CHAPTER 1

# Cisco 2500 Series Overview

The Cisco 2500 series is a multiprotocol router platform that is the basis for the following four product types:

- A compact single LAN multiprotocol router
- A compact router/hub with 8, 14, or 16 Ethernet ports
- A compact router/access server with 8 or 16 asynchronous serial ports
- A dual LAN/multiprotocol router

This chapter provides an overview of the systems and their physical configuration, and contains the following information:

- System Specifications
- Memory Configurations

The 2500 series is available in four fixed-configuration network-interface options, which are listed in Table 1-1 and shown in Figure 1-2 through Figure 1-8.

**Table 1-1 Network Interface Options**

| Model | Ethernet | Token Ring | Serial | BRI | Async | Hub | Product Type |
|---|---|---|---|---|---|---|---|
| 2501 | 1 | 0 | 2 | 0 | 0 | 0 | Multiprotocol router |
| 2502 | 0 | 1 | 2 | 0 | 0 | 0 | |
| 2503 | 1 | 0 | 2 | 1 | 0 | 0 | |
| 2504 | 0 | 1 | 2 | 1 | 0 | 0 | |
| 2505 | 0 | 0 | 2 | 0 | 0 | 8 | Router/hub |
| 2507 | 0 | 0 | 2 | 0 | 0 | 16 | |
| 2516 | 0 | 0 | 2 | 1 | 0 | 14 | |
| 2509 | 1 | 0 | 2 | 0 | 8 | 0 | Router/access server |
| 2510 | 0 | 1 | 2 | 0 | 8 | 0 | |
| 2511 | 1 | 0 | 2 | 0 | 16 | 0 | |
| 2512 | 0 | 1 | 2 | 0 | 16 | 0 | |
| 2513 | 1 | 1 | 2 | 0 | 0 | 0 | Dual LAN/ multiprotocol router |
| 2514 | 2 | 0 | 2 | 0 | 0 | 0 | |
| 2515 | 0 | 2 | 2 | 0 | 0 | 0 | |

The multiprotocol router is a fixed-configuration system that is ready for external network hardware connections and software configuration. The router system code operates from Flash memory by default. (For more information on system-code operation, see the section “System Operation Prerequisites” in the chapter “Preparing for Installation.”)

The network interface types include Ethernet 802.3 (AUI and RJ-45), Token Ring 802.5 (DB-9), synchronous serial, asynchronous serial, and Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI). The chassis can be rack- or wall-mounted, or it can be placed on a table or desktop. Figure 1-1 shows the front of the router.

**Figure 1-1 Router Front View**


The Cisco 2500 series hub is available with 8, 14, or 16 hub ports supporting Ethernet interfaces. A single BRI port is supported with 14 hub ports. The hub system code operates from Flash memory by default. For more information on system-code operation, see the section “System Operation Prerequisites” in the chapter “Preparing for Installation.”

The Cisco 2500 series access server contains one or two asynchronous 68-pin SCSI-type connectors, depending on the access server model. Using a modular SCSI-type breakout cable (available from Cisco Systems), you can connect to 8 asynchronous serial devices. The modular SCSI-type breakout cable contains one 68-pin connector on one side of the cable and eight DB-25 connectors or RJ-45 connectors on the other side of the cable (depending on the type of cable you ordered). Therefore, if the Cisco access server contains one asynchronous 68-pin SCSI-type connector, using the modular SCSI-type breakout cable you can connect to eight asynchronous serial devices. If the Cisco access server contains two asynchronous 68-pin connectors, you can connect to 16 asynchronous serial devices.

The access server interface types include Ethernet 802.3 (AUI), Token Ring 802.5 (DB-9), asynchronous serial, and synchronous serial. The chassis can be rack or wall-mounted, or it can be placed on a table or desktop.

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**Note** This publication takes you through the initial hardware installation and selected maintenance procedures. Refer to the *Router Products Getting Started Guide* or the router products configuration publication for software configuration and operating information. To order UniverCD, Cisco’s library of product information in CD-ROM format, or printed documentation, refer to *Ordering Cisco Documentation*, which is in your warranty package.

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An example of each router configuration is shown in Figure 1-2 through Figure 1-8.

