TM 5000

SERVICE**TEK**NOTES

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CG551AP/CG5001 REPLACE BATTERY EVERY TWO YEARS

Reference: Diagram 29 of CG551AP/CG5001 Instruction Manual, Vol. II

Serial Numbers Affected: All

As a preventative maintenance measure, all CG551AP/CG5001's should have the battery (A9BT1231) replaced every two years.

When the new battery is installed, the instrument should be run continuously for at least 24 hours to ensure an adequate level of charge. The date installed should be written on the battery with a permanent marker.

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DAS 9100 BNC COVER AVAILABLE

Affected Instruments: All DAS 9100s

Reports from the field indicate that the rear BNCs on the DAS mainframe are being damaged and frequently need replacing.

There is a non-shorting BNC cover available which will protect these exposed BNCs. The part number for this BNC cover is 200-0678-00. A plastic strap is available which links the cover to the BNC. Its part number is 346-0045-00.

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DAS9100 OPTION 1 NEW TAPE DRIVE CABLE REDUCES CROSSTALK

Affected Serial Numbers:

    DAS 9100 Series   B020219 and below
    DAS 9120 Series   B020239 and below

Reference: DAS Service Manual Vol. II,
           P/N 070-3836-01
           Mod #M46882

Modifications were made to the DAS tape drive to suppress unwanted glitches and crosstalk that can cause intermittent failures. The mods were implemented at S/N B020220 for the DAS9109 and at S/N B020240 for the DAS9129.

The mod replaces the wiring harness that interfaces the tape drive data board (at J450 and J470) to the interconnect board (J431 on the DAS9109 and J427 on the DAS9129). The old wiring harness, 198-4403-00, is replaced by the new wiring harness, 198-4403-01, which interlaces grounds and power supplies with the signal lines.

Note: Part numbers for the wiring assemblies aren't listed in the DAS Manual. This is being corrected. In the mean time, please contact me if you need the part number for one.

The 20 wire tape drive extender cable in the DAS Service Maintenance Kit (067-0980-00) was also modified to reflect the new wiring arrangement. Its part number changes from 198-4583-00 to 198-4583-01. I would recommend ordering this new extender cable for your maintenance kit.

Also included in this mod was the grounding of the data board to the mainframe chassis in order to reduce static sensitivity. This is accomplished by soldering a #22 gauge wire (176- 0005-00) from the negative lead of C876 (the round pad) to a solder lug (210-0203-00) that is mounted to the chassis. This solder lug is mounted under the screw which attaches the right keyboard support to the front cabinet frame. (See Item 42, Figure 8 of the mechanical parts in the Vol. II Service Manual).

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DAS9109 FIRMWARE VERSION V1.05 AND 91A04

Affected Products: All DAS9109s with Firmware Version V1.05.

91A04s will not operate correctly when being used in a DAS Mainframe that contains Firmware Version 1.05.

This incompatibility can be observed by operating the 91A04 in the following mode:

- All four acquisition channels of the P6453 are attached to the same signal. This signal should be a repetitive pulse (e.g. a 20 nanosecond pulse occurring every 200 nanoseconds, at 1 volt P-P centered around ground -- a PG502 can supply this signal).

- Acquire this signal asyncronously (for the above example use a 5 nanosecond internal clock).

- View the acquired data in the timing diagram. In a V1.05 Version DAS, the acquired pulses will appear in a "stair stepping" pattern which is incorrect.

Note: The 91A04 high resolution mode is an exception. The data channels will display the pulses within one clock cycle of each other, which is correct.

The only fix for this is to operate the 91A04/91AE04s in a DAS Mainframe which contains Firmware Version V1.07 or higher. DAS Mainframes which contain Version V1.05 can be updated by ordering the latest version of DAS firmware.

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PDP-11 BOOTSTRAP ROM FOR STS SYSTEMS, ADDENDUM

M9301

The M9301 YA and M9301 YF Bootstrap ROM boards must be replaced at the board level. The M9301's each have a set of four separate ROMs, none of which should be replaced at the component level.

M9312

The M9312 Bootstrap ROM board has four ROMs which may be replaced when defective or added when the system configuration changes.

Slot E35 must always have the Tektronix Console Emulator, part number 160-0900-00. Slot E35 has the highest device priority for Bootup.

Slots E32, E33, and E34 have secondary device priorities. Slot E33 has the second highest device priority. E34 has third highest and E32 the lowest.

Bootup devices used in S3200 Series Systems are RK05 and/or RL02 Disk Drives, Mag Tape Units and Reader/Punch units. The device which is used the most should have the appropriate bootup ROM in Slot E33.

The following Boot ROMs may be used in any of Slots E32, E33, or E34 of a M9312:

160-0897-00	Reader/Punch Units
160-0898-00	Mag Tape Units
160-0899-00	RK05 Disk Drives
160-1986-00	RL01/RL02 Disk Drives

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S-3200 - SECURING INSTRUMENTS TO THE RACK
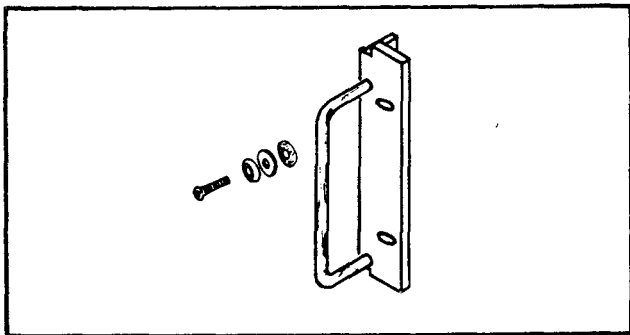
The screw and associated parts used to secure the different rack units to the rack are:

Screw	212-0591-00
Finishing Washer	210-0833-00
Flat Metal Washer	210-1061-00
Flat Teflon Washer	210-0917-00

S-3200 SECURING INSTRUMENTS TO THE RACK (cont.)

There is also a kit available that contains four of each of the parts listed above. The kit part number is 016-0099-00.

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S-3200 - 1804 VERTICAL TEST STATION - NEW MANUALS

There are two new preliminary manuals for the S-3200 Semiconductor Test Station. The S-3200 Users Guide is P/N 061-2809-00. The addendum to 1804 Volume 2 for the Vertical Test Station is 061-2808-00.

There are corrections to be made in the Vertical Test Station Manual. In the Mechanical Parts listing following Figure 7 is a standard accessories page. Remove this page. It is duplicated with some corrections on Page 3-26. On Page 4-5, at the bottom, A2 should be A100. On Page 4-6 in the Drawing A2 should be A100 and A2A1 should be A100A1.

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S3270/50 VERDICT IV NEW MANUAL

A new Verdict IV manual, P/N 070-3346-00 is now orderable. The major difference between it and the

old manual is the inclusion of the following new tests:

INDEX.EDT	F082.TST
PHASCK.EDT	F087.TST
CLOCK.EDT	F088.TST
SHIFT.EDT	F165.TST
T2942A.EDT	F250.TST
T2942B.EDT	F260.TST
T2942C.EDT	F265.TST

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TM5000 INSTRUMENT INTERFACING GUIDES AVAILABLE

Instrument Interfacing Guides which contain useful programming and GPIB information for all TM5000 instruments are now orderable. These reference guides should be a valuable training aid for those who are learning TM5000 instruments or have not done much programming with TM5000/4041 or 405X.

CG5001:	070-4616-00
DC5009:	070-4612-00
DC5010:	070-4611-00
DM5010:	070-4603-00
FG5010:	070-4613-00
MI5010:	070-4614-00
PS5010:	070-4610-00
SI5010:	070-4615-00

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TM5006/TM5003 PROPER RACKMOUNT INSTALLATION ENSURES ADEQUATE COOLING

Serial Numbers Affected: All TM5006 Options 10 or 12. All TM5003's Rackmounted with 4041's.

Reference: TM5003 Rackmount Conversion Kit 040-0984-00, TM5006 Rackmount Conversion Kit 040-0982-00 which changes to 040-0982-01. TM5006 Options 10 & 12.

TM5006/TM5003 PROPER RACKMOUNT INSTALLATION ENSURES ADEQUATE COOLING

To maintain adequate cooling in a rackmount configuration, the left and right side panels will have cooling holes added. If a customer has a rackmounted TM5000 power module with side panels that do not have cooling holes at least one inch of clearance must be allowed between the power module and the instrument below it.

If the rack has positive internal pressure for cooling purposes, the mainframes must have all compartments filled with plug-ins or blank front panels (P/N 016-0195-03). If greater internal airflow is desired in a highly pressurized rack, the grill opening at the bottom front of the power module may also be blocked.

