

**NETCLEAR®  
SOLUTIONS FOR  
EDUCATION**



**Berk-Tek®**  
A NEXANS COMPANY

**legrand®**

**Ortronics**

# GET THE BANDWIDTH FOR LEARNING

Networks have a profound influence on education, changing the relationship students have with learning materials and methods. The learning environment is global, with the ability to access information across boundaries of space and time. Networks have opened new ways of teaching, doing research, and allowing students to expand their horizons creatively. As schools, colleges, and universities continue to incorporate the vast potential enabled by networks, they face the need to ensure that technology is intelligently implemented to meet today's needs and those that evolve tomorrow.

Not only do networks aid in learning, they enable protection, ease administration tasks, and allow building automation systems to maintain a comfortable environment.

Government initiatives are promoting technology integration through the Office of Technology and through the National Technology Plan, which is investigating ways to leverage technology to increase the number of college graduates.

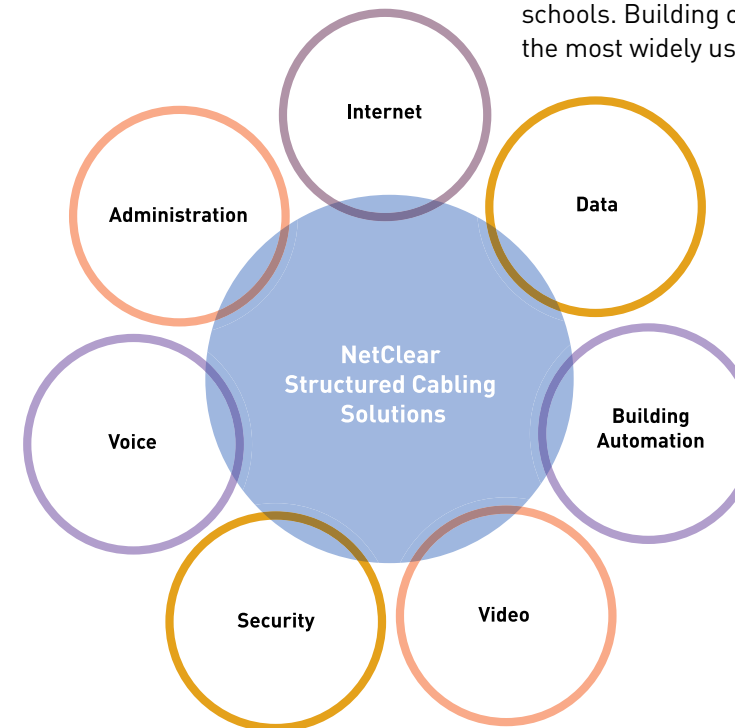
Berk-Tek, A Nexans Company, and Legrand|Ortronics build on their leadership in networks with NetClear® cabling solutions to specifically address the needs of the education market. These copper and fiber structured cabling systems are uniquely capable of providing the reliable, high-bandwidth, long-lasting networking so critical in today's learning environments.

## Meeting the Challenges of Connectivity

### IP Everywhere

A converged Internet Protocol (IP) means that nearly all communication needs can be handled by a single network. Beyond standard data, other systems can run over an IP network: security, access control, building automation, audio, and video—if it can be done digitally, it can be transmitted over an IP-based network. While applications will often be segregated, the fact remains that the prevalence of IP means there are more bits and bytes being transmitted.

The diverse applications that can operate on an IP network allow a common set of cables. One advantage is that a single, integrated structured cabling system can replace all the different wiring schemes, simplifying network administration. But it also makes choosing the right system—including both products and supplier—even more critical. NetClear solutions give you the perfect combination of performance, flexibility, and reliability.



NetClear structured cabling solutions make it easy to support the widest range of applications.

### Unique Challenges Require Flexible Solutions

From elementary school through post-graduate research, networking needs for education vary significantly in complexity, size, and the types of applications that must be supported.

### Matching Performance to Budgets

Balancing networking requirements with budget realities means making smart decisions about the cabling system to ensure the right performance today and tomorrow. Your cabling system should have the range and flexibility to meet your needs cost effectively; you should not have to bend your needs to the cabling system.

