

Important Oscilloscope Considerations

Using Single versus Run/Stop

The oscilloscopes have a **Single** key and a **Run/Stop** key. When you press **Run** (key is illuminated in green), the screen update rate varies over timebase selection. The memory depth is always 16K points per channel and does not change whether Single or Run acquisition is selected.

Using Auto trigger mode versus Normal trigger mode

Normal trigger mode requires a trigger to be detected before an acquisition can complete. In many cases, a triggered display is not needed to check signal levels or activity. For these applications, use Auto trigger mode. If you only want to acquire specific events as specified by the trigger settings, use Normal trigger mode. For more detailed discussion of Auto trigger mode and Normal trigger mode, refer to Chapter 3, „Triggering the Oscilloscope.“

Viewing signal detail with acquire mode

Remember how you had to constantly adjust the brightness on old analog scopes to see a desired level of detail in a signal, or to see the signal at all? With the Wittig 2000A-series oscilloscopes, this is not necessary.

Normal acquire mode

Normal mode is the acquisition mode that you will probably use for acquiring samples most of the time. It compresses up to 16K acquisition points per channel into a 600-pixel column display record. The 2000-series 1 GSa/s sampling speed specification means that samples are taken every 1 ns.

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Average acquire mode

Averaging is a way to pull a repetitive signal out of noise. Averaging works better than either a brightness control or a bandwidth limit because the bandwidth is not reduced except when in high resolution mode (number of averages=1) is selected.

The simplest averaging is high-resolution mode (number of averages = 1). For example, on the 2000A-series, the sample rate at a Time/Div setting of 2 ms/div allows the extra 5-ns samples to be smoothed together, smoothing the data into one sample, which is then displayed. Averaging (number of averages > 1) needs a stable trigger, because in this mode multiple acquisitions are averaged together.

Realtime acquire mode

Realtime mode is permanently set and the only existing acquire mode on the 2000-series oscilloscopes. The oscilloscope produces the waveform display from samples collected during one trigger event. The sample rate is 1 GSa/s per channel. To accurately reproduce a sampled waveform, the sample rate should be at least five times the highest frequency component of the waveform. If not, it is possible for the reconstructed waveform to be distorted or aliased. Aliasing is most commonly seen as jitter on fast edges. Realtime acquisition is used to capture infrequent triggers, unstable triggers, or complex changing waveforms, such as eye diagrams.

Using Vectors (Display menu)

One of the most fundamental choices you must make about your display is whether to draw vectors (connect the dots) between the samples, or simply let the samples fill in the waveform. To some degree, this is a matter of personal preference, but it also depends on the waveform.

- You will probably operate the oscilloscope most often with vectors on.

Complex analog signals like video and modulated signals show analog like intensity information with vectors on.

- Turn vectors off when the maximum display rate is required, or when highly complex or multi-valued waveforms are displayed.

Turning vectors off may aid the display of multivalued waveforms such as eye diagrams.