# BLACK BOX®
## NETWORK SERVICES

## Data Center Solutions

# Optimize your data center to:

» Improve productivity.

» Streamline operations.

» Reduce costs.

» Increase performance.

### Cooling Solutions

Comprehensive Enclosure/
Cooling Solutions, p. 2

### Remote Server Management

CATx Integrated KVM Trays, p. 6

### Enclosures

Elite™ Cabinets, p. 2

# Build, upgrade, and optimize your data center with a trusted data center expert.

### Complete data center solutions.
Let Black Box help you design and build a world-class data center with our enclosures, thermal management, KVM, end-to-end structured cabling solutions, and more. Many of our solutions, such as cabling, cabinets, racks, and cable management are guaranteed for the life of your data center.

### Contact us today for a complimentary data center assessment.
Our solutions include:
- Data center design and layout
- On-site thermal audit
- In-row cooling
- Hot/cold aisle containment
- Liquid passive cooling
- Standalone A/C cabinets
- And much more.

For your data center assessment, call **724-746-5500** and ask for a data center specialist.

### Data center custom design services.
When you want a 21st century data center, turn to Black Box, your one source for custom design-to-build services. Depending on your application, we offer all the options to solve your data center needs, including free, 24/7 application engineering and technical support. For more information, call **724-746-5500**.

### Proven Quality
Black Box is ISO 9001:2008 certified and follows proven quality procedures.

## IT investment is critical to improving business.
Investing in IT is investing in your organization—whether it's improving productivity, streamlining operations, or reducing costs. Find everything you need to optimize your data center right here at Black Box. For free pre-sales engineering support, talk to one of our technical experts at 724-746-5500.

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### Certified Structured Cabling
- Move to 10-GbE CAT6/6A/7A guaranteed-for-life channels.
- Fiber optic (single-mode and 10-GbE OM3 multimode) plus custom colors.
- Secure network ports and unused ports with locking cables and port locks.

*Pages 8–9*

### Enclosures

*Pages 2–3*

- Custom enclosures. Design it on-line. We'll ship in two days.
- NEMA/seismic-rated enclosures.

### Thermal Management—Containment

*Page 2*

- Reduce power and cooling costs.
- Elite™ Cold Aisle Containment System keeps cool air where it's needed.

### Thermal Management—Passive Liquid Cooling

*Page 2*

- Cut cooling and power costs by up to 50% with Cold Front™ passive cooling.
- Installs on existing cabinets so you won't pay for infrastructure you don't need.

### PDUs (Power Distribution Units)
- Save time and headaches by remotely managing power to network devices.
- Space-saving PDU measures and displays the AC current.
- Save space in cabinets and racks. Get 24 power outlets in 0U.

*Page 4*

### KVM

*Pages 6–7*

- Access your KVM tray remotely to manage your servers over the Internet.
- Make life easier with four modes of switching over CATx or fiber.
- Keep track of multiple screens without banks of monitors.

## Cold Front™ Passive Liquid Cooling
### Cut cooling and power costs by up to 50%.

- Heat-Transfer Doors neutralize heat at the source.
- Coolant Management System intelligently moves chilled liquid through Heat-Transfer Doors.
- No moving parts or fans, so it operates reliably with virtually no maintenance.
- Supports five times the cooling power of air-cooled facilities.
- Doesn't require raised floors or hot/cold aisle configurations.
- Installs on existing cabinets. Add Cold Front units as you add computing power so you don't pay for infrastructure that you don't need.
- Requires professional installation. For details and quotes, call **888-433-5049**.
- **Download a brochure, white paper, and webinar at blackbox.com/go/ColdFront.**

Go green!

