Instruction Manual

Tektronix

1705A
Spectrum Monitor (SN B040000 and Above)

070-8222-07

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 this product, that it manufactures and sells, will be free from defects in materials and workmanship for a period of three (3) years from the date of shipment. If any such product proves defective during this warranty period, Tektronix, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

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

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

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General Safety Summary

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

Only qualified personnel should perform service procedures.

While using this product, you may need to access other parts of the system. Read the *General Safety Summary* in other system manuals for warnings and cautions related to operating the system.

To Avoid Fire or Personal Injury

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

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

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

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

Connect the ground lead of the probe to earth ground only.

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

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

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

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

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

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

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in an Explosive Atmosphere.

Keep Product Surfaces Clean and Dry.

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

Symbols and Terms

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

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

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

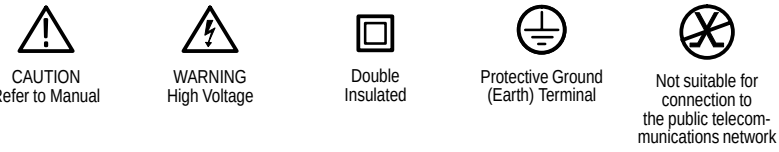
Terms on the Product. These terms may appear on the product:

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

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

CAUTION indicates a hazard to property including the product.

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



Preface

The information in this manual is intended for instrument operators and service technicians. Operators are assumed to befamiliar with basic television terms and measurements. Qualified service technicians are also assumed to be familiar with television terms and measurements, and have moderate experience with analog and logic circuits.

The manual is divided into two parts: Operator's Information and Service Information. The Operator's Information is useful to both operators and service technicians. The Service Information is intended only for qualified service technicians.

Section 1, Introduction

Section 1, Introduction, includes a general description of the instrument followed by the Specifications. The Specifications include references to the corresponding Performance check steps.

Section 2, Operating Instructions

Section 2, Operating Instructions, familiarizes the user with the front– and rear–panel controls, connectors, and indicators; includes an operator's check-out procedure; and includes other operator familiarization information.

Section 3, Installation

Section 3, Installation, includes electrical and mechanical installation information. The electrical installation information includes adjustments and operational changes available with the instrument. The mechanical installation information includes rackmounting, custom installation, and portable use.

Section 4, Theory of Operation

Section 4, Theory of Operation, provides an over-all block diagram description and detailed circuit descriptions. Read the block diagram description for an overview of the instrument. The detailed circuit descriptions should be used with the block diagram and schematic diagrams in the foldout pages for specific information about individual circuits.

Section 5, Checks and Adjustments

Section 5, Checks and Adjustments, includes the Performance Check Procedure and the Adjustment Procedure. The Performance Check Procedure is used to verify that the instrument's performance is within its specifications, and the Adjustment Procedure is used to adjust the instrument to meet its specifications. The procedures are preceded by a list of recommended test equipment. Each procedure has a short form listing of the individual steps.

Section 6, Maintenance

Section 6, Maintenance, includes preventive, troubleshooting, and corrective information.

Section 7, Options

Section 7, Options, documents instrument options. The information in this section summarizes the options. Additional details are included in appro-priate places throughout the manual.

Section 8, Replaceable Electrical Parts

Section 8, Replaceable Electrical Parts, includes order information and part numbers for all replaceable electrical parts.

Section 9, Diagrams

Section 9, Diagrams, contains servicing illustra-tions. These include adjustment locations, circuit board part locations, a block diagram, and schematic diagrams. Parts locating tables are included that cross–reference the circuit board illustrations to the schematic diagrams.

Section 10, Replaceable Mechanical Parts

Section 10, Replaceable Mechanical Parts, includes ordering information and part numbers for all replaceable mechanical parts. This parts list is referenced to an exploded view mechanical drawing. Also included are lists of accessories and optional accessories.

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. www.tektronix.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

Introduction

Section 1
Introduction

The TEKTRONIX 1705A Spectrum Monitor is an 8½" wide by 5¼" high special purpose spectrum analyzer. It weighs approximately 8½ pounds and is powered from an ac source. The crt occupies approximately two-thirds of the front-panel area, with the control panel taking up the remainder of the space. Operation is controlled by a microprocessor that polls the front-panel switches. Front-panel switches are of the momentary touch type with lighted functional indicators. In addition to polling the front panel, the microprocessor provides the characters for an alphanumeric crt readout.

The signal is displayed on a bright crt. It is of the mesh type, for better geometry, and uses an internal graticule to reduce parallax. Variable graticule scale illumination provides even lighting over the usable graticule area to improve measurement accuracy and the quality of display photographs.

The 1705A Spectrum Monitor is a swept front-end superheterodyne-type spectrum analyzer with two inputs; L–Band to accommodate Low-Noise Amplifier/Block Down Converter (LNB) outputs, and 70 MHz for use with Video Exciters. The L–Band input (950 to 1800 MHz) is through an F-type connector, while the 70 MHz input is through a standard bnc connector. The L–BAND INPUT connector is the output for the selectable 18 V supply that is the Block Down Converter auxiliary power.

Typical Configurations

The TEKTRONIX 1705A Spectrum Monitor is designed primarily for use in locating satellites and monitoring their signals. It is designed so that it can be rack mounted, in a dual-width rack adapter, along with a half-rack waveform monitor, such as a TEKTRONIX 1740-Series Waveform/Vector Monitor. However, it can be used as a portable instrument. It is intended to be connected to the rf feed with a directional connector. See Figure 1-1. It is capable of providing the dc power required to run an LNB. The auxiliary LNB power is turned on or off by a rear-panel slide switch. An indicator on the rear panel lights when the +18 V supply is operating normally.

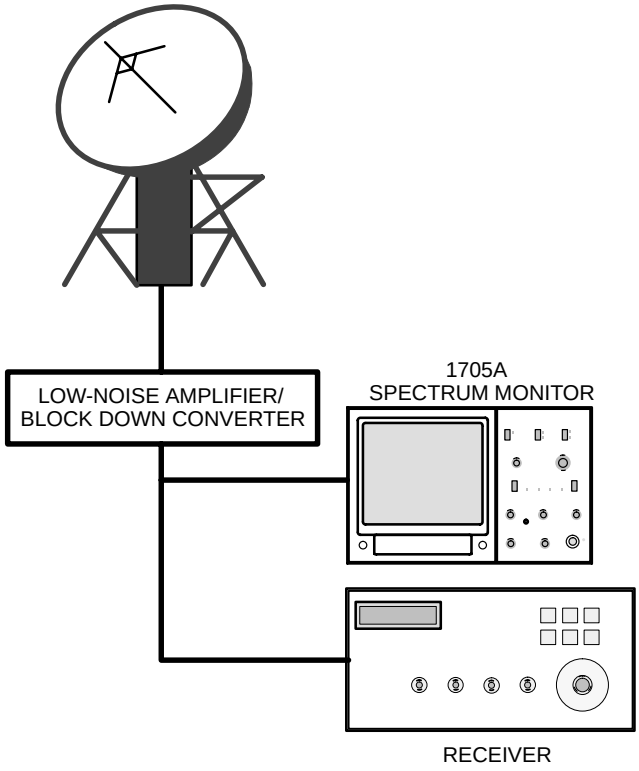


Figure 1-1: 1705A used to locate satellites and determine maximum signal level.

Options

The only options currently available for the 1705A Spectrum Monitor are the power plug options described in Section 7 (Options). If no power cord options are ordered, instruments are shipped with the North American 125 V power cord and one replacement fuse.

Accessories

Standard Accessories

1 Manual, Instruction

1 Adapter, F–type Male connector to BNC female connector

1 Power Cord, with the correct plug for the selected power plug option

1 Replacement Cartridge Fuse (correct rating for the power plug option)

3 Replacement Scale Illumination Bulbs (Tektronix P/N 150-0168-00 or ANSI #73)

Optional Accessories

Camera, C9 (Option 20)

Viewing Hood (016-0475-00)

Front Panel Cover (200-3897-01)

1700F00, Plain Cabinet (painted silver grey)

1700F02, Portable Cabinet (painted silver grey with handle, feet, and front cover)

1700F05, Side-by-Side Rack Adapter

1700F06, Blank Half-Rack Width Panel

1700F07, Utility Drawer

Safety Information

The 1705A Spectrum Monitor is intended to operate from an ac power source that will not apply more than 250 V rms between the supply conductors or between either supply conductor and ground. A protective ground connection, by way of the grounding conductor, is essential for safe operation.

The instrument was tested for compliance in a cabinet. To ensure continued compliance, the instrument will need to be enclosed in a cabinet that is equivalent to those listed as Optional Accessories for the 1705A. A drawing of the 1700F00 plain cabinet is contained in the Installation Instructions (Section 3).

ELECTRICAL SPECIFICATION

Table 1–1: Spectrum Display

Characteristic	Performance Requirements	Supplemental Information	Check Step
Frequency Range L−Band 70 MHz	 950 to 1800 MHz 45 to 100 MHz	 F−type connector Bnc connector	
Frequency Span L−Band Full 10 MHz/Division 1 MHz/Division 100 kHz/Division 70 MHz Full 1 MHz/Division 100 kHz/Division		 10 Horiz. Div. Equals: 1000 MHz 100 MHz 10 MHz 1 MHz 10 Horiz. Div. Equals: 50 MHz 10 MHz 1 MHz	 11 5
Span/Div Accuracy		Typically 0.5 minor Division. Brightup offset by 1 Division in FULL SPAN/DIV should still come on screen in the next magnified position.	4, 5, 10, 11 11
Flatness	L−Band ±5 dB. 70 MHz ±2 dB.	± from center (1400 MHz). ± from center (70 MHz).	12, 7
Maximum Signal Input	L−Band: −30 dBm, 75Ω 70 MHz: −20 dBm, 75Ω.		
Minimum Signal Input	−80 dBm.		
Relative Amplitude Accuracy	L−Band (only) ±3 dB/100 MHz.	Typically ±1 dB /100 MHz.	12
Sweep Length		≈12 Divisions all SPANS/DIV settings.	4
Sweep Speed		Typically 20 − 200 ms.	9
Positioning Range Vertical Horizontal	 + and −3 Divisions. + and −2 Divisions.		13
Displayed Frequencies in FULL SPAN/DIV L−BAND (900 − 1900 MHz) 70 MHz (45 − 100 MHz)		Left Grat. Edge / Mid Grat. Line / Right Grat. Edge 900 / 1400 / 1900 45 / 70 / 95	 11 5
Frequency Readout		Center Frequency shown by time sharing graphic readout. Exact position on the trace of the center frequency shown by a caret in all spans except FULL.	11

Table 1–1: Spectrum Display (Cont.)

Characteristic	Performance Requirements	Supplemental Information	Check Step
Frequency Bright Up Marker Registration		Full Span has bright up and frequency readout (without cursor). Bright-up area will be on screen in at least the next narrower span.	5
Readout Accuracy	L−Band ±20 MHz. 70 MHz ±2 MHz	Typically ±10 MHz. Typically ±1 MHz.	11 5
Resolution 6 dB Down 300 kHz 10 kHz		 300 kHz ±1 Division at 100 kHz Span/Div. <2 minor Divisions at 100 kHz Span/Div.	 6 6
Video Filter		Reduces Video bandwidth to ≈10 kHz.	8
Low Noise Amplifier/Block Down Converter dc Supply (LNB Power)	+18 Vdc ±5%. 250 mA max.	Output through L−BAND input connector, switched on and off by rear-panel slide switch. LED indicator on rear panel.	3
2 dB Gain Accuracy	≈2 dB/Division.	<3 dB/Division at −50 dBm.	14

Table 1–2: Crt Display

Characteristic	Performance Requirements	Supplemental Information	Check Step
Crt Viewing Area		80 X 100 mm.	
Accelerating Potential		13.75 kV.	
Trace Rotation Range	Greater than ±1° from horizontal.	Total adjustment range is typically 8°.	
Graticule		Internal 8 X 10 Division spectrum analyzer graticule with variable SCALE illumination.	

Table 1–3: Power Source

Characteristic	Performance Requirements	Supplemental Information	Check Step
Mains Voltage Range	90−250 V.	Continuous range from 90 to 250 Vac.	2
Mains Frequency Range	48 Hz to 66 Hz.		
Power Consumption		35 Watts (120 BTU/HR) maximum.	

Table 1–4: Environmental Characteristics

Characteristic	Supplemental Information
Temperature Non-Operating Operating	 −55˚C to +75˚C. 0˚C to +50˚C.
Altitude Non-Operating Operating	 To 50,000 feet (15,000 meters). To 15,000 feet (4,800 meters).
Vibration − Operating	15 minutes each axis at 0.015", frequency varied from 10−55−10 Hz in 1-minute cycles with instrument secured to vibration platform. Ten minutes each axis at any resonant point or at 55 Hz if no resonant point is found.
Shock − Non-Operating	30 g's, ½ sine, 11 ms duration, 3 shocks per surface (18 total).
Transportation	Qualified under NTSC Test Procedure 1A, Category II (30" drop).
Humidity	Will operate at 95% relative humidity for up to five days.

Table 1–5: Physical Characteristics

Characteristic	Supplemental Information
Dimensions Height Width Length	 5 1/4 inches (133.4 mm). 8 1/2 inches (215.9 mm). 18 1/8 inches (460.4 mm).
Weight	Approximately 8.5 lbs (approximately 3.8 kg).

Table 1–6: Certifications and Compliances

EC Declaration of Conformity – EMC	Meets intent of Directive 89/336/EEC for Electromagnetic Compatibility. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities: 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 High-quality shielded cables must be used to ensure compliance to the above listed standards. This product complies when installed into any of the following Tektronix instrument enclosures: 1700F00 Standard Cabinet 1700F02 Portable Cabinet 1700F05 Rack Adapter An increase of up to 20dB in the displayed noise floor may be observed if this instrument is operated in electromagnetic fields of 3V/M or more, at frequencies of approximately 130, 250, 350, or 490 MHz.

Table 1–6: Certifications and Compliances (cont.)

FCC Compliance	Emissions comply with FCC Code of Federal Regulations 47, Part 15, Subpart B, Class A Limits	
Installation (Overvoltage) Category	Terminals on this product may have different installation (overvoltage) category designations. The installation categories are:	
	CAT III	Distribution-level mains (usually permanently connected). Equipment at this level is typically in a fixed industrial location.
	CAT II	Local-level mains (wall sockets). Equipment at this level includes appliances, portable tools, and similar products. Equipment is usually cord-connected.
	CAT I	Secondary (signal level) or battery operated circuits of electronic equipment.
Pollution Degree	A measure of the contaminates that could occur in the environment around and within a product. Typically the internal environment inside a product is considered to be the same as the external. Products should be used only in the environment for which they are rated.	
	Pollution Degree 1	No pollution or only dry, nonconductive pollution occurs. Products in this category are generally encapsulated, hermetically sealed, or located in clean rooms.
	Pollution Degree 2	Normally only dry, nonconductive pollution occurs. Occasionally a temporary conductivity that is caused by condensation must be expected. This location is a typical office/home environment. Temporary condensation occurs only when the product is out of service.
	Pollution Degree 3	Conductive pollution, or dry, nonconductive pollution that becomes conductive due to condensation. These are sheltered locations where neither temperature nor humidity is controlled. The area is protected from direct sunshine, rain, or direct wind.
	Pollution Degree 4	Pollution that generates persistent conductivity through conductive dust, rain, or snow. Typical outdoor locations.
Safety Standards		
U.S. Nationally Recognized Testing Laboratory Listing	UL1244	Standard for electrical and electronic measuring and test equipment.
Canadian Certification	CAN/CSA C22.2 No. 231	CSA safety requirements for electrical and electronic measuring and test equipment.
European Union Compliance	Low Voltage Directive 73/23/EEC, amended by 93/69/EEC	
	EN 61010-1	Safety requirements for electrical equipment for measurement, control, and laboratory use.
Additional Compliance	IEC61010-1	Safety requirements for electrical equipment for measurement, control, and laboratory use.

Table 1–6: Certifications and Compliances (cont.)

Safety Certification Compliance	
Temperature, operating	+5 to +40° C
Altitude (maximum operating)	2000 meters
Equipment Type	Test and measuring
Safety Class	Class 1 (as defined in IEC 1010-1, Annex H) – grounded product
Overvoltage Category	Overvoltage Category II (as defined in IEC 1010-1, Annex J)
Pollution Degree	Pollution Degree 2 (as defined in IEC 1010-1). Note: Rated for indoor use only.

APPLICATIONS

The principal application for the TEKTRONIX 1705A Spectrum Monitor is to provide a convenient method to locate and identify Ku-Band satellites, find the correct transponder and check on its availability, and optimize antenna positioning and polarization. The remainder of this section provides basic satellite communications application data. Specific operating instructions are located in Section 2, Operating Instructions.

Locating Satellites

The communications satellites that the television industry is interested in lie in a band directly over the earth's equator, at a distance of approximately 35,900 km (or about 3.7 times the earth's diameter). Traveling at approximately 11,000 km/h the satellite completes one full orbit in 23 hours, 56 minutes, 4.9 seconds, which is referred to as a sidereal day. When a satellite completes one orbit in a sidereal day it is geographically stationary (geostationary) to a point on the earth's surface. Without being geostationary, using a satellite would be extremely complicated and the calculations required to determine when they were in the usable window, and how long they would stay there would, in most cases, require a computer.

At 35,900 km distance the earth subtends an angle of 18˚, which provides coverage of approximately 40% of the earth's surface. See Figure 1-2. Forty percent (40%) of the earth's surface corresponds to an area stretching from 70˚ North latitude to 70˚ South latitude. For rough assumptions, a satellite, in geostationary orbit over the equator, could cover latitudes from the Arctic circle (66˚ 30' N) to the Antarctic circle (66˚ 30' S). However it should be noted that even though the satellite is capable of covering 40% of the earth's surface the actual coverage will be less in most cases because of the antenna design and available transmitter power.

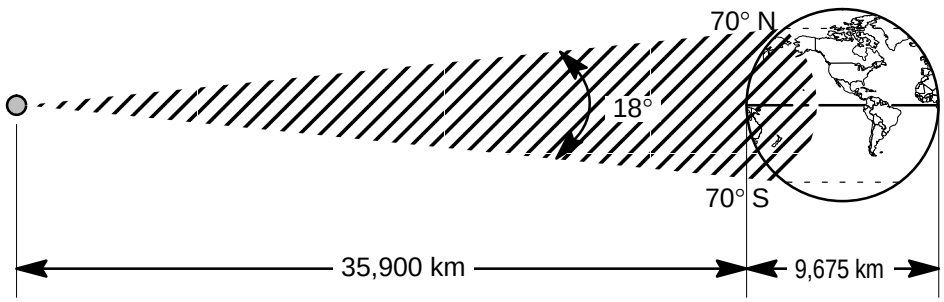


Figure 1-2: Relationship of a communications satellite to earth

Determining the exact angle from the horizon to a satellite (other than at the equator) requires a knowledge of trigonometry, because of the relatively close

orbit of the satellite. If the orbit of an equatorial orbiting satellite were roughly equal to the distance from earth to the sun, ordinary latitude could be used to determine the elevation of the antenna, which is, of necessity, very finely focused. However since there is a disparity this angle is somewhat less than the latitude for the earth station. See Figure 1-3. Simple logic readily points out that as the latitude increases the angle from horizon to the satellite decreases. An example of this would be that at 45˚ North or South latitude the angle above the horizon is about 40˚ for a satellite at the earth station's longitude. Figure 1-3 illustrates why it is not possible to pinpoint a satellite with ordinary navigation.

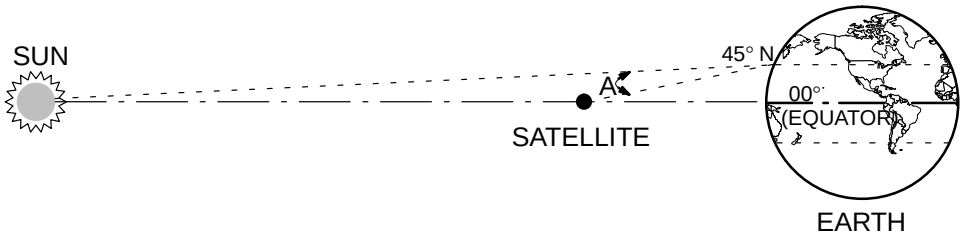


Figure 1-3: Angle A, the difference at a specific latitude between the angle to the sun and the angle to a satellite, is the reason ordinary navigation techniques cannot be used to find a satellite

Figure 1-4 confirms that the angle from the prime meridian to a satellite will be considerably different than the angle from a North American or European earth station to the same satellite. It should also be noted that the elevation also decreases for a satellite the further east or west from the earth station's longitude.

Satellite Footprints

Even though a satellite, in theory, can communicate with 40% of the earth's surface from its location, in most cases it will not. The antenna systems onboard the satellites are usually designed to cover a specific area. These areas are referred to as hemispheres, zones, and spots. A hemispherical beam is designed to cover roughly 40% of the earth's surface, for example, the western hemisphere. A zonal beam covers a specific area, for example, the Continental United States, which is usually referred to as the CONUS beam. A spot beam is exactly what it implies, concentrating on a smaller geographical area, such as the western United States. With each of these beams there are areas where the signal strength is greater. Figure 1-5 shows a propagation map for the western spot beam for one Ku–Band satellite.

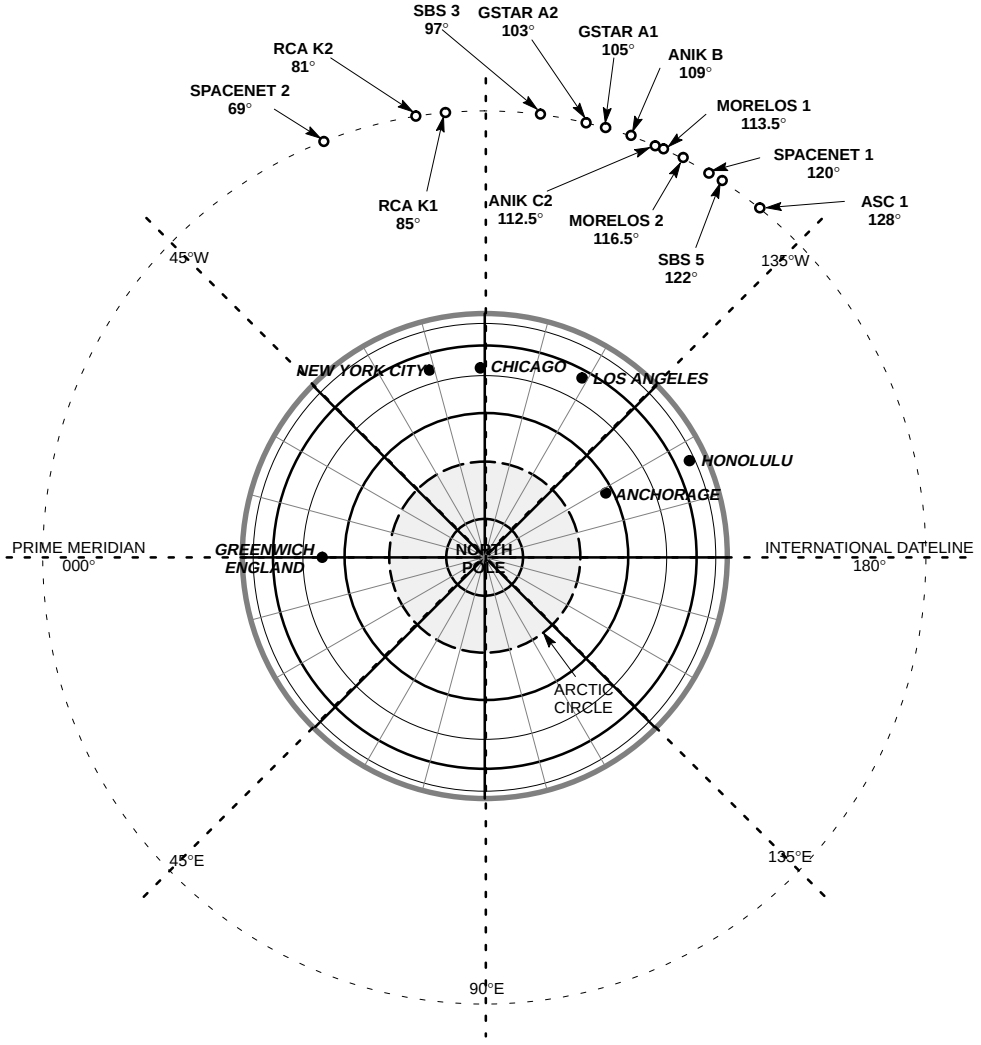


Figure 1-4: Sample longitudinal map of the Ku–Band satellites of most interest to news vehicle earth stations on the North American continent and Hawaii

Using the 1705A for Satellite Communication

The 1705A has two separate inputs, one, the L–Band Input, is specifically designed to work with LNB down converters, which have an output signal range of 0.95 to 1.80 GHz. This provides a means of looking at the signals from either Ku or C–Band satellites. The second input is identified as 70 MHz and accepts signals from 45 to 100 MHz. This second input is primarily designed to work with the IF frequency of an exciter, but can also be used to look at signals in the low VHF television band and the FM broadcast band up to 100 MHz.

L–Band Input Signals

At the present time there are numerous satellites in geostationary orbit. The transponders on each have specific assigned functions, which makes it essential to accomplish at least four things before illuminating a particular transponder:

1. Locate a satellite.
2. Identify the satellite.
3. Find the transponder and check availability with the satellite operator.
4. Optimize signal strength and polarization.

Once a satellite is located and a particular transponder is identified, the 1705A frequency readout can be set so that the entire range of transponder frequencies can be read directly from the 1705A display. As it is shipped from the factory the 1705A provides a readout in MHz for both bands. However, the 1705A has several customizing routines that can be used to tailor displays for ease of operation. In particular the Readout Mode routine provides for frequency offset, so that the frequency displayed on the crt is the actual frequency of the transponder down link. The readout can be set to indicate any 1.10 GHz block within the range of 0.9 GHz to 20 GHz.

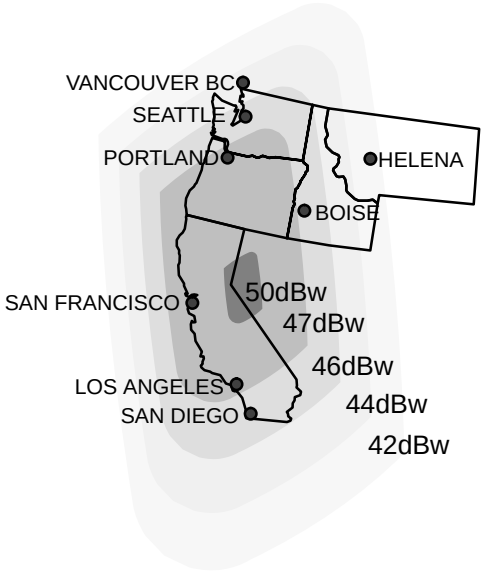


Figure 1-5: The western spot beam footprint for one Ku–Band satellite

Zeroing in on a Satellite

In almost all cases a set procedure for Locating, Identifying, Finding (transponders), and Optimizing will be followed. The 1705A Spectrum Monitor is a tool that greatly simplifies the individual steps so the correct satellite transponder can be accessed in the minimum time.

Locating the Satellite

In most cases the elevation (angle above the horizon) and the true azimuth (direction east or west to the satellite) of the antenna will be the same as it was for the previous access of the same satellite. This angle can be found in one of two ways, calculation or approximation from previous accesses; however, no matter how the satellite is located the signal path will need to be optimized. In most cases the approximate location of the satellite is known from previous transactions and only identification of transponders and signal strength remain to be dealt with.

Identifying the Satellite

Each of the satellites has one or more singular characteristics. In many cases the singular characteristics can be easily identified on the spectrum monitor, which can save valuable setup time. These characteristics can take the form of telemetry beacons, transponder polarization schemes, or blocks of non-video signals that stand out. And in a few cases, the easiest method of identification may be the fact that the satellite is near another satellite that is readily identifiable.

Telemetry Beacons. Satellites have special tracking or telemetry beacons that are easily recognizable on the spectrum monitor. Not only do these assist in identifying the satellite, but they provide an accurate way to set the frequency offset to correspond with actual satellite frequencies. Figure 1-6 shows a typical Ku–Band satellite telemetry beacon. Note that the 1705A readout frequency can be offset to read the down link frequency in GHz. Similar beacons can be found on some C–Band satellites also.

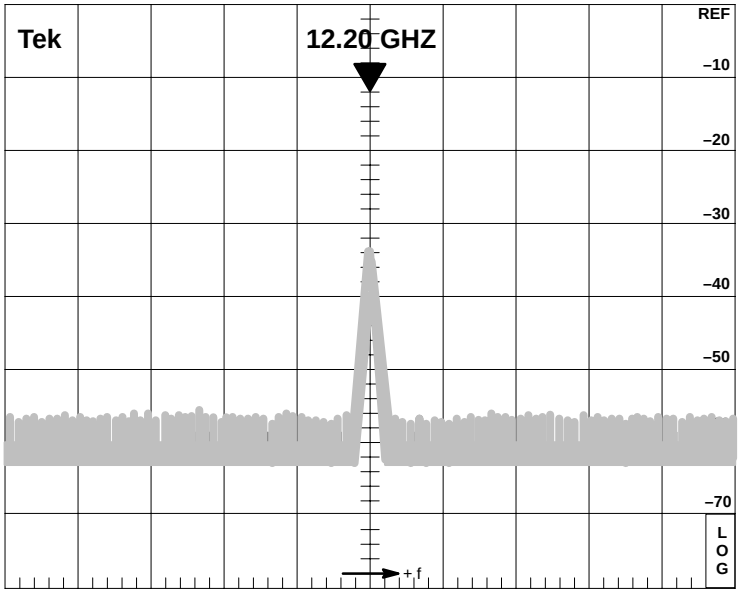


Figure 1-6: A computer representation of the 1705A display showing the 12.198 GHz horizontally polarized telemetry beacon on the SATCOM K2 satellite (Span/Div set to 100 kHz with a 10 kHz Resolution filter)

Transponder Polarization. Whether one or two polarizations are used can often be an easy way to identify a satellite. For example, a satellite with alternate polarization will have overlapping bandwidths, similar to those depicted in Figure 1-7. In this example the center frequency of each transponder down link is given. With the center frequency for each transponder known, finding the correct transponder and determining its activity is easily accomplished with the 1705A Spectrum Monitor.

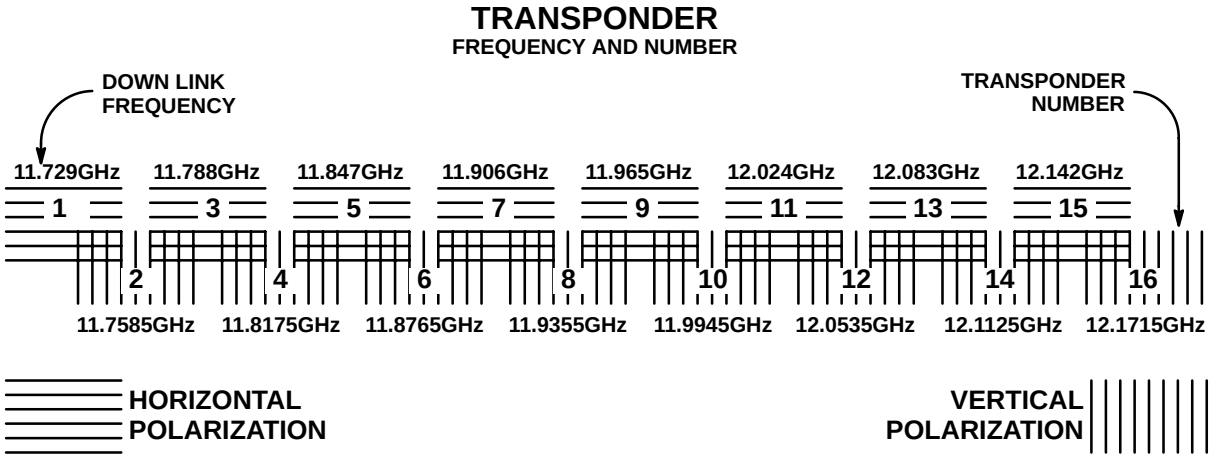


Figure 1-7: Transponder assignments for a typical Ku–Band, 16–transponder satellite that employs alternate polarization (Not all Ku–Band satellites conform to these frequencies and/or this polarization scheme)

Finding The Correct Transponder

Once the satellite has been found it will be necessary to find the proper transponder and determine if it is available. With the 1705A frequency readout offset correctly set up, it is possible to directly zero in on the correct transponder. Figure 1-8 is a computer simulation of the 1705A Spectrum Monitor display in FULL SPAN/DIVISION. Each division corresponds to 100 MHz. If the satellite previously discussed is being looked at and the brightup is on the first marker, then the first signal is transponder number 1 and the antenna feed horn is horizontally polarized. Further, it is possible to determine that transponders 5, 7, 9, 13, and 15 are currently in use. Rotating the feed horn polarity 90˚ would bring up a display of the vertically polarized transponder down links.

Optimize Signal Strength

Once the correct satellite has been identified, minor adjustment to the antenna position will optimize the link. The antenna azimuth and elevation can be fine tuned for maximum signal strength and the opposite polarization carefully nulled while observing the spectrum monitor crt screen.

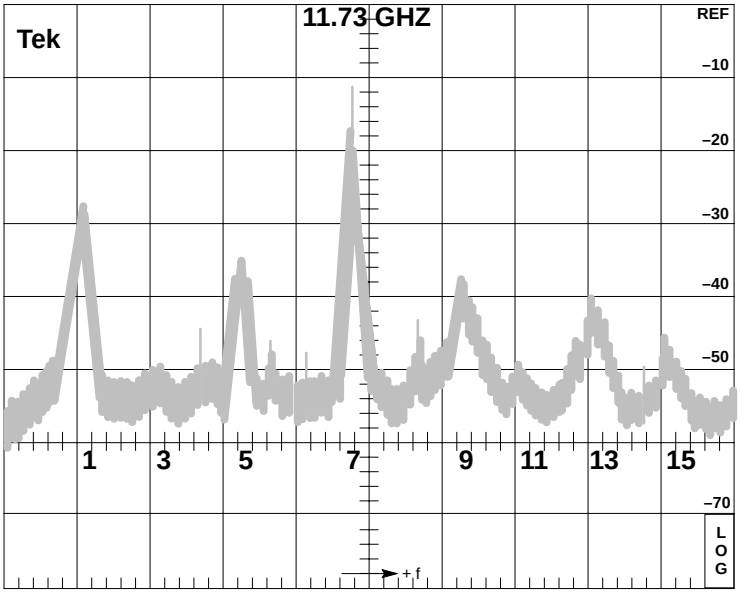


Figure 1-8: Simulation of a 1705A FULL SPAN/DIV display showing six transponders illuminated.

Looking at Exciters with the 70 MHz Input

The 70 MHz Input to the spectrum monitor is a bnc connector. It is designed for use with the IF signal from an up link exciter. Most up link transmitters use an exciter to drive an Upconverter and High Power Amplifier (HPA), and, in most cases, the driving signal to the Upconverter is a 70 MHz IF. If the exciter output is at the up link frequency, a 70 MHz monitoring point is often provided. Sometimes the coupling of the IF signal between the exciter and Upconverter is a coaxial link that can be opened and a directional coupler installed for sampling purposes. See Figure 1-9.

***NOTE**. The 70 MHz input is rated at –20 dBm maximum, external pads may be required to meet this operating condition.*

Once a directional coupler is installed a whole series of checks can be made, including presence of the proper carriers and an indication of the modulation level. More detail can be found in the Tektronix Television booklet “Television Operational Measurements; Video and RF for NTSC Systems.”

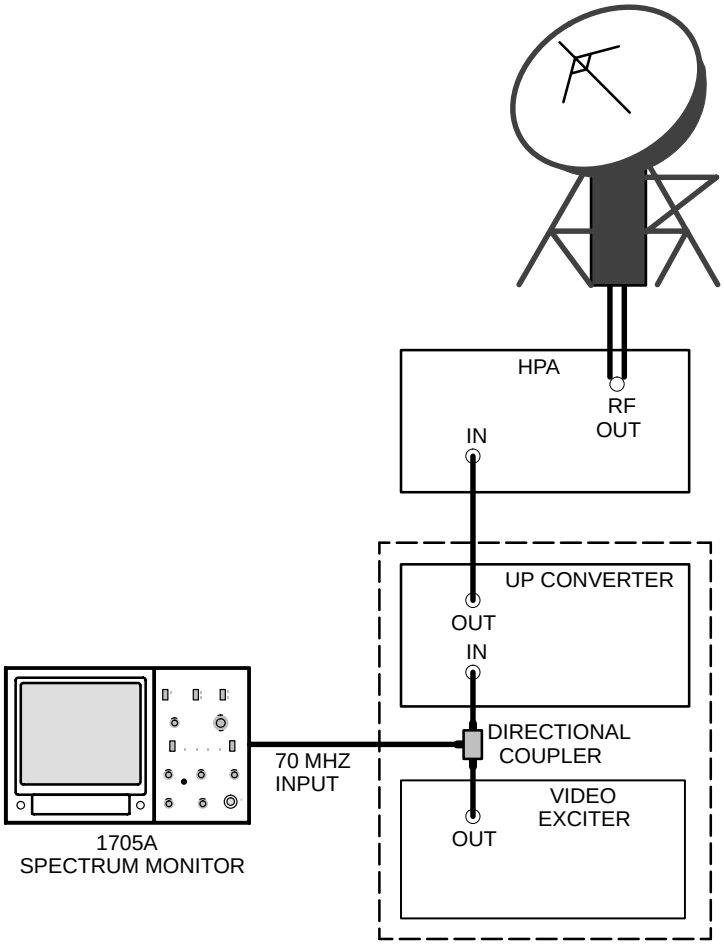


Figure 1-9: Up link Video Exciter, Up converter, and High Power Amplifier (HPA) showing how to hook up a 1705A Spectrum Monitor to look at the Video Exciter output

In addition to the other measurements that can be made a quick check of HPA, antenna, and transponder (as a system) can be made by comparing the exciter output (using the 70 MHz input) to the incoming signal from the down link (using the L–Band Input) by simply switching between inputs. See Figure 1-10.

Miscellaneous Uses for the 1705A

The 1705A Spectrum Monitor 70 MHz band covers a frequency range from 45 to 100 MHz, at center screen. The low VHF television channels and major portion of the FM broadcast band are within the frequency range of the 1705A. If a spectrum monitoring application within this band of frequencies exists the 1705A can easily be used.

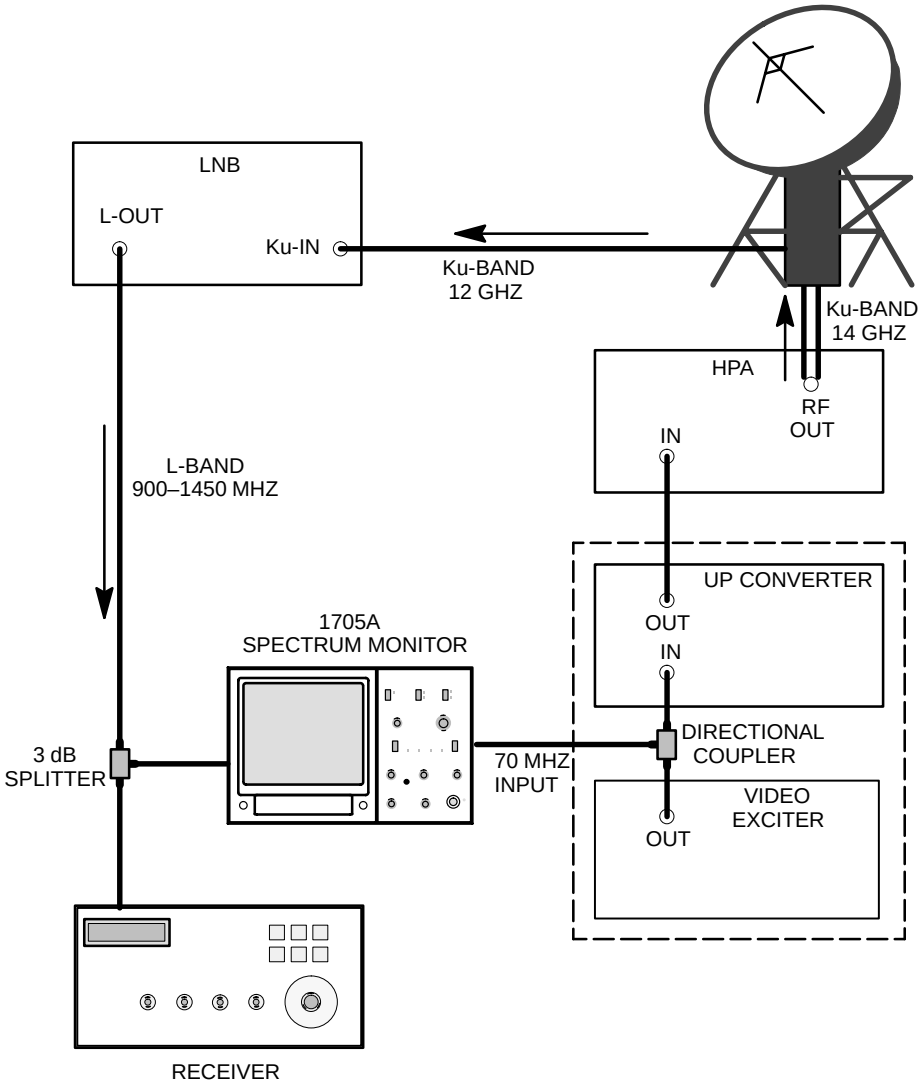


Figure 1-10: 1705A hooked up to look at either the output of the Video Exciter (70 MHz) or the Receiver Input (L–Band)

Operating Instructions

Section 2
Operating Instructions

These instructions provide information about the front-panel controls and indicators, rear-panel connectors and switch, powering-up, and the measurement graticule and alphanumeric readout.

Front-panel Controls and Indicators

The front–panel controls and indicators consist of momentary contact push-button switches, with backlit switch selections, and variable controls. For front-panel control and indicator locations, see Figure 2-1. There are also functions that are accessed by holding the switch down for approximately 1 second. These functions are identified by a blue box surrounding the front–panel label.

FILTER

1. VIDEO

Turns on or off the Video Filter, which reduces the post detection bandwidth (video), to reduce the high-frequency components for display noise averaging. A front-panel LED indicator lights when the Video Filter is on. Holding the Video switch activates the High Gain mode. An on-screen readout indicates 2 dB/Div. To exit this mode, hold the switch again, and the on-screen readout returns to 10 dB/Div. Gain selection will not affect the momentary touch VIDEO On/Off selection.

2. RESOLUTION

Selects the 2nd IF bandwidth. Toggles between 10 kHz and 300 kHz as indicated by the front-panel indicator.

INPUT

3. INPUT

L–BAND or 70 MHz —A push-button switch to select either the L–BAND (900 to 2000 MHz) or the 70 MHz (45 to 100 MHz) input for display. Indicator lights show which input is displayed.

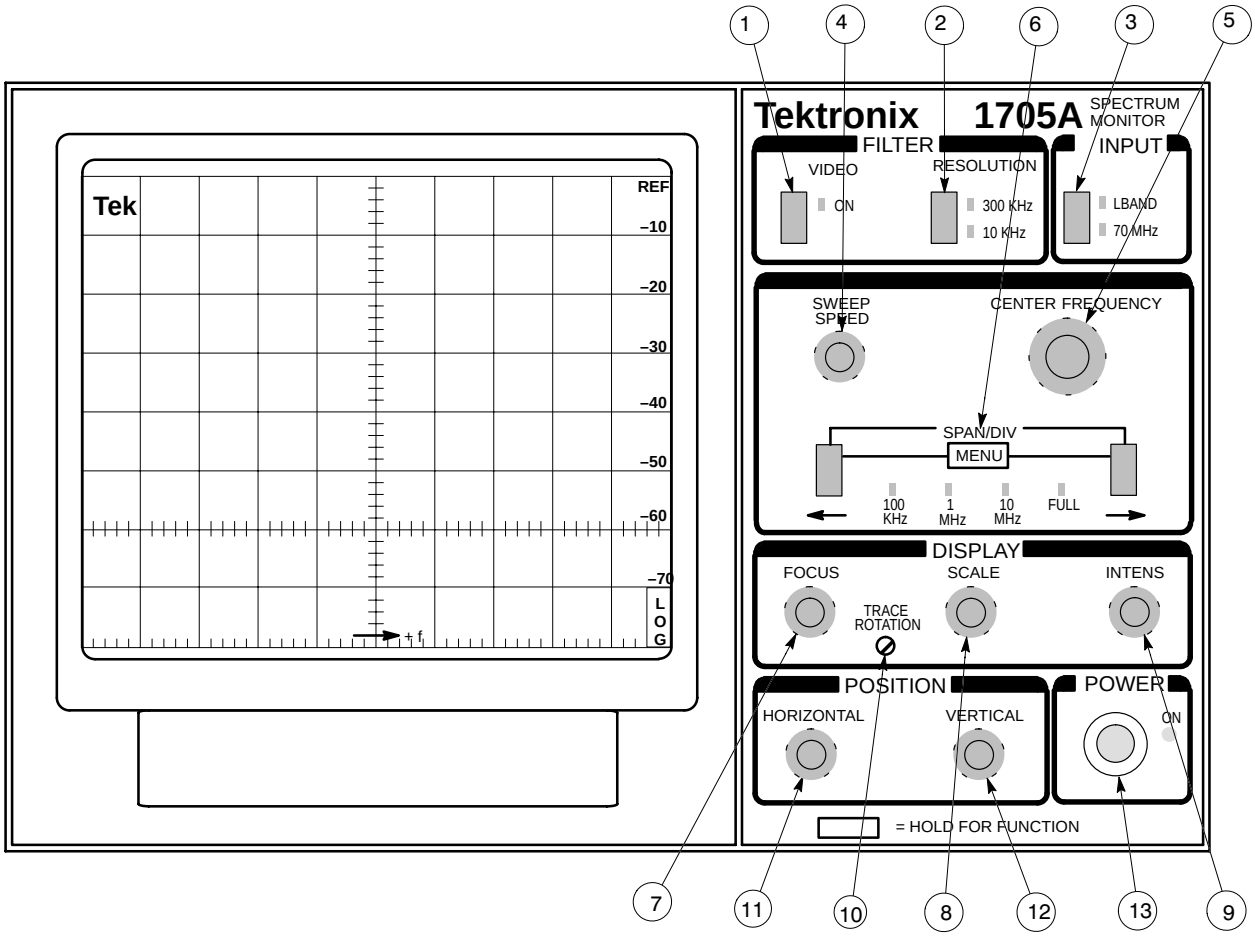


Figure 2-1: 1705A front panel; refer to text for descriptions of controls identified with circled numbers

SWEEP

4. SWEEP SPEED

A variable control that sets the sweep repetition rate, which is typically between 20 and 200 ms.

5. CENTER FREQUENCY

A ten-turn variable control that determines the center frequency of the displayed portion of the spectrum.

6. SPAN/DIV

Two push-button switches (left and right) that select the calibrated span per division. Each span is indicated by a front-panel LED.

FULL – Provides a span of 50 MHz per division for the L–Band (900 – 2000 MHz) input, and 5 MHz per division (45 to 100 MHz) for the 70 MHz input.

10 MHz – Sets display span to 10 MHz per division. Displays a maximum of 120 MHz for one full sweep (not available for the 70 MHz input). The 100 MHz portion of the sweep that is displayed is dependent on the setting of the HORIZONTAL POSITION control.

1 MHz – Sets display span to 1 MHz per division. Displays a maximum of 12 MHz for one full sweep. The 10 MHz portion of the sweep that is displayed is dependent on the setting of the HORIZONTAL POSITION control.

100 kHz – Sets display span to 100 kHz per division. Displays a maximum of 1.2 MHz for one full sweep. The 1 MHz portion of the sweep that is displayed is dependent on the setting of the HORIZONTAL POSITION control.

MENU – When both SPAN/DIV switches are pressed simultaneously, the normal display is replaced by the Main menu. To exit the Main menu, position the cursor by EXIT and press the INPUT switch. The Menu functions are discussed in detail later in this section.

DISPLAY

7. FOCUS

A variable control that adjusts the crt beam for optimum definition.

8. SCALE

A variable control that adjusts the level of graticule illumination.

9. INTENS

A variable control that adjusts the display brightness.

10. TRACE ROTATION

A screwdriver adjustment that aligns the crt trace with the crt graticule to compensate for variations in the magnetic field surrounding the 1705A.

POSITION

11. HORIZONTAL

A variable control that positions the trace horizontally (X axis).

12. VERTICAL

A variable control that positions the display vertically (Y axis).

POWER

13. POWER

Switches the instrument between a powered up state and standby. Portions of the Power Supply circuit board have mains potential on them in either state. A mechanical indicator in the center of the switch shows the status of the POWER switch.

WARNING. *Mains power is still applied to the 1705A Power Supply circuit board, regardless of POWER switch state. To totally remove shock hazard, it is necessary to unplug the instrument and wait for the capacitors to discharge.*

Rear–Panel Connectors

Signal input and power input are located on the 1705A rear panel. See Figure 2-2 for the locations of the rear-panel connectors.

INPUTS

1. L–BAND

A 75Ω input f-type connector used for the 900 – 2000 MHz input of L–Band rf, which is down converted by a Low-Noise Amplifier/Block Down Converter (LNB) from the received satellite signal.

2. LNB POWER (Switch)

Switch to turn on or off the +18 V supply on the L–BAND INPUT connector. Supply is normally used to power a Low-Noise Amplifier/Block Down Converter at the antenna.

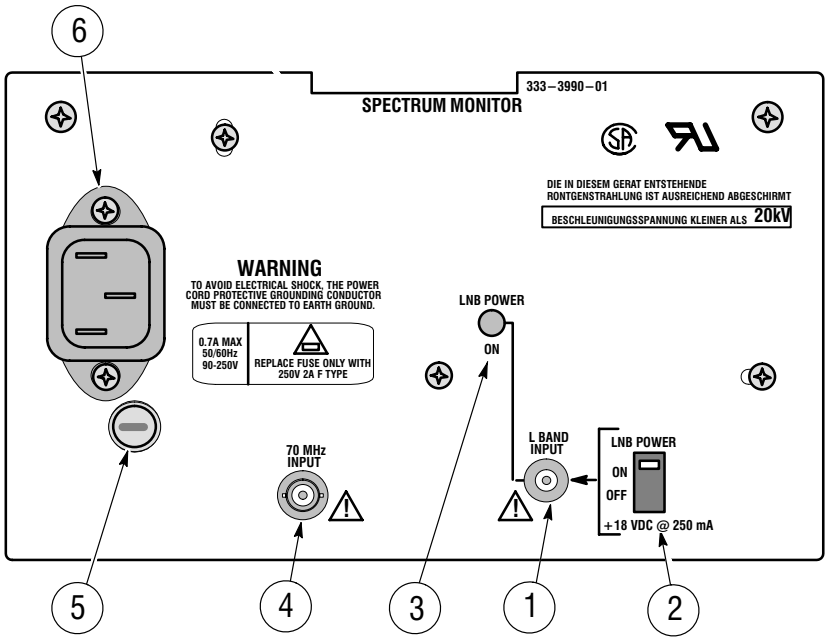


Figure 2-2: 1705A rear panel controls and connectors; refer to text for descriptions of controls identified with circled numbers

3. LNB POWER (Indicator)

LED indicator that lights when the +18 V supply is turned on and operating correctly. Indicator will not light if the +18 V supply is shorted.

4. 70 MHz

A 75Ω input bnc-type connector used for the input of the 45 – 100 MHz rf.

POWER

5. AC FUSE

Holder for the instrument's mains fuse.

6. AC POWER

A standard ac plug receptacle for 120 or 220 Vac power mains.

Powering–up

When the 1705A is first powered up, it should come up in a measurement mode. Most commonly it will be configured as it was when it was last turned off. If not, there are some very simple checks that should be made.

If the power switch is showing ON, but the graticule and front-panel indicators do not come on, check for a mains power problem, such as a blown fuse or interrupted power mains (unplugged or main breaker thrown). If these are right, refer to a qualified service technician for troubleshooting.

If the Non-Volatile RAM (NVRAM) is defective, which disables the operation of the Microprocessor, there is a crt readout. If the 1705A comes on with the following message:

ERROR : CANNOT READ OR WRITE
TO 2444
PRESS [VIDEO] KEY TO EXIT

operation will be questionable and the 1705A should be thoroughly checked out by a qualified service technician.

Normal start-up of the instrument should consist of a display of alphanumeric frequency readout and a spectrum display similar to that in Figure 2-3.

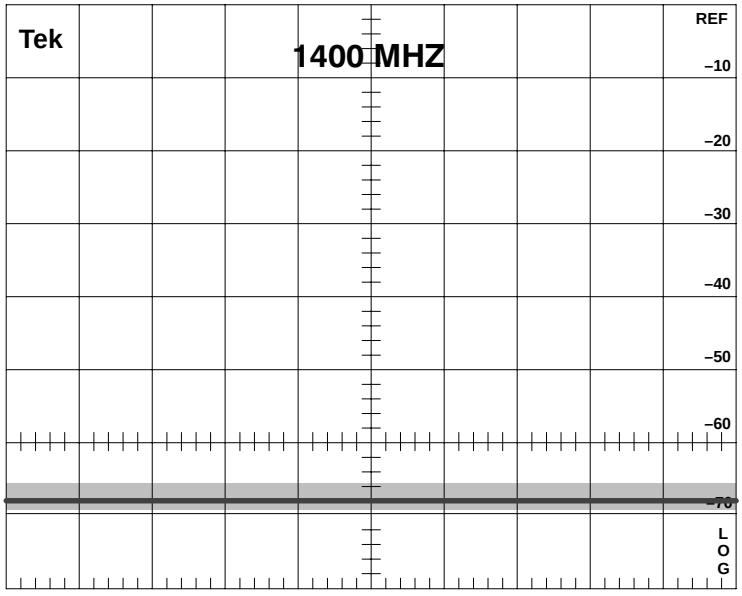


Figure 2-3: 1705A display when powered up in L–BAND and FULL SPAN; CENTER FREQUENCY set to approximately mid range

Measurement Graticule

The 1705A is equipped with an internal graticule crt. The graticule has an 8 X 10 division scale that is lighted. Scale brilliance is controlled by the front-panel SCALE control. Figure 2-4 shows the 1705A graticule. Refer to this figure and subsequent figures when reading the following discussion of the graticule.

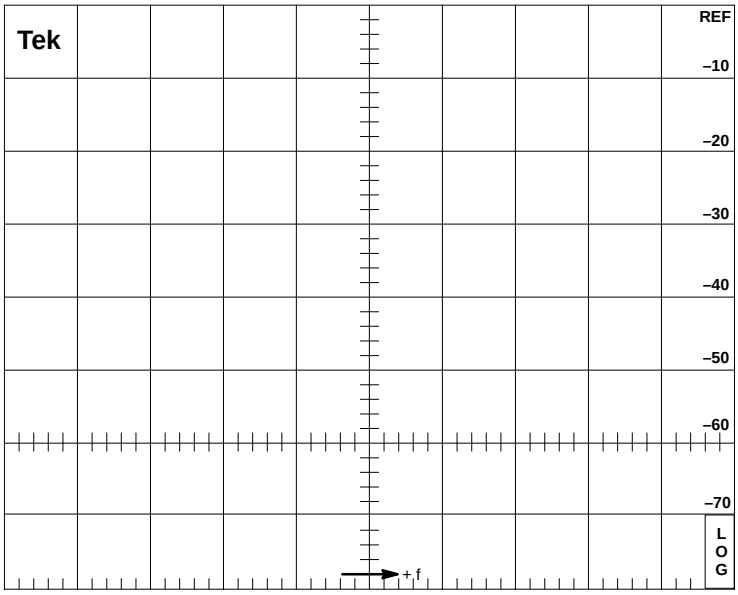


Figure 2-4: 1705A graticule scale

Vertical Scales

The vertical scale is eight divisions in height. The center vertical scale is broken into five equal minor divisions per major division. Note that the 0 dB reference is at the top of the graticule and that 80 dB (maximum division) is at the bottom of the graticule. There are two gain selections: normal gain (10 dB/div) and high gain (2 dB/div). In normal gain mode, major divisions are 10 dB, which makes each minor division 2 dB. When the GAIN front-panel push button is held, high gain is selected, and major divisions are approximately 2 dB, which makes minor divisions about 0.4 dB each.

Since dB is a dimensionless ratio, and there are several scale variations, it is essential that there be some discussion of the various scales. The unit of measure described as dB (decibel) is 10 LOG P1/P2. If there is a specific scale defined (m, k, w, p, etc.), there is a specific reference point established. The 1705A has input specifications in dBm, which means that they are referenced to 1 mW (milliwatt). Therefore, –30 dBm is 30 dB below 1 mW. Table 2–1 is a handy reference table for dB and dBm. Table 2–2 provides a reference for conversion from dBm to μv.

Table 2–1: dB Reference

Reading in dB	Voltage Ratio	Power Ratio	Reading in dB	Voltage Ratio	Power Ratio
0.0	1.000	1.000	25.0	17.783	316.228
0.1	1.012	1.023	26.0	19.953	398.107
0.2	1.023	1.047	27.0	22.387	501.187
0.3	1.035	1.072	28.0	25.119	630.957
0.4	1.047	1.096	29.0	28.184	794.328
0.5	1.059	1.122	30.0	31.623	1000.000
0.6	1.072	1.148	31.0	35.481	1258.925
0.7	1.084	1.175	32.0	39.811	1584.893
0.8	1.096	1.202	33.0	44.668	1995.262
0.9	1.109	1.230	34.0	50.119	2511.886
1.0	1.122	1.259	35.0	56.234	3162.278
1.5	1.189	1.413	36.0	63.096	3981.072
2.0	1.259	1.585	37.0	70.795	5011.872
2.5	1.334	1.778	38.0	79.443	6309.573
3.0	1.413	1.995	39.0	89.125	7943.282
4.0	1.585	2.512	40.0	100.000	10000.000
5.0	1.778	3.162	41.0	112.202	12589.254
6.0	1.995	3.981	42.0	125.893	15848.932
7.0	2.239	5.012	43.0	141.254	19952.623
8.0	2.512	6.310	44.0	158.489	25118.864
9.0	2.818	7.943	45.0	177.828	31622.777
10.0	3.162	10.000	46.0	199.526	39810.717
11.0	3.548	12.589	47.0	223.872	50118.723
12.0	3.981	15.849	48.0	251.189	63095.734
13.0	4.467	19.953	49.0	281.838	79432.023
14.0	5.012	25.119	50.0	316.228	100000.000
15.0	5.623	31.623	51.0	354.813	125892.541
16.0	6.310	39.811	52.0	398.107	158489.319
17.0	7.079	50.119	53.0	446.684	199526.231
18.0	7.943	63.096	54.0	501.187	251188.643
19.0	8.913	79.433	55.0	562.341	316227.766
20.0	10.000	100.000	56.0	630.957	398107.171
21.0	11.220	125.893	57.0	707.946	501187.234
22.0	12.589	158.489	58.0	794.328	630957.344
23.0	14.125	199.526	59.0	891.251	794328.235
24.0	15.849	251.189	60.0	1000.00	1000000.000

Table 2–2: dBm to μv Conversion

Reading in dBm	μv (75Ω)	μv (50Ω)	Reading in dBm	μv (75Ω)	μv (50Ω)
−30	8660	7071	−105	1.540	1.257
−35	4870	3976	−110	0.866	0.707
−40	2739	2236	−115	0.487	0.398
−45	1540	1257	−120	0.274	0.224
−50	866	707	−125	0.154	0.126
−55	487	398	−130	0.087	0.071
−60	274	224	−135	0.049	0.040
−65	154	126	−140	0.027	0.022
−70	87	71	−145	0.015	0.013
−75	49	40	−150	0.009	0.007
−80	27	22	−155	0.005	0.004
−85	15	13	−160	0.003	0.002
−90	9	7	−165	0.002	0.001
−95	5	4	−170	0.001	0.001
−100	3	2	−175	0.000	0.000

Horizontal Scales

The horizontal graticule scales are divided into ten major divisions, which are further divided into five minor divisions each. The horizontal scale corresponds to frequency, with the lowest frequency to the left. Note the arrow in Figure 2-4 that signifies that the frequency ascends toward the right. Both the –60 and –80 dB lines are subdivided with minor division marks. Traditionally, many spectrum analyzer measurements and specifications are between 6 and 60 dB.

