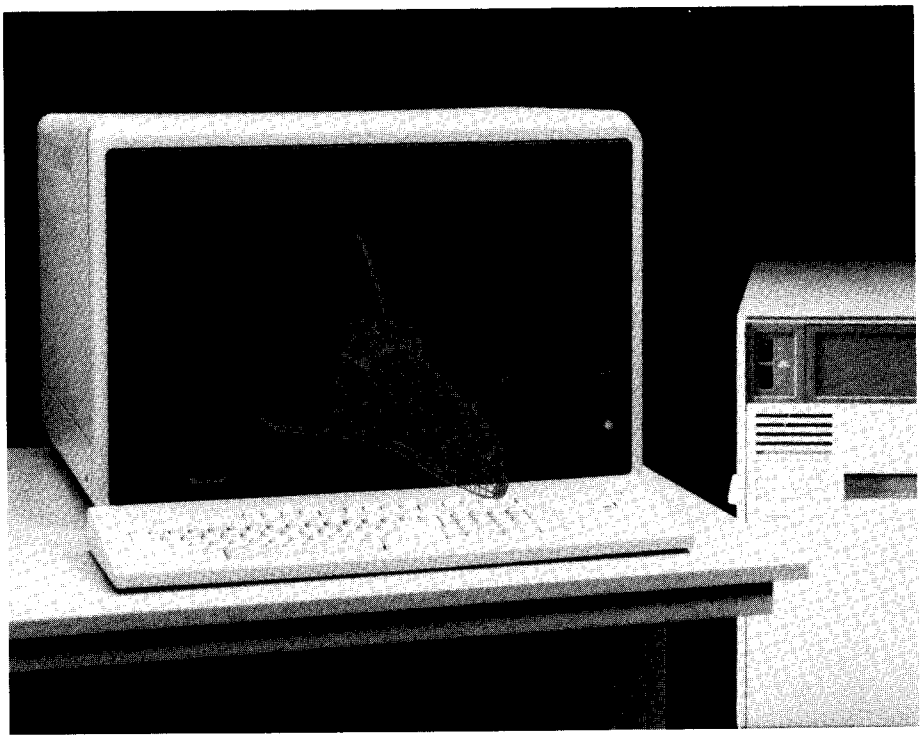
TEK CUSTOMER PRODUCT SERVICING INFORMATION

August 1987, Issue 48

SERVICETEKNOTES

TEKTRONIX—EVER SEARCHING FOR NEW AND BETTER PRODUCTS TO SERVE YOUR NEEDS!



Simulated 3D stereoscopic image.

CG5001
PG 506
2465

High-performance color graphics workstation with true 3D stereoscopic capabilities for enhanced realism and depth perception.

TEK 4126

3D STEREOSCOPIC COLOR GRAPHICS WORKSTATION

- **3D stereoscopic images display more information**
- **Supports 3D wireframe and optional shaded surfaces**
- **Compatible with 4120 Series application software**
- **Locally generated 3D stereoscopic images preserve host resources**
- **Dual functionality—stereoscopic and monocular viewing**
- **Lightweight, comfortable, stereoscopic glasses**

Published by Tektronix Service Operations Support

Tektronix®
COMMITTED TO EXCELLENCE

TO OUR CUSTOMERS

The Tektronix Service Organization firmly supports a policy of assuring continued utility of products sold by Tektronix.

This publication is meant to provide technical information to the customer who has elected to maintain his own Tektronix products. It contains product servicing information and is written for the technician. Reference to W2 Issue #____ refers to this article having been previously published in an in-house publication known as WIZARDS' WORKSHOP.

Articles are submitted primarily by Corporate Service Support & Planning personnel thoroughly familiar with the products they support.

SERVICETEKNOTES also encourages you, the customer, to submit articles for publication. If you have knowledge of a technique, procedure or idea that enables you to service your Tektronix product more effectively, write it up so others may benefit from your experience.

Articles for publication should be submitted directly to:

Tektronix, Inc.
P.O. Box 500, M/S 53-102
Beaverton, Oregon 97077

Attention: *SERVICETEKNOTES* **Editor**

The Editor and staff of *SERVICETEKNOTES* provide the material in this publication as a service to users of Tektronix products. While we have tried to be diligent in assuring the accuracy of the material which we have printed, we cannot guarantee its accuracy. Neither *SERVICETEKNOTES*, its editor and staff, Tektronix, Inc., nor its representatives assume any responsibility for the use of the material printed in this publication; nor can we assume any responsibility for any errors or for the resulting effects of any errors.

SERVICETEKNOTES is distributed by Service Operations Support free of charge to customers who maintain their own Tektronix equipment. A customer may ask to be added to the distribution list by applying through his local Tektronix Sales Engineer. Please send all pertinent mailing information to *SERVICETEKNOTES*, M/S 53-102, Beaverton.

CUSTOMER SERVICE TRAINING SCHEDULE

Some of our self-service customers may wish to attend Tektronix customer product service training classes before they repair Tektronix products. The following schedule includes classes offered during the next six months. To register for these classes contact your local field office or call 1-800-835-9433, WR 1407.

Additional product service training is available and information may be obtained from Bob Derman (503) 629-1177.

1987 CLASS SCHEDULE
CUSTOMER PRODUCT SERVICE TRAINING

CLASS TYPE	AUG	SEP	OCT	NOV	DEC	JAN	FEB
465B/475A $ 850	-	-	12-16 ATLA	-	-	-	8-12 IRVN
2215/35/36 $ 850	-	-	26-30 BOSN	-	-	25-29 IRVN	-
2465A $1,700	-	-	-	9-20 BSON	-	-	-
2430 $1,700	17-28 BVTRN	-	-	-	-	-	22-3/4
7904/7633 $1,900	10-21 IRVN	-	-	-	7-18 ATLA	-	-
TM500 Cal Pack $ 850	-	-	-	-	-	-	1-5 IRVN
Television Monitors $2,100	-	-	-	-	7-18 BVTRN	-	-
Television Generators $2,100	24-9/4 BVTRN	-	-	-	-	-	15-26 BVTRN
7612D $2,500	-	-	-	-	-	-	8-19 BVTRN
7912AD $2,500	-	-	26-10/6 BVTRN	-	-	-	-

1987 CLASS SCHEDULE
CUSTOMER PRODUCT SERVICE TRAINING (Continued)

CLASS TYPE	AUG	SEP	OCT	NOV	DEC	JAN	FEB
DAS9200 $2,500	10-21 BVTRN	-	-	-	-	18-29 BVTRN	-
4014/4631 $ 925	-	14-18 CHIG	-	30-12/4 ATLA	-	-	-
4105/07/09 $ 925	-	-	19-23 BVTRN	-	-	-	-
4111 $1,075	-	-	26-30 BVTRN	-	-	11-15 BVTRN	-
412X $1,900	17-28 DCFO	-	-	9-20 BVTRN	-	-	15-26 ATLA
469X $ 900	10-14 DCFO	-	-	2-6 BVTRN	-	-	8-12 ATLA
85XX MDL $3,400	-	28-10/16 BVTRN	-	-	-	-	-

TEKTRONIX ANNOUNCES FIRST 3D STEREOSCOPIC GRAPHICS WORKSTATION

In early spring, Tektronix, Inc. became the first major player in the emerging field of stereoscopic, three-dimensional CAD-CAM by introducing a new high-performance stereoscopic color graphics workstation. The 4126 graphics workstation offers all the features of the popular Tektronix 4128 workstation and adds 3D stereoscopic viewing. A 3D shaded surface capability is available as an option.

Existing software applications are ready to run with the 4126, because it assumes the burden of accepting a single 4128 or 4129 style 3D picture file and locally creates the appropriate right and left eye stereo images.

As a visual and communication tool, the 4126 provides more explicit representation of 3D data for many diverse applications, ranging from CAD/CAM to molecular modeling. Morgan Howells, marketing manager for Tek Graphics Workstations, explains, "Stereoscopic viewing is an exciting new approach that dramatically enhances the depth perception and realism of 3D images viewed on a flat, two-dimensional display. Lifelike images pop off the screen, increasing viewer comprehension. This technique is highly beneficial to anyone who needs to clarify or represent data."

STEREOSCOPIC TECHNOLOGY BENEFITS USERS

The 4126 workstation incorporates a field-sequential stereoscopic viewing system with a liquid crystal shutter display developed by Tek's Imaging Research Laboratory. In this type of system, the views of the right eye and left eye are alternately presented on the display screen. The liquid crystal shutter, mounted in front of the display and timed by a synchronization signal, encodes each view with a different polarization. A special pair of lightweight, polarized glasses routes the correct view to each eye.

This approach offers many advantages over other stereoscopic techniques. Richard DeHoff, Ph.D., of the Tektronix Imaging Research Laboratory explains, "Our system uses a single graphics system and video monitor with full horizontal resolution available for each eye's view. Having the liquid crystal shutter mounted on the display eliminates the need for wearing cumbersome, heavy and uncomfortable active shutter glasses that are electrically connected to the display, easily broken and very expensive to replace. The passive Tektronix glasses do not require any electrical connections and do not distort normal viewing or cause unpleasant side effects, such as disorientation or headaches."

TRADITIONAL APPLICATIONS ENHANCED, DOOR OPENS TO NEW ONES

The 4126 workstation is targeted at the developing 3D graphics market. Because it clarifies the visual understanding of complex images, it is appropriate for any application associated with 3D data that is manipulated and displayed in computer graphics form. Such applications include mechanical design, solids modeling, molecular modeling, simulation, shop floor/manufacturing, robotics, mapping, geophysical engineering, and ergonomic design.

