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2215
OSCILLOSCOPE
OPERATORS

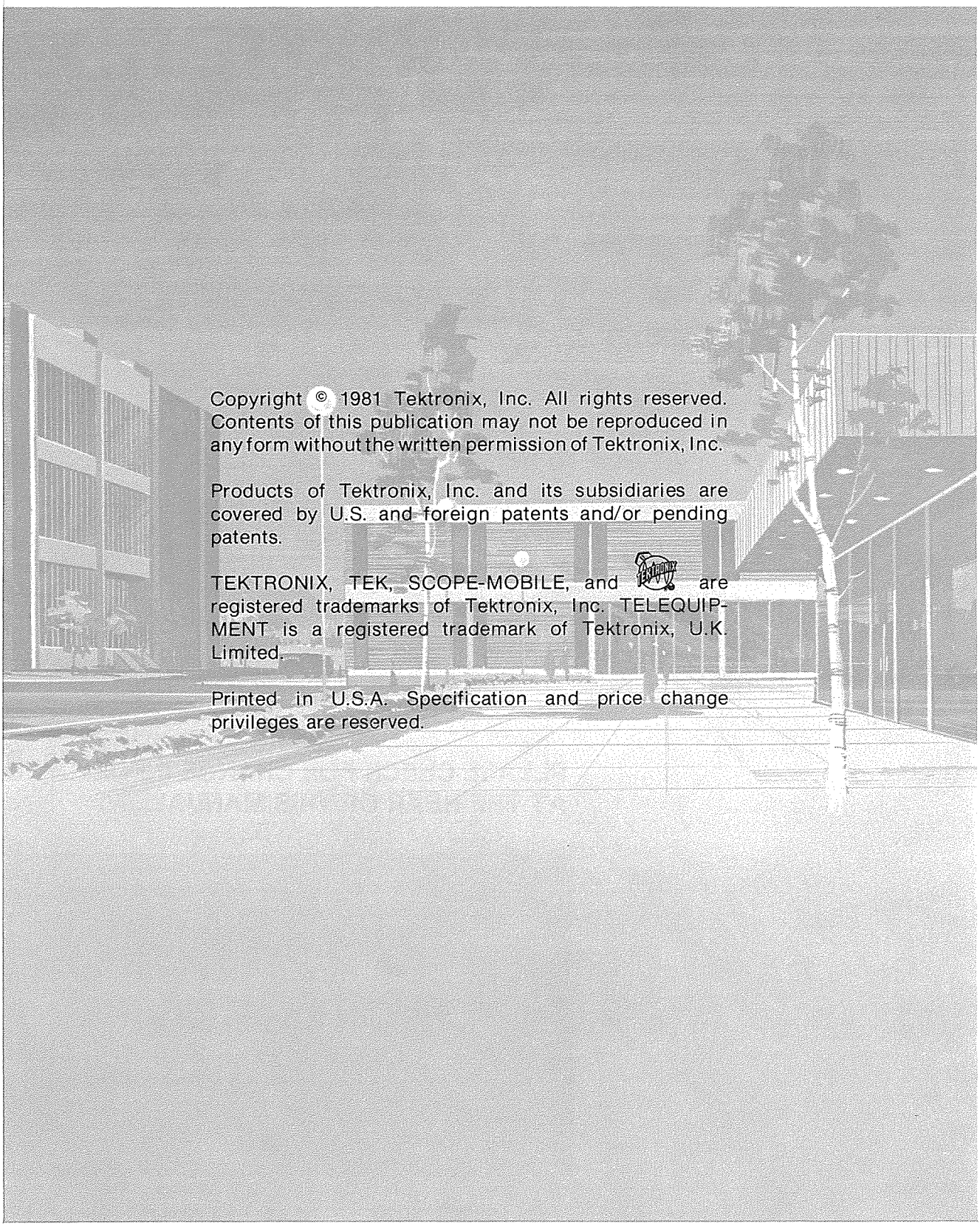
INSTRUCTION MANUAL

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

Serial Number _____

070-3398-00

First Printing JUN 1981



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TABLE OF CONTENTS

	Page
LIST OF ILLUSTRATIONS	ii
LIST OF TABLES	ii
OPERATORS SAFETY SUMMARY	iii
INTRODUCTION	1
PREPARATION FOR USE	1
SAFETY	1
LINE VOLTAGE	1
POWER CORD	1
LINE FUSE	1
CONTROLS, CONNECTORS, AND INDICATORS	3
POWER, DISPLAY, AND PROBE ADJUST	3
VERTICAL	3
HORIZONTAL	5
TRIGGER	6
REAR PANEL	8
OPERATING CONSIDERATIONS	9
GRATICULE	9
GROUNDING	9
SIGNAL CONNECTIONS	9
INPUT COUPLING CAPACITOR PRECHARGING	9
INSTRUMENT COOLING	10
INSTRUMENT FAMILIARIZATION	10
INTRODUCTION	10
BASELINE TRACE	11
DISPLAYING A SIGNAL	11
OPERATOR'S ADJUSTMENTS	16
INTRODUCTION	16
TRACE ROTATION	16
PROBE COMPENSATION	16
BASIC APPLICATIONS	17
NONDELAYED MEASUREMENTS	17
AC Peak-to-Peak Voltage	17
Instantaneous DC Voltage	18
Algebraic Addition	19
Common-Mode Rejection	20
Time Duration	20
Frequency	21
Rise Time	21
Time Difference Between Two Time-Related Pulses	22
Phase Difference	22
Amplitude Comparison	23
Time Comparison	24
DELAYED-SWEEP MAGNIFICATION	25
Magnified Sweep Runs After Delay	25
Pulse Jitter Time Measurement	26
Triggered Magnified Sweep	26
DELAYED-SWEEP TIME MEASUREMENTS	27
Time Difference Between Repetitive Pulses	27
Rise Time	28
Time Difference Between Two Time-Related Pulses	29
SPECIFICATION	30
ACCESSORIES	36
STANDARD ACCESSORIES INCLUDED	36
OPTIONAL ACCESSORIES	36
FRONT PANEL ILLUSTRATION	
CHANGE INFORMATION	

LIST OF ILLUSTRATIONS

Figure		Page
	The 2215 Oscilloscope	iv
1	Power-input-voltage configurations	2
2	Line fuse and power cord	2
