

In-Circuit Emulator for 8051

8031	80C592	AT89C1051
8032	80C652	AT89C2051
8051	80C662	AT89C4051
8052	80C851	AT89C51
80C152JA	80CL410	C501
80C152JB	8344	C502
80C152JC	83C154	C503
80C152JD	83C515A	C504
80C154	83C515B-4	C515C
80C31	83C517A	COM20051
80C32	83C51FB	
80C321	83C528	
80C32T2	83C550	
80C51	83C552	
80C515	83C562	
80C515A	83C592	
80C517	83C652	
80C517A	83C654	
80C51FA	83C851	
80C51GB	83CL580	
80C51RA	83CL782	
80C52	87C51	
80C52T2	87C52	
80C535	87C552	
80C537	87C652	
80C552	87C654	
80C562	89C851	

- Up to 32 MHz emulation
- Boundout and non bondout support
- Dual ported memory
- Trigger on internal SFR access
- Banking up to 16 MB (256 Banks)
- Interface with all compilers
- C/C++ support
- CASE tools interface
- RTOS support
- Windows9x, NT and Xwindows interface

The TRACE32-ICE51 supports most of the members of the 8051-family from Infineon and others. The system is designed for bondout and non-bondout controllers. Its modular and open technology allows the fast integration of new chip designs.

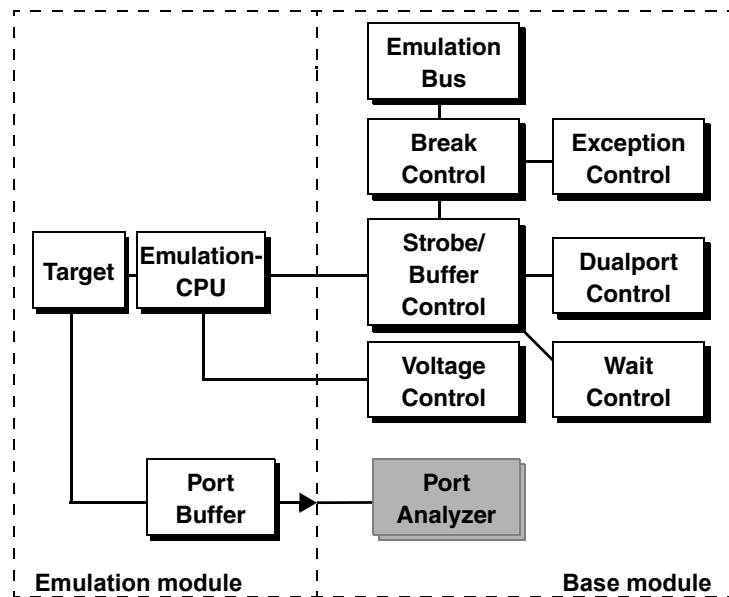
TRACE32-ICE is a state of the art In-Circuit Emulator, which offers unlimited hardware breakpoints and up to 16MByte dual-ported emulation memory. The real-time trace and trigger work up to the max. speed of the CPU. The analyzer offers selective trace as well as performance analysis and statistic functions.

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-ICE51 is also available as a compact 8-bit In-Circuit Emulator.

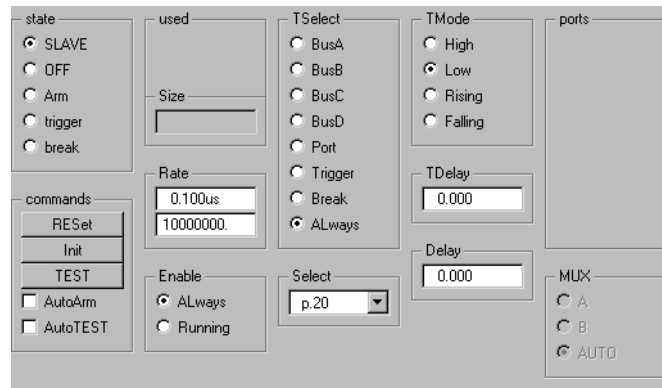
Features

Basics of Operation



The ICE-51 is a high-performance emulation system for most of the members of the 8051 family from Siemens and others.