More specifically, the product fits well in any design application where a heightened three-dimensional sensation of a shape or system is required. For example, mechanical engineering CAD design teams will use it for design verification or review and for

(Article continued on next page)

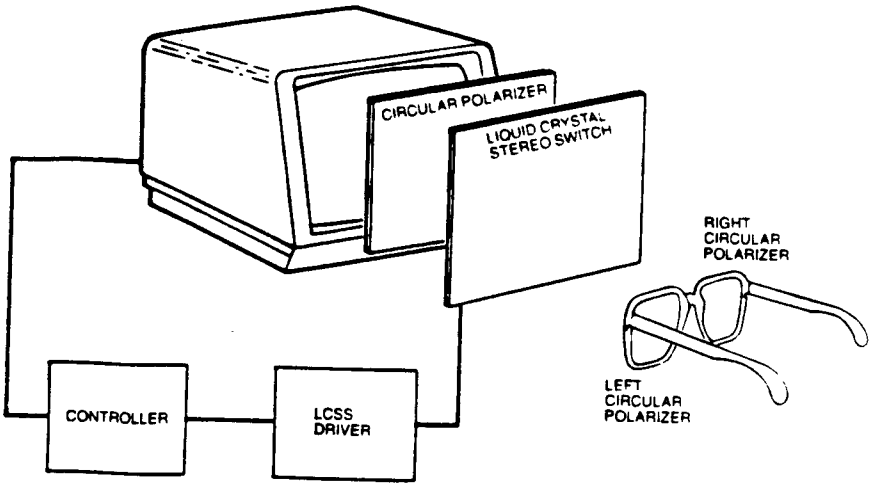
communications between design groups and management. Besides clarifying complex designs, it will also help eliminate the building of costly models.

The 4126 can also be used as a presentation aid for product justification to management or potential clients. In architectural CAD, for example, it is a useful vehicle for presenting 3D information to clients, especially in custom design. The product also fits well in the areas of fabrication, numerical controls, prototyping and in-shop floor applications, where it can be used to clarify the product's finished shape and minimize the occurrence of improperly constructed parts.

George Rhine, general manager of Tektronix' Graphics Workstation Division, offers several examples of some possible new markets for the product: "The 4126 would be extremely useful in molecular and anthropoid modeling where right angles, the traditional building blocks of design, are not present. Or, it can be used for visualizing objects interacting with their environment, as in simulated automobile crashes. In fact, the 4126 opens up entire new vistas for 3D stereoscopic viewing, such as ergonomic and fashion design, and medical imaging for diagnosis and reconstructive surgery."

The Information Display Group, located in Wilsonville, Oregon is a leading developer and marketer of graphics processing systems. For further information on the Tek 4126 3D Stereoscopic Workstation, write on company letterhead to Tektronix, Inc., P.O. Box 15273, Portland, OR 97215, or call toll-free 800/225-5434. In Oregon, call 503/235-7202.

*TEKTRONIX and TEK are registered trademarks of Tektronix, Inc.



PREPARED FOR:

TEKTRONIX, INC.
Donna Loveland
Information Display Group
P.O. Box 1000
Wilsonville, OR 97070
503/685-3837

HOW THE 3D LIQUID CRYSTAL STEREO SWITCH WORKS

-- The 4126 3D stereoscopic intelligent terminal locally processes a 3D picture file to create two images with a four degree offset. A synchronized signal from the graphics hardware manipulates the polarizer and the liquid crystal switch to create two uniquely polarized images; one with right circular polarization and one with left circular polarization. A viewer wearing glasses with a right circular polarized lense over the right eye and a left circular polarized lense over the left eye sees separate images with each eye. The brain interprets these two offset images and forms a single 3D stereoscopic picture.

# # #

TABLE OF CONTENTS

A6902B TANGENTIAL NOISE ON CHANNEL TWO REDUCED

S/N B011100

The A6902B tangential noise specification states that the upper limit for noise is 20 millivolts peak-to-peak, with an applied line voltage of 90Vrms to 115Vrms (outside U.S. between 180Vrms and 230Vrms). As the line voltage is increased above 115 (outside U.S. 230Vrms), the noise spec is increased by .3 millivolts for each 1Vrms increase in the line voltage, up to a maximum line voltage of 132Vrms (outside U.S. 250Vrms).

Typically, there is more noise displayed on channel 2 when compared to channel 1.

By using the following method, the noise might be reduced for a customer who objects to the level of displayed noise.

1) Observe the channel 2 noise waveform on a line triggered oscilloscope set at an attenuator setting of 10 or 20 mV/div.

2) Set the line voltage applied to the A6902B at the high spec point using a variac. (132V or 250Vrms).

3) Insert a non conductive "spudger" into the core of toroid T2850 from the right side.

4) Rotate the toroid within the transformer shield while observing the noise waveform on the test oscilloscope.

5) Position the toroid for lowest amplitude waveform, then cinch into place with a cable tie, Tektronix P/N 343-0549-00.

W2 Issue 17-7

AM502 MAIN BOARD REPLACEMENT

Eff. S/N B010100-B052349

Main circuit board Tek P/N 670-2733-08, replaces main circuit board, Tek P/N 670-2733-04 which is no longer available. Use of the new main circuit boards necessitates the replacement of DS900. Use field mod kit Tek P/N 050-0844-05.

If the instrument serial number is greater than those listed above or, if this kit or kit, Tek P/N 050-0780-XX, has been installed previously, disregard the instructions and use circuit board, P/N 670-2733-08, as a direct replacement for the main circuit board.

W2 Issue 17-9

CG551AP/CG5001 100mV SAC AT 100KHZ ABERRATION MODIFICATION

EFF. S/N: B064185

REF: M62994

If excessive aberrations are noted on the 100mV SAC waveform at 100KHZ on S/N's below B064185, then the following modification should be performed, with the exception of removing and replacing A6U1241. (See pullout "A") This part was changed because of a vendor change and is not directly related.

W2 Issue 17-7

DC503A Q1230 OR Q1630 REPLACEMENT MOD KIT AVAILABLE

S/N Range: B010100-B039999

When replacing transistors Q1230 or Q1630, Tek P/N 151-1117-00, use mod kit 050-2011-01.

Replacement of these transistors requires changing the value of a number of parts on the Main circuit board and the Auxiliary board.

W2 17-13

PG506 MARKER, IDENTIFY PART NUMBER

Effective S/N: B057990

The Tek P/N for the Marker, Ident. Label is not provided in the PG506 Instruction Manual. The part attaches to Index #5 (lens) of mechanical exploded view figure 2.

The Tek P/N for this label is 334-4924-00. The manual will be corrected appropriately.

W2 Issue 17-9

PG506 MAY OSCILLATE WITH 434 AND 432 OSCILLOSCOPES

The PG506 Calibration Generator may oscillate when providing standard amplitude signals of 50 mV or less into a 434 or 432 oscilloscope. Not all 434's, 432's or PG506's exhibit this symptom. If you encounter this oscillation, the PG506 output cable from 'J800' on the Main Board to the 'Amplitude Output High or Standard' connector on the front panel can be replaced with a Tektronix P/N 175-1824-00 cable assembly. This cable is longer than the standard cable, and must be dressed carefully to prevent damage when the side covers are installed. This change should be made only if oscillation occurs.

W2 Issue 17-11

S3200 AMPHENOL CONNECTORS MOD #5909B

Amphenol has discontinued the 36 pin keyed version connectors. The direct replacement for the keyed female connector p/n 131-0294-01 thru 131-0294-06 is unkeyed female connector p/n 131-0294-00.

W2 17-13

TR502/7L13 AND TR502/7L14 SYSTEM SPECIFICATION CHANGE

The system flatness specification for TR502/7L13 and TR502/7L14 systems has been changed to read as follows:

WITHIN +/- 2.4 dB, from 100 KHz to 1.8 GHz.

The new specification may be applied toward TR502's having any serial number when operating with a 7L13 or 7L14 Spectrum Analyzer.

W2 Issue 17-7

TSG170A, SPG170A COLOR BAR PHASE ERROR

REF: TSG170A INSTRUCTION MANUAL
P/N 070-5680-00

SPG170A INSTRUCTION MANUAL
P/N 061-3270-00

Mod 62890

Due to a mathematical error in a programmed device, there is a 1.5 degree error in the phase of the "I" and "Q" segments of the SMPTE color bars that are generated on the option board.

Mod 62890 addresses this problem by changing A5U392 to P/N 160-3574-01. Install Mod 62890 on an "as required" basis.

Mod 62890 is being installed in new instruments from the factory starting with S/N's B030781 (TSG170A), B010275 (SPG170A) and B010104 (TVGF01).

W2 Issue 17-7

TSS40 XEQ SYNC (EXECUTION SYNC) PULSE MODIFICATION

Effective S/N: B010622

Ref: 070-5767-00

The XEQ Sync (Execution Sync) Pulse from the local control may be missed by the TSS40, causing the command not to be executed.

To correct this problem lengthen the output of the XEQ Sync one shot. Change the value of C110, Tek P/N 281-0826-00 2200 PF capacitor to, Tek P/N 281-0772-00 4700 PF capacitor.

W2 Issue 17-9

WFM300/TSG300 BREAK-OUT BOXES

REF: WFM300 INSTRUCTION MANUAL
P/N 070-6039-00

TSG300 INTERIM MANUAL
P/N 061-3302-00

For those of you who have received customer inquiries concerning interconnection methods for Component Analog Video, there are several tools being provided by many vendors.

For instance, Sierra Video Systems produces some low-cost Break-Out Boxes that will allow easy connections between BNC environments and component video 12-pin connectors, such as those found on Betacam or MII machines.

They can contact Sierra Video Systems at (916) 273-9331 for more information.

W2 Issue 17-9

WFM300 VARIABLE GAIN RANGE CHANGED TO ACCOMMODATE 350mV SIGNAL

REF: WFM300 INSTRUCTION MANUAL,
P/N 070-6039-00
MOD 63501

The WFM300 has been modified to accommodate variable gains in the 1X and 5X settings. This will allow the user to increase or decrease a 350mV signal's displayed waveform so that it will be full-screen.

The change consists of altering the values of A3R478 and A3R705. In addition, A3C581 and A3R479 are added to the circuit.

