Tektronix
COMMITTED TO EXCELLENCE

COMBINATION EDITION

Wizards Workshop

****
* ALL SERVICE QUESTIONS FROM EUROPE, MIDDLE EAST, *
* AND AFRICA SHOULD BE ADDRESSED TO THE EUROPEAN *
* MARKETING CENTER SERVICE GROUP IN THE NETHERLANDS. *
****

TEKTRONIX INTERNAL USE ONLY

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PERSONNEL CHANGES

Please join Brian Mandigo in welcoming *REGGIE LUMPKINS* to Tektronix Field Service. Reggie comes to Tek from General Electric Corporation where he spent four years as a data communications specialist. He will be operating out of the Cleveland Field Office.

Welcome Reggie!

****

Please join Jerry Carmichael, Atlanta FSS, in welcoming two new hires to Tek. *ROBERT HOUSE* is an FSS II in Atlanta and comes to Tek from Data Signal. *PATRICK WHITE* is an FSS I and will be working out of the Knoxville office. Pat comes to us from NCR where he was a Field Engineer for two and a half years.

Welcome aboard Bob and Pat!

****

FRANK THORPE had joined Boston STS for training as a resident at IBM in Vermont. Frank comes to Tek from Nixdorf Computer Corp. where he was a National Field Service Support Specialist. He will be in Vermont with his family in October to start his residency.

THOMAS RILEY has also joined Boston STS and will be working from the Boston office. Prior to coming to Tek, Tom was a Senior Technical Representative for Xerox. Tom and his wife Francis reside in Everett, MA.

A hearty welcome to both Frank and Tom!

****

PROMOTIONS

Congratulations are in order for the following people on their recent promotions:

Gary Weaver to Field Service Specialist II in Philadelphia IDG Field Service.

Farrell Smith to Field Service Specialist II in Philadelphia IDG Field Service.

Robert (Buddy) Street to ETII in the Raleigh Service Center.

Van Freeman to FSS III out of the Raleigh Office.

Bruce Sundquist to FSS II out of the Atlanta Office.

Bill Hurst to an FSS III in the Syracuse Office.

Ken Allen to an FSS II also in the Syracuse Office.

Congratulations one and all!

****

--Sharon Huetson
Editor

GUERNSEY MODIFICATIONS, JANUARY & FEBRUARY 1980

The following modifications were made to Guernsey produced products. No corresponding mods were made in other manufacturing areas. These mods are not authorized for Beaverton, Heerenveen or Sony/Tek produced units.

7B53A, Improved 100 MHz triggering when used in 7904.

Reference: Guernsey Mod 3757 Initiated at S/N 106590

The value of R64 in the Main Trigger Preamp was changed from 100Ω to 33Ω, PN 315-0330-00.

7A18, Reduce shift in ADD mode.

Reference: Guernsey Mod 3767 Initiated at S/N 109417

The value of R455 in the Channel 2 Input Amplifier was changed from 2.7 KΩ to 2.4 KΩ, PN 315-0242-00.

5A18N, Cross talk eliminated.

Reference: Guernsey Mod 3770 Initiated at S/N 105402

The value of R306 in the emitter circuit of Q301 and Q308 was changed from 2.2 KΩ to 1.5 KΩ, P/N 315-0152-00.

T900, Improved Power Supply Regulation.

Reference: Guernsey Mod 3766 Initiated at the following serial numbers:

T921	S/N 100514
T922	S/N 104899
T922R	S/N 100401
T932A	S/N 101961
T935A	S/N 103471

The power transformer was changed from P/N 120-0994-02 to P/N 120-0994-03 P/N 120-0994-03 which is a Guernsey made part and is not available from Beaverton.

Submitted by--
John Farnell, EMC

Inserted by--
Editor

PRODUCT HISTORY STATUS LISTING - HEERENVEEN

A new feature has been added to the Product History Status Listing. Products manufactured at Heerenveen will now appear on the microfiche. This new section will be entitled "Warranty Starting Dates - Heerenveen" and will be located at the rear of the set.

--Editor
53-027, Ext. 8939 Merlo

TELEQUIPMENT

Effective April 1, 1980 Tektronix has again taken over the sales and service of all Telequipment products. If you have any technical questions regarding these products please address them to:

Tom Herd
43-000
Ext. 6205

Tom is our resident expert here in Beaverton and is more than willing to help you.

--Editor
53-027, Ext. 8939 Me

311-1915-00 DEFECTIVE DATE CODE

Component Support Engineering has found that Part Number 311-1915-00, with Date Code 7950, is defective. This device is a Bourns Brand trimmer pot and its experiencing intermittent wiper contact and intermittent wiper to element shorts.

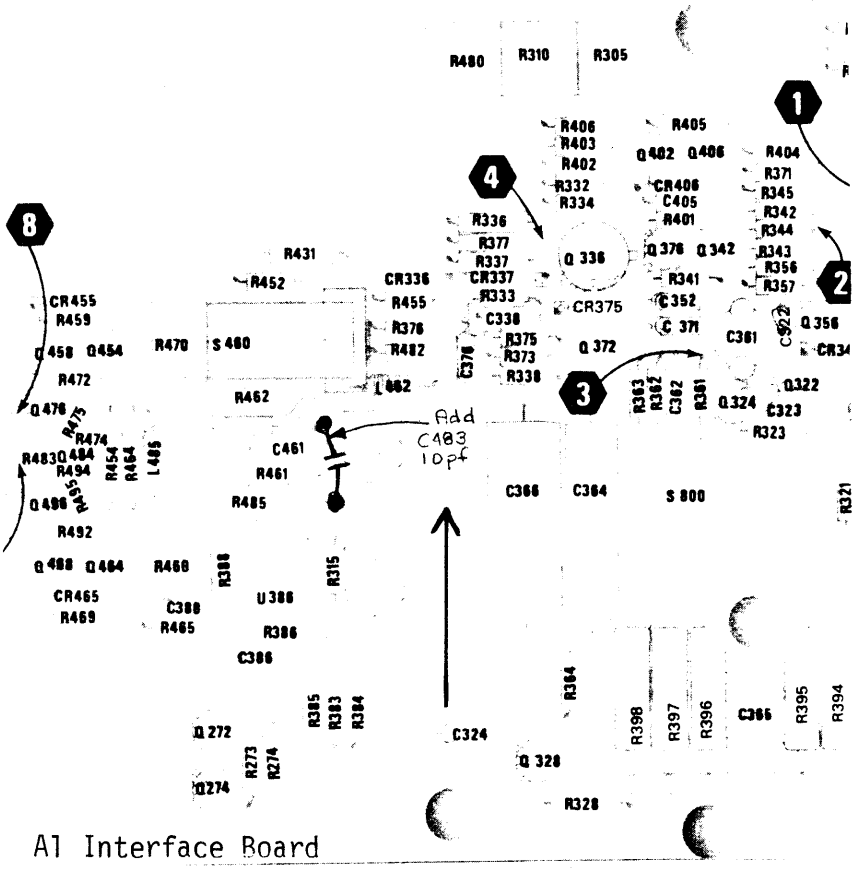
Check all stock areas and purge Bourns Brand, Part Number 311-1915-00 parts with Date Code 7950, reorder as necessary.

--Rich Andrusco
94-816, Ext. 1582

7B10/7B15 POSSIBLE SWEEP OSCILLATIONS

Reference: 7B10 Service Manual P/N 070-2316-00
7B15 Service Manual P/N 070-2318-00
Diagram 4 Sweep Generator
Mod #M40031

There is a chance that the sweep will oscillate at random time/division settings. To eliminate the oscillations, add C483, a 10pf cap, P/N 281-0811-00, from the junction of R482 (68K) and R483 (10K) to the -15 volt power supply. See the attached drawing for part location.



A1 Interface Board

--John Eaton
58/511, Ext. 6902

7854, CALIBRATOR RISETIME AND FALLTIME

Reference: 7854 Operators Manual P/N 070-2873-00

Change calibration rise and fall times to read 250NS or less from the present 250μs or less.

--John Eaton
58/511, Ext. 6902

413 RESPIRATION MICROPHONICS

Respiration trace disturbances can be generated by moving the ECG/RESP input connector, by pushing firmly on the right side rail, or by tapping on the instrument. In a transport environment, vibration which affects the instrument will also be causing significant disturbance to the respiration signal from the patient, electrodes, and electrode leads. The patient movement artifacts will, in some cases, make the respiration measurement useless. This is commonly understood to be a clinical problem with respiration monitoring, even in stationary environments.

Some microphonic noise is acceptable. A simple check would be tapping the work bench the instrument is setting on, and checking for less than or equivalent to $\pm$ 1 cm from the baseline. This is dependent upon the strength of the tapping and requires good judgement from the technician. Comparing two instruments should clear up any questionable cases.

