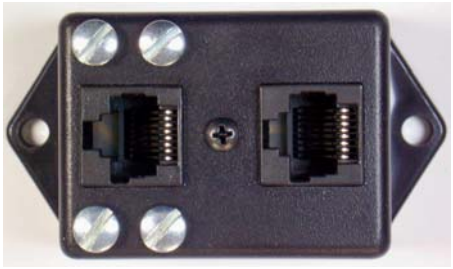
POET-1



P.O.E. TEST PORT MEASUREMENT TOOL

INSTRUCTION BOOK

IB6386-01
9-1-2015

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DESCRIPTION

The POET-1 is a tool that gives you access to the P.O.E. Power Over Ethernet voltage in your IP video system so that you can measure the correct working voltage. To make a measurement of the P.O.E. source voltage on any network cable you connect the POET-1 onto the network cable using a short patch cable and use your voltmeter to measure the DC voltage at the test points on the unit. You can also measure any interfering AC voltage or AC ripple on the power supply in the same way. Then you can measure the delivered P.O.E. voltage by repeating the same test at the camera end of the cable so you can verify the supply voltage delivered to the camera while the camera is operating (under full load). This is a tool that you keep with you in your toolbox to test any P.O.E. system for proper voltage operation.

This product has two 8P8C (RJ-45) connectors with a straight through configuration with and points for measuring the P.O.E. voltages between wire pairs 1/2 – 3/6 and 4/5 – 7/8. You can use any Voltmeter to measure the P.O.E. voltages and measure high level 60 Hz interfering signals as well. It works with all 10/100 Base configured systems to identify P.O.E. loss or incorrect voltage selection.

The POET-1 has two (8P8C) RJ-45 input/output connectors for easy IP Camera connection and has 4 test points for voltmeter measurements. Its compact size can be used easily in tight spaces and it is equipped with a convenient mounting flange.

HOW TO CABLE THE POET-1

Connect the network cable coming from the IP video camera to either one of the 8P8C connectors on the top of the unit. Next connect a short straight (non-reversing) network jumper cable to the other 8P8C connector on the POET-1 unit. Then the opposite end of that cable goes to the NVR or Switch end of the system to complete the IP connection. Basically you are inserting the unit into the network cable in the path of the IP video signal to measure the P.O.E. voltage while the system is on and functioning and under normal system load. If the network cable is long the POET-1 can be inserted at either end of the network cable to test the supply voltage and delivered voltage in any P.O.E. system. The two 8P8C connectors are a straight copper pass-through connection with a tap on the P.O.E. voltage points.

HOW TO TAKE A MEASUREMENT

After inserting the POET-1 into the network cable you should see the camera turn on and output a picture to be seen on the end of line display. To measure the P.O.E. voltage at this point in the cable, take your Voltmeter and set it to read DC voltage you will need at least a 100 Volt range setting. Next take the two probes and touch them to the two screw terminals marked "1 and 3". This will measure the P.O.E. voltage used on the active signal pairs1/2 and 3/6. Record the voltage from that reading. Then touch the two Voltmeter probes to the screw terminals marked "4 and 8". This measures the P.O.E. voltage delivered over the un-used wire pairs 4/5 and 7/8. Record those readings. Both pairs of screw terminals may not have P.O.E. voltage on them but you should check them so you will know for sure what is on them.

Next if you want to you can check for AC voltage on those same P.O.E. wires. Simply repeat the previous test with your Voltmeter set on AC scale for at least 100 Volts. There should be no noticeable AC Voltage on those wire pairs. At the best your Voltmeter may pick up the 800 millivolt reading of the data signal, but most meters are not sensitive enough to read it.

EASE OF USE

Some users remove the screws from the terminal posts so that they can stick the Voltmeter probes into the threaded posts to hold the probes in place for the measurement. This is a no hands trick to make the measurement easier.

APPLICATIONS

This system can be used anywhere that a network cable exists. Use this unit to measure every IP network camera cable run to guarantee correct P.O.E. voltage operation. Also this unit can be used to troubleshoot intermittent network cameras. Some intermittent cameras are caused by loss of the P.O.E. connection. This can be easily determined by observing the P.O.E. voltage during a picture failure to see if the voltage dips or spikes during picture loss. Use this unit to determine if the failure is caused by the P.O.E. supply or by low level signals and bad cable. Insert this unit into the signal path and use your Voltmeter to verify the camera supply voltage is correct. Also use it to check multiport P.O.E. switches to verify that all of the ports are outputting the correct voltage.

The P.O.E. Voltage is not always pure DC, with this unit you can also check for unwanted AC voltages and re-occurring spikes that can cause equipment it fail over time.

