Empowered by Innovation NEC

MICROCONTROLLER
AND DEVELOPMENT TOOLS SELECTOR GUIDE

8-BIT | 16-BIT | 32-BIT

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The NEC Advantage

With over 400,000,000[1] units shipped in 2001, NEC Electronics is the world's second-largest supplier of microcontrollers. Our broad product offering comprises a selection of 4-, 8-, 16- and 32-bit devices, all fabricated with either 0.35 µm or 0.25 µm process technology. A particular focus on the 8- and 32-bit areas has resulted in advantages that give NEC microcontrollers the flexibility required to meet the needs of your individual designs.

8-Bit Microcontrollers

NEC Electronics' three 8-bit series, the K0, K0S and K0/Kx1, are based on a common architecture with over 700 variations. Each series offers a large selection of integrated peripherals that complement a variety of memory sizes and types. A large selection of memory configurations and ROM, flash, OTP and E^2 options also are available.

NEC Electronics' 8-bit microcontrollers range from 28-pin, low-end products to 120-pin, high-end products. The devices operate between 1.8V and 5.5V over standard temperature ranges between –40 and 85°C.

All three of the 8-bit series have software-controlled CPU clock prescalers to control power consumption by decreasing the clock rate. Additionally, on-chip pull-up resistors for port pins reduce circuit complexity.

8-Bit K0S Series

Targeted at cost-sensitive applications, the K0S series offers 2 KB to 48 KB of ROM or flash memory on many devices, on-board LCD drivers and controllers. For very low-cost systems, derivatives with RC oscillators also are available.

8-Bit K0 Series

The K0 series supports applications requiring larger amounts of memory—8 KB to 60 KB—and offers numerous peripherals including LCD drivers and controllers. K0 devices also provide low power consumption, down to a few micro-amps, in a variety of operating modes with up to eight adjustable energy-saving settings.

Many K0 devices are unique in that they feature internal expansion RAM in addition to normal on-board SRAM. This internal expansion RAM can be used for storing either code or data, and for loading and executing instructions while simultaneously storing data.

[1]Source: Gartner Dataquest (July 2002)

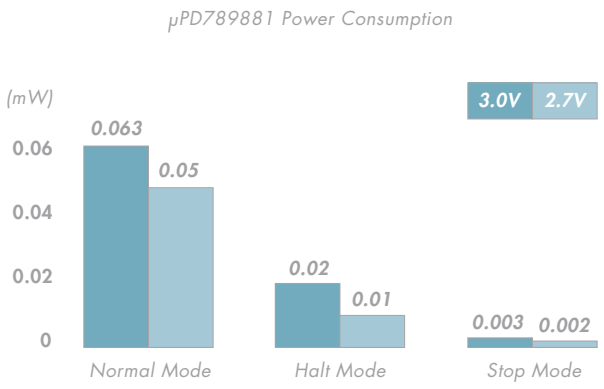
Ultra-Low-Power Operation with LCD Controller

Especially suited for battery-operated devices, the new µPD789881 microcontroller features extremely low power consumption with an integrated 26 x 4 LCD controller/driver. Typical power consumption for this device in full-speed operation is only 18 µA at 2.7V, with a typical standby current of 0.9 µA.

This device uses an external 32 kHz clock that operates the on-chip peripherals and an internally generated 500 kHz clock to control CPU operation. Dynamic switching of CPU operation between the two clock speeds is possible to accommodate the performance and power consumption requirements of a specific design. The traditional power-saving modes of HALT and STOP also are available.

The µPD789881 contains a hardware multiplier, 8- and 16-bit timers, watchdog timer, UART and 512-byte SRAM and is available in 32 KB flash or 16 KB ROM versions.

NEC's µPD789881 microcontroller with integrated LCD controller and driver is designed to meet the power-efficiency needs of handheld battery-powered devices.



The K1 Family of Microcontrollers—The Next-Generation Design Platform

The new K1™ family bridges the gap between 8- and 32-bit performance and builds on the strengths of each.

The 8-bit K0/Kx1™ and the 32-bit V850ES/Kx1™ series feature identical peripherals with identical special-function registers employing the same software. Designs can be migrated easily across the 8- and 32-bit boundaries as application needs change.

PERIPHERAL COMMONALITY

K0/Kx1 (10 MHz)	V850ES/Kx1 (16 MHz)
16-bit timer	16-bit timer
8-bit timer	8-bit timer
8-bit timer[1]	8-bit timer[1]
Real-time clock	Real-time clock
Watchdog timer	Watchdog timer
SPI	SPI
	CSI
UART	UART
	I^2C
LIN bus	
A/D Converter	A/D Converter
	D/A
Switch detection	Switch detection
Subclock	Subclock
Power-on reset/ low-voltage indicator	
On-chip clock	
Clock output/buzzer	
Hardware MUL/DIV	
	ROM correction

[1] Contains additional features

The K0/Kx1 Series

This 8-bit series features a variety of flash memory and ROM options and operates from 2.7 to 5.5 V over temperatures ranging from –40 to +85°C at speeds between 2 and 10 MHz to maximize low power performance. These devices generate less than 100 dB for minimal electromagnetic interference. High-end Kx1 devices have 16 x 16 multiply and 32/16 divide hardware.

Advanced peripherals in the 8-bit Kx1 devices include an on-board fail-safe clock, power-on reset (POR) circuitry and low-voltage indicator (LVI) to provide solutions for both industrial and safety-critical applications. A local interconnect network (LIN) interface also is included for small communication networks.

The fail-safe clock features circuitry consisting of both a clock monitor and a 240 kHz on-board clock that is independent of the main clock, allowing for both internal and system reset when failures are detected. The clock controls full CPU operation after a quick 70 µs.

The V850ES/Kx1 Series

With a 32-bit RISC core running at 20 MHz, the V850/Kx1 series executes 24 MIPS using only 9 mW of power. Low-end 32-bit Kx1 devices provide a solution comparable in cost to 16-bit devices while also providing paths for upward migration.

The V850/Kx1 series features an integrated phase-locked loop (PLL), allowing for a less costly 5 MHz resonator rather than a 20 MHz oscillator. Tuned to generate very low noise, these microcontrollers are ideal for use in EMI-sensitive applications.

POWER-ON RESET

Power-on reset (POR), available on our Kx1 series, puts the microcontroller into a known state when power is first applied and performs an internal reset when voltage drops below a certain user-selected level. This reset signal also is available on a port pin to reset the entire system.

LOW-VOLTAGE INDICATOR

Available on the µPD789881 and the K0/Kx1 series, the low-voltage indicator (LVI) assists in determining when the voltage drops below a certain user-selected level that is not low enough to cause a POR.

This low-voltage condition causes a flag to be set in memory so the user can determine whether the contents of internal memory are still valid. The microcontroller stays in control during a low-voltage or brown-out period, and can take corrective action even in cases where it may not be affected.

Kx1 FAIL-SAFE CLOCK

Designed for applications requiring high reliability, the Kx1 fail-safe clock provides an extra level of protection. If an external clock failure is detected, both an internal and external system reset are generated automatically and an internal 240 kHz clock takes control.

SUBCLOCK OPERATION

Many of NEC's 8-bit and 32-bit devices come with a subclock that maximizes power reduction. The 32 kHz subclock is separate from the main clock and permits a real-time clock to operate while in SLEEP mode, the lowest power-consuming mode.

LOCAL INTERCONNECT NETWORK (LIN) BUS

The LIN bus provides a low-cost, short-distance, slow-speed network implemented over a single wire. The bus is designed for simple control functions such as switches, sensors and actuators.

Derived as a low-cost alternative to the CAN bus, which was pioneered by Bosch and European automotive companies, the LIN bus is used for simple on/off devices and other applications where high speed is not a requirement, for example in simple motor control systems. The bus is now finding new applications in appliance control.

The LIN bus transmits at 20 kb/s and uses a 7-bit protocol. The master initiates each data transfer and the slave nodes answer only when interrogated, eliminating a large amount of bus traffic. The slave nodes have a resynchronizing mode to lock to the master node when receiving or sending data.

The LIN bus allows new slave nodes to be added to the network without any hardware or software changes. In addition, the bus also has built-in error checking.

For motor control applications, significant savings are possible by replacing the typical AC induction motor with the lower-cost electronically controlled, switched-reluctance (SR) motors controlled by the LIN bus.

Using the LIN bus in appliances or other embedded applications extends the diagnostic capabilities of the design.

32-bit V850 Microcontrollers

The V850™ devices comprise three varieties of embedded controllers targeted at various embedded applications.

With a wide assortment of peripherals, these devices operate at speeds ranging from 16 MHz to 50 MHz and include ROM or flash memory ranging in size from 32 KB to 256 KB.

V850/S—Low Power

Designed for applications that need low power (51 mW at 17 MHz at 3.0V) and subclock capabilities, the V850/S™ microcontrollers offer a full complement of flash memory and ROM sizes and a variety of peripherals at a price point that enables these devices to compete successfully against 16-bit products.

V850E—Higher Performance

Created for embedded applications that need higher performance, V850E™ microcontrollers include off-board access to flash memory or SDRAM without additional logic and an on-board 32-bit x 32-bit hardware multiplier with a 64-bit result to address the needs of computationally intense designs. Peripherals such as CAN controllers also are available.

V850ES/Kx1—Compatibility

Ideal for applications that may need to migrate between 8-bit and 32-bit platforms, the V850ES/Kx1 devices can be used in multiple designs to reuse working code.

Development Tools

With the demand to get products to market as rapidly as possible, productive and cost-effective tools are a must. NEC Electronics understands this need and makes a variety of tools available for these purposes. All microcontroller development tools from NEC Electronics have the same user interface and benefit from high-level language support.

NEC microcontrollers are designed to provide efficient software development in C-language programs, resulting in rapidly developed, well-documented and readily modifiable code. Additionally, the C compiler provides for minimal expansion over assembly code size, thus offering many cost-effective benefits.

Simulators with Virtual Hardware Support

With both the K0 and K0S series, NEC simulators allow interfacing of peripherals and virtual hardware such as keypads, LCDs, switches, LEDs, analog inputs and other devices. Timing waveforms also can be viewed.

While the hardware designer is buying resistors and wire, software engineers can write and debug code in major parts of the project. If development bugs arise, it is much easier to determine whether the problem is hardware- or software-based.

The user interfaces for the simulator and NEC emulators are virtually identical. This significantly helps collaboration among groups. Files used by the simulator are usable by the emulator.

Programming Examples on the Web

To aid in rapid code development, engineers may go to www.necelam.com and download programming examples for 8-bit K0 and K0S microcontroller peripherals.

If peripherals can operate in multiple modes, which is often the case, we provide examples for each. For example, for a UART, we provide routines that cover initialization and transmission of data in two-wire mode, three-wire mode and with full UART capabilities. The programs are available in C language and assembly language with corresponding documentation.

Low-Cost Emulators

NEC Electronics has been a pioneer in reducing tool costs. We offer a variety of low-cost emulators (LCEs) for our 8-bit K0 and K0S series.

Designed with a motherboard/daughterboard architecture, the LCE provides the functionality of a standard emulator at the price of a low-end development board.

The emulators connect to the parallel interface on the host computer for fast uploading and downloading speeds. Breakpoints, trace events, single-step operation and time measurements are just a few of the many features found on these emulators.

Most significantly, the LCE contains a built-in flash programmer capable of in-circuit programming to simplify prototype development. NEC Electronics also offers additional flash programmers for production programming.

DEDICATED DEVELOPMENT TOOLS SITE

Evaluation versions of the C compiler and assembler can be downloaded from the NEC Electronics web site, where updated device files and other software updates are also available: www.necelam.com/microcontrollers/devtools.asp

Third-Party Support

NEC Electronics works with a variety of third parties to provide support for our microcontrollers.

In the 8-bit area, IAR supports both the K0 and K0S devices with C compilers and assemblers. These are available in addition to NEC's proprietary tools.

In the 32-bit area, Green Hills Software, Accelerated Technology and Red Hat offer C compilers, real-time operating systems and other software development support.

NEC Electronics is a proud member of EEMBC, the Embedded Microprocessor Benchmark Consortium. The consortium was formed in 1997 to develop meaningful performance benchmarks for microcontrollers and microprocessors in embedded applications. The result is a collection of "algorithms" organized into benchmark suites targeting telecommunications, networking, automotive/industrial, consumer and office equipment products.

NEC Electronics has benchmarked three microcontrollers, the 8-bit K0 and the 32-bit V850E™ and V832.™ Five 64-bit microprocessors also were benchmarked. The ECL certified scores can be found at www.eembc.org.

For more information about NEC microcontrollers and what they can offer your designs, call 1.800.366.9782 or visit www.necelam.com/microcontrollers.

DEVICE NUMBERING CONVENTIONS

8-BIT K SERIES

μPD 78 F 9 41 8 Y XXX GF-3B9

- μPD: NEC digital IC
- 78: 78 = 8-bit or 16-bit microcontroller
- F: F = Flash, P = OTP, Blank = ROM
- 9: Device identifier — 0 = K0 microcontroller, 9 = K0S microcontroller, 4 = K4 microcontroller
- 41: Unique part number
- 8: ROM Size

	K0	K0S
0	0 KB	–
1	8 KB	2 KB
2	16 KB	4 KB
3	24 KB	–
4	32 KB	8 KB
5	40 KB	12 KB
6	48 KB	16 KB
7	–	24 KB
8	60 KB	32 KB

- Y: Y = I²C, Blank = no I²C
- XXX: Unique ROM code identifier
- GF-3B9: Package type

AF1-CN3	=	73-pin FPBGA
CU	=	42-pin SDIP
CW	=	64-pin SDIP
F1-DA3	=	113-pin FBGA
GA	=	48-pin TQFP
GB-3BS	=	44-pin QFP (10 x 10 mm)
GB-8ES	=	44-pin LQFP (10 x 10 mm)
GB-8ET	=	52-pin LQFP (10 x 10 mm)
GB-8EU	=	64-pin LQFP (10 x 10 mm)
GC-AB8	=	64-pin QFP (14 x 14 mm)
GC-8BS	=	64-pin LQFP (14 x 14 mm)
GC-3B9	=	80-pin QFP (14 x 14 mm)
GC-8BT	=	80-pin QFP (14 x 14 mm)
GC-7EA	=	100-pin QFP (FP) (14 x 14 mm)
GC-8EU	=	100-pin LQFP (FP) (14 x 14 mm)
GC-9EB	=	120-pin TQFP (FP) (14 x 14 mm)
GF-3BE	=	64-pin QFP (14 x 20 mm)
GF-3B9	=	80-pin QFP (14 x 20 mm)
GF	=	80-pin QFP (14 x 20 mm)
GF-3BA	=	100-pin QFP (14 x 20 mm)
GF-8ET	=	100-pin LQFP (14 x 20 mm)
GJ-UEN	=	144-pin LQFP (20 x 20 mm)
GK-8A8	=	64-pin LQFP (12 x 12 mm)
GK-9ET	=	64-pin TQFP (12 x 12 mm)
GK-BE9	=	80-pin TQFP (12 x 12 mm)
GK-9EU	=	80-pin TQFP (12 x 12 mm)
MC	=	20/30-pin SSOP
MC-5A4	=	30-pin SSOP (7.62 mm)

32-BIT V850 SERIES

μPD 70 F 30 25 A XXX GC - 33 - 8EU

- μPD: Digital IC
- 70: 32-bit microcontroller
- F: Flash part (if "F" present)
- 30: CPU: 30 = V850 family, 31 = V850E family
- 25: Device identifier
- A: Version
- XXX: Unique ROM code identifier (if ROM device)
- GC: Package code

