Tektronix
COMMITTED TO EXCELLENCE

COMBINATION EDITION

Wizards Workshop

ALL SERVICE QUESTIONS FROM EUROPE, MIDDLE EAST, AND AFRICA SHOULD BE ADDRESSED TO THE EUROPEAN MARKETING CENTER SERVICE GROUP IN THE NETHERLANDS.

TEKTRONIX INTERNAL USE ONLY

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Editor's Corner

by Sharon Huetson

We have had some input regarding which Wizard Workshop articles appear in the sales and service microfiche. Our definition is only articles considered pertinent by the writer are put on the Sales & Service microfiche. These are done in a nine-week cycle and the maximum lag time would be nine weeks.

Remember a copy of each article is in the Wizard Workshop chronological fiche distributed by our department. We are continuing to work on the W^2 "By Product" microfiche and will have it to you as soon as possible.

Sharon

PERSONNEL CHANGES

NEW HIRE

JIM LLOYD - IRVINE

Jim is the newest member of the field service team in Irvine. He has recently completed his AA degree in Electronics at Orange Coast College and will assume the responsibilities of a FSS I.

Welcome and best of luck to Jim!

******

TOMMY HALL - DENVER

Tommy is a welcome addition to the Field Service team in the Denver office. His experience includes four years of computer related experience in the U.S. Army, and more recently was a Field Service Engineer with Computer Mart, Inc.

Tommy is married with one child. His hobbies include swimming, jogging, weight lifting and raising tropical fish.

Welcome to Tek Tommy!

******

TONY HOENLE -
JON GRODE - CHICAGO
PHILLIP HAMMONS -

These new employees are all graduates of the Electronic Technicians program at Devry Institute of Technology. Tony and Jon will be working days, and Phillip will be on swing shift.

Welcome! Wishing all of you best of luck in your careers here at Tek!

******

TRANSFERS

TONY KOVAL from Ft. Lauderdale IDD FS to Orlando IDD FS.

MARSHALL SMITH from Phoenix IDD FS to Ft. Lauderdale IDD FS.

Best of luck to both Tony & Marshall in their new locations!

******

PROMOTION

WIETZE DE BOER - European Board Exchange Center

Wietze has been promoted to Module-Repair Supervisor.

Congratulations!

******

WAYNE GENTERT - SANTA CLARA

Wayne has accepted the position of Western Region Service Operations Manager. He was formerly the Area Service Manager for the Irvine area and resided in Woodland Hills, California. Wayne will continue to operate out of Woodland Hills for the time being and will report to Lyle York.

Wayne's new areas of responsibility include the Region Technical Training Group, Region Service Support Group, Region Logistics Support and Operations Analyst Support.

Congratulations and best of luck to Wayne!

******

AREA CHANGE

RON MORRIS - IRVINE

Ron has replaced Wayne as Area Service Manager in Irvine and also now reports to Lyle York. Ron was formerly the Area Service Manager in Santa Clara.

Best of luck and continued success to Ron!

******

--Editor

GENERAL

AA501 CIRCUIT DESCRIPTION AUDIO TAPE AVAILABLE

AA501 - Circuit Decription Audio Tapes P/N 062-5843-00
Length of tapes are approximately 3½ hours
Handouts included

Please order the tapes and handout from the Marketing Training Distribution Group - Mail Station - 54-031, Extention 8078 Merlo Road.

Submitted by--
Dick Hornicak

CRT FAILURES AND REJECTS

One of the most useful analytical tools in solving current CRT quality problems is the defective CRT itself. We want to encourage each of you to send all failure and reject CRTs you replace directly back to CRT Product Assurance. This enables them to provide CRT Manufacturing with the feedback necessary for corrective action. Both Warranty failures and Out-of-Warranty failures are needed. The pink failure copy of the Service Record should be attached to the CRT. If for some reason another person at Tektronix would also like to see the defective CRT, put their name on either the CRT or CRT box and the tube will be forwarded to them after the reject analysis date has been obtained.

CRTs should be sent to the attention of: Vern Isaac
46-234

Feel free to call Vern at any time you have questions or concerns about CRT quality, operating conditions, applications, etc.

Information submitted by--
Vern Isaac
Ext. 7331 DR

This article is the first of three on the flexible disk. The latter two will be published in upcoming editions of Wizards Workshop.

PRINCIPLES OF OPERATION

Certain hardware and operational characteristics of a disk drive must be understood as a basis for more detailed study of the functional systems and circuits. In this article and future articles, the hope is to provide the necessary background information. The first topic of study is the flexible disk as used in the 4907, 8002, and 4081.

RECORDING MEDIUM

The disk drives use a removable, flexible disk as the storage medium. Figure 1 shows the construction and dimensions of a typical flexible disk and associated jacket. In this example only one (1) side will be used for recording.

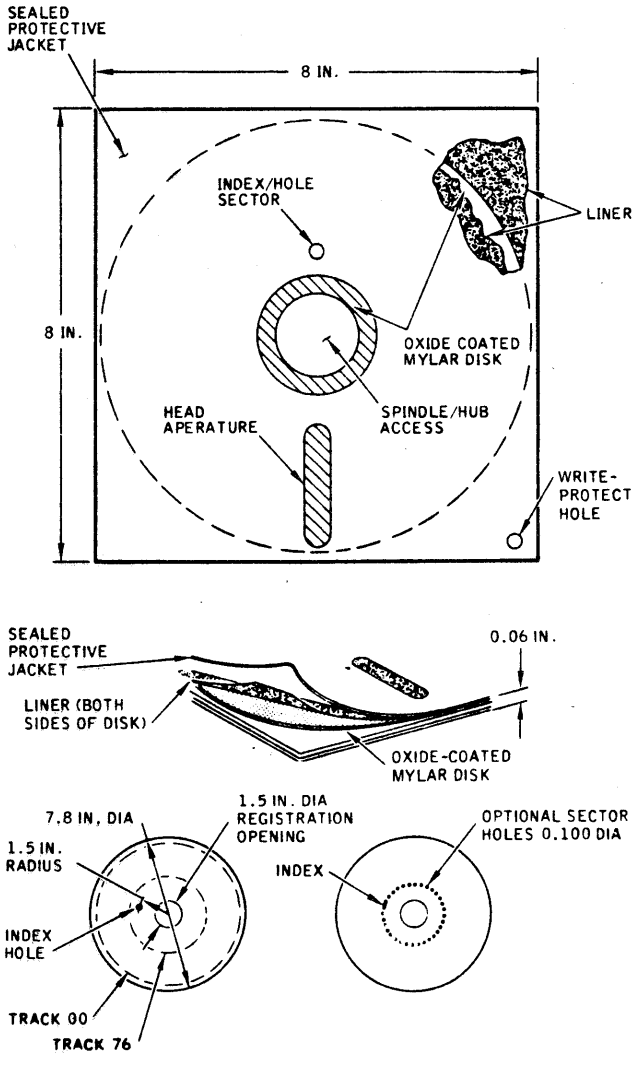


Figure 1. Flexible Disk Construction

The recording medium specified for these drives is a single-side oxide-coated, mylar disk enclosed within a protective plastic jacket. The jacket contains openings for spindle loading, head contact, sector/index detection (if used), and write protect detection.

The circular opening in the center of the jacket exposes the registration opening in the disk. The centering cone enters this opening to center and clutch the disk against the rotating spindle which causes the disk to rotate within the jacket.

When the disk is "loaded", the read/write head is positioned in contact with the disk exposed by the elongated opening. The small circular opening in the jacket, usually above the large center opening, exposes 0.1-inch diameter holes in the disk (Figure 2) that are detected as index and sector.

(Diagram continued on the following page)

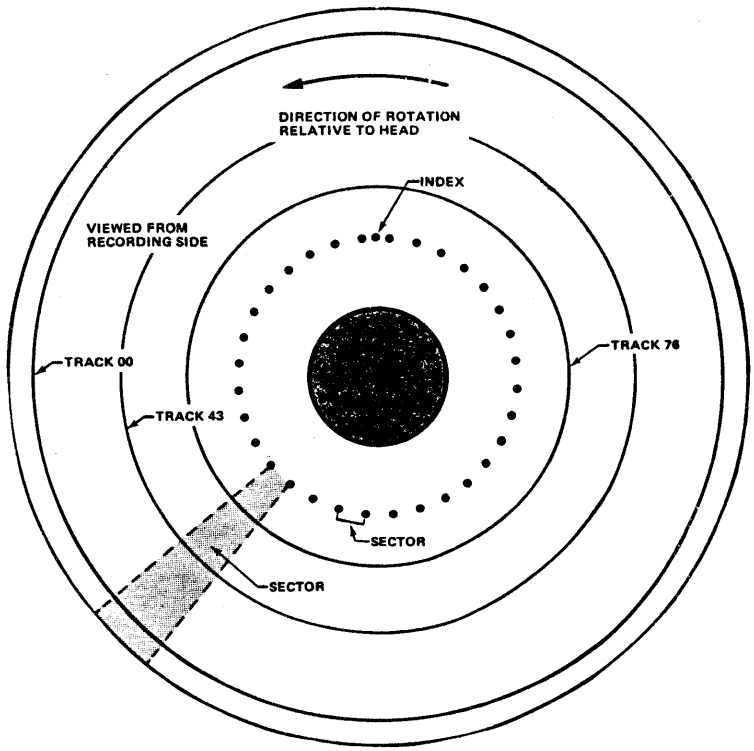


Figure 2. Disk Track and Sector Locations

The index pulse developed from the index hole is used to indicate the rotational speed of the disk and marks the beginning of the recording tracks. Sector pulses (32 per track) are developed for the evenly spaced sector holes in the disk and are used to divide each track into equal areas for recording format purposes.

Data is recorded by magnetizing digital bit patterns in concentric circles (tracks) on the recording surface of the magnetic-oxide coating. As shown in Figure 2, the recording surface contains 77 tracks spaced at 0.02-inch intervals. The tracks are numbered 00 through 76, beginning with the track nearest the outer edge of the disk.

Written by--
Jimm Burk
Maintenance Training
54-077

131-2407-00 - MIXED STOCK - "PURGE"

A mixture of parts under P/N 131-2407-00 has been found. The correct part for P/N 131-2407-00 is a connector with 2 Rows of 13 Pins but some connectors were found to have 2 Rows of 10 Pins. Please check all stock areas and purge all parts under P/N 131-2407-00 that only have 2 Rows of 10 Pins, reorder as necessary.

