PANDUIT®

Application Note

Cable Installation and Routing Guidelines for the Cisco Nexus 7010 Switch

Introduction

Data center stakeholders are increasingly using virtualization technologies to consolidate multiple applications over a smaller number of more powerful servers and switches. Forward-looking enterprises are preparing for the next wave of consolidation, which leverages next-generation switch technologies with a unified 10 Gb/s fabric to consolidate multiple networks over the same cabling infrastructure.

The Cisco Nexus 7010 Switch enables data center stakeholders to deploy a highly scalable 10 Gigabit Ethernet (GbE) network in support of I/O consolidation goals. This document describes the advanced physical layer infrastructure elements required to support the Cisco Nexus 7010 Switch, including the *PANDUIT*® *NET-ACCESS*™ Cabinet, connectivity, accessories, and cable management.

The Application Note includes strategies for routing, managing, and protecting cables for several different switch architectures and line card combinations. When used together, Cisco Nexus Series switches and modular, scalable, and 100% tested *PANDUIT* cabling systems work together to enable business agility and yield best-in-class performance within your data center.

Installation Overview

This Application Note outlines cabling strategies for several of the most common switch configurations, starting at line card connections and progressing to cable routing and management within the switch enclosure.

Multiple deployment strategies and line card combinations exist for the Cisco Nexus 7010 Switch, each of which have an impact on cabling media selection and layout. These switches enable up to 384 1 Gb/s copper connections or 256 10 Gb/s fiber optic connections (i.e. 512 fibers) in a single 10-slot chassis.

Line Card Cabling Techniques

I. Copper ports (RJ45 connectors)
II. Fiber optic ports (SFP+ connectors)
III. Copper and fiber line card combinations

Switch Enclosure Cabling Layouts

IV. Copper ports (RJ45 connectors)
V. Fiber optic ports (SFP+ connectors)
VI. Copper and fiber line card combinations

For more information on deploying a physical infrastructure to support the Cisco Nexus 7000 Series of switches, see At a Glance: *PANDUIT* Data Center Infrastructure Topologies for Cisco Enterprise-Class Platforms and Design Guide: Mapping Cisco Nexus, Catalyst, and MDS Logical Architectures onto *PANDUIT* Physical Layer Solutions.

Cisco Nexus 7010 Switch

Color Legend

Fiber Cabling Connections

Aqua identifies OM3 50/125µm multimode fiber
(Network "A" and "B" connections indicated with blue and red boxes)

Copper Cabling Connections

Blue identifies Category 6A copper cabling, used for "Network A" connections

Red identifies Category 6A copper cabling, used for "Network B" connections

Green identifies Category 6A copper cabling, used for "Out of Band Management", "Console", or "Link" connections

Jacks & Adapters

All *PANDUIT*® *Mini-Com*® Modular Copper RJ45 Jacks and Patch Cords can be color coded to indicate purpose and identify dedicated cabling paths. *PANDUIT*® *Opticom*® Fiber Optic Adapters and Patch Cords are color coded according to TIA/EIA-568-C.3 suggested color identification guidelines.

Installation Notes

Network reliability depends on the proper handling and installation of cables, active equipment, interconnections, and secure enclosures. Disregard for cable management best practices (such as observing proper bend radius and cinching tension limits) can introduce risk into the physical infrastructure, potentially degrading or interrupting network performance. The Cisco Nexus 7010 Switch is equipped with several cable management tools (cable management slots, cable management fins, and *PANDUIT* Elastomeric Cable Ties) to help neatly route and manage copper and fiber optic cabling.

(1) The *PANDUIT*® *Net-Access*™ Cabinet provides 45RU of rack space, with 21RU occupied by the Cisco Nexus 7010 Switch. An additional 3RU of rack space typically houses a 1RU patch panel for "Out of Band Management", "Console", or "Link" connections; and a 2RU horizontal cable manager used as a pathway for cabinet-to-cabinet connections. The remaining 21RU can be used to deploy patch panels or a second Cisco Nexus 7010 Switch.

PANDUIT® *Net-Access*™ Switch Cabinets are compatible with *PANDUIT* connectivity, grounding, and pathway products to provide a complete physical infrastructure solution for Cisco Nexus 7010 Switch deployments. The cabinets include vertical cable management required to properly route, manage, and protect your 10 Gb/s copper and fiber infrastructure.

(2) When cabling the Cisco Nexus 7010 Switch to a patch field within the same cabinet, the switch should be placed in the bottom of the cabinet for stability

- For copper installations, both *QuickNet*™ Angled Patch Panels and *Mini-Com*® Angled Patch Panels provide required port density and cable management.
- For fiber optic installations, both *QuickNet*™ Angled Patch Panels and *Opticom*® Fiber Adapter Panels (used with *Opticom*® Rack Mount Fiber Enclosures) offer the required adapter port density and cable management.

(3) Ensure fiber connector cleanliness any time fiber termination is performed in the field by following *PANDUIT* Best Practices document PN446, "Visual Inspection and Cleaning of Fiber Optic Components".

(4) This document shows modular jacks and adapters (copper and fiber connections) used to fully cable each line card, in accordance with TIA/EIA-568. *PANDUIT*® *Mini-Com*® Blank Modules or *Opticom*® Fiber Adapter Panel Blanks should be used to fill empty module positions or FAP openings.

(5) The *PANDUIT*® *Net-Access*™ Overhead Cable Routing System may be attached directly to the top of the cabinet and used to route and protect copper cables in overhead channels, and is listed in the List of Materials as optional.

(6) The *PANDUIT*® *FiberRunner*® Routing System may be used to route and protect fiber cables in overhead channels, and is listed in the List of Materials as optional.

(7) All the installation elements described in this Application Note should be grounded and bonded using all applicable elements of the *PANDUIT*® *StructuredGround*™ System to provide a high quality, visually verifiable and dedicated grounding path. These systems help network stakeholders improve network reliability, maintain system performance, and protect equipment and personnel by meeting all applicable grounding and bonding industry standards: ANSI/TIA-942; J-STD-607-A-2002; and IEEE Std 1100™-2005 (the Emerald Book).

I. Line Card Cabling Techniques: Copper Ports (RJ45 Connectors)

1. Copper line cards for the Cisco Nexus 7010 Switch are structured in 12-port clusters. Start from the outer-most line card on one side of the switch (Slot 1 or 10), and work toward the inner-most card; repeat this approach on the other side of the switch.
2. Begin copper patch cord installation at the middle of the line card (Ports 25-26) and continue to the bottom (Ports 47-48).
3. Upon connecting each pair of copper patch cords, route cables to the left side of the line card, and up through the switch cable manager slot positioned directly above the card.
4. Lay each successive patch cord on top of the prior cables as installation progresses to position cable bundles close to the card.
5. Continue cable installation at the top of the line card (Ports 1-2), progressing to the final empty positions (Ports 23-24) at the middle of the card.
6. Route cables from the top half of the line card to the right side of the card, and up through the cable management slot.
7. Position cables from the top half of the line card to overlie bundles from the lower half, to prevent excessive cable protrusion.

Step 1

Cable line cards on Cisco Nexus 7010 Switch from outside to inside slots

Step 7

Position cables from top half of line card…

…to overlie bundles from lower half.

