Service Manual

Tektronix

VM100 & VM101
Video Measurment Set

070-9288-02

This document supports firmware version 1.64 and above.

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.

CE

Printed in the U.S.A.

Tektronix, Inc., P.O. Box 1000, Wilsonville, OR 97070–1000

WARRANTY

Tektronix warrants that the products that it manufactures and sells will be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. If a 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; c) to repair any damage or malfunction caused by the use of non-Tektronix supplies; or d) 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.

THIS WARRANTY IS GIVEN BY TEKTRONIX IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. TEKTRONIX AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TEKTRONIX' RESPONSIBILITY TO REPAIR OR REPLACE DEFECTIVE PRODUCTS IS THE SOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR BREACH OF THIS WARRANTY. TEKTRONIX AND ITS VENDORS WILL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER TEKTRONIX OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.

Service Assurance

If you have not already purchased Service Assurance for this product, you may do so at any time during the product's warranty period. Service Assurance provides Repair Protection and Calibration Services to meet your needs.

Repair Protection extends priority repair services beyond the product's warranty period; you may purchase up to three years of Repair Protection.

Calibration Services provide annual calibration of your product, standards compliance and required audit documentation, recall assurance, and reminder notification of scheduled calibration. Coverage begins upon registration; you may purchase up to five years of Calibration Services.

Service Assurance Advantages

- Priced well below the cost of a single repair or calibration
- Avoid delays for service by eliminating the need for separate purchase authorizations from your company
- Eliminates unexpected service expenses

For Information and Ordering

For more information or to order Service Assurance, contact your Tektronix representative and provide the information below. Service Assurance may not be available in locations outside the United States of America.

Name	VISA or Master Card number and expiration
Company	date or purchase order number
Address	Repair Protection (1,2, or 3 years)
City, State, Postal code	Calibration Services (1,2,3,4, or 5 years)
Country	Instrument model and serial number
Phone	Instrument purchase date

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General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it.

Only qualified personnel should perform service procedures.

If this equipment is used in any manner not specified, including failure to follow any rating or direction for use, the protection provided by the equipment may be impaired.

Injury Precautions

Use Proper Power Cord. To avoid fire hazard, use only the power cord specified for this product.

Avoid Overvoltage. To avoid electric shock or fire hazard, do not apply potential to any terminal, including the common terminal, that varies from ground by more than the maximum rating for that terminal.

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.

Do Not Operate Without Covers. To avoid electric shock or fire hazard, do not operate this product with covers or panels removed.

Use Proper Fuse. To avoid fire hazard, use only the fuse type and rating specified for this product.

Do Not Operate in Wet/Damp Conditions. To avoid electric shock, do not operate this product in wet or damp conditions.

Do Not Operate in an Explosive Atmosphere. To avoid injury or fire hazard, do not operate this product in an explosive atmosphere.

Product Damage Precautions

Use Proper Power Source. Do not operate this product from a power source that applies more than the voltage specified.

Provide Proper Ventilation. To prevent product overheating, provide proper ventilation.

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

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:

DANGER
High Voltage

Protective Ground
(Earth) Terminal

ATTENTION
Refer to Manual

Double
Insulated

Certifications and Compliances

Refer to the specifications section for a listing of certifications and compliances that apply to this 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, disconnect the main power by means of the power cord or, if provided, the power switch.

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.

Preface

Use this manual to service the video measurement set to the module or component level. Contact your local Tektronix service center or sales engineer for more information on repair and adjustment services.

Related Manuals

The *VM100 & VM101 Video Measurement Sets User Manual* (Tektronix part number 070-9522-XX) describes how to use the video measurement set.

Service Manual Conventions

In this manual, the term “module” refers to any field-replaceable component, assembly, or part of the video measurement set.

Strategy for Servicing

To prevent personal injury or instrument damage:

- This product should be serviced only by a qualified service person
- Read the *General and Service Safety Summaries* at the front of this manual, as well as *Operating Information* beginning on page 2–1
- Follow all warnings, cautions, and notes in this manual

Adjustment Interval

Generally, you should perform the *Adjustment Procedures* once a year. In addition, perform the procedures after module replacement.

Tektronix Service Offerings

Tektronix provides service to cover repair under warranty as well as other services that may provide a cost-effective answer to your service needs.

Whether providing warranty repair service or any of the other services listed below, Tektronix service technicians are well equipped to service the video measurement set. Tektronix technicians train on Tektronix products and have access to the latest information on product improvements and new options.

Warranty Repair Service

Tektronix warrants this product for one year from date of purchase. The warranty appears behind the title page in this manual. Tektronix technicians provide warranty service at most Tektronix service locations worldwide. The Tektronix product catalog lists all service locations worldwide.

At-Depot Repair or Calibration Service

The following services can be purchased to meet to your repair/calibration needs.

- A single repair and/or adjustment
- Calibrations using equipment and procedures that meet the traceability standards specific to the local area
- Annual maintenance agreements that provide for either calibration and repair, or calibration only.

Module Exchange

Reduce down time for repair by exchanging modules for remanufactured ones. Tektronix ships an updated and tested exchange module from the Beaverton, Oregon service center, typically within 24 hours. Each module comes with a 90-day service warranty.

Contacting Tektronix

Product Support	For application-oriented questions about a Tektronix measurement product, call toll free in North America: 1-800-TEK-WIDE (1-800-835-9433 ext. 2400) 6:00 a.m. – 5:00 p.m. Pacific time Or contact us by e-mail: tm_app_supp@tek.com For product support outside of North America, contact your local Tektronix distributor or sales office.
Service Support	Contact your local Tektronix distributor or sales office. Or visit our web site for a listing of worldwide service locations. http://www.tek.com
For other information	In North America: 1-800-TEK-WIDE (1-800-835-9433) An operator will direct your call.
To write us	Tektronix, Inc. P.O. Box 1000 Wilsonville, OR 97070-1000

Specifications

This chapter provides a complete description of the specifications. *Product Description* is a general description of the instrument. The *Specification Tables*, which begin on page 1–2, contain the complete specifications.

Product Description

The Tektronix VM100 and VM101 Video Measurement Sets are automatic video measurement instruments. The VM100 measures NTSC signals and the VM101 measures PAL signals.

The video measurement sets use existing or inserted test signals and take measurements consistent with regulatory specifications.

The video measurement sets display measurement results on a LCD screen. You can also display measurement results on a serial printer or remote PC using the RS-232 port. The video measurement sets perform the following measurements (on-screen labels are shown in parentheses):

Differential Phase (DIFF PHASE)

Differential Gain (DIFF GAIN)

Chrominance-to-Luminance Delay (YC DELAY)

Chrominance-to-Luminance Gain (YC GAIN)

Signal-to-Noise Ratio (SNR WGT/FLAT)

Frequency Response (FREQ FCC or AVG)

Frequency Response Detail (FREQ FLAG, FREQ #1 through FREQ #6) or (FRQmax and FRQmin)

Group Delay (GRPDLYmax and GRPDLYmin)

Sync Amplitude (SYNC AMPL)

Burst Amplitude (BURST AMPL)

Bar Amplitude (BAR AMPL)

2T K-Factor (2T K-FACTOR)

Luminance Nonlinearity (LUM NON-LIN)

Hum (HUM P-P, 50/60 Hz, and 100/120 Hz)

Specification Tables

This section provides a complete description of the video measurement set specifications. Refer to the *Performance Conditions* for a description of the required temperature range and other pertinent operating conditions.

Terms Used in Specifications

Characteristic. A characteristic refers to a property of the product.

Performance Requirement [REQ]. Performance Requirements define characteristics that are essential to the intended application of the product, usually in limit form.

Reference Information [RI]. Reference Information explains the performance requirements or stipulates conditions under which the performance requirements are effective. Reference information is not considered to be a statement of guaranteed performance.

Specification. A specification is a document or a section of a document that lists and describes characteristics and performance requirements of a product.

Typical. Typical refers to instrument performance that can be expected but is not guaranteed.

Performance Conditions

The performance requirements listed in the *Electrical Specifications* apply over an ambient temperature range of 0° C to +50° C. The rated accuracies are valid over the entire 0° C to 50° C range and become “typical” for temperatures from –10° C to 0° C. Test equipment used to verify performance requirements must be calibrated and working within the specified limits.

All specifications (with the exception of Signal-to-Noise Ratio Measurement Accuracy) apply for Signal-To-Noise Ratio ≥ 52 dB (weighted). Averaging (AVG) is enabled for all specifications.

Electrical Specifications

Table 1–1: Input signal requirements–VIDEO INPUT

Category	Description
Maximum Operating Voltage	**REQ:** –1.8 V to +2.2 V
Absolute Maximum Input Voltage	**REQ:** –8.5 V to +8.5 V
Minimum Operating Voltage	**REQ:** 1 Vp-p video signal **RI:** Typically operates with a 1 Vp-p input, +1 dB or –6 dB
DC Input Impedance	**REQ:** ≥20 KΩ **RI:** DC coupling
Return Loss	**REQ:** >40 dB to 6 MHz **RI:** DC coupling

Table 1–2: Input signal requirements–EXT REF

Category	Description
Absolute Maximum Input Voltage	**REQ:** –8.5 V to +8.5 V
Minimum Operating Voltage	**REQ:** 1 Vp-p video signal **RI:** Typically operates with a 1 Vp-p input, +1 dB or –6 dB
DC Input Impedance	**REQ:** ≥20 KΩ
Return Loss	**REQ:** >40 dB to 6 MHz
Video INPUT / EXT REF	
Loop-through Isolation	**RI:** >70 dB (typical)
Crosstalk	**REQ:** >70 dB to 6 MHz

Table 1–3: Measurement accuracy

Category[1]	Description
Differential Phase	**REQ:** <1.0 ° **RI:** Typically <0.5° from 20° C to 30° C with test signal generator source
Differential Gain	**REQ:** <2.0 % **RI:** Typically <1 % from 20° C to 30° C for nominal 300 mV chrominance amplitude

1 **All tests are performed with AVG enabled. Processing time for each measurement is a function of the signal-to-noise ratio.**

Table 1–3: Measurement accuracy (cont.)

Category[1]	Description
Chrominance-to-Luminance Gain	**REQ:** <2 % **RI:** Typically <1 % from 20° C to 30° C with test signal generator source
Chrominance-to-Luminance Delay	**REQ:** <20 ns **REQ:** <10 ns from 20° C to 30° C with test signal generator source. **RI:** Typically <5 ns from 20° C to 30° C with test signal generator source
Frequency Response	**REQ:** <0.2 dB **RI:** Typically <0.1 dB (1 %) from 20° C to 30° C with test signal generator source **RI:** VM100: 50 kHz to 4.2 MHz VM101: 50 kHz to 5.8 MHz
2T K-Factor	**REQ:** 2 % **RI:** Typically <0.5 % from 20° C to 30° C with test signal generator source
Hum[2]	**REQ:** ±1.0% for hum ≤4.0% ±2.0% for hum >4.0% and <15.0% **RI:** Typically ±0.5% for hum ≤4.0%
Signal-to-Noise Ratio (Weighted or Flat)	**REQ:** ±1 dB, 28 dB to <45 dB ±2 dB, 45 dB to <60 dB ±3 dB, 60 dB to 67 dB (WGT) **RI:** VM100: Noise is weighted with EIA RS-250-B 5 MHz weighted noise filter (Tektronix part number 015-0215-00 equivalent) VM101: Noise is weighted with CCIR 567 weighted noise filter
Group Delay	**REQ:** <20 ns **RI:** 50 kHz to 4.8 MHz, within the bandwidth of the signal under test
Sync Amplitude[2]	**REQ:** <1.0%
Burst Amplitude	**REQ:** <1.0%
Bar Amplitude	**REQ:** <1.0%
Luminance Nonlinearity	**REQ:** <1.0%

1 All tests are performed with AVG enabled. Processing time for each measurement is a function of the signal-to-noise ratio.
2 The hum and sync amplitude measurements are inaccurate in the presence of Sound In Sync (SIS) signals.

Table 1–4: Output

Category	Description
Zero Carrier Reference Pulse Output	**RI:** Can drive demodulator ZCRP trigger of TTL type (Tektronix TDM5, DS1200, 1450) or 1.5 V_{p-p}, 75 Ω type (Tektronix 1340, 1350)

Table 1–5: AC power source

Category	Description
Mains Voltage Range	**REQ:** 90-250 VAC 50/60 Hz 0.7 A
Power Consumption	**REQ:** 30 W maximum

Environmental Characteristics

Table 1–6: Environmental characteristics

Category	Description
Altitude (see page 1–6 for safety-related information)	**REQ:** Operating: to 15,000 f (4572 m) Non-operating: to 50,000 f (15,240 m) **RI:** Maximum operating temperature decreases 1° C per 1000 f (305 m)
Humidity	**REQ:** To 95% relative humidity at or below +50° C
Operating Temperature	**REQ:** 0° C to + 50° C (32° F to 122° F) **RI:** Electrical specifications are guaranteed when the instrument is operated in this temperature range
Package Drop	**REQ:** Meets Tektronix 062-2858-00, Rev. B
Random Vibration (Operating and Non-Operating)	**REQ:** Meets Tektronix Class III (062-2858-00, Rev. B)
Shock (Operating)	**REQ:** Meets Tektronix Class III (062-2858-00, Rev. B) **RI:** Three drops on each face of 50 g, 11 ms duration, half-sine pulse shape for a total of 18 drops
Storage Temperature	**REQ:** –40° C to + 75° C (–40° F to +167° F)
Loose Load Vibration (Repetitive Shock)	**REQ:** Meets Tektronix 062-2858-00, Rev. B (page 51, section 17.7.4)
Vehicle Vibration	**REQ:** Meets Tektronix 062-2858-00, Rev. B

Safety Standards and Certification

Table 1–7: Certifications and compliances

Category	Description
Altitude (Maximum Operating) See page 1–5 for additional information	Operating: to 6,500 f (2000 m)
Certifications	
US Nationally Recognized Testing Laboratory Listing	ANSI/ISA S82 Safety Standard for Electrical and Electronic Test, Measuring, Controlling, and Related Equipment
Canadian Certification	CAN/CSA C22.2 No.1010.1 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use
European Union Compliance	Low Voltage Directive 73/23/EEC, Amended by 93/68/EEC
Additional Compliance	UL3111-1 Standard for Electrical Measuring and Test Equipment IEC 1010-1 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use
EC Declaration of Conformity	Meets intent of Directive 89/336/EEC for Electromagnetic Compatibility and Low Voltage Directive 73/23/ECC for Product Safety. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities: EMC Directive 89/336/EEC: [3] 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 Low Voltage Directive 73/23/EEC: EN 61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use [3] Using high quality shielded cables.
Equipment Type	Test and Measuring
FCC Compliance	Emissions comply with FCC Code of Federal Regulations 47, Part 15, Subpart B, Class A Limits

Table 1–7: Certifications and compliances (cont.)

Category	Description
Overvoltage Category	Overvoltage Category II (as defined in IEC 1010-1, Annex J)
Pollution Degree	Pollution Degree 2 (as defined in IEC 1010-1); rated for indoor use only
Safety Class	Class I (as defined in IEC 1010-1, Annex H)
Temperature (Operating)	+5° C to +50° C (+41° F to 122° F)

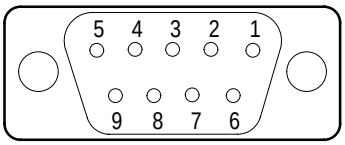
Physical Characteristics

Table 1–8: Physical characteristics

Category	Description
Dimensions	Height: 1.71 in (4.34 cm) Nominal Width: 8.1 in (20.6 cm) Nominal Depth: 17.2 in (43.7 cm) Nominal
Stand-Alone Instrument Weight	4.00 lbs (1.81 kg) Nominal
Packaged Weight (for domestic shipment)	7.12 lbs (3.23 kg) Nominal

Remote Control Port

Table 1–9: Remote control port

Category	Description		
RS232 Serial Port	Connector: Nine-pin DCE female Baud Rate: 1200, 2400, 9600, or 19.2K		
	**Pin**	**Signal Name**	**RS232-C Name**
	1	Not Used	
	2	TX (Transmit Data; Output)	BA
	3	RX (Receive Data; Input)	BB
	4	Not Used	
	5	GND (Signal Ground)	AB
	6	Not Used	
	7	RTS (Request to Send; Output)	CA
	8	CTS (Clear to Send; Input)	CB
	9	Not Used	

Operating Information

This section describes how to operate the video measurement set. The operating information is limited to the functions required to perform the procedures found in this manual. More detailed operating instructions can be found in the *VM100 & VM101 Video Measurement Sets User Manual* (Tektronix part number 070-9522-XX).

The *Operating Information* is divided into the following sections:

- *Installation* describes the power source requirements and explains where to find a list of the power cord options
- *Operating Information* on page 2–1 describes the front panel buttons and LCD display, the menus, the rear panel connectors, the power on procedure, and configuration instructions

Installation

Power Source Requirements

The video measurement set operates over the range of 90 V_{rms} to 250 V_{rms} at either 50 Hz or 60 Hz. The power source should never apply more than 250 V_{rms} between the supply conductors or between either supply conductor and ground.

WARNING. *To avoid personal injury due to electrical shock, never operate the video measurement set without the protective ground connection by way of the grounding conductor in the power cord.*

Operating Information

This section provides the information you will need to operate the video measurement set when performing the procedures in this manual. It contains the following information:

- Descriptions of the front panel buttons and the LCD display
- Descriptions of the menus
- Descriptions of the rear panel connectors
- Power on procedure
- Configuration instructions for each operating mode

Front Panel Buttons and LCD Display

The front panel contains twelve buttons and an LCD display as shown in Figure 2–1. There are seven function buttons, four arrow buttons, and the enter button. A green LED indicator, located at the center of each function button, lights to show when the associated function is turned on. The arrow buttons are designated by directional arrows. A carriage return symbol (↵) identifies the enter button.

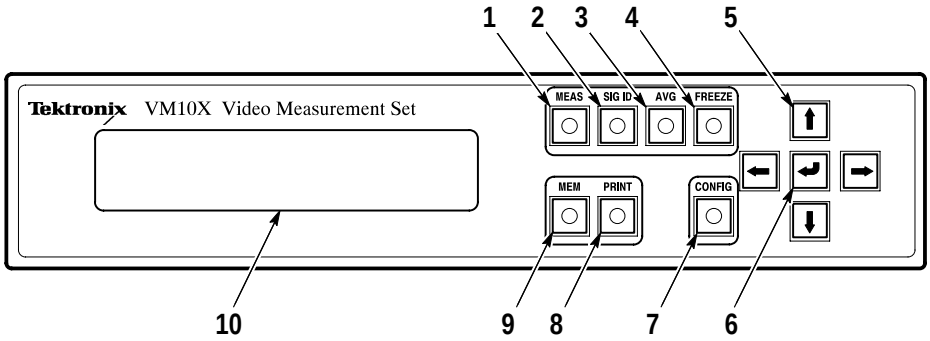


Figure 2–1: Front panel

Five of the function buttons (MEAS, SIG ID, MEM, PRINT, and CONFIG) are exclusive to each other. This means that only one of the functions can be active at a time. When you press another of these buttons, the previous function automatically turns off.

The following descriptions refer to Figure 2–1.

1 **MEAS.** Press the measure button to display the results of measurements the video measurement set makes on the LCD display. Use the CONFIG menu to turn measurements ON or OFF. Measurements must be ON to appear in the MEAS list.

2 **SIG ID.** Press the signal identification button to display the name and location of signals in the vertical interval and the source ID (when contained in the signal).

3 **AVG.** Press this toggle switch to turn signal averaging on and off.

4 **FREEZE.** Press this toggle switch to turn the freeze feature on and off. When FREEZE is turned on, all acquisition and measurement activity stops so that you can view intermediate measurement and signal ID results.

5 **Arrow Buttons.** Press the up (↑) or down (↓) arrow buttons to scroll through various LCD displays. Press the left (←) and right (→) arrow buttons to change instrument parameters and to view measurement results on other video lines.

6 **Enter Button.** Press the enter (↵) button to enter and exit the CONFIG submenus and to control print and memory functions.

7 **CONFIG.** Press the configure button to access instrument configuration menus and to view the instrument software version.

8 **PRINT.** Press the print button to print the current or saved measurement data or to output results to a computer, using the RS-232 serial port. You must configure the RS-232 port for printing and select the print parameters before using the print function.

9 **MEM.** Press the memory button to save the current measurement and SIG ID results in instrument memory and to access memory management selections including ERASE, REPLACE, VIEW, and RENAME.

10 **LCD Display.** The LCD display shows measurement readouts and menu selections. Figure 2–2 shows examples of the text and symbols you will see on the LCD display. The symbols help you navigate quickly through the menu system using the arrow buttons and the enter button. Dots (…) following the menu name indicate that a menu has a submenu.

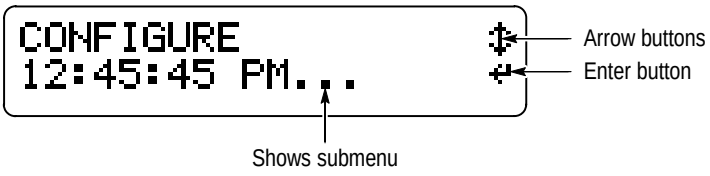


Figure 2–2: LCD display characteristics

Menus

The MEAS, SIG ID, MEM, PRINT, and CONFIG buttons allow access to additional selections or measurement results. Figures 2–3 and 2–4 show the menu structure of the video measurement set. The SIG ID menu is not shown because its contents depend upon the input signal characteristics.

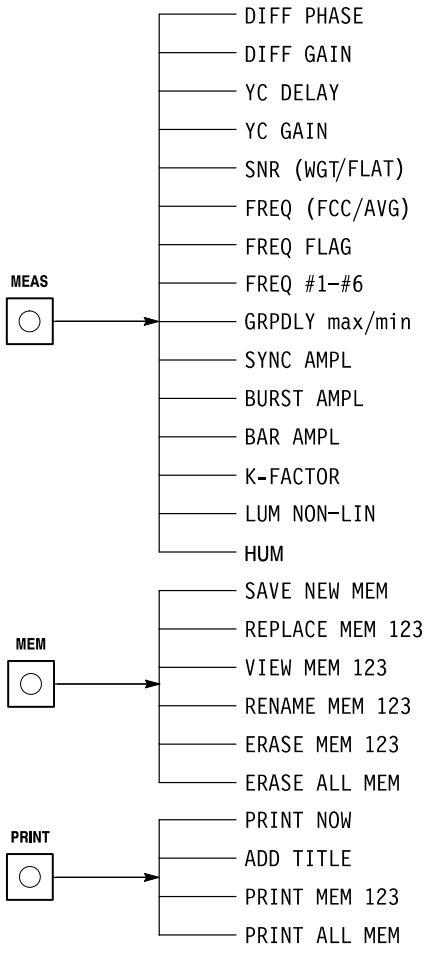


Figure 2–3: The MEAS, MEM, and PRINT menus

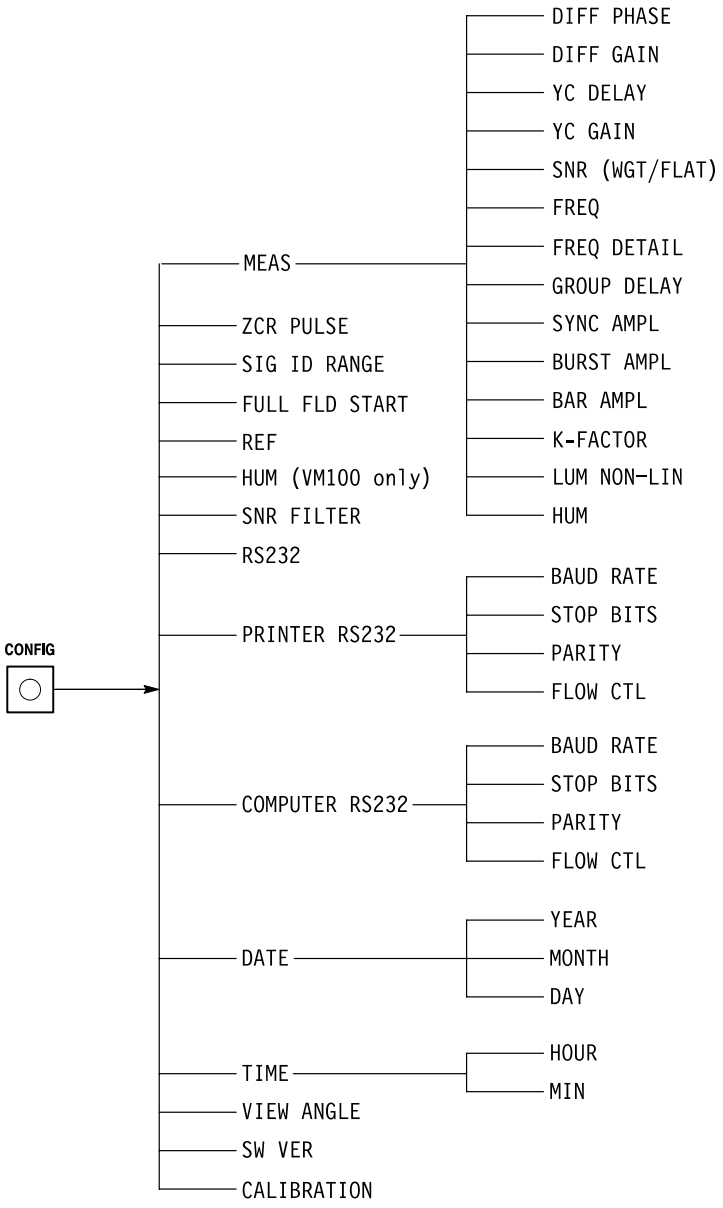


Figure 2–4: The CONFIG menu

Rear Panel Connectors

There are seven connectors mounted on the video measurement set rear panel. Refer to Figure 2–5 for descriptions.

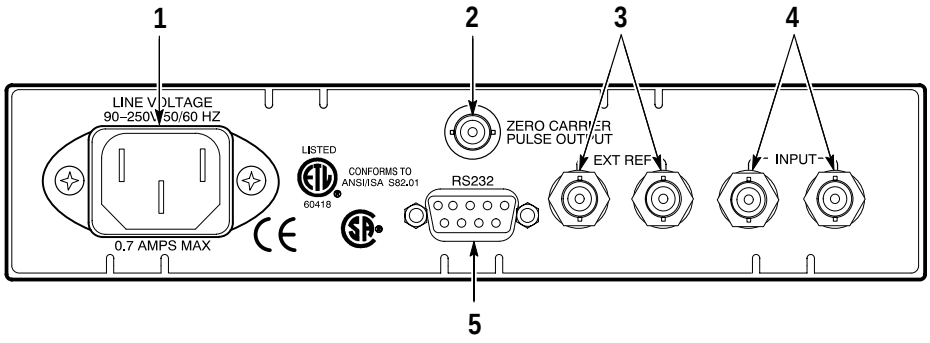


Figure 2–5: Rear panel connectors

1 **AC Power Connector.** The AC power connector is a standard AC plug receptacle for 120 or 240 V_{ac} power mains. The plug is compatible with each available power cord option.

2 **ZERO CARRIER PULSE OUTPUT.** The ZERO CARRIER PULSE OUTPUT produces a reference pulse that triggers a demodulator. Signal amplitude is 1.5 V_{p-p} when driving a 75 Ω load or TTL compatible when driving a high impedance. This pulse is compatible with the trigger inputs on the following Tektronix Demodulators: DS1200, TDM5, 1450, 1340, and 1350.

3 **EXT REF.** This high-impedance, loop-through input (two BNC connectors) accepts external reference signals of composite video or black burst (1 V_{p-p}). Use this input if the video input has no sync information. The input is AC coupled and compensated for 75 Ω. It is not internally terminated.

4 **INPUT.** This high-impedance, loop-through input (two BNC connectors) accepts video input signals for the video measurement set. The input is AC coupled and compensated for 75 Ω. It is not internally terminated.

5 **RS232 Port.** This nine-pin subminiature D-type female connector provides an RS232 serial interface for printer and computer communication. The port also provides the interface for waveform the monitor control function.

Power On Procedure

To power on the video measurement set, connect it to the AC power source. There is no power switch.

The power-on sequence completes in approximately 10 seconds. After power on completes, check for the following conditions:

The LCD display shows the message No video present, or no lock possible (if no signals are connected to the rear panel INPUT connector).

The MEAS button indicator lights.

NOTE. *The AVG button indicator lights at power on if the AVG feature was in use when AC power was last disconnected.*

Configuration

This section guides you through the configuration of each operating parameter. (No configuration is necessary for basic operation.) Refer to Table 2–1 for an overview of the parameters you can configure, the location of the configuration instructions, and the factory default values.

If you need more detailed information about the instrument features, refer to the *VM100 & VM101 Video Measurement Sets User Manual* (Tektronix part number 070-9522-XX).

NOTE. *You cannot configure the hum frequency on the VM101. The default value is 50 Hz.*

Table 2–1: Configuration parameters

Parameter	Page Number	Factory Default Value
MEASURE	2–8	SNR is ON All other measurements are OFF
ZCR PULSE	2–9	VM100: Line 10 VM101: Line 7
SIG ID RANGE	2–10	VITS
FULL FLD START	2–10	23
REF	2–11	Input
HUM (VM100 only)	2–11	60HZ
SNR FILTER	2–11	WEIGHTD
RS232	2–11 for printing 2–12 for computer 2–13 for waveform monitor operation	Computer

Table 2–1: Configuration parameters (cont.)

Parameter	Page Number	Factory Default Value
PRINTER RS232 BAUD RATE STOP BITS PARITY FLOW CTL	2–11	 9600 1 NONE NONE
COMPUTER RS232 BAUD RATE STOP BITS PARITY FLOW CTL	2–12	 9600 1 NONE NONE
1995 NOV 11 (Date) YEAR MONTH DAY	2–14	Today's date
10:13:18AM (Time) HOUR MINUTE	2–14	Current time
VIEW ANGLE	2–15	80
SW VER	2–15	Current software version
CALIBRATE	2–15	N/A

Use the following procedures to customize the operation of the video measurement set. Once you have configured the parameters, the video measurement set powers on as you configured it. Refer to page 2–1 for detailed descriptions of the front panel buttons or the LCD display.

NOTE*. The video measurement set uses the last setting that was saved for each parameter if power is interrupted during configuration.*

To exit the CONFIGURE menu at any time during these procedures, press the MEAS, SIG ID, MEM, or PRINT buttons.

Configure the Measurements. The video measurement set performs a group of measurements when you press the MEAS button. The display update rate depends upon the number of measurements made and the presence of valid input signals. You can customize this feature for your application by selecting only the measurements you need.

Perform the following steps to choose measurements that will be performed when you press the MEAS button:

1. CONFIG	2.	3.	4.	5. MEAS
Press the **CONFIG** button.	Select CONFIGURE MEASURE (default). Press the ↵ enter button.	Select the desired measurement. See list below.	Select ON or OFF. Repeat steps 3 and 4 to configure additional measurements.	Press the **MEAS** button to exit.

The following measurements are available:

Differential Phase (DIFF PHASE)

Differential Gain (DIFF GAIN)

Chrominance-Luminance Delay (YC DELAY)

Chrominance-Luminance Gain (YC GAIN)

Signal-to-Noise Ratio (SNR WGT/FLAT)

Frequency Response (FREQ FCC or AVG and FREQ DETAIL)

Group Delay (GRPDLYmax and GRPDLYmin)

Sync Amplitude (SYNC AMPL)

Burst Amplitude (BURST AMPL)

Bar Amplitude (BAR AMPL)

2T K-Factor (2T K-FACTOR)

Luminance Nonlinearity (LUM NON-LIN)

Hum (HUM)

Configure the Zero Carrier Reference Pulse Trigger Output. The Zero Carrier Reference Pulse Trigger Output synchronizes a demodulator when you take hum measurements. You can configure the output to OFF or to any line from 10 – 20 (VM100) or 7 – 20 (VM101).

Perform the following steps to configure the Zero Carrier Reference Pulse Trigger Output:

1. CONFIG	2.	3.	4. MEAS
Press the **CONFIG** button.	Select CONFIGURE ZCR PULSE.	Select OFF or a line number.	Press the **MEAS** button to exit.

Configure the Signal Identification Range. The SIG ID menu displays all of the test signals that are present in the video signal applied to the INPUT connector. You can configure the SIG ID range to match your system requirements (VITS or FULL).

Perform the following steps to configure the SIG ID range:

1. CONFIG	2.	3.	4. MEAS
Press the **CONFIG** button.	Select SIG ID RANGE.	Select VITS or FULL.	Press the **MEAS** button to exit.

NOTE. *After you configure the signal identification range, the video measurement set reacquires the signal.*

Configure the Full Field Start Line. You can configure the video line used for full field start (valid only when the SIG ID range is FULL). With this feature you can view a specific video line within the active area.

Perform the following steps to configure the Full Field Start Line:

1. CONFIG	2.	3.	4. MEAS
Press the **CONFIG** button.	Select FULL FLD START.	Select 23 - 43 (VM100) or 23 – 39 (VM101).	Press the **MEAS** button to exit.

NOTE. *After you configure the full field start line, the video measurement set reacquires the signal if FULL is selected.*

Configure the Reference. You can configure the video measurement set to use either an internally generated sync reference or a signal connected to the EXT REF rear panel input. For example, use an external reference if the video input has no sync information.

Perform the following steps to configure the Reference:

1. CONFIG	2.	3.	4. MEAS
Press the **CONFIG** button.	Select CONFIGURE REF.	Select INPUT or EXTERNAL.	Press the **MEAS** button to exit.

Configure the Hum Measurement (VM100 Only). You can configure the hum measurement to match your power line frequency (VM100 only). The video measurement set configuration must match your power line frequency to produce accurate hum measurement results.

Perform the following steps to configure the hum measurement:

1. CONFIG	2.	3.	4. MEAS
Press the **CONFIG** button.	Select HUM.	Select 50HZ or 60HZ.	Press the **MEAS** button to exit.

Configure the Signal-to-Noise Ratio Filter. The video measurement set provides weighted and flat filter selections for taking signal-to-noise measurements. You can configure the filter type needed for your application.

Perform the following steps to configure the SNR filter:

1. CONFIG	2.	3.	4. MEAS
Press the **CONFIG** button.	Select SNR FILTER.	Select WEIGHTD or FLAT.	Press the **MEAS** button to exit.

Configure for Printing. The video measurement set can drive a printer, computer, or waveform monitor using the RS232 serial port. To print the measurement results, you must configure the RS232 serial port for printer operation and select the parameters that match your printer.

Perform the following steps to configure the RS232 serial port to drive a printer:

1. 	2. 	3. 	4. 
Press the **CONFIG** button.	Select CONFIGURE RS232=.	Select PRINTER.	Press the **MEAS** button to exit.

NOTE. *If the serial port is not configured for printing, the print function is disabled.*

Refer to your printer manual to determine the settings for baud rate, stop bits, parity, and flow control.

Perform the following steps to configure the print parameters:

1. 	2. 	3. 	4. 	5. 
Press the **CONFIG** button.	Select CONFIGURE PRINTER RS232. Press the ↵ enter button.	Choose the appropriate setting for the displayed parameter. See Table 2–2.	Select the next parameter. See Table 2–2. Repeat steps 3 and 4 for all parameters.	Press the **MEAS** button to exit.

Table 2–2: Print parameters

Parameter	Settings
BAUD RATE	1200, 2400, 9600, 19.2K
STOP BITS	1 or 2
PARITY	NONE, EVEN, ODD
FLOW CTL	NONE, XON/XOFF, HARDWARE

Configure for Computer Communications. The video measurement set can drive a computer, printer, or waveform monitor using the RS232 serial port. To send the measurement results to a computer or to set up for remote operation, you must configure the RS232 serial port for computer operation and select the parameters that match your computer interface.

Perform the following steps to configure the RS232 port to drive a computer:

1. CONFIG	2.	3.	4. MEAS
Press the **CONFIG** button.	Select CONFIGURE RS232=.	Select COMPUTER.	Press the **MEAS** button to exit.

NOTE. *Refer to your computer manual to determine the settings for baud rate, stop bits, parity, and flow control.*

Perform the following steps to configure the computer interface parameters:

1. CONFIG	2.	3.	4.	5. MEAS
Press the **CONFIG** button.	Select CONFIGURE COMPUTER RS232. Press the ↵ enter button.	Choose the appropriate setting for the displayed parameter. See Table 2–3.	Select the next parameter. See Table 2–3. Repeat steps 3 and 4 for all parameters.	Press the **MEAS** button to exit.

NOTE. *If* COMPUTER *was not selected at power on, you will experience a short delay when scrolling through the* CONFIGURE RS232 *menu choices.*

Table 2–3: Computer interface parameters

Parameter	Settings
BAUD RATE	1200, 2400, 9600, 19.2K
STOP BITS	1 or 2
PARITY	NONE, EVEN, ODD
FLOW CTL	NONE, XON/XOFF, HARDWARE

Configure for Waveform Monitor Control Function. The video measurement set can drive a computer, printer, or 1740A-series waveform monitor using the RS232 serial port. The waveform monitor control function allows you to view the waveform on a 1740A-series waveform monitor while the video measurement set measures the signal parameters.

Perform the following steps to configure the RS232 port to drive a waveform monitor:

1. CONFIG	2.	3.	4. MEAS
Press the **CONFIG** button.	Select CONFIGURE RS232=.	Select CONTROL.	Press the **MEAS** button to exit.

Configure the Date. The video measurement set keeps track of the date. Perform the following steps to change the date setting:

1. CONFIG	2.	3.	4.	5. MEAS
Press the **CONFIG** button.	Select CONFIGURE <DATE>. Press the ↵ enter button.	Choose the appropriate setting for the displayed parameter. See Table 2–4.	Select the next parameter. See Table 2–4. Repeat steps 3 and 4 for all parameters.	Press the **MEAS** button to exit.

Table 2–4: Date parameters

Parameter	Settings
YEAR	1990 through 2089
MONTH	JAN through DEC
DAY	1 through 31

Configure the Time. The video measurement set keeps track of the time. Perform the following steps to change the time setting:

1. CONFIG	2.	3.	4.	5. MEAS
Press the **CONFIG** button.	Select CONFIGURE <TIME>. Press the ↵ enter button.	Choose the appropriate setting for the displayed parameter. See Table 2–5.	Select the next parameter. See Table 2–5. Repeat steps 3 and 4 for all parameters.	Press the **MEAS** button to exit.

Table 2–5: Time parameters

Parameter	Settings
HOUR	01AM to 12AM and 01PM to 12PM
MINUTE	00 to 59

Adjust the LCD View Angle. You can adjust the viewing angle of the LCD display for the best readout with your lighting conditions. To change the viewing angle, place the video measurement set in the lighting conditions where you will use it and then perform the following steps:

1. 	2. 	3. 	4. 
Press the **CONFIG** button.	Select CONFIGURE VIEW ANGLE.	Select 0 through 180 for best LCD display.	Press the **MEAS** button to exit.

Display the Software Version Number. You can view the software version number for the operating system installed in this video measurement set. Refer to this number if you need to report a software problem or order a software upgrade. The software version displayed here should correspond to the version number(s) printed on the title page of this manual.

Perform the following steps to view the software version number:

1. 	2. 	3. 
Press the **CONFIG** button.	Select CONFIGURE SW VER.	Press the **MEAS** button to exit.

Calibration. If you inadvertently enter the CALIBRATE menu, use the following steps to exit the menu without changing internal video measurement set settings:

1. 	2. 
Select PRESS ↵ TO ABORT CAL.	Press the ↵ enter button to exit the menu.

***NOTE**. Refer to the* Adjustment Procedures *section for test equipment requirements and detailed adjustment instructions.*

Theory of Operation

This section describes the electrical operation of the video measurement set using the major circuit blocks or modules.

This section is divided into the following parts:

- *Logic Conventions* describes how logic functions are discussed and represented in this manual.
- *Block Level Description* describes circuit operation to the functional block level.
- *Detailed Circuit Description* on page 3–3 describes circuit operation to the circuit and component level.

Logic Conventions

This manual refers to digital circuits with standard logic symbols and terms. All logic functions use the positive-logic convention: the more positive of the two logic levels is the high state, and the more negative level is the low state. The specific voltages that constitute a high or low state may vary among the electronic devices.

A back slash prefixed to the signal name (/RESET) indicates active-low signals. Signal names can be either active high, active low, or have both active-high and active-low states.

Block Level Description

Refer to Figure 9–2, the detailed block diagram found on page 9–4, when reading the block-level description. The description explains the basic operation of each circuit block. If you need more detailed information, refer to the *Detailed Circuit Description* on page 3–3 and the component-level circuit diagrams found in the *Diagrams* section.

DC Restore The DC Restore circuit selects AC or DC input coupling and clamps the backporch level of the video signal when AC coupling is active. To terminate the INPUT the user must install a 75 Ω device to the unused INPUT connector.

Sync Stripper The Sync Stripper consists of a reference select circuit and three sync separators. The reference select circuit chooses either the INPUT video signal or an external signal for the sync reference. The sync separator uses the selected sync reference to generate composite, vertical, and horizontal sync signals.

Gain, DC Offset, and Filtering

The Gain, DC Offset, and Filtering block provides signal processing to the input video signal. The circuit selects one of three input filters, and also provides an anti-aliasing filter to remove unwanted signal components from the A/D Converter input. Under host processor control, the circuit provides fixed gain, variable gain, and variable DC offset for the video signal.

Phase Lock Loop

The Phase Lock Loop synchronizes signals within the video measurement set to a known reference. Either the video signal from the INPUT, or an external reference applied to the EXT REF input, can be used. The Phase Lock Loop locks to either the sync or burst signals.

Analog-to-Digital Converter

The Analog-to-Digital (A/D) Converter converts the analog video signal into 10-bit digital words. The conversion rate is 8 times the subcarrier frequency.

Digital Signal Processor

The Digital Signal Processor (DSP) system is a coprocessor that makes rapid calculations using the acquired data. Processed waveform data from the DSP is available for use by the host processor.

Acquisition Control

The Acquisition Control stores data from the A/D Converter into waveform memory. It also controls the real-time aspects of acquisition such as bus arbitration phase lock operation, gain and DC offset settings.

Host Processor and Memory

The host processor controls the main operating system functions including acquisition, front panel control, and the LCD display. The operating system stored in Flash EPROM can be upgraded through the RS232 port using an external PC controller.

Remote Interface (RS232)

The Remote Interface (RS232) drives the rear-panel RS-232 connector for remote operation.

Front Panel

The Front Panel contains a 13-switch keypad and 8 LED indicators. The host processor reads the front panel registers to detect switch closures, and writes to the registers to change the status of LED indicators.

LCD Display

The LCD Display provides displays of the measurement results, signal identification codes, and configuration parameters. The host processor provides signals to control the display and set the LCD viewing angle.

Power Supply

The Power Supply provides +12 V, –12 V, and +5 V.

Detailed Circuit Description

This detailed circuit description explains the function of each major circuit. Use this description to help you isolate faults when troubleshooting. As you read the description, refer to the component-level circuit diagrams found in the *Diagrams* section.

DC Restore

The DC Restore circuit (diagram 1) consists of the Video Input and Input Amplifier. These circuits combine to perform the following functions:

- Select AC or DC input coupling
- Clamp the backporch level of the video signal

Video Input. The video signal to be measured connects to loop-through INPUT connectors at either J30 or J31. The unused connector must be terminated with 75 Ω. Transistors Q2 and Q3 establish the coupling mode. When the AC/DC SEL line is high, C58 AC-couples the signal to amplifier U17. Acquisition Control FPGA U99 (diagram 4) controls the AC/DC SEL line. Switching occurs to accommodate the requirements of signal measurement modes.

Input Amplifier. Input Amplifier U17 (diagram 1) clamps the backporch level of the video signal. Signal clamping determines the DC level measured at TP9. When the amplifier is operating, the DC level at TP9 is equal to the video backporch level at U17 pin-3, minus the voltage across sampling capacitor C13. An operational amplifier within U17 performs the subtraction using R60 to feed back the sample-and-hold output (buffered voltage on C13) to pin-1, the negative input of the operational amplifier.

The CLAMP_PLS signal (from U31, diagram 2) goes low during the backporch interval while U17 and C13 sample and hold the back porch level of the incoming video. As a result, the backporch level of the clamped video is zero volts. The OFFSET signal from U30C (diagram 4) can then control the negative input (pin 6) of the sample-and-hold amplifier to establish the DC level of the clamped video.

When switch U18A is closed, the DC restore circuit is disabled. The DCREST_ON signal from U99 (diagram 4) disables the DC Restore circuit. When the switch is closed, sampling capacitor C13 charges to the OFFSET voltage. As a result only the OFFSET voltage is subtracted from the input video signal, under normal conditions the sum of the backporch level and the OFFSET voltage are subtracted.

