WHITE PAPER

Patch-by-Exception

How to save time and money while improving performance, manageability, security and aesthetics.

ADC®
KRONE

Immediate cost benefits when using **Patch-by-Exception**

How to save time and money while improving performance, manageability, security and aesthetics.

Introduction

In the race for high performance, it is important to consider the elements that go beyond pure performance. ADC KRONE's termination modules with their unique Patch-by-Exception design provide an easy and inexpensive cabling alternative. The design not only provides industry-leading performance, but also many additional benefits that make installation, administration and maintenance of a structured cabling system fast and efficient. Cost savings are made at the initial investment of the solution, leading to significant cost savings over the lifetime of the asset.

The Need

The most common method of installation for communications systems throughout the world is to utilise a standard RJ45 patch panel style solution.

Advantages of the RJ45 patch panel solution:

- Changes can be made by most staff.
- Does not require a qualified technician to make changes.

Disadvantages of the RJ45 patch panel solution:

- No records kept or very hard to keep records up to date.
- Unauthorised changes can be made without approval.
- Testing of outlets requires disconnection of the service.
- Patch cords required for every service.
- Poor management can lead to a patch cable nightmare.
- Takes up space in equipment racks.
- Changes can be made to network equipment within the equipment rack.

Patch cord mismanagement and an inability to test/monitor circuits create a costly operational nightmare. The good news is that there is a better way, one that will not result in a tangled mess of patch cords.

Patch-by-Exception technology offers a superior patching solution whilst avoiding many of these issues associated with traditional RJ45 systems.

What is Patch-by-Exception (PBE)?

The following definitions come from satisfied users around the world.

- "PBE is the ability to create a completely interconnected communications management system at the floor distributor without the entangled mess of patch cords or expensive patch cord management systems."
- "PBE is where hard wiring is used to connect circuits. This hard wiring can then be overridden by a patch cord making patching the exception rather than the rule."
- "PBE is a solution whereby you hard wire your network and make subsequent changes utilising patch cords.To go back to the original configuration, simply remove the patch cords."
- "PBE provides the simplicity of an RJ patch panel solution without the need for patch cords or messy leads."

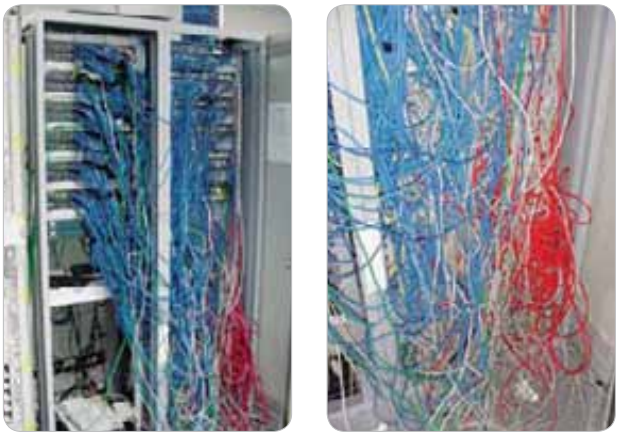
ADC KRONE offers a Patch-by-Exception solution for Category 5e, 6 and 6A applications.

Immediate Cost Savings

The Patch-by-Exception solution offers many cost savings to an organisation. This is both in the initial installation and most importantly the ongoing cost of maintaining your patching environment.

These initial cost savings are due to:

- Fewer patch cords required.
- Fewer equipment racks required.
- The wall mounted solution reduces the real estate required for equipment racks.
- Labour is reduced due to the front termination of the disconnect modules.
- Cable offcuts are used for connecting services (no special jumper wires required).



Examples of the RJ45 patch cord jumble.

The ongoing cost savings that Patch-by-Exception offers are:

- Neat and manageable patching environment increases the productivity of the IT department.
- Quick deployment of adds, moves and changes.
- Easier to locate network faults, on all four pairs.
- Uses disconnection modules instead of patch panels.
- Unauthorised changes can be easily identified.
- Records of moves and changes are more easily kept up to date.
- Protection of the patching environment by using a non standard RJ45 patching solution.

