To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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RENESAS

V850 Series
Development Environment

Empower your creativity
V850
Embedded Controller

2006·February

V850 Series Development Environment

The V850 Series development environment encompasses a range of tools designed to enable smoother, faster, and more precise development of application systems that employ NEC Electronics' original V850 Series of embedded RISC microcontrollers. Each tool is provided with functions that optimize the performance of the V850 Series.

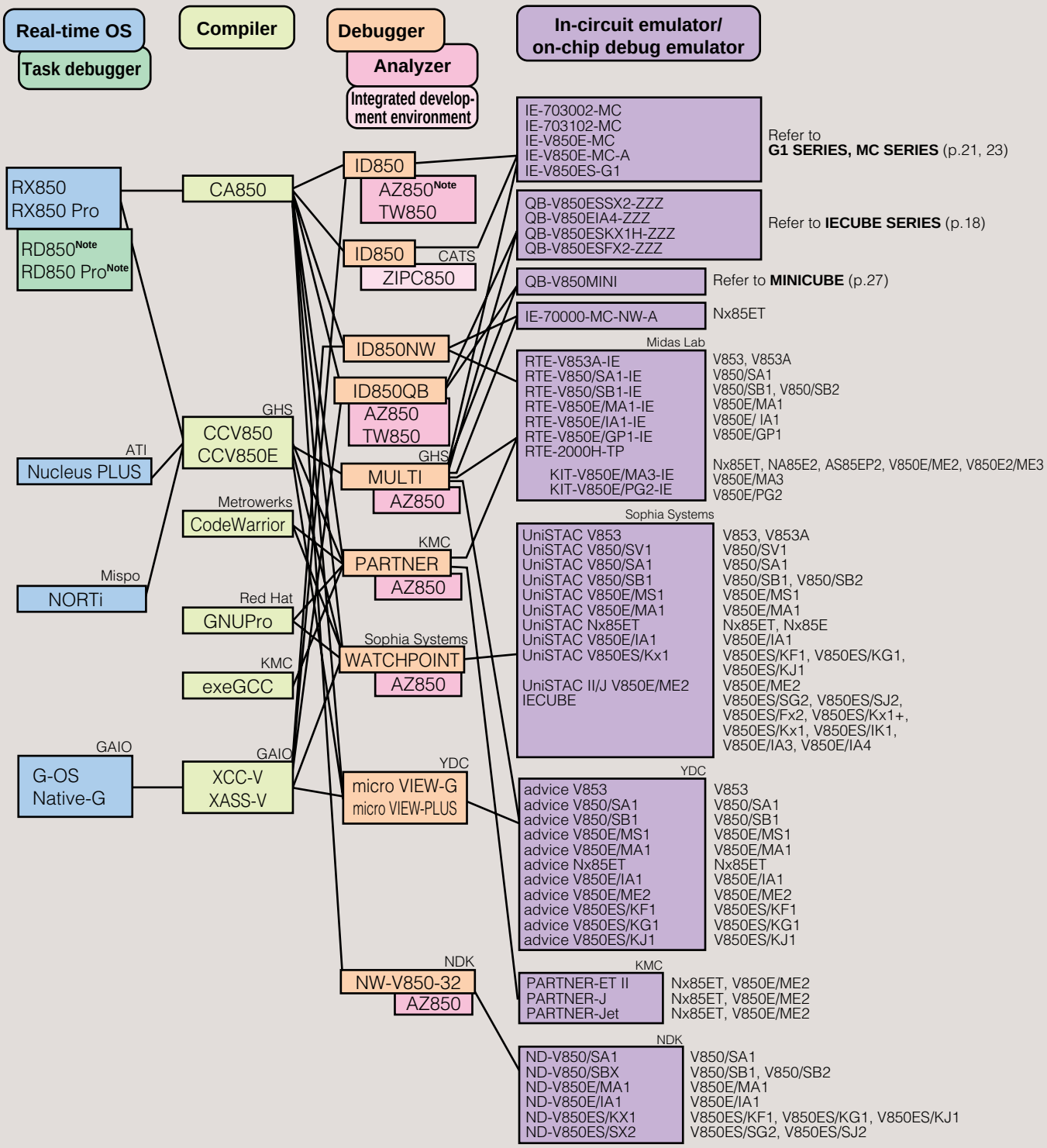
Development Environment Background

The expanded scale of hardware and software in recent application systems has brought with it an increase in the level of complexity. Successful development in today's environment means being able to **easily expand and improve functions, and efficiently raise the performance of the system.** With its V850 Series, NEC Electronics now gives developers the opportunity to achieve this. To enable the development of systems that capitalize on the excellent features of these high-performance devices, NEC Electronics provides support in the following three key areas: reduced development time, improved system performance, and coordination with partners.

INDEX

DEVELOPMENT ENVIRONMENT FOR V850 SERIES (1/2)

In-Circuit Emulator and On-Chip Debug Emulator Environment

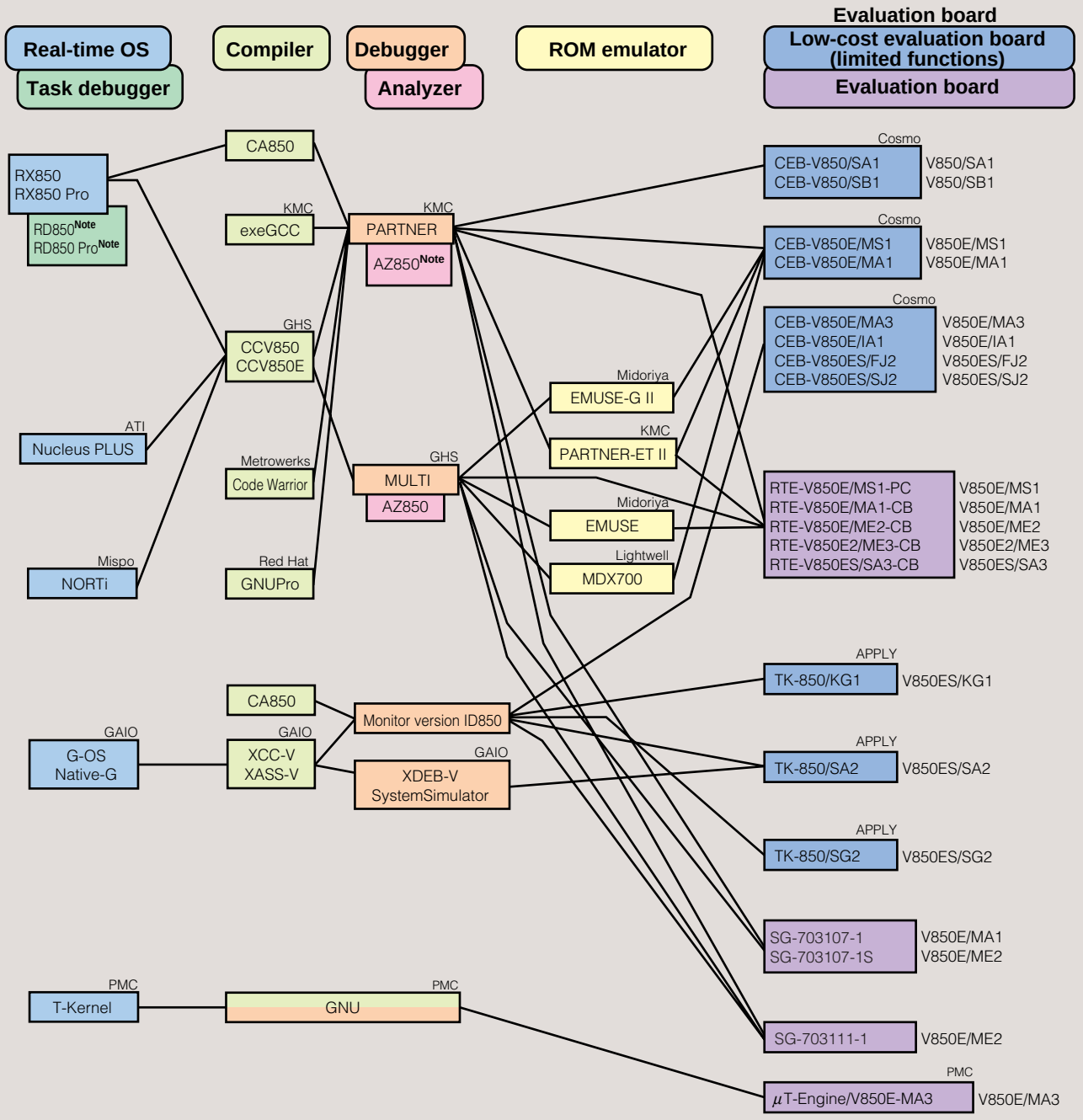


Note RD850, RD850 Pro, and AZ850 can be used with ID850, ID850QB, MULTI, PARTNER, and WATCHPOINT.

ATI:	Accelerated Technology, Inc.	Mispo:	MiSPO Co., Ltd.
CATS:	CATS, Inc.	NDK:	Naito Densei Machida Mfg. Co., Ltd.
GAIO:	GAIO TECHNOLOGY CO., LTD.	Red Hat:	Red Hat, Inc.
GHS:	Green Hills Software, Inc.	Sophia Systems:	Sophia Systems Co., Ltd.
KMC:	Kyoto Microcomputer Corporation	YDC:	Yokogawa Digital Computer Corporation
Metrowerks:	Metrowerks Corporation	Others:	NEC Electronics Corporation
Midas Lab:	Midas Lab Co., Ltd.		

DEVELOPMENT ENVIRONMENT FOR V850 SERIES (2/2)

ROM Emulator and Evaluation Board Environment



Note RD850, RD850 Pro, and AZ850 can be used with MULTI and PARTNER.

APPLY:	Application Corporation
ATI:	Accelerated Technology, Inc.
Cosmo:	Cosmo, Inc.
Red Hat:	Red Hat,Inc.
GAIO:	GAIO TECHNOLOGY CO., LTD.
GHS:	Green Hills Software, Inc.
KMC:	Kyoto Microcomputer Corporation
Lightwell:	Lightwell Co., Ltd.
Metrowerks:	Metrowerks Corporation
Midas Lab:	Midas Lab Co., Ltd.
Midoriya:	Midoriya Electric Co.,Ltd.
Mispo:	MiSPO Co.,Ltd.
WRS:	Wind River Systems, Inc.
PMC:	Personal Media Corporation
Others:	NEC Electronics Corporation

SP850

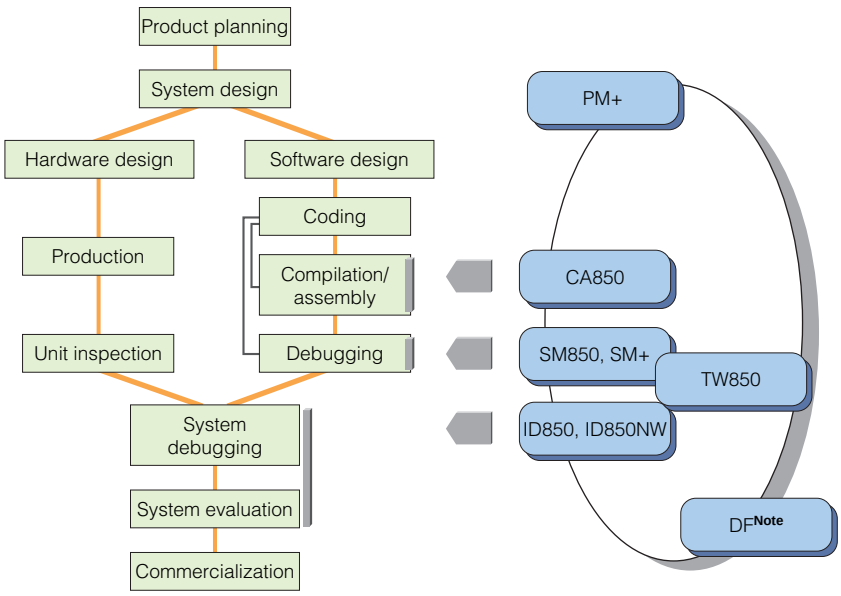
The SP850 software package combines various V850 Series development tools and software products previously sold individually.

Package Contents

- C compiler package (CA850)
- Project manager (PM+)
- Integrated debugger (ID850, ID850NW)
- System simulator (SM850, SM+)
- Performance analysis tuning tool (TW850)

Features

- Integrated development environment from language tools to debugger and analysis tools
- Simple installation using integrated installer
- Enhanced linking functions for development tools and software products
- Optimized object debugging with compiler
- High-speed simulation of peripheral function operation
- Program performance analysis and tuning
- Management of different versions of the same tool
- Sample program for development tool operation verification (with user's manual) included
- Timely version upgrade via development tools download service (ODS) as well as version upgrade via supply media



Note Download from development tools download service (ODS).

COMPILERS

The following compilers are supported in the V850 Series.

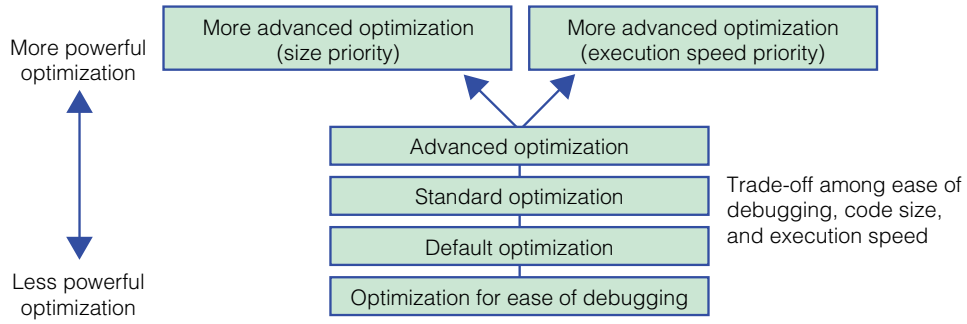
CA850: C compiler package for V850 Series

Features

- ◆ Complies with ANSI-C standard for C language programming
- ◆ Includes powerful optimization functions
- ◆ Provides functions optimized for embedded systems
- ◆ Provides multiple utilities

Powerful Optimization Functions

The CA850 comes with "powerful optimization functions" that make the most of the device's performance features. Users can select among six optimization levels, and can even set optimization levels for individual sources.



Functions Optimized for Embedded Systems

The CA850 provides functions optimized for development of the embedded systems.

○ Functions related to size reduction of ROM/RAM used and acceleration of execution speed

- ◆ Selection of register mode (software register bank function)
  - → Setting a limit on the number of registers that can be used by the compiler (either 22 or 26 registers) reduces the interrupt overhead (saving to and restoring from registers).
- ◆ Run-time library is used for processing of function prologues and epilogues
  - → Code size is reduced by library functions that can be called both when saving to registers and when restoring from registers (slightly accelerates execution speed).
- ◆ Structure/union packing function
  - → This packing function fills holes between members of structures or unions due to alignment, which reduces code size (slightly accelerates execution speed).
- ◆ Register allocation function for external variables
  - → When in 22 or 26 register mode, the user can freely allocate external variables to any usable register and can change the memory access to the register access. This can shrink the code size while accelerating execution speed.

○ **Functions implemented via C language descriptions**

- ◆ Data and variables can be allocated to specified memory areas.
  → Enables allocation of data and/or variables to memory areas that can be accessed at high speed
- ◆ Interrupt/exception handler processing can be coded in C language.
  → Register save/restore processing required in assembly code can be performed automatically by compiler
- ◆ Assembly code instructions can be inserted into C language source code.
  → Useful for partial, high-speed processing, etc.
- ◆ Access to peripheral I/O register can be handled as ordinary variable access.
  → Uses "device files" that contain definitions of peripheral I/O register names, interrupt request names, on-chip memory size, and other information
- ◆ Real-time OS (RX850, RX850 Pro) tasks can be coded
  → Reduces code not required for tasks

Accessory Utilities

The CA850 provides various utilities that can be used for development of embedded systems.

○ **ROMization processor (romp850)**

The initial values of variables must be set before running any applications when they are declared with initial values. The romp850 utility generates these initial values and the information to be copied. This ROMization processor's functions can also be used to generate information to be copied when ROM code is deployed to RAM before executing.

○ **HEX converter (hx850)**

This utility converts executable object files to a hexadecimal format. The following hexadecimal formats are supported.

- ◆ Intel expanded hex format
- ◆ Motorola S type format (standard address)
- ◆ Motorola S type format (32-bit address)
- ◆ Extended Tek hex format

○ **Section file generator (sf850)**

This utility allocates frequently used variables (among all variables used by an application) to an internal RAM area.

○ **Dump command (dump850)**

The dump command displays the contents of a specified object file or archive file in an easy-to-read format.

○ **Disassembler (dis850)**

This utility converts text-attribute data (program code) from object files or archive files into assembly language and displays the assembly language code.

○ **Cross reference tool (cxref)**

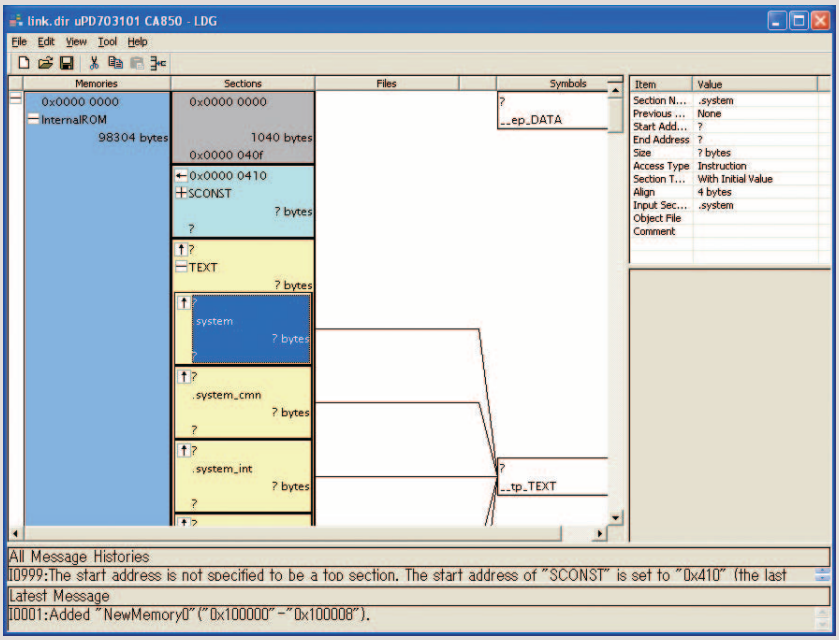
This utility outputs cross reference information, tag information, call tree information, function metrics (number of lines in function, function's call frequency, etc.), and call data base (function call information).

○ **Memory layout visualization tool (rammap)**

This utility displays a visualization of variable allocation information.

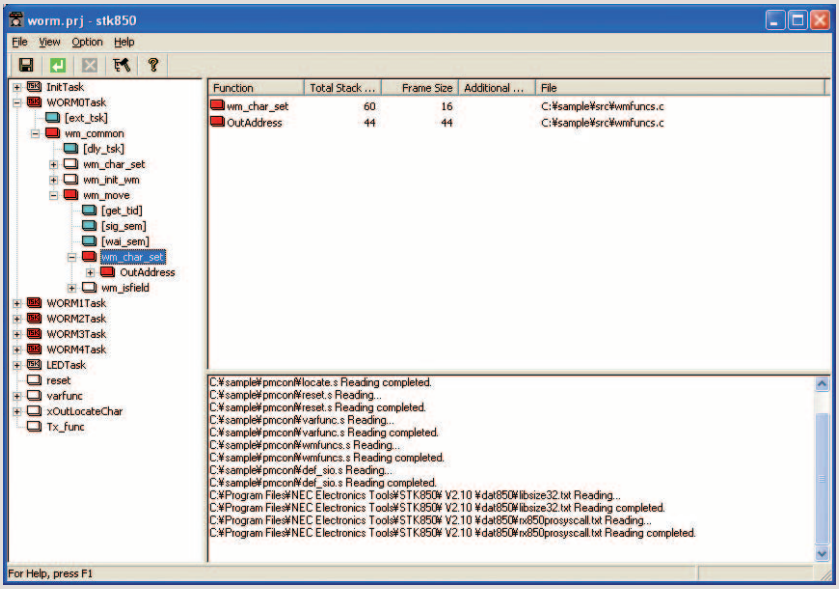
○ **Link directive generator (LDG)**

This utility can be used to generate (via the GUI) "link directive files" that specify the section allocation order, addresses, etc.



○ **Stack usage tracer (stk850)**

This utility statically estimates the stack size used by sets of functions within a project. Estimations can also be performed as the real-time OS task (RX850, RX850 Pro).

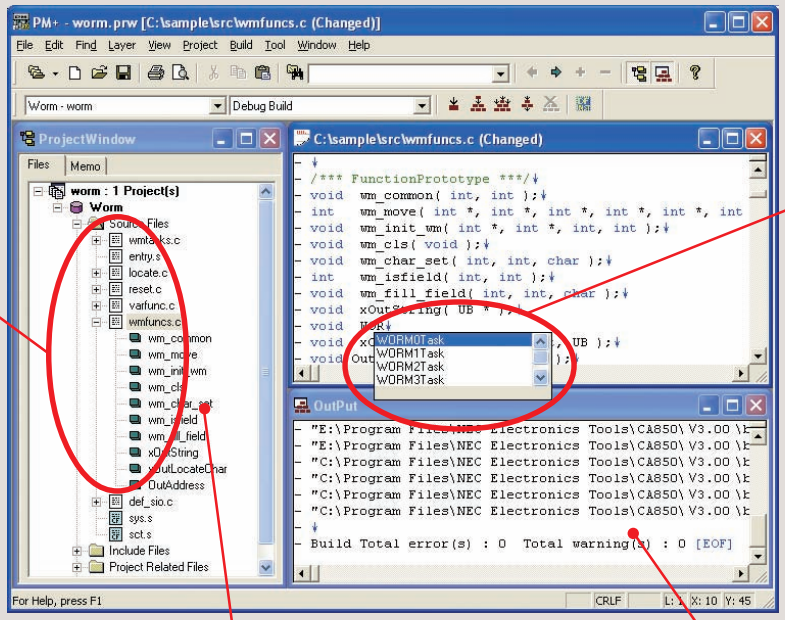


PROJECT MANAGER (PM+)

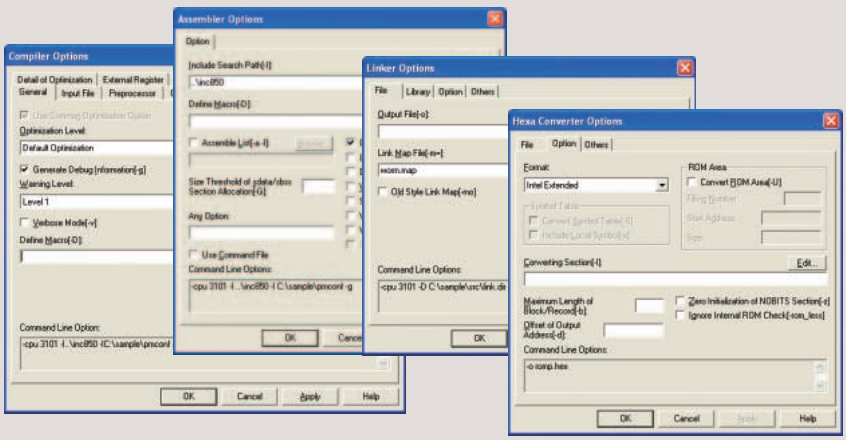
The project manager enables more efficient development by integrating tools such as a C compiler and debugger.

Features

- ◆ Enables editing, build, and debugging, as a series of operations
- ◆ Includes an editor function
  Includes a smart look-up function that provides a short-cut for coding function names and task names
- ◆ Menus and tool bars can be customized

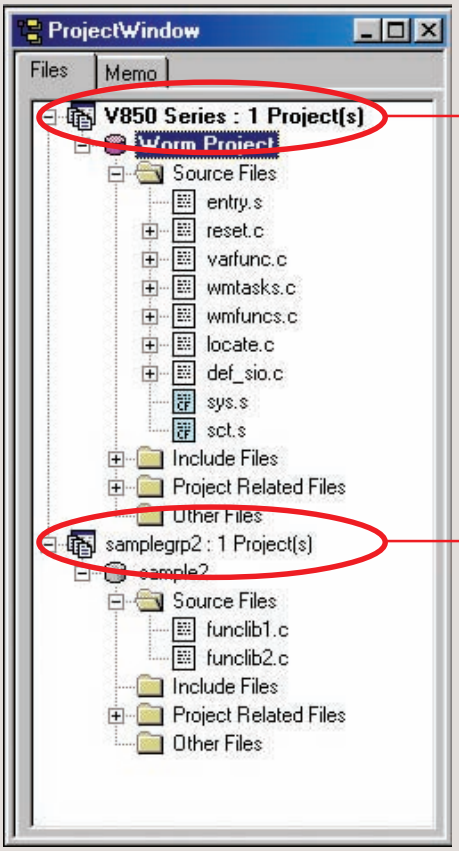


- ◆ Tool options can be specified via dialog boxes



◆ Facilitates project management

Enables management of source code and documents as well as version management using CVS. Multiple projects can be managed in the same work space.



This is the "main project."

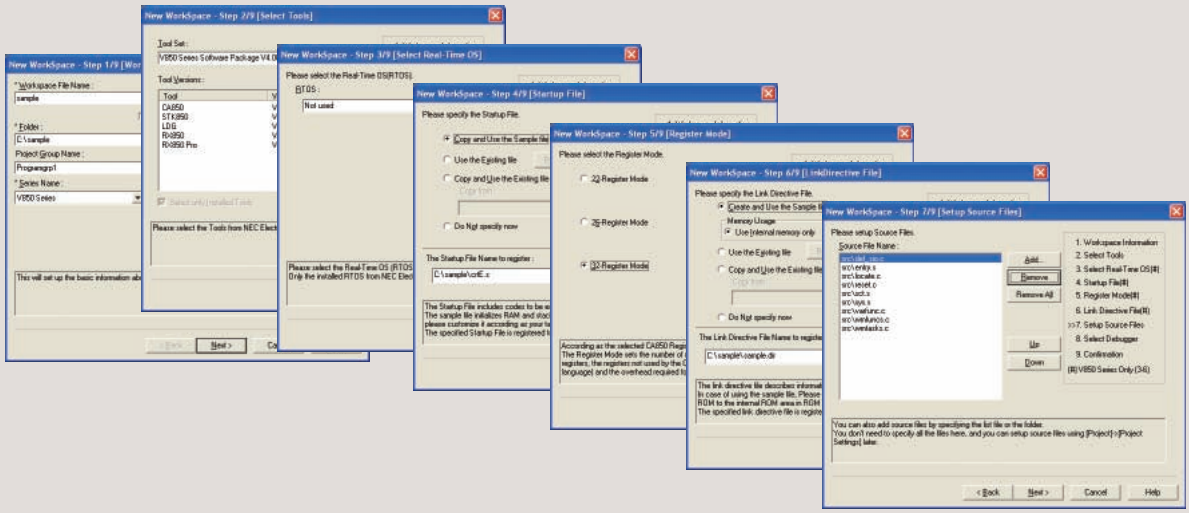
This is the "library creation project."

This kind of management is enabled.

Includes a "batch build" function that builds multiple projects as a single batch.

◆ Wizards can be used to create projects

Wizard screens provide an easier way to register target device names and required source files, to specify whether or not a real-time OS will be used, and to set startup routines or link directive files.



DEBUGGERS

The following debuggers are available.

ID850: C source debugger for V850 Series (supporting MC series and G1 series)
ID850NW: C source debugger for V850 Series (supporting the N-Wire emulator)
ID850QB: C source debugger for V850 Series (supporting MINICUBE and IECUBE)

Features

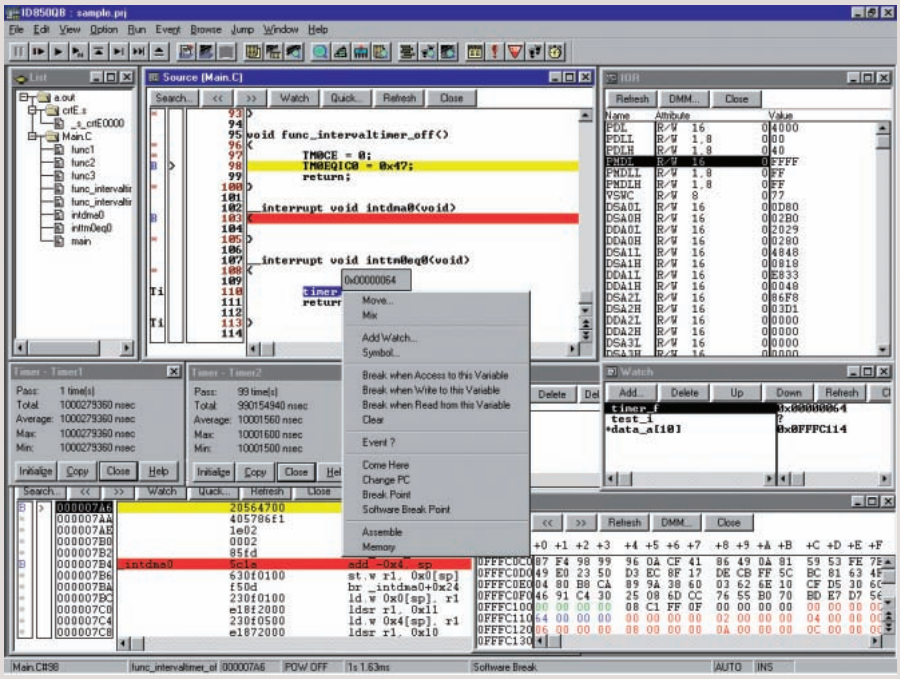
◆ Source can be debugged.
Source program in C and assembly language can be debugged.

◆ Wealth of debug functions
By using the event functions of an in-circuit emulator (IE), break, trace, and time measurement, and coverage measurement can be executed.
In addition, basic debugging such as break and run-break time measurement can be executed also for on-chip debugging (OCD) by using the event functions of the debug control unit (DCU).

◆ Saving debugging environments
Debugging environments such as information on setting of breakpoints and events, downloading of files, and display status of windows can be saved as a project file.
By loading this project file, the debugging environments can be restored.

◆ Function expansion by Tcl
Batch processing and hook processing on the command line and creating user's original custom windows can be performed by using Tcl/Tk (Tool Command Language).

◆ Function expansion by TIP or ToolLink
By using a task debugger (RD) and system performance analyzer (AZ) supporting TIP (Tool Interface Protocol) or ToolLink, debugging efficiency of a user program using a real-time OS (RX) can be dramatically enhanced.



Debugger Usage Environment

Target Device	Debugger	In-Circuit Emulator or On-Chip Debug Emulator		Host Machine
		Main Unit	Emulation Board or Option Board	
V850ES/SG2, V850ES/SJ2	ID850QB	QB-V850ESSX2-ZZZ	—	PC 9800 series IBM PC/AT or compatible
V850E/IA3, V850E/IA4, V850ES/IK1		QB-V850EIA4-ZZZ		
V850ES/KE1, V850ES/KE1+, V850ES/KF1, V850ES/KF1+, V850ES/KG1, V850ES/KG1+, V850ES/KJ1, V850ES/KJ1+		QB-V850ESKX1H-ZZZ		
V850ES/FE2, V850ES/FF2, V850ES/FG2, V850ES/FJ2, μPD703229Y, μPD70F3229Y		QB-V850ESFX2-ZZZ		
V850E/ME2, V850E/MA3, V850E/IA4, V850E/SV2, V850ES/SG2, V850ES/SJ2, V850ES/FE2, V850ES/FF2, V850ES/FG2, V850ES/FJ2, μPD70F3229, V850ES/KJ1+, V850ES/KJ1		QB-V850MINI		
V850ES/SA2, V850ES/SA3	ID850	IE-V850ES-G1	IE-703204-G1-EM1	
V850ES/KF1, V850ES/KG1, V850ES/KJ1			IE-703217-G1-EM1	
V850ES/SG2, V850ES/SJ2			IE-703288-G1-EM1	
V850ES/PM1			IE-703228-G1-EM1	
V850ES/FE2, V850ES/FF2, V850ES/FG2, V850ES/FJ2, μPD703229Y, μPD70F3229Y			IE-703239-G1-EM1	
V850ES/ST2			IE-703220-G1-EM1	
V850E/SV2		IE-V850-MC-A	IE-703166-MC-EM1	
V850E/MA1, V850E/MA2			IE-703107-MC-EM1	
V850E/IA1		IE-V850E-MC	IE-703116-MC-EM1	
V850E/IA2			IE-703114-MC-EM1	
V850E/MS1(5V), V850E/MS2(5V)		IE-703102-MC	IE-703102-MC-EM1	
V850E/MS1(3.3V)			IE-703102-MC-EM1-A	
V850/SA1		IE-703002-MC	IE-703017-MC-EM1	
V850/SB1, V850/SB2			IE-703037-MC-EM1	
V850/SV1			IE-703040-MC-EM1	
V850/SF1			IE-703079-MC-EM1	
V850/SC1, V850/SC2, V850/SC3			IE-703089-MC-EM1	
V853			IE-703003-MC-EM1	
V850E/ME2	ID850NW	RTE-2000-TP	—	
V850E/MA3			KIT-V850E/MA3-IE	
NB85ET		IE-70000-MC-NW-A	—	

Manufactured by Midas Lab Co., Ltd.