Sync Stripper

The Sync Stripper (diagrams 1 and 2) consists of a Reference Select circuit and three Sync Separators. The Reference Select circuit chooses either the internal video signal or an external signal for the sync reference. The Sync Separators use the selected sync reference to generate composite, vertical, and horizontal sync signals.

Reference Select. The selected sync reference signal controls video timing within the video measurement set. Video switch U14 selects either the INT VIDEO signal or an external signal connected to the EXT REF input. The INT/EXT signal from U99 (diagram 4) controls U14. When INT/EXT is high, the INT VIDEO signal is selected.

Composite Sync Separator. The REF_VIDEO output from U16 drives pin-12 of composite sync separator U6. From this input, U6 generates the COMP_SYNC (horizontal and vertical composite synchronization) and BPSAMP (back porch sample) signals at pin-24 and pin-28, respectively.

An AGC (automatic gain control) circuit within U6 compensates for low- or high-gain input signals. Capacitor C55 samples and provides feedback of the sync amplitude for the AGC circuit.

Vertical Sync Separator. Active filter U85A filters the COMP_SYNC signal, and the combination of CR86, R172, and C213 provide envelope following. The filter integrates the broad pulses of the vertical interval so that during the vertical sync interval, the filter output goes lower than the output of the envelope follower. For PAL signals, a low NTSC/PAL signal from U99 (diagram 4) increases the filter time constant by adding C24 to the filter.

Comparator U85B compares the input and the output of the envelope follower. Buffer U87A buffers the output and shifts the logic level for CMOS compatibility. The resulting FIELD signal (at TP16) reflects the vertical sync rate.

Horizontal Sync Separator. U31 (diagram 2) uses the COMP_SYNC signal to generate the horizontal sync (HSYNC) signal. HSYNC is output on pin 8.

Gain, DC Offset, and Filtering

Figure 3–1 shows a simplified diagram of the Gain, DC Offset, and Filtering block. This block provides signal processing to the input video signal. It consists of the the Filter Select and Analog Processing circuits, which perform the following functions:

- Filter select
- Gain
- DC offset
- Anti-aliasing filter

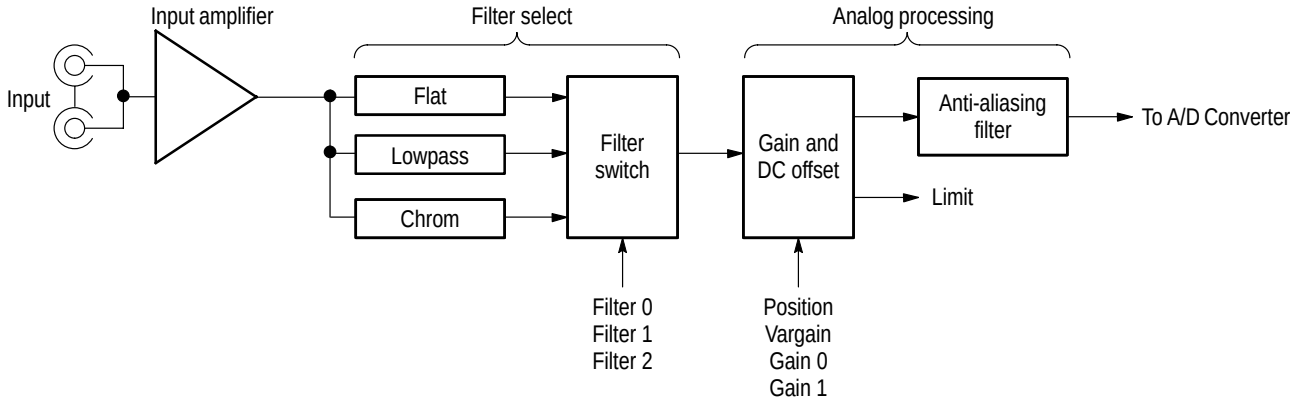


Figure 3–1: Simplified view of Gain, DC Offset, and Filtering block

Filter Select. Multiplexer U10 (diagram 1) selects one of three filtered signals to drive the A/D Converter: INT VIDEO (flat), CHROM (chrominance), and LUM (lowpass). Control lines FILTER0, FILTER1, and FILTER2 from U99 (diagram 4) select the filter.

The flat filter output signal (INT VIDEO) is taken directly from pin-14 of input amplifier U17. Operational amplifiers U13 and U14 form a lowpass filter used to generate the LUM signal for the hum measurement. Buffer U20 and its surrounding components form a bandpass filter to generate the CHROM (chrominance) signal.

Analog Processing. The Analog Processing circuit controls gain and offset. The circuit also filters the video signal before routing it to the A/D Converter. A Gilbert gain cell within U5 provides variable gain, and switches within U5 control fixed gain. The VARGAIN signal from U29C (diagram 4) controls variable gain, while GAIN0 and GAIN1 from U99 control fixed gain.

The Analog Controls circuit (U29D) generates the POSITION signal to rapidly change the DC offset at the output of U5. The OFFSET signal (U17 pin-6) also adjusts DC offset but has a slower response time because it serves as the reference for the DC Restore circuit.

After U5 sets gain and DC offset, buffer U9 converts the current output signal to a voltage. The signal is then applied to an anti-aliasing filter consisting of inductors L11, L12, and the surrounding components. The filter removes signal components whose frequencies exceed 4-times the subcarrier frequency (the Nyquist frequency at the 8-times subcarrier frequency sampling rate of the A/D Converter).

The LIMIT signal generated by U84 provides status information to the Acquisition Control circuit (diagram 4). If the video signal limits due to low or high signal amplitude, the LIMIT signal goes high.

Phase Lock Loop

The Phase Lock Loop circuit synchronizes signals within the video measurement set to a known reference. Either the video signal from the INPUT, or an external reference applied to the EXT REF input can be used. The Phase Lock Loop contains circuits for locking to the sync and burst signals.

The Phase Lock Loop circuits use a common voltage-controlled crystal oscillator (VCXO). They also contain phase detectors, a counter/divider circuit for synthesizing burst, h-sync, and a multiplexer for selecting either subcarrier burst phase error or horizontal synchronization phase error signals.

VCXO. VCXO Y1 (diagram ◇2◇) is the controlled oscillator within the loops. The crystal frequency is 28.63636 MHz for the VM100 and 35.46895 MHz for the VM101. Control line SYNC/BURST from U31 selects which error voltage source (sync or burst) will control the VCXO through switch U120.

The output of the VCXO is a 50% ±5% duty cycle square wave at 8-times the subcarrier frequency. Comparator U116 buffers the VCXO output to create both positive (8FSC_IN) and negative (/8FSC_IN) polarities with very low time skew.

Buffer U12A and comparators U113C and U113D form a window comparator that senses when a loop is unable to achieve lock. When the error voltage at TP19 reaches either the upper (+4 V) or lower (+1 V) limit, U113C or U113D sets the /PLL RANGE signal low. When this occurs, U31 attempts to close the loop. If unable to reestablish a locked loop, U31 asserts the /UNLOCKED line to alert the acquisition system of the unlocked condition.

U31 generates miscellanious video line-based timing signals for use during acquisition. It also generates the 2 MHz square wave DSP_RCK signal. DSP U48 (diagram ◇3◇) uses the DSP_RCK signal as its phase-lock loop input. The DSP clock has a known frequency relationship to the sample (A/DC) clock when it locks to the DSP_RCK signal.

Sync-Locked Loop. Error amplifiers U26A and U26B form the horizontal synchronization signal (h-sync) phase detector for the Sync-Locked Loop. When in sync locked mode, U31 sets the SYNC/BURST signal high to control the VCXO from U26B pin-7.

Within U31, the 8FSC_IN signal from U116 is divided to one-half the h-sync frequency. The HSYNC signal is also divided by two within U31. Both signals are applied to a phase detector that produces outputs on pin-4 and pin-5 to drive error amplifier U26A.

Burst Locked Loop. The Gilbert multiplier section of U118 serves as the burst phase detector for the Burst Locked Loop. U118 detects errors between the REF_VIDEO signal and the synthesized FSC burst frequency signal from U31.

After level shifting and buffering by Q7, Q6 and U12B, the phase error signal passes through switch U120 to control the VCXO. U31 sets the SYNC/BURST signal low to close the switch.

U31 generates the BP_GATE signal by counting the 8FSC_IN signal edges with reference to HSYNC. The BP_GATE signal gates the burst phase detector through gates U119A and U119B. To achieve lock, U31 divides the 8FSC_IN signal from the VCXO to the subcarrier frequency, producing the FSC and /FSC signals which are compared to REF_VIDEO by phase detector U118.

A/D Converter

A/D Converter U22 (diagram 3) converts the VIDEO signal into 10-bit digital words. The conversion rate is 8-times the subcarrier frequency, controlled by the 8FSC signal. During acquisition, Aquisition Control FPGA U99 (diagram 4) enables tri-state buffers U38 and U39 to drive the DSP data bus with the A/D Converter output. The A/D Converter is part of the Acquisition and DSP system within the video measurement set. Figure 3–2 shows a simplified view of the system.

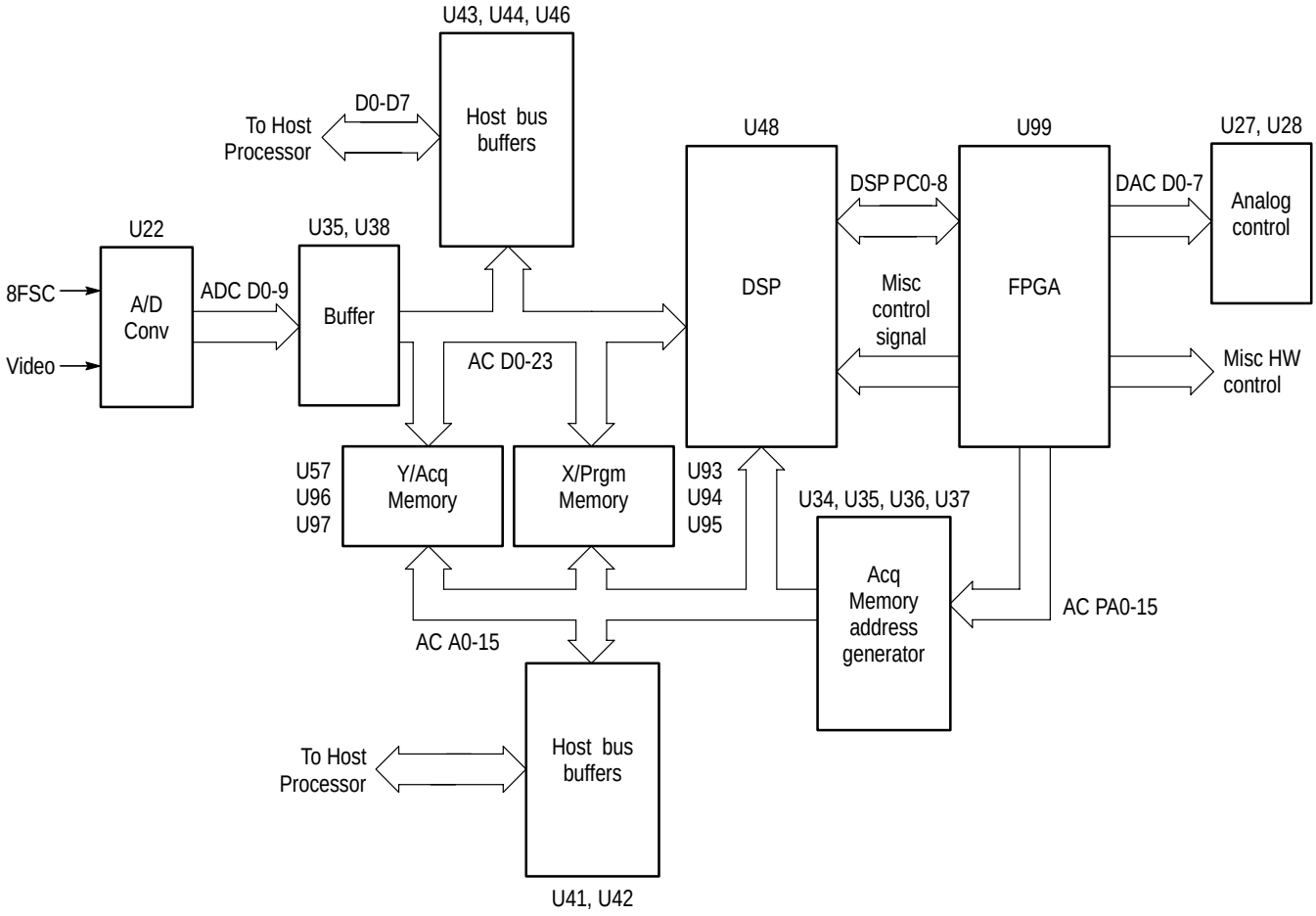


Figure 3–2: Acquisition and DSP system

Digital Signal Processor (DSP)

The Digital Signal Processor (DSP) system is a coprocessor that makes rapid calculations using the acquired data. It follows instructions provided by the host processor to process the waveform data, and to make the data available to the host processor.

The DSP system consists of the following circuits:

- Acquisition Memory
- X/Program Memory
- Digital Signal Processor (DSP)

Acquisition Memory. The Acquisition Memory (U57, U96, and U97 on diagram ◇3◇) stores the signal amplitude (Y-axis) data output by A/D Converter U22. The A/D Converter writes data words to Acquisition Memory through tri-state buffers U38 and U39. The host processor also accesses Acquisition Memory

through tri-state transceivers U41, U42, U43, U44, and U46. The memory is 24-bits wide and 64K words deep. It resides in the native Y-memory space of DSP U48 and the host processor.

X/Program Memory. The X/Program Memory (U93, U94, U95 on diagram 3) stores the DSP program provided by the host processor and the address locations (X-axis) of the acquired signal data. The host processor also accesses Acquisition Memory through tri-state transceivers U41, U42, U43, U44, and U46. The X/Program memory is 24-bits wide and 64K words deep.

Digital Signal Processor (DSP). Digital Signal Processor (DSP) U48 (located on diagram 3) is a coprocessor that makes rapid calculations using the acquired data. The DSP communicates directly with the host processor through its host port located in host memory space. The DSP also communicates with the host processor by writing measurement results to X-memory and signalling the host to read it. Acquisition Control FPGA U99 (diagram 4) controls bus arbitration, a process that removes the DSP from the bus during acquisition and host access.

The host processor loads the DSP program into DSP program memory (U93, U94, and U95). After the program is loaded, it begins with initialization which includes the following tasks:

- Program the internal phase lock loop (U31 on diagram 2) to lock to the DSP_RCK signal. (When locked, LED DS1 on diagram 3 turns on.)
- Copy internal X-constant and Y-constant data from external X-memory and Y-memory, if needed

After initialization, the DSP waits for host commands through the host port.

Acquisition Control

Acquisition Control FPGA U99 (diagram 4) stores data from the A/D Converter into waveform memory. It also controls the real-time aspects of acquisition including the following:

- Implement bus arbitration between the DSP, host processor, and A/D Converter
- Control settings for the Gain, DC Offset, and Filtering block and the Phase Lock Loop
- Check the status of the Gain, DC Offset, and Filtering block and the Phase Lock Loop

Acquisition Control FPGA U99 counts video lines and fields based on the HSYNC and FIELD signals from the Sync Stripper circuit. The host processor programs registers within U99 that control the following parameters:

- Line and field where acquisition will start
- Number of lines to acquire
- Acquisition of sync tip for the hum measurement

Host Processor and Memory

The host processor (diagram 5) controls the main operating system functions including acquisition, front panel functions, and the LCD display. Figure 3–3 shows a simplified view of the system.

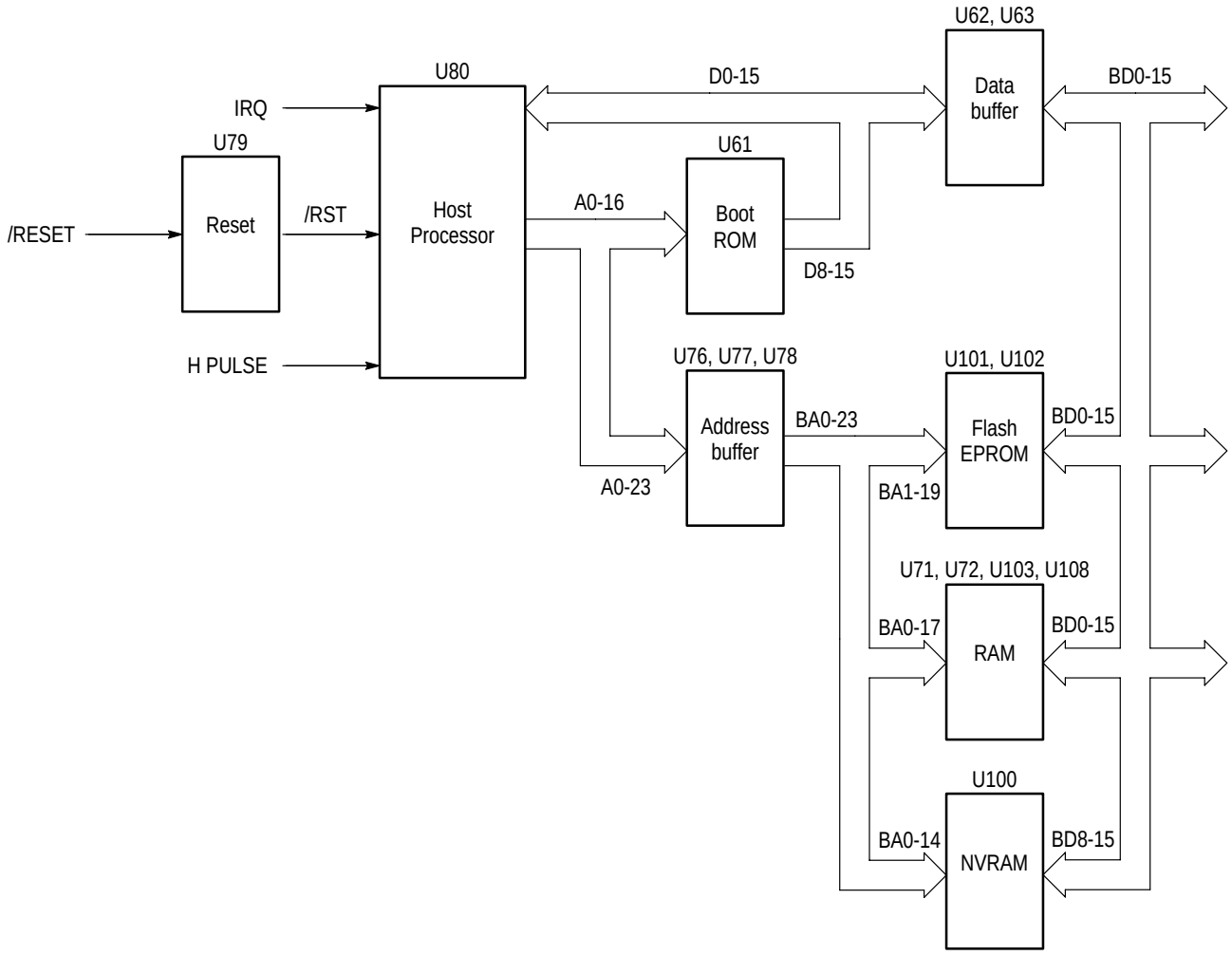


Figure 3–3: Host processor and memory system

Host processor U80 receives initial instructions from boot ROM U61, which connects directly to the address bus. All other memory and peripheral devices reside on one of two external buses:

- System memory bus, which includes SRAM (U71, U72, U103, and U108), NVRAM (U100), and Flash EPROM (U101 and U102)
- DSP bus, which includes DSP U48, Acquisition Control FPGA U99, Acquisition Memory, and X/Program Memory

Reset circuit U79 (diagram 5) synchronizes the system reset function and ensures that the host processor powers up to a known state. The +5 V supply connects to U79 pin-7. When power is turned on, U79 holds the /RST signal on pin-5 low until the +5 V supply reaches a safe operating level. The /RST signal controls the host processor reset (U80 pin-69). If the +5 V supply drops below normal limits, U79 asserts the /RST line low so the host processor can initiate the power-down sequence. Buffer U66A routes the /RESET signal to DSP U48, Acquisition Control FPGA U99, and RS-232 DUART IC U115.

The host processor performs system diagnostics during the power-on sequence. When power is turned on, the reset circuit (U79) ensures that the host processor powers up to a known state. The host processor then runs the program in boot ROM U61 to execute the diagnostics as shown in Table 3–1.

Table 3–1: Power-on diagnostics

Diagnostic Test	Indication of Successful Test
Initialize the memory mapped I/O and bus control logic (program the internal chip select logic and interrupts)	LED DS2 blinks one time
Checksum test for boot ROM U61	LED DS2 blinks one time
Host Processor enables the external data and address buses (U62, U63, U66, U70, U73, U76, U77, U78)	LED DS2 blinks two times
Host Processor testing the system SRAM U71, U72, U103, U108 (excluding acquisition and DSP memory)	LED DS2 blinks three times
The program then switches to Flash EPROM memory (U101 and U102) for normal operation.	LCD Display is enabled; LED DS2 blinks five times

Remote Interface (RS232)

The host processor communicates with the RS-232 port through DUART IC U115 and RS232 transceiver U112 (diagram 6). DUART IC U115 converts 8-bit parallel data from the host processor to serial data for transmission. It also converts serial data received from the remote interface to 8-bit parallel data.

In addition to buffering the data, DUART IC U115 generates an interrupt on IRQ5 whenever data is received or transmitted. Transceiver U112 converts signals to the levels required for internal and external devices. DUART IC U115 requires CMOS levels and external devices require RS232 logic levels.

Rotary switch S1 controls the RS232 serial interface pin selection for the TX (Transmit Data) and RX (Receive Data) lines. The switch is set at the factory to the clockwise position (pointing to DEFAULT label on the circuit board).

Front Panel

The front panel board (A1) contains a 13-switch keypad and eight LED indicators. The host processor reads and writes the control data through a two-way serial bus. Once every 20 ms, the host processor latches the keypad data into shift registers U2 and U3 (diagram 8). The host processor then clocks U2 and U3 to generate the serial FPMISO signal, which it reads to determine the switch status. Each closed switch produces a low bit within the serial FPMISO string. When LED status changes are required, the host processor loads shift register U1 with an 8-bit control string (BMOSI).

Buffer U74 (diagram 6) routes the clock and serial data to the front panel board (A1). Decoder U75 performs the address decoding for the serial bus.

LCD Display

The LCD board (A4) contains the LCD display (diagram 6). Built-in drivers on the board connect to the microprocessor bus as an 8-bit port. Shift register U122 lengthens and inverts the chip select signals for compatibility with the LCD. The LCD_ANGLE signal from U30D (diagram 4) controls the LCD viewing angle as viewed from top to bottom.

Power Supply

The power supply board (A3) supplies +12 V, –12 V, and +5 V to the main board (A2). Voltage regulators on the main board (diagram 7) post-regulate the +12 V supply to +8 V, and the –12 V supply to –8 V and –5 V.

A switching regulator consisting of U124 and Q123 provides greater efficiency for the –5 V supply. Switching regulator U124 turns on FET pair Q123 often enough to charge C293 to an average of –5 V. This forces VFB at pin-2 to equal the VREF level at pin-8. A second-order filter formed by L21 and C290 passes the average (low frequency) value to pin-2 (VFB) of U124 through amplifier Q9 and resistors R365 and R366. L20 and C289 provide additional filtering.

Performance Verification

This section contains information needed to test the performance of the video measurement set. The procedure tests each characteristic that is designated as checked (REQ) in *Specifications*.

The Performance Verification Procedure is divided into the following parts:

- *General Information* on page 4–1 provides basic information you need before performing the tests
- *Prerequisites* on page 4–2 describes conditions that must be met before performing the tests
- *Equipment Required* on page 4–2 lists the test equipment you need to perform the tests
- *Test Record* on page 4–3 provides a way to record the test results
- *Performance Verification Procedure* on page 4–4 provides the procedures needed to test the video measurement set

General Information

Read the following information before performing the *Performance Verification Procedure*.

Purpose

This procedure verifies that the video measurement set performance is in conformance with the specifications that are designated as checked (REQ) in *Specifications*.

Test Interval

Generally, you should perform these procedures once a year to ensure that the video measurement set is operating within specified parameters. In addition, perform the procedures after module replacement.

Prerequisites

The tests in this section comprise a valid confirmation of performance and functionality when the following requirements are met:

- The video measurement set was last adjusted at an ambient temperature between +20° C and +30° C and is operating at an ambient temperature between 0° C and +50° C.
- For operating temperatures below +20° C, you must allow a warmup period of 25 minutes (no warmup time is needed for temperatures at or above +20° C).
- The cabinet is installed on the video measurement set.
- The video measurement set is in an environment within the limits described in Table 1–6 on page 1–5.

Equipment Requirements

These procedures use external, traceable signal sources to directly test characteristics that are designated as (REQ) in *Specifications*. Table 4–1 shows the required test equipment.

Table 4–1: Test Equipment

Item Description	Minimum Requirements	Example
Test Signal Generator	Amplitude accuracy: ± 0.5% Differential phase: ± 0.3° Differential gain: ± 0.3% K-factor: ± 0.3% Chroma delay: 2.5 ns Chroma gain: ± 0.5% Luminance nonlinearity: ± 0.4% Group delay: ≤ 3 ns Frequency response: ± 0.05 dB from 0.5 – 4.8 MHz, ± 0.06 dB at 5.8 MHz	Tektronix TG 2000 with the AVG module
Cable, Precision 75 Ω Coaxial	75 Ω, 42 in, male-to-male BNC connectors	Tektronix part number 012–0074–00
Termination, 75 Ω	75 Ω, male BNC connector	Tektronix part number 011–0102–01

Test Record

Use this form to record the results of the *Performance Verification Procedure* for the video measurement set.

Serial Number	Procedure Performed By	Date

Procedure Step	Requirement	Test Result
Differential Phase	±1.0°	
Differential Gain	±2.0%	
Sync Amplitude	±1%	
Burst Amplitude	±1%	
Bar Amplitude	±1%	
2T K-Factor	≤2 %	
Chroma-Luma Delay	±10 ns	
Chroma-Luma Gain	±2.0%	
Luminance Nonlinearity	±1%	
Max Group Delay	0 to 20 ns	
Min Group Delay	0 to –20 ns	
Frequency Response		
FREQ FLAG	±1%	
FREQ #1	±0.2 dB	
FREQ #2	±0.2 dB	
FREQ #3	±0.2 dB	
FREQ #4	±0.2 dB	
FREQ #5	±0.2 dB	
FREQ #6	±0.2 dB	

Performance Verification Procedure

This section provides the procedures needed to test the video measurement set. If you are not familiar with the operation of the video measurement set, read the *Operating Information* section before proceeding.

These procedures test the NTSC (VM100) and PAL (VM101) versions of the video measurement set. When the requirements and measurement results are not the same for the VM100 and VM101, the procedure will specify the differences.

***NOTE**. When instructed, verify that the signal displayed on the video measurement set is within the specified percentage of the generator signal.*

Initial Setup

Perform the following steps to power on the equipment:

1. Connect the output of the test signal generator to the rear-panel input of the video measurement set, as shown in Figure 4–1. If you are using a TG 2000 generator, configure the AVG1 module for a composite output on all channels and connect the cable to any of the AVG1 outputs.
2. Power on the test signal generator and the video measurement set. Allow at least a 15 minute warm-up period before proceeding.

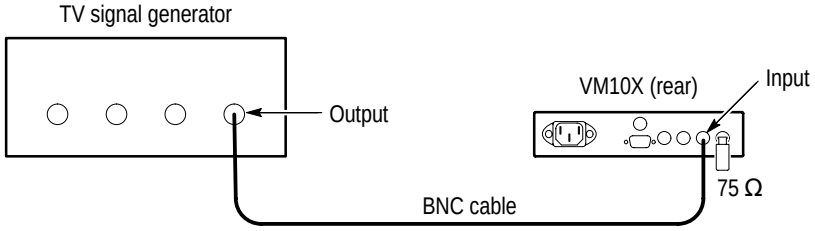


Figure 4–1: Initial setup for the PV procedure

Configure the Video Measurement Set

Perform the following steps to select measurements the video measurement set will perform during the *Performance Verification Procedure*:

1. On the video measurement set, press the AVG button to turn averaging on (LED is illuminated).
2. Press the CONFIG button.
3. Press the ↵ enter button to enter the CONFIG MEAS submenu.

***NOTE**. All measurements must be configured to ON except for SNR and HUM.*

4. Press the ↓ arrow button to scroll through the CONFIG MEAS submenu. Press the → arrow button to turn off the SNR and HUM measurements.
5. Press the MEAS button to exit the menu.

Signal Identification Test

Perform the following steps to test the signal identification feature:

1. On the video measurement set, press the SIG ID button. Verify that the LED in the center of the button is illuminated.
2. Press the ↓ arrow button to scroll through the SIG ID menu. Verify that all of the signal names and locations match the VITS signals generated by the test signal generator.

Differential Phase Test

Perform the following steps to test the differential phase measurement accuracy:

1. Set the test signal generator to produce the following signal:
   - VM100: NTC7 Composite signal
   - VM101: CCIR 330 signal
2. On the video measurement set, press the MEAS button and check that the LED in the center of the button is illuminated.
3. Verify that the displayed differential phase is within ±1.0°.

Differential Gain Test

Perform the following steps to test the differential gain measurement accuracy:

1. Set the test signal generator to produce the following signal:
   - VM100: NTC7 Composite signal
   - VM101: CCIR 330 signal
2. On the video measurement set, press the ↓ arrow button to scroll to the DIFF GAIN measurement screen.
3. Verify that the displayed differential gain is within ±2.0%.

Sync Amplitude Test

Perform the following steps to test the sync amplitude measurement accuracy:

1. Set the test signal generator to produce the following signal:
   - VM100: NTC7 Composite signal
   - VM101: CCIR 330 signal

2. On the video measurement set, press the ↓ arrow button to scroll to the SYNC AMPL measurement screen.
3. Verify that the displayed sync amplitude is within ±1%.

Burst Amplitude Test

Perform the following steps to test the burst amplitude measurement accuracy:

1. Set the test signal generator to produce the following signal:
   - VM100: NTC7 Composite signal
   - VM101: CCIR 330 signal
2. On the video measurement set, press the ↓ arrow button to scroll to the BURST AMPL measurement screen.
3. Verify that the displayed burst amplitude is within ±1%.

Bar Amplitude Test

Perform the following steps to test the bar amplitude measurement accuracy:

1. Set the test signal generator to produce the following signal:
   - VM100: NTC7 Composite signal
   - VM101: CCIR 330 signal
2. On the video measurement set, press the ↓ arrow button to scroll to the BAR AMPL measurement screen.
3. Verify that the displayed bar amplitude is within ±1%.

2T K-factor Test

Perform the following steps to test the 2T K-factor measurement accuracy:

1. Set the test signal generator to produce the following signal:
   - VM100: NTC7 Composite signal
   - VM101: CCIR 330 signal
2. On the video measurement set, press the ↓ arrow button to scroll to the 2 T K-FACTOR measurement screen.
3. Verify that the displayed measurement is ≤2%.

Chrominance-to-Luminance Delay Test

Perform the following steps to test the chrominance-to-luminance delay measurement accuracy:

1. Set the test signal generator to produce the following signal:
   - VM100: NTC7 Composite signal
   - VM101: CCIR 17 signal

2. On the video measurement set, press the ↓ arrow button to scroll to the YC DELAY measurement screen.
3. Verify that the displayed delay is within ±10 ns.

Chrominance-to-Luminance Gain Test

Perform the following steps to test the chrominance-to-luminance gain measurement accuracy:

1. Set the test signal generator to produce the following signal:
   - VM100: NTC7 Composite signal
   - VM101: CCIR 17 signal
2. On the video measurement set, press the ↓ arrow button to scroll to the YC GAIN measurement screen.
3. Verify that the displayed chrominance-to-luminance gain is within ±2.0%.

Luminance Nonlinearity Test

Perform the following steps to test the luminance nonlinearity measurement accuracy:

1. Set the test signal generator to produce a Luminance 5 Step signal.
2. On the video measurement set, press the ↓ arrow button to scroll to the LUM NON-LIN measurement screen.
3. Verify that the displayed luminance linearity is within ±1%.

Group Delay Test

Perform the following steps to test the group delay measurement accuracy:

1. Set the test signal generator to produce the following signal:
   - VM100: Philips ® GCR or Sinx/x signal
   - VM101: Philips ® GCR or Sinx/x signal
2. On the video measurement set, press the ↓ arrow button to scroll to the GRPDLYmax measurement screen.
3. Verify that the displayed max group delay is 0 to 20 ns.
4. Press the ↓ arrow button to scroll to the GRPDLYmin measurement screen.
5. Verify that the displayed min group delay is 0 to –20 ns.

NOTE. If your TV test signal generator does not provide measurements in dB, use the following equation to convert the signal generator's frequency packet amplitude to dB before proceeding to the Frequency Response test:

$$\textit{Characterized pkt (dB)} = 20 \log \frac{[\textit{pkt (charact)}] \times [\%\textit{flag} \div 100\%]}{[\textit{flag (charact)}]}$$

pkt (charact) is the amplitude of a specific packet
% flag is the size of the packet relative to the flag element (typically 100%)
flag (charact) is the amplitude of the flag element of multiburst

Frequency Response Test

Perform the following steps to test the frequency response measurement accuracy:

1. Set the test signal generator to produce the following signal:
   - VM100: multiburst signal
   - VM101: CCIR18 signal
2. On the video measurement set, press the ↓ arrow button to scroll to the FREQ FLAG measurement screen.
3. Verify that the displayed amplitude is within ±1%.
4. Press the ↓ arrow button to scroll to the FREQ #1 measurement screen.
5. Verify that the displayed amplitude is within ±0.2 dB.
6. Repeat steps 4 and 5 for the FREQ #2, FREQ #3, FREQ #4, FREQ #5, and FREQ #6 measurement results.

Adjustment Procedures

This section contains information needed to adjust the video measurement set. The CONFIGURE CALIBRATION menu that you access by pressing the CONFIG button contains built-in adjustment instructions.

General Information

The *Adjustment Procedures* are divided into the following sections:

- *Requirements for Performance* provides general information about adjusting the video measurement set
- *Equipment Required* on page 5–2 provides a list of equipment required to perform the adjustments
- *Adjustment Procedure* on page 5–3 provides a summary of the built-in adjustment procedure, and illustrations that show the test equipment setups

Purpose

This procedure returns the video measurement set to conformance with the warranted characteristics listed in the *Specifications* section. The procedure can also be used to optimize the performance of the video measurement set.

Adjustment Interval

As a general rule, these adjustments should be done once a year. In addition, you may need to perform the adjustment procedure after the removal or replacement of a module, depending on the module serviced. See Table 5–1 for details.

Table 5–1: Adjustments after repair

Module Replaced	Adjustment Required
front panel board (A1)	No
main board (A2)	Yes
power supply board (A3)	Yes
LCD board (A4)	No

Requirements

Before performing the *Adjustment Procedures*, meet the following requirements.

Personnel Only trained service technicians should perform this procedure.

Warmup Period The video measurement set requires a 15-minute warmup time in a +20° C to +30° C environment before it is adjusted.

***NOTE**. Adjustments performed before the operating temperature has stabilized may cause errors in performance.*

Access Do not remove the top cover to perform this procedure.

Required Test Equipment Table 5–2 lists the test equipment required to adjust the video measurement set.

Table 5–2: Required test equipment

Item Description	Minimum Requirements	Example
Test Signal Generator	Produces NTSC (for VM100) or PAL (for VM101) signal with burst and sync. Accuracy equivalent to the Tektronix TG 2000.	Tektronix TG 2000 with the AVG module
Voltage Reference	Amplitude error: Within 2 mV for all settings from –715 mV to +715 mV, including 0 V	Data Precision 8200
Cable, Precision 75 Ω Coaxial (2 required)	75 Ω, 42 in, male-to-male BNC connectors	Tektronix part number 012–0074–00
Termination, 75 Ω	75 Ω, male BNC connector	Tektronix part number 011–0102–01
Connector, Dual-Banana	Female BNC to dual banana	Tektronix part number 103–0090–00

Adjustment Procedure

This section explains how to adjust the video measurement set.

NOTE. *Rotary switch A2S1 sets the proper signal connections to the RS-232 serial interface. Be sure the switch is set to the fully clockwise position (pointing to DEFAULT label on the circuit board).*

Interrupting the Adjustments

You can exit the adjustment procedure at any step by pressing the ↵ enter button. If you exit the adjustment procedure before it completes, the video measurement set displays the message "CAL & MEAS INVALID." Under these conditions, the video measurement set could display inaccurate measurement results.

NOTE. *To avoid inaccurate measurement results, do not perform measurements when the message,* "CAL & MEAS INVALID," *is displayed.*

To restore the previously saved calibration data, turn off the video measurement set and then turn it on again.

Performing the Adjustments

When using the built-in adjustment procedure, you will not manually adjust the circuits. Instead, the video measurement set adjusts its internal circuits using external DC voltages you provide in response to prompts on the LCD display. Your role is to connect the test signals and to instruct the video measurement set to continue. Upon successful completion of the adjustment procedure, the video measurement set automatically loads the new calibration data into memory.

Perform the following steps to adjust the video measurement set:

1. Connect the equipment as shown in Figure 5–1.

NOTE. *Do not connect a 75 Ω terminator to the INPUT connector unless your voltage reference can supply more than 10 mA.*

If the voltage reference output is current-limited, the terminator may attenuate the output voltage, causing the adjustment procedure to fail.

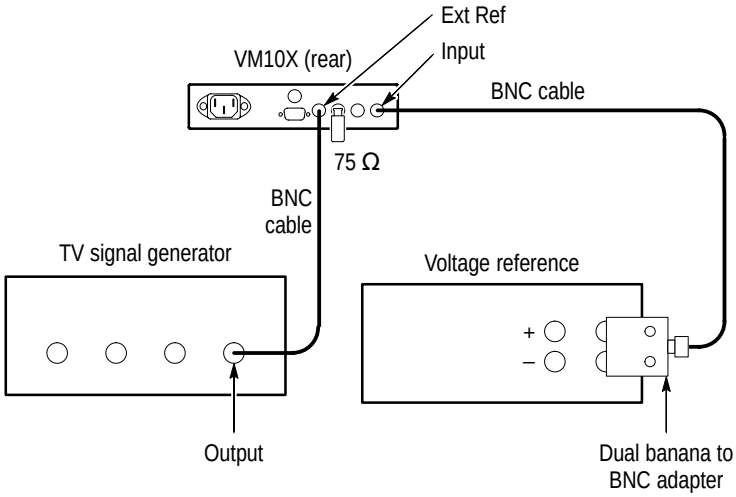


Figure 5–1: Equipment setup for the adjustment procedure

2. Set the test signal generator to produce a signal that has the correct format for the video measurement set (VM100 is NTSC; VM101 is PAL).

NOTE. *Use any video signal having the correct format (NTSC or PAL) that contains burst and sync.*

If you do not connect a video signal, or the video signal is the wrong format, the video measurement set displays the message, "APPLY VIDEO TO EXT." *Under these conditions you will not be able to continue the adjustment procedure.*

3. On the video measurement set, press the **CONFIG** button.

4. Press the ↑ arrow button to select "CONFIGURE CALIBRATION."

5. Press the ↵ enter button to select "CONFIG–-CAL PRESS ↵ TO BEGIN CAL."

NOTE. *To exit the procedure without changing any internal settings, press the ↑ or ↓ arrow key to select "PRESS ↵ TO ABORT CAL."*

6. Press the ↵ enter button to begin the procedure.

7. To adjust the video measurement set, follow the on-screen prompts until the message, “CAL COMPLETE,” is displayed. Table 5–3 provides a summary of the adjustment steps.

Table 5–3: Adjustment steps

Step Number	Signal Required and Action
1	Apply 0 V to INPUT and press ↓.
2	Apply video signal to EXT REF and press ↓.
3	Apply –714.3 mV to INPUT and press ↓.
4	Apply +714.3 mV to INPUT and press ↓.
5	Apply 0 V to INPUT and press ↓.
6	Apply +714.3 mV to INPUT and press ↓.
7	Apply +357.1 mV to INPUT and press ↓.
8	Apply +142.9 mV to INPUT and press ↓.
9	Apply +71.4 mV to INPUT and press ↓.
10	Apply 0 V to INPUT and press ↓.
11	Apply +714.3 mV to INPUT and press ↓.
12	Apply 0 V to INPUT and press ↓.

8. Disconnect the equipment from the video measurement set.

Maintenance

This chapter contains the information needed to do periodic and corrective maintenance on the video measurement set. The following sections are included:

- The *Maintenance* section provides general information on preventing damage to internal modules when doing maintenance, lithium battery warnings and disposal instructions, and procedures for inspecting the video measurement set and cleaning its external and internal modules.
- The *Removal and Installation Procedures* (page 6–7) provide procedures for the removal and installation of modules.
- *Troubleshooting* (page 6–17) provides information for isolating failed modules. Included are power supply parameters, and examples of waveforms measured at key test points within the video measurement set.
- *Repackaging Instructions* (page 6–33) provides packaging information for shipment or storage.

Preventing ESD

When performing any service that requires internal access to the video measurement set, adhere to the following precautions to avoid damaging internal modules and their components due to electrostatic discharge (ESD).

CAUTION. *Static discharge can damage any semiconductor component in this video measurement set.*

Minimize handling of static-sensitive modules.

Transport and store static-sensitive modules in their static protected containers or on a metal rail. Label any package that contains static-sensitive modules.

Discharge the static voltage from your body by wearing a grounded antistatic wrist strap while handling these modules. Do service of static-sensitive modules only at a static-free work station.

Nothing capable of generating or holding a static charge should be allowed on the work station surface.

Handle circuit boards by the edges when possible.

Do not slide the modules over any surface.

Avoid handling modules in areas that have a floor or work-surface covering capable of generating a static charge.

This instrument contains electrical components that can be damaged by static discharge. See Table 6–1 for the relative susceptibility of various classes of semiconductors. Static voltages of 1 kV to 30 kV can occur in unprotected environments.

Table 6–1: Relative susceptibility to static discharge damage

Semiconductor Classes	Relative Susceptibility Levels
MOS or CMOS microcircuits or discretes, or linear microcircuitswith MOS inputs (most sensitive)	100 to 500 V
ECL	200 to 500 V
Schottky signal diodes	250 V
Schottky TTL	500 V
High frequency bipolar transistors	400 to 600 V
JFET devices	600 to 800 V
Linear microcircuits	400 to 1000 V
Low power Schottky TTL	900 V
TTL (Least Sensitive)	1200 V

Battery Disposal

Dispose of lithium batteries according to local, state, and federal regulations.

WARNING. *To avoid personal injury, observe the proper procedures for handling lithium batteries.*

Improper handling can cause fire, explosion, or severe burns.

Do not recharge, crush, disassemble, heat above 100° C (212° F), incinerate, or expose the battery to water.

The video measurement set contains one lithium battery, A2U100, located on the main board (A2). Battery replacement is accomplished by replacing A2U100 or by installing a new main board (A2). Read the following information before replacing the battery. See *lithium battery* on page 6–16 for replacement instructions.

Inspection and Cleaning

Inspection and cleaning are done as preventive maintenance. Preventive maintenance, when done regularly, may prevent malfunctions and enhance reliability.

Preventive maintenance consists of visually inspecting and cleaning the video measurement set, and using general care when operating it.

How often to do maintenance depends on the severity of the environment in which the video measurement set is used. A proper time to perform preventive maintenance is just before adjustment of the video measurement set.

General Care

The top cover keeps dust out of the video measurement set and should be in place during normal operation.

Inspection and Cleaning Procedures

Inspect and clean the video measurement set as often as operating conditions require. The collection of dirt on internal components can cause them to overheat and breakdown. Dirt acts as an insulating blanket, preventing efficient heat dissipation. Dirt also provides an electrical conduction path that could cause a video measurement set failure, especially under high-humidity conditions.

CAUTION. *Avoid the use of chemical cleaning agents that might damage the plastics and external labels used in the video measurement set.*

Use a cloth dampened with water to clean external surfaces.

Use a cloth dampend with a 75% isopropyl alcohol solution to clean internal surfaces.

Before using any other type of cleaner, consult a Tektronix Service Center or technical representative.

Inspection — Exterior. Inspect the outside of the video measurement set for damage, wear, and missing parts. Use Table 6–2 as a guide. Instruments that have been dropped or otherwise abused should be checked thoroughly to verify correct operation and performance. Immediately repair defects that could cause personal injury or lead to further damage to the video measurement set.

Table 6–2: External inspection check list

Item	Inspect For	Repair Action
Front panel and top cover	Cracks, scratches, deformations, missing or damaged retainer screws.	Replace defective or missing modules.
Front panel buttons	Broken or cracked key caps.	Replace defective modules.
Rear connectors	Cracked or broken shells, damaged or missing contacts. Dirt in connectors.	Replace defective modules. Clear or wash out dirt.
Accessories	Missing items or parts of items, bent pins, broken or frayed cables, and damaged connectors.	Replace damaged or missing items, frayed cables, and defective modules.