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TV MANUAL REVISIONS

The following manuals were revised as of February 1983.

520A Vectorscope	070-1709-00
TSP1 NTSC Switcher	070-2621-00

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TV MANUAL REVISIONS

The following manuals have been updated/added as of March 1983.

Instrument	Manual P/N
015-0352-00	070-2791-01
015-0408-00	070-3872-00
020-0994-00	070-4659-00
147A/149A	070-2029-00
148-M	070-1807-00
381	070-3422-00
69M01	070-3743-00
TSG13	070-2330-00
SPG22	070-2326-00
TSG21	070-2332-00
TSG23	070-2334-00
TSG25	070-4568-00
TSG26	070-4567-00
TSP21	070-4569-00
1900 Service	061-2281-01
1980 Ser.Vol.1	070-2921-00

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7D02 - HOT PLUGGING PERSONALITY MODULES DAMAGES A07U7010

Affected Serial Number: B021911 and below.

Reference:
A07 Acquisition Memory Board
7D02 Service Manual
P/N 070-2917-00, Schematic ⟨7A⟩
Mod #46091.

When inserting a personality module into a powered up 7D02 (hot plugging) it is possible to destroy or damage A07U7010. This will happen if the personality module is off center when hot plugged causing one of its conductors to short Pins 59 (-15 volts) and 61 (/halt put) of A01J8005. This effectively shorts the Pin 3 output of A07U7010 (/halt put) to the -15 volt supply.

To verify if A07U7010 has been damaged due to "hot plugging" run the PM101 diagnostic self tests and look for the following failures:

Test	Failure Code
4 Fails	2E803-7
5 Fails	2E803-7
6 Fails	2E803-7
8 Fails	3E037-2

To protect A07U7010 Mod #M46091 was implemented at Serial Number B021911. It places a protection diode, CR7010, 152-0066-00, between U7010-3 and ground (see included partial schematic ⟨7A⟩).

(ARTICLE CONTINUED ON THE NEXT PAGE)

7D02 HOT PLUGGING PERSONALITY MODULES DAMAGES A07U7010 (cont.)

This diode should be added on the back of A07 with its anode soldered to U7010 Pin 7 and its cathode to U7010 Pin 3.

CR7010
152-0066-00
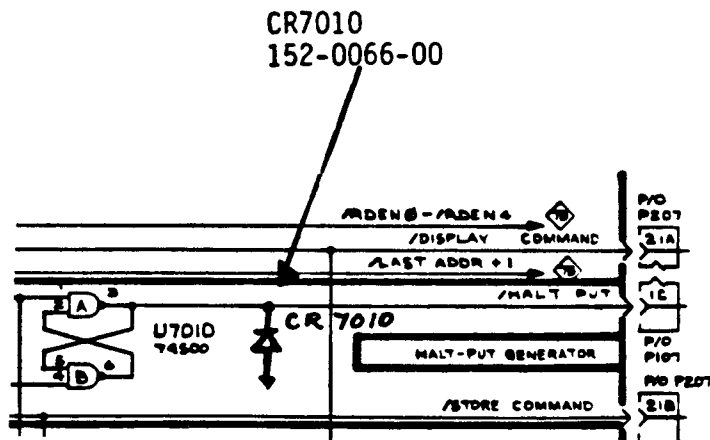
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7L14 MILLER INTEGRATOR A42A1U1170

RE: M49984

A certain percentage of Miller Integrator microcircuits (A42A1U1170, pn 155-0028-00), when installed on the 7L14 circuit board A42A1, will oscillate and this oscillation will lock up the sweep.

To overcome this problem A42A1C1176 pn 281-0509-10 (15 pf) was changed to pn 281-0512-00 (27 pf).

It is recommended that if replacement of A42A1U1170 becomes necessary that the value of A42A1C1176 be checked and changed to 27 pf as needed.

W^2 Issue 13-8

200C/PORTABLE INSTRUMENTS COMPATIBILITY AND CAUTIONS

The recent introduction of several new "Portable Scopes" poses some potential areas where caution should be exercised for customers to obtain maximum scope/cart integrity.

As most portables will be used on 200C Scope-Mobile Carts whenever a moveable platform is required, the following comments will refer to the 200C;

468 This instrument weighs 30 pounds therefore it is highly recommended that these instruments are placed as far back on the top tray as practical to obtain best instrument/ cart weight balance. Some customers may prefer to remove the four retaining feet from the top tray. Use of the tie-down strap is highly advised.

2445 These instruments should be placed
2465 on the top tray with the front instrument feet snuggly fitted into the tray retaining feet then secure the scope with the tie-down strap.

2335 These three instruments feature very
2336 short height (5 inches) and flip-
2337 down covers. Both of these characteristics demand special precautions when these instruments are used with 200C Scope-Mobile Carts.

- because of the short instrument heighth represented by the 2335, 2336, and 2337 and non-compatability of the instrument bottom feet/ the 200C top tray retaining feet plus the mismatch of instrument heighth relative to the 200C tie-down strap:

   We recommend the following procedure:

   1st - position the articulated instrument handle underneath and to the most rearward, locked position.

200C/PORTABLE INSTRUMENTS COMPATIBILITY AND CAUTIONS (cont.)

2nd - open the instrument flip-down cover to the fully open and locked position.

3rd - position the cushioned portion of the instrument handle against the 200C top tray, rear retaining feet (refer to sketch).

4th - and finally, secure the instrument by cinching down the tie-down strap over the instrument.
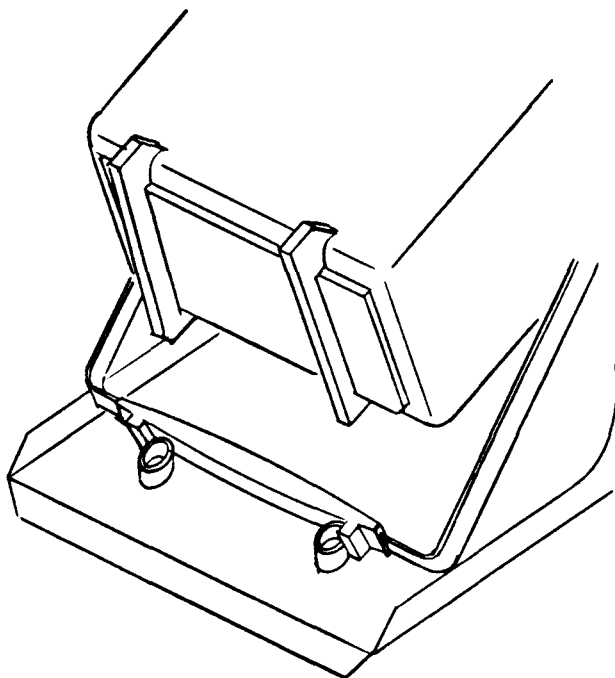
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308 CRT CATHODE CURRENT ADJUSTMENT

Reference: 308 Data Analyzer Service Manual, P/N 070-2662-00, p. 4-25, p. 7-11, and foldout diagram 10.

M47590　　　*Not applicable to qnr 58*

Affected Serial Numbers: Modification was installed beginning with S/N 303537.

R632 has been changed to a test-selected value. When calibrating the CRT circuit

R626 is to be set for a reading of 45mV +/- 5mV (50mV+/-5mV, below S/N 303537). If this reading cannot be obtained, change R632 to 56K ohm, P/N 315-0563-00.

The 45mV+/-5mV reading should be used for CRTs that are changed to the new P/N 154-0848-00.

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390AD FIXTURE KIT NOT AVAILABLE

The 390AD Fixture kit, part number 067-1153-00, will not be available in kit form.

The four items which were to comprise this kit are individually orderable under the following part numbers:

A/D Extender Board - 067-1032-00
Time Base Extender Board - 067-1033-00
Input Adjust ROM Board - 067-1135-00
Input Amp. Extender Cable - 175-0209-00.

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690SR/6942 CONTROL GLUING

REF:　690SR MANUAL 070-2870-00

In order to discourage (and in one case prevent) inadvertent misadjustment of several controls in the 690SR or 6942, two types of glue have been specified for use in certain areas and have been part numbered.

Super Glue (P/N 006-2196-00) is to be used whenever R434 on assembly A7A2A1 has to be adjusted for any reason. This will require replacement of the pot and strict adherence to the Overvoltage Adjustment procedures. (See Maintenance Section, Page 9-24).

NOTE:--This procedure for R434 is mandatory for safety regulation compliance.

690SR/6942 CONTROL GLUING (cont.)

Seven other controls should be "glued" using Red Metron Marker ink (P/N 006-2362-00). In these cases, the risk of not gluing these controls focuses on possible circuit damage.

