

7104 OSCILLOSCOPE WITH OPTIONS

INSTRUCTION MANUAL

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

Serial Number _____

070-2314-00

First Printing NOV 1978

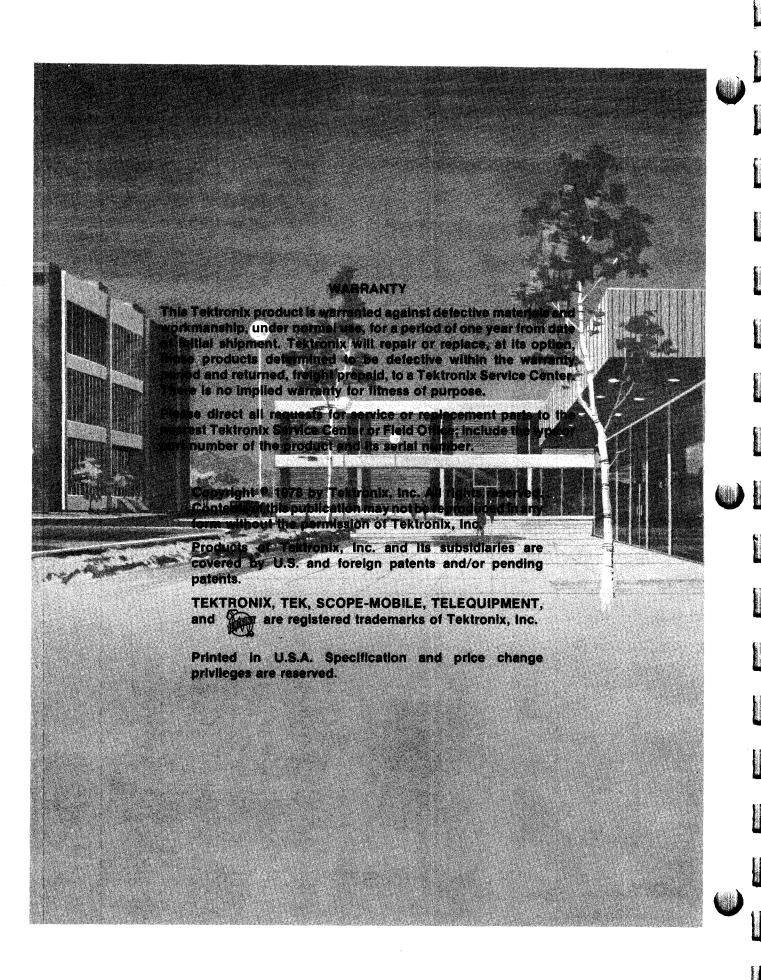


TABLE OF CONTENTS

	MOT OF WALKETPATIONS	PAG
	LIST OF ILLUSTRATIONS	
	LIST OF TABLES OPERATORS SAFETY SUMMARY	٠١
	SERVICING SAFETY SUMMARY	
	SERVICING SAFETT SUMMART	1
	SECTION 1 GENERAL INFORMATION	
	INTRODUCTION	. 1-1
	OPERATORS MANUAL	. 1-1
	INSTRUCTION MANUAL	. 1-1
	INSTALLATION	. 1-1
	INITIAL INSPECTION	. 1-1
	OPERATING YOU TAGE	. 1-1
	OPERATING VOLTAGE OPERATING TEMPERATURE	. 1-2
	OPERATING POSITION	. 1-2
	PACKAGING FOR SHIPMENT	. 1-2
	SPECIFICATION	1 2
	SYSTEM ELECTRICAL SPECIFICATION	1_11
	STANDARD ACCESSORIES	1-14
	SECTION 2 OPERATING INSTRUCTIONS	
	PRELIMINARY OPERATION	. 2-1
	REDUCTION OF DISPLAY GAIN WITH	
	OUTPUT CHARGE	
1	PLUG-IN UNITS	. 2-1
	INSTALLATION OF PLUG-IN UNITS	. 2-2
	CONTROLS AND CONNECTORS	. 2-2
	FRONT-PANEL COLOR CODING	. 2-2
	OPERATORS CHECKOUT PROCEDURE	. 2-2
	TEST EQUIPMENT REQUIRED	. 2-2
	PRELIMINARY SETUP	. 2-2
	DISPLAY FOCUS	. 2-3
	TRACE ALIGNMENTGRATICULE ILLUMINATION	. 2-3
	CONTROL ILLUMINATION	. 2-3
	VERTICAL DEFLECTION SYSTEM	2-3
	HORIZONTAL DEFLECTION SYSTEM	2-3
	TRIGGERING	2-7
	READOUT	
	BEAMFINDER	. 2-8
	CALIBRATOR	. 2-8
	Z-AXIS INPUT	. 2-8
	INTENSITY LIMITING	. 2-8
	DETAILED OPERATING INFORMATION	. 2-8
	GRATICULE	. 2-8
	GRATICULE ILLUMINATION	. 2-8
	LIGHT FILTER	. 2-9
	CONTROL ILLUMINATION	2-9
	INTENSITY CONTROLS	2-9
	ASTIGMATISM-FOCUS ADJUSTMENTS	2-9
	BEAMFINDER	2-9
	TRACE ALIGNMENT	2-1U 2-10
	READOUT DISPLAY	2-10
