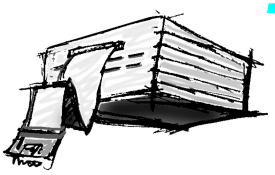
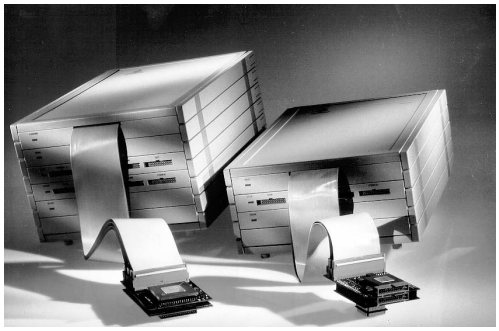


TRACE32 NEWS

Issue 1/1997

TRACE32 Customer-tailored development tools

What's Inside



The openness and modularity of the TRACE32-series products, enables Lauterbach customers to integrate their development systems into any project environment and to adapt the system configuration to their needs. With the new compact emulator TRACE32-ICE$_{COMPACT32}$, Lauterbach now has a system on the market, that is optimized in performance and price for small and medium-size applications.

When choosing a microprocessor development tool, technical system requirements, flexibility when applying the tools and investment costs are key selection criteria. The technical system requirements, defined by the processor and its frequency, along with the complexity of the hard and software and the stringency of the real-time requirements, often vary considerably. By enlarging our product range, Lauterbach can now better enable customers to adapt their development system to their project requirements.

As a low cost starter system, Lauterbach offers the in-circuit debugger TRACE32-ICD for debugging on high-level language and assembler level. Plus, the universal TRACE32-ICD basic concept brings this efficient development tool to market, directly after the introduction of a new processor type.

With the two compact emulators, development tools can be enhansed to fulfill specific applications. TRACE32-ICE$_{COMPACT8}$ was entirely designed for development with 8-bit processors. For TRACE32-ICE$_{COMPACT32}$, the functionality of the integrated state analyzer was enhanced for the application in small and medium-size projects. Both systems are adjusted optimally to their application fields in range of performance and price. The advanced modularity allows extension to the complete system TRACE32-ICE, if required.

With the high end system, TRACE32-ICE, a sophisticated in-circuit emulator, is offered. Its performance enables quick finding of complex errors as well as a comprehensive performance analysis of the target system.

All development tools of the TRACE32-series offer complete freedom when selecting the programming language, compiler and the real-time kernel. Whether you want to use the products of the TRACE32-series stand-alone or integrated in a network, all development tools are fully compatible and offer the same 'look and feel' on all supported host systems. At the same time, the universality of all TRACE32-products guarantees quick integration of new processor types, so that a TRACE32-system will be the right development tool in your next project.

