Cisco AS5200 Universal Access Server Overview

The Cisco AS5200 universal access server is a versatile data communications platform that provides the functions of an access server, a router, modems, and terminal adapters (TAs) in a modular chassis.

The access server provides the greatest benefit for midsized organizations or service providers that need to centralize processing capabilities for mobile users and telecommuters.

The access server is optimized for high-speed modem access and is ideally suited for all traditional dial-up applications, such as access to a host, electronic mail, file transfer, and dial-in access to a LAN.

System Components

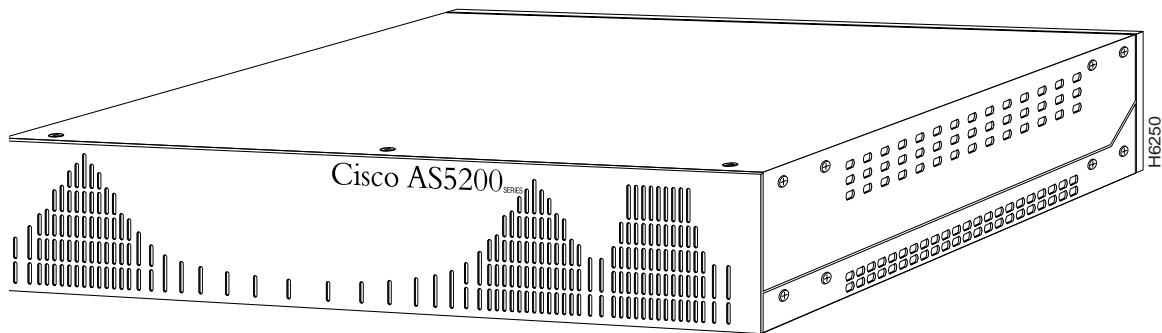The access server consists of the following components:

- One 19-inch modular chassis with three slots for feature cards and a high-speed backplane

- Two serial WAN ports

- One Ethernet LAN port

- One console port for local administrative access

- One auxiliary port for remote administrative access
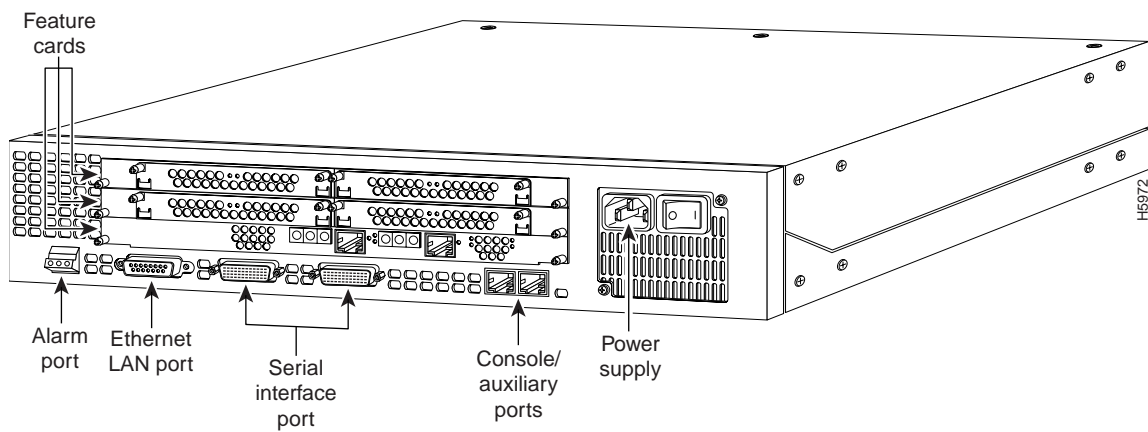
- An integral AC or DC power supply

Figure 1-1 shows the front panel of the access server, and Figure 1-2 shows the rear panel.

