TEK

2430A
DIGITAL OSCILLOSCOPE
USER REFERENCE GUIDE
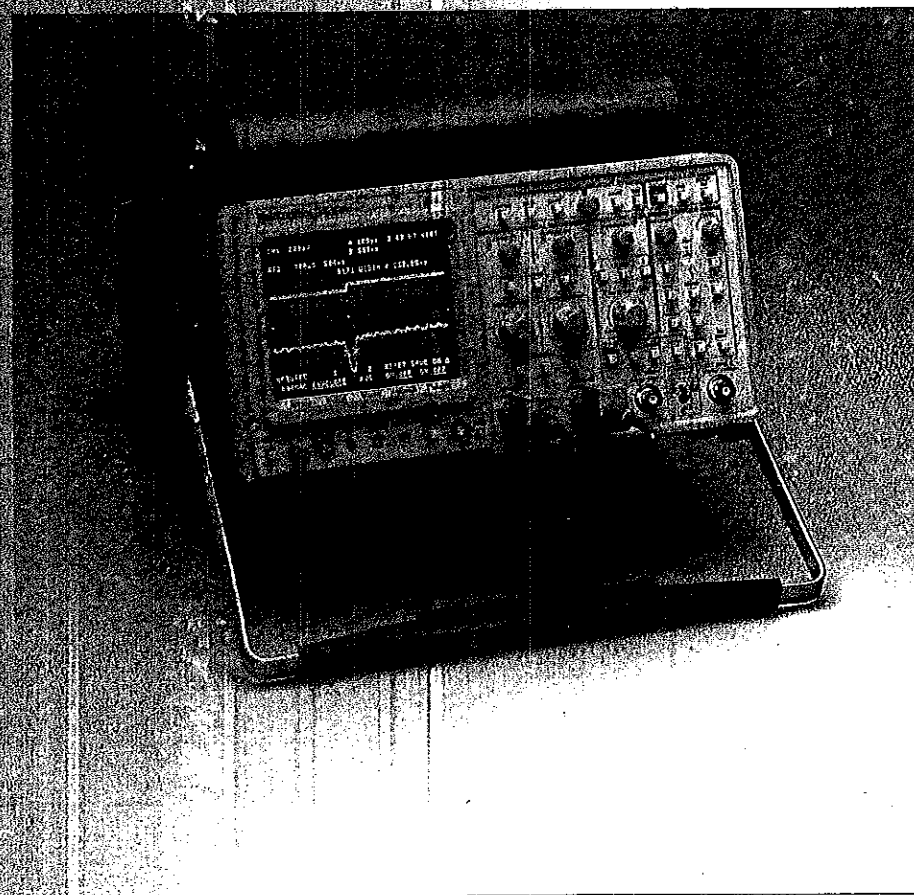
Tektronix
COMMITTED TO EXCELLENCE

INSTRUMENT SERIAL NUMBERS

Each instrument has a serial number on a panel insert, tag, or stamped on the chassis. The first number or letter designates the country of manufacture. The last five digits of the serial number are assigned sequentially and are unique to each instrument. Those manufactured in the United States have six unique digits. The country of manufacture is identified as follows:

B000000   Tektronix, Inc., Beaverton, Oregon, USA
G100000   Tektronix Guernsey, Ltd., Channel Islands
E200000   Tektronix United Kingdom, Ltd., Marlow
J300000   Sony/Tektronix, Japan
H700000   Tektronix Holland, NV, Heerenveen,The Netherlands
HK00000   Tektronix, Inc., Hong Kong

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Illustrations

SAFETY NOTE

This manual is a quick reference guide to the 2430A features. *It does not replace the 2430A Operators manual.* The 2430A Operators manual contains information related to safe use of this instrument as well as information necessary to prevent damage to the instrument or to other property. *Users should refer to the 2430A Operators manual before operating this instrument.* In particular, read the *Operators Safety Summary* at the beginning of the Operators manual, and "Preparation for Use" in Section 1.

GETTING STARTED

See Front Panel (Figure 1) for locating the controls on the 2430A.

Power On

Press the POWER switch, located on the front panel below the CRT.

The 2430A performs a power-on test each time it is turned on. When the test progresses to the point of being able to display, the message "RUNNING SELF TEST" is shown on the CRT. At the end of the self test, the message is removed.

If the 2430A fails the self test, it will enter the extended diagnostics (see "MENU OFF/EXTENDED FUNCTIONS" below for explanation). The 2430A may still be usable if the failed area does not affect the measurements to be made. Press MENU OFF to exit extended diagnostic and enter Scope mode.

The CAL/DIAG menu displays the message "NOT WARMED UP" for ten minutes after each power-on.

Menu Off/Extended Functions

In the CAL/DIAG menu, PASS or FAIL indicates the results of the last calibration or self diagnostic run. No label will appear if calibration has not been run since the last cold start.[a] If an "UNCALD" message appears in the extended diagnostics menu, it may indicate that the last attempt of extended calibration failed. In this case, allow the 2430A to warm up and do a SELF CAL. If the UNCALD message persists after a SELF CAL or some other area has failed, the previous calibration constants will not be overwritten, and the scope may be used. However, calibration should be checked by referring the instrument to a qualified service person. Press MENU OFF to exit extended diagnostics and enter Scope mode. More information on the self test and diagnostics is found in Appendix A of the Operators Manual.

[a]Cold Start is a complete initialization of the system, done only at the factory.

Initialization

Connect a standard accessory probe to the CH 1 input BNC.

Connect the probe tip to the CALIBRATOR loop; connect the probe ground lead to scope ground.

Press the PRGM SETUP button, located below the A AND B SEC/DIV knob.

Select INIT PANEL menu choice by pressing the bezel button directly below the INIT PANEL menu label.

The initial settings for major front-panel controls are as follows:

VERTICAL MODE	CH 1
CH 1 and CH 2 VOLTS/DIV	1V (With 10X probe)
A AND B SEC/DIV	1 ms
TRIGGER MODE	AUTO LEVEL
TRIGGER SOURCE	VERT (CH 1)
Input Coupling	1 MΩ DC
STORAGE MODE	ACQUIRE
ACQUIRE MODE	NORM

Verify that CH 1 Vertical Mode is selected (CH1 VOLT/DIV readout is in upper left corner of CRT). If CH 1 Vertical Mode is not selected, press Vertical MODE button and select CH 1 (see Section 10, *Vertical Mode*).

Press ACQUIRE button on front panel.

NOTE

Connecting a probe to the signal source and pressing the Auto Setup front-panel button will provide a scaled and triggered display. If no vertical channel is selected AUTO Setup will default to Channel 1. Auto Setup will not change the channel selected if either or both of the two channels are on. If the display intensity is set too low and the scaled display is not easy to see, Auto Setup boosts intensity so the display can be seen. Auto Setup does not affect readout or graticule intensity.
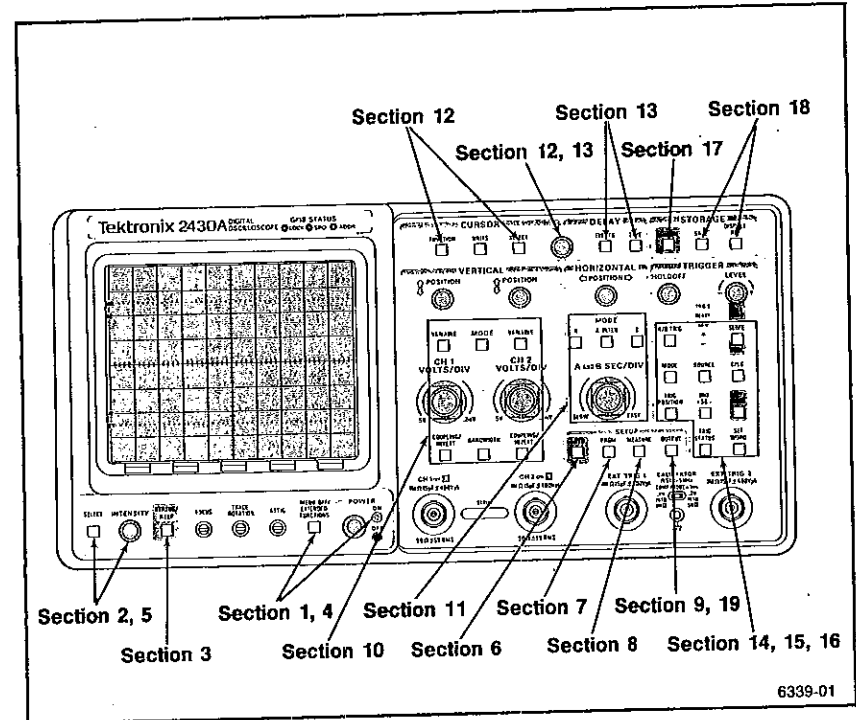
FRONT PANEL

Figure 1. Front Panel buttons and Controls.

