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\* ALL SERVICE QUESTIONS FROM EUROPE, MIDDLE EAST, \*  
\* AND AFRICA SHOULD BE ADDRESSED TO THE TEKTRONIX \*  
\* EUROPE B.V. SERVICE GROUP IN THE NETHERLANDS. \*  
\*\*\*\*\*

TEKTRONIX INTERNAL USE ONLY

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## YOU DONE GOOD & PERSONNEL CHANGES



you done  
GOOD,

Our "You Done Good" award this week goes to GARY SEWELL in Dallas for sending in the disk that resulted in identifying a spooler bug in DOS/50. This is a good example of how a little extra effort by field personnel can result in system performance improvement and/or reliability improvement.

\*\*\*\*\*

### NEW HIRES

CHRIS KUDYM - Remote technician in Omaha, Nebraska

Chris comes to Tek with experience at Wang Lab, Inc., Control Data Corporation and nine years in the U.S. Navy as an E.T. He is now working out of the Kansas City Field Office as a remote technician in Omaha. We feel this is of great benefit to our Omaha customers and are happy to have Chris serving them.

Welcome Chris!

JACK ROTH - CLEVELAND

Jack will be working as the shipping and receiving clerk for the Cleveland Service Center.

Welcome Jack!

## PROMOTIONS

The following promotions have been announced in the Santa Clara Service Team.  
Congratulations to:

BOBBIE MARTINEZ to FSS III

GARY BEAM to ET III

RON LUDWIG to FSS II

BUI TRUONG to ET II

### MYRON TSUN

Myron has been promoted to FSS II in the Western Service Region.

Congratulations Myron!

### RUSS SWANSON - CHICAGO

Russ has been promoted to FSS III.

Congratulations Russ!

### NANCY LANGE

Nancy has been promoted to FSS I in the Indianapolis Field Office.

Congratulations Nancy!

### RON HOLLINGSWORTH

Ron has been promoted to Electronic Technician II.

Congratulations Ron!

### LARRY ANDERSON

Larry has been promoted to FSS II.

Congratulations Larry!

GENERAL

NEW TOOLS AND SUPPLIES ORDERABLE FROM CSG

<u>Part Number</u>	<u>Description</u>
002-1783-00	11.5" x 10" x 1.5" Padded Case w/zipper. Used to carry most-often-used-tools on-site.
003-0643-00	Soldering Iron Tip Cleaner. Container w/4 sponges positioned vertically.
003-0644-00	Replacement Sponges for 003-0643-00.
003-0961-00	Berg Connector Crimp Tool. Crimps mini con- nectors 131-0707-00 and 131-0708-00.
003-0962-00	Berg Connector Crimp Tool. Crimps maxi con- nector 131-0621-00.
003-0968-00	Tweezer, Square-Tipped, Johanson #8758.
006-4640-00	Case 22.88" long x 17.46" wide x 9" deep. The depth is split to 3" top and 6" bottom. Used to carry bulky and shock-sensitive modules on-site.
006-4641-00	Case 17.01" long x 11.49" wide x 11" deep. The depth is split to 4" top and 7" bottom.
006-4642-00	Case 22.88" long x 11.49" wide x 12" deep. The depth is split to 4.5" top and 7.5" bottom.
006-3924-00	Safety Goggles, Must be worn to protect eyes while handling CRT's.
006-7661-00	Loctite 496-50. Bonds plastic to metal.

--Tom Fox  
53/108, Ext. 8697

## SERVICE UPDATE PROGRAMS STATUS

Please use this article to update your lists of approved Service Update Programs.

Service Update Programs are driven by Service Support for implementing special product modifications which correct either of the following:

1. Safety Hazards
2. Performance Deviations

In the U.S., these expenses are identified to Activity Code 18. All other modification categories are billable or covered by warranty, maintenance agreement, and rental. All Service Update Programs are authorized by Business Unit and Service Support management.

--Don Taylor  
56-063, Ext. 8651 MR

(ARTICLE CONTINUED ON THE NEXT PAGE)



SYSTEMS SERVICE UPDATE PROGRAMS  
Wally Karstad  
x1285, 92-236

Revised 9/10/81

Service Update #	Product/Option	Description	Part Number of Kit	Status	Publication	Comments
2000	834R03	Firmware change	045-0018-00	Active	S0B 11/18/80	Kits available.
--	634	High Voltage Mode	--	--	--	Wilsonville
--	851	Ohm Mode	045-0003-00	Active	Wizard	To be closed Apr 82
2001	CG551AP	Firmware update	045-0020-00	Terminated	Service Update Plan 12/18/80 1/30/81	Replaced by update #2005
2002	1803/04/05	Safety Mod	045-0024-00 045-0024-01 045-0024-02	Active	July 10, 1981 S0B	Mandatory update install as soon as possible
2003	834R02	Firmware Update	045-0022-00	Active	Wizard May 81	Kit to be available June 81.
2005	CG551AP	Relay Mod	045-0025-00	Active	Service Update Plan 8/3/81	Kits available

TEST & MEASURE T  
SERVICE UPDATE PROGRAMS

Todd Paulus  
x8685, 53-108

Revised 9/10/81

Service Update #	Product/Option	Description	Part Number of Kit	Status	Publication	Comments
--	7L18	Spot-of-Gold Connectors	Return to Beaverton	Active	SOB 10/6/80	Will be completed by AP305
--	5000/7000	Spot-of-Gold Connectors	175-xxxx-xx	Complete	Wizard 4/4/80	Terminates AP109
--	T900	Intermittent Vertical Attenuators	343-0564-00 343-0565-00	Complete	Wizard 12/17/80	Terminates 1/1/81
--	413	Power Supply	040-0961-00	Active	SOB 5/6/80 Wizard 6/13/80	Safety corrective action - run indefinitely.
--	C30B	X-sync wiring error	no parts	Active	SOB 5/6/80	Terminate 12/31/80
--	221	Power Supply Insulation	045-0016-00	Active	SOB 5/30/80	Safety corrective action - will run indefinitely.
--	7D15	Socket rework	10 + sockets return to Beaverton	Complete	SOB 7/24/79	Terminates AP109
--	Model 3 Scopecart	Waber Power Strip Replacement	Exchange - Beaverton	Active	IOC 6/18/80	Safety corrective action-will run indefinitely.
--	TV Instruments	Spot-of-Gold Socket Rework	Return to Beaverton	Active	SOB 11/1/79	Terminates AP204 Return via manufacturing Repair and Return Program.
--	7904/R7903 7704A	CRT X-Ray Mod	Multiple parts (See Wizard)	Complete	SOB 8/4/78 Wizard 9/29/78	Safety corrective action-will run indefinitely.

TEST & MEASUREMENT  
SERVICE UPDATE PROGRAMS

Todd Paulus  
x8685, 53-108

Revised 9/10/81

Service Update #	Product/Option	Description	Part Number of Kit	Status	Publication	Comments
3001	1502/1503	Battery Pack Mod	040-0971-00	Active	IOC 12/17/80	Terminates June 30, 1982.
3002	468	SCR Replacement	045-0023-00	Active	Wizard 4/10/81	Will run indefinitely.
3003	468	Firmware update	050-1517-00	Active	Wizard 7/31/81	Will run thru FY200
3004	1912	Reliability Problem	040-1040-00	Active	S08 9/10/81	Will run indefinitely.

# IDD SERVICE UPDATE PROGRAMS

Dick Schilling  
x3931, 63-503

Revised 9/10/81

Service Update #	Product/Option	Description	Part Number of Kit	Status	Publication	Comments
102	4014, 15, 16, Opt 5	F/W update to V3.0 charged to Code 18	045-0014-00	Complete	Svc Update Plan 4/4/80	Completion Wizard to be published in this or next printing. Svc Update termination plan is being written. This was a mandatory update replaced by 040-0990-00.
104	4663*	Fuse holder bracket replacement, potential safety problem charge to Code 18.	040-0932-00	Active	IOC - Steve Prunty - Jim Tiano 5/5/80	Mandatory Safety Update
110	4924*	Charge to Code 18 to make compatible with 4052.	V1 to V4 050-0860-02 V2 to V4 050-0942-01 V3 to V4 050-0924-01	Active	4052 Svc Impact notice	To be performed as needed.
114	4081*	Mod to Floating Point processor charged to Code 18.	050-1218-00	Active	Wizard 1/25/80 Update Plan 1/16/80	All kits shipped waiting return of Floating Point processors.
1023	4663	Major Mod Interim level fix Phase I Final fix Phase II	046-0002-00	Active	Service Update Plan 8/27/80	Update of approximately 300 4663 - Phase I of two phase program.

(ARTICLE CONTINUED ON THE NEXT PAGE)

IDD SERVICE UPDATE PROGRAMS

Dick Schilling  
x3931, 63-503

Revised 9/10/81

Service Update #	Product/Option	Description	Part Number of Kit	Status	Publication	Comments
1025	4054	Placing electronic relay in power line circuit.	045-0017-00	Active	Svc Update Plan 12/10/80	Specification corrective action.
1026	4052 R09	Firmware update	045-0019-00	Active	Svc Update Plan 12/10/80	Fixes firmware "bugs" which causes unit to hang busy.
<p>*Note: This update program was under development before current 045/046 kit update program guidelines and therefore uses another type of parts kit.</p>						

## ADMINISTRATIVE SUPPORT

### SERVICE RECORD PROCESSING; DOA PRODUCTS

Reporting of DOA products is an important part of the failure reporting process. The responsibility of reporting DOA products rests on all service personnel whether the product is in the IDD, ID or Systems area.

A product which a customer, upon initial receipt, is unable or refuses to use because it does not meet published specifications or reasonable expectations. These situations should be reported as "DOA".

"Normal expectations" includes such things as missing lettering, broken or missing knobs, shipping damage, etc.

DOA's should be reported in the PROBLEM DESCRIPTION/ACTION TAKEN block of the service records. Enter the line item number of the product, the letters "DOA" and a short explanation of why the product is being reported as DOA (see example below under PROBLEM DESCRIPTION/ACTION TAKEN).

### Problem Description/Action Taken

Remarks placed in the block of the service records should be keyed to the appropriate product through use of the line item number.

0

	PRODUCT TYPE
1	475
2	485
3	

Problem Description Action Taken

① NO SIGNAL DISPLAY - REPLACED LOOSE BNC ② DOA - CH2 VOLTS/DIV  
KNOB MISSING LETTERING

--Bill Duerden  
56-037, Ext. 8938

# INFORMATION DISPLAY DIVISION

## MEASUREMENT DISPLAY

### 611 HIGH VOLTAGE CAPACITOR MODIFICATION 43496

Some of the capacitors in the 611 high voltage have shown poor reliability. Those on the high voltage circuit board are C481, C482, C497 and C498. Those between the terminal strips are C470, C480 and C492.

Corporate modification 43496 calls for the replacement of all the above ceramic capacitors with equivalent or better-than Mylar tubular devices. The table below gives the part numbers of the components involved. Note that the hardware supporting the circuit board capacitors also changes.

<u>Circuit No.</u>	<u>Old Value</u>	<u>New Value</u>	<u>New Part Number</u>
C470	.0068 @ 6KV	.0068 @ 5KV	285-0509-01
C480	.0068 @ 6KV	.0068 @ 5KV	285-0509-01
C481	.01 @ 5KV	.022 @ 8KV	285-1202-00
C482	.01 @ 5KV	Not Used	--
C492	.0068 @ 6KV	.0068 @ 5KV	285-0509-01
C497	.01 @ 5KV	.022 @ 8KV	285-1202-00
C498	.01 @ 5KV	Not Used	--
Mounting Clips (4)			344-0244-00

As a result of this capacitor mod, the various 611 high voltage board numbers change as follows:

670-0561-01 changes to 670-0561-02 (Customer Service)

670-0837-01 changes to 670-0837-13 (Customer Service)

670-0837-02 changes to 670-0837-14 (Customer Service)

670-0837-05 changes to 670-0837-15 (Customer Service)

670-0837-10 changes to 670-0837-12 (Current Production)

The effective serial number is B228722.

(ARTICLE CONTINUED ON THE NEXT PAGE)

## 611 HIGH VOLTAGE CAPACITOR MODIFICATION 43496 (continued)

This modification should be installed whenever convenient into all 611 monitors with orange or red (Sprague or Erie) ceramic capacitors in the above mentioned circuit locations. This is not a Code 18 update. This is a reliability improvement free of charge to customers with maintenance agreements and billable to all others.

Please note that a blue variety of capacitor made by Murata has shown excellent reliability and need not be changed.

--George Kusiowski  
63-503, ex. 3928

## 634 PERFORMANCE MODIFICATION #43894

Modification 43894 calls for the addition of some components and changing values of others to enhance performance of the 634 monitor. A list of parts affected is given in the table below. These parts and instructions for installation are available in kit 040-1039-00.

<u>Circuit No.</u>	<u>Old Value</u>	<u>New Value</u>	<u>New Part No.</u>
C25	---	22 pf	281-0759-00
C350	2200 pf	220 pf	283-0108-00
C353	1.0 uf	3.3 uf	290-0744-00
C438	---	.02 uf	283-0430-00
E324	---	Ferrite Bead	276-0532-00
E325	---	Ferrite Bead	276-0532-00
R25	---	1.8 K $\Omega$	315-0182-00
R232	390 $\Omega$	402 $\Omega$	321-0155-00
R353	51 $\Omega$	10 $\Omega$	315-0100-00
R438	---	100 K $\Omega$	315-0104-00
Terminal	---	---	131-0157-00
Insulation	---	1.5 inches	162-0042-00

### Yoke Driver Boards:

One of the vertical deflection output transistors, Q330, occasionally needs hand selection for high beta. A low beta device causes a high current draw on the +55 volt supply (measured at TP353). To eliminate the need for selecting Q330, the current capability of the +55 volt supply has been increased. This has been done by changing the value of C353 from 1.0 uf to 3.3 uf and R353 from 51 ohms to 10 ohms.

The very top of a raster sometimes displays a "top hook" due to the sluggish response of U350 after the vertical retrace interval. To correct this, C350 is changed from 2200 pf to 220 pf.

(ARTICLE CONTINUED ON THE NEXT PAGE)



Crossover noise from the horizontal amplifier can feed into the vertical amplifier through C326 and its ground connection. This causes the vertical amplifier to swing momentarily at horizontal crossover and produce a vertical line (or series of lines) at midscreen or just to the right of midscreen. To correct this, two ferrite beads are added, E324 and E325, one around each lead of C326.

The above changes roll the standard yoke driver board part number from 670-5594-03 to 670-5594-04. The option 15 board rolls from 670-6122-02 to -03.

#### Sync Separator Board:

Customers have objected to the 634's tendency to produce line pairing. Line pairing is caused by the coupling of the horizontal retrace pulse into the vertical ramp generator. The problem is solved by changing the value of R232 from 390 ohms to 402 ohms. This changes the part number of the sync separator board from 670-5596-01 to -02.

#### Interface Boards:

Focus uniformity has been adversely affected by an offset in the dynamic focus waveform. To correct this, a series RC circuit (R25 and C25) is added in parallel to R23. This is depicted in the schematic of figure 1. The addition of these two components changes the standard interface board from 670-5592-03 to -04 and the option 14 board from 670-5965-01 to -02.

