Instructions

Tektronix

067-0912-00
Analog Test Card for 7854

062-4567-00

Please check for change information at the rear of this manual.

First Edition: February 1980

Printed in the U.S.A.

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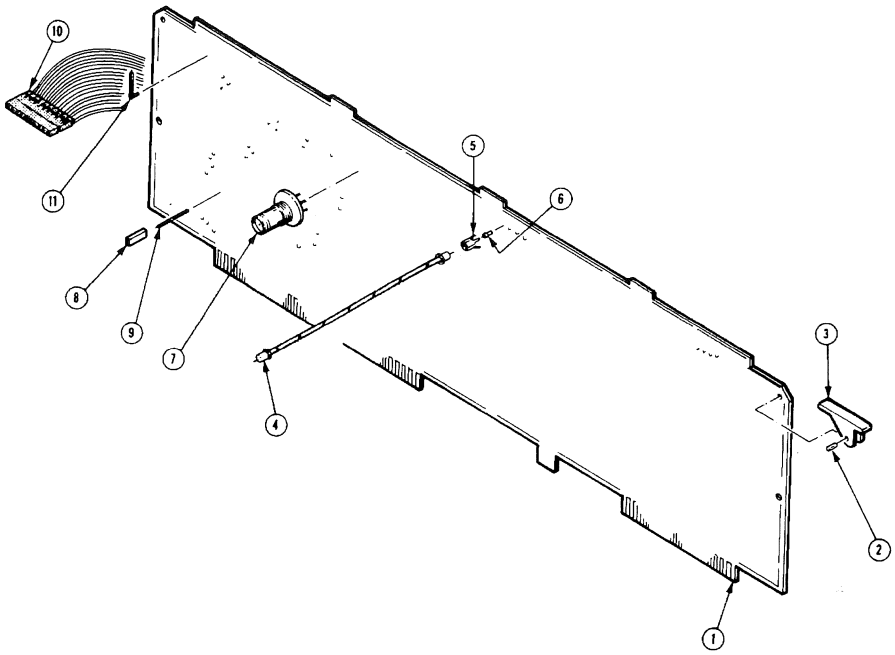
ANALOG TEST CARD FOR 7854

Part No. 067-0912-00



1.0 FUNTIONAL DESCRIPTION

1.1 OVERVIEW

The 067-0912-00 "7854 Analog Test Card" is used to replace the digital subsection of the 7854 oscilloscope for testing or trouble shooting the analog circuitry of the 7854. The analog test card consists of a single circuit board which plugs into P109 and P110 of the 7854 digital backplane (the "display" board slot -- A29). All other digital subsystem boards must be removed from the 7854 digital backplane in order to avoid bus conflict and assure proper operation of the analog test card.

The analog test card has no application other than testing and trouble shooting of the 7854 oscilloscope.

When the analog test card is installed, the following analog functions of the 7854 oscilloscope are not available:

1. The knob readout display system is disabled.

2. Front panel vertical and horizontal mode buttons are not initialized upon power up; the operational mode must be selected by pushing the mode buttons as soon as the 7854 mainframe is powered up.

All other analog functions of the 7854 oscilloscope (delayed sweep, all triggering options, etc.) are supported with the 067-0912-00 installed.

1.2 "SMART SUBSTITUTE" OPERATION

The analog test card allows operation of the analog scope without the 7854 digital subsection by monitoring the nine momentary contact mode switch buttons on the 7854 front panel (LEFT, ALT, ADD, CHOP, RIGHT, A, ALT, CHOP, and B). Whenever a mode switch button is pressed, the 067-912-00 hardware latches a bit code indicating which of the nine buttons was pressed. Vertical and horizontal mode buttons are latched separately. The mode switch buttons are monitored through a ten conductor ribbon cable supplied with the 067-0912-00 which runs between P420 of the analog test card and P9 of the mode switch and calibrator board (A2) of the 7854 mainfrmae. The pinout assignment for these connectors and ribbon cable are presented in table 1.1.

The mode switch data latched into the analog test card hardware is presented to the mode switch and calibrator board of the 7854 mainframe (through the 7854 digital data bus) where it is used to drive the front panel mode indicator lights and the mainframe logic board. This latching of the front panel mode switches will thus allow analog scope operation of the 7854 mainframe without the 7854 digital subsection.

