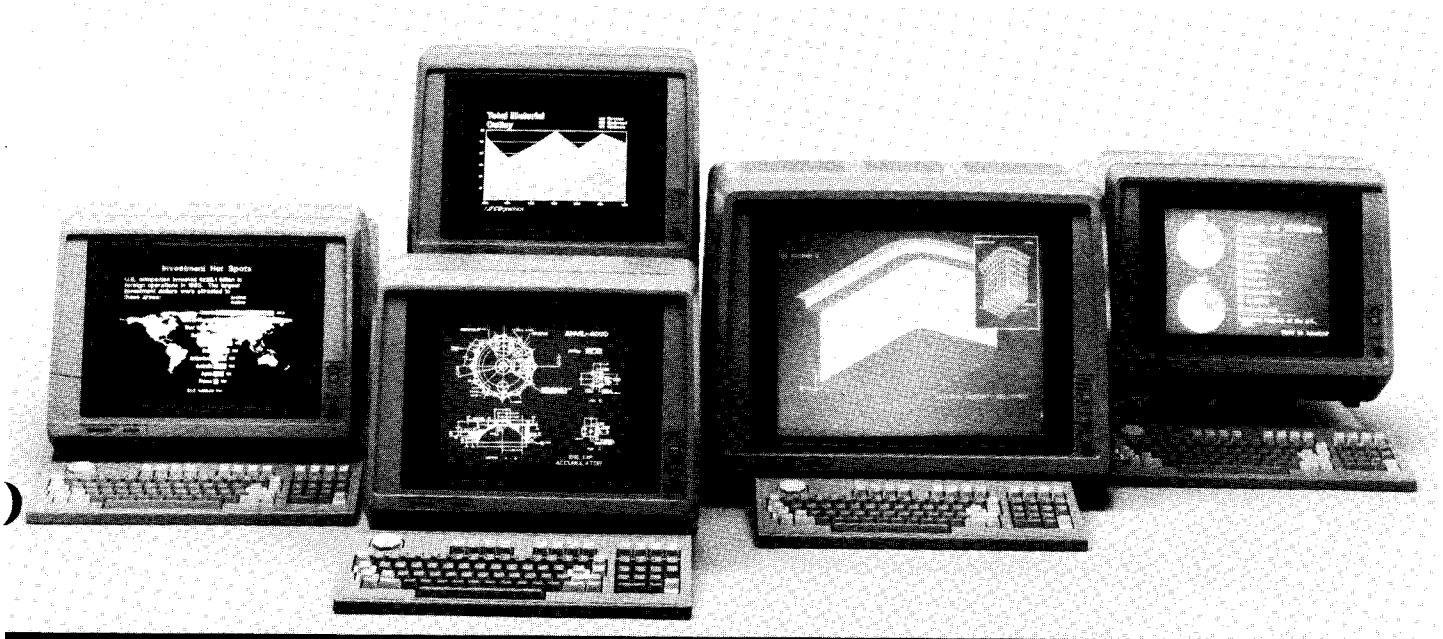
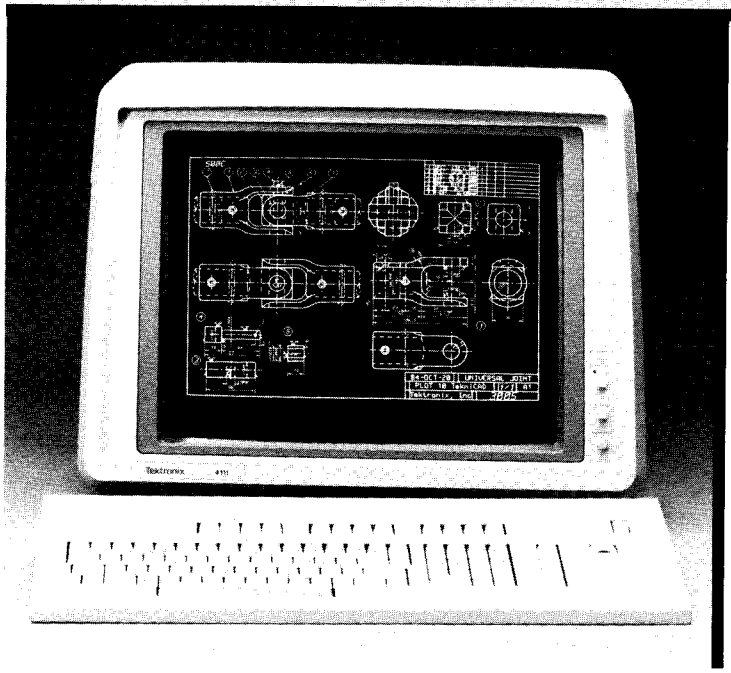
TEK CUSTOMER PRODUCT SERVICING INFORMATION

November 1985, Issue 41

# SERVICETEKNOTES





**The new high resolution 4111 Computer Display Terminal (4100 Series-compatible) from IDG, provides users with a 1024 X 780 pixel display and an extensive set of graphics functions such as multiple views, segments, surface support, and local zoom and pan. Priced at $12,950, the terminal is tailored to such computer aided design (CAD) applications as electrical engineering, mechanical drafting, and structural analysis. The 4111 is positioned between the 4109A and 4125 to reinforce Tek's commitment to a full family of high-performance graphics terminals.**

Published by Tektronix Service Administrative Support

Tektronix®
COMMITTED TO EXCELLENCE

# *4100 Series CDTs*

## New A models offer more features for less money

New A models of the 4100 Series Computer Display Terminals from Information Display Group offer more features for less money.