I. Line Card Cabling Techniques: Copper Ports (RJ45 Connectors)

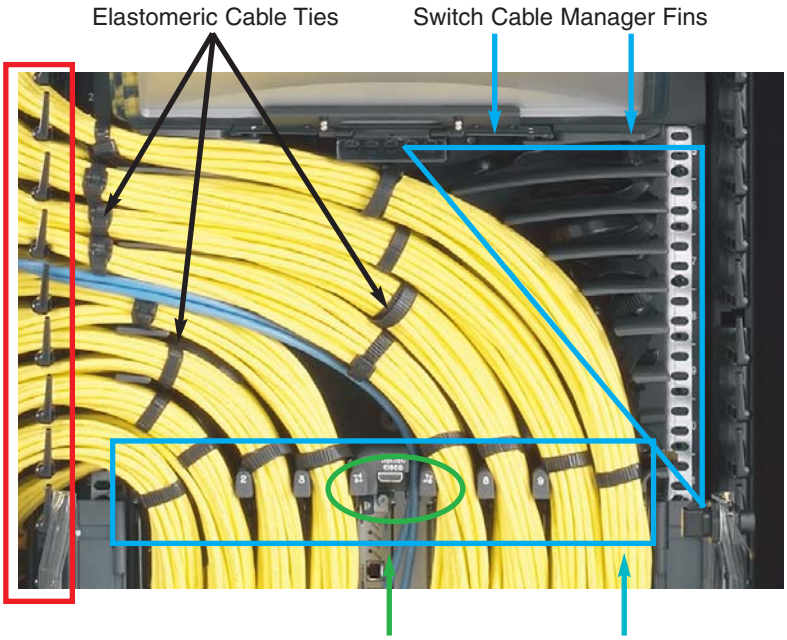
8. Before cabling the next line card, route current cable bundle through the individual cable management slots and fins provided on the switch cable manager (as highlighted in blue boxes), then through *NET-ACCESS*™ Cabinet vertical cable management fingers (as highlighted in red box) and out to final destination, including patch panels above switch, overhead cable routing system, etc.

   Note: Cable management fins attached to the switch help support cables as they transition from switch cable managers out to vertical pathway spaces. Installers should split cable bundles as needed when routing cables through the fins.

9. Bundle and organize cables using the *PANDUIT* Elastomeric Cable Ties included with the switch. Ties are located at the top of each line card, and at multiple locations near cable management slots and on the inside of each cable management fin. These elastic cable ties are designed to prevent cable bundle overtensioning, and are UL 94V-0 flammability rated to meet NEBS GR-63-CORE requirements.

   Once cables transition into vertical pathway spaces, bundle cables using *PANDUIT*® *TAK-TY*® Hook-&-Loop Cable Ties every 8-10 inches along length of cable bundle

Steps 8-10



10. Install “Out of Band Management,” “Console,” and/or “Link” connections by routing Category 6A or Category 6 copper patch cords from supervisor line cards (Slots 5 and 6) through switch cable manager slots and upward to Out Of Band Management patch panel. Ensure that these cables do not become entangled with data communications cabling by positioning them between already-installed cable bundles and close to the cabinet vertical post.

II. Line Card Cabling Techniques: Fiber Optic Ports (SFP+ Connectors)

1. Fiber line cards for the Cisco Nexus 7010 Switch are structured in 8-port clusters. Start from the outer-most line card on one side of the switch (Slot 1 or 10), and work toward the inner-most card; repeat this approach on the other side of the switch.

2. Begin fiber patch cord installation at the top of the line card (Ports 1-8) and continue to the bottom (Ports 25-32).

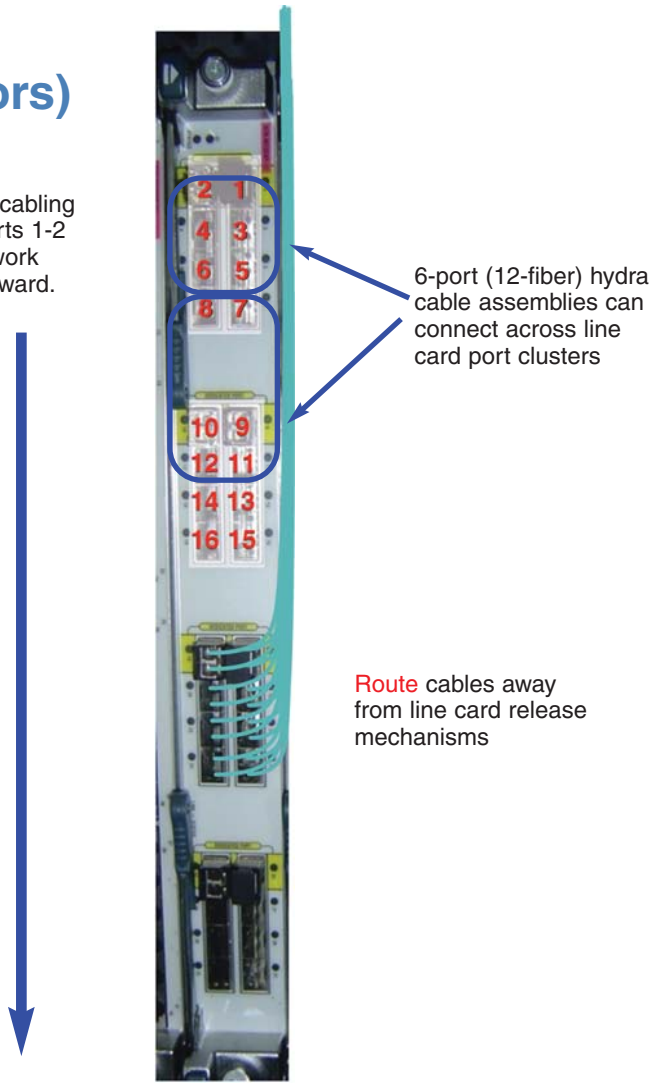
3. Upon connecting each 8-port cluster, route cables up through the switch cable manager slot positioned directly above the card.

   a. For discrete duplex LC patch cords: Route cables through manager slot after connecting each cluster.

   b. For duplex LC to MTP "hydra" cable assemblies (4-port / 8-fiber or 6-port / 12-fiber): Route each full cable assembly through manager slot upon connection of all assembly cables to the line card ports. Six-port hydra cable assembly break-outs can connect across 8-port line card clusters.

      Note: Depending on port locations and line card position, the cable assembly furcation (i.e., break-out) point may be located either within the Cisco Nexus 7010 Switch cable manager or within the *NET-ACCESS*™ Cabinet vertical cable routing space.

4. Lay each successive patch cord (or hydra assembly) on top of the prior cables as installation progresses to position bundles close to the card. Cables should be routed away from line card release mechanisms in order to maintain unhindered access to mechanisms.



5. Route cables from each line card through the individual cable management slots and fins provided on the switch, then through *NET-ACCESS*™ Cabinet vertical cable management fingers and out to final destination (patch panels above switch, 0RU fiber adapter panels in vertical space, etc.).

6. Bundle cables using *PANDUIT*® *TAK-TY*® Hook-&-Loop Cable Ties every 8-10 inches along length of fiber cable bundle.

7. Install "Out of Band Management," "Console," and/or "Link" connections by routing Category 6A or Category 6 copper patch cords from supervisor line cards (Slots 5 and 6) through designated switch cable manager slots and upward to Out Of Band Management patch panel. Ensure that these cables do not become entangled with data communications cabling by position them between already-installed cable bundles and close to the cabinet vertical post.

