

Exhibitions

- **Embedded Systems Show**
at Wembley Conference Centre
in London
April, 2, 3, 1996
Represented by
Noral Micrologics Limited
- **Embedded Systems
Conference '96**
in Boston
April, 2-4, 1996
- **Embedded Systems
Conference '96**
in San Jose
September, 17-19, 1996
- **Het Instrument 1996**
at Zaarbeurshallen
at Utrecht, The Netherlands
October, 7-11, 1996
Represented by
TRITEC Benelux B.V.
- **Forum Mesure et Test**
at Parc des expositions,
porte de Versailles in Paris
October 1996
Represented by
LOGIC INSTRUMENT S.A.

TRACE32 Training

TRACE32 training in English will be held on:

- Wednesday and Thursday
June 12, 13, 1996

in our headquarters Hofolding/
Germany

For registration or further information
please contact your local distributor
or Ms Bidell:

Phone: ++49 8104 8943-10
FAX: ++49 8104 8943-49

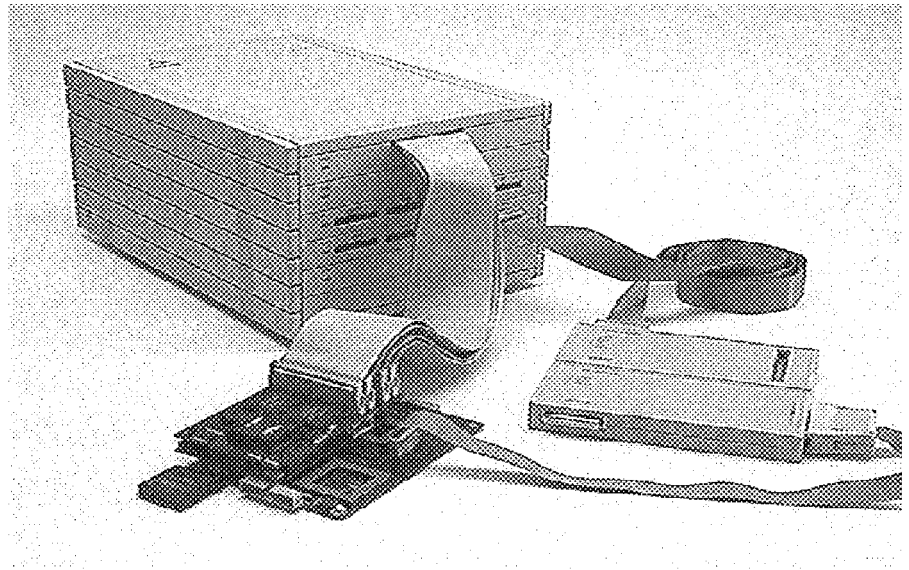
The TRACE32 In-Circuit Emulator supports more than 300 derivatives

When the first TRACE32 In-Circuit Emulator was introduced for the 68000 microprocessor in 1986, the number of potential customers was relatively small. In 1995, customers are offered more than 300 different probes for the TRACE32-ICE.

The variety of Microprocessors and Microcontrollers will increase in the coming years and there is no end in sight for the increasing stream of derivatives coming on to the market. Although the TRACE32 development system cannot support them all, in comparison with other emulator manufacturers, our customers can rely on the widest support available.

- Can the new emulator module offered really work on the same base-unit?
- Does the new module permit complete freedom of choice in the selection of the programming language and compiler?
- Is the system available for all current host platforms?
- Does the user software offer the same 'Look and Feel' for all variants of the development system?

For the TRACE32 system, the answer to all of these questions is 'YES'.

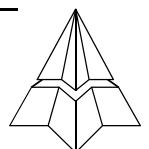


When searching for a suitable tool for a device family, not only is the support for the chosen CPU important. When purchasing a development tool, you must also consider the issues of universality:

- Are all members of the processor family supported, or is the manufacturer limited to the standard types?
- Can you rely on rapid availability of a new probe, when new derivatives become available?

Some competitors claim to be the largest emulator manufacturer in Europe. It is clear, both in terms of turnover and breadth of processor support, that we hold this position but more important to us is maintaining our customer satisfaction and our commitment to them as a reliable partner for the future.

The latest list of supported processors, compilers, real-time kernels and host computers can be found on our web site at [HTTP://WWW.LAUTERBACH.COM](http://www.lauterbach.com)



Current Information

68MH360

The 68MH360 communication processor contains 32 multiplexed HDLC-channels in addition to the 360 core. The processor can be emulated with the same module as the 68360 and 68EN360, since all derivatives are pin-compatible. To emulate a different member of the family, simply change the CPU on the emulation module.

68341, 68349

Emulation modules for the MC68341 and the MC68349 are now available for the TRACE32 system. The modules are used with the 6833x base unit (LA-6750).

ColdFire

An emulation module supporting the RISC-processor, MCF5102 at 33MHz, zero wait state, will be available by the end of 1995. Support for the MCF5200 family is planned for 1996.

H8

Emulation modules for the new H8 derivatives H8/3614, H8/3734, H8/3834, H8/3927, H8/3292, H8/3294, H8/3296, H8/3297 are now available. With these additions, Lauterbach Datentechnik GmbH now offers support for the entire H8-family.

C163, PMB2706 GOLD-uC

From the end of 1995, emulation modules are available for Siemens' new processors. The C163 can be emulated with the same module as the C167 and an additional adapter for the emulation of the XBUS.

