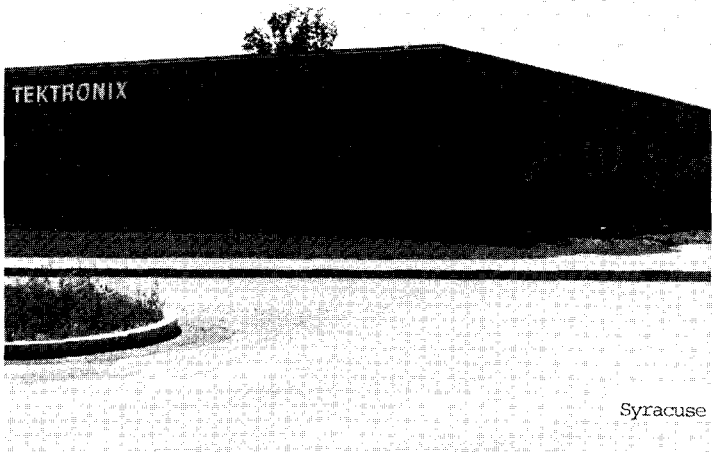
TEK CUSTOMER PRODUCT SERVICING INFORMATION

2465

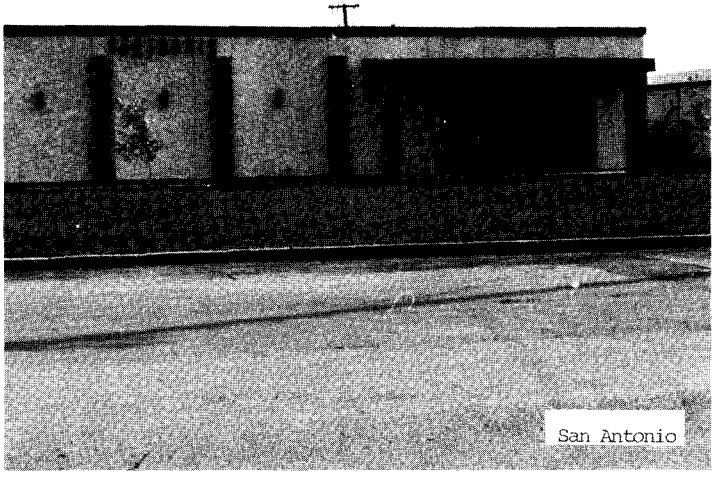
SERVICETEKNOTES


New Orleans



Syracuse

Albuquerque


San Antonio

Published by Tektronix Service Administrative Support

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TABLE OF CONTENTS

DAS9100 CIRCUIT BOARD PACKAGING

Affected instruments: All DAS Circuit Boards.

A shipping package is now available in which DAS circuit boards can be reliably transported. It's part number is 004-2181-00. It's dimensions allow packaging of a circuit board that is 17" x 7.5" which is the size of DAS plug in modules.

This package could also accommodate many MDP and IDD circuit boards.

W² Issue 13-21

DC5090/DC510 MICROPROCESSOR RESET CYCLER

Serial Numbers Affected: All

The following procedure can be very useful for cycling microprocessor based instruments with intermittent kernal problems. GPIB instruments that support the "TEST" command may not always perform a complete power-on self test.

From time to time it may be useful to cycle a uP-based instrument at a rate much faster than the fifteen minutes of a typical cycler. This set-up is a convenient way of doing it and requires only a TG501 (or other clock) and a DD501.

Connect the trigger output of the TG501 through a cable, terminator, and dual input coupler to the inputs of the DD501. Connect the output of the DD501 without a terminator through a cable and BNC-to-EZ Hook adapter to the reset pin of the uP in the instrument under test.

Set the TG501 to 1 mS and trigger the DD501. The events delay count switches will now control the time between resets from zero to 99.999 seconds, in 1 mS increments.

W² Issue 13-16

IDD TOUCH-UP PAINT PART NUMBERS: OLD/NEW COLORS

Approximately 3 years ago, IDD changed the colors of their products. This has caused some confusion in determining which products have the old colors and which products have the new colors. The following are three lists, one listing the IDD products having the Tek blue color, the second listing the IDD products having the old gray/tan colors and the third listing the products having the new gray/tan colors. Included with each list of products are the correct color names and Tek part numbers of the 13 oz. cans of spray touch-up paint for each color.

Tek Blue Colored IDD Products

Tek Blue spray paint p.n. 252-0092-02

Tek 21
Tek 31
603
604A
606
607A
608
620
624
634

Tek Old Gray/Tan IDD Products

TV Gray spray paint p.n. 252-0217- 03
Tek Tan spray paint p.n. 252-0203- 04

(ARTICLE CONTINUED ON THE NEXT PAGE)

IDD TOUCH-UP PAINT PART NUMBERS: OLD/NEW COLORS (CONT.)

4006	466X
401X	4905
402X	4907
405X	4923
4081	4924
4601	4952
461X	4953
4623	4954
463X	4956
464X	

Tek New Gray/Tan IDD Products

Slate Gray spray paint p.n. 252-0728-00
Smoke Tan spray paint p.n. 252-0727-00

ADS01	4925
41XX	4926
4691	4932
4695	4970

W2 Issue 13-20

J16 OPERATING HINTS

REF: J16 Manual 070-1879-00

The following article provides some helpful hints for use of the J16. This information can help the technician achieve more accurate and repeatable results when adjusting the color temperature on color picture monitors.

J16 Photometer Operating Recommendations

Many engineering and manufacturing areas are using Tek J16 photometers for measuring CRT luminance and setting color balance of white fields. I have observed several problems which seem to reoccur. The following are some recommendations regarding the correct or at least improved techniques for making these measurements:

1) Zeroing--This is undoubtedly the greatest single cause of errors with the J16 and can occur with any of the probes. Due to variations in silicon input bias current, the zero should always be rechecked when changing probes and when the photo-diode temperature changes. This is most noticeable on AC powered J16's where the photo-diode is positioned directly over the AC power supply when plugged into the top of the J16. Also when using the AC power supply, continuous operation or at least 1/2 to 1 hour warmup is best to minimize zero drift on the most sensitive ranges.

The J16 uses a mono-polar DVM circuit which will still read 000 even when the zero is offset in a negative direction. This has the appearance of non-linearity especially at low light levels. Also the same reading will not be obtained when changing to the next range. To let the operator know that it is incorrectly zeroed, the minus sign is wired to indicate that the zero is offset in a negative direction. To correctly zero the J16, cover the sensor and adjust the zero adjustment on the 0.1X range until the minus sign just flickers on and off. An alternate method is to adjust the zero until a reading of typically 5 in the last place digit is obtained. This reading is checked often when using the most sensitive ranges. If the J16 zeros correctly on the X0.1 range but is incorrect on the X1000 range, it is an indication that the internal DVM zero needs readjustment according to the procedure in the manual.

The zero procedure is more complex when using the J6523 1 luminance probe--enough so that I recommend use of the Minolta 1 spot meter, if possible, rather than the J16/J6523. The Minolta has auto ranging, no zeroing required, compact size and a display that is visible through the eyepiece used for sighting. The

(ARTICLE CONTINUED ON THE NEXT PAGE)

J16 OPERATING HINTS (CONT.)

trade-off is a poorer spectral match to the CIE photopic response curve. To correctly zero the J6523/J16 combination, cover the J6523 objective lens and adjust the J6523 zero on the X1000 range. Then change to the X0.1 range and adjust the J16 zero. It is usually necessary to repeat the procedure once or twice as the adjustments interact. There is an incompatability between the J6523 and very early J16's that prevents zeroing on the X1000 range. A simple mod kit is available to cure it. The kit P/N is 040-0746-00, and applies to the J16's below S/N B052000.

2) Calibration--The photopically corrected J16 probes are all initially calibrated in the plant using 3000 K tungsten-halogen white light source. For maximum accuracy with CRT's they should be calibrated for the individual phosphors to be measured. Correction factors up to approximately 10% (higher for the Minoltas) may be necessary to obtain correct data due to deviations from the photopic response curve. This is most severe in the red and blue regions where a small absolute deviation can be a large percentage of the actual value due to it being on the lower skirts of the photopic response curve. Electrical Standards can provide this calibration service.

The long term calibration of the probes is very stable due to the silicon photodiode and glass photopic correction filters. Since the J16 itself is calibrated using only a simple current source and DVM, it is seldom a source of error unless incorrectly zeroed.

I recommend that the J16's be recalibrated about once a year. The probes probably should be recalibrated every six months or so--mostly because calibration techniques are being improved with time rather than the likelihood of the probes themselves changing calibration. Routine J16 and probe calibration is handled through Factory Service while special probe calibrations are done by Electrical Standards.

3) J6503 Modifications--As assembled, the J6503 has a plastic window and shiny blue plastic front which can cause minor reflections when placed directly in contact with a CRT faceplate. For best accuracy the plastic window should be discarded, the probe front painted flat black and the probe recalibrated.

Some early J6503's had glossy black paint on the internal baffles and no inner black shield to reduce internal reflections. This resulted in side lobes and a significant difference in readings with and without the light occluder often used for CRT measurements. These can be modified and recalibrated without too much difficulty.