Inserted by --
Rich Andrusco
58-511, Ext. 5609

281-0812-00 - MIXED STOCK - "PURGE"

Some parts under P/N 281-0812-00 have been found to be marked incorrectly. These parts should be marked 102(1000pf) and not 103 (10000pf). Please check all stock areas and purge all parts found to be marked incorrectly, reorder as necessary.

Inserted by --
Rich Andrusco
58-511, Ext. 5609

SERVICE RECORD PROCESSING; DOA PRODUCTS

Reporting of DOA products is an important part of the failure reporting process. The responsibility of reporting DOA products rests on all service personnel whether the product is in the IDD, T&M or Systems area.

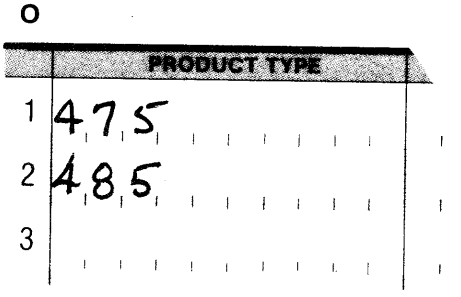
A product which a customer, upon initial receipt, is unable or refuses to use because it does not meet published specifications or reasonable expectations. These situations should be reported as "DOA".

"Normal expectations" includes such things as missing lettering, broken or missing knobs, shipping damage, etc.

DOA's should be reported in the PROBLEM DESCRIPTION/ACTION TAKEN block of the service records. Enter the line item number of the product, the letters "DOA" and a short explanation of why the product is being reported as DOA (see example below under PROBLEM DESCRIPTION/ACTION TAKEN).

Problem Description/Action Taken

Remarks placed in this block of the service records should be keyed to the appropriate product through use of the line item number.



Problem Description/Action Taken:
(1) NO SIGNAL DISPLAY - REPLACED LOOSE BNC (2) DOA - CH2 VOLTS/DIV KNOB MISSING LETTERING

--Bill Duerden
56-037, Ext. 8938

618 MOD DM, GMA125 MOD KA POWER SUPPLY CABLE

Reference: 618 MOD DM Manual P/N 061-2405-00
GMA125 MOD KA Manual P/N 061-2159-00
GMA125 Manual P/N 070-2618-00

Factory Service has received power supplies (P/N 620-0279-00) from the field with power cable attached. Cable is installed from J25 in power supply to Molex connector on back panel of display. Cable P/N is 175-2674-00. This cable is NOT part of the 620-0279-00 power supply and should be removed (and left with instrument) before shipping power supply to Factory Service for exchange.

--Dennis Painter
63/503, ext. 3597 (WI)

634 GEOMETRY SPECIFICATIONS

Confusion has been expressed by customers and field service personnel regarding the 634 geometry specifications. This article is written to alleviate some of the confusion.

Linearity charts (calibration graticules) are designed according to recommendations in the Electronic Industries Association's document RS-170, "Electrical Performance Standards--Monochrome Television Facilities." The perimeter of the donuts on the chart represents the limit of the specification defined for that given portion of the screen. For instance, on the standard 634, the specification for linearity in the quality area is .5% of the CRT height. Since the 634 CRT height is 9 cm, variation may be as much as .5% X 9cm = .045cm, or about .018 inches. The diameter of the donut in the quality area of the 337-2537-01 chart is then 2 X .018", or.036 inches.

Please note that the specification limit is represented by the outside diameter of the donut. A display of horizontal lines is in specification if all of the traces' centerlines fall within the outer perimeter of the donuts. Similarly, a vertical trace which is in spec is shown below in figure A. When dealing with a crosshatch pattern, the intersection of the centerlines (not necessarily the intersection of the traces) must fall within the perimeter of the donut to be within specification (see figure B).

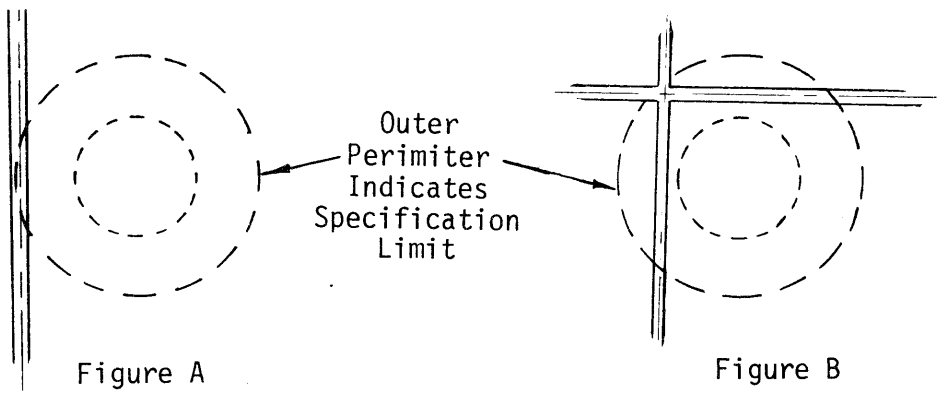


Figure A

Figure B

--George Kusiowski
63-503 EXT. 3928

5000 SERIES

5223, GPIB CONVERSION KIT

Reference: MSR 1101-52

The GPIB conversion for the 5223 is a Service Center installable kit which up-grades a standard 5223, bench or rackmount, to an Option 10, with IEEE-488 interface. The P/N for this kit is 040-0996-00.

--John Eaton
58/511, Ext. 5222

7000 SERIES

7603 AND 7613 VERT. SIG. OUT CENTERING SPEC. CORRECTION

Please note the following corrections to the listed manuals.

7603/R7603 Operators Manual	070-1310-00
7603/R7603 Service Manual	070-1429-00
7613/R7613 Operators Manual	070-1365-00

Text Changes

Section 2 Specification
Pages 2 - 5
Signals Out Vert. Sig. Out Centering Supplemental Information.

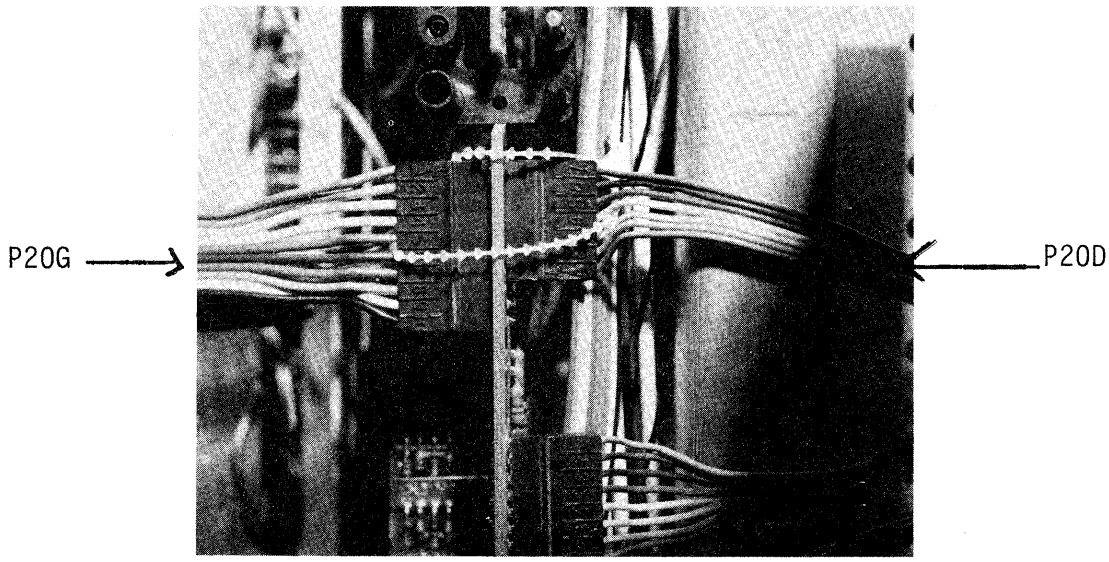
Change to read:
+3 div system CRT to VERT SIG OUT. (1.5V into 1MΩ or 75mV into 50Ω.)

--Lynn Sperley
58-511, Ext. 6902

7704A MAIN INTERFACE POWER CABLE FALLS OFF

Manufacturing Engineers are aware of the harmonica connector falling off P20G They have selected a different style connector that will be used in new instruments as soon as it is available.

For instruments in the field and until the new connector is available, a unique and simple solution exists. Use a cable tie, P/N 006-0531-00, and tie P20G to P20D as shown in the photo.



TEKTRONIX INTERNAL USE ONLY

The cable ties are inexpensive and take only a minute to install. If you know of other plugs where this is a problem, let me know the instrument type, serial number, and plug number. A "You Done Good" to Gary Beam, Santa Clara for this suggestion via a Service Action Request.

--Lynn Sperley
58/511, Ext. 6902

7854, ROM BOARD ERROR, S/N B010400 & BELOW

Reference: 7854 Instruction Manual P/N 070-2874-00
Read Only Memory <29>

A board lay-out error has been found in Manufacturing on the ROM Board, A31. It is not really known what it will effect, but can possibly cause the scope to do strange things when acquiring a display. I would suggest that all instruments in the serial number range be checked whether they display a problem or not. To check the board, remove the GPIB board. Next remove the ROM board and make a resistance measurement across R222 or between Pins 4 & 8 of U220. If the resistance is 200Ω it is okay. If it measures a short, the board has an error. You will have to cut out U220. Cut the run between pins 4 and 8 underneath the I.C. and replace the I.C. as usual.

--John Eaton
58/511, Ext. 5222

SPECTRUM ANALYZERS

492/P TUNABLE 2ND L.O. P/N 119-1022-01 MARKED INCORRECTLY

The 2nd L.O. for the 492/P was modified to allow for center frequency tuning. Some of the tunable 2nd L.O.'s, P/N 119-1022-01, were inadvertently shipped in 492/P's marked 119-1022-00. You can identify a 119-1022-01 assembly by the 5/64 inch Allen tuning slug on the side of the 2nd L.O. If you have a tunable 2nd L.O. that is marked incorrectly, change the 00 suffix to 01 with a black marking pen. This will save some confusion when this part is in need of repair.

--Rich Kuhns
58-511, Ext. 6782

492/P 3MM CONNECTORS

Be careful when tightening the 3mm connectors on the 492/P RF deck. These parts are easily damaged and are costly to repair. You should tighten the 3mm connections slightly more than finger tight. In tightening or loosening a connector, you can change the flatness response of the analyzer so a flatness check should be performed to insure the instrument is within specification.

