U656C	E5
U656D	E3
U687	D1
U694A	C1
U694B	C2
U694C	C2
U694D	C1
U750	F2
U764	F5
U787	D2
U887	D5
U889	D3
U894A *	C3
U894B *	C5
U894C *	C5
U894D *	C3
U896	C5
U947	F4
U990 *	C4
ASSEMBLY A3	
J161	A3
J168	A2
J183	A5
J191	A4
J260	A1
J280	A3
J361	A1
J368	A1
J383	A4
J391	A3

*See Parts List for serial number ranges.

Figure 7-5: Schematic 2 Look–up Chart



ECO–170A

PART OF A2 MAIN BOARD

AMPLIFIERS & REF. SUPPLY ◇2

SCHEMATIC 3

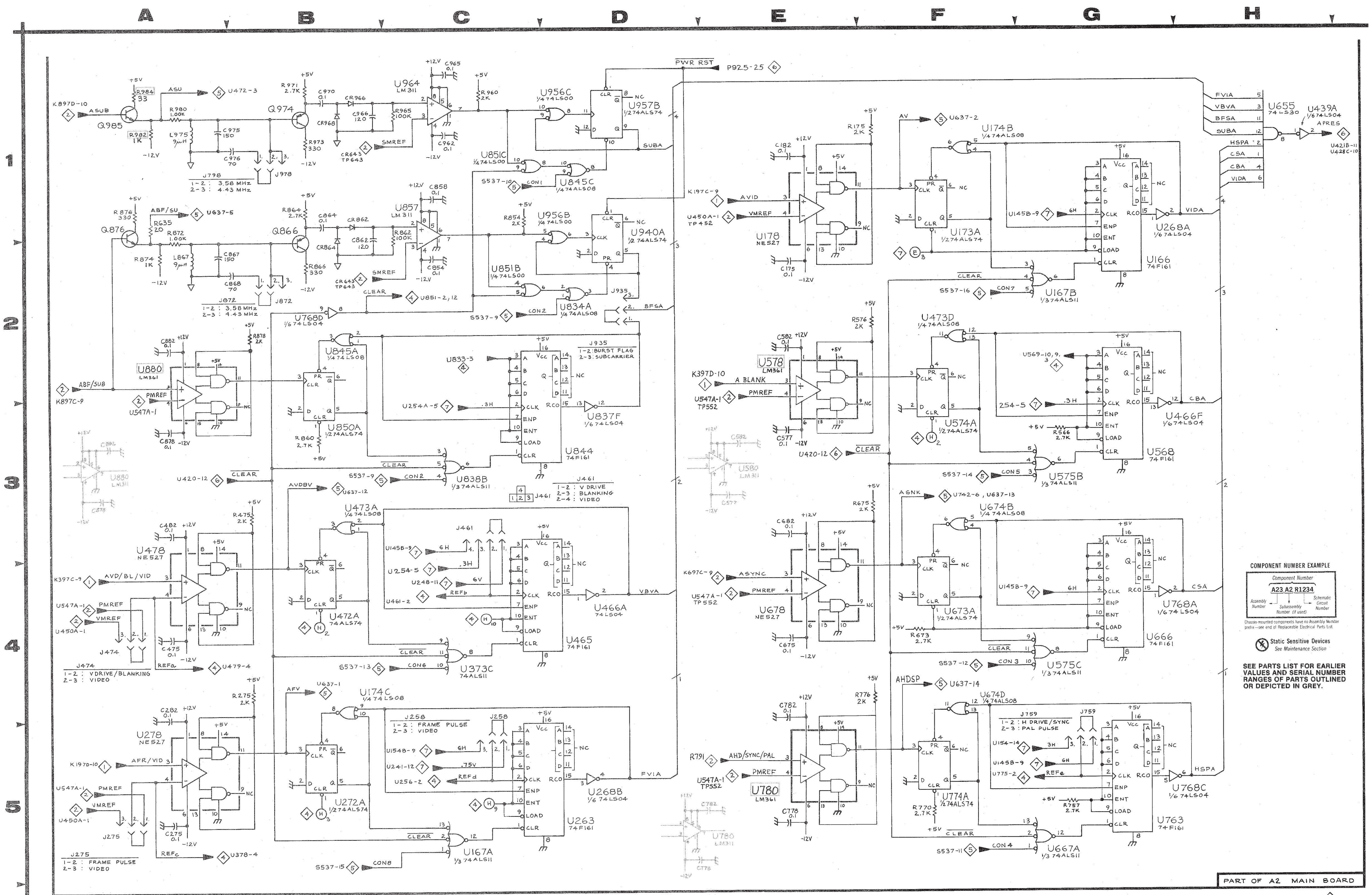
LOOK-UP CHART

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

Circuit Number	Diagram Location
ASSEMBLY A2	
C175	E2
C182	E1
C275	A5
C282	A4
C475	A4
C482	A3
C577	E3
C582	E2
C675	E4
C682	E3
C778	E5
C782	E4
C854	C2
C858	C1
C862	B2
C864	B1
C867	A2
C868	B2
C878	A3
C882	A2
C962	C1
C965	C1
C966	B1
C970	B1
C975	A1
C976	B1
CR862	B1
CR864	B2
CR966	B1
CR968	B1
J258	C5
J275	A5
J461	C3
J474	A4
J759	G5
J872	B2
J935	D2
J978	B1
L867	A2
L975	A1
Q866	B1
Q876	A1
Q974	B1
Q985	A1
R175	F1
R275	B4
R475	B3
R566	G3
R576	F2
R673	F4
R675	F3
R757	G5
R770	F5
R776	F5
R830	D1
R854	C1
R860	B3
R862	C1
R864	B1
R866	B2
R872	A1
R874	A2
R876	A1
R878	B2
R960	C1
R961	C3
R961	D1
R965	C1
R971	B1
R973	B1
R980	A1
R982 *	A1
R984	A1
U166	G2
U167A	C5
U167B	G2
U173A	F1
U174B	F1
U174C	B4
U178	E1
U263	D5
U268A	G1
U268	D5
U272A	B5
U278	A5
U373C	C4
U439A	H1
U465	D4
U466A	D4
U466F	G3
U472A	B4
U473A	B3
U473D	F2
U478	A3
U568	G3
U574A	F3
U575B	G3
U575C	G4
J578	E2
U580 *	E2
U655	H1
U666	G4
U667A	G5
U673A	F4
U674B	F3
U674D	F4
U678	E4
U763	G5
U768A	G4
U768C	G5
U768D	B2
U774A	F5
U780 *	E5
U834A	D2
U837F	D3
U838B	C3
U844	D3
U845A	B2
U845C	D1
U850A	B3
U851B	C2
U851C	C1
U857	C1
U880 *	A2
U940A	D1
U956B	D1
U956C	D1
U957B	D1
U964	C1

*See Parts List for serial number ranges.

Figure 7-6: Schematic 3 Look–up Chart


A B C D E F G H
1 2 3 4 5
PWR RST
P925-25
U956C
U957B
U964 LM311
Q985
Q974
Q876
Q866
U857 LM311
U956B
U940A
U851C
U845C
U851B
U834A
U880
U845A
U850A
U844
U837F
U838B
U478
U473A
U472A
U465
U466A
U373C
U278
U174C
U272A
U263
U268B
U167A
U178
U173A
U174B
U166
U268A
U167B
U578
U473D
U574A
U568
U466F
U575B
U678
U674B
U673A
U666
U768A
U575C
U780
U674D
U774A
U763
U768C
U667A
U655
U439A
APRES
FVIA
VBVA
BFSA
SUBA
HSPA
CSA
CBA
VIDA
COMPONENT NUMBER EXAMPLE
A23 A2 R1234
Static Sensitive Devices
See Maintenance Section
SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.
PART OF A2 MAIN BOARD
REV MAY 1991
A PULSE DETECTOR 3
ECO–170A

SCHEMATIC 4

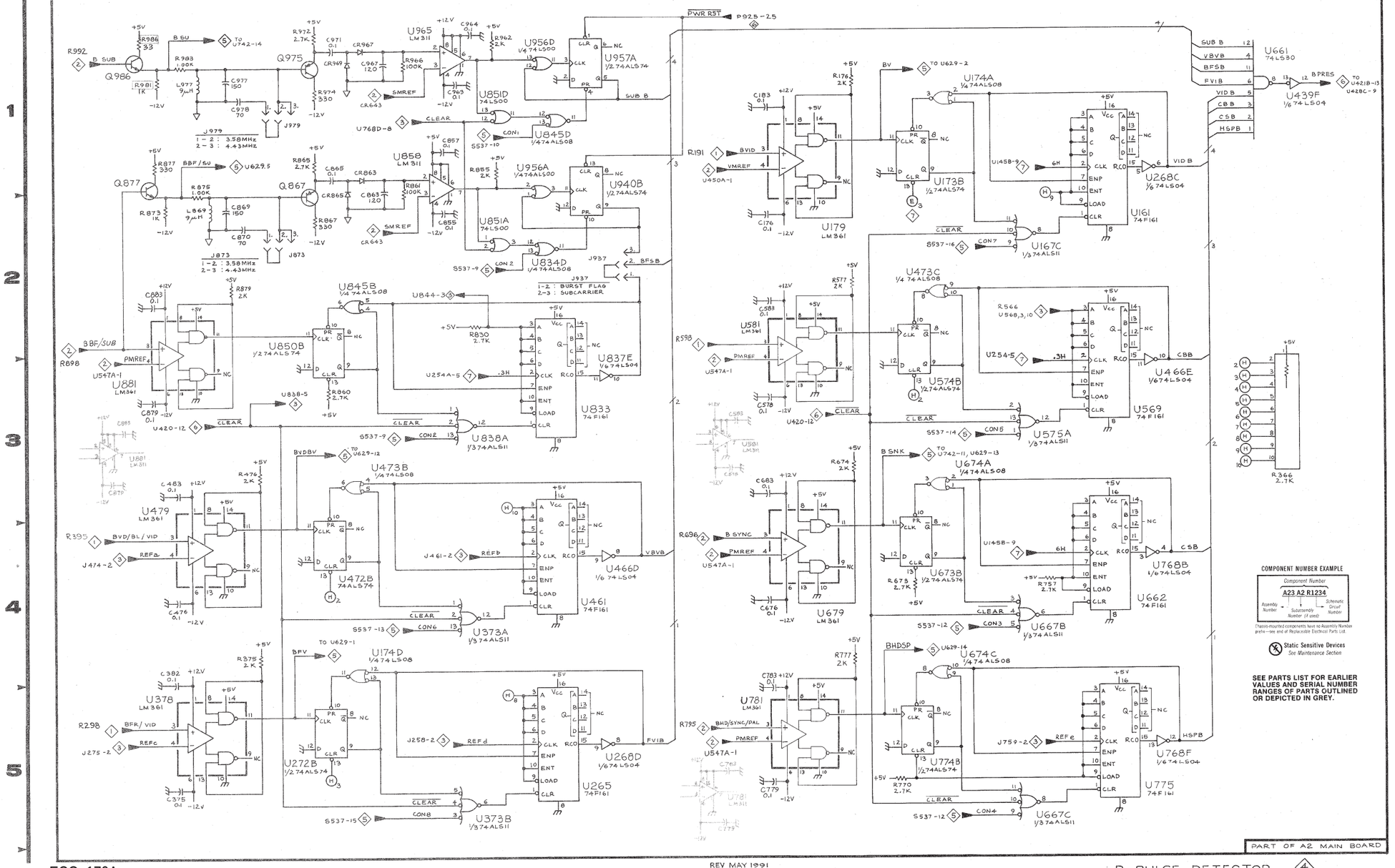
LOOK-UP CHART

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

Circuit Number	Diagram Location
ASSEMBLY A2	
C176	E2
C183	E1
C375	A5
C382	A4
C476	A4
C483	A3
C578	E3
C583	E2
C676	E4
C683	E3
C779	E5
C783	E4
C855	C2
C857	C1
C863	B2
C865	B1
C869	A2
C870	B2
C879	A3
C883	A2
C963	C1
C964	C1
C967	B1
C971	B1
C977	A1
C978	B1
CR863	B1
CR865	B2
CR967	B1
CR969	B1
J873	B2
J937	D2
J979	B1
L869	A2
L977	A1
Q867	B1
Q877	A1
Q975	B1
Q986	A1
R176	E1
R366	H3
R375	B4
R476	B3
R577	E2
R673	F4
R674	E3
R757	G4
R770	F5
R777	E5
R830	D1
R855	C1
R860	B3
R861	C1
R865	B1
R867	B2
R873	A2
R875	A2
R877	A1
R879	B2
R961	D1
R962	C1
R966	C1
R972	B1
R974	B1
R981	A1
R983	A1
R986	A1
U161	G2
U167C	F2
U173B	F1
U174A	F1
U174D	B4
U179	E2
U265	D5
U268C	G1
U268D	D5
U272B	B5
U373A	C4
U373B	C5
U378	A5
U439F	H1
U461	D4
U466D	D4
U466	G3
U472B	B4
U473B	B3
U473C	F2
U479	A4
U569	G3
U574B	F3
U575A	F3
U581	E2
U661	H1
U662	G4
U667B	F4
U667C	F5
U673B	F4
U674A	F3
U674C	F4
U679	E4
U768B	G4
U768F	G5
U774B	F5
U775	G5
U781	E5
U833	D3
U834D	C2
U837E	D3
U838A	C3
U845B	B2
U845D	C1
U850B	B2
U851A	C2
U851D	C1
U858	C1
U881	A2
U940B	D1
U956A	C1
U957A	D1
U965D	C1
U965	C1

*See Parts List for serial number ranges.

Figure 7-7: Schematic 4 Look–up Chart



COMPONENT NUMBER EXAMPLE

Component Number

A23 A2 R1234

Assembly Number — Subassembly Number (if used) — Schematic Circuit Number

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

Static Sensitive Devices
See Maintenance Section

SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.

ECO–170A

REV MAY 1991

B PULSE DETECTOR ④

DIAGRAM 5

SCHEMATIC DIAGRAM LOOK-UP CHART

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

Circuit Number	Diagram Location
ASSEMBLY A2	
C247	C1
C254	C1
C347 *	C2
C354 *	C2
C626	C3
C633	C2
C729	D4
C736	C4
C738	B4
C741	A5
C744	B3
C746 *	B3
C745	A3
J910	H1
R239	E1
R243	E1
R246	D1
R345	D1
R346 *	D2
R537	G5
R630	D3
R728	D4
R736	C4
R737	B3
R741 *	B3
R821	D4
S537	E4
TP241	F2
TP245	D1
TP823	E3
U222D	E1
U249	D1
U343A	E1
U343B	E1
U344A	D1
U344B	E1
U348 *	D2
U349A *	D1
U433A *	E1
U514	F2
U521	H1
U525	F1
U529	A2
U531	H4
U614	F2
U615	F4
U621	H4
U629	C3
U637	C1
U729	D4
U732A	D5
U732B	D4
U736	C4
U741	B4
U742	A4
U827	E4
U837A	C4
U837B	A4
U837C	D3
U837D	E3

*See Parts List for serial number ranges.