4) 2 1/2 Digit J16's--Early J16's having only 2 1/2 digits are difficult to read accurately when the reading are at "20" or so as the +1 digit ambiguity amounts to 5%. Also they have a 12Hz count rate rather than 6 Hz as in the 3 1/2 digit version. This causes the display to change faster than the user can detect a reading for varying light intensities. Both of these shortcomings were addressed with major modifications at S/N B052000.

5) AC Versus Battery Operation--The J16 is available with an AC power supply installed as Option 3 or it may be ordered separately to replace the battery pack as 119-0404-00. This overcomes three problems--

1) Battery life is short and recharging time is long,

(ARTICLE CONTINUED ON THE NEXT PAGE)

J16 OPERATING HINTS (CONT.)

2) the charging current is 1/3 of the operating current; thus, use of the charger during operation will not siginificantly increase operating time, and

3) the J16 zero will be most stable on the higher sensitivity ranges when operated continuously.

Also, the early J16's used a three pin battery charger plug that had no strain relief and often had the wires short or break unbeknownst to the user.

In conclusion, recent J16's are quite stable and should have good correlation between individual units if zeroed and calibrated correctly. Older J16's can be brought up to date relatively easily.

W2 Issue 13-18

OF150 LINE FUSE FAILURE MOD

REF: M51508

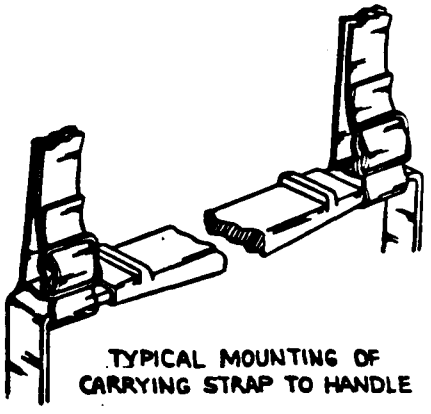
As a result of the excessive number of line fuse failures caused by high transient voltages from the AC line, a Metal Oxide Varistor (307-0415-00) has been added to the power supply in parallel with the spark gap A30A2E2010.

To install the Varistor, incapsulate it in shrink tubing (162-0031-00), lay it on top of A30A2C2010, and solder the Varistor's leads to the spark gap leads.

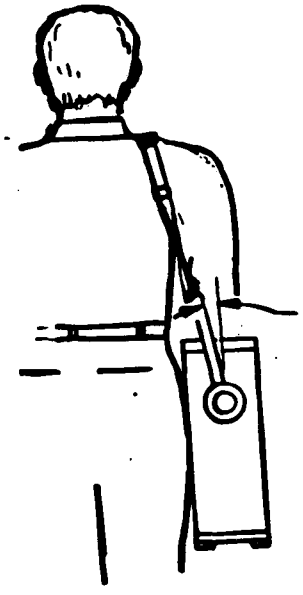
W2 Issue 13-18

PORTABLE CARRYING STRAP NOW AVAILABLE

A new style carrying strap is now available, P/N 346-0199-00. It was designed for use with the 2213/2215's, but can be used with any portable instrument having a standard adjustable carrying handle, such as the 400/300 series and 2300 series. The illustration below shows typical mounting and use.



TYPICAL MOUNTING OF CARRYING STRAP TO HANDLE



MOVE HANDLE OVER ONE POSITION FOR EASE WHEN CARRYING

W2 Issue 13-17

P6131 MANUAL CORRECTION P/N 070-4210-00

On Page 6-4 of the P6131 Manual, Figure 1, Index #1, the comp box for the 3 Meter Probe is incorrectly listed. It should be P/N 206-0282-00, not 206-0283-00.

W2 Issue 13-16

TDC1/TDC2 MANUAL CHANGE

RE: TDC1/TDC2 Manual 070-2754-00

Below is a manual correction for the TDC1/TDC2 Instruction Manual that deals with specification changes for the required test equipment.

W2 Issue 13-16

TEKTRONIX MANUALS CHANGE INFORMATION

Date: 7/13/83
Product: TDC1/TDC2
Manual Part No.: 070-2754-00
Change Reference: C5/783

DESCRIPTION

TEXT CHANGES

SECTION 4 CALIBRATION,

TABLE 4-1, TEST EQUIPMENT REQUIRED, Page 4-2

CHANGE TO READ:

Test Modulator	0.1 dB Flatness within channel limits and phase noise less than 0.2 degrees rms. Signal Generator to drive Test Modulator 100 MHz to 1000 MHz with typical sideband phase noise of at least -70 dBc[a] at 100 Hz from the carrier as measured in a 1 Hz bandwidth.	Performance Check and Adjustment	Tektronix Part No. 067-0886-00

[a] dBc = dB referenced to carrier

PERFORMANCE CHECK, STEP 14 part a, Page 4-16

CHANGE TO READ:

a. Refer to Fig. 4-9. Drive the test modulator with a linearity staircase signal from a video test signal generator such as a TEKTRONIX 1410/TSG3/SPG combination. Connect the low phase noise signal generator to the test modulator ext lo input. Connect the test modulator rf output to the 1450-1 (SYSTEM) rf input, and make the appropriate front-panel connections on the 1450-1 to complete the SYSTEM.

S3200 RACK, EQUIPMENT SLIDE ASSEMBLY EXTENDER

REF: 2943/2944 Clock Generator 070-3335-00

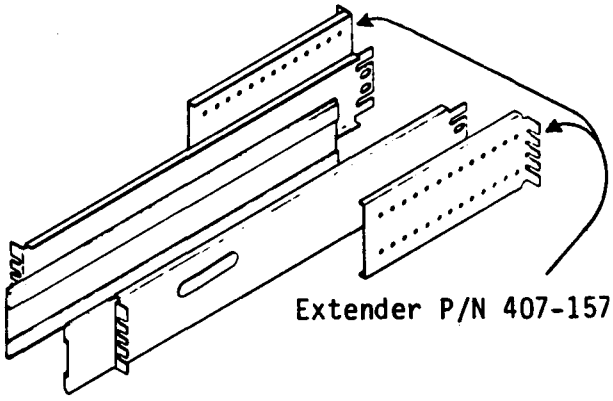
2941 Clock Generator 070-3126-00

R1140 Programmable Power Supply 070-3108-00

R1340 Data Coupler 070-3107-00

The part number for the equipment slide assembly extender is 407-1577-00. The 407-1577-00 is for a pair of extenders, left and right side. These extenders are 3.56 inches wide and 6 inches long. The extenders are included as a sub part for the slide assembly 351-0085-00. Normally there should be no need to order the extender separately. The exception to this is when the extender is damaged or a rack mounted equipment is bought outside Tektronix, i.e. DEC RK05 disk drive. The extender may be needed because the slide assembly supplied with other vendor equipment is usually too short for the racks used in the S3200 series system.

Slide Assembly 351-0085-00



Extender P/N 407-1577-00

W2 Issue 13-20

S3200 SAFETY, FRONT PANEL LINE VOLTAGE, M46259

Reference: 2942, 2943, 2944, R1340 Series, 1140 Series, and R1330 Series instruments.

Line voltages are accessible. These changes protect the service technician from exposure to dangerous line voltages.

Install mounting plate, switch cover, and appropriate hardware over toggle switches contained on the inside of the front panels on the above referenced instruments. For the 2942 only, remove a section from the right subpanel (386-3241-00) to prevent pinching wires when incorporating the switch cover change.

2942 Pattern Generator Only:

Remove: 1 ea. 386-3241-00 Subpanel, front right

Add: 1 ea. 386-3241-01 subpanel, front right

2 ea. 211-0097-00 Screw, mach. 4-40 x 0.312

1 ea. 337-3064-00 Shield, SW poly carb

1 ea. 386-4942-00 Plate, mounting

2 ea. 129-0304-00 Spacer post, 1.265L, w/4-40 THD

All Others:

Add: 2 ea. 211-0097-00 Screw, mach. 4-40 x 0.312

2 ea. 129-0304-00 Spacer Post, 1.265L, w/4-40 THD

(ARTICLE CONTINUED ON THE NEXT PAGE)

S3200 SAFETY, FRONT PANEL LINE VOLTAGE, M46259 (CONT.)

1 ea. 386-4942-00
Plate, mounting

1 ea. 337-3064-00
Shield, SW poly carb.

No update modification kit is available for the change. Discrete parts must be ordered. This modification will also protect against electrical shorting of AC voltages to extended circuit boards.

W2 Issue 13-16

S3200 SERIES SITE LOG BOOK, 062-7232-00

The Site Log Book provides maintenance personnel with one common place to record S3200 Series Semiconductor Test System's information. All S3200 Series system models may use the Site Log Book.

A new Site Log Book is recommended annually for each system.

SECTION DESCRIPTIONS

The Site Log Book is divided into eight major sections. Each section will contain documentation concerning one specific area of system information.

Section I - Information

The information Section identifies personnel for maintenance, repairs, or other system responsibilities.

Section II - Logs

The Logs Section is for recording system maintenance or repair calls. This section also contains Service Logs, which should be completed for each service call. Documentation related to system performance is also included under Uptime Calculation.

