

## FIRE Emulator MPC8XX

- Windows9x, NT and Xwindows interface
- CASE Tools interface
- Interface with all compilers
- C, C++ Support
- RTOS support
- Support all Family Members
- TPU Debugger
- Compatible JTAG/BDM Debugger
- Mapper for 32 Bit Emulation
- 40 MHz Zero-Waitstate Emulation
- 80 MHz Emulation with Wait States
- Optional Port Analyzer
- Trace on Show-Cycles
- Cache Trace
- BDM Download 600 KByte/sec to Target or Emulation Memory
- Fast ETHERNET Download up to 10 MByte/sec.

MPC821  
MPC823  
MPC850  
MPC855  
MPC860  
MPC862

TRACE32 provides a complete set of development and testing tools for the PowerPC family. TRACE32 is an open system and can be connected to most host platforms via ETHERNET, USB or Printer Interface.

TRACE32-FIRE for PowerPC is a high performance emulation system. Its integrated analyzer offers selective trace as well as software performance analysis and statistic functions on HLL level.

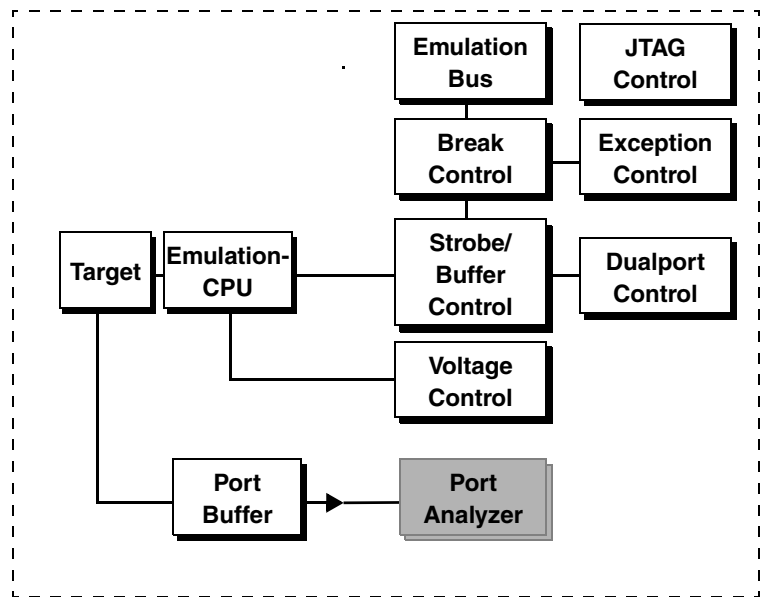
An optional port analyzer can trace all peripheral signals on the chip.

The TCON adaption concept all allows many target adaption methods.

Compatible BDM Debuggers and RISC Trace Preprocessors are available.

## Features

### Basics of Operation



The ICE-PPC is a high-performance emulation system for most PowerPC controllers.

On the emulation base there is an extra slot for the TRACE32 Port Analyzer. Depending on CPU type various signals can be traced. S

### 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 output buffers and isolates its internal emulation circuits.

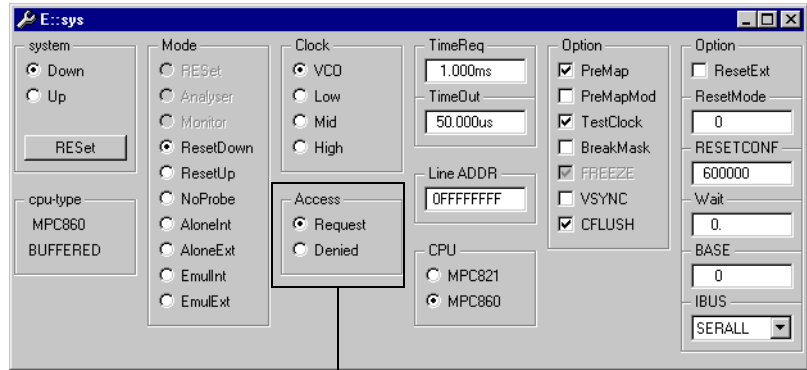
- Reset
- Alone Internal
- Alone External
- Emulation Internal
- Emulation External

### Voltage Monitor for the Target System

This feature prevents failures caused by or undervoltage.

