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JAN SVANTERSON

TEKTRONIX®

L1

50-OHM

PLUG-IN MODULE

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

INSTRUCTION MANUAL

070-1957-00

Serial Number _____

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WARRANTY

All TEKTRONIX instruments are warranted against defective materials and workmanship for one year. Any questions with respect to the warranty should be taken up with your TEKTRONIX Field Engineer or representative.

All requests for repairs and replacement parts should be directed to the TEKTRONIX Field Office or representative in your area. This will assure you the fastest possible service. Please include the instrument Type Number or Part Number and Serial Number with all requests for parts or service.

Specifications and price change privileges reserved.

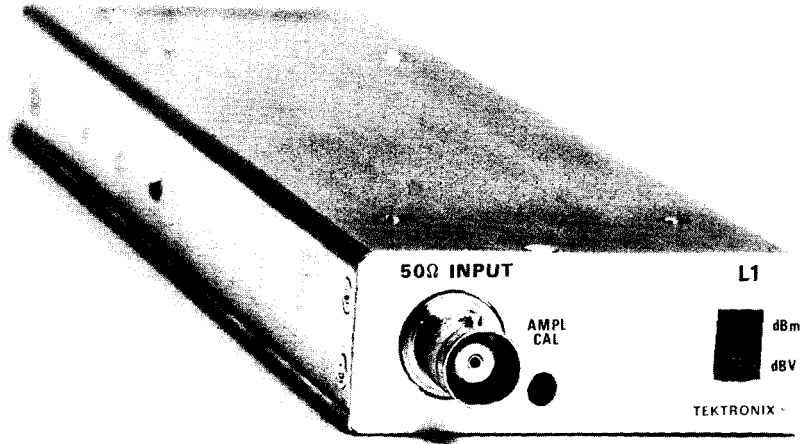
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TABLE OF CONTENTS

| SECTION 1 | SPECIFICATIONS | Page |
|------------------|-------------------------------|-------------|
| | Electrical Characteristics | 1-1 |
| | Accessories | 1-3 |
| SECTION 2 | OPERATING INSTRUCTIONS | |
| | Front Panel Controls | 2-1 |
| | Initial Calibration | 2-2 |
| | Using the Analyzer | 2-3 |
| SECTION 3 | CIRCUIT DESCRIPTION | |
| | Schematic Diagram | 3-2 |
| SECTION 4 | MAINTENANCE | |
| | Repackaging for Shipment | 4-1 |
| SECTION 5 | PARTS LIST | |
| | Electrical | 5-1 |
| | Exploded View | 5-7 |
| | Mechanical Parts List | 5-8 |



L1

Fig. 1-1. L1 50 Ω plug-in module.

1957-1

SPECIFICATIONS

GENERAL INFORMATION AND SPECIFICATIONS

Introduction

Abbreviations used in the text of this manual are in accord with ANSI Y1.1—1972 Standard. Graphic symbols used to illustrate diagrams comply with ANSI Y32.2—1970 Standard. Copies of these publications can be obtained from the American National Standards Institute, 345 E. 47th Street, New York, N.Y. 10017.

Description

The L1 Plug-In Module is one of a series of modules that are used in conjunction with the 7L5 Spectrum Analyzer to provide it with various front end capabilities including a selectable input impedance. The L1 module provides a 50 ohm input impedance via the front panel BNC input connector.

ELECTRICAL CHARACTERISTICS

The following electrical characteristics apply when the L1 Plug-In Module, in combination with a 7L5 Spectrum Analyzer, are normally installed in a 7000-Series oscilloscope and after a warm-up of ten minutes or more.

Intermodulation Distortion

Intermodulation products for two, on-screen, -30 dBm or less signals (within any frequency span) are ≥ 75 dB down for third order products and ≥ 72 dB down for second order products.

Second and third order intermodulation products for two, on-screen, -40 dBm or less signals (within any frequency span) are at least 80 dB down.

With the INPUT BUFFER switch on, second and third order intermodulation products for any two, on-screen signals within any frequency span, are at least 80 dB down.

Sensitivity

The following tabulation of input noise for each resolution bandwidth is measured with: 1) an L1 Plug-In Module installed; 2) the INPUT BUFFER off; 3) the VIDEO PEAK/AVG at max cw position; and 4) the TIME/DIV set to 10 seconds.

| Resolution Bandwidth | Equivalent Input Noise (equal to or less than) |
|----------------------|--|
| 10 Hz | -135 dBm |
| 30 Hz | -133 dBm |
| 100 Hz | -130 dBm |
| 300 Hz | -125 dBm |
| 1 kHz | -120 dBm |
| 3 kHz | -115 dBm |
| 10 kHz | -110 dBm |
| 30 kHz | -105 dBm |

NOTE

Sensitivity is degraded an additional 8 dB when the INPUT BUFFER is on (illuminated); e.g., at 3 kHz, the equivalent input noise would be -107 dBm instead of -115 dBm. Noise level will increase by approximately 10 dB when operation is in the Video Peak mode.

Residual Response

Internally generated spurious signals are -130 dBm or less (referred to the input mixer).

Display Flatness

Maximum peak to peak amplitude variation over any frequency span is 0.5 dB plus quantization error if digital storage is used (see 7L5 specifications).

Reference Level

In log mode, reference level refers to the top horizontal graticule line and is calibrated in 1 dB and 10 dB steps.

Range in the LOG 2 dB/div mode:
-125 dBm/-138 dBV to +21 dBm/+8 dBV.

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Range in the LOG 10 dB/div mode: -70 dBm/ -83 dBV to $+21$ dBm/ $+8$ dBV.

Accuracy (when calibrated @ -40 dBV): Within 0.20 dB/dB to a maximum of 0.25 dB/ 10 dB change in reference level.