Inquiries to: Naito Densei Machida Mfg. Co., Ltd. (Tel: 81-45-475-4191)
CORE Corporation (Tel: 81-3-3795-5171)
Application Corporation (Tel: 81-42-732-1377)

SIMULATORS

The following simulators are available.

SM+ for V850ES/Sx2:	Instruction + peripheral simulator for V850ES/SG1, V850ES/SG2, and V850ES/SJ2
SM+ for V850ES/Fx2:	Instruction + peripheral simulator for V850ES/FE2, V850ES/FF2, V850ES/FG2, and V850ES/FJ2
SM+ for V850:	Instruction simulator for V850E and V850ES Series
SM850:	Instruction + peripheral simulator for V853, V850/SA1, V850/SB1, V850/SB2, V850/SF1, V850E/MS1, V850E/MA1, V850E/IA1, V850E/IA2, V850ES/SA2, V850ES/SA3, V850ES/KF1, V850ES/KG1, V850ES/KJ1, V850/SC1, V850/SC2, V850/SC3

Instruction + peripheral simulators: Can simulate instruction execution by the CPU and internal peripheral functions such as timers and UART.

Instruction simulators: Can simulate only instruction execution by the CPU.

Features

◆ Target-less evaluation

Microcontroller operations, including the operations of the on-chip peripheral units and interrupt servicing, in addition to the operation of the CPU, can be simulated.

Programs can be debugged in an early stage without an in-circuit emulator.

◆ Same operability as debuggers for V850 Series

◆ Various simulation functions

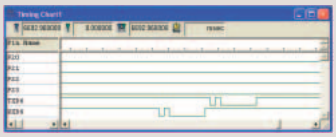
· System debugging on PC (I/O panel window)

Dummy target systems can be organized by placing buttons and LEDs.

Panels having the same operability as Microsoft PowerPoint can be created.

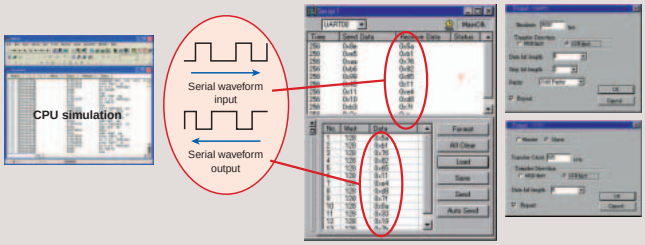
· Monitoring I/O waveform of microcontroller (timing chart window)

Waveforms can be monitored in an oscilloscope-like image.



· Simulation of serial transmission/reception (serial window)

Transmits serial data to the microcontroller and displays reception of serial data from the microcontroller.



PERFORMANCE ANALYSIS TUNING TOOL

The following performance analysis tuning tool is supported by the V850 Series.

TW850: Tuning tool for V850 Series

The TW850 performance analysis tuning tool is a tuning tool for embedded software.
It enables performance estimation, performance prediction, and performance improvement through easy operation.
The TW850 tool can also be used for the V850E with on-chip cache and other system LSI devices.

Features

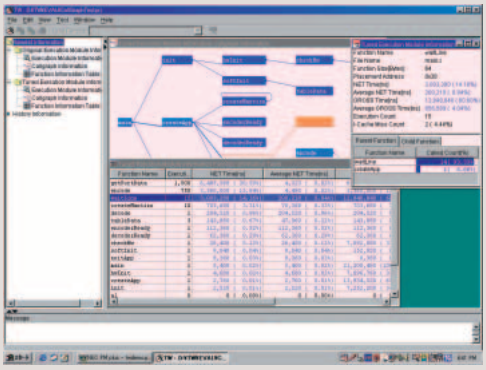
◆ Easy-to-use interface
The wizard-type GUI allows easy specification of conditions. Moreover, profiling, performance analysis, and tuning are automatically performed.

◆ Profiling function
Two profiling approaches are available, one in which trace data is analyzed during execution using the in-circuit emulator trace function, and another in which software analysis is performed by inserting probe code into the target program.

◆ Performance estimation
Performance analysis changing the internal ROM size, instruction cache size, etc. is possible, and the analysis results can also be used for microcontroller selection.

◆ Analysis result output function
The following analysis results are output.
· Interfunction call relations, call count information
· Function execution time information
· Cache miss-hit information

◆ Performance tuning function
The following types of tuning can be performed.
· Instruction cache optimization
(Optimum placement of functions so as to reduce cache miss-hits)
· High-speed access memory allocation optimization
(Allocation of functions that constitute bottlenecks to high-speed access memory such as internal ROM)



The following auto verification systems are supported in the V850 Series.

XO850: Auto verification system for V850 Series

XO850 is an auto verification system for the V850 Series.

At the test process (the final process in software development), this system performs auto execution and auto evaluation using the actual target hardware, providing support for test automation.

Features

◆ Improved execution of tedious repetitive and regression tests

Full testing after each software revision is tedious and time-consuming. Test automation enables regression tests to be performed more easily, for improved software quality.

◆ Executes tests that are too complex or too large to be executed manually.

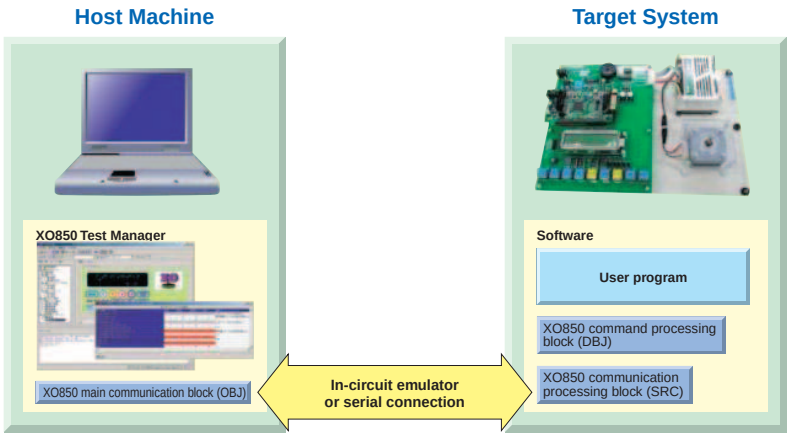
With the advent of ever more complex software, an increasing number of tests are endurance tests or other tests too complex for manual operation. Test scripts can be used to enable implementation of abnormality-related tests or other complex tests, and it saves time when implementing very large tests.

◆ Facilitates reproduction of abnormalities

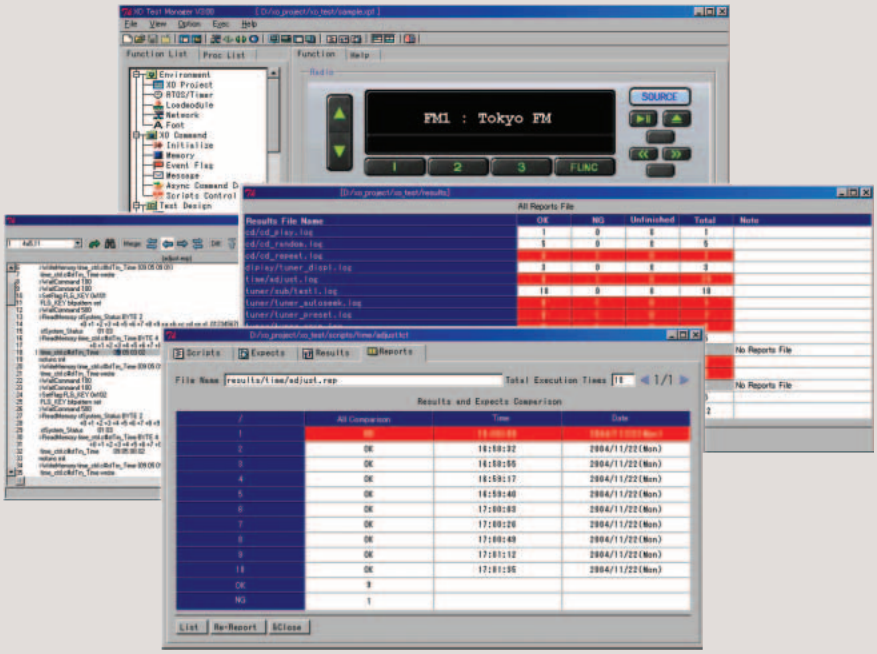
When an abnormality is discovered, it is often difficult to remember the execution steps that preceded the abnormality. Test automation includes recording these execution steps, which facilitates and helps ensure accuracy when reproducing the abnormality.

Configuration

Tests are performed using a host machine connected to the target system.
The XO850 Test Manager, which is installed in the host machine, manages the tests by executing the tests, gathering the test results, automatically comparing the test results to the expected values, etc.



XO850 Test Manager (screen example)



Functions

◆ Support for creating test scenarios
- Auto generation of test scenarios from virtual target's operations
- Auto generation of test scenarios from actual device's operations

◆ Auto execution of test scenarios
- Enables execution of multiple test iterations or multiple consecutive test scenarios
- Enables execution of test scenarios concurrent with condition judgments

◆ Auto comparison of execution results and expected values
- When execution of test scenario ends, the pass/fail results are automatically displayed in a readable format.
- Displays a report describing the execution conditions for all test scenarios

◆ Use of upstream resources
- Verification logs from design stages can be used to make test script generation more efficient.
- Analysis of abnormalities found during testing is facilitated by links to a status transition table.
- Coverage can be viewed at the status transition table level, enabling confirmation of a test's coverage.

Use Conditions

◆ Load module

The load module is generated by the V850 Series' C compiler package (CA850). The RX850 and RX850 Pro real-time operating systems for the V850 Series are also supported when the real-time OS is used.

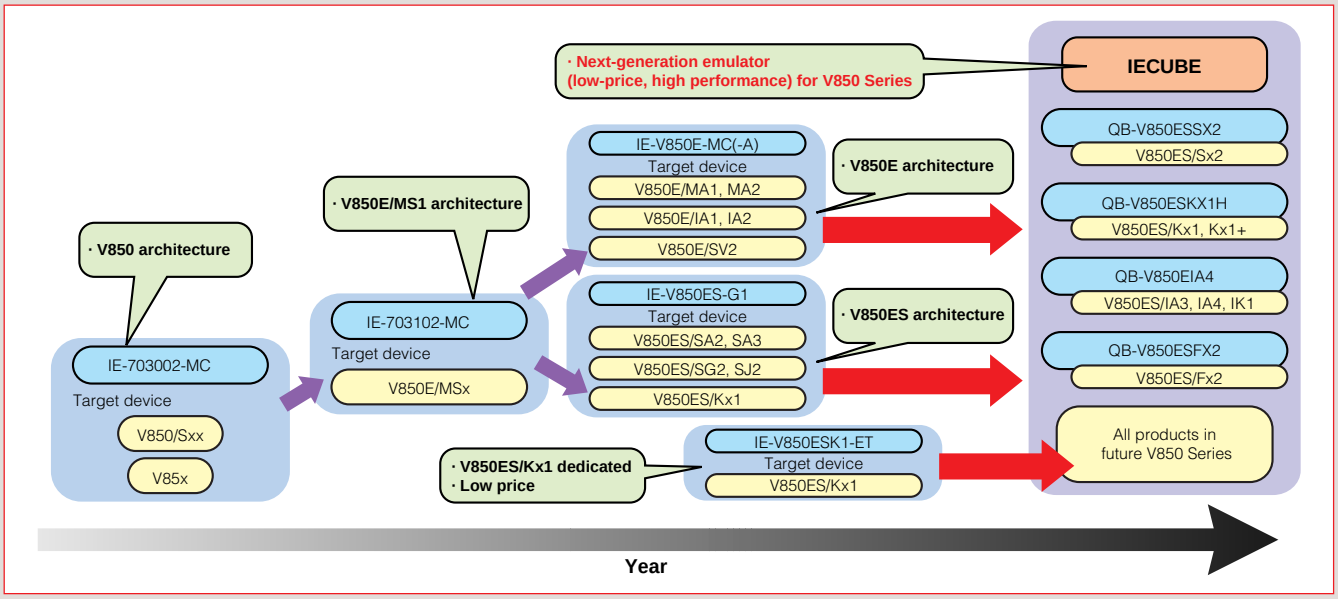
◆ Communication tools

One of the following is required for communications between the host machine and the target device.
- One serial communication channel for the device
- An in-circuit emulator (IE-703002-MC, IE-703102-MC, IE-V850E-MC, IE-V850E-MC-A, IE-V850ES-G1, or QB-V850ESSX2)

IECUBE SERIES

The following IECUBE series in-circuit emulators are supported in the V850 Series.

QB-V850EIA4:	In-circuit emulator for V850ES/IK1, V850E/IA3, or V850E/IA4
QB-V850ESSX2:	In-circuit emulator for V850ES/SG2 or V850ES/SJ2
QB-V850ESKX1H:	In-circuit emulator for V850ES/KE1, V850ES/KE1+, V850ES/KF1, V850ES/KF1+, V850ES/KG1, V850ES/KG1+, V850ES/KJ1, or V850ES/KJ1+
QB-V850ESFX2:	In-circuit emulator for V850ES/FE2, V850ES/FF2, V850ES/FG2, V850ES/FJ2, or μPD703229



Features

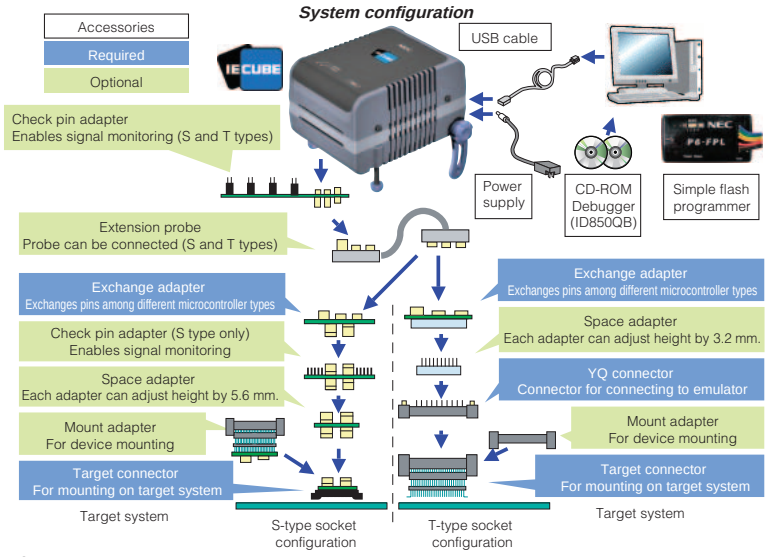
◆ Low price
- Price of 1/3 to 1/4 of the existing high-performance emulators
- Debugger "ID850QB" and simple programmer "PG-FPL" are available as a package.

◆ Easy setup
- Emulator and emulation board, which have conventionally been available separately, are combined.
- USB (1.1/2.0) is employed for communication with the host machine.

◆ Many debugging functions
- Functions equivalent to a high-performance emulator are realized (coverage and external memory emulation are optional).
- Time measurement function as well as real-time monitor and RAM monitor functions that are frequently used are reinforced.

◆ Reinforced maintainability
- Self-diagnostic function is provided to smoothly solve troubles.

◆ Small and lightweight
- Palm size for easy transportation



O Accessories
- Debugger (ID850QB), simple programmer (PG-FPL), and documentation are provided.
- The following sockets are provided in the following packages that include sockets.
  Exchange adapter and target connector (S type only)
  Exchange adapter, YQ connector, and target connector (T type only)

◆ IECUBE optional functions

The following functions are optionally available. They can be added by specifying an option when placing your order or by upgrading your IECUBE.

- Memory emulation function

  This function substitutes the external memory on the target system so that programs and data can be located in emulation memory and debugged.
- Coverage measurement function

  Percentage of executing load modules and sections can be measured.
- TimeMachine™ function

  This function is supported by a Green Hills Software (GHS) debugger. Consult a GHS tool distributor for the outline and specifications of this function.

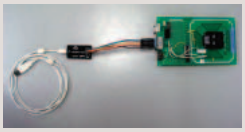
PG-FPL

The PG-FPL is a simple programmer that is supplied with IECUBE.

Features

◆ Connects to a PC (via USB 1.1 or 2.0 cable), AC adapter not required.
◆ Write is also enabled via UART in the target device.
◆ Status display LEDs: power ON (green LED lit) and communication online (red LED blinking) display lamps
◆ Connection to target system selectable: via PG-FP4's connector or a direct connection
◆ Able to supply power to the target system (up to 200 mA)
◆ Not able to supply clock to the target system
◆ Evaluation programmer for development (conditionally guaranteed for use with mass production)
◆ Target devices: Any device supported by IECUBE (except flash memory versions that use two power supplies)

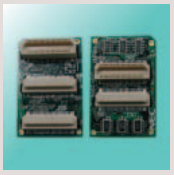
PG-FPL


Connection

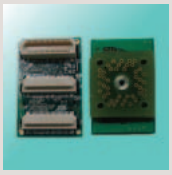

GUI

Socket for IECUBE

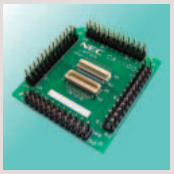
① Extension probe (S and T types) (option)
Connecting IECUBE to target system with probe



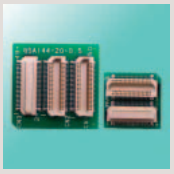
② Exchange adapter
Adapter whose pins need to be converted, depending on the product



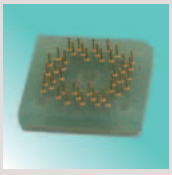
⑦ Exchange adapter
Adapter whose pins need to be converted, depending on the product



③ Check pin adapter (option)
Adapter for monitoring waveform



④ Space adapter (option)
Adapter for adjusting height

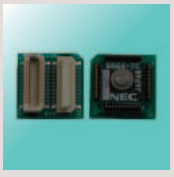


⑧ Space adapter (option)
Adapter for adjusting height

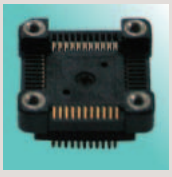
⑨ YQ adapter
Adapter for connecting IECUBE

⑤ Mount adapter (option)
Adapter for mounting device (cover and unit)

⑩ Mount adapter (option)
Adapter for mounting onto device



⑥ Target connector
Connector soldered onto the target system



⑪ Target connector
Connector to be soldered onto the target system

S-type socket **T-type socket**

Connections

When Connecting to IECUBE	
S Type	T Type
IECUBE	
①	
②	⑦
③	—
④	⑧
	⑨
⑥	⑪
Target System	

When Mounting on Device	
S Type	T Type
⑤(top)	⑩
Device	
⑤(bottom)	—
⑥	⑪
Target System	

Remark The YQ adapter (T type) includes guide screws (YQGUIDE-S3).
The exchange adapter (S type) differs according to the G1 emulator.
A check pin adapter that can be used with both T type and S type is currently under development.
The following products are identical (except 64-pin products).
· Check pin adapter (S type) and check pin adapter for G1 emulator
· Space adapter (S type) and space adapter for G1 emulator
· Mount adapter (S type) and mount adapter for G1 emulator
· Target connector (S type) and target connector for G1 emulator
· Space adapter (T type) and YQSOCKET for MC emulator
· YQ adapter (T type) and YQPACK for MC emulator
· Mount adapter (T type) and HQPACK for MC emulator
· Target connector (T type) and HQPACK for MC emulator

G1 SERIES

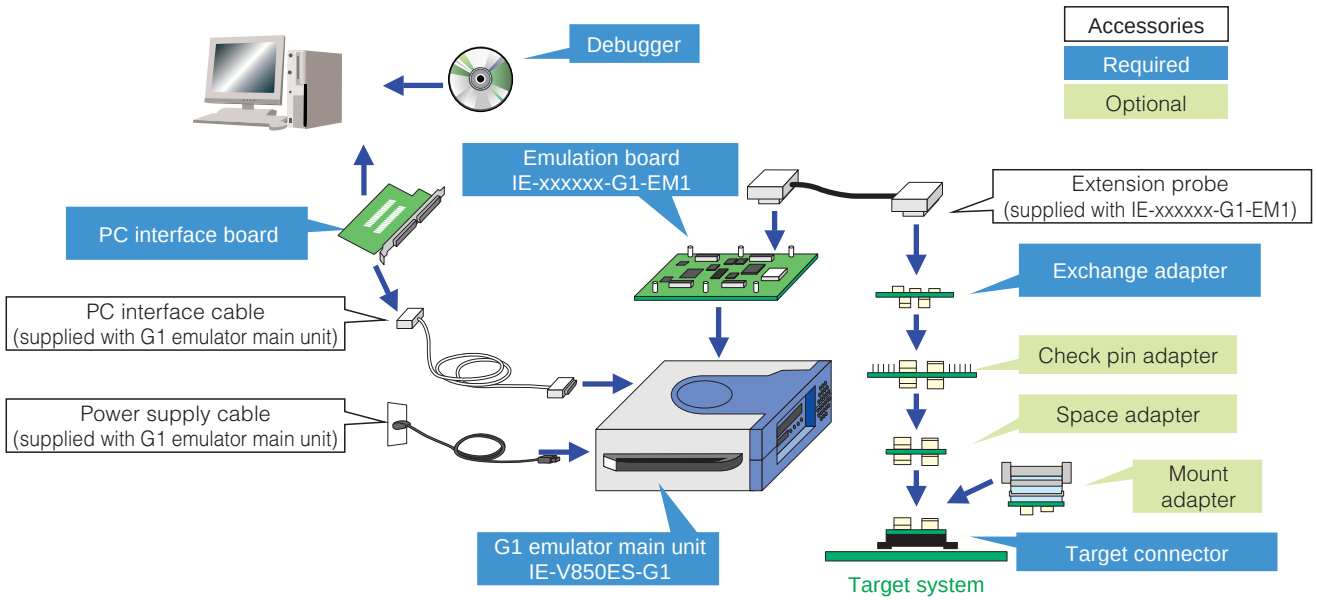
The following products are G1 series in-circuit emulators for V850 Series.

IE-V850ES-G1: In-circuit emulator for V850ES
- IE-703204-G1-EM1: In-circuit emulator emulation board for V850ES/SA2 and V850ES/SA3
- IE-703288-G1-EM1: In-circuit emulator emulation board for V850ES/SG2 and V850ES/SJ2
- IE-703228-G1-EM1: In-circuit emulator emulation board for V850ES/PM1
- IE-703239-G1-EM1: In-circuit emulator emulation board for V850ES/FE2, V850ES/FF2, V850ES/FG2, V850ES/FJ2, μPD703229Y
- IE-703220-G1-EM1: In-circuit emulator emulation board for V850ES/ST2

IE-V850ES-G1

Features

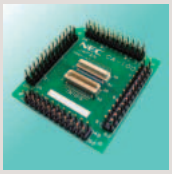
- ◆ Attains a high approximation of an actual device by integrating emulator functions on a dedicated chip.
- ◆ Provides many debugging functions such as break, trace, coverage measurement, external memory emulation, and real-time RAM monitoring.
- ◆ Extension probe supplied as standard makes connection with the target system easy.
- ◆ Internal power supply and easy-to-carry housing
- ◆ Connectable to various types of computers.



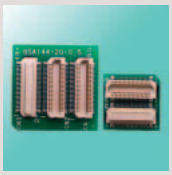
Caution A different extension probe and adapter/connector are required when emulating the V850ES/SA2 and V850ES/SA3.

Socket for G1 Emulator

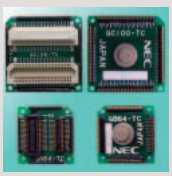
② Exchange adapter
Adapter whose pins need to be converted, depending on the product



④ Check pin adapter
(option)
Adapter for monitoring waveform



⑤ Space adapter
(option)
Adapter for adjusting height



① Target connector
Connector to be soldered onto the target system

Connections

When Connecting to Emulator	When Mounting on Device
Emulator	③ (top)
②	Device
④	③ (bottom)
⑤	①
①	Target system
Target system	

③ Mount adapter
(cover and unit)
Adapter for mounting onto device

Remark The exchange adapter differs from the exchange adapter for IECUBE (S type).
The following products are identical, although the product names are not the same (except 64-pin products).
· Check pin adapter and check pin adapter for IECUBE (S type)
· Space adapter and space adapter for IECUBE (S type)
· Mount adapter and mount adapter for IECUBE (S type)
· Target connector and target connector for IECUBE (S type)

MC SERIES

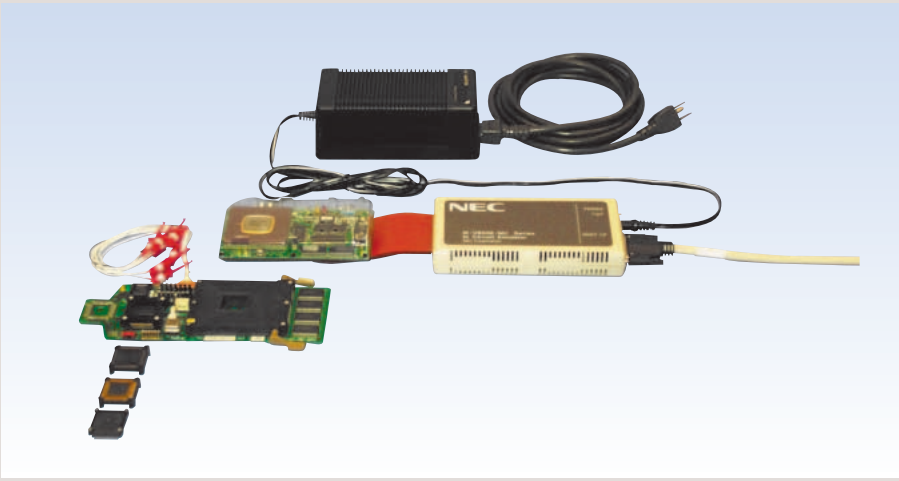
The following products are MC series in-circuit emulators for V850 Series.

IE-703002-MC: In-circuit emulator for V85x, V850/Sxx
- IE-703003-MC-EM1: In-circuit emulator option board for V853
- IE-703017-MC-EM1: In-circuit emulator option board for V850/SA1
- IE-703037-MC-EM1: In-circuit emulator option board for V850/SB1, V850/SB2
- IE-703040-MC-EM1: In-circuit emulator option board for V850/SV1
- IE-703079-MC-EM1: In-circuit emulator option board for V850/SF1
- IE-703089-MC-EM1: In-circuit emulator option board for V850/SC1, V850/SC2, V850/SC3

IE-703102-MC: In-circuit emulator for V850E/MS1, V850E/MS2
- IE-703102-MC-EM1: In-circuit emulator option board for V850E/MS1, V850E/MS2 (5 V type)
- IE-703102-MC-EM1-A: In-circuit emulator option board for V850E/MS1 (3.3 V type)

IE-V850E-MC: In-circuit emulator for V850E (5 V type)
- IE-703116-MC-EM1: In-circuit emulator option board for V850E/IA1
- IE-703114-MC-EM1: In-circuit emulator option board for V850E/IA2

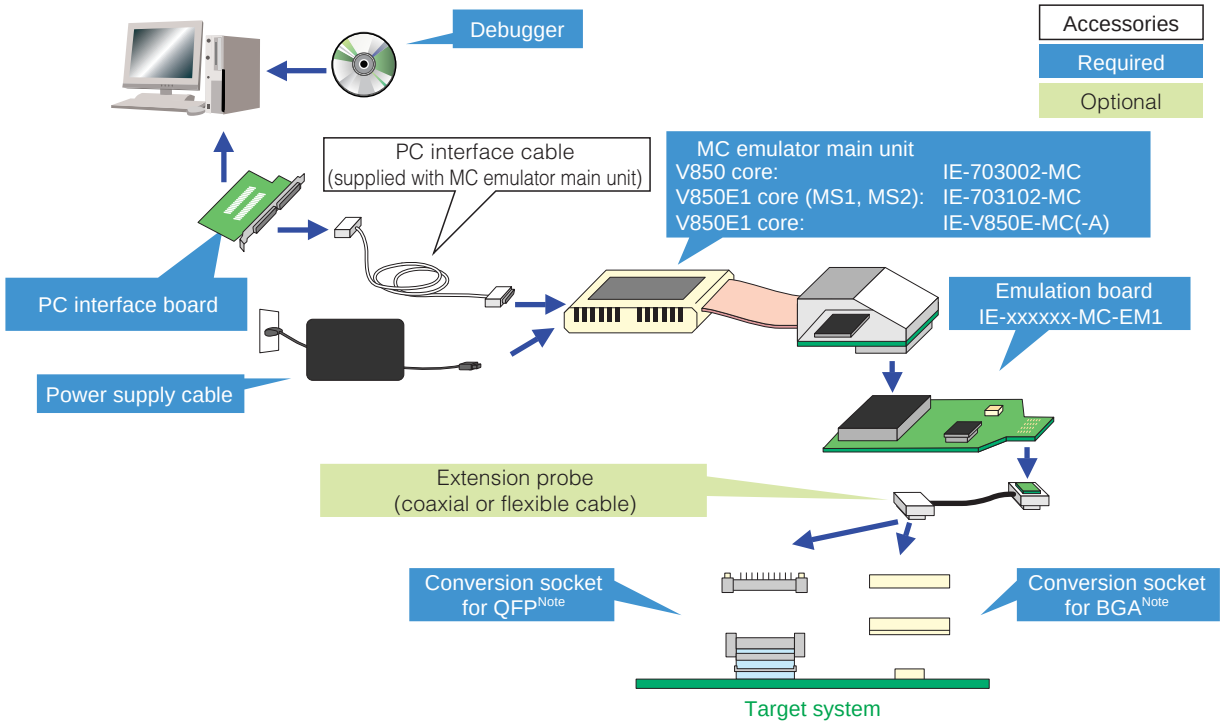
IE-V850E-MC-A: In-circuit emulator for V850E (3.3 V type)
- IE-703166-MC-EM1: In-circuit emulator option board for V850E/SV2
- IE-703107-MC-EM1: In-circuit emulator option board for V850E/MA1, V850E/MA2
- IE-V850E-MC-EM1-A: In-circuit emulator core adapter for NB85E core (2.5 V type)
- IE-V850E-MC-EM1-B: In-circuit emulator core adapter for NB85E core (3.3 V type)



IE-703002-MC
IE-703102-MC
IE-V850E-MC
IE-V850E-MC-A

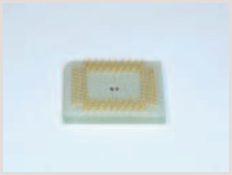
Features

- ◆ Integration of conventional emulator functions in a single chip enables considerable penetrability
- ◆ Rich variety of emulator functions
- ◆ High-speed operation equivalent to the target device
- ◆ Connectable to a variety of PCs



Note For the conversion socket configuration, refer to Microcontroller Development Tools Socket Guide (U16531EJ1V0).