CRT READOUT DISPLAY

Figure 2. CRT Readout Display.

STATUS MENU

Figure 3. Status Menu Display.

The Status Menu display will appear on screen when the STATUS/HELP front-panel button is selected. It provides an overview of instrument configuration at the time the selection is made. This menu will enable you to determine if you are currently operating in the desired modes, or if you are set in a conflicting mode (causing the instrument to appear to operate incorrectly). Special attention should be paid to the TRIGGER STATUS comment and the ACQ MODE statement in the lower-left quadrant of the screen, which enables you to determine the instrument's current activity.

You should become very familiar with this entire menu and the location and meaning of the readout characters. They will help you determine the cause of possible operational difficulties.

POWERING UP

|		
①	**POWER Button**	Does a power-on self test with each turn on. (See Section 1 for a more detailed description of POWER.)
②	**MENU OFF/EXTENDED FUNCTIONS Button**	Turns off any displayed menu or turns on the EXTENDED FUNCTIONS menu if a menu is not being displayed. When pressed to remove a menu display, all the scope hardware is reset to match the soft front-panel settings. Messages sent via GPIB will be erased. (See Section 1 for more a detailed description of MENU OFF/EXTENDED FUNCTIONS.)

6339-02
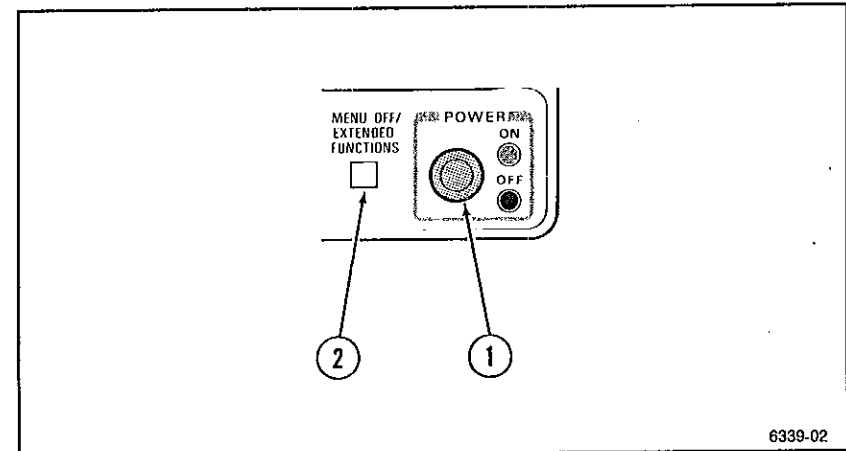
Figure 4. POWER and MENU OFF Button.

Menu Off/Extended Functions Menu

2. MENU OFF/EXTENDED FUNCTIONS

Turns off any menu being displayed or, if none is on, calls up the EXTENDED FUNCTIONS menus. See Appendix A in the Operators Manual for the Extended Functions Calibration and Diagnostics menus.

EXT FUNCT

	SYSTEM	SPECIAL	CAL/DIAG

Second-level menu for SYSTEM.

		PREFLT	
PANEL	MISC	ON¦OFF	VIDEO OPT

Third-level menu for PANEL.

	----TEKSECURE----	
PWR ON	ERASE	
LAST¦INIT	MEMORY	↑

Fourth-level menu for TEKSECURE ERASE MEMORY.
WARNING: WFM & PRGM MEMORY WILL BE ERASED.

ERASE

Third-level menu for MISC.

			ROLL	
BELL	TRIG T	AUTO	MENU	
ON¦OFF	ON¦OFF	PROBE	ON¦OFF	↑

Fourth-Level menu for AUTO PROBE.

SELECT PROBE IDENTIFY FUNCTION

AUTO	STEP		SAVE/	
SETUP	PRGM	INIT@50%	ACQUIRE	↑

Third-level menu for SYSTEM VIDEO OPT.

TV SYS	CNT RST	
M¦NON/M	BOTH¦F1	↑

Second-level menu for SPECIAL.

WARNING: SERVICE ONLY-SEE MANUAL (if enabled)
DISABLED-SEE MANUAL (if disabled)

COLD	CCD	CCD	CAL PATH	FORCE
START	SIDES	ADJ	ON¦OFF	DAC

Second-level menu for CAL/DIAG.

<status>	<status>	<status>	NOT WARMED UP
SELF	EXT	SELF	EXT
CAL	CAL	DIAG	DIAG

Second-level menu for CAL/DIAG.

<status>	<status>	<status>	NOT WARMED UP
SELF	EXT	SELF	EXT
CAL	CAL	DIAG	DIAG

Menu Off/Extended Functions Menu
(Instruments Serial # B019999 & Below)

2. MENU OFF/EXTENDED FUNCTIONS

Turns off any menu being displayed or, if none are on, calls up the EXTENDED FUNCTIONS menus. See Appendix A in the Operators Manual for the Extended Functions Calibration and Diagnostics menus:

EXT FUNCT

	SYSTEM	SPECIAL	CAL/DIAG

Second-level menu for SYSTEM.

		PREFLT	
PANEL	MISC	ON¦OFF	VIDEO OPT

Third-level menu for SYSTEM PANEL.

PWR ON	
LAST¦INIT	↑

Third-level menu for SYSTEM MISC.

BELL	TRIG T	
ON¦OFF	ON¦OFF	↑

Third-level menu for SYSTEM VIDEO OPT.

TV SYS	CNT RST	
M¦NON/M	BOTH¦F1	↑

Second-level menu for SPECIAL.

WARNING: SERVICE ONLY--SEE MANUAL (if enabled)
DISABLED--SEE MANUAL (if disabled)

COLD		CAL PATH	FORCE
START		ON¦OFF	DAC

Second-level menu for CAL/DIAG.

<status>	<status>	<status>	NOT WARMED UP
SELF	EXT	SELF	EXT
CAL	CAL	DIAG	DIAG

CRT DISPLAY MENUS

① **INTENSITY Control**   A continuous rotating pot, the Intensity control adjusts the intensity of any of four screen elements (readout, display, A INTEN zone, and graticule). It always controls the element last selected in the Select menu, except when STATUS is selected. It then controls the readout intensity.

② **SELECT Button**   Toggles between readout and display after turning on the menu.
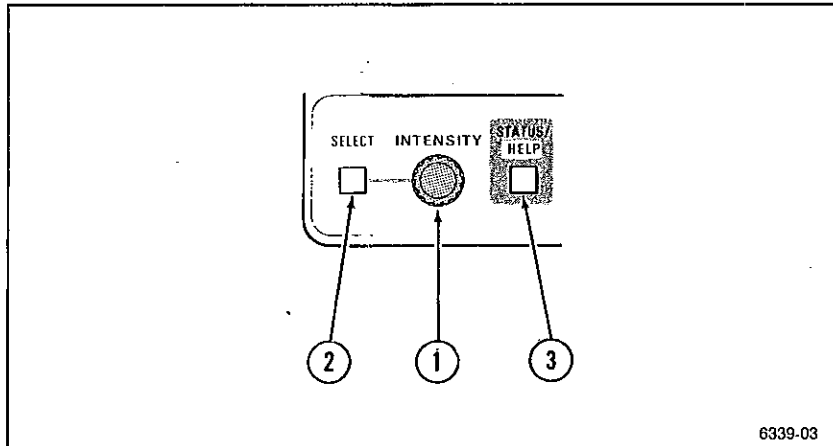

6339-03

Figure 5. INTENSITY Control, SELECT and STATUS/HELP Buttons.

③ **STATUS/HELP Button**   Pressing this button displays a Status menu (see Page 5) which can help you determine why a display is not seen or triggering is not occurring. Some common conditions to check for are:

- Channel called up?

- Display intensity setting?

- Ground indicator (+) and trigger position (T) at top or bottom edge (vertical position)?

Common triggering conditions:

- Single sequence on?

- Save Mode?

- Events on?

- Delay on?

- Trig wait state?

- Ext clk on?

The top three lines of the status menu update with front control changes. Remaining lines are updated with a press of the status button.

Pushing MENU OFF or calling up another menu turns off the status display.

HELP (see below).

CRT Display On-Screen Menus

2. SELECT	INTENSITY				VECTORS
	READOUT	DISP	INTENS	GRAT	ON:OFF

INTENS: Controls brightness of intensified zone in A Intensified.

