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HARMONIZED SYSTEM COMMITTEE

26th Session

NC0301E1 (+ Annexes I to III) O. Eng.

Brussels, 24 October 2000.

CLASSIFICATION OF FLASH ELECTRONIC STORAGE CARDS

(Item VII.19 on Agenda)

Reference documents:

42.448 (HSC/22)

NC0160E2, Annex G/17 (HSC/24 – Report)

NC0250E2, Annex IJ/14 (HSC/25 - Report)

I. BACKGROUND

NC0225E1

- 1. At its 25th Session, the Committee considered the possible classification of flash electronic storage cards. A number of delegates supported the Secretariat's view in Doc. NC0225E1 that the cards at issue had an individual function (i.e., storage of data) and were, therefore, classifiable as apparatus under their appropriate heading (e.g., heading 85.43, as suggested by the Secretariat).
- 2. The US Delegate, however, held the view that the Committee should consider a specific sample, rather than a number of articles representing a class of goods. He suggested a further study on the basis of information his administration could provide. The Delegate of China informed the Committee that his administration would submit detailed information to the Secretariat on this subject.
- 3. The Chairman concluded that a new document should be prepared based on the information to be provided by the United States and China, and taking into account the observations of the Secretariat in Doc. NC0225E1. Finally, the EC Delegate requested that the example referred to in Annex VIII to Doc. 42.448 and its description given in paragraph 2 of Doc. NC0225E1 should be included in the new document.

II. SECRETARIAT COMMENTS

Product information

4. Acting on the Committee's instructions, the Secretariat has prepared a new document, taking into account observations received from the United States and China. The information

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received from China, which basically refers back to a publication called "Computer Desktop Encyclopedia", is reproduced in Annex I to this document. The paragraphs have been numbered to facilitate discussion. Copies of brochures (SanDisk and Micron companies) submitted by China will be made available in the meeting room.

- 5. On 31 August 2000, the Secretariat received a note from the United States, enclosing product literature for the Toshiba SmartMedia Card, the Sony Memory Stick and the SanDisk CompactFlash card. This information, which has been reproduced from various Internet web sites, will be available to delegates in the meeting room. It is to be noted, however, that the US has not indicated which specific type of memory card should be considered (see paragraph 2 above).
- 6. On 11 July 2000, the Secretariat discussed the issue with representatives of the ICC, from which the following can be concluded:
 - (i) The technology used is the same for all types of flash memory cards;
 - (ii) The function of all cards is the same (i.e., storage of data), although the form (presentation) may differ to facilitate the connection to other apparatus;
 - (iii) Flash electronic storage cards, also called flash memory cards consist of a controller, which acts as an interface between the host and the card, and flash memories:
 - (iv) Flash memory cards are used in various apparatus, such as telecommunication apparatus, palm size PC's, MP3 players (audio), dictating machines, heart monitoring apparatus, printers, communicators, camcorders and digital cameras; and
 - (v) The power is taken from the host apparatus.
- 7. The larger formats consist of a printed circuit board on which the components (integrated circuits, passive components, etc.) are placed.
- 8. The structure of the smaller types is not exactly known to the Secretariat, but it appears that they have been built up in a hybrid, non-separable way; the passive elements, however, not being obtained by thin- or thick-film technology. The ICC or other parties are invited to furnish the appropriate information in order to arrive at a full and correct description of the products at issue.
- 9. As requested by the EC, the description given in paragraph 2 of Doc. NC0225E1 has been reproduced in Annex II to this document, duly amended to take into account the additional information received from the ICC (see paragraphs 6 to 8 above), whereas Annex VIII to Doc. 42.448 has been reproduced in Annex III.

Classification

- 10. The Secretariat has not received observations from administrations with respect to the possible classification of flash memory cards. It would, therefore, like to repeat its comments set out in paragraphs 3 to 7 of Doc. NC0225E1, which read as follows:
 - " 3. The Secretariat believes that flash electronic storage cards are classifiable in Section XVI. In this context it should be noted that the cards in some cases form a part of the appliances where they may be used, or are used as additional memory appliances in other cases. In both cases, however, the cards are removable, and their function is the same, i.e., storing data. One could, therefore, argue that the cards have an individual function.
 - 4. Note 2 (a) to Section XVI stipulates that parts which are goods included in any of the headings of Chapters 84 and 85, are to be classified in their respective heading.

