

Dell Powerconnect 2824 Manual



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NOTICE A NOTICE indicates either potential damage to hardware or loss of data and tells you how to avoid the problem. Reproduction in any manner whatsoever without the written permission of Dell Inc. Trademarks used in this text Dell, Dell OpenManage, the DELL logo, Inspiration, Dell Precision, Dimension, OptiPlex, PowerConnect, PowerApp, PowerVault, Axim, DellNet, and Latitude are trademarks of Dell Inc. Other trademarks and trade names may be used in this document to refer to either the entities claiming the marks and names or their products. Dell Inc. disclaims any proprietary interest in trademarks and trade names other than its own. March 4, 2012 Rev. A04 These PowerConnect devices are ideal for the small to medium business that requires high performance network connectivity along with advanced web management features. The PowerConnect management features are designed to minimize administrative management effort, while enhancing and improving network traffic control. System Description This section describes the hardware configurations of the PowerConnect 28xx. The switches are managed by Dell's OpenManage Switch Administrator. Head of Line Blocking Prevention Head of Line HOL blocking results in traffic delays and frame loss caused by traffic competing for the same egress port resource. HOL blocking queues packets, and the packets at the head of the queue are forwarded before packets at the end of the queue. By default, the device is configured so that the HOL blocking prevention mechanism is active at all times, except when QoS Quality of Service, Flow Control or Back Pressure is active on a port where the HOL blocking prevention mechanism is disabled on the whole system. Back Pressure Support On half duplex links, the receiving port prevents buffer overflows by occupying the link so that it is unavailable for additional incoming traffic. The user may enable or disable this feature on a per port basis. <http://mail.emeigroup.com/upload/innovation-oslo-manual.xml>

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Port advertisement allows the system administrator to configure the port speeds advertised. Jumbo Frames Support Jumbo frames are frames with an MTU Maximum Transmission Unit size of up to 10K bytes. The Jumbo Frames Support feature, utilizes the network optimally by transporting the same data using less frames. The main benefits of this facility are reduced transmission overhead and reduced host processing overhead. Jumbo frames are used for server to server transfers. Standard wiring for end stations is Media Dependent Interface MDI and the standard wiring for hubs and switches is known as Media Dependent Interface with Crossover MDIX. This feature is automatically enabled for the entire system and cannot be turned off by the user. Flow Control Support IEEE802.3X On Full Duplex links FDX, the flow control mechanism allows the receiving side to signal to the sending side that transmission must be halted temporarily, in order to prevent buffer overflows. Flow control is enabled by default. Virtual Cable Testing VCT VCT technology provides the mechanism to detect and report potential cabling issues, such as cable opens and cable shorts on copper links. Auto Learning MAC Addresses The switch enables MAC address auto learning from incoming packets. The MAC addresses are stored in the Bridging Table. Automatic Aging for MAC Addresses MAC addresses from which no traffic is received for a given period of time are aged out.

This prevents the Bridging Table from overflowing. VLAN-aware MAC-based Switching in Managed and Secure Modes In Managed or Secure mode, the switch system always performs VLAN-aware bridging. Classic bridging IEEE802.1D is not performed where frames are forwarded based only on their destination MAC address. However, a similar functionality may be configured for untagged frames. Addresses are associated with ports by learning them from the incoming frames source address. 802. http://www.morozovadance.ru/cite_imgs/innovative-millennium-user-manual.xml