80386/80486

A module is now available for the TRACE32 which supports all 486 PGA and PQFP derivatives thus completing the coverage of the entire 80386/80486-family. The 486-PGA-module, can support the 80486SX, 80486DX, 80486DX2 and 80486SL Enhanced derivatives. Changing between derivatives simply involves changing the CPU on the emulation probe and adjusting a DIP-switch. For the 80386 devices, support is offered for the 80386SX, 80386CX, 80386DX and 80386EX.

80186

Software support for bank switching on the 80186 family is being added, allowing up to 16 banks of 1 Mbyte accessible by using a **Bank:Segment:Offset** type of addressing format.

AMD 80186EM, 80386EM

From the end of 1995, a module supporting AMD's 80186EM device will be available. A module for the 80386EM from AMD is planned for the middle of next year.

BDM-Debugger und ROM-Monitor

Lauterbach Datentechnik continues to expand the line of Low-Cost development tools. A wide range of processors, including some of the newest releases, are now supported using the BDM-debuggers and ROM-monitors.

These tools use the PODBUS interface, currently available either via the TRACE32 ECU module (as part of a TRACE32 system) or via an ISA bus card for the PC. An Ethernet to PODBUS interface will be available shortly, which will allow the tools to be connected to other host systems.

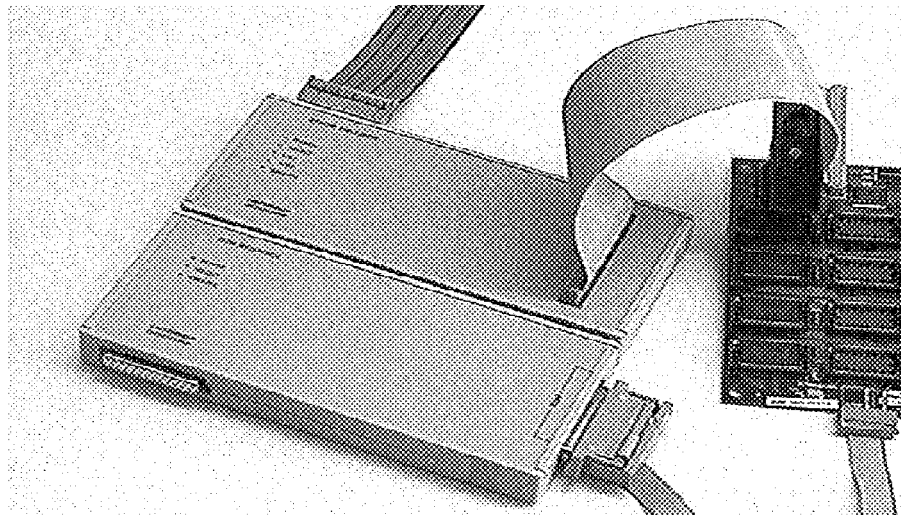
BDM-debuggers and ROM-monitors are highly cost effective when it comes to basic debugging. Debugging is achieved using a set of BDM commands providing control of important features such as registers, memory, complex high-level structures etc. All the major programming languages are supported,

In addition, an EPROM-simulator can be used to load and test the programs in EPROM memory.

Standard Features:

- Easy high-level debugging
- Easy debugging at assembler level
- PRACTICE test language
- Internal and external peripherals displayed at a logical level
- Adaptation to the debug speed of the CPU
- User Interface completely compatible with TRACE32-ICE

In addition to these standard features, any CPU specific feature that are available are also fully supported providing development



C, C++, PASCAL, MODULA2, ADA, PL/M from most compiler vendors. Real time systems also include support for task-registers and processor states. The TRACE32's macro language, PRACTICE, is included to allow batch processing for automated testing, fast set-up's etc.

Low cost systems comprise: universal BDM, Monitor/EPROM-Simulator, the evaluation boards, PODBUS-interface and of course the debugging software.

BDM-Debugger

Processors with a Background Debug Mode interface can be interfaced with debugging software running on a host system.

A universal BDM-module has been developed which allows the debugger to interface to the target processor using an adaptive protocol within the software. As a result, BDM debuggers are now available for a large number of processors.

support for breakpoints, memory-accesses, trigger points, execution histories, TPU-Debugging, etc.

ROM-Monitor

Processors which do not support a BDM interface can be developed using a ROM monitor based solution. An 8KB monitor program may be located anywhere in the processors address space. The monitor can be linked and loaded separately or it can be linked and loaded along with the user-program. To implement a ROM Monitor, some interrupt vectors must be reserved for monitor program use and these must be allowed for in the target software design.