3	Power, display, and probe adjust controls, connector, and indicator	3
4	Vertical controls and connectors	4
5	Horizontal controls	5
6	Trigger controls, connector, and indicator	6
7	Rear-panel connector	8
8	Graticule measurement markings	9
9	Initital setup for instrument familiarization procedure	12
10	Probe compensation	16
11	Peak-to-peak waveform voltage	17
12	Instantaneous voltage measurement	18
13	Algebraic addition	19
14	Common-mode rejection	20
15	Time duration	20
16	Rise time	22
17	Time difference between two time-related pulses	22
18	Phase difference	23
19	High-resolution phase difference	24
20	Delayed-sweep magnification	26
21	Pulse jitter	27
22	Time difference between repetitive pulses	27
23	B DELAY TIME POSITION control setting	28
24	Rise time, differential time method	28
25	Time difference between two time-related pulses, differential time method	30

LIST OF TABLES

Table		Page
1	Equipment Required for Instrument Familiarization Procedure	10
2	Electrical Characteristics	31
3	Environmental Characteristics	35
4	Physical Characteristics	36

OPERATORS SAFETY SUMMARY

The general safety information in this part of the summary is for both operating and servicing personnel. Specific warnings and cautions will be found throughout the manual where they apply and do 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.

Terms as Marked on Equipment

CAUTION indicates a personal injury hazard not immediately accessible as one reads the markings, 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



This symbol indicates where applicable cautionary or other information is to be found. For maximum input voltages, see Table 2.

Symbols as Marked on Equipment



DANGER – High voltage.



Protective ground (earth) terminal.



ATTENTION – Refer to manual.

