It's in the Science

How Innovative Engineering & Technology Define the World's Best Structured Cabling

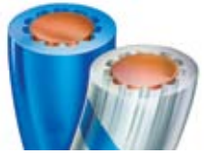
It's in the Science >

A scientific invention by a young engineer more than 70 years ago launched ADC. Indeed, ADC is a company born from innovation, and to this day, leads the network infrastructure industry for percentage of dollars spent on research and development. The proof can be found on the walls of ADC's engineering facilities where hundreds of patents reveal the names of company engineers and scientists.

In this book you'll read about many of these innovations. You'll see that when it comes to structured cabling, the difference between the others and ADC, is in the science.

To be sure, ADC's infrastructure solutions set the bar high for the industry. And that's why we keep raising it.

AirES®



Managed Density™

LSA-PLUS®

Laser-Tuned Jacks

Cat6$_A$ Solutions

Dynamic Angled Patch Panels

Engineering for Uptime

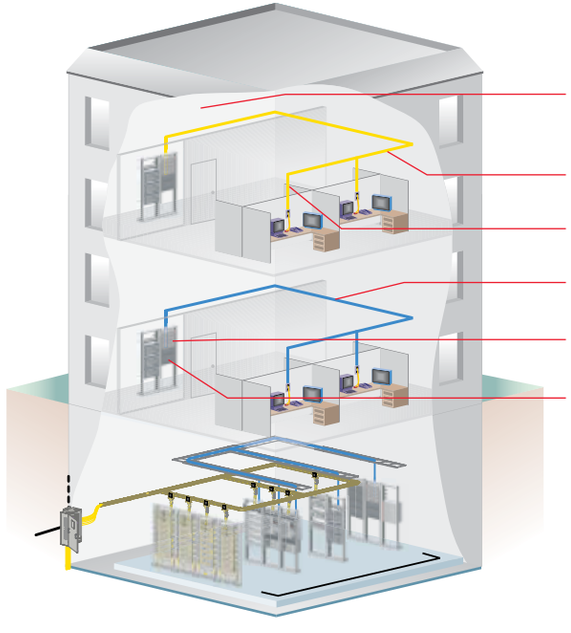
Designing the Systems That Maximise Network Uptime.

Your data centre and network is the epicentre of the organisation.

The typical data centre is a high-performance machine constructed of thousands of components. And like the spot welds in the frame of a car, the data centre is held together and cannot function reliably without the "spot welds" of structured cabling and connectivity equipment.

ADC's Premier Infrastructure Solutions

- Copper solutions
- Fibre solutions
- Connectivity solutions
- Cable management solutions
- All optimized to maximize system uptime