The available sweep for the 1705A is 12 divisions long, which means that not all of the frequencies that it is capable of displaying can be displayed simultaneously. Figure 2-5 compares the sweep length to the graticule. It shows the usable areas of the sweep, as well as the minimum and maximum frequencies of the two bands.

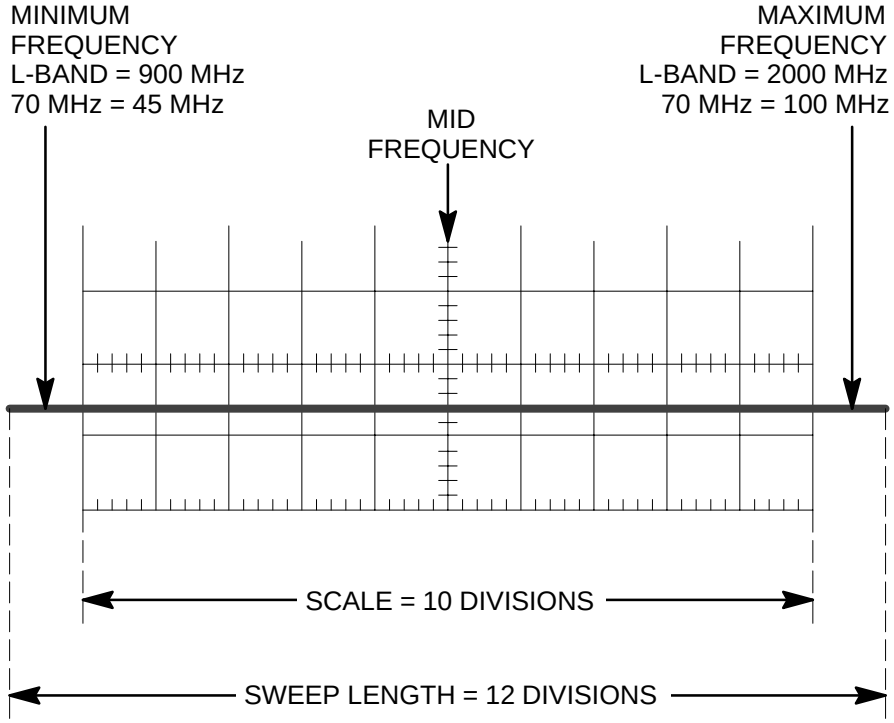


Figure 2-5: Relationship of sweep to graticule showing minimum and maximum frequencies when CENTER FREQUENCY is set to mid band

Figure 2-6 shows frequencies associated with the graticule lines in FULL SPAN/DIV when the CENTER FREQUENCY control is set to 1400 (for L–Band) or 70 MHz (for the 70 MHz). Note also that the HORIZONTAL POSITION control affects the frequency-to-graticule scale resolution. Determining where the HORIZONTAL POSITION control is set can easily be determined using one of the magnified SPAN/DIV settings and the readout cursor.

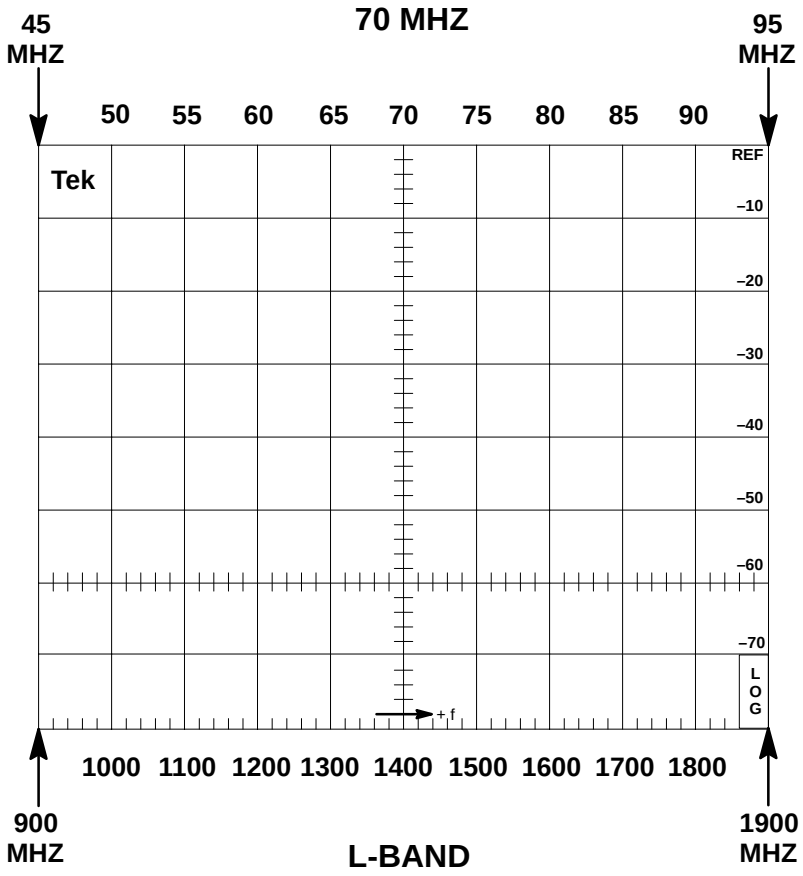


Figure 2-6: Frequency relationship to horizontal graticule scale; center frequency corresponds to the center of the horizontal scale

Center Frequency Readout

The 1705A is equipped with alphanumeric readout for the CENTER FREQUENCY. This readout works in conjunction with a cursor. In FULL SPAN/DIV, the cursor is actually a bright-up zone on the trace. See Figure 2-7. Actual position of the readout on the crt can be positioned to a location where it will not interfere with the measurements being made.

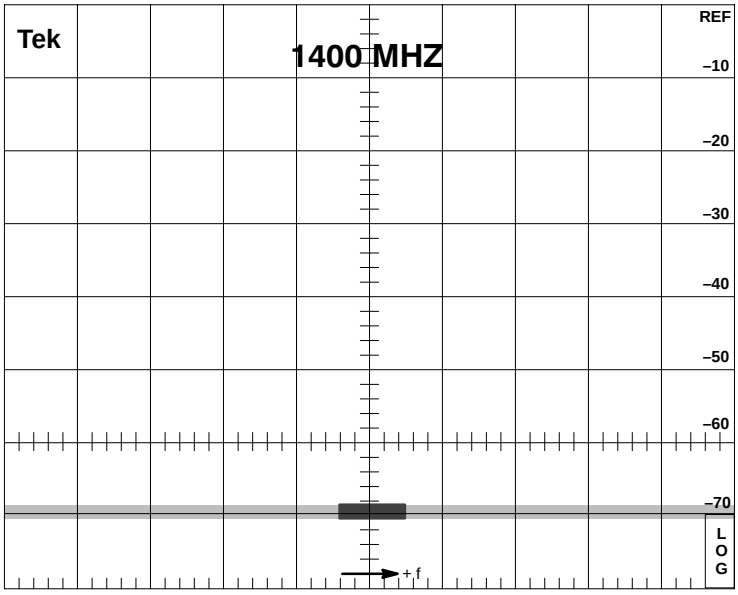


Figure 2-7: Center frequency cursor and readout for the L–Band with FULL SPAN/DIV

In the magnified, or decreased, SPAN/DIV settings the cursor is an inverted pyramid (caret) that is directly over the part of the sweep that corresponds to the setting of the front-panel CENTER FREQUENCY control. See Figure 2-8. Horizontal positioning affects the position of the cursor and the associated alphanumeric readout, which is directly above the cursor. The displayed location of the CENTER FREQUENCY can be displaced by up to 2 divisions from graticule center depending on the setting of the control. See Figure 2-9.

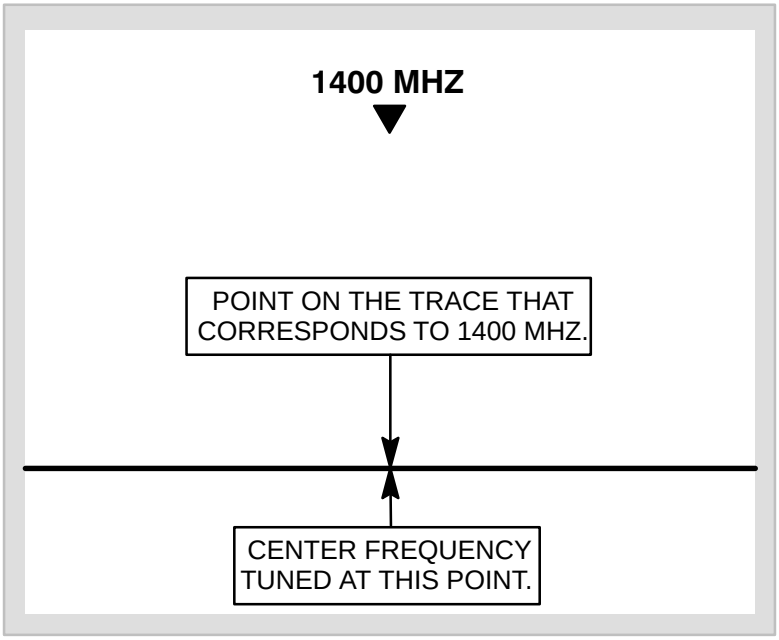


Figure 2-8: 1705A crt with the SCALE turned down to show the relationship between the alphanumeric readout and the front-panel CENTER FREQUENCY tuning

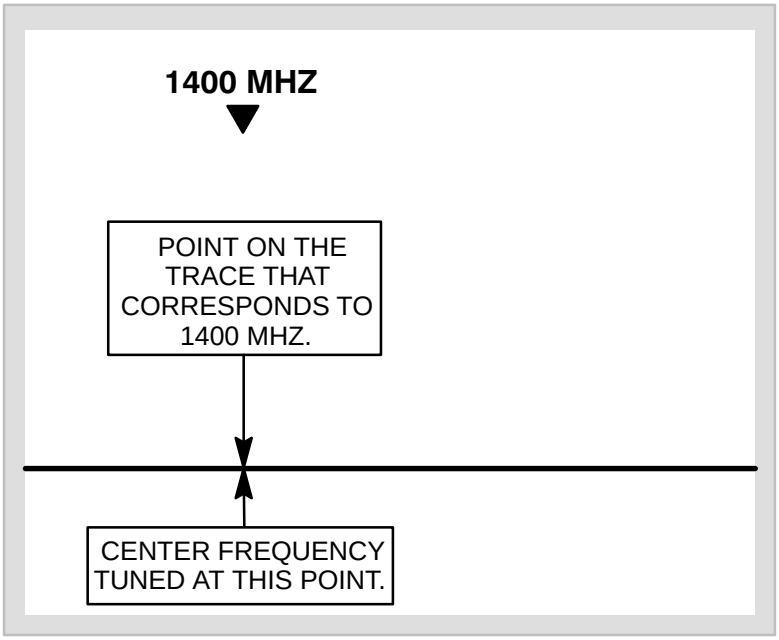


Figure 2-9: The setting of the HORIZONTAL POSITION control can displace the location of the displayed center frequency

Customizing Frequency Readout

The type and location of the readout for the TEKTRONIX 1705A Spectrum Monitor can be changed from the front panel. The options available are: 1. The choice of having readout or turning it off. 2. The position on the crt where the readout appears. 3. A customized readout that displays the satellite transponder frequency rather than the L–Band tuner frequency.

The auxiliary setup menu used to make these selections is brought up to the crt when both ←SPAN/DIV→ buttons are pushed simultaneously. Figure 2-10 shows the selections that are available from the crt menus. Pushing the designated front-panel switch accomplishes the specified menu task. Note that the solid lines in Figure 2-10 denote how to work through the menus, while the dashed lines show how to exit from the menu and return to the normal monitor display.

The readout control options share a software routine with the operator diagnostics (Test) in the Main menu. The Main menu, along with the Readout Mode and Test menus, use a cursor and select method of operation. With these menus the selection is marked by moving the cursor, up with the SPAN→ push button or down with the ←SPAN push button, and pushing the INPUT button to complete the selection.

The Readout Position and Offset Adjust menus assign other functions to some of the front-panel push-button switches. For these specific functions the names in brackets correspond to front-panel switch names.

Turning On or Off Readout

The selections for disabling/enabling the crt readout are contained in the Readout Mode menu. Readout is turned off by setting the displayed cursor (>) next to the OFF selection and pushing the INPUT push button. Readout is turned on by moving the displayed cursor next to ON and pushing the INPUT push button. Once the function is selected pushing the INPUT push button a second time returns to normal monitor operation.

Changing Readout Position

Pushing the RESOLUTION, VIDEO, ←SPAN, and SPAN→ push buttons after the Readout Position auxiliary menu has been displayed moves the readout around the crt area. Readout can be anywhere within the crt area. See Figure 2-10 for the function of the push-button switches in the Readout Position menu.

Pushing any one of the four (newly assigned positioning) buttons returns to the normal display, with readout. At this point, pushing RESOLUTION, VIDEO, or either of the SPAN buttons moves the readout. Push buttons can be held down for smooth advancement, or pushed for each small movement increment. Once the readout location is satisfactory, pushing the INPUT button saves the position and returns to the Main menu. When the INPUT push button is pushed again, the monitor returns to normal operation.

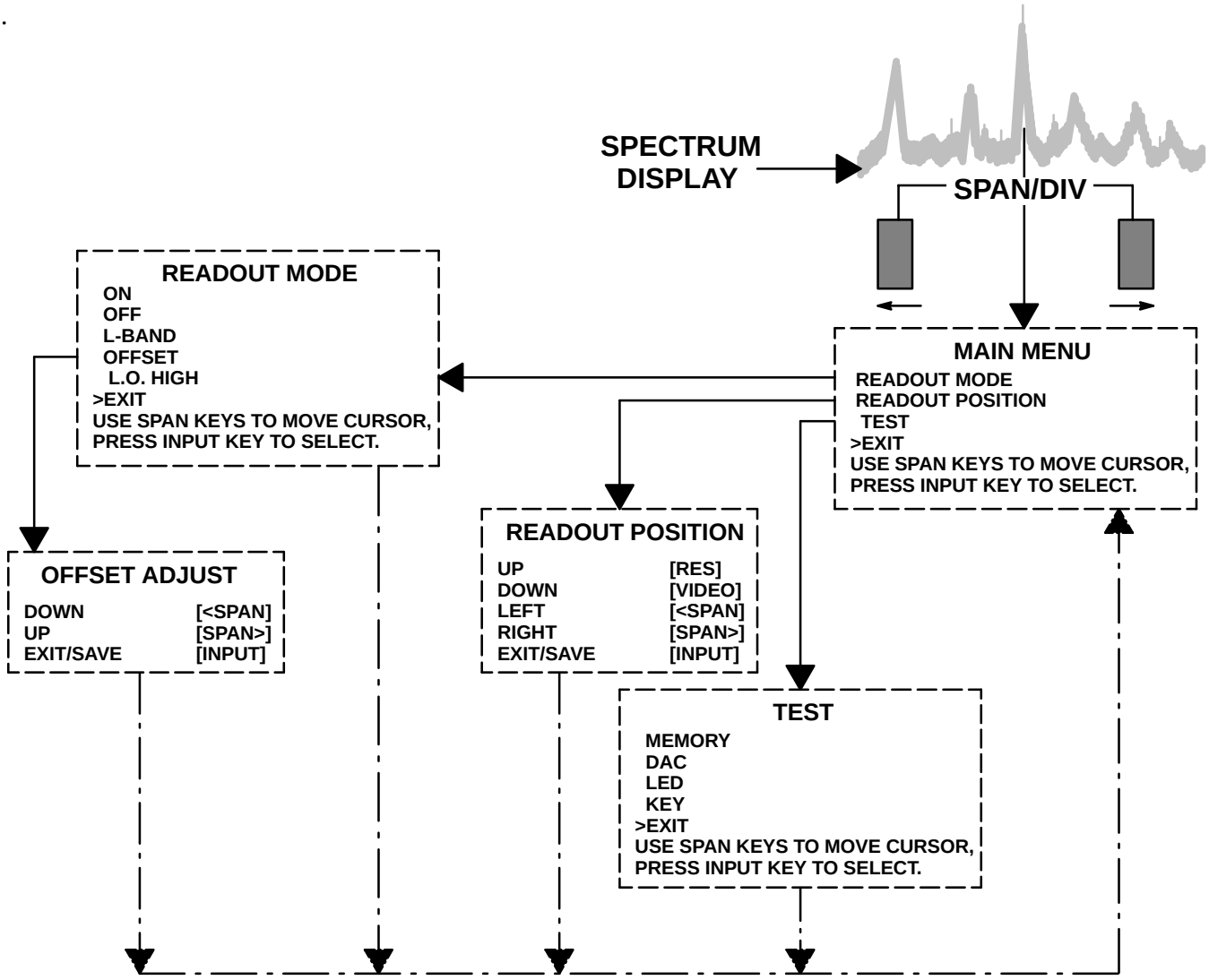


Figure 2-10: Using the 1705A menus. Main menu is entered from the spectrum display by pressing both SPAN/DIV buttons simultaneously

***NOTE**. The 1705A must be returned to the normal operating routine before the front-panel push-button switches perform the label functions. Push the INPUT push button as many times as required to bring up the spectrum analyzer display.*

Changing Readout Frequency

The 1705A readout normally displays the frequency of the L–Band or 70 MHz input signal. The L–Band input is a downconverted signal between 900 to 2000 MHz, which by itself does not return meaningful information. Because of this it may be easier to display the readout that corresponds to the actual satellite

transponder frequency. Changing the readout to reflect these frequencies is easily accomplished by selecting the Readout Mode from the Main menu and Offset from the Readout Mode menu, which brings up the Offset Adjust menu.

Selecting Offset allows the readout units to be changed to GHz and the frequency set to a value between 0.9 and 20. Push buttons can be held down for smooth advancement or pushed for each small movement increment. Maximum and minimum readout can only be achieved with the CENTER FREQUENCY at the appropriate extreme.

CENTER FREQUENCY control can change the range of readout (in L–Band) by 1.1 GHz for full end-to-end rotation. See Figure 2-11 for an example of the display during Offset Adjust.

Figure 2-11: An example of the readout displayed while satellite frequency is being set. The Δ is the same for both increasing and decreasing frequency

When Offset is selected from the Readout Mode an additional auxiliary menu appears on screen for several seconds before it extinguishes and the spectrum analyzer display with GHz readout appears. Refer to Figure 2-10. Pushing the SPAN→ push button causes the numerical part of the readout to scale upward toward 20. Pushing the ←SPAN push button scales down the numerical readout toward 0.9.

Once the readout has been changed to GHz, the frequency display can be altered to show frequencies ascending or descending from left to right. When L.O. High is selected turning the front-panel CENTER FREQUENCY clockwise incre-

ments the frequency readout (low to high) and moves the brightened portion of the sweep from left to right. When L.O. Low is selected the readout decrements (high to low) and the brightened portion of the sweep moves from left to right, with clockwise rotation of the CENTER FREQUENCY.

When L–Band is selected from the Readout Mode menu, the Main menu returns and the readout is scaled in MHz. Changes of frequency readout are shown in ascending order when the front-panel CENTER FREQUENCY control is rotated clockwise.

Once the satellite frequency and L.O. have been set, pushing the INPUT push button saves the display and returns the Main menu. Pushing the INPUT push button again returns to normal monitor operation.

NOTE. *The 1705A must be returned to the normal operating routine before the front-panel push-button switches perform the label functions. Push the INPUT push-button as many times as required to bring up the spectrum analyzer display.*

Test Mode

The series of tests that can be made are documented in Section 6, Maintenance, under the sub-section heading of **"General Troubleshooting Techniques."**

Locating Ku–Band Satellites

The TEKTRONIX 1705A Spectrum Monitor is specifically designed to help the television news vehicle operator quickly and properly address a satellite. Even though the 1705A will be most often used for Ku–Band transmissions, it can be used with any satellite system that can be downconverted to its L–Band input frequencies.

The following operating procedure is typical and can be adjusted to fit particular vehicle and operator preferences.

Basic Operating Procedure

1. The expected true azimuth and elevation to the satellite from a specific location should be determined by calculation or reference to Table 2–3 for popular news satellites. Table 2–3 lists 21 Continental United States (CONUS) cities; the cities in the table are spotted around the country and can help to approximate (the location of a satellite) from any area of the 48 contiguous states.

2. Stabilize the vehicle in a location where there will be a clear path between the antenna and the satellite. The vehicle should be reasonably level to facilitate antenna and polarization adjustment.

3. Point the antenna in the expected direction of the satellite. Note that compass readings may not be accurate in the presence of vehicles or structures. Several readings, at nearby locations, should be taken to determine any unusual effects. Appropriate correction for magnetic variation must be made when a magnetic compass is used. The locating tables indicate true north.

4. If the antenna azimuth and elevation are remotely adjusted, the TEKTRONIX 1705A may be permanently connected to the splitter feeding the L–Band downlink signal from the outdoor Low Noise Block Converter (LNB) to the indoor receiver. If the antenna is to be adjusted manually, a portable ac or battery-powered 1705A may be connected directly to the LNB at the antenna, in which case the spectrum monitor can be used to power the LNB.

Table 2–3: Azimuth / Elevation Table for 21 CONUS Cities

CITY	SATCOM K2		G–STAR II		SBS–3	
	AZ	EL	AZ	EL	AZ	EL
Atlanta	175˚	50˚	214˚	45˚	199˚	49˚
Boston	195˚	40˚	225˚	31˚	214˚	36˚
Chicago	170˚	41˚	205˚	38˚	190˚	41˚
Dallas /Ft. Worth	150˚	47˚	192˚	53˚	172˚	51˚
Denver	145˚	38˚	180˚	44˚	165˚	43˚
Detroit	177˚	44˚	212˚	38˚	198˚	42˚
Houston	153˚	52˚	199˚	53˚	180˚	55˚
Las Vegas	131˚	35˚	163˚	47˚	148˚	43˚
Los Angeles	127˚	34˚	158˚	48˚	143˚	43˚
Miami	180˚	61˚	227˚	49˚	211˚	55˚
Minneapolis/St Paul	164˚	37˚	198˚	37˚	184˚	38˚
Nashville	170˚	48˚	209˚	44˚	193˚	47˚
New Orleans	162˚	54˚	208˚	51˚	190˚	55˚
New York	191˚	42˚	223˚	33˚	211˚	38˚
Philadelphia	189˚	43˚	222˚	34˚	210˚	39˚
Phoenix	132˚	39˚	168˚	51˚	150˚	47˚

Table 2–3: Azimuth / Elevation Table for 21 CONUS Cities (Cont.)

Salt Lake City	137˚	34˚	169˚	42˚	155˚	39˚
San Francisco	125˚	28˚	154˚	42˚	140˚	38˚
Seattle	131˚	22˚	158˚	32˚	146˚	29˚
St. Louis	166˚	44˚	204˚	42˚	188˚	45˚
Washington DC	186˚	45˚	221˚	36˚	216˚	38˚

5. If the antenna is pointed close to a satellite, one or both polarizations of the full satellite will appear on the screen because the 1705A Spectrum Monitor is a much more sensitive indicator than a receiver and picture monitor. Initially, there is no need to be concerned with antenna polarization or which satellite channels may be active.

6. If no satellite signal is observed, or the incorrect satellite is identified, sweep the antenna azimuth carefully around the expected satellite direction. If no satellite is found, return the azimuth to the expected direction and increase (or decrease) the elevation by about one degree and resweep the azimuth.

7. When a satellite signal has been observed on the 1705A display, it may be identified by the nature of the signals on the satellite. For example, wide bandwidth NBC television signals with multiple audio and data carriers on many transponders will identify Satcom K–2. Other satellites will have similar identifying characteristics. If the incorrect satellite has been selected, repoint the antenna to locate the desired satellite. Once any satellite is found and identified, a reference point is established and nearby satellites may be located by moving the antenna carefully in the proper direction.

8. Optimize the antenna by carefully adjusting azimuth and elevation while observing the signal strength on the 1705A Spectrum Monitor. At this time one or both satellite polarizations will be observed, but the received signal may not be a viewable picture for a picture monitor.

9. The polarization must be adjusted in a transmit/receive system by rotating the antenna feed to minimize the undesired, cross polarized signal.

WARNING. *This adjustment requires a spectrum monitor and should not be attempted using a receiver and picture monitor alone. Any mis-adjustment will put the transmit signal on the wrong satellite transponder and create interference with another user. Furthur access to the satellite may be denied!*

As the antenna feed is rotated, observe that there will be a sharp null of signals on one polarization or the other. Rotate the feed carefully to null the signals of the polarization that will not be used. Most news vehicle feed

systems are single polarization receive to avoid the possibility of nulling the wrong polarization. If the antenna is set up to receive more than one polarization, be sure that the feed polarization being observed is associated with the transponder that will be used for the transmission.

10. Before transmitting, the satellite operator will need to be contacted. The operator will want a transmit signal to be brought up to verify correct transponder, signal polarization, and to determine the correct operating power. If the antenna and transmitting system are correctly adjusted, this check will only take seconds. This check may be permitted earlier in the day, if time is available and the antenna or transmitter setting are not to be changed.

11. During transmit, the 1705A may be used to verify the presence of video, audio, and any communications signals at the 70 MHz output of the Video Exciter. This signal may be permanently connected to the 1705A, along with the L–Band receive connection, to allow front-panel selection. With either input, narrower spans may be selected to permit observing discrete signals.

12. Be sure that there is an agreed upon “good night” for the transmission. The carrier will not be watching your program content, and must know clearly when you are finished with the satellite. Unless there is a specific agreement, the carrier will expect a telephone call to know you are clear, and you will be charged.

Warning

The following servicing instructions are for use only by qualified personnel. To avoid personnel injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer to General Safety Summary and Service Safety Summary prior to performing any service.

Service Safety Summary

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

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

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

Use Caution When Servicing the CRT. To avoid electric shock or injury, use extreme caution when handling the CRT. Only qualified personnel familiar with CRT servicing procedures and precautions should remove or install the CRT.

CRTs retain hazardous voltages for long periods of time after power is turned off. Before attempting any servicing, discharge the CRT by shorting the anode to chassis ground. When discharging the CRT, connect the discharge path to ground and then the anode. Rough handling may cause the CRT to implode. Do not nick or scratch the glass or subject it to undue pressure when removing or installing it. When handling the CRT, wear safety goggles and heavy gloves for protection.

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.

X-Radiation. To avoid x-radiation exposure, do not modify or otherwise alter the high-voltage circuitry or the CRT enclosure. X-ray emissions generated within this product have been sufficiently shielded.

Installation

Section 3
Installation

Packaging

The shipping carton and pads provide protection for the instrument during transit, and should be retained in case subsequent shipment becomes necessary. Repackaging instructions can be found in Section 6 (Maintenance) of this manual.

Electrical Installation

Power Source

This instrument is intended to operate from a single-phase power source having one of its current-carrying conductors at or near earth-ground (the neutral conductor). Only the line conductor is fused for over-current protection. Systems that have both current-carrying conductors live with respect to ground (such as phase-to-phase in multiphase systems) are not recommended as power sources.

Mains Frequency and Voltage Ranges

The 1705A operates over a frequency range of 48 to 66 Hz, at any mains voltage between 90 Vac and 250 Vac. These newer versions of the 1705A instruments *do not* require any internal changes to select their operating voltage range.

+18 Volts For Block Down Converter

The slide switch located on the 1705A rear panel, between the input connectors, enables/disables the +18 V supply on the L–BAND connector. See Figure 3-1. This supply, when switched on, is intended to provide power for a Block Down Converter (LNB), through the L–BAND INPUT connector.

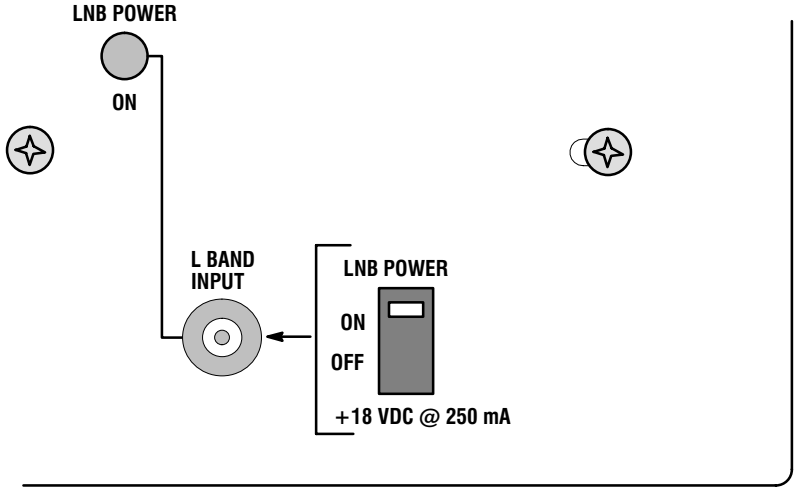


Figure 3-1: L–BAND INPUT connector and controls

Under extreme LNB load conditions it is possible for the +18 V supply to load the main 1705A power supply enough to change the low line regulation. Under these circumstances the power supply may go out of regulation when mains voltage falls below 100 V.

Operating Options

The 1705A provides an internal jumper setting to enable or disable the graticule lights. See Table 3–1.

Table 3–1: Internal Jumper Selection

Jumper	Name	Position	Function
A3A1 J100	Light Enable	1–2	Graticule lights enabled (factory set)
		2–3	Graticule lights disabled

Mechanical Installation

Cabinet Options

NOTE. *Cabinet drawings are provided for installation information only, and are not to scale. All dimensions are in inches.*

All qualification testing for the 1705A was performed with a 1700F00 cabinet installed. See Figure 3-2. To guarantee compliance with specifications, the instrument must be operated in a cabinet. The portable cabinet, 1700F02, has a handle, four feet, a flip-up stand, and has different hole sizes and spacing than the 1700F00. See Figure 3-3.

All of the 1700-Series metal cabinets, available from Tektronix as Optional Accessories, provide the proper electrical environment for the instrument, supply adequate shielding, minimize handling damage, and reduce dust accumulation within the instrument.

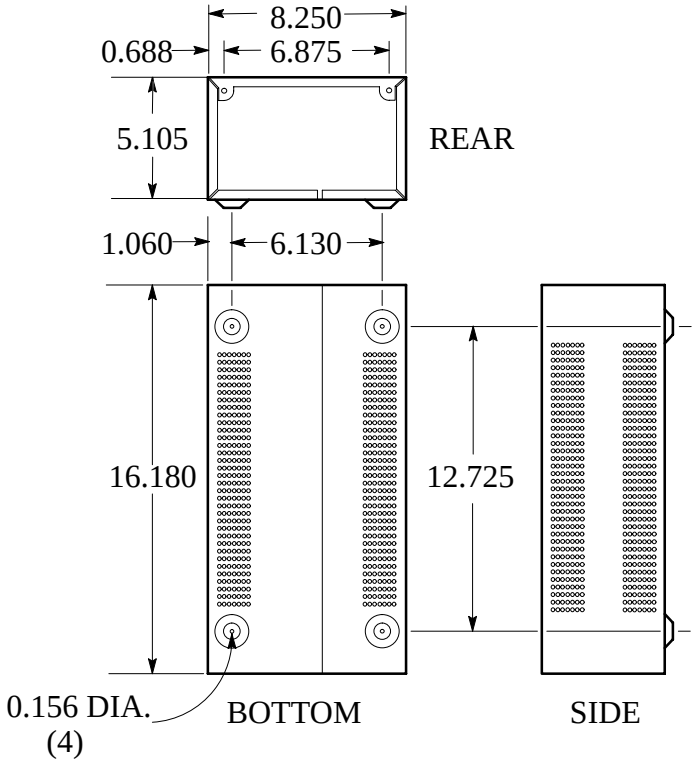


Figure 3-2: Dimensions of the 1700F00 plain cabinet

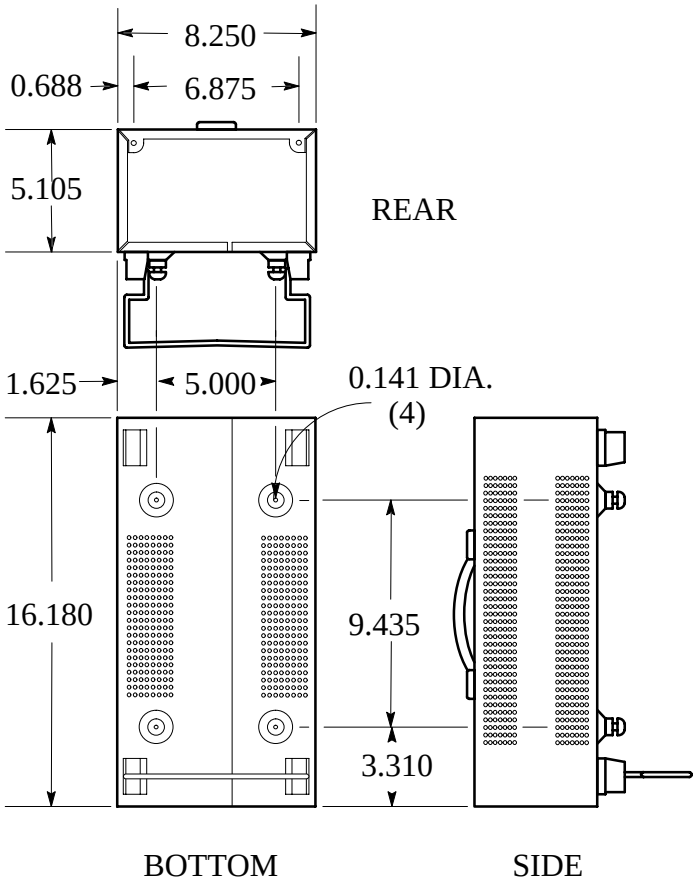


Figure 3-3: 1700F02 portable cabinet

Cabinetizing

WARNING. *Do not attempt to carry a cabinetized instrument without installing the mounting screws. There is nothing to hold the instrument in the cabinet if it is tipped forward.*

The instrument is secured to the cabinet by two 6–32 Pozidrive® screws, located in the upper corners of the rear-panel. See Figure 3-4.

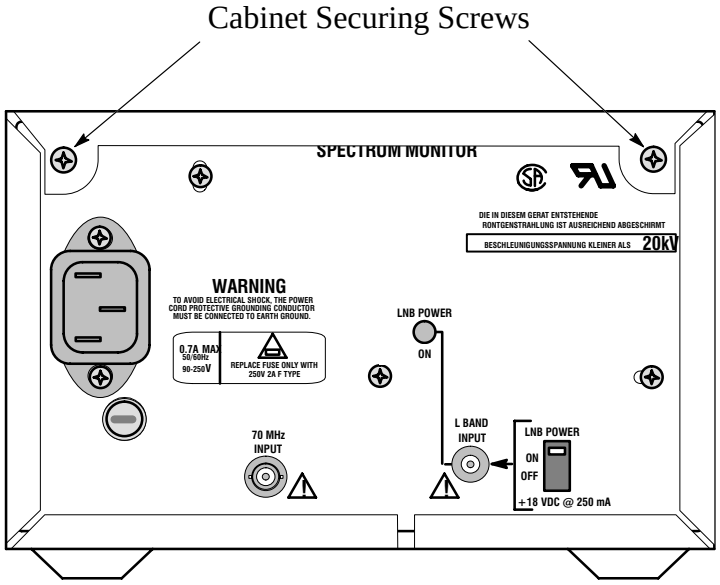


Figure 3-4: Cabinet securing screws

Rack Mounting

The optional 1700F05 Side-by-Side Rack Adapter, shown in Figure 3-5, includes two attached cabinets, and can be used to mount the 1705A in a standard 19-inch rack with another half-rack-sized instrument.

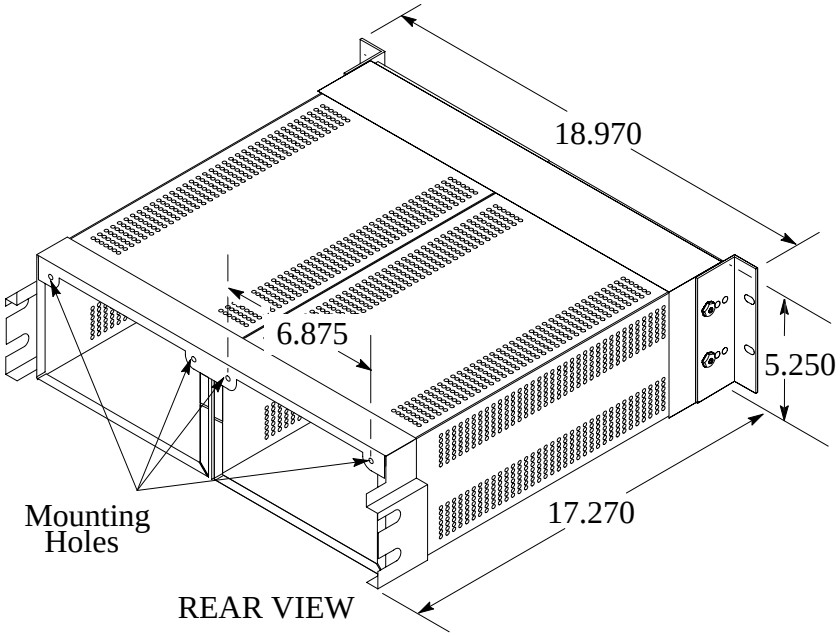


Figure 3-5: The 1700F05 side-by-side rack adapter

The rack adapter is adjustable, so the 1705A can be more closely aligned with other equipment in the rack (see Figure 3-5).

If only one section of the rack adapter is used, either a blank panel or utility drawer can occupy the other section. A 1700F06 Blank Panel can be inserted in the unused section to conveniently cover the hole. See Figure 3-6. A 1700F07 Utility Drawer contains over 1/3 cubic foot of storage space. See Figure 3-7. The rack adapter, blank panel, and utility drawer are available through your local Tektronix field office or representative.

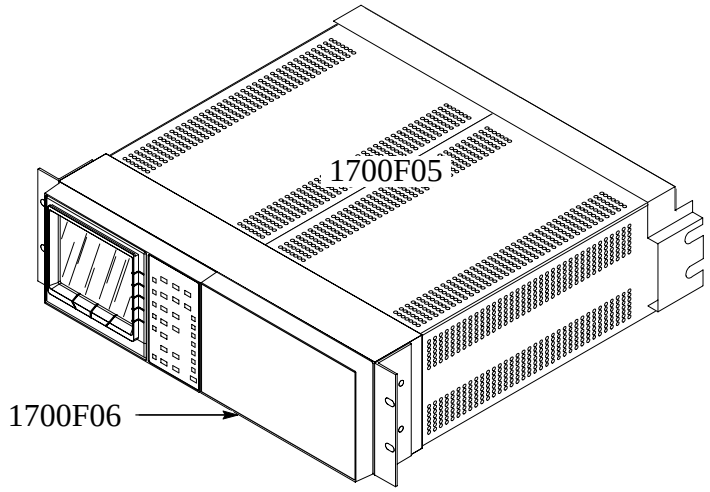


Figure 3-6: With a blank front panel (1700F06)

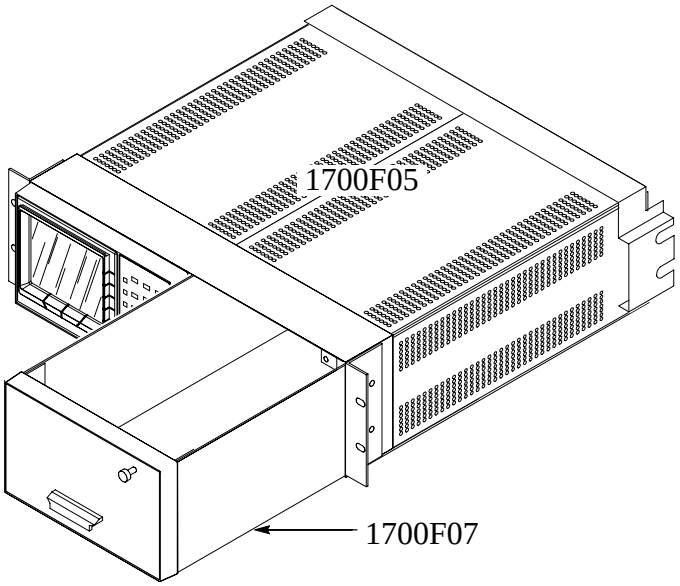


Figure 3-7: With a 1700F07 utility drawer

Custom Installation

For applications such as consoles, shown in Figure 3-8, the instrument can be mounted with front molding flush or protruding from the console. In both cases, allow approximately 3 inches of rear clearance for bnc and power cord connections.

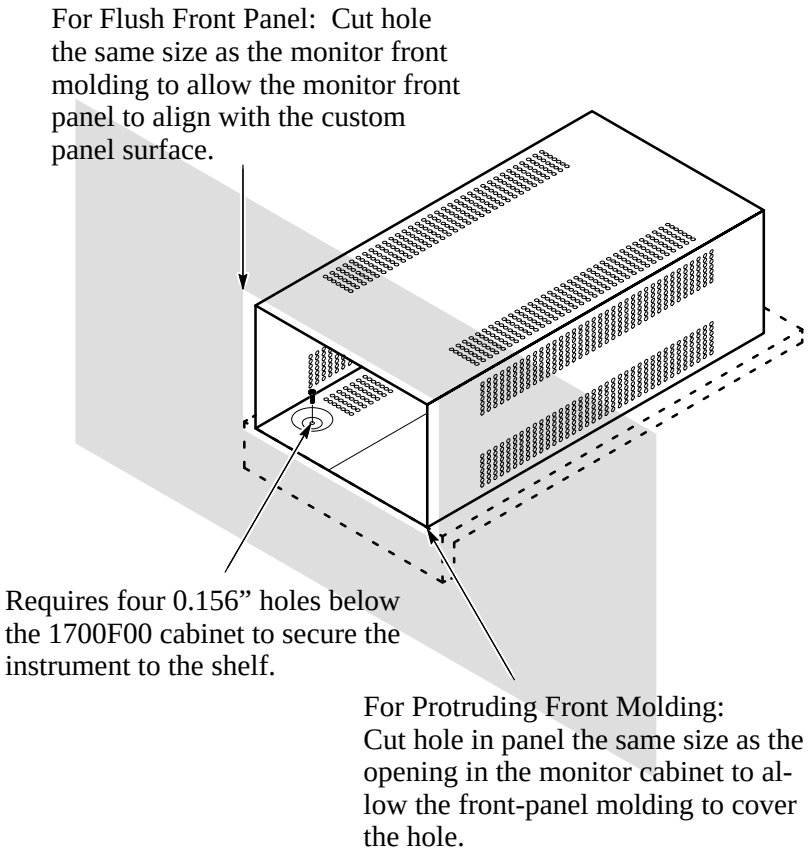


Figure 3-8: Considerations for custom installation of an instrument

To mount the 1705A safely, attach it to a shelf strong enough to hold its weight, using the four 0.156-inch diameter holes in the bottom of the 1700F00 cabinet. See Figure 3-8.

Theory of Operation

Section 4
Theory of Operation

The material in this section is subdivided into a general description (which is supported by the main block diagram) and detailed circuit descriptions that use the schematic diagrams as illustrations. A thorough understanding of the instrument starts with knowing how the major circuit blocks fit together, followed by an understanding of the individual circuit's functions. These discussions of the 1705A Spectrum Monitor begin with a brief, fundamental overview, then proceed on to the block diagram, and then into individual circuit descriptions.

Overview

The 1705A Spectrum Monitor is a specialized spectrum analyzer, designed to assist in locating satellites, and to help optimize communication with the satellite. It is capable of displaying the spectral plot of signals in the L–Band (900 – 1750 MHz), and the 45 – 100 MHz range on the crt. An alphanumeric frequency readout displays the frequency at the center of the intensified zone, in FULL SPAN/DIV, on the crt. In the magnified SPAN/DIV ranges, the frequency readout is the approximate frequency under the readout marker.

Front-panel mode switching is accomplished by push-button switches whose status is constantly polled by a microprocessor. In turn, the microprocessor controls switching functions and circuit gains so that the instrument can be used to locate or monitor a specific set of frequencies.

The Low Voltage Power Supply is a high-efficiency switching type. The High Voltage Power Supply provides 13 kV acceleration potential.

Block Diagram

RF Input Circuits (Diagram 1)

The 1705A has two separate signal inputs, L–Band (Sweep range 900 – 2000 MHz, calibrated range 900 – 1750 MHz) and 70 MHz (45 – 100 MHz). Selection of the frequency band to be displayed is accomplished by pushing a front-panel, momentary, push-button switch, which is monitored and acted upon by the microprocessor. When one input is selected, the other has its supply voltage interrupted.

The L–Band Tuner is self contained and consists of an RF Amplifier, Voltage Controlled Oscillator, and a mixer stage. The gain, at the 1st IF frequency of 489.9 MHz, is ≈10 dB. Both RF and IF gain can be adjusted. Its VCO is

driven with a pre-corrected sweep ramp. Pre-correction is required to make up for the inherent VCO nonlinearity.

A +18 V supply is connected to the L–BAND input connector so that it can be used to power a Block Down Converter (usually at the antenna). The supply can be switched on and off by a recessed slide switch on the rear panel. The voltage is generated on a separate circuit board that is mounted inside the 1705A rear panel.

The L–Band Tuner output passes through a 1st IF filter which contains a notch at 590 MHz to eliminate a spurious mixing product. It is then mixed with an L.O. of 359.4 MHz to produce a 2nd IF output at 130.5 MHz. This output is amplified by an 8 dB gain MMIC and is combined with the 70 MHz tuner output.

The 70 MHz input consists of a 7-pole, 120 MHz, bandwidth low-pass filter; a VCO (which, like the L–Band VCO, is driven by a pre-corrected sweep ramp); a mixer; and a 20 dB amplifier. The 70 MHz input circuits also output a 136 MHz 1st IF with a gain of 0 dB ±3 dB.

IF Amplifier Circuits (Diagram 2)

The 136 MHz 2nd IF is converted a third time to produce a 3rd IF frequency of 10.7 MHz. The crystal-controlled Local Oscillator operates at 119.8 MHz to provide the 10.7 conversion. The oscillator's output is tripled to 359.4 MHz to provide the 130.5 MHz conversion for the L–Band Tuner output. A three-section helical resonator is used for the 130.5 MHz IF filter.

An additional band-pass crystal filter, centered at 10.7 kHz, with a 10 kHz bandwidth, can be added by front-panel selection, to provide narrow resolution. The 300 kHz bandwidth filter is always in the circuit regardless of the front-panel RESOLUTION selection. Maximum bandwidth of the 1705A is 300 kHz.

The resolution filters drive a FSK receiver IC. Only the meter output of this IC is used to provide a voltage proportional to the log of the input power. This drives a selectable video filter and the Vertical Deflection Amplifier.

Sweep Generator Circuits (Diagram 3)

The output of the Ramp Generator drives the Horizontal Deflection Amplifier (Diagram 4), Gain Control (SPAN/DIV), and the Marker Generator. The Ramp Generator free runs with its repetition rate controlled by the front-panel SWEEP SPEED control. The amplitude of the ramp remains constant.

The Gain Control, which provides the ramp that is eventually used to drive the VCOs, consists of an operational amplifier with selectable input resistances. The resistance selected is dependent upon the SPAN/DIV setting selected from the front panel. The output ramp from the Gain Control circuit drives the Sweep Shapers.

The CENTER FREQUENCY control provides an offset to the sweep ramps in all SPAN/DIV settings except FULL. In the FULL SPAN/DIV setting, a

bright-up signal, centered around the center frequency, is generated for the Z–Axis Control circuit by the Marker Generator.

The Z–Axis Control circuit provides the driving signal for the Z–Axis Amplifier (Diagram 8). Included in these unblanking signals are the sweep unblanking, readout unblanking, and the intensified marker. This circuit controls both display and readout intensity and adding the intensified marker in FULL SPAN/DIV.

Deflection Amplifiers (Diagram 4)

The output signal from the Log Detector (Diagram 2) is buffered and switched in and out, for time sharing with the readout signal, prior to driving the Vertical Output Amplifier. The output amplifier normalizes gain and matches the crt deflection plate input impedance.

The ramp signal from the Sweep Generator (Diagram 3) is buffered, inverted, and has its gain set prior to being used to drive the Horizontal Output Amplifier. Like the Vertical Output Amplifier, the readout signal is time shared with active signal. The horizontal amplifier has approximately three times the gain of the vertical amplifier to meet the crt gain requirements.

Microprocessor (Diagram 5)

The microprocessor, along with the EPROM that contains the measurement and diagnostic routines, is the controlling element of the 1705A. A Non-Volatile Random Access Memory (NVRAM) provides a method to store the current front-panel switch settings, at power down, so that the 1705A can come back up with the last front-panel setup.

CENTER FREQUENCY readout data is converted to digital data by an Analog-to-Digital Converter and then input into the microprocessor. Readout data and the Readout Enable (/RO–EN) are output from the microprocessor. The readout data is converted back to an analog signal by the Digital-to-Analog Converter.

Front Panel (Diagram 6)

All of the switching and external control for the 1705A is shown on this diagram. Control voltages are limited to 11.8 V or less. All switching is done in conjunction with the microprocessor (Diagram 5). Indicator lights, that are controlled by the microprocessor, are also included on this diagram.

The +18 V supply that is designed to drive an external Block Down Converter is also shown on this schematic. The On/Off switch for the +18 V supply is located on the 1705A rear panel.

Low Voltage Power Supply (Diagram 7)

The Low Voltage Power Supply converts the mains ac line voltage to 4 dc output voltages (–15 V, +5 V, +15 V, and +40 V). The +40 V is used to power the Vertical Deflection Amplifier (Diagram 4). The + and –15 V supplies are post

regulated to become the + and –11.8 V supplies on the Main circuit board (regulator circuits are on Diagram 4).

The Power Supply schematic also contains the 11.8 V Post Regulators, whose outputs are used by most of the circuits on the Main circuit board. The Post Regulators do not appear on the block diagram.

High Voltage (Diagram 8)

The unblanking signal from the Z–Axis Control drives the Z–Axis Amplifier. The Focus Amplifier, controlled by the front-panel control, provides a voltage to the crt focus ring. The crt is of the Post Acceleration type, which requires a relatively high potential difference between the cathode and post anode. The boost in 2nd anode voltage is provided by an encapsulated 4X Multiplier.

The High Voltage supply also provides the +100 V, required by the Horizontal Deflection Amplifier (Diagram 4), to drive the crt horizontal deflection plates.

RF Input Diagram 1

This diagram has both RF inputs for the Spectrum Monitor. The L–Band and 70 MHz inputs are both off-board subassemblies. The 70 MHz input consists of discrete components on a small circuit board that is totally shielded. The L–Band Tuner is also self contained, totally shielded, and contains no user-serviceable parts.

L–Band Input

The L–Band signal (900 – 1750 MHz) is input directly to a tuner subassembly that contains the Tuned RF Amplifier, mixer, and Voltage Controlled Oscillator (VCO) required to produce the first Intermediate Frequency (IF) of 489.9 MHz. The 489.9 MHz 1st IF signal is cabled to the Main board.

The tuner subassembly is powered by the +11.8 volts, which is controlled by the Input Switching. (The +11.8 V to the L–Band Tuner is disabled when the 70 MHz input is selected.) In addition, the Block Down Converter +18 V supply (from Diagram 5) is fed to the tuner for output on its F-type connector. A recessed, rear-panel slide switch connects the +18 V supply to the L–Band Tuner. A pre-corrected ramp (from Diagram 3) to drive the VCO is also supplied to the tuner subassembly.

The /LBAND control line, from the microprocessor, is low when the L–Band is selected. When /LBAND goes high (indicating that the 70 MHz input has been selected) Q31 turns on and Q30 turns off, causing Q32 to turn off and disconnect the +11.8 V from the tuner.

70 MHz Input

The input to the 70 MHz tuner has a 75Ω, 10 dB pad, which allows it to accept signals up to –20 dBm. The 70 MHz signal (45 – 100 MHz) is preconditioned

by a 7-pole, 120 MHz, low-pass filter that rejects out-of-band frequencies. The Mixer, U190, with input frequencies of 45 – 100 MHz, and the Local Oscillator operating at [F_i + 130 MHz] provide a 130 MHz 1st IF. The signal output from the Mixer is terminated by a 75Ω, 3 dB pad made up of R291, R292, and R293. The IF signal is ac coupled into the amplifier, U296, with a gain of 20 dB. R396, R391, and R392 form a 6 dB pad that outputs the 136 MHz 1st IF signal that approximates the L–Band output level for inputs 10 dB higher.

L393, L391, L389, C292, and C290 form a low-pass filter that is peaked at the 1st IF frequency (136 MHz) and approximately 20 dB down at the Local Oscillator frequency. Harmonics of the Local Oscillator frequency are at least 30 dB down.

70 MHz Local Oscillator

The Local Oscillator (LO) is a Voltage Controlled Oscillator (VCO) whose output frequency range is 175 MHz to 230 MHz. The oscillator is a differential pair (pins 7–8 and 5–11) contained in U283. The oscillator employs positive feedback through L284 to the base tank circuit (L280 and C281). CR280 is a varactor whose capacitance is determined by the instantaneous level of the pre-corrected ramp from the Sweep Generator (Diagram 3). The center tap of T187 is the LO output providing an amplitude of approximately +7 dBm.

Q20 and Q21 form a switching circuit that turns off the VCO when the L–Band input is selected. When /LBAND goes low, Q21 is shut off, causing Q20 to unsaturate and disconnect the –11.8 V from the VCO.

The 70 MHz tuner assembly (A5) is contained in a rigidly mounted shield. Control signals and the –11.8 V supply are brought into this shielded tuner through feedthrough capacitors.

IF Amplifier Diagram 2

This diagram shows the L–Band and 70 MHz inputs to the various conversion stages. It also shows the Local Oscillator/Tripler circuitry, Mixers, Amplifiers, IF filters, and Log Detector output.

2nd Local Oscillator

Both Local Oscillator (LO) signals are derived from a single crystal, whose operating frequency is 119.8 MHz. The crystal is a 5th overtone type in a Butler oscillator configuration using Q13. Q11 buffers the oscillator and drives a 3 dB isolation pad on the LO input of Double Balanced Mixer (DBM) U25. Q12 is a cascode stage driving a tank circuit at the 3rd harmonic (359.4 MHz). The tank circuit is tapped down to drive a three-section helical resonator, FL1, tuned to 359.4 MHz. The output from FL1 is coupled into DBM U28.

DBM U28 is driven by the L–Band Tuner output at 489.9 MHz through a LPF/Notch filter consisting of L11, L12, and series resonant circuit C69 and W13. W13 is a shorted length of 50Ω coax forming a high-Q inductor. This provides a narrow notch at 590 MHz to eliminate a spurious output from the L–Band Tuner.

The output from DBM U28 drives U31 which provides about 8 dB gain to compensate for the mixer loss and optimize the system dynamic range. This signal is then combined with the 70 MHz tuner output with 3 dB combiner T1.

Input Filter, Mixer, and IF Amplifier

The band-pass filter, FL2, is a three-section helical resonator with about 8 MHz bandwidth.

U25 is a double balanced mixer that converts the 130.5 MHz 2nd IF frequency to the 10.7 MHz 3rd IF frequency. The LO frequency (119.8 MHz) is below the 2nd IF frequency by the 3rd IF frequency. J6 is a test jumper that can be lifted to evaluate prior circuitry or to insert a signal at the 3rd IF frequency to trouble-shoot the circuits that follow.

The 2nd IF Amplifier, U22, has a gain of 20 dB. U22 requires a 6 V Vcc; VR3 and R136 are used to derive the voltage from the +11.8 V supply. C31 and C32 are decoupling capacitors. The output signal level is –20 dBm maximum. J5 is another test jumper that can be used to access prior circuits or insert a signal at the 2nd IF frequency.

Resolution Filter and Log Detector

The 10.7 MHz 2nd IF signal passes through the 300 kHz Resolution filter or a combination of the 10 kHz and the 300 kHz Resolution filters. The switching of filters is accomplished by a combination of a control signal (/10KHZ) from the microprocessor (Diagram 5) and a switching network consisting of U23D, E, and F, Q9, and Q10, and switching diodes (CR22, 23, 25, 26, 27, 28, 29, and 30). When the control line is low, the signal path is through the 10 kHz filter. The 300 kHz filter is always in the circuit. Q10, CR22, and CR30 turn on to enable the 10 kHz filter; Q9, CR23, and CR28 turn off to switch out the bypass line. When the control line goes high, Q10 turns off to turn off CR22 and CR30; Q9, CR23, and CR28 turn on to shunt the 10 kHz filter and provide 300 kHz resolution. R175, the 300 kHz Gain adjustment, is set to match the loss of the 10 kHz filter. J10 is another test jumper provided to access prior circuits or insert a signal directly into the Log Detector.

The input to the Log Detector, U32, is amplified by U29 and pre-shaped by FL3 and FL4, a 300 kHz Resolution filter, and then ac coupled to U32. When the 10 kHz filter is selected, the signal is filtered by the 10 kHz filter and then applied to the Log Detector. The output current from the Log Detector is processed by Q24 and Q25 to the 15 kHz low-pass filter at U27 pin 3 (Diagram 4). The filter output then drives the Vertical Deflection Amplifier.

Sweep Generator Diagram 3

This schematic contains the free–running Ramp Generator, Switchable Gain Control (SPAN/DIV), Sweep Shapers, Marker Generator, and the Z–Axis (Brightness) control.

Ramp Generator

U24 is the Ramp Generator; U24B is configured as an integrator and U24A is used as a comparator. C40 is the integration capacitor and is charged by current from the front-panel SWEEP SPEED control. The ramp integrates in the positive direction from –2 volts to +2 volts. At +2 V the output of U24A trips to the positive power supply voltage (+5 V) and causes C40 to ramp down through CR24 and R151. The value of R151 determines the amount of time required to discharge C40 (retrace time). The power supply for U24 is +5 and –11.8 volts. The output swing of U24A is nearly to these supply values. The Ramp Generator output, through R142, drives Q6 through U23B in the Z–Axis control to provide retrace blanking. CR21 limits the output swing in the negative direction to –0.7 volts.

Gain Control (SPAN/DIV)

The Ramp Generator output (U24B, pin 7) drives the Horizontal Deflection Amplifier and the Gain Control (SPAN/DIV) switching, U20. Each switch in U20 selects a different value of R_i for operational amplifier U18A. The gain is maximum at FULL (50 MHz per division) and minimum at 100 kHz per division. The output of U18A is a negative-going ramp that drives the Sweep Shapers.

Sweep Shapers

U16B and C form the Sweep Shaper that drives the L–BAND VCO; U16A and D drive the 70 MHz VCO. The Sweep Shapers pre-distort the VCO driving ramps to compensate for the inherent nonlinearity of the VCO. The shapers have adjustable break points so that gain at each can be individually adjusted. The 70 MHz shaper has four adjustments, R48, R49, R55, R56; and the L–BAND shaper has six adjustments, R35, R51, R58, R75, R81, and R82. Figure 4-1 shows the area of control for the various adjustments on the 1705A L–Band display, when a comb signal is applied.

