

In-Circuit Emulator for Z80 and Z180

HD64180R1
HD64180Z
HD647180X0
HD648180W
TMP8085
TMPZ84C00
TMPZ84C013
TMPZ84C015
Z80180
Z80181
Z80182
Z8400
Z84013
Z84015
Z84C00
Z84C01
Z84C13
Z84C15
Z84C50
Z8S180

- 20 MHz no-waitstate emulation
- Interface with C and PLM
- RTOS support for CMX-RTX and VRTX80
- Banking support up to 256 banks
- MMU support
- Support for power down mode
- Port analyzer
- Cost effective 8-bit emulation system
- Software compatible ROM-monitor

The TRACE32-ICE80 supports most of the members of the Z80- and Z180-family from Zilog and Renesas. Its modular and open technology allows the fast integration of new chip designs.

A software compatible ROM monitor is also available.

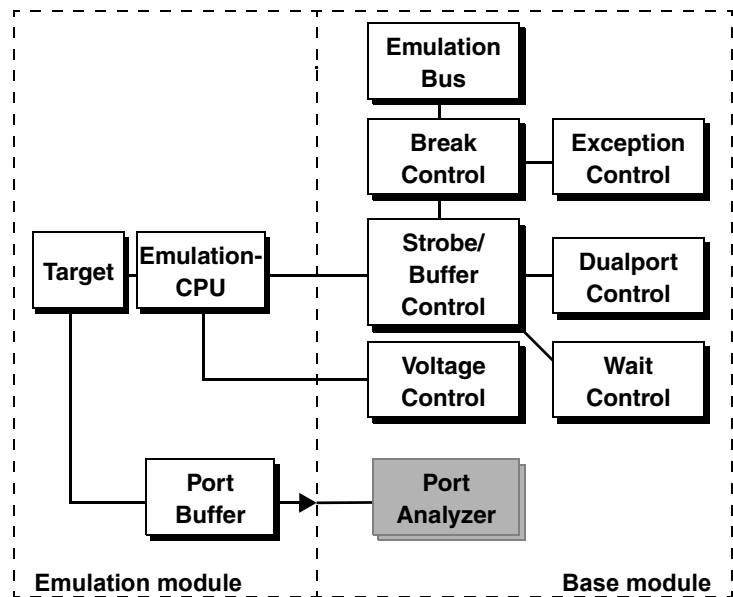
TRACE32-ICE is a state of the art In-Circuit Emulator, which offers unlimited hardware breakpoints and up to 16MByte dual-ported emulation memory. The real-time trace and trigger work up to the max. speed of the CPU. The analyzer offers selective trace as well as performance analysis and statistic functions.

TRACE32 works with the highest variety of host interfaces. The communication link to the host is done by the printer port, a fibre optic interface or ethernet allowing a high-speed transfer.

TRACE32-ICE80 is also available as a compact 8-bit In-Circuit Emulator.

Features

Basics of Operation



The ICE 80 probe is a high-performance emulation system for many derivatives of the Z80 family. The change between different CPU types is done by changing the adapter board.

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

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 Down
- Reset Up
- No Probe
- Alone Internal
- Alone External
- Emulation Internal
- Emulation External

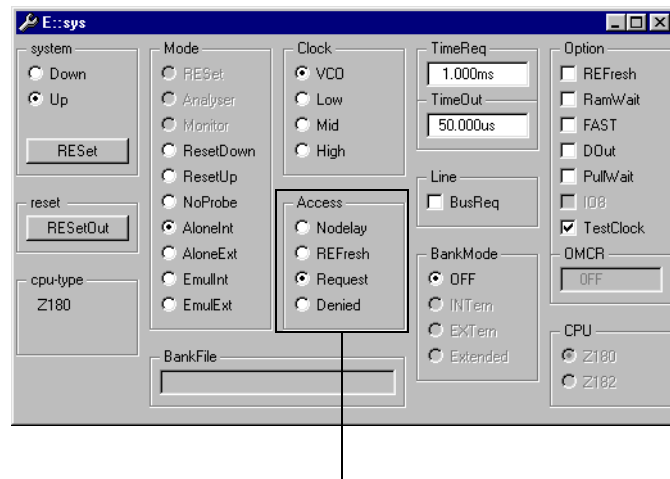
Clock

- Operation with external or internal Clock, up to 25 MHz depending on the derivative
- 0.75..35 MHz internal clock can be chosen using an VCO

Voltage and Clock Monitors for the Target System

This feature prevents failures caused by missing clock or undervoltage.

Dual-Port Access



Dual port access modes

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. Most modes do not touch real time program execution. However for different demands the user may choose different access modes.

The following dual-port access modes are implemented:

- Nodelay

- REFresh

- Request

In the **Nodelay mode** the dual port access is done between two CPU cycles.

