

Go fast. Stay cool.

Super-low power, high performance 16-bit microcontrollers.

18K0R

GO FAST. STAY COOL.

NEC ELECTRONICS' 78K0R/Kx3 series of 16-bit microcontrollers deliver a class leading combination of both high performance, and low power consumption. Designers of 8-bit applications can benefit by upgrading to a higher performance microcontroller without significant increases in power consumption. Designers of existing 16-bit applications can significantly reduce power consumption and therefore increase battery life.

With a range of 50 devices in 64- to 144-pin packages, and 64 KB to 512 KB of SST SuperFlash[®] Flash memory, designers have the ability to choose the best microcontroller for the job at hand.

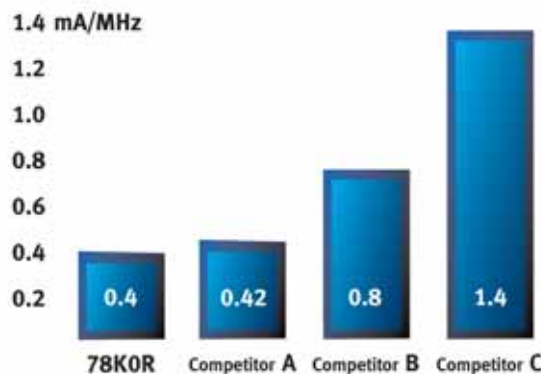
“GO FAST” – 16-BIT PERFORMANCE

The 78K0R 16-bit CPU executes many of its 71 instructions in a single cycle including popular 16-bit arithmetic, data transfer, logical operations, and compound instructions such as ‘exchange’, ‘compare’, and ‘skip’. This allows designers to exploit 13 Dhrystone MIPS from the 78K0R CPU running at 20 MHz. In addition to data operations enhanced program control operations are also available such as 16-bit relative and immediate addressing enabling faster program execution for larger program loops.

“STAY COOL” – SUPER LOW POWER

As well as delivering high performance the 78K0R CPU was designed to offer super low power consumption. Designers no longer have to trade performance for battery life. Under full operating speed conditions 78K0R/Kx3 microcontrollers draw only 4 mA when running at 10 MHz and 3 V, which is class leading amongst other 16-bit Flash and Mask ROM based microcontrollers.

Operating Current Consumption (3 V)



WIDE RANGE, EASY MIGRATION

Designed to be upwards compatible from the established 78K0 8-bit microcontroller family of microcontrollers, the 78K0R family provides a very easy path to higher performance for legacy 8-bit applications. The 78K0R CPU instruction set is compatible with 78K0 CPU instructions making porting of both ‘C’ and assembler based software quick and easy.

78K0 is a subset of 78K0R instruction set.



The 78K0R/Kx3 series includes 50 devices from 64 KB to 512 KB of Flash memory. Devices are available in 64- to 144- pin packages. All devices contain the similar peripherals making migration from smaller memory sizes to larger ones as easy as possible.

78K0R Common Features (KE, KF, KG):

- 32 KHz to 20 MHz CPU operation
- 16x16-bit Hardware multiplier
- Power-on-clear and Low Voltage Indicator
- 8 Ch 16-bit Timer Unit
- Real Time Clock Unit
- Window Watchdog Timer
- Serial Interface Unit including 3 UARTs, 2 CSIs, LIN support, and I2C
- 16 channel 10-bit A/D converter
- 2 channel 8-bit D/A converter (Not available on KE3)
- Self programming Flash with security features
- On-chip debug functions
- Plastic LQFP and fine pitch LQFP packages

