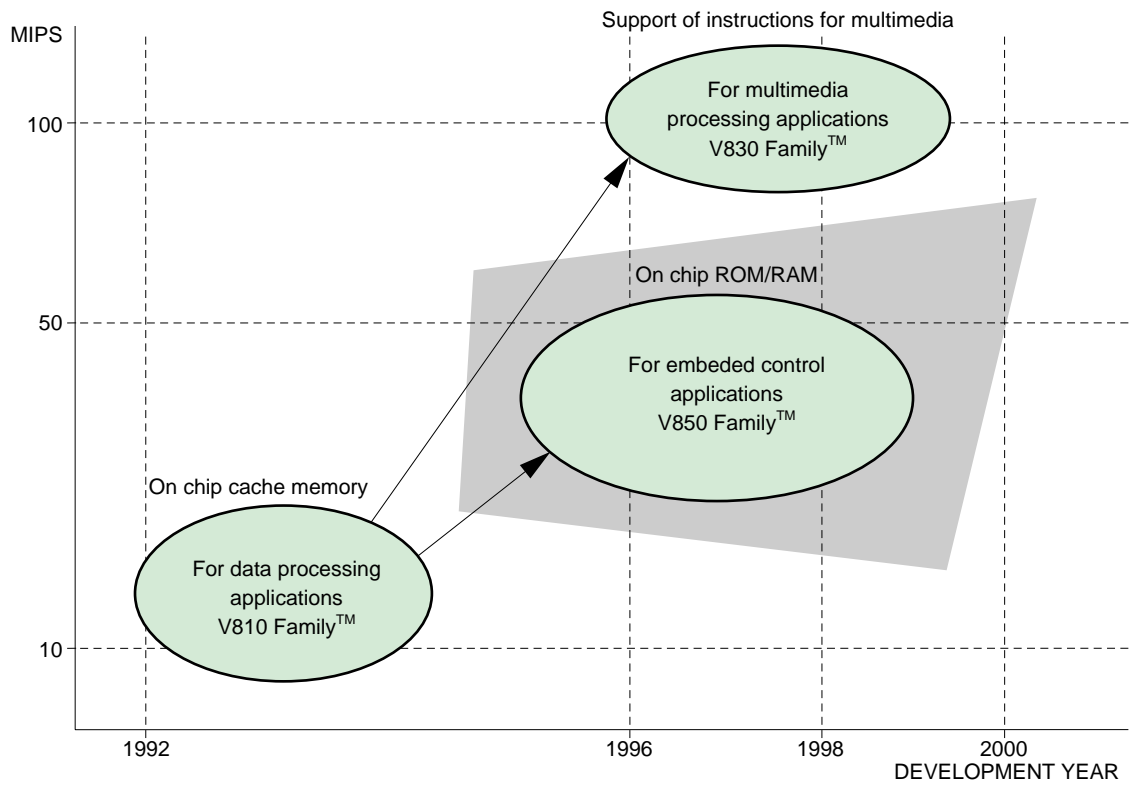


CD-ROM Microcomputer (32-Bit)

32-Bit Microprocessor

V800 Series™

■ V800 Series Road Map



32-Bit Microprocessor

V810 Family, V830 Family

Part number	μ PD70741	μ PD705101	μ PD705102*
Alias	V821™	V831™	V832™
Performance	16 MIPS/25 MHz	118 MIPS/100 MHz	170 MIPS/143 MHz
Operating frequency	25 MHz	100 MHz	143 MHz
Operating voltage	4.5 to 5.5 V	3.0 to 3.6 V	2.3 to 2.7 V 3.0 to 3.6 V
Power consumption (max.)	500 mW (5 V/25 MHz)	550 mW (3.3 V/100 MHz)	350 mW (2.5 V, 3.3 V/143 MHz)
Address bus	24-bit	24-bit	
Data bus	16-bit	16-/32-bit	
Address space	Internal: 4 G bytes External: 64M bytes (maximum)	Internal: 4 G bytes External: 128M bytes (maximum)	
Cache	Instruction cache: 1K bytes	Instruction cache: 4K bytes, Data cache: 4K bytes	
Internal RAM	—	Instruction RAM: 4K bytes, Data RAM: 4K bytes	
DSP	—	32 bits	
Peripheral I/O	Timer	2 channels	2 channels
	Interrupt	External: 9, Internal: 11	External: 9, Internal: 11
	Serial I/O	2 channels	2 channels
	DMA	2 channels	4 channels
	Memory interface	Fast page mode DRAM, SRAM, I/O, Page-ROM	EDO DRAM, SRAM, I/O, Page-ROM
Others	Watchdog timer	Debug controller	
Package	100-pin plastic QFP	160-pin plastic LQFP	
Development tools	Real-time OS	Real-time OS, task debugger, C compiler, system performance analyzer, device file	
Applications	Printers, facsimiles, word processors, game machines, car navigation, PDAs, etc.	Internet/intra-net systems, car navigation, color facsimile machines, high-performance TVs, etc.	Internet/intra-net systems, car navigation, color facsimile machines, digital still cameras, etc.

* : Under development

32-Bit Single-Chip Microcontroller

V850 Family

■ V850E/MS1™

Part number		μ PD703100/ μ PD703100-A*	μ PD703101/ μ PD703101-A*	μ PD703102/ μ PD703102-A*	μ PD70F3102/ μ PD70F3102-A*
CPU core		V850E			
CPU performance (Dhrystone)		—	43 MIPS (33 MHz)		
On-chip ROM (bytes)		—	96K	128K	128K (Flash memory)
On-chip RAM (bytes)		4K			
External bus interface	Address bus	24-bit			
	Data bus	16-bit			
	Programmable wait	0 to 7			
Interrupt controller		External: 25, Internal: 47			
DSP	$32 \times 32 \rightarrow 64$	0.025 to 0.05 μ s (40 MHz)	0.03 to 0.06 μ s (33 MHz)		
	$32 \times 32 + 32 \rightarrow 32$	0.075 μ s (40 MHz)	0.09 μ s (33 MHz)		
	$16 \times 16 \rightarrow 32$	—			
	$16 \times 16 + 32 \rightarrow 32$	—			
Timer/counter (RPU)		16-bit \times 8 channels			
Serial interface (SIO)	CSI	2 channels			
	CSI/I ² C	—			
	CSI/UART	2 channels			
	UART	—			
	Dedicated baud rate generator	3 channels			
A/D converter		10-bit resolution \times 8 channels			
DMA controller		4 channels			
Real-time output port		—			
Port	Input/output	114			
	Input	9			
Other peripheral function		Memory access control function (Direct connectable various memory)			
Power save function		HALT/IDLE/STOP			
Operating frequency		2 to 40 MHz	2 to 33 MHz		
Operating voltage		Internal unit: 3.3 V, A/D converter: 5 V/3.3 V, External pin: 5 V/3.3 V			
Power consumption (TYP.)		570 mW/ 360 mW (40 MHz)	470 mW/300 mW (33 MHz)		
Package		144-pin plastic LQFP (20 \times 20 mm) 157-pin plastic FBGA (14 \times 14 mm)*			
Development tools		Real-time OS, task debugger, C compiler, debugger, system performance analyzer, device file, in-circuit emulator			
Applications		Printers, facsimiles, PPCs, digital still cameras, video printers, DVD systems, etc.			

*: Except μ PD703100, 703101, 703102, 70F3102

*: Under development

32-Bit Single-Chip Microcontroller

V850 Family

■ V850/SA1™

Part number		μ PD703015/ μ PD703015Y	μ PD703017*/ μ PD703017Y*	μ PD70F3017*/ μ PD70F3017Y*
CPU core		V850		
CPU performance (Dhrystone)		19 MIPS (17 MHz)		
On-chip ROM (bytes)		128K	256K	256K (Flash memory)
On-chip RAM (bytes)		4K	8K	
External bus interface	Address bus	22-bit		
	Data bus	16-bit		
	Programmable wait	0 to 3		
Interrupt controller		External: 8, Internal: 23		
DSP	$32 \times 32 \rightarrow 64$	—		
	$32 \times 32 + 32 \rightarrow 32$	—		
	$16 \times 16 \rightarrow 32$	0.059 to 0.118 μ s (17 MHz)		
	$16 \times 16 + 32 \rightarrow 32$	0.177 μ s (17 MHz)		
Timer/counter (RPU)		16-bit \times 2 channels 8-bit \times 4 channels (Cascade connection supported)		
Serial interface (SIO)	CSI	2 channels/1 channel	2 channels/1 channel	2 channels/1 channel
	CSI/I ² C	0 channels/1 channel	0 channels/1 channel	0 channels/1 channel
	CSI/UART	1 channel		
	UART	1 channel		
	Dedicated baud rate generator	2 channels (UART only)		
A/D converter		10-bit resolution \times 12 channels		
DMA controller		3 channels (internal RAM \leftrightarrow internal peripheral I/O)		
Real-time output port		8-bit \times 1 or 4-bit \times 2		
Port	Input/output	72		
	Input	13		
Other peripheral function		Watch timer: 1 channel Watchdog timer: 1 channel		
Power save function		HALT/IDLE/STOP		
Operating frequency		1 to 17 MHz (main clock, 3 V) 32.768 kHz (subclock)		
Operating voltage		2.7 to 3.6 V		
Power consumption (TYP.)		30 mW (main clock: 10 MHz, 3 V)		
Package		100-pin plastic LQFP (14 \times 14 mm) 121-pin plastic FBGA (12 \times 12 mm)		
Development tools		Real-time OS, task debugger, C compiler, debugger, system performance analyzer, device file, in-circuit emulator		
Applications		Portable equipment such as camcorders, PHS (Personal Handyphone System), digital still cameras, cellular phones, portable MDs, etc.		

