

Voice/Fax and **ATM AIM Modules** for the Cisco 2600, 2600XM, 2691, 3660 and Cisco 3700 Series Modular Multiservice Access Routers

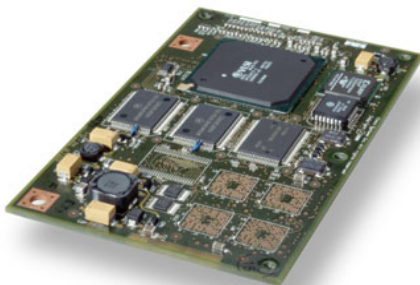
The Cisco 2600 Series, Cisco 2600XM Series, Cisco 2691, Cisco 3660, and Cisco 3700 Series multiservice access routers provide enterprises and service providers a wide range of solutions for data, voice, and video. These routers are equipped with an Advanced Integration Module (AIM) slot, which provides customers the flexibility to deploy additional features.

Three AIMS are described in this data sheet: an ATM AIM called AIM-ATM, a Voice AIM called AIM-VOICE-30, and a Voice + ATM AIM called AIM-ATM-VOICE-30. The AIM-ATM provides asynchronous transfer mode (ATM) services to the WAN. The AIM-VOICE-30 provides digital signal processor (DSP) services, which can support up to 30 medium-complexity or 16 high-complexity voice channels. The AIM-ATM-VOICE-30 combines the features from the AIM-ATM and AIM-VOICE-30 modules onto a single AIM module. These AIM modules

supplement the broad portfolio of Cisco voice solutions and allow enterprises and service providers the flexibility of implementing ATM and voice solutions on the routers.

The AIM-ATM optimizes the Cisco 2600, 2600XM, 2691, 3660, and Cisco 3700 Series modular multiservice routers by offering ATM adaptation layer 2 (AAL2) and ATM adaptation layer 5 (AAL5) support for low-density T1/E1 data and voice connections over ATM networks. This AIM module allows service providers and enterprise customers to take advantage of the reliability and quality of service (QoS) available with ATM connectivity.

The AIM-VOICE-30 contains DSPs that can support up to 30 medium-complexity or 16 high-complexity voice channels when used with the Voice/WAN (VWIC-MFT) interface card. All DSP voice features such as voice activity detection, echo cancellation, and a full suite of PBX/PSTN signaling protocols are supported. When the AIM-VOICE-30 is used in a Cisco 2600, 2600XM, 2691, 3660, or Cisco 3700 Series Router, users can use voice over IP (VoIP) or voice over Frame Relay (VoFR) while freeing up the network module slot for other applications. When used with one of the various ATM network modules, voice over ATM (VoATM) and VoIP over ATM are supported.





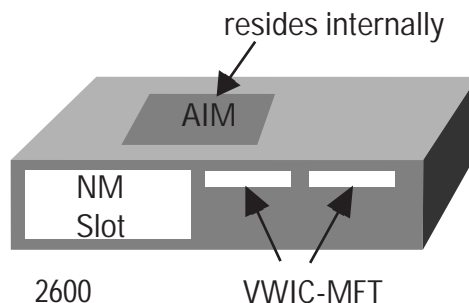
The AIM-ATM-VOICE-30 combines the ATM features of AIM-ATM and voice features of AIM-VOICE-30 in a single AIM. In addition to these ATM and voice features, the AIM-ATM-VOICE-30 also supports FR/HDLC/PPP encapsulation and channelized voice on the same T1/E1 interface to PSTN. This feature greatly reduces the recurring cost of PSTN access and data WAN access. The AIM-ATM-VOICE-30 enables voice and data traffic to be carried over an ATM network using AAL2 and AAL5 encapsulation when installed in Cisco 2600, 2600XM, 2691, 3660, or Cisco 3700 Series router. When used with T1/E1 Voice/WAN interface cards for circuit-mode data and frame-mode data over an ATM network, the AIM-ATM-VOICE-30 supports up to four (Cisco 2600, 2600XM Series) or eight (Cisco 2691, 3660, 3700 Series) T1/E1 WAN interfaces, which can be independent links or inverse multiplexing over ATM (IMA) groups. This AIM introduces T1/E1 ATM uplink capability in a WIC slot of the Cisco 2600 and 2600XM Series. For data applications, this allows for low-cost ATM WAN access. For voice applications, when used with the existing NM-HDV, NM-HDA, and NM-1V/2V voice cards in the NM slot, this configuration allows VoATM to be supported on the Cisco 2600 and 2600XM Series platforms.