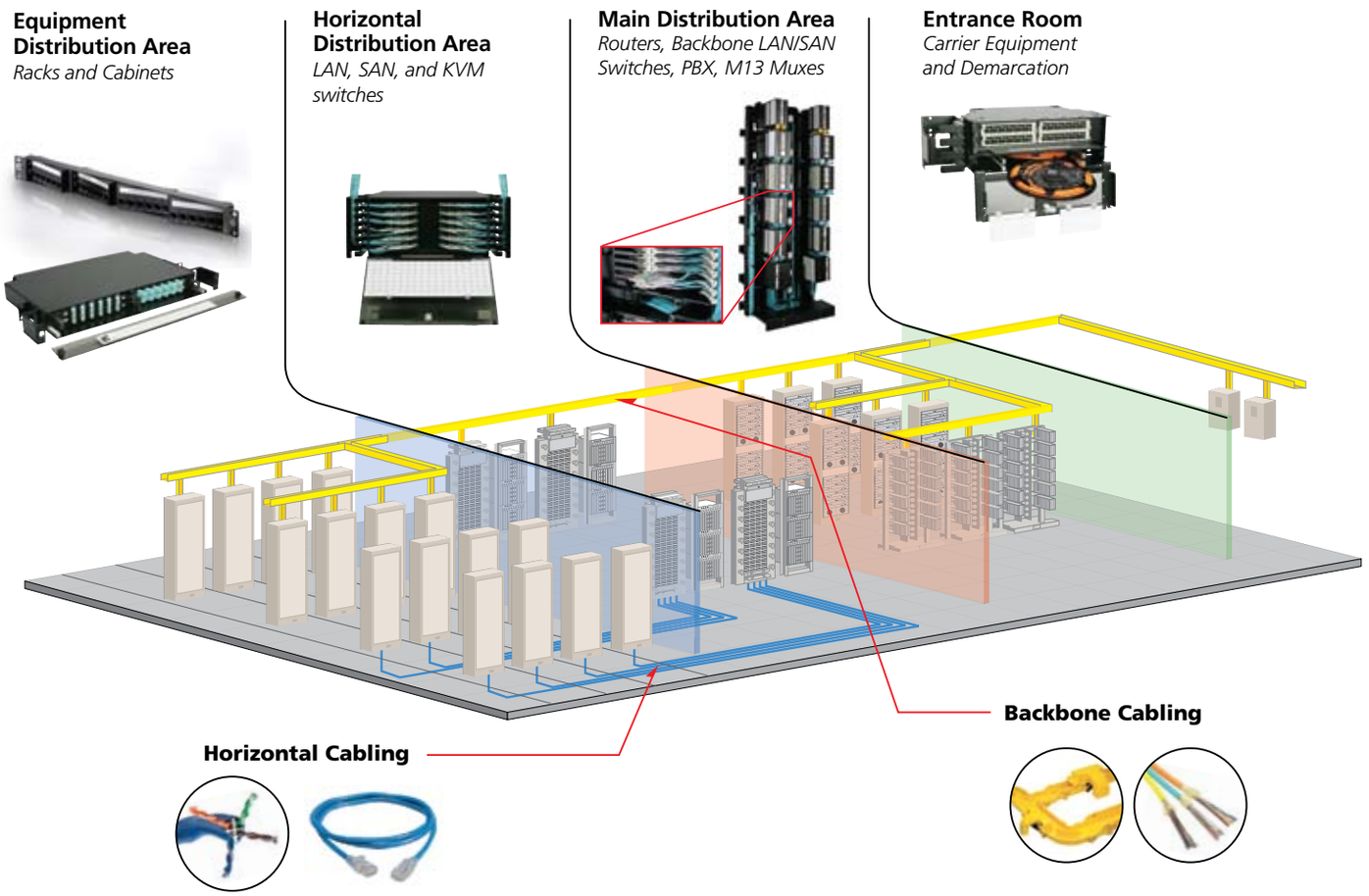
"Connectivity solutions are at the foundation of data centre managers' ability to maximize their networking investments and provide a stable, efficient network architecture."

Linda Borovick – Program Director for IDC's Datacentre Networks Program

TIA-942 sets the data centre standard.

The Telecommunications Industry Association (TIA) has published design guidelines for data centre designers in a standard known as TIA-942. Shown here, the standard breaks down the data centre into distinct sections. ADC equipment depicted is typical of the equipment you'll find in each of these areas.

Science – and not marketing hype – is the difference in ADC's Structured Cabling Solutions and Systems.



Cool Technology

How AirES Lowers Temperatures While Increasing Uptime.

AirES Cable Technology Deployed in the Data Centre:

22% smaller than typical Augmented Category 6 cable

Increased Uptime

- Crush resistance surpasses UL 444 requirements by factor of 4
- Improved electrical and physical properties
- Improved airflow increases reliability and lifespan of electronics
- Increased reliability by providing better circuit access

Improved Scalability

- Reduced diameter yields 16-22% increase in conduit fill rates versus competitors
- 22% less fuel to be burned in case of fire
- Better utilization of floor space
- Decreased cable size
- Fewer and smaller pathways

ADC's Plenum Cat6$_A$ with AirES®

Competitor's Cat6$_A$

AirES cable improves attenuation due to lower dielectric loss—resulting in smaller gauge copper than other cable.

The choice of conductor insulation is critical to cable performance.

- In AirES technology, air channels are used in the traditional FEP insulation, which results in a **17% better dielectric constant** over conventional FEP cables.
- The result: **Improved data communications** in a smaller diameter cable.
- **22% smaller** than typical Augmented Category 6 Cable

Hard to crush an AirES cable.

Air channels within the FEP insulation are distributed evenly along the entire conductor, forming a unified system of arched channels to strengthen the construction.