The enhanced desktop color terminals feature expanded DEC VT-100 compatibility, additional graphics manipulation capabilities, and support additional input and output devices. The new terminals cost $500 to $1,000 less than the original 4100 Series terminals.

The 4100A Series includes the 4104A ($2,995), 4105A ($3,495), 4106A ($5,995), 4107A ($6,995), and 4109A ($8,995); and the IBM compatible CX4106A ($6,995), CX4107A ($7,995), and CX4109A ($9,995). The CX4100A terminals are IBM 3270 plug-compatible and retain the full feature set of their 4100A counterparts.

Like the 4100 Series, the 4100A Series terminals are targeted for applications such as technical data analysis, presentation graphics, CAD drafting and previewing, computer programming, and text editing. The terminals also address the growing application area of shop floor control: they can be used as "display only" terminals in an automated "paperless" manufacturing floor environment. More sophisticated segment handling capabilities make the 4107A/CX4107A and 4109A/CX4109A suitable for more complex CAD applications.

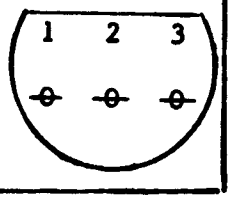
The 4104A is a new addition to Tek's graphics display terminal series. It offers balanced 480 X 360 resolution, four graphic colors and four dialog colors, and fast sophisticated graphics, including scalable graph text, a wide variety of patterns and line styles, 82 programmable keys, graphic input via the keyboard's joydisk, and an expansion path to the entire Tek graphics family.□

TABLE OF CONTENTS

## FG502 FET (Q200, Q202) ORIENTATION

The question has been raised about terminal identification on FET's with P/N 151-1042-00. This in turn causes confusion when replacing Q200 and Q202 in the FG502 Triangle Generator circuit. Below is a diagram that identifies the terminals on this particular case style.

| TERMINAL IDENTIFICATION |
|---|
| 1 SOURCE |
| 2 DRAIN |
| 3 GATE |




**Note: Bottom view of component is indicated.**

W2 Issue 15-15

## PG508 CONTROL ERROR LIGHT IMPROVEMENT

The CONTROL ERROR light will occasionally indicate an error when no error exists. This has been traced to differing vendor characteristics of IC A3U740. Motorola brand parts operate reliably in this circuit.

A new part number has been set up for Motorola brand parts, PN 156-0205-03. This new part can be installed in any PG508.

W2 Issue 15-17

## SC503 MODIFICATION KIT CORRECTION

REF: 050-1533-01 Mod Kit Instructions

It has been discovered that the instructions for Step (3), part two are not complete.

Zener diode VR1022 when removed should be replaced with R1025 (2.2M ohm) resistor which is included in the kit.

W2 Issue 15-15

## SPG1/SPG2 CAL PROCEDURE CHANGES

**REF: SPG1/SPG2 Instruction Manual P/N 070-2104-00**

**Enclosed with this issue as a pull out supplement are some recent changes/ corrections to the SPG1/SPG2 Cal procedure. (See A-1, 2 and 3)**

W2 Issue 15-16

## 7L12 REFERENCE LEVEL READOUT CIRCUIT MOD

REF: M58236
7L12 S/N B190000 & Above

The base bias circuit for Unijunction transistor Q2815 (P/N 151-0504-00) has been changed to insure a stable clock output signal for the Reference Level Readout 7-segment LED Display circuit. When Q2815 is not functioning properly, only one of the four 7-segment LEDs will operate. The following changes have been made to improve the stability of Q2815:

Change R2811 from 3.3M ohm to 2M ohm
P/N 317-0205-00

Change C2815 from 650PF to .001uf
P/N 283-0065-01

This mod changes the Reference Level Readout circuit board (A800) to P/N 670-4971-03.

A parts replacement kit (P/N 050-2095-00) has been set up for Field replacement of Q2815. The kit provides Q2815 (P/N 151-0504-00), R2811 (P/N 317-0205-00), C2815 (P/N 283-0065-01), and installation instructions.

W2 Issue 15-18

## 7L14: 200KHz SIDEBANDS

REF: M58746

A -15 Volt Power Supply decoupling capacitor has been increased in value to eliminate oscillations which may cause 200KHz sidebands on the displayed signal. Input bypass capacitor C2877 (.47uF, P/N 283-0203-00) has been replaced by a 2uF Ceramic Disk capacitor, P/N 283-0212-00. C2877 is mounted on the back side of A82, the CRT Readout Circuit board (P/N 670-4937-05).

W2 Issue 15-17

## 528A CRT FILAMENT VOLTAGE CHANGE

REF: 528A Instruction Manual
P/N 070-3662-00

Mod 57819

Mod 57819 has been implemented to extend CRT life in 528A's. The mod changes fuse F460 to a fusible resistor, FR490.