--Rich Kuhns
58-511, Ext. 6782

7L14 MANUAL CORRECTIONS TO DIAGRAM 15

The following is a list of corrections to the 7L14 manual P/N 070-3434-00.

CHANGE TO:

A88R3080	321-0411-00	RES.,FXD,FILM:18.7K OHM.1%.0.125W

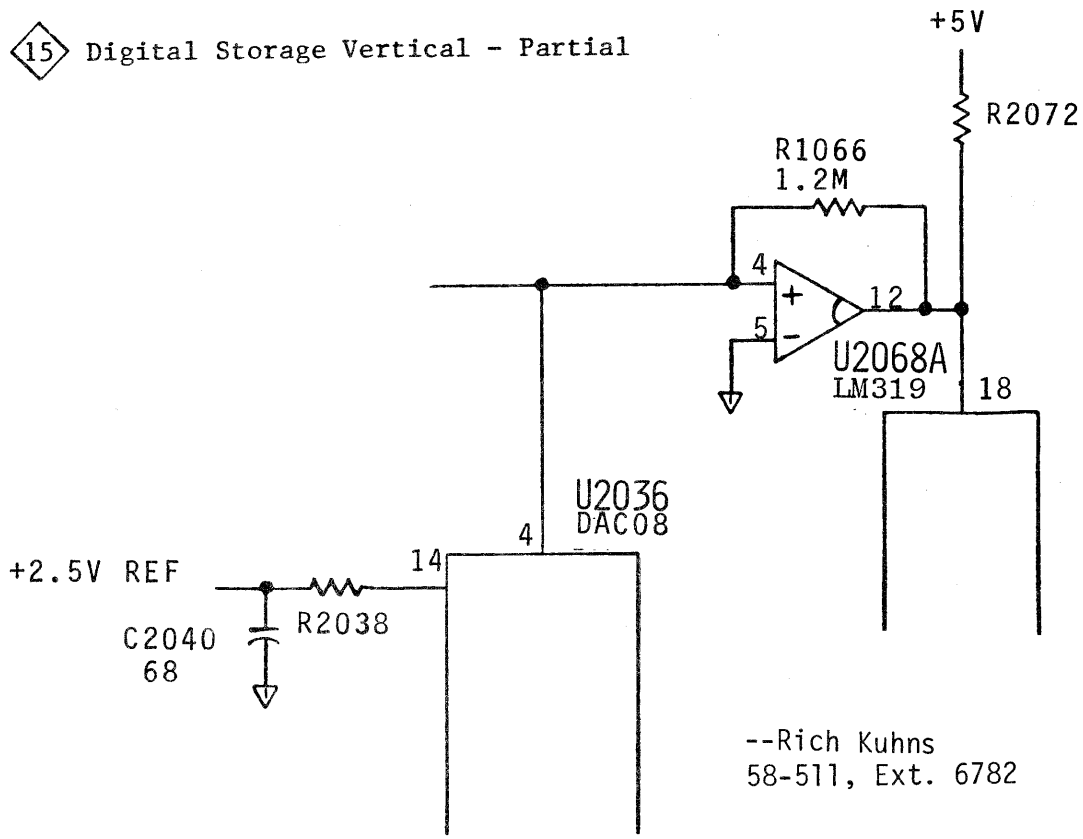
REMOVE:

A88R2074	315-0102-00	RES.,FXD,CMPSN:1K OHM,5%,0.25W
A88R2093	315-0180-00	RES.,FXD,CMPSN:18 OHM,5%,0.25W
A88R3091	315-0180-00	RES.,FXD,CMPSN:18 OHM,5%,0.25W

ADD:

A88C2040	290-0530-00	CAP.,FXD.ELCTLT:68UF.20%,6V
A88R1066	315-0125-00	RES.,FXD,CMPSN:1.2M OHM,5%,0.25W
A88W2093		WIRE STRAP,#22
A88W3091		WIRE STRAP,#22

DIAGRAM 15 Digital Storage Vertical - Partial



--Rich Kuhns
58-511, Ext. 6782

SPG1/SPG2 CAL PROCEDURE CORRECTION

Reference: SPG1/SPG2 INSTRUCTION MANUAL (P/N 070-2104-00)

Steps 5p, 5r, 5t, 5v on Page 4-10 begin "Rotate the Video Signal Source Subcarrier Phase control in the direction that"--etc. This must be changed in all four places to read "Rotate the SPG1 or SPG2 SUBCARRIER PHASE control in the direction that"--etc. This will allow the procedure to function properly.

Thanks to Bob Castleberry at Grass Valley for bringing this to our attention.

Manuals correction requests have been submitted.

--Bill Bean
58/511, Ext. 6507

650HR, ADJUSTMENT C1270

Reference: 650HR Instruction Manual (P/N 070-2646-00)

On page 6-5, Step 2's title refers to a part (C1270) for adjustment. However, the adjustment step does not appear in the text, nor the part in the circuit board photo, Figure 6-4. The part (C1270) can be located by referring to Figure 7-4 on page 7-8 of the 653A Instruction Manual (P/N 070-2337-00), and the adjustment is done according to Step 2c on page 3 of manual change M31987 of 2-10-78 in the 650A Manual (P/N 070-2234-00).

Thanks to Tom Doak in Philadelphia for pointing this out.

Manual change requests have been submitted.

--Bill Bean
58/511, Ext. 6507

1440 MOD I2R, I3B, I3C, H SYNC WIDTH

Reference: 1440 Maintenance Notes, pp. 6-7

Starting with serial number B061126, a modification was added that allows independent adjustment of equalizer pulse width, horizontal sync width, and serration width. Instruments prior to this serial number, unless subsequently modified, must have their Horizontal sync width adjusted to 4.8 usec. in order to stay within the prescribed H sync to equalizer ratio of .45 to .55. Instruments produced after B061126, or modified, should have H sync set to 4.7 usec $\pm$ 0.1, V serration to 4.7 usec. $\pm$ 0.1, and V equalizing to 2.3 usec $\pm$ 0.1.

--Bill Bean
58-511, Ext. 6507

400 SERIES PORTABLE SCOPES/COMPLETE HANDLE ASSEMBLY PART NUMBERS

Serial Numbers: All

The following part numbers provide for a complete handle assembly (this includes the hub, springs, identity marker, and handle cover):

PRODUCT	PART NUMBER
434	367-0195-02
442	367-0195-03
455	367-0210-02
464	367-0172-02
465	367-0195-04
465B	367-0195-05
465M	367-0233-02
466	367-0172-03
475	367-0195-06
475A	367-0195-07
485	367-0193-02

--Mike Laurens
58/511, Ext. 6246

4052/4054 MAS/ALU CIRCUIT BOARD MODIFICATION #M40036

The MAS and ALU Circuit Boards have been causing random hang busy problems. The cause of some of these problems are due to the T.I. sockets on these boards. Chips in these sockets tend to "walk out" and make poor contact. Modification #M40036 is changing the T.I. sockets on these two boards to Brundy sockets, which have proven to be more reliable.

The 670-5627-02 ALU board has four of the T.I. sockets, which are in locations U210, U235, U170, and U172. This board will roll to a -03 after the T.I. sockets are replaced with the Brundy sockets.

The 670-6030-04 Mas board has thirty-one T.I. sockets which are being replaced and will roll to a -05 level board.

The part numbers for these sockets are as follows.

16 pin socket -	136-0729-00
20 pin socket -	136-0752-00
24 pin socket -	136-0751-00
28 pin socket -	136-0755-00

--Darrell McGiverin
63-503 EXT. 3786

4611, 4612 LINES IN COPY

The 4611 and 4612 paper guide (see 4611 or 4612 service manuals; Figure 4, Printer Assembly, index 1) may cause dirty or lined copies. The raw edge of an unfinished guide may score the treated surface of the electrographic paper. The damaged paper surface will then capture toner particles regardless of the change placed on the paper by the printing belt.

To correct the problem, smooth the edge of the paper guide with 400 grit sandpaper. As many as twenty or thirty passes of the sandpaper may be necessary to smooth the edge of the guide sufficiently.

The 400 grit sandpaper may be purchased locally at a hardware store.

--George Kusiowski
63-503 EXT. 3928

4611,4612 PRE-SHIPMENT PREPARATION

It must be stressed that before shipping a 4611/12, the toner must be removed from the hopper. Failure to do so will result in spilling toner during shipment and lost time in cleanup upon receipt.

Two methods may be used to remove the toner. The easiest is simply to vacuum it out. The second more time consuming method is to insert a piece of paper into the path of the toner particles as they move around the hopper magnet. To do this, proceed as follows:

- Lift the cabinet top and lock it open.
- Unlatch the top frame and lift it well away from the instrument.
- Fold the electrographic paper over the paper top cover in such a way as to defeat the paper out switch.
- Initiate a copy. Observe that the toner particles appear to move in waves toward the printing belt. In actuality, their path is away from the belt.
- Insert a 5X8 file car (or Equivalent) into the path of the particles atop the hopper magnet.
- Carefully remove the accumulation of toner on the edge of the card and dispose of the toner. Repeat the above procedure as needed to empty the hopper.

When carrying the instrument for short distances with toner in the hopper, carry it straight and level. Avoid leaning the instrument into your body, and don't sling it under your arms.

--George Kusiowski
63-503 EXT. 3928

463X MOTOR AND TACH BRUSH CHANGE #41203

Some hardcopier motors used in the 463X series of products have failed far short of their 2,000 hour life expectancy. The failure mode has typically been excessive current draw. The source of the problem has been the use of incorrect brushes.

The 147-0039-0X motor/tachometer assembly is designed for use with two different sets of brushes. The brushes in the tachometer portion are hard and should last the life of the unit. Those in the motor part should be soft and wear moderately. In fact, these forward brushes should typically require replacement two or three times during the life of the motor assembly.

Recently, the 147-0039-0X assemblies have been supplied by the vendor with the harder tachometer brushes in the motor portion. In addition, the replacement brushes (p/n 118-0072-00) have all been of a hard variety similar to the tachometer brushes. The result has been rapid wearing of the motor commutator.

To correct this situation, two new part numbers have been established. The soft motor brushes are available under p/n 118-0072-02. The harder tachometer brushes are orderable under p/n 118-0072-01.

Normally the tachometer brushes should not require replacement. The motor brushes, however, are expected to require replacement approximately every 1,000 hours.