GC-8EU	=	100-pin LQFP (14 x 14 mm)
GC-YEU	=	100-pin TQFP (14 x 14 mm)
GF-3BA	=	100-pin QFP (14 x 20 mm)
GJ-UEN	=	144-pin QFP (20 x 20 mm)
S1-YJC	=	121-pin FBGA (12 x 12 mm)
F1-3A6	=	121-pin FBGA (12 x 12 mm)
F1-FA1	=	151-pin FBGA (12 x 12 mm)
GJ-8EN	=	144-pin LQFP (20 x 20 mm)
GM-8ED	=	160-pin LQFP (24 x 24 mm)

- 33: Operation frequency (MHz)
- 8EU: Package code (lead detail)

8- AND 32-BIT Kx1 SERIES

78K0 / K x 1
V850ES / K x 1

- 78K0 / V850ES: V850 (32-bit), 78K0 (8-bit)
- K: K: General-purpose products
- x: Subseries
  - A: 20-pin (reserved)
  - B: 30-pin
  - C: 44-pin
  - D: 52-pin
  - E: 64-pin
  - F: 80-pin
  - G: 100-pin
  - H: 120-pin (reserved)
  - J: 144-pin
- 1: Generation 1st, 2nd…

8-BIT K0 GENERAL-PURPOSE MICROCONTROLLERS

SUBSERIES	MEMORY		SPEED		TIMERS				PWM	A/D	D/A	SERIAL INTERFACE		OSC. TYPE	SUBCLOCK	I/O PINS	OP. VOLTAGE	PACKAGE
	ROM (KB)	RAM (B)	MHz	MIET[1] (µs)	8-BIT	16-BIT	RTC	WATCHDOG				I²C	UART/3-WIRE					
µPD78002x																		
µPD780021A(Y)	8	512	12	0.167	2-ch	1-ch	Yes	Yes	2-ch 8-bit	8-ch 8-bit	–	Yes[2]	1-ch UART 1-or 2-ch 3-wire 0-ch or 1-ch I²C	Xtal	Yes	51	1.8–5.5	64-pin SDIP, QFP/TQFP or 73-pin FPBGA
µPD780022A(Y)	16																	
µPD780023A(Y)	24	1024																
µPD780024A(Y)	32																	
µPD78003x																		
µPD780031A(Y)	8	512	12	0.167	2-ch	1-ch	Yes	Yes	2-ch 8-bit	8-ch 10-bit	–	Yes[2]	1-ch UART 1-ch 3-wire	Xtal	Yes	51	1.8–5.5	64-pin SDIP, QFP/TQFP or 73-pin PFBGA
µPD780032A(Y)	16																	
µPD780033A(Y)	24	1024																
µPD780034A(Y)	32																	
µPD78F0034A(Y)	32 (flash)																	
µPD78005x																		
µPD780053(Y)	24	1024	5	0.4	2-ch	1-ch	Yes	Yes	1-ch 14-bit	8-ch	2-ch 8-bit	Yes[2]	1-ch UART/3-wire 1-ch 3-wire 1-ch 2-wire/3-wire 0-ch or 1-ch I²C	Xtal	Yes	68	1.8–5.5	80-pin QFP or TQFP
µPD780054(Y)	32																	
µPD780055(Y)	40																	
µPD780056(Y)	48																	
µPD780058(Y)	60	2048																
µPD78F0058(Y)	60 (flash)																	
µPD789006x																		
µPD7890065	40	5152	8.38	0.24	2-ch	1-ch	Yes	Yes	2-ch 8-bit	8-ch 8-bit	–	–	1-ch 2-wire 2-ch 3-wire	Xtal	–	53	2.7–5.5	80-pin QFP
µPD7890066	48 (flash)																	
µPD78007x																		
µPD780076(Y)	48	2048	8.38	0.24	2-ch	1-ch	Yes	Yes	2-ch 8-bit 1-ch 14-bit	8-ch 10-bit	–	Yes[2]	2-ch UART 2-ch 3-wire	Xtal	Yes	52	1.8–5.5	64-pin TQFP or LQFP
µPD780078(Y)	60																	
µPD78F0078(Y)	60 (flash)																	

Notes: 1. MIET = minimum instruction execution time.
2. Yes = Y version has I²C.
3. Operating temperature is –40° to +85°C.

8-BIT K0 GENERAL-PURPOSE MICROCONTROLLERS (CONT.)

SUBSERIES	MEMORY		SPEED		TIMERS				PWM	A/D	D/A	SERIAL INTERFACE		OSC. TYPE	SUBCLOCK	I/O PINS	OP. VOLTAGE	PACKAGE
	ROM (KB)	RAM (B)	MHz	MIET[1] (µs)	8-BIT	16-BIT	RTC	WATCHDOG				I²C	UART/3-WIRE					
µPD7807x																		
µPD78070A(Y)	ROMless	1024	5	0.4	4-ch	1-ch	Yes	Yes	2-ch 8-bit 1-ch 14-bit	8-ch 8-bit	2-ch 8-bit	Yes[2]	1-ch UART/3-wire 1-ch 3-wire 1-ch 2-wire/3-wire 0-ch or 1-ch I²C	Xtal	Yes	61	2.7–5.5	100-pin QFP or LQFP
µPD78074B	32	1056										–				88	1.8–5.5	
µPD78075B	40																	
µPD78076(Y)	48											Yes[2]						
µPD78078(Y)	60	2048																
µPD78P078(Y)	60 OTP																	
µPD78908x																		
µPD789086	16	256	5	0.4	3-ch	1-ch	–	Yes	–	–	–	–	1-ch UART/3-wire	Xtal	–	24	1.8–5.5	30-pin SSOP
µPD789088	32	320																
µPD78F9088	32 (flash)																	

Notes: 1. MIET = minimum instruction execution time.
2. Yes = Y version has I²C.
3. Operating temperature is –40° to +85°C.

8-BIT K0S GENERAL-PURPOSE MICROCONTROLLERS

SUBSERIES	MEMORY		SPEED		TIMERS					A/D	SERIAL INTERFACE		OSC. TYPE	SUBCLOCK	I/O PINS	OP. VOLTAGE	PACKAGE
	ROM (KB)	RAM (B)	MHz	MIET[1] (µs)	8-BIT	16-BIT	RTC	WATCHDOG	PWM		I²C Note 2	UART/3-WIRE					
µPD78902x																	
µPD789022	4	256	5	0.4	1-ch	1-ch	–	1-ch 8-bit	4-ch 8-bit	–	–	1-ch UART/3-wire	Xtal	–	32	1.8–5.5	44-pin LQFP
µPD789024	8																
µPD789025	12	512															
µPD789026	16																
µPD78F9026	16 (flash)																
µPD789046	16						Yes							Yes			
µPD78F9046	16 (flash)																
µPD78907x																	
µPD789071	2	256	10	0.2	1-ch	1-ch	–	1-ch	1-ch 8-bit	–	–	1-ch UART/3-wire	Xtal	–	24	1.8–5.5	30-pin SSOP
µPD789072	4																
µPD789074	8																
µPD78F9076	16 (flash)																
µPD78910xA/911xA																	
µPD789101A	2	256	10	0.2	1-ch	1-ch	–	Yes	1-ch 8-bit	4-ch 8-bit	–	1-ch UART/3-wire	Xtal	–	20	1.8–5.5	30-pin SSOP
µPD789102A	4																
µPD789104A	8																
µPD789111A	8									4-ch 10-bit							
µPD789112A	4																
µPD789114A	8																
µPD78F9116A	16 (flash)																
µPD78912xA/913xA																	
µPD789121A	2	256	4	0.5	1-ch	1-ch	–	Yes	1-ch 8-bit	4-ch 8-bit	–	1-ch UART/3-wire	RC	–	20	1.8–5.5	30-pin SSOP
µPD789122A	4																
µPD789124A	8																
µPD789131A	2									4-ch 10-bit							
µPD789132A	4																
µPD789134A	8																
µPD78F9136A	16 (flash)																

Notes: 1. MIET = minimum instruction execution time.
2. Yes = Y version has I²C.
3. Operating temperature is –40° to +85°C.

8-BIT K0S GENERAL-PURPOSE MICROCONTROLLERS (CONT.)

SUBSERIES	MEMORY		SPEED		TIMERS					A/D	SERIAL INTERFACE		OSC. TYPE	SUBCLOCK	I/O PINS	OP. VOLTAGE	PACKAGE
	ROM (KB)	RAM (B)	MHz	MIET[1] (µs)	8-BIT	16-BIT	RTC	WATCHDOG	PWM		I²C	UART/3-WIRE					
µPD78916x/917x																	
µPD789166(Y)	16	512	10	0.2	3-ch	1-ch	Yes	Yes	3-ch 8-bit	8-ch 8-bit	Yes[1]	1-ch UART/3-wire 0-ch or 1-ch I²C	Xtal	Yes	31	1.8–5.5	44-pin LQFP or 48-pin TQFP
µPD789167(Y)	24																
µPD789176(Y)	16									8-ch 10-bit							
µPD789177(Y)	24																
µPD78F9177(Y)	24 (flash)																
µPD78986x																	
µPD789860	4	128	5	0.4	2-ch	–	–	Yes	1-ch 8-bit	–	–	–	Xtal	–	14	1.8–3.6	20-pin SSOP
µPD78E9860	4 E[2]																
µPD789861	4		1	2									RC				
µPD78E9861	4 E[2]																
µPD789862	16	512	5		1-ch	2-ch						1-ch UART/3-wire	Xtal		22		30-pin SSOP
µPD78E9862	16E[2]																

Notes: 1. MIET = minimum instruction execution time.
2. Yes = Y version has I²C.
3. Operating temperature is –40° to +85°C.

8-BIT K0 MICROCONTROLLERS WITH LCD CONTROLLER

SUBSERIES	MEMORY		SPEED		TIMERS				PWM	A/D	D/A	LCD	SERIAL INTERFACE		OSC. TYPE	SUBCLOCK	I/O PINS	OP. VOLTAGE	PACKAGE
	ROM (KB)	RAM (B)	MHz	MIET[1] (µs)	8-BIT	16-BIT	RTC	WATCHDOG					I²C	UART/3-WIRE					
µPD7806x																			
µPD78062(Y)	16	512	5	0.4	2-ch	1-ch	Yes	Yes	1-ch 14-bit	8-ch 8-bit	–	40x4	Yes[2]	1-ch UART/3-wire 0-ch or 1-ch I²C/3-wire	Xtal	Yes	57	2.0–6.0	100-pin QFP or LQFP
µPD78063(Y)	24	1024																	
µPD78064(Y)	32																		
µPD78064B(Y)	32																		
µPD78P064(Y)	32 OTP																		
µPD78030x																			
µPD780306(Y)	48	2048	5	0.4	1-ch	1-ch	Yes	Yes	1-ch 14-bit	8-ch 8-bit	–	40x4	Yes[2]	1-ch UART/3-wire 1-ch 3-wire 0-ch or 1-ch I²C/3-wire	Xtal	Yes	57	2.0–5.5	100-pin QFP or LQFP
µPD780308(Y)	60																		
µPD78P0308(Y)	60 OTP																	2.7–5.5	
µPD78035x																			
µPD780343(Y)	24	1024	10	0.2	4-ch	1-ch	Yes	Yes	2-ch 8-bit 1-ch 18-bit	8-ch 8-bit	–	40x4	Yes[2]	1-ch UART 2-ch 3-wire 0-ch or 1-ch I²C	Xtal	Yes	66	1.8–5.5	100-pin QFP or 113-pin BGA
µPD780344(Y)	32																		
µPD780353(Y)	24									8-ch 10-bit									
µPD780354(Y)	32																		
µPD78F0354(Y)	32 (flash)	1536																	
µPD78033x																			
µPD780316	48	2560	10	0.2	3-ch	2-ch	Yes	Yes	3-ch 8-bit 1-ch 16-bit	10-ch 10-bit	1-ch 8-bit	24x4	–	1-ch UART 2-ch 3-wire	Xtal	Yes	70	1.8–5.5	120-pin TQFP
µPD780318	60																		
µPD780326	48											32x4					62		
µPD780328	60																		
µPD780336	48											40x4					54		
µPD780338	60																		
µPD78F0338	60 (flash)																		
µPD78085x																			
µPD780851	32	1536	8.38	0.24	2-ch	1-ch	Yes	Yes	2-ch 8-bit	5-ch 8-bit	–	20x4	–	1-ch UART 2-ch 3-wire	Xtal	No	56	4.0–5.5	80-pin QFP
µPD780852	40																		

Notes: 1. MIET=minimum instruction execution time.
2. Yes=Y version has I²C.
3. Operating temperature is –40° to +85°C.

8-BIT K0S MICROCONTROLLERS WITH LCD CONTROLLER

SUBSERIES	MEMORY		SPEED		TIMERS				PWM	A/D	LCD	SERIAL I/O	OSC. TYPE	SUBCLOCK	I/O PINS	OP. VOLTAGE	PACKAGE	OTHER
	ROM (KB)	RAM (BYTE)	MHz	MIET[1] (µs)	8-BIT	16-BIT	RTC	WATCHDOG				UART/3-WIRE						
µPD78930x																		
µPD789304	8	512	5	0.4	2-ch	1-ch	1-ch	1-ch	1-ch 8-bit	–	24x4	1-ch UART/3-wire 1-ch 3-wire	Xtal	Yes	23	1.8–5.5	64-pin QFP or TQFP	Voltage booster
µPD78F9306	16 (flash)																	
µPD789316	8		4	0.5									RC					
µPD78F9316	16 (flash)																	
µPD78932x																		
µPD789322	4	256	5	0.4	2 ch	–	1-ch	1-ch	1ch 8-bit	–	24x4	1-ch UART/3-wire	Xtal	Yes	18	1.8–5.5	52-pin LQFP	POR
µPD789324	8																	
µPD789326	16	512																
µPD789327	24																	
µPD78F9328	32 (flash)																	
µPD78940xA/941x																		
µPD789405A/415A	12	512	5	0.4	3-ch	1-ch	1-ch	1-ch	–	7-ch 8-bit or 7-ch 10-bit	28x4	1-ch UART/3-wire	Xtal	Yes	43	1.8–5.5	80-pin QFP or TQFP	
µPD789406A/416A	16																	
µPD789407A/417A	24																	
µPD78F9418A	32																	
µPD78942x/943A																		
µPD789425	12	512	5	0.4	2-ch	1-ch	1-ch	1-ch	6-ch 8-bit	6-ch 10-bit	5x4	1-ch UART/3-wire	Xtal	Yes	40	1.8–5.5	64-pin LQFP or TQFP	
µPD789426	16																	
µPD789435	12								2-ch 8-bit									
µPD789436	16																	
µPD78F9436	16 (flash)																	
µPD78944x/945x																		
µPD789445	12	512	5	0.4	2-ch	1-ch	Yes	Yes	1-ch 8-bit	6-ch 8-bit	15x4	1-ch UART/3-wire	Xtal	Yes	30	1.8–5.5	64-pin TQFP or LQFP	
µPD789446	16																	
µPD789455	12									6-ch 10-bit								
µPD789456	16																	
µPD78F9456	16 (flash)																	

Notes: 1. MIET = minimum instruction execution time.
2. Yes = Y version has I²C.
3. Operating temperature is –40° to +85°C.

8-BIT K0S MICROCONTROLLERS WITH LCD CONTROLLER (CONT.)