The parts required to implement this change are contained in a kit, P/N 050-2102-00.

Please install 050-2102-00 in all 528A's that are returned for service where not already done.

**NOTE:** Since the kit contains a UL required Caution label that is to be installed with the new fusible resistor, the complete 050 kit is the only recommended installation method. Partial installations from shelf stocks are not acceptable.

W2 Issue 15-16

## 670A SELECTABLE PARTS

REF: 670A Instruction Manual,
070-2201-01

One of the capacitors listed in table 6-4 of the 670A manual, as a selectable alternative for C5240, is no longer available.

P/N 285-0532-00 was a 0.15 ufd -2% + 20% 400 V cap.

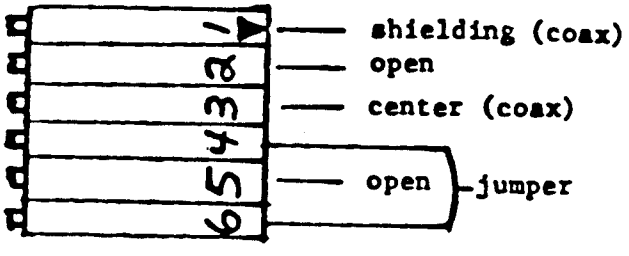
A suitable replacement part for this application is 285-1227-00, a 0.15 ufd +/- 2% 400 V cap.

W2 Issue 15-16

## 7612D CIRCUIT BOARD DISCREPANCY

REF: 7612D Instruction Manual
(070-2387-00)
Parts Location Diagram for the
A26 Deflection Amplifier
Circuit Board

Connector A26 J918 was changed when the circuit board went from a 670-4941-04 to the 670-4941-05 version. The connector on cable P918 will need to be modified to be compatible with the -05 version circuit board. The illustration below reflects these changes. P/N 352-0164-00 (Black plastic connector, 6-pin) is needed to make this change.




NEW

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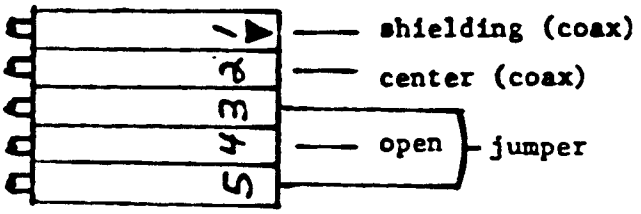
## 7612D CIRCUIT BOARD DISCREPANCY (continued)




OLD

W2 Issue 15-17

## 1430 INTERMITTENT NOISE PEDESTAL LOSS

REF: 1430 Instruction Manual
P/N 070-1455-00

Mod 58915

In high ambient static environments, such as electrical storms, the noise pedestal may drop out. This is caused by the Clear pins of U2063 being unterminated, and thereby assuming that these inputs will float high.

To insure that the Clear pins are at a high state, Mod 58915 ties them high by adding two small wire straps, one from U2271 pin 13 to U2063 pin 11, and one from U2063 pin 11 to U2063 pin 3.

Mod 58915 should be installed on all 1430's returned for routine service.

W2 Issue 15-19

## 1440 I3B WHITE CLIP LIMITATIONS

REF: 1440 Instruction Manual
P/N 070-1498-02

1440 I3B Manual Insert
P/N 061-1448-00

A recent input from a customer questioned the 1440 I3B's ability to properly White Clip the transients from a character generator.

The present design of the White Clip circuitry is meant to clip luminance signals. The circuit's clipping ability starts to degrade significantly at about 2.5MHz, therefore limiting its ability to address rapid transitions at or above chrominance frequencies.

External filtering may or may not help. The best alternative is to use a character generator that has control chrominance envelope risetimes.

W2 Issue 15-17

## 1450 SERIES CONVERTER CONTROL OSCILLATOR, INTERMITTENT OPERATION

REF: 1450-1 Instruction Manual,
070-2200-01

1450-2 Instruction Manual,
070-2998-00

1450-3 Instruction Manual,
070-3660-00

MOD 58116

In order to address an occasional tendancy of the A56 converter control oscillator not to self-start, Mod 58116 changes C03 from 20pfd to 16.8pfd (P/N 283-0663-00).

This Mod may be installed to address the stated symptom, and will be installed in all new 1450's (except 1450-1 Opt. 3) from the factory starting with S/N B020234 (1450-1), B020194 (1450-2) and B010275 (1450-3).

W2 Issue 15-15

## 1450 RELIABILITY IMPROVEMENT/AS REQUIRED SERVICE UPDATE PROGRAM (REVISION #1)

REF: 1450 Service Update Plan #3007

The purpose of this article is to announce a revision to the original expected program termination date.

This UPDATE PROGRAM addresses overall reliability issues of the instrument by making changes to the identified areas when the instrument is received for repair.