In the **REFresh mode** the dual port access is made on CPU refresh cycles.

In the **Request mode** allow the dual-port access up to the max. speed of the CPU. It runs only on processors with open BUSREQ/BUSACK lines.

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

Memory Banking (only Z80/8085)

To extend the limited address space of the processor, sometimes external memory must be added. The TRACE32-ICE80 supports nearly all additional memory constructions up to 16MByte.

- Max. 256 banks
- With external bank logic
- With internal bank logic
- Banked EPROM

For an external bank logic a separate input probe is needed.

Programming of the on chip EEPROM (HD648180)

ICE-80 supports the programming of the on chip EEPROM. This means the emulator executes an EEPROM write protocol on write cycles to the EEPROM.

MMU Support

The screenshot shows the TRACE32 software interface. The main window displays a memory dump with columns for record, run, address, address, cycle, .b symbol, and ti.back. Below it, a smaller window titled 'E::mmu.LIST' shows a mapping table between logical and physical addresses.

record	run	address	address	cycle	.b symbol	ti.back
000033	f	D:00B403	AD:010403	wr-mem	05	1.250us
000032	f	P:4C4C6B	AP:050C6B	opfetchn	20 \\iarz180\iarz80b\sieve+0A3	0.700us
000031	f	D:4C4C6C	AD:050C6C	rd-mem	02 \\iarz180\iarz80b\sieve+0A4	1.175us
000030	f	P:4C4C6F	AP:050C6F	opfetchn	18 \\iarz180\iarz80b\sieve+0A7	1.325us
000029	f	D:4C4C70	AD:050C70	rd-mem	92 \\iarz180\iarz80b\sieve+0A8	1.175us
000028	f	P:4C4C03	AP:050C03	opfetchn	C1 \\iarz180\iarz80b\sieve+3B	1.325us
000027	f	D:00B403	AD:010403	rd-mem	05	1.175us
000026	f	D:00B404	AD:010404	rd-mem	00	1.125us
					C5 \\iarz180\iarz80b\sieve+3C	1.075us
					00	1.425us
					05	1.125us
					11 \\iarz180\iarz80b\sieve+3D	1.075us
					12 \\iarz180\iarz80b\sieve+3E	1.175us
					00 \\iarz180\iarz80b\sieve+3F	1.125us
					CD \\iarz180\iarz80b\sieve+40	0.700us

logical	physical
C:000000--003FFF	A:000000--003FFF
C:000000--00FFFF	A:010000--017FFF
C:4C4000--4C7FFF	A:050000--053FFF
C:FF4000--FF7FFF	A:103000--106FFF

ICE80 supports the built-in MMU of the Z180 processors.

Background Task

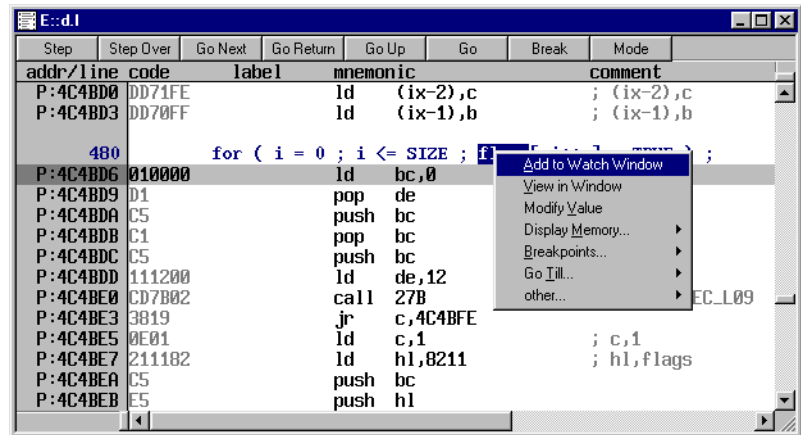
The background task allows:

To process interrupts

To maintain the refresh of a target DRAM

while the emulation is stopped.

