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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DATA COMMUNICATIONS

Editor's Corner

by

Sharon Huetson

Hello,

Let me introduce our new "MR. WIZARD". Now before you panic I want you to know he will not replace our present <u>mean</u> looking Wizard. His purpose will be to occasionally perk up an edition or emphasize a point.

"Mr. Wizard" was drawn for us by Maynard Leach in Creative Graphics - Wilsonville. I think he did a great job and we appreciate his efforts and creative ability.

A special greeting to all our associates in Sony Tek. We hope our editions of

魔術師講習会 are meeting your needs.

Sharon

PERSONNEL CHANGES

NEW HIRES

DAVID CRITTON - Seattle

Dave has accepted the position as Service Center Supervisor in Seattle and will report to Steve Lynch.

Daves comes to Tek with two years experience as a Production/Service Supervisor at Sequoia Turner and eight years experience with Radar Tracking Systems in the U.S. Navy.

Welcome to Tektronix and the Santa Clara team Dave. We wish you success in your new position.

****

ROBERT FUNK - Woodbridge

Bob joins Tek bringing years of experience in electronics. Most recently he was with AKAI America Ltd., servicing consumer products. Bob is single and enjoys music, flying and horseback riding. Welcome Bob!

****

CHARLES DA SILVA - Woodbridge

Chuck comes to Tek with seven years experience in electronics. Most recently he worked on the weapons control systems for Lockheed. Chuck is married and shortly expects an addition to his family. His hobbies include stamp collecting when he is not in school working towards his Associates degree. Welcome Chuck!

****

TRANSFERS AND PROMOTIONS

ANDY SPENCE - Seattle

Ansy has assumed the Field Service Supervisor responsibility for Seattle IDD and System Products. Best wishes in your new position Andy!

****

DAVE JONES - Santa Clara

Dave has accepted a position as Service Center Supervisor in Santa Clara. He will assume responsibility for a section of the Santa Clara T&M operation and will report to Harry Turnbull. Prior to coming to Santa Clara, Dave was with Tek in Rockville. He transferred to Santa Clara as an ET III. His previous experience has included a diverse background from owning his own home entertainment business to instructing at National Radio Institute. Congratulations and best of luck in your new position Dave!

****

--Editor

ANTI-STATIC MATERIALS REMINDER

Initially the need for electrostatic protective work surfaces was met with skepticism and strained budgets. But with the newer products containing microprocessors, EROM's, RAM's, registers, etc., there should be no doubt in any properly educated technician, engineer or manager that an electrostatic discharge of such a low level that it can't be felt by a human can permanently damage these components. As such, this article was written to convey information on the newest anti-static materials and equipment available and not to parade the need for such things any longer.

Tektronix has used anti-static mats for nearly a decade and in that time has tested and used many different materials. Following are 3 well known mats and one new one:

1. Pink Poly
2. Black Poly
3. Black Plastic (3M Velostat)
4. Static Control (3M)

The resulting deficiency in items 1, 2 and 3 is premature wear, which through normal use may cause the mat to change from a static eliminator to a static generator. This is because the base material is polyethylene which is an excellent static generator of which most of us are familiar.

Item 4, above, is highly recommended because of its durability and comfort. The mat is layered to provide a high impedance conductive top layer and a foam bottom layer sandwiching a highly conductive scrim that gives this mat its tensil strength. This mat and a 3M wrist strap are part numbered as follows:

006-3414-00 Mat
006-3415-00 Wrist Strap

The mat comes with a 15 foot ground cord and you can order a replacement cord with part number 006-3416-00.

New storage bags are now orderable from CSG providing static protection and are tough enough to be labeled as reuseable. These bags are manufactured by 3M as their Transparent Static Shielding Bag. Each bag is constructed of an antistatic polyethylene film 1.5 mil thick which is covered externally by a nickel plated polyester layer 1 mil thick. This combination provides high tensile strength, high tear resistance, high puncture resistance, high abrasion resistance, antistatic shielding (10^{12}ohm/cm^2 internal face and 10^4ohm/cm^2 external face, and is heat sealable. The polyester layer is a dielectric shield that greatly reduces the possibility of any static energy touching a circuit board or its component.

(Continued)

Pink poly does not have a dielectric layer to prevent a static discharge from reaching a circuit board. The only protection pink poly provides is that it won't generate static nor allow static energy to remain on a circuit board, but it will not protect a circuit board from an externally generated static discharge. Do not use pink poly as the final covering on sensitive digital circuit boards under any circumstances.

NOTE: These bags are reuseable.

New 3M Bag Size	Tek Part Number
4" x 6"	006-3523-00
5" x 8"	006-3524-00
5" x 10"	006-3525-00
10" x 12"	006-3526-00
12" x 16"	006-3527-00
29" x 18"	006-3528-00

One popular anti-static material can turn an IC into the nemesis of intermittents. That is your conductive foam, manufacturer not-withstanding. All black foam contains carbon which is corrosive to all metals used on IC leads. Use of foam longer than 10 days or in a humidity greater than 85% will corrode enough IC lead plating to cause some type of problem. Order all IC's in conductive circuit rails and store them that way.

The newest addition to Tektronix is a soldering station that will not subject the part being soldered to electrostatic discharge. This is the Weller model WTCPZ. The handpiece contains a zero-voltage switching regulator that switches on the power to the heater when the sinusoidal voltage passes through relative-zero volts. The following part numbers include a solder iron that will convert any WTCPN to a WTCPZ.

PART NUMBER	DESCRIPTION
251-0807-01	Solder, Eutectic, small dia.
003-0955-00	Solder Station, Weller WTCPZ
003-0950-00	Heater for Weller TC201z Iron
003-0948-00	Solder Iron, Replacement for WTCPN & WTCPZ (Will change a WTCPN to a WTCPZ)
003-0947-00	Sponge for WTCPZ Station
003-0945-00	Solder Tip PTA6
003-0916-00	" " PTA7
003-0917-00	" " PTA8
003-0918-00	" " PTC7
003-0920-00	" " PTD8
003-0914-00	" " PTP8
003-0913-00	" " PTF8
003-0915-00	" " PTK8
003-0919-00	" " PTM8
003-0946-00	" " PTR8

ANTI-STATIC MATERIALS REMINDER

TYPE	DESCRIPTION		
	Reach	Tip	
PTA6	5/8"	1/16"	Screwdriver, 600°F
PTA7	5/8"	1/16"	Screwdriver, 700°F
PTA8	5/8"	1/16"	Screwdriver, 800°F
PTC7	5/8"	1/8"	Screwdriver, 700°F
PTD8	3/4"	3/16"	Screwdriver, 800°F
PTP8	5/8"	1/32"	Conical, 800°F
PTF8	5/8"	1/32"	Conical Flat,800°F
PTK8	1"	3/64"	Long Scwdrv.,800°F
PTM8	1"	1/8"	Long Scwdrv.,800°F
PTR8	5/8"	1/16"	Narrow Scdrv,800°F

--Tom Fox
58/511, Ext. 7349

EXTENSION SHAFTS (W-KNOBS)

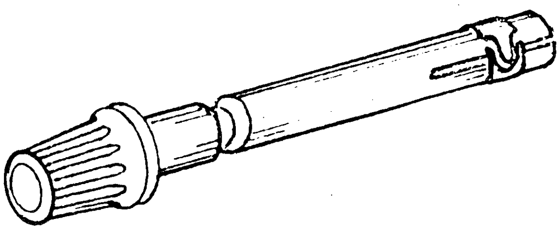
If you have instruments with knobs and shafts molded together, with binding problems here is good news.

The shafts have been slightly modified, to correct the binding problem, and are a direct replacement of the old type. Also, the cost is reduced by half.