Operational Benefits

The worldwide move to VoIP means that Patch-by-Exception has really come of age. In a VoIP system, all adds, moves and changes to user handsets are done using software tools. The user name and phone number are related to the handset by the IP and MAC address assigned to the VoIP enabled handset itself. Thus when a user needs to move, they simply unplug the handset from the current RJ45 outlet and plug it into another active RJ45 outlet on the same logical IP network. This could be across the hall, the building or the world. All this is achieved with no patch cord changes on the cross connect at all. Thus in a VoIP environment utilising this system, the need for patch cords is eliminated, only to be used perhaps for diagnosis or to bypass a damaged cable.

The unique design of the ADC KRONE LSA-PLUS® contact allows two wires to be inserted into each contact slot. This can be used when call monitoring or double jumpering is required for voice services.

Anatomy of a Disconnection Module

A disconnection module has two contacts for each wire, an 'in' and an 'out' as shown in Figure 2. These two contacts touch in the middle of the modules with a controlled amount of spring pressure. The central spring contacts allow the single-wire circuit to be disconnected, hence the name 'disconnection contact', and provides the access for patch plugs, test plugs, monitoring plugs or isolation plugs.

All HighBand and CopperTen™ modules contain disconnection contacts. It's this distinctly unique feature that sets it above other contact types, like the through-connect 110-style. You can only achieve the benefits of a Patch-by-Exception solution by utilising disconnect modules.

The design of disconnection modules provides a clean front panel. The insulation displacement contacts for the wire and the disconnection spring contacts are recessed inside the module, so accidental contact of the module with a metallic tool like a screwdriver will not cause any short circuits.

During moves, adds and changes, the act of plugging a patch cord into the work area modules opens the internal spring contacts, thereby disconnecting the existing circuit as shown in Figure 3. When the other end of the patch cord is plugged into the module on the network equipment field, it will disconnect that existing circuit and feed the signal via the patch cord to the new work area outlet.

The patch cord has therefore created a new patched configuration, bypassing the original hard wired configuration. The patch has become an exception to the original, hence the name "Patch-by-Exception".

To revert back to the original jumpered configuration, simply remove the patch plug from the network equipment modules, then the work area module. This sequence ensures no signal voltages will appear on the plug ends. The patch cords can be hung in a cupboard ready for use the next time an exception is required to the original jumpering.

How does Patch-by-Exception work?

Referring to Figure 1, one vertical column of disconnection modules is terminated with system tails that plug straight into the front ports of a switch/router with a standard RJ45. All of the work area horizontal cabling from the telecommunications outlets is terminated onto a second vertical column of disconnection modules which is located beside the first vertical column. The technicians simply terminate a series of 4-pair cables known as "hardwired (jumpered) cross-connects" on to the disconnection modules to complete the connection between the switch and the work area outlets.

Moves, Adds and Changes

When it comes time to move services for an individual from one location to another, no special tools are required. Moves are done quickly and efficiently with a patch cord. Simply plug a patch cord into the work area field at the circuit to be moved and then plug the other end into the new source on the network switch field. The 4-pair patch cord will move all signals from one work area to another in a matter of seconds.

ADC KRONE manufactures patch cords in lengths of 1.2, 2.1, 3, 4.5, 7.5 and 15 metres. These lengths not only provide flexibility in patching, but also the best possible performance. ADC KRONE has found that these specific lengths offer better electrical performance at critical wavelengths and frequencies.