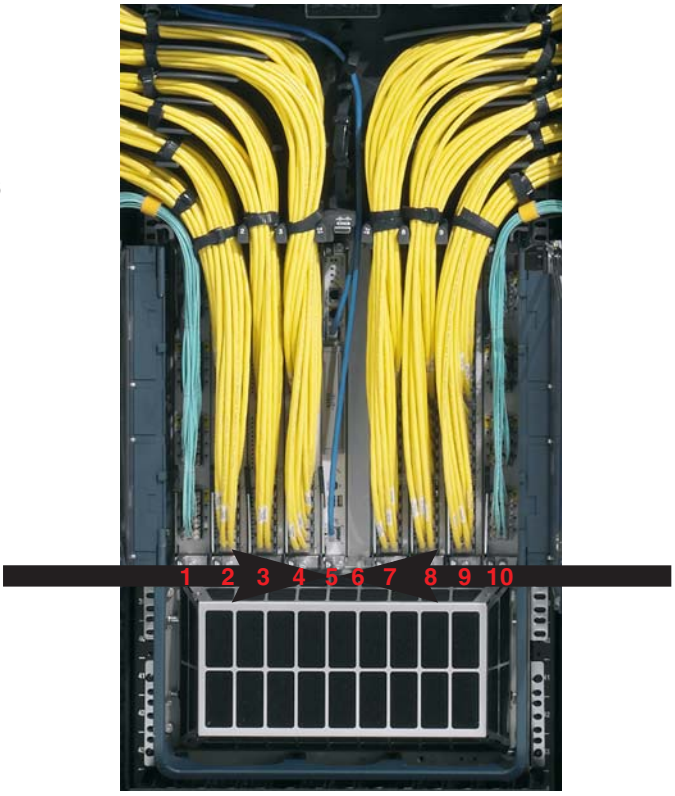
III. Line Card Cabling Techniques: Copper and Fiber Line Card Combinations

1. When mixing copper and fiber optic line cards within a single switch chassis, position fiber optic (SFP+) line cards in slots at the edge of the switch. This strategy enables easier transition of data communication cables (i.e., fiber optic patch cords or hydra cable assemblies) from outer line card slots to vertical pathways, and promotes segregation of copper and fiber optic cabling pathways.

2. Install copper and fiber optic cables onto line cards as described in Sections I and II of this Application Note, routing cables from each line card through the individual cable management slots and fins provided on the switch. Start from the outer-most line card on one side of the switch and work toward the inner-most card (for example, from Slot 1 to Slot 4); repeat this approach on the other side of the switch.

3. Route cable bundles through *NET-ACCESS*™ Cabinet vertical cable management fingers and out to final destination. Secure bundles in vertical spaces using *PANDUIT*® *TAK-TY*® Hook-&-Loop Cable Ties every 8-10 inches.

4. Install "Out of Band Management," "Console," and/or "Link" connections by routing Category 6A or Category 6 copper patch cords from supervisor line cards (Slots 5 and 6) through designated half-width switch cable manager slots and upward to Out Of Band Management patch panel. Ensure that these cables do not become entangled with data communications cabling by position them between already-installed cable bundles and close to the cabinet vertical post.



Position fiber line cards and cables in slots at switch edges, then cable cards from outer-most slots to inner-most

IV. Switch Enclosure Cabling Layouts: Copper Ports (RJ45 Connectors)

The Cisco Nexus 7010 Switch can be cabled with copper data links in several different configurations depending upon installation requirements and topology layout preferences. This section describes how to cable the Cisco Nexus 7010 Switch with copper media for both cross-connect and interconnect topologies.

Cross-Connect

- One switch per cabinet, cabled to a patch field in another location **(see Example 1)**
- Two switches per cabinet, cabled to a patch field in another location **(see Example 2)**

Interconnect

- One switch per cabinet, cabled to patch field within the same cabinet **(see Example 3)**
- One switch and patch field per cabinet, cabled to patch fields between two cabinets **(see Example 8)**

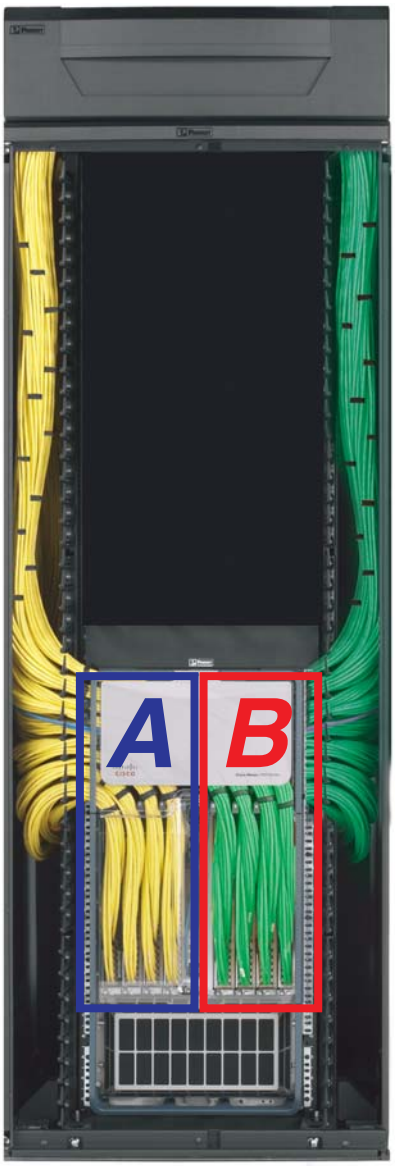
When deploying copper line cards, first determine if a cross-connect or an interconnect patching topology will be used:

- **Cross-connect** topologies (patch cords from passive patch panel to passive patch panel) are preferred for locations where many service or application reconfigurations will be taking place. In dynamic data center environments, cross-connect topologies provide the routing and configuration flexibility to rapidly commission and decommission servers, reducing facility reconfiguration costs and cabling time. Also, configuration changes are made at patching connections isolated from active hardware, thus reducing the risk of inadvertent worker damage.

- **Interconnect** topologies (patch cords from active switch port to passive patch panel) are utilized in locations where physical space is at a premium and limited moves, adds and changes will occur. Rack space is conserved by placing high-density patch fields in the same enclosure as the switch. Also, operational costs are reduced in these more static data center areas through fewer reconfiguration efforts and higher density connections.

Note: Line card refreshes commonly occur every 3-5 years, whereas the typical life of a data center can reach 10-15 years, and with regular maintenance the facilities infrastructure and structured cabling are both expected to support multiple generations of IT equipment. It also is generally predicted that most (if not all) links in the data center will need to carry 10 Gb/s in the near future with certain critical “core” links supporting even faster data rates.

For these reasons a 10-Gigabit ready cabling infrastructure is recommended, with data center speed and reach requirements favoring the deployment of Category 6A copper links. The *PANDUIT® TX6A™ 10GIG™* UTP Copper Cabling System offers an innovative cable design and advanced connector compensation techniques to improve pathway capacity up to 30%, addressing the need for a smaller diameter Category 6A cable without compromising channel performance.



Example 1. Single-switch cabinet cabled with copper media to remote patch field

For more information about this document, contact customer service at cs@panduit.com or 800-777-3300, reference Cisco Nexus 7010 Application Note (March 2009).

