

INTRODUCTION

The 015-0407-00 Subcarrier Harmonic Rejection (SHR) Filter is used in conjunction with the 067-0916-00 Video Amplitude Calibration Fixture to reduce odd subcarrier harmonics generated by a video signal source. The test system setup, using the SHR Filter, (shown in Figure 1) is for making p-p amplitude measurements of the chrominance packets in a video signal.


When installing the filter, connect the output of the signal generator under test to the INPUT of the filter and connect the OUTPUT of the filter through a low loss 75 Ω cable to the input of a 1485 W5F waveform monitor.

SPECIFICATION

The electrical characteristics presented in Table 1 are valid only if the SHR Filter has been calibrated at an ambient temperature from 20° to 30°C and when the filter is operating at an ambient temperature from 0° to 50°C. Environmental and physical characteristics of the SHR Filter are listed in Tables 2 and 3 respectively.

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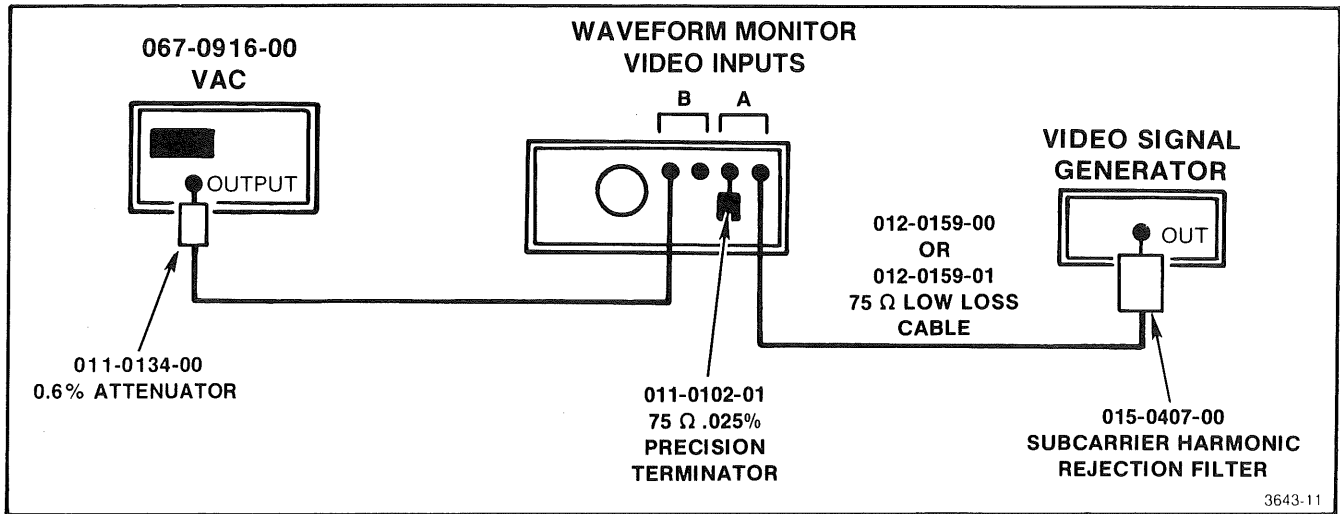


Figure 1. Test setup using SHR Filter.

Table 1

Electrical Characteristics

Characteristic	Performance Requirement	Supplemental Information
Pass band	-0.6% ± 0.1% @ 50 kHz, 3.58 MHz, & 4.43 MHz	Low Pass Filter 0-5 MHz
Stop band	-20 db at 10.74 MHz & 13.29 MHz	

Table 2
Environmental Characteristics

Characteristics	Description
Operating Temperature	0° to 50°C (32° to 122°F)
Storage Temperature	-40° to 65°C (-40° to 149°F)
Operating Altitude	4,572 m (15,000 feet)
Storage Altitude	15,240 m (50,000 feet)

Table 3
Physical Characteristics

Characteristics	Description
Height	3.8 cm (1.5 in.)
Width	6.2 cm (2.4 in.)
Depth	3.8 cm (1.5 in.)
Weight	3.99 oz. (114 g.)
Connector Types Input	Female bnc.
Output	Male bnc.