Features:

- Easy high-level debugging
- Easy debugging at assembler level
- PRACTICE test language
- User Interface completely compatible with TRACE32-ICE

BDM-Debuggers	ROM-Monitors	Evaluation Boards
<ul style="list-style-type: none"> • BDM-68K for 68330, 68336, 68340, 68341, 68349, 68360, 68370, ColdFire • BDM-68HC16 for all 68HC16 derivatives • NEW! BDM-MPC600 for MPC601, MPC603 • NEW! BDM-MPC505 for MPC505, MPC821, MPC860 • NEW! BDM-PPC403 for PPC403GA, PPC403GB • NEW! BDM-DSP56K for DSP56002/4/5, DSP-part of 68356 • NEW! BDM-ARM7 for ARM7 family • NEW! BDM-196EA 	<ul style="list-style-type: none"> • MON-68K for 68K family • MON-166 for 80C165, 80C166, 80C167, PMB2705 • MON-68HC11 for 68HC11 family • MON-196 for 80C196, 80C194, 80C198 • NEW! MON-NS32000 for NS32000 family • MON-Z80 for Z80 family • NEW! MON-POWERPC for MPC601, MPC603 	<ul style="list-style-type: none"> • EVAL-166 Evaluation Board for 80C166 • EVAL-68332 Evaluation Board for 68332 • EVAL-68340 Evaluation Board for 68340 • EVAL-68HC11 Evaluation Board for 68HC11 • EVAL-51 Evaluation Board for 8051/80537 • EVAL-196 Evaluation Board for 80C196 • NEW! EVAL-PPC403 Evaluation Board for PPC403 • NEW! EVAL-MPC505 Evaluation Board for MPC505

EPROM Simulator

The monitor/EPROM-simulator can support two 8-bit or one 16-bit EPROM. The combination of several modules allows 32 or 64-bit configurations to be supported. During simulation the EPROM configuration of the target system can be imitated by the software in the EPROM-Simulator. Using this technique paged or banked EPROM's can be simulated.

Evaluation Boards

It is not unusual for software development to take place before target hardware becomes available. Evaluation boards allow software to be tested before the main target hardware is available, thus reducing delays in software development. Evaluation boards allow development of sections of code which have little or no hardware dependence.

Host interfaces

The universal BDM-module is connected to the host system via a high speed serial bus known as the PODBUS. This has a data transfer rate of 10 Mbit/s.

The PODBUS-interface is currently available either via the ECU as part of a full TRACE32 system or as an ISA-Bus card for the PC. However, an ethernet interface to the PODBUS will shortly be available which means that a large range of host systems are now supported.

PODBUS-Interface on the Emulator

In addition to their use in low cost development solutions, the BDM-debugger and ROM-monitor can also be used as an extension of the in-circuit emulator TRACE32, to emulate additional slave processors on a target system under emulation.

Application possibilities

The compatibility that exists between the emulator and the BDM-debugger/ROM-monitor opens up a wide range of application areas for these tools.

In addition to their obvious application in starter and test system environments for small and medium size projects, both tools are being used more and more for pure software development. Compatibility means that it is easy to move from one system to the other without having to learn new debugger interfaces etc.

Our BDM-debuggers and ROM-monitors have been designed to allow maximum flexibility in processor support and it is therefore very easy to bring new CPU support to the market, often very soon after the introduction of the processor itself. This gives the developer a powerful set of development tools to use before the availability of a full in-circuit emulator.

ONCE Debugger for DSP56K

Using the BDM-DSP56K software package, the universal BDM-module can be adapted to the ONCE interface of the DSP product family. The software completely supports the functions of the ONCE interface. In addition to the standard features provided by the TRACE32-BDM, it is also possible to break execution on variable accesses and an execution history of 5 instructions can also be displayed. Analogue information, a major feature of DSP devices, can now be intelligently interpreted by configuring memory areas for graphical display.

The BDM-DSP56K software package which already supports the DSP56002 digital signal processors and the 68356 DSP, now supports the DSP56004 and DSP56005 derivatives.

INTEL MCS196 Bondout Emulator

Lauterbach Datentechnik GmbH is pleased to announce their first **INTEL MCS196-bondout-based Emulator. The TRACE32-MCS196 emerges in narrow co-operation with INTEL and an European key-account.**

The MCS196EA is thereby the first derivative from the MCS196 family. Further derivatives of the MCS196 microcontroller will follow in close partnership with INTEL. "We're pleased with the progress Lauterbach is making on the first bondout emulator for the MCS196, and look forward to continued work with them..." says Mike Hendershot, head of Intel's embedded development tool programs in Europe. "Lauterbach Datentechnik GmbH and we expect a continuous development of this relationship."

The MCS196EA is a derivative, which is especially designed for engine-management, for ABS-systems, moreover it suits also for network applications.

Through the usage of the bondout it is guaranteed, that no resources are used by the MCS196 Emulator and the personally NMI-routines leave themselves easily debugable. The TRACE32 Emulator supports the processor up to the supreme frequency of 32MHz real-time. Through it's "dual port" emulation RAM the TRACE32 suites especially for the above named operational areas, since here frequently parameters must be presented without injuring the real-time.

A SDU (Serial Debug Unit)-debugger is already available for the MCS196EA.

Support for the complete range of PowerPC

Lauterbach Datentechnik is currently working on development tools for the PowerPC families PPC400, MPC505, MPC600 and MPC800.

BDM-debuggers are already available for IBM's PPC400 family and Motorola's MPC505 family with the PowerQUICCS (MPC812 and MPC860) devices, due for release at the end of 1995.

The TRACE32 PowerPC BDM-debuggers support all the CPU specific features of the BDM interfaces in addition to all the standard BDM functions.

Technical information on the 600 series debug port is still not available, so until this data is released, the 600 family will be supported using the ROM-monitor based debugger only.

Evaluation boards for the PPC403GA and MPC505 are now available whilst evaluation boards for the 600 and 800 families are planned.

