In-Circuit Emulator for the 80186 and 80196

V40

- Works with Intel, Microsoft, Borland and many other Compilers
- C++ support
- Up to 40 MHz no-waitstate emulation
- Dual ported memory
- FPU support
- Support for all 5V and 3.3V derivatives
- Banking support for 16 banks (186) or 256 banks (196)
- Supports memory split for program and data
- CASE tools interface
- RTOS support
- Windows9x, NT and X windows interface

The TRACE32-ICE186 supports microcontroller from AMD, NEC and Intel. Its modular and open technology allows the fast integration of new chip designs. A software compatible ROM Monitor is also available. 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.
Features

Basics of Operation

The ICE-186 is a high-performance emulation system. The change between the different supported CPU types is done by changing the emulation module.

On the emulation base there is an extra slot for the TRACE32 Port Analyzer. Depending on CPU type various signals can be traced. Some probes also have connectors to trace external target lines.

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
- 1..40 MHz internal clock
Bank Support
External bank switching schemes or the MMU can be supported by the memory mapper. Therefore a separate input probe is needed for the emulator.

- 16 banks for 186
- 256 banks for 196

Selective Mapping of Memory Classes
The address mapper can segment the memory into program and data area. By using this segmentation e.g. it is possible to map the program area to the emulation memory while the RAM area remains mapped to the target memory.
**Dual-Port Access**

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 modes are implemented:

- **Nodelay**
- **REFresh (not 196)**
- **Request (not 196)**

In the **Nodelay mode** the dual-port cycle is inserted between the bus cycles generated by the CPU. This means that the max. speed of operation is not possible in this mode, or extra wait states are needed for correct operation.

In the **REFresh mode** refresh cycles of 188/186 Enhanced Mode controller are used to generate dual-port cycles.

In the **Request mode** Hold/HLDA line of the CPU is used to implement dual-port cycles.

In the **Denied Mode** the dual-port access is switched off.
**HLL Debugging**

The TRACE32 Debugger supports all standard compilers for C and C++. For more information refer to the section “Debug Interfaces”.

**Background Task**

The background task allows:
- To process interrupts
- To maintain the refresh of a target DRAM while the emulation is stopped.

**Wait System**

- Additional wait cycles (1-15) may be specified
- Up to 250 wait cycles (4K blocks global and byte wise)
CPU Peripherals

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

FPU Support

The display and modification of the FPU registers is supported.
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.

Clock Fail Detection

On-Circuit Emulation

- Supports the ONCE mode Clip-Over adaptation
Modules Overview

tbd
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 186

<table>
<thead>
<tr>
<th>Language</th>
<th>Compiler</th>
<th>Company</th>
<th>Option</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASM</td>
<td>AXLS</td>
<td>HP</td>
<td></td>
<td>Source level debugging</td>
</tr>
<tr>
<td>C</td>
<td>BORLANDC</td>
<td>Borland Software Corporation</td>
<td>EOMF-86</td>
<td>with Paradigm LOCATE</td>
</tr>
<tr>
<td>C</td>
<td>ORGANON</td>
<td>CAD-UL ElectronicServices GmbH</td>
<td>EOMF-86</td>
<td>Banking support</td>
</tr>
<tr>
<td>C</td>
<td>IC86</td>
<td>Intel Corporation</td>
<td>OMF-86</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>MSC/MSVC-16BIT</td>
<td>Microsoft Corporation</td>
<td>EOMF-86</td>
<td>with Paradigm LOCATE</td>
</tr>
<tr>
<td>C</td>
<td>MSC/MSVC</td>
<td>Microsoft Corporation</td>
<td>EXE/TD</td>
<td>with Paradigm LOCATE</td>
</tr>
<tr>
<td>C</td>
<td>ICC86</td>
<td>TASKING</td>
<td>OMF-86</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>ICC86</td>
<td>TASKING</td>
<td>IEEE</td>
<td></td>
</tr>
<tr>
<td>C++</td>
<td>BORLANDC</td>
<td>Borland Software Corporation</td>
<td>EXE/TD</td>
<td></td>
</tr>
<tr>
<td>C++</td>
<td>MSVC-16BIT</td>
<td>Microsoft Corporation</td>
<td>EXE/CV</td>
<td></td>
</tr>
<tr>
<td>MODULA</td>
<td>LOGITECH-M2</td>
<td>Terra Datentechnik</td>
<td>MAP/REF</td>
<td></td>
</tr>
<tr>
<td>PASCAL</td>
<td>TEK-PASCAL</td>
<td>Tektronix</td>
<td>TEK</td>
<td></td>
</tr>
<tr>
<td>PLM</td>
<td>PL/M86</td>
<td>Intel Corporation</td>
<td>OMF-86</td>
<td>reads src or list file</td>
</tr>
</tbody>
</table>
### Compiler Support 196