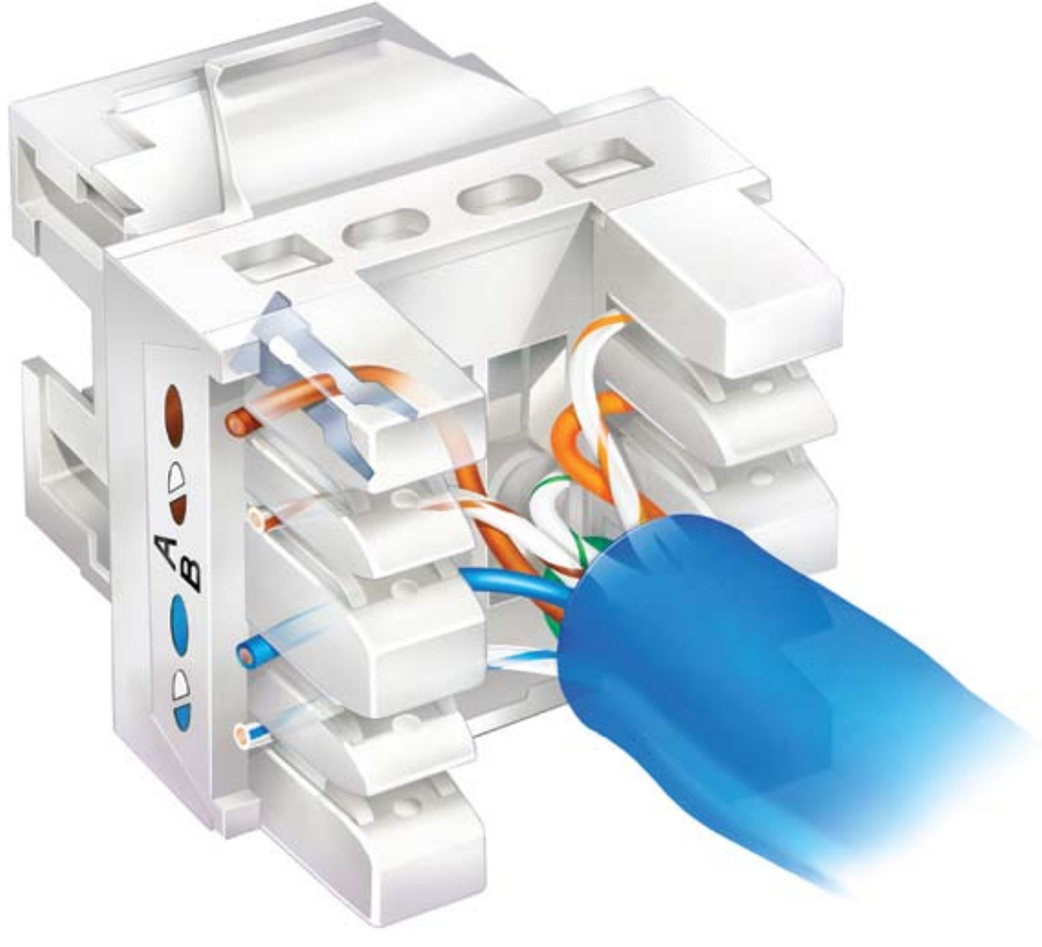
a **Gripping** Story

Uptime Performance Starts at Cable Connections.

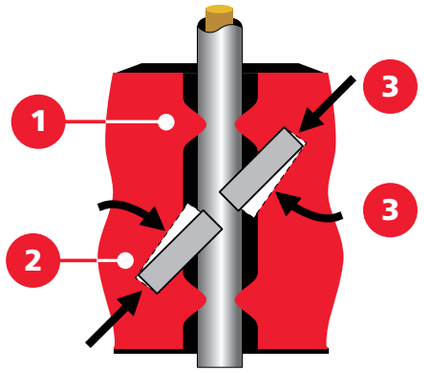
With ADC's LSA-PLUS® contacts, connections will never be the source of system weakness.

Cable connections and terminations within data centers are subject to vibrations and mechanical stresses not seen elsewhere within the enterprise.

- **70 percent of network downtime** is attributed to the physical layer, or cables and connectivity equipment.
- The patented LSA-PLUS® Insulation Displacement Contact (IDC) is the highest performing, most reliable IDC in the industry.
- LSA-PLUS® technology is used throughout ADC's Structured Cabling Solutions – in jacks, panels and termination blocks.



LSA-PLUS® silver-plated angled contacts are the securest available, anywhere.

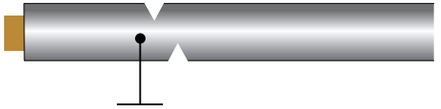


1. Insulation clamping ribs hold the wire securely – isolating the contact area from vibration and mechanical stress.
2. Silver-plated contact tags at 45-degree angles across the wire's axis make a solid, gas-tight connection.
3. Axial and torsional restoring forces make a solid, gas-tight connection.

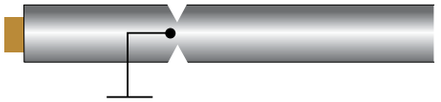
Billions of Connections

LSA-PLUS® technology has been used in billions of connections worldwide, and continues to set the pace for others to follow.

- Accepts 26-22 AWG insulated conductors
- Accepts solid or stranded insulated conductors
- Accepts two insulated conductors of the same type (solid or stranded) and size (26-22 AWG)
- Can be re-terminated 200 or more times



ADC leaves more wire between contact points; provides a more reliable stress resistant connection.