PERFORMANCE CHECK AND ADJUSTMENT PROCEDURE

This section contains the Performance Check and Adjustment Procedure for the SHR Filter. To verify that the filter meets its electrical specification, perform steps 1 through 6 of the following procedure. If the need for calibration is indicated, complete the steps listed in the Adjustment Procedure. Test equipment required for accomplishing the Performance Check and Adjustment Procedure are listed in Table 4.

Table 4

Recommended Test Equipment

Description	Minimum Specification	Equipment used
Attenuator	75 Ω	Tektronix 011-0103-02
Attenuator	0.6% \pm 0.01%	Tektronix 011-0134-00
Filter (Low pass)	-20 db @ 10.74 MHz & 13.29 MHz	Tektronix 015-0407-00
Impedance Match	50 Ω : 75 Ω	Tektronix 011-0057-00
Coax Cable	75 Ω	Tektronix 012-0159-00
Video Signal	Sinewave Sweep \approx 50 kHz to 5 MHz; Odd harmonics -40 db	Tektronix 1900 & Tektronix 067-1011-00 & Tektronix 175-3671-00
Video Buffer	75 Ω input & output; Returnloss = 40 db; Gain \approx 1	Grass Valley Group 901. Auxiliary Video in & out on Tektronix 1480
Signal Generator	Sinewave 10.7 & 12.9 MHz @ 1.0V; Harmonics -35 db	Tektronix SG503 & Power Module TM503
Oscilloscope System	Bandwidth, dc to 30 MHz; Minimum deflection factor 1 mV/division; two input channels capable of alternate operation; Time base 0.1 μ s/div and slower.	Tektronix 7603 Tektronix 7A13 Tektronix 7A26 Tektronix 7B53A
Peak-to-peak Detector	75 Ω input; Returnloss >40 db with corrections for gain errors.	Tektronix 015-0408-00 & Tektronix 015-0413-00

Performance Check Procedure

1. Using the equipment listed in Table 4, or equivalent, connect the test setup illustrated in Figure 2.
2. Set the controls on the sinewave generator to produce a 1.0 V p-p signal at a frequency of 10.74 Mhz with the filter bypassed. Verify that the signal on the oscilloscope is less than 100 mV p-p with the filter in line.
3. Set the controls on the sinewave generator to produce a 1.0 V p-p signal at a frequency of 13.29 Mhz with the filter bypassed. Verify that the signal on the oscilloscope is less than 100 mV p-p with the filter in line.
4. Using the equipment listed in Table 4, or equivalent, connect the test setup illustrated in Figure 3. Make sure that all connections are electrically stable and wherever possible use 'short' interconnecting cables to reduce signal loss.
5. Use the 011-0134-00 attenuator in place of the 015-0407-00 SHR Filter. Note the trace on the oscilloscope and use a grease pencil to mark the position of the trace at approximately 50 - 500 kHz, 3.58 MHz and 4.43 MHz.
6. Replace the attenuator with the SHR Filter. Verify that the trace on the oscilloscope matches the marked frequencies that were made when previously using the attenuator by $\pm 0.1\%$.

