

Belden's High-density Footprint

Presenting a complete 'footprint' of technologies and products designed to meet the cabling installation, management and performance challenges of today's high-density networks.



Belden® Offers Practical, Cost-Effective Solutions For high-density Enterprise Networks and Data Centers

The trend today in fast-growing enterprise networks and data centers is for cables and connectivity-related products to become smaller and installations increasingly dense. The problem is, when engineers add more networking equipment and drive higher density of networked systems without sufficient forethought, they can sacrifice network performance and manageability caused by heat build-up, insufficient cooling and power distribution challenges. Added to this, the vexing – and often costly – challenge of finding the space required to expand network density.

The key is to work with a partner who understands these challenges and provides network infrastructure technologies and solutions designed to optimize network performance, facilitate installation, properly manage the structure cabling system, and conserve on valuable Information Systems real estate.

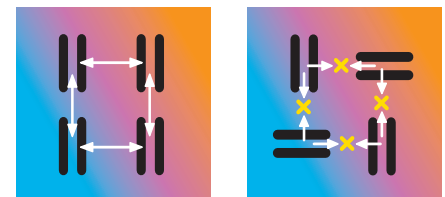
Belden is that partner. As an acknowledged industry leader with a long history of innovation in cabling design and engineering, Belden is the brand you can trust, with quality you can rely on. When it comes to high-density networking, our portfolio of technologies and products is matched only by the breadth and depth of our technical expertise. Read on to learn more about Belden's significant 'footprint' in the rapidly expanding world of high-density networking applications.

Technologies and Products for High-density Installations

MatriX IDC Technology

In Belden's patent-pending IDC design and patch panel circuit layout, each IDC is positioned at 90° to its neighbor, effectively canceling out the Alien Crosstalk between modules by 15 dB as compared with traditional technology.

Belden's MatriX 10GX IDC Modules and Patch Panels employ this technology which allows for stable high-performance in high-density environments. Connectors can be close together within faceplates and patch panels to provide true high-performance while not compromising on port identification or manageability.

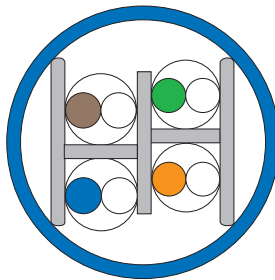


Traditional Technology vs. MatriX IDC Technology

As an acknowledged industry leader with a long history of innovation in cabling design and engineering, Belden® is the brand you can trust, with quality you can rely on.

RoundFlex Technology

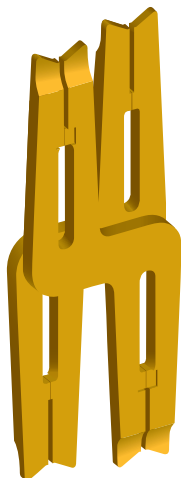
The latest evolution in Belden's 10GX® cabling technology has resulted in the **RoundFlex cable design**. The cables, which feature an Asymmetric Cross-web configuration designed to improve internal noise and Alien Crosstalk immunity, offer a smaller diameter and greater flexibility – especially valuable in high-density installations.



Belden's small OD RoundFlex cable design features an internal cross-web construction — this keeps Alien Crosstalk at an exceptionally low level.

X-Pair Technology

X-Pair Technology, the linchpin of Belden's revolutionary 10GX IDC System, is a patent-pending design in which the two IDC clips of the same pair cross inside the block in an X configuration, allowing the continuation of the twisted pair within the module and making the connector virtually transparent to the signal carried over the cable's twisted pairs. This new technology is used in the high-performance **10GX IDC Connecting blocks**, allowing the use of many connection points in close proximity within short channels and providing additional flexibility in confined areas.



X-Pair Technology refers to a patent-pending IDC clip design innovation which results in the continuation of the twisted pair within the module, making the connector virtually transparent to the signal carried over the cable's twisted pairs.

Encapsulated Lead Frame Technology

GigaFlex Modules are punch-down UTP connectors built on patented Encapsulated Lead Frame technology that uses a single, uninterrupted copper contact path to allow signals to pass virtually unchanged through the connector. This ensures long-term reliability and extremely stable transmission performance, thus allowing the connectors to be positioned closely together in high-density environments.