* : Under development

32-Bit Single-Chip Microcontroller

V850 Family

■ V850/SB1™, V850/SB2™

Part number		μ PD703033*/ μ PD703033Y*	μ PD70F3033*/ μ PD70F3033Y*	μ PD70F3035*/ μ PD70F3035Y*
Alias		V850/SB1™		V850/SB2™
CPU core		V850		
CPU performance (Dhrystone)		22 MIPS (20 MHz)		
On-chip ROM (bytes)		256K	256K (Flash memory)	
On-chip ROM (bytes)		16K		
External bus interface	Address bus	22-bit		
	Data bus	16-bit		
	Programmable wait	0 to 3		
Interrupt controller		External: 8, Internal: 30 (31 for Y products)		External: 8 Internal: 32 (33 for Y products)
DSP	32 × 32 → 64	—		
	32 × 32 + 32 → 32	—		
	16 × 16 → 32	0.050 to 0.100 μ s (20 MHz)		
	16 × 16 + 32 → 32	0.150 μ s (20 MHz)		
Timer/counter (RPU)		16-bit × 2 channels 8-bit × 6 channels (Cascade connection supported)		
Serial interface (SIO)	CSI	3 channels/1 channel	3 channels/1 channel	3 channels/1 channel
	CSI/I ² C	0 channels/2 channels	0 channels/2 channels	0 channels/2 channels
	CSI/UART	2 channels		
	UART	—		
	Dedicated baud rate generator	3 channels		
A/D converter		10-bit resolution × 12 channels		
DMA controller		6 channels (internal RAM ↔ internal peripheral I/O)		
Real-time output port		8-bit × 1 or 4-bit × 2		
Port	Input/output	71		
	Input	12		
Other peripheral function		Watch timer: 1 channel Watchdog timer: 1 channel		Watch timer: 1 channel Watchdog timer: 1 channel IEBus (Simple version)
Power save function		HALT/IDLE/STOP		
Operating frequency		2 to 20 MHz (main clock) 32.768 kHz (subclock)		
Operating voltage		4.5 to 5.5 V		
Power consumption (TYP.)		40 mW (target value) (main clock: 5 V, 10 MHz)		
Package		100-pin plastic LQFP (14 × 14 mm) 100-pin plastic QFP (14 × 20 mm)		
Development tools		Real-time OS, task debugger, C compiler, debugger, system performance analyzer, device file, in-circuit emulator		
Applications		AV equipment such as car audio systems, TVs, and VCRs, and other applications		

* : Under development

32-Bit Single-Chip Microcontroller

V850 Family

■ V854™

Part number		μ PD703006	μ PD703008	μ PD703008Y	μ PD70F3008* _J μ PD70F3008Y*
CPU core		V850			
CPU performance (Dhrystone)		—	29 MIPS (25 MHz)	38 MIPS (33 MHz)	18 MIPS (16 MHz)
On-chip ROM (bytes)		—	128K		128K (Flash memory)
On-chip RAM (bytes)		4K			
External bus interface	Address bus	24-bit			
	Data bus	16-bit			
	Programmable wait	0 to 3			
Interrupt controller		External: 22, Internal: 31			
DSP	$32 \times 32 \rightarrow 64$	—			
	$32 \times 32 + 32 \rightarrow 32$	—			
	$16 \times 16 \rightarrow 32$	0.03 to 0.06 μ s (33 MHz)	0.04 to 0.08 μ s (25 MHz)	0.03 to 0.06 μ s (33 MHz)	0.06 to 0.12 μ s (16 MHz)
	$16 \times 16 + 32 \rightarrow 32$	0.09 μ s (33 MHz)	0.12 μ s (25 MHz)	0.09 μ s (33 MHz)	0.18 μ s (16 MHz)
Timer/counter (RPU)		24-bit \times 2 channels 16-bit \times 6 channels			
Serial interface (SIO)	CSI	3 channels	3 channels	2 channels	3 channels/2 channels
	CSI/I ² C	0 channels	0 channels	1 channel	0 channels/1 channel
	CSI/UART	1 channel			
	UART	—			
	Dedicated baud rate generator	4 channels			
A/D converter		8-bit resolution \times 16 channels			
DMA controller		—			
Real-time output port		8			
Port	Input/output	96			
	Input	16			
Other peripheral function		PWM: 4 channels (12 to 16-bit resolution)			
Power save function		HALT/IDLE/STOP			
Operating frequency		2 to 33 MHz (3.3 V)	2 to 25 MHz (3 V)	2 to 33 MHz (3.3 V)	2 to 16 MHz (3.3 V)
Operating voltage		3.0 to 3.6 V	2.7 to 3.6 V	3.0 to 3.6 V	3.1 to 3.6 V
Power consumption (TYP.)		195 mW (3.3 V, 33 MHz)	120 mW (3 V, 25 MHz)	195 mW (3.3 V, 33 MHz)	136 mW (3.3 V, 16 MHz)
Package		144-pin plastic LQFP (20 \times 20 mm)			
Development tools		Real-time OS, task debugger, C compiler, debugger, simulator, system performance analyzer, device file, in-circuit emulator			
Applications		Low-voltage-operation equipment including camcorders, VCRs, cellular phones, PDAs, and digital still cameras			

* : Under development

32-Bit Single-Chip Microcontroller

V850 Family

■ V853™

Part number		μ PD703003/ μ PD703003A*	μ PD703004A*	μ PD70F3003	μ PD70F3003A*	μ PD703025A*	μ PD70F3025A*
CPU core		V850					
CPU performance (Dhrystone)		38 MIPS (33 MHz)		29 MIPS (25 MHz)	38 MIPS (33 MHz)		
On-chip ROM (bytes)		128K	96K	128K (Flash memory)		256K	256K (Flash memory)
On-chip RAM (bytes)		4K				8K	
External bus interface	Address bus	20-bit					
	Data bus	16-bit					
	Programmable wait	0 to 3					
Interrupt controller		External: 17, Internal: 32					
DSP	$32 \times 32 \rightarrow 64$	—					
	$32 \times 32 + 32 \rightarrow 32$	—					
	$16 \times 16 \rightarrow 32$	0.03 to 0.06 μ s (33 MHz)					
	$16 \times 16 + 32 \rightarrow 32$	0.09 μ s (33 MHz)					
Timer/counter (RPU)		16 bit \times 5 channels					
Serial interface (SIO)	CSI	2 channels					
	CSI/I ² C	—					
	CSI/UART	2 channels					
	UART	—					
	Dedicated baud rate generator	3 channels					
A/D converter		10-bit resolution \times 8 channels					
DMA controller		—					
Real-time output port		—					
Port	Input/output	67					
	Input	8					
Other peripheral function		PWM: 4 ch (8/9/10/12-bit resolution) D/A converter: 2 channels					
Power save function		HALT/IDLE/STOP					
Operating frequency		5 to 33 MHz (5 V)		5 to 25 MHz (5 V)	5 to 33 MHz (5 V)		
Operating voltage		4.5 to 5.5 V		4.75 to 5.25 V	4.5 to 5.5 V		
Power consumption (TYP.)		450 mW/365 mW (5 V, 33 MHz)	365 mW (5 V, 33 MHz)	385 mW (5 V, 25 MHz)	425 mW (5 V, 33 MHz)	450 mW (5 V, 33 MHz)	480 mW (5 V, 33 MHz)
Package		*	100-pin plastic LQFP (14 \times 14 mm)	100-pin plastic QFP (14 \times 14 mm)	100-pin plastic LQFP (14 \times 14 mm)		
Development tools		Real-time OS, task debegger, C compiler, debugger, simulator, system performance analyzer, device file, in-circuit emulator					
Applications		HDDs, PPCs, VCRs, motor control, robots, LBPs, printers, NC machine tools, single-lens reflex cameras, digital still cameras, etc.					

- *: • 100-pin plastic QFP (14 \times 14 mm)
• 100-pin plastic LQFP (14 \times 14 mm)

★: Under development

32-Bit Single-Chip Microcontroller

V850 Family

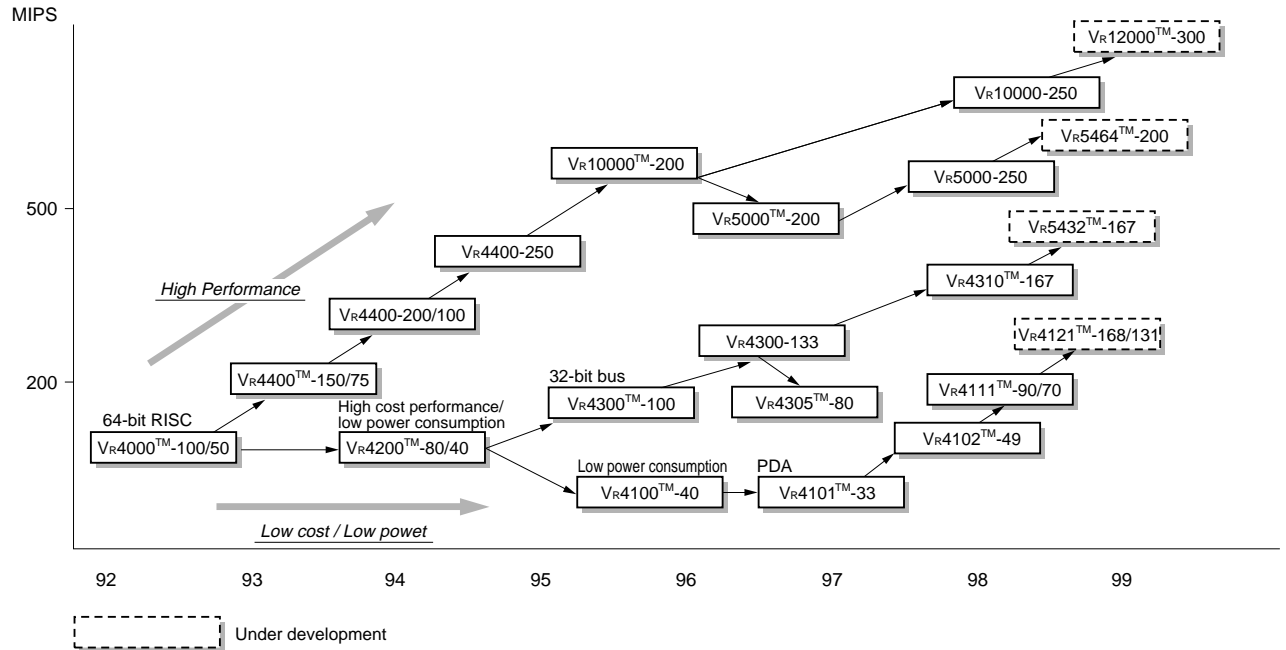
■ V852™

Part number		μ PD703002	μ PD70P3002
CPU core		V850	
CPU performance (Dhrystone)		29 MIPS (25 MHz)	
On-chip ROM (bytes)		90K	90K (PROM)
On-chip RAM (bytes)		3K	
External bus interface	Address bus	24-bit	
	Data bus	16-bit	
	Programmable wait	0 to 3	
Interrupt controller		External: 9, Internal: 16	
DSP	$32 \times 32 \rightarrow 64$	—	
	$32 \times 32 + 32 \rightarrow 32$	—	
	$16 \times 16 \rightarrow 32$	0.04 to 0.08 μ s (25 MHz)	
	$16 \times 16 + 32 \rightarrow 32$	0.12 μ s (25 MHz)	
Timer/counter (RPU)		16-bit \times 2 channels	
Serial interface (SIO)	CSI	3 channels	
	CSI/I ² C	—	
	CSI/UART	—	
	UART	1 channel	
	Dedicated baud rate generator	2 channels	
A/D converter		—	
DMA controller		—	
Real-time output port		—	
Port	Input/output	67	
	Input	1	
Other peripheral function		—	
Power save function		HALT/IDLE/STOP	
Operating frequency		3 to 25 MHz (5 V)	
Operating voltage		4.5 to 5.5 V	
Power consumption (TYP.)		250 mW (5 V, 25 MHz)	320 mW (5 V, 25 MHz)
Package		<ul style="list-style-type: none"> • 100-pin plastic QFP (14 \times 14 mm) • 100-pin plastic LQFP (14 \times 14 mm) 	100-pin plastic QFP (14 \times 14 mm)
Development tools		Real-time OS, task debugger, C compiler, debugger, simulator, system performance analyzer, device file, in-circuit emulator	
Applications		HDDs, PPCs, VCRs, motor control, robots, LBPs, printers, NC machine tools, digital phones, engine control, etc.	