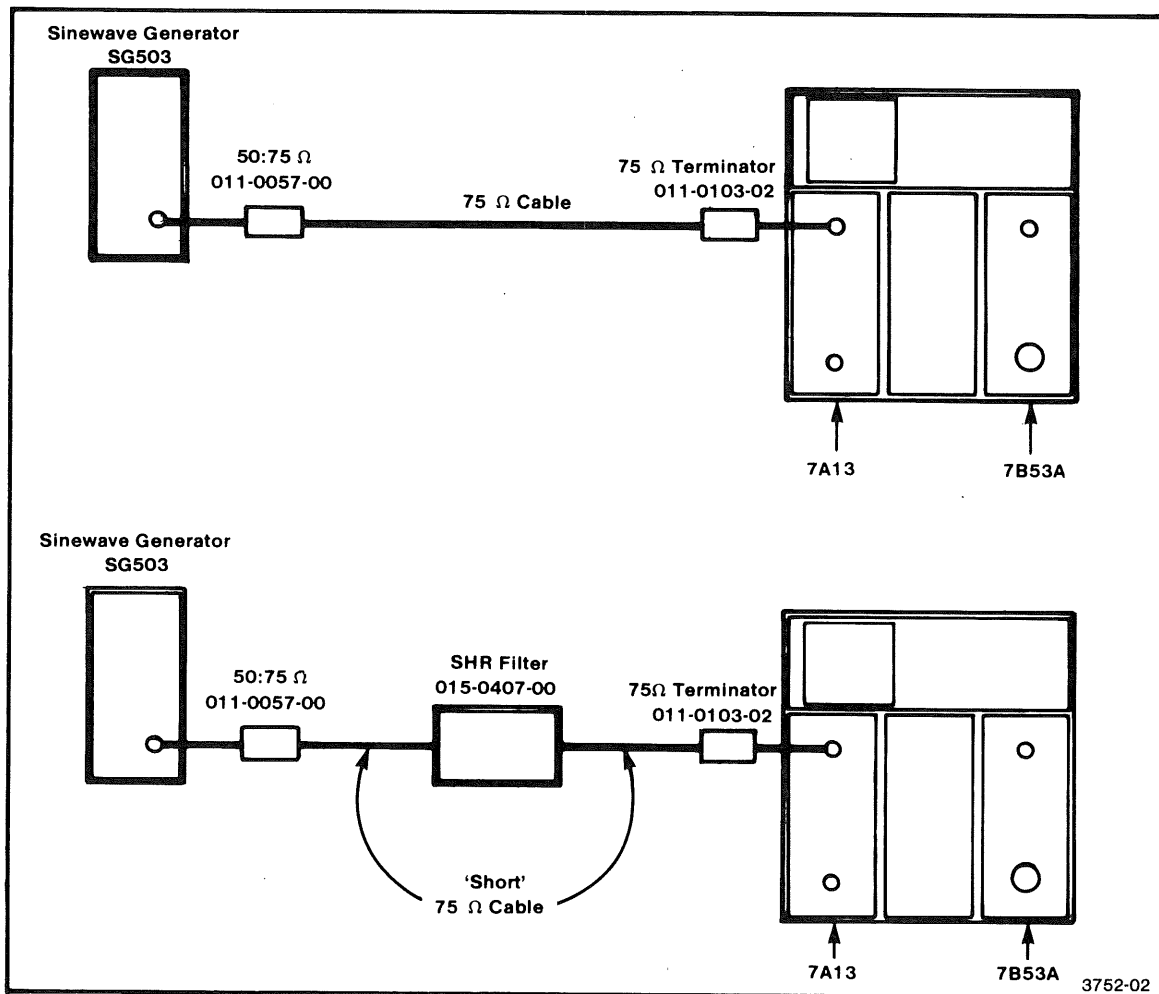
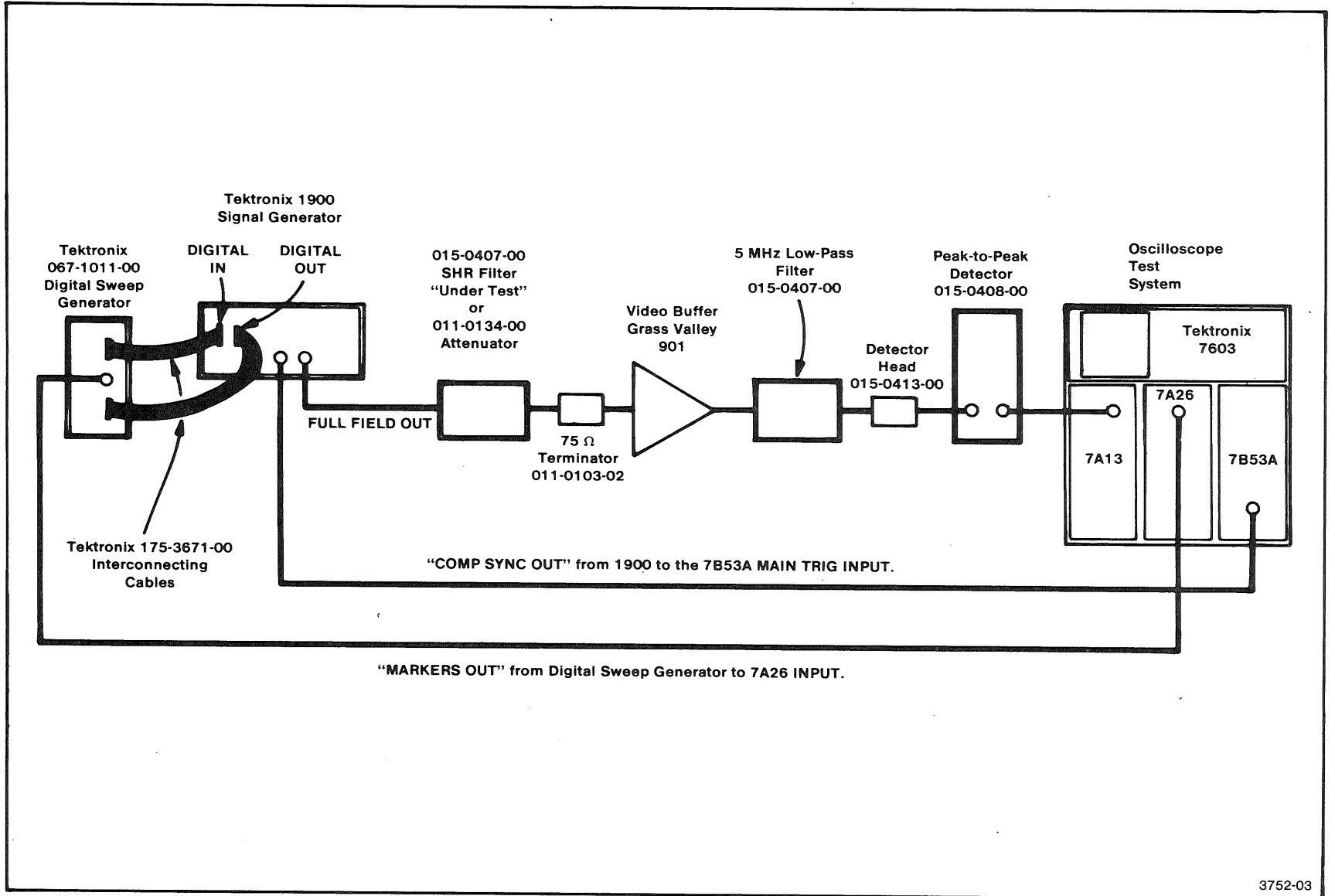