Figure 1-1   Cisco AS5200 Front Panel

Figure 1-2   Cisco AS5200 Rear Panel

Feature Cards

The access server includes three slots in which you can install a combination of the following feature cards:

- Dual T1/Primary Rate Interface (PRI) card

- Dual E1/PRI card

- Carrier card

You can install one of the following feature cards in any of the three available slots:

- Dual T1/PRI card with integrated channel service units (CSUs)

- Dual E1/PRI card with one slot for an optional 12-port module

In the two remaining slots, you can install carrier cards.

Dual T1/PRI Card

The dual T1/PRI card routes incoming digital T1 lines to the 6-port or 12-port modules. The dual T1/PRI card provides RJ-48C connectors to terminate trunks. The dual T1/PRI card performs all necessary equalization and gain functions to support 6000 feet of 24-gauge unshielded cable. This card complies with all Bell Core standards relating to T1 (ANSI T1.403) alarms, loopbacks, and error detection. The dual T1/PRI card is equipped with integrated CSUs.

The dual T1/PRI card handles up to 48 digital signal level 0 (DS-0) channels from two trunks. Each channel carries either a pulse code modulation (PCM)–encoded voice channel or digital data. The dual T1/PRI card supports 64-kbps clear channel operation for data or voice channels and feature group B operation for voice channels.

Figure 1-3 shows the dual T1/PRI card.
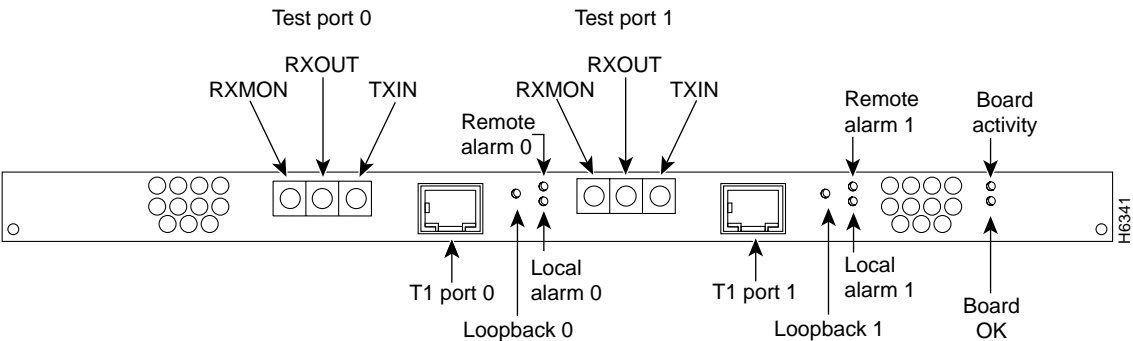
Figure 1-3   Dual T1/PRI Card

Table 1-1 describes a typical maximum configuration. Note that the dual T1/PRI and the carrier cards are not slot dependent. Even though the system can contain 60 ports, the dual T1/PRI card can only support 48 simultaneous calls. The 12 extra ports are used for redundancy.

Table 1-1   Cisco AS5200 T1/PRI Port Configurations

Slot	Card	Maximum Ports
2	6-port MICA modem module carrier card or 12-port Microcom/V.110 carrier card	30 MICA modem ports or 24 Microcom/V.110 modem ports
1	6-port MICA modem module carrier card or 12-port Microcom/V.110 carrier card	30 MICA modem ports or 24 Microcom/V.110 modem ports

Indicators

Table 1-2 describes the LEDs on the dual T1/PRI feature card. The LEDs indicate the current operating condition of the card. You can observe the LEDs, note any fault condition that the card is encountering, and contact your system administrator or a customer service representative, if necessary.

Table 1-2   Dual T1/PRI Feature Card LEDs

LED	State	Description
Board Activity	Flickering	The CSU/DSU in the card is communicating with a remote CSU/DSU.
Board OK	On	The T1/PRI card has passed initial power-ON diagnostics tests and is operating normally.
Loopback	On	A local or remote loopback diagnostic test is running on the associated T1 port.
Remote alarm	On	A remote alarm indication signal (AIS) has been received on the associated T1 port. The AIS is received when there has been a loss of signal (LOS).
Local alarm	On	The associated T1 port has detected local loss of signal (LOS) or out of frame (OOF) errors.

