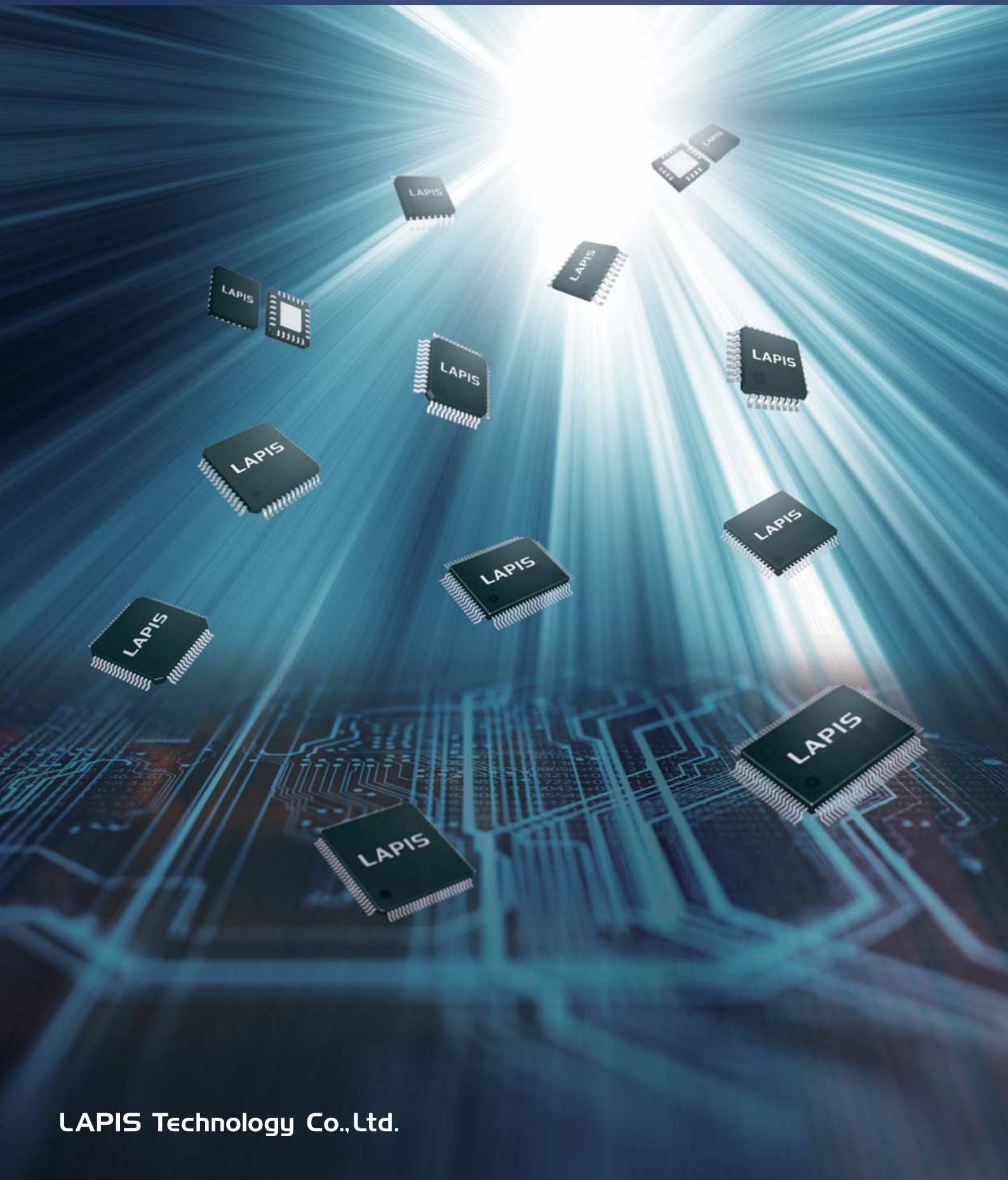
LAPIS Technology Microcontrollers

General-Purpose Robust and Safe 16bit MCUs

ML62Q1000 series



LAPIS Technology Co.,Ltd.