SUBSERIES	MEMORY		SPEED		TIMERS				PWM	A/D	LCD	SERIAL I/O	OSC TYPE	SUBCLOCK	I/O PINS	OP. VOLTAGE	PACKAGE	OTHER
	ROM (KB)	RAM (BYTE)	MHz	MIET[1] (µs)	8-BIT	16-BIT	RTC	WATCHDOG				UART/3-WIRE						
µPD78946x																		
µPD789462	4	256	5	0.4	2-ch	–	Yes	Yes	1-ch 8-bit	1-ch 8-bit	23x4	—	Xtal	Yes	18	1.8–5.5	52-pin LQFP	POR and volt. booster
µPD789464	8																	
µPD789466	16	512																
µPD789467	24																	
µPD78F9468	32 (flash)																	
µPD78947x/948x																		
µPD789477	24	768	5	0.4	3-ch	1-ch	Yes	Yes	3-ch 8-bit	8-ch 8-bit	28x4	1-ch UART/3-wire 8-ch 10-bit	Xtal	Yes	45	1.8–5.5	80-pin QFP	
µPD78F9478	32 (flash)	1024																
µPD789488	32																80-pin QFP or TQFP	
µPD78F9488	32 (flash)																	
µPD78983x																		
µPD789830P	24	1024	5	0.4	1-ch	1-ch	Yes	Yes	–	–	40x16	1-ch UART/3-wire	Xtal	Yes	30	2.7–5.5	88-pin die	Dot matrix
µPD78F9831	48 (flash)	2048													38		100-pin LQFP	
µPD789832	24	2240			1-ch	–				3-ch 8-bit	80x16	1-ch UART/3-wire	Xtal	Yes	37	1.8–3.6	144-pin LQFP	
µDP789833	32																	
µPD789834	48																	
µPD789835	60	3264																
µPD78F9835	60 (flash)															3.0–3.6		
µPD78988x																		
µPD789881	16	512	0.5	4	2-ch	1-ch	–	Yes	–	–	26x4	1-ch UART/3-wire	Xtal	Yes	28	2.7–3.5	64-pin LQFP	Ultra-low power
µPD78F9882	16 (flash)																	

Notes: 1. MIET = minimum instruction execution time.
2. Yes = Y version has I^2C.
3. Operating temperature is −40° to +85°C.

8-BIT K0 MICROCONTROLLERS WITH VACUUM FLUORESCENT DISPLAY

SUBSERIES	MEMORY		SPEED		TIMERS				PWM	A/D	FIP[4]	UART/3-WIRE	OSC. TYPE	SUBCLOCK	I/O PINS	OP. VOLTAGE	PACKAGE
	ROM (KB)	RAM (BYTE)	MHz	MIET[1] (µs)	8-BIT	16-BIT	RTC	WATCHDOG									
µPD78045x																	
µPD78042	16	512	5	0.4	1-ch	1-ch	Yes	Yes	1-ch 14-bit	8-ch 8-bit	24x16	2-ch 3-wire	Xtal	Yes	68	2.7–5.5	80-pin QFP
µPD78043	24																
µPD78044	32	1024															
µPD78045	48																
µPD78048A	60 OTP	2048														2.7–6.0	
µPD78023x																	
µPD780232	16	768	5	0.4	3-ch	–	Yes	Yes	–	8-ch 8-bit	51x16	1-ch 3-wire 1-ch 2-wire	Xtal	–	40	4.5–5.5	80-pin QFP
µPD780233	24																
µPD78F0233																	
µPD78020x																	
µPD780204	32	1024	5	0.4	2-ch	1-ch	Yes	Yes	1-ch 14-bit	8-ch 8-bit	40x16	2-ch 3-wire	Xtal	Yes	74	2.7–5.5	100-pin QFP
µPD780205	40																
µPD780206	48	2048															
µPD780208	60																
µPD78P0208	60 OTP																
µPD78987x																	
µPD789870	4	512	5	0.4	2	–	Yes	Yes	–	–	25	1-ch 3-wire	Xtal	–	33	2.7–5.5	52-pin LQFP
µPD789871	8																
µPD78F9872	16 (flash)																

Notes: 1. MIET = minimum instruction execution time.
2. Yes = Y version has I²C.
3. Operating temperature is –40° to +85°C.
4. FIP = fluorescent indicator panel.

8-BIT ASSPs

APPLICATION	SUBSERIES	MEMORY		SPEED		TIMERS				PWM	A/D	D/A	LCD	SERIAL INTERFACE		OSC. TYPE	SUB-CLOCK	I/O PINS	OP. VOLT.	PACKAGE	OTHER
		ROM (KB)	RAM (BYTE)	MHz	MIET[1] (μs)	8-BIT	16-BIT	RTC	WATCHDOG					I²C	UART/3-WIRE						
Motor Control	***μPD78098x***																				
	μPD780982	16	1024	8.38	0.24	3-ch	2-ch	–	Yes	1-ch 8-bit 1-ch 16-bit	8-ch 10-bit	–	–	–	2-ch UART 1-ch 3-wire/2-wire	Xtal	–	47	1.8–5.5	64-pin LQFP or SDIP	3-ch 10-bit inverter
	μPD780983	24																			
	μPD780984	32																			
	μPD780986	48	2048																		
	μPD780988	60																			
	μPD78F0988A	60 (flash)																			
	μPD78403x																				
	μPD784035	48	2048	32	0.125	–	4-ch	–	Yes	2-ch 12-bit 2-ch 16-bit	8-ch 8-bit	2-ch 8-bit	–	Yes[2]	2-ch UART 1-ch 3-wire/2-wire	Xtal	—	64	2.7–5.5	80-pin QFP	
	μPD784036	64																			
	μPD784037	96	3584																		
	μPD78403xY																				
	μPD784035Y	48	2048	32	0.125	–	4-ch	Yes	2-ch 12-bit	2-ch 16-bit	8-ch 8-bit	2-ch 8-bit	–	Yes[2]	12-ch UART 1-ch 3-wire/2-wire	Xtal	—	64	2.7–5.5	80-pin QFP	
	μPD784036Y	64																			
	μPD784037Y	96	3584																		
	μPD78984x																				
	μPD789841	8	256	8.38	0.24	3-ch	1-ch 10-bit	Yes	Yes	–	8-ch 8-bit	–	–	–	1-ch UART	Xtal	–	30	4.0–5.5	44-pin QFP or TQFP	
	μPD789842	16																			
	μPD78F9842	16 (flash)																			
Stepper Motor	***μPD78403x***																				
	μPD784031 μPD784031Y	ROMless	2048	32	0.125	–	4-ch	–	Yes 2-ch 16-bit	2-ch 12-bit 8-bit	8-ch 8-bit	2-ch	—	 Yes[2]	2-ch UART 1-ch 3-wire/2-wire	Xtal	–	46	2.7–5.5		
	μPD78P403x																				
	μPD78P4038 μPD78P4038Y	128 (OTP)	4352	32	0.125	–	4-ch	–	Yes	2-ch 12-bit 2-ch 16-bit	8-ch 8-bit	2-ch 8-bit	—	 Yes[2]	2-ch UART 1-ch 3-wire/2-wire	Xtal	–	64	2.7–5.5		

Notes: 1. MIET = minimum instruction execution time.
2. Yes = Y version has I²C.
3. Operating temperature is −40° to +85°C.

8-BIT ASSPs (CONT.)

APPLICATION	SUBSERIES	MEMORY		SPEED		CAN	TIMERS				PWM	A/D	D/A	LCD	SERIAL INTERFACE		OSC. TYPE	SUB-CLOCK	I/O PINS	OP. VOLT.	PACKAGE	OTHER
		ROM (KB)	RAM (BYTE)	MHz	MIET[1] (µs)		8-BIT	16-BIT	RTC	WATCHDOG					I²C	UART/3-WIRE						
CAN Bus	***µPD78081x***																					
	µPD780814	32	1504	8.38	0.24	1	2-ch 1-bit	2-ch 1-bit	Yes	Yes	1-ch 8-bit 1-ch 16-bit	12-ch	–	–	–	1-ch UART 2-ch 3-wire	Xtal	Yes	46	4.0–5.5	64-pin TQFP	CAN 500 kbps
	µPD780816	48	1504																			
	µPD78F0818	60 (flash)	3036																			
	µPD78070xY																					
	µPD780701Y	60	3360	6.29	0.318	1	3-ch	2-ch 1-ch PWM	Yes	Yes	1-ch 8-bit 1-ch 16-bit	16-ch	–	–	Yes[2]	1-ch UART 2-ch 3-wire	Xtal	–	67	3.5–5.5	80-pin QFP	CAN 390 kbps
	µPD78F0701Y	60 (flash)																				
	µPD78094x																					
	µPD780948 µPD78F0948 µPD780949 µPD78F0949	60	2016	8.5	0.24	1	2-ch	2-ch	Yes	Yes	1-ch 8-bit 1-ch 14-bit	8-ch 8-bit	–	40x4	–	1-ch UART 1-ch 3-wire 1-ch 2-wire	Xtal RC	Yes	79	4.0–5.5	100-pin QFP	CAN 500 kbps
	µPD78985x																					
	µPD789850	16	512	8	0.25	1	1-ch	1-ch	–	1-ch	1-ch 8-bit	4-ch 8-bit	–	–	–	1-ch UART/1-ch 3-wire	Xtal	Yes	18	4.0–5.5	30-pin SSOP	
	µPD78F9850															1-ch 3-wire 2-ch UART			31		44-pin TQFP	
	µPD789852	32	1312				3-ch				2-ch 8-bit	8-ch 10-bit										
	µPD78F9852	32 (flash)																				
Electric Metering	***µPD78095x***																					
	µPD780955	40	1024	0.384	52	–	6-ch	1-ch	–	Yes	1-ch	1-ch	–	19x1	–	2-ch UART	Xtal	–	50	2.2–3.5	80 QFP	3.4 µA
	µPD780957	48	2048	1	2	–	7-ch	2-ch	–	Yes	1-ch	–	–	30x3	–	1-ch UART 1-ch 3-wire	RC	Yes	69	2.2–3.5	100-pin QFP	6.0 µA
	µPD780958	60	2048	1	2	–	7-ch	2-ch	–	Yes	1-ch	–	–	30x3	–	1-ch UART 1-ch 3-wire	RC	Yes	69	2.2–3.5	100-pin QFP	6.0 µA
USB	***µPD78980x***																					
	µPD789800	8	256	6	0.16	–	2-ch	–	–	Yes	–	–	–	–	–	1-ch 3-wire	Xtal	Yes	31	4.0–5.5	44-pin QFP	
	µPD78F9801	16 (flash)																			64-pin LQFP	
	µPD789802	8		8	0.125														41			
	µPD789803	16	512		0.13																	
	µPD78F9803	16 (flash)																				

Notes: 1. MIET = minimum instruction execution time.
2. Yes = Y version has I²C.
3. Operating temperature is –40° to +85°C.

16-BIT K4 MICROCONTROLLERS

SUBSERIES	MEMORY		SPEED		TIMERS				PWM	A/D	D/A	SERIAL INTERFACE			SUBCLOCK	I/O PINS	OP. VOLTAGE	PACKAGE
	ROM (KB)	RAM (BYTE)	MHz	MIET[1] (µs)	8-BIT	16-BIT	RTC	WATCHDOG				I²C	UART	SYNC				
µPD78F4046																		
µPD78F4046	64 (flash)	2048	32	0.125	–	5-ch	–	Yes	2-ch 16-bit	16-ch 10-bit	–	–	2-ch	–	–	65	4.5–5.5	80-pin QFP
µPD78F4225																		
µPD78F4225	128 (flash)	4352	12.5	0.160	4-ch	1-ch	Yes	Yes	2-ch 8-bit	1-ch 16-bit	2-ch 8-bit	Yes[2]	2-ch	1-ch	Yes	67	1.9–5.5	80-pin QFP/TQFP
µPD78F4225Y																		
µPD78F4225Y	128 (flash)	4352	12.5	0.160	4-ch	1-ch	Yes	Yes	2-ch 8-bit 1-ch 16-bit	8-ch 8-bit	2-ch 8-bit	Yes[2]	2-ch	1-ch	Yes	67	1.9–5.5	80-pin QFP/TQFP
µPD784044																		
µPD784044	32	1024	32	0.125	–	5-ch	–	Yes	2-ch 16-bit	16-ch 10-bit	–	–	2-ch	–	–	65	4.5–5.5	80-pin QFP
µPD784046																		
µPD784046	64	2048	32	0.125	–	5-ch	–	Yes	2-ch 16-bit	16-ch 10-bit	–	–	2-ch	–	–	65	4.5–5.5	80-pin QFP
µPD784054																		
µPD784054	32	1024	32	0.125	–	3-ch	–	Yes	–	16-ch 10-bit	–	–	2-ch	–	–	64	4.5–5.5	80-pin QFP
µPD78422x																		
µPD784224	96	3584	12.5	0.16	4-ch	1-ch	Yes	Yes	2-ch 8-bit 1-ch 16-bit	8-ch 8-bit	2-ch 8-bit	Yes	2-ch	1-ch	Yes	67	1.8–5.5	80-pin QFP/TQFP
µPD784225	128	4352																
µPD78422xY																		
µPD784224Y	96	3584	12.5	0.16	4-ch	1-ch	Yes	Yes	2-ch 8-bit 1-ch 16-bit	8-ch 8-bit	2-ch 8-bit	Yes	2-ch	1-ch	Yes	67	1.8–5.5	80-pin QFP/TQFP
µPD784225Y	128	4352																
µPD78421xA																		
µPD784214A	96	3584	12.5	0.16	6-ch	1-ch	Yes	Yes	6-ch 8-bit 1-ch 16-bit	8-ch 8-bit	2-ch 8-bit	–	2-ch	1-ch	Yes	86	1.8–5.5	100-pin QFP/LQFP
µPD784215A	128	5120																
µPD784216A		8192																
µPD784217A	192	12800																
µPD784218A	256																	
µPD78421xAY																		
µPD784214AY	96	3584	12.5	0.16	6-ch	1-ch	Yes	Yes	6-ch 8-bit 1-ch 16-bit	8-ch 8-bit	2-ch 8-bit	Yes[1]	2-ch	1-ch	Yes	86	1.8–5.5	100-pin QFP/LQFP
µPD784215AY	128	5120																
µPD784216AY		8192																
µPD784217AY	192	12800																
µPD784218AY	256																	

Notes: 1. MIET = minimum instruction execution time.
2. Yes = Y version has I²C.
3. Operating temperature is –40° to +85°C.

16-BIT K4 MICROCONTROLLERS (CONT.)

SUBSERIES	MEMORY		SPEED		TIMERS			WATCHDOG	PWM	A/D	D/A	SERIAL INTERFACE			SUBCLOCK	I/O PINS	OP. VOLTAGE	PACKAGE
	ROM (KB)	RAM (BYTE)	MHz	MIET[1] (µs)	8-BIT	16-BIT	RTC					I^2C	UART	SYNC				
µPD78F421xA																		
µPD78F4216A	128 (flash)	8192	12.5	0.16	6-ch	1-ch	Yes	Yes	6-ch 8-bit 1-ch 16-bit	8-ch 8-bit	2-ch 8-bit	–	2-ch	1-ch	Yes	86	1.9–5.5	100-pin LQFP
µPD78F4218A	256 (flash)	12800																
µPD78F421xAY																		
µPD78F4216AY	128 (flash)	8192	12.5	0.16	6-ch	1-ch	Yes	Yes	6-ch 8-bit 1-ch 16-bit	8-ch 8-bit	2-ch 8-bit	Yes[2]	2-ch	1-ch	Yes	86	1.9–5.5	100-pin QFP or LQFP
µPD78F4218AY	256 (flash)	12800																

Notes: 1. MIET = minimum instruction execution time.
2. Yes = Y version has I^2C.
3. Operating temperature is –40° to +85°C.

