

Cisco 3631-CO Modular Access Platform for Operations Support Networks

The Cisco 3631-CO is a robust 12inch/300mm deep, AC/DC, Network Equipment Building Systems (NEBS) Level 3/European Telecommunication Standards Institute (ETSI)-compliant network connectivity platform, specifically designed to optimize the operations support function of service provider networks.

As a key new element in a scalable Operations Support Network solution, the Cisco 3631-CO provides seamless remote operations management connectivity to network elements such as Synchronous Optical Network/Synchronous Digital Hierarchy (SONET/SDH), which may require Ethernet, asynchronous or synchronous, and X.25 interfaces on the same compact platform. The Cisco 3631-CO adds greater versatility to a product line that includes the following platforms and software images:

Ethernet Switching: Cisco NM-16ESW, Catalyst[®] 1924, Catalyst 2924M-XL, Catalyst 4003

Routing: Cisco 3662, Cisco 3640, Cisco 3631-CO, Cisco 2600

Software: Optimized IOS software images—Telco & Telco Plus

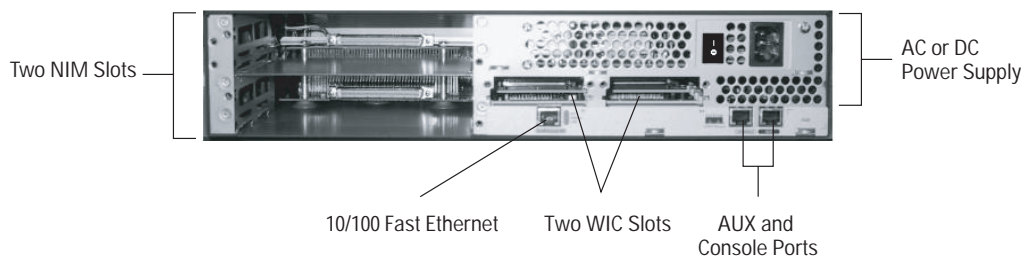
Data Communications Network (DCN) is an ITU terminology for a device that provides network telemetry to remote network elements for the purpose of operations and network element management. The Cisco DCN Operations Support Network product line is comprised of highly scalable and robust series of platforms, modular interfaces and software for remote connectivity into network elements (NEs). Common applications include: alarm monitoring, remote provisioning and diagnostics, software downloads, configuration backup, and billing data collection. Other mission critical applications include: alarm monitoring, alternate & secure network access, and local number portability.

Figure 1
Cisco 3631-CO





Figure 2
Cisco 3631-CO (backplane view)



The Cisco 3631-CO is a versatile modular access platform ideally designed for small to medium-density telemetry applications. It significantly reduces the complexity and costs of managing mission critical operations: by integrating multiple Network Element (NE) management interfaces onto one operations support network access device. The Cisco 3631-CO streamlines service providers operations support functions by replacing legacy and 3rd party systems that are often plagued with fixed and inflexible architectures, often yielding limited interface and software support. The Cisco 3631-CO provides flexible / modular connectivity to legacy X.25, asynchronous/synchronous devices as well as Ethernet devices. The Cisco 3631-CO facilitates a graceful migration from cumbersome proprietary network support systems to an open standard, scalable and flexible Operations Support Network. In addition, Service Providers can use the Cisco 3631-CO in their numerous points of presence (POPs) or Central Office (CO) collocations for digital-subscriber-line access multiplexers (DSLAMs), Voice Switches and Transmission operations networking. (See Figure 2.)

As illustrated in Figure 2, the Cisco 3631-CO is two rack units (RUs—3.4 inches) high, less than 12 inches (300mm) deep and 17 inches wide. The Cisco 3631-CO is equipped with two Network Module (NM) slots, and two WAN Interface Controller (WIC) slots, a built in Advanced Integration Module (AIM) slot (for enhanced processing capabilities), an integrated autosensing 10/100 Mbps Ethernet port, and external AUX and Console ports. These slots, in tandem with the broad base of NMs and WICs yield unmatched versatility and growth capacity to a service provider. With the option of an AC or DC power source, the Cisco 3631-CO can be utilized in virtually any network application. For added reliability, the single DC power supply is a dual rail system, i.e., it is designed to accept power from two independent / redundant DC power sources common in central offices. If one power source fails, the Cisco 3631-CO will continue functioning by drawing power from the backup/redundant power source.