Enclosed as a pull-out supplement (B) is the Manual Change information pertinent to this mod. Included are part number, schematic and calibration procedure changes.

Install this change on an "as requested" basis.

Mod 63501 is being installed in new WFM300's from the factory, starting with S/N B010388.

W2 Issue 17-9

7L5: CABLE ASSEMBLY PART NUMBERS

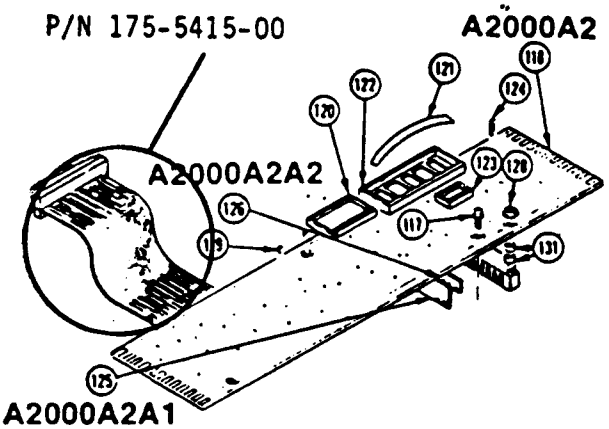
REF: 7L5 SERVICE MANUAL,
P/N 070-2184-01

The following figures provide part numbers and other pertinent information for three 7L5 Cable assemblies. Part numbers for these items do not appear in the service manual electrical or mechanical parts lists. Please record this information in your service manuals for future reference.

(Article Continued on Next Page)

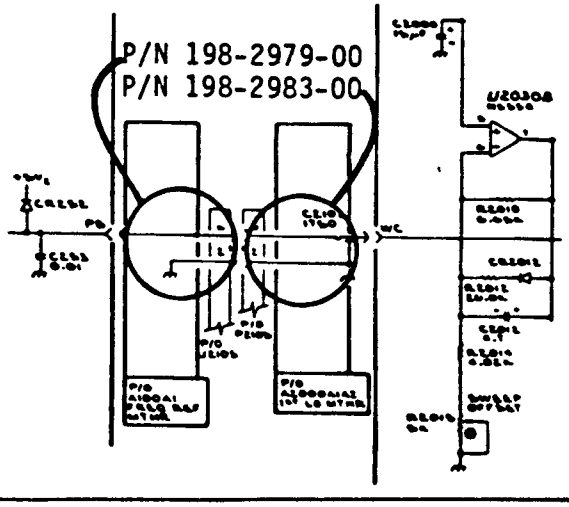
7L5: Cable Assembly Part Numbers (continued)

Part Of Figure 1
Exploded View



The P/N 175-5415-00 is a 34 wire ribbon cable which connects the A2000A2 Vertical Control assembly and A1000A1 I.F. Mother assembly at P1010. The cable is soldered to the back side of the Vertical Control assembly.

Part Of 1st L.O./1st L.O. Lock Schematic #10



The P/N 198-2979-00 and P/N 179-2983-00 form a shielded Coax Cable assembly which provides a 1st L.O. Phase Lock Error Voltage signal path from the A100A5 1st L.O. Lock board to the A2000A1A1 1st L.O. board. These grey cable assemblies are located near the rear of the instrument, and interconnect via a 3 pin harmonica connector (P2105/J2105).

All three cable assemblies described above can be purchased from Tektronix.
W2 Issue 17-7

7L5: VARIABLE RESOLUTION MOD

REF: M63588

The 7L5 Variable Resolution Assembly (A1000A8 P/N 672-0486-03) has been modified to enable the continued use of P/N 108-0342-00 variable inductors in the 10kHz/30kHz Filter and Post V.R. Amplifier circuits. Circuit locations L1856, L1860, L1864, L1870, L1872, L1916, and L1918 use the P/N 108-0342-00 variable inductor.

New P/N 108-0342-00s have a different tolerance (+8% to -2% rather than +/-5%), causing their variable range to be inadequate for centering the 10kHz and 30kHz filters. Mod M63588 changed several capacitor values, minimizing these circuits' sensitivity to the variable inductor tolerances.

A parts replacement kit (P/N 050-2274-00) has been set-up for Field replacement of the P/N 108-0342-00 in instruments manufactured prior to this mod. The kit provides 1 P/N 108-0342-00 variable inductor and 13 capacitors needed to fully update the V.R. Assembly. The P/N 050-2274-00 only needs to be installed once. If more than 1 variable inductor needs to be replaced, install the kit and use new P/N 108-0342-00s as direct replacements for the remaining inductors.

Mod M63588 will be installed into new 7L5s beginning with S/N B093765.
W2 17-13

143 CAL PROCEDURE HINTS

REF: 143 INSTRUCTION MANUAL
P/N 070-2204-00

The following hints, changes and suggestions are provided to assist in achieving a properly adjusted 143 SECAM Generator. Refer to the Adjustment Procedure, beginning on page 6-1 of the Instruction Manual.

Page 6-1, Test Equipment

1. A Digital Voltmeter with 0.01% accuracy is required.

Page 6-2, Test Equipment

14. A Video Amplitude Calibrator, P/N 067-0916-00, is required.

Page 6-5, Power Supply

In general, all three power supplies are critical to the proper operation of the 143, and must be within their stated tolerances.

Page 6-8, Step 6

Before beginning cal Step 6, perform Step 43. Because of the nature of the SECAM signal (Frequency Modulation), the ability to correctly measure packet frequencies will be highly dependent upon the complete circuit path performance.

For Step 6.c (and 6.d), jitter can best be observed by turning D'R and D'B to OFF, and by observing the signal at TP 1075 with your scope set to 20usec/div.

For Step 6.g, make the specified check, and then perform Step 43 again. Now, check Step 5.g again. Steps 5.g and 6.g interact, and Step 43 should be checked if a change is made to either one.

Page 6-8, Step 8

Change Step 8.c to read "CHECK--For a DC level of 7.5V $\pm$ 0.75V."

Page 6-10, Figure 6-5

The addition of a color monitor in the instrument hook-ups will make some adjustments easier to resolve. Loop-thru connect the video signals from the Waveform Monitor A and B channels to the 653HR color monitor channels A and B, and terminate.

Page 6-10, Step 9

This Step can be most easily observed if the adjustment (9.d) is made while viewing the color monitor in pulse-cross, and A-B.

Page 6-10, Step 10

Steps 10.c and 10.d are more easily adjusted by setting the test scope to 20usec/div.

Page 6-11, Step 11

Step 11.c should not be adjusted unless absolutely necessary.

For Step 11.d, turning off pre-emphasis from the bench signal source and using the video signal on a waveform monitor to help in identifying the White bar, will make this step easier.

Step 11.f refers to bottle signals. By increasing the intensity on the test scope, the bottles will be observable as dim background signals. These dim signals are noticeable in Figure 6-9.

Page 6-12, Step 13

Change Step 13.f to read "... leading edge of blanking."

(Article Continued on Next Page)

143 Cal Procedure Hints (continued)

Page 6-12, Step 14

Delete the words "to peak white" from Step 14.b.

Page 6-13, Step 16

Delete the words "within 300 ms." from Step 16.g. The change is easily seen by observing the 653HR display.

Page 6-13, Step 18

In order to see the jitter with adequate resolution, Step 18.g is most easily performed using the test scope, at 5 or 10 ns per div.

Page 6-16, Step 25

Nominal range for Step 25.d is 3.5 to 6V.

Page 6-19, Step 30

Step 30, as stated in the manual, should be done only when good reasons exist. If Step 30 is done, Step 24, and possibly 22 and 23, must be checked again. There is interaction between these areas.

Step 30.c is best accomplished by running the signal through a 5MHz filter, P/N 015-0213-00.

Page 6-19, Step 31

Change "pulse amplitude" to "spikes" in Step 31.c.

Page 6-20, Steps 32, 33, 34

Steps 32, 33 and 34 interact, so they must be repeated until all conditions are met. Also, when adjusting Step 33.d, C1404, you should also adjust R1351 and R1364 for equal amplitudes.

The amplitudes (Step 34) are best checked with the Video Amplitdue Calibrator, 067-0916-00.

W2 Issue 17-12

370 RESISTOR KIT

REF: 370 SERVICE MANUAL
P/N 070-6065-00

A kit has been set up which includes all resistors needed to do the checks and adjustment procedures in the manual. Order P/N 067-1337-00 for the complete set.

W2 Issue 17-11

492/P, 492A/P, 494/P, 495/P, 496/P, 2754/P, 2755/P: CRT READOUT STABILIZED

REF: M63002

The A64 Deflection Amplifier circuit board (P/N 670-8083-02) has been modified to eliminate oscillations that distort the CRT Readout characters. Bypass capacitors (.1uF, P/N 283-0167-00) are being installed between the +15V power supply and ground connections of all LM318 Op Amps located on the circuit board. This includes U2060, U2062, U6065, U6073, and U7065.

The new bypass capacitors (C2060, C2062, C6065, C6073, C7065) are mounted on the back side of the circuit board. Use the following instructions for field installation of M63002.

(Article Continued on Next Page)

492/P, 492A/P, 494/P, 495/P, 496/P, 2754/P, 2755/P (continued)

Bypass Capacitor	Installation Instructions
C2060, C2062, C6065, & C6073	Solder Capacitors onto the back side of the circuit board between pin 3 (ground) and pin 7 (+15 V) of the corresponding I.C.
C7065	Solder onto the back side of the circuit board between pin 7 of U7065 and pin 3 of U7073.

M63002 will be installed into new products beginning with the following serial numbers:

492/P	S/N B056051
492A/P	S/N B010454
494/P	S/N B011092
495/P	S/N B010192
496/P	S/N B021803
2754/P	S/N B010136
2755/P	S/N B010211

W2 Issue 17-11

690SR CHASSIS TRACK SLIDE PART NUMBER

REF: 690SR INSTRUCTION MANUAL
P/N 070-3821-00

The chassis track slides that are shown on the "Accessories" pull-out page have one additional part that is not illustrated.