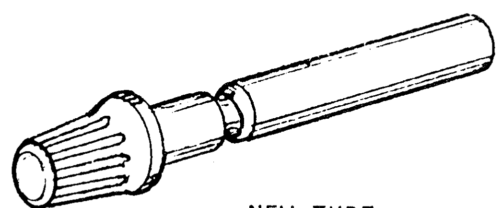
Ample quantities are available, see part numbers listed below when you order. Instruments using these shafts are T900, 442.

Parts redesigned and dash numbers changed:

384-1371-00----becomes 384-1371-05
384-1371-01----becomes 384-1371-06
384-1371-02----becomes 384-1371-07
384-1371-03----becomes 384-1371-08



OLD TYPE



NEW TYPE

Written by--
Harvey Gjesdal

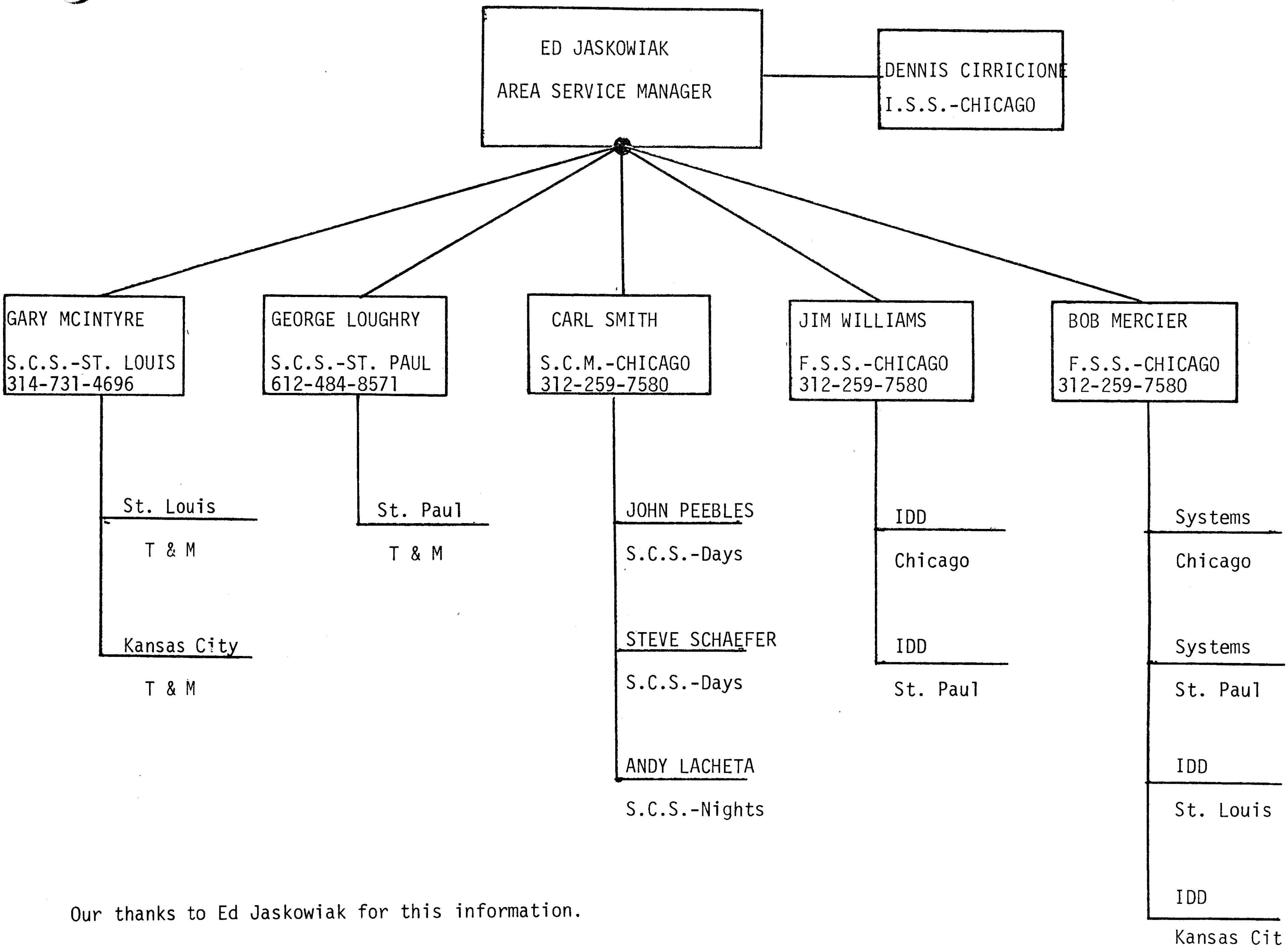
Edited by--
Editor

LOGIC PROBE, 010-6401-01

Tektronix manufactures a small light weight TTL logic probe (P6401). The probe is useable with any logic system that has a threshold level between 0.7 and 2.15 volts. Its uses include quick troubleshooting of digital faults, verification of logic state, firmware testing, and transmission line verification. For more details consult page 44 of the 1981 Tektronix Product Catalog.

--Tom Fox
58/511, Ext. 7349

ANIZATIONAL CHART - CHICAGO AREA



Our thanks to Ed Jaskowiak for this information.

January 30, 1981
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PRODUCT SAFETY PERSONNEL

Personnel that are responsible for answering questions on product safety and liability.

Instruments Category or Location	Individual	Extension	Delivery Station
200	Don Hanson	7728	58-290
300 Sony/Tek	Rich Nute	5032	58-305
400	Don Hanson	7728	58-290
600 Measurement display	Henry Jones	3959	63-419
800	Jim Averill	1632	92-835
2000	Don Hanson	7728	58-219
TM 500	George Clark	1563	92-835
4000	Orv Olson	3231	63-419
	Lynn Holt	3158	63-419
5000	Vaughn Weidel	3106	39-156
7000	Vaughn Weidel	3106	39-156
8000	Bob Epling	1631	92-835
Micro Processing Devlopment Aid	Bob Epling	1631	92 835
TV	Don Hanson	7728	58-290
FDI and Spectrum Analyzer	Don Hanson	7728	58-290
Medical	Henry Jones	3959	63-419
Signal Processing Systems	Vaughn Weidel	3106	39-156

(Continued)

PRODUCT SAFETY PERSONNEL (CONTINUED)

Instruments Category or Location	Individual	Extension	Delivery Station
Bench-Top Semiconductor	Bob Crawford	1633	92-835
Semiconductor Test System	Bob Crawford	1633	92-835
Telequipment Products	Rich Nute	5032	58-305
Scopemobiles	Wally House	7374	58-290
Logic Analyzers	Bob Epling	1631	92-835
Cameras	Wally House	7374	58-290
Probes	Wally House	7374	58-290
Wire and Cable Tek Made	Wally House	7374	58-290
Circuit Board	Wally House	7374	58-290
Grass Valley Group	Heiner Schwede		GVG
International	Bob Randall	5034	58-305
Tek Austrialia	Pete Neech		TAPL
Product Safety Liability Policies and Procedures	Peter Perkins	5036	58-305

Our thanks to Dick Griffin, Product Safety/Technical Support Manager, for this information.

--Editor

SERVICE UPDATE PROGRAMS STATUS

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

Service Update Programs are driven by Service Support for implementing special product modifications which require;

1. Safety Corrections
2. Corrections to meet advertized specifications.

In the U.S., these programs are identified as Activity Code 18. All other modification categories are billable or covered by warranty, maintenance agreement, and rental. The key to determining if a program is free to the customers program is to look for the words "Service Update Program". Also look for kit part numbers 045 or 046. These are the only authorized kits for Service Update Programs. All Service Update Programs are authorized by Service Support management in conjunction with the appropriate business unit.

