



**HP 13187A**  
**16K Memory Module**  
**installation manual**



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## 1. INTRODUCTION

This manual provides installation instructions for the HP 13187A 16K Memory Modules, which are part of the HP 2102A Memory System. When one or more memory modules are to be field installed in an HP 21MX Computer or an HP 12990A Memory Extender, it may be necessary to order a new memory system cable.

## 2. MODULE NUMBER ASSIGNMENT

A 16K memory module is equivalent to two contiguous 8K memory modules; therefore, two module numbers must be allocated to each 16K memory module as shown in figure 1. Notice that the module numbers must first be an even number followed by the next sequential odd number. This poses one minor restriction on module number assignments when a mixture of 8K and 16K memory modules reside in the same system.

Table 1 lists a typical memory system in which a 16K memory module is being added. The "old configuration" included three 8K modules, one 4K module (a 4K module

is a half-loaded 8K module), and zero 16K modules. The considerations given to the "new configuration" are as follows:

- a. The 8K module formerly assigned module number 2 must be reassigned as module number 4 because the 16K module is assigned module numbers 2 and 3.
- b. The 4K module must be reassigned as module number 5 because a half-loaded module must be assigned the highest module number in a given memory system.

It should be noted in table 1 that the 16K module could have alternatively been assigned modules 0 and 1, but this would have required that two of the 8K modules (0 and 1) be reassigned memory module numbers instead of the one given in the "new configuration" example.

Table 2 lists another typical memory system in which a 16K memory module is being added. The "old configuration" included two 16K modules, three 8K modules, and one 4K module. The considerations given to this "new configuration" are as follows:

Table 1. Typical Memory Configuration (Example 1)

OLD CONFIGURATION			NEW CONFIGURATION			ALTERNATE CONFIGURATION		
MEM MOD.	QTY	MOD. NO.	MEM MOD.	QTY	MOD. NO.	MEM MOD.	QTY	MOD NO.
8K	3	0,1,2	8K	3	0,1,4	8K	3	2,3,4
4K*	1	3	4K*	1	5	4K*	1	5
16K	0	—	16K	1	2,3	16K	1	0,1

\*Must always be highest numbered module in memory.

Table 2. Typical Memory Configuration (Example 2)

OLD CONFIGURATION			NEW CONFIGURATION			ALTERNATE CONFIGURATION		
MEM MOD.	QTY	MOD. NO.	MEM MOD.	QTY	MOD. NO.	MEM MOD.	QTY	MOD NO.
16K	2	0,1,2,3	16K	3	0,1,2,3,6,7	16K	3	0,1,2,3,4,5
8K	3	4,5,6	8K	3	4,5,8	8K	3	6,7,8
4K*	1	7	4K*	1	9	4K*	1	9

\*Must always be highest numbered module in memory.

- a. To allow for a minimum of memory module number reassignment, the new 16K module is assigned module numbers 6 and 7. This allows two of the 8K module numbers (4 and 5) to remain unchanged.
- b. The 8K module formerly assigned module 6 must be reassigned as module number 8 and the 4K module must be reassigned as module 9.

It should be noted in table 2 that the 16K module could have alternatively been assigned modules 4 and 5, but this would have required that two of the 8K modules (4 and 5) be reassigned memory module numbers instead of the one given in the "new configuration" example.

### 3. INSTALLATION IN COMPUTER

Install the 16K memory module in the computer memory PCA cage as follows:

#### CAUTION

All contents of memory will be lost when the mains (line) and battery voltages are both off. Therefore, before proceeding with the installation, ensure that any contents of memory to be saved are stored in another medium for later retrieval.

- a. On computer rear panel, set  $\sim$ LINE and BATTERY switches to off.
- b. Loosen quarter-turn fasteners on computer operator panel and lower it to the access position. Remove memory PCA cage cover by removing the two screws and lockwashers.
- c. Remove memory system cable from memory controller and existing memory modules.
- d. Assign memory module numbers to 16K memory module and install XW1 jumpers as specified in figure 1.
- e. If necessary, reassign memory module number(s) to displaced 8K memory module(s) by installing XW1 jumpers as specified in figure 2.
- f. Reassign memory module number to displaced 4K memory module (if present) by installing XW1 jumpers as specified in figure 3.
- g. Connect memory system cable to memory controller and memory modules. Replace memory PCA cage cover and operator panel.

