



TECH NOTE

VICON TECHNICAL SERVICES GROUP

Subject: Poor video quality/twisted pair
Product: A2K, Kollektor series
Number: 1400-0001-27-00
Date: 12/4/01

Problem:

Video twisted pair products with digital video products

There is potential for video to appear bright, washed out and have poor or no color when using products that convert video into a twisted pair format. The video all looks perfect on a (analog) monitor either direct or through a non-digital switcher device.

Solution:

Excerpts from NVT's Technical Bulletin explain the reasons, causes and options...

Performance with Digitizing Devices

If you are troubled by less than desirable results using NVT with digitizing devices, such as multiplexers or digital recorders, please consider the following:

Low Signal Level

Some devices are very sensitive to attenuated color burst signals. A typical monitor can handle 25 dB of attenuation without problems. Some digitizing devices lose color after only 8 dB of loss. Most multiplexers are higher than this, losing color at perhaps 15 dB.

The passive-to-passive NVT solution has no gain. Although the 213A has 0.5 dB of loss, it's really the *wire* that attenuates the signal, especially at high frequencies, which is where the color burst is. Customers concerned with highest quality may wish to de-rate, going no more than 800 feet. Alternately, use an amplified NVT receiver for zero-loss compensated performance.

Over-Amplified Signals

Again, a conventional monitor is extremely forgiving of over-equalized video. The sync recovery circuit is just a 'tuned oscillator' and will lock on to even the worst sync pulses. By contrast, the frame-store circuit in a multiplexer or digital recorder must correctly receive each and every sync pulse. The way these pulses are recovered is to find the most negative voltage, and set a threshold that's about 100 mV up from there. That gives a nice clean reference. The sync pulses are rapidly crossing through this 'cut-level' and a voltage comparator is employed to capture the sync portion of the video signal. This is used to start the A-to-D converter, which digitizes one line of video.

Now, what happens if we over-equalize the video? We are amplifying the high frequencies much more than the lows (picture looks 'grainy' when viewed on the monitor). On a scope, an over-equalized sync pulse shoots down too far and then recovers upward. The effect is a leading-edge negative-going 'tail'. Some multiplexers roll off the high frequencies when establishing the 'cut-level', thereby ignoring this tail. Other designs use the negative-most tip of this tail as it's reference, and goes up 100 mV from there. The comparator is now looking at the base of the sync-pulse, not its middle. The result is missed sync pulses, especially when further damaged by ground loop induced hum-bars.

The Solution

Before these types of problems arise, it is a good idea to identify the wire distance and the wire type. Shielded twisted-pair wire, runs that are too long, or highly capacitive transient protection devices along the path may be to blame.

With amplified devices, it is recommended that the installer first verify that a good signal is coming from the camera. This usually involves a hand-held monitor at the camera. Attempts to post-equalize an incorrectly set camera iris is a recipe for trouble, as now the sync pulses are too big, and the high frequencies too hot.

Next at the receive end, feed the amplified NVT output signal directly into a monitor. Set both trim pots to their minimum counter-clockwise positions. Then bring up the brightness until the whitest part of the picture is white. Then add sharpness, taking care not to go so high that the picture appears 'grainy'. Once the picture is good, proceed to the next step, which is to send the signal into the multiplexer. Correct 75-ohm termination is essential, as a non-terminated signal will be too bright. If the tech wasn't paying attention, he might try to adjust the trim pots downward, but the EQ won't be correct.

A bad picture may not be the fault of one specific device, but the erosion due to many poorly interoperating devices. Among them:

- Camera Iris (NVT brightness control attempting to compensate)
- Camera focus (NVT sharpness control attempting to compensate)
- Camera output stage damaged by lightning, but limping along (acts like the wire is too long, however a monitor placed at the camera looks OK)
- Too long a wire run (trim pots at max)
- Shielded wire (Sharpness control at max)
- Waterlogged wire (known short distance attenuates as if it were a very long wire)
- Ground loops (passive to passive)
- Missing termination
- Double termination
- Mux or digital recorder that has poor margins for sync or color burst recovery.

Additional information may be found in the Learning Center at www.nvt.com.