Noise Cancellation and Other Useful Outcomes

Invert and add is the basic strategy. Double the voltage, cancel the noise. On oscilloscope, there is a button that says invert and another one that adds channel 2 to channel 1; this is useful here.

Aligning/adjusting Video Device so that Output Matches Input

Video level at 1 volt peak to peak. Diagram 1. Take video in from generator through oscilloscope loop through to device, and resistor/ground the other side. Take device output and route it through oscilloscope channel 2, and resistor/ground the other side.

If have 0.5 volts per centimeter on both input and output, what would we expect to see on oscilloscope? Signal coming in is color bars. Horizontal rate is about 50 microseconds per centimeter, use 5 microseconds per centimeter. H is trigger. Diagram 2. The two channels look basically the same. If hit invert, channel 2 would be upside-down. If push the add button, you'd get the difference, which is hopefully nothing, but would get the noise. Any changes that show up in the device will show up as amplitude. So, if adjust the output on the device, will align exactly with what comes in. This would eliminate the problems caused by inaccurate values of termination resistors, since you match the input, even if the input voltage is incorrect.

We as technicians can't calibrate a scope. Oscilloscopes are calibrated by somebody else, who uses a reference based on the reference standard maintained by the National Bureau of Standards.

Will see spikes that represent delays through the circuitry; these can be ignored. Consider everything else.

If only have one good terminator in this setup, use it to terminate channel 2. The one terminating the input of the device doesn't have to be as exact.

Setting Trigger Point

How to set up an oscilloscope to trigger at the point that we want (the downward part of the horizontal sync pulse)? Want a negative-going slope, set trigger level just above zero. Oscilloscope control with two controls on it, trig level +/-. The two-position switch in the middle chooses which direction will trigger, and the pot on the outside will adjust the level at which trigger occurs.

Looking at Vertical Interval on an Oscilloscope

That is the hardest thing to do. Level and slope adjusted to find vertical. Hard to do on an analog scope, and isn't at all stable. Newer digital scopes allow you to specify pulse width, which is how you'd trigger on vertical interval (looking for broad pulses). Solution is to externally lock to vertical interval.

Oscilloscopes are very different, including where they put the power switch; can be embarrassing in an interview. Need to be very comfortable with how oscilloscopes work.

Storage scope is expensive, but will retain the display that occurs at the point where an infrequent even triggers.

Oscilloscopes are not very good at really low frequencies.

Charge and Discharge of an RC Series Circuit

Later.

Hook up Intercoms

So we can do production this afternoon.