GRAT: Controls graticule intensity.

3. STATUS/HELP	Presents an instrument status display (see Page 5) and increases the readout intensity to 65% to ensure visibility. Intensity adjustment will now control readout intensity. Intensity control will return to function selected before entering STATUS menu mode when the STATUS menu is removed.
	Pressing MENU OFF or any other front-panel control that requires a menu display removes the STATUS display from the CRT.
	When HELP mode is selected, operating any front-panel knob or button will cause a screen full of information to be displayed. If -MORE- appears at the lower-left corner of the screen, selection of MORE will cause additional information to be displayed. Press EXIT MENU to return to normal operation.

AUTO SETUP

(1) AUTO SETUP Button   Selecting this button will cause the scope to set the vertical, horizontal, and triggers to display the input signal on the selected vertical channel or channels.

View Mode   Selects sweep speed for 2-5 cycles on screen.

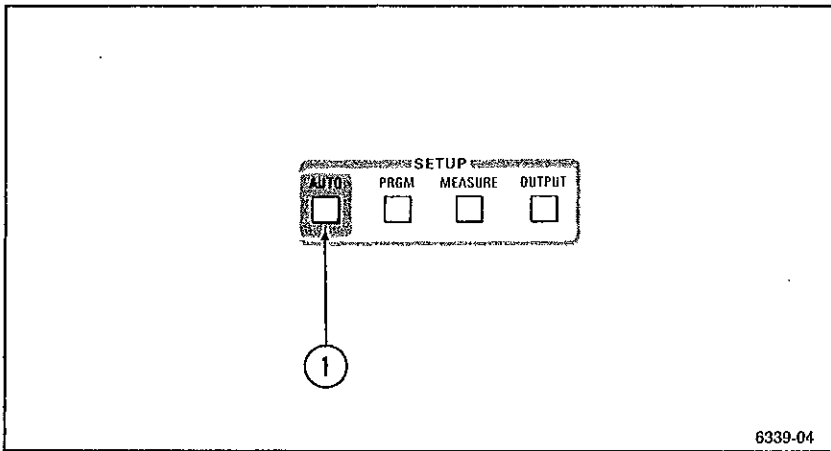Other modes optimize scaling for selected signal type.

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Figure 6. AUTO SETUP Button.

Auto Setup On-Screen Menus

1. AUTO SETUP				EDGE	RES
	VIEW	PERIOD	PULSE	⌐¦⌐	HI¦LO

NOTE

RES HI¦LO only appears when in Measurement modes, (i.e., PERIOD, PULSE, or EDGE).

PRGM AUTOSTEP

(2) **PRGM Button** Selecting PRGM displays the AUTOSTEP SEQUENCER menu. This menu lets you save and recall typically 50 to 200 front-panel setups, and associated control and I/O actions, in as many as named test or measurement procedures.

To save a single front panel:

1. Press PRGM (Program) on front panel.

2. Select SAVE bezel button.

3. Select SAVE bezel button in second level menu.

4. Set up front panel that you want to save.

5. Press PRGM (Program) button on front panel.

6. Press SAVE SEQ bezel button.
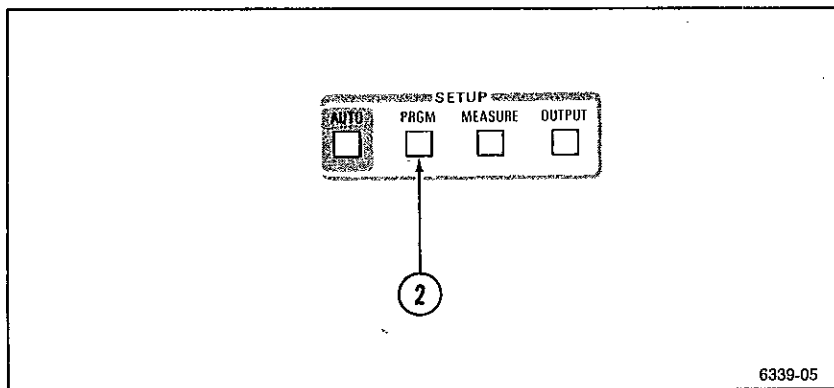
6339-05

Figure 7. PRGM Button.

AutoStep Sequencer Control Menus

2. PRGM	----------AUTOSTEP SEQUENCER----------			MEMORY nn%
	SAVE	RECALL	DELETE	EDIT	INIT
					PANEL

Second-level menu for SAVE.

USE ARROW KEYS TO CHANGE NAME:

ROLL-CHARS		CURSOR		
↑	↓	< >	SAVE	EXIT

Instruction message displayed after pushing SAVE. (This message is displayed any time the user is expected to setup the front-panel controls.)

SETUP CONTROLS, PUSH PRGM TO CONTINUE
SEQUENCE <name> STEP <num> MEMORY <%>

Third-level menu for second-level SAVE. This menu is displayed after pushing PRGM as directed in the instruction message.

SEQUENCE <name> STEP <num> MEMORY <%>
BEGIN STEP
REPEAT   <N>
SELF-CAL   <N>   PRINT/PLOT   <N>
SELF-TEST   <N>   BELL   <N>
LOAD PANEL   SRQ   <N>
AUTOSETUP   <N>   PAUSE   <N>
MEASUREMENTS   PROJECT   <N>
                       END STEP

SET STEP ACTIONS

			NEXT	SAVE
↑	↓	Y¦N	STEP	SEQ

AutoStep Sequencer Control Menus (cont)

Second-level menu for RECALL.

First Labeled Sequence
Second Labeled Sequence
nth Labeled Sequence

---------SELECT---------

↑	↓	RECALL		EXIT

Second-level menu for DELETE.

First Labeled Sequence
Second Labeled Sequence
nth Labeled Sequence

---------SELECT---------

↑	↓	DELETE		EXIT

Second-level menu for EDIT.

First Labeled Sequence
Second Labeled Sequence
nth Labeled Sequence

---------SELECT---------

↑	↓	EDIT	COPY	EXIT

Third-level menu for EDIT.

---------SELECT--------- DELETE

↑	↓	TO BUF	ADD	EXIT

Third-level menu for COPY.

USE ARROW KEYS TO CHANGE NAME:

ROLL-CHARS   CURSOR

↑	↓	< >	SAVE	EXIT

Fourth-level menu for ADD.

LOAD
BUFFER   EXIT

MEASURE

③ MEASURE
Button
(Waveform
Parameter
Extraction)

Pressing this front panel button displays MEASURE menu on screen.

Provides selects for measurement type, setup and snapshots.

> *NOTE*
>
> *In MEASURE menu, MARK ON selection turns on "X" markers that indicate measurement locations, i.e., 10%-90% risetime locations.*

> *NOTE*
>
> *If WINDOW menu is selected, time cursors must be manually selected. The cursors can then be set to bracket the portion of the waveform to be measured.*
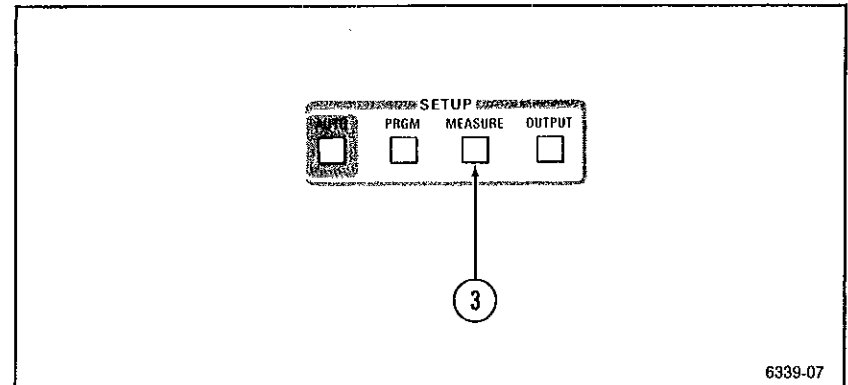

6339-07

Figure 8. MEASURE Button.

Measure Menus

3. MEASURE

	MEAS	SETUP	DISPLAY	WINDOW
SNAPSHOT	TYPE	·	ON!OFF	ON!OFF

Second-level menu for SNAPSHOT when more than one display source is displayed.

TARGET:

CH1	CH2	MULT/ADD	REF

Resulting display when either SNAPSHOT is pressed and only one display source is on screen or when the TARGET waveform is selected.

