



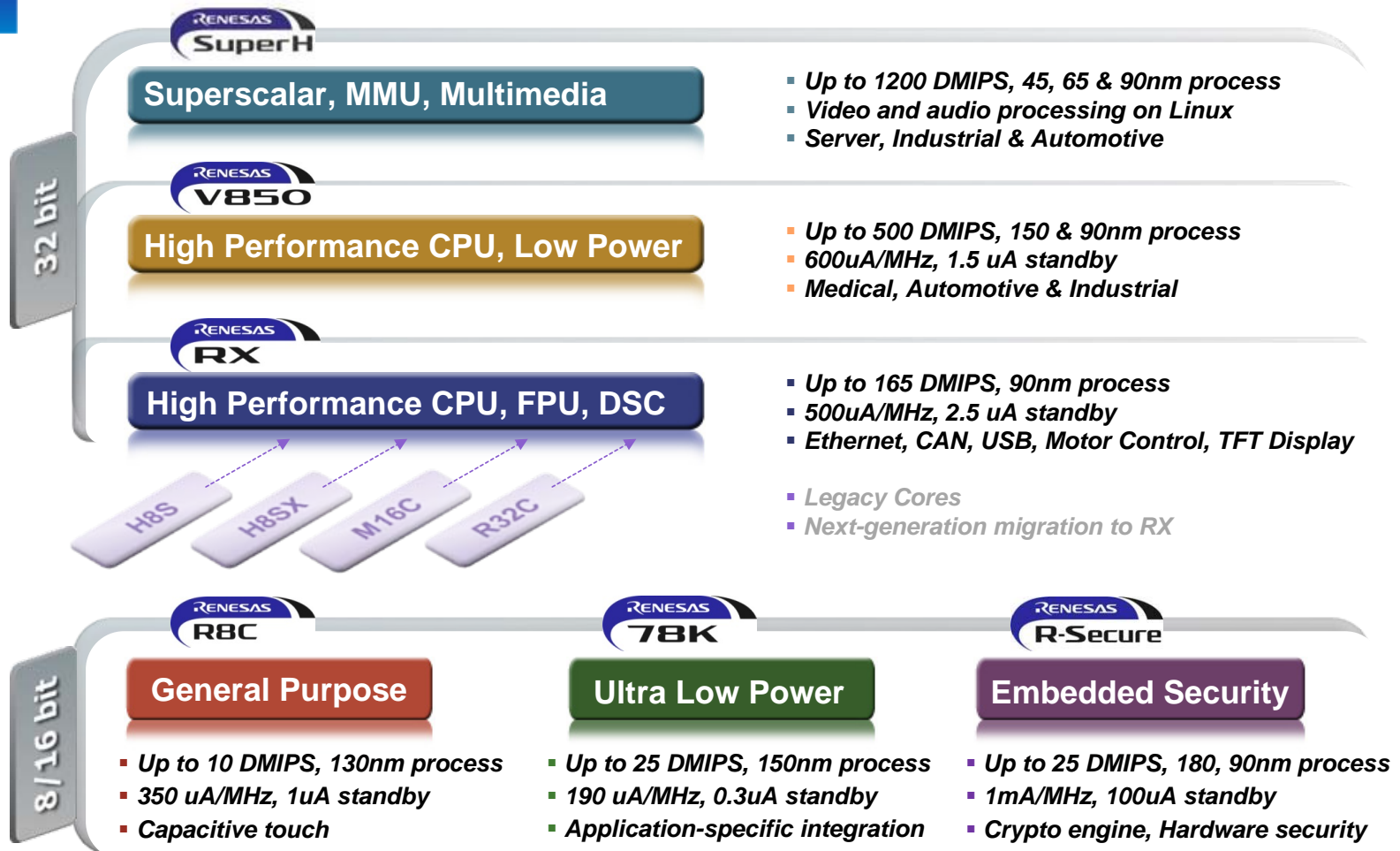
# SuperH MCUs

## SH7216 Highest Performance Flash-based MCU with Connectivity



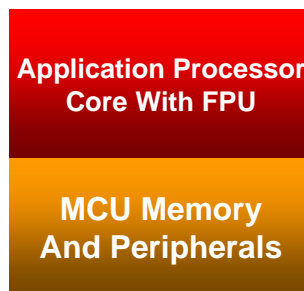
Renesas Electronics America Inc.

