

3. To view both waveforms simultaneously, set the **VERTICAL MODE** switch to **DUAL** and select either **ALT** (alternate) or **CHOP** with the **PULL CHOP** switch.
4. In the **ALT** sweep mode (**PULL CHOP** switch pushed in), one sweep displays the channel 1 signal and the next sweep displays the channel 2 signal in an alternating sequence. Alternate sweep is normally used for viewing high-frequency or high-speed waveforms at sweep times of 1 ms/div and faster, but may be selected at any sweep time.
5. In the **CHOP** sweep mode (**PULL CHOP** switch pulled out), the sweep is chopped (switched) between channel 1 and channel 2. Using **CHOP**, one channel does not have to "wait" for a complete swept display of the other channel. Therefore, portions of both channel's waveforms are displayed with the phase relationship between the two waveforms unaltered. Chop sweep is normally used for low-frequency or low speed waveforms at sweep times of 1 ms/div and slower; or where the phase relationship between channel 1 and channel 2 requires measurement. If chop sweep is used at sweep times of 0.2 ms/div and faster, the chop rate becomes a significant portion of the sweep and may become visible in the displayed waveform. However, you may select chop sweep at any sweep time for special applications.
6. Adjust the channel 1 and 2 **POSITION** controls to place the channel 1 trace above the channel 2 trace.
7. Set the **CH 1** and **CH 2 VOLTS/DIV** controls to a position that gives 2 to 3 divisions of vertical deflection for each trace. If the display on the screen is unsynchronized, refer to the "Triggering" paragraphs in this section of the manual for procedures for setting triggering and sweep time controls to obtain a stable display showing the desired number of waveforms.
8. When the **VERTICAL MODE** switch is set to **ADD**, the algebraic sum of CH 1 + CH 2 is displayed as a single trace. When the **PULL INV** switch is pulled out, the algebraic difference of CH 1-CH 2 is displayed.
9. If two waveforms have no phase or frequency relationship, there is seldom reason to observe both waveforms simultaneously. However, these oscilloscopes do permit the simultaneous viewing of two such unrelated waveforms, using alternate triggering. Refer to the paragraphs on "Triggering - Trigger SOURCE Switch", for details on alternate triggering.

TRIGGERING

The Oscilloscopes provide versatility in sync triggering for ability to obtain a stable, jitter-free display in single-trace, or dual-trace operation. The proper settings depend upon the type of waveforms being observed and the type of measurement desired. An explanation of the various controls which affect synchronization is given to help you select the proper setting over a wide range of conditions.

Trigger COUPLING Switch

1. In the **AUTO** position, automatic sweep operation is selected. In automatic sweep operation, the sweep generator free-runs to generate a sweep without a trigger signal. However, it automatically switches to triggered sweep operation if an acceptable trigger source signal is present. The **AUTO** position is handy when first setting up the scope to observe a waveform; it provides sweep for waveform observation until other controls can be properly set. Once the controls are set, operation is often switched back to the normal triggering mode, since it is more sensitive. Automatic sweep must be used for dc measurements and signals of such low amplitude that they will not trigger the sweep.
2. The **NORM** position provides normal triggered sweep operation. The sweep remains at rest until the selected trigger source signal crosses the threshold level set by the **TRIG LEVEL** control. The trigger causes one sweep to be generated, after which the sweep again remains at rest until triggered. In the normal triggering mode, there will be no trace unless an adequate trigger signal is present. In the **ALT VERTICAL MODE** of dual trace operation with the **SOURCE** switch also set to **ALT**, there will be no trace unless both channel 1 and channel 2 signals are adequate for triggering. Typically, signals that produce even one division of vertical deflection are adequate for normal triggered sweep operation.
3. The **TV H** and **TV V** positions are primarily for viewing composite video waveforms. Horizontal sync pulses are selected as trigger when the trigger **COUPLING** switch is set to the **TVH** position, and vertical sync pulses are selected as trigger when the trigger **COUPLING** switch is set to the **TV V** position. The **TV H** and **TV V** positions may also be used as low frequency reject and high frequency reject coupling, respectively. Additional procedures for observing video waveforms are given later in this section of the manual.