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As data centres embrace infrastructure consolidation and virtualisation and deploy next generation architecture to improve efficiencies and performance, they are being confronted with challenges around managing power, cooling, space, speed and infrastructure performance.

Increased demand for power caused by accelerating IT growth creates direct conflict for IT managers as environmental regulation intensifies and energy costs increase.

The need to plan data centre infrastructure to ensure that it is best equipped to maximise efficiency and reduce total cost of ownership has never been greater.

"By 2020 IT will be more polluting than aviation." The Economist.

The data centre market is expected to see rapid growth in the next few years bringing with it significant demand and challenges.

On the following pages we have put together a number of product solutions that enable data centres to meet those demands and challenges.

Panduit Data Centre Advisory Services

PANDUIT



Panduit Professional Services help you make certain that physical & logical infrastructure are effectively integrated in the optimum framework. Panduit's expertise is in the physical layer. Not glamorous - just critical. Panduit covers the entire physical landscape with assessment, design & maintenance methodology by partnering with global industry leaders to ensure infrastructure is designed to handle emerging technologies.

Panduit Alliances

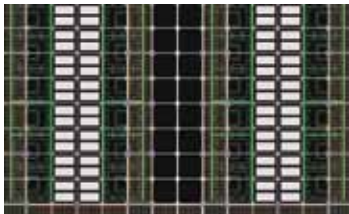
PANDUIT



Panduit has established long-term strategic alliances with top global industry leaders such as Cisco Systems, EMC, HP, IBM, Liebert and Rockwell Automation to develop and integrate innovative, holistic solutions for customers. Panduit continually invests in relationships and resources for solving customers' greatest business challenges.

Software Design Tools

PANDUIT



Data Centre Viso Layout Tool & Design Tool For AutoCad:

- Both feature drag & drop functionality
- Both with automated BOM generator
- Viso designs in 2D (stencils for 3 different views provided).
- AutoCad designs in 2D & 3D
- Viso is a free download from www.panduit.com for AutoCad ask for free CD ref SA-FRCD02.

Support Documents

PANDUIT



Panduit have many white papers, technical papers & brochures related to the data centre market detailing technology considerations, physical infrastructure & design. See the "Solutions" & "Support" sections at www.panduit.com



Based on a Unified Physical Infrastructure (UPI) Panduit's high speed data transport solutions deliver maximum flexibility during planning, designing commissioning & operation of the data centre that is both protocol & media diagnostic. Copper & fibre systems address the needs for network throughput, latency, thermal management, power consumption & operational efficiency. Panduit have developed the industries most comprehensive & holistic approach to a Unified Physical Infrastructure (UPI) & can help enterprises align, converge & optimise critical systems - communications, computing, control, power & security - to build a smarter, unified business foundation. See www.panduit.com for data ctr related white papers, brochures and solutions.

Unified Physical Infrastructure™



Data Centre

Cat6 & Cat6a Structured Cabling



Patent pending matrix technology in Panduit's Cat6a cable & advanced connector design ensures channel bandwidth performance above industry standards.

- Cat6a & Cat6 shielded & UTP systems
- Standard & high density panels with up to 48 ports in a 1U panel

See page 40 onwards

QuickNet PreTerminated Copper & Fibre



- Cat6a, Cat6 & fibre solutions
- Quick network deployment & increased reliability.
- Can be installed in 75% less time than field termination methods.
- 100% factory tested pre-terminated assemblies supplied with test results.

See page 47

Fibre Solutions



- OM3 system features the highest quality laser optimised fibre to support transmission speeds up to 10Gbs for link lengths up to 300Mtrs.
- OM4 system delivers unmatched reliability, scalability & performance at an extended reach of 550Mtrs.
- High density panels with up to 96 fibres in 1U or 192 fibres in 2U.

