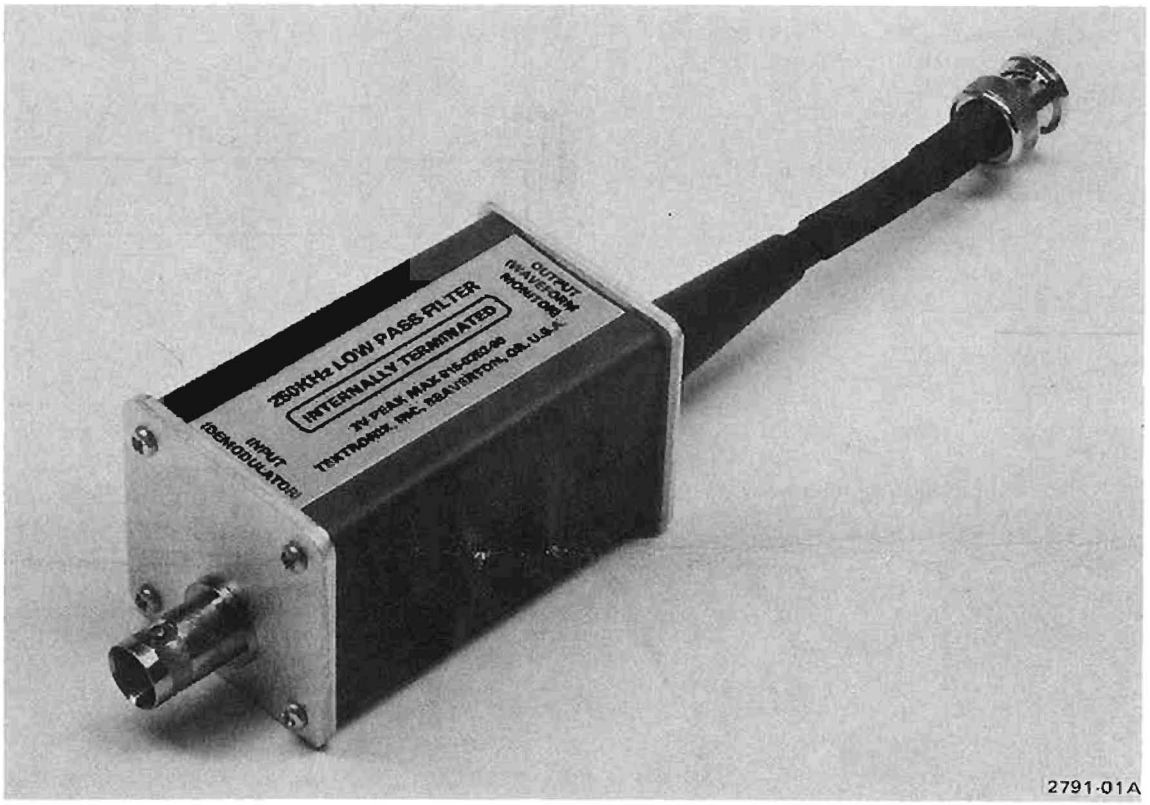
Tektronix®
COMMITTED TO EXCELLENCE

Instructions

015-0352-00 250 kHz Low-Pass Filter



INTRODUCTION

The 250 kHz Low-Pass Filter is designed for use with the TEKTRONIX 1450-series Television Demodulator and the TEKTRONIX 1480 Waveform Monitor. It reduces bandwidth between the 1450's Quadrature 75 Ω Output and the External Horizontal Input of the 1480. To minimize ringing aberrations on pulse-type signals, the filter employs the Bessel filter characteristic (maximally flat time delay).