- h. On rear panel, set  $\sim$ LINE and BATTERY switches to ON. On operator panel, set key-operated switch to R (reset) and then to STANDBY.
- i. Perform checkout as described in paragraph 5.

### 4. INSTALLATION IN EXTENDER

Install the 16K memory module in the memory extender as follows:

#### CAUTION

All contents of memory will be lost when the mains (line) and battery voltages are both off. Therefore, before proceeding with the installation, ensure that any contents of memory to be saved are stored in another medium for later retrieval.

- a. On extender rear panel, set  $\sim$ LINE switch to OFF. If an internal battery is installed, set BATTERY switch to EXT; if an external battery is employed, set BATTERY switch to INT.
  - b. Loosen quarter-turn fasteners on memory extender front panel and lower it to the access position. Remove memory PCA cage cover by removing the two screws and lockwashers.
  - c. On computer rear panel, set  $\sim$ LINE and BATTERY switches to OFF.
  - d. Loosen quarter-turn fasteners on computer operator panel and lower it to the access position. Remove memory PCA cage cover by removing the two screws and lockwashers.
  - e. Remove memory system cable from computer and extender.
- Note: It is recommended that the eight memory extender slots be filled before adding memory to the computer mainframe.
- f. Assign memory module numbers to 16K memory module and install XW1 jumpers as specified in figure 1.
  - g. If necessary, reassign memory module number(s) to displaced 8K memory module(s) by installing XW1 jumpers as specified in figure 2.
  - h. Reassign memory module number to displaced 4K memory module (if present) by installing XW1 jumpers as specified in figure 3.

- i. Connect memory system cable to the memory controller (highest numbered slot in the computer memory PCA cage) and the memory modules
- j. Replace memory PCA cage cover in the computer and the extender. Replace computer operator panel and extender front panel.
- k. On extender rear panel, set ~LINE switch to ON. If an internal battery is installed, set BATTERY switch to INT; if an external battery is employed, set BATTERY switch to EXT.
- l. On computer rear panel, set ~LINE and BATTERY switches to ON. On operator panel, set key-operated switch to R (reset) and then to STANDBY.
- m. Perform checkout as described in paragraph 5.

