Empowered by Innovation

NEC

NEC ELECTRONICS AMERICA

Low-Power, High-Performance Microcontrollers

NEC Electronics: A Recognized Leader in Microcontrollers

NEC Electronics has been a leading microcontroller (MCU) supplier for more than 35 years.

Quality

- Shipped over 1.4 billion flash MCUs
- Achieved quality levels of less than 1 PPM
- Pioneered error correction code (ECC) on NEC Electronics' flash in 1999
  - ECC on all NEC Electronics' 8-, 16- and 32-bit MCUs
- Manufacturing and ISO-conformant quality management systems ensure world-class MCU quality levels

Leadership

In a 2009 report (based on revenue from shipments), Gartner rated NEC Electronics:

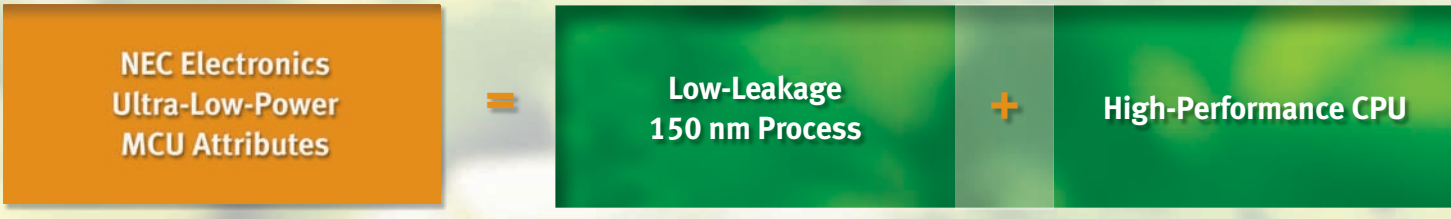
- **#1** supplier worldwide of 32-bit MCUs – for the second consecutive year
- **#2** overall MCU supplier worldwide
- **#2** supplier worldwide in 8-bit MCUs

Advanced Technologies and Products

Innovative, flexible solutions for diverse applications

- Next-generation roadmap includes over 100 new products
- Solid supply chain with a U.S. manufacturing facility

* *Revenue from Shipments of 32-bit MCU, 2008*
Source: Gartner "Semiconductor Industry Worldwide Annual Market Share: Database" (2 April 2009)



Why Choose NEC Electronics for Your Low-Power Microcontroller Needs?

Low-power designs require MCUs that offer both high performance and efficient power utilization in all operating modes. Through five low-power product lines, NEC Electronics delivers a complete spectrum of general-purpose, LCD and advanced analog-featured 8-, 16- and 32-bit MCUs to meet these stringent requirements.

Meeting Low-Power Design Considerations

NEC Electronics MCUs offer five critical features that render them an ideal choice for low-power and ultra-low-power applications:

- 150 nm low-leakage flash process
- High-performance CPUs
  - Up to 20 MHz operating frequency
  - More instructions executed in a given timeframe
- Multiple standby modes
  - Fast wake-up from interrupt or reset in HALT or STOP mode
- Flexible on-chip peripherals
  - Wide range of options
  - Individual peripheral control
  - Low-power, real-time counter (RTC) clock/calendar function and RAM retention mode
- Dynamic system clock
  - Multiple internal oscillators and external system clocks
  - Pre-scaling of system and individual peripheral clocks
  - Internal slow oscillator for watchdog timer (WDT) and 8-bit timer
  - External subsystem 32 kHz oscillator

+ Multiple Standby Modes + Flexible On-Chip Peripherals + Dynamic System Clock

Low-/Ultra-Low-Power MCU Lineup

32-bit 16-bit 8-bit

Low-Power

V850ES/Jx3-L — 32-bit General-Purpose

V850ES/JF3-L	V850ES/JG3-L
80-pin QFP, 20 MHz	100-pin QFP, 20 MHz
Up to 42 DMIPS	Up to 42 DMIPS
Up to 256 KB Flash	Up to 256 KB Flash
Up to 16 KB RAM	Up to 16 KB RAM
CRC, DMA	CRC, DMA
Ext. Bus Interface	Ext. Bus Interface
8 ch × 10-bit ADC	12 ch × 10-bit ADC
1 ch × 8-bit DAC	2 ch × 8-bit DAC

78K0R/Lx3 — 16-bit LCD with Advanced Analog

K0R/LF3	K0R/LG3	K0R/LH3
80-pin QFP	100-pin QFP	128-pin QFP
20 MHz	20 MHz	20 MHz
Up to 128 KB Flash	Up to 128 KB Flash	Up to 128 KB Flash
Up to 7 KB RAM	Up to 7 KB RAM	Up to 7 KB RAM
2 ch Op Amp	3 ch Op Amp	3 ch Op Amp
8 ch × 12-bit ADC	12 ch × 12-bit ADC	12 ch × 12-bit ADC
2 ch × 12-bit DAC	2 ch × 12-bit DAC	2 ch × 12-bit DAC
Internal Voltage Ref.	Internal Voltage Ref.	Internal Voltage Ref.