P/N 351-0377-00 is the mating slide section that is fastened directly to the instrument's chassis.

W2 Issue 17-12

650/650A/650HR SERIES CRT SHIELD CHANGE

REF: 650A INSTRUCTION MANUAL
P/N 070-2234-00

650HR INSTRUCTION MANUAL
P/N 070-2646-02

653A/656A INSTRUCTION MANUAL
P/N 070-2337-00

653HR/656HR INSTRUCTION MANUAL
P/N 070-2647-00

Mod 61658

Due to non-availability of one of the sub-components, whenever the CRT shield (P/N 337-1467-03) requires replacement, a new kit (P/N 050-2204-00) will be required.

Attached to this issue as pull-out "C" is a manual insert detailing the physical changes, and a change to the adjustment procedure.

Mod 61658 is being installed in new instruments from the factory starting with Serial Number B056190 (650HR, 651HR, 652HR and 655HR) and B050670 (656HR).

W2 Issue 17-7

1480 SERIES HORIZONTAL SWITCH CHANGE

REF: 1480 SERIES INSTRUCTION MANUAL
P/N 070-2338-00

Mod 62561

The 1480's 6-Pole Horizontal switch has been replaced by a new 4-Pole switch, P/N 260-2358-00, in order to consolidate common parts usage.

The new switch will be provided as part of a kit (P/N 050-1470-01) and that will supply you with a new circuit board and front panel where required.

Replace the old switch with the appropriate update kit upon failure only.

Mod 62561 is being installed in new instruments from the factory starting with S/N B106003 (1480R Series) and B094533 (1480C Series).

W2 17-13

1480 SERIES MOD W5F ADJUSTMENT PROCEDURE CHANGES

REF: 1480 SERIES MOD W5F MANUAL SUPPLEMENT, P/N 070-5844-00

Enclosed as pull-out "D" are some adjustment procedure changes to the 1480 Mod W5F Manual Supplement.

W2 Issue 17-7

1705 10.7MHz IF SYSTEM SENSITIVITY IMPROVEMENT

REF: 1705 INSTRUCTION MANUAL
P/N 070-6355-00

Mod 63334

In order to provide an increase in the sensitivity of the 10.7MHz IF section, Mod 63334 has made the following changes to the 1705.

Parts Removed

A3R363, A3R574, A3R673 & A3C674

Parts Added

Add A3L674, a 12uH coil, P/N 108-0249-00, in the circuit where A3C674 was removed.

Add a parallel pair consisting of A3C672, a 5-35 pf capacitor, P/N 281-0219-00, and A3C673, a 22 pf capacitor. This component pair has one lead connected to the U672 end of the L674 and the other lead connected to a nearby ground. One of the holes vacated by R673 will provide a convenient ground point.

Install Mod 63334 as required to address sensitivity complaints.

Mod 63334 is being installed in new instruments from the factory starting with S/N B010129.

W2 17-13

1710B SERIES INTERMITTENT CHANNEL A LATCH-UP

REF: 1710B SERIES INSTRUCTION MANUAL
P/N 070-5522-00

Mod 62626

In order to avoid an intermittent circuit latch-up that prevents Channel A from switching on, a different IC has been specified for A3U238.

Replace A3U238 with P/N 156-2859-00 upon failure.

Mod 62626 is being installed in new instruments from the factory starting with S/N B021134 (1710B) and B020250 (1711B).

W2 17-13

1710B SERIES, 1721, 1731, WFM300 NEW SURE-LOCK POWER CORDS

REF: 1710B SERIES INSTRUCTION MANUAL
P/N 070-5522-00

1720 SERIES INSTRUCTION MANUAL
P/N 070-5846-00

1730 SERIES INSTRUCTION MANUAL
P/N 070-4474-02

WFM300 INSTRUCTION MANUAL
P/N 070-6039-00

Mod 63198

Mod 63198 provides a new "Sure-Lock" power cord for instruments being sold internationally. Standard (120 Volt) and Option A1 (240 Volt) versions are available.

The "Sure-Lock" power cord will be provided in new instruments from the factory starting with S/N B021215 (1710B), B020266 (1711B), B010698 (1721), B020722 (1731), B010129 (1735), and B010400 (WFM300).

For those customers who desire Field installation of these new cord sets, two kits are available:

P/N 040-1186-000 provides parts and instructions applicable to the 120 Volt (Standard) cord set.

P/N 040-1185-00 provides parts and instructions applicable to the 240 Volt (A1) cord set.

W2 17-13

1710B SERIES, 1720 SERIES, 1740 SERIES, AVC-20 PART NUMBER CHANGE

REF: 1710B SERIES INSTRUCTION MANUAL
P/N 070-5522-00

1720 SERIES INSTRUCTION MANUAL
P/N 070-5846-00

1740 SERIES INSTRUCTION MANUAL
P/N 070-4473-00

AVC-20 INSTRUCTION MANUAL
P/N 070-5979-00

Mod 63434

In order to overcome excessive pulse width variations between different vendors of the 74LS221 IC, the part number has been changed to 156-0733-04.

Use P/N 156-0733-04 when replacing a failed IC in the following locations:

1710B Series: A3U344, A3U568, A3U572, A3U575

1720 Series: A3U884

1740 Series: A4U374, A4U576, A4U636

AVC-20: A1U130, A1U148

W2 Issue 17-9

1720 LINE SELECT FOCUS ADJUSTMENT

REF: 1720 Series Instruction Manual, P/N 070-5846-00

An alternative procedure for adjusting Line Select focus (page 5-16, Step 15) is available. This procedure change precludes the need for a 1730.

1. Connect Line Strobe Out from your bench 1480 to pin 7 of the 1720's AUX connector.
2. Put the 1480 into Line Select mode and select a line that contains the desired test signal.
3. Set the 1720 for Vector mode.
4. Push the 1720 AUX button.
5. Adjust R244 (LS Focus) for best display.

W2 Issue 17-8

1720 SERIES EXCESSIVE SUBCARRIER LOOP GAIN CAUSING LOCK-UP ON CAL SIGNAL

REF: 1720 SERIES INSTRUCTION MANAUL P/N 070-5846-00

MOD 61905

Mod 61905 lowers the effective loop gain of the 1720 Series Demodulator circuitry in order to address an intermittent tendency for the circuit to lock-up when CAL is enabled.

On 1720's, A3R637 changes from 20Kohms to 16Kohms P/N 315-0163-00, and A3R739 changes from 30Kohms to 20Kohms, P/N 315-0203-00.

On 1721's, A3R739 was changed from 30Kohms to 20Kohms P/N 315-0203-00.

Install these changes as required to address the CAL lock-up symptom.

Mod 61905 is being installed in new instruments from the factory starting with S/N B011213 (1720) and B010511 (1721).

W2 17-13

1720 SERIES PERFORMANCE CHECK PROCEDURE CHANGE

REF: 1720 SERIES INSTRUCTION MANUAL P/N 070-5846-00

CHANGE REF: C2/686 Rev. 1

The Performance Check procedure for the 1720 Series instruments has been changed per Change Ref: C2/686; Revision 1 as follows:

Page 5-6, Step 7.
Check Phase Accuracy

-- Delete part d --

W2 Issue 17-7

1720 SERIES, PHASE SHIFTER ROTATIONAL NOISE

REF: 1720 SERIES INSTRUCTION MANUAL P/N 070-5846-00

Mod 63924

In order to address an asthetically objectionable trace noise associated with rotation of the phase shifter control, Mod 63924 adds a .1ufd capacitor to the 1720 Main board.

The new capacitor, A3C334, P/N 283-0024-00, is added between the base lead of A3Q334 and a nearby ground. The change is most easily implemented by adding the new part between the right ends of C328 and R328.

Install Mod 63924 as required. Mod 63924 will be installed in new 1720's from the factory starting with S/N B012106 (1720) and B010754 (1721, 1721 PM).

W2 Issue 17-12

1720 SERIES, UNSTABLE VECTOR LOCK-UP

REF: 1720 SERIES INSTRUCTION MANUAL P/N 070-5846-00

Mod 63154

Mod 63154 has been implemented in the 1720 Series to address an occasional tendency for the vector to lock-up 180 degrees out of phase and/or with a unstable display of 5 to 10 degrees.

To correct for this symptom, A3CR834, A3R835 and A3R836 have been removed.

Install Mod 63154 as required.

Mod 63154 is being installed in new instruments from the factory starting with S/N B011635 (1720) and B010609 (1721, 1721 PM).

W2 Issue 17-12

1720 SERIES VECTOR ALIGNMENT IMPROVEMENT

REF: 1720 SERIES INSTRUCTION MANUAL, P/N 070-5846-00

MOD 63272

In order to improve the match between Vector X alignment and XY beam rotation, MOD 63272 changes the circuit location of A3R666.

The new location connects the emitter of A3Q371 with the emitter of A3Q671.

This can be most easily done by removing R666 from its present position, and reconnecting it between the right end of R569 and the right end of R670.

Install MOD 63272 as required.

MOD 63272 is being installed into new instruments from the factory, starting with S/N B011737 (1720) and S/N B010619 (1721).

W2 Issue 17-7

1720 SERIES, 1730 SERIES, WFM300 CAPACITOR CHANGED FOR STABILITY AND RELIABILITY

REF: 1720 SERIES INSTRUCTION MANUAL, P/N 070-5846-00
1730 SERIES INSTRUCTION MANUAL, P/N 070-4474-02
WFM300 INSTRUCTION MANUAL, P/N 070-5039-00

MOD 63269

Due to a capacitor type's inherent susceptibility to contaminants such as moisture, dirt and flux; the following changes are being implemented by MOD 63269.

1720 Series
A3C198 Changes to P/N 281-0220-00, a 1.0 -5.5 pf cap.

(Article Continued on Next Page)

1720 Series, 1730 Series, WFM300 (continued)

1730 Series

A3C195, A3C696, A3C953 and A3C368 are changing to P/N 281-0220-00, a 1.0 -5.5 pf cap.