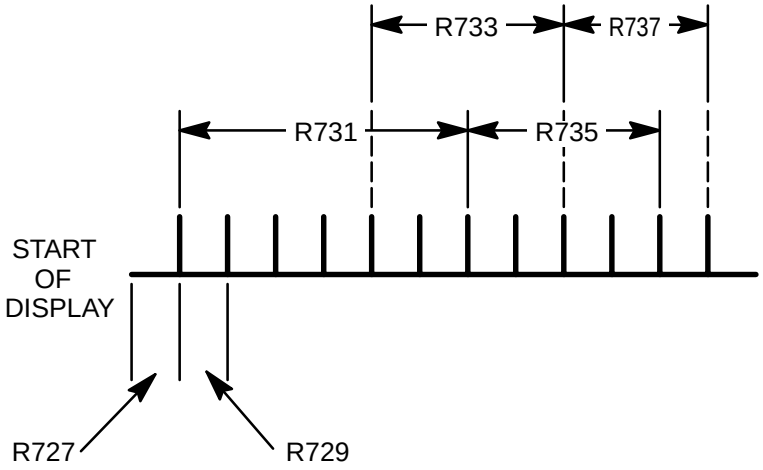


Figure 4-1: 1705A L–Band comb display showing the areas each of the six sweep shaper variable resistors adjust

Bright–Up Generator

The Marker Generator is U14. The front-panel CENTER FREQUENCY control provides the voltage from which the digital frequency readout is obtained. In addition, the CENTER FREQUENCY (through U14) positions the bright zone in FULL SPAN/DIV and tunes the center frequency in magnified SPAN/DIV settings. The gain and offset of U14A are adjustable with R37 and R38. When the CENTER FREQUENCY control is turned from one end to the other, the output of U14A will move from about – to +2 V, which is approximately the range of the ramp at U24B. In any SPAN/DIV setting other than FULL, analog switch U17A is closed and the output of U14A provides an offset voltage to move the attenuated ramp, at the output of U18A, over the range of the large ramp in FULL SPAN/DIV

When the SPAN/DIV is set at FULL, the output of U14A positions the bright-up zone to correspond to the frequency displayed by the readout. The output of U14B provides a voltage that offsets the ramp at the output of U14C.

In the FULL setting of SPAN/DIV, U17D (an analog switch) is closed and U14C provides a gain of 10 to both the ramp from U24B and the offset from U14B. The bright-up zone is generated when the ramp, at the output of U14C, passes through 0 V. The offset voltage from U14B can offset the ramp from almost tip to tip, thus moving the bright-up zone over almost the entire length of the sweep.

U14D is an absolute value circuit. Its output will be near the positive power supply unless the input, from U14C, is within ± 0.7 V of ground. If the input goes above +0.7 V, CR8 conducts and U14D becomes a non-inverting amplifier with a gain of about 20 (set by R83 [R_f], R84 [R_i] and the divider R87, R88). Under these conditions the output goes towards the positive power supply. If the input to U14D goes below –0.7 V, CR12 conducts and becomes an inverting amplifier with a gain of ≈ 20 (set by R83 [R_f] and R87 [R_i]). Again under these

conditions the output goes toward the positive supply. If the input is between + and –0.7 V, neither diode conducts and the amplifier has no input and, consequently, an output of 0 V. When the output of U14D is near 0 V, a pulse that produces the crt bright zone is generated by the Z–Axis Control circuit.

Z–Axis Control

The Z–Axis Control circuit is comprised of a transistor array, U13, and discrete transistors Q4 and Q5. The output is the common collector line of the three differential amplifiers (Q5, and pins 5 and 8 of U13). The output line drives the summing junction of the Z–Axis Amplifier on Diagram 8. The front-panel INTENSITY control drives the current source (pins 12, 13, and 14 of U13). All of the current from this transistor can be directed to the Z–Axis Amplifier, through the differential amplifiers or shunted away if Q6 is turned on. Q6 is on during sweep retrace, to blank the crt, and during crt readout time, when /RO–EN is active (low). With Q6 off, the current from the source is split between R54 and R79. The current through R54 is the collector current on pin 5. The current through R79 will appear as collector current on pin 8 if its base (pin 9) is low, which occurs at marker time. The result is that when the instrument is in FULL SPAN, the trace is brightened for the marker. In any other SPAN/DIV setting, the trace is of uniform brightness when the output of U14D is near 0 V, a pulse that produces the crt bright zone is generated by the Z–Axis Control circuit.

The readout intensity is controlled separately by Q4 and Q5. If the RO–BLANK control line is active (low), Q4 is turned off and Q5 is turned on. When Q5 is on, the current through R89 and R91 is sent to the Z–Axis Amplifier. When the control line goes high, Q4 turns on and the emitter current from the readout intensity control is directed into the +5 volt supply instead of into the Z–Axis Amplifier.

Deflection Amplifiers Diagram 4

Circuitry on this schematic normalizes gains, and drives the crt deflection plates.

Buffers

The vertical signal from the Log Detector is buffered by U27. U27 drives the Vertical Output Amplifier, whose input can be filtered to reduce the effects of noise. The Video Filter is a 15 kHz, 3-pole, low-pass filter whose output is switched in by U30A. The enable, for U30A, is the /VFILTER signal from the microprocessor (Diagram 5).

U27 is a switchable gain amplifier. When high gain (2 dB/Div) is selected with the front-panel push button, the signal at pin 12 of the microprocessor (U2) goes high, and the switch in U21C grounds R135 through pins 3 and 4. This increases the gain of U27 by approximately a factor of five. U21A also switches, connecting pins 13 and 14, putting a portion of the Vertical Position

control into the summing junction of U27 (pin 2). The Vertical Position control is attenuated by resistors R152 and R140 (2 dB POS RANGE). This positions the video signal at pin 6 of U27, providing greater positioning range while in High Gain mode.

The horizontal ramp signal from the Sweep Generator (Diagram 3) is approximately 4 V in amplitude. Typical sweep length is 12 divisions. The variable resistor, R168, is one-half of the input resistance (R_i) for U26B, an inverting operational amplifier. The amplifier feedback resistance (R_f) consists of R180 and R177. Reducing the R_f of the operational amplifier while holding R_i constant reduces the gain, and in this case the sweep length. Strapping across W11 and W12 provides a convenient method of shortening the sweep to adjust the Horizontal Gain (R168) against the 10 divisions of the crt graticule. When the strap is removed the sweep length increases to 12 divisions.

Switches U30B and C are are enabled by the Readout Enable (/RO–EN) from the microprocessor (Diagram 5). When enabled, the input to the Deflection Amplifier is the X– (horizontal) and Y–Axis (vertical) components of the crt alphanumeric readout. The readout signal components are from the microprocessor through a Digital-to-Analog Converter (DAC) (Diagram 5). The vertical positioning signal, from the front-panel VERTICAL POSITION control, is applied to the readout in order to common mode out positioning effect when the trace is repositioned.

Vertical Deflection Amplifier

The vertical output signal, or the Y–Axis readout, drives the base of Q26, one side of a differential input amplifier. The other side, Q28, is driven by the positioning voltage from the front-panel VERTICAL POSITION control. The signal from the collectors of Q26 and Q28 drive Q27 and Q29, common base amplifier stages. The gain of the Vertical Deflection Amplifier is approximately 7. The gain normalized output voltage, to drive the crt deflection plates, is developed across R229 and R230, the load resistors. Q22 and Q23 are a temperature-compensated current source from the –11.8 volt supply.

Horizontal Deflection Amplifier

Sweep ramp or X–Axis readout drives the base of Q17, one side of a differential input amplifier. The other side, Q16, is driven by the positioning voltage from the front-panel HORIZONTAL POSITION control (Diagram 5). The signal from the collectors of Q17 and Q16 drive Q14 and Q15, common base amplifier stages. The gain of the Horizontal Deflection Amplifier is approximately 20. The gain normalized output voltage, to drive the crt deflection plates, is developed across load resistors R178 and R179. Q18 and Q19 are a temperature-compensated current source from the –11.8 volt supply.

Microprocessor Diagram 5

The 1705A is a microprocessor-controlled instrument. Circuitry on Diagram 5 shows the microprocessor, the front-panel LED drive, the crt readout drive, the graticule light circuit, and the trace rotation circuit.

Microprocessor

The processor (U2) is an 8-bit, 3-port microprocessor running at 12 MHz. U8 is the lower order address de-multiplexer for the Program PROM U9. U9 is a 64K UV Erasable CMOS PROM. R5 is the bus termination assuring TTL levels (0 =0 V, 1 = 5 V). Output enable for the PROM is the PSEN output from the microprocessor (U2, pin 29). The lower-order addresses from the processor (AD0 – AD7), which are de-multiplexed by U8, are from Port 0; the higher-order addresses (AD8 – AD12) are from Port 2. The higher-order addresses are not multiplexed.

Port 1 is a multifunction input/output port. Lines 0 through 4 are used to poll the front-panel push-button switches (momentary ground closures) to set up the measurement program. Line 6 outputs the clock (U2, pin 7) that is used by the Readout DAC and the NVRAM (Non-Volatile Random Access Memory). Line 5 is the data transfer (U2, pin 6) for the NVRAM, U4. The Readout Enable (/RO–EN) that turns on the crt readout is output through Line 7 (U2, pin 8). The Center Frequency Readout data from U1, the readout ADC, is input through Line 5 also (U2, pin 6).

U1 is an A-to-D Converter (ADC), with successive approximation register. It is used to convert the analog voltage level from the front–panel CENTER FREQUENCY control to a digital signal for the microprocessor and the Readout Digital-to-Analog Converter (DAC). R4 is the calibration adjustment to ensure correct readout.

U4 is the NVRAM that stores the instrument condition when power is turned off or lost, to ensure that the instrument will come back up in the correct operating condition. The power down detection circuit consists of a comparator, U11, and a +5 volt regulator, U3. U3 input voltage is from the +15 volt supply. C5 charges up high enough to allow U3 to continue to power U11 so that it can store needed data during the power-down sequence. U11 monitors the +5 volt supply on pin 2. Pin 3 is set to approximately 2.5 volts and has a large capacitor, C13, to provide a slow decay. Under normal conditions, pin 2 is slightly higher than pin 3, keeping the output (pin 7) high. When instrument power starts to go down, pin 2 goes below pin 3, which forces the output (pin 7) low to enable the /STO input to U4. When /STO goes low, the current conditions, as input from the microprocessor D-Out output, are stored in the U4 Non-Volatile RAM.

Readout

U6 is an 8-bit D-type data latch that drives all the front-panel LEDs and most of the internal control lines. Chip select for U6 is /WR (U2, pin 16) inverted (U7C) and ANDed with Address 14 (U2, pin 27) by U7A.

U10 is a dual 8-bit DAC (Digital-to-Analog Converter) that generates the horizontal and vertical readout signals. The analog current outputs of U10 are pins 2 and 20, which are converted to voltage by U12 A and B. Chip select is /WR (U2, pin 16) which is inverted (U7C) and ANDed with Address 7 in U7D. Line A0 from U8, pin 19, is the DAC A select (low enable). U5 provides a –5 volt analog voltage reference for U10.

Trace Rotate

Trace rotation compensates for changes in the magnetic field surrounding the 1705A. Q1 and Q2 are emitter followers that provide the Trace Rotation current to a coil around the crt, inside the shield. The voltage on the emitter of either Q1 or Q2 will develop a current through R19 to drive the coil. Current amplitude and polarity are controlled by the front-panel TRACE ROTATION screwdriver adjustment.

Graticule Lights

Q3 and Q100 provide a current source for the graticule lights. Base voltage, which controls the amount of current flowing in the light circuit, is set by the front-panel SCALE control. Jumper J100 on the Graticule Light board allows the graticule lights to be disabled.

Front Panel Diagram 6

The front-panel schematic shows all of the operational controls for the instrument, including potentiometers, momentary push-button switches, and indicator LEDs. All the push buttons are polled by the microprocessor, and the LEDs are driven by output ports from the microprocessor. Also included on this diagram is the +18 volt Block Down Converter (BDC) power supply.

Indicators, Controls, and Switches

The front-panel LED indicators are returned to a current source (+5 V). When an LED is lighted, there is a complete circuit from the Light Driver (Diagram 5) through the LED to the +5 V supply. The five function switches (front-panel push buttons) are simple ground closures that are read by the microprocessor to determine the operating mode.

The eight front-panel controls determine voltages (in a range between –11.8 V and +11.8 V) depending on circuit requirements. Each control works with a specific circuit on another diagram.

+18 Volt Supply

The +18 V supply is of the Buck-Regulator type. It uses a Switched Mode Power Supply Control Circuit, U583. Q783 is a buffer for slow startup and duty cycle limit. R681 and R680 are the limit resistors. The voltage on C684 ramps up to provide for slow startup when power is initially applied. The Internal Zener reference (V_Z) for U583 is approximately 8 V and is present on pin 2. R586 and C583 are the frequency determining components for the IC's internal sawtooth generator, which in this instance runs at approximately 50 kHz. R686 and R685 are the voltage setting components on the feedback input; C683, C684, and R682 form a frequency compensation network to prevent the IC from oscillating.

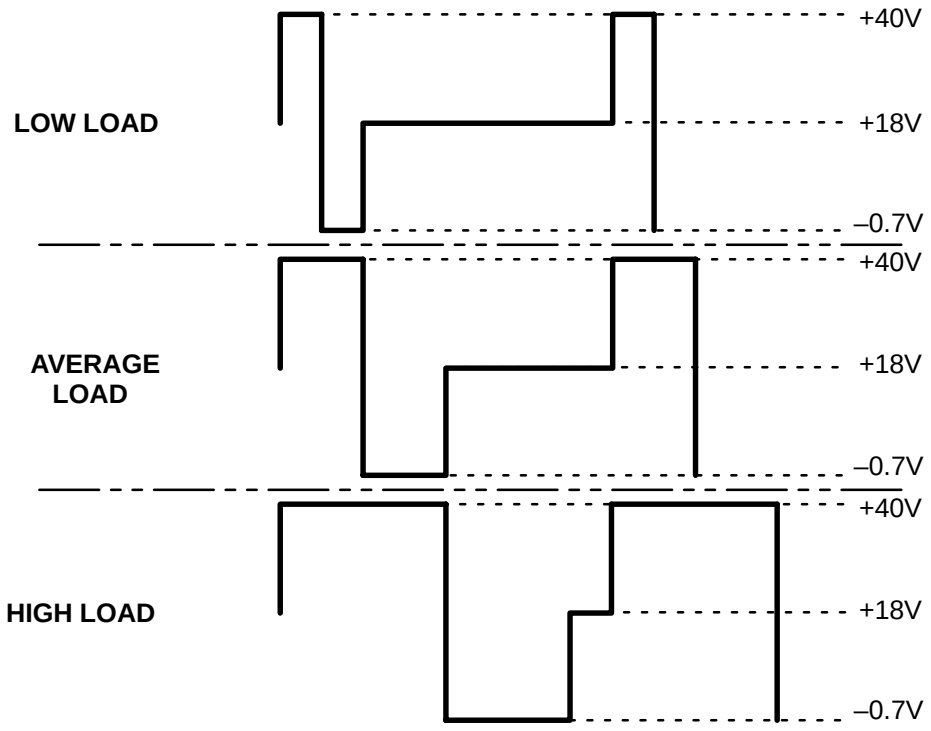


Figure 4-2: Output duty cycle of the pulse width modulator used in the +18 V Power Supply

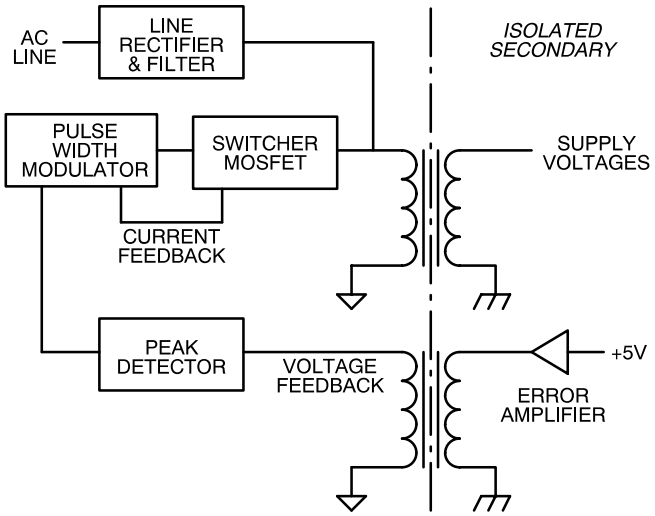
Q481 and Q482 drive the switching transistor. Q482 provides forward base current to the switching transistor, Q596. Q483 provides reverse base current to effectively turn off Q596. Q596 operates with voltage levels between –0.7 V and +40 V. CR594 is the commutating diode that sets the voltage level when Q596 is off (–.07 V) and current is still flowing in L591. The input filter circuit, composed of L591 and C690, is effectively driven with a square wave; however it is not a true square wave and is dependent on the loading of the +18 V supply. See Figure 4-2. The output voltage is fed back to the FB input of U583, which compares it to an internal reference voltage to determine the on time for the

internal pulse width modulator. Q588 is the current sense, sampling current across R690 to provide a voltage level to the sensing input of U583. If the level on the over current sense input (Sen) gets too high, U583 shuts down to prevent damage.

L695 and C697 are the output filter providing a dc output that can be switched onto the rear-panel L–Band connector to power a Block Down Converter.

DS698 is an LED indicator light which is lighted when the +18 V supply is operating into a normal or no-load condition. If the +18 V output is shorted, the light will extinguish.

Low Voltage Power Supply Diagram 7



The Low Voltage Power Supply converts the mains line voltage (90 – 250 Vac) to supply the power requirements of the instrument. The voltages supplied by the Low Voltage Power Supply are +40 V, ± 15 V, and +5 V.

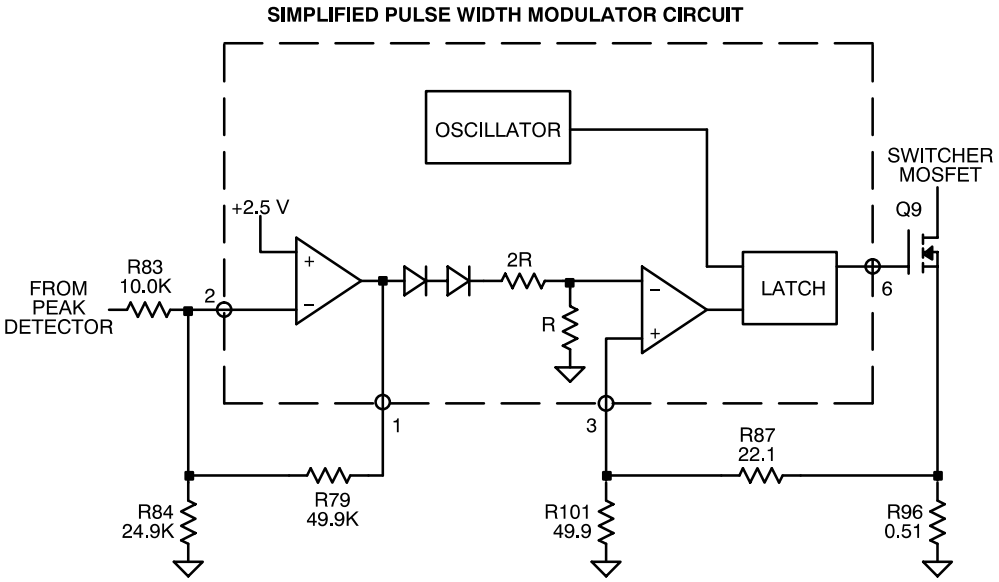
The Low Voltage Power Supply is called a Flyback Switcher. When switcher mosfet Q9 is turned on, its drain voltage drops to approximately 0 V. The current through the 350 μH primary winding of T3 begins ramping up. The voltages present at all secondaries is such that the rectifier diodes are reverse biased. Energy is being stored in the magnetic field of T3. When Q9 turns off, the drain voltage "flies back" in a positive direction. Current now flows in all of the secondary windings and supplies power.

Line Rectifier and Filter

The input line voltage is filtered by the rear-panel connector to reduce the electrical noise conducted into or out of the instrument. R89 limits the initial charging current through the rectifier diodes and C54.

CR21, CR22, CR23, and CR24 form a bridge rectifier. C54 filters the 110 to 350 Vdc rectifier output. L4 filters the switching noise produced by the switcher. R102 reduces the circulating current in the parallel circuit consisting of L4 and C44. DS4, R93, and R94 form a line voltage indicator. R91 and R92 charge C42. C42 provides power to U5 until the primary housekeeping winding provides power through CR17.

Pulse Width Modulator



U5 is a current-mode pulse width modulator (PWM). A current-mode PWM uses two feedback loops. The inner current-feedback loop directly controls the switcher mosfet peak current. The outer voltage-feedback loop programs the inner loop peak current trip point.

U5 pin 2 is the inverting input of an internal op-amp. The non-inverting input is set to 2.5 V by an internal voltage reference. Current from the peak detector flows through R83 and R79. R84 provides a 100 μA offset. The voltage at U5 pin 1 will vary in order to maintain U5 pin 2 at 2.5 V.

The voltage at U5 pin 1 is modified by an internal circuit and sets the trip point of the internal comparator. U5 pin 3 is the external input to the comparator. R88 and C52, connected to U5 pin 4, set the internal oscillator to 80 kHz.

The circuit works as follows: The oscillator resets the latch and U5 pin 6 goes high, turning the switcher mosfet on. The current through the switcher mosfet

increases, causing the voltage across R96 to increase. This voltage is divided by R87 and R101, and is applied to the comparator (pin 3). When the voltage at U5 pin 3 reaches the comparator trip point, the latch toggles and the switcher mosfet is turned off. This process is repeated at an 80 kHz rate.

C58 increases the PWM noise immunity by rolling off the internal op-amp frequency response. R82 holds the switcher mosfet off as the circuit is powering up. R81 slows the turn-on of the switcher mosfet while CR27 speeds up the turn off.

Output Filters

The three output windings supply four output voltages. Each output is rectified by a single diode and filtered by an LC pi filter.

Error Amplifier

The Error Amplifier regulates the +5 V output by feeding an error signal to the Pulse Width Modulator. VR1 is a 2.5 V shunt regulator containing an op-amp and a voltage reference. The +5 V is divided by R69 and R70 to provide 2.5 V to VR1, with fine adjustment provided by R99. C40 and R71 determine the gain and frequency response of VR1. VR4 controls overshoot of the +5 V at power up. R98 and CR26 provide a minimum operating current for VR1. R68 decouples C39 from VR1. Overvoltage protection for the +5V supply is provided by a crowbar circuit formed by Q11, VR3, R13, and R14.

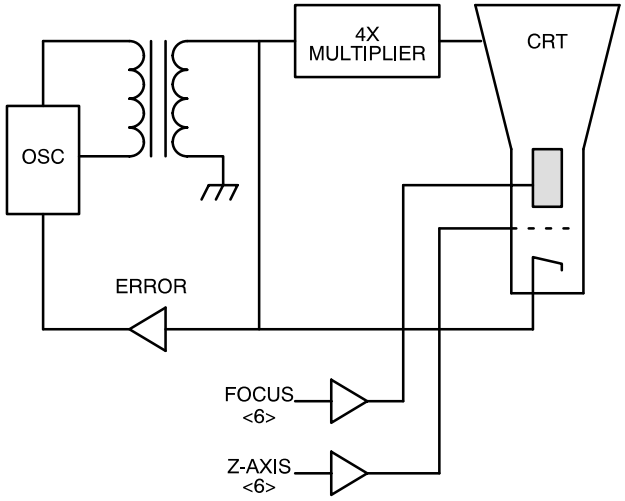
Feedback Transformer Driver and Peak Detector

The 80 kHz sawtooth waveform at U3 pin 3 trips comparator U3. U3 pin 1 then feeds a trigger pulse to one-shot U4. U4 pin 13 outputs a 300 nS pulse to the 130 mA current source consisting of Q7 and Q8. When Q8 turns on, T2 pin 2 is pulled down until CR15 (Error Amplifier) is forward biased. The negative-going pulse at T2 pin 2 is peak detected by CR16 and C46. The dc voltage present at the anode of CR16 feeds the pulse width modulator and the Output Under-Voltage Shutdown circuit. CR29 resets T2 between pulses.

Output Under-Voltage Shutdown

If the +5 V is below 4.9 V, the Error Amplifier will cause the Peak Detector output to go below 2.9 V. The output of comparator U3B will pull low and shut down pulse width modulator U5. C47 and R96 delay the operation of U3B long enough for the power supply to power up. If the +5 V does not reach 4.9 V within 50 ms of power up, U3B will shut down the switcher. The power supply will then cycle on and off every couple of seconds.

High Voltage Power Supply Diagram 8



The High Voltage Power Supply generates the heater, cathode, control grid, focus anode, and post accelerating potentials required to display the outputs of the Vertical and Horizontal Output Amplifiers.

HV Osc and Error Amp

The High Voltage Power Supply is generated by a sine-wave oscillator and step-up transformer. Q6 and T1 are the principal elements of an Armstrong oscillator running at about 22 kHz. Error Amplifier U2 regulates the +100 V output and keeps the High Voltage Power Supply constant under varying load conditions by controlling the base current to Q6. The +100 V output is regulated directly, while the High Voltage Power Supply is indirectly regulated through a current feedback circuit.

R48, C16, R60, and R64 form the High Voltage Power Supply current feedback circuit. As the current from the High Voltage Power Supply is increased, the voltage to the + side of the Error Amplifier (U2) increases, which increases the base drive to Q6, the HV Osc. This current feedback compromises the regulation of the +100 V supply to keep the high voltage constant with varying intensities.

C66 and Q10 are a start delay circuit that holds the Error Amplifier output low, through CR30, until C66 is charged. Delaying the start of the high voltage oscillator allows the Low Voltage Power Supply to start, unencumbered by the load from the high voltage oscillator.

Power Supply Outputs

CR4 is the high voltage rectifier. Filter capacitors C3, C4, and C8 work with CR4 to provide –2530 V to the crt cathode. U1 is a four-times multiplier providing +11 kV to the crt anode.

Focus Amplifier

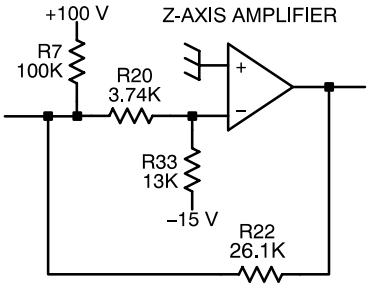
Q1 and Q2 form an operational amplifier that sets the voltage at the bottom of the focus divider. The front-panel FOCUS pot determines the voltage at the bottom of the focus divider. The Center Focus control, R11, is set for optimum beam focus, as viewed on the crt, with the front-panel FOCUS control set to mid range. Once the Center Focus adjustment has been set, adjusting the front-panel FOCUS control changes the voltage at the bottom end of the divider and, consequently, the voltage on the crt focus anode.

Grid Drive Circuit

The cathode of the crt is at a –2530 V potential with the grid coupled to the Z–Axis Amplifier by the grid drive circuit. The grid is approximately 75 V negative with respect to the cathode. The 200 V p-p sine wave present at the cathode of CR8 is input to the Grid Drive circuit where it is clipped for use as the crt control grid bias.

The sine wave from the cathode of CR8 is coupled through R47 to a clipping circuit consisting of CR5 and CR6. Clipping level for the positive excursion of the sine wave is set by the CRT Bias adjustment, R58. The negative clipping level is set by the front-panel INTENSITY control through the Z-Axis Amplifier. The clipped sine wave is coupled through C11 to a rectifier made up of CR1 and CR3. The rectified, clipped sine wave is the crt control grid bias voltage. C9 couples the blanking signal from the Z-Axis Amplifier to the crt control grid. DS1 and DS2 limit the crt grid to cathode voltage at instrument turn on or off. DS3 limits the crt heater to cathode voltage.

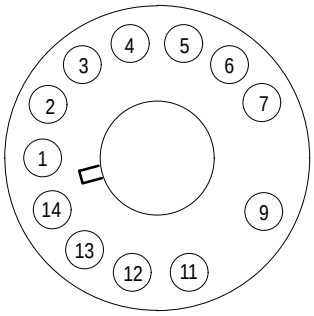
Z-Axis Amplifier



This is an inverting amplifier with negative feedback. R22 is the feedback resistor while R7, R20, and R33 act to maintain the summing junction at +5 V. Without any Z–Axis input current, the amplifier output is approximately +10 V. Negative Z–Axis input current will cause the output to go positive.

Q5 is a current amplifier feeding the output stage. Q3 and Q4 form a push-pull output stage. Q3 acts as a 2.7 mA constant current pull-up, while Q4 is the pull-down transistor. C6 speeds up the amplifier by coupling ac signals to the base of Q3. CR2 and R41 protect the amplifier during crt arcing.

CRT The pinout for the CRT is shown in Figure 4-3.



Pin	Description
1	Filament (f)
2	Cathode (k)
3	GRID (g1)
4	FOCUS (g3)
5	ASTIG (g4)
6	GEOM (g5)
7	VERT PLATE (y2)
9	VERT PLATE (y1)
11	HORIZ PLATE (x2)
12	1st ANODE (g2)
13	HORIZ PLATE (x1)
14	Filament (f)

Figure 4-3: Pinout of the CRT Socket

Checks and Adjustments

Section 5
Checks And Adjustments

This section consists of two separate procedures. The first, a Performance Check, is used to determine compliance with the Performance Requirements in the Specification. The second is the Adjustment Procedure, that provides the instructions on how to adjust the instrument and return it to operation within the specification.

In both procedures, front- and rear-panel controls and connectors, on the instrument under test, are fully capitalized (e.g., 300 kHz RESOLUTION). Control and connector names on test equipment and internal controls and adjustments for the instrument under test are initial capitalized (e.g., Time/Div, Geometry, etc.).

Limits, tolerances, and waveforms given in this section are guides to adjustments and checks. They are not instrument specifications, except when listed in the Performance Requirement column of the Specification Tables in Section 1 of this manual.

Recommended Equipment List

The following equipment and accessory items are required to do the Performance Check and/or Adjustment Procedures. Broad specifications are followed by a piece of equipment that meets these specifications; in most cases, the recommended instrument was used in preparing the procedures that follow.

Electrical Instruments

1. **Test Oscilloscope**

   Vertical Amplifier:

   30 MHz Bandwidth, 1 mV Sensitivity.

   Time Base:

   10 ns/Division to 5 ms/Division sweep speeds, triggering to 5 MHz.

   For example: a TEKTRONIX 7603 Oscilloscope with a 7A18 Dual-Trace Amplifier and a 7B53A Dual Time Base, or a TEKTRONIX 11403A Oscilloscope with a 11A34V Video Amplifier and an 11T5H Video Trigger. Also a 10X probe, P6106 (Tektronix Part No. 010-6106-03).

2. **Leveled Sine Wave Generator**, at least 250 kHz to 95 MHz.

   For example: A TEKTRONIX SG503 Leveled Sine Wave Generator installed in a TEKTRONIX TM500 Series Power Module.

3. **Voltmeter**

   Range, 0 to greater than 100 Vdc; accuracy, ±0.1%.

   For example: A TEKTRONIX DM501A in a TM500 Series Power Module.

4. **Power Module** for powering and housing TEKTRONIX DM501A, DC503A, FG503, 067-0916-00, and 015-0408-00.

   For example: A TEKTRONIX TM506 Power Module.

5. **UHF Signal Generator**

   A frequency range of at least 900 to 1800 MHz, with an amplitude of –20 dBm, or more, and flatness within 3 dB over the frequency range. Accurate step attenuator calibrated in dB (0 to –60).

   For example: A TEKTRONIX TR502 Tracking Generator and associated equipment, a Wavetek Model 3520, or a Hewlett Packard 8614A Signal Generator with 8496A Attenuator/110 dB.

6. **Variable Autotransformer**

   For example: General Radio Metered Auto Transformer W10MT3W. If 220 volt operation must be checked, a conversion transformer or appropriate 220 volt autotransformer is needed.

7. **Comb Generator**

   For example: Tektronix Part No. 015-1054-00.

Auxiliary Equipment

8. 50Ω Coaxial Cable

   Two required.

   For example: Tektronix Part No. 012-0057-01.

9. Bnc Male-to-bnc Male Adapter

   For example: Tektronix Part No. 103-0029-00.

10. F-Type Male-to-bnc Female Adapter

    For example: Tektronix Part No. 103-0158-00.

11. SMA Male-to-bnc Female Adapter

Two required (supplied with the Tektronix Comb Generator).

For example: Tektronix Part No. 015-1018-00.

12. SMB Female-to-bnc Female Adapter

For example: Coaxial Components Corporation Part No. 2525-4.

Performance Check

The Short-Form Procedure is intended for those who are familiar with the complete Performance Check procedure. Step numbers and sub-step designations correlate directly to the steps in the Performance Check Procedure; this makes it possible to use the Short-Form Procedure as a table of contents.

Short-Form Procedure

1. Preliminary Setup

a. Connect autotransformer.

b. Connect markers from Comb Generator.

2. Check Power Supply Operation

d. **CHECK** – for stable operation over the prescribed voltage range.

3. Check LNB Power Supply

c. **CHECK** – that the rear-panel, red indicator lamp is lighted and that the DVM reads +18 V ±0.9 V.

e. **CHECK** – that the red indicator lamp extinguishes and then comes back on when the short is removed.

4. Check 70 MHz Linearity

c. **CHECK** – for 10 frequency markers from beginning to end of sweep.

d. **CHECK** – that each marker is within one minor Division of a major graticule Division.

5. Check 70 MHz SPAN/DIV and Readout

d. **CHECK** – for one mark every 5 major Divisions, ±1 major Division.

k. **CHECK** – that readout reads 45, ±1 count.

m. **CHECK** – that the marker is on screen.

6. Check Resolution Filter

b. **CHECK** – that the marker width 0.6 Divisions down from the top is 3 Divisions, ±1 Division.

e. **CHECK** – that the marker width 0.6 Divisions down from the top of the signal is ≤2 minor Divisions.

f. **CHECK** – that the 10 kHz marker amplitude matches the highest point of the 300 kHz marker amplitude within 1 minor Division.

7. Check 70 MHz Gain and Flatness

e. **CHECK** – for a marker amplitude change of 2 Divisions, ±2 minor Divisions when switching the leveled sine wave generator Amplitude Multiplier between .01 and 0.1 (a 20 dB change).

i. **CHECK** – that the tip of the marker is on the crt center line, ±1 minor Division (vertically).

8. Check Video Filter

d. **CHECK** – that the baseline noise amplitude drops approximately 50% when the VIDEO FILTER is ON.

9. Check Sweep Speed

b. **CHECK** – for a solid trace with almost no flicker.

d. **CHECK** – for approximately 3 to 4 sweeps per second.

Alternate Method

e. **CHECK** – for a ramp duration of 20 ms ±10 ms.

h. **CHECK** – for a ramp duration of 200 ms ±100 ms.

10. Check L–Band Linearity

e. **CHECK** – for 10 frequency markers.

f. **CHECK** – that each marker is within 1 minor Division of a major graticule line.

11. Check L–Band SPAN/DIV and Readout

d. **CHECK** – for 1 marker every 5 Divisions, ±1 Division.

i. **CHECK** – for 1 marker every 5 Divisions, ±1 Division.

o. **CHECK** – that the marker is intensified.

q. **CHECK** – that the marker is on screen.

s. **CHECK** – that the readout still reads 1000, ±10.

u. **CHECK** – that the marker is on screen.

v. **CHECK** – that the readout still reads 1000, ±10.

x. **CHECK** – that the marker is on screen.

12. Check L–Band Gain and Flatness

e. **CHECK** – that the marker is on the same crt center line (vertically), ±0.5 Division.

g. **CHECK** – that the marker is on the same crt line (vertically), ±0.5 Division.

j. **CHECK** – that the marker tip is on the –10 reference line, ±0.5 Division. Note: Make sure that the baseline is on the –70 graticule reference line.

13. Check Positioning Range

b. **CHECK** – that the tip can be positioned 2 Divisions left and right of center.

e. **CHECK** – that the marker tip can be positioned 3 Divisions down from its present position.

f. **CHECK** – that the baseline can be positioned to the –30 graticule line.

14. Check 2 dB/Div Gain

g. **CHECK** – for more than 1 Division of amplitude change.

h. **CHECK** – that the noise floor can be positioned on screen.

Long Form Procedure

1. Preliminary Setup

a. Connect the 1705A ac power cord to the variable autotransformer. Turn power on and set the autotransformer to the local nominal mains voltage (110 V or 220 V). Allow 15 minutes for warm-up time before continuing.

b. Set up the 1705A as shown in Table 5–1.

Table 5–1: Preliminary Control Settings

POWER	ON
INTENSITY	Set to Preference
FOCUS	
SCALE	
VERTICAL POSITION	Set later
HORIZONTAL POSITION	
INPUT	70 MHz
RESOLUTION	300 kHz
VIDEO	off
SPAN/DIV	FULL
CENTER FREQUENCY	anywhere
SWEEP SPEED	

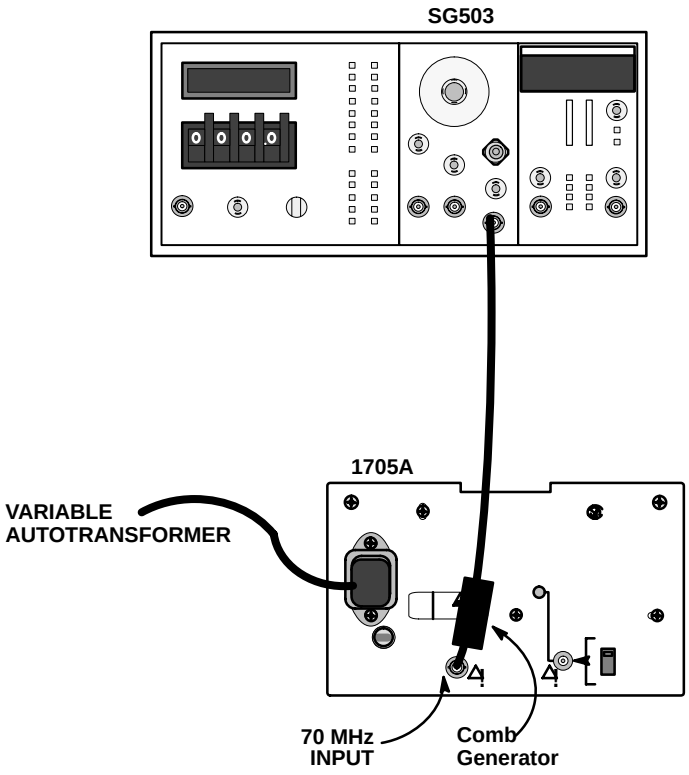


Figure 5-1: Initial equipment connections

c. Connect the leveled sine wave generator output to the comb generator. Connect the comb generator output to the 1705A rear-panel 70 MHz INPUT. See Figure 5-1.

2. Check Power Supply Operation

REQUIREMENT — Check ac input range, 90 – 250 V.

a. Set the leveled sine wave generator Frequency to 5.0 MHz, the Amplitude Multiplier to X1, and the Amplitude to 4.0 (+16 dBm).

b. Adjust the controls for a usable display.

c. Vary the autotransformer from low-line to high-line voltage (90 - 132 V for 110 V, or 180 - 250 V for 220 V operation).

d. **CHECK** – **f**or stable operation over the prescribed voltage range. (Note: If the LNB POWER is on and in use, the requirement is derated to 100 – 132 V or 200 – 250 V.)

e. Return the autotransformer to the local nominal mains voltage.

3. Check LNB Power Supply

REQUIREMENT — +18 Vdc ±5%.

a. Connect DVM leads between the center conductor of the L–BAND INPUT connector and ground.

b. Turn on the LNB POWER switch.

c. **CHECK** – **t**hat the rear-panel, LNB POWER LED is ON, and that the DVM reads +18 V ±0.9 V.

d. Temporarily (approximately 2 seconds) short the L–BAND INPUT connector center conductor to ground.

e. **CHECK** – **t**hat the red indicator lamp extinguishes and then comes back on when the short is removed.

f. Turn LNB POWER off.

CAUTION. *The LNB POWER switch MUST be turned off for the rest of this procedure to prevent damage to the generators used in later steps.*

4. Check 70 MHz Linearity

REQUIREMENT — One marker per Division ±1 minor Division.

a. Adjust FOCUS, INTENSITY, SCALE, and SWEEP SPEED for a useable display.

b. Place the 2nd marker on the left edge of the graticule. See Figure 5-2.

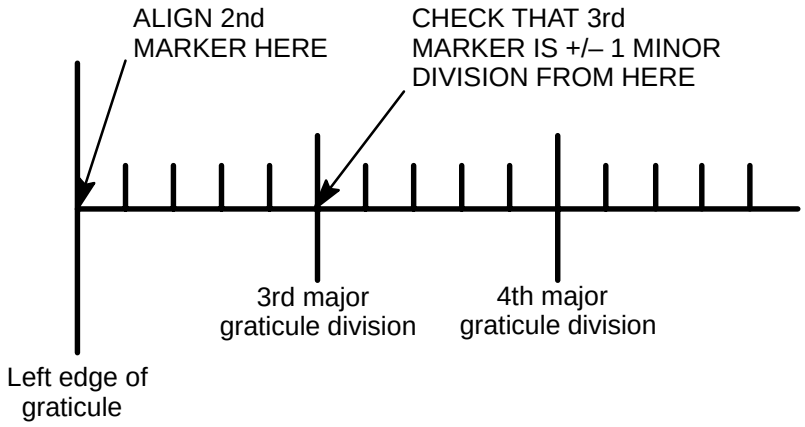


Figure 5-2: Check time mark graticule alignment

c. **CHECK** – for 10 frequency markers from beginning to end of sweep.

d. **CHECK** – **th**at each marker is within 1 minor Division of a major graticule line when the 2nd marker is on the left edge of the graticule (see Figure 5-2).

5. Check 70 MHz SPAN/DIV and Readout

REQUIREMENT — One marker per 5 Divisions ±1 Division. Readout accuracy: L–Band ±20 MHz. 70 MHz ±2 MHz.

a. Select 1 MHz SPAN/DIV.

b. Set the CENTER FREQUENCY to read 70 MHz.

c. Center the readout caret horizontally on screen.

d. **CHECK** – **f**or 1 marker every 5 major Divisions, ±1 major Division. Readjust CENTER FREQUENCY, if necessary.

e. Repeat with Center Frequency at 50 MHz and 90 MHz.

f. Connect the leveled sine wave generator to the 70 MHz input without the comb generator. See Figure 5-3.

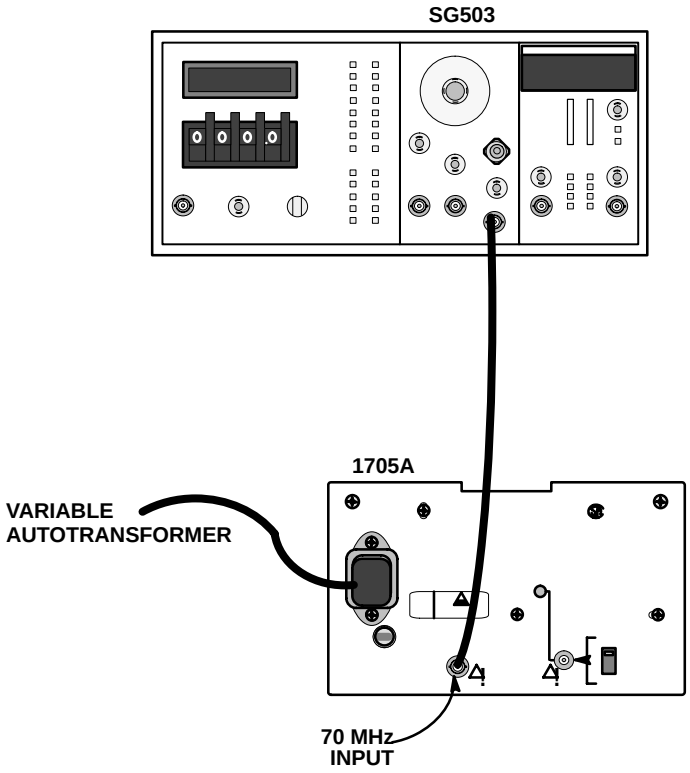


Figure 5-3: Output of the SG503 connected directly to the 1705A 70 MHz INPUT

g. Set the leveled sine wave generator Frequency to 45 MHz, Amplitude Multiplier to .01, and Amplitude to 0.5 (–42 dBm).

h. Set the 1705A SPAN/DIV to FULL, and the CENTER FREQUENCY to read 45 MHz. Check to see that the marker is intensified.

i. Set the 1705A SPAN/DIV to 1 MHz and check that the marker is on screen.

j. Position the marker under the readout caret with the CENTER FREQUENCY control.

k. CHECK – that readout reads 45, ±1 count.

l. Set SPAN/DIV to 100 kHz.

m. CHECK – that the marker is on screen.

n. Repeat steps h. through m., substituting 95 MHz.

o. Leave SPAN/DIV at 100 kHz.

6. Check Resolution Filter

REQUIREMENT – 300 kHz Filter Resolution 200 – 400 kHz. 10 kHz Filter Resolution 20 kHz or less. Filter through gain matches ±2 dB.

a. Adjust the leveled sine wave generator Amplitude for a 5 Division signal amplitude.

b. **CHECK** – that the marker width 0.6 Divisions down from the top of the signal is 3 Divisions, ±1 Division.

c. Change resolution to 10 kHz.

d. Set SWEEP SPEED fully counterclockwise.

e. **CHECK** – that the marker width 0.6 Divisions down from the top of the signal is ≤2 minor Divisions.

f. **CHECK** – that the 10 kHz marker amplitude matches the highest point of the 300 kHz marker amplitude within 1 minor Division, when switching between 300 KHZ and 10 KHZ RESOLUTION.

7. Check 70 MHz Gain and Flatness

REQUIREMENT – Incremental Amplitude Accuracy ±4 dB/70 MHz. Flatness ±1 minor Division from 70 MHz to either 50 or 90 MHz.

a. Set SPAN/DIV to FULL.

b. Set RESOLUTION to 300 kHz.

c. Set SWEEP SPEED fully clockwise.

d. Set the leveled sine wave generator Frequency to 70 MHz, the Amplitude Multiplier to X1, and the Amplitude to 0.5 (–2 dBm).

e. **CHECK** – for a marker amplitude change of 2 Divisions, ±2 minor Divisions when switching the leveled sine wave generator Amplitude Multiplier between 0.01 and 0.1 (a 20 dB change).

f. Set the leveled sine wave generator Amplitude Multiplier to 0.01 and Amplitude to 0.5 (–42 dBm).

g. Position the tip of the marker to exact crt center with the HORIZONTAL and VERTICAL POSITION controls.

h. Set the leveled sine wave generator Frequency to 50 MHz.

i. **CHECK** – that the tip of the marker is on the crt center line, ±1 minor Division (vertically).

j. Set the leveled sine wave generator Frequency to 90 MHz.

k. CHECK – that the marker tip is on the crt center line ±1 minor Division (vertically).

8. Check Video Filter

REQUIREMENT – Video Filter reduces noise by approximately 50%.

a. Be sure that the VIDEO FILTER is OFF.

b. Position the baseline on screen with the VERTICAL POSITION control.

c. Switch between VIDEO FILTER ON and OFF.

d. CHECK – that the baseline noise amplitude drops approximately 50% when the VIDEO FILTER is ON.

9. Check Sweep Speed

REQUIREMENT – Typically 20 – 200 ms.

a. Verify that SPAN/DIV is set to FULL and that SWEEP SPEED is set fully clockwise.

b. CHECK – for a solid trace with almost no flicker.

c. Set SWEEP SPEED fully counterclockwise.

d. CHECK – for about 3 to 4 sweeps per second.

e. Return SWEEP SPEED fully clockwise.

Alternate Method

a. Connect the oscilloscope 10X probe to W2.

b. Set the oscilloscope timebase to 5 ms/Div.

c. Set the oscilloscope vertical to 2 Volts/Div.

d. Set SWEEP SPEED fully clockwise.

e. CHECK – for a ramp duration of 20 ms ±10 ms.

f. Set SWEEP SPEED fully counterclockwise.

g. Set the oscilloscope timebase to 50 ms/Div.

h. CHECK – for a ramp duration of 200 ms ±100 ms.

i. Remove probe. Return SWEEP SPEED fully clockwise.

10. Check L–Band Linearity

REQUIREMENT – One marker per Division ±1 minor Division.

a. Connect the output of the leveled sine wave generator, through the comb generator, to the 1705A L–BAND INPUT. See Figure 5-4.

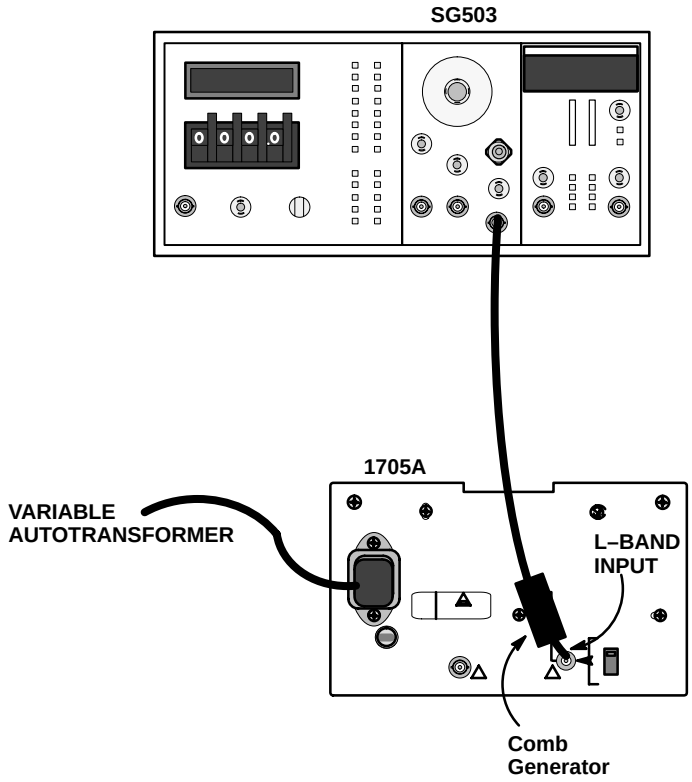


Figure 5-4: Equipment connections for L–Band checkout

b. Set the leveled sine wave generator Frequency to 100 MHz, Amplitude Multiplier to X1, and the Amplitude to 1.5 (8 dBm).

c. Set the 1705A INPUT to L–BAND.

d. Set the SPAN/DIV to FULL.

e. **CHECK** – for 10 frequency markers. (Ignore any sweep start marker.)

f. **CHECK** – that each marker is within one minor Division of a major graticule line when the 2nd marker is on the first graticule line in from the left. See Figure 5-5.

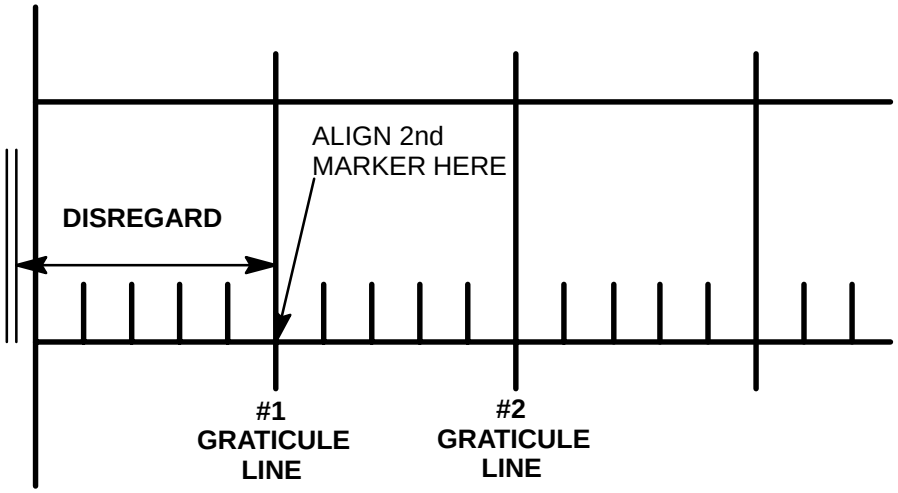


Figure 5-5: Aligning L–Band time markers with the graticule lines. The graticule begins with 0 while the time markers are counted 1, 2, 3, etc. The first and last divisions of sweep should be disregarded

11. Check L–Band SPAN/DIV and Readout

REQUIREMENTS:

FULL — 1 marker/Division ±1 minor Division

10 MHz — 1 marker/5 Divisions ±1 Division

1 MHz — 1 marker/5 Divisions ±1 Division

Readout Accuracy — ±20 MHz.

a. Set CENTER FREQUENCY to 1400 MHz, and set SPAN/DIV to 10 MHz.

b. Set the leveled sine wave generator Frequency to 50 MHz.

c. Position the readout caret to center of screen horizontally.

d. **CHECK** – for 1 marker every 5 Divisions, ±1 Division (adjust CENTER FREQUENCY, if necessary).

e. Repeat parts a. through d. with CENTER FREQUENCY at 950 MHz and 1700 MHz.

f. Set CENTER FREQUENCY to 1400 MHz.

g. Set SPAN/DIV to 1 MHz.

h. Change the leveled sine wave generator Frequency to 5 MHz, Amplitude Multiplier to X1, and the Amplitude to 3.0 (14 dBm).

i. **CHECK** – for 1 marker every 5 Divisions, ±1 Division (adjust CENTER FREQUENCY, if necessary).

j. Repeat parts f. through i. with CENTER FREQUENCY at 950 MHz and 1700 MHz.

k. Remove the leveled sine wave generator and comb generator from the 1705A L–BAND INPUT.

l. Connect the UHF signal generator output to the 1705A L–BAND INPUT. See Figure 5–6.

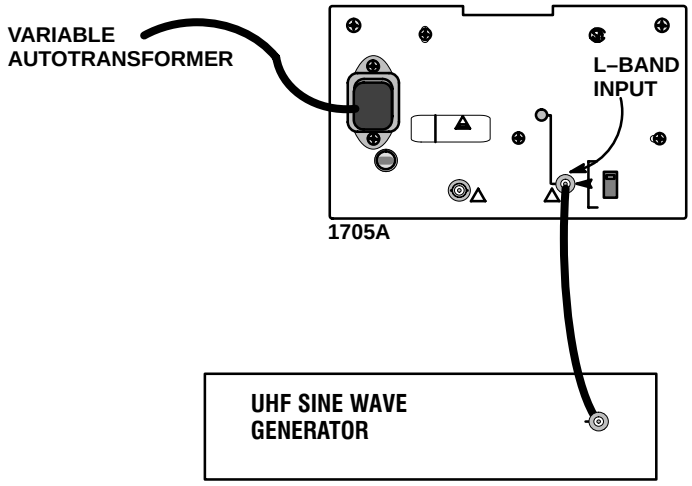


Figure 5-6: Using the UHF Signal Generator to check L–Band Span/Division, Readout, Gain, and Flatness

m. Set the UHF signal generator Amplitude to –50 dBm and Frequency to 1000 MHz.

n. Set the 1705A SPAN/DIV to FULL. Dial the CENTER FREQUENCY until readout reads 1000 MHz.

o. **CHECK** – that the marker is intensified.

p. Set SPAN/DIV to 10 MHz.

q. **CHECK** – that the marker is on screen.

r. Position the marker under the caret with the CENTER FREQUENCY control.

s. **CHECK** – that the readout still reads 1000, ±10.

t. Set SPAN/DIV to 1 MHz.

u. **CHECK** – that the marker is on screen. Position the marker under the caret with the CENTER FREQUENCY control.

v. **CHECK** – that the readout still reads 1000, ±10.

w. Set SPAN/DIV to 100 kHz.

x. **CHECK** – that the marker is on screen.

y. Repeat steps m. through x., substituting 1700 MHz.

12. Check L–Band Gain and Flatness

REQUIREMENT – Flatness: ±5 dB (± from center (1400 MHz)). Relative Amplitude Accuracy ±3 dB/100 MHz. (Typically ±1 dB/100 MHz.)

a. Set SPAN/DIV to FULL.

b. Set the 1705A SWEEP SPEED fully counterclockwise.

c. Set the UHF signal generator Frequency to 1400 MHz and Amplitude to –30 dBm. Position the tip of the marker to the –10 graticule reference line (vertical scale).

d. Change the UHF signal generator Frequency to 950 MHz.

e. **CHECK** – that the marker is on the same crt center line (vertically), ±0.5 Division.

f. Change the UHF signal generator Frequency to 1700 MHz.

g. **CHECK** – that the marker is on the same crt line (vertically), ±0.5 Division.

h. Set the UHF signal generator Frequency to 1400 MHz.

i. Position tip of marker to crt center.

j. **CHECK** – that the marker tip is on the –10 graticule reference line, ±0.5 Division. Note: Make sure that the baseline is on the –70 graticule reference line.

13. Check Positioning Range

REQUIREMENT – Vertical: + and –3 Divisions, Horizontal: + and –2 Divisions.

a. Set the UHF signal generator Frequency to 1400 MHz, and Amplitude to –60 dBm.

b. **CHECK** – that the tip can be positioned 2 Divisions left and right of center.

c. Set the UHF signal generator Amplitude to –30 dBm.

d. Position baseline on the –60 graticule reference line.

e. **CHECK** – that the marker tip can be positioned 3 Divisions down from its present position.

f. **CHECK** – that the baseline can be positioned to the –30 graticule line.

14. Check 2 dB/DIV Gain

REQUIREMENT – Greater than 1 Division of amplitude change while changing from –50 dBm to –53 dBm.

a. Set the UHF signal generator Frequency to 1400 MHz, and Amplitude to –50 dBm.

b. Hold the VIDEO push button until 2 dB/Div appears on the crt readout.

c. Use the CENTER FREQUENCY control to locate the 1400 MHz marker.

d. Select 100 kHz SPAN/DIV. Using CENTER FREQUENCY and VERTICAL controls, check that the marker tip can be positioned on screen.

e. Return to FULL SPAN.

f. Turn the 1705A SWEEP SPEED control fully counterclockwise.

g. **CHECK** – for more than 1 Division of amplitude change while switching the frequency generator between –50 dBm and –53 dBm.

h. **CHECK** – that the noise floor can be positioned on screen.

i. Hold the VIDEO push button down again to exit the 2 dB/Div mode.

End of the Performance Check Procedure

Adjustment Procedure

The Adjustment Procedure covers only adjustments. Checks, other than those that must be made to ensure a step is completed, are in the Performance Check Procedure.

There are actually two Adjustment Procedures, the short-form version is provided for those familiar with the adjustments, while the longer (more detailed) procedure is provided for those who need it.

Allow 20 minutes of warm-up time, at normal room temperature (approximately 25° C) before making any adjustments to the instrument.

Short–Form Procedure

The Short-Form Adjustment Procedure has the adjustment steps in the same order as the longer form of the procedure, so the Short-Form Procedure can be used as an index for the Long Form. Circuit numbers for parts adjusted in the step are also included with the step title.

A1 POWER SUPPLY BOARD

1. Adjust +5 V (R99)

2. Adjust CRT Bias (R58)

3. Adjust Geometry (R45), Center Focus (R11) and Astigmatism (R49)

4. Adjust Trace Rotation

A3 MAIN BOARD

5. Adjust On-Board Regulated Power Supplies (R99, –11.8V; R111, +11.8V)

6. Adjust Horizontal Gain (R168)

7. Adjust Readout Position (R27, Horizontal; R29, Vertical)

8. Adjust 360/119.8 MHz L.O. (C55, C69, L4, FL1, and FL2)

9. Adjust Ramp Size (R113)

10. Adjust 70 MHz Band Linearity (R55, R49, R56, R48, and R57)

11. Adjust 10 kHz Filter (C52, C62, C64, and R175)

12. Adjust L-Band Linearity (R35, R51, R58, R75, R81, and R82)

13. Adjust Readout Range (R4)

14. Adjust Span/Div Magnification Registration (R27)

15. Adjust Span/Div Magnifier Range (R38 and R37)

16. Adjust Intensified Zone Range (R61 and R36)

17. Adjust Vertical Gain (R176, R239, R240, and R232)

18. Adjust 2 dB/Div Position (R140)

19. Adjust 590 MHz Notch (C69)

Long Form Procedure

Figure 5-7 shows the 1705A Spectrum Monitor internal adjustment locations.

PRELIMINARY SETUP

Connect the 1705A ac power cord to the variable autotransformer. Turn the 1705A power on. Set the front-panel controls to start this procedure as shown in Table 5–2.