With operation in LIN mode, reference level calibration range is from 20 nV/div to 200 mV/div, within 5% , in a 1-2-5 sequence. A variable reference level control, VAR, can be used to increase the display amplitude by ≥ 8 dB.

NOTE

A > sign is displayed adjacent to the reference level readout when the reference level is not calibrated due to an incompatible selection of the REFERENCE LEVEL, FREQUENCY SPAN/DIV and TIME/DIV controls.

Input Characteristics

The INPUT connector of the L1 is the input connector for the 7L5 Spectrum Analyzer. Input impedance for the L1 Plug-In Module is nominally 50 ohms.

Maximum Input Levels

Absolute maximum input power is 21 dBm (2.5 V rms) for all reference levels equal to or greater than 0 dBm (or

50 mV/div in LIN) and $+10$ dBm (0.7 V rms) maximum for all reference levels below 0 dBm.

CAUTION

The application of any dc voltage to the INPUT connector on the L1 can cause permanent damage to the mixer circuit.

ENVIRONMENTAL CHARACTERISTICS

The L1 Plug-In Module will meet the foregoing electrical characteristics when installed in a 7L5 Spectrum Analyzer within the environmental limits of a 7000-Series oscilloscope. Complete details on environmental test procedures including failure criteria etc., can be obtained from your local Tektronix Field Office or representative.

ACCESSORIES

Standard Accessories

Manual Instruction 070-1957-00

Optional Accessories

Attenuator, step, 50 ohm 2701

OPERATING INSTRUCTIONS

Introduction

The L1 Plug-In Module operates with a Tektronix 7L5 Spectrum Analyzer to provide it with a 50 ohm input impedance and other front end capabilities.

This section of the manual contains installation instructions for the L1 plug-in, describes the function of its front panel controls and connectors and includes general operating information such as initial calibration and signal application.

Installation

Visually inspect the 7L5 plug-in cavity to verify the absence of any obstruction such as misplaced internal cables or packing materials such as cardboard or styrofoam. Carefully inspect the L1 module to ensure that the cover plate is properly fastened with no protruding screw heads.



Never install the L1 Plug-In Module without its cover plate. The metal grounding fingers within the 7L5 cavity will catch and be severely damaged when the plug-in is removed.

Align the L1 module in front of the 7L5 plug-in aperture with its edge card connector to the rear and the dBV/dBm switch to the right. Carefully slide the L1 into the 7L5 plug-in cavity and apply a steady pressure to the L1 front panel until its rear connector is firmly seated and its front panel is approximately flush with the 7L5 front panel.

FRONT PANEL CONTROLS AND CONNECTORS

AMPL CAL

The AMPL CAL control is a potentiometer that is adjusted during the Operational Check to calibrate the full screen reference level. This control is used to compensate

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for gain differences in the RF and IF portions of the instrument. The AMPL CAL control should be adjusted or checked for proper setting each time the L1 Plug-In Module is installed in a 7L5.

dBm/dBV

The dBm/dBV control is used to select the reference level scale factor; decibels with respect to one 1 milliwatt or decibels with respect to 1 volt.

50 Ω INPUT

The 50 Ω INPUT is a panel mounted, coaxial, female connector that accomodates all BNC male coaxial connectors. This input connector has a nominal 50 ohm impedance from dc to greater than 5 MHz.

Initial Calibration

The following adjustments and verifications ensure deflection sensitivity correlation between the L1 Plug-In Module, the 7L5 Spectrum Analyzer and the mainframe oscilloscope. The following steps should be completed each time the L1 is installed in a 7L5 and each time the 7L5 is turned on.

a. With the L1 installed in a 7L5 and the 7L5 installed in a mainframe oscilloscope, apply ac power and allow a 10 minute warmup.

b. Select mainframe Vertical Mode, Horizontal Mode, and Trigger Source (RIGHT or LEFT) to correspond with plug-in compartments occupied by the 7L5.

c. Connect the 7L5 CALIBRATOR signal to the 50 Ω INPUT connector on the L1 front panel with a short length of coaxial cable.

d. Set the FREQUENCY SPAN/DIV to 2 kHz, RESOLUTION to 3 kHz, TIME/DIV to .2 s and switch the DISPLAY A and DISPLAY B display processing selectors on. Adjust the VERT POSITION to place the display on the bottom horizontal graticule line.

e. Adjust the REFERENCE LEVEL to -40 dBV and set the DOT FREQUENCY to 500.00 kHz. Select the LOG 10 dB/DIV pushbutton and adjust the 7L5 LOG CAL control for a full screen (8-division) display.

f. Select the LOG 2 dB/DIV display and adjust the L1 AMPL CAL control for a full screen display.

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g. Repeat steps e and f until the displayed waveform is 8 vertical divisions in both the 10 dB/DIV and 2 dB/DIV modes. (Refer to Figure 2-1, Log Amplifier Calibration Composite Waveform.)

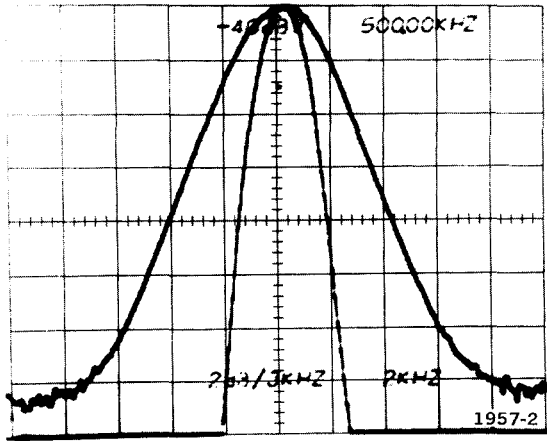


Fig. 2-1. Initial calibration waveform.

