

# cost-effective

stackable  
switching

## Product Brief

### Nortel Networks BayStack 425 Switches

#### Highlights

- Cost-effective stackable switching for small and medium enterprise customers
- Up to 384 10/100 Mbps ports for desktop switching in an 8-rack unit high design
- Plug-and-play stacking with built-in stacking ports
- Easy to use
- Flexible combo uplink ports for wiring closet or backbone connections
- Resilient uplink connectivity for minimal network downtime
- Easy Web-based management
- 1U high compact design with low power consumption
- Flexible stacking across BayStack 425 and 420 Switches—a stack is managed as a single entity with a single IP address

Small and medium businesses are faced with different challenges than larger enterprises. When it comes to networking equipment, they are looking for:

- Minimal time for set-up
- Plug-and-play capability
- Opportunities to improve employee productivity
- Potential for gaining competitive advantage
- Ability to save money

Nortel Networks BayStack\* 425 Switches have been designed to address the needs of small and medium customers. The switches help save money by allowing devices to be connected at either 10 Mbps or 100 Mbps without needing newer switches to accommodate different speeds. In addition, the switches are scalable and provide small and medium businesses (SMBs) with the comfort of knowing that their investment is protected as their company grows. Easy Web-based management features and plug-and-play stacking ports will save customers significant time in setting up the switches. Also, the switches' ease-of-use features require minimal technical expertise to configure them. For more details on Nortel Networks SMB solutions, please visit [www.nortelnetworks.com/smb](http://www.nortelnetworks.com/smb).

The BayStack 425 Switches are stackable 10/100 Mbps Layer 2 Ethernet switches featuring easy configuration and stackability, flexible choices for high-speed uplinks, and Web-based management from a Web browser. The BayStack 425 Switches have been architected to be Layer 3 and DiffServ capable via a software upgrade in the future.

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Combining high port density with low per-port pricing for a cost-effective switching solution, the BayStack 425 Switches are designed for small to medium-sized businesses and branch offices that consider price to be a predominant decision factor when acquiring advanced networking functionality such as:

- High-density, cost-effective stackable switching
- Flexible combo uplink port options
- Easy set-up

The BayStack 425 Switches are available in two models—the BayStack 425-24T Switch (*Figure 1*) and the BayStack 425-48T Switch (*Figure 2*).

The BayStack 425-24T Switch has 24 10BASE-T/100BASE-TX autosensing ports, 2 flexible combo uplink ports, and built-in stacking ports. It can be used standalone or in a stack of up to 8 switches that can be easily managed as a single unit, to get up to 192 10/100 Mbps ports. The BayStack 425-48T can also be used standalone or in a stack of up to 8 switches for up to 384 10/100 Mbps ports based on a future software release. Advanced features such as Distributed Multi-Link Trunking, IGMP Snooping, VLAN Trunking, and flexible management tools help efficiently manage the network traffic. BayStack 425 Switches are ideal stackable switching solutions for small and medium businesses needing performance and scalability at cost-effective prices (*Figure 3*).