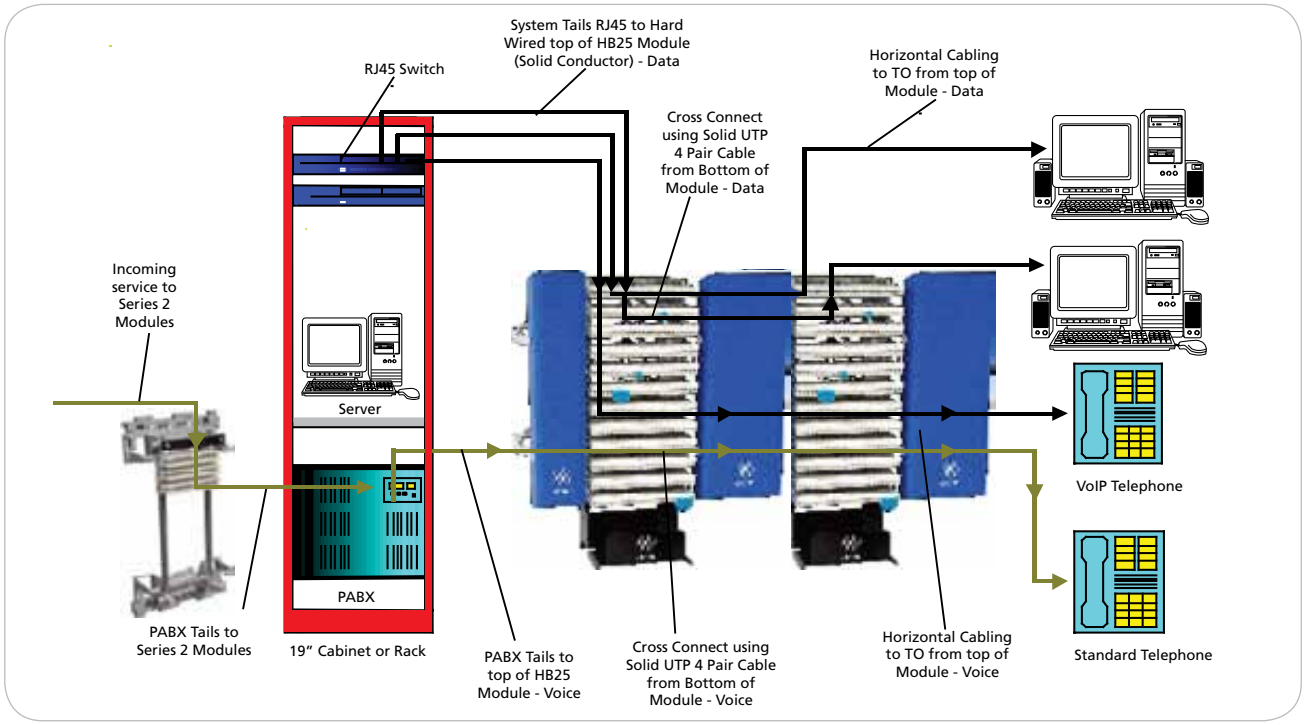


Figure 1

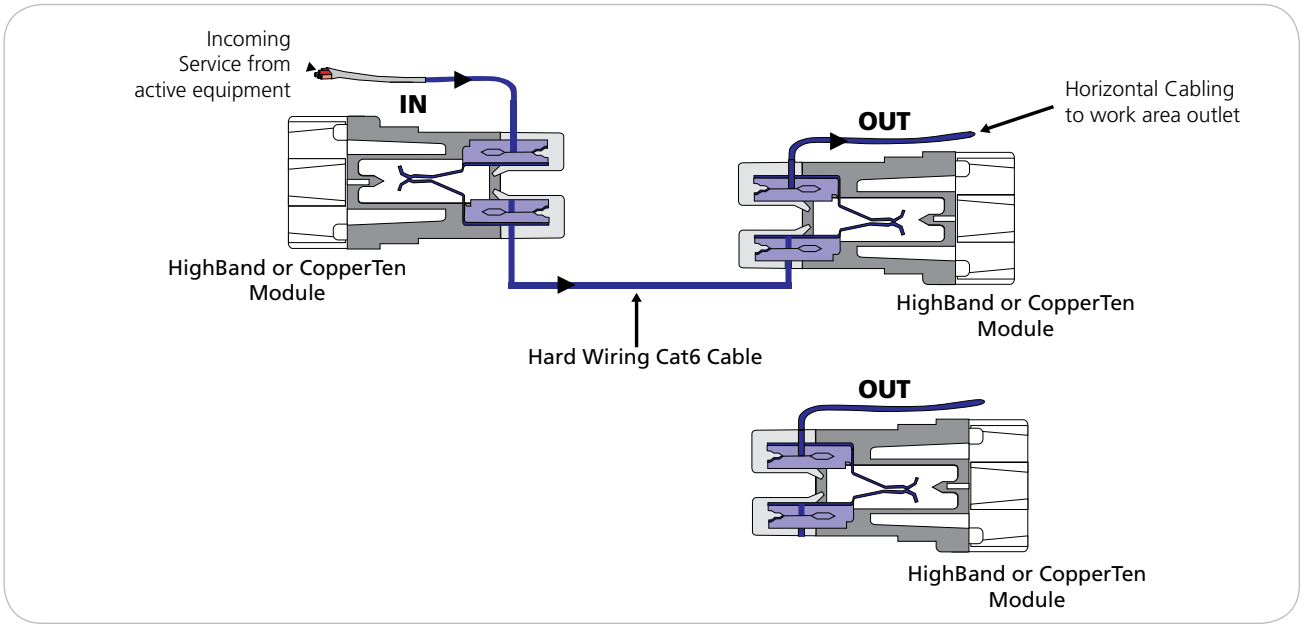


Figure 2

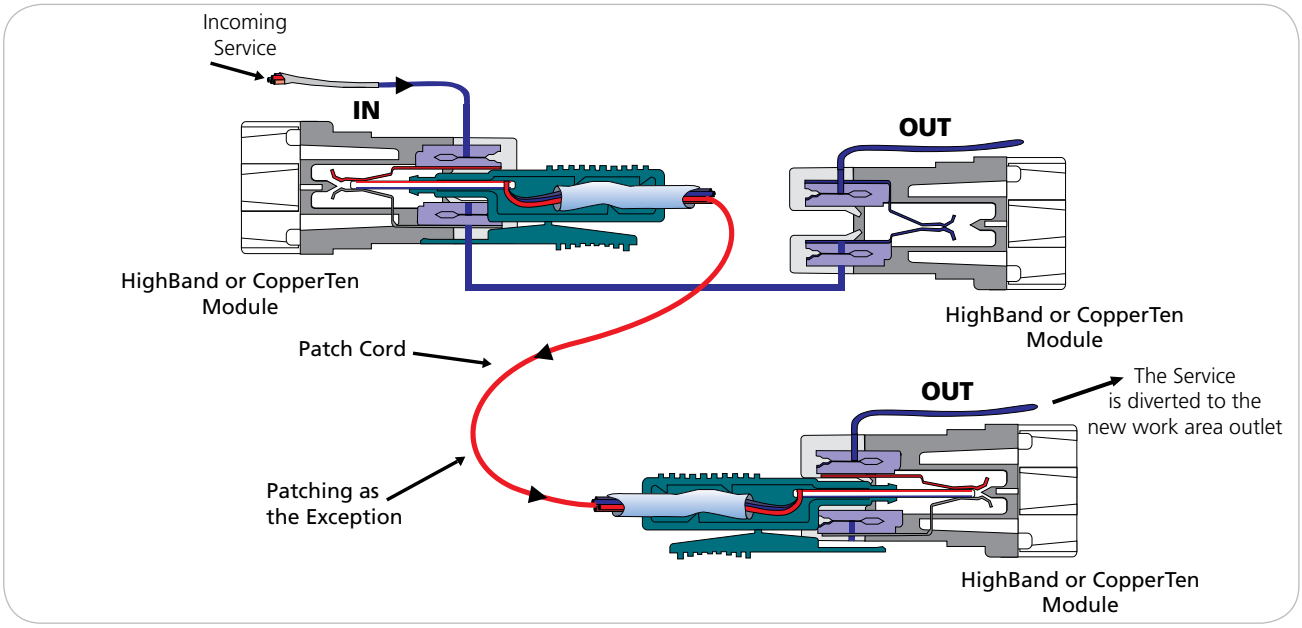


Figure 3

In time, as more and more changes are made, the fields of disconnection modules show all changes that have been made by the patch cords and you may want to make some or all of these changes part of your jumpered solution. At that time, a technician may be called in to rewire the temporary changes and make them permanent. This restores the cross-connect fields to their original "patch cord free" state. The panel will again look like it did the day it was first installed. The removed patch cords are then available for the next round of inevitable moves, adds and changes.