These three AIM modules provide a cost-effective option for reducing recurring cost and maximizing the benefits of the advanced bandwidth management features of the Cisco IOS software. These AIM modules take advantage of the internal AIM slot(s) of the Cisco 2600, 2600XM, 2691, 3660, and 3700 series routers, ensuring that external slots remain available for components such as WAN interface network modules, and serial WAN network modules.

The Advanced Integrated Module Architecture

For better versatility, integration, and performance capabilities, all Cisco 2600, 2600XM, 2691, 3660, and 3700 Series modular access routers support internal AIM slots. The slot connects to both the main system bus and a secondary TDM bus running between the WAN interface card slots and network module slot. This flexible architecture enables the AIM to offload one or more processor-intensive tasks from the router's CPU. By supporting CPU-intensive applications such as ATM or voice services on a dedicated coprocessor, users can obtain significantly higher throughput rates and enable new services and applications. The Cisco 2600 and 2600XM Series routers have one AIM slot and the Cisco 2691, 3660 and 3700 Series have two AIM slots.

Figure 1
Cisco 2600 Router with AIM and VWIC-MFT Cards



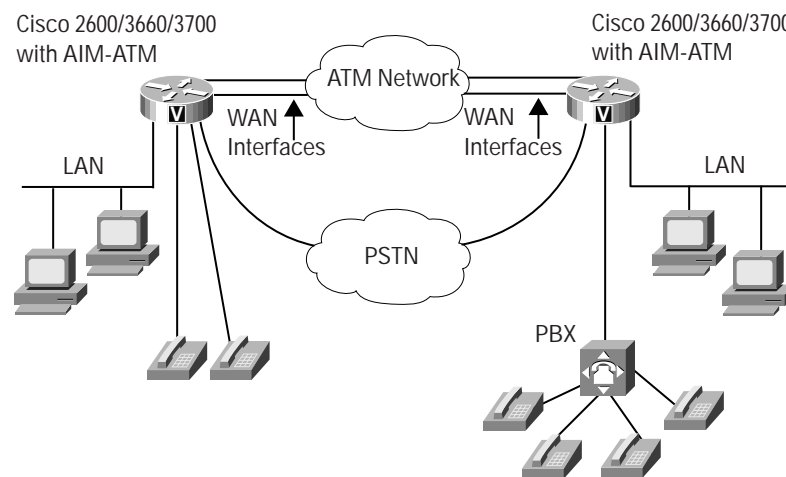


Applications

Scenario 1—Providing ATM Services

Figure 2 represents a method of providing ATM services on the Cisco 2600, 2600XM, 2691, 3660, or 3700 Series routers. Without the use of the AIM-ATM module, providing ATM services on these routers requires a unique ATM network module (NM). The AIM-ATM, when used with a Voice/WAN interface card (VWIC-MFT), can provide low-density ATM service without the use of a network module, thus freeing the valuable network module slot for other applications. A single AIM-ATM module can support up to 4 T1 or E1 lines of ATM services (two VWIC-MFT cards required) and the VWIC-MFT interface cards can connect to any ATM service provider network. Because the 2691, 3660, and 3700 Series can accommodate two AIM cards, when two AIM-ATM modules are installed, up to eight T1 or E1 of ATM services can be supported.

Figure 2
ATM Applications with AIM-ATM



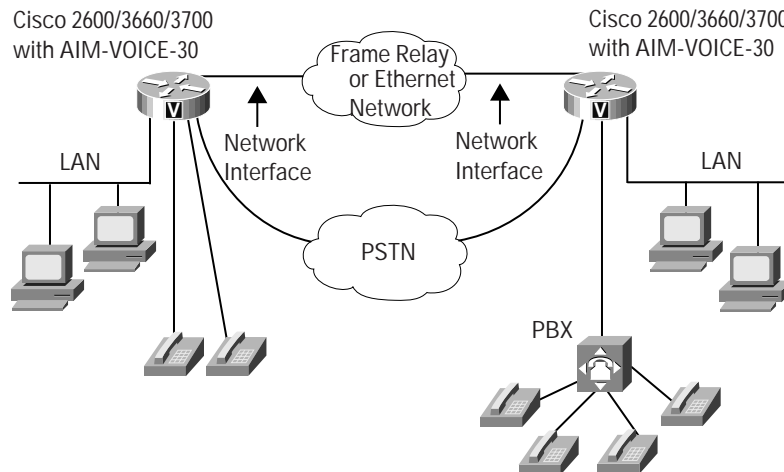
Scenario 2—Providing Voice Services

Figure 3 represents an AIM-based approach for providing voice services on the Cisco 2600, 2600XM, 2691, 3660, or 3700 Series routers. Before the introduction of the AIM-VOICE-30, providing digital voice service required the NM-HDV and analog voice services required the NM-1V/2V or NM-HDA. The AIM-VOICE-30, when used with a Voice/WAN interface card (VWIC-MFT), can provide digital voice service without using the NM-HDV, thus freeing the valuable network module slot for other applications. A single AIM-VOICE-30 module supports up to