Typical primary wire after being punched into a 110 IDC; positioning contacts at a 90-degree angle results in a weak connection, which is prone to breakage.

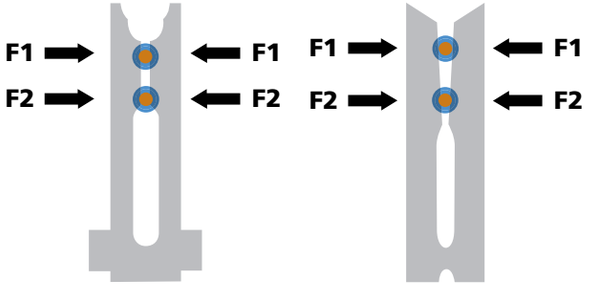
LSA-PLUS® IDC versus 110 and 66 Block IDCs

LSA-PLUS® Contacts

- Split beam technology
- (F1=F2) = no movement
- Balancing of forces eliminates the tendency for a conductor to be forced out of the contact over time

110 and 66 Type Contacts

- Wedge technology
- (F2>F1) = wire movement
- Unequal forces at top and bottom cause conductor movement over time



LSA-PLUS® Contact

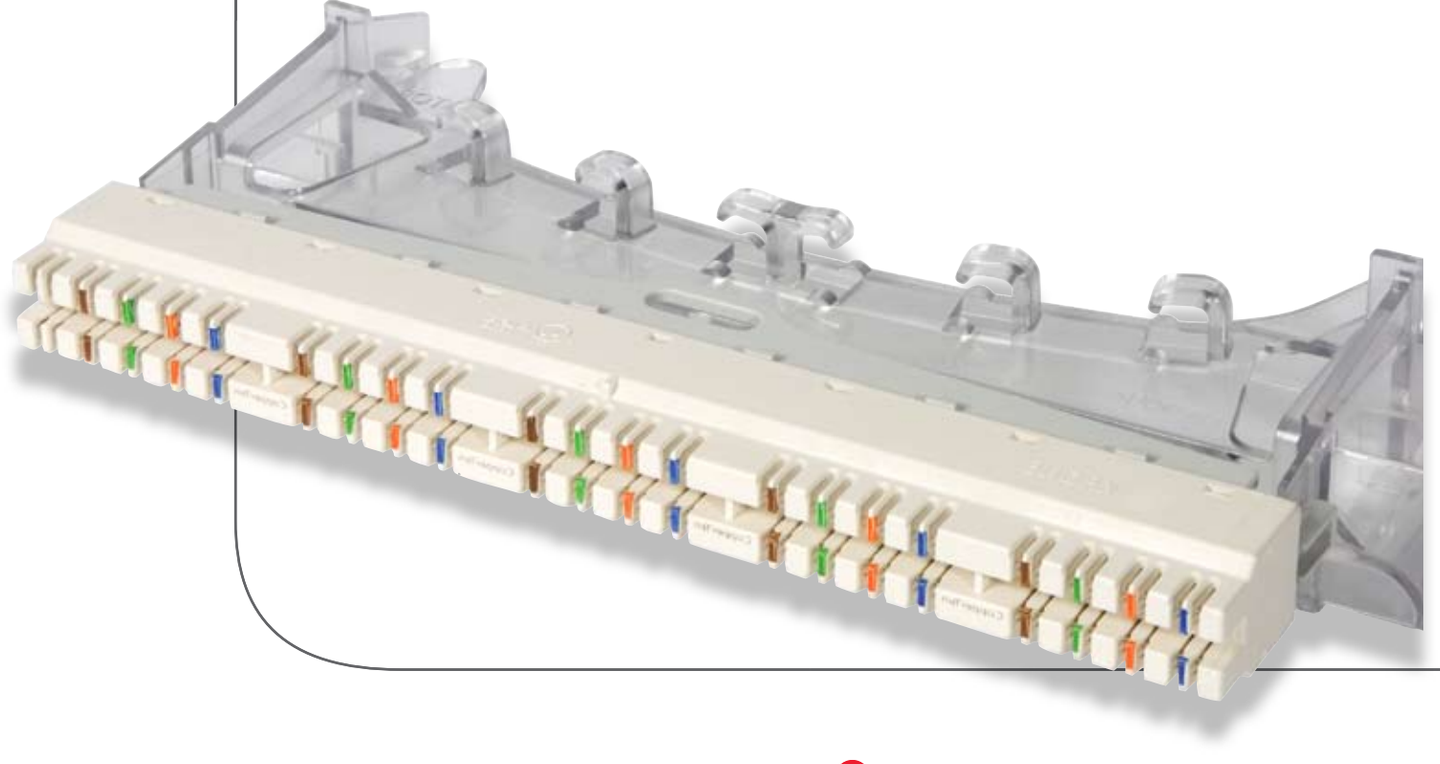
110 & 66 Type Contact

Designing a Better Block

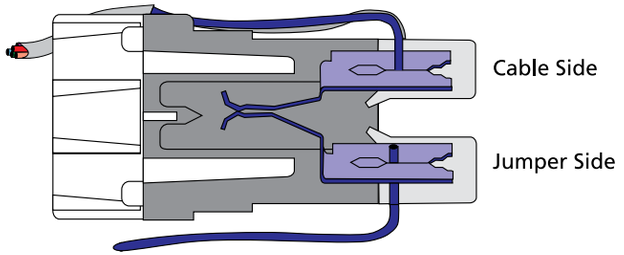
Innovative Block Technology Offers Industry's Only Disconnect Feature.

ADC is the only manufacturer to offer a termination block with a disconnect feature. Competitors typically offer one solution: Closed.

