



# 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

Published by Service Admin Support  
53-027 Ext. 8939

June 13, 1980  
Issue 10-12

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REFERENCE PULL-OUT

SERVICE INSTRUMENT DIVISION

PORTABLES

442 TROUBLESHOOTING CHART . . . . .	A-1 thru A-4
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### PERSONNEL CHANGES

Please join Tom Greathouse, FSS, Houston, in welcoming BRYAN SHELTON to Tek. Bryan will assume the duties of a Field Service Specialist I in the Houston Field Office. Bryan comes to Tek after spending 8 years with A.M. International as a Technical Representative.

Welcome Bryan!

\*\*\*\*

Carl Smith, SCM, Chicago, has announced that DENNIS CIRRICIONE has accepted the swing shift supervisor position in the Chicago Service Center.

Dennis has a 20 year U.S. Air Force background including radar maintenance, quality control, instructing, and supervision.

Please join Chicago in welcoming Dennis to his new position.

\*\*\*\*

Mike Anastas, FSS, Boston, has announced the following promotions:

LARRY WRINN has been promoted to a Field Specialist III.

Larry has been the "Lead Specialist" in the field for over one year. He has developed and conducted training seminars for the Boston Service Center. In addition, he has offered many technical "fixes" and suggestions to our factory support in Beaverton. Larry has demonstrated excellent customer management skills which have helped enable Boston to Maintain a good support team.

Please join us in congratulating Larry for a job well done and continued future success.

--

CURT SNOW has been promoted to a Field Service Specialist III.

For over a year Curt has been performing as a Field Service Specialist II and had been assigned the role of "Lead Specialist". He helped organize and maintain the in-house IDD operation consisting of himself and three Field Service Specialist I's. Along with his in-house technical support, Curt provides phone support for our Field Specialists on-site. He also has prepared and conducted training seminars for the Boston In-House operations and designs computer programs for their inventory control support functions.

Please join Boston in congratulating Curt for a job well done and continued future success.

\*\*\*\*

--Sharon Huetson  
Editor  
June 13, 1980  
Issue 10-12



GENERAL

NEW PARTS ORDERABLE FROM CSG

<u>Part Number</u>	<u>Description</u>
003-0892-00	Set, Socket Key, Metric, 4mm - 10mm
003-0893-00	Set, Socket Key, Metric, 1.5mm - 6mm
003-0894-00	Set, Feeler Gauge, Metric, 0.05mm - 1mm
*003-0875-00	Fixture, IC Lead Bending (To support 7612D)
*003-0876-00	Former, IC Lead (To support 7612D)
003-0877-00	Lead Sizer (To support 7612D)
006-2427-00	Pouch, HD Kimcel (Pink Poly Bubble Blanket)
006-3442-00	Thermometer 25°C to 100°C
006-3444-00	Thermometer 0°C to 60°C
006-3443-00	Thermometer 100°C to 160°C
006-3486-00	Chart Paper for Spectracom 8161 Recorder

\*To use the IC lead former 003-0876-00, it must be installed in the IC fixture 003-0875-00.

--Tom Fox  
58/511, xt. 7349

## PHONE EXTENSION CHANGES FOR BEAVERTON T & M SERVICE SUPPORT

Effective June 3, 1980, Gary Ellsworth, Tom Peters, and Mike Laurens of the T & M Service Support group will have new phone extensions. Listed below is the entire T & M group with the proper phone extensions:

### SERVICE PROGRAM MANAGER

TODD PAULUS	EXT. 7092
-------------	-----------

### SECRETARIES

DIANE OLMSCHIED	EXT. 6918
BRENDA MOHR	EXT. 6918

### 5000/7000 SERIES SUPPORT TEAM

DICK FRESHOUR	SPS*	EXT. 6810
LYNN SPERLEY	PAE**	EXT. 6902
JOHN EATON	PAE	EXT. 6902

### 200/300/400 SERIES SCOPE SUPPORT TEAM

ROY LINDLEY	SPS	EXT. 7173
MIKE LAURENS	PAE	EXT. 7173 (New)

### MEDICAL/ACCESSORIES SUPPORT TEAM

GARY ELLSWORTH	SPS	EXT. 7072 (New)
DAVE MCKINNEY	PAE	EXT. 7072

### COMMUNICATIONS DIVISION SUPPORT TEAM

TOM PETERS	SPS	EXT. 6507 (New)
RICH KUHS	PAE	EXT. 6782
(Spectrum analyzers)		
STEVE SCHMELZER	PAE	EXT. 6507
(TV)		
OPEN	PAE	EXT. 6782
(Spectrum analyzers/TV)		

### SERVICE STAFF METROLOGIST

TOM FOX	SPS	EXT. 7349
---------	-----	-----------

Extensions 6843, 7718, 7012, and 6781 will no longer be used by Service Support. Please use this new listing or update your phone list to reflect the new numbers.