Table 5–2: Preliminary Control Settings

POWER	ON
INTENSITY	Set to Preference
FOCUS	
SCALE	
VERTICAL POSITION	Set later
HORIZONTAL POSITION	
INPUT	70 MHz
RESOLUTION	300 kHz
VIDEO	ON
SPAN/DIV	FULL
CENTER FREQUENCY	anywhere
SWEEP SPEED	

A1 POWER SUPPLY BOARD

(Refer to Figure 5-7 for adjustment locations.)

1. Adjust +5 V

a. Connect the DMM negative lead to TP1 (GND) and the positive lead to W1 (+5V).

b. ADJUST – R99 (+5V ADJ) for +5.0 V ± 0.5V.

2. **Adjust CRT Bias**

   a. Turn the INTENSITY control fully counterclockwise.

   b. **ADJUST** – R58 (CRT BIAS) so that the display is just extinguished.

   c. Set INTENSITY control for a useable display.

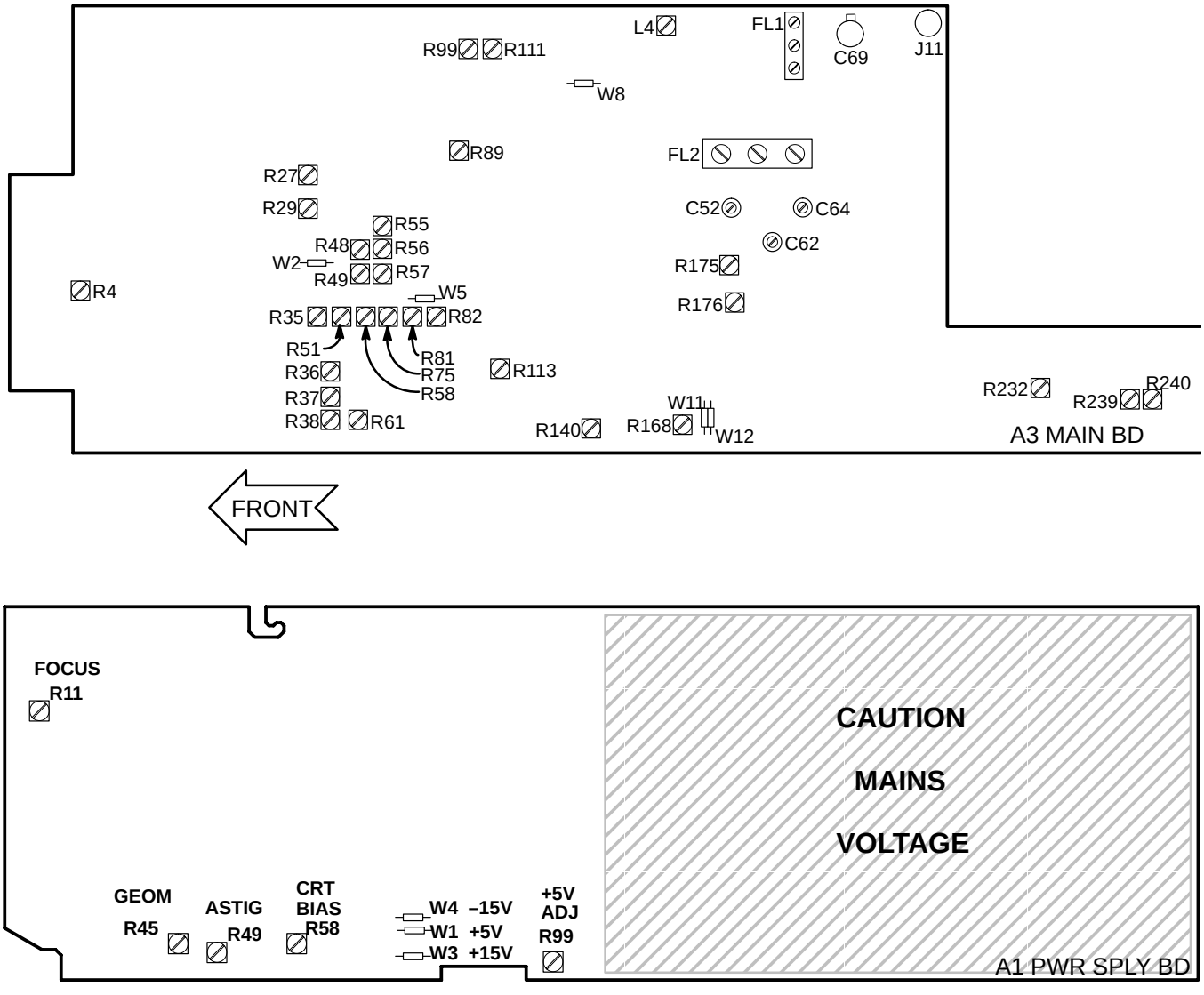


Figure 5-7: Adjustment locations

3. Adjust Geometry, Focus, and Astigmatism

Display the DAC test pattern by completing parts a. through c.

a. Press both the 1705A SPAN/DIV buttons simultaneously to display the Main Menu.

b. Press either SPAN/DIV button to move the cursor to TEST, then press the INPUT button to display the TEST menu.

c. Press either SPAN/DIV button to move the cursor to DAC, then press the INPUT button to display the DAC test pattern.

d. Set the front-panel FOCUS control so that it is approximately at the center of its rotation.

e. **ADJUST** – R45 (GEOM) for 35V ± 1V at pin 1 of J3.

f. **ADJUST** – R11 (CTR FOCUS) and R49 (ASTIG) for the most clearly-defined DAC test pattern. See Figure 5-8.

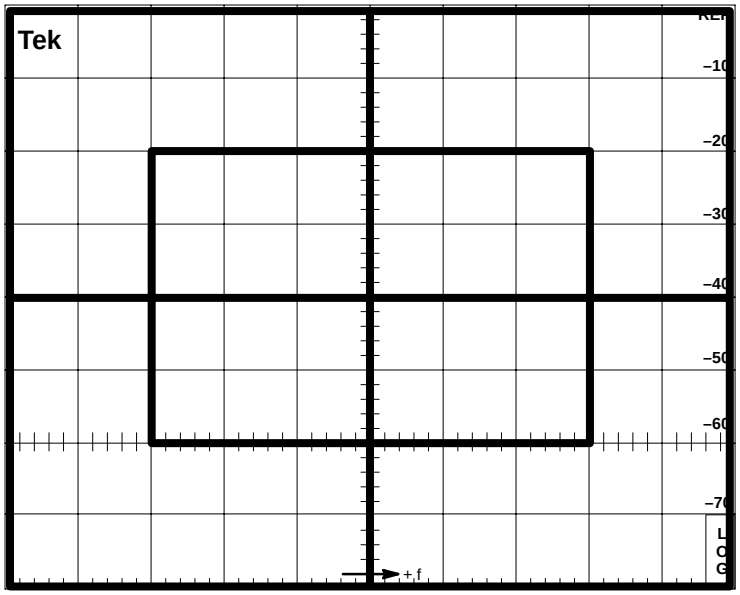


Figure 5-8: DAC check waveforms used to check Focus, Astigmatism, Geometry, and setting of the Trace Rotation (DAC test pattern may vary in size from instrument to instrument)

4. Adjust Trace Rotation

a. **ADJUST** – the front-panel TRACE ROTATION potentiometer for a level display, using a crt graticule line as a reference.

b. Exit the DAC test pattern by first pressing the INPUT button to display the TEST menu.

c. Press either SPAN/DIV button to move the cursor to EXIT, then press the INPUT button twice to return to a normal display.

A3 MAIN BOARD

(Refer to Figure 5-7 for adjustment locations)

5. Adjust On-Board Regulated Power Supplies

a. Connect the voltmeter ground lead to the rear-panel LNB POWER switch ground lug, and the active lead to the –11.8 V test point (W8). See Figure 5-7.

b. **ADJUST** – R99 (–11.8 V ADJ) for –11.8 V (–11.78 to –11.82 V).

c. Connect the voltmeter active lead to the +11.8 V test point (W9). See Figure 5-7.

d. **ADJUST** – R111 (+11.8 V ADJ) for +11.8 V (+11.78 to +11.82 V).

6. Adjust Horizontal Gain

a. Connect a shorting strap between W11 and W12. See Figure 5-9.

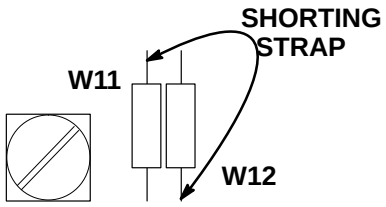


Figure 5-9: Location of the shorting strap used when adjusting sweep length

b. **ADJUST** – R168 (HORIZ GAIN) for a sweep length of 10 major Divisions. Use the –60 horizontal graticule line as the reference.

c. Remove the shorting strap.

7. Adjust Readout Position

Display the DAC test pattern by completing parts a. through c.

a. Press both the 1705A SPAN/DIV buttons simultaneously to display the Main Menu.

b. Press either SPAN/DIV button to move the cursor to TEST, then press the INPUT button to display the TEST menu.

c. Press either SPAN/DIV button to move the cursor to DAC, then press the INPUT button to display the DAC test pattern.

d. **ADJUST** – R27 and R29 (HORIZ and VERT POSN READOUT) for a display crossing at the crt center.

e. Exit the DAC test pattern by first pressing the INPUT button to display the TEST menu.

f. Press either SPAN/DIV button to move the cursor to EXIT, then press the INPUT button twice to return to a normal display.

8. Adjust 360/119.8 MHz L.O.

NOTE*. Use an insulated tool for the following adjustments.*

a. Adjust the VERTICAL POSITION control so that the crt trace is on the –70 graticule reference line.

b. Connect the signal generator to J11 (480 MHz IF Input). Set the output Frequency for 489.7 MHz and the Amplitude to –40 dBm.

c. Select 300 kHz RESOLUTION.

d. Set C55 to full mesh, C69 to 1/8 mesh, and L4 to the top of the coil (three slug threads visible).

e. **ADJUST** – FL1 for maximum signal (three screws beginning at the outside adjustment screw). If no signal is present, adjust L4 down a few turns and then adjust FL1.

f. **ADJUST** – C55 for maximum signal. (C55 should peak at about 1/8 to 1/2 mesh.)

g. **ADJUST** – FL1, center and inside screws (do not readjust the outside screw), for maximum signal. (Less than one turn should be required.)

h. **ADJUST** – FL2 for maximum signal (three screws beginning at the back screw).

i. Repeat part i. using 2 dB/Div if necessary.

j. **ADJUST** – C69 for maximum signal.

k. **ADJUST** – L4 for maximum signal. (The slug may be removed if L4 provides no benefit.)

l. Repeat this step as necessary until the signal amplitude is 37 to 43 dB above the noise floor.

9. Adjust Ramp Size

a. On the 1705A select 70 MHz INPUT, turn the CENTER FREQUENCY knob fully counterclockwise, and set the SPAN/DIV to 1 MHz.

b. Set the DVM to AC Volts.

c. Connect the ground lead to chassis ground and the active lead to W5. See Figure 5-7.

d. Note reading on the DVM (should be ≈0.4 volts).

e. Connect the DVM to W2. See Figure 5-7.

f. Set the 1705A SPAN/DIV to FULL.

g. **ADJUST** – R113 (FULL GAIN) to match the reading from part d.

10. Adjust 70 MHz Band Linearity

a. Set SWEEP SPEED fully clockwise, SPAN/DIV to 1 MHz, and adjust the HORIZONTAL POSITION to place the caret on the center graticule.

b. Set the SPAN/DIV to FULL.

c. Connect the signal generator output to the 1705A 70 MHz INPUT.

d. Set the signal generator Frequency to 45 MHz, and the Amplitude to –25 dBm.

e. **ADJUST** – R55 to place the signal on the extreme left graticule.

***NOTE**. Ramp start amplitude (step 9) should be verified after R55 and 70 MHz linearity are completed and the 70 MHz tuner cover is on. All of these adjustments interact and ramp start amplitude is critical for proper linearity.*

---

f. Connect the signal generator output to the 1705A 70 MHz INPUT through the comb generator.

g. Set the signal generator Frequency to 5.0 MHz, and the Amplitude to +10 dBm.

h. Position the first marker at the extreme left graticule.

i. **ADJUST** – R49, R56, R48, then adjust R57 to position one marker per major Division over the 10 major graticule Divisions, ±1 minor Division. (All these adjustments affect dc level of ramp start in 70 MHz tuner.)

11. Adjust 10 kHz Filter

a. Remove the comb generator and reconnect the cable from the signal generator to the 1705A 70 MHz INPUT.

b. Set the signal generator Frequency to 70 MHz, and the Amplitude to –25 dBm.

c. On the 1705A set SPAN/DIV to 100 kHz, adjust CENTER FREQUENCY to position the marker onto the screen, and set RESOLUTION to 10 kHz.

d. **ADJUST** – C52, C62, and C64 for a tall, symmetrical signal (≈6 Divisions).

e. Set RESOLUTION to 300 kHz, and turn SWEEP SPEED fully counterclockwise.

f. **ADJUST** – R175 to match the signal amplitude of the highest point of the 300 kHz filtered marker with the tip of the 10 kHz filtered marker while switching between 10 kHz and 300 kHz RESOLUTION.

12. Adjust L–Band Linearity

a. Set INPUT to L–BAND and SPAN/DIV to 10 MHz. Adjust the HORIZONTAL POSITION control to center the caret, and then set SPAN/DIV to FULL.

b. Connect the signal generator output to the L–BAND INPUT.

c. Set the signal generator Frequency to 900 MHz, and Amplitude to –30 dBm.

d. **ADJUST** – R35 to position the signal on the extreme left graticule.

e. Connect the signal generator output to the L–BAND INPUT through the comb generator.

f. Set the signal generator Frequency to 100 MHz, and Amplitude to +10 dBm.

g. **ADJUST** – R51, R58, R75, R81, and R82 for a linear display with each marker on a graticule mark, ±1 minor Division.

h. Readjust R35 to place first marker on the extreme left graticule.

***NOTE**. Readjustment of R35 may cause a change in linearity.*

13. Adjust Readout Range

a. Turn CENTER FREQUENCY fully counterclockwise.

b. **ADJUST** – R4 (Readout Cal) so the frequency readout displays 900 MHz.

14. Adjust Span/Div Magnification Registration

a. Set SPAN/DIV to 1 MHz.

b. Turn the CENTER FREQUENCY control to position any marker under the readout caret.

c. Set SPAN/DIV to 10 MHz.

d. **ADJUST** – R27 (Horiz Posn Readout) to position the caret directly over the marker.

e. Set SPAN/DIV to 1 MHz. Marker should be under caret ±1 minor Division.

f. Adjust the HORIZONTAL POSITION control to place the caret at the center of the screen.

g. If R27 requires adjustment, check step 10 parts a. through e. (R55), and check step 12 parts a. through d. (R35).

15. Adjust Span/Div Magnifier Range

a. Set SPAN/DIV to 10 MHz.

b. Use the HORIZONTAL POSITION control to position the caret to the center screen graticule line.

c. Turn the CENTER FREQUENCY control fully clockwise (the readout should display 2000 MHz ±50 MHz).

d. Set the signal generator Frequency to 1800 MHz, and Amplitude to –30 dBm.

e. Turn the CENTER FREQUENCY control counterclockwise until the frequency readout display is 1800 MHz.

f. **ADJUST** – R38 (Offset) to position the 1800 MHz marker directly under the caret.

g. Set the signal generator Frequency to 1000 MHz.

h. Turn the CENTER FREQUENCY control to display 1000 MHz.

i. **ADJUST** – R37 (Offset Gain) to position the 1000 MHz marker directly under the caret.

j. Repeat this step until the markers at 1800 and 1000 MHz are properly positioned.

16. Adjust Intensified Zone Range

a. Set the SPAN/DIV to FULL.

b. Set the signal generator Frequency to 1400 MHz, and Amplitude to –30 dBm.

c. Adjust the CENTER FREQUENCY control so the readout displays 1400 MHz.

d. **ADJUST** – R61 to center the intensified zone on the 1400 MHz marker.

e. Set the leveled sine wave generator Frequency to 1000 MHz.

f. Turn the CENTER FREQUENCY control counterclockwise to 1000 MHz.

g. **ADJUST** – R36 to center the intensified zone on the 900 MHz marker.

h. Repeat this step until the intensified zone is centered on appropriate markers.

17. Adjust Vertical Gain

a. Set the 1705A SWEEP SPEED fully counterclockwise.

b. Set the signal generator Frequency to 1400 MHz, and Amplitude to –30 dBm.

c. **ADJUST** – R176 for a three-Division shift (±0.25 major Divisions) when switching the input level between –30 and –60 dBm.

d. Set VERTICAL POSITION to place the noise floor one major Division up from the bottom graticule line.

e. **ADJUST** – R239 (IF AGC) for maximum signal amplitude.

f. **ADJUST** – R240 (RF AGC) so the signal is one major Division (±0.5 major Divisions) down from the top graticule line.

g. **ADJUST** – R232 to its midpoint.

18. Adjust 2 dB/Div Position

a. Disconnect the signal from the L–BAND INPUT.

b. Turn VERTICAL POSITION fully clockwise.

c. Hold the VIDEO push button down until 2 dB/Div appears on the crt readout.

d. **ADJUST** – R140 to position the noise floor to center screen.

e. Hold the VIDEO push button down again to exit the 2 dB/Div mode.

19. Adjust 590 MHz Notch

a. Select L–BAND INPUT and set the SPAN/DIV to 10 MHz.

b. Connect the signal generator to the L–BAND INPUT.

c. Set the signal generator Frequency to 1200 MHz, and Amplitude to –20 dBm.

d. Use the HORIZONTAL POSITION control to place the 1200 MHz signal at the extreme left graticule mark. A small spur should be visible near the extreme right graticule mark. Note: R240, RF AGC, may be adjusted to ease visibility of the spur. Be sure to reset R240 (step 17 part f.).

e. **ADJUST** – C69 carefully until spur is minimized. Note: While adjusting C69, note the 1200 MHz amplitude. The spur should be minimized without reducing the 1200 MHz spike by more than 2 dB.

End of Adjustment Procedure

Maintenance

Section 6
Maintenance

This section contains instructions for preventive maintenance, diagnostics, general troubleshooting, and corrective maintenance. If the instrument does not function properly, troubleshooting and corrective measures should be taken immediately to circumvent additional problems.

PREVENTIVE MAINTENANCE

Preventive maintenance consists of cleaning, visual inspection, performance checking, and, if needed, readjustment. The preventive maintenance schedule established for the instrument should be based on the environment in which it is operated and the amount of use. Under average conditions, scheduled preventive maintenance should be performed every 2000 hours of operation.

Cleaning

CAUTION. *A 2% RMA flux content solder is recommended for making repairs in this instrument. Cleaning of rosin residue is not recommended. Most cleaning solvents tend to reactivate the rosin and spread it under components where it may cause corrosion under humid conditions. The rosin residue, if left alone, does not exhibit these corrosive properties.*

The instrument should be cleaned often enough to prevent dust or dirt from accumulating. Dirt acts as a thermal insulating blanket that prevents effective heat dissipation, and can provide high-resistance electrical leakage paths between conductors or components in a humid environment.

Exterior. Clean the dust from the outside of the instrument by wiping with a soft cloth or small brush. A brush is especially useful to remove dust from around the selector buttons, knobs, and connectors. Hardened dirt may be removed with a cloth dampened in water that contains a mild detergent. Abrasive cleaners should not be used.

Crt. Clean the crt protective shield, light filter, and crt face with a soft, lint-free cloth dampened in denatured alcohol.

Interior. Clean the interior of the instrument by loosening the accumulated dust with a dry, soft brush. Once the dirt is loosened remove it with low–pressure air (high-velocity air can damage some parts). Hardened dirt or grease may be removed with a cotton-tipped applicator dampened with a solution of mild

detergent and water. Abrasive cleaners should not be used. If the circuit board assemblies must be removed for cleaning, follow the instructions for removal/replacement under the heading of Corrective Maintenance.

After cleaning, allow the interior to thoroughly dry before applying power to the instrument.

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

Visual Inspection

After cleaning, carefully check the instrument for defective connections, damaged parts, and improperly seated transistors or integrated circuits. The remedy for most visible defects is obvious; however, if heat–damaged parts are discovered, determine the cause of overheating before replacing the damaged part, to prevent additional damage.

Periodic checks of the transistors and integrated circuits are not recommended. The best measure of performance is the actual operation of the component in the circuit.

Static–Sensitive Components

This instrument contains electrical components that are susceptible to damage from static discharge. Static voltages 1 kV to 30 kV are common in unprotected environments. Table 6–1 shows the relative static discharge susceptibility of various semiconductor classes.

Table 6–1: Static Susceptibility

Relative Susceptibility Levels		Voltage
1	CMOS	100 V – 500 V
2	ECL	200 V – 500 V
3	SCHOTTKY SIGNAL DIODES	250 V
4	SCHOTTKY TTL	500 V
5	HF BIPOLAR TRANSISTORS	400 to 600 V
6	JFETS	600 to 800 V
7	LINEAR μCIRCUITS	400 to 1000 V est.
8	LOW POWER SCHOTTKY TTL	900 V
9	TTL	1200 V

Observe the following precautions to avoid damage:

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

Performance Checks and Readjustments

Instrument performance should be checked after each 2000 hours of operation, or every 12 months, if used intermittently. This will help to ensure maximum performance and assist in locating defects that may not be apparent during regular operation. The Performance Check Procedure and the Adjustment Procedure are in Section 5.

TROUBLESHOOTING

The 1705A is equipped with a microprocessor and, as with all of the new Tektronix monitors, it is capable of some power-up and off-line diagnostics. A thorough understanding of the information available in the diagnostic routines will assist in isolating problems and speed repairs.

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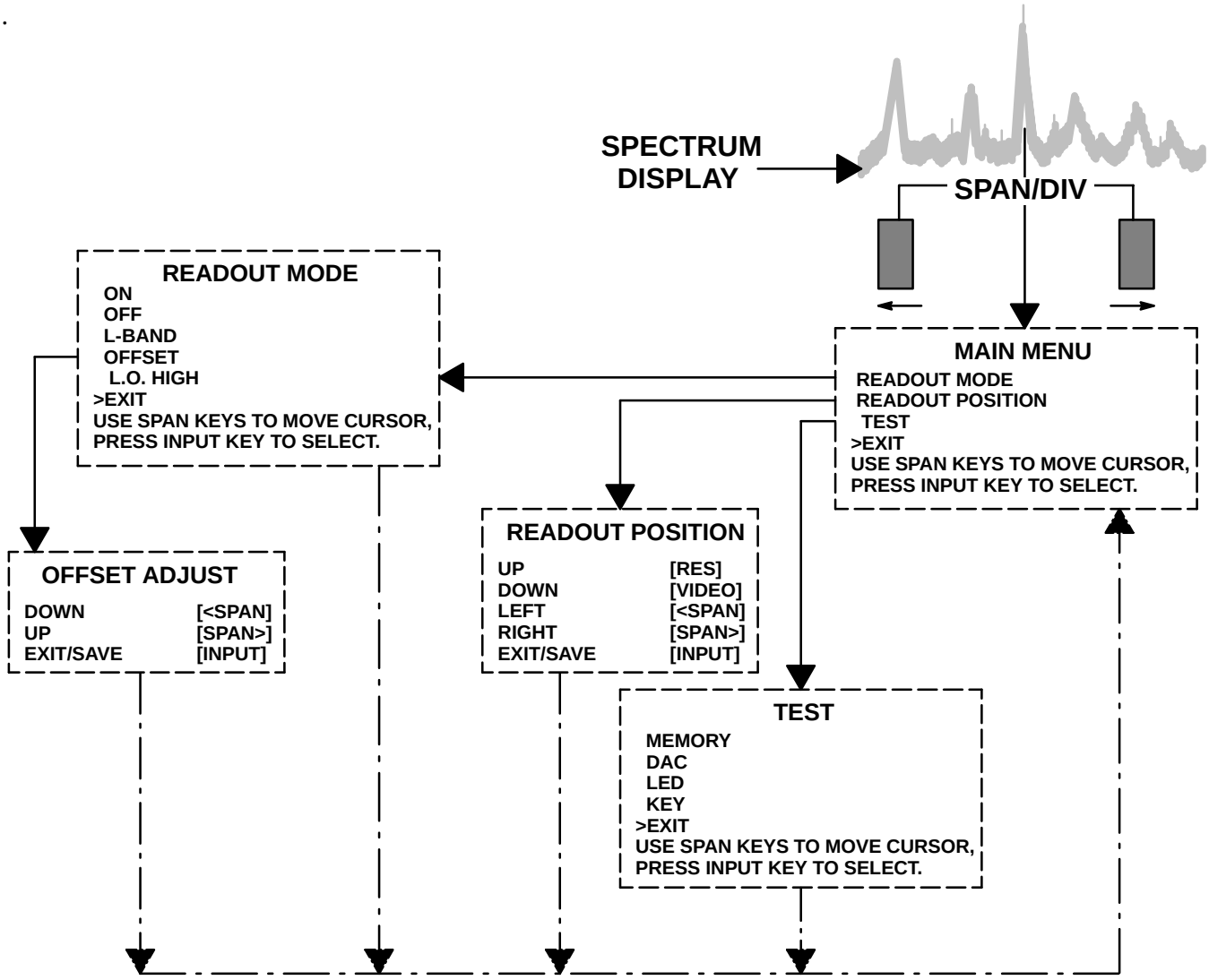


Figure 6-1: Using the 1705A menus; Main menu is entered from the spectrum display by pressing both SPAN/DIV buttons simultaneously

Diagnostic Routines

Diagnostics are addressed by pushing both ←SPAN→ buttons at the same time, which brings up the Main menu on the crt screen. Figure 6-1 shows the Main menu, and all of the submenus. In addition to the Test routine, there are operating parameters addressed from this menu (they are discussed in detail in Section 2, Operating instructions).

Setting the cursor to the Test selection and pushing the INPUT push button brings up the Test menu. See Figure 6-2. Now any one of four tests can be

selected by moving the cursor to a point adjacent to the test name and pushing the INPUT push button.

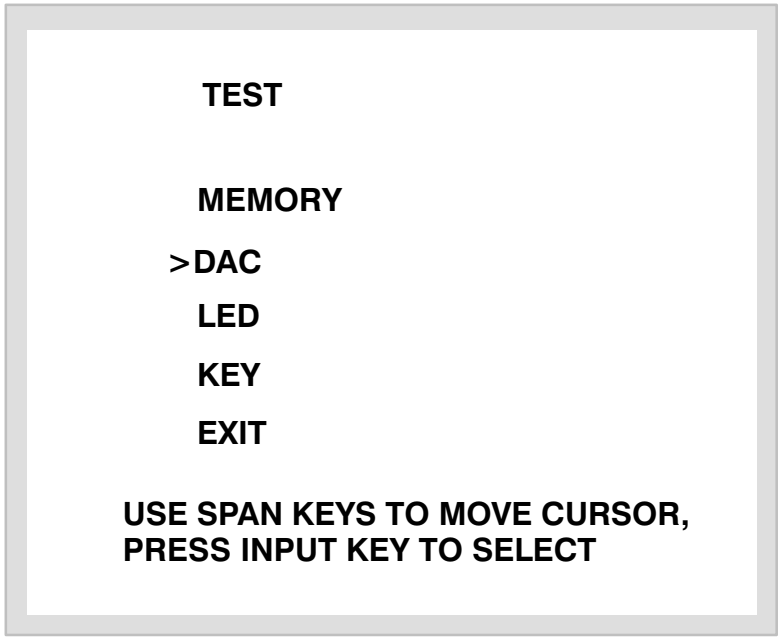


Figure 6-2: 1705A Test menu, displayed when Test is the Main menu selection

Memory Test

The NOVRAM (Non Volatile Random Access Memory) test is selected from the crt-displayed Test menu by pushing the VIDEO push button. When this test is selected, the crt first displays a message that gives the memory version and copyright dates.

The test then proceeds to check the NOVRAM and the Electrically Eraseable Programmable Memory (EEPROM). The test goes through three steps, each with its own message displayed on the crt starting with:

NONVOLATILE <2444> RAM TEST

Its first action is to write to and read out of memory; during this step there is a message that the microprocessor is:

WRITING AND READING 2444

This test checks that all lines and the NOVRAM are operating correctly. If the microprocessor can not establish Read and Write communications with the NOVRAM (U812), the following message will be displayed on the crt:

ERROR : CANNOT WRITE TO 2444

Once communication with the NOVRAM is verified, the microprocessor will attempt to store data. While attempting to store data, the following message is displayed on the crt:

READING 2444:
DATA STORED AT 60H TO 7F IN PROCESSOR

If data cannot be stored in the NOVRAM, the following message will be displayed on the crt:

ERROR : CANNOT STORE DATA

If data cannot be stored, the probable fault is with either the NOVRAM (U812) or U809 and associated components.

Once the NOVRAM test is successfully completed, there will be an acknowledging crt display. See Figure 6-3.

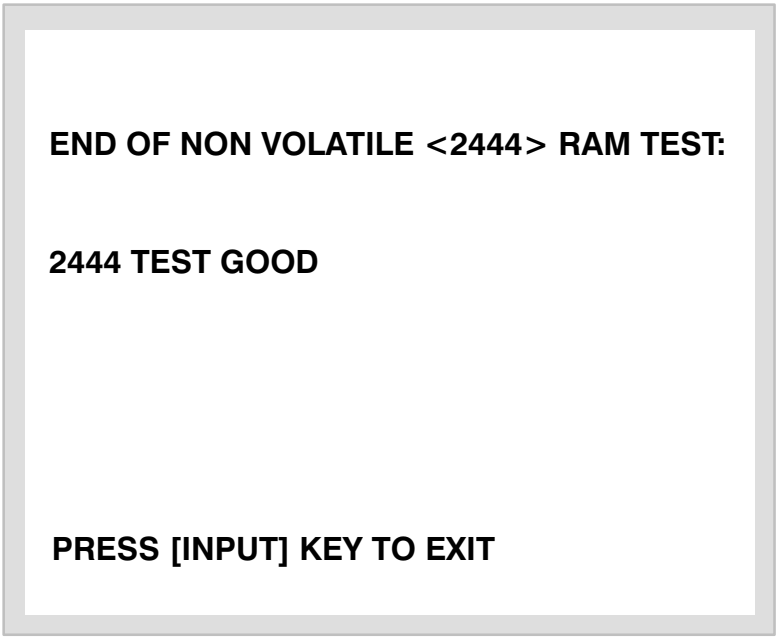


Figure 6-3: 1705A crt display when the NOVRAM Test has been successfully completed

There is a special case that can occur. In normal operation, the 1705A front-panel setup should be stored when the power is removed (either turned off or lost due to power failure) so that it can be recalled when the instrument is powered up again. If the 1705A does not come back with its previous front-panel setup, it will provide an error message. See Figure 6-4.

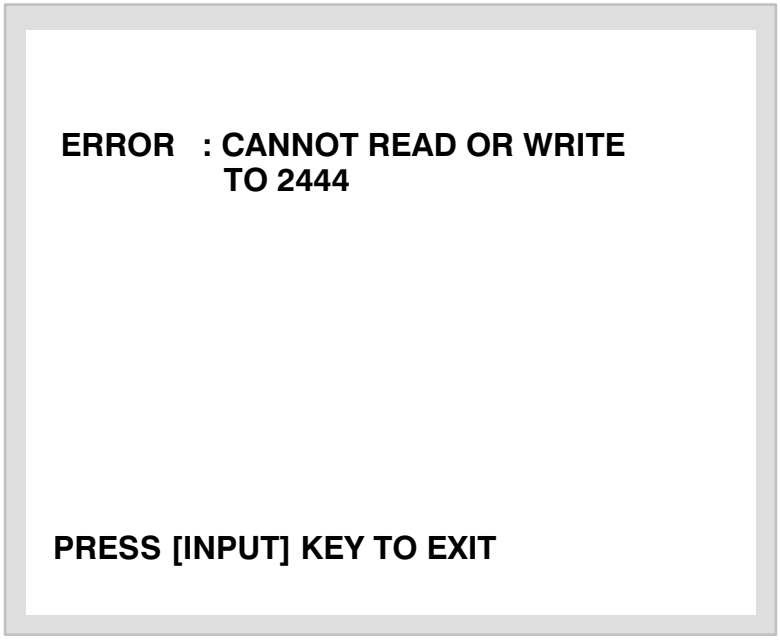


Figure 6-4: 1705A power up error message

When this message is displayed, any subsequent measurements (if possible) must be considered suspect.

DAC Test

The DAC test is used to test the readout capability, crt geometry and focus, and provides a convenient method of determining if Trace Rotation needs to be adjusted.

Figure 6-5 shows the waveform superimposed over the crt graticule to demonstrate its value as an adjustment tool. The DAC test is selected, from the Test Auxiliary menu, by pushing the 1705A RESOLUTION push button. The test in progress is exited any time the INPUT push button is pushed.

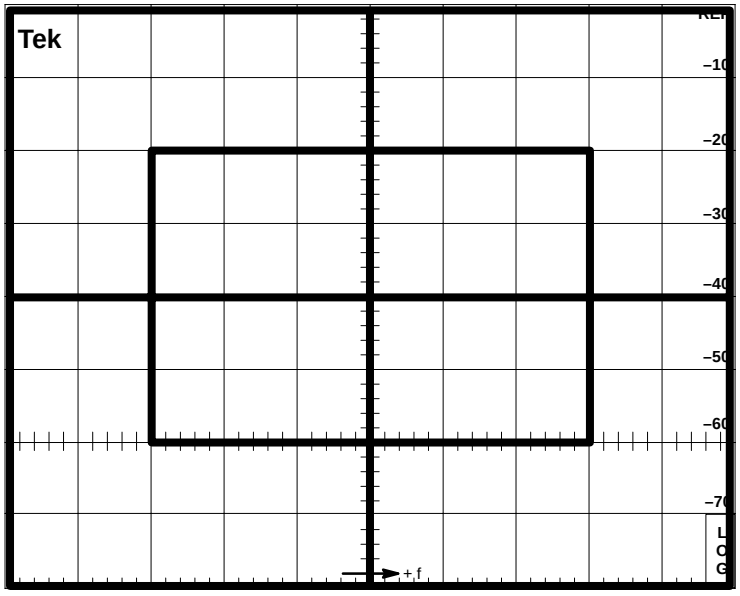


Figure 6-5: DAC check waveform used to check Focus, Astigmatism, Geometry, and Trace rotation setting

LED and Key Tests

There are two additional diagnostic tests that can be made. The LED test alternates high and low levels on the control lines to the front-panel indicators. It can be used to either locate burned-out indicators (visual inspection of flashing indicators) or shorted indicator lines (by probing with an oscilloscope).

The Key test simply prints out the name of the key's function when it is pressed. In both cases the test is terminated by pressing the INPUT push button.

Troubleshooting Aids

Since this manual is also a troubleshooting aid, its organization is described here. This material is general, and does not cover specific cases.

Foldout Pages

The foldout pages at the back of the manual contain block and schematic diagrams, circuit board illustrations, and lookup charts.

Diagrams. Schematic diagrams show the circuit number and electrical value of each component. Symbols used on these diagrams are defined on the first page of Section 9. Circuit boards are indicated by a heavy border.

Signals leaving or entering a schematic diagram are cross-referenced with the connecting schematic number in brackets and the schematic grid location in small print.

Refer to the Replaceable Electrical Parts list for a complete description of each component.

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

Look up Charts. Each schematic diagram is assigned an alphanumeric grid and a look up chart which lists the grid location of components on that schematic.

Circuit Board Illustrations. Electrical components, connectors, and test points are identified on circuit board illustrations, which are located on the back of a preceding schematic diagram.

Assembly and Circuit Numbering. The circuit board assemblies are assigned assembly or "A" numbers. Figure 6-6 shows the circuit board assembly locations for this instrument.

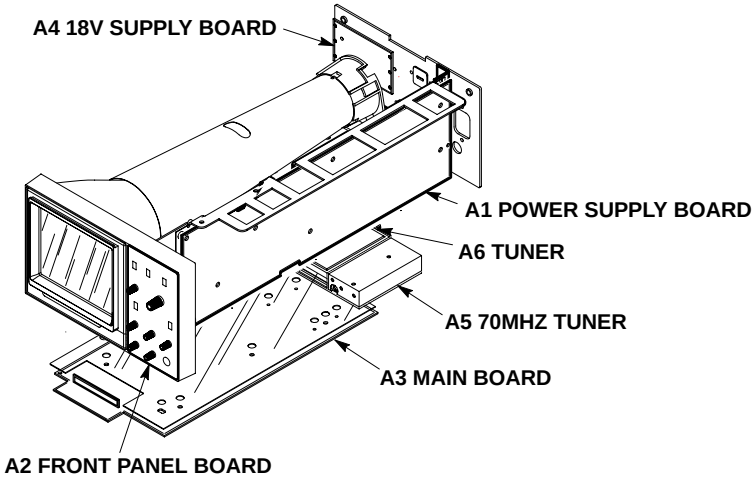


Figure 6-6: Circuit board assembly locations

Parts Lists

There are two separate parts lists in this manual. The Replaceable Electrical Parts list precedes the schematic diagrams and circuit board illustrations. The Replaceable Mechanical Parts list, accompanied by exploded view drawings, follows the schematic diagrams and circuit board illustrations.

Replaceable Electrical Parts. This list is arranged by assembly as designated in ANSI Standard Y32.16–1975. The list begins with the part numbers for the major assemblies (etched circuit boards). Each circuit board is identified by an A# (assembly number).

The circuit numbers of the individual components in the parts list is made up by combining the assembly number with the individual circuit number. EXAMPLE: R117 on Assembly (circuit board) A3 is listed in the Replaceable Electrical Parts list as A3R117.

***NOTE**. Always consult the parts list and "Change Information" for part numbers and descriptions before ordering replacement parts. Some parts may have been replaced in an individual instrument.*

Replaceable Mechanical Parts. Parts listed in the Replaceable Mechanical Parts list are assigned index numbers which correspond to circled numbers on the exploded view drawing(s).

Accessories List. Standard accessories are illustrated in the exploded view drawing. Part numbers of standard and optional accessories are given at the end of the Replaceable Mechanical Parts list.

Major Assembly Interconnection

Signals and power supply voltages are passed through the instrument with a system of interconnecting cables. The connector holders on these cables have numbers that identify terminal connectors; numerals are used from 2 up. A triangular key symbol is used to identify pin 1 on the circuit board and the connector to assist in aligning the connector with correct square pins. Figure 6-7 shows the numbering scheme (and the triangular marking) on the connector and the marking on the etched circuit board.

A pin replacement kit including necessary tools, instructions, and replacement pins is available from Tektronix, Inc. Contact a Tektronix field office or representative for assistance in ordering this kit.

Connectors with Center Polarizers. These polarizers serve as a key for proper mating with the connector on the circuit board. Pin 1 is also marked with a triangular symbol on both connectors.

General Troubleshooting Techniques

The following procedure is designed to assist in isolating problems, which in turn expedites repairs and minimizes down time.

1. Ensure that the malfunction exists in the instrument. This is done by making sure that the instrument is operating as intended by Tektronix (see Operating Instructions in Section 2).
2. Determine the nature of the problem. Attempt to make the determination of whether the instrument is out of calibration or if there has been a component failure. Once the type of failure has been determined, proceed on to identify the functional area most likely at fault.

3. Determine and evaluate all trouble symptoms. This is accomplished by isolating the problem to a general area such as an assembly. The block diagram is a valuable aid in signal tracing and circuit isolation.

CAUTION. *Use extreme care when probing with meter leads or probes, because of the high component density and limited access within the instrument. The inadvertent movement of leads or a probe could cause a short circuit or transient voltages capable of destroying components.*

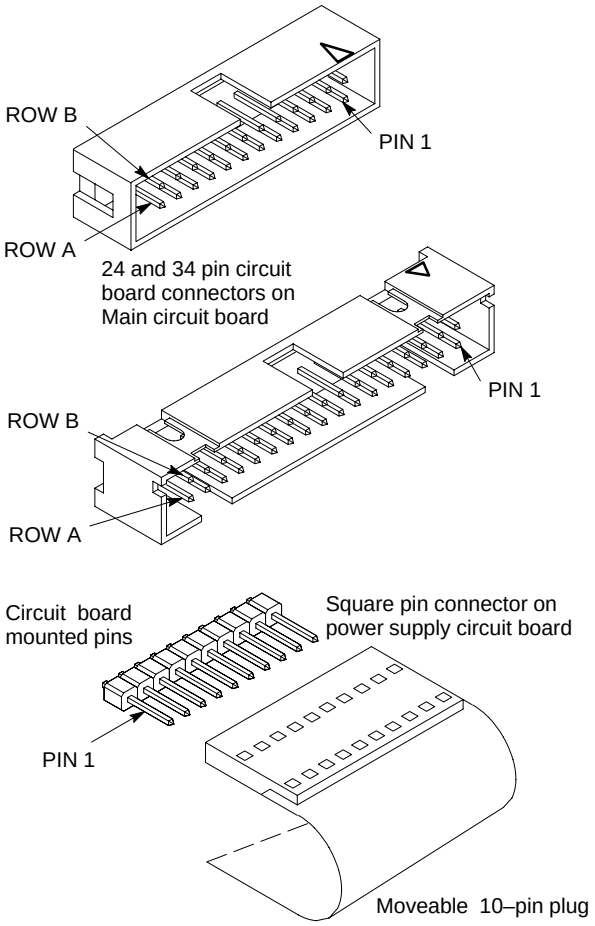


Figure 6-7: Multiple pin connectors used in the 1705A Spectrum Monitor

CAUTION. *Always remove the assembly from the instrument prior to attempting to replace a soldered-in component. See Corrective Maintenance for the correct procedure.*

4. Visually inspect the suspect assembly for obvious defects. Most commonly these will be broken or loose components, improperly seated components, overheated or burned components, chafed insulation, etc. Repair or replace

all obvious defects. In the case of overheated components, determine and correct the cause of overheating before re-applying power.

5. Use successive electrical checks to locate the source of the problem. The primary tool for problem isolation is the oscilloscope. Use the Performance Check Procedure (located in Section 5) to determine if a circuit is operating within specifications. At times it may be necessary to change a calibration adjustment to determine if a circuit is operational, but since this can destroy instrument calibration, care should be exercised. Before changing an adjustment, note its position so that it can be returned to its original setting.

6. Determine the extent of the repair. If the necessary repair is complex, it may be advisable to contact your local Tektronix field office or representative before continuing. If the repair is minor, such as replacing a component, see the parts list for replacement information. Removal and replacement procedures for the assemblies can be found under Corrective Maintenance.

Power Supply Troubleshooting Procedure

NOTE. *A review of the power supply theory of operation is recommended before attempting repairs.*

The equipment needed to troubleshoot the power supply:

- Digital Multimeter (DMM), with a diode check function
- Oscilloscope
- 0 to 20 Vdc Variable Power Supply
- Clip Lead – to short across a component
- High Voltage Probe, ≥ 1 GΩ input resistance

Introduction

The Troubleshooting Procedure for the Power Supply (Assembly A1) is split into two sections, the Low Volts and High Volts Supplies. Start the procedure by determining which section of the Power Supply the problem is in. Apply ac power and turn on the Power Supply. From Table 6–2, determine which symptom the Power Supply exhibits and refer to the corresponding procedure.

Table 6–2: Power Supply Fault Symptoms

Symptom	Procedure
Line fuse open	Rectifier/Switcher Check (Low Volts)

Table 6–2: Power Supply Fault Symptoms (Cont.)

Power Supply cycles OFF/ON	Output Check (Low Volts), or High Voltage Oscillator Check (High Volts)
Does not power up	Control Circuit Check (Low Volts)
5 V not regulating	Error Amplifier Check (Low Volts)
Improper crt display	High Volts Supply

Low Volts Supply

NOTE. *A 20Ω, 2 watt resistor should be used as a load for the Low Volts Supply. Disconnect J4 and connect the 20Ω resistor between W1 (+5 V) and TP1 (secondary ground).*

1. Preliminary Checks

a. A properly functioning and loaded Low Volts Supply will output the voltages listed in Table 6–3. Use the DMM to measure the voltages between TP1 and the voltage test points. If the supply is not regulating properly, continue with the procedure.

Table 6–3: Low Volts Supply Voltages

Test Point	Voltage
W1 – (+5 V)	+4.88 to +5.12 V
W4 – (+15 V)	+14.0 to +16.0 V
W3 – (–15 V)	–14.0 to –16.0 V
W2 – (+40 V)	+39.0 to +41.0 V

NOTE. *The Low Volts Power Supply troubleshooting is performed without applying ac power.*

b. Disconnect ac power from the instrument. Disconnect the instrument from the Power Supply by removing the jumper from J4.

c. Use the digital multimeter to measure the voltage between TP2 and the tab (drain) of Q9. Be sure the voltage is near 0 V before proceeding.

CAUTION. *Do not proceed until the drain of Q9 is near 0 V. Dangerous voltage potentials are present in the circuit until the capacitors discharge.*

2. Rectifier/Switcher Check

a. Use the digital multimeter to measure the voltage between TP2 and the tab (drain) of Q9. Be sure the voltage is near 0 V before proceeding.

b. Unsolder and lift one end of R102.

c. With the negative lead of the digital multimeter connected to TP2 and the positive lead connected to the tab of Q9, measure the circuit resistance. A resistance of less than 20 kΩ indicates a shorted mosfet (Q9). If the mosfet is shorted, replace it and perform the Control Circuit Check.

d. Using the digital multimeter diode test function, test CR21, CR22, CR23, and CR24 for shorts. Diode replacements must be fast reverse recovery (300 ns) types to reduce conducted noise.

e. Reconnect the lifted end of R102.

3. Output Check

a. Connect the negative output from the 20 Vdc Power Supply to TP1. Connect the positive output to W4 (+15 V). The circuit should draw less than 20 mA. Excessive current draw can be caused by CR11 or U2 (High Volts Power Supply).

b. Connect the negative output from the 20 Vdc Power Supply to TP1. Connect the positive output to W2 (+40 V). The circuit should draw less than 20 mA. Excessive current draw can be caused by CR14 or Q6 (High Volts Power Supply).

c. Connect the positive output from the 20 Vdc Power Supply to TP1. Connect the negative output to W3 (–15 V). The circuit should draw less than 20 mA. Excessive current draw can be caused by CR12.

d. Connect the negative output from the 5 Vdc Power Supply to TP1. Connect the positive output to W1 (+5 V). The circuit should draw less than 20 mA. Excessive current draw can be caused by CR13 or Q1 and Q2 (High Volts Power Supply).

4. Control Circuit Check

a. Connect the negative output from the 20 Vdc Power Supply to TP2. Connect the positive output to the cathode of CR17. Short C47 with a clip lead. Connect the oscilloscope probe ground to TP2.

b. Table 6–4 lists the signal present in a properly functioning control circuit.

Table 6–4: Control Circuit Test Points

Circuit Location	Signal
U5, pin 1	Approximately 5 Vdc
U5, pin 2	Approximately 2 Vdc
U5, pin 3	0 V
U5, pin 4	80 kHz triangle wave, 2 V p-p
U5, pin 6	80 kHz square wave, 18 V p-p
U3, pin 1	80 kHz square wave, 5 V p-p
U3, pin 2	2.1 Vdc
U3, pin 6	2.9 Vdc
U3, pin 7	Approximately 5 Vdc
U4, pin 13	80 kHz repetition rate, 300 ns width, approximately 3 V p-p
Q8, collector	80 kHz repetition rate, 400 ns width, switching from 5 V to approximately 2 V.

5. Error Amplifier Check

a. Connect the negative output from the variable DC Power Supply to TP1. Connect the positive output to W1 (+5 V).

b. Connect the negative output of another variable DC Power Supply to TP1. Connect the positive output to W4 (+15 V). Set the variable power supply to 20 Vdc.

c. Connect the digital multimeter between TP1 and the cathode of CR15.

d. Set the variable DC Power Supply connected to W1 (+5 V) to 4.8 V. The cathode of CR15 should be approximately 20 V.

e. Set the variable DC Power Supply connected to W1 (+5 V) to 5.2 V. The cathode of CR15 should be approximately 2 V.

f. If this check did not reveal the cause for the +5 V supply not regulating, refer to the Output Check and the Control Circuit Check.

High Volts Supply

Table 6–5 lists the High Volts Supply fault symptoms and procedures.

Table 6–5: High Volts Supply Fault Symptoms

Symptom	Procedure
Unable to focus crt using the front-panel control	Focus Amplifier Check
Unable to adjust crt intensity using the front-panel control	Z–Axis Amplifier Check Grid Drive Check
No crt display	High Voltage Oscillator Check CRT Voltage Check

Load the Low Volts Supply with the instrument, or with the 20Ω resistor as stated at the beginning of the Troubleshooting Procedure.

Focus Amplifier Check

Unsolder and lift one end of R24.

Power up the Power Supply.

Using the digital multimeter, measure the voltage between TP1 and the collector of Q1. It should be approximately –140 V.

Reconnect the lifted end of R24.

Z-Axis Amplifier Check

Unsolder and lift one end of R8.

Power up the Power Supply.

Using the digital multimeter, measure the voltage between TP1 and the collector of Q4. It should be approximately +10 V.

Short together the base and emitter of Q5. The collector of Q4 should be approximately +100 V.

Reconnect the lifted end of R8.

Grid Drive Check

Turn off the Power Supply. Use the digital multimeter's diode check to test CR1, CR2, CR3, CR5, and CR6 for shorts.

Power up the Power Supply.

Using the digital multimeter, measure the voltage between TP1 and the cathode of CR5. It should vary between approximately +75 and +200 V as R58 (CRT Bias) is adjusted.

Connect the oscilloscope probe to the anode of CR5 and the probe ground to TP1. The signal should be a clipped sine wave of +75 to +200 V p-p.

High Voltage Oscillator Check

Connect the oscilloscope probe to T1 pin 3 (Q6 collector) and the probe ground to TP1. Power up the supply. The signal should be a +60 V p-p, 22 kHz sine wave.

Check the following voltages using the digital multimeter:

Table 6–6: High Voltage Oscillator Test Points

Circuit Location	Voltage
T1, pin 4	Approximately +40 V.
T1, pin 13	Less than +2 V.
U2, pin 2	Approximately +4.8 V.
U2, pin 6	+4 to +11 V.
CR9, cathode	Approximately +100 V.

CRT Voltage Check

NOTE. *This check requires a high voltage probe having an input resistance of 1 GΩ or more.*

Connect the high voltage probe ground to TP1.

Load the Low Volts Supply with the instrument, or with a 20Ω, 2 watt resistor loading the 5 V supply.

Power up the Power Supply.

Use the high voltage probe to measure the voltage at the anode of CR4. It should be approximately –2530 V.

Measure the voltage at the anode end of CR3. It should be 50–150 V more negative than the reading from the anode of CR4.

CORRECTIVE MAINTENANCE

CAUTION. *A 2% RMA flux content solder is recommended for making repairs in this instrument. Cleaning of rosin residue is not recommended. Most cleaning solvents tend to reactivate the rosin and spread it under components where it may cause corrosion under humid conditions. The rosin residue, if left alone, does not exhibit these corrosive properties.*

NOTE*. No repair should be attempted during the warranty period.*

Obtaining Replacement Parts

Replacement parts are available through the local Tektronix, Inc., field office or representative. However, many common electronic parts are available through local sources. Using a local source, where possible, will eliminate shipping delays.

Changes to Tektronix instruments are sometimes made to accommodate improved components, as they become available, and to improve circuit performance. Therefore, it is important to include the following information when ordering parts:

1. Part Number
2. Instrument Type or Number
3. Serial Number
4. Modification or Option Number (if applicable)

If an ordered part has been replaced with a new or improved part that is a direct replacement, the new part will be shipped. If the part does not directly replace the old one, the local Tektronix field office or representative will contact the customer. After any repair or modification of the instrument, circuit readjustment may be required.

Test Selected Components

Test selectable components and their values are shown in Table 6−7.

Table 6–7: Test Selectable Components

Circuit Number	Nominal Value	Range of Values	Selection Criteria
R50 R74 R73	5.62K 3.40K 18.2K	2.7K to 8.2K 1K to 6.8K 18K to 27K	To correct nonlinearities of L–band tuners.
R53	115.0K	115K to 130K	To alter magnifier range when adjustment range of A3R38 is insufficient.

Mechanical Disassembly/Assembly

Use these instructions for disassembly and reverse them for reassembly, unless otherwise noted.

WARNING. *Before attempting any disassembly/assembly of the instrument, be sure to disconnect the power cord.*

CAUTION. *Do not reinsert screws in the rear panel when the instrument is removed from the cabinet.*

NOTE. *All screws, unless otherwise noted, are TORX® screws and can be removed with a T15 screwdriver tip (Tektronix part number 003-0966-00). The exception is #2 Pozidrive® screws which can be removed with a #1 Pozidrive® tip (003-0443-00).*

Do not reinsert screws in the rear panel when the instrument is removed from the cabinet.

Bezel Removal

1. Remove the two bezel screws. See Figure 6-8.
2. Grasping the bottom of the bezel, pull out and upward. There are two hinges at the top of the bezel that hold it in place; once the bezel is at an approximate 45° angle with the front panel, they will disengage.

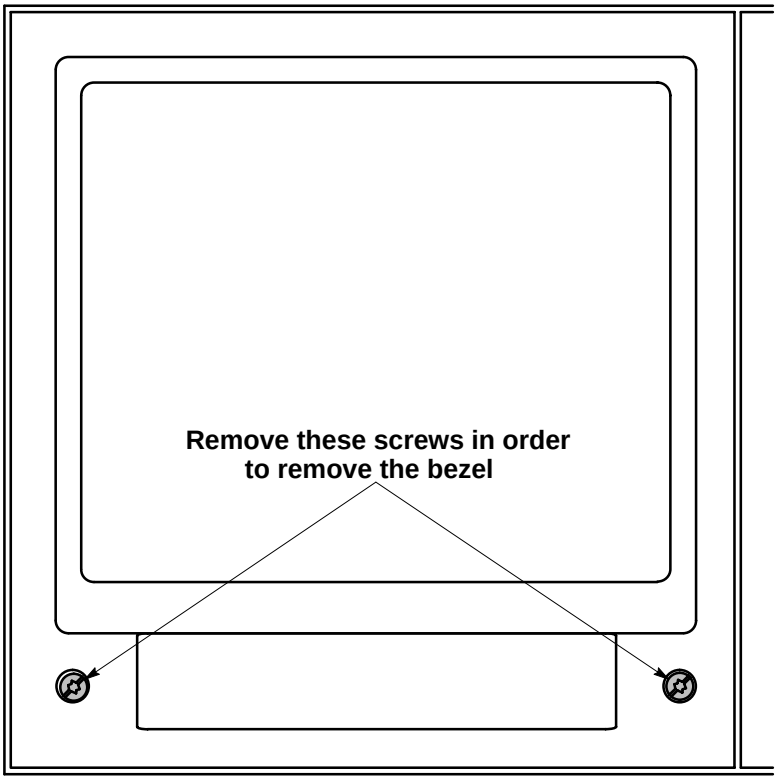


Figure 6-8: Bezel securing screws

Graticule Light Removal and Replacement

For graticule light removal and replacement, tweezers with curved, serrated tips are recommended. For example: Miltex PL312, 6–100 (equivalent to PL312) or PL317 (longer than PL312).

CAUTION. *Needle-nosed pliers are not recommended.*

Replacement bulbs are supplied with this instrument as Standard Accessories. Additional bulbs can be purchased from Tektronix (see Replaceable Electrical Parts list) or from local electronics distribution sources.

Procedure

1. Remove the bezel according to the preceding instructions.
2. To remove a bulb, position the tweezer tips on the thin, flat portion of the bulb (close to the plastic socket). Carefully pull the bulb straight out.
3. To install a bulb, hold it with the tweezers as described in step 2, position it in front of the socket, and push the bulb with your finger until it snaps into place.

Removal of the crt

1. Remove the bezel.

WARNING. *The crt may retain a dangerous charge. Ground the conductor of the anode to discharge the crt. Do not allow the conductor to touch your body or any circuitry.*

2. Remove the anode connector and discharge it to ground.
3. Disconnect J2 (trace rotation) on the Main board and push the connector through the hole in the board.
4. The CRT can now be pulled straight out (some pressure is needed). The CRT shield, along with the rubber manchet around its back, should come out with the CRT.

Replacing the crt

1. If the CRT is to be replaced, remove the metal shield from the neck of the old crt and place it around the neck of the new CRT, with the WARNING sticker towards the top of the instrument. Be prepared to align the notches in the metal cover with the plastic CRT holder.
2. Slip the CRT part way back into position and feed the trace rotation wires (and plug) back through the hole in the Main board.

CAUTION. *Avoid bending the crt base pins when pushing the crt into the socket.*

3. Slide the CRT into the instrument, guiding the rubber manchet on the end of the shield into the rear CRT support.
4. Align the socket on the A10 CRT Socket board with the pins and key on the CRT. Gently push the CRT and the socket board together until the CRT pins are fully seated in the socket.
5. Replace the trace rotation connector (J2, Main board), and snap the anode lead onto the anode connector on the side of the CRT.
6. Wipe the faceplate of the CRT to remove fingerprints, then replace the bezel. If the fit is too tight to allow the bezel to go into position, or if the CRT has a loose fit after the bezel is completely tightened down, then the rear CRT support must be repositioned.

   To reposition the rear CRT support, loosen the two nuts that hold the support in place. With the CRT and bezel in place, push the support towards the front of the instrument until it is snug against the rubber manchet on the rear of the CRT shield. Tighten the two support nuts.

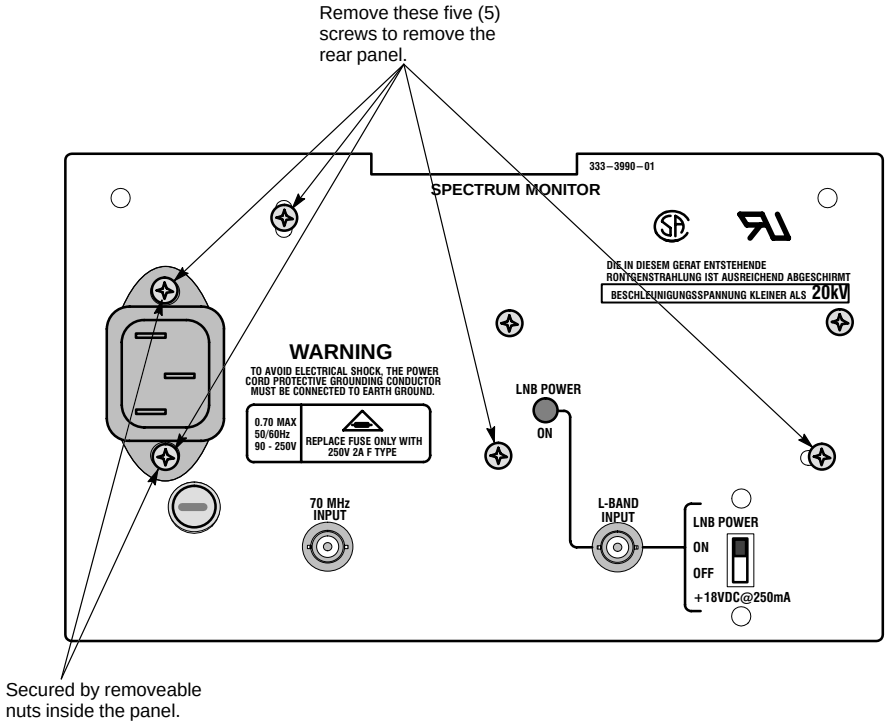


Figure 6-9: Screws securing the rear panel

Removal of the Rear Panel

1. Remove the five rear screws. See Figure 6-9. Screws securing the power receptical use removeable nuts as fasteners inside the rear panel.
2. Unsolder the bnc and ground connections. (If 1700F10 Field Upgrade is installed, unsolder leads from the battery connector.)
3. Unsolder the two leads to the +18 V switch.
4. Remove the hex nut on the L–BAND INPUT connector.
5. Pull the rear panel free from the chassis, be careful not to pull the unsoldered wires.
6. To replace, reverse the procedure.

