

TEKTRONIX®

**L2
75-OHM
PLUG-IN MODULE**

Tektronix, Inc.
P.O. Box 500
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INSTRUCTION MANUAL

070-2018-00

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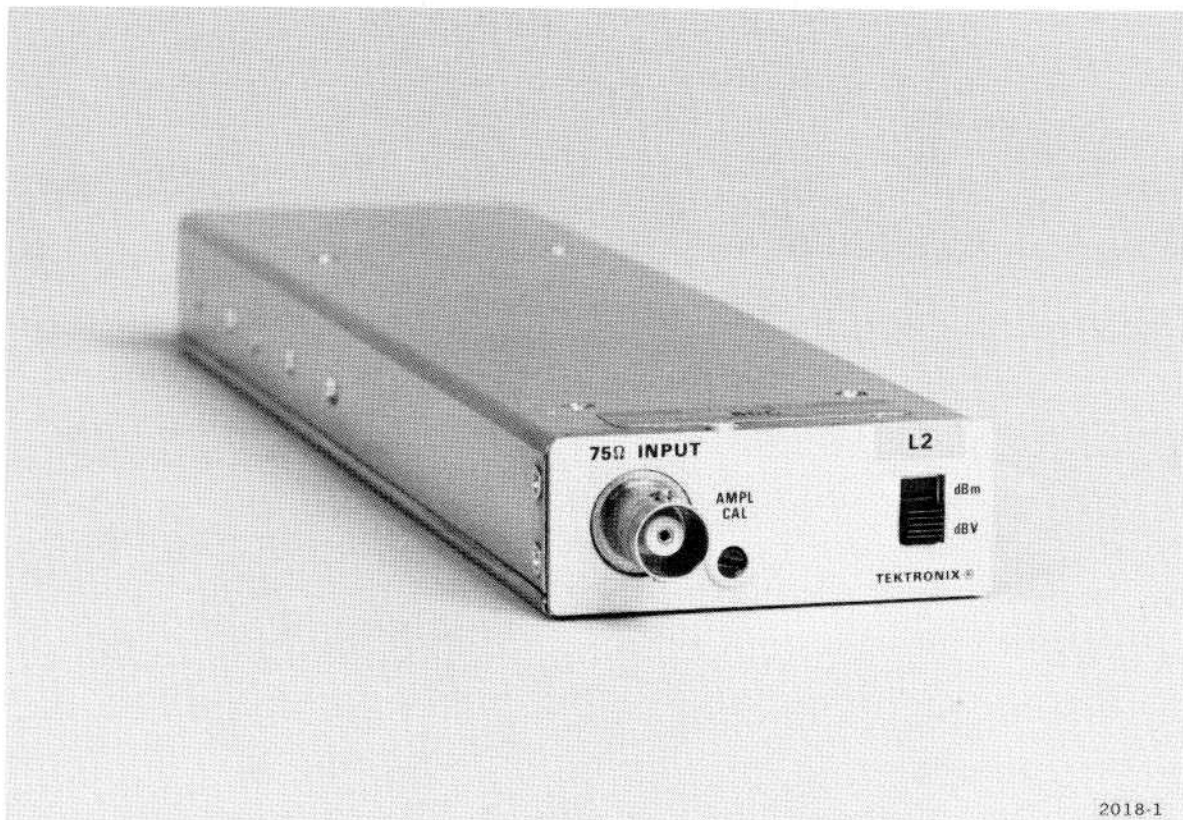
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L-SERIES MANUAL AS AN INTEGRAL PART OF THE 7L5 MANUAL

This manual can be attached to the inside of the back cover for the 7L5 manual using the tape adhesive. If you wish to use a three ring binder for the manuals, attach the L-Series manuals slightly forward of the holes punched in the 7L5 manual.

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2018-1

Fig. 1-1. L2 75 Ω plug-in module.

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 L2 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 L2 module provides a 75 ohm input impedance via the front panel BNC input connector.

ELECTRICAL CHARACTERISTICS

The following electrical characteristics apply when the L2 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 L2 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 the 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: -129 dBm/-139 dBV to +21 dBm/+10 dBV.

Range in the LOG 10 dB/div mode: -70 dBm/-81 dBV to +21 dBm/+10 dBV.

Incremental Accuracy, 1 dB change: Within 0.2 dB for any 1 dB change of reference level with cumulative error of 0.25 dB for any change up to 10 dB.

Incremental Accuracy, 10 dB change: Within 0.25 dB/10 dB for any change of 10 dB or more.

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 L2 is the input connector for the 7L5 Spectrum Analyzer. Input impedance for the L2 Plug-In Module is nominally 75 ohms.

Maximum Input Levels

Absolute maximum input power is 21 dBm (3.07 V rms) for all reference levels equal to or greater than 0 dBm (or 50 mV/div in LIN) and +10 dBm (0.866 V rms) maximum for all reference levels below 0 dBm.



The application of any dc voltage to the INPUT connector on the L2 may cause permanent damage to the mixer circuit.

ENVIRONMENTAL CHARACTERISTICS

The L2 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	070-2018-00
Cable, Coaxial, 75 Ω , BNC/BNC, 42 inches	012-0074-00

Optional Accessories

Attenuator, step, 75 ohm	2703
Attenuator, minimum loss, 75 Ω to 50 Ω	011-0112-00

OPERATING INSTRUCTIONS

Introduction

The L2 Plug-In Module operates with a Tektronix 7L5 Spectrum Analyzer to provide it with a 75 ohm input impedance and other front end capabilities.