*CFD42UBF24*

## Elite™ Cabinets
### Twenty seconds to configure, two days to ship!

- More door and panel choices, more cable management, and features like high-flow mesh and dual universal PDU mounting brackets.
- Feature heavy-duty, welded steel construction.
- Arrive fully assembled and ready to populate.
- Use Elite Cabinet Chimney Tops to vent warm air into the plenum.
- **Learn more and configure your cabinet at blackbox.com/go/Elite.**

*EC45U2436SPDS3NK*

## Elite Cold Aisle Containment System
### Keep cool air where it's needed.

- Convenient, professional-looking doors seal cold aisles.
- Includes one pair of center-opening doors and all the parts you need for installation.
- Works with 42U or 45U Elite Cabinets.
- **Learn more at blackbox.com/go/ColdAisle.**

*EC42U48WCD*

## Select™ Plus Cabinets
### These versatile cabinets can hold extra-large servers.

- Weight capacity of 2200 pounds.
- Solid, 16-gauge steel construction with a fully welded frame.
- Arrive fully assembled and ready to go to work in your data center.
- Removable side panels and vented top panel.
- UL® Listed.
- **Learn more at blackbox.com/go/SelectPlus.**

*Left: RM2540A, front view; right: RM2540A, rear view*

## 2- and 4-Post Premier Aluminum Distribution Racks
### Don't put your expensive equipment in a flimsy rack.

- Sturdy, high-quality aluminum racks support up to 1000 pounds.
- Features standard 19" rails with prethreaded 12-24 EIA holes.
- Constructed of high-grade 6061-T6 aluminum.
- Self-squaring and self-supporting.
- **Learn more at blackbox.com/go/PremierRack.**

*RM162A-R3*

*RM253A*

*RM252A*

## Rack Manager II
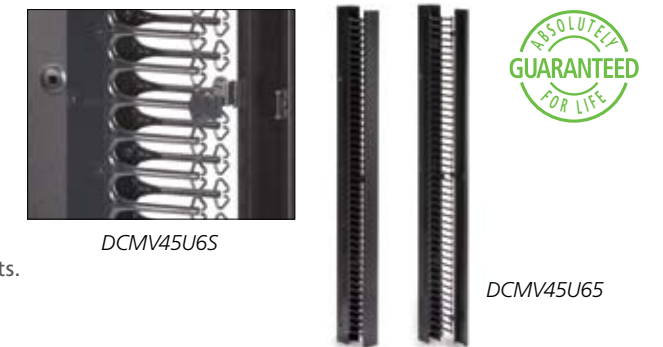### Choose a rack with all the cable management you need.

- Weight capacity of 750 pounds.
- 14-gauge steel construction provides strength to hold equipment solidly.
- Top channel is designed with an adjustable waterfall to support cables and protect bend radius.
- Has built-in steel cable rings, cable access cutouts, and extra-wide and deep channels.
- Meets EIA standards.
- Features standard drilled and tapped 12-24 holes.
- Base features predrilled holes for bolting the rack to the floor for extra stability.
- **Learn more at blackbox.com/go/RackManager.**

*RM940A*

## Deluxe Vertical Cable Manager
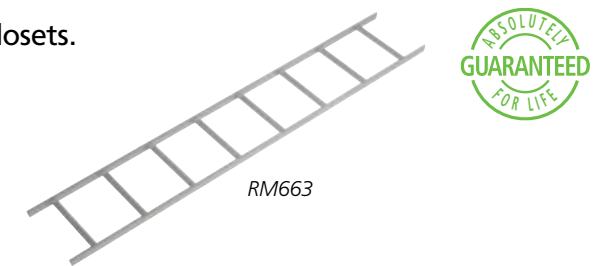### Super cable access and capacity at an economical price.

- Attaches to the sides of 2- and 4-post open frame racks.
- The front provides high cable capacity. The rear provides support for horizontal cabling. Get unobstructed access from all rack locations.
- Includes a front cover with snap hinges.
- Arrowhead fingers hold cables securely but move apart easily for cable insertion/removal.
- Extra-deep cable channel offers high capacity and mutliple tie-down points.
- **Learn more at blackbox.com/go/VertCM.**

*DCMV45U6S*

*DCMV45U65*

## Ladder Rack and Accessories
### The cable management solution for ceilings, walls, and wiring closets.

- Rack is fabricated from seamless 16-gauge tubular steel and mig-welded for strength and durability.
- Side rails are constructed of ⅜" x 1½" tubing; strings are made of ½" x 1" tubing.
- Many accessories are available, including brackets, radius drop kits, and splice kits.
- **Learn more at blackbox.com/go/LadderRack.**

*RM663*

## Outlet-Managed PDUs
### Remotely switch and manage power for one network device or multiple devices.

- Get complete power control: remote and timed individual outlet switching, auto on/off/reboot, load shed switching, outlet sequencing, and more.
- Switch power on/off for individual network devices or for groups of equipment.
- Monitor equipment power and automatically notify you of changes in current levels, circuit breaker status, temperature, unauthorized access attempts, ping response, and more.
- Notify you via e-mail, text, SNMP, SYSLOG, and audible alarms when user-defined thresholds are exceeded.
- Generate reports with detailed records of current and power consumption.
- Save energy and money by shutting off power to equipment during downtimes.
- **See them all at blackbox.com/go/OMPDU.**

Go green!