Ultra-Low-Power

78K0R/Kx3-L — 16-bit General-Purpose

K0R/KC3-L	K0R/KD3-L	K0R/KE3-L	K0R/KF3-L	K0R/KG3-L
44 – 48-pin QFP	52-pin QFP	64-pin QFP	80-pin QFP	100-pin QFP
20 MHz	20 MHz	20 MHz	20 MHz	20 MHz
Up to 64 KB Flash	Up to 64 KB Flash	Up to 64 KB Flash	Up to 128 KB Flash	Up to 128 KB Flash
Up to 3 KB RAM	Up to 3 KB RAM	Up to 3 KB RAM	Up to 8 KB RAM	Up to 8 KB RAM
2 ch Comparator	2 ch Comparator	2 ch Comparator	12 ch × 16-bit Timer	12 ch × 16-bit Timer
Prog. Gain Amp	Prog. Gain Amp	Prog. Gain Amp	12 ch × 10-bit ADC	16 ch × 10-bit ADC
10 – 11 ch × 10-bit ADC	11 ch × 10-bit ADC	12 ch × 10-bit ADC		

78K0/Lx3 — 8-bit LCD

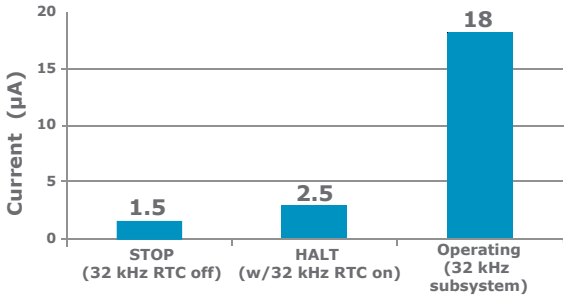
K0/LC3	K0/LD3	K0/LE3	K0/LF3
48-pin QFP	52-pin QFP	64-pin QFP	80-pin QFP
10 MHz	10 MHz	10 MHz	10 MHz
Up to 32 KB Flash	Up to 32 KB Flash	Up to 60 KB Flash	Up to 60 KB Flash
Up to 1 KB RAM	Up to 1 KB RAM	Up to 2 KB RAM	Up to 2 KB RAM
22 – 44 LCD Seg.	24 – 160 LCD Seg.	32 – 224 LCD Seg.	40 – 288 LCD Seg.
6 ch × 10-bit ADC	6 ch × 10-bit ADC	8 ch × 10-bit ADC	8 ch × 10-bit ADC
		3 ch × 16-bit ADC	3 ch × 16-bit ADC

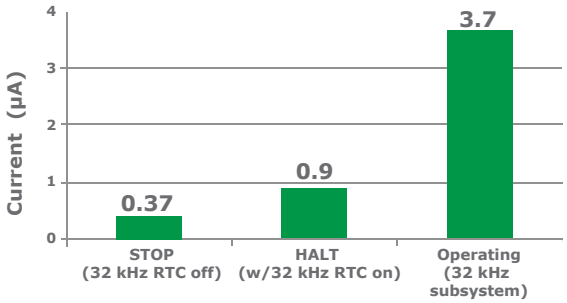
78K0/Kx2-L — 8-bit General-Purpose

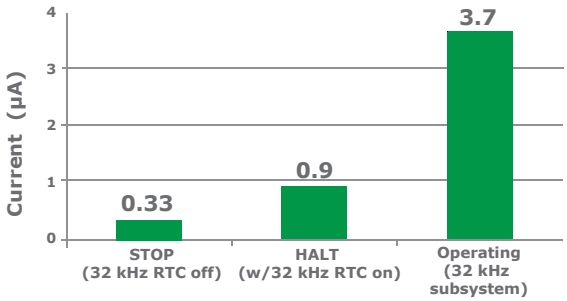
K0/KY2-L	K0/KA2-L	K0/KB2-L	K0/KC2-L
16-pin SSOP	20-pin SSOP	30-pin SSOP	44 – 48-pin QFP
10 MHz	10 MHz	10 MHz	10 MHz
Up to 16 KB Flash	Up to 16 KB Flash	Up to 32 KB Flash	Up to 32 KB Flash
Up to 768 B RAM	Up to 768 B RAM	Up to 1 KB RAM	Up to 1 KB RAM
1 ch Prog. Gain/ Op Amp	1 ch Prog. Gain/ Op Amp	2 ch Prog. Gain/ Op Amp	2 ch Prog. Gain/ Op Amp
4 ch × 10-bit ADC	6 ch × 10-bit ADC	4 – 7 ch × 10-bit ADC	8 – 11 ch × 10-bit ADC

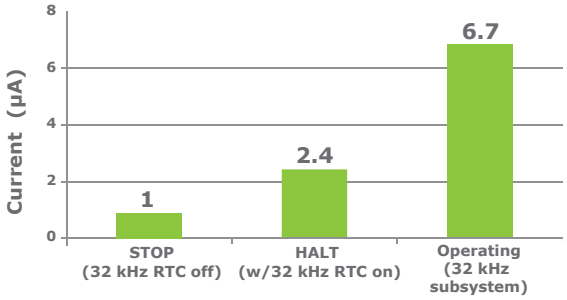
Power Consumption (Typical)