This section of the manual contains installation instructions for the L2 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 L2 module to ensure that the cover plate is properly fastened with no protruding screw heads.



Never install the L2 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 L2 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 L2 into the 7L5 plug-in cavity and apply a steady pressure to the L2 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

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 L2 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 1 milliwatt or decibels with respect to 1 volt.

75 Ω INPUT

The 75 Ω INPUT is a panel mounted, coaxial, female connector that accomodates all BNC male coaxial connectors. This input connector has a nominal 75 ohm impedance from dc to greater than 5 MHz.

INITIAL CALIBRATION

The following adjustments and verifications ensure deflection sensitivity correlation between the L2 Plug-In Module, the 7L5 Spectrum Analyzer and the mainframe oscilloscope. The following steps should be completed each time the L2 is installed in a 7L5 and each time the 7L5 is turned on.

a. With the L2 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 75 Ω INPUT connector on the L2 front panel with a short length of 75 ohm coaxial cable.

d. Select the LOG 2 dB/DIV pushbutton and set the FREQUENCY SPAN/DIV to 2 kHz, RESOLUTION to 3 kHz, and TIME/DIV to .2 s. 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 L2 AMPL CAL control for a full screen display.

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.

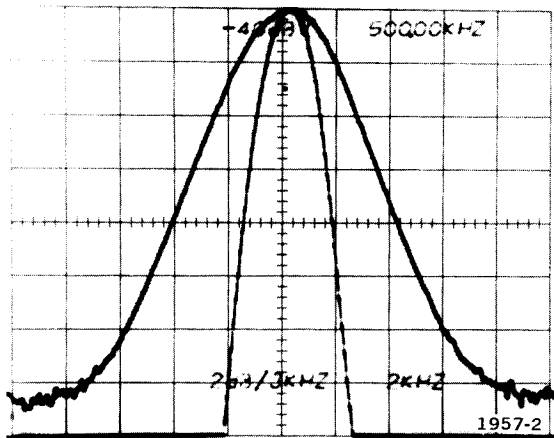


Fig. 2-1. Initial calibration waveform.

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 reflections 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 3.07 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).

PERFORMANCE CHECKS

Introduction

The following procedures verify performance capabilities of the L2 Plug-In Module and include; intermodulation distortion, residual response, reference level accuracy and display flatness. Internal calibration or adjustments are not included. If the instrument fails to meet a specified performance requirement, the adjustment procedure for the related circuit will be found in the 7L5 Instruction Manual.

Equipment Required or Recommended

Test equipment recommended for the performance checks in this section are listed in Table 3-1. Substitute test equipment should meet or exceed the listed characteristics as they are the minimum required for accuracy.

TABLE 3-1

Equipment	Characteristics	Model/Type
Low Frequency Signal Generator (2 required)	Range: 1 Hz — 5 MHz Output Impedance: 75 ohms	HP 654A
Frequency Counter	Short Term Stability: 1 part/10 ⁷	Tektronix 7D14 Plug-In
Step Attenuator	1 dB and 10 dB steps Range: 0 to 94 dB	Tektronix 2703
10X (20 dB) Attenuator (2 required)	75 ohm: BNC connectors	Tektronix Part No. 011-0061-00
Termination, 75 Ω		Tektronix Part No. 011-0102-00

Preliminary Preparation

Perform the Operational Check and Front Panel Calibration Procedure described in the Operating Instructions (L2/7L5) so the L2 is calibrated to the 7L5/7000 Series deflection sensitivities.

1. Intermodulation Distortion

a. Connect the test setup as shown in Figure 3-1. Set the 7L5 front panel controls as follows:

DOT FREQUENCY	2500.00 kHz
RESOLUTION	3 kHz
FREQUENCY SPAN/DIV	5 kHz
TIME/DIV	.5 s
REFERENCE LEVEL	-30 dBm
INPUT BUFFER	Off
BASELINE CLIPPER	Max cw
LOG 10 dB/DIV	On
DIGITAL STORAGE	Display A/B

b. On both signal generators, select the 75 ohm output switch. Adjust the output level of signal generator No. 1 to approximately -20 dBm. Adjust its output frequency to 2495.0 kHz so that its displayed signal appears one division to the left of center screen.

c. Adjust the output level of signal generator No. 2 to approximately -20 dBm. Adjust its output frequency to 2505.0 kHz so that its displayed signal appears one division to the right of center screen.

d. Reset the 7L5 RESOLUTION control to 300 Hz. Adjust both signal generator output level controls to set the displayed signals for a full screen reference.

e. Reset the 7L5 TIME/DIV switch to 2 s. Wait 20 seconds and verify that the third order intermodulation product (that is 3 divisions from center screen) is at least 7.5 divisions (75 dB) below the top graticule line (-30 dBm reference).

f. Reset signal generator No. 1 output frequency to 10.0 kHz and if necessary, readjust its output signal level to -30 dBm (full screen). Wait 20 seconds and verify that the second order intermodulation product, that is 2 divisions from signal generator No. 2 display, is at least 7.2 divisions (72 dB) below the reference level.

g. Select the INPUT BUFFER pushbutton. Wait 20 seconds and verify that no second order intermodulation products are visible.