Platform rear access cabling allows easy connectivity, and a modular design allows fast servicing of field-replaceable units (FRUs). Common language equipment identification (CLEI) coding is provided for easy identification and tracking. Robust network-management capabilities are achieved through CiscoWorks, CiscoView, and CiscoView Stack Management Interface applications. These same applications are used to manage a large number of Cisco products that have already been deployed in existing networks, presenting network support personnel a familiar look and feel.



Key Features and Benefits

Optimized for Service-Provider Networks

- Significantly reduces network management complexity by consolidating legacy and 3rd party multiple overlay Operations Support Networks onto a single cost-effective network management solution.
- Provides a graceful migration path from proprietary management and support networks to an open, standards based Operations Support Network.
- Reduces life-cycle costs of Operations Support functions. Single vendor platform with open standard instead of a multi-vendor proprietary management network. Reduced manpower expenses. Increased network visibility and reliability. Reduced employee training.
- Offers remote alarming, monitoring and control of Network Elements and infrastructure.

Customized Feature Rich Operating Software

Cisco IOS Software is a key advantage in any Operations Support Network. Not only is it deployed in most IP networks around the world, but it has been customized for optimum performance in a service providers Operations Support Network (OSN). Known as the Telco and Telco Plus IOS Images for the Cisco 3631-CO, they support the following network-management requirements:

- Full IP/Open System Interconnection (OSI) routing services, including Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP), IGRP, Routing Information Protocol (RIP), multiprotocol Border Gateway Protocol (BGP), multi-area integrated Intermediate System-to-Intermediate System (IS-IS), and Domain Name System (DNS)
- Transaction Language One (TL-1) support, including transport via IP, X.25, TCP, or OSI. TID Address Resolution Protocol (TARP) support and TARP Storm Avoidance support
- Point-to-Point Protocol (PPP) services and WAN interface support for ISDN, Frame Relay, ATM, and X.25
- X.25 support services, including X.25 switching, X.3 asynchronous packet assembler/disassembler (PAD), DNS for X.25 address resolution, hunt groups, and switched/permanent-virtual-circuit (SVC/PVC) conversion
- IP-to-X.25 protocol translation
- BX.25 transport over X.25 or TCP (XOT)
- Multi-area OSI support, eight (8) OSI areas per chassis, essentially providing the same capabilities as seven separate OSI routers

Platform Manageability

- Support for CiscoWorks, CiscoWorks2000, and CiscoView allows simplified management of all integrated and stackable components.
- CLEI codes enable easy identification and tracking of CO equipment.
- An enhanced setup feature provides context-sensitive questions that guide the user through the router configuration process, allowing faster deployment.
- AutoInstall (Simple Network-enabled Auto Provisioning feature) configures remote routers automatically across a WAN connection to save the cost of sending technical staff to remote sites.
- Support for the Cisco Discovery Protocol (CDP) enables a CiscoWorks network-management station to automatically discover the Cisco 3631-CO in a network topology.



Versatility

- A modular architecture offers a large selection of interfaces for simple customization to address general or specific network requirements. With widely varying network module port densities, the Cisco solution encourages an operations management philosophy of “pay-as-you-grow”.
- The Cisco 3631-CO has been developed to address the particular connectivity and growth needs of a small to medium central office or Point of Presence (POP).
- WAN Interface Cards (WIC's) and Network Modules (NM's) are shared with the Cisco 2600 series, 3631-CO, and 3660 Series Multiservice Access platforms, fostering reduced expense in maintaining inventory of modular components and lowering support costs support personnel training costs.

Performance

The Cisco 3631-CO accommodates the varying levels of port density to meet the operations connectivity (telemetry) for small to medium-sized offices or POP's. From a price performance and density perspective, the Cisco 3631-CO provides a chassis design that bridges the gap between a smaller Cisco 2600-DC and a larger Cisco 3662-DC-CO. Table 1 provides a general comparison of the Cisco 3631-CO and Cisco 3662 products.

