User Manual

Tektronix

2430
Digital Oscilloscope

070-5497-00

Please check for change information at the rear of this manual.

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GETTING STARTED

See Front Panel for locating the controls on the 2430.

POWER ON: Press the POWER switch, located on the front panel below the crt.

The 2430 performs a power-on self 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 2430 fails the self test, it will enter the extended diagnostics (see below, MENU OFF/EXTENDED FUNCTIONS, for explanation). The 2430 may still be used if the failed area does not affect the measurement 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 diag run. No label will appear if the cal has not been run since the last cold start. If an "UNCALD" message appears in the extended diagnostics menu, it may indicate that the last attempt of extended calibration failed. Allow the 2430 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 B of the Operators Manual.

CONNECT: A standard accessory P6131 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 SAVE/RECALL 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 major front-panel controls are set up as follows for the initial settings.

VERTICAL MODE	CH 1
CH 1 and CH 2 VOLTS/DIV	1 V (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

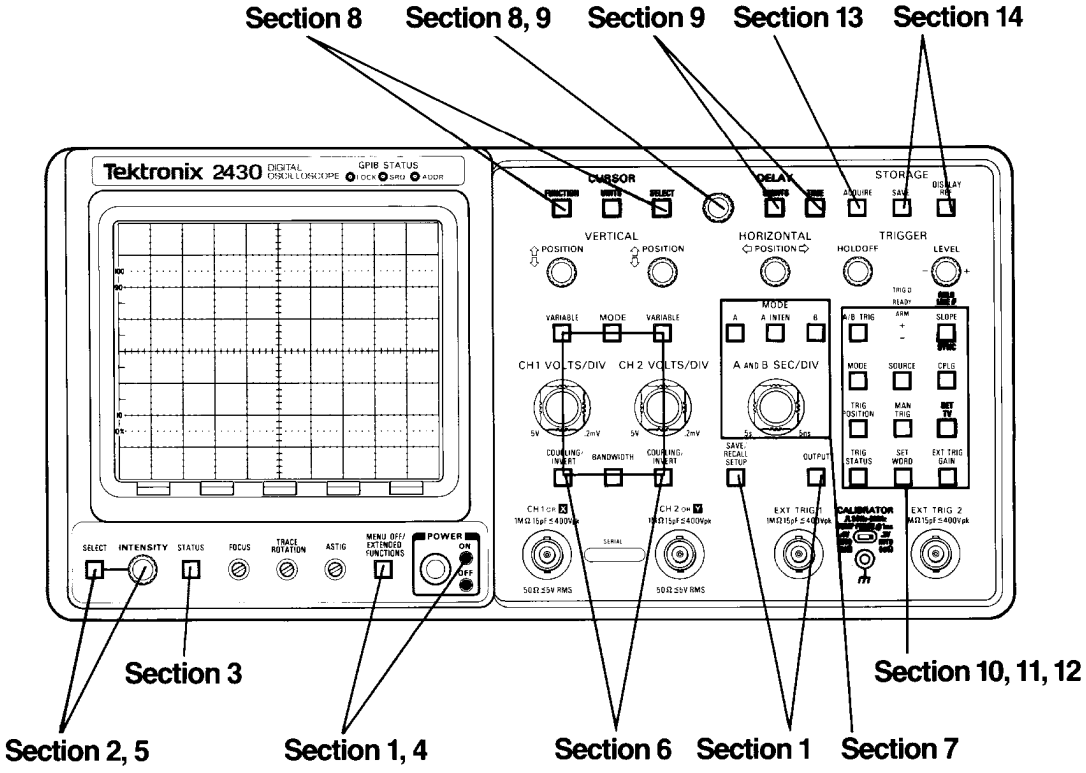
VERIFY: That CH1 vertical mode is selected (CH1 VOLT/DIV readout is in upper left corner of CRT. If CH1 vertical mode is not selected then: Press vertical MODE button, and select CH1 (See section 6, Vertical Mode #4, of this guide.)

PRESS AQUIRE: button on front panel.

VERIFY: That you have a triggered waveform display.

NOTE: The procedure just done should always get you a triggered display. When signals other than the CALIBRATOR square wave are applied to the input, the VOLTS/DIV, SEC/DIV, and Trigger controls must be set to appropriate settings to accommodate the applied signal.