### Standards Aid Deployment

BICSI, a professional organization providing information, education, and certification for individuals and companies in the IT industry, issued a standard for educational facilities. ANSI/BICSI 001-2009, Information Transport Systems Design Standard for K-12 Educational Institutions addresses the specific requirements of schools. Building on ANSI/TIA-568C, the most widely used standard for

structured cabling systems, the BICSI standard recommends best practices for K-12 schools by addressing each unique area—classrooms, administration offices, arts (including auditoriums), building services, cafeteria and gyms, athletic areas, dorms, etc. Within each area, the standard makes recommendations for pathways, spaces, cabling media and termination types needed to support the diverse applications. As you move from elementary school to colleges, the applications and cabling requirements increase. The BICSI standard will be expanded to include post-secondary applications.

## NetClear Simply Works Better to Address Education Needs

NetClear solutions include a variety of systems to create a cabling infrastructure that suits every capacity required from K-12 schools to university campuses. NetClear solutions offer the most comprehensive copper and fiber systems for an infrastructure that is easy to manage, provides a path to the future, and offers reliability day in and day out. NetClear, the longest industry partnership, provides systems that have been tested through third-party independent labs to provide channel integrity second to none.

# K-12 EDUCATION: PUTTING SMARTER TECHNOLOGY TO WORK



Today's students are growing up on-line and connected. The role of technology in primary education is expanding rapidly. On-line connectivity—for streaming video, on-line learning, and the wealth of Internet-based tools—brings the world to the classroom.

School budgets are tight and any allocated funds for upgrades must demonstrate a return of investment higher than most businesses. The good news is that the networking needs of K-12 schools are modest compared to the demands of other industries. Businesses often require complex, high-bandwidth networks to move multigigabyte files, process tens of thousands of transactions a day, or provide real-time access to vast amounts of information. In such cases, performance is more critical than cost. Schools, on the other hand, walk the tightrope between cost and performance. Yet the cabling system is typically a small portion of the overall costs of a network and shortchanging performance may represent insignificant savings.

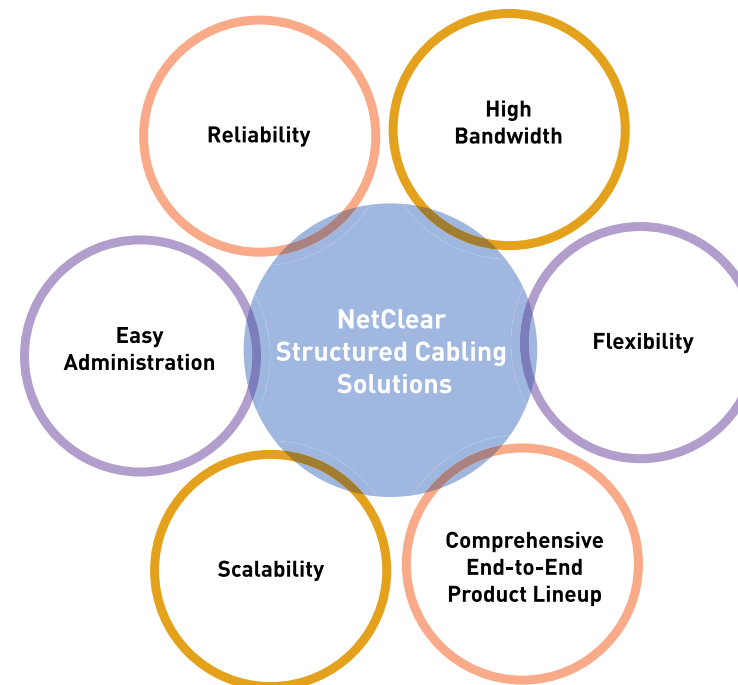
Even better, the right cabling system will prove its value by offering the scale of products to fit any school—and budget—while ensuring the quality and reliability fundamental to successful education.

## Meet the Needs of Every Grade

There is no one answer to the cabling infrastructure of K-12 schools. The technology needs of elementary students differ from those high-school students. As grade levels ascend, classroom layouts change, cabling density increases, and users (teachers, administrators, and students) employ technology with different levels of sophistication. The structured cabling system should be scalable to meet these varying needs.

## Manage the Network Easily

Achieving a network that is robust and reliable enough makes essential management easier. Most school districts have limited IT support—often only one or two people serving the entire district. A poorly implemented cabling infrastructure can be a significant source of performance headaches. On the other hand, a carefully planned and installed system can make the tasks of moves, adds, and changes easy, as well as eliminate most network performance issues.