--Dave McKinney
58/511, Ext. 7072

670A SERIES, MODIFICATION TO HORIZONTAL OUTPUT CIRCUITS

Reference: 670A Manual P/N 070-2201-01
670A-1 Manual P/N 070-2202-00
Modification M39864

Q5030, Q5275, Q5280 and F5042 are high failure rate components in the 670A Series monitors. Q5030 is failing because of timing problems which causes some transistors used in this location to turn on during flyback. This would open the fuse (F5042) and in most cases, destroy the transistor. Q5275 and Q5280 apparently fail due to a high induced voltage present during flyback.

To correct these malfunctions, change R5085 from 56 ohms to 27 ohms (303-0270-00) and change L5085 from 10 microhenries to 5 microhenries (108-0554-00). Add diodes CR5275 and CR5280 (both 152-0398-00) across Q5275 and Q5280, respectively. Connect the anode of CR5275 to emitter of Q5275 and connect cathode of CR5275 to collector of Q5275. Connect anode of CR5280 to collector of Q5280 and connect cathode of CR5280 to emitter of Q5280. (See the following schematic for changes.) A parts kit is available for both modifications.

To replace a failed Q5030 order P/N 050-1369-00. This kit contains Q5030, F5042, the new coil and the new resistor. To replace Q5275 and Q5280 after failure order P/N 050-1370-00. This kit contains transistors and diodes.

The modifications described here should be added to any 670A Series monitor as a preventative measure. Also, add these modifications when replacing any failures to Q5030, Q5275, Q5280 or F5042.

Modification installed by manufacturing at:

670A	B031140
670A-1	B020210
671A	B031140

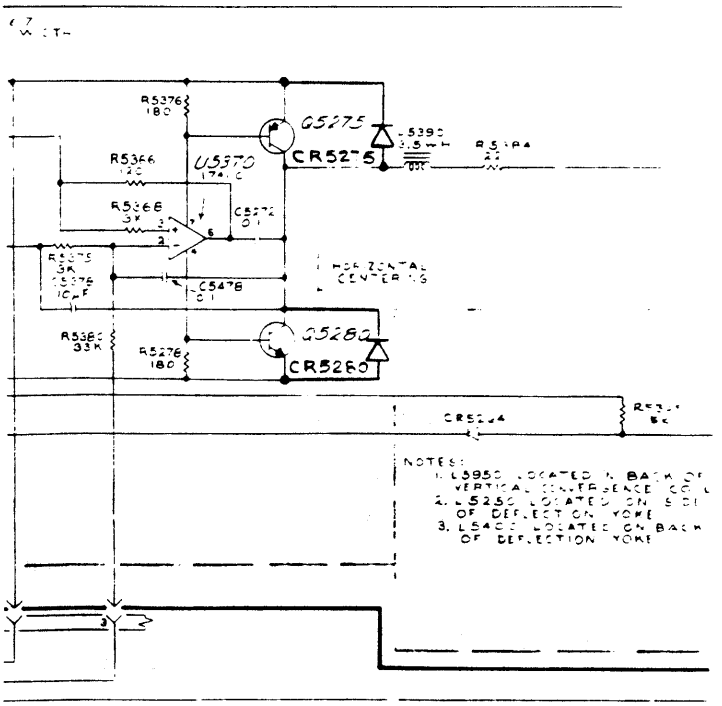
(continued on the following page)

670A SERIES, MODIFICATION TO HORIZONTAL OUTPUT CIRCUITS (CONTINUED)

ADD:

CR5275	152-0398-00	SEMICOND DEVICE:SILICON,200V,1A,1N4935
CR5280	152-0398-00	SEMICOND DEVICE:SILICON,200V,1A,1N4935

DIAGRAM <12> HORIZONTAL DEFLECTION (670A & 671A) DIAGRAM <5>$_b$ 670A-1 SERIES



--Steve Schmelzer
58/511, Ext. 6507

1401, 1401A BATTERY CHARGE LEVEL METER REPLACEMENT KIT

Reference: 1401 Manual P/N 070-1071-00
1401A Manual P/N 070-1197-00
Modification B0462, S31466

Battery level meter, part number 149-0044-05, replaces the Battery Charge Level Meter, M30, part number 149-0031-00, which is no longer available. These new meters require changes to the meter circuit. Use parts kit 050-0922-01 when replacing M30.

Effective Serial Numbers: 1401 B010100 - Up
1401A B020400 - B059990

--Steve Schmelzer
58/511, Ext. 6507

1405, PARTS KIT FOR REPLACEMENT OF U500

Reference: 1405 Manual P/N 070-2078-00
Modification M36081

Integrated circuit, P/N 156-0402-00, and R500/R504, a 1K ohm potentiometer and a 1.02K ohm resistor, are required to replace U500. A parts kit, P/N 050-1361-00, is available for this purpose. This modification is installed by manufacturing in all units above S/N B040610.

--Steve Schmelzer
58/511, Ext. 6507

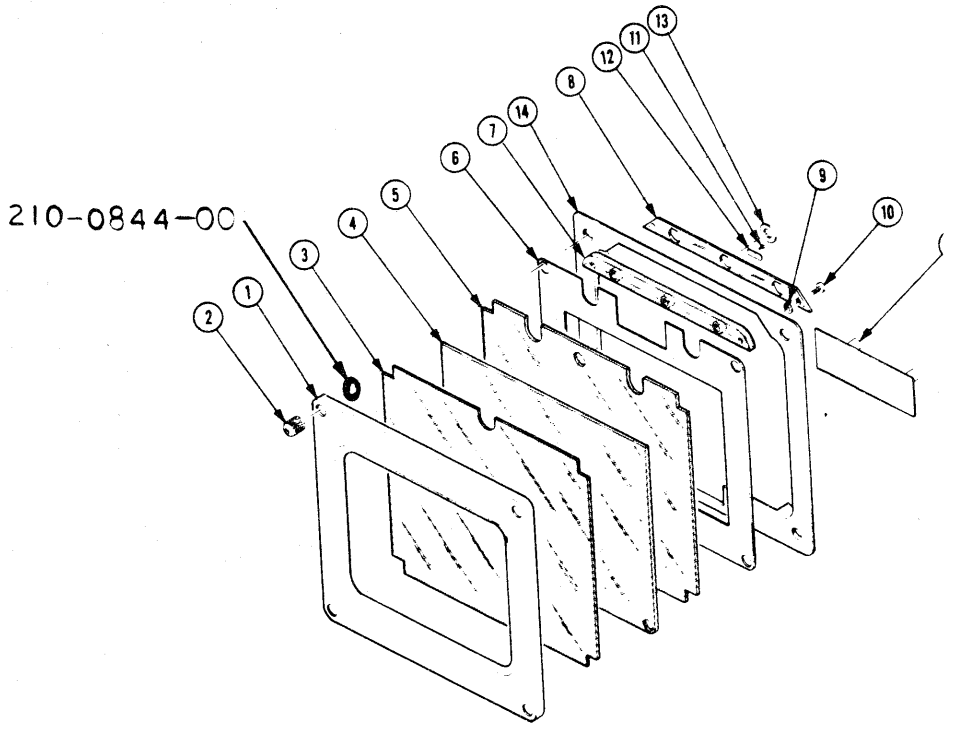
1410, SPG, TSG SERIES DEFECTIVE TRIMMER POT, PART NUMBER 311-1915-00

311-1915-00 parts, code date 7950, are defective. Failure modes are intermittent wiper contact and intermittent wiper to element shorts. Inspect all parts in stock and purge those with code date 7950. Reorder as necessary. This part is used in the SPG Series, TSG Series and the 1410 Series.

--Steve Schmelzer
58/511, Ext. 6507

1480 SERIES, PART NUMBER FOR RUBBER WASHER UNDER CRT BEZEL

The part number for the rubber washer underneath the CRT Bezel is 210-0844-00. See the following drawing for the location.



1480 SERIES

--Steve Schmelzer
58/511, Ext. 6507

P/N 155-0147-00, 155-0147-02, 050 REPLACEMENT KITS FOR TV PRODUCTS

Kits for replacement of Tektronix made sync timing integrated circuits (P/N 155-0147-00 and 155-0147-02) are set-up and available. Please consult parts notice #204 for information and procedures regarding these kits. The kits contain a new circuit board, installation instructions and calibration procedure.

Kits are available for the following instruments:

INSTRUMENT	SERIAL NUMBER	KIT NUMBER
SPG1/SPG2	B010100 - B019999	050-1338-00
SPG3	" "	050-1339-00
SPG11/SPG12	" "	050-1340-00
SPG13	" "	050-1341-00
143	" "	050-1342-00
1470	" B029999	050-1343-00
1474	" B029999	050-1344-00

Cost for the kit is $75.00 when the customer returns his old integrated circuit or circuit board. In other cases the cost of the kit will be the total price of all parts of the kit.

