

R32C/111 – The Next Level of Performance 32-bit CISC Microcontroller

R32C/111



Description

With a high performance 50MHz CPU, large memory integration and enhanced peripheral functions for highly sophisticated applications, the R32C is the latest evolution on the M16C Platform in terms of performance for a 32-bit microcontroller market. The R32C Series is upwards code compatible with the M16C Series.

The R32C ensures RISC like performance with excellent code density of CISC architecture. DSP functionality is also provided with a single cycle multiply accumulate instruction to allow functions such as software modem, speech compression & telecommunication software stacks. Furthermore the single precision floating point unit (FPU), the 32-bit barrel shifter as well as the 32-bit Hardware multiplier support the trend to higher performance.

A high level of communication channels is supported, such as 9 channels of separate hardware USART. This feature combined with high CPU performance and the four DMA channels makes it suitable for a large range of industrial applications.

The R32C/111 comes with a Flash memory density range from 256K to 512K Flash with a selectable 40kB or 64kB FlatRAM™ option. This option provide constant RAM size independent from selected Flash size.

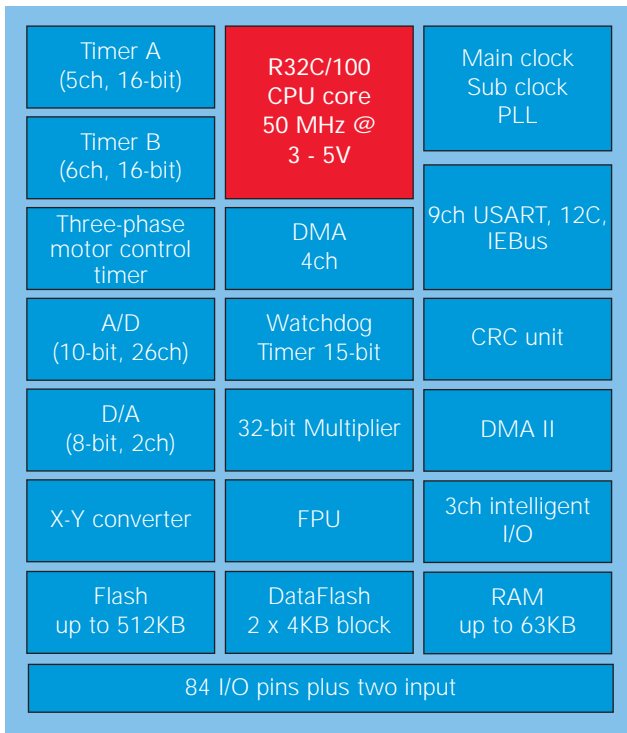
Due to pin to pin capability to other products within the M16C Platform product line-up, R32C/111 is also a proven replacement of M16C and M32C designs. If you are looking for a new synonym of performance, R32C is the right choice!

Key Features:

- R32C/100 Series 32-bit CISC CPU Core
- 50MHz@ 3.0V to 5.5V
- FPU (single precision floating point unit)
- 32-bit multiplier and barrel shifter
- Single cycle RMPA instruction
- Scaleable Flash 256kB -512kB
- Selectable 40kB or 64kB FlatRAM™ option
- 8KB embedded DataFlash
- 4 DMA channels
- PLL, Main-, Sub clock
- 9 serial ports USART including IIC
- 26ch 10-bit ADC
- 2ch 8-bit DAC
- Up to 88 available IO pins in 100pin package
- Three phase motor
- High efficient R32C family low power modes
- Best EMI/EMS performance
- Single Wire debug interface (NSD)

Group	Memory Type	Memory Size (bytes)		Device	Temperature Spec	Package Type
		ROM+ DataFlash	RAM			
R32C/111	Flash	256k + 8K	40K	R5F64114NFB	-20°C/ +85°C	100 pin 14 x 14mm LQFP 0.5mm pitch
		384k + 8K		R5F64115NFB		
		512K + 8K		R5F64116NFB		
		256k + 8K	63K	R5F64110NFB		
		384k + 8K		R5F64111NFB		
		512K + 8K		R5F64112NFB		
	Flash	256k + 8K	40K	R5F64114DFB	-40°C/ +85°C	
		384k + 8K		R5F64115DFB		
		512K + 8K		R5F64116DFB		
		256k + 8K	63K	R5F64110DFB		
		384k + 8K		R5F64111DFB		
		512K + 8K		R5F64112DFB		

R32C/111 – 100-pin Block Diagram



R32C/111 Development Tools



Compiler

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

R32C/100 CPU Core (32-bit)

- 50 MHz, 3V-5.5V;
- 32-bit FPU (single precision)
- 32-bit Multiplier
- 32-bit Barrel shifter
- 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 32MHz
- 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
- Intelligent IO
 - Input Capture 16ch
 - Output compare 19ch
- DMA 4ch
- Watchdog Timer 1ch
- A/D Converter (10-bit) 26ch
- D/A Converter (8-bit) 2ch
- I/O ports 84pins plus two input
- Interrupts (7 priority levels)
 - Number of Interrupts 261
 - External sources 11
- CRC (CRC-CCITT) 1ch

R32C/111 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: ROE00008AKCE00)

E30A On Chip debugging Emulator

Full Trace, breakpoint & performance analysis
 • (Part: ROE00030AKCT00)