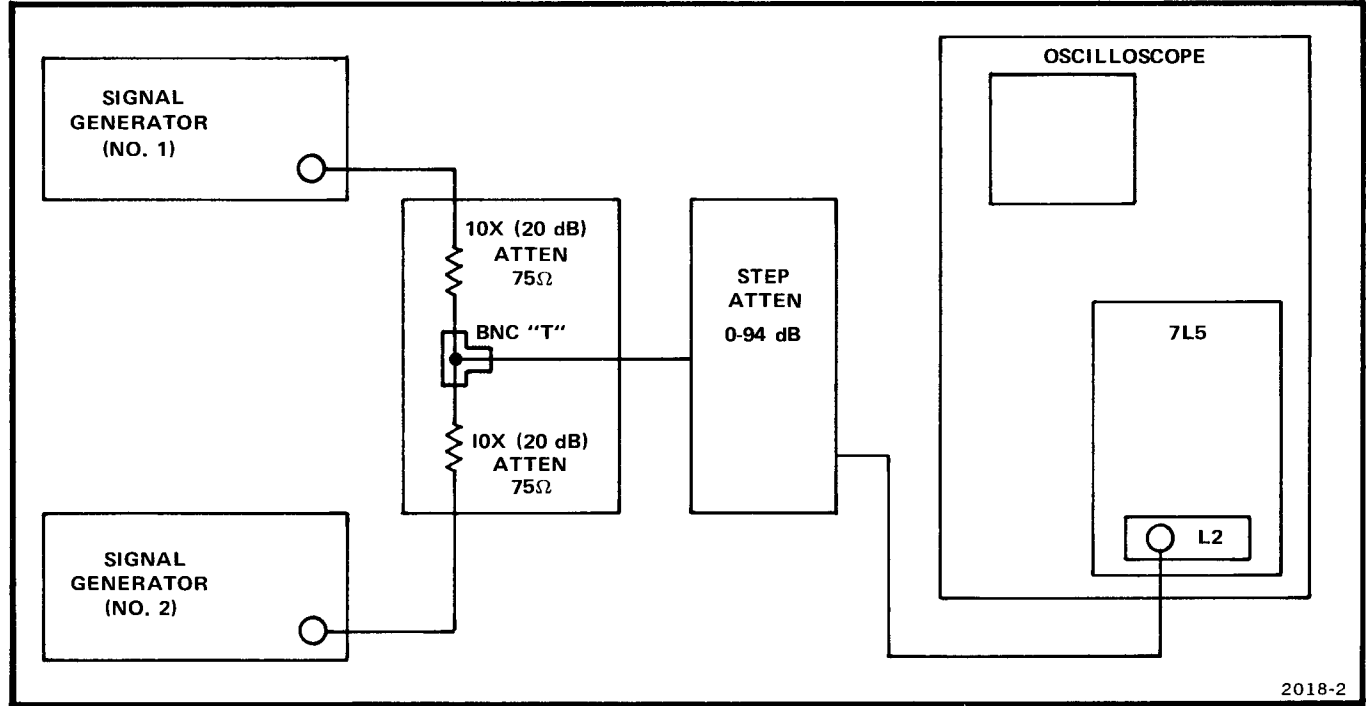


Fig. 3-1. Intermodulation Distortion test equipment setup.

2. Sensitivity

NOTE

Sensitivity for the L2 Plug-In Module is specified using the equivalent input noise method. The 7L5's internal reference level, as indicated by the display readout, is used as the reference in the following steps.

a. Set the 7L5 front panel controls as follows:

DOT FREQUENCY	1000.00 kHz
RESOLUTION	30 kHz
FREQUENCY SPAN/DIV	.1 kHz
TIME/DIV	1 s
REFERENCE LEVEL	-70 dBm
INPUT BUFFER	Off
DIGITAL STORAGE	DISPLAY A/B
LOG 2 dB/DIV	On
TRIGGERING	FREE RUN and NORM
L2 dBm/dBV	dBm

b. Terminate the INPUT connector with a 75 ohm termination or attenuator (Tektronix Part No. 011-0102-00 or 011-0061-00). Adjust the VERT POSITION to place the trace on the bottom line.

c. Select the LOG 10 dB/DIV pushbutton and adjust the AVERAGE LEVEL cursor above the noise peaks. Set the TIME/DIV switch to 10 s.

d. Determine the average noise level in terms of -dBm or divisions below the top graticule line (-70 dBm). Verify that the average noise level of the display is at least 3.5 divisions below the -70 dBm line (i.e., ≥ -105 dBm).

Set the RESOLUTION control to each of its positions and verify performance per Table 3-2.

TABLE 3-2

RESOLUTION Setting	Average Noise Level Below Reference Level
30 kHz	-105 dBm (≥ 3.5 divisions)
10 kHz	-110 dBm (≥ 4.0 divisions)
3 kHz	-115 dBm (≥ 4.5 divisions)
1 kHz	-120 dBm (≥ 5.0 divisions)
300 Hz	-125 dBm (≥ 5.5 divisions)
100 Hz	-130 dBm (≥ 6.0 divisions)
30 Hz	-133 dBm (≥ 6.3 divisions)
10 Hz	-135 dBm (≥ 6.5 divisions)

3. Residual Response

NOTE

Each L2 Plug-In Module is carefully tested at the factory to ensure that all internally generated spurious responses are below -130 dBm. Verification of this specification would take several days. A procedure to check the full frequency range down to -110 dBm and to spot check 200 kHz of the total range down to 0 dBm is given in the following steps. The 200 kHz of frequency range chosen is 300 kHz through 500 kHz, however, the procedure can be used to spot check any 200 kHz span within the 0 — 5 MHz capability of the instrument.