USING THE ANALYZER

Impedance Matching

Input impedance of the 7L5 Spectrum Analyzer is determined by the Plug-In Module that is installed. Plug-In Modules include a 50 ohm module (L1) and a 75 ohm module (L2). Impedance mismatch between a signal source and the modules' input connector causes reflec-

tions or standing waves in the interconnecting transmission line. Standing waves at the input connector may cause amplitude errors in the display and an overall degraded performance of the analyzer. To minimize the probability of an impedance mismatch, all cables and transmission lines fastened to the input connector should have the same impedance as the Plug-In Module. All cables used should be of minimum length, and of good quality with connector center conductors not worn, protruding or recessed. Degraded display caused by impedance mismatch may be improved by selecting the 7L5's INPUT BUFFER control.

Signal Amplitude

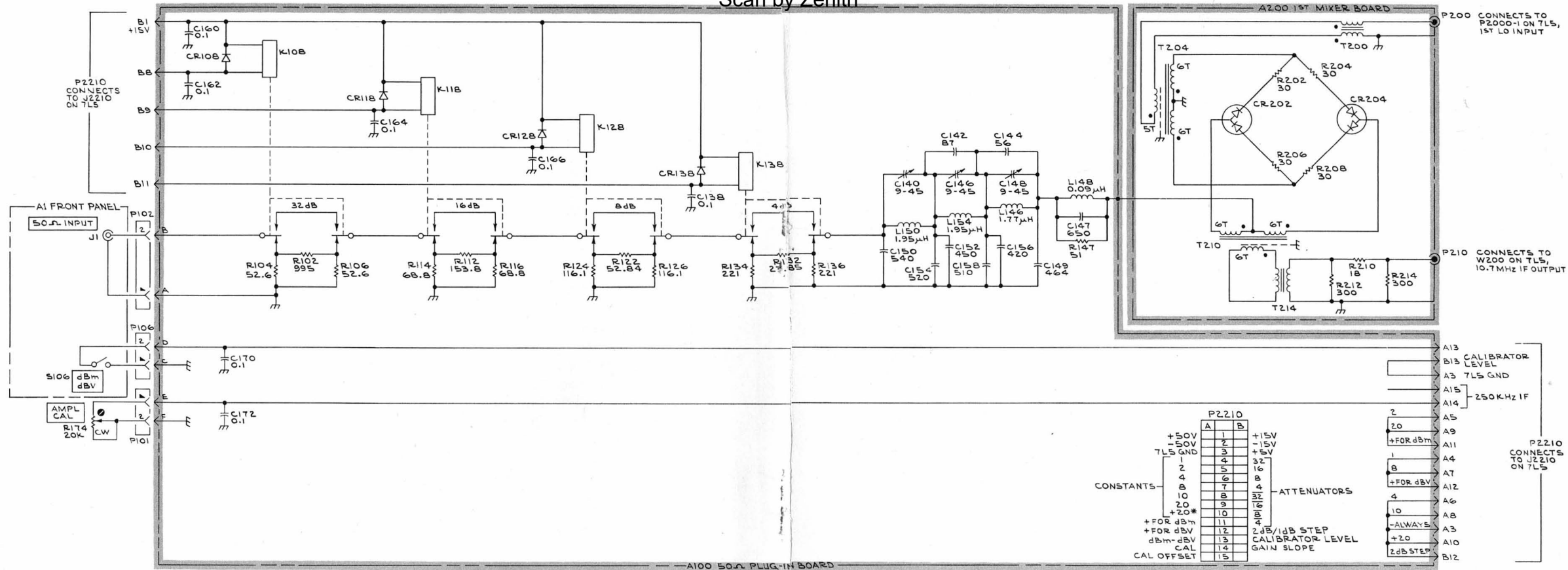
High amplitude signals (above 21 dBm or 2.5 V rms will overload and damage the mixer circuit and should not be applied to the input connector. Signals of unknown amplitude should be routed through a series attenuator. If spurious or multitone intermodulation signals are present in the display, or if saturation of the mixer is suspected, the 7L5 INPUT BUFFER can be selected. This control adds 8 dB of attenuation in series with the input signal. If the displayed signals show little or no change with the buffer on, the intermodulation or spurious signals are being generated prior to the spectrum analyzer input. If the displayed signals decrease in amplitude, they are being generated within the analyzer (probably as a result of excessive input signal amplitude).

CIRCUIT DESCRIPTION

Signals are input to the L1 Plug-In Module via a front panel, female BNC connector. Input impedance at this connector is 50 ohms. Input signals are fed directly to a series connected, four section, pi-type signal attenuator. An attenuator section is removed from the input signal path when any one of four, 15 volt SPDT relays (K108, K118, K128, K138) are actuated. In the deenergized position of each relay, a precision section attenuator reduces input signal amplitude by a precise amount; 32 dB, 16 dB, 8 dB, or 4 dB. Individual relays are actuated by a logic zero (connection to ground) from the spectrum analyzer reference level subsystem. To protect the L1 mixer circuit, the 7L5 turn-on logic circuit ensures that these relays maintain the deenergized state when ac power is reapplied to the 7L5 or when no ac power is applied.

Input signals from the signal attenuator are routed to a 5 MHz low pass filter that attenuates input signals above 5 MHz. Rolloff in this LC filter starts slightly above this limit and the "first zero" (approximately -110 dB) is at 10.7 MHz. Input signals, passed by this filter, are fed to the center tap of T210 which forms part of a double balanced mixer circuit. A signal from the 7L5 first LO is mixed with input signals from the low pass filter in the mixer's bridge circuit. The first LO signal from the 7L5 enters the L1 module at coaxial connector P200 and is coupled to the mixer via Balun transformer, T200. The 10.7 MHz mixer output signal at the secondary of T210 is coupled through T214 and through a pi-connected 3 dB attenuator pad to the output coaxial connector P210.