\*Service Program Specialist (new products)

\*\*Performance Assurance Engineer (technical support)

--Todd Paulus  
58-511, Ext. 7092

321-0126-03 MIXED STOCK

The correct value for Part Number 321-0126-03 is 200 Ohms, but some areas have reported receiving 20 Ohm resistors instead. Check all stock areas under Part Number 321-0126-03 and verify that they are only 200 Ohms. Any parts found to be 20 Ohms can be placed in stock under Part Number 321-0030-02. Reorder new parts as necessary.

--Rich Andrusco  
92-236, Ext. 1582

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## ADMINISTRATIVE SUPPORT

### SERVICE RECORD PROCEDURES

Hours reported against a product should reflect the hours actually spent in SERVICING the product. Do not include travel time, time spent in security checks, etc.

	PRODUCT TYPE	SERIAL NUMBER	ACTY CODE	PM	HOURS
1					
2					
3					
4					
5					

#### ON-SITE

	PRODUCT TYPE	SERIAL NUMBER	ACTY CODE	TIME DATE	HOURS	TIME DATE	HOURS	TIME DATE
1			ACT					
			SQI					
2			ACT					
			SQI					
3			ACT					
			SQI					
4			ACT					
			SQI					
5			ACT					
			SQI					

#### IN-HOUSE

This data is used in determining average times by product for repair, quote, clean, calibration, etc.

--Bill Duerden  
53-027, Ext. 8938 Merlo



LABORATORY INSTRUMENT DIVISION

TM500

TM500 SOCKET REWORK PROGRAM (CODE 18) DISCONTINUED

The TM500 Socket Rework Program will be discontinued on September 1, 1980. TM500 Manufacturing will not accept any additional units for rework after August 31, 1980. Any TM500 product requiring rework after August 31, 1980 will have to be handled by the local service center. The customer will be charged for all parts and labor unless the instrument is still under warranty.

The TM500 Socket Rework Program affected all TM500 products except the following:

AM503  
AM511  
DL502

LA501  
LA501W  
SW503

TR501  
TR502  
WR501

--Rich Andrusco  
92-236, Ext. 1582



COMMUNICATIONS DIVISION

MEDICAL

408/414 POWER CORD

When replacing a power cord (P/N 175-1415-01) delete the tinning process of the stripped wires. Multi-stranded wires were tinned to make wiring easier. Medical monitors have open wiring chambers equipped with binding screws and tinning was used to reduce the hazard of loose strands touching adjacent conductors.

However, an increase in terminal burnouts and intermittent connections on the clamp type terminals with tinned wires, warrants the deleting of this process. The problem with tinning is the wires under constant pressure from the terminal clamps will cold flow\*. Untinned multi-strand wire will compress until compressed solid. There is some relaxation but at a much slower rate than the tinned wires.

\*Cold Flow - Terminal Resistance is dependent on contact pressure. If contact pressure decreases, the terminal resistance rises and could raise the junction temperature at the contact to the point where the solder on a tinned wire will melt. When the temperature decreases and the solder cools, a cold solder joint could occur.

--Dave McKinney  
58/511, Ext. 7072

# 413 MONITOR - POWER SUPPLY MODIFICATION (CODE 18)

Serial Numbers Affected: B010100 - B049999

Reference: 040-0961-00

It has come to our attention that a momentary interruption of the mains supply (AC power line) may cause the 413 monitor to shut off. If this occurs, all monitor functions will cease to operate, including the alarms.

If this shut-off occurs, normal operation is restored simply by pushing the monitor On switch to "Off" and then back to the "On" position. A modification kit (040-0961-00) has been developed to correct this problem.

The 413 monitor was designed especially for neonatal monitoring and used extensively in neonatal intensive care units. Because of this application, all owners of a 413 will be notified of the problem.

All reply cards will be sent to Jim Sandberg's attention. When the cards have been tabulated, he will supply each of you with the names and addresses of customers who you must contact. We believe that there will be a minimum amount of confusion if you contact the customers directly to make the necessary arrangements for updating their monitors. This mod will be handled as a Code 18 repair and should be installed in all 413's, in the affected serial number range, that come through the service centers. The mod kit will be installed at no charge to the customer.

International: Information on countries, customers, instrument type and serial numbers has been sent to EMC and AM/PAC. They will distribute this information to the appropriate subsidiaries.

If you have any questions, contact Jim Sandberg or Gary Ellsworth.