	CARE OF CRT SCREEN	∡-1U 2-11
	VERTICAL AND HORIZONTAL MODE	Z-11
		2 1 1

	PAGE
VERTICAL TRACE SEPARATION	
TRIGGER SOURCE	2-13
CALIBRATOR OUTPUT	2-13
SIGNAL OUTPUTS	2-14
DISPLAY PHOTOGRAPHY	
INTENSITY MODULATION	2-15
REMOTE INPUT SIGNALS	
APPLICATIONS	2-15
VERTICAL AMPLIFIER PLUG-IN UNITS	2-15
TIME-BASE PLUG-IN UNITS	2-16
SAMPLING DISPLAYS	2-16
SPECIAL PURPOSE PLUG-IN UNITS	2-16
X-Y OPERATION	2-17
RASTER DISPLAYS	

WARNING

THE REMAINING PORTION OF THIS TABLE OF CONTENTS LISTS THE SERVICING INSTRUCTIONS. THESE SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID ELECTRICAL SHOCK, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CALLED OUT IN THE OPERATING INSTRUCTIONS UNLESS QUALIFIED TO DO SO.

SECTION 3 THEORY OF OPERATION	
BLOCK DIAGRAM	3-1
DESCRIPTION	3-1
DETAILED CIRCUIT OPERATION	3-4
LOGIC FUNDAMENTALS	3-4
SYMBOLS	3-4
LOGIC POLARITY	3-4
INPUT/OUTPUT TABLES	3-8
NON-DIGITAL DEVICES	3-8
CABLE DISTRIBUTION	3-8
MODE SWITCH AND CALIBRATOR	3-8
CALIBRATOR	3-8
MODE SWITCHING	3-8
MAIN INTERFACE	3-8

NON-DIGITAL DEVICES 3-8
CABLE DISTRIBUTION 3-8
MODE SWITCH AND CALIBRATOR 3-8
CALIBRATOR 3-8
MODE SWITCHING 3-8
MAIN INTERFACE
LOGIC
HORIZONTAL LOGIC 3-10
Z-AXIS LOGIC 3-12
HORIZONTAL BINARY
VERTICAL BINARY 3-15
PLUG-IN BINARY 3-16
VERTICAL CHOPPED BLANKING 3-17
CHOP COUNTER
VERTICAL MODE LOGIC 3-21
TRACE SEPARATION
MCP (MICROCHANNEL PLATE) INTENSITY
TRACKING 3-22
TIME-BASE CONTROLLED Z-AXIS FOR
X-Y DISPLAYS 3-22
TRIGGER SELECTOR 3-24
A AND B TRIGGER CHANNEL SWITCHES 3-24
A AND B TRIGGER AMPLIFIER
VERTICAL SIGNAL OUTPUT AMPLIFIER 3-25
3-25

TABLE OF CONTENTS (CONT.)