FRONT PANEL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Tektronix 2430 DIGITAL OSCILLOSCOPE
GPIB STATUS
CURSOR
DELAY
STORAGE
VERTICAL
HORIZONTAL
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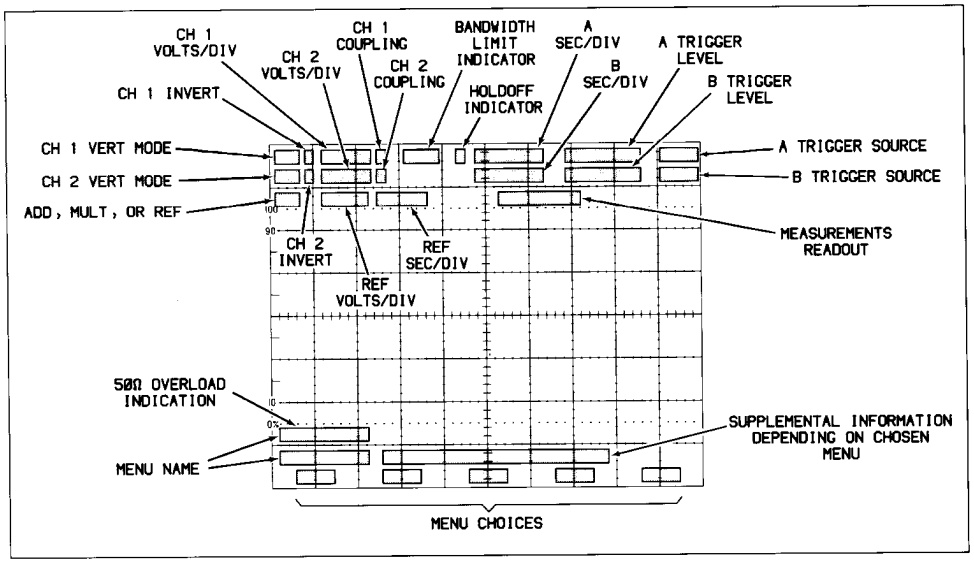
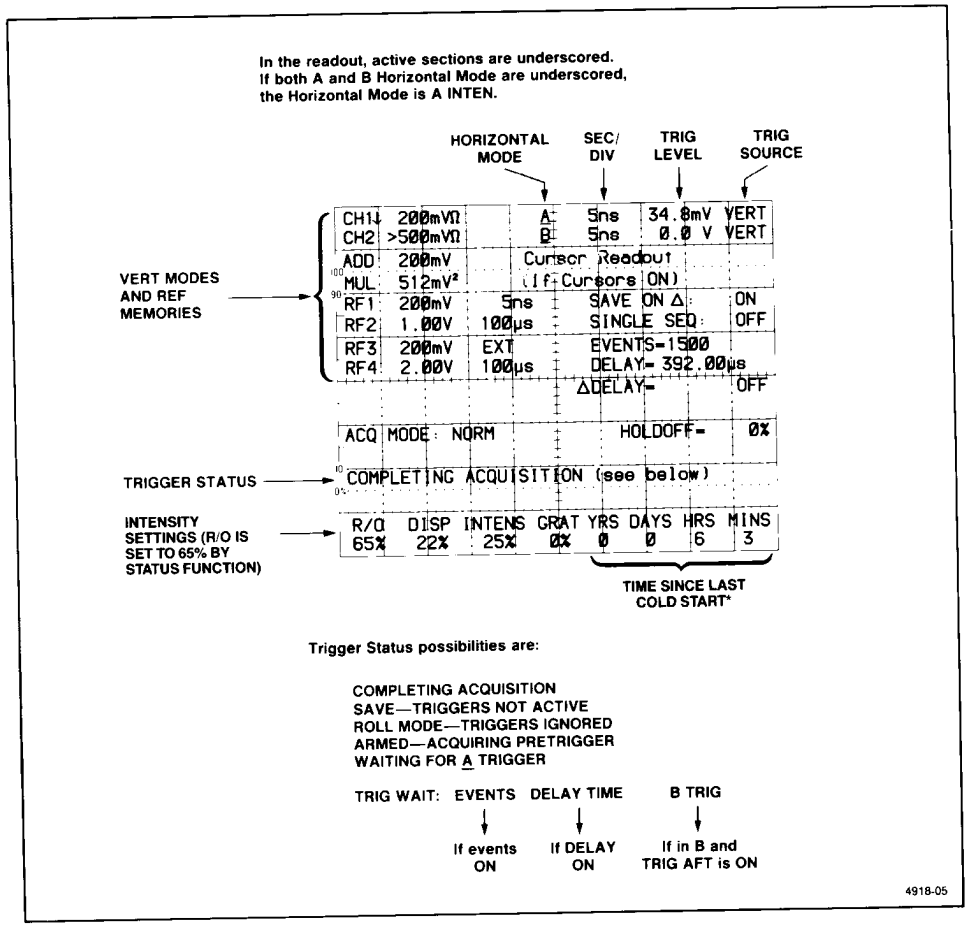
CRT READOUT DISPLAY



STATUS MENU

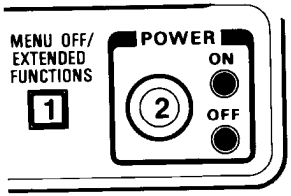


The above display will appear on screen when the status front panel button is selected. It provides an overview of instrument configuration at the time the selection was made. This menu will enable you to determine if you are currently operating in the desired modes, or if you are set in a conflicting 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 hand quadrant of the screen, which enable you to determine the instruments current activity.

It is recommended that you become very familiar with this entire menu and the location and meaning of the readout characters because it will aid you in determining the cause of possible operational difficulties.

*Cold Start is a complete initialization of the system. Normally, only done at the factory.