64-Bit Microprocessor

VR Series™

■ VR Series Road Map



64-Bit Microprocessor

VR Series

■ VR Series Products (1/2) 

Part number	μ PD30121*		μ PD30200		μ PD30210	μ PD30500
Alias	VR4121		VR4300	VR4305	VR4310	VR5000
Internal frequency	131 MHz	168 MHz	100 MHz 133 MHz	80 MHz	167 MHz	200 MHz 250 MHz
Operating voltage	External: 3.3 V Internal: 2.5 V		3.3 V			3.3 V
Cache size	Instruction: 16K bytes Data: 8K bytes		Instruction: 16K bytes Data: 8K bytes			Instruction: 32K bytes Data: 32K bytes
Performance	163 MIPS	208 MIPS	177 MIPS 80 SPECint92 60 SPECfp92	106 MIPS 48 SPECint92 36 SPECfp92	222 MIPS 100 SPECint92 75 SPECfp92	391 MIPS 6.8 SPECint95 6.8 SPECfp95
Features	CPU core: VR4120™ On-chip peripheral function ideal for PDAs High-speed processing by 168 MHz operation and 0.25 μ m process rule Low power consumption design		Software compatible with VR4000 Series 32-bit external bus High-speed floating-point operation		Software compatible with VR4300 32-bit external bus High-speed floating-point operation	Two-way superscalar On-chip large primary cache On-chip secondary cache interface
Package	224-pin plastic FBGA		120-pin plastic QFP			272-pin plastic BGA 223-pin ceramic PGA
Applications	PDAs such as handheld PCs and palm-size PCs		Embedded equipment for LBP, and game machines			High-end embedded equipment for color LBPs, network routers, etc

*: Under development

64-Bit Microprocessor

VR Series

■ VR Series Products (2/2) ◀

Part number	μ PD30540*	μ PD30541*	μ PD30700		μ PD30710
Alias	VR5464	VR5432	VR10000		VR12000
Internal frequency	200 MHz	167 MHz	200 MHz	250 MHz	300 MHz
Operating voltage	External: 3.3 V, Internal: 2.5 V		3.3 V	2.6 V	2.6 V
Cache size	Instruction: 32K bytes Data: 32K bytes		Instruction: 32K bytes Data: 32K bytes		
Performance	309 MIPS 7 SPECint95 4 SPECfp95	258 MIPS 6.6 SPECint95 3.6 SPECfp95	9.0 SPECint95 19.0 SPECfp95	14 SPECint95 23 SPECfp95	16.8 SPECint95 27.8 SPECfp95
Features	Two-way superscalar On-chip large primary cache with line-lock function Hardware debugging function		Five-way superscalar On-chip FPU and MMU On-chip multiprocessor and secondary cache interface		
Package	272-pin plastic BGA	208-pin plastic QFP	599-pin ceramic LGA		
Applications	High-end embedded equipment for color LBPs and STB, etc.		Advanced WSs, servers		

* : Under development

Development Tools

75XL Series Software Tools

■ List of Software Tools

Host machine	Software tool name
PC-9800 Series	Relocatable assembler RA75X
IBM PC/AT™ and compatibles	
PC98-NX Series	IE control program IE75X

■ List of Device Files

Target device	Device file name	Target device	Device file name	Target device	Device file name
μ PD750004	DF750008	μ PD753036	DF753036	μ PD754144	DF754244
μ PD750006				μ PD754244	
μ PD750008					
μ PD750104		μ PD753104	DF753108	μ PD754202	DF754202
μ PD750106		μ PD753106			
μ PD750108		μ PD753108			
μ PD750064	DF750068	μ PD753204	DF753208	μ PD754264	DF754264
μ PD750066		μ PD753206			
μ PD750068		μ PD753208			
μ PD753012A	DF753017	μ PD753304	DF753304	μ PD754302	DF754304
μ PD753016A				μ PD754304	
μ PD753017A					

Development Tools

75XL Series Hardware Tools

■ Common Hardware Tools

Tool name	Product name
In-circuit emulator	IE-75001-R
Emulation board	IE-75300-R-EM

■ List of Hardware Tools

Target device		Emulation probe	Conversion socket/ Conversion adapter/ Flexible board
Device name	Package		
μ PD750004 μ PD750006 μ PD750008	42-pin SDIP (600 mil) 44-pin QFP (10 × 10)	EP-75008CU-R EP-75008GB-R	– EV-9200G-44
μ PD750104 μ PD750106 μ PD750108	42-pin SDIP (600 mil) 44-pin QFP (10 × 10)	EP-75008CU-R EP-75008GB-R	– EV-9200G-44
μ PD750064 μ PD750066 μ PD750068	42-pin SDIP (600 mil) 42-pin SSOP (375 mil)	EP-750068CU-R EP-750068GT-R	– EV-9500GT-42
μ PD753012A μ PD753016A μ PD753017A	80-pin QFP (14 × 14) 80-PIN TQFP (12 × 12)	EP-753017GC-R EP-753017GK-R	EV-9200GC-80 TGK-080SDW*
μ PD753036	80-pin QFP (14 × 14) 80-pin TQFP (12 × 12)	EP-75336GC-R EP-75336GK-R	EV-9200GC-80 TGK-080SDW*
μ PD753104 μ PD753106 μ PD753108	64-pin QFP (14 × 14) 64-pin LQFP (12 × 12)	EP-753108GC-R EP-753108GK-R	EV-9200GC-64 TGK-064SBW*
μ PD753204 μ PD753206 μ PD753208	48-pin SSOP (375 mil)	EP-753208GT-R	EV-9500GT-48
μ PD753304	42-pin SDIP (600 mil) (ES only)	EP-753304DU-R (ES only)	–
μ PD754144 μ PD754244 μ PD754264	20-pin SOP (300 mil) 20-pin SSOP (300 mil) 20-pin SOP (300 mil)	EP-754144GS-R	EV-9501GS-20 EV-9500GS-20 EV-9501GS-20
μ PD754202	20-pin SOP (300 mil) 20-pin SSOP (300 mil)	EP-754144GS-R	EV-9501GS-20 EV-9500GS-20
μ PD754302 μ PD754304	36-pin SSOP (300 mil)	EP-754304GS-R	EV-9500GS-36

*: This is a product of Tokyo Eletech Corporation.

Development Tools

17K Series Software Tools

■ List of Software Tools

Host machine	Software tool name
PC-9800 Series	Relocatable assembler RA17K
IBM PC/AT and compatibles	C-like compiler <i>emlC-17K™</i>
PC98-NX Series	Integrated debugger <i>SIMPLEHOST™</i>

■ List of Device Files

Target device	Device file name	Target device	Device file name	Target device	Device file name
μ PD17001	AS17001	μ PD17053	AS17053	μ PD17933A	AS17934
μ PD17003A	AS17003	μ PD17062	AS17062	μ PD17934A	
μ PD17005	AS17005	μ PD17068	AS17068	μ PD17201A	AS17201
μ PD17010	AS17010	μ PD17071	AS17071	μ PD17203A	AS17203
		μ PD17072		μ PD17204	AS17204
		μ PD17073		μ PD17207	AS17207
μ PD17012	AS17012	μ PD17704	AS17707	μ PD17225	AS17225
		μ PD17705		μ PD17226	
		μ PD17707		μ PD17227	
μ PD17015	AS17015	μ PD17708		μ PD17228	AS17235*
		μ PD17709		μ PD17235*	
		μ PD17717		μ PD17236*	
μ PD17016	AS17016	μ PD17718			
μ PD17017		μ PD17719			

*: Under development

Development Tools

17K Series Hardware Tools

■ Common Hardware Tools

Tool name	Product name
In-circuit emulator	IE-17K IE-17K-ET EMU-17K*

*: This is a product of I.C Corporation.

■ List of Hardware Tools (1/2)

Target device		SE board	Emulation probe	Conversion socket/ Conversion adapter/ Flexible board
Device name	Package			
μ PD17001	48-pin QFP	SE-17001	EP-17001GH	EV-9200GH-48
μ PD17003A	80-pin QFP	SE-17010	EP-17003GF	EV-9200G-80
μ PD17005	80-pin QFP	SE-17010	EP-17003GF	EV-9200G-80
μ PD17010	80-pin QFP	SE-17010	EP-17003GF	EV-9200G-80
μ PD17012	64-pin QFP	SE-17012	EP-17202GF	EV-9200G-64
μ PD17015	38-pin SSOP	SE-17015	EP-17K38GT	EV-9500GT-38
μ PD17016	80-pin QFP	SE-17010	EP-17003GF	EV-9200G-80
μ PD17017				
μ PD17053	64-pin SDIP	SE-17053	EP-17052CW	–
μ PD17062	48-pin SDIP	SE-17002	EP-17002CU	–
	64-pin QFP		EP-17002GC	EV-9200GC-64
μ PD17068	100-pin QFP	SE-17008	EP-17068GF	EV-9200GF-100
μ PD17071	56-pin QFP	SE-17072	EP-17K56GB -1 (Bend lead package)	TGB-056SBW*
μ PD17072			EP-17K56GB-2 (Inverted lead package)	
μ PD17073			64-pin TQFP	EP-17K64GB

*: This is a product of Tokyo Eletech Corporation.

Development Tools

17K Series Hardware Tools

■ List of Hardware Tools (2/2) ◀ Common Hardware Tools

Target device		SE board	Emulation probe	Conversion socket/ Conversion adapter/ Flexible board
Device name	Package			
μPD17704 μPD17705 μPD17707 μPD17708 μPD17709 μPD17717 μPD17718 μPD17719	80-pin QFP	SE-17709	EP-17K80GC	EV-9200GC-80
μPD17933A μPD17934A	80-pin QFP	SE-17934	EP-17K80GK	TGB-080SDP*
μPD17201A	80-pin QFP (14 × 20)	SE-17207	EP-17201GF	EV-9200G-80
μPD17203A μPD17204	52-pin QFP (14 × 20)	SE-17204	EP-17203GC	EV-9200G-52
μPD17207	80-pin QFP (14 × 20)	SE-17207	EP-17201GF	EV-9200G-80
μPD17225	28-pin SDIP (400 mil)	SE-17225	EP-17K28CT	–
μPD17226	28-pin SOP (375 mil)		EP-17K28GT	EV-9500GT-28
μPD17227	30-pin SSOP (300 mil)		EP-17K30GS*	EV-9500GT-30
μPD17228				
μPD17235*	28-pin SOP (375 mil)	SE-17235*	EP-17K28GT	EV-9500GT-28
μPD17236*	30-pin SSOP (300 mil)		EP-17K30GS*	EV-9500GT-30

*: This is a product of Tokyo Eletech Corporation.

