CHAPTER 2

Memory Requirements

Depending on the circumstances, you might need to determine the amount of main memory (DRAM or SDRAM) required by your Cisco 7200 series router to support a combination of installed port adapter types and a specific Cisco IOS software subset image.

Note The NPE-175, NPE-225, NPE-300, and NSE-1 use SDRAM DIMMs for main memory, whereas the NPE-100, NPE-150, and NPE-200 use DRAM SIMMs for main memory.

The NPE-400 uses a single SDRAM SODIMM for main memory.
The NPE-G1 uses two SDRAM SODIMMs for main memory.
The NPE-G2 uses a single SDRAM DIMM for main memory.

This chapter contains the following sections:

Determining Port Adapter and System Memory Requirements

Table 2-1 Initial Memory Requirement Guidelines

Question	Answer
What determines the amount of SDRAM or DRAM memory required?	The DRAM or SDRAM required by a Cisco 7200 series router to support a combination of installed port adapter types and a Cisco IOS software subset image is influenced by such variables as the features in the software you plan to use and the size of your network.
Where can I find Cisco IOS memory requirements?	Cisco IOS memory requirements are listed in the Cisco IOS Release Notes. The SDRAM column provides processor memory information. Flash memory recommendations are also included. For Cisco IOS Release Notes, see the documentation page for Cisco IOS Software Configuration. If you are a registered user on Cisco.com, you can access the Software Advisor at http://www.cisco.com/cgi-bin/Support/CompNav/Index.pl to get memory requirements.

Sample Configuration Showing Processor Memory Required

Use the example in Table 2-2 to familiarize yourself with the criteria for determining processor memory required for your configuration. Then use the worksheet in Table 2-3 to determine the processor memory required for your configuration.

Table 2-2 Sample Configuration (Cisco 7206 Router with an NPE-150 Installed)

Item	Processor Memory Required		
Cisco IOS software subset image			
Network Layer 3 Switching	11.5 MB[1]	or	22.0 MB[2]
Port adapters			
1 Fast Ethernet port on the I/O controller	0.10 MB[3]		
1 full-duplex multimode FDDI	0.10 MB[3]		
1 high-speed serial	0.10 MB[3]		
1 4-port Token Ring half-duplex	0.30 MB[3]		
2 2-port channelized T1/PRI ISDN	1.80 MB[3] 1.80 MB[3] 1.20 MB[3, 4]		
1 2-port channelized T1 PRI/ISDN	1.80 MB[3]		
Totals	18.7 MB	or	29.2 MB
Minimum DRAM required	32 MB	or	64 MB

1. Specific to Cisco IOS Release 11.1CA.
2. Specific to Cisco IOS Release 12.0T.
3. Specific to Cisco IOS Release 11.1CA, Release 11.1CC, Release 11.2P, Release 11.3T, Release 11.3AA, and Release 12.0 .
4. Additional processor memory required for ISDN functionality.

Table 2-3 Worksheet for Various Hardware and Software Memory Requirements

Item	Processor Memory Required	
Cisco IOS software subset image[1]		
Port adapters		
Totals	MB or	MB
Minimum DRAM required	MB or	MB

1. See Cisco IOS Release Notes (listed under specific Cisco IOS releases) for memory requirements,

Cisco IOS Software Memory Requirements

Cisco IOS memory requirements are listed in the Cisco IOS Release Notes. The SDRAM column provides processor memory information. Flash memory recommendations are also included. For Cisco IOS Release Notes, see the documentation page for Cisco IOS software configuration.

Step 1 Click the appropriate Cisco IOS release.

Step 2 Click **Release Notes**.

Step 3 Click the appropriate release.

Step 4 Locate your platform and memory requirements.

Determining DRAM or SDRAM Required If the Router Has Only 32 MB of Memory (NPE-100, NPE-150, and NPE-200)

This section is applicable only to the NPE-100, NPE-150, and NPE-200.

To determine the minimum amount of DRAM or SDRAM required by a Cisco 7200 series router to support a combination of installed port adapter types and a Cisco IOS software subset image, complete the following steps only if your Cisco 7200 series router has 32 MB of DRAM or SDRAM.

If your Cisco 7200 series router has 64 MB or more of DRAM or SDRAM installed, you have enough memory to support any combination of installed port adapter types and Cisco IOS software subset images.

Note For Cisco 7206 and Cisco 7206VXR router shelf memory requirements, refer to the Cisco AS5800 Universal Access Server documentation at http://www.cisco.com/univercd/cc/td/doc/product/access/acs_serv/as5800/index.htm.

Note The steps in this section assume that the port adapter hardware configuration of your Cisco 7200 series router follows the configuration guidelines explained in the "Configuration Guidelines and Requirements" section on page 1-4.

If you need assistance when determining DRAM or SDRAM requirements for your Cisco 7200 series router, contact the Cisco Technical Assistance Center (TAC). See the "Obtaining Documentation, Obtaining Support, and Security Guidelines" section on page vii for information on contacting TAC.

Tip Use the worksheets in the "Sample Configuration Showing Processor Memory Required" section on page 2-2 to help calculate your system memory requirements if your router has 32 MB of memory.

Step 1 Add the processor memory requirements for all of the installed port adapter types and the Cisco IOS software subset image. (See Table 1-6 in Chapter 1, and Table 2-5 through Table 2-11 in this chapter.)