MPSH8-S20-120V

## Metered Vertical PDU
### Always know the AC current and when the threshold has been reached with this space-saving PDU.

- Space-saving PDU measures and displays AC current.
- Provides 24 NEMA 5-20R outlets on a strip that mounts to the vertical rails in your cabinet or rack.
- Three-digit LED display shows current draw.
- Alarm notifies you when current threshold has been reached.
- Includes a 15-foot (4.5-m) NEMA L5-20P power cord and mounting clips.
- **See it at blackbox.com/go/MVPDU.**

*NOTE: This PDU does not provide surge protection.*

PDUMV24-S20-120V

## 24-Outlet Vertical AC Power Strips with Surge Protection
### Get more outlets, more space—and surge protection, too.

- Provide 24 IEC C13 receptacles in 0U of space.
- Mount vertically in your cabinet or rack, leaving valuable space for other network-critical devices.
- Dual-circuit model features two independent circuit breakers—when one is overloaded, the other still gets power.
- Fuseless design enables a quick return to service.
- **See them at blackbox.com/go/VertPS.**

PDUBV24-S20-200+

## AlertWerks™ ServSensor V4E Hub
### Keep an eye on your mission-critical IT equipment— even when you're out of the office.

- Real-time, extensive environmental and video monitoring and alerting system.
- Supports up to eight plug-and-play Intelligent Sensors and up to four surveillance cameras.
- Can be daisychained to expansion hubs, increasing the total sensor count to more than 600.
- Notifies you of alarms in a variety of ways, including e-mail, SNMP, and text messages.
- Can also monitor up to 80 SNMP devices.
- Manageable through an easy-to-use Web interface.
- Full SNMP v1, v2, and v3 compliance.
- **See the whole solution at blackbox.com/go/AlertWerks.**

EME134A-R2: top: front view; bottom: rear view

## Value Line Console Servers
### Manage a range of serial console ports and devices from a single user interface.

- Provide affordable, secure console access.
- Manageable over your network—or even the Internet— using any standard Web browser.
- Embedded with open-source Linux® based operating system.
- Protect data traveling over a public network with Secure Shell (SSH) encryption, SSH tunneled serial bridging, SSH tunneling for TCP/UDP, IP packet filtering, and more.
- **See them all at blackbox.com/go/ValueCS.**

LES1116A

## Advanced Console Servers
### Save travel time—get continuous, reliable access to console ports on remote devices.

- Federal Information Processing Standard (FIPS) 140-2 validated module for enhanced security.
- Dual Ethernet ports with bonding ensure high availability.
- Dual universal AC input for redundant backup power.
- Includes a built-in modem RJ-11 port as well as a DB9 serial port.
- Accessible in band with a Web browser, out of band via modem, or directly through the local console port.
- Supports IPMI, ILO, LOM, DRAC, and RSA.
- Protects data with Secure Shell (SSH) encryption, SSH tunneled serial bridging, SSH tunneling for TCP/UDP, IP packet filtering, and more.
- **See them all at blackbox.com/go/AdvCS.**

FIPS 140-2 validated module

Top: LES1216A, front view; bottom: LES1216A, rear view

## 10/100/1000 Auto Bypass Switch, 1U
### Stop network disruptions.

- This dual-port AB switch automatically switches 10-, 100-, and 1000-Mbps data to a bypass or failover path if the "normal" network path is disrupted.
- User-configurable parameters control independent auto-bypass and auto-recovery.
- Control switching remotely using SNMP commands over a TCP/IP Ethernet network or via an RS-232 serial console connection.
- Typical applications include connecting all network traffic through an intrusion prevention system with automatic failover to a bypass path.
- **See it at blackbox.com/go/AutoBypass.**