Original Plan Distribution

May 26, 1982

Expected Program Termination

May, 1984

**REVISED PROGRAM TERMINATION DATE**

**INDEFINITE**

W2 Issue 15-17

## 1450 SERIES INTERMITTENT QUADRATURE JITTER

REF: 1450-1 Instruction Manual P/N 070-2200-01

1450-2 Instruction Manual P/N 070-2998-00

1450-3 Instruction Manual P/N 070-3660-00

**For those Technicians who have had a 1450 in for repair with complaints of intermittently excessive Quad Phase Jitter, a leaky capacitor may be the problem.**

**Two capacitors to check are A50C85 and A56C73. Both are 150pfd, P/N 283-0644-00.**

**Past experiences have shown that one or both of these capacitors was faulty when the quad phase jitter had spurts of about 50 twice an hour.**

W2 Issue 15-16

## 1700F10 FIELD UPGRADE KIT

REF: 1700F10 Instruction Manual, 070-5812-00

The 1700F10 Field Upgrade Kit is now available.

The 1700F10 has been designed to allow the owner of a 1710B or 1711B to retrofit his instrument for DC capability. The DC power requirements are 11-15 VDC, with a current consumption of less than 2 Amps at 12 VDC.

The upgrade kit consists of a circuit board, appropriate interconnect cables, and the manual.

The initial use for this kit is the 1710B series, however, it will be added to some future instruments.

No service problems are anticipated with the F kit itself.

However, when installed in a 1710B with the intent of using the BP1 as the DC source, the owner may notice that the DC cable from the BP1 is a bit short. It will be necessary to install the DC cable, that is supplied as an accessory, into the BP1, cut to an acceptable length.

The manual is orderable now. TV Service technicians can obtain their copy by ordering P/N 070-5812-00.

W2 Issue 15-19

# SERVICE MAINTENANCE INFORMATION

## 1710B/1711B WAVEFORM MONITORS

INTENT: Provide supplementary or additional maintenance information not available in the Service Implementation Plan or Service Manual. Reference should be made to the published Service Implementation Plan, dated May 3, 1985.

### I. PRODUCT DESCRIPTION

The 1710B (NTSC) and 1711B (PAL) are low cost television waveform monitors that provide all of the commonly used waveform measuring display modes. In addition, a dual filter display and relative burst phase indicator have been added.

These products will be shipped without cabinets and, at present, there are no factory options. There are, however, five field-installable options. They are:

1700F00 - Plain TV Grey aluminum case

1700F02 - TV Grey Carrying case w/handle and feet

1700F03 - MPS case (necessary when used with BP1 battery pack)

1700F05 - 19 Inch rack adapter case

1700F10 - DC Operation Kit (12 VDC)

### II. MANUALS

There is one manual for the 1710B/1711B. Its part number is 070-5522-00. It contains operating and service information. The 1700FXX Kits will have their own Manuals or Data sheets as appropriate.

### III. DIAGNOSTICS

The 1710B and 1711B, being primarily analog instruments, have minimal internal diagnostics. The diagnostics that are available to test the CPU kernel are described in the Theory of Operation-Microcontroller section.

(ARTICLE CONTINUED ON NEXT PAGE)

Service Maintenance Information 1710B/1711 Waveform Monitors

## IV. TROUBLESHOOTING HINTS

Since the majority of the instrument is analog, standard troubleshooting techniques and test instrumentation apply. Standard precautions concerning workmanship and static-sensitivity also apply. A technician who is familiar with previous waveform monitor (528A, 1740) topology should encounter very few problems in the 1710B/1711B. A thorough review of the Theory of Operation and Schematics is highly encouraged.

Schematic 1 contains the entire Vertical section, from input to CRT deflection. An interesting problem on this page to watch for is U491, which is a three-section FET switch. An excessive load on any input or output can cause the entire package to appear defective, and since the three switches are used in three separate areas of the Vertical section, it can lead one down the wrong troubleshooting path.

The load may consist of an input or output being pulled toward a supply or a ground by a defective connecting component, and will normally cause the device to become hot to the touch. Look for the shorted cap, transistor, etc. The switch may not be defective.

To effectively eliminate the DC Restorer, for troubleshooting purposes, ground pin 3 of U595.

Schematic 2, the Horizontal section, is also a fairly complete representation of all horizontal Functions. Horizontal trace jitter can be isolated to either the sweep generation/timing circuitry or the horizontal amplifier circuitry by shorting pins 6 and 7 of U556. This will kill the sweep, leaving a dot on the CRT that can be observed for jitter problems.

Schematic 3, the Front Panel controls, presents no problems if you make the following changes to your manual.

- R420 should be connected between +5 volts and ground.
- The incoming line labeled ROW 2 only goes to S520.

Schematic 4, the Microcontroller section, contains what little processor logic that exists in this instrument. Upon initial power-Up, with no buttons pushed, looking for a low on pins 1, 2 and 3, and a high on pins 4, 5 and 6 of U223 will help to isolate switch

(ARTICLE CONTINUED ON NEXT PAGE)

Service Maintenance Information 1710B/1711 Waveform Monitors

malfunctions. As in the majority of "bussed" data architectures, checks for proper highs and lows, and independent operations of address and data lines can isolate most logic devices.

