

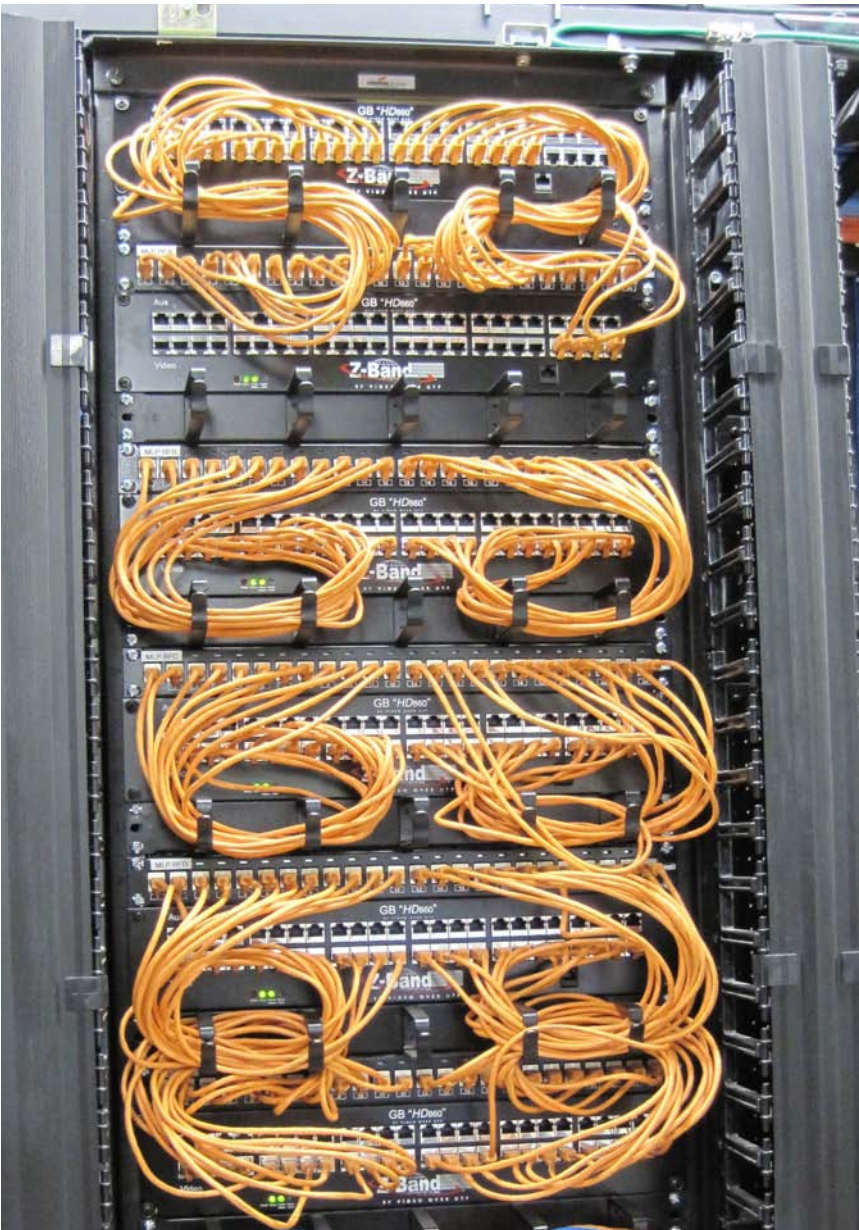
# AV TECHNOLOGY

THE AV RESOURCE FOR TECHNOLOGY MANAGERS AND USERS

## Lose the Coax

*A Good Migration Path Is Critical To Successful Business Strategy.*

///// by Phil Hippensteel



Most of us are caught in a world that uses coaxial cable for video and twisted pair for voice and data. With the evolution to IP video and audio, we must be thinking, "When will the convergence to IP be complete?" It may never be. That's why finding a good migration path is necessary. And it is necessary right now.

Cabling is one of the most expensive parts in the deployment of video. Estimates vary, but usually range between \$150-400 per drop, or terminal location. For a hospital with one thousand outlet locations, the cabling could cost \$150,000-400,000. So, you don't want to do this task twice in a five- or 10-year period. Yet, that's often exactly what happens.

New products have appeared that may offer a good intermediate solution to the migration from analog video to IP video. They carry the analog video signal over unshielded twisted pair (UTP). That doesn't mean that they can't also carry digital or high definition. These are still transmitted as analog waveforms.

Probably the most cleverly engineered output in this category of products comes from Z-Band, a Carlisle, Pennsylvania firm. They boast and demonstrate that they carry the entire range of signals from 46-850 MHz, or channels 1-122 over UTP up to 100 meters (328 feet), the standard distance specified for Cat 5 or Cat 6 cable. Don't confuse this product or its competitor Lynx with the dozens of products that advertise video over UTP but carry baseband video. That's a single channel in the base frequency, 0 to 6 Mhz. Z-Band and Lynx carries every channel and all of the signals you would conventionally get from your cable service provider.