Section III - Schedules

The Schedules Section contains several types of forms to assist in documenting and scheduling maintenance. The Schedules Section should be reviewed soon after the system is installed. Prior to finalization of a maintenance plan, all sections should be compared. This comparison should be done to check for conflicts in scheduling. Different maintenance services should not be scheduled simultaneously.

Section IV - Configuration

The Configuration Section provides worksheets for system inventory. The System Inventory is broken into basic categories. Tektronix products and options are separate from computers and peripherals. The OEM portion lists many products not manufactured by Tektronix that may be placed in an S3200 Series System.

Section V - Software

The Software Section is a very important part of the Site Log Book. Because of its importance, the four portions of this section should be kept current at all times. Software modifications, updates, and changes should be documented in this section. A system CONFIG.EDT listing, a copy of the System Formatter, and a copy of the System Disk directory are located in the Software Section.

Section VI - Site Spares

System spares provide additional support at the system site. The Site Spares Section provides Log Out Sheets and inventory forms. Users may desire to use their own forms or methods to meet their needs.

(ARTICLE CONTINUED ON THE NEXT PAGE)

S3200 SERIES SITE LOG BOOK, 062-7232-00 (CONT.)

Section VII - General

Additional system information may be filed in this section.

Section VIII - Service Records

The last section of the Site Log Book may be used to file Service Records.

W2 Issue 13-20

S-3200 2943/2944 CORRECTION FOR SIGNAL EDGE JITTER

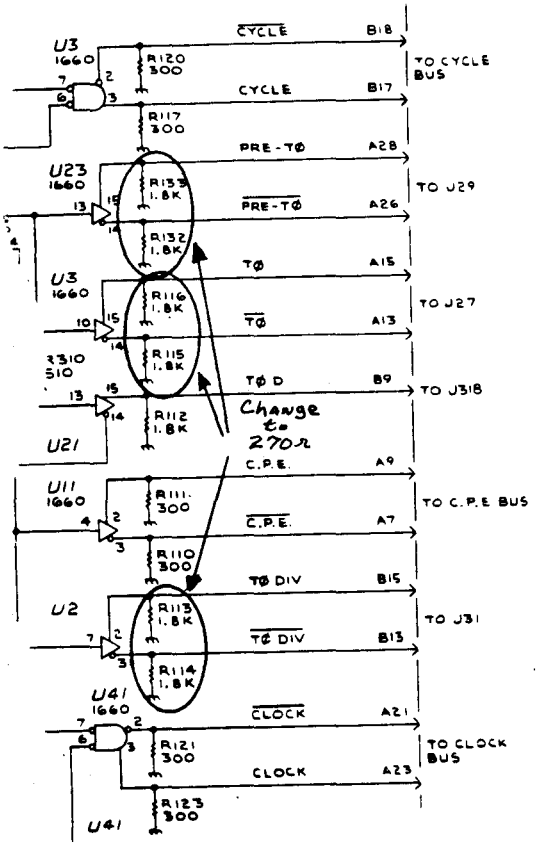
Ref: 2943/2944 Manual, P/N 070-3335-00
Mod #50198
Wizard's Workshop, Issue 13-8, April 15, 1983, Pg. 9, S-3200 2943/2944 Clock Standardization Mod #M45157.

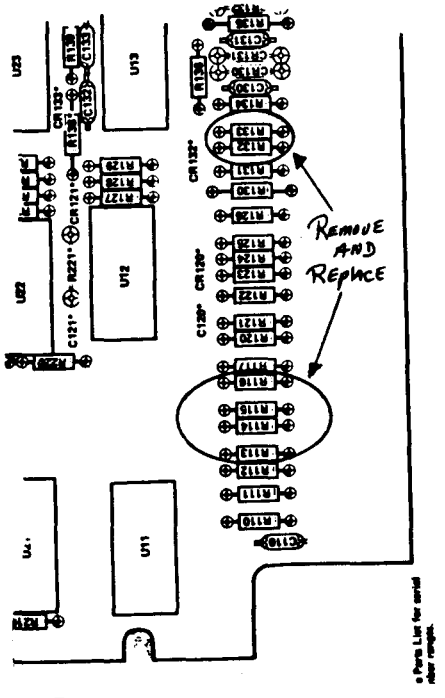
In some 2943/2944 clock generators the clock signal edges may vary (jitter) between 400 ps to 1 ns. The jitter is caused by high signal impedance, signal sources and cross talk to adjacent signals.

The solution is to decrease source impedance to increase the drive current. This will stabilize the signal and reduce cross talk effects.

On the Cycle Length Board 670-5383-05 change R113, R114, R115, R116, R132, R133 from 1.8K P/N 315-0182-00 to a 270 ohm P/N 315-0271-00. Change board P/N to 670-5383-06. On the Clock Phase Board 670-5425-01 change R300 and R301 from a 1.5K ohm P/N 315-0152-00 to a 270 ohm P/N 315-0271-00, change board P/N to 670-5425-02. On the Programmed Cycle Board 670-5417-01 change R211 and R212 from 1.8K ohm P/N 315-0182-00 to 270 ohm P/N 315-0271-00, change board P/N to 670-5417-02.

The following are locations of the changes on partial drawing of schematic and parts layout:

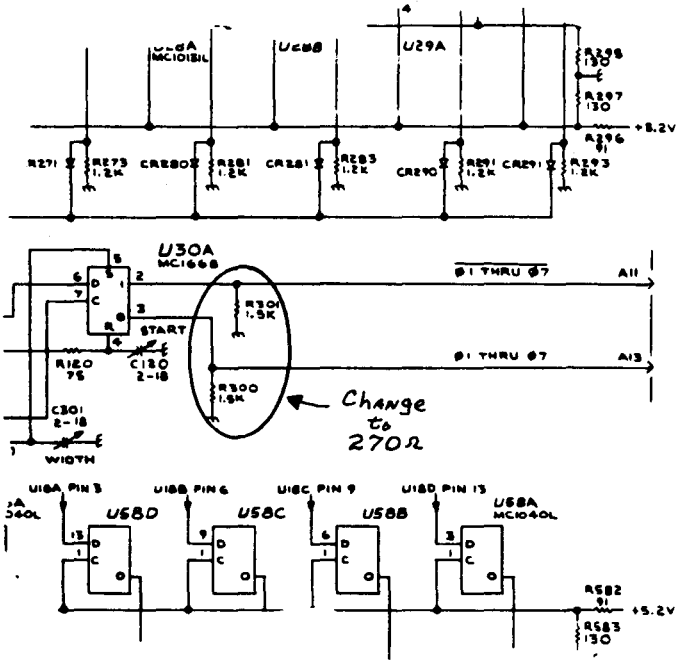


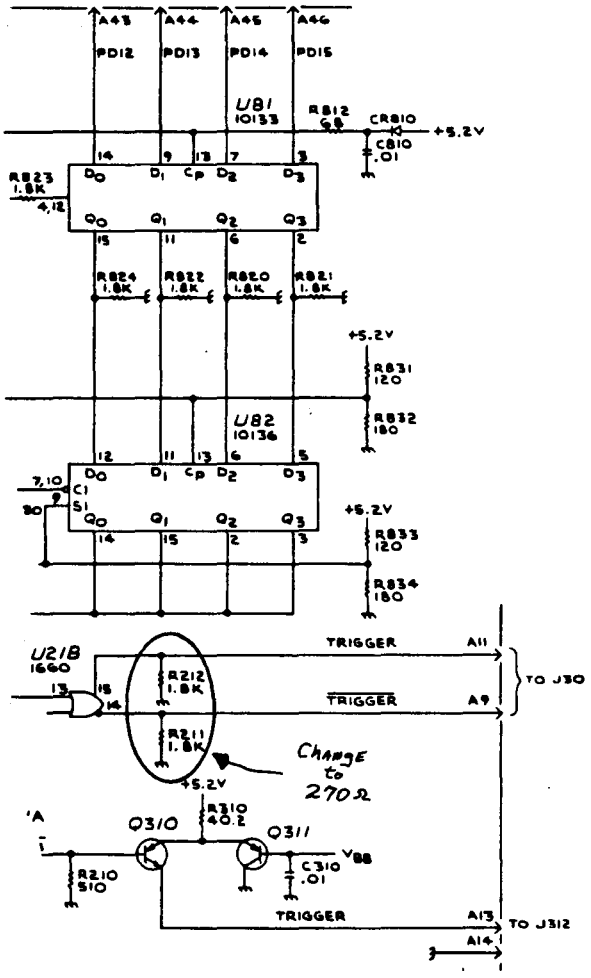


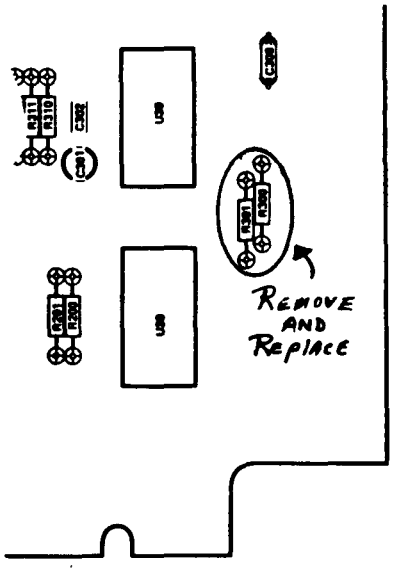
670-5383-06
P4 Cycle Length

(ARTICLE CONTINUED ON THE NEXT PAGE)

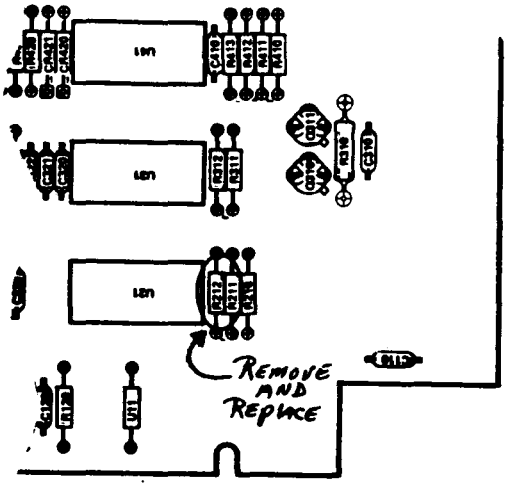
S-3200 2943/2944 CORRECTION FOR SIGNAL EDGE JITTER (CONT.)