**Figure 1-2 Configurations for Models 2501 and 2503 Multiprotocol Routers**

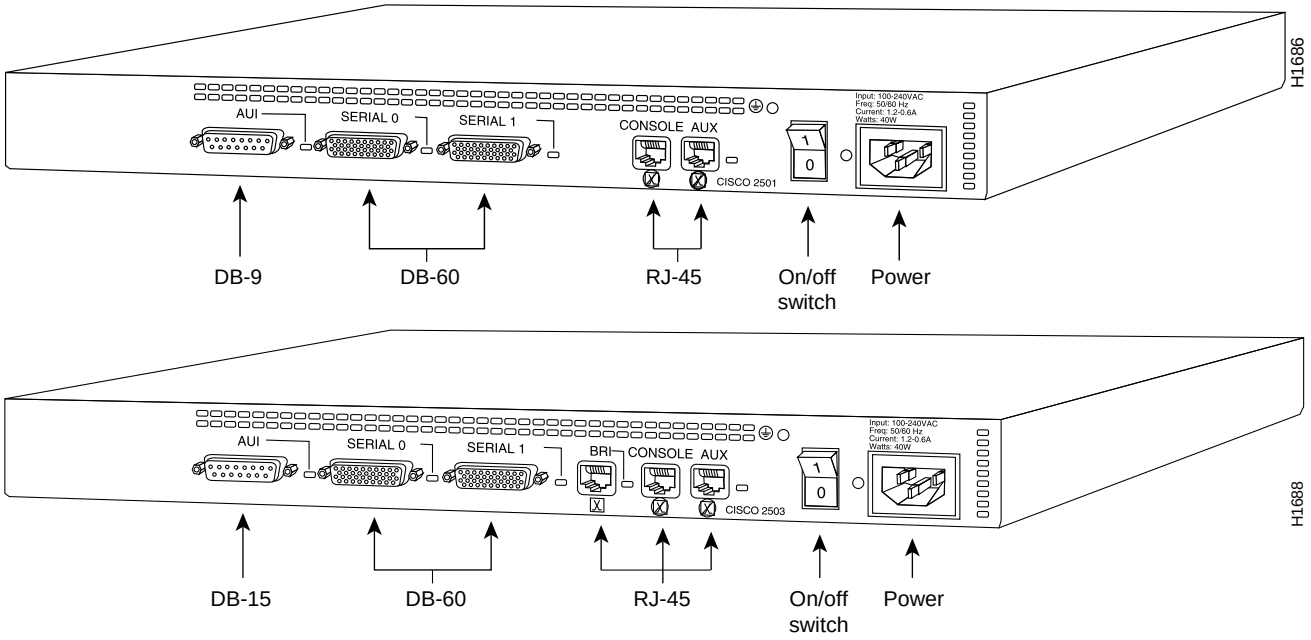



**Figure 1-3 Configurations for Models 2501-DC and 2503-DC Multiprotocol