- Normal premappper
- CS premappper for fast mapping

## Dual-Port Access



Dual port access mode

All TRACE32 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 following dual-port access mode is implemented:

- Request

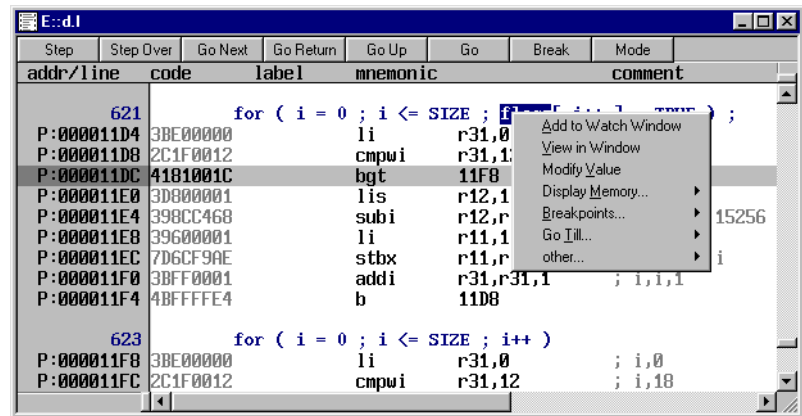
In the **Request mode** the dual port access is always possible.

In the **Denied mode** the dual port access is switched off.

## Clock

- Operation with external or internal clock
- 0.1..60 MHz internal clock can be chosen using an VCO.

## HLL Debugging

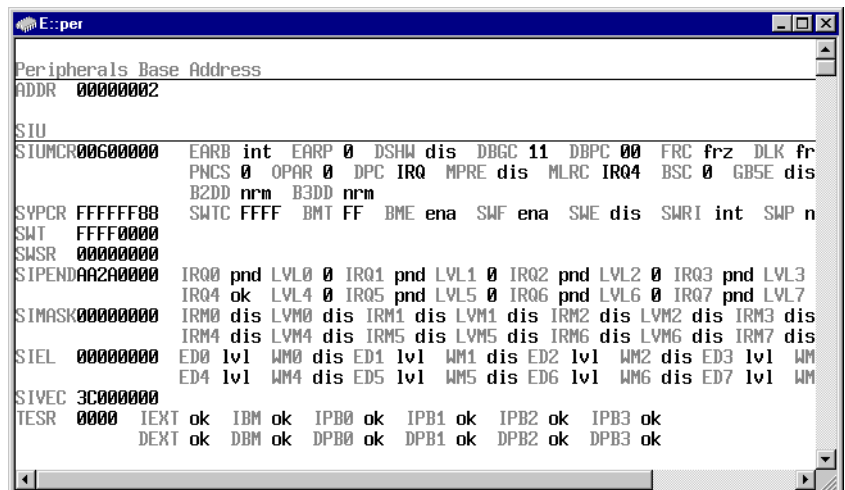


The TRACE32 debugger provides a interface to C and C++ for all standard compilers. For more information on the supported compilers refer to the section "Debug Interfaces".

Full support in real-time for:

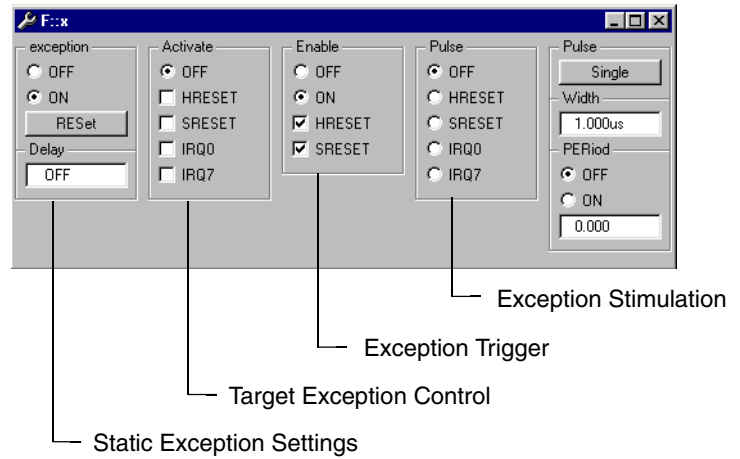
- Break-before-line operation
- HLL single step in real-time
- Trigger and trace on local variables

## Peripheral Window



- Display of onchip peripherals
- User definable display of the onchip peripherals
- Definition is done interactive supported by softkeys
- Pull down menus for settings
- Additional description for each field
-

## Exception Control



The TRACE32 exception controller allows to permanently activate an exception, to enable or disable specific

exceptions, to trigger on specific exceptions or to stimulate an exception.