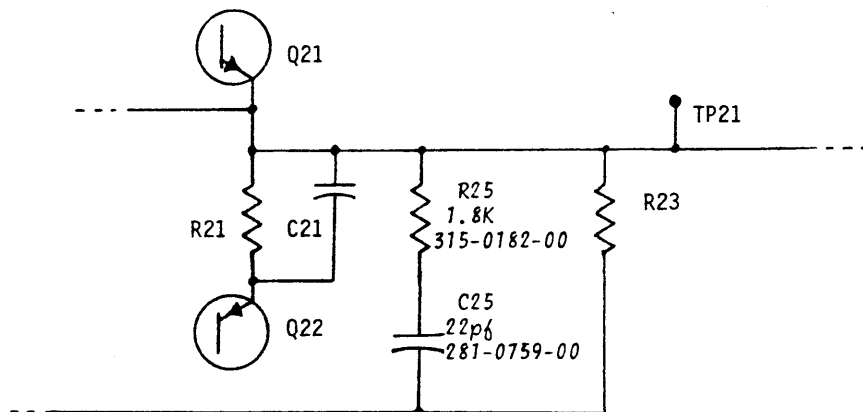


Figure 1. Addition of C25 and R25 to dynamic focus circuitry.

#### High Voltage Supply Boards:

Visible noise in the raster has been caused by ripple in the +62 Volt supply. To reduce this ripple (and the noise), C438 and R438 are added to the back side of the high voltage boards. This is not a straight forward "Tee-Pee" and must be done in the following manner.

(ARTICLE CONTINUED ON THE NEXT PAGE)

- Relocate RV137 to the position shown in figures 2 and 3. The functioning and schematic representation of RV137 does not change.
- Install a terminal post (131-0157-00) in the tooling hole near the number 1 lead of T410 (high voltage transformer).
- Add C438 from ground to the terminal. Protect the lead to the terminal with 1/2" of 162-0042-00 sleeving.
- Solder in R438 between the pad shown in figure 2 (junction of C437 and wiper of R435) and the terminal. Cover the whole resistor with a 1" length of 162-0042-00 sleeving to prevent it from shorting to nearby components or the underlying ground run.
- Solder the 9-5 (white background, green stripe) CRT lead to the terminal.

The addition of these components changes the standard high voltage board from 670-5593-02 to 670-5593-03, and the option 15 high voltage board from 670-6403-01 to 670-6403-02.

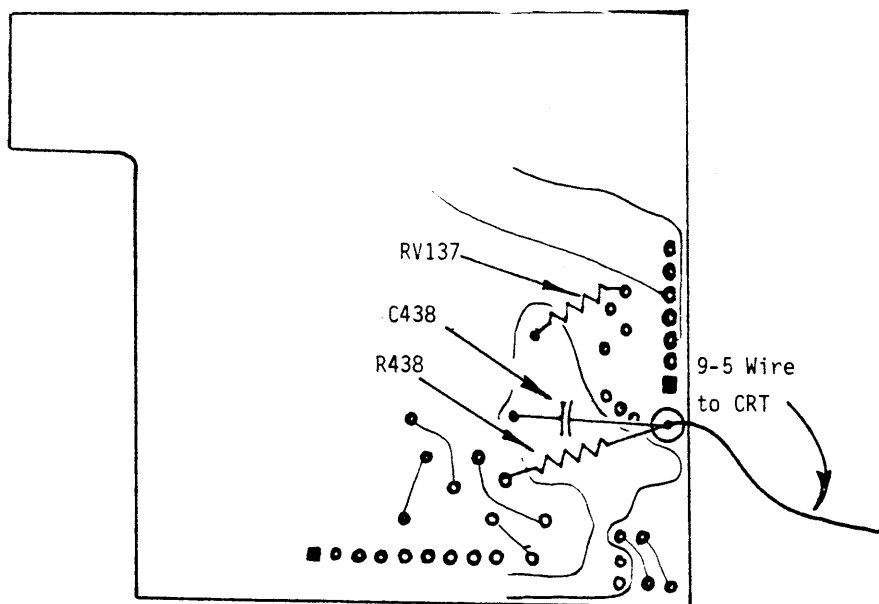


Figure 2. Component layout on back of high voltage board.

(ARTICLE CONTINUED ON THE NEXT PAGE)

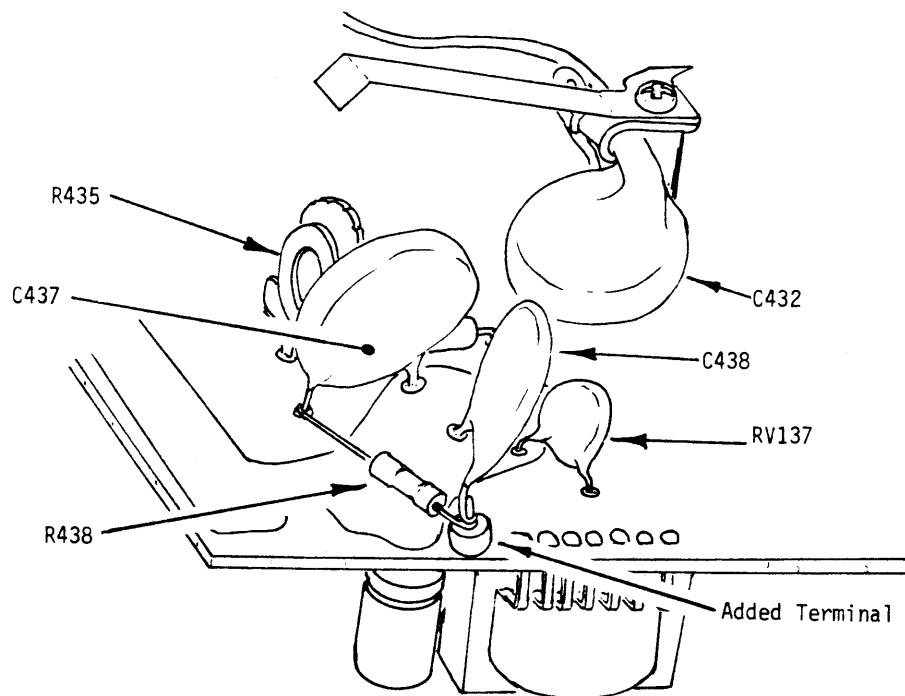


Figure 3. Appearance of components on back of high voltage board.

Modification 43894 is effective starting serial number B045287. Any earlier product displaying the above mentioned problems should have this modification installed.

--George Kusiowski  
63-503 EXT. 3928 (WI)

## LABORATORY INSTRUMENT DIVISION

### TM500

#### CG551AP RELAY MODIFICATION CLARIFICATION

REFERENCE KIT #045-0025-00

Step 4 of the mod kit instructs the installer to remove R1328, a 50.5 $\Omega$  resistor from the A7 Output Board. The instructions do not, however, tell you to install R1328 on the Attenuator Compensation Board from the kit. R1328 must be installed on the Attenuator Compensation Board before the board is mounted on the A7 Output Board. If you have any questions, please call.

--Terry Turner  
92-236, Ext. 1288

#### TM500 REAR INTERFACE DATA BOOK

The latest version of the TM500 Rear Interface Data Book, Part Number 070-0088-03 is available. This book gives useful information not found in the instruction manual for rear interfacing TM500 instruments.

--Terry Turner  
92-236, Ext. 1288

### 5000 SERIES

#### 5441: HORIZONTAL PARTS LOCATOR ERROR - S/N B09286 & UP

Reference: Manual Change Reference M31626

On page 7 of the change information, which shows the component locations, the resistor directly below R257 is labeled R255. It should be labeled R260. Also, the NPR is in error by listing R257, P/N 305-0182-00 as not available. It is available, orderable and will be corrected in the next NPR update.

--John Eaton  
53/108, Ext. 8689

## 7000 SERIES

### 7104, 7854 LOW LINE, HIGH LOAD, POWER SUPPLY SHUTDOWN

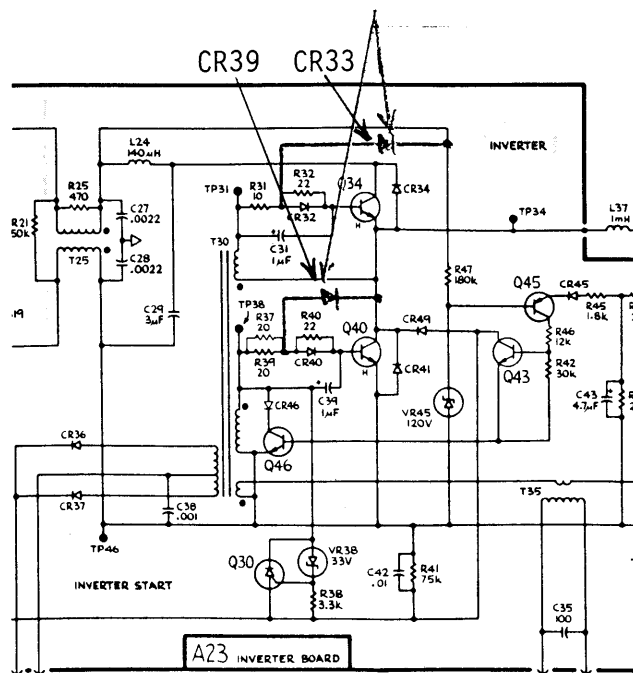
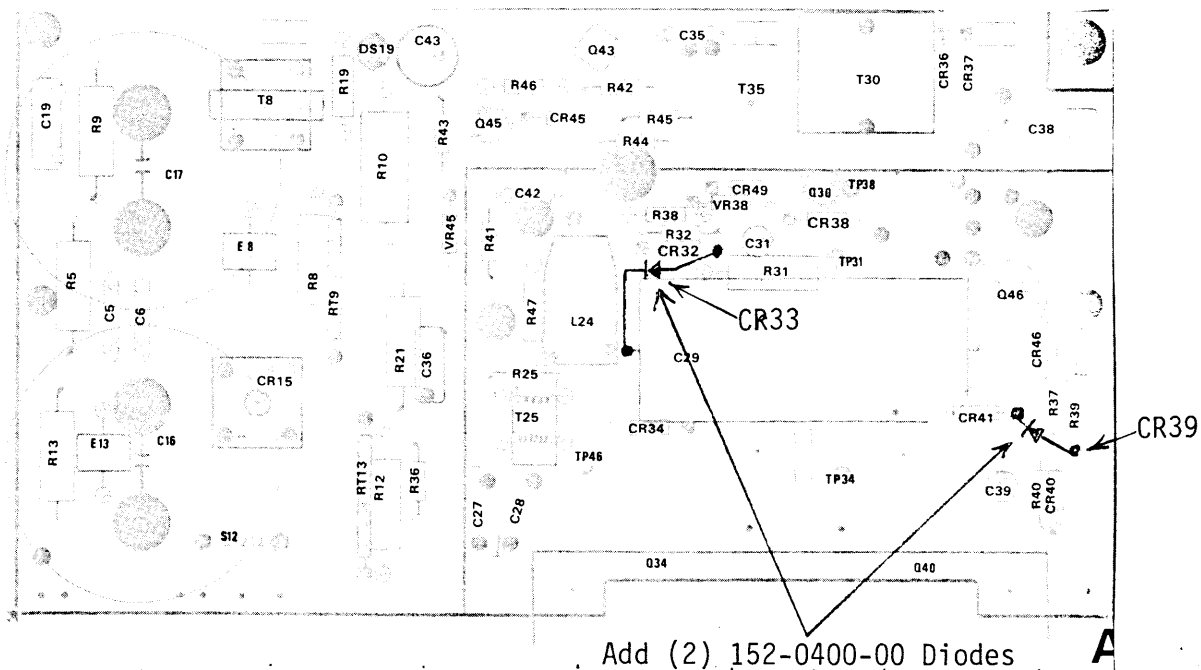
Reference: 7104 Instruction Manual P/N 070-2314-00  
7854 Instruction Manual P/N 070-2874-01  
Corporate Mod #M43813

The problem was originally solved by corporate mod #42248, by selecting the inverter transistors and part numbering them 151-0632-03. The vendor is having problems supplying this part, so this part will be deleted and the following mod added.

The following description and drawings will use the 7854 part numbers, so refer to the manual for the corresponding 7104 part numbers. Add CR33, P/N 152-0400-00, from the collector of Q34 to junction of R31 and R32. Add CR39, 152-0400-00, from collector of Q40 to the junction of R39 and R40.

To use up old stock, either transistor 151-0632-03 or 151-0632-00 may be used when the diodes have been installed. See attached drawings for physical and schematic placement.

(ARTICLE CONTINUED ON THE NEXT PAGE)



--John Eaton  
53/108, Ext. 8689

COMMUNICATIONS DIVISION

SPECTRUM ANALYZERS

492/P, 496/P MICROPROCESSOR LOCK-UP DURING TURN-ON

Reference: Corporate Mod #43249

Intermittently, U4035, the 6875 clock IC on the microprocessor board (A58 P/N 670-5542-00), will start at three times its normal frequency causing the microprocessor not to initialize. This appears as a catastrophic failure to the user.

To prevent U4035 from oscillating on the third harmonic of 3.4133 MHz, replace A58C4038. A 180PF capacitor with a 220PF capacitor, P/N 283-0625-00. Also remove A58R3034, a 2.7 ohm resistor, and replace it with a wire strap, P/N 131-0566-00. (See WIZARD WORKSHOP article, April 28, 1981.)

An 050-1528-00 Kit was set-up for the replacement of U4035 in the 492 S/N B010100 to B013419; 492P S/N B010100 to B041659; 496 S/N B010100 to B010110; 496P S/N B010100 to B010110.

This kit includes: 1 EA A58W3034 P/N 131-0566-00 Wire Strap  
1 EA A58U4035 P/N 156-1086-00 IC  
1 EA A58C4038 P/N 283-0625-00 220pf Capacitor

--Rich Kuhns  
53/108, Ext. 8693

## TELEVISION PRODUCTS

### PRINTOUT PORT: ANSWER SERVICE BULLETIN #16

Since the Option 1 software assumes that all printouts are sent to physical port 0, patches are necessary to send those printouts to other devices via other ports.

For instance, if you wish to send data through the auto-call port (port 3), either of the following patches may apply.

- A. To send printouts of measurement errors to port 3, create and store "OUTLIM. PCH" in NVMO: or NVM1: .

15001 ! OUTLIM. PCH

15010 T=3

- B. To send the first and scheduled reports to port 3, create and store "REPORT.PCH" in NVMO: or NVM1: .

15001 ! REPORT. PCH

15010 T=3

If, for instance, a line printer was attached to port 4, line 15010 could be changed to read--

15010 T=4

--in either of the examples above. The line printer would then be a "document generator" leaving out control and operations codes that the user might be exercising at the master terminal (port 0).

--Bill Bean  
53/108, Ext. 8695



## 147 CIRCUIT BOARD (VIT INSERTION)

Due to the economic infeasibility of making new raw circuit boards, and the low demand, the 670-1468-00 circuit board assembly is being discontinued. Many of its common sub-parts will still be available throughout the remaining 1 1/2 years of support life.

