IBM

Personal Computer

IBM 256KB Memory Expansion Option

Contents

Notes:

Description

The IBM 256KB Memory Expansion Option is available for the IBM Personal Computer family of products. The system board must be populated to the maximum 256KB of RAM before the IBM 256KB Memory Expansion Option can be installed.

The IBM 256KB Memory Expansion Option has four pluggable sockets. Each socket will accept a 64KB Memory Module, consisting of one (64K by 9) 32-pin D RAM Module. The 256KB expansion option comes with all four modules installed providing 256KB of memory.

In addition to the memory modules, the memory expansion option contains the following circuits: bus buffering, dynamic memory timing generation, address repowering, and card-select decode logic.

Dynamic-memory refresh timing and address generation are functions that are performed by the system board and made available in the I/O channel for all devices.

The 256KB Memory Expansion Option is parity checked. If a parity error is detected, a latch is set and an I/O 'channel check' line is activated, indicating an error to the microprocessor.

To allow the system unit to address the expanded memory provided by the IBM 256KB Memory Expansion Option, refer to the *Guide to Operations* manual for the proper memory-expansion-option switch settings.

Switch-Configurable Start Address

The 256KB Memory Expansion Option must be configured to reside at a sequential 64KB memory address boundary within the system address space. This is done by setting dual-in-line package (DIP) switches on the option. The IBM 256KB Memory Expansion Option has a small DIP module containing eight switches. The switches are used to set the card start address as follows:

Number	256KB Options
1	ON: A19=0; OFF:A19=1
2	ON: A18=0; OFF:A18=1
3	ON: A17=0; OFF:A17=1
4	ON: A16=0; OFF:A16=1
5	ON: Select 64KB
6	ON: Select 128KB
7	ON: Select 192KB
8	ON: Select 256KB

DIP Module Start Address

The following method can be used to determine the switch settings for the 256KB memory expansion option.
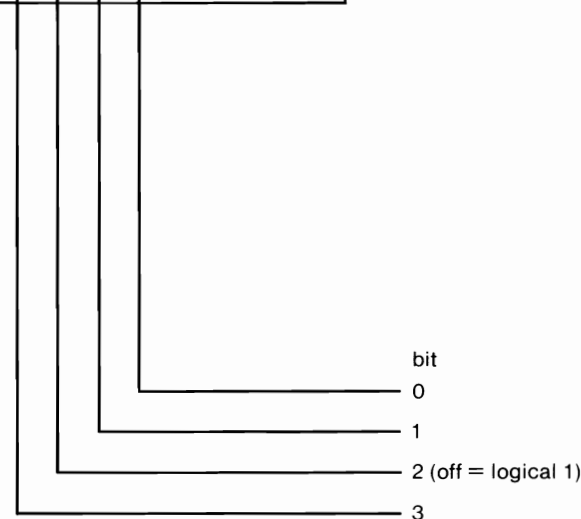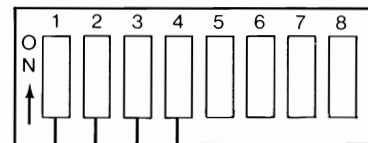
Starting Address = xxxKB

$$\frac{\text{Starting Address} = \text{xxxKB}}{64\text{KB} \quad \text{xxxKB}} = \text{Decimal value}$$

Convert decimal value to binary

Bit. 3 2 1 0
Bit value. . . . 8 4 2 1

Switch

bit
0
1
2 (off = logical 1)
3

Operating Characteristics

The system board operates at a frequency of 4.77 MHz, which results in a clock cycle of 210 ns.

Normally four clock cycles are required for a bus cycle so that an 840-ns memory cycle time is achieved. Memory-write and memory-read cycles both take four clock cycles, or 840 ns.

Access and cycle times for memory used on the IBM 256KB Memory Expansion Option are:

Time.	256KB Card
Access	290 ns
Cycle	840 ns

Access/Cycle Times

Voltage Requirements

The IBM 256KB Memory Expansion card requires 3 voltage levels: +12Vdc, +5Vdc, and –5Vdc.
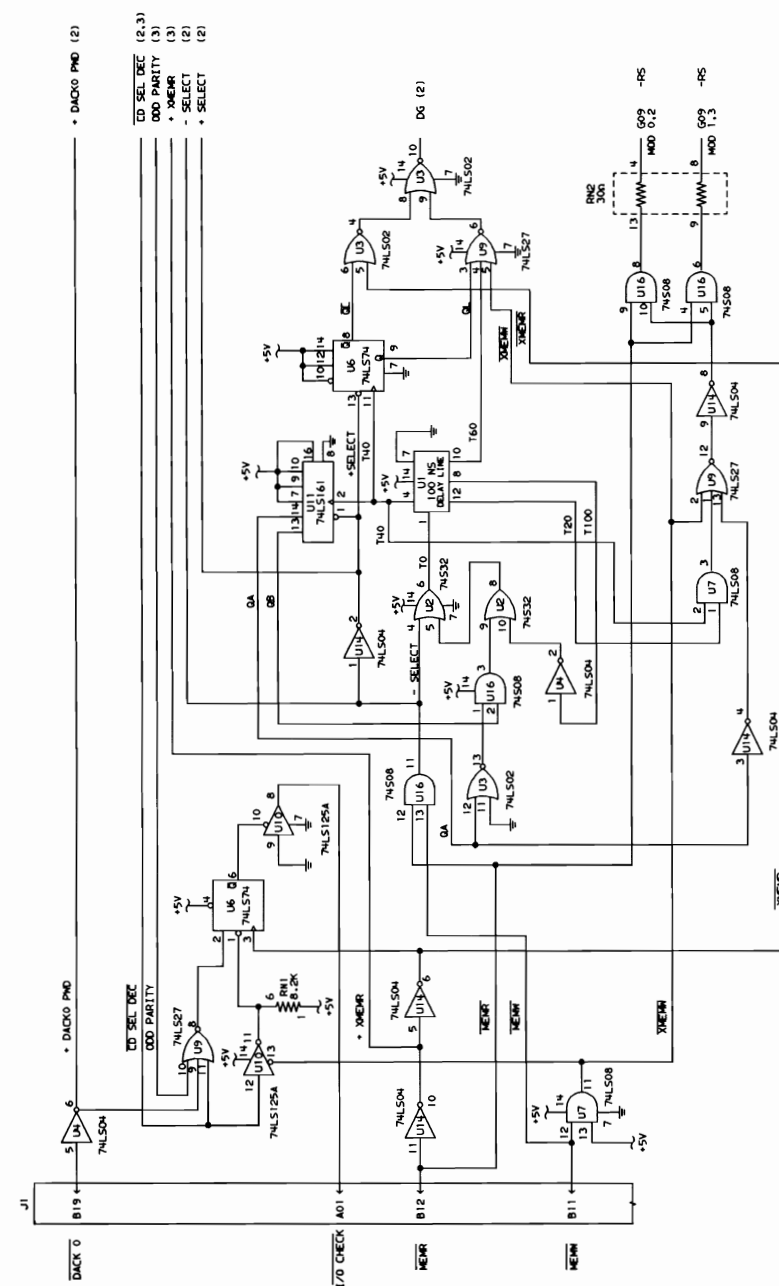
Specifications

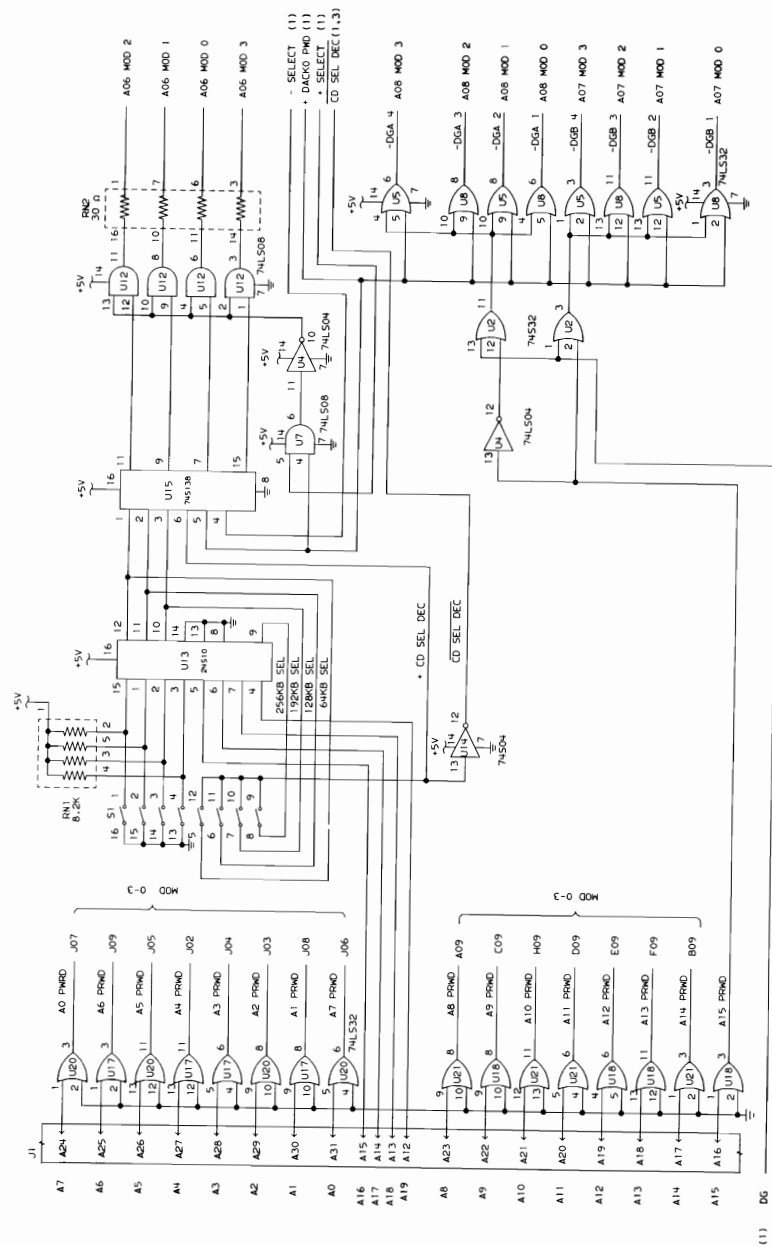This is the pin side view of the IBM 64KB 32-Pin D RAM Module.

