

Measuring Transient Grain and Time Constant

DSOX1204G Oscilloscope

1. Tap the power button and wait as the oscilloscope starts.
2. When the oscilloscope is ready for use, press and release the **Default Setup** button. This recovers from any previous controls settings and selects parameters that should provide *some* kind of usable display.

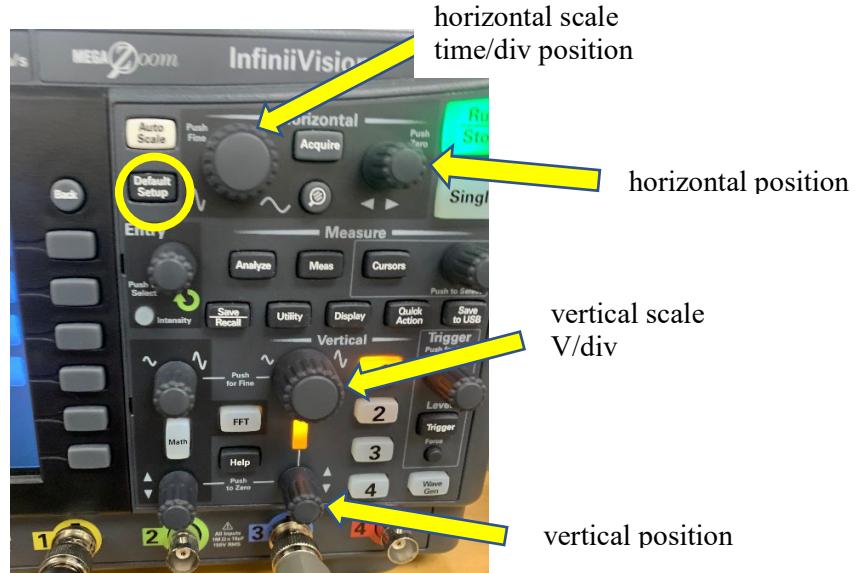


Figure 1 Initial setup

3. Adjust the four controls shown in Figure 1 to produce a display that fills the screen, as shown in Figure 2. The numbers under the display may be different for your waveforms.

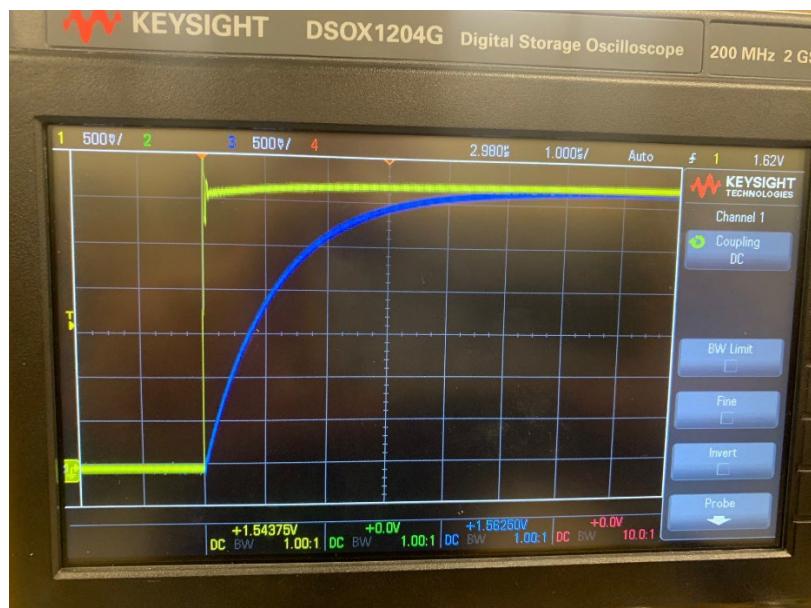


Figure 2 Well adjusted waveform display

4. Press and release the **Cursors** button, shown in Figure 3.



Figure 3 Location of the **Cursors** button

5. The **Cursors** soft keys appear. Select **Mode Track** with the top soft key. This places two cross-hairs on the display that move along one of the two waveforms. In Figure 4, one cross-hair is at the rise of CH1, near the left of the screen, and the other is on the wave near the top right of the screen.