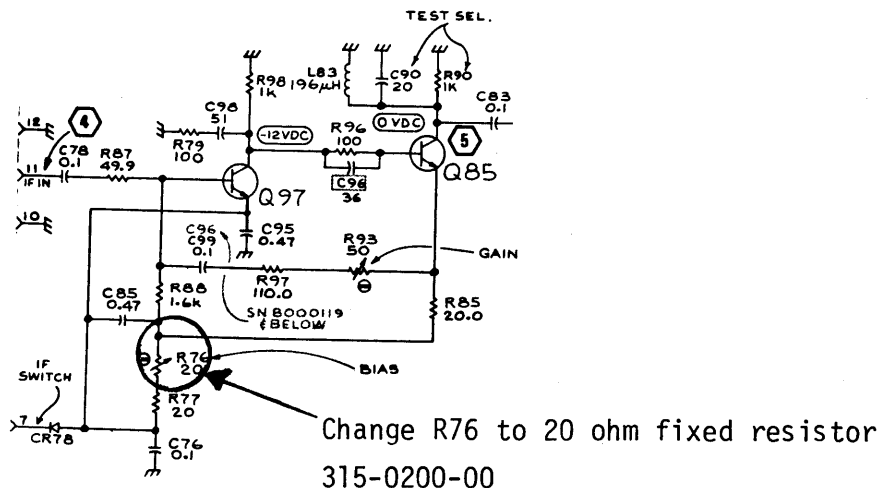
--Bill Bean  
53/108, Ext. 8695

### 1450 SERIES

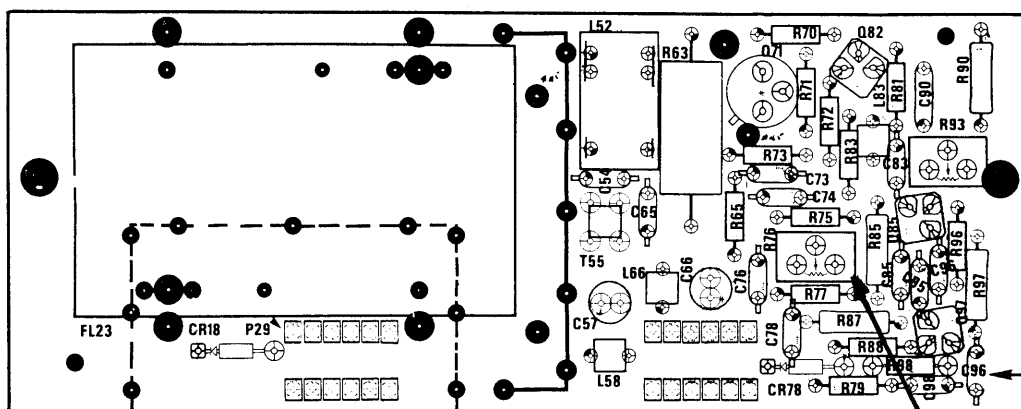
Instruments Affected:	1450	Assemblies Affected:	670-5004-00
	1450-1		670-5004-01
	1450-2		670-5004-02
	1450-3		670-5004-03
			670-5004-04
			670-5004-05

Setting R76 for minimum intermodulation (clockwise), as per the calibration procedure, has caused pre-mature failures of Q85 due to excessive power levels. This adjustment has been found to have very little effect on intermodulation distortion, as was its reason for being. A mod has, therefore, been submitted to implement removal of R76 and replacement of it with a 20 ohm fixed resistor (315-0200-00).

This bulletin is designed to formally request the field service organization to make this change on any 1450 series instrument that comes in for service. Copies of appropriate manual changes are included. Example schematics and parts location charts are below.



(ARTICLE CONTINUED ON THE NEXT PAGE)



**A24 IF SAW AMPLIFIER (NARROW BAND) BOARD**

**A25 IF SAW AMPLIFIER (WIDE BAND) BOARD**

Change R76 to 20 ohm fixed resistor  
315-0200-00

(ARTICLE CONTINUED ON THE NEXT PAGE)

**Tektronix**  
COMMITTED TO EXCELLENCE**MANUAL CHANGE INFORMATION**Date: Aug. 28, 1981 Change Reference: M44094 Rev.Product: 1450-1 Television DemodulatorManual Part No.: 070-2200-01**DESCRIPTION**

(SN B010775 - up)

**TEXT CHANGES**

Section 4 CALIBRATION, Adjustment Procedure, Page 4-29

DELETE: Steps 8 and 9

Page 4-33, DELETE: Step 8

Page 4-34, Figs. 4-43 and 4-44, CHANGE captions TO READ:

Fig. 4-43. Equipment Setup to Adjust Bias on A26.

Fig. 4-44. Waveform for Adjusting Bias on A26.

Page 4-35, DELETE: Step 9

## Section 7 REPLACEABLE ELECTRICAL PARTS


CHANGE TO:

A24		CKT BOARD ASSY:I.F. S.W.F. PREAMP
A25		CKT BOARD ASSY:I.F. S.W.F. PREAMP
A24R76	315-0200-00	RES.,FXD,CMPSN:20 OHM,5%,0.25W
A25R76	315-0200-00	RES.,FXD,CMPSN:20 OHM,5%,0.25W

Section 8 DIAGRAMS &amp; CIRCUIT BOARD ILLUSTRATIONS, Adjustment Locations A24 &amp; A25

DELETE: R76

Component Locations, A24, A25, CHANGE: R76 to a fixed resistor

IF Nyquist Filtering A24, A25, A26, Diagram CHANGE: R76, Bias Adj. TO: Fixed resistor, 20  $\Omega$ 

(ARTICLE CONTINUED ON THE NEXT PAGE)

**Tektronix**

COMMITTED TO EXCELLENCE

**MANUAL CHANGE INFORMATION**Date: Aug. 28, 1981 Change Reference: M44094 Rev. M44197Product: 1450-2 TELEVISION DEMODULATORManual Part No.: 070-2998-00**DESCRIPTION**

EFF. SN B020108 &amp; up

**TEXT CHANGES**

Section 4 CALIBRATION, Adjustment Procedure, Page 4-33

DELETE: Steps 8 and 9

Page 4-38, DELETE: Step 8

Page 4-39, Figs. 4-42 and 4-43, CHANGE captions TO READ:

Fig. 4-42. Test Equipment Setup for Adjusting Bias on A26.

Fig. 4-43. Waveform for Adjusting Bias on A26.


Page 4-39, DELETE: Step 9

**REPLACEABLE ELECTRICAL PARTS LIST CHANGES****Section 7 REPLACEABLE ELECTRICAL PARTS****CHANGE TO:**

A24		CKT BOARD ASSY:I.F. S.W.F. PREAMP
A25		CKT BOARD ASSY:I.F. S.W.F. PREAMP
A24FL23		MICROCIRCUIT,LI: NARROW BAND FILTER
A24R76	315-0200-00	RES.,FXD,CMPSN:20 OHM,5%,0.25W
A25R76	315-0200-00	RES.,FXD,CMPSN:20 OHM,5%,0.25W

**DIAGRAMS & CIRCUIT BOARD ILLUSTRATION CHANGES****Section 8 DIAGRAMS & CIRCUIT BOARD ILLUSTRATIONS, Adjustment Locations A24 & A25**~~DELETE:~~ R76

Component Locations, A24, A25, CHANGE: R76 to a fixed resistor

IF Nyquist Filtering A24, A25, A26, Diagram CHANGE: R76, Bias Adj. TO: Fixed resistor, 20  $\Omega$ 

(ARTICLE CONTINUED ON THE NEXT PAGE)

**Tektronix**

COMMITTED TO EXCELLENCE

**MANUAL CHANGE INFORMATION**Date: Aug. 28, 1981Change Reference: M44094 Rev.Product: 1450-3 TELEVISION DEMODULATORManual Part No.: 070-3660-00**DESCRIPTION**

EFF. SN B010156 &amp; up

**TEXT CHANGES**

Section 4 CALIBRATION, Adjustment Procedure, Page 4-33

DELETE: Steps 8 and 9

Page 4-38, DELETE: Step 8

Page 4-39, Figs. 4-42 and 4-43, CHANGE captions TO READ:

Fig. 4-42. Test Equipment Setup for Adjusting Bias on A26.

Fig. 4-43. Waveform for Adjusting Bias on A26.

Page 4-39, DELETE: Step 9

**REPLACEABLE ELECTRICAL PARTS LIST CHANGES**

Section 7 REPLACEABLE ELECTRICAL PARTS

CHANGE TO:

A24 CKT BOARD ASSY:I.F. S.W.F. PREAMP

A25 CKT BOARD ASSY:I.F. S.W.F. PREAMP

A24R76 315-0200-00 RES.,FXD,CMPSN:20 OHM,5%,0.25W

A25R76 315-0200-00 RES.,FXD,CMPSN:20 OHM,5%,0.25W

**DIAGRAMS & CIRCUIT BOARD ILLUSTRATION CHANGES**

Section 8 DIAGRAMS &amp; CIRCUIT BOARD ILLUSTRATIONS, Adjustment Locations A24 &amp; A25

DELETE: R76

Component Locations, A24, A25, CHANGE: R76 to a fixed resistor

IF Nyquist Filtering A24, A25, A26, Diagram

CHANGE: R76, Bias Adj. TO: Fixed resistor, 20  $\Omega$ --Bill Bean  
53/108, Ext. 8695September 25, 1981  
Issue 11-18

## 1474 PHASE SHIFTER BOARD

Several people have noticed that the shield wire going to P938 Pin 1 on the Phase Shifter board has a tendency to touch the top cover if not dressed properly. In most cases, the technician would normally associate a braided shield with ground potential, but this is not always true. In this particular instance, the shield is at +15 volts, and putting the cover on will generally blow the fuse. However, once re-opened, the fault mysteriously disappears.

Please check all wire dress carefully and, when necessary, apply a length of heat-shrink tubing.

Manufacturing has been asked to look into this and similar problems with bare cables and elevated potentials.

Thanks to Tom Buchanan in Indianapolis for this information.

--Bill Bean  
53/108, Ext. 8695

## 1480 SERIES -- HORIZONTAL GAIN CALIBRATION

Since the 184 Time Mark Generator has gone away, the field is being instructed to use the TG501 Mod HB as a possible replacement. This unit (TG-501) has not been a direct replacement due to the fact that it does not have a negative-going trigger output, which is required by most 1480's.

An interim solution can be to use the trigger pulse from the TG501 to externally trigger a PG502. Set the PG502 PERIOD to EXT, set DURATION to  $.5\mu\text{s}$  and adjust DURATION VARIABLE for a half-amplitude duration of  $4.7\mu\text{s} \pm 100\text{ns}$ . Set the OUT switch to COMPLEMENT (-). The PG502 OUTPUT (VOLTS) controls should be set to provide a negative-going pulse amplitude of -4 volts MAX (-1 VOLT NOMINAL) with a DC offset of 0 volts.

The PG502 output can now be used to trigger the 1480 series EXT SYNC inputs, allowing Horizontal Gain timing adjustments to be made.

Manual change requests have been submitted to ask for a more permanent and/or satisfactory method.

--Bill Bean  
53/108, Ext. 8695

1980 SOFTWARE PATCHES: ANSWER SERVICE BULLETIN #15

Due to errors, misunderstandings and further additions, this bulletin is meant to fully supercede Answer Service Bulletin #13.

The following software "patches" are to be used to correct for various faults in Option 1 Application Programs. Operating System upgrades (from version 1.0 to version 2.1, for example) will not delete the requirement to have these patches in place in order to operate the various routines correctly.

To be used, load them into Non-Volatile Memory using the SAVE NVM0: command as per the Operator's Manual and the Program Reference Manual.

1. Temporary fix so that BRSTCRSS will not always assume that burst is unlocked. Also corrects some initialization parameters. (See Figure 1.)
2. Corrects an omission which causes fatal errors when writing out modem phone numbers to NVM. Also corrects some additional initialization parameters. (See Figure 2.)
3. Corrects vertical blanking  $\pm .5$  line error and also allows more reliable identification of Canadian multiburst signals. (See Figure 3.)
4. Corrects "Quiet Line Not Found" message which caused a fatal error. (See Figure 4.)
5. Corrects defect which never marked the modem as being disconnected. Without this patch, the MONITOR & REPORT program would dial the modem once, send the report, hang up the modem, and not remember that it hung up. The modem, therefore, would never be dialed again, and the remaining reports would never be received. (For use with Auto-Call only--Option 12).\* (See Figure 5.)
6. Corrects chrominance to luminance crosstalk error. (See Figure 6.)
7. Corrects an error in Manual Individual program. (See Figure 7.)
8. Corrects an error in Manual Group program. (See Figure 8.)
9. Checks to see if modem port is connected and active. If active, dialing will not occur. (Use with Auto-Call only--Option 12).\* (See Figure 9.)

\*NOTE--Auto-Call (Option 12) will not function properly with version 1.X Operating System. People desiring to use this option MUST be upgraded to Version 2.1.

(ARTICLE CONTINUED ON THE NEXT PAGE)

FIGURE 1

```

11001 ! TIMNSE.PCH 11-NOV-80
11285 I=OH-OL
11290 K=(CA(BC-I)+CA(50-I))/2\CO$(8+7)=''\M8(8+7)=0
11300 LULSCH CA(0:BC-I),K,4,1,L,-1\IF L=-1 THEN L=BC-20-I
11310 LULSCH CA(BC-I:200-I),K,4,1,R\IF R=-1 THEN R=BC+20-I
11330 BRSTCRSS U(0:31,L-20:R+8),MC*TG,RAD(360),J,A,SC(8),SC(9),N
11340 IF A<MC*GN*TG THEN 11400
11540 I=ITP(ABS(P-8-SC(DL(1))-M0)+.999)/192
11580 MNSTDV LA(16:31),J\IF CU$(<)'Y' THEN I=J-.2*BA*TG
11810 !
11850 SA(1)=FB(1)+16-(J+K)/16\SA(3)=1
11860 K=(K-J)*2/FB(2)\IF K<9 THEN K=256/31
11910 TA(J:J+511)=LA(0:511)-LA(512:1023)\NEXT J
12020 RETURN
12050 IF FE$(0)='DC' THEN WAIT 5
12160 CO$(79)='(PK-PK)'\RETURN
    
```

FIGURE 2

```

6001 ! INIT.PCH 11-NOV-80
11070 PRINT 1.1;TAB(T);'CONNECT FLAT FIELD SIGNAL'ICR$
11080 CLOSE #5\OPEN #5 AS VID:\I=10\GOSUB 11120
11090 AP=A\I=90\GOSUB 11120
11100 AX=80/(A-AP)\AY=10-AX*AP
15005 BL=2
17010 BL=3\NT=23
    
```

(ARTICLE CONTINUED ON THE NEXT PAGE)



FIGURE 3

```

5501 I MEASYS.PCH 11-NOV-80
7110 GOSUB 7190\A1=AP\L=257+FD\J=0\F=3-FD
7140 IF SM=5 THEN L=20\F=FD\J=16\GOSUB 7340\GOTO 7170
7205 IF EF=1 THEN 7220
7210 GOSUB 5000\PRINT #TT<0>,CR$1\TGSYNC LOST ON SOURCE 'SU$;' SYNC 'SY$
7215 P8=1
7340 PUT F,L,OU+OS,PU INTO #5,'UMC'
8020 MINMAX U<0,200:800>,S,I\IF U<0,1>-U<0,9><39 THEN CM=7\GOTO 8160
8021 MINMAX VA,S,I
8030 S=VA<I>-VA<BP>\MNSTDV VA<287:342>,L\MNSTDV VA<740:768>,R\D=(L-R)/S
8040 RESTORE 8190\N=3\IF ABS<D><.26 THEN 8075
8050 RESTORE 8200\N=5\IF D>0 THEN 8080
8060 J1=FP\LULSCN VA<0:J1>,VA<J1>+S*.3,4,2,8C,-1
8070 RESTORE 8210\N=4\E=SC<1>\GOTO 8090
8075 IF <L-VA<BP>>/S<.28 THEN 8160
8080 J1=BP\LULSCN VA<J1:1023>,VA<J1>+.02*S,0,2,8C\E=SC<0>
8190 DATA 3,0,0,5,1,1,7,-1,1
8200 DATA 4,0,0,13,-1,2,16,0,2,21,1,3,40,0,4
8210 DATA 16,0,0,23.5,-1,3,29,0,0,43,0,5

