



FIRE Emulator for NEC V850

V850/SA1
V850/SB1
V850RS1
V851
V852
V853

- Support for V850 family
- Full bondout support
- On chip FLASH emulation
- Dual-ported emulation memory
- Software compatible ROM Monitor
- Interface with all compilers
- RTOS support
- CASE tool interface
- Windows9x, NT and X windows interface

TRACE32-FIRE V850 module supports most members of the V85X family from NEC. The modular and open technology of the system allows the fast integration of new chip designs.

TRACE32-FIRE is a state of the art In-Circuit Emulator, which offers unlimited hardware breakpoints and up to 16MByte dual-ported emulation memory. The real-time trace and trigger work up to the max. speed of the CPU. The analyzer offers selective trace as well as performance analysis and statistic functions. The system offers an interface to all C and C++ compilers, and full RTOS support is available.

Features

Basics of Operation

The FIRE-V850 supports the most features provided by the bondout chip.

The bondout chip has 4 bus systems:

- ROM emulation bus
- Trace instruction bus
- Trace memory access bus
- External bus

The **ROM emulation bus** emulates together with the 256K emulation RAM on the family module the on-chip ROM or FLASH memory.

The **Trace instruction bus** shows all instruction accesses to memory (internal/external). Only executed cycles are displayed in the trace. An extra 512K break memory is connected to this bus to allow breakpoints to instruction access.

The **Trace memory access bus** shows all memory data accesses (internal/external). Accesses to chip internal peripherals and internal RAM

is also displayed in the trace. An extra 512K break memory is connected to this bus to allow breakpoints to memory data access.

The **External bus** is used to access the external memories. The mapper system qualifies, if the target memories or the emulation memory shall be used for the bus accesses.

In addition the emulator supports three types of coverage analysis. CO coverage marks the memory with pass-through and branching flags. MO coverage can measure, at which address a branching instruction is executed how many times (up to 254). The branching destination address is marked. Access coverage marks at which address a memory data access has occurred.

Furthermore, emulator detects incorrect accesses to internal peripherals. The chip internal RAM can be supervised in realtime.

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Operating Modes

The Emulator can work in stand-alone mode with internal clock or in active mode with internal or the target clock. On power-down of the target system the emulator tristates its data buffers to the target and isolates its internal emulation circuits.

The operation modes are as follows:

- Reset
- Alone Internal
- Alone External
- Emulation Internal
- Emulation External

Clock

- Operation with external or internal Clock
- 1..33 MHz internal clock

Dual-Port Access

All TRACE32-FIRE memories are dual-ported. The dual-port access makes it possible to display and modify the contents of the overlay memory, to set or

delete breakpoints or use the flag memory while the application is running in real-time.

The FIRE-V850 uses the not active part of a memory cycle to generate the dualport cycle. This dualport access is called 'nodelay'.

ROM Emulation

The ROM emulation circuits build a separate emulator system to emulate all on-chip FLASH or ROM based applications.

- 256K ROM emulation memory for FLASH and ROM emulation

Trace Operation

The internal bondout buses are used to trace the bus operations. The trace can display all internal operations like onchip ROM and RAM memory and onchip peripheral transfers.

Execution Breakpoints

The emulator supports execution breakpoints on the ROM and external area. All breakpoints are 'break-before-make' breakpoints. Emulation is stopped before execution.

- execution breakpoints only limited by amount of system memory.