Routers**

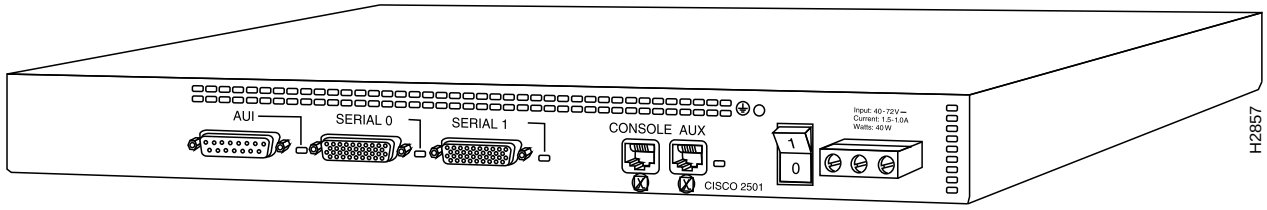


**Figure 1-4 Configurations for Models 2502 and 2504 Multiprotocol Routers**

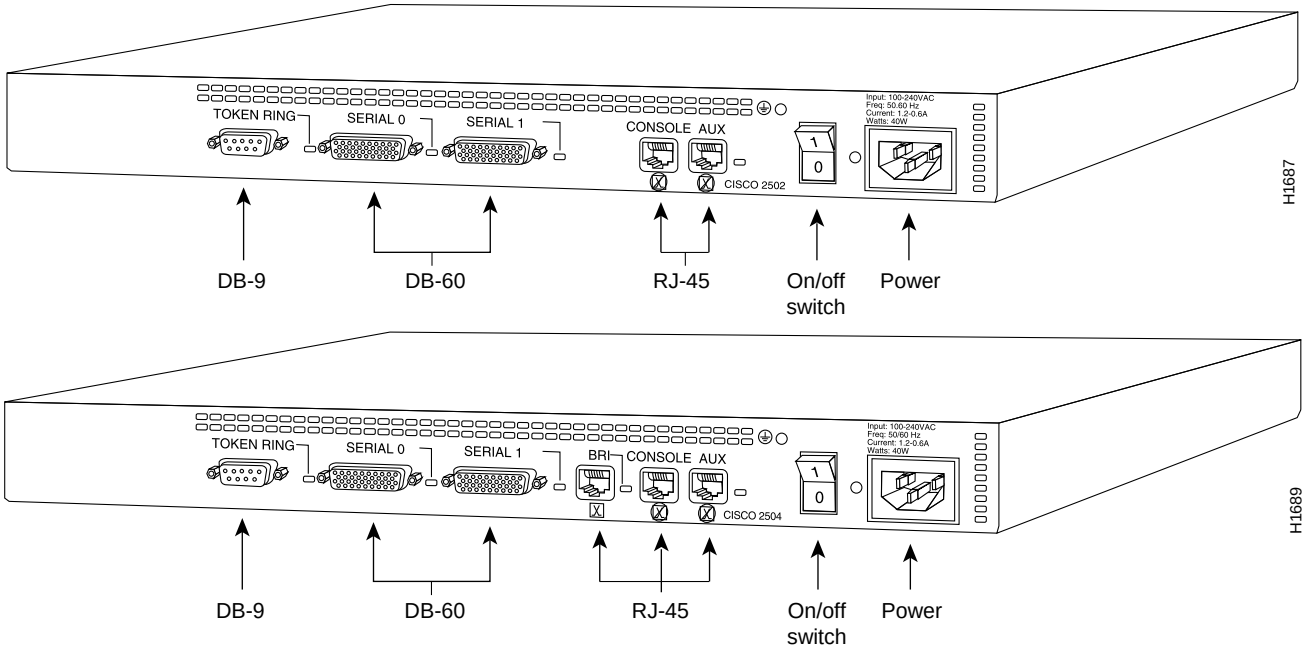


