# DIAGNOSTIC MEMORY BOARD 067-0961-00



# SERVICE MANUAL





# WARNING

THIS MANUAL CONTAINS SERVICING INSTRUCTIONS FOR USE BY QUALIFIED SERVICE PERSONNEL ONLY. TO AVOID PERSONAL INJURY, DO NOT PERFORM ANY SERVICING UNLESS YOU ARE QUALIFIED TO DO SO.

> 067-0961-00 DIAGNOSTIC

# MEMORY BOARD SERVICE

For Qualified Service Personnel Only

# INSTRUCTION MANUAL

Tektronix, Inc. P.O. Box 500 Beaverton, Oregon 97077

Serial Number \_

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# SAFETY SUMMARY

The general safety information contained in this summary is for servicing personnel. Specific warnings and cautions will be found throughout the manual where they apply, but may not appear in this summary.

### TERMS

#### IN THIS MANUAL

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property.

WARNING statements identify conditions or practices that could result in personal injury or loss of life.

#### AS MARKED ON EQUIPMENT

CAUTION indicates a personal injury hazard not immediately accessible as one reads the marking, or a hazard to property including the equipment itself.

DANGER indicates a personal injury hazard immediately accessible as one reads the marking.

## SYMBOLS

#### IN THIS MANUAL



Static-Sensitive Devices.

This symbol indicates where applicable cautionary or other information is to be found.

#### AS MARKED ON EQUIPMENT.



DANGER-High voltage.



Protective ground (earth) terminal.



ATTENTION-refer to manual.

## WARNINGS

#### POWER SOURCE

ii

This product is intended to operate in a mainframe connected to a power source that will not apply more than 250 volts rms between the supply conductors or between either supply conductor and ground. A protective ground connection by way of the grounding conductor in the mainframe power cord is essential for safe operation.

#### GROUNDING THE PRODUCT

This product is grounded through the grounding conductor of the mainframe power cord. To avoid electrical shock, plug the mainframe power cord into a properly wired receptacle before connecting to the product input or output terminals. A protective ground connection by way of the grounding conductor in the mainframe power cord is essential for safe operation.

#### DANGER ARISING FROM LOSS OF GROUND

Upon loss of the protective-ground connection, all accessible conductive parts (including knobs anad controls that may appear to be insulating), can render an electric shock.

#### DO NOT SERVICE ALONE

Do not perform internal service or adjustment of this product unless another person capable of rendering first aid and resuscitation is present.

#### USE CARE WHEN SERVICING WITH POWER ON

Dangerous voltages exist at several points in this product. To avoid personal injury, do not touch exposed connections and components while power is on.

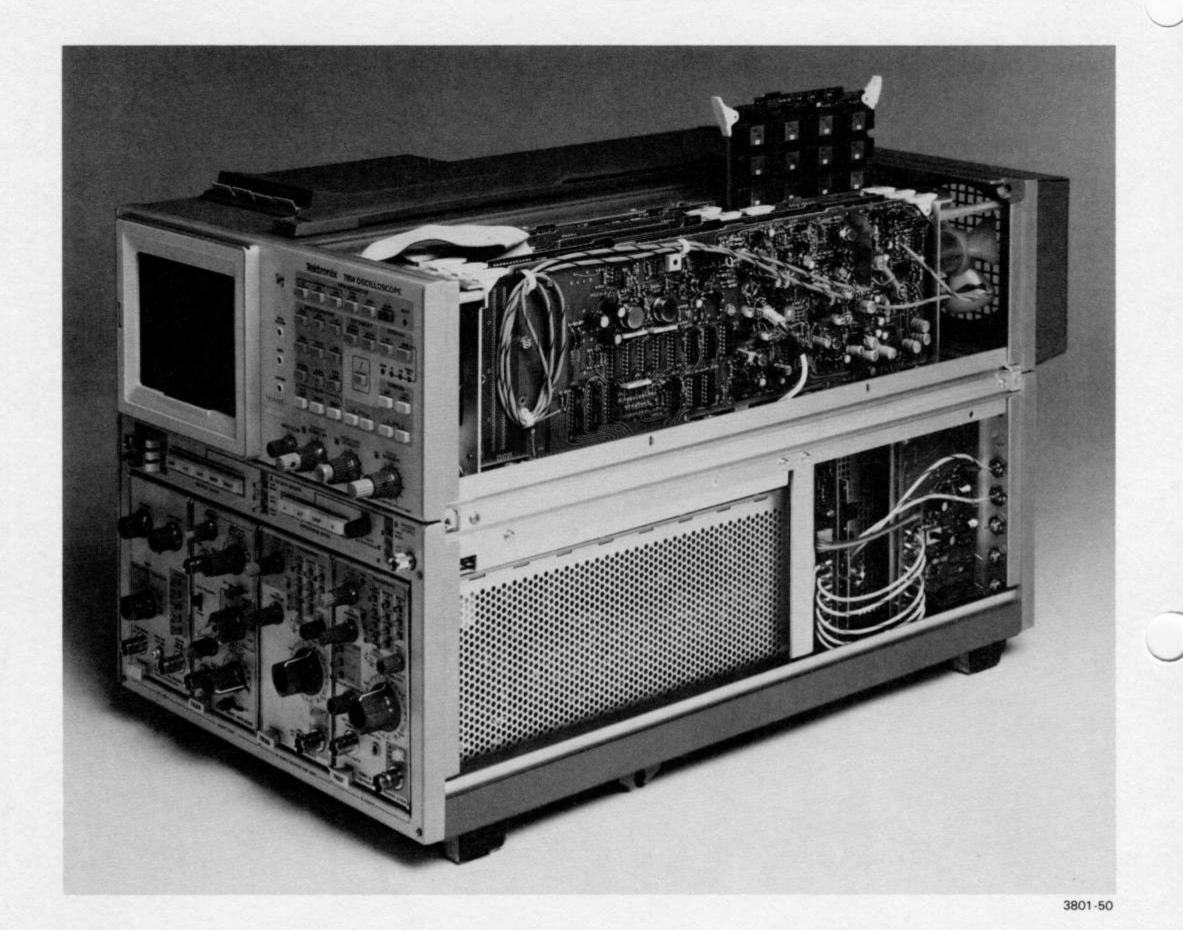
Disconnect power before removing protective panels, soldering, or replacing components.

#### DO NOT OPERATE IN EXPLOSIVE ATMOSPHERES

To avoid explosion, do not operate this product in an atmosphere of explosive gasses unless it has been specifically certified for such operation.

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067-0961-XX DIAGNOSTIC MEMORY BOARD

The 067-0961-XX Diagnostic Memory Board contains diagnostic firmware for testing, calibrating and troubleshooting the 7854 Oscilloscope. The board replaces the normal 7854 ROM Board as illustrated above and, when used with other related test equipment, provides for thorough and specific troubleshooting of the 7854.

# THEORY OF OPERATION

This section of the manual describes the circuitry of the 067-0961-XX Diagnostic Memory Board. The number inside the diamond preceeding the heading in the following discussion refers to the schematic diagram for that circuit. The schematic of the board is given on the foldout at the rear of this section (of the 067-0911-XX Diagnostic Test Interface manual). Stages are outlined on the schematic with wide shaded lines; the stage names are in shaded boxes. Refer to the schematic throughout the following discussion for specific electrical values and relationships.



The Programmable Read Only Memory (PROM) circuit contains the stored firmware responsible for the proper operation of diagnostic routines for troubleshooting the 7854. It provides the control circuitry necessary for the microprocessor or a DMA device to access this stored data by using the Address and Data Buses.

#### ADDRESS BUS BUFFER

The Address Bus Buffer stage consists of U140 and U240. This stage is continuously enabled by the LO (ground) applied to the enable inputs of U140 and U240 (pins 1 and 15) and buffers 11 bits of data from the Address Bus to the address inputs of the IC's that make up the Memory stage.

#### PROM CONTROL

The PROM Control stage is composed of Binary-to-Decimal Decoder U245. Bits 12, 13 and 14 from the Address Bus, and a LO on the ROM enable line selects one of the CS (chip select) lines. The selected CS line applies a LO level to the enable inputs of the selected pair of PROMS in the Memory stage.

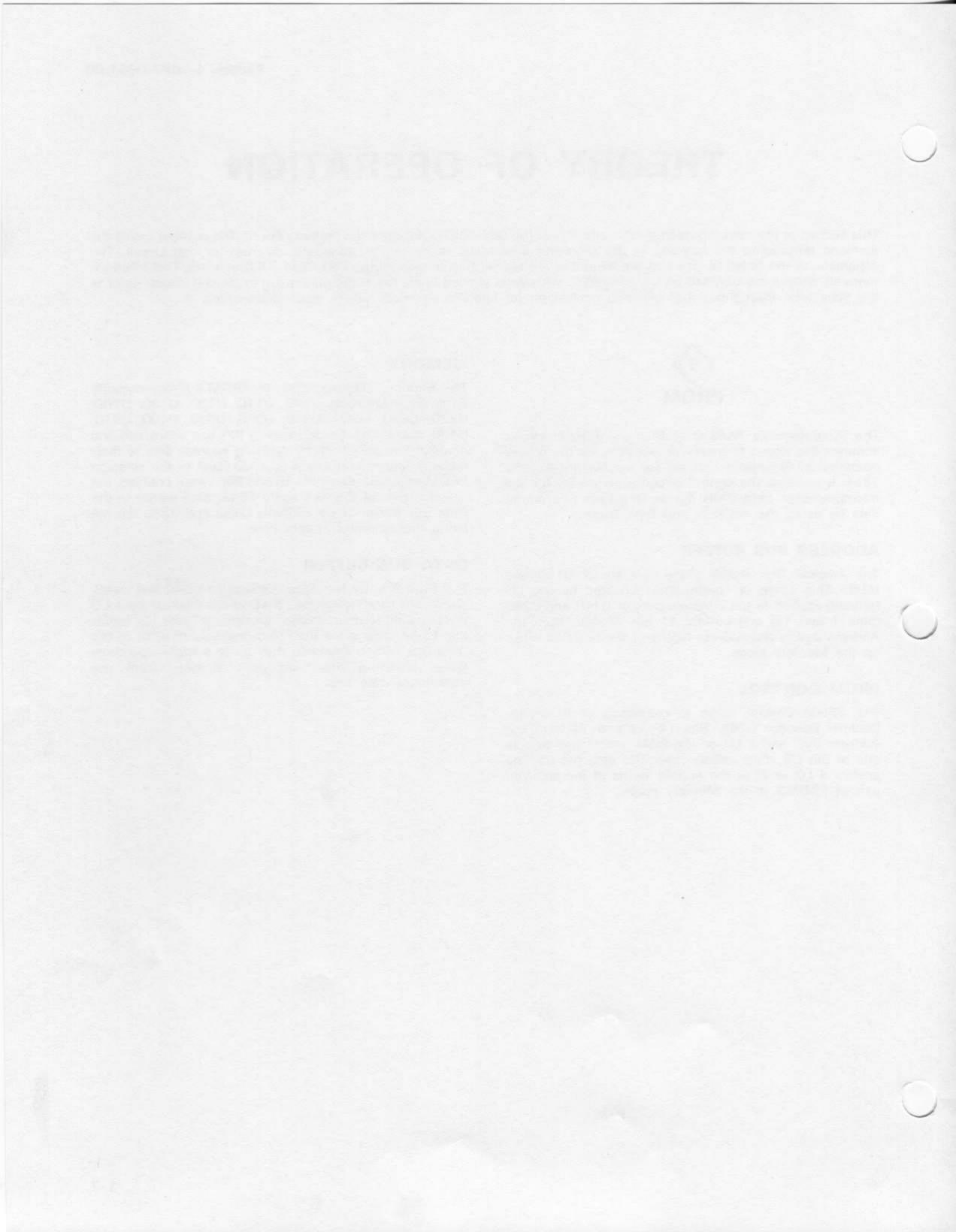
#### MEMORY

The Memory stage consists of PROM's (Programmable Read Only Memory) U100, U110, U120, U130, U200, U220, U230, U300, U310, U320, U330, U400, U410, U420, and U430. These memory IC's are addressed and enabled two at a time by applying address data to their address inputs and applying a LO level to the selected PROM enable inputs (pins 18 and 20). When enabled, the selected pair of PROM's apply 16-bit data words to the Data Bus Buffer stage. PROM's U130 and U230 are not being implemented at this time.