# Microcontroller and Microprocessor Line-up



## Our SH-2A MCU Solution

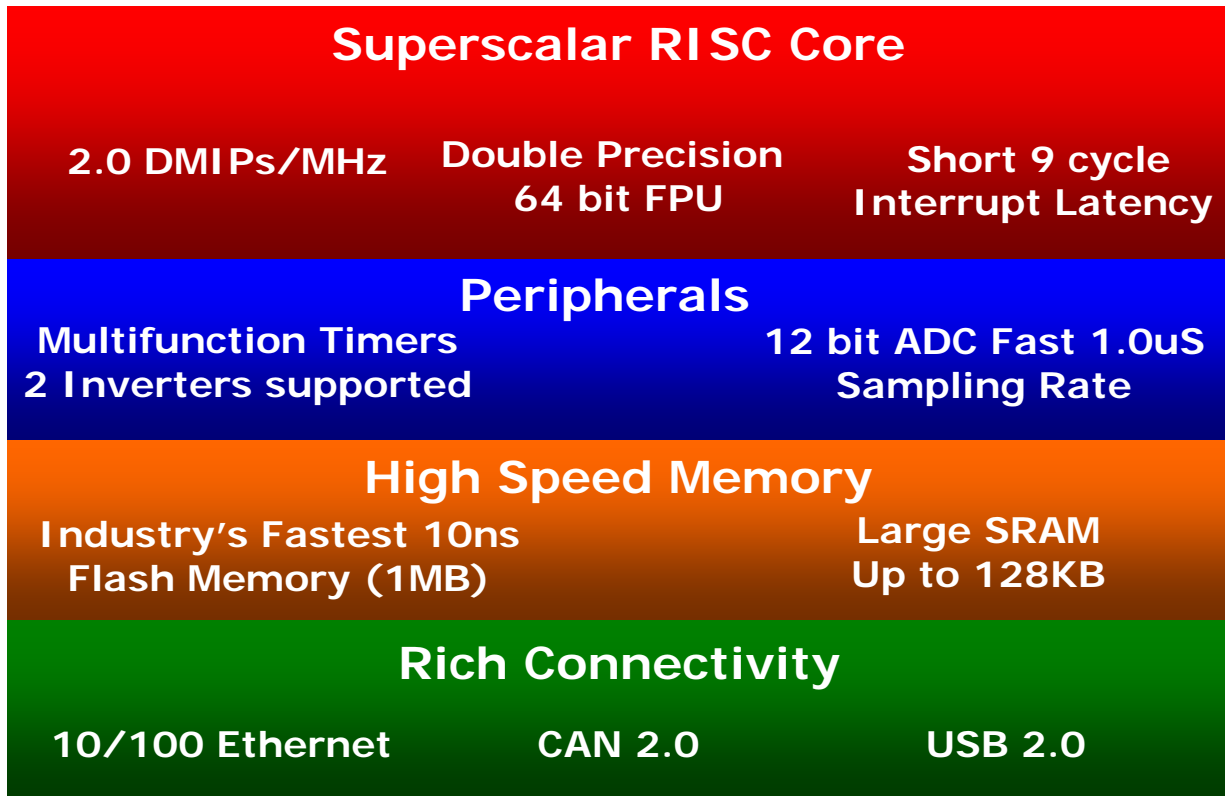
- High Performance SH-2A Process Core efficiencies Equivalent to Application Processors (2 DMIPS/MHz)
- Combined with High Performance Memory and Peripherals on MCUs



- The SH-2A with Floating Point Unit (FPU)
  - Integrates enough functionality to replace a DSP + MCU into a single chip
  - Benefits include smaller form factors, lower cost, less EMI
  - Software development is simple because everything is coded on a single platform