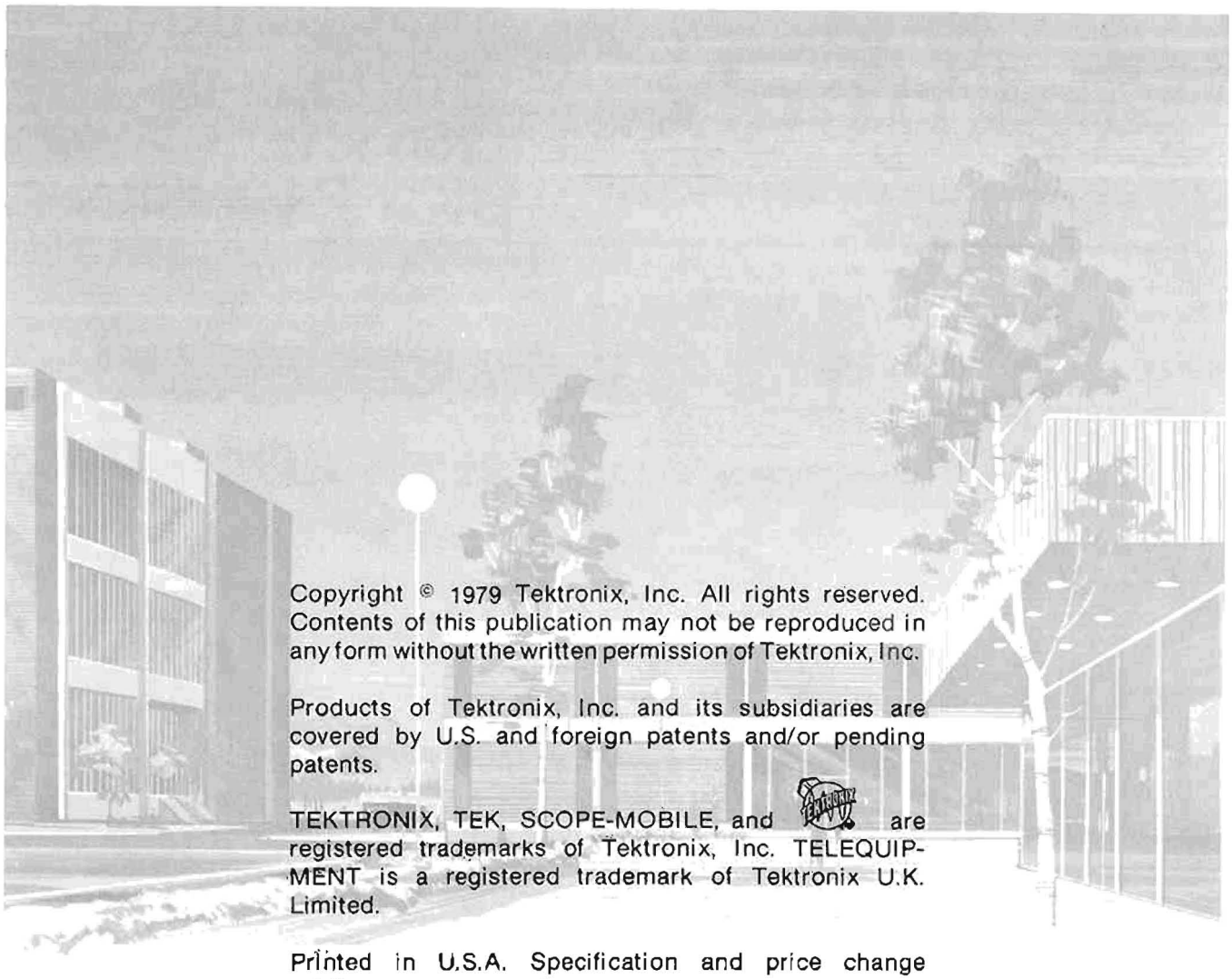
When installing the filter, connect the output of the 1450 to the INPUT connector of the filter and connect the OUTPUT cable of the filter to the 1480 input.

SPECIFICATION

The electrical characteristics presented in Table 1 are valid only if the filter has been calibrated at an ambient temperature between 20° C and 30° C and when the filter is operating at an ambient temperature between 0° C and 55° C. Environmental and physical characteristics of the filter are listed in Tables 2 and 3 respectively.