SW1020A

## ServSwitch™ CX Quad IP
### Connect one local user and up to four remote users—simultaneously.

- 16-port KVM switch with 4 IP sessions.
- IP support enables you to access servers remotely.
- 1600 x 1200 remote resolution with scalable windows.
- Simplify cabling with CAT5, CAT5e, or CAT6 UTP cable.
- Connect USB or PS/2 supported computers.
- Cascade switches to control up to 128 servers.
- Work with Outlet-Managed PDUs (blackbox.com/go/OMPDU).
- **See them all at blackbox.com/go/CXIP.**

*KV4161A*

## CATx Integrated KVM Tray Modules
### Access your KVM tray remotely to manage your servers over the Internet.

- KVM over IP or KVM with extender remote access options.
- Multiplatform support using USB, PS/2, or Sun® compatible SAMs.
- KVMoIP models support VNC and Web browser remote access.
- CATx patch cables ensure neat rack installation.
- Management software included.
- **Learn more at blackbox.com/go/TraysCXIP.**

*KVT417A-8CATX*

## Find the perfect KVM switching solution in seconds with on-line selectors.

» Use these handy, interactive tools to match a KVM solution to your application.

Just click to specify your number of computers, ports, support, and other options and the perfect match will pop up. It takes only seconds.

- KVM Switch Selector: www.blackbox.com/go/KVMSwitchSel
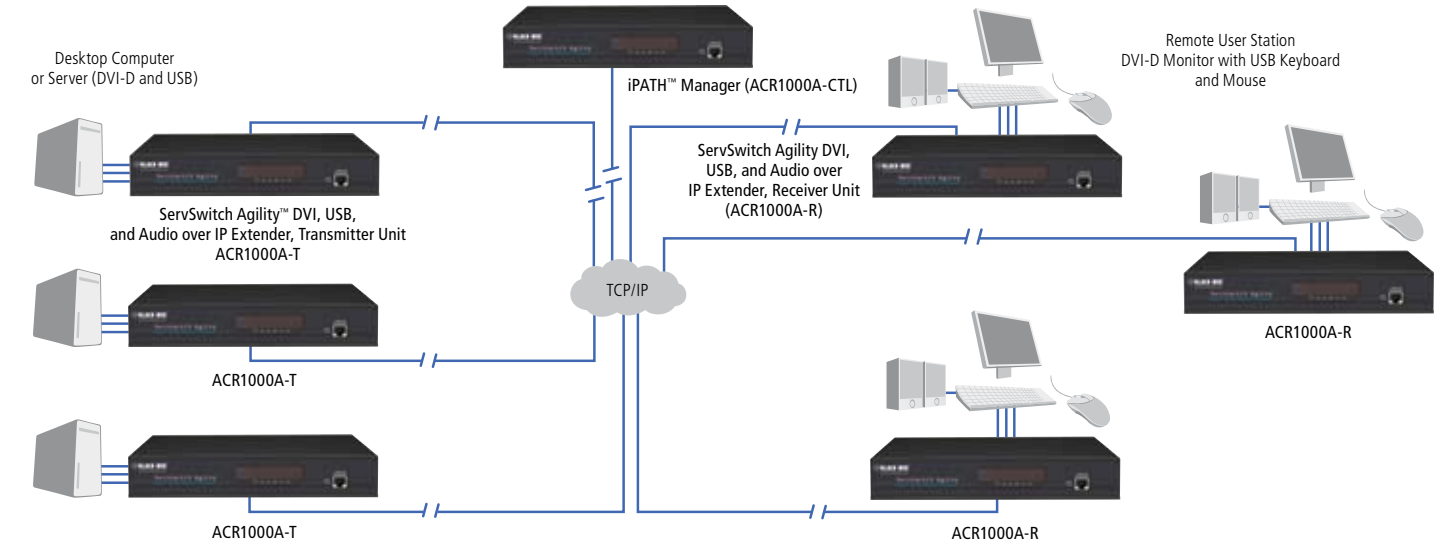- KVM Extender Selector: www.blackbox.com/go/KVMExtSel

Need help finding the right ServSwitch Solution? You have it with our 24/7, FREE, live Tech Support at **724-746-5500** or blackbox.com/go/TS.

