

MMBasic Firmware Memory Map for the CMM2 Implementation

Below is a summary of the details of how the MMBasic firmware makes use of the available resources on the STM32H743 chip. This detail is not really need to use MMBasic but may be of interest if you want to dig deeper. The summary is derived from the [STM32H743 Reference Manual \(RM04033\)](#) and the MMBasic source code.

All the Ram, Flash and peripherals of the STM32H743 are mapped to a 32 bit address space. The table below lists some of the relevant items.

Address Range (hex)	Type	Size	Usage/Detail
D080 0000 – D1FF FFFF	SDRAM (G2 32M)	24M	MMBasic Heap in SDRAM MM.INFO(SHEAP) Variable data > 256 bytes FrameBuffer GetMemory GetTempMemory > 8192 bytes
D078 0000 – D07F FFFF	SDRAM (G2 32M)	0.5M	Program Memory (If OPTION RAM)
D000 0000 - D077 FFFF	SDRAM (G2 32M)	7.5M	RAM CMM2 G2 Display Page Memory (See MODE command)
D038 0000 - D07F FFFF	SDRAM (G1 8M)	4.5M	MMBasic Heap in SDRAM MM.INFO(SHEAP) Variable data > 256 bytes FrameBuffer GetMemory GetTempMemory > 8192 bytes
D030 0000 - D037 FFFF	SDRAM (G1 8M)	0.5	Program Memory (If OPTION RAM)
D000 0000 - D02F FFFF	SDRAM (G1 8M)	3M	RAM CMM2 G1 Display Page Memory (See MODE command)
4000 0000 -5FFF FFFF	Registers Peripherals		This address range allows access to the registers that control the various functions. Eg. GPIO, ADC, Timers, SPI, DAC, USART, I2C. MMBasic takes care of all this, however it is possible to PEEK and POKE these registers.
3880 0000 – 3880 0FFF	Battery Backed Ram	4K	Saved Variables. MMBasic VAR SAVE, VAR RESORE and VAR CLEAR use this area. This Ram is battery backed up if a battery is connected to VBAT.
3800 0000 – 3800 FFFF	Ram	64K	MMBasic hashed VARTBL 512 * ??? The MMBasic variable table is located in this RAM. It is possible to use PEEK and POKE to manipulate the variable table. Size 512 * size of structure. String Variables < 16 chars Non array Integer and Floats

3004 0000 – 3004 7FFF	Ram	32K	MMBasic SUB/FUN hash table 512 * (32+4) 18K
3000 0000 – 3003 FFFF RAMBase - RAMEnd	Ram	256K	MMBasic HEAP in RAM MM.INFO(IHEAP) Integer and Float arrays DIMed < 32 and Non array Strings from Top down. GetTemporaryMemory < 8192 bytes from Bottom Up. GetInternalMemory Top Down GetStringMemoryBottom Bottom Up
2400 0000 - 2407 FFFF	Ram	512K	Display Page 0 memory. See MODE command
2000 0000 - 2001 FFFF	Ram	128K	Fast DTCM RAM used by MMBasic Firmware for its own variables, C stack.
081E 0000 – 081F FFFF	Flash	128K	Saved Options, Permanent options are stored here. See Option Settings
081C 0000 – 081D FFFF	Flash	128K	Used to store the MMBasic program. Page 6
081A 0000 – 081B FFFF	Flash	128K	Used to store the MMBasic program. Page 5
0818 0000 – 0819 FFFF	Flash	128K	Used to store the MMBasic program. Page 4
0816 0000 - 0817 FFFF	Flash	128K	Used to store the MMBasic program. Page 3. Usage reported by the MMBasic Memory Command
0814 0000 - 0815 FFFF	Flash	128K	Used to store the MMBasic program. Page 2 Usage reported by the MMBasic Memory Command
0812 0000 - 0813 FFFF	Flash	128K	Used to store the MMBasic program. Page 1 Usage reported by the MMBasic Memory Command
0800 0000 – 0811 FFFF	Flash	1152K	1152 K of the total 2M flash is used to store the MMBasic Firmware and its constant data.
0000 0000 - 0000 FFFF	ITCRAM Ram	64K	

Maximum Program Size in Flash

Program	Allowed OPTION FLASH <i>values</i>					
Page no.	1	2	3	4	5	6
Page 6			512K	384K	256K	128K
Page 5		512K				
Page 4	512K					
Page 3						
Page 2						
Page 1						

Flash Wearing

Programs are stored on the SDCard.

Programs are tokenised and transferred to Flash or RAM before they are run.

Flash

Maximum tokenised program size in flash is 512K. Only as many flash pages are erased and used as required. Up to 4 flash pages (if available) are used starting at the location defined by Option Flash.

The flash is only rewritten if the program stored on the SDcard has been changed.

If Option Flash is > 3 then the maximum size of the program is reduced s shown in the table above.

RAM

If OPTION RAM is set then the program from the SDCARD is tokenised to and run from RAM in lieu of Flash

External I/O connector

Pin	Features
1	3.3 Volt Power
3-PB9	I ² C SDA or CAN1-Tx 5V
5-PB8	I ² C SCK or CAN1-Rx 5V
7-PC1	Analog Input or COUNT 1
9	Ground
11-PH4	COM2: RX 5V
13-PC2	Analog Input or COUNT 2
15-PC3	Analog Input or COUNT 3
17	3.3 Volt Power
19-PB5	SPI MOSI or CAN2-Rx 5V
21-PA7	SPI MISO 5V
23-PB3	SPI CLOCK 5V
25	Ground
27-PB7	I ² C2 SDA 5V
29-PB0	Analog Input or PWM-1C
31-PC7	PWM 2B 5V
33-PI3	General I/O 5V
35-PB14	SPI2 MISO 5V
37-PA1	Analog Input or COM1 DE
39	Ground

Pin	Features
2	5.0 Volt Power
4	5.0 Volt Power
6	Ground
8-PA2	Analog Input or COM1: TX
10-PA3	Analog Input or COM1: RX
12-PA6	Analog Input or PWM 1A
14	Ground
16-PA0	Analog Input or COM2: TX
18-PA15	FAST COUNT 5V
20	Ground
22-PA7	Analog Input or PWM 1B
24-PC4	Analog Input or COUNT 4
26-PC5	Analog Input
28-PH11	I ² C2 SCK 5V
30	Ground
32-PI8	General I/O 5V
34	Ground
36-PC6	PWM 2A 5V
38-PB15	SPI2 MOSI 5V
40-PB13	SPI2 CLOCK or CAN2-Tx 5V