Cross-Connect Patching Topology

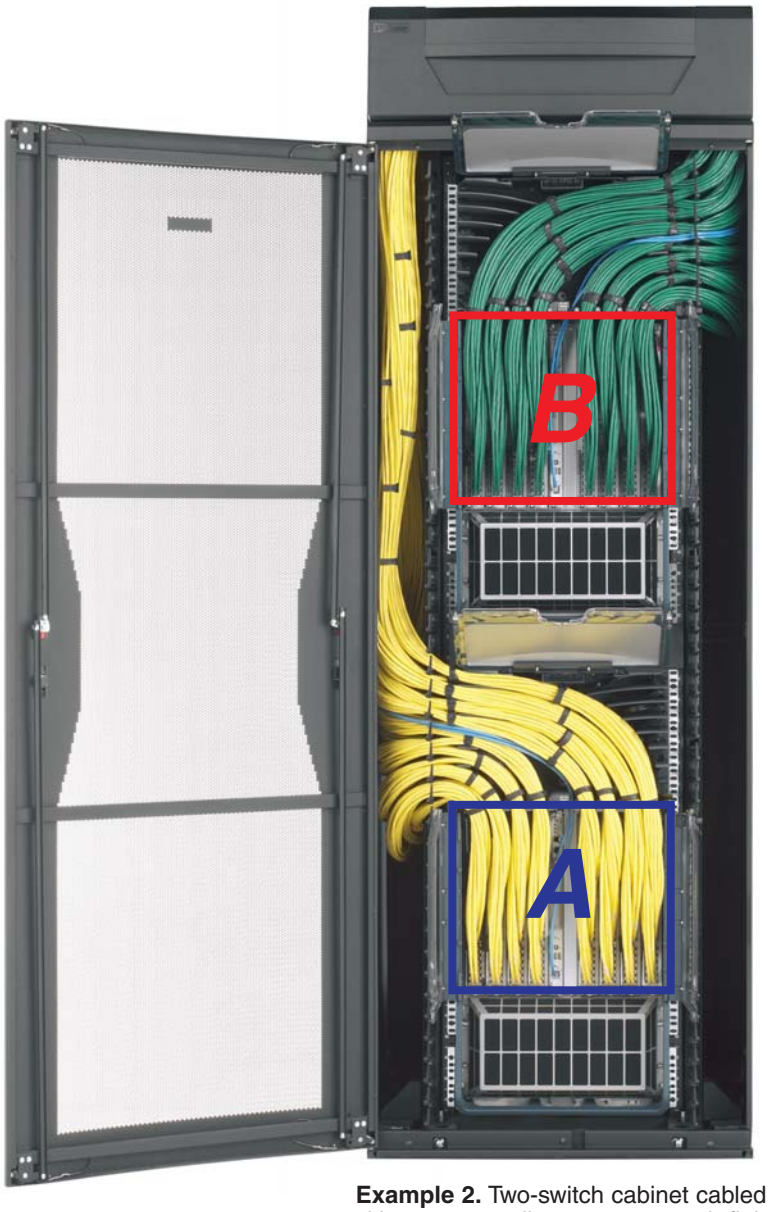
Cisco Nexus 7010 Switches can be placed within a *NET-ACCESS™* Cabinet with all "permanent link" copper cabling exiting the cabinet to a remote cross-connect patch field located in a different rack and/or cabinet.

When deploying the Cisco Nexus 7010 Switch in a cross-connect patching environment:

1. Cable copper (RJ45) line cards using Category 6A copper cabling to establish the "permanent link" between the switch cabinet and the "remote" cross-connect patch field cabinet or rack.

2. Use both sides of each *NET-ACCESS™* Cabinet vertical cable management pathways to separately route cables exiting the switch, creating a "Network A / B" layout.

3. Install "Out of Band Management," "Console," and/or "Link" connections by routing Category 6A or Category 6 copper patch cords from supervisor line cards (Slots 5 and 6) through designated switch cable manager slots and upward to Out Of Band Management patch panel.



Example 2. Two-switch cabinet cabled with copper media to remote patch field

Interconnect Patching Topology

In an interconnect topology a single Cisco Nexus 7010 Switch is placed in the bottom half of the *NET-ACCESS*™ Cabinet, with the associated patch field mounted in the top rack spaces. Category 6A copper patch cords connect the switch to the patch panels, and all "permanent link" copper cabling runs from the rear of the patch panels to remote patch fields located elsewhere in the data center.

Multiple *NET-ACCESS*™ Cabinets can be ganged together, creating a standardized network equipment row with Cisco Nexus 7010 Switches positioned at the bottom of each enclosure. With this configuration, in-cabinet patch fields may be split to create a "Network A/B" layout.

The interconnect layout requires that an equal number of copper cables be routed to the left and right of the switch to prevent cabling congestion in vertical pathways. It is recommended that 48-port angled patch panels be used such as *QUICKNET*™ Angled Patch Panels and *MINI-COM*® Angled Patch Panels to facilitate proper bend radius control and conserve rack space.

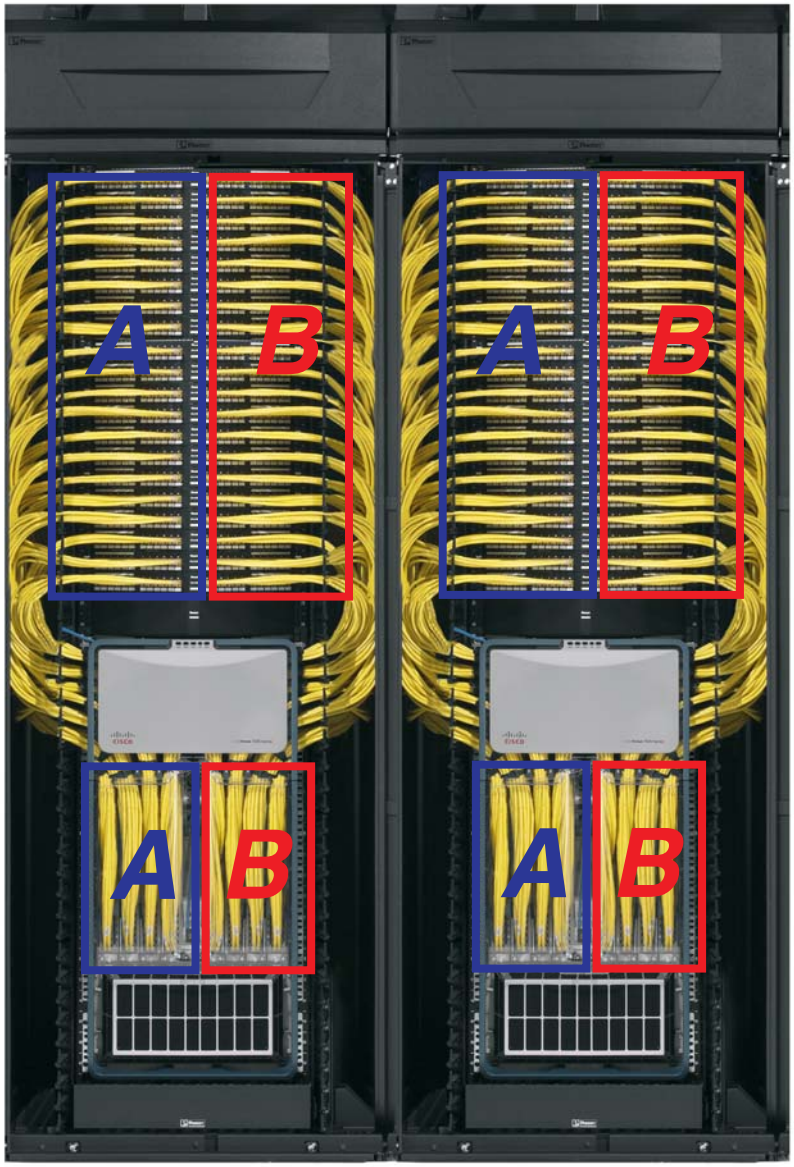
When deploying copper cabling with the Cisco Nexus 7010 Switch in an interconnect patching topology:

1. For line card Slots 1-4, route all copper cabling through the switch cable manager, transitioning bundles into left vertical space and then up to patching locations on the left side of the panel. Switch cable manager pathways can be utilized to minimize cable bundle size by placing 24 cables per slot.

