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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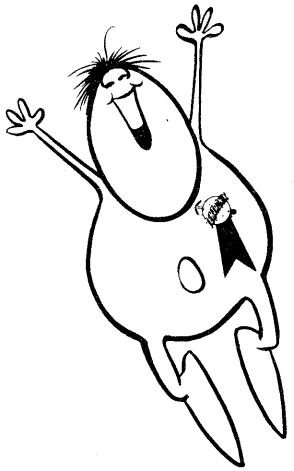


you done GOOD,

STAN KOUBA, Corporate Service Manager, was recently recognized for completing twenty years at Tektronix. Special guests at the cake-and-coffee celebration included Stan's wife, Venice, and Lew Kasch, Group Vice President - U.S. Sales and International Operations.

While the sharing of Stan's special recognition is a bit late in publication, it is of no less importance. Please join all of us in the Service Organization in again thanking Stan for his twenty years of service and a job well done.

******

Ed Orlet, Shipping/Receiving Clerk at the Long Island Field Office was recently presented with a certificate awarded in recognition of a cost-effective contribution to the ITI program. Congratulations, Ed!

******

Robert Faist, Field Technician in our Denver office, has earned a "You Done Good" award for his excellent representation of Tek in Mexico. He not only fixed a completely dead 4027 but also three new hard copy units. Another customer had a 4014-1 with Opts. 40 & 41 as well as a 4027 that interfaced with a Xerox 6500 Color Copier, all of which had serious problems. In just two days Bob gained for Tek two very satisfied customers. Thanks for a job well done!

******

Roy Lindley, T&M Service Support, was commended for his speedy assistance in obtaining a badly needed part for a service center. As the writer put it, "We don't shoot a 'Silver Bullet' often, but it's nice to know you are there when we need you." Keep up the good work Roy!

******

--Editor

PERSONNEL CHANGES

Virginia Ruddy, Rockville, has announced the addition of two new instructors to the Eastern Region Training Group.

In Boston, Roy Lewis, currently a Field Service Specialist II and formerly a technician, supervisor, and training officer in the Navy, will be the newest Product Maintenance Instructor for Field Service/IDD Products. Roy has been with Tek since January 1979, and will bring some valuable field experience to the group.

For T & M, Frank Campfield, an ETII/Acting Supervisor in the Orlando Service Center, will replace Jere Hofstetter who is one of our newest T & M SE's. Frank brings ten years of electronic instructor experience (at Keesler and Goodfellow AFB) as well as almost two years on the bench for Tek.

Both gentlemen will operate out of their present Service Centers effective June 1, 1980.

Congratulations and best wishes for a great future with Tek!

******

Larry Null, District Field Service Manager, Rockville, has accepted the the new position of Area Service Manager in Denver. Larry will have responsibility for all service in the corresponding territories served by the Denver, Salt Lake City, Phoenix and Albuquerque offices and will report to Lyle York.

Larry came to Tektronix approximately three years ago from Searle where he held several positions in Service Management.

Best wishes and good luck to Larry in his new responsibilities.

******

Congratulations are in order for both Morrie Vogt and John Loggie on their promotions to Field Service Specialists II in the orlando IDG Field Service Area.

******

Congratulations to the following Long Island people for their promotions ...

Dave Micheels - promotion to ET II. Dave has been with Tek since June 1978.

Tek Krause - promotion to ET II. Ted has been in the LIFO since November 1978.

Hank Moore - promotion to ET II. Hank is the video tech and has been with Tek since May 1979.

Frank DeStefano - promotion to ET II. Frank came to Tek from the U.S. Coast guard in July of 1979.

Congratulations and best wishes on your promotions.

--Editor

******

SERVICE TEKNOTES - PURPOSE AND PROCEDURES

In answer to the many questions we have regarding this publication I am again running the following article. Please pass this information on to anyone you feel could benefit from it.

SERVICE TEKNOTES is meant to provide technical information to the customer who has decided to maintain his own Tektronix products. It contains product servicing information and is written for the technician.

The majority of the articles appearing in SERVICE TEKNOTES are reprints of selected Wizards Workshop articles (the service organization's technical information publication). However, customers are encouraged to submit articles on techniques and hints related to servicing Tektronix products.

SERVICE TEKNOTES is presently being published every other calendar month (January, March, May, July, September and November) and distributed through one of two methods:

1. Copies are mailed directly to customers, or
2. Copies are mailed to a Tektronix sales representative for further distribution to customers.

Due to the rising costs of printing and distribution we do not send copies to individuals within Tektronix. However, an issue of each edition is sent to every service center for routing and central filing.

A customer may be added to the distribution list by applying through his local sales representative. The following information is required:

1. Customer name and address
2. Product interest area (Information Display Division, Service Instruments Division, Laboratory Instrument Division)
3. Method of distribution
4. If distribution through a Tektronix sales representative is desired, his/her name, payroll code, and mailing address are needed.

This information should be sent to SERVICE TEKNOTES Editor, Mail Station 53-027, Beaverton, Oregon (Ext. 8939). If you have any questions please call me directly on Ext. 8939 Merlo Road.

--Sharon Huetson
Editor

IN-HOUSE SERVICE RECORDS (ACTIVITY CODE Ø1)

Blocks 38B and 40B must reflect all hours to be billed the customer.[1] Block 38B containing the billable hours by product. Block 40B the billable hours for all products for which labor is to be billed.

These blocks print through to the Customer Copy of the service record.

[1](including all billable repair hours)

--Bill Duerden
53-027, Ext. 8939 Merlo

MAINTENANCE AGREEMENT PRICING

The SQI (Service Quote Information Book) is the only document to be used for quoting Maintenance Agreement prices. The March 31st edition of the IDD Pal lists *7 (Refer to SQI - Service Quote Information Book for all Maintenance Agreement prices) in the Monthly Maintenance Column.

At the present time the IDD Pal is scheduled to be discontinued in AP101. However, if this schedule changes and this publication continues we will make every attempt to include monthly maintenance prices.

--Sharon Huetson
53-207
Ext. 8939 (Merlo)

7000 SERIES, REPLACEMENT RIBBON CABLE ASSEMBLIES FOR "SPOT-OF-GOLD" CONNECTORS

Part numbers are now set up and orderable for 19 different lengths of 10 wide, 26 gauge, and 12 lengths of 10 wide, 22 gauge, ribbon cable assemblies. The ribbon wires have P/N 131-0707-00 (fully gold-plated connectors) at each end.

The 10 wide ribbon cables may be stripped apart to provide any number of conductors needed as a replacement cable. For example, 3 wires can be removed to provide a 7 wide cable. The harmonica housing from the defective cable is to be reused on the new cable assembly.

The "spot-of-gold" connector can be identified by its pale color as compared to the bright gold color of a fully plated connector.

"Spot-of-gold" connectors will develop corrosion between the connector and wire. The resulting contact resistance will build up and cause intermittents or failures in critical voltage or current circuits. Some known problem areas are the readout and power supplies.

All materials and labor are to be charged to Activity Code 18. Code 18 should be used for all of year 1980. This applies to all 7000 Series products plus any 5000 Series units where "spot-of-gold" connectors may be causing problems.

It is recommended that each service location order cable assemblies in sufficient quantities to support your product base. Order the appropriate lengths as you deem necessary from the following list.