You can isolate problems on the dual T1/PRI card by connecting external test equipment to the RECEIVE jack to monitor signals coming into the RJ-48C port without interrupting normal data transmission. You can use the TRANSMIT jack to inject data, which interrupts normal data transmission.

Dual T1/PRI Card Network Specifications and Port Pinouts

Table 1-3 lists the network specifications you should consider before connecting the dual T1/PRI card to a network.

Table 1-3   Dual T1/PRI Card Network Specifications

Description	Specification
Line rate	1.544 Mbps
Data rates	*number* x 56 kbps or *number* x 64 kbps, where *number* = 1 to 24
Standards	AT&T Pub. 62411, 54016, and 43801; ANSI T1.403

Table 1-4 lists the dual T1/PRI card port pinouts. Use a straight-through RJ-48C-to-RJ-48C cable to connect the T1 port to an RJ-48C jack.

Table 1-4   **Dual T1/PRI Card Port (RJ-48C) Pinouts**

RJ-48C8 Pin[1]	Description
1	Receive Ring from telco
2	Receive Tip from telco
4	Transmit Ring to telco
5	Transmit Tip to telco

1. Pins 3, 6, 7, and 8 are not used.

Dual E1/PRI Card

The dual E1/PRI card (see Figure 1-4) is installed in the Cisco AS5200 to provide physical termination for two E1/PRI lines. The card is designed to support the E1 cable standard of 30 Bearer (B) channels for voice and data, one Data (D) channel for signaling, and one channel for framing. Each channel transmits at up to 64 kbps for a combined total of 2.048 Mbps for each E1/PRI line.

The Cisco AS5200 is used to service calls from users accessing remote services using a variety of network protocols. Calls are terminated in the Cisco AS5200 through up to 60 modems or modem/terminal adapter combinations. Your access server can support a combination of MICA modems, Microcom modems, and V.110 terminal adapters. User data can then be routed through the Ethernet or synchronous serial ports on the Cisco AS5200 chassis.
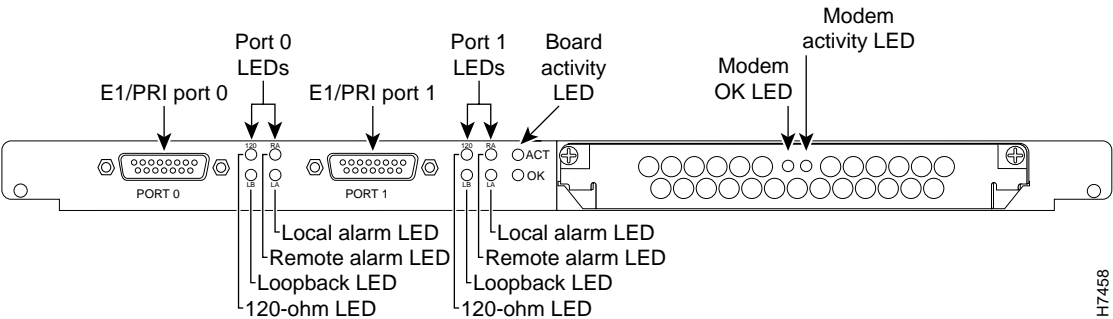
Figure 1-4   Dual E1/PRI Card

Table 1-5 describes a typical maximum configuration. Note that the dual E1/PRI and the carrier cards are not slot dependent. Even though the system can contain 72 ports, the dual E1/PRI card can only support 60 simultaneous calls. The 12 extra ports are used for redundancy.