Figure 1. The BayStack 425-24T switch



Figure 2. The BayStack 425-48T switch

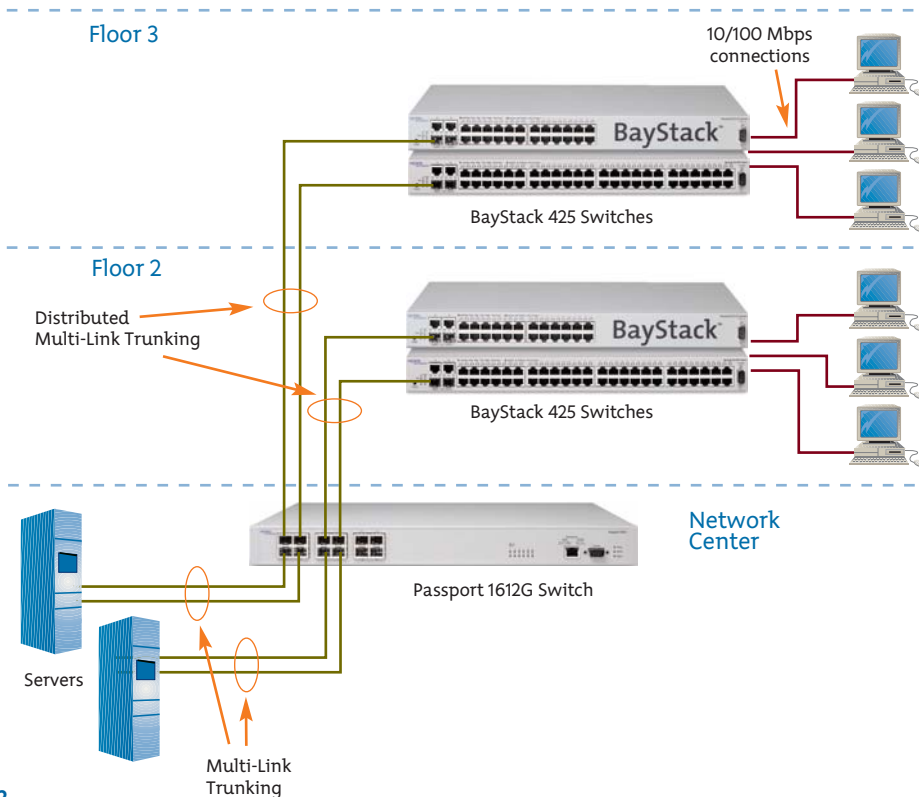


## Features and benefits

### Full autosensing on every port

Every UTP port on the BayStack 425 Switches is equipped with autosensing technology to automatically detect and support the speed and mode of a connected device. The ports determine whether a connected device is operating at 10 Mbps or 100 Mbps, and automatically adjust to the optimal speed. Each of the switched ports can also automatically detect and support full-duplex connections to servers, power-user end stations or other switches, as well as half-duplex connections to legacy NICs or hubs.

Figure 3. Small/medium business solution



### High-density stacking architecture

The plug-and-play cascade stacking architecture permits connection of up to 8 BayStack 425 Switches with stack cables (*Figure 4*) into a single manageable unit of up to 192 10/100 Mbps ports. With the BayStack 425-48T Switch, up to 384 10/100 Mbps ports can be achieved in a stack of eight units. Two built-in Gigabit stacking ports in the rear of the switch provide easy connections to other members of the stack; there is no need to purchase a cascade module or use an uplink port for stacking. This scalable architecture protects the network investment, as business needs change or grow, enabling a cost-effective “buy as you grow” strategy. When a BayStack 425-24T Switch is being stacked, one of the combo uplink ports (port 26) is turned off. When the stacking feature becomes available for BayStack 425-48T, combo port 50 will be turned off. Note that the BayStack 425-48T Switch cannot be stacked with itself or with BayStack 425-24T and BayStack 420-24T Switches. BayStack 425-48T Switch is standalone only; it will be

stackable with itself and BayStack 425-24T Switches in a future software release. Currently, BayStack 425-24T and BayStack 420-24T Switches can be stacked in any combination up to a maximum of eight units.

### Flexible high-speed uplink ports

The BayStack 425 Switches offer two built-in combo uplink ports (ports 25 and 26 of BayStack 425-24T and ports 49 and 50 of the BayStack 425-48T) in the front of the unit that provide high-speed connection to backbone switches or servers. Each combo port consists of one SFP (Small Form Factor Pluggable) GBIC (Gigabit Interface Converter) uplink port and one 10/100/1000BASE-T port (Figure 5). Each combo port autosenses between the SFP and the 10/100/1000BASE-T port. When the stacking ports are being used for stacking on the BayStack 425-24T Switch, combo port 26 is automatically turned off. When the stacking feature becomes available for BayStack 425-48T, combo port 50 will be automatically turned off. In a stack of eight BayStack 425 Switches, up to 8 uplink ports can be used.

### Wire-speed throughput

A 16 Gigabit per second (Gbps) switching fabric and ASICs support full 802.1d-compliant MAC Layer frame forwarding and filtering across all ports at wire-speed performance. The BayStack 425-24T Switch has a peak forwarding rate of 6.6 million packets per second and the BayStack 425-48T Switch has a peak forwarding rate of 10.1 million packets per second.

