AN1033
APPLICATION NOTE

Designing for Compatibility between ST, AMD and Fujitsu Flash Memories

STMicroelectronics offers a range of Flash memory devices that are hardware and software compatible with similar AMD and Fujitsu devices. They have the same density, functionality, command set, instruction protocol, memory partition, package range and pin-out. They represent a true independent second source, but with reduced operating power consumption.

Table 1 summarises these equivalent devices. The notes (1, 2 and 3) refer to the section headings on the next page. The data is believed to be correct at the time of writing, according to the data available, but the latest specification from each supplier, including that of ST, should be checked for up-to-date information.

Table 1. Comparison between ST, AMD and Fujitsu Flash Memory Devices

ST Part	AMD Part	Fujitsu Part	Description		Max Operating Current in mA (Read/Write)		Application Note[4]	Notes
				Format	ST	Others		
M29F100	AM29F100A		1 Mbit sing. V	128K x 8 / 64K x 16	20	40 to 60	AN944	
M29F200	Am29F200A Am29F200B	MBM29F200A	2 Mbit sing. V	256K x 8 / 128K x 16	20	40 to 60	AN942	1
M29F002	Am29F002	MBM29F002	2 Mbit sing. V	256K x 8	20	40 to 60	AN1008	2
M29F400	Am29F400A Am29F400B	MBM29F400A	4 Mbit sing. V	512K x 8 / 256K x 16	20	40 to 60	AN943	1
M29F040	Am29F040 Am29F040B	MBM29F400A	4 Mbit sing. V	512K x 8	15 to 20	30 to 40	AN945	1, 3
M29W400	Am29LV400 Am29LV400B	MBM29LV400	4 Mbit low V	512K x 8/ 256K x 16	10 to 20	16 to 35	AN943	1
M29W004	Am29LV004 Am29LV004B	MBM29LV004	4 Mbit low V	512K x 8	10 to 20	16 to 35	—	1
M29W800	Am29LV800 Am29LV800B	MBM29LV800	8 Mbit low V	1M x 8/ 512K x 16	10 to 20	30 to 35	AN1053	1
M29W008	Am29LV008 Am29LV008B	MBM29LV008	8 Mbit low V	1M x 8	10 to 20	30 to 35	AN1054	1

Notes: 1. 2. and 3. These notes refer to the section headings on the next page.
Notes: 4. Also see www.st.com product-support-flash

PRECAUTIONS

Despite the equivalence of the devices, some precautions are recommended when designing applications to work with them interchangeably. In particular, your software should check the product signature fields for the manufacturer code and device code, so as to allow for differences, where they exist. These codes are summarised in Table 2 to Table 10. The cost of making this check is a few extra lines of software code.

You should carefully control the use of the Read/Reset command during Block Erase, since the ST device will execute it while the others will not. It is advisable to use the ST algorithm on all programmers. Ask your local ST office to check for our latest listings of programming equipment, or check for it on the *Discover Flash Memories* CDROM.

These precautions, and others, along with the extra lines of program needed to check for the product signature fields, are described more fully in the ST Application Notes that are listed in Table 1. These can be down-loaded from the ST web-site, at *www.st.com*.

Note 1

All instructions should be written as specified in the ST and Fujitsu data-sheets.That is, they should be written as long integers (as indicated by the letter “L” at the end of the number) in a four-digit hexadecimal format. Lines of the form:

```
FlashWrite(0x555L, 0x90);
```

although adequate for B-model AMD devices should, by preference, be written in the following form:

```
FlashWrite(0x5555L, 0x90);
```

This form, with four hexadecimal digits, is required for the devices from ST, the devices from Fujitsu and the A-models and unlettered models from AMD. The B-models from AMD will ignore the four high order bits.

Note 2

You must not tie the pin 1 ($\overline{RP}$NC for ST, Reset or NC for AMD and Fujitsu) to ground, as this may leave some of the products in a state of permanent Reset. You also need to check thoroughly, in the respective specification sheets, the way that coded cycles are written: for example, AMD in their January 1998 data-sheet have changed the address AAAh to address 2AAh.

Note 3

Do not use the second toggle bit (DQ2). Use only DQ6. During Program/ Erase, DQ6 toggles 1-0-1-0-1-0-1-0-1.