CAUTION. *To prevent damage to electrical components from moisture during external cleaning, use only enough liquid to dampen the cloth or applicator.*

Cleaning Procedure — Exterior. To clean the video measurement set exterior, perform the following steps:

1. Remove loose dust on the outside with a lint-free cloth.
2. Remove remaining dirt with a lint free cloth dampened with water.

Inspection — Interior. Remove the top cover (see page 6–8) to access the inside of the video measurement set for inspection and cleaning.

Inspect the internal portions for damage and wear using Table 6–3 as a guide. Defects found should be repaired immediately. If any electrical module is replaced, check Table 5–1 on page 5–1 to determine if you need to adjust the video measurement set.

Table 6–3: Internal inspection check list

Item	Inspect For	Repair Action
Circuit boards	Loose, broken, or corroded solder connections. Burned circuit boards. Burned, broken, or cracked circuit-run plating.	Repair failed module, or remove and replace with a new module.
Resistors	Burned, cracked, broken, blistered condition.	Repair failed module, or remove and replace with a new module.
Solder connections	Cold solder or rosin joints.	Resolder joint and clean with isopropyl alcohol.

Table 6–3: Internal inspection check list (Cont.)

Item	Inspect For	Repair Action
Capacitors	Damaged or leaking cases. Corroded solder on leads or terminals.	Repair failed module, or remove and replace with a new module.
Semiconductors	Loosely inserted in sockets. Distorted pins.	Firmly seat loose semiconductors. Remove devices that have distorted pins. Carefully straighten pins (as required to fit the socket), and reinsert firmly. Ensure that straightening action does not crack pins, causing them to break off.
Wiring and cables	Loose plugs or connectors. Burned, broken, or frayed wiring.	Firmly seat connectors. Repair or replace modules with defective wires or cables.
Chassis	Dents, deformations, or damaged hardware.	Straighten, repair, or replace defective hardware.

CAUTION. *To prevent damage from electrical arcing, ensure that circuit boards and components are dry before applying power to the video measurement set.*

Cleaning Procedure — Interior. To clean the video measurement set interior, perform the following steps:

1. Remove the top cover (see page 6–8) to gain access to the internal parts.
2. Blow off dust with dry, low-pressure, deionized air (approximately 9 psi).
3. Remove any remaining dust with a lint free cloth dampened with a 75% isopropyl alcohol solution.

NOTE*. After you perform steps 1 through 3, if the video measurement set is clean upon inspection, skip the remaining steps.*

If steps 1 through 3 do not remove all the dust or dirt, the video measurement set may be spray washed using a solution of 75% isopropyl alcohol (see steps 4 through 7).

4. Spray wash dirty parts with the isopropyl alcohol and wait 60 seconds for the majority of the alcohol to evaporate.

5. Use hot (48.9° C to 60° C/120° F to 140° F) deionized water to thoroughly rinse the parts.
6. Dry all parts with low-pressure, deionized air.
7. Use low-temperature (51.7° C to 65.6° C/125° F to 150° F) circulating air in an oven or drying compartment to dry all components and assemblies.

Removal and Replacement Procedures

This section describes how to remove and replace the major mechanical and electrical modules.

- *Summary of Procedures* on page 6–7 lists the procedures for removal and replacement of modules
- *Tools Required* on page 6–8 describes the tools needed to perform the procedures
- Beginning with *top cover* on page 6–8, detailed procedures describe the removal and replacement of modules

Preparation

Read the following warning statement and the *Summary of Procedures* on page 6–7 before removing a module.

WARNING. *Before doing this or any other procedure in this manual, read the* General Safety Summary *and* Service Safety Summary *found at the beginning of this manual. Also, to prevent possible injury to service personnel or damage to electrical components, read* Preventing ESD *on page 6–1.*

Summary of Procedures

The procedures are listed below in the order in which they appear in this section:

- *Top Cover* on page 6–8 describes how to replace the top cover
- *front panel* on page 6–9 describes how to replace the front panel board (A1)
- *main board* on page 6–11 describes how to replace the main board (A2)
- *Power Supply* on page 6–13 describes how to replace the power supply board (A3)
- *LCD board* on page 6–14 describes how to replace the LCD board (A4)
- *lithium battery* on page 6–16 describes how to replace the lithium battery (A2U100)

Tools Required

Table 6–4 lists the tools needed to replace modules. Tools required to remove and replace each module are listed before the procedure.

Table 6–4: Tools required for module replacement

Name	Description
Screwdriver with a T-10 Torx tip	Standard tool
Screwdriver with a #1 Pozidriv tip	Standard tool
9/16 inch nut driver or wrench	Standard tool
3/16 inch nut driver or wrench	Standard tool
Soldering iron	Standard tool

Top Cover

Use the following procedure to remove the top cover.

Removal

Disconnect the power cord. Disconnect any cables from the instrument. Refer to Figure 6–1, and use the following procedure.

Place the instrument on its feet with the top cover up and remove the 11 screws that secure the top cover to the chassis, and remove the top cover.

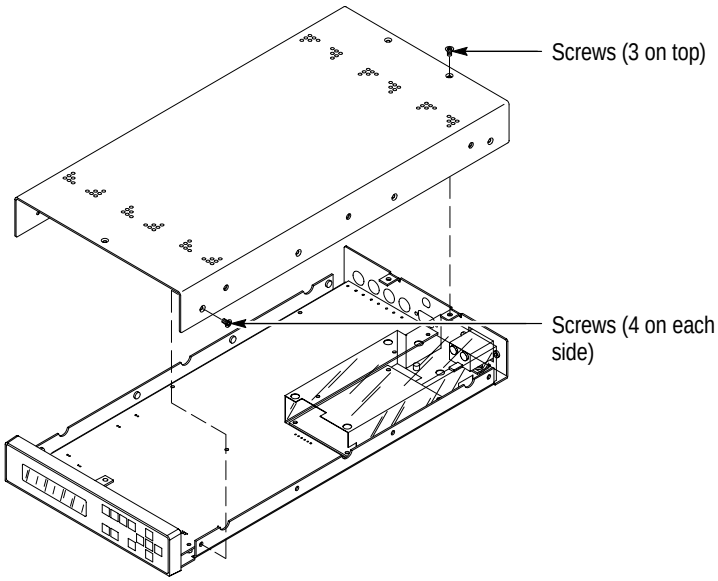


Figure 6–1: Top cover replacement

Replacement

Use the following procedure and Figure 6–1 to replace the top cover.

Place the instrument on its feet so the main board (A2) faces up.

Place the top cover onto the chassis and replace the 11 screws that secure the top cover to the chassis.

Front Panel

Use the following procedure to remove the front panel board (A1).

Removal

You will need a screwdriver with a T-10 Torx tip to replace the front panel board (A1).

1. Perform the *top cover* removal procedure (see page 6–8).
2. To unlock connector A2J9 (Figure 6–2), lift up on the blue locking tab. Unplug the ribbon cable from A2J9.
3. Unplug the ribbon cables connected between the front panel assembly and A2J20 and A2J24 on the main board (A2).
4. Remove the two screws (bottom side of the chassis) that secure the front panel assembly to the chassis.

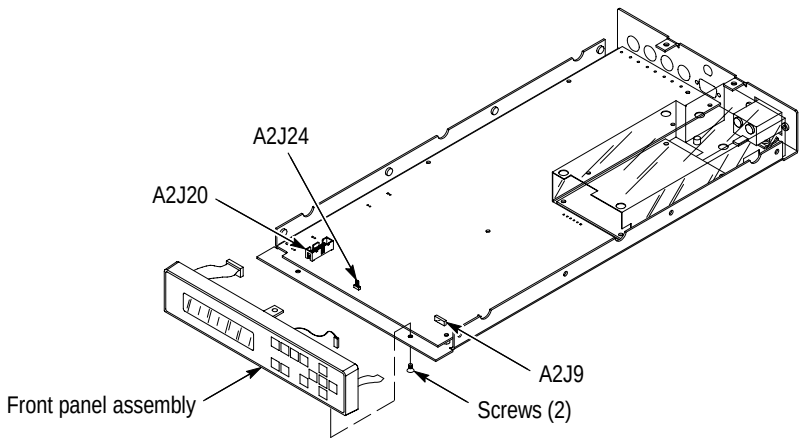


Figure 6–2: Front panel assembly replacement

5. Place the front panel assembly face down (Figure 6–3). Remove the 4 screws that secure the front panel board (A1) to the front subpanel.

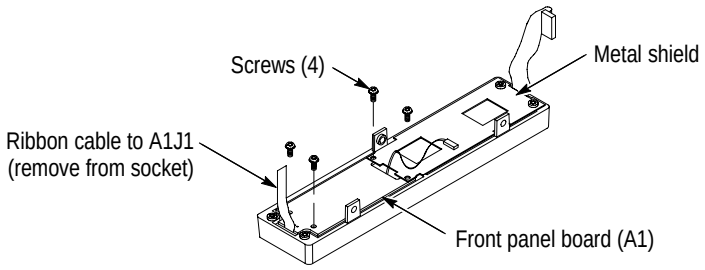


Figure 6–3: Front panel board replacement

6. Lift the board from the front panel assembly.
7. To unlock connector A1J1, lift up on the blue locking tab. Then unplug the ribbon cable from the front panel board (A1).

Replacement

Use the following procedure and Figures 6–2 and 6–3 to replace the front panel board (A1).

1. If necessary, unlock connector A1J1. Then replace the 8-conductor ribbon cable and lock the connector.
2. Place the front panel assembly face down (Figure 6–3).
3. Insert the edge of the front panel board (A1) between the LCD board (A4) and its metal shield. Then align the front panel buttons so the front panel board (A1) rests evenly on the front subpanel.
4. Replace the four screws to secure the front panel board (A1) to the front subpanel.
5. Align the front panel assembly with the instrument chassis. Replace the two screws (bottom side of the chassis) that secure the front panel assembly to the chassis.
6. Replace the two ribbon cables from the front panel board (A1) at A2J20 (14-pin) and A2J24 (2-pin) on the main board (A2).
7. If necessary, unlock connector A2J9. Then replace the 8-conductor ribbon cable from the front panel board (A1) and lock the connector.
8. Perform the *top cover* replacement procedure (see page 6–9).

Main Board

You will need a screwdriver with a size T-10 Torx tip and a size #1 Pozidriv tip, a 9/16 inch and 3/16 inch nut driver or wrench, and a soldering iron to replace the main board (A2).

Removal

Use the following procedure to remove the main board (A2).

1. Perform the *Top Cover* removal procedure (see page 6–8).
2. Using a soldering iron, unsolder the two wires near the rear panel that connect to A2J34 and A2J35 (Figure 6–4).
3. Using a 3/16 inch nut driver or wrench, remove the two jack screws that secure the RS232 connector to the rear panel.
4. Using a 9/16 inch nut driver or wrench, remove the four nuts that secure the BNCs to the rear panel.
5. Unplug the ribbon cable connected between the power supply board (A3) and A2J10.
6. Remove the eight screws that secure the main board (A2) to the chassis.

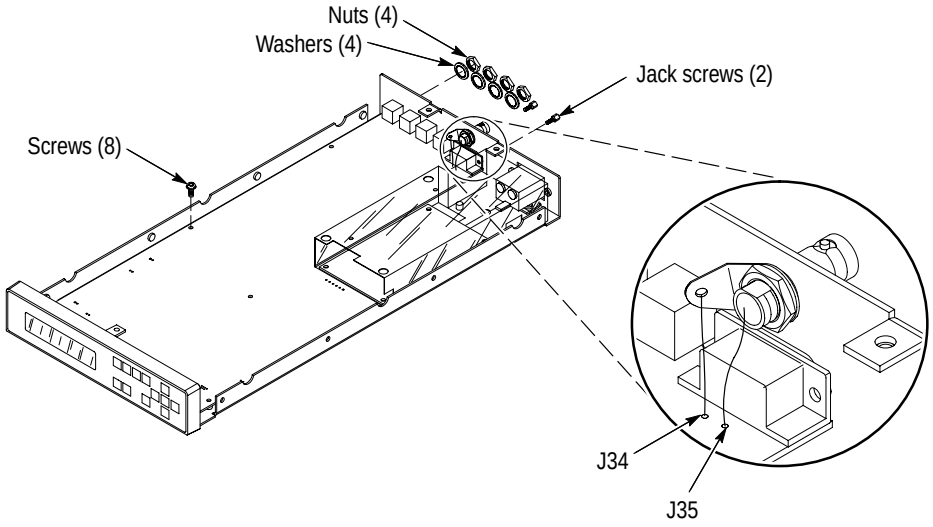


Figure 6–4: Main board removal

7. To unlock connector A2J9 (Figure 6–5), lift up on the blue locking tab. Then unplug the 8-conductor ribbon cable from A2J9.
8. Unplug the two ribbon cables connected between the front panel board (A1) and A2J20 and A2J24.

9. Remove the two screws (bottom side of the chassis) that secure the front panel assembly to the chassis. Set the front panel assembly aside.

10. Slide the main board (A2) forward until the rear-panel connectors clear the rear panel, then lift the main board (A2) from the chassis.

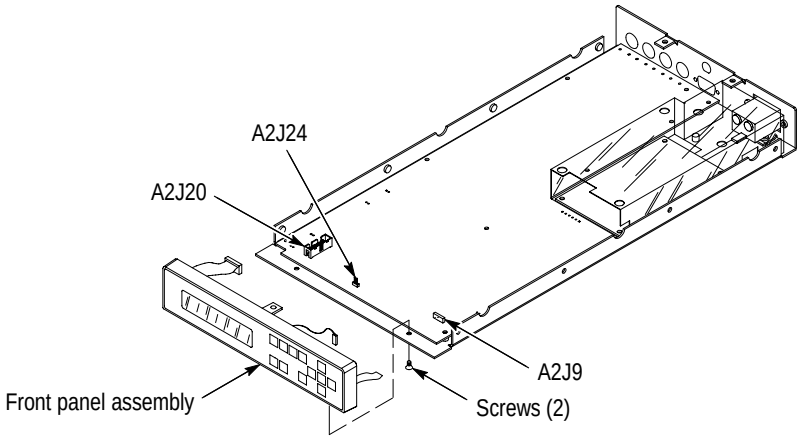


Figure 6–5: Front panel assembly removal

Replacement

Use the following procedure and Figures 6–4 and 6–5 to replace the main board (A2).

1. Align the rear-panel connectors with the rear panel, then set the main board (A2) in place on the chassis.

2. Replace the eight screws that secure the main board (A2) to the chassis (Figure 6–4).

3. Using a 9/16 inch nut driver or wrench, replace the four nuts that secure the BNCs to the rear panel.

4. Using a 3/16 inch nut driver or wrench, replace the two jack screws that secure the RS232 connector to the rear panel.

5. Using a soldering iron, solder the two wires from the ZERO CARRIER PULSE OUTPUT as follows:

   Solder the center conductor wire to J34.

   Solder the ground wire to J35.

6. Connect the ribbon cable connected between the power supply board (A3) and A2J10.

7. Align the front panel assembly with the instrument chassis as shown in Figure 6–5. Replace the two screws (bottom side of the chassis) that secure the front panel assembly to the chassis.
8. Replace the two ribbon cables from the front panel board (A1) at A2J20 (14 pins) and A2J24 (2 pins) on the main board (A2).
9. If necessary, unlock connector A2J9. Then replace the 8-conductor ribbon cable from the front panel board (A1) and lock the connector.
10. Perform the *Top Cover* replacement procedure (see page 6–9).

Power Supply

You will need a screwdriver with a size T-10 Torx tip and a size #1 Pozidriv tip to replace the power supply board (A3).

Removal

Use the following procedure to remove the power supply board (A3).

1. Perform the *Top Cover* removal procedure (see page 6–8).
2. Remove the four screws (Figure 6–6) that secure the power supply board (A3) to the chassis.
3. Unplug the two ribbon cables from A3J1 and A3J2 on the power supply board (A3).
4. Lift the top of the plastic shield to gain access to the power supply board (A3). Then lift the power supply board (A3) from the chassis.

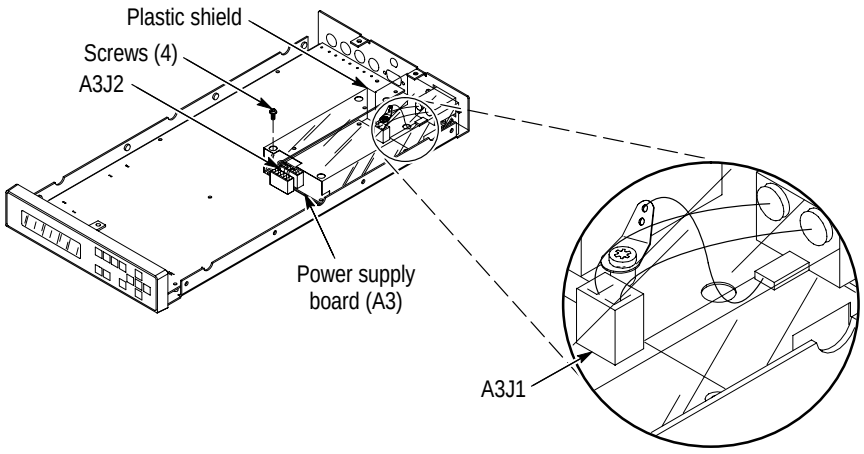


Figure 6–6: Power supply board replacement

Replacement

Use the following procedure and Figure 6–6 to replace the power supply board (A3).

1. Lift the top of the plastic shield (Figure 6–6) to gain access to the chassis. Then place the power supply board (A3) onto the chassis.
2. Connect the two ribbon cable to the power supply board (A3) as shown below:
   - Connect the 2-pin ribbon cable from the input receptacle to A3J1
   - Connect the 6-pin ribbon cable from the main board (A2) to A3J2
3. Replace the four screws that secure the power supply board (A3) to the chassis.
4. Perform the *Top Cover* replacement procedure (see page 6–9).

LCD Board

You will need a screwdriver with a size T-10 Torx tip, a size #1 Pozidriv tip, and a soldering iron to replace the LCD board (A4).

Removal

Use the following procedure to remove the LCD board (A4).

1. Perform the *Top Cover* removal procedure (see page 6–8).
2. Perform the *front panel* removal procedure (see page 6–9).
3. Remove the two screws (Figure 6–7) that secure the cover shield to the front panel assembly.
4. Remove the two screws that secure the front frame to the front panel. Separate the front frame from the front panel.
5. Carefully push the LCD board (A4) from the front frame.
6. Using a soldering iron, unsolder the ribbon cable from the LCD board (A4).

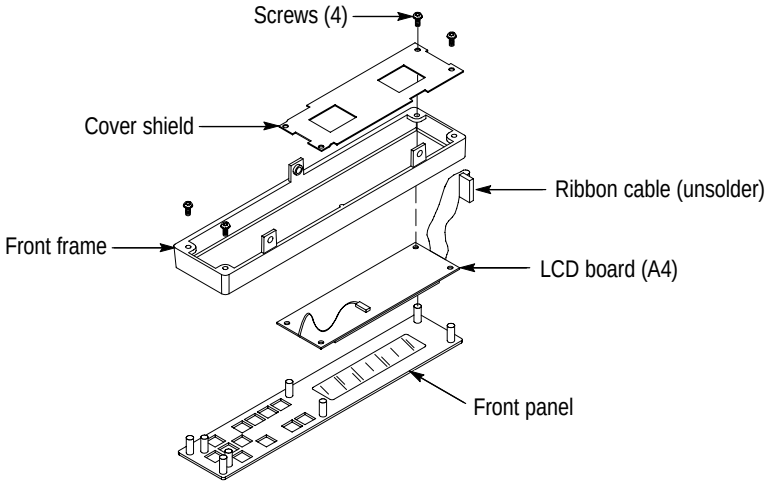


Figure 6–7: LCD board replacement

Replacement

Use the following procedure and Figure 6–7 to replace the LCD board (A4).

1. Using a soldering iron, solder the ribbon cable (Figure 6–7) to the LCD board (A4).
2. Carefully replace the LCD board (A4) into the front frame.
3. Using a lint-free cloth, clean the LCD display and the clear window on the front panel.
4. Replace the front panel over the front frame.Replace the two screws that secure the front frame to the front panel.
5. Place the cover shield over the LCD board (A4). Replace the two screws that secure the cover shield to the front panel assembly.
6. Perform the *front panel* replacement procedure (see page 6–10).
7. Perform the *Top Cover* replacement procedure (see page 6–9).

Lithium Battery

WARNING. *To avoid personal injury due to improper handling of lithium batteries, read* Battery Disposal *on page 6–2 before proceeding.*

You will need a screwdriver with a size T-10 Torx tip and a size #1 Pozidriv tip, a 9/16 inch and 3/16 inch nut driver or wrench, and a soldering iron to replace the lithium battery.

Removal

Use the following procedure to remove the lithium battery (A2U100)

1. Perform the *Top Cover* removal procedure (see page 6–8).
2. Perform the *main board* removal procedure (see page 6–11).
3. Using a soldering iron, unsolder A2U100 from the main board (A2) (Figure 6–8).

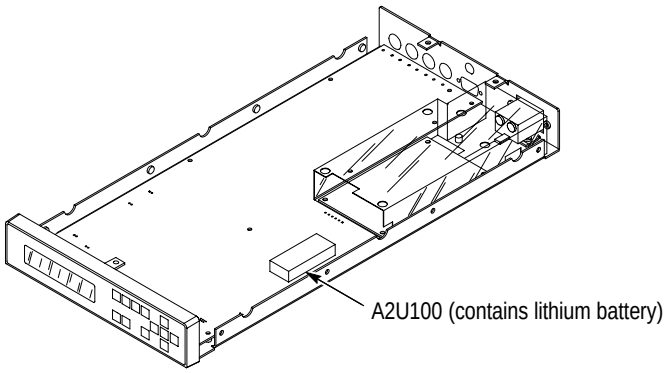


Figure 6–8: Lithium battery replacement

Replacement

Use the following procedure and Figure 6–8 to replace the lithium battery (A2U100).

1. Using a soldering iron, solder the lithium battery (Figure 6–8) to the main board (A2).
2. Perform the *main board* replacement procedure (see page 6–12).
3. Perform the *Top Cover* replacement procedure (see page 6–9).

Troubleshooting

WARNING. *Before doing this or any other procedure in this manual, read the* General Safety Summary *and* Service Safety Summary *found at the beginning of this manual.*

To prevent possible injury to service personnel or damage to electrical components, read Preventing ESD *on page 6–1.*

This section contains information and procedures designed to help you isolate faults within the video measurement set.

Refer to the following sections for troubleshooting instructions:

- *Testing the Lithium Battery* on page 6–18 describes how to determine when to replace the lithium battery (A2100)
- *Power Supply Limits* on page 6–19 describes the power supply voltages, limits, and test points
- *Troubleshooting the main board (A2)* on page 6–20 explains how to isolate faults when the main board (A2) requires repair

NOTE. *The main board (A2) contains most electrical components within the video measurement set.*

If the video measurement set has power supplies that are within limits and an operational front panel and LCD display, the main board (A2) needs to be repaired or replaced.

After you locate the faulty module, refer to the following sections to complete the repairs:

- Use the *Removal and Installation Procedures* that begin on page 6–7 for module replacement instructions
- Refer to Table 5–1 on page 5–1 to determine if adjustments are required after module replacement.
- Complete the procedures found in the *Performance Verification* section to verify instrument functionality following repairs or adjustment

Equipment Required

The test equipment needed to troubleshoot the video measurement set depends on the type of failure. Many faults can be detected using a digital multimeter, oscilloscope, and test signal generator. However, video measurement set testing and adjustments might be required to correct some faults. Under those circumstances you will need the test equipment listed in the *Performance Verification* and *Adjustment Procedures* sections.

A computer (PC) and terminal emulator or communication program are needed to isolate faults using the ACQ:SHOW command. See page 6–28 for details.

Testing the Lithium Battery

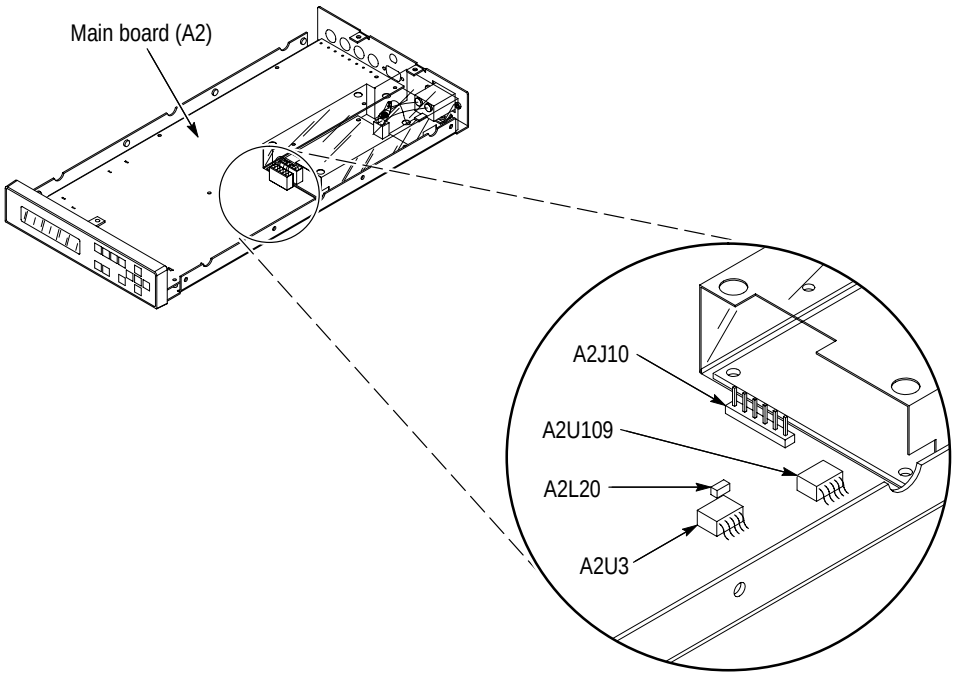
The video measurement set contains one lithium battery (A2U100). The battery provides power to the NVRAM when AC power is disconnected. If the video measurement set has the following symptoms after you disconnect AC power, replace the battery:

- Memory does not retain saved measurement results
- Memory does not retain calibration data
- Memory does not retain configuration parameters

Refer to page 6–16 for replacement instructions.

Power Supply Limits

This section shows the power supply test points and provides operating limits. See Figure 6–9 for a listing of the power supplies in the video measurement set.



Test Point	Power Supply	Limits
A2J10 pin 1	+12 V	+11.76 V to +12.24 V
A2U109 pin 5	+8 V	+7.84 V to +8.16 V
A2J10 pin 3	+5.1 V	+4.85 V to +5.15 V
A2L20	–5 V	–4.75 V to –5.25 V
A2U3 pin 5	–8 V	–7.84 V to –8.16 V
A2J10 pin 6	–12 V	–11.4 V to –12.6 V

Figure 6–9: Power supply test points and limits

Troubleshooting the main board (A2)

This section provides the following troubleshooting information for locating faults on the main board (A2):

- Power on diagnostics
- Examples of analog signal measurements
- Phase lock and DSP diagnostic LEDs and key signals
- ACQ:SHOW command
- Troubleshooting the VM140 or VM141 System

Power-On Diagnostics

The host processor performs a limited set of system diagnostics during the power on sequence. When power is turned on, the reset circuit (U79) ensures that the host processor powers up to a known state. The host processor then runs the program in boot ROM U61 to execute the diagnostics as shown in Table 6–5. Use the results of the power-on diagnostics to locate faults within the host processor system.

See Figure 6–10 to locate the power on diagnostics LED DS2.

Table 6–5: Power-on diagnostics

Diagnostic Test	Indication of Successful Test
Initialize the memory mapped I/O and bus control logic (program the internal chip select logic and interrupts)	LED DS2 blinks one time
Checksum test for boot ROM U61	LED DS2 blinks one time (if the test fails, the LED blinks continuously)
Host processor enables the external data and address buses (U62, U63, U66, U70, U73, U76, U77, U78)	LED DS2 blinks two times
Host processor testing the system SRAM U71, U72, U103, U108 (excluding acquisition and DSP memory)	LED DS2 blinks three times
The program switches to Flash EPROM memory (U101 and U102) for normal operation	LCD Display is enabled; LED DS2 blinks five times

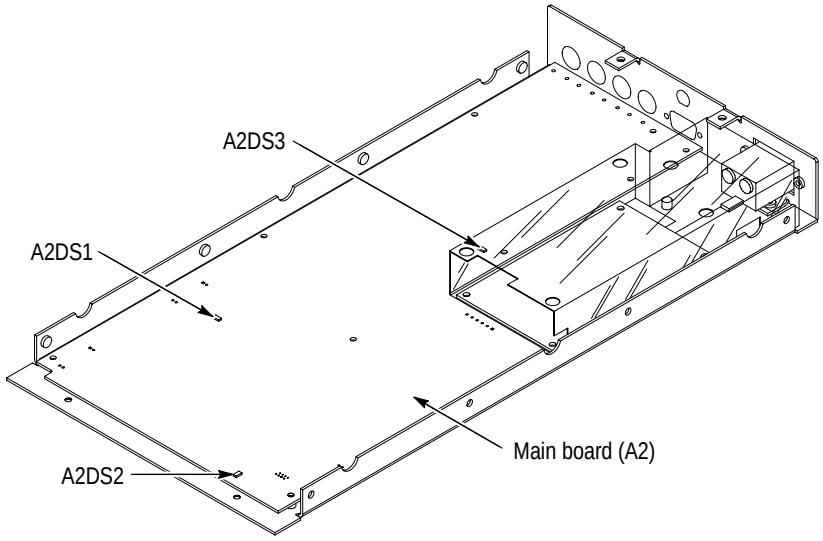


Figure 6–10: Location of diagnostic LEDs

Examples of Analog Signal Measurements

By connecting a test signal to the INPUT connector, you can use an oscilloscope to measure waveforms in the signal path up to the A/D Converter. Compare your measured waveforms to the example waveforms in this section to determine if the analog section of the main board (A2) is functioning properly.

You can also measure the output of A/D Converter A2U22 using an oscilloscope. When you apply a luminance ramp signal to the INPUT of the video measurement set, the output bits from A2U22 toggle at increasing rates. The least significant bit (pin 16) toggles at the fastest rate and the most significant bit (pin 28) toggles at the slowest rate. Trigger the oscilloscope on the /ACQUIRE signal (A2TP34 or A2U39 pin 1) for best results.

NOTE. *The example waveforms are PAL format signals taken from a VM101. If your video measurement set is a VM100 (NTSC), the waveforms you measure will have a different horizontal scale.*

Perform the following steps to measure the example waveforms shown in Figure 6–12 through Figure 6–16. Refer to the circuit board illustrations in the *Diagrams* section for test point locations.

1. Connect the test equipment as shown in Figure 6–11.

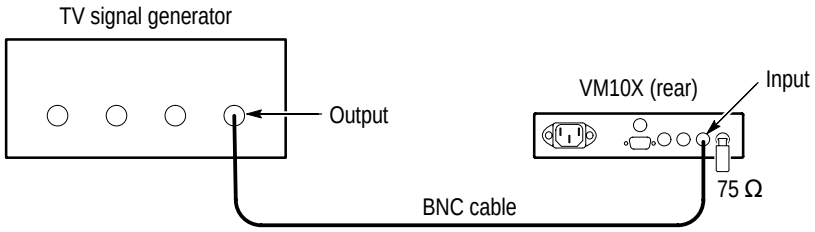


Figure 6–11: Setup for measuring analog signals

2. On the video measurement set, press the **CONFIG** button.
3. Press the ↵ enter button to enter the CONFIG MEAS submenu.
4. Press the ↓ arrow button to scroll through the measurements. Press the → arrow button to select LUM NON-LIN= Off and HUM= Off.
5. Press the ↵ enter button to exit the CONFIG MEAS submenu.
6. Press the ↓ arrow button to scroll through the CONFIG menu. Press the → arrow button to select REF= INPUT.
7. Press the **MEAS** and **AVG** buttons (averaging should be on).
8. On the TV signal generator, set the output for a Luminance Ramp signal.
9. Use an oscilloscope to measure the waveforms.

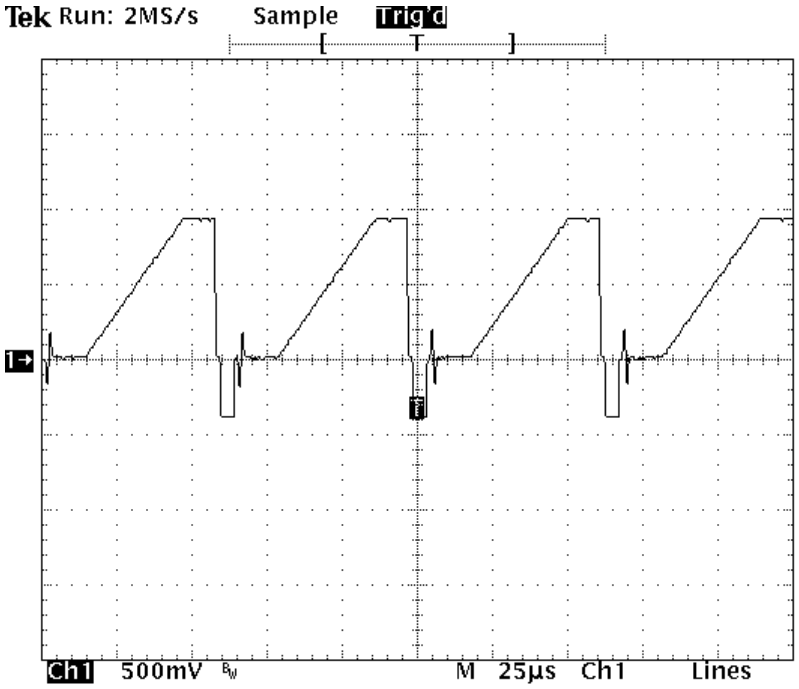


Figure 6–12: Waveform at A2TP9

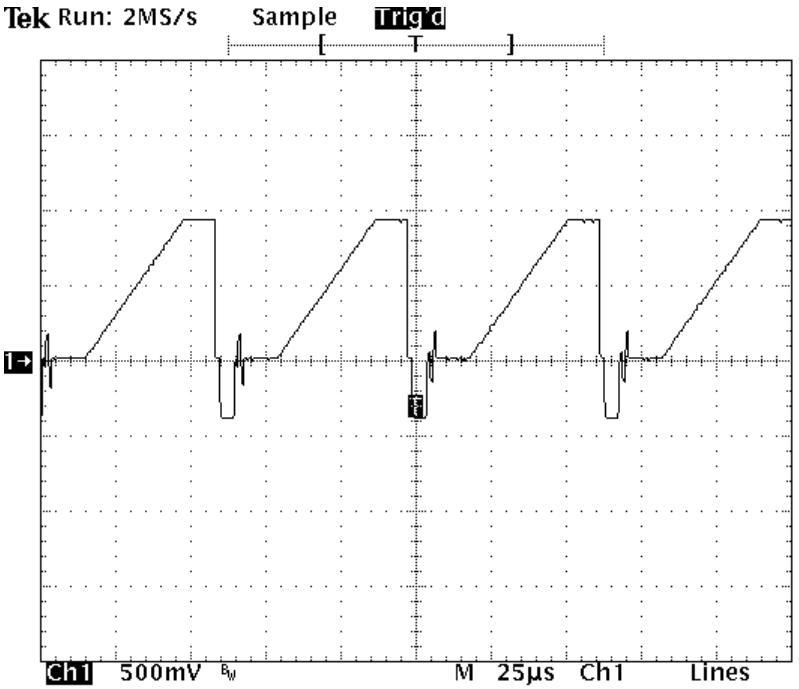


Figure 6–13: Waveform at A2TP10

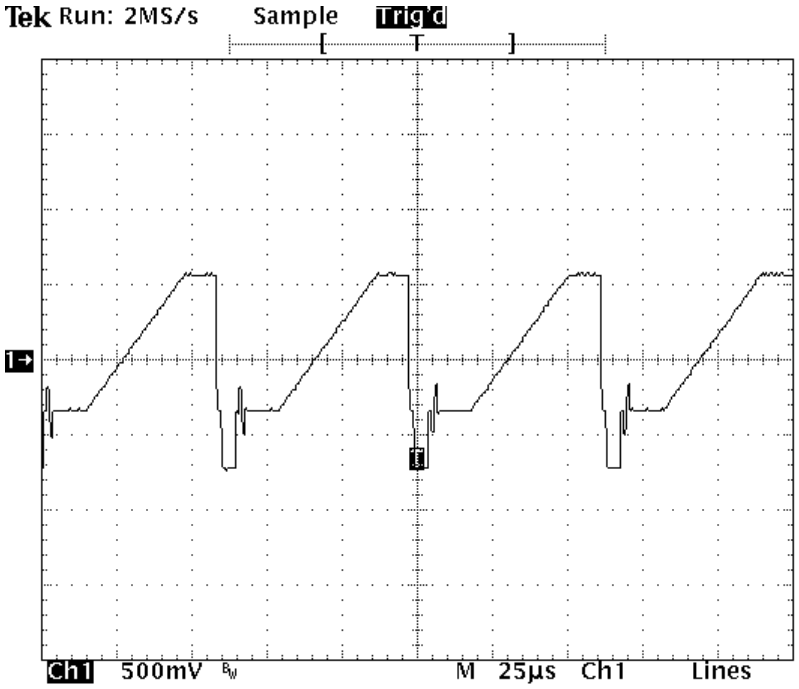


Figure 6–14: VIDEO waveform at A2TP31

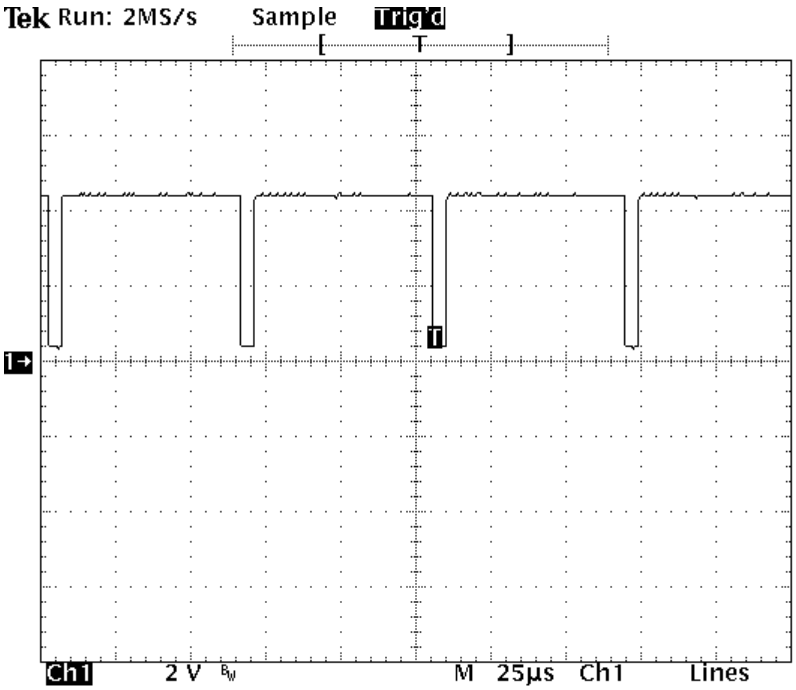


Figure 6–15: COMP_SYNC waveform at A2TP15

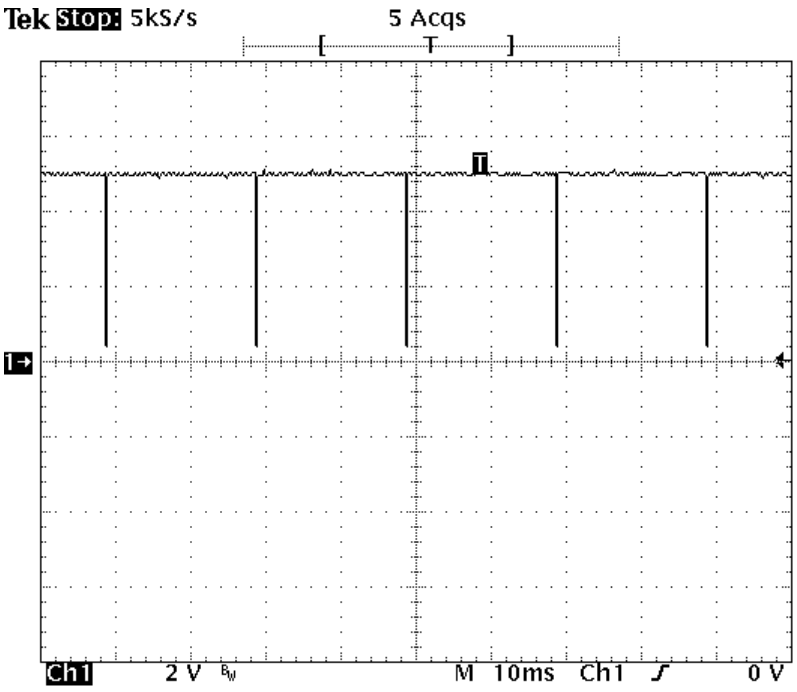


Figure 6–16: FIELD waveform at A2TP16

Phase Lock and DSP Diagnostic LEDs and Key Signals

The main board (A2) contains two LEDs, DS1 and DS3, that indicate the status of the Phase Lock and DSP circuits. See Figure 6–10 on page 6–21 for the location of each LED. Under normal conditions DS1 (DSP) is on and DS3 (Phase Lock) is off.

***NOTE**. If the video measurement set is configured for an external reference and a suitable signal is not connected to the EXT REF input, DS3 will turn on.*

DS1. Indicator DS1 lights when the video measurement set is ready to acquire a signal. A signal does not need to be connected to the INPUT connector. If DS1 fails to light, either the DSP phase lock loop is not working or the host processor has failed to program the DSP.

To isolate the fault, test the Phase Lock circuit operation as described below. If the Phase Lock circuit is operating correctly, the fault is most likely in the DSP/Data Acquisition circuits that include A2U48, A2U99, and their surrounding components.

DS3. Indicator DS3 lights when the video measurement set is unable to achieve phase lock. If DS3 is illuminated, check for the following signals (refer to the circuit board illustrations in the *Diagrams* section for test point locations):

- DC voltage between +1 V and +4 V at measured at A2TP19
- Video signal with burst and sync components measured at A2R353 (similar to Figure 6–12 on page 6–23)
- The COMP_SYNC signal measured at A2TP15 (see Figure 6–15)
- HPULSE measured at A2TP18 (see Figure 6–18)
- DSP_RCK measured at A2U48 pin 1 (see Figure 6–19)
- The 8FSC_IN and /8FSC_IN signals measured at A2U116 pins 7 and 8 (see Figure 6–17)

NOTE. *The 8FSC_IN and /8FSC_IN signals are 180° out of phase, but otherwise identical. Figure 6–17 only shows an example of the 8FSC_IN waveform.*

Digital control signals such as NTSC/PAL and SYNC/BURST (A2U31 pins 36 and 74, respectively) can also cause the Phase Lock circuit to fail. Check for digital control failures if DS3 is illuminated but you measure correct test waveforms.