670-5425-02
P5 through P11
Clock Phase



670-5417-02
P12 Programmed Cycle

(ARTICLE CONTINUED ON THE NEXT PAGE)

S-3200 2943/2944 CORRECTION FOR SIGNAL EDGE JITTER (CONT.)

These changes should only be used on systems that have had the 2943/2944 Clock Generator standardization mod installed. There are 040 kits available to install the standardization mod.
The kit P/Ns are 040-1110-00 for 7 Phase systems and the 040-1111-00 for 14 Phase systems.

With the 2943/2944 standardized any standardized clock is a direct replacement without having a major reskew or calibration of system. Without standardization replacing any part or all of the clock my require a major reskew or calibration of systems.

W2 Issue 13-19

TDC1/2 SPURIOUS OUTPUT

REF: TDC1/2 Instruction Manual 070-2754-00

SAR #05211

A recent inquiry from the Field questioned the presence of a spurious signal at about 31 MHz when the TDC2 was tuned to Channel 69 or 70. This spur was about -30 down from the fundamental which gave a total of about -80dBm. In either case, it was judged to be worse than other units (TDC2's) under similar conditions, but was not out of specs.

One of the problems encountered in making this measurement centered around the 067-0886-01 Test Modulator. The signal coming out of RF OUT is spec'd at -25dBm. However, due to the lack of any filtering on this output, harmonics generated by the RF Mixer stage will be present. In the case of Channel 69, the second Harmonic would be at 2 X Visual Carrier + I.F., or 2 X (801.25 + 37) or 1676.5 MHz.

If one assumes no harmonic attenuation out of RF OUT, this frequency (1676.5 MHz) would be at -25dbm when it was applied to the TDC2, and would mix with the first L.O. in the TDC2. Due to the input Bandpass Filter's image rejection of 40dB, the first Mixer would produce a signal of about -65dBm at about 434.5 MHz. Mixing this frequency with the second L.O. (403.75 MHz) will produce a signal at 30.75MHz, giving us the presence of a spur.

The amplitude of this spur is dependent upon the first IF Image Rejection Ratio, which is spec'd at 40dB or greater for the TDC2, and the level of harmonics coming out of the Test Modulator, which are not spec'd.

Some places to look for cures to this "problem" are:

---Pay close attention to balancing the RF mixer in the Test Modulator.

---Check cable dress in the TDC2.

---Use care when adjusting the Pin Attenuator in the TDC, along with the Mixer, Bandpass Filter, IF Amp other associated areas.

---Don't use the Test Modulator to look at Image Rejection. Follow the procedures in the TDC1/2 manual.

W2 Issue 13-21

TV LINEARITY GRATICULES

REF: 650HR Manual 070-2646-01
670A Manual 070-2201-01
690SR Manual 070-3821-00

When adjusting the convergence of a color monitor to meet specifications,

(ARTICLE CONTINUED ON THE NEXT PAGE)

TV LINEARITY GRATICULES (CONT.)

one is faced with a variety of linearity graticules, color display monitor types, and signal generators to make a choice from. Besides having three sizes of CRT's, there are four major television standards, non-television display applications, and more than 18 signal generators from Tektronix alone. This list is further expanded when one considers custom modified products or specification/standards changes. This article will mainly touch upon standard applications, however, some custom units will be discussed where appropriate.

The following list describes the linearity graticules currently available for Tektronix Color Monitors. In general, these are plastic overlays that are designed to be placed in front of the CRT. A small high-intensity lamp is then placed at a prescribed distance from the face of the CRT, thereby projecting the shadows of the various graticule markings on to the CRT face.

Graticule P/N	Instrument	TV Stand.
331-0305-00	650 Series	NTSC, SECAM, PAL-M*
331-0359-00	650 Series	PAL
331-0305-01	670 Series	NTSC, PAL-M*
331-0359-01	670 Series	PAL
067-1054-00	690SR	NTSC*
067-1055-00	690SR	PAL
067-1034-00	690SR Opt 40/48	Hi Res***
067-1034-00	6942	Hi Res***
331-0305-02**	650,670, 690SR	NTSC, PAL-M
331-0359-02**	650,670, 690SR	PAL

* Some TSG12 and TSP11 generators were compatible with NTSC Graticules due to the number of horizontal and vertical lines used.

** 331-0305-02 and 331-0359-02 are 35mm slides that are meant to be projected upon the CRT face with a slide projector having a lens of the proper focal length. By carefully positioning the projector, these slides can be used with any display that has the proper aspect ratio (3 to 4).

*** The 067-1034-00 graticule for the 690SR and 6942 is for non-TV displays using a 31 KHz scan rate and a special generator.

In general, those graticules that are used for television applications have patterns designed for crosshatch convergence patterns of two types. NTSC, SECAM and PAL-M use a 14 x 17 line configuration, while PAL uses a 15 x 20 line configuration. High resolution graticules such as the 067-1034-00 use an 11 x 15 line configuration. The following table lists convergence generators produced by Tektronix and provides a handy reference describing the convergence line pattern that the various instruments produce.

14 x 17	15 x 20	11 x 15
140	141A Mod 431L	067-1039-00
142	141A Mod 703Z	
143	141A Mod 431S	
144	141A Mod 432D	
145-M	145	

(ARTICLE CONTINUED ON THE NEXT PAGE)

TV LINEARITY GRATICULES (CONT.)

146 TSG12(*1)(*3)

TSG2(*3) TSP11(*2)(*3)

TSP(*3)

TSG12(*1)(*3)

TSP11(*2)(*3)

TSP21(*3)

*1 TSG12's produced prior to S/N B011550 produced 14x17 line patterns. After S/N B011550, the TSG12 produced a 15x20 pattern, with a 14x17 line pattern available through the remote connector. Consult the product manual (P/N 070-2329-00) for further details.

*2 TSP11's produced prior to S/N B011550 produced 14x17 line patterns. After S/N B011550, the TSP11 produced a 15x20 line pattern with an 8x10 pattern available through the remote connector. consult the product manual (P/N 070-2664-00) for further details.

*3 TSP1, 11, 21 and TSG2 and 12 generators have the capability of producing large or small square convergence patterns. Refer to the product manuals for further details.

TSP1	070-2621-00
TSP11	070-2664-00
TSG21	070-4569-00
TSG2	070-2599-00
TSG12	070-2329-00

From the two tables given (above), one can readily determine which linearity graticule is needed for the particular monitor and generator that is available. Convergence can be accomplished in a straight forward manner using the procedures outlined in the display device manuals. Close attention to detail is recommended, with particular attention paid to the correct physical placement of the light source and proper adjustment of other circuits and parameters that directly or indirectly affect convergence. Some of these are horizontal and vertical scan size and linearity, purity, and low and high voltages.

W2 Issue 13-18

TV MANUAL REVISIONS (JUNE, JULY)

The following TV product manuals were updated/revised as of June and July 1983.

June Revisions

TDC1 and TDC2	070-2754-00
650HR Series	070-2646-01

July Revisions

SPG1/SPG2	070-2104-00
TSG5	070-2336-00
69M41	070-2878-00

W2 Issue 13-18

TV MANUAL REVISIONS (AUGUST)

The following television product manuals have been revised/updated as of August 1983:

1450, 1450-1 Instruction Manual
P/N 070-2200-01

TSG Instruction Manual
P/N 070-3782-00

W2 Issue 13-21

7L14 A48A5 U1755 REPLACEMENT

RE: M50713

On the Summing Amplifier and 2nd LO Error Amplifier Board A48A5, if the -15V supply comes up before the +15V supply, the current limit in A48A5 U1755 is disabled and the microcircuit (P/N 156-0067-12) becomes inoperative.

To prevent the destruction of A48A5 U1755, A48A5 C1755 was replaced with a 1uf capacitor and a 100ohm resistor was added in series with the -15V line to A48A5 U1755.

If field replacement of A48A5U1755 becomes necessary, parts replacement kit 050-1781-00 will provide the new microcircuit along with parts and instructions for installing the mod.