Figure 7-8: Schematic 5 Look–up Chart

PULSE WIDTH MULTIPLEXER
PULSE WIDTH COUNTER CONTROL
PULSE WIDTH COUNTER
PULSE WIDTH CLOCK
VERTICAL
CONFIGURE SWITCH
PULSE WIDTH DETECTORS
COMPONENT NUMBER EXAMPLE
Component Number
A23 A2 R1234
Assembly Number
Subassembly Number (if used)
Schematic Circuit Number
Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List
Static Sensitive Devices
See Maintenance Section
PART OF A2 MAIN BOARD
REV JUL 1989
6113-05
ECO–170A

DIAGRAM 6

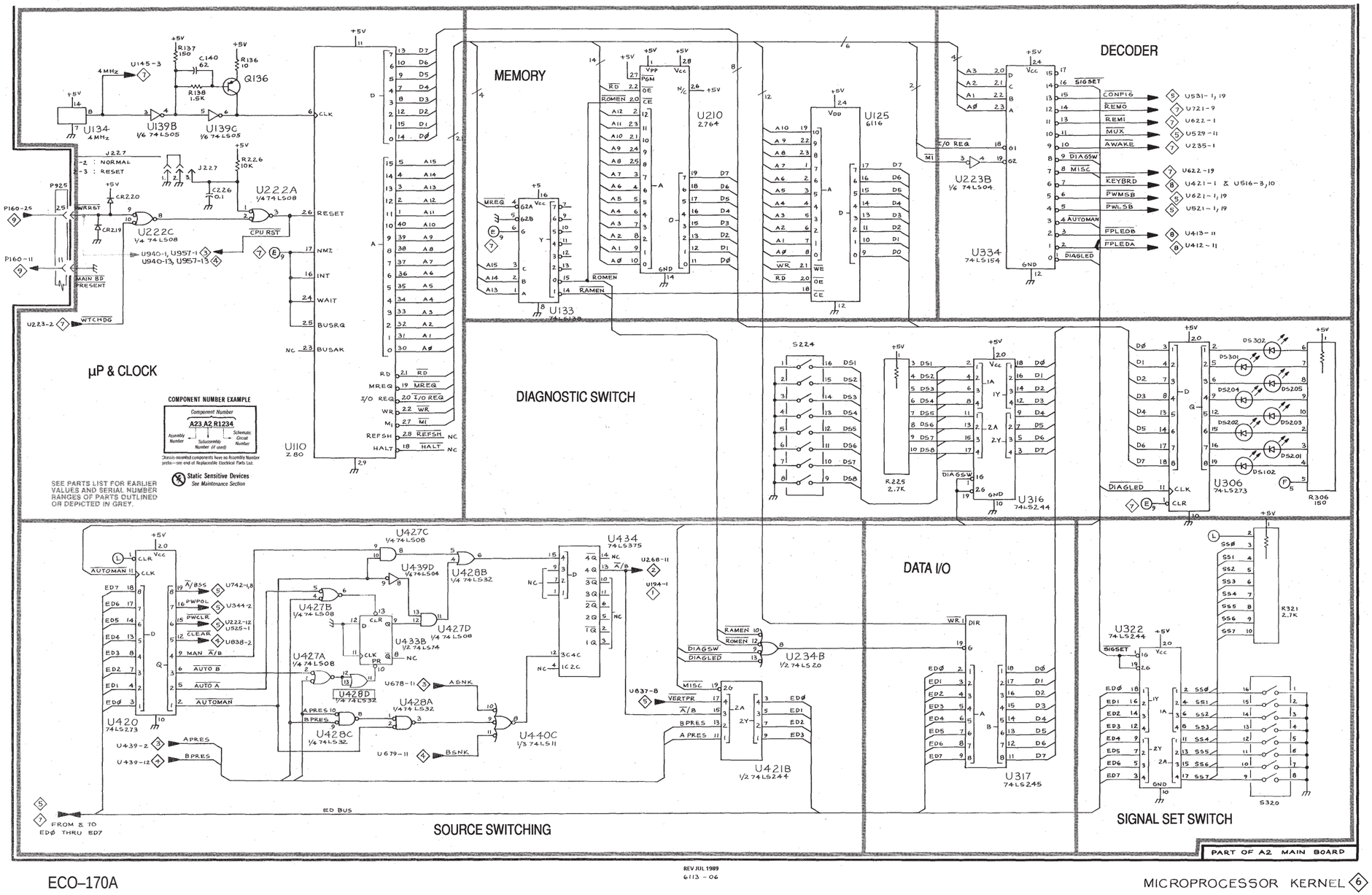
SCHEMATIC DIAGRAM LOOK-UP CHART

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

Circuit Number	Diagram Location
ASSEMBLY A2	
C140	B1
C226	B1
CR219	A2
CR220	A2
DS102	H3
DS201	H3
DS202	H3
DS203	H3
DS204	H3
DS205	H3
DS301	H3
DS302	H2
J227	B1
Q136	B1
R136	B1
R137	A1
R138	B1
R225	F3
R226	B1
R306	H3
R321	H4
S224	E3
S320	H5
U110	B3
U125	F1
U133	D2
U134	A1
U139B	A1
U139C	B1
U210	E1
U222A	B2
U222C	A2
U223B	F1
U234B	E4
U306	H3
U316	G3
U317	F5
U322	G4
U334	F2
U420	A5
U421B	E5
U427A	B4
U427B	B4
U427C	C4
U427D	C4
U428A	C5
U428B	C4
U428C	B5
U428D *	B4
U433B	C4
U434	D4
U439D	C4
U440C	C5

*See Parts List for serial number ranges.

Figure 7-9: Schematic 6 Look–up Chart



REV JUL 1989
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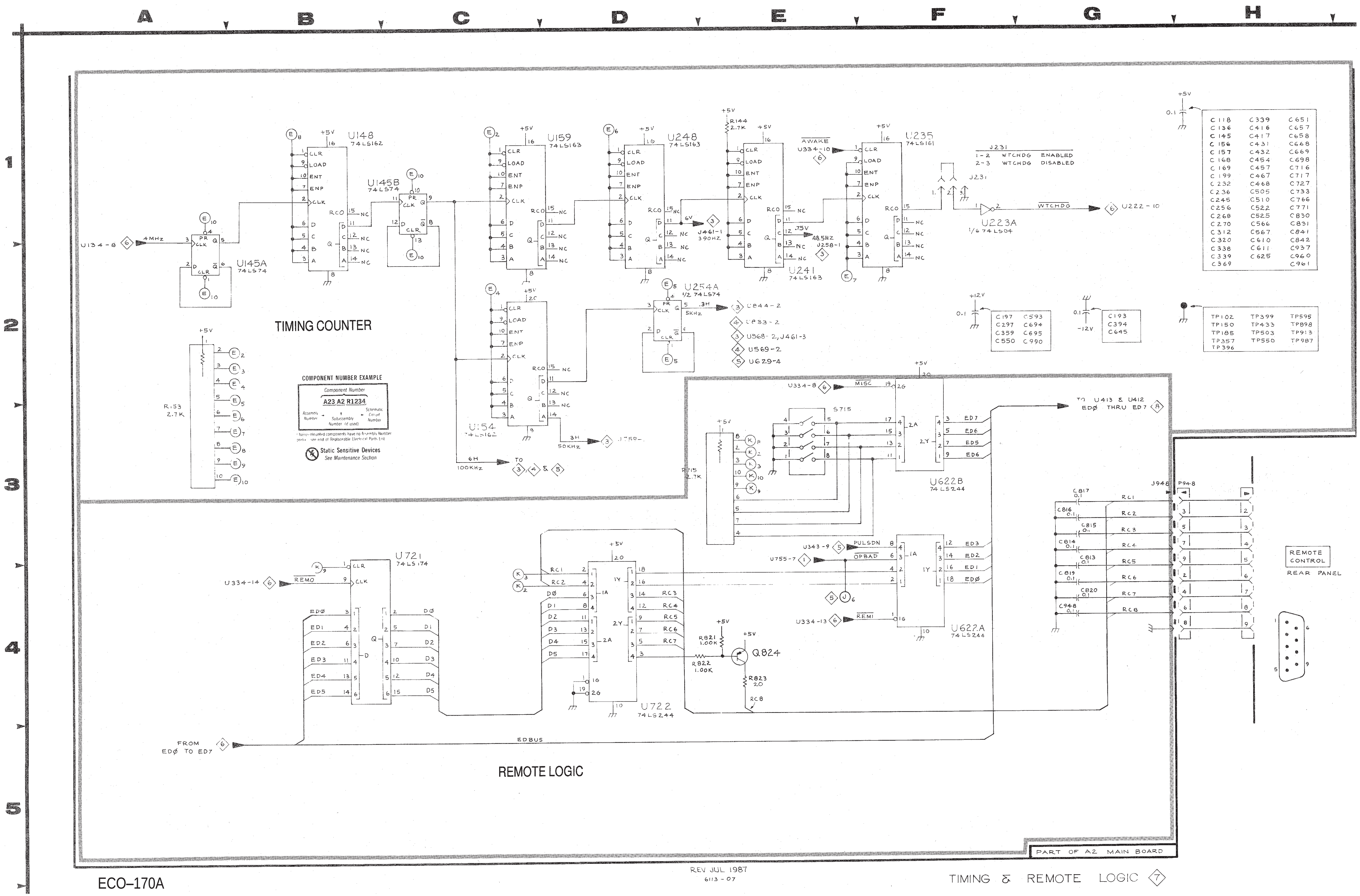
MICROPROCESSOR KERNEL 6

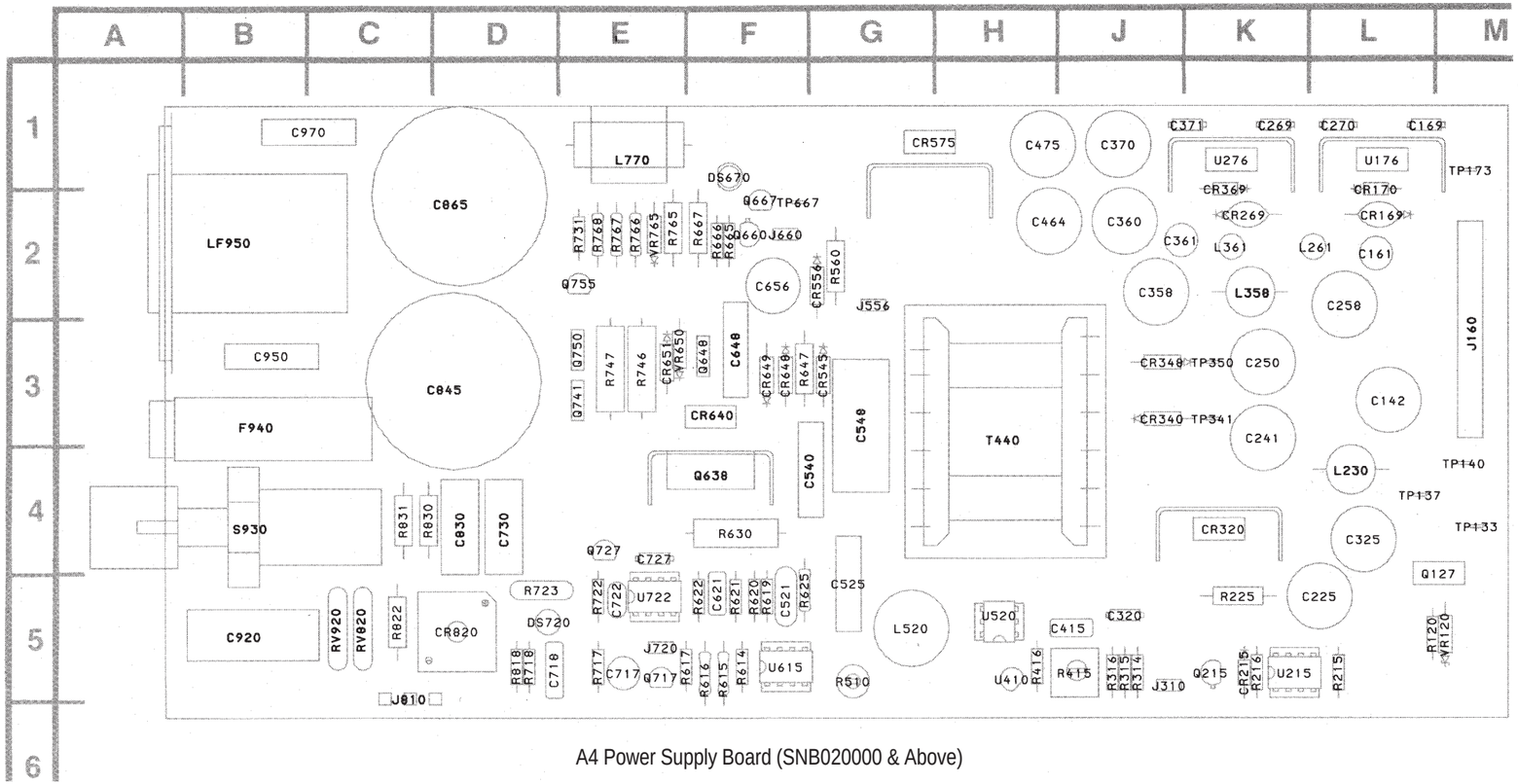
DIAGRAM 7
SCHEMATIC DIAGRAM LOOK-UP CHART

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

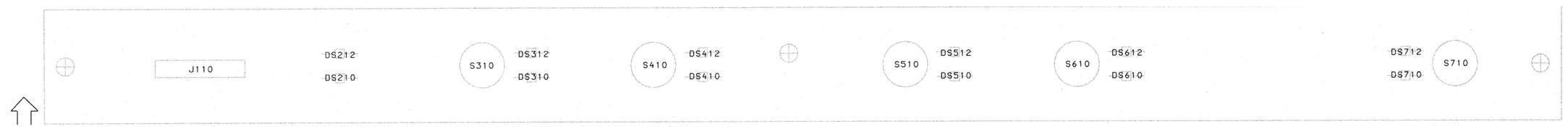
Circuit Number	Schematic Diagram Location
Assembly A2	
C118	H1
C136	H1
C145	H1
C156	H1
C157	H1
C168	H1
C169	H1
C193	G2
C199	H1
C232	H1
C236	H1
C245	H1
C256	H1
C268	H1
C270	H1
C296	F2
C312	H1
C320	H1
C338	H1
C339	H1
C369	H1
C394	G2
C395	G2
C399	H1
C416	H1
C417	H1
C431	H1
C432	H1
C454	H1
C457	H1
C467	H1
C468	H1
C505	H1
C510	H1
C522	H1
C525	H1
C550	F2
C566	H1
C567	H1
C610	H1
C611	H1
C625	H1
C645	G2
C651	H1
C657	H1
C658	H1
C668	H1
C669	H1
C694	G2
C695	G2
C698	H1
C716	H1
C717	H1
C727	H1
C733	H1
C766	H1
C771	H1
C813	G4
C814	G4
C815	G4
C816	G3
C817	G3
C819	G3
C820	G3
C830	H1
C831	H1
C841	H1
C842	H1
C937	H1
C948	G4
C960	H1
C961	H1
C990	G2
J231	F1
J948	G3
Q824	E4
R144	E1
R153	A3
R715	E3
R822	E4
R823	E4
S715	E3
TP102	H2
TP150	H2
TP185	H2
TP357	H2
TP396	H2
TP433	H2
TP503	H2
TP550	H2
TP595	H2
TP898	H2
TP913	H2
TP987	H2
U145A	A2
U145B	C1
U148	B1
U154	C3
U159	D1
U223A	F1
U235	F1
U241	E2
U248	D1
U254A	D2
U622	F4
U721	B4
U722	D4

Figure 7-10: Schematic 7 Look–up Chart


TIMING COUNTER
REMOTE LOGIC
COMPONENT NUMBER EXAMPLE
A23 A2 R1234
Static Sensitive Devices
See Maintenance Section
PART OF A2 MAIN BOARD
REMOTE CONTROL
REAR PANEL
ECO–170A
REV JUL 1987
TIMING & REMOTE LOGIC 7



A4 Power Supply Board (SNB020000 & Above)



A1 Front Panel Board

Circuit Numbering Sequence

Static Sensitive Devices
See Maintenance Section

DIAGRAM 8

SCHEMATIC DIAGRAM LOOK-UP CHART

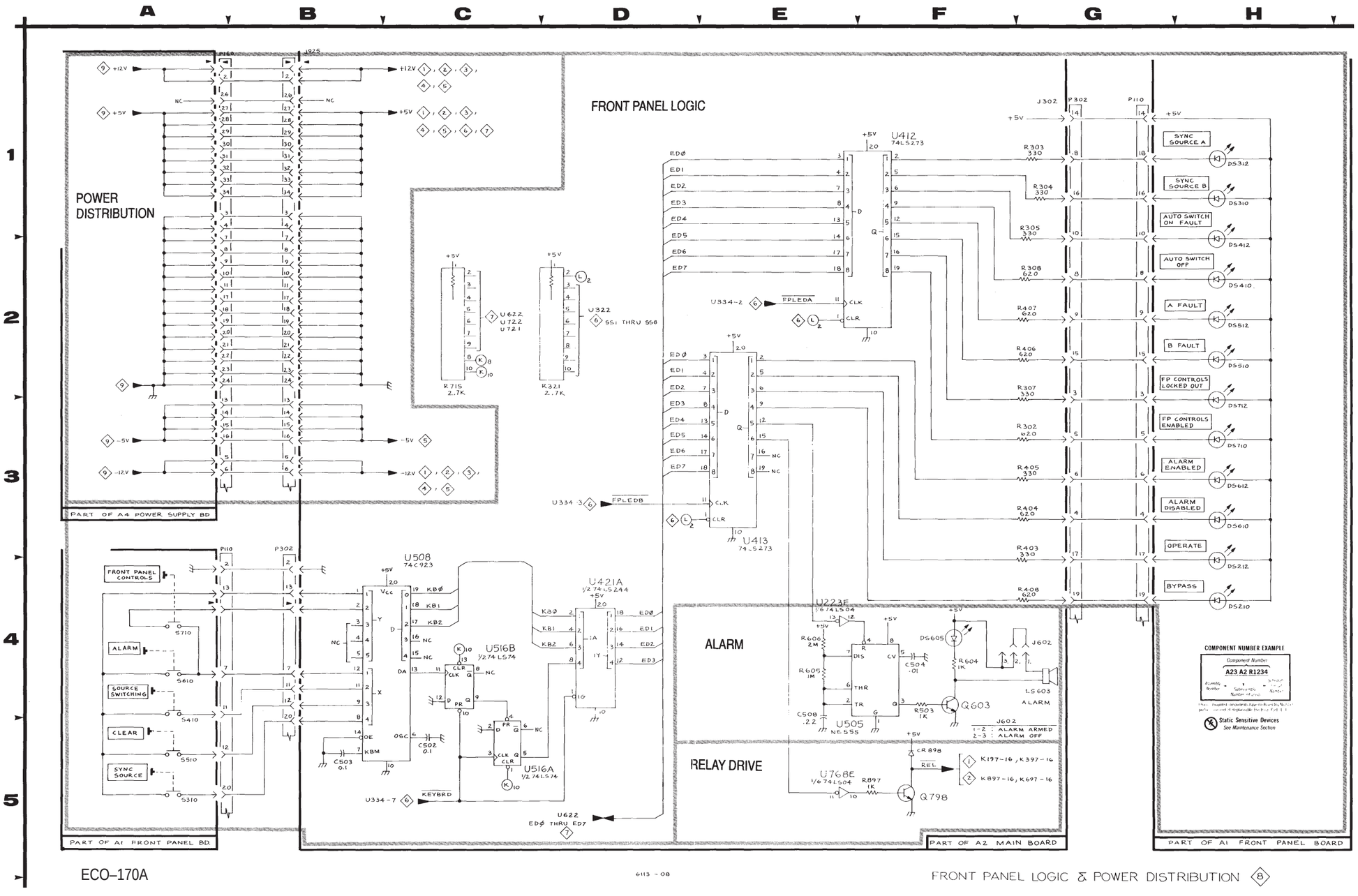
The schematic diagram has an alpha-numeric grid to assist in locating parts within that diagram. The etched circuit boards follow a numbering sequence starting with the lowest number at the upper left corner, as pictured in this manual.