## 5. CHECKOUT

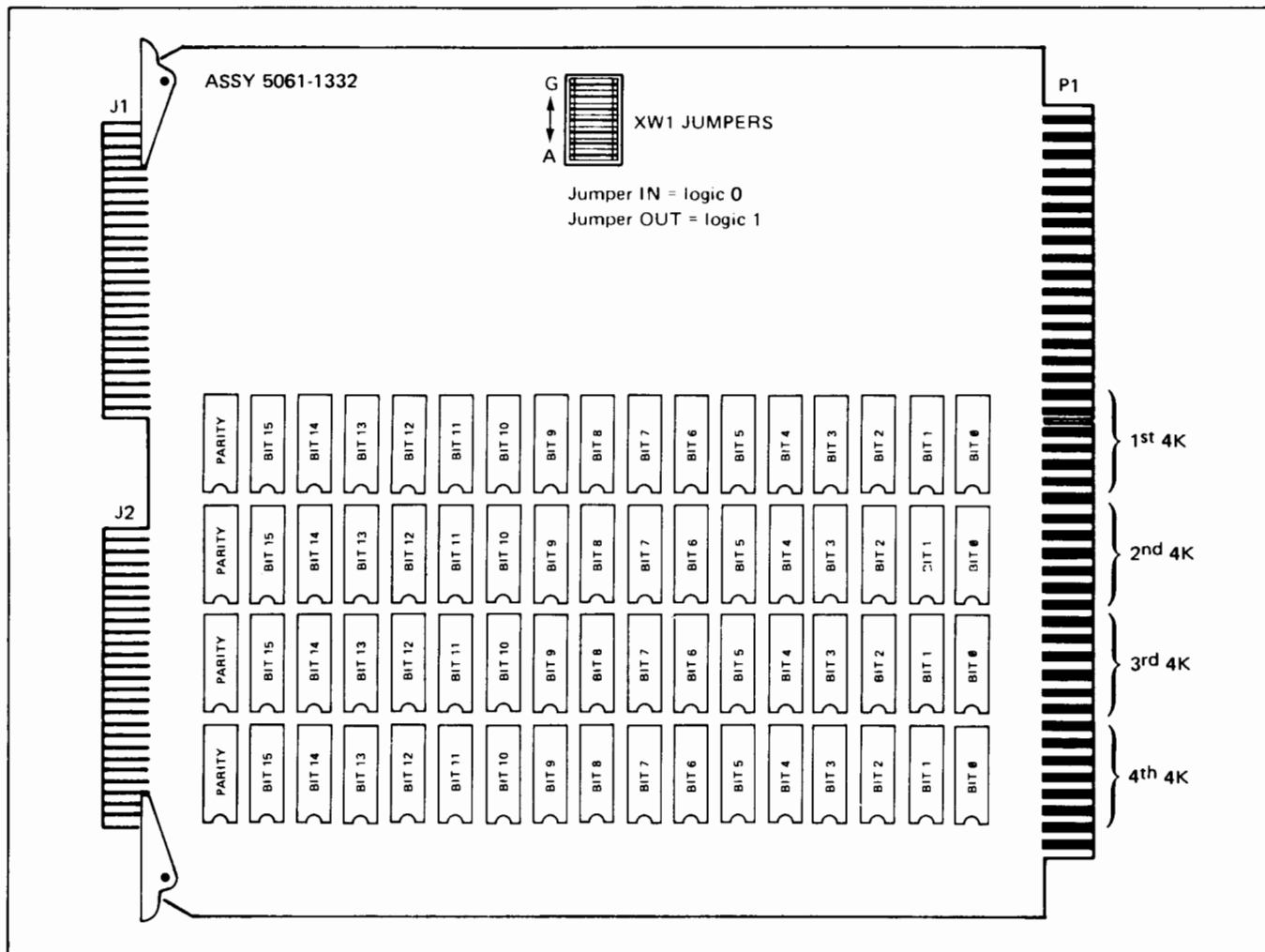
After installing a memory PCA, verify proper operation by

performing the memory and memory parity diagnostic tests. Part numbers for the diagnostic manuals and diagnostic tapes are listed below

DIAGNOSTIC	MANUAL	ABSOLUTE BINARY PROGRAM
Semiconductor Memory Diagnostic Test	24395-90001	24395-16001
Memory Protect/Parity Error Diagnostic Test	12892-90005	12892-16001

If the diagnostic tests are completed without an error halt, the memory PCA is operating correctly. If the diagnostic tests indicate an error halt, notify your nearest HP Sales and Service Office. A list of the HP Sales and Service Offices is given in the **HP 21MX Computer Series Reference Manual**, part no. 02108-90002, and the **HP 21MX E-Series Computer Operating and Reference Manual**, part no. 2109-90001.