#### DATA BUS BUFFER

The Data Bus Buffer stage consists of U340 and U440. These are tri-state devices that, when enabled by a LO level applied to their enable inputs (pins 1 and 19), buffer the 16-bit data word read from memory (PROM) to the Data Bus. When disabled, they go to a high-impedance state, isolating the read only memory from the instrument data bus.

1-1 @



# MAINTENANCE

This section of the manual contains information for performing preventive maintenance, troubleshooting, and corrective maintenance for the 067-0961-XX Diagnostic Memory Board.

# PREVENTIVE MAINTENANCE

Preventive maintenance, when performed on a regular basis, can prevent or forestall breakdown and may improve the reliability of the assembly. The severity of the environment to which the assembly is subjected will determine the frequency of maintenance.

## CLEANING

The assembly should be cleaned as often as operating conditions require. Accumulation of dirt on the assembly can cause overheating and component breakdown. Dirt on components acts as an insulating blanket and prevents efficient heat dissipation. It also provides an electrical conduction path which may result in instrument failure.



Avoid the use of chemical cleaning agents which might damage the plastics used in this assembly. Use a nonresidue type of cleaner, preferably isopropyl alcohol or totally denatured ethyl alcohol. Before using any other type of cleaner, consult your Tektronix Service Center or representative.

Cleaning the board should only be occasionally necessary. The best way to clean the board is to blow off the accumulated dust with dry, low-velocity air (approximately 5 lb/in<sup>2</sup>.) Remove any dirt which remains with a soft brush or a cloth dampened with a mild detergent and water solution. A cotton-tipped applicator is useful for cleaning in narrow spaces, or for cleaning more delicate circuit components.



Circuit board and components must be dry before applying power to prevent damage from electrical arcing.

### VISUAL INSPECTION

The assembly should be inspected occasionally for such defects as broken connections, improperly seated semiconductors, and heat-damaged parts. The corrective procedure for most visible defects is obvious; however, particular care must be taken if heat-damaged parts are found. Overheating usually indicates other trouble in the system; therefore, correcting the cause of overheating is important to prevent recurrence of the damage.

## SEMICONDUCTOR CHECKS

Periodic checks of semiconductors are not recommended. The best check of semiconductor performance is actual operation in the assembly. More details on semiconductors are given under Troubleshooting later in this section.

2-1

# TROUBLESHOOTING

The following information is provided to facilitate troubleshooting of the 067-0961-XX Diagnostic Memory Board. Information contained in other sections of this manual should be used in conjunction with the following data to aid in locating a defective component. An understanding of the circuit operation is helpful in locating troubles. See Section 1, Theory of Operation, for this information.

### TROUBLESHOOTING AIDS

#### DIAGRAMS

A complete schematic diagram is given on the pullout page in Section 4, Diagram and Circuit Board Illustration. The component number and electrical value of each component on this board is shown on this diagram. (See the first page of the Diagram and Circuit Board Illustration section for definitions of the reference designators and symbols used to identify components in this assembly.)

#### SIGNATURE TABLES

Signature tables for the Diagnostic Memory Board are located behind the Signature Tables tab in the 067-0911-XX Diagnostic Test Interface Manual. The related test procedures are located in volume 1 of the test procedures manuals.

To find the correct flowchart and signature tables, first locate the number '067-0961-XX' affixed to the Diagnostic Memory Board. The last 2 digits of that number sequence is the board version. Then, locate the board version on the Signature Table Version Locator table and proceed to the appropriate tabbed pages for further information.

#### CIRCUIT BOARD ILLUSTRATION

To aid in locating circuit components, a circuit board illustration is provided on the back of the pullout page facing the schematic diagram. The circuit board illustration is arranged in a grid locator with a grid index to facilitate rapid location of components contained in the schematic diagram.

#### SEMICONDUCTOR LEAD CONFIGURATION

Lead configurations for the semiconductor devices used in this assembly are shown in Figure 2-1.

#### STATIC-SENSITIVE DEVICES



Static discharge can damage any semiconductor component in this instrument.

This instrument contains electrical components that are susceptible to damage from static discharge. See Table 2-1 for relative susceptibility of various classes of semiconductors. Static voltages of 1 kV to 30 kV are common in unprotected environments.

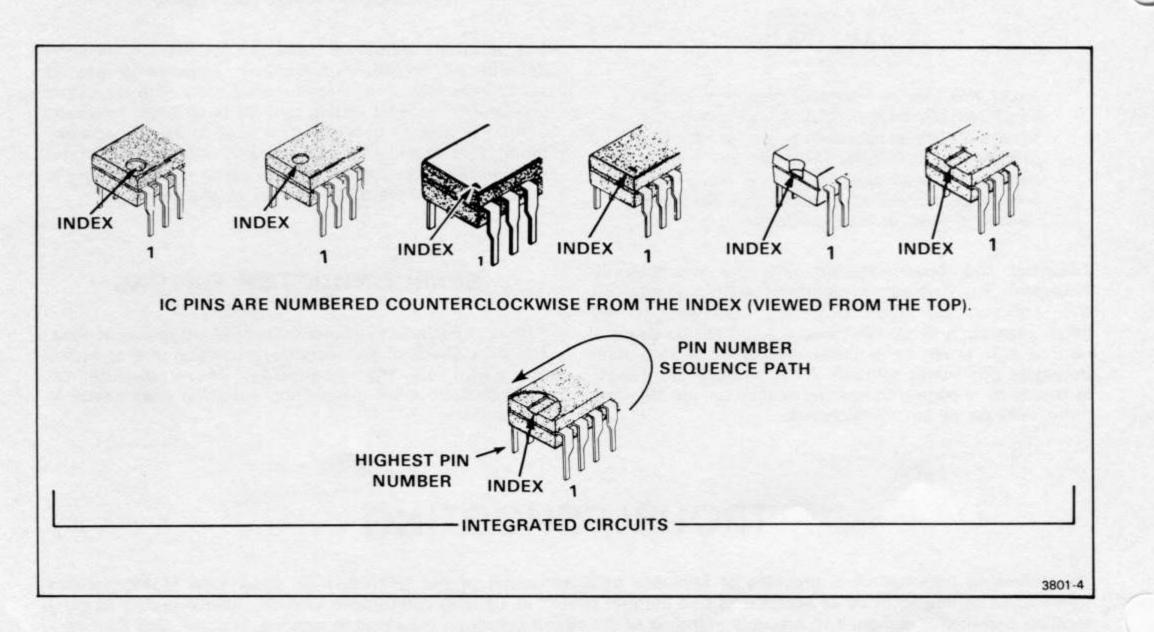


Figure 2-1. Semiconductor lead configuration.

Semiconductor Classes	Relative Susceptibility Levels <sup>1</sup>
MOS or CMOS microcircuits or discretes, or linear microcircuits with MOS inputs (most sensitive).	1
ECL	2
Schottky signal diodes	3
Schottky TTL	4
High-Frequency bipolar transistors	5
JFETs	6
Linear Microcircuits	7
Low-power Schottky TTL	8
TTL (least sensitive)	9

TARIE 2.1

Voltage equivalent for levels.

1 = 100 to 500 V	6 = 600 to $800$ V
2 = 200 to 500 V	7 = 400 to 1000 V (est.)
3 = 250V	8 = 900 V
4 = 500 V	9 = 1200 V
5 = 400 to 600 V	

(Voltage discharged from a 100 pF capacitor through a resistance of 100 ohms).

Observe the following precautions to avoid damage.

Minimize handling of static-sensitive components.

- 2. Transport and store static-sensitive components or assemblies in their original containers, on a metal rail, or on conductive foam. Label any package that contains static-sensitive assemblies or components.
- 3. Discharge the static-voltage from your body by wearing a wrist strap while handling these components. Servicing static-sensitive assemblies or components should be performed only at a staticfree work station by qualified service personnel.
- 4. Nothing capable of generating or holding a static charge should be allowed on the work station surface.
- 5. Keep the component leads shorted together whenever possible.
- Pick up components by the body, never by the leads.
- 7. Do not slide the components over any surface.
- 8. Avoid handling components in areas that have a floor or work-surface covering capable of generating a static charge.
- 9. Use a soldering iron that is connected to earth ground.
- Use only special antistatic suction-type desoldering tools.

# CORRECTIVE MAINTENANCE

Corrective maintenance consists of component replacement and assembly repair. Special techniques are required to replace components in the 067-0961-XX Diagnostic Memory Board.

### **OBTAINING REPLACEMENT PARTS**

### SOLDERING TECHNIQUES

WADNING

All electrical and mechanical parts can be obtained through your local Tektronix Field Office or representative.

When ordering replacement parts from Tektronix, Inc., include the following information:

- 1. Instrument name.
- A description of the part (if electrical, include circuit number).
- 3. Tektronix part number.



To avoid electric-shock hazard, disconnect the instrument from the power source before soldering.

The reliability and accuracy of this assembly can be maintained only if proper soldering techniques are used when repairing or replacing parts.

The desoldering and removal of parts is especially critical and should be done only with a vacuum solder extractor; further, one approved by a Tektronix Inc., Service Center.

2-3

#### Maintenance-067-0961-00

Use wire solder with rosin core, 63% tin, 37% lead. Contact your local Tektronix Inc. representative or field office for approved solders.

Conductive paths between the top and bottom board layers of this multilayer circuit board may connect with one or any number of inner layers. Once this inner conductive path is broken (due mainly to poor soldering practices) between the top and bottom layer, the board is unusable and must be replaced. Damage can void warranty.



Only an experienced maintenance person, proficient in the use of vacuum type desoldering equipment, should attempt repair of the Diagnostic Memory Board.

When soldering on the circuit board, use only a 15-watt, pencil-type soldering iron. A higher wattage soldering iron can cause the etched circuit wiring to separate from the board base material. Always keep the soldering-iron tip properly tinned to ensure the best heat transfer to the solder joint. Apply only enough heat to make a good solder joint. To protect heat-sensitive components, hold the component lead with a pair of long-nose pliers between the component body and the solder joint.

The following technique should be used to replace a component on the circuit board.

 Touch the tip of the vacuum desoldering tool directly to the solder to be removed.

Excessive heat can cause the etched circuit wiring to separate from the board base material.