PAGE	PAGE
READOUT SYSTEM 3-25	CONTROL RECTIFIER
DISPLAY FORMAT 3-25	INVERTER START NETWORK 3-53
DEVELOPING THE DISPLAY 3-27	INVERTER 3-54
TIMER 3-28	OVER-VOLTAGE STOP 3-54
TIME-SLOT COUNTER	INVERTER CONTROL 3-54
WORD TRIGGER	POWER ON LOGIC 3-56
CHANNEL COUNTER 3-32	LV REGULATOR 3-56
SINGLE-SHOT LOCKOUT 3-32	OPERATIONAL AMPLIFIER POWER
ENCODING THE DATA 3-32	SUPPLIES 3-56
COLUMN AND ROW DATA SWITCHES 3-34	+50 VOLT SUPPLY 3-57
DISPLAY-SKIP GENERATOR 3-35	-15 VOLT SUPPLY 3-57
COLUMN AND ROW DECODERS 3-35	+5 VOLT SUPPLY 3-57
ZEROS LOGIC AND MEMORY 3-35	+15 VOLT SUPPLY
CHARACTER GENERATOR 3-37	-50 VOLT SUPPLY 3-58
DECIMAL POINT LOGIC AND CHARACTER	FAN CIRCUIT 3-58
POSITION COUNTER 3-37	GRATICULE-LIGHT SUPPLY
FORMAT GENERATOR	DELAY COMP (OPTION 2)
Y-OUTPUT3-38	TIME-BASE OPERATION 3-58
X-OUTPUT	X-Y OPERATION
DISPLAY SEQUENCE	X 1 01 2.13 (10 to 10 to
SIGNALS OUT	
+SAWTOOTH AMPLIFIER	
+GATE AMPLIFIER 3-40	
GRATICULE ILLUMINATION 3-40	SECTION 4 MAINTENANCE
VERTICAL CHANNEL SWITCH 3-40	PREVENTATIVE MAINTENANCE 4-1
CHANNEL SWITCH	CABINET PANEL REMOVAL 4-1
VERTICAL CHANNEL SELECTOR	CLEANING
RIGHT AND LEFT CHANNEL FEEDBESIDE 3-41	EXTERIOR 4-1
VERTICAL AMPLIFIER 3-41	CRT
DELAY-LINE COMPENSATION 3-41	INTERIOR
OUTPUT AMPLIFIER 3-42	VISUAL INSPECTION
FEEDBESIDE	SEMICONDUCTOR CHECKS 4-2
AUXILIARY AMPLIFIER 3-42	PERIODIC ELECTRICAL ADJUSTMENT 4-2
OUTPUT AMPLIFIER 3-42	TROUBLESHOOTING
POWER SUPPLY SHUTDOWN 3-43	TROUBLESHOOTING
HORIZONTAL CHANNEL SWITCH	DIAGRAMS
CHANNEL SWITCH	CIRCUIT BOARD ILLUSTRATIONS
HORIZONTAL CHANNEL SELECTOR 3-43	TROUBLESHOOTING CHART 4-3
A AND B CHANNEL FEEDBESIDE 3-43	ADJUSTMENT AND TEST POINT
HORIZONTAL AMPLIFIER	
READOUT POSITIONING 3-44	LOCATIONS
OUTPUT AMPLIFIER 3-44	
	SEMICONDUCTOR LEAD CONFIGURATIONS 4-3
INPUT CLAMP	MULTI-PIN CONNECTORS 4-3
	TROUBLESHOOTING EQUIPMENT 4-3
INTENSITY LIMITER	TROUBLESHOOTING TECHNIQUES 4-6
Z-AXIS AMPLIFIER 3-46	1. CHECK CONTROL SETTINGS 4-6
AUTO FOCUS 3-47	2. CHECK ASSOCIATED EQUIPMENT 4-6
CRT CIRCUIT 3-47	3. VISUAL CHECK 4-6
CONTROL GRID DC RESTORER	4. CHECK INSTRUMENT ADJUSTMENT 4-6
FOCUS GRID DC RESTORER	5. ISOLATE TROUBLE TO A CIRCUIT 4-6
HIGH-VOLTAGE TRANSFORMER	6. CHECK VOLTAGES AND WAVEFORMS 4-7
ANODE VOLTAGE MULTIPLIER	7. CHECK INDIVIDUAL COMPONENTS 4-7
GRID BIAS SUPPLY	8. REPAIR AND ADJUST THE CIRCUIT 4-7
MICROCHANNEL PLATE SUPPLY 3-50	TROUBLESHOOTING THE HIGH-EFFICIENCY
GRID BIAS 3-51	POWER-SUPPLY UNIT
-2400 VOLT SUPPLY	GENERAL 4-7
GRID CROW BAR	PRELIMINARY PROCEDURE 4-8
CRT	TROUBLESHOOTING PROCEDURE 4-8