--Steve Schmelzer
58/511, Ext. 6507

ACCESSORIES

P6013/P6013A SUPPORT POLICY

Effective April 14, 1980, all P6013/P6013A's will be on long-term support. The support policy will be to send all P6013/P6013A's to Factory Service for repair. This is necessary because the service centers are not equipped to verify operation of the P6013/P6013A at 8K Volts or greater.

--Gary Ellsworth
58-511, Ext. 6781

BATTERY POWER FOR THE 308

The 308 will work with the portable 1105 Power Supply (Battery Pack-rechargeable). The 1105 will operate the 308 for approximately three (3) hours maximum, but we recommend 2 to 2.5 hours for safe nominal operation.

With the combined 308 and battery power supply you can take the 308 practically anywhere. This combination will not be set up as an option to the 308 Data Analyzer. The 1105 Battery Power Supply can be ordered through the Tektronix catalog.

If any problems occur, due to the operation of the 1105 and 308, please let me know so that they can be resolved quickly.

Submitted by--
John Huber
LA Marketing
92-691

Inserted by--
Doug Comstock
94-816, Ext. 1611

LA501 NEW MANUAL

A new manual for the LA501 is now orderable. If you have a need for one, order 1 each, Part Number 070-1967-01. One of the major advantages of this manual is that the schematics are now broken apart for serial numbers, B010249 and below, and B010250 and above.

--Rich Andrusco
94-816, Ext. 1582

308 AUTO UPDATE MODE

The following procedure will provide an automatic update of the CRT to view new data as it enters the instrument. You may now acquire the data and view it either in Parallel Timing, Parallel State or Serial State.

1. Power up 308
2. Press "Serial State Key" (after self-test is complete)
3. With the Serial Probe (P6107) DISCONNECTED take an acquisition
4. After about 10 seconds press "STOP". There should be invalid data on CRT.
5. Press "Store Data to Reference Key". This loads invalid data into Reference Memory.
6. Connect your parallel acquisition probes to view with data you want.
7. Press "Parallel Timing"
8. Put the "Data =" field to "X X" (HEX).
9. Press "Restart If" key. The 308 will begin acquiring data. Since the Reference Memory is filled with invalid data there will be no compare loop and a reset never really happens. The 308 just continually loads data into memory according to your trigger parameters.

You may word recognize but the display will be stationary, if you are on a looping pattern. Normally, you would use this mode to observe the behavior of data and not really care about a specific trigger point.

You can also use this mode in the STATE FORMAT but as you will see the display moves too fast to be useful.

Submitted by--
John Huber

Inserted by--
Rich Andrusco
94-816, Ext. 1582

465B ADJUSTING H.F. ABERRATIONS AFTER CHANGING INPUT FET

Reference: 465B Manual P/N 070-2757-00
Schematic ◇1◇ & ◇2◇ CH 1 & CH 2 Vertical Pre Amps

A dual N-Channel Fet, P/N 151-1090-00, used in the CH1 (Q1297) & CH2 (Q1698) vertical input circuit, now has 7 legs instead of 6. (The new leg will have to be removed to fit in the socket, see Fig. 1.) This is due to a change with internal bonding.

The change in bonding effects the capacitance of the FET, which in turn effects the H.F. response of the preamps. To compensate for this change in capacitance R1299, (CH1) and R1798 (CH2) are now selectable with a nominal value of 510Ω, P/N 315-0511-00 and a range of selection from 100Ω to 1KΩ. To select the correct value of resistance after replacing Q1297, Q1698:

1) Switch the preamp to the 5mv range and input the H.F. square wave. Use 6 div of display.

2) Adjust for a flat top within specs.

3) Switch to 20mv, and adjust the generator for 6 div.

4) If the first 10NS of display is rolled down, select a lower value resistor. If the first 10NS is rolled up, select a higher value resistor.

5) Due to interraction, check the 5mv range and readjust as necessary. If an adjustment is made, recheck and adjust the 20mv range. Re-check L.F. compensation.

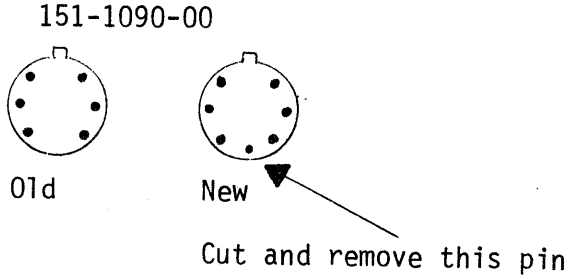


Fig. 1

--Mike Laurens
58/511, Ext. 7012

465B FAST SWEEP LINEARITY

Reference: 465B Manual P/N 070-2757-00
Schematic ⟨10⟩ Horizontal Amp.
Serial Number: B039320 and Below

In order to meet fast sweep speeds linearity in the past, U4269 P/N 156-0197-00 had to be selected for an optimum part. To eliminate selection of U4269 the part is now changed to P/N 156-0048-03. When replacing U4269 use the new part number.

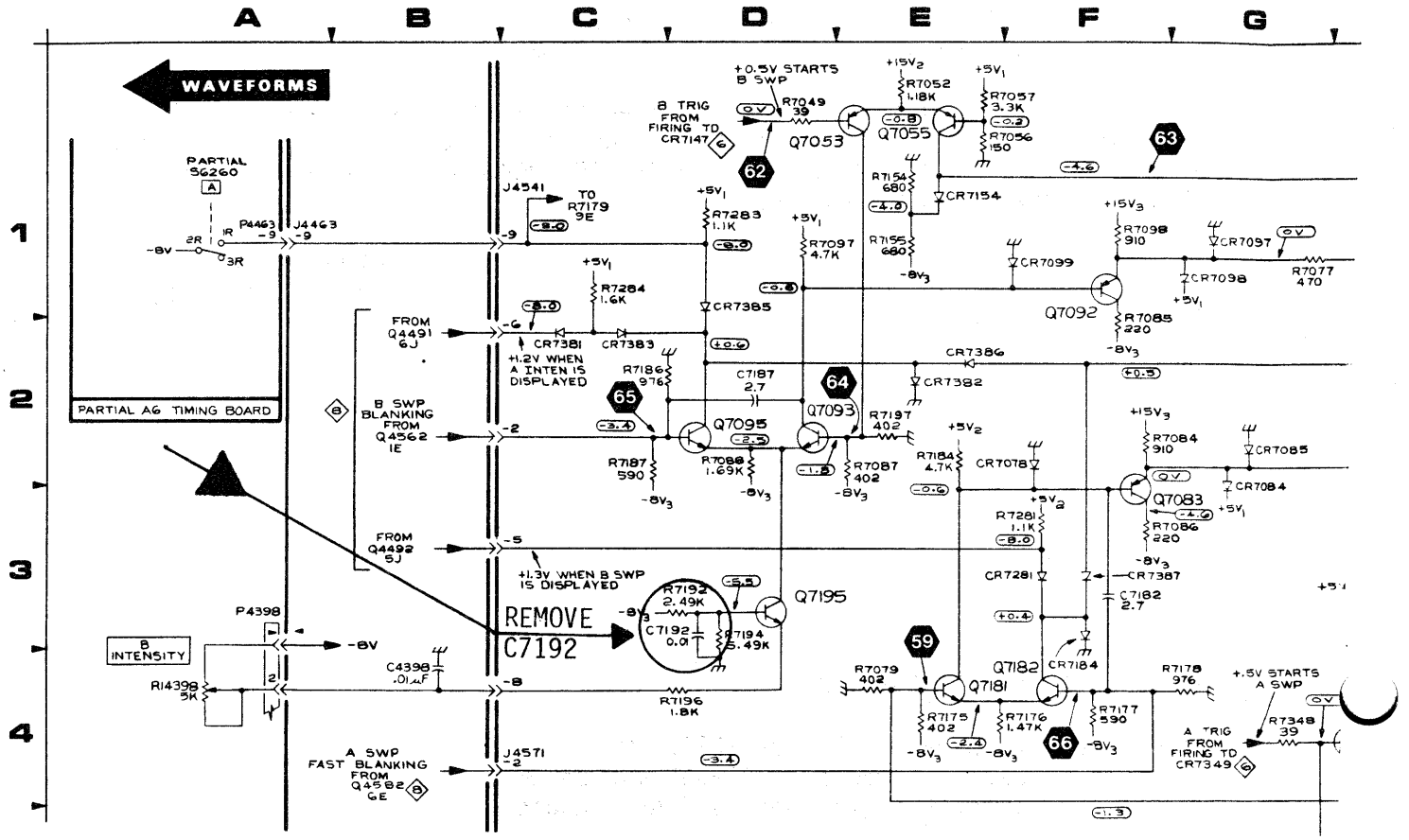
--Mike Laurens
58/511, Ext. 7012

465B UNSTABLE B TRIGGERING

Reference: 465B Manual P/N 070-2757-00
Serial Numbers: B039950 and Below
Schematic ⟨7⟩ Sweep & Z-Axis Logic

To eliminate B trigger jitter and to improve the adjustment of R7045, ("B" trigger sensitivity) C7192, .01uf capacitor, is removed. With the capacitor in the circuit, the "B" trigger will occasionally oscillate causing poor "B" triggering and will cause the adjustment of R7045 to be difficult to set.