## On-Circuit Emulation

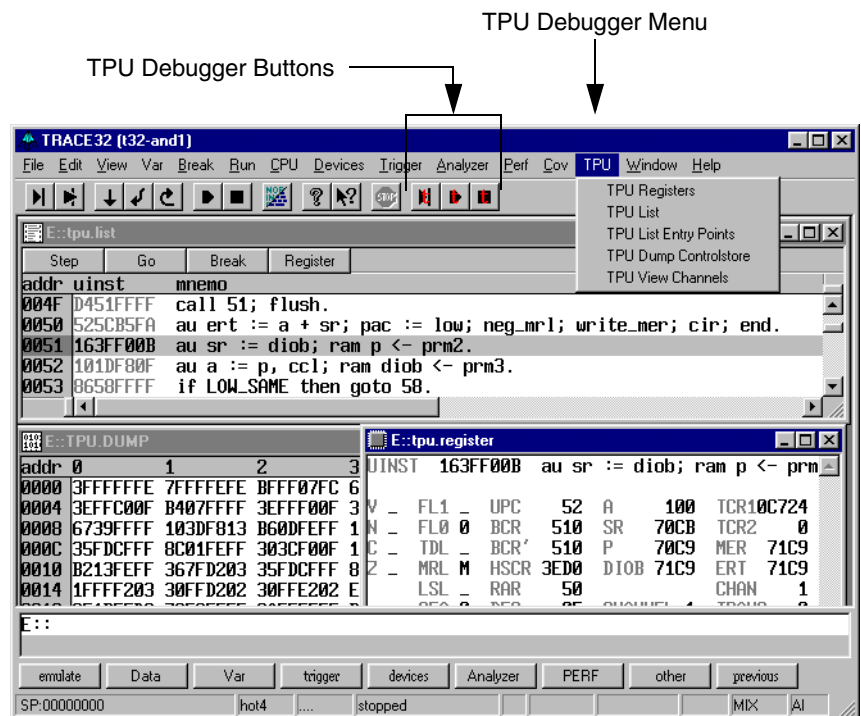
- Support for Clip-Over adapters

## Cache Trace

record	run	address	cycle	d.l	symbol	ti.back
633					anzahl++;	
634						
-000110	f	addi r28,r28,1			; anzahl,anzahl,1	/
		P:00001248	fetch	3BFF0001	\diabp8\diabp8\sieve+94	/
-000109	f	addi r31,r31,1			; i,i,1	/
		P:0000124C	fetch	4BFFFFB0	\diabp8\diabp8\sieve+98	/
-000108	f	b 11FC				/
		P:0000124C		XXXXXXXX	\diabp8\diabp8\sieve+98	/
-000107	f	P:000011FC	fetch	2C1F0012	\diabp8\diabp8\sieve+48	/
-000106	f	cmpwi r31,12			; i,18	/
		P:00001200		XXXXXXXX	\diabp8\diabp8\sieve+4C	/
-000105	f	P:00001200	fetch	41810050	\diabp8\diabp8\sieve+4C	/
-000104	f	bgt 1250			; 1250 (-)	/
		P:00001204	fetch	3D800001	\diabp8\diabp8\sieve+50	/
624		{				
625		if ( flags[ i ] )				
		lis r12,1			; r12,1	

The support for the program flow unit allows a cache flow trace.

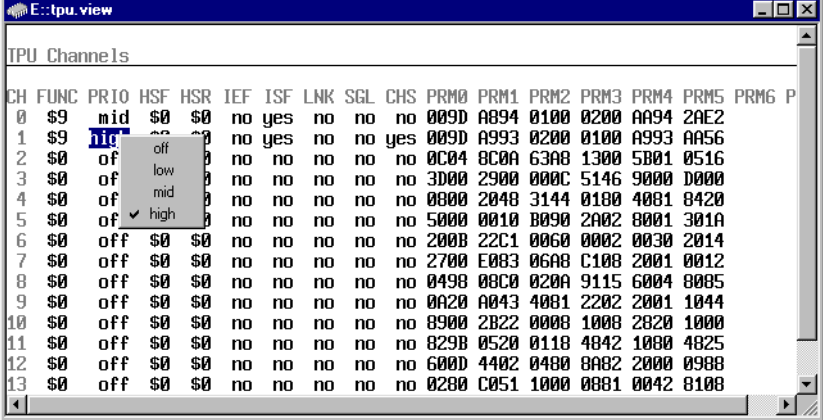
## TPU Debugger



The TPU module is a complex free programmable RISC processor. The TRACE32 TPU debugger supports:

- Display and setting of the TPU registers
- Display of the TPU configuration for each channel
- Display of the TPU microcode
- Hexdump of the TPU microcode
- Display of the entry-table in a symbolic format
- Single stepping of the TPU microcode
- Setting breakpoints in the TPU microcode
  - $\mu$ PC breakpoints
  - Channel breakpoints
  - State breakpoints

## TPU Configuration



The screenshot shows a window titled 'tpu.view' with a table of 'TPU Channels'. A pull-down menu is open over the 'PRIO' column for channel 1, showing options: 'off', 'low', 'mid', and 'high'. The 'high' option is currently selected in the table.

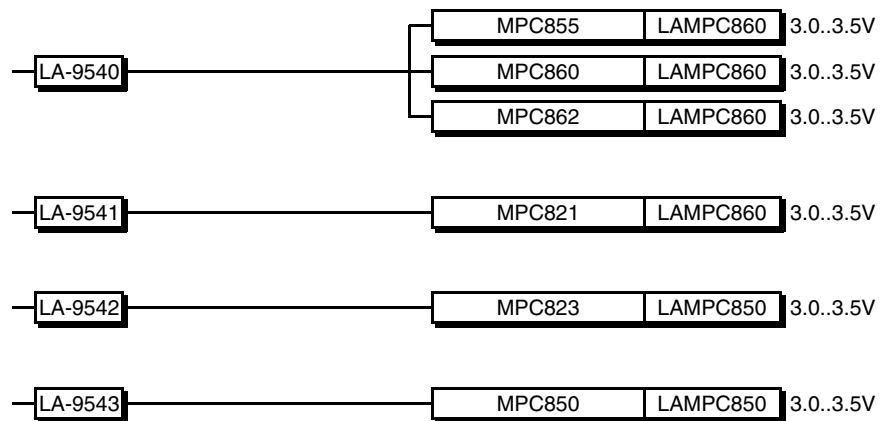
CH	FUNC	PRIO	HSF	HSR	IEF	ISF	LNK	SGL	CHS	PRM0	PRM1	PRM2	PRM3	PRM4	PRM5	PRM6	P
0	\$9	mid	\$0	\$0	no	yes	no	no	no	009D	A894	0100	0200	A894	2AE2		
1	\$9	high	\$0	\$0	no	yes	no	no	yes	009D	A993	0200	0100	A993	AA56		
2	\$0	off	\$0	\$0	no	no	no	no	no	0C04	8C0A	63A8	1300	5B01	0516		
3	\$0	off	\$0	\$0	no	no	no	no	no	3D00	2900	000C	5146	9000	D000		
4	\$0	off	\$0	\$0	no	no	no	no	no	0B00	2048	3144	0180	4081	8420		
5	\$0	off	\$0	\$0	no	no	no	no	no	5000	0010	0090	2A02	8001	301A		
6	\$0	off	\$0	\$0	no	no	no	no	no	200B	22C1	0060	0002	0030	2014		
7	\$0	off	\$0	\$0	no	no	no	no	no	2700	E083	06A8	C108	2001	0012		
8	\$0	off	\$0	\$0	no	no	no	no	no	0498	08C0	020A	9115	6004	8085		
9	\$0	off	\$0	\$0	no	no	no	no	no	0A20	A043	4081	2202	2001	1044		
10	\$0	off	\$0	\$0	no	no	no	no	no	8900	2B22	0008	1008	2820	1000		
11	\$0	off	\$0	\$0	no	no	no	no	no	829B	0520	0118	4042	1000	4025		
12	\$0	off	\$0	\$0	no	no	no	no	no	600D	4402	0480	8A82	2000	0988		
13	\$0	off	\$0	\$0	no	no	no	no	no	0280	C051	1000	0081	0042	8108		