LAPIS Technology Microcontrollers

LAPIS Technology MCUs utilize original low power technology cultivated over many years to achieve class-leading performance.
As such they have been widely adopted in a variety of applications, from compact battery-driven devices
such as high-performance digital watches to consumer appliances, industrial equipment, and infrastructure,
and continues to ensure a stable supply with over 100 million units shipped per year over a long term.
The new ML62Q1000 series delivers superior robustness and safety by incorporating safety functions (IEC 60730/60335 Class B compliant)
while featuring high temperature and noise resistance. A broad lineup is offered in a range of package sizes and ROM capacities
that take into account common designs and scalability for system optimization.
In addition, an easy-to-use starter kit is available that allows for immediate evaluation and development.

16bit MCUs with safety functions robust against noise and high temperatures

New ML62Q1000 series

ML62Q1300/1500/1700/1800 Group

Feature

1 Strong against noise, compatible with high temperatures

- Clears Class 4 (±8kV - the highest level) during IEC61000-4-2 electrostatic noise testing, as well as ±30V (indirect discharge testing using a reference board)
- Operating temp. range: –40°C to +105°C

2 Built-in safety functions

- Protects equipment and systems from unforeseen circumstances (IEC 60730/60335 Class B compliant)

Self-diagnostic functions: 8 items

- Register test
- UART/SSIO/I²C test
- A/D converter test
- Program counter test
- Oscillation frequency test
- WDT test
- GPIO test
- Interrupt test

Peripheral circuit diagnosis detects failures

Error detection functions: 3 items

- Flash memory CRC calculation
- RAM parity error
- ROM unused area access

Detects malfunctions due to memory data errors and invalid memory access

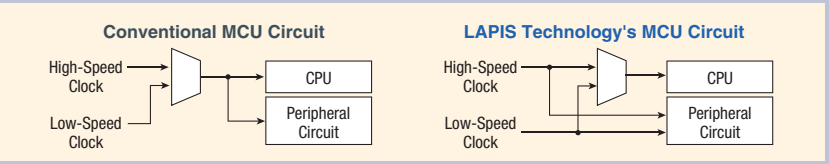
Memory protection functions: 2 items

- RAM guard
- SFR guard
  (Special Function Register)

RAM erroneous write prevention
SFR erroneous write prevention

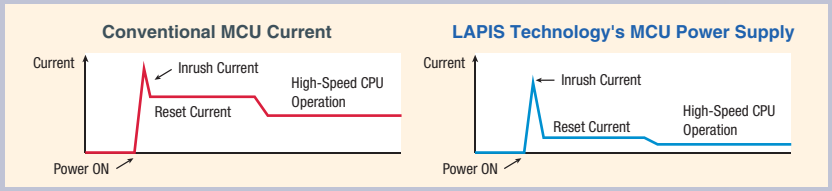
3 Low power consumption technology

Full Dual Clock System



- Select high-speed and low-speed clocks for each peripheral circuit and CPU Flexible clock control ensures low power consumption
- 4,800bps (Max) UART communication possible even during low-speed clock operation (32.768kHz)

Current Control at Startup



- MCU startup carried out with low-speed clock to minimize current consumption

4 ISP* function built-in

*In System Programming

- Program memory space and data flash areas can be rewritten via UART communication with external devices
  This provides the flexibility to rewrite programs in the field by the customer after shipment