TABLE OF CONTENTS (CONT.)

PAGE	PAGE
TROUBLESHOOTING THE CRT AND ASSOCIATED	PART I—PERFORMANCE CHECK
CIRCUITRY 4-12	INDEX TO PERFORMANCE CHECK
CRT DISPLAY SYMPTOM CHECKOUT	PROCEDURE 5-15
PROCEDURE 4-13	PERFORMANCE CHECK POWER-UP
CRT CIRCUIT TROUBLESHOOTING	SEQUENCE 5-15
PROCEDURE 4-13	A. Z-AXIS AND DISPLAY
CORRECTIVE MAINTENANCE 4-22	B. CALIBRATOR AND OUTPUT SIGNALS 5-18
OBTAINING REPLACEMENT PARTS 4-22	C. TRIGGER SYSTEM5-22
SOLDERING TECHNIQUES 4-22	D. HORIZONTAL SYSTEM 5-24
COMPONENT REMOVAL AND REPLACEMENT 4-23	E. VERTICAL SYSTEM5-27
DISPLAY UNIT KICKSTAND 4-23	F. READOUT SYSTEM5-31
POWER-SUPPLY UNIT REMOVAL 4-23	G. PHOTOGRAPHIC WRITING RATE5-33
CATHODE-RAY TUBE REMOVAL 4-24	PART II—ADJUSTMENT AND PERFORMANCE
CATHODE-RAY TUBE REPLACEMENT 4-25	CHECK 5-35
CIRCUIT BOARDS4-25	INDEX TO ADJUSTMENT AND PERFORMANCE
PLUG-IN INTERFACE CONNECTORS 4-30	CHECK 5-35
DELAY LINE REMOVAL 4-30	ADJUSTMENT AND PERFORMANCE CHECK
SEMICONDUCTORS 4-30	POWER-UP SEQUENCE 5-35
INTERCONNECTING PINS 4-34	A. POWER SUPPLY5-36
PUSHBUTTON SWITCHES 4-35	B. Z-AXIS AND DISPLAY
GRATICULE LIGHT BULBS 4-35	C. CALIBRATOR AND OUTPUT SIGNALS 5-46
POWER TRANSFORMER 4-35	D. TRIGGER SYSTEM5-50
LINE FUSE 4-37	E. HORIZONTAL SYSTEM 5-54
ADJUSTMENT AFTER REPAIR 4-37	F. VERTICAL SYSTEM 5-61
	G. READOUT SYSTEM 5-68
	H. PHOTOGRAPHIC WRITING RATE5-71
	5-71
	SECTION 6 INSTRUMENT OPTIONS
	SECTION 7 REPLACEABLE ELECTRICAL PARTS
ECTION 5 CALIBRATION	
USING THESE PROCEDURES 5-2	SECTION 8 DIAGRAMS AND CIRCUIT BOARD
PERFORMANCE CHECK SUMMARY 5-2	ILLUSTRATIONS
ADJUSTMENT INTERVAL 5-2	
TEKTRONIX FIELD SERVICE 5-2	
TEST EQUIPMENT REQUIRED 5-12	SECTION 9 REPLACEABLE MECHANICAL PARTS
SPECIAL FIXTURES 5-12	