Power Source

This product is intended to operate from a power source that does 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.

Grounding the Product

This product is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptable before connecting to the product input or output terminals. A protective ground connection by way of the grounding conductor in the 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 and controls that may appear to be insulating) can render an electric shock.

Use the Proper Power Cord

Use only the power cord and connector specified for your product.

Use only a power cord that is in good condition.

For detailed information on power cords and connectors see Figure 1.

Use the Proper Fuse

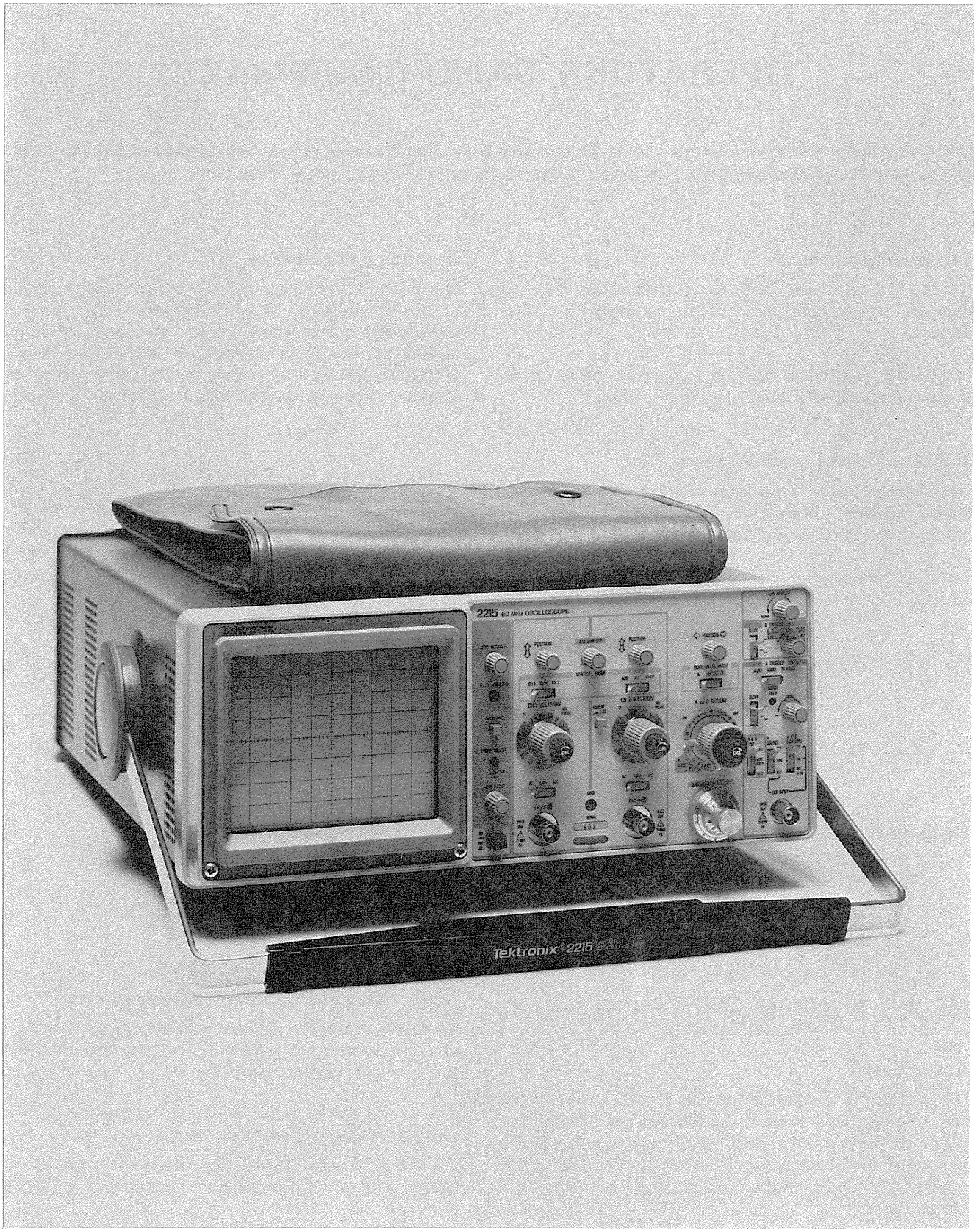
To avoid fire hazard, use only a fuse of the correct type, voltage rating and current rating as specified in the parts list for your product.