See pages 50-52

In Ceiling Zone Cabling Enclosures

PANDUIT



Active & Passive In-Ceiling Enclosures allow network equipment to be located in the air handling space above a drop ceiling. Thermal management systems within the enclosure support high heat load applications, including PoE enabled network switches & UPSs.

See www.panduit.com

Overhead Zone Cabling Distribution Racks

PANDUIT



Provides additional 2, 4 or 6U rack space above a rack or cabinet to maximise space utilisation in a data centre or telecommunications room.

See www.panduit.com

Underfloor Consolidation Points

PANDUIT



Can be used under floor or wall mounted horizontally or vertically.

See page 44

Physical Infrastructure Management

PANDUIT



Panduit's Physical Infrastructure Manager (PIM) platform tracks the allocation & utilisation of critical IT assets within the data centre. The software provides an end to end view of your data centre. It provides a real time representation of assets space/ port availability & power/environmentals ensuring effective management.

See www.panduit.com

PoE Systems



POE patch panels supply ample power for seamless integration to VoIP, wireless access points, IP cameras & other converged network applications. DPoE systems are supplied with management software that allows remote control of port power & configuration plus real time access to port status & power consumption information.



Panduit PoE see www.panduit.com.
Surveyon PoE IP Cameras: page 243

Data Centre

Grounding Systems



Correct grounding is often overlooked but of critical importance in data centres & other applications. Panduit's Structured Ground system for data ctrs provides a high quality, visually verifiable & dedicated grounding path to maintain system performance, improve network reliability & protect equipment & personnel. Contact us for details.

QuickNet Plug Pack Housings



Allows multiple patch cords to be simultaneously connected/disconnected with one hand for speed of deployment. Patch leads snap into plug pack housing. Standard versions compatible with Cisco Catalyst 6500 & 4500 series switches. Recessed versions compatible with Cisco Nexus 7000 series switches. See page 54

PatchRunner Systems

PANDUIT



Manages high density network cabling in up to half the area required by traditional rack/cable management systems. Eliminates the need for horizontal cable mngmnt when used with angled panels by taking cables out to the side channels. Frees up rack space for additional panels or equipment & reduces the overall number of racks required. Can be used with 2/4 post racks. See page 60

Net-Access Energy Efficient Data Centre Cabinet System

PANDUIT



Net-Access cabs include innovative thermal designs to maintain hot/cold air separation for improved cooling & reduced energy consumption. Superior cable management, inset frame & in cabinet ducting options ensure proper airflow.



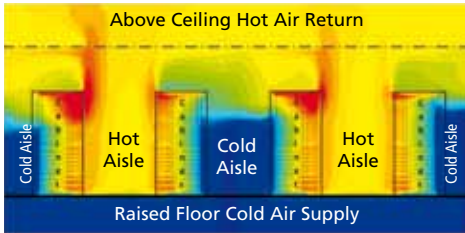
Net Access cabs have been designed around Cisco switches & have been verified by Cisco as meeting their Nexus 7000 series requirements. See pages 55-57



Room Level Computational Fluid Dynamics Analysis Of Data Centre Thermal Characteristics. See next page.

Room Level Computational Fluid Dynamics Analysis Of Data Centre Thermal Characteristics

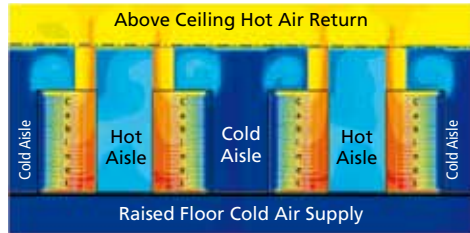
Typical Data Centre



Typical Data Centre:

- Cool air does not reach top portions of the cabinets making servers in the top racks vulnerable to overheating.
- Hot air exhaust follows complex airflow path back to CRAH units.
- Mixing of hot & cold air reduces the thermal efficiency of cooling system.