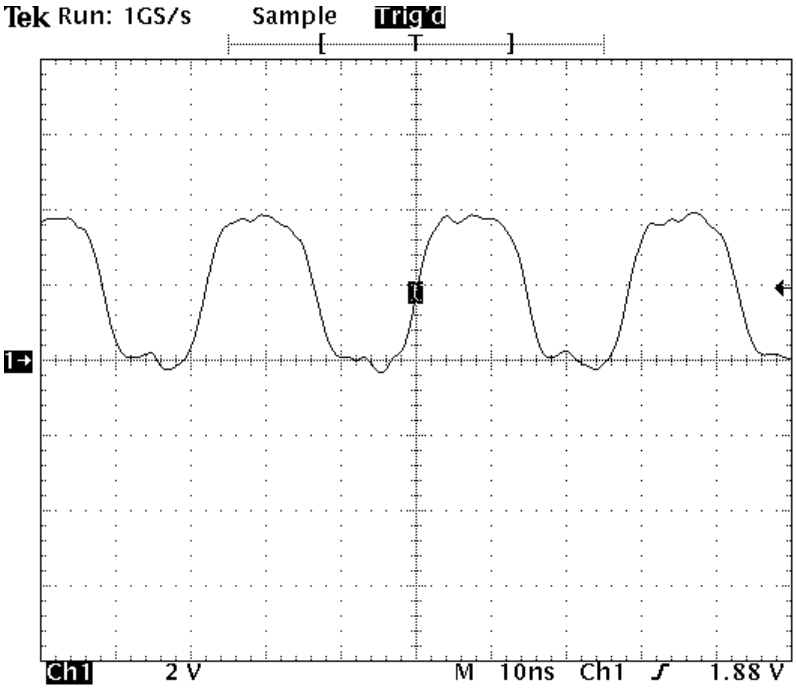


Figure 6–17: 8FSC_IN waveform at A2U116 pin 7

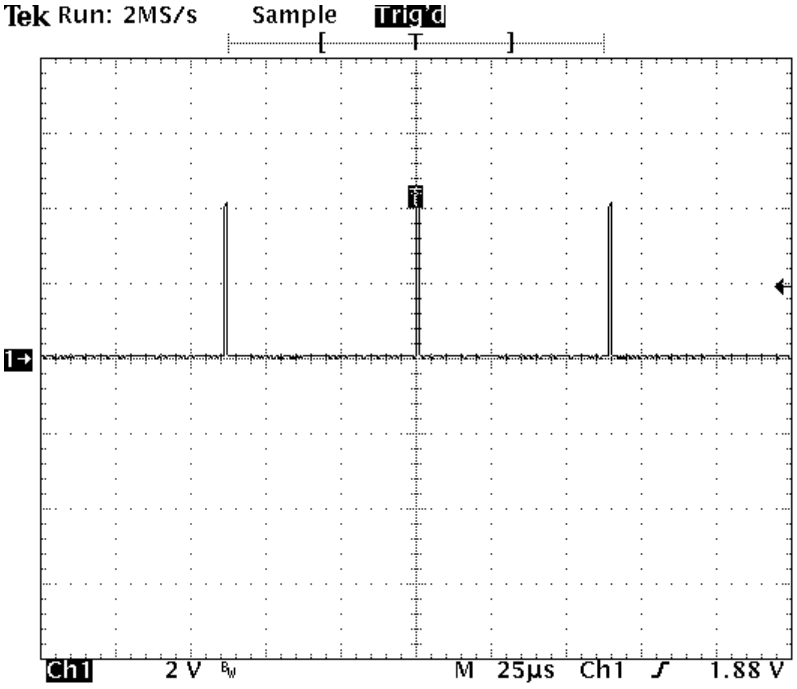


Figure 6–18: HPULSE waveform at A2TP18

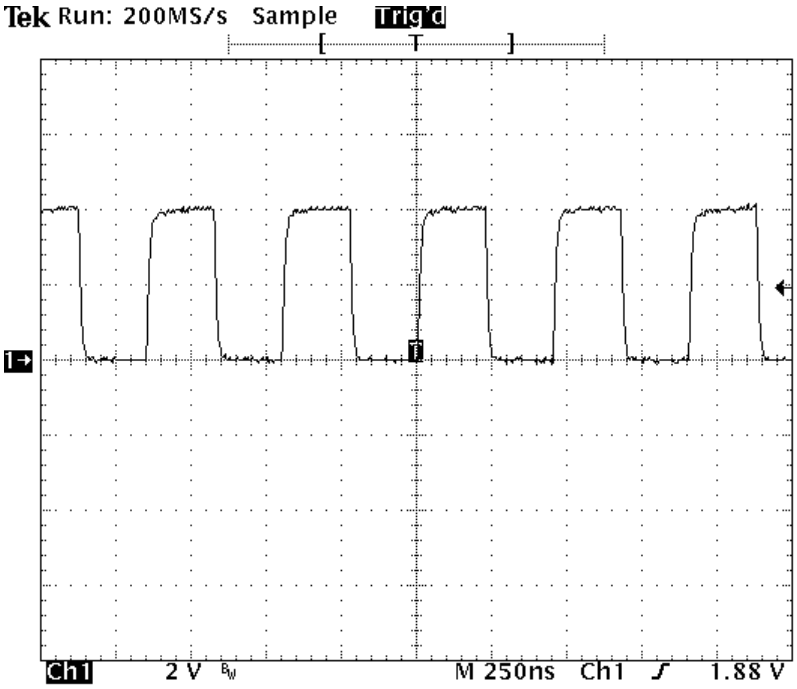


Figure 6–19: DSP_RCK waveform at A2U48 pin 1

ACQ:SHOW Command

The ACQ:SHOW command is a remote command you can send to test the functionality of the video measurement set. The command causes the host processor to transfer a coarse representation (approximately 24 × 80) of the signal from memory to the PC display (Figure 6–20).

***NOTE**. The ACQ:SHOW command is only intended for use by qualified service personnel when troubleshooting the video measurement set. Do not use the command for any other video measurement set applications.*

If you are not able to send the ACQ:SHOW command (the RS-232 does not function properly), verify that rotary switch A2S1 is set fully clockwise (pointing to DEFAULT label on the circuit board).

```
acq:show f1,8
```

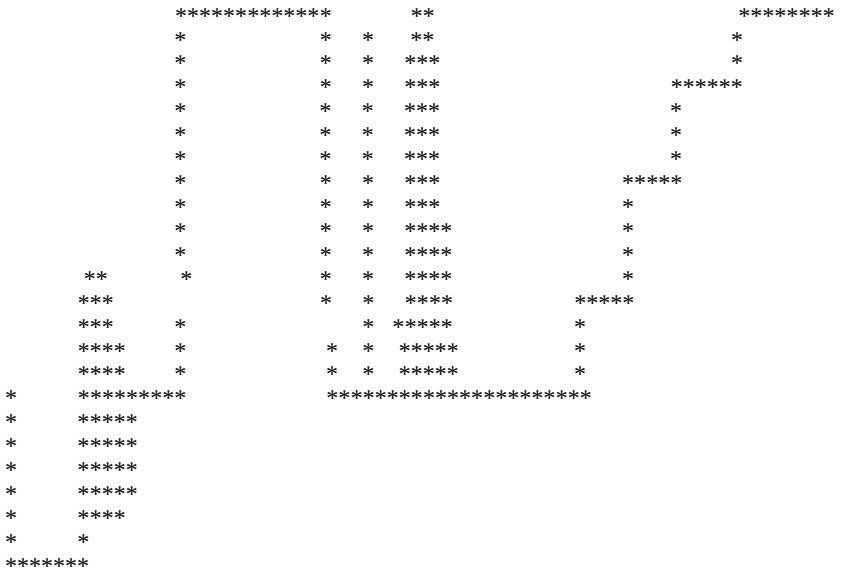


Figure 6–20: Example of the ACQ:SHOW command PC display

The ACQ:SHOW command isolates failures within the host processor and DSP circuits. If the PC displays the ACQ:SHOW waveform correctly, the host processor is able to access RAM and successfully read data from and write data to the RAM; the failure is most likely in the DSP circuit.

If the PC cannot display the ACQ:SHOW waveform and you can measure the analog waveform at the A/D Converter input, the failure is most likely in the host processor or in the acquisition circuits.

***NOTE**. Under some conditions, the host processor and memory circuits could fail and still allow the PC to display the ACQ:SHOW waveform.*

To display the ACQ:SHOW waveform on a PC, perform the following steps:

1. Connect the equipment as shown in Figure 6–21.

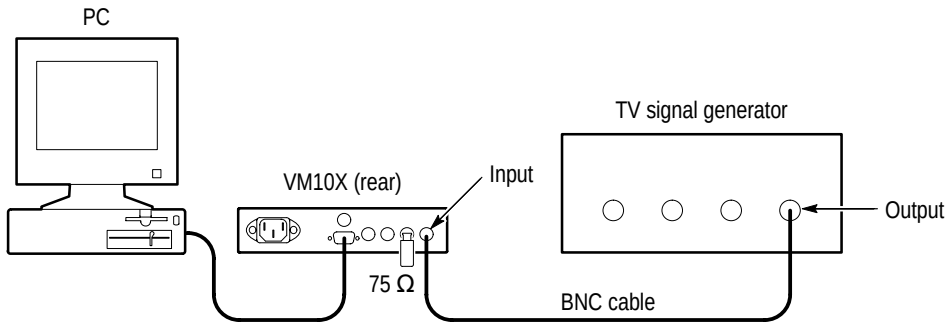


Figure 6–21: Setup for using the ACQ:SHOW command

2. Run the terminal emulator or communication program on the PC.

***NOTE**. To avoid data transfer problems, do not use a file transfer protocol such as Kermit or XMODEM.*

3. Configure the video measurement set RS-232 serial port for computer operation.
4. Configure the video measurement set RS-232 parameters to match the required settings for your computer.

***NOTE**. Refer to your computer manual to determine the settings for baud rate, stop bits, parity, and flow control.*

5. On the TV signal generator, set the output for a video signal in the correct format for your video measurement set (NTSC or PAL).
6. Send the following command to the video measurement set:

   ACQ:SHOW f1,8
7. Check the PC display for the ACQ:SHOW waveform (Figure 6–20).

NOTE. *You can use either F1 or F2 with any valid line number as arguments for the ACQ:SHOW command. Valid line numbers are 9 – 263 for F1 and 9 – 262 for F2 for the VM100, and 6 – 310 for F1 and 318 – 623 for F2 for the VM101.*

After completing the ACQ:SHOW command, the video measurement set will reacquire the signal.

Troubleshooting the VM140 or VM141 System

The waveform monitor control function allows you to simultaneously view the waveform on a 1740A-series waveform monitor while the video measurement set measures the signal parameters. The video measurement set automatically sends line select commands to the waveform monitor to control the monitor display. The resulting waveform display is the video line where the video measurement set is performing measurements.

The video measurement set and waveform monitor system is called a VM140 when the video measurement set is a VM100. The system is a VM141 when the video measurement set is a VM101.

If the video measurement set is unable to control the waveform monitor, use the following procedure to test the RS-232 serial port on the video measurement set:

NOTE. *Use a standard 9-pin cable to connect the PC and video measurement set RS-232 serial ports. The RS-232 serial port cable used with the video measurement set and waveform monitor is not PC-compatible.*

1. Connect a standard 9-pin cable between the RS-232 serial ports on the video measurement set and a PC.
2. Run the terminal emulator or communication program on the PC.

NOTE. *To avoid data transfer problems, do not use a file transfer protocol such as Kermit or XMODEM.*

3. Configure the video measurement set RS-232 serial port for CONTROL mode.
4. Configure the PC RS-232 parameters to match the CONTROL mode settings shown in Table 6–6.

Table 6–6: CONTROL mode communications parameters

Parameter	PC Setting
BAUD RATE	9600
DATA BITS	8
STOP BITS	1
PARITY	NONE
FLOW CTL	NONE

5. On the video measurement set, press the **MEAS** button. If the RS-232 serial port is functioning properly, lines of text appear on the PC screen as shown in the following example:

:sweep:timing:onel;:lines:field f2;:lines:number:ntsc 17 (signal connected)
:sweep:timing twof (no signal connected)

Repackaging Instructions

This section contains the information needed to repackage the video measurement set for shipment or storage.

Packaging

Use a corrugated cardboard shipping carton having a test strength of at least 275 pounds (125 kg) and with an inside dimension at least six inches (15.25 cm) greater than the instrument dimensions.

If the instrument is being shipped to a Tektronix Service Center, enclose the following information:

- The owner's address
- Name and phone number of a contact person
- Type and serial number of the instrument
- Reason for returning
- A complete description of the service required

Seal the shipping carton with an industrial stapler or strapping tape.

Mark the address of the Tektronix Service Center and also your own return address on the shipping carton in two prominent locations.

Storage

Store the video measurement set in a clean, dry environment. The following environmental characteristics apply for both shipping and storage:

- Temperature range: –40° F to +167° F (–40° C to +75° C)
- Altitude: To 50,000 feet (15,240 meters)

See Table 1–6 on page 1–5 for a complete listing of the environmental charactertistics.

Options

This chapter describes the accessories and options that are available for the video measurement set.

Tektronix offers maintenance options that cover calibration and repair services. Contact your local Tektronix representative for details.

Standard Accessories

The following accessories are shipped with the video measurement set:

- *VM100 & VM101 Video Measurement Sets User Manual*
  (Tektronix part number 070-9522-XX)
- Power cable assembly, standard USA, 125 V
  (Tektronix part number 161-0216-00)
- Replacement cushioning pads, six each
  (Tektronix part number 348-0844-00)

Optional Accessories

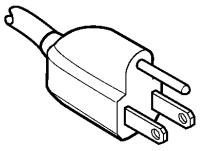
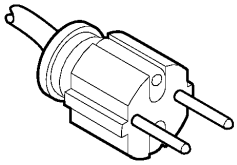
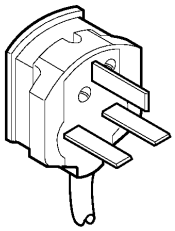
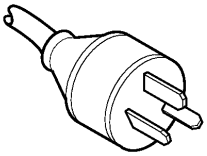
The following accessories can be ordered for use with the video measurement set:

- *VM100 & VM101 Video Measurement Sets Service Manual*
  (Tektronix part number 070-9289-XX)
- RS-232 Cable, DCE to DTE
  (Tektronix part number 174-1809-00)
- TVGF13 Rackmounting Adapter (mounts two half-rack width instruments side by side in a standard 19 inch rack when used with a 1700F10 kit)
- TBGF14 Rackmounting Kit (mounts two half-rack width instruments in a standard 1/2 rack application)
- TVGF15 Mounting Kit (for use with a 1740A-series waveform monitor)

Options

Table 7–1 shows the available power cord options:

Table 7–1: Power cord identification

Plug Configuration	Normal Usage	Option Number
	North America 115 V	Standard
	Europe 230 V	A1
	United Kingdom 230 V	A2
	Australia 230 V	A3

Replaceable Electrical Parts

This section contains a list of the electrical components for the video measurement set. Use this list to identify and order replacement parts.

Parts Ordering Information

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

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

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

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

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

Using the Replaceable Electrical Parts List

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

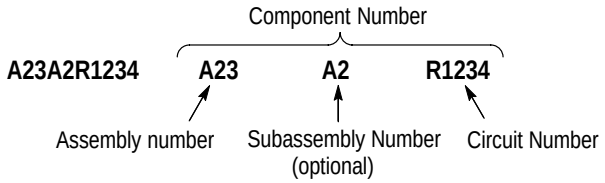
Parts list column descriptions

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

Abbreviations

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

Component Number



Read: Resistor 1234 (of Subassembly 2) of Assembly 23

List of Assemblies

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

Chassis Parts

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

Mfr. Code to Manufacturer Cross Index

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

Manufacturers cross index

Mfr. Code	Manufacturer	Address	City, State, Zip Code
01295	TEXAS INSTRUMENTS INC	SEMICONDUCTOR GROUP 13500 N CENTRAL EXPRESSWAY PO BOX 655303	DALLAS, TX 75272–5303
04222	AVX/KYOCERA	PO BOX 867	MYRTLE BEACH, SC 29577
04713	MOTOROLA INC	SEMICONDUCTOR PRODUCTS SECTOR 5005 E MCDOWELL ROAD	PHOENIX, AZ 85008–4229
00779	AMP INC.	CUSTOMER SERVICE DEPT PO BOX 3608	HARRISBURG, PA 17105–3608
01295	TEXAS INSTRUMENTS INC	SEMICONDUCTOR GROUP 13500 N CENTRAL EXPRESSWAY PO BOX 655303	DALLAS, TX 75272–5303
04713	MOTOROLA INC	SEMICONDUCTOR PRODUCTS SECTOR 5005 E MCDOWELL ROAD	PHOENIX, AZ 85008–4229
09023	CORNELL–DUBILIER CORPORATION	C/O EARL & BROWN CO INC 7185 SW SANDBURG RD	TIGARD, OR 97223
09969	DALE ELECTRONIC COMPONENTS	EAST HWY 50 P.O. BOX 180	YANKTON, SD 57078
0B0A9	DALLAS SEMICONDUCTOR	4350 BELTWOOD PKWY S	DALLAS, TX 75244
0JR03	ZMAN MAGNETICS INC	7633 S 180TH	KENT, WA 98032
0JR04	TOSHIBA AMERICA INC	9775 TOLEDO WAY	IRVINE, CA 92718
17856	SILICONIX INC	2201 LAURELWOOD RD	SANTA CLARA, CA 95954–1516
1CH66	PHILIPS SEMICONDUCTORS	811 E ARQUES AVE PO BOX 3409	SUNNYVALE, CA 94086–3409
1ES66	MAXIM INTEGRATED PRODUCTS INC	120 SAN GABRIEL DR	SUNNYVALE, CA 94086
21847	FEI MICROWAVE	825 STEWART DRIVE	SUNNYVALE, CA 94086
22526	BERG ELECTRONICS INC	857 OLD TRAIL ROAD	ETTERS, PA 17319
24355	ANALOG DEVICES	1 TECHNOLOGY DRIVE	NORWOOD, MA 02062
27014	NATIONAL SEMICONDUCTOR CORP	2900 SEMICONDUCTOR DR PO BOX 58090 MS 30–115	SANTA CLARA, CA 95051–0606
27264	MOLEX PRODUCTS COMPANY	2222 WELLINGTON CT.	LISLE, IL 60532
30983	PHILIPS COMPONENTS	1440 W INDIANTOWN ROAD	JUPITER, FL 33458
31433	KEMET ELECTRONICS CORP	P O BOX 5928	GREENVILLE, SC 29606
34335	ADVANCED MICRO DEVICES INC	ONE AMD PLACE PO BOX 3453	SUNNYVALE, CA 94088–3453
48726	UNITRODE INTEGRATED CIRCUITS	7 CONTINENTAL BLVD	MERRIMACK, MN 03054
50139	ALLEN–BRADLEY COMPANY INC	ELECTRONIC COMPONENTS DIVISION 1414 ALLEN BRADLEY DRIVE	EL PASO, TX 79936
50434	HEWLETT PACKARD	370 W TRIMBLE ROAD	SAN JOSE, CA 95131–1008
50579	SIEMENS COMPONENTS INC	OPTOELECTRONICS DIVISION 1900 HOMESTEAD RD	CUPERTINO, CA 95014
53387	3M COMPANY	ELECTRONICS PRODUCTS DIV 3M AUSTIN CENTER	AUSTIN, TX 78769–2963
55680	NICHICON (AMERICA) CORP	927 E STATE PARKWAY	SCHAUMBURG, IL 60195–4526

Manufacturers cross index (cont.)

Mfr. Code	Manufacturer	Address	City, State, Zip Code
56845	DALE ELECTRONIC COMPONENTS	2300 RIVERSIDE BLVD PO BOX 74	NORFOLK, NE 68701
57489	OHMTEK	2160 LIBERTY DR	NIAGRA FALLS, NY 14304
59124	KOA SPEER ELECTRONICS INC	BOLIVAR DRIVE PO BOX 547	BRADFORD, PA 16701
61058	MATSUSHITA ELECTRIC CORP OF AMERICA	PANASONIC INDUSTRIAL CO DIV TWO PANASONIC WAY	SECAUCUS, NJ 07094
61429	FOX ELECTRONICS	DIV OF FOX ENTERPRIXED INC 5842 CORPORATION CIRCLE	FORT MEYERS, FL 33905
62643	UNITED CHEMICON INC	9801 W HIGGINS ST SUITE 430	ROSEMONT, IL 60018–4771
62786	HITACHI AMERICA LTD	HITACHI PLAZA 2000 SIERRA POINT PKWY	BRISBAINE, CA 94005
64155	LINEAR TECHNOLOGY CORP.	1630 MCCARTHY BOULEVARD	MILPITAS, CA 950357487
64762	ELANTEC INC	1996 TAROB COURT	MILPITAS, CA 95035–6824
67183	ALTERA CORP	2610 ORCHARD PKWY	SAN JOSE, CA 95134–2020
68994	XILINX INC	2100 LOGIC DR	SAN JOSE, CA 95124
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON, OR 97077–0001
91637	DALE ELECTRONIC COMPONENTS	1122 23RD ST	COLUMBUS, NE 68601
TK0IU	OPTREX CORPORATION	3–14–9 YUSHIMA BUNKO–KU	TOKYO, JAPAN 113
TK1857	HIROSE ELECTRIC USA INC	2688 WESTHILLS COURT	SIMI VALLEY, CA 93065–6235
TK2058	TDK CORPORATION OF AMERICA	1600 FEEHANVILLE DRIVE	MOUNT PROSPECT, IL 60056
TK2424	CHAMPION TECHNOLOGIES	2553 N EDGINGTON ST	FRANKLIN PARK, IL 60131
TK2635	ALPS ELECTRIC CO LTD	1–7 YUKIGAYA–OHTSUKA–CHO	OHTA–KU; TOKYO JAPAN
TK2598	MAXIM – ASICS	14150 SW KARL BRAUN DRIVE M/S 59–420	BEAVERTON, OR 97077

Replaceable electrical parts list

Component Number	Tektronix PartNumber	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A1	671–3589–00	B010100	B010349	CIRCUIT BD ASSY:FRONT PANEL (VM100 ONLY)	80009	671–3589–00
A1	671–3589–00	B010100	B010312	CIRCUIT BD ASSY:FRONT PANEL (VM101 ONLY)	80009	671–3589–00
A1	671–3589–01	B010350		CIRCUIT BD ASSY:FRONT PANEL (VM100 ONLY)	80009	671–3589–01
A1	671–3589–01	B010313		CIRCUIT BD ASSY:FRONT PANEL (VM101 ONLY)	80009	671–3589–01
A2	671–3250–00	B010100	B010129	CIRCUIT BD ASSY:MAIN (VM100 ONLY)	80009	671–3250–00
A2	671–3250–01	B010130	B010222	CIRCUIT BD ASSY:MAIN (VM100 ONLY)	80009	671–3250–01
A2	671–3250–02	B010223	B010307	CIRCUIT BD ASSY:MAIN (VM100 ONLY)	80009	671–3250–02
A2	671–3250–03	B010308		CIRCUIT BD ASSY:MAIN (VM100 ONLY)	80009	671–3250–03
A2	671–3751–00			CIRCUIT BD ASSY:MAIN (VM101 ONLY)	80009	671–3751–00
A3	119–5075–00			POWER SUPPLY:44W,5.1V 6A,+12.0V 1.0A,–12V 0.1A, 90–264VAC 47–63HZ,OPEN FRAME,3 X 5 X 1.45 INCH	80009	119–5075–00
A4	119–4809–00			DISPLAY MODULE:LCD,320 X 240,DOT MATRIX NTN SUPER TWIST,LED BACKLIGHT,96 X 72MM	TK0IU	DMC20261ANY–LY–B
A1	671–3589–00			CIRCUIT BD ASSY:FRONT PANEL	80009	671–3589–00
A1C22	283–5353–00			CAP,FXD,CER:0.1UF,20%,16V,X7R,0603,SMD,T&R	04222	0603YC104MAT2A
A1J1	131–5775–00			CONN,BOX:PCB,FFC/ZIF,FEMALE,STR,1 X 8,0.039 CTR,1MM,0.396 H X 0.138 TAIL,TIP,ACCOM 0.012	27264	52030–0810
A1R1	321–5427–00			RES,FXD,FILM:10.0K,1%,100V,62.5MW,0603,SMD,T&R	59124	RK73H1J1002FT
A1R2	321–5427–00			RES,FXD,FILM:10.0K,1%,100V,62.5MW,0603,SMD,T&R	59124	RK73H1J1002FT
A1R3	321–5427–00			RES,FXD,FILM:10.0K,1%,100V,62.5MW,0603,SMD,T&R	59124	RK73H1J1002FT
A1R4	321–5427–00			RES,FXD,FILM:10.0K,1%,100V,62.5MW,0603,SMD,T&R	59124	RK73H1J1002FT
A1R5	321–5427–00			RES,FXD,FILM:10.0K,1%,100V,62.5MW,0603,SMD,T&R	59124	RK73H1J1002FT
A1R6	321–5427–00			RES,FXD,FILM:10.0K,1%,100V,62.5MW,0603,SMD,T&R	59124	RK73H1J1002FT
A1R7	321–5427–00			RES,FXD,FILM:10.0K,1%,100V,62.5MW,0603,SMD,T&R	59124	RK73H1J1002FT
A1R8	321–5427–00			RES,FXD,FILM:10.0K,1%,100V,62.5MW,0603,SMD,T&R	59124	RK73H1J1002FT
A1R9	321–5427–00			RES,FXD,FILM:10.0K,1%,100V,62.5MW,0603,SMD,T&R	59124	RK73H1J1002FT
A1R10	321–5427–00			RES,FXD,FILM:10.0K,1%,100V,62.5MW,0603,SMD,T&R	59124	RK73H1J1002FT
A1R11	321–5427–00			RES,FXD,FILM:10.0K,1%,100V,62.5MW,0603,SMD,T&R	59124	RK73H1J1002FT
A1R12	321–5427–00			RES,FXD,FILM:10.0K,1%,100V,62.5MW,0603,SMD,T&R	59124	RK73H1J1002FT
A1R13	321–5427–00			RES,FXD,FILM:10.0K,1%,100V,62.5MW,0603,SMD,T&R	59124	RK73H1J1002FT
A1R14	321–5420–00			RES,FXD,FILM:475 OHM,1%,100V,63MW,0603,SMD	59124	RK73H1J4750FT
A1R15	321–5420–00			RES,FXD,FILM:475 OHM,1%,100V,63MW,0603,SMD	59124	RK73H1J4750FT
A1R16	321–5420–00			RES,FXD,FILM:475 OHM,1%,100V,63MW,0603,SMD	59124	RK73H1J4750FT
A1R17	321–5420–00			RES,FXD,FILM:475 OHM,1%,100V,63MW,0603,SMD	59124	RK73H1J4750FT
A1R18	321–5420–00			RES,FXD,FILM:475 OHM,1%,100V,63MW,0603,SMD	59124	RK73H1J4750FT
A1R19	321–5420–00			RES,FXD,FILM:475 OHM,1%,100V,63MW,0603,SMD	59124	RK73H1J4750FT
A1R20	321–5420–00			RES,FXD,FILM:475 OHM,1%,100V,63MW,0603,SMD	59124	RK73H1J4750FT
A1R21	321–5420–00			RES,FXD,FILM:475 OHM,1%,100V,63MW,0603,SMD	59124	RK73H1J4750FT
A1S1	260–2442–00	671–3589–00	671–3589–00	SWITCH,PUSH:SPST,MOM,NO,100 GRM FRC (VM100)	TK1857	HL20–LSG

Replaceable electrical parts list (cont.)

Component Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A1S1	260–2442–00	671–3589–00	671–3589–00	SWITCH,PUSH:SPST,MOM,NO,100 GRM FRC (VM101)	TK1857	HL20–LSG
A1S1	260–2671–00	671–3589–01		SWITCH,PUSH:SPST,MOM,NO,100 GRM FRC (VM100)	TK2635	SKECFL
A1S1	260–2671–00	671–3589–01		SWITCH,PUSH:SPST,MOM,NO,100 GRM FRC (VM101)		
A1S2				Same as A1S1		
A1S3				Same as A1S1		
A1S4				Same as A1S1		
A1S5				Same as A1S1		
A1S6				Same as A1S1		
A1S7				Same as A1S1		
A1S8				Same as A1S1		
A1S9				Same as A1S1		
A1S10				Same as A1S1		
A1S11				Same as A1S1		
A1S12				Same as A1S1		
A1S13				Same as A1S1		
A1U1	156–5480–01			IC,DIGITAL:HCMOS,RGTR,8–BIT SHRGTRIFT ,WITH OUTPUT LATCHES,74HC595,SO16.150,16MM	01295	SN74HC595ADR
A1U2	156–5358–01			IC,DIGITAL:HCMOS,RGTR,8–BIT PISO SHIFT RGTR,74HC165,SO16.150,T&R	01295	SN74HC165DR
A1U3	156–5358–01			IC,DIGITAL:HCMOS,RGTR,8–BIT PISO SHIFT RGTR,74HC165,SO16.150,T&R	01295	SN74HC165DR
A2	671–3250–00	B010100	B010129	CIRCUIT BD ASSY:MAIN (VM100 ONLY)	80009	671–3250–00
A2	671–3250–01	B010130	B010222	CIRCUIT BD ASSY:MAIN (VM100 ONLY)	80009	671–3250–01
A2	671–3250–02	B010223	B010307	CIRCUIT BD ASSY:MAIN (VM100 ONLY)	80009	671–3250–02
A2	671–3250–03	B010308		CIRCUIT BD ASSY:MAIN (VM100 ONLY)	80009	671–3250–03
A2	671–3751–00			CIRCUIT BD ASSY:MAIN (VM101 ONLY)	80009	671–3751–00
A2C1	290–5009–00			CAP,FXD,TANT:15UF,20%,25V,0.287 X 0.169,7343,SMD	04222	TAJD156M025R
A2C3	290–5009–00			CAP,FXD,TANT:15UF,20%,25V,0.287 X 0.169,7343,SMD	04222	TAJD156M025R
A2C6	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C9	290–5034–01			CAP,FXD,ALUM:33UF,20%,10V,5.7MM(0.224),SMD,T&R	62643	MVK10VC33RME60T PX (13")
A2C12	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C13	283–5203–00			CAP,FXD,CER:MLC,1000PF,10%,100V,X7R,1206,SMD	04222	12061C102KAT1A
A2C17	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C18	283–5189–00			CAP,FXD,CER:MLC,220PF,5%,100V,NPO,1206,SMD	04222	12061A221JAT1A
A2C19	283–5203–00			CAP,FXD,CER:MLC,1000PF,10%,100V,X7R,1206,SMD	04222	12061C102KAT1A
A2C20	283–5189–00			CAP,FXD,CER:MLC,220PF,5%,100V,NPO,1206,SMD	04222	12061A221JAT1A
A2C21	290–5037–01			CAP,FXD,ALUM:10UF,20%,35V,5.7 H X 5 DIA MM,SMD,T&R	62643	MVK35VC10RME60T PX (13")

Replaceable electrical parts list (cont.)

Component Number	Tektronix PartNumber	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A2C22	283–5189–00	671–3250–03		CAP,FXD,CER:MLC,220PF,5%,100V,NPO,1206,SMD	04222	12061A221JAT1A
A2C22	283–5189–00	671–3751–00		CAP,FXD,CER:MLC,220PF,5%,100V,NPO,1206,SMD	04222	12061A221JAT1A
A2C23	290–5037–01			CAP,FXD,ALUM:10UF,20%,35V,5.7 H X 5 DIA MM,SMD,T&R	62643	MVK35VC10RME60T PX (13")
A2C24	283–5188–00	671–3751–00		CAP,FXD,CER:MLC,100PF,5%,100V,NPO,1206,SMD	04222	12061A101JAT1A
A2C25	283–5189–00	671–3250–03		CAP,FXD,CER:MLC,220PF,5%,100V,NPO,1206,SMD	04222	12061A221JAT1A
A2C25	283–5189–00	671–3751–00		CAP,FXD,CER:MLC,220PF,5%,100V,NPO,1206,SMD	04222	12061A221JAT1A
A2C26	290–5037–01			CAP,FXD,ALUM:10UF,20%,35V,5.7 H X 5 DIA MM,SMD	62643	MVK35VC10RME60T PX (13")
A2C28	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C29	290–5037–01			CAP,FXD,ALUM:10UF,20%,35V,5.7 H X 5 DIA MM,SMD,T&R	62643	MVK35VC10RME60T PX (13")
A2C31	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C32	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C34	290–5037–01			CAP,FXD,ALUM:10UF,20%,35V,5.7 H X 5 DIA MM,SMD,T&R	62643	MVK35VC10RME60T PX (13")
A2C35	290–5037–01			CAP,FXD,ALUM:10UF,20%,35V,5.7 H X 5 DIA MM,SMD,T&R	62643	MVK35VC10RME60T PX (13")
A2C37	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C38	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C40	290–5037–01			CAP,FXD,ALUM:10UF,20%,35V,5.7 H X 5 DIA MM,SMD,T&R	62643	MVK35VC10RME60T PX (13")
A2C41	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C42	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C43	283–5267–00			CAP,FXD,CER:MLC,1UF,+80%–20%,25V,Y5V,1206,SMD	04222	12063G105ZAT4A
A2C44	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C50	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C51	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C52	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C55	283–5114–00	671–3250–00	671–3250–02	CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C55	283–5018–00	671–3250–03		CAP,FXD,CER:MLC,0.033UF,10%,50V,X7R,1206,SMD	04222	12065C333KAT1A
A2C55	283–5018–00	671–3751–00		CAP,FXD,CER:MLC,0.033UF,10%,50V,X7R,1206,SMD	04222	12065C333KAT1A
A2C56	283–5202–00	671–3250–00	671–3250–02	CAP,FXD,CER:MLC,0.022UF,10%,50V,X7R,1206,SMD	04222	12065C223KAT1A
A2C56	283–5265–00	671–3250–03		CAP,FXD,CER:MLC,0.0033UF,5%,50V,NPO,1206,SMD	04222	12065A332JAT1A
A2C56	283–5265–00	671–3751–00		CAP,FXD,CER:MLC,0.0033UF,5%,50V,NPO,1206,SMD	04222	12065A332JAT1A
A2C57	283–5267–00	671–3250–00	671–3250–02	CAP,FXD,CER:MLC,1UF,+80%–20%,25V,Y5V,1206,SMD	04222	12063G105ZAT4A
A2C57	283–5112–00	671–3250–03		CAP,FXD,CERAMIC:MLC,0.33UF,10%,25V,X7R,0.177 X 0.126,1812,12MM T&R	04222	18123C334KAT1A

Replaceable electrical parts list (cont.)

Component Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A2C57	283–5112–00	671–3751–00		CAP,FXD,CERAMIC:MLC,0.33UF,10%,25V,X7R,0.177 X 0.126,1812,12MM T&R	04222	18123C334KAT1A
A2C58	290–1289–00			CAP,FXD,AL:47UF,20%,16V,0.250 X 0.276,RDL	55680	USP1C470MCA1TP
A2C59	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C60	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C61	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C62	283–5202–00			CAP,FXD,CER:MLC,0.022UF,10%,50V,X7R,1206,SMD	04222	12065C223KAT1A
A2C63	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C64	283–5188–00			CAP,FXD,CER:MLC,100PF,5%,100V,NPO,1206,SMD	04222	12061A101JAT1A
A2C65	283–5201–00			CAP,FXD,CER:MLC,33PF,5%,100V,NPO,1206,SMD,8MM	04222	12061A330JAT1A
A2C66	283–5188–00			CAP,FXD,CER:MLC,100PF,5%,100V,NPO,1206,SMD	04222	12061A101JAT1A
A2C67	283–0698–01			CAP,FXD,MICA DI:390PF,1%,500V,TAPE & AMMO PACK	09023	CDA15FD391F03
A2C68	283–5187–00			CAP,FXD,CER:MLC,15PF,5%,100V,NPO,1206,SMD,8MM	04222	12061A150JAT1A
A2C69	283–5189–00			CAP,FXD,CER:MLC,220PF,5%,100V,NPO,1206,SMD	04222	12061A221JAT1A
A2C74	283–5188–00			CAP,FXD,CER:MLC,100PF,5%,100V,NPO,1206,SMD	04222	12061A101JAT1A
A2C75	283–5188–00			CAP,FXD,CER:MLC,100PF,5%,100V,NPO,1206,SMD	04222	12061A101JAT1A
A2C77	283–5108–00			CAP,FXD,CER:MLC,68PF,5%,100V,NPO,1206,SMD,8MM	04222	12061A680JAT1A
A2C78	283–5188–00			CAP,FXD,CER:MLC,100PF,5%,100V,NPO,1206,SMD	04222	12061A101JAT1A
A2C79	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C80	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C81	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C82	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C83	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C84	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C86	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C87	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C88	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C89	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C90	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C91	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C92	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C93	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C94	283–5188–00			CAP,FXD,CER:MLC,100PF,5%,100V,NPO,1206,SMD	04222	12061A101JAT1A

Replaceable electrical parts list (cont.)

Component Number	Tektronix PartNumber	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A2C102	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C103	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C104	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C106	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C110	283–5195–00			CAP,FXD,CER:MLC,10PF,5%,100V ,NPO,1206,SMD	04222	12061A100JAT1A
A2C111	283–5195–00			CAP,FXD,CER:MLC,10PF,5%,100V ,NPO,1206,SMD	04222	12061A100JAT1A
A2C112	283–5195–00			CAP,FXD,CER:MLC,10PF,5%,100V ,NPO,1206,SMD	04222	12061A100JAT1A
A2C113	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C118	283–5068–00			CAP,FXD,CER:MLC,2200PF,10%,50V,X7R,1206,SMD	04222	12065C222KAT1A
A2C120	283–5003–00			CAP,FXD,CER:MLC,0.01UF,10%,50V,X7R,1206,SMD	04222	12065C103KAT060R
A2C127	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C131	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C132	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C133	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C134	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C139	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C140	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C141	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C142	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C143	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C144	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C145	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C146	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C147	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C148	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C149	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C150	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C151	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C152	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C153	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C154	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C155	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C156	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C157	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C158	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C159	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C160	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C161	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C162	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C163	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C164	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A

Replaceable electrical parts list (cont.)

Component Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A2C165	290–5037–01			CAP,FXD,ALUM:10UF,20%,35V,5.7 H X 5 DIA MM,SMD,T&R	62643	MVK35VC10RME60T PX (13")
A2C166	290–5024–00			CAP,FXD,TANT:3.3UF,20%,25V,0.236 X 0.126,6032	04222	TAJC335M025
A2C167	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C168	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C169	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C170	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C171	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C172	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C173	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C174	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C175	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C176	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C177	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C178	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C179	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C180	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C181	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C182	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C183	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C184	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C185	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C186	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C187	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C188	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C189	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C190	290–5037–01			CAP,FXD,ALUM:10UF,20%,35V,5.7 H X 5 DIA MM,SMD,T&R	62643	MVK35VC10RME60T PX (13")
A2C191	283–5267–00			CAP,FXD,CER:MLC,1UF,+80%–20%,25V,Y5V,1206,SMD	04222	12063G105ZAT4A
A2C192	283–5107–00			CAP,FXD,CER:MLC,22PF,5%,100V,NPO,1206,SMD,8MM	04222	12061A220JAT1A
A2C193	283–5107–00			CAP,FXD,CER:MLC,22PF,5%,100V,NPO,1206,SMD,8MM	04222	12061A220JAT1A
A2C194	283–5189–00			CAP,FXD,CER:MLC,220PF,5%,100V,NPO,1206,SMD	04222	12061A221JAT1A
A2C195	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C196	283–5202–00			CAP,FXD,CER:MLC,0.022UF,10%,50V,X7R,1206,SMD	04222	12065C223KAT1A
A2C197	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C198	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C199	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C200	290–5037–01			CAP,FXD,ALUM:10UF,20%,35V,5.7 H X 5 DIA MM,SMD,T&R	62643	MVK35VC10RME60T PX (13")
A2C201	290–5037–01			CAP,FXD,ALUM:10UF,20%,35V,5.7 H X 5 DIA MM,SMD,T&R	62643	MVK35VC10RME60T PX (13")
A2C203	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C204	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)

Replaceable electrical parts list (cont.)

Component Number	Tektronix PartNumber	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A2C205	283–5108–00			CAP,FXD,CER:MLC,68PF,5%,100V,NPO,1206,SMD,8MM	04222	12061A680JAT1A
A2C206	283–5108–00			CAP,FXD,CER:MLC,68PF,5%,100V,NPO,1206,SMD,8MM	04222	12061A680JAT1A
A2C207	283–5196–00			CAP,FXD,CER:MLC,47PF,5%,100V,NPO,1206,SMD,8MM	04222	12061A470JAT1A
A2C208	283–5188–00			CAP,FXD,CER:MLC,100PF,5%,100V,NPO,1206,SMD	04222	12061A101JAT1A
A2C209	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C210	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C211	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C212	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C213	283–5113–00			CAP,FXD,CER:MLC,0.047UF,10%,50V,X7R,1206,SMD	04222	12065C473KAT1A
A2C214	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C216	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C217	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C222	283–5188–00			CAP,FXD,CER:MLC,100PF,5%,100V,NPO,1206,SMD	04222	12061A101JAT1A
A2C223	283–5108–00			CAP,FXD,CER:MLC,68PF,5%,100V,NPO,1206,SMD,8MM	04222	12061A680JAT1A
A2C224	283–5173–00			CAP,FXD,CER:MLC,1000PF,10%,50V,NPO,0.08X0.05	04222	08055A102KAT2A
A2C225	283–5173–00			CAP,FXD,CER:MLC,1000PF,10%,50V,NPO,0.08X0.05	04222	08055A102KAT2A
A2C226	283–5189–00			CAP,FXD,CER:MLC,220PF,5%,100V,NPO,1206,SMD	04222	12061A221JAT1A
A2C227	283–5189–00			CAP,FXD,CER:MLC,220PF,5%,100V,NPO,1206,SMD	04222	12061A221JAT1A
A2C228	283–5189–00			CAP,FXD,CER:MLC,220PF,5%,100V,NPO,1206,SMD	04222	12061A221JAT1A
A2C229	283–5195–00			CAP,FXD,CER:MLC,10PF,5%,100V ,NPO,1206,SMD	04222	12061A100JAT1A
A2C230	283–5189–00			CAP,FXD,CER:MLC,220PF,5%,100V,NPO,1206,SMD	04222	12061A221JAT1A
A2C232	283–5267–00			CAP,FXD,CER:MLC,1UF,+80%–20%,25V,Y5V,1206,SMD	04222	12063G105ZAT4A
A2C233	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C234	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C235	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C236	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C237	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C238	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C239	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C240	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C241	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C242	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C243	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C244	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C245	290–5009–00			CAP,FXD,TANT:15UF,20%,25V,0.287 X 0.169,7343	04222	TAJD156M025R
A2C246	290–5009–00			CAP,FXD,TANT:15UF,20%,25V,0.287 X 0.169,7343	04222	TAJD156M025R
A2C248	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C249	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C250	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)

Replaceable electrical parts list (cont.)

Component Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A2C251	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C252	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C253	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C254	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C255	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C256	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C257	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C258	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C259	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C260	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C261	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C262	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C263	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C264	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C265	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C266	283–5201–00			CAP,FXD,CER:MLC,33PF,5%,100V,NPO,1206,SMD,8MM	04222	12061A330JAT1A
A2C267	283–5267–00			CAP,FXD,CER:MLC,1UF,+80%–20%,25V,Y5V,1206,SMD	04222	12063G105ZAT4A
A2C268	283–5108–00			CAP,FXD,CER:MLC,68PF,5%,100V,NPO,1206,SMD,8MM	04222	12061A680JAT1A
A2C269	283–5003–00	671–3250–00	671–3250–02	CAP,FXD,CER:MLC,0.01UF,10%,50V,X7R,1206,SMD	04222	12065C103KAT060R
A2C270	283–5267–00			CAP,FXD,CER:MLC,1UF,+80%–20%,25V,Y5V,1206,SMD	04222	12063G105ZAT4A
A2C271	283–5267–00			CAP,FXD,CER:MLC,1UF,+80%–20%,25V,Y5V,1206,SMD	04222	12063G105ZAT4A
A2C272	283–5267–00			CAP,FXD,CER:MLC,1UF,+80%–20%,25V,Y5V,1206,SMD	04222	12063G105ZAT4A
A2C273	283–5267–00			CAP,FXD,CER:MLC,1UF,+80%–20%,25V,Y5V,1206,SMD	04222	12063G105ZAT4A
A2C274	283–5267–00			CAP,FXD,CER:MLC,1UF,+80%–20%,25V,Y5V,1206,SMD	04222	12063G105ZAT4A
A2C275	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C276	283–5197–00			CAP,FXD,CER:MLC,330PF,5%,100V,NPO,1206,SMD	04222	12061A331JAT1A
A2C277	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C278	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C279	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C280	283–5188–00			CAP,FXD,CER:MLC,100PF,5%,100V,NPO,1206,SMD	04222	12061A101JAT1A
A2C281	283–5173–00			CAP,FXD,CER:MLC,1000PF,10%,50V,NPO,0.08X0.05	04222	08055A102KAT2A
A2C282	283–5188–00			CAP,FXD,CER:MLC,100PF,5%,100V,NPO,1206,SMD	04222	12061A101JAT1A

Replaceable electrical parts list (cont.)