(continued on the following page)



--Mike Laurens
58/511, Ext. 7012

1105 BATTERY SET REPLACEMENT

Reference: 1105 Manual P/N 070-1479-00
BT 120 P/N 146-0020-00 Battery Set
Serial Numbers: All

To obtain replacement battery sets for the 1105, order a new mod kit P/N 050-1348-00. The kit includes plastic feet to be used with General Electric battery sets. (GE battery sets are provided with 90% of the kits.) GE brand battery sets are slightly smaller than battery sets manufactured by other suppliers and might short due to shifting in the holder. Instructions for installing the plastic feet are included with the kit. All other brands of battery sets are a direct replacement.

--Mike Laurens
58/511, Ext. 7012

IDD TEST PROM FOR THE 832, 833

An IDD Test PROM has been made available for the 832 that will supply messages to test IDD terminals and peripherals. Some of the things included are 4020 series polling messages, 4010 style graphics, gin, enquire, and 4010 Option 15, 22 and 23 correspondence code messages.

The part number for the PROM which includes a user manual is 067-0960-99. There is a limited quantity available, and should only be ordered if you have an 832 or 833.

To install the PROM in the 832/833

1. Turn off power.
2. Remove the bottom cover.
3. Install the PROM in the U1232 socket.
4. Replace the bottom cover.

--Frank Lees
63/503, ext. 3929

MEG TC-3 CIRCUIT BOARD P/N

TC-3 Circuit Boards P/N 670-3093-06 and 670-6072-00 are now functionally identical. For this reason all TC-3 boards used in MEG121/131 will use the P/N 670-3093-06.

INTERNAL ONLY

TC-3 P/N 670-3093-05 and lower suffixes can be used in MEG, for trouble-shooting. Although due to reliability reasons it is not recommended that anything other than a 670-3093-06 is left in the system for long periods of time.

--Bill Hatch
63/503, ext. 3787

OEM SERVICE GUIDELINES, IDD PRODUCTS

During the past several months, IDD Service Support has been in the process of developing a document titled "IDD OEM Service Guidelines". The document is intended to clarify our current service policies with reference to all IDD products sold under an OEM purchase agreement.

The finalized document will be distributed to the following groups of people and publications.

Service Support
Field Service Managers
Field Service Supervisors
OEM Marketing
OEM Sales Managers
OEM Sales Engineers
Service Quote Information (SQI)

A summary of the complete document is shown in the IDD OEM Service Matrix. This is on the next page which is a pull-out for your reference.

--Steve Ross
63/503, ext. 3596

(continued on the following page)

IDD OEM SERVICE MATRIX

TYPE OF SERVICE	LOCATION OF SERVICE (U.S. ONLY)	O.E.M. PRODUCT	END-USER PRODUCT SOLD AS O.E.M.	4633A 4634
WARRANTY	IN-HOUSE: At desig nated S.C. only	Yes (1)	Yes (1)	Yes (1)
	ON-SITE: At OEM Location	No (2,3) T.L.	Yes (3) T.L.	Yes (3) T.L.
	ON-SITE: At End-User Location	No (1,2,5) T.L.	Yes (1,3) T.L.	Yes (1,3) T.L.
Maintenance Agreement	IN-HOUSE: At Designated S.C. only	Yes	No	Yes
	ON-SITE: At OEM Location	No (2,5)	Yes (3)	Yes (3)
	ON-SITE: At End-User Location	No (1,2,5)	Yes (1,3,4)	Yes (1,3,4)
Time & Material	IN-HOUSE: At Designated S.C. only	Yes	No	Yes
	ON-SITE: At OEM Location	No (2,5)	Yes	Yes
	ON-SITE: At End-User Location	No (1,2,4,5)	Yes (1,4)	Yes (1,4)

Notes:

Yes = Service may be offered
No = Service may be offered by exception

Exceptions:

(1) = Requested by OEM Customer
(2) = From Designated Service Center
(3) = Region Field Service Manager Approval
(4) = Requested by OEM End-User
(5) = Discouraged; requires Region Field Service Manager Approval

Abbreviations:

T = Travel Expense or Transportation Charge
L = Repair Labor Charged
P = Parts Charged

Designated Repair Deport:

Santa Clara Field Office
Boston Field Office
Denver Field Office - GMA Series for Autotrol only
Factory Service - Beaverton

For detailed information about OEM Service, please refer to the complete document.

PHONE REQUESTS FOR TECHNICAL ASSISTANCE

We in Service Support want to provide Field Service with the best possible response to your phone requests for technical assistance. Our goal is to provide immediate response to all requests. We are certainly not there yet, but are taking steps to get us closer to our goal. There are other responsibilities that our Performance Assurance Engineers have, that require them to leave our area during the normal workday. As the PAE who has the primary responsibility for any given product may not be available when a call comes in, we have established a program to provide backup support for each PAE. The intent is to connect you with someone who will make every effort to provide you support.

You can help. When our secretaries ask who you are, what office you're from, whether you are on-site or in the office, and what product you are inquiring about, it's not because we are nosy. We are trying to insure your call isn't lost and direct you to the best qualified person to assist. If there is no urgency in your call, please tell us so we may call back. We take a lot of field calls (over 400 last AP) and efficiency is necessary. We can be more efficient when the person who "knows" the answer takes the call rather than someone who will "find out" the answer.

Occasionally we are asked the same question more than once. This indicates that there might be others who would like to know the answer to there questions also. We will be compiling a list of these questions and the answers from our phone logs, and periodically will be publishing them in the Wizard Workshop. Some of these Questions and Answers will seem common knowledge.

We recognize that Field Service is growing and constantly hiring new people that don't share the same knowledge as the folks who have been around awhile. Most of this information will be aimed at them, hopefully there will be something for everyone.

--Dick Schilling
63/503, ext. 3931

463X: PAPER GUIDE ASSEMBLY

The fishline-wrapped processor entrance guide is not available in assembled form. It must be assembled from two parts: the "frame" and the fishline. The frame is orderable from Tektronix under part number 351-0378-01 (for the 4631 and 4632) or 351-0582-00 (for the 4633A and 4634). The fishline is 25 pound test monofilament line available in a 4 ounce spool under part number 253-0200-00. Assembly is not difficult provided a sample is at hand (see figure 1).

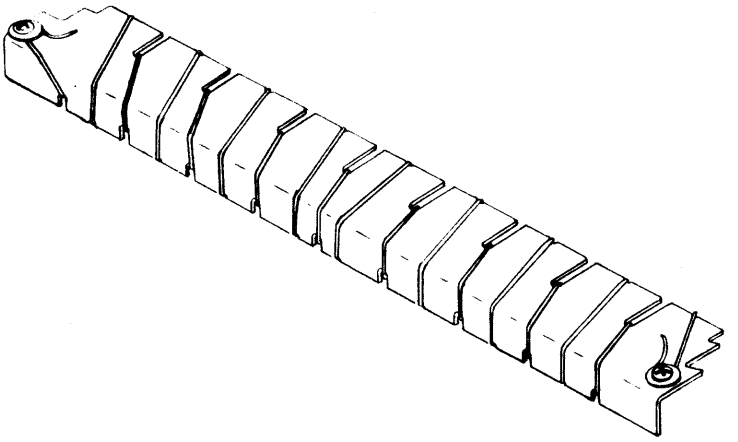


Figure 1. Front View

The fishline should be wrapped reasonable taut. If the wrapping is done correctly, a neat symetric pattern is apparent when the assembly is viewed from below (figure 2).