1.3 OTHER ANALOG TEST FUNCTIONS

In addition to latching the front panel mode switches, the 067-912-00 7854 Analog Test Card provides the following test functions:

1. Termination resistors are provided for the following signal lines to/from the vertical and horizontal signal paths of the 7854 mainframe.

Vertical pickoff + Vertical pickoff –	>--51 Ohms with 0.1 UF
Horizontal pickoff	91 Ohm
RO-WFM X	51 Ohm
RO-WFM Y	51 Ohm

2. The following test points are provided to facilitate checking of the aux regulator power supplies:

TP100-1	Ground
TP100-2	+5 volts digital
TP100-3	+12 volts digital
TP100-4	–5 volts digital
TP100-5	–15 volts analog
TP100-6	+15 volts analog
TP100-7	+5 volts analog
TP100-8	Ground

3. The front panel mode switch lamps may be checked for functionality and uniformity of intensity with the 067-0912-00 7854 Analog Test Card. By removing jumper P430 from the 067-0912-00 and then pressing any of the nine front panel mode buttons, all front panel mode switch lamps will be lighted to allow intensity comparison. Jumper P430 must be reinstalled to allow normal analog scope operation.

4. In conjunction with the 067-0587-0X pulser, the 067-0912-00 7854 Analog Test Card will allow test and calibration of the vertical channel switch board (A19) of the 7854 mainframe. This is accomplished by connecting the pretrigger output signal from the pulser to the BNC connector on the analog test card and connecting the "XYINH" output line (J610) from the analog test card to the XYINH line on the 7854 mainframe (the XYINH cable is supplied with the 067-0912-00; the BNC cables are not). This will cause the vertical channel switch to switch signal paths at a rate determined by the 067-0587-0X pulser, thus facilitating test and calibration of the channel switch circuitry.

2.0 SPECIFICATIONS

2.1 ENVIRONMENTAL

All 7854 environmental specifications apply. The analog test card is intended for use over the calibration temperature range of the 7854 oscilloscope: +20 degrees C to +30 degrees C.

2.2 MECHANICAL

The 067-0912-00 7854 Analog Test Card has the same nominal dimensions as the digital display board (A29) of the 7854 oscilloscope.

2.3 ELECTRICAL

Power Consumption +5 volts DC at 250 MA maximum
+15 volts DC at 50 MA maximum
−15 volts DC at 50 MA maximum

3.0 INSTALLATION AND OPERATION

Complete installation and operating instructions for the Analog Test Card are contained in the 7854 Service Manual (Section, Maintenance).

4.0 CHECK-OUT PROCEDURE

The following procedure will check for proper operation of the Analog Test Card.

Equipment required:

1. 7854 oscilloscope
2. Test oscilloscope
3. Multimeter
4. Two 50 (ohm) BNC cables (at least 18 inches long)

4.1 INITIAL INSPECTION AND TEST SYSTEM SETUP

A. Check that the resistance between pins 1 and 2 of P620 (HORIZ) is 91 ohms (+/−)5%.

B. Check that the resistance between the center conductors of J720 (VERT −) and J725 (VERT +) is 102 ohms (+/−)5%.

C. Check that the resistance between the center conductor and the shield conductor of J805 (RO-WFM X) is 51 ohms (+/−)5%.

D. Check that the resistance between the center conductor and the shield conductor of J900 (RO-WWFM Y) is 51 ohms (+/−)5%.

E. Install the Analog Test Card in the 7854 oscilloscope as shown in the Maintenance section of the 7854 Service Manual.

Connect the 7854 to the 120 volt AC line and power up the system. Check the following voltages on the power supply test points:

TP100-1	Ground	
TP100-2	+5.0V	+5%, -0% TOL
TP100-5	−15.0V	(+/−)5% TOL
TP100-6	+15.0V	(+/−)5% TOL
TP100-7	+5.0V	+5%, -0% TOL
TP100-8	Ground	

Make sure these voltages are correct before proceeding.

4.2 LAMP TEST

A. Power down the system and remove jumper P420 from the analog test card.

B. Power up the system. At this point none of the lamps behind the nine mode switches (LEFT, ALT, ADD, CHOP, RIGHT, A, ALT, CHOP, B) should be lit.