**Figure 1-5 Configurations for Models 2513, 2514, and 2515 Dual LAN/Multiprotocol Routers**

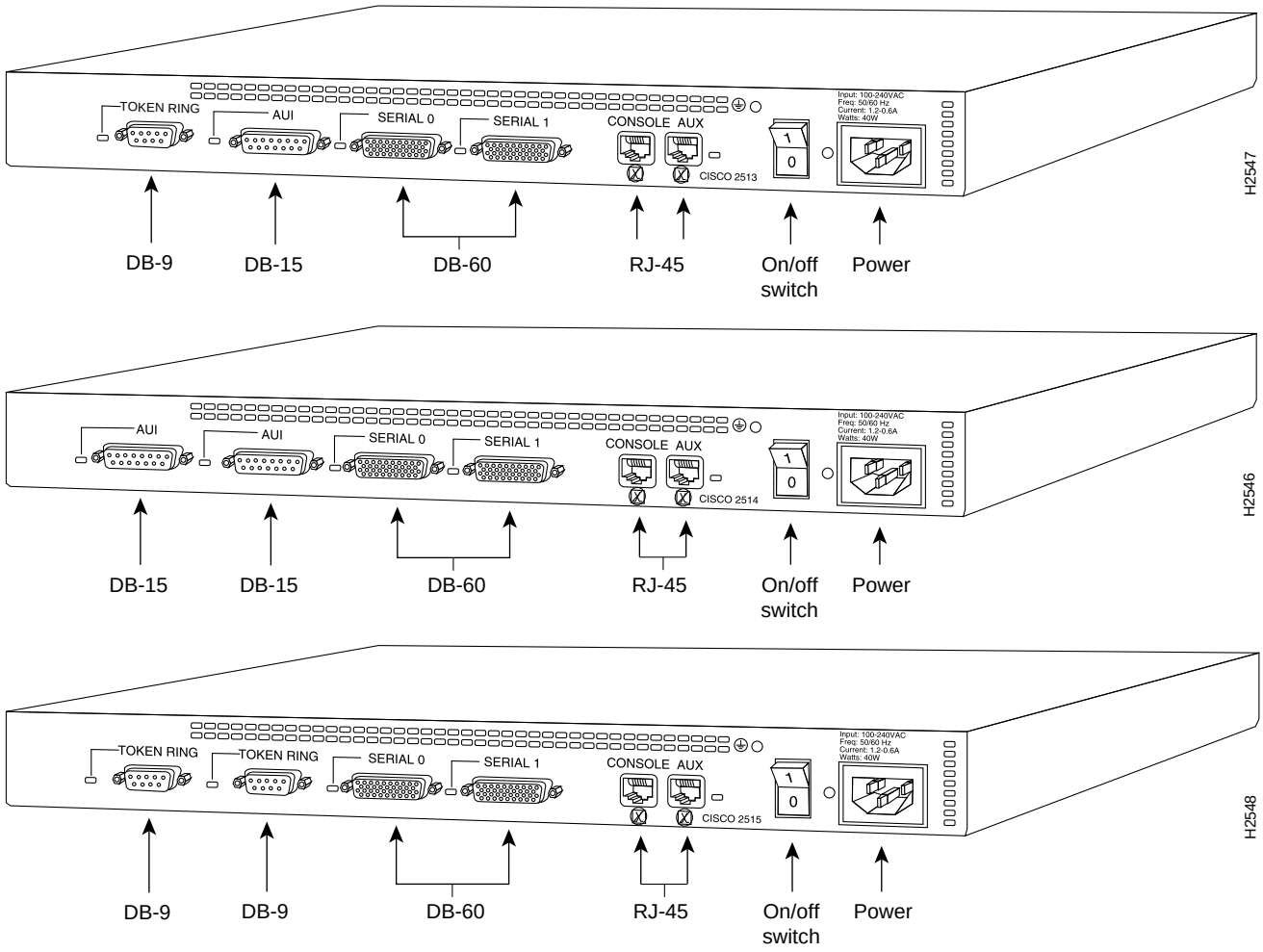


**Figure 1-6 Configurations for Models 2505, 2507, and 2516 Routers/Hubs**