Display of the configuration for each channel

Pull down menus for settings

## Emulation Modules

### 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	CXPPC	Cosmic Software	ELF/ DWARF	
C	CC	Freescale Semiconductor, Inc.	XCOFF	
C	XCC-V	GAIO Technology Co., Ltd.	SAUF	
C	GREEN HILLS C	Greenhills Software Inc.	ELF/ DWARF	
C	GCC	HighTec EDV-Systeme GmbH	ELF/ DWARF	
C	MCCPPC	Mentor Graphics Corporation	ELF/ DWARF	
C	ULTRA C	Radisys Inc.	ROF	
C	HIGH-C	Synopsys, Inc	ELF/ DWARF	
C	DCPPC	TASKING	ELF/ DWARF	
C	D-CC	Wind River Systems	IEEE	
C	D-CC	Wind River Systems	COFF	
C	D-CC	Wind River Systems	ELF/ DWARF	
C++	GCC	Free Software Foundation, Inc.	ELF/ DWARF	
C++	GREEN HILLS C++	Greenhills Software Inc.	ELF/ DWARF	

Language	Compiler	Company	Option	Comment
C++	CCCPPC	Mentor Graphics Corporation	ELF/ DWARF	
C++	MSVC	Microsoft Corporation	EXE/ CV5	WindowsCE
C++	HIGH-C++	Synopsys, Inc	ELF/ DWARF	
C++	D-C++	Wind River Systems	ELF/ DWARF	
C++	GCCPPC	Wind River Systems	ELF/ STABS	
C/C++	CODEWARRIOR	Freescale Semiconductor, Inc.	ELF/ DWARF	
GCC	GCC	Free Software Foundation, Inc.	ELF/ DWARF	
JAVA	FASTJ	Wind River Systems	ELF/ DWARF	

## RTOS Support

Name	Company	Comment
AMX	KadakProducts Ltd.	
ChorusOS	Oracle Corporation	
CMX-RTX	CMX Systems Inc.	
ECOS	eCosCentric Limited	1.3, 2.0 and 3.0
Elektrobit tresos	Elektrobit Automotive GmbH	via ORTI
ERCOSEK	ETAS GmbH	via ORTI
Erika	Evidence	via ORTI
FreeRTOS	Freeware I	v7
Linux	-	Kernel Version 2.4 and 2.6, 3.0
Linux	MontaVista Software, LLC	3.0, 3.1, 4.0, 5.0
Linux SMP	-	Kernel Version 2.4 and 2.6, 3.0
LynxOS	LynuxWorks Inc.	3.1.0, 3.1.0a, 4.0
MQX	Freescale Semiconductor, Inc.	3.x and 4.x
MQX	Synopsys, Inc	2.40 and 2.50
NetBSD	-	
NORTi	MISPO Co. Ltd.	

Name	Company	Comment
Nucleus PLUS	Mentor Graphics Corporation	
OS-9	Radisys Inc.	
OSE Delta	Enea OSE Systems	4.x and 5.x
OSEK	-	via ORTI
OSEKturbo	Freescale Semiconductor, Inc.	via ORTI/former MetrowerksOSEK
PikeOS	Sysgo AG	
ProOSEK	Elektrobit Automotive GmbH	via ORTI
pSOS+	Wind River Systems	2.1 to 2.5, 3.0, with TRACE32
QNX	QNX Software Systems	6.0 to 6.5.0
QNX SMP	QNX Software Systems	6.0 to 6.5.0
RTEMS	RTEMS	4.10
RTXC 3.2	Quadros Systems Inc.	
RTXC Quadros	Quadros Systems Inc.	
SMX	Micro Digital Inc.	3.4 to 4.0
ThreadX	Express Logic Inc.	3.0, 4.0, 5.0
ThreadX SMP	Express Logic Inc.	3.0, 4.0, 5.0
uC/OS-II	Micrium Inc.	2.0 to 2.92
uITRON	-	HI7000, RX4000, NORTi,PrKernel
VRTXsa	Mentor Graphics Corporation	
VxWorks	Wind River Systems	5.x and 6.x
VxWorks SMP	Wind River Systems	5.x and 6.x