New, intuitive TRACE32 User Interface

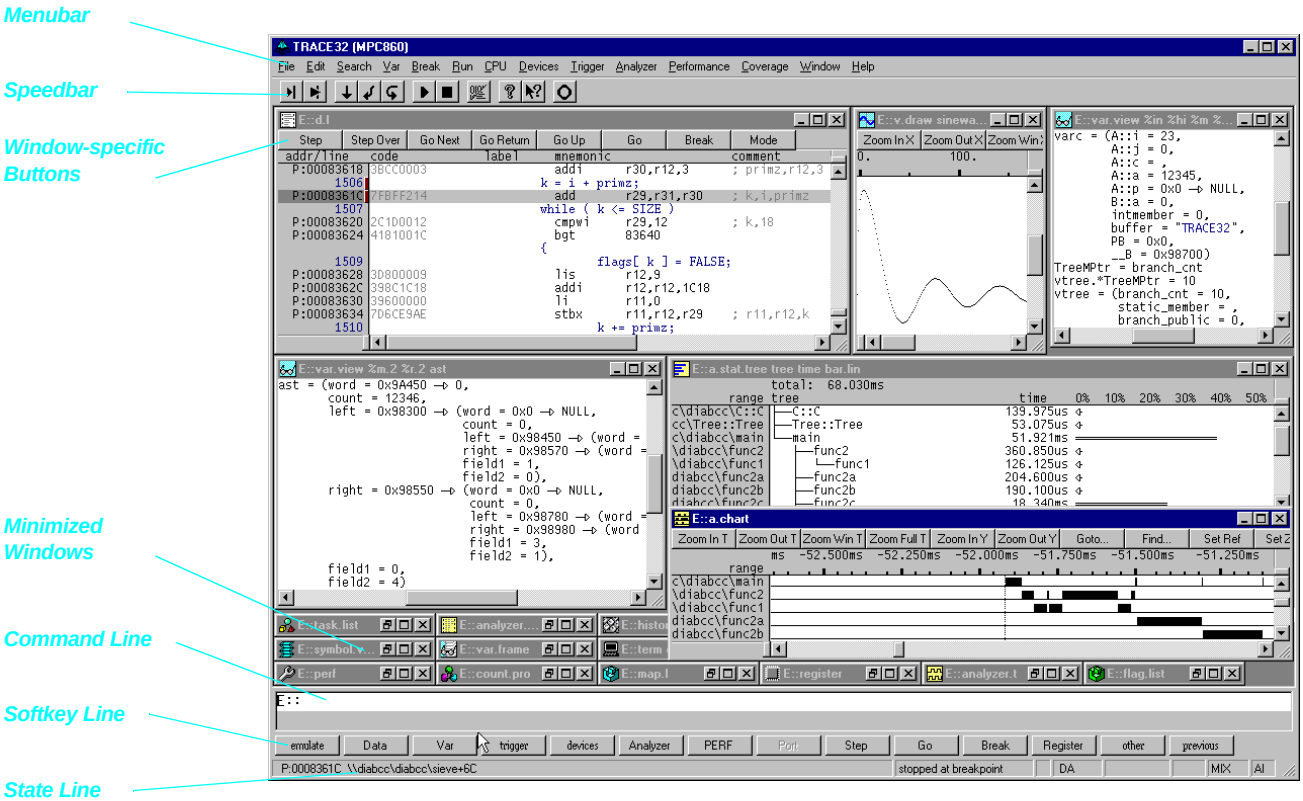
For microprocessor development systems, intuitive graphical interfaces are already today's standard. With the new TRACE32-user interface, Lauterbach not only offers a uniform, compatible interface for all products of the TRACE32-series, but also again guarantees the same 'Look and Feel' for all supported host systems.

The new TRACE32-interface guarantees a quick start for all TRACE32-development tools. No matter if you use the low-cost system TRACE-ICD or the sophisticated in-circuit emulator TRACE32-ICE, the new user interface is fully compatible for all systems. Therefore, it is possible to use different complex development tools in the same project side by side, and what's more, the user instantly feels at home on every system.

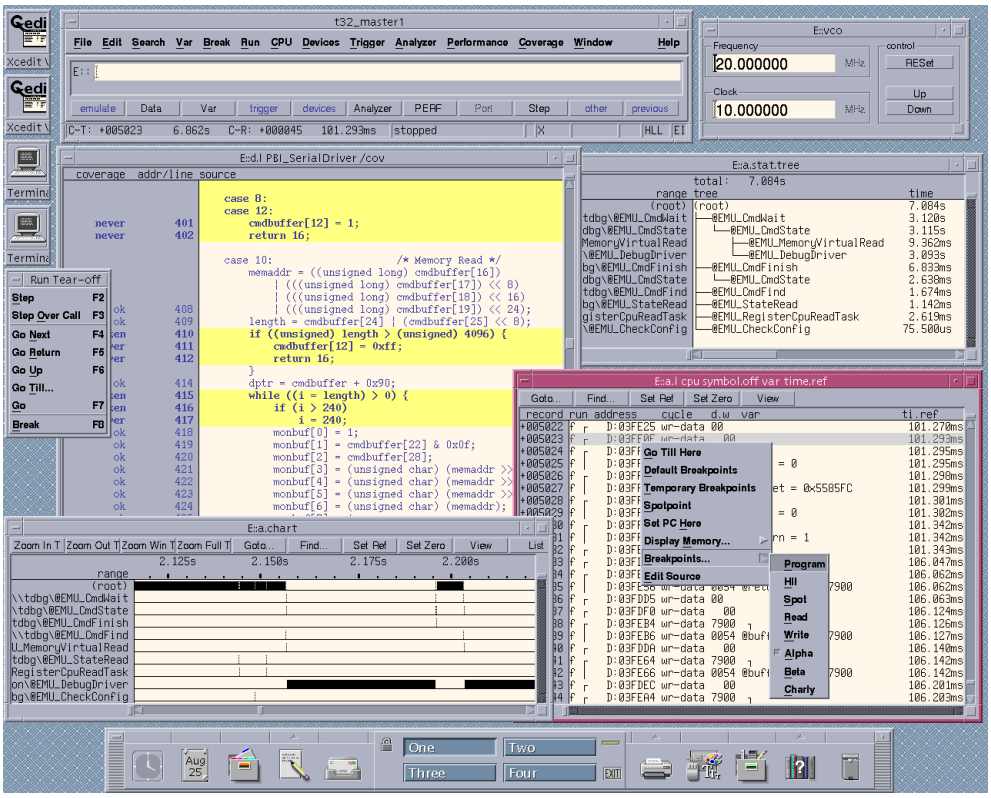
At the same time, the uniform 'Look and Feel' for all supported host systems allows the seamless integration of TRACE32-development tools in a network of PC and workstations.