## ServSwitch™ Agility DVI, USB, and Audio Extenders over IP
### Get perfect digital video with no loss.

- Pure digital media extension over IP.
- New flexible topology for KVM extension.
- No-loss compression minimizes bandwidth use while maximizing the user experience.
- Configure your network to suit your needs: point-to-point extension, KVM switching, single-target sharing, or multicasting.
- Features keyboard/mouse emulation, and emulation for other standard Human Interface Devices (HIDs), such as touchscreens or flash drives.
- Distance is only limited by your network capabilities when you use network switches.
- **Learn more at blackbox.com/go/ServSwitchAgility.**

*ACR1000A*



Desktop Computer or Server (DVI-D and USB)

iPATH™ Manager (ACR1000A-CTL)

Remote User Station DVI-D Monitor with USB Keyboard and Mouse

ServSwitch Agility DVI, USB, and Audio over IP Extender, Receiver Unit (ACR1000A-R)

ServSwitch Agility™ DVI, USB, and Audio over IP Extender, Transmitter Unit ACR1000A-T

TCP/IP

ACR1000A-T

ACR1000A-T

ACR1000A-R

ACR1000A-R

## ServSwitch Wizard IP DXS
### Get full, non-blocking IP access to every computer from anywhere in the world.

- Powerful and flexible KVM over IP product enables secure, full non-blocking remote access from anywhere in the world.
- Direct KVM over IP server management.
- Independent operation gives full control even during bootup, BIOS level, or computer crash states.
- Supports virtual media, via USB, for remote file transfer.
- **Learn more at blackbox.com/go/IPDXS.**

*ACR101A*

## USB Laptop Console Crash Cart Adapter
### Turn your notebook into a portable server crash cart. Plug a laptop into the server for quick BIOS-level control.

- Gives you a fast, easy way to log in to a server or computer to troubleshoot or service a system after a crash.
- Handheld adapter plugs into the server on one end and your laptop on the other.
- No drivers to install on the target computer.
- Includes software for viewing server video on your laptop, without having to reboot or change the server in any way.
- Scale the video window as needed and even take a screen snapshot.
- Works with Windows® and Mac® OS X laptops.
- **See them all at blackbox.com/go/KVMCC.**

*KVT100A*

# Guaranteed-for-life, end-to-end channel solutions
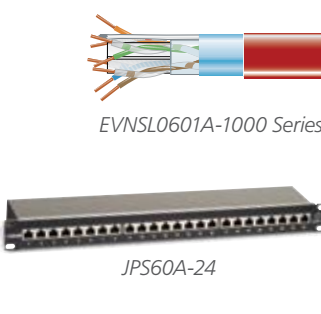
## 1-GbE

### CAT6 UTP

*EYN870A-PB-1000 Series*

GigaTrue®

*EVNSL670 Series*

**ETL-Verified performance.**
- ETL tested four times a year.
- Channel and component level performance.
- Channel includes solid bulk and stranded patch cables.
- **See the entire channel at blackbox.com/go/ Category6.**

### CAT6 F/UTP

*EVNSL0601A-1000 Series*

*JPS60A-24*

**Ideal for retrofitting existing data centers.**
- Solid bulk and stranded patch cable are double shielded.
- 24-port panel and jack are also shielded.
- More shielded cable options are available on-line.
- **Learn more at blackbox.com/go/6FUTP**
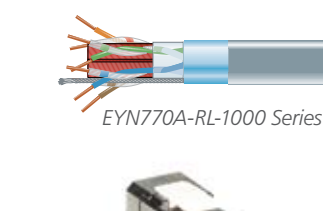
## 10-GbE

### CAT6A UTP

*EVNSL6A-R2*

*EYN10G10A-1000 Series*

**Use for new VoIP, SAN, and 10-GbE networks.**
- Supports PoE and PoE+.
- Ideal for WAP and security applications.
- Engineered to reduce ANEXT.
- Patch cable is stranded; bulk cable is solid.
- **Learn more at blackbox.com/go/6A**

