TEK TECHNICAL INFORMATION FOR FIELD SERVICE PERSONNEL

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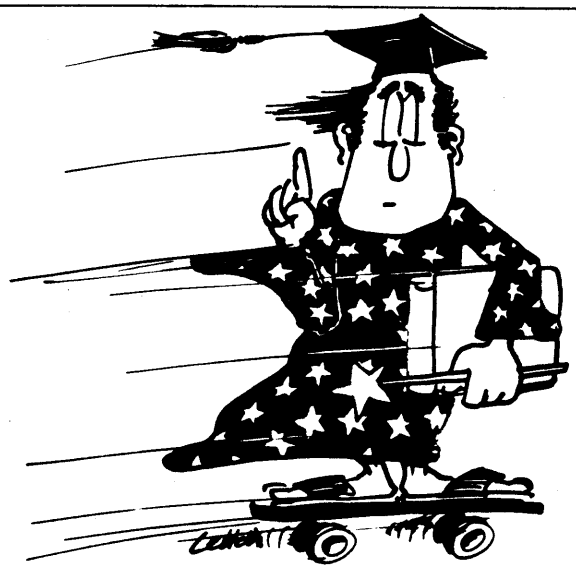

WIZARDS WORKSHOP

TEKTRONIX INTERNAL USE ONLY

Published by Service Administration Support, d.s. 56-037, ext. 642-8940

All service questions from Europe, Middle East, and Africa should be addressed to the Tektronix Europe B.V. Service Group in the Netherlands.

COMBINATION

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Tektronix
COMMITTED TO EXCELLENCE

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ON-SITE

YOU DONE GOOD

This week we would like to award the "You Done Good" to Gary McIntyre of St. Louis Service Center and John Peebles of the Chicago Service Center.

They have both provided support that is helping to re-establish our quality reputation.

Keep up the good work!

Gene Rank, Chicago, received his 10-year pin from Earl Wantland Sept. 17, 1981.

Gene, who is a Swing Shift ET III (in-house) started at Tek in Chicago in 1971, transferred to Concord in 1977, to Santa Clara in 1975 and back to Chicago in 1980.

Congratulations Gene!

ADMINISTRATIVE SUPPORT

WIZARDS WORKSHOP REFORMAT/MICROFICHE

We now have a Corporate Identity Manual which sets standards for all Tek publications. In order to meet these standards it was necessary to reformat the Wizards Workshop into the two column format you see here.

Also, for your ease in retrieving old information, all Wizard articles (both past and present) will be published in the Maintenance Notes section of the Sales/Service microfiche. This is in lieu of a separate set of fiche such as a Wizard by product set. There were two basic reasons for making this decision:

1. Ease in use by field personnel
   a) Only one piece of fiche to look at for any one product
   b) Only one piece of fiche to file
2. Eliminates the need for another distribution list in Beaverton
   a) Publications Support is already set up to separate the fiche by product type and send out product groups to individuals desiring them

If you have any questions or concerns please contact me.

--Sharon Huetson
56-037 Ext. 8939 MR

EXCHANGE CENTER MANUALS

The Factory Service Exchange Center staff is proud to announce the final completion and release of their Exchange Program Reference Manual and Exchange Program Users Manual. These manuals have been distributed to all the Field Offices. The manuals describe, in detail, policies and procedures related to Exchange Center activities. They will be available for reference in all Service Center Stockrooms. All field technicians should have access to these manuals. The "in-house" technicians will also find information about exchange and Repair & Return of T&M assemblies.

If you have any questions, please contact Fred Zinda, Exchange Center Manager, Merlo Road, 56-101, Ext. 8928 MR, Beaverton.

Special thanks to S.K. Sherman (Rockville), Ron Volk (Santa Clara), Bonnie Holmen (Factory Service) for contributing to the manuals production and to Marlene Pereyda for her many hours spent typing the final copies.

Submitted by--
Linda Anthony

NEW MRC TAGS

In the past, each exchange module was shipped from the MRC with a white REPAIRED/INSTALLED sticker on it.

Effective immediately, the repaired modules will be shipped with a yellow JOB/DATE sticker affixed. These new tags, with an identifying MRC logo on it will provide better legibility and visibility, both in the field and in the Repair Center.

A reference number and the repair technicians initials are supplied on the top portion of this sticker by the technician when it is affixed to the module. This information provides MRC personnel with valuable repair history on the exchange module.

It is requested that field personnel furnish additional information by dating the bottom portion of the sticker when the module is installed in an instrument. In the event of failure this dating will then furnish MRC personnel with reliability and length of time in service information, which in turn will provide for better quality and reliability in the repaired exchange module.

The dating of this new sticker by the field personnel will help us all achieve the goal of supplying our customers with a more reliable and better quality product.

--Barney Brooks
Module Repair Center Tek Circle
56-051 Ext. 8629 MR

152-0397-00--MIXED STOCK (PURGE)

Incorrect parts have been found mixed in with the 152-0397-00 parts. *The incorrect parts are marked "MR 2002S".* Please check all parts areas and purge all parts which are not marked 152-0397-00. RSO reject parts to Don Stalp, 78/092, and reorder as necessary.

--Rich Andrusco
53/108, Ext. 8694

156-0158-00, 01, 03, & 04 -- OSCILLATIONS (PURGE)

It has been discovered that Motorola has changed their process on the MC 1458; this is causing oscillation problems in several product lines. Due to this process change Motorola parts, MC1458, will no longer be used for part numbers 156-0158-00, 01, 03, and 04.

(ARTICLE CONTINUED ON THE NEXT PAGE)

156-0158-00, 01, 03, & 04 -- OSCILLATIONS (PURGE) (cont.)

Please check all stock areas and purge all Motorola parts under these part numbers, *with Date Codes later than 8019*. RSO all defective parts to 78/092, with the reason for rejection noted as, "Parts Oscillate"; reorder as necessary.

--Rich Andrusco
53/108, Ext. 8694

305-0183-00 -- INCORRECT PARTS *PURGE*

The 305-0183-00 part number is an 18K ohm, 2 watt, 5% resistor. Large quantities of stock were found to measure 180K ohms, even though they are marked 18K ohms. Please check all areas and measure all parts in stock under P/N 305-0183-00. Purge all parts measuring 180K ohms and send the defective parts to 78/092; reorder as necessary.

--Rich Andrusco
53/108, Ext. 8694

CG551AP - RECOMMENDED DMM'S FOR CALIBRATION

Reference: Instruction Manual Volume II, Page 5-1

Serial Numbers Affected: All

The recommended DMM for calibrating CG551APs is the Fluke 8502A. The Fluke 8375A and the Dana 5900 are acceptable if a proper calibration interval is maintained.

The recommended calibration interval is ninety (90) days for the Fluke 8375A and one (1) year for the Dana 5900.

The reason such tight accuracy specs are needed is the input offset voltage of A6U1311 must be nulled within a certain region to insure the drift of this device is minimized. The drift of this device becomes significant if the input offset voltage is not nulled accurately. Using an improper meter or one not calibrated can result in unwanted drift in lower voltage modes.

The Fluke 8800A, which is the example given in the manual, is marginally acceptable. A manual change notice has been submitted to update the example to the Fluke 8500A/8502A.

--Terry Turner
92-236, Ext. 1288

PG506 MAINBOARD REPLACEMENT

Serial Numbers Affected: All instruments below B04000.

The new main board assembly, P/N 672-0455-02, is not a direct replacement and requires kit #050-0764-04 for installation. If your instrument does not have relay circuit board, P/N 670-4328-01, installed, then you will also need to order Kit #040-0774-01.

The microfiche did not originally reference the 050 kit and corrections have been sent. Thanks to Jim Mauck in Rockville for this information.

--Terry Turner
92-236, Ext. 1288

S-3200: PROBER, SIGNAL INTERFACE PART AVAILABLE

The Signal Interface (021-0218-00) is used to interface the Electroglas and Teledyne probers to the test station. Serviceability of this unit has been enhanced by a new replaceable part. The interface includes 60 each, 94 ohm, RF cable assemblies. Individual cables with connectors attached may now be replaced. Order Part Number 179-2293-00.

Previously these 15.38 inch cables did not come as replaceable assemblies with the connectors. This presented a service problem since the RF cables cannot be soldered to, and special crimping tools are required to install the connectors.

