INSTALLATION NOTICE

64170-92002

THIS PAGE MAY BE DISCARDED AFTER YOU PLACE THE DOCUMENT UNDER IT INTO THE BINDER.

Installation Notice

HP 64170A Memory Control Board

Installation at a Glance

If the HP 64170A memory control board is ordered with your emulator.

If you ordered an HP 64170A memory control board with your emulator installed in the HP 64700A Card Cage, you can skip this installation notice and go directly to the user's manual for information on using the emulator.

If you want to change memory modules.

If you are already using the HP 64170A memory control board in your emulator and want to change memory modules, refer to "Installing Static Random Access Memory." Your firmware is current and will automatically determine the memory capacity available on the memory board.

Information about checking the performance verification of the emulator and error messages is also provided in this installation notice.

If you have an emulator with 128/512 Kbyte memory.

If you have an HP 64742, HP 64743 or HP 64746 emulator with 128 Kbytes or 512 Kbytes of memory and want to upgrade to the HP 64170A, this notice provides information on:

- Installing Static Random Access Memory (SRAM) modules on the HP 64170A control memory board.
- Installing the memory board into the HP 64700A Card Cage.
- Updating your firmware.
- Checking performance verification of the emulator.
- Checking version numbers.
- Error Messages.
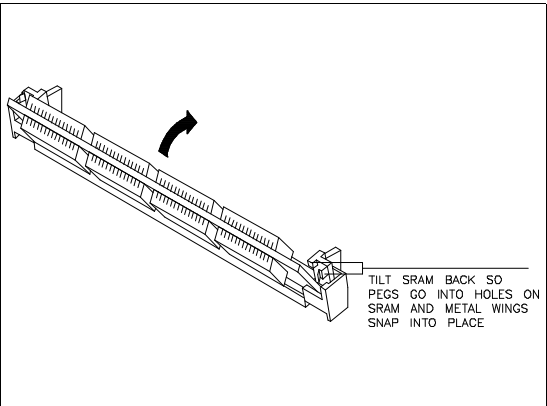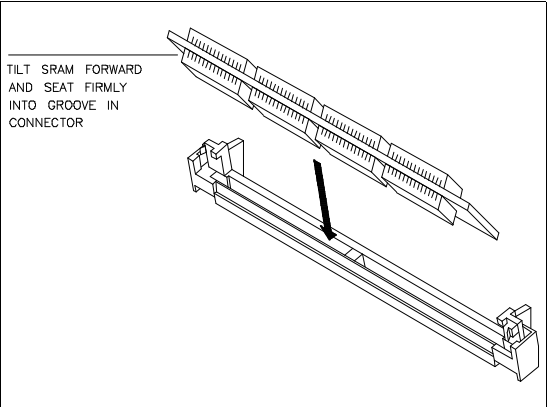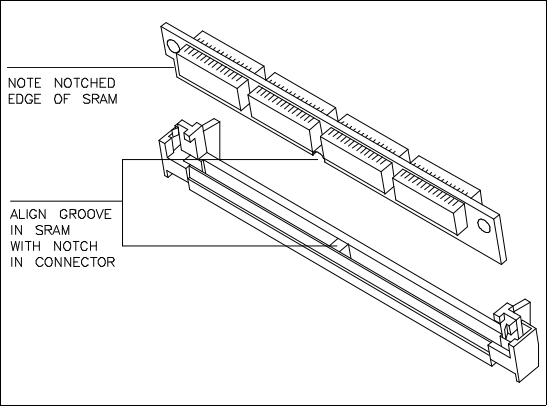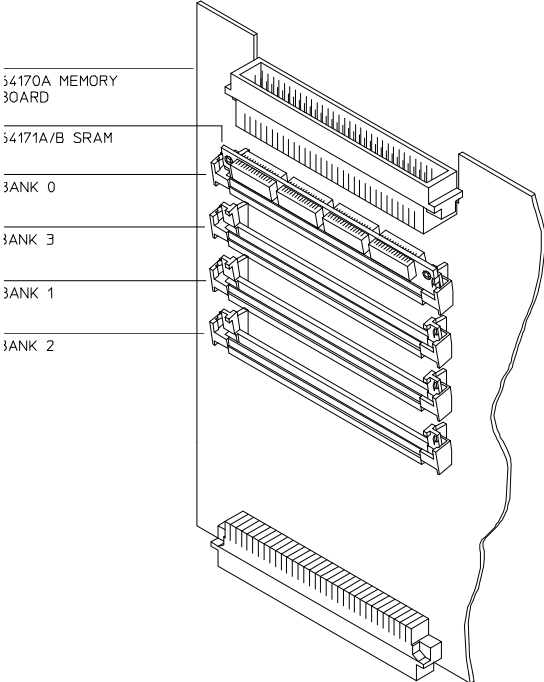
Installing Static Random Access Memory

There are four banks (0 through 3) on the HP 64170A memory board. You can NOT mix Static Random Access Memory (SRAM) modules. That is, you can NOT use a 256Kbyte and a 1 MByte SRAM modules on the same board. Also, you must install 1, 2, or 4 SRAM modules (3 results in an invalid configuration).

