

Reference

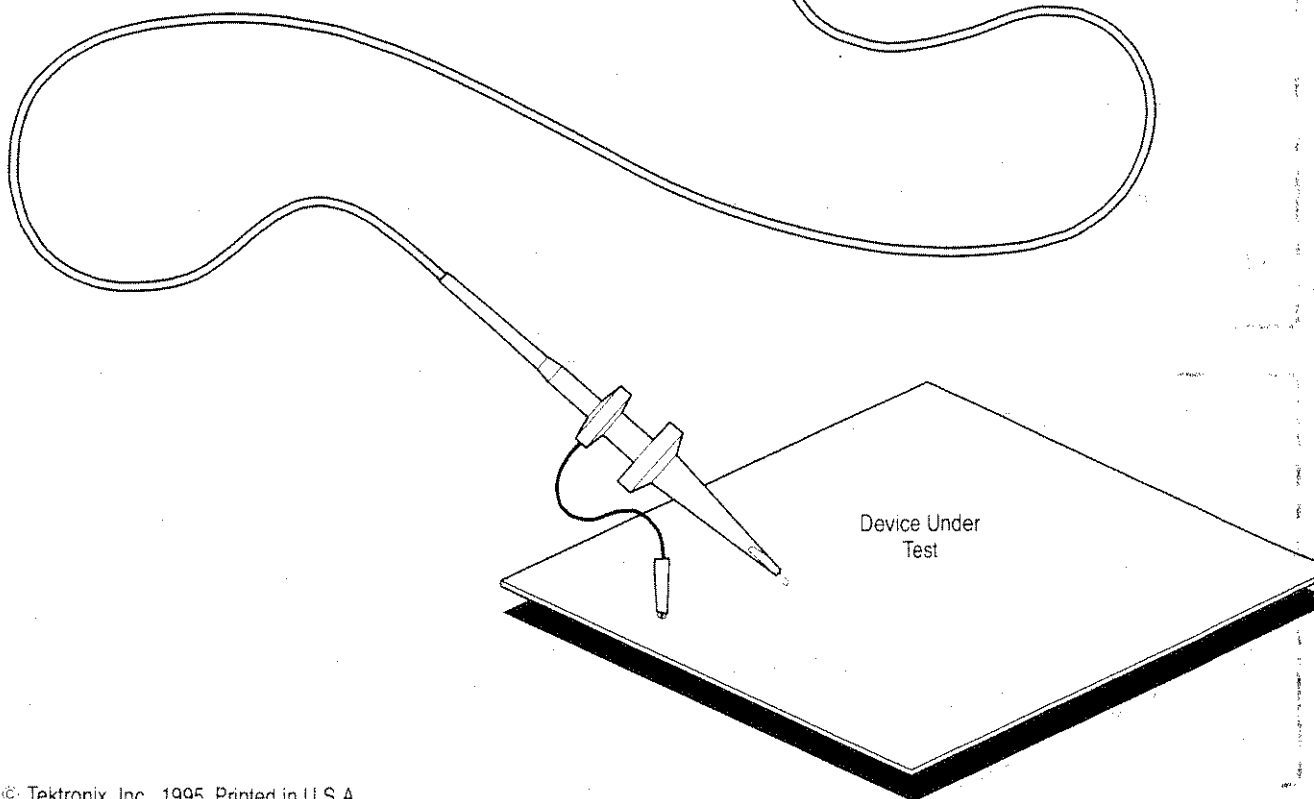
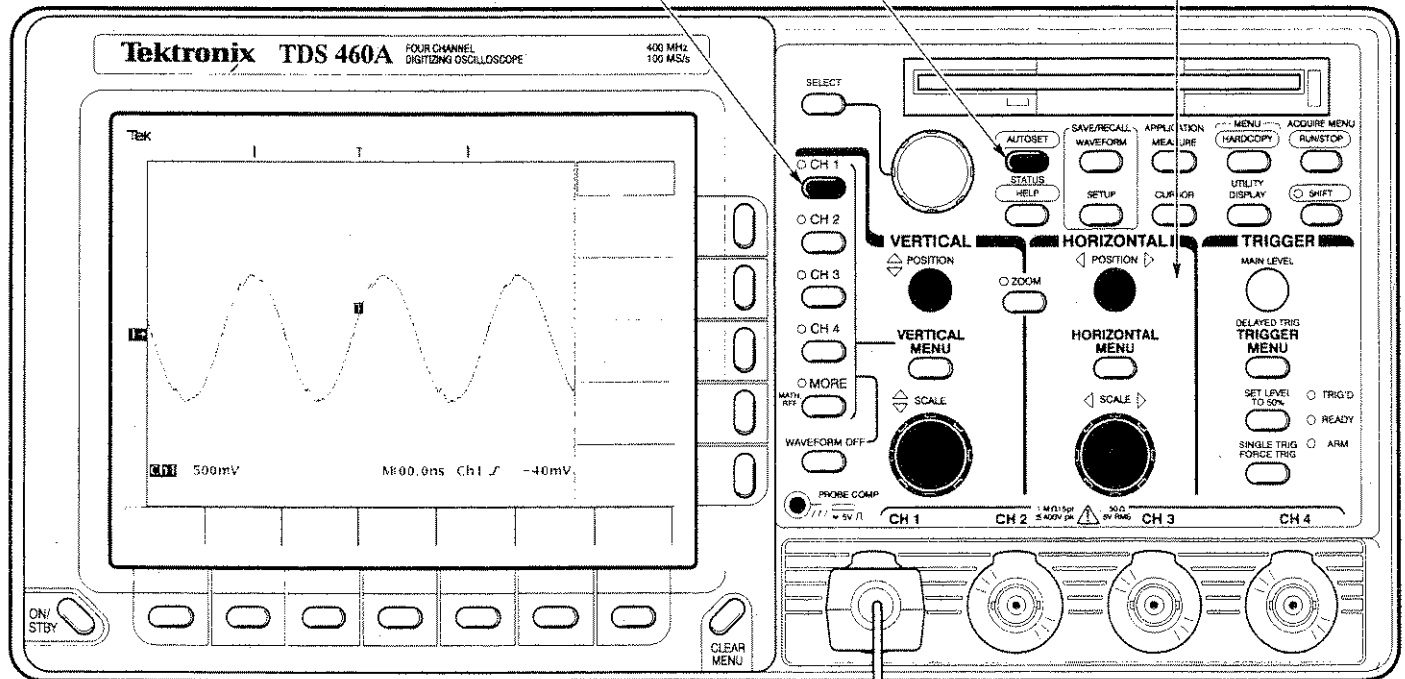
Tektronix