Added Security

All active equipment can be safely locked away in cabinets, as technicians do not require access to perform moves, adds and changes. Any unauthorised patching will stand out from the normally clean front faces on the modules. Sometimes a patch cord can be incorrectly positioned on a patch panel system but difficult to locate. This problem is eliminated in a Patch-by-Exception system, all temporary patch cords and plugs stand out from the normally clean module faces so you can quickly see an incorrect patch.

Security Isolation

If you have ever had an employee make unauthorised long distance phone calls from a vacant office, send anonymous e-mail from someone else's computer, or log onto the Internet and incur service charges, you know how important it is to be able to disconnect services temporarily. To disable services to a work area, simply place a disconnection plug into the centre port for that outlet. Because the plug fits a single pair, it allows for very selective management. The entire work area may be disabled or just one or two services, whichever is necessary. Isolation management of the network, phones and Internet service requires no special tools or training - just a simple disconnection plug.

Protection for IDC Contacts

All Insulation Displacement Connection (IDC) contacts work on the principle of displacing the insulation on the wire and displacing a small amount of the copper wire to form a gas-tight joint. ADC KRONE's IDC contacts are set at 45° and are isolated from mechanical vibration by the clamping ribs on both sides of the IDC slot. It is vitally important that the gas-tight IDC junction with the copper wire remains free from vibration and disturbance otherwise it will start a corrosion process that over time will increase circuit resistance and can cause an open-circuit inside the connection. This would have to be a technician's worst nightmare because it is virtually impossible to detect during fault finding.

The use of ADC KRONE disconnection modules with the central spring contacts for the plug means that the IDC-wire junctions are not disturbed in any way during the plugging in and removal of patch plugs. This ensures ADC KRONE disconnection modules have unparalleled protection for the IDC contacts. This is a more desirable patch plug process than those plug systems like the through-connect style that make contact with the IDC at the wire junction area.

ADC KRONE's contacts can accept up to 200 re-terminations, allowing for repeated use.

Colourful Slots

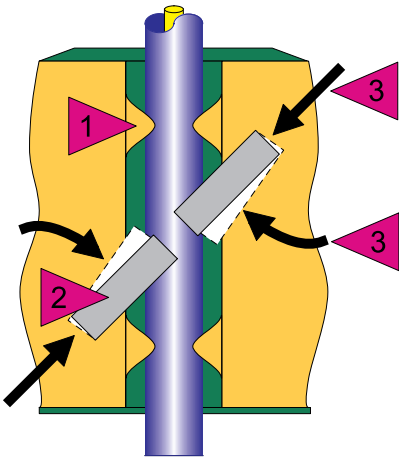
All disconnection modules are marked on the top of each turret with either a colour code or a number to show the correct location of the wires when terminating. When modules are used in a cross-connect arrangement, all network equipment system leads are terminated on the top row of the module. In addition, all horizontal cables from the work areas are terminated on the top row of their modules. The cross-connecting jumper cables are terminated onto the bottom of both modules.

Labelling

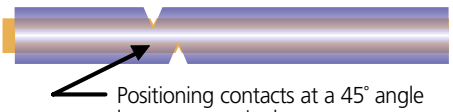
The labelling facilities of PBE systems are far superior to that of an RJ45 style patch panel installations. Labels are larger and easier to follow for each wire either by colour code or number. Coloured tags are easy to apply to PBE disconnection modules enabling fast identification of groups of circuits. Records are more easily kept for PBE sites because once initially entered, any subsequent exception patching is easy to see on the modules. Patch cords will no longer obscure your view of labelling information on modules. ADC KRONE's hinged label holders for 8-pair modules can be applied to every module if desired or in groups of 10 with push-in numbers for the intervening modules. Conventional numbering in a vertical stack is left to right, starting from the bottom left module and numbering up the vertical.