The +5 V, -15 V, +50 V, and -50 V supplies are available on pins of connector P2 but are not used in the L1 plug-in module.



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MAINTENANCE

Standard Maintenance

There are no special maintenance requirements for the L1 Plug-In Module. Standard maintenance procedures as listed in the Maintenance section of the 7L5 Instruction Manual are applicable to the plug-in.

Calibration

To adjust C140, C146 and C148:

a. With the L1 normally installed in a 7L5 Spectrum Analyzer, apply a 10.7 MHz, cw signal at an input level of approximately +10 dBm from a signal generator (such as the Tektronix SG 503 with TM 500 Series) to the 50 Ω INPUT connector.

b. Sequentially adjust C140, C146 and C148 for a minimum baseline rise of the 7L5 display.

Repackaging for Shipment

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

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

1. Obtain a carton of corrugated cardboard having inside dimensions of no less than six inches more than the instrument dimensions; this will allow for cushioning. Refer to Table 1 for carton test strength requirements.

2. Surround the instrument with polyethylene sheeting to protect the finish of the instrument.

3. Cushion the instrument on all sides by tightly packing dunnage or urethane foam between carton and instrument, allowing three inches on all sides.

4. Seal carton with shipping tape or industrial stapler.

TABLE 1
Shipping Carton Test Strength

| Gross Weight (lb) | Carton Test Strength (lb) |
|-------------------|---------------------------|
| 0 — 10 | 200 |
| 10 — 30 | 275 |
| 30 — 120 | 375 |
| 120 — 140 | 500 |
| 140 — 160 | 600 |

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REPLACEABLE PARTS

PARTS ORDERING INFORMATION

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

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

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

FIGURE AND INDEX NUMBERS

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

ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentation system used in the description column.

| 1 | 2 | 3 | 4 | 5 | Name & Description |
|---|---|---|---|---|--|
| | | | | | <i>Assembly and/or Component</i> |
| | | | | | <i>Attaching parts for Assembly and/or Component</i> |
| | | | | | --- * --- |
| | | | | | <i>Detail Part of Assembly and/or Component</i> |
| | | | | | <i>Attaching parts for Detail Part</i> |
| | | | | | --- * --- |
| | | | | | <i>Parts of Detail Part</i> |
| | | | | | <i>Attaching parts for Parts of Detail Part</i> |
| | | | | | --- * --- |

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation. The separation symbol --- * --- indicates the end of attaching parts.

Attaching parts must be purchased separately, unless otherwise specified.

ABBREVIATIONS

| | | | | | | | |
|-------|--------------------|---------|-----------------------|----------|----------------------|----------|-----------------|
| " | INCH | ELCTRN | ELECTRON | IN | INCH | SE | SINGLE END |
| # | NUMBER SIZE | ELEC | ELECTRICAL | INCAND | INCANDESCENT | SECT | SECTION |
| ACTR | ACTUATOR | ELOTLT | ELECTROLYTIC | INSUL | INSULATOR | SEMICOND | SEMICONDUCTOR |
| ADPTR | ADAPTER | ELEM | ELEMENT | INTL | INTERNAL | SHLD | SHIELD |
| ALIGN | ALIGNMENT | EPL | ELECTRICAL PARTS LIST | LPHLDR | LAMPHOLDER | SHLDR | SHOULDERED |
| AL | ALUMINUM | EQPT | EQUIPMENT | MACH | MACHINE | SKT | SOCKET |
| ASSEM | ASSEMBLED | EXT | EXTERNAL | MECH | MECHANICAL | SL | SLIDE |
| ASSY | ASSEMBLY | FIL | FILLISTER HEAD | MTG | MOUNTING | SLFLKG | SELF-LOCKING |
| ATTEN | ATTENUATOR | FLEX | FLEXIBLE | NIP | NIPPLE | SLVG | SLEEVING |
| AWG | AMERICAN WIRE GAGE | FLH | FLAT HEAD | NON WIRE | NOT WIRE WOUND | SPR | SPRING |
| BD | BOARD | FLTR | FILTER | OBD | ORDER BY DESCRIPTION | SQ | SQUARE |
| BRKT | BRACKET | FR | FRAME or FRONT | OD | OUTSIDE DIAMETER | SST | STAINLESS STEEL |
| BR5 | BRASS | FSTNR | FASTENER | OVH | OVAL HEAD | STL | STEEL |
| BRZ | BRONZE | FT | FOOT | PH BRZ | PHOSPHOR BRONZE | SW | SWITCH |
| BSHG | BUSHING | FXD | FIXED | PL | PLAIN or PLATE | T | TUBE |
| CAB | CABINET | GSKT | GASKET | PLSTC | PLASTIC | TERM | TERMINAL |
| CAP | CAPACITOR | HDL | HANDLE | PN | PART NUMBER | THD | THREAD |
| CER | CERAMIC | HEX | HEXAGON | PNH | PAN HEAD | THK | THICK |
| CHAS | CHASSIS | HEX HD | HEXAGONAL HEAD | PWR | POWER | TNSN | TENSION |
| CKT | CIRCUIT | HEX SOC | HEXAGONAL SOCKET | RCPT | RECEPTACLE | TPG | TAPPING |
| COMP | COMPOSITION | HLCPS | HELICAL COMPRESSION | RES | RESISTOR | TRH | TRUSS HEAD |
| CONN | CONNECTOR | HLEXT | HELICAL EXTENSION | RGD | RIGID | V | VOLTAGE |
| COV | COVER | HV | HIGH VOLTAGE | RLF | RELIEF | VAR | VARIABLE |
| CPLG | COUPLING | IC | INTEGRATED CIRCUIT | RTNR | RETAINER | W/ | WITH |
| CRT | CATHODE RAY TUBE | ID | INSIDE DIAMETER | SCH | SOCKET HEAD | WSHR | WASHER |
| DEG | DEGREE | IDENT | IDENTIFICATION | SCOPE | OSCILLOSCOPE | XFMR | TRANSFORMER |
| DWR | DRAWER | IMPLR | IMPELLER | SCR | SCREW | XSTR | TRANSISTOR |