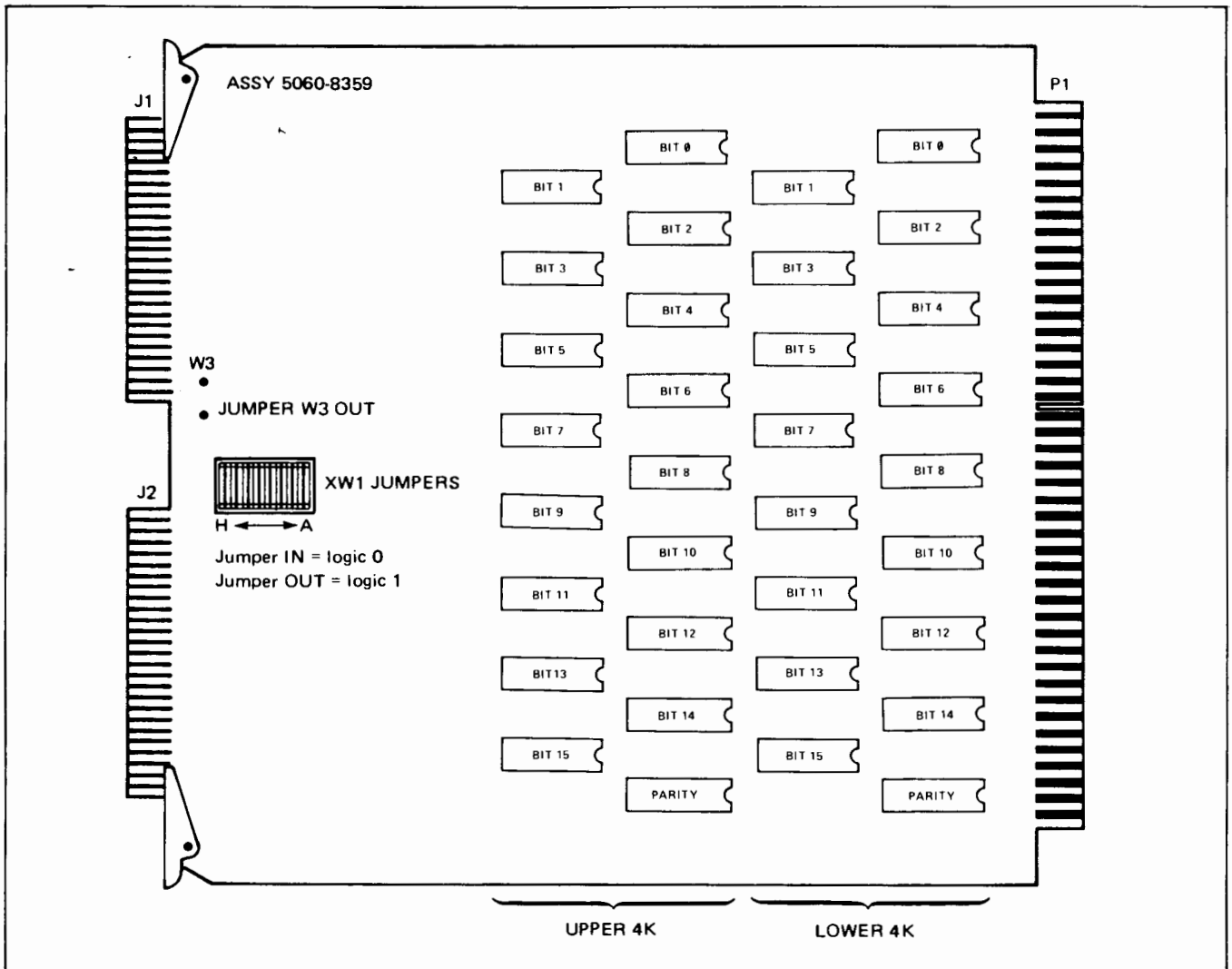




MEMORY MODULE NO.	XW1 JUMPERS						
	A (2 <sup>0</sup> )	B (2 <sup>1</sup> )	C (2 <sup>2</sup> )	D (2 <sup>3</sup> )	E (2 <sup>4</sup> )	F (2 <sup>5</sup> )	G
0,1	IN	IN	IN	IN	IN	IN	ALWAYS OUT
2,3	OUT	IN	IN	IN	IN	IN	
4,5	IN	OUT	IN	IN	IN	IN	
6,7	OUT	OUT	IN	IN	IN	IN	
8,9	IN	IN	OUT	IN	IN	IN	
10,11	OUT	IN	OUT	IN	IN	IN	
12,13	IN	OUT	OUT	IN	IN	IN	
14,15	OUT	OUT	OUT	IN	IN	IN	
16,17	IN	IN	IN	OUT	IN	IN	
18,19	OUT	IN	IN	OUT	IN	IN	
20,21	IN	OUT	IN	OUT	IN	IN	
22,23	OUT	OUT	IN	OUT	IN	IN	
24,25	IN	IN	OUT	OUT	IN	IN	
26,27	OUT	IN	OUT	OUT	IN	IN	
28,29	IN	OUT	OUT	OUT	IN	IN	
30,31	OUT	OUT	OUT	OUT	IN	IN	
32,33	IN	IN	IN	IN	OUT	IN	