### BoSS (BayStack operating system Switching Software)

BoSS for BayStack 425 Switches is a single software image that is used for BayStack 425-24T, BayStack 420-24T, and BayStack 425-48T switches. Future versions provide new features and will be available for free for the lifetime of the switches. Other BayStack switches support a different version of BoSS.

BoSS version 3.1 is currently available from [www.nortelnetworks.com/support](http://www.nortelnetworks.com/support) and adds support for the following features:

- Support for BayStack 425-48T
- 255 VLANs support (BayStack 425 only)
- Custom Auto Negotiation Advertisements (CANA)

### Flexible stacking across BayStack 425 and 420 Switches

The BayStack 425-24T Switch can be stacked with the BayStack 420-24T Switch. A maximum of eight switches can be stacked together in any combination. BayStack 425-48T Switch will be able to stack with BayStack 425-24T Switch in a future software release.

### Simplified network operations

BoSS simplifies network operations by reducing the number of steps required for switch software updates. With BoSS, only a single image needs to be downloaded from Nortel Networks Web site for all BayStack 425 and 420 Switches. Loading the image to different switches is also considerably simplified. The image is loaded only to the base unit of the stack, which automatically loads it to other switches in the stack.

### Multi-Link Trunking

Multi-Link Trunking (MLT) enables grouping of links between a BayStack 425 Switch and another switch or a server to provide greater bandwidth with active redundant links. Nortel Networks unique Distributed Multi-Link Trunking (DMLT) feature allows trunked ports to span multiple units of the stack for redundant connectivity to mission-critical servers and the network center (Figure 4). The BayStack 425 Switches support up to 6 MLTs per switch or stack with up to 4 ports per MLT.

Figure 4. The plug-and-play architecture allows easy expansion, and management as a single unit



Figure 5. Each combo port auto-senses between 1 SFP uplink port and 1 10/100/1000BASE-T port



### **VLAN support**

Up to 255 port-based VLANs can be established for each switch, to extend the broadcast domain and segment network traffic for higher network efficiency. The 255 VLANs can be on a standalone switch or across a stack. IEEE 802.1Q VLAN Trunking is supported on every port of the switch, allowing efficient means of transporting broadcast domains across switches. VLANs reduce administration costs by simplifying network moves, adds, and changes.

### **Enterprise-sized MAC address table**

The BayStack 425 Switches support up to 8,000 MAC addresses to support ample scalability for growing networks to accommodate many attached devices and workgroups connected to each switch.

### **IGMP snooping**

The BayStack 425 Switches feature IP Multicast support by examining ('snooping') all Internet Group Multicast Protocol (IGMP) traffic in hardware at line rate, and filtering out (dropping) unwanted IGMP packets such as PING from disrupting the network or end-station performance.

### **Nortel Networks Command Line Interface (NNCLI)**

The NNCLI is used to automate general management and configuration of BayStack 425 Switches. The NNCLI is used through a Telnet session or through the serial port on the console.

### **ASCII configuration file**

BayStack 425 Switches can download a user-editable ASCII configuration file from a Trivial File Transfer Protocol (TFTP) server. The ASCII configuration file can be loaded automatically at boot time or on-demand using the management systems (console menus or CLI). Once downloaded, the configuration file automatically configures the switch or stack according to the NNCLI commands in the file. This feature allows the flexibility of creating command configuration files that can be used on several switches or stacks with minor modifications.

### **ASCII configuration file generator**

This feature works by reading the current configuration on the switch and generating the appropriate NNCLI commands to recreate that configuration. Basically, it provides the ability to view and store the switch configuration in a text, editable format. The generated file can be stored on an external server and also used to restore the switch configuration.

### **IEEE 802.1p priority queuing**

802.1p priority queuing is standards-based and enables priority to the order in which the switch forwards packets on a per-port basis. For example, if messages from a specific segment are crucial to the network, the switch port connected to that segment can be set to a higher priority level. Up to four queues can be set on the BayStack 425 Switch with IEEE 802.1p.