Never allow the solder extractor to remain on the board for more than three (3) seconds. Solder wick, spring-actuated or squeeze-bulb solder suckers, and heat blocks (for multi-pin components) must not be used. Damage can When removing multi-pin components i.e., IC's, do not heat adjacent conductors consecutively (see Fig. 2-2). Allow a moment for the circuit board to cool before proceeding to the next pin.

- Bend the leads of the replacement components to fit the holes in the circuit board. Insert the leads into the holes in the board, or as originally positioned.
- Touch the iron to the connection and apply enough solder to make a firm solder joint.
- Cut off any excess lead protruding through the board.
- Clean the areas around the solder connection with a flux removing solvent. Be careful not to remove information printed on the circuit board.

### COMPONENT REMOVAL AND REPLACEMENT



To avoid component damage, always disconnect the assembly from the power source before removing or replacing components.

#### SEMICONDUCTORS

Semiconductors should not be replaced unless actually defective. If removed from their sockets during routine maintenance, return them to their original sockets. Unnecessary replacement of semiconductors may affect assembly performance. When semiconductors are replaced, check the operation of circuits which may be affected.

#### void warranty.

#### NOTE

Some components are difficult to remove from the circuit boards due to a bend placed in each lead during machine insertion of the component. The purpose of the bent leads is to hold the component in position during a flow-solder manufacturing process which solders all components at once. To make removal of machine inserted components easier, straighten the leads of the component on the back of the circuit board using a small screwdriver or pliers.

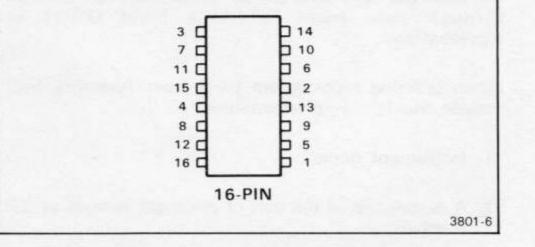


Figure 2-2. Recommended desoldering sequence for multipin devices.

#### Maintenance-067-0961-00

Replacement semiconductors must be of the original type or a direct replacement. Lead configurations of the semiconductors used in this instrument are shown in Figure 2-1.

Do not remove stickers affixed to the top of EPROM's. Removal of this sticker will allow light into the chip, and may cause partial erasure of its data.

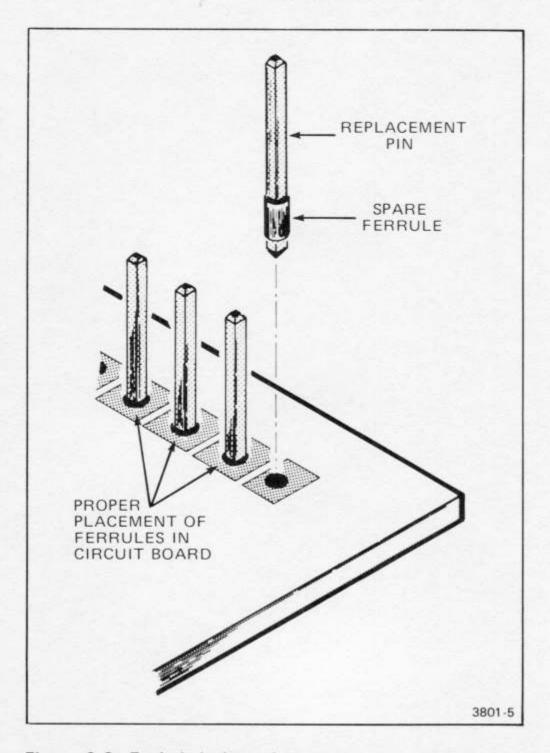
An extracting tool should be used to remove the in-line integrated circuits to prevent damaging the pins. This tool is available from Tektronix, Inc.; order Tektronix Part 003-0619-00. If an extracing tool is not available, use care to avoid damaging the pins. Pull slowly and evenly on both ends of the integrated circuit. Try to avoid one end disengaging from the socket before the other end.

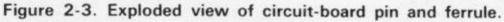
#### INTERCONNECTING PINS

#### **Circuit-Board Pins**

A circuit-board pin replacement kit (including necessary tools, instructions, and replacement pins with attached ferrules) is available from Tektronix, Inc. Order Tektronix Part 040-0542-00. Replacing circuit-board pins on this board is not recommended.

To replace a damaged pin, first disconnect any pin connectors. Then unsolder the damaged pin and pull it from the board with a pair of pliers, leaving the ferrule (see Fig. 2-3) in the circuit board if possible. If the ferrule remains in the circuit board remove the spare ferrule from the replacement pin and press the new pin into the hole in the circuit board. If the ferrule is removed with the damaged pin, clean out the hole then press the replacement pin, with attached spare ferrule, into the circuit board. Position the replacement pin in the same manner as the original. Solder the pin to the circuit board on each side of the board. If the original pin was bent at an angle to mate with a connector, carefully bend the new pin to the same angle.



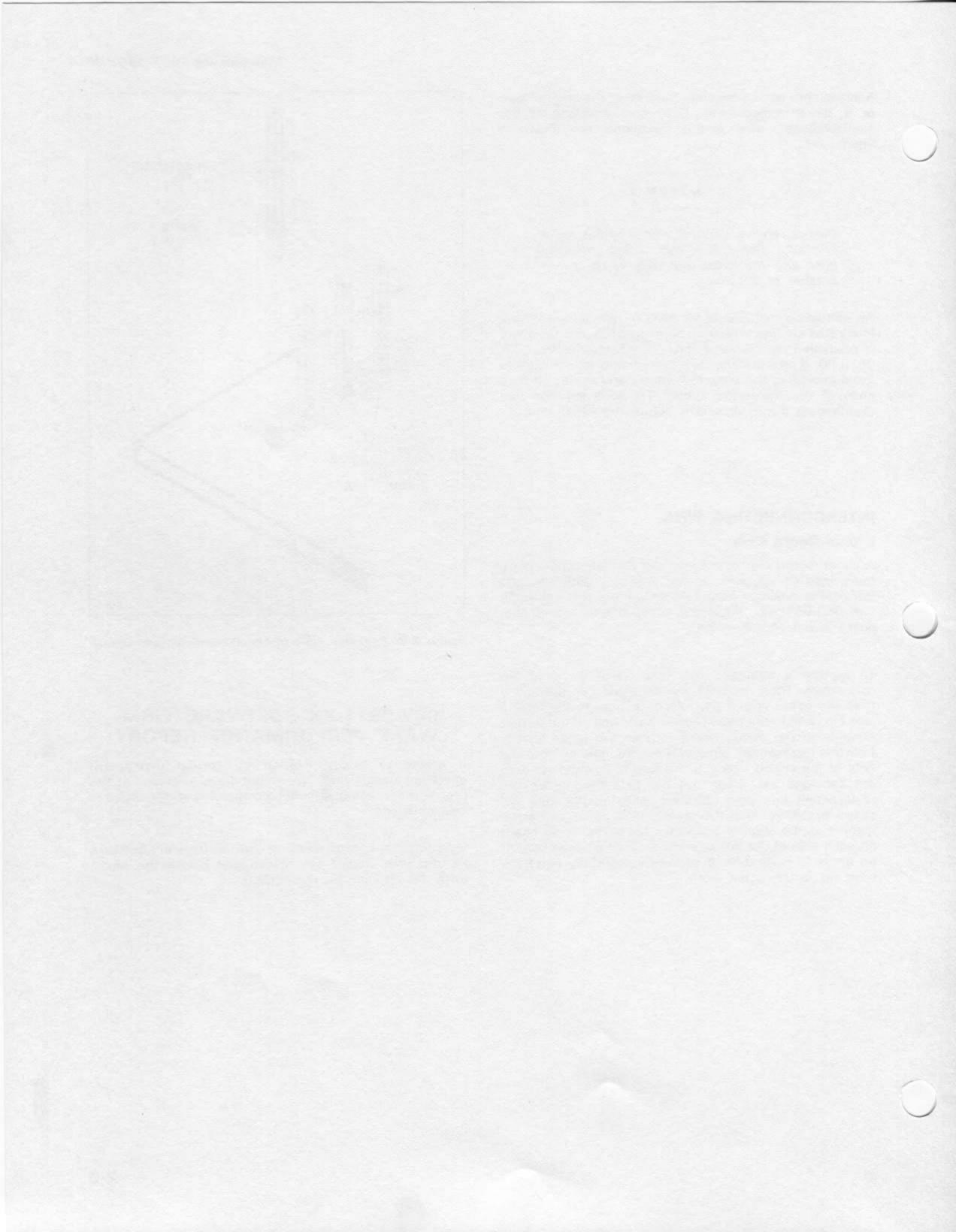


## 067-0911-XX SOFTWARE/FIRM-WARE PERFORMANCE REPORT

If errors in documentation or normal instrument operation occur, the error report form (provided at the rear of this manual) should be completed and returned to Tektronix, Inc.

Instructions for completing the Software/Firmware Performance Report are placed just before the report form, which may be reproduced.

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# REPLACEABLE ELECTRICAL PARTS

#### PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

#### SPECIAL NOTES AND SYMBOLS

X000	Part first added at this serial number

00X Part removed after this serial number

#### ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

#### ABBREVIATIONS

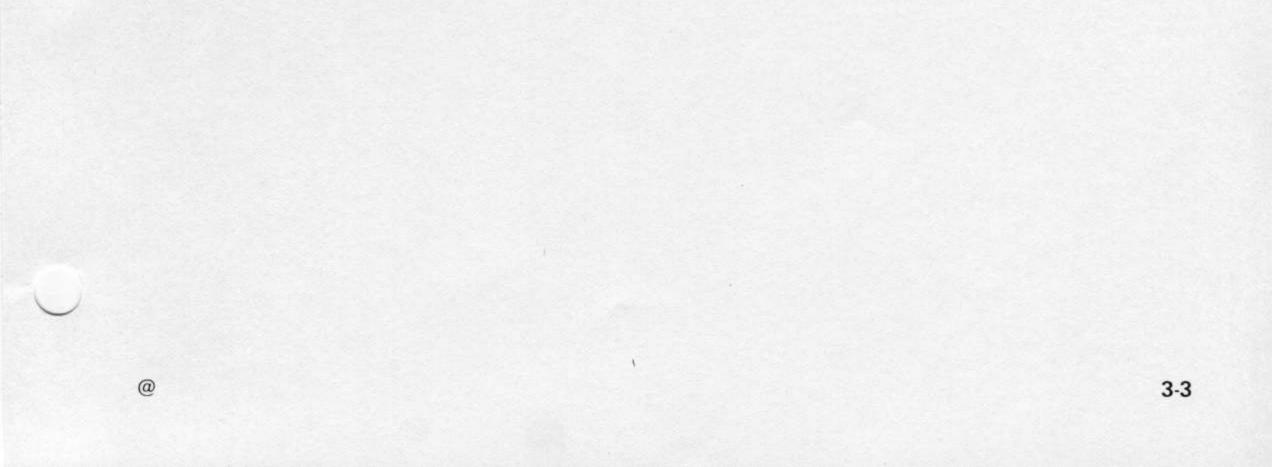
ACTR	ACTUATOR	PLSTC	PLASTIC
ASSY	ASSEMBLY	QTZ	QUARTZ
CAP	CAPACITOR	RECP	RECEPTACLE
CER	CERAMIC	RES	RESISTOR
СКТ	CIRCUIT	RF	RADIO FREQUENCY
COMP	COMPOSITION	SEL	SELECTED
CONN	CONNECTOR	SEMICOND	SEMICONDUCTOR
ELCTLT	ELECTROLYTIC	SENS	SENSITIVE
ELEC	ELECTRICAL	VAR	VARIABLE
INCAND	INCANDESCENT	ww	WIREWOUND
LED	LIGHT EMITTING DIODE	XFMR	TRANSFORMER
NONWIR	NON WIREWOUND	XTAL	CRYSTAL