NetClear structured cabling solutions provide all the features for a totally integrated network.

## Eliminate the Hassles of Multiple Systems

The convergence of IP to allow nearly every application from video to building automation to run over a single cabling system gives more control and more opportunity to save money. Building automation, for example, can cut energy costs while providing the comfortable environment needed for learning. Security systems can be simplified and consolidated without compromising safety. In place of hard-wired inflexible systems, an IP-based structured cabling system gives you the flexibility to upgrade and evolve systems without rewiring, whether it's a building controller, security system, or classroom video.

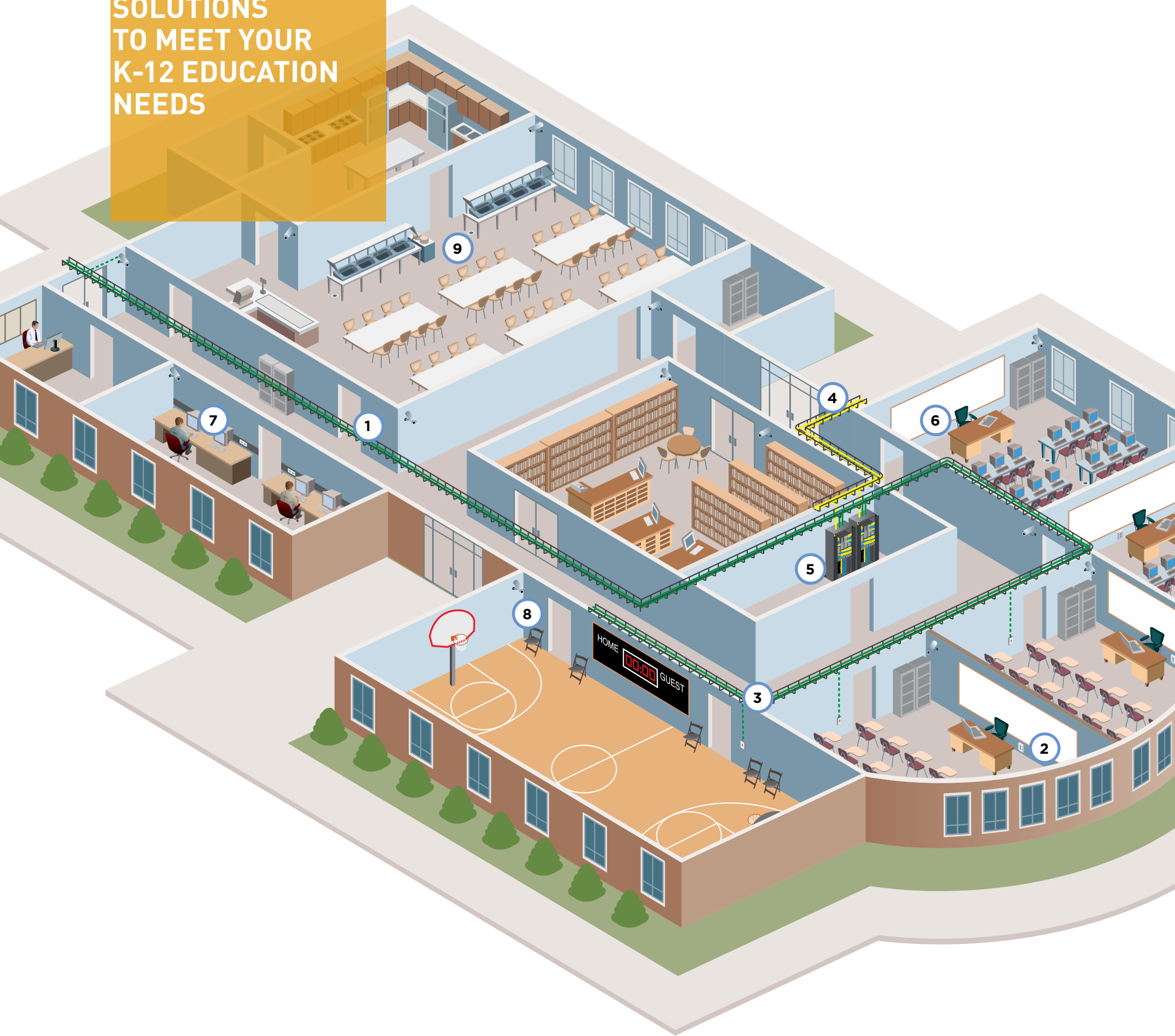


## NetClear Systems Make the Grade

A NetClear structured cabling system gives you the choices you need to find the best match of performance and cost—all while meeting the educational needs of students and teachers. It also gives the flexibility to meet changing curriculum and accommodating changes to the arrangement of a classroom.