CARE AND MAINTENANCE

There is no routine maintenance or calibration required with this equipment. There are no controls that require adjustment inside the box. The box is sealed at the factory.

MORE INFORMATION

IP video is a relatively new technology and with it comes new installation techniques and tricks of the trade for the installer to learn. The advantages of using IP video cameras and recorders are obvious. Higher definition cameras are available, the cable slope loss will not degrade the video image, and when you connect the network cables you get a picture that is as sharp and clear as the camera can produce. That is of course, if you get a picture at all.

Once you have confirmed that the P.O.E. DC voltage is correct and the P.O.E. AC Voltage is low or non-existent and you still don't have a picture, then the next thing you have to do is to find the source of the picture loss.

IP video does have its limitations and when you reach those limits you will get a total failure of the system to deliver any kind of a picture. Unlike the old analog cameras that would give you a dull washed out picture when the signal level was too low, IP cameras will give you a perfect picture until the cable loss reaches beyond the minimum allowable signal and then you suddenly get no picture at all.

This effect is called the digital cliff, because like walking off of a cliff, everything is great till you take the last step off the edge and then all is lost.

IP VIDEO MARGIN is the amount of signal level above the digital cliff that you have in your system to prevent a failure from occurring. The question is how much margin is there in your IP video system, how close are you to falling off the cliff, and how can you measure it?

First let's look at what causes this loss of the network signal. Signal level loss and high frequency roll-off in the network cable also called "cable slope loss" are the main causes of most failure. Reactive loss is the predominant loss of signal level and is caused by the distributed inductance of the wires and the distributed capacitance between the wires with a small additional loss due to the loop resistance of the wire. So what effects cable loss the most is the insulating material, twists of the wire and the uniformity of manufacture of the cable, not so much the gage of the wire although increasing that does help some.

The rate of wire twist and uniformity of twist strongly affects inter-pair cross-talk between active pairs in the cable and ultimately this sets the maximum distance that a cable can be used. In the manufacture of cable the magnetic and electrostatic forces within the network cable must be precisely controlled to prevent Common Mode cable loss. When all the equipment is working correctly common mode loss is caused by slight mechanical defects in the manufacturing of the cable.

Small changes or irregularities in the twist of the wires or non-uniform insulation thickness on the wires can cause a long cable to have unusually high common mode loss. Network cable loss is also affected by the temperature and humidity, not to mention water infiltration into the cables outer jacket and wire insulation. This common mode loss will directly affect the maximum distance you can go with a network cable and it can change with time. Temperature effects are a daily change in the loss of the network cable. However humidity and water intrusion is a lasting slowly progressive loss that will take the system down over time.

In particular the consistency of the rate of twist and the diameter of the insulation must be very closely controlled over the entire length of the cable. Some manufactures control these parameters better than others, so if you find a good manufactured cable stick to using that brand for repeatable results. The manor in which the cable is handled and installed will also have a great effect on cable loss and over all system integrity. When installing network cable try not to stretch the cable when pulling it into conduit, this permanently changes the wire diameter and insulation thickness damaging the cable and creating greater loss in the cable. Also twisting, kinking, or bending the cable in a radius sharper than 5 times its diameter will create additional loss in the cable.

So now that you have installed your IP system, how do you test for the margin? What you need to know is how much additional loss can the system take before it fails and how close are you to having a failure? You will want to know if you are on the edge of the digital cliff before you finish the job so you can walk away with confidence that the system will continue to operate when cable losses change slightly.

The easiest way to test for this margin is to use the IPMT-3 IP VIDEO MARGIN TESTER to insert a known amount of loss in steps into the signal path and see how much additional loss the system can stand and still deliver a picture. This loss is measured on a dB scale, and you should have at least 3 dB margin for a safe operating system. A loss of 3dB is the equivalent of a 29% drop in the operating level of the system. By using the other loss steps on the unit you can determine if you have enough margin to reliably operate the system under all conditions. This unit will insert up to 7 dB of attenuation in 1 dB steps so you can precisely determine your system margin to guarantee reliable operation.

The IPMT-3 is a low cost inline attenuator for testing IP video margin equipped with 8P8C connectors to fit your network cables directly. Simply loop your IP video signal through the unit starting with the highest attenuation and when the system displays a picture you will know the amount of margin your system has and then you will know with confidence how much additional loss the system can withstand. Most importantly you will know your system is not sitting at the edge of the digital cliff waiting to fall off. Measuring this margin is a must for all installations to give you the security of knowing your system is capable of withstanding additional loss and still operate properly. You can also use the unit to perform periotic testing to insure that you maintain your margin of operating safety.

IPMT-3
IP VIDEO MARGIN TESTER