### CAT6A FTP

*EYN770A-RL-1000 Series*

*FMT700*

**Get channel performance beyond CAT6A.**
- Virtually eliminates ANEXT.
- Solid bulk cable features foil shield.
- Stranded patch cable has aluminum/Mylar® tape and a tinned copper braid.
- **Learn more at blackbox.com/go/6A**
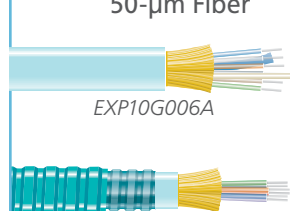
### CAT7/7A S/FTP

*EVNSL71-80-001M Series*

*FMC700*

**Get ready for broadband video and convergence.**
- Supports performance beyond 10-GbE.
- Ideal for full-motion video, government, and industrial applications.
- Twice the bandwidth of Category 7A/Class FA when used with a TERA® outlet—1.2 GHz per pair.
- **Learn more at blackbox.com/go/7**

## 10-GbE and beyond

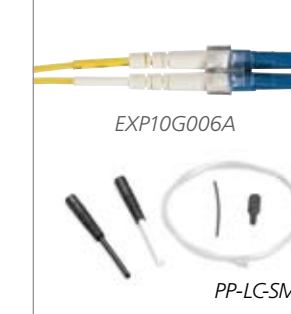### Laser-Optimized OM3 50-µm Fiber

*EXP10G006A*

*EXPIA10G12A*

**The right choice for SANs and 10-GbE.**
- Use in 10-GbE runs up to 300 meters.
- Ideal for backbone and campus connections.
- Choose from bulk, armored bulk, and patch cable.
- Make quick field connections with pre-polished connectors.
- **Learn more at blackbox.com/go/OM3**

### Single-mode Fiber

*EXP10G006A*

*PP-LC-SM*

**With infinite bandwidth, the future is limitless.**
- Use for SANs, WANs, and telco applications.
- Ideal for backbone and campus connections.
- Choose from bulk, armored bulk, and patch cable.
- Make quick field connections with pre-polished connectors.
- **Learn more at blackbox.com/ go/SingleMode**

**The real deal: Genuine, tested, guaranteed performance.**

Black Box Channel Solutions (bulk and patch cable, patch panels, and jacks) are all guaranteed for life so you're assured of guaranteed performance. Our cable is also UL® Listed, and our CAT6 bulk calbe and channel are ETL Verified.

### MTP OM3 10-GbE Cassettes and Patch Cable

*MTPCS-LC-10G*

**Add 10-GbE modular connectivity to the data center.**
- Use cassettes to break out one 12-fiber MTP cable into six duplex SC or LC connectors.
- Cassettes fit all the Black Box fiber enclosures and panels.
- Cable provides 12 strands of OM3 fiber in one cable.
- **For more info, go to blackbox.com/go/MTPFiber.**

### Fiber Enclosures

*JPM407A-R4*

**Complete your fiber channels.**
- Choose from a wide variety of panels, cabinets, and shelves.
- NEMA 4 panels protect terminations in damp environments.
- Populate enclosures with a wide variety of Adapter Panels.
- **See them all at blackbox.com/go/FiberPanels.**

### Multicolor Fiber

**Choose from as many as 12 colors!**

Violet | Orange | Blue | Black | Green | Gray
Brown | Red | Pink | White | Aqua | Yellow

**Color-code applications and departments.**
- Color-code data center connections: aqua for SANs, red for security, green for finance.
- 12 different colors, 13 lengths.
- Single-mode, 10-GbE 50-, 50-, and 62.5-micron.
- **See them all at blackbox.com/go/ColorFiber**