### **Spanning Tree Protocol**

Built-in support for Spanning Tree Protocol (IEEE 802.1D) detects and eliminates logical loops in the network. When multiple paths exist, the switch will automatically place some ports on standby to form a network with the most efficient traffic pathways, avoiding the continual looping of frames.

### **Custom Auto Negotiation Advertisements (CANAs)**

This feature enables the network manager to tune the capabilities that a particular Ethernet port can advertise via autonegotiation. The capabilities include half-duplex and full-duplex modes with speeds of 10, 100, and 1000 Mbps. Autonegotiated Ethernet ports establish a

connection based upon the highest common capabilities. This feature is implemented by using CLI commands and saves the network manager from having to go to each workstation and switch to configure a "fixed" speed.

## Network management

### Web-based management

Web-based network management makes managing the BayStack 425 Switch stack easy. Summary, configuration, fault, statistics, application, administration, and support pages can be provided for the entire stack. Real-time sampling provides up-to-date LED statistical information for stacked units. The Web interface also allows for static configuration of numerous parameters of the device. Plus, the stack can be managed as a single entity with one IP address.

### On-box management

Network management begins with the device. BayStack 425 Switches support four groups of Remote Monitoring (RMON) on all ports and are SNMPv3 compliant. The four groups of RMON are Alarms, Events, History, and Statistics. RMON2 support is achievable via port mirroring and the use of an external probe. The SNMP agent software resides in the switch and uses the information it collects to provide management for all ports in the stack providing comprehensive network monitoring capabilities.

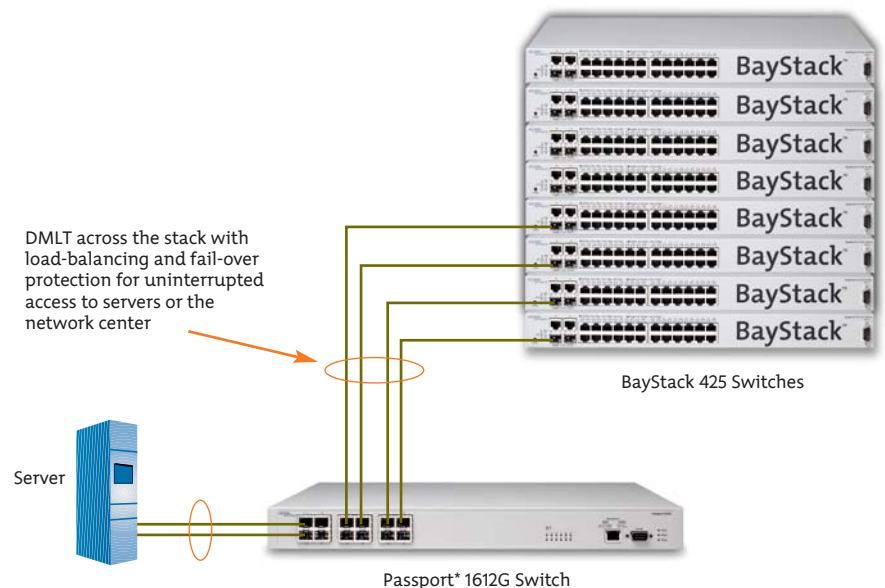
### Configuration management

The process of configuration begins with a single device but finishes across multiple devices. Java™ Device Manager is the device configuration tool for those functions that require communicating with a single device. It uses a common user interface and workflow that supports many Nortel Networks Ethernet switches. This commonality allows the network manager to become familiar with one tool instead of multiple tools. Optivity Switch Manager\* (OSM) is a Java-based, real-time, configuration management application for Nortel Networks Ethernet products including BayStack 425 Switches. It enables network managers to discover, view, and configure more than 500 network devices and their physical links on a topology map. Configuration is stored in NVRAM (Non-Volatile Random Access Memory).

### Fault management and resolution

With Optivity Network Management System (ONMS), the network manager has quick access to the information required to manage and isolate all network events on BayStack 425 switches. Tools, such as Physical Topology View, inform the network manager of how a particular event is affecting the physical connectivity within the network. The 'End Node Locate' tool provides the ability to locate a failing end node and, with one mouse click, provides access to the RMON statistics for the failing Ethernet port supporting that end node. These solutions provide visual and statistical tools necessary to quickly resolve network events or to manage performance in real-time. The BayStack 425 Switches support "syslog" capability that helps in troubleshooting network issues.