26 GAUGE, 10 WIDE RIBBON CABLE ASSEMBLIES

PART NUMBER	LENGTH (Inches)	PART NUMBER	LENGTH (Inches)
175-2992-00	3	175-3002-00	14
175-2993-00	4	175-3003-00	16
175-2994-00	5	175-3004-00	18
175-2995-00	6	175-3005-00	20
175-2996-00	7	175-3006-00	22
175-2997-00	8	175-3007-00	24
175-2998-00	9	175-3008-00	26
175-2999-00	10	175-3009-00	30
175-3000-00	11	175-3010-00	36
175-3001-00	12		

(continued on the following page)

22 GAUGE, 10 WIDE RIBBON CABLE ASSEMBLIES

PART NUMBER	LENGTH (Inches)	PART NUMBER	LENGTH (Inches)
175-3011-00	4	175-3017-00	16
175-3012-00	6	175-3018-00	18
175-3013-00	8	175-3019-00	20
175-3014-00	10	175-3020-00	22
175-3015-00	12	175-3021-00	26
175-3016-00	14	175-3022-00	28

If "spot-of gold" connectors are found on wires that are in wiring harnesses or other complex cables, it is left to the discretion of the local service center to determine whether or not to replace that particular cable. In general it is recommended that, if labor time is excessive, you replace only cables or wiring that are causing a problem or are known to have caused a problem in the past.

--John Eaton
58-511, Ext. 6902

7603, CRT STATIC DISCHARGE

CRT's for these products are being fitted with lead foil tape. A grounding strap is added to remove static charges from the tape. When this mod was first implemented, however, approximately 100 7603's (not rackmounts) were shipped without the grounding strap. These instruments may emit disturbing snaps, crackles and pops. In some cases spurious sweep triggers may occur. If an instrument shows up with these complaints, it may be necessary to add the grounding strap as follows:

> Remove the CRT, then using contact cement (006-0367-01), glue a one-inch length of conductive rubber EMI gasket material (348-0340-00) inside the CRT shield as follows:
>
> Insert approximately .25 inch of the gasket material into the hole at the bottom left side of the CRT shield, wedging the piece between the shield and the lower frame. Glue into place. The remaining .75 inch of gasket material protrudes like a finger to make contact with the foil tape on the CRT envelope, thus providing a discharge path to ground. Before re-installing the CRT, remove the protective coating from the lead tape in the small area where the conductive gasket will make contact with the lead tape. (The protective covering is only for the purpose of preventing the formation of unsightly lead oxide.)

Submitted by--
Dick Mock
7000 Series Mfg.

Inserted by--
John Eaton
58-511, Ext. 6902

5L4N NEW LATCH ASSEMBLY "ADDENDUM TO WIZARD ARTICLE, MARCH 7, 1980

Latch assembly, consisting of retaining latch (P/N 214-1513-01) knob securing pin (P/N 214-1840-00) and latch knob (P/N 366-1520-00) is replaced with a new latch assembly consisting of release bar (P/N 105-0718-01), retaining latch (P/N 105-0719-00), and latch knob (P/N 366-1690-00).

The new latch assembly consisting of Part Numbers 366-1690-00, 105-0719-00, & 105-0718-01 can also be found in the 050-1077-00 part kit.

--Rich Kuhns
58/511, Ext. 6782

602 HIGH VOLTAGE POWER SUPPLY IMPROVEMENT

The filter capacitors in the 602 high voltage power supplies have been replaced with a more reliable part. Capacitors C226, C227, and C228 in the cathode high voltage supply should be changed to P/N 285-0509-01. Also, capacitors C255, C268 and C269 in the control grid high voltage supply should be changed to P/N 285-0509-01. The new high voltage capacitor is more reliable, so 602 power supply failures should decrease. If one of these capacitors needs to be replaced, the others should be replaced also. All 602 Monitors above S/N B082896 already have the more reliable capacitors installed. Modification M37662 changed these capacitor part numbers.

--Liles Garcia
94-816/Ext. 1288

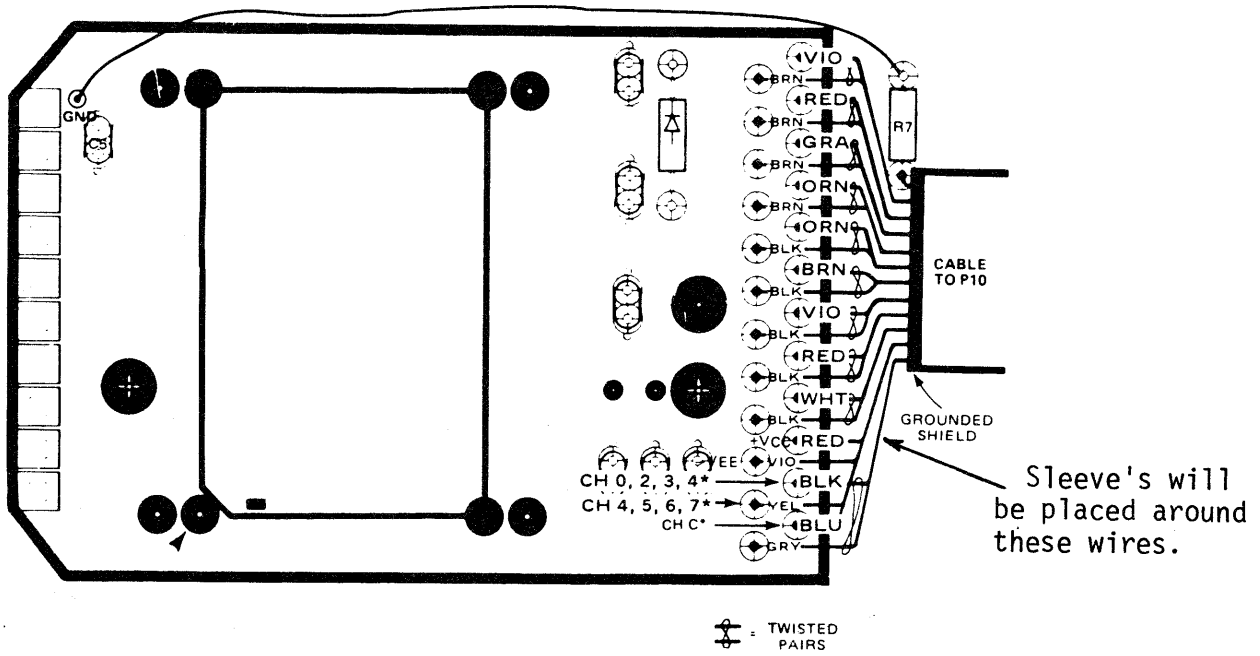
ACCESSORIES

P6451 WIRING ERROR

When a Service Center repairs a P6451 Probe, keep in mind that some of the probe head connectors have been incorrectly wired. Manufacturing has corrected the problem with colored sleeve's. The sleeve's will be placed over the incorrect wire indicating its actual color. This information should be useful when troubleshooting the probe head assembly.

EXAMPLE: A blue wire is connected to a pin where a red wire should have been connected.

CORRECTION: A red sleeve over the blue wire, indicating that red is the true color.



Probe Head Cable Connections

Information supplied by:
Bob Korbel - Chicago
Jim Mauck - Rockville

--Dave McKinney
58/511, Ext. 7072

465, REPLACE C1220 IN UNITS BELOW B294620

Reference: Wizard's Workshop, May 7 and December 22, 1976

C1220 has had three different part numbers during the life of the 465.

B010100 - B291513	290-0650-00	1000µF, 10V
B291514 - B294619	290-0759-00	290µF, 15V
B294620 & Up	290-0807-00	1000µF, 10V

P/N 290-0650-00 was removed because of a high failure rate (shorting). P/N 290-0759-00 caused horizontal modulation when used with 50 hertz line power.

All 465 units below S/N B294620 should have C1220 in the Horizontal Amplifier replaced with P/N 290-0807-00 if it still has an old type capacitor.