GigaBIX Technology

Belden pioneered the use of staggered IDC clips in compact BIX connectors over 25 years ago to allow more pairs to be terminated per square inch. The technology is still in use today in the **GigaBIX IDC System**, which can save a minimum of 20 percent of floor space in high-density installations. With the GigaBIX System, users can terminate hundreds of pairs within a very small area – a real benefit in office network environments where space is at a premium.

Wireless Networking Technology

Among the newest solutions Belden is offering to enterprise networking customers is the **Belden Wireless Solution**, which is designed to provide seamless mobility, bullet-proof security, zero co-channel interference and unmatched system capacity. Network density inherently increases with wireless technology simply because it eliminates the cables.

Moreover, the innovative Channel Blanket technology utilized in the Belden Wireless Solution solves the most difficult challenges posed by traditional radio frequency (RF) cell-based wireless WLAN architectures – namely, co-channel interference, limited access points and roaming latency. With Belden's modular and fully scalable WLAN solution, Access Points (APs) can be added as needed and users can triple their network throughput density because channels can be used to increase bandwidth, rather than to manage AP deployment.



Field Installation Technology for Fiber Connectors

Belden® pioneered a field technology a decade ago for field installation of fiber connectors. Now the technology has been miniaturized for use in the LC connector format which has become the de facto standard for high-density fiber installations. **Belden's Optimax® Field-Installable Connectors**, designed for use in the Belden IBDN FiberExpress System, utilize LC technology to provide fast, secure and reliable fiber termination of multimode or singlemode fiber optic cable.

LC Fiber Connector Technology

The LC connector has won the battle of Small Form Factor connectors for high-density environments, based on their performance, reliability and ease of use. When deployed in **Belden's FiberExpress Manager Modules**, the LC connectors can provide up to 2,880 fiber terminations per 19-inch rack. Belden also offers FiberExpress Manager Connector Modules with pre-terminated components for reusable 'plug and go' convenience.

MT Ferrule Technology

Belden uses this technology in its MPO Connectors to enable users to build high-density fiber assemblies in pre-terminated fiber solutions. MPO cable assemblies - which are multi-fiber cables (ribbon or loose tube) using a single or multiple MPO connectors - are frequently used in data center applications where density, speed of deployment and scalability are very important.

Solutions for High-density Network Cable Management

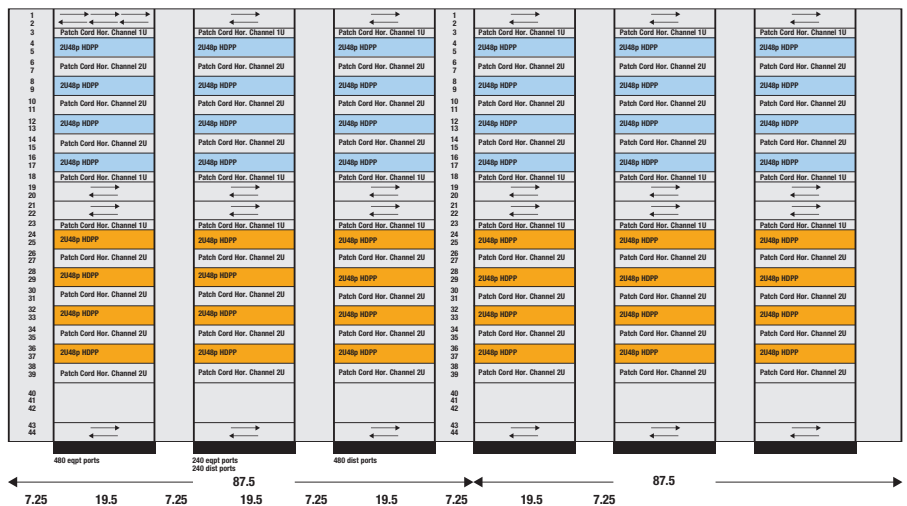
Belden recognizes that proper cable management can make a huge difference in the quality and reliability of network performance, especially in large enterprise networks and world class data centers. To address this need, we have developed and engineered a host of network infrastructure management solutions designed to optimize the performance of high-density structured cabling systems, while helping organizations make the best possible use of valuable information system real estate.