Figure 2. Stop band test setup.

Figure 3 . Passband test setup for SHR Filter. Use short 75Ω interconnecting cables when needed to avoid signal degradation.



3752-03

Adjustment Procedure

1. Using the equipment listed in Table 4, or equivalent, connect the test setup shown in Figure 2.

NOTE

Make all coil adjustments using a nylon or other non-inductive alignment tool.

2. Set the controls on the sinewave generator to produce a 1.0 V p-p signal at a frequency of 10.7 MHz. Adjust L46 on the SHR Filter for minimum signal on the oscilloscope (typically less than 1.0 mV).

3. Set the controls on the sinewave generator to produce a 1.0 V p-p signal at a frequency of 12.9 MHz. Adjust L73 for minimum signal on the oscilloscope (typically less than 1.0 mV).

4. Using the equipment listed in Table 4, or equivalent, connect the test equipment setup shown in Figure 3. Make sure all connections are electrically stable and wherever possible use 'short' interconnecting cables to reduce signal loss. Remove the four screws retaining the lower (unlabeled) half of the filter case (see Figure 4) and pull off the half case.

5. Use the 011-0134-00 attenuator in place of the 015-0407-00 SHR Filter. Note the trace on the oscilloscope and use a grease pencil to mark the position of the trace at approximately 50-500 Hz, 3.58 MHz and 4.43 MHz.