SNAPSHOT READOUT:

SNAPSHOT OF CHx USING MIN/MAX METHOD:

DIS=4.35 V	TOP=5.01 V	WID=20.3 μS
MES=2.12V	BASE=2.00 mV	DUTY=50%
PRX=-1.23 mV	MEAN=2.32 V	FREQ=24.6 kH
MAX=5.15 V	OVRS=2.0%	PER=40.6 μS
MID=2.47 V	UNDS=1.0%	RISE=28.4 nS
MIN=21.4 mV	RMS=2.65 V	FALL=18.3 nS
P-P=5.36 V	AREA=47.5 nVs	

DIST=90.0%	MES=50.0%	PROX=10.0%
AGAIN		↑

1: Returns the scope to the MEASURE Menu.

AGAIN: Initiates another snapshot.

Measure Menus (cont)

Second-level menu for SETUP.

			MARK
........METHOD........			
MIN/MAX HIST CURSOR		LEVEL	ON!OFF

This menu is used to set up criteria for extraction of LEVEL. Pushing the menu button labeled LEVEL displays a third level menu which allows the DISTAL, MESIAL, and PROXimal levels on the waveform to be specified.

Third-level menu for LEVEL.

ADJUST LEVELS WITH CURSOR/DELAY KNOB

nn%	nn%	n.nV	nn%	
DISTAL	MESIAL	PROXIMAL	MESIAL2	%!VOLT

Second-level menu for MEAS TYPE.

MEAS TYPE: The continuous parameter extraction function is executed by selecting up to four parameters for display from a parameter matrix. Pushing the menu button labeled MEAS causes the Parameter Selection menu to be displayed:

DISTAL	MESIAL	PROX	MAX	MID
MIN	PK-PK	TOP	BASE	MEAN
OVRSHT	UNDRSHT	RMS	AREA	WIDTH
DUTY	FREQ	PERIOD	RISE	FALL
DELAY				

←	→	↓	ON	OFF

Third-level menu for MEAS TYPE when more than one display source is displayed and DELAY is not selected in the parameter matrix.

TARGET:

| CH1 | CH2 | MULT/ADD | REF |

Selection of DELAY as the parameter to be extracted causes a different third- and fourth-level TARGET menu to be displayed.

Third-level menu for MEAS TYPE when more than one display source is displayed and DELAY is selected in the parameter matrix.

DELAY FROM
TARGET:

| CH1 | CH2 | MUL/ADD | REF |

Fourth-level menu for MEAS TYPE when more than one display source is displayed and DELAY is selected in the parameter matrix.

DELAY TO
TARGET:

| CH1 | CH2 | MUL/ADD | REF |

OUTPUT

④ OUTPUT Button

Calls up the OUTPUT menu for configuring the GPIB.

6339-08
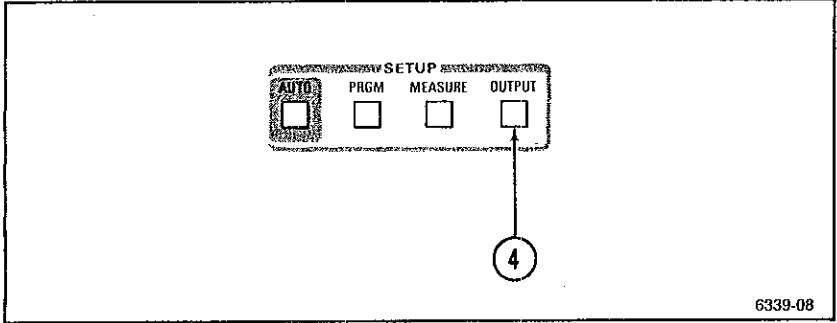
Figure 9. OUTPUT Button.

OUTPUT Control Menus

4. OUTPUT	STATUS SETUP DEBUG TRANSMIT/(PRINT)
	STATUS calls up an on-screen display of most GPIB parameters in which a system user might be interested.
	TRANSMIT/PRINT/PLOT switches to ABORT when transmitting, printing, or plotting. TRANSMIT/PRINT/PLOT disappears in OFF BUS mode.
	Second-level menu for GPIB SETUP. OUTPUT SETUP MODE TERM ADDR ENCDG
	Third-level menu for GPIB MODE. T/ONLY L/ONLY T/L DEVICES OFF BUS
	Selecting DEVICES changes TRANSMIT to PRINT (or PLOT) in the OUTPUT control menu. Selecting OFF BUS turns off the TRANSMIT/PRINT/PLOT choice.
	Fourth-level menu for DEVICES. HPGL THINKJET PLOTTER PRINTER SETUP

OUTPUT Control Menus (cont)

Fifth-level menu for SETUP.

SETTINGS	TEXT	GRAT	WFM	PGSIZE
ON¦OFF	ON¦OFF	ON¦OFF	ON¦OFF	US¦A4

Fourth-level menu for GPIB T/ONLY.

```
........ SEND CURVE ........
ONLY    WFMPRE/CURVE        SEND PRGM
```

Third-level menu for GPIB TERM.

```
EOI      LF/EOI
```

Third-level menu for GPIB ADDR.

```
GPIB ADDRESS    =                nn
                ↑                ↓
```

Third-level menu for GPIB ENCDG.

```
..........WHOLE WFMS............        PARTIAL WFMS
     ASCII    RP    RI                   RP    RI
```

RI encoding is a two's-complement format. RP is positive-integer format. At power-on the scope assumes that the data is formatted RI. The user must select RP (or send ENCDG RP via GPIB) to get positive-integer formats interpreted correctly.

Second-level menu for GPIB DEBUG.

DEBUG	.... MONITOR		-SCREEN UPDATE-	
ON¦OFF	BUS¦SCOPE	IN¦OUT	SLOW	PAUSE

VERTICAL

(1)	**VERTICAL POSITION Controls**	CH 1 is the HORIZONTAL POSITION control in XY mode.
(2)	**VARIABLE Buttons**	CH 1 VARIABLE uncalibrates the ADD mode readout, but the CH 2 VARIABLE does not. This feature lets you input a sample of an unwanted signal into CH 2 and adjust the CH 2 VARIABLE to cancel the unwanted signal in the ADD display. See Section 3 of the Operators Manual for use of this feature.

Arrow (↑ and ↓) menu button functions are continuous when held down. CAL returns V/D to calibrated setting.

(3)	**VOLTS/DIV Switches**	Readouts automatically adjust to the correct readout scale factor when 1X, 10X, 100X, and 1000X TEK coded-attenuator probes are attached.

VOLTS/DIV is the vertical expansion control in SAVE storage mode and the extended range control in AVG ACQUIRE mode.
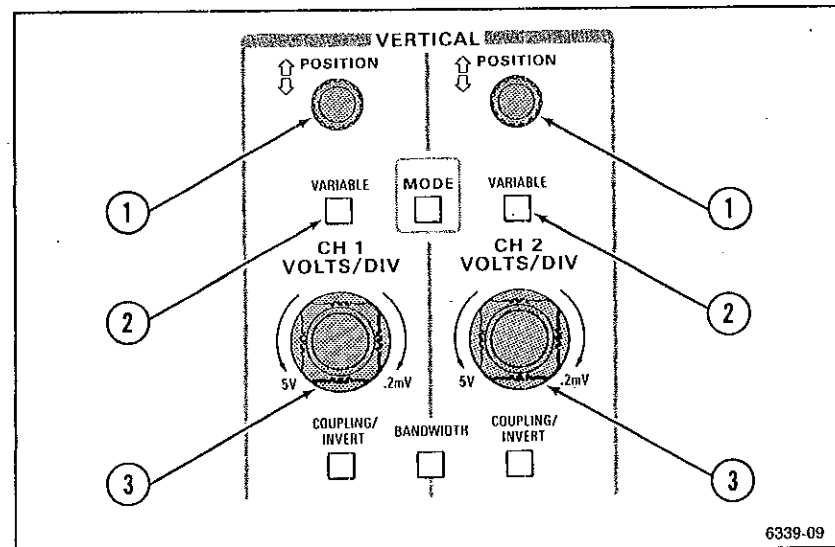

6339-09

Figure 10a. Vertical Buttons and Controls.

(4) MODE Button — Initiates Vertical MODE menu on screen. Active selections are underscored.

The resultant signal of a MULT display is scaled down by a factor of 5.12 to maintain the display within the graticule area.

XY mode automatically turns on the CH 1 and CH 2 signals REF 1 vs REF 2, may be displayed as XY REF.

