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CLASSIFICATION OF CERTAIN ELECTRONIC MEMORY MODULES

(SIMMs and DIMMs)

(Item VII.16 on Agenda)

Reference documents :

NC0402E1 (HSC/27)
NC0430E2, Annex IJ/4 (HSC/27 - Report)

I. BACKGROUND

1. At its 27th Session in May 2001, the HS Committee carried out a preliminary study of the classification of certain electronic memory modules.

2. At that session, all the delegates seemed to agree that DRAM modules were classifiable in heading 85.42.

3. In the course of the discussion, a number of delegates pointed out that Note 5 (B) (c) to Chapter 85 stipulated that microassemblies and micromodules of heading 85.42 must necessarily be formed of discrete components, and the corresponding Explanatory Note indicated that integrated circuits were not considered as discrete components (see the Explanatory Notes, page 1517, Part (II), third paragraph). In these circumstances, heading 85.42 could not justifiably be taken into consideration, even though the legal texts did not give a formal definition of discrete components.

4. One delegate expressed concern with the conclusion in the working document that the Explanatory Note to heading 85.42 regarding electronic microassemblies could be disregarded or amended. In his view, the term “electronic microassemblies” referred to an older and simpler technology in which discrete components were assembled in contrast to the technology for integrated circuits in which multiple components were created in the mass. Microassemblies did not include integrated circuits which were produced by the process described in Note 5 (B) (a) and (b) to Chapter 85. Accordingly, the limitation on electronic microassemblies in the Explanatory Note was fully in line with the legal texts.

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5. Moreover, he cautioned that any effort to expand the scope of the term “electronic microassemblies” would be inconsistent with the decisions of the Committee (e.g., with regard to the Pentium II and “smart” cards) and would result in the transfer of many products of other headings to heading 85.42. In his view, this would be a radical change which should be avoided. Any effort to expand the scope of heading 85.42 should be undertaken by amending the legal texts.

6. In the light of the foregoing, the Committee felt that the examination of the classification of the *SIMMs* and *DIMMs* should be continued at its next session on the basis of descriptive technical files, the so-called data sheets for these products, which should provide, inter alia, an indication as to their use.

II. SECRETARIAT CONTENTS

7. Firstly, the Secretariat wishes to point out that no comments have been received from Member administrations.

8. However, as requested by the Committee at its last session, the ICC has provided additional information concerning these memory modules, together with three samples. This new information is appended hereto.

9. With respect to the classification of SIMMs and DIMMs, the Secretariat considers that headings 84.73, 85.42, 85.43 and 85.48 merit consideration, in connection with Note 2 to Section XVI, which governs the classification of commodities which could be considered as “parts” of machines, and Note 5 to Chapter 85. In this context, the following issues should be addressed by the Committee :

(i) does heading 85.42 cover devices consisting of a number of integrated circuits mounted on a single printed circuit board, combined with other (passive or active) components;
(ii) do SIMMs and DIMMs have an individual function; and
(iii) Are they part of a specific machine or group of machines.

Heading 85.42

10. SIMMs and DIMMs comprise a number of electronic memories in the form of integrated circuits (“chips”) mounted on a single printed circuit board (PCB), in combination with other (active or passive) electrical components. Although the last paragraph of Note 5 to Chapter 85 stipulates that heading 85.42 take precedence over any other heading which might cover the article, the Secretariat is of the view that SIMMs and DIMMs have lost the character of “chips” and are, henceforth, excluded from that heading. This is also reflected in the last paragraph of the Explanatory Note to heading 85.42, on page 1517.