HLL Debugging

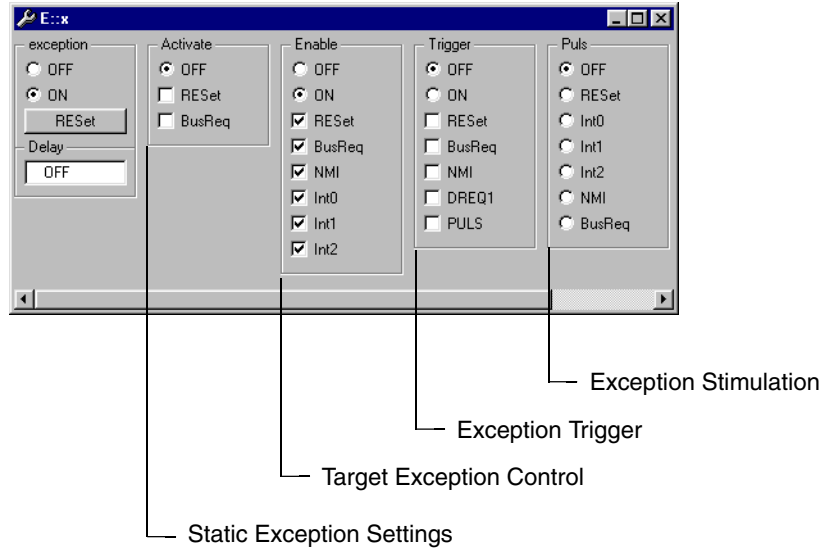


The TRACE32 debugger provides a interface to C and PLM for all standard compilers. For more information on the supported compilers refer to the section "Debug Interfaces".

Full support in real-time for:

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

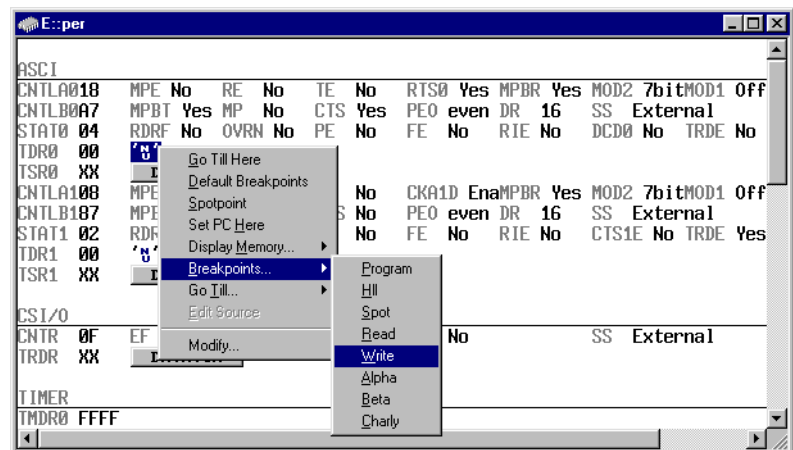
Exception Control



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

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

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

Modules Overview

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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

CPU	Language	Compier	Compan y	Option
Z80	ASM	HP-64000-ASM		HP
Z80	ASM	MI-C		SYM
Z80	ASM	AS	SDSI	SDS
Z80	C	MI-C		SYM/LOC
Z80	C	ICZ80	IAR Systems AB	UBROF
Z80	C	MCCZ80	Mentor Graphics Corporation	IEEE
Z80	C	HT-Z80	Microchip Technology Inc.	HITECH
Z80	C	UNIWARE-C	SDSI	SDS
Z80	C	CC	Softtools Inc.	UBROF
Z80	PLM	ISIS-PL/M	Intel Corporation	SYM/LOC

RTOS Support

Company	Product	Comment
CMX Systems Inc.	CMX-RTX	
Mentor Graphics Corporation	VRTX80x	

Debugger Support

CPU	Debugger	Company
	WINDOWS CE PLATF. BUILDER	-
	CODE::BLOCKS	-
	C++TEST	-
	ADENEO	-
	X-TOOLS / X32	blue river software GmbH
	CODEWRIGHT	Borland Software Corporation
	CODE CONFIDENCE TOOLS	Code Confidence Ltd
	CODE CONFIDENCE TOOLS	Code Confidence Ltd
	EASYCODE	EASYCODE GmbH
	ECLIPSE	Eclipse Foundation, Inc
	CHRONVIEW	Inchron GmbH
	LDRA TOOL SUITE	LDRA Technology, Inc.
	UML DEBUGGER	LieberLieber Software GmbH

CPU	Debugger	Company
	SIMULINK	The MathWorks Inc.
	ATTOL TOOLS	MicroMax Inc.
	VISUAL BASIC INTERFACE	Microsoft Corporation
	LABVIEW	NATIONAL INSTRUMENTS Corporation
	RAPITIME	Rapita Systems Ltd.
	RHAPSODY IN MICROC	IBM Corp.
	RHAPSODY IN C++	IBM Corp.
	DA-C	RistanCASE
	TRACEANALYZER	Symtavigation GmbH
	TA INSPECTOR	Timing Architects GmbH
	UNDODB	Undo Software
	VECTORCAST UNIT TESTING	Vector Software
	VECTORCAST CODE COVERAGE	Vector Software

Operation Voltage and Frequency

The maximum operation frequency of TRACE32-ICE depends on:

- The max. frequency of the CPU
- The access time of the overlay memory (15ns or 35ns)
- The mapper mode (**S**low or **F**ast)
- The number of waitstates (W0 = 0 waitstates, W1 = 1 waitstate)
- The dual-port access mode

Denied Access

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.

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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.

Not necessary.

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.

tbd

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Module Description

Detailed Order Information

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