Internationally manufactured units with the old part numbers would have been shipped prior to January, 1977.

Roy Lindley
58-511, Ext. 7173

KEYBOARDS P/N 119-0482-XX AND 119-0488-XX

The Board Exchange Center will no longer recognize suffix (dash) numbers for keyboards part numbers 119-0483-XX or 119-0488-XX. All these will be handled as one number, 119-0483 or 119-0488 regardless of whether it is a -00, -01, -02, -03 or -04. The 119-0483 is a 4014 or 4012 ASC11 keyboard depending on the strapping. All of these keyboards will now be strapped for 4014 operation. The 119-0488 is a 4015 or 4013 APL-ASC11 keyboard depending on the strapping. All of these keyboards will now be strapped for 4015 operation.

The reasons for this action are:

1) Board identification is impossible. Keytronics does not generally label these boards by suffix numbers. In one case where they were suffixed two -01 boards were physically different.

2) These boards are interchangable and they are interchanged in the field. All boards are electronically identical as far as inputs/outputs are concerned and the function identically with the exception of the strapping which is easily and readily changed in the field.

3) It is easier to deal with two part numbers than the nine or more introduced by suffix numbers. A good portion of the boards coming in are not identified correctly. For inventory tracking purposes all boards 119-0483 and 119-0488 will considered to be -00's.

4) There is no indication that any one type of the same part number is more reliable than any other.

In order to implement this decision the following installation notes will be included with the keyboards being sent out from Board Exchange.

119-0483 (4014 or 4013 keyboard)
Installation note: This keyboard is strapped for 4014 operation. To install in a 4012, remove the straps between E1 and E2, E3 and E4, and E5 and E6.

119-0488 (4014 or 4013 keyboard)
Installation note: This keyboard is strapped for 4015 operation. To install in a 4013, remove the straps between E3 and E4, E5 and E6, and E7 and E8.

--John Stillmaker
53-017 Ext 8916

4016-1 FUSEHOLDER MODIFICATION

Reference: Modification #33774
Wizard Article - August 10, 1979, Issue 9-15

This article's purpose is to correct the previously written article titled, FUSEHOLDER MODIFICATION #33774, appearing in the August 10, 1979 Issue 9-15.

The 4016-1 had used two types of fuseholders, a low profile 204-0832-00 for the Display, and a high profile 204-0833-00 for the pedistal.

The previous article as well as modification #33774 did not call out that the pedistals high profile fuseholder is changing to a low profile fuseholder 204-0832-00 identical to the Display.

Addition: Revision #5 to Modification #33774 now states this change.

Replacing the pedistal fuseholder should only be done on an as needed basis.

--Dennis Painter
63/503, ext. 3597

4025: VIDEO OUT HAS INCORRECT BLANKING LEVEL

Reference: 4024/25 Service Manual Vol. 2 P/N 070-2831-00
Delux Display Controller Circuit Board P/N 670-5058-04
Mod #M38615

Instruments with serial numbers B043704 and below were shipped without this Mod.

The Mod to the Delux Display Controller Circuit Board correct for the blanking level being to high at the video output (BNC connector). The incorrect blanking level will give the appearance of the background being brighter than the user portion of the external monitor.

DELUX DISPLAY CONTROLLER BOARD MOD:

Replace R79 (130Ω) with an 82Ω P/N 315-0820-00. The Delux Display Controller changes from a 670-5058-03 to a 670-5058-04.

-- Marty DeVall
63/503, ext. 3927

4027: BAD LOT DATES ON HIGH VOLTAGE TRIPLER

The high voltage tripler P/N 152-0712-00 with lot dates 7847 and 7848 has been found to be defective. No instruments have been shipped with the defective parts. Please check all stock areas for these two lot dates and return to Beaverton at delivery station 70-899.

--Marty DeVall
63-503, Ext. 3927

4027: MECHANICAL CLEARANCE MAY CAUSE 5V SUPPLY TO CURRENT LIMIT

Reference: 4027 Service Manual Vol. 2 P/N 070-2832-00
4027 Power Supply Board P/N 670-5651-01

Minimum mechanical clearance of the right side of L251 between the back of the Power Supply Circuit Board and the stud mounted to the Power Supply chassis may cause the 5V supply current to limit, thus resulting in the terminal displaying a "RESET" message. The Power Supply Board being slightly warped or the soldered lead of L251 projecting out too far from the back side of the circuit board will make this condition worse.

The Power Supply Board will be relayed out to correct for this condition. If this condition is suspected in existing instruments you can correct it by; shortening the lead of L251 on the back side of board, and place insulating tape on stud mounted to chassis adjacent to L251.

--Marty DeVall
63-503, Ext. 3927

4052/54 DIAGNOSTIC ROMPAK (067-0900-00) FIRMWARE UPGRADE

The 4052/54 Diagnostic ROMPAK has been upgraded to Version 1.4. This upgrade is needed in order to check instruments with Version 4.1 and above firmware, and adds the ability to check 4054 Option 30 memory.

The mod consists of replacing PROMs U101 and U111. The two new PROMs can now be ordered, the part numbers are 160-0381-01 and 160-0382-01, and are direct replacements for the exising parts.

U101 goes from a 160-0381-00 to a 160-0381-01
U111 goes from a 160-0382-00 to a 160-0382-01

The circuit card goes from a 670-6124-01 to a 670-6124-02.

(continued on the following page)

4052/54 DIAGNOSTIC ROMPAK (067-0900-00) FIRMWARE UPGRADE (CONTINUED)

The new CRC for the ROMPAK (one CRC for both PROMs) is D4B6, make the appropriate changes in the 067-0900-00 Diagnostic ROMPAK Manual - P/N 061-1990-00.

"FOR U.S. ONLY"

The old PROMs can be returned for credit, use the Interplant Packing Slip (Figure 1), fill out the "FROM" section but do not fill out the "TO" section. Return the old PROMs to Factory Service 93/186, ATTN: Thelma Bergerson.

000-0793-00

INTERPLANT PACKING SLIP

INTERPLANT PACKING SLIP DO NOT FILL IN

MOVE TO DEL. ADDRESS	RECEIVED BY	EXT.	TRANSACTION CODE		RESPONSIBILITY NO.	CC	ACCT. NO.
93/186				TO			
SENT FROM DEL. ADDRESS	PREPARED BY	EXT.	IDENTITY NUMBER		RESPONSIBILITY NO.	CC	ACCT. NO.
XX-XXX	XXXXXX	XXXX		FROM	XXXX	XX	XXXX

614514

DATE

✓	ITEM NUMBER	UNIT OF MEASURE	QUANTITY	OPERATION SEQUENCE	REMARKS	COMPLETED ORDER	FOR MATERIAL CONTROL USE: STORAGE LOCATION	FOR MATERIAL CONTROL USE: QUANTITY "HOT"
	160-0381-00	ea.	1.0					
	160-0382-00	ea.	1.0					

Figure 1

--Frank Lees
63/503, ext. 3929

4054 GPIB ERROR

Two different instances of GPIB error have been observed in the field on the 4054 Graphics System. The problem in both cases was the same, DIO3 and DIO4 of J106 were switched. The location of these two wires are in positions 3 and 4 of J106, on the I/O Board. The color code for each wire is DIO3 - 9-3, DIO4 - 9-4.

If there are any problems with the GPIB on a 4054 please check these wires. There has been a test implemented in Manufacturing to catch this error.

--Darrell McGiverin
63/503, ext. 3786

4054 OPTION 30

There has been a problem found in the 4054 Option 30. There are three obvious symptoms.