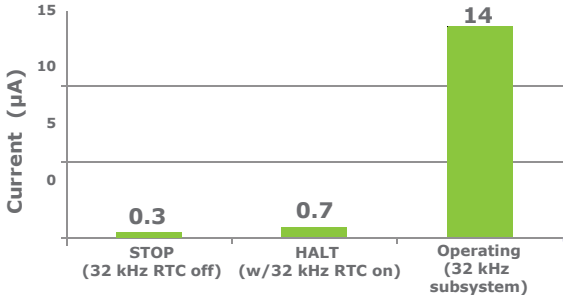
STOP/HALT 32 kHz Operation



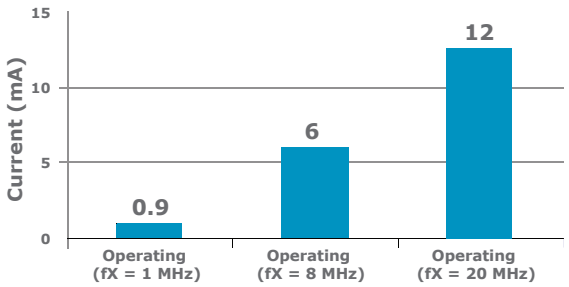


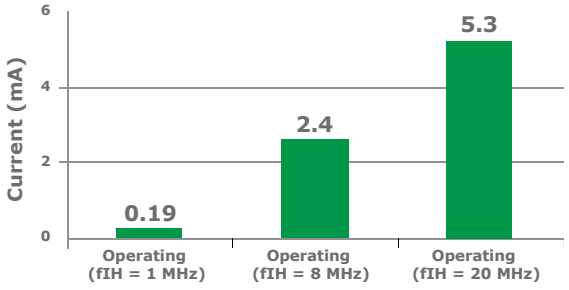


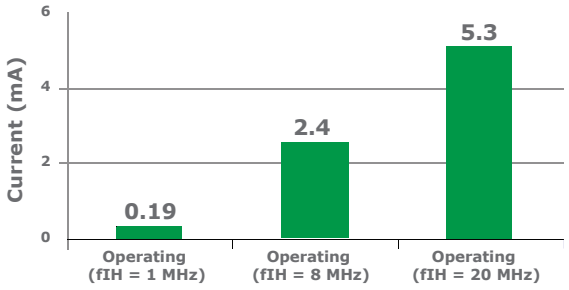


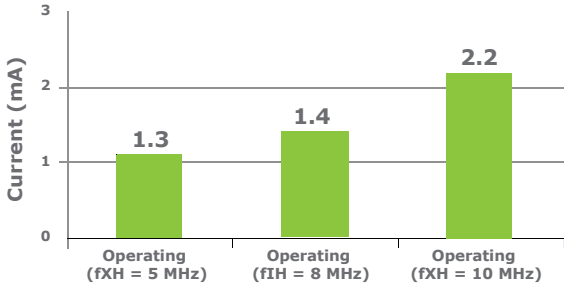


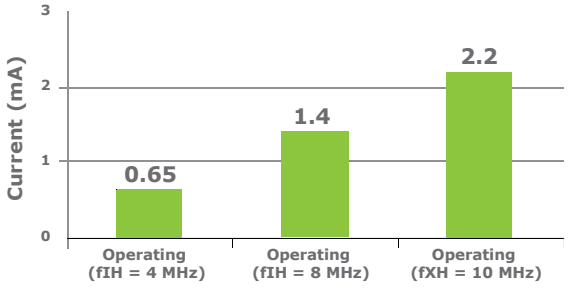
High-Speed Operation











Note: HALT and STOP modes include RAM and register data retention.

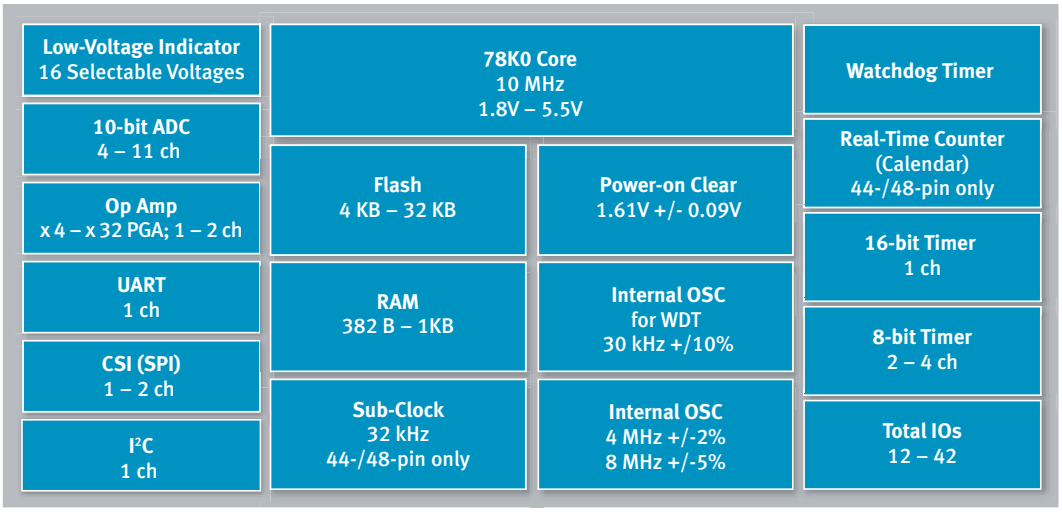
78K0/Kx2-L Microcontrollers

Target Applications

8-bit battery-powered applications, including:

- Industrial controls
- Building management systems
- Test and measurement equipment
- Consumer healthcare equipment

Features	Benefits
High-performance, low-power 8-bit 78K0 flash, program voltage range: 2.0V to 5.5V	Optimized for battery-powered applications, re-programmable at low battery voltage levels
4 KB – 32 KB flash memory, 384 B to 1 KB SRAM	Wide memory range with rich, common peripherals enable flexible 8-bit MCU scalability
Internal oscillator selectable for 4 MHz or 8 MHz	Fast wake-up on internal oscillators enables MCU to meet power consumption budget
Versatile serial interfaces (UART, CSI/ SPI, I²C)	Easily add external serial peripherals and EEPROM
Up to 11 ch 10-bit A/D converter	Monitors multiple external analog system inputs
4 ch 8-bit timer/counters and 1 ch 16-bit timer/ counter	Provides software interrupt intervals as well as counts external events, measures pulse widths, etc.
Real-time counter (calendar function)	RTC provides clock/calendar function and alarm function with no CPU assist required. 99-year calendar with leap-year function
Low power consumption (typical values): › 0.3 µA in stop mode › 0.7 µA with 32 kHz standby mode with real-time counter (clock calendar) running › 260 µA in 1 MHz CPU full-operation mode	Provides months/years of RAM data retention and time-of-day function on inexpensive coin cell Li-ion battery. Convenient/inexpensive for end-user