1D Bridging in Unmanaged Mode In Unmanaged Mode, the switch performs classic bridging. Frames are forwarded based on their destination MAC address only, regardless of the VLAN tag. MAC Multicast Support Multicast service is a limited broadcast service, which allows one-to-many and many-to-many connections for information distribution. Layer 2 Multicast service is where a single frame is addressed to a specific Multicast address, from where copies of the frame are transmitted to the relevant ports. IGMP Snooping is supported, including IGMP Querier which simulates the behavior of a multicast router, allowing snooping of the layer 2 multicast domain even though there is no multicast router. When Multicast groups are statically enabled, you can set the destination port of registered groups, as well as define the behavior of unregistered multicast frames. Layer 2 Features Green Ethernet Green Ethernet, also known as Energy Efficient Ethernet, is an effort to make networking equipment environmentally friendly, specifically by reducing power usage of Ethernet connections. From the frame, the device identifies workstations configured for Multicast sessions, and which Multicast routers are sending Multicast frames. Port Mirroring The port mirroring mechanism monitors and mirrors network traffic by forwarding copies of incoming and outgoing packets from a monitored port to a monitoring port. Users can specify which target port receives copies of all traffic passing through one or more source ports. Storm Control Storm Control enables limiting the amount of Multicast, Broadcast and Unknown Unicast frames accepted and forwarded by the switch. When Layer 2 frames are forwarded, Broadcast and Multicast frames are flooded to all ports on the relevant VLAN. All nodes connected to these ports accept and attempt to process these frames, thus placing load on both the network links and the host operating system.

Dynamic VLAN Assignment DVA Dynamic VLAN Assignment allows automatic assignment of users to VLANs during the RADIUS server authentication. When a user is authenticated by the RADIUS server, the user is automatically joined to the VLAN configured on the RADIUS server. VLAN Supported Features VLAN Support VLANs are collections of switching ports that comprise a single broadcast domain. Packets are classified as belonging to a VLAN based on either the VLAN tag or based on a combination of the ingress port and package contents. Packets sharing common attributes can be grouped in the same VLAN. Port Based Virtual LANs VLANs Port-based VLANs classify incoming packets to VLANs based on their ingress port. Link Aggregation The PowerConnect 28xx switches support up to eight aggregated links. Each of the eight aggregated links may be defined with up to eight member ports to form a single Link Aggregated Group LAG. The Dynamic Host Configuration Protocol DHCP automates the assignment of IP addresses, subnet masks, default gateway, and other IP parameters. BootP and DHCP Clients DHCP Dynamic Host Configuration Protocol enables additional set-up parameters to be received from a network server upon system startup. DHCP service is an ongoing process. DHCP is an extension to BootP. The BootP client is operational if there is a corrupted or invalid software image. The BootP client then continuously attempts to find a BootP server, by sending BootP requests to all ports on the default VLAN, until a BootP server replies. The information replied is then used to provide the switch system with a TFTP server IP address and a download file name. The switch can then configure these values to the TFTP client and try to download a valid runtime image. Spanning Tree Protocol Features Spanning Tree Protocol STP 802.1d Spanning tree is a standard Layer 2 switch requirement that allows bridges to automatically prevent and resolve L2 forwarding loops.

<http://www.drupalitalia.org/node/71275>

Switches exchange configuration messages using specifically formatted frames and selectively enable and disable forwarding on ports. Fast Link STP can take up to 3060 seconds to converge. During this time, STP detects possible loops, allowing time for status changes to propagate and for relevant devices to respond. 3060 seconds is considered too long of a response time for many applications. The Fast Link option bypasses this delay, and can be used in network topologies where forwarding loops do not occur. IEEE 802.1w Rapid Spanning Tree Spanning Tree can take 3060 seconds for each host to decide whether its ports are actively forwarding traffic. Rapid Spanning Tree RSTP detects uses of network topologies to enable faster convergence, without creating forwarding loops. STP Root Guard Root guard restricts the interface from functioning as the root port for the switch. The underlying mechanism for supporting bandwidth management and control is based on the use of multiple priority queues for classifying traffic. The switches support four queues per port. A CoS is defined by the user, whereby packets are related to the same Class of Service. After a packet has been classified, it is assigned to one of the queues. The PowerConnect 28xx system can classify according to IPv4 information DSCP. No bandwidth reservations or limits are established or enforced. 802.1p is a spinoff of the 802.1Q VLANs standard. Ethernet Switch Management Features WebBased Management With a Webbased management interface, the Ethernet Switches' system can be managed from any Web browser. The system contains an Embedded Web Server EWS, which serves HTML pages, through which the system can be monitored and configured. TFTP Trivial File Transfer Protocol The PowerConnect 28xx switches support software boot image and software download through TFTP.