Note: The 16K modules are equivalent to two contiguous 8K modules.

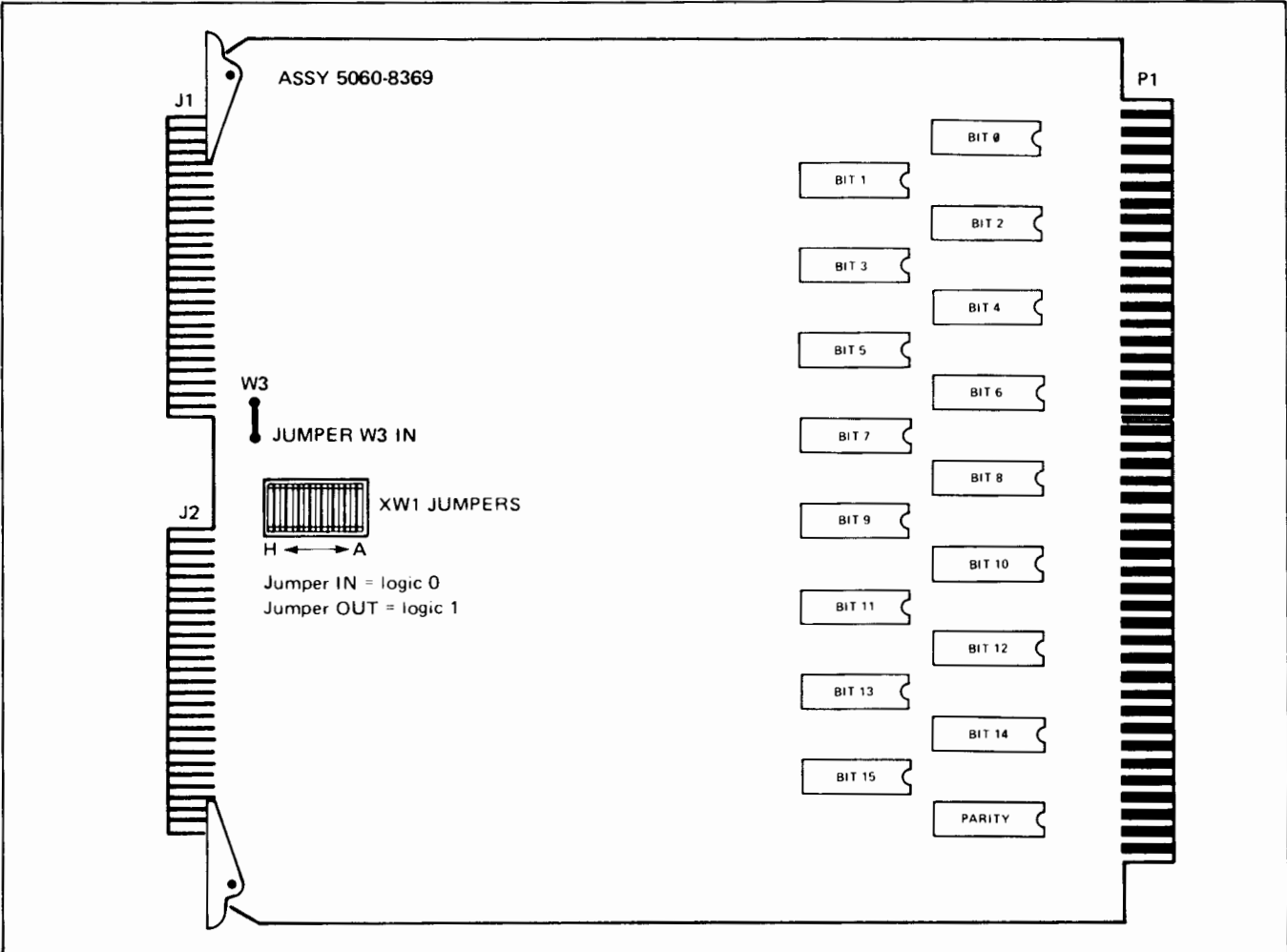
Figure 1. 16K Memory Module



MEMORY MODULE NO.	W3	XW1 JUMPERS								
		A	B (2 <sup>0</sup> )	C (2 <sup>1</sup> )	D (2 <sup>2</sup> )	E (2 <sup>3</sup> )	F (2 <sup>4</sup> )	G (2 <sup>5</sup> )	H (2 <sup>6</sup> )	
0	ALWAYS OUT	DON'T CARE	IN	IN	IN	IN	IN	IN	IN	IN
1			OUT	IN	IN	IN	IN	IN	IN	IN
2			IN	OUT	IN	IN	IN	IN	IN	IN
3			OUT	OUT	IN	IN	IN	IN	IN	IN
4			IN	IN	OUT	IN	IN	IN	IN	IN
5			OUT	IN	OUT	IN	IN	IN	IN	IN
6			IN	OUT	OUT	IN	IN	IN	IN	IN
7			OUT	OUT	OUT	IN	IN	IN	IN	IN
8			IN	IN	IN	IN	OUT	IN	IN	IN
9			OUT	IN	IN	IN	OUT	IN	IN	IN
10			IN	OUT	IN	OUT	IN	IN	IN	IN
11			OUT	OUT	IN	OUT	IN	IN	IN	IN
12			IN	IN	OUT	OUT	IN	IN	IN	IN
13			OUT	IN	OUT	OUT	IN	IN	IN	IN
14			IN	OUT	OUT	OUT	IN	IN	IN	IN
15			OUT	OUT	OUT	OUT	IN	IN	IN	IN
16	IN	IN	IN	IN	IN	OUT	IN	IN		

Figure 2. 8K Memory Module