Removal of Front–Panel Assembly

1. Remove the blue multiwire connector from J154.
2. Remove the two screws holding the board in place. See Figure 6-10 for location.

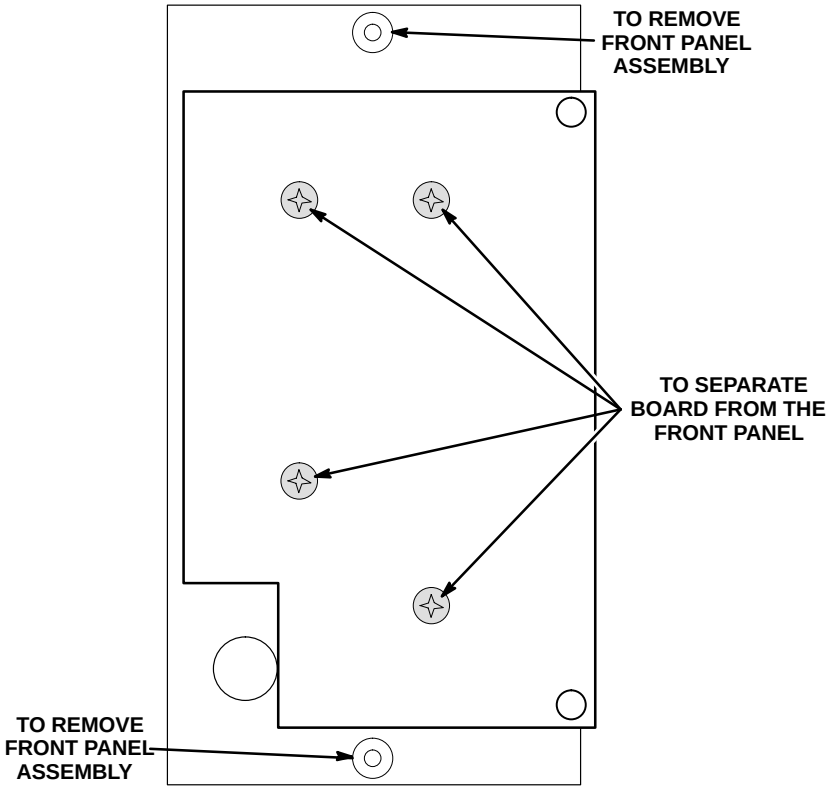


Figure 6-10: Screws securing the front panel board (A2) in place

3. Remove the board by slipping it through the front–panel opening.
4. To access the Front-Panel board components:
   a. Remove the knobs from the front.
   b. Remove the four screws from the rear.
   c. The board should now separate from the front panel making the components accessible.

Removing the L–Band Tuner

1. Unsolder the five wires from the tuner.
2. Unplug the phone jack from the tuner.
3. Remove the rear-panel L–BAND INPUT connector hex nut. See Figure 6-11.

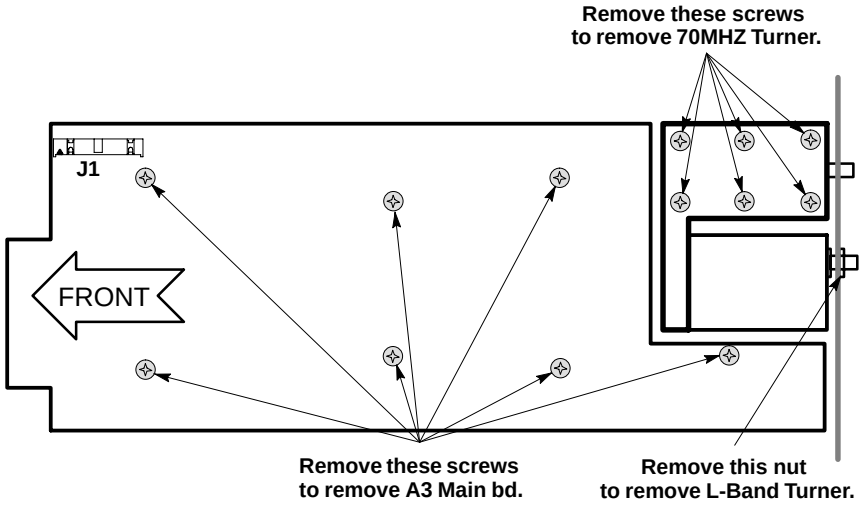


Figure 6-11: Screws holding the Main board (A3) and the Tuners (A5 and A6) in place

4. Remove the six screws that hold the cover on the 70 MHz tuner. (The cover serves as a hold down for the L–Band tuner.)
5. Slide the tuner back and upward until the L–BAND INPUT connector is clear of the rear panel.

Removing the 70 MHz Tuner

1. Unsolder the three wires from the feed-through capacitors at the back of the 70 MHz tuner.
2. Unplug the coax connector from the rear of the 70 MHz tuner.
3. Remove the 70 MHz tuner cover. It is held on by six screws. See Figure 6-11.
4. Turn the 1705A on its left side (crt down) and remove the two screws that secure the 70 MHz tuner to the main chassis.
5. Slide the tuner back and upward to remove.
6. Reverse the procedure to re-install the tuner.

Removal and Replacement of the Main Board

1. Remove both tuners.

2. Remove the plugs from the following connectors: J1 to the Front-Panel board, J4 on the Power Supply board, and J2 on the Main board (Trace Rotation).
3. Unsolder the leads that go to the rear-panel bnc connector and ground the two horizontal crt leads (red and green) and the two vertical crt leads (blue and brown).
4. Slip the crt and trace rotation leads through the appropriate holes in the Main board.
5. Remove the seven screws that are holding the board in place. See Figure 6-11 for their locations.
6. Remove the Main board by sliding it toward the rear panel until the toe of the board clears the front. Then lift out.
7. To replace the Main board, lay the board flat and slide it back into place. Guide the front of the circuit board into the slots in the front molding.
8. To complete the replacement of the board, reverse the rest of the steps.

Removal and Replacement of the Power Supply Board

1. Remove the plug from A1J4 on the Power Supply board (the connection to the Main board).

WARNING. *The crt may retain a dangerous charge. Ground the conductor of the anode to discharge the crt. Do not allow the conductor to touch your body or any circuitry.*

2. Remove the anode connection from the crt and discharge it to ground.
3. Remove the plugs from J1 and J3 (the crt wires). Remove the plug from J2 (the power switch). (If the 1700F10 Field Upgrade Kit is installed, unsolder the leads to the rear-panel DC Connector.)
4. Disconnect the ac line filter from the rear panel by unscrewing the two screws on the rear panel that are holding it in.
5. Using a #1 Pozidrive® tip, disconnect the power ON/OFF switch from the front panel.
6. Remove the seven screws that fasten the Power Supply board to the instrument, as shown in Figure 6-12.
7. Remove the board by sliding it forward and lifting it up.

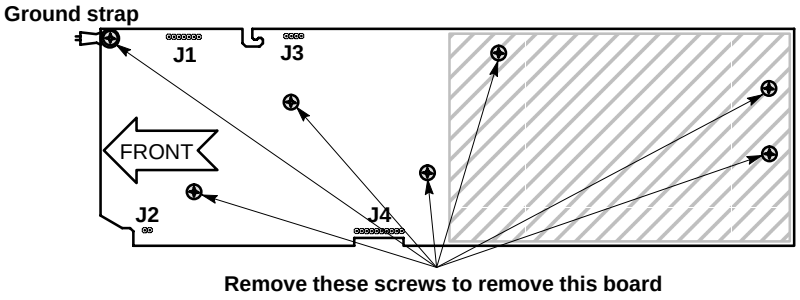


Figure 6-12: Removing the Power Supply board

Removing the LNB Power Supply Board

1. Unplug the interconnecting plug from the right side of the LNB power supply.
2. Remove the two Torx screws securing the circuit board to the rear panel. See Figure 6-13.
3. Remove the circuit board.
4. Replace the circuit board by reversing the procedure.

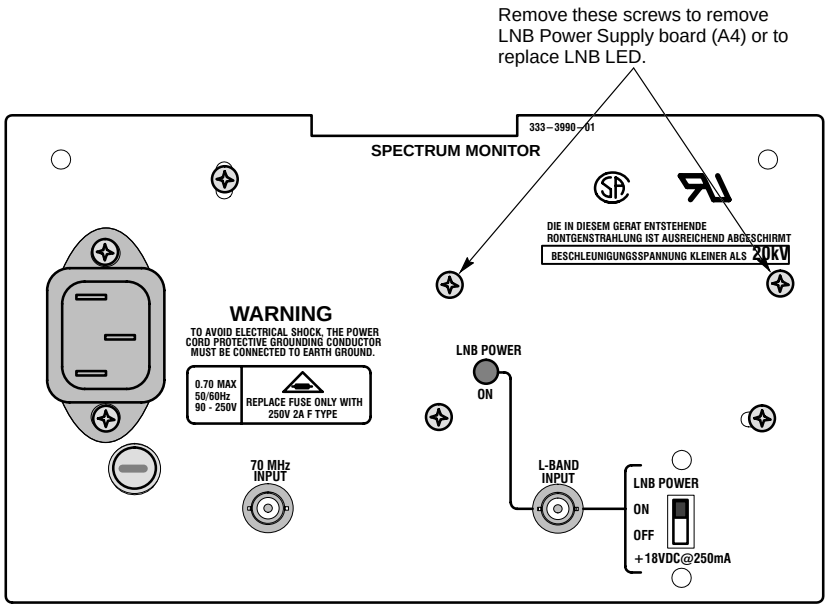


Figure 6-13: Mounting screws for the LNB Power Supply circuit board, A4

REPACKAGING

If the instrument is to be shipped to a Tektronix Service Center for service or repair, attach a tag to the instrument showing the following information:

1. Owner (with complete address) and the name of the person at your firm that can be contacted.
2. Instrument serial number and a description of the service required.

If possible, save and reuse the package in which your instrument was shipped, since this will provide maximum protection. (See Figure 6-14.) If the original package is unfit for use or not available, repackage the instrument as follows:

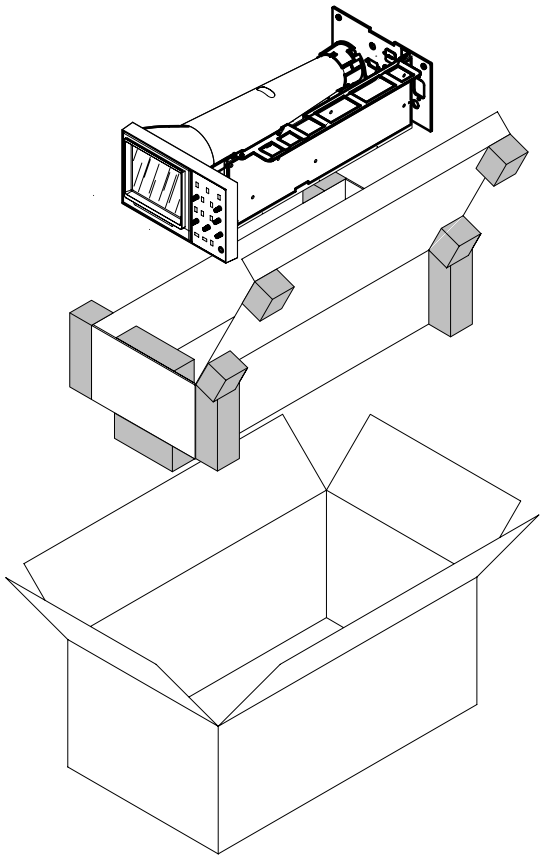


Figure 6-14: Repackaging a 1705A instrument

1. Use a shipping carton of corrugated cardboard, with a test strength of at least 275 pounds, and inside dimensions that are at least six inches greater than the dimensions of the instrument.
2. Surround the instrument with polyethylene sheeting to protect the finish.

3. Cushion the instrument on all sides by tightly packing dunnage or urethane foam between the carton and the instrument. Allow 3 inches on all sides for cushioning.

4. Seal the carton with shipping tape or industrial stapler.

Options

Section 7
Options

This section describes instrument options and customer-installable field upgrade kits available for the 1705A Spectrum Monitor.

Options

CRT Options

The standard instrument is shipped with a P31 (green) phosphor crt installed. If Option 74 is ordered, the instrument is shipped with a P4 (white) phosphor crt installed. The crt part numbers are given at the end of the Replaceable Electrical Parts list.

Power Cord Options

Table 7–1: Power Cord Options

Option	Description of power cord*
A1	Universal Europe 220V/16A Locking
A2	United Kingdom 240V/15A
A3	Australian 240V/10A
A4	North American 250V/18A
A5	Swiss 240V/6A

*All power cords include captive power plug and one replacement fuse.

Unless otherwise specified, power cords for use in North America are UL listed and CSA certified. Option cords are approved by at least one test house acceptable in the country to which the product is shipped. Power cord part numbers are shown on the pull-out in Section 10.

Field Upgrade Kits

Cabinets

All of the Safety and EMI tests used to qualify the 1705A were performed in a cabinet. There are two optional cabinets and a dual rack adapter available for the installation of these instruments.

For more information, refer to the cabinet installation drawings in Section 3, or contact a Tektronix field office or distributor.

Plain Cabinet (1700F00) This plain, silver-grey cabinet is designed for permanent mounting. The ventilating holes in the top, bottom, and sides of the cabinet allow heat generated within the instrument to dissipate. When mounting, allow air to circulate freely through these holes.

Carrying Case (1700F02) This silver-grey metal cabinet, designed for portable applications, is equipped with feet, flipstand, and carrying handle. The TEKTRONIX BP1 Battery Pack can easily be mounted to this cabinet to provide a 12 Vdc power source for portable operation.

Side–by–Side Rack Adapter (1700F05) This 19-inch rack-mounting adapter, which contains two 1700F00 cabinets, accepts two 1700-Series instruments side by side.

Blank Panel (1700F06) When only one side of a 1700F05 dual rack adapter is used, this blank panel can be installed in the other half to improve appearance and protect air flow.

Utility Drawer (1700F07) When only one side of a 1700F05 dual rack adapter is used, an alternate to the 1700F06 blank panel is the 1700F07 utility drawer. This drawer provides over 1/3 cubic foot of storage space for accessories. The drawer kit includes a tray, which is permanently mounted to the 1700F05. The drawer opens and closes readily, unless latched for transport. The drawer can also be removed from the drawer tray by lifting up and out.

ORDERING

These items can be ordered with the 1705A, or purchased through a Tektronix field office or distributor. When ordering, include both the name and number of the field upgrade kits.

Replaceable Electrical Parts

Section 8
Replaceable Electrical Parts

This section contains a list of the components that are replaceable for the 1705A. Use this list to identify and order replacement parts. There is a separate Replaceable Electrical Parts list for each instrument.

Parts Ordering Information

Replacement parts are available from or through your local Tektronix, Inc., Field Office or representative.

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

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

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc., Field Office or representative will contact you concerning any change in part number.

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

Using the Replaceable Electrical Parts List

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

Cross Index–Mfr. Code Number to Manufacturer

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

Abbreviations

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

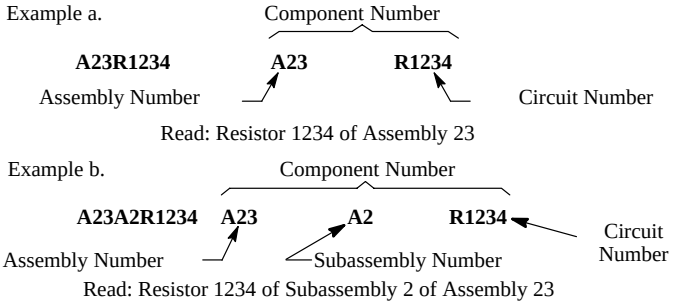
List of Assemblies

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

Column Descriptions

Component No. (Column 1)

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



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

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

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

Tektronix Part No. (Column 2)

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

Serial/Assembly No. (Column 3 and 4)

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

Name and Description (Column 5)

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

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

Mfr. Code (Column 6)

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

Mfr. Part No. (Column 7)

Indicates actual manufacturer's part number.

CROSS INDEX – MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code.	Manufacturer	Address	City, State, Zip Code
00779	AMP INC	2800 FULLING MILL PO BOX 3608	HARRISBURG PA 17105
01121	ALLEN–BRADLEY CO INDUSTRIAL CONTROL PRODUCTS	1201 S 2ND ST	MILWAUKEE WI 53204–2410
01295	TEXAS INSTRUMENTS INC SEMICONDUCTOR GROUP	13500 N CENTRAL EXPY PO BOX 655012	DALLAS TX 75265
02735	RCA CORP SOLID STATE DIVISION		
02875	HUDSON TOOL & DIE CO INC	18 MALVERN STREET	NEWARK, NJ 07105
04222	AVX CERAMICS DIV OF AVX CORP	19TH AVE SOUTH P O BOX 867	MYRTLE BEACH SC 29577
04713	MOTOROLA INC SEMICONDUCTOR PRODUCTS SECTOR	5005 E MCDOWELL RD	PHOENIX AZ 85008–4229
05397	UNION CARBIDE CORP MATERIALS SYSTEMS DIV	11901 MADISON AVE	CLEVELAND OH 44101
05828	GENERAL INSTRUMENT CORP GOVERNMENT SYSTEMS DIV	600 W JOHN ST	HICKSVILLE NY 11802
07263	FAIRCHILD SEMICONDUCTOR CORP		
09023	CORNELL–DUBILIER ELECTRONICS DIV FEDERAL PACIFIC ELECTRIC CO	2652 DALRYMPLE ST	SANFORD NC 27330
09922	BURNDY CORP	RICHARDS AVE	NORWALK CT 06852
12697	CLAROSTAT MFG CO INC	LOWER WASHINGTON ST	DOVER NH 03820
12969	MICROSEMI CORPORATION WATERTOWN DIVISION	530 PLEASANT STREET	WATERTOWN MA 02172
15513	DATA DISPLAY PRODUCTS	301 CORAL CIR	EL SEGUNDO CA 90245–4620
18796	MURATA ERIE NORTH AMERICAN INC STATE COLLEGE OPERATIONS	1900 W COLLEGE AVE	STATE COLLEGE PA 16801–2723
22526	BERG ELECTRONICS INC (DUPONT)	857 OLD TRAIL RD	ETTERS PA 17319
24165	SPRAGUE ELECTRIC CO	267 LOWELL ROAD	HUDSON NH 03051
24226	GOWANDA ELECTRONICS CORP	NO 1 INDUSTRIAL PL	GOWANDA NY 14070–1409
26364	COMPONENTS CORP	6 KINSEY PLACE	DENVILLE NJ 07834–2611
27014	NATIONAL SEMICONDUCTOR CORP	2900 SEMICONDUCTOR DR	SANTA CLARA CA 95051–0606
31918	ITT SCHADOW INC	8081 WALLACE RD	EDEN PRAIRIE MN 55344–2224
33095	SPECTRUM CONTROL INC	2185 W WEIGHT ST	ERIE PA 16505
34361	OMRON ELECTRONICS INC.		SUNNYVALE CA
37942	NORTH AMERICAN CAPACITOR CO MALLORY DIVISION	INDIANAPOLIS ROAD, HWY 240 PO BOX 240	GREEN CASTLE IN 46135 1
51406	MURATA ERIE NORTH AMERICA INC HEADQUARTERS AND GEORGIA OPERATIONS	2200 LAKE PARK DR	SMYRNA GA 30080
54583	TDK ELECTRONICS CORP	12 HARBOR PARK DR	PORT WASHINGTON NY 11550
55680	NICHICON /AMERICA/ CORP	927 E STATE PKY	SCHAUMBURG IL 60195–4526
56289	SPRAGUE ELECTRIC CO WORLD HEADQUARTERS		
57668	ROHM CORP	8 WHATNEY PO BOX 19515	IRVINE CA 92713
59660	TUSONIX INC	7741 N BUSINESS PARK DR PO BOX 37144	TUCSON AZ 85740–7144
60395	XICOR INC	851 BUCKEYE CT	MILPITAS CA 95035–7408
73743	FISCHER SPECIAL MFG CO	111 INDUSTRIAL RD	COLD SPRING KY 41076–9749
74276	GENERAL INSTRUMENT CORP		
75042	IRC ELECTRONIC COMPONENTS PHILADELPHIA DIV TRW FIXED RESISTORS	401 N BROAD ST	PHILADELPHIA PA 19108–1001
75915	LITTELFUSE INC SUB TRACOR INC	800 E NORTHWEST HWY	DES PLAINES IL 60016–3049
76493	BELL INDUSTRIES INC JW MILLER DIV	19070 REYES AVE PO BOX 5825	COMPTON CA 90224–5825
78189	ILLINOIS TOOL WORKS INC SHAKEPROOF DIV	ST CHARLES ROAD	ELGIN IL 60120
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077–0001
84411	AMERICAN SHIZUKI CORP OGALLALA OPERATIONS	301 WEST O ST	OGALLALA NE 69153–1844
86928	SEASTROM MFG CO INC	701 SONORA AVE	GLENDALE CA 91201–2431
8X345	NORTHWEST SPRING MFG CO	5858 WILLOW LANE	LAKE OSWEGO, OR 97035
91637	DALE ELECTRONICS INC	2064 12TH AVE PO BOX 609	COLUMBUS NE 68601–3632
93907	TEXTRON INC CAMCAR DIV	600 18TH AVE	ROCKFORD IL 61108–5181
S3629	SCHURTER AG H C/O PANEL COMPONENTS CORP	2015 SECOND STREET	BERKELEY CA 94170
S4307	SCHAFFNER ELECTRONIK AG		LUTERBACH SWITZERLAND
TK1345	ZMAN & ASSOCIATES		

Mfr. Code.	Manufacturer	Address	City, State, Zip Code
TK1450	TOKYO COSMOS ELECTRIC CO LTD	2–268 SOBUDAI ZAWA	KANAGAWA 228 JAPAN
TK1462	YAMAICHI ELECTRONICS CO LTD 2ND FLOOR NEW KYOEI BLDG 17–11	3–CHROME SHIBAURA MINATO–KU	TOKYO JAPAN
TK1573	WILHELM WESTERMAN	PO BOX 2345 AUGUSTA–ANLAGE 56	6800 MANNHEIM 1 WEST GERMANY
TK1884	ROGERS CORPORATION Q PAC DIVISION	5750 EAST MCKELLIPS RD	MESA AZ 85205
TK1913	WIMA THE INTER–TECHNICAL GROUP IND	2269 SAW MILL RIVER ROAD PO BOX 127	ELMSFORD NY 10523

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A1	671–4056–00			CIRCUIT BD ASSY:POWER SUPPLY, 1705A	80009	671–4056–00
A2	671–0041–00			CIRCUIT BD ASSY:FRONT PANEL	80009	671–0041–00
A3	672–1373–05			CIRCUIT BD ASSY:MAIN BOARD ASSY,1705A	80009	672–1373–05
A3A1	671–1796–01			CIRCUIT BD ASSY:GRATICULE LIGHT	80009	671–1796–00
A4	671–0145–02			CIRCUIT BD ASSY:18V POWER SUPPLY	80009	671–0145–02
A5	671–0042–03			CIRCUIT BD ASSY:70MHZ TUNER	80009	671–0042–03
A6	119–4338–00			TUNER:FREQ 950–1750MHZ,OUT IF FREQ 479.5MHZ,IMP IN/OUT 75	80009	119–4338–00
A10	671–3637–00			CIRCUIT BD ASSY:CRT SOCKET BD,389–2115–XX WIRED,	80009	671–3637–00
A1	671–4056–00			CIRCUIT BD ASSY:POWER SUPPLY, 1705A	80009	671–4056–00
A1C1	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A1C2	283–0021–00			CAP,FXD,CER DI:0.001UF,20%,5000V	18796	DE1310Y5P102M6KV
A1C3	283–0261–00			CAP,FXD,CER DI:0.01UF,20%,4000V	51406	DHR28Z5U103M4KV
A1C4	283–0261–00			CAP,FXD,CER DI:0.01UF,20%,4000V	51406	DHR28Z5U103M4KV
A1C5	285–1341–01			CAP,FXD,MTLZD:0.1UF,20%,100VDC	84411	X674L .1 20 100
A1C6	281–0771–00			CAP,FXD,CER DI:2200PF,20%,200V	80009	281–0771–00
A1C7	285–1470–00			CAP,FXD,PLSTC:	80009	285–1470–00
A1C8	283–0261–00			CAP,FXD,CER DI:0.01UF,20%,4000V	51406	DHR28Z5U103M4KV
A1C9	283–0261–00			CAP,FXD,CER DI:0.01UF,20%,4000V	51406	DHR28Z5U103M4KV
A1C10	281–0563–00			CAP,FXD,CER:MLC;0.47UF,20%,50V,0.150 X 0.290;AXIAL,MI	80009	281–0563–00
A1C11	283–0021–00			CAP,FXD,CER DI:0.001UF,20%,5000V	18796	DE1310Y5P102M6KV
A1C12	281–0707–00			CAP,FXD,CER DI:15000PF,10%,200V	80009	281–0707–00
A1C13	281–0707–00			CAP,FXD,CER DI:15000PF,10%,200V	80009	281–0707–00
A1C14	281–0707–00			CAP,FXD,CER DI:15000PF,10%,200V	80009	281–0707–00
A1C15	285–1341–01			CAP,FXD,MTLZD:0.1UF,20%,100VDC	84411	X674L .1 20 100
A1C16	290–1311–00			CAP,FXD,AL:10UF,20%,50V,5 X 11MM;5000 HRS,RDL,T&A	80009	290–1311–00
A1C17	285–1341–01			CAP,FXD,MTLZD:0.1UF,20%,100VDC	84411	X674L .1 20 100
A1C18	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A1C19	290–1310–00			CAP,FXD,ALUM:10UF,20%,160V,13 X 20MM;RDL,0.2LS,105 DEG,5000 HR	80009	290–1310–00
A1C20	281–0707–00			CAP,FXD,CER DI:15000PF,10%,200V	80009	281–0707–00
A1C21	281–0707–00			CAP,FXD,CER DI:15000PF,10%,200V	80009	281–0707–00
A1C22	281–0563–00			CAP,FXD,CER:MLC;0.47UF,20%,50V,0.150 X 0.290;AXIAL,MI	80009	281–0563–00
A1C23	285–1328–00			CAP,FXD,PLSTC:MTLZD FILM;0.01UF,5%,2000V, POLYPRO-PYLENE,1.25X.95;RDL,T/A	TK1573	FKP1 .01/2000/5
A1C24	290–1310–00			CAP,FXD,ALUM:10UF,20%,160V,13 X 20MM;RDL,0.2LS,105 DEG,5000 HR	80009	290–1310–00
A1C25	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A1C27	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A1C28	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A1C29	290–1267–00			CAP,FXD,AL:560UF,20%,50V,12.5 X 31.5,LOW IMP;RDL,BULK	80009	290–1267–00
A1C30	290–1267–00			CAP,FXD,AL:560UF,20%,50V,12.5 X 31.5,LOW IMP;RDL,BULK	80009	290–1267–00
A1C31	290–1267–00			CAP,FXD,AL:560UF,20%,50V,12.5 X 31.5,LOW IMP;RDL,BULK	80009	290–1267–00
A1C32	290–1267–00			CAP,FXD,AL:560UF,20%,50V,12.5 X 31.5,LOW IMP;RDL,BULK	80009	290–1267–00
A1C33	290–1310–00			CAP,FXD,ALUM:10UF,20%,160V,13 X 20MM;RDL,0.2LS,105 DEG,5000 HR	80009	290–1310–00
A1C34	290–1310–00			CAP,FXD,ALUM:10UF,20%,160V,13 X 20MM;RDL,0.2LS,105 DEG,5000 HR	80009	290–1310–00
A1C35	290–1267–00			CAP,FXD,AL:560UF,20%,50V,12.5 X 31.5,LOW IMP;RDL,BULK	80009	290–1267–00
A1C36	290–1267–00			CAP,FXD,AL:560UF,20%,50V,12.5 X 31.5,LOW IMP;RDL,BULK	80009	290–1267–00
A1C37	290–1267–00			CAP,FXD,AL:560UF,20%,50V,12.5 X 31.5,LOW IMP;RDL,BULK	80009	290–1267–00

Replaceable Electrical Parts

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A1C38	290–1267–00			CAP,FXD,AL:560UF,20%,50V,12.5 X 31.5,LOW IMP;RDL,BULK	80009	290–1267–00
A1C39	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A1C40	281–0772–00			CAP,FXD,CER:MLC;4700PF,10%,100V,0.100 X 0.170;AXIAL,MI	04222	SA101C472KAA
A1C41	281–0563–00			CAP,FXD,CER:MLC;0.47UF,20%,50V,0.150 X 0.290;AXIAL,MI	80009	281–0563–00
A1C42	290–1267–00			CAP,FXD,AL:560UF,20%,50V,12.5 X 31.5,LOW IMP;RDL,BULK	80009	290–1267–00
A1C43	281–0563–00			CAP,FXD,CER:MLC;0.47UF,20%,50V,0.150 X 0.290;AXIAL,MI	80009	281–0563–00
A1C44	285–1331–00			CAP,FXD,MTLZD:0.47UF,5%,400V	TK1573	MKS4 .47/400/5
A1C45	281–0563–00			CAP,FXD,CER:MLC;0.47UF,20%,50V,0.150 X 0.290;AXIAL,MI	80009	281–0563–00
A1C46	283–0005–03			CAP,FXD,CER DI:0.01 UF,+80–20%,250V	80009	283–0005–03
A1C47	281–0563–00			CAP,FXD,CER:MLC;0.47UF,20%,50V,0.150 X 0.290;AXIAL,MI	80009	281–0563–00
A1C48	281–0809–00			CAP,FXD,CER:MLC;200 PF,5%,100V,0.100 X 0.170;AXIAL,MI	04222	SA101A201JAA
A1C49	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A1C50	281–0563–00			CAP,FXD,CER:MLC;0.47UF,20%,50V,0.150 X 0.290;AXIAL,MI	80009	281–0563–00
A1C51	281–0773–00			CAP,FXD,CER:MLC;0.01UF,10%,100V,SAF,0.100 X 0.170;AXIAL,MI	80009	281–0773–00
A1C52	281–0773–00			CAP,FXD,CER:MLC;0.01UF,10%,100V,SAF,0.100 X 0.170;AXIAL,MI	80009	281–0773–00
A1C53	285–1437–00			CAP,FXD,PLSTC:100PF,5%,1600VDC/500VAC	TK1913	FKP1/100/1600/5
A1C54	290–1275–00			CAP,FXD,AL:330UF,20%,400V,35 X 35;105 DEG,SNAP IN,BULK	80009	290–1275–00
A1C56	285–1246–00			CAP,FXD,PPR DI:0.022UF,20%,250VAC	80009	285–1246–00
A1C57	285–1222–00			CAP,FXD,PLSTC:0.068UF,20%,250V	37942	158/.068/M/250/H
A1C58	281–0809–00			CAP,FXD,CER:MLC;200 PF,5%,100V,0.100 X 0.170;AXIAL,MI	04222	SA101A201JAA
A1C59	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A1C60	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A1C61	281–0768–00			CAP,FXD,CER DI:470PF,20%,100V TUBULAR,MI	04222	SA101A471KAA
A1C65	285–1301–01			CAP,FXD,MTLZD:0.47UF,10%,50V; TAPE & AMMO PACK	37942	185/0.47/K/50/AB/B
A1C66	290–1311–00			CAP,FXD,AL:10UF,20%,50V,5 X 11MM;5000 HRS,RDL,T&A	80009	290–1311–00
A1CR1	152–0061–00			DIO,SIG:200V,0.1A,700NS,4.0PF;FDH2161,T&R	07263	FDH2161
A1CR2	152–0061–00			DIO,SIG:200V,0.1A,700NS,4.0PF;FDH2161,T&R	07263	FDH2161
A1CR3	152–0061–00			DIO,SIG:200V,0.1A,700NS,4.0PF;FDH2161,T&R	07263	FDH2161
A1CR4	152–0409–00			DIO,RECT:FAST RCVRY;12KV,10MA,250NS;CRVT150,AXIAL LEAD	80009	152–0409–00
A1CR5	152–0061–00			DIO,SIG:200V,0.1A,700NS,4.0PF;FDH2161,T&R	07263	FDH2161
A1CR6	152–0061–00			DIO,SIG:200V,0.1A,700NS,4.0PF;FDH2161,T&R	07263	FDH2161
A1CR7	152–0400–00			DIO,RECT:FAST RCVRY;400V,1A,200NS;1N4936,DO–41,T&R	80009	152–0400–00
A1CR8	152–0400–00			DIO,RECT:FAST RCVRY;400V,1A,200NS;1N4936,DO–41,T&R	80009	152–0400–00
A1CR9	152–0400–00			DIO,RECT:FAST RCVRY;400V,1A,200NS;1N4936,DO–41,T&R	80009	152–0400–00
A1CR10	152–0400–00			DIO,RECT:FAST RCVRY;400V,1A,200NS;1N4936,DO–41,T&R	80009	152–0400–00
A1CR11	152–0808–00			DIODE,RECT:ULTRA FAST,400V,1.5A,50NS,BYD73G,AXIAL	04713	PR 1273
A1CR12	152–0400–00			DIO,RECT:FAST RCVRY;400V,1A,200NS;1N4936,DO–41,T&R	80009	152–0400–00
A1CR13	152–1191–00			DIO,RECT:SCHTKY;100V,10A,150A IFSM,800MVF AT 10A;MBR10100,TO–220	80009	152–1191–00
A1CR14	152–0400–00			DIO,RECT:FAST RCVRY;400V,1A,200NS;1N4936,DO–41,T&R	80009	152–0400–00
A1CR15	152–0400–00			DIO,RECT:FAST RCVRY;400V,1A,200NS;1N4936,DO–41,T&R	80009	152–0400–00
A1CR16	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A1CR17	152–0400–00			DIO,RECT:FAST RCVRY;400V,1A,200NS;1N4936,DO–41,T&R	80009	152–0400–00
A1CR19	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A1CR20	152–0897–00			DIO,RECT:FAST RCVRY;1000V,1.5A,300NS,SOFT RCVRY;BYV96E,T&R	80009	152–0897–00
A1CR21	152–1165–00			DIO,RECT:ULTRA FAST;600V,4A,50NS;MUR460,T&R	80009	152–1165–00
A1CR22	152–1165–00			DIO,RECT:ULTRA FAST;600V,4A,50NS;MUR460,T&R	80009	152–1165–00
A1CR23	152–1165–00			DIO,RECT:ULTRA FAST;600V,4A,50NS;MUR460,T&R	80009	152–1165–00
A1CR24	152–1165–00			DIO,RECT:ULTRA FAST;600V,4A,50NS;MUR460,T&R	80009	152–1165–00

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A1CR25	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A1CR26	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A1CR27	152–0400–00			DIO,RECT:FAST RCVRY;400V,1A,200NS;1N4936,DO–41,T&R	80009	152–0400–00
A1CR29	152–0400–00			DIO,RECT:FAST RCVRY;400V,1A,200NS;1N4936,DO–41,T&R	80009	152–0400–00
A1CR30	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A1CR31	152–0400–00			DIO,RECT:FAST RCVRY;400V,1A,200NS;1N4936,DO–41,T&R	80009	152–0400–00
A1DS1	150–0050–00			LAMP,GLOW:135V MAX,1.9MA,C2A–T,WIRE LEAD	74276	LT2–24–2 (NE2H)
A1DS2	150–0050–00			LAMP,GLOW:135V MAX,1.9MA,C2A–T,WIRE LEAD	74276	LT2–24–2 (NE2H)
A1DS3	150–0050–00			LAMP,GLOW:135V MAX,1.9MA,C2A–T,WIRE LEAD	74276	LT2–24–2 (NE2H)
A1DS4	150–0050–00			LAMP,GLOW:135V MAX,1.9MA,C2A–T,WIRE LEAD	74276	LT2–24–2 (NE2H)
A1F1	159–0021–00			FUSE,CRTG:3AG,2A,250V,FAST BLOW	75915	312 002
				MOUNTING PARTS		
	200–2264–00			CAP,FSHLDR:3AG FUSES	S3629	FEK 031 1666
	204–0906–00			BODY,FSHLDR:3AG & 5 X 20MM FUSES	S3629	TYPEFAU031.3573
				END MOUNTING PARTS		
A1J1	131–5338–00			CONN,HDR:	80009	131–5338–00
A1J2	131–4794–00			CONN,HDR:PCB;MALE,STR,1 X 2,0.1 CTR,0.235 MLG X 0.112 TAIL,30 GLD,0.035 DIA PCB	80009	131–4794–00
A1J3	131–5337–00			CONN,HDR:	80009	131–5337–00
A1J4	131–3392–00			CONN,HDR:PCB;MALE,STR,1 X 10,0.1 CTR,0.230 MLG X 0.120 TAIL,30 GLD,BD RETENTION	80009	131–3392–00
A1J6	119–1946–00			FLTR,RFI:1A,250V,400HZ W/PC TERM	S4307	FN326–1/02–K–D–T
A1L1	108–1412–00			COIL,RF:FXD, 4.7 UH, +/– 20 %,Q 25, SRF 50 MHZ, DCR 0.017 OHM I MAX 3.7 A,RDL LEAD	54583	TSL08074R7M3RO
A1L2	108–1412–00			COIL,RF:FXD, 4.7 UH, +/– 20 %,Q 25, SRF 50 MHZ, DCR 0.017 OHM I MAX 3.7 A,RDL LEAD	54583	TSL08074R7M3RO
A1L3	108–1412–00			COIL,RF:FXD, 4.7 UH, +/– 20 %,Q 25, SRF 50 MHZ, DCR 0.017 OHM I MAX 3.7 A,RDL LEAD	54583	TSL08074R7M3RO
A1L4	108–0205–00			COIL,RF:IDCTR;FXD,1MH,+–5%, DCR 2.12 OHMS, FERRITE CORE	76493	8209
A1Q1	151–0749–00			XSTR,SIG:BIPOLAR,PNP;400V,500MA,50MHZ, AMPL;MPSA94,TO–92 EBC	80009	151–0749–00
A1Q2	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A1Q3	151–0350–03			XSTR,SIG:BIPOLAR,PNP;150V,600MA,100MHZ, AMPL;2N5401,TO–92 EBC,T&A	80009	151–0350–03
A1Q4	151–0347–02			XSTR,SIG:BIPOLAR,NPN;160V,600MA,100MHZ, AMPL;2N5551,TO–92 EBC,T&A	56289	CT7916
A1Q5	151–0350–03			XSTR,SIG:BIPOLAR,PNP;150V,600MA,100MHZ, AMPL;2N5401,TO–92 EBC,T&A	80009	151–0350–03
A1Q6	151–0476–00			XSTR,PWR:BIPOLAR,NPN;100V,3.0A,3.0MHZ, AMPL;TIP31C,TO–220	80009	151–0476–00
				MOUNTING PARTS		
	214–3848–00			HTSK,ELEC:LOW COST CLIP–ON,TO–126/TO–220	80009	214–3848–00
				END MOUNTING PARTS		
A1Q7	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A1Q8	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A1Q9	151–1286–00			XSTR,PWR:MOS,N–CH;800V,4.0A,3.0 OHM;BUK456–800A,TO–220	80009	151–1286–00
				MOUNTING PARTS		
	210–0406–00			NUT,PLAIN,HEX:4–40 X 0.188,BRS CD PL	73743	12161–50
	211–0008–00			SCR,MACH:4–40 X 0.25,PNH,STL	93907	ORDER BY DESCR
	214–3841–00			HTSK,XSTR:TO–220 W/SLDR TABS,AL	80009	214–3841–00
				END MOUNTING PARTS		

Replaceable Electrical Parts

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A1Q10	151–0350–03			XSTR,SIG:BIPOLAR,PNP;150V,600MA,100MHZ, AMPL;2N5401,TO–92 EBC,T&A	80009	151–0350–03
A1Q11	151–0528–00			THYRISTOR,PWR:BIPOLAR,SCR,50V,16A RMS,PHASE CONTROL,2N6400,TO–220	04713	2N6400
A1R1	303–0155–00			RES,FXD,CMPSN:1.5M OHM,5%,1W	80009	303–0155–00
A1R2	301–0225–02			RES,FXD,CMPSN:2.2M OHM,5%,0.5W	80009	301–0225–02
A1R3	303–0155–00			RES,FXD,CMPSN:1.5M OHM,5%,1W	80009	303–0155–00
A1R4	303–0155–00			RES,FXD,CMPSN:1.5M OHM,5%,1W	80009	303–0155–00
A1R5	303–0155–00			RES,FXD,CMPSN:1.5M OHM,5%,1W	80009	303–0155–00
A1R7	322–3385–00			RES,FXD:MET FILM;100K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 100K
A1R8	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 100E
A1R11	311–1256–00			RES,VAR,TRMR:CERMET;2.5M OHM,10%,0.5W,0.375 SQ,TOP ADJUST;BULK	80009	311–1256–00
A1R12	315–0471–03			RES,FXD,CMPSN:470 OHM,5%,0.25W	80009	315–0471–03
A1R13	322–3097–00			RES,FXD:METAL FILM,100 OHM,1%,0.2W,TC=100 PPM,AXIAL,T&R,SMALL BODY	91637	CCF501G100R0F
A1R14	322–3001–00			RES,FXD:METAL FILM,10 OHM,1%,0.2W,TC=100 PPM,AXIAL,T&R,SMALL BODY	91637	CCF501G10R00F
A1R20	322–3248–00			RES,FXD,FILM:3.74K OHM,1%,0.2W,TC=T0	80009	322–3248–00
A1R22	322–3329–00			RES,FXD,FILM:26.1K OHM.1%,0.2W,TC=T0	57668	CRB20 FXE 26K1
A1R24	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 100E
A1R25	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 100E
A1R26	322–3452–00			RES,FXD,FILM:499K OHM,1%,0.2W,TC=TO	91637	CCF50–2–G4993FT
A1R27	322–3300–02			RES,FXD,FILM:13K OHM,0.5%,0.2W,TC=T2	57668	CRB20 DYE 13K0
A1R28	322–3344–00			RES,FXD,FILM:37.4K OHM,1%,0.2W,TC=T0	80009	322–3344–00
A1R29	315–0470–03			RES,FXD,CMPSN:47 OHM,5%,0.25W	80009	315–0470–03
A1R30	315–0103–03			RES,FXD,CMPSN:10K OHM,5%,0.25W	80009	315–0103–03
A1R31	322–3385–00			RES,FXD:MET FILM;100K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 100K
A1R32	322–3452–00			RES,FXD,FILM:499K OHM,1%,0.2W,TC=TO	91637	CCF50–2–G4993FT
A1R33	322–3300–02			RES,FXD,FILM:13K OHM,0.5%,0.2W,TC=T2	57668	CRB20 DYE 13K0
A1R34	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A1R35	322–3162–00			RES,FXD:MET FILM;475 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3162–00
A1R36	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A1R37	322–3034–00			RES,FXD:MET FILM;22.1 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20FXE2K94
A1R38	315–0226–01			RES,FXD,CMPSN:22 M OHM,5%,0.25W	80009	315–0226–01
A1R39	315–0471–03			RES,FXD,CMPSN:470 OHM,5%,0.25W	80009	315–0471–03
A1R40	315–0103–03			RES,FXD,CMPSN:10K OHM,5%,0.25W	80009	315–0103–03
A1R41	322–3121–00			RES,FXD:MET FILM;178 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3121–00
A1R42	322–3402–00			RES,FXD:MET FILM;150K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3402–00
A1R43	315–0471–03			RES,FXD,CMPSN:470 OHM,5%,0.25W	80009	315–0471–03
A1R44	315–0471–03			RES,FXD,CMPSN:470 OHM,5%,0.25W	80009	315–0471–03
A1R45	311–2239–00			RES,VAR,TRMR:CERMET;100K OHM,20%,0.5W,0.197 SQ,SIDE ADJUST;T&R	TK1450	GF06UT 100K
A1R46	322–3001–00			RES,FXD:MET FILM;10 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3001–00
A1R47	322–3385–00			RES,FXD:MET FILM;100K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 100K
A1R48	322–3239–00			RES,FXD,FILM:3.01K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 3K01

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A1R49	311–2239–00			RES,VAR,TRMR:CERMET;100K OHM,20%,0.5W,0.197 SQ,SIDE ADJUST;T&R	TK1450	GF06UT 100K
A1R50	322–3001–00			RES,FXD:MET FILM;10 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3001–00
A1R51	322–3260–00			RES,FXD,FILM:4.99K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 4K99
A1R52	322–3001–00			RES,FXD:MET FILM;10 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3001–00
A1R53	322–3001–00			RES,FXD:MET FILM;10 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3001–00
A1R54	322–3260–00			RES,FXD,FILM:4.99K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 4K99
A1R55	322–3322–00			RES,FXD:MET FILM;22.1K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3322–00
A1R56	322–3001–00			RES,FXD:MET FILM;10 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3001–00
A1R57	322–3034–00			RES,FXD:MET FILM;22.1 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20FXE2K94
A1R58	311–2239–00			RES,VAR,TRMR:CERMET;100K OHM,20%,0.5W,0.197 SQ,SIDE ADJUST;T&R	TK1450	GF06UT 100K
A1R59	322–3485–07			RES,FXD,FILM:5K OHM,0.1%,0.2W,TC=T9	91637	CCF501C50000B
A1R60	322–3268–00			RES,FXD,FILM:6.04K OHM,1%,0.2W,TC=T0	80009	322–3268–00
A1R61	322–3034–00			RES,FXD:MET FILM;22.1 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20FXE2K94
A1R62	322–3097–OO			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AX–IAL,T&R,SMALL BODY	80009	322–3097–OO
A1R63	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A1R64	322–3385–00			RES,FXD:MET FILM;100K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 100K
A1R65	322–3385–00			RES,FXD:MET FILM;100K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 100K
A1R66	322–3452–00			RES,FXD,FILM:499K OHM,1%,0.2W,TC=TO	91637	CCF50–2–G4993FT
A1R67	322–3001–00			RES,FXD:MET FILM;10 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3001–00
A1R68	322–3121–00			RES,FXD:MET FILM;178 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3121–00
A1R69	322–3289–07			RES,FXD,FILM:10K OHM,0.1%,0.2W,TC=T9,T&R,SM BODY	80009	322–3289–07
A1R70	322–3289–07			RES,FXD,FILM:10K OHM,0.1%,0.2W,TC=T9,T&R,SM BODY	80009	322–3289–07
A1R71	322–3418–00			RES,FXD:MET FILM;221K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 221K
A1R72	322–3001–00			RES,FXD:MET FILM;10 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3001–00
A1R73	322–3001–00			RES,FXD:MET FILM;10 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3001–00
A1R74	322–3260–00			RES,FXD,FILM:4.99K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 4K99
A1R75	322–3260–00			RES,FXD,FILM:4.99K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 4K99
A1R76	322–3248–00			RES,FXD,FILM:3.74K OHM,1%,0.2W,TC=T0	80009	322–3248–00
A1R77	322–3097–OO			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AX–IAL,T&R,SMALL BODY	80009	322–3097–OO
A1R78	322–3248–00			RES,FXD,FILM:3.74K OHM,1%,0.2W,TC=T0 TAPED & REELED,SMALL BODY	57668	CRB20 FXE 3K74
A1R79	322–3356–00			RES,FXD,FILM:49.9K OHM,1%,0.2W,TC=T0	80009	322–3356–00
A1R80	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A1R81	322–3121–00			RES,FXD:MET FILM;178 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3121–00
A1R82	322–3260–00			RES,FXD,FILM:4.99K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 4K99
A1R83	322–3289–07			RES,FXD,FILM:10K OHM,0.1%,0.2W,TC=T9,T&R,SM BODY	80009	322–3289–07
A1R84	322–3315–00			RES,FXD,FILM:18.7K OHM,1%,0.2W,TC=T0	80009	322–3315–00
A1R85	322–3385–00			RES,FXD:METAL FILM,100K OHM,1%,0.2W,TC=100 PPM,AXIAL,T&R,SMALL BODY	91637	CCF501G10002F

Replaceable Electrical Parts

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A1R86	308–0793–00			RES,FXD:0.51 OHM,5%,1WTC=150PPM/DEG C,MI,T&R	80009	308–0793–00
A1R87	322–3034–00			RES,FXD:MET FILM;22.1 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20FXE2K94
A1R88	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A1R89	307–0746–00			RES,THERMAL:5 OHM,10%,7A/DEG C	80009	307–0746–00
A1R90	305–0242–00			RES,FXD,CMPSN:2.4K OHM,5%,2W	80009	305–0242–00
A1R91	306–0104–00			RES,FXD,CMPSN:100K OHM,10%,2W	01121	HB1041
A1R92	306–0104–00			RES,FXD,CMPSN:100K OHM,10%,2W	01121	HB1041
A1R93	322–3402–00			RES,FXD:MET FILM;150K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3402–00
A1R94	322–3402–00			RES,FXD:MET FILM;150K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3402–00
A1R95	322–3256–00			RES,FXD,FILM:4.53K OHM,1%,0.2W,TC=T0 MI,SMALL BODY	91637	CCF50–2–G4531FT
A1R96	322–3356–00			RES,FXD,FILM:49.9K OHM,1%,0.2W,TC=T0	80009	322–3356–00
A1R97	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A1R98	322–3289–07			RES,FXD,FILM:10K OHM,0.1%,0.2W,TC=T9,T&R,SM BODY	80009	322–3289–07
A1R99	311–2239–00			RES,VAR,TRMR:CERMET,100K OHM,20%,0.5W,0.197 SQ,TOP ADJUST,T&R	TK2073	GF06UT2 104 M L20
A1R101	322–3068–00			RES,FXD:MET FILM;49.9 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3068–00
A1R102	308–0290–00			RES,FXD,WW:8 OHM,5%,5W	80009	308–0290–00
A1R103	322–3452–00			RES,FXD,FILM:499K OHM,1%,0.2W,TC=TO	91637	CCF50–2–G4993FT
A1T1	120–1695–00			XFMR,PWR:HI V,FDBK 3V, RESN 231V, 100V 1MA,	80009	120–1695–00
A1T2	120–1945–00			XFMR,RF:PRI 8UH,2:7,ON–OFF,VERT MT,PC MT	80009	120–1945–00
A1T3	120–1944–00			XFMR,RF:	80009	120–1944–00
A1TP1	214–4085–00			TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYLON COLLAR	26364	104–01–02
A1TP2	214–4085–00			TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYLON COLLAR	26364	104–01–02
A1U1	152–0900–00			MOD,HV:7.5KVAC IN,15KVDC OUT,POTTED MOD;MSL2556	80009	152–0900–00
A1U2	156–0067–00			IC,LIN:BIPOLAR,OP–AMP;741C,DIP08.3	80009	156–0067–00
A1U3	156–1225–00			IC,LIN:BIPOLAR,COMPTR;DUAL,OPEN COLL,300NS;LM393N,DIP08.3	01295	LM393P
A1U4	156–2761–01			IC,DGTL:HCMOS,MULTIVIBRATOR;74HC221A,DIP16.3,TUBE	80009	156–2761–01
A1U5	156–2524–00			IC,LIN:	12969	UC3842N
A1VR1	156–1631–01			IC,LIN:BIPOLAR,VR;ADJUST,SHUNT,100MA,2.2%;TL431CLP,TO–92 T&A	80009	156–1631–01
A1VR2	152–0195–00			DIO,ZENER:5.1V,5%,0.4W;1N751A FMLY,DO–35 OR 7	80009	152–0195–00
A1VR3	152–0195–00			DIODE,ZENER:5.1V,5%,0.4W,MZ5523D,DO–35 OR 7	04713	SZ11755RL
A1VR4	152–0149–00			DIODE,ZENER:10V,5%,0.4W,1N961B,DO–7 OR DO–35,T&R	04713	1N961BRL
A1VR5	152–0287–00			DIODE,ZENER:110V,5%,0.4W,1N986B,DO–7 OR 35,TR	04713	1N986BRL
A1VR6	152–0287–00			DIODE,ZENER:110V,5%,0.4W,1N986B,DO–7 OR 35,TR	04713	1N986BRL
A1W1	131–0566–00			BUS,CNDCT:DUM RES,0.094 OD X 0.225 L	80009	131–0566–00
A1W2	131–0566–00			BUS,CNDCT:DUM RES,0.094 OD X 0.225 L	80009	131–0566–00
A1W3	131–0566–00			BUS,CNDCT:DUM RES,0.094 OD X 0.225 L	80009	131–0566–00
A1W4	131–0566–00			BUS,CNDCT:DUM RES,0.094 OD X 0.225 L	80009	131–0566–00
A2	671–0041–01			CIRCUIT BD ASSY:FRONT PANEL,388–9484–XX WIRED,1705A	80009	671–0041–01
A2DS112	150–1289–00			LED ASSY:DIR;2 IN 3 GRN	80009	150–1289–00
A2DS113	——— ———			(PART OF A2DS112)		
A2DS126	150–1290–00			LED ASSY:DIR;3 IN 3 GRN	80009	150–1290–00
A2DS127	——— ———			(PART OF A2DS126)		
A2DS128	——— ———			(PART OF A2DS126)		
A2DS133	150–1286–00			LED ASSY:DIR;2 IN 2 GRN	80009	150–1286–00
A2DS135	——— ———			(PART OF A2DS133)		

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A2DS213	150–1283–00			LED ASSY:DIR;1 IN 1	80009	150–1283–00
A2DS313	150–1289–00			LED ASSY:DIR;2 IN 3 GRN	80009	150–1289–00
A2DS314	——— ———			(PART OF A2DS313)		
A2P112	175–9773–01			CA ASSY,SP,ELEC:34,26 AWG,5.0 L	TK1462	ORDER BY DESCR
A2R211	311–2540–00			RES,VAR,PNL:CP,20K OHM,20%,0.5W,LINEAR,W/ GROUNDING LUG,0.5 IN DIA	12697	311–2540–00
				ATTACHED PARTS		
	214–4725–00			SPRING:COMPRESSION SPRING,0.026,302 STAINLESS STEEL,0.313,+/–,0.0A0	8X345	214–4725–00
	366–1701–01			KNOB:GY,0.127 ID X 0.392 OD X 0.4 H	80009	366–1701–01
				END ATTACHED PARTS		
A2R235	311–2287–00			RES,VAR,NONWW:PNL,20K OHM,10%,0.5W	12697	CM45210
				ATTACHED PARTS		
	366–0665–00			KNOB:GRAY,0.41 ID X 0.546 OD X 0.67 H	80009	366–0665–00
				END ATTACHED PARTS		
A2R343	322–3342–00			RES,FXD,FILM:35.7K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 35K7
A2R411	311–2540–00			RES,VAR,PNL:CP,20K OHM,20%,0.5W,LINEAR,W/ GROUNDING LUG,0.5 IN DIA	12697	311–2540–00
				ATTACHED PARTS		
	214–4725–00			SPRING:COMPRESSION SPRING,0.026,302 STAINLESS STEEL,0.313,+/–,0.0A0	8X345	214–4725–00
	366–1701–01			KNOB:GY,0.127 ID X 0.392 OD X 0.4 H	80009	366–1701–01
				END ATTACHED PARTS		
A2R419	311–2287–00			RES,VAR,NONWW:PNL,20K OHM,10%,0.5W	12697	CM45210
A2R428	311–2540–00			RES,VAR,PNL:CP,20K OHM,20%,0.5W,LINEAR,W/ GROUNDING LUG,0.5 IN DIA	12697	311–2540–00
				ATTACHED PARTS		
	214–4725–00			SPRING:COMPRESSION SPRING,0.026,302 STAINLESS STEEL,0.313,+/–,0.0A0	8X345	214–4725–00
	366–1701–01			KNOB:GY,0.127 ID X 0.392 OD X 0.4 H	80009	366–1701–01
				END ATTACHED PARTS		
A2R444	311–2540–00			RES,VAR,PNL:CP,20K OHM,20%,0.5W,LINEAR,W/ GROUNDING LUG,0.5 IN DIA	12697	311–2540–00
				ATTACHED PARTS		
	214–4725–00			SPRING:COMPRESSION SPRING,0.026,302 STAINLESS STEEL,0.313,+/–,0.0A0	8X345	214–4725–00
	366–1701–01			KNOB:GY,0.127 ID X 0.392 OD X 0.4 H	80009	366–1701–01
				END ATTACHED PARTS		
A2R511	311–2540–00			RES,VAR,PNL:CP,20K OHM,20%,0.5W,LINEAR,W/ GROUNDING LUG,0.5 IN DIA	12697	311–2540–00
				ATTACHED PARTS		
	214–4725–00			SPRING:COMPRESSION SPRING,0.026,302 STAINLESS STEEL,0.313,+/–,0.0A0	8X345	214–4725–00
	366–1701–01			KNOB:GY,0.127 ID X 0.392 OD X 0.4 H	80009	366–1701–01
				END ATTACHED PARTS		
A2R528	311–2540–00			RES,VAR,PNL:CP,20K OHM,20%,0.5W,LINEAR,W/ GROUNDING LUG,0.5 IN DIA	12697	311–2540–00
				ATTACHED PARTS		
	214–4725–00			SPRING:COMPRESSION SPRING,0.026,302 STAINLESS STEEL,0.313,+/–,0.0A0	8X345	214–4725–00
	366–1701–01			KNOB:GY,0.127 ID X 0.392 OD X 0.4 H	80009	366–1701–01
				END ATTACHED PARTS		
A2S109	260–2300–00			SW,PUSH:SPST,25MA,15VAC	34361	B3F1152
				ATTACHED PARTS		
	366–0616–00			PUSH BTN:0.585 X 0.3 X 0.150	80009	366–0616–00
				END ATTACHED PARTS		
A2S123	260–2300–00			SW,PUSH:SPST,25MA,15VAC	34361	B3F1152
				ATTACHED PARTS		
	366–0616–00			PUSH BTN:0.585 X 0.3 X 0.150	80009	366–0616–00

Replaceable Electrical Parts

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
				END ATTACHED PARTS		
A2S139	260–2300–00			SW,PUSH:SPST,25MA,15VAC	34361	B3F1152
				ATTACHED PARTS		
	366–0616–00			PUSH BTN:0.585 X 0.3 X 0.150	80009	366–0616–00
				END ATTACHED PARTS		
A2S311	260–2300–00			SW,PUSH:SPST,25MA,15VAC	34361	B3F1152
				ATTACHED PARTS		
	366–0616–00			PUSH BTN:0.585 X 0.3 X 0.150	80009	366–0616–00
				END ATTACHED PARTS		
A2S345	260–2300–00			SW,PUSH:SPST,25MA,15VAC	34361	B3F1152
				ATTACHED PARTS		
	366–0616–00			PUSH BTN:0.585 X 0.3 X 0.150	80009	366–0616–00
				END ATTACHED PARTS		
A3	672–1373–05			CIRCUIT BD ASSY:MAIN BOARD ASSY,1705A	80009	672–1373–05
				ATTACHED PARTS		
	131–3717–00			BUS,CNDCT:	TK1884	SM2098
	202–0196–01			SHIELD,ELEC:1.29 SQ X 0.675,AL	02875	HU4430–0.953–AL
	337–0607–00			PLATE,ELEC SHLD:CIRCUIT BOARD	80009	337–0607–00
	337–2804–00			SHIELD,ELEC:CIRCUIT BOARD	80009	337–2804–00
	337–3834–00			SHIELD,ELEC:1705A,BRS	80009	337–3834–00
	337–3923–00			SHIELD,ELEC:TOP,1705A	80009	337–3923–00
	337–3924–00			SHIELD,ELEC:FENCE,1705A	80009	337–3924–00
	337–3925–00			SHIELD,ELEC:BOTTOM,1705A	80009	337–3925–00
				END ATTACHED PARTS		
A3C1	290–0748–00			CAP,FXD,ELCTLT:10UF,+50–20%,25WVDC	24165	501D106F063LL4
A3C2	281–0819–00			CAP,FXD,CER:MLC;33 PF,5%,50V,0.100 X 0.170;AXIAL,MI	04222	SA102A330JAA
A3C3	281–0819–00			CAP,FXD,CER:MLC;33 PF,5%,50V,0.100 X 0.170;AXIAL,MI	04222	SA102A330JAA
A3C4	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C5	290–1296–00			CAP,FXD,ALUM:100UF,20%,25V,8 X 9MM;RDL,105 DEG,BULK	80009	290–1296–00
A3C6	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C7	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C8	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C10	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C11	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C12	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C13	290–1295–00			CAP,FXD,ALUM:10UF,20%,16V,5 X 9 MM;RDL,105 DEG,BULK	80009	290–1295–00
A3C14	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C15	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C16	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C17	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C18	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C19	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C20	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C21	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C22	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C24	290–1295–00			CAP,FXD,ALUM:10UF,20%,16V,5 X 9 MM;RDL,105 DEG,BULK	80009	290–1295–00
A3C25	281–0812–00			CAP,FXD,CER:MLC;1000PF,10%,100V,0.100 X 0.170;AX-IAL,MI	04222	SA101C102KAA
A3C26	290–1295–00			CAP,FXD,ALUM:10UF,20%,16V,5 X 9 MM;RDL,105 DEG,BULK	80009	290–1295–00
A3C28	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C29	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C30	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C31	281–0773–00			CAP,FXD,CER:MLC;0.01UF,10%,100V,SAF,0.100 X 0.170;AX-IAL,MI	80009	281–0773–00
A3C32	281–0772–00			CAP,FXD,CER:MLC;4700PF,10%,100V,0.100 X 0.170;AX-IAL,MI	04222	SA101C472KAA