HLL Debugging

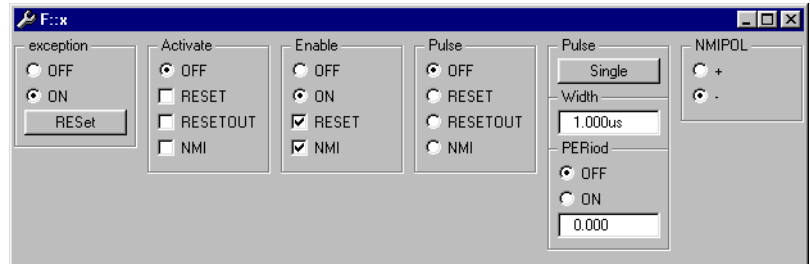
addr/line	code	label	mnemonic	comment
		char flags[SIZE+1];		
		int sieve()		/* sieve of erathostenes */
520	{			
P:0000CA4	581A	sieve:	add	-8,r3
P:0000CA6	63EF0500		st.w	r29,4[r3]
P:0000CAA	03E8		mov	r3,r29
		register int i, primz, k;		
		int anzahl;		
524	anzahl = 0;			
P:0000CAC	7D070100		st.w	r0,0[r29]
526	for (i = 0 ; i <= SIZE ; flags[i++] = TRUE) ;			
P:0000CB0	005A		mov	0,r11 ; 0,i
P:0000CB2	20561200		movea	12,r0,r10
P:0000CB6	E459		cmp	r10,r11 ; r10,i
P:0000CB8	A705		ble	00CB
P:0000CBA	C50D		br	00CD
P:0000CBC	40760800		movhi	8,r0,r14

Full support in real-time for:

- Internal and external buses

- Break-before-line operation

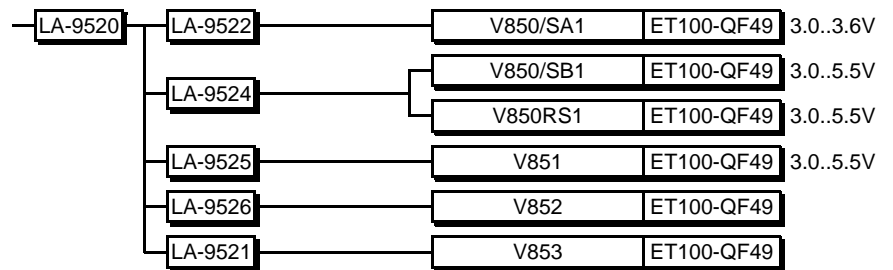
Exception Control



The FIRE-V850 exception controller allows to permanently activate an exception, to enable or disable specific exceptions or to stimulate an exception.

- Static exception setting
 - Reset
 - Manual Reset
 - NMI
- Target exception control
 - Reset
 - Manual Reset
 - NMI

Modules Overview



Debug Interfaces

TRACE32-PowerView supports most compilers, realtime operation systems and debuggers.

New integrations are mostly done on customers request. If your compiler or RTOS is not supported now, please ask us !

Compiler Support

Language	Compiler	Company	Option	Comment
C	GCCV850	Free Software Foundation, Inc.	ELF/STABS	
C	GREENHILLS C	Greenhills Software Inc.	ELF/DWARF	
C	ICCV850	IAR Systems AB	UBROF	
C	CA850	Renesas Technology, Corp.	ELF/NEC	

RTOS Support

Name	Company	Comment
OSEK	-	via ORTI
ProOSEK	Elektrobit Automotive GmbH	via ORTI
uC/OS-II	Micrium Inc.	2.0 to 2.8

Debugger Support

CPU	Debugger	Company	Host
ALL	X-TOOLS / X32	blue river software GmbH	Windows
ALL	CODEWRIGHT	Borland Software Corporation	Windows
ALL	EASYCODE	EASYCODE GmbH	Windows
ALL	ECLIPSE	Eclipse Foundation, Inc	Windows
ALL	RHAPSODY IN MICROC	IBM Corp.	Windows
ALL	RHAPSODY IN C++	IBM Corp.	Windows
ALL	LDRA TOOL SUITE	LDRA Technology, Inc.	Windows
ALL	ATTOL TOOLS	MicroMax Inc.	Windows
ALL	VISUAL BASIC INTERFACE	Microsoft Corporation	Windows
ALL	LABVIEW	NATIONAL INSTRUMENTS Corporation	Windows
ALL	CODE::BLOCKS	Open Source	-
ALL	RAPITIME	Rapita Systems Ltd.	Windows
ALL	DA-C	RistanCASE	Windows
ALL	WINDOWS CE PLATF. BUILDER	Windows	Windows

Operation Voltage and Frequency

The maximum operation frequency of TRACE32-FIRE depends on:

- The max. frequency of the CPU
- The access time of the overlay memory (10ns)
- The mapper mode (**S**low or **F**ast)
- The number of waitstates
(WO = 0 waitstates
W1 = 1 waitstate)
- The dual-port access mode
- If no emulation memory is used, the frequency limit depends on the trace speed (TRACE)
- Some probes use extra high-speed memory on the emulation adapter (HEAD RAM)