--Jim Stubbs
92-236, Ext. 1287

TSG 13

Reference: Mod 44527

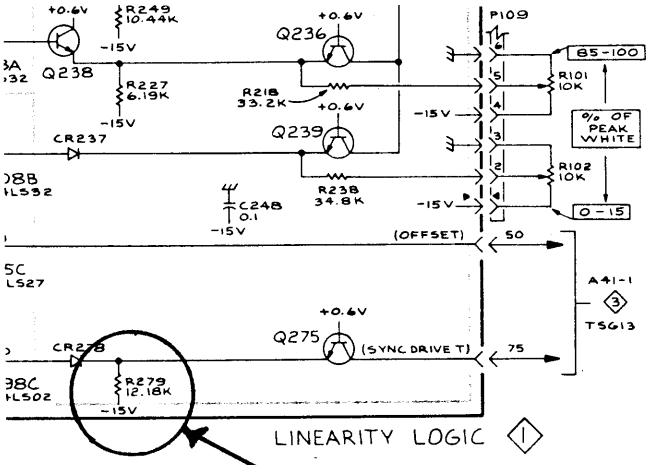
A possible problem has come to light where the sync pulses are very close to specified limits, creating the need to adjust other amplitudes to slightly out of position.

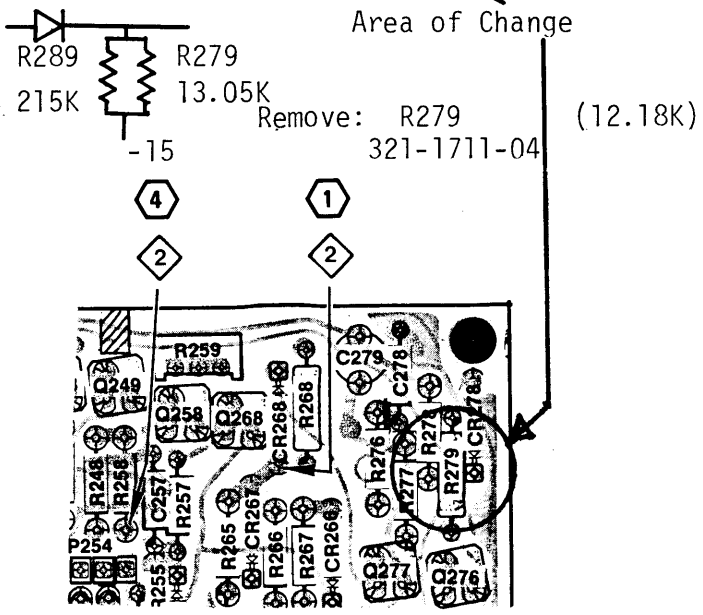
To correct this, change R279 from a 321-1711-04 to a parallel combination of two resistors, 321-1705-04 and 321-0147-00. The new resistor added (321-0147-00) is to be disignated as R289.

(ARTICLE CONTINUED ON THE NEXT PAGE)

TSG 13 (cont.)

See the following diagrams for more information.





Remove: R279 (12.18K)
321-1711-04

Add: R279 321-1705-04
(13.05K)

R289 321-0147-00
(215K)

--Bill Bean
53/108, Ext. 8695

147A/149A MULTIBURST FREQUENCY ADJUSTMENT

Reference: 147/149A Instruction Manual P/N 070-2029-00

The present instruction manual suggests an adjustment method for the frequencies of the multiburst packets using an oscilloscope to adjust in the time domain. The chart on Page 3-25 of the manual lists tolerances allowed for the generator/inserter's specs, discounting any possible scope inaccuracies.

To more accurately set the frequencies required and discount any scope anomalies, the following method is suggested:

A. Connect the OUTPUT from an FG502 to one channel of your Dual-Input scope vertical input.

B. Connect the TRIG OUT from the FG502 to a digital counter (DC 503A Opt. 1).

C. Connect the FULL FIELD OUT of the 147A/149A under test to the other input of your scope dual-input vertical.

D. Adjust the FG502 frequency for the desired multiburst packet frequency to be adjusted, using the DC503A as the frequency meter.

E. Overlay the two traces on the scope using the chop or alternate mode as appropriate and adjust the 147A/149A as desired.

A possible alternative is to accurately characterize the timebase of the scope you are using to make these adjustments.

A note will be added to the manual alluding to possible inaccuracies.

Thanks to Larry Davies in St. Louis for the input.

--Bill Bean
53/108, Ext. 8695

528A WW, WX INTERMITTENT LOSS OF EXTERNAL SYNC

Reference: 528A Manual P/N 070-3802-00

Some 528A WW and WX units have been turned in for service for an intermittent loss of external sync. Two possible failure modes exist here.

1. Wires and pins on the relay (K380) socket may be touching.
2. C593 (on the relay socket) may be touching the CRT shield.

In both cases, good wire/parts dressing away from contact should be appropriate.

If the wires going to the socket continue to give problems, some lengths of heat-shrink tubing will help.

Service Support needs to know the frequency of problems concerning wire and pin contact. Contact Bill Bean with your information.

--Bill Bean
53/103, Ext. 8695

528 REMOTE PLUG

Reference: 528 Manual P/N 070-0800-00

The remote plug (136-0099-00), shipped as a standard accessory with this product, has proven to be too loose in the relay socket. This was due to the pins being too small.

Where a plug is necessary, use a 136-0099-01. It is properly sized and is currently being used in the 528A.

--Bill Bean
53/108, Ext. 8695

603A, 604A HIGH VOLTAGE CAPACITOR MODIFICATION 43875

The high voltage capacitors used in the 603A and 604A monitors have shown a high rate of failure. This is despite the fact that they are rated at 5kv and used in a 3.5kv application. Capacitors C580 and C581 tend to shut the high voltage supply down when they fail. Capacitor C565 sometimes causes CRT damage when it fails.

To solve the problem, a new vendor has been approved to supply a similar component (Tek P/N 283-0162-01). These capacitors have shown good reliability even at maximum specified voltage. They are distinguishable from their 283-0162-00 counterparts by their blue color.

Modification 43875 calls for the part number of C565, C580 and C581 to change from the 283-0162-00 to the 283-0162-01 component. This change rolls the high voltage board part number from 670-1813-02 to -04. In addition, the 050-1035-01 parts replacement kit changes to 050-1035-02.

The 283-0162-01 capacitors should be installed into all 603A/604A monitors whenever convenient. This reliability improvement is free of charge to customers with maintenance agreements, warranty, or rental products and billable to all others.

--George Kusiowski
63-503 Ext. 3928 WI

634: GEOMETRY CALIBRATION CORRECTION

Reference: Wizards Workshop Issue 11-20 page 5.

Under Geometry Calibration a partial sentence was inadvertently excluded. The paragraph in its entirety is repeated below for your use.

The earth's magnetic field affects the position and rotation of the CRT display. If the electron beam moves approximately parallel to the earth's magnetic lines of force (north-south), display rotation will result. If the electron beam moves perpendicular to the field (east-west), then vertical and/or horizontal displacement of the image will occur. Similar effects may be expected from local magnetic fields

(ARTICLE CONTINUED ON THE NEXT PAGE)

634: GEOMETRY CALIBRATION CORRECTION (cont.)

produced by electrical machinery, structural steel in buildings and nearby geologic formations. Typically, yoke rotation, vertical repositioning (R315) and horizontal repositioning (R355) will return the display to normal. This is not unique to the 634 but affects all cathode ray tubes.

Our apologies to George Kusiowski.

--Janet Hemenway
Editor

834: DISPLAY DRIVER EXHIBITS HIGH LEAKAGE

Reference: 834 Instruction Manual, P/N 070-3399-00; Foldout ◇9◇ ; A3 Display Board.

The plate and grid drivers have excessive leakage current after exposure to 40oC. In the display the problem appears as "ghosting" or a display area which will not turn off completely.

The drivers are Tektronix P/N 156-1454-00, National device DS8654, lot code date 8047B. Also, please check your stock and send rejects to Jim Heisler in Beaverton at 78-092 with the Reject, Scrapped, or Obsolete slip marked "Reject: Parts exhibit high leakage current." Reorder as necessary.

--Stan Uffner
92-236, Ext. 1564 WR

834 - MOD KIT AVAILABLE FOR COMPATIBILITY WITH WESTERN ELECTRIC 201/208 MODEMS

Reference: Mod #44203

Affected Serial Numbers: B041804 and below.

Modification kits are now available to upgrade the 834 for compatibility with 201/208 modems. Order kit number 040-1043-00.

The kit should be installed in units that are identified as faulty or as they are brought in for other service.