MC Emulator (QFP Package)



④ YQSOCKET
Spacer for emulator protection (option)

③ YQGUIDE
Screws for guide

② YQPACK
Adapter for emulator connection

① NQPACK
Connector soldered onto target system

Connections

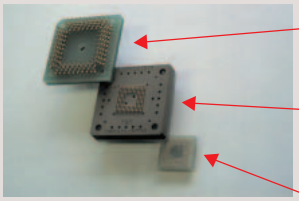
When Connecting to Emulator
Emulator
④
③
②
①
Target system

When Mounting on Device
⑤
Device
①
Target system

⑤ HQPACK
Adapter for mounting onto device

Remark The following products are identical, although the product names are not the same (except 64-pin products).
- YQSOCKET and space adapter for IECUBE (T type)
- YQPACK and YQ adapter for IECUBE (T type)
- HQPACK and mount adapter for IECUBE (T type)
- NQPACK and target connector for IECUBE (T type)

Socket for MC Emulator (V850E/MA1 BGA Package)



③ CSICE
Socket for emulator connection

② LSPACK[Note]
Pogo pin connector

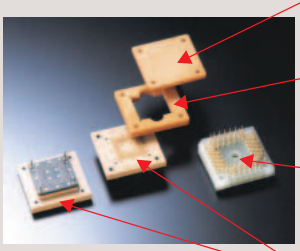
① CSSOCKET
CSP socket for connection to target system

Connections

When Connecting to Emulator	When Mounting on Device
Emulator	Cover for mounting on device
YQGUIDE	Spacer for mounting on device
③	Device
②	②
①	①
Target system	Target system

Note LSPACK is provided with the cover for mounting on a device and the spacer for mounting on a device.

Socket for MC Emulator (V850/SA1, V850E/MS1 BGA Package)



Cover for mounting on device
(provided with CSPACK)

Spacer for mounting on device
(provided with CSPACK)

② CSICE
Socket for emulator connection
(The actual color is different)

① CSPACK
Socket for target connection

Connections

When Connecting to Emulator	When Mounting on Device
Emulator	Cover for mounting on device
YQGUIDE	Spacer for mounting on device
②	Device
①	①
Target system	Target system

In-Circuit Emulator Functions

		In-Circuit Emulator				
		QB-V850XXX (IECUBE)	IE-703002-MC	IE-703102-MC	IE-V850E-MC IE-V850E-MC-A	IE-V850ES-G1
Maximum operating frequency		Equivalent to target device				
Emulation memory capacity	Internal ROM	1 MB	512 KB		1 MB	
	Internal RAM	60 KB	28 KB	60 KB		
	External memory	16 MB (optional)	1 MB	2 MB (disabled for 8-bit bus width)	4 MB (disabled for 8-bit bus width)	
Event function	Execution events	10	14			
	Access events	6	8			
Break function	Hardware break	16	22			
	Software break	2000	100			
	Forcible break	Enabled				
	Step execution	Enabled				
	File safe break	Enabled				
Trace function	Trace memory capacity	256K frames	32K frames			
	Trace items	Branch, access, timestamp, interpolation function	Instruction execution, timestamp, access			
Time measuring function	Program execution (start - end) measuring	Enabled				
	Inter-event measuring	Enabled (8)	Enabled (3)			
	Display items of inter-event measuring result	Total value, pass count, maximum value, minimum value, average value	Total value			
	Timeout break	Enabled	Disabled			
Real-time RAM monitor function	Number of points	8	1			
	Maximum capacity	2 KB	1 KB			
Coverage function	Memory capacity	Internal ROM space + any 1 MB space (optional)	1 MB			
	Execution coverage		Enabled			
	Access coverage		Disabled	Enabled	Disabled	
Maskable pins		RESET, WAIT, HLDRQ, NMI, STOP				RESET, NMI, STOP
PC interface		USB2.0, USB1.1	PCI, PCMCIA network		PCI, PCMCIA	

MINICUBE

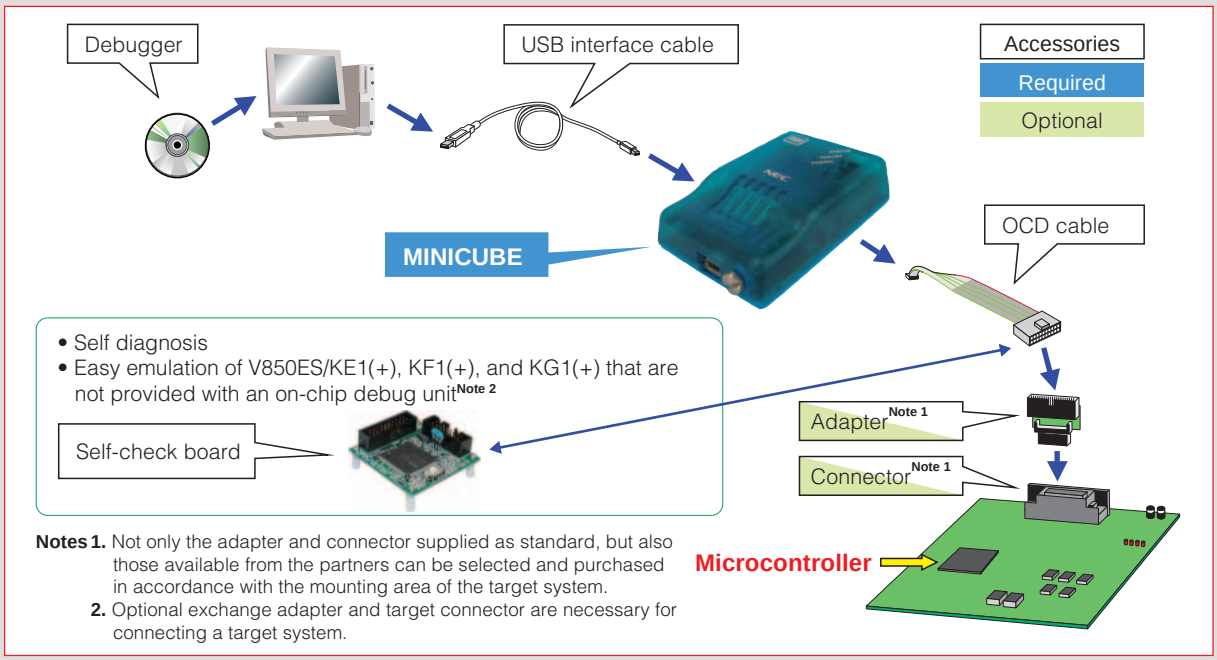
The following products are on-chip debug emulator MINICUBE for V850 Series.

QB-V850MINI: On-chip debug emulator for V850E1 and V850ES
Supported devices as of October 2005.
V850E/MA3, V850E/ME2, V850E/IA4, V850E/SV2, V850E/RS1
V850ES/SG2, V850ES/SJ2, V850ES/KJ1, V850ES/KJ1+, V850ES/FE2,
V850ES/FF2, V850ES/FG2, V850ES/FJ2
μPD70F3229Y

Features

- ◆ Low price
  Price 1/20 of the existing high-performance emulator and debugger "ID850QB" also available in same package
- ◆ Easy setup
  USB (1.1/2.0) is employed for communication with the host machine. No power supply is necessary.
- ◆ Can write to on-chip flash memory.
  Evaluation can be started right away even if a flash memory programmer is not at hand.
- ◆ Debugging in in-circuit mode
  Supports debugging of V850ES/KE1(+), V850ES/KF1(+), and V850ES/KG1(+) that are not equipped with a debug unit, by using the self-check board supplied as an accessory.
- ◆ Reinforced maintainability
  Self-diagnosis using the self-check board supplied as an accessory for smoothly solving problems
- ◆ Small and lightweight
  Pocket-size for easy transportation

System configuration



Notes 1. Not only the adapter and connector supplied as standard, but also those available from the partners can be selected and purchased in accordance with the mounting area of the target system.
2. Optional exchange adapter and target connector are necessary for connecting a target system.

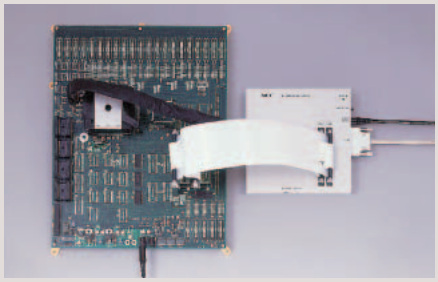
N-WIRE EMULATOR

The following product is an on-chip debug emulator N-Wire emulator for V850 Series.

IE-70000-MC-NW-A: N-Wire emulator for Nx85ET

Features

- ◆ Ideal development environment for NB85ET and NU85ET core
- ◆ On-board debugging is possible when the target system has wiring and a connector for debugging.
- ◆ Supports high-speed operation in excess of 66 MHz
- ◆ ID850NW with identical operability to SM850 and ID850
- ◆ Includes internal ROM and RAM so user's resources are not utilized



IE-70000-MC-NW-A

On-Chip Debug Emulator Functions

		On-Chip Debug Emulator	
		QB-V850MINI (MINICUBE)	IE-70000-MC-NW-A
Maximum operating frequency		Equivalent to target device	Equivalent to target device (minimum operation frequency is 2 MHz)
Emulation memory capacity	Internal ROM	On-chip target device Flash ROM capacity	None
	Internal RAM	Target device's internal RAM capacity	
	External memory	None	Optional 2 MB × 2 banks
Event function	Execution events	2 execution/access alternate-function pins	8 (2 access alternate-function pins)
	Access events		4 (2 execution alternate-function pins)
Break function	Hardware break	2	14
	Software break	2000 (only number of ROM correction channels of target device can be set to internal ROM)	100 (Setting to internal ROM is disabled)
	Forcible break	Enabled	
	Step execution	Enabled	
	File safe break	Disabled	
Trace function	Trace memory capacity	No trace functions	2M frames
	Trace items		Branch, access, timestamp, interpolation function
Time measuring function	Program execution (start - end) measuring	Enabled (disabled for V850E/ME2, V850E/SV2)	Disabled
	Inter-event measuring	Disabled	
	Display items of inter-event measuring result		
	Timeout break		
Real-time RAM monitor function	Number of points		
	Maximum capacity		
Coverage function	Memory capacity	None	
	Execution coverage		
	Access coverage		
Maskable pins		RESET, WAIT, HLDRQ, NMI, STOP	
PC interface		USB2.0, USB1.1	PCI, PCMCIA, network

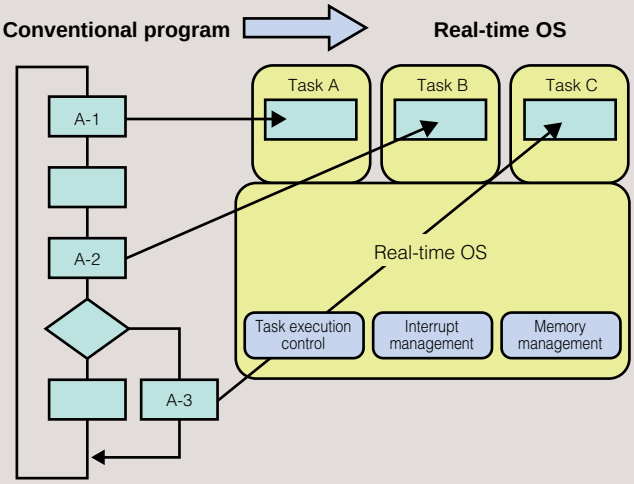
RX850, RX850 Pro

The following real-time OSs are supported in the V850 Series.

RX850: Real-time OS for V850 Series
RX850 Pro: Real-time OS for V850 Series

Why is a real-time OS needed?

With the recent advances in the performance and functionality of microcontrollers, not only have the systems to be developed become more complex, but also the quantity of the programs to be executed by these systems has increased. Because systems in the field of control equipment in particular are required to respond immediately to changes in external and internal events, many problems that cannot be solved by conventional interrupt servicing have arisen; hence the development of the real-time OS.
The real-time OS is designed to react promptly to event changes and interrupts and manages multiple processing programs by dividing them into task units, which are then executed in the optimal order.



Real-time OS advantages

<For designing>
◆ Facilitates creation of application modules
◆ Software development can be focused solely on the application
◆ Management of program in task units
◆ Tasks can be set individually by prescribing an inter-task communication mode
<For debugging>
◆ Discrete task debugging enables multiple operators to debug simultaneously
◆ Only inter-task communication and synchronization testing are required for integrated debugging
<For program maintenance>
◆ Specification changes and function additions can be executed in task units, reducing the effect on the system as a whole
◆ Because the program consists of task units:
→ The internal structure is simplified, resulting in greater program legibility
→ The program can be reused in task units, even in other systems

The V850 Series real-time OSs have been designed as the natural successors of the 16-bit V Series and 78K Series real-time OSs. They offer the following high-performance environment.

◆ Compliance with industry standards (ITRON, μITRON specifications)
◆ Support for power management functions
◆ Capability to embed required functions only (selection of system calls to be used)
◆ Advanced task development support through task debugger (RD)
◆ Application operational analysis support through system performance analyzer (AZ)

Real-Time OS	Specification	Performance	Description
RX850	μITRON3	[Conditions] · V853 (25 MHz) · Program: Internal ROM · Data/stack: Internal RAM ◆ Maximum interrupt disable time: 7 μs ◆ Task switching time: 11 μs (wup_tsk) ◆ Code size: 3 to 7 KB	This OS is easy to port from the 78 K Series. It has a compact design to enable operation from the on-chip ROM and RAM of the V850.
RX850 Pro	μITRON3	[Conditions] · V850E/MA1 (50 MHz) · Program: External ROM (external bus width: 16 bits/2 waits) · Data/stack: Internal RAM ◆ Maximum interrupt disable time: 8 μs ◆ Task switching time: 20 μs (wup_tsk) ◆ Code size: 5 to 13 KB	This is the RX850 OS but with enhanced functions.

System Call List (1/2)

Control Module	System Call	Description	RX850	RX850 Pro
Task management	cre_tsk	Creates a task	—	√
	del_tsk	Deletes a task	—	√
	sta_tsk	Activates a task	√	√
	ext_tsk	Terminates this task	√	√
	exd_tsk	Terminates and deletes this task	—	√
	ter_tsk	Forcibly terminates another task	√	√
	dis_dsp	Disables dispatch	√	√
	ena_dsp	Enables dispatch	√	√
	chg_pri	Changes the priority level of a task	√	√
	rot_rdq	Rotates a ready queue of a task	√	√
	rel_wai	Forcibly releases a task from waiting	√	√
	get_tid	Obtains the ID number of this task	√	√
	ref_tsk	Obtains task information	√	√
	vget_tid	Obtains the ID number of a task	—	√
Task-associated synchronous management	sus_tsk	Places a task in the suspended state	√	√
	rsm_tsk	Resumes operation of a task in the suspended state	√	√
	frsm_tsk	Forcibly resumes operation of a task in the suspended state	√	√
	slp_tsk	Places this task in the wakeup waiting state	√	√
	tslp_tsk	Places this task in wakeup waiting state (with timeout)	√	√
	wup_tsk	Wakes up a task	√	√
	can_wup	Invalidates a wakeup request	√	√
Synchronous communication management	cre_sem	Creates a semaphore	—	√
	del_sem	Deletes a semaphore	—	√
	sig_sem	Returns a resource	√	√
	wai_sem	Acquires a resource	√	√
	preq_sem	Acquires a resource (polling)	√	√
	twai_sem	Acquires a resource (with timeout)	√	√
	ref_sem	Obtains semaphore information	√	√
	vget_sid	Obtains the ID number of a semaphore	—	√
	cre_flg	Creates an event flag	—	√
	del_flg	Deletes an event flag	—	√
	set_flg	Sets a bit pattern	√	√
	clr_flg	Clears a bit pattern	√	√
	wai_flg	Checks a bit pattern	√	√
	pol_flg	Checks a bit pattern (polling)	√	√
	twai_flg	Checks a bit pattern (with timeout)	√	√
	ref_flg	Obtains event flag information	√	√
	vget_fid	Obtains the ID number of an event flag	—	√
	vset_flg1	Sets a bit pattern (1-bit event flag)	√	—Note

Note System calls related to event flags are supported.

System Call List (2/2)

Control Module	System Call	Description	RX850	RX850 Pro
Obtains version information	vclr_flg1	Clears a bit pattern (1-bit event flag)	√	—Note
	vwai_flg1	Checks a bit pattern (1-bit event flag)	√	—Note
	vpol_flg1	Checks a bit pattern (1-bit event flag, polling)	√	—Note
	vtwai_flg1	Checks a bit pattern (1-bit event flag, with timeout)	√	—Note
	vref_flg1	Obtains 1-bit event flag information	√	—Note
	cre_mbx	Creates a mailbox	—	√
	del_mbx	Deletes a mailbox	—	√
	snd_msg	Sends a message	√	√
	rcv_msg	Receives a message	√	√
	prcv_msg	Receives a message (polling)	√	√
	trcv_msg	Receives a message (with timeout)	√	√
	ref_mbx	Obtains mailbox information	√	√
	vget_mid	Obtains the ID number of a mailbox	—	√
Interrupt management	def_int	Registers/cancels an indirectly started interrupt handler	—	√
	ret_int	Returns from a directly started interrupt handler	√	√
	ret_wup	Returns from waking up another task and a directly started interrupt handler	√	√
	loc_cpu	Acknowledges a maskable interrupt and disables dispatch processing	√	√
	unl_cpu	Acknowledges a maskable interrupt and enables dispatch processing	√	√
	dis_int	Disables maskable interrupt acknowledgement	√	√
	ena_int	Enables maskable interrupt acknowledgement	√	√
	chg_icr	Changes the interrupt control register contents	√	√
	ref_icr	Obtains the interrupt control register contents	√	√
Memory pool management	cre_mpl	Creates a variable-length memory pool	—	√
	del_mpl	Deletes a variable-length memory pool	—	√
	get_blk	Obtains a variable-length memory block	√	√
	pget_blk	Obtains a variable-length memory block (polling)	√	√
	tget_blk	Obtains a variable-length memory block (with timeout)	√	√
	rel_blk	Releases a variable-length memory block	√	√
	ref_mpl	Obtains variable-length memory pool information	√	√
	vget_pid	Obtains the ID number of a variable-length memory pool	—	√
	get_blf	Obtains a fixed-length memory block	√	—
	pget_blf	Obtains a fixed-length memory block (polling)	√	—
	tget_blf	Obtains a fixed-length memory block (with timeout)	√	—
	rel_blf	Releases a fixed-length memory block	√	—
	ref_mpf	Obtains fixed-length memory pool information	√	—
Time management	set_tim	Sets the time of the system clock	—	√
	get_tim	Obtains the time of the system clock	—	√
	dly_tsk	Places the task in the time lapse waiting state	√	√
	def_cyc	Registers/cancels a cyclic handler	—	√
	act_cyc	Deletes the active state of a cyclic handler	√	√
	ref_cyc	Obtains cyclic handler information	√	√
System management	get_ver	Obtains version information	√	√
	ref_sys	Obtains system information	√	√
	def_svc	Registers/cancels the extended SVC handler	—	√
	viss_svc	Calls the extended SVC handler	—	√

Note System calls related to event flags are supported.

OSEK/VDX SPECIFICATION-COMPLIANT OS

The following OSEK/VDX specification-compliant OS is supported by the V850 Series.

RX-OSEK850: OSEK/VDX specification-compliant OS for V850 Series

Features

◆ Kernel
Compliant with the OSEK/VDX OS Ver. 2.0 specifications
Four conformance classes (BCC1, BCC2, ECC1, and ECC2) are supported

◆ Communication
Compliant with the OSEK/VDX COM Ver. 2.1 rev 1 specifications
Three conformance classes (CCC1, CCC2, and CCC3) are supported.

◆ Configurator
A configurator that simplifies the configuration of system information (OIL850) is provided as standard.
The configuration file supports a format compliant with OIL Ver. 2.0.

◆ Task debugger (RD-OSEK850)
An efficient task debugger for debugging applications that use the RX-OSEK850 is provided as standard.

◆ System performance analyzer (AZ-OSEK850)
System performance analyzer for RX-OSEK850 (sold separately)

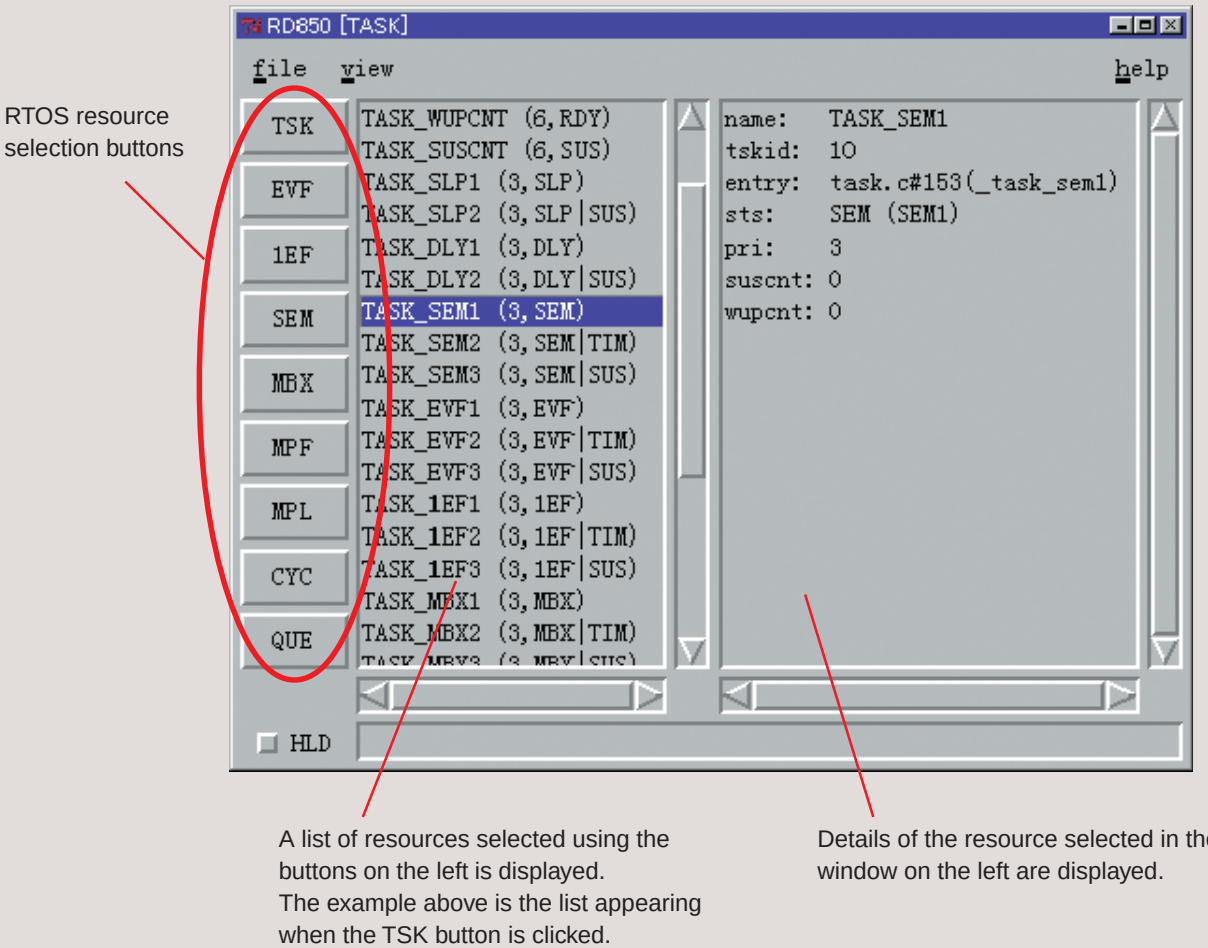
◆ Target devices
V850 Series

TASK DEBUGGERS (RD850/RD850 Pro)

These RX Series dedicated task debuggers provide the functions essential for debugging applications that employ a real-time OS. The debuggers are supplied in the RX Series package as standard. The main functions of the task debuggers are shown below.

- ◆ Detailed display of OS resources such as tasks
- ◆ Display of referenced task sources

These task debuggers also enable connection with a variety of other debuggers.



SYSTEM PERFORMANCE ANALYZER

The following system performance analyzer is supported in the V850 Series.

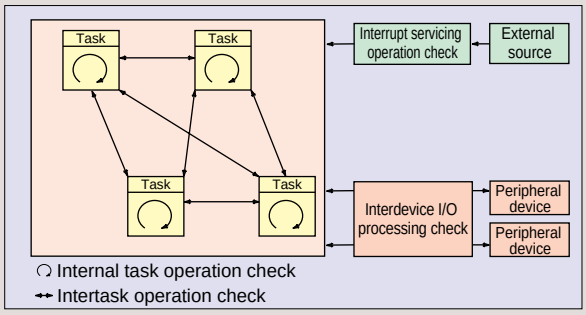
AZ850: System performance analyzer for the V850 Series

The system performance analyzer visually displays records of executed tasks and RTOS resource access data, thereby clarifying the task load status and making it easy to determine the tuning index.

Quantitative Evaluation Index

In a system constructed using a design → coding → debugging process, tuning work is necessary to optimize the CPU's performance and resources, and is used to assess the system performance and analyze its operation, through which system performance and product quality can be raised.
Tuning work usually involves checking the following operations and then analyzing the system's response performance.

Operation check



- ◆ Intertask operation check
  (Deadlock status, task run sequence, resource access status)
- ◆ Internal task operation check
  (System call/return value)
- ◆ Interrupt servicing operation check
  (Occurrence frequency, nesting depth, servicing time, enable/disable position)

Response Performance Analysis

- ◆ Adequacy of access division (task run time)
- ◆ Selection of optimal scheduling (task priority level)
- ◆ Optimal resource allocation (resource utilization efficiency, resource values)

Algorithms and the system configuration concept can be changed at the design stage, based on analysis results. The tool that supports this kind of analysis and modification is the system performance analyzer (AZ).

This performance analyzer, operated in combination with one of a variety of debuggers, has the following functions.

- ◆ Detection of bugs caused by system timing misses
- ◆ Detection of problems caused by the simultaneous operation of multiple tasks
- ◆ Verification/analysis of real-time system execution performance

The system performance analyzer displays trace data visually and provides the following functions for software operation control, thus facilitating task operation analysis.

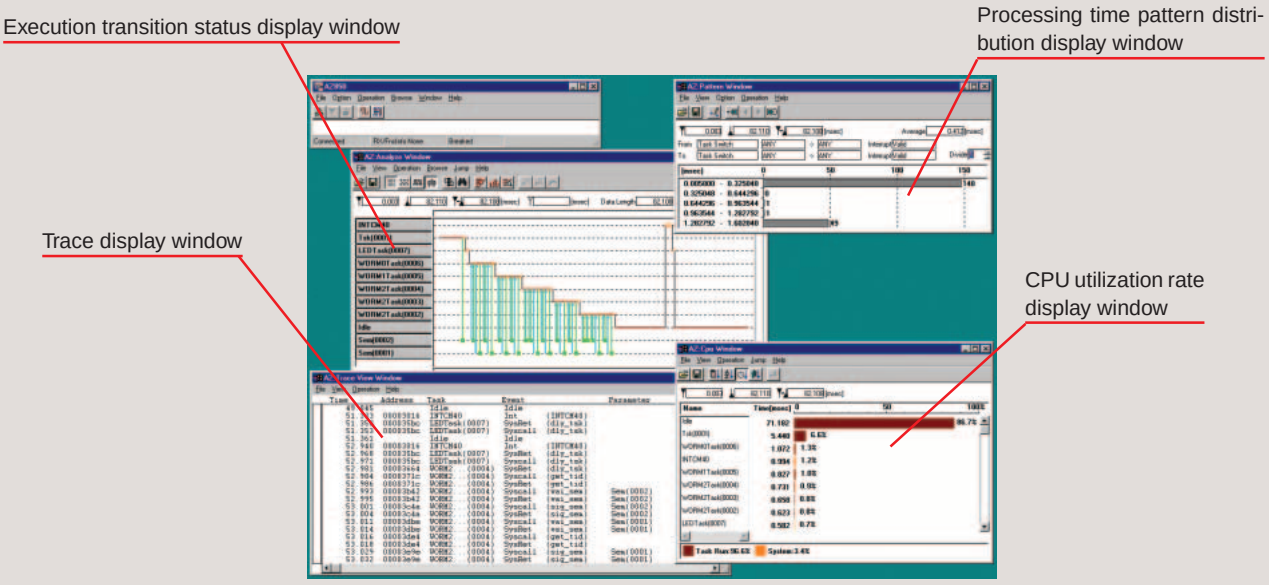
- ◆ Detection of unnecessary system processing
- ◆ Support of source analysis
- ◆ Clarification of the system tuning index

The tools supported for this analyzer and their operating environments are shown in the table below.

Target Device	AZ	Supported Tool		
		OS	Debugger	Simulator
V850 Series	AZ850	RX850 RX850 Pro	ID850[Note] ID850QB	SM850 SM+

Note Some functions can also be executed using a partner debugger.

The performance analyzer consists of four windows:



◆ Execution transition status display window

This window displays the object movement versus time relationship, with time indicated by the horizontal axis and object movement by the vertical axis. Analysis of system status changes caused by task switching or interrupts/exceptions, and object accesses based on real-time OS system calls are displayed as symbols, making it easy for the user to ascertain the sequence and transition of execution. These functions enable specification of the problems for the performance analysis.

◆ CPU utilization rate display window

This window can be used to confirm the object execution time and CPU utilization rate that guide users in the analysis of the system overhead and indicate execution performance, so that the system performance can be evaluated from the view point of the idle time and interrupt time.

◆ Processing time pattern distribution display window

Users can analyze the causes of scheduling problems by viewing the statistical breakdown of the execution processing time, as well as the interrupt frequency and execution time maximum/average/minimum figures displayed in this window.

◆ Trace display window

Trace data from the execution transition status can be viewed. This window can be used as a sub window of the execution transition status window so that timestamps of execution status transitions and values returned by system calls can be checked.

NETWORK LIBRARY

The following network library is supported by the V850E.

RX-NET: Network library for V850E

With the rapid spread of the Internet, network libraries are now being employed for many embedded systems such as portable information terminals. NEC Electronics has therefore provided the network library "RX-NET" for embedded systems that use the V850E.

Features

◆ Conforms to RFC
◆ Supports multi-socket interfaces
◆ Supports optional products such as PPP, FTP, Telnet, as well as TCP/IP basic set
◆ Device drivers provided
Various LAN controller drivers and serial control drivers are included in the source. Since the device driver section is separate from the RX-NET library, device drivers other than those included in the package can also be imported.
◆ Supports NEC Electronics real-time OS (RX850 Pro)

Supported Devices

◆ V850E (only devices enabling misalignment)

Real-Time OSs

◆ Target Real-Time OS
· RX850 Pro
◆ Required resources of real-time OS
· 2 tasks
· 1 cyclic startup handler

Package Contents

1. Basic set

○ TCP/IP protocol stack
TCP, UDP, IP, ICMP, ARP

○ LAN controller
· LAN91C96 (manufactured by Standard Microsystems Corporation)
· NE2000 compatible

○ Board support package (BSP) library
· Includes library for driving SolutionGear-V850E/MA1[Note]

Note Manufactured by NEC Electronics Corporation

2. Options

● PPP (Point-to-Point Protocol)
○ Serial controller
· TL16550C

● DNS (Domain Name System)
● FTP server (File Transfer Protocol)
● Telnet server
● SMTP/POP (Simple Mail Transfer Protocol/Post Office Protocol)
● DHCP (Dynamic Host Configuration Protocol)
● Web server

3. Evaluation version

Basic set + options + RX-FS850

FILE SYSTEM

The following file system is available.

RX-FS850: File system for V850E

Now that the employment of storage function in embedded devices has increased and many ordinary households have at least one PC, there has been a sharp increase in the amount of data being exchanged between embedded devices and PCs. The PC-compatible file system "RX-FS850" is designed for use with V850E.