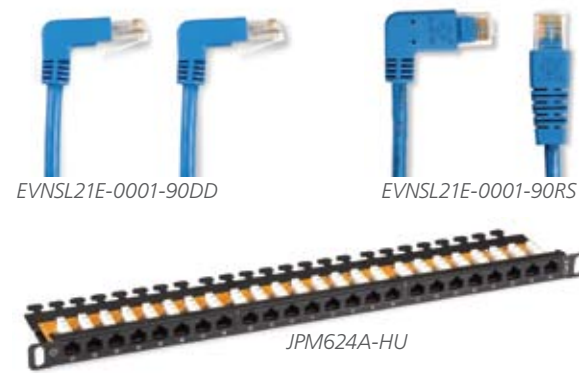## Specialty connectivity solutions

### Security Locking Cables and Port Locks

**Lock up network and unused ports, especially in co-location data centers.**
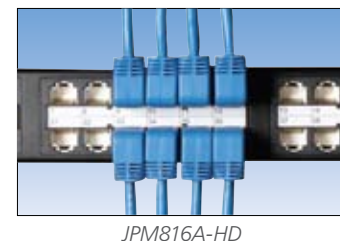- Prevent unauthorized network access.
- Red key locks require a Removal Tool. Green secure locks can be removed by anyone.
- Port Locks secure unused panel and equipment ports.
- **Download the brochure at blackbox.com/go/LockPORT.**

### SpaceGAIN™ Cables and Specialty Panels

*EVNSL21E-0001-90DD*

*EVNSL21E-0001-90RS*

*JPM624A-HU*

**Protect cable bend radius for top performance and save money by eliminating cable managers.**
- Reduce bend stress on the cable.
- Gain up to 4" of space in crowded cabinets.
- Choose from up, down, left, and right-angle connectors.
- Up and down Angled-Port Panels eliminate cable managers.
- Fit 48 ports into 1U with High-Density Feed-Through Panels.
- Tight on rack space? Connect 24 ports in a ½U Panel.
- **See the entire line at blackbox.com/go/SpaceGAIN.**

*Award-Winning Solution*

*JPM648-45ANG*

*JPM816A-HD*

### Need OM4 or a custom configuration?

If you're looking for OM4 patch cords or specialized assemblies, just ask. Our team of technical experts is on-call 24 hours a day to answer questions and help you get exactly what you need. Best of all, our pre-sales engineering is absolutely free, whether you buy or not.

For more information, contact Tech Support at **724-746-5500** or go to **blackbox.com/go/Customs**.

## White Paper: Extending the Life of Your Data Center

# Retrofitting with passive water cooling at the rack level

## Introduction

The proliferation of new, extended application development in software as a service, as well as new virtualization technologies, has created a conflict in many data centers between today's outdated capabilities versus tomorrow's growing needs. There is no doubt that the cost of building and managing data center resources continues to increase yearly. Likewise, the yearly cost to power and cool data centers makes up a majority of operating expenses.

Legacy data centers waste at least 50% of the energy they consume managing heat generated by IT systems. Most data centers are not new; they are housed in buildings that are using practices that could be 20 years old and have not yet caught up with the latest trends in IT rack power densities. Fully populated racks can dissipate as much as 7–25 kW per rack, and high-end servers can dissipate more than 40 kW per rack. This level of density requires data centers to provide power and cooling resources that exceed typical current capabilities.

Furthermore, most legacy data centers have not been designed to use their maximum capabilities, best practices have not been implemented, and the cooling requirements of IT equipment have been considerably less than optimal. This has created a common situation, as identified by the Uptime Institute, where data centers consume 2.0 to 2.6 times the cooling required by the IT equipment, thus wasting energy and power and further reducing the amount of IT equipment that can be housed in the structure.

By implementing best practices and optimizing the performance of the existing air cooling infrastructure, data center operators can improve the performance of the specified cooling infrastructure to 70% efficiency. The question data center owners must ask themselves is if their current air cooling is acceptable at 70% or if they can continue to sustain that performance as computing technologies push power and cooling beyond their current requirements. What can operators expect from their environment if cooling requirements exceed 12 kW to up to 25 kW per rack?

## Build or Renovate

With the adoption of virtualization, cloud computing, and consolidation, most data center operators who have reached the upper limit of energy consumption essentially have two choices: build new or renovate. New data centers built using performance-enhancing cooling, either with fully optimized air, liquid cooling, or hybrid systems, have improved efficiency. But the cost to build a new data center is prohibitive. According to the Uptime Institute, the total capital expense of building a new data center ranges from $18,000 to $25,000 or more per kilowatt…

Download the entire white paper free at blackbox.com/go/ColdFront.

For free pre-sales engineering support on how to approach your data center build or renovation, talk to one of our technical experts at Black Box, John Summers at **888-433-5049**.