070-2791-01
Product Group 20

First Printing MAR 1979
Revised MAR 1983



Printed in U.S.A. Specification and price change privileges are reserved.

Table 1

Electrical Characteristics

Characteristics	Performance Requirements
Bandwidth	Approximately 250 kHz.
Aberrations	Less than 2%.
Maximum Input Voltage	3 V (dc + peak ac).

Table 2

Environmental Characteristics

Characteristics	Description
Temperature	
Operating	0° to +55° C (+32° to +131° F).
Nonoperating	-62° to +85° C (-80° to +185° F).
Humidity (Operating and Nonoperating)	Up to 97%.
Altitude	
Operating	To 4,500 m (15,000 ft).
Nonoperating	To 15,000 m (50,000 ft).
Mechanical Shock	500 g, half-sine, 0.5 ms and 1 ms duration; three shocks in each major axis, for a total of 18 shocks.

Table 3

Physical Characteristics

Characteristics	Description
Housing Dimensions	
Height	3.8 cm (1.5 in).
Width	6.2 cm (2.4 in).
Depth	3.8 cm (1.5 in).
Weight	113.4 g (4 oz).
Connector Types	
Input	Female bnc
Output	Male bnc.

PERFORMANCE CHECK AND ADJUSTMENT

This section contains performance check and adjustment instructions for the 250 kHz Low-Pass Filter. To verify that the filter meets its electrical specification, perform steps 1 through 4 of the following procedure. If the need for calibration is indicated, complete the remaining steps of the procedure. Test equipment required for accomplishing the performance check and adjustment procedure is listed in Table 4.

Table 4

Required Test Equipment

Description	Minimum Specification	Purpose	Example of Suitable Equipment
Television Signal Generator	Generate 100 IRE flat-field signal.	Provide signal to check transient response of filter.	TEKTRONIX 1410 NTSC Sync Pulse and Test Signal Generator
Waveform Monitor	5 MHz bandwidth or greater.	Observe output of filter.	a. TEKTRONIX 1480 Waveform Monitor b. TEKTRONIX 221 Oscilloscope
Coaxial Cable	Impedance 75 Ω Connectors bnc male Length 42 in.	Connect output of generator to input of filter.	Tektronix Part Number 012-0074-00
Nylon Alignment Tool	Fit 5/64-inch hex cores.	Adjust transient response of filter.	Tektronix Part Numbers: 003-0307-00 (handle) 003-0310-00 (insert)

Performance Check and Adjustment Procedure

1. Using equipment listed in Table 4, or equivalent equipment, connect the test setup illustrated in Figure 1.

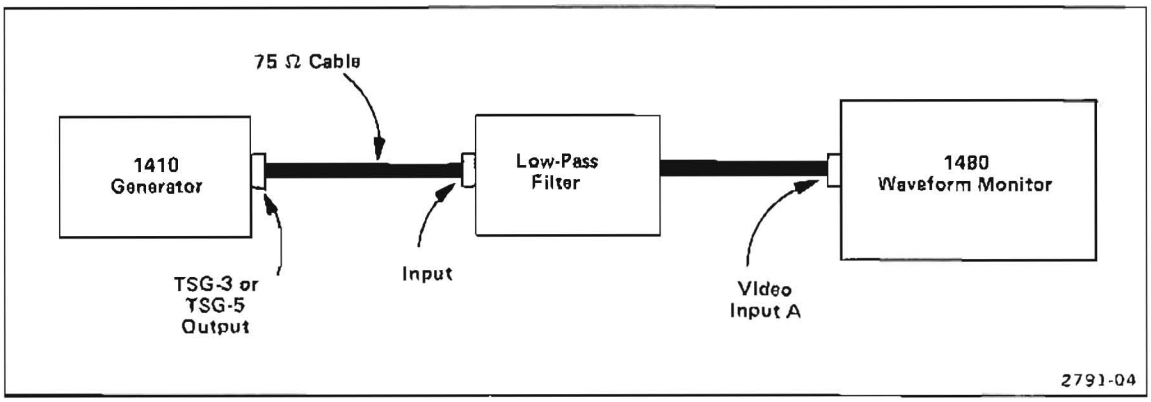


Figure 1. Test setup to check transient response of filter.