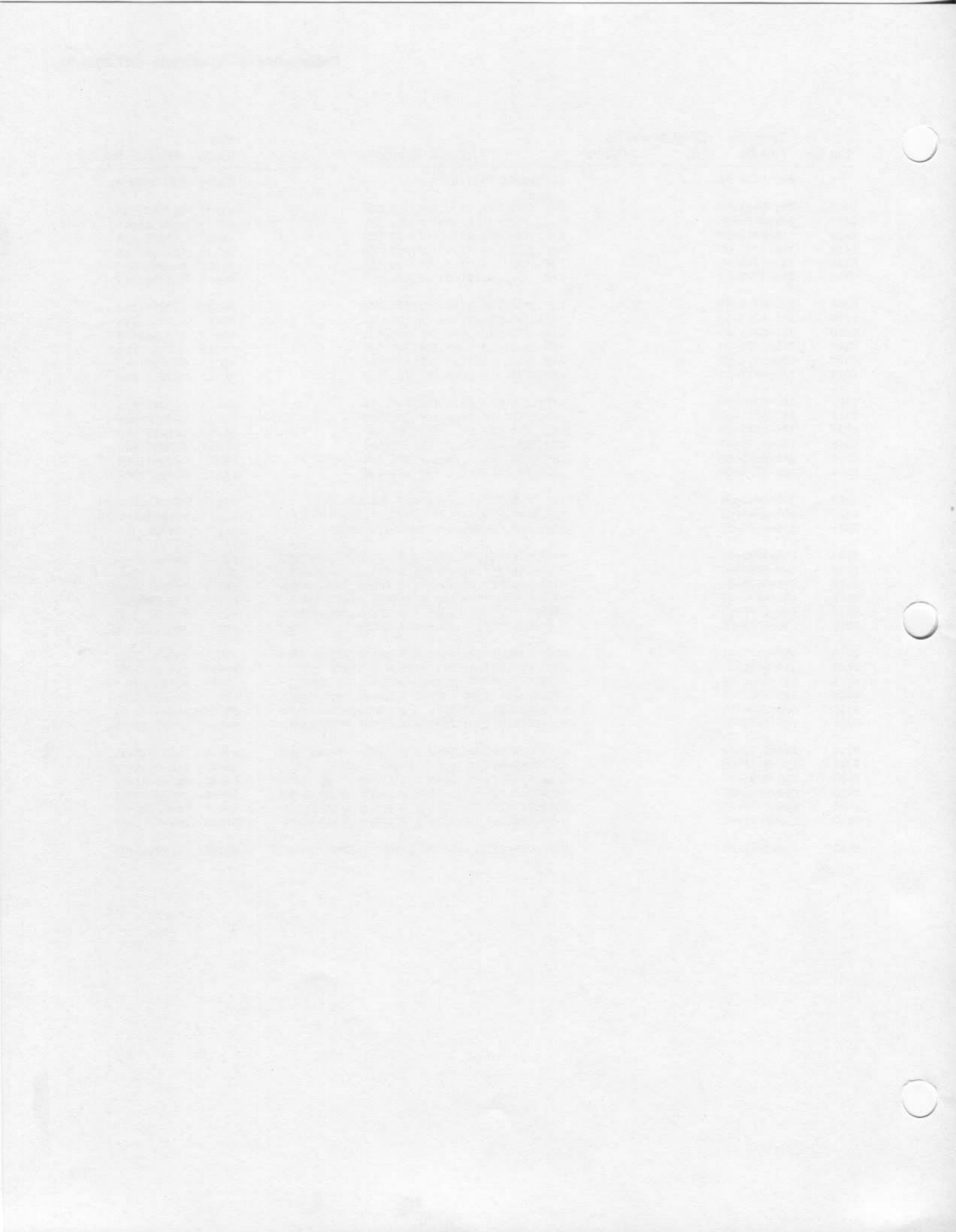
## CROSS INDEX-MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
01121	ALLEN-BRADLEY COMPANY	1201 2ND STREET SOUTH	MILWAUKEE, WI 53204
04222	AVX CERAMICS, DIVISION OF AVX CORP.	P O BOX 867, 19TH AVE. SOUTH	MYRTLE BEACH, SC 29577
27014	NATIONAL SEMICONDUCTOR CORP.	2900 SEMICONDUCTOR DR.	SANTA CLARA, CA 95051
80009	TEKTRONIX, INC.	P O BOX 500	BEAVERTON, OR 97077
91637	DALE ELECTRONICS, INC.	P. O. BOX 609	COLUMBUS, NE 68601
91637	DALE ELECTRONICS, INC.	P. O. BOX 609	COLUMBUS, NE 68601

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Ckt No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
	670-5958-01		CKT BOARD ASSY: PROM	80009	670-5958-01
C105	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	04222	GC705E104M
C115	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	04222	GC705E104M
C125	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	04222	GC705E104M
C130	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	04222	GC705E104M
C135	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	04222	GC705E104M
C140	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	04222	
C200	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	04222	GC705E104M
C210	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	04222	GC705E104M
C240	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	04222	GC705E104M
C245	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	04222	GC705E104M
C300	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	04222	GC705E104M
C310	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	04222	GC705E104M
C320	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	04222	GC705E104M
C325	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	04222	GC705E104M
C330	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	04222	GC705E104M
C340	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	04222	GC705E104M
C400	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	04222	GC705E104M
C440	281-0775-00		CAP., FXD, CER DI:0.1UF, 20%, 50V	04222	GC705E104M
R100	307-0445-00		RES,NTWK,FXD,FI:4.7K OHM,20%,(9) RES	91637	MSP10A01-472M
R200	307-0445-00		RES, NTWK, FXD, FI:4.7K OHM, 20%, (9) RES	91637	MSP10A01-472M
R201	315-0472-00		RES., FXD, CMPSN:4.7K OHM, 5%, 0.25W	01121	CB4725
U100	160-0776-01		MICROCIRCUIT, DI: 2048 X 8 EPROM, PROGRAMMED	80009	160-0776-01
U110	160-0790-00		MICROCIRCUIT, D1:2048 X 8 EPROM, PROGRAMMED	80009	160-0776-01
U120	160-0778-01		MICROCIRCUIT, DI: 2048 X 8 EPROM, PROGRAMMED	80009	160-0778-01
U140	156-0852-02		MICROCIRCUIT, DI: HEX DRVR W/3 STATE INP	80009	156-0852-02
U200	160-0775-01		MICROCIRCUIT, DI: 2048 X 8 EPROM, PROGRAMMED	80009	160-0775-01
U210	160-0789-00		MICROCIRCUIT, DI: 2048 X 8 EPROM, PROGRAMMED	80009	160-0789-00
U220	160-0777-01		MICROCIRCUIT, DI: 2048 X 8 EPROM, PROGRAMMED	80009	160-0777-01
U240	156-0852-02		MICROCIRCUIT, DI: HEX DRVR W/3 STATE INP	80009	156-0852-02
U245	156-0736-00		MICROCIRCUIT, DI: BCD-TO-DECIMAL DECODER	27014	DM74LS42N
U300	160-0782-00		MICROCIRCUIT, DI: 2048 X 8 EPROM, PROGRAMMED	80009	160-0782-00
U310	160-0774-01		MICROCIRCUIT, DI: 2048 X 8 EPROM, PROGRAMMED	80009	160-0774-01
U320	160-0780-01		MICROCIRCUIT, DI: 2048 X 8 EPROM, PROGRAMMED	80009	160-0780-01
U330	160-0772-01		MICROCIRCUIT, DI: 2048 X 8 EPROM, PROGRAMMED	80009	160-0772-01
U340	156-0916-00		MICROCIRCUIT, DI:EIGHT 2-INP 3-STATE BFR	80009	156-0916-00
U400	160-0781-00		MICROCIRCUIT, DI: 2048 X 8 EPROM, PROGRAMMED	80009	160-0781-00
U410	160-0773-01		MICROCIRCUIT, DI: 2048 X 8 EPROM, PROGRAMMED	80009	160-0773-01
U420	160-0779-01		MICROCIRCUIT, DI: 2048 X 8 EPROM, PROGRAMMED	80009	160-0779-01
0430	160-0771-01		MICROCIRCUIT, DI: 2048 X 8 EPROM, PROGRAMMED	80009	160-0771-01
U440	156-0916-00		MICROCIRCUIT, DI:EIGHT 2-INP 3-STATE BFR	80009	156-0916-00





## Section 4-067-0961-00 DIAGRAMS AND CIRCUIT BOARD ILLUSTRATIONS

#### Symbols

Graphic symbols and class designation letters are based on ANSI Standard Y32.2-1975.

Logic symbology is based on ANSI Y32.14-1973 in terms of positive logic. Logic symbols depict the logic function performed and may differ from the manufacturer's data.

The overline on a signal name indicates that the signal performs its intended function when it is in the low state.

Abbreviations are based on ANSI Y1.1-1972.

Other ANSI standards that are used in the preparation of diagrams by Tektronix, Inc. are:

Y14.15, 1966	Drafting Practices.
Y14.2, 1973	Line Conventions and Lettering.
Y10.5, 1968	Letter Symbols for Quantities Used in
	Electrical Science and Electrical

American National Standard Institute 1430 Broadway New York, New York 10018

Engineering.

#### **Component Values**

Electrical components shown on the diagrams are in the following units unless noted otherwise:

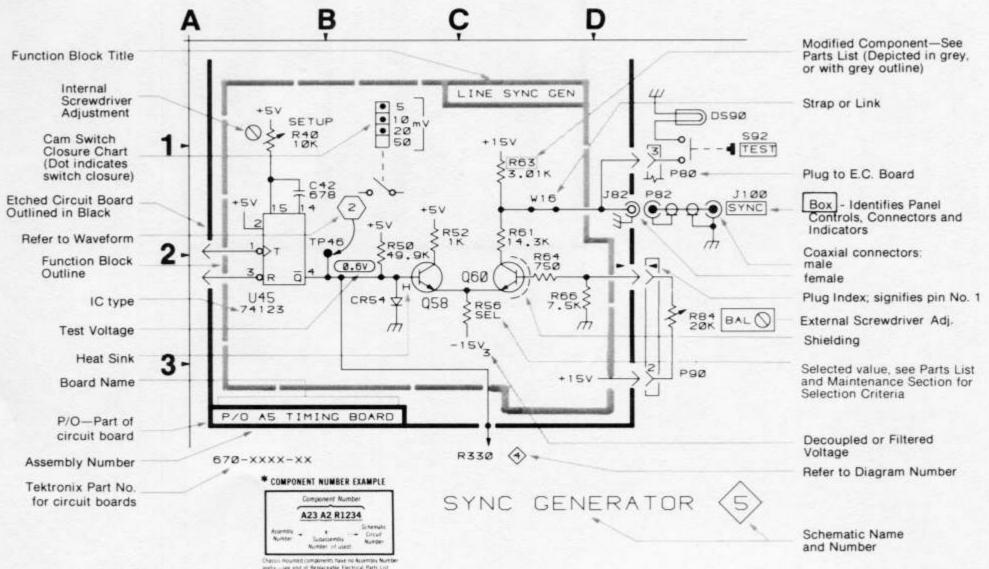
Capacitors = Values one or greater are in picofarads (pF).Values less than one are in microfarads (μF). Resistors = Ohms ( $\Omega$ ).

