This control is usually set to the **MIN** position (fully counterclockwise) because no additional holdoff period is necessary. The **HOLDOFF** control is useful when a complex series of pulses appear periodically such as in Fig. 4B. Improper sync may produce a double image as in Fig. 4A. Such a display could be synchronized with the **VAR SWEEP** control, but this is impractical because time measurementsare then uncalibrated. An alternate method of synchronizing the display is with the **HOLDOFF** control. The sweep speed remains the same, but the triggering of the next sweep is "held off"for the duration selected by the **HOLDOFF** control. Turn the **HOLDOFF** control clockwise from the **MIN** position until the sweep starts at the same point of the waveform each time.

MAGNIFIED SWEEP OPERATION

Since merely shortening the sweep time to magnify aportion of an observed waveform can result in the desired portion disappearing off the screen, magnified display should be performed using magnified sweep.

Using the **POS**ition control, move the desired portion of waveform to the center of the CRT. Pull out the **PULL X10** knob to magnify the display ten times. For this type of display the sweep time is the **Main Time Base TIME/DIV** control setting divided by 10. Rotation of the POSition control can then be used to select the desired portion of the waveforms.

X-Y OPERATION

X-Y operation permits the oscilloscope to perform many measurements not possible with conventional sweep operation. The CRT display becomes an electronic graph of two instantaneous voltages. The display may be a direct comparison of the two voltages such as stereoscope display of stereo signal outputs. However, the **X-Y** mode can be used to graph almost any dynamic characteristic if a transducer is used to change the characteristic (frequency, temperature,velocity, etc.) into a voltage. One common application is frequency response measurements, where theYaxis corresponds to signal amplitude and the X axis corresponds to frequency.

1.depress the X-Y switch. Set the Trigger Source and VERTical MODE switches to X-Y.

2. In this mode, channel 1 becomes the X axis input and channel 2 becomes the Y axis input. The X and Y positions are now adjusted using the **POS**ition and the **channel 2 POS**ition controls respectively.

3. Adjust the amount of vertical (Y axis) deflection with the **CH 2 VOLTS/DIV** and **VARIABLE** controls.
4. Adjust the amount of horizontal (X axis) deflection with the **CH 1 VOLTS/DIV** and **VARIABLE** controls.

VIDEO SIGNAL OBSERVATION

Setting the COUPLING switch to the TV-H or TV-Vposition permits selection of horizontal or vertical sync pulses for sweep triggering when viewing composite video waveforms.

When the **TV-H** mode is selected, horizontal sync pulses are selected as triggers to permit viewing of horizontal lines of video. A sweep time of about 10 ms/div is appropriate for displaying lines of video. The **VAR SWEEP** control can be set to display the exact number of waveforms desired. When the **TV-V** mode is selected, vertical sync pulses are selected as triggers to permit viewing of vertical fields and frames of video. A sweep time of 2 ms/div is appropriate for viewing fields of video and 5 ms/div for complete frames(two interlaced fields) of video.

At most points of measurement, a composite video signal is of the (-) polarity, that is, the sync pulses are negative and the video is positive. In this case, use (-) **SLOPE**. If the waveform is taken at a circuit point where the video waveform is inverted, the sync pulses are positive and the video is negative. In this case, use (+) **SLOPE**.