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

| Mfr. Code | Manufacturer | Address | City, State, Zip |
|-----------|--|-----------------------------|--------------------------|
| 0000A | Lemo USA | 2015 2nd St. | Berkley, CA 94710 |
| 00779 | AMP, Inc. | P. O. Box 3608 | Harrisburg, PA 17105 |
| 00853 | Sangamo Electric Co., S. Carolina Div. | P. O. Box 128 | Pickens, SC 29671 |
| 01121 | Allen-Bradley Co. | 1201 2nd St. South | Milwaukee, WI 53204 |
| 07910 | Teledyne Semiconductor | 12515 Chadron Ave. | Hawthorne, CA 90250 |
| 12360 | Albany Products Co., Div. of Pneumo Dynamics Corp. | 351 Connecticut Ave. | South Norwalk, CT 06856 |
| 14655 | Cornell-Dubilier Electronics Div. of Federal Pacific Electric Co., Govt. Contracts Dept. | 150 Ave. L. | Newark, NJ 07101 |
| 22526 | Berg Electronics, Inc. | Youk Expressway | New Cumberland, PA 17070 |
| 23499 | Gavitt Wire and Cable, Division of Amerace Esna Corp. | 455 N. Quince St. | Escondido, CA 92025 |
| 70276 | Allen Mfg. Co. | P. O. Drawer 570 | Hartford, CT 06101 |
| 71159 | Bristol Socket Screw, Div. of American Chain and Cable Co., Inc. | P. O. Box 2244 | Waterbury, CT 06720 |
| 72136 | Electro Motive Mfg. Co., Inc., The | South Park and John Streets | Willimantic, CT 06226 |
| 72982 | Erie Technological Products, Inc. | 644 W 12th Street | Erie, PA 16512 |
| 73743 | Fischer Special Mfg. Co. | 446 Morgan St. | Cincinnati, OH 45206 |
| 75042 | TRW Electronic Components, IRC Fixed Resistors, Philadelphia Division | 401 N. Broad St. | Philadelphia, PA 19108 |
| 78189 | Illinois Tool Works, Inc. Shakeproof Division | St. Charles Road | Elgin, IL 60126 |
| 80009 | Tektronix, Inc. | P. O. Box 500 | Beaverton, OR 97005 |
| 83385 | Central Screw Co. | 2530 Crescent Dr. | Broadview, IL 60153 |
| 91637 | Dale Electronics, Inc. | P. O. Box 609 | Columbus, NB 68601 |

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| Ckt No. | Tektronix | Serial/Model No. | | Name & Description | Mfr | Mfr Part Number | |
|---------|-------------|------------------|--------|----------------------------------|-------|-----------------|------|
| | Part No. | Eff | Dscont | | Code | | |
| A100 | 670-3600-00 | | | CKT BOARD ASSY:50 OHM ATTENUATOR | 80009 | 670-3600-00 | |
| A200 | 670-3913-00 | | | CKT BOARD ASSY:FIRST MIXER | 80009 | 670-3913-00 | |
| C140 | 281-0167-00 | | | CAP.,VAR,CER DI:9-45PF,200V | 72982 | 538-011-D | 9-45 |
| C142 | 283-0632-00 | | | CAP.,FXD,MICA D:87PF,1%,100V | 00853 | D151E870F0 | |
| C144 | 283-0639-00 | | | CAP.,FXD,MICA D:56PF,1%,100V | 00853 | D151E560F0 | |
| C146 | 281-0167-00 | | | CAP.,VAR,CER DI:9-45PF,200V | 72982 | 538-011-D | 9-45 |
| C147 | 283-0691-00 | | | CAP.,FXD,MICA D:650PF,1%,300V | 72136 | DM15F651F0300 | |
| C148 | 281-0167-00 | | | CAP.,VAR,CER DI:9-45PF,200V | 72982 | 538-011-D | 9-45 |
| C149 | 283-0688-00 | | | CAP.,FXD,MICA DI:464PF,1%,300V | 14655 | CD15FC(464)F03 | |
| C150 | 283-0660-00 | | | CAP.,FXD,MICA D:510PF,2%,500V | 00853 | D155F511G0 | |
| C152 | 283-0622-00 | | | CAP.,FXD,MICA D:450PF,1%,300V | 00853 | D153F451F0 | |
| C154 | 283-0596-00 | | | CAP.,FXD,MICA D:528PF,1%,300V | 00853 | D153F5280F0 | |
| C156 | 283-0667-00 | | | CAP.,FXD,MICA D:420PF,1%,500V | 00853 | D155F421F0 | |
| C158 | 283-0660-00 | | | CAP.,FXD,MICA D:510PF,2%,500V | 00853 | D155F511G0 | |
| C160 | 283-0111-00 | | | CAP.,FXD,CER DI:0.1UF,20%,50V | 72982 | 8131N075651104M | |
| C162 | 283-0111-00 | | | CAP.,FXD,CER DI:0.1UF,20%,50V | 72982 | 8131N075651104M | |
| C164 | 283-0111-00 | | | CAP.,FXD,CER DI:0.1UF,20%,50V | 72982 | 8131N075651104M | |
| C166 | 283-0111-00 | | | CAP.,FXD,CER DI:0.1UF,20%,50V | 72982 | 8131N075651104M | |
| C168 | 283-0111-00 | | | CAP.,FXD,CER DI:0.1UF,20%,50V | 72982 | 8131N075651104M | |
| C170 | 283-0111-00 | | | CAP.,FXD,CER DI:0.1UF,20%,50V | 72982 | 8131N075651104M | |
| C172 | 283-0111-00 | | | CAP.,FXD,CER DI:0.1UF,20%,50V | 72982 | 8131N075651104M | |

