



## A REEL TIME CABLE SOLUTION

by Carol Everett Oliver, RCDD  
Berk-Tek, a Nexans Company

**A MAJOR CONTRACTOR WAS CHALLENGED WITH PROVIDING A CONSISTENT STRUCTURED CABLING LAYOUT FOR MULTIPLE APPLICATIONS AND MULTIPLE NETWORKS. FOR THIS REEL TIME COLUMN, WE ARE PRESENTING A REAL LIFE INSTALLATION SCENARIO. THE ORIGINAL SYSTEM DESIGN, WHICH ENCOMPASSED A FAIRLY STRAIGHT-FORWARD 50-MICRON FIBER BACKBONE AND CATEGORY 6 COPPER FOR THE HORIZONTAL DATA, VOICE AND VIDEO CABLE RUNS, QUICKLY TURNED INTO A MÉLANGE OF APPLICATIONS AND COMPLEX NETWORKS. READ HOW THE INSTALLER WAS ABLE TO READJUST THE INFRASTRUCTURE DESIGN TO FIT THE CUSTOMER'S NEEDS.**

The initial cable system design proposal by Belway Electrical Contracting Company was to replace a Category 5 data and voice system, installed in 1998 in a three-building campus, totaling 300,000 square-feet of office space. Since the new tenant's main business includes consumer credit card processing, daily transactions needed to be fast and efficient and reliable data storage was critical. In addition to creating an efficient LAN environment, the network was eventually required to connect to the corporate headquarters to create a company-wide WAN. Besides the LAN and WAN, their corporate I.T. decided to operate the security network over IP onto the same structured cabling infrastructure.

During construction the three buildings known as A, B, and C, created a triangular campus. The main data center and telecom room, which housed the active equipment, was located in Building B. Buildings A and C were treated as "pass through" buildings and therefore did not require initial active equipment. The connectivity went through separate runs to Building C. Belway's design recommendation was to connect all the buildings in order to support the future addition of active equipment into all the main telecom rooms. In doing so, this would create self-sufficient environments for those buildings. This is practical in such

cases as sub-leasing or even expansion within the company.

The distance between the main telecom rooms in Buildings A, B and C is 950 feet. Because of that distance and the need for future 10 Gigabit Ethernet performance, the obvious choice for the fiber optic backbone was a 50-micron OM3-rated optical cable. "I recommended 24-strands of 50-micron fiber for both the primary and redundant backbone cabling between buildings. Since most standard 50-micron fiber is only guaranteed to 300 meters, for 10 Gb/s, I specified a higher-grade fiber which can perform at higher bandwidths and distances to 600 meters," explains Larry Jalbert, MGN & Associates.

The fiber optic cable construction, used as the backbone cable between the buildings, is a loose-tube riser cable, which utilizes a patented dry blocking technology for waterblocking, versus one with the messy gel. "The cable proved to be durable and easy to install and was put to the test when a backhoe accidentally broke through the conduit. After total exposure and seven hours of testing, we were amazed that the cable came through unscathed," comments Wendy Perry, RCDD, at Belway Electrical Contracting Company in Elmsford, NY.

The fiber optic cable between the

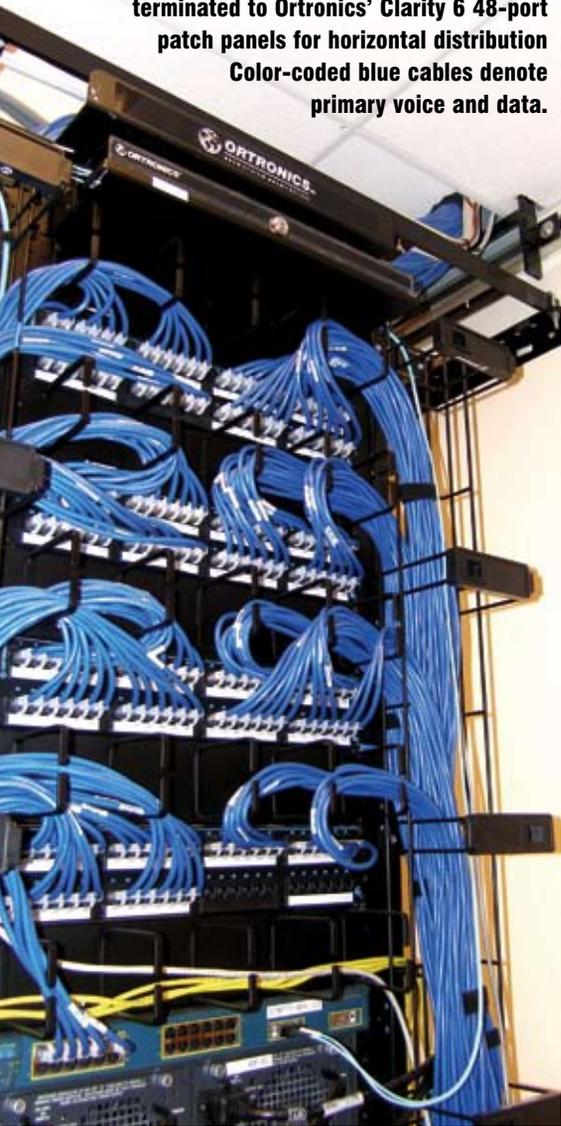
buildings ran in two separate conduits for redundancy. Belway Electrical Contracting had the foresight to recommend and install an extra 1" innerduct for future use. During the build-out process, corporate network administrators decided that they wanted access to this campus and its network, so the spare innerduct needed to be populated with 12-strands of fiber optic cable to provide connection between corporate

**The fiber optic cable backbone for the corporate network was terminated into a separate Ortronics wall-mount fiber cabinet, then patched to the Clarity 6 mini patch panel for horizontal distribution.**



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**Berk-Tek's LANmark-1000 Category 6 cable, terminated to Ortronics' Clarity 6 48-port patch panels for horizontal distribution. Color-coded blue cables denote primary voice and data.**



LAN room and the data center.