Charges for out-of-warranty instruments should be customer-accommodated.

--Stan Uffner
92-236, Ext. 1564

851: INCORRECT PART INSTALLED

Reference: 851 Service Manual, P/N 070-2192-01, A1 I/O Board, R193

Some 851 I/O Boards may have an incorrect value of resistance installed for R193. The problem may cause catastrophic failure under the following conditions:

1. The 851 is in DCV mode;

2. RANGE is set to MNL and in the lowest range; and

3. Input voltage is high (in excess of 500V).

These conditions will cause damage to the +14V and -14V supplies. They may also cause physical damage to the board. Other supplies may also be affected.

The correct value for R193 is 1M ohm (P/N 303-0105-00).

--Stan Uffner
92-236, Ext. 1564 WR

1410 SERIES POWER SUPPLIES

Mod #39235 changed U199, U196, U209, and U206 from a 156-0105-00 to a tested part, 151-0105-02, for reliability reasons.

Some parts under this number, specifically Motorola parts, will not function pro-

(ARTICLE CONTINUED ON THE NEXT PAGE)

1410 SERIES POWER SUPPLIES (cont.)

perly to limit current in a power fault situation. The IC's will get very hot, along with the series pass resistors, R243, R153, R237 and R166.

To achieve proper current foldback during power fault conditions, use a 156-0105-04 IC in these areas (U199, U196, U209, and U206).

Another alternative is to select out Motorola parts.

--Bill Bean
53/108, Ext. 8695

1470/1474 BURST AMPLITUDE ADJUSTMENT AND GEN LOCK FREQUENCY CHANGE

1470 Reference: Mod M44284 and Instruction Manual P/N 070-2096-00

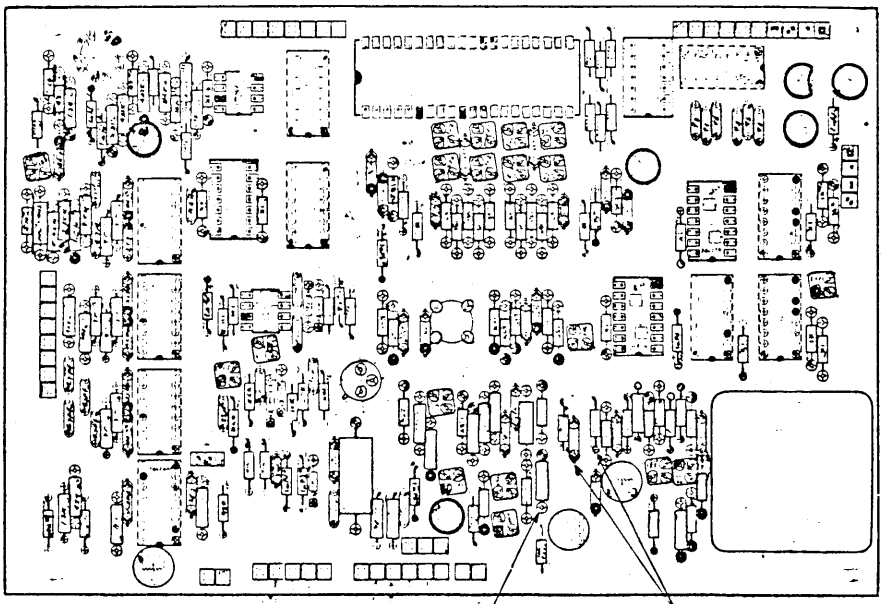
1474 Reference: Mod M44284 and Instruction Manual P/N 070-2097-00

To allow the black burst adjustment (sub-carrier amplitude, R230) to be made more to the center of R230's rotation, R229 can be changed from the present 11.0K resistor to a 12.7K 1% resistor, 321-0299-00.

To assure that the subcarrier frequency remains constant when the front panel SUB-CARRIER switch is exercised in the internal mode with no Gen Lock signal applied to the rear panel, a 220pf capacitor (C237) can be added to the sync board as shown in the following diagrams.

(ARTICLE CONTINUED ON THE NEXT PAGE)

PARTS LOCATION GRID
SYNC GENERATOR ASSEMBLIES 670-4553-03
AND 670-4553-04 CHANGING TO 670-4553-05 AND 670-4553-06 RESPECTIVELY



CHANGE R229 FROM
321-0293-00 (11.0K, 1%)
TO 321-0299-00 (12.7K, 1%)

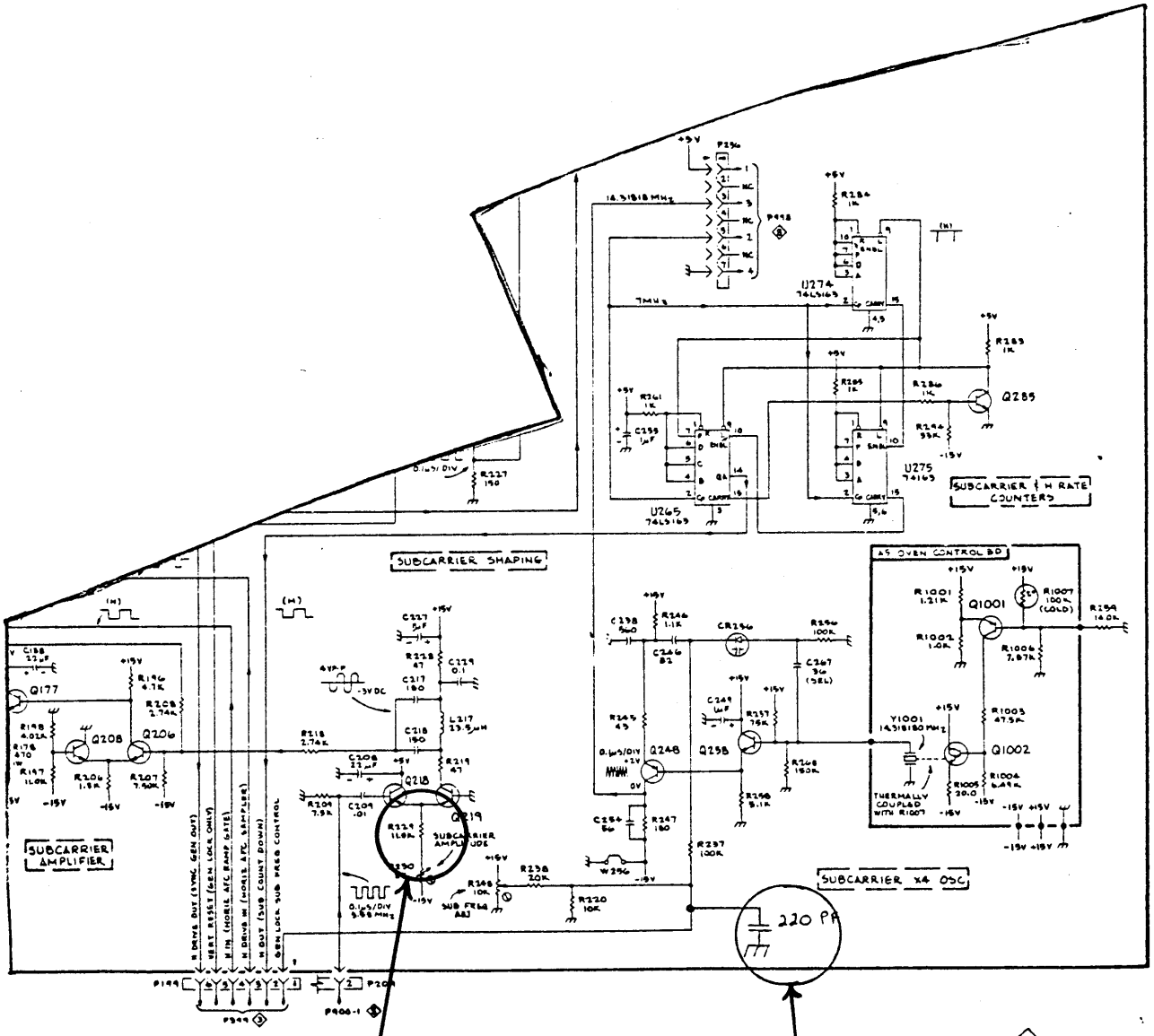
ADD C237 283-0108-00
(220pf, 10%) FROM
LEAD OF C229 TO LEAD
OF R237

PARTIAL SCHEMATIC

SYNC GENERATOR ASSEMBLIES 670-4553-03 AND 670-4553-04

CHANGING TO 670-4553-05 AND

670-4553-06 RESPECTIVELY



Change R229 to 12.7K 1%
321-0299-00

ADDED C237 CAPACITOR
283-0108-00 (220pf, 10%)

--Bill Bean
53/108, Ext. 8695

2213, 2215 -- A19, CURRENT LIMIT BOARD PARTS LIST

The parts list for the Current Limit board is located in the Change Information section at the back of all early 2213 and 2215 service manuals.

