Cisco Nexus 7700 Power Supplies

The Cisco Nexus® 7700switches are the latest extension to the modular Cisco Nexus 7000 Series Switches. The Cisco Nexus 7700 switches have operational and feature consistency with the existing Cisco Nexus 7000 Series Switches, using a common system architecture, the same application-specific integrated circuit (ASIC) technology, and the same proven Cisco® NX-OS Software releases.

The Cisco Nexus 7700 AC and DC power supply modules (Figures 1 and 2) deliver fault tolerance, high efficiency, load sharing, and hot-swappable power features to the Cisco Nexus 7700 switches. The Cisco Nexus 7700 switches use 3.0-kilowatt (kW) power supplies that are 90 percent efficient or greater, so less power is dissipated as heat, and more power is available to the system to use than with typical power supplies. The high-efficiency 3.0-kW power supplies allow a smaller power configuration and provide flexible power provisioning.

The maximum output for the 3.0-kW AC power supplies is 1400 or 3000 watts (W) if input power is 110 or 220 VAC respectively, and the dual input 3.0-kW DC power scale is 1500 or 3000W if one or two inputs respectively are active. Both the AC and DC versions support multiple system-level redundancy options for greater availability. Designed to address high-availability requirements, the power supplies incorporate internal component-level monitoring, temperature sensors, and intelligent remote-management capabilities.

The power supplies are fully hot swappable, helping ensure no system interruption during installation or upgrades. They are fitted at the bottom front of the Cisco Nexus 7700 chassis, allowing installation and removal without disturbing the network cabling of the I/O modules.

Figure 1. Cisco Nexus 7700 3.0-kW AC Power Supply Module

Figure 2. Cisco Nexus 7700 3.0-kW DC Power Supply Module

Cisco Nexus 7700 3.0-kW AC Power Supply

The 3.0-kW AC power supply module for the Cisco Nexus 7700 switch is a single 20-ampere (A) AC input power supply. Connection to high line nominal voltage (220 VAC) will produce a power output of 3000W. Connection to low line nominal voltage (110 VAC) will produce a power output of 1400W. Table 1 shows the available power output for the input options.

Table 1. Available Output Based on Input Power

Number of Inputs	Input Power	Output
Single input	220 volts (V)	3000W
	110V	1400W

Cisco Nexus 7700 3.0-kW DC Power Supply

The 3.0-kW DC power supply has two isolated input stages, each delivering up to 1500W of output power. Each stage uses a -48V DC connection. The power supply will deliver 1500W when only one input is active and 3000W when two inputs are active.

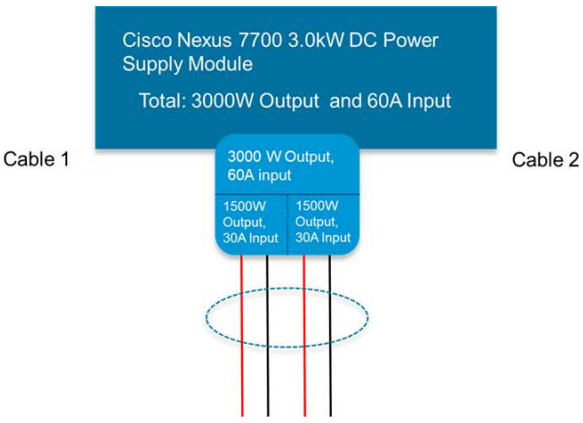
Table 2 shows the available power output for the input options.

Table 2. Available Output Based on Input Power

Number of Inputs	Input Power	Output
Single input	–48V	1500W
Dual input	–48V	3000W

Figure 3 shows the connections to the power supply inputs.

Figure 3. Cisco Nexus 7700 3.0-kW DC Power Supply Module Connections and Power Ratings



Cisco Nexus 7700 Platform Power Supply Redundancy

The power supplies on the Cisco Nexus 7700 chassis provide multiple load sharing and fault tolerance and are hot swappable. A maximum of 4 power supplies are supported on the Cisco Nexus 7700 6-Slot Switch, a maximum of 8 power supplies are supported on the Cisco Nexus 7700 10-Slot Switch, and a maximum of 16 power supplies are supported on the Cisco Nexus 7700 18-Slot Switch. The 4, 8, and 16 power supply bays for the 6-slot, 10-slot, and 18-slot Cisco Nexus 7700 platform chassis, respectively, are designed for future growth.