Circuit Number	Schematic Diagram Location
Assembly A1	
DS210	H4
DS212	H3
DS310	H1
DS312	H1
DS410	H2
DS412	H1
DS510	H2
DS512	H2
DS610	H3
DS612	H3
DS710	H3
DS712	H3
J110	A3
J110	G1
S310	A5
S410	A4
S510	A4
S610	A4
S710	A3

Circuit Number	Schematic Diagram Location
Assembly A2	
C502	C4
C503	B4
C504	F4
C508	E4
CR898	F5
DS605	F4
J302	B3
J302	G1
J602	G4
J925	B1
LS603	G4
Q603	F4
Q798	F5
R302	G3
R303	G1
R304	G1
R305	G1

Circuit Number	Schematic Diagram Location
R307	G2
R308	G2
R403	G3
R404	G3
R405	G3
R406	G2
R407	G2
R408	G4
R503	F4
R604	F4
R605	E4
R606	E4
R897	F5
R898	F5
U223F	E4
U412	F1
U413	E3
U421A	D4
U505	F4
U508	C3
U516A	C5
U516B	C4
U768E	E5

Figure 7-11: A1 Front Panel Board, A4 Power Supply Board and Schematic 8 Look–up Chart (SNB020000 & Above)



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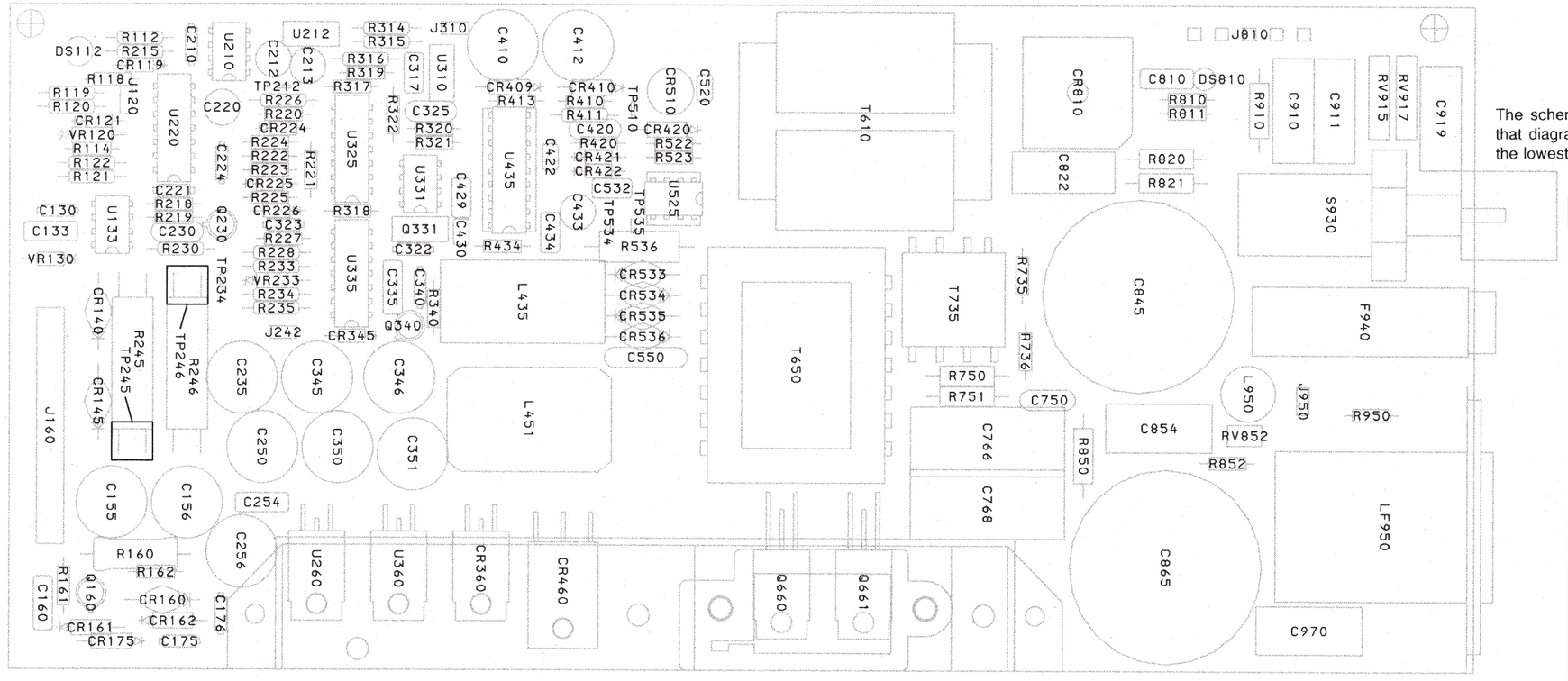
FRONT PANEL LOGIC & POWER DISTRIBUTION 8



Static Sensitive Devices
See Maintenance Section

A4 Power Supply Board (SNB019999 & Below)
REV JUL 1989

SCHEMATIC 9
(SN B020000 AND ABOVE)
LOOK-UP CHART

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

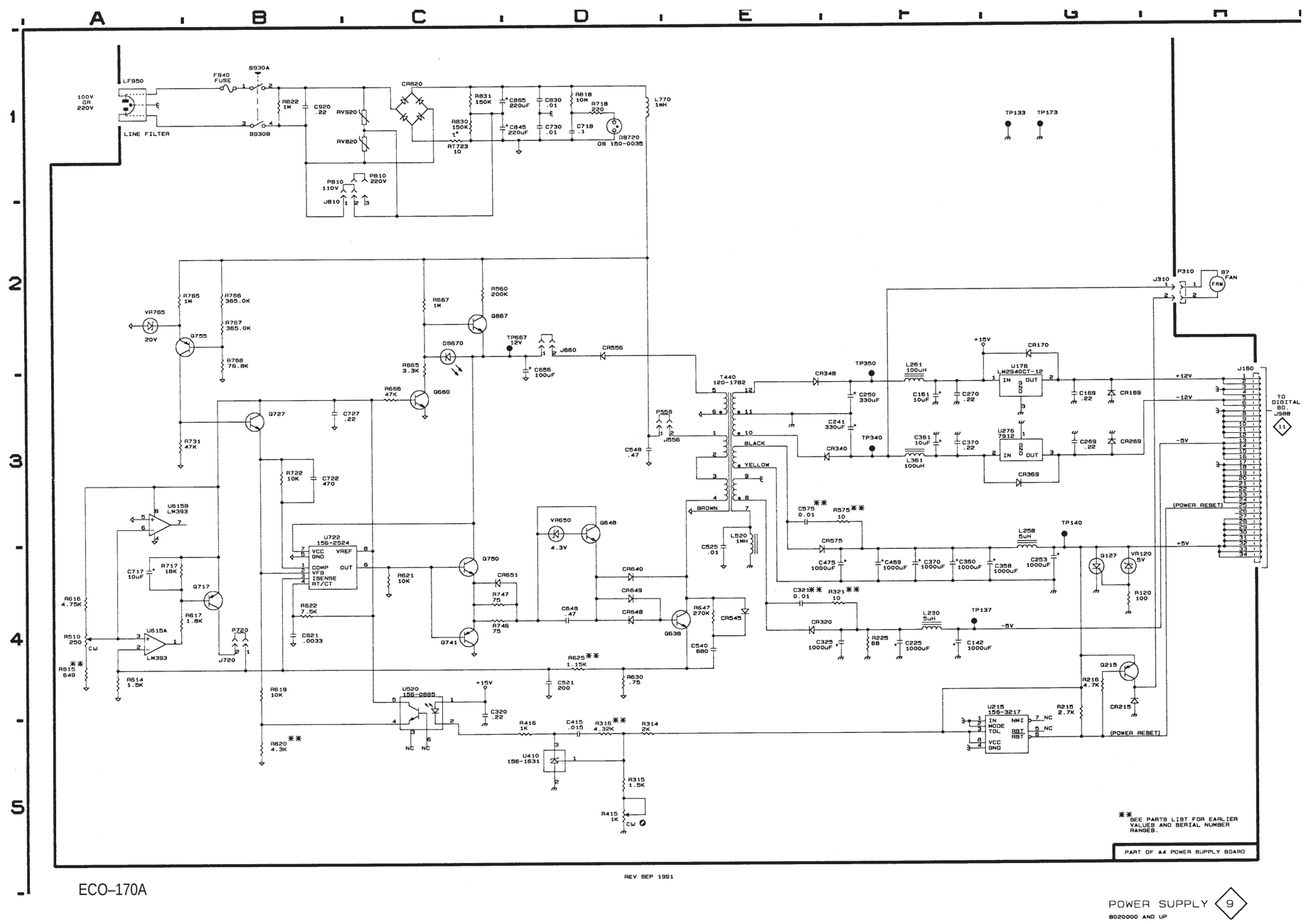
Circuit Number	Diagram Location
ASSEMBLY A4	
B2	H2
C142	F4
C161	F3
C169	G3
C225	F4
C241	F3
C250	F3
C253	G3
C269	G3
C270	F3
C320	C4
C321 *	E4
C325	F4
C358	G4
C360	F4
C361	F3
C370	F4
C415	D5
C469	F4
C475	F4
C521	D4
C525	E3
C540	E4
C548	D3
C575 *	E4
C621	B4
C648	D4
C656	D2
C717	A4
C719	D1
C722	B3
C727	B3
C730	D1
C830	D1
C845	D1
C865	D1
C920	B1
CR169	G3
CR170	G2
CR215	H4
CR268	G3
CR320	E4
CR340	F3
CR348	E3
CR369	G3
CR545	E4
CR556	D2
CR575	E3
CR640	D
CR648	D4
CR649	D4
CR651	C4
CR820	C1
DS670	C2
DS720	D1
F940	B1
J160	H3

Circuit Number	Diagram Location
J310	H2
J556	E3
J660	D2
J720	B4
J810	C1
L230	G4
L258	G3
L261	F3
L361	F3
L520	E3
L770	D1
LF950	A1
P310	H2
P556	E3
P810	C1
P720	B4
Q127	G4
Q215	G4
Q638	E4
Q648	D3
Q660	C3
Q667	C2
Q717	B4
Q727	B3
Q741	C4
Q750	C4
Q755	B2
R120	G4
R215	G4
R216	G4
R225	F4
R314	D5
R315	D5
R316	D5
R321 *	E4
R415	D5
R416	D5
R510	A4
R560	C2
R575 *	E4
R613	B4
R614	A4
R615	A4
R616	A4
R617	B4
R620	B5
R621	C4
R622	B4
R625	D4
R630	D4
R647	E4
R665	C3
R666	C3
R667	C2
R717	A4
R718	D1
R722	B3
R731	A3
R746	C4

Circuit Number	Diagram Location
R747	C4
R765	A2
R766	B2
R767	B2
R768	B2
R819	D1
R822	B1
R830	C1
R831	C1
RT723	C1
RV820	C1
RV920	C1
S930A	B1
S930B	B1
T440	E3
TP133	G1
TP137	F4
TP140	G3
TP173	G1
TP340	F3
TP350	F3
TP667	D2
U176	G3
U215	G4
U276	G3
U410	D5
U520	C4
U615A	A4
U615B	A3
U722	B4
VR120	G4
VR650	D3
VR765	A2

*See Parts List for serial number ranges.

Figure 7-12: A4 Power Supply Board and Schematic 9 Look–up Chart (SNB019999 & Below)


LF950
100V OR 220V
LINE FILTER
F940 FUSE
S930A
S930B
C920 .22
R822 1M
RV920
RV820
CR820
R831 150K
R830 150K
C865 220UF
C845 220UF
C830 .01
C730 .01
R818 10M
R718 330
C718 .1
DB720 DB 150-0035
R7723 10
L770 1MH
P810 110V
P810 220V
J810
TP133
TP173
P310
J310
B7 FAN
R765 1M
R766 365.0K
R767 365.0K
R768 76.8K
VR765 20V
Q755
R667 1M
R560 200K
Q667
DS670
TP667 12V
J660
C655 100UF
CR556
R665 3.3K
R666 47K
Q660
T440 120-1782
CR348
TP350
L261 100UH
C161 10UF
C270 .22
C250 330UF
C241 330UF
TP340
CR340
L361 100UH
C351 10UF
C370 .22
CR170
U176 LM2940CT-12
C169 .22
CR169
U276 7912
C269 .22
CR269
CR369
+15V
+12V
-12V
-5V
J160
TO DIGITAL BD. J888
P556
J556
C548 .47
BLACK
YELLOW
BROWN
Q727
C727 .22
R731 47K
R722 10K
C722 470
U6158 LM393
C717 10UF
R717 18K
Q717
R616 4.75K
R617 1.8K
R510 250
CW
U615A LM393
R615 649
R614 1.5K
P720
J720
U722 156-2524
VCC GND VREF
COMP VFB ISENSE RT/CT OUT
R621 10K
R622 7.5K
C621 .0033
Q750
Q741
CR651
R747 75
R746 75
VR650 4.3V
Q648
CR640
CR649
CR648
C648 .47
Q638
R647 270K
CR545
C540 680
R619 10K
R620 4.3K
U520 156-0885
NC NC
C320 .22
R625 1.15K
C521 200
R630 .75
R416 1K
C415 .015
R315 4.32K
R314 2K
U410 156-1631
R315 1.5K
R415 1K
CW
C575 0.01
R575 10
CR575
C475 1000UF
C469 1000UF
C370 1000UF
C360 1000UF
C358 1000UF
C253 1000UF
L258 5UH
TP140
Q127
VR120 5V
R120 100
C321 0.01
R321 10
CR320
C325 1000UF
R225 68
C225 1000UF
L230 5UH
TP137
C142 1000UF
Q215
R216 4.7K
CR215
R215 2.7K
U215 156-3217
IN MODE TOL VCC GND
NMI RST RST
7 NC
5 NC
(POWER REBET)
+5V
** SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES.
PART OF A4 POWER SUPPLY BOARD
REV SEP 1991
ECO–170A
POWER SUPPLY 9
B020000 AND UP

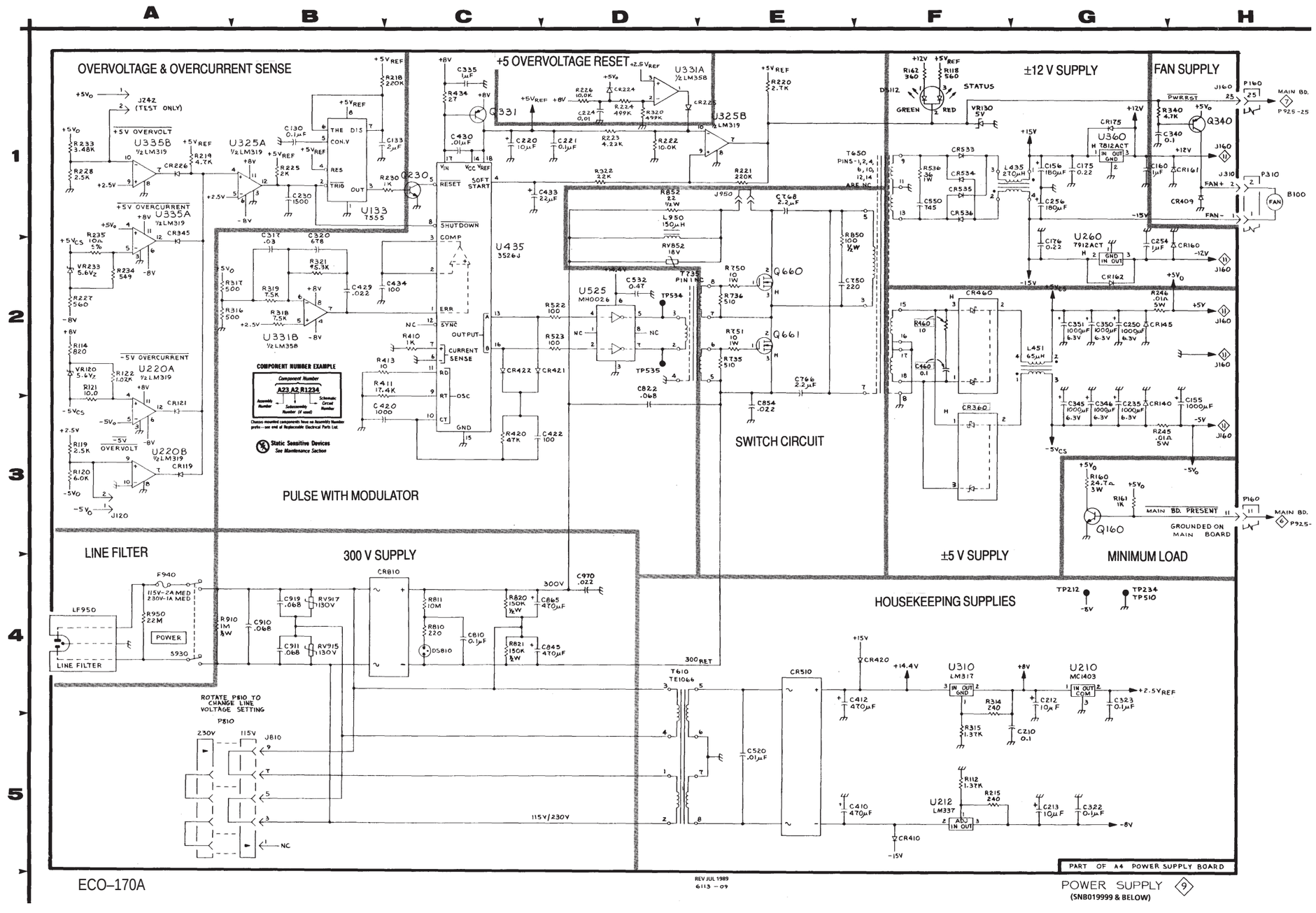
SCHEMATIC 9
(SN B019999 AND BELOW)
LOOK-UP CHART