30 voice channels and the VWIC-MFT interface card connects to the PSTN or PBX. Because the 2691, 3660, and 3700 Series routers can accommodate two AIM cards, when two AIM-VOICE-30 modules are installed, up to 60 voice channels can be supported.

Figure 3
Voice Applications with AIM-VOICE-30



Scenario 3—Providing ATM and Voice Services

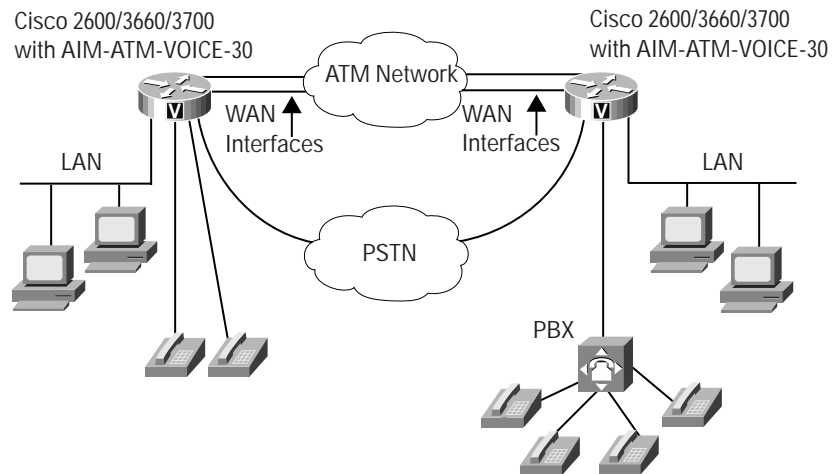
Figure 4 shows another way of providing digital voice services as well as ATM (AAL5) services into an ATM network on the Cisco 2600, 2600XM, 2691, 3660, or 3700 Series routers. Using the AIM-ATM-VOICE-30, digital voice service and low-density ATM services can be provided without network modules, thus releasing the NM slots for other services.

With one AIM-ATM-VOICE-30 module and a corresponding number of VWIC-MFT cards installed, the Cisco Router can handle up to 30 channels of voice services and have up to three T1 or E1's of low-density ATM services. One of the VWIC-MFT ports assigned to voice services can interface to either the PSTN or PBX while the rest of the VWIC-MFT ports assigned to ATM data services can interface to an ATM network.



With two AIM-ATM-VOICE-30 modules and a corresponding number of VWIC-MFT cards installed, the Cisco 2691, 3660, or 3700 series router can handle up to 60 channels of voice services, and have up to six or seven T1 or E1's of low-density ATM services. One or two of the VWIC-MFT ports assigned to voice services can interface to either the PSTN or PBX while the rest of the VWIC-MFT ports assigned to ATM data services can interface to an ATM network.

Figure 4
ATM and Voice Applications with AIM-ATM-VOICE-30



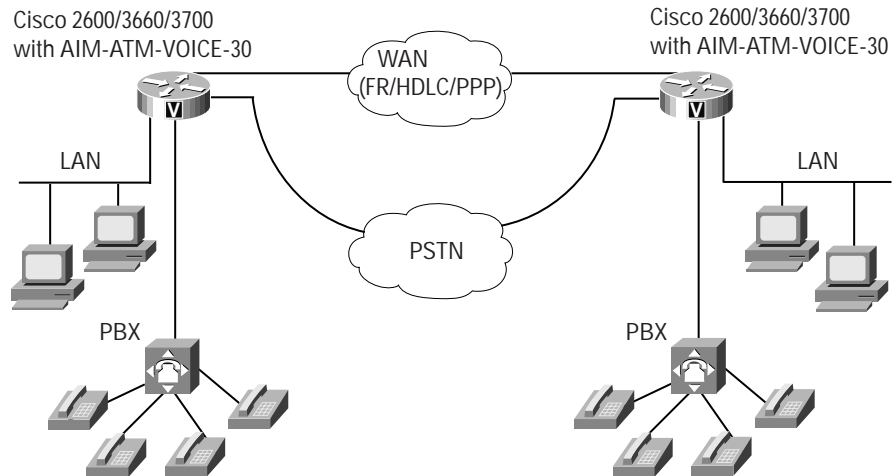
Scenario 4—Providing FR/HDLC/PPP encapsulation and Voice on the same T1/E1