Do Not Operate in Explosive Atmospheres

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

Do Not Remove Covers or Panels

To avoid personal injury, do not remove the product covers or panels. Do not operate the product without the covers and panels properly installed.



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The 2215 Oscilloscope.

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INTRODUCTION

The TEKTRONIX 2215 Oscilloscope is a rugged, lightweight, dual-channel, 60-MHz instrument that features a bright, sharply defined trace on an 80- by 100-mm cathode-ray tube (crt). Its vertical system provides calibrated deflection factors from 2 mV per division to 10 V per division. Trigger circuits enable stable triggering over the full bandwidth of the vertical system. The horizontal system provides calibrated sweep speeds from 0.5 s per division to 50 ns per division along with delayed-sweep features for accurate relative-time measurements. A X10 magnifier extends the maximum sweep speed to 5 ns per division.

The instrument is shipped with the following standard accessories:

1 Operators manual	2 Probe packages
1 Service manual	2 Probe grabber tips

For part numbers and further information about both standard and optional accessories, refer to the "Accessories" page at the back of this manual. Your Tektronix representative, your local Tektronix Field Office, or the Tektronix product catalog can also provide accessories information.

PREPARATION FOR USE

SAFETY

Refer to the "Operators Safety Summary" at the front of this manual for power source, grounding, and other safety considerations pertaining to the use of the 2215. Before connecting the instrument to a power source, carefully read the following information about line voltages, power cords, and fuses; then verify that the proper power-input fuse is installed.

LINE VOLTAGE

The instrument is capable of continuous operation using ac-power-input voltages that range from 90 V to 250 V nominal at frequencies from 48 Hz to 62 Hz.

POWER CORD

For the 110-V North American customer, the 2215 is delivered with a three-wire power cord permanently attached. At the end of the cord is a three-contact plug for connection to the power source and to protective ground. The plug's protective-ground contact connects (through the protective-ground conductor) to the accessible metal parts of the instrument. For electrical-shock protection, insert this plug only into a power-source outlet that has a securely grounded protective-ground contact.

For the non-North American customer (and for the 220-V North American user), the appropriate power cord is supplied by an option that is specified when the instrument is ordered. The optional power cords available are illustrated in Figure 1.

LINE FUSE

The instrument fuse holder is located on the rear panel (see Figure 2) and contains the line fuse. Verify that the proper fuse is installed by performing the following procedure:

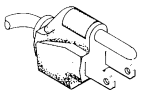
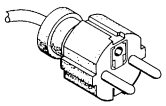
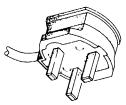
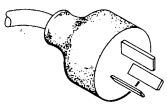
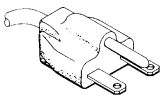
1. Unplug the power cord from the power-input source (if applicable).