# SOLUTIONS TO MEET YOUR K-12 EDUCATION NEEDS

## NetClear Products for K-12 Education



- 1. Cablofil® basket trays:** with cable separation for easier routing, identification, and management
- 2. TechChoice and TracJack® color-coded jacks and outlets:** connectivity for every category of cabling from patch panels to work outlets and patch cords
- 3. LANmark™-6 cable:** provides Category 6 performance to each of today's IP applications and to tomorrow's emerging technologies
- 4. Adventum™ indoor/outdoor fiber-optic cable:** provides a highly reliable and redundant backbone within a building and between multiple buildings
- 5. Mighty Mo® advanced cable management systems:** offer superior features for higher cabling densities, better cable management, and better airflow
- 6. Multimedia outlets:** color-coded with a wide range of options to meet any connectivity need
- 7. MUTOA:** multiuser telecommunication outlet assemblies provide additional outlets and flexibility
- 8. OneReach PoE extender system:** a complete Power over Ethernet solution for operating remote IP devices, such as security cameras and wireless access points, at distances over 100 m
- 9. Wiremold floor boxes and poke thrus:** with shuttered covers, allow outlets to be conveniently placed away from walls, close to desks and other furniture, while protecting outlets when not in use

# POST-SECONDARY EDUCATION: PERFORMANCE FROM THE LAB TO THE DORM

Students and faculty expect high-performance connectivity campuswide.

Campuses not only vary in size but also in unique services—from state-of-the-art trading floor simulators and full-fledged biotech engineering to supercomputing data centers and HD video products—giving rise to the need for enhanced network support.

With classrooms, dorms, arts, sport complexes, shopping arcades, broadcast studios, healthcare facilities, and, in some cases, manufacturing, today's higher education campuses are small cities—with all the needs of a bustling metropolis. And the campus has all the same infrastructure needs for data, video, voice, power, mechanical, and security systems.

## Bandwidth

The bandwidth requirements in a campus are complex and varying, ranging from the high-bandwidth needs of research departments to the streaming video needs of students. Social media—from Facebook and Twitter to YouTube and Flickr—are recent trends combining both pervasive connectivity and substantial network use. Computer-intensive research often needs cutting-edge connectivity. Similarly, a medical school needs to accommodate the transfer and storage of diagnostic images such as MRI scans or digital x-rays. A broadcast school needs to edit and transfer large video files.

## Storage

The volume of data that must be stored, accessed, and backed up continues to grow unencumbered. Libraries are digitizing their collections, scientific research generates volumes of data, and the cloud is becoming an important application architecture. The bottom line for the network is obvious: storing and retrieving data requires high bandwidth.

## E-Learning

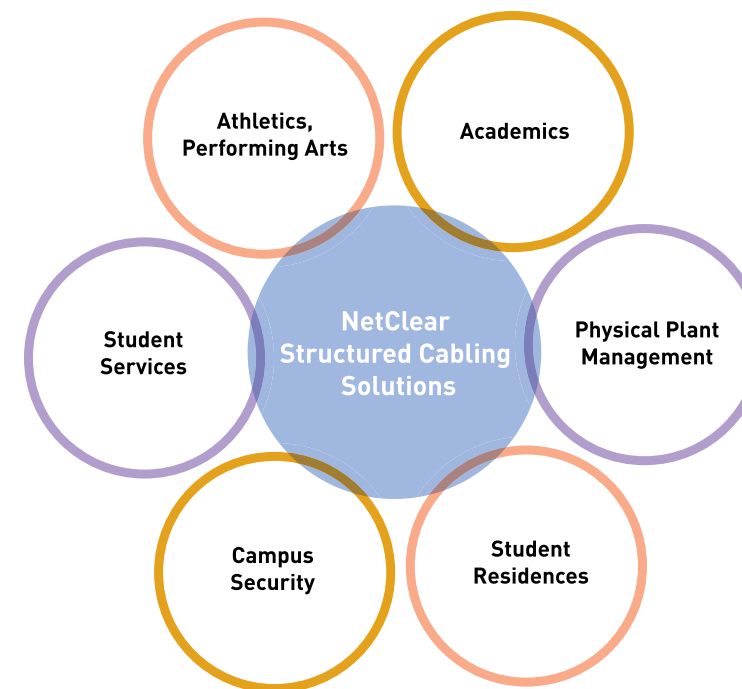
The power of the Internet has been harnessed for on-line courses, requiring real-time streaming of audio and video. In addition, traditional brick-and-mortar classrooms benefit from the ability to bring in the outside world—guest lecturers, video conferencing, and the like.