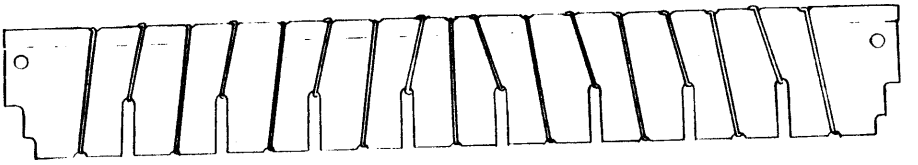


Figure 2. Bottom View

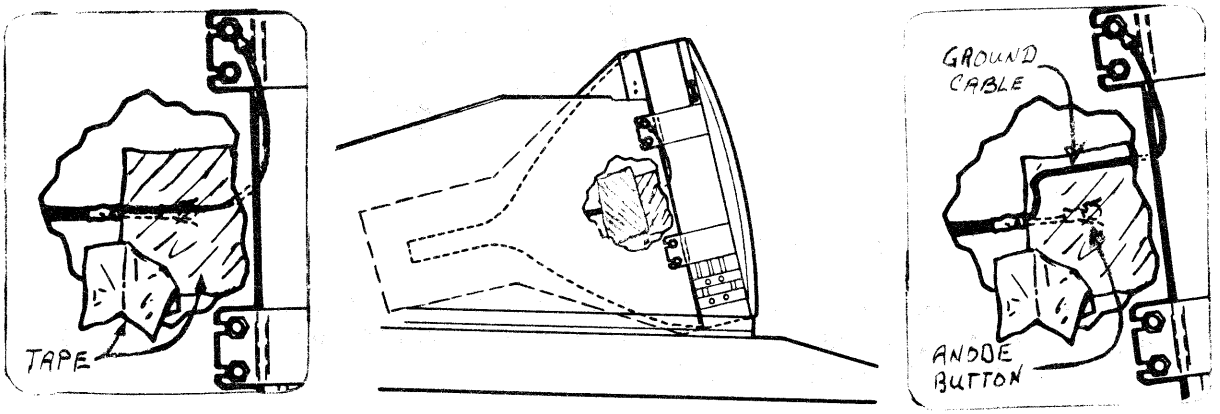
--George Kusiowski
63/503, ext. 3928

4014/15 CRT GROUND WIRE DRESSING AFFECTS STORAGE BOARD

Reference: 4014, 4014-1, 4015, 4015-1
Computer Display Terminal Service
Manual 070-2302-00

Recently reports from the field have indicated a common failure with the 4014/15 Storage boards on new terminals. The symptoms are; no storage, will not page, collimation okay, OP LEVEL high and can not be adjusted. Troubleshooting will probably show that Q85, Q154, Q183, and Q1023 are all shorted. Q1021 and Q1022 may also be shorted and in addition R589 will be burned and R185 and R187 may be burned.

The cause of these multiple failures has been traced to incorrect dressing of the ground cable on the CRT. Below is a illustration showing the location of the cable on one side of the CRT (newer CRTs have a cable on both sides), and two (2) exploded drawings showing the correct and incorrect methods of dressing the cable. What happens is with the cable incorrectly dressed directly over the anode button (target voltage), there is a tendency to short the anode (approx. 250 volts) to the grounding cable.



Incorrect Method

Correct Method

To remedy this problem the CRT must be removed from the terminal and the CRT Shield Assembly must be removed as per the Service Manual (070-2302-00) on pages 3-4 thru 3-6. With the shield removed notice that there are two (2) pieces of surgical tape holding the wire against the CRT. Be very careful when removing this tape, the silver paint from the anode buttons to the tabs comes off easily. If this paint is removed, the CRT will have to be replaced. As per the illustration, only the top layer of tape needs to be removed. Position the ground wire as shown and cover it back up with the tape. Note that there is an orange wire connecting to another button under these tapes. This is CE-2 and has not been a part of the problem.

Thanks go to Walt Burns of the Rockville Field Office for the help we received in identifying this problem in the field.

--Dennis Painter
63/503, ext. 3597

4025 OPTION 10 FIRMWARE UPGRADE V2.1

Reference: 4025 SERVICE MANUAL VOLUME 2 P/N 070-2831-00
Mod #36176

Instruments below serial number B031940 were shipped before Version 2.1 Option 10 firmware was implemented. The 4025 Processor Board with Option 10 firmware changes to 670-5688-01.

The Option 10 firmware on the Processor Board required an upgrade to Version 2.1 to remain compatible with the 4025 Standard Masked ROMs which changed to Version 2. Also at the same time firmware changes implemented in V2.1 Standard Firmware were implemented in V2.1 Option 10 firmware. The Option 10 Masked ROM P/N 156-1009-00 remains unchanged. To upgrade the Option 10 firmware to Version 2.1, order 050 kit 050-1225-00. The 050-1225-00 contains:

156-1005-01	V2 Masked ROM
156-1006-01	V2 Masked ROM
156-1007-01	V2 Masked ROM
160-0354-00	F - ROM
160-0355-00	FPLA

The firmware upgrade requires the three (3) V1 Standard Firmware Masked ROMs be replaced by the three (3) V2 Standard Firmware Masked ROMs located in U365, U375 and U385 on the Processor Board. The F-ROM 160-0354-00 and FPLA 160-0355-00 replace the IC's in U265 and in U275.

PROCESSOR BOARD OPTION 10 FIRMWARE

Version 1.3	Version 2.1	
156-1005-00	156-1005-01	U365
156-1006-00	156-1006-01	U375
156-1007-00	156-1007-01	U385
*156-1009-00	*156-1009-00	U395
156-0976-08	160-0354-00	U265
156-0940-10	160-0355-00	U275

*This ROM does not change when upgrading the Option 10 firmware from V1.3 to V2.1.

The new check sums for Version 2.1 Option 10 firmware is:

130 2 175 113

Version 2.1 Option 10 firmware is compatible with Version 1.4, 1.5 and 1.6 optional firmware located on the ROM Expansion Board and either of the two (2) Option 11 firmware versions.

TEKTRONIX INTERNAL USE ONLY

This firmware update for the Option 10 is not a Service Update Program! Do not charge to Activity Code 18.

--Marty DeVall
63/503, ext. 3927

4025/27 OPTION 11 FIRMWARE UPGRADE

Reference: 4025 Service Manual Vol. 2 P/N 070-2831-00
4027 Service Manual Vol. 2 P/N 070-2832-00
Mod # M36568
Polling Controller Processor Board 670-5376-03
Wizard Workshop Issue 9-3 Article
"4025/27 OPTION 11: 8251 USART IS INCOMPATIBLE

Instruments below serial number B031940 (4025) and B010280 (4027) were shipped before this mod went in to ffect. The mod changes the Polling Controller Processor Board to a 670-5376-03.

The new version of firmware for the Option 11 Polling Controller Interface and the modification to the printer cable P/N 012-0778-00 corrects for the Option 11 not communicating to the printer when a 8527A USART (Universal Synchronous/Asynchronous Receiver/Transmitter) P/N 156-0877-00 is located in U171 of the Polling Controller Interface Board. With the new version of Option 11 firmware either the 8251A or the 8251 USARTs will work in U171.

The 050 kit 050-1314-00 was set up to upgrade the Option 11 firmware. The 050 kit consists of:

160-0017-01	Version 2 E-ROM
160-0018-01	Version 2 E-ROM
160-0019-01	Version 2 E-ROM
160-0020-01	Version 2 E-ROM

To upgrade the Option 11 firmware, replace the four (4) Version 1 E-ROMs which are in U141, U145, U155 and U165 on the Polling Controller Processor Board with the Version 2 E-ROMs.

OPTION 11 FIRMWARE

Version 1	Version 2	
160-0017-00	160-0017-01	U141
160-0018-00	160-0018-01	U145
160-0019-00	160-0019-01	U155
160-0020-00	160-0020-01	U165

To modify the Option 11 Printer Cable P/N 012-0778-00:

1. Remove the red and yellow wires (pins 3 and 5) from the 7 wire harmonica.
2. Replace pins 3 and 5 on the harmonica with a short jumper wire. A short jumper wire can be obtained from a jumper P/N 131-1776-00.
3. Tie back and insulate the two (2) loose wires.

Version 2 Option 11 firmware is compatible with Version 1.3 or 2.1 Option 10 firmware located on the 4025 Processor Board.

TEKTRONIX INTERNAL USE ONLY

This firmware update for the Option 11 is not a Service Update Program! Do not charge to Activity Code 18.

--Marty DeVall
63/503, ext. 3927

4052 SERVICE UPDATE PROGRAM DELETED

A Service Update Program was set up to provide free updates for the customers who had a 4052 with Level 3.1. The update would take them to L3.2. Level 3.2 has been replaced by Level 4.1 an 050-1282-01 kit which is not a free update to non warranty, maintenance agreement, or rental customers. Any customer who requests or needs the latest level of firmware will be charged for parts and labor unless they are under warranty, maintenance agreement, or rental. If a customer has a hardware failure on the MAS board which contains a level of firmware lower than 4.1 and the exchange board you install in the customers unit has L4.1 then charge only for exchanging the board. Do not charge for the firmware update in addition to the exchange price of the board.

This procedure becomes effective May 5, 1980.