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

Circuit Number	Diagram Location
ASSEMBLY A4	
C130	B1
C133	C1
C155	H2
C156	G1
C160	G1
C175	G1
C176	G1
C210	G5
C212	G4
C213	G5
C220	C1
C221	D1
C224	D1
C230	B1
C235	G2
C250	G2
C254	G1
C256	G1
C317	B1
C320	B1
C322	G5
C323	G4
C335	C1
C340	H1
C345	G2
C346	G2
C350	G2
C351	G2
C410	E5
C412	E4
C420	B3
C422	D3
C429	B2
C430	C1
C433	C1
C434	C2
C460 *	F3
C520	E5
C532	D2
C550	F1
C750	E2
C766	E2
C768	E1
C810	C4
C822	D2
C845	D4
C854	E2
C865	D4
C910	B4
C911	B4
C919	B4
C970	D4
CR119	A3
CR121	A3
CR140	G2
CR145	G2
CR160	H1
CR161	H1
CR162	G2
CR175	G1
CR224	D1
CR226	A1
CR345	A1
CR360 *	F3
CR409	H1
CR410	F5
CR420	F4
CR421	D2
CR422	C2
CR460	F2
CR510	E4
CR533	F1
CR534	F1
CR535	F1
CR536	F1
CR810	C4
DS112	F1
DS810	C4
F940	A4
J120	A3
J160	H1
J242	A1
J310	H1
J810	B5
J950	E1
L435	G1
L451	G2
L950	D1
LF950	A4
P160	H3
P810	A5
Q160	G3
Q230	C1
Q331	C1
Q340	H1
Q660	E2
Q661	E2
R112	F5
R114	A2
R118	F1
R119	A3
R120	A3
R121	A2
R122	A2
R123	A3
R160	G3
R161	G3
R162	F1
R215	F5
R218	C1
R219	A1
R220	E1
R221	E1
R222	D1
R223	D1
R224	D1
R225	B1
R226	D1
R227	A2
R228	A1
R230	C1
R233	A1
R234	A2
R235	A1
R236	A1
R245	G3
R246	G2
R314	F4
R315	F5
R316	A2
R317	A2
R318	B2
R319	B2
R320	D1
R321	B2
R322	D1
R340	H1
R410	C2
R411	B2
R413	B2
R420	C3
R434	C1
R460 *	F3
R522	D2
R523	D2
R536	F1
R735	E2
R736	E2
R750	E2
R751	E2
R810	C4
R811	C4
R820	C4
R821	C4
R850	E1
R852	D1
R910	A4
R950	A4
RV852	D2
RV915	B4
RV917	B4
S930	A4
T610	D4
T650	F1
T735	D2
TP212	G4
TP234	G4
TP245	H3
TP246	H2
TP510	G4
TP534	D2
TP535	D2
U133	B1
U210	G4
U212	F5
U220B	A3
U260	G1
U310	F4
U325A	B1
U325B	E1
U331A	D1
U331B	B2
U335A	A1
U335B	A1
U360	G1
U435	C2
U525	D2
VR120	A2
VR130	F1
VR233	A2

*See Parts List for serial number ranges.

Figure 7-13: A4 Power Supply Board and Schematic 9 Look–up Chart (SNB019999 & Below)


OVERVOLTAGE & OVERCURRENT SENSE
+5 OVERVOLTAGE RESET
±12 V SUPPLY
FAN SUPPLY
STATUS
PULSE WIDTH MODULATOR
SWITCH CIRCUIT
±5 V SUPPLY
MINIMUM LOAD
LINE FILTER
300 V SUPPLY
HOUSEKEEPING SUPPLIES
ROTATE P810 TO CHANGE LINE VOLTAGE SETTING
COMPONENT NUMBER EXAMPLE
Static Sensitive Devices
See Maintenance Section
PART OF A4 POWER SUPPLY BOARD
ECO–170A
REV JUL 1989
6113 – 09
POWER SUPPLY
(SNB019999 & BELOW)

Section 8
Replaceable Mechanical Parts

This section contains a list of the components that are replaceable for the ECO–170A. Use this list to identify and order replacement parts. There is a separate Replaceable Mechanical Parts list for each instrument.

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. Therefore, when ordering parts, it is important to include the following information in your order.

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

If 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.

Using the Replaceable Mechanical Parts List

The tabular information in the Replaceable Mechanical Parts list is arranged for quick retrieval. Understanding the structure and features of the list will help you find all of the information you need for ordering replaceable parts.

Cross Index–Mfr. Code Number to Manufacturer

The Mfg. Code Number to Manufacturer Cross Index for the mechanical parts list is located immediately after this page. The cross index provides codes, names, and addresses of manufacturers of components listed in the mechanical parts list.

Abbreviations

Abbreviations conform to American National Standards Institute (ANSI) standard Y1.1.

Chassis Parts

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

Column Descriptions

Figure & Index No. (Column 1)

Items in this section are referenced by figure and index numbers to the illustrations.

Tektronix Part No. (Column 2)

Indicates part number to be used when ordering replacement part from Tektronix.

Serial No. (Column 3 and 4)

Column three (3) indicates the serial number at which the part was first used. Column four (4) indicates the serial number at which the part was removed. No serial number entered indicates part is good for all serial numbers.

Qty (Column 5)

This indicates the quantity of mechanical parts used.

Name and Description (Column 6)

An item name is separated from the description by a colon (:). Because of space limitations, an item name may sometimes appear as incomplete. Use the U.S. Federal Catalog handbook H6-1 for further item name identification.

Following is an example of the indentation system used to indicate relationship.

```
1  2  3  4  5        Name & Description
Assembly and/or Component
Mounting parts for Assembly and/or Component
*MOUNTING PARTS*/*END MOUNTING PARTS*
    Detail Part of Assembly and/or Component
    Mounting parts for Detail Part
    *MOUNTING PARTS*/*END MOUNTING PARTS*
        Parts of Detail Part
        Mounting parts for Parts of Detail Part
        *MOUNTING PARTS*/*END MOUNTING PARTS*
```

Mounting 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. **Mounting parts must be purchased separately, unless otherwise specified.**

Mfr. Code (Column 7)

Indicates the code number of the actual manufacturer of the part. (Code to name and address cross reference can be found immediately after this page.)

Mfr. Part Number (Column 8)

Indicates actual manufacturer's part number.

CROSS INDEX – MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code.	Manufacturer	Address	City, State, Zip Code
00779	AMP INC	2800 FULLING MILL PO BOX 3608	HARRISBURG PA 17105
01536	TEXTRON INC CAMCAR DIV SEMS PRODUCTS UNIT	1818 CHRISTINA ST	ROCKFORD IL 61108
04729	UNICORP	291 CLEVELAND ST	ORANGE NJ 07050–2817
06666	GENERAL DEVICES CO INC	1410 S POST RD PO BOX 39100	INDIANAPOLIS IN 46239–9632
06915	RICHCO PLASTIC CO	5825 N TRIPP AVE	CHICAGO IL 60646–6013
09422	PLASTIC STAMPING CORP	2216 W ARMITAGE AVE	CHICAGO IL 60647–4461
09922	BURNDY CORP	RICHARDS AVE	NORWALK CT 06852
12327	FREEWAY CORP	9301 ALLEN DR	CLEVELAND OH 44125–4632
18565	CHOMERICS INC	77 DRAGON COURT	WOBURN MA 01801–1039
55285	BERGQUIST CO INC THE	5300 EDINA INDUSTRIAL BLVD	MINNEAPOLIS MN 55435–3707
71468	ITT CANNON COMERCIAL COMPONENTS DIV (CCD)	1851 E DEERE AVE	SANTA ANA CA 92705
72228	AMCA INTERNATIONAL CORP CONTINENTAL SCREW CO DIV	459 MT PLEASANT	NEW BEDFORD MA 02742
73743	FISCHER SPECIAL MFG CO	111 INDUSTRIAL RD	COLD SPRING KY 41076–9749
77900	ILLINOIS TOOL WORKS SHAKEPROOF DIV	ST CHARLES RD	ELGIN IL 60120
78189	ILLINOIS TOOL WORKS INC SHAKEPROOF DIV	ST CHARLES ROAD	ELGIN IL 60120
79136	WALDES KOHINOOR INC	47–16 AUSTEL PLACE	LONG ISLAND CITY NY 11101–4402
79963	ZIERICK MFG CO	RADIO CIRCLE	MT KISCO NY 10549
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077–0001
83486	ELCO INDUSTRIES INC	1101 SAMUELSON RD	ROCKFORD IL 61101
86928	SEASTROM MFG CO INC	701 SONORA AVE	GLENDALE CA 91201–2431
93907	TEXTRON INC CAMCAR DIV	600 18TH AVE	ROCKFORD IL 61108–5181
95987	BRADY/WECKESSER MFG CO	4444 WEST IRVING PARK RD	CHICAGO IL 60641
S3629	SCHURTER AG H C/O PANEL COMPONENTS CORP	2015 SECOND STREET	BERKELEY CA 94170
TK0435	LEWIS SCREW CO	4300 S RACINE AVE	CHICAGO IL 60609–3320
TK0858	STAUFFER SUPPLY CO (DIST)		
TK1148	ACACIA SALES INC (DIST)	7763 SW CIRRUS DR BLDG 26	BEAVERTON OR 97005–6452
TK1373	PATELEC–CEM (ITALY)	10156 TORINO	VAICENTALLO 62/45S ITALY
TK2165	TRIQUEST CORP		

Fig. & Index No.	Tektronix Part No.	Serial Number Effective	Serial Number Dscont	Qty	12345	Name & Description	Mfr. Code	Mfr. Part No.
1–1	200–3218–00			1		COVER,CHASSIS:TOP,ALUM	80009	200–3218–00
						MOUNTING PARTS		
–2	211–0559–00			7		SCR,MACH:6–32 X 0.375,FLH,100 DEG,STL	TK0435	1593–300
						END MOUNTING PARTS		
–3	351–0104–03			2		SL SECT,DWR EXT:12.625 L,W/O HARDWARE	06666	C–720–3
						MOUNTING PARTS		
–4	212–0158–00			8		SCR,MACH:8–32 X 0.375,PNH,STL,CDPL,T–20 TORX DR	83486	ORDER BY DESCR
						END MOUNTING PARTS		
–5	—— ——			1		PANEL,FRONT:(SEE A1 REPL)		
						MOUNTING PARTS		
–6	210–0457–00			2		NUT,PL,ASSEM WA:6–32 X 0.312,STL CD PL	78189	511–061800–00
						END MOUNTING PARTS		
–7	174–0741–00			1		CA ASSY,SP,ELEC:20,28 AWG,4.5 L,RBN	80009	174–0741–00
–8	378–0269–00			1		FILTER,AIR:	80009	378–0269–00
–9	213–0216–00			1		THUMBSCR:10–32 X 0.85,0.375 OD HD,SST	80009	213–0216–00
						MOUNTING PARTS		
–10	354–0025–00			1		RING,RETAINING:EXTERNAL,U/O 0.187 DIA SFT	79136	5555–18
						END MOUNTING PARTS		
–11	210–0894–00			1		WSHR,FLAT:0.19 ID X 0.438 OD X 0.031	09422	ORDER BY DESCR
–12						*MOUNTING PARTS*		
	196–3119–00	B010100	B020357	2		LEAD,ELECTRICAL:34 AWG,2.35 L	80009	196–3119–00
–13	211–0661–00			2		SCR,ASSEM WSHR:4–40 X 0.25,PNH,STL,CD PL,POZ,MACH	01536	821–01655–024
						END MOUNTING PARTS		
–14	426–2116–01			1		FRAME,FRONT:	80009	426–2116–01
						MOUNTING PARTS		
–15	213–0760–00			4		SCR,TPG,TF:8–32 X 0.875,SPCL TAPTITE,FILH,STL	72228	ORDER BY DESCR
						END MOUNTING PARTS		
–16	—— ——			1		CKT BOARD ASSY:MAIN (SEE A2 REPL)		
						MOUNTING PARTS		
–17	211–0661–00			9		SCR,ASSEM WSHR:4–40 X 0.25,PNH,STL,CD PL,POZ,MACH	01536	821–01655–024
–18	129–1115–00			1		SPACER,POST:1.218 L,4–40 EXT,6–32 INT,AL	04729	1458M09F09632144
						END MOUNTING PARTS		
						CKT BOARD ASSY INCLUDES:		
–19	131–0993–02			2		BUS,CONDUCTOR:SHUNT ASSEMBLY,RED	00779	1–850100–O
	131–0993–05			18		BUS,CONDUCTOR:SHUNT ASSEMBLY,GRN	00779	850100–5
–20	136–0755–00			1		SKT,DIP:	09922	DILB28P–108
–21	136–0757–00			1		SKT,DIP:	09922	DILB40P–108
–22	136–0751–00			1		SKT,DIP:	09922	DILB24P108
	136–0727–00			1		SKT,PL–IN ELEK:MICROCKT,8 CONTACT	09922	DILB8P–108
	136–0728–00	B010100	B010119	7		SKT,PL–IN ELEK:MICROCKT,14 CONTACT	09922	DILB14P–108
	136–0729–00	B010100	B010119	9		SKT,DIP:PCB;FEM,STR,2 X 8,16 POS,0.1 X 0.3 CTR,0.175 H X 0.130 TAIL,BECU,TIN	09922	DILB16P–108T
	136–0729–00	B010120		4		SKT,DIP:PCB;FEM,STR,2 X 8,16 POS,0.1 X 0.3 CTR,0.175 H X 0.130 TAIL,BECU,TIN	09922	DILB16P–108T
–23						*MOUNTING PARTS*		
	214–3976–00	B010100	B021279	1		HEAT SINK,RES:ALUM	80009	214–3976–00
–24	211–0246–00	B010100	B021279	12		SCR,ASSEM WSHR:4–40 X 0.625,PNH,STL,CD PL,POZ,MACH	01536	ORDER BY DESCR
–25						*END MOUNTING PARTS*		
	211–0512–00	B010100	B021279	6		SCR,MACH:6–32 X 0.5,FLH,100 DEG,STL	TK0435	ORDER BY DESCR
–26						*MOUNTING PARTS*		
	200–3389–00	B010100	B021279	1		COVER,HEAT SINK: ALUM	80009	200–3389–00
–27						*END MOUNTING PARTS*		
	211–0007–00	B010100	B021279	9		SCR,MACH:4–40 X 0.188,PNH,STL	93907	ORDER BY DESCR
–28	—— ——			2		TERM,PIN:0.25 L X 0.04 OD,BRS,SLDR PL		
–29						*MOUNTING PARTS*		