The adaptation of the new TRACE32-interface for all supported host systems will be completed by the beginning of 1997. For PC-users the new user-interface is already available for WINDOWS NT and WINDOWS 95. For the workstations, the adaptation will be carried out at first on SUN Solaris. All other workstation-platforms will follow.

Customers, already applying a TRACE32 system may request an update for the new interface, free of charge, within the warranty term or in the case of a valid software maintainance contract.

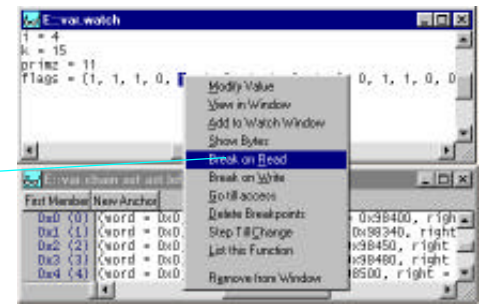


TRACE32 User Interface for WINDOWS 95



TRACE32 User Interface for SUN

For all other customers an update-package will be offered at the beginning of next year. The new user interface offers intuitive access on all important functions of the development system by the pull down menues or the window-specific command line. In addition the use of the analyser was made much easier by integrating all important analyser functions into the menu line. Information recording for the statistic functions and their evaluation e.g. can be triggered by a single mouse click.



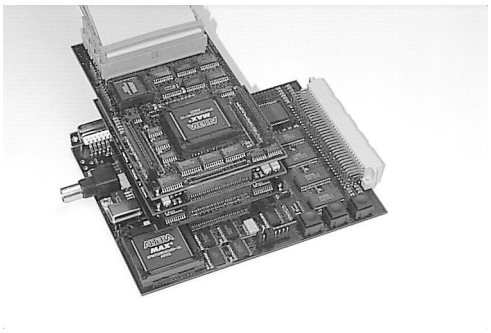
Local Menu

Besides the default menu line, the user can load his own pull-down-menues which can be optimally adapted for his application. For debugging real-time systems, for example, the end-user can create his own menu lines and list commands that display all system resources and analyse the real-time behaviour of the application.

Furthermore, the functionality of the editors, integrated into the development system, was expanded so that all standard editing functions are available.

To enable experienced users to have access on all commands of their development system, the command line will still be available.

In-Circuit Emulator for ARM7



ARM7TDMI

In close cooperation with advanced RISC machines Lauterbach offers, as the first European manufacturer, an in-circuit emulator for the processor ARM7TDMI.

From now on, an emulation module for ARM-macro-cells is available for the universal development system TRACE32. As the first core, the ARM7TDMI with the AMBA-interface is supported. The system emulates the ARM7TDMI macro-cell with the AMBA-logic, but not the peripherals integrated in the ASIC, i.e. the structure and the operational characteristics of the internal peripherals do not influence the emulation of the microcontroller.

For the emulation of an ARM-based ASIC several signals of the processor are required. In any case, controlling the emulation requires the JTAG-port of the ARM7TDMI and some debug- and status signals. Unfortunately, there is no JTAG-port on most of the ARM-standard-products at the moment (e.g. ARM710, ARM100, ARM7500, StrongARM), so that for these chips, an emulation with TRACE32-products is not available at this time.

Coming soon, is the in-circuit emulation of future ASICs of the ARM-family upgradeable to the existing system. Therefore, during the design-period of the ASIC, a close cooperation between the design engineers and the constructing engineers at Lauterbach is necessary. Details for the interface between the ARM core and the TRACE32-system must match. For this purpose, Lauterbach issued the application note "Specification of TRACE32 for ARM Cores", which, upon request, we will be delighted to send it to.

