

M32C –Upward Compatible Path For Performance Requirements

M32C/87



Description

With a high performance 32MHz CPU, large memory integration and enhanced peripheral functions for highly sophisticated applications, the M32C closes the gap between the 16-bit and 32-bit microcontroller market. The M32C Series is upwards code compatible with the M16C Series. The M32C/87 is the latest M16C Platform member with the largest available embedded memory size of up to 1MB Flash. Furthermore it includes 48KB RAM and the very well known and widely appreciated rich peripheral set of the M16C platform.

All M16C 16-bit instructions have been maintained and added to by a set of complimentary 32-bit instructions. 32-bit registers are implemented by using 16-bit register pairs along a hardware barrel shifter.

The numbers of cycles per instruction are reduced from three to an average of two. This ensures RISC like performance whilst maintaining excellent code density. DSP functionality is also provided with a two cycle multiply accumulate instruction to allow functions such as software modem, speech compression and telecommunication software stacks.

A high level of communication channels is supported, such as 2ch full CAN controllers and up to 7ch of separate hardware USART. These features combined with high CPU performance at 32MHz and the four DMA channels make it suitable for a large range of industrial applications.

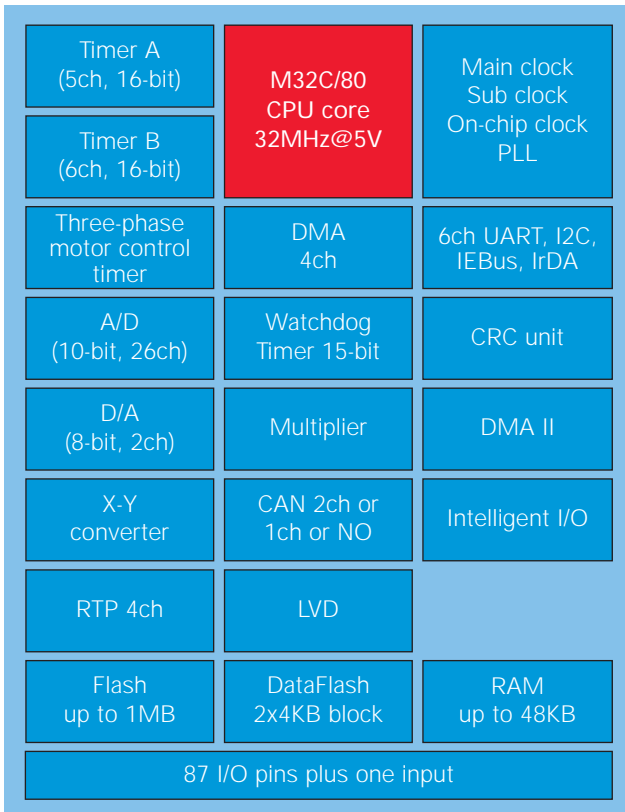
Key Features:

- High CPU performance 32MHz @ 5V
- High CPU performance 24MHz @ 3.3V
- Up to 1MB full-speed Flash with 48KB RAM
- 4KB embedded virtual DataFlash
- Four DMA channels
- 11ch 16-bit Timer
- Three Phase Motor control unit
- Input capture/Output compare unit
- PLL, Main, Sub, and on-chip oscillator
- Seven serial ports USART (including IIC and IrDA)
- 34ch 10-bit ADC
- 2ch 8-bit DAC
- Up to 123 available I/O pins
- Highly efficient M16C family low power modes
- 2ch, 1ch or no CAN option

Group	Device	Package Type	Memory Type	Memory Size (bytes)	
				ROM + DataFlash	RAM
M32C/87	M30873FHyGP	100-pin 14x14mm LQFP 0.5mm pitch	Flash	384K+4K	24K
	M30876FJyGP			512K+4K	31K
	M30879FKyGP			768K+4K	48K
	M30879FLyGP		1M+4K	48K	
	M30876MJy-xxxGP		Mask	384K	24K
	M30873MHy-xxxGP			512K	31K
	M30879FLyFP	100-pin 14x20mm QFP 0.65mm pitch	Flash	1M+4K	48K
	M30876MJy-xxxFP		Mask	512K	31K
	M30875FHyGP	144-pin 20x20mm LQFP 0.5mm pitch	Flash	384K+4K	24K
	M30878FJyGP			512K+4K	31K
	M3087BFKyGP			768K+4K	48K
	M3087BFLyGP		1M+4K	48K	
	M30875MHy-xxxGP		Mask	384K	24K
	M30878MJy-xxxGP			512K	31K

Note: Use the y as identify for the qty of CAN channels:
blank= 2ch; A= 1ch CAN; B= no CAN

M32C/87 - 100-pin Block Diagram



M32C/87 Development Tools



Compiler

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

E8a On-chip Debugger (OCD)

- Low cost OCD
- (Part: R0E00008AKCE00)

M32C/80 CPU Core (16/32-bit)

- 32 MHz, 5V
- 24 MHz, 3V

Clock generation circuit

- Main clock with Xin/Xout
- Sub clock with Xcin/Xcout
- On-chip oscillator with 1MHz
- PLL frequency synthesizer
- Main clock stop / Re-oscillation detection

Peripherals	100-pin	144-pin
• Timer		
- Timer A 16-bit	5ch	5ch
- Timer B 16-bit	6ch	6ch
- Three-phase motor control	1ch	1ch
• Serial I/O		
USART, I ² C, IEBus, IrDA	6ch	7ch
• DMA	4ch	4ch
• DMA II	√	√
• Watchdog Timer (also with ring oscillator)	1ch	1ch
• A/D Converter (one circuit with 10-bit)	26ch	34ch
• D/A Converter (8-bit)	2ch	2ch
• I/O ports (plus one input only pin)	87-pins	123-pins
• Interrupts (7 priority levels)		
- Internal sources	41	41
- External sources	8	11
- Software sources	5	5
• CRC (CRC-CCITT)	1ch	1ch
• X-Y converter (16-bit x 16-bit)	1ch	1ch
• Intelligent I/O	√	√
- Input Capture	8ch	8ch
- Output compare	10ch	16ch
• CAN (2.0B Bosch compliant)	2ch, 1ch, NO CAN	
• Real time port RTP (4-bit)	4ch	4ch

M32C/87 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
- (Part: R0K330879S001BE)

Compact Emulator

- Low cost Emulator with limited trace and breakpoint
- (Part: M30870T2-CPE)

Full Specification Emulator

- Full Trace, breakpoint and performance analysis
- (Part: PC7501 + M30870T-EPB)