# The information and special symbols below may appear in this manual.

#### Assembly Numbers and Grid Coordinates

Each assembly in the instrument is assigned an assembly number (e.g., A20). The assembly number appears on the circuit board outline on the diagram, in the title for the circuit board component location illustration, and in the lookup table for the schematic diagram and corresponding component locator illustration. The Replaceable Electrical Parts list is arranged by assemblies in numerical sequence; the components are listed by component number \*(see following illustration for constructing a component number).

The schematic diagram and circuit board component location illustration have grids. A lookup table with the grid coordinates is provided for ease of locating the component. Only the components illustrated on the facing diagram are listed in the lookup table. When more than one schematic diagram is used to illustrate the circuitry on a circuit board, the circuit board illustration may only appear opposite the first diagram on which it was illustrated; the lookup table will list the diagram number of other diagrams that the circuitry of the circuit board appears on.



Reverse Side

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067-0961-00

A4-Diagnostic Memory Circuit Board Illustration and Locator

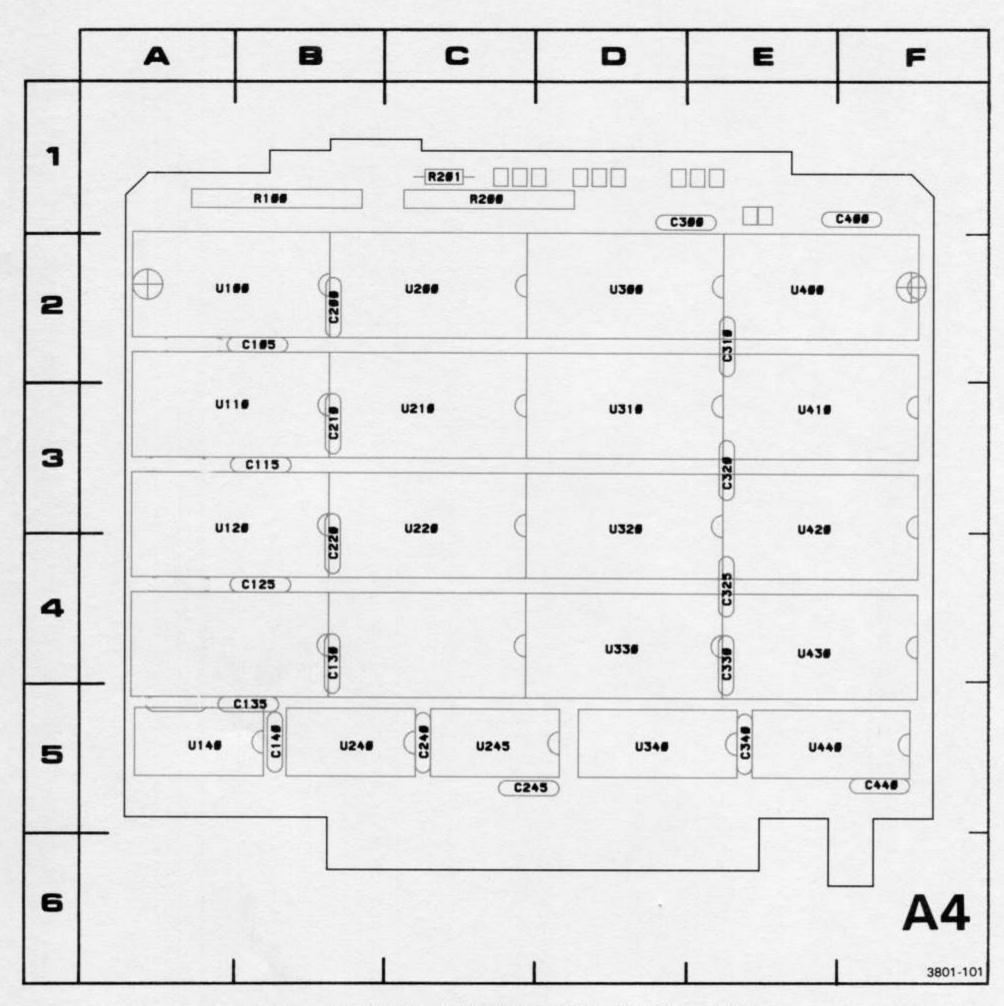
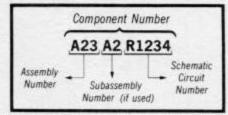


Figure 4-1. A4-Diagnostic Memory circuit board assembly.



#### COMPONENT NUMBER EXAMPLE



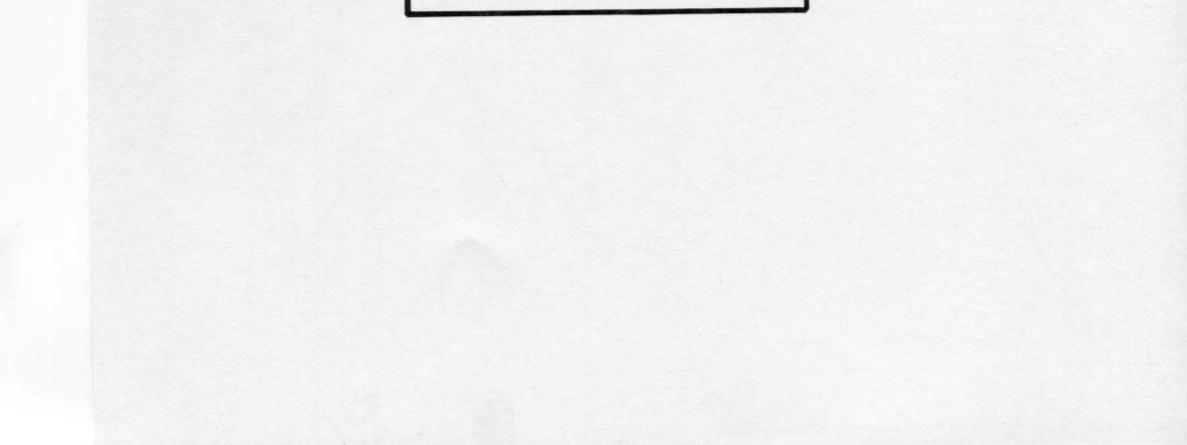
Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

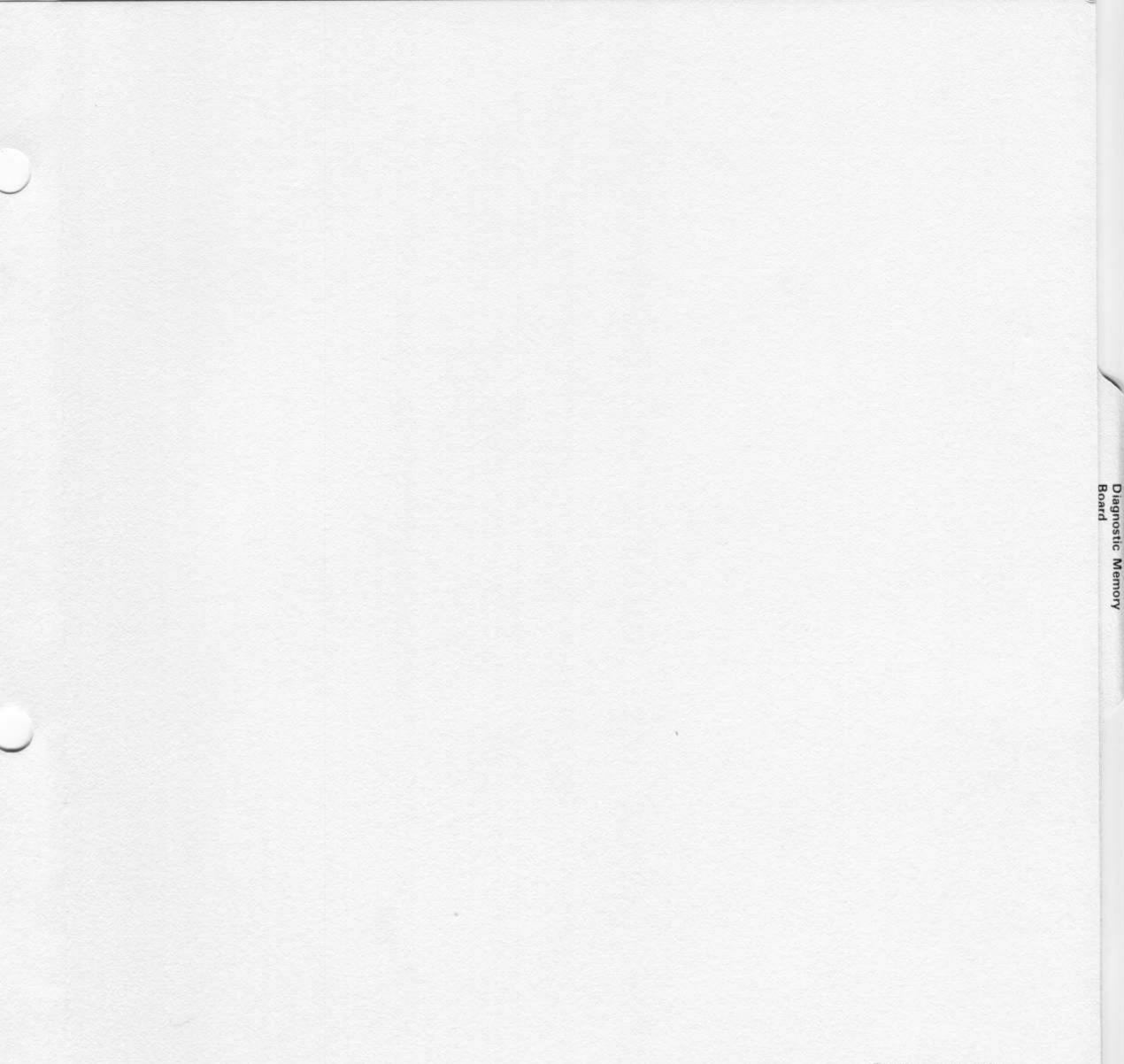
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# 067-0961-00

#### ASSEMBLY A4

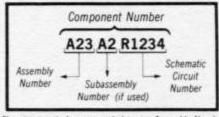
	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	
	C105	A4	B2	
	C115	A4	B3	
	C125	A4	B4	
	C130	A4	B4	
	C135	A4	B5	
	C140	A5	B5	
	C200	A4	B2	
	C210	A4	B3	
	C220	A4	84	
	C240	A4	C5	
	C245	A4	C5	
	C300	A5	D1	
	C310	B4	E2	
	C320	B4	E3	
	C325	B4	E4	
	C330	B4	E4	
	C340	B4	E5	
	C400	B5	F1	
	C440	85	F5	
	R100	C1	B1	
	R200A	D3	C1	
	R200A	C3	C1	
	R2006	C2	C1	
	R200C	D2	C1	
	R200E	F3	C1	
	R200F	F2	C1	
	R200G	E3	C1	
	R200J	E2	C1	
	R2000	B1	C1	
	R2000	C1	C1	
	1201	0.		
	U100	F2	A2	
	U110	F5	A3	
	U120	G2	A3	
	U140	B1	A5	
	U200	F1	C2	
	U210	F4	C3	
	U220	G1	C3	
	U240	B2	B5	
	U245	B3	C5	
	U300	E5	D2	
	U310	E2	D3	
	U320	C5	D3	
	U330	C2	D4	
	U340	G1	D5	
	U400	E4	E2	
	U410	E1	E3	
	U420	C4	E3	
	U430	C1	E4	
	U440	G2	E5	
10 C				








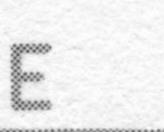
#### COMPONENT NUMBER EXAMPLE

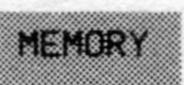


Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.



