How To Identify SIMMs

You've found some old SIMMs in a desk drawer or extracted them from an unwanted PC. Are they fit only for the bin, or are they suitable for use in a user's PC? Guy Clapperton shows how to find out.

There has been a massive growth in demand for memory upgrades lately, fuelled by a number of factors.

First there has been the increasing demand from the software companies. Whereas it is true that both OS/2 Warp and Windows 95 will sit in 4 MB of RAM, using heavy-duty applications on top of the base system necessitates more. Users and buyers therefore need to look at how much of their projected requirement can be filled by their existing systems and how much they need to expand.

Most RAM comes today in the form of SIMMs, or Single Inline Memory Modules. Buying SIMMs, or using existing ones from old machines in order to upgrade another PC, is unfortunately far from straightforward. The first difficulty is the shortage of these components, partly due to the demand outlined above but also due to manufacturing difficulties. Each transistor on board has to be working or the entire SIMM is useless, and when the transistors themselves number some 200 million on a high-capacity SIMM chip it can be seen that the failure rate must be high.

There are failsafes built in to effect minor repairs and rectifications, but the cost of research and development remains high. At present there is a general shortage of SIMMs, and the mass upgrades accompanying Windows 95 installations is doing nothing to reduce that scarcity.

SIMMs

SIMMs are used in place of single memory chips and, as their name implies, are modular in design. The components can be organised in several ways and these are indicated by numbers. For example, a 1 MB SIMM might consist of nine 1 Mbit chips, indicated by the insignia 1Mx1, or it could consist of two 4 Mbit chips with another one for the parity bits, indicated by the number 1Mx4. The components are arranged pair by pair or four by four to allow a main memory data width of either 16 or 32 bits.

Connections

SIMMs are connected to the motherboard by a strip much the same as an adapter card would have for bus slots. This is how they differ from the similar SIP modules, which have pins that attach to corresponding holes. Incidentally, there are adaptors available for converting SIPs to SIMMs, so don't assume that old memory modules have to be thrown away just because they use a different connection mechanism.

SIMMs can be designed with either 30 or 72 pins. The 36-bit 72-pin versions have a faster access time and are more suitable for modern installations. Nine-bit 30-pin devices will improve the performance of older computers, and there are doublers available to convert 30-pin models into 72-pin models. These enable near-72-pin performance from a two-slot 30-pin socket.

Incompatibilities

SIMMs are commonly available in configurations of 1, 4 or 16 MB, and sometimes up to 32. Incompatibilities can crop up at any point in the spectrum. 16 MB models are available in 2 KB and 4 KB refresh models, and the 2 KB version works with more or less

HB56G25632 B	-	256Kx32 (4M based)
HB56A51242 B	-	512Kx32 (4M based)
HB56A132 BV/BU	-	1Mx32 (The BU model is a low profile SIMM)
HB56A232 BT	-	2Mx32
HB56A432 BR	-	4Mx32 (16M based, 2K cycles/32ms refresh)
HB56A832 BS	-	8Mx32 (16M based, 2K cycles/32ms refresh)

Figure 1 - Hitachi 72-pin SIMMs arranged as 32 DRAM modules.

HB56G25636 B	-	256Kx36 (4M based)
HB56G51236 B	-	512Kx36 (4M based)
HB56D136 BV	-	1Mx36 (Parity with 1M DRAM)
HB56D136 BW	-	1Mx36 (Parity with 2M DRAM)
HB56D236 BS	-	2Mx36 (parity with 1M DRAM)
HB56D236 BW	-	2Mx36 (parity with 2M DRAM)
HB56A436 BR	-	4Mx36 (4M based)
HB56D436 BR	-	4Mx36 (16M based, 2K cycles/32ms refresh)
HB56D836 BR	-	8Mx36 (16M based, 2K cycles/32ms refresh)

Figure 2 - Hitachi x36 DRAM modules.