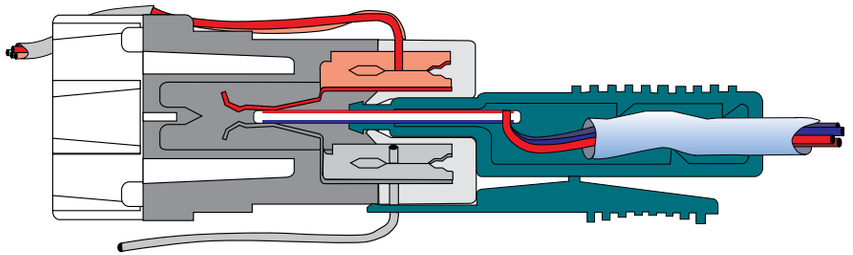
- ADC's UL certified blocks exceed all TIA and EIA Category 6 and 6_A requirements
- Available in 25 pair for Cat6 Module and 20 Pair for $Cat6_A$ Module
- Enables a path from the cable to the jumper side of the block, which can be used to either temporarily or permanently disconnect the circuit via the built-in test/disconnect port



Cross-section view of ADC's HighBand® 25 Module.

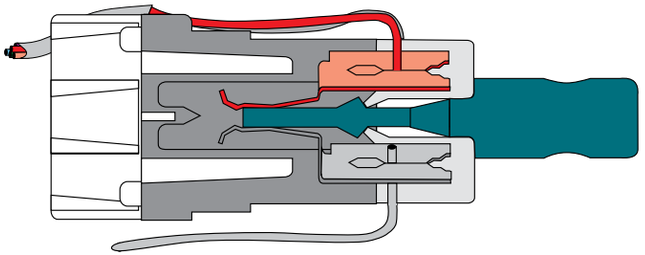


Normally Closed



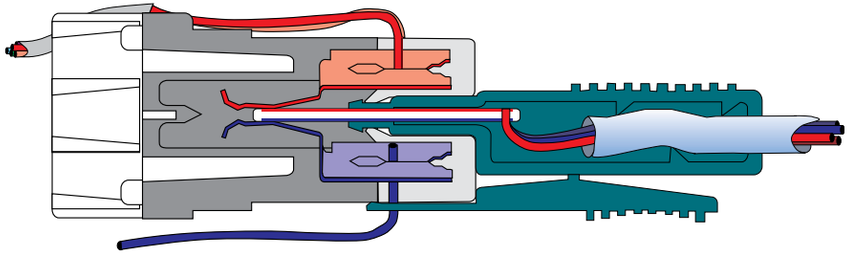
Patching Capability

When a patch cord is inserted, the cable-side circuit may be redirected to another location.



Disconnect Feature

- When a disconnect plug is inserted, the circuit is broken, either temporarily or permanently
- Disconnect port provides fault isolation, testing and monitoring without removing any wires