## Cashless Campus

Many colleges and universities use debit cards for the majority of small transactions—including vending machines, cafeterias, student laundries, campus stores, etc. While such equipment must be connected to the network to track usage, demands on network performance are still pressed. These systems must be available 24/7 year-round.

## Security

Security is one of the fastest growing applications on campus. From access control and mass-notification capabilities to security cameras and blue light emergency phones, security networks need to operate reliably in real time.



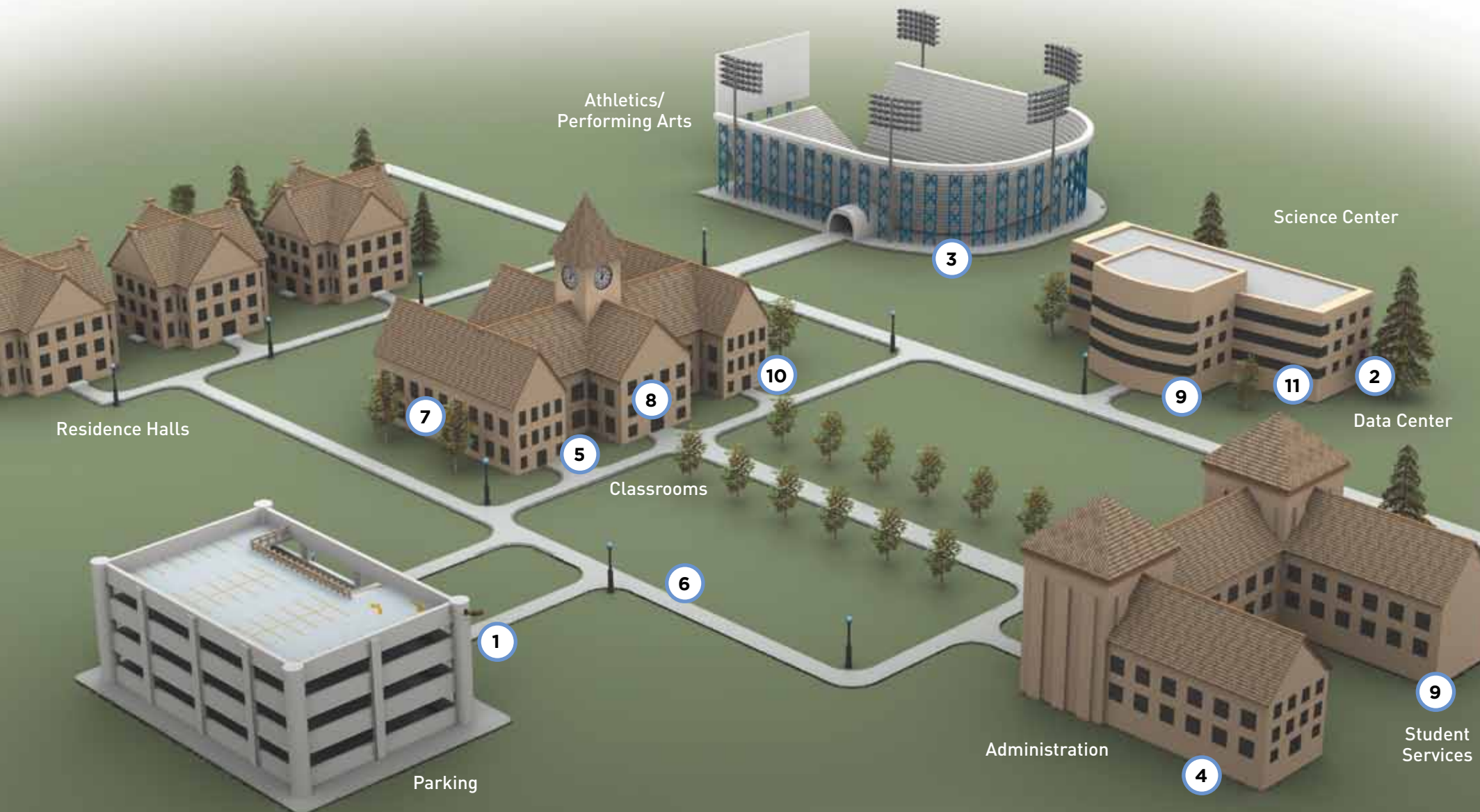
NetClear structured cabling solutions provide connectivity and reliability to all applications throughout the campus.