```

(ARTICLE CONTINUED ON THE NEXT PAGE)

FIGURE 4

```
16001 ! MAKEMS.PCH 11-NOV-80
16970 A$=UP$(6)&' NOT FOUND'\GOSUB 16110\GOSUB 9420\RETURN
```

FIGURE 5

```
11 ! MNITOR.PCH 13-MAR-81
65 PRINT TAB(9); 'FIRST REPORT IN 160 SECONDS'
720 WAIT 30\INITG\IF TT$(2)<>'Y' THEN 740
725 GET I FROM 'MASTER'\IF I=TT(1) THEN RETURN
735 TT$(3)='OFF'
```

FIGURE 6

```
11001 ! VITSMS.PCH 11-NOV-80
12200 R0=2*(DL(3)-2)\SA(2)=FB(2)*256/(20+DG(2))
12290 MR(40)=ITP(DL(M)/R0/SA(2)*2000+.5)/10
```

FIGURE 7

```
11 ! MANIND.PCH 11-NOV-80
470 READ #6,U$,N$,C$,S$,T$,A9$,B$\IF Q$<>U$ THEN 470
510 A$=A9$\GOSUB 4500\IF B$<>'NO' THEN READ #6,LM\LN$=A$
```

FIGURE 8

```
11 ! MANGRP.PCH 11-NOV-80
430 READ #6,U$,N$,C$,S$,T$,A9$,B$\IF Q$<>U$ THEN 430
470 A$=A9$\GOSUB 4500\IF B$<>'NO' THEN READ #6,LM\LN$=A$
```

FIGURE 9

```
25001 ! GETERM.PCH 13-MAR-81
25090 TT(0)=L\TT$(3)='OFF'\DRAWON #L\IF TT$(2)<>'Y' THEN RETURN
25095 GET A$ FROM #L, 'MODE'\ IF A$='CONNECTED' THEN TT$(3)='ON'
25096 RETURN
```

--Bill Bean  
53/108, Ext. 8695

## SERVICE INSTRUMENT DIVISION

### ACCESSORIES

#### A6302 & A6303 SERVICE MAINTENANCE NOTES

The P6302 and P6303 current probes for the AM503 have been productized with a change from "P" to "A" nomenclature. They will no longer have a 9 digit part number.

The only other change to the P6302/A6302 was the addition of a serial number. The P/N 276-0507-00, a ferrite core, was deleted from the P6303/A6303 and P/N 276-0543-00 (L-38) was added as a selectable part, with nominal being 3 beads.

Manuals for the A6302 (P/N 070-3905-01) and A6303 (P/N 070-3906-01) will be available Week 35. All other accessories remain the same as for the old P6302 and P6303.

--Eilene Dickey  
53/108, Ext. 8692

### DATA COMMUNICATION ANALYZERS

#### DAS9109 INTERMITTENT POWER-UP FAILURES

Affected Serial Numbers: B010180 and below.

A change has been made to the controller board of the DAS 9109 mainframe which cures intermittent power up failures.

Symptoms of this failure are:

No lighting sequence from the "Remote" and "Lockout" leds on the keyboard.

No display on the CRT.

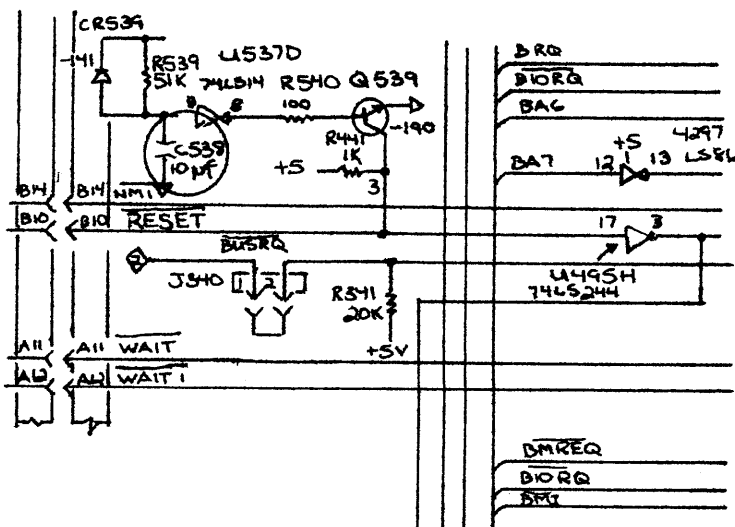
To cure this problem, C538 on the controller board was changed from a 10 $\mu$ f, electrolytic capacitor (Part Number 290-0536-00) to a 100 $\mu$ f, electrolytic capacitor (Part Number 290-0755-00).

See the attached diagrams for schematic changes and circuit location.

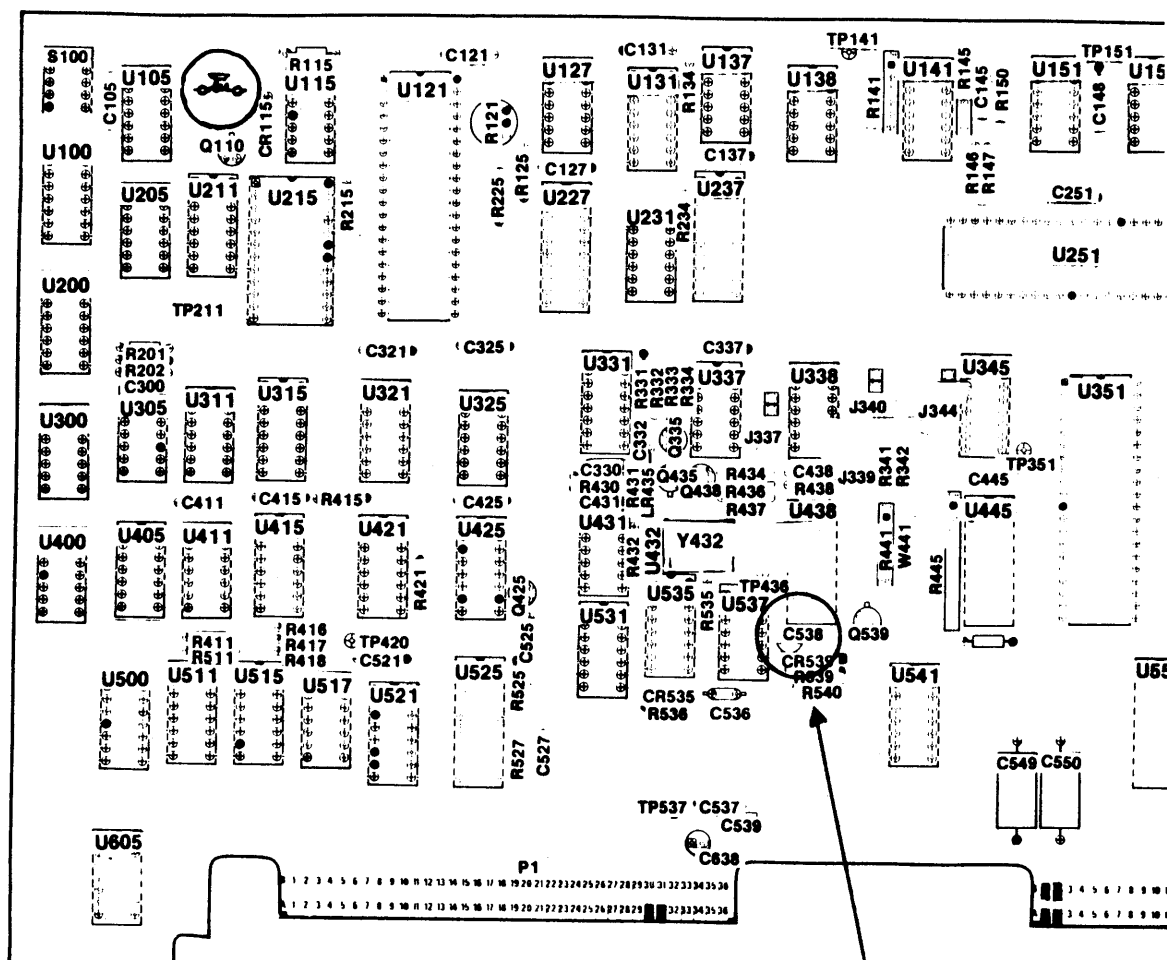
(ARTICLE CONTINUED ON THE NEXT PAGE)

# DAS9109 INTERMITTENT POWER-UP FAILURES (continued)

## CONTROLLER BOARD, SCHEMATIC 1



## CONTROLLER BOARD PARTS DIAGRAM



--Pat Wolfram  
92-236, Ext. 1582

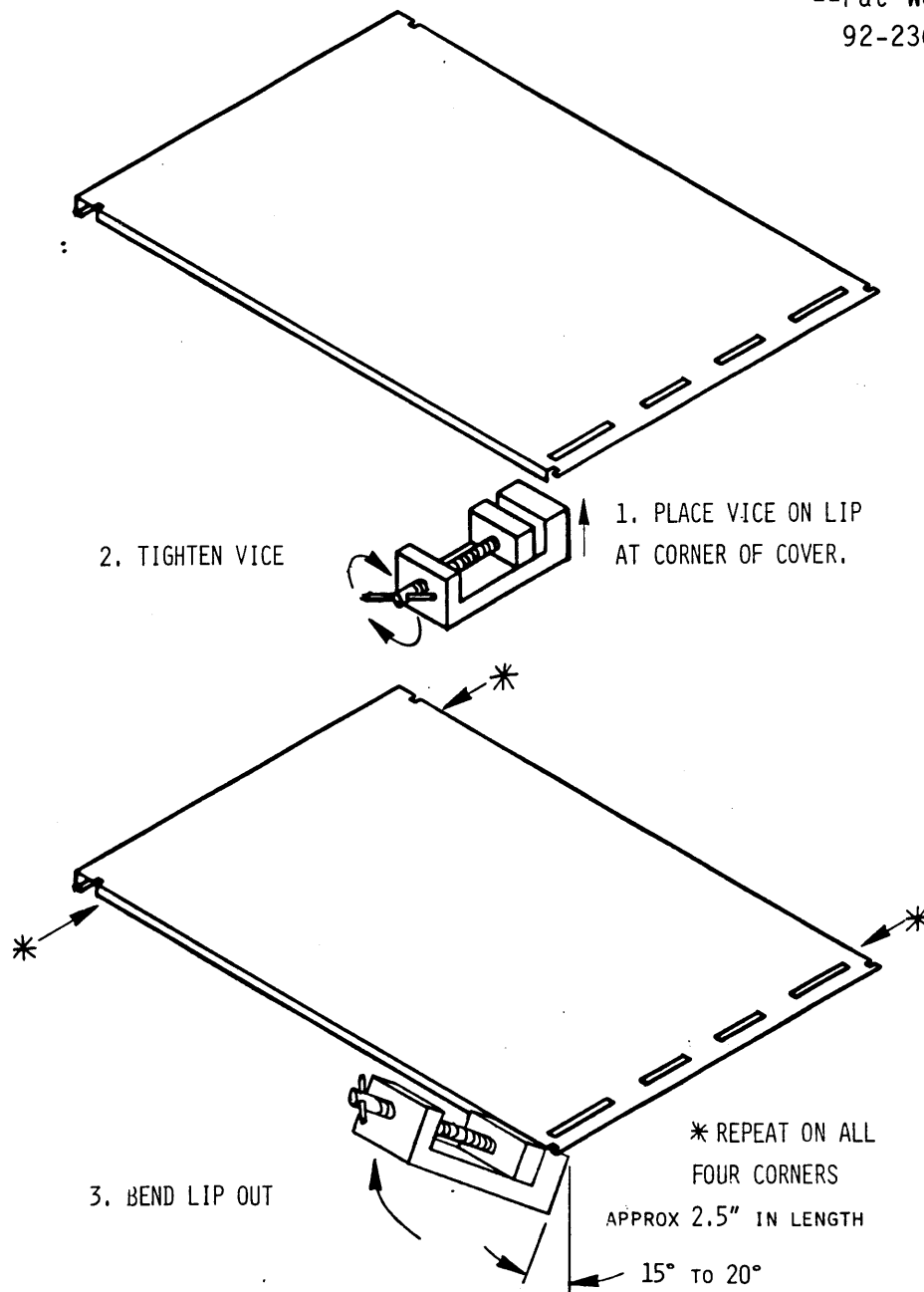
## LOGIC ANALYZERS

### DAS9109 - TOP COVER MODIFICATION

The removal of the DAS9109 top cover can be very difficult. The problem exists because the top corner rails (which support the top panel) are slightly bowed at the ends.

Our mechanical engineers are currently working on a solution to this problem. To cure this problem in existing DAS9109s, refer to the procedure in the following diagrams.

--Pat Wolfram  
92-236, Ext. 1582



## PORTABLES

### T912 RELIABILITY MODIFICATIONS TO GUERNSEY BUILT INSTRUMENTS

"AS REQUIRED" SERVICE UPDATE PROGRAM #3004

Reference: Power Supply Board & Storage Circuit Board  
Serial Numbers: 0106358 - 0106748

Reliability modifications were left out of Guernsey built instruments. These instruments must have the following Beaverton mods installed:


	<u>Beaverton Mods</u>	<u>Guernsey Instruments</u>
F702	Install P/N 159-0203-00	Has a wire strap
F742	Install P/N 159-0159-00	Has P/N 159-0153-00
F743	Install P/N 159-0159-00	Has P/N 159-0153-00
F782	Install P/N 159-0159-00	Has P/N 159-0153-00
CR944	Install P/N 152-0141-02 on Q942, diode cathode to base an anode to emitter. Remove C943, if present. (The capacitor may be present where CR944 will be located.)	Has diode missing or has C943

Part number 040-1040-00 includes all the parts and instructions needed to complete these mods. All labor and part charges will be coded 18.

*Any instruments with the above serial numbers coming in for service, must have these mods installed.*

--Mike Laurens  
53/108, Ext. 8688

## T921, T922, T922R SELECTING RESISTOR VALUES AFTER CHANGING THE CRT

Reference: CRT & Vert Amp Schematic   
R463 (680K $\Omega$  to 2M $\Omega$ ) Nominal 910K $\Omega$   
R469 (1M $\Omega$  to 10M $\Omega$ ) Nominal 10M $\Omega$

R463 is selected to eliminate any intensity modulation that is visible when operating in CHOP mode at slow sweep speeds (2 ms/div or slower). R469 is selected (after intensity modulation has been eliminated) so that during X-Y operating when the intensity is set fully counter-clockwise, the displayed dot will extinguish within 15 minutes after turn-on.

**WARNING:** The components are in a High Voltage area. Before proceeding with soldering or unsoldering of R463 and R469, turn the instrument off and discharge the H.V. at the junction of R463 - C463 to chassis ground.