Fig. & Index No.	Tektronix Part No.	Serial Number Effective	Serial Number Dscont	Qty	12345	Name & Description	Mfr. Code	Mfr. Part No.
	337-3286-00	B010100	B019999	1		SHIELD:LV PWR SPLY	80009	337-3286-00
	337-3286-01	B020000		1		SHIELD,PWR SPLY:LOW VOLTAGE	80009	337-3286-01
-30	211-0244-00			4		SCR,ASSEM WSHR:4-40 X 0.312,PNH STL	TK0858	211-0244-00
						END MOUNTING PARTS		
-31	174-0742-00			1		CA ASSY,SP,ELEC:34,28 AWG,9.0,RBN	80009	174-0742-00
-32	——— ———			1		CKT BOARD ASSY:POWER SUPPLY(SEE A4 REPL)		
						MOUNTING PARTS		
-33	211-0661-00			6		SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,CD PL,POZ,MACH	01536	821-01655-024
-34	211-0578-00			3		SCR,MACH:6-32 X 0.438,PNH,STL	93907	ORDER BY DESCR
-35	210-0586-00			2		NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	78189	211-041800-00
-36	211-0025-00			2		SCR,MACH:4-40 X 0.375,FLH,100 DEG,STL	TK0435	ORDER BY DESCR
						END MOUNTING PARTS		
						CKT BOARD ASSY INCLUDES:		
-37	131-0157-00	B010149	B019999	1		TERM,PIN:0.25 L X 0.04 OD,BRS,SLDR PL	80009	131-0157-00
-38	136-0756-00	B010149	B019999	1		SKT,DIP:PCB;FEM,STR,2 X 9,18 POS,0.1 X 0.3 CTR,0.175 H X 0.130 TAIL,BECU,TIN	09922	DILB18P-108
-39	136-0727-00	B010149	B019999	1		SKT,PL-IN ELEK:MICROCKT,8 CONTACT	09922	DILB8P-108
-40	198-5529-00	B010149	B019999	1		WIRE SET,ELEC:	80009	198-5529-00
-41	——— ———	B010149	B019999	1		MICROCIRCUIT,DI:(SEE A4U260 REPL)		
	——— ———	B020000		1		MICROCIRCUIT,DI:(SEE A4U276 REPL)		
						MOUNTING PARTS		
-42	211-0661-00	B010149	B019999	1		SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,CD PL,POZ,MACH	01536	821-01655-024
	211-0097-00	B020000		1		SCR,MACH:4-40 X 0.312,PNH,STL	93907	ORDER BY DESCR
-43	210-1178-00			1		WSHR,SHLDR:	80009	210-1178-00
	214-2953-00	B020000		1		HEAT SINK,XSTR:TO-220,AL	80009	214-2953-00
	210-0586-00	B020000		1		NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	78189	211-041800-00
	342-0563-00	B020000		1		INSULATOR,PLATE:XSTR,FIBERGLASS REINFORCED SILICON RUBBER	18565	69-11-8805-1674
						END MOUNTING PARTS		
-44	——— ———	B020000		1		MICROCIRCUIT,DI:(SEE A4U176 REPL)		
						MOUNTING PARTS		
-45	211-0661-00	B010149	B019999	1		SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,CD PL,POZ,MACH	01536	821-01655-024
	211-0097-00	B020000		1		SCR,MACH:4-40 X 0.312,PNH,STL	93907	ORDER BY DESCR
-46	210-1178-00			1		WSHR,SHLDR:	80009	210-1178-00
	214-2953-00	B020000		1		HEAT SINK,XSTR:TO-220,AL	80009	214-2953-00
	342-0563-00	B020000		1		INSULATOR,PLATE:XSTR,FIBERGLASS REINFORCED SILICON RUBBER	18565	69-11-8805-1674
	210-0586-00	B020000		1		NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	78189	211-041800-00
						END MOUNTING PARTS		
-47	——— ———	B010149	B019999	1		SEMICOND DVC,DI:(SEE A4CR360 REPL)		
	——— ———	B020000		1		SEMICOND DVC,DI:(SEE A4CR320,A4CR575 REPL)		
						MOUNTING PARTS		
-48	211-0661-00	B010149	B019999	1		SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,CD PL,POZ,MACH	01536	821-01655-024
	211-0097-00	B020000		1		SCR,MACH:4-40 X 0.312,PNH,STL	93907	ORDER BY DESCR
-49	210-1178-00			1		WSHR,SHLDR:	80009	210-1178-00
	210-1178-00	B020000		1		WSHR,SHLDR:	80009	210-1178-00
	214-2953-00	B020000		1		HEAT SINK,XSTR:TO-220,AL	80009	214-2953-00
	342-0563-00	B020000		1		INSULATOR,PLATE:XSTR,FIBERGLASS REINFORCED SILICON RUBBER	18565	69-11-8805-1674
	210-0586-00	B020000		1		NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL (A4CR320 ONLY)	78189	211-041800-00
	214-4115-00	B020000		1		HEAT SINK:COPPER (A4CR575 ONLY)	80009	214-4115-00
						END MOUNTING PARTS		

Fig. & Index No.	Tektronix Part No.	Serial Number Effective	Serial Number Dscont	Qty	12345	Name & Description	Mfr. Code	Mfr. Part No.
-50	——— ———	B010149	B019999	1		SEMICOND DVC,DI:(SEE A4CR460 REPL)		
	——— ———	B020000		1		XSTR:(SEE A4Q638 REPL)		
						MOUNTING PARTS		
-51	211-0012-00	B010149	B019999	1		SCR,MACH:4-40 X 0.375,PNH,STL	93907	ORDER BY DESCR
	211-0097-00	B020000		1		SCR,MACH:4-40 X 0.312,PNH,STL	93907	ORDER BY DESCR
	210-1178-00	B020000		1		WSHR,SHLDR:	80009	210-1178-00
	214-2953-00	B020000		1		HEAT SINK,XSTR:TO-220,AL	80009	214-2953-00
	342-0354-00	B020000		1		INSULATOR,PLATE:XSTR	55285	7403-09FR-52
	210-0586-00	B020000		1		NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	78189	211-041800-00
						END MOUNTING PARTS		
-52	342-0354-00	B010149	B019999	1		INSULATOR,PLATE:XSTR	55285	7403-09FR-52
-53	342-0563-00	B010149	B019999	3		INSULATOR,PLATE:XSTR,FIBERGLASS REINFORCED SILICON RUBBER	18565	69-11-8805-1674
-54	200-2269-01	B010149	B019999	1		COVER,XSTR:	80009	200-2269-01
						MOUNTING PARTS		
-55	211-0513-00	B010149	B019999	2		SCR,MACH:6-32 X 0.625,PNH,STL	93907	B80-00032-003
-56	210-0273-00	B010149	B010149	1		TERM,LUG:0.196 ID,PLAIN,BRS TINNED	79963	ORDER BY DESCR
						END MOUNTING PARTS		
-57	342-0458-00	B010149	B019999	1		INSULATOR,PLATE:XSTR,MICA	86928	ORDER BY DESCR
-58	342-0449-01	B010149	B019999	1		INSULATOR,PLATE:XSTR,ALUM	80009	342-0449-01
-59	214-3797-00	B010149	B019999	1		HEAT SINK:ALUM	80009	214-3797-00
						MOUNTING PARTS		
-60	211-0661-00	B010149	B019999	2		SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,CD PL,POZ,MACH	01536	821-01655-024
						END MOUNTING PARTS		
-61	200-2264-00			1		CAP,FSHLDR:3AG FUSES	S3629	FEK 031 1666
-62	204-0906-00			1		BODY,FSHLDR:3AG & 5 X 20MM FUSES	S3629	TYPEFAU031.3573
-63	200-2735-00			1		COVER,POWER SW:BLACK,POLYCARBONATE	TK2165	ORDER BY DESCR
-64	——— ———			1		SWITCH,PUSH:(SEE A4S930 REPL)		
						MOUNTING PARTS		
-65	210-0405-00			2		NUT,PLAIN,HEX:2-56 X 0.188,BRS CD PL	73743	12157-50
-66	211-0022-00			2		SCR,MACH:2-56 X 0.188,PNH,STL	TK0435	ORDER BY DESCR
-67	210-0001-00			2		WSHR,LOCK:#2 INTL,0.013 THK,STL	77900	1202-00-00-0541C
						END MOUNTING PARTS		
-68	366-1160-00			1		PUSH BUTTON:CHARCOAL,0.523 X 0.253 X 0.43	80009	366-1160-00
-69	211-0177-00			1		SCR,MACH:4-40 X 0.312,PNH,STL	TK0435	ORDER BY DESCR
-70	175-9877-00			1		CA ASSY,SP,ELEC:10,28 AWG,12.5 L,RBN	80009	175-9877-00
						MOUNTING PARTS		
-71	131-0890-00			1		CONN,HARDWARE:	71468	D 20418-2
						END MOUNTING PARTS		
-72	——— ———			1		CKT BOARD ASSY:BNC(SEE A3 REPL)		
-73	210-0255-00			4		TERM,LUG:0.391 ID,LOCKING,BRS CD PL	12327	ORDER BY DESCR
-74	174-0939-00			4		CA ASSY SP:RBN;IDC,26,28 AWG,2.0 L,2X13,0.1 CTR,RCPT,BOTH ENDS,NON PLZ	TK1148	ORDER BY DESCR
-75	426-2115-00			1		FRAME SECTION:SIDE	80009	426-2115-00
						MOUNTING PARTS		
-76	213-0760-00			4		SCR,TPG,TF:8-32 X 0.875,SPCL TAPTITE,FILH,STL	72228	ORDER BY DESCR
-77	210-0863-00			1		WSHR,LOOP CLAMP:0.091 ID U/W 0.5 W CLP,STLCD PL	95987	C191
-78	343-0003-00			1		CLAMP,LOOP:0.25 ID,PLASTIC	06915	E4 CLEAR ROUND
						END MOUNTING PARTS		
-79						STANDARD ACCESSORIES		
	200-3314-00	B010100	B020357	1		COVER,BOTTOM:ALUM	80009	200-3314-00
	200-3314-01	B020358		1		COVER,BOTTOM:ALUM	80009	200-3314-01
-80	161-0066-00			1		CA ASSY,PWR:3,18 AWG,250V/10A,98 INCH,STR,IEC320,RCPT X NEMA 5-15P,US,SAF CONT	80009	161-0066-00

Fig. & Index No.	Tektronix Part No.	Serial Number Effective	Dscont	Qty	12345	Name & Description	Mfr. Code	Mfr. Part No.
-81	161-0066-09			1		CA ASSY,PWR:3,0.75MM SQ,250V/10A,99 INCH,STR,IEC320,RCPT,EUROPEAN,SAF CONT (EUROPEAN OPTION A1 ONLY)	80009	161-0066-09
-82	161-0066-11			1		CA ASSY,PWR:3,1.0MM SQ,250V/10A,2.5 METER,STR,IEC320,RCPT,AUSTRALIA,SAF CONT (AUSTRALIAN OPTION A3 ONLY)	80009	161-0066-11
-83	161-0066-10			1		CA ASSY,PWR: (UNITED KINGDOM OPTION A2 ONLY)	TK1373	24230
-84	351-0751-00	B010100	B020478	1		TRK,SL OUT SECT:STA & INTMD	80009	351-0751-00
	351-0751-01	B020479		1		TRK,SL OUT SECT:STA & INTMD	80009	351-0751-01
	070-6113-01			1		MNL,TECH:USERS,ECO170A	80009	070611301

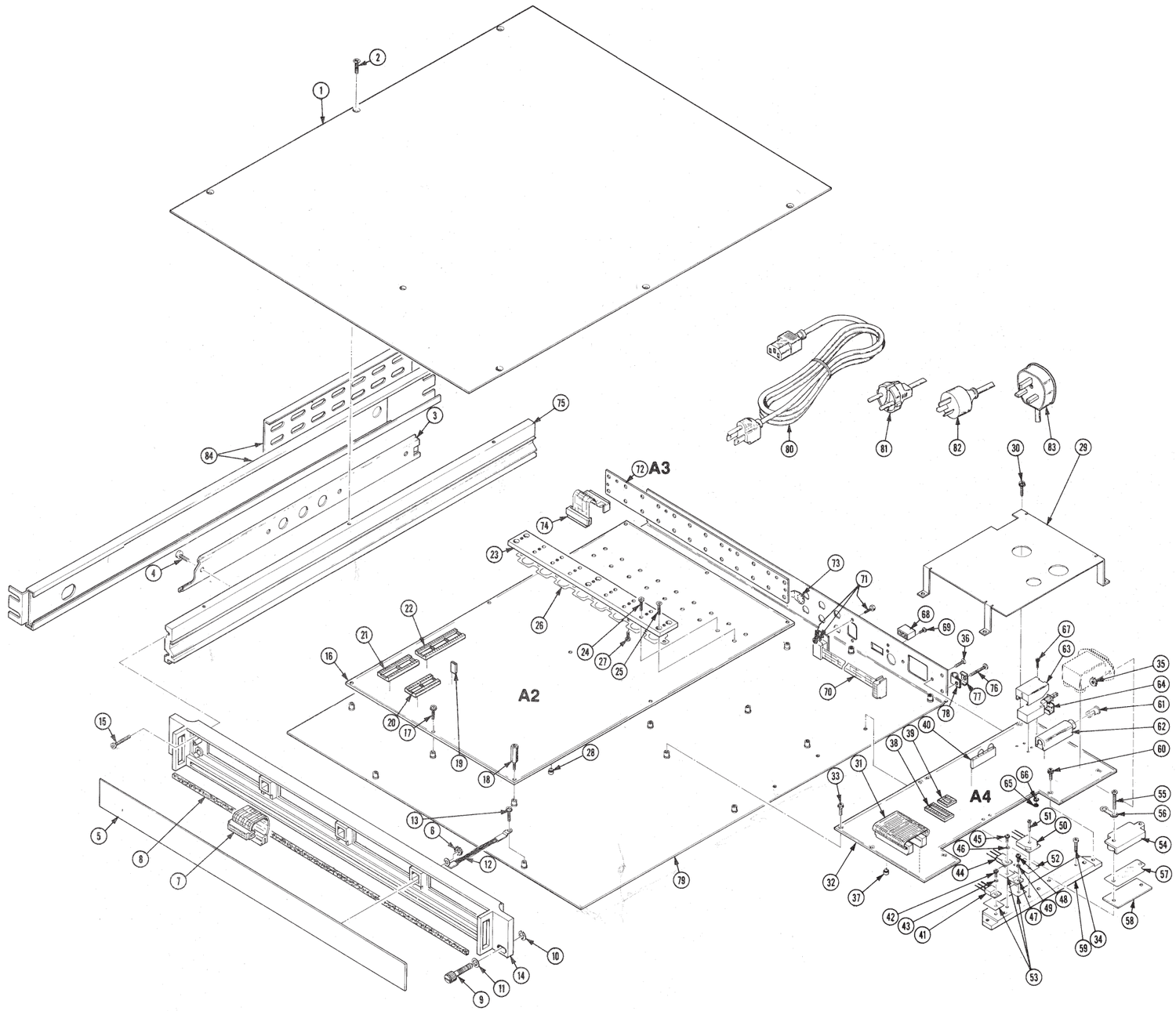


Figure 8–1: Mechanical parts exploded view

Manual Change Information

Tektronix products are constantly under development for increased performance or lower cost to the customer. Often, changes are incorporated into a product as soon as they are shown to meet the highest quality standards.

This aggressive policy of product improvement can result in changes that are not reflected in the appropriate sections of the manual. Information regarding such changes will appear on the following pages. If no change notices are inserted after this page, the manual is correct as printed.

Please review any included change information and note the changes that will affect your use of the product. A single change may apply to several sections of the manual. Because change information sheets are inserted until all the changes are incorporated into every applicable section of the manual, some duplication may result.

Tektronix
COMMITTED TO EXCELLENCE

MANUAL CHANGE INFORMATION

Group Code 20

Date: 4/13/92 Change Reference: M77237

Product: See List Manual Part No: See List

DESCRIPTION

INST	EFF S/N	MANUAL P/N	INST	EFF S/N	MANUAL P/N
ECO-170A	B021072	070-6113-01	TSG-300	B031935	070-5722-00
SPG-170A	B021642	070-5965-00	TSG-370	B010341	070-7446-00
TSG-170A	B043445	070-5680-00	TSG 371	B010850	070-7707-00
TSG-170D	B010585	070-6943-00	TSG-422	B010482	070-7022-00
SPG-271	B021832	070-6814-00	TPG-625	B010262	061-3677-00
TSG-271	B032586	070-6304-00			

ELECTRICAL PARTS LIST CHANGES

SECTION 7 REPLACEABLE ELECTRICAL PARTS LIST

CHANGE TO READ:

A4	671-0572-04	CKT BD ASSY:POWER SUPPLY
A4C142	290-1301-00	CAP,FXD,ELCTLT:2700UF,10V,20%
A4C161	290-0943-00	CAP,FXD,ELCTLT:47UF,25V,20
A4C225	290-1301-00	CAP,FXD,ELCTLT:2700UF,10V,20%
A4C241	290-1302-00	CAP,FXD,ELCTLT:1000UF,10V,20%
A4C250	290-1302-00	CAP,FXD,ELCTLT:1000UF,10V,20%
A4C258	290-1301-00	CAP,FXD,ELCTLT:2700UF,10V,20%
A4C325	290-1301-00	CAP,FXD,ELCTLT:2700UF,10V,20%
A4C358	290-1301-00	CAP,FXD,ELCTLT:2700UF,10V,20%
A4C360	290-1301-00	CAP,FXD,ELCTLT:2700UF,10V,20%
A4C361	290-0943-00	CAP,FXD,ELCTLT:47UF,25V,20%
A4C370	290-1301-00	CAP,FXD,ELCTLT:2700UF,10V,20%
A4C464	290-1301-00	CAP,FXD,ELCTLT:2700UF,10V,20%
A4C475	290-1301-00	CAP,FXD,ELCTLT:2700UF,10V,20%
A4R622	322-3248-00	RES,FXD,FILM:3.74K OHM,1.0%,0.2W
A4R768	315-0104-00	RES,FXD,FILM:100K OHM,5%,0.25W
A4U722	156-4236-00	IC,LINEAR:PWM CONTROLLER,UC3488

Tektronix
COMMITTED TO EXCELLENCE

MANUAL CHANGE INFORMATION

Group Code 20

Date: 9/14/92 Change Reference: M77236

Product: See List Manual Part No: See List

DESCRIPTION

INST	EFF S/N	MANUAL P/N	INST	EFF S/N	MANUAL P/N
ECO–170A	B021130	070–6113–01	TSG–300	B031969	070–5722–00
SPG–170A	B021686	070–5965–00	TSG–370	B010359	070–7446–00
TSG–170A	B043529	070–5680–00	TSG 371	B010894	070–7707–00
TSG–170D	B010644	070–6943–00	TSG–422	B010535	070–7022–00
SPG–271	B021938	070–6814–00	TPG625	B010277	070–7248–00
TSG–271	B032729	070–6304–00			

ELECTRICAL PARTS LIST and SCHEMATIC CHANGES

REPLACEABLE ELECTRICAL PARTS LIST

CHANGE TO READ:

A4	671–0572–05	CKT BD ASSY:POWER SUPPLY
A4C845	290–1293–00	CAP,FXD,ELCTLT:390 UF,20%,200V
A4C865	290–1293–00	CAP,FXD,ELCTLT:390 UF,20%,200V