--Del Moore
63/503, ext. 3930

4052/4054 HARD COPY QUALITY

It has been found that power supply noise from the +5 volt output board in 4052's and 4054's has been degrading hard copy quality. A mod has been generated to reduce the noise from the +5 volt supply, thus increasing hard copy quality.

Corporate Mod #39429 adds a capacitor and a toroid to the +5 volt output board. For the 4054 the board level changes from a 670-5622-00 to a 670-5622-01. The board for the 4052 is 672-0833-00.
Procedure: (refer to figure 1)

1. Add a 2μf CAP C134 P/N 283-0212-00 from the junction of C132, R133, R131 to ground (pin 8 U121)

2. Unsolder the grey cable with the small red and black leads. The red lead attaches to the right side of R134, the black lead attaches to the eyelet under U41. It is important that this be unsoldered at the board, DO NOT UNSOLDER it at the resistor on the back panel.

3. Put the toroid T1003 P/N 276-0640-00 on the gray cable then put an "O" ring 354-0538-00 on the cable to keep the toroid away from the circuit card.

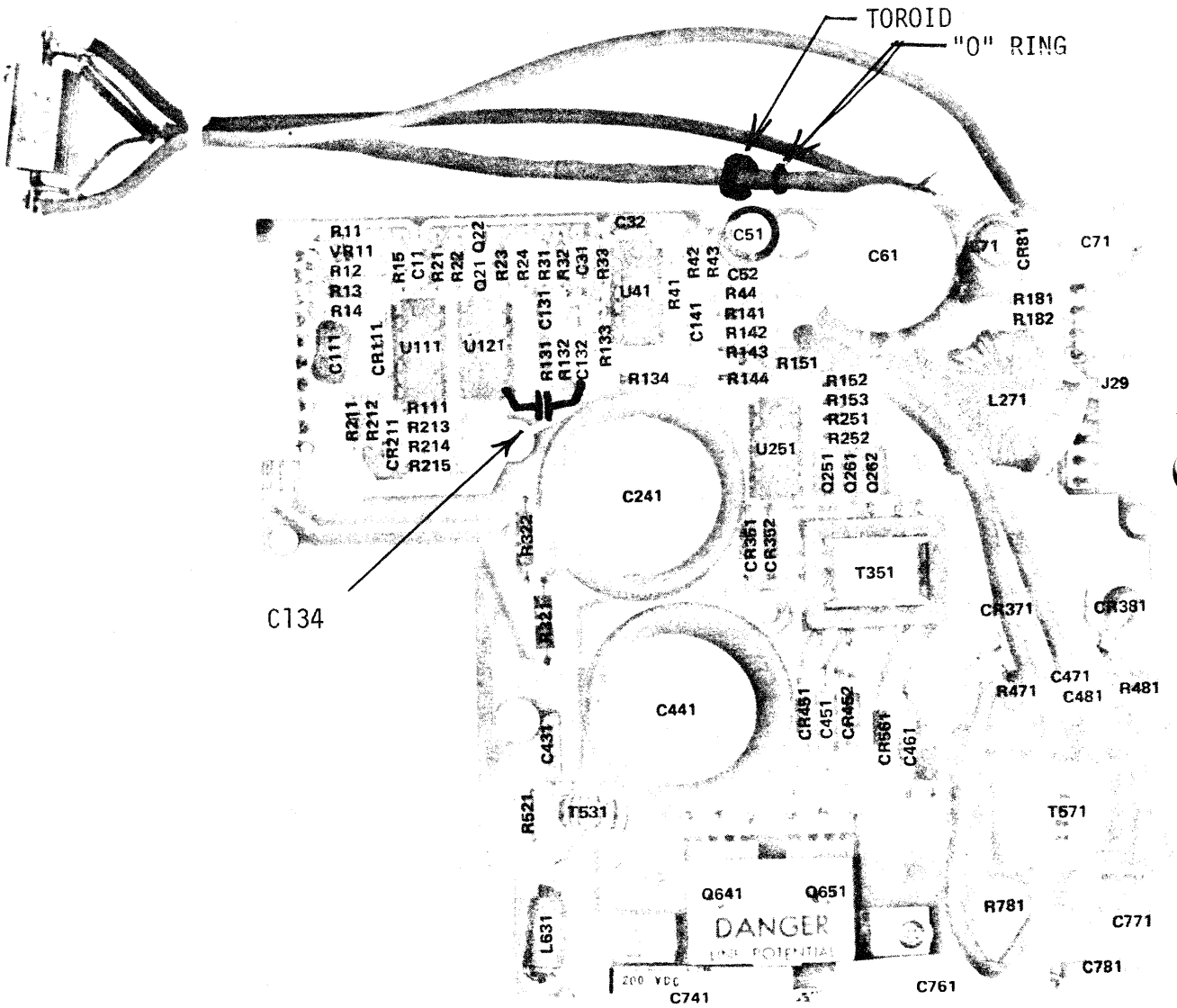
4. Resolder the red and black leads to the circuit card. Red lead to the right side of R134 and the black lead to the eyelet hole under U41.

(continued on the following page)

The modification should be done on any instruments giving a poor hard copy or on instruments that are difficult to adjust in for good hard copies.

Make the appropriate changes to the schematics and parts lists in the 4052/54 Manuals 070-2829-00 and 070-2839-00 (refer to figure 2).

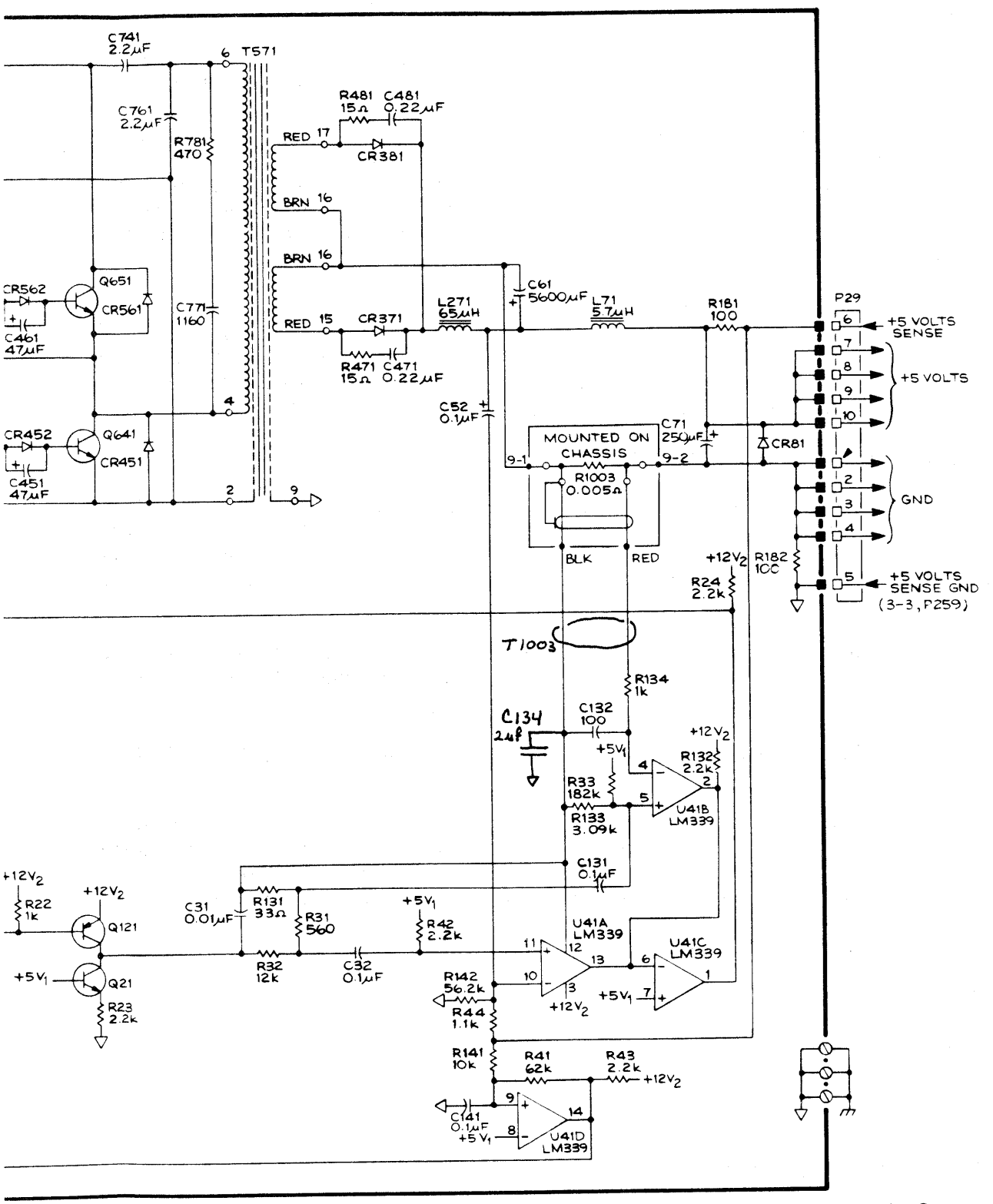
--Frank Lees
63/503, ext. 3929



+5 Volt Output Component Location (067-5622-00).