To select the values of either resistor, perform the following steps:

- 1) With no signal applied, select CHOP vertical mode, AUTO triggering, horizontal set for 2ms/div, and intensity adjusted so the trace is barely visible. CHECK--for no intensity modulation on the chopped waveform. If the intensity modulation is present, proceed to Step 3.
- 2) Set intensity fully counter-clockwise and set Triggering SOURCE to X-Y. CHECK that the dot extinguishes within 15 minutes of instrument turn-on. If not, proceed to Step 3.
- 3) If checks in either 1 or 2 are unsatisfactory, install a 10M $\Omega$  value for R469 and a 680K $\Omega$  value for R463. Set the controls as stated in Step 2 and increase the value of R463 until the dot just appears (use steps of about 100K $\Omega$ ). Then repeat Step 1. If intensity modulation is now eliminated, permanently install the new value of R463. If intensity modulation is present, increase R463 until the modulation is gone.
- 4) Repeat Step 2; if unsatisfactory, select a lower value for R469 and repeat Step 2 until satisfactory results occur. Repeat Steps 1 - 4 as necessary.

--Mike Laurens  
53/108, Ext. 8688

## 2215 MANUAL PERFORMANCE & CALIBRATION PROCEDURES CORRECTIONS

Reference: 2215 Manual P/N 070-3826-00  
Pages 4-1 to 5-21

The following are corrections to the performance and calibration procedures.

(ARTICLE CONTINUED ON THE NEXT PAGE)

## DESCRIPTION

Page 4-7 Step 1, part f, first line

CHANGE TO:

f. Align the first time marker that is 50 ns beyond the...

Page 4-10 Step 2, part a

ADD: VERTICAL MODE CH 1

Page 4-11 Step 2, part d, VERTICAL MODE CH 1

CHANGE TO: VERTICAL MODE CH 2

Page 4-11 Step 2, part e

CHANGE TO:

e. Move the signal from the CH 1 OR X input connector to the EXT INPUT connector.

Page 4-11 Step 2, part m, VERTICAL MODE CH 1

CHANGE TO: VERTICAL MODE CH 2

Page 4-12 Step 1, part b

CHANGE TO:

b. Adjust the generator controls to produce a 5-volt, 50-kHz display.

Page 5-3 INDEX TO ADJUSTMENT PROCEDURE, Vertical

ADD:

15. Check Channel Isolation.....5-12

Page 5-5 Step 2, parts a through c.

REPLACE WITH:

2. Check High-Voltage Supply

a. Set the POWER switch to OFF (button out).

b. Set the dc voltmeter to a range of at least -2500 V dc and connect the volts lead to chassis ground. Remove the crt base-socket cover and connect the common lead of the dc voltmeter to pin 2 on the socket.

c. Set the POWER switch to ON (button in).

d. CHECK--High Voltage Supply dc level is -1900 V to -2100 V.

e. Set the POWER switch to OFF (button out).

f. Disconnect the voltmeter leads and re-install the crt base-socket cover.

g. Set the POWER switch to ON (button in).

(ARTICLE CONTINUED ON THE NEXT PAGE)



## DESCRIPTION

Page 5-8 Step 4, part a. CH 2 VOLTS/DIV

CHANGE TO: CH 2 VOLTS/DIV 10V

Page 5-9 Step 5, parts a and b

CHANGE TO:

- a. Set both VOLTS/DIV switches to 50-mV.
- b. Set the calibration generator to produce a 200-mV standard-amplitude signal.

Page 5-12 Step 14, part a

CHANGE TO:

- a. Set:
  - VERTICAL MODE CH 1
  - VOLTS/DIV (both) 50 mV
  - AC-GND-DC (both) AC

Page 5-12 Step 14, part f

REPLACE WITH:

- f. Move the signal from the CH 1 OR X input connector to the CH 2 OR Y input connector and set the VERTICAL MODE switch to CH 2.
- g. Repeat parts c through e for Channel 2.
- h. Disconnect the test setup.

Page 5-12 At the end of Step 14

ADD:

15. Check Channel Isolation

- a. Set:
  - CH 1 VOLTS/DIV 0.5 V
  - CH 2 VOLTS/DIV 10 mV
  - VERTICAL MODE CH 1
- b. Connect a 10-MHz leveled sine-wave signal via a 50- $\Omega$  cable and a 50- $\Omega$  termination to the CH 1 OR X input connector.
- c. Adjust the generator output for an 8-division display.
- d. Set the VERTICAL MODE switch to CH 2.
- e. CHECK-Display amplitude is 4 divisions or less.
- f. Move the input signal from the CH 1 OR X input connector to the CH 2 OR Y input connector.

(ARTICLE CONTINUED ON THE NEXT PAGE)

## DESCRIPTION

g. Set:

CH 1 VOLTS/DIV            10 mV

CH 2 VOLTS/DIV            0.5 V

VERTICAL MODE            CH 1

h. CHECK--Display amplitude is 4 divisions or less.

i. Disconnect the test setup.

Page 5-15    Step 6, part f, first line

CHANGE TO:    f. Align the first time marker that is 50 ns beyond the...

Page 5-19    Step 4, part a

ADD:          VERTICAL MODE    CH 1

Page 5-19    Step 4, part d

ADD:          VERTICAL MODE    CH 2

Page 5-20    Step 4, part e

CHANGE TO:

          e. Move the signal from the CH 1 OR X input connector  
to the EXT INPUT connector.

Page 5-20    Step 4, part j, VERTICAL MODE

CHANGE TO:    VERTICAL MODE        CH 1

Page 5-20    Step 4, part m, VERTICAL MODE

CHANGE TO:    VERTICAL MODE        CH 2

Page 5-21    Step 1, part b.

CHANGE TO:

          b. Adjust the generator controls to produce a 5-volt,  
50 kHz display.

--Mike Laurens  
53/108, Ext. 8688

## 4054 OPTION 31 - SERVICE MAINTENANCE INFORMATION PLAN

INTENT: Provide supplementary or additional maintenance information not available in the Service Implementation Plan or Service Manual. Reference should be made to the published Service Implementation Plan, dated August 28, 1981.

ORIGINATORS: Frank Lees, Performance Assurance Engineer  
63-503, ext. 3929 (WI)  
Darrell McGiverin, Performance Assurance Engineer  
63-503, ext. 3786 (WI)  
Hank Piatek, Service Program Specialist  
63-503, ext. 3596 (WI)

### I. DESCRIPTION

The 4054 Option 31 consists of a 4054 Option 30 with a color enhanced refresh 19 inch DVST. The color refresh is accomplished by using a mixture of red and green phosphors on the CRT. In refresh mode the writing beam excites both red and green phosphors resulting in an orange trace. In storage mode, the writing beam also excites both red and green phosphors causing a momentary orange trace, then a stored green trace on the screen.

Some of the circuit boards used in the 4054 Option 31 Display are different from those used in the Standard Display. Below is a list of the differences.

<u>Description</u>	<u>Standard</u>	<u>Option 31</u>
Power Supply Board	670-4798-04	670-4798-04
Deflection Amp	672-0783-04	672-1025-00
Storage Board	672-0795-04	672-0795-06
High Voltage	672-0807-01	672-1026-01

The Low Voltage Power Supply and the High Voltage Boards are interchangeable between the two units. The Deflection Amps and Storage Boards are not interchangeable. In addition a 6 Amp Fuse is now being used on both the Standard and Option 31 4054.

### II. SERVICE MANUAL

A Service Manual Revision is being sent to update the 4054 Parts and Schematics Service Manual. A preliminary calibration procedure for both the Standard and Option 31 4054's has been distributed as a Service Organization Bulletin. The final version of the Calibration Procedure will be sent as a manual revision by week 41.

(ARTICLE CONTINUED ON THE NEXT PAGE)

## 4054 OPTION 31 - SERVICE MAINTENANCE INFORMATION PLAN (continued)

### III. FIELD INSTALLATION

The Option 31 Color Enhanced Refresh is not offered as a Field Installable Option.

### IV. SERVICE IMPLEMENTATION PLAN UPDATE

#### A. Maintenance Agreement Price

	<u>Schedule A</u>	<u>Schedule B</u>
4054 Option 31	+35	N/A

This price includes Option 30 Maintenance Agreement Price.

#### B. Board Exchange, Repair & Return PPRL Prices

<u>Part Number</u>	<u>Description</u>	<u>Exch.Price</u>	<u>R&amp;R Price</u>	<u>PPRL</u>
670-4798-04	Display Power Supply	100	80	250
672-1025-00	Deflection Amp	160	130	440
672-0795-06	Storage Board	125	100	390
672-1026-01	High Voltage	155	125	550

### V. PLANNED MAINTENANCE

The planned maintenance requirements for the 4054 Option 31 will be the same as for the Standard 4054.

### VI. FAULT ISOLATION TECHNIQUES

There are only minor electrical changes to circuitry used in the 4054 Option 31. The present Fault Isolation Methods used in the Standard 4054 can be used in the 4054 Option 31.

The luminance of the Color Write Thru 19" DVST will vary from tube to tube. The basic criteria for acceptable CRT luminance is that the stored and refresh data must be readable and usable.

--Frank Lees  
63-503 ext. 3929 (WI)

## 4112 HISTORY OF BOARD AND ASSEMBLY PART NUMBERS

The following article is to help identify those boards that are beyond the -00 suffix. DO NOT try to use this information to modify any board. This information is incomplete and only to be an aid in identifying the level of the board.

### CURRENT BOARD AND ASSEMBLY NUMBERS FOR 4112 ONLY

119-1400-00      Keyboard  
119-1401-00      Keyboard (APL)  
119-1402-00      Keyboard (Swedish)  
  
620-0295-01      Power Supply Assembly

#### History:

-00 Reference: Power Supply PICN #16

Reason: Power Supply will not operate at 250V (UK and Aust.). Thermistor can drop enough voltage to activate surge arrester.

#### Changed:

- (1) E205 became E333 on inverter board (670-6430-XX).
- (2) One lead of E333 goes through hole in lug of diode nearest to CR331
- (3) The other lead is soldered to the run at pin "C" of J61.
- (4) Rolled 620-0295-XX and 670-6430-XX to -01.

670-6429-00      Regulator

#### History:

Reference: Power Supply PICN #11

Reason: Power Supply will not start-up reliably, and to change current sense circuitry. Also to change the -5.2V and +55V current limits.

(ARTICLE CONTINUED ON THE NEXT PAGE)

## 4112 HISTORY OF BOARD AND ASSEMBLY PART NUMBERS (continued)

NOTE: All 620-0295-00 power supplies were to ship with this change. Any Regulator boards found without this change should be updated.

Changed:

- (1) Replaced U258 (LM1458) with 156-0853-00, (LM358).
- (2) Replaced R341, 4.32K with 321-0249-00, 3.83K resistor.

Reference Power Supply PICN #14

Reason: Shorting problems with L1, L205, and L231.

NOTE: All 620-0295-00 power supplies were to ship with this change. Any Regulator boards found without this change should be updated.

Changed:

- (1) Added insulators between cores and ECB.
- (2) Used larger screws to more accurately align cores.
- (3) Sleeving was added to leads of transformers to prevent winding to core shorts.

670-6430-01      Inverter

History:

Reference: Power Supply PICN #12

Reason: Schmitt trigger in start-up circuit does not switch reliably.

NOTE: All 620-0295-00 power supplies were to ship with this change. Any Inverter boards found without this change should be updated.

- (1) Replaced Q487 (151-0190-00), and Q489 (151-0292-00) with 151-0126-00.
- (2) Replaced Q389 (151-0188-00) with 151-0453-00.
- (3) Replaced R485 (321-0451-00) with 321-0441-00, 383k, resistor.
- (4) Q487 and Q489 must not touch and will be bent away from each other.

(ARTICLE CONTINUED ON THE NEXT PAGE)

-00 Reference: Power Supply PICN #16

Reason: Power Supply will not operate at 250V (UK and Aust.). Thermistor can drop enough voltage to activate surge arrester.

Changed:

- (1) E205 became E333 on inverter board (670-6430-XX).
- (2) One lead of E333 goes through hole in lug of diode nearest to CR331
- (3) The other lead is soldered to the run at pin "C" of J61.
- (4) Rolled 620-0295-XX and 670-6430-XX to -01.

670-6450-00 Voltage Selector

670-6471-01 Raster Mother Bd

History:

-00 Reference: PICN #32

Reason: To reduce cost.

Changed:

- (1) Removed (131-2279-00) connectors and replaced with 131-2059-01 connectors.
- (2) Rolled 670-6471-00 to -01.

Reference: PICN #53

Reason: For compatibility with future product, the connection between pin 30 of J32 and pin 30 of J34 was deleted.

- (1) Open card cage and remove any cards that are installed in J30, J32 and J34, which are 44 pin connectors on the Raster Bus.
- (2) Insert an extender board in J34.
- (3) Connect an ohm meter to pin 30 of the extender board. Use the other lead to verify which run between J32 and J34 must be cut. It is the 13th run from the top and is a narrow run between two wider runs.

(ARTICLE CONTINUED ON THE NEXT PAGE)

4112 HISTORY OF BOARD AND ASSEMBLY PART NUMBERS (continued)

- (4) Cut the run with a sharp knife being careful not to damage any other runs.
- (5) Check for an open between pins 30 of J32 and J34.
- (6) Reinstall the cards removed from the card cage and close up instrument.

670-6473-01      Std. Raster Memory

History:

-00 Reference: PICN #37

Reason: The 50 Pin Connector is not used, and to change a 5V run.

Changed:

- (1) Stop gold plating the 50 pin connector.
- (2) Removed the connection of 5V to the anode of CR586.
- (3) Rolled 670-6473-00 to -01.

670-6474-01      Vector Generator

History:

-00 Reference: PICN #36

Reason: The 50 Pin Connector is not used.

Changed:

- (1) Stop gold plating the 50 pin connector.
- (2) Rolled 670-4674-00 to -01.

670-6475-02      Video Controller

History:

-00 Reference: #43

Reason: Feed-through shorted to heatsink, and to add two runs.

(ARTICLE CONTINUED ON THE NEXT PAGE)



4112 HISTORY OF BOARD AND ASSEMBLY PART NUMBERS (continued)

Changed:

- (1) Moved feed-through under Q621.
- (2) Added run from U565-8 to P280-51.
- (3) Added run from U345-8 to P281-22.
- (4) Rolled 670-6475-00 to -01.

-01 Reference PICN #54

Reason: To eliminate a 5V ripple that sometimes creates a waterfall effect on the screen.

- (1) Replace C114 with a 0.22uf capacitor (283-0423-00).
- (2) Cut the run between Q29 collector and Q26 collector on back side of board.
- (3) Add the 3-terminal +5V regulator, U117, (156-0991-00) to the front side of the board.
  - (a) pin 1 to C114
  - (b) pin 2 to R115
- (4) Add the 0.1uf (C117) capacitor between pin one of U121 and pin 3 of the 5V regulator (U117) just installed.
- (5) From the junction of pin 3 of U117 and C117 run a mod wire to the bottom of the board to C642. Run the mod wire under the grounded stiffener bar to help hold it close to the board.
- (6) Completion of the Mod will be to roll the board number to -02.

670-6476-01 Dual Raster Memory

History:

-00 Reference: PICN #38

Reason: The 50 Pin Connector is not used. The Address must be strapable, and additional input/output connections added.

(ARTICLE CONTINUED ON THE NEXT PAGE)

Changed:

- (1) Stop gold plating the 50 pin connector.
- (2) Cut and installed pins at W679 and W680.
- (3) Renamed W679 and W680 to J679 and J680.
- (4) Added 4 wire jumpers.
- (5) Removed 2 each 2 pin jumpers.
- (6) Rolled 670-6476-00 to -01

670-6478-01      H.V.

History:

-00 Reference: Monitor PICN #8

Reason: Post was added to chassis for stability.