Development Tools

- TK-78K0/KC2L evaluation kit for 48-pin device
  - Flash programming and on-board debugging via USB interface
- Software development tools
  - CubeSuite™ integrated development environment
  - C-compiler, assembler, software debugger, code generator
- QB-78K0KC2L-TB target board
  - Use with MINICUBE2™ in-circuit, on-chip debug emulator
- Hardware tools
  - Full-function IECUBE™ in-circuit emulator, including real-time trace
  - MINICUBE2 (QB-MINI2-EA) on-chip debug emulator and in-system flash memory programmer
  - Stand-alone flash programmer (PG-FP5-EA)

Ordering Information

µPD78Fxxxxyy-zzz-AX

Flash Memory	RAM	Op Amp	xxxx Body Part Number	yy-zzz Package Suffix	RoHS Plating (NiPdAu)
4 KB	384 B	No	0550	MA-FAA 16-pin SSOP (4.4 × 5.0)	-AX
8 KB	512 B		0551		
16 KB	768 B		0552		
4 KB	384 B	Yes	0555		
8 KB	512 B		0556		
16 KB	768 B		0057		
4 KB	384 B	No	0560	MC-CAA 20-pin SSOP (6.1 × 6.5)	
8 KB	512 B		0561		
16 KB	768 B		0562		
4 KB	384 B	Yes	0565		
8 KB	512 B		0566		
16 KB	768 B		0567		
8 KB	512 B	No	0571	MC-CAB 30-pin SSOP (6.1 × 9.7)	
16 KB	768 B		0572		
32 KB	1 KB		0573		
8 KB	512 B	Yes	0576		
16 KB	768 B		0577		
32 KB	1 KB		0578		
8 KB	512 B	No	0581	GB-GAF 44-pin LQFP (10.0 × 10.0) GA-GAM 48-pin LQFP (7.0 × 7.0)	
16 KB	768 B		0582		
32 KB	1 KB		0583		
8 KB	512 B	Yes	0586		
16 KB	768 B		0587		
32 KB	1 KB		0588		

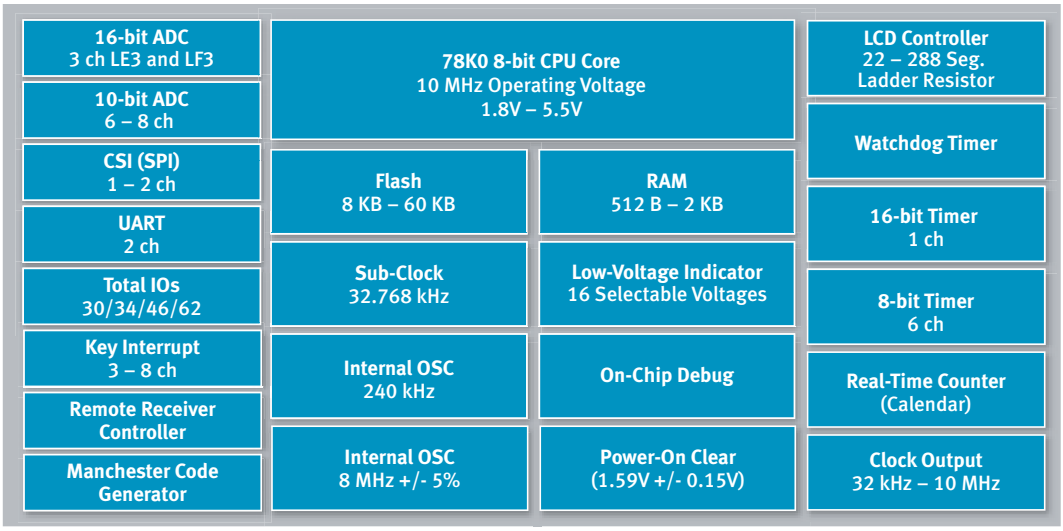
78K0 Lx3 Microcontrollers

Target Applications

Low-cost, handheld designs, including:

- LCD drive, analog-sensing and battery-powered applications
- Consumer healthcare equipment
  - Blood glucose meters
  - Thermometers
  - Blood pressure monitors
- Building management
  - Thermostats
  - Security
  - HVAC control panels
- Irrigation control panels
- Water filter control panels

Features	Benefits
Low-power, 8-bit 78K0 flash MCU, 1.8V to 5.5V operation	Flexible LCD controller/driver for low-cost, handheld portable designs
Low-power performance, 2.2 mA typical @ 10 MHz	Long battery life and energy efficient product implementation
8 KB to 60 KB flash memory, 512 B to 3 KB SRAM	150 nm flash process enables low-power operation at full speed (capable of in-circuit programming, self-programming and flash EEPROM emulation)
Internal 8 MHz (+/-5%) main and 240 kHz watchdog oscillators	Minimizes total system cost, reducing PCB footprint, while lowering power consumption
1 ch 16-bit and 6 ch 8-bit timers	Monitors/counts/measures multiple external events and provides timing to external peripherals
Real-time counter (RTC) clock/calendar function, 2.4 µA typical in 32 kHz HALT mode	Very low power consumption. No CPU intervention for time-of-day function. 99-year calendar with leap-year function
Hardware safety features: windowed watchdog timer (with independent 240 kHz internal OSC), power-on-clear (POC) reset, low-voltage indicator (LVI)	Internal circuits provide bullet-proof CPU operation over wide battery voltage, lowering total system costs
3 ch 16-bit sigma-delta A/D convertor	High-resolution ADC enables high-precision reading of analog inputs for instrumentation and measurement systems