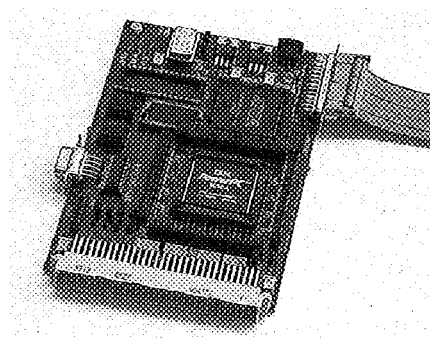
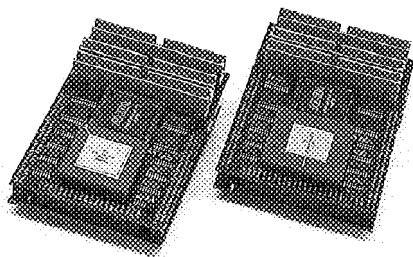
Emulation for 68PM302, 68LC302 and 68EN302

Lauterbach is the first company to offer emulator support for these three new derivatives of the 68302 communication processor, by way of adaptors for the TRACE32 Universal Development System.

The MCP68PM302 is a 68302 core with a PCMCIA-interface. The interface can be disabled if necessary, so that the high order address lines, some bus control signals and ports can be used. The same module supports both modes and also supports On-Chip Emulation.

The Low-Cost (68LC302) and the ethernet (68EN302) variants, are supported by a single module.

All modules can be adapted to the TQFP and PGA footprints, by means of special adapters.



A complete emulator for the 400 and 500 families is planned for release in the second quarter of 1996. The systems are being designed using the familiar TRACE32 concept, and all the standard debug features will be supported. As usual, Lauterbach will be pioneering new technology to bring ICE support to these extremely fast (very short cycle time) devices.

Emulation for 68HC05 and 68HC08

An emulation adaptor supporting the MC68HC08 processor family is now available for the TRACE32 Universal Development System.

Initially, support is available for the 68HC08XL36 derivative, which is the only part in the family available from Motorola at the moment. Other modules will follow when new derivatives appear. On the same emulation adapter, modules will soon be available for the MC68HC05 family of devices.

The emulator can support device speeds up to 12 MHz and both 5v and 3.3v parts are supported with the same module.

Support for 68K MMU

For the 68030, 68040 and 68060-systems, the support of the internal MMU (Memory Management Unit) has been extended. Up to now, MMU-registers could only be accessed and modified. The introduction of a full featured MMU-translation table makes it possible to debug using logical addresses, with the MMU enabled.

For use in multi-tasking systems, a new feature allows the symbols for different tasks residing at the same logical addresses to be distinguished from each other by appending a task number during download. The

TRACE32 development tools for ARM7

Working in close cooperation with Advanced RISC Machines, Lauterbach Datentechnik now offers support for the ARM7 processor family. Yet again, Lauterbach is the first European manufacturer to bring development tools for a new processor family to market.

"We are delighted to be working with Lauterbach as we have seen strong demand from major customers wanting to couple the benefits of high performance, low power ARM silicon with the comprehensive debug tools offered by Lauterbach", comments Pete Magowan, ARM's European Marketing Manager.

The introduction of the TRACE32 system for the RISC-family is planned in two phases:

1. BDM-Debugger

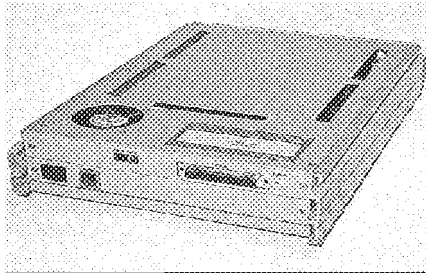
Firstly, a BDM-debugger will be available. This, combined with an EPROM-simulator, is an effective debug tool for assembler and high-level development. Because adaptation to the debug interface is achieved in software, it is possible to introduce this tool very quickly. In addition to the standard features of the TRACE32-BDM interface, all the additional debug features found on the actual processor, for example, breakpoints on memory-access, will be supported.

2. In-Circuit Emulator

Due for release in mid 1996 is the complete TRACE32 in-circuit emulator. In its first configuration, the emulation probe will contain the pure processor core. In the future, emulation support will be available for applications using the ARM-Core integrated within an ASIC.

Speed, Speed, Speed

TRACE32 provides very high download performance, which can be maximised in several ways .



1. Avoid using the options COLUMNS, Puzzled or Verify with the DATA.LOAD command unless the application needs them, since they can significantly increase the download time.
2. When using an IAR-compiler, the option "-rn" should be used to avoid creating a larger UBROF file than is necessary.
3. Loading the code directly into emulation memory (via dual port accesses rather than via the CPU) greatly increases the download speed. To use this method, simply add e: after the filename in the load command, e.g. d.l.ubrof < filename> e:
4. When loading several files, the MoreFiles option can speed up the loading significantly.

When this option is specified, the building of the internal symbol database only starts after the last file is loaded.

5. File loading speeds can be increased by fitting more memory in the SCU(System Controller Unit). The additional memory can then be used as cache. However, when loading a file for the first time, it must be loaded directly from the host system. The achievable download speed primarily depends on the communication method. The table below shows the download speeds for several configurations.

The results are related to the size of the objectfile and therefore cannot be compared with load on demand systems.