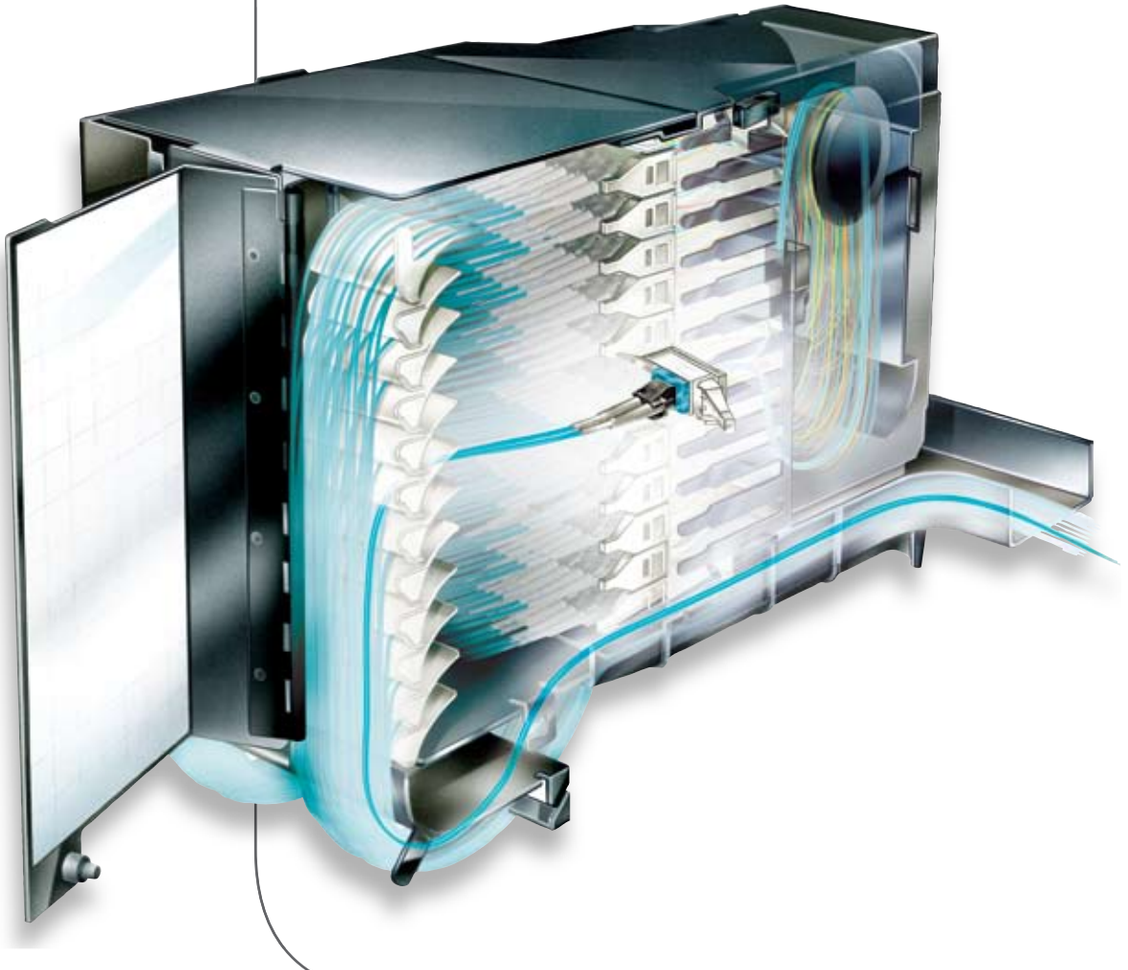
Testing Features

When a look-both-ways Test Cord is inserted, both sides of the circuit may be tested independently.

- Accelerates fault isolation
- Eliminates finger pointing in collocation applications

Room **to Grow**

The key to a Scalable Network is Managed Density.

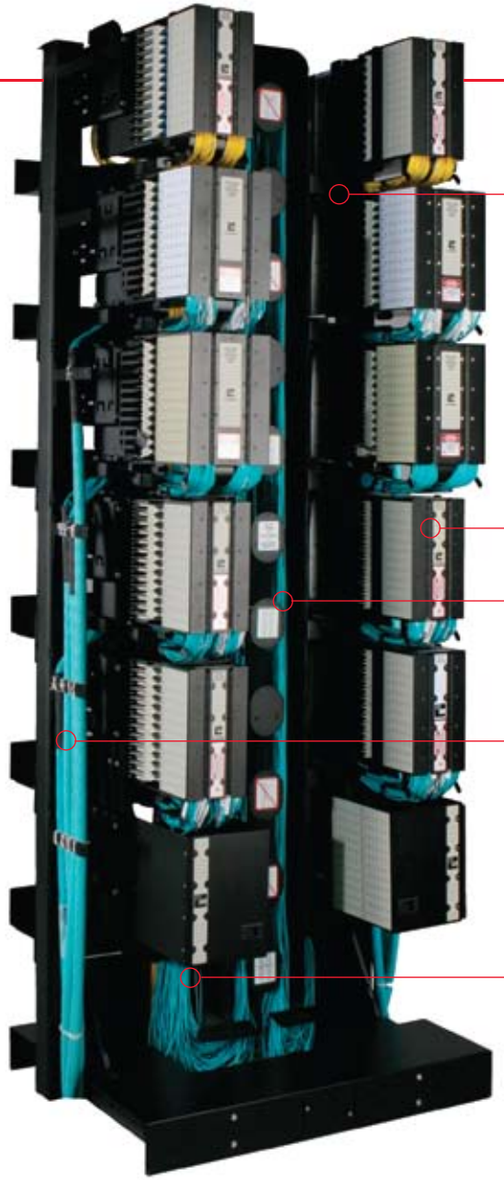


Simple density solutions are costly.