Data Centre using Panduit Thermal Solutions:



Data Ctr Using Panduit Thermal Solutions:

- Uniform distribution of cool air reaching the top of the cabinet.
- Hot exhaust air is isolated & ducted directly to CRAH units.
- Segregation of hot & cool air improves the overall thermal efficiency of the cooling system & makes the environment more predictable & scaleable.

See the Panduit "Energy Efficient Data Ctr Cabinet Systems" brochure for full details.

Data Centre

Net-Serv Cabinets



Net-Serv cabinets are designed to provide the best combination of space utilisation & thermal management for server applications. They complement the Net-Access cabs & provide a complete infrastructure solution. See page 56



Pre-Configured Infrastructure Enclosures

PANDUIT



Panduit & Cisco have created a data centre solution that has the physical infrastructure systems needed in a pre-configured enclosure that arrives on site ready to be deployed.

Suitable for Cisco Nexus 7010, UCS & Catalyst 6509 platforms. Pre -configured enclosures have all the scalability and optimised power & thermal management features described in the Net-Access enclosures.

Includes all the necessary systems, pre-configured to deploy Cisco platforms including thermal management, copper & fibre cabling, cable management, grounding & bonding.

See page 57

Data Centre

Cool Boot Raised Floor Air Sealing Grommet

PANDUIT



For hot isle/cold isle environments in data centres where cables pass through a cutout in a raised floor.

- Airtight design reduces bypass airflow cooling network equipment.
- Prevents debris falling below floor
- Utilised with cable bundles
- Flame retardant materials

See page 58

GridRunner Underfloor Cable Routing System

PANDUIT

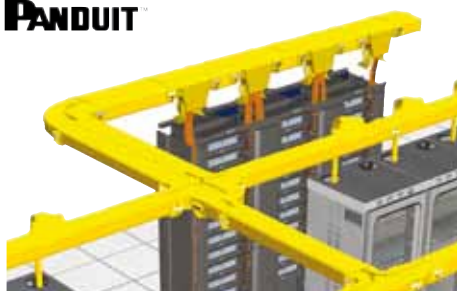


Panduit GridRunner is a versatile pathway designed to route & manage data & power cable beneath the raised floor in a data centre. Basket sections simply drop in between the floor stringers & attach to pedestal baskets for fast assembly. Includes integral bonding, waterfall, brackets, offset sections. Can be integrated with FibreRunner overhead system.

See pages 172-173

FibreRunner Overhead Cable Tray Routing System

PANDUIT

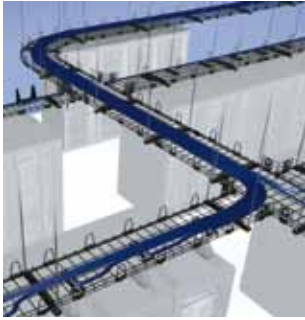


FibreRunner provides an integrated cable routing solution to segregate, route and protect fibre and copper cabling to, between and above racks within an equipment room or facility. Available in various sizes and colours with hinged covers and multiple spill out options.

Contact us for details.

Wyr Grid Overhead Cable Tray Routing System

PANDUIT



Fast assembly & greater strength for load bearing. Snap on side walls eliminate cutting sidewalls at intersections. Traditional cable tray requires side wall to be removed at intersections compromising strength & load carrying capability. Wyr-Grid eliminates that risk. With integral bonding, waterfall, brackets. Can be integrated with FibreRunner overhead system. See pages 169-170

Data
Centre

Panduit Demonstration Facility

PANDUIT



Panduit's cabling systems, racks, cable routing systems and accessories can all be viewed at Panduit's demonstration and briefing centre, opposite Liverpool St Station in London. Contact us for details.

Migration Path to 40 Gigabit



Independent data shows that 10Gig Ethernet will only be useful for about five more years. Cabling from access layer to server layer will soon reach 40G.

