The Digitizing Oscilloscope

Hints:
* The BNC shield is at earth ground. Use only the probe TIP for measuring high voltages. "Floating" the BNC shield or connecting it to a high voltage could cause a safety hazard.
* Make sure probes are compensated and set to proper scale (X1,X10,X100).
* If you can't get the signal on screen:
  - Check Probe connection
  - Touch: SETUP, Default Setup
  - Touch: AUTOSCALE
  - Check for offset (ground symbol). If offscale, adjust vertical sensitivity. If still offscale, Touch:
  - Check Trigger Source
  - Set Mode Auto

Getting Started:
1. Line 0 1 (Power ON)
2. Setup (All settings to default)
3. Connect probe to calibrator
4. Auto-scale
5. Compensate probes:
   Adjust screw to eliminate:
   Overshoot
   Undershoot

Status bar:
Vertical sensitivity
Sweep speed
Trigger time reference
Channel(s) on Run/stop
Softkey labels
Calibration Source
Power ON/OFF
Screen brightness
Measurement: Vrms, tr, φ, f
Trace / Setup Memory
Display: grid, vectors, averaging
Storage: Auto-store, Erase, RUN/STOP
Triggering:
Modes: Auto, Normal, TV
Sources: Ch1, Ch2, Ext, Line
Horizontal:
Main Sweep Speed,
Sweep Modes:
Delayed, XY, Roll
1 = 0 Reference

Measure:
Match
Probe 1 100
Toggle softkey for setting that matches probe
Set probe attenuation factor:
What the display says:

- **Vertical sensitivity of CH1** is 1 Volt per major division
- **Horizontal sweep speed** is 200 µsec per major division
- **Channel 1** is ON
- **Time=0**
- **Blinks if no trigger**
- **Ground (V=0)**
- **Trigger slope** is positive (rising edge)

What the main controls do:

- **Display:**
  - Grid full
  - Vectors off
  - Time/division (sweep speed)
  - Vertical Volts/division
  - Vertical Position

- **Horizontal delay**

- **Trigger level** Line is only visible when you turn the knob. When signal is smaller than trigger level, scope stops sampling.

- **Trigger source** is Channel 1
- **Scope is ready for trigger**
- **Trigger holdoff** Signals with multiple zero crossings per cycle cause unstable displays. Holdoff ignores the false triggers for a given length of time.

Other main controls:

- **Trigger holdoff**
  - Signals with multiple zero crossings per cycle cause unstable displays. Holdoff ignores the false triggers for a given length of time.

Making Measurements: Vp-p

- **Measure Vp-p, using cursors:**
  1. Hook Calibrator signal to CH1
  2. Display
  3. Cursors
  4. Source
  5. Active Cursor

- **Measure Vp-p, the easy way:**
  1. Voltage
  2. Vp-p

- **Answer**

- **Math Functions**
  - Enable channel
  - Set up probe
  - Add waveforms
  - FFT (if equipped with module)
Making Measurements: RISETIME

1. Time
2. Width
3. RiseTime
4. FallTime

If answer needs more resolution:

3. Time/Div
   Rotate for best display:

Risetime Answer

Making Measurements: RISETIME, Using DELAYED SWEEP:

1. Time/Div
2. Main/Delayed
3. Time/Div

To do FFT, a Measurement/Storage Module must be installed on back of scope.

Making Measurements: FFT (Frequency Domain)

1. Setup: Default
2. Auto-scale
3. Function 2
   Off/On Menu
4. Operation FFT

Hint: To look ONLY at FFT signal without time domain signal, turn channel off:

Hint: To return to FFT menu at any time, use Math key

Storing Waveforms: AUTOSTORE

1. Auto-store
   Displays all waveforms (Good for looking at jitter, noise, glitches)
2. Example: Calibrator signal in CH 1. Setup Default. AUTOSCALE. Touch AUTOSTORE.
   Now move horizontal delay knob and watch all waveforms stay on screen, making an overlapping pattern.
3. Auto-store
   Touching Autostore again returns display to normal mode.
Storing Waveforms:
TRACE MEMORY

1. Example: Calibrator signal in CH 1.
   Setup Default: AUTOSCALE.
2. Save to Trace 1
3. Trace 1
   Off On
4. Now move waveform with horizontal delay and vertical position knobs.
   Note that Trace 1 still stays on screen, allowing comparison with stored waveform.