Use of multiple smaller power supplies provides flexible power provisioning and redundancy in the event of power supply failure. These power supplies also support grid redundancy to allow for grid failure or failure of facility components such as an uninterruptible power supply (UPS) or a circuit breaker.

Cisco Nexus 7700 systems can operate in four user-configurable power-redundancy modes, summarized in Table 3, to meet the redundancy needs of the environment.

Table 3. Power-Redundancy Modes

Redundancy Mode	Description
Combined	This mode does not provide redundancy. The power available to the system is the sum of power outputs of all power supplies in the chassis.
Power supply redundancy (N+1)	This mode guards against failure of one of the power supplies. The redundant power available to the system is the sum of the all power outputs less one of the maximum-rated power supplies.
Input source redundancy (grid redundancy)	This mode guards against failure of one power supply or input circuit (grid), with at least half the power supplies connected to a different independent AC or DC feed. The power available to the system is the minimum power from both the grids. If one of the power supplies fails, the operational power redundancy mode changes to combined mode.
Power supply and input source redundancy (full redundancy)	This mode guards against failure of one power supply or one grid. The power available is the minimum power from the input source and power supply redundancy. If one of the power supplies fails, the operational power redundancy mode changes to the power supply redundancy (N+1) mode.

The total amount of power available to the Cisco Nexus 7700 switch depends on the type of power supplies installed and the configured power supply redundancy mode. The 3.0-kW AC power supply supports operation with 110 and 220V, which results in different levels of output power for the different redundancy modes. The 3.0-kW DC power supply supports single or dual input, which results in different levels of output power for the different redundancy modes.

Features and Benefits

Table 4 summarizes the features and benefits of the Cisco Nexus 7700 3.0-kW AC power supply modules.

Table 4. Features and Benefits of Cisco Nexus 7700 3.0-kW AC Power Supply Modules

Feature	Benefit
Universal input (110 to 240 VAC and 50 to 60 hertz [Hz])	Flexibility to provision circuits with either high-input voltage (200 to 240V) or low-input voltage (100 to 120V), depending on availability and power output needs
Energy efficient	More than 90% efficient to reduce power waste even at low loads (achieved 80 Plus® Platinum Certification; for more information, go to http://www.80plus.org)
Compatible with all Cisco Nexus 7700 switches	Provides investment protection and ease of sparing across different members of the product family
Hot swappable	Enables continuous system operations; no downtime when replacing power supply (assuming that the remaining power supplies can provide enough power to support the system)
Temperature sensors and instrumentation	Measures internal temperature and shuts down the power supply if temperature exceeds thresholds; prevents damage due to overheating of the power supply unit
Internal fault monitoring	Detects short circuits and component failures within the power supply unit; if a failure is found, the unit is shut down

Feature	Benefit
Intelligent remote management	Users can remotely power-cycle one or all power supplies using the supervisor command-line interface (CLI), enabling remote management and improving operating efficiency (not available at initial software release)
Real-time power draw	Shows real-time actual power consumption (not available at initial software release)
Variable fan speed	Allows reduction in fan speed for lower power use and lower audible noise in well-controlled environments while helping ensure sufficient system cooling capacity

Table 5 summarizes the features and benefits of the Cisco Nexus 7700 3.0-kW DC power supply modules.

Table 5. Features and Benefits of Cisco Nexus 7700 3.0-kW DC Power Supply Modules

Feature	Benefit
Variable-output design configurable	Output capacity based on input configuration allows various operating modes to correctly size power supplies and increases deployment flexibility with a common DC supply unit.
Equally sized multiple inputs (DC version only)	Multiple inputs allow lower fusing requirements and maintain a consistent wire gauge among different output configurations.
Peak efficiency of more than 92% (with loads greater than 20%, efficiency is more than 90%)	Higher efficiency reduces power losses and so reduces both heat and the cost of cooling the equipment.
Real-time power information	Each power supply provides actual power delivery information, allowing dynamic monitoring of system power consumption.
Hot swappable	Hot-swap capability helps ensure consistent system operation with no service interruptions for upgrades and maintenance periods (assuming that the remaining power supplies can provide enough power to support the system).
Mixed DC and AC operation	Mixed operation enables support for dual-power environments and conversion between AC and DC power.
Temperature sensors and instrumentation	The sensor measures the internal temperature and shuts down the power supply if the temperature exceeds thresholds, preventing damage due to overheating of the power supply.
Internal fault monitoring	Monitoring detects short circuits and component failures in the power supply unit; if a failure is found, the unit is shut down.
Variable-speed power supply fans	Variability enables the use of reduced fan speed for lower power use and lower audible noise in controlled environments while helping ensure sufficient system cooling capacity for power supplies.