1. There may be no cursor. The instrument will function properly, you will be able to change character size and write on the screen.
2. When the cursor is all the way on the left margin of the screen, the cursor is not complete. The left portion of the cursor is missing. As the cursor is moved from the left margin towards the right margin the cursor will become completed.
3. When a FULL PAGE occurs the FULL PAGE is written in Char size 2, no matter what character size you have commanded, and also the F on FULL PAGE is partially missing.

EXAMPLE: -ULL PAGE

The only time these three problems have been found to occur is when a large percentage of the Option 30 memory is used. To get a completed cursor and FULL PAGE, there are three commands that will cause the cursor and FULL PAGE to come back.

1. INIT
2. Delete All
3. Char size

There is no modifications at this time for these problems, but the causes of the problems have been identified, and a solution is being worked on.

--Darrell McGiverin
63/503, ext. 3786

4054 OPTION 30 - MEMORY TESTING WITH THE DIAGNOSTIC ROMPAK (067-0900-00)

To use the 4052/54 Diagnostic ROMPAK to check 4054 Option 30 memory, install and enable the Diagnostic ROMPAK and perform the following steps: (The ROMPAK must be Version 1.4 or above)

1. Set The ROMPAK switches as follows
   SW1-ON
   SW2-ON
   SW3-ON
   SW4-OFF

2. Depress the "RESTART" button on the ROMPAK, the Option 30 RAM will be checked - the approximate time for one pass is 5 seconds.

3. Indications for completion/or failure of the test are as follows:

   a. If no Option 30 is installed or if the first byte of Option 30 memory is bad then the text "OPTION NOT INSTALLED" will appear on the CRT.
   b. If the 32K of memory is checked and no errors are found the text "ERR AT: 8000 BAD BITS: XX" will appear on the CRT. The BAD BITS in this case are of no significance.
   c. The first memory error encountered causes the following text to be displayed on the CRT:
      "ERR AT: AAAA BAD BITS: BB" where:
      AAAA = the error address in hexadecimal
      BB = the bad bit indication in hexadecimal - 1 = ERROR BIT, 0 = Correct bit.

The following chart is used to determine which Option 30 memory IC is bad.

OPTION 30 MEMORY MAP

	BIT	MSB 7	6	5	4	3	2	1	LSB 0
ADDRESS	0000 - 3FFF	U155	U160	U165	U170	U175	U180	U185	U190
	4000 - 7FFF	U255	U260	U265	U270	U275	U280	U285	U290

NOTE

Option 30 schematics use the convention of bit 0 being the most significant bit (MSB), rather than bit 7.

Figure 1

4054 OPTION 30 - MEMORY TESTING WITH THE DIAGNOSTIC ROMPAK (067-0900-00)CONTINUED

Example: The memory test is run and the following message appears on the CRT.

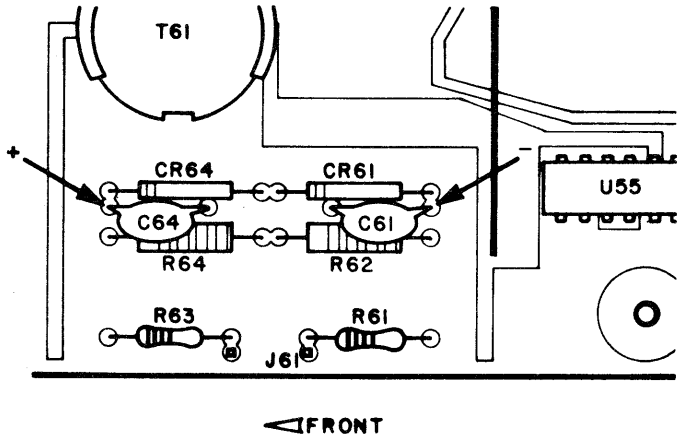
ERR at: 23DF BAD BITS: 24

1. Convert the HEX 24 to Binary = 0010 0100
2. Address 23DF Falls between 0000 and 3FFF (Figure 1)
3. Comparing the BAD BITS (binary) indication to the chart (Figure 1) indicates that U165 and U180 are bad.

--Frank Lees
63/503, ext. 3929

4662 MEASURING THE PLATEN ELECTROSTATIC 880 VDC

When measuring the Electrostatic Platen hold-down voltage of 880 VDC (± 10%) it is necessary to take into consideration the input impedance of your voltmeter. An example is the DM501 or the DM502. Both have an input impedance of 10MΩ which is low compared to the platen if measured at J61 of the plotter board, hence it places a load on the 880V Electrostatic supply. The resultant reading of a good supply is between the high 600's VDC and the low 700's VDC. To obtain a more accurate reading place the volt meters positive lead on the component lead of C64 as illustrated below (+), and place the negative lead on the component lead of C61 as illustrated below (-). This connects the volt meter before the two load resistors, which helps to remove the previously described loading effect, and allows for a true reading of your 880V supply.



--Larry North
63/503, ext. 3926

4663 NEW "B" PROCESSOR BOARD

The 4663 starting at B020545 is shipped with a new Processor Board 670-6420-00, that is downward compatible. The old board 670-5121-XX, is not upward compatible. If a plotter has the new board installed, the old board can not be used as an acceptable direct replacement. The new board can and should be used as the direct replacement for the old Processor Board. There is not a Service Update Program to replace the old processor boards with the new processor boards. The new boards will be shipped as an Exchange Item for all 670-5121-XX's returned prior to April 1981, at which time the old board will no longer be accepted for exchange.

The main improvement to the Processor Board is that the Motorola MC6800 microprocessor has been replaced with the MC68B00 microprocessor, resulting in a 20-30% improvement in throughput speed. The new processor boards' configuration is identical to the old, so the firmware, options, and interrupt strap locations are the same.

Even though a 20-30% throughput improvement doesn't sound like much, it is enough to make a noticable reduction in the physical reaction time of the 4663.

--Larry North
63-503, Ext. 3926

4663 ROM SHORTAGE: FOR U.S. ONLY

There is currently a supply shortage of 4663 system ROM's from the vendor. The ROM's on shortage at this time are system ROM 5, and system ROM 6. Manufacturing is currently shipping the 4663 with the ROM Overlay Board which has the appropriate substitute PROMs installed.

NAME	PART NUMBER	U#	CKT. BOARD
ROM 5	160-0239-00	291	Processor
	SUBSTITUTE REPLACEMENT:		
PROM5H	160-0298-00	535	ROM Overlay
PROM5L	160-0297-00	540	ROM Overlay
ROM 6	160-0240-00	171	Processor
	SUBSTITUTE REPLACEMENT:		
PROM6H	160-0296-00	465	ROM Overlay
PROM6L	160-0295-00	470	ROM Overlay

(continued on the following page)

4663 ROM SHORTAGE: FOR U.S. ONLY (CONTINUED)

Board Exchange is required to send out a complete set of firmware with each processor board. In order for Board Exchange to be able to continue supplying serviceable spares it is necessary to return along with the Processor Board it's associated ROM Overlay Board.

NOTE: The purpose of the ROM Overlay Board is to facilitate the use of PROMs during ROM shortages.

Board Exchange urgently needs any ROM Overlay Boards that are not presently installed in an instrument, with the possible exception of the one in the 4663 Service Kit. Please send spares to Board Exchange, Atten· Mike Meyer.