Changed:

- (1) Removed spacer post 385-0107-00 from High-Voltage board.
- (2) Rolled 670-6478-00 to -01.

670-6479-03      Deflection Amplifier

History:

-00 Reference: Monitor PICN #7

Reason: L721 has incorrect specifications.

Changed:

- (1) Replaced L721 (114-0385-00) with 114-0385-01.
- (2) Rolled 670-6479-00 to -01

-01 Reference Monitor PICN #10

Reason: Horizontal jitter in display.

(ARTICLE CONTINUED ON THE NEXT PAGE)

4112 HISTORY OF BOARD AND ASSEMBLY PART NUMBERS (continued)

Changed:

- (1) Cut two ground runs a mounting hole.
- (2) Cut 5V run from C544 to R694 near R694.
- (3) Add L670 (108-0146-00) 5.5 uh inductor across cut.
- (4) Rolled 670-6479-01 to -02.

-02 Reference Monitor PICN #12, #13

Reason: To eliminate white noise waterfall problem which is noise oscillations in the vertical amplifier.

Changed:

- (1) Added C161 (281-0763-00), 47pf capacitor.
- (2) Attached one lead of C161 to pin 2 of U161.
- (3) Attached the second lead to pin 6 of U161.
- (4) Replaced C775 (281-0772-00, 4700pf Cap.) with 281-0788-00, 470pf Capacitor.
- (5) Replaced R669 (315-0332-00, 3.3K) with 315-0393-00, 39K resistor.
- (6) Removed connector pin 6 of J586.
- (7) Rolled 670-6479-02 to -03.

670-6803-00      External Video

670-6811-00      P/S Distribution

672-0951-01      Processor

History:

-00 Reference:

Reason: 8284 use in U155 is no longer available and is replaced by the 8284A.

Changed:

- (1) Replaced U155 with 8284 (156-1428-02).
- (2) Added wire strap from U155-1 to U155-15.
- (3) Rolled 670 and 672 part number to -01.

(ARTICLE CONTINUED ON THE NEXT PAGE)

4112 HISTORY OF BOARD AND ASSEMBLY PART NUMBERS (continued)

672-0952-02      RAM/ROM

History:

-00 Reference: 4114 PICN #98, #128

Reason: 8202 causes intermittent soft RAM errors.

-00 Changed:

(1) If the board has an 8202 and U193 does not have a piggyback IC, it is a 670-6940-XX/672-0950-00.

(a) Remove and replace U473 (8202) with an 8202A.

(b) Remove U193 (74S74).

(c) Insert R192 and R193 (131-0566-00, 0 ohm resistors)

(d) Rolled 670-6940-XX. Add 672-0950-02 sticker.

-01 Changed:

(1) If the board has an 8202 and U193 has a piggyback IC, it is a 670-6940-XX/672-0950-01.

(a) Remove and replace U473 (8202) with an 8202A.

(b) Remove U193 (74S74) and piggyback (74S04).

(c) Inserted R192 and R193 (131-0566-00, 0 ohm resistors).

(d) Rolled 670-6940-XX. Add 672-0950-02 sticker.

672-1004-00      Video Controller (50HZ)

CURRENT COMMON BOARDS AND ASSEMBLY NUMBERS FOR 4110

670-6343-01      Tablet Controller

History:

-00 Reference: 4114 PICN #107

Reason: Tablet Board needed more adjustment on timing range.

(ARTICLE CONTINUED ON THE NEXT PAGE)

4112 HISTORY OF BOARD AND ASSEMBLY PART NUMBERS (continued)

Changed:

- (1) Six pins and two jumper straps were added along with the cutting of 32X and 32Y cut straps.
- (2) Rolled 670-6343-00 to -01

670-6591-00 Floppy Controller

670-6669-02 RAM Controller

History:

Reference: 4114 PICN #99, #129

Reason: 8202 causes intermittent soft RAM errors.

-00 Changed:

- (1) If U535 does not have a piggyback IC.
  - (a) Remove and replace U451 (8202) with an 8202A.
  - (b) Remove U535 (74S74).
  - (c) Insert R538 and R539 (131-0566-00, 0 ohm resistors).
  - (d) Roll 670-6669-00 to 670-6669-02 and skip step -01.

-01 Changed:

- (1) If U535 has a piggyback IC.
  - (a) Remove and replace U451 (8202) with an 8202A.
  - (b) Remove U535 (74S74) and piggyback (74S04).
  - (c) Insert R538 and R539 (131-0566-00, 0 ohm resistors).
  - (d) Roll 670-6669-01 to 670-6669-02.

670-6670-00 RAM Array

670-6671-00 3PPI

670-6709-00 Tablet Interconnect

670-7089-00 Current Loop

--Bill Hatch  
Dennis McGary  
63/503, ext 3787, 3788

#### 4112/4114/4114 OPT. 31 FIRMWARE LEVEL 2 SERVICE UPDATE PROGRAM

The purpose of this Wizard is to announce to the field the upcoming firmware level 2 Service Update Program for the 4112/4114/4114 Opt. 31. This update consists of two patch EPROMs on the Processor Board. The purpose of the patch is to correct the base firmware and self-test firmware so that it conforms to published specifications.

The expected distribution date of the Service Update Plan is Week 39 (AP 205-2). The expected availability of the 045 kit needed to perform the update would be Week 41 (AP 205-4).

--Dennis McGary  
63/503, ext. 3588 (WI)

#### 4611, 4612: COPIER STOPS AND LIGHT FLASHES IN MIDDLE OF COPY CYCLE

After initiating a copy, the 4611 or 4612 may suddenly stop and the ready light will start blinking. We also have a report of the copier running too much paper out. In either case, the likely cause is foreign matter between the backing electrodes and guard segments. Arcing across this gap can cause the copier to reset and stop, or conversely may scramble the belt index signal, resulting in a long copy. The symptom will show itself only when there is a TARSIG input, such as when the unit is connected to a terminal, or when pins 5 and 7 on the rear panel are shorted. Remove the signal and the symptom should disappear.

If the copier stops in mid-copy with no signal input, check the paper out micro switch. It may be too sensitive and open as the paper is pulled taut. You may adjust it by removing the paper, removing the bottom paper cover (humidor), and left idler pulley cover. Reposition the switch upward, or bend the actuator lever so that it closes positively.

Note: Check that the switch does open when paper is not in the unit. This is essential to protect the printing belt and backing electrodes when paper runs out.

Thanks to Bob Gilbert, Albuquerque, and others for assistance with this problem.

--Dan Harris  
63/503, ext. 3313

#### 463X: PAPER CANISTER IMPROVEMENT -- METAL END CAPS

For almost a year we have received field input on light leaks occurring with the new plastic end caps. We have just received a commitment from the dry silver paper vendor to go back to the metal end caps, effective before the end of the year. Thanks to all of you who wrote S.A.R.s or called, all of which helped us substantiate our request for the change.

--Dan Harris  
63/503, ext. 3313

## LABORATORY INSTRUMENT DIVISION

### MICROCOMPUTER DEVELOPMENT PRODUCTS

#### 8002A TO 8550 EMULATOR UPGRADE KITS

The kits listed in this article provide a convenient means for a customer to transport an emulator from an 8002A to an 8550 system. Included in the kits are the software, manuals, and when necessary the hardware modification information. The customer may request Field Service to install the upgrade kits. When installed by Field Service the customer will be charged for time and travel.

<u>Emulator</u>	<u>Kit Number</u>	<u>Hardware Mod Required</u>
8080	040-0985-01	Yes
6800	040-0992-00	Yes
Z80	020-0655-00	No
9900	050-1464-01	Yes
8085	040-0993-00	Yes
1802	040-0988-01	Yes
3870	020-0656-00	No
8048	020-0657-00	No

A kit to transport the RTPA from the 8002A to the 8550 system is 020-0659-00.

The 8550 emulator compatibility hardware modifications were published in Wizard Issue 11-2 page 32. An update to the 9900 modification was published in Wizard Issue 11-14 page 29. The intent of these articles was to provide Field service with the emulator modifications required to transport an emulator from an 8002A to an 8550 system.

It is recommended that when a customer requests an emulator upgrade from an 8002A to an 8550 system the kits described here be used.

--Kevin King, Brad Griffin  
92-236, Ext. 1636, 1608

#### 8002A PROGRAM MEMORY SWITCH SUMMARY

The following tables summarize the switch settings for both the 16K dynamic and high speed memory boards. The tables are divided into byte and word mode with corresponding address ranges desired and switch setting. Note that the 16K dynamic memory must have a hardware modification installed for word mode operation.

(ARTICLE CONTINUED ON THE NEXT PAGE)

## 8002A PROGRAM MEMORY SWITCH SUMMARY (continued)

### Switch Settings for 16K Dynamic Memory 670-5298-XX

(Address Range)		Switch Positions			
		1	2	3	4
Byte Mode:	0000-3FFF	Off	Off	On	Off
	4000-7FFF	On	Off	On	Off
	8000-BFFF	Off	On	On	Off
	C000-FFFF	On	On	On	Off
Word Mode*:	0000-7FFF				
	Low Byte	Off	Off	On	On
	High Byte	Off	Off	On	Off
	8000-FFFF				
	Low Byte	On	Off	On	On
	High Byte	On	Off	On	Off

\*Word Mode Modification must be installed.

### Switch Settings for High Speed Memory 670-5505-XX

Address Range		Switch Positions					
		1	2	3	4	5	6
Byte Mode:	0000-3FFF	Off	Off	Off	On	Off	Off
	4000-FFFF	Off	On	Off	On	Off	Off
	8000-BFFF	On	Off	Off	On	Off	Off
	C000-FFFF	On	On	Off	On	Off	Off
Word Mode:	0000-7FFF						
	Low Byte	Off	Off	On	On	Off	Off
	High Byte	Off	Off	On	On	Off	On
	8000-FFFF						
	Low Byte	Off	On	On	On	Off	Off
	High Byte	Off	On	On	On	Off	On

--Brad Griffin/Kevin King  
92-236, Ext. 1608, 1636



S3200 HPO ADJUSTMENT IMPROVEMENTS

Reference: Mod #M42844

Calibration adjustment range with HPO (High Performance Option) on the D70 and D1B Sector Cards is limited by capacitor values used in the HPO. Increasing the capacitance will increase the adjustment range.

The following changes should be incorporated if calibration of sector cards is limited due to range.

Switch Assembly, Attenuator, Right: Replace 12 each, 15.8pf, 1%, 500V capacitors 281-0718-00 with 18pf, 2%, 200V capacitors 281-0650-01. Components: C14, 17, 19, 34, 41, 43, 45, 47, 50, 54, 58, 62.

Switch Assembly, Attenuator, Left: Replace 12 each, 15.8pf, 1%, 500V capacitors 281-0718-00 with 18pf, 2%, 200V capacitors 281-0650-01. Components: C6, 7, 8, 9, 10, 11, 12, 13, 15, 18, 20, 22.

--Ron Lang  
92-236, Ext. 1015

S-3200: SIGNAL SENSE FAULT DETECTOR UPDATE

Reference: Service Update Program #2002  
Quadrant Board Fusing/Fault Detector Shutdown

The 1800 Series Test Stations which are part of the S-3200 Semiconductor Test Systems contain the Signal Sense Card 670-3782-00 or 670-3782-01. This card is located in the Test Station Card Nest (J805).

The addition of the Fault Detector Circuit Board 670-7545-00 to the Signal Sense Card 670-3782-01 creates a new Signal Sense Assembly 672-1043-00. The assembly created by adding the Fault Detector Board to the Signal Sense Card 670-3782-00 has not been part numbered. However, it will function the same as the 672-1043-00 Signal Sense Assembly. In either case the correct replacement assembly is the 672-1043-00 Signal Sense Assembly.

The addition of the Fault Detector Board to a 670-3782-01 Signal Sense Board will change the 670-3782-01 to a 670-3782-02. A label with the new assembly part number is provided in each update kit. This label, 672-1043-00, should only be placed on assemblies created from the 670-3782-01 Signal Sense Circuit Board.

Replacement Parts:

The circuit boards listed below are not orderable as replacements:

1. 670-3782-00 Signal Sense Circuit Board
2. 670-3782-01 Signal Sense Circuit Board
3. 670-3782-02 Signal Sense Circuit Board (Part of 672-1043-00)
- \*4. 670-7547-00 Fault Detector Circuit Board

The replacement part for all of the above circuit boards is the Signal Sense Assembly 672-1043-00.

\*Note: The Fault Detector Board will be set up in the future as a replaceable circuit board.

(ARTICLE CONTINUED ON THE NEXT PAGE)

Reference Figures/Replaceable Parts Lists:

- Figure 1. Fault Detector Block Diagram
  - Figure 2. Fault Detector Circuit Board Component Layout
  - Figure 3. Partial Signal Sense Schematic
  - Figure 4. Fault Detector Schematic (1803, 1804, 1804A, and 1805 Test Stations)
- Replaceable Parts Lists

Fault Detector Circuit Description

Provided by Don Murray, Systems Engineering (Walker Road)

The Fault Detector Circuit Board, mounted on the back of the Signal Sense Card in the card nest, has provisions to allow use with both the electro-mechanically-switched and solid-state switched AC controllers. The +15 V supply, applied to either J1 pin 1 or J1 pin 10 depending upon the type of controller, is clamped by Q100, VR300, and CR301 to prevent overvoltage damage to the CMOS circuitry.

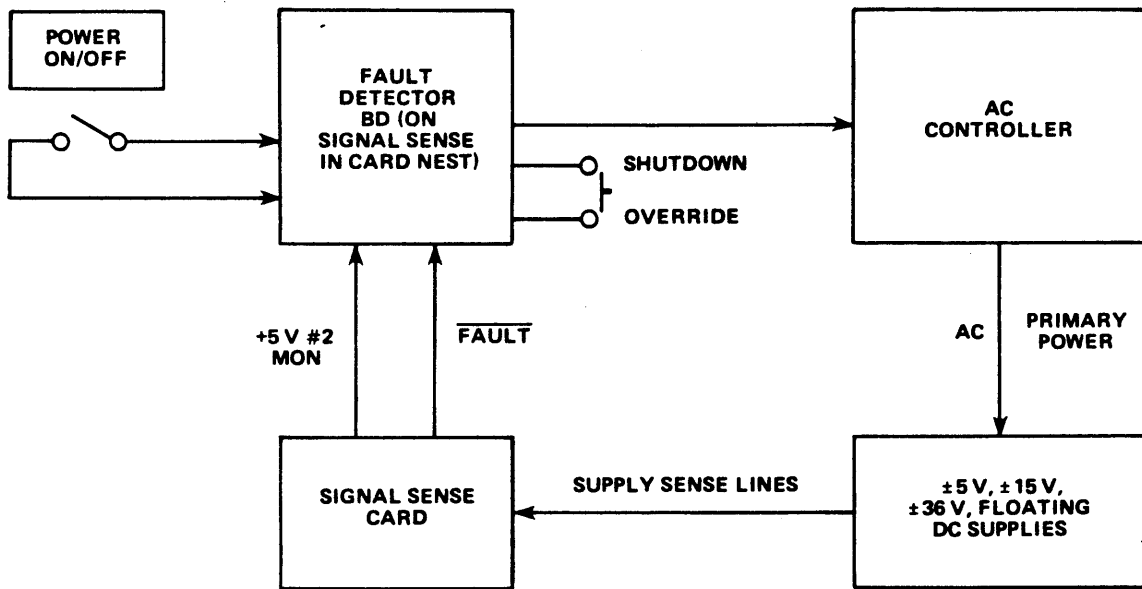
The turn-on sequence is initiated by the POWER ON/OFF switch on the front of the test station. For electromechanical type controllers, the switch triggers U410A via U210A, for solid-state controllers, the switch triggers U410A via U210E. The nine-second timeout of U410A holds the r/s flip-flop combination of U420A and U420B to the SET state, enabling both Q001 and Q010 via U420D and U210B. Although both Q001 and Q010 are enabled, only one of the transistors will be connected, according to the AC controller type. The outputs of Q001 and Q010 are ANDed with their respective POWER ON/OFF switches, thereby forcing the test station off when the POWER switch is in the OFF position.