TDS 410A, TDS 420A & TDS 460A
Digitizing Oscilloscopes

070-9220-00

To Display a Waveform:

- 1** Attach a probe to CH 1 and hook it up to your signal.
- 2** Press CH 1 button.
- 3** Press AUTOSET.
- 4** Adjust VERTICAL POSITION and HORIZONTAL POSITION and SCALE as desired.



To Set Up Using a Menu:

1 Press any of the front panel menu buttons.

The diagram shows the front panel of an oscilloscope with various menu buttons. The buttons are organized into sections: Vertical (POSITION, ZOOM, VERTICAL MENU, SCALE), Horizontal (POSITION, HORIZONTAL MENU, SCALE), and Trigger (MAIN LEVEL, DELAYED TRIG, TRIGGER MENU, SET LEVEL TO 50%, SINGLE TRIG, FORCE TRIG). There are also utility buttons like AUTOSET, SAVE/RECALL, APPLICATION MEASURE, MENU, ACQUIRE MENU, STATUS HELP, SETUP, CURSOR, UTILITY DISPLAY, and RUN/STOP. A callout points to the SHIFT button with the text "Use SHIFT Button for Alternate (Blue) Menus".

2 Select an item from the main (bottom) menu.

The diagram shows the oscilloscope screen displaying a waveform. Below the screen is a main menu with several options: Edge, Source (CH1), Coupling (DC), Slope (f), Level (-5mV), and Mode & Holdoff. The Level option is highlighted. A callout points to the Level option with the text "Set to 50%".

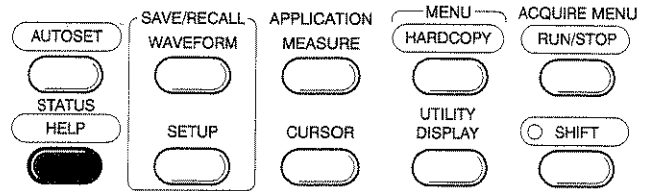
3 Select any displayed item from the side menu.