The ROM Overlay Board is not an accountable item and when returned by itself or with a Processor Board it does not result in any special exchange credit. Neither does Board Exchange charge anything for it, as it should, when used, be considered part of the Processor Board

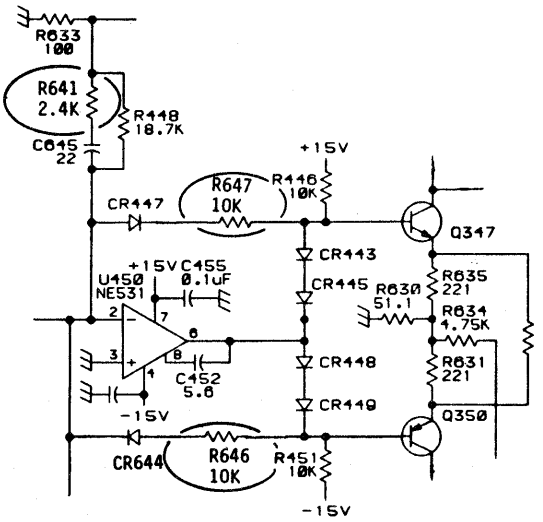
--Larry North
63/503, ext. 3926

4633A MOD JE: MAINBOARD DEFLECTION AMPLIFIER CHANGE

The 4633A Mod JE x-axis deflection amplifier has been known to break into a one megahertz (1 MHZ) sawtooth oscillation. The tendency to oscillate has been best displayed when the CRT trace is not centered on the faceplate. The cause of oscillation lies in the fact that during retrace, when either CR447 or CR644 are on, the feedback is unity. U450, however, is not compensated for unity feedback.

To prevent this oscillation, 10KΩ resistors are installed in series with CR447 and CR644 to attenuate feedback during retrace. In addition, R641 is changed in value from 15KΩ to 2.4KΩ (see schematic).

CIRCUIT NUMBER	OLD VALUE	NEW VALUE	NEW PART NUMBER
R641	15K	2.4K	315-0242-00
R646	-	10K	315-0103-00
R647	-	10K	315-0103-00



Installation of this modification causes the mainboard part number to change from CM670-6394-00 to CM670-6394-01.

NOTE: The CM670-6394-00/01 circuit board is a custom modified part. Contact OEM Modified Products (extension 3793 or delivery station 63/516) for price, availability or Modified Products Quote number.

--George Kusiowski
63/503, ext. 3928

4633A MOD JE: VIDEO ASSEMBLY CHANGE

The video assembly used in the 4633A Mod JE is being modified to enhance the instrument's performance. Among the improvements in the new video assembly are:

- a decrease in the sensitivity of the DENSITY control
- removal of the interaction between DENSITY and CONTRAST controls
- modification of the AGC circuitry to track with sweep speed
- a limit on the AGC adjustment to prevent polarity reversal.

The modification is extensive and calls for a new layout of the circuit board. For these reasons, no field modification or update is to be done. This article is for your information only.

Per this modification, the part number of the video assembly changes from CM 672-0853-00 to CM 672-0853-01. This is a custom modified part and any questions regarding price or availability should be refered to OEM Modified Products, extension #3793 or delivery station 63/516.

--George Kusiowski
63/503, ext. 3928

LDP (MDL) SYSTEMS

EMULATOR PROBE TIP ASSEMBLY PART NUMBERS

The following is a list of part numbers for prototype control probe braided cables with the probe tip assemblies (Fig. 1). Each assembly part number is listed by the respective microprocessor it supports. Most of the assemblies were involved in a modification, so part numbers in the appropriate service manuals are incorrect. All of the following part numbers are currently set up in customer service.

8080	175-2466-01
6800	175-2467-01
Z80	175-2151-01
9900	175-2153-02
8085	175-2152-01
3870	175-2152-01
F8	175-2247-00
1802	175-2708-00
8048	175-2710-01
8021	175-2709-01

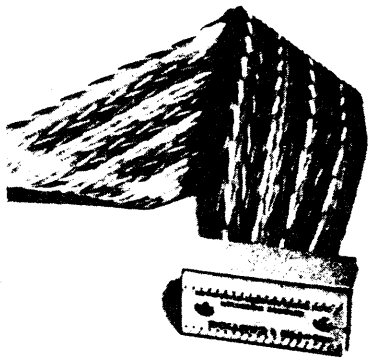


Fig. 1

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

NEW VERSION 3.0 EDITOR BEING SHIPPED

All current software options being shipped to customers will contain a new editor (Version 3.0).

Customers will receive, in addition to the normal software package, another disc and manual for the V3.0 editor. The customer will then install the new editor on his TEKDOS V3.1 Disc, over writing the existing editor with the new V3.0

Customers with V3.1 TEKDOS prior to the new editor shipping date can order the new editor disc and manual from customer service under part number 062-4598-01. The part number for just the manual is 070-3441-00 and just the reference card is 070-3442-00.

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

1802 WAIT STATES

Wait States are required with the 1802 emulator when the processor access speed exceeds the set up time of the 8001 or 8002A program memory. This condition will occur in mode 1 mapping program memory with a user clock frequency greater than 5.8 MHz. Note: the latest RCA specifications on the CDP1802 and CDP1802C, Printed 6-79, specify a maximum clock input frequency of 5 MHz with a Vcc and Vdd of 10 volts. This specification was revised from an earlier specification of 6.4 MHz, Printed 2-78, with Vcc and Vdd equal to 10 volts. If the recommended maximum clock input frequency of 5 MHz is used, no wait states are necessary.

There are five switches on S3170 that are used. The three switches S3170 6, 7, and 8 are not used. The switches and their functions are described below.

S3170-1 It is recommended that S1 always be in the ON position. In the ON position S1 enables circuitry that will reset the command byte 1.5 seconds after being paused. This will occur if the emulator Processor does not relinquish the system bus before the time out occurs.

NOTE: The system will hang on the program side requiring that the operator reboot the system to regain control if the following conditions exist. S3170-1 is in the OFF position, the 1802 Emulator is executing an IDLE instruction and there is not a Real Time Prototype Analyzer installed in the system.

(continued on the following page)

S3170-2 In the OFF position and in the debug mode, wait states will be inserted when a break point is set or during a trace all. This option has been included for future upgrading of the emulator and is not used at this time. The switch S3170-2 should be in the ON position.

S3170-3 In the OFF position wait states will be inserted during program memory accesses in modes Ø and 1. No wait states will be added when in mode 1 mapping prototype memory or in mode 2. No wait states are inserted when S3170-3 is in the ON position.

S3170-4,5 When the wait generator is enabled by S3170-2 or S3170-3 the switches S3170-4 and S3170-5 will select the desired number of wait states. When no wait states are generated both S3170-4 and S3170-5 should be in the ON position. The following chart shows the number of wait states generated by the different switch positions of S3170-4 and S-3170-5.

S-3170-4	S3170-5	Number of wait states
OFF	OFF	One wait state generated
OFF	ON	Two wait states generated
ON	OFF	Three wait states generated
ON	ON	Four wait states generated

S3170-6, 7, 8 Not used

Now that the functions of all the switches on S3170 have been described the switches that are currently used will be discussed.

At the present time only three of the switches on S3170 are used, these are S3170-3, 4, and 5. The switches S3170-3, 4 and 5 will be either all ON or all OFF. In the ON position no wait states will be generated. In the OFF position one wait state will be generated for each 8001 or 8002A program memory access. The wait states are only necessary if the prototype clock is above 5.8 MHz. The switches S3170-1, 2, 6, 7 and 8 should always be in the ON position.

(continued on the following page)

1802 WAIT STATES (CONTINUED)

In the two following tables the switch selections currently used will be shown and a table showing when wait states are inserted.

Switch Settings								Description
1	2	3	4	5	6	7	8	
ON	ON	ON	ON	ON	ON	ON	ON	No wait states added
ON	ON	OFF	OFF	OFF	ON	ON	ON	1 wait state for each program memory access

Wait states added by the 1802 emulator processor during program memory reference operations when S3170-3, 4 and 5 are in the OFF position will be described in the following table.