Component Number	Tektronix PartNumber	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A2C283	283–5003–00			CAP,FXD,CER:MLC,0.01UF,10%,50V,X7R,1206,SMD	04222	12065C103KAT060R
A2C284	283–5267–00			CAP,FXD,CER:MLC,1UF,+80%–20%,25V,Y5V,1206,SMD	04222	12063G105ZAT4A
A2C285	283–5003–00			CAP,FXD,CER:MLC,0.01UF,10%,50V,X7R,1206,SMD	04222	12065C103KAT060R
A2C286	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C287	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C288	283–5098–00			CAP,FXD,CER:MLC,0.1UF,+80%–20%,50V,Z5U,1206	04222	12065E104ZAT3A
A2C289	290–5049–00			CAP,FXD,TANT:DRY,150UF,20%,10V,ESR=0.7 OHM (100KHZ,25C),0.287 X 0.169 (EXTENDED D CASE),SMD	31433	T491X157M010AS
A2C290	290–5049–00			CAP,FXD,TANT:DRY,150UF,20%,10V,ESR=0.7 OHM (100KHZ,25C),0.287 X 0.169 (EXTENDED D CASE),SMD	31433	T491X157M010AS
A2C291	283–5203–00			CAP,FXD,CER:MLC,1000PF,10%,100V,X7R,1206,SMD	04222	12061C102KAT1A
A2C292	290–5009–00			CAP,FXD,TANT:15UF,20%,25V,0.287 X 0.169,7343,SMD	04222	TAJD156M025R
A2C293	283–5173–00			CAP,FXD,CER:MLC,1000PF,10%,50V,NPO,0.08X0.05, 0805,SMD,8MM T&R	04222	08055A102KAT2A
A2C295	283–5173–00			CAP,FXD,CER:MLC,1000PF,10%,50V,NPO,0.08X0.05, 0805,SMD,8MM T&R	04222	08055A102KAT2A
A2C296	283–5197–00			CAP,FXD,CER:MLC,330PF,5%,100V,NPO,1206,SMD	04222	12061A331JAT1A
A2C297	283–5188–00			CAP,FXD,CER:MLC,100PF,5%,100V,NPO,1206,SMD	04222	12061A101JAT1A
A2C298	283–5003–00			CAP,FXD,CER:MLC,0.01UF,10%,50V,X7R,1206,SMD	04222	12065C103KAT060R
A2C299	283–5101–00			CAP,FXD,CER:MLC,0.22UF,+80–20%,50V,Z5U,1210	04222	12105E224ZAT060R
A2C300	283–5267–00			CAP,FXD,CER:MLC,1UF,+80%–20%,25V,Y5V,1206,SMD	04222	12063G105ZAT4A
A2C301	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C302	283–5114–00			CAP,FXD,CER:MLC,0.1UF,10%,50V,X7R,1206,SMD,8MM	04222	12065C104KAT(1A OR 3A)
A2C303	281–0813–00	671–3250–00	671–3250–02	CAP,FXD,CER:MLC,0.047UF,20%,50V,0.100 X 0.170	04222	SA105E473MAA
A2C303	283–5113–00	671–3250–03		CAP,FXD,CER:MLC,0.047UF,10%,50V,X7R,1206,SMD	04222	12065C473KAT1A
A2C304	283–5267–00			CAP,FXD,CER:MLC,1UF,+80%–20%,25V,Y5V,1206,SMD	04222	12063G105ZAT4A
A2CR4	152–5018–00			DIODE,SIG:ULTRA FAST,100V,0.74VF,4NS,2.0PF, SER–PAIR,MMBD1203,SOT–23,8MM T&R	27014	MMBD1203
A2CR5	152–5018–00			DIODE,SIG:ULTRA FAST,100V,0.74VF,4NS,2.0PF, SER–PAIR,MMBD1203,SOT–23,8MM T&R	27014	MMBD1203
A2CR6	152–0845–00			DIODE,SIG:SCHTKY,COM–CATH,20V,410MV,1.3PF,HSM S–2814,SOT–23,T&R	04713	SRV–V–018
A2CR86	152–5062–00			DIODE,SIG:ULTRA FAST,100V,0.74VF,4NS,2.0PF, COM–ANODE,MMBD1205,SOT–23,8MM T&R	27014	MMBD1205
A2CR87	152–5027–00			DIO,RECT:SCHTKY,40V,1A,MBRS140,DO–214AA SMB	04713	MBRS140T3
A2CR89	152–5048–00			DIODE,SIG:SCHTKY,8V,340MV AT 1MA,500MV AT 10MA,1.0PF,ISOLATED PAIR,HSMS–2825,8MM T&R	50434	HSMS–2825–T31
A2CR90	152–0322–00	671–3250–00	671–3250–02	DIODE,SIG:SCHTKY,15V,410MVF AT 1MA,1.2PF	21847	A2X600
A2CR90	152–5048–00	671–3250–03		DIODE,SIG:SCHTKY,8V,340MV AT 1MA,500MV AT 10MA,1.0PF,ISOLATED PAIR,HSMS–2825,8MM T&R	50434	HSMS–2825–T31
A2CR90	152–5048–00	671–3751–00		DIODE,SIG:SCHTKY,8V,340MV AT 1MA,500MV AT 10MA,1.0PF,ISOLATED PAIR,HSMS–2825,8MM T&R	50434	HSMS–2825–T31
A2DS1	150–5001–00			DIODE,OPTO:LED,GRN,565NM,2.0VF AT 10MA IF,12.5VF MAX,0.4MCD MIN AT 10MA	50579	LG S260–DO E7502
A2DS2	150–5001–00			DIODE,OPTO:LED,GRN,565NM,2.0VF AT 10MA IF,12.5VF MAX,0.4MCD MIN AT 10MA	50579	LG S260–DO E7502

Replaceable electrical parts list (cont.)

Component Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A2DS3	150–5001–00			DIODE,OPTO:LED,GRN,565NM,2.0VF AT 10MA IF,12.5VF MAX,0.4MCD MIN AT 10MA	50579	LG S260–DO E7502
A2J3	131–6028–00			CONN,DSUB:PCB,LC FILTER,FEMALE,RTANG,9 POS, 0.375 MLG X 0.125 TAIL,GOLD,4–40 THD INSERT,BD	00779	869522–5
A2J4	131–3323–00			CONN,HDR:PCB,MALE,STR,2 X 20,0.1 CTR,0.365 H X 0.112 TAIL,SHRD/4 SIDES,CTR PLZ,30 GOLD	22526	66506–025
A2J5	131–3323–00			CONN,HDR:PCB,MALE,STR,2 X 20,0.1 CTR,0.365 H X 0.112 TAIL,SHRD/4 SIDES,CTR PLZ,30 GOLD	22526	66506–025
A2J7	131–4183–00			CONN,HDR:PCB,MALE,STR,2 X 7,0.1 CTR,0.365 H X 0.112 TAIL,SHRD/4 SIDES,CTR PLZ,30 GOLD	53387	2514–6002UB
A2J8	131–3520–00			CONN,HDR:PCB,MALE,STR,2 X 5,0.1 CTR,0.365 H X 0.112 TAIL,SHRD/4 SIDES,MIL PLZ,30 GOLD	53387	2510–6002UB
A2J9	131–5775–00			CONN,BOX:PCB,FFC/ZIF,FEMALE,STR,1 X 8,0.039 CTR,1MM,0.396 H X 0.138 TAIL,TIP,ACCOM 0.012	27264	52030–0810
A2J10	131–5227–00			CONN,HDR PWR:PCB,MALE,STR,1 X 6,0.156 CTR, 0.450 MLG X 0.140 TAIL,TIN,NON PLZ	27264	26–64–2060
A2J16	131–4794–00			CONN,HDR:PCB,MALE,STR,1 X 2,0.1 CTR,0.235 MLG X 0.112 TAIL,30GOLD,0.035 DIA PCB,SAFETY CO	53387	2402–6112 UB
A2J20	131–4183–00			CONN,HDR:PCB,MALE,STR,2 X 7,0.1 CTR,0.365 H X 0.112 TAIL,SHRD/4 SIDES,CTR PLZ,30 GOLD	53387	2514–6002UB
A2J22	131–4794–00			CONN,HDR:PCB,MALE,STR,1 X 2,0.1 CTR,0.235 MLG X 0.112 TAIL,30GOLD,0.035 DIA PCB,SAFETY CO	53387	2402–6112 UB
A2J24	131–4794–00			CONN,HDR:PCB,MALE,STR,1 X 2,0.1 CTR,0.235 MLG X 0.112 TAIL,30GOLD,0.035 DIA PCB,SAFETY CO	53387	2402–6112 UB
A2J25	131–4530–00			CONN,HDR:PCB,MALE,STR,1 X 3,0.1 CTR,0.230 MLG X 0.120 TAIL,30 GOLD,BD RETENTION	00779	104344–1
A2J27	131–4530–00			CONN,HDR:PCB,MALE,STR,1 X 3,0.1 CTR,0.230 MLG X 0.120 TAIL,30 GOLD,BD RETENTION	00779	104344–1
A2J28	131–4530–00			CONN,HDR:PCB,MALE,STR,1 X 3,0.1 CTR,0.230 MLG X 0.120 TAIL,30 GOLD,BD RETENTION	00779	104344–1
A2J29	131–4530–00			CONN,HDR:PCB,MALE,STR,1 X 3,0.1 CTR,0.230 MLG X 0.120 TAIL,30 GOLD,BD RETENTION	00779	104344–1
A2J30	131–3378–00			CONN,RF JACK:BNC,50 OHM,FEM,RTANG,PCB/REAR PNL,0.5–28 THD,0.625 H X 0.187 TAIL,W/O MTG FL	00779	227677–1
A2J31	131–3378–00			CONN,RF JACK:BNC,50 OHM,FEM,RTANG,PCB/REAR PNL,0.5–28 THD,0.625 H X 0.187 TAIL,W/O MTG FL	00779	227677–1
A2J32	131–3378–00			CONN,RF JACK:BNC,50 OHM,FEM,RTANG,PCB/REAR PNL,0.5–28 THD,0.625 H X 0.187 TAIL,W/O MTG FL	00779	227677–1
A2J33	131–3378–00			CONN,RF JACK:BNC,50 OHM,FEM,RTANG,PCB/REAR PNL,0.5–28 THD,0.625 H X 0.187 TAIL,W/O MTG FL	00779	227677–1
A2L2	108–5002–00			INDUCTOR,FXD:SIGNAL,15UH,5%,I<0.2A,RDC<2.5OHM ,Q>50,SRF>20MHZ,NL453232T–150K,1812,12MM T&R	61058	ELJ–FB150KE
A2L3	108–5002–00			INDUCTOR,FXD:SIGNAL,15UH,5%,I<0.2A,RDC<2.5OHM ,Q>50,SRF>20MHZ,NL453232T–150K,1812,12MM T&R	61058	ELJ–FB150KE
A2L7	108–5134–00			INDUCTOR,FXD:SIGNAL,2.2UH,5%,IDC<320 MA,RDC<1 OHM,Q>30,SRF>75 MHZ,NL322522T–2R2,1210,8MM	TK2058	NL322522T–2R2J–03
A2L8	108–5134–00			INDUCTOR,FXD:SIGNAL,2.2UH,5%,IDC<320 MA,RDC<1 OHM,Q>30,SRF>75 MHZ,NL322522T–2R2,1210,8MM	TK2058	NL322522T–2R2J–03
A2L9	108–5134–00			INDUCTOR,FXD:SIGNAL,2.2UH,5%,IDC<320 MA,RDC<1 OHM,Q>30,SRF>75 MHZ,NL322522T–2R2,1210,8MM	TK2058	NL322522T–2R2J–03
A2L10	108–5134–00			INDUCTOR,FXD:SIGNAL,2.2UH,5%,IDC<320 MA,RDC<1 OHM,Q>30,SRF>75 MHZ,NL322522T–2R2,1210,8MM	TK2058	NL322522T–2R2J–03

Replaceable electrical parts list (cont.)

Component Number	Tektronix PartNumber	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A2L11	108–1561–00			INDUCTOR,FXD:CUSTOM,POWER,1.9UH,5%,IDC<2.0A, RDC<0.10 OHM,Q>200,SRF>13MHZ,TOROIDAL CORE	0JR03	108–1561–00
A2L12	108–1558–00			INDUCTOR,FXD:CUSTOM,INDUCTOR,1.75UH,5%,Q=20 0,TOROID,0.478 DIA,0.02 THICK	0JR03	108–1558–00
A2L13	108–5131–00			INDUCTOR,FXD:SIGNAL,33UH,5%,IDC<70 MA,RDC<5.6 OHM,Q>30,SRF>17 MHZ,NL322522T–330J,1210,8MM	TK2058	NL322522T–330J–3
A2L15	108–5134–00			INDUCTOR,FXD:SIGNAL,2.2UH,5%,IDC<320 MA,RDC<1 OHM,Q>30,SRF>75 MHZ,NL322522T–2R2,1210,8MM	TK2058	NL322522T–2R2J–03
A2L16	108–5134–00			INDUCTOR,FXD:SIGNAL,2.2UH,5%,IDC<320 MA,RDC<1 OHM,Q>30,SRF>75 MHZ,NL322522T–2R2,1210,8MM	TK2058	NL322522T–2R2J–03
A2L17	108–5129–00			INDUCTOR,FXD:POWER,10UH,10%,IDC<550 MA,RDC <0.5 OHM,Q>10,SRF>22 MHZ,NLC453232T–100K,1812	TK2058	NLC453232T–100K
A2L18	108–5129–00			INDUCTOR,FXD:POWER,10UH,10%,IDC<550 MA,RDC <0.5 OHM,Q>10,SRF>22 MHZ,NLC453232T–100K,1812	TK2058	NLC453232T–100K
A2L19	108–5129–00			INDUCTOR,FXD:POWER,10UH,10%,IDC<550 MA,RDC <0.5 OHM,Q>10,SRF>22 MHZ,NLC453232T–100K,1812	TK2058	NLC453232T–100K
A2L20	108–5129–00			INDUCTOR,FXD:POWER,10UH,10%,IDC<550 MA,RDC <0.5 OHM,Q>10,SRF>22 MHZ,NLC453232T–100K,1812	TK2058	NLC453232T–100K
A2L21	108–1262–00			INDUCTOR,FXD:POWER,100UH,10%,I<0.75A,RDC<0.23 OHM,Q>15,SRF>5.4MHZ,BOBBIN CORE,TSL0807–101K	TK2058	TSL0807–101KR75
A2L22	108–5002–00			INDUCTOR,FXD:SIGNAL,15UH,5%,I<0.2A,RDC<2.5OHM ,Q>50,SRF>20MHZ,NL453232T–150K,1812,12MM T&R	61058	ELJ–FB150KE
A2Q1	151–5012–00			TRANSISTOR,SIG:BIPOLAR,PNP,15V,10MA,2.0GHZ,AM PLIFIER,MMBTH69L,TO–236/SOT–23,8MM T&R	04713	MMBTH69LT1
A2Q2	151–5002–00			TRANSISTOR,SIG:JFET,N–CH,5V,75MA,60 OHM,SWITCH,MMBF4392L,SOT–23,8MM T&R	04713	MMBF4392LT1
A2Q3	151–5012–00			TRANSISTOR,SIG:BIPOLAR,PNP,15V,10MA,2.0GHZ,AM PLIFIER,MMBTH69L,TO–236/SOT–23,8MM T&R	04713	MMBTH69LT1
A2Q4	151–5001–00			TRANSISTOR,SIG:BIPOLAR,NPN,40V,200MA,300MHZ,A MPLIFIER,MMBT3904L,TO–236/SOT–23,8MM T&R	04713	MMBT3904LT1
A2Q5	151–5000–00			TRANSISTOR,SIG:BIPOLAR,PNP,40V,200MA,250MHZ,A MPLIFIER,MMBT3906L,TO–236/SOT–23,8MM T&R	04713	MMBT3906LT1
A2Q6	151–5000–00			TRANSISTOR,SIG:BIPOLAR,PNP,40V,200MA,250MHZ,A MPLIFIER,MMBT3906L,TO–236/SOT–23,8MM T&R	04713	MMBT3906LT1
A2Q7	151–5000–00			TRANSISTOR,SIG:BIPOLAR,PNP,40V,200MA,250MHZ,A MPLIFIER,MMBT3906L,TO–236/SOT–23,8MM T&R	04713	MMBT3906LT1
A2Q8	151–5000–00			TRANSISTOR,SIG:BIPOLAR,PNP,40V,200MA,250MHZ,A MPLIFIER,MMBT3906L,TO–236/SOT–23,8MM T&R	04713	MMBT3906LT1
A2Q9	151–5000–00			TRANSISTOR,SIG:BIPOLAR,PNP,40V,200MA,250MHZ,A MPLIFIER,MMBT3906L,TO–236/SOT–23,8MM T&R	04713	MMBT3906LT1
A2Q10	151–5001–00	671–3250–03		TRANSISTOR,SIG:BIPOLAR,NPN,40V,200MA,300MHZ,A MPLIFIER,MMBT3904L,TO–236/SOT–23,8MM T&R	04713	MMBT3904LT1
A2Q10	151–5001–00	671–3751–00		TRANSISTOR,SIG:BIPOLAR,NPN,40V,200MA,300MHZ,A MPLIFIER,MMBT3904L,TO–236/SOT–23,8MM T&R	04713	MMBT3904LT1
A2Q123	151–5083–00			TRANSISTOR,PWR:MOS,N–CH,60V,3.5A,0.1/0.2 OHM,DUALSTD/LOGIC LEVEL,SI9945DY,SO8.150,12MM	27014	NDS9945
A2R14	321–5032–00			RES,FXD:THICK FILM,15.0K OHM,1%,0.125W,TC=100	50139	BCK1502FT
A2R15	321–5038–00			RES,FXD:THICK FILM,47.5K OHM,1%,0.125W,TC=100	50139	BCK4752FT
A2R17	321–5033–00			RES,FXD:THICK FILM,18.2K OHM,1%,0.125W,TC=100	50139	BCK1822FT
A2R20	321–5024–00			RES,FXD:THICK FILM,3.32K OHM,1%,0.125W,TC=100	50139	BCK3321FT
A2R21	321–5032–00			RES,FXD:THICK FILM,15.0K OHM,1%,0.125W,TC=100	50139	BCK1502FT

Replaceable electrical parts list (cont.)

Component Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A2R22	321–5013–00			RES,FXD:THICK FILM,392 OHM,1%,0.125W,TC=100	50139	BCK3920FT
A2R23	321–5113–00			RES,FXD:THICK FILM,75 OHM,1%,0.125W,TC=100 PPM	56845	CRCW1206–75ROFT
A2R24	321–5032–00			RES,FXD:THICK FILM,15.0K OHM,1%,0.125W,TC=100	50139	BCK1502FT
A2R28	321–5020–00			RES,FXD:THICK FILM,1.5K OHM,1%,0.125W,TC=100	50139	BCK1501FT
A2R29	321–5113–00			RES,FXD:THICK FILM,75 OHM,1%,0.125W,TC=100 PPM	56845	CRCW1206–75ROFT
A2R30	321–5012–00			RES,FXD:THICK FILM,332 OHM,1%,0.125W,TC=100	50139	BCK3320FT
A2R31	321–5033–00			RES,FXD:THICK FILM,18.2K OHM,1%,0.125W,TC=100	50139	BCK1822FT
A2R34	321–5113–00			RES,FXD:THICK FILM,75 OHM,1%,0.125W,TC=100 PPM	56845	CRCW1206–75ROFT
A2R35	321–5000–00			RES,FXD:THICK FILM,10 OHM,1%,0.125W,TC=100 PPM	50139	BCD10R0FT
A2R36	321–5023–00			RES,FXD:THICK FILM,2.74K OHM,1%,0.125W,TC=100	50139	BCK2741FT
A2R41	321–5166–00	671–3250–00	671–3250–02	RES,FXD:THICK FILM,150K OHM,1%,0.125W,TC=100	91637	CRCW1206–1503FT
A2R41	321–5051–00	671–3250–03		RES,FXD:THICK FILM,0 OHM,1%,0.125W,TC=100 PPM	09969	CRCW1206 JUMPER
A2R41	321–5051–00	671–3751–00		RES,FXD:THICK FILM,0 OHM,1%,0.125W,TC=100 PPM	09969	CRCW1206 JUMPER
A2R42	321–5166–00			RES,FXD:THICK FILM,150K OHM,1%,0.125W,TC=100	91637	CRCW1206–1503FT
A2R43	321–5034–00			RES,FXD:THICK FILM,22.1K OHM,1%,0.125W,TC=100	50139	BCK2212FT
A2R44	321–5009–00			RES,FXD:THICK FILM,182 OHM,1%,0.125W,TC=100	50139	BCK1820FT
A2R45	321–5049–00			RES,FXD:THICK FILM,1M OHM,1%,0.125W,TC=100	50139	BCA1004FT
A2R46	321–5033–00			RES,FXD:THICK FILM,18.2K OHM,1%,0.125W,TC=100	50139	BCK1822FT
A2R47	321–5006–00			RES,FXD:THICK FILM,100 OHM,1%,0.125W,TC=100	50139	BCK1000FT
A2R48	321–5113–00			RES,FXD:THICK FILM,75 OHM,1%,0.125W,TC=100 PPM	56845	CRCW1206–75ROFT
A2R49	321–5266–00			RES,FXD:THICK FILM,11K OHM,1%,0.125W,TC=100	91637	CRCW1206–1102FT
A2R50	321–5033–00			RES,FXD:THICK FILM,18.2K OHM,1%,0.125W,TC=100	50139	BCK1822FT
A2R51	321–5266–00			RES,FXD:THICK FILM,11K OHM,1%,0.125W,TC=100	91637	CRCW1206–1102FT
A2R52	321–5266–00			RES,FXD:THICK FILM,11K OHM,1%,0.125W,TC=100	91637	CRCW1206–1102FT
A2R53	321–5033–00			RES,FXD:THICK FILM,18.2K OHM,1%,0.125W,TC=100	50139	BCK1822FT
A2R54	321–5033–00			RES,FXD:THICK FILM,18.2K OHM,1%,0.125W,TC=100	50139	BCK1822FT
A2R55	321–5049–00			RES,FXD:THICK FILM,1M OHM,1%,0.125W,TC=100	50139	BCA1004FT
A2R56	321–5012–00			RES,FXD:THICK FILM,332 OHM,1%,0.125W,TC=100	50139	BCK3320FT
A2R57	321–5018–00			RES,FXD:THICK FILM,1.0K OHM,1%,0.125W,TC=100	50139	BCK1001FT
A2R58	321–5018–00			RES,FXD:THICK FILM,1.0K OHM,1%,0.125W,TC=100	50139	BCK1001FT
A2R60	321–5018–00			RES,FXD:THICK FILM,1.0K OHM,1%,0.125W,TC=100	50139	BCK1001FT
A2R61	321–5024–00			RES,FXD:THICK FILM,3.32K OHM,1%,0.125W,TC=100	50139	BCK3321FT
A2R62	321–5024–00			RES,FXD:THICK FILM,3.32K OHM,1%,0.125W,TC=100	50139	BCK3321FT
A2R63	321–5024–00			RES,FXD:THICK FILM,3.32K OHM,1%,0.125W,TC=100	50139	BCK3321FT
A2R64	321–5024–00			RES,FXD:THICK FILM,3.32K OHM,1%,0.125W,TC=100	50139	BCK3321FT
A2R65	321–5051–00			RES,FXD:THICK FILM,0 OHM,1%,0.125W,TC=100 PPM	09969	CRCW1206 JUMPER
A2R66	321–5051–00			RES,FXD:THICK FILM,0 OHM,1%,0.125W,TC=100 PPM	09969	CRCW1206 JUMPER
A2R67	321–5051–00			RES,FXD:THICK FILM,0 OHM,1%,0.125W,TC=100 PPM	09969	CRCW1206 JUMPER
A2R68	321–5051–00			RES,FXD:THICK FILM,0 OHM,1%,0.125W,TC=100 PPM	09969	CRCW1206 JUMPER
A2R69	321–5014–00			RES,FXD:THICK FILM,475 OHM,1%,0.125W,TC=100	50139	BCK4750FT
A2R70	321–5014–00			RES,FXD:THICK FILM,475 OHM,1%,0.125W,TC=100	50139	BCK4750FT
A2R71	321–5020–00			RES,FXD:THICK FILM,1.5K OHM,1%,0.125W,TC=100	50139	BCK1501FT
A2R72	321–5020–00			RES,FXD:THICK FILM,1.5K OHM,1%,0.125W,TC=100	50139	BCK1501FT
A2R73	321–5013–00			RES,FXD:THICK FILM,392 OHM,1%,0.125W,TC=100	50139	BCK3920FT
A2R74	321–5017–00			RES,FXD:THICK FILM,825 OHM,1%,0.125W,TC=100	50139	BCK8250FT
A2R75	321–5017–00			RES,FXD:THICK FILM,825 OHM,1%,0.125W,TC=100	50139	BCK8250FT
A2R76	321–5044–00			RES,FXD:THICK FILM,56.2 OHM,1%,0.125W,TC=100	50139	BCD56R2FT
A2R77	321–5036–00			RES,FXD:THICK FILM,33.2K OHM,1%,0.125W,TC=100	50139	BCK3322FT

Replaceable electrical parts list (cont.)

Component Number	Tektronix PartNumber	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A2R80	321–5019–00			RES,FXD:THICK FILM,1.21K OHM,1%,0.125W,TC=100	50139	BCK1211FT
A2R81	321–5051–00			RES,FXD:THICK FILM,0 OHM,1%,0.125W,TC=100 PPM	09969	CRCW1206 JUMPER
A2R82	321–5005–00			RES,FXD:THICK FILM,27.4 OHM,1%,0.125W,TC=100	50139	BCD27R4JT
A2R85	321–5051–00	671–3250–00	671–3250–02	RES,FXD:THICK FILM,0 OHM,1%,0.125W,TC=100 PPM	09969	CRCW1206 JUMPER
A2R85	321–5166–00	671–3250–03		RES,FXD:THICK FILM,150K OHM,1%,0.125W,TC=100	91637	CRCW1206–1503FT
A2R85	321–5166–00	671–3751–00		RES,FXD:THICK FILM,150K OHM,1%,0.125W,TC=100	91637	CRCW1206–1503FT
A2R86	321–5113–00			RES,FXD:THICK FILM,75 OHM,1%,0.125W,TC=100 PPM	56845	CRCW1206–75ROFT
A2R97	321–5090–00			RES,FXD:THICK FILM, 20K OHM,0.125W,100 PPM	50139	BCK2002FT
A2R98	321–5171–00			RES,FXD:THICK FILM,562K OHM,1%,0.125W,TC=100	91637	CRCW1206–5623FT
A2R99	321–5266–00			RES,FXD:THICK FILM,11K OHM,1%,0.125W,TC=100	91637	CRCW1206–1102FT
A2R100	321–5090–00			RES,FXD:THICK FILM, 20K OHM,0.125W,100 PPM	50139	BCK2002FT
A2R101	321–5090–00			RES,FXD:THICK FILM, 20K OHM,0.125W,100 PPM	50139	BCK2002FT
A2R102	321–5037–00			RES,FXD:THICK FILM,39.2K OHM,1%,0.125W,TC=100	50139	BCK3922FT
A2R103	321–5090–00			RES,FXD:THICK FILM, 20K OHM,0.125W,100 PPM	50139	BCK2002FT
A2R104	321–5090–00			RES,FXD:THICK FILM, 20K OHM,0.125W,100 PPM	50139	BCK2002FT
A2R110	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R112	321–5055–00			RES,FXD:THICK FILM,681K OHM,1%,0.125W,TC=100	91637	CRCW120668102FT
A2R113	321–5031–00			RES,FXD:THICK FILM,12.1K OHM,1%,0.125W,TC=100	50139	BCK1212FT
A2R114	321–5028–00			RES,FXD:THICK FILM,6.81K OHM,1%,0.125W,TC=100	50139	BCK6811FT
A2R116	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R119	321–5047–00			RES,FXD:THICK FILM,100K OHM,1%,0.125W,TC=100	50139	BCK1003FT
A2R120	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R121	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R122	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R123	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R124	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R125	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R126	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R127	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R128	321–5018–00			RES,FXD:THICK FILM,1.0K OHM,1%,0.125W,TC=100	50139	BCK1001FT
A2R129	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R130	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R132	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R133	307–5038–00			RES NTWK,FXD,FI:(8)4.7K OHM,2%,0.25W,SO–16	91637	SOMC–1603–472G
A2R134	307–5038–00			RES NTWK,FXD,FI:(8)4.7K OHM,2%,0.25W,SO–16	91637	SOMC–1603–472G
A2R135	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R136	307–5016–00			RES NTWK,FXD,FI:10K OHM,2%,0.125W SMD,TUBE	91637	SOMC–1601–103G TUBE
A2R137	321–5048–00			RES,FXD:THICK FILM,332K OHM,1%,0.125W,TC=100	50139	BCK3323FT
A2R138	321–5208–00			RES,FXD,FILM:THKF,10M OHM,5%,0.125W,TC=100	91637	CRCW1206–106JT
A2R139	321–5012–00			RES,FXD:THICK FILM,332 OHM,1%,0.125W,TC=100	50139	BCK3320FT
A2R140	307–5016–00			RES NTWK,FXD,FI:10K OHM,2%,0.125W SMD,TUBE	91637	SOMC–1601–103G TUBE
A2R141	307–5016–00			RES NTWK,FXD,FI:10K OHM,2%,0.125W SMD,TUBE	91637	SOMC–1601–103G TUBE
A2R142	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R144	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R145	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT

Replaceable electrical parts list (cont.)

Component Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A2R146	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R147	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R148	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R149	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R150	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R152	321–5039–00			RES,FXD:THICK FILM,56.2K OHM,1%,0.125W,TC=100	50139	BCK5622FT
A2R153	321–5035–00			RES,FXD:THICK FILM,27.4K OHM,1%,0.125W,TC=100	50139	BCK2742FT
A2R156	307–5016–00			RES NTWK,FXD,FI:10K OHM,2%,0.125W SMD,TUBE	91637	SOMC–1601–103G TUBE
A2R157	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R158	321–5049–00			RES,FXD:THICK FILM,1M OHM,1%,0.125W,TC=100	50139	BCA1004FT
A2R159	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R160	321–5008–00			RES,FXD:THICK FILM,150 OHM,1%,0.125W,TC=100	50139	BCK1500FT
A2R161	321–5194–00			RES,FXD:THICK FILM,49.9 OHM,1%,0.125W,TC=100	91637	CRCW–1206–49R–90 –FT
A2R162	321–5194–00			RES,FXD:THICK FILM,49.9 OHM,1%,0.125W,TC=100	91637	CRCW–1206–49R–90 –FT
A2R163	321–5051–00			RES,FXD THICK FILM;0 OHM,1%,0.125W,TC=100 PPM	09969	CRCW1206 JUMPER
A2R164	321–5017–00			RES,FXD:THICK FILM,825 OHM,1%,0.125W,TC=100	50139	BCK8250FT
A2R165	321–5017–00			RES,FXD:THICK FILM,825 OHM,1%,0.125W,TC=100	50139	BCK8250FT
A2R171	321–5167–00			RES,FXD:THICK FILM,221K OHM,1%,0.125W,TC=100	59124	RK73H2B2213FT
A2R172	321–5208–00			RES,FXD,FILM:THKF,10M OHM,5%,0.125W,TC=100	91637	CRCW1206–106JT
A2R173	321–5031–00			RES,FXD:THICK FILM,12.1K OHM,1%,0.125W,TC=100	50139	BCK1212FT
A2R174	321–5025–00			RES,FXD:THICK FILM,3.92K OHM,1%,0.125W,TC=100	50139	BCK3921FT
A2R175	321–5015–00			RES,FXD:THICK FILM,562 OHM,1%,0.125W,TC=100	50139	BCK5620FT
A2R176	321–5018–00			RES,FXD:THICK FILM,1.0K OHM,1%,0.125W,TC=100	50139	BCK1001FT
A2R177	321–5166–00			RES,FXD:THICK FILM,150K OHM,1%,0.125W,TC=100	91637	CRCW1206–1503FT
A2R178	321–5031–00			RES,FXD:THICK FILM,12.1K OHM,1%,0.125W,TC=100	50139	BCK1212FT
A2R179	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R180	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R182	321–5090–00			RES,FXD:THICK FILM, 20K OHM,0.125W,100 PPM	50139	BCK2002FT
A2R182	321–5090–00			RES,FXD:THICK FILM, 20K OHM,0.125W,100 PPM	50139	BCK2002FT
A2R184	321–5039–00			RES,FXD:THICK FILM,56.2K OHM,1%,0.125W,TC=100	50139	BCK5622FT
A2R186	321–5035–00			RES,FXD:THICK FILM,27.4K OHM,1%,0.125W,TC=100	50139	BCK2742FT
A2R187	321–5266–00			RES,FXD:THICK FILM,11K OHM,1%,0.125W,TC=100	91637	CRCW1206–1102FT
A2R188	321–5266–00			RES,FXD:THICK FILM,11K OHM,1%,0.125W,TC=100	91637	CRCW1206–1102FT
A2R189	321–5027–00			RES,FXD:THICK FILM,5.62K OHM,1%,0.125W,TC=100	50139	BCK5621FT
A2R190	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R191	321–5001–00			RES,FXD:THICK FILM,12.1 OHM,1%,0.125W,TC=100	50139	BCD12R1FT
A2R192	321–5001–00			RES,FXD:THICK FILM,12.1 OHM,1%,0.125W,TC=100	50139	BCD12R1FT
A2R193	321–5018–00			RES,FXD:THICK FILM,1.0K OHM,1%,0.125W,TC=100	50139	BCK1001FT
A2R194	321–5027–00			RES,FXD:THICK FILM,5.62K OHM,1%,0.125W,TC=100	50139	BCK5621FT
A2R195	321–5027–00			RES,FXD:THICK FILM,5.62K OHM,1%,0.125W,TC=100	50139	BCK5621FT
A2R196	321–5018–00			RES,FXD:THICK FILM,1.0K OHM,1%,0.125W,TC=100	50139	BCK1001FT
A2R197	321–5045–00			RES,FXD:THICK FILM,68.1 OHM,1%,0.125W,TC=100	50139	BCD68R1FT
A2R198	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R199	321–5022–00			RES,FXD:THICK FILM,2.21K OHM,1%,0.125W,TC=100	50139	BCK2211FT
A2R200	321–5035–00			RES,FXD:THICK FILM,27.4K OHM,1%,0.125W,TC=100	50139	BCK2742FT

Replaceable electrical parts list (cont.)

Component Number	Tektronix PartNumber	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A2R201	321–5044–00			RES,FXD:THICK FILM,56.2 OHM,1%,0.125W,TC=100	50139	BCD56R2FT
A2R202	321–5037–00			RES,FXD:THICK FILM,39.2K OHM,1%,0.125W,TC=100	50139	BCK3922FT
A2R204	321–5024–00			RES,FXD:THICK FILM,3.32K OHM,1%,0.125W,TC=100	50139	BCK3321FT
A2R205	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R207	321–5049–00			RES,FXD:THICK FILM,1M OHM,1%,0.125W,TC=100	50139	BCA1004FT
A2R208	321–5049–00			RES,FXD:THICK FILM,1M OHM,1%,0.125W,TC=100	50139	BCA1004FT
A2R210	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R330	321–5034–00	671–3250–03		RES,FXD:THICK FILM,22.1K OHM,1%,0.125W,TC=100	50139	BCK2212FT
A2R330	321–5034–00	671–3751–00		RES,FXD:THICK FILM,22.1K OHM,1%,0.125W,TC=100	50139	BCK2212FT
A2R332	321–5006–00			RES,FXD:THICK FILM,100 OHM,1%,0.125W,TC=100	50139	BCK1000FT
A2R333	321–5022–00			RES,FXD:THICK FILM,2.21K OHM,1%,0.125W,TC=100	50139	BCK2211FT
A2R334	321–5021–00			RES,FXD:THICK FILM,1.82K OHM,1%,0.125W,TC=100	50139	BCK1821FT
A2R335	321–5038–00	671–3250–00	671–3250–02	RES,FXD:THICK FILM,47.5K OHM,1%,0.125W,TC=100	50139	BCK4752FT
A2R335	321–5034–00	671–3250–03		RES,FXD:THICK FILM,22.1K OHM,1%,0.125W,TC=100	50139	BCK2212FT
A2R335	321–5034–00	671–3751–00		RES,FXD:THICK FILM,22.1K OHM,1%,0.125W,TC=100	50139	BCK2212FT
A2R336	321–5025–00			RES,FXD:THICK FILM,3.92K OHM,1%,0.125W,TC=100	50139	BCK3921FT
A2R337	321–5027–00			RES,FXD:THICK FILM,5.62K OHM,1%,0.125W,TC=100	50139	BCK5621FT
A2R338	321–5034–00			RES,FXD:THICK FILM,22.1K OHM,1%,0.125W,TC=100	50139	BCK2212FT
A2R339	321–5038–00			RES,FXD:THICK FILM,47.5K OHM,1%,0.125W,TC=100	50139	BCK4752FT
A2R340	321–5038–00			RES,FXD:THICK FILM,47.5K OHM,1%,0.125W,TC=100	50139	BCK4752FT
A2R342	321–5090–00			RES,FXD:THICK FILM, 20K OHM,0.125W,100 PPM	50139	BCK2002FT
A2R343	321–5046–00			RES,FXD:THICK FILM,82.5 OHM,1%,0.125W,TC=100	50139	BCK82R5FT
A2R345	321–5025–00			RES,FXD:THICK FILM,3.92K OHM,1%,0.125W,TC=100	50139	BCK3921FT
A2R346	321–5018–00			RES,FXD:THICK FILM,1.0K OHM,1%,0.125W,TC=100	50139	BCK1001FT
A2R347	321–5266–00			RES,FXD:THICK FILM,11K OHM,1%,0.125W,TC=100	91637	CRCW1206–1102FT
A2R348	321–5266–00			RES,FXD:THICK FILM,11K OHM,1%,0.125W,TC=100	91637	CRCW1206–1102FT
A2R349	321–5023–00	671–3250–00	671–3250–02	RES,FXD:THICK FILM,2.74K OHM,1%,0.125W,TC=100	50139	BCK2741FT
A2R349	321–5020–00	671–3250–03		RES,FXD:THICK FILM,1.5K OHM,1%,0.125W,TC=100	50139	BCK1501FT
A2R349	321–5020–00	671–3751–00		RES,FXD:THICK FILM,1.5K OHM,1%,0.125W,TC=100	50139	BCK1501FT
A2R350	321–5023–00	671–3250–00	671–3250–02	RES,FXD:THICK FILM,2.74K OHM,1%,0.125W,TC=100	50139	BCK2741FT
A2R350	321–5020–00	671–3250–03		RES,FXD:THICK FILM,1.5K OHM,1%,0.125W,TC=100	50139	BCK1501FT
A2R350	321–5020–00	671–3751–00		RES,FXD:THICK FILM,1.5K OHM,1%,0.125W,TC=100	50139	BCK1501FT
A2R351	321–5006–00			RES,FXD:THICK FILM,100 OHM,1%,0.125W,TC=100	50139	BCK1000FT
A2R352	321–5006–00			RES,FXD:THICK FILM,100 OHM,1%,0.125W,TC=100	50139	BCK1000FT
A2R353	321–5006–00			RES,FXD:THICK FILM,100 OHM,1%,0.125W,TC=100	50139	BCK1000FT
A2R354	321–5018–00			RES,FXD:THICK FILM,1.0K OHM,1%,0.125W,TC=100	50139	BCK1001FT
A2R355	321–5176–00			RES,FXD,FILM:3.01K,1%,0.125W,1206,SMD,T&R	91637	CRCW12063011FT
A2R356	321–5027–00			RES,FXD:THICK FILM,5.62K OHM,1%,0.125W,TC=100	50139	BCK5621FT
A2R357	321–5036–00			RES,FXD:THICK FILM,33.2K OHM,1%,0.125W,TC=100	50139	BCK3322FT
A2R358	321–5025–00	671–3250–00	671–3250–02	RES,FXD:THICK FILM,3.92K OHM,1%,0.125W,TC=100	50139	BCK3921FT
A2R358	321–5281–00	671–3250–03		RES,FXD:THICK FILM,2K OHM,1%,0.125W,TC=100 PPM	91637	CRCW1206–2001FT
A2R358	321–5281–00	671–3751–00		RES,FXD:THICK FILM,2K OHM,1%,0.125W,TC=100 PPM	91637	CRCW1206–2001FT
A2R359	321–5018–00			RES,FXD:THICK FILM,1.0K OHM,1%,0.125W,TC=100	50139	BCK1001FT
A2R360	321–5064–00			RES,FXD:THICK FILM,200K OHM,1%,0.125W,TC=100	91637	CRCW1206–2003FT
A2R361	321–5025–00			RES,FXD:THICK FILM,3.92K OHM,1%,0.125W,TC=100	50139	BCK3921FT
A2R362	321–5113–00			RES,FXD:THICK FILM,75 OHM,1%,0.125W,TC=100 PPM	56845	CRCW1206–75ROFT
A2R363	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R364	321–5014–00			RES,FXD:THICK FILM,475 OHM,1%,0.125W,TC=100	50139	BCK4750FT

Replaceable electrical parts list (cont.)

Component Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A2R365	321–5011–00			RES,FXD:THICK FILM,274 OHM,1%,0.125W,TC=100	50139	BCK2740FT
A2R366	321–5018–00			RES,FXD:THICK FILM,1.0K OHM,1%,0.125W,TC=100	50139	BCK1001FT
A2R367	321–5030–00			RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R368	321–5000–00			RES,FXD:THICK FILM,10 OHM,1%,0.125W,TC=100 PPM	50139	BCD10R0FT
A2R369	321–5028–00			RES,FXD:THICK FILM,6.81K OHM,1%,0.125W,TC=100	50139	BCK6811FT
A2R370	321–5006–00			RES,FXD:THICK FILM,100 OHM,1%,0.125W,TC=100	50139	BCK1000FT
A2R371	321–5047–00			RES,FXD:THICK FILM,100K OHM,1%,0.125W,TC=100	50139	BCK1003FT
A2R372	321–5370–00			RES,FXD,FILM:0.25 OHM,10%,0.33W,TC=300PPM,SMD	57489	L1206MR250KBT
A2R373	321–5370–00			RES,FXD,FILM:0.25 OHM,10%,0.33W,TC=300PPM,SMD	57489	L1206MR250KBT
A2R374	321–5018–00			RES,FXD:THICK FILM,1.0K OHM,1%,0.125W,TC=100	50139	BCK1001FT
A2R375	321–5025–00			RES,FXD:THICK FILM,3.92K OHM,1%,0.125W,TC=100	50139	BCK3921FT
A2R376	321–5012–00			RES,FXD:THICK FILM,332 OHM,1%,0.125W,TC=100	50139	BCK3320FT
A2R377	321–5049–00			RES,FXD:THICK FILM,1M OHM,1%,0.125W,TC=100	50139	BCA1004FT
A2R378	321–5049–00			RES,FXD:THICK FILM,1M OHM,1%,0.125W,TC=100	50139	BCA1004FT
A2R379	321–5024–00			RES,FXD:THICK FILM,3.32K OHM,1%,0.125W,TC=100	50139	BCK3321FT
A2R380	321–5024–00			RES,FXD:THICK FILM,3.32K OHM,1%,0.125W,TC=100	50139	BCK3321FT
A2R381	321–5028–00			RES,FXD:THICK FILM,6.81K OHM,1%,0.125W,TC=100	50139	BCK6811FT
A2R382	321–5033–00			RES,FXD:THICK FILM,18.2K OHM,1%,0.125W,TC=100	50139	BCK1822FT
A2R383	321–5039–00			RES,FXD:THICK FILM,56.2K OHM,1%,0.125W,TC=100	50139	BCK5622FT
A2R384	321–5012–00			RES,FXD:THICK FILM,332 OHM,1%,0.125W,TC=100	50139	BCK3320FT
A2R385	322–3473–00	671–3250–00	671–3250–02	RES,FXD,FILM:825K OHM,1%,0.2W,TC=100PPM,MI	91637	CCF50–2F82502FT
A2R385	321–5170–00	671–3250–03		RES,FXD:THICK FILM,825K OHM,1%,0.125W,TC=100	59124	RK73H2B8253FT
A2R385	321–5170–00	671–3751–00		RES,FXD:THICK FILM,825K OHM,1%,0.125W,TC=100	59124	RK73H2B8253FT
A2R470	321–5030–00	671–3250–02 671–3751–00		RES,FXD:THICK FILM,10.0K OHM,1%,0.125W,TC=100	50139	BCK1002FT
A2R471	307–5100–00	671–3250–02 671–3751–00		RES,THERMAL:50K OHM,5% NTC,–4.40/DEGREE C AT 25 DEGREES C	56845	NTHS–1206N01
A2R472	307–5100–00	671–3250–02 671–3751–00		RES,THERMAL:50K OHM,5% NTC,–4.40/DEGREE C AT 25 DEGREES C	56845	NTHS–1206N01
A2S1	260–5005–00			SWITCH,ROTARY:DPDT,SMD	30983	CS–4 22YTB
A2TP9	214–4705–00			TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00
A2TP10	214–4705–00			TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00
A2TP12	214–4705–00			TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00
A2TP15	214–4705–00			TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00
A2TP16	214–4705–00			TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00
A2TP17	214–4705–00			TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00
A2TP18	214–4705–00			TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00
A2TP19	214–4705–00			TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00
A2TP20	214–4705–00			TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00
A2TP22	214–4705–00			TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00
A2TP23	214–4705–00			TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00
A2TP24	214–4705–00			TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00
A2TP25	214–4705–00			TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00
A2TP26	214–4705–00			TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00
A2TP28	214–4705–00			TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00
A2TP29	214–4705–00			TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00
A2TP30	214–4705–00			TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00
A2TP31	214–4705–00			TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00

Replaceable electrical parts list (cont.)