POWERING UP



NOTE : The following information for Powering Up may include serial numbers in their descriptions. If this is the case, the information pertains only to the specific serial numbered instruments. Information that does not include serial numbers is relevent to all instruments.

1. MENU OFF/ EXTENDED FUNCTIONS 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 a more detailed description of MENU OFF/ EXTENDED FUNCTIONS.)

2. POWER does a power-on self test with each turn on. (See Section 1 for a more detailed description of POWER.)

NOTE (For Instruments with SN B011410 & Above): The 2430 will power-up in either the Acquire mode or Save mode, whichever mode it was in when last powered down. The 2430 will display the following message if the instrument powers-up in the Save mode:

2430 is in SAVE mode
Press ACQUIRE to begin acquiring new waveforms.

Power Up On-Screen Menus (For SN B011410 & Above)

1.MENU OFF/ EXTENDED FUNCTIONS

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

EXT FUNCT

SYSTEM SPECIAL CAL/DIAG

SYSTEM (Second-level menu)

PANEL MISC PREFLT ON ¦ OFF TV OPT

SYSTEM PANEL (Third-level menu)

PWR ON LAST ¦ INIT REF4 REF ¦ PNL ↑

SYSTEM MISC (Third-level menu)

BELL ON ¦ OFF TRIG T ON ¦ OFF PG SIZE 11 ¦ 12 ↑

SYSTEM TV OPT (Third-level menu)

TV SYS M ¦ NON/M CNT RST BOTH ¦ F1 ↑

SPECIAL (Second-level menu)
WARNING: SERVICE ONLY--SEE MANUAL (if enabled)
DISABLED--SEE MANUAL (if disabled)

COLD START CAL PATH ON ¦ OFF FORCE DAC

CAL/DIAG (Second-level menu)

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

NOTE (For Instruments with SN B011409 & Below): If the instrument is powered down in an active acquire mode, the instrument may power up with no valid vertical channel waveforms. To prevent loss of waveforms, place instrument in SAVE mode before power down.

Power Up On-Screen Menus (For SN B011409 & Below)

1. MENU OFF/ EXTENDED FUNCTIONS

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

EXT FUNCT

SYSTEMS SPECIAL CAL/DIAG

SYSTEM (Second-level menu).

PWR ON LAST⁞INIT	BELL ON⁞OFF	PREFLT ON⁞OFF	REF4 REF⁞PNL	TV SYS M⁞NON/M

SPECIAL (Second-level menu).

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

COLD START	FORCE DAC

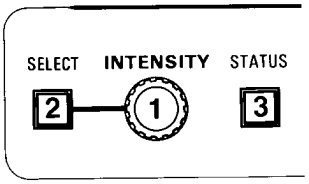
CAL/DIAG (Second-level menu).

PASS SELF CAL	PASS EXT CAL	SELF DIAG	NOT WARMED UP EXT DIAG

NOTE: If the SPECIAL menu choices are enabled, a Cold Start selection means a partial instrument calibration will be required before use.

If the REF4 menu selection is set to REF (under SYSTEM in the EXTENDED FUNCTIONS), only 1 front-panel setup may be saved or recalled and only the number 1 will be displayed in the SAVE and RECALL second-level menus. When the menu choice is set to PNL, five front-panel SAVE/RECALL SETUP memory locations are available. Front panel memory 1 is long-term non-volatile storage; memories 2 through 5 are short-term non-volatile storage (3 to 5 days).

CRT DISPLAY MENUS



1. INTENSITY control is an infinite turn pot. Its controlling action remains directed to the last selected choice; except when Status is selected; it then becomes the readout intensity control.

2. SELECT button toggles between readout and display after turning on the menu.

3. STATUS display is useful for determining 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 and bottom edges (vert. pos.)? Common triggering conditions: Single sequence on? Save Mode? Events on? Delay on? Trig wait state? Ext clk on?

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

Menu off or calling up another menu turns off the status display.

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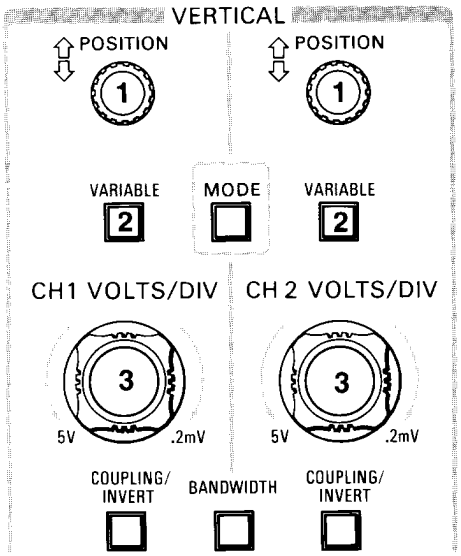
CRT Display On-Screen Menus

2. SELECT	INTENSITY READOUT DISP INTENS GRAT VECTORS ON|OFF INTENS: Controls brightness of intensified zone in 'A' Intensified. GRAT: Controls graticule intensity.
3. STATUS	Presents an instrument status display (see page 7) 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.

