# 8bit Low Power Microcontroller

**ML610Q482(P)/ML610482(P)**


- Integrated Circuits
- Communication LSI
- Low Power Microcontroller
- **ML610Q400 series**
- ML610300 series
- 32-bit Microcontroller
- Speech Synthesis LSI
- Audio LSI
- Security LSI
- Video LSI
- Video Memory
- P2ROM
- DRAM
- Display LSI
- Other LSI
- Optical Components
- Product Name
- Quality Assurance and Reliability


| ML610Q400 series | **ML610Q482(P)/482(P)** | ML610Q411(P)/Q412(P) | ML610Q415 | ML610Q421(P)/Q422(P) | ML610Q431/Q432 | ML610Q435/Q436 | Software Development Support System |

## Suitable for the controller of all compact battery-driven applications!

### Description

ML610Q482(P)/482P is a high-performance 8-bit CMOS microcontroller built-in with the original eight bits CPU nX-U8/100 as its core. The LCD driver is not built-in, and the interface with various external display drivers such as for electronic paper is possible. The difference between ML610Q482 and ML610Q482P is only the operating temperature range. The program memory(64KB), RAM(4KB), and, as the peripheral functions, UART, SSIO(SPI), I2C (master), battery level detector, 24-bit RC-type A/D converter, analog comparator, timers, and GPIO ports are integrated. The CPU core is capable of efficient instruction execution in one-instruction one cycle by 3-stage pipelined architecture parallel processing.
The built-in Flash memory achieves operating at low voltage and low power consumption equivalent of Mask-ROM. Additionally the microcontroller operates in low-speed mode and power-saving mode, is most suitable for battery-driven applications. The Flash memory enables writing a custom code in the final test process, achieving a shorter turnaround time(TAT).

### Feature

- Ultra low power, 1V operative Flash memory & Halt current 0.5µA
- Original RISC CPU: achieved one-instruction one cycle by 3-stage pipelined architecture.
- Suitable for the controller of compact battery-driven applications
  - Chip or TQFP48pin
  - UART, SSIO (SPI), or I2C(master) selectable
  - Various memory sizes (64KByte ROM, 4KByte RAM)
- Provides small-sized cost saving development environment: On-chip debug emulator “µEASE”

### Applications

- Electronic shelf label
- Thermostat
- Weather station

### Specification

| Parameter | | Specification |
|---|---|---|
| CPU | | 8bit RISC CPU nX-U8/100 Core |
| ROM (FLASH) | | 64KB (including 1KB as test area) |
| RAM | | 4KB |
| General Port (incl. 2nd function) | | Max. 32 |
| A/D Converter | | 24bit RC-type×2ch |
| Analog Comparator | | Common mode input: 0.2V to (VDD-1.0)V<br>Input offset: 50mV (typ.) |
| Serial I/F | | UART×1ch, SSIO(SPI)×1ch, I2C(master)×1 |
| Timer | 8bit Timer | 4 |
| | 16bit PWM | 1 |
| | Others | TBC (Time Base Counter)×1<br>WDT×1 |
| External Interrupt | | 5 |
| Other Functions | | Battery level detector,<br>Clock out, etc. |
| Operating Frequency | High Speed | 4.096MHz<br>(Internal PLL or External ceramic/crystal)<br>500kHz(internal RC) |
| | Low Speed | 32.768/38.4kHz |
| Supply Voltage | | 1.1V to 3.6V |


Topics

8bit low power microcontroller ML610Q482(P)/ML610482(P)

Software development support system -Low power microcontroller-

ML610300 series Low power microcontroller with speech output function

ML610Q400 series Low power with embedded Flash memory microcontroller

News Release

**2009/03/26** Starts shipping samples of ML610340 Series low-power microprocessor family with built-in audio playback function

**2009/02/25** Expands its Family of Ultra Low Power 8-bit Flash Microcontrollers for Portable Applications

**2008/11/19** Expands its Family of Ultra Low Power 8-bit Flash Microcontrollers

FAQ

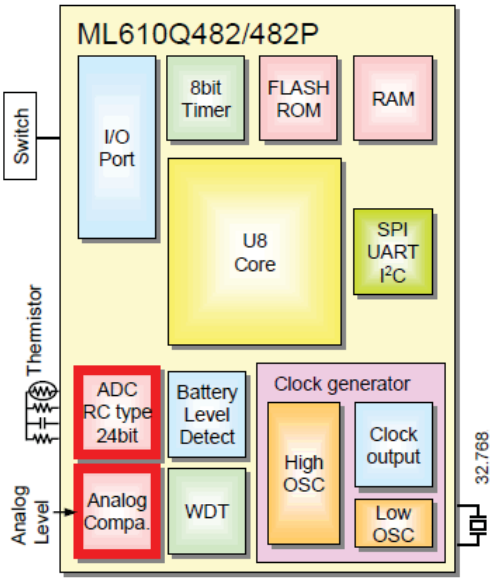
ML610Q400 series

Inquiries

| | | |
|---|---|---|
| Operating Temperature | | ML610Q482: -20°C to +70°C<br>ML610Q482P: -40°C to +85°C |
| Current Consumption (Typ.) | Standby mode | HALT mode: 0.5µA<br>STOP mode: 0.15µA |
| | Operating mode | 32kHz: 5µA(CPU run duty 100%)<br>500KHz: 70µA(internal RC)<br>4.096MHz: 830µA(internal PLL) |
| Supply Form | | Die or 48TQFP |



**Block Diagram**




**Program Development Environment**

The page of the application program development environment is:

- Software development support system

**Related Pages**

- Low Power Microcontroller
  - ML610Q400 series
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