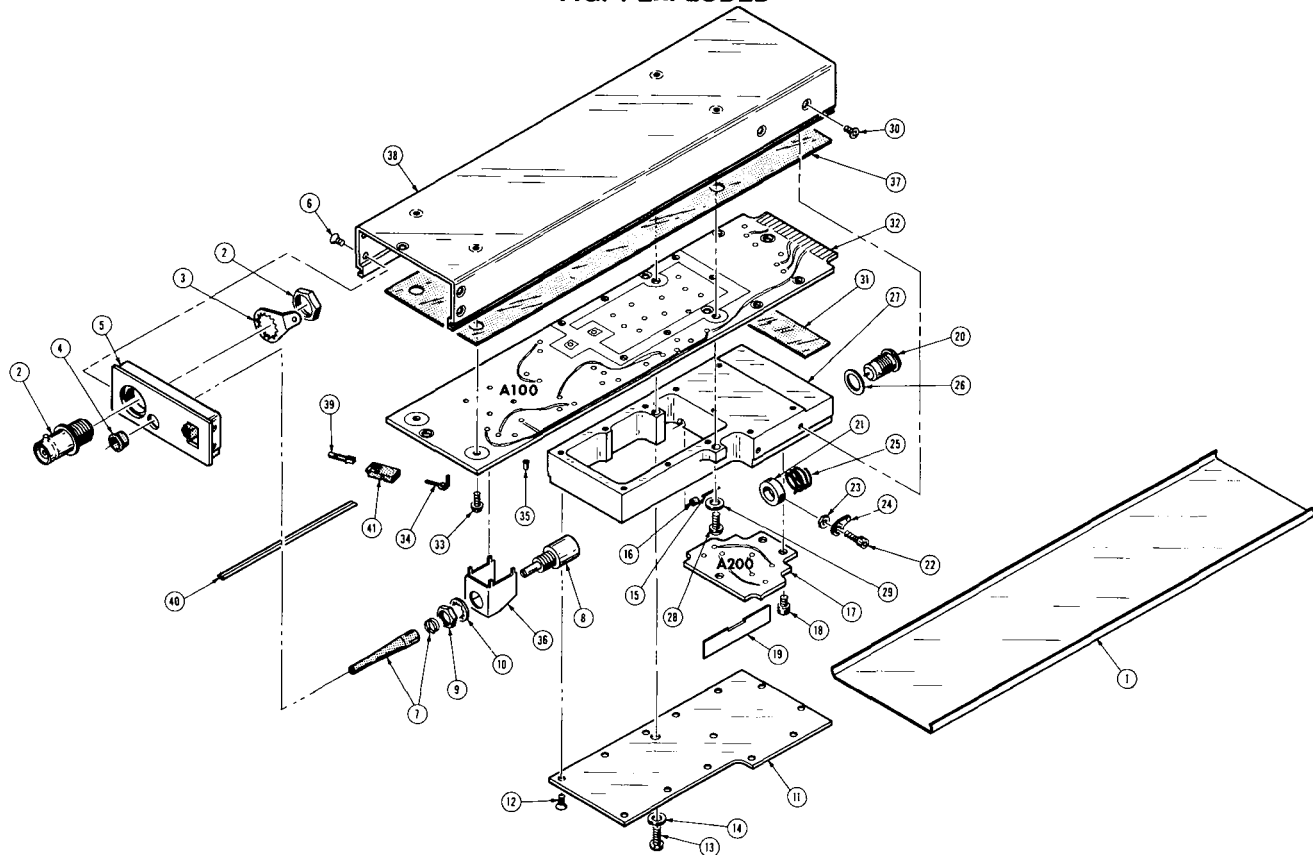
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| Ckt No. | Tektronix Part No. | Serial/Model No. Eff Dscont | Name & Description | Mfr Code | Mfr Part Number |
|---------|--------------------|--------------------------------|--------------------------------------|----------|-----------------|
| CR108 | 152-0141-02 | | SEMICON D DEVICE:SILICON,30V,150MA | 07910 | 1N4152 |
| CR118 | 152-0141-02 | | SEMICON D DEVICE:SILICON,30V,150MA | 07910 | 1N4152 |
| CR128 | 152-0141-02 | | SEMICON D DEVICE:SILICON,30V,150MA | 07910 | 1N4152 |
| CR138 | 152-0141-02 | | SEMICON D DEVICE:SILICON,30V,150MA | 07910 | 1N4152 |
| CR202 | 152-0646-00 | B010100 B020299 | SEMICON D VC UN:SI,PAIR,MIXER | 80009 | 152-0646-00 |
| CR202 | 152-0646-02 | B020300 | SEMICON D VC UN:SI,PAIR,MIXER | 80009 | 152-0646-02 |
| CR204 | 152-0646-00 | B010100 B020299 | SEMICON D VC UN:SI,PAIR,MIXER | 80009 | 152-0646-00 |
| CR204 | 152-0646-02 | B020300 | SEMICON D VC UN:SI,PAIR,MIXER | 80009 | 152-0646-02 |
| K108 | 148-0088-00 | | RELAY,ARMATURE:DPDT,120MW | 80009 | 148-0088-00 |
| K118 | 148-0088-00 | | RELAY,ARMATURE:DPDT,120MW | 80009 | 148-0088-00 |
| K128 | 148-0088-00 | | RELAY,ARMATURE:DPDT,120MW | 80009 | 148-0088-00 |
| K138 | 148-0088-00 | | RELAY,ARMATURE:DPDT,120MW | 80009 | 148-0088-00 |
| L146 | 108-0825-00 | | COIL,RF:1.77UF TOROIDAL IDCTR | 80009 | 108-0825-00 |
| L148 | 108-0620-00 | | COIL,RF:90NH | 80009 | 108-0620-00 |
| L150 | 108-0826-00 | | COIL,RF:FIXED,1.95MH TOROIDAL IDCTR | 80009 | 108-0826-00 |
| L154 | 108-0826-00 | | COIL,RF:FIXED,1.95MH TOROIDAL IDCTR | 80009 | 108-0826-00 |
| R102 | 321-1665-03 | | RES.,FXD,FILM:995 OHM,0.25%,0.125W | 91637 | MFF1816D995ROC |
| R104 | 322-1600-03 | | RES.,FXD,FILM:52.6 OHM,0.25%,0.25W | 91637 | MFF1421D52R60C |
| R106 | 321-1668-03 | | RES.,FXD,FILM:52.6 OHM,0.25%,0.125W | 91637 | MFF1816D52R60C |
| R112 | 321-1666-03 | | RES.,FXD,FILM:153.8 OHM,0.25%,0.125W | 91637 | MFF1816D153RBC |
| R114 | 321-1664-03 | | RES.,FXD,FILM:68.8 OHM,0.25%,0.125W | 91637 | MFF1816068R80C |
| R116 | 321-1664-03 | | RES.,FXD,FILM:68.8 OHM,0.25%,0.125W | 91637 | MFF1816068R80C |