Table 1 Comparison of Cisco 3631-CO and Cisco 3662-CO

	Cisco 3631-CO (AC/DC)	Cisco 3662-CO (AC/DC)
Performance	70 kpps	100-120 kpps
LAN Ports (integrated)	One 10/100 Ethernet	Two 10/100 Ethernet
Network Module Slots	Two (2)	Six (6)
WAN Interface Card (WIC) slots	Two (2)	None (0)
Advanced Integration Modules	One internal (Super AIM)	Two internal (AIM)
Async Ports	68	192
Sync Ports	20	48
Ethernet Ports	33	34
Hot-Swap Capability	Not available	Like-to-like network modules Power supplies
Power-Supply Redundancy	Single supply (accepts dual-redundant source input)	Redundant Power Supplies, 2 power supplies per chassis
Dimension (H x W x D)	3.4 x 16.75x 11.5 (in.) 86 x 425 x 292 (mm) Meets 12-in. (300-mm) depth requirement	8.7 x 17.5 x 11.8 (in.) 221 x 445 x 300 (mm) Meets 12-in. (300-mm) depth requirement



- The Cisco 3631-CO uses a high-performance architecture to provide up to 70,000 packets per second of fast-switching capability. Support for four/eight-port T1/E1 inverse multiplexing over ATM (IMA) interfaces provides higher bandwidth for remote software downloads, statistics collection, and billing-records collection.
- The Cisco 3631-CO offers support for two (2) network module slots, and two (2) WIC slots which can be used today to provide a variety of connectivity options for different applications.
- Security features, such as data encryption, tunneling, Remote Access Dial-In User Service (RADIUS), TACACS+, and Authentication, Authorization, and Accounting (AAA), are enabled to protect data assets.

Connectivity Options

- Cisco IOS Software support provides connectivity to legacy X.25 and async devices; it also supports full-featured IP and OSI routing on a single platform.
- A large variety of interfaces with a full selection of feeds and speeds provide connectivity to IP, ATM, Frame Relay, and time-division multiplexing (TDM) networks and will support the needs of any CO environment. A full description of these interfaces is provided in Table 2.

Reliability

- Full diagnostics and error reporting on all major components of the chassis, including power supply, main board, back plane, and fans, is provided.
- Flash memory allows a backup copy of Cisco IOS Software to be stored in Flash memory for reduced downtime.
- LED status indicators provide at-a-glance activity status.

Investment Protection

- With the ability of the Cisco 3631-CO to support field-upgradable modular components, customers can easily change network interfaces without a “forklift upgrade” of the entire platform.

Lower Cost of Ownership

- Integrated the functions of channel/data service units (CSU/DSUs), ISDN Network Termination 1 (NT1) devices, and other equipment found in operations support networks, onto a single compact chassis. Yielding a space-saving solution that can be easily managed remotely using network-management applications such as CiscoWorks and CiscoView.

Serviceable Design

All network interfaces are located on the rear of the chassis for simplified installation and cable management.

The NEBS Level 3/ETSI platform is two RUs (3.4 inches, 86 mm) high, and can be installed into a 19- or 23-inch-wide relay rack.



Summary

The proliferation of new telecommunications services has changed the requirements for the operations support systems required to support these new services. Further straining the capabilities of legacy Operations Support Networks is the rapid growth in network elements coupled with the wide variety of network interfaces that must be supported. The Cisco 3631-CO provides a highly compact and proven modular architecture for Operations Support Network connectivity. The Cisco 3631-CO enables a service provider to deploy an ultra-reliable, scalable, and versatile platform, which allows graceful migration from current proprietary-based operations management/ connectivity systems to a next generation, open standards based infrastructure. Further, the proven versatility of the Cisco IOS Software, prevalent on most TCP/IP traffic around the world today, positions the Cisco solution as the industry's best.

Support

Cisco support solutions are designed for one purpose—to put customers quickly in touch with appropriate resources. The Cisco support network consists of Technical Assistance Center (TAC) engineers, development engineers, field engineers, parts warehouses, delivery services, and service partners. By including Cisco support with Cisco equipment purchases, customers immediately gain access to a wealth of support resources.