2. Press in and slightly rotate the fuse-holder cap counterclockwise to release it.

3. Pull out the cap from the fuse holder, with the fuse attached to the inside of the cap.

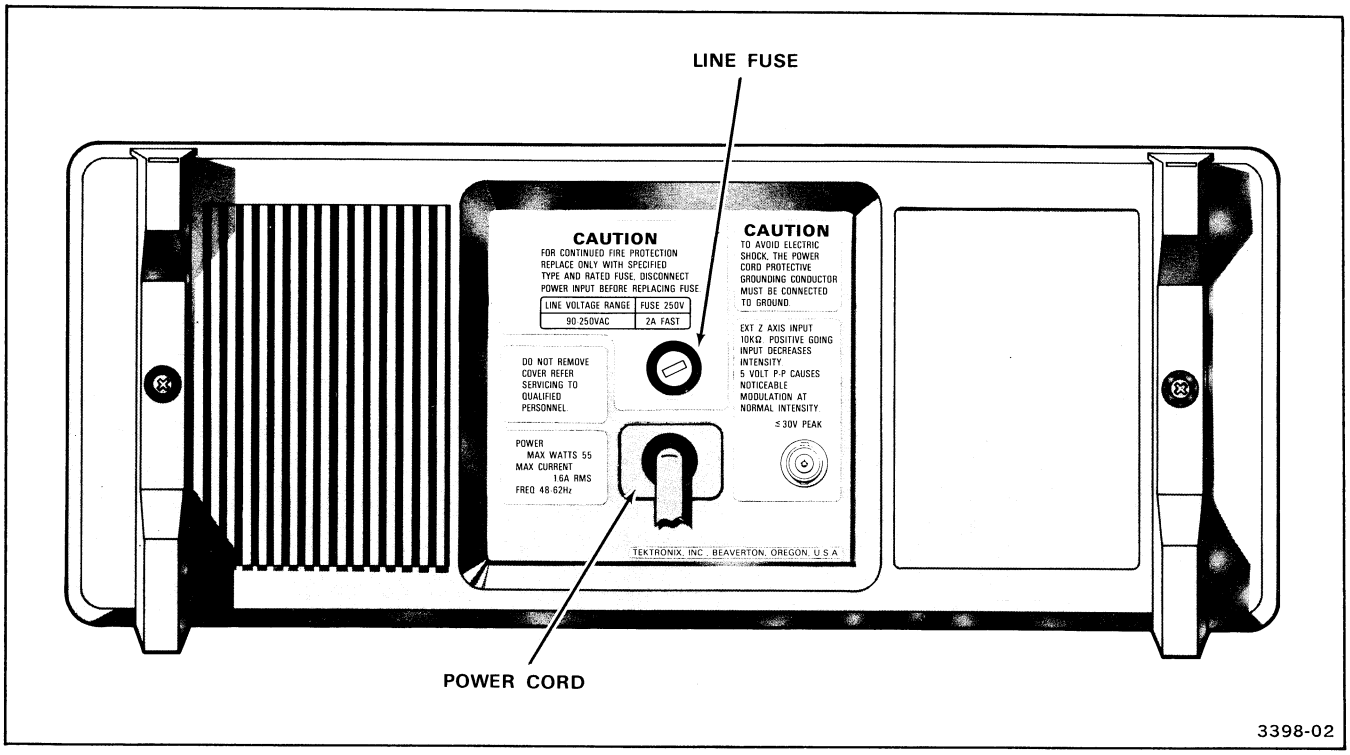
4. Note fuse values and verify proper size (2 A, 250 V, fast-blow).

5. Reinstall the fuse and fuse-holder cap.

Plug Configuration	Category	Power Cord and Plug Type	Factory Installed Instrument Fuse	Fuse Holder Cap	Line Cord Plug Fuse
	U.S. Domestic Standard	US 115V	2 A, 250 V Fast-blow AGC/3AG	AGC/3AG	None
	Option A1	Euro 240V 10-16A	2 A, 250 V Fast-blow 5x20 mm	5x20 mm	None
	Option A2	UK 240V 13A	2 A, 250 V Fast-blow 5x20 mm	5x20 mm	13A Type C
	Option A3	Australian 240V 10A	2 A, 250 V Fast-blow 5x20 mm	5x20 mm	None
	Option A4	North America 240V 15A	2 A, 250 V Fast-blow AGC/3AG	AGC/3AG	None

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Figure 1. Power-input-voltage configurations.



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Figure 2. Line fuse and power cord.

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CONTROLS, CONNECTORS, AND INDICATORS

The following descriptions are intended to familiarize the operator with the location, operation, and function of the instrument's controls, connectors, and indicators.

POWER, DISPLAY, AND PROBE ADJUST

Refer to Figure 3 for location of items 1 through 7.