067-0961-00





3801-100



DIAGNOSTIC MEMORY BOARD

TO J108 37

# REPLACEABLE **MECHANICAL PARTS**

#### PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

#### SPECIAL NOTES AND SYMBOLS

Part first added at this serial number X000

00X Part removed after this serial number

#### FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

#### INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentation system used in the description column.

12345

Name & Description

Assembly and/or Component Attaching parts for Assembly and/or Component

...\*...

. . . \* . . .

Detail Part of Assembly and/or Component Attaching parts for Detail Part

Parts of Detail Part Attaching parts for Parts of Detail Part ...\*...

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation. The separation symbol - - - \* - - - indicates the end of attaching parts.

Attaching parts must be purchased separately, unless otherwise specified.

#### ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

## ABBREVIATIONS

IN

INTL

MTG

INCH NUMBER SIZE ACTR ACTUATOR ADAPTER ADPTR ALIGN ALIGNMENT ALUMINUM AL ASSEM ASSEMBLED ASSY ASSEMBLY TTENUATOR

ELCTRN ELEC ELCTLT ELEM EPL EQPT EXT FIL

ELECTRON ELECTRICAL ELECTROLYTIC ELEMENT ELECTRICAL PARTS LIST EQUIPMENT EXTERNAL FILLISTER HEAD

INCH INCANDESCENT INCAND INSULATOR INSUL INTERNAL LPHLDR LAMPHOLDER MACHINE MACH MECHANICAL MECH MOUNTING NIPPI F

SINGLE END SE SECTION SECT SEMICOND SEMICONDUCTOR SHIELD SHLD SHOULDERED SHLDR SKT SOCKET SLIDE SL SLFLKG SELF-LOCKING SLEEVING SLVG

ATTEN	ATTENUATOR	FLEX	FLEXIBLE	NIP	NIPPLE	SLVG	SLEEVING	
AWG	AMERICAN WIRE GAGE	FLH	FLAT HEAD	NON WIRE	NOT WIRE WOUND	SPR	SPRING	
BD	BOARD	FLTR	FILTER	OBD	ORDER BY DESCRIPTION	SQ	SQUARE	
BRKT	BRACKET	FR	FRAME or FRONT	OD	OUTSIDE DIAMETER	SST	STAINLESS STEEL	
BRS	BRASS	FSTNR	FASTENER	OVH	OVAL HEAD	STL	STEEL	
BRZ	BRONZE	FT	FOOT	PH BRZ	PHOSPHOR BRONZE	SW	SWITCH	
BSHG	BUSHING	FXD	FIXED	PL	PLAIN or PLATE	т	TUBE	
CAB	CABINET	GSKT	GASKET	PLSTC	PLASTIC	TERM	TERMINAL	
CAP	CAPACITOR	HDL	HANDLE	PN	PART NUMBER	THD	THREAD	
CER	CERAMIC	HEX	HEXAGON	PNH	PAN HEAD	THK	THICK	
CHAS	CHASSIS	HEX HD	HEXAGONAL HEAD	PWR	POWER	TNSN	TENSION	
CKT	CIRCUIT	HEX SOC	HEXAGONAL SOCKET	RCPT	RECEPTACLE	TPG	TAPPING	
COMP	COMPOSITION	HLCPS	HELICAL COMPRESSION	RES	RESISTOR	TRH	TRUSS HEAD	
CONN	CONNECTOR	HLEXT	HELICAL EXTENSION	RGD	RIGID	V	VOLTAGE	
COV	COVER	HV	HIGH VOLTAGE	RLF	RELIEF	VAR	VARIABLE	
CPLG	COUPLING	IC	INTEGRATED CIRCUIT	RTNR	RETAINER	W/	WITH	
CRT	CATHODE RAY TUBE	ID	INSIDE DIAMETER	SCH	SOCKET HEAD	WSHR	WASHER	
DEG	DEGREE	IDENT	IDENTIFICATION	SCOPE	OSCILLOSCOPE	XFMR	TRANSFORMER	
DWR	DRAWER	IMPLR	IMPELLER	SCR	SCREW	XSTR	TRANSISTOR	
		CONCEPT OF STREET		and a				

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5-1

# CROSS INDEX-MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
22526 73803	BERG ELECTRONICS, INC. TEXAS INSTRUMENTS, INC., METALLURGICAL	YOUK EXPRESSWAY	NEW CUMBERLAND, PA 17070
80009	MATERIALS DIV. TEKTRONIX, INC.	34 FOREST STREET P O BOX 500	ATTLEBORO, MA 02703 BEAVERTON, OR 97077

5-2

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## Replaceable Mechanical Parts-067-0961-00

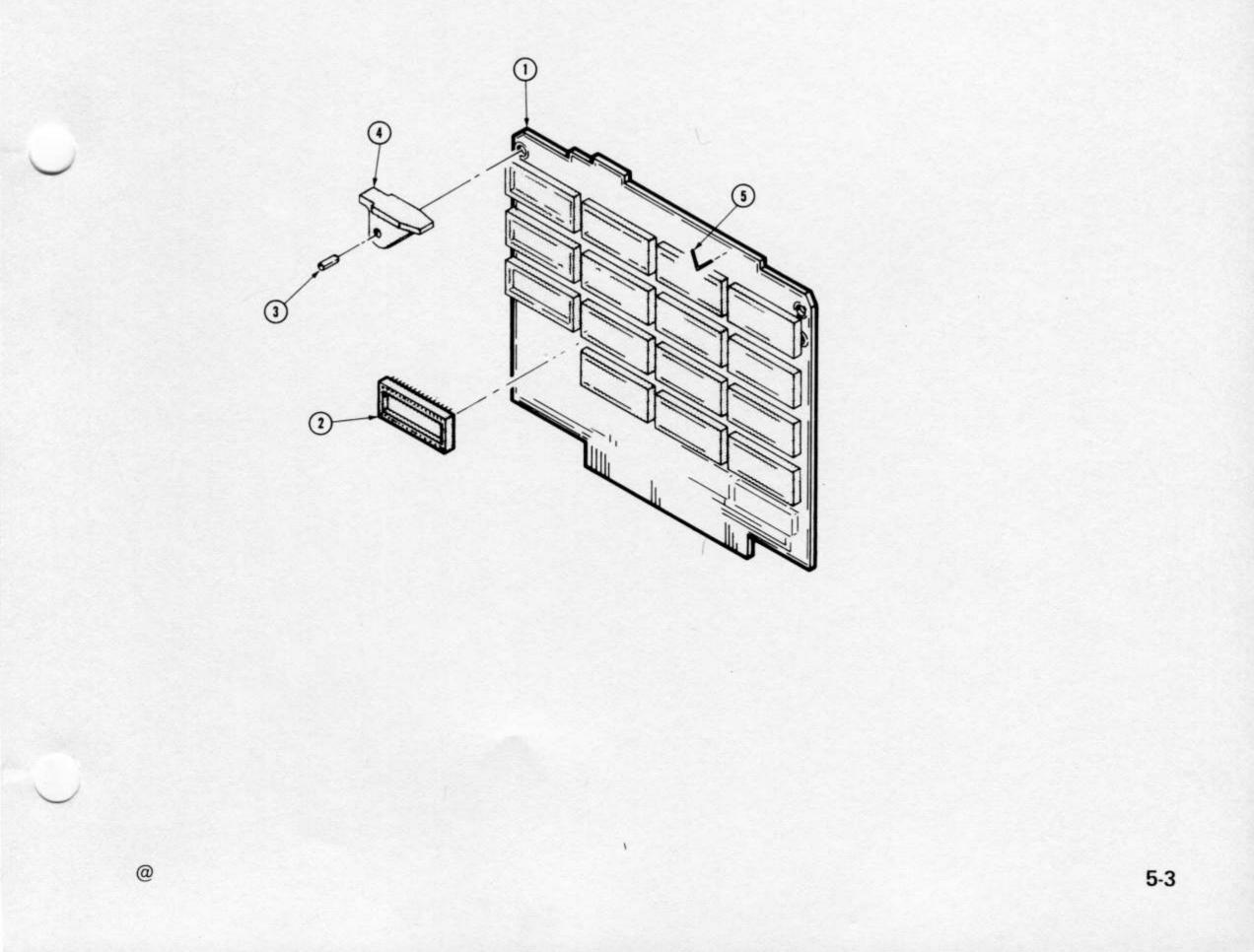
Fig. & Index No.	Tektronix Part No.	Serial/ Eff	Model No. Dscont	Qty	1 :	234	4 5	Name & Description	Mfr Code	Mfr Part Number
1-	067-0961-00			1	FIX	TURE	,CAL:I	DIAGNOSTIC MEMORY CARD	80009	067-0961-00
-1				1	. CI	KT BO	OARD A	ASSY: PROM(SEE EPL)		
-2	136-0578-00			16		SOCI	KET, PI	LUG-IN:24 DIP,LOW PROFILE	73803	CS9002-24
-3	214-1337-00			2		PIN	,SPRIN	NG:0.10 OD X 0.25 INCH L,STL	80009	214-1337-00
-4	105-0160-00			2		EJEC	CTOR,C	CKT BD:WHITE PLASTIC	80009	105-0160-00
-5	131-0608-00			2		TERM	MINAL,	,PIN:0.365 L X 0.25 PH, BRZ, GOLD PL	22526	47357