The Secretariat considers that the cards may fall within the description of heading 85.43 ("electrical machines or apparatus, having an individual function, not specified or included elsewhere"), the Explanatory Note to that heading stipulating that the appliances of that heading must have individual functions, as described in the introductory provisions of the Explanatory Note to heading 84.79. Item (B) of the Explanatory Note to heading 84.79, on page 1423, provides the following description of appliances which are to be regarded as having "individual functions":

- "... 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."
- 5. The Secretariat considers that the cards at issue satisfy the above criteria, i.e., (i) the storing of data is a function distinct from the function performed by any of the appliances referred to in paragraph 2 above, to which the card is to be connected, and (ii) the storing of data does not play a part in the actual function of the appliances.
- 6. Based on the above considerations, the cards at issue could be classified in heading 85.43 (subheading 8543.89), by application of General Interpretative Rules 1 (Note 2 (a) to Section XVI and heading 85.43) and 6 (subheading 8543.89).
- 7. If, on the other hand, it is considered that the cards do <u>not</u> have a distinct function as described above, the Secretariat considers that Note 2 (b) to Section XVI would not be applicable, given the fact that the cards can be used in several machines or appliances, falling within different headings. Consequently, Note 2 (c) to Section XVI would be applicable, resulting in the classification of the cards in heading 85.48 ("electrical parts of machinery, not specified or included elsewhere in Chapter 85"), as parts not solely or principally suitable for use with a particular machine."
- 11. In addition to the comments presented in the paragraph above, the Secretariat would like to add the following. The smaller types of the flash memory cards might be considered, prima facie, to be "hybrid integrated circuits" of heading 85.42. However, based on the information available to the Secretariat, it appears that their structure would not meet the criteria set out in Note 5 (B) (b) to Chapter 85 (see Annex II).

III. CONCLUSION

12. The Committee is invited to examine the classification of articles known as "flash electronic storage cards", as described in Annex II to this document, taking into account the comments of China reproduced in Annex I to this document, the information provided by the US and the comments of the Secretariat in paragraphs 4 to 8 above. It is also invited to indicate what further action should be taken with regard to this matter.

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Annex I to Doc. NC0301E1 (HSC/26/Nov. 2000)

Observations of China

From Computer Desktop Encyclopedia

Flash memory

- A memory chip that can be rewritten and hold its content without power. It is widely
 used for digital film and for data and programs for communications and industrial products as
 well as a variety of handheld devices. Flash chips replaced the earlier ROM BIOS chips in a
 PC so that the BIOS could be updated by a software download. Flash chips generally have
 lifespans from 100K to 300K write cycles.
- 2. Unlike DRAM and SRAM memory chips, in which a single byte can be written, flash memory must be erased and written in fixed blocks, typically ranging from 512 bytes up to 256 KB. Evolving out of the EEPROM chip technology, which can be erased in place, flash memory is less expensive and more dense. The term was coined by Toshiba for its ability to be erased "in a flash".
- 3. Flash memory chips are conveniently packaged as "flash cards" and come in several formats, including the full-size PC Card (ATA PC Card) and the smaller CompactFlash, SmartMedia and similar formats.
- 4. There are two types of flash interfaces. The earlier linear flash, which is also used to execute a program directly from the chip (XIP), requires Flash Translation Layer (FTL) or Flash File System (FFS) software to make it look like a disk drive. There are various implementations of FTL and FFS.
- 5. The second type is the ATA interface, which is widely used for hard disks and has the same 512-block (sector) size.

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Annexe III Doc. NC0301E1

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Description of flash memory cards

Solid-state, non-volatile storage device (known as a "memory card" or "flash electronic storage card"), consisting of :

- (i) a printed circuit board onto which are mounted (i) one or more flash memories ("FLASH E²PROM") in the form of integrated circuits, (ii) a microcontroller in the form of an integrated circuit, (iii) a number capacitors and resistors, and (iv) a connecting socket (larger types); or
- (ii) flash memories ("FLASH E²PROM") and a controller, both in the form of integrated circuits, combined in a hybrid way with passive elements, the traces and through hole connection being of copper, with a connecting socket (smaller types)¹⁾.

Data from an external source, such as navigation and global positioning systems, data collection terminals, portable scanners, medical monitoring appliances, audio recording apparatus, personal communicators ("pagers"), mobile phones and digital cameras, can be stored onto and read from the card once it has been connected to that particular appliance. The data can also be loaded into an automatic data processing machine by using a special adapter. The storage capacities of the cards range from 2 MB to 500 MB. The card only uses power from the appliances to which it is connected and requires no battery.

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¹⁾ Subject to further information to be provided by the ICC or other parties.