Apply a small drop of ink to the following controls upon completion of calibration:

ASSEMBLY	CONTROL AFFECTED
A14A1	R141, R342, R542, R648
A10A1	R640
A11A1	R723, R724

This new adhesive can be broken easily when readjustment is required, but should be re-glued during normal calibration/repair.

This new glue is applicable wherever adjustments are sensitive. Its use will let the technician know of areas determined to be critical for performance, failure or other reasons.

Another possible use for this glue is to mark adjustments as a part of QC approach.

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851 CHANGES MADE TO EASE AC VOLTS RANGE ADJUSTMENT

Reference: 851 Service Manual, P/N 070-2192-01, p.4-5 step 4 and foldout diagram 1

M46082

Affected Serial Numbers: Modification was installed beginning with B036917.

If there is difficulty in performing step 4, ACV adjustment, M46082 should be installed. It consists of changing two capacitors on A1, the IO board. C184 should be changed to 6.8pF, 500V (P/N 281-0541-00) and C191 changed to 5.6pF, 500V (P/N 281-0544-00).

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1430 REAR INTERFACE

RE: 1430 MANUAL, 070-1455-00

The part number for a complete rear interface assembly is 610-0599-00.

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1440 I3B WRONG RESISTOR

REF: 1440 I3B Manual 061-1448-00

A recent input from the field questioned a resistor (R6085) used on the Insertion Timing Board. The resistor called for (315-0391-00) seemed to be running too hot.

The latest manual insert for the 1440 I3B calls this part out as a 308-0252-00, which is a 3 watt part. This part is of adequate size since the circuit normally exercises this part at about .5 watts.

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1503 MODIFICATION KIT FOR OPTION 1

Due to popular demand there is now available a modification kit to modify the standard 1503 to option 1. The kit pn is 040-1089-01.

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1800 PRAM -2V PWR SUP OSCILLATIONS, MOD NO. M50427

Reference:

062-4428-00	Power One HC2-6.0 Data Sheet
070-3261-00	1803, 4, 5 Test Stations Pattern RAM 015-0307-00
070-4545-00	1K and 4K Pattern RAM (PRAM), 015-0431-00, 015-0432-00

1800 PRAM -2V PWR SUP OSCILLATIONS, MOD
NO. M50427 (cont.)

The PRAM -2 Volt Power Supply (P/N
119-0873-01) is mounted on the rear air
duct housing of an 1803, 1804, or 1805
test station. The -2 Volt supply may
oscillate at about 40 kHz with an
amplitude of 200mV to 400mV. These
oscillations may cause intermittent
failures of the PRAM Option Verdict
tests. Note that not all 119-0873-01
supplies will exhibit oscillations or
instability.

The -2 Volt supply may be checked by
extending one of the PRAM circuit boards
located in the front of the 1800 card
nest. Power distribution for the -2 Volts
is found in the following instruction
manuals referenced above:

070-3261-00   Illustration diamond 14
070-4545-00   Illustration diamond 20

Power Supply part number 119-0873-01
changes to -02 with the addition of
capacitor C6. The 119-0873-02 is a direct
replacement for the 119-0873-01.

Modification:

    Add: C6 1 each   283-0341-00   Cap,
                        0.047uf, 10%, 100V

Capacitor C6 should be installed between
the -out and U1 pin 5 points. Insulation
sleeving should be placed on the C6 leads
to prevent shorting.

Figures 1 and 2 show the -2 Volt power
supply circuit board lay out. Note two
different layouts can be found.

Figure 3 shows the schematic with C6
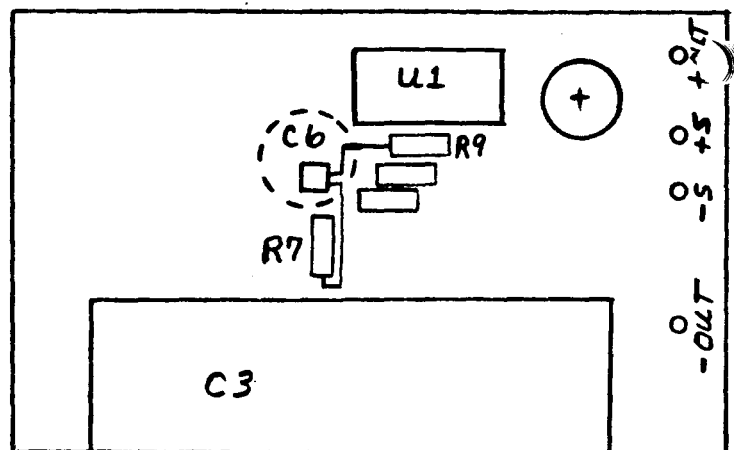installed. This schematic is part of the
062-4428-00 Data Sheet.
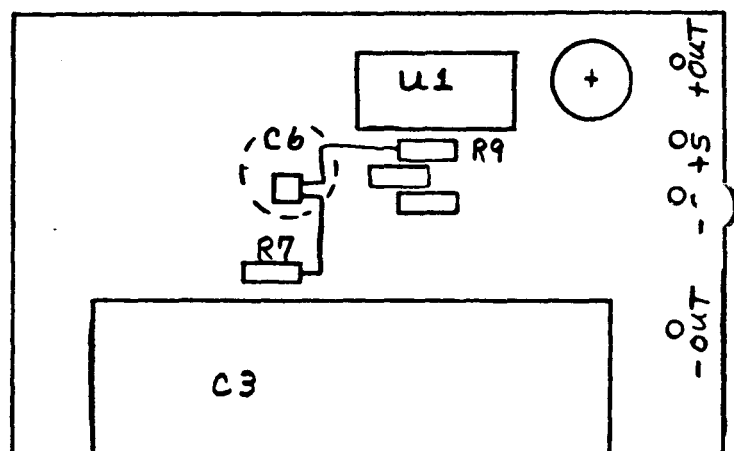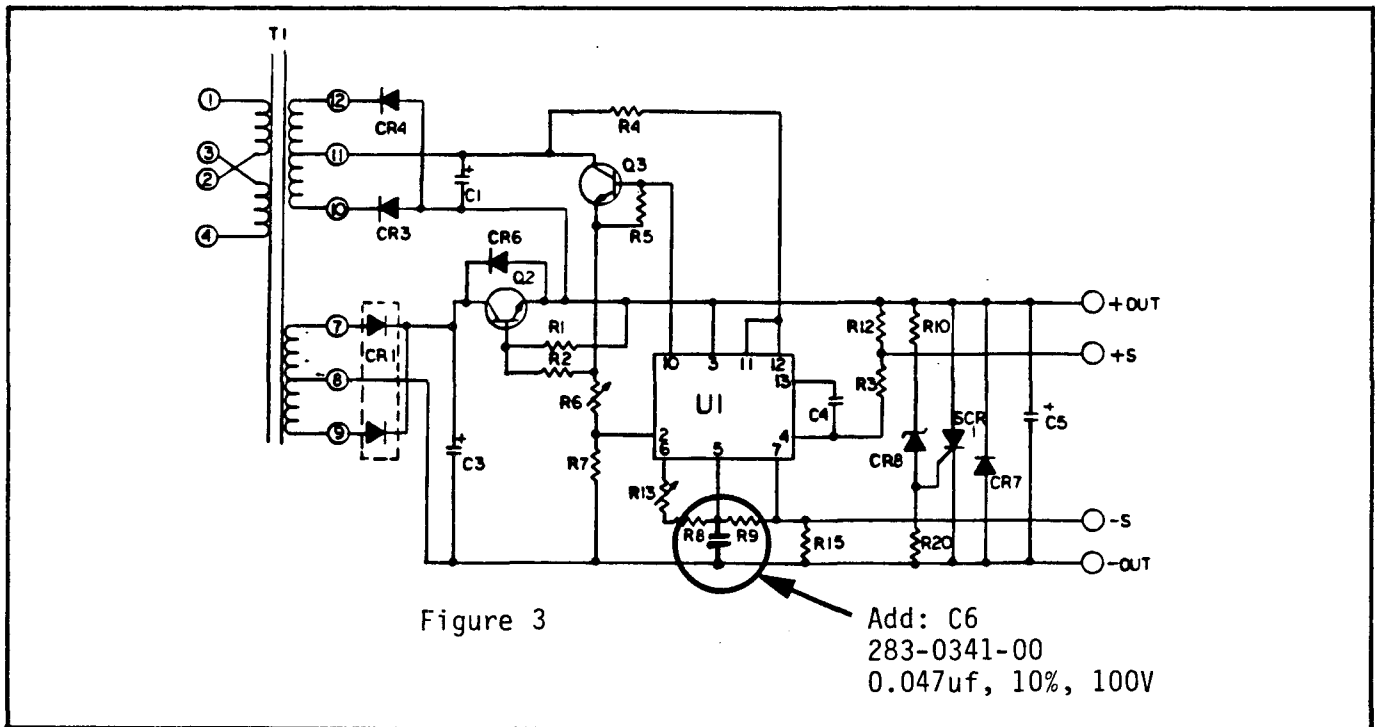

Figure 1 - ECB Layout
C6 Added

Figure 2 - ECB Layout
C6 Added

1800 PRAM -2V PWR SUP OSCILLATIONS, MOD NO. M50427 (cont.)

Figure 3

Add: C6
283-0341-00
0.047uf, 10%, 100V

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1800 TEST STATION FAULT DETECTOR MONITORING UPDATE

In a past article troubleshooting an intermittent table shutdown on 1800 series test station was discussed. This was done with the use of a logic analzyer. By monitoring the status card (P/N 670-3782-XX) power supply status signals and triggering on the 180X Power Status signal, it can be determined which power supply is causing the test table to shut down. There is one shortcoming to this method. In some cases the power up sequencer (P/N 670-5755-00) can cause problems which are misleading with the above method.