--Written by  
Jim Sandberg  
Quality Assurance Mgr.  
Portable Patient  
Monitors  
53/099, Ext. 8015-MR

--Inserted by  
Gary Ellsworth  
Service Program Spec.  
58/511, Ext. 6781

## TELEVISION PRODUCTS

### 650A/REWORK OF 119-0320-04 EHT SUPPLIES

All 119-0320-04 EHT supplies in your stock with date codes of 7844 to 7950 should be returned to Steve Schmelzer at Delivery Station 58/511 for rework. All 119-0320-04 supplies that have failed in an instrument and are replaced with new supplies should be returned through normal channels. Substantial savings can be realized by reworking any supplies that may still be in your stock. Because of high shipping costs, International customers may choose not to return unused supplies unless a substantial number are involved (10 or more).

--Steve Schmelzer  
58/511, Ext. 6507

### 1480 SERIES/DEFECTIVE HIGH VOLTAGE TRANSFORMER

High voltage transformer (P/N 120-0948-00) date code 8004 are defective. Symptoms exhibited are inability to properly focus in digital line mode. Reject from stock and order replacements as necessary.

--Steve Schmelzer  
58/511, Ext. 6507

## 1480 SERIES/SPACER REQUIRED FOR PUSHBUTTON SWITCHES

References: 1480 Series Manual P/N 070-1813-01  
1480 Series Manual (Above B060000) P/N 070-2338-00  
Modification M33940

Some months ago the vendor for the pushbutton switches (P/N 260-1674-00/01, 260-1675-00/01 and 260-1676-00/01) changed the design of the switch. Now the latch spring bar movement is restricted by the head of the mounting screw. To prevent this a spacer (P/N 361-0969-00) was added to the instrument and the screw type changed from P/N 211-0262-00 to 211-0232-00. The spacer is added to the inside (nearest CRT) edge of the switch assembly. When replacing a switch assembly, the vertical switch circuit board (670-3486-00) or the horizontal switch circuit board (670-3489-00) this spacer must be added and the screw type changed. The addition of a small solder lug (P/N 210-0261-00) placed as shown in the following drawings also helps prevent the screw from tilting the spacer and provides additional clearance. A modification is in process to eliminate the need for this spacer. That information will be provided when available. A manual change request has been generated to update mechanical parts lists.

See the following drawings for details on spacer location.

Thanks go to Jerry Smith of the Irvine Service Center for bringing this information to our attention.

Units Affected: All

(continued on the following page)