W2 Issue 13-16

50M40 WRONG RESPONSE TO "CONFIGURE?" COMMAND

Serial Number: B010100 to B010310
Reference: U1101

To correct for a possible erroneous response to the CONFIGURE? query over the GPIB buss U1101 was reprogramed. The new part number for U1101 is 160-1479-01.

W2 Issue 13-19

401X OPTION 22/23 INSTALLATION/REPLACEMENT CHANGES

REF: 021-0201-00/01 2741 Correspondence Code Interface Service Manual, p.n. 070-2280-0X

Reports have come in from the field of the Option 22/23 interface being DOA on installation. This would normally show as continual erasing of the screen after initial powering up and pressing the page key. Turning power off and then back on will not clear the problem in most instances.

Investigation into this phenomenon has found a firmware abnormality caused by changes to the CMOS RAM mask. This firmware abnormality will not be fixed.

The reason for this failure mode has been found to be incorrect initialization and set up parameters written into the CMOS RAMs by virtue of the particular way the CMOS RAM initially powers up.

To work around this, the installation and replacement procedures must be changed. Any time the Processor board is installed or replaced, the battery backup must be disconnected before powering up the interface. This is easily done after installing the interface by disconnecting J110 on the processor board, powering up the terminal, typing page, and then reconnecting J110 (without powering down) onto the Processor board. This procedure will ensure that the menu comes up and set up parameters can be set correctly without hanging the terminal in an erase mode.

If a unit requires service because it constantly pages when the terminal is turned on and paged, first, turn off the terminal and disconnect J110 from the Processor board. Wait at least one minute for all voltage potential to drain off, then power up. If the menu does not come up, type Break 1. If the menu still does not appear, then there is probably a problem with the Processor board. If the menu comes up, then check the battery. It may be the cause fo the problem. Normal battery voltage should be be approximately 2.9 volts.

W2 Issue 13-16

463X HARD COPY MOTOR IMPROVEMENTS

Ref: November 20, 1981 Wizard Workshop article "463X: Hard Copy Unit - Maintenance of D.C. Motors"

The 147-0039-01 motors used in the 463X dry silver copiers have recently been improved.

- An o-ring seal is now being used around the output shaft of the gearhousing to reduce leakage of lubricant.
- A thicker gearhousing cover is also being used to reduce leakage. Some motors have been seen with two of the thinner covers, one mounted on top of the other.
- The cut on the worm gear has been changed to reduce heat and friction.

These changes to the motor do not affect specifications, inventory, documentation, etc. Therefore, the part number of the motor does not change.

The effective lot code for all the above improvements is LW (December, 1983). For an explanation of the coding of these motors, please refer to the above referenced article.

W2 Issue 13-21

468 NEW FAN FILTER REDUCES OPERATING TEMPERATURE

Serial Numbers: All
Ref: 468 Service Manual, Vol. II; Figure 2-122

A new Air Filter for the 468 is now being used that reduces the internal ambient temperature by 4 degrees Centigrade. As a result of the decrease in temperature, the instrument will have increased reliability. The part number for the new filter is 378-2042-02.

PLAN OF ACTION:

All old filters (378-2042-00) are to be purged. Every 468 that comes in for service either under warranty or billable that has the old filter is to have the new filter installed at no cost to the customer.

NOTE:

When the new filter is installed, it is possible to see a faint image of the fan and the fan mounting screws. When the denser old filter is installed, nothing can be seen behind it.

W2 Issue 13-17

613 HIGH VOLTAGE MODIFICATION #50474

Customer Service has implemented a modification to 613 high voltage boards to improve reliability and performance. As a result of this mod, the 613 high voltage board part number rolls from 670-2308-06 to 670-2308-09.

The restorer diodes CR51 and CR62 have failed readily especially when being soldered with a high wattage iron (see reference above for details). To correct this, their part number is being changed from 152-0242-00 to 152-0107-03.

The high voltage capacitors C132, C141, C142, C151, C152, C161 and C162 have also shown poor reliability. On occasion, their failure has destroyed a CRT by producing a phosphor burn. This situation is improved by changing the part numbers of these capacitors from 283-0101-00 to 283-0477-00. The -0477- is a distinctive blue capacitor similar to those recently modified into the 611.

W2 Issue 13-17

670/A, 671A, 672 COLOR TEMPERATURE MOD

REF: SAR #16778

670, 671, 672 Instruction Manual
P/N 070-1445-00

670A, 671A Instruction Manual
P/N 070-2201-01

670-1 Series Instruction Manual
P/N 070-1946-00

670A-1 Series Instruction Manual
P/N 070-2202-00

Mod 52244

Recent inputs from the Field have indicated problems concerning setting up color temperatures in the 670 Series Color Monitors.

The problem centered around the proper high and low light values, and the inability to set all three colors up for a proper white. With Red and Blue set for the proper 10 IRE and 100 IRE levels, Green had insufficient adjustment range. This becomes particularly apparent when the CRT is changed due to slight changes in the phosphors from batch to batch.

Mod 52244 has made R4201 and R4231 test selectable with a nominal value of 5.1K ohms (P/N 315-0512-00). The selection range is approximately -1K ohms + 3K ohms.

This mod will alter the Red and Blue biases enough to allow the three guns to track.

W2 Issue 13-21

690SR/6942 HV POWER SUPPLY FAILURE

REF: 690SR Instruction Manual
070-3821-00

690SR Opt. 40 & 48 Instruction Manual, 070-2870-00

Several field failures have shown the following symptoms:

o Burst mode (HV overload)

o Erratic or non-existant phase-lock of the high volt output circuit

o No control through U445

If the High volt oscillator circuitry cannot be shut down by grounding pin 9 of U445, one of the first places to look for a problem may be a shorted transistor at Q304. If this device is shorted, +200 volts will be applied to Q100, it will start to turn on, and will be shut off intermittently (burst mode) by the High Volt Overload protect circuitry due to the lack of coincidence of the H-Deflection signal with the High Volt oscillator.

W2 Issue 13-21

834 POWER SUPPLY AUDIBLE NOISE

REF: 48621

An audible whining noise can occur in the power supply of the 834 due to the low value of capacitor A4C441.

To eliminate this condition A4C441 was changed from 270uF, 40V (290-0946-00) to 470uF, 35V (290-0919-00).

W2 Issue 13-20

1450 RF LEVEL INDICATION

RE: 1450/1450-1 Manual
070-2200-01

As the result of a customer's inquiry concerning the reason why the RF Level changes about 3dB between modulated and unmodulated signals when in the SYNC TIP/AGC

(ARTICLE CONTINUED ON THE NEXT PAGE)

1450 RF LEVEL INDICATION (CONT.)

mode, the following information was provided as part of an IOC to the field office involved.

The AGC circuit in the 1450 samples the output video and corrects the gain of the IF section in order to offer a 1 volt video signal at the output connectors. The sample points are controlled by the SYNC TIP and BACK PORCH controls.

When used in the BACK PORCH mode, the signal (sync tip to peak white) is corrected for the desired output. BACK PORCH is a nominal voltage of 0 volts, and the Sample-and-Hold circuitry uses this point for reference.

In the SYNC TIP mode, the signal is sampled at sync tip. The voltage difference between sync tip and back porch must then be compensated for prior to the conversion function (Sample-and-Hold) to achieve the desired 0 volt point. If this compensation was not done, the circuit would see a signal that might represent sync tip to peak white plus sync tip to back porch, and decrease the IF gain accordingly in order to put a one volt video signal out.

Since sync is a normal component of video modulation, it therefore, follows that absence of modulation means absence of sync, and since the correction for sync is still being applied to the AGC circuit, a corresponding offset will be reflected in the RF Level indications. Calculations for the 1450-1 indicate the difference to be approximately 2.5dB between modulated and unmodulated signals, as observed on the front panel RF Level indicator.

If the customer desires to measure RF Levels with and without modulation, BACK PORCH is the suggested mode. This also assumes that any modulating signals applied to the RF carrier have been properly DC restored for the application involved. Improper DC restoration in Amplitude Modulated systems will increase carrier levels, and in Frequency Modulation systems, will increase bandwidth consumption. Both of these will present the broadcaster with technical problems in his transmitter's capability and legal problems with his regulating agencies.

W2 Issue 13-16

1502/1503 DEFECTIVE CHART RECORDER PAPER

The possibility exists that some defective rolls of chart recorder paper (006-1658-01) may be in stock in the Service Centers. The defect involves the cardboard center of the roll being slightly longer than the width of the paper. This causes binding of the roll in the recorder and inability of the motor to properly advance the paper.

Stock should be checked and purged if necessary.

W2 Issue 13-18

1800 SERIES TEST STATION, SIGNAL SENSE CARD, MANUAL CORRECTION

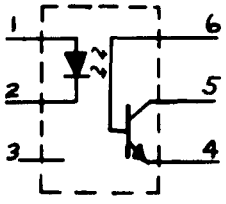
Reference:
Signal Sense Card Manual 070-3213-00
1804 Test Station Manual 070-3331-02
Schematic Diamond 57A
1805 Test Station Manual 070-3338-00
Schematic Diamond 57

(ARTICLE CONTINUED ON THE NEXT PAGE)

1800 SERIES TEST STATION, SIGNAL SENSE CARD, MANUAL CORRECTION (CONT.)

1807 Test Station Manual 070-4134-00
Schematic Diamond 48

The pin numbers on the optical isolator P/N 156-0109-00 are not shown on the schematic. On the 670-3782-00 the IC's are U21, U22, U23, U24, U44, and U34. On the 670-3782-01 the ICs are U21, U23, U24, U25, U44, and U34. Below is a drawing of the IC pin configuration.