Features

◆ Uses PC-compatible file system
  ○ Formats for hard disk drives
    · FAT (FAT12, FAT16, or FAT32)
    · Supports file names up to 254 characters long (VFAT)
  ○ Formats for CD-ROM drives
    · ISO-9660 Level 1
    · Joliet (supports file names up to 64 characters long)
    · Supports multi-session CDs
◆ Designed for multi-tasking
  ○ No need to set up exclusive control between tasks when issuing API
  ○ Includes file locking function to prevent concurrent write operations from multiple tasks to the same file
◆ UNIX API-compliant
◆ Supports hot swap
  ○ Enables hot swap such as for PC cards
◆ Auto buffering function
  ○ I/O buffer is acquired automatically for I/O processing.
◆ Compact design suitable for ROM programming

Supported Devices

◆ V850E Series

Real-Time OS

◆ Target real-time operating system
  ○ RX850 Pro

HIGH-SPEED FLOATING-POINT LIBRARY

The following product is offered as a high-speed floating-point library.

GOFAST: V850 Series high-speed floating-point library

This library increases the operation speed when using floating-point operations with V850 Series products that do not have an on-chip FPU.

Features

◆ Created based on FPT3.0 from USSOFT
◆ ANSI-C (JIS X 3010)-compliant

Supported Devices

◆ V850 Series

Supported Compilers

◆ GHS, GNUPro, IAR

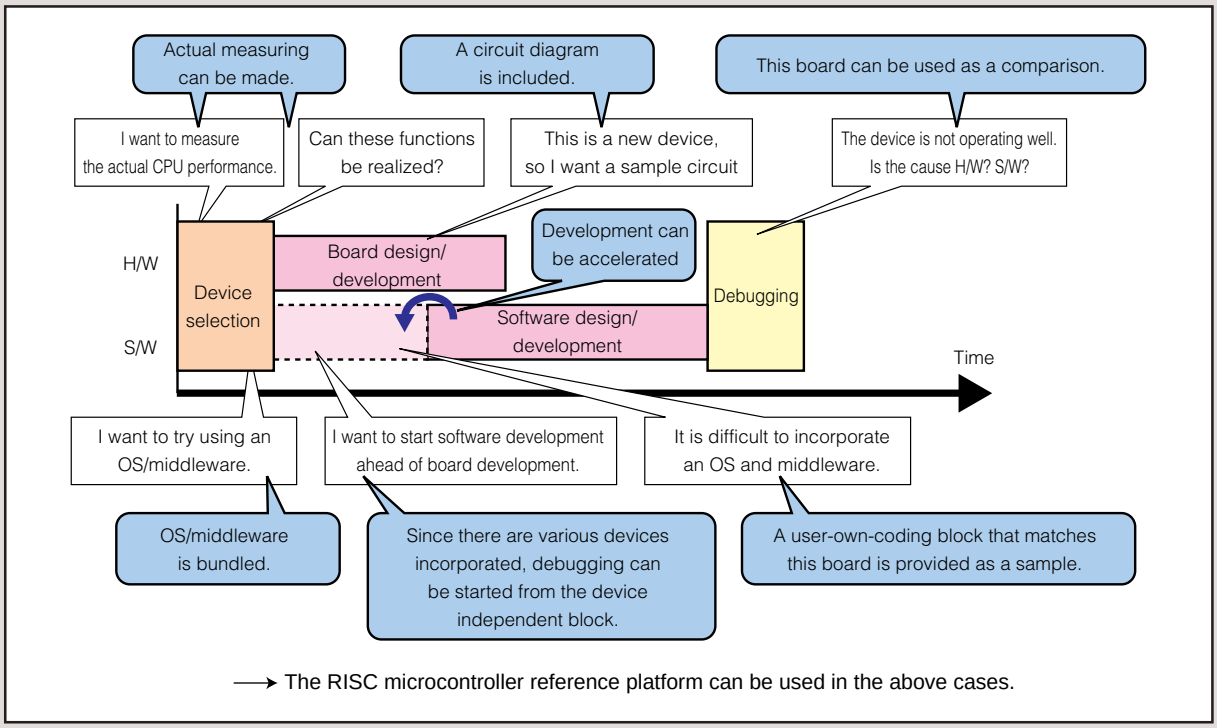
Supported Mathematical Functions

Basic operations	
· Double-precision operations	dpadd, dpsub, dpmul, dpdiv
· Single-precision operations	fpadd, fpsub, fpmul, fpdiv
· Conversion operations	dptofp, litodp, dptoli, ultodp, dptoul, litofp, fptoli, ultofp, fptoul
· GCC only	lltodp, ulltodp, dptoull, dptoll, fptoll, fptoull, lltofp, ulltofp
· Compare	dpcmp, fpcmp
· GCC runtime functions	negdf2, negsf2, eqdf2, nedf2, ltdf2, ledf2, gtdf2, gedf2, eqsf2, nesf2, ltsf2, lesf2, gtsf2, gesf2
Basic functions	
· Double-precision	fabs, ceil, floor, fmob, modf, frexp, ldexp, sqrt
· Single-precision	fabsf, ceilf, floort, fmodf, modff, frexpf, ldexpf, sqrtf
Transcendental functions	
· Double-precision	asin, acos, atan, atan2, cos, cosh, exp, log, log10, pow, sin, sinh, tan, tanh
· Single-precision	acosf, asinf, atanf, atan2f, cosf, coshf, expf, logf, log10f, powf, sinf, sinhf, tanf, tanhf
Additional functions	
	isnan, isnanf, isinf, isinff

SolutionGear®

The following products are available as RISC microcontroller reference platforms.

SG-703107-1: V850E/MA1 CPU board
SG-703107-1S: V850E/MA1 CPU board (socket version)
SG-703111-1: V850E/ME2 CPU board
SG-MOTHER-1: Motherboard



Features

The reference platform comprises the CPU board provided for each microcontroller, and a CPU-independent motherboard.

The reference platform sold by NEC Electronics comes in a set that includes the following.

- ◆ Binary including the rights to use the RX Series (μITRON) on the reference platform
- ◆ Binary including rights to use middleware on the reference platform
- ◆ Sample driver source code for peripheral devices incorporated on board
- ◆ Board circuit diagram

These features enable the following.

- Measuring of user program benchmarks using the actual CPU
- Evaluation of RTOS and middleware supplied by NEC Electronics
- Utilization of reference information when designing user target board
- Prototype development prior to user target board completion
- Utilization of reference information for device driver when porting RTOS to target board
- Utilization as object of comparison when doubts arise about target board operation.

By simply acquiring additional development tools, therefore, this reference platform can be used as a turnkey solution.

◆ Multi from Green Hills Software, Inc. or the remote monitor debugger of PARTNER from Midas Lab Co., Ltd. can be used.

Target Device

◆ V850E/MA1
◆ V850E/ME2

Features of Motherboard

◆ Hardware for speech I/O and other middleware
◆ Industry-standard (PC-compatible) PCI, ISA, PCMCIA, E-IDE, Ethernet, SIO, parallel, keyboard, mouse, and other interfaces
◆ Can be used with PC unit, power-supply, and peripheral equipment (ATX-compatible board size)
◆ Support of all CPUs in V850E (CPU independent)
◆ Support of partner tools such as Multi from Green Hills Software, Inc. and the PARTNER remote monitor debugger from Midas Lab Co., Ltd.

Incorporated Software

NEC Electronics provides the following RTOS and middleware on this board.

◆ μITRON-compliant real-time OS, RX Series (RX850 Pro)
◆ TCP/IP software Library (RX-NET)
◆ Speech recognition middleware
◆ Text-to-speech middleware
◆ JPEG middleware
◆ Various device drivers (samples)

Applilet

The following product is provided as a device driver configuration tool.

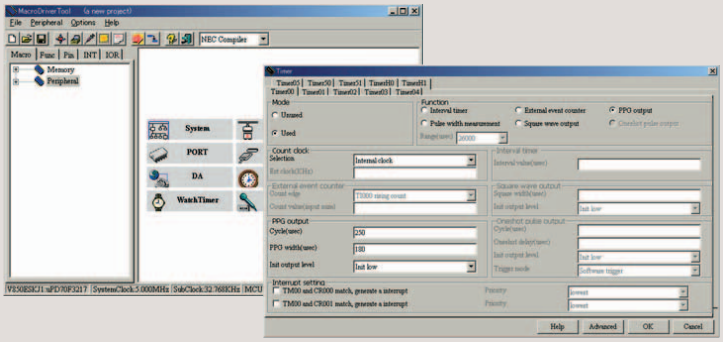
Applilet: Device driver configuration tool

When Applilet is used, setup source files for on-chip peripheral functions can be automatically generated following a simple selection process that does not require consulting the manual.

Operation steps

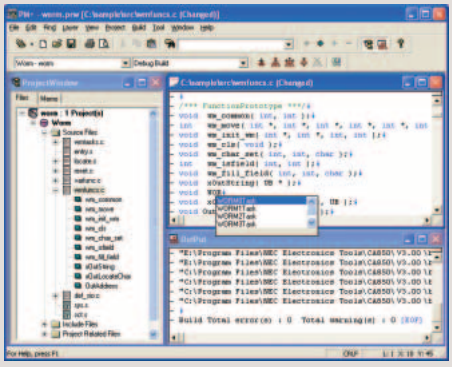
1. Set up on-chip peripheral functions

Select the target model, then enter settings as required for the peripheral functions to be used.



2. Generate code

Source files for each function are generated automatically.



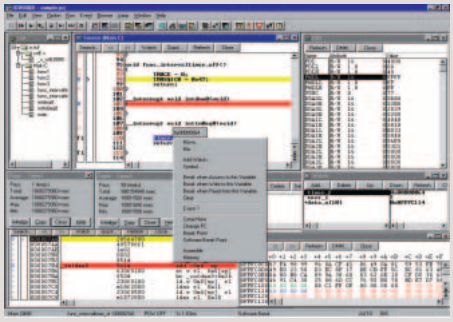
3. Add or revise code as needed.

4. Build

The project files used by the Project Manager are also generated automatically. These project files are loaded before building the target object.

5. Debug

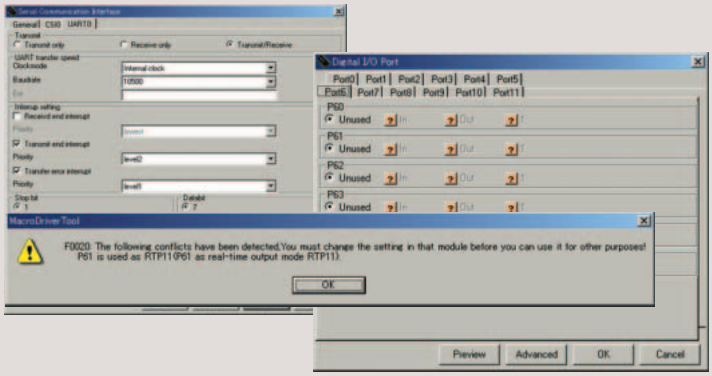
Use a debugger or simulator to perform debugging.



Features

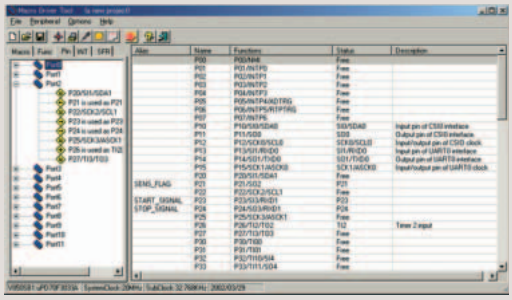
◆ **Conflict check among interactive type input resources**

In addition to providing a digital I/O port function, ports provide various alternate functions. The conflict check function ensures that there is no overlap between ports being used by the I/O port function and ports being used by an alternate function.



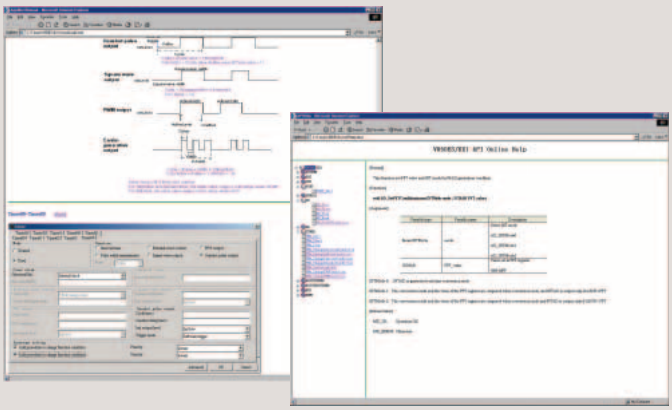
◆ **Port aliases**

The alternate functions of each port can be referenced.



◆ **On-line help**

Help descriptions of various functions in automatically generated source code can be referenced.



PG-FP4

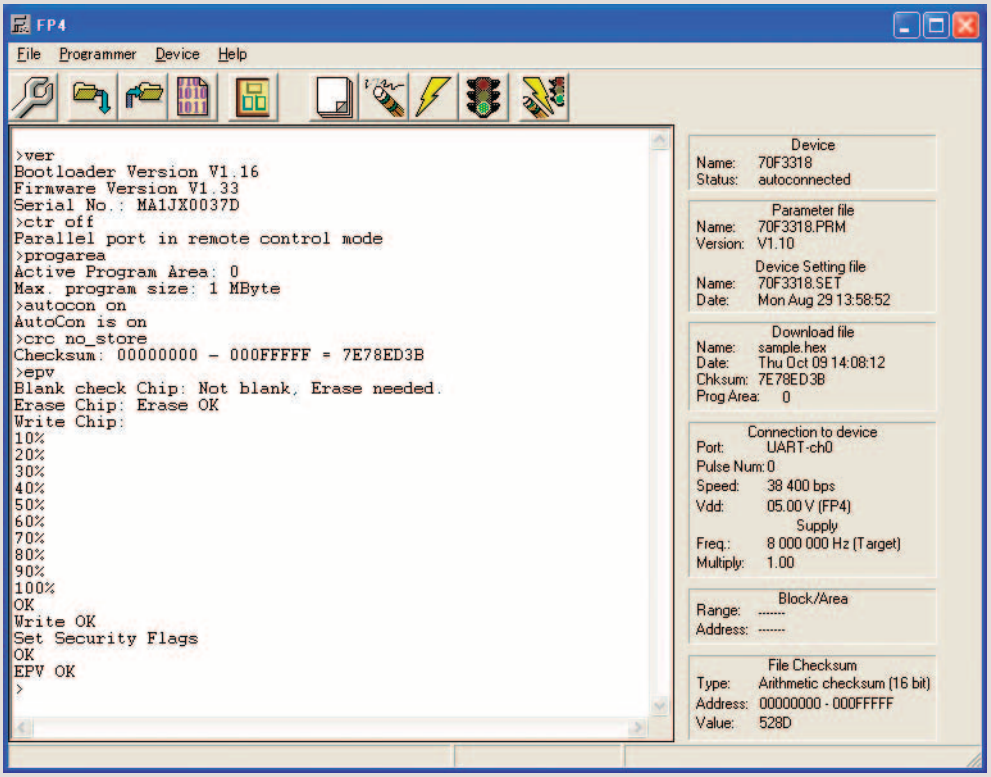
The following flash memory programmer is available.

PG-FP4: Microcontroller general-purpose flash memory programmer

Features

PG-FP4

- ◆ Supports programming of all NEC Electronics microcontrollers with on-chip flash memory
- ◆ USB support via host machine interface
- ◆ LCD panel allows checking of programmer setting information, error messages, checksum values, etc., even when used as a standalone unit
- ◆ Two user codes can be downloaded and valid code selection is supported
- ◆ Device-specific information required for programming can be freely set using parameter files
- ◆ On-board programming and programming via a program adapter are possible
- ◆ Portable A5 size
- ◆ Easily operable both as a standalone unit or on Windows 98/Me/2000/XP and Windows NT Ver. 4.0 by using a dedicated application (FlashPro4)



SOFTWARE TOOLS

Software Tools (1/2)

Product		Target Device	Host Machine (Required OS in Parentheses)	Medium	Order Number
Software package	SP850	V850 Series	IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17SP850 μSAB17SP850-×Note 3
			IBM PC/AT or compatible (English Windows)	CD-ROM	μSBB17SP850 μSBB17SP850-×Note 3
Real-time OS	RX850		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17RX703000-###Note 1
			IBM PC/AT or compatible (English Windows)	CD-ROM	μSBB17RX703000-###Note 1
	RX850 Pro		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17RX703100-###Note 1
			IBM PC/AT or compatible (English Windows)	CD-ROM	μSBB17RX703100-###Note 1
Compiler Note 2	CA850		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17CA703000Note 4 μSAB17CA703000-×Note 3, 4
			IBM PC/AT or compatible (English Windows)	CD-ROM	μSBB17CA703000Note 4 μSBB17CA703000-×Note 3, 4
Debugger Note 2	ID850		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17ID703000Note 4 μSAB17ID703000-×Note 3, 4
			IBM PC/AT or compatible (English Windows)	CD-ROM	μSBB17ID703000Note 4 μSBB17ID703000-×Note 3, 4
	ID850NW		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17ID703000-NWNote 4 μSAB17ID703000-NW-×Note 3, 4
			IBM PC/AT or compatible (English Windows)	CD-ROM	μSBB17ID703000-NWNote 4
Simulator Note 2	SM850		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17SM703000Note 4 μSAB17SM703000-×Note 3, 4
			IBM PC/AT or compatible (English Windows)	CD-ROM	μSBB17SM703000Note 4 μSBB17SM703000-×Note 3, 4
	SM+ for V850 (Core version)		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17SM703100Note 4 μSAB17SM703100-×Note 3, 4
			IBM PC/AT or compatible (English Windows)	CD-ROM	μSBB17SM703100Note 4 μSBB17SM703100-×Note 3, 4
	SM+ for V850 (Peripheral version)		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17SM703289 μSAB17SM703289-×Note 3
			IBM PC/AT or compatible (English Windows)	CD-ROM	μSBB17SM703289 μSBB17SM703289-×Note 3
System performance analyzer	AZ850		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	Supplied with RX850, RX850 Pro
			IBM PC/AT or compatible (English Windows)	CD-ROM	
Performance analysis tuning tool	TW850		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	**Note 4**
			IBM PC/AT or compatible (English Windows)	CD-ROM	

Notes 1. ###: Number of copies licensed (precontract required)

2. The device file corresponding to the relevant product of the V850 Series is required (device files can be obtained by downloading the file using NEC Electronics' Development Tools Download service (ODS)).

3. ×: Number of licenses (5, 10, 20, or 50)

4. Supplied with SP850.

Remark Contact an NEC Electronics representative if the host machine to be used is not on the list above.

Software Tools (2/2)

Product		Target Device	Host Machine (Required OS in Parentheses)	Medium	Order Number
Network library	RX-NET TCP/IP	V850E	IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17AP703100-###-B17[Note]
	RX-NET (PPP)		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17AP703100-###-B18[Note]
	RX-NET (DNS)		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17AP703100-###-B19[Note]
	RX-NET (FTP)		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17AP703100-###-B20[Note]
	RX-NET (TELNET)		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17AP703100-###-B21[Note]
	RX-NET (DHCP)		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17AP703100-###-B22[Note]
	RX-NET (SMTP/POP)		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17AP703100-###-B24[Note]
	RX-NET (Web server)		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17AP703100-###-B38[Note]
	RX-NET evaluation version		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17AP703100-###-B30[Note]
File system	RX-FS850		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17AP703100-###-B33[Note]
Floating-point library	GOFAST	V850 Series	IBM PC/AT or compatible (Japanese Windows)	CD-ROM	μSAB17AP703100-###-B34[Note]
			IBM PC/AT or compatible (English Windows)		μSBB17AP703100-###-B34[Note]
OSEK/VDX specification-compliant real-time OS	RX-OSEK850		IBM PC/AT or compatible (Japanese Windows)	CD-ROM	TBD
			IBM PC/AT or compatible (English Windows)	CD-ROM	TBD

Note ###: Number of copies licensed (precontract required)

Remark Contact an NEC Electronics representative if the host machine to be used is not on the list above.

HARDWARE TOOLS (IECUBE)

V850ES/KE1, V850ES/KE1+, V850ES/KF1, V850ES/KF1+, V850ES/KG1, V850ES/KG1+, V850ES/KJ1, V850ES/KJ1+, V850ES/SG2, V850ES/SJ2, V850ES/FE2, V850ES/FF2, V850ES/FG2, V850ES/FJ2, μPD703229, V850ES/IK1, V850E/IA3, V850E/IA4

When purchasing IECUBE, you can select which of the following sockets to include by changing the last section of the part name.
· Exchange adapter
· Target connector
· YQ connector (T type only)

These sockets can also be purchased separately.

IECUBE ordering number

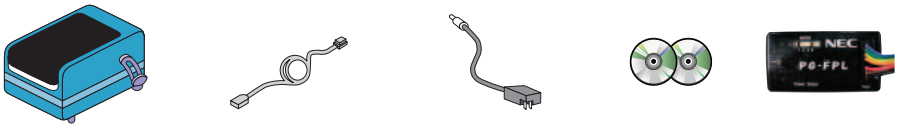
QB	—	V850ESKX1H	—S	100GC	—CM

- V850ESKX1H: Target device subseries name
- 100GC: Specification of the number of pins and package name (omitted if socket is not supplied)
- —S: Specification of socket supplied as accessory (cannot be omitted)
  - -S: S type socket
  - -T: T type socket
  - -ZZZ: No socket
- —CM: Specification of optional function (may be omitted.)
  - -M: Memory emulation function supported
  - -C: Coverage measurement function supported
  - -S: TimeMachine function supported
  - -CM: Coverage measurement function + memory emulation function supported
  - -SM: TimeMachine function + memory emulation function supported

Example 1) Order code: QB-V850ESSX2-ZZZ

Breakdown: Target device subseries name: V850ES/SG2 or SJ2
Selection of supplied socket: No socket supplied
Selection of optional function: No optional function

Package contents



IECUBE main unit, USB cable, Power supply, CD-ROM, PG-FPL

Example 2) Order code: QB-V850ESFX2-T100GC-CM

Breakdown: Target device subseries name: V850ES/FE2, FF2, FG2, or FJ2
Selection of supplied socket: T type socket, 100-pin GC package
Selection of optional function: Coverage measurement function and memory emulation function added

Package contents

IECUBE main unit (with optional function), USB cable, Power supply, CD-ROM, PG-FPL, Exchange adapter, YQ connector, Target connector

IECUBE Ordering Number

Target Device	Package	Ordering Number	Accessories			
			In-Circuit Emulator	Socket		
				Exchange Adapter	YQ Connector (T Type Only)	Target Connector
V850ES/KE1 (+) V850ES/KF1 (+) V850ES/KG1 (+) V850ES/KJ1 (+)	—	QB-V850ESKX1H-ZZZ	QB-V850ESKX1H Including · Power supply · USB cable · Simple programmer · Debugger	—	—	—
V850ES/KJ1 (+)	144-pin GJ	QB-V850ESKX1H-S144GJ		QB-144GJ-EA-02S	—	QB-144GJ-TC-01S
		QB-V850ETKX1H-T144GJ		QB-144GJ-EA-02T	QB-144GJ-YQ-01T	QB-144GJ-NQ-01T
V850ES/KG1 (+)	100-pin GC	QB-V850ESKX1H-S100GC		QB-100GC-EA-01S	—	QB-100GC-TC-01S
		QB-V850ESKX1H-T100GC		QB-100GC-EA-01T	QB-100GC-YQ-01T	QB-100GC-NQ-01T
	100-pin GF	QB-V850ESKX1H-S100GF		QB-100GF-EA-01S	—	QB-100GF-TC-01S
		QB-V850ESKX1H-T100GF		QB-100GF-EA-01T	QB-100GF-YQ-01T	QB-100GF-NQ-01T
V850ES/KF1 (+)	80-pin GC	QB-V850ESKX1H-S80GC		QB-80GC-EA-02S	—	QB-80GC-TC-01S
		QB-V850ESKX1H-T80GC		QB-80GC-EA-02T	QB-80GC-YQ-01T	QB-80GC-NQ-01T
	80-pin GK	QB-V850ESKX1H-S80GK		QB-80GK-EA-01S	—	QB-80GK-TC-01S
		QB-V850ESKX1H-T80GK		QB-80GK-EA-03T	QB-80GK-YQ-01T	QB-80GK-NQ-01T
V850ES/KE1 (+)	64-pin GB	QB-V850ESKX1H-S64GB		QB-64-EA-01S	—	QB-64GB-TC-01S
		QB-V850ESKX1H-T64GB		QB-64GB-EA-03T	QB-64GB-YQ-01T	QB-64GB-NQ-01T
	64-pin GK	QB-V850ESKX1H-S64GK		QB-64-EA-01S	—	QB-64GK-TC-01S
		QB-V850ESKX1H-T64GK		QB-64GK-EA-02T	QB-64GK-YQ-01T	QB-64GK-NQ-01T
V850E/IA4 V850E/IA3 V850ES/IK1	—	QB-V850EIA4-ZZZ	QB-V850EIA4 Including · Power supply · USB cable · Simple programmer · Debugger	—	—	—
V850E/IA4	100-pin GC	QB-V850EIA4-S100GC		QB-100GC-EA-02S	—	QB-100GC-TC-01S
		QB-V850EIA4-T100GC		QB-100GC-EA-02T	QB-100GC-YQ-01T	QB-100GC-NQ-01T
	100-pin GF	QB-V850EIA4-S100GF		QB-100GF-EA-02S	—	QB-100GF-TC-01S
		QB-V850EIA4-T100GF		QB-100GF-EA-02T	QB-100GF-YQ-01T	QB-100GF-NQ-01T
V850E/IA3	80-pin GC	QB-V850EIA4-S80GC		QB-80GC-EA-01S	—	QB-80GC-TC-01S
		QB-V850EIA4-T80GC		QB-80GC-EA-03T	QB-80GC-YQ-01T	QB-80GC-NQ-01T
V850ES/IK1	64-pin GC	QB-V850EIA4-S64GC		QB-64GC-EA-01S	—	QB-64GC-TC-01S
		QB-V850EIA4-T64GC		QB-64GC-EA-02T	QB-64GC-YQ-01T	QB-64GC-NQ-01T
V850ES/SG2 V850ES/SJ2	—	QB-V850ESSX2-ZZZ	QB-V850ESSX2 Including · Power supply · USB cable · Simple programmer · Debugger	—	—	—
V850ES/SJ2	144-pin GJ	QB-V850ESSX2-S144GJ		QB-144GJ-EA-01S	—	QB-144GJ-TC-01S
		QB-V850ESSX2-T144GJ		QB-144GJ-EA-01T	QB-144GJ-YQ-01T	QB-144GJ-NQ-01T
V850ES/SG2	100-pin GC	QB-V850ESSX2-S100GC		QB-100GC-EA-01S	—	QB-100GC-TC-01S
		QB-V850ESSX2-T100GC		QB-100GC-EA-01T	QB-100GC-YQ-01T	QB-100GC-NQ-01T
	100-pin GF	QB-V850ESSX2-S100GF		QB-100GF-EA-01S	—	QB-100GF-TC-01S
		QB-V850ESSX2-T100GF		QB-100GF-EA-01T	QB-100GF-YQ-01T	QB-100GF-NQ-01T
V850ES/FE2 V850ES/FF2 V850ES/FG2 V850ES/FJ2	—	QB-V850ESFX2-ZZZ	QB-V850ESFX2 Including · Power supply · USB cable · Simple programmer · Debugger	—	—	—
V850ES/FJ2	144-pin GJ	QB-V850ESFX2-S144GJ		QB-144GJ-EA-03S	—	QB-144GJ-TC-01S
		QB-V850ESFX2-T144GJ		QB-144GJ-EA-03T	QB-144GJ-YQ-01T	QB-144GJ-NQ-01T
V850ES/FG2	100-pin GC	QB-V850ESFX2-S100GC		QB-100GC-EA-01S	—	QB-100GC-TC-01S
		QB-V850ESFX2-T100GC		QB-100GC-EA-01T	QB-100GC-YQ-01T	QB-100GC-NQ-01T
μPD703229	100-pin GC	QB-703229-S100GC		QB-100GC-EA-03S	—	QB-100GC-TC-01S
V850ES/FF2	80-pin GK	QB-V850ESFX2-S80GK		QB-80GK-EA-02S	—	QB-80GK-TC-01S
		QB-V850ESFX2-T80GK		QB-80GK-EA-02T	QB-80GK-YQ-01T	QB-80GK-NQ-01T
V850ES/FE2	64-pin GB	QB-V850ESFX2-S64GB		QB-64GB-EA-01S	—	QB-64GB-TC-01S
		QB-V850ESFX2-T64GB		QB-64GB-EA-02T	QB-64GB-YQ-01T	QB-64GB-NQ-01T