IOS Images Supported

Software	Description
S363T-12.2.11T & up	Cisco 3631 Series IOS Telco Feature Set (Included)
S363T-12.2.8T & up	Cisco 3631 Series IOS Telco Feature Set (Included)
S363TP-12.2.11T & up	Cisco 3631 Series IOS Telco Plus Feature Set
S363TP-12.2.8T & up	Cisco 3631 Series IOS Plus Feature Set

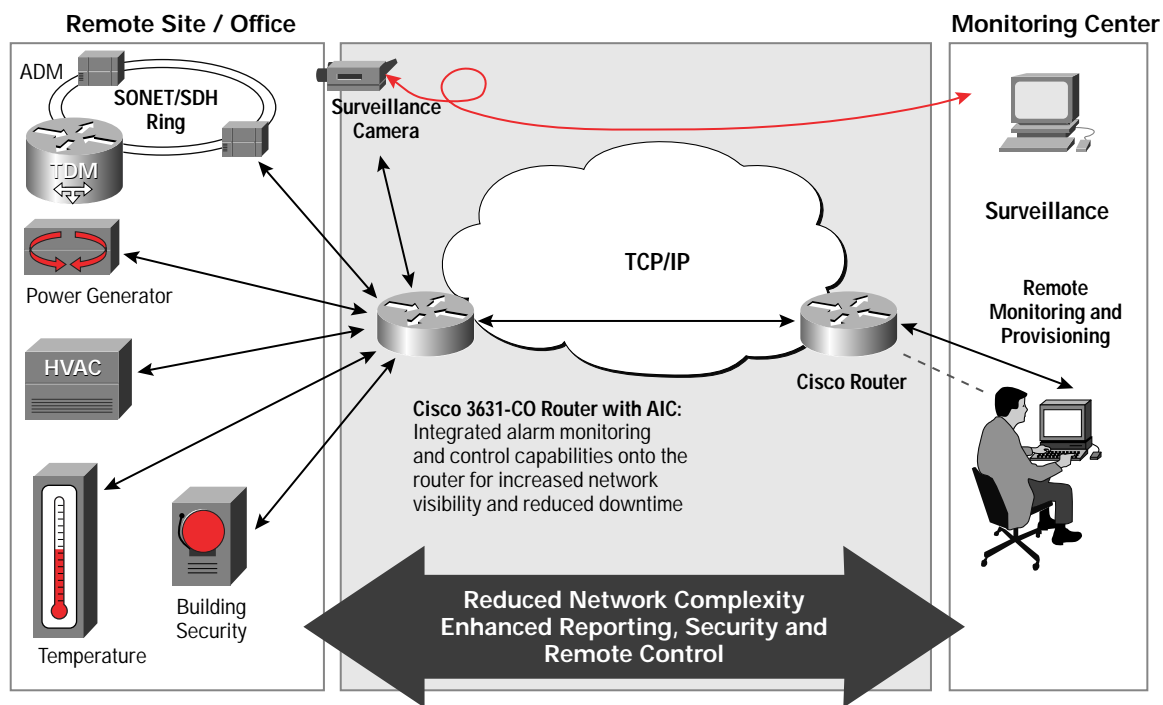
Solution Application Notes

What follows are two examples that illustrate the versatility of the Cisco 3631-CO. The first example depicts a Cisco 3631-CO as both an Ethernet/Asynchronous/Synchronous telemetry platform, and with the new Alarm Interface Controller network module (NM-AIC-64), facilitates remote alarm monitoring and control of vital network elements. A second application example depicts the Cisco 3631-CO with the new Ethernet Switch network module (NM-ESW-16). The Cisco 3631-CO has been developed to accept a myriad of modules, allowing the user to custom tailor the platform to specialized network requirements.