## Debugger Support

CPU	Debugger	Company	Host
ALL	X-TOOLS / X32	blue river software GmbH	Windows
ALL	CODEWRIGHT	Borland Software Corporation	Windows
ALL	CODE CONFIDENCE TOOLS	Code Confidence Ltd	Windows
ALL	CODE CONFIDENCE TOOLS	Code Confidence Ltd	Linux
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	C++TEST	Parasoft	Windows
ALL	RAPITIME	Rapita Systems Ltd.	Windows
ALL	DA-C	RistanCASE	Windows

CPU	Debugger	Company	Host
ALL	SIMULINK	The MathWorks Inc.	Windows
ALL	WINDOWS CE PLATF. BUILDER	Windows	Windows
POWERPC	GR228X IC-TESTSYSTEME	Battefeld GmbH	Windows
POWERPC	OSE ILLUMINATOR	Enea OSE Systems	Windows
POWERPC	DIAB RTA SUITE	Wind River Systems	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 (Slow or Fast)
- The number of waitstates  
(W0 = 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 and Request Access

Module	CPU	F-W0-10	F-W1-10	S-W0-10	S-W1-10	CHIP	TRACE	HEAD RAM
-	MPC855	45.0	50.0+	35.1	50.0+	50.0		
-	MPC860	45.0	73.1	35.1	57.1	80.0		
-	MPC862	45.0	73.1	35.1	57.1	80.0		
-	MPC821	45.0	50.0+	35.1	50.0+	50.0		
-	MPC823	45.0	50.0+	35.1	50.0+	50.0		
-	MPC850	45.0	50.0+	35.1	50.0+	50.0		

## Operation Voltage

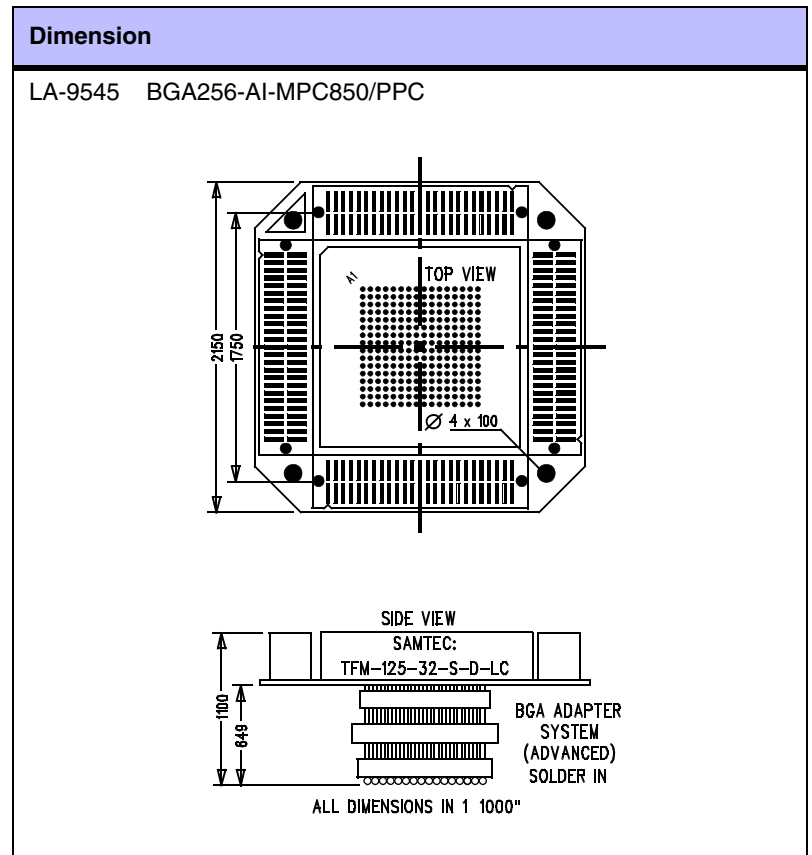
This list contains information on probes available for other voltage ranges.