Schematic 5, the Burst Phase circuitry, is new to this instrument, but is not inherently complex. Problems on this page can be best approached by first verifying that the loop, consisting of the Phase Detector, the VCXO and the Voltage-Controlled Phase Shifter, is functional. The circuit needs to have an A or B input signal and an external reference signal applied. If the loop is locked, pin 12 of U632 should be about 6 volts, and pin 8 should have Fsc/2 pulses coming in. If there are no pulses coming from U344B, the Votage-Controlled Phase Shifter is next. Look for a ramp coming into U446A and a DC level coming into U446B. The DC level should never be above or below the ramp's peak levels. The Demodulators (U846 and U742) should have R-Y B-Y type signals at Pin 12. U846, Pin 12 if everything is working right, should also have the same voltage at the peak of a subcarrier cycle as pin 1 of U935A. Pin 10 of U926B can be forced high or low, and this should cause the counters to increment up or down. The DC Level at U446B should then shift up or down accordingly.

Schematic 6, the Low Volts supply, is a standard switching supply. The +15 volt Housekeeping supply will have a small ramp on it. Excessive load conditions can be isolated by removing P456. If the ramp size changes, load was excessive and should be isolated. The action of a properly functioning kick starter circuit can be observed as a small amount of oscillation on a step transition at the collector of Q463.

Schematic 7 is the High Volts supply. Many failures in this circuit can kill the low volts supply. R544 can isolate the +40 volt supply, L437 can isolate the +100 volt supply, and C428/C532 can isolate the Z axis supply from the High Volts oscillator.

## V. MODIFICATIONS

Since the 1710B and 1711B have been introduced, the following production modifications have been implemented.

Mod 58059 addresses the following problems:

1A Glitches in the Vertical Section

1B ECB clean-up/TP parts layed down

(ARTICLE CONTINUED ON NEXT PAGE)

## Service Maintenance Information 1710B/1711 Waveform Monitors

2 Synchronization with signals 6dB down

3 Burst Phase operability over a wide range of amplitudes

4 Vendor supply problems with P/N 151-0346-01

Item 1A was addressed by relocating some components and adding R975, a 15 ohm resistor (P/N 315-0150-00), in the line coming from pin 9 of U875.

Item 2 was addressed by changing R285 from 22K ohms to 2.2K ohms (P/N 315-0222-00).

Item 3 was addressed by changing R730 and R940 from 2K ohms to 1K ohm (P/N 315-0102-00).

Item 4 changed Q367 to P/N 151-0346-00.

Items 1 and 4 are "As required", 2 and 3 are "Recommended".

These changes were implemented at the factory starting with S/N B020206 (1710B) and B020115 (1711B).

Mod 58521 addresses the following problems:

1. The threshold of the Comparator in the Reference Set Loop of the Burst Phase Circuit was too sensitive, causing the yellow LEDs to light instead of the two center green LEDs.

2. Insufficient adjustment range for the Calibrator.

3. Problems with the Burst Phase Display inconsistently zeroing in the Dual Filter and Burst Phase modes.

Item 1 was addressed by changing:

R916 from 10.0K ohms to 30K ohms (P/N 315-0303-00)

R922 from 110K ohms to 430K ohms (P/N 315-0434-00)

R648 from 33.2K ohms to 54.9K ohms (P/N 321-0360-00)

R450 from 9.31K ohms to 7.87K ohms (P/N 321-0279-00)

Item 2 was addressed by changing:

R294 from 4.75K ohms to 3.92K ohms (P/N 321-0250-00)

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Service Maintenance Information 1710B/1711 Waveform Monitors

Item 3 was addressed by changing:

U233 from P/N 160-3289-00 to P/N 160-3289-01

Item 1 thru 3 are "Recommended"

These changes were implemented at the factory starting with S/N B020245 (1710B) and B020126 (1711B).

MOD 58730 addresses the following problems in the 1711B only:

1. Intermittent Burst Phase Lockup

Item 1 was addressed by changing

R449 from 768 ohms to 909 ohms (P/N 321-0189-00)

R450 from 7.68K ohms to 7.32K ohms (P/N 321-0276-00)

These changes were implemented at the factory starting with S/N B020149.

## VI. TEST EQUIPMENT

No new and unique test equipment will be required for 1710B/1711B service. The instruments are serviceable with TV Level 1, NTSC or PAL as appropriate.

## VII. TEST DATA

Before and After Cal Data sheets will be made available through the Factory Service Cal/Cert Lab.

W2 Issue 15-16

## 1741 VECTOR JITTER WITH TAPE RECORDER

REF: 1740 Series Instruction Manual P/N 070-4473-00

When using the 1741 to monitor tape machines, the user may notice a fair amount of vector jitter, or burst phase jitter. This is an expected anomaly in tape recorders, will vary from manufacturer to manufacturer, and can usually be corrected through Time Base Correctors.

The 1741, however, was designed to show the jitter present in an uncorrected signal, by sampling every other burst and displaying its immediate phase relationship. Previous Vectorscopes (521, 1421) would not display as much jitter because they sampled every burst, and averaged.

For the 1741 user who would rather see a jitter-free vector display, the 1741 can be made to average the bursts similar to the 521's or 1421's.