--Don Taylor
U.S. Service Accounting

(Diagrams continued on the following pages)

Todd Paulus
x7092, 58-511

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

SYSTEMS SERVICE UPDATE PROGRAMS

Wally Karstad
x1285, 92-236

Service Update #	Product/Option	Description	Part Number of Kit	Status	Publication	Comments
--	7912AD	Firmware change	046-0001-00	Complete	10/22/80, 10/31 Wizard	Kits not orderable. Present orders will be filled.
2000	834	Firmware change	045-0018-00	New	SOB 11/18/80	Kits orderable but not available yet.
--	7D01	Board Update Socket	--	Complete	9/80 Wizard	
--	634	High Voltage Mode	--	--	--	Wilsonville
--	851	Ohm Mode	045-0003-00	Active	Wizard	To be closed Jan.81
2002	1803F, 1804, 1805	Safety Mod	--	Active	--	Kits to be available January.
2001	CG551AP	Firmware update	Not assigned	Firm Plan	--	Publish Week 50, Kits available Week 1.

Dick Shilling
x3931, 63-503

Service Update #	Product/Option	Description	Part Number of Kit	Status	Publication	Comments
101	4025	Mechanical Update charged to Code 18	045-0002-00	Cancelled	IOC to field	Changed to 040-0921-00
102	4014, 15, 16, Opt 5	F/W update to V3.0 charged to Code 18	045-0014-00	Complete	Svc Update Plan 4/4/80	Completion Wizard to be published in this or next printing. Svc Update termination plan is being written. This was a manditory update Replaced by 040-0990-00
103	4051 R07*	F/W update charged to Code 18	160-0160-01 160-0161-01	Complete	Wizard 8/10/79	Needed when R07 used with E01 ROM expander unit. Ordered 160-0160-01 160-0161-01 No further field action.
104	4663*	Fuse holder bracket replacement, potential safety problem charge to Code 18	040-0932-00	Active	IOC - Steve Prunty - Jim Tiano 5/5/80	Mandatory Safety Update
105	GMA102A	High voltage shield ground	045-0001-00	Complete	IOC 5/3/79 Wizard 2/79	No field service action.
106	GMA102A	Major MOD reliability performance & safety charged to Code 18	045-0006-00 045-0007-00 045-0008-00 045-0009-00	Complete	Wizard & Svc Plan 1/31/80	Performed by OEM Customer or at designated OEM Depot. No further field action.

Dick Shilling
x3931, 63-503

Service Update #	Product/Option	Description	Part Number of Kit	Status	Publication	Comments
107	GMA101A	Major Mod charged to	045-0012-00	Complete	Svc Update Plan	Same as Update 106-GMA102A.
108	618/618AA	High voltage shield & charged to Code 18	045-0004-00 045-0001-00	Complete	IOC 7/18/79	All Kits shipped
109	4907*	F/W Update V1.0 to 1.2 & V1.1 to V1.2*	050-1160-01 156-0960-08	Complete	IOC 1/5/79	No further action all future updates will be billable.
110	4024 *	Charge to Code 18 to make compatible with 4052	V1 to V4 050-0860-02 V2 to V4 050-0942-01 V3 to V4 050-0924-01	Active	4052 Svc Impact notice	To be preformed as needed.
111	4052 *	F/W Update V3.1 to V3.2 charged to Code 18	050-1282-02	Complete	Wizard 11/16/79	Replaced by V4.1 Update announced in Wizard 5/30/80 no longer Svc Update program.
112	4054/52 *	F/W Update V3.2 to V4.1 charged to Code 18	050-1282-02	Cancelled	Wizard 5/2/80	Never set up or approved program replaced by V4.2 F/W V4.1 to 4.2 050-1402-00 2.1, 3.1, 3.2 to 4.2 order 050-1282-02 - Not a Code 18 announced Wizard 6/27/80.
113	4016-1	LVPS reliability	045-0011-00	Cancelled		This program was cancelled. It was never implemented.

Dick Shilling
x3931, 63-503

Service Update #	Product/Option	Description	Part Number of Kit	Status	Publication	Comments
114	4081 *	Mod to floating point processor charged to Code 18	050-1218-00	Active	Wizard 1/25/80 Update Plan 1/16/80	
1023	4663	Major Mod Interim level fix Phase II	046-0002-00	Active	Service Update Plan 8/27/80	Update of approximately 250 4663 - Phase I of two phase program.
1025	634	Performance & reliability update	045-0015-00	Active	Service Organization Bulletin 3/10/80	Mandatory-Wizard article being written.
1025	4054	Placing electronic relay in power line circuit	045-0017-00	Active	Svc Update Plan 12/10/80	Specification corrective action.
1026	4052	Firmware update	045-0019-00	Active	Svc Update Plan 12/10/80	Fixes firmware "bugs" which causes unit to hang busy.
	* Note: This update program was under develepement before current 045/046 kit update program guidelines and therefore uses another type of parts kit.					

SERVICE INFORMATION SYSTEMS PROJECT

The Project will feature phased development and installation. The first phase will be a prototype system to be installed in the Santa Clara Field Office.

The Santa Clara prototype will be a minimum size configuration with the following functions:

- Recording and tracking job movement, In-House and On-Site;
- Breakdown of the job flow by work station, or status code, to allow visibility of all jobs at all times;
- Ability to prioritize jobs and produce alert status report;
- Collect product/customer history; and,
- Enable measurement of various Turn-Around-Times.

Installation of the prototype will take place late in FY100 with testing to go into first quarter FY200.

More later.

--Bill Duerden
56-037, Ext. 8938 Mr

MEASUREMENT DISPLAY MODIFIED PRODUCTS

Earlier in FY 000, Measurement Display Product Group 51, was transferred to the IDD organization. Marketing, Engineering, and Manufacturing functions are now being conducted in Wilsonville. We are now in a position to also assume the Modified Product activity in Wilsonville. Effective immediately, Product Group 51 Measurement Display Mod quoting will be integrated into the present IDD OEM and END USER MOD GROUPS. Please contact the following people for large order quantity and custom mod quotes:

OEM	END-USER
Anne Lindsay, Ext. 3724	Fran Case, Ext. 3055
Dan Randolph, Ext. 3797	Ed Tobias, Ext. 3261

Submitted by--
Dan Randolph/Ed Tobias

TM500

BNC WRENCH AVAILABLE

New TM500 instruments are using Lexan front panels to prevent scratching and stress marks that occur on metal front panels. However, the new front panels also expand and contract with changing temperatures and are very flexible. BNC's tightened against the front panel may loosen over a period of time.

A BNC wrench, P/N 003-0755-00 is available to hold the front of the BNC connector while tightening the nut behind the front panel. Care should be taken not to over tighten the BNC. This will cause the Lexan to delaminate from the metal portion of the front panel.

TM500 is pursuing a better way to affix front panel BNC's.

--Terry Turner
92-236, Ext. 1288

5000 SERIES

5110/R, 5111/R, 5115/R OPTION 7 HORIZONTAL BANDWIDTH

Reference: 5110 Instruction Manual P/N 070-2134-01
5111 Instruction Manual P/N 070-2135-01
5115 Instruction Manual P/N 070-2138-01
Corporate Mod #41201

With the addition of Option 7, Signals Out, modification to the above mentioned instruments, it has been found that the horizontal bandwidth comes close to being out of specifications. It causes the phase adjustment capacitor to run out of range. To cure this two capacitors are having their values changed. C106 in the vertical output amplifier is being changed to a 670pf, 1%, 300v, P/N 283-0692-00. In the horizontal output amplifier, C126 is being changed to a 639pf, 1%, 300v, P/N 283-0774-00. Both these changes should make the adjustment of the phase capacitor come out about at mid-range and horizontal bandwidth well within specifications.

--John Eaton
58/511, Ext. 5222

5223, CAPACITOR RATING CHANGE (C613)

Reference: 5223 Instruction Manual P/N 070-2932-00
⑤ Z - Axis Amplifier & Front Panel
Corporate Mod #42315

When the front panel focus control is full CCW, it will put +86 volts across C613 on the XYZ board, A3. The capacitor is currently rated at 50 volts. To improve the reliability, C613 is being changed to .01μf, 100v, P/N 281-0773-00.