Since the beginning of 1996, Lauterbach has been supporting the processor family ARM7 with the in-circuit debugger TRACE32-ICD, together with the EPROM-simulator, an efficient tool for debugging on the assembler- and high-language level. The ICD-debugger communicates with the ARM7-processor on the target hardware via the JTAG-interface, built into the processor. Through this interface, the software is loaded into the target-RAM. Any number of program-breaks as well as spot-breaks can be defined. It goes without saying that the highly complex ICE-breaker-logic, integrated in the ARM7-core is also supported. In this way, it is possible to trigger address-, data- and control-signals as well as combinations of these signals. Operating the ICD-debugger is done via the intuitive user interface, compatible for all products of the TRACE32-series.

Support for ColdFire

MCF5102
MCF5202
MCF5203
MCF5204
MCF5206

Lauterbach completes its support for Motorola's high performance embedded systems products with development tools for the ColdFire family.

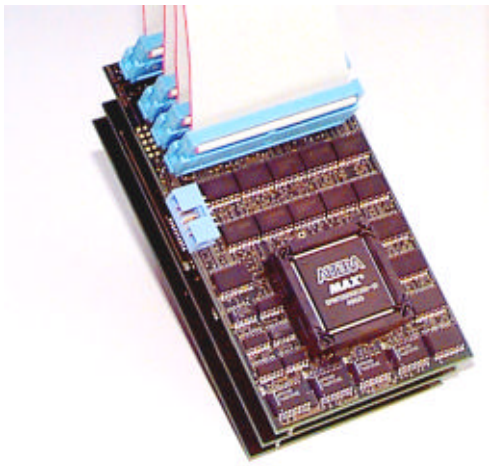
As usual, the introduction of the TRACE32 development tools for the ColdFire-family takes place in two phases. An ICD-debugger on BDM-basis for debugging on high-level language- and assembler level is already at hand.

Market introduction of the in-circuit emulator for the ColdFire-family is scheduled for the beginning of 1997. The first system will support the MCF5204. Emulation modules for all other derivatives will follow, and again, as a matter of course, the TRACE32 development tools will support a wide spectrum of compilers and real-time kernels for this family.

In-Circuit Emulator for the PowerPC-Family

PPC403GA
PPC403GB
PPC403GC
MPC505
MPC821
MPC860

PPC401EF
MPC801
MPC823



A year ago, Lauterbach put ICD-debuggers on the market for the entire Power PC-Family. Now the development of the in-circuit emulator TRACE32-ICE for these extremely fast RISC-processors is completed.

The modularity of the universal development tools of the TRACE32-series also allows the simultaneous completion of the emulation modules for the various power PC-processors. From now on, PPC403GA, PPC403GB, PPC403GC, MPC505, MPC821 and MPC860 are supported. Other modules will follow as soon as new derivatives for this family get to market.

It goes without saying that all approved TRACE32-features are provided for the Power PC emulator. Moreover, all debug-features provided by the on-chip debug support are fully supported. This way, for example, it is also possible to monitor variables in the cache by using the internal breakpoint-logic.

By an additional trace stage on the emulation module, it is possible to record the trace status lines. For each CPU-cycle, these lines inform about the program flow, without reducing the real-time behaviour of the CPU by showing all internal bus cycles and sequentializing the program execution. Together with the recorded external bus cycles and program listing, the entire program flow may be retraced.

TRACE32 Support for the 68HC12-Family

68HC12A4
68HC12B32

As one of the first manufacturers, Lauterbach offers development tools for the 68HC12-family.

Already, a short time after the first 68HC12-derivatives were available, the first in-circuit debuggers TRACE32-ICD were delivered. The ICD-debugger was realized on the basis of the 'Single Wire' BDM-interface of the 68HC12. It is an efficient tool for debugging on high- level language- and assembler level. In addition to the standard ICD-debugger's features, all additional features of the BDM-interface are fully supported. For the first time, the 68HC12 enables you to read or write on RAM-memories and/or registers, while the application is running in real-time. Moreover the different modes of the 2 hardware breakpoints, implemented for the BDM-interface, allow an effective monitoring of variable access. Byte-wise deletion and programming of on-chip EEPROM and/or flash-EPROM already belongs to the standard-features of TRACE32-ICD and are also available for the corresponding 68HC12-derivatives. Market introduction of the in-circuit emulator for the 68HC12-family is scheduled for December 1996. The expanded functionality and advanced performance of the 68HC12 can be fully supported by the standard features of TRACE32-ICE. At first, emulation modules will be available for the 68HC12A4 and the 68HC12B32. Other modules for this family will follow.