<table>
<thead>
<tr>
<th>Language</th>
<th>Compiler</th>
<th>Company</th>
<th>Option</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>ICC196</td>
<td>IAR Systems AB</td>
<td>UBROF</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>IC96</td>
<td>Intel Corporation</td>
<td>OMF-96</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>C196</td>
<td>TASKING</td>
<td>OMF-96</td>
<td></td>
</tr>
<tr>
<td>PLM</td>
<td>PL/M96</td>
<td>Intel Corporation</td>
<td>OMF-96</td>
<td></td>
</tr>
</tbody>
</table>

### RTOS Support

### Debugger Support

<table>
<thead>
<tr>
<th>CPU</th>
<th>Tool</th>
<th>Company</th>
<th>Host</th>
</tr>
</thead>
<tbody>
<tr>
<td>WINDOWS CE PLATF. BUILDER</td>
<td>-</td>
<td></td>
<td>Windows</td>
</tr>
<tr>
<td>CODE::BLOC KS</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C++TEST</td>
<td>-</td>
<td></td>
<td>Windows</td>
</tr>
<tr>
<td>ADENEIO</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X-TOOLS / X32</td>
<td>blue river software GmbH</td>
<td></td>
<td>Windows</td>
</tr>
<tr>
<td>CODEWRIGHT</td>
<td>Borland Software Corporation</td>
<td></td>
<td>Windows</td>
</tr>
<tr>
<td>CODE CONFIDENCE TOOLS</td>
<td>Code Confidence Ltd</td>
<td></td>
<td>Windows</td>
</tr>
<tr>
<td>CODE CONFIDENCE TOOLS</td>
<td>Code Confidence Ltd</td>
<td></td>
<td>Linux</td>
</tr>
<tr>
<td>EASYCODE</td>
<td>EASYCODE GmbH</td>
<td></td>
<td>Windows</td>
</tr>
<tr>
<td>ECLIPSE</td>
<td>Eclipse Foundation, Inc</td>
<td></td>
<td>Windows</td>
</tr>
<tr>
<td>Tool</td>
<td>Company</td>
<td>Host</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td>CHRONVIEW</td>
<td>Inchron GmbH</td>
<td>Windows</td>
<td></td>
</tr>
<tr>
<td>LDRA TOOL SUITE</td>
<td>LDRA Technology, Inc.</td>
<td>Windows</td>
<td></td>
</tr>
<tr>
<td>UML DEBUGGER</td>
<td>LieberLieber Software GmbH</td>
<td>Windows</td>
<td></td>
</tr>
<tr>
<td>SIMULINK</td>
<td>The MathWorks Inc.</td>
<td>Windows</td>
<td></td>
</tr>
<tr>
<td>ATTOL TOOLS</td>
<td>MicroMax Inc.</td>
<td>Windows</td>
<td></td>
</tr>
<tr>
<td>VISUAL BASIC INTERFACE</td>
<td>Microsoft Corporation</td>
<td>Windows</td>
<td></td>
</tr>
<tr>
<td>LABVIEW</td>
<td>NATIONAL INSTRUMENTS Corporation</td>
<td>Windows</td>
<td></td>
</tr>
<tr>
<td>TPT</td>
<td>PikeTec GmbH</td>
<td>Windows</td>
<td></td>
</tr>
<tr>
<td>CANTATA</td>
<td>QA Systems Ltd</td>
<td>Windows</td>
<td></td>
</tr>
<tr>
<td>RAPITIME</td>
<td>Rapita Systems Ltd</td>
<td>Windows</td>
<td></td>
</tr>
<tr>
<td>Rhapsody in MicroC</td>
<td>IBM Corp.</td>
<td>Windows</td>
<td></td>
</tr>
<tr>
<td>Rhapsody in C++</td>
<td>IBM Corp.</td>
<td>Windows</td>
<td></td>
</tr>
<tr>
<td>TESSY</td>
<td>Razorcat Development GmbH</td>
<td>Windows</td>
<td></td>
</tr>
<tr>
<td>DA-C</td>
<td>RistanCASE</td>
<td>Windows</td>
<td></td>
</tr>
<tr>
<td>TRACEANALYZER</td>
<td>Symtavision GmbH</td>
<td>Windows</td>
<td></td>
</tr>
<tr>
<td>ECU-TEST</td>
<td>TraceTronic GmbH</td>
<td>Windows</td>
<td></td>
</tr>
<tr>
<td>UNDODB</td>
<td>Undo Software</td>
<td>Linux</td>
<td></td>
</tr>
<tr>
<td>TA INSPECTOR</td>
<td>Vector</td>
<td>Windows</td>
<td></td>
</tr>
<tr>
<td>VECTORCAST UNIT TESTING</td>
<td>Vector Software</td>
<td>Windows</td>
<td></td>
</tr>
<tr>
<td>VECTORCAST CODE COVERAGE</td>
<td>Vector Software</td>
<td>Windows</td>
<td></td>
</tr>
</tbody>
</table>
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 (Slow or Fast)
- The number of waitstates (WO = 0 waitstates, W1 = 1 waitstate)
- The dual-port access mode