2. For line card Slots 7-10, route all copper cabling through the switch cable manager, transitioning bundles into the right vertical space and then up to patching locations on the right side of the panel. Switch cable manager pathways can be utilized to minimize cable bundle size by placing 24 cables per slot.

3. Install "Out of Band Management," "Console," and/or "Link" connections by routing Category 6A or Category 6 copper patch cords from supervisor line cards (Slots 5 and 6) through designated switch cable manager slots and upward to Out Of Band Management patch panel.

Note: If not all line card slots are filled, it is critical to install blanking panels over empty patch panel locations to promote proper airflow and cooling.



Example 3. Two single-switch cabinets cabled with copper media to in-cabinet patch field

For more information about this document, contact customer service at cs@panduit.com or 800-777-3300, reference Cisco Nexus 7010 Application Note (March 2009).

V. Switch Enclosure Cabling Layouts: Fiber Optic Ports (SFP+ Connectors)

The Cisco Nexus 7010 Switch can be cabled with fiber optic data links in several different configurations depending upon installation requirements and topology layout preferences. This section describes how to cable the Cisco Nexus 7010 Switch with fiber optic media for both cross-connect and interconnect topologies.

Cross-Connect

- One switch per cabinet, cabled to a patch field in another location **(see Example 4)**
- Two switches per cabinet, cabled to a patch field in another location **(see Example 5)**

Interconnect

- One switch per cabinet, cabled to patch field within the same cabinet **(see Example 6)**
- One switch and patch field per cabinet, cabled to patch fields between two cabinets **(see Example 7)**

When deploying fiber optic line cards, first determine if a cross-connect or an interconnect patching topology will be used:

- **Cross-connect** topologies (patch cords from passive patch panel to passive patch panel) are preferred for locations where many service or application reconfigurations will be taking place. In dynamic data center environments, cross-connect topologies provide the routing and configuration flexibility to rapidly commission and decommission servers, reducing facility reconfiguration costs and cabling time. Also, configuration changes are made at patching connections isolated from active hardware, thus reducing the risk of inadvertent worker damage

- **Interconnect** topologies (patch cords from active switch port to passive patch panel) are utilized in locations where physical space is at a premium and limited moves, adds and changes will occur. Rack space is conserved by placing high-density patch fields in the same enclosure as the switch. Also, operational costs are reduced in these more static data center areas through fewer reconfiguration efforts and higher density connections.

If array-based connectivity is used (i.e., pre-terminated cassettes, MTP ribbon cables, pre-terminated trunk cables, hydra cable assemblies), extra care must be taken to ensure proper “Send” and “Receive” polarity throughout the duplex fiber optic link. For further information on maintaining polarity across fiber optic channels please refer to the *PANDUIT* white paper “Best Practices for Ensuring Polarity of Array-Based Fiber Optic Channels.” channel performance.

Note: Line card refreshes commonly occur every 3-5 years, whereas the typical life of a data center can reach 10-15 years, and with regular maintenance the facilities infrastructure and structured cabling are both expected to support multiple generations of IT equipment. It also is generally predicted that most (if not all) links in the data center will need to carry 10 Gb/s in the near future with certain critical “core” links supporting even faster data rates.

For these reasons a 10-Gigabit ready cabling infrastructure is recommended, with data center speed and reach requirements favoring the deployment of OM3 fiber optic links. OM3 has become the 50 µm fiber of choice for data center applications due to its ability to cost-effectively achieve10 Gb/s performance over distances out to 300m. For longer distances or future faster transport speeds, the deployment of OM4 multimode fiber or OS1/OS2 singlemode fiber should be considered.

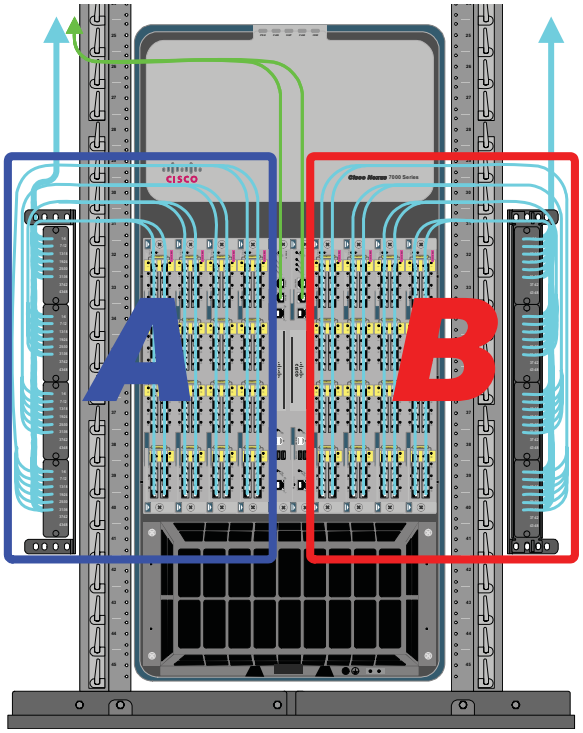
Cross-Connect Patching Topology

Cisco Nexus 7010 Switches can be placed within a *Net-Access*™ Cabinet with all “permanent link” fiber optic cabling exiting the cabinet to a remote cross-connect patch field located in a different rack and/or cabinet.