8001/8002A µProcessor Lab System Operation Status		Number of wait states added
Mode Ø	All operations	1
Mode 1	Program Memory Used	1
	Prototype Memory used	Ø
Mode 2	All operations	Ø

To summarize, one wait state must be added to program memory reference operations only if the prototype clock exceeds 5.8 MHz. Otherwise, no wait states need to be added. The switch to add wait states when the Debug Sequencer is on is not used at this time and should remain in the "ON" position.

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

S-3200 SYSTEMS: CONSOLE TERMINAL HANGS UP

DL11-W TERM/CLOCK INTERFACE (DIGITAL EQUIPMENT)

Problem

Drops INTR ENABLE (Rec and Xmit) caused by Rom E34. The Rom output is always enabled, thus the address lines on the Rom Change with the unibus address lines, causing spikes to appear on the output of the Rom.

The spike on Pin 3, E34, RCSR CLK ENB L on DL-7 gets anded with MSYNL on Pins 11 and 12 of E23 (DL-4), result is DL-4 RCSR CLK H. This signal clocks the RCVR ENTR F/F ON DL-1 E37 Pin 3, being there is no data on Pin 6 at the time, the F/F gets cleared, dropping the enable.

Remedy (D.E.C. method)

Either change Rom E34 to one that does not have a noisy output or install the following mod: (All new DL11-W's coming out of D.E.C. will have this mod.)

1. Remove E31,
2. Side 2 E31-7,8 cut run
3. Side 1 E31-9,8 cut run
4. Side 1 E31-9 to E32-7 cut run
5. Add wire from E32-8 to E31-9
6. Add green wire from E31-7 to E31-9
7. Reinstall E31

Request Digital Equipment service organization to provide installation of modification.

See following schematics and diagrams.

Tek Preferred Method

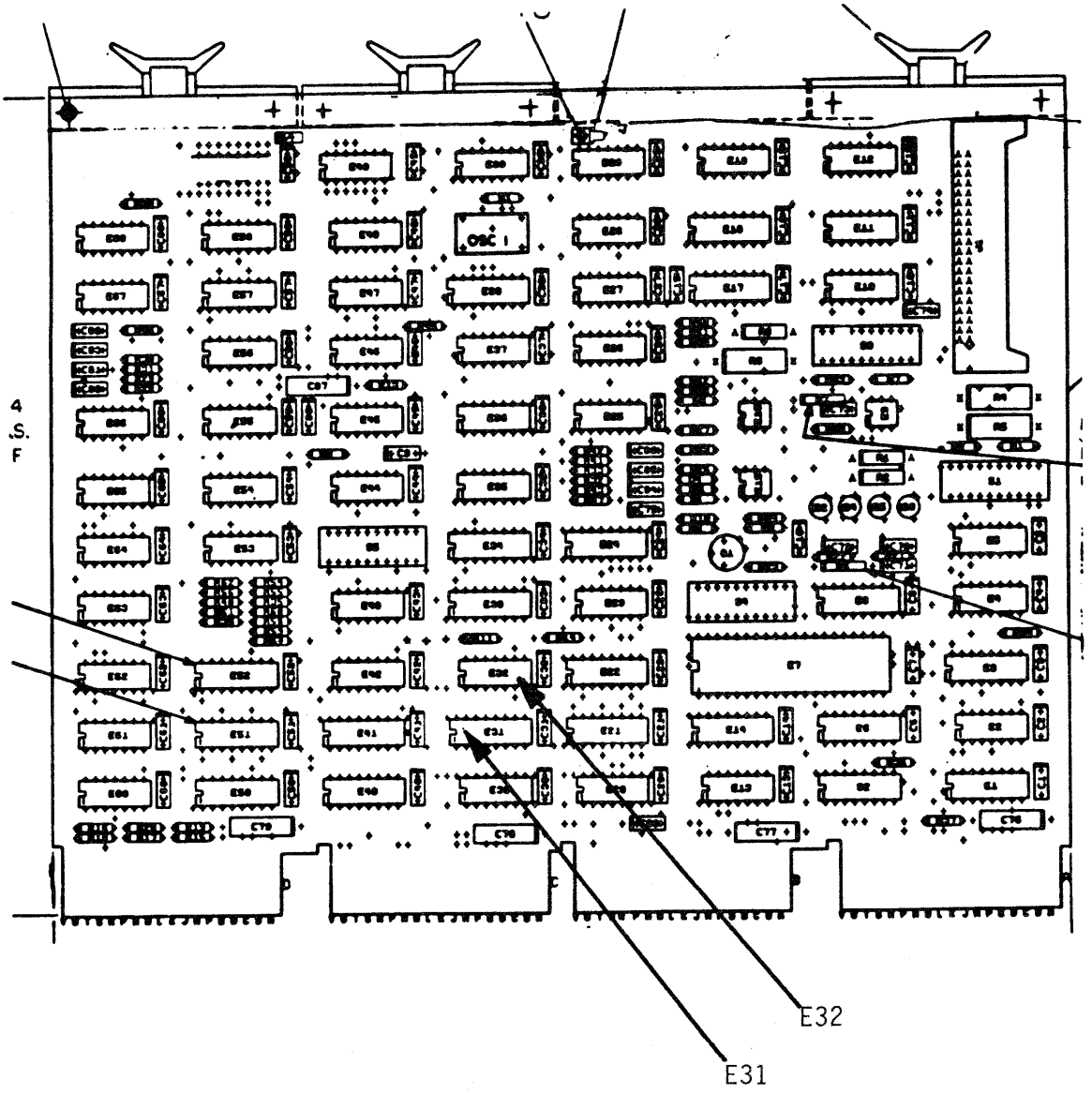
Due to the confusion experienced with D.E.C. method, the following procedure is recommended.

1. Side 1, Lift legs 7 and 9 of E31
2. Connect legs 7 and 9 of E31 to leg 8 of E32 using small insulated wire.

(continued on the following page)