Scan by Zenith

| Ckt No. | Tektronix Part No. | Serial/Model No. Eff | Dscont | Name & Description | Mfr Code | Mfr Part Number |
|---------|--------------------|----------------------|--------|--------------------------------------|----------|-----------------|
| R122 | 321-1670-03 | | | RES.,FXD,FILM:52.84 OHM,0.25%,0.125W | 91637 | MFF1816D52R84C |
| R124 | 321-1667-03 | | | RES.,FXD,FILM:116.1 OHM,0.25%,0.125W | 91637 | MFF1816D116R1C |
| R126 | 321-1667-03 | | | RES.,FXD,FILM:116.1 OHM,0.25%,0.125W | 91637 | MFF1816D116R1C |
| R132 | 321-1663-03 | | | RES.,FXD,FILM:23.85 OHM,0.25%,0.125W | 91637 | LMF1816D23R85C |
| R134 | 321-0130-03 | | | RES.,FXD,FILM:221 OHM,0.25%,0.125W | 91637 | MFF1816D221R0C |
| R136 | 321-0130-03 | | | RES.,FXD,FILM:221 OHM,0.25%,0.125W | 91637 | MFF1816D221R0C |
| R174 | 311-1712-00 | | | RES.,VAR,NONWW:PNL,20K OHM,1W | 01121 | SPSG04052034A |
| R202 | 321-0702-00 | | | RES.,FXD,FILM:30 OHM,0.25%,0.125W | 75042 | CEAT2-30R00C |
| R204 | 321-0702-00 | | | RES.,FXD,FILM:30 OHM,0.25%,0.125W | 75042 | CEAT2-30R00C |
| R206 | 321-0702-00 | | | RES.,FXD,FILM:30 OHM,0.25%,0.125W | 75042 | CEAT2-30R00C |
| R208 | 321-0702-00 | | | RES.,FXD,FILM:30 OHM,0.25%,0.125W | 75042 | CEAT2-30R00C |
| R210 | 317-0180-00 | | | RES.,FXD,CMPSN:18 OHM,5%,0.125W | 01121 | BB1805 |
| R212 | 317-0301-00 | | | RES.,FXD,CMPSN:300 OHM,5%,0.125W | 01121 | BB3015 |
| R214 | 317-0301-00 | | | RES.,FXD,CMPSN:300 OHM,5%,0.125W | 01121 | BB3015 |
| T200 | 120-0445-00 | | | XFMR,TOROID:8 TURNS,BIFILAR | 80009 | 120-0445-00 |
| T204 | 120-1019-00 | | | XFMR,TOROID:3 TURNS,TRIFILAR | 80009 | 120-1019-00 |
| T210 | 120-1019-00 | | | XFMR,TOROID:3 TURNS,TRIFILAR | 80009 | 120-1019-00 |
| T214 | 120-1035-00 | | | XFMR,TOROID:4 TURN PRIM/5 TURN SEC | 80009 | 120-1035-00 |