WFM300

A3C460, A3C856, and A3C862 change to P/N 281-0220-00, a 1.0 -5.5 pf cap.

A3C840 changes to P/N 281-0168-00, a 1.3 -5.4 pf cap.

Install this mod as required to address capacitors that fail, drift or stick.

MOD 63269 will be installed in new instruments from the factory starting with the following serial numbers:

1720	B011796
1721	B010630
1730	B022266
1731	B020673
1735	B010115
WFM-300	B010374

W2 Issue 17-7

1730 SERIES INSTRUCTION MANUAL UPDATE

REF: 1730 SERIES INSTRUCTION MANUAL P/N 070-4474-02

The 1730 SERIES INSTRUCTION MANUAL has been upgraded. The new manual is P/N 070-4474-02.

Key changes include, but are not limited to the following:

-- Inclusion, in one manual, of all 1730 Series instruments. This includes NTSC, PAL, PAL-M and Dual-Standard types.

-- Changes in the chroma filter bandwidth information that more accurately reflects production instruments.

W2 Issue 17-12

1730 SERIES MOD BT, X5 GAIN ADJUSTMENT RANGE

REF: 1730 SERIES INSTRUCTION MANUAL P/N 070-6514-00

Mod 63969

In order to improve the adjustment range of the X5 Gain registration function, Mod 63969 makes the following changes:

-- A3R273 changes from 100K to 75Kohms, P/N 321-0373-00

-- A3R274 changes from 50K to 500Kohms, P/N 311-1243-00

Install mod 63969 as required.

Mod 63969 will be installed in new units from the factory starting with S/N B022601 (1730 BT), B020753 (1731 BT) and B010135 (1735 BT).

W2 Issue 17-12

1730 SERIES POWER SUPPLY REGULATION

REF: 1730 SERIES INSTRUCTION MANUAL P/N 070-4474-00

If the power supply in your 1730 Series Waveform Monitor loses regulation when you try to store front panel set-ups, one possible place to look for the cause may be A1 C436. Inspect this electrolytic for properly installed polarity.

W2 Issue 17-11

1730 SERIES TRANSISTOR ARRAY, INSUFFICIENT BETA

REF: 1730 SERIES INSTRUCTION MANUAL
P/N 070-4474-02

In early 1730 Series instruments (before B02XXXX), a transistor array (U188, P/N 156-0259-00) was used in the Vertical Amplifier.

If this array is replaced due to failure, there is a small chance that the new part may have insufficient beta. The symptom will be a tendency for a signal to compress when it is displaced from graticule center.

The best method for overcoming this problem at this time is to test-select U188 for minimum compression.

Instruments produced after S/N B02XXXX no longer use this part in the Vertical Output circuitry.

W2 Issue 17-9

1740/1750 SERIES GONIOMETER CABLES GETTING PINCHED

REF: 1740 SERIES INSTRUCTION MANUAL
P/N 070-4473-00

1750 SERIES INSTRUCTION MANUAL
P/N 070-5664-00

Mod 61828

In order to prevent the goniometer cables from getting pinched when the instrument is slid into its housing, Mod 61828 has made a change to the front circuit board guide.

The change to the guide involves a small notch that has been formed in the plastic. The goniometer cables can be laid into this notch, thus preventing them from being caught by the instrument housing.

The new circuit board guide is P/N 351-0708-01, and should be installed on an "as required" basis.

Mod 61828 is being installed in new instruments from the factory starting with serial numbers:

B013997 -- 1740
B011458 -- 1741
B010168 -- 1742
B031880 -- 1750
B030939 -- 1751

W2 Issue 17-11

1750 SERIES ADJUSTMENT PROCEDURE CHANGES

REF: 1750 Series Instruction Manual,
P/N 070-5664-00

Enclosed as pull-out supplement "E" are changes to the 1750's adjustment procedure.

These changes are intended to make adjustment of the High Volt section contingent upon how well + 100 volts tracks + 12 volts. This should help alleviate some concerns about the difficulty of access to R738 (HV Adjust).

W2 Issue 17-8

1910 INSERTING VITS ON LINE 21

REF: 1910 SERVICE MANUAL
P/N 070-4523-00

Mod 63037

In order to allow the 1910 to insert internally generated VITS on Line 21, A9U632 changed to P/N 160-1918-01, and A9U611 was changed to P/N 160-0474-02.

These ICs must be replaced as a set in pre-mod instruments. Therefore, order P/N 050-2248-00.

Install mod 63037 in 1910's on an "as requested" basis.

Mod 63037 is being installed in new instruments from the factory starting with S/N B021411.
W2 Issue 17-7

2213A/15A/35 CHANGE TO HIGHER VOLTAGE RATED POWER SUPPLY FET

Mod #63493

2213A S/N B020799
2215A S/N B021446
2235 S/N B030119

To improve the 2200 power supplies, Q9070 has been changed to a 151-1152-00. Due to the 500V rating of the part, the reliability should improve, especially in International environments.

W2 Issue 17-9

2245/2246 VOLTAGE MEASUREMENTS ACCURACY IMPROVED AT 100 MHz

63157 2245 S/N B010546
2246 S/N B041457

AC voltage measurements may be out of specification at higher frequencies. This is caused by the inadequate frequency response of the trigger circuit.

To improve measurement bandwidth, A10R460 was changed to 1K ohm, Tektronix P/N 313-1102-00.

W2 Issue 17-9

2400 SERIES HYBRID VLSI SOCKETS

Affects: 2445/A/2455/A/2465/A/2467/ 2430/A

Two different sockets are used to connect the leadless thick film VLSI hybrids to the main circuit board. If a socket connector fails, the entire socket must be changed. Order replacement parts using the following part numbers:

P/N 136-0763-00 Rectangle, e.g. Preamp U100

P/N 136-0764-00 Square, e.g. Trigger U500

W2 Issue 17-7

2445/2465 VARIABLE POT SHAFT P/N

The CH1 and CH2 Volts/Div variable and Sec/Div variable pot connection shafts are missing from the 2445 and 2465 Service Manuals. Add the following two part numbers to both Service Manuals for Fig.2 CHASSIS, FRONT AND BACK after index 25.

V/D 384-1640-02
S/D 384-1639-02

W2 Issue 17-7

2445/2445A/2455/2455A/2465/2465A DM FRONT COVER P/N

The 24X5 and 24X5A that have option 1 installed use Front Cover P/N 200-2844-00. Write this P/N in your option service manual under the accessories listing.

W2 17-13

2467-MAGNETIC FIELDS AFFECT READ-OUT

The 2467 CRT display may be affected by either man-made or natural magnetic fields. Typically, the Earth's flux will cause a slight vertical change that may position the readout such that it shifts into the red border at the extreme of the MCP protection algorithm. Attempting to view this effect requires careful analysis of the magnetic field at your test bench. First, determine the best direction to face the scope by slowly rotating a 2467 while watching the cursors; with the cover on and the volts cursors set to the top and bottom of the graticule. Note the maximum span of the cursor shift and then position the scope at the average of these extremes. Second, mark the scope placement on your bench and always orient a 2467 to these marks.

The SPEC

If the readout shifts into the red CRT graticule border (an unofficial specification), then vertical gain and centering, or readout gain and centering may need to be adjusted. Start your adjustment with the following vertical gain and centering procedure. This procedure is a modification of the Service Manual Readout Jitter adjustment procedure found on manual page 5-25.

An Aid

If the 2467 serial number is above B011180, the adjustment can be performed with the cover on, utilizing two new adjustment holes provided in the cabinet. Use tweeker 003-1364-01 or 003-0675-00 milled, filed or sanded down to <0.080 inches over about one inch of the shaft length. However, if the holes are absent, you must remove the cabinet to gain access to the pots. Allow at least 20 minutes warm up before adjusting.

The Procedure

1. Set Delta Volts Cursors on.
2. Rotate a Variable Volts control to get RATIO R/O.
3. Set one cursor to the top and the other to the bottom and adjust cursors for a RATIO reading of 160.0%.
4. Set the top cursor downward until you have a RATIO reading of 130.0%.
5. Set the bottom cursor upward until you have a RATIO reading of 100.0%.
6. Adjust vertical gain and centering, R638 and R639 on the main board, to position the cursors at the 0% and 100% graticule lines.

The CHECK

Note: If the customer has complained about the readout position, it would be preferable if CAL 07 is run to insure the R/O shift limit is properly set (requires removal of the instrument cover to access the CAL/NO CAL jumper).

The R/O can start its shift process from any one of 16 different positions on the CRT. This random start can make it difficult to know where the R/O is positioned in its shift algorithm and result in an assumption the position is correct, when the opposite is true. The shift range can be

(Article Continued on Next Page)

2467-Magnetic Fields (continued)

checked by forcing the shift algorithm, and by using a control change to cause a display update; e.g., Press the CH4 VOLTS/DIV button (CH4 does not need to be on). Wait for 7 to 10 seconds and press again. Check the top limit as the R/O steps across in its highest position. Perform at least 7 control changes to ensure the R/O top limit is reached. If the R/O enters the red border, then perform CAL 07.

NOTE

The 2467 R/O shift pattern is an MCP aging protection algorithm.

The typical max shift distance in one direction is 0.4 divisions.

W2 Issue 17-12

2754/P, 2755/P: 16-20MHz VCO TUNE SENSITIVITY AND RANGE CAL PROCEDURE

REF: 2754/P SERVICE VOLUME 1
P/N 070-6097-00

2755/P SERVICE VOLUME 1
P/N 070-6032-00

The following paragraph should be used to replace step 4c of the 16-20 MHz VCO calibration procedure "Tune Sensitivity and Range." This procedure is located on page 6-41 of the product service manuals listed above.