Heading 85.43

11. According to Note 2 (a) to Section XVI, commodities which are goods included in any of the headings of Chapters 84 and 85 (other than headings 84.09, 84.31, 84.48, 84.66, 84.73, 84.85, 85.03, 85.22, 85.29, 85.38 and 85.48) are in all cases to be classified in their respective headings. Therefore, it is necessary to determine whether or not SIMMs and DIMMs have an individual function. If so, classification in heading 85.43 would seem appropriate. The second paragraph of the Explanatory Note to heading 85.43, on page

1518, stipulates that “the introductory provisions of Explanatory Note to heading 84.79 concerning machines and mechanical appliances having individual functions apply, *mutatis mutandis*, to the appliances and apparatus of this heading.” In particular, the third paragraph, Part (B), of the Explanatory Note to the latter heading gives guidelines with respect to the scope of the term “individual function”. In pertinent part, it says that the following are to be regarded as having "individual functions": “Mechanical devices which cannot perform their function unless they are mounted on another machine or appliance, or are incorporated in a more complex entity, **provided** that this function :
(i) is distinct from that which is performed by the machine or appliance whereon they are to be mounted, or by the entity wherein they are to be incorporated, and

(ii) does not play an integral and inseparable part in the operation of such machine, appliance or entity.”

12. Given the fact that SIMMs and DIMMs are being used in the central processing unit of an automatic data processing machine, by holding temporary instructions and data needed to complete tasks, the Secretariat considers that SIMMs and DIMMs do not comply with subparagraph (ii) of the above-referenced Explanatory Note, i.e., they do play an integral and inseparable part in the operation of a central processing unit. That being the case, SIMMs and DIMMs cannot be regarded as electrical devices having an individual function, of heading 85.43.

Heading 84.73

13. This heading covers the parts (and accessories) of, among others, automatic data processing machines. As indicated in the paragraph above, SIMMs and DIMMs play an integral and inseparable part in the operation of a central processing unit. That being the case, classification in heading 84.73 (subheading 8473.30) seems appropriate.

Heading 85.48

14. Heading 85.48 would be applicable if the SIMMs and DIMMs were not suitable for use solely or principally with a particular machine, or with a number of machines of the same heading (Note 2 (b) to Section XVI). Since the devices at issue are configured to become a part of a specific machine (i.e., a central processing unit of an automatic data processing machine of heading 84.71) rather than of different machines, classification in heading 85.48 should be ruled out.

III. CONCLUSION

15. The Committee is invited to :

- rule on the classification of SIMMs and DIMMs in the light of the Secretariat comments reproduced above and the additional information provided by the ICC (appended hereto),

- decide on what further action to take to reflect its decisions in this matter.

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Information received from ICC

"Electronic Memory Modules

I. General Description of Memory and Memory Modules[1]

Memory. The computer industry commonly uses the term "memory" to refer to Random Access Memory (RAM). A computer uses RAM to hold temporary instructions and data needed to complete tasks. This enables the computer's Central Processing Unit (CPU) to access instructions and data stored in memory very quickly.

For example, when a user enters a command from the computer keyboard, the command, which is in the form of "data," is then copied from a storage device (such as a hard disk drive or CD-ROM drive) into memory. The memory then provides the data to the CPU more quickly than the storage device.

(Note : The distinction between memory and storage : memory refers to the amount of RAM installed in the computer and any data held in memory is cleared when the computer is turned off; storage refers to the available amount of hard disk capacity and any data stored on a hard disk remains intact even when the computer is turned off.)

To understand the concept of "memory," think of a typical office environment in which the file cabinet represents the computer's hard disk (which provides the storage) and the desk represents memory (which offers quick and easy access to the files or data the user is working on at the moment).

Memory Chip - DRAM. Dynamic Random Access Memory (DRAM) is by far the most common type of memory chip. DRAM chips are found in primarily three forms : DIP (Dual In-Line Package), SOJ (Small Outline J-Lead), and TSOP (Thin Small Outline Package). DIPs are DRAM chips installed in holes extending into the surface of the printed circuit board; they can be soldered in place or installed in sockets. SOJ and TSOP packages are surface-mount components, which are mounted directly onto the surface of the printed circuit board.

Memory Module. In today's high-tech environment, memory chips are produced in large, specialized fabrication plants. They are then sold to memory module manufacturers (such as Kingston), which make memory modules. Such modules generally consist of a number of DRAM chips on a small Printed Circuit Board (PCB) which generally fits into a socket or slot on a computer's system board.

Memory chips used to be soldered directly onto the computer's system board (also known as a motherboard), but as memory requirements increased, it was not feasible to solder all the memory chips onto the system board. They are now placed onto PCBs and installed vertically in sockets to increase the amount of memory available in a computer. A vertically mounted memory module requires only a fraction of the space required by horizontally mounted DRAMs. That is how SIMMs and SIMM sockets, described in the next section, became popular.