The LSA-PLUS® Contact Difference

1. Insulation clamping ribs hold the wire securely and isolate the contact area from vibration and mechanical stress.
2. Silver-plated contact tags at 45° angles across the axis of the wire make a solid, gas-tight connection.
3. Unique axial and torsional restoring forces maintain a durable connection.

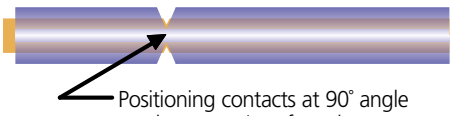


Effects of LSA-PLUS contact on wire:



Positioning contacts at a 45° angle leaves more wire between contact points and provides a more reliable, stress-resistant connection.

Effects of other traditional contacts on wire:



Positioning contacts at 90° angle produces a point of weakness subject to possible breakage.

Figure 4

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Installed Appearance

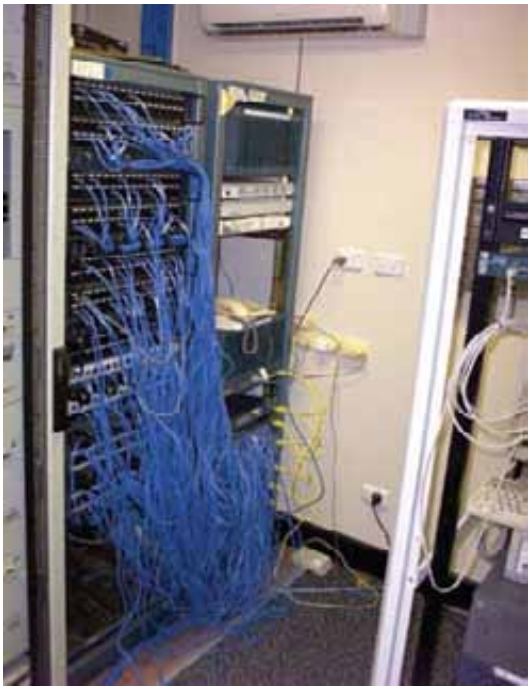
The Patch-by-Exception installations use disconnect modules that mount directly onto wall mounted backmount frames, equipment rack mounting frames are available however it is highly recommended that the wall mount option is utilised.

In all newly installed PBE systems there are no patch cords or jumper cables visible to the front. The system is totally hard wired from network equipment to work area, providing a secure, reliable, high performance infrastructure from switch to work area, or PABX to telephone. Neat, uncluttered, eliminating patch cord mess, aesthetically pleasing, and a breeze to operate and maintain.

Performance

International telecommunications standards recognise there is a difference in insertion loss between solid (horizontal) cable and stranded (patch) cable. Solid cable is 20 to 50 percent better. So by using solid jumpers at the cross-connect, not only are you saving money, you are getting better performance. This translates directly into fewer problems in the network, more data throughput and less fault-finding issues.

ADC KRONE's disconnection modules used for PBE solutions provide the highest performance available anywhere in the world today. This ensures not only high bandwidth now, but also spare bandwidth capacity for future upgrades.



These pictures were taken at a customer site, before and after the HighBand® installation.

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www.adckrone.com/in

Corporate Office and Factory: P.B. No. 5812. 10C II Phase, Peenya, Bangalore – 560058 INDIA
Tel: +91 80 28396101 Fax: +91 80 28396104
TOLLFREE: 1800 425 8232
OFFICE LOCATIONS: BANGALORE, NEW DELHI, MUMBAI, PUNE, CHENNAI, HYDERABAD

ADC Telecommunications, Inc., P.O. Box 1101, Minneapolis, Minnesota USA 55440-1101

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