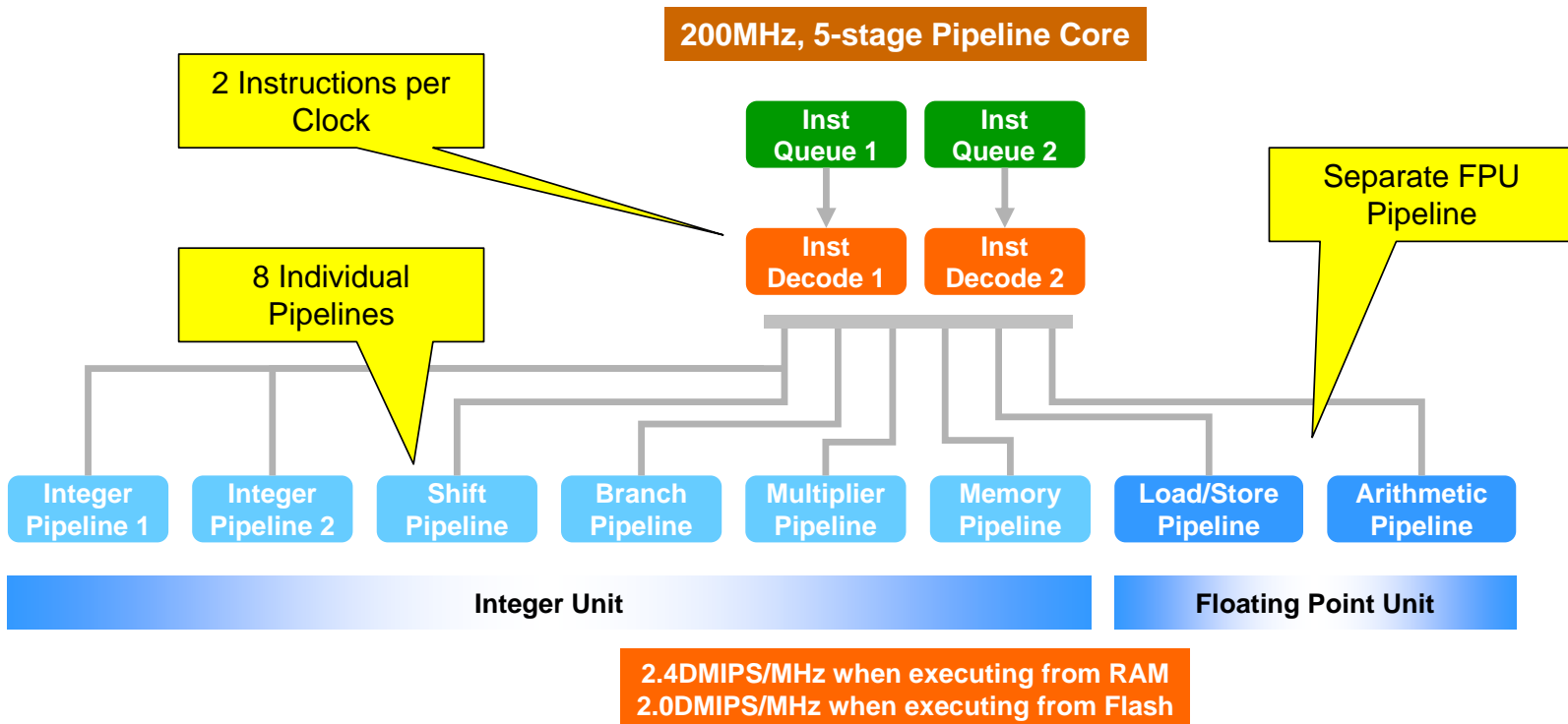
# What's Unique about the SH7216?

The SH7216 shines when customer needs performance & high-throughput



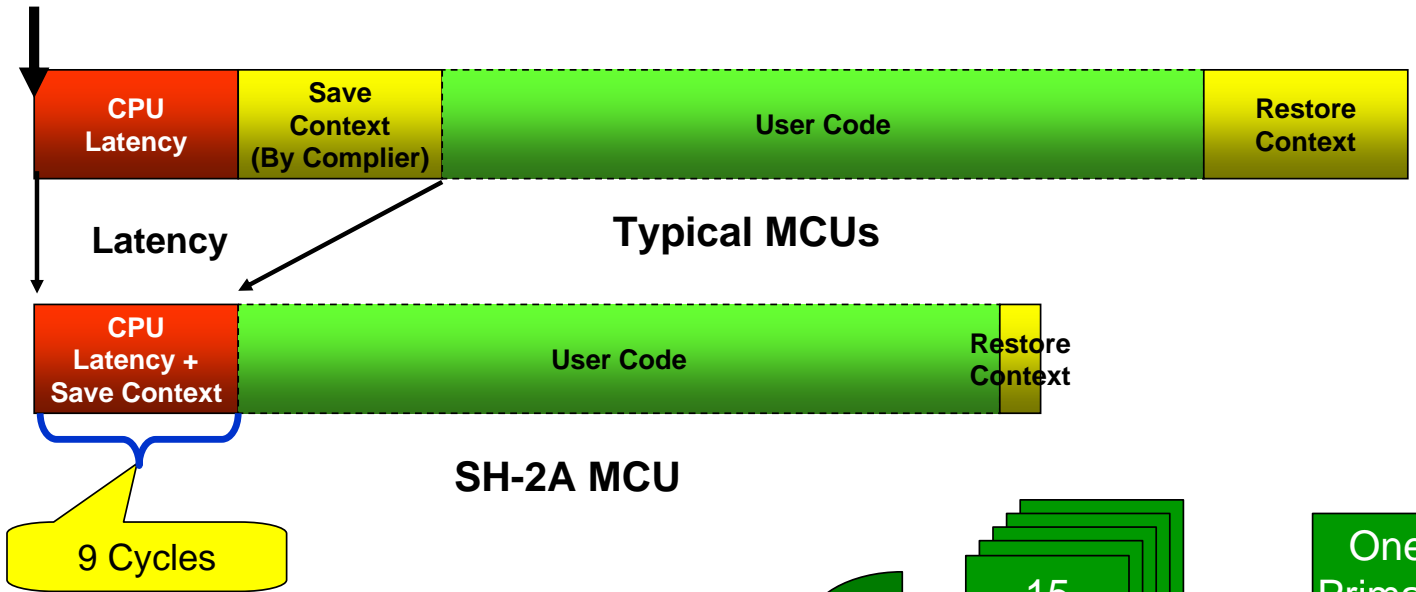
Supported by leading Third Party SW & Tools:  
CMX, Eclipse, Express Logic, GNU Tool suite, IAR, Micrium, Segger

