Quiz from Last Thursday

Called upon to fix camera that won't stay in focus when zoom out to a wide shot; what would you do? Back focus. How to adjust back focus? Zoom in (critical focus) on a star chart, then zoom out and set the back focus adjustment, repeat this cycle until focuses at both zoom extremes. Setting the back-most lens on the camera with the back focus adjustment.

Tally system in studio failed, and none of the tally lights operate. Where would you check first? The video switcher, since that controls the tally lights.

List of five separate distortions that we put in camera circuitry to make the picture look better. Knee and slope is one set (gives more detail in the high IRE values). Detail (artificial sharpening). Skin tone detail (softening of face tones). Gamma. Shading. Could be flare also, but this is more of a bandage. Clipping of high IRE. Shutter speed isn't one. What does shutter do? It limits the amount of light going to the pickups (tubes or CCDs). In a tube type camera it must be mechanical, and Steve has never heard of a mechanical shutter on a tube-type camera. With CCD, bleed off charge electrically. Shutter for motion; to limit light, use the iris.

Draw waveform where serrations are used. This would be in the vertical sync within the vertical interval (lines 4-6). The serrations are the thin flat points at higher voltage, where the broad pulses are the wide flat areas at lower voltage. What are the serrations there for? To maintain horizontal sync since they happen at a horizontal rate. They lock the horizontal oscillator in the monitor during the vertical interval. What circuit gets used to detect a broad pulse? Integrator detects broad pulses. Differentiator detects the narrow pulses. Put a capacitor in series (and a resistor to ground) for a differentiator; that passes the highs and blocks the DC; will get positive-going and negative-going spikes. Integrator is the opposite: resistor in series and a capacitor bypassing to ground. Diagram 1. The downward going side (the trailing side) of the serration occurs at the same time in the line as does the leading edge (downward going side) of horizontal sync during active video.

Circuit that removes all of the sync (comp sync) from video is called what? Can't just use a diode since would cut off the lower half of burst, and some of the chroma. Sync separator. Finds a level just above sync tip (transistor biased just above sync tip, so it just conducts at the sync tips), and that's what it senses. Get the sync pulses and send them to the differentiator and integrator. Diagram 2.

Burst flag is not normally in a receiver; burst flag is what we put into the camera to tell us where master generator is putting burst. Burst flag comes from the master sync generator. Won't see much in the field due to modern good circuitry. Electrically is a pulse, happens during the 9 cycles when burst will happen. Burst flag is run on a totally independent line since it would bias down the burst if it were added to house sync or comp sync. Burst is in the video signal all the time; it is added in the camera and stays throughout the studio and gets transmitted. The receiver/monitor uses burst to synchronize its internal subcarrier oscillator. If there was no color in the signal, there would be no subcarrier output. This is why receivers/monitors have local subcarrier oscillators.

If lost burst at station, what would happen? The R-Y and B-Y in the NTSC video signal would not be phase locked, so would get color drift based on the phase of the local oscillator of the receiver. Actually, color killer circuit in monitor kills the color if there is no burst, else would get this color strobing effect.

Some people call all the equalizing pulses as such, others call the pulses not used for horizontal

synchronization the equalizing pulses. Used to prepare the vertical oscillator for retrace. Preparing the oscillator for the broad pulses. As electronics technology improved, maybe not so important.

Tri-level sync. Diagram 3. Purpose of it is to average it out to zero so as not to be included in APL calculations. Changed detection point to 50% of middle rising edge. If see tri-level sync on a standard definition video signal, and put it into a regular NTSC monitor, will lock to the leading falling edge, which slightly moves over the sync timing. Never have color burst with tri-level sync. Assumed since tri-level sync is an ATSC standard, we have left NTSC out. ATSC standard that is strictly component video (no composite).

Gamma correction: what are two reasons for it. One is to correct the CRT's (maybe the phosphors) nonlinear response curve for luminance vs. voltage. Another reason was discovered after implementing gamma correction: suppressed a huge amount of noise. This has to do with the amplitude modulated signal, not for baseband. Within an LCD monitor must uncorrect the gamma correction put in at the camera. Still have the benefit of noise suppression. Plasma may still need correction since it is a phosphor-based system. Early TV was not gamma corrected, and so at the monitors we saw some extra junk in the blacks.

Depth of modulation; how to perform? Probably just have to do this when get a new camera so verify it operated within spec. With tube cameras needed to do this periodically. Look at multiburst, and over the frequency bandwidth look to see if the amplitude changes. Look at a depth of modulation chart that has sets of lines with different spacing. Actually looking at (assessing) the pickup tube. May just look at 30 or 40 IRE in the whites, or mess with waveform monitor to make the lower IRE level read at 100 IRE. Should see flat multiburst. How well that transfer between light levels occurs. When bought new tubes for a camera would have to perform this test to verify the new tubes work as expected. Really just involves tube-type cameras, since can't do anything about this with CCD cameras.

Line out monitor gets dark with bright scenes and light with dark scenes. What's wrong? Clamping problem. Lets video ride up all over the place. What does a clamp do to the video? Sets blanking to zero volts. Short out the capacitor at some time during blanking (often the back porch). Capacitor is so large that it can't rise up enough within the time of a line (until the next blanking). Unclamped will find the average picture level: brings down overall voltage of bright scene, raises overall voltage of dark scene. Diagram 4.

Started a night job at KZZZ, required to check station performance during regularly scheduled performances. How to check this? VITS. Vertical interval test system. Usually lines 10 to 20. Most places transmit one line of color bars (won't include I and Q), or could look at I and Q if you wanted.

Represent company as field service engineer. Customer installed company's color cameras. Complains that color doesn't look right. Customer has fluorescent lights and no other type of lighting. What do you tell the customer? Sunshine on cloudless day generates all that light. Fluorescent lights are missing a lot of the spectrum. Full spectrum fluorescent light covers the entire spectrum, but not continuously, so could be missing some important colors. OK to light a blue screen wall with fluorescent lights, but don't light a subject with it. Halogen bulbs cause redeposition of the tungsten onto the filament. Don't touch a halogen bulb with your skin directly; the skin oils will greatly reduce the lifetime of the bulb.

As chief engineer, notice color saturation and hue change with luminance level on a specific camera. What tests to perform? Differential phase and gain. Use ramp modulated with subcarrier.

Maintenance Lab

Continue with what we started yesterday.

Terry's Talk

Most important knowledge to have is IT knowledge. Confidence: if don't know answer, know how to find it. This was a common theme to all speakers.

Elaine Hernandez used to be a secretary (admin assistant) and started talking to the engineers.

Networking is important. Even if they meet you just briefly, that's all you need.

Napa Valley College: curriculum is SBE curriculum for all other programs and is a good curriculum. Of the other 9 people in the program, none of them go to colleges who are accredited so that their students are exempt from taking the SBE CBT test.

Biggest hype right now is IPTV.

50 questions, 84% is passing for SBE CBT test.