Denied/Gap Access

Module	CPU	F-W0-10	F-W1-10	S-W0-10	S-W1-10	CHIP	TRACE	HEAD RAM
LA-9522	V850/SA1	17.0+	17.0+	17.0+	17.0+	17.0	*	
LA-9524	V850/SB1	33.0	33.0+	27.0	33.0+	33.0	*	
LA-9524	V850RS1	33.0	33.0+	27.0	33.0+	33.0	*	
LA-9525	V851	33.0	33.0+	27.0	33.0+	33.0	*	
LA-9526	V852	33.0	33.0+	27.0	33.0+	33.0	*	
LA-9521	V853	33.0	33.0+	27.0	33.0+	33.0	*	

Operation Voltage

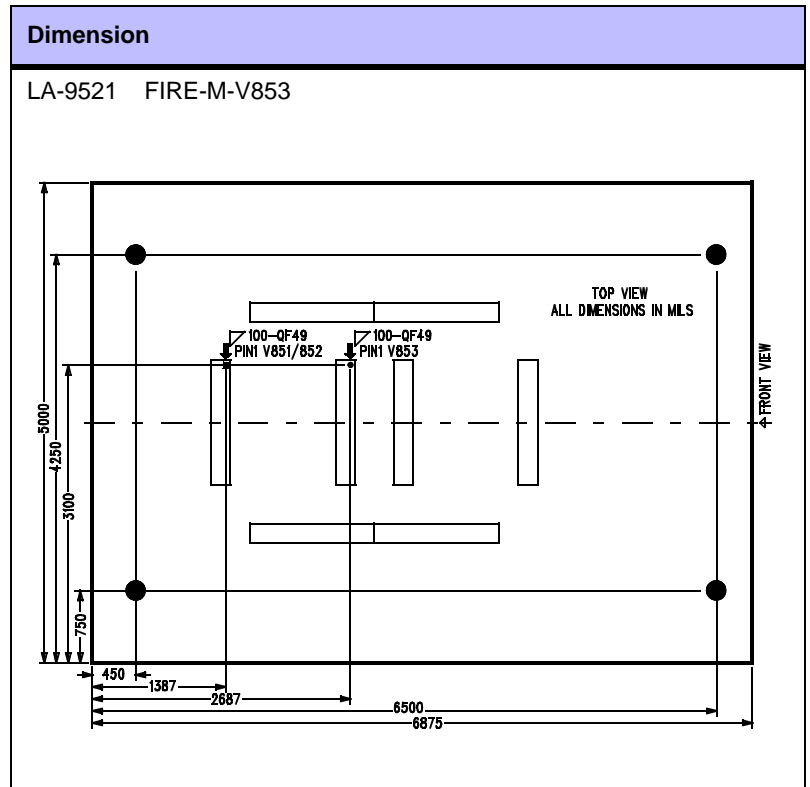
This list contains information on probes available for other voltage ranges.