HB56A140 BR	-	1Mx40
HB56A240 BR	-	2Mx40
HB56A440 BR	-	4Mx40 (16M based, 4K cycles/64ms refresh)
HB56A840 BR	-	8Mx40 (16M based, 4K cycles/64ms refresh)

Figure 3 - x40 Hitachi DRAM modules.

every PC product. The 4 KB version is newer and faster but more prone to incompatibility.

At the lower end, a system configured for parity will fail when an 8-bit SIMM with no parity chip is installed, while a non-parity system will fail if a SIMM configured for parity checking is put in. Both, though, will fit into the slot. A low-spec technology for 72-pin SIMMs without parity is also available as 32-bit technology.

KTM1000/8-80S	-	1Mx8, 80ns SIMM module
KTM1000/8-70S	-	1Mx8, 70ns SIMM module
KTM1000/8-60S	-	1Mx8, 60ns SIMM module
KTM1100/8-70	-	1Mx8 2-chip, 70ns SIMM module
KTM1100/8-60	-	1Mx8 2-chip, 60ns SIMM module
KTM1000/9-60S	-	1Mx9, 60ns SIMM module
KTM1100/9-70	-	1Mx9, 3-chip 70ns SIMM module
KTM1100/9-60	-	1Mx9 3-chip, 60ns SIMM module
KTM4000/9-80S	-	4Mx9, 80ns SIMM module
KTM4000/9-70S	-	4Mx9, 70ns SIMM module (3 chips)
KTM4900/9-70	-	4Mx9, 70ns SIMM module (9 chips)
KTM4900/9-60	-	4Mx9, 60ns SIMM module (9 chips)
KTM4000/9-60S	-	4Mx9, 60ns SIMM module
KTM4000/8-70S	-	4Mx8, 80ns SIMM module
KTM4000/8-80S	-	4Mx8, 80ns SIMM module
KTM4000/8-70S	-	4Mx8, 70ns SIMM module
KTM1x32L-60T	-	1Mx32, 60ns low-profile SIMM with tin connector
KTM1x32L-60G	-	1Mx32, 60ns low Profile SIMM with gold connector
KTM1x32L-70T	-	1Mx32, 70ns SIMM with tin connector
KTM1x32L-70G	-	1Mx32, 70ns SIMM with gold connector
KTM1x32L-70ET	-	1Mx32, 70ns SIMM - EDO with tin connector
KTM1x32L-70EG	-	1Mx32, 70ns SIMM - EDO with gold connector
KTM1x36L-60T	-	1Mx36, 60ns low-profile SIMM, tin connection
KTM1x36L-60G	-	1Mx36, 60ns low-profile SIMM, gold connection
KTM1x36L-70T	-	1Mx36, 70ns low profile SIMM, tin connection
KTM1x36L-70G	-	1Mx36, 70ns low-profile SIMM, gold connection
KTM361020-80	-	1Mx36, 80ns SIMM
KTM2x32L-60T	-	2Mx32, 60ns low-profile SIMM, tin connection
KTM2x32L-60G	-	2Mx32, 60ns low-profile SIMM, gold connection
KTM2x32L-70T	-	2Mx32, 70ns low-profile SIMM, tin connection
KTM2x36L-70G	-	2Mx32, 70ns low-profile SIMM, gold connection
KTM2x36L-80	-	2Mx36, 80ns low-profile SIMM
KTM4x32L-60T	-	4Mx32, 60ns low-profile SIMM, tin connection
KTM4x32L-60G	-	4Mx32, 60ns low-profile SIMM, gold connection
KTM4x32L-70T	-	4Mx32, 70ns low-profile SIMM, tin connection
KTM4x32L-70G	-	4Mx32, 70ns low-profile SIMM, gold connection
KTM4x36L-60G	-	4Mx36, 60ns low-profile SIMM, gold connection
KTM4x36L-60T	-	4Mx36, 60ns low-profile SIMM, tin connection
KTM4x36L-70G	-	4Mx36, 70ns low-profile SIMM, gold connection
KTM4x36L-70T	-	4Mx36, 70ns low-profile SIMM, tin connection
KTM4x36L-80	-	4Mx36, 80ns low-profile SIMM

Figure 4 - Kingston SIMMs.