--John Eaton
58/511, Ext. 5222

7000 SERIES

7904-R7903 HIGH SPEED TIMING

Reference: 7904 Instruction Manual P/N 070-2390-00
R7903 Instruction Manual P/N 070-1464-00
Corporate Mod #M40936

On the 7904 with serial numbers of B280809 and greater, and the R7903 with serial numbers of B191395 and greater, two parts on the horizontal amplifier have been changed. C4874 changes from a 5-35pf variable cap to a 7-45pf, P/N 281-0158-00. R4874 changes from a 62 ohm resistor to a 250 ohm variable resistor, P/N 311-0978-00. These two changes should make calibration easier and provide increased range of adjustment.

--John Eaton
58/511, Ext. 5222

SPECTRUM ANALYZER

492 OPERATOR'S MANUAL CORRECTION (C8/880)

The following is a list of corrections for the 492 Operator's Manual (P/N 070-2726-01).

TEXT CORRECTIONS

SECTION 3 OPERATION

Page 3-7 Insert the following prior to TURN ON PROCEDURE:

Firmware Version

During initial turn-on or power-up cycle, the firmware version in the instrument will flash on screen for approximately two seconds. The Replacement Parts List in the Service manual lists the ROM's used for each version.

Error Message Readout

The 492/492P features error message readout. These messages (numbers) flash on screen when the address and data from the microcomputer fails to complete an operational routine. These error numbers and their meaning are as follows:

Error #	Meaning
57	Tune routine failed
58	Failed to phase lock
59	Lost phase lock
60	Failed to recenter frequency when phase lock cancelled or when switching to an unlocked span/div setting. (Phase lock occurs for 50 kHz or less in bands 1 through 3, 100 kHz or less for band 4, and 200 kHz or less for bands 5 and above.)

(Continued)

Page 3-15 Table 3-3

Change Option 3, 100 Hz sensitivities to read, from top to bottom:

-123

-108

-103

-108

-103

-103

Page 3-16 Table 3-4

Change Option 3, 100 Hz sensitivities to read, from top to bottom:

-118

-103

-93

-108

-103

-103

Page 3-16 Step 7 Frequency Drift or Stability, part c.

Add: Allow a period of at least 30 minutes at a fixed frequency before performing the drift check.

--Rich Kuhns
58/511, Ext. 6782

The following is a list of manual corrections for the 492/492P Spectrum Analyzer Manual, Volume 1 (P/N 070-2727-02).

SECTION 1 GENERAL INFORMATION AND SPECIFICATION

Page 1-10 GENERAL CHARACTERISTICS

Change the Performance Requirement for Triggering to read:

≥2.0 division of signal for internal triggering and ≥0.5 V peak minimum for external.

Page 1-16 Frequency Drift

Add the following under the Supplemental Information column:

A restabilization period of 10 minutes per GHz of frequency change must be allowed if the center frequency is retuned.

SECTION 3 CALIBRATION

Page 3-5 Paragraph 3 EXT should read:

EXT. Active, trace runs when an external signal ≥0.5 volt peak, terminated in 1 kΩ or less is applied to the back panel EXT IN connector.

Page 3-6 FREQUENCY SPAN/DIV

Change the first sentence to read:

As this control is rotated clockwise or counter-clockwise, FREQ SPAN/DIV should change from 0 to MAX in a 1-2-5 sequence as the control is rotated clockwise.. . . .

Page 3-18 Step 9, part b, line 1

Change to read:

b. Tune the FREQUENCY to center the 3.5 GHz signal on....

(Continued)

Page 3-22 Table 3-5

Change Option 3, 100 Hz sensitivities to read, from top to bottom:

-123

-108

-103

-108

-103

-103

Page 3-23 Table 3-6

Change Option 3, 100 Hz sensitivities to read, from top to bottom:

-118

-103

-98

-93

-108

-103

-103

Page 3-29 Step 24, Part a.

Change to read:

a. With the test equipment connected as directed for the previous step, change the TIME/DIV to EXT and deactivate VIEW A/VIEW B.

SECTION 4 MAINTENANCE

Page 4-14 Compliant Mounted Fan

Add to Note:

Do not re-use the self locking nylon nuts.

Replacement Part b.

Add the following to part b.

Do not re-use the nylon nuts because vibration may loosen re-used nuts.

--Rich Kuhns
58/511, Ext. 6782

492/P SERVICE VOLUME #1 MANUAL CORRECTION (C11/1280)

The following is a list of corrections for the 492/P Service Volume #1 (P/N 070-2727-02).

Page 3-43, Step 6.

ADD new Step 6 and INCREMENT remaining steps:

6. Check/Adjust the Cavity 2nd LO

a. Set the FREQUENCY RANGE to band 1 and FREQ SPAN/DIV to MAX.

b. Connect a microwave frequency counter, such as Hewlett Packard 5342A, with a sensitivity of -20 dBm or better, to the 2nd LO OUTPUT connector.

c. Measure the 2nd LO frequency. Frequency should read 2182.0 MHz ±0.5 MHz. Proceed with the next step if frequency is out of specifications.

d. Use a 5/16 inch open-end wrench and a 5/64 inch Allen to loosen the lock nut and adjust the Fine Tune slug in the cavity for a counter reading of 2182.0 MHz.

CAUTION

Do not adjust the two slotted slugs. These are Varactor diode mounts.

e. Tighten the lock nut and recheck frequency to insure it is still within specifications.

--Rich Kuhns
58/511, Ext. 6782

TV GENERAL/PARTS ORDER PROBLEMS

Just a reminder that when you have problems in getting parts (especially long ESC's on priority orders) please contact Leonard Monroe (73/854, Ext. 2144) in Parts Planning. He can best help with information regarding delays or other problems.

--Steve Schmelzer
58/511, Ext. 5927

1421, 1422 PAL PULSE SPECS

The 1421/1422 is sometimes marginal in operation over the specified range for the External PAL Pulse, which is 1 volt to 5 volts peak to peak. To improve this operation, change R1219 on the External Subcarrier board from a 240K ohm (P/N 315-0244-00) resistor to a 560K ohm (P/N 315-0564-00) resistor.

--Bill Bean
58/511, Ext 6507

1450-1, -2, -3 EXCESS RESISTOR DISSIPATION

Two resistors on the A21 Attenuator-Amplifier (670-5002-01) circuit board have been observed to dissipate more power than their rated values. Change as follows when instrument is in for service:

CIRCUIT NUMBER:	REMOVE:	ADD:
A21R61	P/N 321-0134-00	P/N 323-0134-00
A21R52	P/N 315-0201-00	P/N 301-0201-00

--Bill Bean
58/511, Ext. 6507

DATA COMMUNICATION ANALYZERS

834 FIRMWARE UPDATE

PRODUCT:

834 Programmable Data Communications Tester
Service Update Plan
Service Update Program # 2000
Update Kit #: 045-0018-00

EFFECTIVE SERIAL NUMBER RANGE:

B010100 to B020409

Note: This program is not a RECALL PROGRAM. Customer solicitation is not required. Sales and Service instruments should be updated.

INTENT:

The DCA Business Unit has approved an Update Program for all 834s within the above serial number range. The 834R03 ROM Pack will not operate with 834 Kernel Firmware Part Number 160-0836-01 or 160-0836-02.

VERIFICATION OF PROBLEM:

Customers who purchase "834R03 ROM Packs" and install them into the above serial number range have been provided the following information to determine Kernel version level in their 834. The 834 displays Kernel version level verification by: "CSRMOMØ:PN=0836-02"; "CSRMOMØ:PN=0836-01."

A. When the 834R03 ROM Pack is installed into a 834, the 834R03 will automatically check the 834 for correct version level. If the version level is incorrect, the 834 will display "WRONG KERNEL ROM."

B. The 834 and the 834R03 service manual provides the procedure for determination of current Kernel ROM version.

PRODUCT FIX:

Remove and replace 834 Kernel ROM, Circuit Number "A1U214," Part Number 160-0836-04. See 834 service manual for replacement procedures (Order Part Number: 045-0018-00).