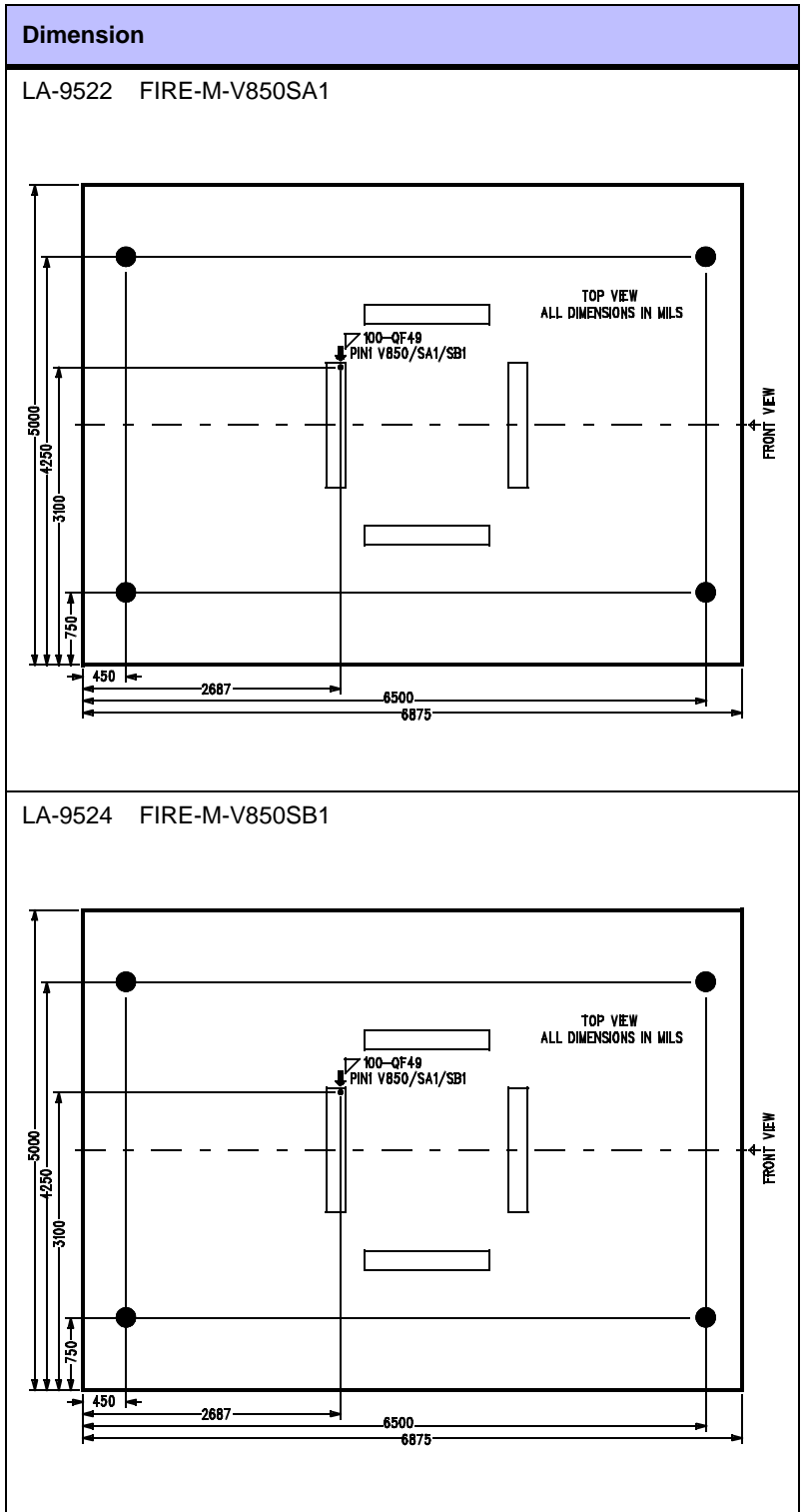
Probes not noted here supply an operation voltage range from 4.5V to 5.5V.