MC421000A32B-70	-	1Mx32, 8 chip
MC421000A32BA-70	-	1Mx32, 2 chip 1Mx16s
MC421000A36BE-70	-	1Mx36
MC422000A32B-70	-	2Mx32, 16 chip
MC422000A32BA-70	-	2Mx32, 4 chip 1Mx16s
MC422000A36BE-70	-	2Mx36
MC424000A32B-70	-	4Mx32
MC424000A36BE-70	-	4Mx36
MC428000A32B	-	8Mx32
MC428000A36BE-70	-	8Mx36

Figure 5 - NEC 70-pin SIMMs.

The main disadvantage with using 30-pin SIMMs is that you almost inevitably have to throw away the old set of SIMMS when upgrading, making the process costly, which is why the 72-pin converter can be a purchase well worth considering if upgrading the entire computer system is not a practical option. For example, computers originally supplied with 2 MB of memory will often have had eight 30-pin 256 KB SIMMs installed, so in order to upgrade at all at least four of these have to be discarded or recycled using a converter.

Another reason to opt for 72-pin SIMMs wherever possible is that the others require an entire bank of memory space on the motherboard because they are configured in fours, whereas the 72-bit versions can be installed one by one. They should be compatible with most 386 and above systems. It is worth noting that on a Pentium system, SIMMs must be installed in pairs. Most motherboards set up for 30-pin SIMMs will have sockets for eight in total.

Labelling

It is regrettable that the manufacturers have no agreed, logical manner of labelling their SIMMs. The above named mismatches - and a number of others - are not easy to spot and it is therefore all too possible to find system performance is hardly enhanced at all in a given PC environment. A computer's manual and the SIMM's spec should be all that is required to verify that the products are compatible.

The remainder of this article provides a brief guide to some of the more commonly used SIMMs, with product numbers and their memory capacity and arrangement, including manufacturers' comments and access times where available. If you're trying to identify a SIMM that is not listed here, you may be able to work out its spec by gathering information about similar devices. However, if you're in any doubt, you should check with the manufacturer before using it in a PC.

Hitachi

Each Hitachi SIMM comes in two or three versions, denoted by a suffix number after the main product code. These

Identifying SIMMs

numbers are -8, -7 and -6 and denote an 80ns, 70ns or 60ns access time. The lower-spec SIMMs (ie, those of less than 1 MB) do not go as low as 60ns.

Remember that an excessively fast SIMM will normally do no harm, though it will often mean you're wasting money by installing components that are capable of being driven faster than the CPU can actually manage. A SIMM that's too slow for the host system, on the other hand, will almost always lead to problems such as system crashes and corruption.

The following are Hitachi's 30-pin SIMMs:

HB56G18 B - 1Mx8
HB56A48 BR - 4Mx8
HB56A168 BR - 16Mx8

The above, being 8 bit DRAM modules, will not have a chip for parity - this is not always recommended, and parity checking must be disabled on a system for them to function at all. This is done on the motherboard and the PC's manual will tell you whether the SIMMs are suitable.

HB56G19 B - 1Mx9 (4M based)
HB56A49 BR - 4Mx9
HB56A169 BR - 16Mx9

The three SIMMs listed above all have parity but are configured as the comparatively low-spec 30-pin SIMMs. The SIMMs listed in Figure 1 are all 72-pin SIMMs arranged as 32 DRAM modules. Those in Figure 2 are x36 DRAM modules. Figure 3 lists some Hitachi x40 DRAM modules.

Hitachi also provides DIMMs (Dual Inline Memory Modules), the next generation of SIMMs, that upgrade only the higher-spec systems. These provide up to four megabytes on a 72 DRAM module.