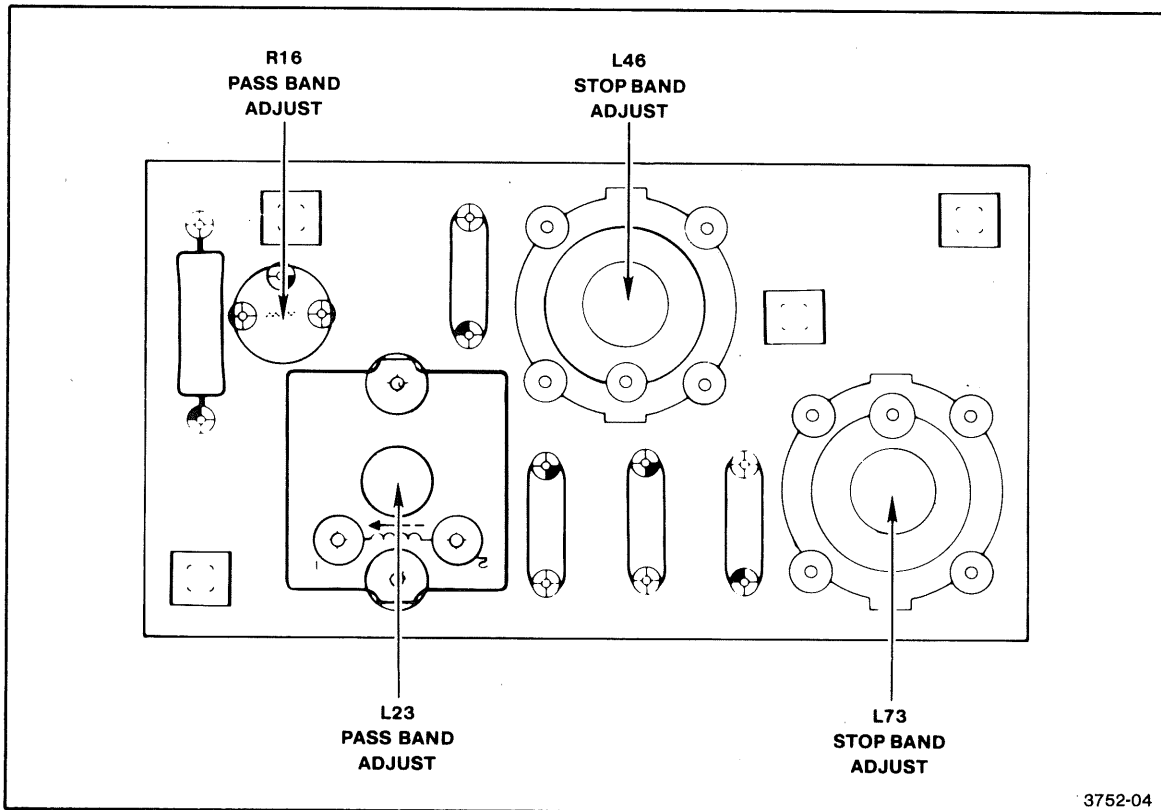


Figure 4. Adjustment Locations.

6. Replace the attenuator with the SHR Filter. Adjust R16 to match the marked frequencies at 50-500 Hz which were made when previously using the attenuator. Adjust L23 to match the marked frequencies at 3.58 MHz and 4.43 MHz. The oscilloscope trace using the SHR Filter must match the marked frequencies $\pm 0.1\%$.

NOTE

To obtain the proper amplitude at the higher frequencies a slight readjustment of L46 and L73 may be required.

7. Replace the lower (unmarked) half of the filter case. Perform steps 1 through 3 of the Performance Check Procedure. If the filter passes these steps, replace the retaining screws to the filter case. If the filter fails these steps, perform the Adjustment Procedure once more.