## STACKED CLOSET LAYOUT

The backbone fiber optic cable was terminated into the main telecom rooms (also known as IDFs) located in the basement in Buildings A and B. All closets, including the main telecom rooms and riser closets, were outfitted with cable management racks to hold the termination equipment. All fiber optic cable was then terminated to rack-mount fiber cabinets with multiple 12-fiber adapter panels, using SC connectors. Each cabinet holds 36 fiber connections, allowing room for additional adapter panels in the future.

In the telecom rooms, two cable man-

agement racks hold the fiber termination equipment, as well as multiple 48-port patch panels and patch cords for the horizontal patching. The Category 6 cable was color-coded with blue jacketing to delegate primary voice and data cabling and white jacketing for redundancy. The colors are separated in the patch panels and racks in the closet.

## DESKTOP CONNECTIONS

Over one million feet of Category 6 cable was installed from the closets to 1,000 total locations. Each location includes two drops of data/voice cabling, which are not application-dependent as the voice is running over IP. The white cable was denoted as the spare secondary cable, which is passive as it is not patched into the active equipment, but available for future applications. The cable was terminated to the workstation outlets, color-coded to correspond with the blue and white cables. The majority of desktop terminations are in cubicles or office furniture utilizing a raceway configuration. However, due to sloping of the property, cabling to the first floor of Building B was a challenge as it was constructed as a slab-on-grade. "Instead of pulling cable through raceway in areas on the first floor of each building, we installed floor boxes which offered power and separate workstation outlets for voice or data. In addition, on the second and third floors, poke-thru boxes worked well for conference tables and the corporate offices where the furniture is located in the middle of the room," explains Perry.

## ... AND THE KITCHEN SINK

In addition to the LAN and WAN network, the client identified other unique applications to run over the network. "If we were going to install a warranted long-term, high-bandwidth reliable network, we realized that we could utilize it for security and wireless," states Perry.

Belway specified legacy 62.5-micron fiber optic cable for runs to the security cameras. Since the cameras are connect-

ed over IP and must adhere to the TIA-568 standard distance limitations of 100 meters if using twisted-pair copper cabling, fiber optic cable was selected for the distance, signal clarity and for its immunity to EMI. To provide data and voice to the out-building guard complex, 12-strands of 50-micron fiber optic cable were installed. The fiber optic cable to the cameras and to the guard complex runs through the corporate network, but is terminated into a separate security command center. For continuity throughout the campus, Belway specified four cable management racks, multiple fiber enclosures, Category 6 patch panels, vertical and horizontal wire management for the entire security command center.

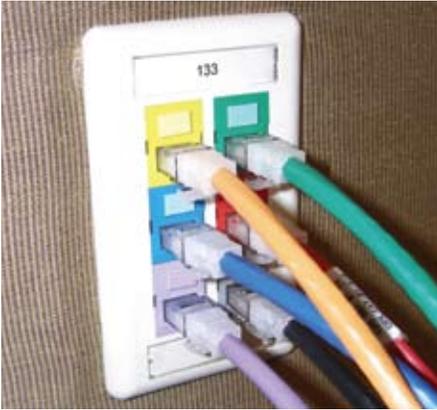
For connection to the cell tower, a 12-strand single-mode cable ran between Buildings A to C and B to C. Six strands of single-mode were then run to each riser closet in the three floors of each building.

Wireless access points were cabled to a wireless switch in each telecom room through the Category 6 cabling. The Category 6 cable jacket was color-coded as yellow so that it would be highly visible in the ceiling and easy to distinguish from the blue and white data/voice cable. There are four access points per floor and three sensors per floor. The sensor is an air monitor that is wired back to each telecom room to a 24-port patch panel. The sensors filter out any unauthorized users on the wireless system.

## FROM SOUP TO NUTS

"Our lifeline to meeting the tight deadline was mainly the support of CSC, the distribution company who works with the manufacturers' rep, MGN and Associates. Everything was staged at the CSC location in Stamford and provided to us in a 'just-in-time' basis," Perry notes. At the height of the installation, there were 140 electricians and 40 data installers onsite. During the entire five-month winter project, Belway's onsite operations were managed from two construction trailers housing Mark Cucinell,

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**The Ortronics' Clarity 6 TracJack workstation outlets were color-coded to correspond with the color-coded patch cords and applications delegated to the ports.**

V.P., Ray Hart, Project Manager and Wendy Perry, RCDD.

“When we first started the project, we were handed a one-page sketch. From there it grew to a multiple page design/build document for the two complex networks. Through consistency of products and standards, we were able to design and install in five months, from start to finish,” notes Perry. “Because the premier financial firm had pre-selected global structured cabling standards in place, the selection of the components was not the challenge as much as putting the building blocks together,” states Perry.

*(Editor's Note: The selected horizontal, warranted structured cabling solution is a NetClear GT2, the Berk-Tek and Ortronics/*

*Legrand enhanced Category 6 cabling solution to the desk for high-speed data and support for VoIP. This system includes Berk-Tek's LANmark-1000 Category 6 cable and Ortronics Mighty Mo racks and Clarity 6 termination products. The backbone solution was a redundant NetClear MM10 10-Gigabit, 50-micron fiber optic system. Wiremold floor boxes and poke-thru boxes were used in Building B for slab-on-grade.) ■*