Component Number	Tektronix PartNumber	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A2TP34	214–4705–00	671–3250–03		TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00
A2TP34	214–4705–00	671–3751–00		TEST POINT:SURFACE MOUNT PCB TEST POINT	80009	214–4705–00
A2U3	156–7032–01			IC,LINEAR:BIPOLAR,VR,NEGATIVE,ADJ,3%,1.0A,LOW DROPOUT,LM2991SX,TO–263/D2PAK	27014	LM2991SX
A2U5	234–0739–22			IC,ASIC:BIPOLAR,VIDEO DISPLAY OUTPUT AMP,QC6–40,M639–039,PLCC44,T&R	TK2598	234–0739–22
A2U6	234–1119–20			IC,ASIC:BIPOLAR,SYNC SEPERATOR (CORE),QC6–120,M652–019,44PLCC,TUBE	TK2598	234111920
A2U9	156–6603–00			IC,LINEAR:BIPOLAR,OP–AMP,200MHZ,1.5MV VOS,HIGH OUTPUT CURRENT,EL2073CS,SO8.150	64762	EL2073CS
A2U10	234–0728–22			IC,ASIC:BIPOLAR,VIDEO MULTIPLEXER,QC6–40, M639–028,PLCC44,T&R	TK2598	234–0728–22
A2U12	156–5587–01			IC,LINEAR:BIFET,OP–AMP,QUAD,3.0MV VOS,TL074BCD,SO14.150,16MM T&R	01295	TL074BCDR
A2U13	156–5853–01			IC,LINEAR:BIPOLAR,OP–AMP,35MHZ,UNITY GAIN STABLE,LM6361M,SO8.150,12MM T&R	27014	LM6361MX
A2U14	156–5853–01			IC,LINEAR:BIPOLAR,OP–AMP,35MHZ,UNITY GAIN STABLE,LM6361M,SO8.150,12MM T&R	27014	LM6361MX
A2U16	156–6645–01			IC,LINEAR:BIPOLAR,OP–AMP,140MHZ,HIGHOUTPUT CURRENT,W/2–INPUT MUX,MAX442CSA,SO8.150	1ES66	MAX442CSA–T
A2U17	156–6407–01			IC,LIN:BIPOLAR,AMPLIFIER,CUR FDBK,100MHZ, SAMPLE/HOLD,VIDEO DC RESTORATION,EL209	64762	EL2090CM(T&R)
A2U18	156–6059–01			IC,MISC:CMOS,ANLG SW,QUAD,DG444DY,SO16.150	17856	DG444DY–T1
A2U20	156–6603–00			IC,LINEAR:BIPOLAR,OP–AMP,200MHZ,1.5MV VOS,HIGH OUTPUT CURRENT,EL2073CS,SO8.150	64762	EL2073CS
A2U22	156–6651–00			IC,CONERTER:BICMOS,A/D,10–BIT,4OMSPS,2–STEP, 1W,AD9040A,S028.300	24355	AD9040AJR
A2U23	156–6007–00			IC,CONVERTER:CMOS,A/D,8–BIT,13US,11 CHAN MUX, SERIAL OUT,TLC540,PLCC20	01295	TLC540IFN
A2U26	156–5138–01			IC,LIN:BIFET,OP–AMP,DUAL,MC34002/TL072,SO8.150	01295	TL072CDR
A2U27	156–5435–01			IC,CONVERTER:CMOS,D/A,DUAL,8 BIT,200NS,CUR OUT MPU COMPATIBLE,MULTIPLYING,AD7528JP	24355	AD7528JP–REEL
A2U28	156–5435–01			IC,CONVERTER:CMOS,D/A,DUAL,8 BIT,200NS,CUR OUT MPU COMPATIBLE,MULTIPLYING,AD7528JP	24355	AD7528JP–REEL
A2U29	156–5587–01			IC,LINEAR:BIFET,OP–AMP,QUAD,3.0MV VOS,TL074BCD,SO14.150,16MM T&R	01295	TL074BCDR
A2U30	156–5587–01			IC,LINEAR:BIFET,OP–AMP,QUAD,3.0MV VOS,TL074BCD,SO14.150,16MM T&R	01295	TL074BCDR
A2U31	163–0514–00	671–3250–00	671–3250–02	IC,DIGITAL:CMOS,PLD,EEPLD,7096,96 M/C,60 I/O,4 IN,15NS,EPM7096–15,PLCC84,T	80009	163–0514–00
A2U31	163–0514–01	671–3250–03		IC,DIGITAL:CMOS,PLD,EEPLD,7064,64 M/C,64 I/O,4 IN,15NS,PRGM 156–6950–00,EPM7064–15,PLCC84,T	80009	163–0514–01
A2U31	163–0514–01	671–3751–00		IC,DIGITAL:CMOS,PLD,EEPLD,7064,64 M/C,64 I/O,4 IN,15NS,PRGM 156–6950–00,EPM7064–15,PLCC84,T	80009	163–0514–01
A2U32	156–5118–01			IC,DIGITAL:FTTL,GATE,QUAD 2–INPUT NAND,74F00,SO14.150,16MM T&R	01295	SN74F00DR
A2U34	156–5167–00			IC,DIGITAL:FTTL,COUNTER,8–BIT BIDIRECTIONAL BINARY,74F269,SO24.300,TUBE	04713	MC74F269DW
A2U35	156–5167–00			IC,DIGITAL:FTTL,COUNTER,8–BIT BIDIRECTIONAL BINARY,74F269,SO24.300,TUBE	04713	MC74F269DW
A2U36	156–5602–00			IC,DIGITAL:FTTL,FLIP FLOP,OCTAL D–TYPE, NONINV, 3–STATE,74F574,SO20.300,TUBE	01295	SN74F574DW

Replaceable electrical parts list (cont.)

Component Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A2U37	156–5602–00			IC,DIGITAL:FTTL,FLIP FLOP,OCTAL D–TYPE, NONINV, 3–STATE,74F574,SO20.300,TUBE	01295	SN74F574DW
A2U38	156–5602–00			IC,DIGITAL:FTTL,FLIP FLOP,OCTAL D–TYPE, NONINV, 3–STATE,74F574,SO20.300,TUBE	01295	SN74F574DW
A2U39	156–5602–00			IC,DIGITAL:FTTL,FLIP FLOP,OCTAL D–TYPE, NONINV, 3–STATE,74F574,SO20.300,TUBE	01295	SN74F574DW
A2U40	156–5820–00			IC,DIGITAL:ACTCMOS,TRANSCEIVER,OCTAL,3–STATE, 74ACT245,SO20.300,TUBE	04713	MC74ACT245DW
A2U41	156–5820–00			IC,DIGITAL:ACTCMOS,TRANSCEIVER,OCTAL,3–STATE, 74ACT245,SO20.300,TUBE	04713	MC74ACT245DW
A2U42	156–5820–00			IC,DIGITAL:ACTCMOS,TRANSCEIVER,OCTAL,3–STATE, 74ACT245,SO20.300,TUBE	04713	MC74ACT245DW
A2U43	156–5820–00			IC,DIGITAL:ACTCMOS,TRANSCEIVER,OCTAL,3–STATE, 74ACT245,SO20.300,TUBE	04713	MC74ACT245DW
A2U44	156–5820–00			IC,DIGITAL:ACTCMOS,TRANSCEIVER,OCTAL,3–STATE, 74ACT245,SO20.300,TUBE	04713	MC74ACT245DW
A2U45	156–5820–00			IC,DIGITAL:ACTCMOS,TRANSCEIVER,OCTAL,3–STATE, 74ACT245,SO20.300,TUBE	04713	MC74ACT245DW
A2U46	156–5820–00			IC,DIGITAL:ACTCMOS,TRANSCEIVER,OCTAL,3–STATE, 74ACT245,SO20.300,TUBE	04713	MC74ACT245DW
A2U48	156–6939–00			IC,PROCESSOR:CMOS,DSP,24–BITS,66MHZ,PLL,DSP5	04713	DSP56002FC66
A2U52	156–5054–01			IC,DGTL:FTTL,GATE,QUAD 2–INP OR,74F32,SO14.150	01295	SN74F32DR
A2U53	156–5051–01			IC,DGTL:FTTL,GATE,QUAD 2–INP NOR,74F02, SO14.150,16MM T&R	01295	SN74F02DR
A2U54	156–5504–01			IC,DIGITAL:FTTL,GATES,DUAL 4–INPUT NAND,74F20,SO14.150,16MM T&R	01295	SN74F20DR
A2U55	156–5052–01			IC,DIGITAL:FTTL,GATE,HEX INV,74F04,SO14.150,16MM	01295	SN74F04DR
A2U57	156–6796–00			IC,MEM:CMOS,SRAM,64K X 16,20NS,621664,SOJ44	62786	HM621664HJP–20
A2U58	156–5053–01			IC,DGTL:FTTL,GATE,QUAD 2–INP AND,74F08,SO14.150	01295	SN74F08DR
A2U61	163–0515–00	671–3250–00	671–3250–00	IC,MEMORY:CMOS,EPROM,128K X 8,120NS, OTP,27C010,PLCC32	80009	163–0515–00
A2U61	163–0515–01	671–3250–01		IC,MEMORY:CMOS,EPROM,128K X 8,120NS, OTP,27C010,PLCC32	80009	163–0515–01
A2U61	163–0515–01	671–3751–00		IC,MEMORY:CMOS,EPROM,128K X 8,120NS, OTP,27C010,PLCC32	80009	163–0515–01
A2U62	156–5820–00			IC,DIGITAL:ACTCMOS,TRANSCEIVER,OCTAL,3–STATE, 74ACT245,SO20.300,TUBE	04713	MC74ACT245DW
A2U63	156–5820–00			IC,DIGITAL:ACTCMOS,TRANSCEIVER,OCTAL,3–STATE, 74ACT245,SO20.300,TUBE	04713	MC74ACT245DW
A2U64	156–5052–01			IC,DIGITAL:FTTL,GATE,HEX INV,74F04,SO14.150,16MM	01295	SN74F04DR
A2U66	156–5304–01			IC,DIGITAL:HCTCMOS,BUFFER,QUAD BUFFER, /OE, 3–STATE,74HCT125,SO14.150,16MM T&R	01295	SN74HCT125DR
A2U67	156–5304–01			IC,DIGITAL:HCTCMOS,BUFFER,QUAD BUFFER, /OE, 3–STATE,74HCT125,SO14.150,16MM T&R	01295	SN74HCT125DR
A2U70	163–0516–00			IC,DIGITAL:CMOS,PLD,EEPLD,16V8,25NS,45MA,16V8–25,PLCC20,TUBE	80009	163–0516–00
A2U71	156–6151–01			IC,MEMORY:CMOS,SRAM,128K X 8,100NS,15UA,OE, 431000,SO32.440,T&R	62786	HM628128LFP–10SL
A2U72	156–6151–01			IC,MEMORY:CMOS,SRAM,128K X 8,100NS,15UA,OE, 431000,SO32.440,T&R	62786	HM628128LFP–10SL

Replaceable electrical parts list (cont.)

Component Number	Tektronix PartNumber	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A2U73	156–5190–01			IC,DIGITAL:FTTL,DEMUX/DECODER,1–OF–8 DECODER,74F138,SO16.150,16MM T&R	01295	SN74F138DR
A2U74	156–5057–01			IC,DIGITAL:FTTL,BUFFER,OCTAL,3–STATE,74F244,SO2 0.300,24MM T&R	01295	SN74F244DWR
A2U75	156–5123–01			IC,DIGITAL:HCTCMOS,DEMUX/DECODER,4–TO–16 DECODER,74HCT154,SO24.300,24MM T&R	1CH66	74HCT154DT
A2U76	156–5058–01			IC,DIGITAL:FTTL,TRANSCEIVER,OCTAL,3–STATE,74F2 45,SO20.300,24MM T&R	1CH66	N74F245D
A2U77	156–5058–01			IC,DIGITAL:FTTL,TRANSCEIVER,OCTAL,3–STATE,74F2 45,SO20.300,24MM T&R	1CH66	N74F245D
A2U78	156–5058–01			IC,DIGITAL:FTTL,TRANSCEIVER,OCTAL,3–STATE,74F2 45,SO20.300,24MM T&R	1CH66	N74F245D
A2U79	156–5489–01			IC,MISC:BIPOLAR,PWR SUPPLY SUPERVISOR,MPU RESET GEN,5V SUPPLY SENSING,TL7705ACD,SO	01295	TL7705ACDR
A2U80	156–6744–00			IC,PROCESSOR:CMOS,MICROCONTROLLER,32–BIT, 16 MHZ OLD VERSION; 68331A,PQFP132,TRAY	04713	MC68331CFC16B1
A2U81	156–5138–01			IC,LIN:BIFET,OP–AMP,DUAL,MC34002/TL072,SO8.150	01295	TL072CDR
A2U84	156–7047–01			IC,LINEAR:BIPOLAR,COMPARATOR,TTL OUT,9NS,LATCH, MAX9686BCSA,S08.150,12MM T&R	1ES66	MAX9686BCSA–T
A2U85	156–5138–01			IC,LIN:BIFET,OP–AMP,DUAL,MC34002/TL072,SO8.150	01295	TL072CDR
A2U87	156–5019–01			IC,LINEAR:BIPOLAR,COMPARATOR,DUAL,SINGLE SUPPLY,LM393D,SO8.150,12MM TAPE & REEL	01295	LM393DR
A2U93	156–6796–00			IC,MEMORY:CMOS,SRAM,64K X 16,20NS,621664	62786	HM621664HJP–20
A2U94	156–6270–00			IC,MEMORY:CMOS,SRAM,64K X 4,WITH OE,25NS	0JR04	TC55465AJ–25
A2U95	156–6270–00			IC,MEMORY:CMOS,SRAM,64K X 4,WITH OE,25NS	0JR04	TC55465AJ–25
A2U96	156–6270–00			IC,MEMORY:CMOS,SRAM,64K X 4,WITH OE,25NS	0JR04	TC55465AJ–25
A2U97	156–6270–00			IC,MEMORY:CMOS,SRAM,64K X 4,WITH OE,25NS	0JR04	TC55465AJ–25
A2U98	156–5504–01			IC,DIGITAL:FTTL,GATES,DUAL 4–INPUT NAND,74F20,SO14.150,16MM T&R	01295	SN74F20DR
A2U99	156–6406–00			IC,DIGITAL:CMOS,PLD,FPGA,XC3000 FAMILY,3064,224 CLBS,120 IOBS,120 I/O,100 MHZ,3064–100,PQFP	68994	XC3064–100PQ160C 0090
A2U100	156–4202–00			IC,MEMORY:CMOS,NVRAM,32K X 8,150NS,INTERNAL BATTERY AND CLOCK,DS1386–32,DIP32.600	0B0A9	DS1386–32–15
A2U101	156–6869–00			IC,MEMORY:CMOS,EPROM,512K X 8,120NS,5VOLTS FLASH,29F040,PLCC32	34335	AM29F040–120JC
A2U102	156–6869–00			IC,MEMORY:CMOS,EPROM,512K X 8,120NS,5VOLTS FLASH,29F040,PLCC32	34335	AM29F040–120JC
A2U103	156–6151–01			IC,MEMORY:CMOS,SRAM,128K X 8,100NS,15UA,OE, 431000,SO32.440,T&R	62786	HM628128LFP–10SL
A2U104	156–5051–01			IC,DIGITAL:FTTL,GATE,QUAD 2–INPUT NOR,74F02,SO14.150,16MM T&R	01295	SN74F02DR
A2U105	156–5053–01			IC,DIGITAL:FTTL,GATE,QUAD 2–INPUT AND,74F08,SO14.150,16MM T&R	01295	SN74F08DR
A2U107	156–7024–01			IC,MEMORY:CMOS,ROM,64–BIT,SILICON SERIAL NUMBER,DS2401Y,SOT–223,12MM T&R	0B0A9	DS2401Y
A2U108	156–6151–01			IC,MEMORY:CMOS,SRAM,128K X 8,100NS,15UA,OE, 431000,SO32.440,T&R	62786	HM628128LFP–10SL
A2U109	156–6940–01			IC,LINEAR:BIPOLAR,VR,POSITIVE,ADJ,3%,1.0A,LOW DROPOUT,LM2941S,T0–263/D2PAK	27014	LM2941SX
A2U112	156–6746–00			IC,MISC:CMOS,INTFC,RS–232,3 DRIVER/5 RCVR,+5V VCC,0.1UF EXTERNAL CAPS REQD,+/–10	64155	LT1137ACS

Replaceable electrical parts list (cont.)

Component Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Name & Description	Mfr. Code	Mfr. Part Number
A2U113	156–5262–01			IC,LINEAR:BIPOLAR,COMPARATOR,QUAD,SINGLE SUPPLY,LM339D,SO14.150,16MM T&R	01295	LM339DR
A2U114	156–5776–01			IC,MISC:CMOS,INTERFACE,DUAL RS–232LINE DRIVER/RCVR,+5V VCC,EXTERNAL CAPS REQUIRED	1ES66	MAX232CWE–T
A2U115	156–6031–01			IC,PROCESSOR:NMOS,PERIPHERAL,DUAL ASYNCH RCVR/TRANSMITTER, DUART,68681,PLCC44,32MM	04713	MC68681FNR2
A2U116	156–7047–01			IC,LINEAR:BIPOLAR,COMPARATOR,TTL OUT,9NS,LATCH, MAX9686BCSA,S08.150,12MM T&R	1ES66	MAX9686BCSA–T
A2U118	156–5136–01			IC,MISC:BIPOLAR,MODULATOR/DEMODULATOR,BALANCED,MC1496D,SO14.150,16MM T&R	04713	MC1496DR2
A2U119	156–5241–00			IC,LINEAR:BIPOLAR,COMPARATOR,DUAL,DIFFERENTIAL INPUT,NE522D,SO14.150	1CH66	NE522D
A2U120	156–6707–00			IC,MISC:CMOS,ANALOG SWITCH,DUAL SPDT,45 OHM,DG403DY,SO16.150	17856	DG403DY
A2U121	156–5853–01			IC,LINEAR:BIPOLAR,OP–AMP,35MHZ,UNITY GAIN STABLE,LM6361M,SO8.150,12MM T&R	27014	LM6361MX
A2U122	156–5619–01			IC,DIGITAL:FTTL,SHIFT RGTR,8–BIT SIPO, WITH /MR,74F164,SO14.150,16MM T&R	04713	MC74F164DR2
A2U124	156–6987–00			IC,LIN:BIPOLAR,SW–REGULATOR CONT,PWM,CUR MODE,SGL TOTEM POLE OUT,UC3845	48726	UC3845AD8
A2U125	156–5820–00			IC,DIGITAL:ACTCMOS,TRANSCEIVER,OCTAL,3–STATE, 74ACT245,SO20.300,TUBE	04713	MC74ACT245DW
A2Y1	158–0410–00	671–3250–00		OSC,RF:28.63636MHZ,VCXO,TTL/CMOS,CONTROL VOLT 0.5–4.5VDC,FREQ PULLABILITY +/–100PPM,4 P	61429	158–0410–00
A2Y1	158–0440–00	671–3751–00		OSCILLATOR:VCXO,35.468950 MHZ,TTL,0.0025%,14 PIN DIP COMPATIBLE,4 PINS USED	TK2424	K1523BA 35.468950 MHZ, SP#9306
A2Y2	158–5013–00			CRYSTAL,QTZ:32.768 KHZ,20 PPM,ESR 50K OHMS,CL 12.5PF,SMD,FSM PKG,0.41 X 0.16,0.14 H,T&R	61429	FSM327
A2Y3	158–5020–00			OSC,RF:XTAL CONTROLLED,3.6864 MHZ,0.01%,HCMOS, SMD	61429	F3160–3.6864MHZ
A3	119–5075–00			POWER SUPPLY:44W,5.1V 6A,+12.0V 1.0A,–12V 0.1A,90–264VAC 47–63HZ,OPEN FRAME,3 X 5 X 1.45	80009	119–5075–00
A4	119–4809–00			DSPLY MOD:LCD,320 X 240,DOT MATRIX NTN SUPER TWIST,LED BACKLIGHT,96 X 72MM VIEWING AREA,DM	TK0IU	DMC20261ANY–LY–B

Diagrams and Circuit Board Illustrations

This section contains the block diagram, circuit board illustrations, component locator tables, and schematic diagrams.

Symbols

Graphic symbols and class designation letters are based on ANSI Standard Y32.2-1975. Abbreviations are based on ANSI Y1.1-1972.

Logic symbology is based on ANSI/IEEE Standard 91-1984 in terms of positive logic. Logic symbols depict the logic function performed and can differ from the manufacturer's data.

The backslash (/) preceding a signal name indicates that the signal performs its intended function when in the low state.

Other standards used in the preparation of diagrams by Tektronix, Inc., include the following:

- Tektronix Standard 062-2476 Symbols and Practices for Schematic Drafting
- ANSI Y14.159-1971 Interconnection Diagrams
- ANSI Y32.16-1975 Reference Designations for Electronic Equipment
- MIL-HDBK-63038-1A Military Standard Technical Manual Writing Handbook

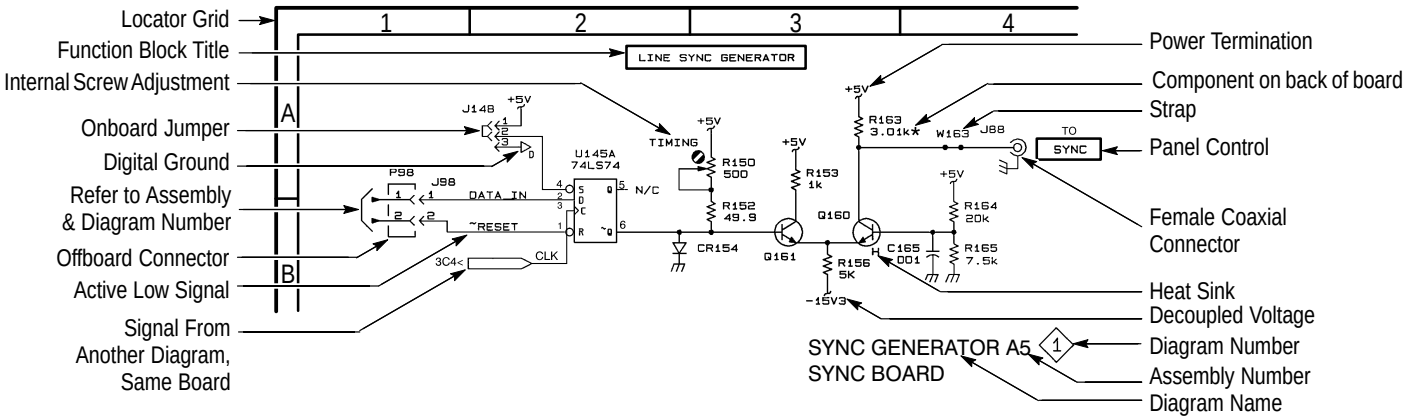
Component Values

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:	Values are in Ohms (Ω).

Graphic Items and Special Symbols Used in This Manual

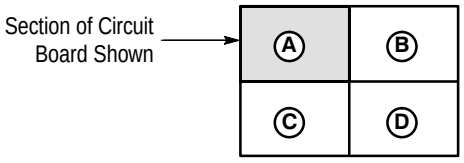
Each assembly in the instrument is assigned an assembly number (for example A5). The assembly number appears in the title on the diagram, in the lookup table for the schematic diagram, and corresponding component locator illustration. The Replaceable Electrical Parts list is arranged by assembly in numerical sequence; the components are listed by component number.

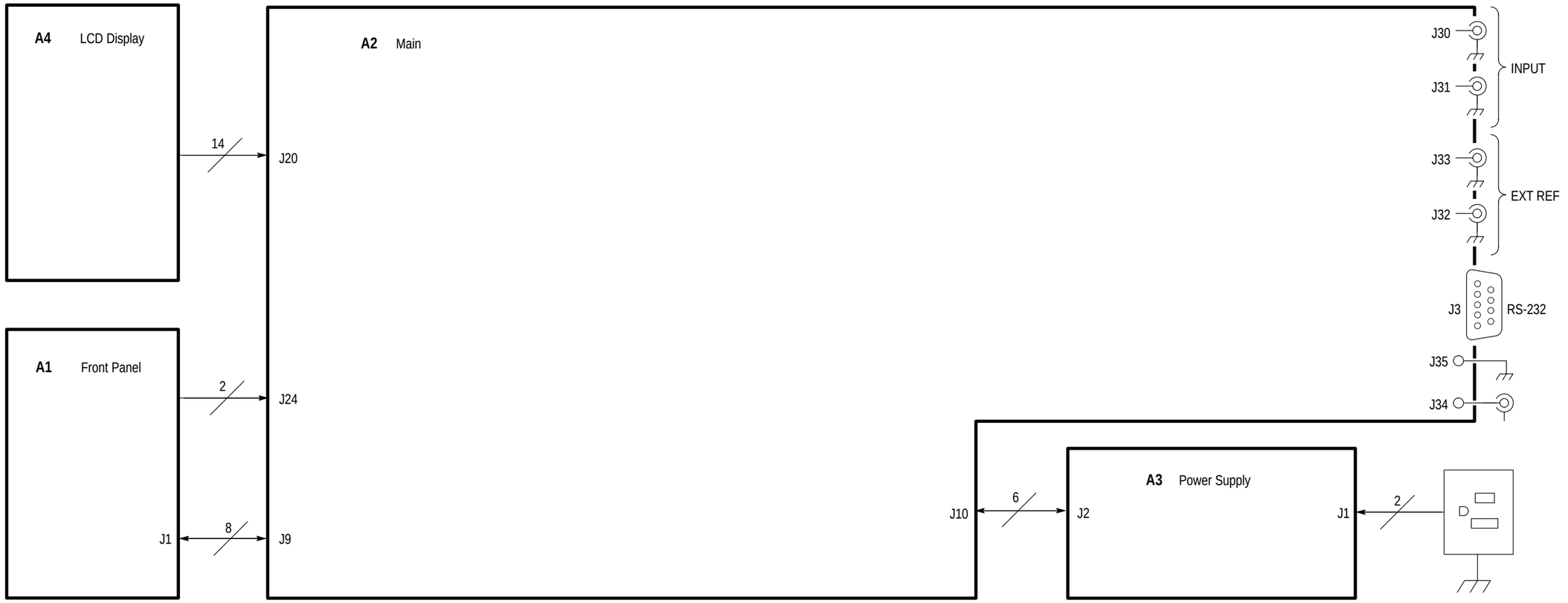


Component Locator Diagrams

The schematic diagram and circuit board component location illustrations have grids marked on them. The component lookup tables refer to these grids to help you locate a component. The circuit board illustration appears only once; its lookup table lists the diagram number of all diagrams on which the circuitry appears.

Some of the circuit board component location illustrations are expanded and divided into several parts to make it easier for you to locate small components. To determine which part of the whole locator diagram you are looking at, refer to the small locator key shown below. The gray block, within the larger circuit board outline, shows where that part fits in the whole locator diagram. Each part in the key is labeled with an identifying letter that appears in the figure titles under component locator diagrams.





Note: Connectors J4, J5, J7, J8, J16, J22, J25 and J27 are not used.

Figure 9–1: Interconnect diagram

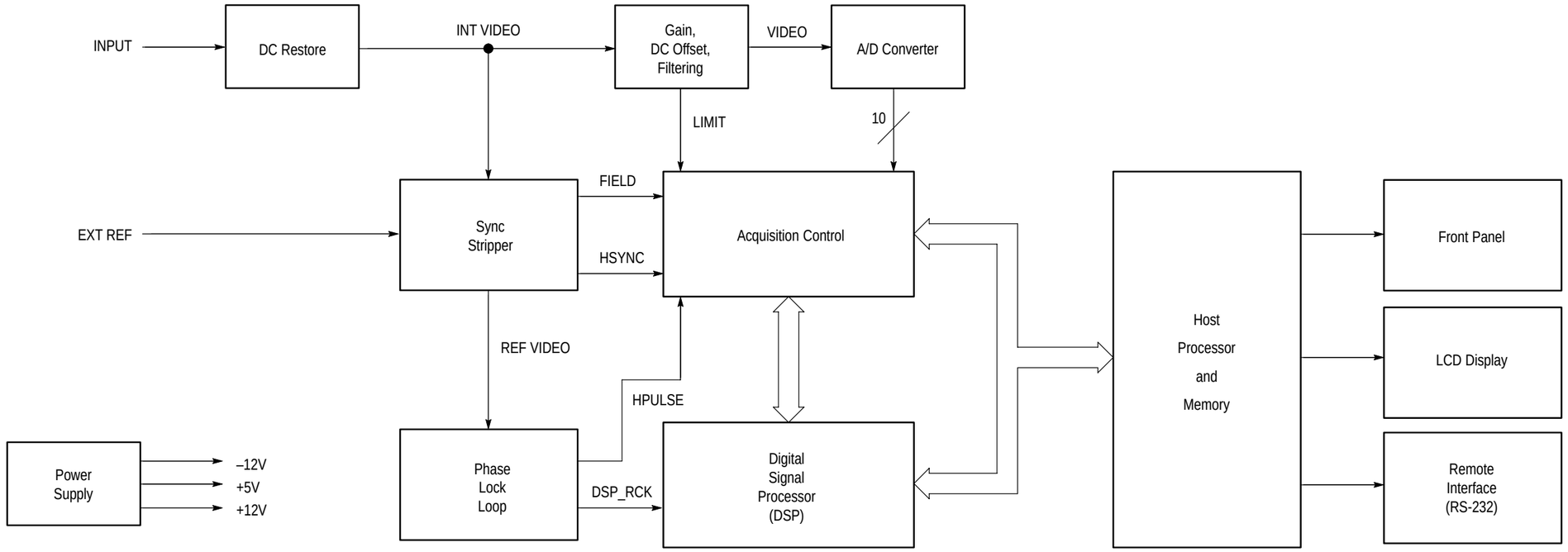
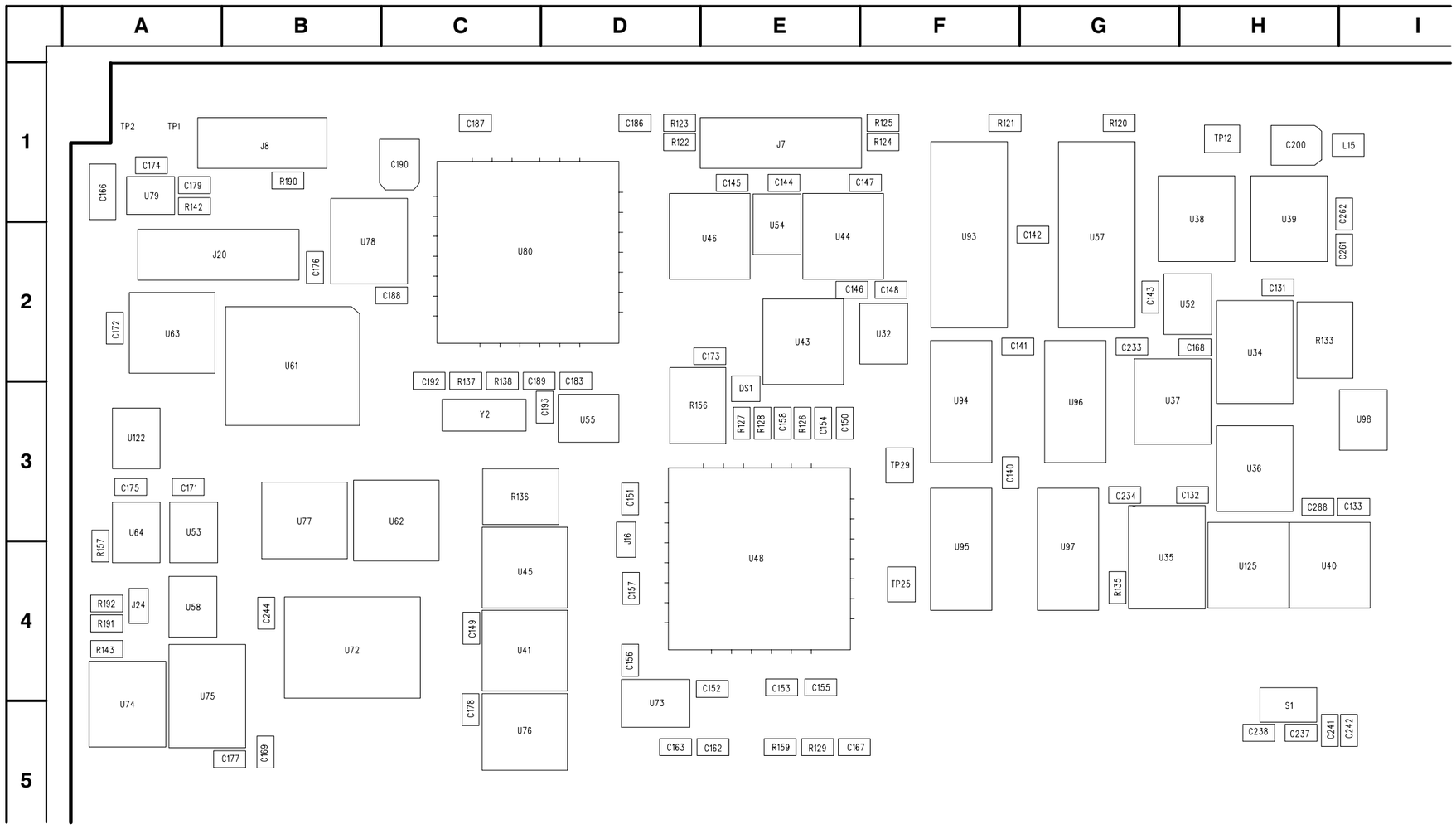
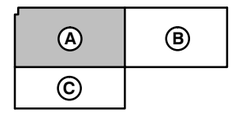
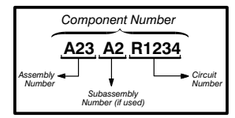


Figure 9–2: Block diagram





COMPONENT NUMBER EXAMPLE



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

STATIC SENSITIVE DEVICES

Figure 9–3: A2 Main board view A (671-3250-00/01/02/03)

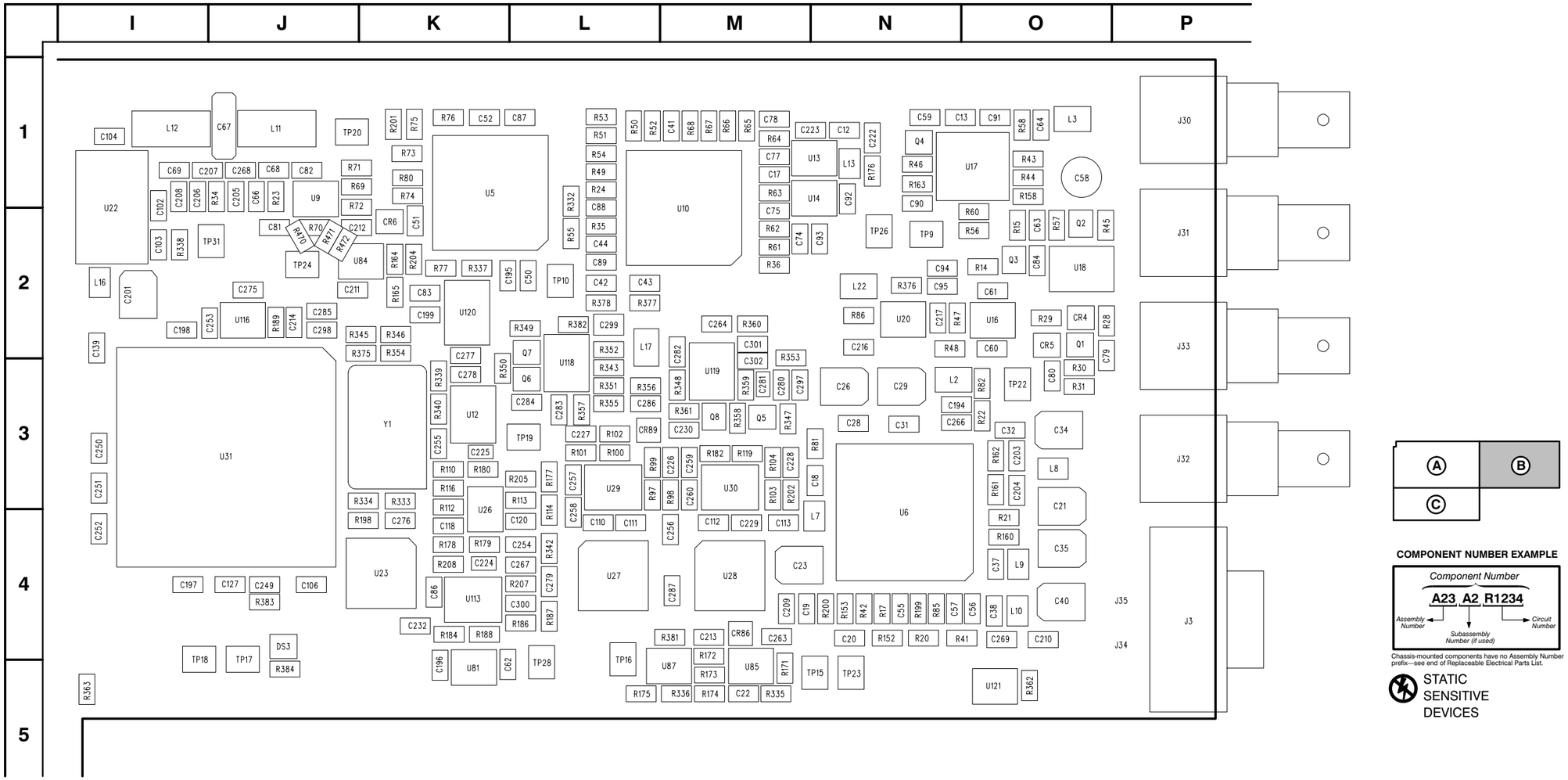
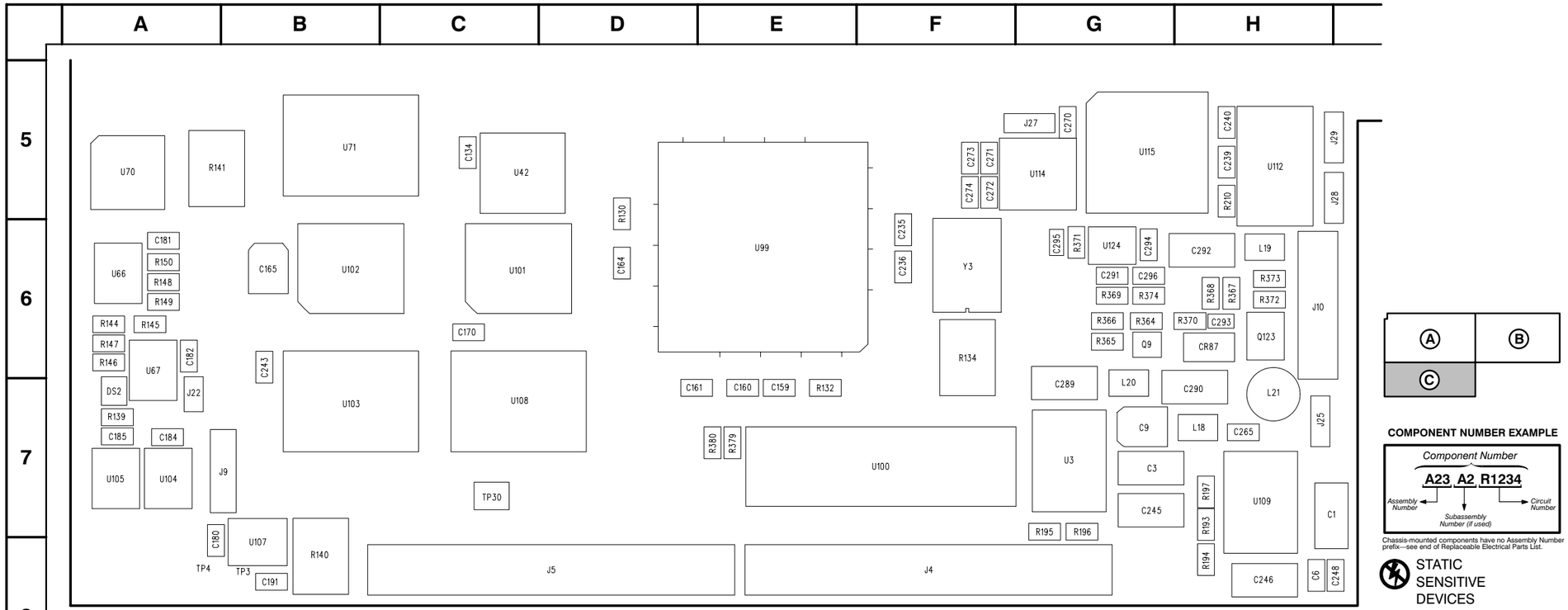


Figure 9–4: A2 Main board view B (671-3250-00/01/02/03)



COMPONENT NUMBER EXAMPLE

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

STATIC SENSITIVE DEVICES

A2 Main Board Component Locator (671-3250-00/01/02/03)

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C1	7C2	H7	C41	1E4	M1	C77	1D4	M1	C111	4F3	L4	C152	3G3	D4	C175	5B4	A3	C198	2E5	I2	C227	4G3	L3
C3	7E2	G7	C42	1E4	L2	C78	1D4	M1	C112	4F4	M4	C153	3G3	E4	C176	5B4	B2	C199	2E5	K2	C228	4G4	M3
C6	7B2	H8	C43	1E4	L2	C79	1B1	O3	C113	4F5	M4	C154	3F4	E3	C177	5B4	A5	C200	3B5	H1	C229	4F4	M4
C9	7F4	G7	C44	1E4	L2	C80	1B1	O3	C118	2B2	K4	C155	3G3	E4	C178	5B4	C5	C201	3B5	I2	C230	4G4	M3
C12	1C3	N1	C50	1G4	L2	C81	1F2	J2	C120	2C2	K4	C156	3G3	D4	C179	5B4	A1	C203	1E2	O3	C232	2F3	K4
C13	1B5	N1	C51	1G4	K2	C82	1G2	J1	C127	2D5	J4	C157	3G3	D4	C180	5B4	A8	C204	1E2	O3	C233	3C3	G2
C17	1C3	M1	C52	1G4	K1	C83	1B3	K2	C131	4F2	H2	C158	3H2	E3	C181	5B4	A6	C205	1G3	J1	C234	3C3	G3
C18	1D2	M3	C55	1D1	N4	C84	1B3	O2	C132	4G1	G3	C159	4B4	E7	C182	5B4	A6	C206	1H3	I1	C235	4B4	F6
C19	1D2	M4	C56	1D1	O4	C86	1F5	K4	C133	4D1	H3	C160	4B4	E7	C183	5B4	D3	C207	1H3	I1	C236	4B4	F6
C20	1D2	N4	C57	1D1	N4	C87	1F5	K1	C134	4G2	C5	C161	4B4	D7	C184	5B4	A7	C208	1H3	I1	C237	6F1	H5
C21	1D1	O3	C58	1A4	O1	C88	1E5	L1	C139	4B5	I2	C162	4B4	D5	C185	5B4	A7	C209	1F2	M4	C238	6E1	H5
C22	1F1	M5	C59	1B5	N1	C89	1E5	L2	C140	3E3	F3	C163	4A4	D5	C186	5C4	D1	C210	1G2	O4	C239	6E1	H5
C23	1E1	M4	C60	1C1	O2	C90	1B4	N1	C141	3E3	F2	C164	4A4	D6	C187	5C4	C1	C211	1G5	J2	C240	6E1	H5
C26	1F2	N3	C61	1C1	O2	C91	1B4	O1	C142	3D1	F2	C165	5H4	B6	C188	5C4	B2	C212	1G5	J2	C241	6F1	H5
C28	1E2	N3	C62	1F3	K5	C92	1D3	N1	C143	3A1	G2	C166	5A4	A1	C189	5C3	C3	C213	1G2	M4	C242	6F1	I5
C29	1E2	N3	C63	1C5	O2	C93	1D3	N2	C144	3C5	E1	C167	5E3	E5	C190	5B1	C1	C214	2F2	J2	C243	5G3	B6
C31	1E2	N3	C64	1C4	O1	C94	1C4	N2	C145	3G5	E1	C168	5H2	H2	C191	5A3	B8	C216	1C4	N2	C244	5G4	B4
C32	1E2	O3	C66	1G3	J1	C95	1C4	N2	C146	3F5	E2	C169	5G2	B5	C192	5C4	C3	C217	1C4	N2	C245	7E2	G7
C34	1F2	O3	C67	1H3	J1	C102	3A4	I2	C147	3F4	E1	C170	5G5	C6	C193	5C4	C3	C222	1D4	N1	C246	7B2	H8
C35	1E2	O4	C68	1G3	J1	C103	3B5	I2	C148	3G5	F2	C171	5E1	A3	C194	1E1	N3	C223	1D3	M1	C248	7D2	H8
C37	1E2	O4	C69	1H3	I1	C104	3B5	I1	C149	3G5	C4	C172	5E3	A2	C195	1F2	K2	C224	2B2	K4	C249	2E5	J4
C38	1E2	O4	C74	1C4	M2	C106	6E4	J4	C150	3G4	E3	C173	5D3	D2	C196	1B4	K5	C225	2B2	K3			
C40	1F2	O4	C75	1C4	M2	C110	4F3	L4	C151	3G3	D3	C174	5A4	A1	C197	2D5	I4	C226	4G3	M3			