NOTE

In this menu, CH 1, CH 2, ADD and MULT buttons are push/push; one push turns the mode on, another turns it off. Also, selecting ADD turns MULT off, and vice versa. Pushing YT:XY toggles the mode between YT and XY. Functions are underscored when turned on.
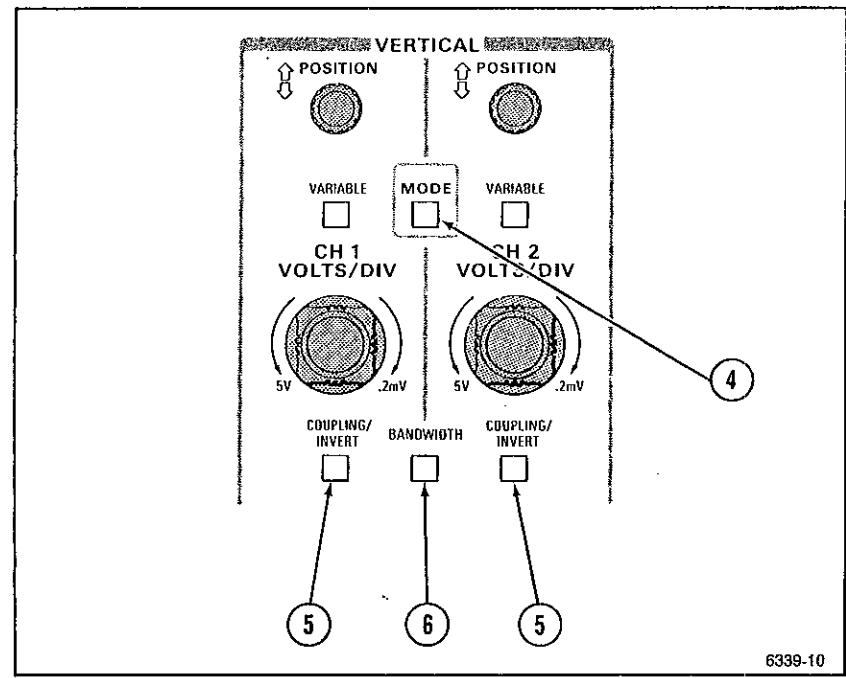
Figure 10b. Vertical Buttons and Controls.

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(5) COUPLING/ INVERT Buttons — May be used to switch through the available coupling choices after menu is called up.

AC coupling and 50 Ω termination are mutually exclusive.

(6) BANDWIDTH Button — May be used to scroll through menu choices after menu is called up.

Vertical On-Screen Menus

2. VARIABLE	CH1 VARIABLE CAL ↓ ↑
	CH2 VARIABLE CAL ↓ ↑
4. VERTICAL MODE	In YT Mode. VERTICAL MODE CH1 CH2 ADD MULT YT:XY
	In XY Mode. VERTICAL MODE CH1 vs CH2 YT:XY
5. COUPLING INVERT	CH1 COUPLING 50 Ω INVERT AC DC GND ON:OFF ON:OFF
	CH2 COUPLING 50 Ω INVERT AC DC GND ON:OFF ON:OFF

6. BANDWIDTH	(For Instruments with Serial # B020000 & Above)
	USB=xxxxHz USR=xxxx s SR=xxxxS/s
	           ....BANDWIDTH.......... SMOOTH
	20 MHz 50 MHz FULL ON:OFF
	
	The number xxxx depends on the Acquisition Mode, the SEC/DIV setting, and the bandwidth selected.

6. BANDWIDTH	(For Instruments with Serial # B019999 & Below)
	USB=xxxxHz USR=xxxx s
	           ....BANDWIDTH.......... SMOOTH
	20 MHz 50 MHz FULL ON:OFF
	
	The number xxxx depends on the Acquisition Mode, the SEC/DIV setting, and the bandwidth selected.

HORIZONTAL

① **A Button** — Selects A Horizontal mode. SEC/DIV switch (2) will control A SEC/DIV.

② **A AND B SEC/DIV Switch** — Determines sweep rate for A and B sweep functions. Used in SAVE mode to horizontally expand display. Do not change Horizontal mode after entering SAVE storage mode if using horizontal expansion. ROLL mode replaces AUTO mode in the A TRIGGER mode menu for A SEC/DIV settings ≤ 100 ms/div.

③ **A INTEN Button** — Selects A INTENsified Horizontal mode. SEC/DIV switch (2) will control the B SEC/DIV.

④ **B Button** — Selects B Delayed sweep operation. SEC/DIV switch will now control B sweep rate.
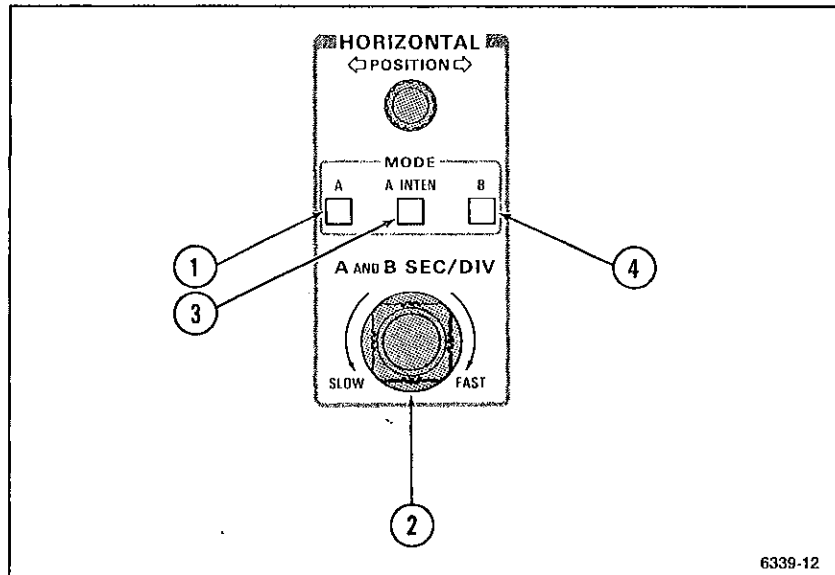

Figure 11. Horizontal Buttons and Controls.

CURSORS

① **FUNCTION Button** — Displays CURSOR FUNCTION menu on screen. Selecting a cursor function (VOLTS, etc.) from the menu advances to the second level ATTACH cursors menu. When neither the CURSOR FUNCTION or ATTACH CURSORS menu is displayed, pressing CURSOR FUNCTION twice steps through the CURSOR FUNCTION menu to the ATTACH CURSOR menu. Turning a cursor function off and back on also displays the ATTACH CURSOR menu.

② **UNITS Button** — Displays UNITS menu on screen.

③ **SELECT Button** — Selects which cursor the CURSOR/DELAY knob (4) controls.

NOTE

No cursor, regardless of type, can be positioned off screen; all cursors are bound at the screen perimeter. For cursor functions displaying time cursors, attempting to move either cursor past either edge of the screen causes the display to horizontally reposition. Pressing SELECT moves the bound cursor to center screen.
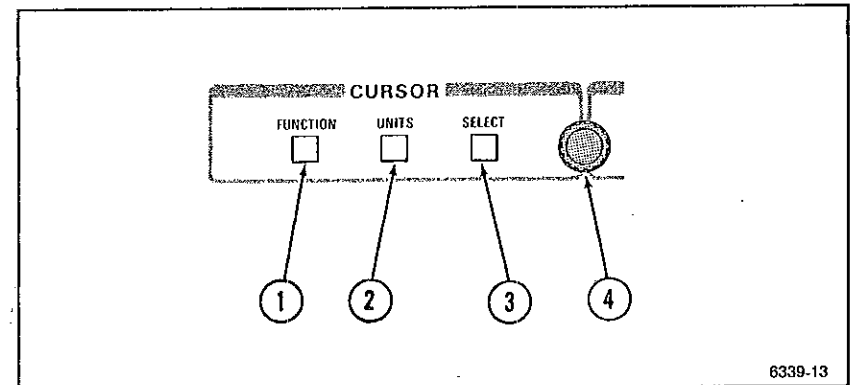

Figure 12. Cursor Buttons and Controls.

(4) **CURSOR/DELAY Control** Controls active cursor positioning, adjusts DELAY TIME or DELAY EVENTS.

When time cursors are displayed and active, the CURSOR/DELAY knob may be used to scroll through the entire record length. Cursors will operate similarly for a reference waveform when attached to that displayed reference waveform.

CURSOR/DELAY knob is a shared control. It positions cursors for cursor functions and sets delay times or delay events number for DELAY functions.

NOTE

Bezel buttons operate in a push/push mode, selecting and deselecting the function. Selection of an alternate function will deselect a previous mode.