Table 1-5   Cisco AS5200 E1/PRI Port Configurations

Slot	Card	Maximum Ports
2	6-port MICA modem module carrier card or 12-port Microcom/V.110 carrier card	30 MICA modem ports or 24 Microcom/V.110 modem ports
1	6-port MICA modem module carrier card or 12-port Microcom/V.110 carrier card	30 MICA modem ports or 24 Microcom/V.110 modem ports
0	Dual E1/PRI card with: Optional 12-port Microcom modem card or Optional 12-Port V.110 TA card	12 Microcom modem ports or 12 V.110 TAs

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> **Note** When mixing Microcom, MICA, and the Dual E1/PRI cards, the following
> configuration is not supported:
> Slot 2: Microcom 56K card
> Slot 1: MICA modem card
> Slot 0: Dual E1/PRI card

The following list describes the features of the Dual E1/PRI card:

- Two DB-15 connectors for physically terminating two E1/PRI lines.

- Channelized E1 support for assigning E1 time slots in 1 to 30 channel groups.

- Optional 12 modem ports (Microcom) or terminal adapters for call termination on E1
  channels. The optional 12 modems and two carrier cards with 48 modems are required
  if a modem is needed for each of the 60 B channels contained in two E1/PRI lines.

- Optional 30 modem ports (MICA) for call termination on E1 channels.

- LEDs to indicate the operating condition of the E1/PRI lines.

- Full management of the dual E1/PRI card though a command line interface or
  CiscoWorks network management software.

The dual E1/PRI card includes two DB-15 ports for terminating 120-ohm balanced lines or
75-ohm unbalanced lines. Jumper settings on the card configure the ports for the line
termination. Jumper positions and settings are listed in the section "Setting E1 Jumpers" in
Appendix A, "Maintaining the Universal Access Server."

Indicators

Table 1-6 describes the LEDs on the dual E1/PRI feature card. The LEDs indicate the
current operating condition of the card. You can observe the LEDs, note any fault condition
that the card is encountering, and contact your system administrator or a customer service
representative, if necessary.

Table 1-6   Dual E1/PRI Feature Card LEDs

| LED	State	Description
Activity	Flickering	The CSU/DSU in the card is communicating with a remote CSU/DSU.
Board OK	On	The E1/PRI card has passed initial power-up diagnostics tests and is operating normally
Loopback	On	A local or remote loopback diagnostic test is running on the associated E1 port.
120-ohm	On	The port is configured for 120-ohm line termination.
Remote alarm	On	A remote alarm indication signal (AIS) has been received on the associated E1 port. The AIS is received when there has been a loss of signal (LOS).
Local alarm	On	The associated E1 port has detected local loss of signal (LOS) or out of frame (OOF) errors.

Carrier Card

You can install up to two carrier cards in any unpopulated slot of the access server chassis. Each carrier card includes two slots in which you can install any combination of the following 12-port modules:

- V.34 12-port module

- 56K 12-port module

- V.110 12-port module

The modules connect through the carrier card and the system backplane to a dual T1/PRI or dual E1/PRI card installed in the access server chassis. Data is transmitted or received on T1 or E1 lines connected to the dual T1/PRI or dual E1/PRI card and then routed to the 12-port modules installed in the carrier card.

Figure 1-5 shows the carrier card.

Figure 1-5   Carrier Card
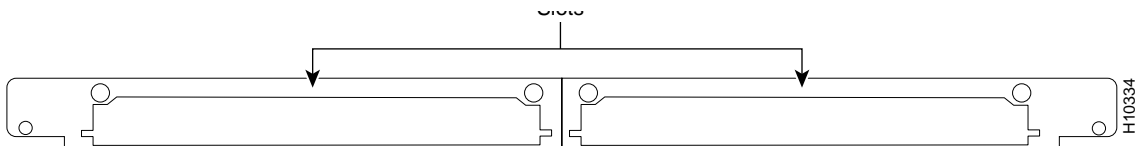
12-Port Modules

The access server supports the following 12-port modules:

- V.34 12-port module
- 56K 12-port module
- V.110 12-port module

In an access server with a dual T1/PRI card installed, you can install up to four 12-port modules for a total of 48 ports. If your access server includes a dual E1/PRI card, you can install up to five 12-port modules for a total of 60 ports. The dual E1/PRI card (see Figure 1-4) includes an extra slot for a 12-port module, which provides you with 12 extra ports to terminate up to 60 lines.