VERTICAL



1. VERTICAL **POSITION** controls.

CH1 is the HORIZONTAL **POSITION** control in XY mode.

2. CH 2 **VARIABLE** does not set ADD mode readouts to divisions but CH 1 VARIABLE does. CH 2 is used to develop an inverted cancellation signal.

Arrow menu button functions are continuous when held down. CAL returns V/D to calibrated setting.

3. VOLTS/DIV 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 average acquisitions mode.

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Vertical On-Screen Menus

2. VARIABLE	CH1 VARIABLE CAL	↓	↑
	CH2 VARIABLE CAL	↓	↑

4. MODE 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.

Add and Mult are not displayed in envelope mode.

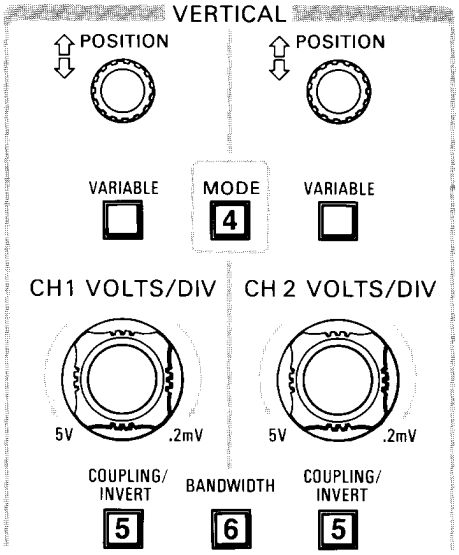
XY mode automatically turns on the CH 1 and CH 2 signals REF 1 vs. REF 2 may be displayed as XY REF.

NOTE: For Vertical Mode menu, bezel buttons operate in push/push fashion, causing modes to be selected by repeated activation. YT/XY modes toggle in push/push fashion. Active selections are underscored.

5. COUPLING/INVERT button may be used to switch through the available coupling choices after menu is called up.

AC coupling and 50Ω termination are mutually exclusive.

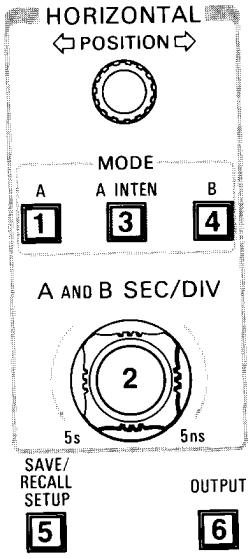
6. BANDWIDTH Button may be used to scroll through menu choices after menu is called up.



Vertical On-Screen Menus (cont.)

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 AC DC GND 50Ω ON¦OFF INVERT ON¦OFF
	CH2 COUPLING AC DC GND 50Ω ON¦OFF INVERT ON¦OFF
6. BANDWIDTH	BANDWIDTH USB = xxxxHz USR = xxxx s 20 MHz 50 MHz FULL The number xxxx depends on the Acquisition Mode, the SEC/DIV setting, and the bandwidth selected.

HORIZONTAL/SAVE/RECALL SETUP



1. A activates "A" sweep function.

2. A and **B SEC/DIV** control 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 becomes available on Trigger Mode selection menu at 100 ms/div.

3. A INTEN selects A INTENsified operating mode. SEC/DIV control (2) controls the B intensified time/div.

4. B selects B Delayed sweep operation. A AND B SEC/DIV will now control B sweep rate.

5. SAVE/RECALL SETUP initializes the SAVE/RECALL SETUP menu including INIT PANEL.

NOTE: If the REF4 menu selection is set to REF (under SYSTEM in the EXTENDED FUNCTIONS), only 1 front-panel setup may be saved or recalled and only the number 1 will be displayed in the SAVE and RECALL second-level menus. When the menu choice is set to PNL, five front-panel SAVE/RECALL SETUP memory locations are available. Front panel memory 1 is long-term non-volatile storage; memories 2 through 5 are short-term non-volatile storage (3 to 5 days).

NOTE: INIT PANEL completely initializes the front-panel and other operating features to factory-defined states. See Table C-16, in Appendix C of Operators Manual, for the complete listing of INIT STATES.

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Save/Recall Setup On-Screen Menus

5. SAVE/ RECALL SETUP	SAVE/RECALL SETUP SAVE RECALL INIT PANEL
	SAVE (Second-level menu.) SAVE SETUP 1 2 3 4 5
	RECALL (Second-level menu). RECALL SETUP 1 2 3 4 5

Output On-Screen Menus

6. OUTPUT

------- XY ------- ---------- GPIB ----------
PLOT FORMAT STATUS SETUP TRANSMIT/(PRINT)

PLOT and TRANSMIT/(PRINT) switch to ABORT when the functions are active. TRANSMIT/(PRINT) is not displayed in OFF BUS mode.

XY FORMAT (Second-level menu).

XY FORMAT READOUT GRAT PEN LIFT OPEN¦CLOSE PLOT

Pressing PLOT in this level menu reverts back to the first level menu with ABORT displayed.