Current Information

Faster Emulation Memories

Since the beginning of 1996, Lauterbach offers faster emulation memories for its in-circuit emulators. Consequently, the maximum emulation frequency for most of the processors can be increased.

Emulation memory with an access time of 15ns is now available up to 4MB. Memories with an access time of 35ns may be expanded up to 16MB.

68K

Lauterbach further expands the support for the 68K-family. There are new emulation modules for the 68EN302, 68308, 68328, 68338 and the 68376.

AMD

Since July 1996, an emulation module for the controller AM186ER is available. With this addition Lauterbach supports the entire family.

Hitachi Super H

An ICD-debugger is already deliverable for the Super H-family.

The TRACE32 in-circuit emulator for the Super H-series of Hitachi will be available in the 2nd. Quarter of 1997. First of all, the microcontrollers SH7020, SH7021, SH7034 and SH7032 of the SH-1 family will be supported. Emulation modules for the other Super H-series will then follow.

Siemens C16x

Lauterbach completes its support for the C16x-family with a new emulation module for the C161. Moreover it is now possible to emulate the processors C163, C165 and C167 in the 3.3V version.

Thanks to a redesign of the ICE-base for the 16x-family, a 256Kbyte dual-ported ROM emulation memory is available. As a result, it is possible to set up to 256Kbyte break points on access on the internal ROM of the processor. These accesses may also be recorded in the trace buffer.

MCS196-Family

By a redesign of the emulation base for the MCS196-family, Lauterbach shifts its support to bondout technology for this family. New additions are an emulation module for the 196EA and the 196ET, which can support all derivatives of the NT- and KR-family.

As the 196EA has the serial debug interface (SDU), an ICD-debugger may be offered for this processor type.

ICD-Debugger for 56K

The TRACE32-ICD in-circuit debugger for the DSP56K product family now also supports the families DSP561xx and DSP563xx.

New supported Realtime Kernels

68K

VRTXmc, Microtec
VxWorks, Wind River Systems

Z80

CMX,CMX
VRTX80, Microtec

80166

PXROS, HighTec
OSE Basic, ENEA Data AB
Rubus OS, Articus Systems

H8

Nucleus Plus, Accelerated Technology

TRACE32 Support for Philips XA Processors

8051XA-G3

For the XA-family, an ICD-debugger on ROM-monitor-base has been available for several months. Until the beginning of 1997, the development of the in-circuit emulator for this family will be completed.

Until today, the 80C51 is the most popular processor on the 8-bit market. The constructing engineers, however, often face the problem that the requirements for the efficiency of their applications are no longer satisfied by an 8-bit system.

The XA Philips Semiconductors offers a 16-bit microcontroller which allows the change-over from an 8-bit system to a 16-bit architecture comfortably and at low costs. On the one hand the processors of the XA-family are upward compatible for the 80C51 and on the other hand, its system architecture satisfies the high requirements of modern controllers.

By implementing 16-bit CPU-registers, and by expanding the address space and the command set, the XA is more efficient than most of the comparable upgrade solutions. Moreover, the improvement of the high-level-language support and the multi-task capability allows the implementation of modern, state of the art software applications.

As always, market introduction of the TRACE32-development tools for the XA-family takes place in two steps. The in-circuit debugger TRACE32-ICD has been available for several months. It is realized on the basis of a ROM-monitor and represents an efficient tool for debugging on high-level language- and assembler level.

The second step, the introduction of the in-circuit emulator for this family is planned for the beginning of 1997. For a long time, Lauterbach has offered enhansed features such as the high-level language support and multitask capability as a part of the standard scope of performance of the TRACE32-series universal microprocessor development tools, and as a matter of course, are also fully available for the XA-family.

The 8051XA-G3 is supported as the first derivative. The emulation modules for other derivatives will follow.

Codewright-TRACE32 Link

Coupling the products of the TRACE32-series to the professional program editor Codewright (Premia Corporation), allows for easy debugging directly from Codewright. This way any occurring errors can be corrected immediately in the loaded source file.

For the linking of Codewright to the TRACE32-debugger, a special TRACE32-menu is integrated into the Codewright user-interface during installation. This menu offers commands for controlling the debugger and for displaying variables. In this way, the program flow can be controlled in real-time from within the high-level language program, loaded in the editor.