If you are using only one SRAM module, you must insert the SRAM module in bank 0. If you are using two SRAM modules, you must insert them into banks 0 and 1.

Quantity	Size	Location	Part Number
1	256 Kbyte	bank 0	HP 64171/172A
2	256 Kbyte	bank 0 and 1	HP 64171/172A
4[*]	256 Kbyte	bank 0, 1, 2, 3	HP 64171/172A
1	1 MByte	bank 0	HP 64171/172B
2	1 MByte	bank 0 and 1	HP 64171/172B
4[*]	1 Mbyte	bank 0, 1, 2, 3	HP 64171/172B
[*]NOTE: Some older versions of the HP 64170A have only 2 banks.			

To install the SRAM, refer to the following illustrations

64170A MEMORY
BOARD

64171A/B SRAM

BANK 0

BANK 3

BANK 1

BANK 2

NOTE NOTCHED
EDGE OF SRAM

ALIGN GROOVE
IN SRAM
WITH NOTCH
IN CONNECTOR

TILT SRAM FORWARD
AND SEAT FIRMLY
INTO GROOVE IN
CONNECTOR

TILT SRAM BACK SO
PEGS GO INTO HOLES ON
SRAM AND METAL WINGS
SNAP INTO PLACE

Updating your firmware

If you purchased an HP 64743 68000 or HP 64746 68302 emulator with the HP 64170A memory control board, your firmware is current. If you have an HP 64742 68000, HP 64743 68000, or HP 64746 68302 emulator with 128K or 512K memory, you must update firmware.

To update firmware for an HP 64742, you need:

☐ ROM kit for the host control card and analyzer card if the host control card software is earlier than version A.03.00.

☐ ROM version A.00.08, part number 64742-80008 for the 64742 emulator card.

To update firmware for an HP 64743, you need:

☐ a flash ROM board,

☐ software update materials,

☐ ROM kit, so the host control card will recognize the flash ROM board,

☐ Update instructions (included with the ROM kit),

☐ HP 64743 software version A.00.02 or later.

To update firmware for an HP 64746, you need:

☐ software update materials,

☐ HP 64746 software version A.00.03 or later.

The HP 64746 emulator board is flash ROM based and does not require a flash ROM board. For information on how to update your firmware, refer to the *HP 64700 Series Installation/Service manual* or your local HP Field Service Representative.

Installing the HP 64170A memory control board

If you have an HP 64742, HP 64743, or HP 64746 emulator using 128 Kbytes or 512 Kbytes of memory, turn off power, remove the old memory board and insert the HP 64170A memory control board in its place.

The HP 64170A memory control board must be installed in a slot next to the emulation control board. Instructions for installing the HP 64170A memory control board into the HP 64700A Card Cage are provided on a label attached to the bottom of the card cage, and the *HP 64700 Series Installation/Service* manual.

Checking performance verification of the emulator

1 Turn on power.

2 Establish communication with the emulator from your host or ASCII terminal.

3 Enter: **pv n** <return>

where "n" is the desired number of cycles for running performance verification.

To insure that the emulator is working properly after installation, run a performance check. A message will appear on your terminal indicating the number of tests, number of failures, and if the test passed. If you have a failure, check the following:

☐ Make sure that the HP 64170A memory control board is properly seated into the mother board.

☐ Make sure that the SRAM modules are seated properly on the memory board.

☐ The SRAM modules used should not be mixed. Use all 256 Kbyte SRAMs or all 1 MByte SRAMs.

☐ The version numbers for the HP 64700 Series System, HP 64170A memory control board, host control board, analyzer, and local area network (LAN if any), should be compatible. Version numbers are provided in this installation notice. For more information about version numbers, refer to the *HP 64700 Series Installation/Service* manual.

☐ Make sure that you have the current firmware for using the HP 64170A memory control board. Information on updating firmware is provided later in this installation notice.