Page 6-41, Step 4, Paragraph c --

CHANGE TO READ:

c. Press <SHIFT> 0 and select item 6 from the menu; then press <SHIFT> 0, and select item 0 from the menu. Now select frequency display of 2nd LO (2). Readout will now indicate the 2nd LO frequency. Calibration step 4c has been revised to employ the key sequence <SHIFT> 0,6 for disabling frequency corrections. Previously, <SHIFT> 7 was used for this purpose. However, although the <SHIFT> 7 key sequence will disable frequency corrections, this diagnostic mode does not disable the "Continuous Center Frequency Tuning" mode of operation. As a result, the 16-20MHz VCO frequency is recentered and the 1st L.O. frequency is offset by an equal amount, whenever the 16-20MHz VCO frequency approaches the end of its tuning range.

Key sequence <SHIFT> 0, 6 will disable frequency corrections and the "Continuous Center Frequency Tuning" mode. Because the 16-20MHz VCO "Tune Sensitivity and Range" calibration procedure requires voltage and frequency measurements at both extremes of the VCO frequency range, the <SHIFT> 0, 6 key sequence must be used whenever calibration is required.

W2 Issue 17-7

4041 TAPE "MTPACK" PROGRAM

The manufacturer of the DC100 tape cartridge recommends that the tape be fully wound from end-to-end periodically. Usually, normal use performs this function. However, some users access the same program repeatedly, and may eventually experience tape jamming. Also, the tape should be completely wound from end-to-end if it has been in storage a long time, or subjected to extreme temperatures.

Below is a program that will perform an end-to-end tape wind. This program gets the record count of the tape from its header record (determined during Tape Format), then accesses the last record on that tape. The program takes approximately one minute. No data is added or deleted from the tape, so it is safe to use on all tapes. The tape must be formatted for the program to function. (Pullout F)

W2 Issue 17-12

4205/4207 FIRMWARE UPGRADE INFORMATION

REF: 4205/4207 Field Service Manual
070-6283-00

Some firmware kits for 4205 and 4207 Version 10.6 did not contain instructions on how to set-up the Terminal Display Control Board (also known as Main Logic Board).

Version 10.6 uses 512K ROMs and requires the strap at J16 be moved to the '5' position. Products with the serial numbers listed below were shipped with version 10.2 and were strapped in the '2' position. The '2' position of J16 is used when only 256K ROMs are used.

The serial number break is 4205 B011321 and below, 4207 B012119 and below. Instruments shipped with a serial number above the range of those noted have version 10.6 and were shipped with a 0 ohm resistor in location R1051, instead of a strap in position '5' of J16.

The part numbers of the firmware kits are 020-1460-03 (4205 ROM set) and 020-1462-03 (4207 ROM set). The firmware upgrade kits 4205F01 and 4207F01 may also be affected.
W2 Issue 17-7

5223 MULTIPLE FAILURES

REF: 5223 INSTRUCTION MANUAL,
P/N 070-2932-01

5223 INSTRUCTION MANUAL
With Options, P/N 070-3715-00

In some recent evaluations we have found some instruments which show errors to lead you to the Memory Board, A11, being at fault. But with further investigation, the problem was found to be on the A10 Switch Board on the standard instruments, and on the A18 GPIB Board on the option 10 instruments. It was found that the wiping action of the mode switches was causing "gold tracking", thus causing some switch pads to be shorted together.

These switch pads are all connected to the system data bus. Shorted system data bus lines can cause many strange problems which could be very time consuming to find. My suggestion is, if you have shorted data bus lines, remove the specific above mentioned board and remove all the switches. (Refer to the appropriate page of the maintenance section of the manual.) Now using gold wipe, or some other cleaner, clean all the areas around all the switch pads. This gold tracking has only been seen on older instruments or ones where the mode switches are used frequently.
W2 17-13

7612D FAN REVERSAL PRECAUTION

S/N Range: ALL

7612D's that do not have the Air Flow improvement modification #M60644 installed cannot have the fan reversed. Testing performed by engineering indicates that fan reversal in premodified instruments will cause cooling improvements in some ares; however, other areas will operate hotter. The net result will be higher overall internal temperatures than before.

If the airflow mod is installed, the cooling of the instrument works equally well with forward or reverse airflow.

W2 Issue 17-7

7612D PERFORMANCE SPECIFICATION GUIDELINE

REF: Manual Change Reference M63940

When performing Performance Check and Calibration Procedures both vertical plug-ins need to be installed. The reason for this is the electrical performance specifications in these areas are based on both vertical plug-ins (e.g. 7A16P's) being installed in both the A and B channels. Failure to follow this guideline may result in erroneous indications in the areas of Bit Accuracy and Trigger Slope Accuracy.

The Instruction Manual will be changed to reflect this.
W2 17-13

Tektronix
COMMITTED TO EXCELLENCE

MANUAL CHANGE INFORMATION

Date: FEB 6 1987 Change Reference: M62994

Product: CG551AP/CG5001 Manual Part No.: 070-4767-00

DESCRIPTION

EFFECTIVE SERIAL NUMBER B064185 & UP

Remove:

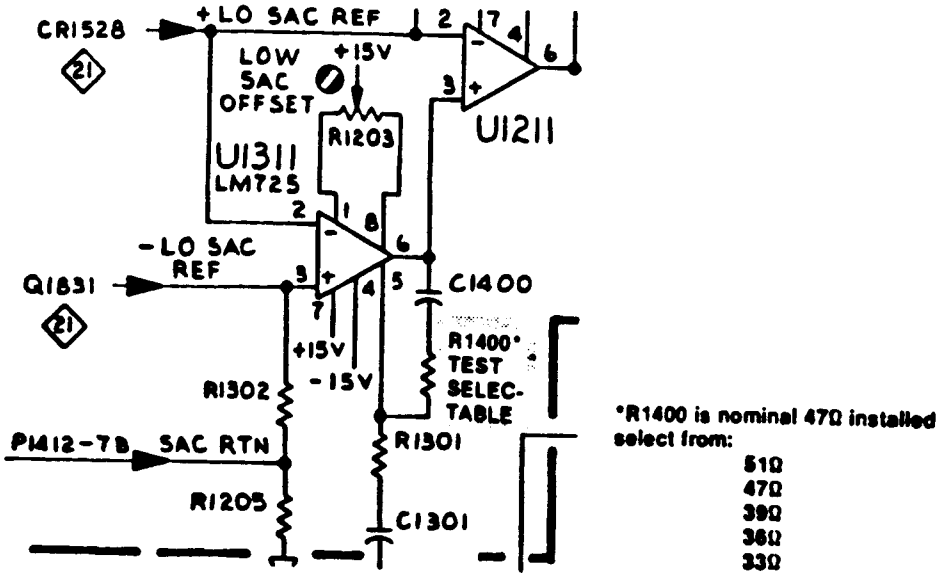
Component No.	Part No.	Description
A6C1633	281-0770-00	Capacitor, ceramic 100pf, 20%, 100V

Add:

Component No.	Part No.	Description
A6C1834	281-0775-00	Capacitor, ceramic, .1 μf, 20%, 50V

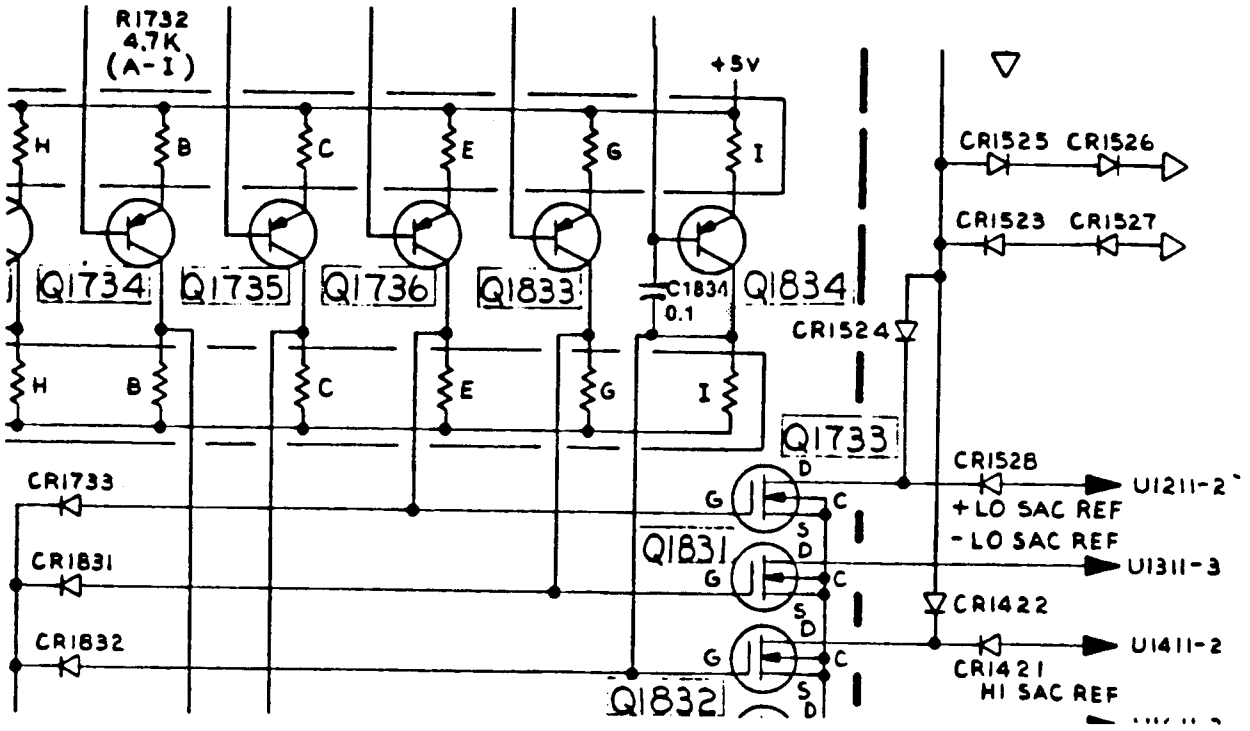
Change:

Component No.	Part No.	Description
A6	670-6088-10	Circuit Bd Assy: Reference
A6Q1832	151-1103-00	Transistor, FET, N-Channel
A6U1241	156-0719-00	Microcircuit, D/A Converter
A6R1400		Resistor, TEST SELECTABLE Nominal installed value to be 47Ω p/n 315-0470-00.