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A3C33	281–0773–00			CAP,FXD,CER:MLC;0.01UF,10%,100V,SAF,0.100 X 0.170;AXIAL,MI	80009	281–0773–00
A3C34	281–0773–00			CAP,FXD,CER:MLC;0.01UF,10%,100V,SAF,0.100 X 0.170;AXIAL,MI	80009	281–0773–00
A3C35	281–0773–00			CAP,FXD,CER:MLC;0.01UF,10%,100V,SAF,0.100 X 0.170;AXIAL,MI	80009	281–0773–00
A3C36	290–0920–00			CAP,FXD,ELCTLT:33UF,+50–20%,35WVDC	55680	UVX1H330MAA
A3C37	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C38	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C39	281–0812–00			CAP,FXD,CER:MLC;1000PF,10%,100V,0.100 X 0.170;AXIAL,MI	04222	SA101C102KAA
A3C40	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C41	281–0763–00			CAP,FXD,CER:MLC;47PF,10%,100V,0.100 X 0.170;AXIAL,MI	04222	SA102A470KAA
A3C42	281–0797–00			CAP,FXD,CER:MLC;15PF,10%,100V,SAF ,0.100 X 0.170;AXIAL,MI	80009	281–0797–00
A3C43	281–0823–00			CAP,FXD,CER DI:470PF,10%,50V	04222	SA101A471KAA
A3C46	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C47	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C48	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C49	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C50	281–0538–00			CAP,FXD,CER:MLC;1PF,20%,500V,O.170 X 0.220;AXIAL	80009	281–0538–00
A3C51	281–0812–00			CAP,FXD,CER:MLC;1000PF,10%,100V,0.100 X 0.170;AXIAL,MI	04222	SA101C102KAA
A3C52	281–0167–00			CAP,VAR,CER DI:9–45PF,200V	33095	53–717–001 D9–45
A3C53	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C54	281–0812–00			CAP,FXD,CER:MLC;1000PF,10%,100V,0.100 X 0.170;AXIAL,MI	04222	SA101C102KAA
A3C55	281–0178–00			CAP,VAR,PLSTC:1–3.5PF,500V	80009	281–0178–00
A3C56	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C57	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C58	281–0773–00			CAP,FXD,CER:MLC;0.01UF,10%,100V,SAF,0.100 X 0.170;AXIAL,MI	80009	281–0773–00
A3C59	281–0823–00			CAP,FXD,CER DI:470PF,10%,50V	04222	SA101A471KAA
A3C60	281–0809–00			CAP,FXD,CER:MLC;200 PF,5%,100V,0.100 X 0.170;AXIAL,MI	04222	SA101A201JAA
A3C61	290–0920–00			CAP,FXD,ELCTLT:33UF,+50–20%,35WVDC	55680	UVX1H330MAA
A3C62	281–0123–00			CAP,VAR,CER DI:5–25PF,100V	59660	518–000A5–25
A3C63	281–0809–00			CAP,FXD,CER:MLC;200 PF,5%,100V,0.100 X 0.170;AXIAL,MI	04222	SA101A201JAA
A3C64	281–0167–00			CAP,VAR,CER DI:9–45PF,200V	33095	53–717–001 D9–45
A3C65	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C68	281–0773–00			CAP,FXD,CER:MLC;0.01UF,10%,100V,SAF,0.100 X 0.170;AXIAL,MI	80009	281–0773–00
A3C69	281–0168–00			CAP,VAR,AIR DI:1.3–5.4PF,250V	80009	281–0168–00
A3C70	281–0773–00			CAP,FXD,CER:MLC;0.01UF,10%,100V,SAF,0.100 X 0.170;AXIAL,MI	80009	281–0773–00
A3C71	281–0820–00			CAP,FXD,CER:MLC;680 PF,10%,50V,0.100 X 0.170;AXIAL,MI	04222	SA101C681KAA
A3C72	281–0820–00			CAP,FXD,CER:MLC;680 PF,10%,50V,0.100 X 0.170;AXIAL,MI	04222	SA101C681KAA
A3C73	281–0773–00			CAP,FXD,CER:MLC;0.01UF,10%,100V,SAF,0.100 X 0.170;AXIAL,MI	80009	281–0773–00
A3C74	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C77	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C78	281–0812–00			CAP,FXD,CER:MLC;1000PF,10%,100V,0.100 X 0.170;AXIAL,MI	04222	SA101C102KAA
A3C79	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C80	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C81	281–0773–00			CAP,FXD,CER:MLC;0.01UF,10%,100V,SAF,0.100 X 0.170;AXIAL,MI	80009	281–0773–00
A3C82	281–0813–00			CAP,FXD,CER:MLC;0.047UF,20%,50V,0.100 X 0.170;AXIAL,MI	04222	SA105E473MAA
A3C83	281–0813–00			CAP,FXD,CER:MLC;0.047UF,20%,50V,0.100 X 0.170;AXIAL,MI	04222	SA105E473MAA

Replaceable Electrical Parts

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A3C84	281–0812–00			CAP,FXD,CER:MLC;1000PF,10%,100V,0.100 X 0.170;AXIAL,MI	04222	SA101C102KAA
A3C85	281–0812–00			CAP,FXD,CER:MLC;1000PF,10%,100V,0.100 X 0.170;AXIAL,MI	04222	SA101C102KAA
A3C87	283–0599–02			CAP,FXD,MICA DI:98PF,5%,500V	09023	CDA10FD980J03
A3C88	281–0809–00			CAP,FXD,CER:MLC;200 PF,5%,100V,0.100 X 0.170;AXIAL,MI	04222	SA101A201JAA
A3C89	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3C90	281–0773–00			CAP,FXD,CER:MLC;0.01UF,10%,100V,SAF,0.100 X 0.170;AXIAL,MI	80009	281–0773–00
A3C91	290–0920–00			CAP,FXD,ELCTLT:33UF,+50–20%,35WVDC	55680	UVX1H330MAA
A3C92	281–0864–00			CAP,FXD,CER:MLC;430PF,5%,100V,0.100 X 0.170;AXIAL,MI	04222	SA101A431JAA
A3C93	281–0765–00			CAP,FXD,CER DI:100PF,5%,100V	04222	SA102A101JAA
A3C100	281–0812–00			CAP,FXD,CER:MLC;1000PF,10%,100V,0.100 X 0.170;AXIAL,MI	04222	SA101C102KAA
A3C101	281–0904–00			CAP,FXD,CER:MLC;12PF,10%,100V,0.100 X 0.170;AXIAL,MI	80009	281–0904–00
A3C102	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A3CR1	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR2	152–0501–01			DIO,SIG:FAST RCVRY;70V,200MA,100NS,COM–ANODE;MSD6150,TO–92,TR	80009	152–0501–01
A3CR3	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR4	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR5	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR6	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR7	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR8	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR9	152–0066–00			DIO,RECT:400V,1A,IFSM=30A,1.2VF,2US;GP10G/1N5060,T&R,SAF CONT	05828	GP10G–020
A3CR10	152–0066–00			DIO,RECT:400V,1A,IFSM=30A,1.2VF,2US;GP10G/1N5060,T&R,SAF CONT	05828	GP10G–020
A3CR11	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR12	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR13	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR14	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR15	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR16	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR17	152–0066–00			DIO,RECT:400V,1A,IFSM=30A,1.2VF,2US;GP10G/1N5060,T&R,SAF CONT	05828	GP10G–020
A3CR18	152–0066–00			DIO,RECT:400V,1A,IFSM=30A,1.2VF,2US;GP10G/1N5060,T&R,SAF CONT	05828	GP10G–020
A3CR19	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR20	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR21	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR22	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A3CR23	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR24	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR25	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR26	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR27	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR28	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR29	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR30	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR31	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3CR32	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A3FL1	119–4325–00			FLTR,BANDPASS:	80009	119–4325–00
A3FL2	119–4324–00			FLTR,BANDPASS:	80009	119–4324–00
A3FL3	119–2590–00			FLTR,RFI:10.7MHZ	80009	119–2590–00
A3FL4	119–2590–00			FLTR,RFI:10.7MHZ	80009	119–2590–00
A3J1	131–3571–00			CONN,HDR:	80009	131–3571–00
A3J2	131–4752–00			CONN,HDR:PCB;MALE,45 DEG,1 X 2,0.1 CTR,0.240 MLG X 0.110 TAIL,30 GLD	80009	131–4752–00
A3J3	131–4752–00			CONN,HDR:PCB;MALE,45 DEG,1 X 2,0.1 CTR,0.240 MLG X 0.110 TAIL,30 GLD	80009	131–4752–00
A3J4	175–9797–00			CA ASSY,SP:FLAT FLEX;FLX,10,27 AWG,2.5 L,1X10,BOX X STR,SLDR TAB,CONN NON PLZ	00779	487729–1
A3J5	131–2919–01			CONN,HDR:PCB;MALE,STR,1 X 4,0.1 CTR,0.235 MLG X 0.112 TAIL,30 GLD,0.035 DIA PCB	80009	131–2919–01
A3J6	131–2919–01			CONN,HDR:PCB;MALE,STR,1 X 4,0.1 CTR,0.235 MLG X 0.112 TAIL,30 GLD,0.035 DIA PCB	80009	131–2919–01
A3J9	131–0391–00			CONN,RF JACK:	80009	131–0391–00
A3J10	131–2919–01			CONN,HDR:PCB;MALE,STR,1 X 4,0.1 CTR,0.235 MLG X 0.112 TAIL,30 GLD,0.035 DIA PCB	80009	131–2919–01
A3J11	131–0391–00			CONN,RF JACK:	80009	131–0391–00
A3J100	131–4752–00			CONN,HDR:PCB;MALE,45 DEG,1 X 2,0.1 CTR,0.240 MLG X 0.110 TAIL,30 GLD	80009	131–4752–00
A3J101	131–4752–00			CONN,HDR:PCB;MALE,45 DEG,1 X 2,0.1 CTR,0.240 MLG X 0.110 TAIL,30 GLD	80009	131–4752–00
A3J200	131–4794–00			CONN,HDR:PCB;MALE,STR,1 X 2,0.1 CTR,0.235 MLG X 0.112 TAIL,30 GLD,0.035 DIA PCB	80009	131–4794–00
A3J201	131–4794–00			CONN,HDR:PCB;MALE,STR,1 X 2,0.1 CTR,0.235 MLG X 0.112 TAIL,30 GLD,0.035 DIA PCB	80009	131–4794–00
A3J202	131–4794–00			CONN,HDR:PCB;MALE,STR,1 X 2,0.1 CTR,0.235 MLG X 0.112 TAIL,30 GLD,0.035 DIA PCB	80009	131–4794–00
A3J203	131–4794–00			CONN,HDR:PCB;MALE,STR,1 X 2,0.1 CTR,0.235 MLG X 0.112 TAIL,30 GLD,0.035 DIA PCB	80009	131–4794–00
A3J300	131–4752–00			CONN,HDR:PCB;MALE,45 DEG,1 X 2,0.1 CTR,0.240 MLG X 0.110 TAIL,30 GLD	80009	131–4752–00
A3L1	120–0382–00			COIL,RF:210UH,+28%–43%,14 TURNS,TEST COND. 10 KHZ, 0.115 MA	TK1345	120–0382–00
A3L2	120–0382–00			COIL,RF:210UH,+28%–43%,14 TURNS,TEST COND. 10 KHZ, 0.115 MA	TK1345	120–0382–00
A3L3	120–0382–00			COIL,RF:210UH,+28%–43%,14 TURNS,TEST COND. 10 KHZ, 0.115 MA	TK1345	120–0382–00
A3L4	114–0475–00			COIL,RF:	80009	114–0475–00
A3L5	108–0826–00			COIL,RF:	80009	108–0826–00

Replaceable Electrical Parts

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A3L6	108–0987–00			COIL,RF:FIXED,45NH	80009	108–0987–00
A3L7	120–0382–00			COIL,RF:210UH,+28%–43%,14 TURNS,TEST COND. 10 KHZ, 0.115 MA	TK1345	120–0382–00
A3L8	120–0382–00			COIL,RF:210UH,+28%–43%,14 TURNS,TEST COND. 10 KHZ, 0.115 MA	TK1345	120–0382–00
A3L9	108–0826–00			COIL,RF:	80009	108–0826–00
A3L10	120–0382–00			COIL,RF:210UH,+28%–43%,14 TURNS,TEST COND. 10 KHZ, 0.115 MA	TK1345	120–0382–00
A3L11	108–0444–00			COIL,RF:FIXED,15NH	80009	108–0444–00
A3L12	108–0444–00			COIL,RF:FIXED,15NH	80009	108–0444–00
A3L14	108–0826–00			COIL,RF:	80009	108–0826–00
A3L15	108–0395–00			COIL,RF:FIXED,64UH	80009	108–0395–00
A3L16	108–0262–00			COIL,RF:FIXED,505NH	80009	108–0262–00
A3L17	108–0170–01			COIL,RF:FIXED,360NH ON FORM 276–0153–00	80009	108–0170–01
A3L18	108–0455–00			COIL,RF:FIXED,24NH,15%	80009	108–0455–00
A3L19	108–0395–00			COIL,RF:FIXED,64UH	80009	108–0395–00
A3P3	131–3957–00			BUS,CNDCT:SHUNT,1 X 2,0.1 CTR,JUMPER,0.2 H,LOW PF,BLK	80009	131–3957–00
A3P5	131–3957–00			BUS,CNDCT:SHUNT,1 X 2,0.1 CTR,JUMPER,0.2 H,LOW PF,BLK	80009	131–3957–00
A3P6	131–3957–00			BUS,CNDCT:SHUNT,1 X 2,0.1 CTR,JUMPER,0.2 H,LOW PF,BLK	80009	131–3957–00
A3P10	131–3957–00			BUS,CNDCT:SHUNT,1 X 2,0.1 CTR,JUMPER,0.2 H,LOW PF,BLK	80009	131–3957–00
A3P100	131–3957–00			BUS,CNDCT:SHUNT,1 X 2,0.1 CTR,JUMPER,0.2 H,LOW PF,BLK	80009	131–3957–00
A3P101	131–3957–00			BUS,CNDCT:SHUNT,1 X 2,0.1 CTR,JUMPER,0.2 H,LOW PF,BLK	80009	131–3957–00
A3P300	131–3957–00			BUS,CNDCT:SHUNT,1 X 2,0.1 CTR,JUMPER,0.2 H,LOW PF,BLK	80009	131–3957–00
A3Q1	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A3Q2	151–0188–00			XSTR,SIG:BIPOLAR,PNP;40V,200MA,250MHZ, AMPL;2N3906,TO–92 EBC	80009	151–0188–00
A3Q3	151–0476–00			XSTR,PWR:BIPOLAR,NPN;100V,3.0A,3.0MHZ, AMPL;TIP31C,TO–220	80009	151–0476–00
A3Q4	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A3Q5	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A3Q6	151–0188–00			XSTR,SIG:BIPOLAR,PNP;40V,200MA,250MHZ, AMPL;2N3906,TO–92 EBC	80009	151–0188–00
A3Q7	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A3Q8	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A3Q9	151–0188–00			XSTR,SIG:BIPOLAR,PNP;40V,200MA,250MHZ, AMPL;2N3906,TO–92 EBC	80009	151–0188–00
A3Q10	151–0188–00			XSTR,SIG:BIPOLAR,PNP;40V,200MA,250MHZ, AMPL;2N3906,TO–92 EBC	80009	151–0188–00
A3Q11	151–0282–00			XSTR,SIG:BIPOLAR,NPN;12V,50MA,900MHZ, AMPL;2N5179,TO–72	80009	151–0282–00
A3Q12	151–0719–01			XSTR,SIG:BIPOLAR,PNP;20V,50MA,600MHZ, AMPL;MPSH81,TO–92 BEC,T/A	80009	151–0719–01
A3Q13	151–0367–00			XSTR,SIG:BIPOLAR,NPN;25V,30MA,1.0GHZ;MPS–H10 SPECIAL,TO–92 EBC	80009	151–0367–00
A3Q14	151–0347–02			XSTR,SIG:BIPOLAR,NPN;160V,600MA,100MHZ, AMPL;2N5551,TO–92 EBC,T&A	56289	CT7916
A3Q15	151–0347–02			XSTR,SIG:BIPOLAR,NPN;160V,600MA,100MHZ, AMPL;2N5551,TO–92 EBC,T&A	56289	CT7916

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A3Q16	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A3Q17	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A3Q18	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A3Q19	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A3Q20	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A3Q21	151–0188–00			XSTR,SIG:BIPOLAR,PNP;40V,200MA,250MHZ, AMPL;2N3906,TO–92 EBC	80009	151–0188–00
A3Q22	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A3Q23	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A3Q24	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A3Q25	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A3Q26	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A3Q27	151–0347–02			XSTR,SIG:BIPOLAR,NPN;160V,600MA,100MHZ, AMPL;2N5551,TO–92 EBC,T&A	56289	CT7916
A3Q28	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A3Q29	151–0347–02			XSTR,SIG:BIPOLAR,NPN;160V,600MA,100MHZ, AMPL;2N5551,TO–92 EBC,T&A	56289	CT7916
A3Q30	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A3Q31	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A3Q32	151–0188–00			XSTR,SIG:BIPOLAR,PNP;40V,200MA,250MHZ, AMPL;2N3906,TO–92 EBC	80009	151–0188–00
A3Q100	151–0188–00			XSTR,SIG:BIPOLAR,PNP;40V,200MA,250MHZ, AMPL;2N3906,TO–92 EBC	80009	151–0188–00
A3Q101	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A3R1	322–3276–00			RES,FXD,FILM:7.32K OHM,1%,0.2W,TC=T0	80009	322–3276–00
A3R2	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3289–00
A3R3	322–3306–00			RES,FXD:MET FILM;15K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 15K0
A3R4	311–2232–00			RES,VAR,TRMR:CERMET,2K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 2K
A3R5	307–0446–00			RES NTWK,FXD,FI:10K OHM,20%,(9)RES	80009	307–0446–00
A3R6	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R7	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R8	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R9	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R10	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R11	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R12	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 100E

Replaceable Electrical Parts

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A3R13	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R14	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R15	322–3251–00			RES,FXD,FILM:4.02K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 4K02
A3R16	322–3402–00			RES,FXD:MET FILM;150K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3402–00
A3R17	322–3254–00			RES,FXD,FILM:4.32K OHM,1%,0.2W,TC=T0	80009	322–3254–00
A3R18	322–3402–00			RES,FXD:MET FILM;150K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3402–00
A3R19	301–0181–00			RES,FXD,FILM:180 OHM,5%,0.5W	80009	301–0181–00
A3R20	322–3258–00			RES,FXD:MET FILM;4.75K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3258–00
A3R21	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R23	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R24	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R25	322–3326–00			RES,FXD,FILM:24.3K OHM,1%,0.2W,TC–T0	91637	CCF50–2F24301F
A3R26	322–3318–00			RES,FXD:MET FILM;20K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 20K0
A3R27	311–2236–00			RES,VAR,TRMR:CERMET;20K OHM,20%,0.5W,0.197 SQ,SIDE ADJUST;T&R	TK1450	GF06UT 20K
A3R28	322–3318–00			RES,FXD:MET FILM;20K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 20K0
A3R29	311–2236–00			RES,VAR,TRMR:CERMET;20K OHM,20%,0.5W,0.197 SQ,SIDE ADJUST;T&R	TK1450	GF06UT 20K
A3R30	322–3306–00			RES,FXD:MET FILM;15K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 15K0
A3R31	322–3260–00			RES,FXD,FILM:4.99K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 4K99
A3R32	322–3318–00			RES,FXD:MET FILM;20K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 20K0
A3R33	322–3318–00			RES,FXD:MET FILM;20K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 20K0
A3R34	322–3385–00			RES,FXD:MET FILM;100K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100K
A3R35	311–2235–00			RES,VAR,TRMR:CERMET;10K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	80009	311–2235–00
A3R36	311–2234–00			RES,VAR,TRMR:CERMET;5K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 5K
A3R37	311–2236–00			RES,VAR,TRMR:CERMET;20K OHM,20%,0.5W,0.197 SQ,SIDE ADJUST;T&R	TK1450	GF06UT 20K
A3R38	311–2236–00			RES,VAR,TRMR:CERMET;20K OHM,20%,0.5W,0.197 SQ,SIDE ADJUST;T&R	TK1450	GF06UT 20K
A3R39	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A3R40	322–3114–00			RES,FXD:MET FILM;150 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	91637	CCF50–2–G1500F
A3R41	322–3258–00			RES,FXD:MET FILM;4.75K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3258–00
A3R42	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3289–00
A3R43	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A3R44	322–3239–00			RES,FXD,FILM:3.01K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 3K01
A3R45	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3289–00
A3R46	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 2K00

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A3R47	322–3318–00			RES,FXD:MET FILM;20K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 20K0
A3R48	311–2235–00			RES,VAR,TRMR:CERMET;10K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	80009	311–2235–00
A3R49	311–2235–00			RES,VAR,TRMR:CERMET;10K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	80009	311–2235–00
A3R50	322–3265–00			RES,FXD:MET FILM;5.62K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3265–00
A3R52	322–3360–00			RES,FXD,FILM:54.9K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 54K9
A3R53	322–3391–00			RES,FXD,FILM:115K OHM,1%,0.2W,TC=T0	80009	322–3391–00
A3R54	322–3318–00			RES,FXD:MET FILM;20K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 20K0
A3R55	311–2234–00			RES,VAR,TRMR:CERMET;5K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 5K
A3R56	311–2236–00			RES,VAR,TRMR:CERMET;20K OHM,20%,0.5W,0.197 SQ,SIDE ADJUST;T&R	TK1450	GF06UT 20K
A3R57	311–2234–00			RES,VAR,TRMR:CERMET;5K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 5K
A3R58	311–2232–00			RES,VAR,TRMR:CERMET,2K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 2K
A3R59	322–3318–00			RES,FXD:MET FILM;20K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 20K0
A3R60	322–3279–00			RES,FXD,FILM:7.87K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 7K87
A3R61	311–2236–00			RES,VAR,TRMR:CERMET;20K OHM,20%,0.5W,0.197 SQ,SIDE ADJUST;T&R	TK1450	GF06UT 20K
A3R62	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3289–00
A3R63	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3289–00
A3R64	322–3421–00			RES,FXD,FILM:237K OHM,1%,0.2W,TC=T0	91637	CCF50–2F23702F
A3R65	322–3239–00			RES,FXD,FILM:3.01K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 3K01
A3R66	322–3346–00			RES,FXD:MET FILM;39.2K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3346–00
A3R67	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A3R68	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A3R69	322–3326–00			RES,FXD,FILM:24.3K OHM,1%,0.2W,TC–T0	91637	CCF50–2F24301F
A3R70	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A3R71	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A3R72	322–3273–00			RES,FXD:MET FILM;6.81K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3273–00
A3R73	322–3314–00			RES,FXD:MET FILM;18.2K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3314–00
A3R74	322–3244–00			RES,FXD,FILM:3.4K OHM,1%,0.2W,TC=T0	80009	322–3244–00
A3R76	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A3R77	322–3172–00			RES,FXD,FILM:604 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 604E
A3R78	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A3R79	322–3318–00			RES,FXD:MET FILM;20K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 20K0
A3R80	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3289–00
A3R81	311–2235–00			RES,VAR,TRMR:CERMET;10K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	80009	311–2235–00
A3R83	322–3385–00			RES,FXD:MET FILM;100K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 100K

Replaceable Electrical Parts

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A3R84	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A3R85	322–3258–00			RES,FXD:MET FILM;4.75K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3258–00
A3R86	322–3385–00			RES,FXD:MET FILM;100K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100K
A3R87	322–3258–00			RES,FXD:MET FILM;4.75K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3258–00
A3R88	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A3R89	311–2236–00			RES,VAR,TRMR:CERMET;20K OHM,20%,0.5W,0.197 SQ,SIDE ADJUST;T&R	TK1450	GF06UT 20K
A3R90	322–3246–00			RES,FXD,FILM:3.57K OHM,1%,0.2W,TC=T0	80009	322–3246–00
A3R91	322–3335–00			RES,FXD,FILM:30.1K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 30K1
A3R92	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A3R93	322–3290–00			RES,FXD,FILM:10.2K OHM,1%,0.2W,TC=T0	80009	322–3290–00
A3R94	322–3226–00			RES,FXD:MET FILM;2.21K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 2K21
A3R95	322–3277–00			RES,FXD,FILM:7.5K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 7K50
A3R96	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A3R97	322–3360–00			RES,FXD,FILM:54.9K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 54K9
A3R98	322–3260–00			RES,FXD,FILM:4.99K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 4K99
A3R100	322–3258–00			RES,FXD:MET FILM;4.75K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3258–00
A3R101	322–3258–00			RES,FXD:MET FILM;4.75K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3258–00
A3R102	322–3258–00			RES,FXD:MET FILM;4.75K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3258–00
A3R103	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3289–00
A3R104	322–3165–00			RES,FXD,FILM:511 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 511E
A3R105	322–3318–00			RES,FXD:MET FILM;20K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 20K0
A3R106	322–3421–00			RES,FXD,FILM:237K OHM,1%,0.2W,TC=T0	91637	CCF50–2F23702F
A3R107	322–3356–00			RES,FXD,FILM:49.9K OHM,1%,0.2W,TC=T0	80009	322–3356–00
A3R108	322–3265–00			RES,FXD:MET FILM;5.62K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3265–00
A3R109	322–3269–02			RES,FXD,FILM:6.19K OHM,0.2W,5%	80009	322–3269–02
A3R110	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3289–00
A3R111	311–2230–00			RES,VAR,TRMR:CERMET;500 OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 500
A3R112	322–3258–00			RES,FXD:MET FILM;4.75K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3258–00
A3R113	311–2229–00			RES,VAR,NONWW:TRMR,250 OHM,20%,0.5W LIN	TK1450	GF06UT 250
A3R116	322–3172–00			RES,FXD,FILM:604 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 604E
A3R117	322–3165–00			RES,FXD,FILM:511 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 511E
A3R118	322–3281–00			RES,FXD:MET FILM;8.25K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3281–00
A3R119	322–3281–00			RES,FXD:MET FILM;8.25K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3281–00
A3R120	322–3306–00			RES,FXD:MET FILM;15K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 15K0
A3R121	322–3165–00			RES,FXD,FILM:511 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 511E
A3R122	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3289–00
A3R123	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3289–00

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A3R124	322–3269–02			RES,FXD,FILM:6.19K OHM,0.2W,5%	80009	322–3269–02
A3R125	322–3299–00			RES,FXD,FILM:12.7K OHM,1%,0.2W,TC=T0	80009	322–3299–00
A3R126	322–3481–00			RES,FXD,FILM:1M OHM.1%,0.2W,TC=T0	80009	322–3481–00
A3R127	322–3184–00			RES,FXD,FILM:806 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 806E
A3R128	322–3360–00			RES,FXD,FILM:54.9K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 54K9
A3R129	322–3260–00			RES,FXD,FILM:4.99K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 4K99
A3R131	322–3126–00			RES,FXD,FILM:200 OHM,1%,0.2W,TC=T0	80009	322–3126–00
A3R132	322–3126–00			RES,FXD,FILM:200 OHM,1%,0.2W,TC=T0	80009	322–3126–00
A3R133	322–3369–00			RES,FXD:MET FILM;68.1K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3369–00
A3R134	301–0160–00			RES,FXD,FILM:16 OHM,5%,0.50W	57668	TR50J–E 16E
A3R135	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A3R136	322–3114–00			RES,FXD:MET FILM;150 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	91637	CCF50–2–G1500F
A3R137	322–3130–00			RES,FXD:MET FILM;221 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3130–00
A3R138	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3289–00
A3R139	322–3285–00			RES,FXD,FILM:9.09K OHM,1%,0.2W,TC=T0	80009	322–3285–00
A3R140	311–2238–00			RES,VAR,TRMR:CERMET;50K OHM,20%,0.5W,0.197 SQ,SIDE ADJUST;T&R	TK1450	GF06UT 50 K
A3R141	322–3143–00			RES,FXD,FILM:301 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 301E
A3R142	322–3258–00			RES,FXD:MET FILM;4.75K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3258–00
A3R143	322–3318–00			RES,FXD:MET FILM;20K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 20K0
A3R144	322–3377–00			RES,FXD:MET FILM;82.5K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	91637	CCF50–2F82501F
A3R145	322–3024–00			RES,FXD,FILM:17.4 OHM,1%,0.2W,TC=T0	57668	CRB20FXE1K62
A3R146	322–3044–00			RES,FXD:MET FILM;28 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20FXE9K35
A3R146	322–3143–00			RES,FXD,FILM:301 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 301E
A3R147	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R148	322–3177–02			RES,FXD,FILM:681 OHM,0.5%,0.2W,TC=T2	80009	322–3177–02
A3R149	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3289–00
A3R150	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3289–00
A3R151	322–3318–00			RES,FXD:MET FILM;20K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 20K0
A3R152	322–3258–00			RES,FXD:MET FILM;4.75K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3258–00
A3R153	322–3143–00			RES,FXD,FILM:301 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 301E
A3R154	322–3143–00			RES,FXD,FILM:301 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 301E
A3R155	322–3243–00			RES,FXD:MET FILM;3.32K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	91637	CCF50–1–G33200F
A3R156	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3289–00
A3R157	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3289–00
A3R158	322–3318–00			RES,FXD:MET FILM;20K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 20K0
A3R159	322–3414–00			RES,FXD:MET FILM;200K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	91637	CCF501G20002F
A3R160	322–3453–00			RES,FXD,FILM:511K OHM,1%,0.2W,TC=T0	91637	CCF50–2F51102F
A3R161	322–3262–00			RES,FXD,FILM:5.23K OHM,1%,0.2W,TC=T0	80009	322–3262–00
A3R162	322–3284–00			RES,FXD,FILM:8.87K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 8K87

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A3R163	322–3226–00			RES,FXD:MET FILM;2.21K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 2K21
A3R165	322–3143–00			RES,FXD,FILM:301 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 301E
A3R166	322–3024–00			RES,FXD,FILM:17.4 OHM,1%,0.2W,TC=T0	57668	CRB20FXE1K62
A3R167	322–3243–00			RES,FXD:MET FILM;3.32K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	91637	CCF50–1–G33200F
A3R168	311–2234–00			RES,VAR,TRMR:CERMET;5K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 5K
A3R169	322–3044–00			RES,FXD:MET FILM;28 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20FXE9K35
A3R170	322–3184–00			RES,FXD,FILM:806 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 806E
A3R171	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R172	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R173	322–3181–00			RES,FXD,FILM:750 OHM,1%,0.2W,TC=T0	80009	322–3181–00
A3R174	322–3224–00			RES,FXD,FILM:2.1K OHM,1%,0.2W,TC=T0	91637	CCF50–2F21000F
A3R175	311–2227–00			RES,VAR,NONWW:TRMR,100 OHM,20%,0.5W LIN	TK1450	GF06UT 100
A3R176	311–2238–00			RES,VAR,TRMR:CERMET;50K OHM,20%,0.5W,0.197 SQ,SIDE ADJUST;T&R	TK1450	GF06UT 50 K
A3R177	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A3R178	308–0549–00			RES,FXD,WW:6.3K OHM,1%,3W	80009	308–0549–00
A3R179	308–0549–00			RES,FXD,WW:6.3K OHM,1%,3W	80009	308–0549–00
A3R180	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3289–00
A3R181	322–3085–00			RES,FXD:MET FILM;75 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 75E0
A3R182	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R183	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R184	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3289–00
A3R185	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R186	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R187	322–3134–00			RES,FXD,FILM:243 OHM,1%,0.2W,TC=T0	80009	322–3134–00
A3R188	322–3269–02			RES,FXD,FILM:6.19K OHM,0.2W,5%	80009	322–3269–02
A3R189	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A3R190	322–3281–00			RES,FXD:MET FILM;8.25K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3281–00
A3R191	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A3R192	322–3128–00			RES,FXD,FILM:210 OHM,1%,0.2W,TC=T0,MI,SMALL BODY	57668	CRB20FXE210E
A3R193	322–3128–00			RES,FXD,FILM:210 OHM,1%,0.2W,TC=T0,MI,SMALL BODY	57668	CRB20FXE210E
A3R194	322–3385–00			RES,FXD:MET FILM;100K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100K
A3R195	322–3177–02			RES,FXD,FILM:681 OHM,0.5%,0.2W,TC=T2	80009	322–3177–02
A3R196	322–3148–00			RES,FXD,FILM:340 OHM,1%,0.2W,TC=T0	91637	CCF50–2F340R0F
A3R197	322–3376–00			RES,FXD,FILM:80.6K OHM,1%,0.2W,TC=T0	80009	322–3376–00
A3R198	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R199	322–3177–02			RES,FXD,FILM:681 OHM,0.5%,0.2W,TC=T2	80009	322–3177–02
A3R200	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R201	322–3138–00			RES,FXD,FILM:267 OHM,1%,0.2W,TC=T0	80009	322–3138–00
A3R202	322–3134–00			RES,FXD,FILM:243 OHM,1%,0.2W,TC=T0	80009	322–3134–00

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A3R203	322–3134–00			RES,FXD,FILM:243 OHM,1%,0.2W,TC=T0	80009	322–3134–00
A3R204	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3289–00
A3R205	322–3281–00			RES,FXD:MET FILM;8.25K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3281–00
A3R206	322–3134–00			RES,FXD,FILM:243 OHM,1%,0.2W,TC=T0	80009	322–3134–00
A3R207	322–3134–00			RES,FXD,FILM:243 OHM,1%,0.2W,TC=T0	80009	322–3134–00
A3R208	322–3305–00			RES,FXD,FILM:14.7K OHM,1%,0.2W,TC=T0	80009	322–3305–00
A3R209	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3289–00
A3R210	322–3318–00			RES,FXD:MET FILM;20K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 20K0
A3R211	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R212	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A3R213	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R214	322–3258–00			RES,FXD:MET FILM;4.75K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3258–00
A3R215	322–3318–00			RES,FXD:MET FILM;20K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 20K0
A3R216	322–3281–00			RES,FXD:MET FILM;8.25K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3281–00
A3R217	322–3235–00			RES,FXD:MET FILM;2.74K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 2K74
A3R218	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3289–00
A3R219	322–3306–00			RES,FXD:MET FILM;15K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 15K0
A3R220	322–3165–00			RES,FXD,FILM:511 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 511E
A3R221	322–3165–00			RES,FXD,FILM:511 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 511E
A3R222	322–3306–00			RES,FXD:MET FILM;15K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 15K0
A3R223	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R224	322–3235–00			RES,FXD:MET FILM;2.74K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 2K74
A3R225	322–3201–00			RES,FXD:MET FILM;1.21K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3201–00
A3R226	322–3342–00			RES,FXD,FILM:35.7K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 35K7
A3R227	322–3361–00			RES,FXD:MET FILM;56.2K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	91637	CCF50–2F56201F
A3R228	322–3277–00			RES,FXD,FILM:7.5K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 7K50
A3R229	322–3269–02			RES,FXD,FILM:6.19K OHM,0.2W,5%	80009	322–3269–02
A3R230	322–3269–02			RES,FXD,FILM:6.19K OHM,0.2W,5%	80009	322–3269–02
A3R231	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3289–00
A3R232	311–2231–00			RES,VAR,TRMR:CERMET;1K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 1K
A3R233	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A3R234	322–3326–00			RES,FXD,FILM:24.3K OHM,1%,0.2W,TC–T0	91637	CCF50–2F24301F
A3R235	322–3239–00			RES,FXD,FILM:3.01K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 3K01
A3R236	322–3258–00			RES,FXD:MET FILM;4.75K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3258–00
A3R237	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A3R238	322–3254–00			RES,FXD,FILM:4.32K OHM,1%,0.2W,TC=T0	80009	322–3254–00

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A3R239	311–2234–00			RES,VAR,TRMR:CERMET;5K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 5K
A3R240	311–2234–00			RES,VAR,TRMR:CERMET;5K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 5K
A3R241	322–3224–00			RES,FXD,FILM:2.1K OHM,1%,0.2W,TC=T0	91637	CCF50–2F21000F
A3R242	322–3385–00			RES,FXD:MET FILM;100K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 100K
A3R243	322–3481–00			RES,FXD,FILM:1M OHM.1%,0.2W,TC=T0	80009	322–3481–00
A3R244	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3289–00
A3R245	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A3R246	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A3R247	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 100E
A3R300	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3289–00
A3R301	322–3315–00			RES,FXD,FILM:18.7K OHM,1%,0.2W,TC=T0	80009	322–3315–00
A3R302	322–3315–00			RES,FXD,FILM:18.7K OHM,1%,0.2W,TC=T0	80009	322–3315–00
A3R303	322–3318–00			RES,FXD:MET FILM;20K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 20K0
A3R304	322–3411–00			RES,FXD,FILM:187K OHM,1%,0.2W,TC=T0	80009	322–3411–00
A3R305	322–3213–00			RES,FXD,FILM:1.62K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 1K62
A3R306	322–3313–00			RES,FXD,FILM:17.8K OHM,1%,0.2W,TC=T0	91637	CCF50–2F17801F
A3R307	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A3R308	322–3164–00			RES,FXD,FILM:499 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 499E
A3R309	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A3T1	120–1907–00			XFMR,RF:BALUN,R 1:1,FREQ RNG 20M–600MHZ, INSR LOSS 10DB,PKG 7.2MM SQ,6.8MM HI	80009	120–1907–00
A3U1	156–2489–00			IC,CONV:CMOS,A/D;8–BIT,32US,SAR,DIFF IN,SER OUT;ADC0831,DIP08.3	80009	156–2489–00
A3U2	156–1684–01			MICROCKT,DGTL:MICROCOMPUTER,8 BIT	80009	156–1684–01
A3U3	156–0991–02			IC,LIN:BIPOLAR,VR;POS,5.0V,100MA,5%; MC78L05ACP,TO–92 T&A	80009	156–0991–02
A3U4	156–2029–00			IC,MEM:NMOS,NVRAM;16 X 16, SER DATA;X2443,DIP8	60395	X2444P
				MOUNTING PARTS		
	136–0727–00			SKT,PL–IN ELEK:MICROCKT,8 CONT	09922	DILB8P–108
				END MOUNTING PARTS		
A3U5	156–1150–01			IC,LIN:BIPOLAR,VR;NEG,–5.0V,100MA,4%; MC79L05ACP,TO–92,T&R	80009	156–1150–01
A3U6	156–1664–00			IC,DGTL:ALSTTL,FLIP FLOP;OCTAL NONINV D–TYPE, 3–STATE;74ALS574,DIP20.3,TUBE	80009	156–1664–00
A3U7	156–2091–00			IC,DGTL:ALSTTL,GATE;QUAD 2–IN NAND;74ALS00,DIP14.3,TUBE	01295	SN74ALS00AN3
A3U8	156–1858–00			IC,DGTL:ALSTTL,LATCH;OCTAL D–TYPE TRANS, 3–STATE;74ALS573,DIP20.3,TUBE	80009	156–1858–00
A3U9	160–8789–00			IC,DGTL:CMOS,EPROM;8192 X 8,27C64,27C64,DIP28.6	80009	160–8789–00
				MOUNTING PARTS		
	136–0755–00			SKT,DIP:	09922	DILB28P–108
				END MOUNTING PARTS		
A3U10	156–2493–00			IC,CONV:	80009	156–2493–00
A3U11	156–1126–00			IC,LIN:BIPOLAR,COMPTR;OPEN COLL,200NS;LM311N,DIP08.3	80009	156–1126–00
A3U12	156–1191–00			IC,LIN:BIFET,OP–AMP;DUAL;TL072CN/LF353N,DIP08.3	80009	156–1191–00
A3U13	156–0048–00			IC,LIN:	80009	156–0048–00
A3U14	156–1200–00			IC,LIN:BIFET,OP–AMP;QUAD;TL074CN/LF347N/ MC34004P,DIP14.3	80009	156–1200–00

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A3U15	156–1451–00			IC,LIN:BIPOLAR,VR;NEG,ADJUST,1.5A,4%;LM337T,TO–220	80009	156–1451–00
A3U16	156–1200–00			IC,LIN:BIFET,OP–AMP;QUAD;TL074CN/LF347N/ MC34004P,DIP14.3	80009	156–1200–00
A3U17	156–3972–00			IC,MISC:CMOS,ANALOG SW;QUAD SPST,100 OHM,400NS;DG444,DIP16.3	80009	156–3972–00
A3U18	156–1191–00			IC,LIN:BIFET,OP–AMP;DUAL;TL072CN/LF353N,DIP08.3	80009	156–1191–00
A3U19	156–1161–00			IC,LIN:BIPOLAR,VR;POS,ADJUST,1.5A,4%;LM317T,TO–220	04713	LM317T
A3U20	156–3972–00			IC,MISC:CMOS,ANALOG SW;QUAD SPST,100 OHM,400NS;DG444,DIP16.3	80009	156–3972–00
A3U21	156–0515–00			IC,MISC:CMOS,ANALOG MUX;TPL SPDT;CD4053,DIP16.3	80009	156–0515–00
A3U22	156–3047–00			IC,LIN:BIPOLAR,AMPL;RF AMP,20DB GAIN,600MHZ;NE5205AN,DIP08.3	80009	156–3047–00
A3U23	156–0153–00			IC,DGTL:TTL,BFR/DRVR;HEX INV, OC, HI V INTFC;7406,DIP14.3	80009	156–0153–00
A3U24	156–1191–00			IC,LIN:BIFET,OP–AMP;DUAL;TL072CN/LF353N,DIP08.3	80009	156–1191–00
A3U25	119–2592–00			MIXER,FREQ:1–500MHZ	80009	119–2592–00
A3U26	156–1191–00			IC,LIN:BIFET,OP–AMP;DUAL;TL072CN/LF353N,DIP08.3	80009	156–1191–00
A3U27	156–0742–00			IC,LIN:BIPOLAR,OP–AMP;HI SLEW RATE;LM318N,DIP08.3	01295	LM318P
A3U28	119–4326–00			MIXER,RF:PCB;LO/RF 10–1000MHZ,IF 5–500MHZ, CVSRN LOSS 8DB MAX,8 PIN,A06 CASE	80009	119–4326–00
A3U29	156–4200–00			IC,LIN:BIPOLAR,AMPL;MICROWAVE 8.2DB GAIN,1.0GHZ;MSA–0485/MAR–4,4 PIN X PACKAGE	80009	156–4200–00
A3U30	156–0515–00			IC,MISC:CMOS,ANALOG MUX;TPL SPDT;CD4053,DIP16.3	80009	156–0515–00
A3U31	156–4200–00			IC,LIN:BIPOLAR,AMPL;MICROWAVE 8.2DB GAIN,1.0GHZ;MSA–0485/MAR–4,4 PIN X PACKAGE	80009	156–4200–00
A3U32	156–4199–00			IC,LIN:BIPOLAR,AMPL;FM IF/DET,FSK DATA SHAP-ER,W/RSSI;MC13055P,DIP16.3	80009	156–4199–00
A3U33	156–1149–00			IC,LIN:BIFET,OP–AMP;LF351N,DIP08.3	27014	LF351N/GLEA134
A3VR1	152–0667–00			DIO,ZENER:3V,2%,0.4W;DO–7 OR 35,TR	80009	152–0667–00
A3VR2	152–0667–00			DIO,ZENER:3V,2%,0.4W;DO–7 OR 35,TR	80009	152–0667–00
A3VR3	152–0227–00			DIO,ZENER:6.2V,5%,0.4W;1N753A FMLY,DO–35 OR 7,TR	80009	152–0227–00
A3W1	131–0566–00			BUS,CNDCT:DUM RES,0.094 OD X 0.225 L	80009	131–0566–00
A3W2	131–4566–00			BUS,CNDCT:0 OHM,300 SPACING,SM BODY	80009	131–4566–00
A3W3	131–4566–00			BUS,CNDCT:0 OHM,300 SPACING,SM BODY	80009	131–4566–00
A3W4	131–4566–00			BUS,CNDCT:0 OHM,300 SPACING,SM BODY	80009	131–4566–00
A3W5	131–4566–00			BUS,CNDCT:0 OHM,300 SPACING,SM BODY	80009	131–4566–00
A3W7	131–4566–00			BUS,CNDCT:0 OHM,300 SPACING,SM BODY	80009	131–4566–00
A3W8	131–0566–00			BUS,CNDCT:DUM RES,0.094 OD X 0.225 L	80009	131–0566–00
A3W10	131–4566–00			BUS,CNDCT:0 OHM,300 SPACING,SM BODY	80009	131–4566–00
A3W11	131–0566–00			BUS,CNDCT:DUM RES,0.094 OD X 0.225 L	80009	131–0566–00
A3W12	131–0566–00			BUS,CNDCT:DUM RES,0.094 OD X 0.225 L	80009	131–0566–00
A3W13	174–2644–00			CA ASSY,RF:50 OHM COAX,SEMIRIGID,0.087 OD	80009	174–2644–00
A3Y1	158–0300–00			XTAL UNIT,QTZ:12 MHZ,0.05%,SER RESN	80009	158–0300–00
A3Y2	158–0415–00			XTAL,UNIT,QTZ:119.80MTZ,+/–0.005%,SER 5TH OVER-TONE,ESR 70 OHM,PKG HC–45/U	80009	158–0415–00
A3Y3	158–0334–00			XTAL UNIT,QTZ:SET OF 2 : 2 POLE ML XTAL FLTRS, CTR	80009	158–0334–00
A3Y4	158–0334–00			XTAL UNIT,QTZ:SET OF 2 : 2 POLE ML XTAL FLTRS, CTR	80009	158–0334–00
A3A1	671–1796–01			CIRCUIT BD ASSY:GRATICULE LIGHT	80009	671–1796–00
A3A1DS100	150–0168–00			LAMP,INCAND:14V,0.08A,WEDGE BASE,T1.75 FOR SKT MT	80009	150–0168–00
				MOUNTING PARTS		
	136–1119–01			SKT,LPHLDR:PCB,LPHLDR;FEM,STR,SGL,0.404 H X 0.218 TAIL,TIN,T–1.75 WEDGE BASE	80009	136–1119–00
				END MOUNTING PARTS		
A3A1DS200	150–0168–00			LAMP,INCAND:14V,0.08A,WEDGE BASE,T1.75 FOR SKT MT	80009	150–0168–00
				MOUNTING PARTS		
	136–1119–01			SKT,LPHLDR:PCB,LPHLDR;FEM,STR,SGL,0.404 H X 0.218 TAIL,TIN,T–1.75 WEDGE BASE	80009	136–1119–00
				END MOUNTING PARTS		

Replaceable Electrical Parts

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A3A1DS300	150–0168–00			LAMP,INCAND:14V,0.08A,WEDGE BASE,T1.75 FOR SKT MT	80009	150–0168–00
				MOUNTING PARTS		
	136–1119–01			SKT,LPHLDR:PCB,LPHLDR;FEM,STR,SGL,0.404 H X 0.218 TAIL,TIN,T–1.75 WEDGE BASE	80009	136–1119–00
				END MOUNTING PARTS		
A3A1J100	131–4530–00			CONN,HDR:PCB;MALE,STR,1 X 3,0.1 CTR,0.230 MLG X 0.120 TAIL,30 GLD,BD RETENTION	80009	131–4530–00
A3A1P100	131–0993–00			CONN,BOX:SHUNT/SHORTING;FEM,STR,1 X 2,0.1 CTR,0.385 H,30 GLD,BLK,JUMPER	22526	65474–006
A3A1P200	131–2790–00			CONN,HDR:PCB;RTANG,1 X 2,0.15 CTR,0.230 MLG X 0.120 TAIL,30 GLD	80009	131–2790–00
A3A1P800	131–2790–00			CONN,HDR:PCB;RTANG,1 X 2,0.15 CTR,0.230 MLG X 0.120 TAIL,30 GLD	80009	131–2790–00
A4	671–0145–02			CIRCUIT BD ASSY:18V POWER SUPPLY	80009	671–0145–02
A4C491	290–0164–00			CAP,FXD,ALUM:1UF,+50%–10%,160V,0.276 X 0.567;AXIAL,MI,T&R	24165	516D105M160LL7B
A4C497	290–1311–00			CAP,FXD,ALUM:10UF,20%,50V,5 X 11MM;5000 HOURS,RDL,T&A	80009	290–1311–00
A4C580	290–1296–00			CAP,FXD,ALUM:100UF,20%,25V,8 X 9MM;RDL,105 DEG,BULK	80009	290–1296–00
A4C581	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A4C583	281–0771–00			CAP,FXD,CER DI:2200PF,20%,200V	80009	281–0771–00
A4C682	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A4C683	281–0773–00			CAP,FXD,CER:MLC;0.01UF,10%,100V,SAF,0.100 X 0.170;AXIAL,MI	80009	281–0773–00
A4C684	281–0773–00			CAP,FXD,CER:MLC;0.01UF,10%,100V,SAF,0.100 X 0.170;AXIAL,MI	80009	281–0773–00
A4C690	290–0747–00			CAP,FXD,ELCTLT:100UF,+50–20%,25WVDC	24165	516D107M025LM7B
A4C697	290–1311–00			CAP,FXD,ALUM:10UF,20%,50V,5 X 11MM;5000 HOURS,RDL,T&A	80009	290–1311–00
A4C782	290–1311–00			CAP,FXD,ALUM:10UF,20%,50V,5 X 11MM;5000 HOURS,RDL,T&A	80009	290–1311–00
A4CR481	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A4CR485	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A4CR494	152–0400–00			DIO,RECT:FAST RCVRY;400V,1A,200NS;1N4936,DO–41,T&R	80009	152–0400–00
A4CR594	152–0864–00			DIO,RECT:ULTRA FAST;150V,2A,25NS,IFSM=50A,SOFT REC;BYV–150	80009	152–0864–00
A4DS698	150–1095–01			LT EMITTING DIO:RED,660NM,50MA	15513	200–ER
A4J698	131–4553–00			CONN,HDR:PCB;MALE,RTANG,1 X 5,0.1 CTR,0.235 MLG X 0.110 TAIL,30 GLD	80009	131–4553–00
A4L591	108–1385–00			COIL,PWR:IDCTR;FXD,TOROID,250UH,10%,DCR = 0.155 OHMS;	24226	121AT22503H
A4L695	108–1262–00			COIL,RF:FXD,100UH,10%,Q=30,SRF 8.2MHZ,DCR 0.23 OHM,I MAX 0.75ARDL LEAD	80009	108–1262–00
A4Q481	151–0710–00			XSTR,SIG:BIPOLAR,NPN;40V,1.0A,50MHZ, AMPL;2N6715/MPSW01A,TO–237/TO–226AE	80009	151–0710–00
A4Q482	151–0622–00			XSTR,SIG:BIPOLAR,PNP;40V,1.0A,50MHZ, AMPL;2N6727/MPS6727/MPSW51A,TO–237/TO–226AE EBC	80009	151–0622–00
A4Q588	151–0188–00			XSTR,SIG:BIPOLAR,PNP;40V,200MA,250MHZ, AMPL;2N3906,TO–92 EBC	80009	151–0188–00
A4Q596	151–0462–00			XSTR,PWR:BIPOLAR,PNP;100V,3.0A,3.0MHZ, AMPL;TIP30C/TIP32C,TO–220	80009	151–0462–00
A4Q783	151–0188–00			XSTR,SIG:BIPOLAR,PNP;40V,200MA,250MHZ, AMPL;2N3906,TO–92 EBC	80009	151–0188–00
A4R485	322–3162–00			RES,FXD:MET FILM;475 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3162–00
A4R494	322–3083–00			RES,FXD,FILM:71.5 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 71E5

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A4R581	322–3210–00			RES,FXD:MET FILM;1.5K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K50
A4R585	322–3162–00			RES,FXD:MET FILM;475 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3162–00
A4R586	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3289–00
A4R587	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A4R588	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A4R680	322–3277–00			RES,FXD,FILM:7.5K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 7K50
A4R681	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3289–00
A4R682	322–3426–00			RES,FXD,FILM:267K OHM,1%,0.2W,TC=T0	91637	CCF50–2F26702F
A4R685	322–3306–00			RES,FXD:MET FILM;15K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 15K0
A4R686	322–3361–00			RES,FXD:MET FILM;56.2K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	91637	CCF50–2F56201F
A4R687	322–3239–00			RES,FXD,FILM:3.01K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 3K01
A4R688	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A4R690	308–0677–00			RES,FXD,WW:1 OHM,5%,2W	75042	ORDER BY DESC
A4R691	322–3239–00			RES,FXD,FILM:3.01K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 3K01
A4R692	322–3239–00			RES,FXD,FILM:3.01K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 3K01
A4R693	322–3239–00			RES,FXD,FILM:3.01K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 3K01
A4R696	301–0102–00			RES,FXD,CMPSN:1K OHM,5%,0.50W	01121	EB1025
A4U583	156–1799–00			IC,LIN:BIPOLAR,SW–RGLTR CONT;PWM,SGL–ENDED OC OUT;NE5561N,DIP08.3	80009	156–1799–00
A5	671–0042–03			CIRCUIT BD ASSY:70MHZ TUNER	80009	671–0042–03
				ATTACHED PARTS		
	337–0607–00			PLATE,ELEC SHLD:CIRCUIT BOARD	80009	337–0607–00
				(QUANTITY 2)		
				END ATTACHED PARTS		
A5C100	281–0697–00			CAP,FXD,CER DI:5000PF,+100–0%,100V	80009	281–0697–00
A5C102	281–0697–00			CAP,FXD,CER DI:5000PF,+100–0%,100V	80009	281–0697–00
A5C109	281–0697–00			CAP,FXD,CER DI:5000PF,+100–0%,100V	80009	281–0697–00
A5C180	283–5050–00			CAP,FXD,CER DI:560PF,5%,50V	54583	C3216C0G1H561J–T
A5C181	283–5050–00			CAP,FXD,CER DI:560PF,5%,50V	54583	C3216C0G1H561J–T
A5C185	281–0823–00			CAP,FXD,CER DI:470PF,10%,50V	04222	SA101A471KAA
A5C192	283–0643–00			CAP,FXD,MICA DI:22PF,0.5%,500V	80009	283–0643–00
A5C194	283–0782–00			CAP,FXD,MICA DI:39 PF,5%,500V	80009	283–0782–00
A5C196	283–0782–00			CAP,FXD,MICA DI:39 PF,5%,500V	80009	283–0782–00
A5C198	283–0027–00			CAP,FXD,CER DI:0.02UF,20%,50V	05397	C330C203M5X5CA
A5C199	283–0643–00			CAP,FXD,MICA DI:22PF,0.5%,500V	80009	283–0643–00
A5C279	281–0812–00			CAP,FXD,CER:MLC;1000PF,10%,100V,0.100 X 0.170;AXIAL,MI	04222	SA101C102KAA
A5C281	281–0814–00			CAP,FXD,CER:MLC;100 PF,10%,100V,0.100 X 0.170;AXIAL,MI	80009	281–0814–00
A5C282	281–0823–00			CAP,FXD,CER DI:470PF,10%,50V	04222	SA101A471KAA
A5C283	281–0823–00			CAP,FXD,CER DI:470PF,10%,50V	04222	SA101A471KAA
A5C284	281–0823–00			CAP,FXD,CER DI:470PF,10%,50V	04222	SA101A471KAA
A5C285	281–0537–00			CAP,FXD,CER:MLC;0.68PF,20%,500V,0.170 X 0.187;AXIAL,T&R	80009	281–0537–00
A5C286	281–0537–00			CAP,FXD,CER:MLC;0.68PF,20%,500V,0.170 X 0.187;AXIAL,T&R	80009	281–0537–00
A5C290	283–0637–00			CAP,FXD,MICA DI:20PF,2.5%,500V	80009	283–0637–00
A5C292	283–0637–00			CAP,FXD,MICA DI:20PF,2.5%,500V	80009	283–0637–00
A5C295	281–0772–00			CAP,FXD,CER:MLC;4700PF,10%,100V,0.100 X 0.170;AXIAL,MI	04222	SA101C472KAA

Replaceable Electrical Parts

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A5C298	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A5C299	281–0772–00			CAP,FXD,CER:MLC;4700PF,10%,100V,0.100 X 0.170;AXIAL,MI	04222	SA101C472KAA
A5C389	281–0811–00			CAP,FXD,CER:MLC;10PF,10%,100V,0.100 X 0.170;AXIAL,MI	04222	SA102A100KAA
A5C395	281–0772–00			CAP,FXD,CER:MLC;4700PF,10%,100V,0.100 X 0.170;AXIAL,MI	04222	SA101C472KAA
A5CR280	152–1187–00			DIO,SIG:VVC;30V,11PF AT 3V,2.1PF AT 25V, C3/C25=5.2,Q=300,1R=50NA;KN3201,D0–34,T&R	80009	152–1187–00
A5E100	276–0569–00			CORE,EM:TOROID,FERRITE	80009	276–0569–00
A5E101	276–0569–00			CORE,EM:TOROID,FERRITE	80009	276–0569–00
A5E102	276–0569–00			CORE,EM:TOROID,FERRITE	80009	276–0569–00
A5E103	276–0569–00			CORE,EM:TOROID,FERRITE	80009	276–0569–00
A5J400	131–0106–02			CONN,RF JACK:	80009	131–0106–02
A5L193	108–0311–00			COIL,RF:FIXED,150NH	TK1345	108–0311–00
A5L195	108–0734–00			COIL,RF:FIXED,163NH	TK1345	108–0734–00
A5L197	108–0311–00			COIL,RF:FIXED,150NH	TK1345	108–0311–00
A5L280	108–0987–00			COIL,RF:FIXED,45NH	80009	108–0987–00
A5L284	195–1805–00			LEAD,ELECTRICAL:26 AWG,2.5 L,9–1	80009	195–1805–00
A5L389	108–0311–00			COIL,RF:FIXED,150NH	TK1345	108–0311–00
A5L391	108–0734–00			COIL,RF:FIXED,163NH	TK1345	108–0734–00
A5L393	108–0311–00			COIL,RF:FIXED,150NH	TK1345	108–0311–00
A5R181	322–3350–00			RES,FXD,FILM:43.2K OHM,1%,0.2W,TC=T0	80009	322–3350–00
A5R182	322–3218–00			RES,FXD:MET FILM;1.82K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3218–00
A5R183	322–3277–00			RES,FXD,FILM:7.5K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 7K50
A5R184	317–0511–00			RES,FXD,CMPSN:510 OHM,5%,0.125W	80009	317–0511–00
A5R279	317–0104–00			RES,FXD,CMPSN:100K OHM,5%,0.125W	80009	317–0104–00
A5R281	317–0300–00			RES,FXD,CMPSN:30 OHM,5%,0.125W	80009	317–0300–00
A5R291	322–3012–00			RES,FXD,FILM:13 OHM,1%,0.2W,TC=T0	57668	CRB20FXE301E
A5R292	322–3130–00			RES,FXD:MET FILM;221 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3130–00
A5R293	322–3012–00			RES,FXD,FILM:13 OHM,1%,0.2W,TC=T0	57668	CRB20FXE301E
A5R297	322–3034–00			RES,FXD:MET FILM;22.1 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20FXE2K94
A5R298	322–3105–00			RES,FXD:MET FILM;121 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3105–00
A5R299	322–3034–00			RES,FXD:MET FILM;22.1 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20FXE2K94
A5R391	322–3012–00			RES,FXD,FILM:13 OHM,1%,0.2W,TC=T0	57668	CRB20FXE301E
A5R392	322–3130–00			RES,FXD:MET FILM;221 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3130–00
A5R393	322–3012–00			RES,FXD,FILM:13 OHM,1%,0.2W,TC=T0	57668	CRB20FXE301E
A5R398	322–3114–00			RES,FXD:MET FILM;150 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	91637	CCF50–2–G1500F
A5T187	120–1393–00			XFMR,RF:BALUN	80009	120–1393–00
A5U190	119–2592–00			MIXER,FREQ:1–500MHZ	80009	119–2592–00
A5U283	156–0534–00			IC,LIN:	02735	CA3102E–98
A5U296	156–3047–00			IC,LIN:BIPOLAR,AMPL;RF AMP,20DB GAIN,600MHZ;NE5205AN,DIP08.3	80009	156–3047–00
A5VR398	152–0227–00			DIO,ZENER:6.2V,5%,0.4W;1N753A FMLY,DO–35 OR 7,TR	80009	152–0227–00
A6	119–4338–00			TUNER:FREQ 950–1750MHZ,OUT IF FREQ 479.5MHZ,IMP IN/OUT 75	80009	119–4338–00
A10	671–3637–00			CIRCUIT BD ASSY:CRT SOCKET BD,389–2115–XX WIRED,	80009	671–3637–00
A10J1	131–5338–00			CONN,HDR:PCB/WIREWRAP,MALE,STR,1 X 7,0.15 CTR,0.230 MLG X 0.285 TAIL,30 GOLD,SIDE BY SID	22526	65561–107
A10J2	131–5337–00			CONN,HDR:PCB/WIREWRAP,MALE,STR,1 X 4,0.150 CTR,0.230 MLG X 0.285 TAIL,30 GOLD,SIDE BY SI	22526	65561–104
A10J3	131–5338–00			CONN,HDR:PCB/WIREWRAP,MALE,STR,1 X 7,0.15 CTR,0.230 MLG X 0.285 TAIL,30 GOLD,SIDE BY SID	22526	65561–107

Component Number	Tektronix Part Number	Serial / Assembly Number Effective	Discontinued	Name & Description	Mfr. Code	Mfr. Part Number
A10SKT1	136–1289–00			SOCKET:CRT,TUBE,1730,SAFETY CONTROLLED	0LUA3	55595
J890	131–0372–00			CONN,RF PLUG: *ATTACHED PARTS*	80009	131–0372–00
	210–0224–00			TERM,LUG:0.2 ID,PLAIN,BRS TIN PL *END ATTACHED PARTS*	86928	A373–148–1
S1	260–2465–00			SW,PUSH:0.4A,125VAC,W/SLDR LUG,BTN W/YEL IND *ATTACHED PARTS*	31918	602844
	174–2648–00			CA ASSY,SP: *END ATTACHED PARTS*	80009	174–2648–00
S100	260–1780–00			SW,SLIDE:DPDT,3A,125VRM *MOUNTING PARTS*	80009	260–1780–00
	210–0201–00			TERM,LUG:0.12 ID,LOCKING,BRZ TIN PL	86928	A373–157–2
	210–0586–00			NUT,PL,ASSEM WA:4–40 X 0.25,STL CD PL (QUANTITY 2) *END MOUNTING PARTS*	78189	211–041800–00
V1	154–0995–00			CRT FINISHED,D14–375GH/995;SAFETY CONTROLLED (STANDARD ONLY)	80009	154–0995–00
V1	154–0995–16			CRT FINISHED,D14–375WA/995;SAFETY CONTROLLED (OPTION 74 ONLY)	80009	154–0995–16
W698	174–0800–00			CA ASSY,SP,ELEC:5,24 AWG,22.25 L,RBN (CONECTED AT A4J698, A3J21, A3J22, A3J23, AND S100)	80009	174–0800–00
W890	174–2646–00			CA ASSY,RF:50 OHM COAX,2.5 L,W/SMB BOTH ENDS (CONNECTED FROM A3J9 TO A5J890)	80009	174–2646–00
W900	174–2645–00			CA ASSY,RF:50 OHM COAX,8.0 L,W/CONN (CONNECTED FROM A3J11 TO A6)	80009	174–2645–00

Diagrams/Circuit Board Illustrations

Diagrams/Circuit Board Illustrations

Symbols

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

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

Overline, parenthesis, or leading slash indicate a low asserting state.