On the flip side, it is also possible to test the program via the TRACE32-user interface and to find complex errors from the help of efficient TRACE32-features. By a simple synchronization, the corresponding source file can be loaded in Codewright, and thus executes an immediate error correction.

By closely coupling the debugger and program editor, the software development time is shortened considerably. Hence, an optimal integrated development environment is created by the link of these two very efficient tools.

SDL Integration for TRACE32-ICE

In close cooperation with Lauterbach, S&P Media offers the integration of the in-circuit emulator TRACE32-ICE with the SDL-specification tool SDT. The goal of this integration is to provide an integrated development environment which offers an abstract view on the behaviour of complex real-time applications.

S&P Media is the German distributor of SDT (Telelogic) and offers tools and consulting for the real-time industry.

SDT is a highly integrated software package for managing and automating the development and maintainance of real-time and interactive systems. On the basis of the object-oriented methodics OMT and the graphical specification language SDL, SDT allows the specification and design of complex real-time software on an abstract level. The graphical specifications can be simulated and then executed on the target system with the automatically generated C-Code. The standard procedure with SDT is shown in the chart below.

The SDT Cmicro-tester is responsible for testing on the target system. The Cmicro tester consists of two parts: C modules which are compiled together with the SDT Cmicro Library and downloaded to the target, and a program that runs on the host system allowing the user interface to enter commands and to read trace information.

The modules on the target system read the SDL information from the running SDL-system and send this information, by way of a defined interface (e.g.V.24), to the host system. At the same time, the modules accept commands from the program running on the host system.

The integration of the In-Circuit Emulator TRACE32-ICE allows for easy testing without a separate interface on the target system. Through the dual-port access of the emulator, the Cmicro-tester may read out system information without influencing the behaviour of the target system. With the help of the analyzer of TRACE32-ICE a comprehensive analysis of the system behavior is possible.

At the same time, TRACE32-ICE is able to test all non-SDL applications via its intuitive user interface.

By combining SDT and TRACE32, an efficient development environment is available, allowing for a smooth integration of your SDL appliction.

For more information contact:

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Fax: + +46 40 17 47 47
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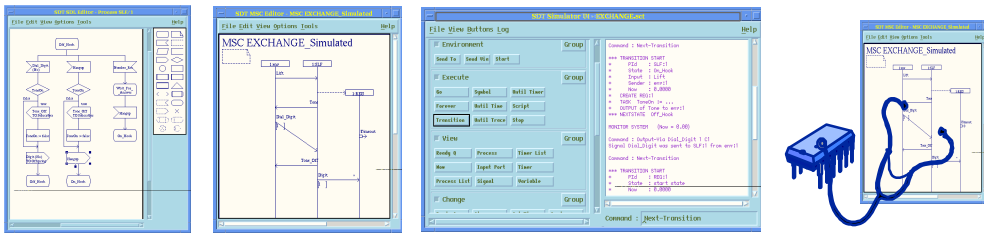


Specification

With SDL and MSCs, you define on PC the architecture and the dynamics oth the target system