Partial A6 Reference Board 22

DESCRIPTION



Partial A6 Reference Board (21)

Change step 13 on page 5-28 to read:

13. Adjust the Low SAC Compensation

a. Set the CG 5001/CG 551AP front panel controls as follows:

AMPLITUDE MODE	VOLTAGE
UNITS/DIV	.1 V/D
NUMBER OF DIVISIONS (MULTIPLIER)	1
FREQUENCY	100 kHZ
VARIABLE	Off
OUTPUT	ON
USE FOR 50 Ω LOAD	Off
TRIGGER OUTPUT	ON

b. Connect the CG 5001/CG 551AP OUTPUT through the output cable assembly to the vertical input of the oscilloscope.

c. Set the oscilloscope vertical deflection for 20 mV/div and the horizontal sweep for 0.5 μs/div.

d. Use a 50 Ω coaxial cable to connect the CG 5001/CG 551AP TRIGGER OUTPUT to the oscilloscope external trigger input. Adjust the oscilloscope trigger level for a stable display with the rising edge of the signal at the first vertical graticule line.

e. CHECK—the positive pulse for squarest leading edge corner and flat top.

f. ADJUST—A6C1201, Low SAC Comp, so that the positive pulse has the best leading edge corner and flat top.

g. For instruments below serial number B064185 skip to Step 13j.

NOTE

A new value for A6R1400 will not need to be selected unless operational amplifier A6U1311 has been replaced.

DESCRIPTION

h. If the leading edge corner and top of the waveform does not look like Fig. A, a new value for A6R1400 must be selected. Select one of the following to replace the existing A6R1400 value depending on the waveform appearance.

51 ohm	.25, 5%	315-0510-00
47 ohm	.25, 5%	315-0470-00
43 ohm	.25, 5%	315-0430-00
39 ohm	.25, 5%	315-0390-00
36 ohm	.25, 5%	315-0360-00
33 ohm	.25, 5%	315-0330-00

i. Repeat 13f, then 13h until the waveform appearance is similar to that in Fig. A.

j. Press the CG 5001/CG 551AP OUTPUT ON button (turns output off).

k. Proceed to the next step.

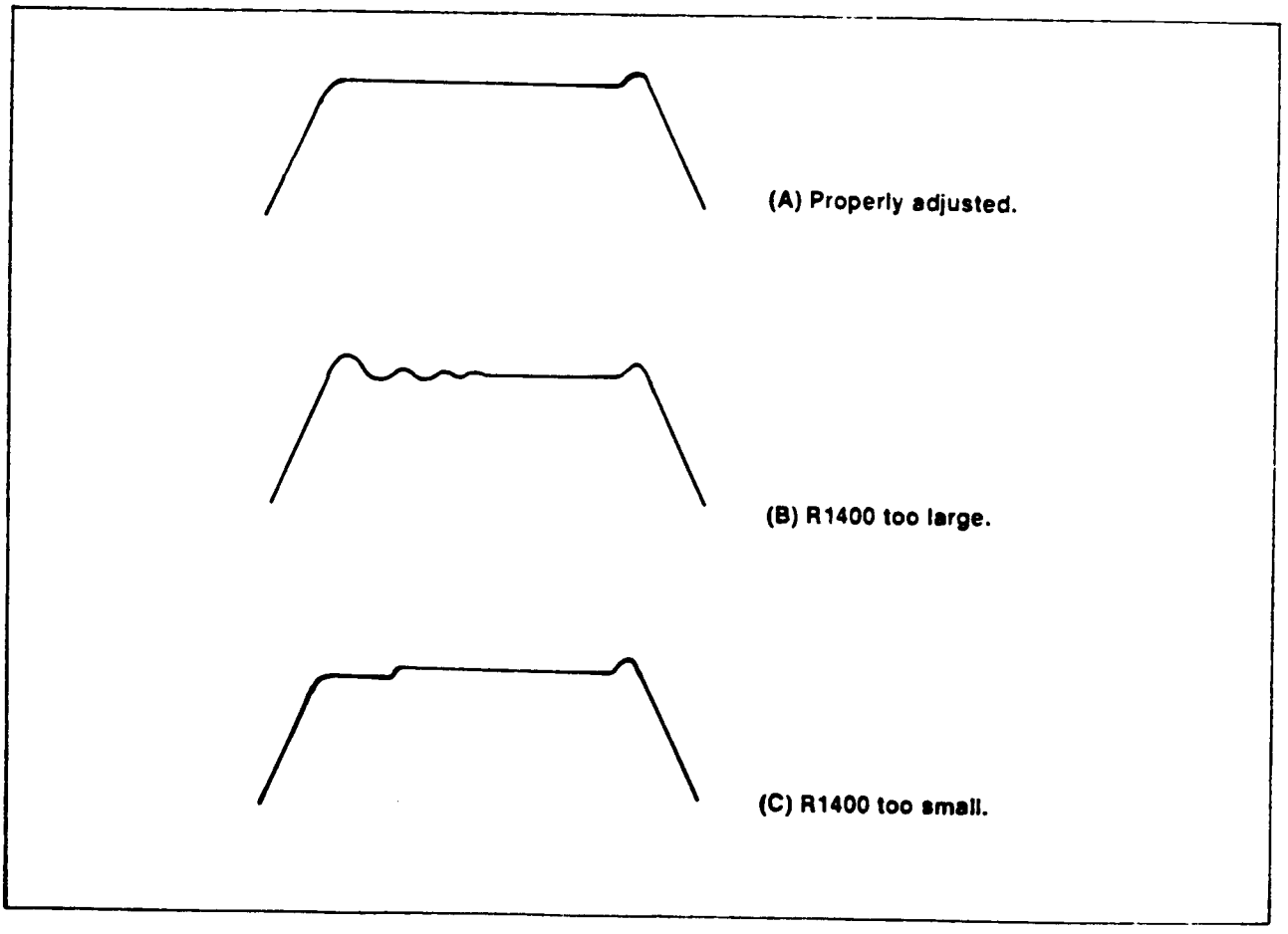


Fig. A. Waveforms indicating A6R1400 value is: (A) properly selected; (B) too large; (C) too small.

Tektronix
COMMITTED TO EXCELLENCE

MANUAL CHANGE INFORMATION

Group Code 24

Date: 4-17-87 Change Reference: M63501 REV 1

Product: WFM-300 Manual Part No: 070-6039-00

DESCRIPTION

EFF SN B010388

ELECTRICAL PARTS LIST AND SCHEMATIC CHANGES

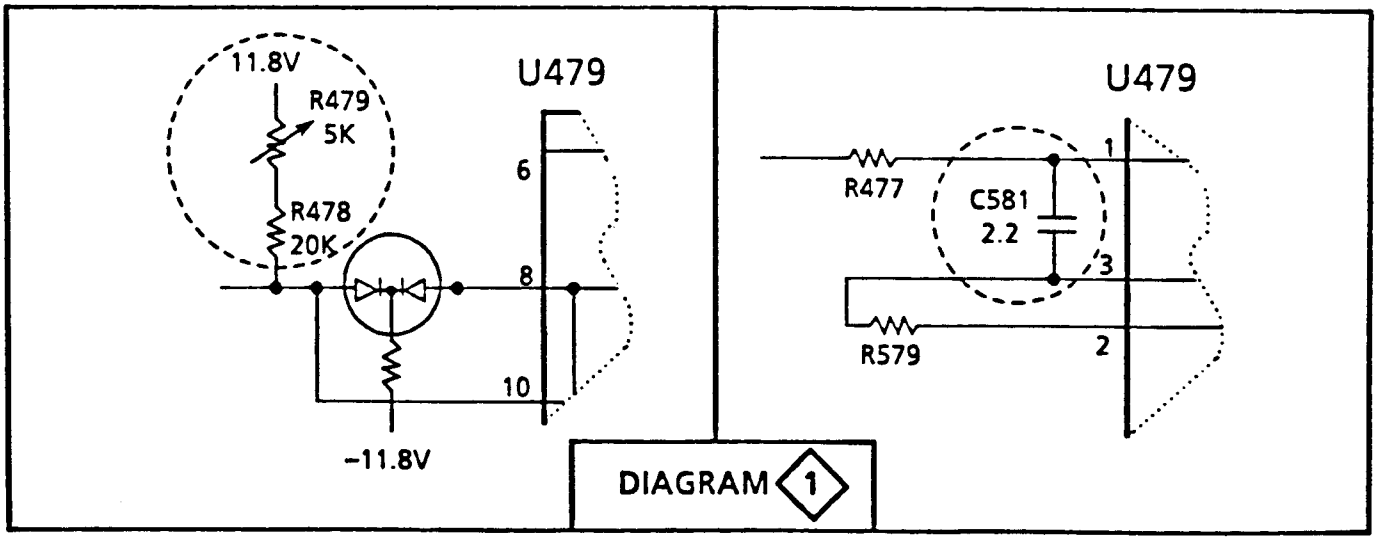
CHANGE TO READ:

A3	670-9539-04	CIRCUIT BOARD ASSY: MAIN
A3	670-9874-04	CIRCUIT BOARD ASSY: MAIN (OPTION 10 ONLY)
A3	670-9875-04	CIRCUIT BOARD ASSY: MAIN (OPTION 12 ONLY)
A3R478	321-0318-00	RES,FXD,FILM:20.0K OHM,1%,0.125W,TC = TO
A3R705	315-0154-00	RES,FXD,FILM: 150K OHM,5%,0.25W

ADD:

A3C581	281-0756-00	CAP,FXD,CER DI: 2.2PF, ± 0.5PF,200V
A3R479	311-2234-00	RES,VAR,NONWW: TRMR, 5K OHM,20%,0.5W LINEAR

NEW PART LOCATIONS ARE SHOWN BELOW.