Development Tools

- Demokit LF3 evaluation kit for 80-pin device
  - Flash programming and on-board debugging via USB interface
- Software development tools
  - CubeSuite integrated development environment
  - C-compiler, assembler, software debugger, code generator
- Hardware tools
  - Full-function IECUBE in-circuit emulator, including real-time trace
  - MINICUBE2 (QB-MINI2-EA) on-chip debug emulator and in-system flash memory programmer
  - Stand-alone flash programmer (PG-FP5-EA)

Ordering Information

µPD78Fxxxxyy-zzz-AX

Flash Memory	RAM	xxxx Body Part Number			yy-zzz Package Suffix	RoHS Plating (NiPdAu)
		No ADC	10-bit ADC	16-bit sigma delta ADC		
8 KB	512 B	0400	0410	-	GA-GAM 48-pin plastic; LQFP (7 × 7)	-AX
16 KB	768 B	0401	0411	-		
24 KB	1 KB	0402	0412	-		
32 KB	1 KB	0403	0413	-		
8 KB	512 B	0420	0430	-	GB-GAG 52-pin plastic; LQFP (10 × 10)	
16 KB	768 B	0421	0431	-		
24 KB	1 KB	0422	0432	-		
32 KB	1 KB	0423	0433	-		
16 KB	768 B	0441	0451	0461	GB-GAH 64-pin plastic; LQFP (10 × 10) GK-GAJ-AX 64-pin plastic; LQFP (12 × 12)	
24 KB	1 KB	0442	0452	0462		
32 KB	1 KB	0443	0453	0463		
48 KB	2 KB	0444	0454	0464		
60 KB	3 KB	0445	0455	0465		
16 KB	768 B	0471	0481	0491	GC-GAD 80-pin plastic; LQFP (14 × 14) GK-GAK 80-pin plastic; LQFP (12 × 12)	
24 KB	1 KB	0472	0482	0492		
32 KB	1 KB	0473	0483	0493		
48 KB	2 KB	0474	0484	0494		
60 KB	3 KB	0475	0485	0495		

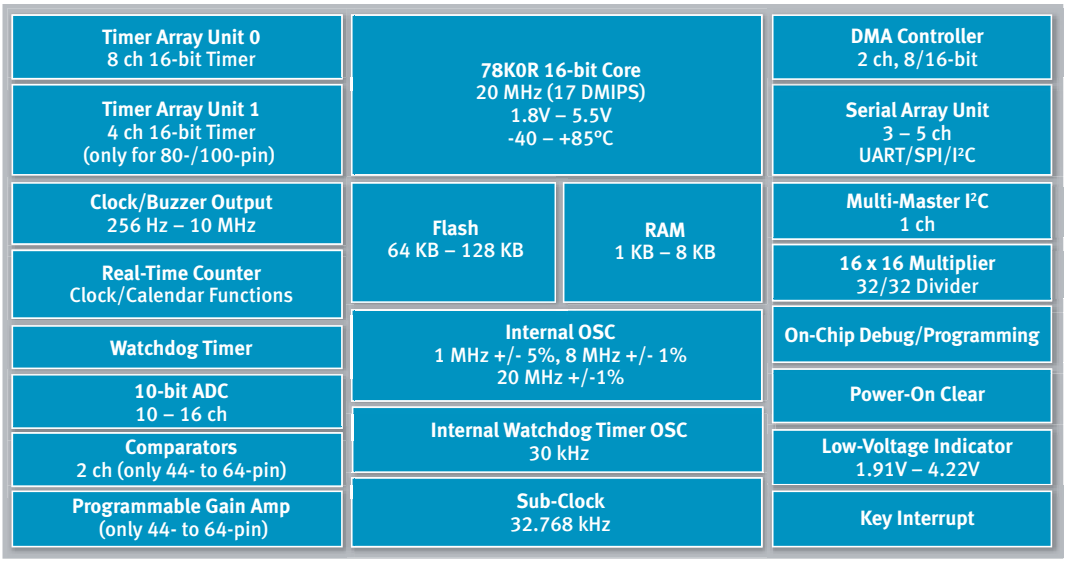
78K0R/Kx3-L Microcontrollers

Target Applications

Portable, battery-operated or battery-backed AC-line applications, where low-power operation and long standby time are required, such as:

- Industrial control
- Building management
- Security systems
- Smart energy
- Portable consumer healthcare equipment

Features	Benefits
High-performance 16-bit 78K0R flash MCU, 17 DMIPS @ 20 MHz	Highly optimized for portable applications
Low-power performance @ <1.6 mW/MIP	Ideal for low power operation at full speed
16 KB to 128 KB flash memory, 1 KB to 8 KB SRAM (flash self programming, flash EEPROM emulation capability)	Flexible memory options for lowest cost. Flash memory can also store user data, preferences
Internal 1 MHz (+/-5%), 8 MHz (+/-1%) and 20 MHz (+/-1%) selectable oscillators	Widest variety of accurate internal oscillators saves system costs and is resilient to external EMI/RFI
Up to 12 ch 16-bit timers	Handles an array of real-time input/output events with ease
Real-time counter (RTC) clock/calendar function, 0.9 µA typical in 32 kHz halt mode	Maintains time-of-day clock without CPU intervention for hours/days/weeks/months
Hardware safety features: windowed watchdog timer, power-on-clear (POC) reset, low-voltage indicator (LVI)	Monitors external battery/power supply with no extra hardware required
Analog features: › 10 – 16 ch 10-bit A/D converter › 2 ch comparators (44- to 64-pin), 1 ch programmable gain amp (44- to 64-pin)	Cost-effective, mixed-signal analog implementation for real-world signal conditioning and digital processing conversion