(FIGURE 1)

(continued on the following page)



2829-2

670-5622-00 +5 VOLT OUTPUT BOARD 1-2

(FIGURE 2)

At power up of a 4052/54 a number of tests are run under routine system initialization. A normal power up sequence will conclude with turning off all front panel lights except power, rewind the tape (if one is present), and display the blinking cursor in the upper left corner of the display. If these conditions cannot be observed then a hardware failure is indicated. At this point the best clue to the source of the failure is the status of the front panel indicator lamps, 4 led's on the MCP board, 1 led on the ALU board and the halt address of the microcode.

NOTE: Although the major subdivisions of the self test are associated with the various boards of the CPU set, it should not be assumed that failure of a given test is necessarily indicative of a failure of the associated board. The failure may involve a handshake sequence connecting to another board.

Location of the indicators used by the self test are:

Program Counter LED's (DS1, DS2, DS3, DS4) located on the left side of the MCP board (edge connector pointing toward you) show the 4 most significant bits of the Program Counter. DS4 is the most significant bit and is located closest to the edge connector.

Half Carry LED (DS190) is located on the right side of the ALU Board (edge connector pointing away from you) and is the rear most LED.

Busy, Break, I/O are located on the front panel just to the right of the CRT.

Microcode Address Test Pins (J204 & J203) are located on the front left edge of the ALU Board (edge connector pointing away from you). These pins can be measured with a logic probe or scope to indicate the halt address of the microcode.

Decipher the address as follows:

Connector	J204		J203							
Pin #	2	1	10	9	8	7	6	5	4	3
Binary	0	0	1	0	0	1	1	0	1	1
HEX	0			9				B		

The HEX microcode address is 09B.

The following table indicates how to interpret the stages of the self test.

--Frank Lees
63/503, ext. 3929

(continued on the following page)

DRP = Diagnostic ROM Pack
h = HEX

TABLE 1

1 = ON
0 = OFF
X = Unpredictable or rapid change
B = Observable blinking

		Micro Code Address	Program Counter D S 4	D S 3	D S 2	D S 1	HC DS	Front Panel Bus	Front Panel Brk	Front Panel I/O
1. Test ALU	During & immediately after restart	0 0 0	X	X	X	X	0	1	1	1
Problem on ALU Board	Test registers, arithmetic & line shorts	0 0 1	X	X	X	X	1	1	1	1
2. Test MCP	Check program counter	X X X	0	0	0	0	1	1	1	1
problem on MCP	Ripple 1 bit through program counter and read it back.	0 9 B,	0	0	0	1	1	1	1	1
board or with	Data error = μ code hangs at 09B	0 6 8,	0	0	1	0	1	1	1	1
ALU/MCP handshake	Handshake error = μ code hangs at 068 or 069	0 6 9,	0	1	0	0	1	1	1	1
			1	0	0	0	1	1	1	1
	Load all 1s into program counter		1	1	1	1	1	1	1	1
	Increment program counter		0	0	0	0	1	1	1	1
3. Test MAS	Store 3000h in program counter	X X X	0	0	1	1	1	1	1	1
problem on MAS	Memory pump up-write address 4000 with 0's 15 times	X X X	0	0	1	1	1	1	1	1
board or with	Store 5000h in program counter	X X X	0	1	0	1	1	1	1	1
ALU/MCP/MAS	Read memory address 4000	X X X	0	1	0	1	1	1	1	1
handshake	Store 6000h in program counter	X X X	0	1	1	0	1	1	1	1
4. Test I/O	Clear PIA at FFOF, load R0 = 01 (16)	X X X	0	1	1	0	1	1	1	1
problem on I/O	Write R0 to PIA's DDR	X X X	0	1	1	0	1	1	1	1
board or w/ALU/MCP/MAS/IO	Store 7000h in program counter	X X X	0	1	1	1	1	1	1	1
handshake	Read PIA's DDR	X X X	0	1	1	1	1	1	1	1
	Store 9000h in program counter	X X X	1	0	0	1	1	1	1	1
	Check DDR with R0 if bad hang	0 8 B	1	0	0	1	1	1	1	1
	Shift R0 1 bit left, branch back until carry = 1	X X X	1	0	0	1	1	1	1	1
	Init bank switch to left slot; if DRP enabled go to it	X X X	1	0	0	1	1	1	1	1
5. RAM test	Turn off busy light	X X X	1	0	0	1	1	0	1	1
Problem on MAS board	Test RAM memory - if error hang up	0 C 5	1	0	0	1	1	0	1	1
6. Init Basic	Turn busy on, break/I/O off	X X X	X	X	X	X	1	1	0	0
	Basic runs RAM memory test	X X X	X	X	X	X	1	1	0	0
	Basic init Complete -	X X X	B	1	1	B	B	0	0	0

4052/54 VERSION 4.1 FIRMWARE

Version 4.1 firmware for the 4052/54 can now be ordered from the field. The part number is 050-1282-01. This is not a code 18 upgrade, instruments upgraded that are not on contract, warranty or rental will be charged to the customer at the MAS Board (670-6030-XX) exchange price - refer to the SQI. Refer to Wizards Workshop Issue 10-5, pages 34 & 35 for Version 4.1 firmware checksums.

--Frank Lees
63/503, ext. 3929

4052/54 +15 REGULATOR CIRCUIT #M39801

The +15 supply goes out of regulation at low line. The problem is caused by insufficient current capability of the +19V supply used to supply the +15V regulator circuit. This problem could be causing the 4052/54 to randomly lock-up customers units.

The Mod to solve this problem is as follows: (refer to figure 1)

1. Change R731 of the 670-5623-00 regulator board from a 10K (321-0289-03) resistor to a 7.5K. (321-0277-00)

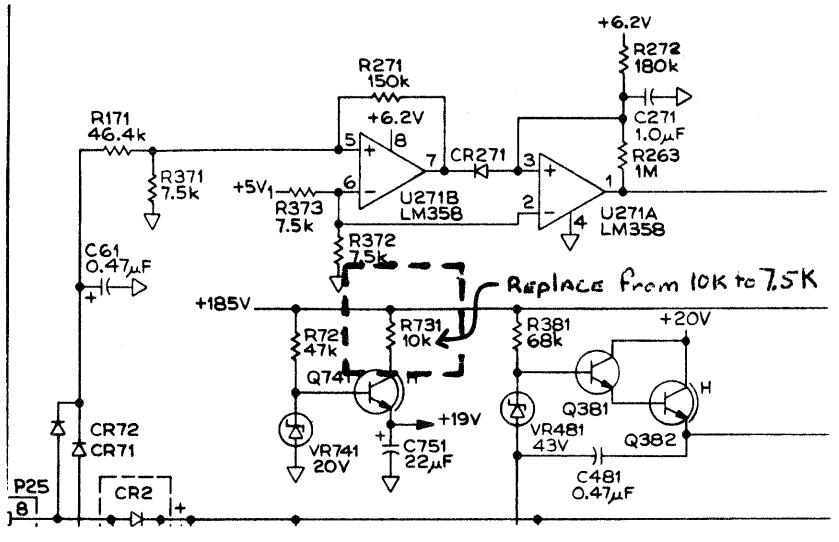


Figure 1 Schematic 1-1 Power Supply
4052 Service Manual

--Darrell McGiverin
63/503, ext. 3786

4907 DISC DRIVE CALIBRATION

When installing or repairing a 4907 file manager the index to data timing should be checked. This is a mechanical adjustment and is sensitive to shock and vibration. If misaligned it could cause problems where a disc created on one drive would not be read on another drive.

The full alignment procedure for the index pulse adjustment and index to data timing adjustment is described in the Flexible Disc Drive Manual (070-2504-00) P4-21 and the 4907 Service Manual (070-2405-00) P5-25. A modified procedure has been developed that will save time and difficulty on-site, however in some cases a full alignment will have to be performed if the modified procedure will not bring the unit into specification.