The board mounting screw is P/N 211-0318-00 and the Kep nut is P/N 210-0586-00.

Thanks to T. Reinseth of Norway and Wim Schaap for their inputs.

--Roy Lindley
53-108 Ext 8687

5B42, HIGH SPEED TIMING

Reference: Instruction Manual P/N 070-1447-00; Corporate Mod #M42480

The high speed timing adjustment, C550, has had a marginal adjustment range. It has caused a lot of time to calibrate the instrument in the three fastest sweep speeds. To cure this, C550 is being changed to a 1.5pf - 9.1pf variable, P/N 281-0079-00. Also change C551 to a 102pf, P/N 283-0472-00.

--John Eaton
53-108 Ext. 8689

5223, POSSIBLE CAPACITOR FAILURES -- B010636 & BELOW

Reference: 5223 Instruction Manual P/N 070-2932-00; 5223 Option 10 Instruction Manual P/N 070-3715-00; Diagram ◇5◇ Z-Axis Amplifier & Front Panel

Decoupling capacitors on the XYZ board, A3, are running very close to rated value and could fail after a period of time. Manufacturing is now changing several capacitors to eliminate this problem. C112, C120 and C805 all on the XYZ board are being changed from .1µf, 100v, P/N 283-0178-00 to .1µf, 200v, P/N 283-0057-00.

--John Eaton
53/108, Ext. 8689

5223/R, CRT SHIELD GROUNDING B010475 & BELOW

Reference: 5223 Instruction Manual P/N 070-2932-01, 5223 Option 10 Instruction Manual P/N 070-3715-00, Corporate Mod #M43699

On the above mentioned serial numbered instruments the CRT shield is not grounded to the chassis. This could cause strange operation in some cases, such as unwanted noise on the Option 10 bus lines. A change has been added in Manufacturing that adds a ground clip, P/N 131-0907-00, between the CRT shield and the front casting.

The instrument will have to be separated to install and clip, and if you are careful, the CRT will not have to be removed. The new clip uses the same screw and nut that holds the contact spring that grounds the CRT to the shield.

Remove the nut; this can usually be done easily as the CRT will hold pressure on the screw head. If this is not the case, the CRT will have to be removed. Next, slide the clip, facing towards the front of the instrument, between the shield and the front casting and slipping the clip mounting hole over the screw in the CRT shield. It may be necessary to use a tool, such as a fiber spudger, to separate the shield from the front casting to be able to slide the clip in. Reinstall the nut and tighten down.

--John Eaton
53/108, Ext. 8689

7104 MOD KIT 040-1008-00 CORRECTION

The CRT Protection Improvement 040-1008-00 kit shows the correct location for R1925.

The 7104 manual, 070-2314-00, incorrectly shows the location of R1925. A manual correction will change future manuals.

(ARTICLE CONTINUED ON THE NEXT PAGE)

7104 MOD KIT 040-1008-00 CORRECTION (cont.)

When installing the 040 kit, use Figure 1 on page 3 of the kit for the location of R1925.

Thanks to Bob Crane, Woodbridge, and Bob Anderson, Irvine, for pointing out the discrepancy.

--Lynn Sperley
53-108 Ext. 8690

7854, GPIB, IEEE-488, CONNECTOR MOUNTING IMPROVEMENT

Reference: 7854 Instruction Manual
P/N 070-2874-01

Corporate Mod M42456

The rivet-type post spacers used to attach the connector to the mounting plate, Figure 2-94 in M.P.L., are being replaced with threaded stud-type spacers secured with nuts. A field modification kit has been set-up to provide parts and instructions for installation. Its P/N is 040-1011-00 and should be installed in any instrument where the posts are loose or missing, or if it is known, more than one cable is being connected to the G.P.I.B. connector.

--John Eaton
53/108, Ext. 8698

MDP: 8002A FLEXIBLE DISC UNIT, AC POWER LINE PROTECTION

The A.C. Power Line insulation on 8002A Flexible Disc Units can be fractured where it comes in contact with the chassis. The fracture is caused by a sharp edge on the chassis and can result in an electrical short to ground. This condition can exist on 8002A Flexible Disc Units shipped prior to July of 1980 with serial numbers below B063799.

Instrument Modification Notice number M40941 added a neoprene channel over the sharp edge of the Flexible Disc Unit chassis. The neoprene channel is installed under the wiring near the power plug. Modification Kit 040-0987-00 provides parts and instructions to add the neoprene channel to existing Flexible Disc Units.

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

S-3200: DL11-W TERMINAL INTERFACE MODS

The DL11-W terminal interface, which is used as the console interface in a PDP11/34A CPU used in S3200 systems, is not DEC supportable. The "PDP11/34A board modifications" information included, shows why this is so. Work is in processes to set this board up in Board Exchange. You will be notified via a Wizard's Workshop article when it is set up and orderable. Until it is set up, you will need to contact Walker Road Service Support for assistance.

Modification #1 must be installed because of a DEC engineering oversight. Modification #3 is used for the 4010 terminal. Modification #2 which is a very extensive mod, must be installed on the DL11-W when the 4006 terminal is used. This 4006 custom mod must be done here at Tektronix because it involves a DL11-W firmware change (ROM change) along with many wiring changes.

DL11-W TERMINAL INTERFACE MODS

Mod #1 (Published in Wizard, April 4, 1980)

A. Problem - Address Rom E34 is always enabled.

The address lines on the ROM change with the unibus address lines. This causes random spikes to appear on the output of the ROM. These spikes cause the INTR ENABLE (interrupt enable) bits in the DL11-W receiver control and status register (RCSRJ) and transmitter control and status register (XCSR) to clear. The spiking can also cause the DL11-W line time clock (LTC) to interrupt randomly. This will show up when INTFAC is run. The INTFAC error message will be "a bad interrupt happened." The modification disables the gates which feed the ROM.

B. Mod Implementation

1. See figure #1 for mod. On side one (component side of DL11-W), lift legs 7 and 9 of E31.

2. Connect legs 7 and 9 of E31 to leg 8 of E32 using small insulated wire.

Mod #2 (Tek 4006 custom mod only)

A. Problem - The DL11-W must be modified to run with the 4006 terminal.

A DL11-W terminal interface that supports a Tektronix 4006 terminal is modified to include the circuits shown in figures #2 and #3. Also, the data stored at location 22 octal of ROM E34 is changed from 00011100 to 10011100 (34 octal to 234 octal). This is done by replacing

(ARTICLE CONTINUED ON THE NEXT PAGE)

the ROM (done at Beaverton). Bit 5 of the DL11-W receiver control and status register (RCSR) is hardwired high to assert DATASET INTR ENABLE bit for "software identification" for the Tek 4006 terminal.

B. Mod Implementation

1. Exchange ROM E34 for ROM with correct firmware. Address 22 of E34 is 10011100 instead of 00011100.

2. Install wire from pin 9, E34 to pin 6, E49.

3. Install wire from pin 13, E49 to pins 11, 12, E58.

4. Install wire from pin 13, E58 to pin 5, E49.

5. Install wire from pin 4, E49 to S-2 switch 1. (Pin 16)

6. Install wire from S-2, switch 1 to pin 1, E14. (Pin 1)

Note: S-2 switch 1 must be on for 4006 terminal and must be "off" for 4010 terminal. Not all DL11-W's have this mod. Only systems shipped from Beaverton having a 4006 will contain a modified DL11-W.

7. Software mod (DEC Diagnostics)

(See Table 1)

Mod #3 (New Part Number 118-0337-01)

A. Problem - The DL11-W has no external input for baud rate control.

The 150 baud rate line is cut and the baud rate clock from the 4010 is fed onto the 150 baud line so the 4010 can control the DL11-W baud rate.

B. Mod Implementation

1. Cut pin 11 of E28.

2. Install a wire from the DL11-W berg connector pin CC to pin 1 of E18. Install the wire on the back of the board. See Figure #4.

See Table 2 for switch settings.