The diagram shows the oscilloscope screen displaying a waveform. To the right of the screen is a side menu with several options: Level, Set to TTL, Set to ECL, and Set to 50%. The Level option is highlighted. A callout points to the Level option with the text "Adjustable Menu Item Value".

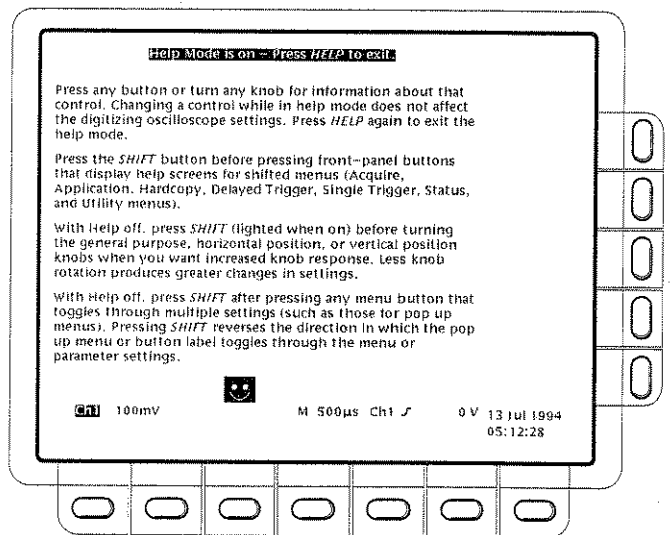
4 Adjust menu item values using the general purpose knob.

The diagram shows a SELECT button connected to a General Purpose Knob. The knob is a large circular knob with a central hole. A callout points to the knob with the text "General Purpose Knob".

To Display Help On Screen:

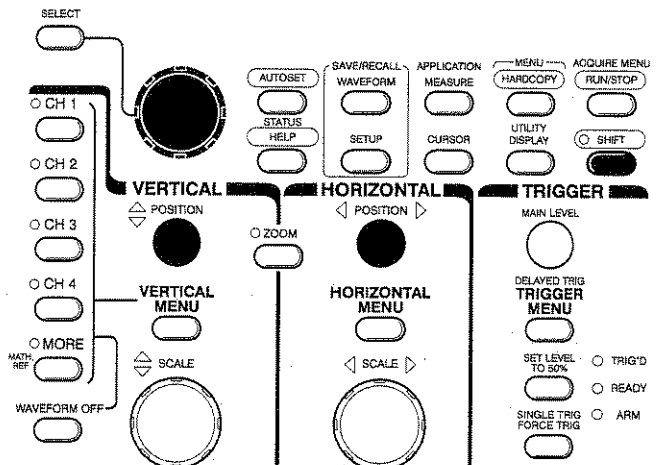


1 Press the **HELP** button.



2 Now turn any knob or press any button and read a description of it on the display. Press the **HELP** button again to exit help.

To Speed Up Knob Adjustments:



Press the **SHIFT** button to change the rate of the **VERTICAL** and **HORIZONTAL POSITION** knobs and the general purpose knob.

To Select a Trigger:

TRIGGER

MAIN LEVEL

○

DELAYED TRIG

TRIGGER MENU

○

SET LEVEL TO 50%

○ TRIG'D

○ READY

SINGLE TRIG

FORCE TRIG

○ ARM

○

1 Press the **TRIGGER MENU** button.

This Symbol

Indicates Pop-Up Menu

2 Select trigger type or parameter from main menu.

TRIGGER

MAIN LEVEL

●

DELAYED TRIG

TRIGGER MENU

○

SET LEVEL TO 50%

○ TRIG'D

○ READY

SINGLE TRIG

FORCE TRIG

○ ARM

○

3 Set **TRIGGER LEVEL** (Edge Trigger Only).

TYPE <Edge>		TYPE <Video>	
Coupling	Slope	Video Class	Sync Polarity
DC DC	Positive	NTSC	Negative
AC AC	Negative	PAL	Positive
HF Reject		SECAM	
LF Reject		Custom	
Noise Rej (DC Low Sensitivity)			