1480 SERIES/SPACER REQUIRED FOR PUSHBUTTON SWITCHES (CONTINUED)

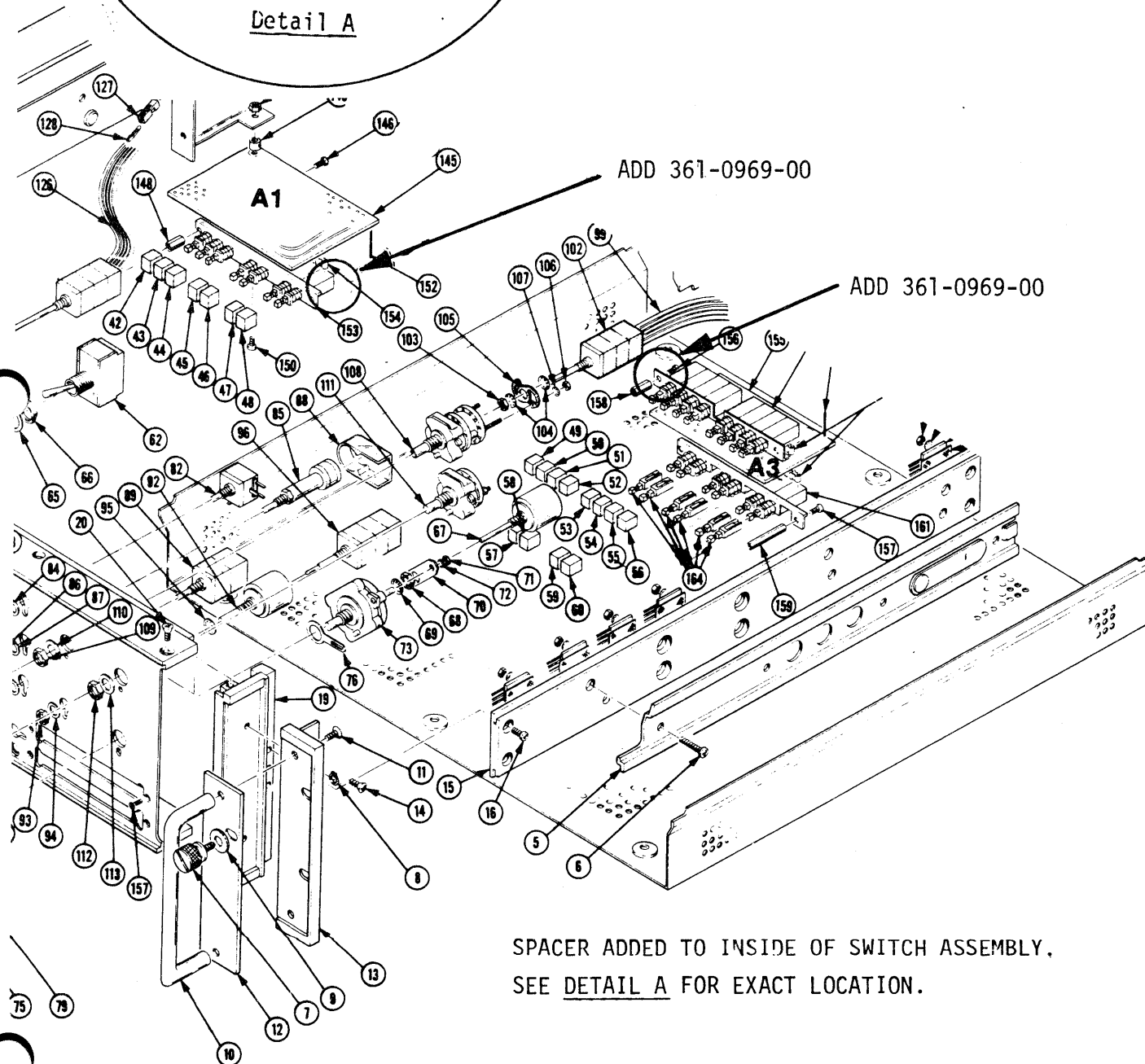
1480R

211-0232-00

ADD 210-0261-00  
BEND TAB AT 90°

361-0969-00

Detail A



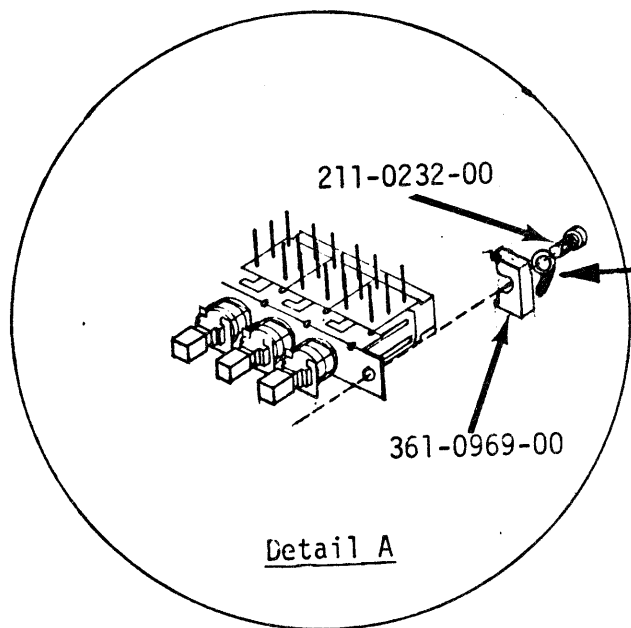
SPACER ADDED TO INSIDE OF SWITCH ASSEMBLY,  
SEE DETAIL A FOR EXACT LOCATION.

CHANGE (6) MOUNTING SCREWS FROM 211-0267-00  
TO 211-0232-00.