☐ For an improper memory configuration, refer to the error messages given later in this installation notice.

Checking version numbers

The **ver** command will display Analyzer, Emulator, LAN (if any), and
HP 64700 Series Emulation System versions. The HP 64700 Series Emulation
System version must be version A.03.00 or later. The following lists memory
versions for the HP 64170A memory control board, 128K memory, and 512K
memory when using an HP 64743 68000 or HP 64746 68302 emulator.   If you
have an HP 64742, the version displayed will be similar to the HP 64743 except
that the version will be **A.00.08 06 Dec 91.** Memory banks 2 and 3 are not
used.

Versions of the HP 64743 68000 emulator

HP 64170A memory control board with one HP 64171/172A 256K SRAM module

```
HP64743 (PPN: 64742A) Motorola 68000 Emulator
  Version:   A.00.02 18Jun91
  Speed:     16.67 MHz
  Control:   HP64170A Memory Control Board
  Memory:    254 Kbytes
    Bank 0:  HP64171A/C 256 Kbyte Memory Module
    Bank 1:  Empty
    Bank 2:  Empty
    Bank 3:  Empty
```

HP 64170A memory control board with two HP 64171/172A 256K SRAM modules

```
HP64743 (PPN: 64742A) Motorola 68000 Emulator
  Version:   A.00.02 18Jun91
  Speed:     16.67 MHz
  Control:   HP64170A Memory Control Board
  Memory:    510 Kbytes
    Bank 0:  HP64171A/C 256 Kbyte Memory Module
    Bank 1:  HP64171A/C 256 Kbyte Memory Module
    Bank 2:  Empty
    Bank 3:  Empty
```

HP 64170A memory control board with one HP 64171/172B 1024K SRAM module

```
HP64743 (PPN: 64742A Motorola 68000 Emulator
  Version:   A.00.02 18Jun91
  Speed:     16.67 MHz
  Control:   HP64170A Memory Control Board
  Memory:    1016 Kbytes
    Bank 0:  HP64171B/D 1024 Kbyte Memory Module
    Bank 1:  Empty
    Bank 2:  Empty
    Bank 3:  Empty
```

HP 64170A memory control board with two HP 64171/172B 1024K SRAM modules

```
HP64743 (PPN: 64742A Motorola 68000 Emulator
  Version:   A.00.02 18Jun91
  Speed:     16.67 MHz
  Control:   HP64170A Memory Control Board
  Memory:    2040 Kbytes
    Bank 0:  HP64171B/D 1024 Kbyte Memory Module
    Bank 1:  HP64171B/D 1024 Kbyte Memory Module
    Bank 2:  Empty
    Bank 3:  Empty
```

Using a 128K memory board:

```
HP64743A/B (PPN: 64742A) Motorola 68000 Emulator
  Version:   A.00.02 18Jun91
  Speed:     16.67 MHz
  Memory:    126 Kbytes
```

Using a 512K memory board:

```
HP64743C/D (PPN: 64742A) Motorola 68000 Emulator
  Version:   A.00.02 18Jun91
  Speed:     16.67 MHz
  Memory:    510 Kbytes
```

Versions of the HP 64746 68302 Emulator

HP 64170A memory control board with one HP 64171/172A 256K SRAM module

```
HP64746 (PPN: 64746A) Motorola 68302 Emulator
Version:   A.00.03 24Jun91
Control:   HP64170A Memory Control Board
Memory:    254 Kbytes
  Bank 0:  HP64171A/C 256 Kbyte Memory Module
  Bank 1:  Empty
  Bank 2:  Empty
  Bank 3:  Empty
```

HP 64170A memory control board with two HP 64171/172A 256K SRAM modules

```
HP64746 (PPN: 64746A) Motorola 68302 Emulator
  Version:   A.00.03 24Jun91
  Control:   HP64170A Memory Control Board
  Memory:    510 Kbytes
    Bank 0:  HP64171A/C 256 Kbyte Memory Module
    Bank 1:  HP64171A/C 256 Kbyte Memory Module
    Bank 2:  Empty
    Bank 3:  Empty
```

HP 64170A memory control board with one HP 64171/172B 1024K SRAM module

```
HP64746 (PPN: 64746A) Motorola 68302 Emulator
  Version:   A.00.03 24Jun91
  Control:   HP64170A Memory Control Board
  Memory:    1016 Kbytes
    Bank 0:  HP64171B/D 1024 Kbyte Memory Module
    Bank 1:  Empty
    Bank 2:  Empty
    Bank 3:  Empty
```