2. Set controls on the 1410 Generator to produce a 100 IRE (714 mV) flat-field signal.

3. Set controls on the 1480 Waveform Monitor to display the preceding signal.

4. CHECK—that the display trace has 2% or less aberrations on its front corner. If the aberrations are 2% or less, calibration is unnecessary. Should calibration be needed, complete the remaining steps of this procedure.

5. Remove the four screws retaining the lower (unlabeled) half of the filter case (see Figure 2) and pull off the half case. This provides access to the two coils which must be adjusted.

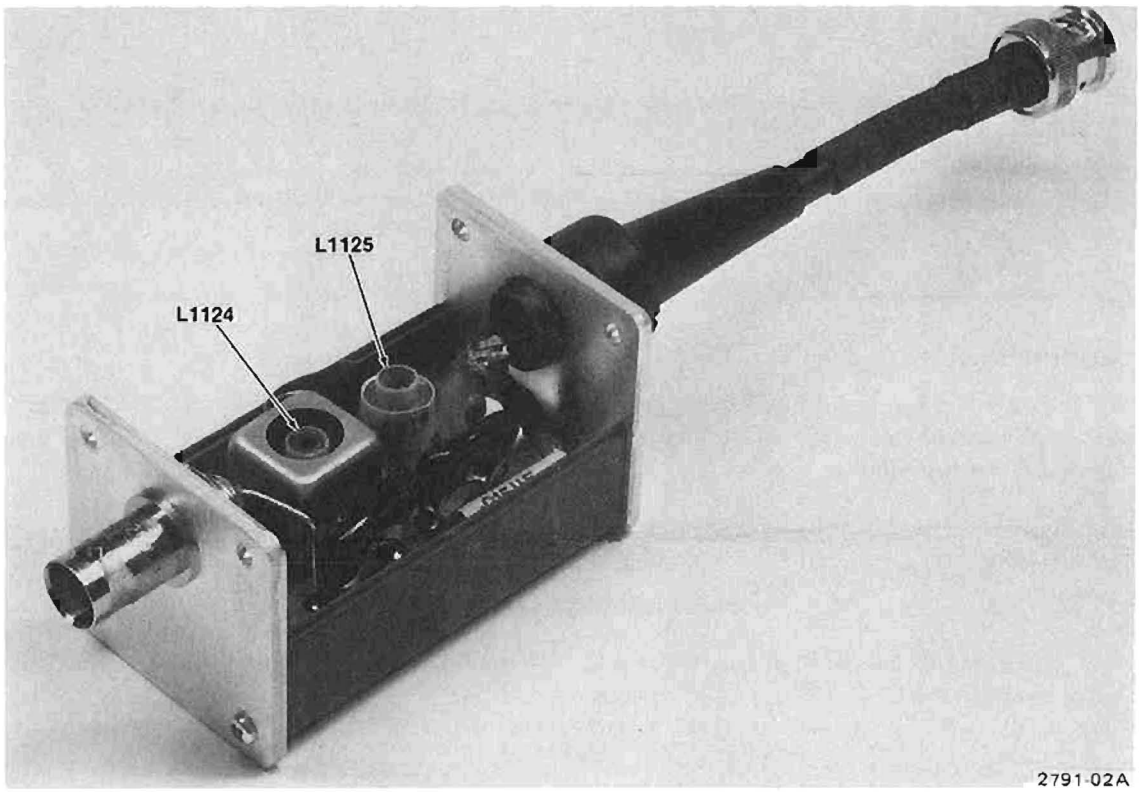


Figure 2. Filter adjustment locations.

6. ADJUST—using the nylon alignment tool, alternately adjust the cores in coils L1124 and L1125 (Figure 2) to obtain optimum transient response of the displayed signal.

NOTE

Since the two coils are interactive, each core must be adjusted at least three times to minimize interaction.