The modified procedure is as follows:

1. Load the "F.D.CAL." program from the 4907 Service Manual (070-2405-00) appendix E. into a 405X series terminal.

2. Insert an alignment disc (119-0896-00) into the drive.
3. Set up a scope as follows
   SYNC: External negative, 50μs/div, probe on TP10
   CHAN1: AC 200mv/div Probe on TP1
   CHAN2: AC 200mv/div Probe on TP2
   MODE: Added channel 2 inverted

4. Step to track 1 (UDK #5)

5. Observe the timing from the start of the sweep to the beginning of the databurst, it should be 200μs ± 50μs.

6. If timing is not within tolerance adjust the index/sector phototransistor potentiometer for proper timing.

7. Step to track 76 (UDK #8)

8. Observe the timing from the start of the sweep to the beginning of the databurst, it should be 200μs ± 50μs.

9. If timing is not within tolerance adjust the index/sector phototransistor potentiometer for proper timing.

10. If necessary repeat steps 4 through 9 to insure proper adjustment.

11. Set scope as follows:
    SYNC: Auto Internal, negative, .2ms/div
    CHAN1: DC, 2V/div, probe on TP12.

12. Check the index pulse for a pulse width of 1.7ms ± .5 ms duration.

13. If this pulsewidth is not in tolerance then the alignment procedures for index/sector phototransistor potentiometer (Flexible Disc Drive - 070-2504-00 page 4-21) and sector to data alignment (4907

(continued on the following page)

Service Manual - 070-2405-00 page 5-25) should be performed to obtain proper calibration.

My thanks to Joe Boim, Long Island Field Office for bringing this information to our attention.

--Frank Lees
63/503, ext. 3929

LDP (MDL) SYSTEMS

8002A VERSION 3.0 TEKTIP DIAGNOSTICS

A new Version 3.0 TEKTIP Diagnostics is being shipped for the 8002A. As before it is not part numbered and is for Tektronix internal use only. The disc and associated manual is being shipped to each service center providing support for MDL products.

The difference between Version 2.1 and Version 3.0 operating systems are minor. Version 3.0 does include diagnostic programs for both the 8048 family and 6500/1 Emulators.

Service Support is soliciting any comments or problems encountered to be directed to:

MDL Service Support
Delivery Station 94-816

--Brad Griffin, Kevin King
94-816, Ext. 1608, 1636

6802 CRYSTAL CLOCK SUPPORT

There have been numerous complaints about our support of the crystal clock using the 6802 prototype control probe. As you know the 6802 microprocessor has an internal oscillator that is controlled by an external crystal. Our 6802 probe simulates the Xtal and EXtal (Pins 39 and 38 respectively) using a dual F.E.T. in the probe tip. This simulation looks very much like the real thing on the 6802 microprocessor. There are two problems that arise using our probe and both stem from the clock circuitry on the user's prototype.

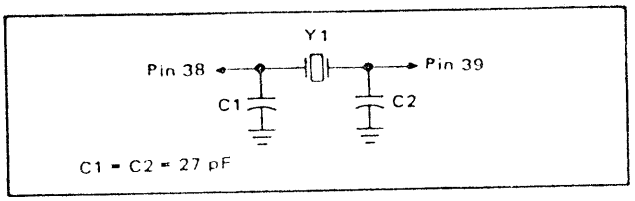
One problem is the type of crystal used. Motorola's advance information sheets (1977) called for a series resonant fundamental crystal (AT cut). Later specification sheets (1979) called for a parallel resonant fundamental crystal (AT cut). At the present time the parallel resonant crystal is the recommended crystal to use with our probe tip and the user's microprocessor.

Another problem is the way the clock circuit is implemented on the user's prototype. Motorola specifies that the parallel crystal with associated capacitors be connected as shown below. This circuit configuration is not intended to drive any other circuitry that requires clock frequency used by the microprocessor. This is to say, that due to load capacitance this crystal clock should only drive the user's 6802 microprocessor or our 6802 probe tip only. Often, the user is able to drive other circuitry with a connection to Pin 38 or 39, but it is not recommended. Our probe due to added load capacitance, most likely will not operate if extra circuitry is being driven.

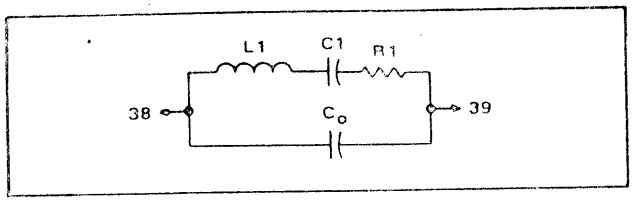
The following are Motorola's crystal specifications to use when ordering crystals. Note the table showing C load. This is the maximum capacitive load that can be driven using specified components.

(continued on the following page)

Crystal Specification — The 4.0 MHz specification case is shown below:



The following is the figure and parameters to be supplied to the crystal vendor.



AT — Cut Parallel Resonance Crystal
C_o = 7.0 pF Max
Frequency = 4.0 MHz @ C_L = 24 pF
R1 = 50 ohms Max
Frequency Tolerance — ±5% to ±0.02%

TOLERANCE NOTE:

Critical timing loops may require a better tolerance than ±5%. Because of production deviations and the Temperature Coefficient of the MC6802, the best "worst-case design" tolerance is ±0.05% (500 ppm) using a ±0.02% crystal. If the MC6802 is not going to be used over its entire temperature range of 0°C to 70°C, a much tighter overall tolerance can be achieved.

In those applications where other than a 4.0 MHz crystal is used, the following table gives the designer the crystal parameters to be specified. The table contains the entire spectrum of usable crystals for the MC6802. Crystal frequencies not shown (that lie between 1.0 MHz and 4.0 MHz) may be interpolated from the table.

Y1 Crystal Frequency	C1 and C2	C Load	R1 (Max)	C_o (Max)
4.0 MHz	27 pF	24 pF	50 ohms	7.0 pF
3.58 MHz	27 pF	20 pF	50 ohms	7.0 pF
3.0 MHz	27 pF	18 pF	75 ohms	6.7 pF
2.5 MHz	27 pF	18 pF	75 ohms	6.0 pF
2.0 MHz	33 pF	24 pF	100 ohms	5.5 pF
1.5 MHz	39 pF	27 pF	200 ohms	4.5 pF
1.0 MHz	39 pF	30 pF	250 ohms	4.0 pF

--Brad Griffin, Kevin King
94-816, Ext. 1608, 1636

PROBLEM REPORT PROCEDURE

When an engineering problem is encountered in the field, there are two forms that can be used to report the problem. Form number 000-7687-00D is used to report hardware problems and 000-5504-00D for software problems. These forms should not be used to report field failures, but rather to notify Beaverton of engineering defects that require mods.

Completed forms should be sent to Service Support, delivery station 94-816. Service Support logs in the report and then forwards it to Production Engineering, who will send an acknowledgement to the originator.

Both problem report forms are orderable.

--Debbie Zukerman
94-816, Ext. 1291

7A16P: SOME 7A16P's ARE NOT COMPATIBLE WITH THE 7612D

REFERENCES: Service Manual 070-2308-00
Schematic Diagram (4) and Figure 8-5
Modification # M39362

SYMPTOM: If a 7A16P (Before Serial Number B030462) is plugged into a 7612D, it may go into a power fail mode.

SOLUTION: On the 670-4916-(00 or 01), Program Logic Board, remove the following components: R224 (84.5Kohm), R226 (29.4Kohm), R228 (680ohm), R320 (34.8Kohm), R324 (23.2Kohm), R326 (41.7Kohm), and VR226 (8.2 Volt zener).

Replace as follows:

Component	Description	Part Number
R224	Res, 52.3Kohm	321-0358-00
R226	Res, 63.4Kohm	321-0366-00
R228	Res, 2Kohm	315-0202-00
R320	Res, 2.61Kohm	321-0233-00
R324	Res, 26.1Kohm	321-0329-00
R326	Res, 23.7Kohm	321-0325-00
VR226	Zener, 5 Volt	152-0662-00

This modification changes the 670-4916-01 to a 670-4916-02.

7A16P's with serial numbers prior to B030462 should not be used in 7612D's until this modification has been accomplished.

--Randy Newton
94-816, Ext. 1635

7912AD: RELIABILITY IMPROVEMENT OF THE POWER SUPPLY

References: Service Manual 070-2385-00
Modification #M38863

SYMPTOMS:

1. Should Q150 on the Regulator Board (670-5418-00 part of Power Supply) fail, it could damage CR144 and Q154 on the Regulator Board. It also could damage UØ14 on the Video Processor and Scan Control Circuit Board (670-5145-XX).

2. Power dissipation of QØ12 (-15V Regulated Supply) of the Regulator Board (670-5418-00) is exceeded during foldback.

3. When VR54Ø (Board #670-5418-00) fails, the supply may not foldback to zero volts.

SOLUTION:

It is recommended to modify power supplies when they are returned to the Service Center or Factory Service. There is an 040-0951-00 kit to upgrade the power supply that will take care of the three problems listed above. This mod makes the power supply a 620-0269-01 part number. Power supplies that have been modded will have this new part number on the rear panel.

--Randy Newton
94-816, Ext. 1635

92-515

MICHAEL A MIHALIK

COMBINATION WIZARDS