Product Specifications

Table 6 lists product specifications for the Cisco Nexus 7700 3.0-kW AC and DC power supply modules. Table 7 lists the cable specifications for the AC unit only.

Table 6. Product Specifications

Item	Specification	
Power Supply	**3.0-kW AC Power Supply**	**3.0-kW DC Power Supply**
Chassis compatibility	• Cisco Nexus 7700 6-Slot Switch (up to 4) • Cisco Nexus 7700 10-Slot Switch (up to 8) • Cisco Nexus 7700 18-Slot Switch (up to 16)	
Software compatibility	Cisco NX-OS Software Release 6.2 or later	
Physical specifications	• (H x W x D): 1.6 x 3.95 x 22 in. (4.1 x 10 x 55.9 cm) • Weight: 5 lb (2.27 kg)	• (H x W x D): 1.75 x 3.95 x 22 in. (4.45 x 10 x 55.9 cm) • Weight: 11 lb (5 kg)
Input voltage range	85 to 264 VAC	• –48 VDC nominal at 37A in North America (operating range: –40.5 to –56 VDC) • –60 VDC nominal at 30A for international (operating range: –55 to –72 VDC)
Input frequency range	47 to 63 Hz	
Input current (each input)	20A maximum at nominal line voltage (110 or 220 VAC)	• 40A maximum at –48 VDC input voltage (total of two inputs) • 45A maximum at –40V input
Rush-in current	55A maximum for one cycle: 50A maximum cold, and 70A maximum hot	

Item	Specification	
Power Supply	**3.0-kW AC Power Supply**	**3.0-kW DC Power Supply**
Power supply input receptacles	International Electro technical Commission (IEC) 320-C20	Dual M6 studs for cable terminal lugs (per KS TCLH!16-6-2AS; 4 each)
Power cord rating	16A	-
Output holdup time	20 milliseconds (ms) minimum	• 8 milliseconds (ms) for half load • 4 milliseconds (ms) for full load
Cooling fan	Integrated variable speed	
Environmental conditions	• Operating temperature: 32 to 104℉ (0 to 40℃) • Storage temperature: –40 to 185℉ (–40C to 85℃) • Relative humidity operating, noncondensing: 10 to 90% • Relative humidity nonoperating, noncondensing: 10 to 95%	
Certifications	80+ Platinum Certification (http://www.plugloadsolutions.com/80PlusPowerSuppliesDetail.aspx?id=239&type=1)	
Regulatory compliance	• EMC compliance • FCC Part 15 (CFR 47) (USA) Class A • ICES-003 (Canada) Class A • EN55022 (Europe) Class A • CISPR22 (International) Class A • AS/NZS CISPR22 (Australia and New Zealand) Class A • VCCI (Japan) Class A • KN22 (Korea) Class A • CNS13438 (Taiwan) Class A • CISPR24 • EN55024 • EN50082-1 • EN61000-3-2 • EN61000-3-3 • EN61000-6-1 • EN300 386	
Environment standards	• NEBS criteria levels* SR-3580 NEBS Level 3 (GR-63-CORE, issue 3, and GR-1089-CORE, issue 4) • Verizon NEBS compliance* Telecommunications Carrier Group (TCG) Checklist • Century Link NEBS requirements* Telecommunications Carrier Group (TCG) Checklist • ATT NEBS requirements* ATT TP76200 level 3 • ETSI* ETS 300 019-1-1, Class 1.2 Storage ETS 300 019-1-2, Class 2.3 Transportation ETS 300 019-1-3, Class 3.2 Stationary Use *Validation in progress	
Safety compliance	• Ul/CSA/IEC/EN 60950-1 • AS/NZS 60950	
LED indicators	• Green input LED (1 to 2): On when input voltage in inputs is within range (1 for AC and 2 for DC) • Green output LED: On when the DC voltage is within the valid range • Red fault LED: On and blinking when the power supply's internal self-diagnostic tests have failed or any other power supply failure has occurred • Blue ID LED: On and blinking when the operator has flagged this card for identification	
Reliability and availability	Capable of online insertion and removal (OIR)	
MIBs	Supports Simple Network Management Protocol Versions 1, 2, and 3 (SNMPv1, v2, and v3; see Cisco NX-OS Software release notes for more information about specific MIB support)	
Warranty	Cisco Nexus 7700 switches come with the standard Cisco 1-year limited hardware warranty.	

