

TECHNICAL BULLETIN

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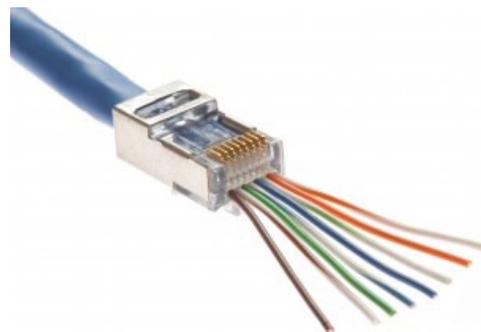
11/21/14

Subject:

EZ-RJ45® connectors and HDBaseT®

Dear Valued Customers:

One of the better inventions for those of us who don't regularly install Category cable is the EZ-RJ45® Cat 5/5e Connector. It is characterized by wires that pass completely through the connector and are trimmed then crimped simultaneously with the EZ-RJPRO® HD or EZ-RJ45® Crimp Tool. It comes in shielded or unshielded versions and works well in data applications. The connector and tools are manufactured by Platinum Tools <http://www.platinumtools.com> and sold by many outlets including Liberty AV, Snap AV and Covid among others.



Recently, we have found that many customers using these connectors have experienced issues with HDBaseT™ extenders. Their complaints are consistent:

“I installed my system and everything worked fine while I was there. A few days later my customer called and the receiver was not communicating with the transmitter. The audio no longer worked. I rebooted the system and it worked for a week. Then I had to reboot it again!”

This has been particularly noticeable with the Atlona HDVS series of extender products.

A very high percentage of the customers with this experience were using the EZ-RJ45 system. Attempts to replace the extenders or perform firmware updates did not solve the issue.

The problems only resolved after customers re-terminated the cables with conventional RJ45 connectors. One customer used the Platinum Tools RJ45 Cat6A 10Gig Shielded Connectors with good success.

Our competitors have seen the same issues and either recommend their own branded connectors or specifically call out replacement of the EZ-RJ45. We do not know the technical reason for the problems, although we have contacted Platinum Tools for guidance.

As a result, we cannot recommend Platinum Tools EZ-RJ45 connectors for use with Atlona HDBaseT products.



Additional information on cable and connectors:

At maximum resolution, HDBaseT signals are very similar in format to 10G Ethernet. At 1080p it is about 1/3rd that frequency, although 3x the frequency of 1000BaseT Ethernet. For best performance, similar care should be taken with cable as to what should be used with 10G networking. For shorter runs, lower RF noise installations, and less critical applications HDBaseT will tolerate less expensive cable.

The right cable for best performance with HDBaseT is Cat 6a, which is manufactured to very high tolerance. Cat 6a cable for long “horizontal” runs is SOLID, SHIELDED, 23 AWG cable. Solid cable and 23 AWG are both essential aspects and will provide dramatically greater bandwidth for longer runs compared to thinner, stranded cable. Shielding reduces crosstalk from external cables and other sources.

Do not confuse Cat 6a patch cable with Cat 6a horizontal cable. Cat 6a UTP PATCH CABLES are 26 AWG / 7/.0069 Copper. It is usually unshielded and stranded. Patch cables for network applications are designed for short runs between ports on a patch panel or from a wall plate to a piece of hardware.

Other installation devices that effect cable performance include connectors and patch panels. Every connector creates a potential for loss or a change in impedance that causes signal reflections that limit the effective distance of the cable. Experienced network installers rely on Cat 6a punch down connectors and never use Cat 5e or Cat 6 passive wall plates for these connections.

Cable that has been rolled and unrolled many times changes the physical relationship between the pairs, thus changing the impedance. This creates additional problems. Even a kink with no visible damage can limit the ability of the cable to transmit high frequencies. Pulling too hard on the cable also creates unseen damage. Usually maximum pull tension is 25 lbs. or 10 kg.

Proper termination is also critical. Each individual pair should remain twisted as close as possible to the connector to minimize introduction of RF interference at the point where the conductors are un-twisted. No untrimmed pieces of conductor or shield should be left hanging.

Belden® has done a lot of good research and documentation of “Best Practices” for HDBaseT cabling. They found that bundling multiple pairs of unshielded cable significantly reduces the total distance and frequency that the link is capable of transmitting. http://www.belden.com/docs/upload/HDBaseT-Signals-White-Paper_Final.pdf

In digital signaling there are some warning signs that the system may fail. A digital signal’s strength will decrease as it passes through cabling and connectors. If the signal becomes too weak, sparkles in the video, glitches in the audio or total loss of the signal can occur. If any of this is observed, it indicates that there may be a problem with the cabling system. In many cases shortening the cable or removing some of the connections between the source and the destination will fix the problem. Cabling that was damaged during installation could also cause the system to fail. If the cable is damaged it will need to be replaced. Unlike Ethernet transmission, digital video signal transmission technologies, such as HDBaseT, do not have error correction built-in. It is critical that proper cable selection and termination practices are followed to prevent failure.



Category cable testers that measure continuity are good for determining that the conductors are correctly installed in the connectors. However, they do not measure the ability of the cable to conduct high frequencies successfully. A Level IV network tester is required for these tests. (E.g. Fluke Networks® DTX-1800 CableAnalyzer™).

HDBaseT provides a reliable transmission method for high frequency digital video signal. Maximum performance can only be obtained with close attention to proper cable installation techniques.

HDBaseT devices are available with two distance ratings. Pairing 328-foot-max device with 230-foot-max results in 230-foot-max performance. Maximum Transmission distances:

100 meter HDBaseT Devices

- 328 ft. (100 m) @ 1080p over Cat 5e/6
- 230 ft. (70 m) @ 4K/Ultra HD over Cat 5e/6
- 328 (100m) @ all resolutions over Cat 6a/7

70 meter HDBaseT Devices

- 230 ft. (70 m) @ 1080p over Cat 6a/7
- 197 ft. (60 m) @ 1080p over Cat 5e/6
- 130 ft. (40 m) @ 4K/UHD over Cat 5e/6

“Long Reach” Firmware

100 meter HDBaseT devices may be modified with “Long Reach” firmware.

When this update is applied, a more robust modulation technique is used in order to enhance range while compromising on maximum supported rate. If your system is not required to support video rates higher than 3 Gbps (i.e. 1080p, 24 bpp, 60 Hz or video formats not exceeding a pixel clock rate of 148 MHz), you may activate long reach mode and enjoy longer cable reach of 150 meters with a Cat 5e/Cat 6 cable. (180 meters with Cat 6a/7)

NOTE: Working in long reach mode is not an HDBaseT certified mode. Interoperability issues may occur when connecting equipment from different vendors.

Contact Atlona Customer Service for more information on Long Reach Firmware.