8-BIT Kx1 MICROCONTROLLERS

SUBSERIES	MEMORY		SPEED		TIMERS				PWM	A/D	POC and LVI	FAILSAFE CLOCK	SERIAL INTERFACE		SUBCLOCK	I/O PINS	OP. VOLTAGE	PACKAGE
	ROM (KB)	RAM (BYTE)	MHz	MIET[1] (µs)	8-BIT	16-BIT	RTC	WATCHDOG					UART	3-WIRE				
µPD78010x (KB1)																		
µPD780101	8	512	10	0.2	3-ch	1-ch	–	Yes	3-ch 8-bit 1-ch 16-bit	4-ch 10-bit	Yes	Yes	1-ch UART/LIN 0- or 1-ch UART	1-ch	–	22	2.7–5.5	30-pin SSOP
µPD780102	16	768																
µPD780103	24																	
µPD78F0103	24 (flash)																	
µPD78011x (KC1)																		
µPD780111	8	512	10	0.2	4-ch	1-ch	Yes	Yes	4-ch 8-bit 1-ch 16-bit	8-ch 10-bit	Yes	Yes	1-ch UART/LIN 1-ch UART	1-ch	Yes	32	2.7–5.5	44-pin LQFP
µPD780112	16	1024																
µPD780113	24																	
µPD780114	32																	
µPD78F0114	32 (flash)																	
µPD78012x (KD1)																		
µPD780121	8	512	10	0.2	4-ch	1-ch	Yes	Yes	4-ch 8-bit 1-ch 16-bit	8-ch 10-bit	Yes	Yes	1-ch UART/LIN 1-ch UART	1-ch	Yes	39	2.7–5.5	52-pin LQFP
µPD780122	16	1024																
µPD780123	24																	
µPD780124	32																	
µPD78F0124	32 (flash)																	
µPD78013x (KE1)																		
µPD780131	8	512	10	0.2	4-ch	2-ch	Yes	Yes	4-ch 8-bit 0- or 1-ch 16-bit	8-ch 10-bit	Yes	Yes	1-ch UART/LIN 1-ch UART	2-ch	Yes	51	2.7–5.5	64-pin QFP or TQFP
µPD780132	16	1024																
µPD780133	24																	
µPD780134	32	2048																
µPD78F0134	32 (flash)	1024																
µPD780136	48	2048																
µPD780138	60																	
µPD78F0138	60 (flash)																	

Notes: 1. MIET = minimum instruction execution time.
2. Yes = Y version has I²C.
3. Operating temperature is –40° to +85°C.

8-BIT Kx1 MICROCONTROLLERS (CONT.)

SUBSERIES	MEMORY		SPEED		TIMERS				PWM	A/D	POC and LVI	FAILSAFE CLOCK	SERIAL INTERFACE		SUBCLOCK	I/O PINS	OP. VOLTAGE	PACKAGE
	ROM (KB)	RAM (BYTE)	MHz	MIET[1] (µs)	8-BIT	16-BIT	RTC	WATCHDOG					UART	3-WIRE				
µPD78014x (KF1)																		
µPD780143	24	1024	10	0.2	4-ch	1-ch	Yes	Yes	4-ch 8-bit 1-ch or 2-ch 16-bit	8-ch 10-bit	Yes	Yes	1-ch UART/LIN 1-ch UART	1-ch	Yes	67	2.7–5.5	80-pin QFP or TQFP
µPD780144	32	2048																
µPD780146	48					2-ch								2-ch				
µPD780148	60																	
µPD78F0148	60 (flash)																	

Notes: 1. MIET = minimum instruction execution time.
2. Yes = Y version has I²C.
3. Operating temperature is –40° to +85°C.

32-BIT Kx1 MICROCONTROLLERS

SUBSERIES	MEMORY		SPEED		TIMERS				PWM	A/D	POC and LVI	FAILSAFE CLOCK	SERIAL INTERFACE	SUBCLOCK	I/O PINS	OP. VOLTAGE	PACKAGE
	ROM (KB)	RAM (BYTE)	MHz	MIET[1] (µs)	8-BIT	16-BIT	RTC	WATCHDOG					UART				
µPD70320x (KF1)																	
µPD703208(Y)	64	4096	20	50	4-ch	4-ch	Yes	Yes	4-ch 8-bit 2-ch 16-bit	8-ch 10-bit	–	–	2-ch UART 3-ch CSI 0-ch or 1-ch I²C	Yes	67	2.7–5.5	80-pin QFP or TQFP
µPD703209(Y)	96																
µPD7032010(Y)	128	6144															
µPD7032010(Y)	128 (flash)																
µPD70321x (KG1)																	
µPD703212(Y)	64	4096	20	50	4-ch	4-ch	Yes	Yes	4-ch 8-bit 4-ch 16-bit	8-ch 10-bit	2-ch 8-bit	–	2-ch UART 4-ch CSI 0-ch or 1-ch I²C	Yes	84	2.7–5.5	100-pin LQFP
µPD703213(Y)	96																
µPD703214(Y)	128	6144															
µPD70F3214(Y)	128 (flash)																
µPD70321x (KJ1)																	
µPD703216(Y)	96	6144	20	50	4-ch	6-ch	Yes	Yes	4-ch 8-bit 6-ch 16-bit	16-ch 10-bit	2-ch 8-bit	–	3-ch UART 5-ch CSI 0-ch or 1-ch I²C	Yes	128	2.7–5.5	144-pin LQFP
µPD703216(Y)	128																
µPD70F3217(Y)	128 (flash)																

Notes: 1. MIET = minimum instruction execution time.
2. Yes = Y version has I²C.
3. Operating temperature is –40° to +85°C.

32-BIT V850 MICROCONTOLLERS

CORE	SUBSERIES	MEMORY			SPEED		TIMERS			RTC	WATCHDOG	A/D	D/A	SERIAL INTERFACE		SUB-CLOCK	CAN	I/O PINS	OP. VOLT.	PACKAGE
		ROM (KB)	FLASH (KB)	RAM (KB)	MHz	µs	8-BIT	16-BIT	PWM					I²C	UART					
V850	***V853A***																			
	µPD703003A	128		4	33	30	–	5	2-ch 8-/12-bit	–	–	8-ch 10-bit	2-ch 8-bit	–	2-ch UART/CSI 2-ch CSI	–	–	76	5	100-pin LQFP
	µPD703004A	96																		
	µPD703025A	256		8																
	µPD70F3003A		128	4																
	µPD70F3025A		256	8																
	V850/SA1																			
	µPD703014A(Y)	64		4	20	50	4	2	4-ch 8-bit 2-ch 16-bit	Yes	Yes	12-ch 10-bit	–	Yes[1]	1-ch UART 1-ch UART/CSI 2-ch CSI	Yes	–	85	3.3	121-pin FBGA
	µPD703014B(Y)																			100-pin LQFP
	µPD703015A(Y)	128																		121-pin FBGA
	µPD703015B(Y)																			100-pin LQFP
	µPD703017A(Y)	256		8																
	µPD70F3015B(Y)		128	4																
	µPD70F3017A(Y)		256	8																
	V850/SB1																			
	µPD703030A(Y)	384		20	20	50	6	2	6-ch 8-bit 2-ch 16-bit	1	1	12-ch 10-bit	–	Yes[1]	2-ch UART/CSI 3-ch CSI	Yes	–	83	5	100-pin LQFP
	µPD703030B(Y)																			
	µPD703031A(Y)	128		12																
	µPD703031B(Y)			8																
	µPD703032A(Y)	512		24																
	µPD703033A(Y)	256		16																
	µPD703033B(Y)																			
	µPD70F3032A(Y)		512	24																
	µPD70F3032B(Y)																			
	µPD70F3033A(Y)		256	16																
	µPD70F3033B(Y)																			
	V850/SF1																			
	µPD703075AY	128		12	16	62.5	–	8	7-ch 16-bit	1	1	1-ch 10-bit	–	Yes	2-ch UART/CS 1-ch-CSI/I²CI 1-ch CSI	Yes	1-ch	84	3.5–5.5	100-pin LQFP and QFP
	µPD703076AY																2-ch			
	µPD703078AY	256		16													1-ch			

Notes: 1. Yes=Y version has I²C.
2. Operating temperature is –40° to +85°C.

32-BIT V850 MICROCONTROLLERS (CONT.)

CORE	SUBSERIES	MEMORY			SPEED		TIMERS			RTC	WATCHDOG	A/D	D/A	SERIAL INTERFACE		SUB-CLOCK	CAN	I/O PINS	OP. VOLT.	PACKAGE
		ROM (KB)	FLASH (KB)	RAM (KB)	MHz	µs	8-BIT	16-BIT	PWM					I²C	UART					
V850 (cont.)	***V850/SF1 (cont.)***																			
	µPD703079AY	256		16	16	62.5	–	8	7-ch 16-bit	1	1	1-ch 10-bit	–	Yes	2-ch UART/CS 1-ch-CSI/I²CI 1-ch CSI	Yes	2-ch	84	3.5–5.5	100-pin QFP or LQFP
	µPD70F3079AY		256																	
	V850/SC3																			
	µPD703088Y	512		24	20	50	–	10-ch	10-ch 16-bit	Yes	Yes	12-ch 10-bit	–	Yes	2-ch UART 2-ch UART/CSI 2-ch CSI/I²C	Yes	1-ch	82	3.5–5.5	144-pin LQFP
	µPD703089Y																1-ch			
	µPD70F3089Y		512														2-ch			
V850ES	***V850ES/SA2***																			
	µPD703201	256		16	17	59	4	2	4-ch 8-bit 2-ch 16-bit	Yes	Yes	12-ch 10-bit	2-ch 8-bit	Yes[1]	1-ch UART 1-ch UART/CSI 2-ch or 3-ch CSI 0-ch or 1-ch CSI/I²C	Yes	–	82	2.2–2.7	100-pin TQFP
	µPD70F3201		256																	
	µPD703201Y	256																		
	µPD70F3201Y		256																	
	V850ES/SA3																			
	µPD703204	256		16	17	59	4	2	4-ch 8-bit 2-ch 16-bit	Yes	Yes	16-ch 10-bit	2-ch 8-bit	Yes[1]	1-ch UART 1-ch UART/CSI 3-ch or 4-ch CSI 0-ch or 1-ch CSI/I²C	Yes	–	102	2.2–2.7	121-FPBGA
	µPD70F3204		256																	
	µPD703204Y	256																		
	µPD70F3204Y		256																	
	V850E/IA1																			
	µPD703116	256		10	20	50	–	8	13-ch 16-bit	–	–	16-ch 10-bit	–	–	3-ch UART 3-ch CSI	–	1-ch	83	3.3/5.0	144-pin LQFP
	µPD70F3116		256																	
	V850E/IA2																			
	µPD703114	128		6	40	25	–	7	13-ch 16-bit	–	–	14-ch 10-bit	–	–	2-ch UART 2-ch CSI	–	–	79	3.3	100-pin QFP or LQFP
	µPD70F3114		128																	
	V850E/MA1																			
	µPD703103	0	0	4	50	20	–	8	2-ch 8/12-bit	–	–	8-ch 10-bit	–	–	1 UART 1 UART/CSI 1CSI	–	–	119	3.3	144-pin LQFP
	µPD703103A																			
	µPD703105	128																		
	µPD703105A																			
	µPD703106			10																

Notes: 1. Yes=Y version has I²C.
2. Operating temperature is –40° to +85°C.

32-BIT V850 MICROCONTROLLERS (CONT.)

CORE	SUBSERIES	MEMORY			SPEED		TIMERS			RTC	WATCHDOG	A/D	D/A	SERIAL INTERFACE		SUB-CLOCK	CAN	I/O PINS	OP. VOLT.	PACKAGE
		ROM (KB)	FLASH (KB)	RAM (KB)	MHz	µs	8-BIT	16-BIT	PWM					I²C	UART					
V850ES (cont.)																				
	µPD703106A	128	–	10	50	20	–	8	2-ch 8/12-bit	–	–	8-ch 10-bit	–	–	1 UART 1 UART/CSI 1 CSI	–	–	119	3.3	144-pin LQFP or FBGA
	µPD703107 µPD703107A	256																		
	µPD70F3107 µPD70F3107A	–	256																	
V850E																				
	µPD703108	0	0	4	40	25	–	6	2-ch 16-bit	–	–	4-ch 10-bit	–	–	2 UART/CSI	–	–	79	3.3	100-pin LQFP
	µPD703100	0	0	4	40	25	–	6	2-ch 16-bit	–	–	4-ch 10-bit	–	–	2 UART/CSI	–	–	79	3.3	144-pin LQFP
	µPD703101	96	–		33	30			12-ch 16-bit			8-ch 10-bit						123	3.3/5.0	144-pin LQFP or 157-pin FBGA
	µPD703102	128																		
	µPD70F3102		128																	
	µPD703130	0	0	4	30	34	–	6	8-ch 16-bit	–	–	4-ch 10-bit	–	–	2 UART/CSI	–	–	81	3.3/5.0	100-pin QFP
	µPD703111	0	0	16	150	6.6	–	10	2-ch 16-bit	–	–	8-ch 8-bit	–	–	1 UART 1 UART/CSI 1 CSI	–	–	77	3.3	176-pin LQFP

Notes: 1. Yes = Y version has I²C.
2. Operating temperature is −40° to +85°C.

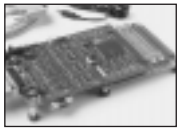
DEVELOPMENT TOOLS

8- and 16-Bit K0, K0S, K4 and Kx1 Microcontrollers

NEC Electronics America offers a diverse selection of development tools that can be used to efficiently assemble, compile, or debug software developed for NEC microcontroller-based systems. Development environments are PC-based and include design development boards, software packages, control programs, in-circuit emulators, emulation boards, emulation probes, conversion sockets, program adapters, and PROM programmers.