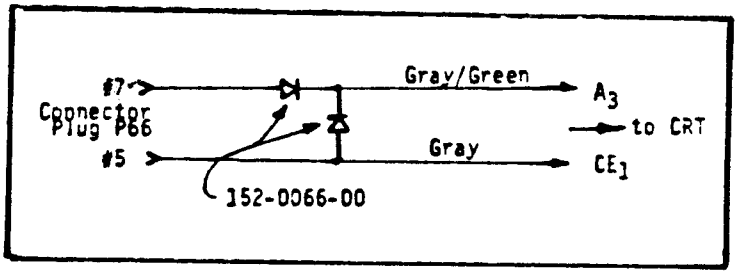
To accomplish this change, P728 (Schematic 6) can be put in the "1740" position. This should help in all but extreme cases of Burst Phase jitter.

W2 Issue 15-16

## 4016/4116/616/GMA125/MEG 25" DVST CHANGE TO FIX HARD COPY NOISE PROBLEM

Many 25" DVST CRT's P/N 154-0807-54 built during the past six months contained a defective resistor (1000 ohm, 3 watt) located in the flood gun anode lead on the wiring harness. The defective resistor was caused by overheating during a CRT manufacturing process.

CRT manufacturing has now eliminated the resistor from the flood gun anode lead; and to control hard copy oscillation of the CRT, installed two diodes (152-0066-00) in the A3 and CE1 leads of the wiring harness. See diagram. The diode will pull the CRT A3 wallband to about 238 volts along with CE1 while the tube is in the hard copy mode.




The CRT's using the new wiring harness configuration will carry P/N 154-0807-55 and will be a direct replacement for the older -54 CRT's. This change was effective in week 32, 1985. The older CRT part number will no longer be available. (Note that the new part number represents only a change to the wiring harness; the actual CRT is the same).

As in the past, tubes will occasionally exhibit noisy hardcopies when copying a very small amount of information. (Copies are clean when greater amounts of stored information is copied). This hard copy oscillation can be eliminated by reducing CE2 wallband voltage to approximately 50 to 70 volts.

(ARTICLE CONTINUED ON NEXT PAGE)

## 4016/4116/616/GMA125/MEG 25" DVST CHANGE TO FIX HARD COPY NOISE PROBLEM (continued)

Also, as a reminder when replacing older 25" DVST's with the newer tubes, the flood gun heater voltage should be reset to 40V.

W2 Issue 15-15

## 4109/CX4109/4109A/CX4109A NEW MONITORS

Ref: 4109/CX4109 Service Implementation Plan, April 15, 1985

4109/CX Service Manual 070-4890-01 with revisions of May 1985 in the Checks and Adjustments; Section 5

4109/CX CDT Service Manual Correction, change reference M56850, dated 4-12-85

4109/CX CDT Service Manual Correction, change reference C2/885, dated 8-1-85

119-2023-00 19-inch Display Module Service Manual 070-5656-00

Corporate Modification M56850

### Reason for Wizard

The GMA301 monitor used in the 4109 series of products has been replaced by a simpler, less expensive monitor purchased from Panasonic. This new monitor will be shipped in 4109/CX4109 products with serial numbers of B02XXXX and in all 4109A/CX4109A products.

### 119-2023-XX Differences

There have been three versions of the new monitor shipped in the 4109/A/CX products. The first two versions of this display module were identical. The third version, part number 119-2023-02, is currently being shipped in the 4109A and CX4109A products only.

The 119-2023-00 display module was originally shipped from the vendor without a connnector for the degauss coil and was reworked by Tektronix manufacturing before being built into the 4109/A/CX products. When the vendor added the degauss coil connection, they rolled the part number up to the next suffix level.

The 119-2023-02 display module is different from the earlier two versions of the monitor because of two corporate modifications to improve reliability of the display module.

### Field Replaceable Units

The assemblies within the new 19-inch monitor (119-2023-XX) closely resemble those of the 13-inch display (119-1988-00) already in the 4106/CX4106 and 4107/CX4107 products. The following is a list of the Field Replaceable Units in the 4109/CX4109/4109A/CX4109A products using the new 119-2023-XX monitor.

| FRU Name | Part Number |
|---|---|
| Analog Interface Bd | 118-4630-00 |
| Main/Socketboard Assy | 118-4629-00 |
| CRT Assy (not exch) | 118-4631-00 |
| Power Supply | 620-0019-02 |
| RAM 3 Bd | 670-7196-XX |
| Display Control Bd | 670-8233-XX |
| CX Interface Bd | 670-8721-00 |
| Terminal Control Bd | 670-8814-40 |
| Video Interface Bd | 670-9045-01 |

(ARTICLE CONTINUED ON NEXT PAGE)

4109/CX4109/4109A/CX4109A
(continued)

**Note:** The Main Board, Socket Board, AC Filter Board and HV Brick are replaced as an assembly. Also, the Video Interface Board is a relayed-out version of what previously was called the Digital Piggyback Board.

## Documentation

Preliminary documentation of the new 19-inch Panasonic display has been previously distributed to the field. This distribution was in the form of:

1. A revision (dated May 1985) to Section 5: Checks and Adjustments, in the 4109/CX Service Manual, part number 070-4890-01

2. Printing a temporary service manual; 119-2023-00 19-Inch Display

There is a now available a new manual, 119-2023-00 19-Inch Display Service Manual, part number 070-5656-00, which replaces the temporary manual. The microfiche for the 4109/CX product has been updated (August 1985) to reflect the changes necessary to support the new 119-2023-XX display module and the older 119-1988-0X display module.