a. Terminate the L2 INPUT connector with a 75 ohm termination. Set the 7L5 front panel controls as follows:

DOT FREQUENCY	500.00 kHz
RESOLUTION	300 Hz
FREQUENCY SPAN/DIV	100 kHz
TIME/DIV	AUTO
REFERENCE LEVEL	-70 dBm
INPUT BUFFER	Off
BASELINE CLIPPER	Max cw
DIGITAL STORAGE	DISPLAY A/B
LOG 10 dB/DIV	On

SAVE A	Off
MAX HOLD	Off
L2 dBm/dBV	dBm

b. Press the SGL SWP pushbutton twice to initiate a sweep. (Additional sweeps are initiated each time the SGL SWP is pressed.) Observe the display for spurious responses (spurs). Verify that, except for the 0 Hz response, the amplitude of any observed spur is 110 dB below 0 dBm.

c. Sequentially reset the DOT FREQUENCY control to 1500.00 kHz, 2500.00 kHz, 3500.00 kHz, and 4500.00 kHz and repeat step b at each frequency setting.

d. Set the DOT FREQUENCY control to 305.00 kHz, FREQUENCY SPAN/DIV to 1 kHz, RESOLUTION to 30 Hz, and TIME/DIV to AUTO.

e. With the TRIGGER SOURCE in FREE RUN, select the SGL SWP pushbutton and observe the display for spurs. Verify that the amplitude of any observed spurious response is at least 130 dB below 0 dBm. (Press the SGL SWP pushbutton again as required for observation.)

f. Increase the dot frequency in 10 kHz increments and repeat step e until the display is scanned with the DOT FREQUENCY set to 395.00 kHz.

NOTE

To measure the amplitude of a spur, carefully reset the DOT FREQUENCY to place and keep the spur within one division of center screen. Continue to reduce the frequency span per division with each sweep until the maximum amplitude of a spur has been noted.

4. Display Flatness

a. Connect the test setup as shown in Figure 3-2. Set the 7L5 front panel controls as follows:

DOT FREQUENCY	500.00 kHz
RESOLUTION	COUPLED
FREQUENCY SPAN/DIV	100 kHz
TIME/DIV	AUTO
REFERENCE LEVEL	-20 dBm
LOG 2 dB/DIV	On
DIGITAL STORAGE	Off
TRIGGERING	Norm

b. Set the signal generator for a test frequency of 500 kHz and adjust its output level for a 6 division vertical reference on the analyzer crt graticule. Note the exact output level as indicated on the monitor meter.

c. Slowly adjust the signal generator frequency control to move the displayed signal across the full width of the graticule. Monitor the output amplitude and adjust the generator's output level control as required to maintain a constant amplitude test frequency. Verify that the displayed signal amplitude remains within 0.5 dB of the 6 division reference as the test frequency is moved through the 1 MHz frequency range represented by 10 horizontal graticule divisions.

d. Sequentially set the DOT FREQUENCY to 1500.00 kHz, 2500.00 kHz, 3500.00 kHz, and 4500.00 kHz and repeat step c at each setting.