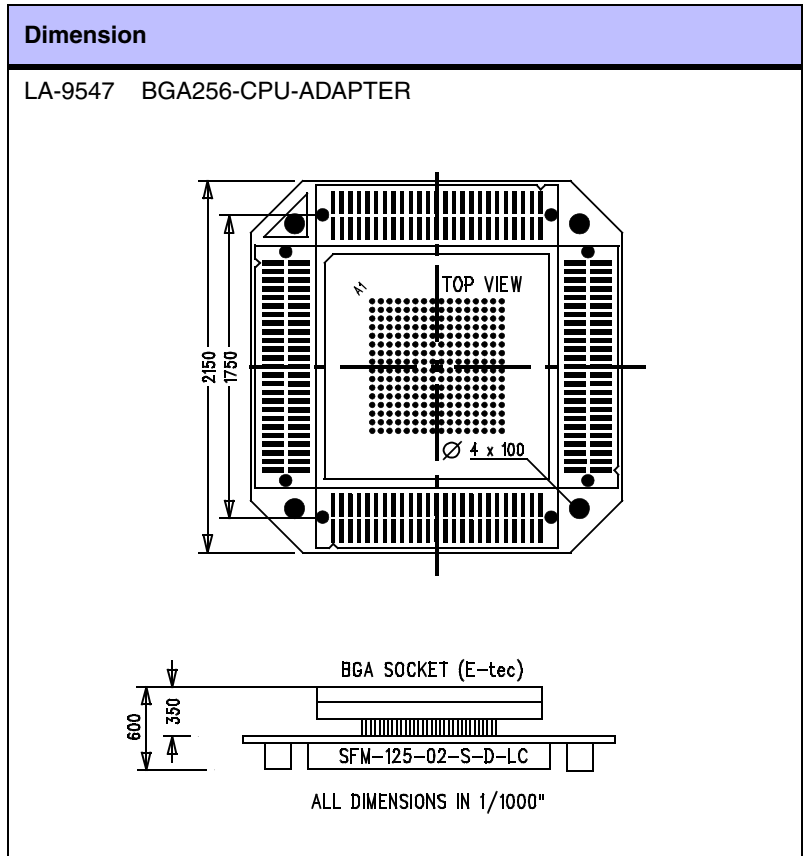
Probes not noted here supply an operation voltage range from 4.5V to 5.5V.

CPU	Module	Adapter	Voltage Range
MPC821	-	-	3.0 .. 3.5 V
MPC823	-	-	3.0 .. 3.5 V
MPC850	-	-	3.0 .. 3.5 V
MPC855	-	-	3.0 .. 3.5 V
MPC860	-	-	3.0 .. 3.5 V
MPC862	-	-	3.0 .. 3.5 V

## Dimensions

### Module Dimensions





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## 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.

**No adaptations available !**

## 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
MPC821		YES	YES		YES		YES
MPC823		YES	YES		YES		YES
MPC850		YES	YES		YES		YES
MPC855		YES	YES		YES		YES
MPC860		YES	YES		YES		YES
MPC862		YES	YES		YES		YES

## Order Information

### Module Description

OrderNo Code	Text
<b>LA-9540</b> FIRE-MPC860	<b>FIRE Emulator for MPC860</b> Emulator for MPC860 up to 80 MHz clock frequency, buffer unit, port analyzer support for 96 channels, JTAG accelerator, exception controller, adaption LAMPC860 supports also MPC821, MPC855, MPC857 and MPC862 by changing the CPU requires FIRE-SRAM
<b>LA-7210</b> BGA357-ETEC-MPC860	<b>Emulation adapter for E-TEC socket for MPC860</b> Adapter for MPC821, MPC860 BGA357 to E-TEC socket E-TEC socket part number: BPW357-1230-19AB01
<b>LA-7214</b> BGA357-ETEC-SOCKET	<b>E-TEC socket for MPC860 (SMD)</b> BGA357 ETEC-socket for MPC860 (SMD)
<b>LA-7218</b> BGA357-ETEC-SOCKET-T	<b>E-TEC socket for MPC860 (through hole)</b> BGA357 ETEC-socket for MPC860/MPC880 (through hole)
<b>AI-7208</b> BGA357-AI-SOCKET	<b>Advanced Interconnect socket for MPC860/880</b> Advanced Interconnect socket BGA357 for MPC860/880 (19 x 19 rows)
<b>AI-7209</b> BGA357-EXTENSION	<b>BGA357-Adapter Extension</b> Extension for Advanced Interconnect Socket (Extends vertical clearance by 3.8 mm) (19 x 19 rows)
<b>LA-7213</b> BGA357-AI-MPC860	<b>Emulation adapter for AI socket for MPC860</b> Adapter for MPC821, MPC860 to BGA357-Socket Advanced Interconnect socket part number (AI-7208): MGS-357-636GG Testadapter for usage of cpu in BGA357 LA-7216)
<b>LA-7215</b> A-MPC860-BOTTOM	<b>Bottom Side Target Adapter for MPC860</b> Adapter for MPC821, MPC860 to Samtec Connectors (FTE-130-01-G-DV or FTE-130-02-G-DV) on the Bottom Side of the Target (mirrored)
<b>LA-7211</b> CONNECTOR-ADS-MPC860	<b>Emulation adapter for ADS board</b> Connector to the ADS board from FREESCALE, standard pin connector to TCON240
<b>LA-7217</b> CON.-FADS-MPC860	<b>Emulation adapter for FADS board</b> Connector to the FADS board from FREESCALE, small pin connector to TCON240