--George Kusiowski
63-503 EXT 3928

4633A, 4634: CONVEYOR TENSION CHANGED

Reference: 4633A, 4634: Conveyor Modification #37411,
Wizard Workshop October 3, 1980 pp. 33-34

The 4633A and 4634 have exhibited paper jamming in the conveyor when making short copies (6" - 9.4"). As the copies exit the processor and enter the conveyor, a twisting or skewing of the paper may occur. This happens because the belts on one side of the conveyor grasp the paper before the belts on the other side do.

To correct this, the tension of the center belts is being increased from 2 - 2.5 lbs. to 4 - 4.5 lbs. The center belts can now grasp the paper more firmly than the sides. This overrides any sideways twist the side belts may impart upon the copy.

Please note this tensioning change to your copies of the above referenced Wizard Workshop article.

--George Kusiowski
63-503, EXT. 3928

4642 DC1 DETECTION

Be aware that the 4642 printer will not respond to a DC1 (octal 21), select command, as indicated by the 4642 service manual on page 2-4. In Tek's applications this is normal and should not be considered a problem. DC1 will not select the printer because of compatibility problems between the RS232 interface installed in the 4642 and other TEK products.

An example of this is Data Terminal Ready (DTR) found on pin 20 of the RS232 connector. The 4642 pulls down on DTR when de-selected, and the 4050 series will not send anything out until DTR is high. The result is a stalemate between these two products. The 4050 terminal will not send out the select (DC1) until the 4642 is selected (DTR).

Thanks to Terry Jordan in Huntsville for bringing this to our attention.

--Larry North
63-503 EXT. 3926

4662 PLATEN SHIMS

The shims used to level out a 4662 platen are now orderable through Customer Service.

Thickness (in inches)	Part Number
.005	361-0855-00
.010	361-0857-00
.020	361-0856-00

These shims are placed under the platen's corner(s) to raise it up, which enables the pen to write evenly over the entire plotting surface.

--Larry North
63-503 EXT. 3926

8022 PROTOTYPE CONTROL PROBE CALIBRATION PROCEDURE ERROR

The 8022 microcomputer contains an analog-to-digital converter. Within the 8022 prototype control probe an onboard analog-to-digital converter is used and this A-to-D converter will require periodic calibration. A procedure to perform the calibration is provided in the 8048/8021/8041A/ 8022 Installation Specifics and the 8048/8021/8041A/8022 Service Manual. Part numbers 070-2473-00 and 070-2632-00.

The step of the procedure that states: "At the system terminal, enter the following commands:" is the location of an error. The commands to be entered should be as follows:

```
.PA ØØ 858ØØ4ØØ <CR>
.DEBUG  <CR>
.EM 1 <CR>
.TRACE ALL <CR>
.GO ØØ <CR>
```

The Trace All display will not show the value of the A to D converter in Mode Ø.

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

S-3200 CF1, POWER-UP, DIODE CHANGE

Reference Mod # M41394

The CF1 Option is part of the S3200 series Systems Test Stations. Upon test station power-up, integrated circuits on CF1 Current Source Circuit Board are latched up due to negative voltage on the non-inverting input of U13.

The addition of CR237 Semiconductor Device Diode (152-0323-00) from U13 pin three to ground on CF1 current source circuit board assembly will clamp the input of U13, preventing it from going more negative than -1V.

The new 670-3722-03 is the same as the old 670-3722-02 except:

ADD: CR237 1 ea. 152-0323-00 Semicond. DVC DI SW, SI, 35V, 0.1A, SE365

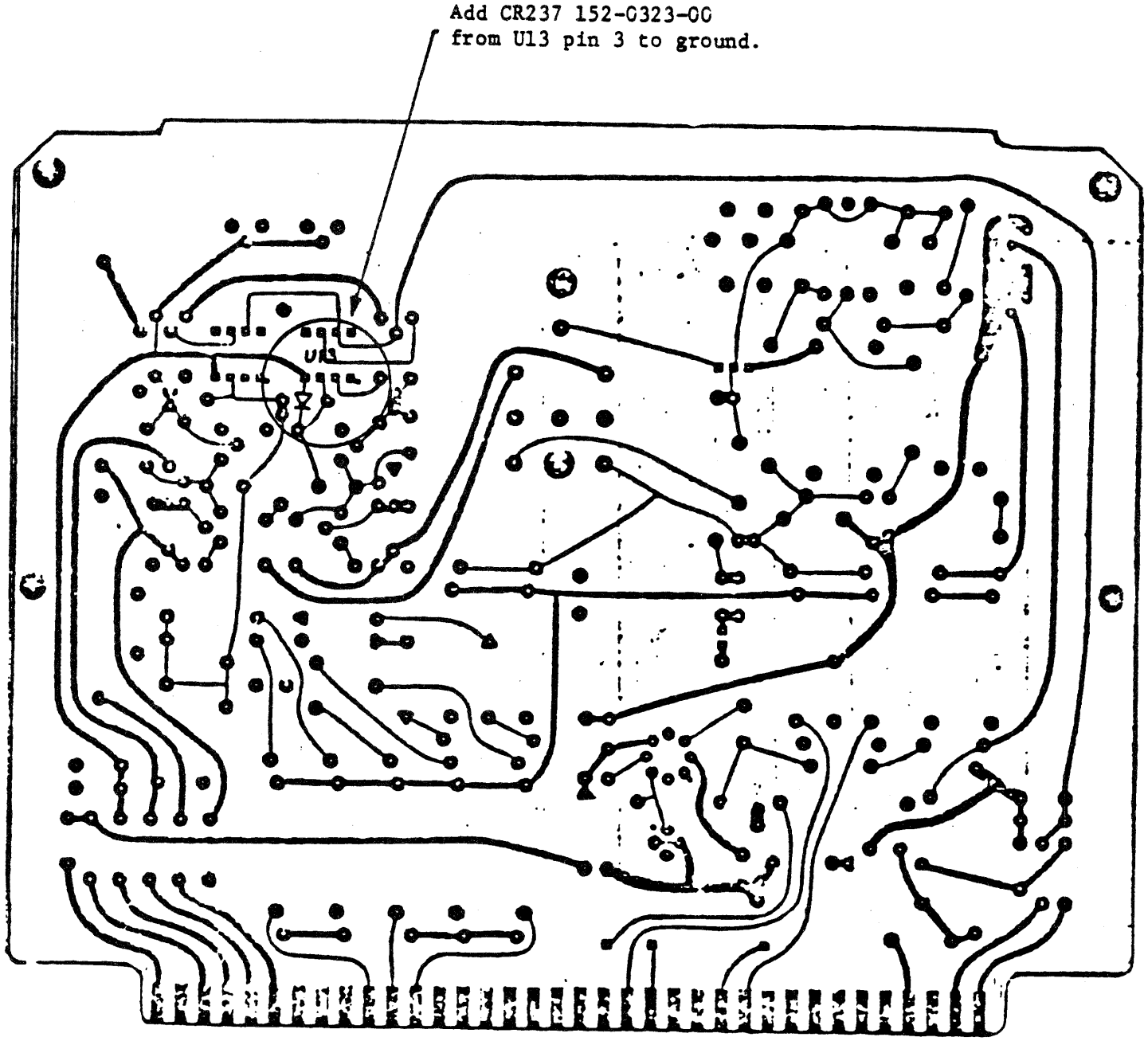
The 670-3722-02 is directly replaceable by the 670-3722-03.

Field installation of this mod should include part number change of the circuit board to reflect this update.

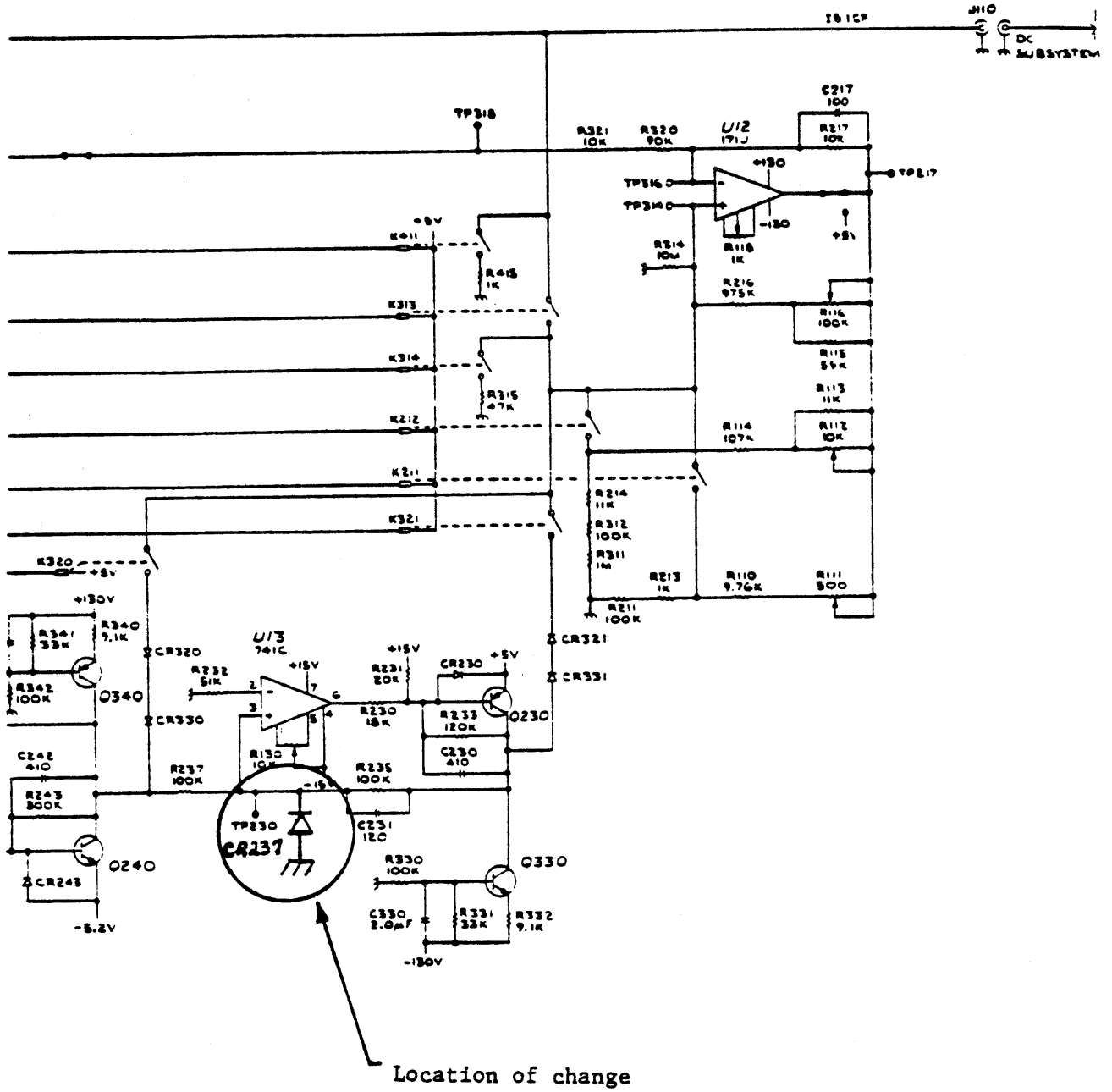
See attached drawing and schematic.