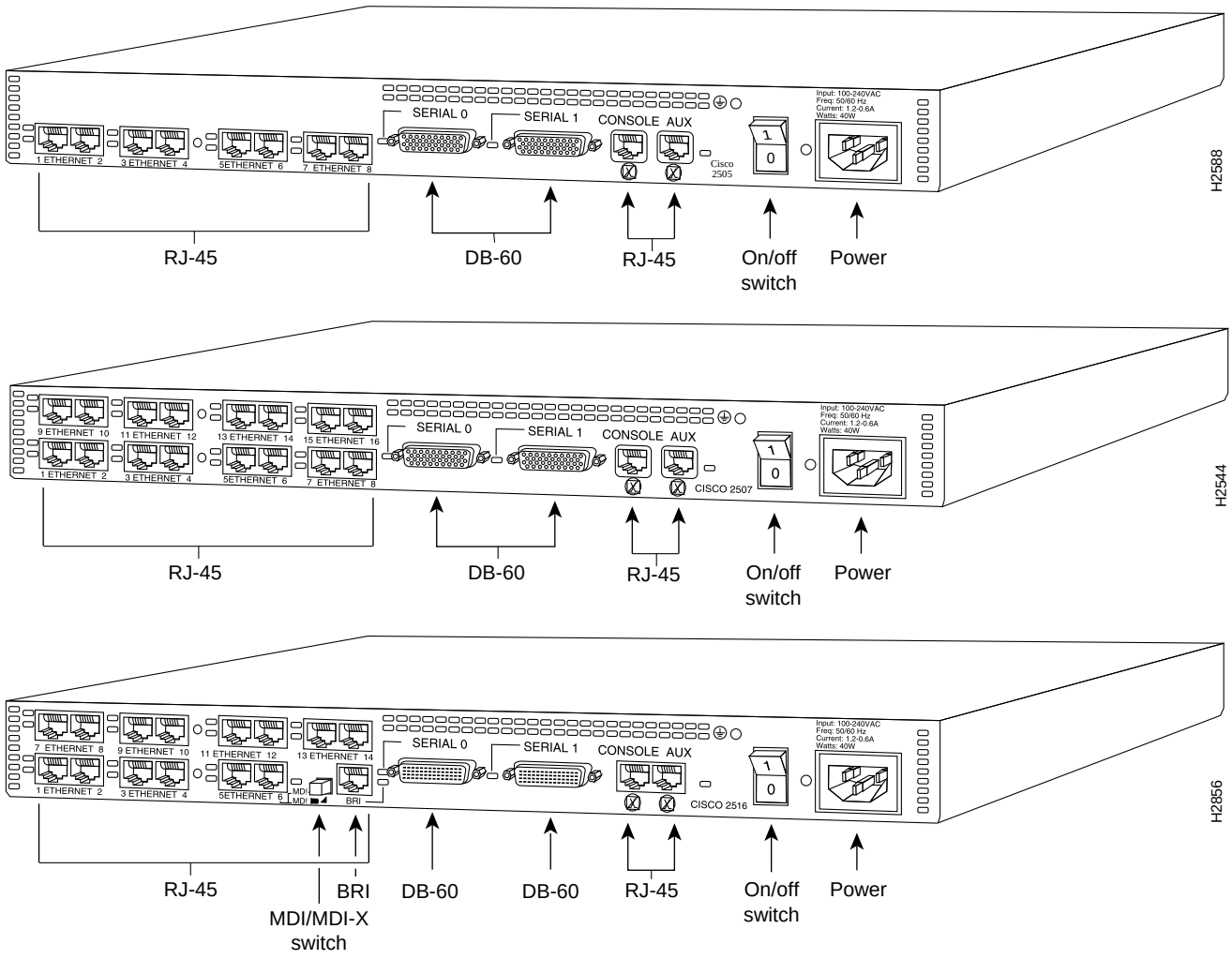


**Figure 1-7 Configurations for Models 2509 and 2511 Routers/Access Servers**

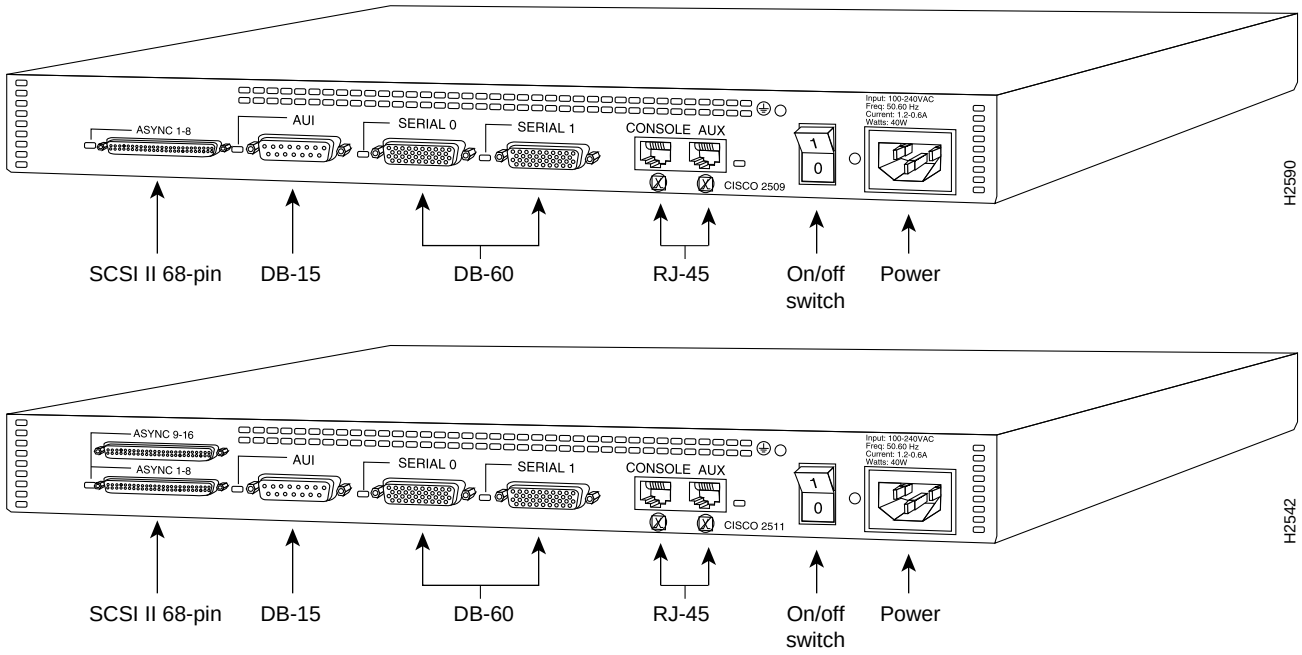
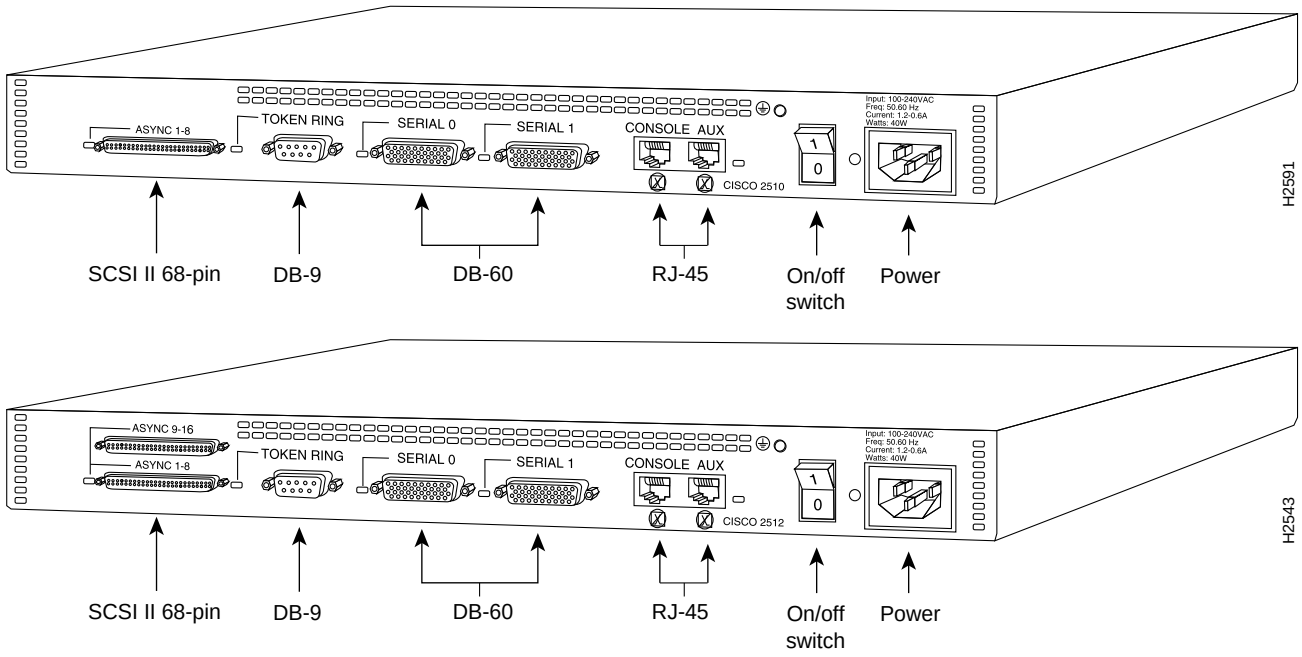