(Continued)

834 FIRMWARE UPDATE

KIT ORDERING INFORMATION:

Use normal Order Processing System.
Order Kit #: 045-0018-00

REPORTING PROCEDURES:

U.S. Service Centers should charge time and materials to Activity Code 18. International Subsidiaries and Distributors should use International procedures.

COMPLETION CARD REPORTING:

All U.S. Service Centers and International Subsidiaries and Distributors should send their completion cards to:

Debbie Zukerman
Walker Road Service Support
92-236

ADDITIONAL INFORMATION:

The Service Update Plan will be distributed to Service Center Supervisors on January 13, 1980.

Any questions or comments concerning the Update Program should be addressed to Gary Ellsworth, Walker Road Service Support, Delivery Station 92-236, Ext. 1611. Technical questions should be directed to Craig Wasson, Walker Road Service Support, Delivery Station 92-236, Ext. 1564 or Pat Wolfram, Walker Road Service Support, Delivery Station 92-236, Ext. 1582.

--Gary Ellsworth
92-236, Ext. 1611

851 DC VOLTS OFFSET

Some 851's may display excessive offset voltage in the lowest DC Volts range when the measurement probes are left open. Shorting the probes together will immediately zero the display.

A common source of this problem is leakage current from the high voltage reed relay K180 (P/N 148-0110-00). The original vendor of this part could not consistantly meet the low leakage requirements required for the 851. The part has since been replaced by an Elec-trol brand part, under the same Tek part number. Replace only with an Elec-trol relay.

If any questions, please call.

--Craig Wasson
92-236, Ext. 1564

308 PART NUMBER CORRECTION

REFERENCE: 308 Service Manual (Part Number 070-2662-00)

The part number for the main wrap around cabinet on the 308 has been misprinted. This part number can be found in the Mechanical Parts List, Page 9-7, Fig. 11, and should be changed to read 390-0684-00. A manual change insert will soon be distributed to correct this error.

--Pat Wolfram
92-236, Ext. 1582

308 TIME BASE STABILIZATION

To improve the stability of the 308 Time Base, Mod Number M41944 was implemented. This will change C260 from a 10pf (Part Number 283-0437-00) to a 15pf (Part Number 283-0628-00) capacitor. This re-tuning of the tank circuit will allow a stable 100Mhz oscillation.

--Pat Wolfram
92-236, Ext. 1582

NEW 4014/4015 SHIPPING CARTONS

This is to inform the field that the new shipping carton we have been evaluating for the 4014/4015 was implemented December 1, 1980. These cartons are available through regular Customer Service Inventory by ordering Part No. 065-0375-00.

Generally all field responses of the experimental cartons sent out were positive. The new cartons were found to reduce installation and packaging time, thus resulting in an efficient cost effective program.

All of the concerns over the design of the shipping carton were addressed and resolved into a carton that will give the 4014 complete protection.

Service Support endorses this shipping carton since it has proven to be as protective to the terminal as we had hoped, results in better field efficiency, exhibits a significant cost reduction and presents itself in a professional manner being in single units ready to operate.

Thanks to those who helped evaluate this carton by giving us your input and suggestions.

--Kent Barnard
63-503,Ext. 3598 (WI)

4014/15/16 CUSTOM MOD INTERACTIVE BUFFER MODIFICATION

Reference: Interactive Buffer Service Manual P/N 061-1371-00
Interactive Buffer Board P/N CM 670-4986-07
TC-2 Circuit Board P/N CM 670-3092-57
TC-2 Circuit Board E.G. P/N CM 670-3559-56

The modification to the interactive buffer corrects for keyboard data and refresh data being on the mini buss at the same time. When keyboard data and refresh data are on the buss at the same time, loss of a character or characters will occur on the screen.

Interactive Buffer Modification:

1) On the TC-2 Circuit Board lift pin 5 of U209.
2) Connect one end of a insulated wire to the lifted pin 5 of U209 on TC-2.
3) Connect the other end of the insulated wire to pin 10 of U325 on the Interactive Buffer Board.

--Marty DeVall
63-503, ext. 3927

4463 MOTOR/PEN DRIVE BOARD UPDATE

The 4663 Motor/Pen Drive Board was changed to accomodate the new pen lifters introduced by Version 3 Firmware.

The pen current may vary from 108 ma. to 208 ma. depending on the pen pressure selected and the F/W version.

The new pen lifters are so responsive that the pen current tolerances had to be tightened from ± 5 ma. to ± 2 ma. when the PED is set at 5 grams of pen pressure.

The rest of this article is a procedure that can be used to change or verify that a Motor/Pen Drive Board is within the ± 2 ma. tolerance.

115 ma. of pen current should be present when the following conditions are true.

1. Version 2 Firmware or below. Note: Due to a F/W "Bug" versions 3 and 4 power up at 115 ma. for 5 grams and may later default to 108 ma., which is the correct current for the new lifters.
2. Parameter Entry Card Selections
   A. Pen Type
      1.) Felt Tip
   B. Pen Pressure
      1.) 5 Grams
3. Front Panel Pen Pressure Override adjustments are in the center position ("NOM").
4. Motor/Pen Drive Board test points 440, 345, and 340 are properly adjusted to 8V ± 1%. The adjustment procedure is given in the Diagnostic Test Fixture Manual under "calibration" for the Motor and Pen Drive Tests.

If the pen current is between 113 ma. and 117 ma. (115 ± 2 ma.) no update modification is necessary. The board is compatible with lifters introduced by version 3 Firmware.

To measure the pen current:

1. Remove the cable connector from J1 of the Y Axis Limit Switch Board. Rotate it 90° and reconnect it so pin one of the connector is connected to pin one of J1, but pin 2 is making no connection.
2. Connect a Current meter in series with the current path line that was left open in step #1. This is accomplished by connecting one lead of the current meter to pin 2 of the connector, and the other lead of the meter to pin 2 of J1 of the Y Axis Limit Switch Board.
3. Push the "Up/Down" switch on the plotters front panel to activate a pen down condition.
4. The meter should read 115 ± 2 ma.; Polarity of the reading is not important. The polarity can be positive or negative depending on the pen solenoid selected.
5. On the Motor/Pen Drive Board change R180 and R184 to the appropriate

(Continued)

values listed in the following table:

Pen current measured in step #4. (ma.)	The Desired Value of R180 and R184	P/N of the Desired Resistors
110 to 111.5	113KΩ 1%	321-0390-00
111.5 to 113	115KΩ 1%	321-0391-00
113 to 117	NO MODIFICATION NECESSARY	
117 to 120	121KΩ 1%	321-0393-00

The tighter pen current tolerance is the only difference between the old Motor/Pen Drive boards and the new ones introduced by Version 3 and 4 Firmware. If a board has been determined to be within this tolerance, it may be used freely in any 4663, Versions 1 thru 4.

--Larry North
63-503, ext. 3926

MICROCOMPUTER DEVELOPMENT PRODUCTS (MDP)

8001/8002A DOS ERROR 66 WITH THE Z80 EMULATOR

The Z80 emulator can exhibit DOS ERROR 66's during accesses to the dump and restore ROMS when program memory is located in the C000-FFFF address space. The problem is a result of data bus drive contention between program memory and the Z80 emulator. The data bus contention causes enough bus noise to affect the memory board's parity checking circuitry. The bus contention is caused by the emulator asserting RAM INH after OPREQ, thereby, violating memory board timing requirements.

The problem was corrected by delaying the emulator's data bus drive turn on until after RAM INH has time to turn the memory board's data bus drivers off. A description of the change follows:

Cut run:

1. U5060 Pin 15 Backside

Add wires on backside:

1. From U3080 Pin 4 to U3080 Pin 12
2. From U3080 Pin 2 to Pin 3 to U3120 Pin 13
3. From U3080 Pin 1 to U3090 Pin 14
4. From U3080 Pin 6 to U5060 Pin 15
5. From U3080 Pin 5 to U5080 Pin 1

The above changes are made on the Z80 Emulator Assembly 670-5295-05 which changes to 670-5295-06. The above information was obtained from Modification Number M41650.