SOFTWARE


EMULATION


LOW-COST EMULATORS

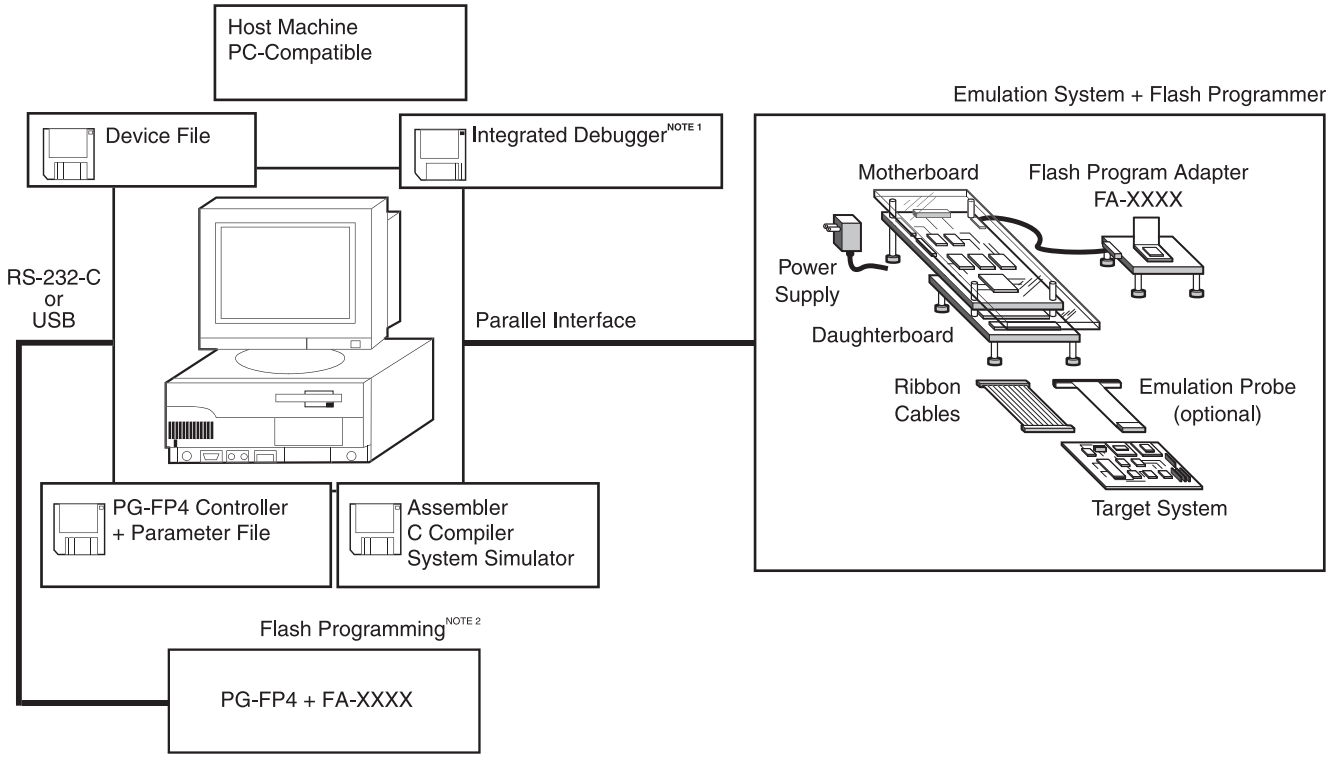

PROGRAMMERS

	K0S	K0	K4	Kx1
SOFTWARE TOOLS				
Assembler, C compiler, simulator, debugger and device files	SP78K0S	SP78K0	SP78K4	SP78K0
Assembler, C compiler and device files	CA78K0S	CA78K0	CA78K4	CA78K0
Simulator and device files	SM78K0S	SM78K0	SM78K4	SM78K0
C library source files	CL78K0S	CL78K0	CL78K4	CL78K0
COMMON HARDWARE TOOLS				
Standard Emulation Tools				
PCI interface card (for use with standard ICE only)	IE-70000-PCI-IF-A	IE-70000-PCI-IF-A	IE-70000-PCI-IF-A	IE-70000-PCI-IF-A
PCMCIA interface card (for use with standard ICE only)	IE-70000-CD-IF-A	IE-70000-CD-IF-A	IE-70000-CD-IF-A	IE-70000-CD-IF-A
New smile performance board (for use with standard ICE only)	—	IE-78K0-NS-PA	—	IE-78K0-NS-PA
New smile probe (see selection guide)	NP-XXXX	NP-XXXX	NP-XXXX	NP-XXXX
Low-Cost Emulator (LCE)				
LCE motherboard	LCE-78K0S	LCE-78K0	—	LCE-78K0
LCE daughterboard (see selection guide)	LCE-78XXXX-EM	LCE-78XXXX-EM	—	LCE-78XXXX-EM
LCE probe (optional; see selection guide)	LCP-XXXX-250	LCP-XXXX-250	–	LCP-XXXX-250
Programmers				
Flash programmer	PG-FP4	PG-FP4	PG-FP4	PG-FP4
OTP programmer	PG-1500	PG-1500	PG-1500	–

Low-Cost Emulators

With low-cost emulators (LCE-K0S and LCE-K0) from NEC Electronics America, you get complete in-circuit emulation functionality, including on-board flash programming, for the price of a low-end development board. The LCEs offer real-time, full-function emulation for efficient debugging of hardware and software in NEC 8-bit microcontrollers.

Typical Low-Cost Emulator Development Environment for NEC 8-Bit Microcontrollers

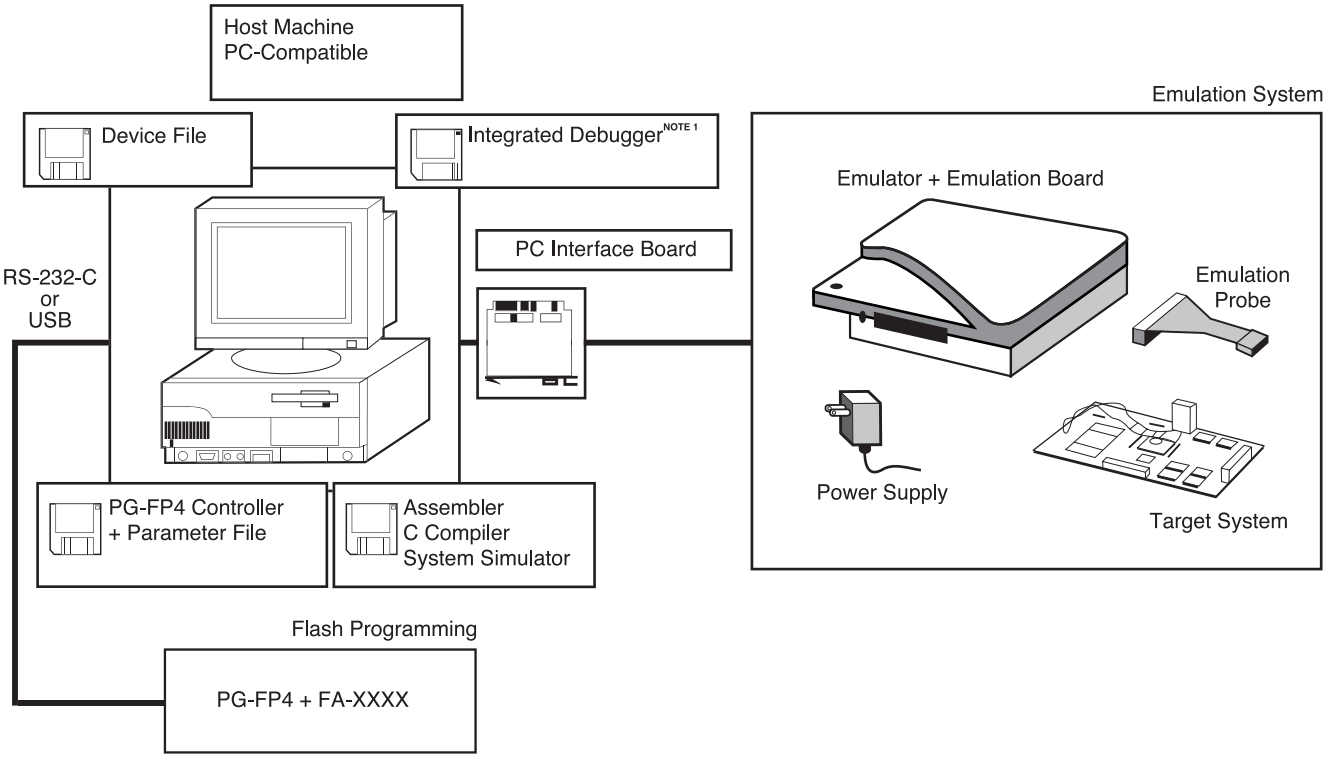


NOTES:
1. Integrated debugger included with emulator
2. Optional

NEC New Smile In-Circuit Emulators

With New Smile (NS) emulators from NEC Electronics, you get all the standard emulation features for efficient debugging of hardware and software in NEC 8-bit microcontrollers. The NS system is designed with universal K0 and K0S main boards and dedicated emulation boards for each specific subfamily. This modular configuration allows for easy emulation of additional devices by simply exchanging the emulation boards.

Typical New Smile Emulator Development Environment for NEC 8- and 16-Bit Microcontrollers



NOTE:
1. Integrated debugger included with emulator

EMULATOR COMPARISONS

The following table shows the differences between the New Smile emulators and the newer low-cost emulators for NEC 8-bit K0 and K0S families.

FEATURES		IE-78K0-NS NEW SMILE	LCE-78K0 LOW-COST EMULATOR	LCE-78K0S LOW-COST EMULATOR
Target Device		μPD780xxxx	Select appropriate daughterboard	Select appropriate daughterboard
Flash Programming		Not included	On-board, in-circuit programming (uses 3-wire mode)	On-board, in-circuit programming (uses 3-wire mode)
Emulation Clock	Internal	Fixed clock (max. chip frequency)	Fixed clock (5 or 10 MHz)	Fixed clock (5 or 10 MHz)
	External	User-installed ceramic or Xtal clock	User-installed Xtal clock	User-installed Xtal clock
Emulation Voltage	Internal	5V	5V or 3.3V	5V or 3.3V
	External	User-supplied	User-supplied	Not available
Memory Mapping	Internal ROM	Up to 60 KB	Up to 60 KB	Up to 48 KB
	Internal RAM	Up to 1 KB data RAM; up to 2 KB internal expansion RAM	Up to 1 KB data RAM; up to 2 KB internal expansion RAM	Up to 1 KB
	Target memory	On target system	On target system	On target system
	Stack	Illegal stack access detection	Illegal stack access detection	Not available
Event Setting		Address, data, status (program run, data read, data write, data read/write)	Address, data, status (program run, data read, data write, data read/write)	Address, data, status (program run, data read, data write, data read/write)
	Events	Up to 6 simultaneous events (4 bus, 2 execution,1 external trigger)	Up to 6 simultaneous break or trace-triggered events	Up to 3 simultaneous break or trace-triggered events
Time Measurement	External trigger	Supported	Not supported	Not supported
	Total time of last execution	Max time: 14.5 minutes Resolution: 125 ns	Max. time: 7.15 min. w/100 ns resolution or 14.32 min. w/200 ns resolution	Max time: 7.15 min. execution w/100 ns resolution or 14.32 min. w/200 ns resolution
Trace	Buffer size	8 KB x 32 bits wide	64 KB x 48 bits wide	64 KB x 64 bits wide
	Time stamp qualifier	Available with option board	Included	Included
		Unconditional, qualified, sectional	Unconditional, qualified, sectional	Unconditional, qualified, sectional
Break	Hardware event-based breaks	Up to 32K fetch or data events can be specified with up to 10 simultaneously active	Up to 32K fetch events (100 simultaneously active) and up to 32K data events (5 simultanteously active)	Up to 32K fetch events (100 simultaneously active) and up to 32 K data events (5 simultanteously active)
	Software breaks	Unlimited number of software breaks	Not supported	Not supported
Execution Options		Real-time, single-step, multiple-step take/ignore branch or jumps	Real-time, single-step, multiple-step take/ignore branch or jumps	Real-time, single-step, multiple-step take/ignore branch or jumps
Code Coverage		Available with option board	Not available	Not available

DEVELOPMENT TOOLS

8-Bit K0 MCUs

		STANDARD IN-CIRCUIT EMULATOR			LOW-COST IN-CIRCUIT EMULATOR			ALL	
									
DEVICE NAME	PACKAGE	EMULATOR	EMULATION BOARD	PROBE	EMULATOR	DAUGHTERBOARD	PROBE	SOCKET	PROGRAM ADAPTER
μPD780021AGC-8BS μPD780021AYGC-8BS μPD780022AGC-8BS μPD780022AYGC-8BS μPD780023AGC-8BS μPD780023AYGC-8BS μPD780024AGC-8BS μPD780024AYGC-8BS	64-pin QFP (14 x 14 mm)	IE-78K0-NS	IE-780034-NS-EM1	NP-64GC-TQ	LCE-78K0	LCE-780034-EM	LCP-64GC-250	064SA*	FA-64GC-8BS-A
μPD780021AGB-8EU μPD780021AYGB-8EU μPD780022AGB-8EU μPD780022AYGB-8EU μPD780023AGB-8EU μPD780023AYGB-8EU μPD780024AGB-8EU μPD780024AYGB-8EU μPD780021AGK-9ET	64-pin LQFP (10 x 10 mm)	IE-78K0-NS	IE-780034-NS-EM1	NP-G4GB-TQ	LCE-78K0	LCE-780034-EM	N/A	064SD*	FA-64GB-8EU-A
μPD780021AYGK-9ET μPD780022AGK-9ET μPD780022AYGK-9ET μPD780023AGK-9ET μPD780023AYGK-9ET μPD780024AGK-9ET μPD780024AYGK-9ET	64-pin TQFP (12 x 12 mm)	IE-78K0-NS	IE-780034-NS-EM1	NP-64GK	LCE-78K0	LCE-780034-EM	LCP-64GK-250	064SB*	FA-64GK-9ET
μPD780031AGC-8BS μPD780031AYGC-8BS μPD780032AGC-8BS μPD780032AYGC-8BS μPD780033AGC-8BS	64-pin QFP (12 x 12 mm)	IE-78K0-NS	IE-780034-NS-EM1	NP-64GC-TQ	LCE-78K0	LCE-780034-EM	LCP-64GC-250	064SA*	FA-64GC-8B5-A

DEVICE NAME	PACKAGE	EMULATOR	EMULATION BOARD	PROBE	EMULATOR	DAUGHTERBOARD	PROBE	SOCKET	PROGRAM ADAPTER
μPD780033AYGC-8BS μPD780034AGC-8BS μPD780034AYGC-8BS μPD78F0034AGC-ABS μPD78F0034AYGC-ABS	64-pin QFP (14 x 14 mm)	IE-78K0-NS	IE-780034-NS-EM1	NP-64GC-TQ	LCE-78K0	LCE-780034-EM	LCP-64GC-250	064SA*	FA-64GC-8BS-A
μPD780031AGB-8EU μPD780031AYGB-8EU μPD780032AGB-8EU μPD780032AYGB-8EU μPD780033AGB-8EU μPD780033AYGB-8EU μPD780034AGB-8EU μPD780034AYGB-8EU	64-pin LQFP (10 x 10 mm)	IE-78K0-NS	IE-780034-NS-EM1	NP-64GB-TQ	LCE-78K0	LCE-780034-EM	N/A	064SD*	FA-64GB-8EU-A
μPD780031AGK-9ET μPD780031AYGK-9ET μPD780032AGK-9ET μPD780032AYGK-9ET μPD780033AGK-9ET μPD780033AYGK-9ET μPD780034AGK-9ET μPD780034AYGK-9ET μPD78F0034AGK-9ET μPD78F0034AYGK-9ET	64-pin TQFP (12 x 12 mm)	IE-78K0-NS	IE-780034-NS-EM1	NP-64GK	LCE-78K0	LCE-780034-EM	LCP-64GK-250	064SB*	FA-64GK-9ET
μPD78F0034ACW μPD78F0034AYCW	64-pin SDIP (750 mil)	IE-78K0-NS	IE-780034-NS-EM1	NP-64CW	LCE-78K0	LCE-780034-EM	LCP-64CW-250	64-pin SDIP	FA-64CW
μPD780053GC-8BT μPD780053YGC-8BT μPD780054GC-8BT μPD780054YGC-8BT μPD780055GC-8BT μPD780055YGC-8BT μPD780056GC-8BT μPD780056YGC-8BT μPD780058GC-8BT μPD780058BYGC-8BT μPD78F0058GC-8BT μPD78F0058YGC-8BT	80-pin QFP (14 x 14 mm)	IE-78K0-NS	IE-780308-NS-EM1	NP-80GC-TQ	LCE-78K0	LCE-780308-EM	LCP-80GC-250	080SB*	FA-80GC-8BT

DEVELOPMENT TOOLS

8-Bit K0 MCUs (cont.)