GPIB SETUP (Second-level menu).

MODE TERM ADDR ENCDG DEBUG ON¦OFF

GPIB ENCDG (Third-level menu).

ASCII RP BIN RI BIN

GPIB MODE (Third-level menu).

T/ONLY L/ONLY T/L PRINTER OFF BUS

Selecting PRINTER changes TRANSMIT to PRINT in the OUTPUT control menu. Selecting OFF BUS turns off the TRANSMIT/PRINT choice.

GPIB T/ONLY (Fourth-level menu.)

CURVE ONLY WFMPRE/CURVE

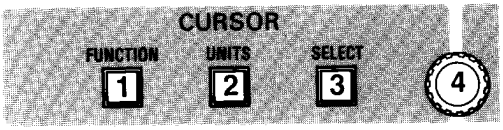
GPIB TERM (Third-level menu.)

EOI LF/EOI

GPIB ADDR (Third-level menu.)
GPIB ADDRESS = nn

A GPIB menu detailing current instrument GPIB configuration can be displayed by pushing the STATUS selection of the first level OUTPUT menu. (See page 24 of this guide for interpretation of on-screen display.)

CURSORS



1. FUNCTION activates cursor function menu on screen.

If the attach cursors menu of an active cursor function has been replaced by some other menu, pressing the function button twice, or turning off and then back on the selected cursors, returns it to the display.

2. UNITS activates units selection menu on screen.

3. SELECT selects cursor under control of the CURSOR/DELAY knob (4).

NOTE: Cursors will not position off screen. They will remain at screen perimeter. SELECT button will bring cursor and window of waveform being measured, on screen.

4. CURSOR/DELAY knob controls active cursor positioning and Delay time period for selected function.

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 Ref. waveforms when attached to displayed Reference waveform.

Cursor/Delay knob is a shared control; positions cursors for cursor functions; sets delay times or delay events number for Delay functions.

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

Cursor On-Screen Menu

1. FUNCTION

CURSOR FUNCTION
VOLTS TIME V@T SLOPE 1/TIME

Second-level ATTACH CURSORS menu.

In YT Mode.

ATTACH CURSORS TO:

CH1	CH2	(func)	(func)Δ	REF n	(no delta delay)
CH1	CH1Δ	(func)	(func)Δ	REF n	(delta delay--CH1 on)
CH2	CH2Δ	(func)	(func)Δ	REF n	(delta delay--CH2 on)
CH1	CH2Δ	(func)	(func)Δ	REF n	(delta delay--CH1 and CH2)

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.

ATTACH CURSORS TO:
CH1 vs CH2 XYREF

2. UNITS

UNITS	VOLTS CURS REF = xxxxxx				
VOLTS	%	dB	NEW REF	ΔǀABS	(in VOLTS or V@T)
UNITS	SLOPE CURS REF = xxxxxx				
SLOPE	%	dB	NEW REF		(in SLOPE)
UNITS	1/TIME CURS REF = xxxxxx				
Hz	%	DEGREES	NEW REF	ΔǀABS	(in 1/TIME)
UNITS	TIME CURS REF = xxxxxx				
SEC	%	DEGREES	NEW REF	ΔǀABS	(in TIME)

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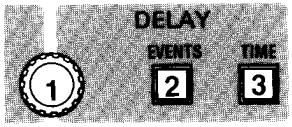
DELAY FUNCTIONS



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

2. EVENTS selects Delay By Events function and connects events count selection to CURSOR/DELAY control knob (1).

3. TIME 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 via 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.

Delay On-Screen Menus

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

NOTE: For a more complete explanation of delay trigger functions see your Operators Manual, page 3-14 and 3-15, and a trigger state diagram on Appendix C, page 7.

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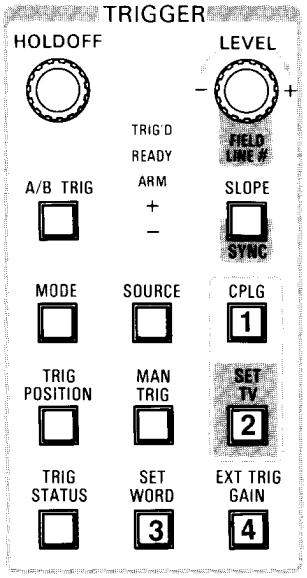
TRIGGERING



1. Trigger **CPLG:** switches through the menu choices (except TV) when pushed repeatedly.

2. SET TV Initiates Video trigger mode selection menu (on scopes equipped with Video trigger only). In addition, TV coupling is selected via the coupling menu.

Video signal must be interlaced for field 2 to appear in on-screen readout.

3. SET WORD activates the Word Recognizer Probe configuration menu.

4. EXT TRIG GAIN activates the external trigger input gain configuration menu.

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Trigger On-Screen Menus

<table>
<tr><td rowspan="2">1. TRIGGER
CPLG</td><td>Without the Video option.

