
DIGITAL GIGAswitch/Ethernet System Upgrading Switch Control Processor Memory

Introduction

The DIGITAL GIGAswitch/Ethernet system stores address tables and statistics information using Dynamic Random Access Memory (DRAM). In installations with large numbers of VLANs, or that collect statistics from many ports, it may be necessary to upgrade the DRAM on the switch control processor (SCP) module.

Upgrading your system memory involves:

- 1 Checking Available System Memory
- 2 Performing the Upgrade
- 3 Verifying the Installation

For guidelines on when to upgrade your system, see [Deciding When to Upgrade](#).

Checking Available System Memory

Before performing the upgrade, check the available system memory to determine how much DRAM is installed currently. To do this:

Step	Action
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- 1 From the menu on the left side of the web agent browser, select **RAM Info**. The RAM Contents window displays.

Total RAM	Operational Image	Dynamically Allocated Memory	
		Used	Available
8.00 MBytes	2.11 MBytes	1.73 MBytes	4.16 MBytes

- 2 If the amount of available Dynamically Allocated Memory is less than 1 MB, or if your switch has very high port density (10/100 ports), perform the upgrade.
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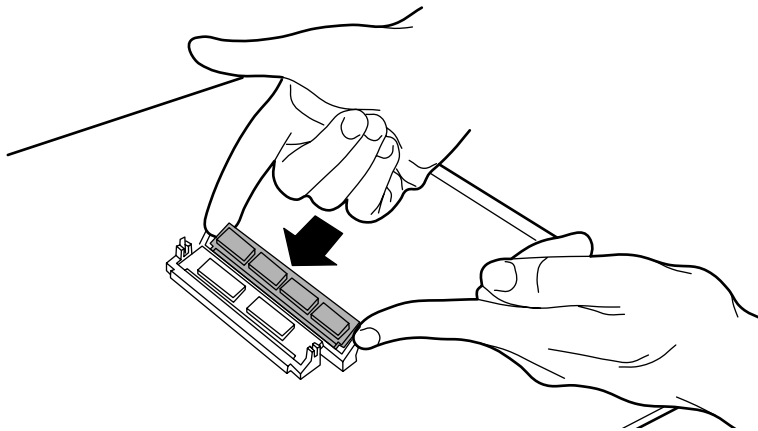
Performing the Upgrade

CAUTION

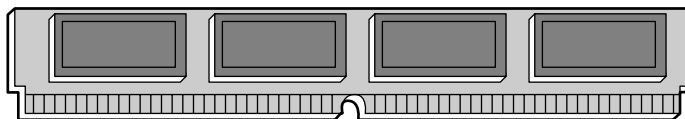
Static electricity can damage modules and electronic components. DIGITAL recommends using a grounded antistatic wrist strap and a grounded work surface when handling any modules.

To upgrade the memory on the switch control processor module:

Step	Action
1	If the switch is powered up, shut down the switch.
2	Loosen the black captive screws on each end of the switch control processor module.
3	Pull the ejector on each end of the module outward, away from the switch chassis.
4	After taking appropriate antistatic precautions, carefully remove the switch control processor module from the switch and place it on an antistatic surface. (Refer to the <i>DIGITAL GIGAswitch/Ethernet System Installation and Operation Guide</i> for more information on proper antistatic precautions.)
5	Remove the current single inline memory module (SIMM) from the switch control processor as shown:

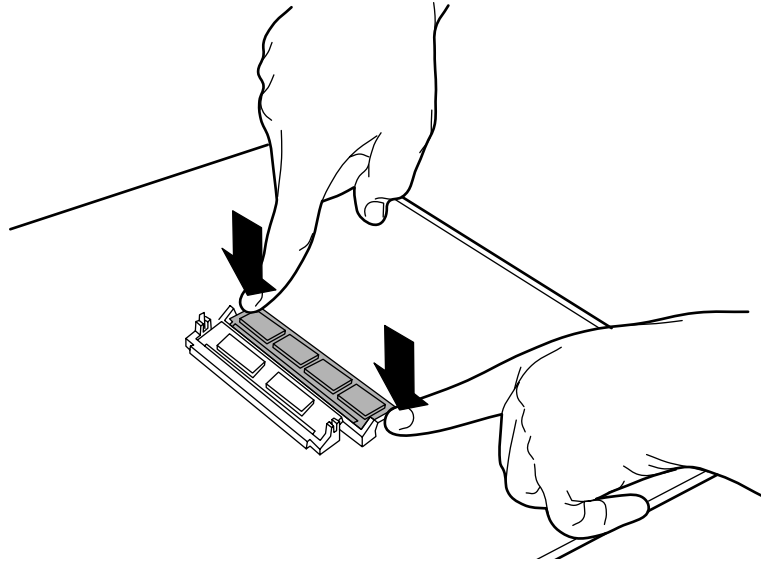


- 6 Remove the new SIMM from its antistatic wrap.