## 2 Instructions/Clock Core

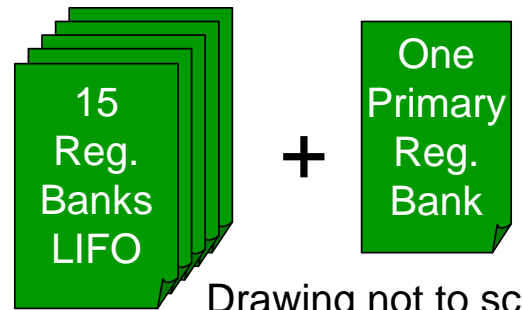


# SH-2A Fast Interrupt Response

INT Trigger



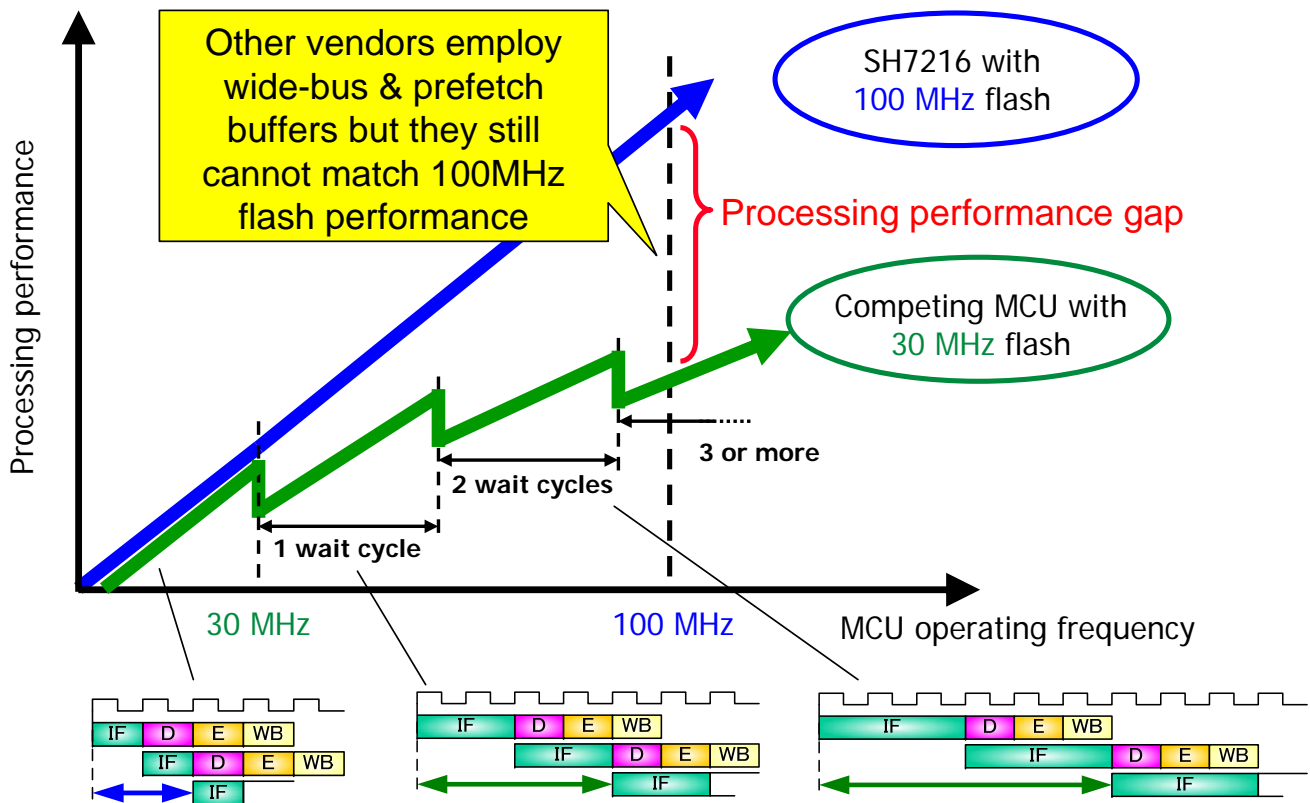
HW saves the context in register bank LIFO