Cursor On-Screen Menus

1. FUNCTION	CURSOR FUNCTION
	VOLTS TIME V@T SLOPE 1/TIME
	Second-level menu for a CURSOR FUNCTION selection.
	In YT Mode.
	ATTACH CURSORS TO:
	No Δ delay
	CH1 CH2 (func) (func)Δ REF n
	Δ delay—CH1 on
	CH1 CH1Δ (func) (func)Δ REF n
	Δ delay—CH1 and CH2 on
	CH1 CH2Δ (func) (func)Δ REF n
	Function is either ADD or MULT; they are mutually exclusive. Pressing REF rolls through the displayed reference waveforms. Only waveforms called up for display are included in the ATTACH CURSORS menu.
	In XY Mode (with CH1 vs CH2 and XYREF selected).
	ATTACH CURSORS TO:
	CH1 vs CH2 XYREF

Cursor On-Screen Menus (cont)

2. UNITS	In VOLTS or V@T.
	UNITS VOLTS CURS REF=xxxxxx
	VOLTS % dB NEW REF ΔIABS
	In SLOPE.
	UNITS SLOPE CURS REF=xxxxxx
	SLOPE % DEGREES NEW REF
	In 1/TIME.
	UNITS 1/TIME CURS REF=xxxxxx
	Hz % DEGREES NEW REF ΔIABS
	In TIME.
	UNITS TIME CURS REF=xxxxxx
	SEC % DEGREES NEW REF ΔIABS

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DELAY FUNCTIONS

① **CURSOR/DELAY Control** — Sets delay times or delay event number for Delay functions. It defaults to cursors control when neither Delay function menu is displayed.

② **EVENTS Button** — Selects DELAY by EVENTS function and directs the CURSOR/DELAY knob (1) to control the events count.

③ **TIME Button** — Selects DELAY by TIME, and switches between Main Delay and Delta Delay functions. CURSOR/DELAY control knob (1) is used to set time delay.

Triggers must be supplied by means of the B trigger circuitry to obtain Event triggering when EVENTS is on. A delayed by B events and B delayed by time may be used sequentially.
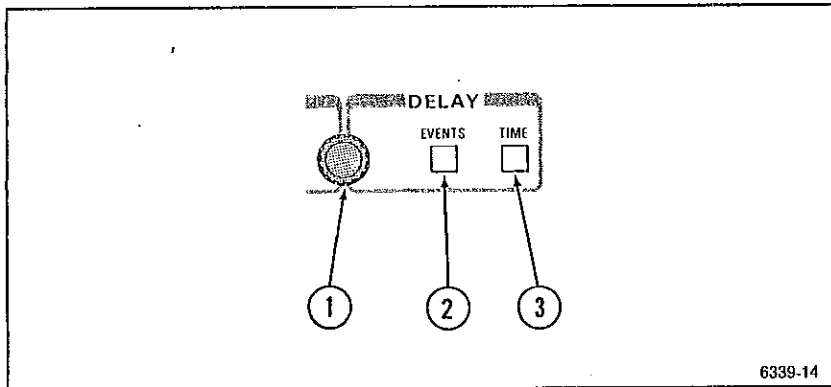

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Figure 13. Delay Buttons and Controls.

Delay On-Screen Menus

2. DELAY by EVENTS	EVENTS START AT A TRIG	EVENTS
	EVENTS COUNT = xxxxx B TRIGS	ON!OFF
3. DELAY by TIME	With Δ TIME OFF.	
	DELAY TIME = xxxxxx B	ΔTIME ON!OFF
	With ΔTIME ON.	
	DELAY TIME = xxxxxx B	ΔTIME
	ΔDELAY TIME = xxxxxx B	ON!OFF
	DELAY by TIME button is pressed to switch the CURSOR/DELAY position knob between the Main DELAY TIME and the Δ (delta) DELAY TIME when ΔTIME is ON.	

TRIGGERING

|		
①	**CPLG Button**	Switches through the menu choices (except VIDEO) when pushed repeatedly.
②	**SET VIDEO Button**	Displays A VIDEO COUPLING menu (on scopes equipped with Video trigger only). Video coupling is selected by means of the A TRIGGER COUPLING menu; mode (or type) of video coupling is selected by means of the A VIDEO COUPLING menu. Video signal must be interlaced for field 2 to appear in on-screen readout.
③	**SET WORD Button**	Displays the Word Recognizer Probe configuration menu.

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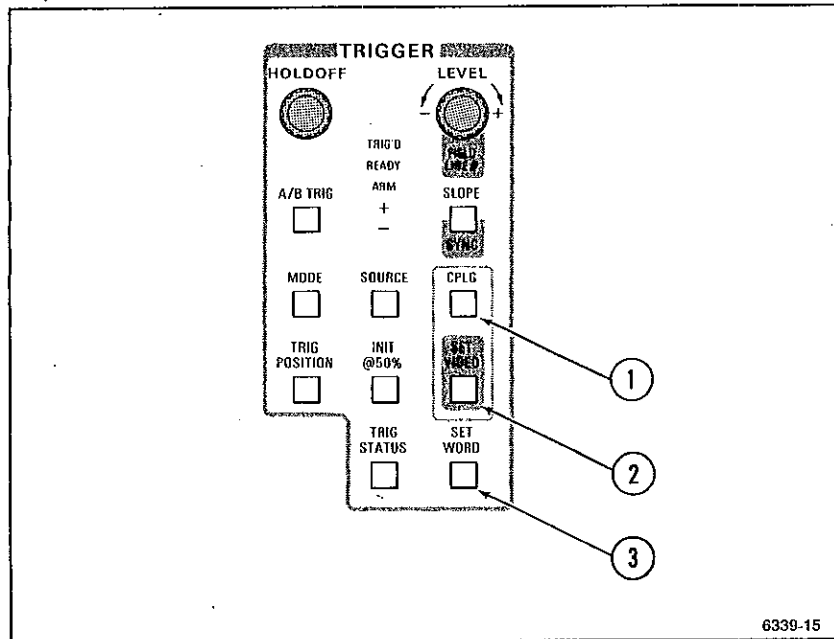
Figure 14. Trigger CPLG, SET VIDEO, and SET WORD Buttons.

Trigger On-Screen Menus

1. TRIGGER CPLG	Without the Video Option.

A COUPLING   ------REJECT------
   DC   AC   NOISE   HF   LF

With the Video Option installed.

A COUPLING   ------REJECT------
  DC¦AC   VIDEO   NOISE   HF   LF

2. SET VIDEO	Video Option only (for interlaced signals).

A VIDEO COUPLING   CLAMP
  FIELD 1   FIELD 2   ALT   TVLINE   ON¦OFF

Video Option only (for non-interlaced signals).

A VIDEO COUPLING   CLAMP
  FIELD 1   TVLINE   ON¦OFF

3. SET WORD	RADIX -----CLOCK----- SET OCT¦HEX _/ ¬_ ASYNC BITS

Second-level menu for SET BITS.

In HEXadecimal:

TRIG WORD:
  CLK=*   HHHH   x xxxx xxxx xxxx xxxx
   1   0   X   ←   →
*Setting for clock in the first-level menu appears here.

In OCTal:

TRIG WORD:
  CLK=*   OOOOOO   x xxx xxx xxx xxx xxx
   1   0   X   ←   →
*Setting for clock in the first-level menu appears here.

④ **SOURCE Button** Toggles between 1 and 2 if channel or external trigger is the selected source.

A and B trigger conditions must be met to obtain a trigger in A 'AND' B. SOURCE remains as the last valid choice. EXTernal GAIN selection is made from the second level of the Trigger SOURCE menu.

⑤ **INIT @50% Button** Causes the 2430A to do a single Auto Level Trigger cycle automatically, setting the trigger level at 50% of peak-to-peak signal value.

⑥ **TRIG STATUS Button** Activates the TRIGGER STATUS menu, which shows the current Trigger mode, Source, Coupling and Trigger position selection for the A and B triggers.
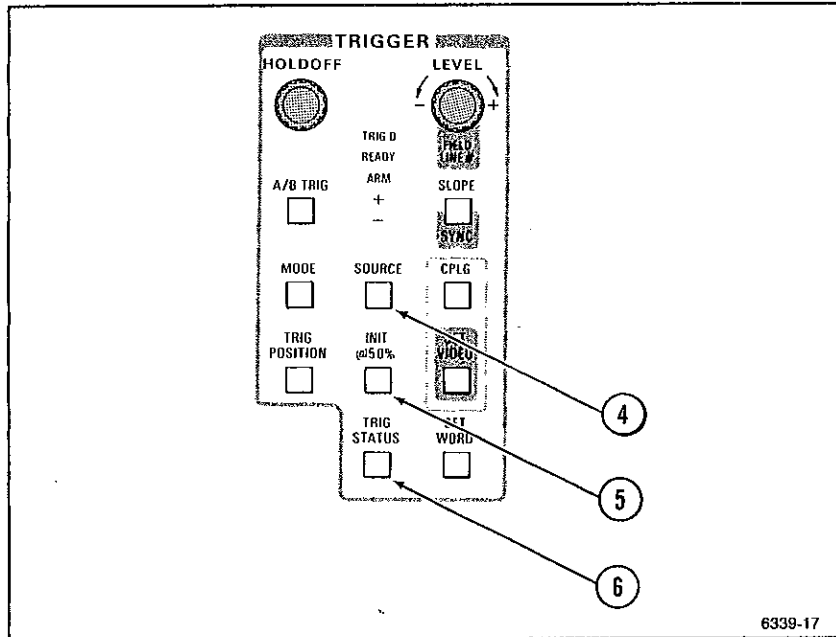
Figure 15. Trigger SOURCE, INIT @50%, and TRIG STATUS Buttons.