Information submitted by Gale Haines, STS Production Engineering.

Schematic to complete article is on the following page.



CF-1 Current Source Circuit Board Assembly 670-3722-03



Location of change

(Partial View)

CF 1 Current Source Circuit Board

Assembly 670-3722-03

Inserted by--
Ron Lang
92-236, Ext. 1015

S-3200 DIODE CHANGES, 1140A, 1140A65IF, DUAL STATIONS, REMOTES

Reference Mod # M40597

The 1140A and 1140A651F Programmable Power Supply cables have a different effective electrical cable length when Dual Stations or Remotes are used. To correct these problems caused by different cable lengths, replacement of the Kepco supplied diode CR21 with three (3) Tek silicone diodes part number 152-0141-02 (1N4152) is recommended.

The following power supply part number changes reflect the addition of CR21, CR24, and CR25. The referenced manual below shows the deletion of the Kepco CR21 diode, and the addition of the Tek CR21, CR24, and CR25 diodes.

The NEW power supply part numbers are direct replacements for the old power supply part numbers. The new power supply part numbers are also direct replacements for power supplies used in standard systems without Dual Stations or Remotes.

Field installation of these diode changes should also include changing the power supply part number of modified power supplies.

OLD PART NUMBER	NEW PART NUMBER	DESCRIPTION
119-0628-01	119-0628-03	Power Supply, 7V, Domestic
119-0628-02	119-0628-04	Power Supply, 7V, Export
119-0629-01	119-0629-03	Power Supply, 15V, Domestic
119-0629-02	119-0629-04	Power Supply, 15V, Export
119-0694-01	119-0694-03	Power Supply, 21V, Domestic
119-0694-02	119-0694-04	Power Supply, 21V, Export
119-0715-01	119-0715-03	Power Supply, 72V, Domestic
119-0715-02	119-0715-04	Power Supply, 72V, Export

Information by Dick Sherrard, STS Production Engineering.

Refer to 070-3108-01 1140A Programmable Power Supply Manual page 2 revision C, 1979, Operational Power Supply VI.

--Inserted by:
Ron Lang
92-236, Ext. 1015

S-3200 NEW MC-3 TEST FIXTURE CIRCUIT BOARD ASSEMBLY

Reference Mod # M34065

The MC-3 Test Fixture Assembly 670-4152-01 is changed to provide greater reliability. Reliability is improved by removal of all sockets and replacement of K10.

K10 (148-0041-01) is replaced by 148-0123-00, Reed Relay. The sockets for K10 must be removed prior to soldering in the new K10 Reed Relay.

The MC-3 Test Fixture Assembly 670-4152-02 is the same as 670-4152-01 except as follows:

REMOVE:

CKT. NO.	QUANT.		PART NO.	DESCRIPTION
	3		131-0601-00	Cont. Set, Elec, Spring Clip Type
	5		136-0220-00	Socket, Pl-In Elek
	1		136-0269-02	Socket, Pl-In, Elec, 14 Dip
K10	1		148-0041-01	Reed, Relay
ADD:				
K10	1	***	148-0123-00	Reed, Relay

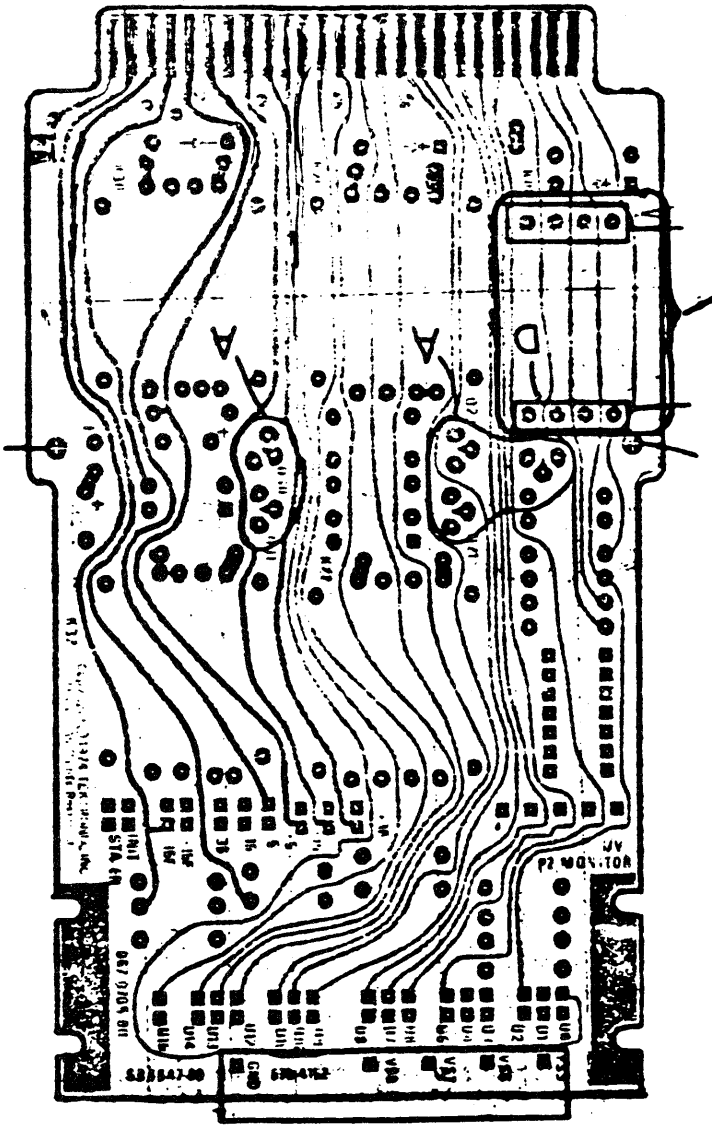
The 670-4152-02 is a direct replacement for the 670-4152-01.

See attached drawing 670-4152-02:

Submitted by Dick Sherrard, STS Production Engineering.

Schematic to complete article is on the following page.

REMOVE ALL SOCKETS AND SOLDER
DIRECTLY INTO CIRCUIT BOARD.



670-4152-02
(MC3 TEST FIXTURE)

--Inserted by:
Ron Lang
92-236, Ext. 1015

S-3200 REED CHANGE, DC SUBSYSTEM AMPLIFIER CIRCUIT BOARDS

Reference Mod # M41961

Reference Manuals 070-3144-01 and 061-2335-00

A high resistance current path develop . on the DC Subsystem Amplifiers within the K430S1 reed switch. This results in inaccurate measurements in the high impedance range on the DC Subsystem Amplifier.

The K430S1 (260-0817-00) reed switch is replaced with a "Reversed Type C" reed switch (260-1647-00). The 260-0817-00 develop a resistance between open and closed contact of the reed. The new reed switch 260-1647-00 has normally open and normally closed contacts on opposite sides of the envelope, thus eliminating contamination of the reed.

The DC Subsystem Amplifier 670-2826-05 changes to 670-2826-06 and is part of the 672-0586-00 DC Subsystem Assembly. This assembly is located in the 1803F, 1804, 1804A, and 1804B Test Stations.

The new 670-2826-06 is the same as the 670-2826-05 except:

REMOVE: K430S1 1 ea. 260-0817-00 Switch Reed Spdt., 0.25A, 100V

ADD: K430S1 1 ea. 260-1647-00 Switch Reed Spdt., 0.125A, 100V

The 670-2826-06 is a direct replacement for the 670-2826-05.

The DC Subsystem Amplifier 670-5479-01 changes to 670-5479-02 and is part of the DC Subsystem Assembly used in the 1805 Test Station.

The new 670-5479-02 is the same as the 670-5479-01 except for the same changes described above for the 670-2826-06.

Upgrade of these boards should also include changes in the manuals replaceable parts lists and part number change of the circuit board.

Information submitted by Lee Atkins and Gale Haines, STS Production Engineering.

--Inserted by
Ron Lang
92-236, Ext. 1015

S-3200 R2942 CROSS TALK

Reference Mod # M38053

Cross talk noise in the R2942 Pattern Generator creates intermittent and random errors. The noise generated at the input of U47B, Pin 4 can be reduced with the addition of C740.

Install C740 (283-0238-00) on the dip side of the 2942 Interface Circuit Card Assembly (670-3674-00). C740 is installed from ground to the "PRGM ENABLE NOT", Pin A22 input line. See attached schematic and dip side layout.