		STANDARD IN-CIRCUIT EMULATOR			LOW-COST IN-CIRCUIT EMULATOR			ALL	
DEVICE NAME	PACKAGE	EMULATOR	EMULATION BOARD	PROBE	EMULATOR	DAUGHTERBOARD	PROBE	SOCKET	PROGRAM ADAPTER
μPD780053GK-9EU μPD780053YGK-9EU μPD780054GK-9EU μPD780054YGK-9EU μPD780055GK-9EU μPD780055YGK-9EU μPD780056GK-9EU μPD780056YGK-9EU μPD780058GK-9EU μPD780058BYGK-9EU μPD78F0058GK-9EU μPD78F0058YGK-9EU	80-pin TQFP (12 x12 mm)	IE-78K0-NS	IE-780308-NS-EM1	TEC-080SD	LCE-78K0	LCE-780308-EM	LCP-80GK-250	080SD*	FA-80GK-9EU
μPD780076GC-ABS μPD780076YGC-ABS μPD780078GC-ABS μPD780078YGC-ABS μPD78F0078GC-ABS μPD78F0078YGC-ABS	64-pin QFP (14 x 14 mm)	IE-78K0-NS	IE-780078-NS-EM1	NP-64GC-TQ	LCE-78K0	LCE-780078-EM	LCP-64GC-250	064SA*	FA-64GC-8BS-A
μPD780076GK-9ET μPD780076YGK-9ET μPD780078GK-9ET μPD780078YGK-9ET μPD78F0078GK-9ET μPD78F0078YGK-9ET	64-pin TQFP (12 x 12 mm)	IE-78K0-NS	IE-780078-NS-EM1	NP-64GK	LCE-78K0	LCE-780078-EM	LCP-64GK-250	064SB*	FA-64GK-9ET
μPD780204GF-3BA μPD780205GF-3BA μPD780206GF-3BA μPD780208GF-3BA μPD78P0208GF-3BA	100-pin QFP (14 x 20 mm)	IE-78K0-NS	IE-780208-NS-EM1	NP-100GF-TQ	N/A	N/A	N/A	100RB*	PA-78P0208GF
μPD780232GC-8BT μPD78F0233GC-8BT	80-pin QFP (14 x 14 mm)	IE-78K0-NS	IE-780233-NS-EM4+ IE-78K0-NS-P01	NP-80GC-TQ	N/A	N/A	N/A	080SB*	FA-80GC-8BT
μPD780306GC-8EU μPD780308GC-8EU μPD78P0308GC-8EU μPD78P0308YGC-8EU	100-pin LQFP (14 x 14 mm)	IE-78K0-NS	IE-780308-NS-EM1	NP-100GC	LCE-78K0	LCE-780308-EM	LCP-100GC-250	100SD*	PA-78P0308GC-8EU

DEVICE NAME	PACKAGE	EMULATOR	EMULATION BOARD	PROBE	EMULATOR	DAUGHTERBOARD	PROBE	SOCKET	PROGRAM ADAPTER		
μPD780306GF μPD780308GF μPD78P0308GF-3BA	100-pin QFP (14 x 20 mm)	IE-78K0-NS	IE-780308-NS-EM1		NP-100GF-TQ	LCE-78K0	LCE-780308-EM	LCP-100GF-250	100RB*	PA-78P0308GF
μPD780316GC-9EB μPD780318GC-9EB	120-pin TQFP (14 x 14 mm)	IE-78K0-NS	IE-780338-NS-EM1		SWEX-120SE-1	LCE-78K0	LCE-780338-EM	LCP-120GC-YQ	120SE*	FA-120GC-9EB
μPD780326GC-9EB μPD780328GC-9EB	120-pin TQFP (14 x 14 mm)	IE-78K0-NS	IE-780338-NS-EM1		SWEX-120SE-1	LCE-78K0	LCE-780338-EM	LCP-120GC-YQ	120SE*	FA-120GC-9EB
μPD780336GC-9EB μPD780338GC-9EB μPD78F0338GC-9EB	120-pin TQFP (14 x 14 mm)	IE-78K0-NS	IE-780338-NS-EM1		SWEX-120SE-1	LCE-78K0	LCE-780338-EM	LCP-120GC-YQ	120SE*	FA-120GC-9EB
μPD780343GC-8EU μPD780343YGC-8EU μPD780344GC-8EU μPD780344YGC-8EU	100-pin QFP (14 x 14 mm)	IE-78K0-NS	IE-780354-NS-EM1		NP-100GC	N/A	N/A	N/A	100SD*	FA-100GC-8EU
μPD780343F1-DA3 μPD780343YF1-DA3 μPD780344F1-DA3 μPD780344YF1-DA3	113-pin FPBGA (9 x 9 mm)	IE-78K0-NS	IE-780354-NS-EM1		NP-113F1-DA3	N/A	N/A	N/A	TBD	FA-113F1-DA3-A
μPD780353GC-8EU μPD780353YGC-8EU μPD780354GC-8EU μPD780354YGC-8EU μPD78F0354GC-8EU μPD78F0354YGC-8EU	100-pin QFP (14 x 14 mm)	IE-78K0-NS	IE-780354-NS-EM1		NP-100GC	N/A	N/A	N/A	100SD*	FA-100GC-8EU
μPD780353F1-DA3 μPD780353YF1-DA3 μPD780354F1-DA3 μPD780354YF1-DA3 μPD78F0354F1-DA3 μPD78F0354YF1-DA3	113-pin FPBGA (9 x 9 mm)	IE-78K0-NS	IE-780354-NS-EM1		NP-113F1-DA3	N/A	N/A	N/A	TBD	FA-113F1-DA3-A
μPD78042FGF-3B9 μPD78043FGF-3B9 μPD78044FGF-3B9 μPD78045FGF-3B9 μPD78P048AGF-3B9	80-pin QFP (14 x 20 mm)	IE-78K0-NS	IE-78048-NS-EM1		NP-80GF-TQ	N/A	N/A	N/A	080RA*	PA-78P048GF

DEVELOPMENT TOOLS

8-Bit K0 MCUs (cont.)









		STANDARD IN-CIRCUIT EMULATOR			LOW-COST IN-CIRCUIT EMULATOR			ALL	
DEVICE NAME	PACKAGE	EMULATOR	EMULATION BOARD	PROBE	EMULATOR	DAUGHTERBOARD	PROBE	SOCKET	PROGRAM ADAPTER
μPD78062GC-8EU μPD78062YGC-8EU μPD78063GC-8EU μPD78063YGC-8EU μPD78064GC-8EU μPD78064YGC-8EU μPD78P064GC-8EU	100-pin LQFP (14 x 14 mm)	IE-78K0-NS	IE-780308-NS-EM1	NP-100GC	LCE-78K0	LCE-780308-EM	LCP-100GC-250	100SD*	PA-78P0308GC-8EU
μPD78062GF μPD78062YGF μPD78063GF μPD78063YGF μPD78064GF μPD78064YGF μPD78P064GF-3BA	100-pin QFP (14 x 20 mm)	IE-78K0-NS	IE-780308-NS-EM1	NP-100GF-TQ	LCE-78K0	LCE-780308-EM	LCP-100GF-250	100RB*	PA-78P0308GF
μPD78070AGC-7EA μPD78070AYGC-7EA	100-pin QFP (14 x 14 mm)	IE-78K0-NS	IE-78078-NS-EM1	NP-100GC	N/A	N/A	N/A	100SD*	N/A
μPD78070AGF-3BA μPD78070AYGF-3BA	100-pin QFP (14 x 20 mm)	IE-78K0-NS	IE-78078-NS-EM1	NP-100GF-TQ	N/A	N/A	N/A	100RB*	N/A
μPD780701YGC-8BT μPD78F0701YGC-8BT	80-pin QFP (14 x 14 mm)	IE-78K0-NS	IE-780701-NS-EM1	NP-80GC-TQ	LCE-78K0	LCE-780703-EM	LCP-80GC -250	080SB*	FA-80GC-8BT
μPD780948GF μPD78F0948GF	100-pin QFP (14 x 20 mm)	IE-78K0-NS	IE-780948-NS-EM4 + IE-78K0-NS-P04	NP-100GF-TQ	N/A	N/A	N/A	100RB*	FA-100GF-3BA
μPD780957GC(A)-8EU μPD78F0958GC(A)-8EU	100-pin LQFP (14 x 14 mm)	IE-78K0-NS	IE-780958-NS-EM4 + IE-78K0-NS-P02	NP-100GC	N/A	N/A	N/A	100SD*	FA-100GC-8EU
μPD780982GC-8BS μPD780983GC-8BS μPD780984GC-8BS μPD780986GC-8BS μPD780988GC-8BS μPD78F0988AGC-8BS	64-pin QFP (14 x 14 mm)	IE-78K0-NS	IE-780988-NS-EM4 + IE-78K0-NS-P01	NP-64GC-TQ	N/A	N/A	N/A	064SA*	FA-64GC-8BS-A

DEVICE NAME	PACKAGE	EMULATOR	EMULATION BOARD	PROBE	EMULATOR	DAUGHTERBOARD	PROBE	SOCKET	PROGRAM ADAPTER
μPD780982CW μPD780983CW μPD780984CW μPD780986CW μPD780988CW μPD78F0988ACW	64-pin SDIP (750 mil)	IE-78K0-NS	IE-780988-NS-EM4 + IE-78K0-NS-P01	NP-64CW	N/A	N/A	N/A	64-pin SDIP	FA-64CW

DEVELOPMENT TOOLS

8-Bit Kx1 MCUs



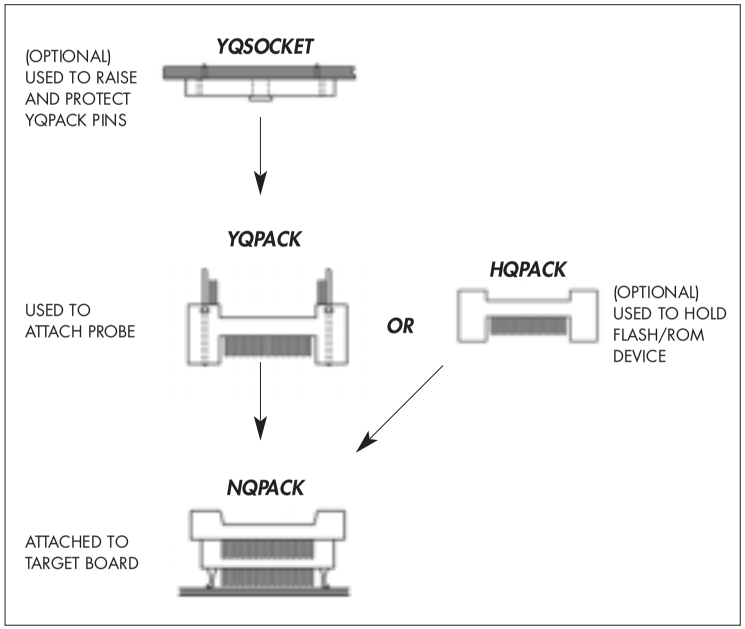


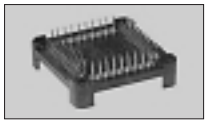
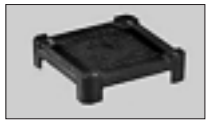
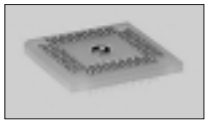




		STANDARD IN-CIRCUIT EMULATOR			LOW-COST IN-CIRCUIT EMULATOR			ALL	
SERIES/DEVICE NAME	PACKAGE	EMULATOR	EMULATION BOARD	PROBE	EMULATOR	DAUGHTERBOARD	PROBE	SOCKET	PROGRAM ADAPTER
KB1 µPD780101MC-5A4 µPD780102MC-5A4 µPD780103MC-5A4 µPD78F0103MC-5A4	30-pin SSOP (300 mil)	IE-78K0-NS	IE-780148-NS-EM1	NP-30MC	Q2'03	Q2'03	Q2'03	30BK*	FA-30MC
KC1 µPD780111GB-8ES µPD780112GB-8ES µPD780113GB-8ES µPD780114GB-8ES µPD78F0114GB-8ES	44-pin QFP (10 x 10 mm)	IE-78K0-NS	IE-780148-NS-EM1	NP-44GB-TQ	Q2'03	Q2'03	Q2'03	044SA*	FA-44GB-8ES
KD1 µPD780121GB-8ET µPD780122GB-8ET µPD780123GB-8ET µPD780124GB-8ET µPD78F0124GB-8ET	52-pin QFP (10 x 10 mm)	IE-78K0-NS	IE-780148-NS-EM1	NP-52GB-TQ	Q2'03	Q2'03	Q2'03	052SB*	FA-52GB-8ET
KE1 µPD780131GB-8EU µPD780132GB-8EU µPD780133GB-8EU µPD780134GB-8EU µPD780136GB-8EU µPD780138GB-8EU µPD78F0134GB-8EU µPD78F0138GB-8EU	64-pin QFP (10 x 10 mm)	IE-78K0-NS	IE-780148-NS-EM1	NP-64GB-TQ	Q2'03	Q2'03	Q2'03	064SD*	FA-64GB-8EU-A
KF1 µPD780143GC-8BT µPD780144GC-8BT µPD780146GC-8BT µPD780148GC-8BT	80-pin QFP (14 x 14 mm)	IE-78K0-NS	IE-780148-NS-EM1	NP-80GC-TQ	Q2'03	Q2'03	Q2'03	080SB*	FA-80GC-8BT

K0 AND Kx1 CONVERSION SOCKETS



	BOARD SOCKET (NQPACK)	PROBE ADAPTER (YQPACK)	CHIP ADAPTER (HQPACK)	HEIGHT (YQSOCKET)
30BK*	EV-NSPACK30BK	EV-YSPACK30BK	EV-HSPACK30BK	EV-YSSOCKET30BKF
044SA*	EV-NQPACK044SA	EV-YQPACK044SA	EV-EV-HQPACK044SA	EV-YQSOCKET044SAF
048SD*	EV-NQPACK048SD	EV-YQPACK048SD	EV-HQPACK048SD	EV-YQSOCKET048SDF
052SB*	EV-NQPACK052SB	EV-YQPACK052SB	EV-HQPACK052SB	EV-YQSOCKET052SBF
064SA*	EV-NQPACK064SA	EV-YQPACK064SA	EV-HQPACK064SA	EV-YQSOCKET064SAF
064SB*	EV-NQPACK064SB	EV-YQPACK064SB	EV-HQPACK064SB140	EV-YQSOCKET064SBF
064SD*	EV-NQPACK064SD	EV-YQPACK064SD	EV-HQPACK064SD	EV-YQSOCKET064SDF
080SB*	EV-NQPACK080SB	EV-YQPACK080SB	HQPACK080SB	EV-YQSOCKET080SBF
080SD*	EV-NQPACK080SD	EV-YQPACK080SD	EV-HQPACK080SD	EV-YQSOCKET080SDF
100SD*	EV-NQPACK100SD	EV-YQPACK100SD	EV-HQPACK100SD	EV-YQSOCKET100SDF
100RB*	EV-NQPACK100RB	EV-YQPACK100RB	EV-HQPACK100RB	EV-YQSOCKET100RBF
120SE*	EV-NQPACK120SE	EV-YQPACK120SE	EV-HQPACK120SE	EV-YQSOCKET120SEF