## Scalable Across the Entire Campus

NetClear solutions are scalable from the data center core and campus backbone to the classroom and dorm. Whether you need 100 Gb/s for high-performance computing and connectivity to the data center or 1 Gb/s to security cameras, we offer the full range of fiber and copper systems in several performance families, each exceeding the standards defining different levels of performance.

# SOLUTIONS FOR A MULTIFACETED CAMPUS

## NetClear Products for Post-Secondary Education



- 1. OneReach Composite Copper/Fiber PoE Extender:** for runs further than 100 meters, this system offers data and power to hard-to-reach and environmentally exposed devices, such as security cameras and access points
- 2. MDP (Micro Data Center Plenum) Cable:** the smallest, highest density multi-fiber solution for backbone and data center environments supporting up to 100 Gb/s
- 3. LANmark™-10G2 Cable:** Category 6A cable for high-bandwidth applications, such as streaming video and transfer of graphic files
- 4. LANmark-2000 Cable:** highest-performing and robust Category 6 cable for data, voice and power
- 5. Adventum™ Fiber-Optic Cable:** indoor/outdoor cable for backbone or horizontal cable runs to the desk or device
- 6. Armor-Tek™ Cable:** armored jacketed cables between buildings or telecom rooms offer fiber protection and eliminate the need for conduit or innerduct
- 7. Wiremold Raceway:** allows cable to run in flexible pathways to work areas (columns, desks, labs) while protecting the horizontal cabling
- 8. Wiremold Floor Boxes:** outlets that need to be conveniently placed away from walls, close to desks and other furniture with outlet protection when not in use
- 9. Mighty Mo® Cable Management Racks:** offer superior features for high cable densities, cable management for ease of installation, and simplified moves, adds, and changes
- 10. Clarity6® Color-Coded Jacks and Outlets:** allow easy identification of services, while optional jack shutters or stainless steel faceplates offer added protection
- 11. Momentum Fiber-Optic Cassettes:** pre-terminated with OptiMo fiber optic patch cords making fiber optic connectivity easy and organized

**IT SIMPLY WORKS BETTER AS SPEEDS INCREASE.**

There are some trends that will continue in education networks. Speeds will continue to climb, bandwidth requirements will continue to increase, accessing remote storage will grow, and students will continue to become more tech savvy. Berk-Tek and Legrand|Ortronics will help you stay ahead of them. As network speeds and standards go from 100 Mb/s to 1 Gb/s to 10 Gb/s, there is a NetClear solution.

Berk-Tek and Legrand|Ortronics have also coordinated research labs to develop synchronized testing. All NetClear solutions are jointly tested, and third-party verified, for both dynamic and static performance. This groundbreaking research and development, conducted in our state-of-the-art labs, allows us to continue to bring optimized network performance, superior network reliability, and reduced long-term total cost of ownership to enterprise networks.

Our cabling systems are guaranteed to handle present and future standards-based applications. You'll be able to take the future in stride, with full channel conformance to EIA/TIA-568.

**A COMPLETE PORTFOLIO OF NETCLEAR SOLUTIONS**

There is a NetClear solution to match your budgetary and performance needs.