(1) **Internal Graticule**—Eliminates parallax viewing error between the trace and graticule lines. Rise-time amplitude and measurement points are indicated at the left edge of the graticule.

(2) **POWER Switch**—Turns instrument power on and off. Press in for ON; press again for OFF.

(3) **AUTO FOCUS Control**—Adjusts display for optimum definition. Once set, the focus of the crt display will be maintained as changes occur in the intensity level of the trace.

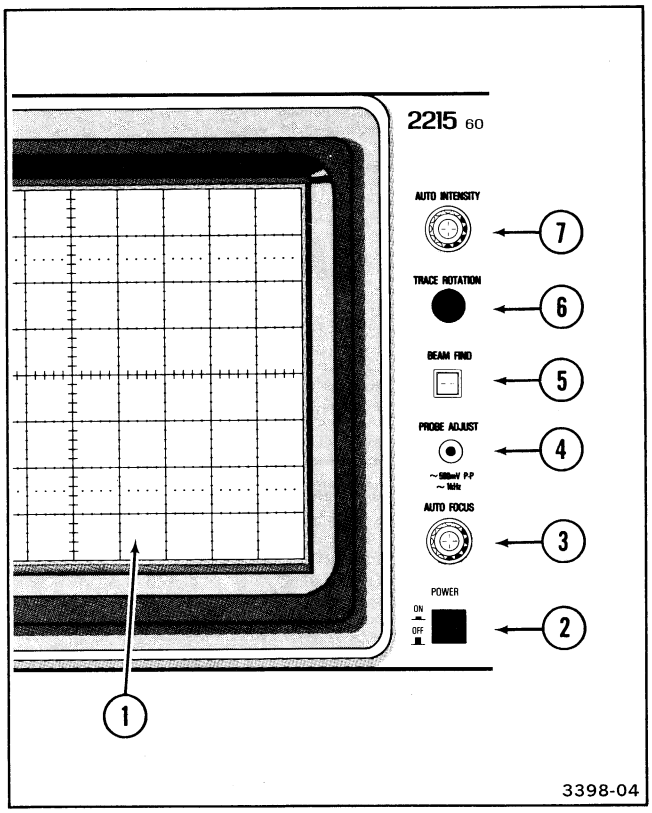


Figure 3. Power, display, and probe adjust controls, connector, and indicator.

(4) **PROBE ADJ Connector**—Provides an approximately 0.5-V, positive-going, square-wave voltage (at approximately 1 kHz) that permits the operator to compensate voltage probes and to check operation of the oscilloscope vertical system. It is not intended to verify the accuracy of the vertical gain or time-base calibration.

(5) **BEAM FIND Switch**—When held in, compresses the display to within the graticule area and provides a visible viewing intensity to aid in locating off-screen displays.

(6) **TRACE ROTATION Control**—Screwdriver control used to align the crt trace with the horizontal graticule lines.

(7) **AUTO INTENSITY Control**—Adjusts brightness of the crt display. This control has no effect when the BEAM FIND switch is pressed in. Once the control is set, intensity is automatically maintained at approximately the same level between SEC/DIV switch settings from 0.5 ms per division to 0.05 μs per division.

VERTICAL

Refer to Figure 4 for location of items 8 through 16.

(8) **SERIAL and Mod Slots**—The SERIAL slot is imprinted with the instrument's serial number. The Mod slot contains the option number that has been installed in the instrument.

(9) **CH 1 OR X and CH 2 OR Y Connectors**—Provide for application of external signals to the inputs of the vertical deflection system or for an X-Y display. In the X-Y mode, the signal connected to the CH 1 OR X connector provides horizontal deflection, and the signal connected to the CH 2 OR Y connector provides vertical deflection.

(10) **GND Connector**—Provides direct connection to instrument chassis ground.