Development Tools

- TK-78K0R/KE3-L evaluation kit for 64-pin device
  - Flash programming and on-board debugging via USB interface
- Software development tools
  - CubeSuite integrated development environment
  - C-compiler, assembler, software debugger, code generator
- Hardware tools
  - Full-function IECUBE in-circuit emulator, including real-time trace
  - MINICUBE2 (QB-MINI2-EA) on-chip debug emulator and in-system flash memory programmer
  - Stand-alone flash programmer (PG-FP5-EA)

Ordering Information

µPD78Fxxxxyy-zzz-AX

Flash Memory	RAM	xxxx Body Part Number	yy-zzz Package Suffix	RoHS Plating (NiPdAu)
16 KB	1 KB	1000	GB-GAF, 44-pin plastic LQFP (10 × 10) GA-HAA, 48-pin plastic TQFP (7 × 7)	-AX
32 KB	1.5 KB	1001		
48 KB	2 KB	1002		
64 KB	3 KB	1003		
32 KB	1.5 KB	1004	GB-GAG, 52-pin plastic LQFP (10 × 10)	
48 KB	2 KB	1005		
64 KB	3 KB	1006		
32 KB	1.5 KB	1007	GK-GAJ, 64-pin plastic LQFP (12 × 12) GB-GAH, 64-pin plastic LQFP (10 × 10) GA-HAB, 64-pin plastic TQFP (7 × 7) F1-AN1, 64-pin plastic FBGA (5 × 5)	
48 KB	2 KB	1008		
64 KB	3 KB	1009		
64 KB	4 KB	1010	GC-GAD, 80-pin plastic LQFP (14 × 14) GK-GAK, 80-pin plastic LQFP (12 × 12)	
96 KB	6 KB	1011		
128 KB	8 KB	1012		
96 KB	6 KB	1013	GB-GAH, 100-pin plastic LQFP (14 × 14)	
128 KB	8 KB	1014	GK-GAJ, 100-pin plastic LQFP (14 × 20)	

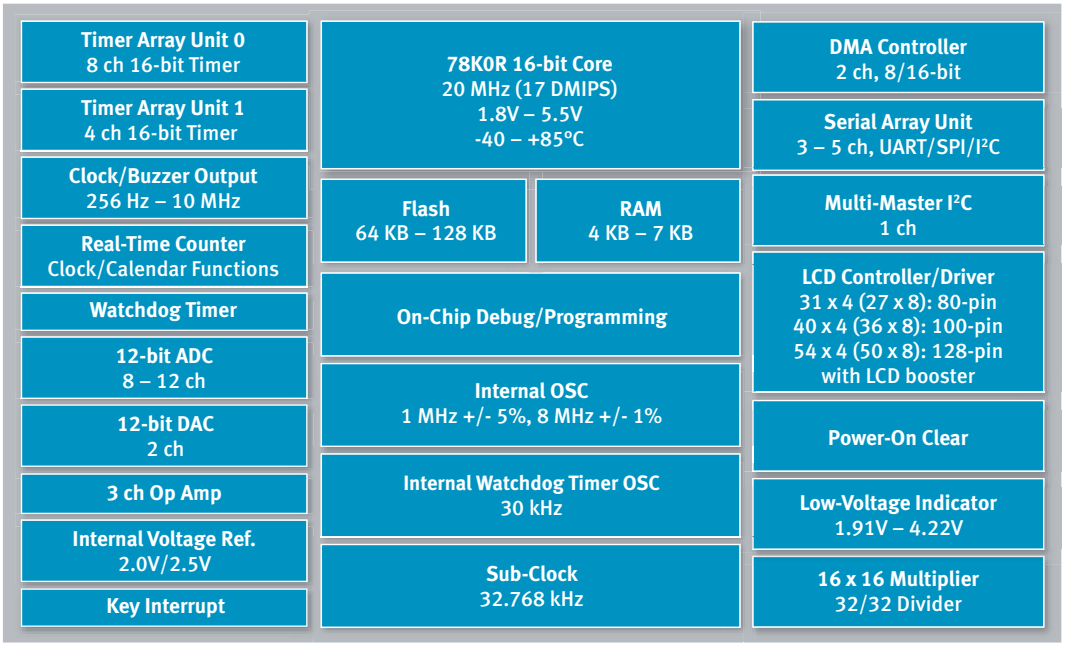
78K0R Lx3 Microcontrollers

Target Applications

Portable instrumentation or battery-operated, low-power equipment with analog signal processing requirements, such as:

- Healthcare equipment
  - Blood glucose meters
  - Blood pressure meters
  - Thermometers
- Building management systems
  - Thermostats
  - Security panels
  - Alarms

Features	Benefits
Highly optimized, high performance, low-power flash process (up to 20 MHz/17 DMIPS)	Low-power operation at full speed and very low power consumption
Full-speed 20 MHz operation down to 2.7V minimum	Ideal for battery-operated, portable devices
Internal 1 MHz and 8 MHz oscillators for system/CPU clocks; 32 kHz real-time clock for continuous time-keeping over months/years	High performance, optimum power savings, and minimal external component costs
Rich analog front-end functions	Signal conditioning/filtering and precision analog processing
Full ADC and DAC analog accuracy from V_{DD} = +2.3V min. to +5.5V max.	Enables A/D designs without the high power and complexity of a DSP
Hardware assist to software: 16 × 16 multiply in one CPU cycle, 32/32 divide in 16 CPU cycles	Offloads the CPU and speeds up software processing
LCD booster controller/driver with up to 400 (× 8) or 216 (× 4) LCD segment drive, with adjustable LCD booster circuit	Provides constant LCD panel drive voltage regardless of battery voltage
Flash memory with ECC	Ensures highly reliable flash data retention
80-, 100- and 128-pin LQFP package options	Flexible solutions for a variety of applications



Development Tools

› TK-K0R/LH3 evaluation kit for 128-pin device
- Flash programming and on-board debugging via USB interface