Figure 6. Distributed Multi-Link Trunking (DMLT) across a stack



### **Advanced management features**

BootP and TFTP support allows centralized switch IP address assignment, software upgrades, and SNMP agent updates over the network. The security feature uses the Remote Authentication Dial-In User Services (RADIUS) protocol to authenticate local console and TELNET logins.

### **Enhanced security**

The BayStack 425 Switches offer security features including Secure Shell (SSH) version 2, IEEE 802.1x based security, [also known as Extensible Authentication Protocol (EAP)], assignment of proper VLAN and priority, Simple Network Management Protocol (SNMPv3), MAC-address based security, and RADIUS authentication.

SSHv2 supports strong authentication and encrypted communications. It allows a user to log into the switch from an SSH client and perform a secure Telnet session using CLI commands. This feature is ideal for security conscious customers such as federal governments.

For added security, BayStack 425 Switches support the 802.1x-based security feature EAP. Based on the IEEE 802.1x standard, EAP limits access to the network based on user credentials. A user is required to “login” to the network using a username/password; the user database is maintained on the authentication server (not the switch).

EAP prevents network connectivity without password authorization for added security and control in physically non-secure areas. It is used where the network is not 100 percent physically secure or where physical security needs enhancement—for example, banks, trading rooms, or classroom training facilities. EAP supports client access to the network and inter-operates with Microsoft™ Windows XP and other compliant 802.1x clients.

SNMPv3 provides user authentication and data encryption for higher security. It also offers secure configuration and monitoring.

BaySecure MAC-address based security allows authentication of all access, not only to the switches for management and configurations, but also access to the infrastructure through these switches. This software feature limits access to only network authorized and trusted personnel, including full tracking of network connections. With BaySecure, network access is granted or denied via proper MAC-address identification (up to a maximum of 448).

The RADIUS-based security feature allows you to set up network access control using the RADIUS security protocol to authenticate local console and Telnet logins.

### **Port mirroring**

The port mirroring feature (sometimes referred to as ‘conversation steering’) allows the network administrator to designate a single switch port as a traffic monitor for a specified port. Port mirroring copies packets flowing into a specified port and sends the replicated data to the mirrored port for in-depth analysis of switched traffic patterns to trouble-shoot problems and optimize network configurations. Additionally, an external probe device can be attached to the designated monitor port.



### **User interface push-button**

The user interface push-button on the front panel is provided for ease of use in configuring the unit. It can be used for the purpose of base unit selection and for resetting the unit or the stack.

### **Common look and feel**

All BayStack switches, including the BayStack 425, have a common “look and feel” which reduces training costs. This allows the switches to be managed in a similar fashion via a broad set of management tools. These tools include Web, Java-based Device Manager (JDM), Command Line Interface (CLI), menus, Optivity Network Management System (ONMS), and Optivity Switch Manager (OSM).

### **Auto MDI/MDI-X**

BayStack 425 Switches can be connected to a hub or another switch quickly and cost-effectively. Instead of needing a crossover cable for this purpose, with the BayStack 425 Switch you can use either a crossover or straight through cable. When a cable is connected to one of the 10/100 ports on the switch, the switch port automatically detects the signal on the cable and configures itself. This feature eliminates the need for an MDI/MDI-X port; any port may be used for connection to a hub or switch.

### **Recovery configuration file support**

The configuration file feature allows for storing of switch or stack configuration parameters on a TFTP server. Configuration parameters can be retrieved automatically to configure a replacement switch or stack with the same configuration. For new installations or when a switch has failed, this feature saves time in reconfiguring another switch or stack.

### **Power and space savings**

Low power consumption of 46W results in lower operating costs. Compact one-rack unit high design allows for significant space and cost savings in the wiring closet.

### **LED indicators**

The LED indicators on the front panel make it easy to monitor the switch and port status and help in isolating and diagnosing switch problems.