*: Under development

Development Tools **μ PD6133, 6604, 63 Series Software Tools****■ List of Software Tools**

Host machine	Product name
PC-9800 Series IBM PC/AT and compatibles PC98-NX Series	Absolute assembler AS6133

Development Tools

178K Series Software Tools

■ List of Device Files

Target device	Device file name	Target device	Device file name	Target device	Device file name
μ PD178002	DF178018	μ PD178023*	DF178134*	μ PD178076*	DF178098
μ PD178003		μ PD178024*		μ PD178078*	
μ PD178004A		μ PD178046*	DF178048*	μ PD178096*	
μ PD178006A		μ PD178048*		μ PD178098*	
μ PD178016A					
μ PD178018A					

*: Under development

Software tools other than device files are common to the 178K Series and the 78K/0 Series. See **78K/0 Series List of Software Tools** for details.

Development Tools

178K Series Hardware Tools

(1) When using the in-circuit emulator IE-78K0-NS

■ Common Hardware Tools (When using IE-78K0-NS)

Tool name	Product name	
In-circuit emulator	IE-78K0-NS	
Performance board	IE-78K0-NS-PA*	
Power supply unit	IE-70000-MC-PS-B	
Interface adapter	IE-70000-98-IF-C	for C bus of PC-9800 Series
	IE-70000-PC-IF-C	for ISA bus of PC/AT and compatibles
	IE-70000-PCI-IF	for PCI bus
	IE-70000-CD-IF-A	for PCMCIA socket

*: Under development

■ List of Hardware Tools (When using IE-78K0-NS)

Target device		Emulation board I/O board	Emulation probe	Conversion socket/ Conversion adapter/ Flexible board
Device name	Package			
μ PD178002 μ PD178003	80-pin QFP (14 × 14)	IE-178018-NS-EM1	NP-80GC*1	EV-9200GC-80
μ PD178004A μ PD178006A μ PD178016A μ PD178018A	80-pin QFP (14 × 14)	IE-178018-NS-EM1	NP-80GC*1	EV-9200GC-80
μ PD178023* μ PD178024*	80-pin QFP (14 × 20) 80-pin QFP (14 × 14)	IE-178134-NS-EM1*	NP-80GF*1 NP-80GC*1	EV-9200G-80 EV-9200GC-80
μ PD178046* μ PD178048*	64-pin SDIP (750 mil) 80-pin TQFP (12 × 12)		IE-178048-NS-EM1*	NP-64CW*1 NP-80GK*1
μ PD178076* μ PD178078*	100-pin QFP (14 × 20)	IE-178098-NS-EM1		NP-100GF*1
μ PD178096* μ PD178098*	100-pin QFP (14 × 20)	IE-178098-NS-EM1	NP-100GF*1	EV-9200GF-100

*1: This is a product of Natio Densai Machida Mfg. Co., Ltd.

*2: This is a product of Tokyo Eletech Corporation.

*: Under development

Development Tools

178K Series Hardware Tools

(2) When using the in-circuit emulator IE-78001-R-A

■ Common Hardware Tools (When using IE-78001-R-A)

Tool name	Product name
In-circuit emulator	IE-78001-R-A
Interface adapter	IE-70000-98-IF-C for C bus of PC-9800 Series
	IE-70000-PC-IF-C for ISA bus of PC/AT and compatibles
	IE-70000-PCI-IF for PCI bus

■ List of Hardware Tools (When using IE-78001-R-A)

Target device		Emulation board I/O board	Emulation probe	Conversion socket/ Conversion adapter/ Flexible board
Device name	Package	Emulation probe conversion board		
μ PD178002 μ PD178003	80-pin QFP (14 × 14)	IE-178018-R-EM	EP-78230GC-R	EV-9200GC-80
μ PD178004A μ PD178006A μ PD178016A μ PD178018A	80-pin QFP (14 × 14)	IE-178018-R-EM	EP-78230GC-R	EV-9200GC-80
μ PD178023 [*] μ PD178024 [*]	80-pin QFP (14 × 20) 80-pin QFP (14 × 14)	IE-178134-NS-EM1 [*] IE-78K0-R-EX1	EP-78130GF-R EP-78230GC-R	EV-9200G-80 EV-9200GC-80
μ PD178046 [*] μ PD178048 [*]	64-pin SDIP (750 mil) 80-pin TQFP (12 × 12)	Not supported. Use IE-78K0-NS for these devices.		
μ PD178076 [*] μ PD178078 [*]	100-pin QFP (14 × 20)	IE-178098-NS-EM1 IE-78K0-R-EX1	EP-78064GF-R	EV-9200GF-100
μ PD178096 [*] μ PD178098 [*]	100-pin QFP (14 × 20)	IE-178098-NS-EM1 IE-78K0-R-EX1	EP-78064GF-R	EV-9200GF-100

^{*}: Under development

Development Tools

78K/0S Series Software Tools

■ List of Software Tools

Host machine	Software tool name
PC-9800 Series IBM PC/AT and compatibles PC98-NX Series	Assembler package RA78K0S
	C compiler CC78K0S
	C library source file CC78K0S-L
	Integrated debugger ID78K0S-NS
	System simulator SM78K0S
	Embedded OS MX78K0S
EWS	Assembler package RA78K0S
	C compiler CC78K0S
	C library source file CC78K0S-L

■ List of Device Files

Subseries name	Device file name	Subseries name	Device file name
μ PD789014	DF789014	μ PD789167*	DF789178
μ PD789026	DF789026	μ PD789177*	
μ PD789046	DF789046	μ PD789407A	DF789418
μ PD789104A*	DF789134	μ PD789417A	
μ PD789114A*		μ PD789800	DF789801
μ PD789124A*		μ PD789830*	DF789831
μ PD789134A*		μ PD789842*	DF789842

*: Under development

Development Tools

78K/0S Series Hardware Tools

■ Common Hardware Tools

Tool name	Product name	
In-circuit emulator	IE-78K0S-NS	
Power supply unit	IE-70000-MC-PS-B	
Interface adapter	IE-70000-98-IF-C	for C bus of PC-9800 Series
	IE-70000-PC-IF-C	for ISA bus of PC/AT and compatibles
	IE-70000-PCI-IF	for PCI bus
	IE-70000-CD-IF-A	for PCMCIA socket

■ List of Hardware Tools (1/2)

Target device		Emulation board	Emulation probe	Conversion socket/ Conversion adapter/ Flexible board
Subseries name	Package			
μ PD789014	28-pin SDIP (400 mil)	IE-789014-NS-EM1	NP-28CT*	–
	28-pin SOP (375 mil)		NP-28GT*	AXS628119P* AXS662821*
μ PD789026	42-pin SDIP (600 mil)	IE-789026-NS-EM1	NP-42CU*	–
	44-pin QFP (10 × 10)		NP-44GB*	EV-9200G-44
μ PD789046	44-pin QFP (10 × 10)	IE-789046-NS-EM1	NP-44GB*	EV-9200G-44
μ PD789104A*	28-pin SDIP (400 mil)	IE-789136-NS-EM1	NP-28CT*	–
	30-pin SSOP (300 mil)		NP-36GS*	NGS-30* (attached to NP-36GS*)
μ PD789114A*	28-pin SDIP (400 mil)	IE-789136-NS-EM1	NP-28CT*	–
	30-pin SSOP (300 mil)		NP-36GS*	NGS-30* (attached to NP-36GS*)
μ PD789124A*	28-pin SDIP (400 mil)	IE-789136-NS-EM1	NP-28CT*	–
	30-pin SSOP (300 mil)		NP-36GS*	NGS-30* (attached to NP-36GS*)

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Development Tools

78K/0S Series Hardware Tools

■ List of Hardware Tools (2/2) ◀ Common Hardware Tools

Target device		Emulation board	Emulation probe	Conversion socket/ Conversion adapter/ Flexible board
Subseries name	Package			
μPD789134A*	28-pin SDIP (400 mil)	IE-789136-NS-EM1	NP-28CT* ¹	–
	30-pin SSOP (300 mil)		NP-36GS* ¹	NGS-30* ¹ (attached to NP-36GS* ¹)
μPD789167*	44-pin QFP (10 × 10)	IE-789177-NS-EM1*	NP-44GB* ¹	EV-9200G-44
μPD789177*	44-pin QFP (10 × 10)	IE-789177-NS-EM1*	NP-44GB* ¹	EV-9200G-44
μPD789407A	80-pin QFP (14 × 14)	IE-789418-NS-EM1	NP-80GC* ¹	EV-9200GC-80
	80-pin TQFP (12 × 12)		NP-80GK* ¹	TGK-080SDW* ²
μPD789417A	80-pin QFP (14 × 14)	IE-789418-NS-EM1	NP-80GC* ¹	EV-9200GC-80
	80-pin TQFP (12 × 12)		NP-80GK* ¹	TGK-080SDW* ²
μPD789800	42-pin SDIP (600 mil)	IE-789801-NS-EM1	NP-42CU* ¹	–
	44-pin QFP (10 × 10)		NP-44GB* ¹	EV-9200G-44
μPD789830*	88-pin bare chip	IE-789831-NS-EM1	–	–
μPD78F9831*	100-pin LQFP (14 × 14)		NP-100GC* ¹	TGC-100SDW* ²
μPD789842*	44-pin QFP (10 × 10)	IE-789840-NS-EM1	NP-44GB* ¹	EV-9200G-44

*1: This is a product of Naito Densai Machida Mfg. Co., Ltd.

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*2: This is a product of Tokyo Eletech Corporation.

Development Tools

78K/0 Series Software Tools

■ List of Software Tools

Host machine	Software tool name
PC-9800 Series IBM PC/AT and compatibles PC98-NX Series	Assembler package RA78K0
	C compiler CC78K0
	C library source file CC78K0-L
	Integrated debugger ID78K0-NS
	Integrated debugger ID78K0
	System simulator SM78K0
	Real-time OS RX78K/0
	Embedded OS MX78K0
EWS	Assembler package RA78K0
	C compiler CC78K0
	C library source file CC78K0-L
	Integrated debugger ID78K0

■ List of Device Files

Subseries name	Device file name	Subseries name	Device file name	Subseries name	Device file name
μ PD78018F	DF78014	μ PD78078	DF78078	μ PD780232	DF780233
μ PD78018FY		μ PD78078Y		μ PD780308	DF780308
μ PD78014H		μ PD78075B		μ PD780308Y	(μ SxxxxDF78064)
μ PD78044F	DF78044	μ PD78083	DF78083	μ PD780701Y*	DF780701*
μ PD78044H		μ PD78098B	DF78098	μ PD780833Y*	DF780831*
μ PD78054	DF78054	μ PD780018AY	DF780018	μ PD780948*	DF780948*
μ PD78054Y		μ PD780024A	DF780024	μ PD780955*	DF780955
μ PD78058F	DF78054	μ PD780024AY	DF780034	μ PD780958*	DF780958*
μ PD78058FY		μ PD780034A		μ PD780973*	DF780974
μ PD78064	DF78064	μ PD780034AY	DF780058	μ PD780988	DF780988
μ PD78064Y		μ PD780058			
μ PD78064B		μ PD780058Y*			
μ PD78070A	DF78078	μ PD780065*	DF780066*		
μ PD78070AY		μ PD780208	DF780208		

*: Under development

Development Tools

78K/0 Series Hardware Tools

(1) When using the in-circuit emulator IE-78K0-NS

■ Common Hardware Tools (When using IE-78K0-NS)