**Figure 1-8 Configurations for Models 2510 and 2512 Routers/Access Servers**



# System Specifications

Table 1-2 contains the specifications for this system.

**Table 1-2 System Specifications**

| Description | Design Specification |
|---|---|
| Dimensions (H x W x D) | 1.75" (one rack unit) x 17.5" x 10.56"<br>(4.44 cm x 44.45 cm x 26.82 cm) |
| Weight | 10 lb (4.5 kg) |
| Input voltage, AC power supply<br>Current<br>Frequency<br>Power dissipation | 100 to 240 VAC<br>0.5 to 1.0 A<br>50 to 60 Hz<br>40W (max.), 135.5 Btus/hr |
| Input voltage, DC power supply<br>Current<br>Power dissipation | 40 W, 40 to 72 VDC, universal<br>0.5 to 1.0 A<br>40W (max.), 135.5 Btus/hr |
| Processor | 20-MHz Motorola 68EC030 |
| Router network interface options | 1 Ethernet and 2 synchronous serial (2501)<br>1 Token Ring and 2 synchronous serial (2502)<br>1 Ethernet, 2 synchronous serial, and 1 BRI[1] (2503)<br>1 Token Ring, 2 synchronous serial, and 1 BRI (2504)<br>1 Ethernet, 1 Token Ring, 2 synchronous serial (2513)<br>2 Ethernet, 2 synchronous serial (2514)<br>2 Token Ring, 2 synchronous serial (2515) |
| Hub network interface options | 2 synchronous serial, 8 hub, RJ-45 (2505)<br>2 synchronous serial, 16 hub, RJ-45 (2507)<br>2 synchronous serial, 1 BRI, 14 hub, RJ-45 (2516) |
| Access server network interface options | 1 Ethernet, 2 synchronous serial, 8 asynchronous serial (2509)<br>1 Token Ring, 2 synchronous serial, 8 asynchronous serial (2510)<br>1 Ethernet, 2 synchronous serial, 16 asynchronous serial (2511)<br>1 Token Ring, 2 synchronous serial, 16 asynchronous serial (2512) |
| Ethernet interface | Ethernet AUI[2] IEEE[3] 802.3 |
| Token Ring interface | IEEE 802.5 (DB-9) |
| Synchronous serial interfaces | EIA/TIA-232[4], EIA/TIA-449, V.35, X.21 (NRZ/NRZI[5] and DTE/DCE[6] mode)<br>EIA-530 (NRZ/NRZI and DTE mode)<br>All serial interfaces use the DB-60 connector at the chassis |
| Asynchronous serial interfaces | EIA/TIA-232, EIA/TIA-449, V.35, X.21 (NRZ/NRZI and DTE/DCE mode)<br>EIA-530 (NRZ/NRZI and DTE mode)<br>Asynchronous serial interfaces use the breakout cable (RJ-45) |