156-0109-00

W2 Issue 13-21

1910 +5V POWER SUPPLY FAILURES

REF: 1910 Service Manual
070-4523-00

Two 1910's recently received in a Service Center had the emitter lead of Q20 shorted to ground (Schematic 14). This was caused by the screws holding the rackmount latches. These screws had penetrated too far into the chassis, shorting an adjacent cable. Further investigation revealed the absence of the lock washers that were intended to be used with these screws (see items 71 & 72 on Figure 1 in the manual).

Please inspect any rackmount 1910's for these washers and install where necessary. Use P/N 210-0008-00. The washer should provide adequate clearance behind the screw, thus preventing this type of failure.

W2 Issue 13-21

1980 PRINTER PATCH

REF: 1980 Terminal Driver manual
070-2922-00

When a printer is attached to one of the RS-232C ports on the 1980 with the intention of using it as the report generator for scheduled or out-of-limits data, many parameters can be defined by the operator for the interface. The Application Programs also predefine these parameters to a set of default values, some with user-definable alterations available during initialization.

Careful attention to the default parameters, and how they may or may not apply to the line printer you are using is important.

For example:

> The Option 1 application firmware puts 0.02 (20msec) into the value for NLDLY, which is the delay that comes after transmitting an EOL (End of Line).

Printers such as the Tektronix 4641 require somewhat longer delays to insure that the carriage has sufficient time to return. In the 4641's case, a delay of about 200msec is desirable.

In order to institute this delay as a matter of routine power-up initiatization, a small "patch program" for the "START.BAS" program can be written as shown in diagram on the following page.

Line 1060 sets up several parameters should a printer get selected as the output device. The variable "I" defines the desired delay as a function of baud rate (BR). By setting I equal to 600/BR, a delay of 250msec (assuming BR=2400) will be set

(ARTICLE CONTINUED ON THE NEXT PAGE)

1980 PRINTER PATCH (CONT.)

```
1000 ! START.PCH FOR 4641 DELAY
1060 IF TP$='PRINTER' THEN A$=CHR(12)&CR$\B$=' '\Q$='OFF'\I=600/BR
```

up for the NLDLY parameter. This insures adequate carriage return time for the 4641.

This "patch" can be stored in Non-Volatile Memory (NVM0: or NVMI:) as a separate file nomenclated "START.PCH".

W² Issue 13-21

2465 INOPERATIVE SWEEP

On the 2465 only, if you have an inoperative sweep after going through the power-up routine here is a possible solution to the problem: Unsoldered A1R752 from the board and clip both leads to a length just long enough to go through the board. Re-solder the resistor back into the board. Now, check to see if you have a proper sweep.

If the leads of the resistor are too long, there is a strong possibility that one of the leads will short out to the delay line shield on the backside of the board.

W² Issue 13-20

4010-1 NOISY HARD COPY FIX

References: 4010, 4010-1 Service Manual, 070-1183-02.
4012 Service Manual, 070-1461-01.
Corporate Mod #47940.

A modification has been approved to improve the terminals ability to make good hard copies. This will also reduce the time required to adjust for a good hard copy.

The modification consists of replacing the 4010-1 Hard Copy Tarsig Amplifier card (p.n. 670-1744-XX) with the 4012 Hard Copy Tarsig Amplifier card (p.n. 670-2570-02), replacing the P100 five hole harmonica cover (p.n. 352-0201-00) with a seven hole harmonica cover (p.n. 352-0203-00) and setting up a new main cable assembly (p.n. 179-1757-07), with the seven hole harmonica cover, as a field replaceable part. P100 is part of the 4010-1 main cable assembly. To match the J number of the 670-2570-02 H.C.A. card, this will change to P159.

Wires in the new P159 harmonica connector should be as follows:

P159 Pins	Signal	Wire Color Code
1	Not Used	
2	+15 Volts	2-1
3	GND	O-N/9-1 Coax Gnd
4	-15 Volts	7-O
5	+5 Volts	2-O
6	Tarsig	9-13
7	Not Used	

An 050 kit, part number 050-1774-00, has been set up to implement this change in the field. The kit consists of only H.C.A. card, the seven hole harmonica cover and installation instructions. This kit is available at this time, but should only be installed on an as needed basis.

W² Issue 13-21

4016-1 POWER CORD HOLDER HINT

Ref: 4016 Service Manual, 070-2661-00

On the 4016, the power cords that connect to the back of the display have a tendency to work loose and develop an intermittent connection. This condition is caused by the weight of the power cord hanging on a quick disconnect type of power connector. This condition can be alleviated by using a Tektronix part numbered, self adhesive cable clamp. The cable clamp, p.n. 343-0853-00, has a 1/2" diameter loop and is made of nylon. It is a reuseable clamp, in that, it has a loop that can be opened and closed several times easily.

Two clamps are used per 4016 terminal. One clamp is placed above each of the power connectors, three inches between the clamp and connector, with the clamp's snap opening positioned upward. The surface on which the clamp will be adhered should be cleaned with a alcohol pad if the surface is dirty or oily. After the clamps are placed, each power cord is looped upward through its respective cable clamp and the clamp is then closed. The cord is then allowed to hang down. The hanging cords now have their weight resting mainly on the loops of the cable clamps and not the power connectors.

W^2 Issue 13-16

4027/27A RELIABILITY MODS TO DEFLECTION BOARD

Ref: 4027/27A Service Manuals, 070-2656-00, 070-2832-00, 070-4169-00, 070-4176-00

Corporate Modification No. 45318

Corporate Modification Number 45318 fixes four reliability problems on the 4027/27A Deflection board and corrects a secondary failure on the LVPS. The new Deflection board is part number 672-0748-03.

The following problems/fixes are implemented with the -03 board.

1. Problem:
   Loss of horizontal sync.

   Fix:
   The flyback sense resistors R291 and R992 are changed from carbon film to metal film. Their new part numbers are: R291 = 323-0385-00 and R992 = 323-0165-00. The older resistors could not dissipate enough heat and would open.

2. Problem:
   At power down, high voltage spikes on Q1102 would cause Q1102, C491 and CR391 to break down causing loss of horizontal deflection.

   Fix:
   A new diode, CR322, part number 152-0242-00, was added in series with R324. This is done as follows: Lift the end of R324 which connects to the junction of C324, C322 and R226, insert the anode end of the new diode into this hole and connect the cathode to the lifted end of R324.

   R227 was also changed to a 41.2K ohm resistor, part number 321-0348-00.

3. Problem:
   Characters on the screen may be irregularly spaced.

   Fix:
   C215 and C313 were replaced with closer tolerance parts (+80% to -20% changed to 10% parts). Their new part number is 283-0167-00.

4. Problem:
   Horizontal jitter on display screen.

   Fix:
   The cause of this problem was an oscillation in the feedback loop of the horizontal flyback. To correct

(ARTICLE CONTINUED ON THE NEXT PAGE)

4027/27A RELIABILITY MODS TO DEFLECTION BOARD (CONT.)

this C100, a 68 pf capacitor (P/N 281-0785-00) and R100, a 51 ohm resistor (P/N 315-0510-00) was added to the input of the Phase Shifter circuit. To install these, first cut the run on the back of the board between TP101 and pin 1 of U101. Then, on the front of the board, add the resistor between TP101 and pin 1 of U101 and add the capacitor between pins 1 and 8 of U101.

Some of these problems were also suspected as a cause of intermittent failures of Q121 and Q191 on the low voltage power supply. These fixes along with some improved assembly processes appear to have corrected this failure.

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4052/4052A/4054/4054A FIRMWARE INFORMATION

The chart on the following page is a list of all the CRC's for the 4052/4052A/4054/4054A system firmware and current level firmware of each 4052/4052A/4054/4054A ROMpack.

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4054/4114/4016-1/GMA101A/GMA102A/GMA125 618 POWER SUPPLY INTERCONNECT CABLE MODIFICATION

Reference:
Mod #M43296
4054 Service Manual, p.n. 070-2839-03
4114 Service Manual, p.n. 070-3818-00
4016-1 Service Manual, p.n. 070-4551-00
GMA101A Service Manual, p.n. 070-2598-00
GMA102A Service Manual, p.n. 070-3635-00
GMA125 Service Manual, p.n. 070-2618-00
618 Service Manual, p.n. 070-2767-00

The 4054, 4114 power supply interconnect cable (p.n. 175-2684-00) and the 4016-1, GMA101A, GMA102A, GMA125 and 618 power supply interconnect cable (p.n. 175-2006-00), have both been changed to p.n. 175-2006-02. The Molex connectors used in the power supply interconnect cables (p.n. 175-2684-00) and (p.n. 175-2006-00) have had a history of poor contact reliability.

The single contact type connectors (p.n. 131-1790-00) and Molex housing (p.n. 204-0751-00) have been replaced by three point Molex Trifurcon connectors (p.n. 131-2728-00) and Molex housing (p.n. 352-0652-00). Also, the cable has been lengthened from 16" ±.5 to 17" ±.250.