Tool name	Product name	
In-circuit emulator	IE-78K0-NS	
Performance board	IE-78K0-NS-PA*	
Power supply unit	IE-70000-MC-PS-B	
Interface adapter	IE-70000-98-IF-C	for C bus of PC-9800 Series
	IE-70000-PC-IF-C	for ISA bus of PC/AT and compatibles
	IE-70000-PCI-IF	for PCI bus
	IE-70000-CD-IF-A	for PCMCIA socket

*: Under development

■ List of Hardware Tools (When using IE-78K0-NS) (1/3) ▶

Target device		Emulation board	Emulation probe	Conversion socket/ Conversion adapter/ Flexible board
Subseries name	Package	I/O board		
μPD78018F	64-pin SDIP (750 mil)	IE-78018-NS-EM1	NP-64CW*1	–
	64-pin QFP (14 × 14)		NP-64GC*1	EV-9200GC-64
	64-pin LQFP (12 × 12)		NP-64GK*1	TGK-064SBW*2
μPD78018FY	64-pin SDIP (750 mil)	IE-78018-NS-EM1	NP-64CW*1	–
	64-pin QFP (14 × 14)		NP-64GC*1	EV-9200GC-64
	64-pin LQFP (12 × 12)		NP-64GK*1	TGK-064SBW*2
μPD78014H	64-pin SDIP (750 mil)	IE-78018-NS-EM1	NP-64CW*1	–
	64-pin QFP (14 × 14)		NP-64GC*1	EV-9200GC-64
	64-pin LQFP (12 × 12)		NP-64GK*1	TGK-064SBW*2
μPD78044F	80-pin QFP (14 × 20)	IE-78048-NS-EM1	NP-80GF*1	TGF-080RAW*2
μPD78044H	80-pin QFP (14 × 20)	IE-78048-NS-EM1	NP-80GF*1	TGF-080RAW*2
μPD78054	80-pin QFP (14 × 14)	IE-780308-NS-EM1	NP-80GC*1	EV-9200GC-80
	80-pin TQFP (12 × 12)	IE-780308-NS-EM1	NP-80GK*1	TGK-080SDW*2
μPD78054Y	80-pin QFP (14 × 14)	IE-780308-NS-EM1	NP-80GC*1	EV-9200GC-80
	80-pin TQFP (12 × 12)	IE-780308-NS-EM1	NP-80GK*1	TGK-080SDW*2
μPD78058F	80-pin QFP (14 × 14)	IE-780308-NS-EM1	NP-80GC*1	EV-9200GC-80
μPD78058FY	80-pin QFP (14 × 14)	IE-780308-NS-EM1	NP-80GC*1	EV-9200GC-80

*1: This is a product of Naito Densai Machida Mfg. Co., Ltd.

*2: This is a product of Tokyo Eletech Corporation.

Development Tools

78K/0 Series Hardware Tools

 ■ List of Hardware Tools (When using IE-78K0-NS) (2/3) ◀ ▶ **Common Hardware Tools**

Target device		Emulation board I/O board	Emulation probe	Conversion socket/ Conversion adapter/ Flexible board
Subseries name	Package			
μPD78064	100-pin SDIP (14 × 20)	IE-780308-NS-EM1	NP-100GF*1	EV-9200GF-100
	100-pin LQFP (14 × 14)		NP-100GC*1	TGC-100SDW*2
μPD78064Y	100-pin QFP (14 × 20)	IE-780308-NS-EM1	NP-100GF*1	EV-9200GF-100
	100-pin LQFP (14 × 14)		NP-100GC*1	TGC-100SDW*2
μPD78064B	100-pin QFP (14 × 20)	IE-780308-NS-EM1	NP-100GF*1	EV-9200GF-100
	100-pin LQFP (14 × 14)		NP-100GC*1	TGC-100SDW*2
μPD78070A	100-pin QFP (14 × 20)	IE-78078-NS-EM1	NP-100GF*1	EV-9200GF-100
	100-pin LQFP (14 × 14)		NP-100GC*1	TGC-100SDW*2
μPD78070AY	100-pin QFP (14 × 20)	IE-78078-NS-EM1	NP-100GF*1	EV-9200GF-100
	100-pin LQFP (14 × 14)		NP-100GC*1	TGC-100SDW*2
μPD78078	100-pin QFP (14 × 20)	IE-78078-NS-EM1	NP-100GF*1	EV-9200GF-100
	100-pin LQFP (14 × 14)		NP-100GC*1	TGC-100SDW*2
μPD78078Y	100-pin QFP (14 × 20)	IE-78078-NS-EM1	NP-100GF*1	EV-9200GF-100
	100-pin LQFP (14 × 14)		NP-100GC*1	TGC-100SDW*2
μPD78075B	100-pin QFP (14 × 20)	IE-78078-NS-EM1	NP-100GF*1	EV-9200GF-100
	100-pin LQFP (14 × 14)		NP-100GC*1	TGC-100SDW*2
μPD78083	42-pin SDIP (600 mil)	IE-78078-NS-EM1	NP-42CU*1	–
	44-pin QFP (10 × 10)		NP-44GB*1	EV-9200G-44
μPD78098B	80-pin QFP (14 × 14)	Not supported. Use IE-78001-R-A for these devices.		
μPD780018AY	100-pin QFP (14 × 20)	IE-780018-NS-EM1	NP-100GF*1	EV-9200GF-100
μPD780024A	64-pin SDIP (750 mil)	IE-780034-NS-EM1	NP-64CW*1	–
	64-pin QFP (14 × 14)		NP-64GC*1	EV-9200GC-64
	64-pin LQFP (12 × 12)		NP-64GK*1	TGK-064SBW*2
μPD780024AY	64-pin SDIP (750 mil)	IE-780034-NS-EM1	NP-64CW*1	–
	64-pin QFP (14 × 14)		NP-64GC*1	EV-9200GC-64
	64-pin LQFP (12 × 12)		NP-64GK*1	TGK-064SBW*2
μPD780034A	64-pin SDIP (750 mil)	IE-780034-NS-EM1	NP-64CW*1	–
	64-pin QFP (14 × 14)		NP-64GC*1	EV-9200GC-64
	64-pin LQFP (12 × 12)		NP-64GK*1	TGK-064SBW*2
μPD780034AY	64-pin SDIP (750 mil)	IE-780034-NS-EM1	NP-64CW*1	–
	64-pin QFP (14 × 14)		NP-64GC*1	EV-9200GC-64
	64-pin LQFP (12 × 12)		NP-64GK*1	TGK-064SBW*2

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*2: This is a product of Tokyo Eletech Corporation.

Development Tools

78K/0 Series Hardware Tools

List of Hardware Tools (When using IE-78K0-NS) (3/3)
Common Hardware Tools

Target device		Emulation board	Emulation probe	Conversion socket/ Conversion adapter/ Flexible board
Subseries name	Package	I/O board		
μPD780058	80-pin QFP (14 × 14)	IE-780308-NS-EM1	NP-80GC*1	EV-9200GC-80
	80-pin TQFP (12 × 12)		NP-80GK*1	TGK-080SDW*2
μPD780058Y*	80-pin QFP (14 × 14)	IE-780308-NS-EM1	NP-80GC*1	EV-9200GC-80
	80-pin TQFP (12 × 12)		NP-80GK*1	TGK-080SDW*2
μPD780065*	80-pin QFP (14 × 14)	IE-780066-NS-EM4* IE-78K0-NS-P01	NP-80GC*1	EV-9200GC-80
μPD780208	100-pin QFP (14 × 20)	IE-780208-NS-EM1	NP-100GF*1	EV-9200GF-100
μPD780232	80-pin QFP (14 × 14)	IE-780233-NS-EM4* IE-78K0-NS-P01	NP-80GC*1	EV-9200GC-80
μPD780308	100-pin QFP (14 × 20)	IE-780308-NS-EM1	NP-100GF*1	EV-9200GF-100
	100-pin LQFP (14 × 14)		NP-100GC*1	TGC-100SDW*2
μPD780308Y	100-pin QFP (14 × 20)	IE-780308-NS-EM1	NP-100GF*1	EV-9200GF-100
	100-pin LQFP (14 × 14)		NP-100GC*1	TGC-100SDW*2
μPD780701Y*	80-pin QFP (14 × 14)	IE-780701-NS-EM1*	NP-80GC*1	EV-9200GC-80
μPD780833Y*	80-pin QFP (14 × 14)	IE-780831-NS-EM4 IE-78K0-NS-P02	NP-80GC*1	EV-9200GC-80
μPD780948*	100-pin QFP (14 × 20)	Not supported. Use IE-78001-R-A for these devices.		
μPD780955*	80-pin QFP (14 × 20)	We, NEC, will support each requirement for the development environment of this subseries' devices. Please contact an NEC sales representative.		
μPD780958*	100-pin LQFP (14 × 14)	IE-780958-NS-EM4* IE-78K0-NS-P01	NP-100GC*1	TGC-100SDW*2
μPD780973*	80-pin QFP (14 × 20)	IE-780974-NS-EM1*	NP-80GF*1	EV-9200G-80
μPD780988	64-pin SDIP (750 mil)	IE-780988-NS-EM4	NP-64CW*1	–
	64-pin QFP (14 × 14)	IE-780K0-NS-P01	NP-64GC*1	EV-9200GC-64

*1: This is a product of Naito Densai Machida Mfg. Co., Ltd.

*: Under development

*2: This is a product of Tokyo Eletech Corporation.