<http://percoraires.com/images/Craftsman-Briggs-And-Stratton-Platinum-700-Series-Manual.pdf>

Remote Monitoring Remote Monitoring RMON is an extension to the Simple Network Management Protocol SNMP, which provides network traffic statistics. RMON defines current and historical MAC Layer statistics and control objects, allowing realtime information to be captured across the entire network. The switches support one RMON group for Ethernet statistics. The system provides a means to collect the statistics defined in RMON and to view the results, using the Web management interface in the system. These ports support auto negotiation, duplex mode Half or Full duplex, and flow control. The combo 1000 Mbps optical ports can only operate at 1000 Mbps, full duplex mode. The following figures illustrate the front panels and back panels of the PowerConnect 28xx switches. Figure 21. PowerConnect 2808 Front Panel On the front panel there are eight ports which are numbered 1 to 8, top down and left to right. On each port there are LEDs Light Emitting Diode to indicate the port status. On the left side of the front panel is the Managed Mode LED which indicates the Ethernet switch operational status and the management mode. The Power LED on the front panel indicates whether the device is powered on or not. A Mode pushbutton, located on the right side on the front panel is used to transition between management modes and to reset the device. On each port there are LEDs to indicate the port status. On the left side of the front panel is the Managed Mode LED which indicates the Ethernet switch operational status and the management mode. The Power LED on the front panel indicates whether the device is powered on or not. A Mode pushbutton, located on the right side on the front panel, is used to transition between management modes and to reset the device. On each port there are LEDs to indicate the port status. There are two SFP Small Form-factor Pluggable ports, designated as ports 23 and 24, for fiber connection.

<http://www.gelbyson.com/images/Craftsman-Briggs-And-Stratton-Lawn-Mower-Owner-S-Manual.pdf>

NOTE Only one of the two physical connections of a combo port can be used at any one time. Port features and port controls are determined by the physical connection used. The system automatically detects the media used on a combo port, and utilizes the information in all the control

interfaces. NOTE The system can switch from the RJ45 to the SFP or vice versa without resetting the device. If both RJ45 and SFP ports are present, the SFP port will be the active port, whereas the RJ45 port will be disabled. On the front panel is the Managed Mode LED which indicates the Ethernet switch operational status and the management mode. The Fan LED indicates the device fan operations status, and the Power LED on the front panel indicates whether the device is powered on or not. A Mode pushbutton, located on the right side on the front panel is used to transition between management modes and to reset the device. On each port, there are LEDs to indicate the port status. There are four SFP Small Form-factor Pluggable ports, designated as ports 45, 46, 47 and 48, for fiber connection. On the top right side of the front panel is the Managed Mode LED which indicates the Ethernet switch operational status and the management mode. The Fan LED indicates the device fan operation status, and the Power LED on the front panel indicates whether the device is powered on or not. A Mode pushbutton is provided on the side panel. The back panel contains an AC Power Supply Interface. The following table describes the Power Supply status LED indications. Managed Mode LED On the PowerConnect 28xx front panel there is a Managed Mode LED monitoring the switch node as well as indicating diagnostic test results. The following table describes the Managed Mode LED indications. The following table describes the fan status LED indications. Off The switch is not turned on. Table 22.

Managed Mode LED Indications

LED Color	Description
Green Flashing	Indicates diagnostics in progress, firmware loading, or Management Mode transition.
Green Solid	Indicates the switch is in Managed Mode.
Amber Solid	Diagnostics has failed.
Amber Flashing	No valid image.
Off	Indicates Unmanaged mode or Secure mode.

Table 23. Fan LED Indications

LED Color	Description
Green Solid	All fans are operating correctly.
Red Solid	One or more fans have failed.