A COUPLING   ------ REJECT ------
DC   AC   NOISE   HF   LF</td></tr>
<tr><td>With the Video option installed.

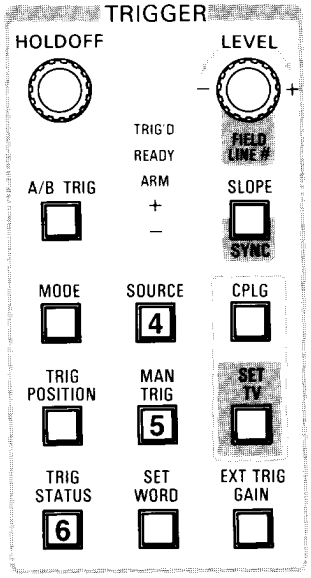
A COUPLING   ------ REJECT ------
DC¦AC   TV   NOISE   HF   LF</td></tr>
<tr><td rowspan="2">2. SET TV
(Video
Option
only)</td><td>A TV COUPLING   CLAMP
FIELD 1   FIELD 2   ALT   TV LINE   ON¦OFF   (for interlaced signals)</td></tr>
<tr><td>A TV COUPLING   CLAMP
FIELD   TV LINE   ON¦OFF (for non-interlaced signals)</td></tr>
<tr><td rowspan="3">3. SET WORD</td><td>RADIX   ------ CLOCK ------   SET
OCT¦HEX   _┌   ┐_   ASYNC   BITS</td></tr>
<tr><td>SET BITS (Second-level menu).

In Hexadecimal:

TRIG WORD:
CLK = *   HHHH   x xxxx xxxx xxxx xxxx   NOTE: * = Clock slope selection will appear in this location.
1   0   X   ←   →</td></tr>
<tr><td>In Octal:

TRIG WORD:
CLK = *   OOOOOO   x xxx xxx xxx xxx xxx
1   0   X   ←   →</td></tr>
<tr><td>4. EXT TRIG
GAIN</td><td>EXT GAIN
EXT 1   EXT 1 ÷ 5   EXT 2   EXT 2 ÷ 5</td></tr>
</table>

TRIGGERING



4. Trigger **SOURCE** button will toggle 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. 'AND' source not available for B Trigger. An attempt to select WORD as the trigger source without a WORD Recognizer Probe attached, displays the message "WORD PROBE FAULT." Source remains at the last valid choice.

5. MAN Trigger forces a manual trigger. Any delay time readouts are invalid after a manual trigger.

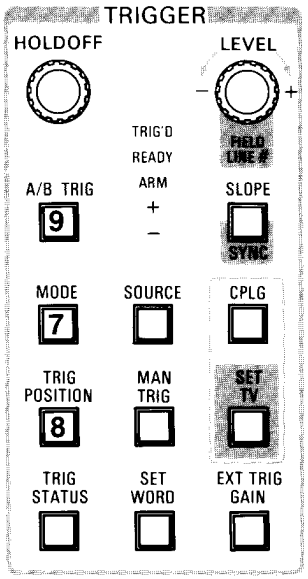
NOTE: Has effect only if trigger system is in 'READY' state.

6. TRIG STATUS activates the trigger status menu, which details the current trigger mode, source, coupling, and trigger position selection for the A and B triggers.

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
6. TRIG STATUS	TRIG STATUS MODE SOURCE CPLG TRIG POS --------- ---------- -------- ------ ------ A (Setup conditions for the A Trigger Controls.) B (Setup conditions for the B Trigger Controls.)

A TRIGGER



7. Trigger **MODE** steps through the mode choices, except single seq, when pushed repeatedly.

8. TRIG POSITION steps through the menu choices when pushed repeatedly.

9. A/B TRIG 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.

Trigger On-Screen Menus (cont.)

7. TRIGGER MODE	A TRIGGER MODE AUTO LEVEL AUTO NORMAL SINGLE SEQ switches to ROLL at 100 ms/div and slower.
8. TRIG POSITION	A TRIGGER POSITION 1/8 1/4 1/2 3/4 7/8

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

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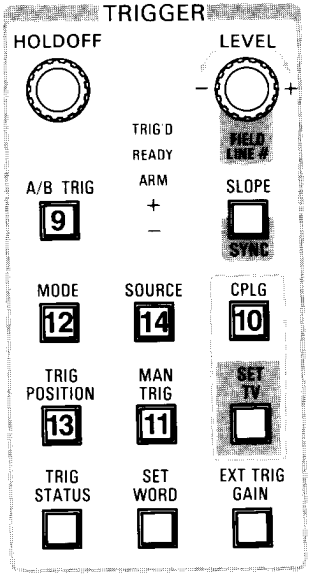
B TRIGGER



9. A/B TRIG switches the effect of the trigger controls between the A and B trigger systems.

10. Trigger **CPLG** button switches through the menu choices when pushed repeatedly.

11. MAN Trigger forces a manual trigger. Any delay time readouts are invalid after a manual trigger.

12. MODE toggles between RUNS AFTER and TRIG AFTER when pressed repeatedly.

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

13. TRIG POSITION in the A and B waveform record is independently selected.

14. SOURCE activates the B Trigger Source selection menu.

B Trigger On-Screen Menus

12. TRIGGER MODE

B TRIG RUNS AFTER TRIG AFTER EXT CLK ON¦OFF

10. TRIGGER CPLG

In B TRIG AFTER Delay Mode.