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Trigger On-Screen Menus (cont)

4. TRIGGER SOURCE	A TRIG SOURCE

	VERT	CHAN	EXT		
	CH1	1!2	1!2	LINE	A*B!WORD
	CH2				
	ADD				
	MULT				

Second-level menu for A EXT.

A EXT
SOURCE   -------A AND B EXT GAIN-------
1!2   EXT 1   EXT 1/5   EXT 2   EXT2/5

6. TRIG STATUS	TRIG STATUS

A*B MODE   SOURCE   CPLG   TRIG POS
----   ------   ----------   ----   ---- ----

A (Setup conditions for the A Trigger Controls.)
B (Setup conditions for the B Trigger Controls.)

A TRIGGERING

⑦ **MODE Button**   Displays TRIGGER MODE menu. Steps through the mode choices in menu, except SINGLE SEQ, when pushed repeatedly.

⑧ **TRIG POSITION Button**   Displays TRIGGER POSITION MENU. Steps through the menu choices when pushed repeatedly.

⑨ **A/B TRIG Button**   Selects between A and B Trigger menu displays for configuration. SLOPE, MODE, SOURCE, CPLG, LEVEL and TRIG POSITION controls are shared by A and B trigger system.
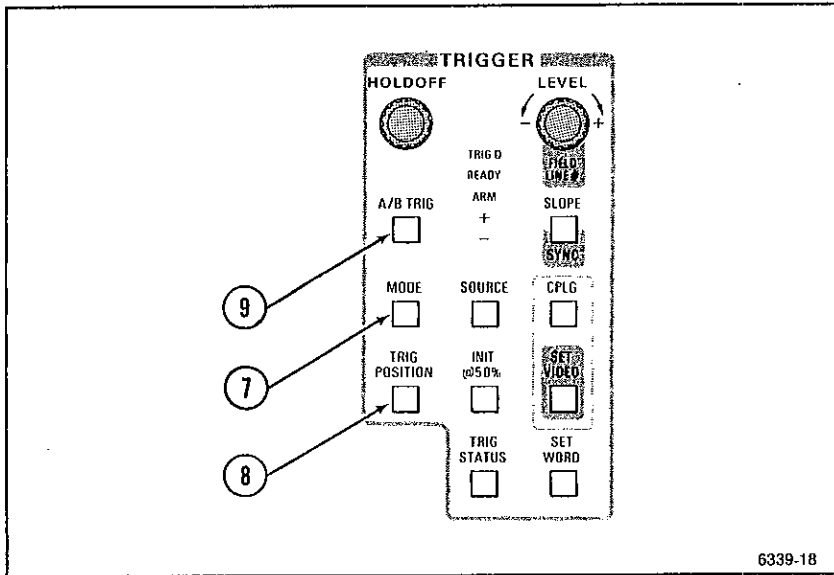

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Figure 16. A Trigger MODE, TRIG POSITION, A/B TRIG Buttons.

A Trigger On-Screen Menus

7. TRIGGER MODE	A TRIG MODE			
	AUTO			SINGLE
	LEVEL	AUTO	NORMAL	SEQ
	AUTO switches to ROLL at 100 ms/div and slower.			

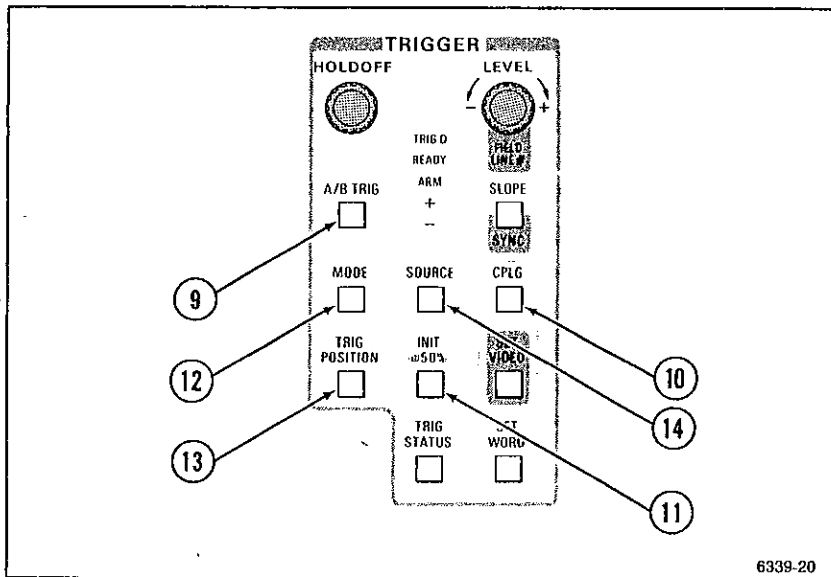| 8. TRIGGER POSITION	A TRIGGER POSITION				
	1/8	1/4	1/2	3/4	7/8

NOTE

If a position other than 1/8, 1/4, 1/2, 3/4, 7/8 is selected over GPIB, then no on-screen selection will be underlined.

B TRIGGERING

⑨ A/B TRIG Button — Toggles the trigger controls between controlling the A and B trigger systems.

⑩ CPLG Button — Displays TRIGGER COUPLING menu. Switches through the menu choices when pushed repeatedly.

⑪ INIT 50% Button — Causes the 2430A to do a single Auto Level Trigger cycle automatically, setting the trigger level at 50% of peak-to-peak signal value.

⑫ MODE Button — Toggles between RUNS AFTER and TRIG AFTER when pressed repeatedly.

EXT CLK ON sets the time cursor readouts and the delay time numbers to CLK (clock) units. A clock signal must be provided by means of the B trigger circuitry to obtain triggering.

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Figure 17. B Trigger A/B TRIG, CPLG, INIT @50%, MODE, TRIG POSITION, SOURCE Buttons.

⑬ TRIG POSITION Button — Displays the control menu used to select the Record Trigger position in the waveform display.

⑭ SOURCE Button — Displays the B TRIGGER SOURCE menu.

B Trigger On-Screen Menus

10. TRIGGER CPLG	In B TRIG AFTER Delay Mode.

B COUPLING
B, EXT CLK CPLG (with EXT CLOCK ON)
B, EVENTS CPLG (with DELAY by EVENTS ON)
B, CLK, EVENTS (with both ON)

			-----REJECT-----	
DC	AC	NOISE	HF	LF

In B RUNS AFTER Delay Mode.

B COUPLING
EXT CLK CPLG (with EXT CLOCK ON)
EVENTS COUPLING (with DELAY by EVENTS ON)
EVENTS, CLK (with both ON)

			-----REJECT-----	
DC	AC	NOISE	HF	LF

12. TRIGGER MODE	B TRIG	RUNS AFTER	TRIG AFTER	EXT CLK ON:OFF	
13. TRIG POSITION	B TRIGGER POSITION				
	1/8	1/4	1/2	3/4	7/8

B Trigger On-Screen Menus (cont)

14. TRIGGER SOURCE	In B TRIG AFTER Delay Mode.

In B TRIG AFTER Delay Mode.

B TRIG SOURCE
B, EXT CLOCK SOURCE (with EXT CLOCK ON)
B, EVENTS SOURCE (with DELAY by EVENTS ON)
B, EXT CLK, EVNT SOURCE (with both ON)

SOURCE			
VERT	CHAN	EXT	
CH1	1¦2	1¦2	WORD
CH2			
ADD			

In B RUNS AFTER Delay Mode.

B TRIG SOURCE
EXT CLK SOURCE (with EXT CLOCK ON)
EVENTS SOURCE (with DELAY by EVENTS ON)
EVENTS, EXT CLK SOURCE (with both ON)

SOURCE			
VERT	CHAN	EXT	
CH1	1¦2	1¦2	WORD
CH2			
ADD			

Second-Level menu for B EXT.