C. Press any one of the mode switch buttons. All lamps should now light. If all of the lamps are lit proceed to the next step. Otherwise, troubleshoot U430, U530, and the data bus of the Analog Test Card.

4.3 MODE SWITCH INTERACTION TEST

A. Replace jumper P430. Press each 7854 Vertical Mode button and check that only that button of the Vertical Mode switch is lit.

B. Press each 7854 Horizontal Mode button and check that only that button of the Horizontal Mode switch is lit.

If the above checks are correct, proceed to the next step. Otherwise, disconnect the ribbon cable from J420 and short the appropriate pin (see Tabe 1.1 or schematic) to ground momentarily. If the proper button lights, the problem is in the 7854 mode switch or cable. If not, trouble shoot U220, U320, U420, U520, and U530 in the Analog Test Card.

4.4 PRETRIGGER INTERFACE TEST

A. Connect the calibrator output of the 7854 to J415 (PRETRIGGER IN) of the Analog Test Card. Set the Calibrator for 0.4 Volts P-P OUT.

B. Connect a probe from the vertical input of the bench scope to the center conductor of J610. Verify that this signal is a TTL level square wave (low level: 0.4 volts or less; high level: 3.5 volts or greater) that is the same frequency but opposite phase with the calibrator output signal.

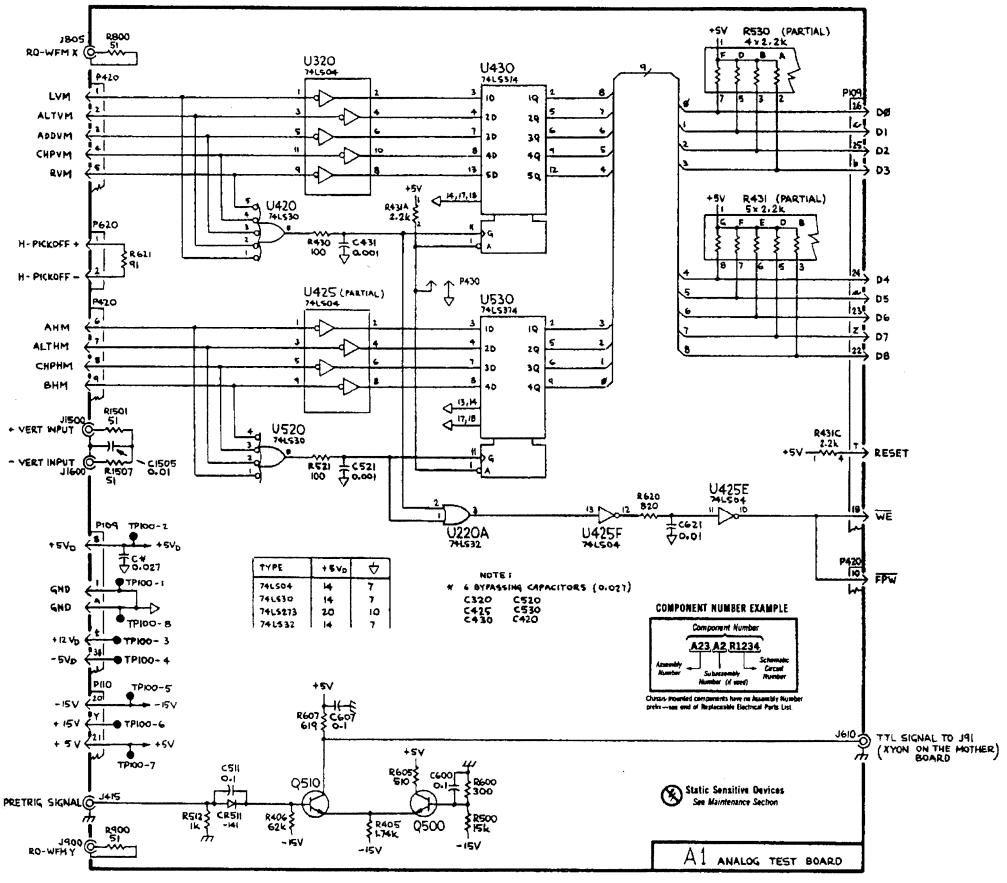
If the XYINH waveform is not correct, troubleshoot the circuitry around Q500 and Q510.

