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## What is "Embedded - Microcontrollers"?

"Embedded - Microcontrollers" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

## Applications of "Embedded - Microcontrollers"

| Details | |
|---|---|
| Product Status | Obsolete |
| Core Processor | 740 |
| Core Size | 8-Bit |
| Speed | 16.8MHz |
| Connectivity | SIO, UART/USART |
| Peripherals | LED, PWM, WDT |
| Number of I/O | 56 |
| Program Memory Size | 24KB (24K x 8) |
| Program Memory Type | QzROM |
| EEPROM Size | - |
| RAM Size | 2K x 8 |
| Voltage - Supply (Vcc/Vdd) | 1.8V ~ 5.5V |
| Data Converters | A/D 16x10b; D/A 2x8b |
| Oscillator Type | Internal |
| Operating Temperature | -20°C ~ 85°C (TA) |
| Mounting Type | Surface Mount |
| Package / Case | 64-LQFP |
| Supplier Device Package | 64-LFQFP (10x10) |
| Purchase URL | https://www.e-xfl.com/product-detail/renesas-electronics-america/m38039g6hhp-u0 |

# 3803 Group (Spec.H QzROM version)

SINGLE-CHIP 8-BIT CMOS MICROCOMPUTER

REJ03B0166-0113
Rev.1.13
Aug 21, 2009

## DESCRIPTION

The 3803 group (Spec.H QzROM version) is the 8-bit microcomputer based on the 740 family core technology.
The 3803 group (Spec.H QzROM version) is designed for household products, office automation equipment, and controlling systems that require analog signal processing, including the serial interface functions, 8/16-bit timer, A/D converter and D/A converter.

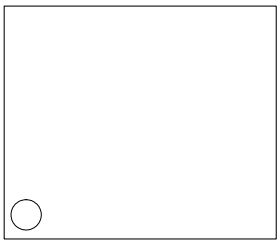
## FEATURES

- Basic machine-language instructions ..... 71
- Minimum instruction execution time ..... 0.24 µs
  (at 16.8 MHz oscillation frequency)
- Memory size
  QzROM ..... 16 K to 48 K bytes
  RAM ..... 2048 bytes
- Programmable input/output ports ..... 56
- Software pull-up resistors ..... Built-in
- Interrupts ..... 21 sources, 16 vectors
  (external 8, internal 12, software 1)
- Timers ..... 16-bit × 1
  8-bit × 4
  (with 8-bit prescaler)
- Serial interface ..... 8-bit × 2 (UART or Clock-synchronized)
  8-bit × 1 (Clock-synchronized)
- PWM ..... 8-bit × 1 (with 8-bit prescaler)
- A/D converter ..... 10-bit × 16 channels
  (8-bit reading enabled)
- D/A converter ..... 8-bit × 2 channels
- Watchdog timer ..... 16-bit × 1 channel
- LED direct drive port .....8
- Clock generating circuit ..... Built-in 2 circuits
  (connect to external ceramic resonator or quartz-crystal oscillator)
- Power source voltage
  [In high-speed mode]
  At 16.8 MHz oscillation frequency ..... 4.5 to 5.5 V
  At 12.5 MHz oscillation frequency ..... 4.0 to 5.5 V
  At 8.4 MHz oscillation frequency ..... 2.7 to 5.5 V
  At 4.2 MHz oscillation frequency ..... 2.2 to 5.5 V
  At 2.1 MHz oscillation frequency ..... 2.0 to 5.5 V
  [In middle-speed mode]
  At 16.8 MHz oscillation frequency ..... 4.5 to 5.5 V
  At 12.5 MHz oscillation frequency ..... 2.7 to 5.5 V
  At 8.4 MHz oscillation frequency ..... 2.2 to 5.5 V
  At 6.3 MHz oscillation frequency ..... 1.8 to 5.5 V
  [In low-speed mode]
  At 32 kHz oscillation frequency..... 1.8 to 5.5 V
- Power dissipation
  In high-speed mode ..... 40 mW (typ.)
  (at 16.8 MHz oscillation frequency, at 5 V power source voltage)
  In low-speed mode ..... 45 µW (typ.)
  (at 32 kHz oscillation frequency, at 3 V power source voltage)
- Operating temperature range ..... –20 to 85 °C
- Packages
  SP.....PRDP0064BA-A (64P4B) <64-pin 750mil SDIP>
  HP ... PLQP0064KB-A (64P6Q-A)<64-pin 10 × 10mm LQFP>
  KP ... PLQP0064GA-A (64P6U-A)<64-pin 14 × 14mm LQFP>
  WG ..... PTLG0064JA-A (64F0G)<64-pin 6 × 6mm FLGA>