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FUJITSU SEMICONDUCTOR DATA SHEET

DS05-30335-2E

MEMORY

FLASH MEMORY CARD PCMCIA Rel.2/JEIDA Ver.4 conformable

MB98A808Ax-/809Ax-/810Ax-/811Ax-20

FLASH ERASABLE AND PROGRAMMABLE MEMORY CARD 256 K/512 K/1 M/2 M-BYTE

■ DESCRIPTION

The Fujitsu MB98A808Ax, MB98A809Ax, MB98A810Ax and MB98A811Ax are Flash electrically erasable and programmable (Flash) memory cards capable of storing and retrieving large amounts of data. The memory circuits are housed in a credit-card sized 68-pin package. Internal circuit is protected by two metal panels, one at the top and bottom of the card, that help to reduce chip damage from electrostatic discharge.

A unique feature of the Fujitsu memory cards allows the user to organize the card into either an 8-bit or a 16-bit bus configuration. All cards are portable and operate on low power at high speed.

In accordance with the Personal Computer Memory Card International Association (PCMCIA) and Japan Electrical Industry Development Association (JEIDA) industry standard specification, Flash memory cards offer additional EEPROM memory that is used to store attribute data. The attribute memory is a Flash memory card option. (See page 2 for description of the three available options.)

- Credit card size: 85.6 mm (length) × 54.0 mm (width) × 3.3 mm (thick)
- · PCMCIA/JEIDA conformed two-piece 68-pin connector (with a two-row built-in receptacle)
- Single +5.0 V ±5% power supply (+12.0 V ±5%Vpp)
- · Command control for Write/Erase operation
- · Write protect function

■ PACKAGE



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MB98A808Ax-/809Ax-/810Ax-/811Ax-20

■ ATTRIBUTE MEMORY OPTIONS

PCMCIA and JEIDA standard memory cards from Fujitsu provide a separate EEPROM memory address space for recording fundamental card information. It is used by the card manufacturers to record basic configuration information such as device type, size, speed, etc.

The attribute memory is selected by asserting the REG pin on the card interface. Option descriptions as follows:

OPTION 1: Attribute memory is not supported. REG Pin: Not Contacted

(JEIDA Ver.3 conformable)

Part Number	Main Memory		Attribute Memory		
	Memory Device	Access Time	Memory Device	Access Time	Memory Organization *
MB98A808A1	1 M Flash Memory × 2 pcs	200 ns	(—) (i	-	256 K × 8 bits/128 K × 16 bits
MB98A809A1	1 M Flash Memory × 4 pcs	200 ns	7/-	-	512 M × 8 bits/256 K × 16 bits
MB98A810A1	1 M Flash Memory × 8 pcs	200 ns		1.50	1 M × 8 bits/512 M × 16 bits
MB98A811A1	1 M Flash Memory × 16 pcs	200 ns	-	-	2 M × 8 bits/1 M × 16 bits

OPTION 2: Attribute memory in a separate location is not supported.

When REG line is asserted, "FF" is output to the data bus to indicate that attribute data may be stored in main memory.

(PCMCIA Rel.2/JEIDA Ver.4 conformable)

Part Number	Main Memory		Attribute Memory		
	Memory Device	Access Time	Memory Device	Access Time	Memory Organization *
MB98A808A2	1 M Flash Memory × 2 pcs	200 ns	-	-	256 K × 8 bits/128 K × 16 bits
MB98A809A2	1 M Flash Memory × 4 pcs	200 ns	5-3	-	512 K × 8 bits/256 K × 16 bits
MB98A810A2	1 M Flash Memory × 8 pcs	200 ns	V-	_	1 M × 8 bits/512 K × 16 bits
MB98A811A2	1 M Flash Memory × 16 pcs	200 ns	_	_	2 M × 8 bits/1 M × 16 bits

OPTION 3: Attribute memory is supported. The data is stored in 16 K-bit EEPROM.

When the REG line is asserted, data stored in EEPROM is output to the data bus.

(PCMCIA Rel.2/JEIDA Ver.4 conformable)

Part Number	Main Memory		Attribute Memory		T AVEC 2500 25 24 25
	Memory Device	Access Time	Memory Device	Access Time	Memory Organization *
MB98A808A3	1 M Flash Memory × 2 pcs	200 ns	EEPROM × 1 pcs	300 ns	256 K × 8 bits/128 K × 16 bits
MB98A809A3	1 M Flash Memory × 4 pcs	200 ns	EEPROM × 1 pcs	300 ns	512 K × 8 bits/256 K × 16 bits
MB98A810A3	1 M Flash Memory × 8 pcs	200 ns	EEPROM × 1 pcs	300 ns	1 M × 8 bits/512 K × 16 bits
MB98A811A3	1 M Flash Memory × 16 pcs	200 ns	EEPROM × 1 pcs	300 ns	2 M × 8 bits/1 M × 16 bits

Note: * To be configured by user.

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