Under development

Ordering Number of Socket for IECUBE/Optional Products

Target Device	Package	Exchange Adapter	YQ Connector	Target Connector	Mount Adapter	Space Adapter	Check Pin Adapter (Dedicated to S Type)	Check Pin Adapter (Common to S/T Type)	Extension Probe
V850ES/KJ1(+)	144-pin GJ	QB-144GJ-EA-02S	—	QB-144GJ-TC-01S	QB-144GJ-MA-01S	QB-144-SA-01S	QB-144-CA-01S	QB-144-CA-01	QB-144-EP-01S
		QB-144GJ-EA-02T	QB-144GJ-YQ-01T	QB-144GJ-NQ-01T	QB-144GJ-HQ-01T	QB-144GJ-YS-01T	—		
V850ES/KG1(+)	100-pin GC	QB-100GC-EA-01S	—	QB-100GC-TC-01S	QB-100GC-MA-01S	QB-100-SA-01S	QB-100-CA-01S		
		QB-100GC-EA-01T	QB-100GC-YQ-01T	QB-100GC-NQ-01T	QB-100GC-HQ-01T	QB-100GC-YS-01T	—		
	100-pin GF	QB-100GF-EA-01S	—	QB-100GF-TC-01S	QB-100GF-MA-01S	QB-100-SA-01S	QB-100-CA-01S		
		QB-100GF-EA-01T	QB-100GF-YQ-01T	QB-100GF-NQ-01T	QB-100GF-HQ-01T	QB-100GF-YS-01T	—		
V850ES/KF1(+)	80-pin GC	QB-80GC-EA-02S	—	QB-80GC-TC-01S	QB-80GC-MA-01S	QB-80-SA-01S	QB-80-CA-01S		
		QB-80GC-EA-02T	QB-80GC-YQ-01T	QB-80GC-NQ-01T	QB-80GC-HQ-01T	QB-80GC-YS-01T	—		
	80-pin GK	QB-80GK-EA-01S	—	QB-80GK-TC-01S	QB-80GK-MA-01S	QB-80-SA-01S	QB-80-CA-01S		
		QB-80GK-EA-03T	QB-80GK-YQ-01T	QB-80GK-NQ-01T	QB-80GK-HQ-01T	QB-80GK-YS-01T	—		
V850ES/KE1(+)	64-pin GB	QB-64-EA-01S	—	QB-64GB-TC-01S	QB-64GB-MA-01S	QB-64-SA-01S	QB-64-CA-01S		
		QB-64GB-EA-03T	QB-64GB-YQ-01T	QB-64GB-NQ-01T	QB-64GB-HQ-01T	QB-64GB-YS-01T	—		
	64-pin GK	QB-64-EA-01S	—	QB-64GK-TC-01S	QB-64GK-MA-01S	QB-64-SA-01S	QB-64-CA-01S		
		QB-64GK-EA-02T	QB-64GK-YQ-01T	QB-64GK-NQ-01T	QB-64GK-HQ-01T	QB-64GK-YS-01T	—		
V850E/IA4	100-pin GC	QB-100GC-EA-02S	—	QB-100GC-TC-01S	QB-100GC-MA-01S	QB-100-SA-01S	QB-100-CA-01S		
		QB-100GC-EA-02T	QB-100GC-YQ-01T	QB-100GC-NQ-01T	QB-100GC-HQ-01T	QB-100GC-YS-01T	—		
	100-pin GF	QB-100GF-EA-02S	—	QB-100GF-TC-01S	QB-100GF-MA-02S	QB-100-SA-01S	QB-100-CA-01S		
		QB-100GF-EA-02T	QB-100GF-YQ-01T	QB-100GF-NQ-01T	QB-100GF-HQ-02T	QB-100GF-YS-01T	—		
V850E/IA3	80-pin GC	QB-80GC-EA-01S	—	QB-80GC-TC-01S	QB-80GC-MA-01S	QB-80-SA-01S	QB-80-CA-01S		
		QB-80GC-EA-03T	QB-80GC-YQ-01T	QB-80GC-NQ-01T	QB-80GC-HQ-01T	QB-80GC-YS-01T	—		
V850ES/IK1	64-pin GC	QB-64GC-EA-01S	—	QB-64GC-TC-01S	QB-64GC-MA-01S	QB-64-SA-01S	QB-64-CA-01S		
		QB-64GC-EA-02T	QB-64GC-YQ-01T	QB-64GC-NQ-01T	QB-64GC-HQ-01T	QB-64GC-YS-01T	—		
V850ES/SJ2	144-pin GJ	QB-144GJ-EA-01S	—	QB-144GJ-TC-01S	QB-144GJ-MA-01S	QB-144-SA-01S	QB-144-CA-01S		
		QB-144GJ-EA-01T	QB-144GJ-YQ-01T	QB-144GJ-NQ-01T	QB-144GJ-HQ-01T	QB-144GJ-YS-01T	—		
V850ES/SG2	100-pin GC	QB-100GC-EA-01S	—	QB-100GC-TC-01S	QB-100GC-MA-01S	QB-100-SA-01S	QB-100-CA-01S		
		QB-100GC-EA-01T	QB-100GC-YQ-01T	QB-100GC-NQ-01T	QB-100GC-HQ-01T	QB-100GC-YS-01T	—		
	100-pin GF	QB-100GF-EA-01S	—	QB-100GF-TC-01S	QB-100GF-MA-01S	QB-100-SA-01S	QB-100-CA-01S		
		QB-100GF-EA-01T	QB-100GF-YQ-01T	QB-100GF-NQ-01T	QB-100GF-HQ-01T	QB-100GF-YS-01T	—		
V850ES/FJ2	144-pin GJ	QB-144GJ-EA-03S	—	QB-144GJ-TC-01S	QB-144GJ-MA-01S	QB-144-SA-01S	QB-144-CA-01S		
		QB-144GJ-EA-03T	QB-144GJ-YQ-01T	QB-144GJ-NQ-01T	QB-144GJ-HQ-01T	QB-144GJ-YS-01T	—		
V850ES/FG2	100-pin GC	QB-100GC-EA-01S	—	QB-100GC-TC-01S	QB-100GC-MA-01S	QB-100-SA-01S	QB-100-CA-01S		
		QB-100GC-EA-01T	QB-100GC-YQ-01T	QB-100GC-NQ-01T	QB-100GC-HQ-01T	QB-100GC-YS-01T	—		
μPD703229	100-pin GC	QB-100GC-EA-03S	—	QB-100GC-TC-01S	QB-100GC-MA-01S	QB-100-SA-01S	QB-100-CA-01S		
V850ES/FF2	80-pin GK	QB-80GK-EA-02S	—	QB-80GK-TC-01S	QB-80GK-MA-01S	QB-80-SA-01S	QB-80-CA-01S		
		QB-80GK-EA-02T	QB-80GK-YQ-01T	QB-80GK-NQ-01T	QB-80GK-HQ-01T	QB-80GK-YS-01T	—		
V850ES/FE2	64-pin GB	QB-64GB-EA-01S	—	QB-64GB-TC-01S	QB-64GB-MA-01S	QB-64-SA-01S	QB-64-CA-01S		
		QB-64GB-EA-02T	QB-64GB-YQ-01T	QB-64GB-NQ-01T	QB-64GB-HQ-01T	QB-64GB-YS-01T	—		

Under development
Socket required for connecting target system
Optional socket for use according to purpose

Mount adapter: Adapter for mounting device
Space adapter: Adapter for adjusting height
Check pin adapter: Adapter for monitoring signal
Extension probe: Probe for extending connection between IECUBE and target system

HARDWARE TOOLS (G1 EMULATOR)

V850ES/KF1, V850ES/KG1, V850ES/KJ1, V850ES/SA2, V850ES/SA3, V850ES/SG2, V850ES/SJ2, V850ES/FE2, V850ES/FF2, V850ES/FG2, V850ES/FJ2, V850ES/PM1, μPD703229Y, V850ES/ST2

① In-circuit emulator (main unit)
② Emulation board (connected inside main unit)
③ Emulation probe
④ Conversion adapter/conversion socket
⑤ PC interface cable (included with ①)
⑥ Power cable (included with ①)

ORDERING INFORMATION

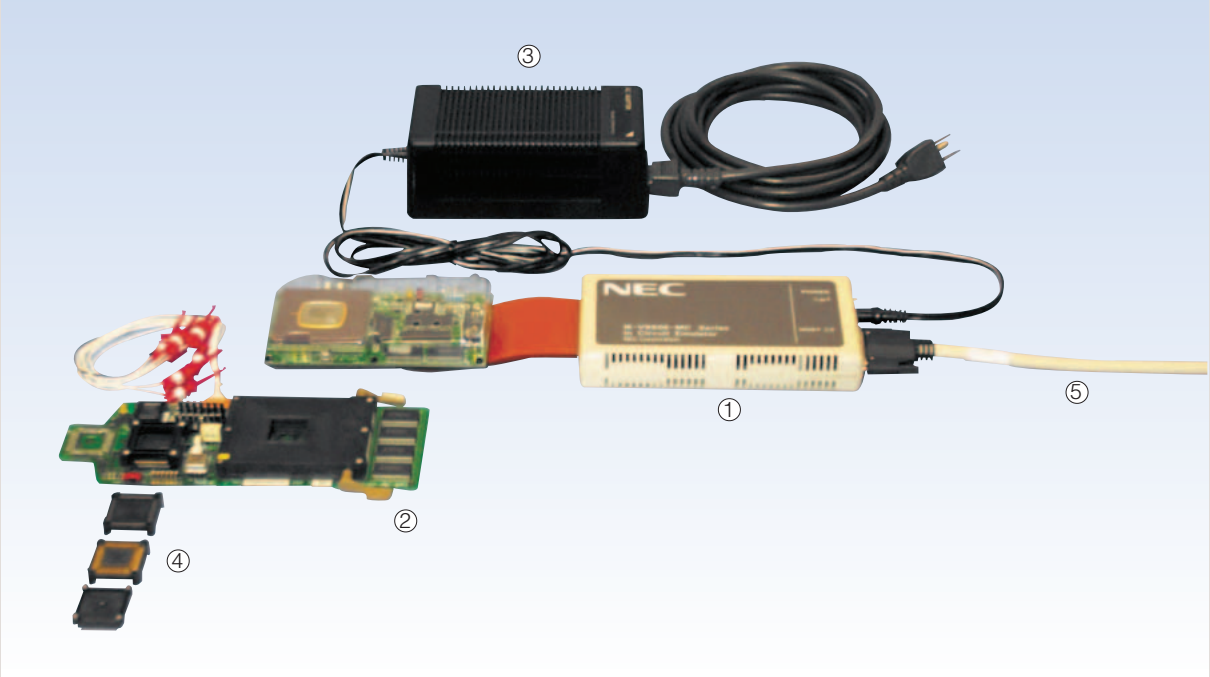
Target Device	In-Circuit Emulator		Conversion Adapter/ Conversion Socket	Emulation Probe	PC Interface Board	Power Supply
	Main Unit	Emulation Board				
V850ES/SA2 100-pin TQFP 14 × 14 mm	IE-V850ES-G1	IE-703204-G1-EM1	NQPACK100SD YQPACK100SD HQPACK100SD YQSOCKET100SDN YQGUIDE	SWEX-100SD-1 (coaxial cable)	IE-70000-CD-IF-A IE-70000-PCI-IF-A	Included with main unit
V850ES/SA3 121-pin FBGA 12 × 12 mm			CSICE121A1312N03 LSPACK121A1312N01 CSSOCKET121A1312N01	SWEX-120SE-1 (coaxial cable)		
V850ES/SG2 100-pin LQFP 14 × 14 mm		IE-703288-G1-EM1	EV-703288GC100	Included with emulation board		
V850ES/SG2 100-pin QFP 14 × 20 mm			EV-703288GF100			
V850ES/SJ2 144-pin LQFP 20 × 20 mm			EV-703288GJ144			
V850ES/FE2 64-pin TQFP 10 × 10 mm		IE-703239-G1-EM1	EV-703239GB64			
V850ES/FF2 80-pin TQFP 12 × 12 mm			EV-703239GK80			
V850ES/FG2 100-pin LQFP 14 × 14 mm			EV-703239GC100			
V850ES/FJ2 144-pin LQFP 20 × 20 mm			EV-703239GJ144			
μPD703229Y 100-pin LQFP 14 × 14 mm			EV-703239GC100			
V850ES/ST2 120-pin TQFP 14 × 14 mm		IE-703220-G1-EM1	EV-703220GC120			
V850ES/ST2 144-pin LQFP 20 × 20 mm			EV-703220GJ144			
V850ES/PM1 100-pin LQFP 14 × 14 mm		IE-703228-G1-EM1 (Includes A/D BOARD, flat cable, NQPACK100SD, YQPACK100SD, HQPACK100SD, YQSOCKET100SDN, and YQGUIDE)	NQPACK100SD YQPACK100SD HQPACK100SD YQSOCKET100SDN YQGUIDE	Use of emulation probe is not possible. Connect to target system via a flat cable and A/D BOARD.		

Manufactured by Tokyo Eletech Corporation

Inquiries to: Daimaru Kogyo Ltd. Tokyo Electronics Department (Tel: 81-3-3820-7112)
Application Corporation (Tel: 81-42-732-1377)

HARDWARE TOOLS (MC EMULATOR 1/3)

V850E/SV2, V850E/MA1, V850E/MA2, NB85E, V850E/IA1, V850E/IA2



① In-circuit emulator (main unit)
② Option board
③ Power-supply unit
④ Conversion adapter/conversion socket (included with ②)
⑤ PC interface cable (included with ①)

ORDERING INFORMATION

Target Device	In-Circuit Emulator		Conversion Adapter/ Conversion Socket	Extension Probe (Option)	PC Interface Board	Power Supply
	Main Unit	Option Board				
V850E/MA1 144-pin LQFP 0.5 mm pitch	IE-V850E-MC-A (Includes PC interface cable and external logic probe)	IE-703107-MC-EM1 (Includes NQPACK144SD, YQPACK144SD, HQPACK144SD, and YQGUIDE)	NQPACK144SD YQPACK144SD HQPACK144SD YQSOCKET144SDN YQGUIDE	SC-144SDN (flexible cable) SWEX-144SD-1 (coaxial cable)	IE-70000-PCI-IF-A IE-70000-CD-IF-A	IE-70000-MC-PS-B (Includes AC100 to 240 V power cable)
V850E/MA1 161-pin FBGA 13 × 13 mm			CSSOKET161A1413N01N[Note 1] (for target board) CSSOKET161A1413N01S1 (fastener) LSPACK161A1413NO1 CSICE161A1413NO2	–		
V850E/MA2 100-pin LQFP 0.5 mm pitch			VP-V850E/MA1-MA2[Note 2] NQPACK100SD YQPACK100SD HQPACK100SD YQSOCKET100SDN YQGUIDE	SC-100SDN (flexible cable) SWEX-100SD-1 (coaxial cable)		
V850E/SV2 257-pin FBGA		IE-703166-MC-EM1	BSSOCKET257B2014N01 (for target board) CSSOCKET257B2014N01 (fastener, option) LSPACK257B2014N01 (for mounting device) CSICE257B2014N01 (for emulator connection)	SWEX-260AXK (coaxial cable)		
NB85E[Note 3] (2.5 V)		IE-V850E-MC-EM1-A	–	–		
NB85E[Note 4] (3.3 V)		IE-V850E-MC-EM1-B				

Notes 1. Type without target socket guides
In the case of the type with guides, remove the N from the end of the order number.

2. NQPACK100SD, YQPACK100SD, HQPQACK100SD, and YQGUIDE are included.

3. For connection to the UDL board, use 2529-1357-50-1902 (manufactured by Sumitomo 3M, Ltd.) (included with the product).

4. For connection to the UDL board, use XH3A-0141-A (manufactured by Omron Corporation) (included with the product).

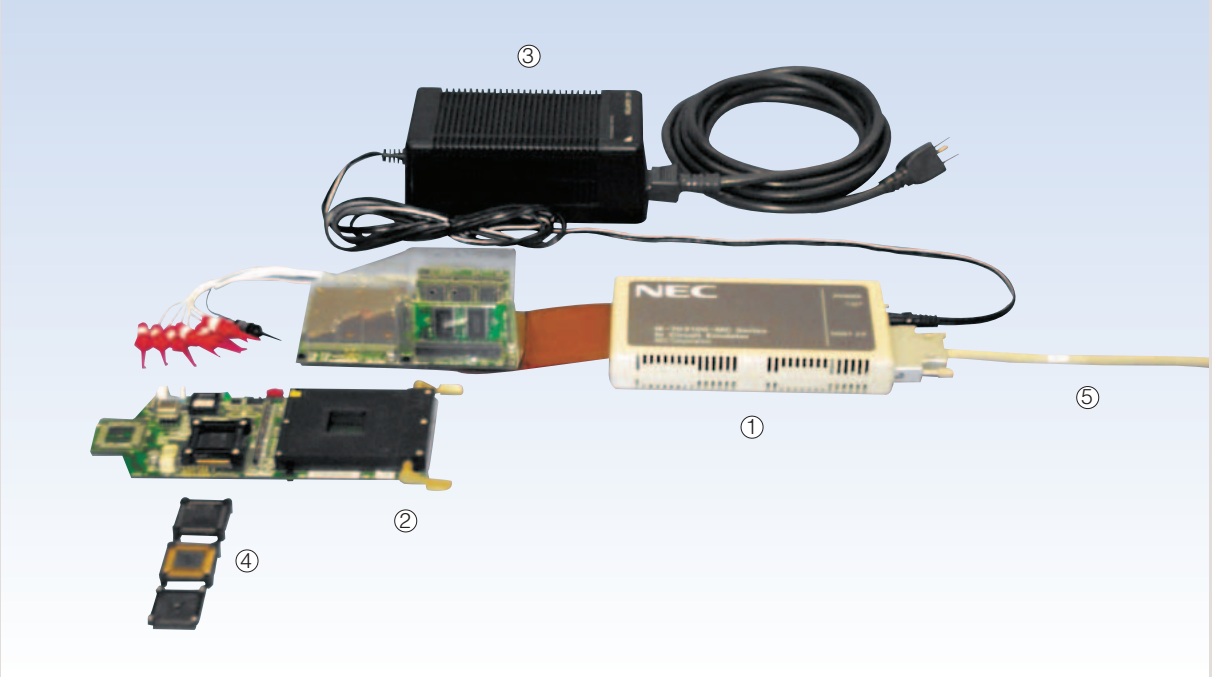
Target Device	In-Circuit Emulator		Conversion Adapter/ Conversion Socket	Extension Probe (Option)	PC Interface Board	Power Supply
	Main Unit	Option Board				
V850E/IA1 144-pin LQFP 0.5 mm pitch	IE-V850E-MC (Includes PC interface cable and external logic probe)	IE-703116-MC-EM1 (Includes NQPACK144SD, YQPACK144SD, HQPACK144SD, and YQGUIDE)	NQPACK144SD YQPACK144SD HQPACK144SD YQSOCKET144SDN YQGUIDE	SC-144SDN (flexible cable) SWEX-144SD-1 (coaxial cable)	IE-70000-PCI-IF-A IE-70000-CD-IF-A	IE-70000-MC-PS-B (Includes AC100 to 240 V power cable)
V850E/IA2 100-pin LQFP 0.5 mm pitch		IE-703114-MC-EM1 (Includes NQPACK100SD, YQPACK100SD, HQPACK100SD, and YQGUIDE)	NQPACK100SD YQPACK100SD HQPACK100SD YQSOCKET100SDN YQGUIDE	SC-100SDN (flexible cable) SWEX-100SD-1 (coaxial cable)		
V850E/IA2 100-pin QFP 0.65 mm pitch			NEXB-2R100SD/RB NQPACK100RB YQPACK100RB HQPACK100RB YQSOCKET100RBN YQGUIDE			

Manufactured by Tokyo Eletech
Inquiries to: Daimaru Kogyo, Ltd. Tokyo Electronics Department (Tel: 81-3-3820-7112)
Application Corporation (Tel: 81-42-732-1377)

Manufactured by Naito Densei Machida Mfg. Co., Ltd.
Inquiries to: Naito Densei Machida Mfg. Co., Ltd. (Tel: 81-45-475-4191)

HARDWARE TOOLS (MC EMULATOR 2/3)

V850E/MS1, V850E/MS2



① In-circuit emulator (main unit)
② Option board
③ Power-supply unit
④ Conversion adapter/conversion socket (included with ②)
⑤ PC interface cable (included with ①)

ORDERING INFORMATION

Target Device	In-Circuit Emulator		Conversion Adapter/ Conversion Socket	Extension Probe (Option)	PC Interface Board	Power Supply
	Main Unit	Option Board				
V850E/MS1 (5 V) 144-pin LQFP 0.5 mm pitch	IE-703102-MC (Includes PC interface cable, external logic probe, NQPACK144SD, YQPACK144SD, HQPACK144SD, and YQGUIDE.)	IE-703102-MC-EM1	NQPACK144SD YQPACK144SD HQPACK144SD YQSOCKET144SDN YQGUIDE	SC-144SDN (flexible cable) SWEX-144SD-1 (coaxial cable)	IE-70000-PCI-IF-A IE-70000-CD-IF-A	IE-70000-MC-PS-B (Includes AC100 to 240 V power cable)
V850E/MS1 (5 V) 157-pin FBGA 14 × 14 mm			CSPACK157A1614N01 CSICE157A1614N01			
V850E/MS2 (5 V) 100-pin LQFP 14 × 14 mm 0.5 mm pitch			VP-V850E/MS1-MS2[Note] NQPACK100SD YQPACK100SD HQPACK100SD YQSOCKET100SDN YQGUIDE	SC-100SDN (flexible cable) SWEX-100SD-1 (coaxial cable)		
V850E/MS1 (3 V) 144-pin LQFP 0.5 mm pitch		IE-703102-MC-EM1-A	NQPACK144SD YQPACK144SD HQPACK144SD YQSOCKET144SDN YQGUIDE	SC-144SDN (flexible cable) SWEX-144SD-1 (coaxial cable)		
V850E/MS1 (3 V) 157-pin FBGA 14 × 14 mm			CSPACK157A1614N01 CSICE157A1614N01			

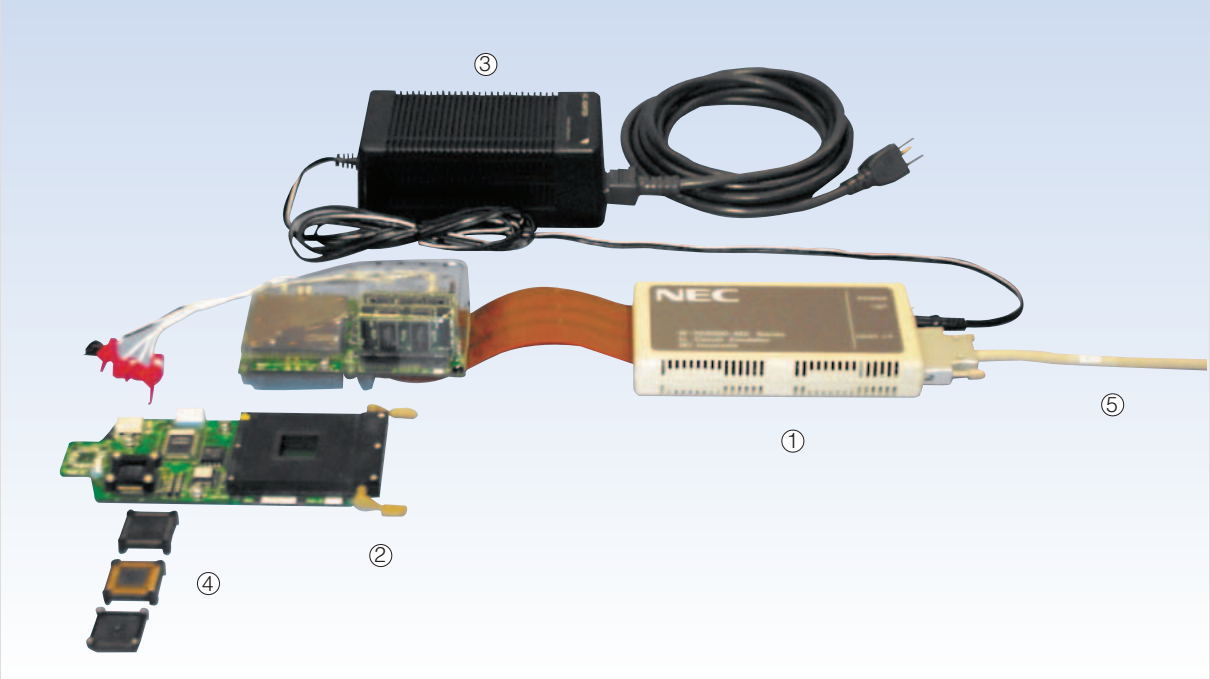
Note NQPACK100SD, YQPACK100SD, HQPACK100SD, and YQGUIDE are included.

Manufactured by Tokyo Eletech
Inquiries to: Daimaru Kogyo, Ltd. Tokyo Electronics Department (Tel: 81-3-3820-7112)
Application Corporation (Tel: 81-42-732-1377)

Manufactured by Naito Densei Machida Mfg. Co., Ltd.
Inquiries to: Naito Densei Machida Mfg. Co., Ltd. (Tel: 81-45-475-4191)

HARDWARE TOOLS (MC EMULATOR 3/3)

V853, V850/SA1, V850/SB1, V850/SB2, V850/SV1, V850/SF1, V850/SC1, V850/SC2, V850/SC3



① In-circuit emulator (main unit)
② Option board
③ Power-supply unit
④ Conversion adapter/conversion socket (included with ① or ②)
⑤ PC interface cable (included with ①)

Target Device	In-Circuit Emulator		Conversion Adapter/ Conversion Socket	Extension Probe (Option)	PC Interface Board	Power Supply
	Main Unit	Option Board				
V853 100-pin LQFP 0.5 mm pitch	IE-703002-MC (Includes PC interface cable, external logic probe, NQPACK100SD, YQPACK100SD, HQPACK100SD, YQSOCKET100SD and YQGUIDE)	IE-703003-MC-EM1 (Includes NQPACK100SD)	NQPACK100SD YQPACK100SD HQPACK100SD YQSOCKET100SDN YQGUIDE	SC-100SDN (flexible cable) SWEX-100SD-1 (coaxial cable)	IE-70000-CD-IF-A IE-70000-PCI-IF-A	IE-70000-MC-PS-B (Includes AC100 to 240 V power cable)

ORDERING INFORMATION

Target Device	In-Circuit Emulator		Conversion Adapter/ Conversion Socket	Extension Probe (Option)	PC Interface Board	Power Supply
	Main Unit	Option Board				
V850/SA1 100-pin LQFP 0.5 mm pitch	IE-703002-MC (Includes PC interface cable, external logic probe, NQPACK100SD, YQPACK100SD, HQPACK100SD, YQSOCKET100SD, and YQGUIDE)	IE-703017-MC-EM1 (Includes NQPACK100SD and crystal oscillator (20 MHz))	NQPACK100SD YQPACK100SD HQPACK100SD YQSOCKET100SDN YQGUIDE	SC-100SDN (flexible cable) SWEX-100SD-1 (coaxial cable)	IE-70000-CD-IF-A IE-70000-PCI-IF-A	IE-70000-MC-PS-B (Includes AC100 to 240 V power cable)
V850/SA1 121-pin FPBGA			CSPACK121A1312N02 CSICE121A1312N02	SC-100SDN (flexible cable) SWEX-100SD-1 (coaxial cable)		
V850/SB1, SB2 100-pin LQFP 0.5 mm pitch		IE-703037-MC-EM1	NQPACK100SD YQPACK100SD HQPACK100SD YQSOCKET100SDN YQGUIDE	SC-100SDN (flexible cable) SWEX-100SD-1 (coaxial cable)		
V850/SB1, SB2 100-pin LQFP 14 × 20 mm 0.65 mm pitch			NEXB-100SD/RB[Note 1] NQPACK100RB YQPACK100RB HQPACK100RB YQSOCKET100RBN YQGUIDE	SC-100SDN (flexible cable) SWEX-100SD-1 (coaxial cable)		
V850/SV1 176-pin LQFP 0.5 mm pitch		IE-703040-MC-EM1 (Includes NQPACK176SD, YQPACK176SD, YQGUIDE, and crystal oscillator (20 MHz))	NQPACK176SD YQPACK176SD HQPACK176SD YQSOCKET176SDN YQGUIDE	SC-176SDN (flexible cable)		
V850/SV1 180-pin FBGA			EXC-180A/SV1 CSSOCKET180A1513N01N[Note 2] (for target board) CSSOCKET180A1513N01S1 (fastener) LSPACK180A1513N01	–		
V850/SF1 100-pin QFP 0.5 mm pitch		IE-703079-MC-EM1	NQPACK100SD YQPACK100SD HQPACK100SD YQSOCKET100SDN YQGUIDE	SWEX-100SD-1 (coaxial cable)		
V850/SF1 100-pin LQFP 14 × 20 mm 0.65 mm pitch			SWEX-100SD/ GF-N17D (coaxial cable) NQPACK100RB YQPACK100RB HQPACK100RB YQSOCKET100RBN YQGUIDE	–		
V850/SC1, V850/SC2, V850/SC3, 144-pin LQFP 14 × 14 mm 0.5 mm pitch		IE-703089-MC-EM1 (Includes NQPACK144SD, YQPACK144SD, HQPACK144SD, and YQGUIDE)	NQPACK144SD YQPACK144SD HQPACK144SD YQSOCKET144SDN YQGUIDE	SWEX-144SD-1 (coaxial cable)		

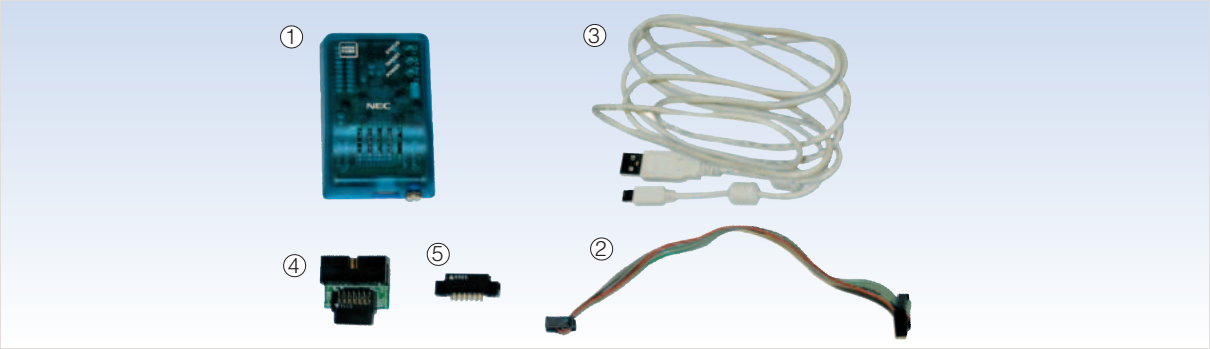
Notes 1. The following conversion sockets are included.
NQPACK100RB, YQPACK100RB, HQPACK100RB, YQGUIDE

2. Type without target socket guides
In the case of the type with guides, remove the N from the end of the order number.

Manufactured by Tokyo Eletech
Inquiries to: Daimaru Kogyo, Ltd. Tokyo Electronics Department (Tel: 81-3-3820-7112)
Application Corporation (Tel: 81-42-732-1377)

HARDWARE TOOLS (MINICUBE)

V850E/MA3, V850E/ME2, V850E/IA4, V850E/SV2, V850E/RS1, V850ES/SG2, V850ES/SJ2, V850ES/KJ1, V850ES/KJ1+, V850ES/FE2, V850ES/FF2, V850ES/FG2, V850ES/FJ2, μPD70F3229Y



① On-chip debug emulator (MINICUBE)
② OCD cable (Supplied with ①)
③ USB interface cable (Supplied with ①)
④ KEL adapter (Supplied with ①)
⑤ KEL connector (Supplied with ①)

On-Chip Debug Emulator	OCD Cable USB Cable	Adapter	Target Connector for OCB
QB-V850MINI	Supplied with QB-V850MINI	B-136 (Supplied with QB-V850MINI)	8830E-026-170S (26-pin KEL connector straight version) (Supplied with QB-V850MINI)
			8830E-026-170L (26-pin KEL connector right-angle version)
		B-137 (Straight version) B-137A (Right-angle version)	2-767004-2 (38-pin MICTOR connector straight version)
		B-140 (One XF2E-1515-1 supplied)	XF2E-1515-1 (15-pin XF2E connector)
		SICA20I2P (One SICA2P20S supplied)	SICA2P20S05 (Five 20-pin SICA connector set)
		Unnecessary	HIF3FC-20PA-2.54DS (20-pin 2.54 mm pitch recommended general-purpose connector right-angle version)
			HIF3FC-20PA-2.54DSA (20-pin 2.54 mm pitch recommended general-purpose connector straight version)

Remark A debugger (ID850QB) is supplied with IE-V850E1-CD-NW.

