Supported Flash Devices

The flash memories listed in this document have been qualified for use with Rabbit 2000 and/or 3000 microprocessors. Only some of these devices have been fully tested with Dynamic C, but specifications for the others indicate compatibility with Dynamic C's flash driver; the lists' footnotes explain restrictions.

The terms "small sector flash" and "large sector flash" as used in industry are somewhat arbitrary. This document uses the following definitions:

- A *small sector flash* has uniform (equally sized) sectors of 128, 256, 512, 1024, or 4096 bytes.

- A *large sector flash* is a sector-erase, byte-write device with either nonuniform (unequally sized) sectors, or uniform sectors of a size larger than 4096 bytes.

Starting with Dynamic C version 7.20, certain large sector flash devices are supported for program loads; version 7.30 and later may also provide limited support for large sector flash writes at run time. To incorporate a large sector flash into an end product, the best strategy is have a small sector development board.

Because it is not usually possible to erase a flash sector only partially, and due to limited back-fill memory resources, the FS2 file system does not support large sector flash and Dynamic C's flash driver has the following limitations when large sector flash is used:

- Flash sectors are not automatically erased before each flash write.

- The size of the combined ID/User Blocks is determined by the size(s) of the top-most sectors. See the pertinent comments in `LIB\BIOSLIB\FLASHWR.LIB`'s GetIDBlockSize function for details.

- The flash must have either uniform sectors or a fully sector-erasable top boot block in order to use a rewritable (mirrored) User Block; thus the total flash consumption is twice the size returned by the GetIDBlockSize function.

- Bottom boot block flash types are generally restricted to a "write once read many" User Block.

Due to the general necessity of disabling interrupts to prevent undesired flash memory access while updating flash content, any run time flash write seriously impacts on a Dynamic C application's real time performance. The interrupts disabled duration depends directly on the amount of time it takes to complete the flash write command. In addition to the flash driver's overhead (e.g., memory back-fill, flash busy polling, etc.), refer to the flash memory device's data sheet for either the maximum sector write time or the maximum sector erase time plus byte write time multiplied by the sector size.

IMPORTANT: The rapidly changing market for flash devices may affect availability. The inclusion of a flash device in the following tables does not speak to its availability.

Small Sector Flash

Table 1. Small Sector Flash Memories

Vendor	Device Name	Device Size (bytes)	Write Mode	Operating Voltage (V)	Dynamic C Support as of Version[b]	Rabbit 2000	Rabbit 3000[c]
Atmel	AT29C010A	128K	sector	4.5–5.5	All	x	
Atmel	AT29C020	256K	sector	4.5–5.5	6.50[d]	x	
Atmel	AT29C040A	512K	sector	4.5–5.5	6.50[a,d]	x	
Atmel	AT29LV010A	128K	sector	3.0–3.6	All	x	x
Atmel	AT29LV020	256K	sector	3.0–3.6	6.50	x	x
Atmel	AT29LV040A	512K	sector	3.0–3.6	6.50[a]	x	x
Atmel	AT29BV010A	128K	sector	2.7–3.6	All[a]	x	x
Atmel	AT29BV040A	512K	sector	2.7–3.6	6.50[a]	x	x
Atmel	AT29BV020	256K	sector	2.7-3.6	6.50[a]	x	x
Mosel/Vitelic	V29C51001B	128K	byte	4.5–5.5	6.50	x	
Mosel/Vitelic	V29C51001T	128K	byte	4.5–5.5	6.50	x	
Mosel/Vitelic	V29LC51001	128K	byte	4.5–5.5	7.02[a]	x	
Mosel/Vitelic	V29C51002B	256K	byte	4.5–5.5	6.50[d]	x	
Mosel/Vitelic	V29C51002T	256K	byte	4.5–5.5	6.50[d]	x	
Mosel/Vitelic	V29LC51002	256K	byte	4.5–5.5	7.02[a]	x	
Mosel/Vitelic	V29C51004B	512K	byte	4.5–5.5	6.50[a]	x	
Mosel/Vitelic	V29C51004T	512K	byte	4.5–5.5	6.50[a]	x	
Mosel/Vitelic	V29C31004B	512K	byte	3.0–3.6	7.02[a]	x	x
Mosel/Vitelic	V29C31004T	512K	byte	3.0–3.6	7.02[a]	x	x
SST	SST29EE512	64K	sector	4.5–5.5	6.50	x	
SST	SST29SF512	64K	byte	4.5–5.5	7.20[a,e,g]	x	
SST	SST39SF512	64K	byte	4.5–5.5	7.20[a]	x	
SST	SST29EE010	128K	sector	4.5–5.5	All[d]	x	
SST	SST29SF010	128K	byte	4.5–5.5	7.20[a,e,g]	x	
SST	SST39SF010	128K	byte	4.5–5.5	7.02[a]	x	
SST	SST29EE020	256K	sector	4.5–5.5	7.02[a]	x	
SST	SST29SF020	256K	byte	4.5–5.5	7.20[a,e,g]	x	
SST	SST39SF020A	256K	byte	4.5–5.5	6.50[d]	x	