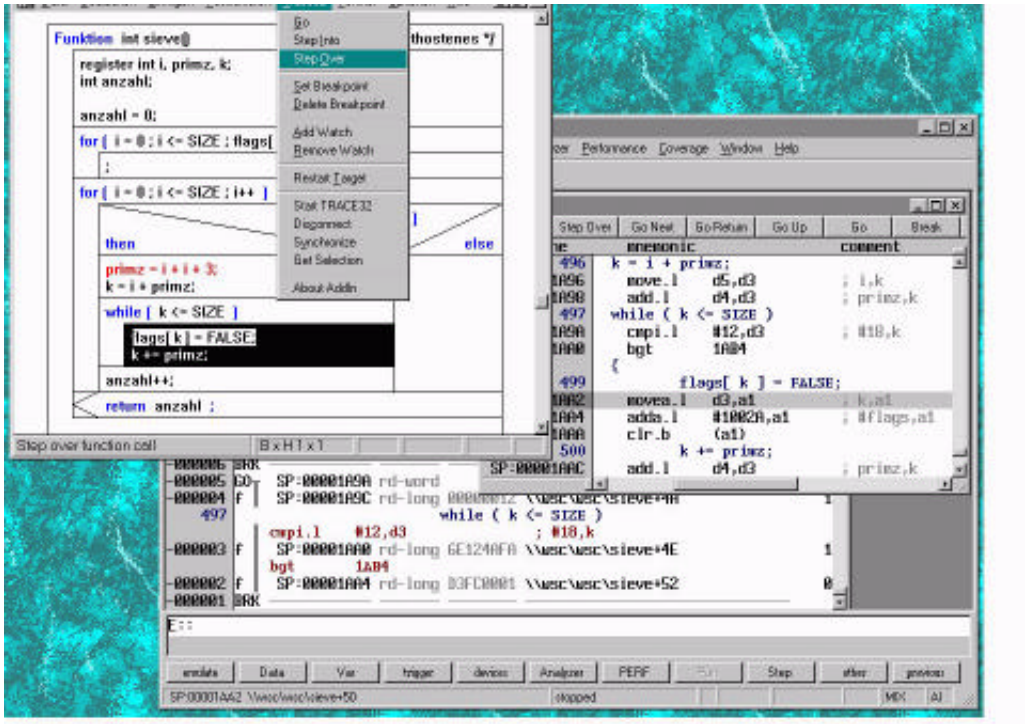
Simulation

You verify the system by simulating it on the PC - with SDT-simulator and MSC-trace no problem

Target Test

The Cmicor-tester shows the MSC-trace directly from the target. The system is validated

EasyCASE-TRACE32 Link



Coupling the case-tool EasyCASE with the development-tools of the TRACE32-series not only reduces the development times for embedded systems, by sophisticated debugging on structure diagram level, it also allows for improved quality assurance according to ISO 9001.

EasyCASE (Siemens Austria) is an integrated development environment, supporting the software engineer in designing and programming, as well as in the maintenance and documentation of complexe software systems. The basic concept of EasyCASE is the graphical visualization of program flows in the form of structure diagrams.

To satisfy the customer's desire for following the program flow at the structure diagram level, in real-time, EasyCase has the potential to integrate debuggers via a programmable add-in-interface. Thereby, the debugger can be controlled from within EasyCASE, and the debugger, is able to influence EasyCASE through a defined control mechanism.

For the link of EasyCASE and the TRACE32-debugger, a special TRACE32-menu is implemented into the EasyCASE user-interface during the installation, offering commands for controlling the debug-process and for displaying variables. With this, the program flow may be followed and controlled in the structure diagram.

Another way is to test the program via the TRACE32-user-interface and localize complex errors by help of the efficient TRACE32 features. By a simple synchronization, it is possible to load the corresponding structure diagram section into the EasyCASE editor for quick error correction.

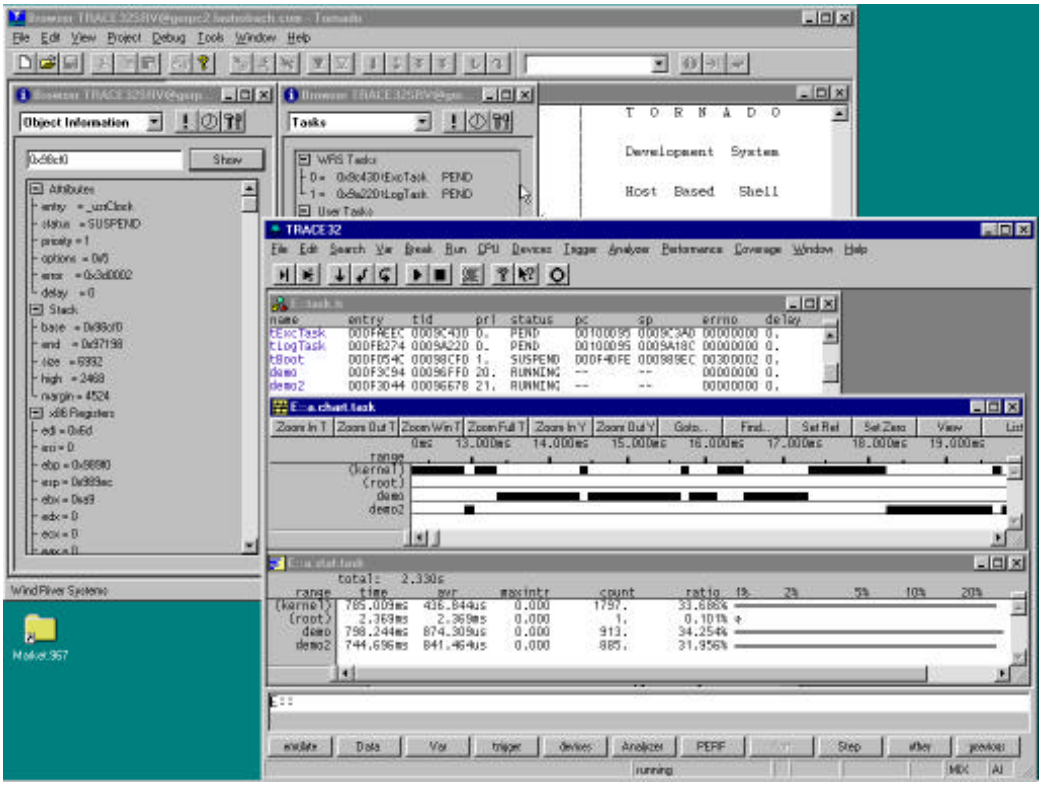
Coupling the TRACE32-debugger with the CASE-tool EasyCASE is possible for all products of the TRACE32-series under WINDOWS NT and WINDOWS 95.