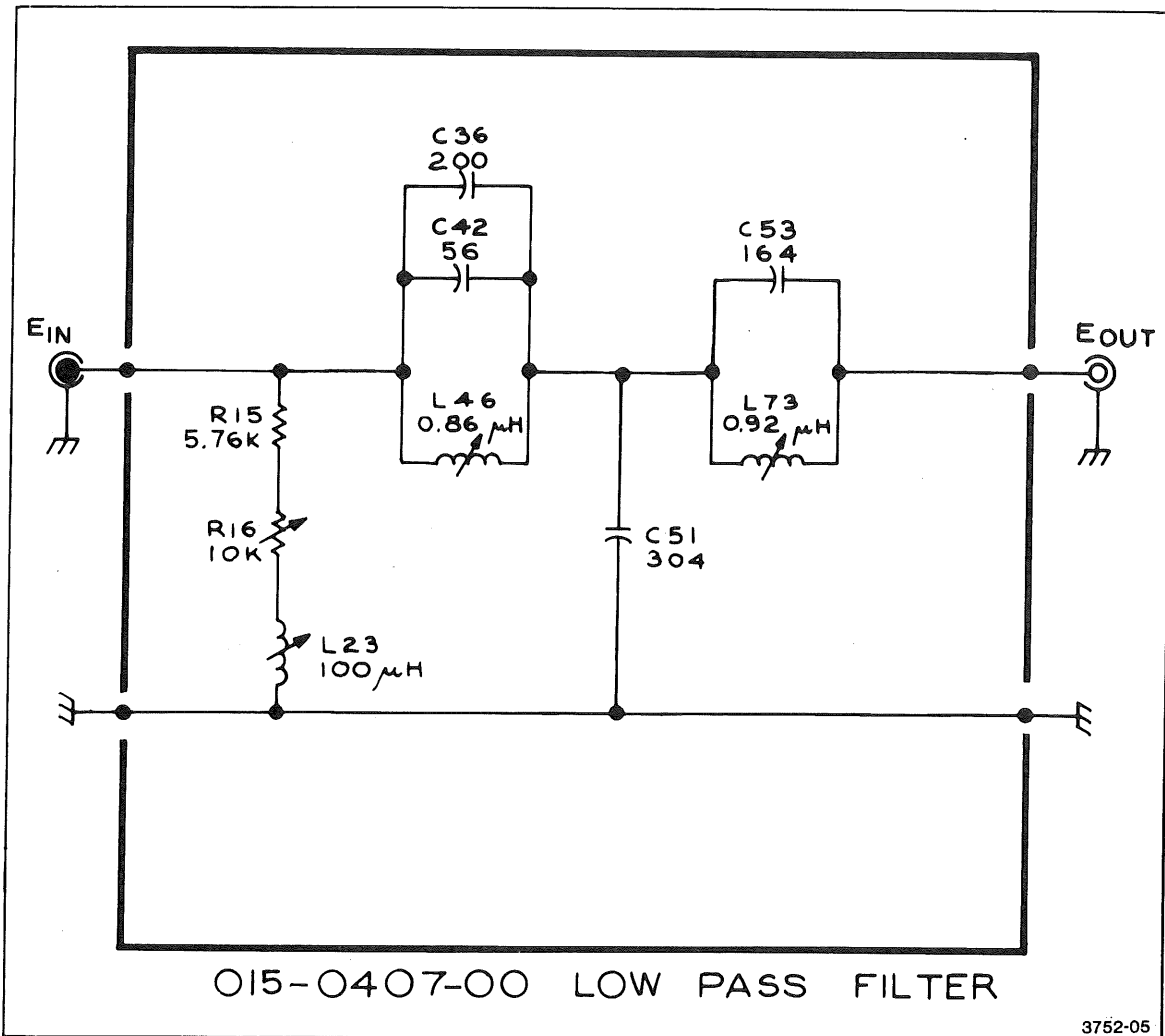


Figure 5. Schematic Diagram.

MAINTENANCE

Cleaning

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



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 of the filter's circuit board.

1. Isolate fault to equipment. Verify that the malfunction exists in the filter by checking the operation of the Video Amplitude Calibration Fixture, the 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 defects such as broken or loose connections, improperly seated components, chafed insulation, damaged components, and similar indications. Repair or replace any obvious defects.
3. Use the schematic diagram (Figure 5) as an aid in isolating the fault.

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 INPUT goes toward the male bnc connector. Pull away the upper half of the case.
3. Remove and replace defective parts as required. Refer to 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 the cover's correct orientation, and secure it with the four screws.
5. Replace the circuit board and secure it to the upper (labeled) half of the case with its two screws.
6. If electrical components were replaced, calibration may be necessary. Refer to the Performance Check and Adjustment section of the Instruction Sheet.
7. Replace the lower (unlabeled) half of the filter case and secure it with its four screws.