Manufactured by Lightwell
Inquiries to: Lightwell Co., Ltd. (Tel: 81-3-3392-3331)

Manufactured by KEL
Inquiries to: KEL Corporation (Tel: 81-42-374-5800)

Manufactured by Tyco Electronics AMP K.K.
Inquiries to: Tyco Electronics AMP K.K. (Tel: 81-44-844-8013)

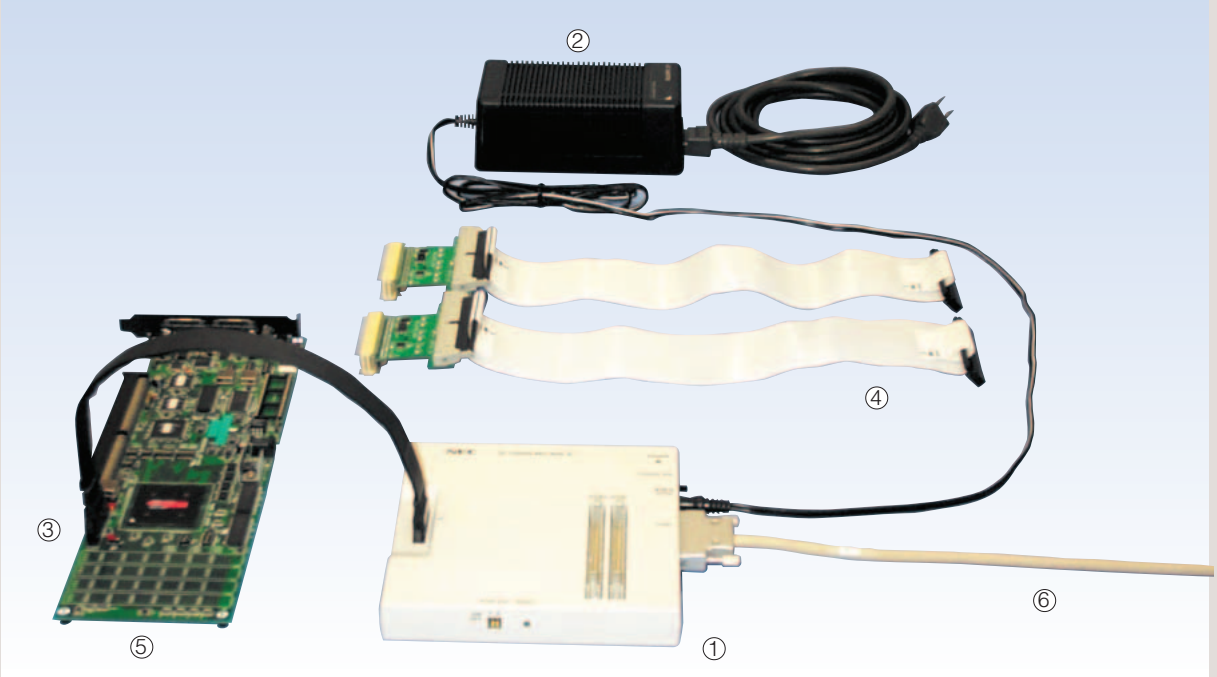
Manufactured by OMRON Corporation
Inquiries to: OMRON Corporation (URL: http://www.omron.com/)

Manufactured by Tokyo Eletech
Inquiries to: Daimaru Kogyo, Ltd. Tokyo Electronics Department (Tel: 81-3-3820-7112)
Application Corporation (Tel: 81-42-732-1377)

Manufactured by HIROSE ELECTRIC CO.,LTD.
Inquiries to: HIROSE ELECTRIC CO.,LTD. (URL: http://www.hirose.com/index.html)

HARDWARE TOOLS (N-WIRE EMULATOR)

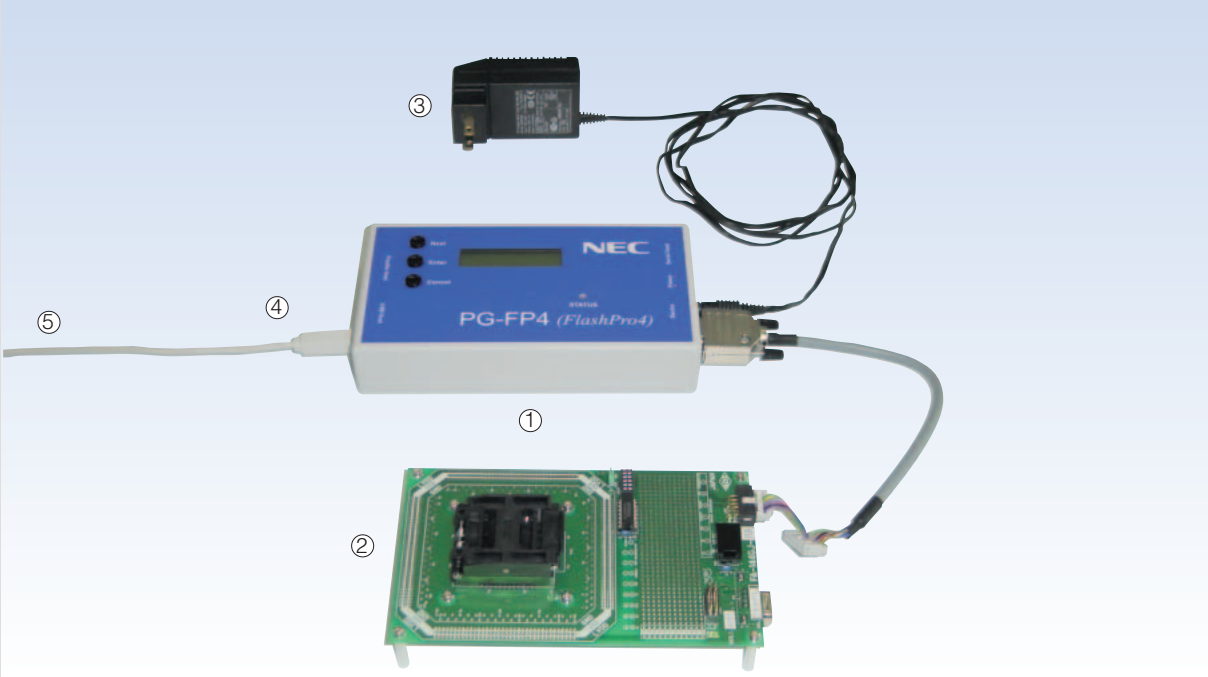
NB85ET, NU85ET



① N-Wire emulator
IE-70000-MC-NW-A
② Power supply unit
IE-70000-MC-PS-B
③ N-Wire connector (manufactured by KEL Corporation)
8830E-026-170S: Straight type
8830E-026-170L: Right-angle type
④ ROM probe
EP-16000C: For 278000/2716000-type ROM
EP-16384C: For 274096-type ROM
⑤ Target system
⑥ PC interface cable (included with ①)

HARDWARE TOOLS (FLASH MEMORY PROGRAMMER)

PG-FP4



① Flash memory programmer (PG-FP4)
② Target system
③ Power supply unit
④ Host machine interface (USB)
⑤ To host machine

Remarks 1. Install the control software of the PG-FP4 and the parameter file of the target device in the host machine.
· PG-FP4 control software: Included with PG-FP4
· Parameter file: Available via development tools download service (see the URL below)
http://www.necel.com/micro/index_e.html

2. On-board programming can also be performed on the target system as well as using the program adapter.

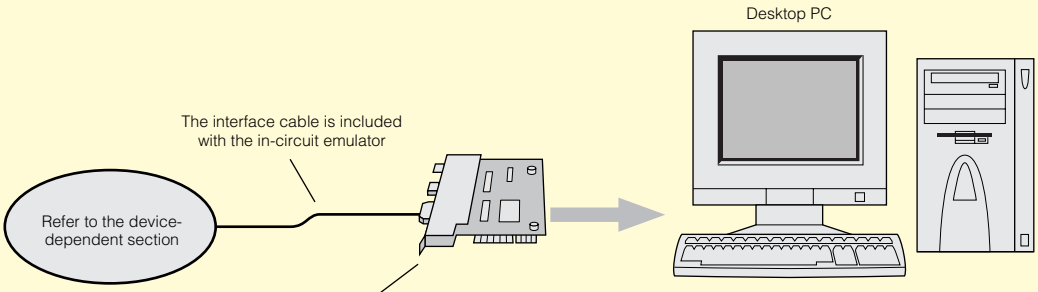
ORDERING INFORMATION

Product	Target Device	Order Number	Remarks
Flash programmer	All products (except V852)	PG-FP4	Flash memory programmer
		FL-PR4	
Program adapter	V850/SA1 (121-pin FBGA)	FA-121FPBGA	Flash program adapter for 121-pin FBGA (121S1-YJC)
		FA-121F1-EA6-A	Flash program adapter for 121-pin FBGA (121F1-EA6)
	V853 (121-pin FBGA)	FA-121F1-EA6-A	Flash program adapter for 121-pin FBGA (121F1-EA6)
	V850E/MS1 (157-pin FBGA)	FA-157FPBGA	Flash program adapter for 157-pin FBGA (157F1-FA1)
	V850E/MA1 (161-pin FBGA)	FA-161F1-EN4-A	Flash program adapter for 161-pin FBGA (161F1-EN4)
	V853, V850/SA1, V850E/IA2, V850/SB1, V850/SB2, V850/SF1, V850ES/KG1, V850ES/KG1+, V850ES/SG2, V850ES/PM1, V850E/IA4, μPD70F3229Y, V850ES/FG2 (100-pin LQFP)	FA-100GC-8EU-A	Flash program adapter for 100-pin LQFP (100GC-8EU, 100GC-8EA)
	V850E/MS1, V850E/MA1, V850E/IA1, V850ES/KJ1, V850ES/KJ1+, V850ES/SJ2, V850ES/FJ2 (144-pin LQFP) , V850/SC1, V850/SC2, V850/SC3	FA-144GJ-UEN-A	Flash program adapter for 144-pin LQFP (144GJ-8EU,144GJ-UEN)
	V850/SB1, V850/SB2 V850/SF1, V850ES/SG2, V850E/IA4, V850ES/KG1+ (100-pin QFP)	FA-100GF-3BA-A	Flash program adapter for 100-pin QFP (100GF-3BA, 100GF-JBT)
	V850/SV1 (176-pin LQFP)	FA-176GM-UEU	Flash program adapter for 176-pin LQFP (176GM-UEU)
	V850ES/SA2 (100-pin TQFP)	FA-100GC-YEU-A	Flash program adapter for 100-pin TQFP (100GC-YEU)
	V850ES/SA3 (121-pin FBGA)	FA-121F1-EA6-A	121-pin FBGA (121F1-EA6) program adapter with connector for single-power-supply flash memory
	V850ES/KF1, V850E/IA3 (80-pin QFP)	FA-80GC-8BT-A	Flash program adapter for 80-pin QFP (80GC-8BT)
	V850ES/KF1, V850ES/KF1+, V850ES/FF2 (80-pin TQFP)	FA-80GK-9EU-A	Flash program adapter for 80-pin TQFP (80GK-9EU)
	V850ES/KJ1 (144-pin LQFP)	FA-144GJ-UEN-A	Flash program adapter for 144-pin LQFP (144GJ-UEN)
	V850E/SV2 (257-pin FBGA)	FA-257F1-FA5-A	Flash program adapter for 257-pin FBGA (257F1-FA5)
	V850ES/KE1+, V850ES/FE2 (64-pin QFP)	FA-64GB-8EU-A	Flash program adapter for 64-pin QFP (64GB-8EU, 64GB-YEU)
	V850ES/KE1+ (64-pin TQFP)	FA-64GK-9ET-A	Flash program adapter for 64-pin TQFP (64GK-9ET)

Manufactured by Naito Densei Machida Mfg. Co., Ltd.
Inquiries to: Naito Densei Machida Mfg. Co., Ltd. (Tel: 81-45-475-4191)

HARDWARE TOOLS (COMMON INTERFACE)

Desktop PC



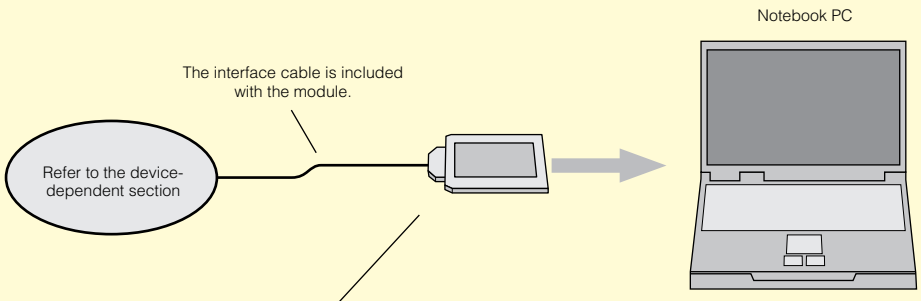
Interface module

IE-70000-PCI-IF-A: For IBM PC/AT-compatible PCI bus (including PC98-NX series)

Software tools

Real-time OS	μSXX17RX703000
	μSXX17RX703100
Software package	μSXX17SP850

Notebook PC



Interface module

IE-70000-CD-IF-A: For PCMCIA socket

Software tools

Real-time OS	μSXX17RX703000
	μSXX17RX703100
Software package	μSXX17SP850

PARTNERS

NEC Electronics works together with partners who provide various types of development tools for the V850 Series to support our customers' system building requirements. By passing on to these partners the hardware and software information we develop, they can tailor product development to our customers' needs.

OS

Nucleus Plus

[Manufacturer/Marketer] Accelerated Technology
Mentor Graphics Division of Mentor Graphics Japan Co., Ltd.

[Features]

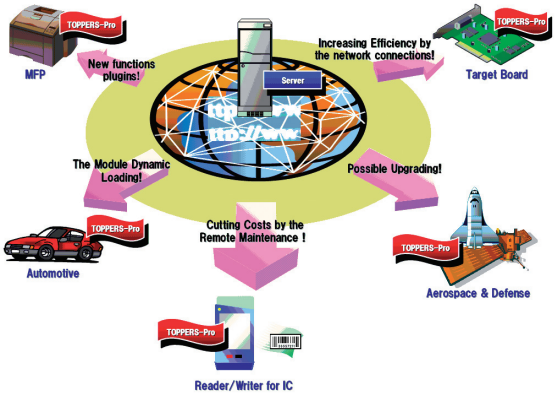
- A real-time operating system with a proven track record throughout the world. Includes source code, making royalties unnecessary.
- Scalable: From 4 KB to 45 KB depending on which functions are required
- Descriptions in ANSI C
- Short interrupt latency
- Expandable: New service calls can be prepared by combining existing service calls
- Configurable: Unused service calls can easily be excluded
- Dynamic creation of all Nucleus PLUS resources
- Intertask communication: Mailboxes, queues, pipes, task synchronization, counting semaphores, events, UNIX-like signal handler
- One-shot timer and multiple-shot timer
- Memory management: Support of fixed length and variable length (malloc)
- Nucleus PLUS components can be allocated to any memory area
- Advanced Interrupt Management Mechanism (AIMM)

TOPPERS-Pro

[Manufacturer/Marketer] AI Corporation

[Features]

- Conforms to μITRON V4.
- Dynamic loading of remote link loader method
- TCP/IP protocol stack and file system integrated



ThreadX/ThreadX μITRON

[Manufacturer] Express Logic, Inc.
[Marketer] Grape Systems Inc.

[Features]

- Supplies ANSI C source code without royalties
- Compact code size (4 KB min.)
- Usable as OS conforming to μITRON
- Easy integration and development with Green Hills MULTI (kernel-aware debug function)
- High-speed response (2.9 μs, context switch@33 MHz)
- Easy-to-understand API and flexible memory configuration
- Quick technical support in Japanese
- Wealth of middleware (such as FileX, NetX, and PegX)
- NetX is supplied with high-end protocol of TCP/IP (such as DHCP, FTP, HTTP, PPP, Telnet, SNMP v1/v2/v3, TFTP, DNS, IGMP, and ICMP)

NORTi Professional

[Manufacturer/Marketer] MiSPO Co., Ltd.

[Features]

- Complies with both μITRON 4.0 and 3.0 specifications, enables mixing of new and old system calls
- Full-fledged TCP/IP protocol stack is a standard-equipped feature
- Simple, royalty-free licensing similar to compiler
- Provides various protocols, file systems, and wireless LAN drivers

Prototype Model Design Tools, Test Tools (1/2)

ProtoBuilder

[Manufacturer/Marketer] GAIO TECHNOLOGY CO., LTD.

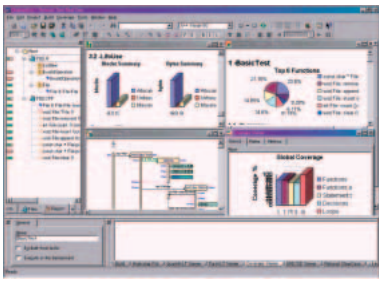
[Features]

- Easy-to-operate product specification creation tool that does not require programming skill
- Smoothes communication between specification creator and software developer, so that "going back" of development because of insufficient specification can be eliminated
- Automatically creates specification based on status transition from a prototype model created.
- Read-only tool that can be distributed to other departments, cooperative companies, and foreign branch offices

Prototype Model Design Tools, Test Tools (2/2)

TestRT

[Manufacturer/Marketer] IBM Japan, Ltd.
[Features]
Integrated dynamic test tool



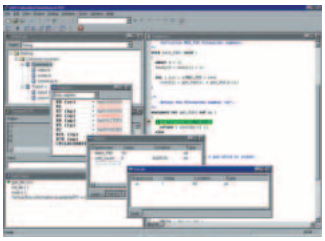
- ◆ This is an optimum test tool for customers with strict test requirements such as in the aerospace, military, and automotive fields.
- ◆ Supports all test processes from unit testing to system testing, displaying application execution results as sequence diagrams that include time stamps. Also simultaneously displays test-related information including high-level coverage/memory error/bottleneck measuring and detection.
- ◆ Realizes linkage with IBM's configuration/fault management tools and other companies' products (MATLAB, Simulink, CodeComposerStudio).
- ◆ A dedicated editor for easy customization of target and compilation environments is included as standard.

Compilers, Assemblers, Integrated Development Environments (1/2)

IAR Embedded Workbench (EW)

[Manufacturer] IAR Systems AB
[Marketer] IAR Systems Company
[Features]

- ◆ No. 1 in Europe
- ◆ Industry's top-level compiler that generates compact code
- ◆ Many include files that can be used immediately, various templates, and sample files supplied as standard
- ◆ Supports various RTOSs.



XASS-V Series

[Manufacturer/Marketer] GAIO TECHNOLOGY CO., LTD.
[Features]

- ◆ Supplies seamless integrated development environment
- ◆ Easy modifying and building program and starting debugger with editor, compiler, and assembler under management of integrated development environment
- ◆ Low-cost monthly rental available
- ◆ Supports in-circuit emulators and RTOSs of many manufacturers

code | lab Debug

[Manufacturer/Marketer] Accelerated Technology
Mentor Graphics Division of Mentor Graphics Japan Co., Ltd.
[Features]

- ◆ Automatic trace function
- ◆ Kernel-aware debugging
- ◆ Configurable display windows for sources, memories, variables, registers, etc.
- ◆ Easy-to-use button bar interface learnable in a short time
- ◆ Complex breakpoints
- ◆ Consistent file viewer
- ◆ Stop watch for timing function
- ◆ Source file tracking
- ◆ Advanced dynamic file exchange
- ◆ Advanced DLL interface

code | lab EDE

[Manufacturer/Marketer] Accelerated Technology
Mentor Graphics Division of Mentor Graphics Japan Co., Ltd.
[Features]

- ◆ Complete embedded development environment that speeds up development, compilation, building, and debugging
- ◆ Microsoft® Visual Studio™
- ◆ System construction possible using any commercially available tools
- ◆ Error display in window for quick editing
- ◆ Ships with settings completed to allow faster development
- ◆ Simple access to cross-development debugger
- ◆ Existing build system commands (make files, batch files, etc.) can be easily applied to code I lab EDE projects.

ZIPC

[Manufacturer/Marketer] Cats, Inc.
[Features]

- ◆ Japan's first CASE tool for embedded system development, using status transition table designing technique
- ◆ Designing with status transition table and dynamic verification at design (model) level. Improves productivity and product quality by early discovery and solution of problems in upstream process
- ◆ Dynamic verification at design (model) level including operation of RX850
- ◆ Automatic generation of ANSI C codes that can operate in accordance with design from design (model) that was proved to be "correct" by dynamic verification
- ◆ Debugging while checking both the target code and design (model) through coordination with ID850 and SM850
- ◆ Model-based dynamic verification log can be used as a test script of automatic verification system "XO850".

ZIPC®
CASE Tool for Real Time System

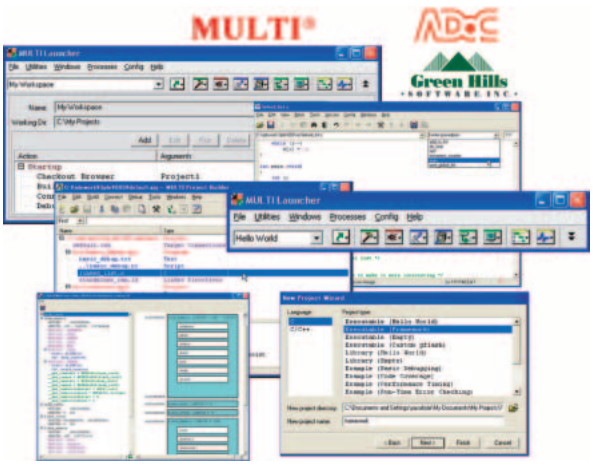
Compilers, Assemblers, Integrated Development Environments (2/2)

IDE MULTI
TimeMachine
C++/EC++/C cross compiler

[Manufacturer] Green Hills Software, Inc.
[Marketer] Advanced Data Controls Corporation
[Features]
MULTI
- Based on integrated GUI, GHS's MULTI provides a high-performance, easy-to-use integrated development environment. It provides a total support from programming to debugging and maintaining, helping shorten the development period and improve the performance and quality of the application program.

TimeMachine
- By reversely executing a program based on trace data, complicated problems of real-time interferences with the application are made clear.
- Realizes execution analysis, such as profile, without extra codes for measurement.

Compiler
- Conforms to ANCI/ISO9899.
- Also supports Japanese Automotive C and MISRA-C.
- Optimization can be set in function units, such as loop optimization and in-line optimization, as well as specification by purpose, such as emphasizing speed and size.
- Can generate more efficient codes by expanding the bit manipulation instructions of the V850.



exeGCC

[Manufacturer] Kyoto Microcomputer Corporation
[Marketer] Kyoto Microcomputer Corporation
Naito Densei Machida Mfg. Co., Ltd.
Application Corporation
NEC Micro Systems, Ltd.
[Target devices] V850E1 core, V850E2 core, NU85E core, V850ES/ST2
[Features]
- Supports GNU C version 3.0.
- Supports C++.
  Also supplies EC++ library suitable for embedding.
- Porting optimized for Windows environment
  By optimizing and porting GNU C/C++ that runs in UNIX environment to Win32 of Windows, short compile time is realized and environment setting by GUI is provided.
- Original embedded library
  Develops new total library including a library conforming to ANSI C and a floating-point emulator library and supplies high operation performances.
- Supports Japanese.
  Comments and character strings in Japanese can be used.

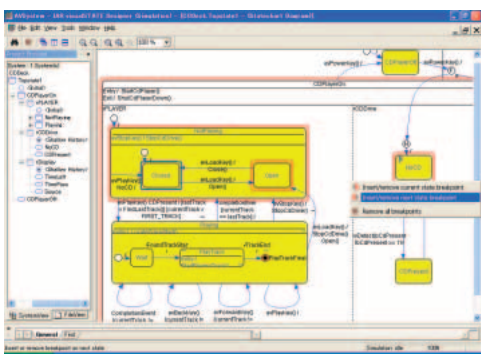
GNUPro™

[Manufacturer] Red Hat, Inc.
[Marketer] Red Hat, Inc.
[Features]
- Package including GNU assembler (gas), C/C++ compiler (gcc/g++), debugger (gdb), simulator and other utilities
- GNUPro is provided in accordance with the GNU General Public License (GPL).
- Supports available for GNU Pro for remuneration

Middleware (1/6)

IAR visualSTATE (graphical design tool)

[Manufacturer] Sweden IAR Systems AB
[Marketer] IAR Systems Company
[Target devices] All devices (no device dependency)
[Features]
Development tool that dramatically improves productivity, reliability, and maintainability of embedded software with the following functions
- Graphical design tool
- Prototyping tool
- Automatic/manual test tool
- C/C++ code generation
- Graphical debugging with actual target
- Automatic document creation



Middleware (2/6)

NetFront™, Compact NetFront®, JV-Lite®2

[Manufacturer/Marketer] ACCESS Co., Ltd.

[Features]

NetFront

- Internet module set including embedded web browsers such as for TVs and PDAs, Internet mail, TCP/IP modules, and a variety of drivers
- The browser includes a 300 KB kernel, complies with HTML 3.2, and provides support for frames. Parts of HTML 4.0 are also supported
- TCP/IP protocol stack AVE-TCPv6.0 for IPv6 is included as standard.

Compact NetFront

- HTML browser optimized for mobile devices with small monochrome liquid crystal displays such as cellular phones, PHS, PDAs, and pagers
- HTML 4.0 subset functions are available with 150 KB of RAM and 300 KB of ROM

JV-Lite2

- Java VM (Virtual Machine) for embedded systems. Entirely compatible with Embedded Java™, Personal Java™ and J2ME CLDC1.0 + Profiles
- The virtual machine and class library are ROMable and available with 500 KB of ROM and 500 KB of RAM
- Can be provided as a plug-in of the Net Front browser or as a discrete JV-Lite2 unit

Nucleus WebServ

[Manufacturer/Marketer] Accelerated Technology
Mentor Graphics Division of Mentor Graphics Japan Co., Ltd.

[Features]

- Fully functional server in a tiny package
- HTTP 1.0/1.1 Support
- Dynamic Web page content (Allows Monitoring)
- Forms support (Allows Configuration)
- Content Independent (Supports Java Applets, Images, etc.)
- CGI (plug-in) support
- Server Side Include support (SSI)
- File upload (online document update)
- Flexible page storage (in memory or on disk)
- Supports multiple concurrent requests
- Basic authentication
- DES authentication
- Document compression

Nucleus FILE

[Manufacturer/Marketer] Accelerated Technology
Mentor Graphics Division of Mentor Graphics Japan Co., Ltd.

[Features]

- FAT12/16/32 support including long file name handling
- Royalties unnecessary as C source code is included
- Reentrant file access
- ROM programming supported
- Support of multiple floppy discs and fixed discs
- File system format functions provided
- RAM disc driver provided free of charge
- Transparent CPU byte allocation
- Simple device driver interface
- Nucleus PLUS integration complete

JAVA platform for embedded computing JBlend™

[Manufacturer/Marketer] Aplix Corporation

[Features]

- Java execution environment optimized for embedded application
- Practical performance with fewer resources
- Supports Java specifications (profile/extension) based on JavaME.
- Quickly supports new Java specification and manufacturer's original specification by sophisticated modularization and standardization.
- Existing software resources can be used as is, so that mounting on the OS/CPU you use is possible.
- Plans to participate in "platformOViA" partner program (as of July 2005).

Nucleus NET

[Manufacturer/Marketer] Accelerated Technology
Mentor Graphics Division of Mentor Graphics Japan Co., Ltd.

[Features]

- Fully functional TCP/IP protocol stack
- Source code provided, no royalties
- Optimized for real-time applications
- Full integration with Nucleus PLUS for optimal performance
- Scalable configurations: IP, IP+UDP, IP+UDP+TCP
- Sockets API
- Compact (small footprint)
- RAW IP, IP Multicasting, IP Forwarding
- Ethernet drivers and serial driver templates
- PPP available
- Reentrant and ROMable
- Multiple protocols supported over same network device
- First class support and training

Mobile PictDirect (MoPiD™)

[Manufacturer/Marketer] Aplix Corporation
eSol Co., Ltd.

[Features]

- Realizes image printing by directly connecting a cellular phone and a printer.
- Conforms to PictBridge standard that has become widespread in the field of direct printing.
- Printer supporting PictBridge can be used regardless of the manufacturer and model.
- Can also be used from applications for printing.
- Requests for porting and customization can also be supported. The number of development processes can be decreased.

Middleware (3/6)

Embedded software products

[Marketer] AI Corporation
[Features]
[Manufacturer] Datalight
FlashFX
◆ Driver for sector emulation with flash memory as disc drive
Reliance
◆ File system supporting power failure

[Manufacturer] EBSnet, Inc.
RTFiles
◆ File system compatible with MS-Windows/power failure (Fail-safe function) support function
UPnP SDK
◆ Conforms to UPnP Device Architecture version 1.0.

[Manufacturer] Extended Systems
XTNDAccess Blue SDK
◆ Bluetooth protocol stack/Supporting CAN CCAP for automobile/Supporting many new protocols
XTNDAccess Data Sync SDK
◆ Data synchronization/Conforming to OMA standard

[Manufacturer] Interpeak
IPNET/IPLITE/IPSec
◆ IPv4/v6 dual stack

[Manufacturer] Mimer Information Technology AB
Mimer SQL Mobile
◆ SQL database engine for embedded system

[Manufacturer] Swell Software, Inc.
PEG
◆ GUI library for embedded system and GUI development environment

[Manufacturer] AINIX Corporation
ImageStar QR/e
◆ Image processing & decoding of QR code (model 2) symbol

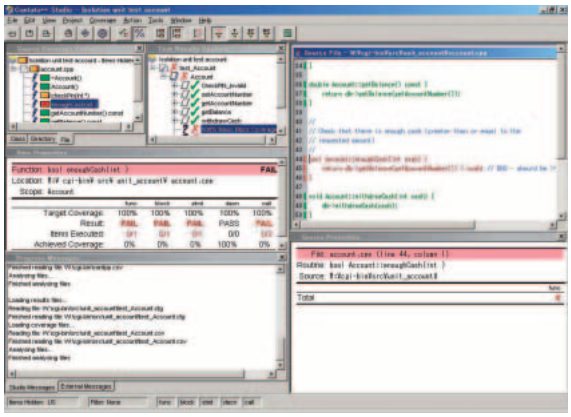
[Manufacturer] AI Corporation
Resizeable
◆ Scalable font engine for embedded system/Japanese Rodan (gothic) supplied
SDIO card driver
◆ Control driver of SD memory card and SDIO card having SD expansion function
Small media driver (SD/SDIO/MemoryStick/CF/MMC)
◆ Control driver of various flash media

Grousenet UPnP

[Manufacturer] SEC Corporation
[Marketer] NEC Engineering, Ltd.
[Features]
◆ Conforming to UPnP Device Architecture Version 1.0
◆ Addressing, discovery, description, control, event, and presentation functions
◆ Supports μITRON as OS.
◆ Debug function
◆ Sample application also in package
◆ Source code supplied

Cantata++

[Manufacturer] Information Processing Ltd., England
[Marketer] AI Corporation
[Features]
◆ Cantata++ is a standalone, combined test support tool.
◆ Standalone, combined test: Supporting host environment and target environment
◆ Test coverage analysis: Statement, branch, MC/DC, entry point, call return metric
◆ GUI: Graphical analysis of test result and test creation with wizard
◆ Wrap, stub function: Simulating and controlling behavior of external functions



KASAGO TCP/IP (IPv4)-based development kit

[Manufacturer/Marketer] Elmic Wescom, Inc.
[Features]
◆ High-speed TCP/IP protocol stack dedicated to embedded applications
◆ Support of ZERO Copy function
◆ Compact code size of about 100 KB
◆ Independent of CPU, OS, and compiler
◆ Supplied in source code conforming to ANSI C
◆ BSD4.4 socket I/F supported
◆ Wealth of optional software products such as PPP, SNMP, HTTPD, POP3&SMTP, and SIP

KASAGO IPv6 (IPv4/IPv6 Dual)-based development kit

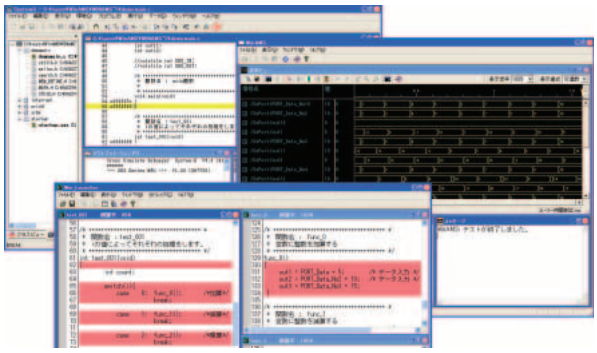
[Manufacturer/Marketer] Elmic Wescom, Inc.
[Features]
◆ High-speed TCP/IP protocol stack supporting IPv6 and dedicated to embedded applications
◆ IPv6 Ready Logo Phase-2 approved
◆ Support of ZERO Copy function
◆ Compact code size of about 150 KB (IPv4/IPv6 Dual)
◆ Independent of CPU, OS, and compiler
◆ Supplied in source code conforming to ANSI C
◆ Many optional software products such as IPsec, SNMP, HTTPD, POP3&SMTP, and SIP

Middleware (4/6)

Coverage master winAMS

[Manufacturer/Marketer] GAIO TECHNOLOGY CO., LTD.
[Features]

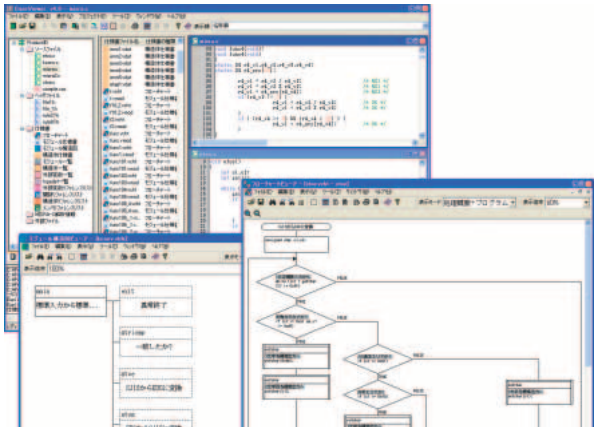
- ◆ Environment automating single module (function) test of software
- ◆ Comprehensively executes single test to improve module quality.
- ◆ Automatically executes and judges I/O test of any module.
- ◆ Automatic coverage test for obtaining quantitative data of coverage rate of module test



CasePlayer2

[Manufacturer/Marketer] GAIO TECHNOLOGY CO., LTD.
[Features]

- ◆ Analyzes source code in C and assembler to automatically create various documents such as flowcharts and variable lists.
- ◆ Visualizes information of source code to accurately analyze existing software resources in a short time.
- ◆ Can also clarify source code review in a short time.