Application Speed	Copper			Fiber	
	Good	Better	Best	Good	Better
100 Mb/s	—	G5e	GT	—	MM1
1 Gb/s	G6	GT2	GT3	MM1	MM10
10 Gb/s	GT3	GTS	GTX	MM10	MM100
40/100 Gb/s	—	—	—	MM10	MM100



### NetClear Fiber Solutions

**NetClear MM100 for 40/100G**  
Premium Multimode Fiber Solution with Berk-Tek GIGALite-10XB OM4+ Fiber

**NetClear MM10 for 10G**  
Advanced Multimode Fiber Solution with Berk-Tek GIGALite-10 OM3 and -10XB OM4+ Fiber

**NetClear MM1 for 1G**  
Multimode Fiber Solution with Berk-Tek GIGALite OM1 and OM2 Fiber

**NetClear SM for Campus Backbones**  
Single Mode Solutions with Berk-Tek Low-Water-Peak Fiber

Supporting distances of >10 km at 1310 nm and >40 km at 1550 nm

NetClear fiber solutions provide high-performance, low-loss options that exceed the requirements of each level of performance for horizontal and backbone applications. Each type of fiber is fully supported by a full range of Berk-Tek cabling options and Legrand|Ortronics connectivity.

NetClear Multimode Family	Transmission Distance @ 850 nm			
	1 Gb/s	10 Gb/s	40 Gb/s	100 Gb/s
GIGALite (MM1)	750	150	—	—
GIGALite-10 (MM10)	1000	300	100	100
GIGALite-10XB (MM100)	1210	600	150	150

### NetClear Fiber Components

Berk-Tek Cable

- PD Series—Premises Distribution Cable
- Adventum™ Series Indoor/Outdoor (Riser/Plenum)
- Adventum OP Series (Outside Plant)

- Micro Data Center Plenum (MDP) Backbone Cable
- All cables available as a pre-terminated cable assembly

Ortronics Connectivity

- OptiMo® Pre-Polished and Anaerobic Field-Installable Connectors
- 615 Series Surface Mount and FC Series Rack Mount Fiber Cabinets
- TracJack or Series II Fiber Modules/Outlets
- OptiMo Fiber Optic Patch and Interconnect Cords
- Momentum Pre-terminated MTP/MPO Cassettes



NetClear systems provide exceptional performance and longevity at horizontal, backbone, data center, and campus levels. Our perfectly matched cabling and connectors provide optimum channel performance, including extraordinary headroom, over distances beyond industry standards.

The NetClear alliance provides a certified installer program to make our systems more easily available in the enterprise. Both Berk-Tek and Legrand|Ortronics take an active role in standards-setting bodies worldwide—so we know the requirements intimately.

With an extensive 25-year warranty, the NetClear system installed today will ensure support for future equipment and applications by extending the useful life of the network, which achieves a lower cost of ownership and provides worry-free reliability.

		NetClear Copper Solutions								NetClear Fiber Solutions				
		Bandwidth	Applications	G5e	G6	GT	GT2	GT3	GTX	GTS	MM1	MM10	MM100	SM
Backbone	40/100 Gb/s	Data Center, Labs, College Classrooms, Athletic Centers											PS	PS
	10 Gb/s	Classrooms, Student Residence Halls,									K-12 PS	K-12 PS		K-12 PS
	1 Gb/s	Campus Security, BAS									K-12	K-12 PS		
	Voice only	Telephone						K-12	K-12		K-12 PS			
Horizontal	10 Gb/s	Data Center, Labs, Streaming Video, Internet, Administration							PS	PS	PS	PS		PS
	1 Gb/s	IP Camera, Blue Light Security Systems, Wireless Access Points, Data, POS, Building Automation	K-12	K-12	K-12 PS	K-12 PS	K-12 PS	PS	PS		K-12 PS			
	100 Mb/s	Smart Boards, Digital Signage, Analog Cameras, Voice, Digital Clocks	K-12	K-12 PS	K-12 PS	K-12 PS	PS				PS			

## NetClear Copper Solutions

### NetClear GTX Category 6A UTP Solution

The highest performing Category 6A UTP cabling system available today, NetClear GTX systems are optimized to ensure a signal-to-noise ratio margin that exceeds the IEEE 10GBASE-T requirements, with guaranteed end-to-end 10G support for channels from 7-100 meters. The compact, round design of LANmark™-10G2 allows for accurate tray fill calculations and effortless cable management.

#### NetClear GTX Components

Berk-Tek Horizontal Cable

- LANmark-10G2 UTP Cable

Ortronics® Connectivity

- Clarity® 10G UTP Patch Panels
- Clarity 10G UTP Patch Cords
- Clarity 10G UTP TracJack® Modular Jacks and Outlets



### NetClear GTS 10G FTP Solution

The NetClear GTS system was the first system to offer full IEEE standards compliance and guaranteed 10 Gb/s support. The Cat 6 LANmark-6 FTP cables use an overall foil shield to virtually eliminate noise from external sources, including alien crosstalk. Clarity 6 shielded jacks are ETL verified TIA Category 6 components, and are center tuned to Clarity 6 shielded patch cords for optimum performance.