Figure 5 shows another useful application of the AIM-ATM-VOICE-30 module. This AIM can support Frame Relay (FR), high-level data link control (HDLC), and Point-to-Point Protocol (PPP). Also, FR/HDLC/PPP encapsulation and channelized voice are supported on the same T1/E1. This is especially useful for reducing the recurring cost of PSTN access and serial WAN data access for low end systems. A combination of DS0, PRI, and channel groups can be configured on the same T1/E1 interface (or across two ports of the same VWIC).

Figure 5



Integrated voice and serial WAN data access with AIM-ATM-VOICE-30



Key Benefits AIM-ATM, AIM-VOICE-30, AIM-ATM-VOICE-30

Maximizes System Resources

- Provides optimum voice capability when needed (AIM-VOICE-30)
- Provides simultaneous support for multiple voice channels and ATM IMA trunks (AIM-ATM-VOICE-30)

Reduces Costs

- Enables users to deploy additional services without consuming valuable network module space

Supports Industry Standards

- Medium complexity Codec types of G.711 a-law, G.711 u-law, G.726-32K, G.726-24K, G.726-16K, G.729A, G.729AB are all supported
- High complexity Codec types of G.723.1 (all variations) G.728, G.729, G.729B and GSM-FR are supported
- ATM standards such as AAL2, AAL5, UNI 3.0, UNI 3.1, and UNI 4.0 are supported

Cost-effective ATM Access Services

- The AIM-ATM-VOICE-30 offers a cost-effective solution for supporting low-speed T1/ E1 ATM WAN connections as well as voice services, without the use of a network module.
- One (1) to four (4) ports of T1 or E1 ATM connections for the Cisco 2600 and 2600XM Series, and one (1) to eight (8) ports of T1 or E1 ATM connections for the Cisco 2691, 3660, or 3700 Series, are supported offering more flexibility as data traffic increases to meet user needs.

Cost-effective Voice Services

- The AIM-VOICE-30 and AIM-ATM-VOICE-30 offer a cost-effective solution for supporting voice services without the use of a network module.



- On the Cisco 2600 and 2600XM Router, up to 30 voice channels are supported. On the Cisco 2691, 3660, and 3700 Series, up to 60 voice channels are supported using two AIM modules. The open network module slot can be used to support additional NM for greater multifunctional support.
- Integrated WAN data access and channelized voice on the same E1/T1 are supported which reduces the recurring cost of data WAN and PSTN access.

Hardware versus Software-Based AAL2/AAL5 Functionality on the Cisco 2600 and 2600XM

- The AIM-ATM-VOICE-30 significantly reduces the load on the 2600 and 2600XM Routers' CPU (CPU utilization) as compared to the software-based solution.
- By offloading the router CPU of the cell-processing function, the router performs at a higher level, resulting in additional feature support.
- The AIM-ATM-VOICE-30 can support a significantly larger number of connections or voice channels when compared to software-based solutions.
- Uses a dedicated onboard (AIM) hardware-accelerated coprocessor, capable of supporting both AAL2 (ITU I.366.1/I.363.2) and AAL5 (VoIP, proprietary VoFR-over-AAL5), offloading the main router CPU from the processor-intensive task of ATM cell segmentation and reassembly.

IP and ATM Quality of Service

- Provisioning networks over ATM by incorporating AAL2 or AAL5 encapsulation provides higher quality of service (QoS) and a low-cost alternative to circuit-based services.
- The Cisco 2600/2600XM/2691/3660/3700 Series with the AIM-ATM enables service providers to increase revenue by building differentiated service options based on premium, standard, or best-effort service classes.

Voice Functionality

- The AIM-VOICE-30 and AIM-ATM-VOICE-30 offer flexible, high-density digital voice over ATM AAL2 and AAL5 support for up to 30 or 60 voice calls when used with a 2-port VWIC-MFT card.
- This application provides support for both AAL2 (ITU I.366.1/I.363.2) and AAL5 (VoIP, proprietary VoFR-over-AAL5), with up to 4 T1/E1 connections (2600, 2600XM) or up to 8 T1/E1 connections (2691, 3660, 3700 Series).