[1] Information provided by Kingston Technology Company and Kingston's "Utimate Memory Guide" Information taken from the Ultimate Memory Guide is reprinted with permission.

SIMM - Memory Module. One type of memory module is the SIMM **(**Single In-line Memory Module). A typical SIMM consists of a number of DRAM chips on a small PCB that fits into a SIMM socket on a computer's system board.

SIMMs are found in a variety of forms, including 30- and 72-pin formats. A 30-pin SIMM supports 8 data bits, meaning if the user has a 32-bit CPU, the user would need four 30-pin SIMMs to supply 32 bits of memory. A 72-pin SIMM, however, supports 32 data bits and thus, the user would only need one 72-pin SIMM to provide the previously referenced 32-bit CPU with 32 data bits. SIMMs come in both single sided and double-sided designs.

It is quite common for SIMMs to vary in specification within one capacity (i.e., within the family of 30-pin formats). These variations include but are not limited to different types of chip technology (FPM[2], ED0[3] and chip configuration depending on whether the computer uses parity[4] or non-parity); voltage designed to suit the specific system into which the modules wiII be installed; and chip speed (50 nanoseconds (ns), 60 ns, 70 ns, 80 ns) depending on the computer model requirements.

With most computer models, mixing different capacity SIMMs on the same board prevents the computer from accurately detecting the amount of available memory.

It is also important to note that SIMM technology usage is in decline, in favour of the memory modules that offer more memory.

DIMM - Memory Module. DIMMs, or Dual In-line Memory Modules, are similar to SIMMs, but they have 168 pins. The design allows more performance while maintaining a small size.

Like SIMMs, most DIMMs install vertically into expansion sockets onto the computer's system board. However, unlike SIMMs, opposing pins on either side of the DIMM module remain electrically isolated to form two separate contacts. On a SIMM, opposing pins on either side of the module are "tied" together to form one electrical contact. DIMMS are generally used in computer configurations that support a 64-bit or wider memory bus. In many cases, these computer configurations are based on 64-bit processors like Intel's Pentium.

S0DIMM - Memory Module. SODIMMs or Small Outline DIMMs are an enhanced version of a standard DIMM and are commonly used in notebook and laptop computers. A S0DIMM is like a 72-pin SIMM in a reduced-sized package, but the way the pins are arranged differentiates the SODIMM and SIMM.

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[2] FPM - **Fast** Page Mode. A common DRAM data-access scheme. Accessing DRAM is sjmilar to finding information in a book. First, you turn to a particular page, then you select the information from the page. Fast page mode enables the CPU to access new data in half the normal access time, as along as it is on the same page as the previous request.

[3] EDO – Extended Data Out. A form of DRAM technology that shortens the read cycle between memory and CPU. On computer systems designed to support it, EDO memory allows a CPU to access memory 10 to 20 percent faster than comparable fast page mode chips.

[4] Parity refers to a method of data integrity, checking that adds a single bit to each byte of data. The parity bit is responsible for checking for errors in the other 8 bits. Unlike ECC (Error Checking and Correction Code), parity only checks for errors, but does not correct them.

Direct Rambus RIMM - Memory Module. Direct Rambus RIMM memory modules are best described in the context of Rambus memory.

Intel Corporation has selected memory technology designed and licensed by Rambus Inc. to power the main memory platform for high-performance PC systems using Pentium-III and future processors. Rambus is high-performance, chip-to-chip interface technology that enables semiconductor memory devices to keep pace with faster generations of processors and controllers. Rambus technology is incorporated onto dynamic-random-access-memory (DRAM) chips and the logic devices that control them. Rambus Inc. states that this new technology delivers ten times the performance of conventional DRAMs and three times the performance of today's PC 100 SDRAM DIMM modules. A single Rambus DRAM, referred to as RDRAM, transfers data at speeds up to 800 MHz over a two-byte-wide channel.

There are three generations of Rambus Technology. The first and second generations, called base and concurrent, operate at a 600 MHz data transfer rate and are currently used in the entertainment industry, graphic workstations and video graphics.