MEMORY MODULE NO.	W3	XW1 JUMPERS								
		A	B (2 <sup>0</sup> )	C (2 <sup>1</sup> )	D (2 <sup>2</sup> )	E (2 <sup>3</sup> )	F (2 <sup>4</sup> )	G (2 <sup>5</sup> )	H (2 <sup>6</sup> )	
0	ALWAYS IN	ALWAYS IN	IN	IN	IN	IN	IN	IN	IN	IN
1			OUT	IN	IN	IN	IN	IN	IN	IN
2			IN	OUT	IN	IN	IN	IN	IN	IN
3			OUT	OUT	IN	IN	IN	IN	IN	IN
4			IN	IN	OUT	IN	IN	IN	IN	IN
5			OUT	IN	OUT	IN	IN	IN	IN	IN
6			IN	OUT	OUT	IN	IN	IN	IN	IN
7			OUT	OUT	OUT	IN	IN	IN	IN	IN
8			IN	IN	IN	OUT	IN	IN	IN	IN
9			OUT	IN	IN	OUT	IN	IN	IN	IN
10			IN	OUT	IN	OUT	IN	IN	IN	IN
11			OUT	OUT	IN	OUT	IN	IN	IN	IN
12			IN	IN	OUT	OUT	IN	IN	IN	IN
13			OUT	IN	OUT	OUT	IN	IN	IN	IN
14			IN	OUT	OUT	OUT	IN	IN	IN	IN
15			OUT	OUT	OUT	OUT	IN	IN	IN	IN
16	IN	IN	IN	IN	IN	OUT	IN	IN		

Note: This 4K module must be assigned the highest used memory module number regardless of the memory configuration. Only one 4K module allowed per configuration.

Figure 3. 4K Memory Module