TORNADO Integration for TRACE32-ICE

The development of real-time applications puts high demands on hard and software engineers. The increasing complexity of these systems requires very efficient development tools. By the integration of TRACE32-ICE into the integrated development environment TORNADO, a powerful tool combination is made available, meeting the highest requirements.

The development time for complex real-time applications has continually decreased in recent years. Integrated development environments, supporting the constructing engineer from the first layout of the software to the end of the test phase, help to face the increasing time pressure. On one hand, such development environments reduce the training time, and on the other hand, allow the switching between the different development phases without any problems, as the applied tools are adjusted accurately. TORNADO, by Wind River Systems, represents a new generation of development environments for complex real-time applications. It includes an enhanced C/C++ Cross-Compiler, an assembler, a linker, a symbolic high-level-language debugger, a system for version control, a browser for real-time operating system structures and many other useful tools.

During the software integration, the debug-tools included in TORNADO, are linked to the target system through a so-called *Target Server* which supports a large number of communication interfaces such as Ethernet, serial connetion, ICE or ROM emulator. On the target system, the so-called *Debug-Agent* handles the communication for the application and for the real-time kernel VxWorks. The debug-agent is a special driver, which is linked to the application.



For integrating the in-circuit emulator TRACE32-ICE into the TORNADO-development environment, Lauterbach uses ICE as the method of communication. As a result, the functions that the debug agent ordinarily provides are now provided by the emulator.
With the TORNADO user interface, the design engineer can now monitor his system resources and debug his application using the powerful TRACE32 features in a transparent way. By utilizing TRACE32-system-resources, the efficiency of the development environment can be improved considerably. For example, it is also possible to set breakpoints for code in the ROM. In addition, monitoring of all system information and resources can be executed in real-time via the dual-port memory.
By totally integrating all tools applied for the development process, efficient development surroundings may result, helping the design engineer to shorten considerably the time-to-market date of his real-time application.The TORNADO-integration of TRACE32-ICE is available on WINDOWS-NT and on SUN for 68K, CPU32 and the x86-family.

Exhibitions

Australia
Electronics at Work
in Melbourne
June 18-19, 1997
represented by Electro Optics Pyt. Ltd.

Denmark
Teknik & Data
in Odense
February 5-7, 1997
represented by NOHAU Denmark A/S

HI 97
in Herning
September 16-20, 1997
represented by NOHAU Denmark A/S

Israel
Electronica 97
in Tel Aviv
March 25-27, 1997
represented by ITEC Ltd.

Netherlands
Industriele Elektronica
in Utrecht Jaarbeurs
April 8-11, 1997
represented by TRITEC Benelux B. V.

Sweden
DSP Scandinavia
in Stockholm
June 3-4, 1997
represented by NOHAU Electronik AB.

Embedded Computing
in Gothenburg
September 2, 1997
represented by NOHAU Electronik AB.

Embedded Computing
in Stockholm
September 4, 1997
represented by NOHAU Electronik AB.

Komponent 97
in Gothenburg
September 9-12, 1997
represented by NOHAU Electronik AB.

USA
Embedded Systems Conference East
in Boston
March 12-15, 1997
represented by Lauterbach Inc.

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_____

❒ We use the following host systems:
_____

❒ We do not use development tools. Please delete our address from your mailing-list.

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