#### NetClear GTS Components

Berk-Tek Horizontal Cable

- LANmark-6 FTP Cable

Ortronics Connectivity

- Clarity 6 FTP Patch Panels with Clarity 6 FTP TracJack Modular Jacks
- Clarity 6 FTP Patch Cords
- Clarity 6 FTP TracJack Modular Jacks and Outlets

#### NetClear GT3

##### Premium Category 6

The NetClear GT3 structured cabling system gives you a cabling solution that provides an unsurpassed margin of additional performance over Category 6 requirements. Guaranteed and verified channel performance is 8 dB above all Category 6 crosstalk requirements and 6 dB above all Category 6 return loss requirements for standards-compliant designs and installations.

#### NetClear GT3 Components

Berk-Tek Horizontal Cable

- LANmark-2000 UTP, Plenum/Non-Plenum

Ortronics Connectivity

- Clarity 6 Modular 110 Patch Panels
- Clarity 6 Patch Cords with Paralign™ 2 Plug Design
- Clarity 6 TracJack and Series II® Modular Jacks and Outlets

#### NetClear GT2

##### Enhanced Category 6 Solution

The NetClear GT2 horizontal channel solution is engineered to surpass all requirements of Category 6 applications by a margin of 5 dB for crosstalk and 3 dB for return loss.

#### NetClear GT2 Components

Berk-Tek Horizontal Cable

- LANmark-1000 UTP, Plenum/Non-Plenum

Ortronics Connectivity

- Clarity 6 TracJack and Series II Modular Jacks/Outlets
- Clarity 6 Modular 110 Patch Panels
- Clarity 6 Patch Cords with Paralign 2 Plug Design

#### NetClear G6

##### Category 6 Solution

NetClear G6 is a cost-effective, standards-compliant Category 6 solution offering a margin of verified channel performance margin of 2 dB for crosstalk requirements and 1 dB for return loss.

#### NetClear G6 Components

Berk-Tek Horizontal Cable

- LANmark-6 UTP, Plenum/Non-Plenum

Ortronics Connectivity

- TechChoice® Cat 6 Modular Jacks/Outlets
- TechChoice Cat 6 Modular 110 Patch Panels
- TechChoice Cat 6 Patch Cords

#### NetClear GT

##### Enhanced Category 5e Solution

The NetClear GT system gives you a Category 5e solution that provides a margin of 6 dB for crosstalk requirements and 3 dB for return loss requirements

#### NetClear GT Components

Berk-Tek Horizontal Cable

- LANmark-350™ UTP, Plenum/Non-Plenum

Ortronics Connectivity

- Clarity 5E TracJack and Series II Modular Jacks/Outlets
- Clarity 5E Modular 110 Patch Panels
- Clarity 5E Enhanced Frequency Patch Cords

#### NetClear G5e

NetClear G6 is a cost-effective, standards-compliant Category 5e solution offering a margin of verified channel performance margin of 2 dB for crosstalk requirements and 1 dB for return loss.

#### NetClear G5e Components

Berk-Tek Horizontal Cable

- HyperPlus 5e UTP, Plenum/Non-Plenum

Ortronics Connectivity

- TechChoice Cat 5e Modular Jacks/Outlets
- TechChoice Cat 5e Modular 110 Patch Panels
- TechChoice Cat 5e Patch Cords

**Berk-Tek**<sup>®</sup>  
A NEXANS COMPANY

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Ortronics

# NetClear<sup>®</sup>

## STRUCTURED CABLING

[www.netclear-channel.com](http://www.netclear-channel.com)

**Berk-Tek, A Nexans Company**

132 White Oak Road  
New Holland, PA 17557  
Tel: 800-BERK-TEK; 717-354-6200  
Fax: 717-354-7944  
[www.berktek.com](http://www.berktek.com)

**Legrand|Ortronics**

125 Eugene O'Neill Drive  
New London, CT 06320  
Tel: 800-934-5432; 860-445-3900  
Fax: 860-405-2992  
[www.legrand.us/ortronics](http://www.legrand.us/ortronics)