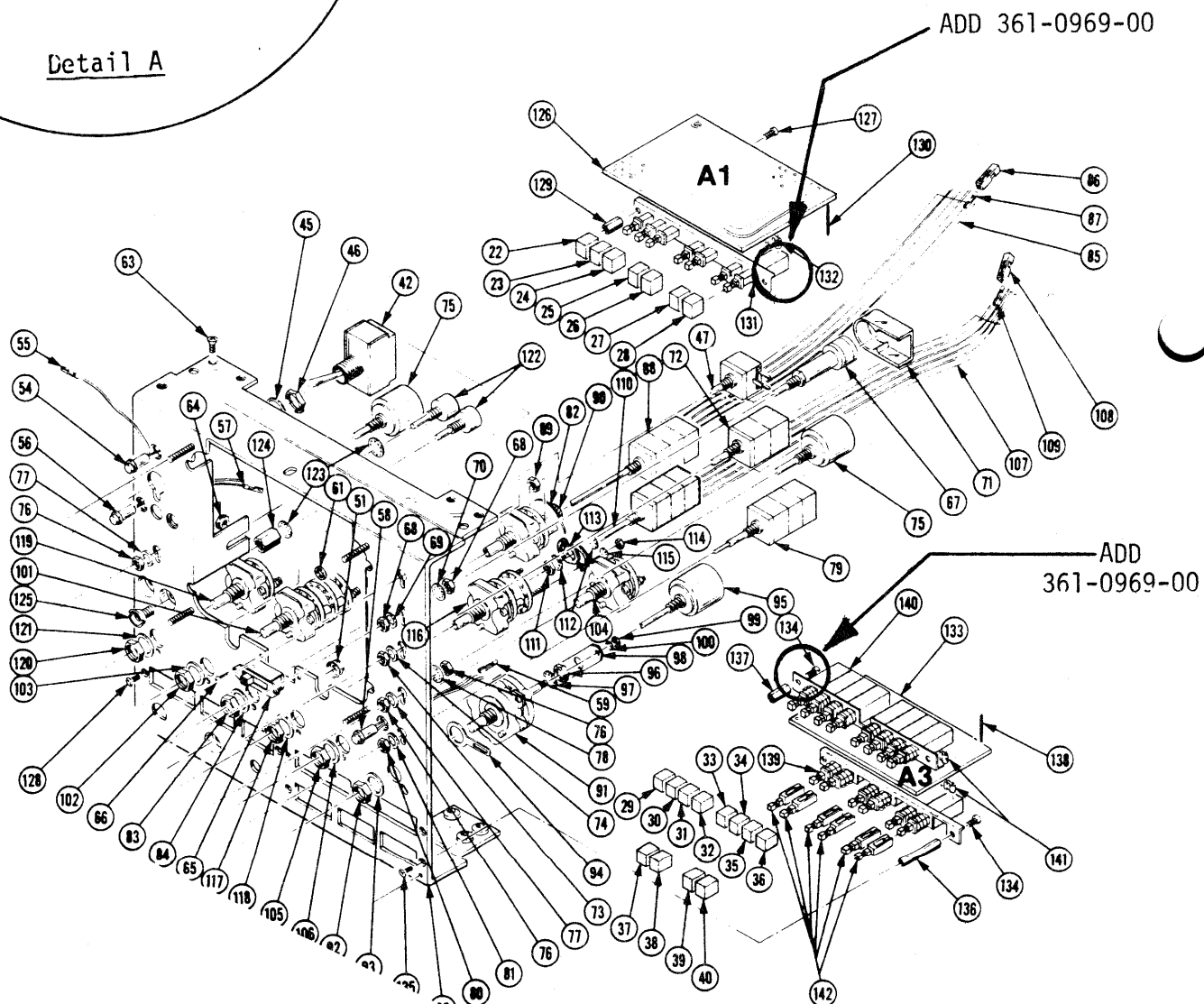
(continued on the following page)

1480 SERIES/SPACER REQUIRED FOR PUSHBUTTON SWITCHES (CONTINUED)

1480C



Detail A



SPACER ADDED TO INSIDE OF SWITCH ASSEMBLY. SEE DETAIL A FOR EXACT LOCATION.  
CHANGE (6) MOUNTING SCREWS FROM 211-0268-00 TO 211-0232-00.

--Steve Schmelzer  
58-511, Ext. 6507  
June 13, 1980  
Issue 10-12

SERVICE INSTRUMENT DIVISION

PORTABLES

434 INTERMITTENT BURST MODE

Reference: 434 Manual P/N 070-1915-00  
Serial Numbers: B500000 and Up.

Some instrument power supplies may intermittently shut down into the burst mode which causes the instrument's display to flash for a second and then return to normal operation. To eliminate this intermittent shutdown, the wires coming from P118 and P119, located on the A11 multiplier board, must be bent away from the bottom of A10, the Power Supply Secondary board. P118 and P119 carry high voltage to A14 Z-axis board, and if these wires are close to or touching A10, there is a possibility of a static charge building up and discharging to A10. These wires are located under U1910, inverter control I.C., and the discharge will cause a pulse on the Phase Trigger input of U1910, pins 10 and 11 which causes the scope's power supply to momentarily "burst". Bending the wires away from A10 will stop this type of shutdown.

--Mike Laurens  
58/511, Ext. 7012



## INFORMATION DISPLAY DIVISION

### 4052/54 +15V REGULATOR CIRCUIT #M39801 CORRECTION

The article "4052/54 +15V Regulator Circuit #M39801" in issue 10-9, May 2, 1980 of the Wizard Workshop requires correction. Please note that mod 39801 does not address the 4054. The +15 volt regulator change, is being made only to the 4052.

In addition the 10K and 7.5K resistor part numbers are incorrect. The 10K resistor should be a 308-0054-00 instead of the 321-0289-03, and the 7.5K resistor should be a 308-0206-00 instead of a 321-0277-00. The suffix of the modified board will change from the -00 to a -01.