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FIG. 1 EXPLODED



Scan by Zenith

| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff | Dscnt | Qty | 1 2 3 4 5 | Name & Description | Mfr | |
|------------------------|-----------------------|-------------------------|-------|-----|-----------|---|-------|------------------|
| | | | | | | | Code | Mfr Part Number |
| 1-1 | 337-2101-00 | | | 1 | | SHIELD,ELEC:RF PLUG-IN CVR | 80009 | 337-2101-00 |
| -2 | 131-0955-01 | | | 1 | | CONN,RCPT,ELEC:BNC,W/HARDWARE | 80009 | 131-0955-01 |
| -3 | 210-0255-00 | | | 1 | | TERMINAL,LUG:0.391" ID INT TOOTH | 80009 | 210-0255-00 |
| -4 | 358-0301-00 | | | 1 | | BUSHING,SLEEVE:FOR 0.185 DIA HOLE,GRAY | 80009 | 358-0301-00 |
| -5 | 644-0459-00 | | | 1 | | FRONT PNL ASSY: (ATTACHING PARTS) | 80009 | 644-0459-00 |
| -6 | 211-0087-01 | | | 5 | | SCREW,MACHINE:2-56 X 0.188" 82 DEG,FLH,STL - - - * - - - | 83385 | OBD |
| -7 | 384-1121-00 | | | 1 | | EXTENSION SHAFT:1.41 INCH LONG | 80009 | 384-1121-00 |
| -8 | ----- | | | 1 | | RESISTOR,VAR:(SEE R174 EPL) (ATTACHING PARTS) | | |
| -9 | 210-0583-00 | | | 1 | | NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS | 73743 | 2X20224-402 |
| -10 | 210-0046-00 | | | 1 | | WASHER,LOCK:INTL,0.26 ID X 0.40" OD,STL - - - * - - - | 78189 | 1214-05-00-0541C |
| -11 | 337-2180-00 | | | 1 | | SHIELD,ELEC:MIXER COVER (ATTACHING PARTS) | 80009 | 337-2180-00 |
| -12 | 211-0087-01 | | | 13 | | SCREW,MACHINE:2-56 X 0.188" 82 DEG,FLH,STL | 83385 | OBD |
| -13 | 211-0100-00 | | | 1 | | SCREW,MACHINE:2-56 X 0.750 INCH,PNH STL | 83385 | OBD |
| -14 | 210-1008-00 | | | 1 | | WASHER,FLAT:0.09 ID X 0.188 OD,BRS - - - * - - - | 12360 | OBD |
| -15 | 195-0148-00 | | | 1 | | LEAD,ELECTRICAL:MIXER,0.062" DIA | 80009 | 195-0148-00 |
| -16 | 342-0122-00 | | | 1 | | INSULATOR,STV:CAVITY CONDUCTOR | 80009 | 342-0122-00 |
| -17 | ----- | | | 1 | | CKT BOARD ASSY:FIRST MIXER(SEE A200 EPL) (ATTACHING PARTS) | | |
| -18 | 211-0196-00 | | | 5 | | SCREW,CAP:4-40 X 0.188,SCH,HEX,STL - - - * - - - | 80009 | 211-0196-00 |

Scan by Zenith

| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff | Dscnt | Qty | 1 2 3 4 5 | | | | | Name & Description | Mfr | |
|------------------------|-----------------------|-------------------------|---------|-----|-----------|-----|------|--------|----------------------------|--------------------|-------|--------------|
| | | | | | Code | Mfr | Part | Number | | | | |
| 1- | ----- | ----- | | - | | | | | | | | |
| | | | | | | | | | | | | |
| -19 | 337-2097-00 | | | 1 | | | | | | | 80009 | 337-2097-00 |
| -20 | 131-1604-00 | | | 2 | | | | | | | 0000A | RA00.100.250 |
| | | | | | | | | | (ATTACHING PARTS FOR EACH) | | | |
| -21 | 343-0548-00 | | | 1 | | | | | | | 80009 | 343-0548-00 |
| | ----- | ----- | | - | | | | | | | | |
| | 213-0306-00 | B010100 | B020234 | 2 | | | | | | | 71159 | OBD |
| -22 | 211-0162-00 | B020235 | | 2 | | | | | | | 70276 | OBD |
| -23 | 210-0405-00 | XB020235 | | 2 | | | | | | | 73743 | 2X12157-402 |
| -24 | 210-0259-00 | XB020235 | | 2 | | | | | | | 80009 | 210-0259-00 |
| -25 | 214-2255-00 | | | 1 | | | | | | | 80009 | 214-2255-00 |
| -26 | 210-1228-00 | | | 1 | | | | | | | 80009 | 210-1228-00 |
| | | | | | | | | | - - - * - - - | | | |
| -27 | 337-2179-00 | | | 1 | | | | | | | 80009 | 337-2179-00 |
| | | | | | | | | | (ATTACHING PARTS) | | | |
| -28 | 211-0159-00 | | | 2 | | | | | | | 83385 | OBD |
| -29 | 210-1008-00 | | | 1 | | | | | | | 83385 | OBD |
| -30 | 211-0087-01 | | | 5 | | | | | | | 83385 | OBD |
| | | | | | | | | | - - - * - - - | | | |
| -31 | 342-0281-00 | | | 1 | | | | | | | 80009 | 342-0281-00 |
| -32 | ----- | ----- | | 1 | | | | | | | | |
| | | | | | | | | | | | | |
| -33 | 211-0180-00 | | | 2 | | | | | | | 83385 | OBD |
| | | | | | | | | | - - - * - - - | | | |
| -34 | 131-1425-00 | | | 1 | | | | | | | 22526 | 65275-001 |
| -35 | 136-0252-00 | | | 16 | | | | | | | 00779 | 2-330808-7 |
| -36 | 407-1573-00 | | | 1 | | | | | | | 80009 | 407-1573-00 |

Scan by Zenith

| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff Dscont | Qty | | | | | | Name & Description | Mfr Code | Mfr Part Number | |
|------------------------|-----------------------|--------------------------------|-----|---|---|---|---|---|--|-------------|-----------------|--|
| | | | | 1 | 2 | 3 | 4 | 5 | | | | |
| 1-37 | 342-0312-00 | | 1 | | | | | | INSULATOR, PLATE: INPUT CKT BOARD | 80009 | 342-0312-00 | |
| -38 | 337-2102-00 | | 1 | | | | | | SHIELD, ELEC: RF PLUG-IN WRAPAROUND | 80009 | 337-2102-00 | |
| -39 | 131-0707-00 | | 6 | | | | | | CONTACT, ELEC: 0.48"L, 22-26 AWG WIRE | 22526 | 47439 | |
| -40 | 175-0825-00 | | FT | | | | | | WIRE, ELECTRICAL: 0.833 FT 2 WIRE RIBBON | 23499 | TEK-175-0825-00 | |
| -41 | 352-0169-00 | | 3 | | | | | | CONN BODY, PL, EL: 2 WIRE BLACK | 80009 | 352-0169-00 | |
| ACCESSORIES | | | | | | | | | | | | |
| | 070-1957-00 | | 1 | | | | | | MANUAL, TECH: INSTRUCTION | 80009 | 070-1957-00 | |