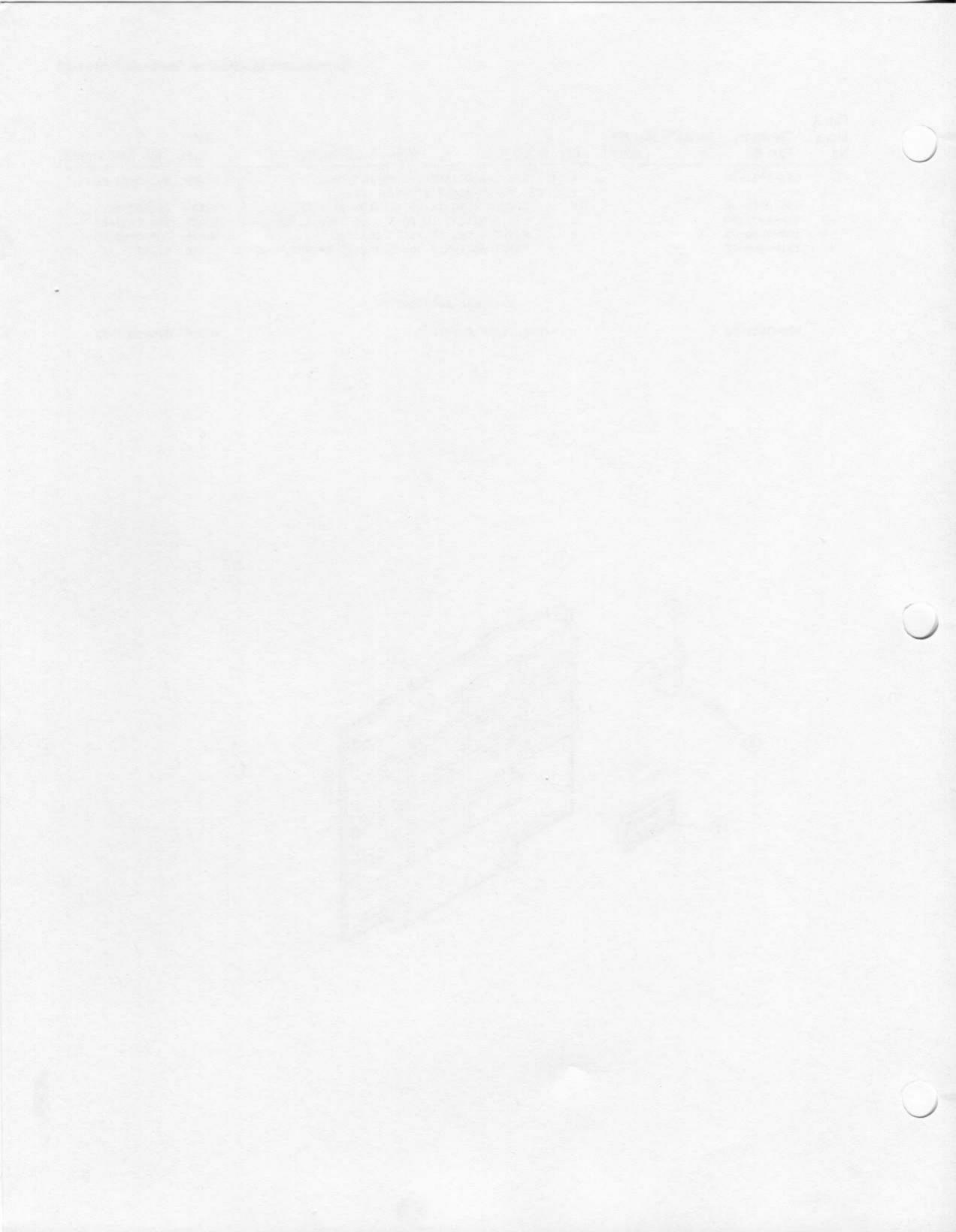
#### STANDARD ACCESSORIES

070-3801-00

1 MANUAL, TECH: SERVICE

80009 070-3801-00





## **INSTRUCTIONS FOR COMPLETING** THE SOFTWARE/FIRMWARE PERFORMANCE REPORT

Please type or print clearly. Use a separate Software/Firmware Performance 1. Report (SFPR) for each problem.

#### 11. SECTION A

Fill in the serial number of the 7854 Oscilloscope the diagnostic firmware version (067-0961-) and the 067-0911- Diagnostic Test Interface version. With the 7854 ROM board installed, press the ID key on the 7854 and copy the entire line of Version information, beginning with TEK/7854.

#### SECTION B III.

Use the complete company mailing address. Include the name and phone number of the person reporting the error. Also, be sure to fill in the name of the person submitting the SFPR.

#### IV. SECTION C

Check the reason for report and whether the error is reproducible. We cannot fix a problem when we cannot reproduce the error condition.

#### SECTION D V.

Give a complete description of the system configuration on which the problem occurred. Include related peripherals, interfaces, options, special switch and/or strap settings and operating system.

#### SECTION E VI.

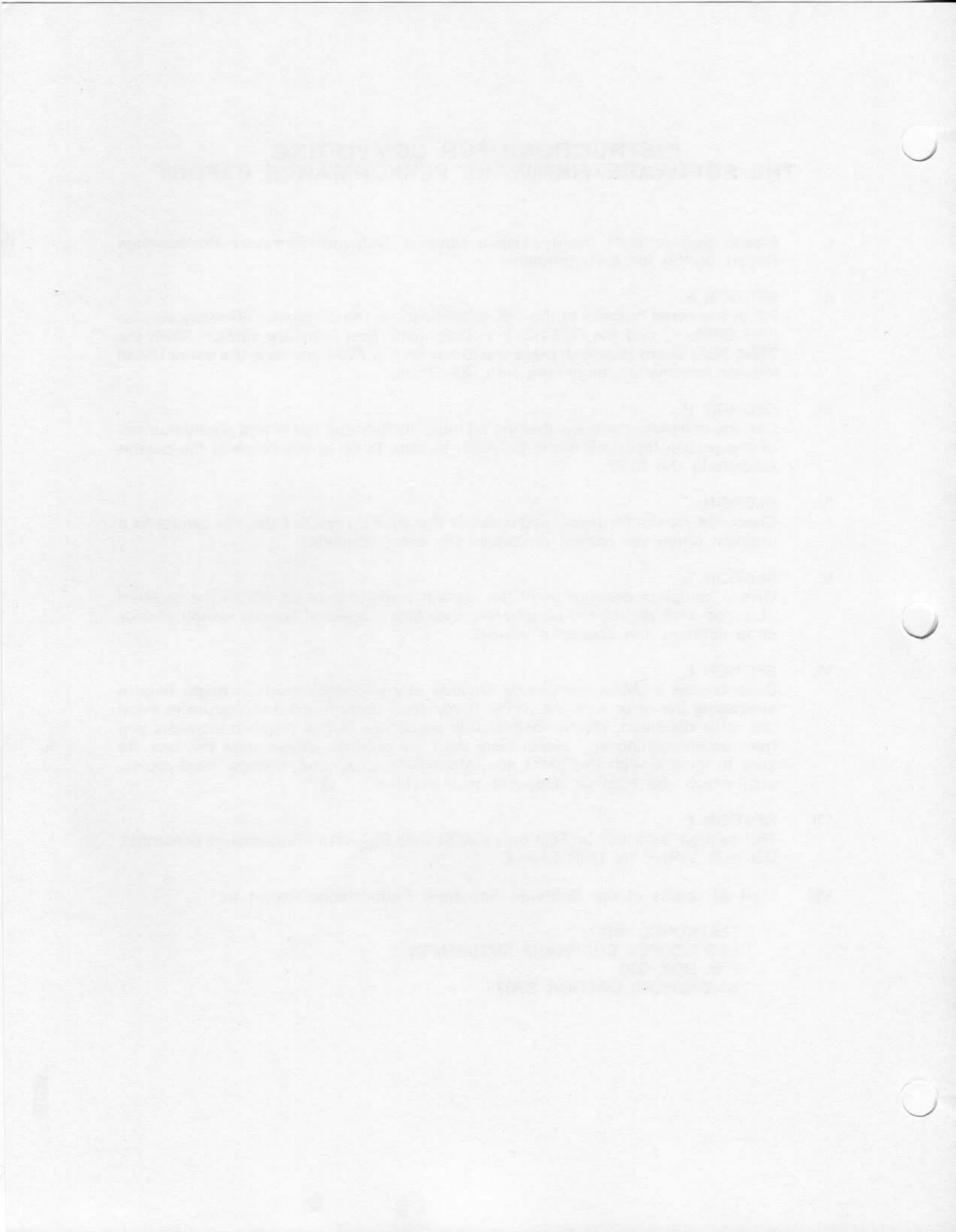
Describe the problem completely. Include any information which might help in evaluating the error with the SFPR. If you have determined a procedure to avoid the error condition, please include this procedure. If this problem prevents you from accomplishing any useful work with the product, please state this fact. Be sure to include with the SFPR any information (programs, listings, hard copies, etc.) which will help us duplicate your problem.

#### VII. SECTION F

This section is for use by Tektronix Lab Scopes Software Maintenance personnel. DO NOT WRITE IN THIS SPACE.

Mail all copies of the Software/Firmware Performance Report to: VIII.

TEKTRONIX, INC. LAB SCOPES SOFTWARE MAINTENANCE P.O. BOX 500 **BEAVERTON, OREGON 97077** 



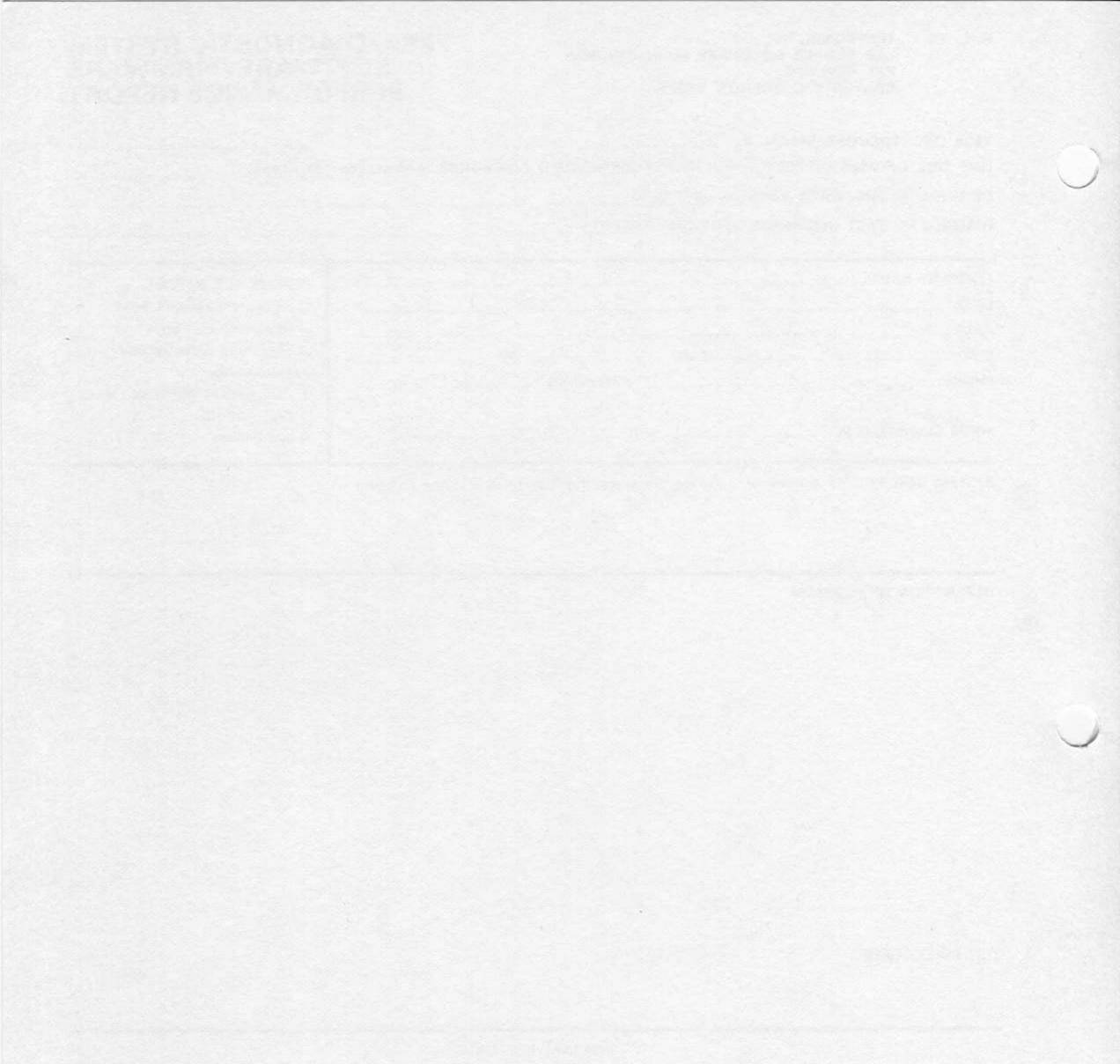
	SEND TO:	TEKTRONIX, INC. LAB SCOPES SOFTWARE MAINTENANCE P.O. BOX 500 BEAVERTON, OREGON 97077	7854/DIAGNOSTIC SYSTEM SOFTWARE/FIRMWARE PERFORMANCE REPORT
٩	LINE ONE DIAGNOST	TIC TEST INTERFACE VERSION 067 0011	
₿	USER: ADDRESS:	NAME:	□ Software/Firmware Error □ Documentation Error
		MITTED BY: DA	IS THE ERROR REPRODUCIBLE? □ Yes □ No
0	SYSTEM DI	ESCRIPTION: (Hardware, software, firmware and host	related to the problem)
E	DESCRIPTIC	ON OF PROBLEM:	