Development Tools

78K/0 Series Hardware Tools

(2) When using the in-circuit emulator IE-78001-R-A

■ Common Hardware Tools (When using IE-78001-R-A)

Tool name	Product name
In-circuit emulator	IE-78001-R-A
Interface adapter	IE-70000-98-IF-C for C bus of PC-9800 Series
	IE-70000-PC-IF-C for ISA bus of PC/AT and compatibles
	IE-70000-PCI-IF for PCI bus

■ List of Hardware Tools (When using IE-78001-R-A) (1/3) ▶

Target device		Emulation board I/O board	Emulation probe	Conversion socket/ Conversion adapter/ Flexible board
Subseries name	Package	Emulation probe conversion board		
μ PD78018F	64-pin SDIP (750 mil)	IE-78014-R-EM-A	EP-78240CW-R	—
	64-pin QFP (14 × 14)			EV-9200GC-64
	64-pin LQFP (12 × 12)			TGK-064SBW*
μ PD78018FY	64-pin SDIP (750 mil)	IE-78014-R-EM-A	EP-78240CW-R	—
	64-pin QFP (14 × 14)			EV-9200GC-64
	64-pin LQFP (12 × 12)			TGK-064SBW*
μ PD78014H	64-pin SDIP (750 mil)	IE-78014-R-EM-A	EP-78240CW-R	—
	64-pin QFP (14 × 14)			EV-9200GC-64
	64-pin LQFP (12 × 12)			TGK-064SBW*
μ PD78044F	80-pin QFP (14 × 20)	IE-78044-R-EM	EP-78130GF-R	EV-9200G-80
μ PD78044H	80-pin QFP (14 × 20)	IE-78044-R-EM	EP-78130GF-R	EV-9200G-80
μ PD78054	80-pin QFP (14 × 14)	IE-780308-R-EM	EP-78230GC-R	EV-9200GC-80
	80-pin TQFP (12 × 12)			TGK-080SDW*
μ PD78054Y	80-pin QFP (14 × 14)	IE-780308-R-EM	EP-78230GC-R	EV-9200GC-80
	80-pin TQFP (12 × 12)			TGK-080SDW*
μ PD78058F	80-pin QFP (14 × 14)	IE-780308-R-EM	EP-78230GC-R	EV-9200GC-80
μ PD78058FY	80-pin QFP (14 × 14)	IE-780308-R-EM	EP-78230GC-R	EV-9200GC-80
μ PD78064	100-pin QFP (14 × 20)	IE-780308-R-EM	EP-78064GF-R	EV-9200GF-100
	100-pin LQFP (14 × 14)			TGC-100SDW*
μ PD78064Y	100-pin QFP (14 × 20)	IE-780308-R-EM	EP-78064GF-R	EV-9200GF-100
	100-pin LQFP (14 × 14)			TGC-100SDW*
μ PD78064B	100-pin QFP (14 × 20)	IE-780308-R-EM	EP-78064GF-R	EV-9200GF-100
	100-pin LQFP (14 × 14)			TGC-100SDW*

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Development Tools

78K/0 Series Hardware Tools

 ■ List of Hardware Tools (When using IE-78001-R-A) (2/3) ◀ ▶ **Common Hardware Tools**

Target device		Emulation board I/O board	Emulation probe	Conversion socket/ Conversion adapter/ Flexible board
Subseries name	Package	Emulation probe conversion board		
μPD78070A	100-pin QFP (14 × 20)	IE-78078-R-EM	EP-78064GF-R	EV-9200GF-100
	100-pin LQFP (14 × 14)		EP-78064GC-R	TGC-100SDW*
μPD78070AY	100-pin QFP (14 × 20)	IE-78078-R-EM	EP-78064GF-R	EV-9200GF-100
	100-pin LQFP (14 × 14)		EP-78064GC-R	TGC-100SDW*
μPD78078	100-pin QFP (14 × 20)	IE-78078-R-EM	EP-78064GF-R	EV-9200GF-100
	100-pin LQFP (14 × 14)		EP-78064GC-R	TGC-100SDW*
μPD78078Y	100-pin QFP (14 × 20)	IE-78078-R-EM	EP-78064GF-R	EV-9200GF-100
	100-pin LQFP (14 × 14)		EP-78064GC-R	TGC-100SDW*
μPD78075B	100-pin QFP (14 × 20)	IE-78078-R-EM	EP-78064GF-R	EV-9200GF-100
	100-pin LQFP (14 × 14)		EP-78064GC-R	TGC-100SDW*
μPD78083	42-pin SDIP (600 mil)	IE-78078-R-EM	EP-78083CU-R	–
	44-pin QFP (10 × 10)		EP-78083GB-R	EV-9200G-44
μPD78098B	80-pin QFP (14 × 14)	IE-780908-R-EM	EP-78230GC-R	EV-9200GC-80
μPD780018AY	100-pin QFP (14 × 20)	IE-780018-R-EM	EP-78064GF-R	EV-9200GF-100
μPD780024A	64-pin SDIP (750 mil)	IE-780034-NS-EM1	EP-78240CW-R	–
	64-pin QFP (14 × 14)	IE-78K0-R-EX1	EP-78240GC-R	EV-9200GC-64
	64-pin LQFP (14 × 14)		EP-78012GK-R	TGK-064SBW*
μPD780024AY	64-pin SDIP (750 mil)	IE-780034-NS-EM1	EP-78240CW-R	–
	64-pin QFP (14 × 14)	IE-78K0-R-EX1	EP-78240GC-R	EV-9200GC-64
	64-pin LQFP (12 × 12)		EP-78012GK-R	TGK-064SBW*
μPD780034A	64-pin SDIP (750 mil)	IE-780034-NS-EM1	EP-78240CW-R	–
	64-pin QFP (14 × 14)	IE-78K0-R-EX1	EP-78240GC-R	EV-9200GC-64
	64-pin LQFP (12 × 12)		EP-78012GK-R	TGK-064SBW*
μPD780034AY	64-pin SDIP (750 mil)	IE-780034-NS-EM1	EP-78240CW-R	–
	64-pin QFP (14 × 14)	IE-78K0-R-EX1	EP-78240GC-R	EV-9200GC-64
	64-pin LQFP (12 × 12)		EP-78012GK-R	TGK-064SBW*
μPD780058	80-pin QFP (14 × 14)	IE-780308-R-EM	EP-78230GC-R	EV-9200GC-80
	80-pin TQFP (12 × 12)		EP-78054GK-R	TGK-080SDW*
μPD780058Y*	80-pin QFP (14 × 14)	IE-780308-R-EM	EP-78230GC-R	EV-9200GC-80
	80-pin TQFP (12 × 12)		EP-78054GK-R	TGK-080SDW*

*: This is a product of Tokyo Eletech Corporation.

*: Under development

Development Tools

78K/0 Series Hardware Tools

■ List of Hardware Tools (When using IE-78001-R-A) (3/3) ◀ Common Hardware Tools

Target device		Emulation board I/O board	Emulation probe	Conversion socket/ Conversion adapter/ Flexible board
Subseries name	Package	Emulation probe conversion board		
μ PD780065*	80-pin QFP (14 × 14)	IE-780066-NS-EM4* IE-78K0-NS-P01 IE-78K0-R-EX1	EP-78230GC-R	EV-9200GC-80
μ PD780208	100-pin QFP (14 × 20)	IE-780208-R-EM	EP-78064GF-R	EV-9200GF-100
μ PD780232	80-pin QFP (14 × 14)	IE-780233-NS-EM4* IE-78K0-NS-P01 IE-78K0-R-EX1	EP-78230GC-R	EV-9200GC-80
μ PD780308	100-pin QFP (14 × 20)	IE-780308-R-EM	EP-78064GF-R	EV-9200GF-100
	100-pin LQFP (14 × 14)		EP-78064GC-R	TGC-100SDW*
μ PD780308Y	100-pin QFP (14 × 20)	IE-780308-R-EM	EP-78064GF-R	EV-9200GF-100
	100-pin LQFP (14 × 14)		EP-78064GC-R	TGC-100SDW*
μ PD780701Y*	80-pin QFP (14 × 14)	IE-780701-NS-EM1* IE-78K0-R-EX1	EP-78230GC-R	EV-9200GC-80
μ PD780833Y*	80-pin QFP (14 × 14)	IE-780831-NS-EM4 IE-78K0-NS-P02 IE-78K0-R-EX1	EP-78230GC-R	EV-9200GC-80
μ PD780948*	100-pin QFP (14 × 20)	IE-780948-SL-EM1 IE-780948-SL-EM4	EP-100GF-SL	TQPACK100RB* or YQPACK100RB* + NQPAC100RB*
μ PD780955*	80-pin QFP (14 × 20)	We, NEC, will support each requirement for the development environment of this subseries' devices. Please contact an NEC sales representative.		
μ PD780958*	100-pin LQFP (14 × 14)	IE-780958-NS-EM4* IE-78K0-NS-P01 IE-78K0-R-EX1	EP-78064GC-R	TGC-100SDW*
μ PD780973*	80-pin QFP (14 × 20)	IE-780974-NS-EM1* IE-78K0-R-EX1	EP-78130GF-R	EV-9200G-80
μ PD780988	64-pin SDIP (750 mil)	IE-780988-NS-EM4 IE-78K0-NS-P01	EP-78024CW-R	—
	64-pin QFP (14 × 14)	IE-78K0-R-EX1	EP-78240GC-R	EV-9200GC-64

*: This is a product of Tokyo Eletech Corporation.

★: Under development

Development Tools

78K/IV Series Software Tools

■ List of Software Tools

Host machine	Software tool name
PC-9800 Series IBM PC/AT and compatibles PC98-NX Series	Assembler package RA78K4
	C compiler CC78K4
	C library source file CC78K4-L
	Integrated debugger ID78K4-NS
	Integrated debugger ID78K4
	System simulator SM78K4
	System performance analyzer AZ78K4
	Real-time OS RX78K4
	Embedded OS MX78K4
	EWS
C compiler CC78K4	
C library source file CC78K4-L	
Integrated debugger ID78K4	

■ List of Device Files

Subseries name	Device file name	Subseries name	Device file name	Subseries name	Device file name
μ PD784038	DF784038	μ PD784218	DF784218	μ PD784928	DF784928
μ PD784038Y		μ PD784218Y		μ PD784928Y	
μ PD784046	DF784046	μ PD784225*	DF784225	μ PD784938*	DF784937*
μ PD784054		μ PD784225Y*		μ PD784955*	
μ PD784216	DF784218	μ PD784908	DF784908		
μ PD784216Y		μ PD784915	DF784916		

★: Under development

Development Tools

78K/IV Series Hardware Tools

(1) When using the in-circuit emulator IE-78K4-NS

■ Common Hardware Tools (When using IE-78K4-NS)

Tool name	Product name
In-circuit emulator	IE-78K4-NS
Power supply unit	IE-70000-MC-PS-B
Interface adapter	IE-70000-98-IF-C for C bus of PC-9800 Series
	IE-70000-PC-IF-C for ISA bus of PC/AT and compatibles
	IE-70000-PCI-IF for PCI bus
	IE-70000-CD-IF-A for PCMCIA socket

■ List of Hardware Tools (When using IE-78K4-NS)

Target device		Emulation board	Emulation probe	Conversion socket/ Conversion adapter/ Flexible board
Subseries name	Package			
μ PD784038	80-pin QFP (14 × 14)	IE-784038-NS-EM1	NP-80GC*1	EV-9200GC-80
	80-pin TQFP (12 × 12)			TGK-080SDW*2
μ PD784038Y	80-pin QFP (14 × 14)	IE-784038-NS-EM1	NP-80GC*1	EV-9200GC-80
	80-pin TQFP (12 × 12)			TGK-080SDW*2
μ PD784046	80-pin QFP (14 × 14)	IE-784046-NS-EM1	NP-80GC*1	EV-9200GC-80
μ PD784054	80-pin QFP (14 × 14)	IE-784046-NS-EM1	NP-80GC*1	EV-9200GC-80
μ PD784216	100-pin QFP (14 × 20)	IE-784225-NS-EM1	NP-100GF*1	EV-9200GF-100
	100-pin LQFP (14 × 14)			TGC-100SDW*2
μ PD784216Y	100-pin QFP (14 × 20)	IE-784225-NS-EM1	NP-100GF*1	EV-9200GF-100
	100-pin LQFP (14 × 14)			TGC-100SDW*2
μ PD784218	100-pin QFP (14 × 20)	IE-784225-NS-EM1	NP-100GF*1	EV-9200GF-100
	100-pin LQFP (14 × 14)			TGC-100SDW*2
μ PD784218Y	100-pin QFP (14 × 20)	IE-784225-NS-EM1	NP-100GF*1	EV-9200GF-100
	100-pin LQFP (14 × 14)			TGC-100SDW*2
μ PD784225*	80-pin QFP (14 × 14)	IE-784225-NS-EM1	NP-80GC*1	EV-9200GC-80
	80-pin TQFP (12 × 12)			TGK-080SDW*2
μ PD784225Y*	80-pin QFP (14 × 14)	IE-784225-NS-EM1	NP-80GC*1	EV-9200GC-80
	80-pin TQFP (12 × 12)			TGK-080SDW*2
μ PD784908	100-pin QFP (14 × 20)	IE-784908-NS-EM1	NP-100GF*1	EV-9200GF-100
μ PD784915	100-pin QFP (14 × 20)	IE-784928-NS-EM1	EP-784928GF-NS	NEV-921GF-100
μ PD784928	100-pin QFP (14 × 20)	IE-784928-NS-EM1	EP-784928GF-NS	NEV-921GF-100
μ PD784928Y	100-pin QFP (14 × 20)	IE-784928-NS-EM1	EP-784928GF-NS	NEV-921GF-100
μ PD784938*	100-pin QFP (14 × 20)	IE-784937-NS-EM1	NP-100GF*1	EV-9200GF-100
μ PD784955*	80-pin QFP (14 × 14)	IE-784956-NS-EM1	NP-80GC*1	EV-9200GC-80

*1: This is a product of Naito Densai Machida Mfg. Co., Ltd.