Note   The 12-port modules are *not* included unless specified by your order. You can order bundled systems that include 12-port modules or you can order the modules separately. Refer to the section "Getting Help" in the appendix "Troubleshooting the Universal Access Server" for ordering information.

V.34 12-Port Module

Each modem on the V.34 12-port module supports V.42*bis* data compression and uses the Hayes Smartmodem AT and V.25*bis* command sets. The Microcom Networking Protocol (MNP) and V.42 error-correction protocol standards provide error-free performance. The modem offers MNP Class 10 with Adverse Channel Enhancements (ACE). MNP 10 includes:

- Multiple connection attempts during autoreliable link negotiation
- Negotiated speed upshifts
- Aggressive adaptive packet assembly
- Dynamic Transmit Level Adjustment

The V.34 module supports the following protocol and modulation standards:

- ITU-T V.42*bis* compression and MNP Class 5 data compression

- ITU-T V.42 error correction (including MNP Class 2, 3, and 4 and LAPM)

- ITU-T V.34 at 33600, 31200, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, and 2400 bps

- ITU-T V.32 at 9600 and 4800 bps

- ITU-T V.25 modem standard

- ITU-T V.23 in two modes: split speed and half-duplex 1200 bps

- ITU-T V.22*bis* at 2400 bps

- ITU-T V.22 at 1200 and 600 bps

- ITU-T V.21 at 300 bps

- V.FC at 28800, 26400, 24000, 21600, 19200, 16800, and 14400 bps

- Bell 212A at 1200 bps

- Bell 103A at 0 to 300 bps

- MNP Class 10 ACE

- MNP 10EC for adverse line conditions, including cellular

Figure 1-6 shows the V.34 12-port module.

Figure 1-6   V.34 12-Port Module
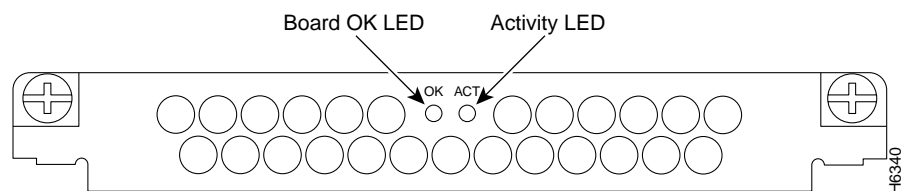
56K 12-Port Module

The 56K 12-port module uses Rockwell's K56Flex technology. The module can send data at up to 56 kbps and receive data at up to 33.6 kbps. Connections at 56 kbps start as analog, are converted to digital, and are *not* converted back to analog at the service provider. Because one conversion (from digital to analog) is omitted, speeds of up to 56 kbps are possible. However, the actual speed that you can achieve with the module depends on the condition of your local telephone network.

Note The initial release of the 56K module operates at up to 33.6 kbps (V.34) and offers a firmware upgrade to enable 56 kbps (K56Flex) when it is available.

The 56K 12-port module supports the following protocol and modulation standards:

- K56Flex modulation at 56000, 54000, 52000, 50000, 48000, 46000, 44000, 42000, 40000, 38000, 36000, 34000, and 32000 bps

- ITU-T V.42*bis* compression and MNP Class 5 data compression

- ITU-T V.42 error correction (including MNP Class 2, 3, and 4 and LAPM)

- ITU-T V.34 33600, 31200, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, and 2400 bps

- ITU-T V.32 at 9600 and 4800 bps

- ITU-T V.25 modem standard

- ITU-T V.23 in two modes: split speed and half-duplex 1200 bps

- ITU-T V.22*bis* at 2400 bps

- ITU-T V.22 at 1200 and 600 bps

- ITU-T V.21 at 300 bps

- Bell 212A at 1200 bps

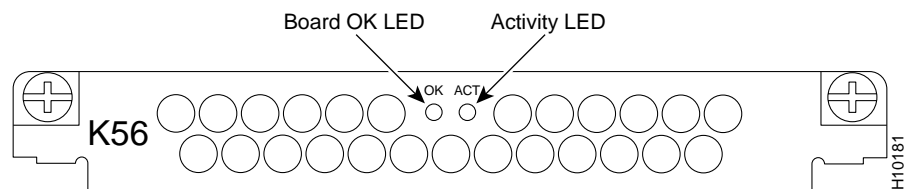- Bell 103A at 0 to 300 bps

- MNP Class 10 ACE

- MNP 10EC for adverse line conditions, including cellular

Figure 1-7 shows the 56K 12-port module.