› Software development tools
- CubeSuite integrated development environment
- C-compiler, assembler, software debugger, code generator

› Hardware tools
- Full-function IECUBE in-circuit emulator, including real-time trace
- MINICUBE2 (QB-MINI2-EA) on-chip debug emulator and in-system flash memory programmer
- Stand-alone flash programmer (PG-FP5-EA)

Ordering Information

μPD78Fxxxxyy-zzz-AX				
Flash Memory	RAM	xxxx Body Part Number	yy-zzz Package Suffix	RoHS Plating (NiPdAu)
64 KB	4 KB	1500	GK-GAK, 80-pin plastic LQFP (12 × 12) GC-GAD, 80-pin plastic LQFP (14 × 14)	-AX
96 KB	6 KB	1501		
128 KB	7 KB	1502		
64 KB	4 KB	1503	GC-UEU, 100-pin plastic LQFP (14 × 14)	
96 KB	6 KB	1504		
128 KB	7 KB	1505		
64 KB	4 KB	1506	GF-GAT, 128-pin plastic LQFP (14 × 20)	
96 KB	6 KB	1507		
128 KB	7 KB	1508		

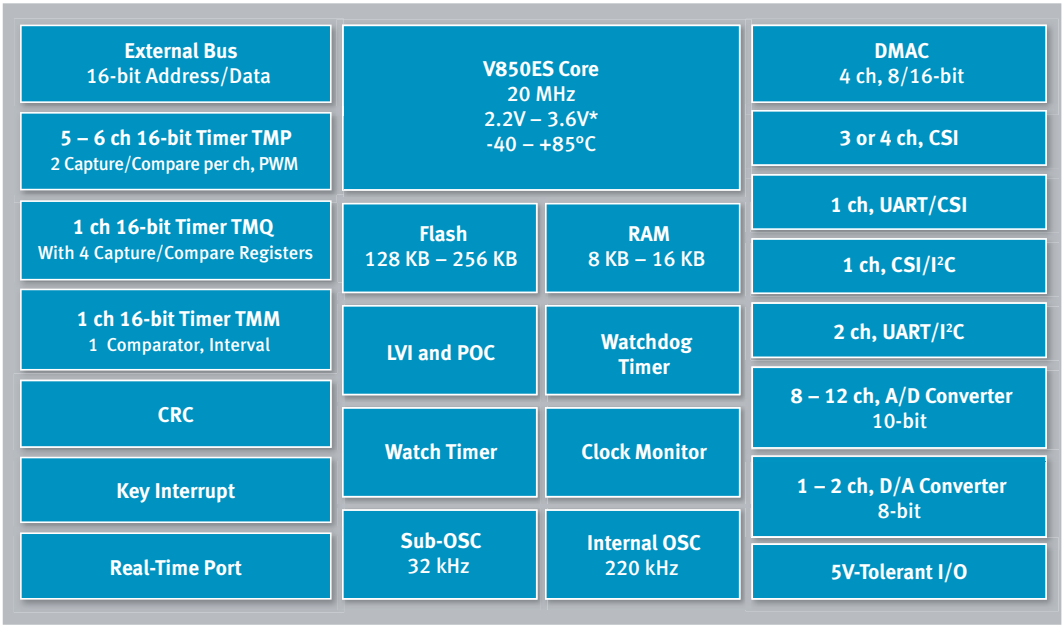
V850ES/Jx3-L Microcontrollers

Target Applications

Portable systems such as:

- Industrial measurement systems
- Scanners and printers
- Medical instrumentation

Features	Benefits
High-performance 32-bit V850ES flash MCU	Ideal for a wide range of industrial applications
2.1 DMIPS/MHz (DMIPS 1.1) processing power	Superior processing power, even at low frequency
Low power consumption (1.5 µA in STOP mode)	Saves power while maintaining system state and extends battery life with memory and register retention
Up to 256 KB flash memory, 16 KB SRAM › EEPROM emulation › Secure self-programming with bootswap	› Large memory sizes › Uses flash as data storage › Fail-safe firmware upgrade
Up to 7 ch of 16-bit timers with 16 capture/compare registers	Handles external input/output real-time events with ease
Real-time port provides synchronized PWM output	Enables stepper motor and other real-time control
Watch timer with 32 kHz clock support	Keeps accurate time for time-of-day clock function
Dedicated internal oscillator for watchdog timer	Renders watchdog timer function impervious to EMI, mechanical shock
Various CSI, UART and I²C interfaces	Handles multiple external serial devices with minimal I/O
Up to 12 ch 10-bit A/D converter; up to 2 ch 8-bit D/A converter	Handles analog input/output processing with ease
16-bit address/data bus with DMA support	Enables fast transport of data
Low-voltage indicator	System protection detects brown-out condition



* The maximum frequency from 2.2 – 2.7V is 5 MHz

Development Tools

- TK-850/JG3L evaluation kit for 100-pin device
  - Flash programming and on-board debugging via USB interface
- Software development tools
  - CubeSuite integrated development environment
  - C-compiler, assembler, software debugger, code generator
- Hardware tools
  - Full-function IECUBE in-circuit emulator, including real-time trace
  - MINICUBE2 (QB-MINI2-EA) on-chip debug emulator and in-system flash memory programmer
  - MINICUBE (QB-V850MINI) JTAG debug emulator
  - Stand-alone flash programmer (PG-FP5-EA)

Ordering Information

µPD70Fxxxxyy-zzz-AX				
Flash Memory	RAM	xxxx Body Part Number	yy-zzz Package Suffix	RoHS Plating (NiPdAu)
128 KB	8 KB	3735	GC-GAD; 80-pin (12 × 12)	-AX
			GK-GAK; 80-pin (14 × 14)	
256 KB	16 KB	3736	GC-GAD; 80-pin (12 × 12)	
			GK-GAK; 80-pin (14 × 14)	
128 KB	8 KB	3737	GC-UEU; 100-pin (14 × 14)	
			GF-GAS; 100-pin (14 × 20)	
256 KB	16 KB	3738	GC-UEU; 100-pin (14 × 14)	
			GF-GAS; 100-pin (14 × 20)	

Solutions for Every Need

NEC Electronics America offers a comprehensive lineup of All Flash™ microcontrollers, designed to meet the price and performance needs of high-volume embedded, consumer and automotive applications.