We would like to thank Yoshio Honda at Sony/Tek for informing us that this information was not readily available.

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

8001/8002A 8048 EMULATOR DUMP AND RESTORE PROM MODIFICATION

The dump and restore proms on the 8Ø48 emulator have been changed to correct a firmware problem. The problem is only seen when an 8041A or 8022 probe is used in an 8001. The SET command will fail to work properly. There were no problems with any probes when used in the 8002A. The problem was corrected by modifying the dump and restore routines.

Tektip Version 3.0, routine 1Ø of A21Ø verifies the contents of the dump and restore proms. Tektip Version 3.0 was released before the revision to the dump and restore proms were implemented. You will find that routine 1Ø of A21Ø will fail when the revised dump and restore proms are used. The revised proms 160-0737-01 and 160-0735-01 replaced the 160-0737-00 and 160-0735-00.

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

The following is a list of all current emulators supported in both the 8550 and 8001/8002A systems. Included in the list are hardware modifications for those emulators that require them.

8080 EMULATOR

670-5296-XX - Modification is not required for 8550 operation.

670-5862-XX - Emulator modification is required as follows:

1. Cut run between R2091 and edge connector P1 Pin 70 on back side of board.
2. Add wire between end of R2091 just cut and edge connector P1 Pin 62. Mask off gold contact to prevent wicking.

6800 EMULATOR

670-5218-XX - Emulator modification is required as follows:

1. Cut run betweeen R5192 and Edge connector P1 Pin 70 on back side of board.
2. Cut run leading to U3130 Pin 12 on the backside of board.
3. Cut run leading to U2100 Pin 2 on the back side of board.
4. Add wire from U2100 Pin 2 to U4130 Pin 9 on back side of board.
5. Add wire from U3130 Pin 12 to U6150 Pin 10 on backside of board.
6. Add wire from U6150 Pin 8 to U6150 Pin 7 on back side of board.
7. Add wire from U1030 Pin 10 to U6150 to Pin 9 on back side of board.
8. Add wire between end of R5192, just cut and edge connector P1 Pin 62. Mask off gold contact to prevent wicking.

670-6144-XX

1. Cut run between R6102 and edge connector P1 Pin 70 on back side of board.
2. Cut run between U2150 Pin 2 and feed-through hole, located adjacent to U2150 Pin 7.
3. Cut run between Pins 10 and 11 of U2130, leaving the circuit board pads intact.
4. Add wire from U1080 Pin 7 to U1080 Pin 8 on back side of board.
5. Add wire from U1080 Pin 9 to U1020 Pin 17 on back side of board.
6. Add wire from U1080 Pin 10 to U2150 Pin 2 on back side of board.
7. Add wire from U2110 Pin 13 to U2130 Pin 10 on back side

of board.

8. Add wire between end of R6102 just cut and edge connector P1 Pin 62. Mask off gold contact to prevent wicking.

Z80 EMULATOR

670-5295-XX - Modification is not required for 8550 Operation.

9900 EMULATOR

670-5395-XX - Modification is required for 8550 Operation. The modification requires the replacement of the Driver/Receiver board and cables in the prototype control probe. Modification to the 9900 emulator is not required.

8085 EMULATOR

670-5463-XX - Emulator modification is required as follows:

1. Cut run leading to U2010 Pin 13 on the back side of board.
2. Cut run leading to U4170 Pin 2 on the frontside of board.
3. Lift Pin 10 of U5130 on the front side of board.
4. Add wire from U3010 Pin 10 to U2110 Pin 9 on back side of board.
5. Add wire from U3120 Pin 9 to U2110 Pin 10 on back side of board.
6. Add wire from U2010 Pin 13 to U2110 Pin 8 on back side of board.
7. Add wire from U4170 Pin 2 to U4170 Pin 7 on back side of board.
8. Add wire from U4020 Pins 13, 14 and 15 to U4100 Pin 15 on back side of board.
9. Add wire from U4020 Pin 10 on backside of board to U5130 (through feed-thru) to lifted Pin 10 on the front side of board.
10. Add wire from U4020 Pin 11 to U4020 Pin 16 on backside of board.
11. Add wire from U4020 Pin 12 to U5050 Pin 1 on back side of board.

F8/3870 EMULATOR

670-5798-XX - Modification is not required for 8550 operation.

1802 EMULATOR

670-6330-XX - Emulator modification is required as follows:

1. Remove a small area of solder mask on the ground run at U5060 Pin 10 on the front side of the board.
2. Install a 1.0 inch piece of AWG 20 stranded wire between U5060 Pin 10 and edge connector P1 Pin 15. Mask off gold contact to prevent wicking. Note AWG 20 is not standard mod wire.
3. Remove a small area of solder mask on the ground run at U5110 Pin 10 on the front side of board.
4. Install a 0.5-inch piece of AWG 20 stranded wire between U5110 Pin 10 to edge connector P1 Pin 85. Mask off gold contact to prevent wicking.
5. On front side of board remove a small area of solder mask from ground run on U5090 Pin 7. Directly under mask removal, drill a hole large enough for a .025 inch square pin to go through easily. Locate hole between, but just above, edge connector P1 Pins 55 and 57.
6. Using two pins of a terminal set (131-1614-00) bend one pin on the long side to a 90 degree angle next to the terminal body. See attached sketch for details.
7. Insert the other unbent pin through the drilled hole. Add insulation to bent pin and solder to ground on U5090 Pin 7.
8. On back of board, bend unbent pin over to edge connector P1 Pin 56, cut to length and solder. Mask off gold contact to prevent wicking.
9. On back side of board install a 1.75 inch piece of 20 AWG stranded wire between U5070 Pin 10 and Edge Connector P1 Pin 16.
10. For 8550 operation install jumper (P/N 131-0993-00) between terminal pins just installed, remove jumper for 8001/8002A operation.

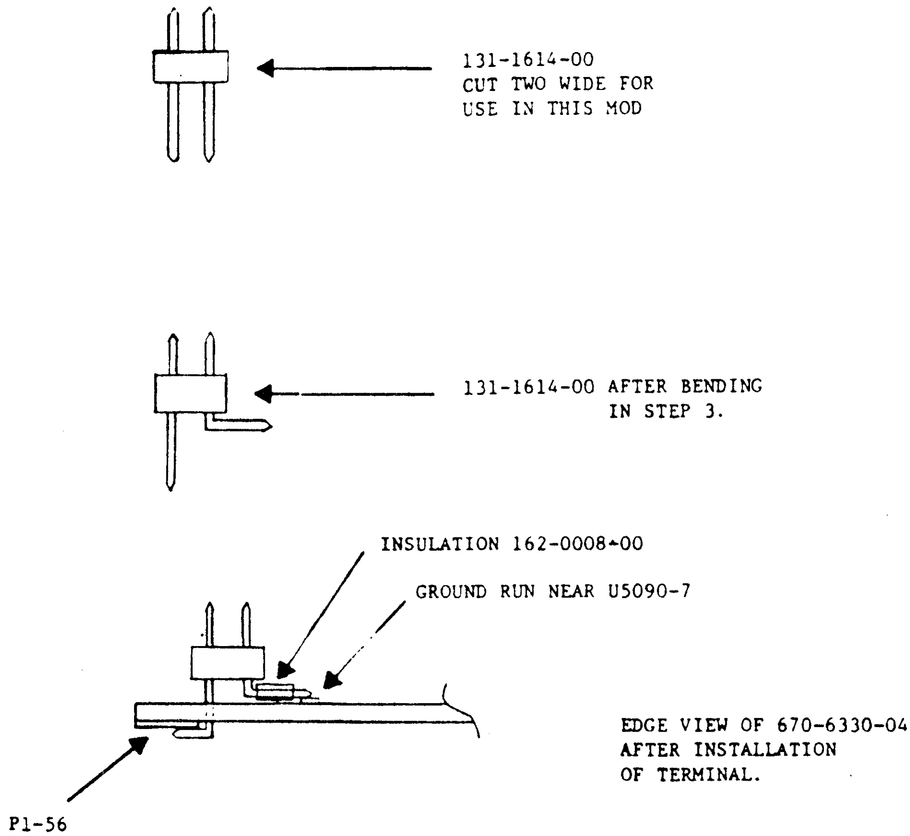
8048 EMULATOR

670-6484-XX - Modification is not required for 8550 operation.