DETAILED COMPARISONS

Table 2. M29F100 versus Am29F100A

	ST M29F100	AMD Am29F100A
Manufacturer Code	0020h	01h
Device Code (top/bottom)	00D0h/00D1h	22D9h/22DFh
SW Reset in erase	Executed	Ignored

Table 3. M29F200 versus Am29F200A, Am29F200B and MBM29F200T/BA

	ST M29F200	AMD Am29F200A	AMD Am29F200B	FUJITSU MBM29F200T/BA
Manufacturer Code	0020h	01h	01h	04h
Device Code (top/bottom)	00D3h/00D4h	2251h/2257h	2251h/2257h	2251h/2257h
Instruction Write	4 hexadecimal digits	4 hexadecimal digits	3 hexadecimal digits	4 hexadecimal digits
SW Reset in erase	Executed	Ignored	Ignored	

Table 4. M29F002T versus Am29F002N and MBM29F002

	ST M29F002T	AMD Am29F002N	FUJITSU MBM29F002
Manufacturer Code	20h	01h	04h
Device Code (top/bottom)	B0h/34h	B0h/34h	B0h/34h
SW Reset in erase	Executed	Ignored	

Table 5. M29F400 versus Am29F400A, Am29F400B and MBM29F400T/BA

	ST M29F400	AMD Am29F400A	AMD Am29F400B	FUJITSU MBM29F400T/BA
Manufacturer Code	0020h	01h	01h	04h
Device Code (top/bottom)	00D5h/00D6h	2223h/22ABh	2223h/22ABh	2223h/22ABh
Instruction Write	4 hexadecimal digits	4 hexadecimal digits	3 hexadecimal digits	4 hexadecimal digits
SW Reset in erase	Executed	Ignored	Ignored	

Table 6. M29F040 versus Am29F040, Am29F040B and MBM29F040A

	ST M29F040	AMD Am29F040	AMD Am29F040B	FUJITSU MBM29F040A
Manufacturer Code	20h	01h	01h	04h
Device Code (top/bottom)	E2h	A4h	A4h	A4h
Coded Cycles Write	4 hexadecimal digits	4 hexadecimal digits	3 hexadecimal digits	4 hexadecimal digits
Toggle bit DQ2	No	No	Yes	No
SW Reset in erase	Executed	Ignored	Ignored	

Table 7. M29W400 versus Am29LV400, Am29LV400B and MBM29LV400

	ST M29W400	AMD Am29LV400	AMD Am29LV400B	FUJITSU MBM29LV400
Manufacturer Code	0020h	01h	01h	04h
Device Code (top/bottom)	00EEh/00EFh	22B9h/22BAh	22B9h/22BAh	22B9h/22BAh
Instruction Write	4 hexadecimal digits	4 hexadecimal digits	3 hexadecimal digits	4 hexadecimal digits
SW Reset in erase	Executed	Ignored	Ignored	

Table 8. M29W004 versus Am29LV004, Am29LV004B and MBM29LV004

	ST M29W004	AMD Am29LV004	AMD Am29LV004B	FUJITSU MBM29LV004
Manufacturer Code	20h	01h	01h	04h
Device Code (top/bottom)	EAh/EBh	B5h/B6h	B5h/B6h	B5h/B6h
Instruction Write	4 hexadecimal digits	4 hexadecimal digits	3 hexadecimal digits	4 hexadecimal digits
SW Reset in erase	Executed	Ignored	Ignored	

Table 9. M29W800 versus Am29LV800, Am29LV800B and MBM29LV800

	ST M29W800	AMD Am29LV800	AMD Am29LV800B	FUJITSU MBM29LV800
Manufacturer Code	0020h	01h	01h	04h
Device Code (top/bottom)	00D7h/005Bh	22DAh/225Bh	22DAh/225Bh	22DAh/225Bh
Instruction Write	4 hexadecimal digits	4 hexadecimal digits	3 hexadecimal digits	4 hexadecimal digits
SW Reset in erase	Executed	Ignored	Ignored	

Table 10. M29W008 versus Am29LV008, Am29LV008B and MBM29LV008

	ST M29W008	AMD Am29LV008	AMD Am29LV008B	FUJITSU MBM29LV008
Manufacturer Code	20h	01h	01h	04h
Device Code (top/bottom)	D2h/DCh	3Eh/37h	3Eh/37h	3Eh/37h
Instruction Write	4 hexadecimal digits	4 hexadecimal digits	3 hexadecimal digits	4 hexadecimal digits
SW Reset in erase	Executed	Ignored	Ignored	

If you have any questions or suggestions concerning the matters raised in this document, please send them to the following electronic mail address:

ask.memory@st.com (for general enquiries)

Please remember to include your name, company, location, telephone number and fax number.