

CCTV VIDEO TROUBLESHOOTING TIPS

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Someone once said, "Knowledge is the key to success". This rule also applies to the installation and maintenance of CCTV camera equipment. Have you ever installed a CCTV camera system and then had to go back to solve a problem that was overlooked. A basic understanding of CCTV video signals, can save you hundreds of man hours, improve customer relations and increase job profitability all at the same time. This article will discuss problems and solutions for CCTV camera installations.

To discuss video let's start with the unit of measure, the I.R.E. unit. I.R.E. stands for Institute of Radio Engineers, this regulating body set the standards of measure for the video industry. This standard has been adopted by all industries in the United States and other parts of the world. 140 I.R.E. units is equal to 1 Volt Peak to Peak. I.R.E. units are easier to use because they divide into a video signal evenly.

For example proper Sync on a camera is 40 I.R.E. units, the Voltage equivalent would be 0.2857143 Volts. Unfortunately this voltage cannot be measured on the Volt Ohm Milliamp Meter that you use for checking contacts. An oscilloscope has been used by some people for this purpose, but it is bulky and does not read in I.R.E. Most people would rather use the simple 40 I.R.E. units of measure. Fortunately some equipment manufacturers sell hand-held battery operated meters to measure the video signal in I.R.E. units. This equipment is compact, extremely accurate and simple to use. Some units like the "CAMERA MASTER" can even help to set the focus of a camera more accurately.

SYNC PULSE AMPLITUDE, HOW IT EFFECTS CCTV INSTALLATIONS.

A CCTV video camera creates synchronization pulses to lock the viewing monitor on the picture. These pulses occur at a rate of 15,750 times a second. There is one synchronization pulse or (sync pulse) for each line in the picture frame. The sync pulse tells the video monitor to start drawing a video line across the picture screen. When it gets to the end of the screen another sync pulse begins the next line, and so forth until the screen has been filled with lines. It takes 262 and a half lines to form a frame, and two frames to form the video picture we see on the monitor.

The proper level for sync is 40 I.R.E. units. If the sync signal from the camera is too small in amplitude the picture will break up or roll. If the sync pulse is too big, any black portion of the picture will be more gray and the dynamic range of the picture will be degraded. Peak white level will also be compressed causing a blooming effect (loss of picture definition).

WHITE LEVEL IRIS SETTING, HOW MUCH IS ENOUGH?

There is a standard for Iris setting, or white level and it is 100 I.R.E. units. When setting a manual iris, or an automatic iris the level should be the same, 100 I.R.E. units. If you set the iris below 100 I.R.E. units, the picture will be dim with less than desired dynamic range and the white picture elements will not be pure white. If you set the iris for more than 100 I.R.E. units, the picture can be washed out causing loss of picture definition. Some cameras can be set to 120 I.R.E. units, but it should be noted that the standard is 100 I.R.E. units and in any case all cameras in the system should be set to the same level of white. This will ensure that the white portion of the picture will be the same brightness when a monitor is switched between them.

PEAK TO PEAK MEASUREMENT OF THE CCTV SIGNAL.

A quick measurement of the peak to peak video signal will re-assure you that the CCTV camera is putting out the right level. The standard level is 140 I.R.E. units.

COLOR CAMERA'S AND WHAT IS COLOR BURST ANYWAY?

More color cameras are being used in CCTV installations. The color camera adds a chrominance component (color information) to the signal, also known as Chroma. This Chroma signal operates at 3.58 Mega-Hertz. The standard level for the Chroma is 40 I.R.E. units. When the chroma level is low, the colors will be dull. If this level is too low, the color monitor will turn its color receiver off causing a Black and White only picture. This condition also indicates a loss of picture detail. You can see this effect on long cable runs. The solution is to install a video equalizer in the line and adjust the color burst back to 40 I.R.E. units. If the Chroma signal is too high the picture will display color flaring and reduction of detail at the edge of the color flare.

VERTICAL INTERVAL, ITS MANY USES

The Vertical Interval (V.I.) is the part of the video signal that tells the monitor to start drawing a new screen. It is made up of special SYNC pulses with no picture elements. The standard level for these SYNC pulses are 40 I.R.E. units. All video SYNC pulses should be 40 I.R.E. units. The Vertical Interval is a very useful place to put alarm and control signals. Some manufacturers make equipment for pan and tilt camera control, alarm contact information, and data transmission that is inserted into the V.I. signal and sent up or down the cable.

TERMINATION, THE END OF THE LINE.

A termination for video is a 75 Ohm resistor placed at the end of any video cable to prevent signal reflections that cause ghosting or multiple images on the monitor. Some CCTV equipment have built-in terminations some of which are switch able. If you are using this equipment in series, you must switch off all Terminations except the termination at the last piece of equipment in the cable run.

Proper termination can be checked by measuring the SYNC pulse amplitude anywhere in the video cable. It should read 40 I.R.E. with the termination ON, and 80 I.R.E. with the termination OFF. If the SYNC level does not change when you remove the termination, the camera or video source is not standard 75 Ohms and should be serviced or replaced. Problems with V.I. control systems can result if the level does not double when you remove the termination.

THE BASIC THREE

To check performance of any CCTV camera installation make sure the SYNC level is 40 I.R.E. units +/- 5 I.R.E.. WHITE level should be 100 I.R.E. units +/- 5 I.R.E.. Remember if you want to run high white level say 120 I.R.E., be sure that all camera's in the system have the same level of I.R.E +/- 5 I.R.E. Color burst level should be 40 I.R.E. units +/- 5 I.R.E.. SYNC, WHITE, and COLOR BURST are the three basic measurements to make to insure proper operation of your CCTV system.



THIS METER WILL MEASURE I.R.E. UNITS AND ALOT MORE!