HP 64170A memory control board with two HP 64171/172B 1024K SRAM modules

```
HP64746 (PPN: 64746A) Motorola 68302 Emulator
  Version:   A.00.03 24Jun91
  Control:   HP64170A Memory Control Board
  Memory:    2040 Kbytes
    Bank 0:  HP64171B/D 1024 Kbyte Memory Module
    Bank 1:  HP64171B/D 1024 Kbyte Memory Module
    Bank 2:  Empty
    Bank 3:  Empty
```

Using a 128K memory board:

```
HP64746A (PPN: 64746A) Motorola 68302 Emulator
  Version:   A.00.03 24Jun91
  Memory:    126 Kbytes
```

Using a 512K memory board:

```
HP64746B (PPN: 64746A) Motorola 68302 Emulator
  Version:   A.00.03 24Jun91
  Memory:    510 Kbytes
```

Using the HP 64170A memory control board

Loaded memory verses user memory

Loaded memory is the total memory loaded onto the memory board. User memory is the total memory less the block used for the monitor program. In the following table, block size and resolution is different with the type of memory used. The first 2 Kbytes of the first block are allocate for background memory.

Example 1:   If you have 256 Kbytes loaded onto the HP 64170A memory control board, and 2 Kbytes are allocated for the monitor, total user memory is 256 Kbytes minus one 2 Kbyte block or 254 Kbytes.

Example 2:   If you have 2 Mbytes loaded onto the HP 64170A memory control board, and 2 Kbytes are allocated for the monitor, total user memory is 2048K minus one 8 Kbyte block or 2040K.

68000/68302 Emulation Memory Boards					
Product Number	**Bank Location**	**Loaded Memory**	**User Memory**	**Block Size**	**Resolution**
64743-66512	N/A	128K	126K	512*	512*
64743-66513	N/A	512K	510K	1K	1K
64170A	Memory board without HP 64171A or HP 64171B SRAM modules.				
64171/172A	0	256K	254K	2K	256
	0, 1	512K	510K	2K	256
	0, 1, 2, 3	1M	1022K	2K	256
64171/172B	0	1M	1016K	8K	1K
	0, 1	2M	2040K	8K	1K
	0, 1, 2, 3	4M	4094K	8K	1K
* Softkey Interface uses a block size and resolution of 1Kbyte for the 64743-66512 (128K) board.					

Block size and resolution

Block size refers to the actual size of the minimum block of emulation memory that can be allocated when mapping emulation memory (eram, erom). Resolution refers to the minimum space that can be mapped for emulation memory (eram, erom), target memory (tram, trom), or guarded memory (grd).

If, when mapping memory, you specify an address range that does not conform to the resolution of the memory board the emulator will adjust the map address range to conform with the available resolution by decreasing the beginning address and/or increasing the ending address.

The resolution is smaller than the block size for the HP 64170A memory board to give you more control over how the microprocessor address space is mapped while still allowing for large quantities of emulation memory. This difference between resolution and block size means that sometimes emulation

memory may be wasted. This is not important unless your application demands the maximum use of the available emulation memory. If you map your emulation memory on address boundaries and in quantities that conform to the block size of the memory board configuration you are using there will be no wasted emulation memory. The 64743-66512 (128 Kbytes) and 64743-66513 (512 Kbytes) memory boards have resolutions which are the same as their block sizes so this is not a concern for these boards.

Below are some examples of how the emulator will allocate and map emulation memory when you are using the HP 64170A memory board.

Example 1:

You are using the HP 64170A memory board loaded with one or two HP 64171A (256 Kbyte) SRAM modules. Your program is in address range 0800H to 08FFH (256 bytes in length). When you map this 256 bytes into emulation memory using command "map 0800..08ff eram" a full 2-Kbyte block is allocated. Only the first 256 bytes of this 2-Kbyte block is actually used, the remainder is unavailable.

Example 2:

You are using the HP 64170A memory board loaded with one or two HP 64171A (256 Kbyte) SRAM modules. Your program is in address range 0800H to 0FFFH (2 Kbytes in length). When you map this 2 Kbytes into emulation memory using command "map 0800..0fff eram" a single 2-Kbyte block is allocated. Here, since the memory is mapped on a block boundary and is a multiple of the size of a block no emulation memory is wasted.