DEVELOPMENT TOOLS

8-Bit K0S MCUs









		STANDARD IN-CIRCUIT EMULATOR			LOW-COST IN-CIRCUIT EMULATOR			ALL	
DEVICE NAME	PACKAGE	EMULATOR	EMULATION BOARD	PROBE	EMULATOR	DAUGHTERBOARD	PROBE	SOCKET	PROGRAM ADAPTER
μPD789022GB-8ES μPD789024GB-8ES μPD789025GB-8ES μPD789026GB-8ES μPD78F9026AGB-8ES	44-pin QFP (10 x 10 mm)	IE-78K0S-NS	IE-789026-NS-EM1	NP-44GB-TQ	LCE-78K0S	LCE-789026-EM	LCP-44GB-250	044SA*	FA-44GB-8ES
μPD789046GB-8ES μPD78F9046GB-8ES	44-pin QFP (10 x 10 mm)	IE-78K0S-NS	IE-789046-NS-EM1	NP-44GB-TQ	LCE-78K0S	LCE-789046-EM	LCP-44GB-250	044SA*	FA-44GB-8ES
μPD789071MC-5A4 μPD789072MC-5A4 μPD789074MC-5A4 μPD78F9076MC-5A4	30-pin SSOP (300 mil)	IE-78K0S-NS	IE-789046-NS-EM1+ NP-K907	NP-30MC	LCE-78K0S	LCE-789046-EM	LCP-30MC-250	30BK*	FA-30MC
μPD789101AMC-5A4 μPD789102AMC-5A4 μPD789104AMC-5A4	30-pin SSOP (300 mil)	IE-78K0S-NS	IE-789136-NS-EM1	NP-30MC	LCE-78K0S	LCE-789136-EM	LCP-30MC-250	30BK*	FA-30MC
μPD789111AMC-5A4 μPD789112AMC-5A4 μPD789114AMC-5A4 μPD78F9116AMC-5A4 μPD78F9116MC-5A4	30-pin SSOP (300 mil)	IE-78K0S-NS	IE-789136-NS-EM1	NP-30MC	LCE-78K0S	LCE-789136-EM	LCP-30MC-250	30BK*	FA-30MC
μPD789121AMC-5A4 μPD789122AMC-5A4 μPD789124AMC-5A4	30-pin SSOP (300 mil)	IE-78K0S-NS	IE-789136-NS-EM1	NP-30MC	LCE-78K0S	LCE-789136-EM	LCP-30MC-250	30BK*	FA-30MC
μPD789131AMC-5A4 μPD789132AMC-5A4 μPD789134AMC-5A4 μPD78F9136AMC-5A4 μPD78F9136MC-5A4	30-pin SSOP (300 mil)	IE-78K0S-NS	IE-789136-NS-EM1	NP-30MC	LCE-78K0S	LCE-789136-EM	LCP-30MC-250	30BK*	FA-30MC
μPD789166GB-8ES μPD789166YGB-8ES μPD789167GB-8ES μPD789167YGB-8ES	44-pin LQFP (10 x 10 mm)	IE-78K0S-NS	IE-789177-NS-EM1	NP-44GB-TQ	LCE-78K0S	LCE-789177-EM	LCP-44GB-250	044SA*	FA-44GB-8ES
μPD789166YGA-9EU μPD789167YGA-9EU	48-pin TQFP (7 x 7 mm)	IE-78K0S-NS	IE-789177-NS-EM1	NP-48GA	LCE-78K0S	LCE-789177-EM	LCP-48GA-250	048SD*	FA-48GA

DEVICE NAME	PACKAGE	EMULATOR	EMULATION BOARD	PROBE	EMULATOR	DAUGHTERBOARD	PROBE	SOCKET	PROGRAM ADAPTER
μPD789176GB-8ES μPD789176YGB-8ES μPD789177GB-8ES μPD78F9177GB-8ES μPD789177YGB-8ES μPD78F9177YGB-8ES	44-pin LQFP (10 x 10 mm)	IE-78K0S-NS	IE-789177-NS-EM1	NP-44GB-TQ	LCE-78K0S	LCE-789177-EM	LCP-44GB-250	044SA*	FA-44GB-8ES
μPD789176YGA-9EU μPD789177YGA-9EU μPD78F9177YGA-9EU	48-pin TQFP (7 x 7 mm)	IE-78K0S-NS	IE-789177-NS-EM1	NP-48GA	LCE-78K0S	LCE-789177-EM	LCP-48GA-250	048SD*	FA-48GA
μPD789304GC-8BS μPD78F9306GC-8BS	64-pin QFP (14 x 14 mm)	IE-78K0S-NS	IE-789306-NS-EM1	NP-64GC-TQ	LCE-78K0S	LCE-789316-EM	LCP-64GC-250	064SA*	FA-64GC-8BS-A
μPD789304GK-9ET μPD78F9306GK-9ET	64-pin TQFP (12 x 12 mm)	IE-78K0S-NS	IE-789306-NS-EM1	NP-64GK	LCE-78K0S	LCE-789316-EM	LCP-64GK-250	064SB*	FA-64GK-9ET
μPD789316GC-8BS	64-pin QFP (14 x 14 mm)	IE-78K0S-NS	IE-789306-NS-EM1	NP-64GC-TQ	LCE-78K0S	LCE-789316-EM	LCP-64GC-250	064SA*	FA-64GC-8BS-A
μPD789316GK-9ET μPD78F9316GK-9ET	64-pin TQFP (12 x 12 mm)	IE-78K0S-NS	IE-789306-NS-EM1	NP-64GK	LCE-78K0S	LCE-789316-EM	LCP-64GK-250	064SB*	FA-64GK-9ET
μPD789322GB-8ET μPD789324GB-8ET μPD789326GB-8ET μPD789327GB-8ET μPD78F9328GB-8ET	52-pin LQFP (10 x 10 mm)	IE-78K0S-NS	IE-789468-NS-EM1	NP-52GB-TQ	N/A	N/A	N/A	052SB*	FA-52GB-8ET
μPD789405AGC-8BT μPD789406AGC-8BT μPD789407AGC-8BT	80-pin QFP (14 x 14 mm)	IE-78K0S-NS	IE-789418-NS-EM1	NP-80GC-TQ	LCE-78K0S	LCE-789418-EM	LCP-80GC-250	080SB*	FA-80GC-8BT
μPD789405AGK-9EU μPD789406AGK-9EU μPD789407AGK-9EU	80-pin TQFP (12 x 12 mm)	IE-78K0S-NS	IE-789418-NS-EM1	TEC-080SD	LCE-78K0S	LCE-789418-EM	LCP-80GK-250	080SD*	FA-80GK-9EU
μPD789415AGC-8BT μPD789416AGC-8BT μPD789417AGC-8BT μPD78F9418AGC-8BT	80-pin QFP (14 x 14 mm)	IE-78K0S-NS	IE-789418-NS-EM1	NP-80GC-TQ	LCE-78K0S	LCE-789418-EM	LCP-80GC-250	080SB*	FA-80GC-8BT
μPD789415AGK-9EU μPD789416AGK-9EU μPD789417AGK-9EU μPD78F9418AGK-9EU	80-pin TQFP (12 x 12 mm)	IE-78K0S-NS	IE-789418-NS-EM1	TEC-080SD	LCE-78K0S	LCE-789418-EM	LCP-80GK-250	080SD*	FA-80GK-9EU
μPD789425GK-9ET μPD789426GK-9ET	64-pin TQFP (12 x 12 mm)	IE-78K0S-NS	IE-789436-NS-EM1	NP-64GK	LCE-78K0S	LCE-789436-EM	LCP-64GK-250	064SB*	FA-64GK-9ET

DEVELOPMENT TOOLS

8-Bit K0S MCUs (cont.)

STANDARD IN-CIRCUIT EMULATOR



LOW-COST IN-CIRCUIT EMULATOR

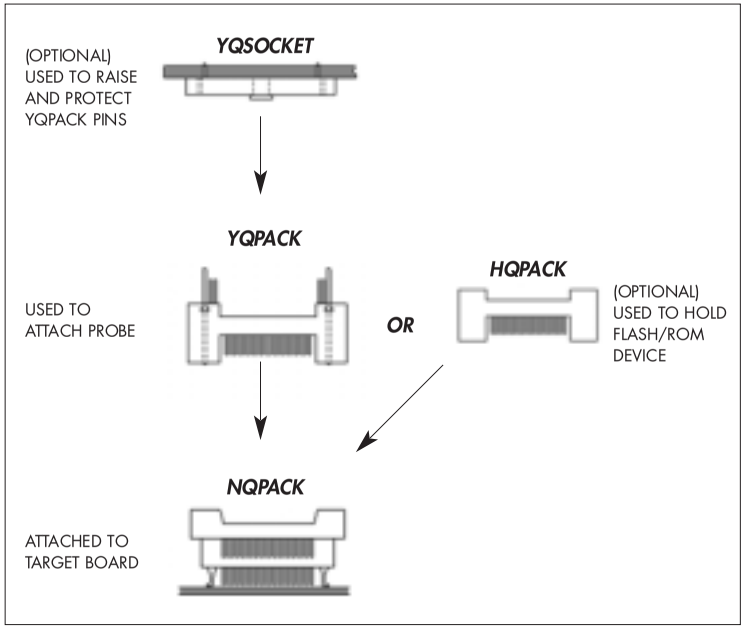


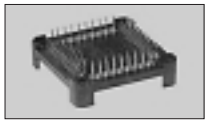
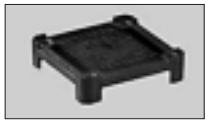
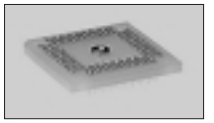
ALL


DEVICE NAME	PACKAGE	EMULATOR	EMULATION BOARD	PROBE	EMULATOR	DAUGHTERBOARD	PROBE	SOCKET	PROGRAM ADAPTER
μPD789435GK-9ET μPD789436GK-9ET μPD78F9436GK-9ET	64-pin TQFP (12 x 12 mm)	IE-78K0S-NS	IE-789436-NS-EM1	NP-64GK	LCE-78K0S	LCE-789436-EM	LCP-64GK-250	064SB*	FA-64GK-9ET
μPD789445GK-9ET μPD789446GK-9ET	64-pin TQFP (12 x 12 mm)	IE-78K0S-NS	IE-789456-NS-EM1	NP-64GK	LCE-78K0S	LCE-789456-EM	LCP-64GK-250	064SB*	FA-64GK-9ET
μPD789455GK-9ET μPD789456GK-9ET μPD78F9456GK-9ET	64-pin TQFP (12 x 12 mm)	IE-78K0S-NS	IE-789456-NS-EM1	NP-64GK	LCE-78K0S	LCE-789456-EM	LCP-64GK-250	064SB*	FA-64GK-9ET
μPD789462GB-8ET μPD78F9468GB-8ET	52-pin LQFP (10 x 10 mm)	IE-78K0S-NS	IE-789468-NS-EM1	NP-52GB-TQ	N/A	N/A	N/A	052SB*	FA-52GB-8ET
μPD789477GC-8BT μPD78F9478GC-8BT	80-pin QFP (14 x 14 mm)	IE-78K0S-NS	IE-789488-NS-EM1	NP-80GC-TQ	N/A	N/A	N/A	080SB*	FA-80GC-8BT
μPD789477GK-9EU μPD78F9478GK-9EU	80-pin TQFP (12 x 12 mm)	IE-78K0S-NS	IE-789488-NS-EM1	TEC-080SD	N/A	N/A	N/A	080SD*	FA-80GK-9EU
μPD789488GC-8BT μPD78F9488GC-8BT	80-pin QFP (14 x 1mm)	IE-78K0S-NS	IE-789488-NS-EM1	NP-80GC-TQ	N/A	N/A	N/A	080SB*	FA-80GC-8BT
μPD789488GK-9EU μPD78F9488GK-9EU	80-pin TQFP (12 x 1mm)	IE-78K0S-NS	IE-789488-NS-EM1	TEC-080SD	N/A	N/A	N/A	080SD*	FA-80GK-9EU
μPD789800GB-8ES μPD78F9801GB-8ES	44-pin LQFP (10 x 10 mm)	IE-78K0S-NS	IE-789801-NS-EM1	NP-44GB-TQ	N/A	N/A	N/A	044SA*	FA-44GB-8ES
μPD789830P	88-pin bare chip	IE-78K0S-NS	IE-789831-NS-EM1	TBD	N/A	N/A	N/A	TBD	TBD
μPD78F9831GC	100-pin LQFP (14 x 14 mm)	IE-78K0S-NS	IE-789831-NS-EM1	NP-100GC	N/A	N/A	N/A	100SD*	FA-100GC-8EU
μPD789841GB μPD78F9842GB	44-pin QFP (10 x 10 mm)	IE-78K0S-NS	IE-789842-NS-EM1	NP-44GB-TQ	N/A	N/A	N/A	044SA*	FA-44GB-8ES
μPD789850MC-5A4	30-pin SSOP (300 mil)	IE-78K0S-NS	IE-789850-NS-EM1	NP-30MC	N/A	N/A	N/A	30BK*	FA-30MC
μPD789852GB-8ES μPD78F9852GB-8ES	44-pin QFP (10 x 10 mm)	IE-78K0S-NS	IE-789852-NS-EM1	NP-44GB-TQ	N/A	N/A	N/A	044SA*	FA-44GB-8ES
μPD789860MC-5A4 μPD789861MC-5A4 μPD78E9860MC-5A4 μPD78E9861MC-5A4	20-pin SSOP (300 mil)	IE-78K0S-NS	IE-789860-NS-EM1	NP-20GS	N/A	N/A	N/A	GS-20*	FA-20MC

DEVICE NAME	PACKAGE	EMULATOR	EMULATION BOARD	PROBE	EMULATOR	DAUGHTERBOARD	PROBE	SOCKET	PROGRAM ADAPTER
µPD789881GB-8EU µPD78F9882GB-8EU	64-pin QFP (10 x 10 mm)	IE-78K0S-NS	IE-789882-NS-EM1	NP-64GB-TQ	N/A	N/A	N/A	064SD*	FA-64GB-8EU

K0S CONVERSION SOCKETS



	BOARD SOCKET (NQPACK)	PROBE ADAPTER (YQPACK)	CHIP ADAPTER (HQPACK)	HEIGHT (YQSOCKET)
GS-20*	EV-9500GS-20	–	–	–
30BK*	EV-NSPACK30BK	EV-YSPACK30BK	EV-HSPACK30BK	EV-YSSOCKET30BKF
044SA*	EV-NQPACK044SA	EV-YQPACK044SA	EV-EV-HQPACK044SA	EV-YQSOCKET044SAF
048SD*	EV-NQPACK048SD	EV-YQPACK048SD	EV-HQPACK048SD	EV-YQSOCKET048SDF
052SB*	EV-NQPACK052SB	EV-YQPACK052SB	EV-HQPACK052SB	EV-YQSOCKET052SBF
064SA*	EV-NQPACK064SA	EV-YQPACK064SA	EV-HQPACK064SA	EV-YQSOCKET064SAF
064SB*	EV-NQPACK064SB	EV-YQPACK064SB	EV-HQPACK064SB140	EV-YQSOCKET064SBF
064SD*	EV-NQPACK064SD	EV-YQPACK064SD	EV-HQPACK064SD	EV-YQSOCKET064SDF
080SB*	EV-NQPACK080SB	EV-YQPACK080SB	HQPACK080SB	EV-YQSOCKET080SBF
080SD*	EV-NQPACK080SD	EV-YQPACK080SD	EV-HQPACK080SD	EV-YQSOCKET080SDF
100SD*	EV-NQPACK100SD	EV-YQPACK100SD	EV-HQPACK100SD	EV-YQSOCKET100SDF

DEVELOPMENT TOOLS

16-Bit K4 MCUs

HARDWARE TOOLS






DEVICE NAME	PACKAGE	EMULATOR	EMULATION BOARD	PROBE	SOCKET	PROGRAM ADAPTER
μPD784031GC-8BT μPD784031YGC-8BT μPD784035GC-8BT μPD784035YGC-8BT μPD784036GC-8BT μPD784036YGC-8BT μPD784037GC-8BT μPD784037YGC-8BT μPD784038GC-8BT μPD784038YGC-8BT μPD78P4038GC-8BT μPD78P4038YGC-8BT	80-pin QFP (14 x 14 mm)	IE-78K4-NS	IE-784038-NS-EM1	NP-80GC-TQ	080SB*	PA-78P4038GC-8BT
μPD784031GK μPD784031YGK μPD784035GK μPD784035YGK μPD784036GK μPD784036YGK μPD784037GK μPD784037YGK μPD784038GK μPD784038YGK μPD78P4038GK μPD78P4038YGK	80-pin TQFP (12 x 12 mm)	IE-78K4-NS	IE-784038-NS-EM1	TEC-080SD	080SD*	PA-78P4038GK

DEVICE NAME	PACKAGE	EMULATOR	EMULATION BOARD	PROBE	SOCKET	PROGRAM ADAPTER
μPD784044GC-3B9 μPD784046GC-3B9 μPD78F4046GC-3B9	80-pin QFP (14 x 14 mm)	IE-78K4-NS	IE-784046-NS-EM1	NP-80GC-TQ	080SB*	FA-80GC
μPD784054GC-3B9	80-pin QFP (14 x 14 mm)	IE-78K4-NS	IE-784046-NS-EM1	NP-80GC-TQ	080SB*	FA-80GC
μPD784214AGC-8EU μPD784214AYGC-8EU μPD784215AGC-8EU μPD784215AYGC-8EU μPD784216AGC-8EU μPD784216AYGC-8EU μPD78F4216AGC-8EU μPD78F4216AYGC-8EU μPD784217AGC-8EU μPD784217AYGC-8EU μPD784218AGC-8EU μPD784218AYGC-8EU μPD78F4218AGC-8EU μPD78F4218AYGC-8EU μPD784214AGF-3BA μPD784214AYGF-3BA	100-pin LQFP (14 x 14 mm)	IE-78K4-NS	IE-784225-NS-EM1	NP-100GC	100SD*	FA-100GC-8EU

DEVELOPMENT TOOLS

16-Bit K4 MCUs (cont.)