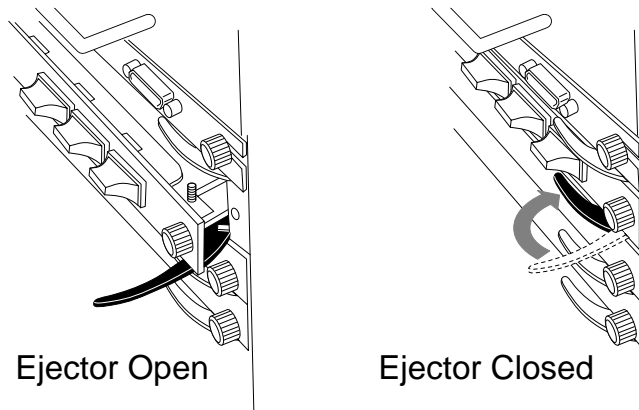


Step	Action
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- 7** Insert the new SIMM into the SIMM slot, and press the SIMM into place as shown below. Note that the bottom of the SIMM is notched to ensure correct installation.



- 8** Push the switch control processor module all the way into the switch chassis, then use the ejectors to lock the module into the switch backplane as shown below:



- 9** Tighten the black captive screws on the module.

- 10** Power on the switch.
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As the system powers on, the system runs its internal diagnostics. The LED display on the switch control processor module should display the following message:

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Digital GIGAswitch/Ethernet Agent v1.x.x.
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Contact your DIGITAL service representative if your module fails to function properly.

Verifying the Installation

To verify the installation:

Step	Action
1	Launch the web agent.
2	From the menu on the left side of the web browser, select RAM Info . The display lists the newly added memory capacity.

RAM Contents			
Total RAM	Operational Image	Dynamically Allocated Memory	
		Used	Available
16.00 MBytes	2.11 MBytes	8.43 MBytes	6.46 MBytes

Contact your DIGITAL service representative if verification fails.

Deciding When to Upgrade

This section provides guidelines for determining when you should upgrade the GIGAswitch/Ethernet system from the standard RAM size of 8 MB to 16 or 32 MB. The following factors influence the amount of memory required:

- Number and type of modules in the system
- Number of VLANs created
- Number of MAC addresses stored on the switch

Memory Usage

The usage numbers discussed here are based on firmware version 1.0.6, but should apply in a similar way to later firmware releases. Each section describes the approximate RAM usage by each system component.

Firmware

The firmware is copied from Flash EEPROM to RAM, and therefore uses RAM. Firmware size is 2.08 MB.

Software Initialization

Initialization of all software components (tables, variables, etc.) requires 1.29 MB RAM.

Temporary Memory

Allow for 1 MB of memory for temporary use during processing.

Modules

- A 20-port 10/100 module requires 0.44 MB RAM. A full stack of 6 10/100 modules will therefore require 2.64 MB.
- A 2-port gigabit module requires 50 KB (0.05 MB) RAM.
- A 4-port gigabit module requires 100 KB (0.10 MB) RAM.

VLANs

Each VLAN that is created with an initial address table size of 1024 (default) uses 0.02 MB. Each VLAN created with an initial address table size of 512 uses 0.01 MB, and so on. The amount of memory used depends on the address table size.

Address Learning

The following table lists the amount of memory needed for the number of learned network addresses:

Address Table Memory Usage

Learned Addresses	Hash Table Size 1024*	Hash Table Size 8192
	RAM Used (MB)	RAM Used (MB)
0	0	0.11
2000	0	0.12
4000	0.14	0.27
6000	0.30	0.41
8000	0.47	0.55
10000	0.64	0.71
12000	0.82	0.86
14000	1.01	0.98
16000	1.20	1.18
18000	1.41	1.34
20000	1.57	1.49
22000		1.64
24000		1.79
26000		1.94
28000		2.09

* Hash table size of 1024 is the default.

Calculations

Use the following calculations to determine the approximate amount of memory needed based on these variables:

$$\begin{aligned} \text{Memory} &= 2.08 + 1.29 + 1 \\ &+ (0.44 \times \text{number of 10/100s}) \\ &+ (0.05 \times \text{number of 2-port gigabit modules}) \\ &+ (0.10 \times \text{number of 4-port gigabit modules}) \\ &+ (0.02 \times \text{number of VLANs}) \\ &+ \text{address memory from table} \end{aligned}$$

Example 1 — A switch with 2 10/100 modules, 1 two-port gigabit module, 10 VLANs, and 10,000 learned addresses (with the default address table size) requires:

$$4.37 + 0.88 + 0.05 + 0.2 + 0.64 = 6.14 \text{ MB}$$

This scenario indicates that the default 8 MB RAM is adequate.

Example 2 — A switch with 6 10/100 modules, 20 VLANs, and 20,000 learned address (with the default address table size) requires:

$$4.37 + 2.64 + 0.4 + 1.57 = 8.98 \text{ MB}$$

This scenario indicates that the switch should be upgraded to 16 MB.

For More Information

Refer to the *DIGITAL GIGAswitch/Ethernet System Installation and Operation Guide* for safety, product specification, and regulatory compliance information. The guide is available in online format on the DIGITAL GIGAswitch/Ethernet System Information Library CD. This information is also available on the DIGITAL Network Products Home Page on the World Wide Web at:

North America:	http://www.networks.digital.com
Europe:	http://www.networks.europe.digital.com
Asia Pacific:	http://www.networks.digital.com.au