--Darrell McGiverin  
63/503, ext. 3786

### 4663 FLEX STRIP TERMINATION CIRCUIT BOARD KIT

The Flex Strip Termination circuit board, 670-5859-00, has been upgraded to increase the 4663 Pen Arms' immunity to environmental and operator induced static charges. Use of the new board, 670-5859-01, in instruments with a serial number of B020300 or less is not possible without a new Flex Strip Cable Tray and some associated hardware. The new board and everything needed to install it comes as a field installable kit, P/N 050-1234-01. If this kit has already been installed in a 4663, or if the serial number is greater than B020300, the new 670-5859-01 can be installed by itself as a direct replacement.

--Larry North  
63/503, ext. 3926

### 4633A, 4634: DISSASSEMBLY/REASSEMBLY VIDEO TAPES

A two part videotape set describing the dissassembly and reassembly of the 4633A and 4634 is now available. The part number of the two tape set is 068-9055-00.

--George Kusiowski  
63/503, ext. 3928



MICROPROCESSOR DEVELOPMENT PRODUCTS (MDP)

8048 EMULATOR EXTERNAL CLOCK CONSIDERATIONS

The prototype control probes that support both the crystal and external modes of clock generation all have the same type of clock circuitry in the prototype control probe tip. Two pin connections used by the microcomputer or microprocessor for the clock are now used by the clock circuitry in the prototype control probe tip. These connections allow either a frequency determining device or an external TTL clock to be used as a clock source in the manner the manufacturer recommends.

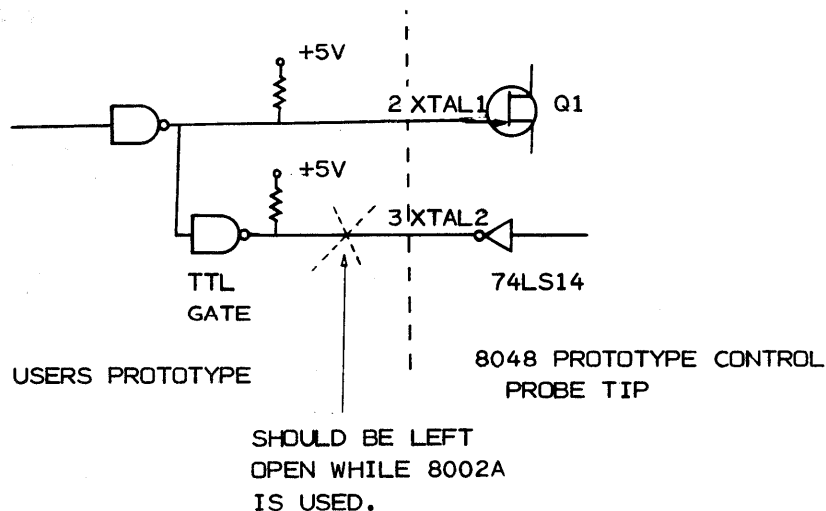
One connection to the prototype control probe is an input to the gate of a Field Effect Transistor, and the other is the output of an LS TTL device. When an external clock is used, the manufacturer generally recommends the external TTL clock to be input to one connection and the other connection be allowed to float.

On the prototype control probe tip the TTL clock is input to the gate of the Field Effect Transistor, and the LS TTL output is allowed to float. This type of external clock configuration works properly with the prototype control probe.

To provide the MCS 8048 with an external clock, Intel recommends driving both the XTAL 1 and XTAL 2 connections with TTL devices. The TTL devices provide the MCS 8048 with a clock and clock not signal to the XTAL 1 and XTAL 2 connections.

In this type of configuration the clock circuitry in the prototype control probe tip will not function properly. At this time the output of a 74LS14 on the prototype control probe tip is connected to the output of another TTL device on the user's prototype.

To avoid this problem, we recommend the user allow the MCS 8048 XTAL 2 connection (Pin 3) to float while the 8001 or 8002A microprocessor design lab is being used with the user's prototype. Once the design of the prototype is complete and the MCS 8048 is being used in the prototype the clock circuit may be configured as Intel recommends.