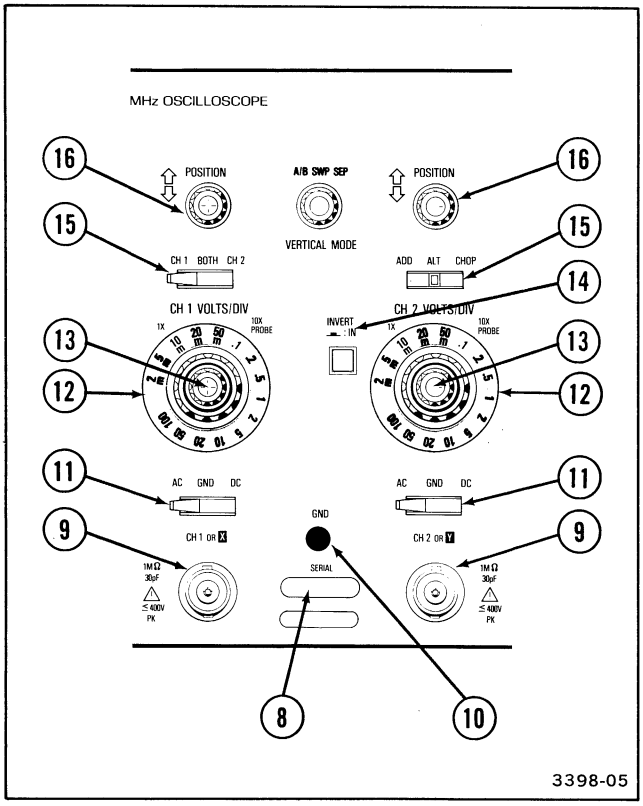


Figure 4. Vertical controls and connectors.

(11) **Input Coupling (AC-GND-DC) Switches**—Used to select the method of coupling input signals to the vertical deflection system.

AC—Input signal is capacitively coupled to the vertical amplifier. The dc component of the input signal is blocked. Low-frequency limit (–3 dB point) is approximately 10 Hz.

GND—The input of the vertical amplifier is grounded to provide a zero (ground) reference-voltage display (does not ground the input signal). This switch position allows precharging the input coupling capacitor.

DC—All frequency components of the input signal are coupled to the vertical deflection system.

(12) **CH 1 VOLTS/DIV and CH 2 VOLTS/DIV Switches**—Used to select the vertical deflection factor in a 1-2-5 sequence. To obtain a calibrated deflection factor, the VOLTS/DIV variable control must be in detent.

1X PROBE—Indicates the deflection factor selected when using either a 1X probe or a coaxial cable.

10X PROBE—Indicates the deflection factor selected when using a 10X probe.

(13) **VOLTS/DIV Variable Controls**—When rotated counterclockwise out of their detent positions, these controls provide continuously variable, uncalibrated deflection factors between the calibrated settings of the VOLTS/DIV switches.

(14) **INVERT Switch**—Inverts the Channel 2 display when button is pressed in. Push button must be pressed in a second time to release it and regain a noninverted display.

(15) **VERTICAL MODE Switches**—Two three-position switches are used to select the mode of operation for the vertical amplifier system.

CH 1—Selects only the Channel 1 input signal for display.

BOTH—Selects both Channel 1 and Channel 2 input signals for display. The BOTH position must be selected for either ADD, ALT, or CHOP operation.

CH 2—Selects only the Channel 2 input signal for display.

ADD—Displays the algebraic sum of the Channel 1 and Channel 2 input signals.

ALT—Alternately displays Channel 1 and Channel 2 input signals. The alternation occurs during retrace at the end of each sweep. This mode is useful for viewing both input signals at sweep speeds from 0.05 μs per division to 0.2 ms per division.

CHOP—The display switches between the Channel 1 and Channel 2 input signals during the sweep. The switching rate is approximately 250 kHz. This mode is useful for viewing both Channel 1 and Channel 2 input signals at sweep speeds from 0.5 ms per division to 0.5 s per division.

(16) **POSITION Controls**—Used to vertically position the display on the crt. When the SEC/DIV switch is set to X-Y, the Channel 2 POSITION control moves the display vertically (Y-axis), and the Horizontal POSITION control moves the display horizontally (X-axis).

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