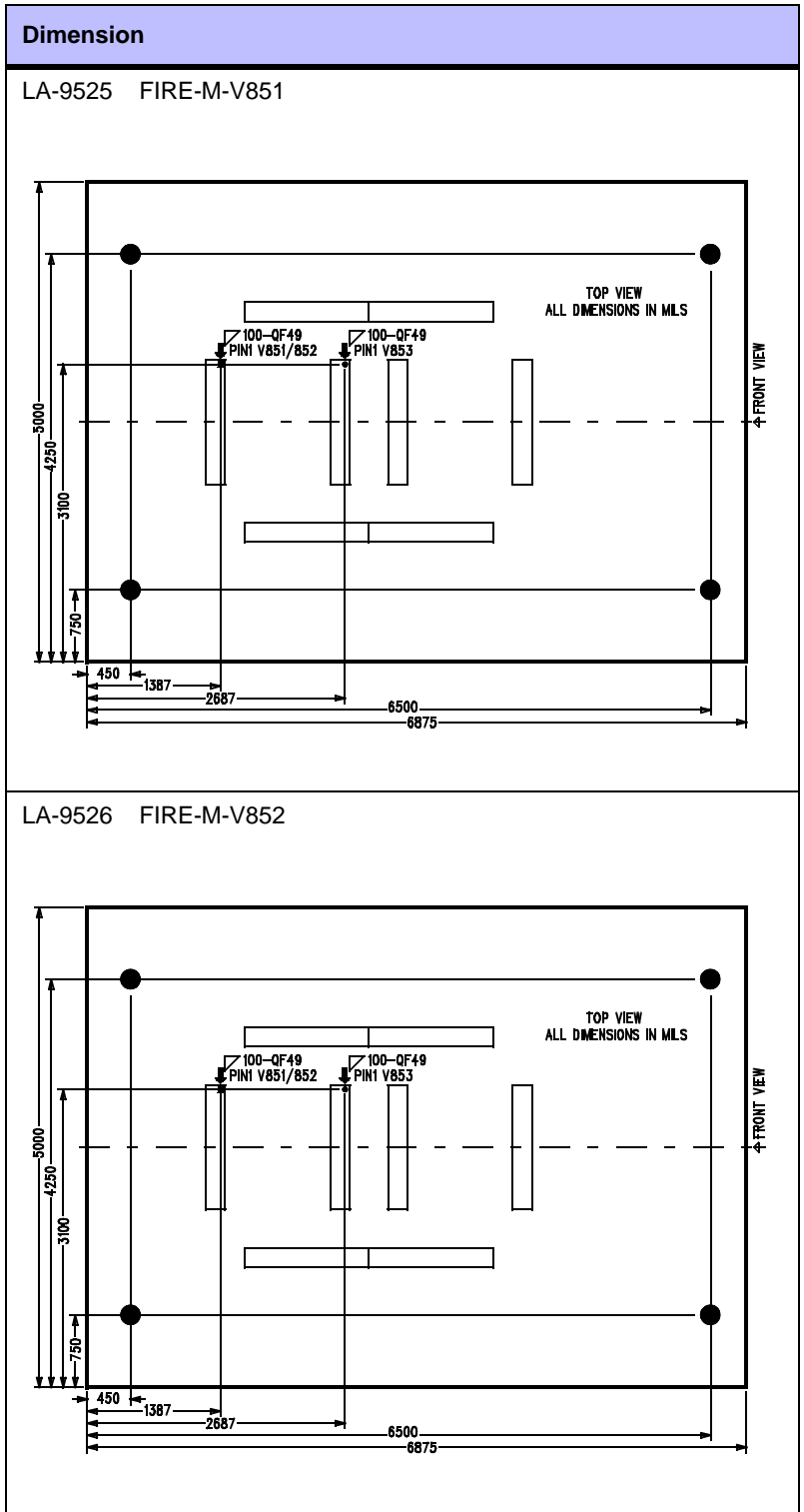
CPU	Module	Adapter	Voltage Range
V850/SA1	LA-9522	-	3.0 .. 3.6 V
V850/SB1	LA-9524	-	3.0 .. 5.5 V
V850RS1	LA-9524	-	3.0 .. 5.5 V
V851	LA-9525	-	3.0 .. 5.5 V

Dimensions

Module Dimensions







Connectors

On each emulation module there are half-size connectors to:

- ❑ Connect the emulation module directly to the target by providing the corresponding connectors also on the target hardware

- ❑ Connect a standard adapter from Emulation Technology, YAMAICHI, AMP, TOKYO ELETECH etc.

The following table lists the physical dimensions of these connectors.

CPU	Dimension
V850/SA1 V850/SB1 V850RS1 V851 V852 V853	<p>ET100-QF49</p> <p>100-QF49 TOP-VIEW</p>

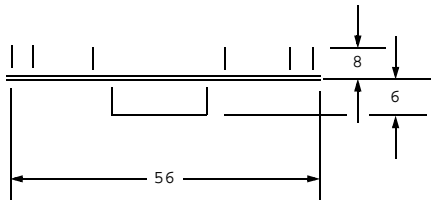
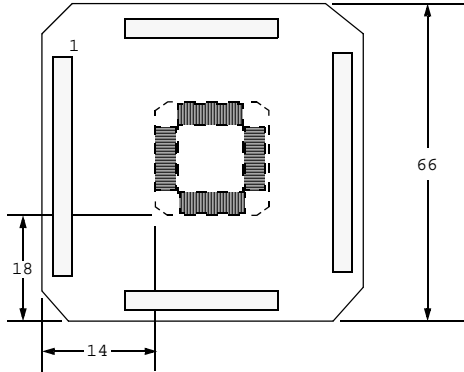
Adapter

The adapters connect in different ways

- With Clip-Over Adapters the CPU can stay on the target board.
- With Solder-ON adapters the CPU must be removed

- YAMAICHI and AMP adapters fit to the CPU socket

The following table lists the physical dimensions of these adapters.