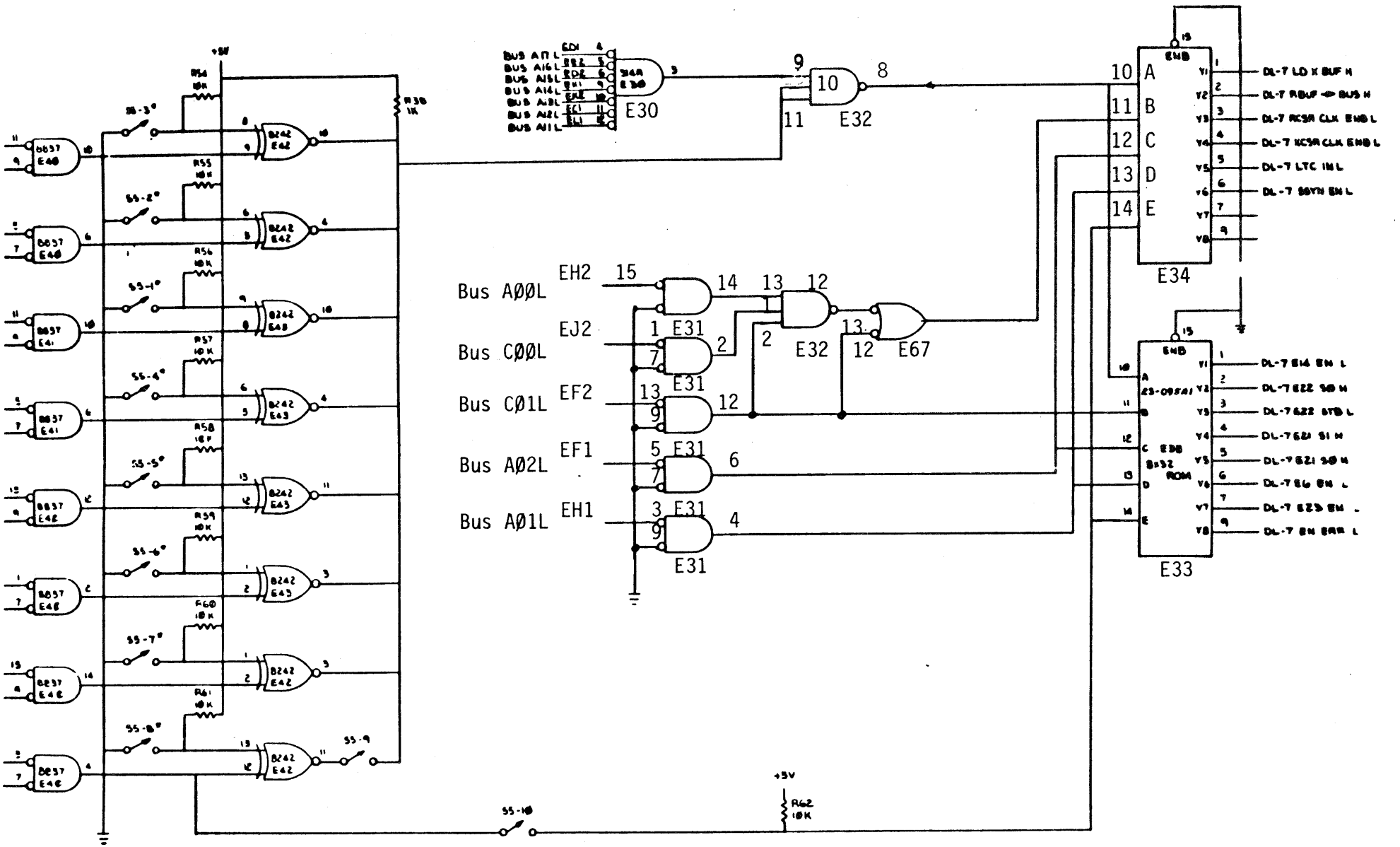
Submitted by--
Dave Beliveau
MSD Computer Support

Inserted by--
Ron Lang
94-816, Ext. 1015
April 4, 1980
Issue 10-7

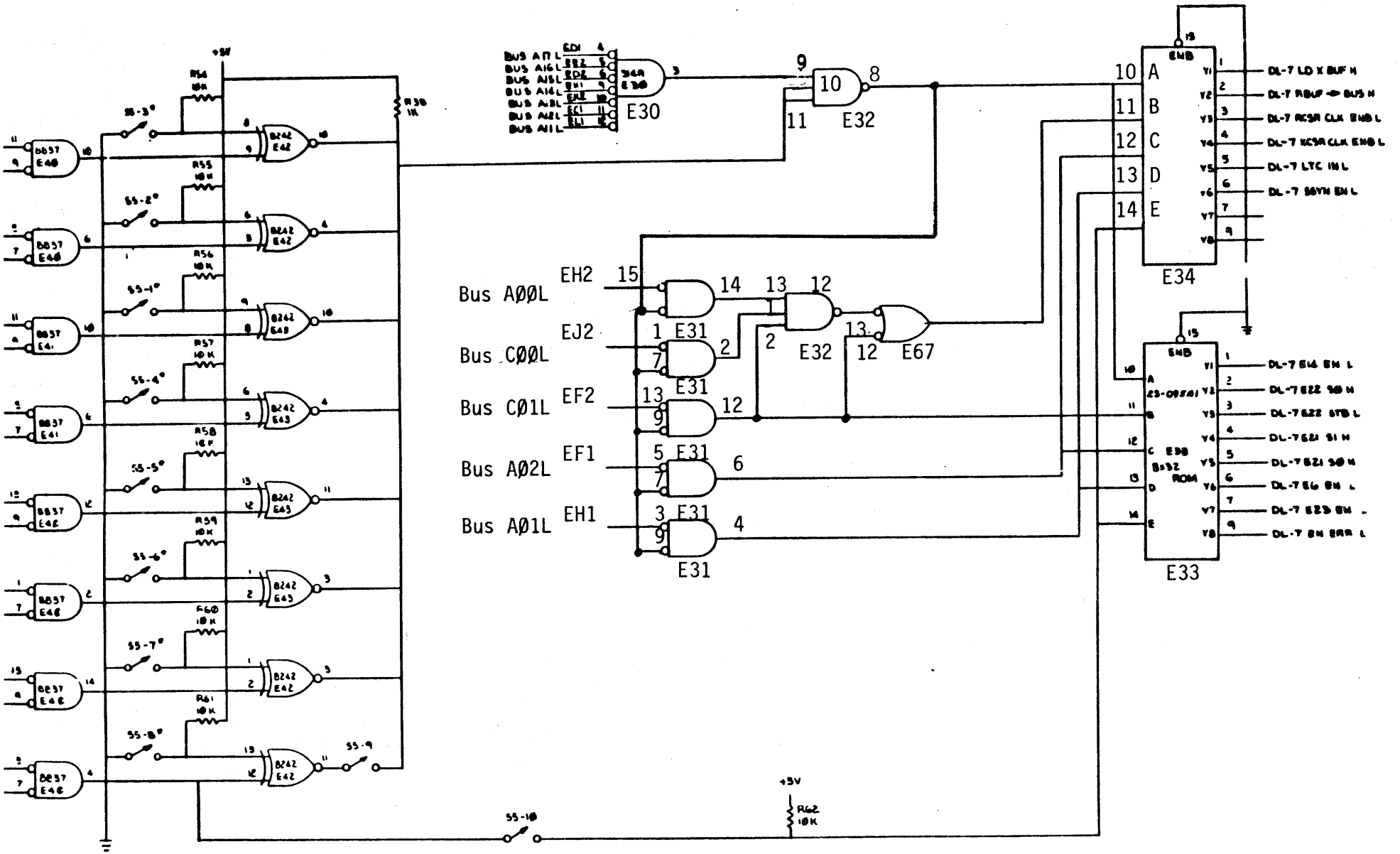


(continued on the following page)

BEFORE


Bus AØØL
Bus CØØL
Bus CØ1L
Bus AØ2L
Bus AØ1L
EH2
EJ2
EF2
EF1
EH1
E30
E31
E32
E33
E34
E67
+5V

AFTER



(continued)

S3200: SOFTWARE, 3 OPERAND IF STATEMENT, DKARY.FNC

The use of "FTARY" in the 3 operand IF statement caused intermittent bad branches, i.e. IF(FTARY FTARY FTARY)x,y,z.

SOLUTION:

The error was found to occur when block boundaries on the disk were spanned. This problem stemmed from the method used for the return of the values retrieved by FTARY to the main TEKTEST "IF" routine. The alternate method of return of value from a function was incorporated into the program and the problem was found not to occur. (Refer to page 2-25 of Systems Programmers Reference Manual, 062-3411-00, for alternate method of return).

The proper version which executes without problems between "FTARY" and "IF" is Version 2.25.

Submitted by--
Dave Suryan
Product Engineering

Inserted by--
Ron Lang
94-816, Ext. 1015

S-3200: SYSTEM SPARES COMPATIBILITY

The S-3270 Delta "T" Output Board, 670-2409-01, was ordered as a spare for a system which has the High Performance Option (HPO). This board was found not to be compatible by the customer for use in his system.

Solution:

The correct Delta "T" Output Board is 670-2409-02 for systems with HPO. The correct Delta "T" assembly is 672-0585-01.