Written by--
Ronald G. Gullion
DAD Computer Support

Submitted by--
Joe Lipska
92-236, Ext. 1634

TABLE 1

	Address	From	To
ZDLDA1	7116	001404	100004
	7176	001404	100004
	7252	001401	100001
ZDLDB0/	7446	001404	100004
ZDLDC0	7546	001404	100004
	7622	001401	100001

TABLE 2

DL11-W Switch Settings for 4006:

S1	S2	S3	S4	S5	
1 on	1 on	1 off	1 off	1 off	
2 on	2 X	2 on	2 on	2 off	
3 off	3 on	3 on	3 off	3 off	
4 on	4 off	4 off	4 off	4 on	
5 off	5 off	5 on	5 off	5 off	
6 off	6 on	6 on	6 off	6 off	
7 on	7 off	7 on	7 on	7 on	
8 on	8 off	8 off	8 off	8 off	
9 off		9 off	9 off	9 off	- On If other than
10 on		10 off	10 off	10 on	- Off console terminal.

See CP3200/CP3201 Manual, 070-3395-00, Pages V through VIII for switch settings for the 4010 terminal.

(ARTICLE CONTINUED ON THE NEXT PAGE)

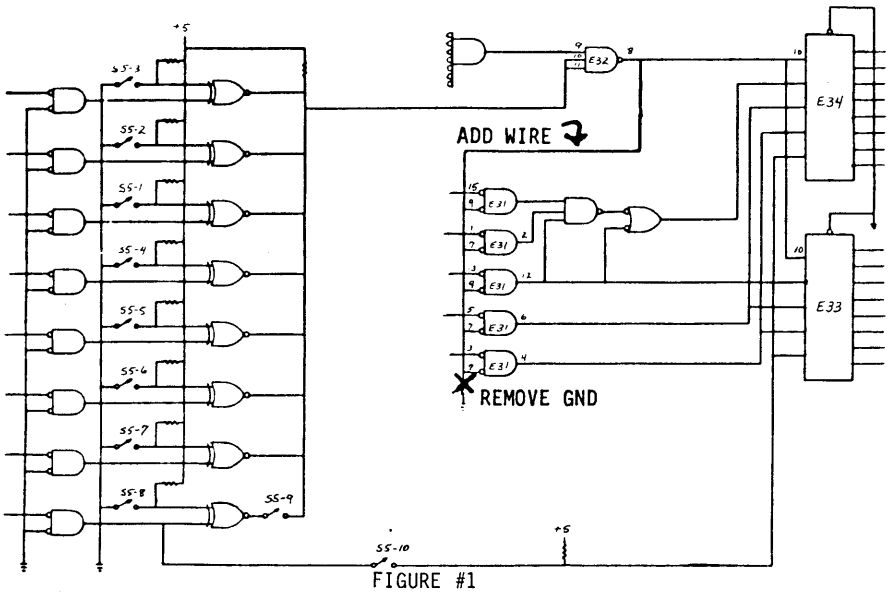


FIGURE #1

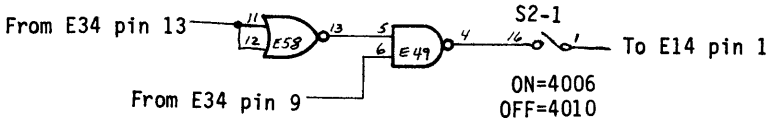


FIGURE #2

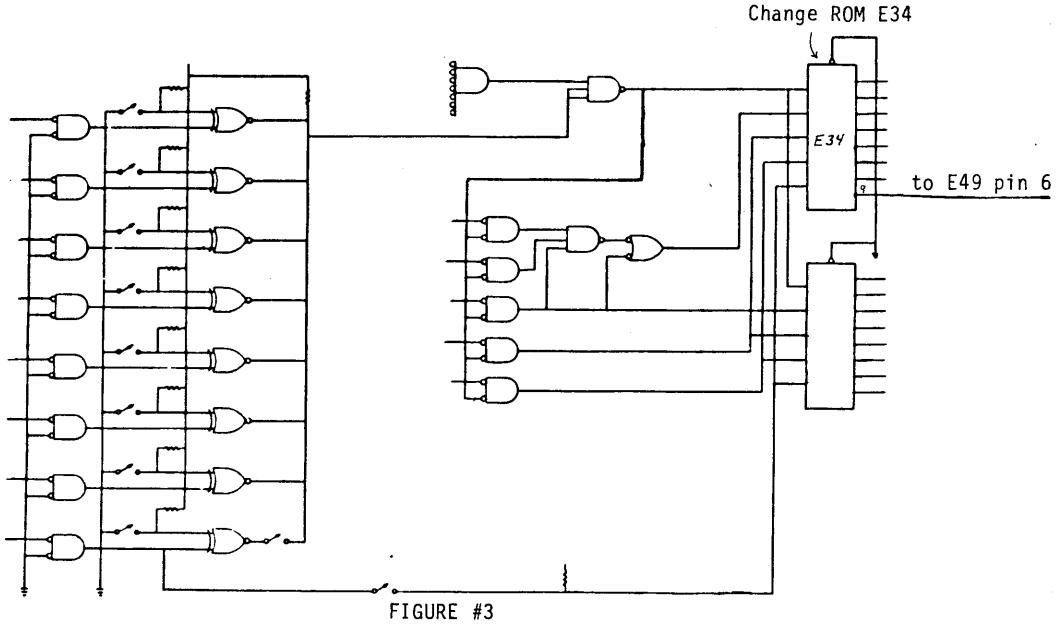


FIGURE #3

(ARTICLE CONTINUED ON THE NEXT PAGE)

S-3200: DL11-W TERMINAL INTERFACE MODS (cont.)

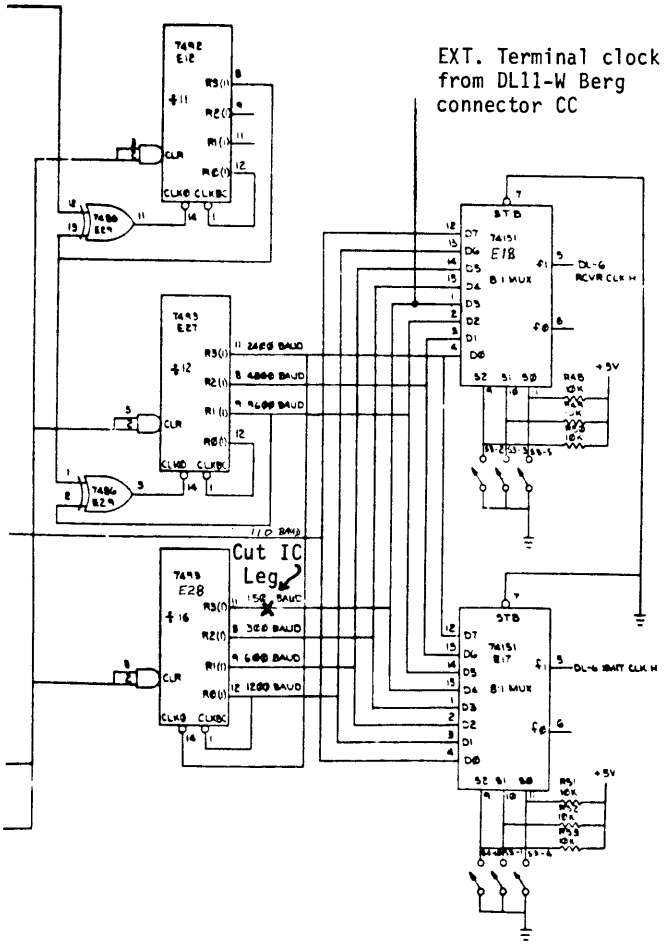


FIGURE #4

S-3200: PROBER, SIGNAL INTERFACE PART AVAILABLE

The Signal Interface (021-0218-00) is used to interface the Electroglas and Teledyne probers to the test station. Serviceability of this unit has been enhanced by a new replaceable part. The interface includes 60 each, 94 ohm, RF cable assemblies. Individual cables with connectors attached may now be replaced. Order Part Number 179-2293-00.

Previously these 15.38 inch cables did not come as replaceable assemblies with the connectors. This presented a service problem since the RF cables cannot be soldered to, and special crimping tools are required to install the connectors.

--Jim Stubbs
92-236, Ext. 1287

S-3200: TEKTEST III AND PRAM APPLICATIONS MANUALS

There are two new manuals for Semiconductor Test Systems. The first, "S-3270 TEKTEST III Test Language, Part Two," P/N 070-3339-01 replaces the -00 version of this manual. The new manual is now orderable.