If any of the three power supplies (+5V#1, +5V#2, or +15V) that control the power up sequencer dips lower than 4.3V, the solid state relay will be disabled. This will turn off the +/-36V and -15V supplies. The dip in the supply voltage may not be enough to cause a power fault

indication at the Signal Sense Card. This is due to the fact that the sequencer is triggered, if the power supply voltage drops below 4.3 volts. The fault detector typically requires a 40 to 60 percent decrease in the power supply voltage before it will be triggered. When this occurs, the solid state relay in the sequencer opens causing the +/-36V and -15V power supplies to drop off, tripping the fault detector circuit. If this situation occurs while using a logic analyzer the indication is that the +/-36V or -15V are failing.

Two possible methods of troubleshooting this fault are:

#1. Temporarily ground the anode of CR011 on the Power Fault board (Signal Sense Board Rear). This will prevent the table from shutting down, if a power supply quits. Monitor the +5V#1, +5V#2, and the

(ARTICLE CONTINUED ON THE NEXT PAGE)

1800 TEST STATION FAULT DETECTOR MONITORING UPDATE (cont.)

+15V supplies. If at any time one of these power supplies drops below the +4.3 volts, the solid state relay will disable turning off the +/-36 V and -15V supplies. The LED on the signal sense card will turn off also. If you are able to determine which supply (+5V#1, +5V#2, or +15V) is dipping, replace it.

#2. This second method is more involved. **Temporarily** lift and ground the negative side (reference voltage) on a comparator. This would be pins 6, or 4, or 10 on U10 on the power supply sequences board (670-5755-00). The effect of this would be to disable that power supply comparator from affecting the solid state relay. If the system does not shut down, then it should be a fair indicator that the supply for the comparator that is grounded is the cause of the problem.

CAUTION: When defeating the circuits by strapping a portion to ground for troubleshooting purposes do not leave the system unattended. Remove the strapping when finished.

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1804 - DC POWER SUPPLIES HAVE AC WIRING STANDARD

There has been some incidence where the leads of the AC wiring harness were swapped around when the DC power supplies were replaced. In these instances the AC In High and Neutral wires were reversed without apparent affect to the DC output voltage.

When this wiring swap is done to modules having externally accessible fuses. One could engage the AC Power when attempting to remove the fuse.

To insure consistency of the wiring scheme and to minimize the possibility of accessing of "hot" fuse, the AC line input must be wired as follows:

±15V	Black to High
	White to 110
±5V	Black to 110
	White to Com
±36V	Black to 110
	White to Com

For the Powertec modules connect Black to A and White to N.

As always, power should be removed from the system when fuses are changed.

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1804 VOLUME 2 MANUAL CORRECTION, FIGURE 5 REAR

Reference: 1804, 1804A, and 1804B Test Stations, Volume 2, Manual, P/N 070-3331-02

The index numbers in the mechanical view, Figure 5 Rear, do not match the replaceable Mechanical Parts List on pages 6-99 through 6-103. Attached is a mechanical view, Figure 1, which contains the correct index item numbers. Index numbers 8, 13, 18, 24.1, 24.2, 29, 34, 37, 76, 77, 82, 83, 84, 85, 86, 87, 88, 89, 90, and 91 are listed in the replaceable parts list, but are not shown in Figure 5.

The part number listed for index number 5-54 is incorrect. It should be 131-1011-00. For reference purposes only, one should add a note that the mating connector is P/N 131-1012-00 (not shown).

1804 VOLUME 2 MANUAL CORRECTION, FIGURE 5
REAR (cont.)
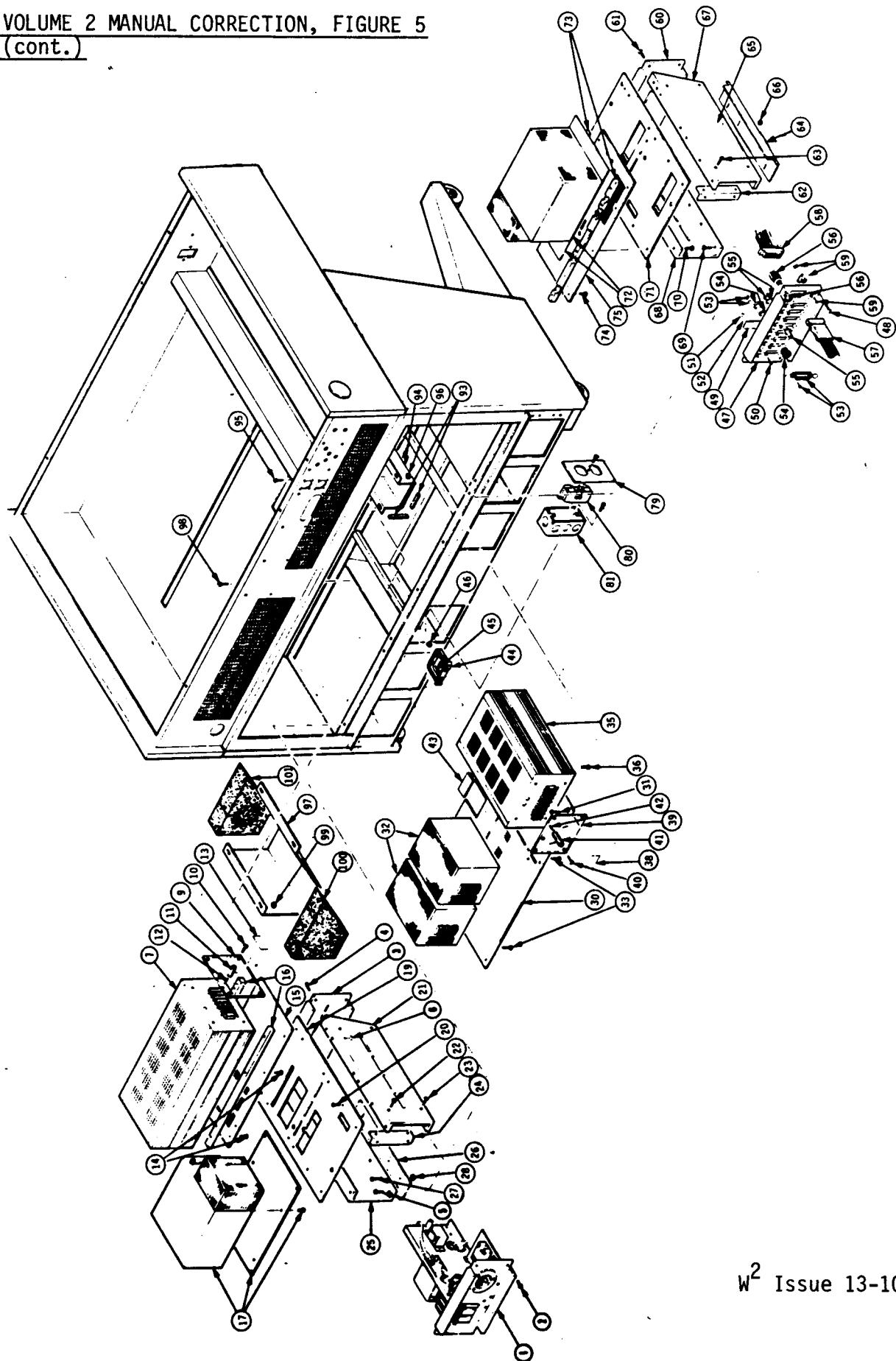
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1980 DUAL STANDARD PROM'S, 020-0967-00

REF: Application Note No. 32, 20W-5097

With the advent of the Option 2 (PAL) and Option 3 (NTSC) firmware sets, the capability of dual standard operation is now available in a single 1980.