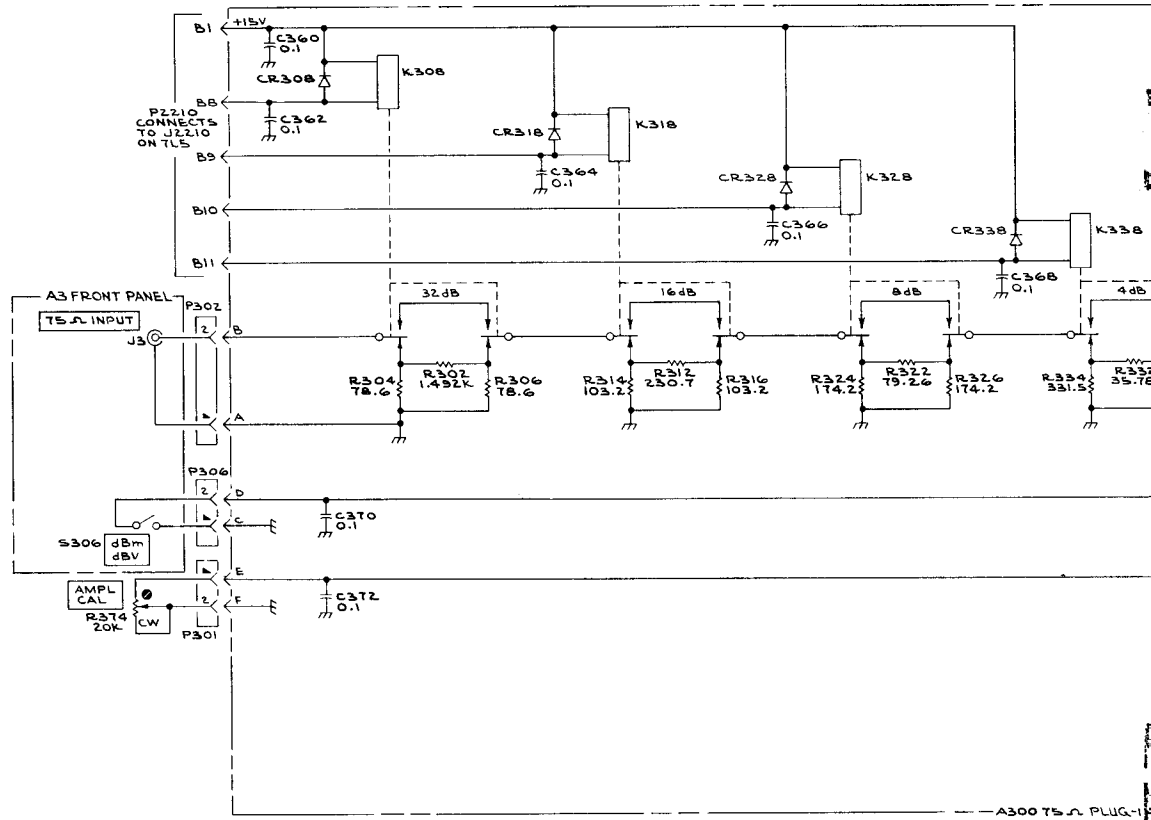
5. Reference Level Accuracy

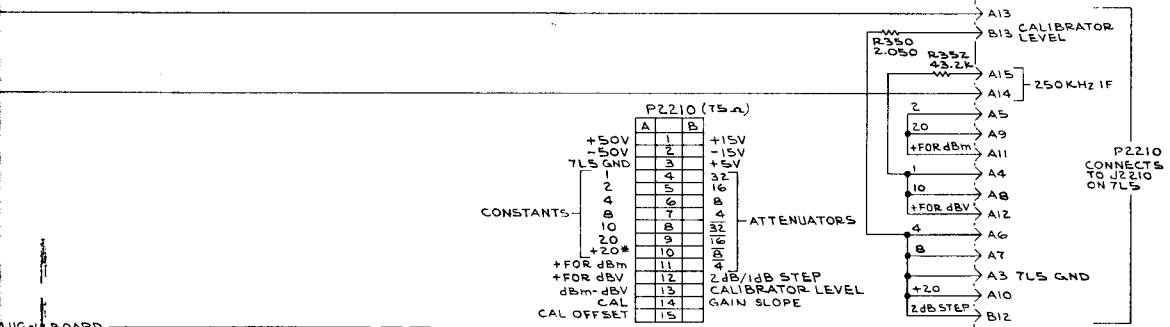
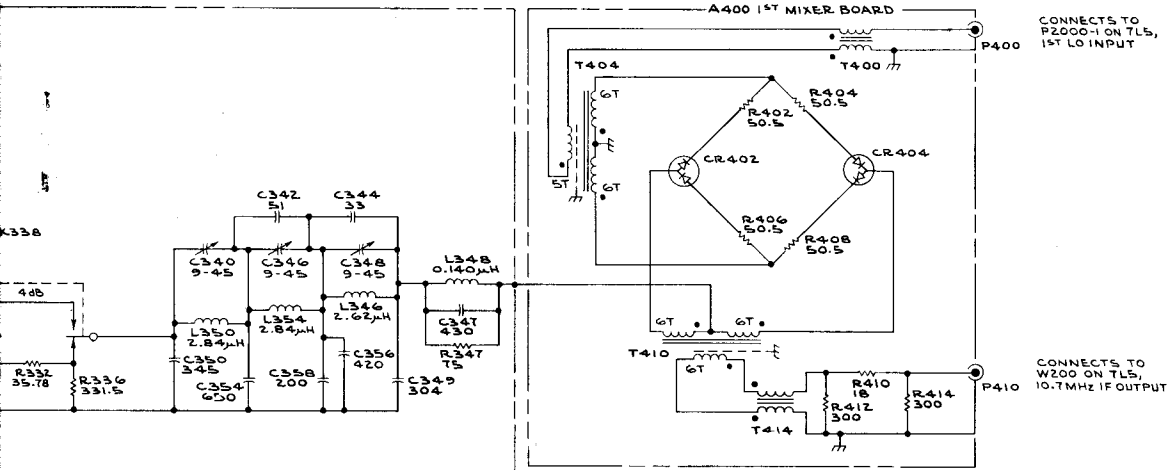
a. Connect the CALIBRATOR signal through an external attenuator to the INPUT connector.

TABLE 3-3

Reference Level (dBm)	External Attenuation (dB)	Allowable Error (dB)
-41	14	0.25
-51	24	0.50
-61	34*	0.75
-71	44	1.00
-81	54	1.25
-91	45	1.50
-101	74	1.75
-111	84	2.00
-121	94	2.25

*If the external attenuator is a Tektronix 2703, set the 0—79 db/30—109 dB range switch to the 30—109 dB position. Then, reset the attenuator controls so that "34" appears in the top window.





L2 PLUG-IN MODULE

4-29-75 PM

Performance Check—L2

CIRCUIT DESCRIPTION

Signals are input to the L2 Plug-In Module via a front panel, female BNC connector. Input impedance at this connector is 75 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 (K308, K318, K328, K338) are actuated. In the de-energized 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 L2 mixer circuit, the 7L5 turn-on logic circuit ensures that these relays maintain the de-energized 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 T410 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 L2 module at coaxial connector P400 and is coupled to the mixer via Balun transformer, T400. The 10.7 MHz mixer output signal at the secondary of T410 is coupled through T414 and through a pi-connected 3 dB attenuator pad to the output coaxial connector P410.

The +5 V, -15 V, +50 V, and -50 V supplies are available on pins of connector P2 but are not used in the L2 Plug-In Module.