"T" Shows Trigger Position

Press to Display Pop-Ups

Press Again to Make Selection

A Pop-Up Selection Changes the Other Main Menu Items

Level

Title of Side Menu

Arrow Shows Trigger Level

Set to TTL

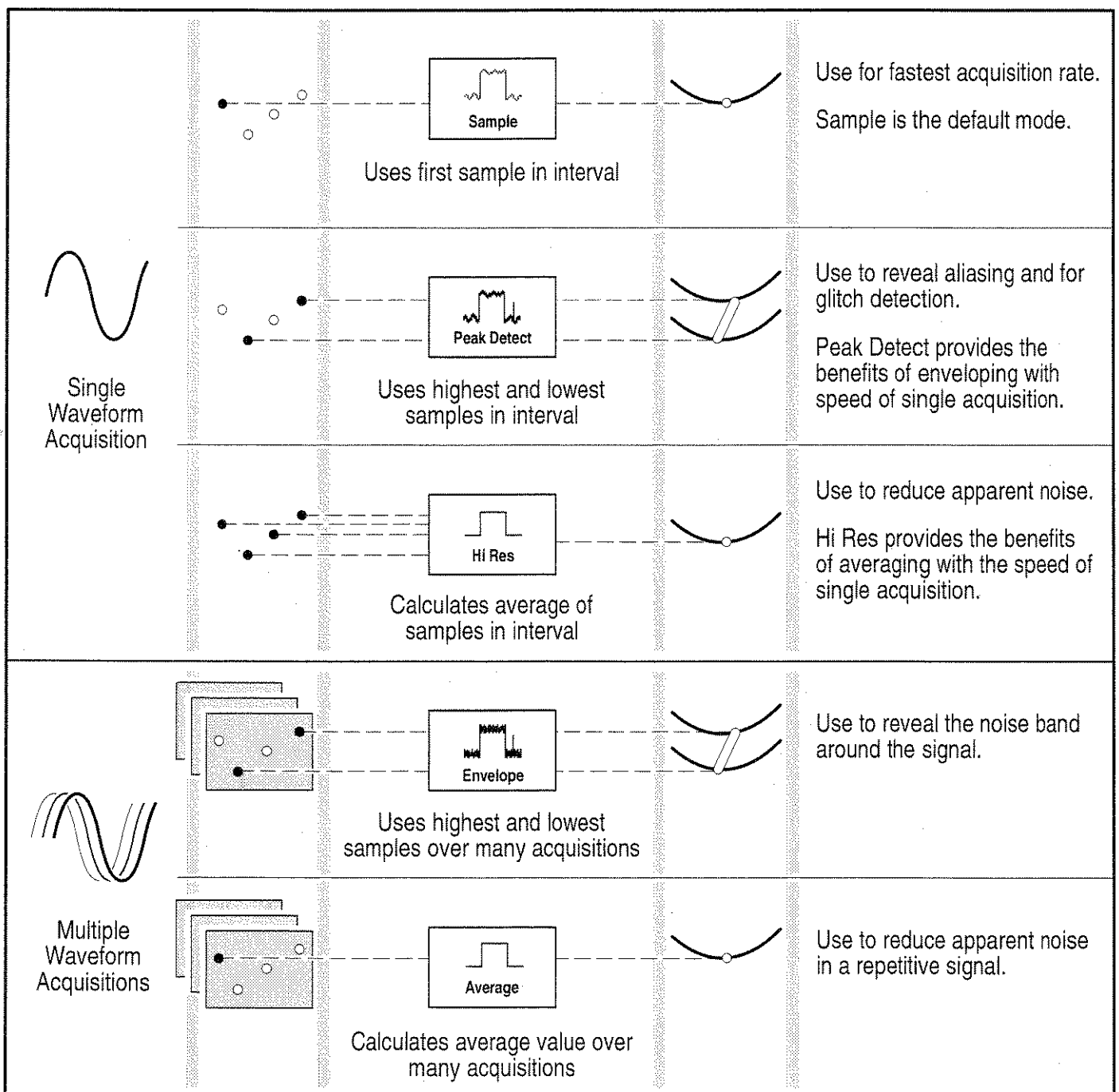
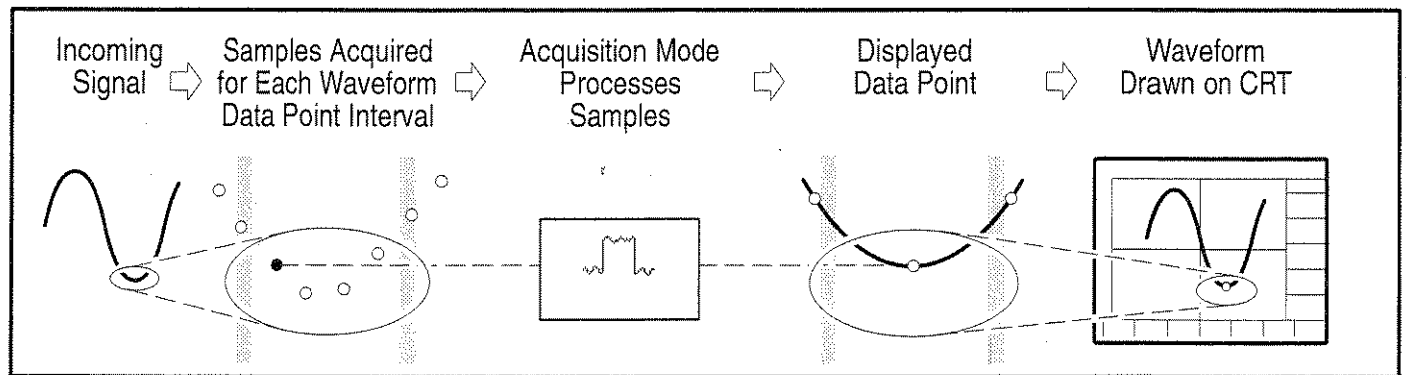
Set to ECL