The serial number breaks for the products that have the mod incorporated at the Factory are as follows:

4054	B012326
4114	B021445
4016-1	B041160
GMA101A	B043859
GMA102A	B065634
GMA125	B040525
618	B013181

When installing a new cable, the pins that have overheated and have discolored the circuit board and/or the housings of the old cable, should be resoldered. Reason for doing this is that any pins that have overheated, may have caused their corresponding solder joints to deteriorate (melt and oxidize). The power supply interconnect cable connector housings should be visually inspected for discoloration, and the corresponding pins for contact surface deterioration anytime that service is required on an applicable product.

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4052/4052A/4054/4054A Firmware Information
June 16, 1983

4052/4052A/4054/4054A ROMpack CRC's:

Editor ROMpack 4052/4054 R06 Level 2.0

U1	160-1414-00	----	
U11	160-1415-00	2D58	(1 CRC for both)

SPS ROMpack #1 4052/4054 R07 Level 2.0

U1	160-1416-00	B6B3	

SPS ROMpack #2 4052/4054 R08 Level 2.0

U1	160-1417-00	---	
U11	160-1418-00	FF43	(1 CRC for both)

Real Time ROMpack 4052/4054 R09 Level 3.0

U21	160-0762-02	673E	

4909 Advanced File Manager ROMpack 4052/4054 R10 Level 1

U1	160-1337-00	----	
*U11	160-1338-00	COCO	(1 CRC for both)

Character & Symbol ROMpack 4052/4054 R11 Level 1

U1	160-1313-00	----	
U11	160-1314-00	5AA8	(1 CRC for both)
U13	160-1315-00	----	
U15	160-1316-00	6051	(1 CRC for both)

Graphics Enhancement ROMpack R12 Level 1.0

U1	160-2039-00	37D2
U11	160-2040-00	6FDC
U13	160-2041-00	98B2

GPIB Enhancement ROMpack 4052/4054 R14 Level 1.0

U1	160-1638-00	----	
U11	160-1639-00	B50F	(1 CRC for both)

GPIB Enhancement ROMpack 4052A/4054A R14 Opt. 1A Level 1.0

U1	160-2026-00	----	
U11	160-2027-00	8756	(1 CRC for both)
U13	160-2043-00	B399	

*Checksum in this line was corrected.

4110A/4112A/4113A/4114A FLEXIBLE DISK DRIVES TWO WIRE STRAPS

Shugart has a new board for their 8" flexible disk drives, p.n. 119-0977-05. It was brought to our attention that some of these have already been shipped in new instruments.

All straps are the same for the new boards, although the location may have changed. See the tables in the 4100 Series F42/43 Disk Options Service Manual when strapping.

The wire jumpers that we install are different. The wires are installed as shown in fig. 1 and fig. 2. The cables and straps will be covered in the F45 Disk Option Service Manual (available Week 36) and a correction is being done to the F42/43 Disk Option Service Manual.

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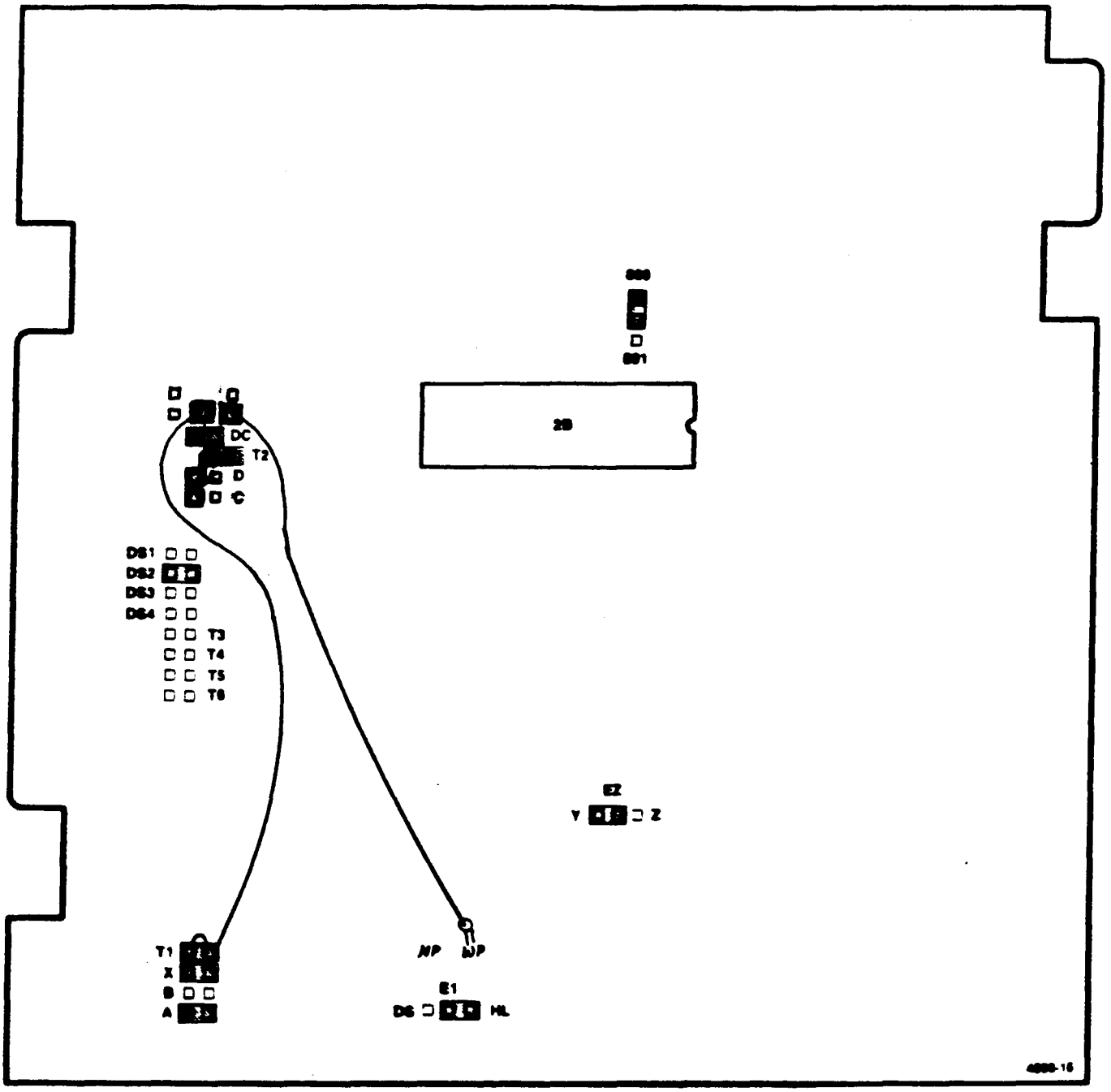

Figure 1. Drive 0

4110A/4112A/4113A/4114A FLEXIBLE DISK DRIVES TWO WIRE STRAPS (CONT.)