MAINTENANCE/CALIBRATION

Standard Maintenance

There are no special maintenance requirements for the L2 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 C340, C346 and C348:

a. With the L2 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 75 Ω INPUT connector.

b. Sequentially adjust C340, C346 and C348 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. To allow room for cushioning, obtain a carton of corrugated cardboard with inside dimensions no less than six inches more than the instrument dimensions.

Refer to Table 5-1 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 5-1

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

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	ELECTL	ELECTROLYTIC	INSUL	INSULATOR	SEMICON	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
BRS	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

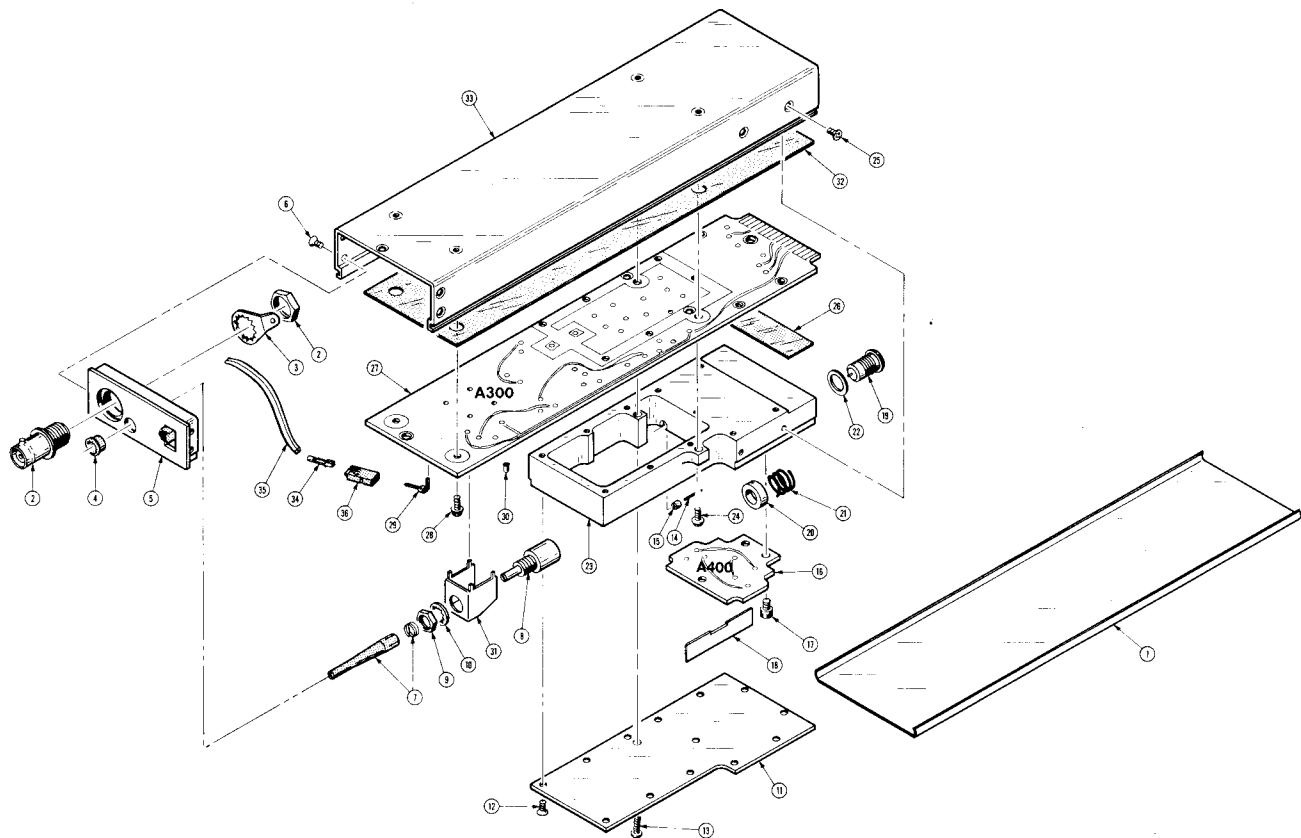
MFR.CODE	MANUFACTURER	ADDRESS	CITY,STATE,ZIP
0000A	LEMO USA	2015 2ND ST.	BERKLEY, CA 94710
00779	AMP, INC.	P. O. BOX 3608	HARRISBURG, PA 17105
00853	SANGAMO ELECTRIC CO., S. CAROLINA DIV.	P. O. BOX 128	PICKENS, SC 29671
01121	ALLEN-BRADLEY CO.	1201 2ND ST. SOUTH	MILWAUKEE, WI 53204
07910	TELEDYNE SEMICONDUCTOR	12515 CHADRON AVE.	HAWTHORNE, CA 90250
22526	BERG ELECTRONICS, INC.	YOUK EXPRESSWAY	NEW CUMBERLAND, PA 17070
23499	GAVITT WIRE AND CABLE, DIVISION OF RSC INDUSTRIES, INC.	455 N. QUINCE ST.	ESCONDIDO, CA 92025
71159	BRISTOL SOCKET SCREW, DIV. OF AMERICAN CHAIN AND CABLE CO., INC.	40 BRISTOL ST.	WATERBURY, CT 06720
72136	ELECTRO MOTIVE CORP., SUB OF INTERNATIONAL ELECTRONICS CORP.	SOUTH PARK AND JOHN STREETS	WILLIMANTIC, CT 06226
72982	ERIE TECHNOLOGICAL PRODUCTS, INC.	644 W. 12TH ST.	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 60120
80009	TEKTRONIX, INC.	P. O. BOX 500	BEAVERTON, OR 97077
83385	CENTRAL SCREW CO.	2530 CRESCENT DR.	BROADVIEW, IL 60153
91637	DALE ELECTRONICS, INC.	P. O. BOX 609	COLUMBUS, NB 68601