The nine-second timeout of U410A provides enough time-out delay to override the FAULT/ and +5V MON lines when the test station is first powered up, as faults will be present until the power up-sequence is completed. Upon completion of the timeout, the reset line of the r/s combination of U420A and U420B monitors the FAULT/ and +5V MON lines by way of Q110, Q120, U210, and U420C. Q110, Q120, and associated circuitry provide filtering to the FAULT/ or +5V MON lines to prevent transients from inadvertently generating a fault condition. When a fault condition is indicated by the FAULT/ or +5V MON lines, U420A and U420B will reset, forcing Q001 and Q010 off, thereby turning off the associated ac controller to shut down the test station. LED DS400 indicates that a fault has occurred.

Switch S2 provides a momentary override function to allow operating the test station to determine the cause of a fault condition. The Override Timeout Single-Shot U410B prevents the Fault Override Switch S2 from forcing the test station on under a fault condition for longer than 90 seconds. U410B is retriggered by reasserting switch S2, thus forcing operator interaction. After the fault condition has been identified and corrected, the test station may be returned to normal power status by setting the POWER switch OFF and back ON, which reinitiates the turn-on sequence.

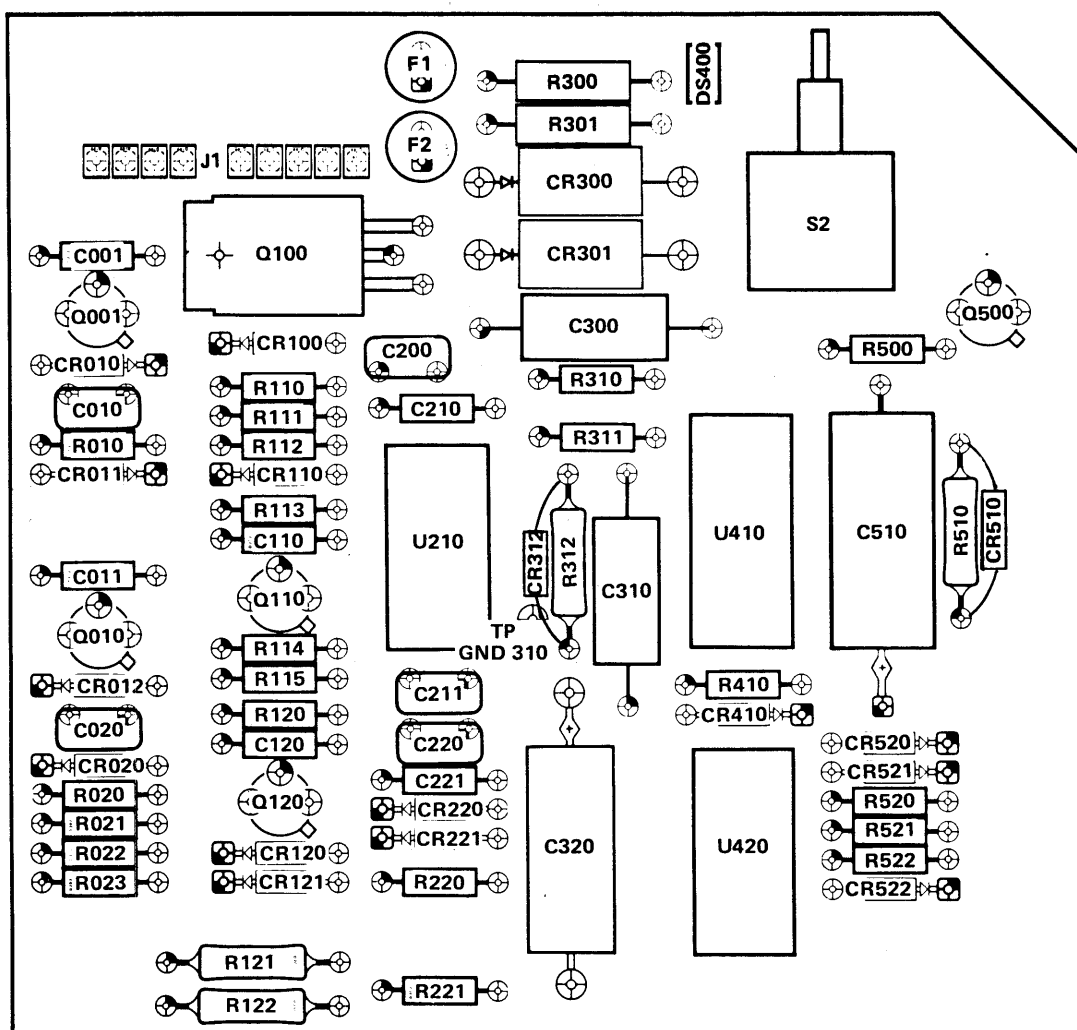
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Fig. 1



Fault Detector Block Diagram

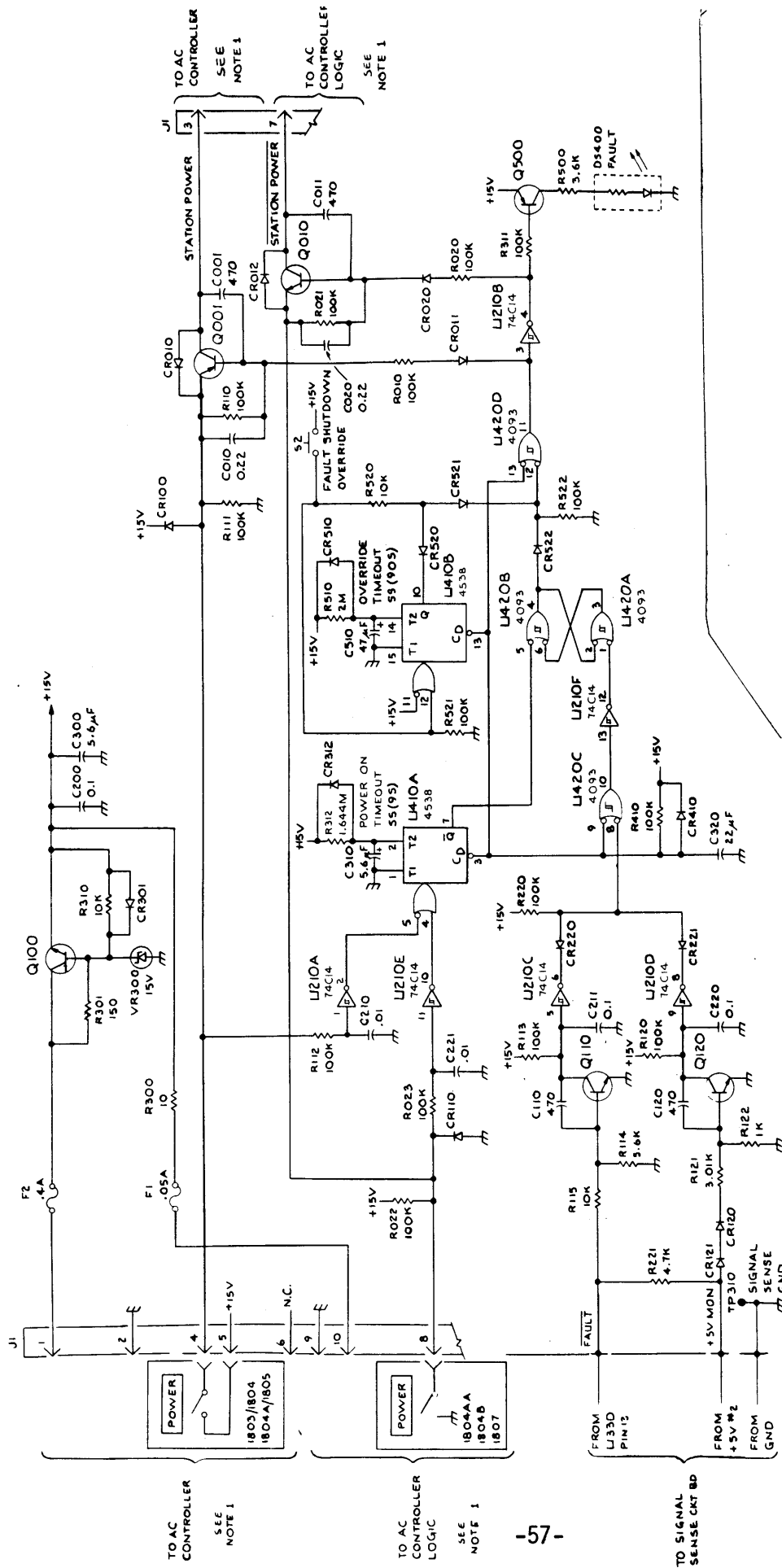
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Fault Detector circuit board component layout.

Fig. 2

(ARTICLE CONTINUED ON THE NEXT PAGE)



### Fault Detector schematic

Fig. 4

**NOTE 1**  
AC controllers with electromechanical primary switching connect to J1 pins 1-5.  
AC controllers with solid state primary switching connect to J1 pins 7-10.

September 25, 1981  
Issue 11-18

S3200: SIGNAL SENSE FAULT DETECTOR UPDATE (continued)

## REPLACEABLE ELECTRICAL PARTS:

Ckt. No.	Part Number	Description
	670-7545-00	Circuit board, Fault Detector
C001	281-0823-00	Capacitor, cer, 470pF 10% 50V
C010	283-0339-00	Capacitor, cer, 0.22 $\mu$ F 10% 50V
C011	281-0823-00	Capacitor, cer, 470pF 10% 50V
C020	283-0339-00	Capacitor, cer, 0.22 $\mu$ F 10% 50V
C110	281-0823-00	Capacitor, cer, 470pF 10% 50V
C120	281-0823-00	Capacitor, cer, 470pF 10% 50V
C200	283-0167-00	Capacitor, cer, 0.1 $\mu$ F 10% 100V
C210	281-0773-00	Capacitor, cer, 0.01 $\mu$ F 10% 100V
C211	283-0167-00	Capacitor, cer, 0.1 $\mu$ F 10% 100V
C220	283-0167-00	Capacitor, cer, 0.1 $\mu$ F 10% 100V
C221	283-0773-00	Capacitor, cer, 0.01 $\mu$ F 10% 100V
C300	290-0415-00	Capacitor, elctl, 5.6 $\mu$ F 10% 35V
C310	290-0415-00	Capacitor, elctl, 5.6 $\mu$ F 10% 35V
C320	290-0162-00	Capacitor, elctl, 22 $\mu$ F 20% 35V
C510	290-0312-00	Capacitor, elctl, 47 $\mu$ F 10% 35V
CR010	152-0141-02	Semicond dvc, diode, 30V 150mA, 1N4152
CR011	152-0141-02	Semicond dvc, diode, 30V 150mA, 1N4152
CR012	152-0141-02	Semicond dvc, diode, 30V 150mA, 1N4152
CR020	152-0141-02	Semicond dvc, diode, 30V 150mA, 1N4152
CR100	152-0141-02	Semicond dvc, diode, 30V 150mA, 1N4152
CR110	152-0141-02	Semicond dvc, diode, 30V 150mA, 1N4152
CR120	152-0141-02	Semicond dvc, diode, 30V 150mA, 1N4152
CR121	152-0141-02	Semicond dvc, diode, 30V 150mA, 1N4152
CR220	152-0141-02	Semicond dvc, diode, 30V 150mA, 1N4152
CR221	152-0141-02	Semicond dvc, diode, 30V 150mA, 1N4152
CR301	152-0414-00	Semicond dvc, diode, rect, Si, 200V 0.75A
CR312	152-0141-02	Semicond dvc, diode, rect, Si, 200V 0.75A
CR410	152-0141-02	Semicond dvc, diode, 30V 150mA, 1N4152
CR510	152-0141-02	Semicond dvc, diode, 30V 150mA, 1N4152
CR520	152-0141-02	Semicond dvc, diode, 30V 150mA, 1N4152
CR521	152-0141-02	Semicond dvc, diode, 30V 150mA, 1N4152
CR522	152-0141-02	Semicond dvc, diode, 30V 150mA, 1N4152
DS400	150-1020-00	Light emitting diode, red, 3mA max
F1	159-0102-00	Fuse, cart, 0.4A 125V, 0.25s, w/leads
F2	159-0115-00	Fuse, cart, 0.05A 125V, 0.0s, w/leads

(ARTICLE CONTINUED ON THE NEXT PAGE)

## REPLACEABLE ELECTRICAL PARTS: (Continued)

Ckt. No.	Part Number	Description
Q001	151-0435-00	Transistor, silicon, PNP, SPS8335
Q010	151-0190-02	Transistor, silicon, NPN
Q100	151-0497-00	Transistor, silicon, NPN, TIP47
Q110	151-0190-02	Transistor, silicon, NPN
Q120	151-0190-02	Transistor, silicon, NPN
Q500	151-0435-00	Transistor, silicon, PNP, SPS8335
R010	315-0104-00	Resistor, cmprsn, 100k $\Omega$ 5% 0.25W
R020	315-0104-00	Resistor, cmprsn, 100k $\Omega$ 5% 0.25W
R021	315-0104-00	Resistor, cmprsn, 100k $\Omega$ 5% 0.25W
R022	315-0104-00	Resistor, cmprsn, 100k $\Omega$ 5% 0.25W
R023	315-0104-00	Resistor, cmprsn, 100k $\Omega$ 5% 0.25W
R110	315-0104-00	Resistor, cmprsn, 100k $\Omega$ 5% 0.25W
R111	315-0104-00	Resistor, cmprsn, 100k $\Omega$ 5% 0.25W
R112	315-0104-00	Resistor, cmprsn, 100k $\Omega$ 5% 0.25W
R113	315-0104-00	Resistor, cmprsn, 100k $\Omega$ 5% 0.25W
R114	315-0562-00	Resistor, cmprsn, 5.6k $\Omega$ 5% 0.25W
R115	315-0103-00	Resistor, cmprsn, 10k $\Omega$ 5% 0.25W
R120	315-0104-00	Resistor, cmprsn, 100k $\Omega$ 5% 0.25W
R121	321-0239-00	Resistor, film, 3.01k $\Omega$ 1% 0.125W
R122	321-0193-00	Resistor, film, 1k $\Omega$ 1% 0.125W
R220	315-0104-00	Resistor, cmprsn, 100k $\Omega$ 5% 0.25W
R221	315-0472-00	Resistor, cmprsn, 4.7k $\Omega$ 5% 0.25W
R300	301-0100-00	Resistor, cmprsn, 10 $\Omega$ 5% 0.5W
R301	301-0151-00	Resistor, cmprsn, 150 $\Omega$ 5% 0.5W
R310	315-0103-00	Resistor, cmprsn, 10k $\Omega$ 5% 0.25W
R311	315-0104-00	Resistor, cmprsn, 100k $\Omega$ 5% 0.25W
R312	321-1628-02	Resistor, film, 1.644M $\Omega$ 0.5% 0.125W, T2
R410	315-0104-00	Resistor, cmprsn, 100k $\Omega$ 5% 0.25W
R500	315-0362-00	Resistor, cmprsn, 3.6k $\Omega$ 5% 0.25W
R510	321-0510-00	Resistor, film, 2.00M $\Omega$ 1% 0.125W
R520	315-0103-00	Resistor, cmprsn, 10k $\Omega$ 5% 0.25W
R521	315-0104-00	Resistor, cmprsn, 100k $\Omega$ 5% 0.25W
R522	315-0104-00	Resistor, cmprsn, 100k $\Omega$ 5% 0.25W
S2	260-1962-00	Switch, push, SPDT, 0.4VA 20V
TP310	214-0579-00	Terminal, test point
U210	156-0876-00	Microckt, dgtl, hex Schmitt trigger
U410	156-1152-00	Microckt, dgtl, dual multivibrator, 4538
U420	156-0961-00	Microckt, dgtl, quad 2-inp NAND, 4093B
VR300	152-0405-00	Semicond dvc, zener, 15V 5% 1W, 1N5567B