Table 1. Small Sector Flash Memories

Vendor	Device Name	Device Size (bytes)	Write Mode	Operating Voltage (V)	Dynamic C Support as of Version[b]	Rabbit 2000	Rabbit 3000[c]
SST	SST29SF040	512K	byte	4.5–5.5	7.20[a,e,g]	x	
SST	SST39SF040	512K	byte	4.5–5.5	7.02[a,d]	x	
SST	SST29LE512	64K	sector	3.0–3.6	6.50	x	x
SST	SST39LF512	64K	byte	3.0–3.6	7.20[a]	x	x
SST	SST29LE010	128K	sector	3.0–3.6	All	x	x
SST	SST39LF010	128K	byte	3.0–3.6	7.21[a]	x	x
SST	SST29LE020	256K	sector	3.0–3.6	7.02[a]	x	x
SST	SST39LF020	256K	byte	3.0–3.6	7.21[a,d]	x	x
SST	SST39LF040	512K	byte	3.0–3.6	7.21[a,d]	x	x
SST	SST29VE512	64K	sector	2.7–3.6	6.50[a]	x	x
SST	SST29VF512	64K	byte	2.7–3.6	7.20[a,e,g]	x	x
SST	SST39VF512	64K	byte	2.7–3.6	7.20[a]	x	x
SST	SST29VE010	128K	sector	2.7–3.6	All[a]	x	x
SST	SST29VF010	128K	byte	2.7–3.6	7.20[a,e,g]	x	x
SST	SST39VF010	128K	byte	2.7–3.6	7.21[a]	x	x
SST	SST29VE020	256K	sector	2.7–3.6	7.02[a]	x	x
SST	SST29VF020	256K	byte	2.7–3.6	7.20[a,e,g]	x	x
SST	SST39VF020	256K	byte	2.7–3.6	7.21[a]	x	x
SST	SST29VF040	512K	byte	2.7–3.6	7.20[a,e,g]	x	x
SST	SST39VF040	512K	byte	2.7–3.6	7.21[a]	x	x
Winbond	W29EE011	128K	sector	4.5–5.5	7.02[a]	x	
Winbond	W29C020C	256K	sector	4.5–5.5	All[d]	x	
Winbond	W29C040	512K	sector	4.5–5.5	7.02[a,d]	x	

Large Sector Flash

Table 2. Large Sector Flash Memories

Vendor	Device Name	Device Size (bytes)	Write Mode	Operating Voltage (V)	Dynamic C Support as of Version[b,e,f]	Rabbit 2000	Rabbit 3000[c]
AMD	AM29F002BB	256K	byte	4.5–5.5	7.25[a]	x	
AMD	AM29F002BT	256K	byte	4.5–5.5	7.25[a]	x	
AMD	AM29F004BB	512K	byte	4.5–5.5	7.25[a]	x	
AMD	AM29F004BT	512K	byte	4.5–5.5	7.25[a]	x	
AMD	AM29F040B	512K	byte	4.5–5.5	7.30[a]	x	
AMD	AM29LV001BB	128K	byte	2.7–3.6	7.20[a]	x	x
AMD	AM29LV001BT	128K	byte	2.7–3.6	7.20[a]	x	x
AMD	AM29LV002BB	256K	byte	2.7–3.6	7.25[a]	x	x
AMD	AM29LV002BT	256K	byte	2.7–3.6	7.25[a]	x	x
AMD	AM29LV004BB	512K	byte	2.7–3.6	7.25[a]	x	x
AMD	AM29LV004BT	512K	byte	2.7–3.6	7.25[a]	x	x
Fujitsu	MBM29F002BC	256K	byte	4.5–5.5	7.30[a]	x	
Fujitsu	MBM29F002TC	256K	byte	4.5–5.5	7.30[a]	x	
Hynix / Hyundai	HY29F002T	256K	byte	4.5–5.5	7.20[a]	x	
Hyundai	HY29F002B	256K	byte	4.5-5.5	7.20[a]	x	
Macronix	MX29F002B	256K	byte	4.5-5.5	7.30[a]	x	
Macronix	MX29F002T	256K	byte	4.5-5.5	7.30[a]	x	
ST	M29F040B	512K	byte	4.5-5.5	7.30[a]	x	
ST	M29W010B	128K	byte	2.7-3.6	7.30[a]	x	x
ST	M29W040B	512K	byte	2.7-3.6	7.30[a]	x	x
Winbond	W39L020	256K	byte	3.0-3.6	8.00[a,h]	x	x

a.
These flash devices are recognized as of the Dynamic C version listed, but have not all been tested with those versions. 512KB flash in particular may not work with versions prior to 7.04, but a software patch is available from Rabbit tech support for 512KB flash support under versions 6.57 and 7.03.

b.
Dynamic C Versions 6.04-6.1x:
The `FLASH_SIZE` parameter in the `JRABBIOS.C` file needs to be changed to reflect the correct number of 4K pages for the selected device. By default, the `FLASH_SIZE` parameter contains a 0x20 that corresponds to a 128K x 8 device with thirty-two 4K pages of flash. Dynamic C versions 6.5x and greater determine the flash size automatically and no code change is required.

c.
Please note that the Rabbit 3000 requires Dynamic C version 7.25 or later.

d.
Tested with Dynamic C version 7.32P to verify basic program load functionality.

e.
For flash program loading (and where practical, flash writes at run time) to these flash devices, Dynamic C versions 7.3x through 8.1x require `TN226.zip`. See the read_me.txt file in `TN226.zip` for installation and usage instructions.

f.
Dynamic C versions prior to 7.30 do not support large sector flash writes at run time.

g.
These flash devices use 0x20 as their sector erase command byte. For Dynamic C versions 7.3x through 8.1x, see the read_me.txt file in `TN226.zip` for instructions regarding use of that ZIP's `BIOS\pilot_0x20.bin file`.

h.
These flash devices use 0x30 as their sector erase command byte, but also accept 0x50 as a page erase command byte. Because the pages have a uniform 4KB size, using the 0x50 page erase command allows these flash devices to be treated as a small sector flash type. For Dynamic C versions 7.3x through 8.1x, see the read_me.txt file in `TN226.zip` for instructions regarding use of that ZIP's `BIOS\pilot_0x50.bin` file.