7. Replace the lower half of the filter case previously removed in step 5 and secure it with the four screws.

MAINTENANCE

Cleaning

Dirt that accumulates on the filter housing can be removed with a soft cloth dampened in a mild detergent and water solution. Abrasive cleaners should not be used.

CAUTION

Avoid the use of chemical cleaning agents which might damage the plastics used in this instrument. In particular, avoid chemicals which contain benzene, toluene, xylene, acetone or similar solvents.

Recommended cleaning agents are isopropyl alcohol (isopropanol) or ethyl alcohol (Fotocol or Ethanol).

Contaminated contact areas of the connectors and circuit board can be cleaned with a cotton-tipped applicator dipped in a recommended cleaning agent.

After cleaning, allow parts to thoroughly dry before using the filter.

Troubleshooting

The following are a few suggestions that may assist in locating a problem. After the defective part has been determined, refer to the Corrective Maintenance procedure of this section for removal and replacement instructions.

1. Isolate fault to equipment. Verify that the malfunction exists in the filter by checking operation of the 1450-series TV Demodulator, the 1480 Waveform Monitor, or other equipment with which the filter is used.

2. Perform a visual check. Remove both halves of the filter case and visually inspect the circuit board and wiring for such defects as broken or loose connections, improperly seated components, chafed insulation, damaged components, and similar indications. Repair or replace all obvious defects.

3. Use the schematic diagram (Figure 3) as an aid in isolating the fault.

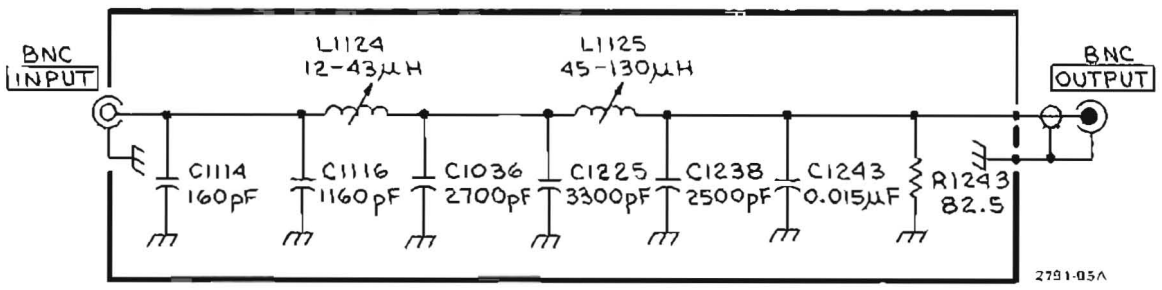


Figure 3. Schematic diagram.

Corrective Maintenance

Corrective maintenance consists of component replacement and filter repair. Access to internal components and repair of the filter are accomplished by performing the following procedure.

1. Remove the four screws retaining the lower (unlabeled) half of the filter case and pull off the half case. Then remove the two screws that secure the circuit board to the upper (labeled) half of the case.

2. Remove the four screws retaining the upper (labeled) half of the filter case. Note and remember the orientation of the label. The end marked OUTPUT goes toward the cable end of the filter assembly. Pull away the upper half case.

3 Remove and replace defective parts as required. Refer to the Replaceable Parts section at the end of this Instruction Sheet for part location and identification information.

4. Reinstall the upper (labeled) half of the case, verifying correct orientation, and secure it with the four screws.

5. Replace the circuit board and secure it to the upper (labeled) half case with its two screws.

6 If electrical components were replaced, calibration may be necessary. Refer to the Performance Check and Adjustment section of this Instruction Sheet.

7 Replace the lower (unlabeled) half of the filter case and secure it with its four screws.

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.

