TDS 684A, TDS 744A & TDS 784A
Digitizing Oscilloscopes
070-8999-02
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 and HORIZONTAL POSITION and SCALE as desired.

Device Under Test
To Set Up Using a Menu:

1. Press any of the front panel menu buttons.

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

3. Select an item from the side menu, if displayed.

4. Adjust menu item values using the general purpose knob or by entering numbers on the keypad.
To Select a Trigger:

1. Press TRIGGER MENU button.

2. Select trigger type or parameter from main menu.

3. Set TRIGGER MAIN LEVEL.

Trigger Selections

<table>
<thead>
<tr>
<th>TYPE &lt;Edge&gt;</th>
<th>CLASS &lt;Pattern&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
<td>Define inputs</td>
</tr>
<tr>
<td>Select any one of Ch 1 thru Ch 4, Line, or DC Aux</td>
<td>Define levels High, Low, or Don't Care for Ch 1 thru Ch 4</td>
</tr>
<tr>
<td>Slope</td>
<td>Define Logic</td>
</tr>
<tr>
<td>Positive</td>
<td>AND</td>
</tr>
<tr>
<td>Negative</td>
<td>OR</td>
</tr>
<tr>
<td>Level</td>
<td>NAND</td>
</tr>
<tr>
<td>Set a threshold level for each of Ch 1 thru Ch 4</td>
<td>NOR</td>
</tr>
<tr>
<td>Coupling</td>
<td>Trigger When</td>
</tr>
<tr>
<td>DC</td>
<td>Goes TRUE</td>
</tr>
<tr>
<td>AC</td>
<td>Goes FALSE</td>
</tr>
<tr>
<td>HF Reject</td>
<td>TRUE for less than¹</td>
</tr>
<tr>
<td>LF Reject</td>
<td>TRUE for more than¹</td>
</tr>
<tr>
<td>Noise Rej (DC Low Sensitivity)</td>
<td>Qualification by time</td>
</tr>
</tbody>
</table>

¹ Qualification by time

This Symbol Indicates Pop-Up Menu

T” Shows Trigger Position

Press to Display Pop-Up Menus
Press Again to Make Selection
A Pop-Up Selection Changes the Other Main Menu Items

Title of Side Menu

Arrow Shows Trigger Level

Removes Menus From Screen
To Save a Hardcopy to the File System:

1. Press \textit{SHIFT}, and then press \textit{HARDCOPY}.

2. Press \textit{Format} in the main menu, and select a hardcopy format from the side menu.

3. Press \textit{Port} in the main menu, press \textit{File} in the side menu, and then press \textit{CLEAR MENU}.

4. Press \textit{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 \textit{SAVE/RECALL WAVEFORM}, and use the menu buttons to save a waveform to a file or recall it from a file.

- Press \textit{SAVE/RECALL SETUP}, and use the menu buttons to save a setup to a file or recall it from a file.

- Press \textit{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.
To Take Measurements Automatically:

1. Press MEASURE button.

2. Press Select Measrmnt or Snapshot in main menu.

3. Select up to four measurements.

4. Press CLEAR MENU button to move measurement readouts away from graticule.
To Take Measurements With Cursors:

1. Press **CURSOR** button.
2. Press **Function** in main menu.
3. Select from side menu.
4. Move cursor with general purpose knob.
   Press **SELECT** to switch between cursors.
   Press **SHIFT** to speed up/slow down cursor movement.

To Display Help On Screen:

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

**Incoming Signal** ➔ **Samples Acquired for Each Waveform Data Point Interval** ➔ **Acquisition Mode Processes Samples** ➔ **Displayed Data Point** ➔ **Waveform Drawn on CRT**

### Single Waveform Acquisition
- **Sample**
  - Use for fastest acquisition rate.
  - Sample is the default mode.
  - Uses first sample in interval

- **Peak Detect**
  - Available on TDS 700A Only
  - Use to reveal aliasing and for glitch detection.
  - Peak Detect provides the benefits of enveloping with speed of single acquisition.
  - Uses highest and lowest samples in interval

- **Hi Res**
  - Available on TDS 700A Only
  - Use to reduce apparent noise.
  - Hi Res provides the benefits of averaging with the speed of single acquisition.
  - Calculates average of samples in interval