If the XYINH waveform is correct, the 067-0912-00 Analog Test Card has passed all tests and may be considered fully functional.

TABLE 1.1

PINOUT FOR P420 OF 067-0912-00

PIN NO.	SIGNAL NAME	DESCRIPTION
1	LVM	Low (<0.5V) when the left vertical mode button of the 7854 mode switches is pressed.
2	ALTVM	Low when the ALT vertical mode button of the 7854 mode switches is pressed.
3	ADDVM	Low when the ADD vertical mode button of the 7854 mode switches is pressed.
4	CHPVM	Low when the CHOP vertical mode button of the 7854 mode switches is pressed.
5	RVM	Low when the RIGHT vertical mode button of the 7854 mode switches is pressed.
6	AHM	Low when the A horizontal mode button of the 7854 mode switches is pressed.
7	ALTHM	Low when the ALT horizontal mode button of the 7854 mode switches is pressed.
8	CHPHM	Low when the CHOP horizontal mode button of the 7854 mode switches is pressed.
9	EHM	Low when the B horizontal mode button of the 7854 mode switches is pressed.
10	FPW	Low when any of the 7854 mode switches have been depressed. Indicates that the button code is latched and ready for presentation to the mainframe logic circuitry.



Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
	670-6320-00			CKT BOARD ASSY:SMART SUBSTITUTE	80009	670-6320-00
C320	281-0815-00			CAP.,FXD,CER DI:0.027UF,20%,50V	72982	8005D9AABW5R273M
C420	281-0815-00			CAP.,FXD,CER DI:0.027UF,20%,50V	72982	8005D9AABW5R273M
C425	281-0815-00			CAP.,FXD,CER DI:0.027UF,20%,50V	72982	8005D9AABW5R273M
C430	281-0815-00			CAP.,FXD,CER DI:0.027UF,20%,50V	72982	8005D9AABW5R273M
C431	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-518-Z5D0102J
C511	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M
C520	281-0815-00			CAP.,FXD,CER DI:0.027UF,20%,50V	72982	8005D9AABW5R273M
C521	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-518-Z5D0102J
C530	281-0815-00			CAP.,FXD,CER DI:0.027UF,20%,50V	72982	8005D9AABW5R273M
C600	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M
C607	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8121-N088Z5U104M
C620	281-0773-00			CAP.,FXD,CER DI:0.01UF,10%,100V	72982	8005H9AADW5R103K
C1505	281-0773-00			CAP.,FXD,CER DI:0.01UF,10%,100V	72982	8005H9AADW5R103K
CR511	152-0141-02			SEMICOND DEVICE:SILICON,30V,50NA	01295	1N4152R
Q500	151-0223-00			TRANSISTOR:SILICON,NPN	80009	151-0223-00
Q510	151-0223-00			TRANSISTOR:SILICON,NPN	80009	151-0223-00
R405	323-0216-00			RES.,FXD,FILM:1.74K OHM,1%,0.50W	75042	CECT0-1741F
R406	315-0623-00			RES.,FXD,CMPSN:62K OHM,5%,0.25W	01121	CB6235
R430	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R431	307-0596-00			RES NTWK,FXD FI:7,2.2K OHM,2%,1.0W	91637	CSP08G01222G
R500	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
R512	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R520	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R521	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R530	307-0596-00			RES NTWK,FXD FI:7,2.2K OHM,2%,1.0W	91637	CSP08G01222G
R600	315-0301-00			RES.,FXD,CMPSN:300 OHM,5%,0.25W	01121	CB3015
R605	315-0511-00			RES.,FXD,CMPSN:510 OHM,5%,0.25W	01121	CB5115
R607	322-0173-00			RES.,FXD,FILM:619 OHM,1%,0.25W	75042	CEBT0-6190F
R620	315-0821-00			RES.,FXD,CMPSN:820 OHM,5%,0.25W	01121	CB8215
R621	315-0910-00			RES.,FXD,CMPSN:91 OHM,5%,0.25W	01121	CB9105
R800	315-0510-00			RES.,FXD,CMPSN:51 OHM,5%,0.25W	01121	CB5105
R900	315-0510-00			RES.,FXD,CMPSN:51 OHM,5%,0.25W	01121	CB5105
R1501	317-0510-00			RES.,FXD,CMPSN:51 OHM,5%,0.125W	01121	BB5105
R1507	317-0510-00			RES.,FXD,CMPSN:51 OHM,5%,0.125W	01121	BB5105
U220	156-0479-02			MICROCIRCUIT,DI:QUAD 2-INP OR GATE	80009	156-0479-02
U320	156-0385-02			MICROCIRCUIT,DI:HEX INVERTED	80009	156-0385-02
U420	156-0465-02			MICROCIRCUIT,DI:8 INP NAND GATE	80009	156-0465-02
U425	156-0385-02			MICROCIRCUIT,DI:HEX INVERTED	80009	156-0385-02
U430	156-0982-00			MICROCIRCUIT,DI:OCTAL D EDGE TRIG F-F	80009	156-0982-00
U520	156-0465-02			MICROCIRCUIT,DI:8 INP NAND GATE	80009	156-0465-02
U530	156-0982-00			MICROCIRCUIT,DI:OCTAL D EDGE TRIG F-F	80009	156-0982-00