CHANGE INFORMATION

TEST EQUIPMENT ALTERNATIVES 5-12

LIST OF ILLUSTRATIONS

FIGURE NO.	PAG	FIGURE GE NO.	PAGE
Frontis- piece	7104 Features	3-18	Readout word relating 10 possible character locations to the decimal point instructions that can be encoded; and the resultant crt
1-1	7104 dimensional drawing 1-	12 3-19	display
2-1	Front-panel controls, connectors and indicators	3-20	Readout System
2-2	Rear-panel controls and connectors		Intensity Limiting stage 3-48
2-3	Definition of graticule measurement lines		(A) Representation of Inverter stage. Idealized
2-4	Location of readout on the crt identifying the	0	waveforms of (B) total inverter current, It,
	originating plug-in and channel 2-	10	(C) voltage of CR1234 and CR1241, and (D) voltage across primary
3-1	Basic block diagram of the 7104 Oscilloscope 3	3-2 4-1	Color code for resistors and capacitors 4-4
3-2	Breakdown of separate stages within Horizontal	4-2	Semiconductor lead configurations 4-5
	Logic IC (4428) 3-	10 4-3	Orientation of multi-pin connectors 4-6
3-3	(A) Diagram of clock generator stage; (B)	4-4	Current sensing waveform at R1284 showing:
	Idealized waveform for clock generator		A. Power supplies not in current limit operation
	stage 3-	18 4-5	B. Power supplies in current limit operation 4-10
3-4	Idealized waveforms for the Vertical Chopped		Location of line shortage capacitor screws
۰.	Blanking IC (U4320) 3-	19	used for manually discharging C1216 and C1217 4-10
3-5	(A) Input and output pins for Chop Counter IC,	4-6	Typical waveforms on C1216 and C1217 with
	U4340; (B) Idealized waveforms for Chop		the line voltage set to about 20 volts 4-11
3-6	Counter stage	20 22 4-7	Current waveforms of T1230 showing burst
3-0 3-7	Logic diagram of Vertical Mode Logic stage 3-:	22	operation at line voltage of about 60 volts 4-12
3-7	(A) Logic diagram of Trace Separation stage; (B) Table of input/output combinations 3-:	23 4-8	Current waveform at T1230 for normal
3-8	Location of readout display on the crt	23	inverter operation at line voltage
00	identifying the originating plug-in and		of 115 volts 4-12
	channel 3-:	25 4-9	Waveform at TP1234 on the power-supply
3-9	Character selection matrix for 7104		Inverter board with the line voltage at about
	Readout System 3-:	26	20 volts 4-12
3-10	Typical readout display where only channel 2	4-10	Typical waveform at junction of R1811 and
	of the Right Vertical and B Horizontal units		CR1747 on the High Voltage circuit board 4-17
	is displayed		Typical waveform at junction of R1814 and
3-11	Output waveforms of the Timer stage 3-2		CR1816 on the High Voltage circuit board 4-18
3-12	Detail of output at pins 12, 13, 14 and 16	4-12	Power supply unit securing screws 4-23
3-13	of U2126	29 4-13	Location of securing screws for the A6-Main Interface board
	condition occurs 3-3	30 4-14	Correct placement of power transistor and
3-14	Timer relationship of the time-slot (TS)		mounting hardware on rear heat sink 4-29
	pulses produced by Q2159 3-3		HYPCON assembly removal and replacement 4-32
3-15	Typical encoding scheme for voltage-sensing	4-16	Coaxial end-lead connector assembly 4-34
	plug-in unit. Coding shown for deflection	4-17	Exploded view of circuit-board pin and ferrule 4-35
3-16	factor of 100 microvolts		Removal procedure for push-button switches 4-36
	data and (B) Column analog data 3-3	34 5-1	Typical 7104 Photographic Writing Rate 5-34
3-17	Typical output waveforms for Zeros Logic and	5-2	Readout display with Q2225 removed 5-69
	Memory stage operation (at pin 7 of U2232) 3-3	36 5-3	Typical 7104 Photographic Writing Rate 5-72

LIST OF ILLUSTRATIONS (CONT.)