Fusion WebPilot

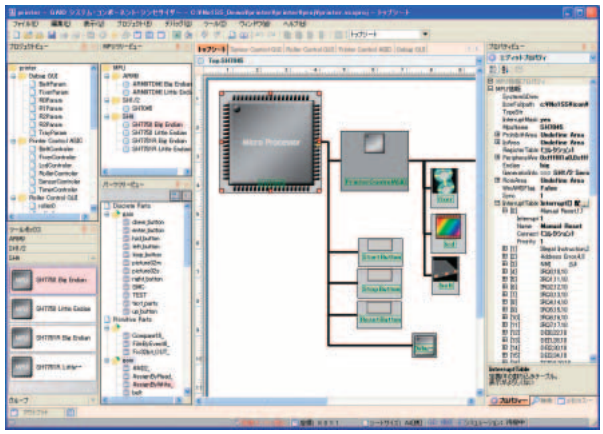
[Manufacturer] Unicoi Systems Inc.
[Marketer] Grape Systems Inc.
[Features]

- ◆ Communications middleware for various embedded applications
- ◆ Supplies royalty-free ANSI C source code
- ◆ Core WEB browser with small footprints
- ◆ Can be transplanted to all platforms.
- ◆ Conforming to HTTP 1.0, 1.1, and completely supporting cookies
- ◆ Supporting Japanese, GIF, GIF89a (animation GIF), JPEG, and BMP (non-compression)
- ◆ Supporting JavaScript (option)

No.1 System Simulator

[Manufacturer/Marketer] GAIO TECHNOLOGY CO., LTD.
[Features]

- ◆ Next-generation simulation environment improving quality of embedded software
- ◆ Easily reproducing exception operations, interrupts, and timing events that are difficult to reproduce in verification using an actual machine, dramatically improving software quality
- ◆ Necessary simulation is automatically synthesized by only connecting model components on GUIs and thus can be organized in a short time.



Middleware series for embedded application (GRAPEWARE)

[Manufacturer/Marketer] Grape Systems Inc.
[Features]
GR-USB series

- ◆ USB protocol stack for embedded applications
- ◆ Supplies royalty-free ANSI C source code.
- ◆ Supporting various real-time OSs, such as μITRON, NORTi, and ThreadX
- ◆ GR-USB/HOST, GR-USB/HOST II (host protocol stack)
- ◆ GR-USB/OTG (On-The-Go specification protocol stack)
- ◆ GR-USB/DEVICE (device protocol stack)
- ◆ GR-USB/FILE (USB mass storage integrated kit)
- ◆ Many class drivers
- ◆ New porting and development upon request possible

GR-FILE

- ◆ FAT file system for embedded application (supporting FAT 12/16/32)
- ◆ Supplies royalty-free ANSI C source code.
- ◆ Supplies standard I/O interface in C compatible with POSIX.
- ◆ Consecutive direct I/O or cache method can be selected in accordance with file characteristics
- ◆ Designing independent of OS
- ◆ Function to set format/partition of file system
- ◆ Supplies sample format code dedicated to SD cards
- ◆ Supporting long file names and Shift JIS file names
- ◆ Supporting simultaneous multi-task accesses
- ◆ Supporting illegal plugging in and out of media

Middleware (5/6)

Cente middleware series

[Manufacturer/Marketer] Data Technology Co., Ltd.
[Features]
◆ Middleware package for μITRON kernel
◆ Supplies 100% source code without project license and royalties.
◆ Flexible technical service (porting customization)
◆ Common modules available (ctkernel, shell, ctlib, crypto, Cente)

CenteIPv6
◆ IPv4/IPv6 dual stack
◆ Expands API of ITRON TCP/IP specification to IPv6.

CenteIPSec
◆ Usable in both IPv4/IPv6 environments
◆ Encryption algorithm: NULL, DES-CBC, 3DES-CBC, AES (RIJNDAEL)
◆ Authentication algorithm: MD5, SHA-1

CenteTCP/IPv4
◆ API of ITRON TCP/IP specification and original DD (DeviceDriverinterface)

Cente HTTPd/c
◆ Both WEB server and client available
◆ Conforms to HTTP 1.0/1.1 (supported method: GET/HEAD/POST)

Cente SMTP/POP
◆ Transmission/reception of E-mail by SMTP/POP3
◆ File data can be attached (CenteFileSystem is necessary).

Cente PPP
◆ Supporting authentication of PAP/CHAP/MS-CHAPv2
◆ Supporting IP address setting with IPCP

Cente SNMP
◆ MIB, MIB-II provided as standard
◆ Original MIB can be defined.

Cente SSL
◆ SSL library usable with CenteTCP/IPv4, CenteIPv6

Cente 802.11g PRISM
◆ Supporting PRISMGT chip set

Cente 802.11b PRISM
◆ Supporting PRISM2.0/2.5/3.0 chip set

Cente USB 1.1 Device
◆ Transfer method: Control transfer/bulk transfer supported
◆ USB device driver sample for Windows supplied

Cente Filesystem
◆ Protects recording data from power failure as much as possible.
◆ Supporting FAT12/16/32, VFAT, and hierarchical directory

Cente SD Card Driver
◆ Can organize/read/write FAT file system to SD memory card via SD memory card controller LSI.
◆ Fully supports SD memory card control commands.

Cente SmartMedia Driver
◆ Conforms to SSFDC forum specifications and can organize/read/write FAT file system to commercially available SmartMedia.
◆ Supports SmartMedia standard control function commands.

Cente NANDFLASH Driver
◆ Can organize/read/write FAT file system to on-board NANDEEPROM.

matrixQUEST series

[Manufacturer/Marketer] TEPCO UQUEST, LTD.
[Features]

matrixUSB (USB host driver)
◆ Supports high-speed operation and OTG
◆ Supports various controllers and classes

matrixDPS (PictBridge software)
◆ Provided for printers and digital cameras respectively
◆ Tested for logo recognition via supplied sample application
◆ Emulation function enables development of applications without actual devices

matrixNET (TCP/IP dual stack)
◆ Full scratch IPv4/v6 dual stack
◆ IPsec/IKE is provided as standard

matrixWLAN (wireless LAN driver)
◆ Supports Conexant's PRISM2/3 and Atheros's AR500x chips
◆ Supports WPA
◆ Can be provided with matrixNET

matrixFS (various file systems)
◆ Products that supports FAT12/16/32, VFAT, ISO9660, and UDF file systems are provided
◆ Supports Japanese file names
◆ Provides cache library common to various file systems

matrixXML/XHTML Browser
◆ Compact browser for viewing XHTML Basic content
◆ Lightweight and fast by using SAX Parser and minimum required CSS Parser (Level 1 subset)
◆ Can be combined with matrixNET and matrixFS

EmbeddedWare series

[Manufacturer/Marketer] Nissin Systems, Co., Ltd.
◆ USNetPlus (super small embedded TCP/IP stack)
◆ USFilesPlus (super small embedded FAT file system)
◆ EW-SSL (super small embedded SSL)
◆ EW-SSH (super small embedded SSH)
[Manufacturer] Pocket Soft, Inc.
[Marketer] MONET
◆ EW-RTPatch (differential upgrading)
[Features]

USNet Plus (embedded TCP/IP stack)
◆ Supporting radio LAN802.11b

USFilesPlus (embedded FAT file system)
◆ Supporting SD memory card

EW-SSL (super small embedded SSL)
◆ Supporting SSL Ver3

EW-SSH (super small embedded SSH)
◆ Supporting SSH Ver2

EW-RTPatch (differential upgrading)
◆ High-speed, safe upgrading of differential/compression/authentication

Middleware (6/6)

CANopen Master source code
CANopen Slave source code

[Marketer] Vector Informatik GmbH
Vector Japan Co., Ltd.
[Target devices] V850ES
[Features]
- ◆ Protocol stack widely employed in Europe, especially in Germany where CANopen was originated
- ◆ Embedded source code for developing CANopen Master or slave device
- ◆ Operation confirmed, including driver for on-chip CAN controller of V850
- ◆ Can be customized by user in accordance with user device specifications.
- ◆ Development efficiency can be further enhanced by also using development support tools such as CANerator and CANoe.

SYSTEM COMPONENT for ECHONET

[Manufacturer/Marketer] YASUKAWA INFORMATION SYSTEMS Corporation
[Features]
- ◆ Easily realizes Echonet (home network) system development.
- ◆ Can freely combine various components of Echonet middleware layer.
- ◆ Lightweight suitable for embedded system
- ◆ Can also support application development for various Echonet systems.

Flash Memory Programmer (1/2)

Stick Writer SW-850SX2

[Manufacturer/Marketer] Application Corporation
[Target devices] V850/SG2
[Features]
- ◆ Compact size directly connectable to USB connector
- ◆ No external power supply needed
- ◆ Operable with only target power supply
- ◆ Operable with USB bus power
- ◆ Operable in standalone mode
- ◆ Easy operation guided by Japanese messages
- ◆ Error log storage function helping you to analyze write errors

Programming system Y1000-8

[Manufacturer/Marketer] Wave Technology Co., Ltd.
[Target devices] V850E/MA1, V850/SV1, V850/SB1 (70F3032A, 70F3033A), V850/SB2 (70F3035A, 70F3037A), V850E/IA1 (70F3116)
[Features]
- ◆ Gang programmer enabling simultaneous programming and verification of up to 8 devices
- ◆ Enables reading of master data directly from floppy disk to internal memory
- ◆ Data dump display and editing functions
- ◆ Master data storable on internal hard disk
- ◆ Emphasizes simple and effortless operation via touch panel and workability via PASS/FAIL display, checksum display, and task count display supporting sockets

Flash Gang Forward FL-G01

[Manufacturer] Hong Kong Forward Electric Co., Ltd.
[Marketer] Application Corporation
[Target devices] V850/SA1, V850/SB1, V850/SF1, V850E/MA1, V850E/MA3, V850ES/KG1
[Features]
- ◆ USB (V1.1) supported as host machine interface
- ◆ Can also operate in standalone mode by using compact flash.
- ◆ Up to eight programs can be written simultaneously (eight optional adapter boards are necessary).
- ◆ Low price

Flash Memory Programmer (2/2)

FlashPRO IV FL-PR4

[Manufacturer/Marketer] Naito Densei Machida Mfg. Co., Ltd.
[Features]

- ◆ Supports programming of all NEC Electronics microcontrollers with on-chip flash memory
- ◆ USB support via host machine interface
- ◆ LCD panel allows checking of programmer setting information, error messages, checksum values, etc., even when used as a standalone unit.
- ◆ Two user codes can be downloaded and valid code selection is supported.
- ◆ Device-specific information required for programming can be freely set using parameter files.
- ◆ On-board programming and programming via a program adapter are possible.
- ◆ Portable A5 size
- ◆ Easily operable both as a standalone unit or on Windows 95/98/Me/2000/XP and Windows NT 4.0 by using dedicated application (FlashPro4)

NET IMPRESS series

[Manufacturer/Marketer] Yokogawa Digital Computer Corporation
[Target devices] V850E/IA1 (μPD70F3116), V850/SB1 (μPD70F3030B, μPD70F3032A, μPD70F3032B, μPD70F3033, μPD70F3033A, μPD70F3033B), V850/SB2 (μPD70F3037A), V850/SA1 (μPD70F3017A), V850/SC3 (μPD70F3089Y), V853 (μPD70F3003A, μPD70F3025A), V850E/MS1 (μPD70F3102A), V850E/MA1 (μPD70F3107), V850E/IA2 (μPD70F3114), V850ES/KF1 (μPD70F3210), V850ES/SA2 (μPD70F3201), V850ES/SA3 (μPD70F3204), V850ES/SG2 (μPD70F3261, μPD70F3263, μPD70F3271, μPD70F3273, μPD70F3281, μPD70F3283), V850ES/SJ2 (μPD70F3264, μPD70F3266, μPD70F3274, μPD70F3276, μPD70F3284, μPD70F3286, μPD70F3288), V850ES/FE2 (μPD70F3231), V850ES/FF2 (μPD70F3232, μPD70F3233), V850ES/FG2 (μPD70F3234, μPD70F3235, μPD70F3236), V850ES/FJ2 (μPD70F3237, μPD70F3238, μPD70F3239)
[Features]

- ◆ Enables programming with various manufacturers' microcontrollers (various programming specifications) with on-chip flash memory solder-mounted onto the user system
- ◆ General-purpose keys on one control module
  Supports parameter changes for microcontrollers in same series
  Supports licensing of definitions from microcontrollers in different series
- ◆ Able to operate via a host machine or as a stand-alone device
- ◆ Full lineup of software available as free downloads
- ◆ Flash programming using CAN interface, widely employed in automobiles, is possible (C"arNETIMPRESS).

Emulators (1/5)

TimeMachine, SuperTrece Probe

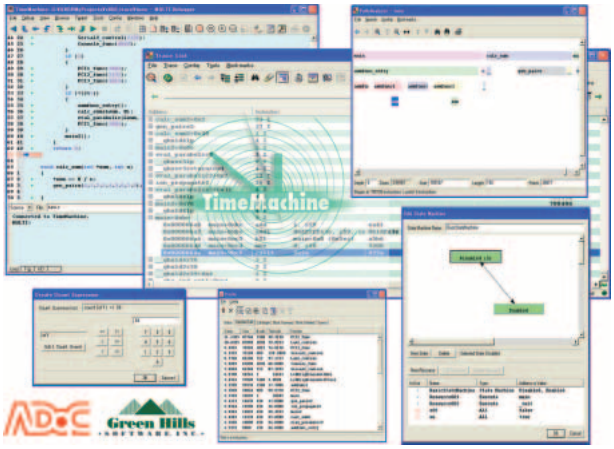
[Manufacturer] Green Hills Software, Inc.
[Marketer] Advanced Data Controls Corporation
[Target devices] V850E, V850ES
[Features]
TimeMachine

- ◆ Clarifies complicated problems of real-time interference with applications by reversely executing programs based on trace data.
- ◆ Realizes execution analysis, such as profiles, without extra codes for measurement.

SuperTrace Probe

- ◆ Trace buffer of up to 1 GB that can completely collect data with a clock exceeding 300 MHz (however, up to 160 MHz if IECUBE is used)
- ◆ Can easily realize execution analysis of program subject to several 100 millions or more of trace frames when used with TimeMachine.

* TimeMachine and SuperTrace Probe in V850 environment requires IECUBE supporting options.

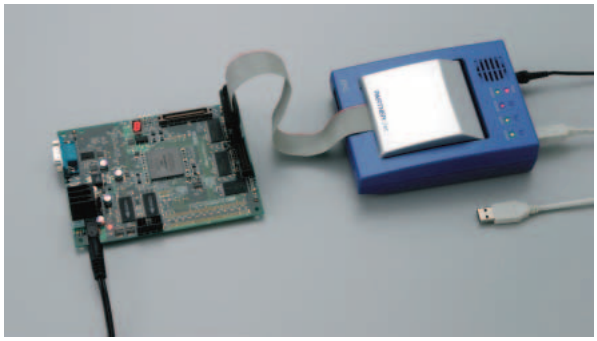


Emulators (2/5)

PARTNER-Jet

[Manufacturer] Kyoto Microcomputer Corporation
[Marketer] Kyoto Microcomputer Corporation
Naito Densei Machida Mfg. Co., Ltd.
Application Corporation
NEC Micro Systems, Ltd.
[Target devices] V850E/MA1, V850E/MA2,
NU85E core (may be added at any time)
[Features]

- Super high-speed download
  Via JTAG: With V850E/ME2 connected: 2.8 MB/s, JTCK = 51.344 MHz
  With ROM emulation probe: 10 MB/s
- Host interface of all models supports USB 2.0/1.1. Model30 also supports LAN (100Base-TX/10Base-T).
- High-capacity trace memory (up to 18 Mb, Model30)
- Supporting high-speed trace clock (200 MHz)
- Option supporting high-capacity emulation memory (Model20/30)
  High capacity (4 MB to 64 MB), high access speed: 30 ns
- Low price
  From 198,000 yen (207,900 yen, including consumption tax)



UniSTAC II

[Manufacturer/Marketer] Sophia Systems Co., Ltd.
[Features]

- Supporting N-Wire interface
- Downloading to flash memory
- Hardware break settable
- Software break (without limit) settable
- Branch trace function (256K steps)
- Debugger WATCHPOINT supporting C/C++ language supplied as standard
- Host connection with USB/LAN

PARTNER-ET II

[Manufacturer] Kyoto Microcomputer Corporation
[Marketer] Kyoto Microcomputer Corporation
Naito Densei Machida Mfg. Co., Ltd.
Application Corporation
NEC Micro Systems, Ltd.
[Target devices] V850 core, processor incorporating V850E core
[Features]

- Debug tool of ROM in-circuit type enabling debugging with microcontroller without N-Wire function
- Tracing program executed on emulation memory
- Super high downloading speed of 4 MB/s
- Supporting network interface of 100Base-TX/10Base-T
- Hardware break and profile functions provided
- Available option of on-chip debugging by N-Wire connection

ND-V850ES Series

[Manufacturer/Marketer] Naito Densei Machida Mfg. Co., Ltd.
[Target devices] V850ES/KF1, V850ES/KG1, V850ES/KJ1,
V850ES/SG2 (under development),
V850ES/SJ2 (under development)
[Features]

- Low price (sold as a set of hardware + debugger)
- Simple-connection USB interface
- High-performance debugger supporting NEC Electronics development environment
- Realizes manipulatability equivalent to NEC Electronics ID debugger
- High device equivalence by using NEC Electronics dedicated in-circuit-emulator chipset
- Provides real-time trace/real-time RAM monitor function
- Supports NEC Electronics compiler/project manager
- Space-saving type that can be used lying down or standing up
- Lineup of low-price, high-flexibility dedicated probes (NP-CX Series: Sold separately)

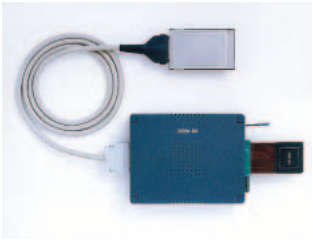
Emulators (3/5)

ND-V850 Series, ND-V850E Series

[Manufacturer/Marketer] Naito Densei Machida Mfg. Co., Ltd.
[Target devices] V850/SB1, V850/SB2, V850/SA1, V850E/MA1, V850E/IA1
[Features]
◆ Low price (sold as a set of hardware + debugger)
◆ On-chip host interface (LPT port)
◆ High-performance debugger supporting NEC Electronics development environment
◆ Realizes manipulatability equivalent to NEC Electronics ID debugger
◆ High device equivalence by using NEC Electronics dedicated in-circuit-emulator chipset
◆ Provides real-time trace/real-time RAM monitor function
◆ Supports NEC Electronics compiler/project manager
◆ Space-saving type which can be used lying down or standing up

RTE Series

[Manufacturer] Midas Lab, Co., Ltd
[Marketer] Naito Densei Machida Mfg. Co., Ltd.
CORE Corporation
[Target devices] N-Wire-supporting micronontrolles in the V853, V853A, V850/SA1, V850/SB1, V850/SB2, V850E/MA1, V850E/MA3, V850E/ME2, V850E2/ME3, V850E/IA1, Nx85ET, NA85E2, AS85EP2, V850ES/E/E2 Series
[Features]
RTE-V850x-IE series
Full ICE series of in-circuit type emphasizing reduction in size and weight as dedicated emulator



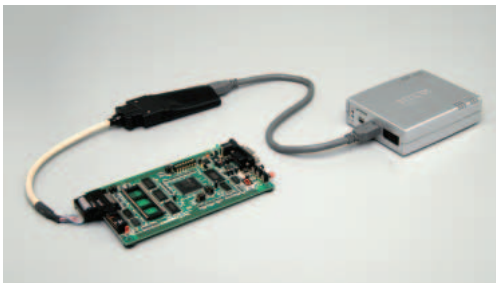
◆ GHS's "MULTI" and Midas Lab's "Partner" can be used as debuggers.
◆ Releases all resources of processor and supports all operation modes.
◆ Provided with emulation memory as standard
◆ Real-time execution and trace
RTE-2000-TP series
New model of ICE of JTAG method that has units of function modules and realizes a high degree of freedom and expandability of component configuration
◆ Equipped with high-speed JTAG circuit (66 MHz min.)
◆ Supporting high-speed N-Trace (333 MHz to 400 MHz)
◆ High-capacity trace memories (36 Mb to 144 Mb)
◆ Many options
  • High-capacity, high-speed emulation memory (35 ns, 64 bits, 128 MB)
  • Emulation memory supporting high-speed synchronous flash
  • Probe supporting 48-bit width N-Trace
  • External bus trace unit (various I/Fs)
  • High-speed download probe (bus connection type)

◆ Low voltage (1.2 V min.)
◆ LAN/USB-IF equipped as standard (100 Mbps/480 Mbps)
◆ Many debuggers usable
  • GHS's "MULTI"
  • NEC Electronics' "ID850NW"
  • Midas Lab's (KMC license) "Partner"
◆ Functions supporting MULTI core

Emulators (4/5)

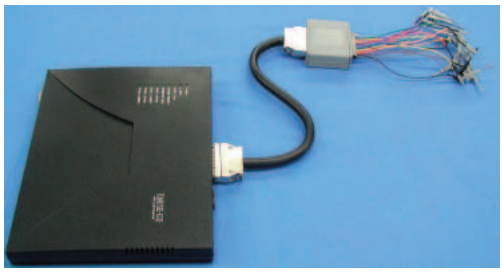
Code Debugger for V850

[Manufacturer/Marketer] BITRAN CORPORATION
[Target devices] V850E/ME2, V850ES/SG2, V850E/MA3, Nx85ET
[Features]
- ◆ Low-cost emulator that supports N-Wire interface
- ◆ Enables support using only one code debugger in a CPU or Nx85ET core equipped with the V850E1 or V850ES DCU (Debug Control Unit)
- ◆ Complies with LAN and USB2.0 host interfaces as standard
- ◆ Supports NEC Electronics compilers as well as various compilers made by other manufacturers
- ◆ Supports programming to internal or external flash memory (over 800 models)



EMUSE-G II

[Manufacturer] CATS, Inc.
[Marketer] Midoriya Electric Co., Ltd.
[Features]
- ◆ Address/data bus monitoring with ROMprobe alone
- ◆ Also usable as logic analyzer
- ◆ High-capacity emulation memory (8 MB)
- ◆ High-speed downloading (about 75 times that of vsEMUSE, 1 MB/5 s)
- ◆ Supporting GHS's MULTI

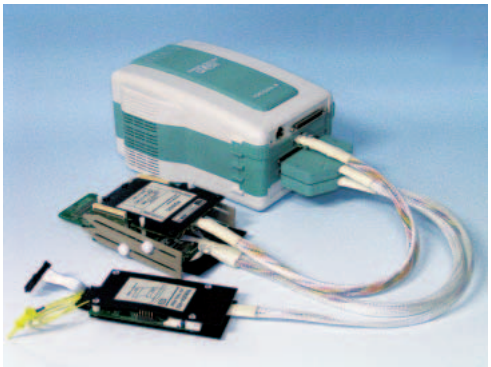


advicePOCKET

[Manufacturer/Marketer] Yokogawa Digital Computer Corporation
[Target devices] V850E/ME2, V850E/MA3, V850E2/ME3
[Features]
- ◆ Easy connection supporting N-Wire interface
- ◆ Power supply-less operation supporting USB Vbus (JTAG model)
- ◆ Branch PC trace/data trace by N-Wire
- ◆ Maximum frequency: 100 MHz (trace model)
  * Support depends on MPU.
- ◆ Can write external flash memory.
- ◆ Can write on-chip flash memory (V850E/MA3)
- ◆ Debugger: microVIEW-PLUS dedicated to advicePOCKET supplied as standard

advice PLUS

[Manufacturer/Marketer] Yokogawa Digital Computer Corporation
[Target devices] V850ES/KF1, V850ES/KG1, V850ES/KJ1: (Full-ICE)
NU85ET, NB85ET, NA85E2, V850E/ME2, V850E2/ME3: (OCD tool)
[Features]
- ◆ Option module support enables selection of only necessary functions
- ◆ Supports large-capacity emulation memory
- ◆ Supports trace analysis function of up to 32K samples
- ◆ Supports a range of measuring functions
  Profile measuring, two-point execution time measuring, coverage measuring
  * Option module used depending on device.
- ◆ Enables writing to external flash memory (OCD tool)
- ◆ Supports N-Wire interface (OCD tool)
- ◆ Debugger: Supports microVIEW-PLUS



Emulators (5/5)

MJX330, MJX440, SSX850

[Manufacturer/Marketer] ZAX Division, Lightwell Co., Ltd.
[Target devices] V850/SA1, V850/SB1, V850E/MA1, V850E/MA2, V850E/IA1, V850E/IA2, V850E/ME2, NB85E

[Features]

MJX330 for NB85E

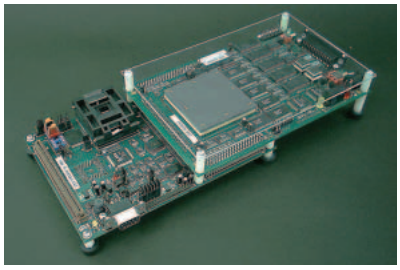
- Card-type JTAG interface debugger
- Supported devices: V850E/ME2, NB85E
- Lightweight and compact JTAG emulator of PC card type with excellent portability
- JTAG emulator with high cost effectiveness, reducing cost while supporting JTAG debug function
- Supports integrated development environment MULTI of Green Hills Software.
- Writing to external general-purpose flash is supported.
- High-speed downloading (440 KB/s max.)

MJX440 for V850E/ME2

- High-performance JTAG interface debugger
- Supported devices: V850E/ME2, NB85E
- High-speed download: 440 KB/s
- Conforms to GHS integrated development environment MULTI
- ROM emulation function
- Real-time trace function
- Supports PC operating on Windows 98/ME, Windows NT 4.0/2000, and Windows XP

SSX850 Series

- Low-cost V850 in-circuit emulator
- Supported devices: V850/SA1, V850/SB1, V850E/MA1, V850E/MA2, V850E/IA1, V850E/IA2
- Conforms to GHS integrated development environment MULTI
- Real-time trace function
- On-chip flash memory programmer
- Supports PC operating on Windows 98/ME, Windows NT 4.0/2000, and Windows XP

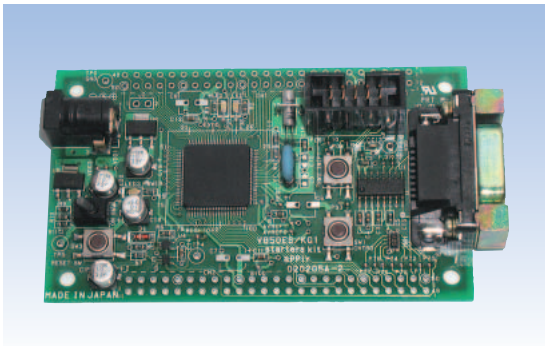


Evaluation Board, Evaluation Kits (1/3)

TK-850 Series

[Manufacturer/Marketer] Application Corporation
[Target devices] V850ES/SG2, V850/KJ1+
[Features]

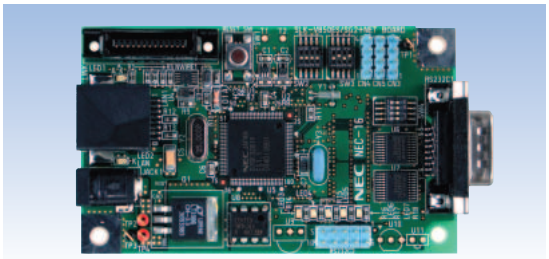
- Various software products necessary for development also supplied
- Low price
- Easy-to-use, as tutorial and sample programs available
- Compact, name card-size



TK-850/SG2+NET

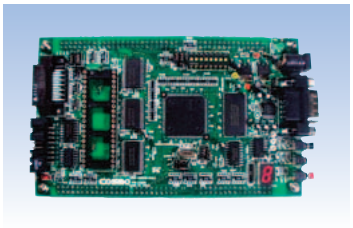
[Manufacturer/Marketer] Application Corporation
[Target devices] V850/SG2
[Features]

- TCP/IP stack that can operate only with internal memory of V850
- Necessary items (AC adapter, serial cable, and Ethernet cross cable) in package
- Not only TCP/IP but also HTTP protocol, mail protocol (POP3, SMTP), and sampling application using these are stored in ROM.
- C compiler, debugger, and flash programmer are also packed as development environments.



Evaluation Board, Evaluation Kits (2/3)

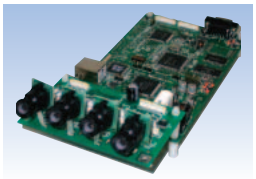
CEB-V8xx



[Manufacturer/Marketer] Cosmo Co., Ltd.
[Target devices] V850E/MA1, V850E/MA3, V850E/IA1, V850/SA1, V850/SB1, V850ES/SJ2, V850ES/FJ2
[Features]
- ◆ V850E/MA1, V850/SA1, and V850/SB1 include evaluation board, PARTNER monitor-debugger, and GNU compiler exeGCC evaluation versions in a single low-price package
- ◆ V850E/MA3, V850E/IA1, V850ES/SJ2, and V850ES/FJ2 include evaluation board and NEC Electronics development tool in a single low-price package
- ◆ RISC chip performance can be experienced by a simple serial PC connection
- ◆ Compact board design measuring just 137 × 86 mm (V850E/MA1, V850/SA1, V850/SB1), 140 × 85 mm (V850E/MA3), ϕ150 mm (V850E/IA1), 150 × 125 mm (V850ES/SJ2, V850ES/FJ2)
- ◆ External fetchability of CPU signals facilitates expansion
- ◆ Includes connector for writing to CPU's on-chip flash memory

KBCR-CB2

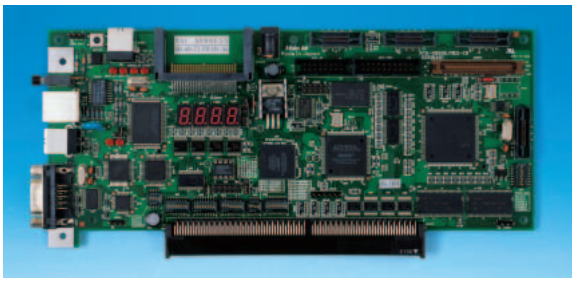
[Manufacturer] Shikino High-Tech Co., Ltd.
[Marketer] Shikino High-Tech Co., Ltd., ZENIC, Inc.
[Target devices] V850E/MA1, V850E/ME2
[Features]



The KBCR-CB2 image processing evaluation kit is a reference board that includes full-motion capture, sensing, and compression processing functions as well as multiple communication ports. This product not only facilitates the development of various surveillance camera systems but is also a useful evaluation kit for developing image processing system algorithms.
- ◆ Various image processing functions such as object sensing and color sensing for sensing functions, and JPEG for image compression functions (ZENIC's ZEN3001F image processing LSI for sensor cameras is used for image processing)
- ◆ Camera inputs include CMOS digital and NTSC inputs, enabling up to 4 channels of multi image control
- ◆ Uses Ethernet (or optional wireless LAN) as network interface, and also includes serial communication port and extended bus
- ◆ Real-time OS complies with μITRON 4.0 specification and TCP/IP is implemented (uses MiSPO's NORTi)

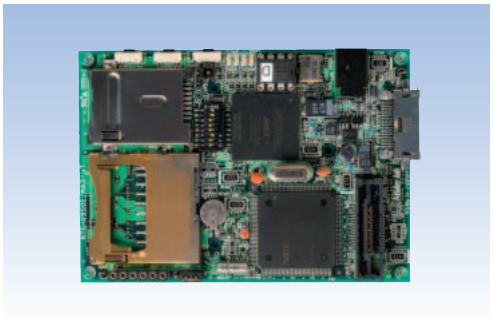
RTE Series

[Manufacturer] Midas Lab, Co., Ltd
[Marketer] Naito Densei Machida Mfg. Co., Ltd.
CORE Corporation
[Target devices] V853, V850E/MS1, V850E/MA1, V850E/ME2, V850E2/ME3, V850ES/SA3
[Features]
- ◆ Monitor support for MULTI from GHS and NEC Electronics' PARTNER
- ◆ High-speed program transfer via PC bus connection (except CB series)
- ◆ Connectable via serial communication (RS-232-C)



μT-Engine/V850E-MA3 development kit

[Manufacturer/Marketer] Personal Media Corporation
[Target devices] V850E/MA3
[Features]
- ◆ Kit based on μT-Engine specification promoted by T-Engine project
- ◆ All software necessary for program development, such as driver, sample application, and development environment, as well as real-time OS "PMC T-Kernel" that makes the best use of 20 years of experience of Tron project, are supplied. Some source codes are also supplied.
- ◆ Detailed technical information related to hardware and circuit diagrams also attached

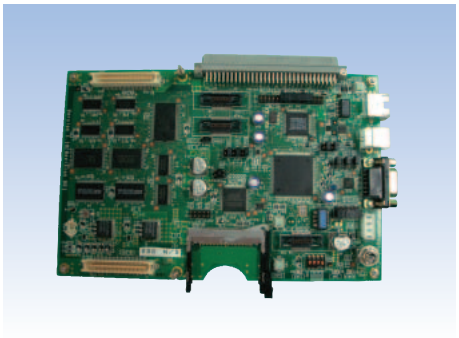


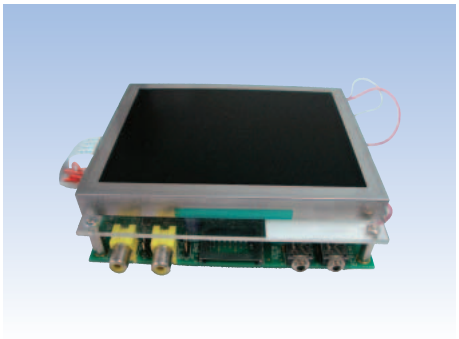
Evaluation Board, Evaluation Kits (3/3)

Giraffe

[Manufacturer/Marketer] Mikasa Shoji Co., Ltd
[Target devices] V850E/ME2
[Features]

- ◆ Supports LAN, compact flash memory card, and USB based on the high-speed (operating frequency: higher than100 MHz) RISC microcontroller (V850E/ME2), and realizes a very adaptable platform.
- ◆ Optional 5.5 inch color LCD board selectable
- ◆ Enables development specialized for audio/visual functions which features A/V I/O connecting NTSC video encoder/decoder and audio ADC/DAC.