Drawing not to scale

	SH7216	Cortex-M3	ARM7TDMI	PIC32
MCU Interrupt Latency	9	18+	24 – 42	18 – 40+

# SH7216 Uses Fastest Flash (10ns read time)



	SH7216	A	B	C	D	E
Max Freq (MHz)	200	72	72	66	80	150
Flash Speed (MHz)	100	24	20	33	30	27

# Target Applications

## Factory Automation

Precision Motion Control  
Industrial Connectivity  
Fast I/O Control



Operator Panels



## Scientific & Medical

Signal Analysis  
Quiet Motor Control  
Connectivity



Operator Panels



## Consumer Media Players User Interfaces



## Office Automation Image Processing Precise Stepper Control Connectivity Operator Panels



## White Goods

Energy Efficient Motor Control



## Information Displays



## Building Automation High-end Security Systems Image Processing Speech, Connectivity Thermostat, Control Panel



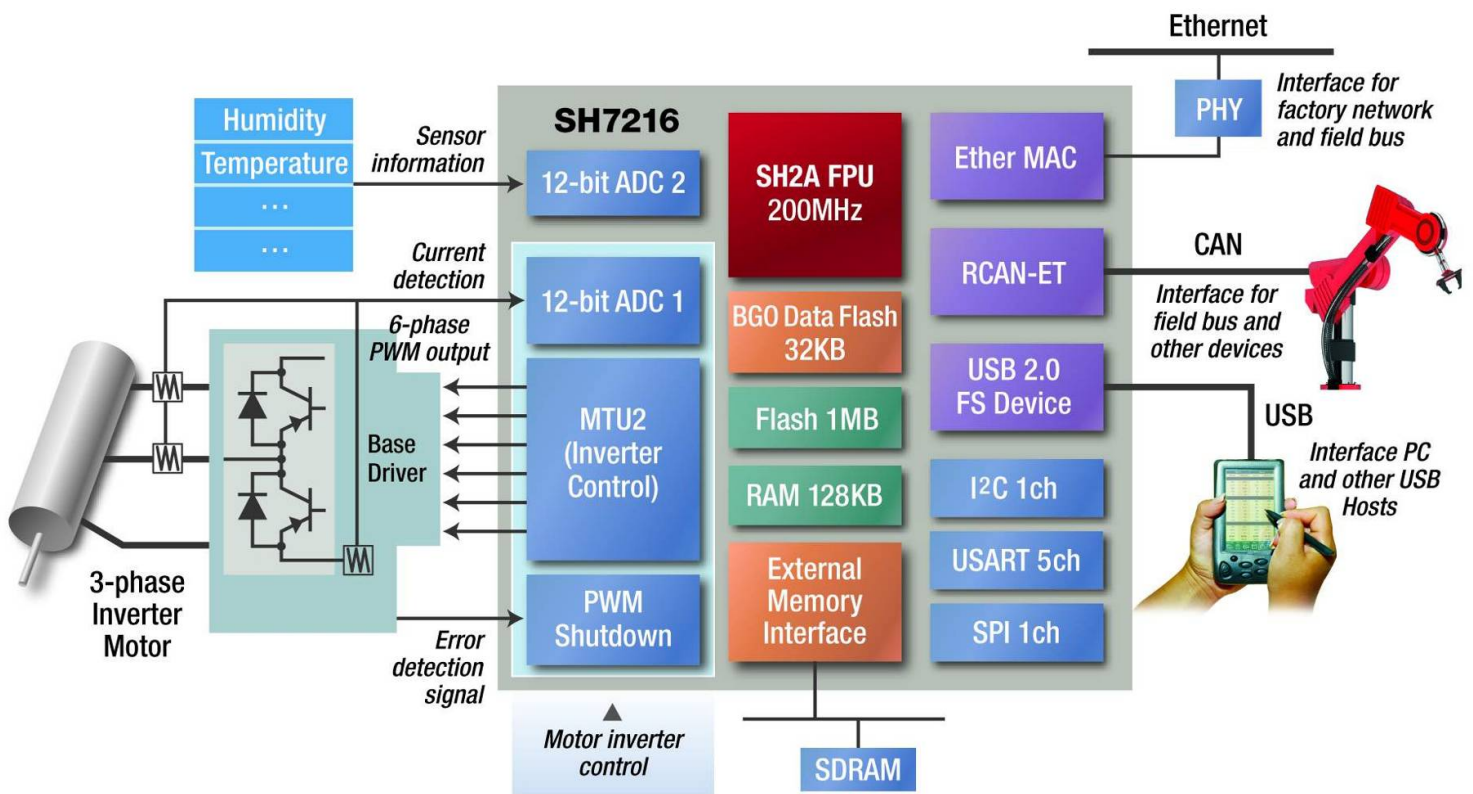
Control Panels





# SH7216 Application Example

Factory Automation



## SH7216 RDK + Micrium uC/OS-III Book

- A comprehensive tool to learn, evaluate, & prototype using SH7216



uC/OS-III Book with  
Example Applications

+



SH7216 Board  
+  
USB Cable  
+  
Power Supply

+

All Software is  
downloaded  
from Micrium Site

MSRP: \$199

Book Only MSRP: \$89

Available free with Future Promotion

### ■ Learn

- RTOS Theory of operation & Usage
- SH7216 Architecture

### ■ Evaluate

- Pre-programmed Demo Application
- Example Applications with Full Source

### ■ Prototype

- Full-featured, flexible board
- Debugger included on the board
- Power supply included



uC/OS-III  
uC/Probe