Example 3:

You are using the HP 64170A memory board loaded with one or two HP 64171A (256 Kbyte) SRAM modules. Your ROM program is in address range 0100H to 08FFH (2 Kbytes in length). When you map this 2 Kbytes into emulation memory using command "map 0100..08ff erom" two 2-Kbyte blocks are allocated (4 Kbytes total). Here the memory to be mapped is a multiple of the block size but is not on a block boundary. Therefore, in this case two blocks must be allocated with 256 bytes wasted in the first block and 1792 bytes wasted in the second block.

Example 4:   You are using the HP 64170A memory board loaded with one or two HP 64171B (1024 Kbyte) SRAM modules. Your program is in address range 1100H to 18FFH (2 Kbytes in length). When you map this 2 Kbytes into emulation memory using command "map 1100..18ff eram" the emulator will change the map to "map 1000..1bff eram". This is because the resolution for this memory board configuration is 1 Kbytes and "1100..18ff" does not conform to this 1 Kbyte resolution. With the change to the map address range 3 Kbytes of emulation memory will be mapped, starting on a 1 Kbyte boundary (1000H). In addition to this, because the block size for this memory board configuration is 8 Kbytes, one 8-Kbyte block of emulation memory will be allocated to map this 3 Kbytes of of "eram."

Example 5:   You are using the HP 64170A memory board loaded with one or two HP 64171B (1024 Kbyte) SRAM modules. Your program is in address range 2000H to 5FFFH (16 Kbytes in length). When you map this 16 Kbytes into emulation memory using command "map 2000..5fff eram" two 8-Kbyte blocks are mapped exactly with no emulation memory wasted. This is because "2000H" is on an 8 Kbyte boundary and the amount of memory to be mapped is exactly a multiple of the block size.

The foreground monitor

The HP 64170A memory board allows for use of a foreground monitor with no "remaining emulation memory" being allocated. This is because the foreground monitor uses the same, first block of memory reserved for the background monitor. You will note that the command "cf mon= fg..2000" does not decrease the amount of "remaining emulation memory."

The foreground monitor must be located on a 2 Kbyte or larger address boundary if you are using the 64743-66512 (128 Kbyte) or 64743-66513 (512 Kbyte) memory boards, or the HP 64170A memory board with one or more 64171/172A (256 Kbyte) SRAM modules. If you are using the HP 64170A memory board loaded with one or more 64171/172B (1024 Kbyte) SRAM modules you must locate the foreground monitor on an 8 Kbyte or larger address boundary, for example 2000H.

Error Messages

The following table is a description of error messages for improper memory configurations. Error messages appear at initialization only. Entering the command **init** will redisplay any initialization error messages.

ERROR 151

HP64170A has missing memory module: bank n
where n = 0, 1, 2, 3

1, 2, or 4 SRAM modules must be installed (3 results in this error). If you are using only one SRAM module, you must insert it into bank 0. If you are using two SRAM modules, you must insert them into banks 0 and 1. This error must be corrected for the emulator to function correctly.

If the ver command is entered, you will see an ILLEGAL combination similar to the one below:

```
HP64746 (PPN: 64746A) Motorola 68302 Emulator
  Version:   A.00.03 24Jun91
  Control:   HP64170A Memory Control Board
  Memory:    0 Kbytes
    Bank 0:  Empty
    Bank 1:  Empty
    Bank 2:  Empty
    Bank 3:  Empty
```

ERROR 152

HP64170A has mixed memory modules: banks 0, n
where n = 0, 1, 2, 3

The HP64170A memory control board may be loaded with all 64171A (256 Kbyte) modules or all HP64171B (1 Mbyte) modules. Mixing the two different sized memory modules is not allowed. This error must be corrected for the emulator to function correctly.

If the ver command is entered, you would see an ILLEGAL combination similar to the one below for mixed modules:

```
HP64746 (PPN: 64746A) Motorola 68302 Emulator
 Version:   A.00.03 24Jun91
 Control:   HP64170A Memory Control Board
 Memory:    0 Kbytes
   Bank 0:  HP64171A/C 256 Kbyte Memory Module
   Bank 1:  HP64171B/D 1024 Kbyte Memory Module
   Bank 2:  Empty
   Bank 3:  Empty
```

ERROR 153   **HP64170A has unrecognized memory module: bank n**
             where n = 0, 1, 2, 3

             The HP64170A memory control board has detected an unusable memory
             module. Verify that a HP64171A or HP64171B memory module is installed
             in the bank in question. If the correct memory module is installed, or there is
             no memory module installed there may be a hardware fault. This error must
             be corrected for the emulator to function correctly.

ERROR 154   **Unable to find emulation memory**

             It cannot be determined which emulation memory board is installed. This is a
             hardware fault and must be corrected for the emulator to function correctly.