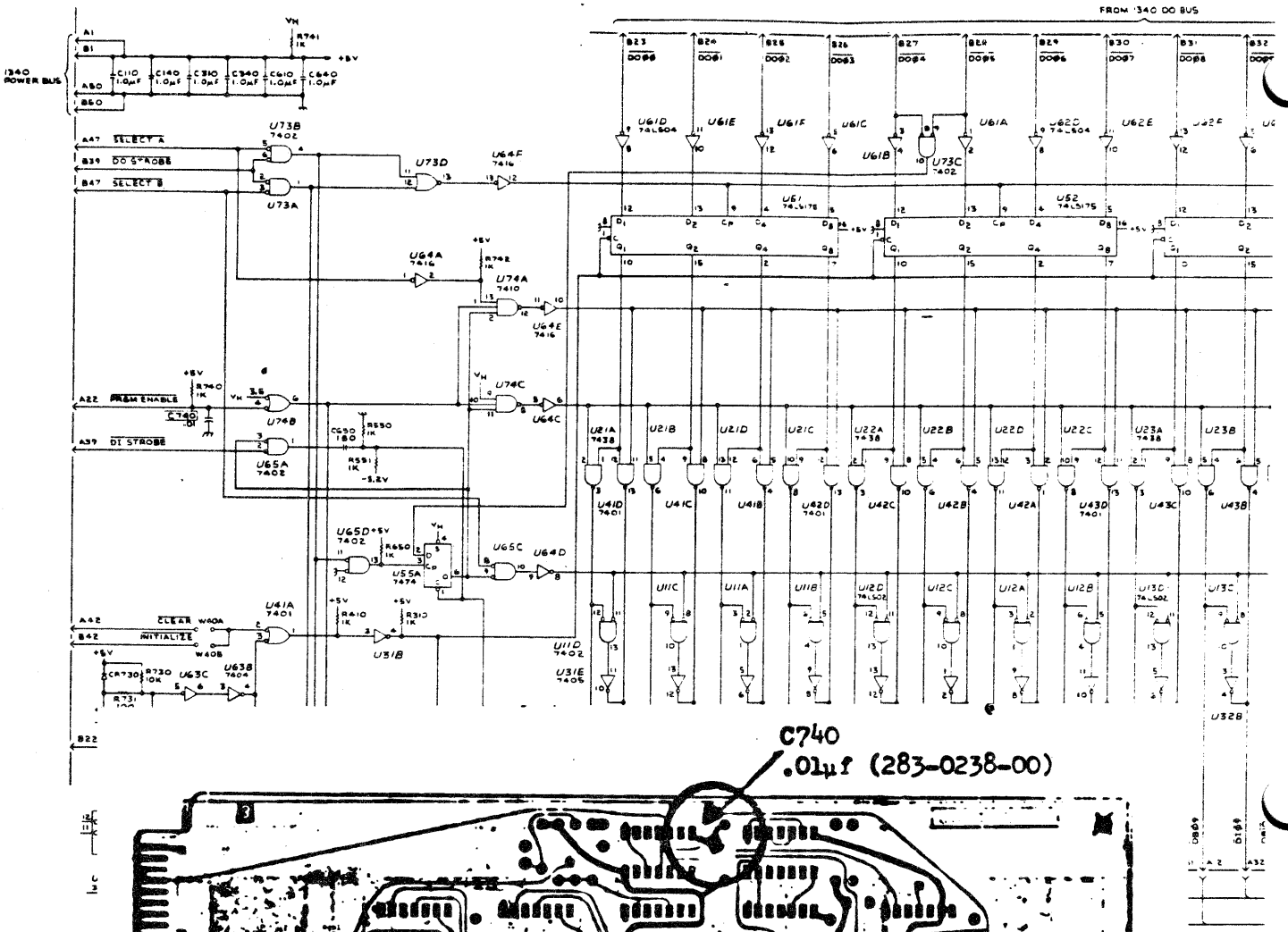
Reference Manual: 070-3193-00 2942 Programmable Pattern Generator, Schematic page Diamond 18, revised February, 1980.

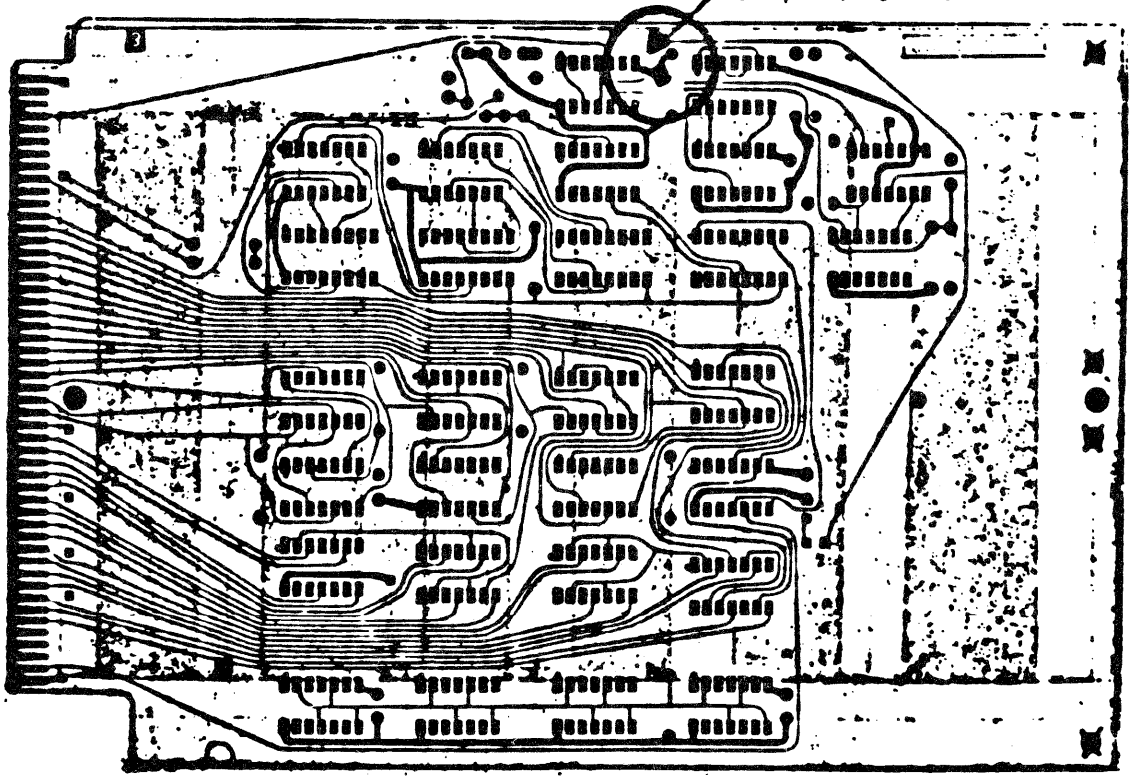
Installation of this change will not change the 670-3674-00 circuit board revision number.

C740 .01μF, 10%, 50V.

Request for publication by Gary Riggle, Field Service Specialist, Syracuse Field Office.

Schematic to complete article is on the following page.





Submitted by Bryan Dinteman, STS Production Engineering

--Inserted by:
Ron Lang
92-236, Ext. 1015

KEY PART NUMBERS (ANS.SERVICE BULLETIN #11)

Part numbers for the two keys used in the 1980 are as follows:

Door - P/N 214-1814-00

Key Switch - P/N 214-3041-00

--Bill Bean
58/511, Ext. 6507

INFORMATION DISPLAY DIVISION

4905 WANGCO HARD DISK DRIVE PARTS CROSS REFERENCE

The following improved cross reference was compiled to replace the incomplete and hard to use cross reference in the 119-0852-00 Hard Disk Drive Service Manual. This improved cross reference will be in all new manuals under Manual Change Information. This pull-out reference is for those who service 4905's and presently have older manuals.

--Bill Hatch
63-503 EXT. 3787

Tektronix
COMMITTED TO EXCELLENCE

MANUAL CHANGE INFORMATION

PRODUCT 119-0852-00 HARD DISC DRIVE Service Manual CHANGE REFERENCE C1/380

MANUAL PART NO. 070-2369-00 DATE 3-14-80

EFF ALL SN

REPLACEABLE PARTS CROSS REFERENCE

Wangco Part No.	Tektronix Part No.	Name & Description	Mfr Code	Mfr Part Number
A100028-020	159-0014-00	FUSE,CARTRIDGE:3AG,5A,250V,FAST-BLOW	71400	MTH5
A100028-027	118-0122-00	FUSE,CARTRIDGE:10 AMP	52465	100028-027
A100036-203	211-0007-00	SCREW,MACHINE:4-40 X 0.188 INCH,PNH STL	83385	OBD
A100036-206	211-0012-00	SCREW,MACHINE:4-40 X 0.375 INCH,PNH STL	83385	OBD
A100036-208	211-0014-00	SCREW,MACHINE:4-40 X 0.50 INCH,PNH STL	83385	OBD
A100036-210	211-0016-00	SCREW,MACHINE:4-40 X 0.625 INCH,PNH STL	83385	OBD
A100036-212	211-0017-00	SCREW,MACHINE:4-40 X 0.375 INCH,PNH STL	83385	OBD
A100036-214	211-0018-00	SCREW,MACHINE:4-40 X 0.875 PNH,STL	83385	OBD
A100036-304	211-0504-00	SCREW,MACHINE:6-32 X 0.25 INCH,PNH STL	83385	OBD
A100036-306	211-0510-00	SCREW,MACHINE:6-32 X 0.375 INCH,PNH STL	83385	OBD
A100036-307	211-0578-00	SCREW,MACHINE:6-32 X 0.438 INCH,PNH STL	83385	OBD
A100036-308	211-0511-00	SCREW,MACHINE:6-32 X 0.500,PNH,STL,CD PL	83385	OBD
A100036-312	211-0514-00	SCREW,MACHINE:6-32 X 0.750 INCH,PNH STL	83385	OBD
A100036-406	212-0023-00	SCREW,MACHINE:8-32 X 0.375 INCH,PNH STL	83385	OBD
A100036-506	211-0507-00	SCREW,MACHINE:6-32 X 0.312 INCH,PNH STL	83385	OBD
A100036-509	212-0596-00	SCREW,MACHINE:10-32 X 0.562 INCH,PNH BRS	83385	OBD
A100040-208	211-0102-00	SCREW,MACHINE:4-40 X 0.500",FLH,STL	83385	OBD
A100040-305	211-0538-00	SCREW,MACHINE:6-32 X 0.312"100 DEG,FLH STL	83385	OBD
A100040-306	211-0574-00	SCREW,MACHINE:6-32 X 0.375,FLH,82 DEG,STL	83385	OBD
A100040-308	211-0512-00	SCREW,MACHINE:6-32 X 0.50" 100 DEG,FLH STL	83385	OBD
A100041-208	211-0183-00	SCREW,MACHINE:4-40 X 0.50 INCH,SKT HEX HD	000AH	OBD
A100041-608	213-0197-00	SCREW,MACHINE:0.25-20 X 0.5,CAP HD,SST	000EL	OBD
A100042-200	210-0054-00	WASHER,LOCK:SPLIT,0.118 ID X 0.212"OD STL	83385	OBD
A100042-300	210-0055-00	WASHER,LOCK:SPLIT,0.145 ID X 0.253 OD,STL	83385	OBD
A100042-500	210-0056-00	WASHER,LOCK:SPLIT,0.195 ID X 0.32" OD,P BRZ	83385	OBD
A100042-600	210-0016-00	WASHER,LOCK:SPLIT,0.259 ID X 0.489 OD,STL	77339	6507
A100043-200	210-0406-00	NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS	73743	2X12161-402
A100043-300	210-0407-00	NUT,PLAIN,HEX.:6-32 X 0.25 INCH,BRS	73743	3038-0228-402
A100043-500	210-0445-00	NUT,PLAIN,HEX.:10-32 X 0.375 INCH,STL	83385	OBD
A100043-510	210-0455-00	NUT,PLAIN,HEX.:0.25-28 X 0.375 INCH,BRASS	73743	3089-402
A100043-800	220-0734-00	NUT,SLFLKG,HEX:0.375-16 CAD PLATED STEEL	56878	OBD
A100047-200	210-0994-00	WASHER,FLAT:0.125 ID X 0.25" OD,STL	86928	5714-147-20N
A100047-300	210-0801-00	WASHER,FLAT:0.14 ID X 0.281 OD NP STL	12327	OBD
A100047-400	210-0803-00	WASHER,FLAT:0.15 ID X 0.032 THK,STL CD PL	12327	OBD
A100047-500	210-0864-00	WASHER,FLAT:0.188 ID X 0.05 THK,STL	12327	OBD
A100049-302	213-0020-00	SETSCREW:6-32 X 0.125 INCH,HEX.SOC STL	70276	OBD
A100050-100	210-1011-00	WASHER,NONMETAL:0.13 ID X 0.375 " OD,PLSTC	83309	OBD
A100059-300	210-0006-00	WASHER,LOCK:#6 INTL,0.018THK,STL CD PL	78189	1206-00-00-0541C
A100059-500	210-0010-00	WASHER,LOCK:INT,0.20 ID X0.376" OD,STL	78189	1210-00-00-0541C
A100063-003	210-1040-00	WASHER,FLAT:0.089 ID X 0.02 THK,0.24 L	80009	210-1040-00
A100063-014	210-1140-00	WSHR,SHOULDERED:0.115 ID X 0.375 INCH OD	80009	210-1140-00
A100068-102	308-0077-00	RES.,FXD,WW:1K OHM,5%,3W	14193	SA301001J
A1000108	156-0053-00	MICROCIRCUIT,LI:VOLTAGE REGULATOR	80009	156-0053-00
A100155-353	322-0257-00	RES.,FXD,FILM:4.64K OHM,1%,0.25W	75042	CEBT0-4641F
A100155-452	322-0356-00	RES.,FXD,FILM:49.9K OHM,1%,0.25W	75042	CEBT0-4992F
A100155-481	322-0385-00	RES.,FXD,FILM:100K OHM,1%,0.25W	75042	CEBT0-1003F
A100155-510	322-0414-00	RES.,FXD,FILM:200K OHM,1%,0.25W	91637	MFF1412G20002F
A100234-001	156-0405-00	MICROCIRCUIT,DI:DUAL RETRIG MONOSTABLE MV	80009	156-0405-00
A100251-200	210-0994-00	WASHER,FLAT:0.125 ID X 0.25" OD,STL	86928	5714-147-20N
A100328-001	156-0030-00	MICROCIRCUIT,DI:QUAD 2-INPUT POS NAND GATE	80009	156-0030-00