Example: $\overline{\text{ID CONTROL}}$, (ID CONTROL), or /ID CONTROL.

Abbreviations are based on ANSI Y1.1–1972.

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

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

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

Component Values

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

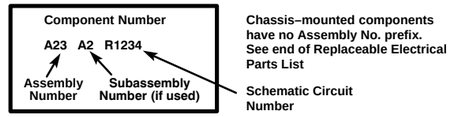
Capacitors: Values one or greater are in picofarads (pF).
Values less than one are in microfarads (μF).
Resistors = Ohms (Ω).

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

Assembly Numbers

Each assembly in the instrument is assigned an assembly number (e.g., A20). The assembly number appears on the diagram (in circuit board outline), circuit board illustration title, and lookup table for the schematic diagram.

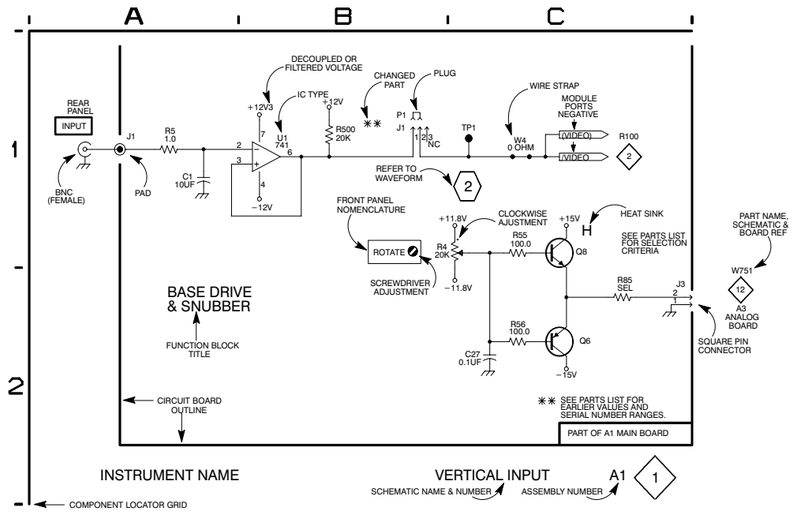
The Replaceable Electrical Parts List is arranged by assembly number in numerical sequence; the components are listed by component number. Example:

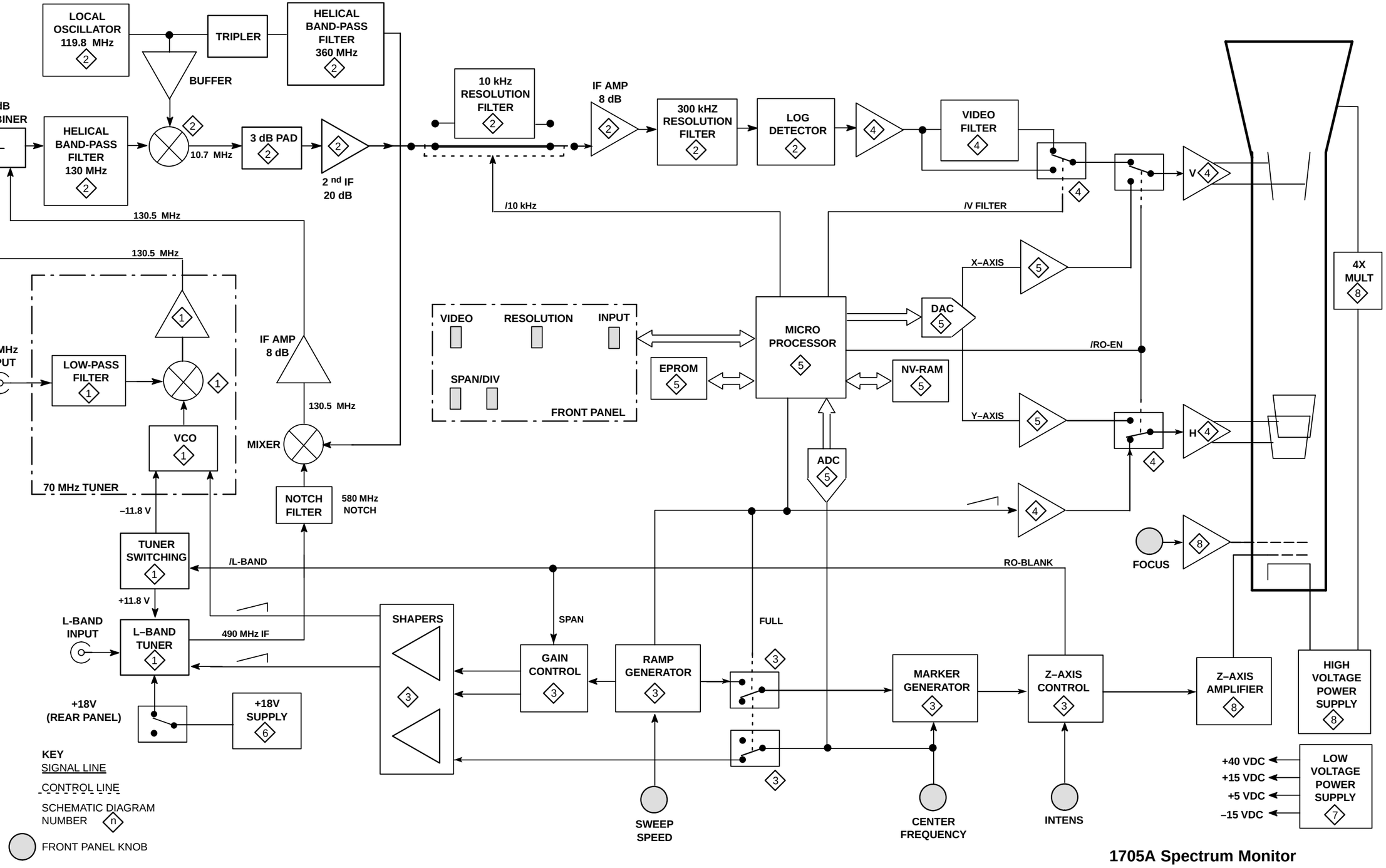


Grid Coordinates

The schematic diagram and circuit board component location illustration have grids. A lookup table with the grid coordinates is provided for ease of locating the component. Only the components illustrated on the facing diagram are listed in the lookup table.

When more than one schematic diagram is used to illustrate the circuitry on a circuit board, the circuit board illustration will only appear opposite the first diagram; the lookup table will list the diagram number of other diagrams that the other circuitry appears on.



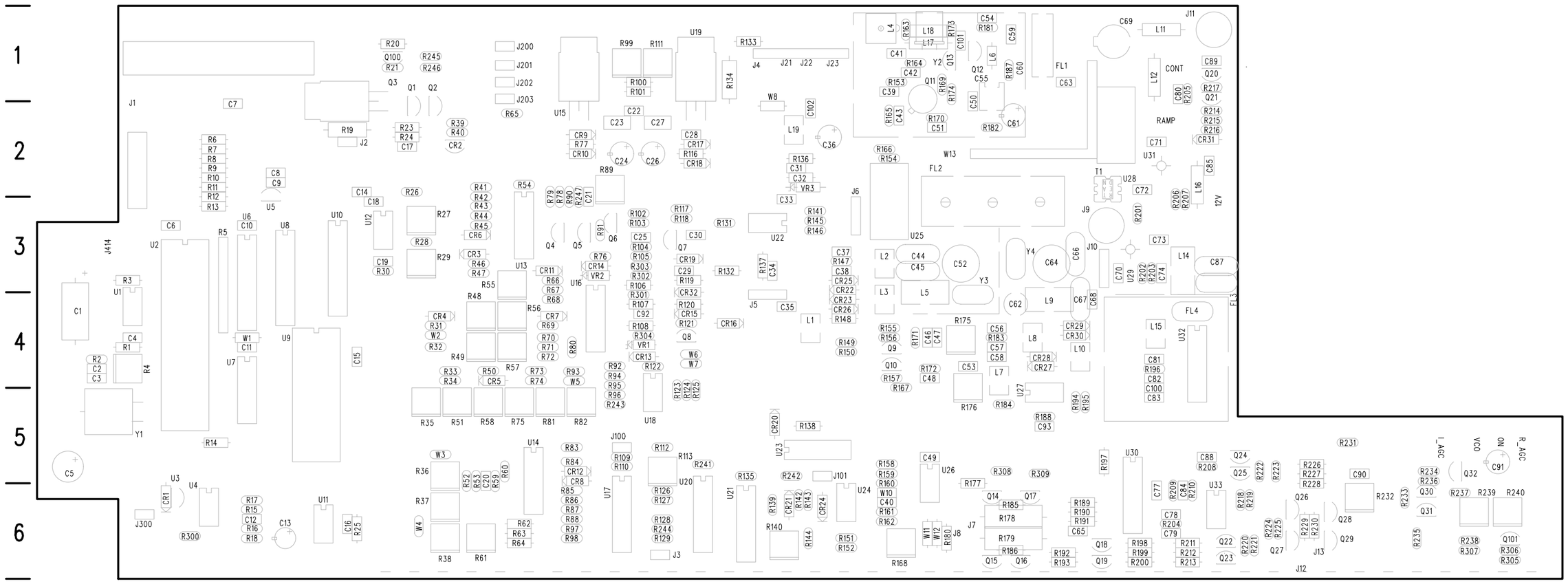


1705A Spectrum Monitor

A3 Main Board Component Locator

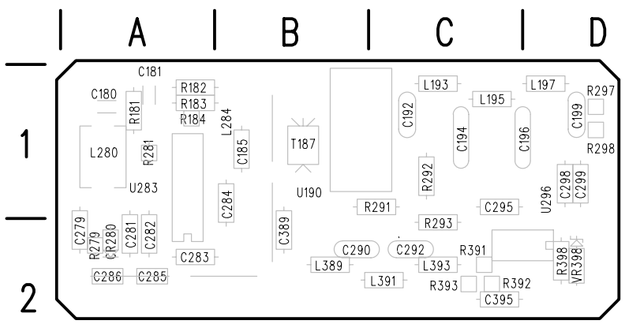
(with cross-references to schematic diagrams 1, 2, 3, 4, and 5).

Comp No	Diag No	Diag Loc	Bd Loc
C1	5	D1	A4
C2	5	D1	A4
C3	5	D1	A4
C4	3	F5	A4
C5	5	C3	A5
C6	3	F5	B3
C7	3	B3	C2
C8	5	G5	C2
C9	5	G5	C2
C10	3	F5	C3
C11	3	F5	C4
C12	5	B4	C6
C13	5	C4	C6
C14	3	G5	D2
C15	3	G5	D4
C16	5	C3	D6
C17	5	A5	D2
C18	3	G5	D3
C19	3	F5	D3
C20	3	B3	E6
C21	3	D5	F3
C22	4	C5	G2
C23	4	C5	G2
C24	4	D5	G2
C25	3	H3	G3
C26	4	B5	G2
C27	4	B5	G2
C28	4	A5	G2
C29	3	H1	G3
C30	3	H3	G3
C31	2	G1	H2
C32	2	H1	H2
C33	2	G1	H3
C34	2	H1	H3
C35	2	H1	H4
C36	2	E3	I2
C37	2	B5	I3
C38	2	B5	I3
C39	2	F2	I1
C40	3	B1	I6
C41	2	E2	I1
C42	2	E2	J1
C43	2	F2	J2
C44	2	C5	J3
C45	2	C5	J3
C46	2	B4	J4
C47	2	B4	J4
C48	2	D4	J4
C49	3	A1	J5
C50	2	D2	J2
C51	2	F3	J2
C52	2	C5	J3
C53	2	D4	J4
C54	2	E2	J1
C55	2	D2	J1
C56	2	D4	J4
C57	2	D4	J4
C58	2	D4	J4
C59	2	D2	K1
C60	2	D2	K1
C61	2	E3	K2
C62	2	D5	K3
C63	2	C2	K1
C64	2	D5	K3
C65	4	G4	K6
C66	2	D5	K3
C67	2	D5	K4
C68	2	E4	L4
C69	2	B3	L1
C70	2	E4	L3
C71	2	B3	L2
C72	2	A3	L2
C73	2	F4	L3
C74	2	F4	L3
C77	3	G5	L6
C78	4	D2	L6
C79	3	F5	L6
C80	1	C4	L1
C81	2	G5	L4
C82	2	G4	L4
C83	2	F5	L5
C84	4	D2	M6
C85	2	A2	M2
C87	2	F4	M3
C88	2	H4	M5
C89	1	C5	M1
C90	3	H1	N5
C91	1	F4	P5
C92	3	G1	G4
C93	4	C1	K5
C100	2	G5	L5
C101	2	E2	J1
C102	4	B4	I2
CR1	5	C3	B6
CR2	3	F2	E2
CR3	3	E4	E3
CR4	3	G3	E4
CR5	3	G1	E4
CR6	3	E4	E3
CR7	3	F3	F4
CR8	3	E4	F6
CR9	4	D5	F2
CR10	4	D5	F2
CR11	3	B4	F3
CR12	3	E3	F5
CR13	3	G2	G4
CR14	3	G3	F3
CR15	3	H1	G4
CR16	3	H2	H4
CR17	4	B5	G2
CR18	4	B5	G2
CR19	3	H3	G3
CR20	3	C5	H5
CR21	3	A2	H6
CR22	2	C5	I4
CR23	2	C4	I4
CR24	3	B1	I6
CR25	2	C5	I3
CR26	2	C4	I4
CR27	2	E4	K4
CR28	2	E4	K4
CR29	2	E5	K4
CR30	2	E5	K4
CR31	1	C4	M2
CR32	3	G3	G4
FL1	2	C2	K1
FL2	2	B1	J2
FL3	2	F4	M4
FL4	2	F4	M4
J1	5	A2	A2
J2	5	B5	D2
J3	3	B2	G6
J4	4	A3	H1
J5	2	H1	H4
J6	2	F1	I2
J7	4	H4	J6
J8	4	H4	J6
J9	1	F2	K3
J10	2	E4	K3
J11	1	G5	M1
J12	4	H2	N6
J13	4	H2	N6
J21	4	A4	H1
J22	4	A4	I1
J23	4	A4	I1
J100	3	C1	G5
J101	3	D1	I5
J200	3	A3	F1
J201	3	B3	F1
J202	3	B3	F1
J203	3	B3	F2
J300	5	C2	A6
J414	5	D5	A3
L1	2	B5	I4
L2	2	B5	I3
L3	2	B4	I4
L4	2	E2	I1
L5	2	C5	J4
L6	2	D2	K1
L7	2	D4	K4
L8	2	D4	K4
L9	2	D5	K4
L10	2	E5	K4
L11	2	B3	L1
L12	2	B3	L1
L14	2	F4	L3
L15	2	G4	L4
L16	2	B2	M 2
L17	2	E2	J1
L18	2	E2	J1
L19	4	B4	H2
ON	1	F4	P5
P3	3	B2	
P5	2	H1	
P6	2	F1	
P10	2	E4	
P100	3	C1	
P101	3	D1	
P300	5	C2	
Q1	5	B5	D1
Q2	5	B5	E1
Q3	5	D5	D1
Q4	3	B4	F3
Q5	3	C4	F3
Q6	3	D5	F3
Q7	3	H3	G3
Q8	3	H1	G4
Q9	2	B3	I4
Q10	2	B4	I4
Q11	2	F2	J1
Q12	2	D2	J1
Q13	2	E2	J1
Q14	4	F4	K6
Q15	4	G4	J6
Q16	4	G4	K6
Q17	4	F4	K6
Q18	4	F4	L6
Q19	4	F4	L6
Q20	1	C5	M1
Q21	1	C4	M2
Q22	4	F2	M6
Q23	4	F2	M6
Q24	2	H4	M5
Q25	2	G4	M6
Q26	4	F2	N6
Q27	4	F2	M6
Q28	4	G2	N6
Q29	4	G2	N6
Q30	1	D5	O6
Q31	1	D5	O6
Q32	1	F4	O5
Q100	5	C4	D1
Q101	1	G5	P6
R1	5	C3	A4
R2	5	C2	A4
R3	5	C3	A3
R4	5	C3	B4
R5	5	G1	B3
R6	5	H2	B2
R7	5	H2	B2
R8	5	H2	B2
R9	5	H2	B2
R10	5	H2	B2
R11	5	H2	B2
R12	5	H3	B3
R13	5	H3	B3
R14	5	H3	B5
R15	5	B4	C6
R16	5	C4	C6
R17	5	B4	C6
R18	5	C4	C6
R19	5	B5	D2
R20	5	C5	D1
R21	5	C5	D1
R23	5	B5	D2
R24	5	B5	D2
R25	5	C4	D6
R26	5	H3	D2
R27	5	H3	E3
R28	5	H4	D3
R29	5	H4	E3
R30	4	E3	D3
R31	3	F4	E4
R32	3	F4	E4
R33	3	G1	E4
R34	3	G1	E4
R35	3	G1	E5
R36	3	C3	D5
R37	3	B3	D6
R38	3	B4	E6
R39	3	G2	E2
R40	3	G2	E2
R41	3	B4	E2
R42	3	B4	E3
R43	3	D4	E3
R44	3	B4	E3
R45	3	E4	E3
R46	3	B4	E3
R47	3	G4	E3
R48	3	F4	E4
R49	3	F3	E4
R50	3	F2	E4
R51	3	G1	E5
R52	3	B3	E6
R53	3	B3	E6
R54	3	D5	F2
R55	3	G3	E3
R56	3	G3	F4
R57	3	F4	E4
R58	3	F2	E5
R59	3	B3	E6
R60	3	D3	E5
R61	3	C4	E6
R62	3	D3	F6
R63	3	D3	E6
R64	3	D4	E6
R65	3	F2	E2
R66	3	G3	F3
R67	3	G4	F4
R68	3	G4	F4
R69	3	F4	F4
R70	3	F3	F4
R71	3	F3	F4
R72	3	G4	F4
R73	3	F2	F4
R74	3	F2	F4
R75	3	F2	E5
R76	3	G3	F3
R77	4	D5	F2
R78	3	D5	F3
R79	3	E5	F3
R80	3	F3	F4
R81	3	G2	F5
R82	3	F3	F5
R83	3	E3	F5
R84	3	E3	F5
R85	3	D4	F6
R86	3	D3	F6
R87	3	E3	F6
R88	3	E4	F6
R89	3	C5	F2
R90	3	D5	F3
R91	3	C5	F3
R92	3	F2	F4
R93	3	F2	F4
R94	3	E1	F4
R95	3	D1	F5
R96	3	C3	F5
R97	3	C1	F6
R98	3	C2	F6
R99	4	C5	G1
R100	4	B5	G1
R101	4	C5	G1
R102	3	C5	G3
R103	3	C5	G3
R104	3	H3	G3
R105	3	H3	G3
R106	3	G3	G3
R107	3	G1	G4
R108	3	G2	G4
R109	3	D2	G5
R110	3	D3	G5
R111	4	B5	G1
R112	3	C3	G5
R113	3	C2	G5
R116	4	B5	G2
R117	3	H3	G3
R118	3	H3	G3
R119	3	H1	G3
R120	3	H1	G4
R121	3	G2	G4
R122	3	E2	G4
R123	3	E2	G5
R124	3	E2	G5
R125	3	E2	G5
R126	3	D1	G6
R127	3	C2	G6
R128	3	C1	G6
R129	3	C2	G6
R131	3	H3	H3
R132	3	H1	H3
R133	5	A3	H1
R134	4	B5	H1
R135	4	B2	H5
R136	2	G1	H2
R137	2	H1	H3
R138	2	A4	H5
R139	4	B1	H6
R140	4	B1	H6
R141	2	G1	I3
R142	3	A2	I6
R143	3	B1	I6
R144	3	B2	I6
R145	2	G1	I3
R146	2	G1	I3
R147	2	B5	I3
R148	2	B5	I4
R149	2	A3	I4
R150	2	A4	I4
R151	3	B1	I6
R152	4	B1	I6
R153	2	F2	I1
R154	2	F2	I2
R155	2	B4	I4
R156	2	B3	I4
R157	2	B4	I4
R158	3	A1	I5
R159	3	A1	I5
R160	3	A1	I6
R161	3	B1	I6
R162	4	D4	I6
R163	2	E2	J1
R164	2	E2	J1
R165	2	F2	I2
R166	2	F2	I2
R167	2	B4	I5
R168	4	D4	I6
R169	2	E2	J1
R170	2	F2	J2
R171	2	B4	J4
R172	2	D4	J4
R173	2	E2	J1
R174	2	E2	J1
R175	2	C4	J4
R176	4	C1	J5
R177	4	E4	J6
R178	4	F3	K6
R179	4	G3	K6
R180	4	D4	J6
R181	2	D2	J1
R182	2	E3	J2
R183	2	D4	J4
R184	4	C1	K5
R185	4	F4	K6
R186	4	G4	K6
R187	2	D3	K1
R188	4	C2	K5
R189	4	F4	K6
R190	4	G4	K6
R191	4	G4	K6
R192	4	F4	K6
R193	4	G4	K6
R194	4	C2	K5
R195	2	E5	L5
R196	2	F4	L4
R197	4	G2	L5
R198	4	F5	L6
R199	4	F4	L6
R200	4	F5	L6
R201	2	A1	L3
R202	2	F4	L3
R203	2	F4	L3
R204	4	D2	L6
R205	1	C4	M2
R206	2	A2	L3
R207	2	B2	M3
R208	2	H3	M5
R209	4	D2	L6
R210	4	D1	M6
R211	4	F3	L6
R212	4	F2	L6
R213	4	F3	L6
R214	1	C4	M2
R215	1	B4	M2
R216	1	C4	M2
R217	1	C5	M1
R218	2	H4	M6
R219	2	G3	M6
R220	4	F2	M6
R221	4	G2	M6
R222	2	H4	M5
R223	4	F2	N5
R224	4	F2	M6
R225	4	F2	N6
R226	4	G2	N5
R227	4	G2	N5
R228	4	G2	N6
R229	4	F1	N6
R230	4	G1	N6
R231	3	H1	N5
R232	3	H2	O6
R233	1	C5	O6
R234	1	D5	O5
R235	1	D5	O6
R236	1	D5	O6
R237	1	D4	O6
R238	1	G5	O6
R239	1	G5	P6
R240	1	G5	P6
R241	3	E1	G5
R242	3	E1	H5
R243	3	D1	F5
R244	3	C1	G6
R245	5	C4	E1
R246	5	C5	E1
R247	3	D5	F3
R300	5	C2	B6
R301	3	G2	G4
R302	3	G3	G3
R303	3	G3	G3
R304	3	G1	G4
R305	1	G5	P6
R306	1	H5	P6
R307	1	H5	O6
R308	4	E3	K5
R309	4	E3	K5
T1	2	A1	L2
U1	5	D3	A4
U2	5	D1	B3
U3	5	C3	B5
U4	5	D3	B6
U5	5	G5	C3
U6	5	G2	C3
U7A	5	F2	B4
U7B	5	E3	B4
U7C	5	E2	B4
U7D	5	F3	B4
U8	5	E1	C3
U9	5	F1	C4
U10	5	G3	D3
U11	5	C4	C6
U12A	5	H4	D3
U12B	5	H4	D3
U13A	3	D4	F3
U13B	3	D4	F3
U13C	3	D5	F3
U13D	3	D4	F3
U14A	3	B3	F5
U14B	3	D3	F5
U14C	3	D3	F5
U14D	3	E3	F5
U15	4	C5	F2
U16A	3	G4	F3
U16B	3	F2	F3
U16C	3	G2	F3
U16D	3	G3	F3
U17A	3	C3	F6
U17B	3	C1	F6
U17C	3	C2	F6
U17D	3	C2	F6
U18A	3	E1	G5
U18B	3	E2	G5
U19	4	B5	G1
U20A	3	D2	G5
U20B	3	D2	G5
U20C	3	E1	G5
U20D	3	D1	G5
U21A	4	B2	H6
U21B	4	B2	H6
U21C	4	B2	H6
U22	2	G1	H3
U23A	3	C3	H5
U23B	3	C5	H5
U23C	3	B2	H5
U23D	2	A4	H5
U23E	2	A4	H5
U23F	2	A3	H5
U24A	3	B2	I5
U24B	3	B1	I5
U25	2	F1	J3
U26A	4	E4	J5
U26B	4	E4	J5
U27	4	C2	K5
U28	2	B2	L2
U29	2	E4	L3
U30A	4	E2	L5
U30B	4	E2	L5
U30C	4	E4	L5
U31	2	B3	L2
U32	2	G4	L4
U33	4	D2	M6
VCO	1	F4	P5
VR1	3	G2	G4
VR2	3	G4	F3
VR3	2	G1	I2
W1	5	D1	C4
W2	3	F4	E4
W3	3	E4	E5
W4	3	C3	E6
W5	3	F2	F4
W6	3	F2	G4
W7	3	F2	G4
W8	4	B4	H1
W10	3	B1	I6
W11	4	E4	J6
W12	4	E4	J6
W13	2	B3	J2
Y1	5	D1	B5
Y2	2	E2	J1
Y3	2	C5	J3
Y4	2	D5	K3



A3 Main Board

Static Sensitive Devices
See Maintenance Section



A5 70 MHz Tuner Board

Schematic Diagram <1> Component Locator Chart

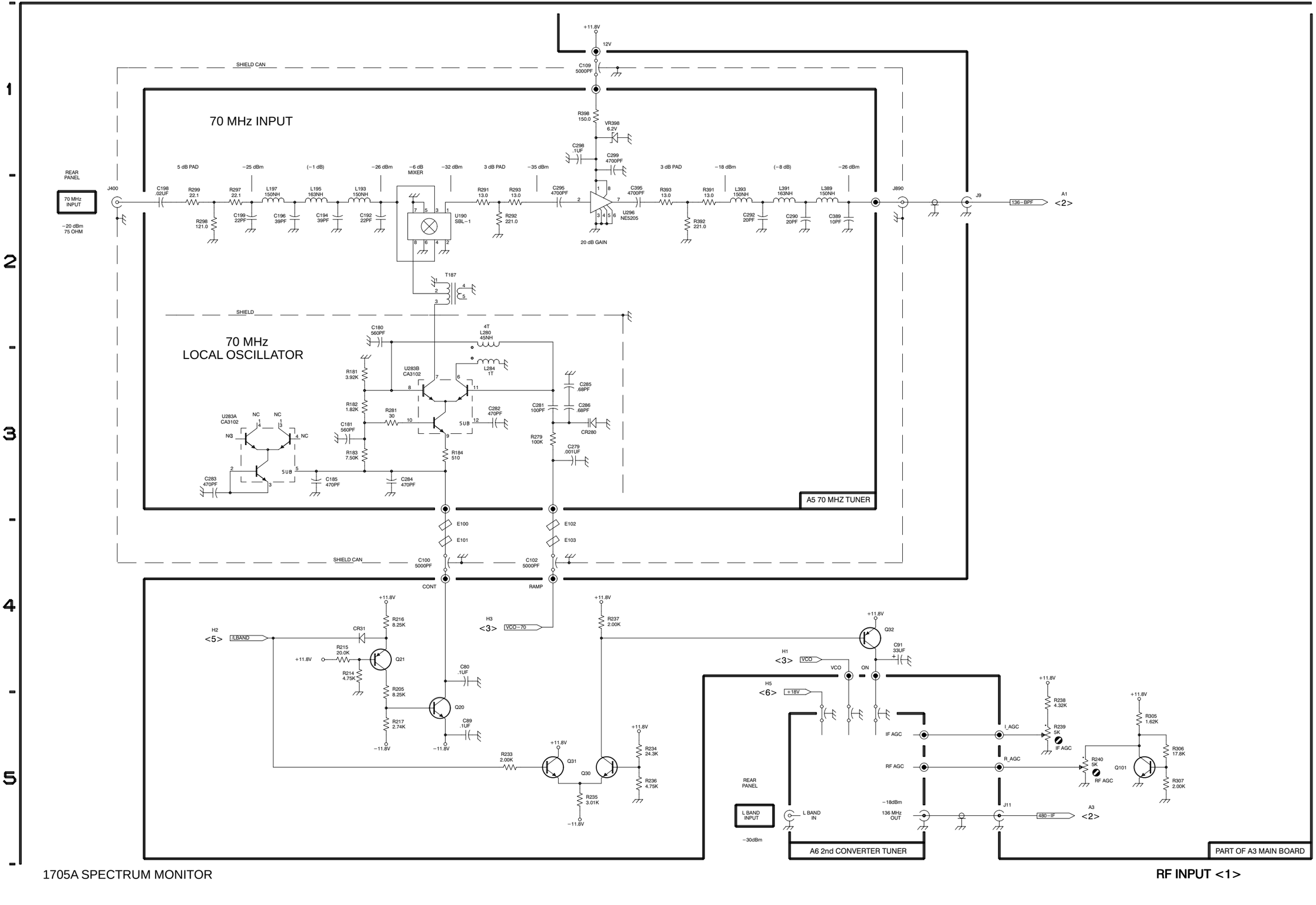
The schematic diagram has an alphanumeric grid to assist in locating parts within that diagram.

Assembly A3 and A5. Partial Assembly A3 also shown on Diagrams, 2, 3, 4, and 5.

Comp No	Diag Loc	Bd Loc
A3		
C80	C4	L1
C89	C5	M1
C91	F4	P5
CR31	C4	M2
J9	F2	K3
J11	G5	M1
Q20	C5	M1
Q21	C4	M2
Q30	D5	O6
Q31	D5	O6
Q32	F4	O5
Q101	G5	P6
R205	C4	M2
R214	C4	M2
R215	B4	M2
R216	C4	M2
R217	C5	M1
R233	C5	O6
R234	D5	O5
R235	D5	O6
R236	D5	O6
R237	D4	O6
R238	G5	O6
R239	G5	P6
R240	G5	P6
R305	G5	P6
R306	H5	P6
R307	H5	O6

Comp No	Diag Loc	Bd Loc
A5		
C100	C4	
C102	D4	
C109	D1	
C180	C2	A1
C181	B3	A1
C185	B3	B1
C192	C2	C1
C194	B2	C1
C196	B2	D1
C198	A2	
C199	B2	D1
C279	D3	A2
C281	D3	A2
C282	C3	A2
C283	B3	A2
C284	C3	B2
C285	D3	A2
C286	D3	A2
C290	E2	B2
C292	E2	C2
C295	D2	C1
C298	D1	D1
C299	D1	D1
C389	F2	B2
C395	D2	C2
CR280	D3	A2
E100	C4	
E101	C4	
E102	D4	
E103	D4	
J400	A2	
J890	F2	

Comp No	Diag Loc	Bd Loc
L193	C2	C1
L195	B2	C1
L197	B2	D1
L280	C2	A1
L284	C3	B1
L389	E2	B2
L391	E2	C2
L393	E2	C2
R181	C3	A1
R182	C3	A1
R183	C3	A1
R184	C3	A1
R279	D3	A2
R281	C3	A1
R291	C2	C1
R292	C2	C1
R293	C2	C2
R297	B2	D1
R298	B2	D1
R299	A2	D1
R391	E2	C2
R392	E2	C2
R393	D2	C2
R398	D1	D2
T187	C2	B1
U190	C2	B1
U283A	B3	A1
U283B	C3	A1
U296	D2	D1
VR398	D1	D2



1705A SPECTRUM MONITOR

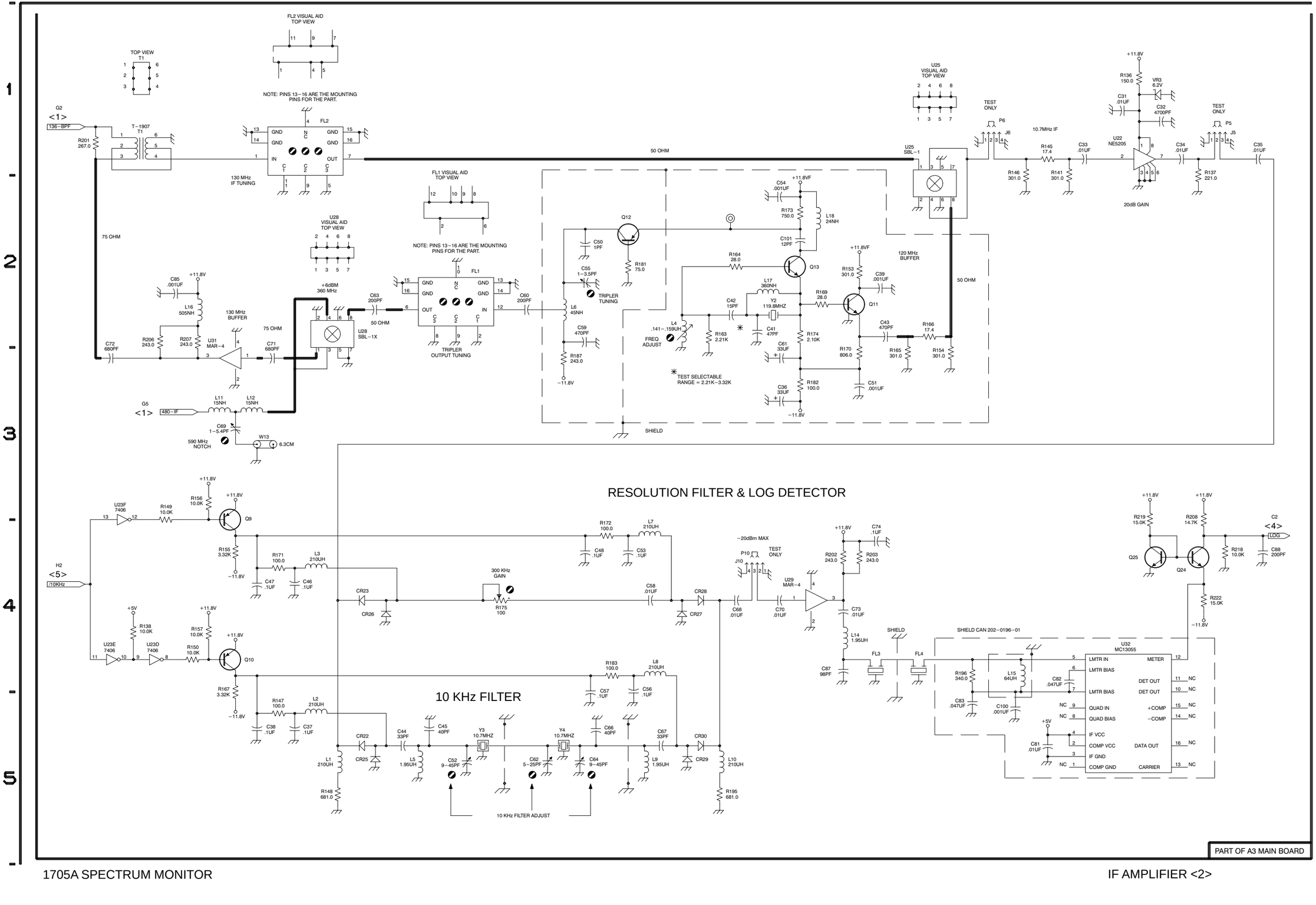
RF INPUT <1>

Schematic Diagram <2> Component Locator Chart

The schematic diagram has an alphanumeric grid to assist in locating parts within that diagram.

Assembly A3. Partial Assembly A3 also shown on Diagrams 1, 3, 4, and 5.

Comp No	Diag Loc	Bd Loc	Comp No	Diag Loc	Bd Loc	Comp No	Diag Loc	Bd Loc	Comp No	Diag Loc	Bd Loc
C31	G1	H2	C74	F4	L3	L15	G4	L4	R173	E2	J1
C32	H1	H2				L16	B2	M2			
C33	G1	H3	C81	G5	L4	L17	E2	J1	R174	E2	J1
C34	H1	H3	C82	G4	L4	L18	E2	J1	R175	C4	J4
C35	H1	H4	C83	F5	L5				R181	D2	J1
			C85	A2	M2	P5	H1		R182	E3	J2
C36	E3	I2	C87	F4	M3	P6	F1		R183	D4	J4
C37	B5	I3				P10	E4				
C39	F2	I1	C88	H4	M5				R187	D3	K1
C41	E2	I1	C100	G5	L5	Q9	B3	I4	R195	E5	L5
C42	E2	J1	C101	E2	J1	Q10	B4	I4	R196	F4	L4
						Q11	F2	J1	R201	A1	L3
C43	F2	J2	CR22	C5	I4	Q12	D2	J1	R202	F4	L3
C44	C5	J3	CR23	C4	I4	Q13	E2	J1			
C45	C5	J3	CR25	C5	I3	Q24	H4	M5	R203	F4	L3
C46	B4	J4	CR26	C4	I4	Q25	G4	M6	R206	A2	L3
C47	B4	J4							R207	B2	M3
			CR27	E4	K4	R136	G1	H2	R208	H3	M5
C48	D4	J4	CR28	E4	K4	R137	H1	H3	R218	H4	M6
C50	D2	J2	CR29	E5	K4	R138	A4	H5			
C51	F3	J2	CR30	E5	K4	R141	G1	I3	R219	G3	M6
C52	C5	J3				R145	G1	I3	R222	H4	M5
C53	D4	J4	FL1	C2	K1						
			FL2	B1	J2	R146	G1	I3	T1	A1	L2
C54	E2	J1	FL3	F4	M4	R147	B5	I3			
C55	D2	J1	FL4	F4	M4	R148	B5	I4	U22	G1	H3
C56	D4	J4				R149	A3	I4	U23D	A4	H5
C57	D4	J4	J5	H1	H4	R150	A4	I4	U23E	A4	H5
C58	D4	J4	J6	F1	I2				U23F	A3	H5
			J10	E3	K3	R153	F2	I1	U25	F1	J3
C59	D2	K1				R154	F2	I2			
C60	D2	K1	L1	B5	I4	R155	B4	I4	U28	B2	L2
C61	E3	K2	L2	B5	I3	R156	B3	I4	U29	E4	L3
C62	D5	K3	L3	B4	I4	R157	B4	I4	U31	B3	L2
C63	C2	K1	L4	E2	I1				U32	G4	L4
			L5	C5	J4	R163	E2	J1			
C64	D5	K3				R164	E2	J1	VR3	G1	I2
C66	D5	K3	L6	D2	K1	R165	F2	I2			
C67	D5	K4	L7	D4	K4	R166	F2	I2	W13	B3	J2
C68	E4	L4	L8	D4	K4	R167	B4	I5			
C69	B3	L1	L9	D5	K4				Y2	E2	J1
			L10	E5	K4	R169	E2	J1	Y3	C5	J3
C70	E4	L3				R170	F2	J2	Y4	D5	K3
C71	B3	L2	L11	B3	L1	R171	B4	J4			
C72	A3	L2	L12	B3	L1	R172	D4	J4			
C73	F4	L3	L14	F4	L3						



1705A SPECTRUM MONITOR

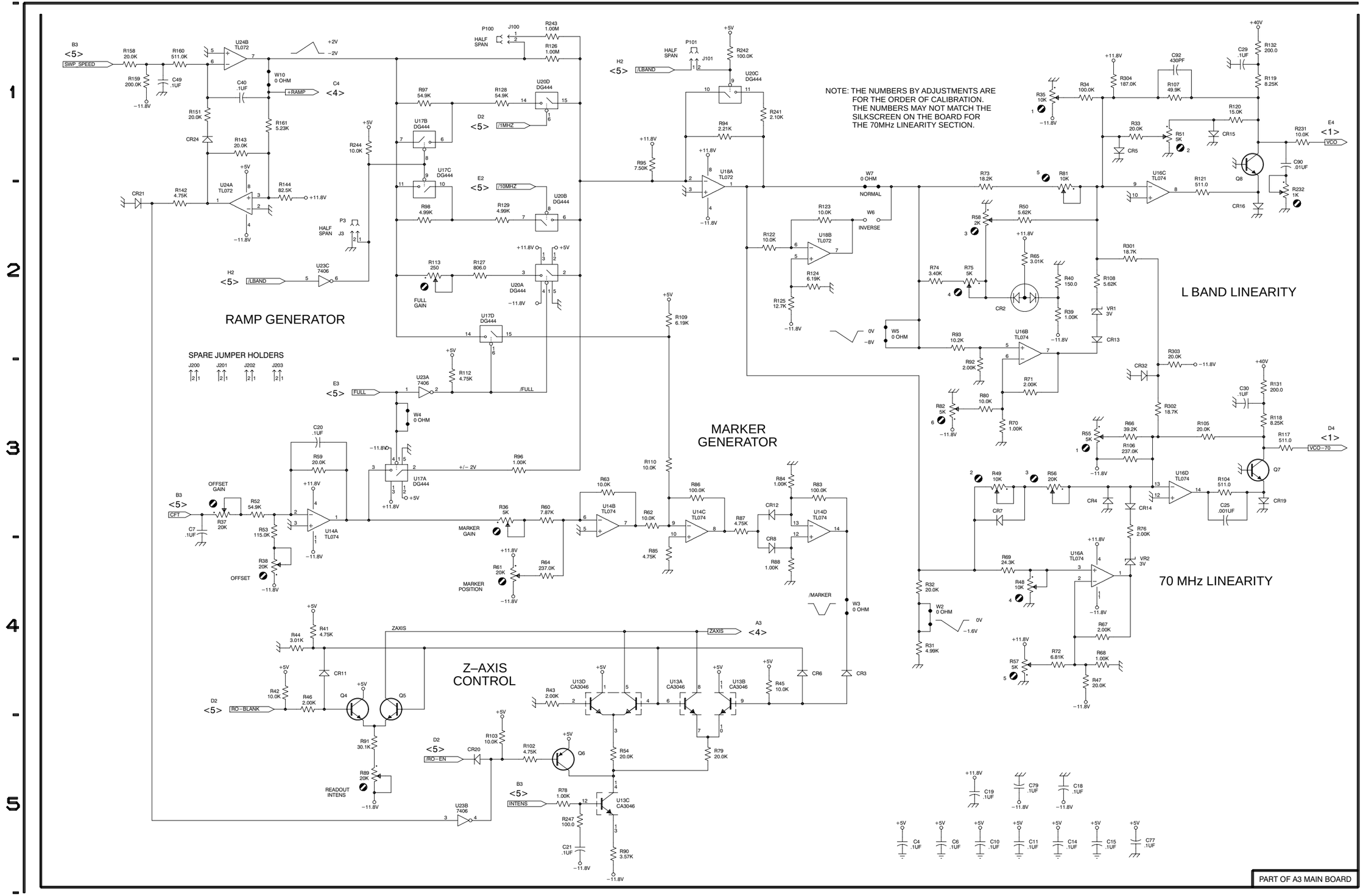
IF AMPLIFIER <2>

Schematic Diagram <3> Component Locator Chart

The schematic diagram has an alphanumeric grid to assist in locating parts within that diagram.

Assembly A3. Partial Assembly A3 also shown on Diagrams 1, 2, 4, and 5.

Comp No	Diag Loc	Bd Loc	Comp No	Diag Loc	Bd Loc	Comp No	Diag Loc	Bd Loc	Comp No	Diag Loc	Bd Loc
C4	F5	A4	Q7	H3	G3				R161	B1	I6
C6	F5	B3	Q8	H1	G4	R82	F3	F5	R231	H1	N5
C7	B3	C2				R83	E3	F5	R232	H2	O6
C10	F5	C3	R31	F4	E4	R84	E3	F5	R241	E1	G5
C11	F5	C4	R32	F4	E4	R85	D4	F6	R242	E1	H5
			R33	G1	E4	R86	D3	F6			
C14	G5	D2	R34	G1	E4				R243	D1	F5
C15	G5	D4	R35	G1	E5	R87	E3	F6	R244	C1	G6
C18	G5	D3				R88	E4	F6	R247	D5	F3
C19	F5	D3	R36	C3	D5	R89	C5	F2	R301	G2	G4
C20	B3	E6	R37	B3	D6	R90	D5	F3	R302	G3	G3
			R38	B4	E6	R91	C5	F3			
C21	D5	F3	R39	G2	E2				R303	G3	G3
C25	H3	G3	R40	G2	E2	R92	F2	F4	R304	G1	G4
C29	H1	G3				R93	F2	F4			
C30	H3	G3	R41	B4	E2	R94	E1	F4	U13A	D4	F3
C40	B1	I6	R42	B4	E3	R95	D1	F5	U13B	D4	F3
			R43	D4	E3	R96	C3	F5	U13C	D5	F3
C49	A1	J5	R44	B4	E3				U13D	D4	F3
C77	G5	L6	R45	E4	E3	R97	C1	F6	U14A	B3	F5
C79	F5	L6				R98	C2	F6			
C90	H1	N5	R46	B4	E3	R102	C5	G3	U14B	D3	F5
C92	G1	G4	R47	G4	E3	R103	C5	G3	U14C	D3	F5
			R48	F4	E4	R104	H3	G3	U14D	E3	F5
CR2	F2	E2	R49	F3	E4				U16A	G4	F3
CR3	E4	E3	R50	F2	E4	R105	H3	G3	U16B	F2	F3
CR4	G3	E4				R106	G3	G3			
CR5	G1	E4	R51	G1	E5	R107	G1	G4	U16C	G2	F3
CR6	E4	E3	R52	B3	E6	R108	G2	G4	U16D	G3	F3
			R53	B3	E6	R109	D2	G5	U17A	C3	F6
CR7	F3	F4	R54	D5	F2				U17B	C1	F6
CR8	E4	F6	R55	G3	E3	R110	D3	G5	U17C	C2	F6
CR11	B4	F3				R112	C3	G5			
CR12	E3	F5	R56	G3	F4	R113	C2	G5	U17D	C2	F6
CR13	G2	G4	R57	F4	E4	R117	H3	G3	U18A	E1	G5
			R58	F2	E5	R118	H3	G3	U18B	E2	G5
CR14	G3	F3	R59	B3	E6				U20A	D2	G5
CR15	H1	G4	R60	D3	E5	R119	H1	G3	U20B	D2	G5
CR16	H2	H4				R120	H1	G4			
CR19	H3	G3	R61	C4	E6	R121	G2	G4	U20C	E1	G5
CR20	C5	H5	R62	D3	F6	R122	E2	G4	U20D	D1	G5
			R63	D3	E6	R123	E2	G5	U23A	C3	H5
CR21	A2	H6	R64	D4	E6				U23B	C5	H5
CR24	B1	I6	R65	F2	E2	R124	E2	G5	U23C	B2	H5
CR32	G3	G4				R125	E2	G5			
			R66	G3	F3	R126	D1	G6	U24A	B2	I5
J3	B2	G6	R67	G4	F4	R127	C2	G6	U24B	B1	I5
J100	C1	G5	R68	G4	F4	R128	C1	G6			
J101	D1	I5	R69	F4	F4				VR1	G2	G4
J200	A3	F1	R70	F3	F4	R129	C2	G6	VR2	G4	F3
J201	B3	F1				R131	H3	H3			
			R71	F3	F4	R132	H1	H3	W2	F4	E4
J202	B3	F1	R72	G4	F4	R142	A2	I6	W3	E4	E5
J203	B3	F2	R73	F2	F4	R143	B1	I6	W4	C3	E6
			R74	F2	F4				W5	F2	F4
P3	B2		R75	F2	E5	R144	B2	I6			
P100	C1					R151	B1	I6	W6	F2	G4
P101	D1		R76	G3	F3	R158	A1	I5	W7	F2	G4
			R78	D5	F3	R159	A1	I5	W10	B1	I6
Q4	B4	F3	R79	E5	F3	R160	A1	I6			
Q5	C4	F3	R80	F3	F4						
Q6	D5	F3	R81	G2	F5						

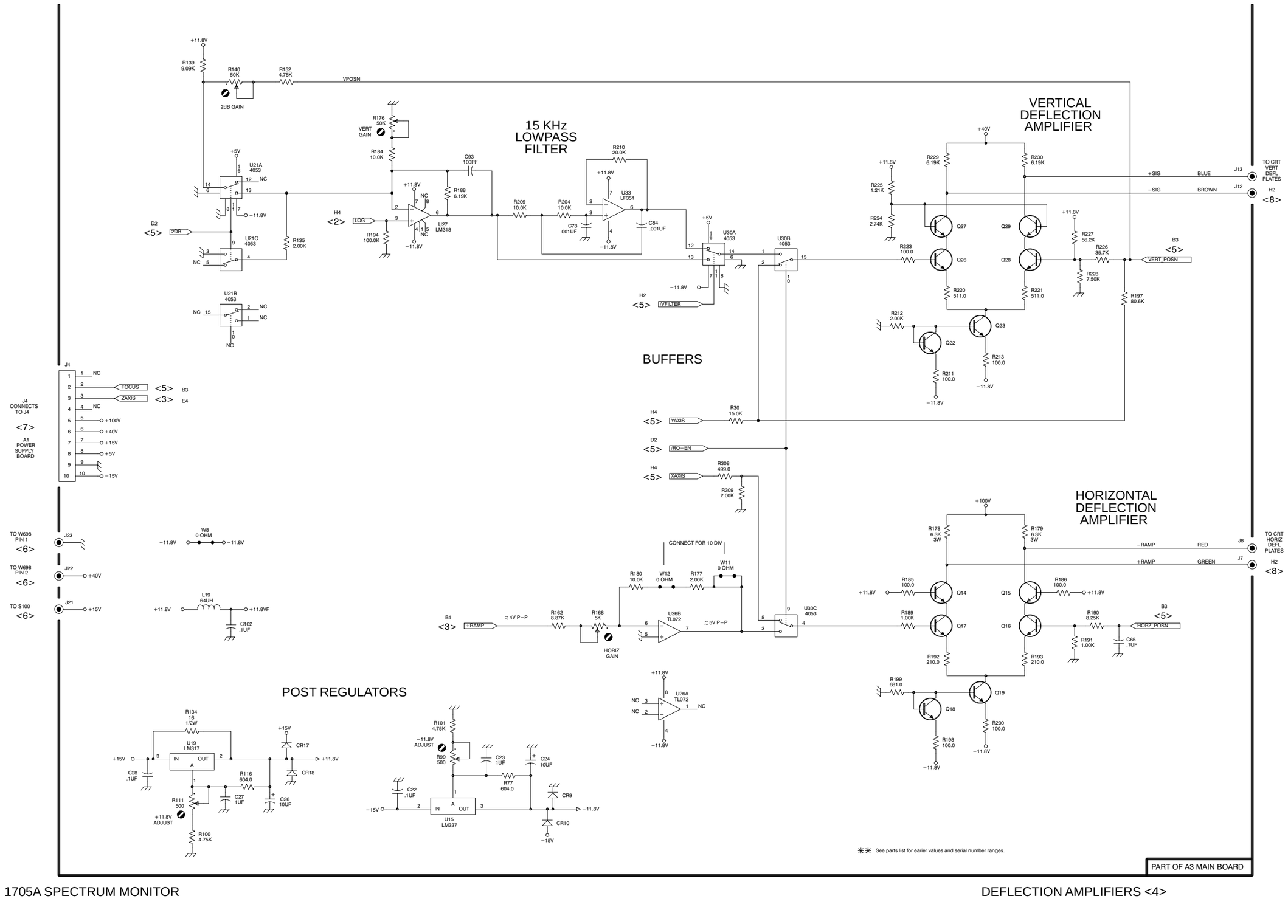

RAMP GENERATOR
MARKER GENERATOR
L BAND LINEARITY
70 MHz LINEARITY
Z–AXIS CONTROL
SPARE JUMPER HOLDERS
J200
J201
J202
J203
NOTE: THE NUMBERS BY ADJUSTMENTS ARE FOR THE ORDER OF CALIBRATION. THE NUMBERS MAY NOT MATCH THE SILKSCREEN ON THE BOARD FOR THE 70MHz LINEARITY SECTION.
SWP_SPEED
+RAMP
/LBAND
/1MHZ
/10MHZ
FULL
/FULL
CFT
INTENS
/MARKER
ZAXIS
RO–BLANK
/RO–EN
READOUT INTENS
OFFSET GAIN
OFFSET
FULL GAIN
HALF SPAN
MARKER GAIN
MARKER POSITION
NORMAL
INVERSE
VCO
VCO–70
PART OF A3 MAIN BOARD

Schematic Diagram <4> Component Locator Chart

The schematic diagram has an alphanumeric grid to assist in locating parts within that diagram.

Assembly A3. Partial Assembly A3 also shown on Diagrams 1, 2, 3, and 5.

Comp No	Diag Loc	Bd Loc	Comp No	Diag Loc	Bd Loc	Comp No	Diag Loc	Bd Loc
C22	C5	G2	Q29	G2	N6	R209	D2	L6
C23	C5	G2						
C24	D5	G2	R30	E3	D3	R210	D1	M6
C26	B5	G2	R77	D5	F2	R211	F3	L6
C27	B5	G2	R99	C5	G1	R212	F2	L6
			R100	B5	G1	R213	F3	L6
C28	A5	G2	R101	C5	G1	R220	F2	M6
C65	G4	K6						
C78	D2	L6	R111	B5	G1	R221	G2	M6
C84	D2	M6	R116	B5	G2	R223	F2	N5
C93	C1	K5	R134	B5	H1	R224	F2	M6
C102	B4	I2	R135	B2	H5	R225	F2	N6
			R139	B1	H6	R226	G2	N5
CR9	D5	F2						
CR10	D5	F2	R140	B1	H6	R227	G2	N5
CR17	B5	G2	R152	B1	I6	R228	G2	N6
CR18	B5	G2	R162	D4	I6	R229	F1	N6
			R168	D4	I6	R230	G1	N6
J4	A3	H1	R176	C1	J5	R308	E3	K5
J7	H4	J6				R309	E3	K5
J8	H4	J6	R177	E4	J6			
J12	H2	N6	R178	F3	K6	U15	C5	F2
J13	H2	N6	R179	G3	K6	U19	B5	G1
J21	A4	H1	R180	D4	J6	U21A	B2	H6
J22	A4	I1	R184	C1	K5	U21B	B2	H6
J23	A4	I1				U21C	B2	H6
			R185	F4	K6			
L19	B4	H2	R186	G4	K6	U26A	E4	J5
			R188	C2	K5	U26B	E4	J5
Q14	F4	K6	R189	F4	K6	U27	C2	K5
Q15	G4	J6	R190	G4	K6	U30A	E2	L5
Q16	G4	K6				U30B	E2	L5
Q17	F4	K6	R191	G4	K6			
Q18	F4	L6	R192	F4	K6	U30C	E4	L5
			R193	G4	K6	U33	D2	M6
Q19	F4	L6	R194	C2	K5			
Q22	F2	M6	R197	G2	L5	W8	B4	H1
Q23	F2	M6				W11	E4	J6
Q26	F2	N6	R198	F5	L6	W12	E4	J6
Q27	F2	M6	R199	F4	L6			
			R200	F5	L6			
Q28	G2	N6	R204	D2	L6			


15 KHz LOWPASS FILTER
VERTICAL DEFLECTION AMPLIFIER
BUFFERS
HORIZONTAL DEFLECTION AMPLIFIER
POST REGULATORS
+11.8V
R139 9.09K
R140 50K
2dB GAIN
R152 4.75K
VPOSN
R176 50K
VERT GAIN
R184 10.0K
C93 100PF
R188 6.19K
R194 100.0K
U27 LM318
LOG
H4 <2>
U21A 4053
U21B 4053
U21C 4053
D2 <5>
2DB
R135 2.00K
R209 10.0K
R204 10.0K
C78 .001UF
R210 20.0K
U33 LF351
C84 .001UF
U30A 4053
U30B 4053
H2 <5>
VFILTER
+40V
R229 6.19K
R230 6.19K
R225 1.21K
R224 2.74K
Q27
Q26
Q29
Q28
R223 100.0
R220 511.0
R221 511.0
R227 56.2K
R226 35.7K
R228 7.50K
R197 80.6K
B3 <5>
VERT_POSN
R212 2.00K
Q22
Q23
R211 100.0
R213 100.0
+SIG
−SIG
BLUE
BROWN
J13
J12
TO CRT VERT DEFL PLATES
H2 <8>
J4
J4 CONNECTS TO J4 <7>
A1 POWER SUPPLY BOARD
FOCUS
ZAXIS
NC
+100V
+40V
+15V
+5V
−15V
B3 <5>
E4 <3>
R30 15.0K
YAXIS
/RO−EN
R308 499.0
XAXIS
R309 2.00K
CONNECT FOR 10 DIV
W8 0 OHM
W11 0 OHM
W12 0 OHM
R180 10.0K
R177 2.00K
R178 6.3K 3W
R179 6.3K 3W
R185 100.0
R186 100.0
R189 1.00K
R190 8.25K
R191 1.00K
C65 .1UF
R192 210.0
R193 210.0
Q14
Q15
Q17
Q16
Q18
Q19
R199 681.0
R200 100.0
R198 100.0
−RAMP
+RAMP
RED
GREEN
J8
J7
TO CRT HORIZ DEFL PLATES
H2 <8>
B1 <3>
≃ 4V P−P
≃ 5V P−P
R162 8.87K
R168 5K
HORIZ GAIN
HORZ_POSN
U26B TL072
U30C 4053
TO J23 PIN 1 <6>
TO W698 PIN 2 <6>
TO S100 <6>
J23
J22
J21
L19 64UH
C102 .1UF
R134 16 1/2W
U19 LM317
C28 .1UF
R116 604.0
R111 500
+11.8V ADJUST
C27 1UF
C26 10UF
R100 4.75K
CR17
CR18
R101 4.75K
−11.8V ADJUST
R99 500
C23 1UF
C24 10UF
R77 604.0
C22 .1UF
U15 LM337
CR9
CR10
U26A TL072
See parts list for earier values and serial number ranges.
PART OF A3 MAIN BOARD

Schematic Diagram <5> Component Locator Chart

The schematic diagram has an alphanumeric grid to assist in locating parts within that diagram.