## Calibration Concerns

**Note:** Prior to attempting any calibration or adjustment of the 119-2023-XX monitor, the 4109/A/CX must have a 40-minute warm up to assure that changes made will remain in specification. This is a change from the normal 20-minute warm up period.

The BRIGHTNESS control is not part of the monitor and each monitor must be calibrated to the control attached. In the field, when either the BRIGHTNESS control, the Analog Interface Board, or the complete display assembly is replaced, the SUB BRIGHT potentiometer (VR1306) on the Analog Interface Board will have to be readjusted. Directions for this procedure are documented in the 119-2023-00 Temporary Manual and in the new 070-5656-00 Service Manual.

Calibration adjustments and checks on the Main Board and Socket Board are eased by the use of a new power extender cable, part number 067-0163-00. This cable connects between the Power Supply at J4 and the Terminal Control Board at P11. This allows the removal of the Terminal Control Board, Display Control Board and RAM 3 Board as a unit from the 4109/A cabinet bottom. On a CX4109/A the CX Interface Board may also be removed to access the adjustments.

Without the CX Interface Board the CX4109/A reverts to the functions of a standard 4109/A. To access and adjust the various trimmers on the Socket Board, use the 003-0675-00 alignment tool.

The degauss circuitry for the 119-2023-XX is weaker than on previous displays. Therefore, use of the hand-held degaussing coil (part number 003-1322-00) may be required for complete color purity of the display.

The preliminary documentation describes a convergence adjustment. Such an adjustment is discouraged except as a last resort. If during the convergence adjustments, the convergence cannot be recovered, the CRT assembly must be replaced.

If your 067-1181-00 calibration graticule has not been upgraded to the -01 suffix level, there is a kit (020-1402-00) available. This kit adds brackets and pins to make it useable on the GMA201, GMA301, GMA302, the 119-1988-0X display module and the 119-2023-XX display module.

W2 Issue 15-19

## 4115B/GMA304 CRT FRONT PANEL REPLACEMENT

Ref: GMA304/4115B Display Service 070-4668-01

When replacing the CRT Front Panel, nomenclated monitor retainer, order part number 343-1092-04. If you order a 343-1092-00, you will get a front panel that does not have conductive coating inside. Without this conductive coating, the power supply may cycle and shut down the display.

W2 Issue 15-18

## 4958 DIP SWITCH SETTINGS

Below are the normal DIP switch settings (on the Digitizing Processor board) for the three 4958 options:

| OPTION | SWITCHES 1-5 | 6 | 7 | 8 |
|---|---|---|---|---|
| 03 (17 x 24) | all closed | 0 | C | C |
| 05 (36 x 48) | all closed | 0 | 0 | C |
| 06 (44 x 60) | all closed | 0 | 0 | 0 |

This assumes connection to a Tek 4100 terminal's peripheral port at 9600 baud.

W2 Issue 15-18

## 4692 INK-JET HEAD ASSEMBLY; SPIRAL COILS DELETED

The spiral wire wrap around the black ink tubing has been deleted from the ink-jet head assembly. The coils were found to be unnecessary, as the current carriage cover does not tend to compress the ink tubing.

If you should install a new head assembly without coil in an older 4692, make sure that the new carriage stiffener bracket and cover supplied in the 4692 Service Update Kit has been installed.

W2 Issue 15-19

## 4695 BLACK INK CLOG FIX

Ref: Wizards Workshop, Issue 15-14; 4695 Jets Clogged/Erratic Dots Caused by Thick Ink....

We have received many reports that the black ink clogs more frequently than any other. This is believed to be caused by two factors:

- The ink itself gets more viscous from evaporation.
- The Tek system usage tends to consume the other three colors of ink in greater quantity, resulting in less frequent replenishment of black ink:

Engineering and Marketing are working on a long-term plan to replace the black ink with a formula that is less viscous. For customers that experience this problem, suggest that they add 2-4 drops of maintenance liquid every time they add a black ink cartridge. And if the copier has been sitting idle for several weeks, suggest a head wash plus 10-20 drops of maintenance liquid in each reservoir before attempting operation.

W2 Issue 15-17

## 4695: LUBRICATE IDLER PULLEY

Ref: Service Manual, 070-4645-00, Section 9

If periodic lubrication is neglected on the 4695, the first failure noted will be a loose and noisy carriage belt idler pulley. Use the carriage rail oil, P/N 016-0742-00, and place two drops on the pulley and one on the carriage motor shaft at the recommended 6-month interval.

W2 Issue 15-17

**Tektronix**
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# MANUAL CHANGE INFORMATION

Product Group 20

Date: 8/27/85 Change Reference: C1 /885

Product: SPG 1/ SPG 2 Manual Part No: 070-2104-00

## DESCRIPTION

**SECTION 1, Operating Instructions, Performance Check, Page 1-6, CHANGE Step 5 part e TO READ:**

e. Check – The breezeway should be approximately 600 ns in width, as measured from the 50% point of the trailing edge of sync to the zero crossing preceding the 50% amplitude point of burst with respect to blanking.