A 3.5MB file containing complex High-Level structures in C++ was used for the IEEE test and a 2.5MB file with a small amount of debug-information was used in the COFF test. Neither file was cached. Depending on the format and contents, the times can vary, with C source files and other file formats being loaded more rapidly in general. The download time also includes the time taken to build the internal symbol database. After loading, no further processing is required and debugging can start immediately. The SCU32/30 mentioned in the table will be available as from the beginning of 1996.

Format	Binary	COFF	IEEE 695
SCU/PAR	58KByte/sec	55KByte/sec	41KByte/sec
SCU32/15 Fiber Optic /2MBit	160KByte/sec	140KByte/sec	120KByte/sec
SCU32/15 Ethernet	350KByte/sec	275KByte/sec	160KByte/sec
SCU32/22 Ethernet	410KByte/sec	340KByte/sec	220KByte/sec
SCU32/30 Ethernet	510KByte/sec	410KByte/sec	270KByte/sec

File Formats for X86-development

In addition to the standard formats OMF86, OMF286 and OMF386, TRACE32 supports a number of other formats which can provide improved high-level debugging.

In real mode, extended OMF86 is accepted in either Paradigm or Microtec formats with the extensions providing more information about source files, enumerations and also support for register variables. The IEEE-695 load option is used to load object files from the Intermetrics Compiler. For the EXE format, a special version of the EXE file must be made which contains the code and the debug information. The file can be an MS-DOS-file, a WINDOWS-Executable or in Pharlap AXE format and the debug information can be in

CodeView or Borland format. Both formats offer complete support of all debug elements, such as full filenames and register variables. In addition, C++ constructions like derived classes can be displayed by both formats.

For protected mode applications, TRACE32 supports the Pharlap extended-OMF386 format which includes support for register variables. Executables are supported using the Pharlap P3 format with CodeView Debugging information thus providing complete support of the C++ language. The a.out format of the GNU compilers can also be loaded. Other solutions for protected mode support are under development.

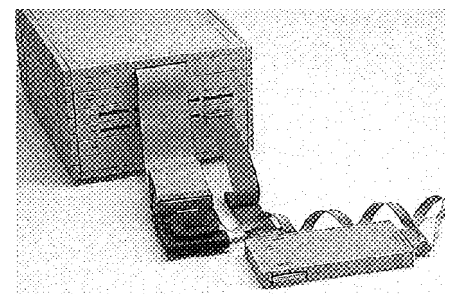
Emulation for MC68356

For the first time, Lauterbach Datentechnik is using a combination of the in-circuit emulator (TRACE32-ICE) and the universal BDM-module to emulate processors.

The MC68356 communication processor combines a MC68302 CPU and the DSP56002 signal processor in one package. The basis of the emulator is an emulation module for the MC68302 with an additional output to support the signal processor's ONCE-adapter. Using this adapter, the DSP56002 can be emulated via a BDM-module connection on the emulator's POBBUS interface.

MC68356 devices which have been soldered in the target system can be tri-stated by the module enabling on-chip emulation (ONCE).

Adaption to the MC68356's ball grid array package is made using a half-pitch connector. The user simply has to design-in additional pads to accept four half-pitch connectors on the target board to enable reliable connection.



New WINDOWS environment for TRACE32

A WINDOWS 95 environment is now available for the TRACE32 development system fully supporting the in-circuit emulator, BDM-debugger and ROM-monitor products. Pull-down menus and tool bars are completely user-configurable and user-definable masks allow the interface to be configured to suit the application and/or the users preferences. The software incorporates the PRACTICE macro-language to allow batch processing for automated testing, fast set-up's etc.

TRACE32's user interface is also fully compatible with most other proprietary operating systems including DOS, WINDOWS and MOTIF. Drivers are available on CD-ROM for PC, SUN, HP9000, VAX-Station, DEC-Station and ALPHA-X host systems.

TRACE32 Multitask-Debugger

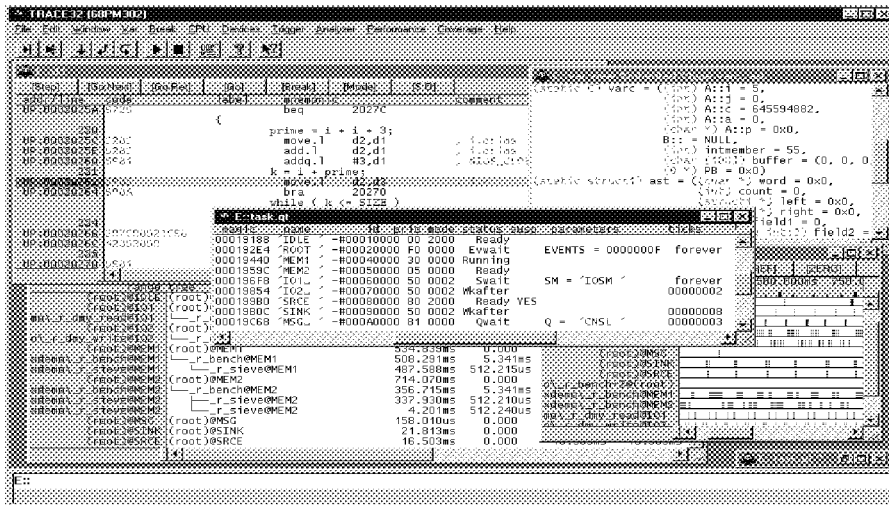
More and more often, Real Time Operating Systems (RTOS) are being used in embedded systems development. The TRACE32 contains an adaptable multitask debugger which supports the symbolic debugging of complex multitask applications and the detailed analysis of the real time behaviour of the system.