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	D4	B9	A14	J8	A1	B1	+8.5 Vdc
A2	D3	C9	A09	J7	A0	C1	–2.2 Vdc
A3	D2	D9	A11	J6	A7	D1	D5
A4	D1	E9	A12	J5	A5	E1	D6
A5	D0	F9	A13	J4	A3	F1	D7
A6	CS	G9	RS	J3	A2	G1	D8
A7	DG B	H9	A10	J2	A4	H1	+5 Vdc
A8	DG A	J9	A06	J1	GND		
A9	A8						

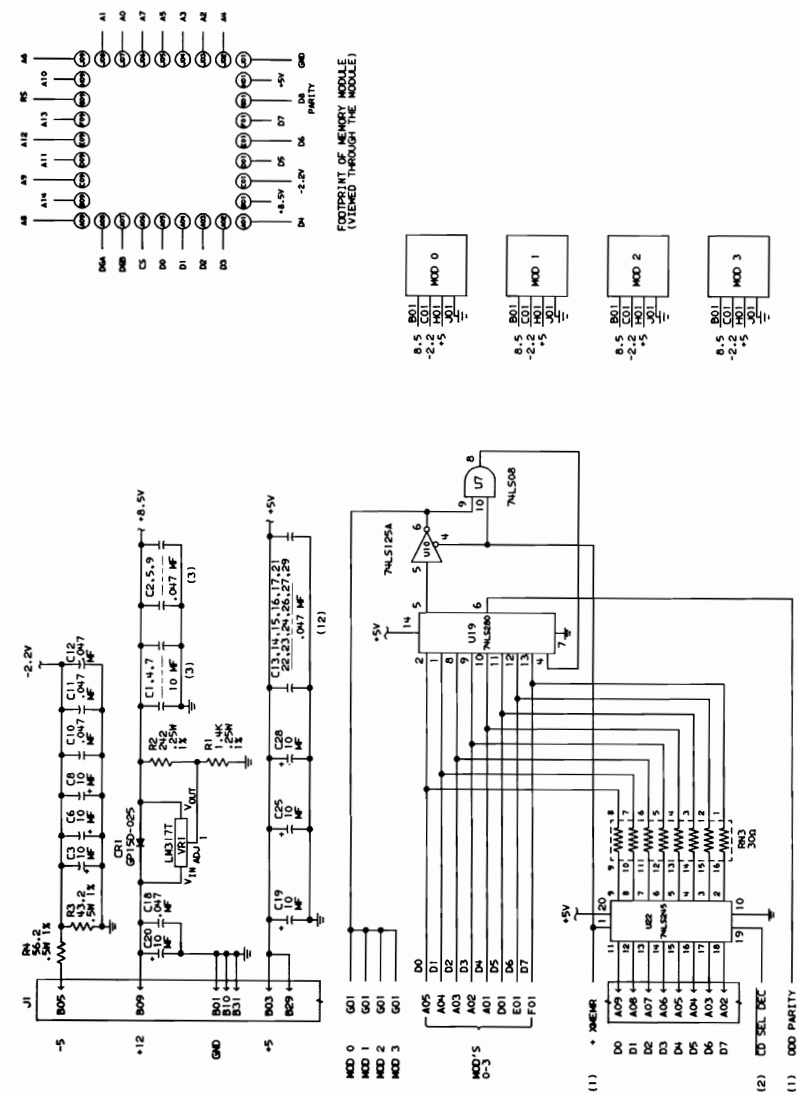The +8.5, +5 and -2.2Vdc are developed on the 256KB Memory Expansion Adapter.

IBM 64KB Memory Module Pin Configuration

Notes:

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256KB Memory Expansion Option (Sheet 2 of 3)

256KB Memory Expansion Option (Sheet 3 of 3)

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