REPLACEABLE PARTS LIST

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-	067-0912-00			1		FIXTURE,CAL:7854 ANALOG TEST CARD	80009	067-0912-00
-1	----- -----			1		. CKT BOARD ASSY:SMART SUBSTITUTE(SEE EPL)		
-2	214-1337-00			2		. . PIN,SPRING:0.10 OD X 0.25 INCH L,STL	80009	214-1337-00
-3	105-0160-00			2		. . EJECTOR,CKT BD:WHITE PLASTIC	80009	105-0160-00
-4	175-2929-00			1		. . CABLE ASSY,RF:50 OHM COAX,18.0 INCH LONG	80009	175-2929-00
-5	131-1003-00			5		. . CONN,RCPT,ELEC:CKT BD MT,3 PRONG	80009	131-1003-00
-6	136-0252-07			5		. . SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-7	131-2010-00			1		. . CONN,RCPT,ELEC:BNC,FEMALE	91836	KC79-225
-8	131-0993-00			1		. . BUS,CONDUCTOR:2 WIRE BLACK	00779	530153-2
-9	131-0608-00			2		. . TERMINAL,PIN:0.365 L X 0.25 PH,BRZ,GOLD PL	22526	47357
-10	175-2734-00			1		. . CA ASSY,SP,ELEC:19.0 INCH LONG	80009	175-2734-00
	352-0168-03			2		. . . CONN BODY,PL,EL:10 WIRE ORANGE	80009	352-0168-03
-11	131-0589-00			20		. . TERM,PIN:0.46 L X 0.025 SQ.PH BRZ GL	22526	47350
						STANDARD ACCESSORY		
	062-4567-00			1		DATA SHEET:067-0912-00	80009	062-4567-00

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
00779	AMP, INC.	P O BOX 3608	HARRISBURG, PA 17105
01121	ALLEN-BRADLEY COMPANY	1201 2ND STREET SOUTH	MILWAUKEE, WI 53204
01295	TEXAS INSTRUMENTS, INC., SEMICONDUCTOR GROUP	P O BOX 5012, 13500 N CENTRAL EXPRESSWAY	DALLAS, TX 75222
22526	BERG ELECTRONICS, INC.	YOUK EXPRESSWAY	NEW CUMBERLAND, PA 17070
72982	ERIE TECHNOLOGICAL PRODUCTS, INC.	644 W. 12TH ST.	ERIE, PA 16512
75042	TRW ELECTRONIC COMPONENTS, IRC FIXED RESISTORS, PHILADELPHIA DIVISION	401 N. BROAD ST.	PHILADELPHIA, PA 19108
80009	TEKTRONIX, INC.	P O BOX 500	BEAVERTON, OR 97077
91637	DALE ELECTRONICS, INC.	P. O. BOX 609	COLUMBUS, NE 68601
91836	KINGS ELECTRONICS CO., INC.	40 MARBLEDALE ROAD	TUCKAHOE, NY 10707