The third generation is called Direct Rambus. A Direct Rambus memory module is called a RIMM. The Direct Rambus RIMM module is a general purpose high-performance memory subsystem suitable for use in a broad range of applications including computer memory in personal computers, workstations and other applications where high bandwidth and low latency are required.

Rambus trademarked the term, RIMM, as an entire word. It is the term used for a module using Rambus technology. It *does not* mean Rambus Inline Memory Module. RDRAM is the memory chip attached on the RIMM module.

Use of Memory Modules - Not Interchangeable. In the WCO HSC document on Certain Electronic Memory Modules (NC0402E1, HSC/27/May 01), Paragraph 5 stated : "One point that we have however noticed is that all the SIMM and DIMM modules we have come across in our research appear to be standard and are not identifiable, for instance by part number. They only differ in capacity. In other words, if a particular machine requires a certain capacity, a SIMM or DIMM module of that particular capacity will be inserted."

It is **important** to note that SIMMs or DIMMs of a certain capacity are not interchangeable for another module of the same capacity. There are electronic and mechanical differences that affect the functionality by brand and model of computer.

For example, the three SODIMM memory modules provided in the attached literature **will** only fit in a SODIMM socket, not in a traditional DIMM socket. Additionally, specific part numbers distinguish these three modules both on the attached product data sheets and on the modules themselves. Those part numbers correspond to compatibility by specific brand and model of computers (please see Kingston's online configuration chart on www.kingston.com).

Additionally, in terms of a difference in technology, two of the three SODIMM memory modules provided for in the attached literature have part numbers starting with KTT. These are both designed for Toshiba notebook computers but one uses 128Mb technology and shrink TSOP packages (KTT-S0100/256) and the other uses 256Mb technology and standard TSOP packages (KTT-SOSIS/256). The reason for this slight differentiation is that one subset of the supported notebooks is built with an 815 chip set on the motherboard. This machine must have TSOP chips used in the design of the module or else system compatibility issues result.

Finally, there are computer models that require standard TSOP chips to be utilized (similar design to the KTT-SO100/256 in layout) while others can use the TSOP design (see KTT-SO815/256 layout) for mechanical, not electronic, reasons. There are computer models that are designed without sufficient internal space to accommodate the larger TSOP chip format.

"Proprietary" Memory Module. Proprietary memory is designed specifically for a particular manufacturer or computer model. It is important to remember that the term proprietary does not apply to a particular type of memory.

II. Product Examples of SIMMs, DIMMs and Other Memory Modules.

As noted above, to determine the specific computer models to which each of the Kingston modules listed below are suited, refer to the cross-reference chart on Kingston's website www.kingston.com.

SIMMs

- Kingston KTM0160 Memory Module - 72-pin SIMM (see attached data sheet)
- Kingston KTM0320 Memory Module - 72-pin SIMM (see attached data sheet)
- Kingston KTC1481/64 Memory Module Kit -two 72-pin SIMMs (see attached data sheet)
- Kingston KTC1691/64 Memory Module Kit -two 72-pin, SIMMs (see attached data sheet)
- 30-pin SIMM (sample)
- 72-pin EDO (Extended Data Output) SIMM (sample)

DIMMs

- Kingston KTC6611/32 Memory Module - 168-pin DIMM (see attached data sheet)
- Kingston KTD-GX150/256 Memory Module - 168-pin DIMM (see attached data sheet)
- Kingston KTD-PE6400/1024 Memory Module Kit - 168-pin DIMMs (see attached data sheet)
- Kingston KTH4515/256 Memory Module Kit - two 144-pin EDO (Extended Data Output) DIMMs (see attached data sheet)

SODIMMS

- Kingston KTH-0B4150/128 Memory Module - 144-pin SODIMM (see attached data sheet and sample)
- Kingston KTT-SO100/256 Memory Module - 144-pin SODIMM (see attached data sheet and sample)
- Kingston KTT-SO815/256 Memory Module - 144-pin SODIMM (see attached data sheet and sample

Direct Rambus RIMMs

- Kingston Direct Rambus RIMM Modules (see attached data sheet)."