The wide variations in the implementation of any RTOS can only be effectively supported by using an adaptable debugger. The adaptation of the TRACE32-debugger to any RTOS is achieved using a macro language and

and visibility but *whilst the system is running in real-time* and avoiding the need for the debugger to be included in the application code.

Task Specific Display in the Trace

The data recorded in the trace-memory can be displayed and used task-specifically. For example, a detailed symbolic display of task changes and system calls can be extracted from the trace records.



the implementation is normally made to follow the command-language of the native debugger for the real-time kernel. The alteration of the macro-definitions enables support for almost any kernel. The performance of the debugger is, for the most part, dictated by the structure of the real-time kernel.

At the moment, adaptations are available for many standard real-time kernels and Lauterbach is rapidly extending their support for other kernels. To support special kernels, (e.g. users own design), the adaptation of the debugger can be done by the user with the help and support of Lauterbach if required.

Support for built-in debuggers

Some RTOS designs provide a built-in debugger, either running as a task or as part of the kernel, communicating using a serial interface on the hardware (e.g. PROBE in pSOS). Using a TRACE32 Terminal Window, integrated into the TRACE32 software, an interface to the RTOS's debugger can be implemented avoiding the need for a separate serial connection and an external terminal.

Display of System Resources

The built-in debugger provided with the RTOS, normally provides commands for display of task-lists, semaphores, message queues, etc. The TRACE32 Multitask-Debugger can provide the same functionality

Analysis of Real-Time Behaviour

With the help of the analyzer, it is possible to do an extensive analysis of the real-time behaviour of the system. The results can be displayed in tabular and/or graphical forms. Analyses of task run times and task changes can be performed and the temporary behaviour of selected tasks can be traced to show whether they are running, ready, waiting or suspended. If a function is used by several tasks, it is possible to perform a task-specific analysis of the function run time and the call structure.

Manual Execution of System Calls

Using the TRACE32 Multitask-Debugger, manual system calls can be executed. Using this technique, it is possible for example to set a task into a known condition or to suspend a task for test purposes.

Task-Selective Debugging

For some real-time kernels (currently pSOS+, VRTX32 and OS9), task selective debugging is available (not available on CPU's with a BDM-type interface). Task-selective debugging allows a selected task to be debugged in the foreground, while other tasks and the real-time kernel keep running in the background. Breakpoints, when set in a function which is shared by several tasks, are only enabled when the foreground task makes the call.

Available adaptations

68K

- OSE classic(OS68), ENEA Data AB
- **NEW!** OSE delta, ENEA Data AB
- OS9, Microware
- pSOS(+), integrated systems
- **NEW!** RealTime Craft, GSI tecsi
- VRTX32, Microtec
- **NEW!** VRTXsa, Microtec

x86

- pSOS, integrated systems
- **NEW!** RTXC, Embedded System Products

80166

- **NEW!** RTX166/tiny Keil Electronic

8051

- **NEW!** RTX51/tiny Keil Electronic

Lauterbach on the Internet

Lauterbach Datentechnik now offers improved communication services to its customers via the Internet.

EMAIL

Use the following internet addresses to contact the appropriate department:

Product information

info@lauterbach.com

Sales and technical questions

sales@lauterbach.com

Technical support for customers

support@lauterbach.com

FTP

An FTP-Server is also available at the address <ftp.lauterbach.com> and is now available for file transfer services. Customers with a valid software-warranty can access the site for all the latest versions of Lauterbach's software. The FTP site will also prove useful for exchanging software for technical support purposes.

WWW

Lauterbach Datentechnik are now using a world-wide web server as an important marketing-platform. With the help of a WWW-Browser such as Netscape or NCSA Mosaic, you can obtain information on products and other important issues. Lauterbach's home page can be reached at the URL site <http://www.lauterbach.com>

TCP/IP under WINDOWS

To set up a TRACE32 emulator under WINDOWS via Ethernet you will need:

- WINDOWS for Workgroups 3.11 or WINDOWS 95 operating system
- a WINSOCK compatible TCP/IP stack
- a copy of Lauterbach T32WSOW.EXE driver program including the DRV-NFS support software (used instead of the standard T32.EXE)
- an Internet address (IP address) for the TRACE32 (usually supplied by your network administrator)
- a NODEname to your TRACE32 (e.g. T32-MAR)

For the WINSOCK compatible TCP/IP stack, we recommend the WINSOCK driver TCP/IP-32-3.11b since the software is easy to install and reliable. The driver is available from MICROSOFT as 'Freeware' and can be downloaded via the FTP site ftp.microsoft.com from the directory /bussys/Clients/WFW as a self-extracting file under the name TCP32B.EXE. After unpacking it is necessary to configure it using the 'Unlisted or Updated Protocol' option in the Add-Protocol part of the network-setup. You will need to configure an IP address for your PC during this part of the set up.

Note that if your PC is connected to a Novell network, make sure that the ethernet card driver configuration in the file NET.CFG includes the statement:

```
Frame ETHERNET_II
```

because this is the frame type that TRACE32 uses.