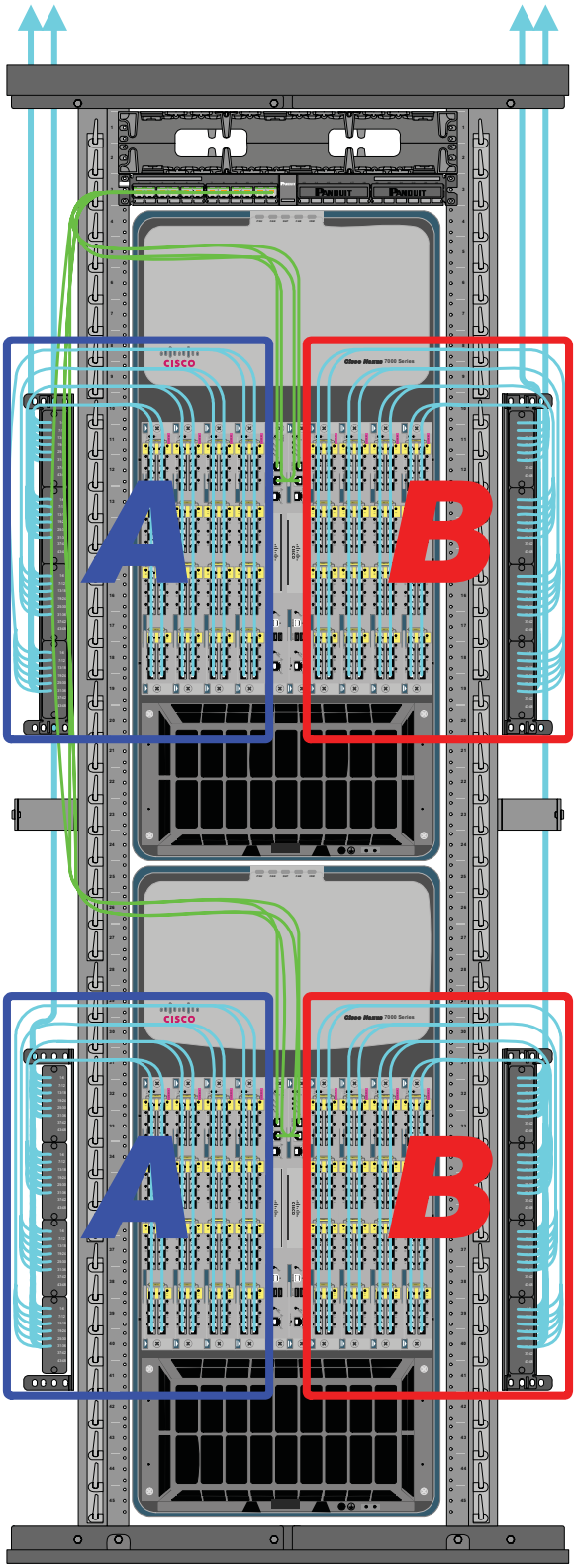
When deploying the Cisco Nexus 7010 Switch in a cross-connect patching environment:

1. Connect all fiber optic (SFP+) line cards to MTP fiber adapter panels (FAPs) located in 0RU brackets adjacent to each switch using hydra cable assemblies.
2. Run pre-terminated MTP ribbon cables or trunk cables from the rear of the MTP adapter FAPs to establish the “permanent link” between the switch cabinet and the “remote” cross-connect patch field cabinet or rack.
3. Install “Out of Band Management,” “Console,” and/or “Link” connections by routing Category 6A or Category 6 copper patch cords from supervisor line cards (Slots 5 and 6) through designated switch cable manager slots and upward to Out Of Band Management patch panel.

Note: Both sides of each Cisco Nexus 7010 Switch cable manager can be used to separately route cables exiting the switch to create a “Network A / B” layout.



Example 4. Single-switch cabinet cabled with fiber optic media to remote patch field



Example 5. Two-switch cabinet cabled with fiber optic media to remote patch field

Interconnect Patching Topology

In an interconnect topology a single Cisco Nexus 7010 Switch can be placed in the bottom half of the *NET-ACCESS™* Cabinet, with the associated interconnect patch field mounted in the top rack spaces. Discrete duplex LC-to-LC patch cords connect the switch to the patch panels, and all "permanent link" fiber optic cabling runs from the rear of the patch panels to remote patch fields located elsewhere in the data center.

Multiple *NET-ACCESS™* Cabinets can be ganged together, creating a standardized network equipment row with Cisco Nexus 7010 Switches positioned at the bottom of each enclosure. With this configuration, a "Network A" patch field may be created using the upper patch panels while a "Network B" patch field may be created with the lower patch panels. It is recommended that angled 48-port patch panels be used such as the *PANDUIT® QUICKNET™* Angled Patch Panel to conserve valuable rack space and accommodate potential future expansion of fiber line cards to 48 ports.

The interconnect layout requires that an equal number of patch cords from each line card be routed to both the left-hand and right-hand sides of the patch field. However, all cords should be routed to one side of the switch before transitioning up to the patch field; this prevents interweaving of patch cords across the face of the switch and patch panels.

When deploying fiber optic cabling with the Cisco Nexus 7010 Switch in an interconnect patching topology:

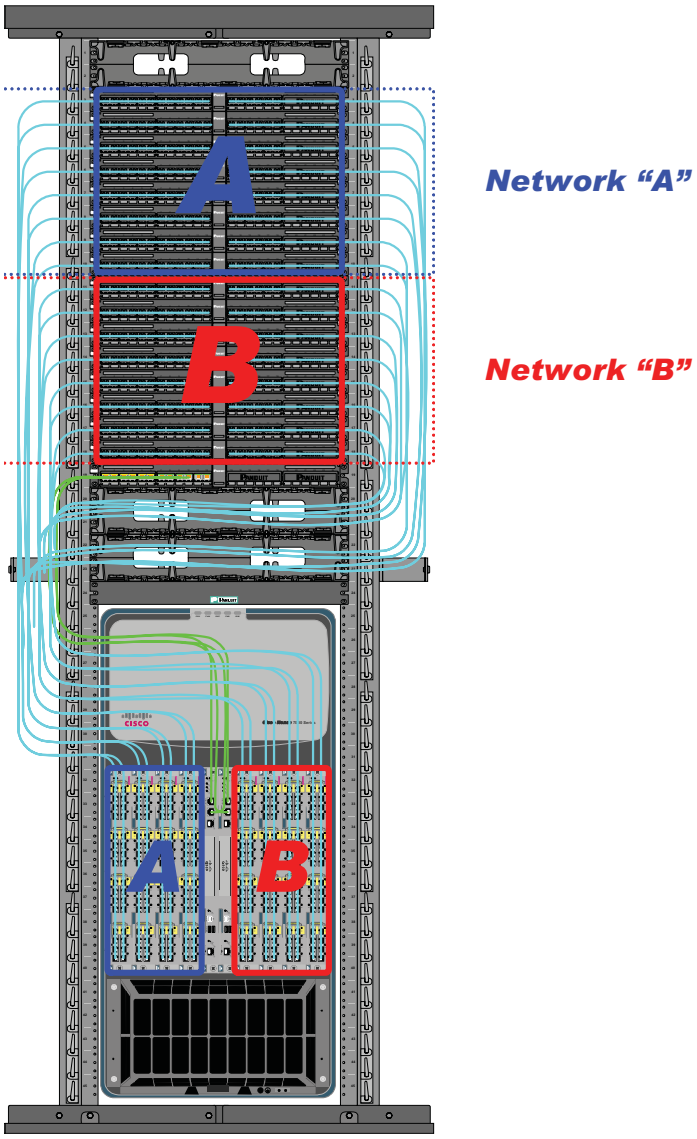
1. Route patch cords from line card Ports 1-12 through the switch cable manager to the left-hand vertical space, and then up to patching locations on the left side of the panel.

2. Route patch cords from line card Ports 13-24 through the cable manager to the left-hand vertical space, and then across a 2 RU *PANDUIT® NETMANAGER™* High Capacity Cable Manager and up to patching locations on the right side of the panel.

3. Route patch cords from line card Ports 25-32 through the switch cable manager and up to patching locations on the left side of the panel.

4. Install "Out of Band Management," "Console," and/or "Link" connections by routing Category 6A or Category 6 copper patch cords from supervisor line cards (Slots 5 and 6) through designated switch cable manager slots and upward to Out Of Band Management patch panel.

Note: It is critical to install blanking panels over empty patch locations on right side of panel, to promote proper airflow and cooling.



Example 6. Single-switch cabinet cabled with fiber optic media to in-cabinet patch field

VI. Switch Enclosure Cabling Layouts: Copper and Fiber Line Card Combinations

The Cisco Nexus 7010 Switch can be cabled with a combination of copper and fiber optic data links in several configurations depending upon installation requirements and topology layout preferences. This section describes how to cable the Cisco Nexus 7010 Switch with mixed media for an interconnect topology.