App. Note No. 32 (reference) explains the program patches required to accomplish dual standard operation. These can either be stored in Non-Volatile memory, or a PROM set can be ordered that carries these patches. The part number for the set is 020-0967-00. This set consists of two PROM's, 160-1668-00 for MSB data and 160-1669-00 for LSB data.

The suggested placement for these parts is in the Opt. 2 ROM/PROM board, A38, 672-1050-00, using the sockets labeled U111 for 160-1668-00 and U151 for 160-1669-00 (see Figure A).

NOTE--*These parts will not be supported through board exchange activities.* If the board is faulty, and if the fault is localized to either of these parts through normal diagnostics, they will be replaced on an individual basis only. If the fault lies elsewhere on the board and the exchange option is to be exercised, these parts must be removed, and retained by the customer, or placed into the suggested locations on the replacement assembly.

Figure B illustrates the proper connections of P111 and P151 for these parts. Table 1 gives the SYSTEST FIRM listing that will result from the installation of this kit. Table 2 gives the Directory listing of the files that will be present with this kit.

NOTE--Figure A, Table 1 and Table 2 have the differences that are a result of the installation of these parts outlined. The tables assume the presence of Opt. 2 and Opt. 3 boards in the system, in card slots 9 and 8 respectively.
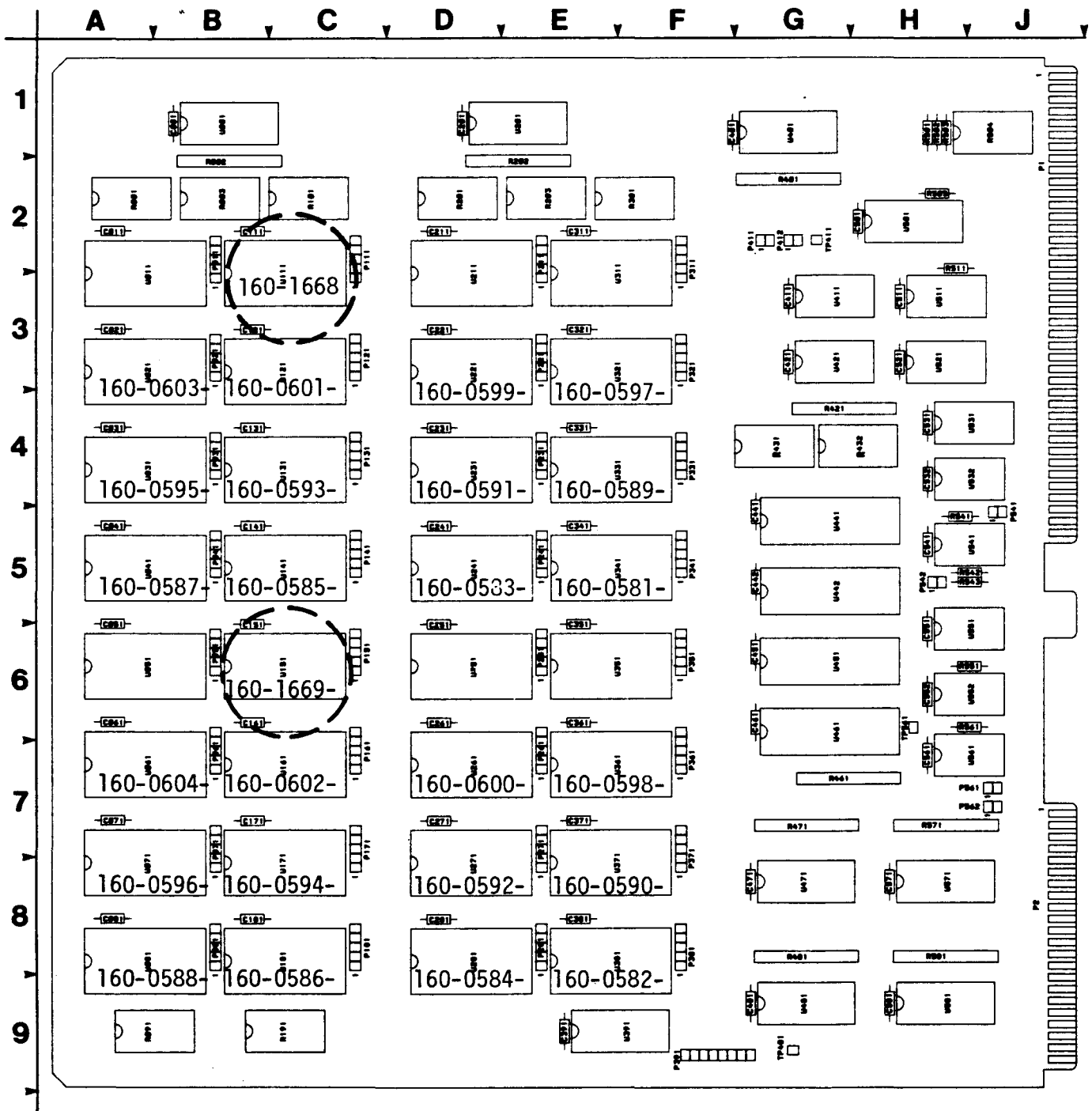
The listings cf the patches for dual standard operation that are contained within these parts are given in Application Note 32, a copy of which will be added to the 1980 microfiche in the near future.

FIGURES AND TABLES ON THE NEXT PAGE

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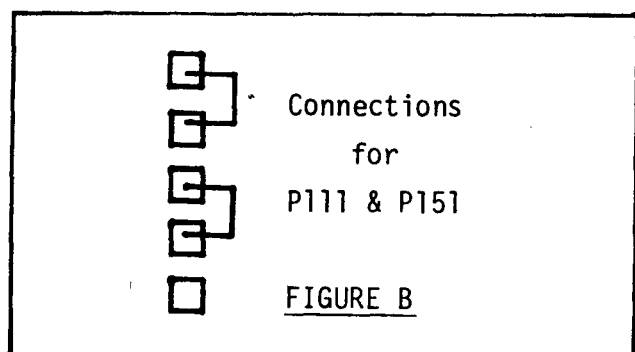A38 ROM/PROM Applications, PAL, Opt. 2

672-1050-00

FIGURE A

```
┌──────────────────────────────────┐
│   ☐┐                             │
│     ├─                           │
│   ☐┘        Connections          │
│                                  │
│   ☐┐          for                │
│     │                            │
│   ☐┘        P111 & P151          │
│   ☐┐                             │
│     │                            │
│   ☐┘                             │
│                                  │
│   ☐         FIGURE B             │
│                                  │
└──────────────────────────────────┘
```

TABLE 1

SYSTEST FIRM

NAME	VER.REL	ADDR	CONDITION
SYSCTL	2.1	00	OK
SCHED		20	
DATMAN		21	
MTHPAK		22	
EVAL		23	
SYSCOM		24	
CMDSUP		25	
STACOM		26	
EDITOR		27	
IOCOM		28	
CLKFIL		29	
GRAPH		2A	
GRAFIX		2B	
MESCM1		2C	
MESCM2		2D	
MEASUP		2E	
MESCLC		2F	
MESRNG		30	
RFFT		31	
TTDRV		32	
TTSUP		33	
VDRIV		34	
VDIAG		35	
NVDRV		36	
TTINT		37	
03AAML	1.2	40	
03BBML		41	
03CCML		42	
03DDML		43	
03EEML		44	
03FFML		45	
03GGML		46	
03HHML		47	
03IIML		48	
03JJML		49	
03KKML		4A	
03LLML		4B	
03MMML		4C	

NAME	VER.REL	ADDR	CONDITION
03NNML		4D	OK
03OOML		4E	
03PPML		4F	
03QQML		50	
03RRML		51	
03SSML		52	
03TTML		53	
ALAAML	1.2	54	
ALBBML	1.2	55	
ALCCML	1.2	56	
ALDDML	1.2	57	
ALEEML	1.2	58	
ALFFML	1.2	59	
02AAML	2.3	60	
02BBML		61	
02CCML		62	
02DDML		63	
02EEML		64	
02FFML		65	
02GGML		66	
02HHML		67	
02IIML		68	
02JJML		69	
02KKML		6A	
02LLML		6B	
02MMML		6C	
02NNML		6D	
02OOML		6E	
02PPML		6F	
02QQML		70	
02RRML		71	
ALAAML		72	
ALBBML		73	
ALCCML		74	
ALDDML		75	
ALEEML		76	
ALFFML		77	
DSAAML	1.1	7C	
DSBBML	1.1	7D	

READY

*

TABLE 2

ROMO:

File	Blocks	Date
NTSC03.STR	7	16-Mar-82
PERIP3.BAS	11	20-Apr-82
I3SKED.BAS	12	16-Mar-82
I3PHON.BAS	3	1-Apr-82
I3ALRM.BAS	5	16-Mar-82
I3NOFF.BAS	4	16-Mar-82
ONOFF3.DAT	1	16-Mar-82
I3LIMI.BAS	17	23-Mar-82
I3CHAN.BAS	7	30-Mar-82
CHAND3.DAT	1	16-Mar-82
I3VLOC.BAS	10	30-Mar-82
VLOC3.DAT	1	16-Mar-82
I3MLST.BAS	6	9-Apr-82
MONLS3.DAT	1	16-Mar-82
I3ERRP.BAS	4	16-Mar-82
I3TERM.BAS	4	16-Mar-82
I3PFUN.BAS	8	16-Mar-82
I3TITL.BAS	2	16-Mar-82
PORTF3.DAT	1	16-Mar-82
SCHED3.DAT	1	16-Mar-82
ERROR3.DAT	1	16-Mar-82
OP3INI.BAS	13	16-Mar-82
OP3NAM.DAT	6	16-Mar-82
OP3LIM.LMT	6	16-Mar-82
CMDSM3.DAT	3	1-Apr-82
DISP3.BAS	2	16-Mar-82
MESMP3.DAT	6	16-Mar-82
INIMP3.DAT	2	9-Apr-82
FILT3.DAT	4	16-Mar-82
OP3MES.BAS	13	8-Jun-82
VIMAX3.BAS	2	16-Mar-82
FIND3.BAS	4	16-Mar-82
TITLE3.DAT	1	16-Mar-82
PIXPK3.BAS	3	16-Mar-82
CLDNG3.BAS	3	23-Mar-82
LTDPB3.BAS	2	16-Mar-82
SCH03.BAS	2	16-Mar-82
OP3MON.BAS	60	12-Apr-82
PHONE3.DAT	1	1-Apr-82
HBLNK3.BAS	1	16-Mar-82
HTIME3.BAS	3	16-Mar-82
EQSER3.BAS	2	16-Mar-82
VBLNK3.BAS	3	16-Mar-82
MB3.BAS	4	16-Mar-82
ALARM3.DAT	1	16-Mar-82
DGETC3.BAS	6	23-Mar-82
NOISE3.BAS	4	16-Mar-82
COLOR3.BAS	4	23-Mar-82
LOFRQ3.BAS	3	16-Mar-82
TRMIN3.BAS	2	12-Apr-82
GRAPH3.BAS	14	7-Apr-82
STATS3.BAS	4	30-Mar-82
LIMDS3.BAS	5	30-Mar-82

File	Blocks	Date
CONINI.BAS	54	20-Apr-82
CALCON.DAT	2	4-Mar-82
TTINIT.BAS	52	4-Mar-82
TTREAD.BAS	4	4-Mar-82
TERM.DAT	4	16-Mar-82
TTLOAD.BAS	14	4-Mar-82
START.BAS	20	23-Mar-82
FIND.BAS	8	4-Mar-82
P4025.BAS	8	14-Mar-82
TEST.BAS	6	14-Mar-82
SAMP.BAS	12	14-Mar-82
MEAS.BAS	15	14-Mar-82
SYSTEM.BAS	28	23-Mar-82
ERROR.BAS	4	8-Mar-82
MON.BAS	9	8-Mar-82
GRAPH.BAS	10	8-Mar-82
MNIV.DAT	2	8-Mar-82
MNDV.DAT	4	8-Mar-82
AFACT.LIM	2	8-Mar-82
BFACT.LIM	2	8-Mar-82
MAP.BAS	3	8-Mar-82
INIT.BAS	13	14-Mar-82
OP2PAL.STR	1	8-Mar-82
OP2DMB.STR	1	8-Mar-82
DBMS.BAS	25	8-Mar-82
DBMSRT.BAS	6	16-Mar-82
DBMA.BAS	4	8-Mar-82
DBME.BAS	8	29-Apr-82
DBMM.BAS	8	8-Mar-82
DBMR.BAS	10	8-Mar-82
DBMP.BAS	14	8-Mar-82
DBMT.BAS	10	8-Mar-82
DBML.BAS	22	8-Mar-82
CONINI.BAS	54	20-Apr-82
CALCON.DAT	2	4-Mar-82
TTINIT.BAS	52	4-Mar-82
TTREAD.BAS	4	4-Mar-82
TERM.DAT	4	16-Mar-82
TTLOAD.BAS	14	4-Mar-82
START.BAS	20	23-Mar-82
FIND.BAS	8	4-Mar-82
P4025.BAS	8	14-Mar-82
TEST.BAS	6	14-Mar-82
OP3MON.PCH	5	5-Aug-82
OP3MES.PCH	2	30-Apr-82
OP3INI.PCH	2	1-Jun-82
I3CHAN.PCH	4	31-Aug-82
INIT.PCH	4	23-JUL-82
SYSTEM.PCH	1	5-AUG-82
GRAPH5.BAS	11	7-Jun-82
MON.PCH	1	5-Aug-82

0 FREE BLOCKS

READY

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1980 OPT. 1/PATCH PROM KIT
P/N 020-1004-00

REF: 1980 Service Manual
       070-2921-00

A few software errors in the Opt. 1
Applications Program have, in the past,
been corrected by various firmware
"patches". As these errors became
apparent, and their solution was deter-
mined, the patches were published and
the user was expected to store them
in the 1980's non-volatile memory. Two
possible problems were created here.

A. Non-volatile memory space was used,
    making it less available for
    special program use by the customer.

B. A failure in the non-volatile memory
    required reentry of all of the
    patches, which could cause problems
    in system down time and operator
    reentry error.

To provide easier access to these patches,
and to free up more non-volatile memory
space for other uses, a pair of PROM's
have been developed and part numbered.
These PROM's contain all of the known
software patches for Opt. 1.

This kit is part number 020-1004-00 and
contains two PROM's, P/N 160-1666-00
(MSB) and 160-1667-00 (LSB), and a brief
data sheet.

The suggested installation for these
parts is to put them into the ROM/PROM
NTSC Assembly B board, A36, 672-0939-00.
Put P/N 160-1666-00 in the socket for
U131 and P/N 160-1667-00 in the socket
for U171. Figure A illustrates the con-
figuration of 672-0939-00 with these two
new parts installed. Figure B illustrates
the required jumper settings for P131
and P171 when these parts are installed.

Table 1 lists the firmware patches that
have been written into these PROM's.
Table 2 lists the SYSTEST FIRM printout
results with these parts installed.

Table 3 is a directory list (DIR
command) with these parts installed.

Power-up System diagnostics are not
altered.

These parts will not be supported
through the Exchange processes. If
this board is faulty and the fault
is not related to these parts, the
PROM's must be removed before the
board is returned to the Module
Exchange Center. The parts can then
be retained by the customer or in-
serted into the appropriate sockets
in the replacement assembly.

NOTE--The outlined areas in Figure A and
Tables 2 & 3 show how the hardware and
firmware will differ from the standard
instrument.

The availability of this kit gives the
servicing technician an additional time
saving convenience.

If the customer does not have this kit
installed, and his non-volatile memory
has been replaced, in the past he has
had to manually reenter all of these
patch routines into NVM. This is some-
what tedious and prone to error. Now,
instead of hand reentry, if the tech-
nician has this parts kit in his 1980
Service Kit, he can temporarily put
these PROM's into their suggested
location, copy the patch routines into
the new non-volatile memory, remove
the PROM's and be done.

Purchase of a parts kit for the 1980
Service Kit will be a local decision.
Stocking of these kits locally for
customer sales should be based upon
your best estimates for the need in
your area.