Table 7. 3.0-kW AC Power Supply Cable Specifications

Locale	Part Number	Cord Length	Wall Appliance Plug Type	Wall Plug Rating
Argentina	CAB-IR2073-C19-AR	14 ft (4.3m)	IRAM 2073	250 VAC, 16A
Australia and New Zealand	CAB-AC-16A-AUS	14 ft (4.3m)	AU20S3	250 VAC, 16A
People's Republic of China	CAB-AC16A-CH	14 ft (4.3m)	GB16C	250 VAC, 16A
Continental Europe	CAB-AC-2500W-EU	14 ft (4.3m)	CEE 7/7	250 VAC, 16A
International	CAB-AC-2500W-INT	14 ft (4.3m)	IEC 309	250 VAC, 16A
Israel	CAB-AC-2500W-ISRL	14 ft (4.3m)	SI16S3	250 VAC, 16A
Japan and North America (nonlocking) 200 to 240 VAC operation	CAB-AC-2500W-US1	14 ft (4.3m)	NEMA 6-20	250 VAC, 16A
Japan and North America (locking) 200 to 240 VAC operation	CAB-AC-C6K-TWLK	14 ft (4.3m)	NEMA L6-20	250 VAC, 16A
Japan and North America 100 to 120 VAC operation*	CAB-7513AC	14 ft (4.3m)	NEMA 5-20	125 VAC, 20A
Power distribution unit (PDU)*	CAB-C19-CBN	14 ft (4.3m)	IEC 60320 C19 IEC 60320 C20	250 VAC, 16A
Switzerland	CAB-ACS-16	14 ft (4.3m)	SEV 5934-2 Type 23	250 VAC, 16A

* The 3000W power supply operating with single 110 VAC delivers 1400W.

Ordering Information

To place an order, visit the Cisco Ordering homepage. To download software, visit the Cisco Software Center. Table 8 provides ordering information.

Table 8. Ordering Information

Product Name	Part Number
Cisco Nexus 7700 3.0kW AC Power Supply Module	N77-AC-3KW
Cisco Nexus 7700 3.0kW AC Power Supply Module Spare	N77-AC-3KW=
Cisco Nexus 7700 3.0kW DC Power Supply Module	N77-DC-3KW
Cisco Nexus 7700 3.0kW DC Power Supply Module Spare	N77-DC-3KW=

Service and Support

Cisco offers a wide range of services to help accelerate your success in deploying and optimizing the Cisco Nexus 7700 switches in your data center. Cisco's innovative services are delivered through a unique combination of people, processes, tools, and partners and are focused on helping you increase operating efficiency and improve your data center network. Cisco Advanced Services uses an architecture-led approach to help you align your data center infrastructure with your business goals and achieve long-term value. Cisco SMARTnet® Service helps you resolve mission-critical problems with direct access at any time to Cisco network experts and award-winning resources. With this service, you can take advantage of the Cisco Smart Call Home service capability, which offers proactive diagnostics and real-time alerts on your Cisco Nexus 7700 switches. Spanning the entire network lifecycle, Cisco services help increase investment protection, optimize network operations, provide migration support, and strengthen your IT expertise. For more information about Cisco Data Center Services, visit http://www.cisco.com/go/dcservices.

For More Information

For more information about the Cisco Nexus 7700 switches, visit the product homepage at http://www.cisco.com/go/nexus7000 or contact your local account representative.

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at www.cisco.com/go/offices.

Printed in USA C78-729141-01 12/13