

M16C/65 – The Next Definition of standard 16-bit Microcontroller

M16C/65



Description

The M16C/65 Series is an easy to design-in 16-bit industrial quasi-standard microcontroller, part of the M16C Platform product line-up utilized in endless applications worldwide. It provides a high level of performance, combined with internal peripherals, which reduce the need for external components.

The M16C core has been designed to take advantage of the best features of both accumulator and register based architectures. The CPU has a total of thirteen 16-bit registers, seven of which come in two sets of register banks. The architecture makes it fast with efficient code execution. A hardware multiplier circuit and four direct memory access controller channels (DMAC) are implemented to speed up the processing. The M16C/65 utilizes several design techniques aimed at providing the best EMI/EMS performance without the need for external components, making it the best solution for effective designs for electrically noisy environments. Using the devices of the M16C Platform makes the CE marking for your end product to an easy task.

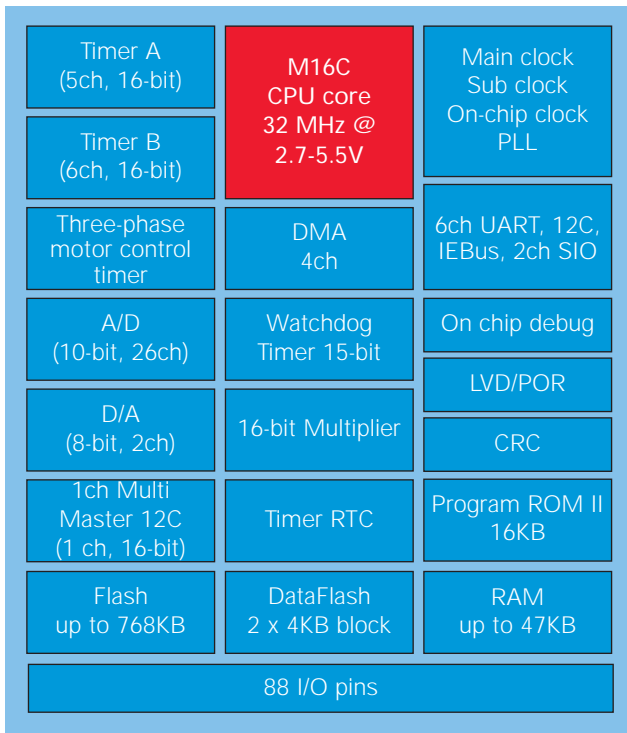
More than 12 variations make the M16C/65 to an ideal solution for a flexible industrial design with a line-up of 100 and 128 (L)QFP packages. The memory density range from 128K to 768K Flash with 12K to 47k RAM covered by M16C/65 is also proven replacement of M16C/62P designs due to pin to pin capability. Using M16C/65 in your design will result in various system improvement but also from system cost point of view.

Key Features:

- High CPU performance 32MHz@ 2.7V to 5.5V
- Up to 786k Flash with 47k RAM
- 8KB embedded DataFlash
- 4 DMA channels
- PLL, Main-, Sub- and 40MHz On Chip oscillator
- 6 serial ports USART including IIC
- 2 serial synchronous ports
- Real Time clock
- 26ch 10-bit ADC (1.72us conversion time)
- 2ch 8-bit DAC
- Up to 88 available IO pins in 100pin package
- Three phase motor control unit
- High efficient M16C family low power modes
- Best EMI/EMS performance

Group	Memory Type	Memory Size (bytes)		Device	Temperature Suffix	Package Type
		ROM DataFlash	RAM			
M16C/65	Flash	128K + 8K	12K	R5F36506NFA	-20°C/ +85°C	100 pin 14 x 20mm QFP 0.65mm pitch
		256K + 8K	20K	R5F3650ENFA		
		512K + 8K	31K	R5F3650MNFA		
		768K + 8K	47K	R5F3650TNFA		
		128K + 8K	12K	R5F36506DFA		
		256K + 8K	20K	R5F3650EDFA		
	512K + 8K	31K	R5F3650MDFA	-40°C/ +85°C	100 pin 14 x 14mm LQFP 0.5mm pitch	
	768K + 8K	47K	R5F3650TDFB			
	128K + 8K	12K	R5F36506NFB			
	256K + 8K	20K	R5F3650ENFB			
	512K + 8K	31K	R5F3650MNFB			
	768K + 8K	47K	R5F3650TNFB			
128K + 8K	12K	R5F36506DFB	-40°C/ +85°C	128 pin 14 x 20mm LQFP 0.5mm pitch		
256K + 8K	20K	R5F3650EDFB				
512K + 8K	31K	R5F3650MDFB				
768K + 8K	47K	R5F3650TDFB				
512K + 8K	31K	R5F3651MNFCA			-20°C/ +85°C	
768K + 8K	47K	R5F3651TNFCA				
		512K + 8K	31K	R5F3651MDFCA	-40°C/ +85°C	
		768K + 8K	47K	R5F3651TDFCA		

M16C/65 – 100-pin Block Diagram



M16C/65 Development Tools



Compiler

- Renesas Embedded Workbench HEW4.0, C-Compiler
- IAR
- Tasking
- GNU

M16C CPU Core (16-bit)

- 32 MHz, 2.7V-5.5V;
- Single chip mode, memory expansion and microprocessor mode

Clock generation circuit

- Main clock with Xin/Xout
- Sub clock with Xcin/Xcout
- On chip oscillator with 125kHz and 40MHz
- PLL frequency synthesizer
- Main clock stop / Re-oscillation detection

Peripherals

- Timers
 - Timer A 16-bit 5ch
 - Timer B 16-bit 6ch
 - Three phase motor control 1ch
- Serial I/O
 - USART, I2C, IEBus 6ch
 - SIO 2ch
- DMA 4ch
- Watchdog Timer 1ch
- A/D Converter (10-Bit) 26ch
- D/A Converter (8-bit) 2ch
- I/O ports 88pins
- Interrupts (7 priority levels)
 - Number of Interrupts 70
 - External sources 13
- CRC (CRC-CCITT & CRC-16) 1ch

M16C/64 Starter Kit (RSK)

The kit includes:

- CPU board with target microcontroller
- LCD panel for user/diagnostic interaction
- E8a On Chip Debugger
- Trial C compiler and IDE
- Tutorial session
- Sample peripheral driver code

E8a On Chip debugger

Low cost On Chip Debugger

- (Part: R0E00008AKCE00)

E100 Full Specification Emulator

Full Trace, breakpoint & performance analysis

- (Part: E100 + M16C/65 MCU board)