Setting the IP Address in TRACE32

When the TRACE32 system with ethernet option is delivered, it will already have an ethernet address stored inside it and written on the back of the SCU. The ethernet address consists of 6 hex octets separated by colons, e.g.

```
0:c0:8a:56:78:90
```

Before an ethernet connection can be established with the TRACE32, a corresponding Internet (IP) address must also be stored in the TRACE32's interface EEPROM. Also, the IP address and the associated 'NODEname' (same as that used in the config file) must be added to the database file named HOSTS.

Example:

```
192.90.100.15 T32-MAR
```

Note that if you are using TCP/IP from Novell, you must also add the ethernet address (on the back of the SCU) and your chosen 'NODEname' into the file ETHERS.

If your network supports RARP (Reverse Address Resolution Protocol), then the Internet address will be set automatically as soon as the emulator is switched on, because on power-up or reset, the emulator issues a RARP request and uses the response to set the correct IP address.

If RARP is not available, then you must manually set the translation of the desired IP address to the physical ethernet address using an ARP (Address Resolution Protocol) utility. An ARP utility is supplied as part of the TCP/IP suite from Microsoft.

Example:

```
arp -s 192.90.100.15 00-c0-8a-56-78-90
```

The command places a static entry in your local ARP cache table which links your chosen IP address to the physical ethernet address as printed on the back of the TRACE32. To confirm the entry in the table, you can use the command *arp -a* to display the current cache values.

If ARP is not available, then the fibre optic interface must be used to set the IP address using the SETETHER.CMM script file.

The TRACE32 system currently supports the TCP/IP-configuration protocols ARP and RARP. The protocols BOOTP and DHCP are not yet supported.

Testing the Ethernet Connection

To test the ethernet connection before configuring the driver program, you could use the PING utility to see if the emulator is responding (PING is supplied with the Microsoft TCP/IP suite) :

Example :

```
PING T32-MAR
```

```
.....
```

Pinging T32-MAR with 32 bytes of data:

```
Reply from 192.90.100.15: bytes= 32 time= 50ms  
TTL= 32
```

```
Reply from 192.90.100.15: bytes= 32 time= 50ms  
TTL= 32
```

```
Reply from 192.90.100.15: bytes= 32 time= 50ms  
TTL= 32
```

```
Reply from 192.90.100.15: bytes= 32 time= 50ms  
TTL= 32
```

If you get the message 'Request timed out' then this means that the emulator is not responding. You must check your cache tables (using *arp -a* command) or check that the RARP daemon is running. Also check your HOSTS file is correctly set (and the ETHERS file if you are running Novell TCP/IP). Also, if you are running over a Novell network, check that there is a frametype Ethernet_II included in the NET.CFG file. Make any necessary corrections, power the emulator off and back on again and make another attempt. If you cannot get the emulator to respond using PING, it will not respond when the driver is started. If the emulator responds correctly, then you can move on to configuring the driver.

Configuring the Driver Program

The configuration information takes care of the selection, the loading and the configuration of all hardware-drivers, necessary for using the TRACE32 emulator.

When using the TRACE32 system under WINDOWS via Ethernet, the driver must be configured accordingly. Before the Ethernet connection can be established, the 'NODEname' must be resolved into an IP address. The packet length should be limited to 1024 at the most and the handshake-method must be enabled.

```
LINK=NET  
NODE=T32-MAR  
PACKLEN=1024  
HANDSHAKE=ON
```

The fonts for the TRACE32 under WINDOWS must be installed by copying the file T32FONT.FON into the system directory for the TRACE32 system (default C:\T32).

The emulator can then be started with the command *t32wsow*.

Optional command line parameters are allowed to support multiple config files (e.g. for different users). For example, the *-c* option forces the driver to use a different config file instead of the default config.t32

```
t32wsow -c d:\t32new\config.win
```

This command would load the driver and configure it according to the contents of a file called config.win in directory d:\t32new

More over, the configuration file can be made more generic by means of command parameters. Parameter substitution can be used within config files to make them more generic. The method used is similar to that used for parameter passing in DOS batch processing:

```
LINK=NET  
NODE=${1}  
PACKLEN=1024  
HANDSHAKE=ON  
  
SCREEN=  
HEADER=TRACE32 ${2}  
  
PRINTER=PS  
DEV=j:\t32tmp\pfile  
SPOOL=prt4 j:\t32tmp\pfile
```

For instance with the command

```
t32wsow T32-MAR Martin
```

T32-MAR is defined as the 'NODEname' for the emulator and 'TRACE32 Martin' will appear as a header in the TRACE32-Window.

To use several emulators on one PC at the same time, the driver software *t32wsow.exe* must exist as a copy under different names. For starting each emulator, another version of the driver must be used.

Please return to us by fax, or mail in a window envelope.

To

Lauterbach Inc.
News '96
945 Concord Street
Framingham, MA 01701

Fax: (508) 620 4522

From

Name _____

Company _____

Address _____

Phone _____

Fax _____

Email _____

We use the following processors:

We use the following Host-Systems:

We would like a demonstration, please call us.

We do not use Development Tools. Please delete our address from your mailing-list.