Feature Summary

AIM-ATM and AIM-ATM-VOICE 30

The AIM-ATM supports the following ATM services:

- Supports up to four ATM T1/E1 ports per AIM, using two 2-port multiflex T1/E1 VWICs in WIC slots, NM-xFE2W, NM-2W, or NM-HDV
- ATM class of service (CoS) features CBR, VBR-nrt, VBR-rt, ABR, and UBR
- AAL5: H.323 VoIP, up to four T1/E1 channels of AAL5 (with IMA support)
- VoATM-AAL2 (trunked only)



- Supports QoS features: Low-Latency Queuing (LLQ), Class-Based Weighted Fair Queuing (CBWFQ), per-virtual circuit queuing, pre-ATM VC shaping for non real-time variable bit rate (VBR-nrt), Resource Reservation Protocol (RSVP), IP CoS map to ATM QoS services, CRTP (over Point-to-Point/Multilink over ATM)
- Permanent virtual circuit (PVC) and switched virtual circuits (SVC) support, where SVC is for data only
- ATM Forum UNI 3.0, UNI 3.1, and UNI 4.0
- LAN Emulation 2.0 Client and Server
- Per VC queuing for segmentation
- Support for up to 1024 AAL5 VCs for data/voice features
- Support for up to 1024 AAL2 VCs with up to 255 subchannels each for voice per AIM
- Network clock management support, which allows synchronization between the ATM network and PBX/Public Switched Telephone Network (PSTN)
- 1-Kbps resolution for sustained cell rate (SCR) and peak cell rate (PCR)
- 32-Kbps minimum traffic rate
- 13-bit range for VPI/VCI per interface
- Maximum Burst Size (MBS) is up to 255 cells per VC
- Dynamic management of the cell scheduler table
- Operations and management (OAM) support (F5)
- Early Packet Discard.
- AAL5 reassembly time-outs
- AAL2 subcell multiplexing support
- RFC 1483 support for multiple encapsulations over ATM
- RFC 1577 support for routing over ATM
- Multiprotocol routing over ATM (MPOA) client and server
- IETF PPP over ATM
- Next Hop Resolution Protocol (NHRP)
- ILMI 4.0
- IMA 1.1 Support

AIM-VOICE-30 and AIM-ATM-VOICE-30

- Supported on all Cisco 2600, 2600XM, 2691, 3660, and 3700 Series multiservice platforms
- Adds VoATM support on Cisco 2600 and 2600XM Series
- Provides T1/E1 voice services in a Cisco 2600/2600XM WIC slot
- When installed in the Cisco 2600 and 2600XM Series routers, supports up to 30 voice channels of medium-complexity codec or 16 voice channels of high-complexity codec
- When installed in the Cisco 2691, 3660, or 3700 Series routers, supports up to 60 voice channels of medium-complexity codec or 32 voice channels of high-complexity codec with two AIM-VOICE-30 or AIM-ATM-VOICE-30 modules
- Channelized T1/E1 interfaces to PBX/PSTN (via VWIC-MFT)



- Medium complexity Codec types of G.711 a-law, G.711 u-law, G.726-32K, G.726-24K, G.726-16K, G.729A, and G.729AB
- High complexity Codec types of G.723.1 (all variations) G.728, G.729, G.729B and GSM-FR
- VoIP, VoFR, VoAAL2, VoAAL5
- Echo cancellation
- Voice activity detection
- T1 channel associated signaling (CAS)
- E1 channel associated signaling (CAS)
- T1 Primary Rate Interface signaling (network side and user side)
- E1 Primary Rate Interface signaling (network side and user side)
- T1 QSIG signaling
- E1 QSIG signaling
- T1 FGD
- E1 R2 signaling—up to 30 country variations
- Transparent CCS
- Connection trunk
- Private Line Automatic Ringdown
- Interactive Voice Response and AAA
- Dual-tone multifrequency (DTMF) Tone Relay
- Cisco FAX relay

AIM-ATM-VOICE-30

- Supports integrated PSTN and data WAN access on T1/E1
- Supports FR/HDLC/PPP
- Supports a combination of DS0, PRI, and channel groups on same T1/E1 or across two ports of the same VWICAIM-ATM, AIM-VOICE-30, and AIM-ATM-VOICE-30