Figure 1-7   56K 12-Port Module

V.110 12-Port Module

The V.110 12-port module includes onboard terminal adapters (TAs) that can terminate up to 12 V.110 rate-adapted digital calls. The V.110 rate adaption protocol is used primarily for:

- Adapting the slower asynchronous data rates of older equipment to the faster data rate of ISDN B channels

- Cellular data applications over the Global System for Mobile Telecommunications (GSM)

- Asynchronous connectivity for European ISDN TAs

The V.110 12-port module includes the following features:

- Compatible with the ITU-T V.110 recommendation

- Optimized for GSM cellular data networks

- Compatible with major GSM switches

- Compatible with legacy ISDN V.110 terminal adapters

- Supports the following data terminal equipment (DTE) and network speeds: 19200, 9600, 4800, 2400, 1200, and 600

- Supports up to 60 GSM calls

- Supports different network/DTE speeds

- Supports end-to-end hardware flow control

- Supports AT command subset

- Supports AT command autobaud

- Supports out-of band port for call setup and teardown

- Supports firmware download over the DTE interface (useful for firmware upgrades)

- Supports V.110 outgoing calls (dial-out) for dial-on-demand or bandwidth-on-demand routing

- OK and Activity LEDs

Figure 1-8 shows the V.110 12-port module.

Figure 1-8   V.110 12-Port Module
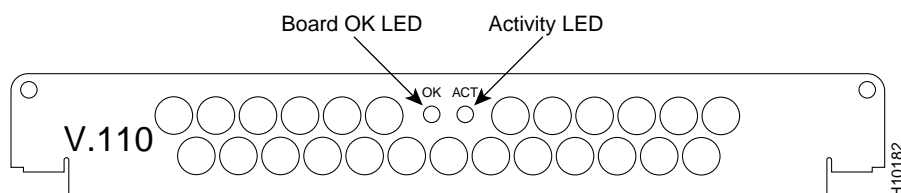
Power Supply

Either an AC or DC power supply is available. The power supply provides DC power to the installed feature cards via connectors on the backplane.

Six-Port MICA Modules and Carrier Cards

The 6-port MICA modules can send data at up to 56 kbps and receive data at up to 33.6 kbps. Connections at 56 kbps start as analog, are converted to digital, and are *not* converted back to analog at the service provider. Because one conversion (from digital to analog) is omitted, speeds of up to 56 kbps are possible. However, the actual speed that you can achieve with the module depends on the condition of your local telephone network.

The 6-port MICA modules and carrier cards support the following protocol and modulation standards:

- Rockwell K56flex at 56000 to 32000 in 2000 bps increments

- Software upgradeable to ITU V.90 56K

- ITU-T V.34 Annex 12 at 33600 and 31200 bps

- ITU-T V.34 at 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, and 2400 bps

- ITU-T V.32terbo at 19,200, 16,800, 14400, 12000, 9600, 7200, and 4800 bps

- ITU-T V.32bis at 14400, 12000, 9600, 7200, and 4800 bps

- ITU-T V.32 at 9600 and 4800 bps

- ITU-T V.23 1200/75 bps (back channel)

- ITU-T V.22bis at 2400 and 1200 bps

- ITU-T V.22 at 1200 bps

- ITU-T V.21 at 300 bps

- Bell 212A at 1200 bps

- Bell 103A at 300 bps

- ITU-T V.42 error correction (including MNP 2-4 and LAPM)

- ITU-T V.42bis (1K nodes) and MNP 5 data compression

Figure 1-9 shows a MICA carrier card.