★: Under development

*2: This is a product of Tokyo Eletech Corporation.

Development Tools

78K/IV Series Hardware Tools

(2) When using the in-circuit emulator IE-784000-R

■ Common Hardware Tools (When using IE-784000-R)

Tool name	Product name	
In-circuit emulator	IE-784000-R	
Emulation board	IE-784000-R-EM	
Interface board	IE-70000-98-IF-C	for C bus of PC-9800 Series
	IE-70000-PC-IF-C	for ISA bus of PC/AT and compatibles
	IE-70000-PCI-IF	for PCI bus
	IE-70000-CD-IF-A	for PCMCIA socket

■ List of Hardware Tools (When using IE-784000-R) (1/2) ▶

Target device		I/O emulation board (emulation board)	Emulation probe	Conversion socket/ Conversion adapter/ Flexible board
Subseries name	Package	Emulation probe conversion board		
μPD784038	80-pin QFP (14 × 14)	IE-784038-R-EM1	EP-78230GC-R	EV-9200GC-80
	80-pin TQFP (12 × 12)			TGK-080SDW*
μPD784038Y	80-pin QFP (14 × 14)	IE-784038-R-EM1	EP-78230GC-R	EV-9200GC-80
	80-pin TQFP (12 × 12)			TGK-080SDW*
μPD784046	80-pin QFP (14 × 14)	IE-784046-R-EM1	EP-78230GC-R	EV-9200GC-80
μPD784054	80-pin QFP (14 × 14)	IE-784046-R-EM1	EP-78230GC-R	EV-9200GC-80
μPD784216	100-pin QFP (14 × 20)	IE-784225-NS-EM1	EP-78064GF-R	EV-9200GF-100
	100-pin LQFP (14 × 14)	IE-78K4-R-EX3	EP-78064GC-R	TGC-100SDW*

*: This is a product of Tokyo Eletech Corporation.

Development Tools

78K/IV Series Hardware Tools

■ List of Hardware Tools (When using IE-784000-R) (2/2) ◀ Common Hardware Tools

Target device		I/O emulation board (emulation board)	Emulation probe	Conversion socket/ Conversion adapter/ Flexible board
Subseries name	Package	Emulation probe conversion board		
μPD784216Y	100-pin QFP (14 × 20)	IE-784225-NS-EM1	EP-78064GF-R	EV-9200GF-100
	100-pin LQFP (14 × 14)	IE-78K4-R-EX3	EP-78064GC-R	TGC-100SDW*
μPD784218	100-pin QFP (14 × 20)	IE-784225-NS-EM1	EP-78064GF-R	EV-9200GF-100
	100-pin LQFP (14 × 14)	IE-78K4-R-EX3	EP-78064GC-R	TGC-100SDW*
μPD784218Y	100-pin QFP (14 × 20)	IE-784225-NS-EM1	EP-78064GF-R	EV-9200GF-100
	100-pin LQFP (14 × 14)	IE-78K4-R-EX3	EP-78064GC-R	TGC-100SDW*
μPD784225*	80-pin QFP (14 × 14)	IE-784225-NS-EM1	EP-78230GC-R	EV-9200GC-80
	80-pin TQFP (12 × 12)	IE-78K4-R-EX2	EP-78054GK-R	TGK-080SDW*
μPD784225Y*	80-pin QFP (14 × 14)	IE-784225-NS-EM1	EP-78230GC-R	EV-9200GC-80
	80-pin TQFP (12 × 12)	IE-78K4-R-EX2	EP-78054GK-R	TGK-080SDW*
μPD784908	100-pin QFP (14 × 20)	IE-784908-R-EM1	EP-784915GF-R	EV-9200GF-100
μPD784915	100-pin QFP (14 × 20)	IE-784928-NS-EM1	EP-784928GF-NS	EV-9200GF-100
		IE-78K4-R-EX3		
μPD784928	100-pin QFP (14 × 20)	IE-784928-NS-EM1 IE-78K4-R-EX3	EP-784928GF-NS	EV-9200GF-100
μPD784928Y	100-pin QFP (14 × 20)	IE-784928-NS-EM1 IE-78K4-R-EX3	EP-784928GF-NS	EV-9200GF-100
μPD784938*	100-pin QFP (14 × 20)	IE-784937-NS-EM1 IE-78K4-R-EX3	EP-78064GF-R	EV-9200GF-100
μPD784955*	80-pin QFP (14 × 14)	IE-784956-NS-EM1	EP-784915GF-R	EV-9200GC-80
		IE-78K4-R-EX2		

*: This is a product of Tokyo Eletech Corporation.

*: Under development

Development Tools

V810 Family Development Tools

■ List of Software Tools

Product name		Target device	Host machine
Real-time OS	RX732	V821	PC-9800 Series IBM PC/AT and compatibles SPARCstation™
File system	RX-FS732		PC-9800 Series SPARCstation

Remark Please contact an NEC sales representative if you use host machines not mentioned above.

■ List of Hardware Tools

Product name	Target device	Part number	Remarks
In-circuit emulator	V821	IE-70741-BX	Conversion socket : TQPACK100SD* + TQSOCKET100SDW* (essential)
Interface board		IE-70000-98-IF-C	For PC-9800 Series
		IE-70000-PC-IF-C	For IBM PC/AT and compatibles
Expansion memory board		IE-70000-BX-MM2	Expands 2M bytes of the emulation memory
External logic probe		IE-70000-BX-EP	Consists of one GND and eight external inputs
Conversion adapter / Conversion socket		TQPACK100SD* TQSOCKET100SDW*	Probe included in the in-circuit emulator → 100-pin QFP

*: This is a product of Tokyo Eletech Corporation.

Development Tools

V830 Family Development Tools

■ List of Software Tools

Product name		Target device	Host machine
Real-time OS	RX830	V830 Family	PC-9800 Series IBM PC/AT and compatibles SPARCstation
Compiler	CA830	V830 V831	PC-9800 Series IBM PC/AT and compatibles SPARCstation
System performance analyzer	AZ830	V830 Family	PC-9800 Series IBM PC/AT and compatibles
Device file	DF705100	V830	PC-9800 Series IBM PC/AT and compatibles
	DF705101	V831	SPARCstation

Remark Please contact an NEC sales representative if you use host machines not mentioned above.

Hardware tools are not provided. Please contact an NEC sales representative about the development environment of the V830 Family.

Development Tools

V850 Family Software Tools

■ List of Software Tools

Product name		Target device	Host machine
Real-time OS	RX850	V850 Family	PC-9800 Series IBM PC/AT and compatibles SPARCstation
	RX850 pro		
Compiler	CA850		PC-9800 Series IBM PC/AT and compatibles SPARCstation
Debugger	ID850		PC-9800 Series IBM PC/AT and compatibles
Simulator	SM850		PC-9800 Series IBM PC/AT and compatibles
System performance analyzer	AZ850		PC-9800 Series IBM PC/AT and compatibles
Device file	DF703002	V852	PC-9800 Series IBM PC/AT and compatibles SPARCstation
	DF703003	V853	
	DF703008	V854	
	DF703017	V850/SA1	
	DF703037	V850/SB1	
		V850/SB2	
DF703102	V850E/MS1		

Remark Please contact an NEC sales representative if you use host machines not mentioned above.

Development Tools

V850 Family Hardware Tools

■ List of Hardware Tools (1/2) ▶

Product name	Target device	Part number	Remarks
In-circuit emulator	V850E/MS1	IE-703102-MC	A PC interface cable, external logic probe, and conversion sockets*1 are included
	V850/SA1, V850/SB1, V852, V853, V854	IE-703002-MC	
In-circuit emulator option board	V850/SA1	IE-703017-MC-EM1	NQPACK100SD*2 is included
	V850/SB1, V850/SB2	IE-703037-MC-EM1*	Conversion socket not included (the V850/SB2 version is under development)
	V853	IE-703003-MC-EM1	NQPACK100SD*2 is included
	V854	IE-703008-MC-EM1	NQPACK144SD*2, YQPACK144SD*2, HQPACK144SD*2, and YQGUIDE*2 are included
	V850E/MS1	IE-703102-MC-EM1*	For 5V, conversion socket not included
IE-703102-MC-EM1-A*		For 3.3V, conversion socket not included	
Power supply unit	V850/SA1, V850/SB1, V850/SB2, V850E/MS1, V852, V853, V854	IE-70000-MC-PS-B	Power supply cable for AC100 to 240V is included
PC Interface board	V850/SA1, V850/SB1, V850/SB2, V850E/MS1, V852, V853, V854	IE-70000-98-IF-B or IE-70000-98-IF-C	For PC-9800 (C bus)*3
		IE-70000-PC-IF-B or IE-70000-PC-IF-C	For IBM PC/AT and compatibles (ISA bus)*3
		IE-70000-CD-IF-A	For PCMCIA socket*4
		IE-70000-PCI-IF	For PCI bus*4

*1: The following conversion sockets, which are products of Tokyo Eletech Corporation, are included. ★: Under development
 IE-703102-MC : NQPACK144SD, YQPACK144SD, HQPACK144SD, YQGUIDE
 IE-703002-MC : NQPACK100SD, YQPACK100SD, HQPACK100SD, YQSOCKET100SDN, YQGUIDE

*2: This is a product of Tokyo Eletech Corporation.

*3: Not available for PC98-NX Series.

*4: Available for PC98-NX Series.