Port Analyzer



On the emulation base there is an extra slot for the TRACE32 Port Analyzer. The Port Analyzer can either be used as a timing analyzer, or as a state analyzer trace extension. Depending on the 8051 derivative, the following additional signals can be traced:

- Port 2
- Port 3
- Port 4
- Port 6
- Port 7
- Port 8

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.

The operation modes are as follows:

- Reset Down
- Reset Up
- Alone Internal
- Alone External
- Emulation Internal
- Emulation External

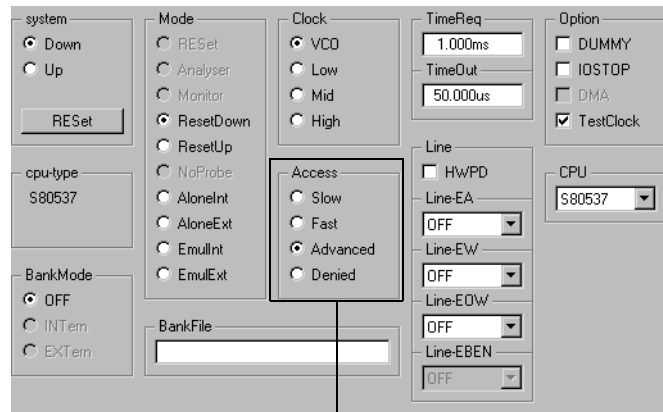
Clock

- Operation with external or internal Clock, up to 32 MHz depending on the derivative
- 0.75..35 MHz internal clock can be chosen using an VCO.

Target Clock and Voltage Monitoring

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

The dual-port access to the emulation memory has 4 different modes :

- Slow
- Fast
- Advanced (for high speed emulation)
- Denied (no dual port access)

Memory Banking

To extend the limited address space of the 8051 kernel, sometimes external memory must be added. The TRACE32-ICE51 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.

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 screenshot shows the TRACE32 debugger's source code window. The window title is ':d.l'. The menu bar includes: Step, Step Over, Go Next, Go Return, Go Up, Go, Break, and Mode. The source code is as follows:

```

BAWRSHP  addr/line source
H        22      anzahl = 0;
H        24      for ( i = 0 ; i <= SIZE ; flags[ i++ ] = TRUE ) ;
H        26      for ( i = 0 ; i <= SIZE ; i++ )
H        27      {
H        28      if ( flags[ i ] )
HP       29      {
HP       30      primz = i + i + 3;
H        31      k = i + primz;
H        32      while ( k <= SIZE )
H        33      {
H        34      flags[ k ] = F
H        35      k += primz;
H        36      }
H        37      anzahl++;
H        38      }
H        39      }
H        41      return anzahl;

```

A context menu is open over line 30, with the following options: Go Till Here, Default Breakpoints, Spotpoint, Set PC Here, Display Memory..., Breakpoints..., Go Till..., and Edit Source.

The TRACE32 debugger provides a interface to C, PASCAL 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:

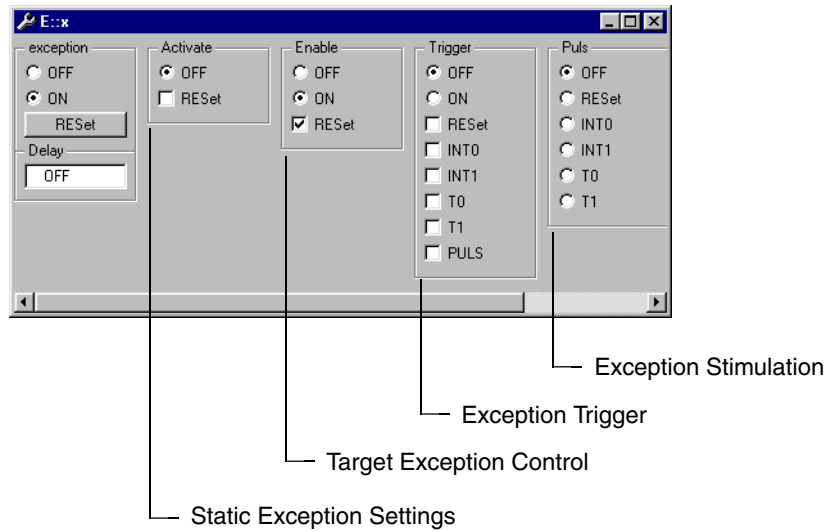
- Single chip, external memory only and mixed memory applications
- Break-before-line operation
- HLL single step in real-time
- Trigger and trace on local variables
- Trigger on bit variables

Dedicated Breakpoints

To react to accesses to internal SFRs and to memory area, there are several additional break and trigger capabilities.