Table 1-6 lists the processor memory required for the port adapter types available for use in Cisco 7200 series routers. Port adapters available for use in Cisco 7200 series routers require a minimum amount of processor memory to function properly in the routers. The amount of processor memory required by a port adapter depends on the number of interfaces or channels the port adapter provides.

Note Some port adapters require additional processor memory to execute port adapter-specific Cisco IOS software functionality. Table 1-6 lists additional processor memory required for each port adapter type (where applicable).

For DRAM and Flash memory requirements for your Cisco IOS release and platform, see Cisco IOS Release Notes at Cisco IOS Software Information: http://www.cisco.com/univercd/cc/td/doc/product/software/index.htm.

The amount of processor memory listed in Table 2-5 through Table 2-11 is for the static size of the image and some default data memory the image requires at system startup.

Step 2 Compare the required processor memory identified in Step 1 with the amount of processor memory provided by each DRAM or SDRAM option listed in Table 2-5 through Table 2-11.

Table 2-5 through Table 2-11 list the processor and I/O memory provided by each DRAM or SDRAM option available for Cisco 7200 series routers. The DRAM and SDRAM options available for Cisco 7200 series routers are logically divided into processor memory (which is used by the system CPU for instruction and data storage) and I/O memory (which is used for packet buffering). The amount of processor memory available for each DRAM or SDRAM option determines the combination of installed port adapter types that a Cisco 7200 series router can support.

Note For a DRAM or SDRAM option to support the installed port adapter types and Cisco IOS software subset image, the required processor memory identified in Step 1 must not exceed the amount of processor memory provided by the DRAM or SDRAM options listed in Table 2-7 through Table 2-11.

Step 3 Choose a DRAM or SDRAM memory option.

This completes the procedure for determining the minimum amount of DRAM or SDRAM required by a Cisco 7200 series router to support a combination of installed port adapters and the Cisco IOS software subset image.

For a sample configuration of a Cisco 7206 router that has an installed NPE-150, an I/O controller with the Fast Ethernet port, and Cisco IOS software subset images for Cisco IOS Release 11.1CA and Cisco IOS Release 12.0T, see Table 2-2.

SDRAM and DRAM Options for NPEs and the NSE

The default memory allocation of total available memory between I/O memory and processor memory is 25% to I/O memory and 75% to processor memory. However, I/O memory may be allocated manually in amounts of 32 MB, 64 MB, 128 MB, or 256 MB, with the remainder going to processor memory.

Table 2-4 through Table 2-11 provide SDRAM and DRAM memory options for network processing engines and the network services engine. Not all possible processor and I/O memory options are listed.

Table 2-4 SDRAM Options for the NPE-G2

SDRAM Options	Processor Memory	I/O Memory
1 GB	992 MB	32 MB
	960 MB	64 MB
	896 MB	128 MB
	768 MB	256 MB
2 GB	2016 MB	32 MB
	1984 MB	64 MB
	1920 MB	128 MB
	1792 MB	256 MB

Table 2-5 SDRAM Options for the NPE-G1

SDRAM Options	Processor Memory	I/O Memory
256 MB	240 MB	16 MB
512 MB	480 MB	32 MB
1 GB	992 MB	32 MB

Table 2-6 SDRAM Options for the NSE-1

SDRAM Options	Processor Memory	I/O Memory
128 MB	116 MB	12 MB
256 MB	240 MB	16 MB

Table 2-7 SDRAM Options for the NPE-400

SDRAM Option	Processor Memory	I/O Memory
128 MB	112 MB	16 MB
256 MB	240 MB	16 MB
512 MB	480 MB	32 MB

Table 2-8 SDRAM Options for the NPE-300

SDRAM Option	Processor Memory	I/O Memory
64 MB	28 MB	36 MB
96 MB	60 MB	36 MB
160 MB	120 MB	40 MB
288 MB	248 MB	40 MB

Table 2-9 SDRAM Options for the NPE-225

SDRAM Options	Processor Memory	I/O Memory
64 MB	56 MB	8 MB
128 MB	116 MB	12 MB
256 MB	240 MB	16 MB

Table 2-10 SDRAM Options for the NPE-175

SDRAM Options	Processor Memory	I/O Memory
64 MB	56 MB	8 MB
128 MB	116 MB	12 MB

Table 2-11 DRAM Options for the NPE-100, NPE-150, and NPE-200

	NPE-100		NPE-150		NPE-200	
DRAM Option	**Processor Memory**	**I/O Memory**	**Processor Memory**	**I/O Memory[1]**	**Processor Memory**	**I/O Memory[2]**
32 MB	26 MB	6 MB	26 MB	7 MB	26 MB	10 MB
64 MB	56 MB	8 MB	56 MB	9 MB	56 MB	12 MB
128 MB	120 MB	8 MB	120 MB	9 MB	120 MB	12 MB[3]

1. The I/O memory for the NPE-150 DRAM options includes 1 MB of packet SRAM.
2. The I/O memory for the NPE-200 DRAM options includes 4 MB of packet SRAM.
3. For Cisco 7206 router shelf memory requirements, refer to the Cisco AS5800 Universal Access Server documentation at http://www.cisco.com/univercd/cc/td/doc/product/access/acs_serv/as5800/index.htm.