Denied Access

Nodelay Access

Operating 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.

tbd
Dimensions

Module Dimensions

tbd
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.

<table>
<thead>
<tr>
<th>Connector</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

tbd
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 gives an overview which development tools are available for the specific derivatives of this family.

TBD
Order Information

Module Description

Detailed Order Information
Contact

International Representative

Argentina
Anacom Eletronica Ltda.
Mr. Rafael Sorice
Rua Nazareth, 807, Barcelona
BR-09551-200 São Caetano do Sul, SP
Phone: +55 11 3422 4200
FAX: +55 11 3422 4242
EMAIL: rsorice@anacom.com.br

Australia
Embedded Logic Solutions P/L
Mr. Ramzi Karlans
Suite 2, Level 3
144 Manseston Street
Parramatta NSW 2150
Phone: +61 2 8867 1880
FAX: +61 2 8867 1881
EMAIL: sales@emlogic.com.au

Austria
Lauterbach GmbH
Altlaufstr. 40
D-85635 Höhenkirchen-Siegertsbrunn
Phone: +49 8102 9876 130
FAX: +49 8102 9876 187
EMAIL: info@lauterbach.com

Belgium
Tritec Benelux B.V.
Mr. Robbert de Voogt
Stationpark 550
NL-3364 DA Sliedrecht
Phone: +31 184 41 41 31
FAX: +31 184 42 36 11
EMAIL: software@tritec.nl

Brazil
Anacom Eletronica Ltda.
Mr. Rafael Sorice
Rua Nazareth, 807, Barcelona
BR-09551-200 São Caetano do Sul, SP
Phone: +55 11 3422 4200
FAX: +55 11 3422 4242
EMAIL: rsorice@anacom.com.br

Canada
Lauterbach Inc.
Mr. Udo Zoettler
4 Mount Royal Ave.
USA-Marlborough, MA 01752
Phone: +1 508 303 6612
FAX: +1 508 303 6813
EMAIL: info_us@lauterbach.com