FIGURE NO. The illustrations in section 8 are located near their associated diagrams on the foldout page.		FIGURE NO.		
		8-15	A1-Front Panel circuit board assembly.	
		8-16	A21-Z-Axis circuit board assembly.	
		8-17	A22-High Voltage circuit board assembly.	
8-1	Location of circuit boards in the 7104.	8-18	A2-Display Control circuit board assembly.	
8-2	Semiconductor lead configurations.	8-19	A23-Inverter circuit board assembly.	
8-3	A1-Front Panel circuit board assembly.	8-20	A24-Rectifier circuit board assembly.	
8-4	A5-Mode Switch circuit board assembly.	8-21	A25-Low-Voltage Regulator circuit board assembly.	
8-5	A6-Main Interface circuit board assembly.	8-22	A26-Fan Motor circuit board assembly.	
8-6	A13-Logic circuit board assembly.	8-23	A28-X-Y Delay Compensation circuit board assembly.	
8-7	A14-Trigger Selector circuit board assembly.	8-24	7104 Troubleshooting Chart.	
8-8	A15-Readout System circuit board assembly.	8-25	Test Point and Adjustment Locations A.	
8-9	A27-Protection Circuit circuit board assembly.	8-26	Test Point and Adjustment Locations B.	
8-10	A1-Front Panel circuit board assembly.	8-27	Test Point and Adjustment Locations C.	
8-11	A16-Vertical Channel Switch circuit board assembly.	8-28	Test Point and Adjustment Locations D.	
8-12A	A17-Vertical Amplifier circuit board assembly.	8-29	Test Point and Adjustment Locations E.	
8-12B	A18-Termination circuit board assembly.	8-30	Test Point and Adjustment Locations F.	
8-13	A19-Horizontal Amplifier circuit board assembly	8-31	Test Point and Adjustment Locations G.	
8-14	A19-Horizontal Amplifier circuit board assembly.	8-32	Test Point and Adjustment Locations H	



LIST OF TABLES

NO.	PAGE	TABLE NO.	PAGE
1-1	Power-Cord Conductor Identification 1-2	3-8	Input/Output Combinations for the Vertical
1-2	Power-Cord Plug Configuration 1-2		Binary stage 3-16
1-3	Shipping Carton Test Strength 1-3	3-9	Input/Output Combinations for the Plug-In
1-4	Electrical Characteristics 1-3		Binary stage
1-5	Environmental Characteristics 1-10	3-10	Input/Output Combinations for the Vertical
1-6	Physical Charcteristics 1-11		Chopped Blanking stage 3-19
1-7	7104 Oscilloscope Vertical System	3-11	Standard Readout Format 3-27
	Specification 1-13	3-12	Channel Address Code 3-32
1-8	7104 Oscilloscope System Horizontal Specification	4-1	Recommended Power Supply Troubleshooting
1-9	Special Purpose Plug-In Units1-14		Sequence 4-8
2-1	Display Combinations 2-11	4-2	Typical Power-Supply Resistance 4-9
3-1	Basic Logic Reference	4-3	Burst Voltage Test Points 4-10
3-2	Mode Switching Inputs/Outputs 3-9	4-4	Recommended CRT Circuitry Troubleshooting
3-3	Input/Output Combinations for A Lockout		Sequence 4-14
	(U4428 pin 14)	5-1	Calibration Procedure Electives 5-1
3-4	Input/Output Combinations for B Lockout	5-2	Performance Check Summary 5-3
	(U4428 pin 15)	5-3	Test Equipment
3-5	Input/Output Combinations for Alternate Pulse	5-4	Power Supply Tolerance 5-37
	(U4428 pin 8) 3-12	5-5	Vertical Compensation Adjustments 5-63
3-6	Input/Output Combinations for Z-Axis	5-6A	Low-Frequency Compensation 5-64
	Logic stage 3-14	5-6B	Low-Frequency Compensation 5-64
3-7	Input/Output Combinations of the Horizontal		
	Binary stage	6-1	Option Information Locator 6-1



OPERATORS SAFETY SUMMARY

The following general safety information applies to all operators and service personnel. Specific warnings and cautions will be found throughout the manual where they apply and should be followed in each instance.