Figure 9–5: A2 Main board view C (671-3250-00/01/02/03)

A2 Main Board Component Locator (671-3250-00/01/02/03)

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C250	2E5	I3	DS1	3H2	E2	R24	1E3	L1	R113	2C2	K3	R187	2E3	L4	R372	7C4	H6	U28	4E4	M4	U66D	5C5	A6
C251	2F5	I3	DS2	5A2	A7	R28	1B1	O2	R114	2C2	L4	R188	2E2	K4	R373	7C4	H6	U29A	4F3	L3	U67A	5C5	A6
C252	2F5	I4	DS3	2H4	J4	R29	1B1	O2	R116	2A2	K3	R189	2E2	J2	R374	7C3	G6	U29B	4F3	L3	U67B	5A2	A6
C253	2E3	I2	J3	6G1	P4	R30	1A1	O3	R119	4F4	M3	R190	5A5	B1	R375	2B3	J2	U29C	4G3	L3	U67C	6E5	A6
C254	2A3	K4	J4	6A2	G8	R31	1A1	O3	R120	3D4	G1	R191	6G4	A4	R376	1C4	N2	U29D	4G3	L3	U67D	6F5	A6
C255	2A3	K3	J5	6A1	D8	R34	1H3	J1	R121	3D4	F1	R192	6G4	A4	R377	1B3	L2	U30A	4F4	M4	U70	5E5	A6
C256	4E4	M4	J7	3H2	E1	R35	1E4	L2	R122	3H3	D1	R193	7C2	H7	R378	1F3	L2	U30B	4F4	M4	U71	5F1	B5
C257	4F5	L3	J8	5A5	B1	R36	1D4	M2	R123	3G2	D1	R194	7C2	H8	R379	4C4	E7	U30C	4G4	M4	U72	5F3	B4
C258	4F5	L4	J9	6G5	B7	R41	1D2	N4	R124	3H2	F1	R195	7E2	G7	R380	4C4	E7	U30D	4G4	M4	U73	5E3	D5
C259	3B5	M3	J10	7G3	H6	R42	1D2	N4	R125	3H3	F1	R196	7E2	G7	R381	2D5	L4	U31	2G2	I4	U74	6B4	A4
C260	3C5	M3	J16	3G3	D4	R43	1B4	O1	R126	3H2	E3	R197	7C2	H7	R382	2D3	L2	U32A	3D2	F2	U75	6D5	B4
C261	3C5	H2	J20	6G3	B1	R44	1A4	O1	R127	3H2	E3	R198	2D2	J4	R383	2G4	J4	U32B	3D3	F2	U76	5D3	D5
C262	3C5	H2	J22	6E5	A7	R45	1A5	O2	R128	3H2	E3	R199	1D2	N4	R384	2H4	J5	U32D	3A2	F2	U77	5D3	B3
C263	2D3	M4	J24	6G4	A4	R46	1A5	N1	R129	4B3	E5	R200	1D2	N4	R470	1G3	J2	U34	4E1	H2	U78	5D4	B1
C264	2D3	M2	J25	6A5	H7	R47	1C1	N2	R130	4B3	D6	R201	1G4	K1	R471	1G3	J2	U35	4E2	G4	U79	5A4	A2
C265	7F4	H7	J27	6E3	G5	R48	1C1	N2	R132	4B3	E7	R202	4G4	M3	R472	1G3	J2	U36	4F1	H3	U80	5B1	D1
C266	1E1	N3	J28	6C2	H5	R49	1D4	L1	R133	4E1	H2	R204	1G4	K2	S1	6G2	H4	U37	4F2	G2	U81A	1F3	K5
C267	2C5	K4	J29	6D1	H5	R50	1D5	L1	R134	4C5	F6	R205	2C2	K3	TP1	5A4	A1	U38	3B4	H1	U81B	1B3	K5
C268	1H3	J1	J30	1A4	P1	R51	1D5	L1	R135	4E2	G4	R207	2C5	K4	TP2	5A3	A1	U39	3B4	H1	U84	1G5	K2
C269	1D1	O4	J31	1A4	P1	R52	1D5	L1	R136	3C4	D3	R208	2E3	K4	TP3	5A3	B8	U40	4C5	H4	U85A	1F1	M5
C270	6D2	G5	J32	1A1	P3	R53	1D5	L1	R137	5C4	C3	R210	6D2	H5	TP4	5A3	A8	U41	3G4	D4	U85B	1G1	M5
C271	6D2	F5	J33	1A1	P2	R54	1D4	L1	R138	5C3	C3	R332	1E3	L2	TP9	1B4	N2	U42	3G5	D5	U87A	1H1	L4
C272	6D3	F5	J34	4E5	O4	R55	1F3	L2	R139	5A2	A7	R333	1C5	K3	TP10	1F3	L2	U43	3F4	E2	U87B	2D5	L4
C273	6E2	F5	J35	4E5	O4	R56	1B4	N2	R140	5A3	B7	R334	1C5	J3	TP12	1F3	H1	U44	3F4	E1	U93	3E1	F1
C274	6E3	F5	L2	1E1	N3	R57	1C5	O2	R141	5E4	A5	R335	1F1	M5	TP15	1E1	M5	U45	3D4	D4	U94	3E2	F2
C275	2E3	J2	L3	1C4	O1	R58	1B4	O1	R142	5B4	A1	R336	1G1	M5	TP16	1H1	L5	U46	3F5	D1	U95	3E3	F4
C276	1C5	K4	L7	1E1	N4	R60	1B4	N2	R143	6B4	A4	R337	1F4	K2	TP17	2G3	J5	U48	3F1	E4	U96	3B2	G2
C277	3A5	K2	L8	1F2	O3	R61	1C3	M2	R144	5D5	A6	R338	3A5	I2	TP18	2H3	I5	U52A	4D5	H2	U97	3B3	G4
C278	3A5	K3	L9	1E2	O4	R62	1C3	M2	R145	5D5	A6	R339	3A5	K3	TP19	2E2	K3	U52B	3A2	H2	U98A	3A3	H3
C279	2E2	L4	L10	1F2	O4	R63	1C3	M1	R146	5C5	A6	R340	3A5	K3	TP20	1B4	J1	U52C	3A3	H2	U99	4B2	F6
C280	2A3	M3	L11	1G3	J1	R64	1C3	M1	R147	5B5	A6	R342	2E2	L4	TP22	1G3	O3	U52D	4A5	H2	U100	5E2	E7
C281	2A4	M3	L12	1H3	I1	R65	1D4	M1	R148	5B4	A6	R343	2C3	L3	TP23	1F1	N5	U53A	3E5	A3	U101	5G2	D6
C282	2B5	M3	L13	1D4	N1	R66	1D4	M1	R149	5C4	A6	R345	2B3	J2	TP24	1C1	J2	U53B	6G4	A3	U102	5G3	B6
C283	2D3	L3	L15	3B5	H1	R67	1D4	M1	R150	5B5	A6	R346	2B3	K2	TP25	2H1	F4	U53C	3H4	A3	U103	5F2	B7
C284	2D3	K3	L16	3B5	I2	R68	1D4	M1	R152	1D2	N4	R347	2A4	M3	TP26	4E3	N2	U53D	3H4	A3	U104A	5E3	A7
C285	2B3	J2	L17	2B3	L2	R69	1G3	J1	R153	1D2	N4	R348	2B5	M3	TP28	2E2	L4	U54A	3E5	E2	U105A	5E4	A7
C286	2C3	L3	L18	7F4	H7	R70	1G3	J2	R156	3G1	D2	R349	2C3	K2	TP29	5C4	F3	U54B	3E5	E2	U105B	6E5	A7
C287	6E1	M4	L19	7B4	H6	R71	1G3	J1	R157	5E4	A4	R350	2D3	K3	TP30	5C4	C7	U55A	3E5	D3	U107	5A2	B7
C288	6D1	H3	L20	7E4	G6	R72	1G3	J1	R158	1B3	O1	R351	2C3	L3	TP31	1H3	I2	U55B	3E5	D3	U108	5F4	D7
C289	7E4	G7	L21	7D4	H6	R73	1G4	K1	R159	4B3	E5	R352	2C3	L2	U3	7E2	G7	U55C	4D5	D3	U109	7C2	H7
C290	7D4	H7	L22	1C4	N2	R74	1G4	K1	R160	1D1	O4	R353	2A3	M2	U5	1F3	L1	U55D	3H5	D3	U112	6F1	H6
C291	7B4	G6	P28	6C2	H5	R75	1G4	K1	R161	1E2	O3	R354	2B4	K2	U6	1D1	O4	U55E	3H5	D3	U113A	2F3	K4
C292	7B4	H6	P29	6D1	H5	R76	1G4	K1	R162	1E2	O3	R355	2B3	L3	U9	1G3	J1	U55F	3H5	D3	U113B	2E3	K4
C293	7D4	H6	Q1	1B1	O2	R77	1G4	K2	R163	1B4	N1	R356	2B3	L3	U10	1E3	M2	U57	3B1	G1	U113C	2F2	K4
C294	7C4	G6	Q2	1A4	O1	R80	1G4	K1	R164	1G4	K2	R357	2D3	L3	U12A	2E2	K3	U58A	3C2	A4	U113D	2F3	K4
C295	7C4	G6	Q3	1A5	O2	R81	1E1	M3	R165	1G5	K2	R358	2B4	M3	U12B	2D3	K3	U58B	3C3	A4	U114	6D2	F5
C296	7B4	G6	Q4	1A5	N1	R82	1E1	O3	R171	1F1	M5	R359	2A5	M3	U12C	3A5	K3	U58C	3E4	A4	U115	6C1	G5
C297	2A3	M3	Q5	2A4	M3	R85	1D2	N4	R172	1G2	M4	R360	2A5	M2	U12D	3B5	K3	U58D	3H4	A4	U116	2F2	J2
C298	2B3	J2	Q6	2C3	L3	R86	1D4	N2	R173	1G1	M5	R361	2C5	M3	U13	1D3	M1	U61	5D1	A3	U118	2C3	L2
C299	2D3	L2	Q7	2C3	K2	R97	4F3	L3	R174	1G1	M5	R362	4E5	O5	U14	1C3	N2	U62	5E1	B3	U119A	2A5	M2
C300	2E4	K4	Q8	2B4	M3	R98	4G3	M3	R175	1H1	L5	R363	6E1	I5	U16	1C1	O2	U63	5E1	A2	U119B	2B5	M2
C301	2A5	M2	Q9	7E4	G6	R99	4G3	L3	R176	1D4	N1	R364	7E4	G6	U17	1B4	N2	U64A	5D2	A3	U120	2D2	K2
C302	2B5	M3	Q123	7D4	H6	R100	4F3	L3	R177	2C2	L3	R365	7E4	G6	U18A	1B5	O2	U64B	6B4	A3	U121	4D5	O5
CR4	1B1	O2	R14	1A5	O2	R101	4G3	L3	R178	2B2	K4	R366	7D4	G6	U20	1C4	N2	U64C	5E4	A3	U122	6F4	A3
CR5	1B1	O2	R15	1A5	O2	R102	4G3	L3	R179	2B2	K4	R367	7C4	H6	U22	3A4	I1	U64E	6B5	A3	U124	7C4	G6
CR6	1G4	K1	R17	1D2	N4	R103	4F4	M3	R180	2B2	K3	R368	7C4	H6	U23	6E3	J4	U64F	6B5	A3	U125	3C5	H4
CR86	1F1	M4	R20	1D1	N4	R104	4G4	M3	R182	4G4	M3	R369	7C3	G6	U26A	2B2	K3	U66A	5A4	A6	Y1	2E2	K2
CR87	7D4	H6	R21	1D1	O4	R110	2A2	K3	R184	2F2	K4	R370	7D4	G6	U26B	2B2	K3	U66B	5C2	A6	Y2	5C4	C3
CR89A	2C5	L3	R22	1E1	O3	R112	2B2	K3	R186	2E2	K4	R371	7B4	G6	U27	4E3	L4	U66C	5C5	A6	Y3	6C1	F5
CR89B	2G4	L3	R23	1G3	J1																		

Figure 9–6: A2 Main board component locator (671-3250-00/01/02/03)

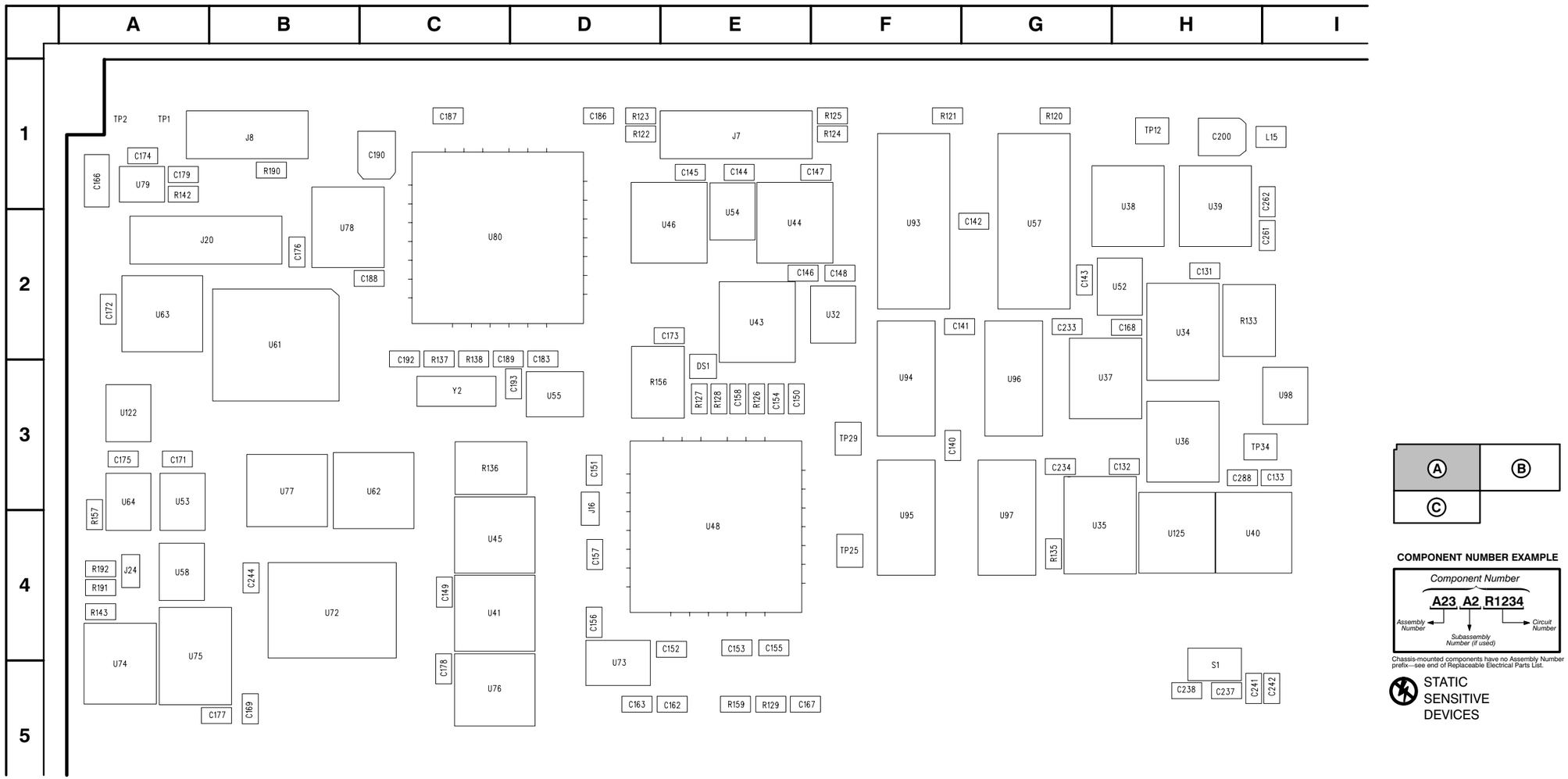


Figure 9–7: A2 Main board view A (671-3751-00)

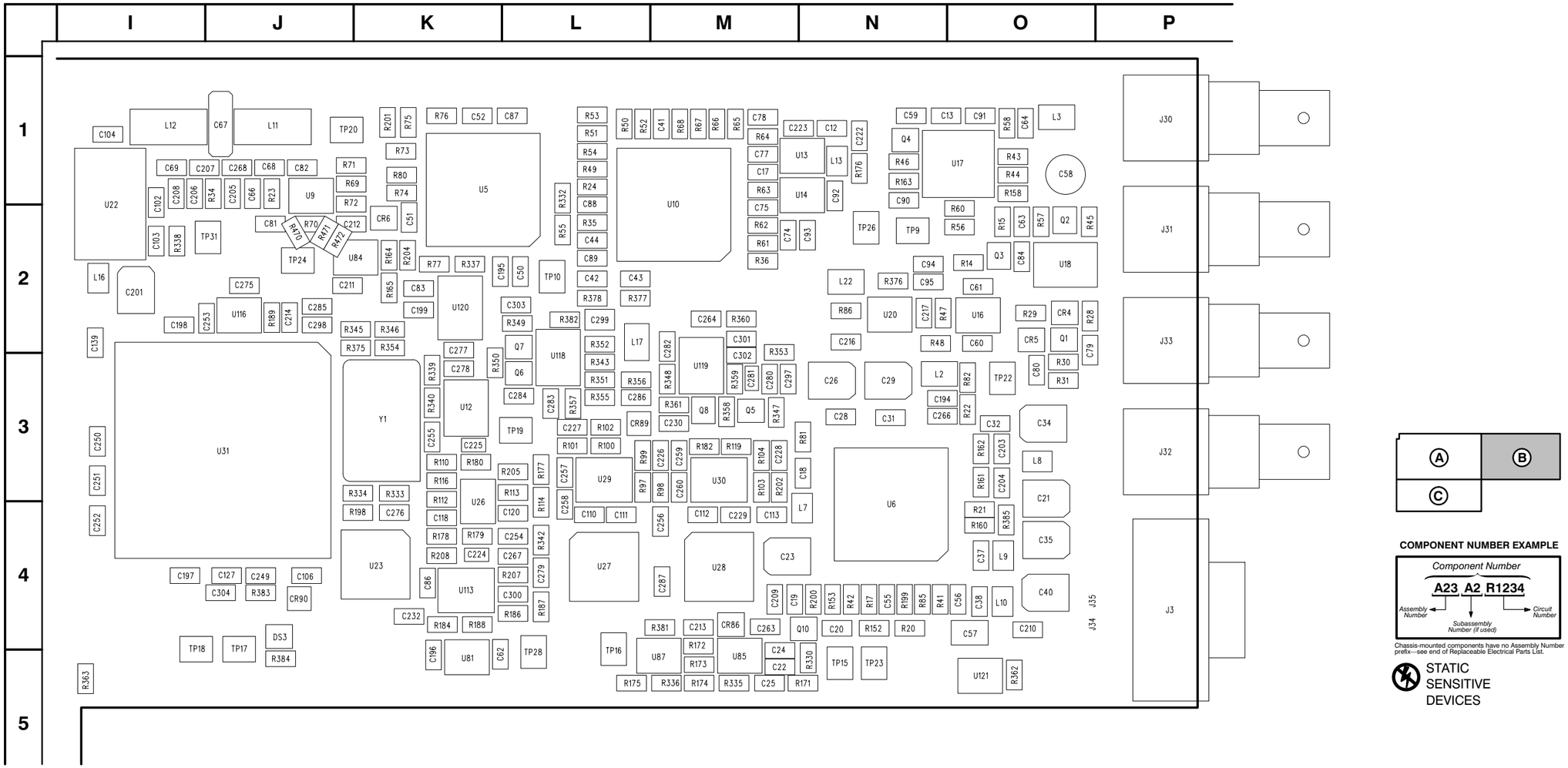
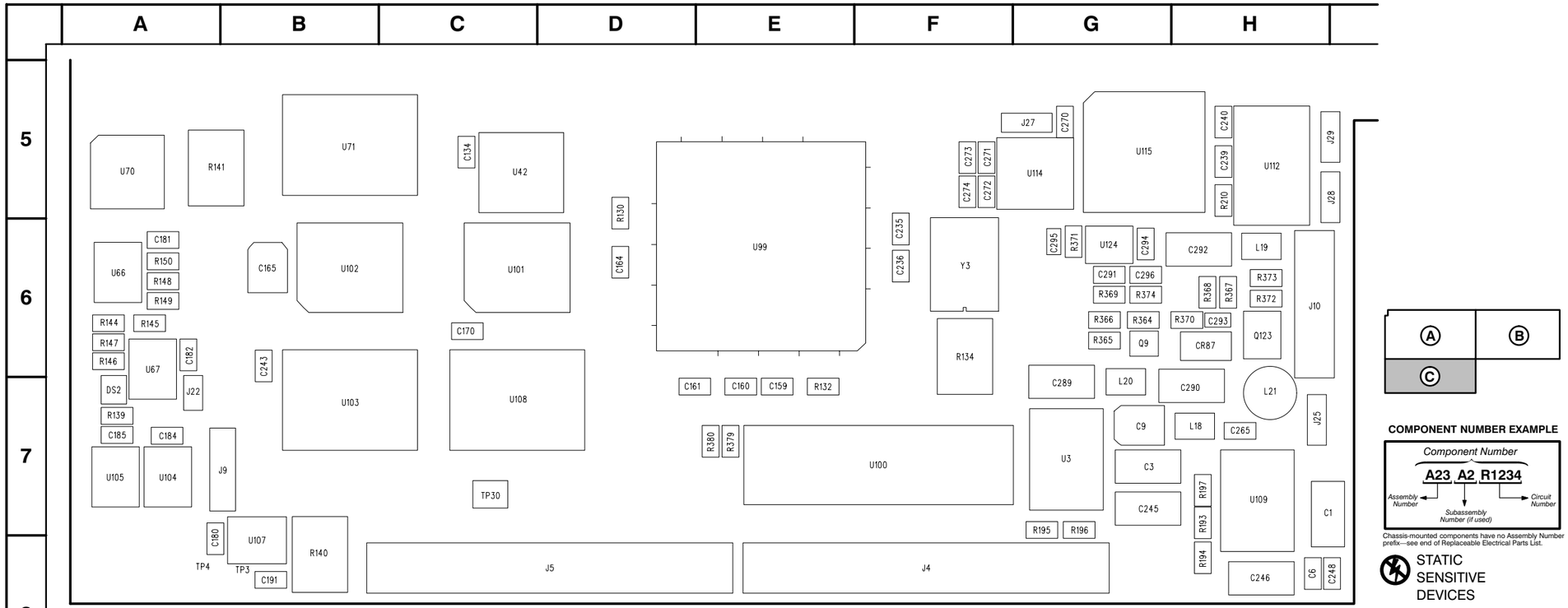


Figure 9–8: A2 Main board view B (671-3751-00)



COMPONENT NUMBER EXAMPLE

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

STATIC SENSITIVE DEVICES

A2 Main Board Component Locator (671-3751-00)

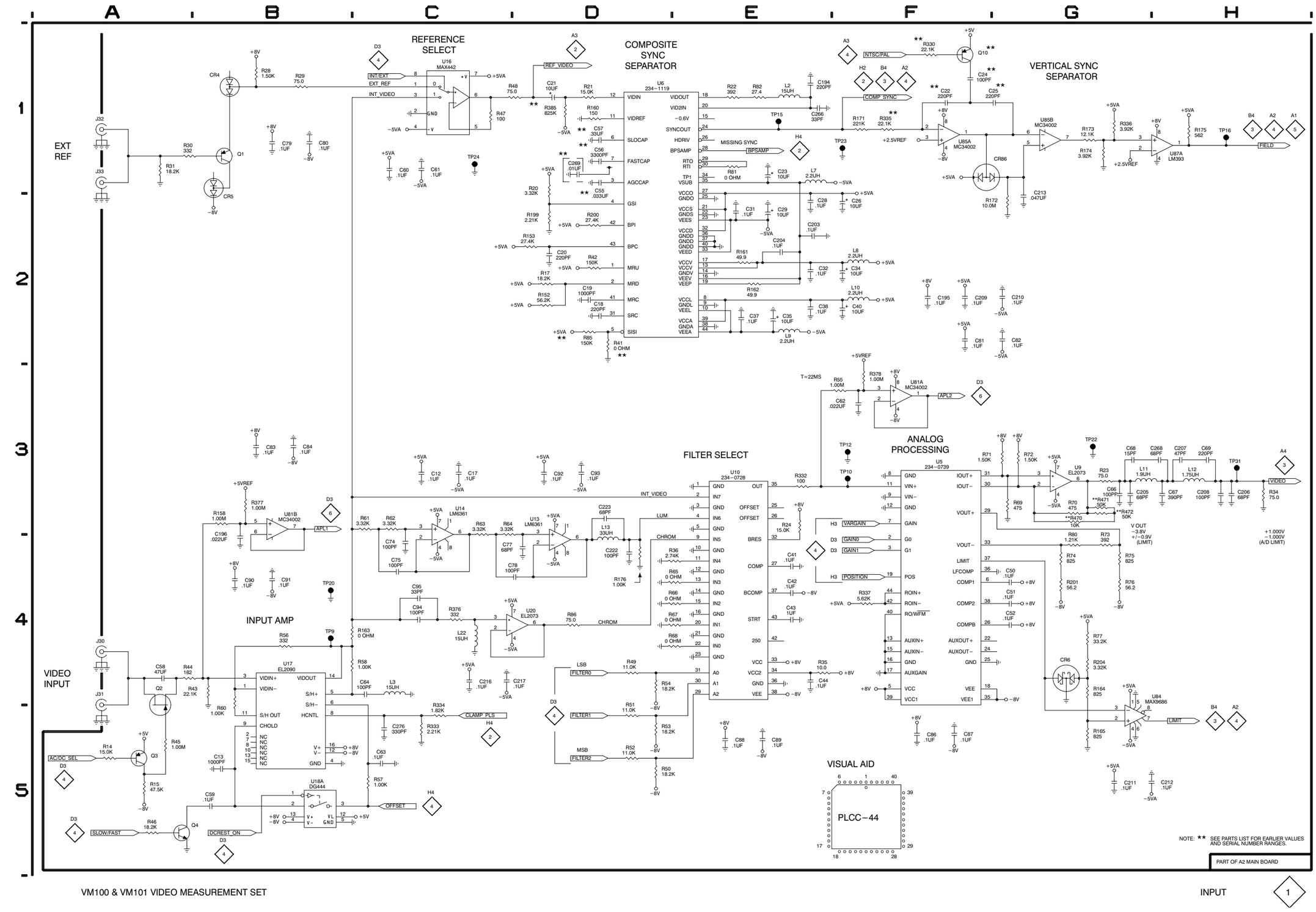
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C1	7C2	H7	C40	1F2	O4	C77	1D4	M1	C111	4F3	L4	C152	3G3	D4	C175	5B4	A3	C198	2E5	I2	C227	4G3	L3
C3	7E2	G7	C41	1E4	M1	C78	1D4	M1	C112	4F4	M4	C153	3G3	E4	C176	5B4	B2	C199	2E5	K2	C228	4G4	M3
C6	7B2	H8	C42	1E4	L2	C79	1B1	O3	C113	4E4	M4	C154	3F4	E3	C177	5B4	A5	C200	3B5	H1	C229	4F4	M4
C9	7F4	G7	C43	1E4	L2	C80	1B1	O3	C118	2B2	K4	C155	3G3	E4	C178	5B4	C5	C201	3B5	I2	C230	4G4	M3
C12	1C3	N1	C44	1E4	L2	C81	1F2	J2	C120	2C2	K4	C156	3G3	D4	C179	5B4	A1	C203	1E2	O3	C232	2F3	K4
C13	1B5	N1	C50	1G4	L2	C82	1G2	J1	C127	2D5	J4	C157	3G3	D4	C180	5B4	A8	C204	1E2	O3	C233	3C3	G2
C17	1C3	M1	C51	1G4	K2	C83	1B3	K2	C131	4F2	H2	C158	3H2	E3	C181	5B4	A6	C205	1G3	J1	C234	3C3	G3
C18	1D2	M3	C52	1G4	K1	C84	1B3	O2	C132	4G1	G3	C159	4B4	E7	C182	5B4	A6	C206	1H3	I1	C235	4B4	F6
C19	1D2	M4	C55	1D1	N4	C86	1F5	K4	C133	4D1	H3	C160	4B4	E7	C183	5B4	D3	C207	1H3	I1	C236	4B4	F6
C20	1D2	N4	C56	1D1	O4	C87	1F5	K1	C134	4G2	C5	C161	4B4	D7	C184	5B4	A7	C208	1H3	I1	C237	6F1	H5
C21	1D1	O3	C57	1D1	O4	C88	1E5	L1	C139	4B5	I2	C162	4B4	D5	C185	5B4	A7	C209	1F2	M4	C238	6E1	H5
C22	1F1	M5	C58	1A4	O1	C89	1E5	L2	C140	3E3	F3	C163	4A4	D5	C186	5C4	D1	C210	1G2	O4	C239	6E1	H5
C23	1E1	M4	C59	1B5	N1	C90	1B4	N1	C141	3E3	F2	C164	4A4	D6	C187	5C4	C1	C211	1G5	J2	C240	6E1	H5
C24	1F1	M5	C60	1C1	O2	C91	1B4	O1	C142	3D1	F2	C165	5H4	B6	C188	5C4	B2	C212	1G5	J2	C241	6F1	H5
C25	1G1	M5	C61	1C1	O2	C92	1D3	N1	C143	3A1	G2	C166	5A4	A1	C189	5C3	C3	C213	1G2	M4	C242	6F1	I5
C26	1F2	N3	C62	1F3	K5	C93	1D3	N2	C144	3C5	E1	C167	5E3	E5	C190	5B1	C1	C214	2F2	J2	C243	5G3	B6
C28	1E2	N3	C63	1C5	O2	C94	1C4	N2	C145	3G5	E1	C168	5H2	H2	C191	5A3	B8	C216	1C4	N2	C244	5G4	B4
C29	1E2	N3	C64	1C4	O1	C95	1C4	N2	C146	3F5	E2	C169	5G2	B5	C192	5C4	C3	C217	1C4	N2	C245	7E2	G7
C31	1E2	N3	C66	1G3	J1	C102	3A4	I2	C147	3F4	E1	C170	5G5	C6	C193	5C4	C3	C222	1D4	N1	C246	7B2	H8
C32	1E2	O3	C67	1H3	J1	C103	3B5	I2	C148	3G5	F2	C171	5E1	A3	C194	1E1	N3	C223	1D3	M1	C248	7D2	H8
C34	1F2	O3	C68	1G3	J1	C104	3B5	I1	C149	3G5	C4	C172	5E3	A2	C195	1F2	K2	C224	2B2	K4	C249	2E5	J4
C35	1E2	O4	C69	1H3	I1	C106	6E4	J4	C150	3G4	E3	C173	5D3	D2	C196	1B4	K5	C225	2B2	K3	C250	2E5	I3
C37	1E2	O4	C74	1C4	M2	C110	4F3	L4	C151	3G3	D3	C174	5A4	A1	C197	2D5	I4	C226	4G3	M3			
C38	1E2	O4	C75	1C4	M2																		

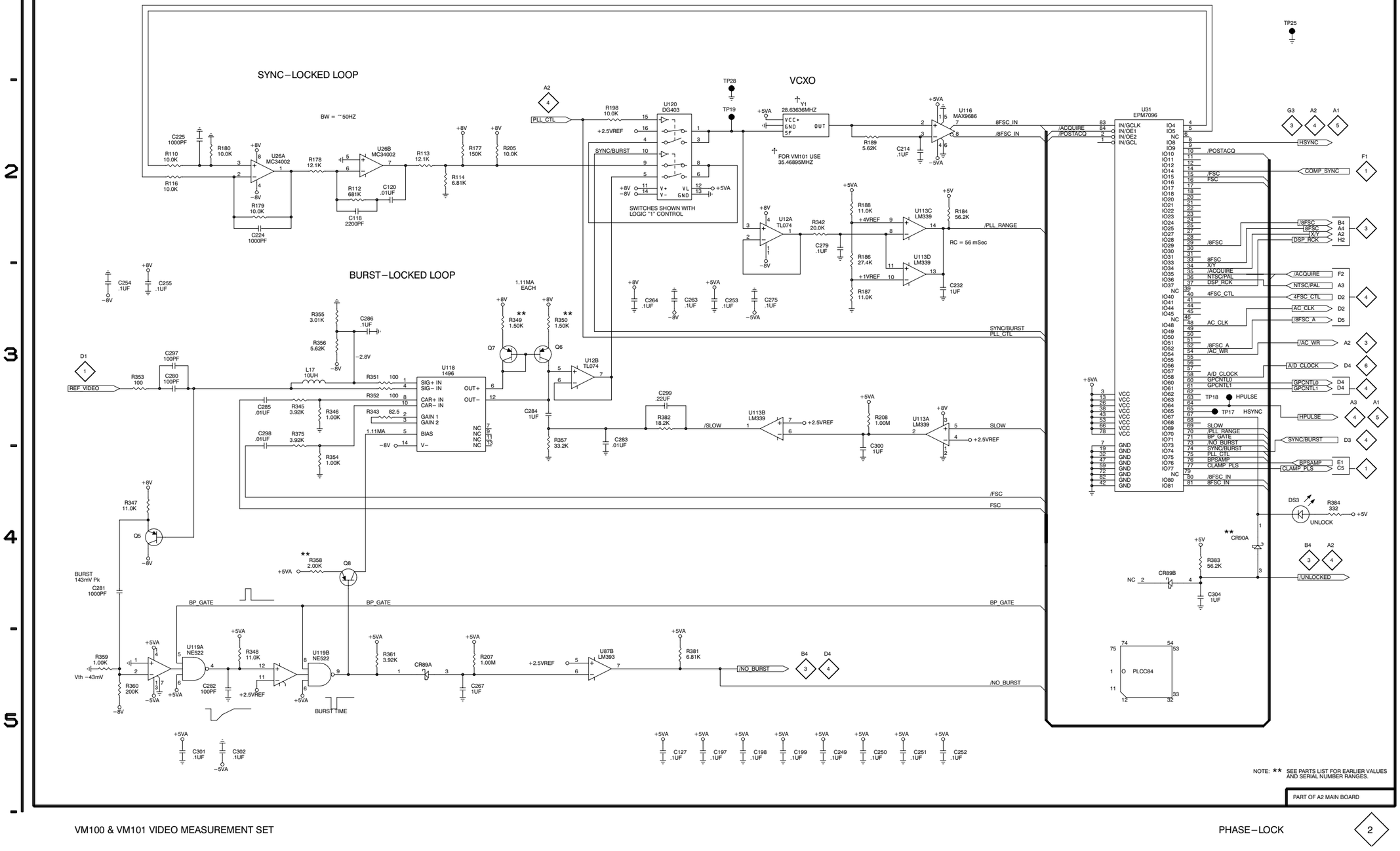
Figure 9–9: A2 Main board section C (671-3751-00)

A2 Main Board Component Locator (671-3751-00)

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C251	2F5	I3	CR90A	2H4	J4	R22	1E1	O3	R112	2B2	K3	R187	2E3	L4	R372	7C4	H6	U27	4E3	L4	U66D	5C5	A6
C252	2F5	I4	DS1	3H2	E2	R23	1G3	J1	R113	2C2	K3	R188	2E2	K4	R373	7C4	H6	U28	4E4	M4	U67A	5C5	A6
C253	2E3	I2	DS2	5A2	A7	R24	1E3	L1	R114	2C2	L4	R189	2E2	J2	R374	7C3	G6	U29A	4F3	L3	U67B	5A2	A6
C254	2A3	K4	DS3	2H4	J4	R28	1B1	O2	R116	2A2	K3	R190	5A5	B1	R375	2B3	J2	U29B	4F3	L3	U67C	6E5	A6
C255	2A3	K3	J3	6G1	P4	R29	1B1	O2	R119	4F4	M3	R191	6G4	A4	R376	1C4	N2	U29C	4G3	L3	U67D	6F5	A6
C256	4E4	M4	J4	6A2	G8	R30	1A1	O3	R120	3D4	G1	R192	6G4	A4	R377	1B3	L2	U29D	4G3	L3	U70	5E5	A6
C257	4F4	L3	J5	6A1	D8	R31	1A1	O3	R121	3D4	F1	R193	7C2	H7	R378	1F3	L2	U30A	4F4	M4	U71	5F1	B5
C258	4F4	L4	J7	3H2	E1	R34	1H3	J1	R122	3H3	D1	R194	7C2	H8	R379	4C4	E7	U30B	4F4	M4	U72	5F3	B4
C259	3B5	M3	J8	5A5	B1	R35	1E4	L2	R123	3G2	D1	R195	7E2	G7	R380	4C4	E7	U30C	4G4	M4	U73	5E3	D5
C260	3C5	M3	J9	6G5	B7	R36	1D4	M2	R124	3H2	F1	R196	7E2	G7	R381	2D5	L4	U30D	4G4	M4	U74	6B4	A4
C261	3C5	H2	J10	7G3	H6	R41	1D2	N4	R125	3H3	F1	R197	7C2	H7	R382	2D3	L2	U31	2G2	I4	U75	6D5	B4
C262	3C5	H2	J16	3G3	D4	R42	1D2	N4	R126	3H2	E3	R198	2D2	J4	R383	2G4	J4	U32A	3D2	F2	U76	5D3	D5
C263	2D3	M4	J20	6G3	B1	R43	1B4	O1	R127	3H2	E3	R199	1D2	N4	R384	2H4	J5	U32B	3D3	F2	U77	5D3	B3
C264	2D3	M2	J22	6E5	A7	R44	1A4	O1	R128	3H2	E3	R200	1D2	N4	R385	1D1	O4	U32D	3A2	F2	U78	5D4	B1
C265	7F4	H7	J24	6G4	A4	R45	1A5	O2	R129	4B3	E5	R201	1G4	K1	R470	1G3	J2	U34	4E1	H2	U79	5A4	A2
C266	1E1	N3	J25	6A5	H7	R46	1A5	N1	R130	4B3	D6	R202	4G4	M3	R471	1G3	J2	U35	4E2	G4	U80	5B1	D1
C267	2C5	K4	J27	6E3	G5	R47	1C1	N2	R132	4B3	E7	R204	1G4	K2	R472	1G3	J2	U36	4F1	H3	U81A	1F3	K5
C268	1H3	J1	J28	6C2	H5	R48	1C1	N2	R133	4E1	H2	R205	2C2	K3	S1	6G2	H4	U37	4F2	G2	U81B	1B3	K5
C270	6D2	G5	J29	6D1	H5	R49	1D4	L1	R134	4C5	F6	R207	2C5	K4	TP1	5A4	A1	U38	3B4	H1	U84	1G5	K2
C271	6D2	F5	J30	1A4	P1	R50	1D5	L1	R135	4E2	G4	R208	2E3	K4	TP2	5A3	A1	U39	3B4	H1	U85A	1F1	M5
C272	6D3	F5	J31	1A4	P2	R51	1D5	L1	R136	3C4	D3	R210	6D2	H5	TP3	5A3	B8	U40	4C5	H4	U85B	1G1	M5
C273	6E2	F5	J32	1A1	P3	R52	1D5	L1	R137	5C4	C3	R330	1F1	N5	TP4	5A3	A8	U41	3G4	D4	U87A	1H1	L4
C274	6E3	F5	J33	1A1	P2	R53	1D5	L1	R138	5C3	C3	R332	1E3	L2	TP9	1B4	N2	U42	3G5	D5	U87B	2D5	L4
C275	2E3	J2	J34	4E5	O4	R54	1D4	L1	R139	5A2	A7	R333	1C5	K3	TP10	1F3	L2	U43	3F4	E2	U93	3E1	F1
C276	1C5	K4	J35	4E5	O4	R55	1F3	L2	R140	5A3	B7	R334	1C5	J3	TP12	1F3	H1	U44	3F4	E1	U94	3E2	F2
C277	3A5	K2	L2	1E1	N3	R56	1B4	N2	R141	5E4	A5	R335	1F1	M5	TP15	1E1	N4	U45	3D4	D4	U95	3E3	F4
C278	3A5	K3	L3	1C4	O1	R57	1C5	O2	R142	5B4	A1	R336	1G1	M5	TP16	1H1	L5	U46	3F5	D1	U96	3B2	G2
C279	2E2	L4	L7	1E1	N4	R58	1B4	O1	R143	6B4	A4	R337	1F4	K2	TP17	2G3	J5	U48	3F1	E4	U97	3B3	G4
C280	2A3	M3	L8	1F2	O3	R60	1B4	N2	R144	5D5	A6	R338	3A5	I2	TP18	2H3	I5	U52A	4D5	H2	U98A	3A3	H3
C281	2A4	M3	L9	1E2	O4	R61	1C3	M2	R145	5D5	A6	R339	3A5	K3	TP19	2E2	K3	U52B	3A2	H2	U99	4B2	F6
C282	2B5	M3	L10	1F2	O4	R62	1C3	M2	R146	5C5	A6	R340	3A5	K3	TP20	1B4	J1	U52C	3A3	H2	U100	5E2	E7
C283	2D3	L3	L11	1G3	J1	R63	1C3	M1	R147	5B5	A6	R342	2E2	L4	TP22	1G3	O3	U52D	4A5	H2	U101	5G2	D6
C284	2D3	K3	L12	1H3	I1	R64	1C3	M1	R148	5B4	A6	R343	2C3	L3	TP23	1F1	N4	U53A	3E5	A3	U102	5G3	B6
C285	2B3	J2	L13	1D4	N1	R65	1D4	M1	R149	5C4	A6	R345	2B3	J2	TP24	1C1	J2	U53B	6G4	A3	U103	5F2	B7
C286	2C3	L3	L15	3B5	H1	R66	1D4	M1	R150	5B5	A6	R346	2B3	K2	TP25	2H1	F4	U53C	3H4	A3	U104A	5E3	A7
C287	6E1	M4	L16	3B5	I2	R67	1D4	M1	R157	5E4	A4	R347	2A4	M3	TP26	4E3	N2	U53D	3H4	A3	U105A	5E4	A7
C288	6D1	H3	L17	2B3	L2	R68	1D4	M1	R152	1D2	N4	R348	2B5	M3	TP28	2E2	L4	U54A	3E5	E2	U105B	6E5	A7
C289	7E4	G7	L18	7F4	H7	R69	1G3	J1	R153	1D2	N4	R349	2C3	K2	TP29	5C4	F3	U54B	3E5	E2	U107	5A2	B7
C290	7D4	H7	L19	7B4	H6	R70	1G3	J2	R156	3G1	D2	R350	2D3	K3	TP30	5C4	C7	U55A	3E5	D3	U108	5F4	D7
C291	7B4	G6	L20	7E4	G6	R71	1G3	J1	R158	1B3	O1	R351	2C3	L3	TP31	1H3	I2	U55B	3E5	D3	U109	7C2	H7
C292	7B4	H6	L21	7D4	H6	R72	1G3	J1	R159	4B3	E5	R352	2C3	L2	TP34	3C5	H3	U55C	4D4	D3	U112	6F1	H6
C293	7D4	H6	L22	1C4	N2	R73	1G4	K1	R160	1D1	O4	R353	2A3	M2	U3	7E2	G7	U55D	3H5	D3	U113A	2F3	K4
C294	7C4	G6	P28	6C2	H5	R74	1G4	K1	R161	1E2	O3	R354	2B4	K2	U5	1F3	L1	U55E	3H5	D3	U113B	2E3	K4
C295	7C4	G6	P29	6D1	H5	R75	1G4	K1	R162	1E2	O3	R355	2B3	L3	U6	1D1	O4	U55F	3H5	D3	U113C	2F2	K4
C296	7B4	G6	Q1	1B1	O2	R76	1G4	K1	R163	1B4	N1	R356	2B3	L3	U9	1G3	J1	U57	3B1	G1	U113D	2F3	K4
C297	2A3	M3	Q2	1A4	O1	R77	1G4	K2	R164	1G4	K2	R357	2D3	L3	U10	1E3	M2	U58A	3C2	A4	U114	6D2	F5
C298	2B3	J2	Q3	1A5	O2	R80	1G4	K1	R165	1G5	K2	R358	2B4	M3	U12A	2E2	K3	U58B	3C3	A4	U115	6C1	G5
C299	2D3	L2	Q4	1A5	N1	R81	1E1	M3	R171	1F1	M5	R359	2A5	M3	U12B	2D3	K3	U58C	3E4	A4	U116	2F2	I2
C300	2E4	K4	Q5	2A4	M3	R82	1E1	O3	R172	1G2	M4	R360	2A5	M2	U12C	3A5	K3	U58D	3H4	A4	U118	2C3	L2
C301	2A5	M2	Q6	2C3	L3	R85	1D2	N4	R173	1G1	M5	R361	2C5	M3	U12D	3B5	K3	U61	5D1	A3	U119A	2A5	M2
C302	2B5	M3	Q7	2C3	K2	R86	1D4	N2	R174	1G1	M5	R362	4E5	O5	U13	1D3	M1	U62	5E1	B3	U119B	2B5	M2
C303	4G4	K2	Q8	2B4	M3	R97	4F3	L3	R175	1H1	L5	R363	6E1	I5	U14	1C3	N2	U63	5E1	A2	U120	2D2	K2
C304	2G4	I4	Q9	7E4	G6	R98	4G3	M3	R176	1D4	N1	R364	7E4	G6	U16	1C1	O2	U64A	5D2	A3	U121	4D4	O5
CR4	1B1	O2	Q10	1F1	M4	R99	4G3	L3	R177	2C2	L3	R365	7E4	G6	U17	1B4	N2	U64B	6B4	A3	U122	6F4	A3
CR5	1B1	O2	Q123	7D4	H6	R100	4F3	L3	R178	2B2	K4	R366	7D4	G6	U18A	1B5	O2	U64C	5E4	A3	U124	7C4	G6
CR6	1G4	K1	R14	1A5	O2	R101	4G3	L3	R179	2B2	K4	R367	7C4	H6	U20	1C4	N2	U64E	6B5	A3	U125	3C5	H4
CR86	1F1	M4	R15	1A5	O2	R102	4G3	L3	R180	2B2	K3	R368	7C4	H6	U22	3A4	I1	U64F	6B5	A3	Y1	2E2	K2
CR87	7D4	H6	R17	1D2	N4	R103	4F4	M3	R182	4G4	M3	R369	7C3	G6	U23	6E3	J4	U66A	5A4	A6	Y2	5C4	C3
CR89A	2C5	L3	R20	1D1	N4	R104	4G4	M3	R184	2F2	K4	R370	7D4	G6	U26A	2B2	K3	U66B	5C2	A6	Y3	6C1	F5
CR89B	2G4	L3	R21	1D1	O4	R110	2A2	K3	R186	2E2	K4	R371	7B4	G6	U26B	2B2	K3	U66C	5C5	A6			