(FIGURE A ON THE FOLLOWING PAGE)

FIGURE B

Jumper Settings for
P131 & P171
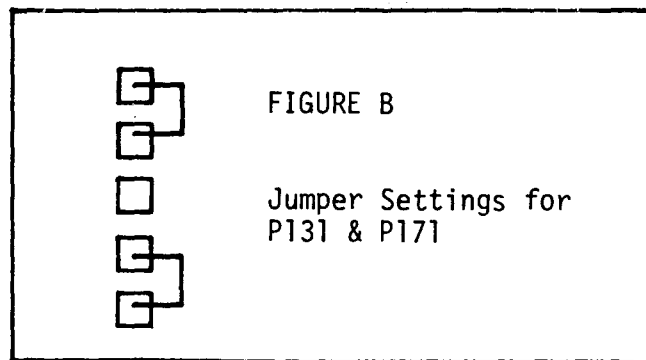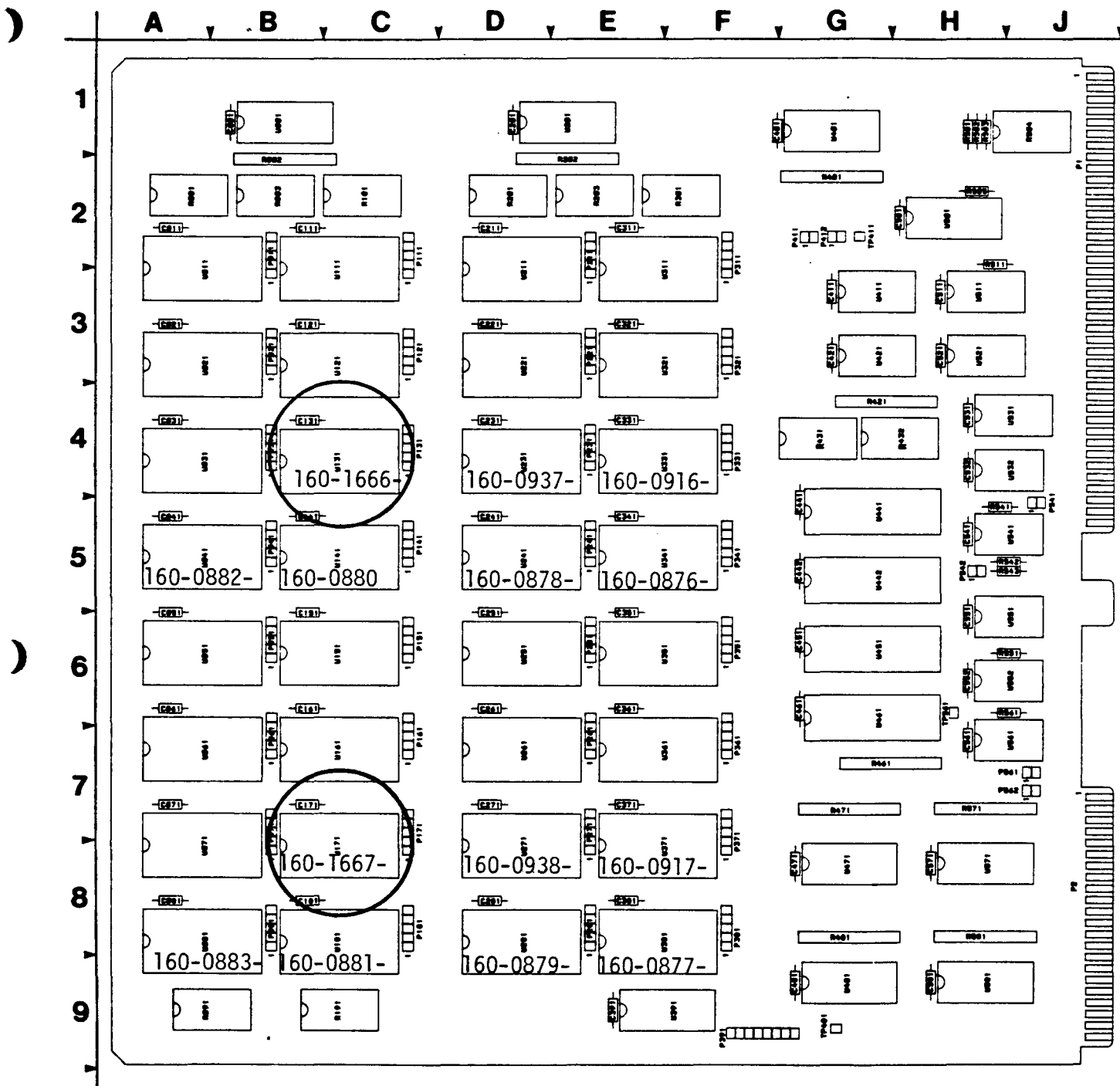
A36 ROM/PROM
Applications, NTSC, Opt. 1, Assy. B
672-0939-00 with Patch PROM's Installed

FIGURE A

```
11001  ! TIMNSE.PCH   28-JAN-82
11150  DATA 4,4,-4,1,P,1,-36,2
11285  I=OH-DL
11290  K=(CA(BC-I)+CA(50-I))/2\CO$(S+7)=''\MS(S+7)=0
11300  LVLSCN CA(0:BC-I),K,4,1,L,-1\IF L=-1 THEN L=BC-20-I
11310  LVLSCN CA(BC-I:200-I),K,4,1,R\IF R=-1 THEN R=BC+20-I
11330  BRSTCRSS V(0:31,L-28:R+8),MC*TG,RAD(360),J,A,SC(8),SC(9),N
11340  IF A<MC*GN*TG THEN 11400
11540  I=ITP(ABS(P-8-SC(DL(1))-MO)+.999)/192
11580  MNSTDV LA(16:31),J\IF CV$<>'Y' THEN I=J-.2*BA*TG
11810  !
11850  SA(1)=FB(1)+16-(J+K)/16\SA(3)=1
11860  K=(K-J)*2/FB(2)\IF K<9 THEN K=256/31
11910  TA(J:J+511)=LA(0:511)-LA(512:1023)\NEXT J
12020  RETURN
12050  IF FE$(0)='DC' THEN WAIT 5
12160  CO$(79)='(PK-PK)'\RETURN



6001  ! INIT.PCH 11-NOV-80
11070  PRINT 1.1;TAB(T);'CONNECT FLAT FIELD SIGNAL';CR$
11080  CLOSE #5\OPEN #5 AS VID:\I=10\GOSUB 11120
11090  AP=A\I=90\GOSUB 11120
11100  AX=80/(A-AP)\AY=10-AX*AP
15005  BL=2
17010  BL=3\NT=23



5501  ! MEASYS.PCH 11-NOV-80
7110  GOSUB 7190\A1=AP\L=257+FD\J=0\F=3-FD
7140  IF SM=5 THEN L=20\F=FD\J=16\GOSUB 7340\GOTO 7170
7205  IF EF=1 THEN 7220
7210  GOSUB 5000\PRINT #TT(0),CR$;'SYNC LOST ON SOURCE ';SU$;' SYNC ';SY$
7215  P8=1
7340  PUT F,L,OV+OS,PV INTO #5,'VMC'
8020  MINMAX V(0,200:800),S,I\IF V(0,1)-V(0,S)<39 THEN CM=7\GOTO 8160
8021  MINMAX VA,S,I
8030  S=VA(I)-VA(BP)\MNSTDV VA(287:342),L\MNSTDV VA(740:768),R\D=(L-R)/S
8040  RESTORE 8190\N=3\IF ABS(D)<.26 THEN 8075
8050  RESTORE 8200\N=5\IF D>0 THEN 8080
8060  J1=FF\LVLSCN VA(0:J1),VA(J1)+S*.3,4,2,SC,-1
8070  RESTORE 8210\N=4\E=SC(1)\GOTO 8090
8075  IF (L-VA(BP))/S<.28 THEN 8160
8080  J1=BP\LVLSCN VA(J1:1023),VA(J1)+.82*S,8,2,SC\E=SC(0)
8190  DATA 3,0,0,5,1,1,7,-1,1
8200  DATA 4,0,0,13,-1,2,16,0,2,21,1,3,40,0,4
8210  DATA 16,0,0,23.5,-1,3,29,0,0,43,0,5
```

OPT. 1 PATCHES

Table 1 (Partial)

```
16001 ! MAKEMS.PCH 11-NOV-80
16970 A$=VP$(6)&' NOT FOUND'\GOSUB 16110\GOSUB 9420\RETURN


11 ! MNITOR.PCH 13-MAR-81
65 PRINT TAB(9);'FIRST REPORT IN 160 SECONDS'
720 WAIT 30\INITG\IF TT$(2)<>'Y' THEN 740
725 GET I FROM 'MASTER'\IF I=TT(1) THEN RETURN
735 TT$(3)='OFF'


11001 ! VITSMS.PCH 11-NOV-80
12200 RO=2*(DL(3)-Z)\SA(2)=FB(2)*256/(20+DG(2))
12290 MR(40)=ITP(DL(M)/RO/SA(2)*2000+.5)/10


11 ! MANIND.PCH 11-NOV-80
470 READ #6,U$,N$,C$,S$,T$,A9$,B$\IF Q$<>U$ THEN 470
510 A$=A9$\GOSUB 4500\IF B$<>'NO' THEN READ #6,LM\LN$=A$


11 ! MANGRP.PCH 11-NOV-80
430 READ #6,U$,N$,C$,S$,T$,A9$,B$\IF Q$<>U$ THEN 430
470 A$=A9$\GOSUB 4500\IF B$<>'NO' THEN READ #6,LM\LN$=A$


25001 ! GETERM.PCH 13-MAR-81
25090 TT(0)=L\TT$(3)='OFF'\DRAWON #L\IF TT$(2)<>'Y' THEN RETURN
25095 GET A$ FROM #L,'MODE'\IF A$='CONNECTED' THEN TT$(3)='ON'
25096 RETURN
```