## APPLICATION

Household products, Consumer electronics, etc.

| | A | B | C | D | E | F | G | H | |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 50<br>P3$_6$/S$_{CLK3}$ | 46<br>P0$_2$/AN$_{10}$ | 44<br>P0$_4$/AN$_{12}$ | 41<br>P0$_7$/AN$_{15}$ | 40<br>P1$_0$/INT$_{41}$ | 32<br>P2$_0$(LED$_0$) | 31<br>P2$_1$(LED$_1$) | 30<br>P2$_2$(LED$_2$) | 8 |
| 7 | 51<br>P3$_5$/T$_X$D$_3$ | 47<br>P0$_1$/AN$_9$ | 45<br>P0$_3$/AN$_{11}$ | 42<br>P0$_6$/AN$_{14}$ | 39<br>P1$_1$/INT$_{01}$ | 27<br>P2$_5$(LED$_5$) | 29<br>P2$_3$(LED$_3$) | P2$_4$(LED$_4$) | 7 |
| 6 | P3$_3$ | P3$_4$/R$_X$D$_3$ | P0$_0$/AN$_8$ | P0$_5$/AN$_{13}$ | P1$_2$ | P1$_3$ | P2$_6$(LED$_6$) | P2$_7$(LED$_7$) | 6 |
| 5 | P3$_0$/DA$_1$ | P3$_1$/DA$_2$ | P3$_2$ | P3$_7$/S$_{RDY3}$ | P1$_7$ | P1$_4$ | P1$_5$ | P1$_6$ | 5 |
| 4 | P6$_2$/AN$_2$ | P6$_3$/AN$_3$ | V$_{REF}$ | AV$_{SS}$ | V$_{CC}$ | V$_{SS}$ | X$_{IN}$ | X$_{OUT}$ | 4 |
| 3 | P6$_7$/AN$_7$ | P6$_6$/AN$_6$ | P5$_7$/INT$_3$ | P5$_4$/CNTR$_0$ | P4$_7$/S$_{RDY1}$/CNTR$_2$ | P4$_5$/T$_X$D$_1$ | P4$_0$/INT$_{40}$/X$_{COUT}$ | P4$_1$/INT$_{00}$/X$_{CIN}$ | 3 |
| 2 | P6$_5$/AN$_5$ | P6$_4$/AN$_4$ | P5$_6$/PWM | P5$_3$/$\overline{S_{RDY2}}$ | P5$_1$/S$_{OUT2}$ | P4$_6$/S$_{CLK1}$ | P4$_2$/INT$_1$ | $\overline{RESET}$ | 2 |
| 1 | P6$_1$/AN$_1$ | P6$_0$/AN$_0$ | P5$_5$/CNTR$_1$ | P5$_2$/S$_{CLK2}$ | P5$_0$/S$_{IN2}$ | P4$_4$/R$_X$D$_1$ | P4$_3$/INT$_2$ | CNV$_{SS}$ | 1 |
| | A | B | C | D | E | F | G | H | |



Package (TOP VIEW)

Fig 3. Pin configuration (Top view) (PTLG0064JA-A (64F0G))