C

LIST ENCLOSURES:

### (DO NOT WRITE BELOW THIS LINE)

	DATE RECEIVED SPR #
SPR LOG	
his form may be reproduced	Tektro

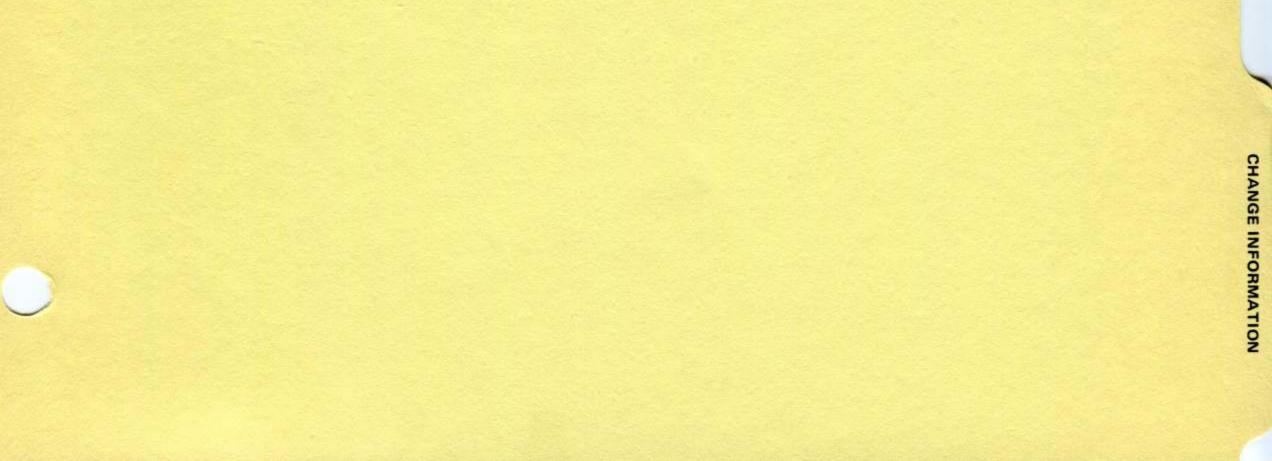


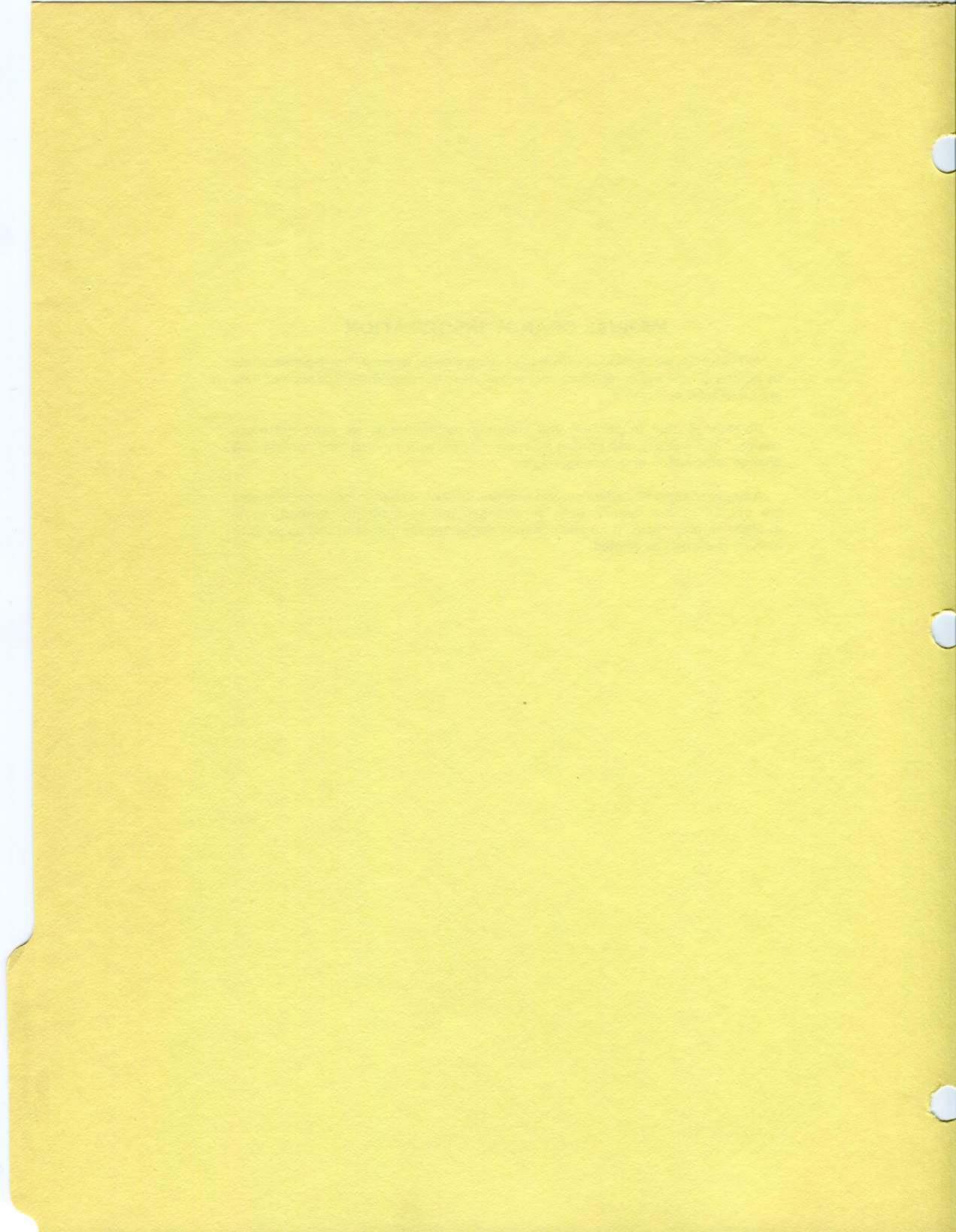
## MANUAL CHANGE INFORMATION

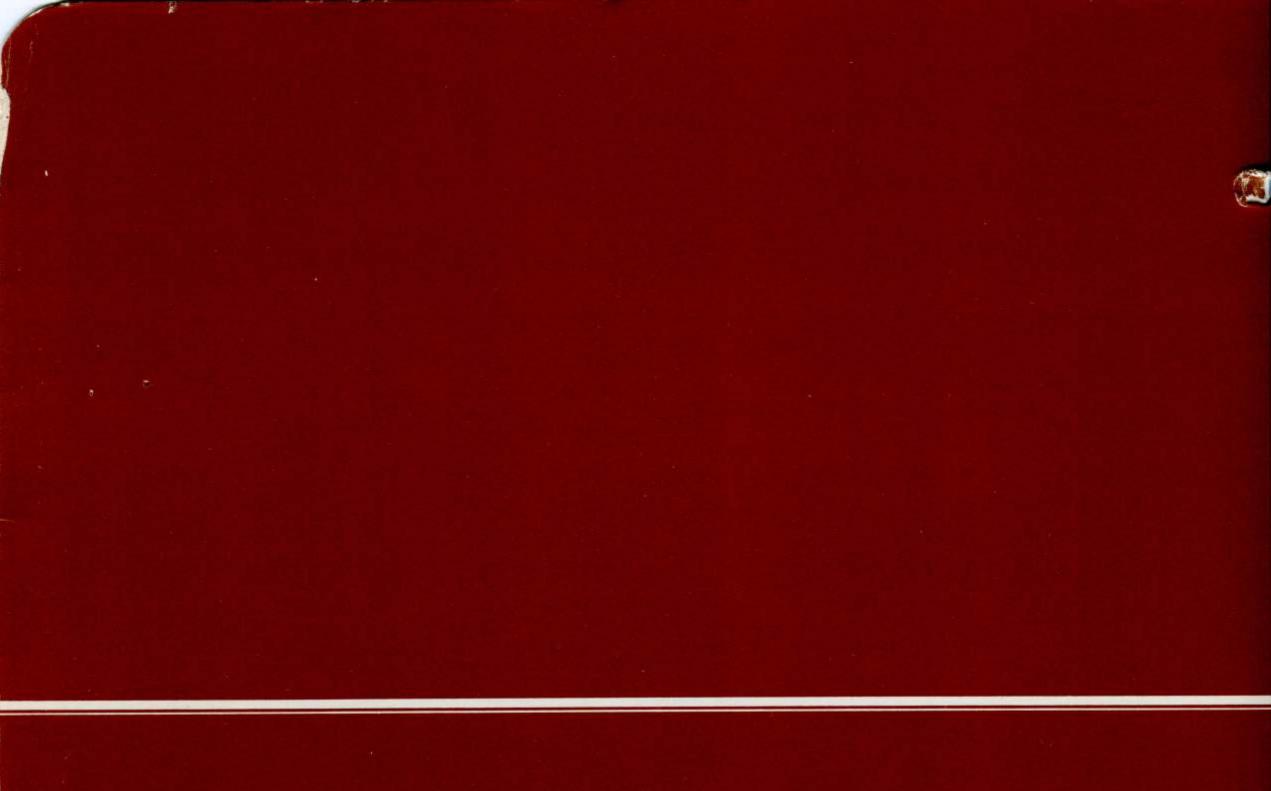
At Tektronix, we continually strive to keep up with latest electronic developments by adding circuit and component improvements to our instruments as soon as they are developed and tested.

Sometimes, due to printing and shipping requirements, we can't get these changes immediately into printed manuals. Hence, your manual may contain new change information on following pages.

A single change may affect several sections. Since the change information sheets are carried in the manual until all changes are permanently entered, some duplication may occur. If no such change pages appear following this page, your manual is correct as printed.







Sec. 1

Tektronix, Inc. P.O. Box 500 Beaverton, OR 97077

Part No. 070-3801-00