

Cisco 6015 IP DSL Switch

Product Overview

The industry-leading Cisco 6000 Series IP DSL Switches supports the most comprehensive set of IP+ATM capabilities with common multi-DSL technologies for central offices (COs), remote terminals, and multitenant/multiple dwelling units (MTUs/MDUs).

The Cisco 6000 Series is IP ready and enables an evolution path to IP+ATM managed services, such as Multiprotocol Label Switching/virtual private networking (MPLS/VPN), multicasting, and Internet protocol (IP) routing/quality of service (QoS). The Cisco 6015 IP DSL Switch is a key addition to the 6000 series, extending the DSL reach beyond the CO to the outside plant (OSP) and MDU. The Cisco 6015 is a companion to the Cisco 6160 and 6260 products, with an ideal form factor for smaller-scale DSL deployments, but with the same robust IP+ATM features of the larger products. The Cisco 6015 is designed for commercial deployments in incumbent local exchange carrier (ILEC), international post, telephone, and telegraph (PTT), and competitive local exchange carrier (CLEC) networks, as well as MTUs/MDUs. An environmentally hardened system is available for OSP deployments.

Cisco 6015 Product Overview

The Cisco 6015 is a front-access, six-slot multiport line-card architecture capable of supporting industry-standard asymmetric DSL (ADSL) and single-pair high-bit-rate DSL (G.shdsl) technologies. The product is fully compliant with Network Equipment Building System (NEBS), American

National Standards Institute (ANSI), European Telecommunication Standards Institute (ETSI), and asynchronous transfer mode (ATM) carrier-class network-element standards. Network transmission connections include T1/E1 inverse multiplexing over ATM (IMA), DS3 User-Network Interface (UNI), and OC-3/Synchronous Transport Module level 1 (STM-1) UNI. Up to 48 ADSL or G.shdsl ports can be provisioned for use with the Cisco 6015 in a variety of configurations. The Cisco 6015 supports simultaneous voice (basic telephone service) and data services with the addition of a specially designed plain old telephone service (POTS) Splitter package that is available from Cisco Ecosystem Partner Program members.

Building on the advanced network interface (Network Interface—version 2 [NI-2]) architecture of the Cisco 6160 and 6260 IP DSL Switches, the Cisco 6015 provides a clear migration path from today's unspecified bit rate (UBR)-oriented Internet access service model (popular for high-volume consumer DSL service rollout), to a comprehensive IP+ATM (class of service [CoS])/QoS family required for the growing demands of telecommuter and business customers with mission-critical applications. In addition to supporting

industry-leading traffic management through I.371-compliant policing, extensive-output queue buffering, and virtual path (VP)-granularity shaping, the Cisco 6015 platform can provide the kind of robust IP+ATM capabilities typically found only in edge-switch or higher-class products. Refer to Table 1 for complete product specifications.

Cisco DSL Manager manages the platform and is a complete Simple Network Management Protocol (SNMP)-based element-management system with fault, configuration, and Performance reporting capabilities. A Cisco IOS® Software command-line interface (CLI) is also available for network-element provisioning. Management solutions are also being extended to include flow-through provisioning with carrier-class network management systems (NMSs).

Key Features and Benefits

- **Telco CO environments**—The small footprint and desirable form of the Cisco 6015 is well-suited for smaller-scale DSL CO applications. The product is equipped with the same full-featured DSL and ATM interface architecture as larger Cisco DSL access multiplexers (DSLAMs). This product gives telcos flexibility to deploy DSL services from small COs, subtend off of larger platforms, or co-locate in constrained spaces.
- **MTU/MDU**—The compact design of the Cisco 6015 is perfect for telco closets or basement installations. An optional external AC power supply is available for these installations. The wide area network (WAN), subtend, and DSL lines of the Cisco 6015 are entirely front-accessible for easy installation and maintenance. Class B compliance ensures universal installation and access, regardless of the location.
- **Remote terminal environments**—The Cisco 6015 is available with hardened common cards and line cards to withstand operational conditions in OSP environments. Adding remote terminal deployment capabilities extends the reach of DSL to virtually 100 percent of the total addressable market. The Cisco 6015 can be installed in existing and new remote terminals, huts, and controlled environmental vaults (CEVs), extending DSL services to remote locations in the service provider’s network. This optimized platform provides a high-density solution for the remote terminals.
- **Multiservice DSL**—ADSL line cards include standards-compliant ANSI T1.413 and future ITU G.shdsl. Full ADSL data rates are supported (8.024 Mbps downstream/864 kbps upstream for discrete multitone [DMT], and 1536 kbps downstream/512 kbps upstream for G.lite). G.shdsl data rates up to 2.3 Mbps symmetric are also supported. DSL subscriber

train rates can automatically adapt to the highest attainable line speed based on individual loop characteristics, or they can be selectively provisioned based on a desired service definition.