The Mode button is for changing between Managed Mode and Unmanaged or Secure Mode and for resetting the device. To transition between modes, press the button normally. To reset the device, press and hold the button for at least 7 seconds. Switch Ventilation Fan The PowerConnect 2848 switch has three fans and the PowerConnect 2824 switch has one fan for system ventilation.

Green Flashing The port is transmitting or receiving data at 1000 Mbps. Amber Solid The port is linked at either 10 or 100 Mbps. Amber Flashing The port is transmitting or receiving data at 10 or 100 Mbps. Off No link is established. Right LED Green Solid The port is currently transmitting in Full Duplex mode. Off The port is operating in Half Duplex mode. Table 25. SFP LED Indications

LED Color	Description
Green Solid	Link is established.
Green Flashing	Activity is occurring.
Off	No link is established.

Copper cable diagnostics are supported. Highspeed workstations, hubs, routers, or other switches are connected through standard RJ45 connectors to the switch physical interface ports, located on the front panel. For each device, the supported mode is set to Half Duplex, Full Duplex, and Auto. 100BASE-T Cable Requirements All Category 5 UTP cables that are used for 100BASE-TX connections also operate with 100BASE-T, provided if all four wire pairs are connected. However, it is recommended that enhanced Category 5 Category 5e cable is used for all critical connections or any new cable installations.

The following figure illustrates the RJ45 pin connector pin numbers. Only one of the two physical connections of a combo port can be used at any time. The system can switch from the RJ45 to the SFP or vice versa without a system reset. The system automatically detects the media used on a combo port, and utilizes this information in the control interfaces. PowerConnect 2824 switch supports SFP diagnostics. The optical transceiver provides access to a set of parameters that can be monitored and displayed to the system administrator. NOTE If both RJ45 and SFP ports are present, the SFP port will be the active port, whereas the RJ45 port will be disabled and ignored. Internal Power Supply Connector The PowerConnect 28xx supports a single internal power supply to provide power for switching operations. The internal power supply supports input voltages between 100 and 240 V AC. The AC power connector is located on the back panel of the switch. 15 Receiver power supply 16 Transmitter power supply 17 Transmitter ground common with receiver

ground 18 Transmitter noninverted data in 19 Transmitter inverted data in 20 Transmitter ground common with receiver ground Table 28. SFP Pin Connections Pin No Use Installation Precautions CAUTION Before performing any of the following procedures, read and follow the safety instructions located in the System Information Guide included in the Dell Documentation. Do not service any device except as explained in the system documentation. Opening or removing covers marked with a triangular symbol with a lightning bolt may cause electrical shock. To determine the possibility of overloading the supply circuits, add together the ampere ratings of all switches installed on the same circuit as the device. Verify that water or moisture cannot enter the device case. Report any damage immediately. CAUTION Disconnect all cables from the device before mounting the device in a rack or cabinet.

CAUTION When mounting multiple devices into a rack, mount the devices from the bottom up. Install the device in a rack as follows 1 Place the supplied rackmounting bracket on one side of the device ensuring the mounting holes on the device line up to the mounting holes on the rack mounting bracket. The following figure illustrates where to mount the brackets. Fasten the lower pair of screws before the upper pair of screws. Ensure that the ventilation holes are not obstructed. Installing on a Flat Surface The device must be installed on a flat surface if it is not installed on a rack. The surface must be able to support the weight of the device and the device cables. 1 Attach the self adhesive rubber pads provided with the device on each marked location on the bottom of the chassis. 2 Set the device on a flat surface, while leaving 2 inches 5.08 cm on each side and 5 inches 12.7 cm at the back. 3 Ensure that the device has proper ventilation. Ensure that the ventilation holes are not obstructed. Figure 33. Mounting Device on a Wall Connecting the Device to the Network To connect to an uplink port, use Category 5 Unshielded Twisted Pair UTP cables with RJ45 connectors at both ends. Standard straightthrough twisted pair cables can be used to connect to any other Ethernet network systems, servers, switches or routers that supports autonegotiation. NOTE Do not plug a phone jack connector into an RJ45 port. This will damage the Ethernet device. Use only twisted pair cables with RJ45 connectors that conform to FCC standards. NOTE If auto negotiation is turned off on the ports, a straight through cable must be used. To connect the device to the network 1 Attach one end of a Twisted Pair cable to the device's RJ45 connector and the other end to a switch or server. 2 Make sure each twisted pair cable does not exceed 328 feet 100 meters in length.