IBM

IBM's older PS/2 systems used IBM's own version of a nine-bit SIMM. These are uncommon and incompatible with current products including IBM's own offerings, since the company now uses only 72-bit SIMMs. Among its most commonly used SIMMs are:

90X8624 - 1 MB 85ns
92F0102 - 2 MB 70ns
92F0103 - 2 MB 80ns
79F1003 - 2 MB 85ns (square notch)
92FO104 - 2 MB 85ns
92FO105 - 4 MB 80ns
87F9980 - 4 MB 80ns
79F1003 - 4 MB 85ns (square notch)
64F3606 - 8 MB 70ns
64F3607 - 8 MB 80ns
79F1004 - 8 MB 80ns (square notch)

Kingston

Kingston Technology identifies its name first (KTM) followed by a figure relating to the number of MB on the SIMM (1000 = 1 MB) followed by the number of DRAMs on it (9) followed by the access time in nanoseconds.

Kingston stocks numerous SIMMs and the ones listed in Figure 4 are intended as a set of examples rather than an exhaustive list. A similar numbering system is adopted further up the range.

NEC

Figure 5 lists a number of NEC 70-pin SIMMs. These are available with tin or gold contacts. For gold contacts, substitute the letter B for an F.

Oki Semiconductor

Oki's 30-pin SIMMs are shown in Figure 6, while the company's 72-pin SIMMs are listed in Figure 7.

DIMMs And EDO

The standard modern SIMM and the one that allows most flexibility is a 32-bit product. Also becoming available for power users is the DIMM, the Dual Inline Memory Module, which looks like an extended SIMM rolled in half. This offers 64-bit performance and is compatible, for example, with the PowerPC 9500. These are available from most of the suppliers mentioned in this article.

Also related to the SIMM is EDO RAM, designed specifically to work with Intel motherboards that use the Triton chipset. This speeds up the Pentium chip by using cache memory, and is a standard 72-pin product.

Irritating though the scope for buying the wrong SIMM is, the most frustrating thing for the jobbing buyer of SIMMs must be the bare fact of product shortages, something exacerbated by the emergence of 32-bit operating systems. This has also been affected by the earthquake in Kobe a few months ago, as this was a region of Japan that manufactured a lot of the resin used in memory devices. The upswing in domestic computing and the popularity of multimedia in home systems has also led to a run on the components by manufacturers wanting to bring their systems up to spec.

MSC23108B-XX - 1Mx8 (4M DRAM)
MSC23108BL-XX - 1Mx8 (4M DRAM)
MSC23109B-XX - 1Mx9 (4M DRAM)
MSC23109BL-XX - 1Mx9 (4M DRAM)
MSC23408B-XX - 4Mx8 (4M DRAM)
MSC23408BL-XX - 4Mx8 (4M DRAM)
MSC23409B-XX - 4Mx9 (4M DRAM)
MSC23409BL-XX - 4Mx9 (4M DRAM)

Figure 6 - Oki's 30-pin SIMMs.

MSC23118-XX - 1Mx18 (4M DRAM)
MSC23132B-XX - 1Mx32 (4M DRAM)
MSC231132BL-XX - 1Mx32 (4M DRAM)
MSC23136B-XX - 1Mx36 (4M DRAM)
MSC32136BL-XX - 1Mx36 (4M DRAM)
MSC23140B-XX - 1Mx40 (4M DRAM)
MSC23140BL-XX - 1Mx40 (4M DRAM)
MSC23232B-XX - 2Mx32 (4M DRAM)
MSC23232BL-XX - 2Mx32 (4M DRAM)
MSC23236B-XX - 2Mx36 (4M DRAM)
MSC23236BL-XX - 2Mx36 (4M DRAM)
MSC23240B-XX - 2Mx40 (4M DRAM)
MSC23240BL-XX - 2Mx40 (4M DRAM)
MSC23432-XX - 4Mx32 (16M DRAM)
MSC23432B-XX - 4Mx32 (4M DRAM)
MSC23433-XX - 4Mx32 (16M DRAM)
MSC23436-XX - 4Mx36 (16M DRAM)
MSC23438B-XX - 4Mx36 (4M DRAM)
MSC23437-XX - 4Mx36 (16M DRAM)
MSC23440-XX - 4Mx40 (16M DRAM)
MSC23441-XX - 4Mx40 (16M DRAM)
MSC23832-XX - 8Mx32 (16M DRAM)
MSC23833-XX - 8Mx32 (16M DRAM)
MSC23836-XX - 8Mx36 (16M DRAM)
MSC23837-XX - 8Mx36 (16M DRAM)
MSC23841-XX - 8Mx40 (16M DRAM)
MSC23841-XX - 8Mx40 (16M DRAM)
MSC23B20-XX - 256Kbitx36 (4M DRAM)
MSC23B21-XX - 512Kbitx36 (4M DRAM)
MSC23B27-XX - 256Kbitx36 (4M DRAM)
MSC23B33-XX - 512Kbitx32 (4M DRAM)
MSC23S132B-XX - 1Mx32 (4M DRAM)
MSC23S132BL-XX - 1Mx32 (4MB DRAM)
MSC23S136B-XX - 1Mx36 (4MB DRAM)
MSC23S136BL-XX - 1Mx36 (4MB DRAM)