Comment:

The ordering of spares packages for S-3200 Series Systems or instruments using the 020-XXXX-XX part numbers is not recommended unless the system has the current board or parts revision levels contained in the spares package.

All spares packages contain only the latest revision level of parts. The part number for a spares package will not reflect a change in a circuit board or a part revision level change. A revision level change of a circuit board which is not a direct replacement will list only the latest revision, resulting in a board which will not run in a system that may require the lower revision level only.

It is recommended that purchase of spares or replacement parts for a system should be done at the board or component level that is in the system for which the part is intended.

Ordering of parts at the present customer's system revision levels will provide the customer with a direct replaceable part or a part with a later revision level which is a direct replacement.

--Ron Lang
94-816, Ext. 1015

S-3200: S-3280 SYSTEM VERDICT SUMMARY

The following is a list of the latest S-3280 standard verdict software available as of 11 March 1980. The second list is not included in the standard S-3280 software package and are optional files.

List description:

Example: FØØØ TSTSRT.EDT 4309023200 11 MAR 80

1. FØØØ.TST Translated Edit File
2. TSTSRT.EDT Edit File Name
3. 4309023200 New Version Number
   A B C
   A. Edit File Number (4309)
   B. Revision Level (02)
   C. System Designation
      Example: (3200) All S-3200 Systems
               (3280) S-3280 Systems only
               (7080) D70,D80 Sector Cards
4. 11 MAR 80 Date of last version change

(continued on the following page)

STANDARD S-3280 VERDICT

TEST	EDIT FILE	VERSION NO.	DATE
FØØØ	TSTSRT.EDT	4309023200	11 MAR 80
FØ1Ø	TIC.EDT	4306013200	11 MAR 80
FØ2Ø	DCSUB.EDT	4288017080	11 MAR 80
FØ3Ø	POWER.EDT	4303017080	11 MAR 80
FØ4Ø	T114OA.EDT	4474003280	11 MAR 80
FØ5Ø	T1S1.EDT	4475003280	11 MAR 80
FØ6Ø	MATRIX.EDT	4476003280	11 MAR 80
FØ7Ø	DRIVSH.EDT	4477003280	11 MAR 80
FØ8Ø	CYCLE.EDT	4478003280	11 MAR 80
FØ85	PHASE.EDT	4479003280	11 MAR 80
FØ87	PHASCK.EDT	4374017080	11 MAR 80
FØ9Ø	DELTAT.EDT	4495003280	11 MAR 80
F1ØØ	COMPAR.EDT	4481003280	11 MAR 80
F11Ø	REEDS.EDT	4496003280	11 MAR 80
F115	OVRDRV.EDT	4492003280	11 MAR 80
F12Ø	FUNDMA.EDT	4483003280	11 MAR 80
F14Ø	GATSKW.EDT	4484003200	11 MAR 80
F15Ø	FUN1M.EDT	4485003280	11 MAR 80
F16Ø	FUN2OM.EDT	4486003280	11 MAR 80
F165	SHIFT.EDT	4367017080	11 MAR 80
F176	F1CM4.EDT	4487013280	11 MAR 80
F177	SAVDAT.EDT	4305017080	11 MAR 80
F178	PRLCH1.EDT	4302017080	11 MAR 80
F179	PLLMD2.EDT	4301017080	11 MAR 80
F18Ø	CHNTST.EDT	4488003280	11 MAR 80
F184	ALTER.EDT	4489003280	11 MAR 80
F19Ø	DRIVMD.EDT	4499003280	11 MAR 80
F195	VRNIER.EDT	4491003280	11 MAR 80
F29Ø	AUXPWR.EDT	4282023200	11 MAR 80
F99Ø	TSTEND.EDT	4308023200	11 MAR 80

OPTIONAL TESTS: S-3280

TEST	EDIT FILE	VERSION NO.	DATE
F2ØØ	PRAMV1.EDT	V01.03	30 JAN 80
F21Ø	VMOD2O.EDT	3280	21 AUG 79
F215	VMOD21.EDT	3280	21 AUG 79
F230	VMOD23.EDT	3280	21 AUG 79
F235	VMOD24.EDT	3280	21 AUG 79
F25Ø	T2942A.EDT	PAP128	27 MAR 79
F26Ø	T2942B.EDT	3280	26 JUL 79
F265	T2942C.EDT	V01.00	16 AUG 79

--Ron Lang
94-816, Ext. 1015

ADMINISTRATIVE SUPPORT

SERVICE RECORD PROCEDURES

You have probably already noted that the new service records do not have the FAILURE CODES printed on the reverse side.

Failure codes are reviewed and revised more frequently than the service record. Changing the service record each time the failure codes change is prohibitively expensive.

Failure code listings to be used in service record reporting will be printed in Wizard's Workshop on a periodic basis as a pull-out section.

--Bill Duerden
53-027, Ext. 8938 Merlo

FAILURE INFORMATION CODE GUIDE

The first digit of the three number under "F" code stands for:

1XX Component problem from the field
2XX CRT problem
3XX Exchange boards
4XX Cycle room failure
5XX Predelivery inspection
6XX Production test failure report
7XX General Maintenance
8XX Secondary failure
9XX Workmanship related failure

The second and third digit are as follows:

01 Adjustments, tweaks
02 Mechanical fitness; holes don't line up,etc.
03 Not compatible as a package, general won't work comments
04 Socket problem (resin, connection (xistor or peltola)
05 Lead out of socket
06 Not connected, unconnected
07 Tin bridge
08 Parts swapped
09 Solder bridge
10 Unsoldered, never soldered
11 Solder problem, cold solder, resin joint
12 Loose part (loose knob, floating hardware)
13 Appearance
14 Wiring error
15 Foreign material
16 Electronic clearance
17 Wrong part
18 Missing part
19 CRT neck pin problems
20 Mechanical assembly problems
21 Workmanship marked but not defined
22 Square pin connector problems
23 Mechanical connection
24 Marked wrong
25 Pinched wires
26 Manual error
27 Electrical connection
28 Mechanical failure (knobs, couplings,etc.)
29 Switch contact problems (plating,poor contact)
30 Insulation problems, mainly transformer
31 Parts reversed
32 Dirty
33 Long End
34 Recal
35 Corrosion, cleaning required
36 Binding
37 Switch, broken contact
38 Switch, contacts not making when actuated
39 Switch, wrong logic
40 Communication problems
41 Shipping damage
42 Customer abuse
43 Worn Part
44 Damage, mechanical
45 BNC connector problems
46 Damage, general
47 Media defects
48 Mica washer problems
49 Circuit board run problems
50 Plating defect on Ckt. board
51 Preventive maintenance
52 Burned
53 Defective mod installed
54 Installation
55 Replaced per Beaverton instruction
56 Software
57 Returned for evaluation
58 Glass reuse, salvage
59 Problem cleared itself
60 No problem found
61 Open
62 Shorted
63 Intermittent
64 Operational
65 Unknown
66 Out of tolerance
67 Noisy
68 Temperature sensitive
69 Drifting
70 Leakage
71 Arcing
72 Oscillates
73 Jitter
74 Defective
75 Dead
76 No output
77 Destroyed (no other info given)
78 Catastrophic failure
79 Writing failure
80 Gassy
81 G-K short
82 Double peaking
83 Low intensity
84 Mesh defects
85 Geometry
86 Halo
87 Phosphor burned
88 Phosphor damage
89 Phosphor defect
90 Faceplate damage
91 Storage defect
92 Focus
93 Socket, CRT
94 Filament open
95 Broken
96 Broken wire, or lead
97 Cracked
98 Lead too short
99 Hard copy noise