OrderNo Code	Text
<b>LA-9541</b> FIRE-MPC821	<b>FIRE Emulator for MPC821</b> Emulator for MPC821, up to 66 MHz clock frequency, buffer unit, port analyzer support for 96 channels, JTAG accelator, exception controller, adaption LAMPC860 supports also MPC860 by changing the CPU requires FIRE-SRAM
<b>LA-9542</b> FIRE-MPC823	<b>FIRE Emulator for MPC823</b> Emulator for MPC823, up to 66 MHz clock frequency, buffer unit, port analyzer support for 96 channels, JTAG accelator, exception controller, support MPC850 by changing the CPU requires FIRE-SRAM
<b>LA-9660</b> TCON200- MPC823-AMC	<b>Converter TCON 200 to AMC Footprint 823</b>
<b>LA-9543</b> FIRE-MPC850	<b>FIRE Emulator for MPC850</b> Emulator for MPC850, up to 66 MHz clock frequency, buffer unit, port analyzer support for 96 channels, JTAG accelator, exception controller, support MPC823 by changing the CPU requires FIRE-SRAM
<b>LA-9545</b> BGA256-AI- MPC850/PPC	<b>Emulation adapter for AI socket for MPC850</b> Adapter for MPC850 (TCON 200) to BGA256-Socket Advanced Interconnect socket part number (AI-9546): 1MGS-256-1-636GG (16 x 16 rows) Testadapter for usage of cpu in BGA256 (LA-9547)
<b>AI-9546</b> BGA256-AI- SOCKET	<b>Advanced Interconnect socket for MPC850</b> Advanced Interconnect socket BGA256 for MPC850 (16 x 16 rows)
<b>LA-9539</b> BGA272-CPU- ADAPTER	<b>CPU Test Adapter for BGA272 (MPC555)</b> Testadapter for LA-9548 allows the use of the original CPU (MPC555)

### Detailed Order Information

Order No.	Code	Text
LA-9540	FIRE-MPC860	FIRE Emulator for MPC860
LA-7210	BGA357-ETEC- MPC860	Emulation adapter for E-TEC socket for MPC860
LA-7214	BGA357-ETEC- SOCKET	E-TEC socket for MPC860 (SMD)
LA-7218	BGA357-ETEC- SOCKET-T	E-TEC socket for MPC860 (through hole)
AI-7208	BGA357-AI- SOCKET	Advanced Interconnect socket for MPC860/880

Order No.	Code	Text
AI-7209	BGA357-EXTENSION	BGA357-Adapter Extension
LA-7213	BGA357-AI-MPC860	Emulation adapter for AI socket for MPC860
LA-7215	A-MPC860-BOTTOM	Bottom Side Target Adapter for MPC860
LA-7211	CONNECTOR-ADS-MPC860	Emulation adapter for ADS board
LA-7217	CON.-FADS-MPC860	Emulation adapter for FADS board
LA-9541	FIRE-MPC821	FIRE Emulator for MPC821
LA-9542	FIRE-MPC823	FIRE Emulator for MPC823
LA-9660	TCON200-MPC823-AMC	Converter TCON 200 to AMC Footprint 823
LA-9543	FIRE-MPC850	FIRE Emulator for MPC850
LA-9545	BGA256-AI-MPC850/PPC	Emulation adapter for AI socket for MPC850
AI-9546	BGA256-AI-SOCKET	Advanced Interconnect socket for MPC850
LA-9539	BGA272-CPU-ADAPTER	CPU Test Adapter for BGA272 (MPC555)
<b>Additional Options</b>		
LA-7216	BGA357-CPU-ADAPTER	CPU Test Adapter for BGA357 (MPC860)

## Contact

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