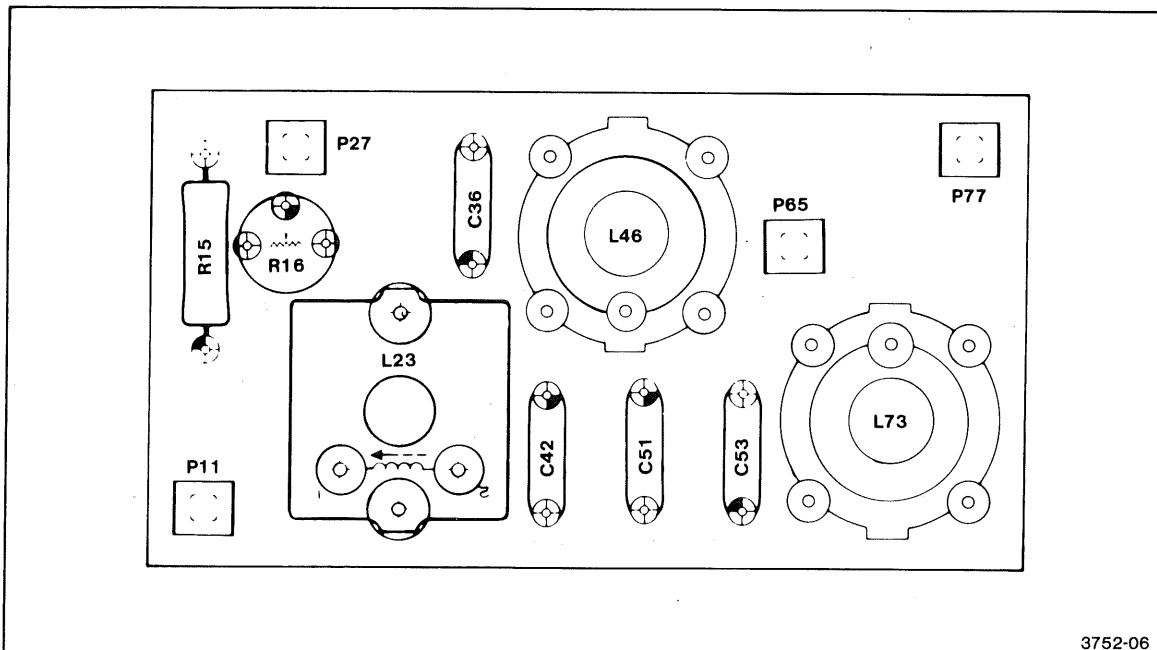


Figure 6. Component Locations.

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

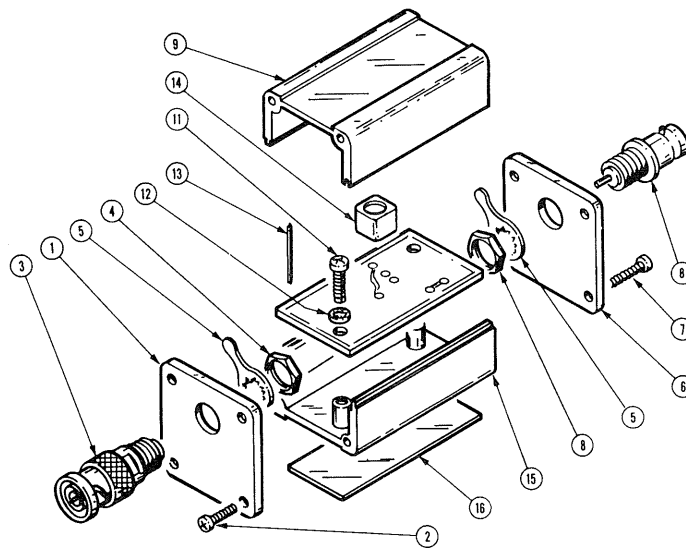
"	INCH	ELECTRN	ELECTRON	IN	INCH	SE	SINGLE END
#	NUMBER SIZE	ELEC	ELECTRICAL	INCAND	INCANDESCENT	SECT	SECTION
ACTR	ACTUATOR	ELECTLT	ELECTROLYTIC	INSUL	INSULATOR	SEMICOND	SEMICONDUCTOR
ADPTR	ADAPTER	ELEM	ELEMENT	INTL	INTERNAL	SHLD	SHIELD
ALIGN	ALIGNMENT	EPL	ELECTRICAL PARTS LIST	LPHLDR	LAMPHOLDER	SHLDR	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	SLEEVEING
AWG	AMERICAN WIRE GAGE	FLH	FLAT HEAD	NON WIRE	NOT WIRE WOUND	SPR	SPRING
BD	BOARD	FLTR	FILTER	OB	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
COPLG	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

