Previous Quiz

What is this relationship called? Subcarrier to horizontal; abbreviated as SCH. An NTSC specification because of color burst and horizontal sync pulse and subcarrier. The gray wave is called a continuous wave. Why is the CW to be in sync with the burst? This occurs in the receiver/monitor. This is controlled by a phase locked loop. What are the two inputs to the PLL? The local oscillator frequency and the continuous wave from the signal received. Horizontal refers to the horizontal sync pulse. The midpoint (cross over) of the subcarrier must occur at the 50% point of the leading edge of the horizontal sync. The positive-going subcarrier at the negative-going edge. What have we left out? We must define the line number. Line 10 – it is even and it is the first one with subcarrier. Where, **on line 10**, that the **down clock of the horizontal sync pulse crosses the upward motion (going positive) of the subcarrier at zero**. If misadjusted, some switchers may do a faulty switch, chroma relationship may be a problem, may have problems editing (cutting). If were a full cycle off, would be on the negative going part of subcarrier at the down clock of the horizontal sync.

Circle the portion of the signal that deals with detail. Steve was looking for *highest* frequency, *greatest* detail. This is the one at the right, marked 4.1 MHz.

Name the waveform. Bowtie.

This part of the graticule is used for what? Differential phase and differential gain. As transit up from 7.5 to 100 IRE, modulate black and white signal with burst/subcarrier. As luminance (amplitude) changes, what does it do to the frequency of color? This is what is being measured.

What is the maximum error reading, both phase and saturation, of the small box? 5 degrees and 5 IRE (+/- 2.5 degrees and +/- 2.5 IRE).

What is the maximum error reading, both phase and saturation, of the large box? 20 degrees and 40 IRE (+/- 10 degrees and +/- 20 IRE).

What color does the calibration point represent? Magenta. Why did the diagram show cyan up near to magenta? This is for PAL. PAL flips its phase every field.

Circle the properly soldered component lead. The one on the left, the one that looks like a pyramid.

What is a Yagi? An antenna.

Describe *active termination*. It is something physical. A 75 ohm resistor is passive termination. It's not a voltage regulator. It's not a switch on the back of the monitor, since that just switches in and out a resistor. It uses an active device (like a transistor); something that does some amplification. From the generator, we send out on our 75 impedance line, we go into the receiving device, normally we have a loop through and we would have to put a 75 ohm resistor here. Could be +/- 7.5 ohms, so must have a termination that is 1% or 0.1%. Over time, they change value even though they are rated at precision tolerance. Bring in terminator inside the unit that is 75 ohms, and then amplify the signal and bring the output to the other side of the loop through. Ensures that the output voltage is maintained since NTSC video is dependent on absdute voltage levels. Diagram 1 of an active termination circuit.

Quiz

Modulation, transmission and reception.

Oscilloscopes

In interview, set up scope to show one line of video. Finding power switch is hardest first step. Next hour the quiz is on oscilloscopes.

Generally uses CRT as display device. Grid on CRT calibrated in centimeters; this is a convenient size for the display size. How many channels on professional scope? 2 minimum.

Voltage

Vertical side. Sensitivity/gain. Reduce gain for big signal, boost gain for small signal. This is what vertical controls do. Calibrated in volts per centimeter.

Calibrated by organizations whose methods and equipment is traceable back to the National Bureau of Standards. Companies will pay for this service to be done every 1-3 months.

Very convenient to be able to compare two signals; that's why there are two channels minimum. For example, reference video and output video, push the invert button on the second channel, push add button, set for maximum sensitivity, would see no signal if properly adjusted.

Alternate and Chop

Alternate alternates which channel shown, on alternating sweeps (traces going across the CRT). Chop alternates but multiple times within a single sweep. Depending on the sweep speed, some waveforms look better on alternate or chop.

Sweep Rate

On right side, have sweep rate in seconds per centimeter (division). 1 / time will give you the frequency.

There are a number of red lights on the scope that indicate that are off calibration. Make sure variable setting is not on to turn off the red lights. Can be handy to look at uncalibrated to see some things better, but should be on calibrated unless need otherwise.

Scope probe amplifies 10 times; multiplies voltage. Sweep button labeled X10 MAG multiplies time by 10.

Have channel selection buttons, so can show just the channels you want.

Input Selection

Switch under voltage knob sets AC/DC/ground.

- If put switch on *ground*, does this short out the probe? No; it just shows where ground is on the scope. It disconnects the probe and grounds the input.

- If put switch on *AC*, puts the signal through a coupling capacitor, which blocks DC.
- If put switch on *DC*, puts signal straight through without modification (nothing blocked, no coupling capacitor).

Trigger

Locks onto some part of input signal. Hopefully that part is at the same place every time. For example, can lock on low voltage at horizontal sync tip. Will see weak display of the equalizing pulses too since the vertical interval happens infrequently.

Waveform monitors are just fancy specialized oscilloscopes.

DC in waveforms. If have a periodic waveform, may want to set DC to see a particular voltage level on a complex waveform.

How would you look at vertical interval? Could plug in vertical drive into channel 1 and use that as your trigger, setting trigger to look on channel 1, or set trigger to external Vertical is not that convenient on a professional scope.

B Delay

B delay is handy for taking a signal and stretching a portion of it out. A button will highlight a portion of the sweep that you are interested in. Push/pull knob for sec/div will adjust B delay. For example, can look at video line 10 on a scope this way.

Some scopes have cursors that tell you time and/or frequency and/or amplitude and reads out on the screen.

Trigger mode switch

Auto mode is what it should be usually. Normal waits for a trigger from the external input, then will sweep; can be useful for very low frequency or intermittent stuff, like a once-per-second clock tick.

There are storage scopes that are good for low frequencies. Phosphor persistence.

Single sweep is part of normal and auto. This allows you to check your sweep setting. It is a momentary switch, so you can test what happens when a sweep occurs. It forces a trigger event to occur when you press the button. Marked as SGL on trigger mode on this particular oscilloscope.