Cat6a copper cabling cannot support 40G. Nexans LANmark-7A copper cabling system has proven it's capability of supporting 40G & is backward compatible with RJ45 systems. See discussions at IEEE about 40/100Gbps. Lanmark-7A Cat7a system has an ACR up to 1200Mhz. Due to its high shielding & EMC performance Cat7a offers potential power reduction consumption compared to Cat6a. Particularly important in data centres where carbon reduction is being looked at.

For Nexans Cat7a as well as Cat7 and Cat6a systems see page 27

Fibre



- New pre-loaded high density patch panel is specifically designed for installation in data centres.

- MPO fibre connectivity for 10G & 40G
- Fibre cable for OM4 & OS2

See www.nexans.co.uk/lansystems

Pre terminated cabling systems in Cat6, Cat6a, Cat7, Cat7a as well as OM1-2-3-4 and OS2 fibre.

Fibre MPO connectivity for 10G & 40G.

See www.nexans.co.uk/lansystems

LANsense Intelligent Patching



LANsense is a hardware & software system for cabling infrastructure management.

- Real time cabling & IP traffic monitoring
- Ideal for alerts, documentation & reporting.
- Specific platform for data centres.
- Automatically detects & identifies devices & provides security alerts for unauthorised changes.

See www.nexans.co.uk/lansystems

LANmark Overhead Patching Frame

Nexans



4U overhead patching frame for 19" patch panels saves rack space in expensive data centre cabinets. Brackets enable vertical fitting under, along & over cable tray & can be angled up to 20 degrees. A 1U cable guide can be added horizontally underneath.
See page 29

Data Centre

LANmark High Density Cross Connect Cabinet

Nexans



Designed to host dense passive cross connects in data centres. Specific attention has been given to cooling & space scarcity.

- Open frame for excellent all round access
- Management fingers each side of front profiles.
- Top panel with adjustable cable entries & brushes
- Rear L shaped cable trays accommodate large cable bundles without interfering with hardware.
- Cable troughs top & bottom
- Carrying capacity 1000kg

See page 32

Environmental Monitoring

Nexans



A Nexans EMAC solution may include some or all of the following features controlled by a rack manager.

- Power management with intelligent PDU's
- Temperature sensing
- Humidity sensing
- Access control

See www.nexans.co.uk/lansystems

Support Documents

Nexans



Nexans have white papers, technical papers & brochures related to the data centre market detailing current & future technology considerations behind their copper & fibre cabling systems.

See www.nexans.co.uk/lansystems

Cat6a Structured Cabling System



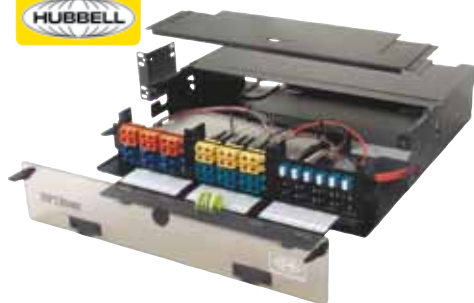
The Hubbell Cat6a 10G cabling system is available in shielded & UTP versions.

- 10Gbe channel tested delivering 3Db of headroom
- Snaps into Hubbell modular panels, modules & surface boxes

See page 66

Data Centre

OM3 & OM4 Fibre Systems



Hubbell's new 144 port 1U ultra high density fibre patch panel is ideal for data centre applications. The panel features 3 drawers that each accept 4 ultra compact 12 port LC -MPO cassette modules which are available in OM3, OM4 & singlemode.

Hubbell have an extensive range of high density fibre panels and OM3/4 patch leads.

For details of this panel & the Hubbell MPO rapid deployment fibre system please contact our sales department.