Development Tools

V850 Family Hardware Tools

■ List of Hardware Tools (2/2) ◀

Product name	Target device	Part number	Remarks
Conversion adapter/ conversion socket	V850/SA1	CSPACK121A1312N02*	Conversion socket for 121-pin FPBGA
		CSICE121A1312N02*	Conversion adapter for 121-pin FPBGA CSPACK121A1312N02* is necessary when using this
	V850/SA1, V850/SB1, V850/SB2, V852, V853	NQPACK100SD*	Conversion socket for target board (for 100-pin QFP (0.5-mm pitch))
		YQPACK100SD*	Conversion socket for connection to an in-circuit emulator
		HQPACK100SD*	Cover of the socket for 100-pin QFP
		YQSOCKET100SDN*	Socket for spacer
		YQGUIDE*	Fixing screws
		V850/SB1, V850/SB2	NEXB-100SD/RB*
	NQPACK100RB*		Conversion socket for target board (for 100-pin QFP (14 × 20 mm, 0.65-mm pitch))
	YQPACK100RB*		Conversion socket for connection to an in-circuit emulator
	HQPACK100RB*		Cover of the socket for 100-pin QFP
	YQSOCKET100RBN*		Socket for spacer
	YQGUIDE*		Fixing screws
	V850E/MS1, V854	NQPACK144SD*	Conversion socket for target board (for 144-pin QFP (0.5-mm pitch))
		YQPACK144SD*	Conversion socket for connection to an in-circuit emulator
		HQPACK144SD*	Cover of the socket for 144-pin QFP
		YQSOCKET144SDN*	Socket for spacer
		YQGUIDE*	Fixing screws
	V850E/MS1	CSPACK157A1614N01*	Conversion socket for 157-pin FPBGA
		CSICE157A1614N01*	Conversion adapter for 157-pin FPBGA CSPACK157A1614N01* is necessary when using this
Expansion probe	V850/SA1, V850/SB1, V850/SB2, V852, V853	SC-100SDN*	Expansion probe for 100-pin QFP (0.5-mm pitch)
	V850E/MS1, V854	SC-144SDN*	Expansion probe for 144-pin QFP (0.5-mm pitch)

*: This is a product of Tokyo Eletech Corporation.

Development Tools

V_R Series Development Tools

■ List of Software Tools

Product name	Target device	Host machine
Real-time OS RX4000	V _R 4100 Series™	PC-9800 Series
	V _R 4300 Series™	IBM PC/AT and compatibles

Other than above, tools as follows are also provided by development tool makers for V_R Series.

Software tools	Hardware tools
Operating system	Evaluation board
Real-time OS	ROM emulator
Optimization compiler	
Source debugger	

Middleware**Middleware that Holds the Key to Multimedia**

Various key technologies are needed to realize multimedia applications, such as a human-machine interface as speech recognition, and data compression/decompression including data communications. And these technologies require high-performance RISC microcomputers capable of high-speed data processing. The V800 Series and VR Series answer these requirements with powerful CPU performance complemented by middleware support based on multimedia performance.

■ The positioning of middleware**◦ Software integration**

- User programs
- Middleware
 - Human interface (speech recognition, handwritten character recognition, etc.)
 - Internet
 - Multimedia signal processing (JPEG, voice compression, moving picture processing)
 - Communication (modem, mobile communications, etc.)

◦ Hardware integration

- CPU
- Memory
- Standard macro
- Dedicated macro
- Analog circuit
- User logic

Middleware

■ Features

- **Reduced overall costs due to shorter TAT development and lower development costs**

If middleware that has been optimized to the CPU architecture is used, the amount of time taken to develop each individual system can be markedly reduced. Moreover, as there is no need to use dedicated devices, the cost is further streamlined.

- **Improved CPU performance**

The CPU, due to the improvement in CPU performance, can now easily realize applications that could previously only be performed by dedicated hardware or personal computers/workstations. The addition, modification and deletion of functions difficult to perform with hardware, as well as the organization of user-friendly interfaces have now been made simpler.

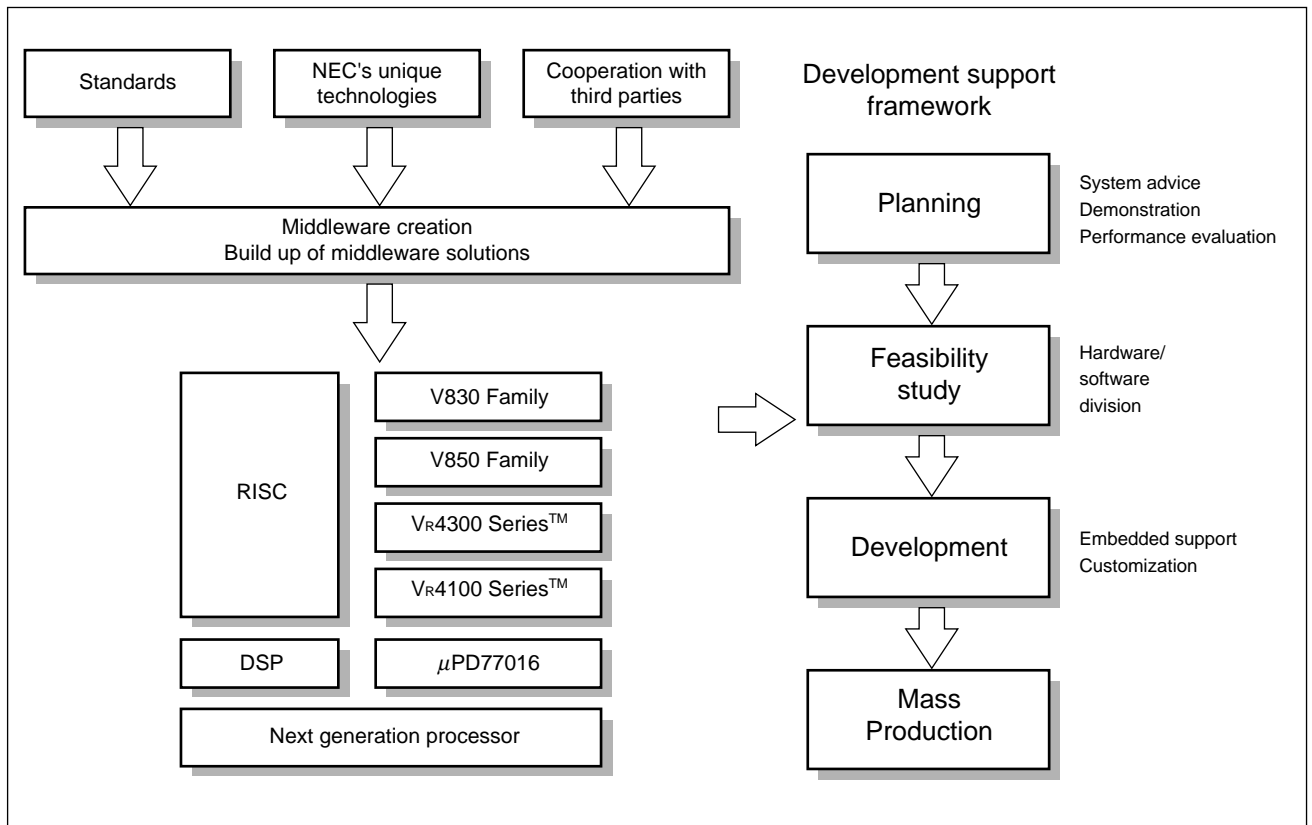
- **Spread of Internet and multimedia signal-processing applications**

Through the popularity of the Internet, the management of multimedia information such as picture images and speech has expanded considerably. To employ dedicated hardware to process this information would take a large-scale system and considerable cost. By using middleware, the processing of this information can be easily realized by the CPU alone.

Middleware

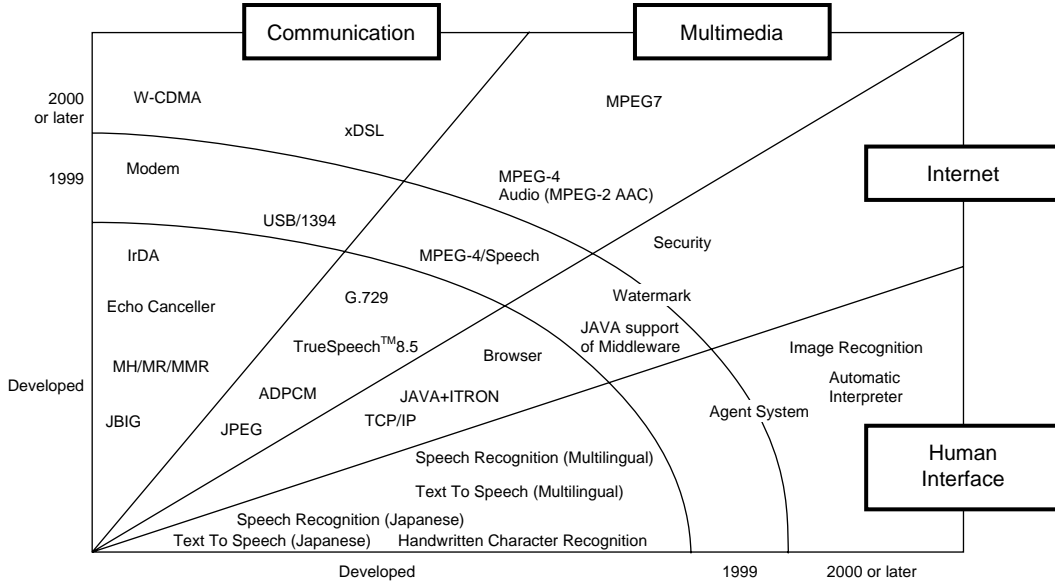
Middleware Development Framework

NEC middleware will gradually develop into optimal processor for each system. Furthermore, NEC plans to realize standardized middleware by using not only NEC's uniquely developed technologies, but also the most outstanding third party technologies and standards.



Middleware

Middleware Road Map



Middleware

Middleware Products

Field	Middleware		V800 Series		V _R Series
			V830 Family	V850 Family	
Image	MH/MR/MMR		◎	◎	◎
	JBIG		◎	◎	◎
	JPEG		◎	◎	◎
Speech	Text To Speech	Japanese	◎	◎	○
		Multilingual Version (TTS3000/C ^{Note 1})	◎	–	–
		English ^{Note 2}	–	–	○
	TrueSpeech8.5		◎	–	◎
	G.726 (ADPCM)		Sample	◎	△
	G.729/AnnexA/B		–	–	△
	MPEG-4/Speech (CELP)		–	–	△
	Echo Canceller (for Hands-free operation)		◎	–	◎
Sound	MPEG-4 Audio (MPEG-2 AAC)		△	–	△
Recognition	Speech Recognition	Multilingual Version (ASR1600/C ^{Note 1})	◎	–	△
		English ^{Note 2}	–	–	○
		Japanese (large vocabulary)	◎	–	○
	Handwritten Character Recognition		◎	◎	◎
Internet (Third party products)	Browser		◎	○	◎
	JAVA		◎	–	◎
	TCP/IP		◎	○	◎
Interface	IrDA protocol stack ^{Note 3}		◎	◎	△

Notes 1. English/German/French/Italian/Dutch/Spanish (Jointly developed with L&H Inc.)

2. WindowsCE supported

3. This is a product of Okaya Systemware Co., Ltd.

Remark ◎ : Developed, ○ : Under Development, △ : Under Planning