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

SPECIAL NOTES AND SYMBOLS

X000	Part first added at this serial number
00X	Part removed after this serial number

FIGURE AND INDEX NUMBERS

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

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

Assembly and/or Component
Attaching parts for Assembly and/or Component
          - - - * - - -
   Detail Part of Assembly and/or Component
   Attaching parts for Detail Part
          - - - * - - -
      Parts of Detail Part
      Attaching parts for Parts of Detail Part
          - - - * - - -
```

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.

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.

ABBREVIATIONS

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

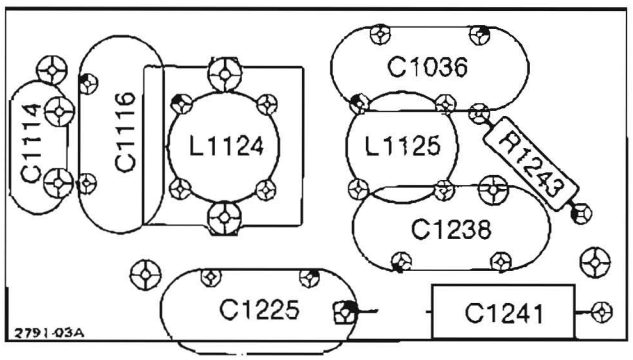


Figure 4. Circuit Board Component Locator.

REPLACEABLE ELECTRICAL PARTS

Ckt No	Tektronix Part No	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
	670-6220-00			CKT BOARD ASSY:FILTER	80009	670-6220-00
C1036	283-0711-00			CAP.,FXD,MICA D:2700PF,2%,500V	00853	D195E272G0
C1114	283-0640-00			CAP.,FXD,MICA D:160PF,1%,100V	00853	D151E161F0
C1116	283-0659-00			CAP.,FXD,MICA D:1160PF,2%,500V	00853	D195C1161G0
C1225	283-0655-00			CAP.,FXD,MICA D:0.0033UF,1%,500V	00853	D195F332F0
C1238	283-0729-00			CAP.,FXD,MICA D:2500PF,5%,500V	00853	D19-5E252J0
C1241	285-0719-00			CAP.,FXD,PLASTIC:0.015UF,5%,100V	84411	663UW-15351
L1124	114-0280-00			COIL,RF:12-43UH,CORE 276-0568-00	80009	114-0280-00
L1125	114-0219-00			COIL,RF:VARIABLE,43-130UH	80009	114-0219-00
R1243	321-0089-00			RES.,FXD,FILM:82.5 OHM,1%,0.125W	91637	MFF1816G82R50F

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
00853	SANGAMO ELECTRIC CO., S. CAROLINA DIV.	P O BOX 128	PICKENS, SC 29671
06090	RAYCHEM CORPORATION	300 CONSTITUTION DRIVE	MENLO PARK, CA 94025
13511	AMPHENOL CARDRE DIV., BUNKER RAMO CORP.		LOS GATOS, CA 95030
80009	TEKTRONIX, INC.	P O BOX 500	BEAVERTON, OR 97077