Tektronix
COMMITTED TO EXCELLENCE

MANUAL CHANGE INFORMATION

Group Code 20

Date: 9/17/92 Change Reference: M78377

Product: ECO-170A Manual Part No: 070-6113-01

DESCRIPTION

Eff S/N: B021126

ELECTRICAL PARTS LIST and SCHEMATIC CHANGES

SECTION 6 REPLACEABLE ELECTRICAL PARTS

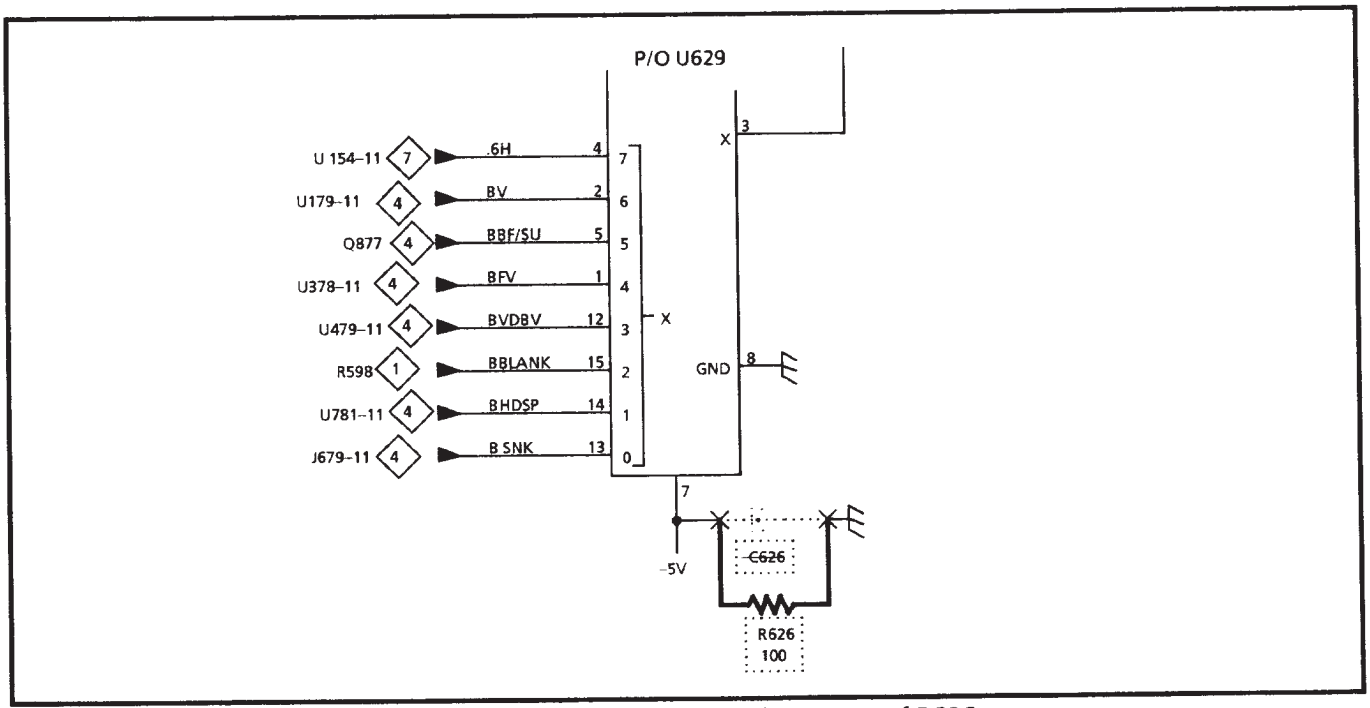
CHANGE TO READ:

A2	670-9838-09	CKT BD ASSY: MAIN BOARD

DELETE: A2C626

ADD:

A2R626	301-0101-00	RES,FXD,FILM:100 OHM,5%,0.5W



Part of Schematic 6 showing placement of R626.

Tektronix / Television Systems

MANUAL CHANGE INFORMATION

Group Code 20

Date: 11/17/92 Change Reference: M78678

Product: ECO-170A Manual Part No: 070-6113-01

DESCRIPTION

Eff S/N: B021141

TEXT, ELECTRICAL PARTS LIST and SCHEMATIC CHANGES

SECTION 1 OPERATING INSTRUCTIONS
Page 1-4, preceding Configuration

ADD THE FOLLOWING:

Fault Determination (B021141 and above)

The front panel FAULT INDICATOR shows when a fault has occurred and whether it was an A or B input, but does not show which input on what channel. Specific information, if needed, can be determined by looking at the diagnostic LEDs (see Fig. 1-5). These LEDs are located just behind the front panel at the left side of the instrument; you must remove the top cover to view them.

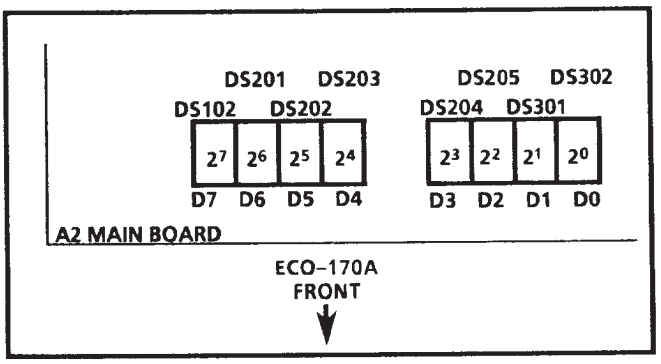


Fig. 1-5. ECO-170A Diagnostic LEDs.

These LEDs will give an indication of whether the A or B input to a specific channel failed, as shown in Table 1-2.

When a failure has occurred, the LEDs will blink at a slow rate, if the problem is still present, or at a fast rate, if the problem is no longer present. To clear the LED display, press the front panel FAULT INDICATOR CLEAR button.

Table 1-2. Channel Failure Determination

LEDs (1=on) D D D D D D D D 7 6 5 4 3 2 1 0	Failure Indication
1 1 1 1 1 1 1 1	Output Amplifier Failure
0 1 0 0 1 1 1 1	A Input Vertical Interval Failure
1 0 0 0 1 1 1 1	B Input Vertical Interval Failure
0 1 0 0 0 0 0 1	A Input Insufficient Signal Level
1 0 0 0 0 0 0 1	B Input Insufficient Signal Level
0 1 0 0 0 0 1 0	Chan 2 A IN Pulse Width Error
1 0 0 0 0 0 1 0	Chan 2 B IN Pulse Width Error
0 1 0 0 0 0 1 1	Chan 3 A IN Pulse Width Error
1 0 0 0 0 0 1 1	Chan 3 B IN Pulse Width Error
0 1 0 0 0 1 0 0	Chan 4 A IN Pulse Width Error
1 0 0 0 0 1 0 0	Chan 4 B IN Pulse Width Error
0 1 0 0 0 1 0 1	Chan 5 A IN Pulse Width Error
1 0 0 0 0 1 0 1	Chan 5 B IN Pulse Width Error
0 1 0 0 0 1 1 0	Chan 6 A IN Pulse Width Error
1 0 0 0 0 1 1 0	Chan 6 B IN Pulse Width Error
0 1 0 0 0 1 1 1	Chan 7 A IN Pulse Width Error
1 0 0 0 0 1 1 1	Chan 7 B IN Pulse Width Error
0 1 0 0 1 0 0 0	Chan 8 A IN Pulse Width Error
1 0 0 0 1 0 0 0	Chan 8 B IN Pulse Width Error

Date: 11/17/92 Group Code 20 Change Reference: M78678

Product: ECO-170A Manual Part No: 070-6113-01

SECTION 6 REPLACEABLE ELECTRICAL PARTS LIST

CHANGE TO READ:

			Shown on Schematic
A2	671-9839-10	CKT BD ASSY:MAIN BOARD	
A2L867	108-1491-00	COIL,RF:FXD,TOROIDAL,9.0 UH,5.5%	3
A2L869	108-1491-00	COIL,RF:FXD,TOROIDAL,9.0 UH,5.5%	4
A2L975	108-1491-00	COIL,RF:FXD,TOROIDAL,9.0 UH,5.5%	3
A2L977	108-1491-00	COIL,RF:FXD,TOROIDAL,9.0 UH,5.5%	4
A2R646	322-3204-00	RES,FXD,FILM:1.3K OHM,1%,0.2W	2
A2U210	160-4339-04	MICROCKT ,DGTL:NMOS,8192 X 8 EPROM,PRGM 2764A-25	6

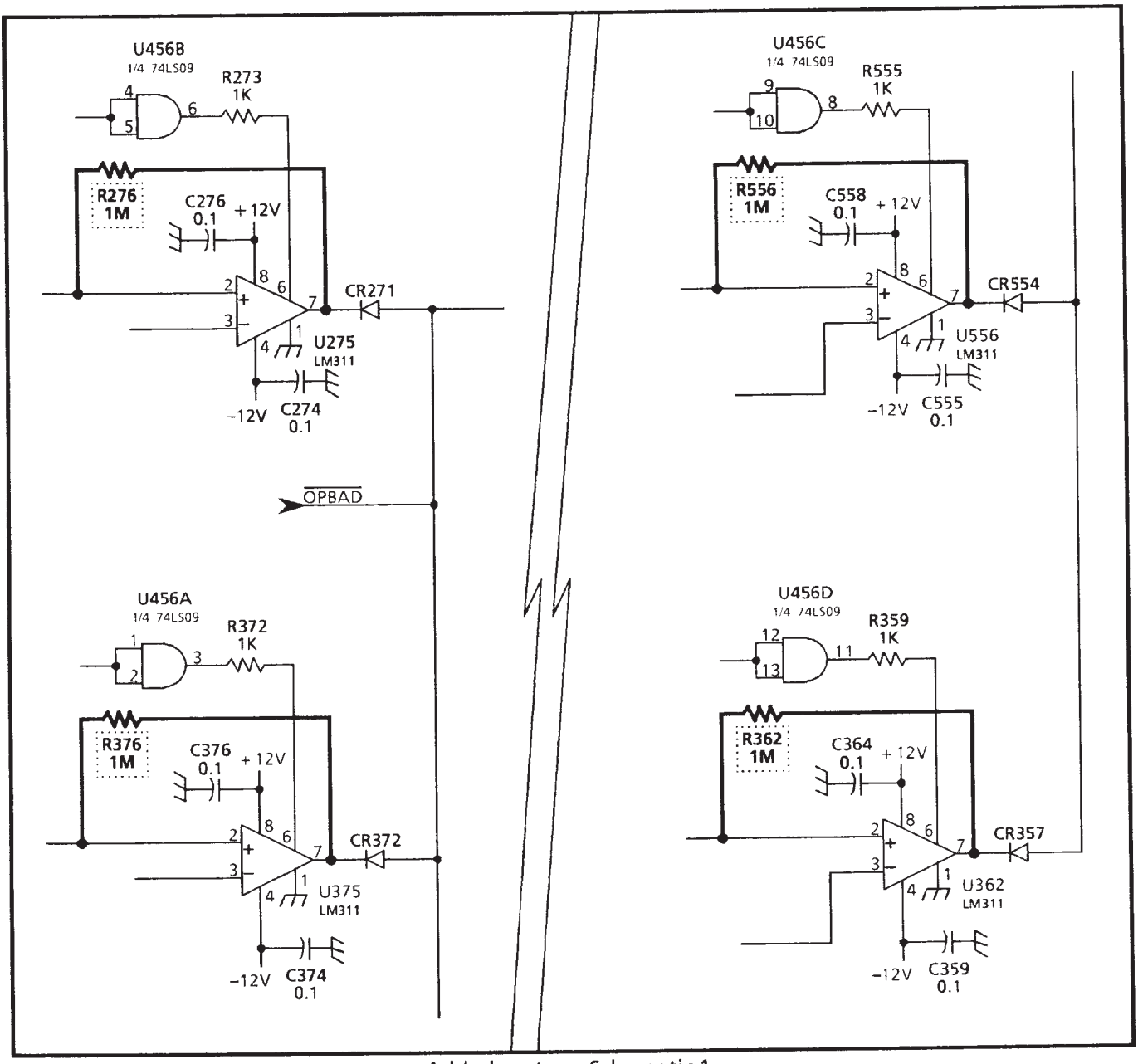
ADD:

A2C278	283-0111-00	CAP,FXD,CER DI:0.1 UF, 20%,50V
A2C781	283-0111-00	CAP,FXD,CER DI:0.1 UF, 20%,50V
A2R276	322-3481-00	RES,FXD,FILM:1M OHM,1%,0.2W
A2R362	322-3481-00	RES,FXD,FILM:1M OHM,1%,0.2W
A2R376	322-3481-00	RES,FXD,FILM:1M OHM,1%,0.2W
A2R556	322-3481-00	RES,FXD,FILM:1M OHM,1%,0.2W
A2R557	322-3481-00	RES,FXD,FILM:1M OHM,1%,0.2W
A2R749	322-3481-00	RES,FXD,FILM:1M OHM,1%,0.2W
A2R764	322-3481-00	RES,FXD,FILM:1M OHM,1%,0.2W
A2R857	322-3481-00	RES,FXD,FILM:1M OHM,1%,0.2W
A2R858	322-3481-00	RES,FXD,FILM:1M OHM,1%,0.2W
A2R947	322-3481-00	RES,FXD,FILM:1M OHM,1%,0.2W
A2R963	322-3481-00	RES,FXD,FILM:1M OHM,1%,0.2W
A2R964	322-3481-00	RES,FXD,FILM:1M OHM,1%,0.2W

Added parts are shown in the following partial schematics:

Date: 11/17/92 Group Code 20 Change Reference: M78678

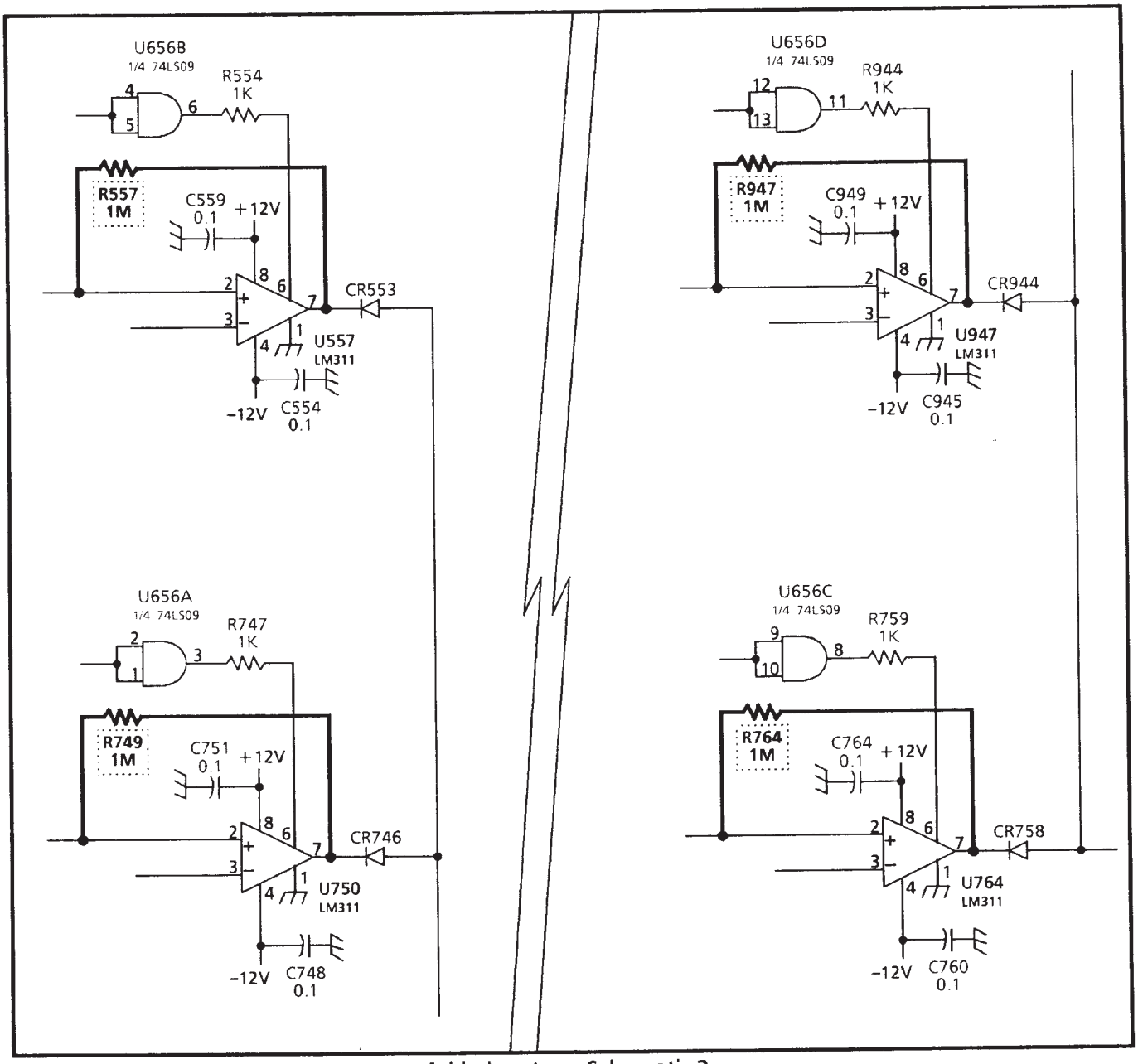
Product: ECO-170A Manual Part No: 070-6113-01



Added parts on Schematic 1.