As each connection is made, the link LED corresponding to each port on the device is illuminated green or amber indicating that the connection is valid. The console port enables a connection to a terminal desktop system running terminal emulation software for monitoring and configuring the device. The Console port connector is a male DB9 connector, implemented as a data terminal equipment DTE connector. To connect a terminal to the device Console port, perform the following 1 Connect the supplied RS232 crossover cable to the terminal running VT100 terminal emulation software. 2 Ensure that the terminal emulation software is set as follows a Select the appropriate serial port serial port 1 or serial port 2 to connect to the console. Ensure that the setting is for Terminal keys not Windows keys. With Windows 2000 Service Pack 2, the arrow keys function properly in HyperTerminal's VT100 emulation. Go to www.microsoft.com for information on Windows 2000, Windows XP, and Windows Vista service packs. 3 Connect the female connector of the RS232 crossover cable directly to the device Console port on the device, and tighten the captive retaining screws. The Console port is located on the back panel. Connecting to Console Port Connecting a Device to a Power Supply 1 Connect the supplied standard AC power cable to the AC connector on the back panel. 2 Do not connect the power cable to a grounded AC outlet at this time. Connect the device to a power source in the steps detailed in Starting and Configuring the Device. Port Connections, Cables, and Pinout Information This section explains the device's physical interfaces, and provides information about port connections. Connector types, ports and cables are summarized in Ports, Connectors, and Cables. Copper Cable and Optical Transceiver Diagnostics

are supported.

To establish a link for the twisted pair ports, Tx pair on one cable end must be connected to the Rx pair on the other cable end, and vice versa. If the cabling is done such that Tx on one end is wired to Tx on the other end, and Rx is wired to Rx, a link is not established. When selecting cables to connect the device ports to their networking peers, straight through cables must be used to connect the device to a station, and crossover cables must be used to connect one transmission device switch or hub to another. Both the straight through and crossover cables are category 5. After a port is connected, its LINK indication LED is lit. Autonegotiation is enabled per port by default. Autonegotiation is a mechanism established between two link partners to enable a port to advertise its transmission rate, duplex mode and flow control the flow control by default is enabled abilities to its partner. The ports then both operate at the highest common denominator between them. If connecting a NIC that does not support autonegotiation or is not set to autonegotiation, both the device switching port and the NIC must be manually set to the same speed and duplex mode. The feature is part of the Autonegotiation and is enabled when Autonegotiation is enabled. By default, this feature is enabled. It can be enabled per port. The flow control mechanism allows the receiving side to signal to the transmitting side that transmission must temporarily be halted to prevent buffer overflow. Back Pressure The device supports back pressure for ports configured to half duplex mode. By default, this feature is disabled. The back pressure mechanism prevents the transmitting side from transmitting additional traffic temporarily. The receiving side may occupy a link so it becomes unavailable for additional traffic. NOTE The PowerConnect 2808 has an internal serial port. NOTE Before proceeding, read the release notes for this product.