Cross-Connect

- One or two switches per cabinet, cabled to a patch field in another location **(see Examples 1-2 and 4-5)**

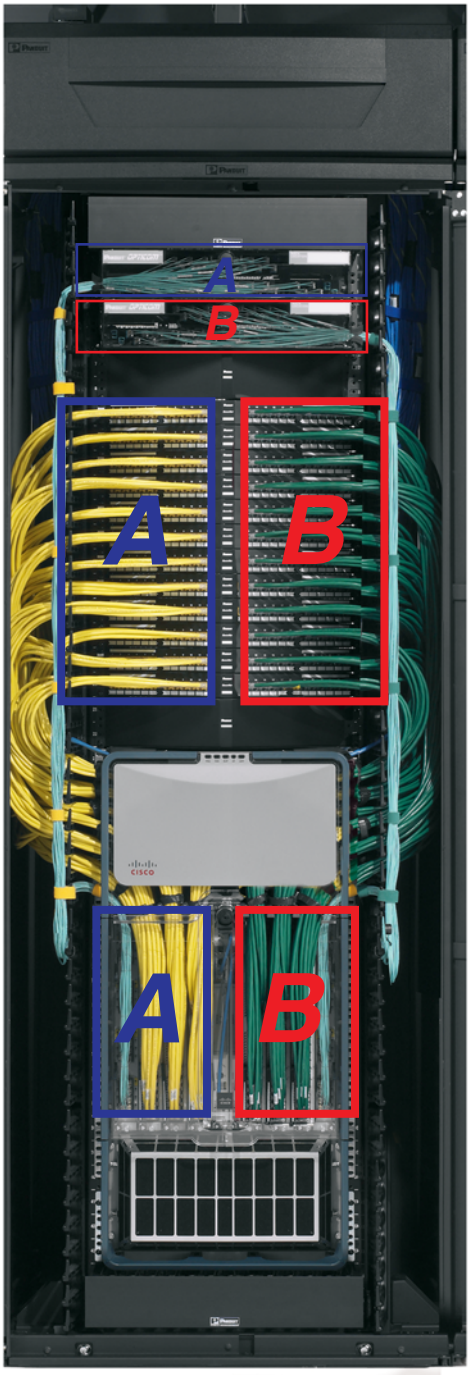
Interconnect

- One switch per cabinet, cabled to patch field within the same cabinet **(see Example 7)**
- One switch and patch field per cabinet, cabled to patch fields between two cabinets **(see Example 8)**

Both sides of the cable manager at the top of the switch should be used to provide cable pathway separation for "Network A/B" layout.

Note: Line card refreshes commonly occur every 3-5 years, whereas the typical life of a data center can reach 10-15 years, and with regular maintenance the facilities infrastructure and structured cabling are both expected to support multiple generations of IT equipment. It also is generally predicted that most (if not all) links in the data center will need to carry 10 Gb/s in the near future with certain critical "core" links supporting even faster data rates.

For these reasons a 10-Gigabit ready cabling infrastructure is recommended, with data center speed and reach requirements favoring the deployment of Category 6A copper and OM3 fiber optic links. The *PANDUIT® TX6A™ 10GIG™* UTP Copper Cabling System offers an innovative cable design and advanced connector compensation techniques to improve pathway capacity up to 30%, addressing the need for a smaller diameter Category 6A cable without compromising channel performance. Also, OM3 has become the 50 µm fiber of choice for data center applications due to its ability to cost-effectively achieve 10 Gb/s performance over distances out to 300m. For longer distances or future faster transport speeds, the deployment of OM4 multimode fiber or OS1/OS2 singlemode fiber should be considered.



Example 7. Single-switch cabinet cabled with mixed media to in-cabinet patch field

For more information about this document, contact customer service at cs@panduit.com or 800-777-3300, reference Cisco Nexus 7010 Application Note (March 2009).

Interconnect Patching Topology

In an interconnect topology a single Cisco Nexus 7010 Switch is placed in the bottom half of the *Net-Access*™ Cabinet, with the associated patch field mounted in the top rack spaces. The interconnect layout requires that an equal number of cables be routed to the left and right of the switch to prevent cabling congestion in vertical pathways.

Multiple *Net-Access*™ Cabinets can be ganged together, creating a standardized network equipment row with Cisco Nexus 7010 Switches positioned at the bottom of each enclosure. With this configuration, a "Network A/B" patch field may be created using one switch for each network (see Example 8). It is recommended that 48-port angled patch panels be used such as *QuickNet*™ Angled Patch Panels and *Mini-Com*® Angled Patch Panels to facilitate proper bend radius control and conserve rack space.

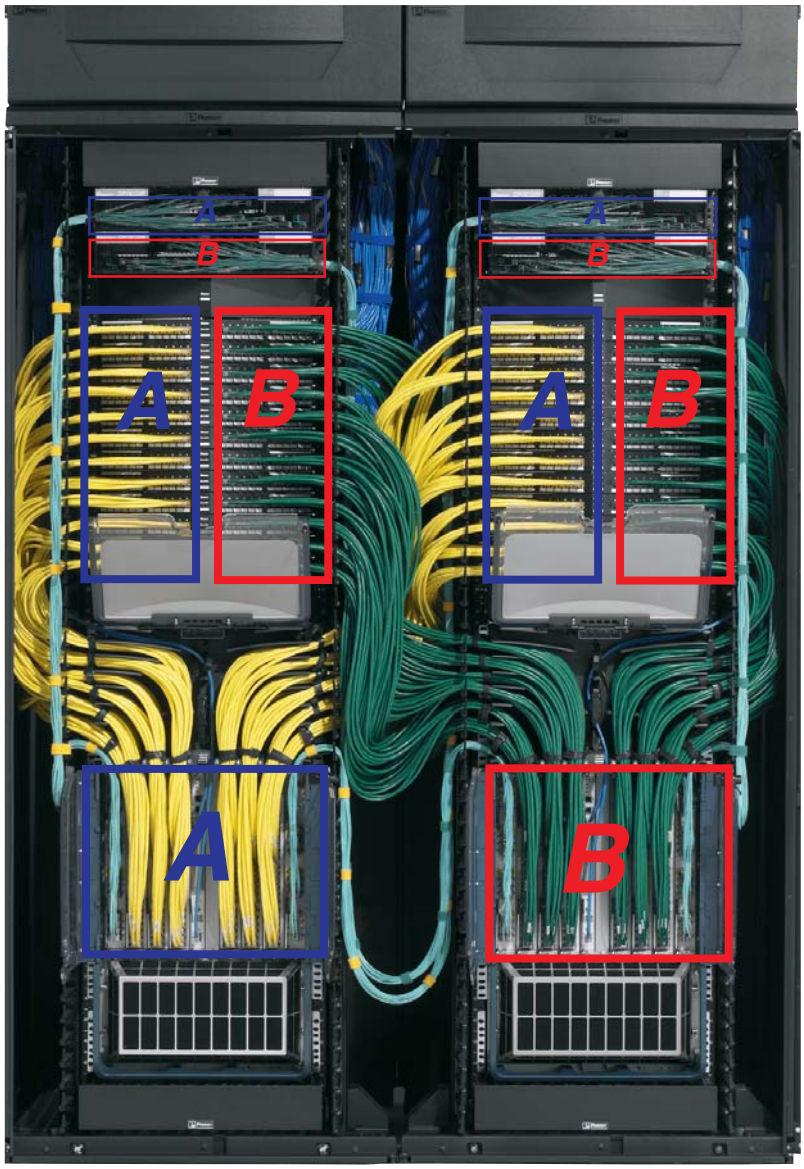
When deploying copper cabling with the Cisco Nexus 7010 Switch in an interconnect patching topology:

1. For line card Slots 1-4, route all cabling through the switch cable manager, transitioning bundles into left vertical space and then up to patching locations on the left side of the panel.