# Development Tools

## Development Environments



**FREE**

## C/C++ Compilers



KPIT GNU Tools

**FREE**

## Evaluation Systems



Motor Control

## Emulators



E10A-USB

E200F



**GDB**

**FREE**

## RTOS & Middleware



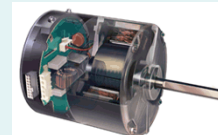
**FREE**

## Sample Code & Libraries from Renesas

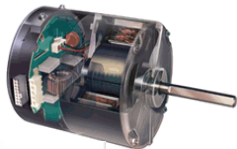


Software Library  
1,000+ FREE sample codes. Software library

**CAN**



## Free SW from Renesas



**CAN**



- Sample code for major peripherals
- Vector Control Motor Algorithms
- Ethernet Send/Receive, Open Source TCP/IP supporting uIP
- CAN API – compatible with R8C & R32C API
- USB Device – CDC, MSC, HID
- Fixed Point Math & DSP Libraries for SH-2A FPU

Available on [am.renesas.com](http://am.renesas.com)

## SH7216 Third Party Support by SW Components

Third Party	IDE	Compiler	Debug	RTOS	TCP/IP Stack	USB Device	File
CMX	-	-	-	Y	Y	Y	Y
Express Logic	-	-	-	Y	Y	Y	Y
FreeRTOS.org	-	-	-	Y	Y	-	-
IAR	Y	Y	Y	-	-	-	-
KPIT GNU Tools	Y	Y	Y	-	-	-	-
Micrium	-	-	-	Y	Y	Y	Y
RoweBots	-	-	-	Y			Y
Segger	-	-	-	Y	Y	Y	Y

## SH7216 Series Part Numbers

Ordering P/N	ROM/RAM	Package	Temperature	Features
R5F72165ADFA#V1	512K/64K	20x20 LQFP176	-40 to 85	200MHz, Ethernet, FPU, CAN, USB
R5F72167ADFA#V1	1M/128K	20x20 LQFP176	-40 to 85	200MHz, Ethernet, FPU, CAN, USB
R5F72165GDFA#V1	512K/64K	20x20 LQFP176	-40 to 85	100MHz, Ethernet, FPU, CAN, USB
R5F72167GDFA#V1	1M/128K	20x20 LQFP176	-40 to 85	100MHz, Ethernet, FPU, CAN, USB

Remaining part numbers are available for qualified opportunities – contact Marketing



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