The release notes can be downloaded from [http://www.dell.com/support/manuals](#). It is recommended that you obtain the most recent revision of the user documentation from the Dell support website at [http://www.dell.com/support/manuals](#). NOTE If the device is to be used as an unmanaged switch, there is no need for a terminal connection. A terminal connection is only required if the device is to be used in Managed mode. Figure 41 provides an overview of the device initialization process. By default, the device is in Unmanaged mode. Connect Device and Console Power On Suspend Bootup Yes Press Esc Startup Menu Special Functions Reboot No Loading Program from flash to RAM Enter Wizard Yes No Initial Configuration IP Address, Subnet mask, Users Basic Security Configuration Wizard Configuration Process Advanced Configuration IP Address from DHCP Standard Device Installation Advanced Device Installation Hardware Setup The Managed Mode LED shows the current mode. In Device reboots in Managed mode. Note See details below regarding restore default configuration page on PC 2808 User presses Managed Mode button for less than 7 seconds. User selects Web option to go to Secure mode. Remove management IP from switch it is no longer manageable. Device reboots in Unmanaged mode and switch operates as a true unmanaged switch Managed Mode LED is OFF. User presses Managed Mode button. Device reboots in Managed mode. Note See details below regarding restore default configuration page on PC 2808 This page can be used to retrieve a saved configuration. See Figure 42 for a description of how to enter the Managed mode In managed mode, the boot procedure can be monitored on the connected terminal as follows 1 Ensure that the device console port is connected to a VT100 terminal device or VT100 terminal emulator via the RS232 crossover cable. 2 Locate an AC power receptacle. 3 Deactivate the AC power receptacle. 4 Connect the device to the AC receptacle. 5 Activate the AC power receptacle.

When the power is turned on with the local terminal already connected, the device goes through Power On Self Test POST. POST runs every time the device is initialized and checks hardware components to determine if the device is fully operational before completely booting. If a critical problem is detected, the program flow stops. If POST passes successfully, a valid executable image is loaded into RAM. POST messages are displayed on the terminal and indicate test success or failure. 6 The boot process begins running in less than 45 seconds when in Unmanaged mode and

approximately 90 seconds when in other modes. Initial Configuration Through the Setup Wizard To configure the device, it must be in Management mode. NOTE The switch is factoryset in Unmanaged Mode. To set the switch to Managed mode, press the Mode button for up to 7 seconds. The Setup Wizard guides you through the initial switch configuration, and gets you up and running as quickly as possible. You can skip the setup wizard, and enter CLI mode to manually configure the switch. The system will prompt you with a default answer; by pressing enter, you accept the default. You must respond to the next question to run the setup wizard within 60 seconds, otherwise the system will continue with normal operation using the default system configuration. You can use Dell Network Manager or CLI to change this setting, and to add additional management systems. For more information on adding management systems, see the user documentation. This account is used to login to the CLI, Telnet and Web interface. You may setup other accounts and change privilege levels later. For more information on setting up user accounts and changing privilege levels, see the user documentation. To setup a user account Configuring user account. Configuring IP and subnet. Thank you for using Dell Easy Setup Wizard.

Initial Configuration Through the Web The administrator can choose to perform device configuration via the web management instead of through the Setup wizard. Basic Configuration To configure a device whose configuration is empty via web management, perform the following steps The device is configured. Retrieving an IP Address From a DHCP Server The device can be set to receive its IP address from a DHCP server. In this case, the configuration received from the DHCP server includes the IP address, and might include subnet mask and default gateway. When using the DHCP protocol to retrieve an IP address, the device acts as a DHCP client. When the device is reset, the DHCP command is saved in the configuration file, but not the IP address. The diagnostics procedures are for use by technical support personnel only and are not disclosed in the document. The Startup menu can be entered when booting the device, user input must be entered immediately after the POST test. ICache 8 KB. DCache 8 KB. Cache Enabled. Autoboot in 2 seconds press RETURN or Esc. This default value can be changed through CLI. Software Download The software download procedure is performed when a new version must be downloaded to replace the corrupted files, update or upgrade the system software. The following prompt appears Downloading code using XMODEM 2 When using the HyperTerminal, click Transfer on the HyperTerminal Menu Bar. 3 In the File name field, enter the file path for the file to be downloaded. 4 Ensure that the Xmodem protocol is selected in the Protocol field. 5 Press Send. The software is downloaded. NOTE After software download, the device reboots automatically. NOTE The length of time taken by the download varies according to the tool used. Erase FLASH File In some cases, the device configuration must be erased. If the configuration is erased, all parameters configured via CLI, EWS or SNMP must be reconfigured.

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