Set to 50%

Removes Menus From Screen

CLEAR MENU

How the Acquisition Modes Work:



To Choose an Acquisition Mode:

Diagram of the oscilloscope control panel. Buttons are arranged in columns:

- Column 1: AUTOSET, STATUS HELP, SHIFT
- Column 2: SAVE/RECALL WAVEFORM, SETUP
- Column 3: APPLICATION MEASURE, CURSOR
- Column 4: MENU HARDCOPY, UTILITY DISPLAY
- Column 5: ACQUIRE MENU RUN/STOP

 The 'ACQUIRE MENU RUN/STOP' button is highlighted with a thick border.

1 Press **SHIFT**, and then press **ACQUIRE MENU**.

Diagram of the oscilloscope screen showing a waveform and a side menu. The side menu options are:

- Peak Detect
- Hi Res
- Envelope 10
- Average 16

 The 'Mode Sample' button at the bottom of the side menu is highlighted.

2 Press **Mode** in main menu.

Diagram of the oscilloscope screen showing a waveform and a side menu. The side menu options are:

- Acquisition Mode
- Sample
- Peak Detect
- Hi Res
- Envelope 10
- Average 16

 The 'Sample' button in the side menu is highlighted.

3 From side menu, select an acquisition mode that will serve your application.

To Use External Clock:

Diagram of the oscilloscope control panel. The 'HORIZONTAL MENU' button is highlighted with a thick border.

1 Press **HORIZONTAL MENU**.

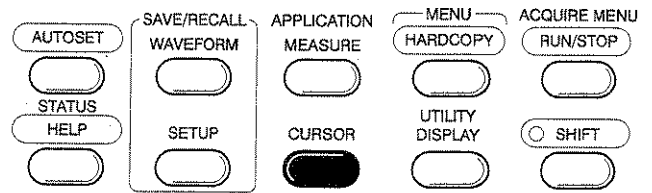
Diagram of the oscilloscope screen showing the 'Clock' side menu. The side menu options are:

- Clock
- Internal
- External

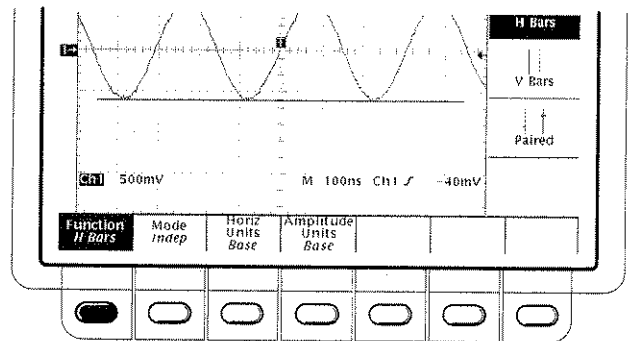
 The 'External' option is highlighted.