Belden High-density Modular Racking System

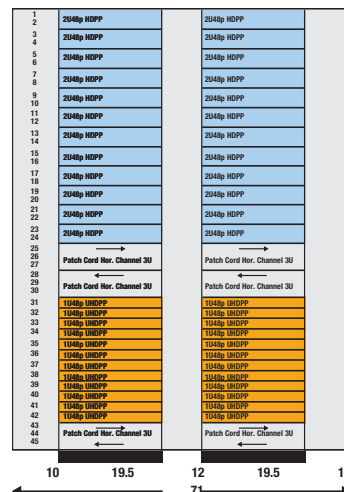
This sturdy and exceptionally versatile racking system has been carefully designed and engineered to facilitate high-density installations that optimize system performance and manageability. The system's modularity makes it highly scalable to grow with the network. Racks can be configured to suit a broad range of high bandwidth, mixed media applications and the

system provides maximum flexibility to accommodate future moves, additions or changes. Ease of removal of interchangeable components such as cable retention gates, doors and accessories, provide unmatched versatility in configuring the system precisely to your equipment requirements. A flat black finish and a streamlined design provide a professional, high tech look.

Standard Density Racking Footprint



Belden's High-density Racking Footprint



- Cross-connect (any-to-any) 1152 x 1152 ports
- Switch ports connected to the lower section via cable harnesses (1U48p panels have same density as network switch)
- Distribution ports (workstations or servers) connected on the upper section (1U24p panels, regular density for easy MACs)
- Uses only 2 racks instead of 6 for a 60% savings in linear space
- Uses only 2 lengths of patch cords to make any connection

45 RU = 7ft
51 RU = 8ft

576 x 576
672 x 672

Belden Open Frame Enclosure

Belden's ruggedly constructed Open Frame Enclosure is perfectly suited to host dense cross-connect fields, large servers, switches and routers. Its open frame design enables easy access to equipment and cables, without the external post obstructions typically found in standard enclosures. Both front and rear doors are perforated to provide an 80 percent opening, facilitating the flow of air through the enclosure for efficient cooling of equipment and avoidance of heat build-up. (Rear doors can also be equipped with high capacity fans if cooling equipment requires forced air.) The unit's optimized footprint (30-in wide x 43-in deep) complies with the TIA-942 recommendation, enabling mounting of deep equipment. Designed for flexibility, the Open Frame Enclosure offers multiple cable management options to manage large quantities of cables (telecom and power), including front and back vertical cable managers with 1U spaced fingers and front-to-rear routing channels.

X-Bar Installation Device

Based on Belden's exclusive X-Bar technology, the X-Bar Installation Device is a control device that affixes to the module to enable accurate positioning of each UTP for termination on the 10GX Module's IDC pins. The device maintains the proper conduct twist lays during installation to prevent untwisting. This ensures Installable Performance®, Belden's after-installation assurance that no termination errors have been made. The unique X-Bar Installation Device is one more way in which Belden makes it easier to perform high-density installations.

Some additional innovative cable management solutions from Belden include:

- **Angled Management Bar.** This device is designed to manage patch cords on the front of the patch panel. The angled bar eliminates the need to provide additional rack space for horizontal cable management units, thereby enabling users to double their port density in the same space.
- **Cable Management Products.** With a deep understanding of the needs and challenges of installing and managing high-density cabling installations, Belden provides a broad spectrum of cable management tools and accessories.
- **Cable Harnesses.** Designed to save installers time and labor in high-density equipment connection, these cable harnesses provide pre-dressed, pre-labeled patch cord 'bundles' for 24- and 48-port applications.
- **Patch Cord Insertion/Extraction Tool.** This specially-contoured tool allows installers to make connections and reconnections between patch cord plugs and connectors faster and more easily.
- **FiberExpress Manager Shelves.** Designed for use in the Belden IBDN FiberExpress System, these sturdy shelves allow for extra-high connection density in rack-mounting the FiberExpress Modules, while also facilitating cable routing and patch cord management.

If you are looking for enterprise network or data center infrastructure solutions, turn to Belden – the most trusted name in the industry for top quality, high performance signal transmission solutions.

To learn more about Belden's full range of premier network infrastructure and connectivity-related solutions for high-density data / telecom environments, contact your Belden sales representative. Or call **1.800.BELDEN.1** today. You can also visit our Web site at www.belden.com and click on Networking.