### Multiple Waveform Acquisitions
- **Envelope**
  - Use to reveal the noise band around the signal.
  - Uses highest and lowest samples over many acquisitions

- **Average**
  - Use to reduce apparent noise in a repetitive signal.
  - Calculates average value over many acquisitions
To Choose an Acquisition Mode:

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

2 Press **Mode** in main menu.

3 From side menu, select an acquisition mode that will serve your application.
<table>
<thead>
<tr>
<th>TYPE &lt;Logic&gt;</th>
<th>TYPE &lt;Pulse&gt;</th>
<th>CLASS &lt;State&gt;</th>
<th>CLASS &lt;Setup/Hold&gt;</th>
<th>CLASS &lt;Glitch&gt;</th>
<th>CLASS &lt;Run&gt;</th>
<th>CLASS &lt;Width&gt;</th>
<th>CLASS &lt;Slew Rate&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define levels High, Low, or Don't Care for Ch 1 thru Ch 4</td>
<td>Select one of Ch 1 thru Ch 1</td>
<td>Source</td>
<td>Positive</td>
<td>Positive</td>
<td>Source</td>
<td>Positive</td>
<td>Source</td>
</tr>
<tr>
<td>Select edge for the clock (always Ch 4)</td>
<td>Do not select the same channel used as the clock source</td>
<td></td>
<td>Negative</td>
<td>Negative</td>
<td></td>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td>AND</td>
<td>Clock Source</td>
<td>Clock</td>
<td>Level</td>
<td>Run</td>
<td>Level</td>
<td>Thresholds</td>
<td>Level</td>
</tr>
<tr>
<td>OR</td>
<td>Clock Source</td>
<td>Clock</td>
<td>Level</td>
<td>Run</td>
<td>Level</td>
<td>Thresholds</td>
<td>Level</td>
</tr>
<tr>
<td>NAND</td>
<td>Clock Source</td>
<td>Clock</td>
<td>Level</td>
<td>Run</td>
<td>Level</td>
<td>Thresholds</td>
<td>Level</td>
</tr>
<tr>
<td>NOR</td>
<td>Clock Source</td>
<td>Clock</td>
<td>Level</td>
<td>Run</td>
<td>Level</td>
<td>Thresholds</td>
<td>Level</td>
</tr>
<tr>
<td>Set a threshold level for each of the pattern channels, Ch 1 thru Ch 3, and the clock, Ch 4.</td>
<td>Set levels or select preset levels based on TTL or ECL logic</td>
<td>Data</td>
<td>Set Levels</td>
<td>Set levels or select preset levels based on TTL or ECL logic</td>
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</tr>
<tr>
<td>Goes TRUE</td>
<td>Trigger When</td>
<td>Glitch (Filter)</td>
<td>OFF</td>
<td>Accept Glitch</td>
<td>Select trigger when any runt occurs or ...</td>
<td>Within Limits</td>
<td>Faster</td>
</tr>
<tr>
<td>Goes FALSE</td>
<td>Trigger When</td>
<td>Glitch (Filter)</td>
<td>ON</td>
<td>Reject Glitch</td>
<td>Select triggering when a runt wider than specified occurs$^2$</td>
<td>Out of Limits</td>
<td>Slower</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Set Lower and Upper Limits</td>
<td>Delta Time</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Select faster than or slower than and set delta time</td>
<td>The oscilloscope computes the slew rate readout from the delta time and thresholds settings</td>
<td></td>
</tr>
</tbody>
</table>

$^2$ Qualification by width
To Preview a Waveform (TDS 700A Models):

1. Press the ZOOM button.

2. Press Mode in the main menu. Then press Preview in the side menu to turn on Dual Window Zoom.

   - Upper graticule zooms the boxed area on the selected waveform.
   - Lower graticule displays the selected waveform unzoomed with the zoomed area in box.

3. Use the Selected Graticule menu to select the upper or lower waveform. Use the vertical and horizontal knobs to adjust the waveform in the graticule you select.

To Capture Infrequent Events (TDS 700A Models):

Press the InstaVu button to toggle between InstaVu and Normal waveform capture rates.

When in InstaVu mode:
- Waveforms displayed are updated thousands of times faster than normal.
- Very brief changes in waveforms are captured.
- Certain features, such as Limit Testing, Math Waveforms, Zoom, and record lengths longer than 500 points, are not available.