### WHY CALL IT A MIGRATION PRODUCT?

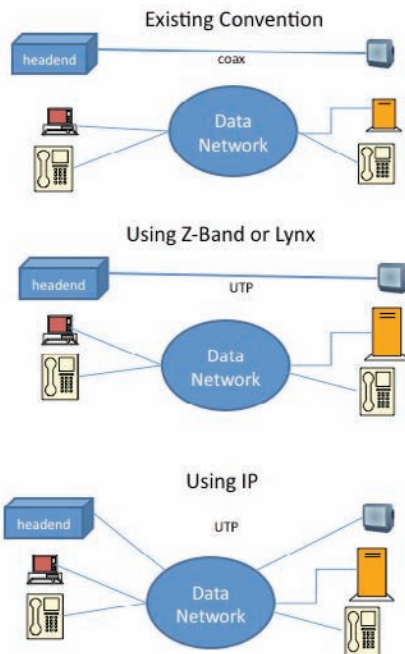
By looking at Figure 1, notice the three main steps in migrating to IP. In the original implementation of analog video a head-end acted as the source and the signal was carried over coaxial cable to the television. That signal could also be digital and be either standard definition or high definition. Even digital signals are conveyed by sending a series of waveforms, each of which represents one, two, four, six or eight bits for waveform. TVs came ready to receive analog but needed a set-top box to decode the waveforms in the digital signal. If you imple-



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Figure 1  
Migration to IP



ment this you'll still need a separate cable run of UTP for voice and data devices.

Looking to the future, we realize now that we will eventually want to send the video from the source to a user device using IP packets. The user device might be a TV with

a set-top box (STB), a TV with imbedded STB, or a computer device in one of many formats. However, this future IP solution currently has a couple of major limitations.

First, each channel needs to be encoded and packetized in IP. Encoders run into the thousands of dollars per channel. HD encoders can cost \$4,000-10,000 each. Yet, we know that cost will decrease as time goes on and more and more encoders are built with software, rather than hardware. In this scenario, the cost of the cable may be approximately the same as the cost of the encoders and decoders at the source and outlet.

That's what makes products like Z-Band attractive. If you currently are contemplating running coax to the TVs, consider UTP. In a few years, when all of your needs are met by IP solutions, you won't need to re-cable. This could potentially yield huge savings. And, as you can see in Figure 1, the intermediate solution allows you to use the same UTP cable run to do data and voice. Dick Snyder of Z-Band calls their products a, "Bridge to IP."

### SO, HOW DOES A UTP VIDEO SYSTEM WORK?

Even though coaxial cable is rather big and bulky, the signal travels on a single conductor in the center. Because of that fact, Z-Band and others realized that it should be possible to use only a single pair out of the four-pair UTP cable to transmit the same video signals.



TABLE 1

Cost of Coax versus UTP

Coax	\$
Lynx UTP	\$
Z-Band UTP	\$\$
IP	\$\$\$\$

So, they designed their system to use the pair connected to pins 7 and 8 for video. That allowed them to use the pair connected to the center two pins (4 and 5), which historically carried telephone, for a reverse video channel. The significance of this is that the pairs always used for 10/100 Ethernet aren't disturbed. That's right. You can do Ethernet in the same cable that is carrying video. Since the vast majority of data requirements at the desktop device require far less than 100Mbps this system saves running a separate data cable.

Now, we don't want to give the impression that developing this technology is a trivial matter. Several competitors tried to do the same thing and failed because of high level of emissions from the cable, which violated FCC Part 15 Rules. The Z-Band system controls these emissions by sending a 240 Mhz pilot tone down the cable. This allows them to adjust the gain in the outgoing signal so that the TV can interpret it but emissions aren't a problem. While functionally very

similar to the Z-Band System, Lynx products are entirely passive. By using off the shelf amplifiers, combiners and splitters, they hold the cost to a minimum.

#### WHY NOT IP NOW?

As you'll see in the price comparison, an all IP solution is still quite expensive. Also, most data networks are not built or operated with a goal of carrying UDP video, which is the type generated by most conventional encoders. Standard definition H.264 still requires about 1-1.5 Mbps of bandwidth or roughly the equivalent of twenty VoIP calls. Consequently adding 25 channels of video to a data network is the same as 500 voice calls. We agreed with the reasons Gregg Kelley of Lynx gave for using video over UTP:

- 1) It eliminates the use of coax, one of the industry's most disliked cable types.
- 2) You gain flexibility in moves, adds, and changes.
- 3) It's much cheaper than IP and more reli-

able than coax.

4) It's a natural bridge to IP because new installs use a cable that will be re-used for IP solutions.

#### BUT WHAT DOES IT COST?

While the cost of a particular implementation will vary considerably, we have indicated in Table 1 how the general costs compare. We base this on typical configurations and average prices. Keep in mind that in a specific instance, the cost of each solution may vary by 50 percent or more. However, the table will give you an idea of how the solutions compare.

While IT directors may want to shy away from a technology they have had forced on them by large vendors, Z-Band and Lynx offer solutions. They are easier to budget for and make more sense than a forklift change to IP.

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