- Bit write direct
- Bit read direct
- Byte read direct
- Byte write direct

Exception Control



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

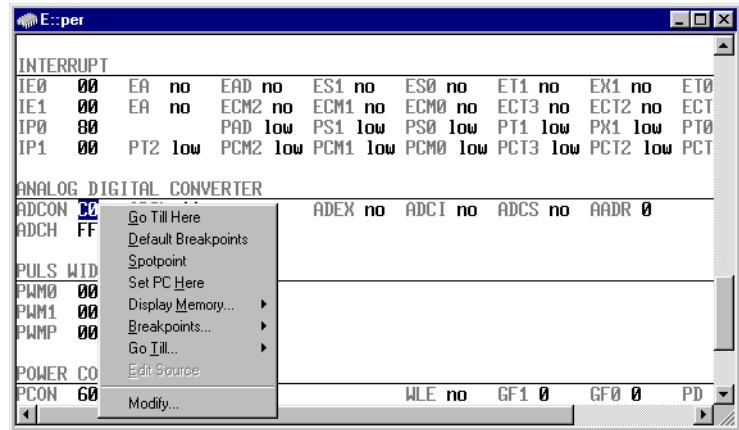
exceptions, to trigger on specific exceptions or to stimulate an exception.

Real-Time Trace and Trigger

In conjunction with the trace analyzer, there are powerful trace and trigger capabilities during real time program execution. Nearly unlimited combinations of address, data, access type, counter results and additional external signals, allow to solve nearly all often needed trace, break and count requirements of the user.

- Trace 32K by 88/120bit
- Timestamp 25/100ns
- 3 Universal counter
- Independent trigger unit
- Statistics
- Performance analysis

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	Compiler	Company	Option
8051	ASM	A8051	Ashling Microsystems Ltd.	SYM
8051	ASM	A8051	IAR Systems AB	UBROF
8051	C	SDCC	Free Software Foundation, Inc.	CDB
8051	C	ICC8051	IAR Systems AB	UBROF
8051	C	C51	ARM Germany GmbH	EOMF-51
8051	C	CC	Small Device C Compiler	COFF
8051	PASCAL	SYSTEM51-PASCAL	KSC Software Systems	OMF-51
8051	PLM	PL/M-51	Intel Corporation	OMF-51
8051	PLM	PLM51	TASKING	IEEE

RTOS Support

Company	Product	Comment
CMX Systems Inc.	CMX-RTX	
ARM Germany GmbH	RTX51/tiny	

Debugger Support

CPU	Debugger	Company
	WINDOWS CE PLATF. BUILDER	-
	CODE::BLOC KS	-
	C++TEST	-
	ADENEO	-
	X-TOOLS / X32	blue river software GmbH
	CODEWRIGH T	Borland Software Corporation
	CODE CONFIDENC E TOOLS	Code Confidence Ltd
	CODE CONFIDENC E 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
	SIMULINK	The MathWorks Inc.
	ATTOL TOOLS	MicroMax Inc.
	VISUAL BASIC INTERFACE	Microsoft Corporation
	LABVIEW	NATIONAL INSTRUMENT S Corporation
	RAPITIME	Rapita Systems Ltd.
	RHAPSODY IN MICROC	IBM Corp.

CPU	Debugger	Company
	RHAPSODY IN C++	IBM Corp.
	DA-C	RistanCASE
	TRACEANALY ZER	Symtavigation GmbH
	TA INSPECTOR	Timing Architects GmbH
	UNDODB	Undo Software
	VECTORCAS T UNIT TESTING	Vector Software
	VECTORCAS T 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.

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Module Description

Detailed Order Information

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Disclaimer

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