Requirements and Support

Feature	Description
Physical	AIM form factor
Platforms Support	Cisco 2610-2613, 2620, 2621, 2650, 2651, 2610XM, 2611XM, 2620XM, 2621XM, 2650XM, 2651XM, 2691, 3661, 3662, 3725, 3745



Feature	Description
Hardware Prerequisites	Cisco 2600 and 2600XM: <ul style="list-style-type: none"> • Available AIM slot • VWIC-MFT for WAN, PSTN or PBX connections Cisco 3660: <ul style="list-style-type: none"> • MIX module and available AIM slots • VWIC-MFT in a NM-1FE1R2W, NM-1FE2W, NM-1FE2W-V2, NM-2FE2W, NM-2FE2W-V2, NM-2W or NM-HDV Cisco 2691, 3700: <ul style="list-style-type: none"> • Available AIM slot • VWIC-MFT in a chassis WIC slot or in NM-1FE1R2W, NM-1FE2W, NM-1FE2W-V2, NM-2FE2W, NM-2FE2W-V2, NM-2W, or NM-HDV.
Number of AIM modules per 2600 or 2600XM router (except 2691)	One (1)
Number of AIM modules per 2691, 3660, or 3700 Series router	Two (2)
Maximum number of ATM T1/E1s supported	Up to 4 ATM T1/E1's per AIM-ATM or AIM-ATM-VOICE-30
Maximum number of voice channels supported	30 voice channels per AIM-VOICE-30 or AIM-ATM-VOICE-30
Minimum Cisco IOS Release required	Cisco 2600 Series, 3660 <ul style="list-style-type: none"> • AIM-ATM: 12.2(2)XA/12.2.4T • AIM-VOICE-30: 12.2(2)XB/12.2.8T • AIM-ATM-VOICE-30: 12.2(2)XB/12.2.8T Cisco 2600XM Series <ul style="list-style-type: none"> • AIM-ATM, AIM-VOICE-30, AIM-ATM-VOICE-30: 12.2.8T1 Cisco 2691, 3700 Series <ul style="list-style-type: none"> • AIM-ATM, AIM-VOICE-30, AIM-ATM-VOICE-30: 12.2(11)YT and 12.2(13)T
Required Cisco IOS Image	<ul style="list-style-type: none"> • Any Cisco IOS "Plus" or "SP Services" Feature Sets

Product Number Information

Part Number	Product Description
AIM-ATM	AIM supporting ATM features for Cisco 2600, 2600XM, 2691, 3660, and 3700
AIM-ATM=	AIM supporting ATM features, spare
AIM-ATM-1T1	Bundle of AIM-ATM and VWIC-1MFT-T1
AIM-ATM-1E1	Bundle of AIM-ATM and VWIC-1MFT-E1
AIM-ATM-4T1	Bundle of AIM-ATM and two VWIC-2MFT-T1
AIM-ATM-4E1	Bundle of AIM-ATM and two VWIC-2MFT-E1
AIM-ATM-1T1/E1	Bundle of AIM-ATM and VWIC2-1MFT-T1/E1



Part Number	Product Description
AIM-ATM-4T1/E1	Bundle of AIM-ATM and two VVIC2-2MFT-T1/E1
AIM-VOICE-30	AIM supporting voice/fax DSP features
AIM-VOICE-30=	AIM supporting voice/fax DSP features, spare
AIM-ATM-VOICE-30	AIM supporting ATM and voice/fax DSP features
AIM-ATM-VOICE-30=	AIM supporting ATM and voice/fax DSP features, spare

Regulatory Compliance, Safety, EMC, Telecom, Network Homologation

The AIM-ATM, AIM-VOICE-30, or AIM-ATM-VOICE-30 module does not change the standards (Regulatory Compliance, Safety, EMC, Telecom, Network Homologation)

When installed in a Cisco 2600 or 3660, the AIM-ATM, AIM-VOICE-30, or AIM-ATM-VOICE-30 module does not change the standards (Regulatory Compliance, Safety, EMC, Telecom, Network Homologation) of the router itself. See the data sheets for the Cisco 2600, 2600XM, 2691, 3660 and 3700 routers.

Hardware Specifications

Dimensions

- Width: 3.25 in (8.26 cm)
- Height: .25 in (.635 cm)
- Depth: 5.25 in (13.34 cm)

Environmental Operating Range

- Operating Temperature: 32 to 104 F (0 to 40 C)
- Non-operating Temperature: -4 to 149 F (-20 to 65 C)
- Relative Humidity: 10 to 85% non condensing, operating, non operating



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