Figure 1-9   **MICA Carrier Card**
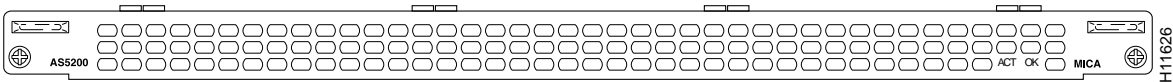
Specifications

The specifications of the access server are listed in Table 1-7.

Table 1-7   **System Specifications**

Description	Specification
Dimensions (H x W x D)	3.5 x 17.5 x 15 in. (8.89 x 44.45 x 38.1 cm)
Weight	25 lb (11.4 kg)
Processor	20-MHz Motorola 68EC030
Operating environment	32 to 104°F (0 to 40°C)
Nonoperating temperature	–40 to 185°F (–40 to 85°C)
Operating humidity	5 to 95%, noncondensing
Noise level	34 dB[1] @ 3 feet(0.914 m)
Input voltage, AC power supply Current Frequency Power dissipation	100 to 240 VAC[2] 1.5 to 3.0A 50/60 Hz 180W (maximum), 135.5 Btus[3] per hour
Input voltage, DC power supply Maximum input current Typical input current Power dissipation Output voltage 5V Output voltage 12V Output voltage –12V Protection	–48 to –60 VDC 6.0A 4.0A 180W (maximum) 5.0 VDC 26A 12.00 VDC 3A –12.00 VDC 2A Current limit, overpower

Table 1-7   System Specifications (Continued)

Description	Specification
WAN interface options	Dual T1/PRI (RJ-48C) Dual E1/PRI (DB-15) Five-in-one synchronous serial (DB-60)
LAN interface options	Ethernet AUI[4] (DB-15)
Synchronous serial interfaces (five-in-one synchronous serial WAN ports)	EIA/TIA[5]-232, EIA/TIA-449, V.35, X.21 (NRZ/NRZI[6] and DTE/DCE[7] mode) EIA-530 (NRZ/NRZI and DTE mode) The five-in-one synchronous serial interface uses the DB-60 connector at the chassis.
Console and auxiliary ports	Asynchronous serial (RJ-45)
Alarm relay rating: Voltage Current Max switching power Maximum switching voltage	 30 VDC 5A 150 W[8] 250 VAC
Regulatory compliance	FCC Part 68. See the *Regulatory Compliance and Safety Information* document that shipped that shipped with the access server.

1. dB = decibels.
2. VAC = volts alternating current; VDC = volts direct current.
3. Btu = British thermal unit.
4. AUI = attachment unit interface.
5. EIA/TIA = Electronic Industries Association/Telecommunications Industries Association.
6. NRZ = nonreturn to zero; NRZI = nonreturn to zero inverted.
7. DTE = data terminal equipment; DCE = data communications equipment.
8. W = Watts.

FCC Part 68

The following text is required for Federal Communications Commission (FCC) Part 68 regulatory compliance:

This equipment complies with Part 68 of the FCC rules. On the side of this Network Module interface card is a label that contains, among other information, the FCC registration number. If requested, this information must be provided to the telephone company.

If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. If advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice for you to make the necessary modifications to maintain uninterrupted service.

If you experience any trouble with this equipment, please contact the following for repair or warranty information.

Cisco Systems, Inc.
RMA Receiving
1135 Walsh Avenue
Santa Clara, California 95050

If the trouble is causing harm to the telephone network, the telephone company may request that you remove the equipment from the network until the problem is resolved.

It is recommended that the customer install an AC surge arrestor in the AC outlet to which this device is connected. This is to avoid damaging the equipment caused by local lightning strikes and other electrical surges.

The Cisco AS52-2CT1 has the 6.0F service order cable.

The unit has the following facility interface codes: 04DU9-BN, 04DU9-DN, 04DU9-IKN, 04DU9-ISN.