--Kevin King, Brad Griffin  
94-816, Ext. 1636, 1608

June 13, 1980  
Issue 10-12

## SEMICONDUCTOR TEST SYSTEMS

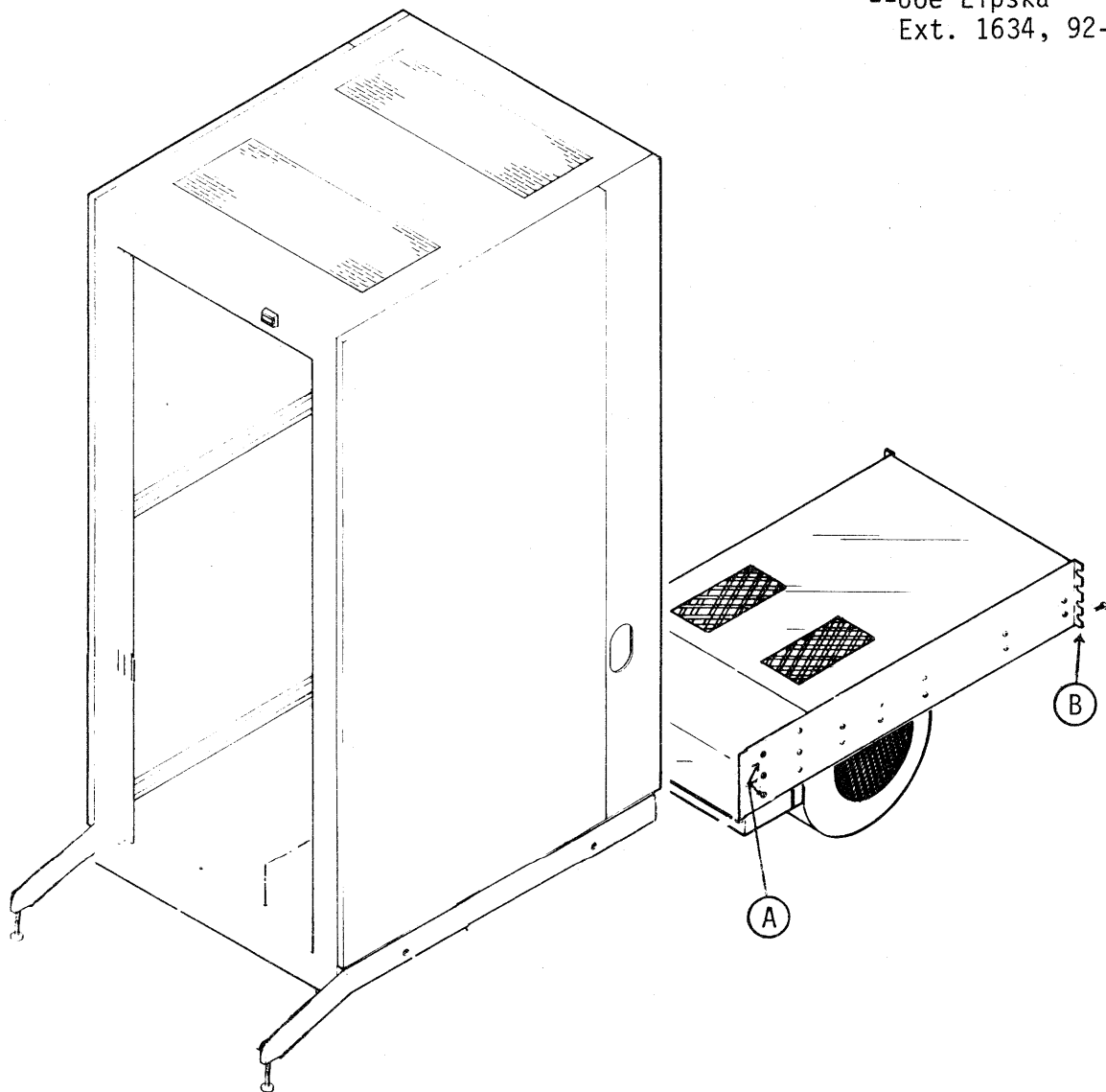
### S-3455 LOWER BLOWER ASSEMBLY CLEANING

Cleaning of the intake and exhaust screens at least every six months is important. Cleaning of the exhaust screen can be difficult in systems that use the 'F' crate. Because there is no set procedure in cleaning the fans, the time it takes to clean them runs from thirty minutes to three hours.

The quickest and most thorough way to clean the blower is to remove the blower completely. By removing the screws shown at location A and B on each side, the blower assembly will be free. This should allow you to pull the fan assembly out for easy cleaning.

My thanks to Gordon Johnson of Santa Clara Field Office for this procedure.