Example Application #1: Security—Remote Alarm Monitoring and Control

Figure 3
Security—Remote Alarm Monitoring and Control

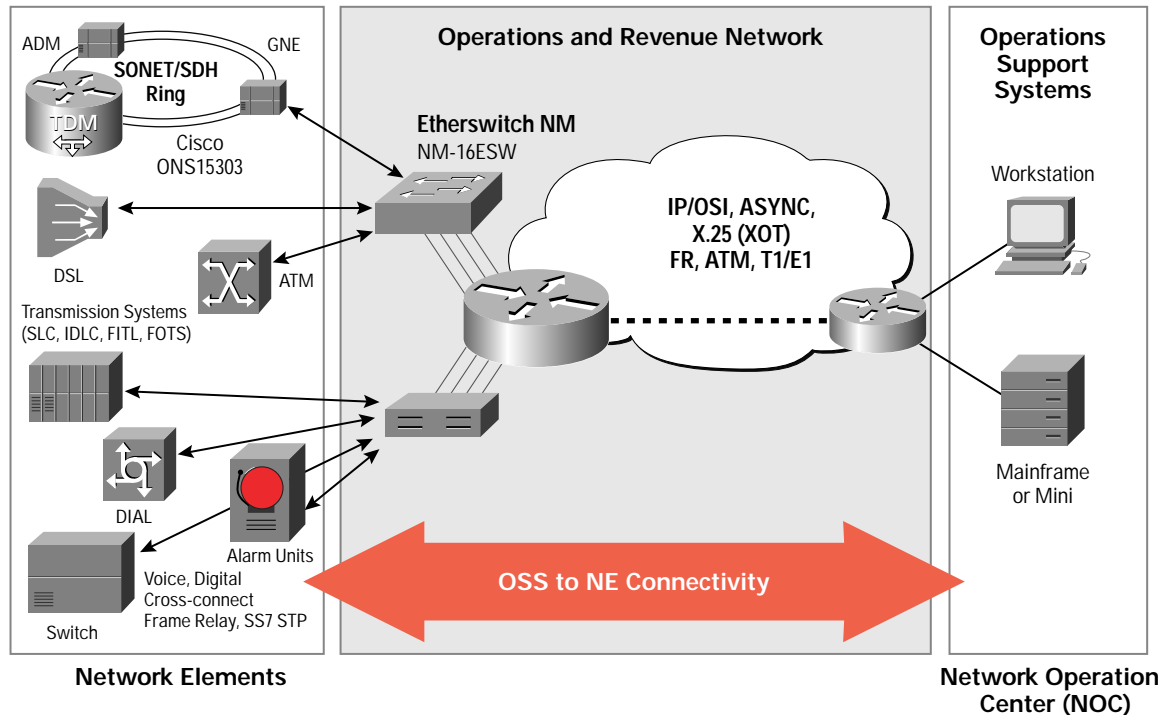


The alarm interface controller (AIC) is a network module that greatly expands the network monitoring and control capabilities of the Cisco 2600 and 3600 Series routers. The AIC functions as an integrated entity residing within the Cisco 3631-CO platform to provide network alarm monitoring and proactive remote control of network elements. The AIC reduces service-provider and enterprise operating expenses by facilitating an integrated solution to remote network management. This eliminates the need for a dedicated external alarm-monitoring device. Greatly simplifying network layout, monitoring, and control; resulting in lower operations, administration, maintenance, and provisioning (OAM&P) costs. The AIC is supported in Cisco IOS 12.2 (2) XG and 12.2(8)T and later. The AIC network module supports 64 discrete alarm inputs, of which 8 of the last 64 alarm points are software-configurable to accept either analog or discrete inputs. The AIC further supports 16 control relays to facilitate the proactive remote control of network elements.



Example Application #2: Ethernet Switch Network Module

Figure 4
Ethernet Switch Network Module



The Cisco 16-port 10/100 Ethernet Switch Network Module (NM-16ESW) is a high-density ethernet network module that provides line-rate Layer 2 switching across Ethernet ports using Cisco IOS[®] Catalyst Software. Features such as port autosensing, QoS and VLAN support from 802.1P and 802.1Q standards, and 802.1D Spanning Tree protocols are standard on the EtherSwitch module. The EtherSwitch offers service providers the option to integrate switching and routing in one compact platform to simplify their Operations Support Network. This combination offers ease of configuration, deployment and management while utilizing the powerful characteristics of Cisco routing and Catalyst switching features.



Technical Specifications

Table 2 provides technical specifications for the Cisco 3631-CO.