**SECTION 2 , SPECIFICATION, Page 2-5, CHANGE Breezeway entry TO READ:**

| Characteristics | Performance Requirements |
|---|---|
| Breezeway | 600 ns typical, from 50% point of line sync trailing edge to start of burst |

**SECTION 4 RECALIBRATION PROCEDURE, EQUIPMENT SETUP, Page 4-4 CHANGE Item 2, SPG2 information TO READ:**

2. 1410 with SPG1 or SPG2 and test signal module

| | SPG2 |
|---|---|
| INTERNAL - GEN LOCK/EXT | INTERNAL |
| GEN LOCK - EXTERNAL | GEN LOCK |
| HORIZONTAL LOCK | SUBCARRIER |
| BLACK BURST SIG VIRS | ON |

**PROCEDURE, A20 Sync Timing Board,**

**Page 4-5,**

**CHANGE Steps 1 and 2 TO READ:**

(ARTICLE CONTINUED ON NEXT PAGE)

Product: SPG 1/ SPG 2 Date: 8/27/85 Change Reference: C1/885

## DESCRIPTION

**1. Check/Adjust Line Frequency (C159)**

a. Mount the A20 Sync Timing board on the 1410 Extender board A2. Turn on the 1410 and allow 20 minutes warmup time at +20°C to +30°C.

b. Connect the 10X probe from the Test Oscilloscope Dual Trace Amplifier to 1410 Interface line 55.

c. ADJUST - C159 for a dc level of approximately +5V at Interface line 55.

d. Remove the probe from Interface line 55.

**2. Adjust Line Sync Delay Range (S109)**

a. SPG1: Apply comp sync and subcarrier signals from the Video Signal Source to the respective Comp Sync and Subcarrier inputs on the rear panel of the 1410/SPG1 under test. Terminate the loop-throughs in 75 ohms.

SPG2: Apply Comp Video or Black Burst from the Video Signal Source to the Gen Lock input on the rear panel of the 1410/SPG2 under test. Terminate the loop-through in 75 ohms.

***NOTE***
*Use a video signal that has proper SCH phasing.*

b. Apply comp sync from the Video Signal Source and from the SPG1 or SPG2 front-panel BLACK BURST output through 75 ohm cables and 75 ohm feed-through terminators to the dual-trace amplifier inputs on the test oscilloscope. Externally trigger the test oscilloscope with H Drive from the Video Signal Source.

Set the test oscilloscope controls for dual-trace operation (alternate mode) and X10 magnification.

c. Set the SPG1 INTERNAL-EXTERNAL push button to EXTERNAL, or the SPG2 INTERNAL-GEN LOCK/EXT push button to GEN LOCK/EXT.

d. CHECK - with all S109 switch sections closed, the 1410 test signal module line sync should lead the Video Signal Source line sync by at least 10 µs.

e. CHECK - with all S109 switch sections open, the 1410 test signal module line sync should lag the Video Signal Source line sync by at least 4 µs.

f. ADJUST - select combinations of S109 to obtain line sync coincidence of the two displayed line sync pulses.

(ARTICLE CONTINUED ON NEXT PAGE)

Product: SPG 1/SPG 2 Date: 8/27/85 Change Reference: C1/885

## DESCRIPTION

Page 4-6

**CHANGE step 3 part a. TO READ:**

a. Use the Video Signal Source V Drive output to externally trigger the test oscilloscope. Return the oscilloscope magnifier control to X1 and set the sweep rate to 2ms. Use the delayed sweep function to view the vertical intervals of the two signals.

**CHANGE step 4 title TO READ:**

**4. Check Field Blanking Duration (Fixed)**

**CHANGE step 6 title and part b.TO READ:**

**6. Check Line Blanking Duration (Fixed)**

b. Display signals from the SPG1 or SPG2 front-panel COMP BLANKING connector and the 1410 rear-panel H Drive connector simultaneously on the Test Oscilloscope. Externally trigger the oscilloscope with H Drive from the Video Signal Source.

**CHANGE Step 7 part b TO READ:**

b. Check - The leading edges of both COMP BLANKING and H Drive should move simultaneously as R116 is rotated.

Page 4-7

**CHANGE Step 9, Parts c, d, and e TO READ:**

c. ADJUST - R119 (Burst Delay) for a burst delay time of 5.309 µs ± 35 ns, the equivalent of 19 cycles of subcarrier. Burst delay is measured from the start of sync (50% point of leading edge) to the start of burst (the zero crossing preceding the first half cycle of subcarrier that is 50% or greater of the burst amplitude).

d. ADJUST - R128 (Burst Width) for a burst width of 2.51 µs ± 70 ns, the equivalent of 9 cycles of subcarrier. Burst width is measured from the start of burst (defined in step 9c) to the end of burst, defined as the zero crossing following the last half cycle of subcarrier that is 50% or greater of the burst amplitude.

e. CHECK - Breezeway, the time from the end of line sync (50% point of trailing edge) to the start of burst, should be approximately 600 ns.

**DELETE Step 9, parts f, and g; CHANGE Step 9 part h TO Step 9 part f.**

W2 Issue 15-16

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