Ckt No.	Tektronix Part No.	Serial/Model No.		Name & Description	Mfr Code	Mfr Part Number	
		Eff	Dscont				
A300	670-4278-00			CKT BOARD ASSY:75 OHM ATTENUATOR	80009	670-4278-00	
A400	670-4283-00			CKT BOARD ASSY:FIRST MIXER	80009	670-4283-00	
C340	281-0167-00			CAP.,VAR,CER DI:9-45PF,200V	72982	538-011-D	9-45
C342	283-0635-00			CAP.,FXD,MICA D:51PF,1%,100V	00853	D151E510F0	
C344	283-0642-00			CAP.,FXD,MICA D:33PF,+/-0.5PF,300V	00853	D10-3E330G0	
C346	281-0167-00			CAP.,VAR,CER DI:9-45PF,200V	72982	538-011-D	9-45
C347	283-0651-00			CAP.,FXD,MICA D:430PF,1%,500V	00853	D155F431F0	
C348	281-0167-00			CAP.,VAR,CER DI:9-45PF,200V	72982	538-011-D	9-45
C349	283-0604-00			CAP.,FXD,MICA D:304PF,2%,300V	00853	D153F3040G0	
C350	283-0752-00			CAP.,FXD,MICA D:345PF,1%,500V	00853	D15ED50F500	
C354	283-0691-00			CAP.,FXD,MICA D:650PF,1%,300V	72136	DM15F651F0300	
C356	283-0667-00			CAP.,FXD,MICA D:420PF,1%,500V	00853	D155F421F0	
C358	283-0672-00			CAP.,FXD,MICA D:200PF,1%,500V	00853	D155F201F0	
C360	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8131N075651104M	
C362	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8131N075651104M	
C364	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8131N075651104M	
C366	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8131N075651104M	
C368	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8131N075651104M	
C370	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8131N075651104M	
C372	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8131N075651104M	
CR308	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152	
CR318	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152	
CR328	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152	

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
CR338	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR402	152-0646-00			SEMICOND DVC UN:SI,PAIR,MIXER	80009	152-0646-00
CR404	152-0646-00			SEMICOND DVC UN:SI,PAIR,MIXER	80009	152-0646-00
K308	148-0088-00			RELAY,ARMATURE:DPDT,120MW	80009	148-0088-00
K318	148-0088-00			RELAY,ARMATURE:DPDT,120MW	80009	148-0088-00
K328	148-0088-00			RELAY,ARMATURE:DPDT,120MW	80009	148-0088-00
K338	148-0088-00			RELAY,ARMATURE:DPDT,120MW	80009	148-0088-00
L346	108-0834-00			COIL,RF:2.62UH TOROIDAL INDUCTOR	80009	108-0834-00
L348	108-0836-00			COIL,RF:14UH TOROIDAL INDUCTOR	80009	108-0836-00
L350	108-0835-00			COIL,RF:2.84UH TOROIDAL INDUCTOR	80009	108-0835-00
L354	108-0835-00			COIL,RF:2.84UH TOROIDAL INDUCTOR	80009	108-0835-00
R302	321-1681-03			RES.,FXD,FILM:1.492K OHM,0.25%,0.125W	91637	MFF1816D14920C
R304	322-1605-03			RES.,FXD,FILM:78.86 OHM,0.25%,0.25W	91637	MFF1421D78R86C
R306	321-1679-03			RES.,FXD,FILM:78.86 OHM,0.25%,0.125W	91637	MFF1816D78R86C
R312	321-1676-03			RES.,FXD,FILM:230.7 OHM,0.25%,0.125W	91637	MFF1816D230R7C
R314	321-1675-03			RES.,FXD,FILM:103.2 OHM,0.25%,0.125W	91637	MFF1816D103R2C
R316	321-1675-03			RES.,FXD,FILM:103.2 OHM,0.25%,0.125W	91637	MFF1816D103R2C
R322	321-1674-03			RES.,FXD,FILM:79.26 OHM,0.25%,0.125W	91637	MFF1816D79R26C
R324	321-1678-03			RES.,FXD,FILM:174.2 OHM,0.25%,0.125W	91637	MFF1816D17HR2C
R326	321-1678-03			RES.,FXD,FILM:174.2 OHM,0.25%,0.125W	91637	MFF1816D17HR2C
R332	321-1680-03			RES.,FXD,FILM:35.78 OHM,0.25%,0.125W	91637	MFF1816D35R78C
R334	321-1677-03			RES.,FXD,FILM:331.5 OHM,0.25%,0.125W	91637	MFF1816D331RSC
R336	321-1677-03			RES.,FXD,FILM:331.5 OHM,0.25%,0.125W	91637	MFF1816D331RSC