China Suzhou
Lauterbach Technologies Co., Ltd
Mr. Linglin He
Hengyi Square, Rm 709
No. 186, Xinlin Street
Suzhou, 215021 P.R. of China
Phone: +86 11 3422 4202
FAX: +86 11 3422 4242
EMAIL: linglin.he@lauterbach.com

Czech. Republic
Lauterbach GmbH
Altlaufstr. 40
D-85635 Höhenkirchen-Siegertsbrunn
Phone: +49 8102 9876 130
FAX: +49 8102 9876 187
EMAIL: sales@lauterbach.com

Denmark
Nohau Danmark A/S
Mr. Flemming Jensen
Herkerter Pl 4
DK-2730 Herlev
Phone: +45 44 52 16 50
FAX: +45 44 52 26 55
EMAIL: info@nohau.dk

Egypt
Lauterbach GmbH
Altlaufstr. 40
D-85635 Höhenkirchen-Siegertsbrunn
Phone: +49 8102 9876 130
FAX: +49 8102 9876 187
EMAIL: sales@lauterbach.com

Finland
Nohau Solutions Finland
Mr. Martti Villanen
Teknikantie 14A
FI-22150 Espoo
Phone: +358 40 546 0142
FAX: +358 9 2517 8101
EMAIL: sales@nohau.fi

France
Lauterbach S.A.R.L.
Mr. Jean-Pierre Paradisi
Europarc - Le Hameau B
135 Chemin Des Bassins
F-94035 Créteil Cedex
Phone: +33 1 49 56 20 30
FAX: +33 1 49 56 20 39
EMAIL: info_fr@lauterbach.com

Germany
Lauterbach GmbH
Sales Team Germany
Altlaufstr. 40
D-85635 Höhenkirchen-Siegertsbrunn
Phone: +49 8102 9876 130
FAX: +49 8102 9876 187
EMAIL: sales@lauterbach.com

Greece
Lauterbach GmbH
Altlaufstr. 40
D-85635 Höhenkirchen-Siegertsbrunn
Phone: +49 8102 9876 130
FAX: +49 8102 9876 187
EMAIL: sales@lauterbach.com

Hungary
Lauterbach GmbH
Altlaufstr. 40
D-85635 Höhenkirchen-Siegertsbrunn
Phone: +49 8102 9876 130
FAX: +49 8102 9876 187
EMAIL: sales@lauterbach.com
Russia
RTSoft
Mr. Alexey Isayev
Nikolskaya 5
RUS-105037 Moscow
Phone: +7 495 742 6828
FAX: +7 495 742 6829
EMAIL: sales@rtssoft.msk.ru

Singapore
Flash Technology
Mr. Teo Kian Hock
61, # 04-15 Kaki Bukit Av 1
Shun Li Industrial Park
SGP-Singapore 417943
Phone: +65 6749 6168
FAX: +65 6749 6138
EMAIL: teokh@flashtech.com.sg

South Korea, Pangyo
Hancom MDS Inc.
Mr. Dongwook Jun
3FL, Hancom Tower
49, Daewangpangyo-ro 644, Bundang-gu
Seongnam-si, Gyeonggi-do, 463-400, ROK
Phone: +82-31-627-3000
FAX: +82-31-627-3100
EMAIL: trace32@hancommds.com

Spain
Captura Electronica,SCCL
Mr. Juan Martinez
c/Duero, 40
E-08021 Barcelona
Phone: +34 93 429 5730
FAX: +34 93 407 0778
EMAIL: info@captura-el.com

Sweden
Nohau Solutions AB
Mr. Jörgen Nilsson
Derbyvägen 6D
SE-21235 Malmo
Phone: +46 40 592 206
FAX: +46 40 592 229
EMAIL: Jorgen.nilsson@nohau.se

Switzerland
JDT Jberg DatenTechnik
Mr. Andreas Jberg
Zimmemreistrasse 5
CH-5734 Reinach AG
Phone: +41 62 7710 886
EMAIL: Andreas.Jberg@jdt.ch