Table 2 Cisco 3631-CO System Specifications

Feature	Specifications
Processor Type	240-MHz PMC-Sierra RM7061A RISC processor
Flash Memory	32 MB, upgradeable to 128 MB
System Memory	64 MB DRAM, upgradeable to 256 MB DRAM
Modular Slots (NM, WIC, AIM)	Two (2) Network Module slots. Two (2) WIC slots. Single internal Super AIM slot.
Ethernet Interface	Single 10/100 Mbps Fast Ethernet port
Power	AC, DC, (Redundant DC input)
Dimensions (H x W x D)	3.4 x 16.75 x 11.5in. (86 x 425 x 292 mm)
Performance	70 kpps
Console and Aux Ports (115.2 kbps)	Yes
Rack-Mounting	Yes

Table 3 Alarm Interface Controller Network Module

Module	Description	Cisco IOS Version
NM-AIC-64	Alarm monitoring and control network module; 64 monitoring points and 16 control points	12.2(2)XG and 12.2(8)T

Table 4 Cisco 3631-CO Network Modules

Module	Description
NM-16A	16-port high-density async network module
NM-32A	32-port high-density async network module
NM-4A/S	4-port async/sync serial network module
NM-8A/S	8-port async/sync serial network module
NM-1HSSI	1-port high-speed serial interface module
NM-4E1-IMA	4-port E1 ATM network module with IMA
NM-8T1-IMA	8-port T1 ATM network module with IMA
NM-8E1-IMA	8-port E1 ATM network module with IMA



Table 4 Cisco 3631-CO Network Modules

Module	Description
NM-8T1-IMA	8-port T1 ATM network module with IMA
NM-1CT1	1 Port Channelized T1/ISDN-PRI Network Module
NM-1CT1-CSU	1 Port Channelized T1/ISDN-PRI with CSU Network Module
NM-2CT1	2 Port Channelized T1/ISDN-PRI Network Module
NM-2CT1-CSU	2 Port Channelized T1/ISDN-PRI with CSU Network Module
NM-4B-S/T	4 Port ISDN-BRI Network Module
NM-8B-S/T	8 Port ISDN-BRI Network Module
NM-4B-U	4 Port ISDN-BRI with NT-1 Network Module
NM-8B-U	8 Port ISDN-BRI with NT-1 Network Module
NM-1A-T3	1-Port DS3 ATM Network Module
NM-1A-E3	1-Port E3 ATM Network Module
NM-2W	2 WAN Card Slot Network Module
NM-1FE2W	1 10/100 Ethernet 2 WAN Card Slot Network Module
NM-2FE2W	2 10/100 Ethernet 2 WAN Card Slot Network Module
NM-1CE1B	1-Port Channelized E1/ISDN-PRI Balanced Network Module
NM-2CEB	2-Port Channelized E1/ISDN-PRI Balanced Network Module
NM-1CE1U	1-Port Channelized E1/ISDN-PRI Unbalanced Network Module
NM-2CEU	2-Port Channelized E1/ISDN-PRI Unbalanced Network Module
NM-16-ESW	16 Port 10/100 Mbps Fast Ethernet Network module
WIC-2A/S	2 Port Serial WAN Interface Card
WIC-1B-U	1 Port ISDN with NT-1 WAN Interface Card and leased line
WIC-1B-S/T	1 Port ISDN WAN interface card, dial and leased line
WIC-1DSU-56k4	1 port 4 Wire 56/64 KBPS WAN interface Card
WIC-1AM	Single Port Analog Modem WIC
WIC-2AM	Dual Port Analog Modem WIC
VWIC-2MFT-T1	2 Port RF-48 Multiflex Trunk T1 (Includes all functionality of the WIC-1DSU-T1)
VWIC-2MFT-E1	2 Port RF-48 Multiflex Trunk E1
VWIC-2MFT-T1-DI	2-port EIA/TIA-48 multiflex trunk—T1 with drop and insert (1/0 multiplexing) (Includes all functionality of the WIC-1DSU-T1)
VWIC-2MFT-E1-DI	2-port EIA/TIA-48 multiflex trunk—E1 with drop and insert. (1/0 multiplexing)



Table 4 Cisco 3631-CO Network Modules

Module	Description
VWIC-1MFT-T1	1 Port RF-48 Multiflex Trunk T1 (Includes all functionality of the WIC-1DSU-T1)
VWIC-1MFT-E1	1 Port RF-48 Multiflex Trunk E1
VWIC-1MFT-G703	1 Port RF-48 Multiflex Trunk T1 with G703 support
VWIC-2MFT-G703.	2 Port RF-48 Multiflex Trunk T1 with G703 support

Table 5 Cables for Network-Module Interface Cards and WAN Interface Card Interfaces