B EXT
SOURCE --------A AND B EXT GAIN--------
  1¦2   EXT 1   EXT 1/5   EXT 2   EXT 2/5

ACQUISITION

① ACQUIRE Button

Starts/restarts the acquisition from SAVE mode.

At the completion of a single-sequence acquisition, the scope switches to SAVE storage mode and displays the SAVE menu. Pushing ACQUIRE button momentarily switches to ACQUIRE menu, but a fast-completing single sequence will switch it back to SAVE menu before the ACQUIRE menu can be used. Turn SINGLE SEQ off in TRIGGER MODE menu before pushing ACQUIRE to use ACQUIRE menu.

NORMAL, ENVELOPE[1], and AVG select the acquisition mode. REPET extends the bandwidth for repetitive waveforms to 150 MHz when ON. SAVE ON Δ causes the scope to enter SAVE (SAVE ON Δ switches to off) when a live waveform exceeds boundary limits set by a reference envelope waveform. If GPIB mode is set for PRINTER output, screen data will be printed. Then SAVE ON Δ will be turned back on to continue monitoring the incoming live waveforms (not done in ROLL mode).

If GPIB mode is selected for the talk/listen mode, the 2430A will issue an SRQ notifying the Controller of the SAVE event.

Average and Envelope acquisitions in progress will be restarted by any of these front-panel control changes:

1. Any vertical or horizontal mode change.
2. A volts/div setting change of either channel.
3. A vertical position change of either channel. (Average but not Envelope.)
4. Input coupling changes to either channel.
5. Changes in the Trigger mode.
6. Pressing the MENU/OFF button to turn off menus.
7. Delay-by-Events or Delay-by-Time changes (Average only).
8. Changing the trigger slope.

[1]For instruments with serial numbers below B020000, ENVELOPE mode is not available when in ADD or MULT Vertical mode; turning ENVELOPE on turns off ADD or MULT and removes both menu choices from the Vertical mode menu.

Storage On-Screen Menus

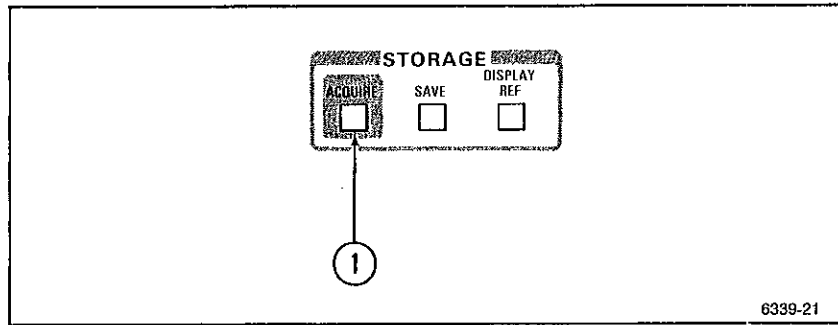| 1. ACQUIRE	ACQUIRE	nnn	nnn	REPET	SAVE ON Δ
	NORMAL	ENVELOPE	. AVG	ON¦OFF	ON¦OFF
	nnn selections:				
	ENVELOPE—1,2,4,8,16,32,64,128,256,CONT				
	AVG—2,4,8,16,32,64,128,256				

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Figure 18. Storage ACQUIRE Button.

SAVE AND DISPLAY REFERENCE

① **SAVE Button** Displays the SAVE menu and "freezes" waveforms on screen. SAVE mode is also entered when a single sequence completes, or when Save-On-Delta occurs on an out-of-limits waveform. It also occurs momentarily during plotting or printing via the GPIB.

Pressing STACK REF in the SAVEREF SOURCE menu treats the reference memories as a stack; waveforms are stored in predetermined reference memories, depending on what source (CH 1, ADD, etc.) they are displayed in.

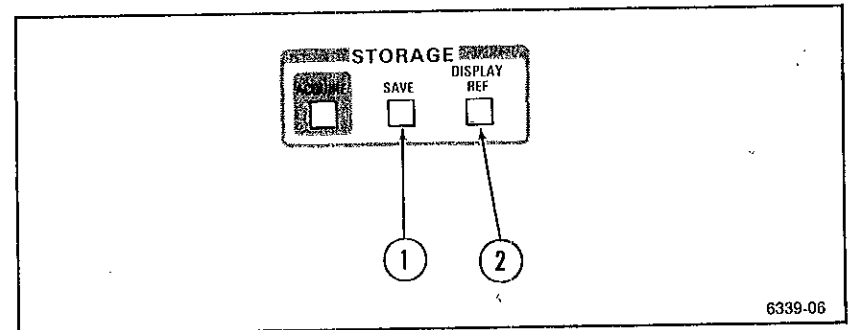② **DISPLAY REF Button** Toggles between DISPLAY and HORIZontal position selection menus.

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Figure 19. Storage SAVE and DISPLAY REF Button.

Storage On-Screen Menus (cont)

1. SAVE					
	----------SAVEREF SOURCE----------				STACK
	CH1	CH2	(function)	REF	REF

Second-level menu for a SAVEREF SOURCE selection (except REF or STACK REF). If REF is selected, or if Δ DELAY TIME is turned on while B is the HORIZONTAL MODE setting, this menu becomes a third-level menu.

	--------SAVEREF DESTINATION--------				SAVEREF
	REF1	REF2	REF3	REF4	SOURCE

Second-Level menu for SAVEREF SOURCE in Δ (delta) DELAY by TIME.

SAVEREF SOURCE—(channel)
DELAY 1   DELAY 2

Second-Level menu for REF.

	SAVEREF SOURCE—REF				SAVEREF
	REF1	REF2	REF3	REF4	SOURCE

2. DISPLAY REF In YT Mode.

DISPLAY REF

REF1	REF2	REF3	REF4	POS REF

EMPTY appears above reference menu choice if no valid waveform is stored.

In XY Mode.

		HORIZ
XYREF		POS REF

Second-level menu for HORIZ POS REF. (In YT Mode.)

	----HORIZONTAL POSITION----			REF HPOS
REF1P	REF2P	REF3P	REF4P	IND¦LOCK

Second-level menu for HORIZ POS REF. (In XY Mode.)

	----HORIZONTAL POSITION----	REF HPOS
XY REFP		IND¦LOCK

GPIB STATUS

GPIB Status On-Line Screen

CH1 100mV	A 1ms	35.2mV EXT1
ADDR 3	RQS ON	START = 256
MODE THINKJET	OPC ON	STOP = 512
TERM EOI	CER ON	
	EXR ON	EVENTS
FASTXMIT	EXW ON	NONE
OFF	INR ON	
1 WFMS REQSTD	PID OFF	
RIBINARY	USER OFF	
SOURCE CH1	PATH ON	
TARGET REF1	LONG ON	
ENCDG RIBINARY	DEBUG OFF	
BINWFM→SCOPE RI	DEVDEP ON	

The GPIB Status menu is displayed on screen when STATUS is selected from the OUTPUT menu. Each underscored item is a GPIB-related function and the adjacent non-underlined item(s) is the setting(s) for the function. The listing "ADDR 3" means the scope's address (a function) is set to 3. The remaining listings at the top of the screen vary with current instrument setup.

Interpretation of GPIB STATUS menu listings:

ADDR=	ADDRESS SELECTION	**EXR**=	ASSERT SRQ ON EXECUTION ERROR
MODE=	MODE SELECTION	**EXW**=	ASSERT SRQ ON EXECUTION WARNING
TERM=	TERMINATION	**INR**=	ASSERT SRQ ON INTERNAL ERROR
SOURCE=	WAVEFORM DATA SOURCE	**PID**=	ASSERT SRQ ON PROBE IDENTIFICATION
TARGET=	WAVEFORM DATA TARGET	**USER**=	ASSERT SRQ ON BEZEL BUTTON PUSH
ENCDG=	ENCODING	**PATH**=	SEND COMPLETE PATH IN QUERY RESPONSE
BINWFM=	INCOMING BINARY WAVEFORM INTERPRETATION MODE	**LONG**=	USE LONG FORM IN QUERY RESPONSE
RQS=	ASSERT SRQ IF PENDING EVENT	**DEBUG**=	TURN ON DEBUG MODE
OPC=	ASSERT SRQ ON OPERATION COMPLETE	**DEVDEP**=	ASSERT SRQ IF TRANSMIT PUSHED
CER=	ASSERT SRQ ON COMMAND ERROR	**401**=	POWER ON SRQ (TYPICAL EVENT)

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