REPLACEABLE ELECTRICAL PARTS

Component No.	Tektronix Part No.	Serial/Model No.		Name & Description	Mfr	
		Eff	Dscont		Code	Mfr Part Number
A1	670-7217-00			CKT BOARD ASSY:LOW PASS FILTER	80009	670-7217-00
A1C36	283-0672-00			CAP.,FXD,MICA D:200PF,1%,500V	00853	D155F2010F0
A1C42	283-0639-00			CAP.,FXD,MICA D:56PF,1%,100V	00853	D151E560F0
A1C51	283-0604-00			CAP.,FXD,MICA D:304PF,2%,300V	00853	D153F3040G0
A1C53	283-0671-00			CAP.,FXD,MICA D:164PF,1%,500V	00853	D155F1640F0
A1L23	114-0311-00			COIL,RF:65-190UH,CORE 276-0568-00	80009	114-0311-00
A1L46	114-0410-00			COIL,RF:VARIABLE,0.185-0.95UH	80009	114-0410-00
A1L73	114-0411-00			COIL,RF:VARIABLE,0.933UH-1.4UH	80009	114-0411-00
A1R15	321-0266-00			RES.,FXD,FILM:5.76K OHM,1%,0.125W	91637	MFF1816G57600F
A1R16	311-1268-00			RES.,VAR, NONWIR:10K OHM,10%,0.50W	32997	3329P-L58-103

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
32997	BOURNS, INC., TRIMPOT PRODUCTS DIV.	1200 COLUMBIA AVE.	RIVERSIDE, CA 92507
80009	TEKTRONIX, INC.	P O BOX 500	BEAVERTON, OR 97077
91637	DALE ELECTRONICS, INC.	P. O. BOX 609	COLUMBUS, NE 68601



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
1-1	200-1357-00			1						COVER, END:WEIGHTING NETWORK (ATTACHING PARTS)	80009	200-1357-00
-2	211-0062-00			4						SCREW, MACHINE:2-56 X 0.312 INCH, RDH STL	83385	OBD
-3	131-0602-00			1						CONNECTOR, RCPT, :BNC, FEMALE (ATTACHING PARTS)	80009	131-0602-00
-4	210-0413-00			1						NUT, PLAIN, HEX.:0.375-32 X 0.50 INCH, STL	73743	3145-402
-5	210-0255-00			2						TERMINAL, LUG:0.391" ID INT TOOTH	80009	210-0255-00
-6	200-1338-00			1						COVER, END:WEIGHTING NETWORK (ATTACHING PARTS)	80009	200-1338-00
-7	211-0062-00			4						SCREW, MACHINE:2-56 X 0.312 INCH, RDH STL	83385	OBD
-8	131-0955-00			1						CONNECTOR, RCPT, :CKT BD, 28/56 CONTACT	13511	31-279
-9	380-0210-01			1						HOUSING HALF:WEIGHTING NETWORK, ALUMINUM	80009	380-0210-01
-10	-----			1						CKT BOARD ASSY:LOW PASS FILTER(SEE A1 REPL) (ATTACHING PARTS)		
-11	211-0507-00			2						SCREW, MACHINE:6-32 X 0.312 INCH, PNH STL	83385	OBD
-12	210-0006-00			2						WASHER, LOCK:#6 INTL, 0.018THK, STL CD PL	78189	1206-00-00-0541C
-13	131-0592-00			4						CONTACT, ELEC:0.885 INCH LONG	22526	47353
-14	337-1417-00			1						SHLD, ELECTRICAL:0.55 SQ X 0.685 INCH HIGH	80009	337-1417-00
-15	380-0210-04			1						HOUSING HALF:WEIGHTING NETWORK, ALUMINUM	80009	380-0210-04
-16	334-4245-00			1						PLATE, IDENT:067-0916-00	80009	334-4245-00
STANDARD ACCESSORIES												
	070-3752-00			1						SHEET, TECHNICAL: INSTRUCTION	80009	070-3752-00

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
13511	AMPHENOL CARDRE DIV., BUNKER RAMO CORP.		LOS GATOS, CA 95030
22526	BERG ELECTRONICS, INC.	YOUR EXPRESSWAY	NEW CUMBERLAND, PA 17070
73743	FISCHER SPECIAL MFG. CO.	446 MORGAN ST.	CINCINNATI, OH 45206
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