Socket CPU	Adapter
ET100-QF49 V850/SA1 V850/SB1 V850RS1 V851 V852 V853	YA-1091 ET100-EYA-QF49 Emul. Adapter for YAMAICHI socket ET100-QF49  <p style="text-align: center;">SIDE VIEW</p>  <p style="text-align: center;">TOP VIEW (all dimensions in mm)</p>

Available Tool Chain

TRACE32 provides a complete set of development tools for this family. This includes:

- The In-Circuit Emulator TRACE32-ICE
- The high speed RISC Emulator TRACE32-FIRE
- The BDM/JTAG/ONCE etc. based In-Circuit Debugger TRACE32-ICD
- The ROM Monitor based In-Circuit Debugger TRACE32-ICD
- The ICD Trace, a trace extension to the BDM/JTAG debuggers or ROM monitors
- Evaluation boards, which can be used until the target hardware is available.
- The Instruction Set Simulator (SIM), a software tool for code test without any hardware

The following list give an overview which development tools are available for the specific derivatives of this family.

CPU	ICE	FIRE	ICD DEBUG	ICD MONITOR	ICD TRACE	POWER INTEGRATOR	INSTRUCTION SIMULATOR
V850/SA1		YES					YES
V850/SB1		YES					YES
V850RS1		YES					YES
V851		YES					YES
V852		YES					YES
V853		YES					YES

Order Information

Module Description

OrderNo Code	Text
LA-9520 FIRE-V850	FIRE Family Module for V85x Emulator for NEC V85x, supports V851/V852/V853 with FIRE CPU Module for V853 up to 33 MHz clock frequency, buffer unit, port analyzer support for 96 channels, JTAG accelator, exception controller requires FIRE-ZRAM
LA-9525 FIRE-M-V851	FIRE CPU Module for V851 Supports V851/V852/V853 QFP100 requires an ET100-QF49 adapter
LA-9526 FIRE-M-V852	FIRE CPU Module for V852 Supports V851/V852/V853 QFP100 requires an ET100-QF49 adapter
LA-9521 FIRE-M-V853	FIRE CPU Module for V853 Supports V851/V852/V853 QFP100 requires an ET100-QF49 adapter
LA-9522 FIRE-M- V850SA1	FIRE CPU Module for V850/SA1 Supports V850/SA1 and V850/SB1 QFP100 requires an ET100-QF49 adapter
LA-9524 FIRE-M- V850SB1	FIRE CPU Module for V850/SB1 Supports V850/SA1 and V850/SB1 QFP100 requires an ET100-QF49 adapter

Detailed Order Information

Order No.	Code	Text
LA-9520	FIRE-V850	FIRE Family Module for V85x
LA-9525	FIRE-M-V851	FIRE CPU Module for V851
LA-9526	FIRE-M-V852	FIRE CPU Module for V852
LA-9521	FIRE-M-V853	FIRE CPU Module for V853
LA-9522	FIRE-M-V850SA1	FIRE CPU Module for V850/SA1
LA-9524	FIRE-M-V850SB1	FIRE CPU Module for V850/SB1
Additional Options		
TO-1250	ET100-ETO- QF49	Emul. Adapter for T0 socket ET100-QF49

Order No.	Code	Text
TO-1255	ET100-ETO-SE	Emul. Adapter for T0 socket ET100-SE 0.4mm
YA-1091	ET100-EYA-QF49	Emul. Adapter for YAMAICHI socket ET100-QF49
ET-1092	ET100-SET-QF49	Surface Mountable Adapter for ET100-QF49
TO-1251	ET100-STO-QF49	Emul. Adapter TO-surface mount. ET100-QF49
LA-8810	SIM-V850	Instruction Set Simulator for V850

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