6500/1 EMULATOR

670-6606-XX - Modification is not required for 8550 operation.

PARTIAL REWORK INSTRUCTIONS FOR 1802 EMULATOR



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

8550 PROGRAMMABLE FEATURES OF AUXILIARY AND LINE PRINTER PORTS

The 8501 has 2 ports, the auxiliary port (J152) and the line printer port (J151). Both of these ports can be changed from the default mode to fit the need of the output device connected. The two tables tell how to change the tab positions and end of line characters for each of the associated ports.

To make a change, the 8501.SAV program is patched. To modify the 8501.SAV program, the DOS-50 "SYSPATCH" command is used. Below is an example of changing the tab conversion flag for the auxiliary port. Remember, you are changing the system files, so you must declare Tektronix as the system user. After making changes, reboot system to install patch.

```
> User,,Tektronix <CR>
> Syspatch 8501.SAV <CR>
* D B868 <CR>
ØØØØB868  ØØ  Ø1...
* P B868  Ø1  <CR>
* V B868  ØØ  <CR>
* E <CR>
>
```

The following tables are changes made to DOS-50 Version 1.1. Earlier or later versions most likely will not use the same address locations.

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

(Tables continued on the following pages)

TAB STOPS

Port Name	Address Location (Hex)	Size (Bytes)	Default Value	Conversion Name	Description
Auxiliary (J152 or AuxØ)	B868	1	ØØ	Tab Conversion Flag	Non-zero=converts tabs to the appropriate number of spaces on port output. Zero=do not convert tabs.
Line Printer (J151 or Aux1)	B869	1	Ø1	Tab Conversion Flag	Same as auxiliary port.
Auxiliary (J152 or AuxØ)	B87B	17	Every 10 Columns	Tab stop positions	Tab stops are the hex value of the decimal column number. Unpredictable results will occur if a line to be printed contains more tabs than are defined in this table.
Line Printer (J151 or Aux1)	B86A	17	Every 8 Columns	Tab stop positions	Same as Auxiliary Port.

(Continued)

END OF LINE CHARACTERS

Port Name	Address Location (Hex)	Size (Bytes)	Default Value	Conversion Name	Description
Auxiliary (J152 or AuxØ)	B88C	1	ØD (CR)	End of Line Character	Flag for S/W that end of line is about to be sent.
Line Printer (J151 or Aux1)	B88D	1	ØD (CR)	End of Line Character	Same as auxiliary port.
Auxiliary (J152 or AuxØ)	B890	8	ØD,ØA (CR,LF)	End of Line String	String to be substituted for the end of line character
Line Printer (J151 or Aux1)	B898	8	ØD,ØA (CR,LF)	End of Line String	Same as auxiliary port.
Auxiliary (J152 or AuxØ)	B88E	1	Ø2	End of Line Count	Value of the number of bytes in the end of line string.
Line Printer (J151 or Aux1)	B88F	1	Ø2	End of Line Count	Same as auxiliary port.

WPXXXX PACKAGES HAVE A NEW IMPROVED EXTENDER BRACKET

Symptom: The old extender bracket (for the slide racks) are only seven inches long and had a slot versus a bolt hole for attaching them to the rack. Because of the hole and the length, there has been times that instruments have come loose from the rack.

Solution: There is now a new extender bracket Part Number 351-0471-00 that is ten and a half inches long with bolt holes versus slots. This now provides adequate support for the instruments.

A special thanks to Mike Tranchemontagne, FSS Boston Service Center, for bringing this to our attention.

--Randy Newton
92-236, Ext. 1635

7000 SERIES

7B85 DIGITAL VOLTMETER BRD CHNG DOCUMENTATION & REF. PULL-OUT CORRECTION

Reference: Wizards Workshop Issue 11-1, January 16, 1981

The last two pages of this reference pull-out were inadvertently left out when this article was published. Please add to your copy behind page A-9. Our apologies for the inconvenience.

--Editor

Tektronix
COMMITTED TO EXCELLENCE

MANUAL CHANGE INFORMATION

Date: 12/3/80 Change Reference: C5/1280

Product: 7B85 DELAYING TIME BASE Manual Part No.: 070-1961-00

DESCRIPTION

TEXT CHANGES

SECTION 5 PERFORMANCE CHECK AND ADJUSTMENT

Page 5-13 B9. Adjust Scaling and DVM Zero (R605, R625)

ADD:

B9. (SN B088750-UP) Adjust DVM Zero (R625)

a. Rotate the Δ TIME control fully counterclockwise and the TRACE SEP counterclockwise out of the switch detent.

b. Set the DELAY TIME control to position the intensified zones near the second graticule line so that the time markers in the delayed-sweep display are on the center graticule line.

c. Advance the Δ TIME control until the first and second delayed time markers are 2.0 divisions (20 microseconds) apart (1 horizontal division equals 10 microseconds of delayed sweep).

NOTE

If it is difficult to set the Δ TIME control for exactly 2 divisions (20 microseconds) between delayed-sweep time markers, note the actual time separation displayed. Then, follow the procedure outlined in part d and adjust R625 so that the Δ time readout corresponds to the actual time separation displayed between the delayed-sweep time markers.

EXAMPLE: A 2.2-division time delay corresponds to a 0.022 ms Δ time readout. Adjust R625 for a Δ time readout of 0.021 ms. Then, adjust R625 until the Δ time readout just changes to 0.022 ms.

d. ADJUST—R625 (DVM Zero) for a Δ time readout of 0.019 ms. Then, adjust R625 until the Δ time readout just changes to 0.020 ms.

e. Rotate the Δ TIME control fully counterclockwise.

f. Check for a Δ time readout of exactly 0.000 ms and for horizontal alignment of the delayed sweep time markers within 0.1 division. Disregard an occasional Δ time readout of 0.001 ms.

Product: 7B85 DELAYING TIME BASE Date: 12/3/80 Change Reference: C5/1280

DESCRIPTION

SECTION 5 PERFORMANCE CHECK AND ADJUSTMENT

Page 5-13 B9. Adjust Scaling and DVM Zero (R605, R625)

CHANGE TO:

B9. (SN B088749-BELOW) Adjust Scaling and DVM Zero (R605, R625)

4Ø1X TELETYPE PORT INTERFACE

TTY Master Option (SP1, SPD2, SP2, SP3, SPD1):

The TTY Master Option Strap will select the minibus line that will be used for the TTY Master Signal Line. When the interface is on line and in the TTY position it will assert the TTY Master signal true (low) to disable other active interfaces in the bus. This is primarily used in dual interface configurations. Minibus pin 23 (SPI) is designated as the terminals TTY Master signal line.

SPI - The interface will use minibus pin 23 for the TTY Master signal.

SPD2 - The interface will use minibus pin 31 for the TTY Master signal.

SP2 - The interface will use minibus pin 28 for the TTY Master signal.

SP3 - The interface will use minibus pin 29 for the TTY Master signal.

SPD1 - The interface will use minibus pin 21 for the TTY Master signal.

Bit 8 (In, On):

The Bit 8 Strap in conjunction with the Parity Straps and the terminal's Send 8 signal line will determine the condition of the Bit 8 sent to the host. Bit 8 can be sent as data, a mark, a space, even parity, or odd parity.