Australia

ELEKTRO OPTICS Pty. Ltd
Mr. Philip Montgomery
Level 1, Nelson Street
Kenthurst N.S.W. 2156
Phone (2) 6541873
FAX (2) 6541539
EMAIL philmo@electro.oz.au
WWW <http://www.electro.oz.au>

Egypt

WANTECH
Mr. W. A. Nawara
14 Amin El-Rafie St., Apt. 9
Cairo, Egypt
Phone (+202) 349-5931
FAX (+202) 349-5931
EMAIL wantech@ritsec2.com.eg

Israel

ITEC Ltd.
Mr. Mauri Gottlieb
P.O.Box 10002
Tel Aviv 61100
Phone 972-3-6491202
FAX 972-3-6497661
EMAIL itec@netvision.net.il

Spain

CAPTURA ELECTRONICA,SCCL
Mr. Juan Martinez
Edificio Forum de la Tecnol.
E-08042 Barcelona
Phone (3)291 76 33
FAX (3)291 76 35
EMAIL capel01@ibm.net

USA

BOSTON SYSTEM OFFICE
Mr. Frank O'Brien
333 Elm Street
Deham, MA 02026
Phone (617) 320 9400
FAX (617) 320 9212
EMAIL frank_obrien@tasking.nl

Austria

Nowatron Elektronik GmbH
Mr. Muttenthaler
Eitnergasse 7
A-1230 Wien
Phone (1) 8658543-0
FAX (1) 8658543-7

France

LOGIC INSTRUMENT
Mr. Denis Morand
33, Rue des Molleons
F-95230 Soisy Sous Montmorency
Phone (1) 39899622
FAX (1) 34280050
EMAIL 100772.3071@compuserve.com

Italy

DELO SYSTEMS
Mr. Giuseppe Egoriti
Via Piemonte 14
I-20090 Fizzonasco Pieve E. (MI)
Phone (02) 90 722 441
FAX (02) 90 722 742
EMAIL 100757.2373@compuserve.com

Sweden

Nohau Elektronik AB
Mr. Mikael Johnsson
Foslevaegen 6
S-21431 Malmoe
Phone 040-922425
FAX 040-968161
EMAIL info@nohau.se

USA

Lauterbach, Inc.
5 Mount Royal Ave.
Marlborough, MA 01752
Phone (508) 620 4521
FAX (508) 620 4522
EMAIL info@lauterbach.com
WWW <http://www.lauterbach.com>

Benelux

TRITEC Benelux B.V.
Mr. Robbert de Voogt
Antoniuslaan 1
NL-3341 GA Hendrik Ido Ambacht
Phone ++31 78 681 61 33
FAX ++31 78 682 00 30
EMAIL development-tools@tritec.nl

Germany

Lauterbach Datentechnik GmbH
Mr. Norbert Weiss
Fichtenstr. 27
D-85649 Hofolding
Phone (08104)8943-28
FAX (08104)8943-49
EMAIL info@lauterbach.com
WWW <http://www.lauterbach.com>

Japan

NPS Inc.
Mr. Hiroshi Kakiuchi
4-26-15 Sendagaya Shibuya-ku
Tokyo, 151 Japan
Phone (03)3405-0511
FAX (03)3405-5410-5877
EMAIL pk@nps.venture-web.or.jp
WWW nps.venture-web.or.jp

Switzerland

JBERG Datentechnik
Mr. Andreas Jberg
Zimmereiweg 2
CH-5734 Reinach
Phone (062) 7710 886
FAX (062) 7717 187

China

Watertek Inc. Mr. J. Chen
Dongshen electron Building
N. B3 Tucheng West Rd, Haidian
Beijing, P.R. China 100088
Phone +86-10-2383376
FAX +86-10-2373872
EMAIL xjwater@public.bta.net.cn

India

Electro Systems
Mr. G. V. Gurunatham
4215 JK Complex First Main Rd.
Bangalore 560 021 India
Phone 0091 803 323029
FAX 0091 803325615
EMAIL guru.esa@access.net.in

South Africa

Eagle Technology
Mr. Karni
P.O.Box 4376
Cape Town 8000
Phone 27-21-23-4943
FAX 27-21-24-4637

Taiwan

Superlink Technology Corp.
Mr. Tony Wu
9F, 399 Ho Ping East Road
RC-10695 Taipei
Phone 886-2-705-7090
FAX 886-2-708-3398
EMAIL stc@tpts1.seed.net.tw

Denmark

NOHAU Denmark A/S
Mr. Flemming Jensen
Naverland 2
DK-2600 Glostrup
Phone 43446010
FAX 43446020
EMAIL nohau-dk@inet.uni-c.dk

Ireland

NORAL MICROLOGICS Ltd.
Mr. Phil Johnson
Logic House, Gate Street
Blackburn, Lancashire BB1 3AQ
Phone (01254) 682092
FAX (01254) 680847
EMAIL noral@noral.co.uk

South Korea

DA SAN Technology
Mr. Gilbert Ko
#35-26, 3F Hae Sung B/D
Kangnam-Ku, Seoul
Phone (02) 511-9846
FAX (02) 511-9845
EMAIL dasan@soback.hana.nm.kr

UK

NORAL MICROLOGICS Ltd.
Mr. Phil Johnson
Logic House, Gate Street
Blackburn, Lancashire BB1 3AQ
Phone (01254) 682092
FAX (01254) 680847
EMAIL noral@noral.co.uk

Lauterbach Datentechnik GmbH Phone ++49 8104/8943-0
FAX ++49 8104/8943-49
Fichtenstraße 27 BBS ++49 8104/8943-47
D-85649 Hofolding Hotline ++49 8104/8943-50

info@lauterbach.com
sales@lauterbach.com
support@lauterbach.com
<http://www.lauterbach.com>

LAUTERBACH
DATENTECHNIK GMBH

