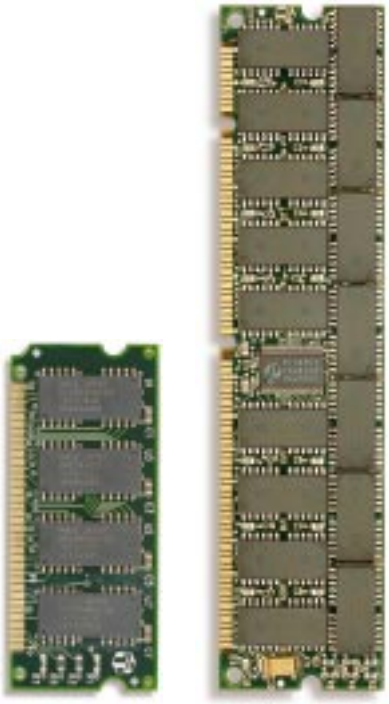
DIMM'S

TECHWORKS EDUCATION SERIES

DIMMs: Dual In-line Memory Modules

FIGURE 1



72-pin SO DIMM 168-pin DIMM

The acronym DIMM stands for Dual In-line Memory Module. The DIMM architecture is an evolution of the SIMM, or Single In-line Memory Module. In its simplest form, the DIMM can be thought of as two SIMMs built into one unit. Each of the SIMM pins (connectors on the bottom edge of the SIMM) is tied to the pin on the other side of the module, and therefore, the two act as a single pin and are read by the computer as the same. On a DIMM, however, the pins on each side of the module act independently for addressing information to the memory chips, and therefore, increase the amount of contacts available in a given space.

What are the different types and sizes of DIMMs?

The 168-pin DIMM and 72-pin small-outline (SO) DIMM are the two most popular types (see Figure 1). 168-pin DIMMs are available for both Macintosh and PC desktop computers in a variety of configurations and sizes, while the 72-pin SO DIMM is shorter than a standard DIMM and has become the standard in notebook computers, mostly PC laptops. Examples of common DIMM types and configurations are shown in Table 1.

168-pin DIMMs are available in non-parity (64-bit), as well as parity and ECC (72-bit) versions. Used primarily in desktop computers, these modules are 5.25" wide and are available in 1.1" and 1.25" heights. The computer manufacturer specifies which sizes and types are appropriate. As with SIMMs, the pins can be either gold or tin. For example, Apple specifies gold pins for its DIMMs.

72-pin SO DIMMs are most typically seen in non-parity configurations for use in notebook computers. The standard SO DIMM design allows for 4MB, 8MB, 16MB and 32MB module capacities. The SO DIMM design is gaining popularity because of its small size, low cost, and ease of upgrade for the user. One of the key differentiating factors in SO DIMMs is the operating voltage, which is either 3.3 Volts or 5 Volts. The SO DIMM connectors and modules for the two voltages are designed with different sized notches on the side of the DIMM (see Figure2). This prevents a 3.3V module from being installed in a 5V system. When ordering SO DIMMs for your PC notebook, be sure to confirm the proper voltage modules.

How do I know what DIMM to buy?

With today's new technologies, deciding which choice is right for you can be a confusing task. The easiest way to get through the identification process is to determine the memory specifications for your computer. Specifications will typically include one of the items from each of the following columns. This information is generally available in your computer manual or user's guide.

Column A	Column B	Column C	Column D
Chip Type	Voltage	Bufferage	Error Checking
FPM	5V	Buffered	Parity
EDO	3.3V	Unbuffered	Non-Parity
S-DRAM			ECC

Table 1 *Memory Capacity*

DIMM Type	4MB	8MB	16MB	32MB	64MB	128MB
72-pin non-parity	1Mx32	2Mx32	4Mx32	8Mx32	•	•
168-pin non-parity	512Kx64	1Mx64	2Mx64	4Mx64	8Mx64	16Mx64
168-pin parity	512Kx72	1Mx72	2Mx72	4Mx72	8Mx72	16Mx72
168-pin ECC	512Kx72	1Mx72	2Mx72	4Mx72	8Mx72	16Mx72

Which chip type do I need?

Choosing which chip type is needed to make your DIMM is easier when you take a longer look at EDO (Extended Data Output), FPM (Fast Page Mode) and Synchronous DRAM. Like a spreadsheet, all DRAM organizes data into columns and rows. Both EDO and FPM DRAM access data by finding the row and column the data is in and reading the information contained in these cells. The difference between the two is FPM DRAM has to read the data before moving on to other rows and columns, but EDO DRAM can process the data from one row and column, while it searches for the location of the next address.

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