(Continued)

In - Bit 8 is sent to the host as determined by the terminal's Send 8 signal line. If Send 8 is true (low), Bit 8 is sent as data. If Send 8 is false (high), Bit 8 is sent as determined by the setting of the Parity Straps.

On - Bit 8 is sent to the host as data.

Parity (AB-A, AB-B, CD-C, CD-D):

The Parity Straps will determine the condition of Bit 8 sent to the host providing the Bit 8 Strap is in the "In" position and the terminals Send 8 line is false (high).

AB-A, CD-C - Bit 8 will be sent to the host as a mark (logical 1).

AB-A, CD-D - Bit 8 will be sent to the host as even parity.

AB-B, CD-C - Bit 8 will be sent to the host as odd parity.

AB-B, CD-D - Bit 8 will be sent to the host as a space (logical Ø).

Echo (Out, In):

The Echo Strap will allow the terminal to echo its transmitted data to the display. When the terminal is echoing its transmitted data, the host should not provide an echo or dual characters will result on the display.

Out - The terminal will not echo its transmitted data. The echo must come from the host.

In - The terminal will echo its transmitted data to the display.

Baud Shift (Out, In, On):

The Baud Shift Strap will select which clock source, the 4.9 MHz or the variable clock, will be used to control the transmit and receive baud rates.

Out - The 4.9 MHz clock will be used to control the transmit and receive baud rate.

In - The 4.9 MHz clock will be used to control the receive baud rate and the variable clock wil be used to control the transmit baud rate.

On - The variable clock will be used to control the transmit and receive baud rate.

Max Baud (3Ø7, 154, 77, 38, 19):

The Max Baud Strap will select the maximum clock rate, counted down from the 4.9 MHz source, that can be used as the baud rate. The 16X Strap will determine the actual baud rate. If the Max Baud Strap is to select the transmit and/or receive baud rate the Baud Shift Strap must be in the appropriate position ("out" or "in").

16X (Out, In):

The 16X Strap will select a 8 or 16 times divisor that will be applied to the selected clock source and used as the baud rate. When the 16X Strap is strapped "In" the baud rates indicated by the Max Baud Strap will be divided by 2, and the variable clock source (R5Ø) will have to be adjusted for a 16X baud rate clock at TP1. When the 16X is strapped "Out" the baud rates indicated by the Max Baud Strap will be as shown, and the variable clock source (R5Ø) will have to be adjusted for a 8X baud rate clock at TP1.

Out - The selected clock source will be divided by 8 before being applied as the baud rate.

In - The selected clock source will be divided by 16 before being applied as the baud rate.

Clock (X8, X4, X2, X1):

The Clock Strap will determine the relationship between the interface clock supplied to the host and the transmit/receive baud rate. The interface can be configured to supply an interface clock that is 16 times the baud rate by strapping the 16X Strap to "In" and running a jumper from "Out" of 16X to the arm of the clock strap.

X8 - The interface clock rate will be 8 times the baud rate.

X4 - The interface clock rate will be 4 times the baud rate.

X2 - The interface clock rate will be 2 times the baud rate.

X1 - The interface clock rate will be equal to the baud rate.

Interface Clock (Normal, Invert):

The Interface Clock Strap will determine the phase relationship between the interface clock and the baud rate.

Normal - The interface clock will be in phase with the baud rate.

Invert - The interface clock will be 18Ø out of phase with the baud rate.

T Data (Normal, Invert):

The T Data Strap will determine whether a positive or negative voltage level will be used to transmit a mark.

Normal - A mark will be transmitted as a negative voltage level, a space will be transmitted as a positive voltage level.

Invert - A mark will be transmitted as a positive voltage level, a space will be transmitted as a negative voltage level.

R Data (Normal, Invert):

The R Data Strap will determine whether a positive or negative voltage level will be interpreted as a mark.

Normal - A positive voltage level will be interpreted as a mark, a negative voltage level will be interpreted as a space.

Invert - A positive voltage level will be interpreted as a space, a negative voltage level will be interpreted as a mark.

Input (TTY, RS232):

The input strap will select the level converter circuitry on the R Data Line to be compatible with either RS232 or TTY.

TTY - The R Data input will be driven by TTY levels.

RS232 - The R Data input will be driven by RS232 levels.

Clear To Send (High, Low):

The Clear To Send Strap will select a high true or low true clear to send signal to be accepted by the interface. If neither Clear To Send bus is in use (positive or negative bus on the relay card), the Clear To Send Strap must be strapped to "high".

High - A high true Clear To Send will be accepted by the interface.

Low - A low true Clear To Send will be accepted by the interface.

Reader On (Normal, Invert):

The Reader On Strap will select a high true or low true Read Tape signal to activate the Reader On signal.

Normal - A high true Read Tape signal will activate the Reader On Signal.

Invert - A low true Read Tape signal will activate the Reader On signal.

Tapefetch (In, Out):

The Tapefetch Strap will allow an active Reader On signal to bring the terminal's Tapefetch line (Pin P) active.

In - The Reader On signal will bring the terminal's Tapefetch line true (low).

Out - The Tapefetch line is not affected by the Reader On signal.

TSL (Out, In):

The TSL Strap will allow the Reader On signal to control the remote teletype.

In - The Reader On signal will select the 88ØHz teletype clock and also switch the TTY relay to select the remote teletype.

Out - The Reader On signal will not affect the teletype or TTY clock.

Aux TSUP (In, Out):

The Aux TSUP Strap will inhibit the terminal display when the interface is in auxiliary mode. This is useful in dual interface configurations.

In - When the interface is in auxiliary mode the terminal display will be disabled.

Out - The terminal display will not be affected when the interface is in auxiliary mode.

GLA (On, Off, Out):

The Graphic Look Ahead Strap will provide control of the Graphic Look Ahead function in the following ways.

On - Enables the "GLA" function to allow the interface to place data on the terminal bus if the terminal is in graph mode, regardless of the condition of T Busy (or C Busy if the interface is in Aux mode). This allows graphics coordinates to be loaded into the TTY registers on TC2 while the terminal is busy drawing the previous vector. This is the normal setting for "GLA", older interfaces have this hardwired on the board.

Off - The GLA function will be disabled.

Out - Will allow the interface to place data on the terminal bus (alphanumeric or graphic) regardless of the condition of T Busy (or C Busy if the terminal is in aux mode). This may be desired in some dual interface applications.

TTY Relay Board

Clear To Send (A to D, B to D, A to C):

The Clear To Send Straps will select either the Clear To Send positive bus or Clear To Send negative bus to be used by the interface. If the negative bus is to be used the positive bus must be grounded.

A to D - Selects the Clear to Send positive bus.

B to D, A to C - Selects the Clear to Send negative bus and grounds the positive bus.

TTY Level (D-G, F-H, E-I):

The TTY Level Strap will select the voltage level to be placed on the teletype R Data line when the terminal is selected. Values given are typical, actual values determined by the host.

D-G - A ground will be placed on the teletype R Data line when the terminal is selected.

F-H - A +5V level will be placed on the teletype R Data line when the terminal is selected.

E-I - A -15V level will be placed on the teletype R Data line when the terminal is selected.

Pull Up/Down (A-B, B-C):

The Pull Up/Down Strap will provide for the terminal's R Data line to be pulled up to +5V or pulled down to ground.

A-B - Will pull the terminal's R Data line to ground.

B-C - Will pull the terminal's R Data line to +5V.

TTY REC Data (B-C, A-C, A-B):

The TTY Receive Data Strap will select the level to which the TTY R Data line will be connected to.

B-C - The TTY R Data line is brought to a preset level determined by the TTY Level Strap during terminal operation.

A-C - The TTY R Data line is connected to AC ground.

A-B - The level selected by the TTY Level Strap is provided on Pin 7 of the TTY connector during terminal operation.

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92-515

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