Wangco Part No.	Tektronix Part No.	Name & Description	Mfr Code	Mfr Part Number
A100329-001	156-0043-00	MICROCIRCUIT,DI:QUAD 2-INPUT POS NOR GATE	80009	156-0043-00
A100330-001	156-0058-00	MICROCIRCUIT,DI:HEX. INVERTER	80009	156-0058-00
A100332-001	156-0129-00	MICROCIRCUIT,DI:QUAD 2-INPUT GATE	80009	156-0129-00
A100333-001	156-0047-00	MICROCIRCUIT,DI:TPL 3-INPUT POS NAND GATE	80009	156-0047-00
A100339-001	156-0041-00	MICROCIRCUIT,DI:DUAL D-TYPE FLIP-FLOP	27014	DM7474N
A100341-001	156-0062-00	MICROCIRCUIT,DI:QUAD 2-INPUT EXCL-OR GATE	80009	156-0062-00
A100344-001	156-0121-00	MICROCIRCUIT,DI:DUAL VOLTAGE-CONT MV	80009	156-0121-00
A100345-001	156-0124-00	MICROCIRCUIT,DI:SGL FREQ/PHASE DETECTOR	80009	156-0124-00
A100347-001	156-0255-00	MICROCIRCUIT,DI:QUAD 2-INPUT NOR GATE	18324	SP380A
A100410-005	118-0428-00	BELT,FLAT:	52465	100410-005
A101009-001	156-0163-00	MICROCIRCUIT,DI:TRIPLE 3-INPUT POS AND GATE	80009	156-0163-00
A101011-001	156-0112-00	MICROCIRCUIT,DI:QUAD 2-INPUT POS NAND GATE	80009	156-0112-00
A101012-001	156-0171-00	MICROCIRCUIT,DI:QUAD 2-INPUT OR GATE	80009	156-0171-00
A101013-001	156-0087-00	MICROCIRCUIT,DI:4-BIT BINARY FULL ADDER	80009	156-0087-00
A101017-001	156-0125-00	MICROCIRCUIT,DI:QUAD 2-INPUT MUX	80009	156-0125-00
A101020-001	156-0089-00	MICROCIRCUIT,DI:4-BIT UP/DOWN COUNTER	80009	156-0089-00
A101022-001	156-0096-00	MICROCIRCUIT,LI:VOLTAGE COMPARATOR	27014	LM311H
A101023-001	156-0402-00	MICROCIRCUIT,LI:TIMER	27014	SL34829
A101031	156-0302-00	MICROCIRCUIT,DI:DUAL 2-INP NAND PRPHL DRVR	01295	SN75452P
A101031-001	156-0302-00	MICROCIRCUIT,DI:DUAL 2-INP NAND PRPHL DRVR	01295	SN75452P
A101033-001	152-0535-00	SEMICOND DEVICE:SILICON,100V,12A	80009	152-0535-00
A101033-002	152-0535-00	SEMICOND DEVICE:SILICON,100V,12A	80009	152-0535-00
A101052	151-0302-00	TRANSISTOR:SILICON,NPN	07263	S038487
A101052-001	151-0302-00	TRANSISTOR:SILICON,NPN	07263	S038487
A101053	151-0301-00	TRANSISTOR:SILICON,PNP	04713	2N2907A
A101053-001	151-0301-00	TRANSISTOR:SILICON,PNP	04713	2N2907A
A101077-001	118-0251-00	SWITCH,ROCKER:DPDT,3A,125V	52465	101077-001
A101077-002	118-0252-00	SWITCH,ROCKER:DPDT,3A,125V	52465	101077-002
A101081-001	118-0245-00	INDICATOR ASSY:READY/LOAD	52465	101081-001
A101082-003	118-0170-00	LAMP,INCAND:28V,SLIDE BASE	52465	101082-003
A101083-002	150-0083-00	LAMP,INCAND:28V,0.04A,#387,MIDGET FLG	08806	387
A101095-001	118-0360-00	BRUSH,CLN,DISC:BOTTOM	52465	101095-001
A101095-002	118-0361-00	BRUSH,CLN,DISC:TOP	52465	101095-002
A101097-001	118-0136-00	SW,SNAP ACTION:4905 OPT 33	52465	101097-001
A101098-001	118-0135-00	SW,SNAP ACTION:4905 OPT 33	52465	101098-001
A101118-001	118-0423-00	BRUSH,GROUNDING:	52465	101118-001
A101137	118-0250-00	SW CODE IND WHL:THUMBWHEEL,10POSN,SGL WDO	52465	101137
A101139-001	156-0094-00	MICROCIRCUIT,DI:DUAL PERIPHERAL DRIVER	01295	SN75451P
A101156-100	315-0100-00	RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
A101156-101	315-0101-00	RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A101156-102	315-0102-00	RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A101156-103	315-0103-00	RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A101156-104	315-0104-00	RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A101156-122	315-0122-00	RES.,FXD,CMPSN:1.2K OHM,5%,0.25W	01121	CB1225
A101156-123	315-0123-00	RES.,FXD,CMPSN:12K OHM,5%,0.25W	01121	CB1235
A101156-150	315-0150-00	RES.,FXD,CMPSN:15 OHM,5%,0.25W	01121	CB1505
A101156-151	315-0151-00	RES.,FXD,CMPSN:150 OHM,5%,0.25W	01121	CB1515
A101156-152	315-0152-00	RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
A101156-153	315-0153-00	RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
A101156-165	315-0165-00	RES.,FXD,CMPSN:1.6M OHM,5%,0.25W	01121	CB1655
A101156-182	315-0182-00	RES.,FXD,CMPSN:1.8K OHM,5%,0.25W	01121	CB1825
A101156-201	315-0201-00	RES.,FXD,CMPSN:200 OHM,5%,0.25W	01121	CB2015
A101156-202	315-0202-00	RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
A101156-203	315-0203-00	RES.,FXD,CMPSN:20K OHM,5%,0.25W	01121	CB2035
A101156-221	315-0221-00	RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215