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

 \triangle

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

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

Grounding the Instrument

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

Use the Proper Power Cord

Use only the power cord and connector specified for your instrument. Use only a power cord that is in good condition. For detailed information on power cords and connectors, see page 1-2 of this manual.

Refer cord and connector changes to qualified service personnel.

Use the Proper Fuse

To avoid fire hazard, use only the fuse specified in the parts list for this instrument, and which is identical in type, voltage rating, and current rating.

Refer fuse replacement to qualified service personnel.

Do Not Operate in Explosive Atmosphere

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

Do Not Remove Panels or Covers

To avoid personal injury, do not remove the protective cabinet panels or covers. Do not operate this instrument without the panels or covers properly installed.

Do Not Remove CRT Implosion Shield

Do not remove the clear plastic implosion shield covering the crt faceplate. This shield provides protection to the operator from crt implosion.



SERVICING SAFETY SUMMARY

FOR QUALIFIED SERVICE PERSONNEL ONLY

Refer also to the preceding Operators Safety Summary

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.

Power Source

This product is intended to operate from 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 power cord is essential for safe operation.

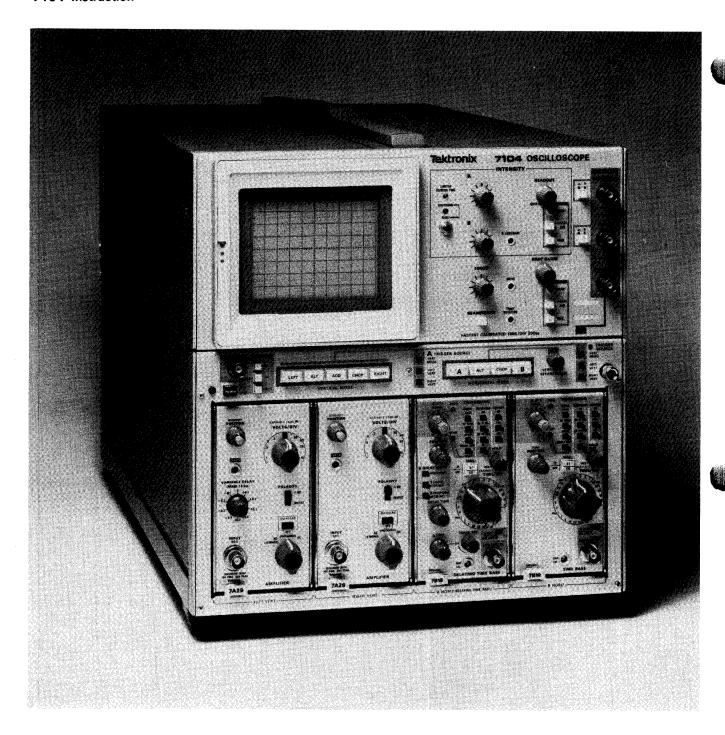
Crt Handling

Use care when handling a crt. Breakage of the crt causes a high-velocity scattering of glass fragments (implosion). Protective clothing and safety glasses should be worn. Avoid striking the crt on any object which might cause it to crack or implode. When storing a crt, place it in a protective carton or set it face down in a protected location on a smooth surface with a soft mat under the faceplate.

Silicone Grease Handling

Handle silicone grease with care. Avoid getting the silicone grease in your eyes. Wash hands thoroughly after use.





7104 Features

The TEKTRONIX 7104 Oscilloscope is a solid-state, wide-bandwidth instrument designed for general-purpose applications. The 7104 can also be used to observe or photograph very fast repetitive or single shot waveforms.

The 7104 accepts Tektronix 7000-series plug-in units; the flexibility of the plug-in feature and variety of plug-in units available allows the system to be used for many measurement applications. The left pair of plug-in compartments are for vertical deflection and the right pair are for horizontal deflection. Electronic switching between each pair will produce multitrace vertical and/or horizontal displays.

2314-43