Now that Ethernet 10GBASE-T (IEEE 802.3an) is ratified and published, specifiers and end users are looking at the cable options to assure an efficient 10 GbE channel for their networks. The majority of U.S. installers tend to narrow the selection to Category 6 UTP, FTP or Augmented Category 6 (otherwise known as CAT 6A). However, there is one approved Category cable that seems to get very little attention in the U.S. that would provide future proofing to beyond 10 Gb/s, namely Category 7.

Category 7 cabling, defined as Class F channels by ISO/IEC 11801:2002, is fully shielded and referred to as S/FTP or PiMF. In the case of CAT 7 these classifications mean that first, all four pairs are individually shielded. Then, there is usually another shield around the four pairs. This heavy-duty construction, combined with the thicker wire gauge size of each pair (23 AWG) lends itself to being the robust copper solution for new bandwidth, access, storage and speed demands.

Category 7 cabling is a widely accepted cable in Germany and surrounding European countries due to its immunity to EMI and alien crosstalk and also for its massive headroom in data capacity. In addition, European installers are specifying Category 7 to provide the “best of the best” for unique harsh environments, such as oil rigs and shipboard, for which they want to assure reliability and bandwidth for many years to come without having to recable.

So, why has this copper cable become the stray CAT in U.S. installations? There are several factors, including:

- Lack of realization that Category 7 is an option for 10GBASE-T channels
- Misconceptions about the unique installation considerations
- Confusion about available connectivity options
- Perceived cost of shielded cable

EVOLVING NETWORK DEMANDS

Shielding makes a cable more immune to internal or external noises. Alien crosstalk becomes a problem for other Category copper cabling, such as Categories 5e and 6 at higher speed applications upwards from 1 Gigabit Ethernet. But Category 7 is impervious to such degrading effects because of the added separation and protection of the individual pairs. In Category 7 cables, the usable bandwidth is increased to at least twice that of CAT 6 UTP. Shielding actually provides more headroom for future applications, as well as compatibility with emerging high-power active equipment. As bandwidth needs continue to rise, further ISO/IEC standards are in the works to increase the capacity of a Category 7/ Class F channel up to 1000 MHz over 100 meters.

UNIQUE INSTALLATION CONSIDERATIONS

Historically, one of the main advantages of installing UTP has been the comparatively small size of the cable. However, the inherent advantages of...
UTP may be fading as the yet-to-be standardized Augmented Category 6 versions on the market today are much thicker and require finesse to install, while only being defined to 500 MHz over 100 meters.

There are also concerns surrounding the grounding requirements for Category 7. “Grounding is an absolute must for any cabling system, whether unshielded or shielded. All patch panels, racks and equipment must be grounded. For Category 7 there are not further grounding rules, but once grounded properly, Category 7 provides much better EMC protection against outside electrical background noises, as well as surrounding data cables, which is also important when running higher frequencies,” notes Oene-Wim Stallinga, marketing director for Nexans Cabling Solutions.

ABOUT THE CONNECTORS

IEC 60603-7-7 defines the standard for the connector for Class F (Category 7) through ISO 11801. Category 7 cable uses an RJ-45 type connector for backwards-compatibility. The RJ-45 with GG45 technology from Nexans has been selected as the preferred interface for Class F systems. GG45 has two additional pins in each corner across from the eight regular RJ-45 contacts, totaling 12 pins. By utilizing the four corner pairs, maximum distance between the pairs is achieved, alleviating near, far and alien crosstalk all of which become critical at high frequencies.

“Another main advantage of using GG45 is maximum flexibility by being able to deploy four different applications through one cable in one connector, due to the separation of pairs all the way to the end device,” states Stallinga. “You can’t get maximum support for full simultaneous multimedia applications with an RJ-45 in UTP applications,” he adds.

“In addition, compared to other non-standardized systems claiming to provide Class F channel performance, the cost of infrastructure components is vastly reduced due to the ability to migrate application support without the need for special proprietary and high cost patch cords. LANmark GG45 allows the use of standard RJ-45 Category 5e or 6 patchcords. A Category 7 patchcord is only needed for future active equipment,” he further explains.

COST PERSPECTIVE

Many U.S. installers and specifiers are reluctant to use Category 7 because of its initial cost of product and termination procedures compared to unshielded versions. Since cable actually represents less than ten percent of the overall network costs and today’s cables can be designed to perform out beyond ten years, the total lifecycle costs should be considered.

The lifespan of a cabling system becomes the key decision factor, especially in environments where the cost to recable could be astronomical. The popular market for 10 Gigabit Ethernet today in the U.S. is in data centers where high volumes of bandwidth-hung-