Wangco Part No	Tektronix Part No	Name & Description	Mfr Code	Mfr Part Number
A101156-223	315-0223-00	RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A101156-241	315-0241-00	RES.,FXD,CMPSN:240 OHM,5%,0.25W	01121	CB2415
A101156-242	315-0242-00	RES.,FXD,CMPSN:2.4K OHM,5%,0.25W	01121	CB2425
A101156-273	315-0273-00	RES.,FXD,CMPSN:27K OHM,5%,0.25W	01121	CB2735
A101156-300	315-0300-00	RES.,FXD,CMPSN:30 OHM,5%,0.25W	01121	CB3005
A101156-301	315-0301-00	RES.,FXD,CMPSN:300 OHM,5%,0.25W	01121	CB3015
A101156-302	315-0302-00	RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
A101156-330	315-0330-00	RES.,FXD,CMPSN:33 OHM,5%,0.25W	01121	CB3305
A101156-331	315-0331-00	RES.,FXD,CMPSN:330 OHM,5%,0.25W	01121	CB3315
A101156-361	315-0361-00	RES.,FXD,CMPSN:360 OHM,5%,0.25W	01121	CB3615
A101156-363	315-0363-00	RES.,FXD,CMPSN:36K OHM,5%,0.25W	01121	CB3635
A101156-393	315-0393-00	RES.,FXD,CMPSN:39K OHM,5%,0.25W	01121	CB3935
A101156-433	315-0433-00	RES.,FXD,CMPSN:43K OHM,5%,0.25W	01121	CB4335
A101156-470	315-0470-00	RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
A101156-471	315-0471-00	RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
A101156-511	315-0511-00	RES.,FXD,CMPSN:510 OHM,5%,0.25W	01121	CB5115
A101156-512	315-0512-00	RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125
A101156-560	315-0560-00	RES.,FXD,CMPSN:56 OHM,5%,0.25W	01121	CB5605
A101156-561	315-0561-00	RES.,FXD,CMPSN:560 OHM,5%,0.25W	01121	CB5615
A101156-562	315-0562-00	RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
A101156-620	315-0620-00	RES.,FXD,CMPSN:62 OHM,5%,0.25W	01121	CB6205
A101156-682	315-0682-00	RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
A101156-683	315-0683-00	RES.,FXD,CMPSN:68K OHM,5%,0.25W	01121	CB6835
A101156-750	315-0750-00	RES.,FXD,CMPSN:75 OHM,5%,0.25W	01121	CB7505
A101156-752	315-0752-00	RES.,FXD,CMPSN:7.5K OHM,5%,0.25W	01121	CB7525
A101156-821	315-0821-00	RES.,FXD,CMPSN:820 OHM,5%,0.25W	01121	CB8215
A101156-824	315-0824-00	RES.,FXD,CMPSN:820K OHM,5%,0.25W	01121	CB8245
A101172-304	211-0558-00	SCREW,MACHINE:6-32 X 0.250 BDGH,NYL,SLOT	26365	921-1150-0014
A101180-024	118-0120-00	FIXTURE,CAL:HUB,TOP LOAD	52465	101180-024
A101185-001	210-1011-00	WASHER,NONMETAL:0.13 ID X 0.375 " OD,PLSTC	83309	OBD
A101701-001	118-0424-00	BRUSH,GROUNDING:	52465	101701-001
A123001-001	156-0462-00	MICROCIRCUIT,DI:HEX SCHMITT TRIG,TTL	80009	156-0462-00
A123023-001	156-0331-00	MICROCIRCUIT,DI:DUAL D-TYPE,FLIP-FLOP	80009	156-0331-00
A123029-001	156-0382-00	MICROCIRCUIT,DI:QUAD 2-INPUT NAND GATE	80009	156-0382-00
A123032-001	156-0480-00	MICROCIRCUIT,DI:QUAD 2-INPUT AND GATE	80009	156-0480-00
A123034-001	156-0481-00	MICROCIRCUIT,DI:TRIPLE 3-INPUT AND GATE	80009	156-0481-00
A123035-001	156-0479-00	MICROCIRCUIT,DI:QUAD 2-INPUT OR GATE	27014	DM74LS32N
A123036-001	156-0388-00	MICROCIRCUIT,DI:DUAL D-TYPE FLIP-FLOP	80009	156-0388-00
A123037-001	156-0736-00	MICROCIRCUIT,DI:BCD-TO-DECIMAL DECODER	27014	DM74LS42N
A123040-001	156-0530-00	MICROCIRCUIT,DI:QUAD 2-INP MUX,16 PIN DIP	80009	156-0530-00
A123046-001	156-0323-00	MICROCIRCUIT,DI:HEX. INVERTER	01295	SN74S04N
A123050-001	156-0459-00	MICROCIRCUIT,DI:QUAD 2-INPUT AND GATE	01295	SN74S08N
A125000-001	156-0860-00	MICROCIRCUIT,DI:TRIPLE LINE RECEIVER	80009	156-0860-00
A136003-006	210-0457-00	NUT,PLAIN,EXT W:6-32 X 0.312 INCH,STL	83385	OBD
A300043-001	118-0118-00	ACTUATOR,CAM SW:4905 OPT 33	52465	300043-001
A300055-024	118-0138-00	RING,SECTOR:4905 OPT 33	52465	300055-024
A300110-002	118-0121-00	PULLEY,FLAT:BLOWER	52465	300110-002
A300133-001	118-0119-00	MAGNETIC DISC:RECORDING	52465	300133-001
A300200-001	118-0231-00	CKT BOARD ASSY:+5 REGULATOR	52465	300200-001
A300223-001	118-0131-00	BRUSH ASSY:4905 OPT 33	52465	300223-001
A300230-001	118-0137-00	ACTUATOR,SWITCH:4905 OPT 33	52465	300230-001
A300274-001	118-0124-00	CABLE,INTCON:4905 OPT 33	52465	300274-001
A300311-001	118-0130-00	TRANSDUCER ASSY:4905 OPT 33	52465	300311-001
A300323-002	118-0128-00	MOTOR,DC:4905 OPT 33	52465	300323-002
A300324-120	118-0132-00	VOLTAGE PLUG:4905 OPT 33	52465	300324-120

Wangco Part No	Tektronix Part No	Name & Description	Mfr Code	Mfr Part Number
A300346-201	118-0127-00	POWER SUPPLY:4905 OPT 33	52465	300346-201
A300382	118-0139-00	CKT BOARD ASSY:FIELD EXERCISER	52465	300382
A300387	118-0232-00	FILTER,AIR:	52465	300387
A300396-001	118-0126-00	BRG HSG ASSY:4905 OPT 33	52465	300396-001
A300397-003	118-0114-00	RECORDING HEAD:SPECIAL PROCESS,TOP	52465	300397-003
A300397-004	118-0113-00	RECORDING HEAD:SPECIAL PROCESS,BOTTOM	52465	300397-004
A300413-004	118-0117-00	WIRING HARNESS:SOLENOID AND BRUSH	52465	300413-004
A300467-001	118-0125-00	THERMISTOR ASSY:4905 OPT 33	52465	300467-001
A300497-001	118-0143-00	CKT BOARD ASSY:SERVO LOGIC	52465	300497-001
A300586-001	118-0116-00	CKT BOARD ASSY:ELECTRONICS INTERCONNECT	52465	300586-001
A300600-002	118-0133-00	POSITIONER ASSY:4905 OPT 33	52465	300600-002
A300774-001	118-0418-00	DISC SNSR ASSY:	52465	300774-001
A300946-001	118-0123-00	FILTER ASSY:4905 OPT 33	52465	300946-001
A301002-001	118-0144-00	CKT BOARD ASSY:POWER REGULATOR	52465	301002-001
A301035-016	118-0146-00	CKT BOARD ASSY:CONTROL INTERFACE	52465	301035-016
A301044-001	118-0140-00	CKT BOARD ASSY:EMERGENCY RETRACT	52465	301044-001
A301074-001	118-0134-00	LINE TERMINATOR:4905 OPT 33	52465	301074-001
A301076-004	118-0148-00	CKT BOARD ASSY:DISC CONTROL	52465	301076-004
A301153-002	118-0142-00	CKT BOARD ASSY:SPINDLE MOTOR POWER SWITCH	52465	301153-002
A301153-002 Q1	151-0607-00	TRANSISTOR:SILICON,PNP	80009	151-0607-00
A301153-002 Q2	151-0607-00	TRANSISTOR:SILICON,PNP	80009	151-0607-00
A301153-002 Q3	151-0607-00	TRANSISTOR:SILICON,PNP	80009	151-0607-00
A301153-002 Q5	151-0606-00	TRANSISTOR:SILICON,NPN	80009	151-0606-00
A301153-002 Q7	151-0606-00	TRANSISTOR:SILICON,NPN	80009	151-0606-00
A301153-002 Q9	151-0606-00	TRANSISTOR:SILICON,NPN	80009	151-0606-00
A301157-001	118-0147-00	CKT BOARD ASSY:DATA ELECTRONICS	52465	301157-001
A301198-002	118-0141-00	CKT BOARD ASSY:SPINDLE DRIVE REGULATOR	52465	301198-002
A301198-002 Q1	151-0607-00	TRANSISTOR:SILICON,PNP	80009	151-0607-00
A301198-002 Q2	151-0607-00	TRANSISTOR:SILICON,PNP	80009	151-0607-00
A301198-002 Q3	151-0607-00	TRANSISTOR:SILICON,PNP	80009	151-0607-00
A301217-002	118-0115-00	SPDL MOTOR ASSY:BRUSHLESS	52465	301217-002
A301250-001	118-0129-00	WIRING HARNESS,:SPINDLE DRIVE	52465	301250-001
A301272-001	156-1193-00	MICROCIRCUIT,LI:OPTOELECTRONIC AIR GAP ISO	52465	301277-001
A301320-110	118-0149-00	CKT BOARD ASSY:VFO	52465	301320-110
A301367-001	118-0150-00	CKT BOARD ASSY:I/O CONNECTOR	52465	301367-001
A301584-002	118-0145-00	CKT BOARD ASSY:SERVO AMPLIFIER	52465	301584-002
A301920-001	118-0362-00	CKT BOARD ASSY:COMMUTATOR	52465	301920-001
		SUGGESTED OPTIONAL ACCESSORIES		
	003-0789-00	WRENCH,TORQUE:WANGCO DISC DRIVE		
	003-0804-00	SERVICE KIT:4905 FOR OPTIONS 33/34	80009	003-0804-00
	006-2398-00	PAD CLEANER:MAGNETIC TAPE HEAD AND DISC		
	006-2436-00	CABLE EXTENDER:SVA,WANGCO DIS DRIVE		
	006-2437-00	CABLE EXTENDER:HEAD,WANGCO DIS DRIVE		
	006-2441-00	CKT BD EXTENDER:WANGCO DIS DRIVE		
	006-2454-00	WIRING HARNESS:PHASING WANGCO DIS DRIVE		
	006-2455-00	CABLE EXTENDER:POWER SUPPLY,WANGCO DISK DR		
	012-0733-00	CABLE INTCON:68.0 L	52465	17-279
	119-0851-00	CKT BOARD ASSY:SELECTOR CHANNEL	30331	M70-103
	119-0853-00	DISC CONT INTFC:W/INTERCONNECT CABLE	52465	M46-421
	119-0867-00	DISC CRTG DR:CE ALIGNMENT	15920	847-51

IF A POWER TRANSISTOR FAILS ON EITHER 301153-002 OR 301198-002, IT IS SUGGESTED THAT ALL 10 BE REPLACED AT THE SAME TIME.

92-515

MICHAEL A MIHALIK

COMBINATION WIZARDS