SPECIFICATION CHANGE

CHANGE TO READ:

Sect. 1, PAGE 1-3

Table 1-1, Vertical Deflection System

Characteristics	Performance Requirements
Variable Gain Range	
1 V Full Scale	A 1V input signal can be adjusted to 250 mV display. A 666 mV input signal can be adjusted to 1 V display.

Date: 4-17-87 Group Code 24 Change Reference: M63501 REV 1

Product: WFM-300 Manual Part No: 070-6039-00

CHECKS AND ADJUSTMENTS CHANGES

CHANGE TO READ:
Sect. 5, PAGE 5-3
Step 5. CHECK VERTICAL GAIN RANGE
A 1 V input signal can be adjusted to provide a 2.5 division display.
A 666 mV input signal can be adjusted to provide a 10 division display.

SECT. 5, PAGE 5-6
Step 5. CHECK VERTICAL GAIN RANGE
REQUIREMENT —A 1 V input signal can be adjusted to provide a 2.5 division display.
A 666 mV input signal can be adjusted to provide a 10 division display.

a. Continuing from Step 4, check that the VAC signal is displayed on the WFM–300 screen.

b. Set the VAC controls for 999.9 mV output.

c. CHECK — Using the front-panel V GAIN control, decrease the amplitude of the display until it is 2.5 divisions.

d. Set the VAC controls for 666 mV output.

e. CHECK — Using the front-panel V GAIN control, increase the amplitude of the display until it is 10 divisions.

f. Return the V GAIN control to its detent position.

g. Disconnect the VAC signal from the WFM–300.

DELETE:
Sect. 5, PAGE 5-6
Delete Fig. 5-2

CHANGE TO READ:
Sect. 5, PAGE 5-21
Step 14:
Change part f to h
Change part g to i
Change part h to j
Change part i to k
Change part j to l
Change part k to m
Change part l to n
Change part m to o

ADD:
Sect. 5, PAGE 5-22
Add to Step 14:

f. Adjust R479 for a 2.5 division display.

g. Return V GAIN to its detent position.

Tektronix COMMITTED TO EXCELLENCE

MANUAL CHANGE INFORMATION

Group Code 23

Date: 10-10-86 Change Reference: M61658

Product: See List Manual Part No: See List

DESCRIPTION

650	EFF SN B056190	070-2646-01/02
653/656HR	EFF SN B050670	070-2647-00

MECHANICAL PARTS LIST AND TEXT CHANGES

CHANGE TO READ:

FIG. #	P.N.	DESCRIPTION
1-70	337-1467-04	SHIELD, CRT
REMOVED:		
1-84	386-2201-00	YOKE SUPPORT
1-85	213-0286-00	WING SCREW
1-86	381-0332-00	NUT BAR
1-87	212-0110-00	METRIC SCREW
ADDED:		
1-70	407-3577-00	BRKT, ANGLE
1-70	407-3578-00	BRKT, YOKE MTG.
1-87	211-0418-00	METRIC SCREW
1-87	210-0805-00	WASHER, FLAT
—	220-0407-00	NUT, HEX (YOKE ADJ)
—	210-0457-00	NUT, PL, ASSEM
—	211-0507-00	SCREW, MACHINE

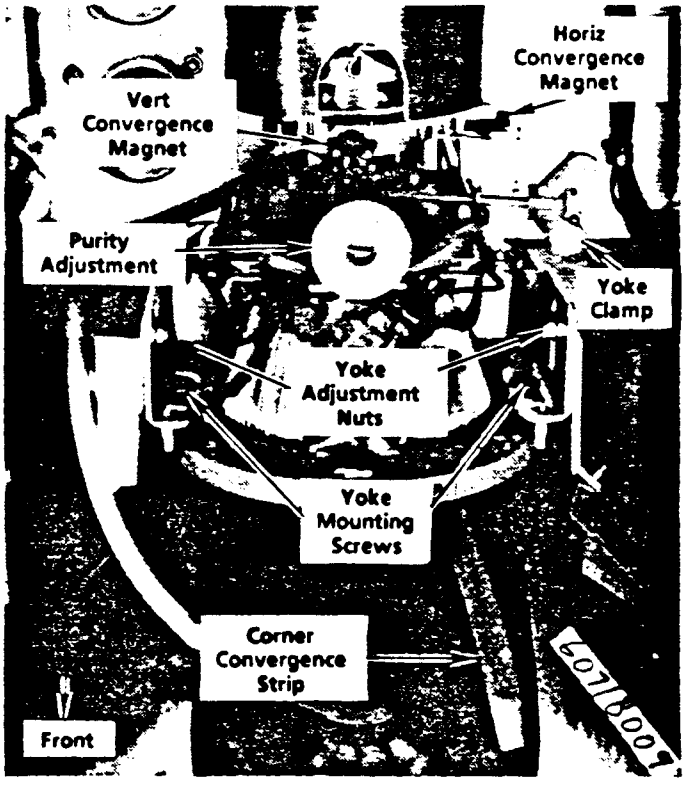


Fig. 6-25 Kinescope neck components.

CHANGE, on pages 6-20 and 6-21, part f of step 22 **TO READ:**

f. ADJUST – Turn the Purity adjustment (see Fig. 6-25) to obtain a uniformly red display. If further improvement is necessary, loosen the yoke clamp, adjustment nuts and mounting screws. Slide forward or back to obtain the best red screen display. Display a convergence crosshatch pattern. Rotate the yoke so the center vertical line is vertical. Retighten the yoke clamp, adjustment nuts and mounting screws. Display a 100 IRE flat field signal. If necessary, readjust the Purity adjustment. If there is still some impurity, use a hand-held degaussing coil to completely degauss the monitor.

Note

Adjustments made to the Yoke mounting screws require a 2.5 mm Allen head Driver. A 3/32" Allen wrench will work nearly as well.

Tektronix
COMMITTED TO EXCELLENCE

MANUAL CHANGE INFORMATION

Group Code 24

Date: 3-18-87 Change Reference: C2/387

Product: 1480-Series MOD W5F Manual Part No: 070-5844-00

DESCRIPTION

ADJUSTMENT PROCEDURE CHANGES

CHANGE TO READ:
SECT. 3, PAGE 3-4
STEP 5a. Connect the 500 kHz squarewave signal from the FG503 to the 1480-Series as shown in Fig. 3-5. Set the FG503 to 2V P-P.

ADD CAPTION:
SECT. 3, PAGE 3-4
Fig. 3-5. Using the FG503 to adjust CMRR.

CHANGE TO READ:
SECT. 3, PAGE 3-5
STEP 6i. Adjust the VAC amplitude so that the pulse peak is on the –40 IRE (0V) graticule line. Note the VAC voltage reading.

SECT. 3, PAGE 3-6
Step 8d. Set the SG503 Amplitude Multiplier and Amplitude Output for a narrow separation between signals and position the display with the 1480-Series VERTICAL POSITION to the point of minimum separation. Readjust the VAC slightly, as necessary to maintain the separation between signals. Note the VAC amplitude reading.

Tektronix MANUAL CHANGE INFORMATION Group Code 24

COMMITTED TO EXCELLENCE Date: 3-19-87 Change Reference: C1/387

Product: 1750-Series Waveform/Vector Monitors Manual Part No: 070-5664-00

DESCRIPTION

TEXT CHANGE

CHANGE TO READ:
Sect 5, Page 5-18

3. Adjust +12 Volt Supply

REQUIREMENT — 100 V supply, 96V ±1V at J237, pin 5A; +12V supply, +12V ±0.5V at pin 6 of J964.

a. Connect voltmeter to J237, pin 5A.

b. Check – for 95V to 97 V.

c. Connect voltmeter to J964, pin 6.

d. Check — for +12V ±0.5V. If reading is within tolerance, do not readjust. If the +12V is out of tolerance, adjust 12V Adj. (R205) on LV Power Supply for +12V ±0.5V.

e. If R205 is adjusted, recheck the reading at J237, pin 5A. If that reading is not between 95 and 97 V, readjust R205 and recheck readings until both the 12V and 96V are within tolerance

4. Adjust HV

REQUIREMENT — 100 V supply, 96V ±1V at J237, pin 5A.

Note: This adjustment does not normally need to be made during periodic recalibration. Correct operation of the HV supply is assured when the +12V supply is adjusted (Step 3). However, when the crt or other major component is changed, it may be necessary to readjust the HV Adj. to allow the HV (and 100V) to track the +12V supply. In the event that the HV Adj. (R738) needs to be adjusted, the following steps should be followed.

1. Separate the instrument and move the crt out of the way of the HV Adj. See Section 6 ("Separating the Instrument") for instructions.

2. Set the +12V supply to 12V (or as close as possible).

3. Adjust the HV Adj. (R738) for 96V (or as close as possible).

4. Reassemble the instrument and repeat step 3.

Attachment for "4041 Tape "MTPACK" Program"

```
100  Rem  MTPACK program
110  Rem  variables used: lu, last_rec, scratch$
120  Integer lu, last_rec
130  Lu=123 ! Logical unit for accessing tape.
140  Dismount "TAPE:" ! Close all LUs open to the tape.
150  Print "DC100 Tape Packer."
160  Input prompt "Insert Tape to Pack, hit <CR>.":scratch$
170  Open #lu:"TAPE(phy=yes):"
180  Rbyte  #lu:1,scratch$  !  Read the tape header record,  set  last
     record #.
190  Last_rec=asc(seg$(scratch$,29,1))+asc(seg$(scratch$,30,1))*256
200  Print "Winding Tape."
210  Rbyte #lu:last_rec, scratch$ ! Access the last record on tape.
220  Print "End of Tape Rewind."
230  Print "Rewinding Tape."
240  Dismount "TAPE:"
250  Print "End of Tape Rewind."
260  Print "Tape Pack Done."
270  End
```