B COUPLING	------ REJECT ------	
B, EXT CLK CPLG	------ REJECT ------	(with EXT CLOCK ON)
B, EVENTS CPLG	------ REJECT ------	(with DELAY by EVENTS ON)
B, CLK, EVENTS	------ REJECT ------	(with both ON)
DC AC	NOISE HF LF	

In B RUNS AFTER Delay Mode.

B COUPLING	------ REJECT ------	
EXT CLK CPLG	------ REJECT ------	(with EXT CLOCK ON)
EVENTS CPLG	------ REJECT ------	(with DELAY by EVENTS ON)
CLK, EVENTS	------ REJECT ------	(with both ON)
DC AC	NOISE HF LF	

14. TRIGGER SOURCE

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, EVENTS	(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
EVENTS SOURCE
EVENTS, EXT CLK

SOURCE

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

13. TRIG POSITION

B TRIGGER POSITION
1/8 1/4 1/2 3/4 7/8

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ACQUISITION

1. ACQUIRE starts/restarts the acquisition from SAVE mode. If single seq trigger mode is on, turn it off to gain access to the acquire menu when fast completing sequences are being acquired.

At the completion of a single seq acquisition, the scope switches to SAVE storage mode.

Save On Delta will be automatically turned off upon entering SAVE when a discrepancy is detected between the Reference envelope and the live waveform. If GPIB mode is set for PRINTER output, screen data will be printed, then Save On Delta will be reinitialized to continue monitoring the incoming live acquisitions (not done in ROLL mode).

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

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

1) Any vertical or horiz mode change,
2) A volts/div setting change of either channel,
3) A vertical position change of either channel, (Avg. 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.

These results are seen on screen.

Envelope turns off ADD or MULT vertical mode choices.

REPET mode extends bandwidth to 150 MHz for repetitive waveforms.

Storage On-Screen Menus

1. ACQUIRE					
	ACQUIRE NORMAL	nnn ENVELOPE	nnn AVG	REPET ON:OFF	SAVE ON Δ ON:OFF
	(nnn selection)	ENVELOPE--1,2,4,8,16,32, 64,128,256,CONT		AVG--2,4,8,16,32, 64,128,256	

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SAVE AND DISPLAY REFERENCE

1. SAVE mode is entered at the end of: a single seq, a discrepancy with save-on-delta reference, as a result of pressing the save front-panel button, and temporarily during an XY plotter or printer output. Pressing STACK REF in the SAVE-REF SOURCE menu treats the reference memories as a stack; waveforms are saved in a predetermined ref memory, depending on what is displayed.

2. DISPLAY REF toggles between display and horiz. position selection menus.

Storage On-Screen Menus (cont.)

1. SAVE

---------- SAVEREF SOURCE ---------- STACK
CH1 CH2 (function) REF REF

Second-level menu displayed after a STACKREF SOURCE (except STACK REF) is selected. REF4 is omitted if the extra front-panel setups have been turned on for the SAVE/RECALL SETUP feature. (For the REF menu SAVEREF SOURCE menu selection or if the Δ delay time feature is on, this menu becomes a third-level menu.)(For instruments with SN B011410 & Above.)

Second-level menu displayed after a SAVEREF SOURCE (except STACK REF) is selected. REF4 is omitted if the extra front-panel setups have been turned on for the SAVE/RECALL SETUP feature.(For instruments with SN B011409 & Below.)

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

Second-level menu if in Δ (delta) DELAY by TIME.

SAVEREF SOURCE - (channel)
DELAY 1 DELAY 2

Second-level menu if REF is selected.

SAVEREF SOURCE - REF SAVEREF
REF1 REF2 REF3 REF4 SOURCE

2. DISPLAY REF

In YT Mode.

DISPLAY REF HORIZ
REF1 REF2 REF3 REF4 POS REF

EMPTY appears above reference menu choice if no waveform stored.
PANEL appears above REF4 if selected for saving front-panel setups.

In XY Mode.

HORIZ
XYREF POS REF

Second-level menu displayed when HORIZ POS REF is called. (For instruments with SN B011410 & Above.)

------ HORIZONTAL POSITION ------ REF HPOS (In YT Mode)
REF1P REF2P REF3P REF4P IND ¦ LOCK

Second-level menu displayed when HORIZ POS REF is called. (For instruments with SN B011409 & Below.)