2 Press **Clock** in main menu, and then press **External** in side menu.

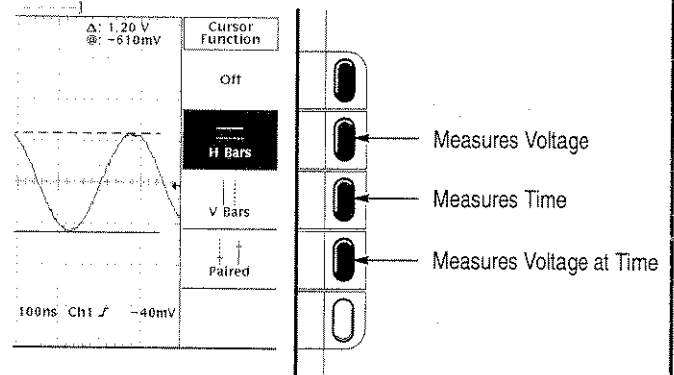
To Take Measurements With Cursors:



1 Press **CURSOR** button.



2 Press **Function** in the main menu.

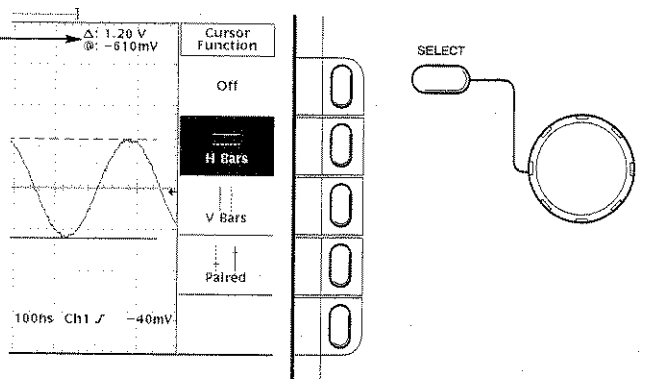


3 Select from the side menu.

Δ Difference Between Cursors in Volts (Horizontal Bars) or Time (Vertical Bars)

@ Position of Active Cursor Relative to Ground (Horizontal Bars) or Trigger (Vertical Bars)

4 Move cursor with the general purpose knob.
Press **SELECT** to switch between cursors.
Press **SHIFT** to speed up/slow down cursor movement.



To Take Measurements Automatically:

1 Press the **MEASURE** button.

2 Press **Select Measrmt** or **Snapshot** in main menu.

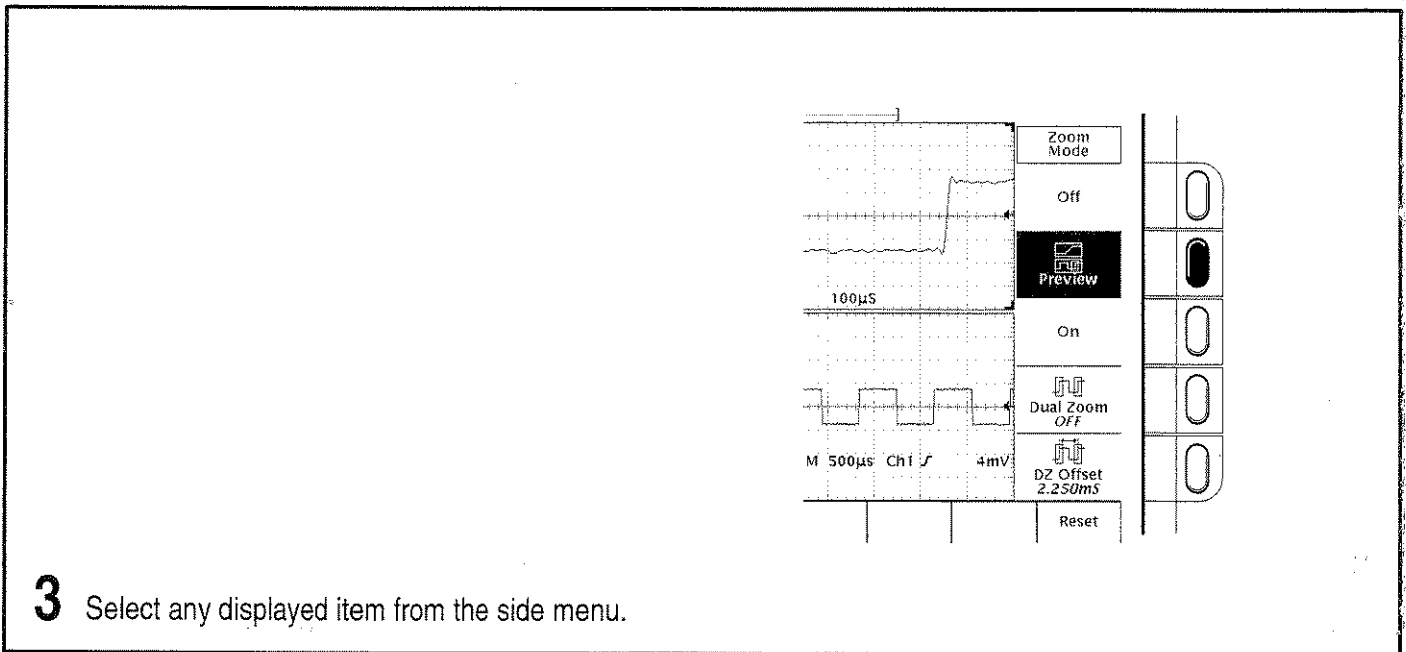
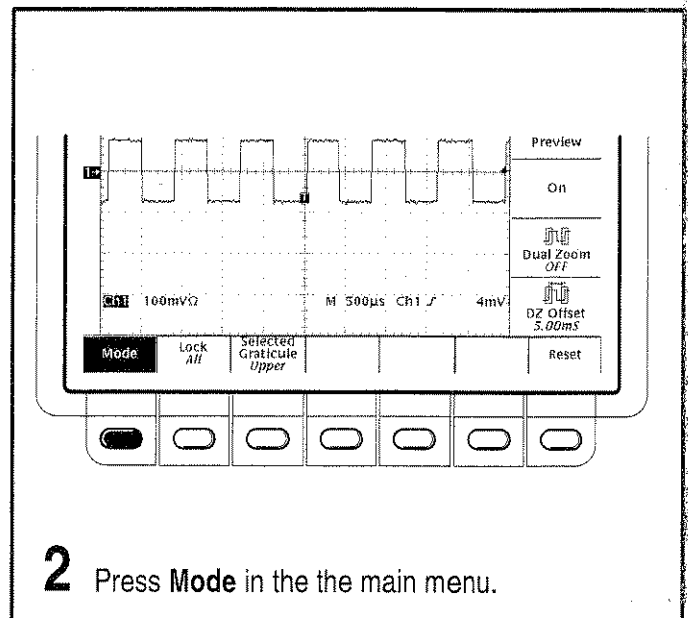
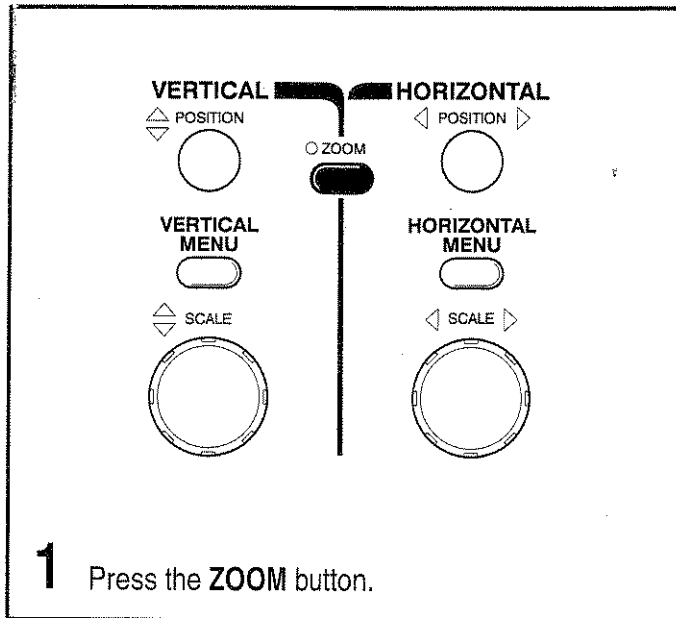
3 Select up to four measurements.