Assembly A3 and A3A1. Partial Assembly A3 also shown on Diagrams 1, 2, 3, and 4.

Comp No	Diag Loc	Bd Loc
A3		
C1	D1	A4
C2	D1	A4
C3	D1	A4
C5	C3	A5
C8	G5	C2
C9	G5	C2
C12	B4	C6
C13	C4	C6
C16	C3	D6
C17	A5	D2
CR1	C3	B6
J1	A2	A2
J2	B5	D2
J300	C2	A6
J414	D5	A3
P300	C2	
Q1	B5	D1
Q2	B5	E1
Q3	D5	D1
Q100	C4	D1
R1	C3	A4
R2	C2	A4
R3	C3	A3
R4	C3	B4
R5	G1	B3
R6	H2	B2
R7	H2	B2
R8	H2	B2
R9	H2	B2
R10	H2	B2
R11	H2	B2
R12	H3	B3
R13	H3	B3
R14	H3	B5
R15	B4	C6
R16	C4	C6
R17	B4	C6
R18	C4	C6
R19	B5	D2
R20	C5	D1
R21	C5	D1
R23	B5	D2
R24	B5	D2
R25	C4	D6
R26	H3	D2
R27	H3	E3
R28	H4	D3
R29	H4	E3
R133	A3	H1
R245	C4	E1
R246	C5	E1
R300	C2	B6
U1	D3	A4
U2	D1	B3
U3	C3	B5
U4	D3	B6
U5	G5	C3
U6	G2	C3
U7A	F2	B4
U7B	E3	B4
U7C	E2	B4
U7D	F3	B4
U8	E1	C3
U9	F1	C4
U10	G3	D3
U11	C4	C6
U12A	H4	D3
U12B	H4	D3
W1	D1	C4
Y1	D1	B5
A3A1		
DS100	D5	A1
DS200	D5	B1
DS300	D5	C1
P100	D5	B1
P200	D5	A1
P800	D5	C1

MICROPROCESSOR

8031 ONLY
W1
0 OHM

U2
8031

C2 33PF
C3 33PF
Y1 12MHZ
C1 10UF
R2 10.0K
R300 10.0K
P300
J300
HALF SPAN

J1
CONNECTS TO J303
H1
<6>

A2
FRONT PANEL BOARD

J1
1A BANDWIDTH
1B FILTER
2A INPUT
2B SPAN_UP
3A NC
3B SPAN_DN
4A LED_1M
4B LED_100K
5A LED_FULL
5B LED_10M
6A LED_LBAND
6B LED_70M
7A LED_300K
7B LED_10K
8A NC
8B LED_ON
9A CFT <3> B3
9B FOCUS <4> A3
10A SCALE
10B SWP_SPEED <3> A1
11A INTENS <3> D5
11B ROTATE
12A H_POSN <4> H4
12B V_POSN <4> H2
13A NC
13B NC
14A 27
14B +5V
15A 29
15B 30
16A 31
16B +11.8V
17A 33
17B −11.8V

U1
ADC0831
R3 15.0K
R1 7.32K
R4 2K
READOUT CAL
R33 68.1K

U3
78L05
C5 100UF
C16 .1UF

U4
2444

CR1
+15V

R15 4.02K
R17 4.32K
C12 .1UF
U11
LM311
R25 24.3K

R16 150.0K
R18 150.0K
C13 10UF

C5 <3>
E3 <4>
/RO−EN

TRACE ROTATION
R24 100.0
R23 100.0
Q1
Q2
R19 180 1/2W
J2
J2 CONNECTS TO CRT
H1
<8>
C17 .1UF

Q3
R245 1.00K
Q100
R20 4.75K
R21 100.0
R246 1.00K
SCALE

J100
LIGHT ENABLE
1−2 ENABLE
2−3 DISABLE
P200
P100
J414
DS100
DS200
DS300
FRONT PANEL

A3A1 GRATICULE LIGHT BOARD

AD[0..7]
A0

U8
74ALS573

U9
27C64

U7A 74ALS00
U7B 74ALS00
U7C 74ALS00
U7D 74ALS00

C2 <3>
C3 <3>
/10MHZ
FULL
/FULL
LED−CONT

R5 10K

U6
74ALS574

B4 B2 D1
/LBAND <1> <3> <3>
/10KHZ <2> A4
/VFILTER <4> E2

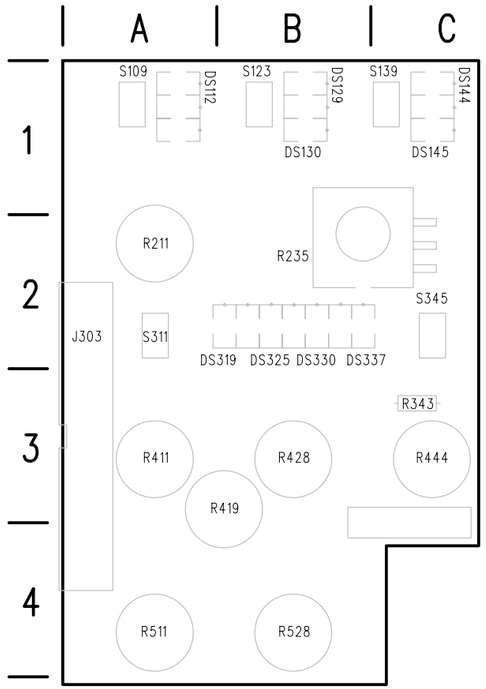
R6 100.0 LED_ON
R7 100.0 LED_300K
R8 100.0 LED_10K
R9 100.0 LED_LBAND
R10 100.0 LED_70M
R11 100.0 LED_1M
R12 100.0 LED_10M
R13 100.0 LED_100K
R14 100.0 LED_FULL

U10
7528
R26 20.0K
R27 20K
HORZ POSN READOUT
U12A TL072
E3 <4> XAXIS
U12B TL072
E3 <4> YAXIS
R28 20.0K
R29 20K
VERT POSN READOUT

−5V SUPPLY
C8 .1UF
U5
79L05

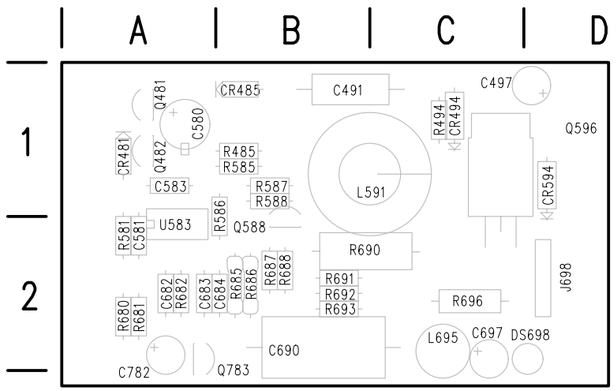
NOTE: ✳✳ SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES.

PART OF A3 MAIN BOARD



A2 Front Panel Board

Static Sensitive Devices
See Maintenance Section



A4 18V Power Supply Board

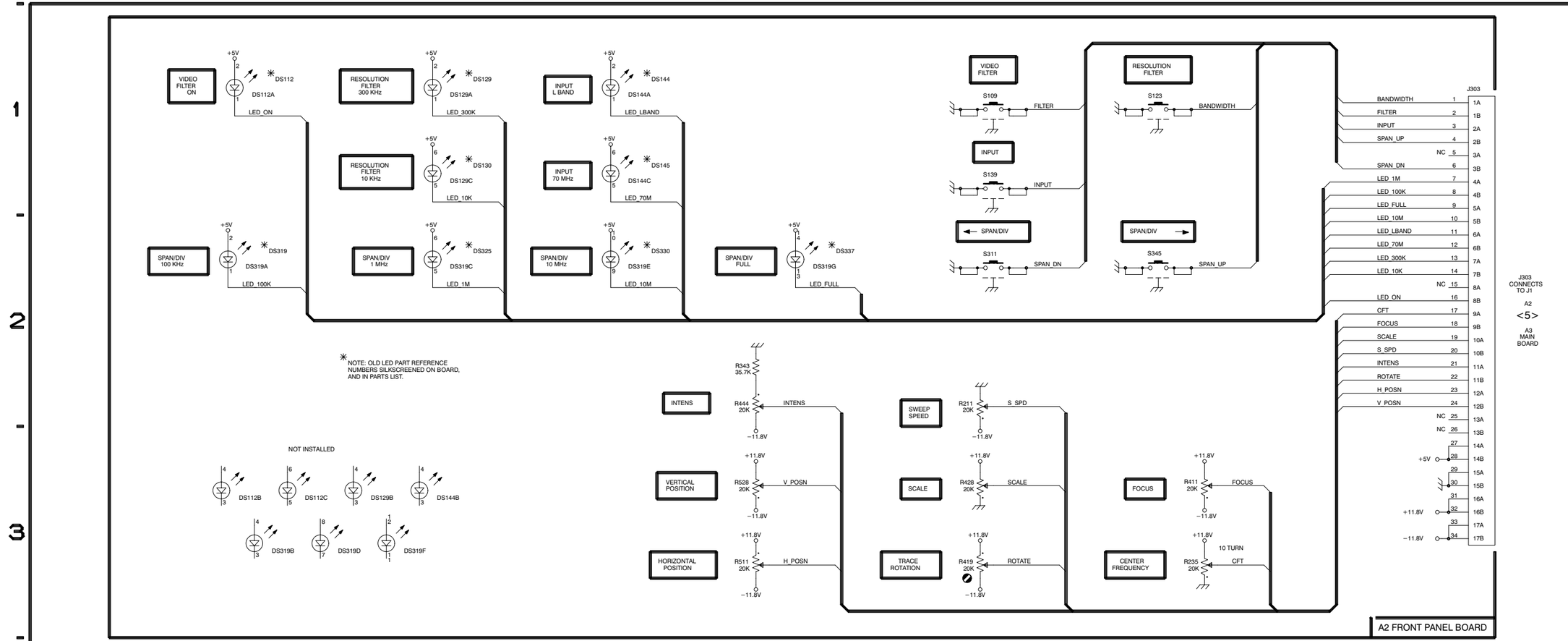
Schematic Diagram <6> Component Locator Chart

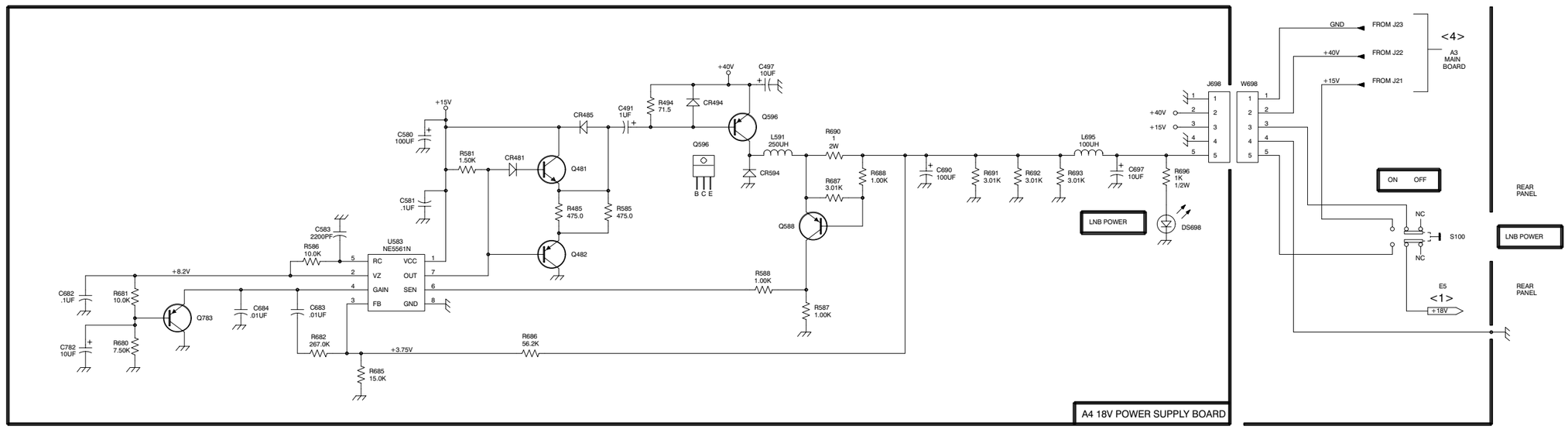
The schematic diagram has an alphanumeric grid to assist in locating parts within that diagram.

Assembly A2 and A4.

Comp No	Diag Loc	Bd Loc
A2		
DS112	A1	
DS112A	B1	
DS112B	A3	
DS112C	B3	
DS129	B1	
DS129A	B1	
DS129B	B3	
DS129C	B1	
DS130	B1	
DS144	C1	
DS144A	C1	
DS144B	B3	
DS144C	C1	
DS145	C1	
DS319	A2	
DS319A	A2	
DS319B	B3	
DS319C	B2	
DS319D	B3	
DS319E	C2	
DS319F	B3	
DS319G	D2	
DS325	B2	
DS330	B2	
DS337	B2	
J303	H1	A2
R211	E2	A1
R235	F3	B2
R343	D2	C3
R411	F3	A3
R419	E3	A3
R428	E3	B3
R444	D2	C3
R511	D3	A4
R528	D3	B4
S109	E1	A1
S123	F1	B1
S139	E1	C1
S311	E2	A2
S345	F2	C2

Comp No	Diag Loc	Bd Loc
A4		
C491	D4	B1
C497	D4	C1
C580	C4	A1
C581	C4	A2
C583	B5	A1
C682	A5	A2
C683	B5	A2
C684	B5	B2
C690	E4	B2
C697	F4	C2
C782	A5	A3
CR481	C4	A1
CR485	D4	B1
CR494	D4	C1
CR594	D4	D1
DS698	F5	C2
J698	G4	D2
L591	D4	B1
L695	F4	C2
Q481	C4	A1
Q482	C5	A1
Q588	E5	B2
Q596	D4	D1
Q783	B5	B3
R485	C4	B1
R494	D4	C1
R581	C4	A2
R585	D4	B1
R586	B5	B2
R587	E5	B1
R588	D5	B1
R680	A5	A2
R681	A5	A2
R682	B5	A2
R685	C5	B2
R686	C5	B2
R687	E4	B2
R688	E4	B2
R690	E4	B2
R691	E4	B2
R692	F4	B2
R693	F4	B2
R696	F4	C2
S100	G5	
U583	C5	A2
W698	G4	


VIDEO FILTER ON
DS112A
DS112
LED_ON
RESOLUTION FILTER 300 KHz
DS129A
DS129
LED_300K
RESOLUTION FILTER 10 KHz
DS129C
DS130
LED_10K
SPAN/DIV 100 KHz
DS319A
DS319
LED_100K
SPAN/DIV 1 MHz
DS319C
DS325
LED_1M
INPUT L BAND
DS144A
DS144
LED_LBAND
INPUT 70 MHz
DS144C
DS145
LED_70M
SPAN/DIV 10 MHz
DS319E
DS330
LED_10M
SPAN/DIV FULL
DS319G
DS337
LED_FULL
VIDEO FILTER
S109
FILTER
INPUT
S139
INPUT
SPAN/DIV
S311
SPAN_DN
RESOLUTION FILTER
S123
BANDWIDTH
SPAN/DIV
S345
SPAN_UP
J303
BANDWIDTH 1
FILTER 2
INPUT 3
SPAN_UP 4
NC 5
SPAN_DN 6
LED_1M 7
LED_100K 8
LED_FULL 9
LED_10M 10
LED_LBAND 11
LED_70M 12
LED_300K 13
LED_10K 14
NC 15
LED_ON 16
CFT 17
FOCUS 18
SCALE 19
S_SPD 20
INTENS 21
ROTATE 22
H_POSN 23
V_POSN 24
NC 25
NC 26
+5V
+11.8V
−11.8V
J303 CONNECTS TO J1
A2
<5>
A3 MAIN BOARD
NOTE: OLD LED PART REFERENCE NUMBERS SILKSCREENED ON BOARD, AND IN PARTS LIST.
NOT INSTALLED
DS112B
DS112C
DS129B
DS144B
DS319B
DS319D
DS319F
INTENS
R343 35.7K
R444 20K
VERTICAL POSITION
R528 20K
V_POSN
HORIZONTAL POSITION
R511 20K
H_POSN
SWEEP SPEED
R211 20K
S_SPD
SCALE
R428 20K
SCALE
TRACE ROTATION
R419 20K
ROTATE
FOCUS
R411 20K
FOCUS
CENTER FREQUENCY
R235 20K
10 TURN
CFT
A2 FRONT PANEL BOARD


+15V
C580 100UF
R581 1.50K
CR481
CR485
C491 1UF
R494 71.5
CR494
+40V
C497 10UF
Q596
L591 250UH
R690 1 2W
R688 1.00K
C690 100UF
R691 3.01K
R692 3.01K
R693 3.01K
L695 100UH
C697 10UF
R696 1K 1/2W
DS698
LNB POWER
C581 .1UF
Q481
Q482
R485 475.0
R585 475.0
C583 2200PF
U583 NE5561N
RC
VZ
GAIN
FB
VCC
OUT
SEN
GND
R586 10.0K
+8.2V
C682 .1UF
R681 10.0K
C782 10UF
R680 7.50K
Q783
C684 .01UF
C683 .01UF
R682 267.0K
R685 15.0K
+3.75V
R686 56.2K
R687 3.01K
Q588
R588 1.00K
R587 1.00K
J698
W698
GND
+40V
+15V
FROM J23
FROM J22
FROM J21
<4>
A3 MAIN BOARD
ON
OFF
S100
NC
E5
<1>
+18V
REAR PANEL
LNB POWER
A4 18V POWER SUPPLY BOARD

A1 Power Supply Board

Static Sensitive Devices
See Maintenance Section

A1 Power Supply Board Component Locator

(with cross-references to schematic diagrams 7 and 8).

Comp No	Diag No	Diag Loc	Bd Loc
C1	8	C4	A4
C2	8	D3	D1
C3	8	D3	A2
C4	8	D3	A2
C5	8	D4	B3
C6	8	C4	B4
C7	8	F3	B1
C8	8	D3	B2
C9	8	E2	B2
C10	8	C5	B4
C11	8	E2	B1
C12	8	D2	C4
C13	8	D2	C4
C14	8	D2	C4
C15	8	F2	C4
C16	8	C2	C3
C17	8	F2	D4
C18	8	F3	E1
C19	8	C1	D4
C20	8	C2	D4
C21	8	C1	D4
C22	8	B2	E2
C23	8	B2	E3
C24	8	D1	E4
C25	8	A3	E2
C27	8	B1	E3
C28	8	B1	E3
C29	7	F2	F1
C30	7	F2	F2
C31	7	F3	F3
C32	7	F2	F3
C33	7	G2	F4
C34	8	D1	F4
C35	7	F3	G3
C36	7	G2	G3
C37	7	G3	G4
C38	7	G2	G4
C39	7	E4	G4
C40	7	F4	H4
C41	7	E4	I4
C42	7	D3	I1
C43	7	C4	J4
C44	7	D2	I3
C45	7	D4	I4
C46	7	C5	I4
C47	7	A3	J3
C48	7	C4	J4
C49	7	D3	J2
C50	7	C3	J2
C51	7	C3	K2
C52	7	C4	J2
C53	7	E3	I2
C54	7	C2	M2
C55	7	E3	H3
C56	7	B2	M3
C57	7	B2	N5
C58	7	B3	J2
C59	7	B4	J3
C60	7	B5	J4
C61	7	D4	I4
C62	7	E1	H1
C63	7	E1	G1
C65	8	B2	F4
C66	8	A2	E2
CR1	8	E2	B1
CR2	8	D4	B3
CR3	8	E2	B1
CR4	8	C2	B2
CR5	8	D2	C3
CR6	8	E2	C3
CR7	8	C2	D4
CR8	8	C2	D4
CR9	8	C1	E4
CR10	7	F1	G2
CR11	7	F2	G2
CR12	7	F2	G1
CR13	7	F3	G2
CR14	7	E2	G3
CR15	7	E4	G5
CR16	7	D5	I4
CR17	7	E2	I2
CR18	7	D2	I2
CR19	7	B3	K3
CR20	7	E3	I3
CR21	7	B2	L4
CR22	7	B2	L4
CR23	7	B2	L4
CR24	7	B2	L4
CR25	7	B3	J2
CR26	7	F4	H4
CR27	7	D3	J1
CR28	7	G4	H5
CR29	7	E4	H5
CR30	8	A2	E2
CR31	8	A2	E2
DS1	8	E2	B2
DS2	8	E2	B2
DS3	8	E3	B2
DS4	7	D2	L2
F1	7	B2	M4
FIL1	8	C3	C1
FIL2	8	C3	C1
J1	8	F3	B1
J2	7	H5	B5
J3	8	F2	D1
J4	7	H3	F5
J5	7	H1	F1
J6	7	A2	M3
J10	7	A2	N1
J11	8	F4	A2
L1	7	F3	F2
L2	7	F2	G1
L3	7	F2	G2
L4	7	C2	N1
Q1	8	E5	B3
Q2	8	E5	A3
Q3	8	D4	B4
Q4	8	D4	B4
Q5	8	C4	B4
Q6	8	B2	E1
Q7	7	D5	I4
Q8	7	E4	I4
Q9	7	D3	J1
Q10	8	A2	E2
Q11	7	G3	G3
R1	8	E3	A1
R2	8	E4	A2
R3	8	E4	A2
R4	8	E4	A3
R5	8	E5	A3
R6	8	E5	A3
R7	8	B4	A4
R8	8	B4	A4
R11	8	F4	A2
R12	8	D3	C1
R13	7	F3	H4
R14	7	G3	H4
R20	8	C4	A4
R21	8	C5	A4
R22	8	D5	A4
R23	8	B4	A4
R24	8	D5	A4
R25	8	B4	A4
R26	8	E5	A3
R27	8	E5	A4
R28	8	E5	A4
R29	8	D2	B1
R30	8	D2	A4
R31	8	D4	B3
R32	8	E5	B3
R33	8	C4	B4
R34	8	C4	B4
R35	8	D4	B3
R36	8	D4	B3
R37	8	C5	B4
R38	8	C5	B4
R39	8	E2	B1
R40	8	D2	B2
R41	8	D4	B3
R42	8	E3	C1
R43	8	E2	B3
R44	8	E2	B3
R45	8	F2	C4
R46	8	E3	C1
R47	8	D2	C3
R48	8	C2	C4
R49	8	F2	C4
R50	8	F2	E1
R51	8	F3	E1
R52	8	F2	E1
R53	8	F2	E1
R54	8	F2	E1
R55	8	D2	D4
R56	8	E3	E1
R57	8	B2	E1
R58	8	B1	E1
R59	8	C1	E3
R60	8	C1	E3
R61	8	D1	E4
R62	7	D4	I4
R63	8	A2	E2
R64	8	C2	E2
R65	8	B1	E3
R66	8	B1	E3
R67	7	F2	F4
R68	7	F4	G5
R69	7	G4	G5
R70	7	G4	G4
R71	7	F4	H4
R72	7	D5	H4
R73	7	E5	I4
R74	7	C4	J5
R75	7	B5	J4
R76	7	C5	I4
R77	7	D4	I4
R78	7	B4	J4
R79	7	B3	J2
R80	7	C4	J4
R81	7	D3	J1
R82	7	C3	J2
R83	7	C5	J2
R84	7	B5	J2
R85	7	G4	H5
R86	7	D3	J1
R87	7	D3	K2
R88	7	B4	J2
R89	7	B2	M4
R90	7	E3	I3
R91	7	D2	K1
R92	7	D2	K1
R93	7	D2	L2
R94	7	D2	L2
R95	7	B4	J3
R96	7	A4	K3
R97	7	A3	J3
R98	7	F4	H4
R99	7	G5	H5
R101	7	C3	K2
R102	7	C2	M1
R103	8	A2	E2
RV1	7	D2	I3
T1	8	B2	C4
T2	7	E4	H5
T3	7	E2	G3
TP1	7	F5	F4
TP2	7	E5	K4
U1	8	D1	C1
U2	8	B1	F4
U3A	7	C4	J3
U3B	7	B3	J3
U4A	7	D4	I5
U4B	7	C4	I5
U5	7	C3	J2
VR1	7	F4	H4
VR2	8	A2	E2
VR3	7	F3	H4
VR4	7	F4	H4
W1	7	G3	E4
W2	7	G3	E4
W3	7	G2	E4
W4	7	G2	E5

* SEE PARTS LIST FOR EFFECTIVE SERIAL NUMBER RANGES

CAUTION: ALL CIRCUITRY TO THE LEFT OF THE ISOLATION BOUNDARY IS AT POWER LINE POTENTIAL AND REQUIRES AN ISOLATION TRANSFORMER TO SERVICE

ISOLATION BOUNDARY

LINE RECTIFIER AND FILTER

MOUNTING
REAR PANEL
J6
J10
90–250V
F1 2A
C56 .022UF
C57 .068UF
R89 5
CR23
CR22
CR24
CR21
L4 1MH
R102 8
C54 330UF

CLAMP

C62 NOT INSTALLED
C63 NOT INSTALLED
C44 .47UF
RV1 NOT INSTALLED
CR18 NOT INSTALLED
R91 100K
R92 100K
R93 150K
R94 150K
DS4
T3
C49 .1UF
C42 560UF
CR17
C55 NOT INSTALLED

OUTPUT FILTERS

CR10
CR11
CR12
CR13
CR14
L3 4.7UH
L2 4.7UH
L1 4.7UH
C30 560UF
C29 560UF
C32 560UF
C35 560UF
C31 560UF
C36 560UF
C38 560UF
C33 10UF
C37 560UF
R67 10.0
W4 0 OHM
W3 0 OHM
W2 0 OHM
W1 0 OHM
+15V
+15A
−15V
−15A
+40V
+40VA
+5V
+5D

J5
USED WITH 1700F10 UPGRADE ONLY
(DC OPER.)

OUTPUT UV SHUTDOWN

+5VC
C47 .47UF
R97 2.00K
CR19
U3B LM393
CR25
R79 49.9K
C58 200PF
R96 49.9K

PULSE WIDTH MODULATOR

U5 UC3842
COMP REF VFB VCC ISEN OUT RT/CT GND
C50 .47UF
R82 4.99K
R81 178
CR27
C51 .01UF
R101 49.9
R87 22.1
R86 .51
Q9
R90 2.4K
CR20
C53 100PF

SWITCHER MOSFET

SNUBBER

FEEDBACK TRANSFORMER DRIVER

U4B 74HC221A
NC CX RX A B Q NC
R88 2.00K
C59 .1UF
C52 .01UF
U4A 74HC221A
CX VCC GND RX A B Q NC
C48 200PF
R80 2.00K
C45 .47UF
C43 .47UF
R74 4.99K
U3A LM393
R95 4.53K
R78 3.74K
R75 4.99K
C60 .1UF
C61 470PF
R62 100
R77 100
Q8
Q7
R72 10.0
R73 10.0

PEAK DETECTOR

R76 3.74K
C46 .01UF
R83 10.00K
R84 18.7K
CR16

ERROR AMPLIFIER

T2
C41 .47UF
CR29
CR15
C39 .1UF
R68 178
VR4 10V
VR1
CR26
R98 10.00K
C40 4700PF
R71 221K
R69 10.00K
R70 10.00K
R85 100K
R99 100K
+5V ADJUST

VR3 5.1V
R14 10.0
R13 100
Q11

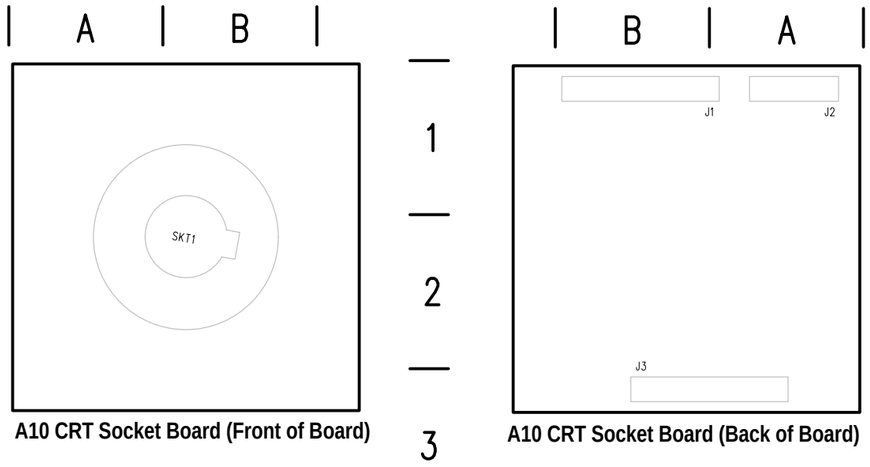
J4
A4 <8>
D5 <8>
A4 <8>
J4–1
FOCUS
ZAXIS
NC
+100V
+40V
+15V
+5V
−15V
J4 CONNECTS TO J4 <4> A3 MAIN BOARD

FRONT PANEL
POWER
(OPEN = ON)
S1
J2

LINE SIDE COMMON
TP2
SECONDARY GROUND (CHASSIS GROUND)
TP1

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

PART OF A1 POWER SUPPLY



A10 CRT Socket Board (Front of Board)

A10 CRT Socket Board (Back of Board)

Schematic Diagram <8> Component Locator Chart

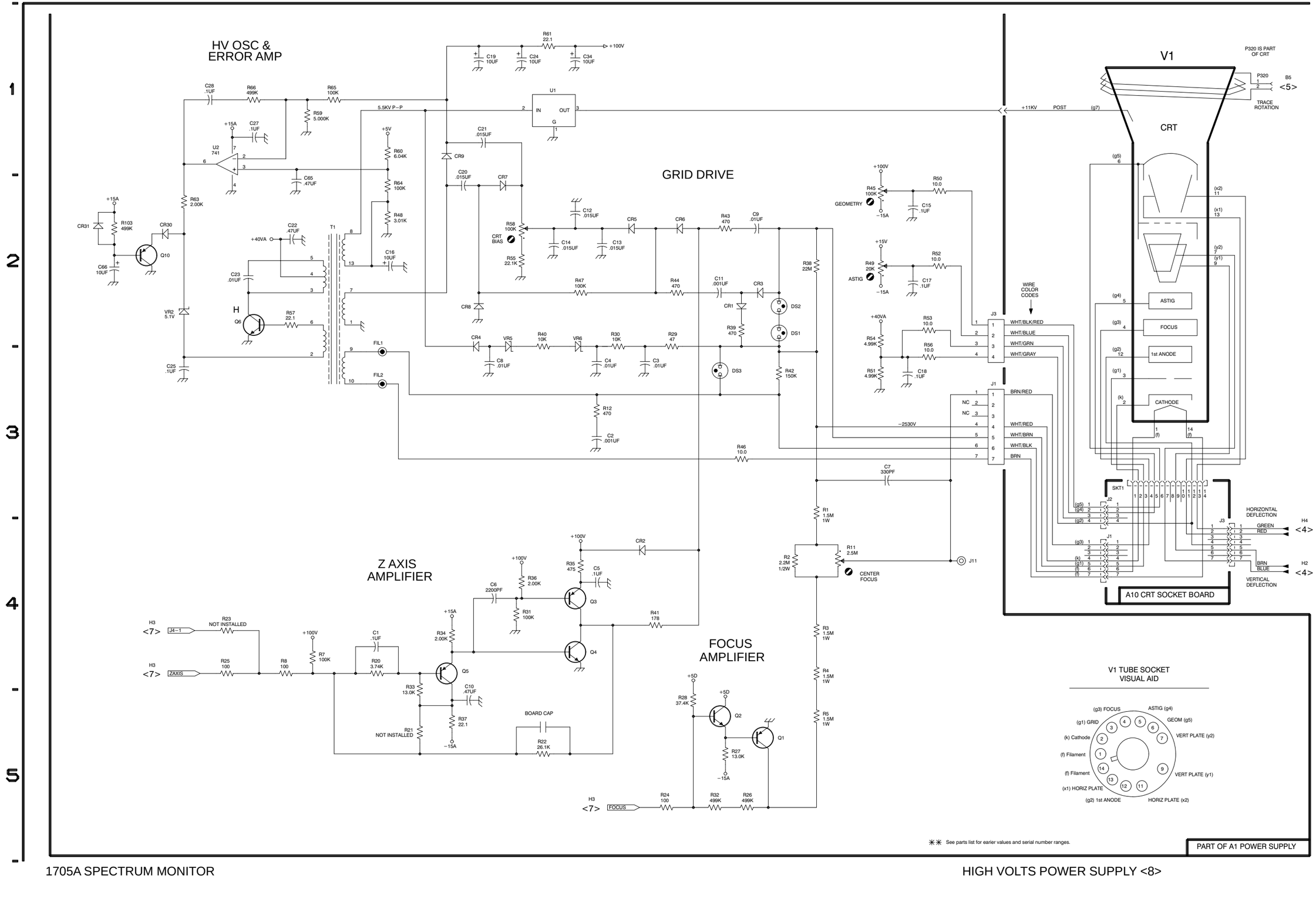
The schematic diagram has an alphanumeric grid to assist in locating parts within that diagram.

Assembly A1. Partial Assembly A1 also shown on Diagram 7.

Comp No	Diag Loc	Bd Loc	Comp No	Diag Loc	Bd Loc	Comp No	Diag Loc	Bd Loc	Comp No	Diag Loc	Bd Loc
C1	C4	A4	CR1	E2	B1	R4	E4	A3	R44	D2	B3
C2	D3	D1	CR2	D4	B3	R5	E5	A3	R45	F2	C4
C3	D3	A2	CR3	E2	B1						
C4	D3	A2	CR4	C2	B2	R7	B4	A4	R46	E3	C1
C5	D4	B3	CR5	D2	C3	R8	B4	A4	R47	D2	C3
						R11	F4	A2	R48	C2	C4
C6	C4	B4	CR6	E2	C3	R12	D3	C1	R49	F2	C4
C7	F3	B1	CR7	C2	D4	R20	C4	A4	R50	F2	E1
C8	D3	B2	CR8	C2	D4						
C9	E2	B2	CR9	C1	E4	R21	C5	A4	R51	F3	E1
C10	C5	B4	CR30	A2	E2	R22	D5	A4	R52	F2	E1
			CR31	A2	E2	R23	B4	A4	R53	F2	E1
C11	E2	B1				R24	D5	A4	R54	F2	E1
C12	D2	C4	DS1	E2	B2	R25	B4	A4	R55	D2	D4
C13	D2	C4	DS2	E2	B2						
C14	D2	C4	DS3	E3	B2	R26	E5	A3	R56	F3	E1
C15	F2	C4				R27	E5	A4	R57	B2	E1
			FIL1	C3	C1	R28	E5	A4	R58	D2	E4
C16	C2	C3	FIL2	C3	C1	R29	D2	B1	R59	B1	E2
C17	F2	D4				R30	D2	A2	R60	C1	E3
C18	F3	E1	J1	F3	B1						
C19	C1	D4	J3	F2	D1	R31	D4	B3	R61	D1	E4
C20	C2	D4	J11	F4	A2	R32	E5	B3	R63	A2	E2
						R33	C4	B4	R64	C2	E2
C21	C1	D4	Q1	E5	B3	R34	C4	B4	R65	B1	E3
C22	B2	E2	Q2	E5	A3	R35	D4	B3	R66	B1	E3
C23	B2	E3	Q3	D4	B4				R103	A2	E2
C24	D1	E4	Q4	D4	B4	R36	D4	B3			
C25	A3	E2	Q5	C4	B4	R37	C5	B4	T1	B2	C4
						R38	E2	B1			
C27	B1	E3	Q6	B2	E1	R39	E2	B1	U1	D1	C1
C28	B1	E3	Q10	A2	E2	R40	D2	B2	U2	B1	F4
C34	D1	F4									
C65	B2	F4	R1	E3	A1	R41	D4	B3	VR2	A2	E2
C66	A2	E2	R2	E4	A2	R42	E3	C1	VR5	D2	B2
			R3	E4	A2	R43	E2	B3	VR6	D2	B2

Assembly A10.

Comp No	Diag Loc	Bd Loc	Comp No	Diag Loc	Bd Loc
J1	G4	B1	J3	H4	B3
J2	G3	A1	SKT1	G3	B2



** See parts list for earier values and serial number ranges.

Replaceable Mechanical Parts

Section 10
Replaceable Mechanical Parts

This section contains a list of the components that are replaceable for the 1705A. Use this list to identify and order replacement parts. There is a separate Replaceable Mechanical Parts list for each instrument.

Parts Ordering Information

Replacement parts are available from or through your local Tektronix, Inc., Field Office or representative.

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

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

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc., Field Office or representative will contact you concerning any change in part number.

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

Using the Replaceable Mechanical Parts List

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

Cross Index–Mfr. Code Number to Manufacturer

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

Abbreviations

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

Chassis Parts

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

Column Descriptions

Figure & Index No. (Column 1)

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

Tektronix Part No. (Column 2)

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

Serial No. (Column 3 and 4)

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

Qty (Column 5)

This indicates the quantity of mechanical parts used.

Name and Description (Column 6)

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

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

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

Mounting Parts always appear in the same indentation as the Item it mounts, while the detail parts are indented to the right. Indented items are part of and included with, the next higher indentation. **Mounting parts must be purchased separately, unless otherwise specified.**

Mfr. Code (Column 7)

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

Mfr. Part Number (Column 8)

Indicates actual manufacturer's part number.

CROSS INDEX – MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code.	Manufacturer	Address	City, State, Zip Code
06383	PANDUIT CORP	17301 RIDGELAND	TINLEY PARK IL 60477–3048
06915	RICHCO	5825 N TRIPP AVE P.O. BOX 804238	CHICAGO, IL 60646
07416	NELSON NAME PLATE CO	3191 CASITAS	LOS ANGELES CA 90039–2410
0KB01	STAUFFER SUPPLY	810 SE SHERMAN	PORTLAND OR 97214
0J9P9	GEROME MFG CO INC	PO BOX 737 403 NORTH MAIN	NEWBERG, OR 97132
12327	FREEWAY CORP	9301 ALLEN DR	CLEVELAND OH 44125–4632
13764	MICRO PLASTICS INC.	HIGHWAY 178 NORTH	FLIPPIN, AR 72634
15912	THOMAS AND BETTS CORP ELECTRONICS GROUP	76 FAIRBANKS	IRVINE CA 92718
20093	FRC–ELECTRICAL INDUSTRIES CORP.	691 CENTRAL AVE	MURRAY HILL, NJ 07974
31918	ITT SCHADOW INC	8081 WALLACE RD	EDEN PRAIRIE MN 55344–2224
34785	DEK INC	3480 SWENSON AVE	ST CHARLES IL 60174–3450
56501	THOMAS & BETTS CORPORATION	1555 LINFIELD RD	MEMPHIS, TN 38119
70903	COOPER BELDEN ELECTRONICS WIRE AND C SUB OF COOPER INDUSTRIES INC		
73743	FISCHER SPECIAL MFG CO	111 INDUSTRIAL RD	COLD SPRING KY 41076–9749
75915	LITTELFUSE INC SUB TRACOR INC	800 E NORTHWEST HWY	DES PLAINES IL 60016–3049
78189	ILLINOIS TOOL WORKS INC SHAKEPROOF DIV	ST CHARLES ROAD	ELGIN IL 60120
7X318	KASO PLASTICS INC	11013 A NE 39TH	VANCOUVER, WA 98662
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
83309	ELECTRICAL SPECIALITY CO	287 WATTIS WAY	SOUTH SAN FRANCISCO, CA 94080
83385	MICRODOT MFG INC GREER–CENTRAL DIV	3221 W BIG BEAVER RD	TROY MI 48098
83486	ELCO INDUSTRIES INC	1101 SAMUELSON RD	ROCKFORD IL 61101
86928	SEASTROM MFG CO INC	701 SONORA AVE	GLENDALE CA 91201–2431
93907	TEXTRON INC CAMCAR DIV	600 18TH AVE	ROCKFORD IL 61108–5181
9M860	ESAM INC	PO BOX 376	GRANTS PASS, OR 97526
TK0435	LEWIS SCREW CO	4300 S RACINE AVE	CHICAGO IL 60609–3320
TK0858	STAUFFER SUPPLY CO (DIST)		
TK1179	PANEL COMPONENTS CORP	1360 N DUTTON AVE PO BOX 6626	SANTA ROSA CA 95406
TK1373	PATELEC–CEM (ITALY)	10156 TORINO	VAICENTALLO 62/45S ITALY
TK1543	CAMCAR/TEXTRON	600 18TH AVE	ROCKFORD IL 61108–5181
TK1617	CRAFT FACTORY PLASTICS	17145 SW ALEXANDER	ALOHA, OR 97007

Replaceable Mechanical Parts

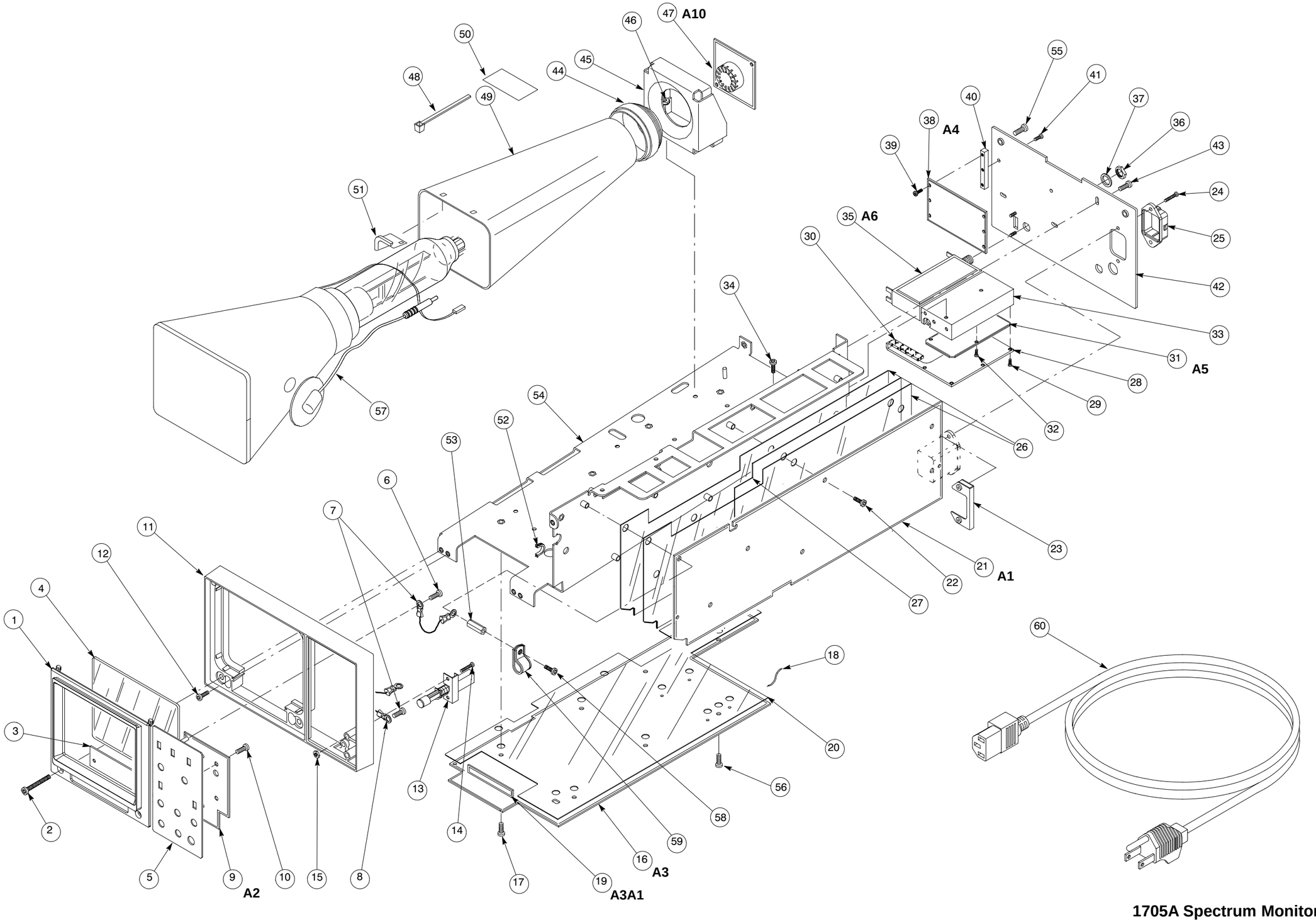
Fig. & Index No.	Tektronix Part No.	Serial Number Effective	Serial Number Dscont	Qty	12345	Name & Description	Mfr. Code	Mfr. Part No.
1–1	426–2102–00			1		FRAME,CRT:BEZEL	80009	426–2102–00
						MOUNTING PARTS		
–2	211–0690–02			2		SCREW,MACHINE:6–32 X 0.875,PNH,SST	TK1543	B20–70430
						END MOUNTING PARTS		
–3	333–3476–00			1		PANEL,FRONT:	80009	333–3476–00
–4	378–0258–00			1		FLTR,CONTRASTIN:GRAY,POLYCARBONATE	80009	378–0258–00
–5	333–3989–01			1		PANEL,FRONT:1705A	80009	333–3989–01
						MOUNTING PARTS		
–6	211–0721–00			2		SCREW,MACHINE:6–32 X 0.375,PNH,STL	83486	ORDER BY DESCR
						END MOUNTING PARTS		
–7	175–9872–01			1		CA ASSY,SP,ELEC:2,18 AWG,2.5 L,0–N	80009	175–9872–01
–8	174–2168–00			1		CA ASSY,SP,ELEC:18 AWG,4.0 L,0–N	80009	174–2168–00
–9	——— ———			1		CIRCUIT BD ASSY:FRONT PANEL		
						(SEE A2 REPL)		
						MOUNTING PARTS		
–10	211–0721–00			4		SCREW,MACHINE:6–32 X 0.375,PNH,STL	83486	ORDER BY DESCR
						END MOUNTING PARTS		
–11	426–2101–04			1		FRAME SECT,CAB.:FRONT	80009	426–2101–04
						MOUNTING PARTS		
–12	211–0721–00			3		SCREW,MACHINE:6–32 X 0.375,PNH,STL	83486	ORDER BY DESCR
						END MOUNTING PARTS		
–13	——— ———			1		SW,PUSH:0.4A,125VAC,W/SLDR LUG,BTN W/YEL IDCTR		
						(SEE S1 REPL)		
						MOUNTING PARTS		
–14	210–0405–00			2		NUT,PLAIN,HEX:2–56 X 0.188,BRS CD PL	73743	12157–50
–15	211–0100–00			2		SCREW,MACHINE:2–56 X 0.750,PNH,STL	83385	ORDER BY DESCR
						END MOUNTING PARTS		
–16	——— ———			1		CIRCUIT BD ASSY:MAIN		
						(SEE A3 REPL)		
						MOUNTING PARTS		
–17	211–0721–00			6		SCREW,MACHINE:6–32 X 0.375,PNH,STL	83486	ORDER BY DESCR
						END MOUNTING PARTS		
–18	196–3146–00			7		FLEX STRIP:SINGLE JUMPER,1.0 L	15912	FSN–LA
–19	——— ———			1		CIRCUIT BD ASSY:GRATICULE LIGHT		
						(SEE A3A1 REPL)		
–20	337–3428–00			1		SHIELD,ELEC:CIRCUIT BOARD,PC	80009	337–3428–00
–21	——— ———			1		CIRCUIT BD ASSY:POWER SUPPLY		
						(SEE A1 REPL)		
						MOUNTING PARTS		
–22	211–0721–00		B041072	7		SCREW,MACHINE:6–32 X 0.375,PNH,STL	83486	ORDER BY DESCR
–22	211–0721–00	B041073		6		SCREW,MACHINE:6–32 X 0.375,PNH,STL	83486	ORDER BY DESCR
–23	337–3796–01			1		SHIELD,ELEC:0.032 BRASS,C26000,0.5 HARD	80009	337–3796–01
–24	211–0016–00			2		SCREW,MACHINE:4–40 X 0.625,PNH,STL	TK0435	ORDER BY DESCR
						END MOUNTING PARTS		
–25	131–3573–00			1		CONN,PLUG,ELEC:MALE,W/LOCKING ADAPTER	80126	B–0779
–26	337–3257–00			2		SHIELD,CKT BD:LV PWR SUPPLY	80009	337–3257–00
–27	337–3931–00			1		SHIELD,ELEC:ALUMINUM	80009	337–3931–00
–28	200–3443–00			1		COVER,HOUSING:ALUMINUM	80009	200–3443–00
						MOUNTING PARTS		
–29	211–0108–00			6		SCREW,MACHINE:2–56 X 0.156,PNH,STL,CD PL,POZ	TK0435	ORDER BY DESCR
						END MOUNTING PARTS		
–30	253–0415–00			1		TAPE,FOAM:1 X 1.5 X 0.125 THK,ADHESIVE ONE SIDE	80009	253–0415–00
–31	——— ———			1		CIRCUIT BD ASSY:70MHZ TUNER		
						(SEE A5 REPL)		
						MOUNTING PARTS		
–32	211–0108–00			3		SCREW,MACHINE:2–56 X 0.156,PNH,STL,CD PL,POZ	TK0435	ORDER BY DESCR
						END MOUNTING PARTS		

Fig. & Index No.	Tektronix Part No.	Serial Number Effective	Serial Number Dscont	Qty	12345	Name & Description	Mfr. Code	Mfr. Part No.
–33	380–0856–00			1		HOUSING,CKT BD:ALUMINUM	80009	380–0856–00
						MOUNTING PARTS		
–34	211–0503–00			2		SCREW,MACHINE:6–32 X 0.188,PNH,STL	93907	ORDER BY DESCR
						END MOUNTING PARTS		
–35	——— ———			1		TUNER:FREQ 950–1750MHZ,OUT IF FREQ 479.5MHZ,IMP IN/OUT 75		
						(SEE A6 REPL)		
						MOUNTING PARTS		
–36	210–0590–00			1		NUT,PLAIN,HEX:0.375–32 X 0.438 BRS CD PL	73743	28269–402
–37	210–0978–00			1		WASHER,FLAT:0.375 ID X 0.5 OD X 0.024,STL	12327	ORDER BY DESCR
						END MOUNTING PARTS		
–38	——— ———			1		CIRCUIT BD ASSY:18V POWER SUPPLY		
						(SEE A4 REPL)		
						MOUNTING PARTS		
–39	211–0008–00			4		SCREW,MACHINE:4–40 X 0.25,PNH,STL	93907	ORDER BY DESCR
						END MOUNTING PARTS		
–40	220–0065–00			2		NUT BAR:4–40/6–32,2 X 0.25 SQ,AL	80009	220–0065–00
						MOUNTING PARTS		
–41	211–0721–00			2		SCREW,MACHINE:6–32 X 0.375,PNH,STL	83486	ORDER BY DESCR
						END MOUNTING PARTS		
–42	333–3990–02			1		PANEL,REAR:1705A	80009	333–3990–02
						MOUNTING PARTS		
–43	211–0721–00			3		SCREW,MACHINE:6–32 X 0.375,PNH,STL	83486	ORDER BY DESCR
						END MOUNTING PARTS		
–44	348–1464–00			1		MANCHET:CRT,END RUBBER MANCHET,31.5MM THK X 63MM OD,50.5 ID,	80009	348–1464–00
–45	407–4395–00			1		BRACKET,CRT:BACK,0.062,ALUM,	80009	407–4395–00
						MOUNTING PARTS		
–46	210–0457–00			2		NUT,PL,ASSEM WA:6–32 X 0.312,STL CD PL	78189	511–061800–00
						END MOUNTING PARTS		
–47	——— ———			1		CIRCUIT BD ASSY:CRT SOCKET BD	80009	136–1167–00
						(SEE A10 REPL)		
						ATTACHED PARTS		
	179–2997–01			1		WIRE HARNESS:DESCRETE,CRT ASSY 5,24AGW,5,26 AGW,1 X 4, 0.1 CTR & 1 X 7, RCPT X 1 X 4 & 1 X 7,	9M860	179–2997–01
	344–0111–00			3		INSUL,SPREADER:DEFL LEADS,POLYPROPYLENE	TK1617	NA
	343–0298–00			1		STRAP,RETAINING:0.25 DIA CABLE	06915	HUC–4
	174–3511–01			1		CA ASSY,SP:DISCRETE,CPD,4,24 AWG, 8.0L,1X7,0.1CTR & 2, 24 AWG, 8.5L X STRAIN RELIEF PCB,	80009	174–3511–01
						END ATTACHED PARTS		
–48	346–0133–00			1		STRAP,TIEDOWN,E:14.0 X 0.091,NYLON	56501	TY234M EURO DIRECT PURCH
	346–0120–00		B041072	2		STRAP,TIEDOWN,E:5.5 L MIN,PLASTIC,WHITE	06383	SST1.5M
	346–0120–00	B041073		1		STRAP,TIEDOWN,E:5.5 L MIN,PLASTIC,WHITE	06383	SST1.5M
–49	337–4087–01			1		SHIELD,CRT:CRT SHIELD,METAL,1740A/17501/1750 SERIES/WFM601M/WFM601A/WFM601E SERIES,	0J9P9	337–4087–01
–50	334–1379–00			1		MARKER,IDENT:MKD HI VACUUM	07416	ORDER BY DESCR
–51	386–6911–00			4		SUPPORT, SHIELD:CRT SHIELD SUPPORT,PLASTIC,1740A	7X318	1365
–52	348–0171–00			1		GROMMET,PLASTIC:BLACK,U–SHAPED,0.276 ID	80009	348–0171–00
–53	343–0916–00		B041072	1		CLAMP,LOOP:0.5 ID,NYLON	34785	029–500
–53	129–1308–00	B041073		1		SPACER,POST: 6–32 X 0.75, HEX, STL, CAD PL		
–54	426–2103–07			1		FRAME,CHASSIS:SAFETY CONTROLLED	80009	426–2103–06
–55	211–0720–01			2		SCREW,MACH:6–32 X 0.50,PNH,STL,TORX T–15 W/SLOT	0KB01	211–0720–01
–56	211–0741–00			1		SCREW,MACHINE:6–32 X 0.5,NYLON	13764	ORDER BY DESCR
						ATTACHED PARTS		
	210–1011–00			1		WASHER,FLAT:0.13 ID X 0.375 OD X 0.1,NYLON	83309	ORDER BY DESCR
						END ATTACHED PARTS		

Replaceable Mechanical Parts

Fig. & Index No.	Tektronix Part No.	Serial Number Effective	Serial Number Dscont	Qty	12345	Name & Description	Mfr. Code	Mfr. Part No.
–57	131–6014–00			1		CA ASSY,CRT:DISCRETE,ANODE LEAD,CRT,1,22 AWG,30KV,UL3239,58MM DIA A NODE X 1.9 L,0.125 LEAD	20093	131–6014–00
						STANDARD ACCESSORIES		
	070–8222–05			1		MANUAL,TECH:INSTR,1705A	80009	070–8222–05
	150–0168–00			3		LAMP,INCAND:14V,0.08A,WEDGE BASE,T1.75 FOR SKT MT	80009	150–0168–00
	159–0021–00			1		FUSE,CARTRIDGE:3AG,2A,250V,FAST BLOW	75915	312 002
–58	161–0216–00		B041072	1		CA ASSY,PWR,:3,18 AWG,2.5M L,BLACK	80126	C7120–25M–BL
–58	211–0720–00	B041073		1		SCREW,MACHINE:6–32 X 0.75 HEX,STL, CAD PL		
–59	343–0013–00	B041073		1		CLAMP,LOOP:0.375 ID,PLASTIC,SAFETY CONTROLLED		
–60	161–0216–00	B041073		1		CA ASSY,PWR,:3,18 AWG,2.5M L,BLACK (STANDARD ONLY)	80126	C7120–25M–BL
						OPTIONAL ACCESSORIES		
	161–0215–00			1		CA ASSY,PWR,:3,0.75MU,2.5MM L,GREY (EUROPEAN OPTION A1 ONLY)	80009	161–0215–00
	161–0066–10			1		CA ASSY,PWR: (UNITED KINGDOM OPTION A2 ONLY)	TK1373	24230
	161–0066–11			1		CA ASSY,PWR:3,1.0MM SQ,250V/10A,2.5 METER,STR,IEC320,RCPT,AUSTRALIA,SAF CONT (AUSTRALIAN OPTION A3 ONLY)	80009	161–0066–11
	161–0066–12			1		CA ASSY,PWR:3,18 AWG,250V/10A,98 INCH,STR,IEC320,RCPT X NEMA 6–15P,US,SAF CONT (NORTH AMERICAN OPTION A4 ONLY)	70903	CH–77893
	161–0212–00			1		CA ASSY,PWR:3,1.0MM SQ,220V,2.5 METERS (SWISS OPTION A5 ONLY)	TK1179	865420000
	016–0475–00			1		VIEWING HOOD:	80009	016–0475–00
	103–0158–00			1		ADAPTER,CONN:BNC FEM TO F SERIES MALE	80009	103–0158–00
	200–3897–01			1		COVER,FRONT:1700F02,HOT STAMPED	80009	200–3897–01
	——— ———			1		CAMERA,SCOPE:C9 (OPTION 20 ONLY)		
	——— ———			1		PLAIN CASE:1700F00		
	——— ———			1		PTD CASE ASSY:1700F02		
	——— ———			1		RACK ADAPTER:1700F05		
	——— ———			1		FILLER PANEL:1700F06		
	——— ———			1		DRAWER,UTILITY:1700F07		

FIG. 1 EXPLODED VIEW



1705A Spectrum Monitor