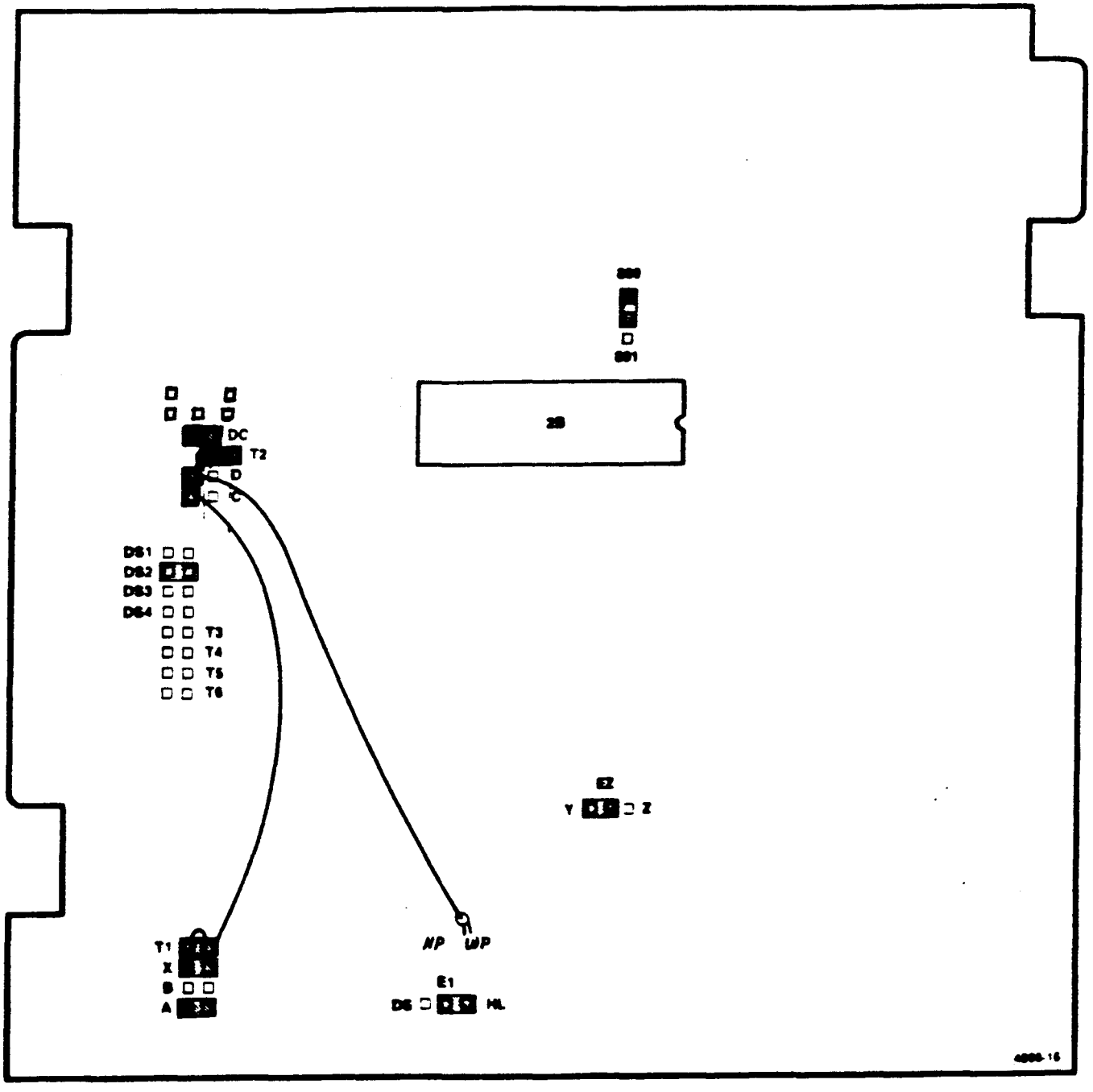

Figure 2. Drive 1

4110/4112/4113/4114/4112A/4113A/4114A/4116A PROCESSOR BATTERY MOD 51340

The NiCad battery on the Processor board has had a high rate of failures. This battery, p.n. 146-0040-00, is used to power the CMOS RAM which stores the user selectable operating parameters. If the battery fails, the set up parameter stored will be returned to their default conditions. This is indicated by a message, "Setup Default Reset", displayed on the screen at power-up. The replacement battery is a lithium battery, p.n. 146-0045-00, with a life rating of ten years, and requires no charging circuit. The charging circuit components will be removed with the old NiCad battery.

To implement Mod 51340, refer to Fig. 1 and 2 while doing the following steps:

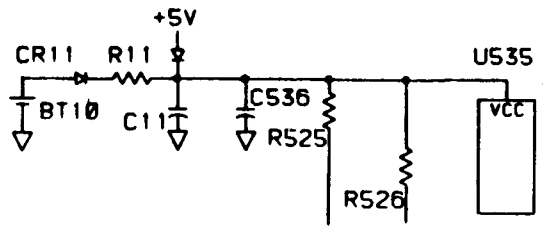

Fig 1. Schematic Diagram

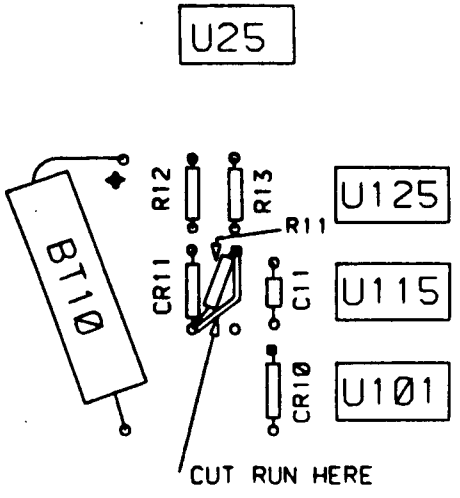

Fig 2. New Component Locations

1. Remove CR9, CR10, CR11, BT10, R11.
2. Add new CR10 (152-0322-00) to replace old CR10.
3. Cut run on surface of board between R11 and CR11.
4. Insert CR11 (152-0322-00) where R11 was removed. Place CR11 in the circuit so the anode is to the battery and the cathode is connected to the run just cut.
5. Move R9 (270 ohms) to bridge the cut run. Attaching one leg to the cathode of CR11 and the second leg to the pad at the other end of the cut run. This 270 ohm resistor will now be referred to as R11.
6. Install the new battery to replace the old battery which was removed. Keep the negative lead short. This battery is slightly longer than the one removed. It will need to be installed at a slight angle for clearance. Use the insulation to cover the positive lead which will need to loop back to the pad labeled with a plus.

The components to make this modification are in a kit (050-1792-00). Upon completion, the 672-XXXX-01 part number will need to be rolled to 672-XXXX-02.

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4113A OPTION 9 045-0054-00 UPGRADE KIT

The 4113A Option 9 firmware in the 045-0054-00 kit has a problem. This firmware is the release 2 that is now being shipped in the Code 18 program. The release 2 firmware exhibits the problem on certain files when doing a "copy sc: to filename". When this problem occurs, the terminal may do

(ARTICLE CONTINUED ON THE NEXT PAGE)

4113A OPTION 9 045-0054-00 UPGRADE KIT (CONT.)

unexpected things. The problem has caused the terminal to jump into self-test, operate correctly, lock-up, etc., depending on the operation previously run. The only known way to recover is by performing a master reset operation.

Do not install any more of the 045-0054-00 kits. Return all kits to stock. Information about the continuation of this Code 18 program will follow when the details are confirmed. This problem should not affect operation of the terminal except Option 9 functions. Customers that have been updated should be made aware that the "copy sc: to filename" command may not operate correctly.

W2 Issue 13-19

4114/4114A/4114A30/4116A/4116A30 DISPLAY CONTROLLER SHORT VECTOR MOD

Ref: Mod 51263
4114 Service Vol. 2, 070-3818-00
4114A/4116A Service Vol. 2, 070-4512-00

The Display Controller (670-6494-03) in the 4114, 4114A and 4116A has been rolled to p.n. 670-6494-04 by Mod 51263.

An 050-1791-00 has been set up to modify Display Control boards that have been found to cause the terminal to lock up when drawing short vectors or have short vectors that disappear. The 050 kit consists of instructions, an IC and six inches of wire.

To modify the Display Controller with the above symptoms, perform the following procedure.

1. Change U260 from a 74LS04 (156-0385-02) to a 74S04 (156-0323-02).
2. Lift pin 3 of U240 and solder one end of a 4" wire to it. Solder the other end of the wire to pin 11 of U55.
3. Solder one end of a 2" wire to pins 12 and 13 of U55. Solder other end of the wire to U155 pin 9.

The effective serial number breaks for this modification are:

4114A	B033300
4114A30	B020480
4116A	B010157
4116A30	B010112

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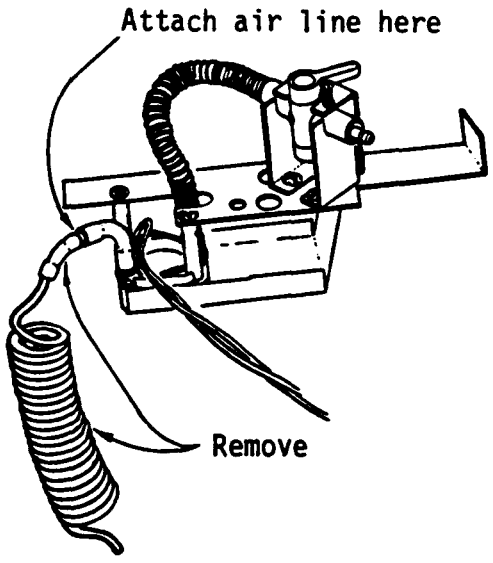
4691 INSTALLATION AND SPIRAL HOSE DISPOSITION

Ref: 4691 Service Manual, 070-4498-00.
Service Maintenance Information, 4691.

The 4691 is shipped with spiral hoses hooked up to the air inlet of the ink jet heads. The spiral hoses are only part of the shipping paraphernalia and should be removed when the 4691 is installed. At installation, the spiral hose and its attendant 1" piece of rubber tubing should be removed from each head. The air lines are then hooked up to the remaining short piece of rubber tubing coming from the air inlet on each head. Hooking the air lines up to the end of the spiral hoses and then operating the units in such manner may cause a spurious splatter on the copies.

(ARTICLE CONTINUED ON THE NEXT PAGE)

4691 INSTALLATION AND SPIRAL HOSE DISPOSITION (CONT.)



Ink Jet Head Assembly

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4691 LOW INK LEVEL DETECTION ADJUSTMENT

Ref: 070-4498-00, 4691 Service Manual

The 4691 low ink level detection adjustment on page 5-16 of the service manual is incorrect as far as the voltage levels are concerned. The ink that is now used with the 4691 requires that different detection levels be used for each color of ink.

The voltages are changed as follows:

1. Magenta, VR1 is adjusted so that the voltage on R10 is .8Vdc.
2. Cyan, VR2 is adjusted so that the voltage on R16 is .3Vdc.
3. Black, VR3 is adjusted so that the voltage on R22 is .6Vdc.
4. Yellow, VR4 is adjusted so that the voltage on R28 is .4Vdc.

All 4691's that are shipped from the factory have been adjusted to the correct voltage levels.

A correction to the service manual is being made.

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