OPT. 1 PATCHES

Table 1 (Continued)

TABLE 2 -- SYSTEST FIRM

NAME	VER. REL.	ADDR.	CONDITION
SYSCTL	2.1	00	OK
SCHED	2.1	20	OK
DATMAN	2.1	21	OK
MTHPAK	2.1	22	OK
EVAL	2.1	23	OK
SYSCOM	2.1	24	OK
CMDSUP	2.1	25	OK
STACOM	2.1	26	OK
EDITOR	2.1	27	OK
IOCOM	2.1	28	OK
CLKFIL	2.1	29	OK
GRAPH	2.1	2A	OK
GRAFIX	2.1	2B	OK
MESCM1	2.1	2C	OK
MESCM2	2.1	2D	OK
MEASUP	2.1	2E	OK
MESCLC	2.1	2F	OK
MESRNG	2.1	30	OK
RFFT	2.1	31	OK
TTDRV	2.1	32	OK
TTSUP	2.1	33	OK
VDRIV	2.1	34	OK
VDIAG	2.1	35	OK
NVDRV	2.1	36	OK
TTINT	2.1	37	OK
01AAML	1.1	40	OK
01BBML	1.1	42	OK
01CCML	1.1	44	OK
01DDML	1.1	46	OK
01EEML	1.1	48	OK
01FFML	1.1	4A	OK
01GGML	1.1	4C	OK
01HHML	1.1	4E	OK
01IIML	1.1	50	OK
01JJML	1.1	52	OK
01KKML	1.1	54	OK
01LLML	1.1	56	OK
01MMML	1.1	58	OK
01NNML	1.1	5A	OK
01OOML	1.1	5C	OK
01PPML	1.1	60	OK
01QQML	1.1	62	OK
01RRML	1.1	64	OK
01SSML	1.1	66	OK
01TTML	1.1	68	OK
01UUML	1.1	6A	OK
01VVML	1.1	6C	OK

TABLE 3

<u>DIR</u>

ROMO:

INIT.BAS	59	22-APR-80
SYSSUP.BAS	6	21-APR-80
PRTSUP.BAS	7	21-APR-80
START.BAS	12	23-APR-80
SPOTIM.BAS	3	23-APR-80
MEASYS.BAS	11	1-MAY-80
FILTER.DAT	2	1-MAY-80
FACTOR.LIM	6	21-APR-80
MESNAM.DAT	8	21-APR-80
SAMGRP.BAS	9	9-APR-80
VITSCN.BAS	6	9-APR-80
COREMS.BAS	4	21-APR-80
VITSMS.BAS	23	21-APR-80
TIMNSE.BAS	17	21-APR-80
MSINIT.BAS	10	22-APR-80
MAKEMS.BAS	16	22-APR-80
QUIKTM.BAS	2	22-APR-80
MNGRP.BAS	13	22-APR-80
CHNVEW.BAS	2	22-APR-80
OUTSRV.BAS	15	22-APR-80
MAKMAN.BAS	8	22-APR-80
MNITOR.BAS	6	22-APR-80
MNEMON.DAT	3	22-APR-80
LISTMN.BAS	3	22-APR-80
MEASIN.BAS	18	22-APR-80
GETERM.BAS	3	22-APR-80
MANIND.BAS	13	22-APR-80
OUTLIM.BAS	2	9-APR-80
REPORT.BAS	2	9-APR-80
NXTSCR.BAS	2	9-APR-80
BKSCHD.BAS	2	9-APR-80
BKGTIM.DAT	1	9-APR-80
TERMIN.DAT	1	9-APR-80
SRCLIM.DAT	1	9-APR-80
TMNSE.PCH	3	1-JUN-82
INIT.PCH	4	23-JUL-82
MEASYS.PCH	4	1-JUN-82
MAKEMS.PCH	1	1-JUN-82
MNITOR.PCH	1	1-JUN-82
VITSMS.PCH	1	1-JUN-82
MANIND.PCH	1	1-JUN-82
MANGRP.PCH	1	1-JUN-82
GETERM.PCH	1	1-JUN-82

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4016-1 with 620-0290-OX LVPS/GMA125 with 620-0279-01 LVPS

When replacing the switching transistors Q1022 and Q1023 (p.n. 153-0652-00) in the LVPS, replace with ones known to have a hfe of 14 or less. Having a gain of more than 14 may cause instability in the switching circuit, which leads to the failure of Q1022 and Q1023.

Prior to February 1983, the parameters at which the transistor were specified did not assure a hfe of less than 14 at low collector current levels.

Stock of selected transistor, p.n. 153-0652-00, ordered prior to February 1983, should be checked on a curve tracer for a hfe less than 14 measured at 5 volts and .1 amps. If curve tracer is not available, purge stock and reorder.

The reliability of the selected transistor at the new specification is much greater than the previous part.

W^2 Issue 13-8

4052A/4054A MAS F/W V1.4 CHECKSUMS

REF: IDD GAS Modification M49382

A new version of firmware; V1.4 for the 4052A/4054A products is now available. This firmware level corrects an operational fault where interrupts from SRQ, keyboard, RS232, Option 1, etc. can cause the system to hang during GPIB operations. The fix consisted of reprogramming the two GPIB EPROMs (U835 and U885) to eliminate the GPIB hang condition.

The MAS circuit board, 670-7624-00, rolls to a -01 and the two EPROMs change part numbers as follows:

Ckt #	V1.3 P.N.	V1.4 P.N.
U835	160-1701-00	160-1701-01
U885	160-1691-00	160-1691-01

A parts replacement kit, part number 050-1743-00, is available to replace the above two EPROMs. The other EPROMs are the same for V1.4 as were in V1.3.

Below is a list of checksums for all EPROMs on the MAS board for V1.4:

Ckt #	CRC
U810	68DF
U820A	E525
U820B	4869
U825	7DDF
U835	EC6E
U870A	64B7
U870B	4F31
U880	59EE
U885	43DF
U893	7F39

When using the 067-0900-00/01 Diagnostic Test Fixture, any checksums listed for U805 and U897 should be ignored. They are for non-existent patch ROM and FPLA which are no longer used.

Serial number breaks for new products manufactured with V1.4 firmware are as follows:

Product	Serial Number
4052A	B045040
4054A	B033027
4052F39	B010474
4054F39	B010342

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4113/4114/4116A PEDESTAL POWER SUPPLY MODIFICATION #M50093

A new power supply, p.n. 620-0294-02, is the result of reliability modification #M50093 to 4113, 4114, and 4116A series terminals. The new power supply is also used on the "A" version and -30 versions of the terminals.

The power supply uses metal oxide varistors in place of the neon spark gaps. This change along with other components in the mod will reduce intermittent fuse blowing during power line transients.

Pedestal power supply modification:

1. Gain access to the inverter board, p.n. 670-6503-04 by removing the power supply from the pedestal and the shield covering the inverter board.

2. Replace CR661 & CR663 with new diodes, p.n. 152-0141-02.

3. Remove E435, p.n. 119-0181-00 and install RV435, p.n. 307-0456-00.

4. Remove E431 and E237, p.n. 119-0181-00 and install RV431 and RV237, p.n. 307-0415-00.

5. Replace power supply.

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4907 FIRMWARE VERSION 1.3 CHECKSUMS

Ref: 4907 File Manager Service Manual, P/N 070-2405-00.

Firmware Checksums for the 4907 ROM board can be obtained by using the 067-0746-00 System Test Fixture. For details on this procedure, please refer to the 4907 File Manager Service Manual.

Below are listed the Checksums for V1.3. This Version no longer uses the Patch ROM or FPLA; therefore, there is only one Checksum for each EPROM.

4907 F/W V1.3 Checksums

Ckt#	P/N	Starting Address (H)	Checksum
U121	156-1067-00	A000	CF
U131	156-1068-01	A800	28
U141	156-1069-00	B000	64
U151	156-1070-01	B800	7C
U161	156-1071-00	C000	C1
U201	156-1072-00	C800	E8
U211	156-1073-00	D000	5A
U221	156-1074-01	D800	35
U231	156-1075-00	E000	79
U241	156-1076-00	E800	47
U251	156-1077-00	F000	AA
U261	156-1078-01	F800	68
U271	156-1079-01	6000	7F

W^2 Issue 13-8

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

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