Solutions include advanced features and peripherals to meet specific needs, ensuring customers can select from an assortment of devices to meet application requirements.

NEC Electronics' state-of-the-art 150 nm flash technology enables higher integration in smaller die sizes, increased performance, lower power consumption and reduced overall unit cost.

8-bit 78K0/K0S MCUs

Indicates available products

USB	**K0/USB** USB Full-Speed Function 16 KB Flash; 3 KB RAM		
Motor Control	**K0/Motor Control** 10-bit Inverter Timer (6-phase PWM Output) 8 KB – 32 KB Flash		
Lighting	**K0/HCD/LED** High-Current LED Driver (350 mA – 1.5A Current Drive) 8 KB – 32 KB Flash	**K0/Ix2** Lighting Ballast (Power Factor Control) 4 KB – 16 KB Flash	
LCD Controller	**K0/Lx2** Up to 160 Segments 16 KB – 128 KB Flash 1.8V – 5.5V	**K0/Lx3** *Ultra-Low-Power* Up to 288 Segments 16-bit Sigma-Delta ADC 8 KB – 60 KB Flash 1.8V – 5.5V	
General-Purpose	**K0S/Kx1+** 1 KB – 8 KB Flash 2.2V – 5.5V 10- to 30-pin	**K0/Kx2** 8 KB – 128 KB Flash 1.8V – 5.5V	**K0/Kx2-L** *Ultra-Low-Power* 4 KB – 32 KB Flash 1.8V – 5.5V

16-bit 78K0R MCUs

Indicates available products

Connectivity	**K0R/USB** USB2.0 Full-Speed Function 32 – 128 KB Flash	**K0R/Ethernet**		
LCD with Advanced Analog	**K0R/Lx3** ***Ultra-Low-Power*** LCD up to 4 x 54 (8 x 50) 3 ch Op Amp Up to 128 KB Flash	**Next-Gen Lxx** LCD up to 4 x 54 (8 × 50) 3 ch Op Amp, USB Up to 256 – 512 KB Flash		
Motor Control	**K0R/Ix3** 6-Phase PWM Outputs 2 ch Comparators Up to 64 KB Flash	**Next-Gen Ixx** 6-Phase PWM Outputs 2 ch Comparators Up to 128 KB Flash		
General-Purpose	**K0R/Kx3** 10-bit ADC, 8-bit DAC On-Chip Temp. Sensor Up to 512 KB Flash	**K0R/Kx3-L** ***Ultra-Low-Power*** 10-bit ADC 0.33 µA STOP Mode Up to 128 KB Flash	**Next-Gen Kxx-L** 12-bit ADC Up to 256 KB Flash	

32-bit V850E/V850ES MCUs

Indicates available products

Motor Control	**V850ES/IE2** 20 MHz 64 – 128 KB 3.5 – 5.5V 6-phase, 16-bit PWM 10-bit ADC	**V850E/Ix3** 64 MHz 128 – 256 KB 3.5 – 5.5V 6-phase, 16-bit PWM Op Amp 12-bit ADC, Comparator		
Connectivity	**V850ES/Jx3-H** 48 MHz 256 – 512 KB 2.85 – 3.6V USB Function	**V850ES/Jx3-U** 48 MHz 256 – 512 KB 2.2 – 3.6V USB Host + Function	**V850ES/Jx3-E** 48 MHz 256 – 512 KB 2.85 – 3.6V USB Function Ethernet MAC	**Next-Gen** V850ES/Jx3-E + Ethernet PHY
General-Purpose	**V850ES/Jx3** 32 MHz 385 – 1024 KB 2.85 – 3.6V	**V850ES/Jx3-L** ***Low-Power*** 20 MHz 128 – 256 KB 2.85 – 3.6V STOP Current 1.5 µA	**V850ES/Hx3** 32 MHz 128 – 512 KB 3.5 – 5.5V	**Next-Gen** Based on V850ES/Jx3-L + Security in WDT + Up to 512 KB/40 KB + Battery-backed RTC

The Value Proposition

- Industry expertise
  - Over 35 years of microcontroller manufacturing experience
- Solid supply chain with U.S. manufacturing facility
- High-quality products with long product life cycles
  - Error correction code (ECC) on all NEC Electronics 8-, 16- and 32-bit MCUs
  - Integrated device manufacturing (IDM) assures quality at all steps
- Broad product portfolio
  - Provides flexibility, serves customer innovation
- Advanced roadmap
  - Enables customers to maximize software re-use

NEC Electronics America

NEC Electronics America is a developer, manufacturer and supplier of semiconductor-based advanced technology solutions, system solutions and multi-market IC solutions. The company offers the Americas a broad range of devices comprising standard and custom products, all backed by outstanding local support and local/global manufacturing resources.

Offering an inventory of more than 5,000 device types

- ASICs
- Automotive ASSPs
- Communications and consumer ASSPs
- LCD display modules
- Memory products
- Microcontrollers
- Power management devices

Advanced system-level integration capabilities

- Customized solutions
- Easy upgrades to next-generation designs
- Extensive IP core portfolio
- Leading-edge design tools and methodologies
- Lead-free packaging options

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