The second new manual, "PRAM Applications, An Addendum to Programming the Pattern RAM (PRAM)," P/N 070-3341-00, is not currently available. The part number will be announced later. In the meantime, Service Support is sending a copy to all STS Field Service Specialists.

--Joe Lipska
92-236 Ext. 1634

603A, 604A HIGH VOLTAGE CAPACITOR MODIFICATION 43875

The high voltage capacitors used in the 603A and 604A monitors have shown a high rate of failure. This is despite the fact that they are rated at 5kv and used in a 3.5kv application. Capacitors C580 and C581 tend to shut the high voltage supply down when they fail. Capacitor C565 sometimes causes CRT damage when it fails.

To solve the problem, a new vendor has been approved to supply a similar component (Tek P/N 283-0162-01). These capacitors have shown good reliability even at maximum specified voltage. They are distinguishable from their 283-0162-00 counterparts by their blue color.

Modification 43875 calls for the part number of C565, C580 and C581 to change

(ARTICLE CONTINUED ON THE NEXT PAGE)

603A, 604A HIGH VOLTAGE CAPACITOR MODIFICATION 43875 (cont.)

from the 283-0162-00 to the 283-0162-01 component. This change rolls the high voltage board part number from 670-1813-02 to -04. In addition, the 050-1035-01 parts replacement kit changes to 050-1035-02.

The 283-0162-01 capacitors should be installed into all 603A/604A monitors whenever convenient. This reliability improvement is free of charge to customers with maintenance agreements, warranty, or rental products and billable to all others.

--George Kusiowski
63-503 Ext. 3928 WI

634: GEOMETRY CALIBRATION CORRECTION

Reference: Wizards Workshop Issue 11-20 page 5.

Under Geometry Calibration a partial sentence was inadvertently excluded. The paragraph in its intirety is repeated below for your use.

The earth's magnetic field affects the position and rotation of the CRT display. If the electron beam moves approximately parallel to the earth's magnetic lines of force (north-south), display rotation will result. If the electron beam moves perpendicular to the field (east-west), then vertical and/or horizontal displacement of the image will occur. Similar effects may be expected from local magnetic fields produced by electrical machinery, structural steel in buildings and nearby geologic formations. Typically, yoke rotation, vertical repositioning (R315) and horizontal repositioning (R355) will return the display to normal. This is not unique to the 634 but affects all cathode ray tubes.

Our apologies to George Kusiowski.

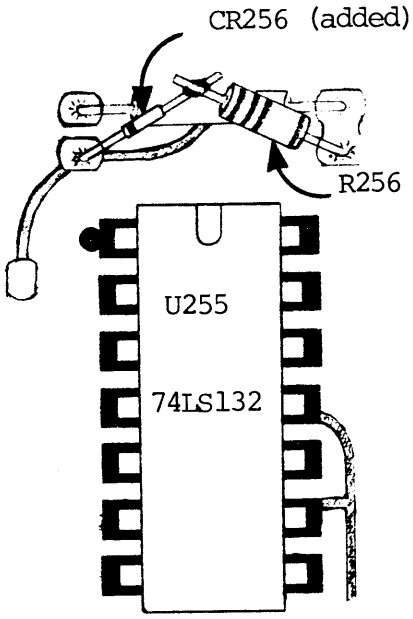
--Janet Hemenway
Editor

4611/4054: GRAPHIC SYSTEM HANGS WHEN COPIER IS TURNED OFF

The 4054 will hang busy when connected to a 4611 that is powered down. The problem is fixed by a mod to the 4611 DVST Interface Board, P/N 670-5756-00. All 4611s with S/N B010765 and above have this mod installed.

Installation instructions:

- Disconnect power and remove the DVST Interface board from the unit.
- Locate U255 and R256 just above it.
- Lift the left end of R256.
- Solder in a diode (P/N 152-0141-02) cathode down, in series with R256. See illustration.



The part number suffix of the board rolls to 670-5756-01.

--Dan Harris
63-503 ext. 3313 (WI)

4611/12: TROUBLESHOOTING THERMAL FUSE FAILURE

The thermal fuse is a safety device. It should not fail unless there is a circuit failure on the Power Supply Board -- such as a shorted solid state

(ARTICLE CONTINUED ON THE NEXT PAGE)

4611/12: TROUBLESHOOTING THERMAL FUSE FAILURE (cont.)

relay. However, some Service personnel have had to replace the fuse (a tedious job) with no failure evident -- except the fuse. Here is why:

1. If you replace the Power Supply Board or the fuser, the fuser temperature must be checked and adjusted if indicated. Use the Service Manual procedure, Section 3, "Adjustments", page 3-22. Differences between Power Supply Boards and fusers may result in a failed thermal fuse unless the calibration is done at first warmup (or preset R170 just CCW of midrange before power up).

2. Do not adjust R170 on the Power Supply Board without proper equipment. A DM501 with temperature probe is required; and be certain that the probe has been calibrated to the DM501.

3. Only Tektronix toner, part number 006-2990-00, may be used. The fusing temperature of this toner is matched to the calibration specification.

4. Look for wrinkles in the paper (they are easier to see on a solid black image). They indicate that the fuser temperature is too high.

5. If steps 1-4 above still do not keep the thermal fuse from blowing, the fuser itself may be at fault. There may be voids (bubbles) in the potting compound around the thermal resistor which inhibit heat transfer to the resistor. The result is overshoot of the fuser temperature during warmup, which can blow the thermal fuse.

--Dan Harris
63/503, ext. 3313

463X: HARD COPY UNITS - MAINTENANCE OF DC MOTORS

HOW LONG SHOULD IT RUN?

The specification on the motor, P/N 147-0039-01, is 2,000 hours minimum, but life is dependent on application--speed, loading, and environment. You should get one year's operation (2,000 hours) on a motor in a 4631, 4632, or 4634--on the original set of brushes. This assumes "average" usage. Brush replacements should extend the motor's life up to 6,000 hours, under ideal loading conditions. Life expectancy of 4633A motors is less because of higher motor speeds and typically heavy usage. You can determine the age of a motor from the 2-letter date code on the vendor's label. It gives month and year of manufacture. "A" equals January, "B" equals February...and "L" equals December. The year may be decoded as follows:

Q	-	1977
R	-	1978
S	-	1979
T	-	1980
U	-	1981

NOTE: A motor will not last long if operated under excessive load. A puddle of oil under the motor may indicate that the gearhead has overheated, with consequent bearing and gear damage.

HOW TO MAXIMIZE MOTOR LIFE

1. Measure the motor current - every time you work on the paper transport system. Be sure to check it when you replace the processor, as a tight or sticky belt can "do in" a motor. This should be the last thing you do before replacing the covers. Remove the red lead from the top motor brush connector and connect a DC current meter in series. Acceptable readings are:

(ARTICLE CONTINUED ON THE NEXT PAGE)

463X: HARD COPY UNITS - MAINTENANCE OF DC MOTORS (cont.)

Idle --- 1.9A maximum
(.7-1.3A typical)
Run ---- 2.4A maximum
(1-1.8A typical)
Cut ---- 2.6A maximum
(1.2-2.0A typical)

Measure 4633A current at 25mm/sec paper speed. The above figures are not a product specification, but should help you keep the unit running reliably. Lower than maximum current readings are strongly preferred.

2. Do not overtighten the chain and belt. Pull all the chain slack to the top section of the chain. When you release it, it should have 1/16" - 1/8" (1.6 - 3.2mm) free play at right angles to the direction of travel. This looseness will not degrade performance. The positive drive (cogged) belt is adjusted by loosening and sliding the motor bracket frontward or rearward. It should be just tight enough to take out the "slack". Excessive tension overloads the motor and causes wear to the gearhead and driveroller clutch.

3. Check the motor brushes (next to gearhead) regularly. Bad or worn brushes will damage the commutator.

4. Check a "suspect" motor's current with no load (remove belt and chain). Replacement is recommended if the current exceeds 0.7A DC.

5. Assure that local key operators are trained. Incorrect paper loading with a subsequent paper jam can overload a motor, despite the current limit circuitry. In the 4633A at 100mm/sec paper speed, the sudden stop due to a misaligned cutter actuator will strip the phenolic gear in the gearhead.

The only replaceable parts for the motor are the brushes. The gearhead is not repairable because of tight gearlash tolerances. A phenolic gear from one motor should never be placed in another motor.