- **MPLS VPN**—MPLS on the Cisco 6015 IP DSL Switch enables providers to offer the benefits of IP services over their ATM infrastructures. Service providers can use MPLS to build an entirely new class of IP virtual private network (VPN). MPLS-enabled IP VPNs are connectionless IP networks with the same privacy as Frame Relay (FR) and multiple IP service classes to enforce business-based policies. Providers can offer low-cost managed IP services because MPLS-based VPNs make operations much more efficient.
- **Scalable architecture**—The six line-card slots are capable of supporting ADSL or G.shdsl line cards. The Cisco 6015 is equipped with a proven ATM switching fabric and traffic-management feature set required for quality Internet-access provisioning.
- **Standards compliant**—The Cisco 6015 fully conforms to UL, Bellcore, and ETSI standards as required for central office or outside plant deployments. In addition, the product is fully FCC Part 15 Class B compliant for installations in MTU/MDUs.

Specifications

Table 1 Cisco 6015 Technical Specifications

Technical Specifications	
Dimensions (H x W x D)	• 3 RU 5.25 x 17.5 x 11 in. (134 x 445 x 280 mm)
Weight	• 25.45 lb (11.56 kg)
NI-2 Common Cards	
Interfaces	<ul style="list-style-type: none"> • 1 DS3 + 8 x T1/E1 IMA NI-2, commercial rated • 1 DS3 + 8 x T1/E1 IMA NI-2, industrial rated for OSP • 1 OC3/STM1 + 1 OC3/STM1, commercial rated • I/O Cards: DS3/8T1 or 8E1 <ul style="list-style-type: none"> – DS3 WAN uplink – T1/E1 interface configured as either WAN or subtend – T1/E1 interfaces can be configured in up to 4 IMA groups

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Technical Specifications	
IP+ATM Features	<ul style="list-style-type: none"> UNI 3.1/4.0 Universal broadband router (UBR), available bit rate (ABR), non-real-time variable bit rate (VBR-nrt), real-time variable bit rate (VBR-rt), constant bit rate (CBR), guaranteed frame rate (GFR) Permanent virtual circuit (PVCs), soft permanent virtual circuit (SPVCs), and switched virtual circuits (SVCs) 256 VCs per port, 256 VPs per system (32 shaped) ILMI IISP/PNNI EPD, PPD MPLS VPN PPPoA and PPPoE termination RBC L2TP tunneling RFC 1483 Bridging and Routing Egress traffic shaping Traffic policing (usage parameter control) per ITU-TI.371 and ATM Forum UNI specification
Management System	<ul style="list-style-type: none"> Cisco DSL Manager
Other	<ul style="list-style-type: none"> Management interfaces <ul style="list-style-type: none"> In band: ATM VC Out of band: 10BaseT Ethernet EIA/TIA-232 console (RJ-48) EIA/TIA-232 auxiliary (RJ-48)
DSL Interface Options	
Quad-port ADSL (Flexi)	<ul style="list-style-type: none"> ANSI T1.413 Issue 2 (ADSL over basic telephone service) ITU G.992.1 (G.dmt) ITU G.992.2 (G.lite) ITU G.994.1 (G.hs) CAP RADSL
Octal-port ADSL	<ul style="list-style-type: none"> Commercial version and outside plant version ANSI T1.413 Issue 2 (ADSL over basic telephone service) ITU G.992.1 (G.dmt) ITU G.992.2 (G.lite) ITU G.994.1 (G.hs)
Octal-port G.shdsl (TC-PAM) -	<ul style="list-style-type: none"> ITU G.991.2 (G.SHDSL)
Data Rates	
ADSL—ANSI T1.413 Issue 2	<ul style="list-style-type: none"> Downstream speed range: 32 kbps to 8032 kbps Upstream speed range: 32 kbps to 864 kbps Increments: 32 kbps