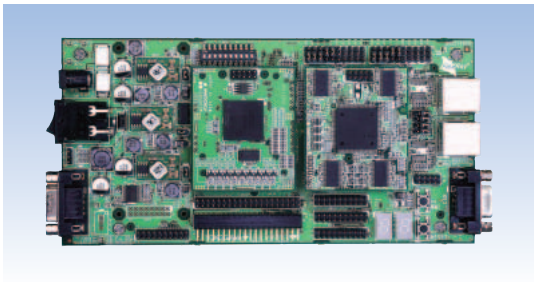




GT200 series

[Manufacturer/Marketer] Yokogawa Digital Computer Corporation
[Target devices] V850E/IA1
[Features]

- ◆ Starter kit evaluating FlexRay next-generation automobile LAN mounting V850E/IA1
- ◆ Robert Bosch GmbH's IP (FPGA version) as FlexRay controller
- ◆ Philips' FlexRay driver mounted on physical layer
- ◆ Enables establishing an appropriate environment for FlexRay system introduction instruction and waveform monitoring of communication operation and output signals.



Partner Contact Information - Support in Japan (1/2)

Contact		TEL	FAX
IAR Systems Company E-mail: info@iarsys.co.jp URL: http://www.iarsys.co.jp		81-3-5298-4800	81-3-5298-4801
ACCESS Co., Ltd. E-mail: adinfo@access.co.jp URL: http://www.access.co.jp/		81-3-3233-0200	81-3-3233-0222
Advanced Data Controls Corporation E-mail: sales@adac.co.jp URL: http://www.adac.co.jp/		81-3-3576-5351	81-3-3576-1772
Application Corporation E-mail: info@apply.co.jp URL: http://www.apply.co.jp/		81-42-732-1377	81-42-732-1378
Aplix Corporation E-mail: http://www.aplixcorp.com/en/contact/index.html URL: http://www.aplix.co.jp/		81-3-3207-6575	81-3-3204-6450
Wave Technology Co., Ltd. E-mail: sales@y1000.com URL: http://www.y1000.com/		81-3-5304-1885	81-3-5304-1886
AI Corporation E-mail: sales@aicp.co.jp URL: http://www.aicp.co.jp/		81-3-3493-7981	81-3-3493-7993
NEC Micro Systems, Ltd. E-mail: si-info@nms.necel.com URL: http://www.nms.necel.com		81-44-722-8194	81-44-733-9054
NEC Engineering, Ltd. E-mail: dsi-sales@nece.jp.nec.com URL: http://www.nec-eng.com/pro/grousenet/		81-4-7185-7707	81-4-7185-7881
Elmic Wescom, Inc. E-mail: info@elwsc.co.jp URL: http://www.elwsc.co.jp/		81-120-045-690 81-45-664-5171	81-45-650-1021
GAIO TECHNOLOGY CO., LTD. E-mail: info@gaio.co.jp URL: http://www.gaio.co.jp/		81-3-3662-3041	81-3-3662-3043
CATS, Inc. E-mail: info@zipc.com URL: http://www.zipc.com/		81-45-473-2816	81-45-473-2673
Kyoto Microcomputer Corporation E-mail: jp-info@kmckk.co.jp URL: http://www.kmckk.co.jp/	Head office	81-75-335-1050	81-75-335-1051
	Tokyo office	81-3-5157-4530	81-3-5157-4531
Grape Systems, Inc. E-mail: middle@info.grape.co.jp (Middleware) threadx@info.grape.co.jp (OS) URL: http://www.grape.co.jp/		81-45-222-3761	81-45-222-3760
C-ICE Sales Division, CORE Corporation URL: http://www.core.co.jp/		81-3-3795-5171	81-3-3795-5170
Cosmo Co., Ltd. URL: http://www.cosmo.co.jp/		81-3-3449-2194	81-3-3449-2197
Shikino High-Tech Co.,Ltd. E-mail: sales@po.shikino.co.jp URL: http://www.shikino.co.jp/oosaka/index.html		81-6-6221-0850	81-6-6221-0859
ZENIC Inc. E-mail: mailto:support@zenic.co.jp URL: http://www.zenic.co.jp/j1/pro_zen3001f.htm		81-77-543-2101	81-77-543-9431
Marketing Group, Planning Division, Sophia Systems Co., Ltd. E-mail: market@sophia-systems.co.jp URL: http://www.sophia-systems.co.jp/		81-44-989-7245	81-44-989-7005
Data Technology Inc. E-mail: sales@cente.jp URL: http://www.cente.jp		81-42-523-1177	81-42-523-7070

Partner Contact Information - Support in Japan (2/2)

Contact		TEL	FAX
Tokyo Eletech Corporation E-mail: info@tetc.co.jp URL: http://www.tetc.co.jp/		81-3-5295-1661	81-3-5295-1663
TEPCO UQUEST, LTD. E-mail: sales@uquest.co.jp URL: http://www.uquest.co.jp		81-3-3580-5501	81-3-3580-5509
Naito Densei Machida Mfg. Co., Ltd. E-mail: info@ndk-m.co.jp URL: http://www.ndk-m.co.jp/asmis/		81-45-475-4191	81-45-475-4091
Nissin Systems Co., Ltd. E-mail: mid-sales@co-nss.co.jp URL: http://www.co-nss.co.jp/	Eastern Japan	81-3-5807-5931	81-3-3839-0112
	Western Japan	81-75-344-7881	81-75-344-7887
IBM Japan, Ltd. E-mail: RATLASK@jp.ibm.com URL: http://www.ibm.com/jp/software/rational/		81-3-5642-9100	81-3-5642-9120
Personal Media, Inc. E-mail: te-sales@personal-media.co.jp URL: http://www.personal-media.co.jp/te		81-3-5475-2185	81-3-5475-2186
ICE Division, BITRAN CORPORATION E-mail: ice-sales@bitran.co.jp URL: http://www.bitran.co.jp/ice/		81-48-556-9881	81-48-556-9591
Open Network Division, Vector Japan Co., Ltd. E-mail: mailto:CANopen@vector-japan.co.jp URL: http://www.vector-japan.co.jp/products/canopen.html		81-3-5769-6974	81-3-5769-6975
Sales Division, Vector Japan Co., Ltd. E-mail: mailto:sales@vector-japan.co.jp URL: http://www.vector-japan.co.jp/		81-3-5769-6980	81-3-5769-6975
Midas Lab, Co., Ltd. E-mail: support@midas.co.jp URL: http://www.midas.co.jp		81-3-3357-2589	81-3-3357-8029
Sales Engineering Division, Mikasa Shoji Co.,Ltd E-mail: info-d1@mikasa.co.jp URL: http://www.mikasa.jp/		81-6-6946-3773	81-6-6946-3753
System Engineering Center, Midoriya Electric Co., Ltd. E-mail: emuse_support@sec.midoriya.co.jp URL: http://www.midoriya.co.jp/		81-3-5907-2814	81-3-5907-2819
MiSPO, Inc. E-mail: sales@mispo.co.jp URL: http://www.mispo.co.jp/		81-44-829-3381	81-44-829-3382
Accelerated Technology Mentor Graphics Division, Mentor Graphics Japan Co., Ltd. E-mail: jpn_info@acceleratedtechnology.com URL: http://www.acceleratedtechnology.jp/		81-3-5488-3041	81-3-5488-3032
YASKAWA INFORMATION SYSTEMS Corporation E-mail: echonet@ysknet.co.jp URL: http://www.ysknet.co.jp/product/johokaden/echonet		81-44-952-8918	81-44-952-8921
advice Division, Yokogawa Digital Computer Corporation E-mail: info-advice@yokogawa-digital.com URL: http://www.yokogawa-digital.com/		81-42-333-6222	81-42-352-6107
Instruments Business Division, Yokogawa Digital Computer Corporation E-mail: info-impress@yokogawa-digital.com URL: http://www.yokogawa-digital.com/		81-42-333-6224	81-42-352-6109
Automotive Instruments Business Division, Yokogawa Digital Computer Corporation E-mail: info-mvi@yokogawa-digital.com URL: http://www.yokogawa-digital.com/		81-42-333-6239	81-42-352-6106
ZAXTEX Division, Lightwell Co., Ltd. E-mail: zaxsales@lightwell.co.jp URL: http://www.lightwell.co.jp/zax/		81-3-3392-3331	81-3-3393-3878
Red Hat, Inc. E-mail: embedded-jp@redhat.com URL: http://www.jp.redhat.com/		81-3-6406-9900	81-3-6406-9901

Partner Contact Information - Support Outside of Japan (1/3)

Company Name (Japanese)	Area	Company Name (Spot)	TEL	FAX
Accelerated Technology Japan Embedded Systems Division of Mentor Graphics Japan Co., Ltd.	Worldwide	Accelerated Technology, Embedded Systems Division of Mentor Graphics info@acceleratedtechnology.com http://www.acceleratedtechnology.com/ATI/contact.php http://www.mentor.com/embedded	1-251-208-3400 Toll-free: 800-468-6853 (US only)	1-251-208-7074
AI Corporation	Worldwide	AI Corporation sales@aicp.co.jp	81-3-3493-7981	81-3-3493-7993
Aplix Corporation	U.S.A.	Aplix Corporation of America www.aplix.co.jp/en/contact/general/index.html http://www.aplix.co.jp/	1-415-558-8800	1-415-558-8822
	Europe, Middle East, Africa	Aplix Europe GmbH www.aplix.co.jp/en/contact/general/index.html http://www.aplix.co.jp/	49-89-2420759-0	49-89-2420759-5
	Asia Pacific	iaSolution Inc.index.html www.aplix.co.jp/en/contact/general/ http://www.aplix.co.jp/, www.iasolution.net/	886-2-2776-1680	886-2-2776-1380
CORE Corporation	Other countries	CORE Corporation	81-3-3795-5171	81-3-3795-5170
	U.S.A.	MICROTEK INTERNATIONAL, INC.	1-310-687-5826	1-310-687-5954
Express Logic,Inc	Japan	Grape Systems Inc.	81-45-323-6541	81-45-323-6546
	Worldwide	Express Logic,Inc info@expresslogic.com http://www.expresslogic.com	1-858-613-6640	1-858-613-6646
GAIO TECHNOLOGY CO., LTD.	Worldwide	GAIO TECHNOLOGY CO., LTD. info@gaio.co.jp http://www.gaio.com	81-3-3662-3041	81-3-3662-3043
Advanced Data Controls Corp.	Japan, Asia	Advanced Data Controls Corp. sales@adac.co.jp http://www.adac.co.jp	81-3-3576-5351	81-3-3576-1772
	U.S.A.	Green Hills Software, Inc. sales@ghs.com http://www.ghs.com	1-805-965-6044	1-805-965-6343
	Europe	http://www.ghs.com		
Hewlett-Packard Company	Worldwide	http://www.tmo.hp.com/tmo/		
IAR Systems	Sweden	IAR Systems AB info@iar.se http://www.iar.com	46-18-16-78-00	46-18-16-78-38
	U.S.A.(West)	IAR Systems Software Inc. info@iar.com http://www.iar.com	1-650-287-4250	1-650-287-4253
	U.S.A.(East)	IAR Systems Software Inc. info@iar.com http://www.iar.com	1-508-485-2692	1-508-485-9126
	China	IAR Systems AB info@iar.se http://www.iar.com	86-21-6267-0236	86-21-6267-5980
	United Kingdom	IAR Systems Ltd. info@iarsys.co.uk http://www.iar.com	44-0-1604-250-440	44-0-1604-250-330
	Germany	IAR Systems AG info@iar.de http://www.iar.com	49-89-88-98-90-0	49-89-88-98-90-90
	Belgium	IAR Systems AB info@iar.se http://www.iar.com	32-2-401-87-89	32-2-401-68-68
	Denmark	IAR Systems A/S info@iar.dk http://www.iar.com	45-8734-1100	45-8734-1190
	Brazil	IAR Systems Software Inc. info@iar.com http://www.iar.com	55-19-3251-1763	55-19-3251-1763

Partner Contact Information - Support Outside of Japan (2/3)

Company Name (Japanese)	Area	Company Name (Spot)	TEL	FAX
IBM Japan, Ltd.	Japan	IBM Japan, Ltd.	81-3-5642-9100	81-3-5642-9120
	Worldwide	International Business Machines Corporation ratlinfo@us.ibm.com http://www.rational.com/products/testrt	1-800-728-1212	1-781-676-2410
Kyoto Microcomputer Co., Ltd.	Worldwide	en-info@kmckk.co.jp http://www.kmckk.co.jp/eng/index.html	81-75-335-1050	81-75-335-1051
Lightwell Co.,Ltd.	Worldwide	ZAXSales@lightwell.co.jp http://www.lightwell.co.jp/ZAX	81-3-3392-3331	81-3-3393-3878
MIKASA SHOJI Co.,Ltd.	Worldwide	info-d1@mikasa.co.jp http://www.mikasa.jp/	81-6-6946-3773	81-6-6946-3753
Naito Densei Machida Seisakusho	Japan	Naito Densei Machida Mfg. Co., Ltd.	—	81-45-475-4091
Red Hat, Inc.	Worldwide	Red Had, Inc. http://www.redhat.com/	1-919-754-3700	1-919-754-3701
Sophia Systems Co., Ltd.	United States, Canada	Enable Engineering Co., Inc sales@eecosales.com	1-650-375-0409	1-650-375-8666
	Israel	Sightsys dani@sightsys.co.il http://www.sightsys.co.il	972-3-922-2771	972-3-922-2059
	United Kingdom	Direct Insight sales@directinsight.co.uk http://www.directinsight.co.uk	44-0-1280-700262	44-0-1280-700577
	France	Antycip akkouche@antycip.com http://www.antycip.com	33-1-39-61-14-14	33-1-30-76-29-73
	Eastern Europe	Eastern Trade Embedded Systems Trading and Consulting info@easterntrade.de http://www.easterntrade.de	49-0-8233-78-09-26	49-0-8233-78-09-27
	Singapore, Malasia	FLASH Technology flashsgp@pacific.net.sg http://www.flashtech.com.sg	065-6749-6168	065-6749-6138
	Taiwan	SuperLink Technology sulin@superlink.com.tw http://www.superlink.com.tw	886-2-2698-3456	886-2-2698-3535
	India	Trident Infosol rameshwarbandi@vsnl.net http://www.tridentinfosol.com	91-80-2224-5037	91-80-2229-1566
	China, Hong Kong	Emdoor Electronic & Technology Co, Ltd. info@emdoor.com http://www.emdoor.com	Shenzhen Office(HQ) 86-755-83474893, 86-755-83474896, 86-755-83474892	Shenzhen Office(HQ) 86-755-83474895
			Beijing Office 86-10-62376767, 86-10-62375506	Beijing Office 86-10-62376767
			Shanghai Office 86-21-62650520, 86-21-62643621	Shanghai Office 86-21-62650520
			Hong Kong Office 852-25780383	—
	Korea	MDS Technology hyungkwan@hkmds.com http://www.mdstec.com	82-2-2106-6000	82-2-2106-6004
Tokyo Eletech Corporation	Japan	Tokyo Eletech Corporation	81-3-5295-1663	81-3-5295-1663
	U.S.A.	DAIMARU NEW YORK CORPORATION	1-212-681-9371	1-212-681-8951
	U.S.A.	OESS SANJOSE OFFICE	1-408-437-5490	1-408-437-5493
	Europe	OESS Gmbh	06106-75013	06106-72719
	Asia	DAIMARU KOGYO, LTD.HONG KONG OFFICE	852-2893-9457/9108	852-2893-5853
	Asia	DAIMARU KOGYO, LTD.TAIPEI OFFICE	886-2-2776-1010/1515/9341	886-2-2771-3023

Partner Contact Information - Support Outside of Japan (3/3)

Company Name (Japanese)	Area	Company Name (Spot)	TEL	FAX
Vector Japan	Germany	Vector Informatik sales@vector-informatik.com http://www.vector-informatik.de	49-711-80670-0	49-711-80670-111
	U.S.A.	Vector CANtech sales@vector-cantech.com http://www.vector-cantech.com	1-248-449-9290	1-248-449-9704
	Japan	Vector Japan sales@vector-japan.co.jp http://www.vector-japan.co.jp	81-3-5769-6980	81-3-5769-6975
	France	Vector France information@vector-france.com http://www.vector-france.com	33-1-4231-4000	33-1-4231-4009
	Sweden	Vector Scandinavia sales@vecscan.com http://www.vecscan.com	46-31-83-40-80	46-31-83-40-99
Wave Technology Co., Ltd.	Worldwide	http://www.y1000.com/en/	81-3-5304-1885	81-3-5304-1886
YASKAWA INFORMATION SYSTEMS Corporation	Worldwide	echonet@ysknet.co.jp http://www.ysknet.co.jp/product/johokaden/echonet	81-44-952-8918	81-44-952-8921
Yokogawa Digital Computer Corporation	U.S.A.	Yokogawa Corporation of America		
		[Pacific Time Zone] shotaro.saito@us.yokogawa.com	1-408-392-1364	1-408-392-0541
		[Eastern Time Zone] bob.timms@us.yokogawa.com	1-770-594-0399, Ext. 5126	1-770-594-0336
		http://www.advice-PLUS.com/		
	Germany	Hitex Development Tools GmbH info@hitex.de http://www.hitex.de/	49-721-9628-0	49-721-9628-149
	Europe	Ashling Microsystems Limited advice@ashling.com http://www.ashling.com/	44-1256-811998	44-1256-811761
	Korea	KM Data Inc. kmdata@kmd.co.kr http://www.kmdata.co.kr/	82-2-3281-0333	82-2-3281-3117
	China	Yokogawa Shanghai Trading Co., Ltd. meng_fanpu@ysh.com.cn http://www.yokogawa.com/cn-ysh/	86-10-6588-3555	86-10-6588-7025
	Singapore	Unidux Electronics Limited sales@unidux.com.sg http://www.unidux.com.sg/	65-6569-3611	65-6566-9271
	Other countries	Yokogawa Digital Computer Corporation info-ovs@yokogawa-digital.com http://www.yokogawa-digital.com/en/	81-42-333-6222	81-42-333-6107

Rental Companies

The above tools (hardware only) are leased out by the following companies. Please contact these companies for further details.

Contact	URL
Orix Rentec	http://www.orixrentec.co.jp
Showa High-Tec Rent	http://www.shiret.co.jp
Yokogawa Rent-A-Lease	http://www.yrl.com

SUPPORT SYSTEM

Purchasing Products

Please contact an NEC Electronics distributor or sales representative regarding the purchase of NEC Electronics products. Customers will receive shipment of products after the distributor or NEC Electronics sales office has submitted their order form.

Note that a precontract is required for real-time OS and middleware (RX-NET, RX-FS, GOFAST) products to be embedded in the customer's system. The procedure for purchasing NEC Electronics products is outlined below.

Purchasing procedure for products requiring precontract

Preparation of purchase order form	A precontract is required when purchasing real-time OS products. Customers are therefore requested to fill out a purchase order form and submit it to an NEC Electronics sales representative.
↓ About 1 week	
Signing of contract	A contract will be ready for signing about 1 week following submission of the order form. Please confirm that the contents are correct before signing the contract.
↓	
Submission of order	After the contract has been signed, the NEC Electronics sales division will submit the order form.
↓ About 2 weeks	
Product shipment	NEC Electronics operates on a production-on-demand system, so customers should expect shipment about 2 weeks after their order is received.

Supply format

Software from NEC Electronics includes only those objects necessary for operation. In the case of real-time OS and middleware products, however, due to the nature of the software, source code is supplied along with the execution objects.

After-sales support

Free upgrades

Provided the customer has completed and returned the User Registration Card included with the product's guarantee card, free upgrades are available online for the period of one-year following purchase. Once this period expires, an upgrade fee will be required.

Inquiries regarding product usage and bugs

Please direct any inquiries to an NEC Electronics distributor, sales division, or use the technical hotline.

Range of support

NEC Electronics provides support for all products that have been used in accordance with the stated methods. Note that real-time OS source code products fall outside NEC Electronics' support range.

Seminars

NEC Electronics provides a wide variety of forums for exploring the V850 Series development environment, ranging from seminars to introduce potential new customers to NEC Electronics products, to training sessions for those customers seeking to improve their knowledge and technical skills. All those interested are warmly invited to attend.

The following seminars have been organized to assist customers in understanding and using the V850 Series development environment.

Seminar Name	Length	Description
V800 Series C Compiler Basics and Application	2 days	A seminar that combines lecturing and hands-on training (using the V850 Series) to give customers an understanding of the basic coding techniques used in software development.
Real-Time OS for V850 Series Basics	2 days	A seminar to give customers detailed descriptions of and hands-on experience in using the functions of a real-time OS (RX850 Pro). Aim: To master RX850 Pro functions, operations, and system call usage.
Real-Time OS for V850 Series Application	2 days	A seminar to give an understanding and practical knowledge of development using the V850E and an evaluation board (SolutionGear) through hands-on practice.

To find out more about these seminars, please refer to the separate introductory pamphlet. Those interested in NEC Electronics' "on-site seminars" held at the customer's location are requested to contact an NEC Electronics for details such as date and content.

DEVELOPMENT TOOLS DOWNLOAD SERVICE (ODS)

Service Outline

1. Development tool software for the V850 Series can be downloaded.

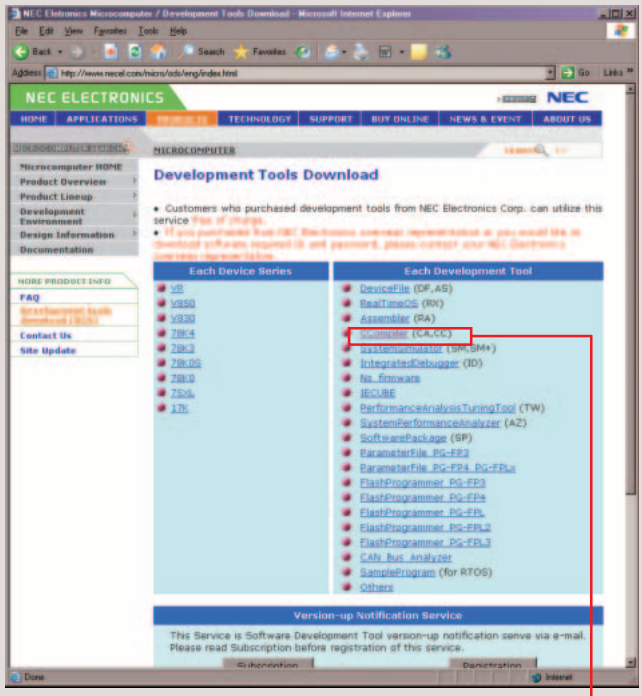
2. Technical information (version, technical documentation, etc.) pertaining to development tool software for the V850 Series can be viewed.

3. Version upgrade information is distributed by e-mail to registered users.

For more information, see
http://www.necel.com/micro/ods/eng/ods_readme_e.pdf

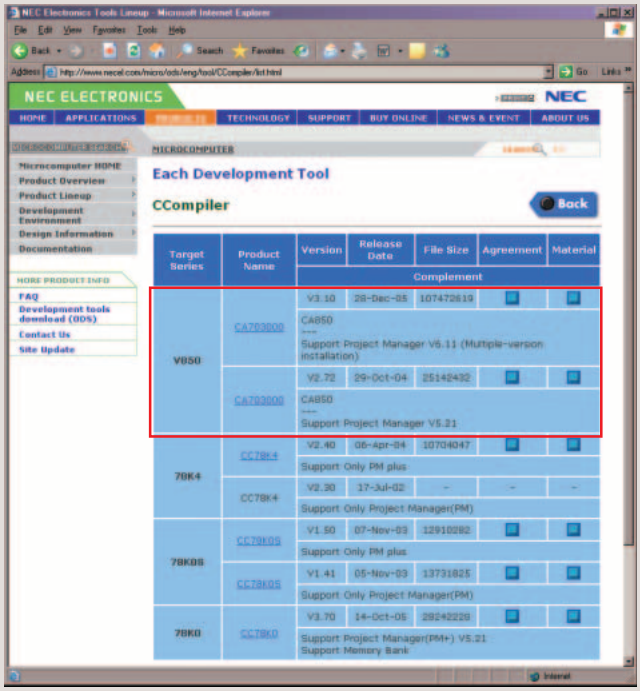
The ODS top screen can be jumped to from the NEC Electronics Microcomputer website (http://www.necel.com/micro/index_e.html) by clicking [Development Tools Download]. (Refer to above figure.)

ODS top screen



The sought after development tool can be looked for by device series or by development tool.

Screen when C Compiler has been selected



Technical information such as the development tool software version, release date, size, and attached documents can be viewed.
(Example: CA703000).

NEC Electronics Microcomputer website: http://www.necel.com/micro/index_e.html

- **The information in this document is current as of August, 2005. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC Electronics data sheets or data books, etc., for the most up-to-date specifications of NEC Electronics products. Not all products and/or types are available in every country. Please check with an NEC Electronics sales representative for availability and additional information.**
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- Descriptions of circuits, software and other related information in this document are provided for illustrative purposes in semiconductor product operation and application examples. The incorporation of these circuits, software and information in the design of a customer's equipment shall be done under the full responsibility of the customer. NEC Electronics assumes no responsibility for any losses incurred by customers or third parties arising from the use of these circuits, software and information.
- While NEC Electronics endeavors to enhance the quality, reliability and safety of NEC Electronics products, customers agree and acknowledge that the possibility of defects thereof cannot be eliminated entirely. To minimize risks of damage to property or injury (including death) to persons arising from defects in NEC Electronics products, customers must incorporate sufficient safety measures in their design, such as redundancy, fire-containment and anti-failure features.
- NEC Electronics products are classified into the following three quality grades: "Standard", "Special" and "Specific".

  The "Specific" quality grade applies only to NEC Electronics products developed based on a customer-designated "quality assurance program" for a specific application. The recommended applications of an NEC Electronics product depend on its quality grade, as indicated below. Customers must check the quality grade of each NEC Electronics product before using it in a particular application.

  "Standard": Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots.

  "Special": Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support).

  "Specific": Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems and medical equipment for life support, etc.

The quality grade of NEC Electronics products is "Standard" unless otherwise expressly specified in NEC Electronics data sheets or data books, etc. If customers wish to use NEC Electronics products in applications not intended by NEC Electronics, they must contact an NEC Electronics sales representative in advance to determine NEC Electronics' willingness to support a given application.

(Note)

(1) "NEC Electronics" as used in this statement means NEC Electronics Corporation and also includes its majority-owned subsidiaries.

(2) "NEC Electronics products" means any product developed or manufactured by or for NEC Electronics (as defined above).

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For further information,
please contact:

NEC Electronics Corporation
1753, Shimonumabe, Nakahara-ku,
Kawasaki, Kanagawa 211-8668,
Japan
Tel: 044-435-5111
http://www.necel.com/

[America]

NEC Electronics America, Inc.
2880 Scott Blvd.
Santa Clara, CA 95050-2554, U.S.A.
Tel: 408-588-6000
800-366-9782
http://www.am.necel.com/

[Europe]

NEC Electronics (Europe) GmbH
Arcadiastrasse 10
40472 Düsseldorf, Germany
Tel: 0211-65030
http://www.eu.necel.com/

Hanover Office
Podbielskistrasse 166 B
30177 Hannover
Tel: 0 511 33 40 2-0

Munich Office
Werner-Eckert-Strasse 9
81829 München
Tel: 0 89 92 10 03-0

Stuttgart Office
Industriestrasse 3
70565 Stuttgart
Tel: 0 711 99 01 0-0

United Kingdom Branch
Cygnus House, Sunrise Parkway
Linford Wood, Milton Keynes
MK14 6NP, U.K.
Tel: 01908-691-133

Succursale Française
9, rue Paul Dautier, B.P. 52180
78142 Velizy-Villacoublay Cédex
France
Tel: 01-3067-5800

Sucursal en España
Juan Esplandiu, 15
28007 Madrid, Spain
Tel: 091-504-2787

Tyskland Filial
Täby Centrum
Entrance S (7th floor)
18322 Täby, Sweden
Tel: 08 638 72 00

Filiale Italiana
Via Fabio Filzi, 25/A
20124 Milano, Italy
Tel: 02-667541

Branch The Netherlands
Limburglaan 5
5616 HR Eindhoven
The Netherlands
Tel: 040 265 40 10

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http://www.cn.necel.com/

NEC Electronics Shanghai Ltd.
Room 2509-2510, Bank of China Tower,
200 Yincheng Road Central,
Pudong New Area, Shanghai P.R. China P.C:200120
Tel: 021-5888-5400
http://www.cn.necel.com/

NEC Electronics Hong Kong Ltd.
12/F., Cityplaza 4,
12 Taikoo Wan Road, Hong Kong
Tel: 2886-9318
http://www.hk.necel.com/

Seoul Branch
11F., Samik Lavied'or Bldg., 720-2,
Yeoksam-Dong, Kangnam-Ku,
Seoul, 135-080, Korea
Tel: 02-558-3737

NEC Electronics Taiwan Ltd.
7F, No. 363 Fu Shing North Road
Taipei, Taiwan, R. O. C.
Tel: 02-2719-2377

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238A Thomson Road,
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Singapore 307684
Tel: 6253-8311
http://www.sg.necel.com/

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