--Dan Harris
63-503 ext. 3313 (WI)

463X: HARD COPY UNITS - MOTOR BRUSHES UPDATE

Reference: Wizards Workshop article by George Kusiowski, issue 11-4, dated March 6, 1981, p. 17.

The motor vendor has made some changes since the previous article was written. The motor and tach brushes are now equal in hardness, and the brush material is identical in color -- dark gray. The brush springs are different: The motor brush, P/N 118-0072-02, has a copper colored spring; the tach brush, 118-0072-01, has a black colored spring and slightly higher spring tension.

A new brush is 9/16 inches (1.43 cm) long. Brushes should be replaced when worn to one half new length. A suggested guideline is to replace them at 5/16 inches (0.80 cm) or less. Only motor brushes, P/N 118-0072-02, should require replacement. Tach brushes should last the life of the motor.

New brushes should be broken in if time and circumstances allow. Unload the motor (remove cog belt and chain), disconnect one of the tach leads, and run the motor for two hours. A reminder: The motor brushes are next to the gear head; the tach brushes are toward the rear of the hard copy unit.

(See related article this issue.)

--Dan Harris
63/503, ext. 3313 (WI)

7912AD: EXISTING BOARDS ARE NOT COMPATIBLE WITH B09XXXX INSTRUMENTS

References: Modifications, M37510, M37514, and M39163.

There are three new redesigned boards in the new 7912ADs (S/N B09XXXX and higher) that are not directly downward compatible. This also means that instruments below B09XXXX are not upward compatible.

The B09XXXX instruments have a new data buffer board (P/N 670-5148-02), a new memory control board (P/N 670-5149-02), and a new main interconnect circuit board (P/N 670-5152-02). Instruments B09XXXX and higher can only use the above part numbers or higher (670-5148-02, 670-5149-02, and 670-5152-02).

If a customer requires an upgrade, it is recommended to use all new boards. This would be at customer expense. The parts to order would be a main interconnect board (670-5152-02), a memory control board (670-5149-02), and an 050-1415-01 kit (Includes a data buffer board, P/N 670-5148-02, and associated wiring hardware).

The memory control board (P/N 670-5149-02) is downward compatible, but it is highly recommended not to use it with instruments below B09XXXX. This will ensure board integrity among older instruments.

The main interconnect is also downward compatible, but order an 050-1431-00 instead of the board for instruments with serial numbers B089999 and lower. Again, it is not recommended to use the newer board in older instruments.

The new data buffer (P/N 670-5148-02) is not downward compatible.

Refer to Wizard Issue 9-5, dated March 16, 1979, pages 11 through 13. These modifications will fix the following problem: Video noise appears in the digitized data under the conditions of high intensity and continuous sweep. The same problem that was seen in the single sweep mode.

--Randy Newton
92-236, Ext. 1635

8001, 8002A, 8550, & MICROLAB MANUALS LIST

This manuals list contains descriptions and part numbers for all current M.D.P. manuals. This list is divided into the following categories:

- 8550 Users: DOS/50 V.1
- 8500 MDP Series A Assembler Users
- 8550 Users: DOS/50 V.2
- 8500 MDL Series B Assembler Users
- Other 8500 Series Users
- 8550 Installation/Service
- Microlab I
- 8002A Users
- 8002A Reference Cards
- 8001 Users Documentation
- 8001/8002A Service
- 8001/8002A Peripheral Service & Users

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

8550 USER'S MANUALS: DOS/50 V.1	PART NUMBER
8550 Microcomputer Dvlpt Lab System Users Manual	070-3457-00
-- 8300E01 8080A Emulator Specifics	070-3562-00
-- 8300E02 6800/02 Emulator Specifics	070-3563-00
-- 8300E04 Z80A Emulator Specifics	070-3564-00
-- 8300E05 TMS9900 Emulator Specifics	070-3565-00
-- 8300E06 8085A Emulator Specifics	070-3566-00
-- 8300E07 3870/3872/F8 Emulator Specifics	070-3567-00
-- 8300E09 1802 Emulator Specifics	070-3568-00
-- 8300E10 8048/8021/8041A/8022 Emulator Specifics	070-3569-00
-- 8300P28 6809 Emulator Specifics	070-3851-00
8550 Microcomputer Dvlpt Lab Sys Ref Bklt: DOS/50 V1	070-3458-00

(ARTICLE CONTINUED ON THE NEXT PAGE)

8001, 8002A, 8550, & MICROLAB MANUALS LIST (cont.)

8500 MDL SERIES A ASSEMBLER USER'S MANUALS	PART NUMBER
8300AXX Assembler User's Manual	070-3575-00
-- 8300A01 8080A/8085A Assembler Specifics	070-3576-00
-- 8300A01 8080A/8085A Assembler Reference Card	070-3577-00
-- 8300A02 6800/01/02 Assembler Specifics	070-3578-00
-- 8300A02 6800/01/02 Assembler Reference Card	070-3579-00
-- 8300A04 Z80A Assembler Specifics	070-3580-00
-- 8300A04 Z80A Assembler Reference Card	070-3581-00
-- 8300A05 TMS9900 Assembler Specifics	070-3582-00
-- 8300A05 TMS9900 Assembler Reference Card	070-3583-00
-- 8300A07 3870/3872/F8 Assembler Specifics	070-3584-00
-- 8300A07 3870/3872/F8 Assembler Reference Card	070-3585-00
-- 8300A09 1802 Assembler Specifics	070-3586-00
-- 8300A09 1802 Assembler Reference Card	070-3587-00
-- 8300A10 8048/etc. Assembler Specifics	070-3588-00
-- 8300A10 8048/etc. Assembler Reference Card	070-3589-00
-- 8300A15 8086/8088 Assembler Specifics	070-3592-00
-- 8300A15 8086/8088 Assembler Reference Card	070-3593-00
-- 8300A20 Z8000 Assembler Specifics	070-3594-00
-- 8300A20 Z8000 Assembler Reference Card	070-3595-00
-- 8300A26 68000 Assembler Specifics	070-3596-00
-- 8300A26 68000 Assembler Reference Card	070-3597-00
-- 8300A28 6809 Assembler Specifics	070-3692-00
-- 8300A28 6809 Assembler Reference Card	070-3693-00

8550 USER'S MANUALS: DOS/50 V.2	PART NUMBER
-- Z80A Emulator Specifics	070-3964-00
-- 8085A Emulator Specifics	070-3966-00
-- 6809 Emulator Specifics	070-3971-00
8550 Microcomputer Dvlpt Lab Sys Ref Bklt: DOS/50 V2	070-3937-00

8500 MDL SERIES B ASSEMBLER USER'S MANUALS	PART NUMBER
8500 MDL Series B Assembler Core User's Manual	070-3856-00
-- 8550 Host Specifics	070-3943-00
-- Z8001/Z8002 Assembler Reference Card	070-3973-00

OTHER 8500 SERIES USER'S MANUALS	PART NUMBER
8550 Microcomputer Development Lab Editor V4.X Manual	070-3571-00
8550 Microcomputer Dvlpt Lab Editor V4.X Ref Card	070-3572-00
8300D15 8086 Prototype Debug Specifics	070-3603-00
8300D15 8086 Prototype Debug Reference Card	070-3604-00
8500 MDL Series ACE Editor Users Manual	070-3573-00
8500 MDL Series ACE Editor Users Reference Card	070-3574-00
8300G01 Pascal 8080/85 Compiler User's Manual	061-2462-00
8300H01/02 MDL/u Compiler Users Manual	070-3601-00
8300H01/02 MDL/u Compiler Reference Booklet	070-3602-00
-- 8300H01 8080A MDL/u Compiler Specifics	070-3598-00
-- 8300H02 6800/02 MDL/u Compiler Specifics	070-3599-00
8500 MDL Series Trigger Trace Analyzer User's Manual	070-3760-00
Real-Time Proto. Analyzer User's Manual: DOS/50 V1	070-2785-01
Real-Time Proto. Analyzer User's Manual: DOS/50 V2	070-3922-00
Simplifying Microcomputer-Based Product Design	062-5812-00
CT 8500 Video Display Terminal Operator's Manual	070-3737-00