83385	CENTRAL SCREW CO.	2530 CRESCENT DR.	BROADVIEW, IL 60153
84411	TRW ELECTRONIC COMPONENTS, TRW CAPACITORS	112 W. FIRST ST.	OGALLALA, NE 69153
90484	ITT, SURPRENANT DIV.	172 STERLING STREET	CLINTON, MA 01510
91637	DALE ELECTRONICS, INC.	P. O. BOX 609	COLUMBUS, NE 68601
91836	KINGS ELECTRONICS CO., INC.	40 MARBLEDALE ROAD	TUCKAHOE, NY 10707

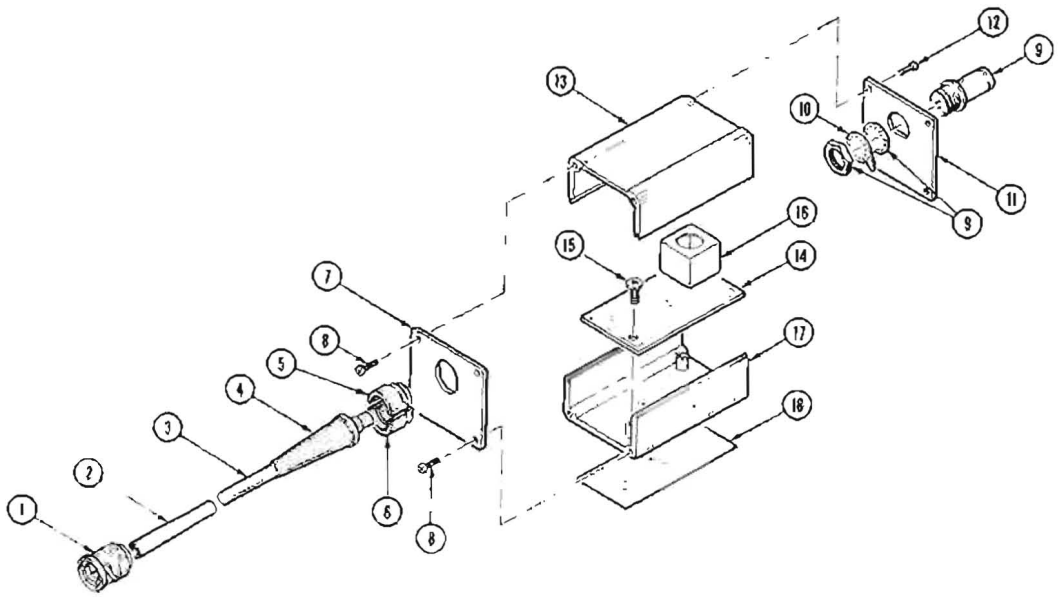


Figure 5. Exploded View.

REPLACEABLE MECHANICAL PARTS

Fig & Index No	Tektronix Part No	Serial/Model No Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
5-1	131-0445-00			1		CONN,PLUG,ELEC:BNC,MALE	91836	KC-59-128
-2	162-0032-00			1		INSUL SLVG,ELEC:HT SHRINK,0.375 ID	06090	RFR-3/81D-BLK
-3	175-0042-00			1		CABLE,RF:75 OHM COAX,W/BLK PVC JKT	90484	RG59B/U
-4	200-1004-00			1		CABLE,NIP.,ELEC:0.265 ID X 0.38"OD W/PLG	80009	200-1004-00
-5	358-0365-00			1		BSHG,STRAIN RLF:	80009	358-0365-00
-6	358-0366-00			1		BSHG,STRAIN RLF:	80009	358-0366-00
-7	200-2339-00			1		COVER,END:ALUMINUM	80009	200-2339-00
						(ATTACHING PARTS)		
-8	211-0062-00			4		SCREW,MACHINE:2-56 X 0.312 INCH,RDH STL	83385	OBD
						- - - * - - -		
-9	131-0955-00			1		CONNECTOR,RCPT,:CKT BD,28/56 CONTACT	13511	31-279
-10	210-0255-00			1		TERMINAL,LUG:0.391" ID INT TOOTH	80009	210-0255-00
-11	200-1338-00			1		COVER,END:WEIGHING NETWORK	80009	200-1338-00
						(ATTACHING PARTS)		
-12	211-0062-00			4		SCREW,MACHINE:2-56 X 0.312 INCH,RDH STL	83385	OBD
						- - - * - - -		
-13	380-0210-01			1		HOUSING HALF:WEIGHING NETWORK,ALUMINUM	80009	380-0210-00
-14	----- -----			1		CKT BOARD ASSY:FILTER(SEE BPL)		
						(ATTACHING PARTS)		
-15	211-0503-00			4		SCREW,MACHINE:6-32 X 0.188 INCH,PNH STL	83385	OBD
						- - - * - - -		
-16	337-1417-00			1		SHLD,ELECTRICAL:0.55 SQ X 0.685 INCH HIGH	80009	337-1417-00
-17	380-0210-04			1		HOUSING HALF:WEIGHING NETWORK,ALUMINUM	80009	380-0210-04
-18	334-3512-00			1		PLATE,IDENT:MKD BASSEL FILTER LOW PASS	80009	334-3512-00
						STANDARD ACCESSORY		
	070-2791-01			1		SHEET,TECH:INSTRUCTION	80009	070-2791-01