	Part Number	Pin Count	ROM	RAM
KE3	UPD78F1142	64	64KB	4KB
KE3	UPD78F1143	64	96KB	6KB
KE3	UPD78F1144	64	128KB	8KB
KE3	UPD78F1145	64	192KB	10KB
KE3	UPD78F1146	64	256KB	12KB
KF3	UPD78F1152	80	64KB	4KB
KF3	UPD78F1153	80	96KB	6KB
KF3	UPD78F1154	80	128KB	8KB
KF3	UPD78F1155	80	192KB	10KB
KF3	UPD78F1156	80	256KB	12KB
KG3	UPD78F1162	100	64KB	4KB
KG3	UPD78F1163	100	96KB	6KB
KG3	UPD78F1164	100	128KB	8KB
KG3	UPD78F1165	100	192KB	10KB
KG3	UPD78F1166	100	256KB	12KB
KG3*	UPD78F1167	128	384KB	24KB
KG3*	UPD78F1168	128	512KB	30KB
KH3*	UPD78F1174	128	128KB	8KB
KH3*	UPD78F1175	128	192KB	10KB
KH3*	UPD78F1176	128	256KB	12KB
KH3*	UPD78F1177	128	384KB	24KB
KH3*	UPD78F1178	128	512KB	30KB
KJ3*	UPD78F1184	144	128KB	8KB
KJ3*	UPD78F1185	144	192KB	10KB
KJ3*	UPD78F1186	144	256KB	12KB
KJ3*	UPD78F1187	144	384KB	24KB
KJ3*	UPD78F1188	144	512KB	30KB

*Under development

APPLICATIONS

The 78K0R is ideal for upgrading 8-bit designs or reducing power consumption for existing 16-bit applications.

- Utility meters
- Fire & security
- Heating controls
- Multipurpose sensors/detectors
- Household appliances
- Blood glucose meter
- Blood pressure monitor
- Mobile EPOS applications

COMMON SOFTWARE DEVELOPMENT TOOLS

The 78K0R 16-bit and 78K0 8-bit microcontroller families are supported by the same platform of software development tools.

IAR EMBEDDED WORKBENCH SOFTWARE DEVELOPMENT TOOLS



More and more designers are switching to high level languages such as C/C++ instead of programming in assembler because of increased pressures on development timescales. IAR's class leading compiler ensures that efficient code is produced even from C and C++ so designers no longer have to worry about sacrificing code size and performance for reduced development time.

Embedded workbench features:

- Extended support for embedded C++
- IDE window management with dockable windows and multiple views
- Standard Template Library (STL) container awareness in IAR C-SPY debugger
- Full hardware debug support
- Ready made project templates
- Customizable C/Embedded C++ libraries
- HTML on-line help system
- On-chip debug and full Flash programming functionality

78K0R – COOL-IT! STARTER KIT



The 78K0R starter kit includes all the components needed to start programming 78K0R microcontrollers. The starter kit PCB includes a KG3 with 256 KB of Flash memory, various peripherals, and an LCD display allowing you to utilise the performance delivered by the 78K0R.

MINICUBE2



A low cost debug option, MINICUBE2 delivers a comprehensive set of debug functions encased in a small footprint enclosure, enabling the development of most applications to proceed quickly and easily. The tool connects to the PC using a USB cable.

MINICUBE2 features:

- Debug at target device speed
- Hardware and software breakpoints
- Single step and slow motion functions
- Pseudo Real-Time RAM monitoring
- Supported by IAR Embedded Workbench™
- USB cable included

IECUBE IN-CIRCUIT-EMULATION TOOLS



For more complex software design requiring sophisticated debug capabilities the IECUBE emulator packs in program flow, monitoring, coverage, and trace functions into a powerful fully featured debug solution. The tool connects to the PC using a USB cable and a variety of connectors and sockets are available to match the target device.

IECUBE features

- Full emulation and trace capabilities
- Real time debug functions
- Pseudo Real-Time RAM monitoring
- MCU resource analysis
- Single platform for all device

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www.eu.necel.com/distributors

Offices world-wide:

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© Published by

NEC Electronics (Europe) GmbH

Printed in Germany, Januar 2007

Document No. U17950EE1V0PF00

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