MCU series System Diagram

LAPIS Technology Microcontrollers

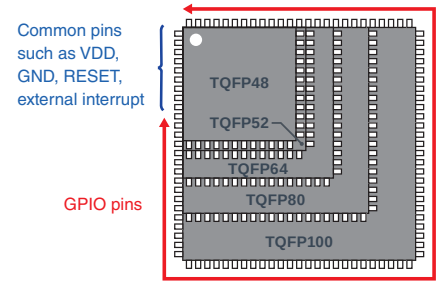
New ML62Q1000 series	General-purpose MCUs (16bit)	16bit / High temperature operation / Noise-resistant / Robust / Safety Functions / Scalability
ML620Q500	Low Power MCUs (16bit)	16bit / Low Consumption
ML610400/ML610Q400	Low Voltage Operation MCUs (8bit)	8bit / Battery Powered
ML610Q300	Speech Play Back MCUs (8bit)	8bit / Audio Playback
ML630Q400	USB Interface & Security function MCUs (32bit)	32bit / USB / Security

5 Broad lineup (92 part numbers/136 models)

ROM size	16pin WQFN16 4mm×4mm 0.5mm pitch SSOP16 4.4mm×5mm 0.65mm pitch	20pin TSSOP20 4.4mm×6.5mm 0.65mm pitch	24pin WQFN24 4mm×4mm 0.5mm pitch	32pin WQFN32 5mm×5mm 0.5mm pitch TQFP32 7mm×7mm 0.8mm pitch	48pin TQFP48 7mm×7mm 0.5mm pitch	52pin TQFP52 10mm×10mm 0.65mm pitch	64pin QFP64 14mm×14mm 0.8mm pitch TQFP64 10mm×10mm 0.5mm pitch	80pin QFP80 14mm×14mm 0.65mm pitch	100pin QFP100 14mm×20mm 0.65mm pitch TQFP100 14mm×14mm 0.5mm pitch
512KB							ML62Q1729 ML62Q1859	ML62Q1739 ML62Q1869	ML62Q1749 ML62Q1879
384KB							ML62Q1728 ML62Q1858	ML62Q1738 ML62Q1868	ML62Q1748 ML62Q1878
256KB							ML62Q1727 ML62Q1557	ML62Q1737 ML62Q1567	ML62Q1747 ML62Q1577
192KB							ML62Q1726 ML62Q1556	ML62Q1736 ML62Q1566	ML62Q1746 ML62Q1576
160KB							ML62Q1725 ML62Q1555	ML62Q1735 ML62Q1565	ML62Q1745 ML62Q1575
128KB					ML62Q1704 ML62Q1534	ML62Q1714 ML62Q1714C ML62Q1544 ML62Q1544C	ML62Q1724 ML62Q1724C ML62Q1554 ML62Q1554C	ML62Q1734 ML62Q1734C ML62Q1564 ML62Q1564C	ML62Q1744 ML62Q1574
96KB					ML62Q1703 ML62Q1533	ML62Q1713 ML62Q1713C ML62Q1543 ML62Q1543C	ML62Q1723 ML62Q1723C ML62Q1553 ML62Q1553C	ML62Q1733 ML62Q1733C ML62Q1563 ML62Q1563C	ML62Q1743 ML62Q1573
64KB			ML62Q1347	ML62Q1367	ML62Q1702 ML62Q1532	ML62Q1712 ML62Q1542	ML62Q1722 ML62Q1552		
48KB			ML62Q1346	ML62Q1366	ML62Q1701 ML62Q1531	ML62Q1711 ML62Q1541	ML62Q1721 ML62Q1551		
32KB	ML62Q1325	ML62Q1335	ML62Q1345	ML62Q1365	ML62Q1700 ML62Q1530	ML62Q1710 ML62Q1540	ML62Q1720 ML62Q1550		
24KB	ML62Q1324	ML62Q1334							
16KB	ML62Q1323	ML62Q1333							

◆ Black P/N : Normal Type
◆ Blue P/N : Built-In LCD Driver Type

Scalability Scalability is ensured by taking into consideration the layout of the common and general-purpose input/output pins