I-Frame 45U 2 post Pack



- Designed to align with two foot data centre floor tiles & dropped ceiling floor grid
- Eleven I-Frame racks fits into the space of ten conventional racks
- Cables run within each vertical column

See page 70

Mini6 Cat6a Structured Cabling System

Mini6™



The Mini6 Cat6a shielded cabling system offers 10Gbit high speed transmission at an affordable price. Mini6 have partnered with Acome who are a major European manufacturer of cable to offer a high performance, reliable system. See page 10 for the Cat6a jack

Data Centre

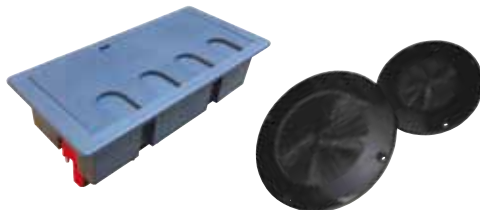
Mini5 OM3 & OM4 Fibre

Mini5™



Fibre patch leads & high density panels in OM3 & OM4 versions for data centre applications. See pages 122-128 & 134

In-Floor Brush Seals



- Prevents leakage of pressurised air around power & data cables
 - Built in edge guards protect cable
 - Thin flexible membrane provides an almost impenetrable air barrier
- See page 180 & 182

Dataracks 3 into 2 & Co-Location Enclosures

dataracks



3 into 2



Co-Location

- 600 or 800 wide with depths of 1000 or 1200mm
 - Lockable glass or vented steel front door
 - Unique space saving 3 into 2 solution available: Three 19" bays in two 800mm wide cabinets bayed together
 - Co-Location enclosures offering effective use of floor space also available.
 - Frameless construction for all round access
- See page 214 & contact us for details of 3 into 2 and Co-Location solutions.

Dataracks 303 EcoRack



EcoRack is the first enclosure to meet the best practice recommendations of the EU Code Of Conduct on Energy Efficiency for Data Centres. EcoRack maximises airflow management & enhances the benefit of free air-cooling. This ensures that cooled air does not by-pass the server and goes through the server fans where it is needed, so rack density can be maximised. Its sleek white finish reflects heat and increases light levels within the data centre, further reducing the need for power. Airflow management reduces energy consumption. When combined with Cold Aisle Containment (CAC) it will typically save 20% or more in energy costs. Clients report reduced hardware failures, improved control over temperature & humidity. Contact Minitran for details.

Rittal TS8 Enclosures



- High level of structural integrity & stability up to 1000kg
 - Server cabs have perforated vented front door & split perforated vented rear
 - Server cab perforated doors have 82% open surface area to aid airflow front to rear.
 - Networking cabs have glass framed front door & steel rear door.
 - Frame offers baying on all sides
 - 4 point locking system on front & rear doors
- See page 213

IP Switched & Monitored PDUs



Rack mount PDUs for critical data centre & remote install sites. Allows remote outlet control/cycling of individual on/off power sockets via a simple secure web based GUI management interface.
See pages 228-229

Data Centre

InfraSolution Access Control & Monitoring



Enhances rack level security & equipment efficiency by using remote rack IP door access with swipe card control, temperature & humidity monitoring including integrated monitored & switched PDUs. Allows cabinet control of door handles, switching & monitoring of smart PDUs as well as control of InfraCool fan units, temperature & humidity up to 200 cabinets over a local or wide area network.
See page 238

IP KVM



The new generation of KVM over the Net switches allows local & remote operators to monitor & access the entire enterprise data centre over the Internet using a web-based browser. Aten now support blade servers & chassis with the KN2124/2140 series IP KVMs. Capabilities further include: Message Board, Panel Array Mode, Mouse DynaSync, Adapter ID, & Virtual Media. With dual on-board NICs & dual power supplies, these switches have been built for 24/7 reliability. See pages 196-197

Megapixel IP Network Cameras



Surveon offers a full line of box, bullet, dome, PTZ and speed-dome cameras with resolutions ranging from D1 to megapixel, including advanced day/night, WDR, wide-temperature, weatherproof IP66 models, NVRs & software. All cameras are backed by a 3 year warranty.
See pages 244-248