Ckt No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
R347	321-0085-00		RES. ,FXD,FILM:75 OHM,1%,0.125W	75042	CEAT0-75R00F
R350	321-0223-07		RES. ,FXD,FILM:2.05K OHM,0.1%,0.125W	80009	321-0223-07
R352	321-0350-00		RES. ,FXD,FILM:43.2K OHM,1%,0.125W	75042	CEAT0-4322F
R374	311-1712-00		RES. ,VAR, NONWIR:20K OHM,10%,1W	01121	SPSG04052034A
R402	321-1068-07		RES. ,FXD,FILM:50.5 OHM,0.1%,0.125W	75042	CEAT9-50R50B
R404	321-1068-07		RES. ,FXD,FILM:50.5 OHM,0.1%,0.125W	75042	CEAT9-50R50B
R406	321-1068-07		RES. ,FXD,FILM:50.5 OHM,0.1%,0.125W	75042	CEAT9-50R50B
R408	321-1068-07		RES. ,FXD,FILM:50.5 OHM,0.1%,0.125W	75042	CEAT9-50R50B
R410	317-0180-00		RES. ,FXD, CMPSN:18 OHM,5%,0.125W	01121	BB1805
R412	317-0301-00		RES. ,FXD, CMPSN:300 OHM,5%,0.125W	01121	BB3015
R414	317-0301-00		RES. ,FXD, CMPSN:300 OHM,5%,0.125W	01121	BB3015
T400	120-0445-00		XFMR, TOROID:8 TURNS, BIFILAR	80009	120-0445-00
T414	120-0445-00		XFMR, TOROID:8 TURNS, BIFILAR	80009	120-0445-00
T404	120-1019-00		XFMR, TOROID:3 TURNS, TRIFILER	80009	120-1019-00
T410	120-1019-00		XFMR, TOROID:3 TURNS, TRIFILER	80009	120-1019-00

FIG. 1 EXPLODED



L2 75 OHM PLUG-IN MODULE
Mechanical Parts List—L2

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Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Qty	Name & Description					Mfr	
				1	2	3	4	5	Code	Mfr Part Number
1-1	337-2101-00		1						80009	337-2102-00
-2	131-0955-01		1						80009	131-0955-01
-3	210-0255-00		1						80009	210-0255-00
-4	358-0301-00		1						80009	358-0301-00
-5	644-0460-00		1						80009	644-0460-00
										(ATTACHING PARTS)
-6	211-0087-01		5						83385	OB D
										- - - * - - -
-7	384-1121-00		1						80009	384-1121-00
-8	-----		1							RESISTOR,VAR: (SEE R374)
										(ATTACHING PARTS)
-9	210-0583-00		1						73743	2X20224-402
-10	210-0046-00		1						78189	1214-05-00-0541C
										- - - * - - -
-11	337-2180-00		1						80009	337-2180-00
										(ATTACHING PARTS)
-12	211-0087-01		13						83385	OB D
-13	211-0100-00		1						83385	OB D
										- - - * - - -
-14	195-0148-00		1						80009	195-0148-00
-15	342-0122-00		1						80009	342-0122-00
-16	-----		1							CKT BOARD ASSY:FIRST MIXER (SEE A400 EPL)
										(ATTACHING PARTS)
-17	211-0196-00		5						80009	211-0196-00
										- - - * - - -
-18	337-2097-00		1						80009	337-2097-00

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	131-1604-00			2						CONN,RCPT,ELEC:LEMO,1 FEMALE (ATTACHING PARTS FOR EACH)	0000A	RA00.100250
-20	343-0548-00			1						COLLAR,CONN: - . EACH COLLAR INCLUDES:		
	213-0306-00			2						. SETSCREW:2-56 X 0.062 INCH,OX STL	71159	OBD
-21	214-2255-00			1						SPRING,HLCPS:0.035 DIA MUSIC WIRE,0.25" L	80009	214-2255-00
-22	210-1228-00			1						WASHER,FLAT:CONNECTOR MIXER - - - * - - -	80009	210-1228-00
-23	337-2179-00			1						SHIELD,ELEC:MIXER (ATTACHING PARTS)	80009	337-2179-00
-24	211-0159-00			2						SCREW,MACHINE:2-56 X 0.375 INCH,PNH STL	83385	OBD
-25	211-0087-01			5						SCREW,MACHINE:2-56 X 0.188" 82 DEG,FLH,STL - - - * - - -	83385	OBD
-26	342-0281-00			1						INSULATOR,PLATE:MIXER CKT BOARD	80009	342-0281-00
-27	-----			1						CKT BOARD ASSY:75 OHM ATTENUATOR(SEE A300 EPL) (ATTACHING PARTS)		
-28	211-0180-00			2						SCR,ASSEM WSHR:2-56 X 0.25 INCH,PNH BRS	83385	OBD
-29	131-1425-00			1						. CONTACT SET,ELE:R ANGLE,0.150" L	22526	65275-001
-30	136-0252-00			32						. CONTACT,ELEC:0.145 INCH LONG	00779	2-330808-7
-31	407-1573-00			1						. BRACKET,VAR RES:	80009	407-1573-00
-32	342-0312-00			1						INSULATOR,PLATE:INPUT CKT BOARD	80009	342-0312-00
-33	337-2102-00			1						SHIELD,ELEC:RF PLUG-IN WRAPAROUND	80009	337-2102-00
-34	131-0707-00			6						CONTACT,ELEC:0.48"L,22-26 AWG WIRE	22526	47439
-35	175-0825-00			FT						WIRE,ELECTRICAL0.833 FT 2 WIRE RIBBON	23499	TEK-175-0825-00
-36	352-0169-00			3						CONN BODY,PL,EL:2 WIRE BLACK	80009	352-0169-00

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscnt	Qty						Name & Description	Mfr Code	Mfr Part Number			
					1	2	3	4	5						
1-													ACCESSORIES		
	070-2018-00			1									MANUAL, TECH:INSTRUCTION	80009	070-2018-00