8550 INSTALLATION/SERVICE MANUALS	PART NUMBER
8550 Microcomputer Development Lab Installation Guide	070-2974-01
-- 6800/02 Emulator Processor/PCP Installation	070-3663-00
-- 8080A Emulator Processor/PCP Installation	070-3664-00
-- Z80A Emulator Processor/PCP Installation	070-3665-00
-- 8085A Emulator Processor/PCP Installation	070-3666-00
-- 1802 Emulator Processor/PCP Installation	070-3667-00
-- 3870/3872/F8 Emulator Processor/PCP Installn.	070-3669-00
-- TMS9900 Emulator Processor/PCP Installation	070-3670-00
-- 8048/8021/8041A/8022 Emul. Proc./PCP Installn.	070-3671-00
-- 68xx Emulator Processor Installation	070-3769-00
-- 6809 Prototype Control Probe Installation	070-3866-00
-- Z8001/Z8002 Emulator Processor Installation	070-3773-00
8301 Microprocessor Development Unit Service Manual	070-2976-00
8501 Data Management Unit Service Manual	070-2975-00

ACCESSORIES/OPTIONS SERVICE MANUALS	
DataTrak 8 Flexible Disc Drive Service Manual	061-2383-01
Real-Time Prototype Analyzer Service Manual	070-2724-01
CTB500 Video Display Terminal Service Manual	061-2431-00
8080A Emulator Processor Svc. Manual	070-2353-03
6800/6802 Emulator Processor Svc. Manual	070-2354-03
Z80A Emulator Processor Svc. Manual	070-2715-01
9900 Emulator Processor Svc. Manual	070-2712-01
8085A Emulator Processor Svc. Manual	070-2716-01
1802 Emulator Processor Svc. Manual	070-2631-01
3870/3872/F8 Emulator Processor Svc. Manual	070-2634-01
8048/8021/8041A/8022 Emulator Processor Svc. Manual	070-2632-01
6500/1 Emulator Processor Svc. Manual	070-2887-00
68xx Emulator Processor Svc. Manual	070-3768-00
6809 Prototype Control Probe Svc. Manual	070-3867-00

MICROLAB I MANUALS	PART NUMBER
MicroLab I Instruction Manual	070-2827-01
---Supplement for 3870 Personality Card	070-2862-01
---Supplement for F8 Personality Card	070-2864-01
---Supplement for 1802 Personality Card	070-2866-01
---Supplement for 6802 Personality Card	070-2939-01
---Supplement for 6500/1 Personality Card	070-2941-01
---Supplement for MCS-48 Personality Card	070-2937-01
---Supplement for 8085A Personality Card	070-2860-00
---Supplement for Z80A Personality Card	070-2861-00
---Supplement for Z8000 Personality Card	070-2863-00
---Supplement for 6809 Personality Card	070-3984-00

(*) There is no charge for 061- preliminary documentation.

8002A USER'S MANUALS	PART NUMBER
TEKDOS System User's Manual	070-2701-02
---Supplement for 6800/6802 Emulator Processor	070-2714-00
---Supplement for 8048/etc. Emulator Processor	070-2856-00
---Supplement for 6500/1 Emulator Processor	070-3433-00
8002A MDL/u Compiler User's Manual	070-2584-01
8002A Pascal Compiler User's Manual	061-2417-00
8002A TEKDOS Editor Version 3.X	070-3441-00
Simplifying Microprocessor-Based Product Design	062-3771-00
8002A 8086 Prototype Debug Users Manual	070-3455-00
8002A Z8000 Prototype Debug Users Manual	070-3507-00
8002A 68000 Prototype Debug Users Manual	070-3511-00
8002A 8080A/8085A Assembler & Emulator User's Manual	070-2702-01
8002A 6800/6802 Assembler & Emulator User's Manual	070-2703-02
8002A 9900 Assembler & Emulator User's Manual	070-2704-01
8002A Z80 Assembler & Emulator User's Manual	070-2705-01
8002A F8/3870/3872 Assembler & Emulator User's Manual	070-2615-00
8002A 1802 Assembler & Emulator User's Manual	070-2627-00
8002A 8048/8021/8041A/8022 Assembler & Emulator User's Manual	070-2611-00
8002A Assembler User's Manual	070-3454-00
---Supplement for 6500/1 Assembler	070-2790-00
---Supplement for 8086 Assembler	070-3505-00
---Supplement for Z8000 Assembler	070-3509-00
---Supplement for 68000 Assembler	070-3513-00

8002A REFERENCE CARDS	PART NUMBER
8002A System Reference Booklet (TEKDOS version 3)	070-2706-01
8002A MDL/u Compiler Reference Booklet	070-2629-01
8002A TEKDOS Editor Version 3.X Reference Card	070-3442-00
8002A uProcessor Lab 8086 Prototype Debug Ref Card	070-3504-00
8002A uProcessor Lab Z8000 Prototype Debug Ref Card	070-3508-00
8002A uProcessor Lab 68000 Prototype Debug Ref Card	070-3512-00
8002A 8080A/8085A Assembler & Emulator Ref Card	070-2707-01
8002A 6800/6802 Assembler & Emulator Reference Card	070-2708-02
8002A 9900 Assembler & Emulator Reference Card	070-2709-01
8002A Z80 Assembler & Emulator Reference Card	070-2710-01
8002A F8/3870/3872 Assembler & Emulator Reference Card	070-2616-00
8002A 1802 Assembler & Emulator Reference Card	070-2628-00
8002A 8048/8021/8041A/8022 Assembler Reference Card	070-2612-00
8002A 6500/1 Assembler Reference Card	070-2784-00
8002A 8086 Assembler Reference Card	070-3506-00
8002A Z8000 Assembler Reference Card	070-3510-00
8002A 68000 Assembler Reference Card	070-3514-00

8001 USER'S DOCUMENTATION	PART NUMBER
8001 System User's Manual	070-2464-00
---Supplement for F8/3870/3872 Emulator Processor	070-2822-00
---Supplement for 1802 Emulator Processor	070-2854-00
---Supplement for 6800/6802 Emulator Processor	070-2713-00
---Supplement for 8048/etc. Emulator Processor	070-2855-00
---Supplement for 6500/1 Emulator Processor	070-3432-00
8001 System Reference Card (TEKOPS version 2)	070-2471-01

8001/8002A SERVICE MANUALS	PART NUMBER
8001/8002A uProcessor Lab Service Manual	070-2711-00
8001/8002/8002A uProcessor Lab Installation Guide	070-2717-01
---Supplement for 8080A Emulator Processor	070-3380-00
---Supplement for 6800/6802 Emulator Processor	070-2951-00
---Supplement for Z80 Emulator Processor	070-3382-00
---Supplement for 9900 Emulator Processor	070-3381-00
---Supplement for 8085 Emulator Processor	070-2871-01
---Supplement for F8/3870/3872 Emulator Processor	070-2872-01
---Supplement for 1802 Emulator Processor	070-2882-01
---Supplement for 8048/etc. Emulator Processor	070-2473-00
---Supplement for 6500/1 Emulator Processor	070-3475-00
8001/8002A: 1702A PROM Programmer Svc. Manual	070-2722-00
8001/8002A: 2704/2708 PROM Programmer Svc. Manual	070-2723-00
8001/8002A: Maintenance Front Panel Svc. Manual	070-2725-00
8002A uProcessor Lab Flexi. Disc Unit Service Manual	070-2587-00
118-0195-00 Flexible Disc Drive Service Manual	070-2786-00

8001/8002A PERIPHERAL SERVICE & USER'S MANUALS	PART NUMBER
CTB100 CRT Terminal Service Manual (4023)	070-2362-00
CTB100 CRT Terminal User's Manual (4023)	070-2359-00
CTB101 Printing Terminal Service Manual	070-2363-00
CTB101 Printing Terminal User's Manual	070-2360-00
LPB200 Line Printer Service Manual	070-2364-00
LPB200 Line Printer User's Manual	070-2361-00
4025 Computer Display Terminal Operator's Manual	070-2401-02
4025 Computer Display Terminal Programmer's Reference Manual	070-2402-00
4025 Computer Display Terminal Programmer's Reference Card	070-2437-03
4024/4025 Computer Display Terminal Service Manual	
.....volume 1	070-2830-00
.....volume 2	070-2831-00

8550 WRAP-BACK CONNECTOR

The following wiring list can be used to construct wrap-back connectors to more completely test the 8501 and 8301 RS232 and HS1 ports. A set of two (1-male, 1-female) can also be purchased under Part Number 067-1020-00.

From Pin	Signal	To Pin	Signal
3	T Data +	2	R Data +
12	T Data -	11	R Data -
5	CTS +	20	DTR +
25	CTS -	13	DTR -
8	CD +	4	RTS +
6	DSR +	4	RTS +

--Brad Griffin
92-236, Ext. 1608

HAPPY THANKSGIVING!