------ HORIZONTAL POSITION ------ DISPLAY (In YT Mode)
REF1P REF2P REF3P REF4P REF

------ HORIZONTAL POSITION ------ DISPLAY (In XY Mode)
XY REFP REF

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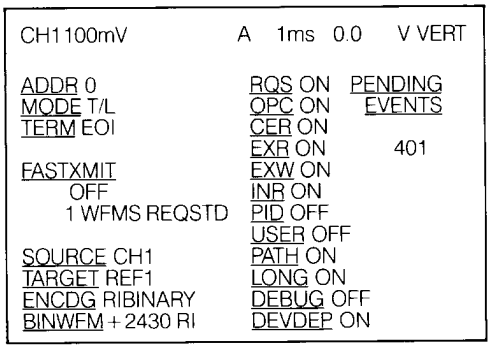
GPIB STATUS

GPIB Status On-Line Screen



The above menu will appear on screen when STATUS is selected from the output menu. The underscored items are configurable functions while the remainder of the listings will vary with current instrument setup.

Interpretation of GPIB STATUS menu listings:

ADDR = ADDRESS SELECTION
MODE = MODE SELECTION
TERM = TERMINATION
SOURCE = WAVEFORM DATA SOURCE
TARGET = WAVEFORM DATA TARGET
ENCDG = ENCODING
BINWFM = INCOMING BINARY WAVEFORM INTERPRETATION MODE

RQS= ASSERT SRQ IF PENDING EVENT
OPC= ASSERT SRQ ON OPERATION COMPLETE
CER= ASSERT SRQ ON COMMAND ERROR
EXP= ASSERT SRQ ON EXECUTION ERROR
EXW= ASSERT SRQ ON EXECUTION WARNING
INR= ASSERT SRQ ON INTERNAL ERROR
PID= ASSERT SRQ ON PROBE IDENTIFICATION
USER= ASSERT SRQ ON BEZEL BUTTON PUSH
PATH= SEND COMPLETE PATH IN QUERY RESPONSE
LONG= USE LONG FORM IN QUERY RESPONSE
DEBUG= TURN ON DEBUG MODE
DEVDEP= ASSERT SRQ IF TRANSMIT PUSHED
401= POWER ON SRQ (TYPICAL EVENT)

PROBLEMS/SOLUTIONS

Symptom	Problem	Solution
Fails Power-on self test with UNCALD message displayed.	a. Self Cal testing failed. b. Extended Cal failed for Attenuator or Triggers.	Allow to warm up and do Self Cal. If condition persists, refer to qualified service personnel. Go to faster sweep speed.
Simple waveform on screen won't trigger (almost but not quite). Switch to Envelope mode and the entire waveform envelopes (fills in) A known high-frequency signal looks like a much lower frequency.	Aliased display	Go to faster sweep speed.
2430 seems locked in Save mode. (Vertical Position may or may not function.)	a. "A" Trigger mode is in Single Sequence mode.	Change the "A" Trigger mode to Auto Level, Auto, or Normal. Then push Acquire, and adjust trigger level.
	b. Delay-by-Events mode is On and there are no Events to be counted.	Look at "B" Trigger Source menu and ensure the selected source is correct and the "B" Trigger Level is set appropriately then push Acquire.
	c. External Clock mode is On.	Select "B" Trigger Mode and turn Ext. Clock mode Off then push Acquire.
	d. You have a Reference Waveform on screen.	Push "Display Ref" and turn the indicated reference off. Then push Acquire.
No Intensified Zones.	a. "Intens" control is turned down.	Push intensity "Select" and then the "Intens" menu key, and turn the intensity up.
	b. Delay time is beyond the "A" sweep range.	Push "Time" button and reduce the delay time until the intensified zone is positioned on screen.

PROBLEMS/SOLUTIONS

Symptom	Problem	Solution
A high-speed signal appears to be somewhat sine-wave modulated. (Only at 200 ns/div or faster).	"Repet" mode is not turned on.	Display the "Acquire" menu, then using the menu key, turn "Repet" on.
Volts Cursors jumpy or are unstable when making Volts-at-Time or Slope Cursor measurements.	The Cursor is following the waveform normally and the signal is noisy.	Use the Averaging feature from the Acquire menu or use Save Storage Mode when possible for making measurements on noisy signals.
Cursor won't position to a specific point on the waveform.	The waveform doesn't have a digitized point at the desired location.	Either increase your sweep speed to increase the number of samples or Save the waveform and then expand.
The 2430's Calibrator waveform will not fill in "Repet" mode at 200 ns/div or faster.	The Calibrators rep rate is determined by the internal clock which is also setting the sampling rate.	No real solution. Note the amplitude accuracy of the display is not affected.
In Delay-by-Time you are looking at "B" sweep and expanding your signal using the sec/div control. Suddenly your signal disappears and you are somewhere else on your overall waveform.	The maximum time delay is 2621.4 times the "B" sweep speed. You just exceeded that limit and the time delay counter reset itself inside the limits.	Move your "A" Trigger point closer to the event you wish to observe. Use Delay-by-Events or reset the Trigger level, Trigger Position, etc.
Dashed line or line broken by vertical fill seen as the waveform display at power on.	Invalid Ch 1 or Ch 2 waveform data in memory	Press ACQUIRE to fill Ch 1 and Ch 2 memory with valid data. Press SAVE before turning 2430 off.