| Description | Design Specification |
|---|---|
| BRI | ISDN[7] Basic Rate S/T (RJ-45) (2503, 2504, and 2516 only) |
| Console and auxiliary ports | Asynchronous serial (RJ-45) |
| 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 dBa @ 3' (0.914 m) |
| Agency approvals | Safety: UL 1950, CSA 950, EN60950, TUV-GS-mark<br>EMI: FCC Class A, VCE Class B, Canadian DOC Class A, EN55022 Class B (CISPR22 Class B), VCCI Class 2 |

1. BRI=Basic Rate Interface.
2. AUI=Attachment unit interface.
3. IEEE=Institute of Electrical and Electronic Engineers.
4. EIA/TIA=Electronic Industries Association/Telecommunications Industry Association. EIA/TIA-232 and EIA/TIA-449 were known as recommended standards RS-232 and RS-449 before their acceptance as standards by the Electronic Industries Association (EIA) and Telecommunications Industry Association (TIA).
5. NRZ/NRZI=Nonreturn to zero/Nonreturn to zero inverted.
6. DTE/DCE=Data terminal equipment/Data communications equipment.
7. ISDN=Integrated Services Digital Network.

# Memory Configurations

The systems contain the following types of memory:

- Primary memory (main memory)—Dynamic random-access memory (DRAM) that stores the running configuration and routing tables.
- Shared memory—Shared DRAM that is used for packet buffering by the router network interfaces.
- System-code memory—Flash or programmable read-only memory (PROM); stores the operating system software image.
- Boot ROM memory—Stores a subset of the operating system software image that is called the *system bootstrap image* or the *bootstrap program* (or ROM monitor). The system bootstrap image allows you to boot the router when Flash memory does not contain a valid system image.

  The boot ROM prompt follows: Router(boot)>. The bootstrap program (ROM monitor) prompt is the *greater than* sign (>), which differs from the user-level operating-system prompt of `router>`. (For more information, see the appendix “Virtual Configuration Register,” and the appendix “Bootstrap Program.”
- Nonvolatile random-access memory (NVRAM)—Stores the system configuration file and the virtual configuration register.

Table 1-3 shows possible memory configurations for the router models.

**Table 1-3 Memory Configurations**

| Memory Type | Memory Capacity |
|---|---|
| Primary memory (DRAM SIMMs) | 1 MB (expandable to 4, 8, or 16 MB) |
| Shared (packet) memory | 1 MB (DRAM on the board)[1] |
| System-code memory (Flash or PROMs) | 4 MB (expandable) |
| Boot ROM memory | 2 MB (expandable) |
| Nonvolatile RAM (NVRAM) memory | 32 KB |

1. The router has 2 MB of permanent (fixed) DRAM memory and a DRAM SIMM socket for upgrading the memory. 1 MB of this permanent memory is used by the CPU and is called *primary* memory. The other 1 MB of memory is used by the network interface ports to store packets and is called *shared* or *packet* memory. When a DRAM SIMM is installed in the DRAM SIMM socket, all of the DRAM memory on this SIMM becomes primary memory for the CPU, and the 2 MB of DRAM that is permanent on the board becomes shared memory.