Taiwan
Superlink Technology Corp.
Mr. Sulin Huang
3F-6 No.77, Sec.1, Xintaiwu Rd., Xizhi District,
New Taipei City 22101, Taiwan, R.O.C.
Phone: +886 2 26083450
FAX: +886 2 26083535
EMAIL: info.stc@superlink.com.tw

Tunisia
Lauterbach Consulting S.A.R.L.
Mr. Khaled Jmal
Boulevard El Krim 3.5
TN-3062 Sfax
Phone: +216-31361061
FAX: +216-74611753
EMAIL: info_tt@lauterbach.com

Turkey-1
Tektronik Muh. ve Tic. A.S.
Mr. Hakan Yavuz
CyberPlaza B-Blok, 702B
Bilkent
06800 Ankara
Phone: +90 312 437 3000
FAX: +90 312 437 1616
EMAIL: info@tektronik.com.tr

Turkey-2
G3TEK Embedded Technologies Ltd.
Mr. Celal Aygun
Siyerlerim Mah. 445.
Sok. No. 48
06370 Bilkent/Ankara
Phone: +90 312 3324769
FAX: +90 312 3324769
EMAIL: info@g3tek.com

UK
Lauterbach GmbH
Mr. Richard Copeman
Altlaufstr. 40
D-86636 Höhenkirchen-Siegertsbrunn
Phone: +49 8102 9876 159
FAX: +49 8102 9876 187
EMAIL: sales@lauterbach.com

USA East
Lauterbach Inc.
Mr. Udo Zoettler
4 Mount Royal Ave.
USA-Marlborough, MA 01752
Phone: +1 508 303 6812
FAX: +1 508 303 6813
EMAIL: info_us@lauterbach.com

USA West
Lauterbach Inc.
Mr. Bob Kupyn
1111 Main Street, Suite 620
USA-Vancouver, WA.  98660
Phone: +1 503 922 2222
FAX: +1 503 524 2223
EMAIL: bob.kupyn@lauterbach.com
Additional Information

http://www.lauterbach.com

Lauterbach GmbH
Altablaustr. 40
D-85635 Höhenkirchen-Siegertsbrunn
Tel. ++49 8102 9876-0 FAX -999
info@lauterbach.com
http://www.lauterbach.de

Lauterbach Inc.
4 Mount Royal Ave.
Marlboro MA 01752
Phone (508) 303 6812 FAX (508) 303 6813
info_us@lauterbach.com
http://www.us.lauterbach.com

Lauterbach Ltd.
11 Basepoint Enterprise Ctre Stroudley Road
Basingstoke, Hants RG24 8UP
Phone ++44-1256-333-690 FAX -661
info_uk@lauterbach.com
http://www.lauterbach.co.uk

Lauterbach S.A.R.L.
135 Chemin Des Bassins
F-94035 Créteil Cedex
Phone ++33-149-562-030 FAX ++33-149-562-039
info_fr@lauterbach.com
http://www.lauterbach.fr

Lauterbach Japan, Ltd.
3-9-5 Shinyokohama Kouhoku-ku
Yokohama-shi Japan 222-0033
Phone ++81-45-477-4511 FAX -4519
info_j@lauterbach.com
http://www.lauterbach.co.jp

Lauterbach s.r.l.
Via Enzo Ferrieri 12
I-20153 Milano
Phone ++39 02 45490282 FAX ++39 02 45490428
info_it@lauterbach.it
http://www.lauterbach.it

Suzhou Lauterbach Consulting Co.,Ltd.
Room 1605, Xing Hai International Square
No.200, Xing Hai Street
Suzhou, 215021 PR of China
Phone: 0086-512 6265 8030
FAX: 0086-512 6265 8032
info_cn@lauterbach.cn
http://www.lauterbach.cn

Disclaimer

The information presented is intended to give overview information only. Changes and technical enhancements or modifications can be made without notice.