Note : Pin pitch may vary depending on the package type

Specifications

Parameter	Overview
CPU	Original 16bit RISC CPU nX-U16/100
Flash ROM	16 to 512KB
Data Flash	2 to 8KB
RAM	4 to 32KB
LCD Driver	8com × 24 to 60seg
A/D Converter	10bit Successive Approximation Type 6 to 16ch
D/A Converter	8bit DAC 1 to 2ch
Comparator	1 to 2ch
UART/SSIO (SPI)	UART Full Duplex/SSIO (SPI) x 2 to 6h
I²C	Master/Slave 1ch, Master1 to 2ch

Parameter		Overview
16bit Timer		Multifunction timer 4 to 8ch, timer 4 to 8ch (can be used as a 2ch 8bit timer)
GPIO		12 to 92
Other		WDT, POR, VLS, DMA controller, multiplier/divider
Clock	Low Speed	32.768kHz (RC oscillation/external crystal oscillation)
	High Speed	24M/16MHz (PLL oscillation)
Current Consumption	Standby	STOP-DEEP : 0.6 to 1.2μA HALT : 3.0 to 4.5μA@Crystal oscillation 3.6 to 6.0μA@RC oscillation
	During Operation	During low-speed operation: 17 to 20μA@32.768kHz RC oscillation During high-speed operation: 3.1 to 5.0mA@16MHz
Operating Voltage		1.6 to 5.5V

Application

- General home appliances

- Compact industrial equipment, consumer devices, etc.

Available for purchase through online distributors

Starter Kit available for purchase

A complete development environment has been established, ranging from program development for LAPIS Technology general-purpose MCUs (ML62Q1000 series) to program writing during production.

The comprehensive development environment supports everything from program development of LAPIS Technology's general-purpose MCUs (ML62Q1000 series) to ROM code generation for mass production and Flash memory writing. 3 types are available based on application needs, along with sample programs for each. Even those new to LAPIS Technology MCUs can easily begin evaluation and development using the LEXIDE-U16 integrated development environment.

LCD Starter Kit

Starter Kits	Main Contents
MCU Starter Kit	ML62Q1577 Reference Board EASE1000 V2 On-Chip Emulator Software Tools Sample LED Flashing Program
Capacitive Switch Starter Kit	ML62Q1367 Capacitive Switch Application Board EASE1000 V2 On-Chip Emulator Software Tools Sample Touch Sensor Software Sample DTMF Audio Generation Software Sample IR Reception/Transmission Software
LCD Starter Kit	ML62Q1747 Reference Board ML62Q1000 LCD Board EASE1000 V2 On-Chip Emulator Software Tools Sample Clock Display Program

Available through online distributors

Digi-Key ELECTRONICS

MOUSER ELECTRONICS

Efficiently carry out program creation, building, and debugging using our integrated development environment featuring a powerful, feature-rich user interface

LEXIDE-U16 Integrated Development Environment

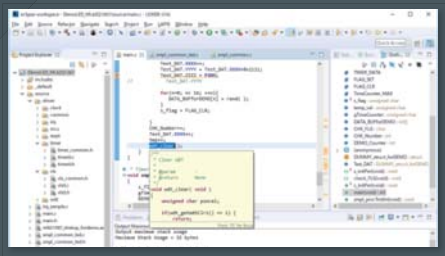
Features

1. Easy-to-use editor with robust functionality
2. An environment that enables seamless linkage between editing and debugging of source programs

LEXIDE-U16 is an integrated development environment for developing programs for LAPIS Technology's original 8/16bit RISC CPUs based on the open source Eclipse platform and CDT*1 plug-in. Editor features such as automatic code completion and code navigation improve programming efficiency, while debugging functions provide a seamless environment for editing and debugging.

*LEXIDE-U16 is bundled with all of the starter kits for U8/U16 Development Tools Release 2.2.0 and later.
*1 The integrated development environment (IDE) is provided by Eclipse Foundation CDT stands for C Development Tooling.

LEXIDE-U16 Operating Screen (image)



ML62Q1000 series

For more information, click here ▶ **https://www.lapis-tech.com/en/semicon/miconlp/hf-mcu.html**

The content specified in this document is correct as of 1st December, 2020.

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