Automated Measurement Selections

Select Measurement						
Period	Rise Time	Delay	High	Pk-Pk	Mean	Area
Frequency	Fall Time	Phase	Low	Amplitude	Cycle Mean	Cycle Area
Positive Width	Positive Duty Cycle	Burst Width	Max	Positive Overshoot	RMS	—more— 7 of 7
Negative Width	Negative Duty Cycle		Min	Negative Overshoot	Cycle RMS	To 1 of 7
—more— 1 of 7	—more— 2 of 7	—more— 3 of 7	—more— 4 of 7	—more— 5 of 7	—more— 6 of 7	

4 Press the **CLEAR MENU** button to move measurement readouts away from graticule.

To Zoom a Waveform:



To Perform Other Zoom Operations:

- Turn the Vertical and Horizontal **SCALE** and **POSITION** knobs to adjust the scale and position factors of the acquisition or the zoomed waveforms.
- Press **Lock**, and then use the menu buttons to choose which waveform group to zoom horizontally.
- Press **Selected Graticule**, and use the menu buttons to direct the scale and position knobs to the upper (zoomed waveforms) or lower (acquisition waveforms) graticule in **Dual Zoom** or **Zoom Preview** modes.
- Press **Reset**, and press the **Reset All Factors** or **Reset Live Factors** menu buttons to reset the zoom factors.

To Save a Hardcopy to the File System:

Diagram of the oscilloscope control panel. The buttons are arranged in a grid:

- Row 1: AUTOSSET, SAVE/RECALL WAVEFORM, APPLICATION MEASURE, MENU HARDCOPY, ACQUIRE MENU RUN/STOP
- Row 2: STATUS, SETUP, CURSOR, UTILITY DISPLAY, SHIFT
- Row 3: HELP, (empty), (empty), (empty), (empty)

1 Press **SHIFT**, and then press **HARDCOPY**.

Diagram of the oscilloscope screen showing a square wave waveform. The screen title is "Tek Run: 200MS/s ET Sample". The right side of the screen displays the "Hardcopy Format" menu with the following options:

- Thinkjet ink jet printer
- Deskjet Hi resolution ink jet printer
- Laserjet Laser printer
- Epson 9 & 24 pin dot matrix printer
- more of 4

The bottom of the screen shows a main menu with "Format" selected. Other options include "Layout", "Port File", "Clear Spot", and "File Utilities".

2 Press **Format** in the main menu, and select a hardcopy format from the side menu.

Diagram of the oscilloscope screen showing a directory listing. The screen title is "Tek Run: 2.50MS/s Sample". The main display area shows a list of files and folders:

File Name	Size	Date	Time	Device
dir0				
TEK000000.IMG	38422	36-11-21	09:14:10	GP16
TEK000001.IMG	38422	36-11-21	09:22:22	
TEK000002.IMG	38422	36-11-21	09:42:53	
TEK000003.IMG	38422	36-11-21	09:43:30	
TEK000004.IMG	38422	36-11-21	09:44:04	RS-232
TEK000005.IMG	38422	36-11-21	09:45:00	
TEK000006.IMG	38422	36-11-21	09:45:24	
TEK000007.IMG	38422	36-11-21	09:45:54	
TEK000008.IMG	38422	36-11-21	09:46:43	Centronics
TEK000009.IMG	38422	36-11-21	09:50:23	

The bottom of the screen shows a main menu with "Port File" selected. Other options include "Format Interface", "Layout Portrait", "Clear Spot", and "File Utilities".

3 Press **Port** in the main menu, press **File** in the side menu, and then press **CLEAR MENU**.

Diagram of the oscilloscope control panel. The buttons are arranged in a grid:

- Row 1: AUTOSSET, SAVE/RECALL WAVEFORM, APPLICATION MEASURE, MENU HARDCOPY, ACQUIRE MENU RUN/STOP
- Row 2: STATUS, SETUP, CURSOR, UTILITY DISPLAY, SHIFT
- Row 3: HELP, (empty), (empty), (empty), (empty)

A "Disk Drive" is shown above the control panel.

4 Press **HARDCOPY** anytime to save a copy of the current screen to a unique file in the oscilloscope file system.

To Perform Other File System Operations:

- Press **SAVE/RECALL WAVEFORM**, and use the menu buttons to save a waveform to a file or recall it from a file.
- Press **SAVE/RECALL SETUP**, and use the menu buttons to save a setup to a file or recall it from a file.
- Press **File Utilities** in the Save/Recall Waveform, Save/Recall Setup, or Hardcopy menus to access utilities that create directories, copy files, and do other operations in the oscilloscope file system.