Figure 7 - Oki's 72-pin SIMMs.

In the case of 72-bit SIMMs, the motherboard can detect the sort of SIMM that is present. The configurations to watch for are:

Pin State				SIMM type
70	69	68	67	
open	open	open	open	not a valid SIMM
grounded	open	open	grounded	1MB 85ns
grounded	grounded	open	grounded	1MB 100ns
open	open	open	grounded	1MB 120ns
open	open	grounded	grounded	2MB 70ns
open	grounded	grounded	open	2MB 80ns
grounded	open	grounded	open	2MB 85ns
open	open	grounded	open	2MB 120ns
grounded	open	grounded	open	4MB 70ns
grounded	grounded	grounded	grounded	4MB 80ns or 2MB 85ns
grounded	grounded	open	open	4MB 85ns
open	grounded	open	open	8MB 70ns
open	grounded	grounded	grounded	8MB 80ns
grounded	grounded	grounded	open	2MB 100ns

Figure 8 - Presence Detect Pins

Parity

A PC's manual will tell you whether the motherboard uses parity checking or not. It is mostly futile to alter this setting to suit the SIMM you want to buy or that you have available. If you change the setting it is possible that the existing memory will cease to function. If you have parity checking and 72-pin sockets you need 36-bit SIMMs, while non-parity systems with 72-bit sockets need 32-bit SIMMs. Parity systems with 30-pin sockets will take 9-bit SIMMs which must be in sets of four; non-parity systems with 30-pin sockets will take sets of four eight-bit SIMMs.

Insufficient numbers

Remember that 30-pin SIMMs need to be installed in clusters of four in order to be recognised by the system at the low-end, and at the other extreme Pentium systems require SIMMs to be installed in pairs.

Speed

Check the memory speed specified in your system manual against the access speed of your SIMM. If the SIMM is rated slower this might result in damage to the data on a system. If the SIMM is faster than your computer can cope with it will do no harm but it is almost certain that you could have bought a cheaper one with no degradation to system performance. It cannot be emphasized enough that the SIMM must be the right one to match a computer's memory configuration if it is to perform to its best advantage.

Force

The plastic side brackets on a SIMM need to be bent very gently while pressing the SIMM into place, otherwise damage to the motherboard can result. This will need a professional repair or swapping out the motherboard, both of which are costly options.

Figure 9 - Troubleshooting SIMM problems.

Conclusion

Some companies are trying to address the issue of the confusing numbering systems. Toshiba, for example, provides a list of memory products available for its laptop PCs, although there is little in the way of a comprehensive guide for multiple vendor PC environments.

Although 256 KB SIMMs are basically obsolete nowadays, and of little use or value, don't throw them away if you happen to have some lying about. Next time you come to install a 16 MB SIMM, worth around $600, you'll be glad you kept that old 256 KB SIMM and 286 motherboard to practice on.

PCSA

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