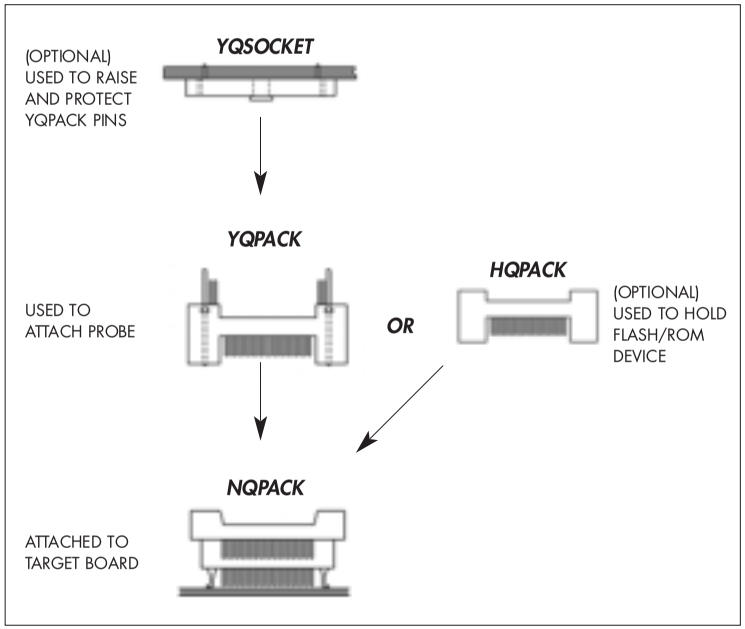
HARDWARE TOOLS

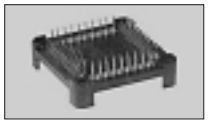
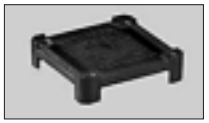
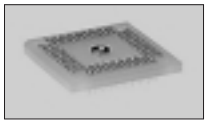





DEVICE NAME	PACKAGE	EMULATOR	EMULATION BOARD	PROBE	SOCKET	PROGRAM ADAPTER
μPD784215AGF-3BA μPD784215AYGF-3BA μPD784216AGF-3BA μPD784216AYGF-3BA μPD78F4216AGF-3BA μPD78F4216AYGF-3BA μPD784217AGF-3BA μPD784217AYGF-3BA μPD784218AGF-3BA μPD784218AYGF-3BA μPD78F4218AGF-3BA μPD78F4218AYGF-3BA μPD784224GC-8BT μPD784224YGC-8BT	100-pin QFP (14 x 20 mm)	IE-78K4-NS	IE-784225-NS-EM1	NP-100GF-TQ	100RB*	FA-100GF-3BA
μPD784225GC-8BT μPD784225YGC-8BT μPD78F4225GC-8BT μPD78F4225YGC-8BT	80-pin QFP (14 x 14 mm)	IE-78K4-NS	IE-784225-NS-EM1	NP-80GC-TQ	080SB*	FA-80GC-8BT
μPD784224GK μPD784224YGK μPD784225GK μPD784225YGK μPD78F4225GK μPD78F4225YGK	80-pin TQFP (12 x 12 mm)	IE-78K4-NS	IE-784225-NS-EM1	TEC-080SD	080SD*	FA-80GK-9EU

K4 CONVERSION SOCKETS



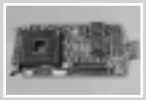
	BOARD SOCKET (NQPACK)	PROBE ADAPTER (YQPACK)	CHIP ADAPTER (HQPACK)	HEIGHT (YQSOCKET)
080SB*	EV-NQPACK080SB	EV-YQPACK080SB	HQPACK080SB	EV-YQSOCKET080SBF
100SD*	EV-NQPACK100SD	EV-YQPACK100SD	EV-HQPACK100SD	EV-YQSOCKET100SDF
100RB*	EV-NQPACK100RB	EV-YQPACK100RB	EV-HQPACK100RB	EV-YQSOCKET100RBF

DEVELOPMENT TOOLS

32-Bit V850 MCUs

DEVICE | HARDWARE TOOLS





CORE	SERIES/PART NO.	PINS	PACKAGE	ICE	PC INTERFACE	EMULATION BOARD	PROBE	SOCKET	PROGRAMMER	PROGRAM ADAPTER
V850	***V853A*** µPD703003A µPD703004A µPD703025A µPD70F3003A µPD70F3025A µPD703003A	100	GC-8EU	IE-703002-MC	IE-70000-PCI-IF-A (PCI) or IE-70000-CD-IF-A (PCMCIA)	IE-703003-MC-EM1	SC100SDN or SWEX100SD	Set 100 GC*	PG-FP4	FA-100GC or FA-100GC-8EU-A
	V850/SA1 µPD703014B µPD703015B µPD703017A µPD70F3015B µPD70F3017A	100	GC-8EU			IE-703017-MC-EM1	SC100SDN or SWEX100SD	Set 100 GC*		FA-100GC or FA-100GC-8EU-A
	µPD703014A µPD703015A µPD703017A µPD70F3017A	121	F1-EA6				SWEX120SD	Set B_121*		FA-121FPBGA
	V850/SB1 µPD703031B µPD703033B µPD70F3033B	100	GC-8EU			IE-703037-MC-EM1	SC100SDN or SWEX100SD	Set 100 GC*		FA-100GC or FA-100GC-8EU-A
	µPD703030B µPD703031B µPD703032A µPD703033B µPD70F3032B µPD70F3033B	100	GF-3BA				SC100SDN or SWEX100SD but always NEXB-100SD/R	Set 100 GF		FA-100GF-3BA
	V850/SF1 µPD703075A µPD703076A µPD703078A µPD703079A µPD70F3079A	100	GC-8EU			IE-703079-MC-EM1	SC100SDN or SWEX100SD[1]	Set 100 GC*		FA-100GC or FA-100GC-8EU-A

[1]For SC100SDN, SWEX100 SD or Yamaichi sockets, please contact TPS.

CORE	SERIES/PART NO.	PINS	PACKAGE	ICE	PC INTERFACE	EMULATION BOARD	PROBE	SOCKET	PROGRAMMER	PROGRAM ADAPTER
V850 (cont.)	***V850/SC3*** μPD703088 μPD703089 μPD70F3089	144	GJ-UEN	IE-703002-MC	IE-70000-PCI-IF-A (PCI) or IE-70000-CD-IF-A (PCMCIA)	IE-703089-MC-EM1 IF.FA (PCMCIA)	SC144SDN or SWEX144SD	Set 144*	PG-FP4	FA-144GJ-UEN
V850ES	***V850ES/SA2*** μPD703201 μPD70F3201	100	GC-8EU	IE-V850ES-G1	IE-70000-PCI-IF-A (PCI) or IE-70000-CD-IF-A (PCMCIA)	IE-703204-G1-EM1	SWEX100SD	Set 100 GC*	PG-FP4	FA-100GC or FA-100GC-8EU-A
	V850ES/SA3 μPD703204 μPD70F3204		F1-EA6				SWEX120SE	Set B 121*		FA-121FPBGA
	V850ES/KF1 μPD703208 μPD703209 μPD703210 μPD70F3210	80	GC-8BT			IE-703217-G1-EM1	TBD	Set 80 GC*		FA-80GC-8BT
	μPD703208 μPD703209 μPD703210 μPD70F3210		GK-9EU				TBD	Set 80 GK*		FA-80GK-9EU
	V850ES/KG1 μPD703212 μPD703213 μPD703214 μPD70F3214	100	GC-8EU				TBD	Set 100 GC*		FA-100GC or 100GC-8EU-A
	V850ES/KJ1 μPD703216 μPD703217 μPD70F3217	144	GJ-UEN	IE-V850ES-G1		IE-703217-G1-EM1	TBD	Set 144*		FA-144GJ-UEN
V850E	***V850E/IA1*** μPD703116 μPD70F3116	144	GJ-UEN		IE-70000-PCI-IF-A (PCI) or IE-70000-CD-IF-A (PCMCIA)	IE-703116-MC-EM1	SC144SDN or SWEX144SD	Set 144*	PG-FP4	FA-144GJ-UEN
	V850E/IA2 μPD703114 μPD70F3114	100	GC-8EU			IE-703114-MC-EM1	SC100SDN or SWEX100SD	Set 100 GC*		FA-100GC or FA-100GC-8EU-A

DEVELOPMENT TOOLS

32-Bit V850 MCUs (cont.)

DEVICE

HARDWARE TOOLS

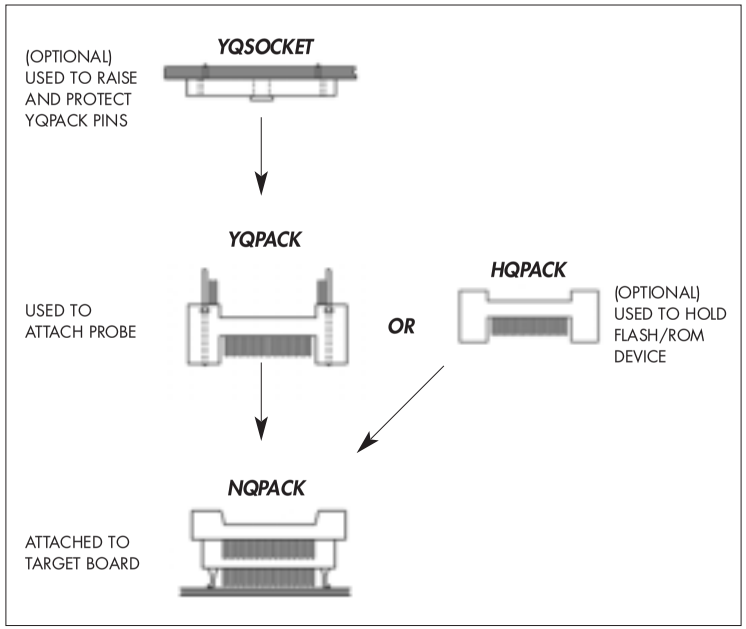







CORE	SERIES/PART NO.	PINS	PACKAGE	ICE	PC INTERFACE	EMULATION BOARD	PROBE	SOCKET	PROGRAMMER	PROGRAM ADAPTER
V850E	***V850E/MA1*** μPD703103A μPD703105A μPD703106A μPD703107A μPD70F3107 μPD70F3107A μPD703106A μPD703107A μPD70F3107A	144	GJ-UEN	IE-V850E-MC-A	IE-70000-PCI-IF-A (PCI) or IE-70000-CD-IF-A (PCMCIA)	IE-703107-MC-EM1	SC144SDN or SWEX144SD	Set 144*	PG-FP4	FA-144GJ-UEN
	μPD703106A μPD703107A μPD70F3107A	161	F1-EN4				SC144SDN or SWEX144SD	Set B 161*		FA-161FPBGA
	V850E/MA2 μPD703108	100	GC-8EU			IE-703107-MC-EM1+ VPV850E/MA1-MA2	SC100SDN or SWEX100SD	Set 100 GC*		FA-100GC or FA100GC-8EU-A
	V850E/MS1 μPD703100 μPD703100 μPD703101 μPD703102	144	GJ-UEN	IE-703102-MC		IE-703102-MC-EM1 (5V)	SC144SDN or SWEX144SD	Set 144*		FA-144GJ-UEN
	V850E/MS2 μPD703130	100	GC-8EU			IE-703102-MC-EM1+ VP-V850E/MS1-MS2	SC100SDN or SWEX100SD	Set 100 GC*		FA-100GC or FA-100GC-8EU-A

V850 CONVERSION SOCKETS



	BOARD SOCKET	ICE SOCKET	CHIP ADAPTER	PROBE ADPTER	HEIGHT ADAPTER	GUIDE PINS
Set 80GC*	NQPACK080SB	–	HQPACK080SB	YQPACK080SB	YQSOCKET080SBF (1x socket)	YQPACKGUIDEPINS
Set 80GK*	TGK-080SDW	–	NONE	NONE	TQSOCKET080SD-W (1x socket)	YQPACKGUIDEPINS
Set 100GC*	NQPACK100SD	–	HQPACK100SD	YQPACK100SD	YQSOCKET100SDF (1x socket) or YQSOCKET100SD-F2 (2x socket)	YQPACKGUIDEPINS
Set 100GF*	NQPACK100RB	–	HQPACK100RB	YQPACK100RB	YQSOCKET100RB-F (1x socket) or YQSOCKET100RB-F2 (2x socket)	YQPACKGUIDEPINS
Set 128*	NQPACK128SD220	–	HQPACK128SD220	YQPACK128SD220	YQSOCKET128SD220F (1x socket) or YQSOCKET128SD220F2 (2x socket)	YQPACKGUIDEPINS
Set 144*	NQPACK144SD	–	HQPACK144SD	YQPACK144SD	YQSOCKET144SDF (1x socket) or YQSOCKET144SD-F2 (2x socket)	YQPACKGUIDEPINS
Set B_121	CSPACK121A1312N02	CSICE121A1312N02	–	–	–	–
Set B_157	LSPACK157A1614N01	CSICE157A1614N01	–	–	–	–
Set B_161	CSSOCKET161A1413N01+ LSPACK161A1413N01	ICSICE161A1413N02	–	–	–	–
Set B_157	LSPACK157A1614N01	CSICE157A1614N01	–	–	–	–
Set B_161	CSSOCKET161A1413N01+ LSPACK161A1413N01	CSICE161A1413N02	–	–	–	–

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