The day-one savings of solutions that do not consider how to manage and grow the network infrastructure are quickly eclipsed by outages, as well as open chassis slots and stranded network capacity, which require new floor space.

- ADC's Managed Density™ approach takes the long view of LAN, SAN and data center design with cable management features that ensure maximum density and growth without disrupting service or adding unneeded floor space.
- Managed Density ensures the network can grow today and be managed tomorrow.

Active network equipment can only perform if the cables perform—a gigabit port is of no value if attenuation from a damaged cable impedes performance or if restricted access delays fiber end face maintenance.



ADC's Data Centre Optical Distribution Frame easily scales to make the best use of expensive floor space.

- Manages up to 2,304 fiber terminations
- Uses industry's highest count MPO plug-and-play cassettes
- Slack storage included in each rack allows for the use of a single jumper length
- MPO trunks enter rack from under-the-floor or overhead
- On-frame jumper routing provides bend radius and physical protection for easily managing slack

With Managed Density honed from years of experience designing the world's largest data centers, you earn significant benefits:

- Improved Reliability. Thorough cable management avoids cable pile-up, mishaps in handling fibers and other forces that damage cables and jumpers
- Lowest Capital Costs. Enables efficient use of floor space, such as fiber frames that scale to 1728 fibers per frame and not stranding ports on active equipment
- Decreased Operating Costs. Plug-and-play cassettes, tracing jumpers in seconds, proper technician access add-up to fewer man hours for managing the network

The **TracerLight®** jumper reduces system turnup speed and improves accuracy

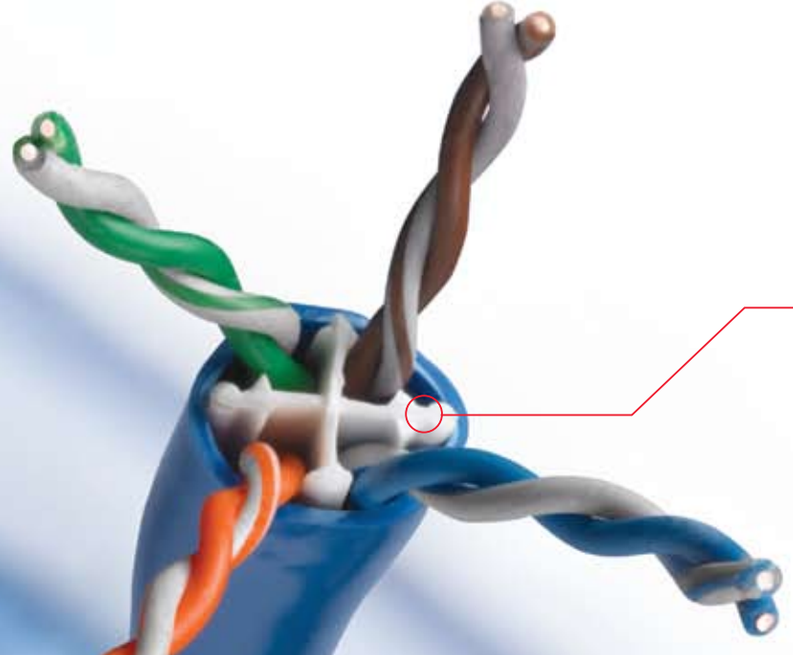
FibreGuide® incorporates bend-radius protection; installs with tool-less components

Angled left and right **TFP MPO cassettes** can provide up to 24 additional fiber terminations.

The Optical Distribution Frame **Plug-and-Play cassette** is available in 144- and 192-position blocks.

Building for **Bandwidth**

The Science of Designing Information Super Highways.

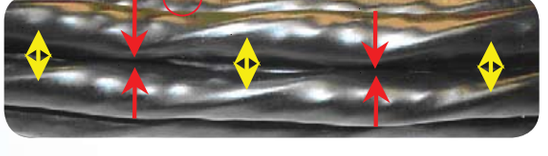


The World's First Augmented Category 6 Cable.

ADC's quest to lead the industry in innovation has resulted in an impressive record of scientific firsts. One such first is ADC's Augmented Category 6 cable.