Date: 11/17/92 **Group Code 20** Change Reference: M78678

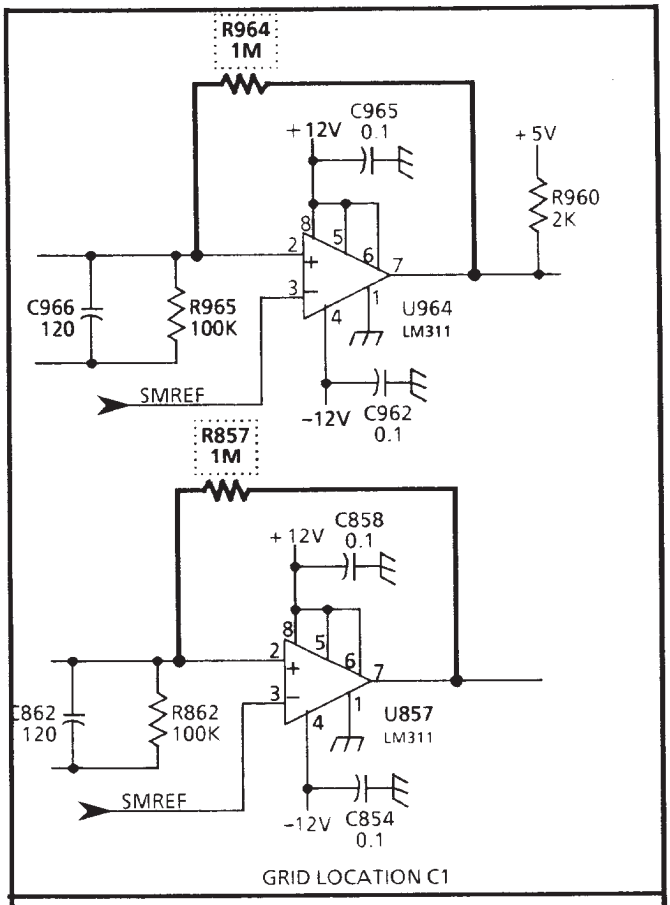
Product: ECO-170A Manual Part No: 070-6113-01

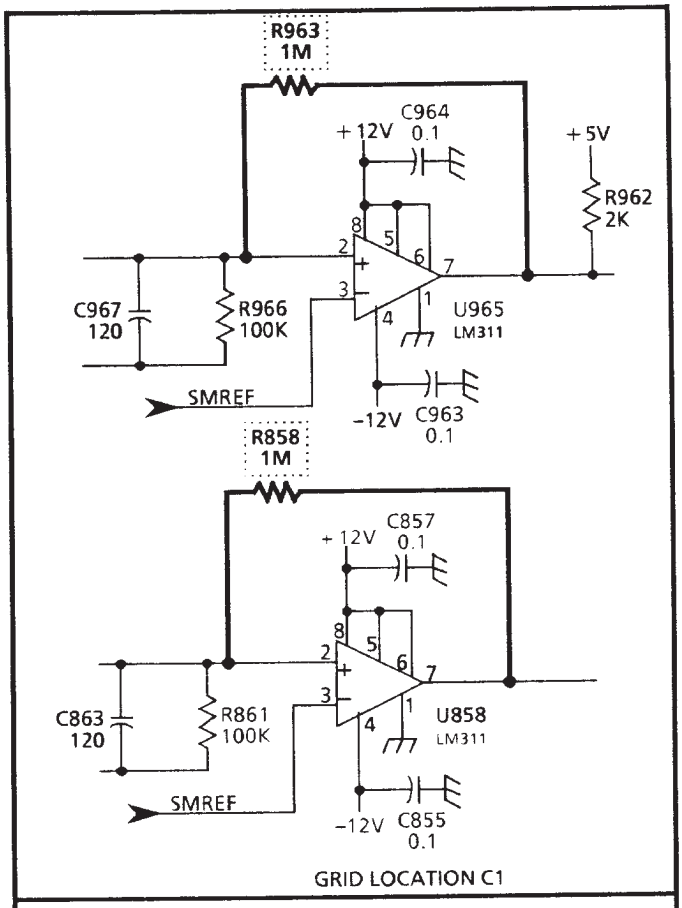


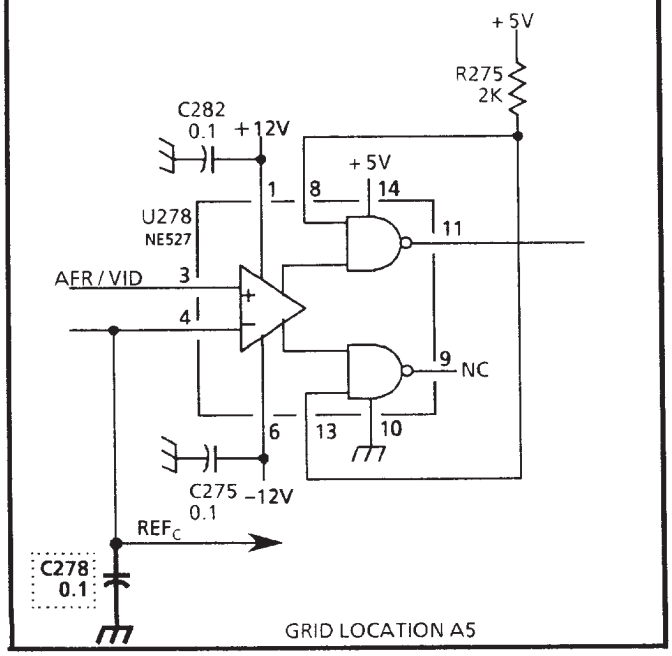
Added parts on Schematic 2.

Date: 11/17/92 Group Code 20 Change Reference: M78678

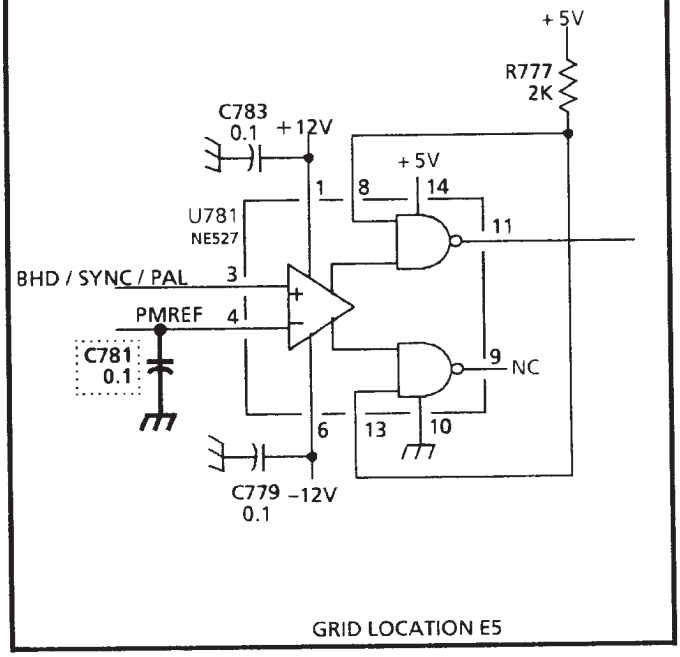
Product: ECO-170A Manual Part No: 070-6113-01







Added parts on Schematic 3.



Added parts on Schematic 4.

Tektronix **MANUAL CHANGE INFORMATION**

Date: 11/12/93 **Change Reference:** M79323

Product(s): ECO–170A **Manual Part No:** 070-6113-01

DESCRIPTION

EFF S/N: B020280

ELECTRICAL PARTS LIST AND SCHEMATIC CHANGES

SECTION 6 REPLACEABLE ELECTRICAL PARTS

CHANGE TO READ:

A2	670–9838–11	CIRCUIT BD ASSY: MAIN BOARD
A2C196	281–0810–00	CAP,FXD,CER DI:5.6PF,+/–0.5PF,100V
A2C278	281–0775–01	CAP,FXD,CER DI:;0.1UF,20%,50V,
A2C290	281–0810–00	CAP,FXD,CER DI:5.6PF,+/–0.5PF,100V
A2C494	281–0810–00	CAP,FXD,CER DI:5.6PF,+/–0.5PF,100V
A2C504	281–0773–00	CAP,FXD,CER DI:0.01UF,10%,100V,AXIAL
A2C508	283–0198–02	CAP,FXD,CER DI 0.22UF,20%,50V SQUARE
A2C592	281–0810–00	CAP,FXD,CER DI:5.6PF,+/–0.5PF,100V
A2C691	281–0810–00	CAP,FXD,CER DI:5.6PF,+/–0.5PF,100V
A2C692	281–0810–00	CAP,FXD,CER DI:5.6PF,+/–0.5PF,100V
A2C694	290–0942–00	CAP,FXD,ELCTLT:100UF,+100–10%,25V,ALUMINUM
A2C695	290–0942–00	CAP,FXD,ELCTLT:100UF,+100–10%,25V,ALUMINUM
A2C893	281–0810–00	CAP,FXD,CER DI:5.6PF,+/–0.5PF,100V
A2C894	281–0810–00	CAP,FXD,CER DI:5.6PF,+/–0.5PF,100V
A2C736	281–0862–00	CAP,FXD,CER DI: 0.001UF,+80–20%,100VTUBULAR
A2C781	281–0775–01	CAP,FXD,CER DI:;0.1UF,20%,50V,
A2CR279	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR280	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR365	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR366	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR379	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR380	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR454	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR455	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR548	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR643	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR644	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR650	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR754	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR766	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR767	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR862	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR863	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR864	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR865	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35

Date: 11/12/93	Change Reference: M79323
Product(s): ECO–170A	Manual Part No: 070-6113-01

CHANGE TO READ (cont):

A2CR952	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR953	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR966	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR967	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR968	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2CR969	152–0951–00	DIODE,SIG:SCHTKY,;60V,2.25PF;1N6263,DO–35
A2DS102	150–1171–00	DIODE,OPTO:LED;RED,626NM,60 DEG VIEW ANGL
A2DS201	150–1171–00	DIODE,OPTO:LED;RED,626NM,60 DEG VIEW ANGL
A2DS202	150–1171–00	DIODE,OPTO:LED;RED,626NM,60 DEG VIEW ANGL
A2DS203	150–1171–00	DIODE,OPTO:LED;RED,626NM,60 DEG VIEW ANGL
A2DS204	150–1171–00	DIODE,OPTO:LED;RED,626NM,60 DEG VIEW ANGL
A2DS205	150–1171–00	DIODE,OPTO:LED;RED,626NM,60 DEG VIEW ANGL
A2DS301	150–1171–00	DIODE,OPTO:LED;RED,626NM,60 DEG VIEW ANGL
A2DS302	150–1171–00	DIODE,OPTO:LED;RED,626NM,60 DEG VIEW ANGL
A2DS605	150–1171–00	DIODE,OPTO:LED;RED,626NM,60 DEG VIEW ANGL
A2L596	108–0181–01	COIL,RF,FIXED:165NH ON FORM276–0153–00
A2L599	108–0170–01	COIL,RF,FIXED:360NH ON FORM276–0153–00
A2L695	108–0170–01	COIL,RF,FIXED:360NH ON FORM276–0153–00
A2L697	108–0170–01	COIL,RF,FIXED:360NH ON FORM276–0153–00
A2L794	108–0181–01	COIL,RF,FIXED:165NH ON FORM276–0153–00
A2L797	108–0181–01	COIL,RF,FIXED:165NH ON FORM276–0153–00
A2L895	108–0212–00	COIL,RF,FIXED:495NH ON FORM315–0331–01
A2R136	321–3001–00	RES,FXD,FILM:10 OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R192	322–3193–00	RES,FXD,FILM:1K OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R193	322–3192–00	RES,FXD,FILM:976 OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R378	321–0510–07	RES,FXD,FILM: 2.00 MEG OHM,0.1%,0.125W
A2R392	322–3193–00	RES,FXD,FILM:1K OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R393	322–3192–00	RES,FXD,FILM:976 OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R492	322–3193–00	RES,FXD,FILM:1K OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R493	322–3192–00	RES,FXD,FILM:976 OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R591	322–3193–00	RES,FXD,FILM:1K OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R592	322–3192–00	RES,FXD,FILM:976 OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R606	321–0510–07	RES,FXD,FILM: 2.00 MEG OHM,0.1%,0.125W
A2R630	307–0650–00	RES NTWK,FXD,FI:9 X 2.7K OHM,5%,0.150W
A2R646	322–3210–00	RES,FXD,FILM:1.5K OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R692	322–3193–00	RES,FXD,FILM:1K OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R693	322–3192–00	RES,FXD,FILM:976 OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R792	322–3193–00	RES,FXD,FILM:1K OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R793	322–3192–00	RES,FXD,FILM:976 OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R890	322–3193–00	RES,FXD,FILM:1K OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R891	322–3192–00	RES,FXD,FILM:976 OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R892	322–3193–00	RES,FXD,FILM:1K OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R893	322–3192–00	RES,FXD,FILM:976 OHM,1%,0.2W,TC=100 PPM;AXIAL

Date: 11/12/93	Change Reference: M79323
Product(s): ECO–170A	Manual Part No: 070-6113-01

CHANGE TO READ (cont):

A2U287	156–4228–00	IC,LINEAROP–AMP;CURRENT FEEDBACK,100MHZ,W/DISABLE
A2U387	156–4228–00	IC,LINEAROP–AMP;CURRENT FEEDBACK,100MHZ,W/DISABLE
A2U487	156–4228–00	IC,LINEAROP–AMP;CURRENT FEEDBACK,100MHZ,W/DISABLE
A2U587	156–4228–00	IC,LINEAROP–AMP;CURRENT FEEDBACK,100MHZ,W/DISABLE
A2U687	156–4228–00	IC,LINEAROP–AMP;CURRENT FEEDBACK,100MHZ,W/DISABLE
A2U787	156–4228–00	IC,LINEAROP–AMP;CURRENT FEEDBACK,100MHZ,W/DISABLE
A2U887	156–4228–00	IC,LINEAROP–AMP;CURRENT FEEDBACK,100MHZ,W/DISABLE
A2U889	156–4228–00	IC,LINEAROP–AMP;CURRENT FEEDBACK,100MHZ,W/DISABLE

ADD:

A2R135	322–3235–00	RES,FXD,FILM:2.74K OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R593	322–3193–00	RES,FXD,FILM:1K OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R691	322–3193–00	RES,FXD,FILM:1K OHM,1%,0.2W,TC=100 PPM;AXIAL
A2R799	322–3193–00	RES,FXD,FILM:1K OHM,1%,0.2W,TC=100 PPM;AXIAL
A2U135	156–3050–00	IC,MISC:CMOS,PWR SUPPLY SUPERVISOR;MPU RESET GEN

DELETE:

A2C287

A2C387

A2C487

A2C587

A2C687

A2C787

A2C887

A2C889

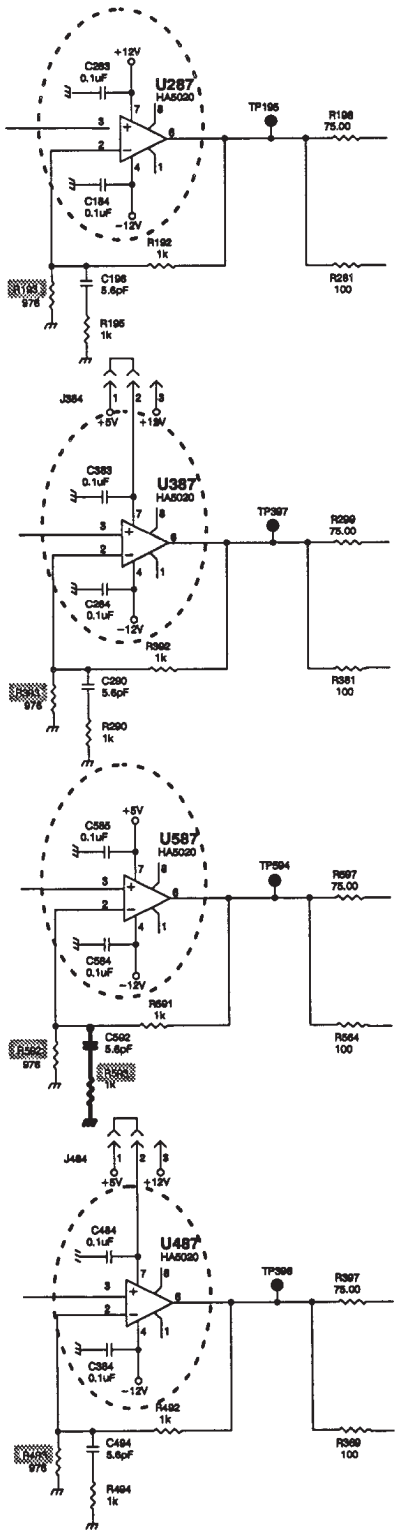
SECTION 8 REPLACEABLE MECHANICAL PARTS

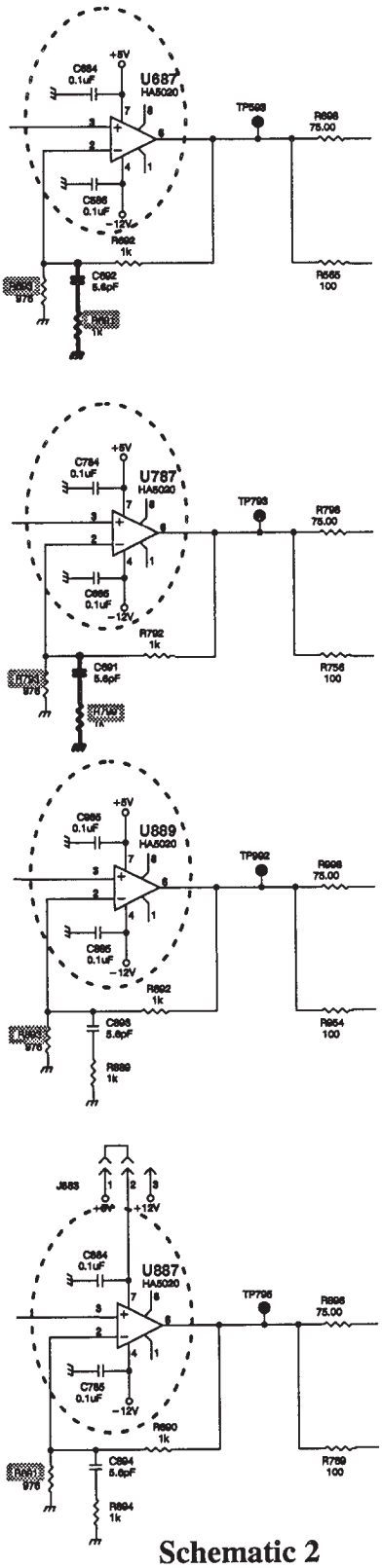
DELETE:

ITEM #	QTY	P/N
1–23	1	214–3976–00
–24	12	211–0246–00
–25	6	211–0512–00
–26	1	200–3389–00
–27	9	211–0007–00

Added parts and circuitry changes are shown in the following partial schematics:

Date: 11/12/93	**Change Reference:** M79323
Product(s): ECO–170A	**Manual Part No:** 070-6113-01

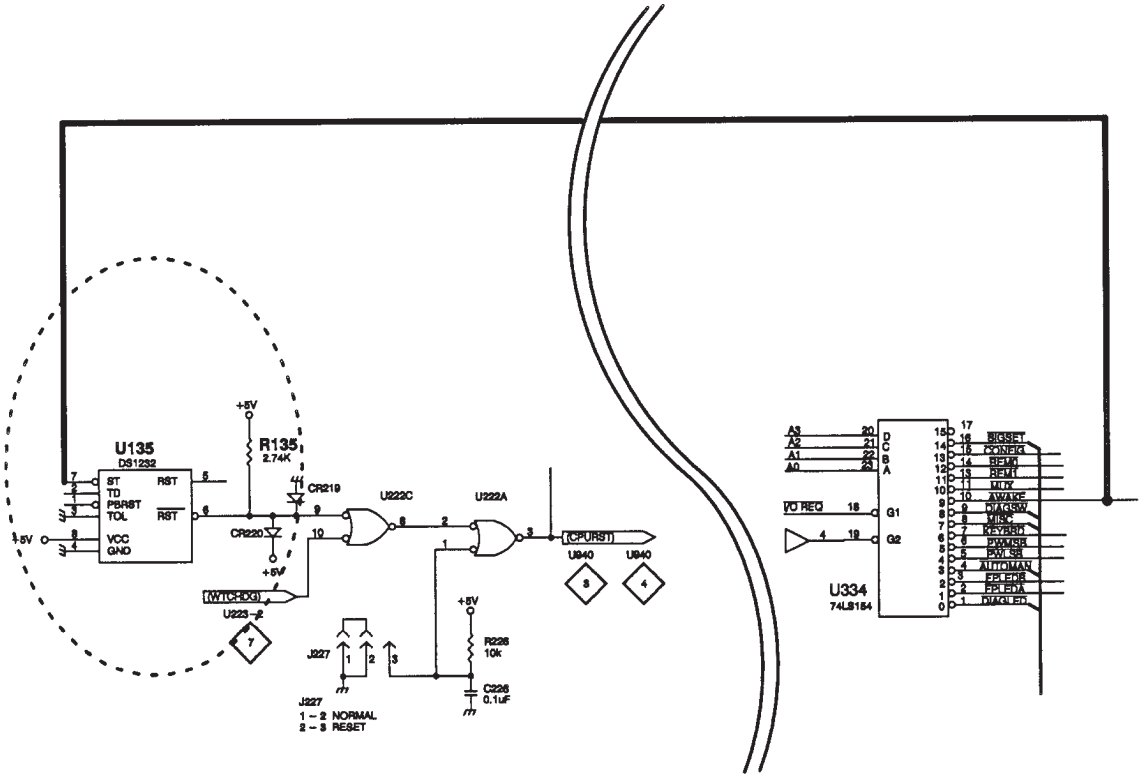




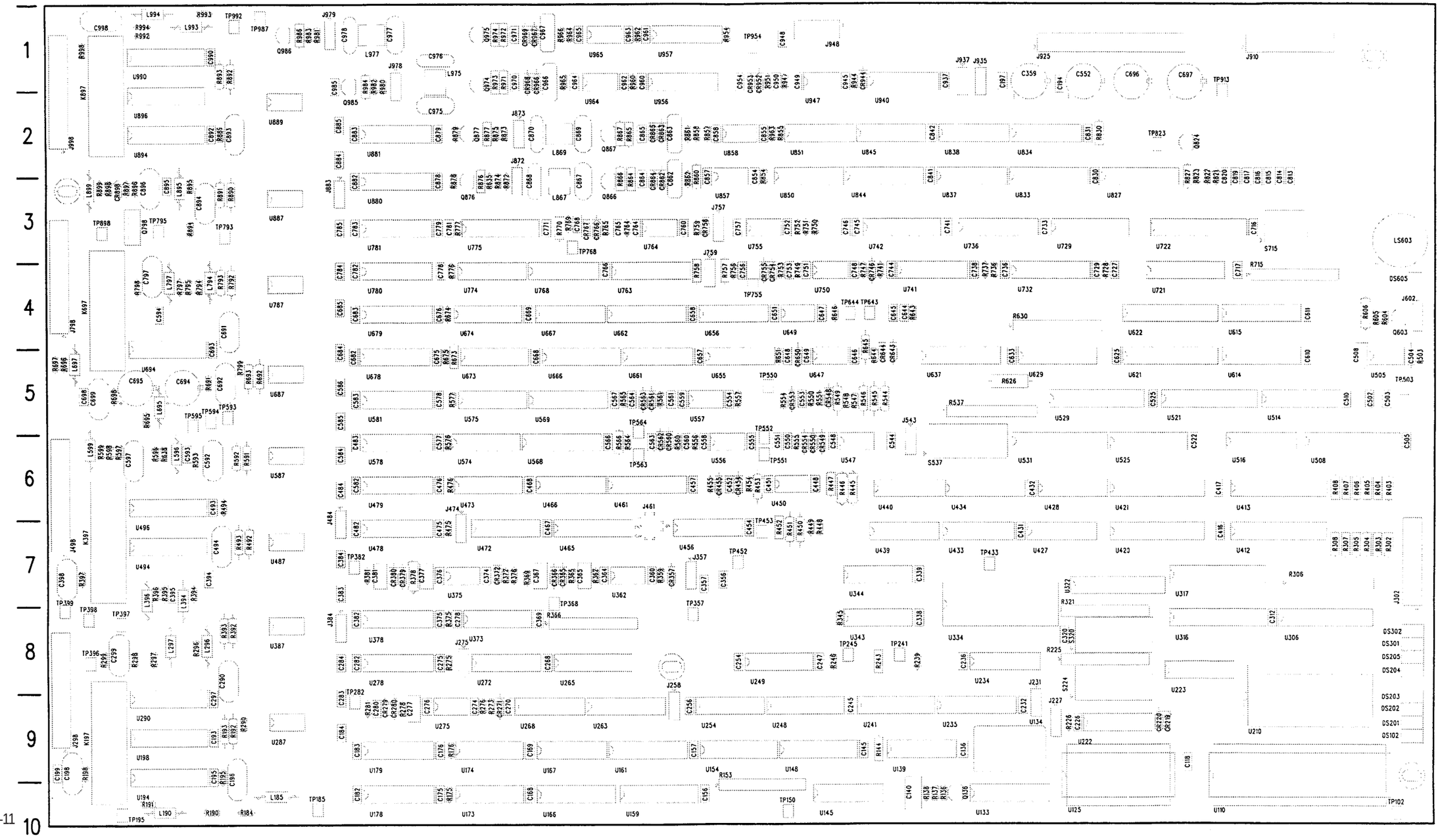
Schematic 1 **Schematic 2**

Part of Schematics 1 and 2 showing added parts and circuitry changes.

Date: 11/12/93	**Change Reference:** M79323
Product(s): ECO–170A	**Manual Part No:** 070-6113-01



Part of Schematic 6 showing added parts and circuitry changes.



670–9838–11

A2 Main Board, M79323

Tektronix

MANUAL CHANGE INFORMATION

Date: 6/6/94 **Change Reference:** M81265

Product:	Manual P/N:	Product	Manual P/N:
067–1011–00	070–3679–00	TSG 1125	061–3629–00
118AS/118RC	070–5114–00	TSG 1250	061–3719–00
1450–1	070–5568–00	TSG–170A	070–5680–00
1450–2	070–2998–00	TSG–170D	070–6943–00
1450–3A	070–3660–01	TSG200	070–8351–00
1910	070–4523–00	TSG–271	070–6304–00
728D	070–7629–00	TSG–273	070–7956–00
728E	070–7630–02	TSG–300	070–5722–00
728M	070–8045–00	TSG–370	070–7446–00
751	070–7631–00	TSG–371	070–7707–00
ASG100	070–8546–00	TSG–422	070–7022–00
ASG140	070–8867–01	VITS100	061–3939–00
DAC422	070–8595–00	VITS200	061–3923–00
ECO–170A	070–6113–01	VITS200 AA	061–3984–00
PE1000	070–8474–00	VITS201	070–7385–00
SPG1000	070–8074–00	VM700 Vol 1	070–8197–00
SPG–170A	070–5965–00	VM700 Vol 2	070–8275–00
SPG–271	070–6814–00	VM700A	070–8165–00
TPG–625	070–7248–00	VS210	070–8754–00
TSG 1001	070–8625–00	VS211	070–8164–00
TSG 1050	061–3718–00	VS211A	070–8827–00

Mechanical Parts List Changes

In the 1910

CHANGE all occurances of 131–0890–00 **TO READ:**

214–3903–01	1	SCREW,JACK:4–40 X 0.312 EXT THD,4–40 INT THD,0.188 HEX, STEEL,CAD PLATE
		ATTACHED PARTS
210–0004–00	2	WASHER,LOCK:#4 INTL,0.015 THK,STL CD PL
210–0406–00	2	NUT,PLAIN,HEX: 4–40 X 0.188,BRS CD PL
		END ATTACHED PARTS

In all other instruments

CHANGE all occurances of 131–0890–00 **TO READ:**

214–3903–01	1	SCREW,JACK:4–40 X 0.312 EXT THD,4–40 INT THD,0.188 HEX, STEEL,CAD PLATE

Tektronix

MANUAL CHANGE INFORMATION

Date: 7/25/94 **Change Reference:** M81904

Product:	Manual P/N:	Effective S/N:
728M	070–8045–00	B020189
728E	070–7630–02	B020282
ECO 170A	070–6113–01	B021464
SPG 170A	070–5965–00	B022083
SPG 271	070–6814–00	B022464
TPG 625	070–7248–00	B010372
TSG–170A	070–5680–00	B044102
TSG 170D	070–6943–00	B010857
TSG 271	070–6304–00	B033388
TSG 300	070–5722–00	B032112
TSG 370	070–7446–00	N/A
TSG 371	070–7707–00	B011124

Replaceable Electrical Parts Changes

In the 728M and 728E

Change to Read:

A4	671–1836–06	CKT BD ASSY:POWER SUPPLY
A4R510	311–0634–00	RES,VAR,NONWW:TRMR,500 OHM,0.5W CERMET

In the ECO 170A,SPG 170A, SPG 271, TPG 625, TSG 170A, TSG 170D, TSG 271, TSG 300, TSG 370, TSG 371

Change to Read:

A4	671–0572–07	CKT BD ASSY:POWER SUPPLY
A4R510	311–0634–00	RES,VAR,NONWW:TRMR,500 OHM,0.5W CERMET

Tektronix

MANUAL CHANGE INFORMATION

Date: 12/14/94 **Change Reference:** M81765

Product:	Manual P/N:	Effective S/N:
ECO170A	070–6113–01	B021461

Replaceable Electrical Parts Changes

Section 7 Replaceable Electrical Parts

Change to Read:

A2U287	156–4436–00	IC,LINEAR:BIPOLAR,OP–AMP; 55MHZ;CLC430AJP
A2U387	156–4436–00	IC,LINEAR:BIPOLAR,OP–AMP; 55MHZ;CLC430AJP
A2U487	156–4436–00	IC,LINEAR:BIPOLAR,OP–AMP; 55MHZ;CLC430AJP
A2U587	156–4436–00	IC,LINEAR:BIPOLAR,OP–AMP; 55MHZ;CLC430AJP
A2U687	156–4436–00	IC,LINEAR:BIPOLAR,OP–AMP; 55MHZ;CLC430AJP
A2U787	156–4436–00	IC,LINEAR:BIPOLAR,OP–AMP; 55MHZ;CLC430AJP
A2U887	156–4436–00	IC,LINEAR:BIPOLAR,OP–AMP; 55MHZ;CLC430AJP
A2U889	156–4436–00	IC,LINEAR:BIPOLAR,OP–AMP; 55MHZ;CLC430AJP

Tektronix

MANUAL CHANGE INFORMATION

Date: 5/30/95 **Change Reference:** M82523 REV 1

Product:	Manual P/N:	Effective S/N:
SPG170A	070–5965–00	B022188
SPG271	070–6814–00	B022574
TSG170A	070–5680–00	B044296
TSG170D	070–6943–00	B010895
TSG271	070–6304–00	B033558
TSG273	070–7956–00	B010301
TSG371	070–7707–00	B011162
TSG422	070–7022–00	B031482
TPG625	070–7248–00	B010378
TSG300	070–5722–00	B032150
TSG300E	070–8374–00	B032150

Replaceable Electrical Parts Changes

Replaceable Electrical Parts

In the TSG170A. TSG170D, and TSG370, **CHANGE TO READ:**

A2–1	670–9111–14	CKT BD ASSY:DIGITAL;WIRED (TSG170A ONLY)
A2–1	670–9111–15	CKT BD ASSY:DIGITAL;WIRED (TSG170A OPT 2J ONLY)
A2–1	670–9111–16	CKT BD ASSY:DIGITAL;WIRED (TSG170A OPT 1V ONLY)
A2–1	670–9111–59	CKT BD ASSY:DIGITAL;WIRED (TSG170D ONLY)
A2–1	670–9111–60	CKT BD ASSY:DIGITAL;WIRED (TSG170D OPT 1J ONLY)
A2–1	670–9111–61	CKT BD ASSY:DIGITAL;WIRED (TSG170D OPT 1V ONLY)
A2–1	670–9111–71	CKT BD ASSY:DIGITAL;WIRED (TSG370 ONLY)
A2–1R258	308–0677–00	RES,FXD,WW:1 OHM,5%,2W AXIAL LEAD

In the TSG300, TSG300E, and TSG370, **CHANGE TO READ:**

A2–1	670–9130–16	CKT BD ASSY:DIGITAL;WIRED (TSG300 OPT 01 ONLY)
A2–1	670–9130–17	CKT BD ASSY:DIGITAL;WIRED (TSG300 ONLY)
A2–1	670–9130–18	CKT BD ASSY:DIGITAL;WIRED (TSG300E ONLY)
A2–1R997	308–0677–00	RES,FXD,WW:1 OHM,5%,2W AXIAL LEAD

In the SPG170A **CHANGE TO READ:**

A2–1	670–9523–08	CKT BD ASSY:DIGITAL;WIRED (SPG170 ONLY)
A2–1	670–9523–09	CKT BD ASSY:DIGITAL;WIRED (SPG170 OPT 2J ONLY)
A2–1R338	308–0677–00	RES,FXD,WW:1 OHM,5%,2W AXIAL LEAD

In the SPG271, TSG271, TSG273, and TSG371 **CHANGE TO READ:**

A2–1	670–9905–18	CKT BD ASSY:DIGITAL;WIRED (TSG271 ONLY)
A2–1	670–9905–19	CKT BD ASSY:DIGITAL;WIRED (TSG271 OPT 03 ONLY)
A2–1	670–9905–33	CKT BD ASSY:DIGITAL;WIRED (TSG371 ONLY)
A2–1	670–9905–56	CKT BD ASSY:DIGITAL;WIRED (SPG271 ONLY)
A2–1	670–9905–57	CKT BD ASSY:DIGITAL;WIRED (SPG271 OPT 02 ONLY)
A2–1	670–9905–94	CKT BD ASSY:DIGITAL;WIRED (TSG273 ONLY)
A2–1R446	308–0677–00	RES,FXD,WW:1 OHM,5%,2W AXIAL LEAD

In the TSG422 **CHANGE TO READ:**

A2–1	671–0764–12	CKT BD ASSY:DIGITAL;WIRED (TSG422 ONLY)
A2–1R996	308–0677–00	RES,FXD,WW:1 OHM,5%,2W AXIAL LEAD

In the TPG625 **CHANGE TO READ:**

A2–1	671–0958–01	CKT BD ASSY:DIGITAL;WIRED (TPG625 ONLY)
A2–1R359	308–0677–00	RES,FXD,WW:1 OHM,5%,2W AXIAL LEAD