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ADSL—ITU G.992.1 (G.dmt)	<ul style="list-style-type: none"> Downstream speed range: 32 kbps to 8032 kbps Upstream speed range: 32 kbps to 864 kbps Increments: 32 kbps
ADSL—ITU G.992.2 (G.lite)	<ul style="list-style-type: none"> Downstream speed range: 32 kbps to 1536 kbps Upstream speed range: 32 kbps to 512 kbps Increments: 32 kbps
SHDSL—ITU G.shdsl	<ul style="list-style-type: none"> Speed range: Up to 2.312 Mbps Trellis-coded Pulse Amplitude Modulation (TC_PAM) line encoding Increments: 8 kbps
Management Access	<ul style="list-style-type: none"> DB-9 serial interface for craft alarm discovery RJ-45 Ethernet ATM in-band management
External Alarm Contacts	Single dry contact alarm input (NO)
Power Input	<ul style="list-style-type: none"> -48 VDC power module; 6A fused recommended for quad-port ADSL Optional external 110V/220V AC power module
Commercial Operating Requirements	
Temperature	<ul style="list-style-type: none"> 41° to 104°F (5° to 40°C)—Operating 23° to 131°F (-5° to 55°C)—Short-term operating
Altitude	<ul style="list-style-type: none"> -197 to 13,123 ft (-60 to 4000 m)
Humidity	<ul style="list-style-type: none"> 5 to 90% (noncondensing)
Outside Plant Operating Requirements	
Temperature	<ul style="list-style-type: none"> -40° to 149°F (-40° to 65°C)—Operating
Altitude	<ul style="list-style-type: none"> -197 to 13,123 ft (-60 to 4000 m)
Humidity	<ul style="list-style-type: none"> 5 to 95% (noncondensing)
Cooling	<ul style="list-style-type: none"> Fan cooling via built-in fan assembly
Regulatory Approvals and Compliance	
Product Safety	<ul style="list-style-type: none"> UL 1950, third edition EN 60950, second edition, amendments 1, 2, 3, 4, and 11 IEC 60950, second edition, amendments 1, 2, 3, and 4 AS/NZS 3260
EMI	<ul style="list-style-type: none"> EN55022/CISPR22 FCC Part 15 Class B AS/ANS 3548 ICCS-003 VCCI BSMI (CNS 13438)
Immunity	<ul style="list-style-type: none"> EN/IEC 61000-4-2, 3, 4, 5, and 6

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Technical Specifications	
NEBS	<ul style="list-style-type: none"> Telcordia GR-63-CORE associated with TR-NWT-000057 (Note: the system must be installed inside a GR-487 cabinet to pass the optional outdoor airborne contaminant requirement). Telcordia GR-1089-CORE Telcordia SR-3580 Level 3
Telecom	<ul style="list-style-type: none"> FCC Part 68 IC-CS03 CTR 12, 13
ETSI	<ul style="list-style-type: none"> EN/ETSI 300-386-1, 300-386-2

Ordering Information

Table 2 lists the part numbers for the Cisco 6015. Please refer to the Cisco 6015 Configuration Guide for more information.

Table 2 Cisco 6015 Product Part Numbers

Part Number	Description	Quantity
Chassis		
CISCO6015	Cisco 6015 IP DSL Switch	1
Power Supplies		
6015-1-PEM-DC	Cisco 6015-48V DC power-entry module	1
6015-1-PEM-AC-E	Cisco 6015 AC power-entry module (external)	1 (optional)
Software		
S6015AB21-12.XXXDA	Cisco DSL Access Concentrator Cisco IOS Software	1

Table 2 Cisco 6015 Product Part Numbers

Part Number	Description	Quantity
FL6015-03	Cisco 6015 Series DSL Concentrator—Subtending	1 (optional)
FL6015-06	Cisco 6015 Series DSL Concentrator—MPLS	1 (optional)
FL6015-07	Cisco 6015 Series DSL Concentrator—03, 06 Bundle	1 (optional)
System Cards		
NI-2-DS3-T1E1	NI2, 1 DS3, 8 x T1/E1, commercial temp	1
6015-DS3/T1-IO	Cisco 6015 network I/O card (DS3/T1)	1
6015-E1-IO	Cisco 6015 network I/O card (E1)	1
NI-2-DS3-T1E1-H	NI2, 1 DS3, 8 x T1/E1, temp hardened	1
NI-2-155SM-155SM	NI2, OC3/STM1, Single Mode, 1 WAN, 1 Subtend	1
NI-2-155MM-155MM	NI2, OC3/STM1, Multimode, 1 WAN, 1 Subtend	1
Line Cards		
ATUC-4-FLX-2	4-port ADSL flexicard	0-6
ATUC-8-DMT-1	8-port DMT line card, commercial temp	0-6
ATUC-8-DMT-1-H	8-port DMT line card, temp hardened	0-6
STUC-8-SHDSL-1	8-port G.shdsl line card, commercial temp	0-6



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