Figure 9–10: A2 Main board component locator (671-3751-00)

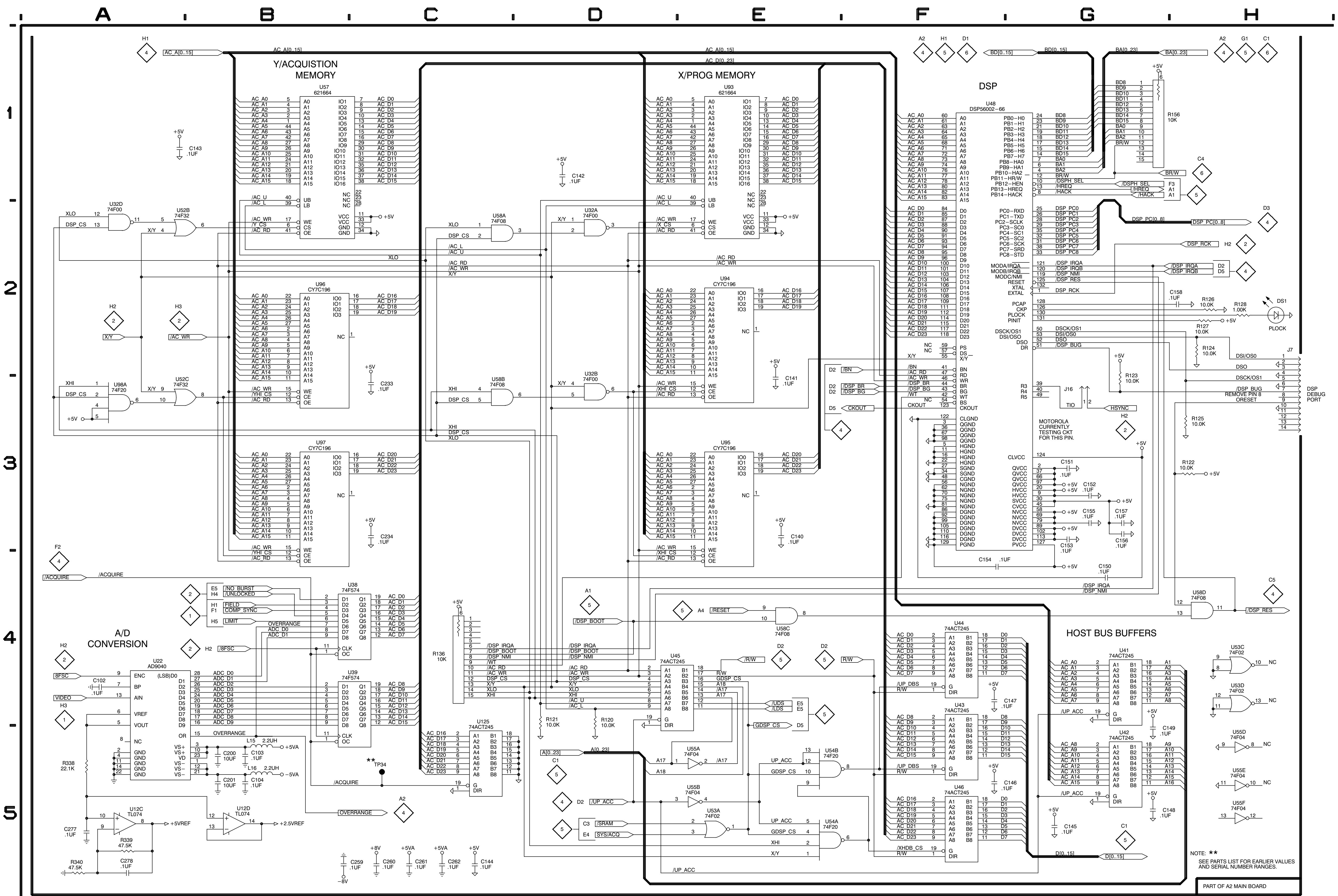

REFERENCE SELECT
COMPOSITE SYNC SEPARATOR
VERTICAL SYNC SEPARATOR
INPUT AMP
FILTER SELECT
ANALOG PROCESSING
VISUAL AID
EXT REF
VIDEO INPUT
INT/EXT
EXT_REF
INT_VIDEO
REF_VIDEO
NTSC/PAL
COMP_SYNC
MISSING SYNC
BPSAMP
FIELD
VIDEO
LIMIT
OFFSET
CLAMP_PLS
AC/DC_SEL
SLOW/FAST
DCREST_ON
VARGAIN
GAIN0
GAIN1
POSITION
APL1
APL2
LSB
MSB
FILTER0
FILTER1
FILTER2
U16 MAX442
U6 234−1119
U10 234−0728
U5 234−0739
U17 EL2090
U18A DG444
U81A MC34002
U81B MC34002
U85A MC34002
U85B MC34002
U87A LM393
U84 MAX9686
U9 EL2073
U14 LM6361
U13 LM6361
U20 EL2073
PLCC−44
+1.000V −1.000V (A/D LIMIT)
V OUT −3.8V +/−0.9V (LIMIT)
NOTE: ** SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES.
PART OF A2 MAIN BOARD



VM100 & VM101 VIDEO MEASUREMENT SET

PHASE–LOCK

2


Y/ACQUISTION MEMORY
X/PROG MEMORY
DSP
A/D CONVERSION
HOST BUS BUFFERS
DSP DEBUG PORT
MOTOROLA CURRENTLY TESTING CKT FOR THIS PIN.
NOTE: ** SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES.
PART OF A2 MAIN BOARD

FPGA

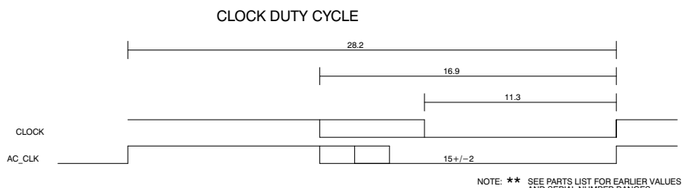
ACQUISITION MEMORY ADDRESS GENERATION

ANALOG CONTROLS

HARDWARE IDENTIFICATION

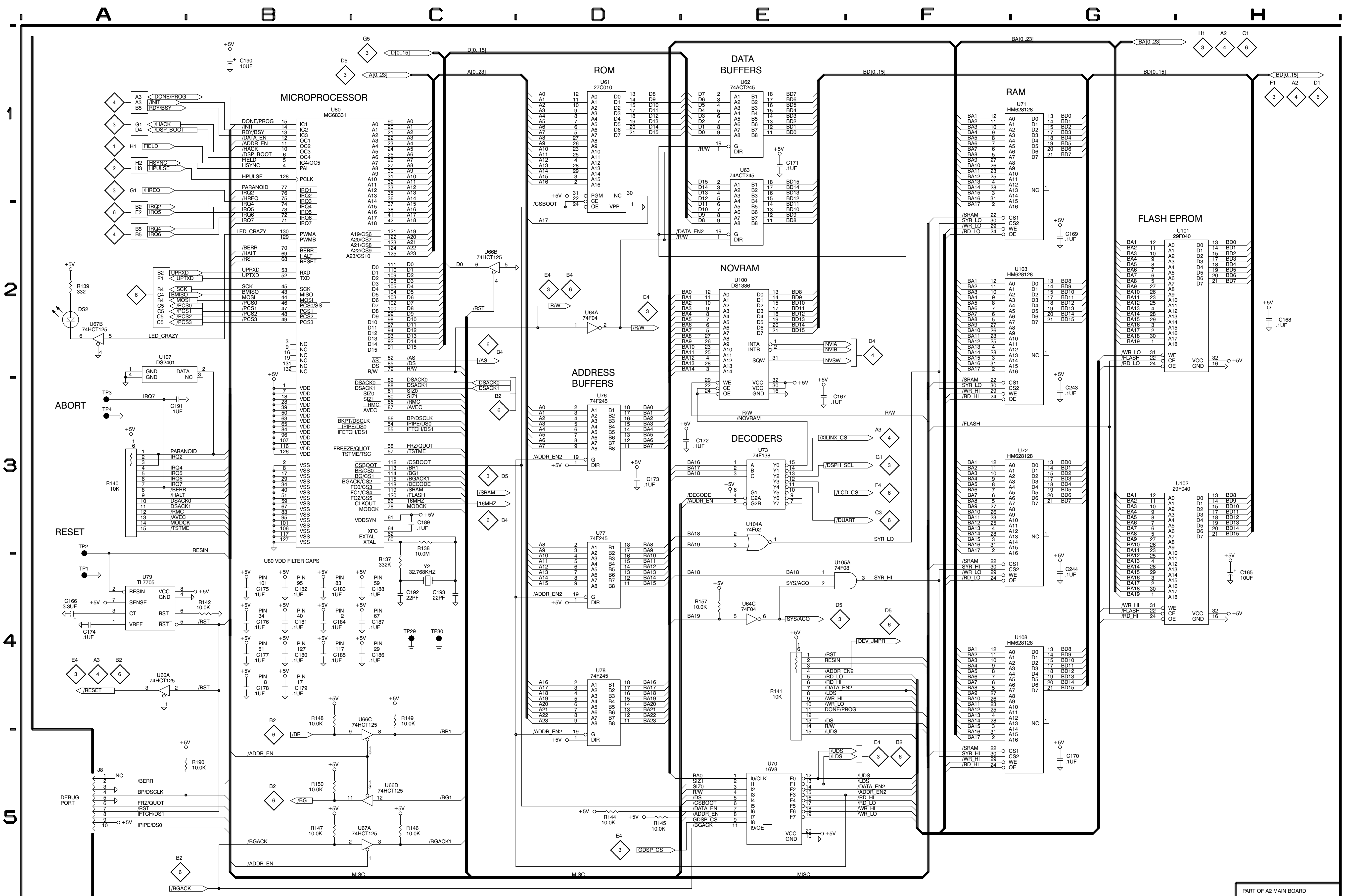
ZERO CARRIER REFERENCE PULSE

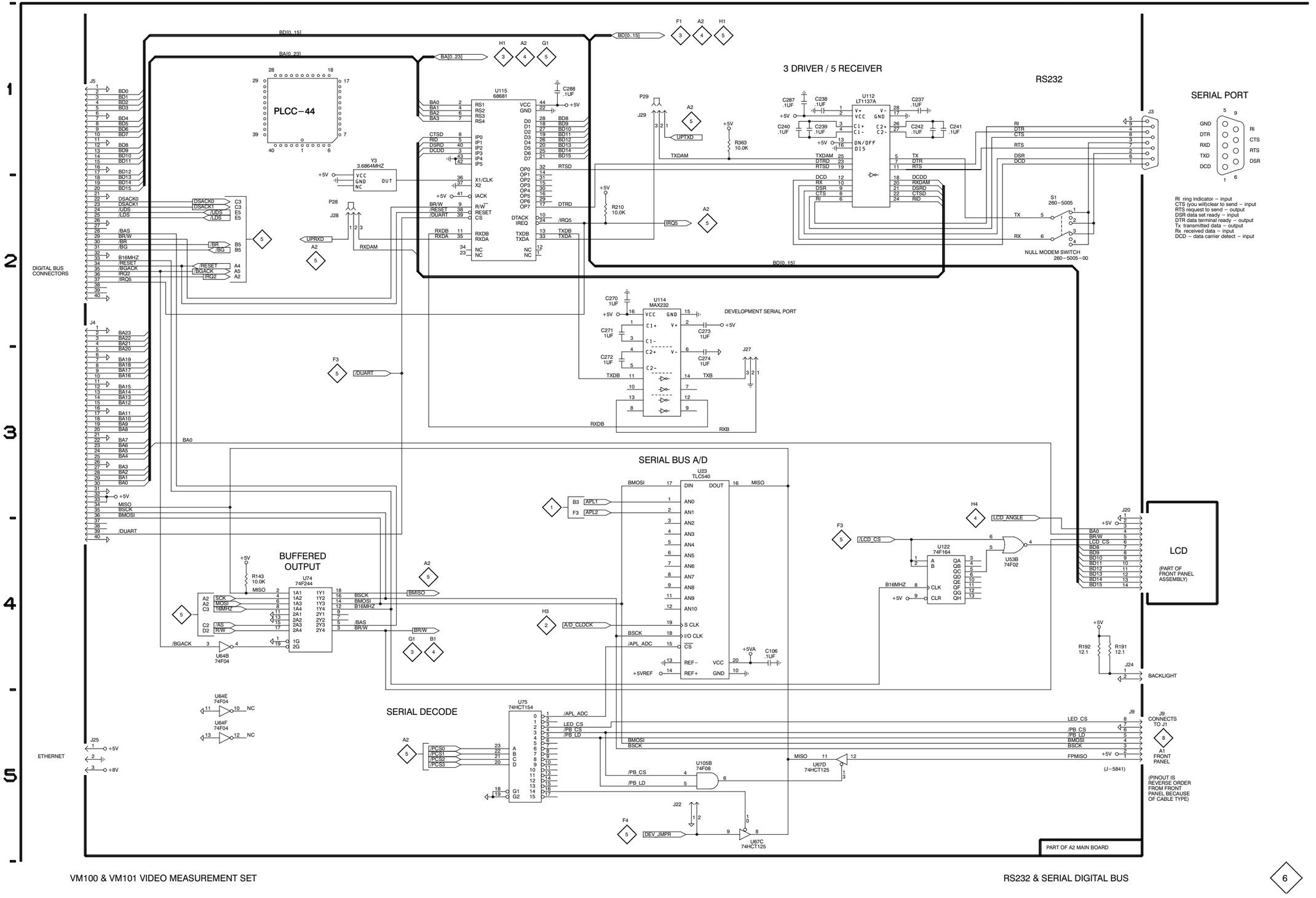
CLOCK DUTY CYCLE



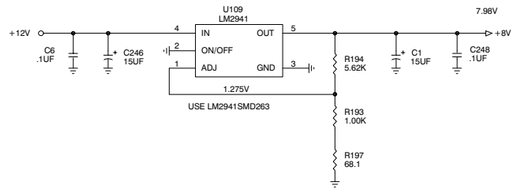
NOTE: ** SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES.

PART OF A2 MAIN BOARD

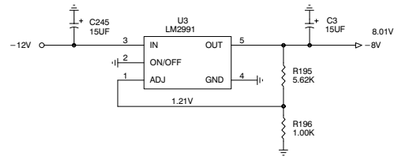

MICROPROCESSOR
U80
MC68331
ROM
U61
27C010
DATA BUFFERS
U62
74ACT245
U63
74ACT245
RAM
U71
HM628128
NOVRAM
U100
DS1386
ADDRESS BUFFERS
U76
74F245
U77
74F245
U78
74F245
DECODERS
U73
74F138
FLASH EPROM
U101
29F040
U102
29F040
U103
HM628128
U72
HM628128
U108
HM628128
U70
16V8
U79
TL7705
U107
DS2401
ABORT
RESET
DEBUG PORT
U80 VDD FILTER CAPS
PART OF A2 MAIN BOARD

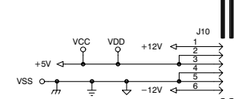

PLCC-44
U115
68681
Y3
3.6864MHZ
U112
LT1137A
3 DRIVER / 5 RECEIVER
RS232
SERIAL PORT
J3
S1
260-5005
NULL MODEM SWITCH
260-5005-00
RI ring indicator – input
CTS (you will)clear to send – input
RTS request to send – output
DSR data set ready – input
DTR data terminal ready – output
Tx transmitted data – output
Rx received data – input
DCD – data carrier detect – input
DIGITAL BUS CONNECTORS
J5
J4
BD[0..15]
BA[0..23]
P29
J29
UPTXD
TXDAM
R363
10.0K
P28
J28
UPRXD
RXDAM
R210
10.0K
IRQ5
DTRD
RTSD
DEVELOPMENT SERIAL PORT
U114
MAX232
J27
TXDB
TXB
RXDB
RXB
F3
/DUART
SERIAL BUS A/D
U23
TLC540
APL1
APL2
A/D_CLOCK
/APL_ADC
BMOSI
BSCK
MISO
BUFFERED OUTPUT
U74
74F244
U64B
74F04
R143
10.0K
BMISO
BR/W
B16MHZ
SERIAL DECODE
U75
74HCT154
/APL_ADC
LED_CS
/PB_CS
/PB_LD
U105B
74F08
U67D
74HCT125
U64E
74F04
U64F
74F04
NC
ETHERNET
J25
+8V
DEV_JMPR
J22
U67C
74HCT125
U53B
74F02
U122
74F164
LCD_ANGLE
/LCD_CS
B16MHZ
LCD
(PART OF FRONT PANEL ASSEMBLY)
J20
J24
BACKLIGHT
R192
12.1
R191
12.1
J9
J9 CONNECTS TO J1
A1 FRONT PANEL
(J-5841)
(PINOUT IS REVERSE ORDER FROM FRONT PANEL BECAUSE OF CABLE TYPE)
PART OF A2 MAIN BOARD

+8V SUPPLY



−8V SUPPLY



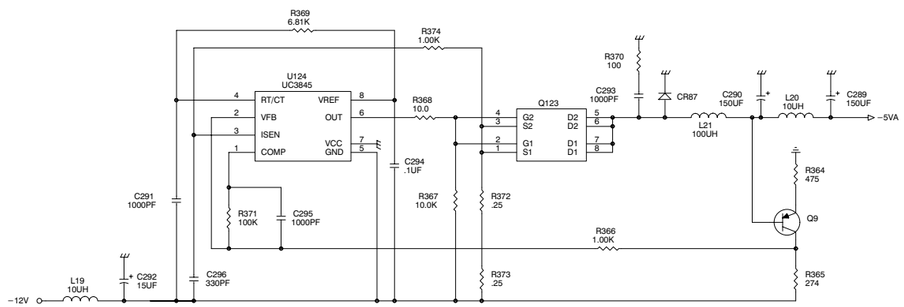


POWER
SUPPLY

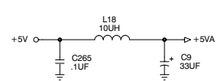
LINE VOLTAGE
90−250V
50/60 Hz

A3 POWER SUPPLY BOARD

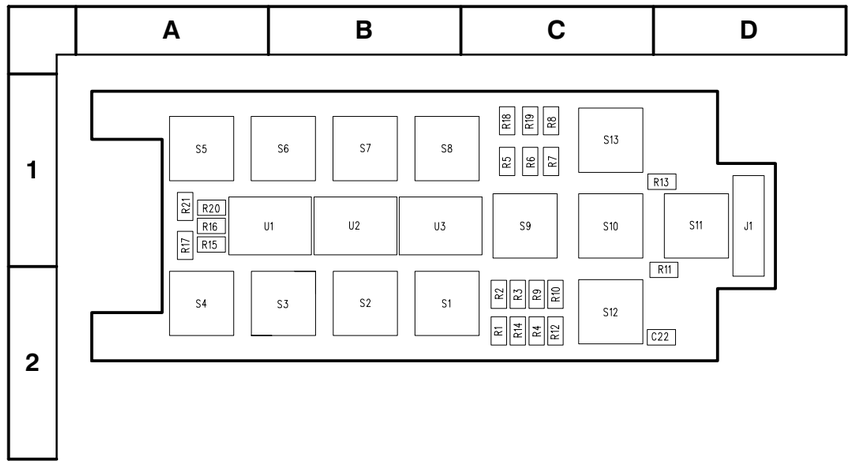
−5V ANALOG



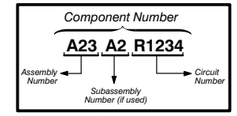
+5V ANALOG



PART OF A2 MAIN BOARD



COMPONENT NUMBER EXAMPLE



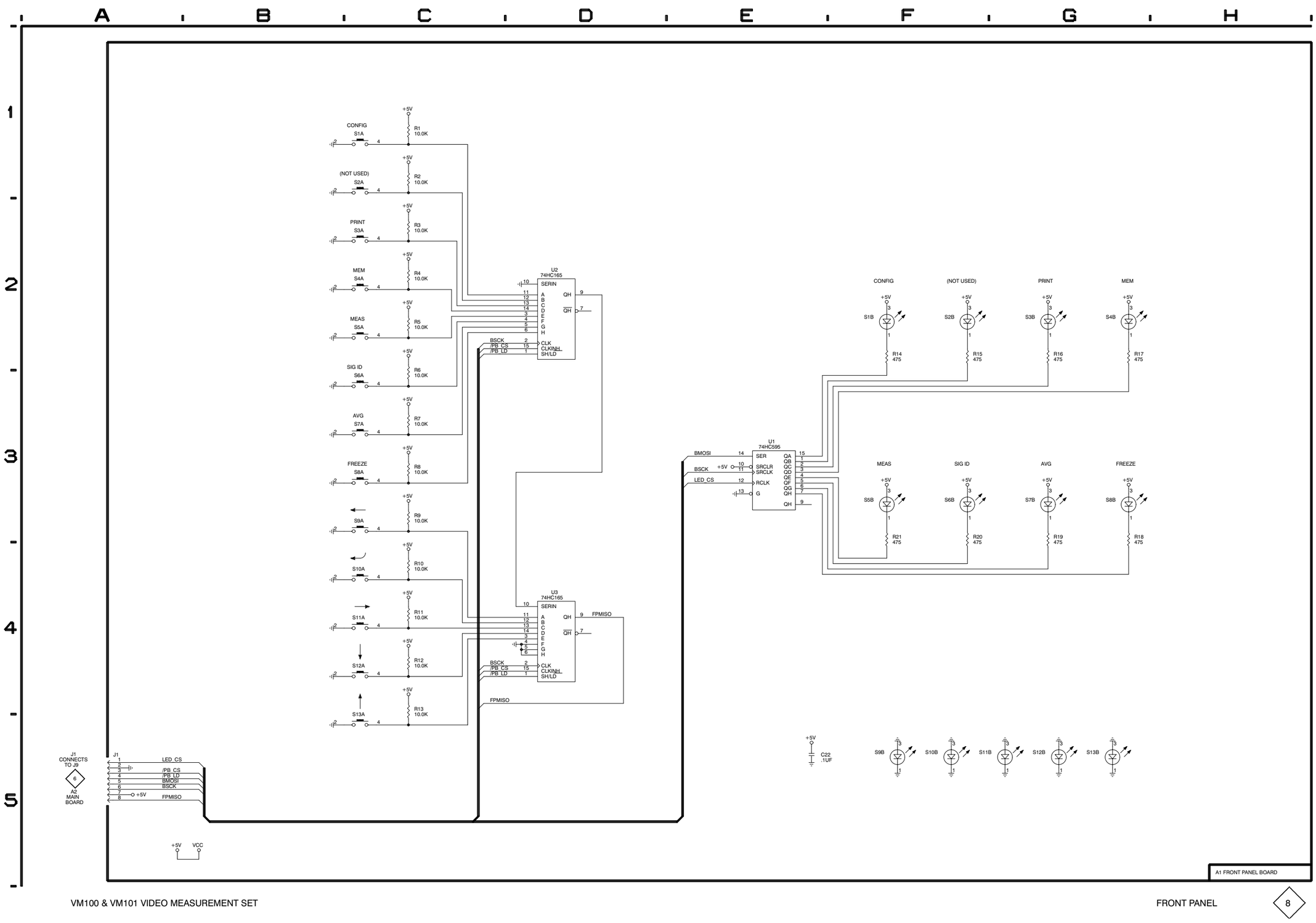
Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

STATIC SENSITIVE DEVICES

A1 Front Panel Component Locator

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C22	E5	C2	R6	C2	C1	R13	C4	C1	R20	F3	A1	S3B	G2	A2	S6B	F3	A1	S9B	F5	C1	S12B	G5	C2
J1	A5	D1	R7	C3	C1	R14	F2	C2	R21	F3	A1	S4A	C2	A2	S7A	C3	B1	S10A	C4	C1	S13A	C5	C1
R1	C1	C2	R8	C3	C1	R15	F2	A1	S1A	C1	B2	S4B	G2	A2	S7B	G3	B1	S10B	F5	C1	S13B	G5	C1
R2	C1	C2	R9	C3	C2	R16	G2	A1	S1B	F2	B2	S5A	C2	A1	S8A	C3	B1	S11A	C4	D1	U1	E3	A1
R3	C2	C2	R10	C4	C2	R17	G2	A1	S2A	C1	B2	S5B	F3	A1	S8B	G3	B1	S11B	G5	D1	U2	D2	B1
R4	C2	C2	R11	C4	C1	R18	G3	C1	S2B	F2	B2	S6A	C3	A1	S9A	C3	C1	S12A	C4	C2	U3	D4	B1
R5	C2	C1	R12	C4	C2	R19	G3	C1	S3A	C2	A2												

Figure 9–11: A1 Front Panel board


CONFIG
S1A
(NOT USED)
S2A
PRINT
S3A
MEM
S4A
MEAS
S5A
SIG ID
S6A
AVG
S7A
FREEZE
S8A
S9A
S10A
S11A
S12A
S13A
R1 10.0K
R2 10.0K
R3 10.0K
R4 10.0K
R5 10.0K
R6 10.0K
R7 10.0K
R8 10.0K
R9 10.0K
R10 10.0K
R11 10.0K
R12 10.0K
R13 10.0K
+5V
U2
74HC165
SERIN
A
B
C
D
E
F
G
H
QH
QH
CLK
CLKINH
SH/LD
BSCK
/PB_CS
/PB_LD
U3
74HC165
FPMISO
U1
74HC595
SER
SRCLR
SRCLK
RCLK
G
QA
QB
QC
QD
QE
QF
QG
QH
BMOSI
BSCK
LED_CS
CONFIG
(NOT USED)
PRINT
MEM
S1B
S2B
S3B
S4B
R14 475
R15 475
R16 475
R17 475
MEAS
SIG ID
AVG
FREEZE
S5B
S6B
S7B
S8B
R21 475
R20 475
R19 475
R18 475
J1
CONNECTS
TO J9
6
A2
MAIN
BOARD
LED_CS
/PB_CS
/PB_LD
BMOSI
BSCK
FPMISO
VCC
C22
.1UF
S9B
S10B
S11B
S12B
S13B
A1 FRONT PANEL BOARD

Replaceable Mechanical Parts

This section contains a list of the replaceable mechanical components for the video measurement set. Use this list to identify and order replacement parts.

Parts Ordering Information

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

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

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

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

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

Using the Replaceable Mechanical Parts List

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

Parts List Column Descriptions

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

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

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

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

Manufacturers cross index

Mfr. Code	Manufacturer	Address	City, State, Zip Code
0KB01	STAUFFER SUPPLY	810 SE SHERMAN	PORTLAND OR 97214
0KB05	NORTH STAR NAMEPLATE INC	5750 NE MOORE COURT	HILLSBORO, OR 97124–6474
07416	NELSON NAME PLATE CO	3191 CASITAS	LOS ANGELES CA 90039–2410
1DM20	PARLEX CORPORATION LAMINATED CABLE DIV	7 INDUSTRIAL WAY	SALEM, NH 03079
24931	SPECIALTY CONNECTOR CO INC	2100 EARLYWOOD DR PO BOX 547	FRANKLIN IN 46131
52152	MINNESOTA MINING AND MFG CO INDUSTRIAL TAPE DIV	3M CENTER	ST PAUL MN 55144–0001
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077–0001
80126	PACIFIC ELECTRICORD CO	747 W REDONDO BEACH PO BOX 10	GARDENA CA 90247–4203
85471	BOYD CORP	13885 RAMOMA AVE	CHINO CA 91710
TK0IU	OPTREX CORPORATION	3–14–9 YUSHIMA, BUNKYO–KU TOKYO	113 JAPAN
TK0196	ALMAC/ARROW ELECTRONICS	9500 SW NIMBUS AVE BUILDING E	BEAVERTON, OR 97005
TK0435	LEWIS SCREW CO	4300 S RACINE AVE	CHICAGO IL 60609–3320
TK1547	MOORE ELECTRONICS INC (DIST)	19500 SW 90TH COURT PO BOX 1030	TUALATIN OR 97062
TK1572	RAN–ROB INC	631 85TH AVE	OAKLAND CA 94621–1254
TK1857	HIROSE ELECTRIC USA INC	2688 WESTHILLS COURT	SIMI VALLEY, CA 93065–6235
TK1943	NEILSEN MANUFACTURING INC	3501 PORTLAND ROAD NE	SALEM OR 97303
TK2058	TDK CORPORATION OF AMERICA	1600 FEEHANVILLE DRIVE	MOUNT PROSPECT, IL 60056
TK2469	UNITREK CORPORATION	3000 LEWIS & CLARK WAY SUITE #2	VANCOUVER WA 98601

Replaceable mechanical parts list

Fig. & Index Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Qty	Name & Description	Mfr. Code	Mfr. Part Number
1–1	————————			1	DISPLAY MODULE: LCD; 320 X 240, DOT MATRIX NTN SUPER TWIST, LED BACKLIGHT, 96 X 72MM VIEWING AREA (SEE A4 REPL)		
–2	174–3306–00			1	CABLE ASSY: RIBBON; IDC, 14, 28 AWG, 7.5 L, 2X7, .1 CTR, CPT, ON PLZ X2X7, .1 CTR,CB (CONNECTED AT A4 TO A2J20)	TK2469	174–3306–00
–3	337–4090–00	B020427		1	SHIELD: SHIELD, ELECTRICAL, EMI, VM101 (VM100 ONLY)	80009	337–4090–00
	337–4090–00	B010100		1	SHIELD: SHIELD, ELECTRICAL, EMI, VM101 (VM101 ONLY)	80009	337–4090–00
–4	211–0409–00			20	SCR, ASSEM WSHR: 4–40 X 0.312, PNH, STL, CDPL, T–10 TORX	0KB01	211–0409–00
					* END MOUNTING PARTS*		
–5	————————			1	CIRCUIT BD ASSY: MAIN (SEE A2 REPL)		
–6	174–2338–00			1	CA ASSY, SP, ELEC: DISCRETE, JUMPER PWR; 6, 18AWG, 2.2 L, 1X6, 0.156 CTR TIN, W/O FRICTION LOCK BOTH ENDS (CONNECTED AT A2J10 TO A3J2)	TK1547	174–2338–00
–7	211–0433–00			16	SCREW, MACHINE: 0.188 L, 4–40, FLH, STL POZI, BLACK	0KB01	ORDER BY DESC
–8	200–4164–00	B010100	B020426	1	COVER, TOP (VM100 ONLY)	TK1943	200–4164–00
	200–4164–01	B020247		1	COVER, TOP (VM100 ONLY)	TK1943	200–4164–01
	200–4164–01	B010100		1	COVER, TOP (VM101 ONLY)	TK1943	200–4164–01
–9	333–4180–00	B010100	B020426	1	PANEL, REAR: REAR PANEL;VM100 (VM100 ONLY)	80009	333418000
	333–4180–02	B020247		1	PANEL, REAR: REAR PANEL;VM101 (VM100 ONLY)	80009	333418002
–9	333–4180–02	B010100		1	PANEL, REAR: REAR PANEL;VM101 (VM101 ONLY)	80009	333418002
–10	196–3146–00			2	CA ASSY, SP: FLAT FLEX, FLX, 27 AWG, 1.0 L, PCB, TERM, STR BOTH ENDS	TK0196	FSN–1A, P OR K
–11	210–1039–00			4	WASHER, LOCK: 0.521 ID, INT, 0.025 THK, SST	0KB01	1224–02–00–0541C
–12	220–0497–00			4	NUT, PLAIN, HEX: 0.5–28 X 0.562 HEX, BRS CD PL	0KB01	220–0497–00
–13	131–0106–02			1	CONN, RF JACK: BNC; 50 OHM, FEMALE, STR, SLDR CUP/FRT PNL, 0.520 MLG X0.403 TAIL, 0.04 L SLDR CUP, 0.380, D/1 FLAT	24931	28JR178–1
–14	210–0255–00			1	TERMINAL, LUG: 0.391 ID, LOCKING, BRS CD PL	TK1572	ORDER BY DESC
–15	214–3903–01			2	SCREW, JACK: 4–40 X 0.312 EXT THD, 4–40 INT THD, 0.188 HEX, STEEL, CADPLATE	0KB01	214–3903–01
–16	131–4131–00			1	CONN, PLUG, ELEC: MALE W/LOCKING ADPTR, EXTMTG	80126	B–0778
–17	211–0410–00			2	SCR, ASSEM WSHR: 4–40 X 0.437, PNH, STL, CDPL, T–10 TORX	0KB01	211–0410–00

Replaceable mechanical parts list (cont.)

Fig. & Index Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Qty	Name & Description	Mfr. Code	Mfr. Part Number
–18	119–1536–00			1	FILTER, RFI: 3A, 250VAC, 50/60HZ	TK2058	ZUB2203–00
–19	211–0409–00	B010100	B010327	1	SCREW,ASSEM WSHR:4–40 X 0.312,PNH,STL,CDPL,T–10 TORX (VM100 ONLY)	0KB01	211–0409–00
	211–0722–00	B010328		1	SCREW, MACHINE: 6–32 X 0.250, PNH, STL, CDPL, T–15 TORX (VM100 ONLY)	0KB01	211–0722–00
	211–0722–00	B010100		1	SCREW, MACHINE: 6–32 X 0.250, PNH, STL, CDPL, T–15 TORX (VM101 ONLY)	0KB01	211–0722–00
–20	196–1213–00			1	LEAD, ELECTRICAL: 18 AWG, 2.5 L, 5–4 (CONNECTED TO LINE FILTER AND GROUND)	TK2469	196–1213–00
–21	174–3188–01			1	CA ASSY, PWR: DISCRETE; CPM, 2, 18 AWG, 2.625 L, 1X3, 0.156 CTR, RCPT X 0.05 L CUT & STRIP, 20GOLD, W/O FRICT LOCK (CONNECTED TO LINE FILTER AND A3J1)	TK1547	174–2188–01
–22	334–3379–00			1	MARKER, IDENT: MARKED GROUND SYMBOL	07416	ORDER BY DESC
–23	337–3738–00			1	SHIELD, ELEC: POWER SUPPLY	85471	337–3738–00
–24	————————			1	POWER SUPPLY: 44W;5.1V 6A, +12.0V 1.0A, –12V 0.1A, 90–264VAC 47–63HZ (SEE A3 REPL)		
–25	348–0844–00			6	PAD, CUSHIONING: 0.05 SQ X 0.23 H, POLYURETHANE W/PRESSURE SENS ADHESIVE	52152	SJ–5018–GRAY
–26	200–4262–00	B010100	B010327	1	COVER, BOTTOM: BOTTOM COVER; VM100, SAFETY CONTROLLED (VM100 ONLY)	80009	200–4262–00
	200–4262–01	B010328		1	COVER, BOTTOM: BOTTOM COVER; VM100, SAFETY CONTROLLED (VM100 ONLY)	80009	200–4262–01
	200–4262–01	B010100		1	COVER, BOTTOM: BOTTOM COVER; VM100, SAFETY CONTROLLED (VM101 ONLY)	80009	200–4262–01
–27	174–3240–00			1	CA ASSY, SP: FLAT FLEX; FLX 8, 1MM, 0.039 CTR, 4.5 L WITH MYLAR BACKING, 0.012 THK, FFC (CONNECTED AT A1J1 TO A2J9)	1DM20	1.00M–8–4.5–B
–28	————————			1	CIRCUIT BD ASSY: FRONT PANEL (SEE A1 REPL)		
–29	366–0767–00	B010100	B010349	1	PUSHBUTTON: SQ KEYTOP WITHOUT LENS, NON–LIGHTED (VM100)	80009	366076700
	366–0767–00	B010100	B010312	1	PUSHBUTTON: SQ KEYTOP WITHOUT LENS, NON–LIGHTED (VM101)	80009	366076700

Replaceable mechanical parts list (cont.)

Fig. & Index Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Qty	Name & Description	Mfr. Code	Mfr. Part Number
	366–0782–00	B010350		1	PUSHBUTTON: SQ KEYTOP WITHOUT LENS, NON–LIGHTED (VM100)	80009	366078200
	366–0782–00	B010313		1	PUSHBUTTON: SQ KEYTOP WITHOUT LENS, NON–LIGHTED (VM101)	80009	366078200
–30	366–0766–00	B010100	B010349	4	PUSHBUTTON: SQ KEYTOP WITHOUT LENS, NON–LIGHTED (VM100)	80009	366076600
	366–0766–00	B010100	B010312	4	PUSHBUTTON: SQ KEYTOP WITHOUT LENS, NON–LIGHTED (VM101)	80009	366076600
	366–0781–00	B010350		4	PUSHBUTTON: SQ KEYTOP WITHOUT LENS, NON–LIGHTED (VM100)	80009	366078100
	366–0781–00	B010313		4	PUSHBUTTON: SQ KEYTOP WITHOUT LENS, NON–LIGHTED (VM101)	80009	366078100
–31	366–0671–00	B010100	B010349	7	PUSH BUTTON: W/LENS (VM100)	80009	366067100
	366–0671–00	B010100	B010312	7	PUSH BUTTON: W/LENS (VM101)	80009	366067100
	366–0779–00	B010350		7	PUSH BUTTON: W/LENS (VM100)	80009	366077900
	366–0779–00	B010313		7	PUSH BUTTON: W/LENS (VM101)	80009	366077900
–32	426–2532–00			1	FRAME, FRONT: FRONT FRAME, CHROMATE CONVERSION COATING, TV GRAY;VM100	80009	426253200
–33	333–4179–01			1	PANEL, FRONT: FRONT PANEL; VM100 (VM100 ONLY)	80009	333–4179–01
	333–4187–01			1	PANEL, FRONT: FRONT PANEL, VM101 (VM101 ONLY)	0KB05	333–4187–01
					STANDARD ACCESSORIES		
	161–0216–00			1	CABLE ASSY, PWR: 3, 18 AWG, 2.5M L, BLACK	80126	C7120–25M–BL
	070–9522–XX			1	MANUAL, TECH: USERS, VM100/VM101	80009	070–9522–XX
	348–0844–00			6	PAD, CUSHIONING: 0.05 SQ X 0.23 H, POLYURETHANE W/PRESSURE SENS ADHESIVE	52152	SJ–5018–GRAY
					OPTIONAL ACCESSORIES		
	070–9288–XX			1	MANUAL, TECH: SERVICE, VM100 SERIES	80009	0709288XX
	174–1809–00			1	CA ASSY, SP, ELEC: 9 COND, 72.0 L	80009	174180900

Replaceable mechanical parts list (cont.)

Fig. & Index Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Qty	Name & Description	Mfr. Code	Mfr. Part Number
					RACKMOUNT KIT, SIDE-BY-SIDE: TVGF13	80009	
					RACKMOUNT ADAPTER, FOR USE WITH 1700F05: TVGF14	80009	
					VM140 & VM141 MOUNTING KIT: TVGF15	80009	

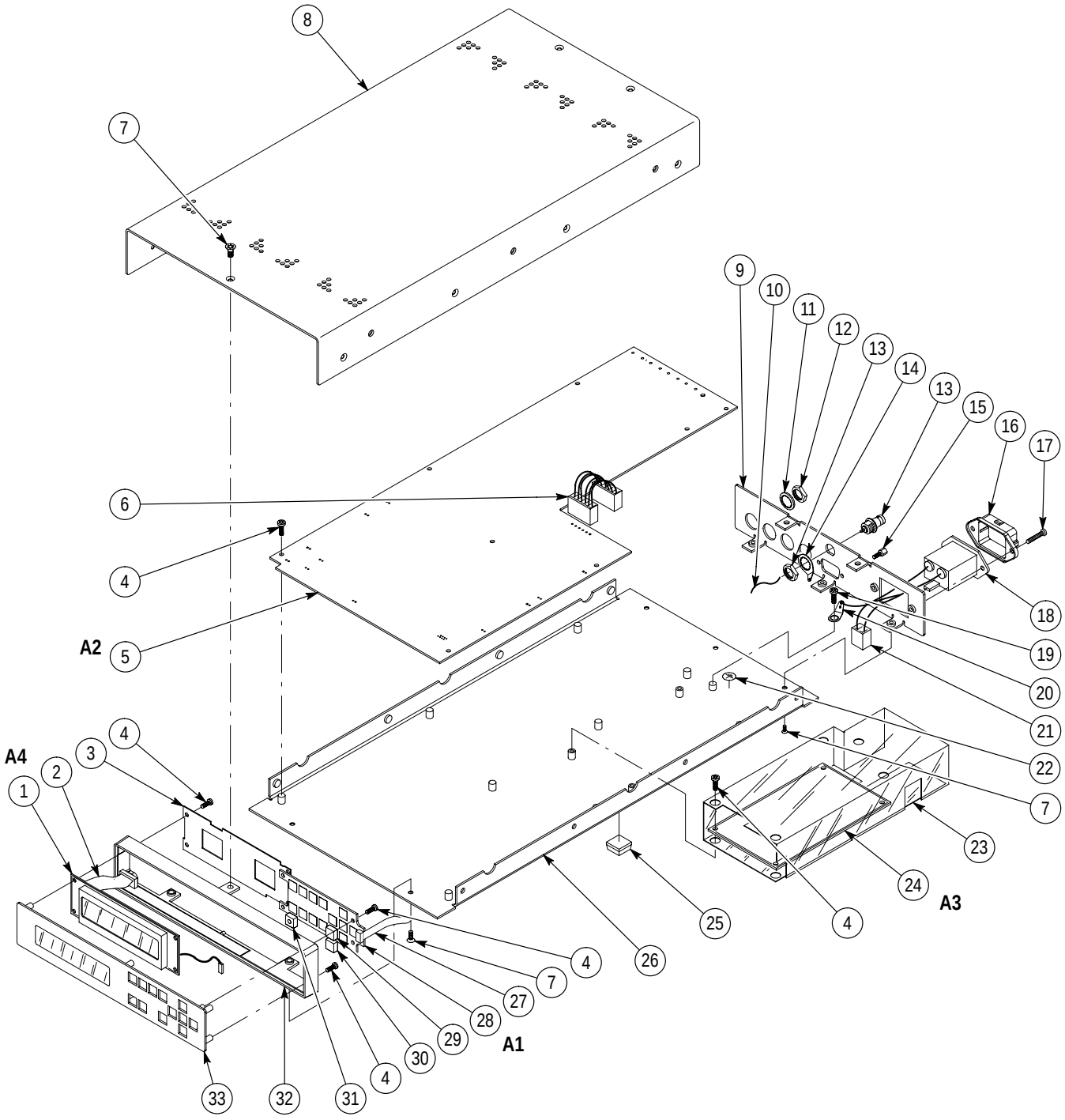


Figure 10–1: Exploded view