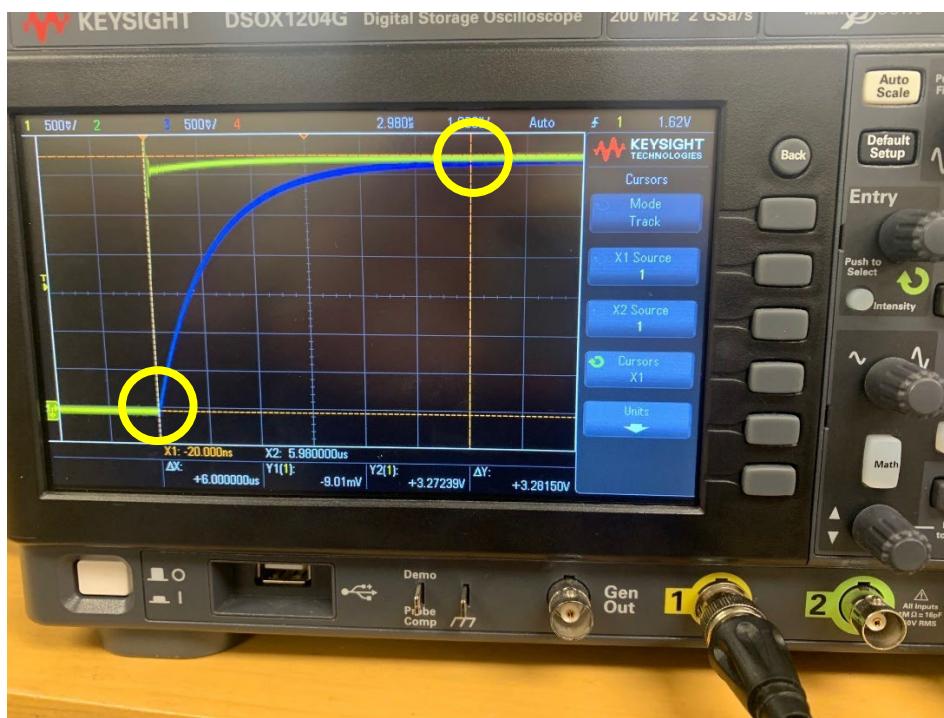


Figure 4 Tracking cursors selected

- To measure the response of the output waveform, attach each of the cursors (**X1** and **X2**) to CH3, which is measuring the output. Use the second and third soft buttons to set **X1Source** to 3 and **X2 Source** to 3. This is shown in Figure 5.



Figure 5 Attaching the cursors to the output waveform

- Select **Cursors X1** with the 4th soft button. Then use the knob beside the **Cursors** button to move that cross-hair to the lower left edge of the output, just as the voltage begins to move up.
- Then select **Cursors X2** by pressing the 4th soft button again. Move that cross-hair to the upper right edge of the output, where the voltage is flat. These are shown in Figure 6.

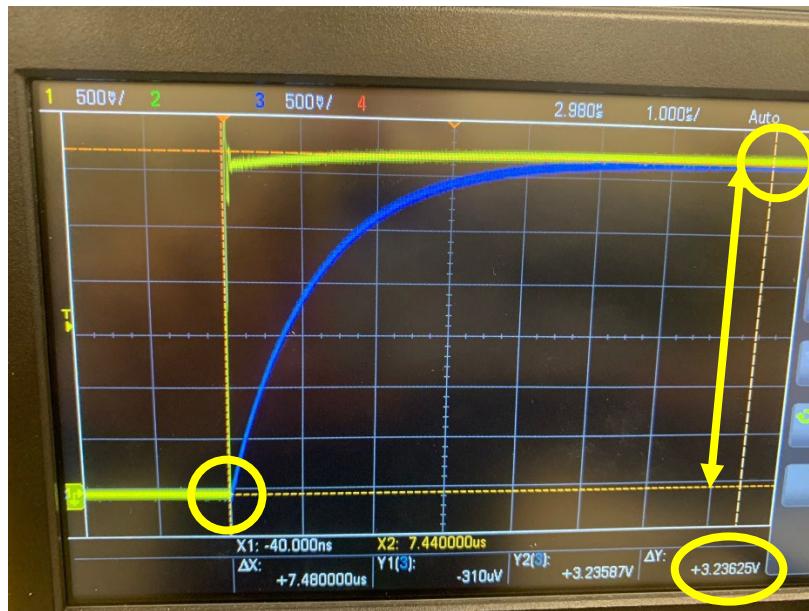


Figure 6 Proper cursor positions and data

- The ΔY display at the bottom right indicates that the output on CH3 increases 3.236 V between the two cursors. The time constant, τ , is the time it takes for the output to change by 63.2% of this maximum increase.

$$\Delta v_{\text{out in one } \tau} = 0.632 \times 3.236 \text{ V} = 2.045 \text{ V}$$

10. Move **Cursor 2 (X2)** to the left using the knob beside the **Cursors** button, until $\Delta Y = 2.04 \text{ V}$, as shown in Figure 7. $\tau = \Delta x = 1.14 \text{ us}$



Figure 7 Time constant measurement display

11. To disable the cursors, press and release the **Cursors** button. Then press and release the **Meas** button.