The patented star filler used for ADC's Augmented Category 6 cable.

Creates an oblong cable shape that produces distance between cable pairs. In a bundle, the oblong-shaped cable also creates natural separation between adjacent cables.



Typical Stranded Conductor

Cat6$_A$ Stranded Conductor

Negating Alien Crosstalk

- By effectively maintaining the distance between the same twisted pairs, alien crosstalk is negated in a six around one bundle. The result: Outstanding electrical performance in a compact, unshielded twisted pair cable.
- ADC designed and built the world's first 10Gbps solution to run over a full 100 meters, and still leads the industry today. All of ADC's Augmented Category 6 channel solutions met the strict performance requirements of IEEE 802.3an and TIA-B.2.10.

The weakest link in any channel is the patch cord. This is especially true under the high-frequency operation of Augmented Category 6 systems.

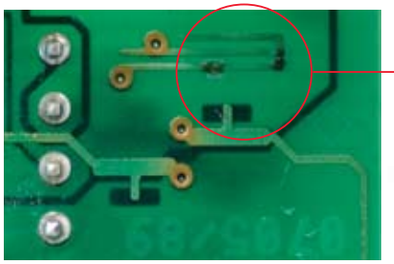
- Your infrastructure must last 10-15 years—so should your patch cords.
- ADC patch cords are made with stranded conductors for improved mechanical durability.
- Solid conductor patch cords break when they are over flexed.
- With its patch cords, ADC uses a machine die to compact in dividual strands in a form that resembles a solid conductor. The result: Electrical performance of a solid conductor combined with the flexibility and durability of a stranded cord.

Cat6$_A$ Patch Panels

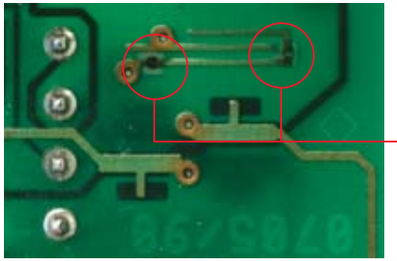
Offset jack positioning and a composite (not metal) frame reduces alien crosstalk.

Cat6$_A$ Modular Jacks

Each modular jack is laser-tuned using a million-dollar automated process performed in Berlin, Germany. Trimming each board guarantees performance to 500 MHz.



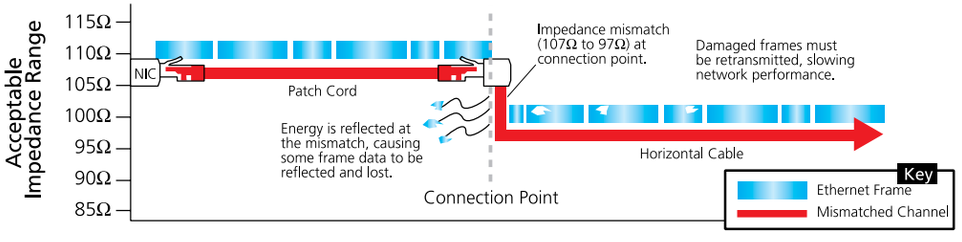
Laser tuning

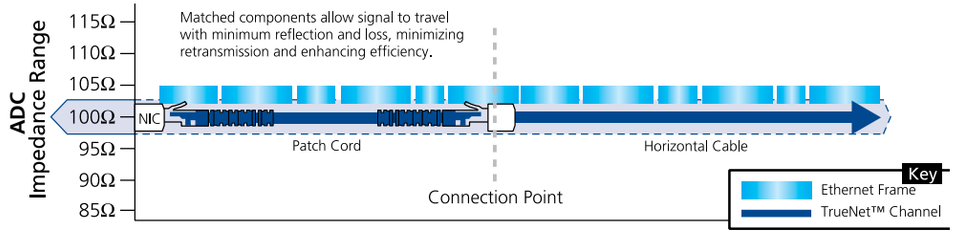


Laser tuning

Impedance Matching= **Signal Integrity**

True impedance matching guarantees extraordinary performance with ADC's structured cabling system.





In high-bandwidth applications, signal throughput is imperative for maintaining signal integrity.

- All ADC systems are impedance matched to operate at tolerances of 100± 3Ω. The industry standard is ± 15Ω.
- Impedance matching allows systems to run at the highest possible performance levels.
- Optimizing impedance minimizes return loss and greatly reduces Bit Error Rates (BER).

ADC manufactures every component of the its cabling system.

As a result, we manufacture component compliant products that are specifically tuned to maximum throughput when used as a part of a system.

By tightly controlling the impedance of each component in the channel, the effects of Return Loss are minimized and the Bit Error Rates (BER) plummet.

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