### **Port naming alias**

This feature gives the ability to name, or specify a text string for, each port. It basically provides easy identification of the connected users.

### **Destination Address (DA) filtering**

DA filtering allows the use of the MAC address-based security feature (BaySecure) to configure the switch to drop all packets with specified MAC DAs. You can enter up to 10 specific MAC DAs you want filtered.

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## **Summary**

With more than 100 years in telecommunications, Nortel Networks is uniquely positioned to help your business reduce cost by combining voice and data into an integrated system. Why take a chance on a vendor that only understands part of the equation? Let us show you how the BayStack 425 Switches, along with other Nortel Networks products, can increase your profitability, streamline your business operations, increase productivity, and help you gain the competitive edge.

## Technical specifications

### Physical specifications

#### BayStack 425-24T Switch:

Weight: 3 kg (6.61 lb)  
Height: 4.37 cm (1.72 in)  
Width: 43.82 cm (17.25 in)  
Depth: 22.91 cm (9.02 in)

#### BayStack 425-48T Switch:

Weight: 3.1 kg (6.83 lb)  
Height: 4.37 cm (1.72 in)  
Width: 43.82 cm (17.25 in)  
Depth: 22.91 cm (9.02 in)

### Performance

Switch fabric bandwidth—16 Gbps

Frame forwarding rate—

BayStack 425-24T 6.6 million packets per second (Mpps)

BayStack 425-48T 10.1 million packets per second (Mpps)

Switched 10 Mbps forwarding rate—14,880 pps maximum

Switched 100 Mbps forwarding rate—148,810 pps maximum

Switched 1000 Mbps forwarding rate—1,488,810 pps maximum

Memory—32MB memory architecture shared by all ports

4MB Flash Memory

16MB SDRAM

Address database size—8,000 entries at line rate

Addressing—48-bit MAC address

Frame length—64 to 1518 bytes (IEEE 802.1Q Untagged)  
68 to 1522 bytes (IEEE 802.1Q Tagged)

### Interface options

10BASE-T/100BASE-TX

RJ-45 (8-pin modular) connectors for Auto MDI/MDI-X interface with auto-polarity

*The BayStack 425 Switches support the following SFP GBICs:*

1000BASE-SX

Uses short wavelength 850 nm MTRJ or LC type fiber optic connectors to connect devices over multimode (275m, 62.5um core or 550m, 50.0um core) fiber optic cable.

1000BASE-LX

Uses long wavelength 1300nm duplex LC type fiber optic connector to connect devices over single mode (10km, 9um core) fiber optic cable.

### Network protocol and standards compatibility

- IEEE 802.3 10BASE-T (ISO/IEC 8802-3, Clause 14)
- IEEE 802.3u 100BASE-TX (ISO/IEC 8802-3, Clause 25)
- IEEE 802.3u Autonegotiation on Twisted Pair (ISO/IEC 8802-3, Clause 28)
- IEEE 802.3x (Flow Control on the Gigabit Uplink ports)
- IEEE 802.3z Gigabit
- IEEE 802.1d MAC Bridges (ISO/IEC 10038)
- IEEE 802.1p (Prioritizing)
- IEEE 802.1Q (VLAN Tagging)
- IEEE 802.1D (Spanning Tree Protocol)
- IEEE 802.3ad (manual/static)
- IEEE 802.3ad (LACP)<sup>†</sup>
- IEEE 802.1s<sup>†</sup>
- IEEE 802.1w<sup>†</sup>

<sup>†</sup> Future software upgrade

### RFC support

- RFC 1213 (MIB-II); RFC 1493 (Bridge MIB); RFC 2863 (Interfaces Group MIB);
- RFC 2665 (Ethernet MIB); RFC 2737 (Entity MIBv2); RFC 2819 (RMON MIB);
- RFC 1757 (RMON); RFC 1271 (RMON); RFC 1157 (SNMP); RFC 2570 (SNMPv3);
- RFC 2571 (SNMP Frameworks); RFC 2573 (SNMPv3 Applications);
- RFC 2574 (SNMPv3 USM); RFC 2575 (SNMPv3 VACM); RFC 2576 (SNMPv3);
- RFC 2572 (SNMP Message Processing; RFC 791 (IP); RFC 792 (ICMP); RFC 793 (TCP); RFC 783 (TFTP); RFC 826 (ARP); RFC 768 (UDP); RFC 854 (TELNET); RFC951 (Bootp); RFC 2236 (IGMPv2); RFC 1112 (IGMPv1); RFC 1945 (HTTP v1.0); RFC 2138 (RADIUS); RFC 894 (IP over Ethernet); RFC 2674 (Q MIB)