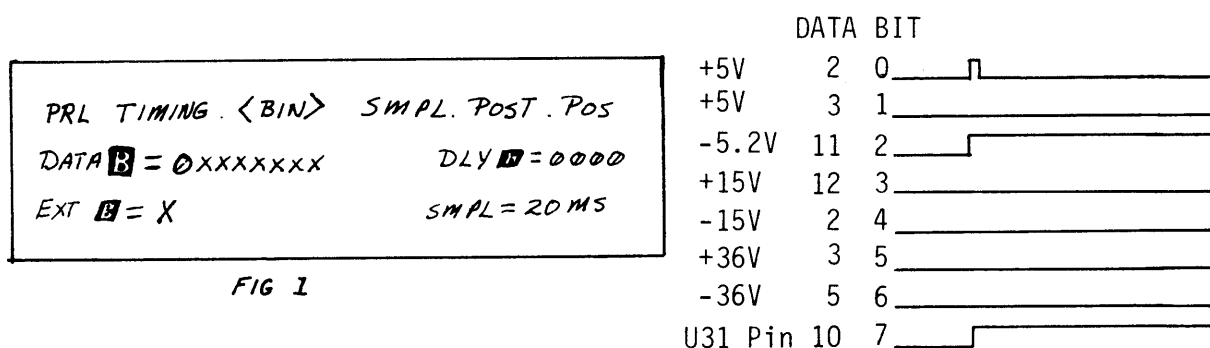
--Ron Lang  
92-236, Ext. 1015

## 1800 SERIES TEST STATIONS: FAULT DETECTOR MONITORING

Troubleshooting the fault detector circuitry can be achieved in the following manners. For constant power supply failures the use of the fault detector override button is the easiest method of troubleshooting. Turning the table on with the override button pushed, look at the LEDs on the signal sense card. The LED that does not light up is the faulty power supply or circuit. For intermittent power failures the use of a logic analyzer can determine which power supply circuit is causing the fault detector circuitry to activate.

The Sony/Tek 308 is recommended for the following procedure. Put the signal sense card on an extender. Connect the probe wires #0 through #6 on U31 Pins 2, 3, 11, and 12 and U32 Pins 2, 3, and 5. Connect wire #7 of the probe to U31 Pin 10. Connect probe ground to signal sense card ground. Push the 308 STOP button. Push these buttons in the following order: BINARY format, SAMPLE input, POST data position, DATA trigger, 0, X, X, X, X, X, X, X. This will trigger the 308 on a power supply failure. Push the sample interval until SMPL = 20ms is displayed. The header on the CRT should look the same as Figure 1.

Turn the power on the Test Station. As soon as the -15, +36 and -36 LEDs come on, push the 308 START button. If any power supply circuit glitches, the 308 will detect it. By looking at the display of the 308, it can be determined which circuit has problems.



From the example wave form U31 Pin 11 shows the -5.2 volt circuit is at fault. The glitch on U31 Pin 2 occurs because there is no isolation between the +5 volts terminator resistor and transistor driver for each power supply sensing circuits. It should be noted that any fluctuation of the +5 volt supply will show up on the display on all logic analyzer inputs. This is because the +5 is supplied to collector resistors on all signal sense circuits.

--Joe Lipska, Ron Lang  
Ext. 1634, 1015



## COMMUNICATIONS DIVISION

1980

### 1980 SOFTWARE PATCHES: ANSWER SERVICE BULLETIN #15

Due to errors, misunderstandings and further additions, this bulletin is meant to fully supercede Answer Service Bulletin #13.

The following software "patches" are to be used to correct for various faults in Option 1 Application Programs. Operating System upgrades (from version 1.0 to version 2.1, for example) will not delete the requirement to have these patches in place in order to operate the various routines correctly.

To be used, load them into Non-Volatile Memory using the SAVE NVMO: command as per the Operator's Manual and the Program Reference Manual.

1. Temporary fix so that BRSTCRSS will not always assume that burst is unlocked. Also corrects some initialization parameters. (See Figure 1.)
2. Corrects an omission which causes fatal errors when writing out modem phone numbers to NVM. Also corrects some additional initialization parameters. (See Figure 2.)
3. Corrects vertical blanking  $\pm .5$  line error and also allows more reliable identification of Canadian multiburst signals. (See Figure 3.)
4. Corrects "Quiet Line Not Found" message which caused a fatal error. (See Figure 4.)
5. Corrects defect which never marked the modem as being disconnected. Without this patch, the MONITOR & REPORT program would dial the modem once, send the report, hang up the modem, and not remember that it hung up. The modem, therefore, would never be dialed again, and the remaining reports would never be received. (For use with Auto-Call only--Option 12).\* (See Figure 5.)
6. Corrects chrominance to luminance crosstalk error. (See Figure 6.)
7. Corrects an error in Manual Individual program. (See Figure 7.)
8. Corrects an error in Manual Group program. (See Figure 8.)
9. Checks to see if modem port is connected and active. If active, dialing will not occur. (Use with Auto-Call only--Option 12).\* (See Figure 9.)

\*NOTE--Auto-Call (Option 12) will not function properly with version 1.X Operating System. People desiring to use this option MUST be upgraded to Version 2.1.

(ARTICLE CONTINUED ON THE NEXT PAGE)

FIGURE 1

```

11001 ! TIMNSE.PCH 11-NOV-80
11285 I=OH-OL
11290 K=(CA(BC-I)+CA(50-I))/2\CO$(8+7)=''\M8(8+7)=0
11300 LULSCH CA(0:BC-I),K,4,1,L,-1\IF L=-1 THEN L=BC-20-I
11310 LULSCH CA(BC-I:200-I),K,4,1,R\IF R=-1 THEN R=BC+20-I
11330 BRSTCRSS U(0:31,L-20:R+8),MC*TG,RAD(360),J,A,SC(8),SC(9),N
11340 IF A<MC*GN*TG THEN 11400
11540 I=ITP(ABS(P-8-SC(DL(1))-M0)+.999)/192
11580 MNSTDV LA(16:31),J\IF CV$<>'Y' THEN I=J-.2*BA*TG
11810 !
11850 SA(1)=FB(1)+16-(J+K)/16\SA(3)=1
11860 K=(K-J)*2/FB(2)\IF K<9 THEN K=256/31
11910 TA(J:J+511)=LA(0:511)-LA(512:1023)\NEXT J
12020 RETURN
12050 IF FE$(0)='DC' THEN WAIT 5
12160 CO$(79)='(PK-PK)'\RETURN

```

FIGURE 2

```

6001 ! INIT.PCH 11-NOV-80
11070 PRINT 1.1;TAB(T);'CONNECT FLAT FIELD SIGNAL'ICR$
11080 CLOSE #5\OPEN #5 AS VID:\I=10\GOSUB 11120
11090 AP=A\I=90\GOSUB 11120
11100 AX=80/(A-AP)\AY=10-AX*AP
15005 BL=2
17010 BL=3\NT=23

```

(ARTICLE CONTINUED ON THE NEXT PAGE)

FIGURE 3

```

5501 I MEASYS.PCH 11-NOV-80
7110 GOSUB 7190\A1=AP\L=257+FD\J=0\F=3-FD
7140 IF SM=5 THEN L=20\F=FD\J=16\GOSUB 7340\GOTO 7170
7205 IF EF=1 THEN 7220
7210 GOSUB 5000\PRINT #TT(0),CR$1,'TGSYNC LOST ON SOURCE 'JSU$1' SYNC 'JSY$
7215 P8=1
7340 PUT F,L,OV+OS,PU INTO #5,'UMC'
8020 MINMAX U(0,200:800),8,1\IF U(0,1)-U(0,8)<39 THEN CM=7\GOTO 8160
8021 MINMAX VA,S,I
8030 S=VA(I)-VA(BP)\MNSTDV UA(287:342),L\MNSTDV UA(740:768),R\D=(L-R)/S
8040 RESTORE 8190\N=3\IF ABS(D)<.26 THEN 8075
8050 RESTORE 8200\N=5\IF D>0 THEN 8080
8060 J1=FP\LULSCN UA(0:J1),VA(J1)+S*.3,4,2,8C,-1
8070 RESTORE 8210\N=4\E=SC(1)\GOTO 8090
8075 IF (L-VA(BP))>S<.28 THEN 8160
8080 J1=BP\LULSCN UA(J1:1023),VA(J1)+.02*S,8,2,8C\E=SC(0)
8190 DATA 3,0,0,5,1,1,7,-1,1
8200 DATA 4,0,0,13,-1,2,16,0,2,21,1,3,40,0,4
8210 DATA 16,0,0,23.5,-1,3,29,0,0,43,0,5

```

(ARTICLE CONTINUED ON THE NEXT PAGE)

FIGURE 4

```
16001 ! MAKEMS.PCH 11-NOV-80
16970 A$=UP$(6)&' NOT FOUND'\GOSUB 16110\GOSUB 9420\RETURN
```

FIGURE 5

```
11 ! MNITOR.PCH 13-MAR-81
65 PRINT TAB(9);'FIRST REPORT IN 160 SECONDS'
720 WAIT 30\INITG\IF TT$(2)<>'Y' THEN 740
725 GET I FROM 'MASTER'\IF I=TT(1) THEN RETURN
735 TT$(3)='OFF'
```

FIGURE 6

```
11001 ! UITSMS.PCH 11-NOV-80
12200 R0=2*(DL(3)-Z)\SA(2)=FB(2)*256/(20+DG(2))
12290 MR(40)=ITP(DL(M)/R0/SA(2)*2000+.5)/10
```

FIGURE 7

```
11 ! MANIND.PCH 11-NOV-80
470 READ #6,U$,N$,C$,S$,T$,A9$,B$\IF Q$<>U$ THEN 470
510 A$=A9$\GOSUB 4500\IF B$<>'NO' THEN READ #6,LM\LN$=A$
```

FIGURE 8

```
11 ! MANGRP.PCH 11-NOV-80
430 READ #6,U$,N$,C$,S$,T$,A9$,B$\IF Q$<>U$ THEN 430
470 A$=A9$\GOSUB 4500\IF B$<>'NO' THEN READ #6,LM\LN$=A$
```

FIGURE 9

```
25001 ! GETERM.PCH 13-MAR-81
25090 TT(0)=L\TT$(3)='OFF'\DRAWON #L\IF TT$(2)<>'Y' THEN RETURN
25095 GET A$ FROM #L,'MODE'\ IF A$='CONNECTED' THEN TT$(3)='ON'
25096 RETURN
```

--Bill Bean  
53/108, Ext. 8695

## 4025A/4027A SERVICE MAINTENANCE INFORMATION

INTENT: Provide supplementary or additional maintenance information not available in the Service Implementation Plan or Service Manual. Reference should be made to the published Service Implementation Plan, dated September 18, 1981 and the attached Training/Service Document.

ORIGINATOR: Marty DeVall, Performance Assurance Engineer  
63-503, ext. 3927 (WI)

### I. GENERAL DESCRIPTION

The 4025A and 4027A is an enhanced version of the 4025 and 4027 computer terminals. The most noticeable feature change is the faster display speed, nearly three times faster. Additional features such as circles, macros, remote start/stop and clear to send flagging are now all standard plus the 4025A now has a standard GIN option (38).

The electrical changes to the 402XA include a new processor board that replaces the old Processor and ROM Expansion Board. The new Processor board is based around the Intel 8085A microprocessor.

The firmware code is almost identical to the 4025/27 firmware except for the enhancement changes. The firmware ROMs used on the 4020A processor board are now EPROMs. Fixit firmware is no longer used on the new Processor Board.

All ROMs (EPROMs) including optional ROMs are contained on the 4020A Processor Board. All standard ROMs are different between 4025A and the 4027A Processor Board. The optional ROMs are the same for both products. Eight (8) ROMs are standard on the 4027A Processor Board and seven (7) are standard on the 4025A Processor Board. The (2) Graphic/GIN ROMs are now a part of the standard 4025A firmware but are not used until the hardware options are installed. The GIN option requires a jumper to be added on the Processor Board to enable the GIN firmware.

#### Field Kits

Existing 4025s and 4027s can be upgraded to operate the same as a 4025A and 4027A. The field kit (4025F30 and 4027F30) contains a 4020A Processor Board, 402XF30 sticker, 4020A Operations Manual and an Installation Guide. Once an F-kit has been installed, reference should be made to the 4020 "A" Service Manuals.

(ARTICLE CONTINUED ON THE NEXT PAGE)

## 4025A/4027A SERVICE MAINTENANCE INFORMATION (continued)

### Service Manuals

The 4025A and 4027A Service Manuals are orderable but will not be available until November 1, 1981. A Training/Service Document has been distributed to U.S. Field Service Management. A Service Organization Bulletin has been distributed to International Subsidiary Service Managers containing this document. This Training/Service Document should be used with the existing 4025 & 4027 service manuals to service the 4025A and 4027A until the "A" service manuals are available.

4025A, Vol. 1, P/N 070-4167-00  
4025A, Vol. 2, P/N 070-4168-00  
4027A, Vol. 1, P/N 070-4169-00  
4027A, Vol. 2, P/N 070-4176-00

### Planned Maintenance

The planned maintenance for the 4025A and 4027A will be the same as the 4025 and 4027 respectively.

### Fault Isolation to Board Level

The TEST command has changed in the 4020A. It now displays which firmware ROMs are installed and whether or not they are good or bad. You no longer must keep track of checksum numbers. The G/TEST command and the 4027A CAL command remain unchanged.

Option 41 Self Test is not compatible with the 4025A and 4027A. The Self Test option has been replaced by a Cycle Test that is contained in the Option 1 firmware ROM. The Cycle Test is enabled by placing a jumper on J757 on the Processor Board. The Cycle Test continually tests ROMs, display memory, graphics memory, the host port, I/O ports, color map circuitry (4027A only), and display circuitry. For more information, refer to the "A" Service Manual or Training/Service Document.

### Fault Isolation To Component Level

A 4020A Processor Board Test Fixture, P/N 067-1102-99, aids in component level repair of the 4025A and 4027A. It contains a display memory RAM test, 4025A graphics memory RAM test, 4027A graphics memory RAM test, GPIB hardware test, RS-232 (printer I/F) hardware test, the cycle test firmware and an ODT to allow the technician to control the microprocessor. For more information refer to the 067-1102-99 Test Fixture Manual.

The standard firmware also contains a Power Up Scope Loop enabled by a jumper on the Processor Board.

--Marty DeVall  
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