2. For line card Slots 7-10, route all cabling through the switch cable manager, transitioning bundles into right vertical space and then up to patching locations on the right side of the panel.

3. Install "Out of Band Management," "Console," and/or "Link" connections by routing Category 6A or Category 6 copper patch cords from supervisor line cards (Slots 5 and 6) through designated switch cable manager slots and upward to Out Of Band Management patch panel.

Note: If not all line card slots are filled, it is critical to install blanking panels over empty patch panel locations to promote proper airflow and cooling.



Example 8. Two one-switch cabinet cabled with mixed media to in-cabinet patch fields

List of Materials

To assist you in selection and ordering of *PANDUIT* products for deploying the Cisco Nexus 7010 Switch, this List of Materials reflects the parts referenced in this Application Note.

Note: Not all parts on this list will be required for every cabling configuration for the Cisco Nexus 7010 Switch. Be sure to visit http://www.panduit.com for a comprehensive offering of all *PANDUIT* accessories necessary to complete your layout.

Part Number	Description	Color
Cabinets		
CN2	*NET-ACCESS*™ Switch Cabinet	Black
CNPS	*NET-ACCESS*™ Switch Cabinet Side Panel	Black
CSVBP	*NET-ACCESS*™ Switch Cabinet Vertical Blanking Panel	Black
CNCSTR	*NET-ACCESS*™ Switch Cabinet Casters (set of 4)	Black
Cable Management		
PRV*	*NET-ACCESS*™ Vertical Cable Manager	Black
NMF2	*NETMANAGER*™ High Capacity Horizontal Cable Manager (2RU)	Black
SRB19BLY	Horizontal Cable Strain Relief Bar	Black
HLS-75R*	*TAK-TY*® Hook & Loop Cable Ties	Various
ERT2M-C20	Elastomeric Cable Ties	Black
CRB6BL	*NET-ACCESS*™ Overhead Cable Routing System Base Unit	Black
CRBRDGBL	*NET-ACCESS*™ Overhead Cable Routing System Bridge Insert	Black
CRTB	*NET-ACCESS*™ Overhead Cable Routing System Trapeze Bracket	Black
FR*****	*FIBERRUNNER*® Routing System	Yellow
Airflow Management		
DPFP*	Horizontal Flat Blanking Panel	Black
CPAF*BLY	Horizontal Angled Blanking Panel	Black
CPATCBL	Transitional Cover Plate for Angled Patch Panels (to block airflow between angled and flat 19” rack mount products)	Black
FAPB	*OPTICOM*® Blank Fiber Adapter Panel	Black
QPPBBL	*QUICKNET*™ Patch Panel Blank	Black
CMB**-X	*MINI-COM*® Blank Module	Various
Grounding		
RGCBNJ	*STRUCTUREDGROUND*™ Common Bonding Network (CBN) Jumper Kits	Green
RGEJ	*STRUCTUREDGROUND*™ Equipment Jumper Kit	Green
RGESD	Electrostatic Discharge (ESD) Port Kit	Black
RGESDWS	Electrostatic Discharge (ESD) Wrist Strap Kit	Black

Part Number	Description	Color
Copper Connectivity		
PUR6A04**-**	*TX6A™ 10GIG™* Category 6 UTP cable (1000 ft)	Blue or White
UTP6A**	*TX6A™ 10GIG ™* UTP Patch Cord (various lengths)	Various
UTPSP*Y	*TX6™ PLUS* UTP Patch Cord (various lengths)	Various
CJ6X88TG**	*MINI-COM® TX6A™ 10Gig™* UTP Jack Module	Various
CPPA48HDEWBL	*MINI-COM®* High Density Angled Patch Panel (48 port)	Black
QAPBCHJRXX10N	*QUICKNET™* Assembly (example part number references a10 ft assembly made of UTP, Category 6A, plenum, blue cable with a pre-terminated cassette containing off white jacks on one end and red jacks on the other end)	Blue
QAPP48HDBL	*QUICKNET™* Angled Modular Patch Panel (48 port, 1RU)	Black
QPPABL	*QUICKNET™* Patch Panel Adapter for *MINI-COM®* Modules	Black
EGJT	Enhanced *GIGA -TX™* Jack Tool	Aqua
TGJT	Enhanced *GIGA-TX™* Jack Tool for high volume installations	Black
Fiber Connectivity		
FXE10-10M*Y	LC to LC *OPTICOM® 10GIG ™*OM3 Multimode Duplex Patch Cord (various lengths)	Aqua
FADJLC*AQ-L	LC Sr./Jr. *OPTICOM®* Fiber Optic Adapters	Aqua
FAP*WAQLCZ	LC *OPTICOM®* Fiber Adapter Panels (FAPs) (aqua adapters, zirconia ceramic split sleeves)	Black
FRME	*OPTICOM®* Rack Mount Fiber Enclosure	Black
FCX*	*QUICKNET™ 10GIG™* MTP* Fiber Optic Cassettes, 50/125µm (OM3)	Black
FHPX126LM*	*QUICKNET™ 10GIG™* Hydra Cable Assemblies, Male MTP* to LC Duplex, 50/125µm (OM3)	Aqua
FX12D5-5M1Y	*QUICKNET™ 10GIG™* MTP* Interconnect Cable Assemblies, 50/125µm (OM3)	Aqua
FSPX*55F*A	*QUICKNET™ 10GIG™* MTP* Trunk Cable Assemblies, 50/125µm (OM3), various lengths	Aqua
FCE2U	*QUICKNET™* Rack Mount Fiber Cassette Enclosure	Black
QAPP48HDBL	*QUICKNET™* Angled Modular Patch Panel (48 port, 1RU)	Black
FEABRUA	*OPTICOM®* Zero RU Fiber Enclosure Adapter Panel Bracket (adhesive or magnetic mount)	Black
FEABRU	*OPTICOM®* Zero RU Fiber Enclosure Adapter Panel Bracket (screw mount)	Black

About *PANDUIT*

PANDUIT is a world-class developer and provider of leading-edge solutions that help customers optimize the physical infrastructure through simplification, increased agility and operational efficiency. *PANDUIT*'s *UNIFIED PHYSICAL INFRASTRUCTURE*SM (UPI) based solutions give Enterprises the capabilities to connect, manage and automate communications, computing, power, control and security systems for a smarter, unified business foundation. *PANDUIT* provides flexible, end-to-end solutions tailored by application and industry to drive performance, operational and financial advantages. *PANDUIT*'s global manufacturing, logistics, and e-commerce capabilities along with a global network of distribution partners help customers reduce supply chain risk. Strong technology relationships with industry leading systems vendors and an engaged partner ecosystem of consultants, integrators and contractors together with its global staff and unmatched service and support make *PANDUIT* a valuable and trusted partner.

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