Product Number	Electrical Interface	Length	Connector Gender
CAB-V35MT	NM-4A/S NM-8A/S (Up to 115.2 Async or 128 kbps async); NM-4T WIC-IT; V.35 DTE	10 ft	Male
CAB-V35FC	V.35 DCE	10 ft	Female
CAB-232MT	RS-232 DTE	10 ft	Male
CAB-232FC	RS-232 DCE	10 ft	Female
CAB-449MT	RS-449 DTE	10 ft	Male
CAB-449FC	RS-449 DCE	10 ft	Female
CAB-X21MT	X.21 DTE	10 ft	Male
CAB-X21FC	X.21 DCE	10 ft	Female
DTE CAB-530MT	RS-530	10 ft	Male
CAB-7KCT1DB15	CT1/CE1 PRI; MIP-CT1 DSX1 to DB15 cable	-	-
CAB-T1-RJ-45	CT1/PRI; RJ-45-RJ-45	10 ft	Male
CAB-E1-PRI	CE1/PRI; E1-ISDN PRI	10 ft	-
CAB-E1-TWINAX	E1 twinax 120-ohm balanced	3m	-
CAB-E1-DB15	E1 DB15 120-ohm balanced	5m	-
CAB-E1-BNC	FSIP and MIP-CE1 BNC 75-ohm unbalanced	5m	-
CAB-OCTAL-ASYNC	16/32 Async; 8-port with RJ-45 ends	10 ft	Male RJ-45
CAB-OCTAL-MODEM	8-port with 25 pin ends	10 ft	Male EIA/TIA-232
CAB-OCTAL-KIT	8-port RJ-45 + eight xMMOD	10 ft	Male EIA/TIA-232
CAB-25AS-MMOD	CAB-OCTAL-ASYNC Adapter cable	-	RJ-45 - EIA/TIA-232M
CAB-25AS-FDTE	Adapter cable	-	Female RJ-45 -EIA/TIA-232F



Table 5 Cables for Network-Module Interface Cards and WAN Interface Card Interfaces

Product Number	Electrical Interface	Length	Connector Gender
CAB-E1-RJ45BNC	WAN Interface Card Cable; E1 Cable RJ45 to Dual BNC (Unbalanced)	-	RJ-45 - dual BNC
CAB-E1-RJ45TWIN	E1 Cable RJ45 to Twinax (balanced)	-	RJ-45 - twinax
CAB-SS-V35MT(=)	Smart Serial Cable (or 12-in-1) cables DTE and DCE versions of the following physical interfaces: EISA/TIA-232, V.35, X.21, RS-449, RS-530, and RS-530A	-	Male
CAB-SS-V35FC(=)		-	Female
CAB-SS-232MT(=)		-	Male
CAB-SS-232FC(=)		-	Female
CAB-SS-449MT(=)		-	Male
CAB-SS-449FC(=)		-	Female
CAB-SS-X21MT(=)		-	Male
CAB-SS-X21FC(=)		-	Female
CAB-SS-530MT(=)		-	Male
CAB-SS-530FC(=)		-	Female
CAB-SS-530AMT(=)		-	Male
CAB-SS-530AFC(=)		-	Female

Table 6 Dimensions and Weight Specifications

Height	3.44 in. (86 mm) - 2 RU
Width	16.75 in. (425 mm)
Depth	11.5 in. (292 mm)
Weight (minimum)	8 lb (3.5 kg)
Weight (maximum)	15 lb (5.5 kg)

Table 7 Power Requirements

Output, Watts	105 Watts
AC Input Voltage	100 to 240V
Frequency	50/60 Hz
AC Input Current	2.0 Amps
DC Input Voltage	18 to 75 V _i +/-
DC Input Current	4 Amps

Table 8 Environmental Specifications

Operating Temperature	32 to 104 F (0 to 40 C)
Nonoperating Temperature	-13 to 158 F (-25 to 70 C)
Relative Humidity	5 to 95%
Noise Level (Maximum)	57 dbA

Regulatory Compliance

The Cisco 3631-CO platform conforms to numerous different safety, EMI, immunity, and network homologation standards, including Telcordia GR-63 and NEBS Level 3. Additional information on compliance standards for the Cisco 3631-CO can be found on the Cisco Web site.



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