--Joe Lipska  
Ext. 1634, 92-236





REFERENCE PULL-OUT  
SERVICE INSTRUMENT DIVISION

PORTABLES

442 TROUBLESHOOTING CHART

Reference: 442 Manual, P/N 070-2374-00

VERTICAL BOARD PROBLEMS

POSSIBLE REMEDIES

- |  |   |
|--|---|
| 1. Position range offset.  | Reverse or change Q4158, Q4168 (Ch 1)   |
| 2. DC trigger range.   | or Q4258, Q4268 (Ch 2).   |
|  | a. Try the above cure.  |
|  | b. Make VR4184 a larger value.  |
|  | c. Mismatch gains of Q4194, Q4196--<br>high gain for Q4196 and low gain<br>for Q4194. |
| 3. High vertical gain (slightly too<br>high--not extreme cases). | a. For both channels, select lower<br>gain Q4376, Q4396.                              |
|  | b. Single channel--select lower gain<br>Q4176, Q4186 (Ch 1); Q4276, Q4278<br>(Ch 2).  |
| 4. Vertical jitter or noise.                                     | a. Ch 1--Q4132, Q4134, Q4158, Q4168,<br>Q4122. Ch 2--equivalent parts as<br>Ch 1.     |
| 5. No chop (intermittently sticks in<br>alternate).              | U4306 defective.  |
| 6. HF roll off at .2V/Div.                                       | Q4122 or Q4222 defective (may also<br>cause low bandwidth).                           |
| 7. Trace noisy when scope tapped.                                | C4122 or C4222 noisy.   |
| 8. Gate current.   | CR4122 or CR4222 leaky.   |

(continued on the following page)

## 442 TROUBLESHOOTING CHART (CONTINUED)

### INTERFACE BOARD PROBLEMS

1. Trace oscillating at 35-40 MHz.
2. Intensity doesn't shut off (small dot or dim trace).
3. Burned board under R817.
4. When checking triggers at 50 KHz and it looks like two separate traces at beginning of sweep.

### POSSIBLE REMEDIES

- Bend legs and body of Q812 up off bracket.
- Replace 1M $\Omega$  (R463) with 680K $\Omega$ , or else change CRT if Z- axis is all right.
- C478 leaky.
- T460 could cause this or C458.

### HF PROBLEMS

1. Position effect.
2. Ch 2 slow roll up, fast roll off.
3. HF rolls off at .2V/Div.

### POSSIBLE REMEDIES

- a. Rolls off from top to bottom-- check Q134, Q136, Q144, Q146 (also check 32V supply).
  - b. Spikes up from top to bottom-- change Q4376, Q4386.
- Wire from vertical to trigger board (blk wh) not pulled tight to vertical board.

See vertical board #6.

### TRIGGER PROBLEMS

1. No triggers.
  - a. Weak or no 35 MHz in comp, Ch 1/Ch 2, ext.
  - b. No 35 MHz in ext.
2. Trigger jitter.

### POSSIBLE REMEDIES

- Check S2010 contacts.
- a. C2035 possibly open or change Q2122, Q2142, and U2156 to TI parts.
  - b. Check C2014 for wrong parts.
- a. Check U742 for Motorola part 7741 (bad lot).
  - b. Check for intermittent main wiring harness.

## 442 TROUBLESHOOTING CHART (CONTINUED)

### TIMING AND SWEEP PROBLEMS

1. Short sweep from 10 $\mu$ s-.5ms.
2. Short high speed mag. timing.
3. Non-linear high speed mag. timing.
4. Horizontal position range off.

### POSSIBLE REMEDIES

- C2276 open or bad timing switch.
- Check C2325 for open or C2322 wrong part.
- Possibly--CR2234, Q2242, Q2244, Q2246, Q2314, Q2326, Q2312, CR2317, CR2326 and more.
- Check R2316, mag. registration, R2352, R2353.

### MISCELLANEOUS PROBLEMS

1. Trace moving vertically, horizontally, trigger or horizontal jitter, intensity change.
2. 50 KHz running through trace.
3. Low X-Y bandwidth.
4. Chop double triggers.
5. X-Y bandwidth goes up to 7-9 div.
6. Intensity modulation at .1 $\mu$ s.

### POSSIBLE REMEDIES

- Check main wiring harness for intermittent crimps.
- a. Check CRT MU shield ground clip on CRT.
  - b. Make sure CRT wire harness is dressed away from T460.
- Check C2063 for a wrong part.
- a. Bend R4173 closer to board, away from P4346.
  - b. C2001, C2005 open.
  - c. Check wiring to chop filter circuit, diode CR2025.
  - d. C2025 open.
- Check C4196 for a wrong part.
- Insert 200 pf cap. across R437.

442 TROUBLESHOOTING CHART (CONTINUED)

BEWARE: Gold tracking in the trigger switches can cause a variety of problems.  
Some are:

- a. Short X10 gain at start of sweep; sweep lengthens out when you turn hold-off pot.
- b. No 60 Hz ext. triggers.
- c. No 50 KHz ext. triggers.
- d. No 35 MHz ext. triggers.
- e. Trace shifts horizontally when you trigger and detrigger a signal.
- f. Distorted time marks at .1, .5s.

--Submitted by  
T900 Staff Engineer

--Inserted by  
Mike Laurens  
58-511, Ext. 7173

MICHAEL A MIHALIK  
COMBINATION WW

92-515