### Environmental

Operating temperature: 0° to 40°C (32° to 104°F)

Storage temperature: -25° to 70°C (-13° to 158°F)

Operating humidity: 10 to 85% maximum relative humidity, noncondensing

Storage humidity: 10 to 95% maximum relative humidity, noncondensing

Operating altitude: Up to 3,024 m (10,000 ft.) above sea level

Storage altitude: Up to 3,024 m (10,000 ft.) above sea level

### Electrical

Input voltage (AC version): 100 to 240 VAC @ 47 to 63 Hz

Input power consumption (AC version): 46 W maximum

Input current (AC version): 2 A @ 120 VAC, 1 A @ 240 VAC

Maximum thermal output: 75 BTU/hour

### Safety agency approvals

- UL EN60950 (UL 1950 and CSA 22.2 No. 60950)
- IEC 60950/EN60950, CB report and certificate with all national deviations
- C22.2 No. 950 (CUL) with all national deviations
- UL-94-V1 flammability requirements for PC board
- NOM-019

### Electromagnetic emissions

Meets the following standards:

- US: CFR47, Part 15, Subpart B, Class A
- Canada: ICES-003, Issue 3, Class A
- Australia/New Zealand. AS/NZS 3548:1995, Class A, A1:1997/A2:1997 class A
- Japan: VCCI-V-3/02.04 class A
- Taiwan: CNS 13438, Class A
- Europe: EN55022:1998/A1:2000  
EN61000-3-2:2000  
EN61000-3-3:1995/A1:2001  
CISPR 22-1997/A1:2000 Class A

### Electromagnetic immunity

The BayStack 425-24T Switch and BayStack 425-48T meet the EN55024:1998/A1:2001 standard.

## Ordering information

Order number	Description
AL2012?41**	BayStack 425-24T Switch with 24 10BASE-T/100BASE-TX ports plus 2 built-in combo uplink ports and built-in stacking ports (includes rack mount kits)
AL2012?44**	BayStack 425-48T Switch with 48 10BASE-T/100BASE-TX ports plus 2 built-in combo uplink ports and built-in stacking ports (includes rack mount kit)
AL2018005^	BayStack 420/425 Stack Cable, short (30 cm)
AL2018006^	BayStack 420/425 Stack Cable, long (100 cm)
AL2011012	BayStack 425 Switch Rack Mount Kit
AA1419013	1-port 1000BASE-SX SFP GBIC (LC connector)
AA1419014	1-port 1000BASE-SX SFP GBIC (MT-RJ connector)
AA1419003	1-port 1000BASE-LX SFP GBIC (LC connector)
AL2011013	Console Cable for use with BayStack switches

\*\* The seventh character (?) of the switch order number must be replaced with the proper code to indicate desired product nationalization:

"A" – No power cord included

"B" – Includes European "Schuko" power cord common in Austria, Belgium, Finland, France, Germany, The Netherlands, Norway, and Sweden

"C" – Includes power cord commonly used in the United Kingdom and Ireland

"D" – Includes power cord commonly used in Japan

"E" – Includes North American power cord

"F" – Includes Australian power cord, also commonly used in New Zealand and the People's Republic of China

^ Stack cables are not included with the switches and need to be ordered separately. Stack configuration examples: For a stack of 8 switches, order 7 short cables and 1 long cable. Follow this method for stack of 3 or more switches. For a stack of two, order two short cables only.

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**[www.nortelnetworks.com](http://www.nortelnetworks.com)**

For more information, contact your Nortel Networks representative, or call 1-800-4 NORTEL or 1-800-466-7835 from anywhere in North America.

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