TRACE32®

Technical Information

NEXUS-PPC

NEXUS Debugger and Trace for PowerPC

- Support for NEXUS standard class 1 to 3
- Easy high-level and assembler debugging
- Interface to all compilers
- Program and data flow trace up to 100 MHz
- 16/32 M * 128 bit trace depth
- Trace contents readable while sampling
- Code coverage
- Performance analysis
- Trigger programming
- Interface to all hosts
- USB and ETHERNET interface included

MPC533
MPC534
MPC535
MPC536
MPC561
MPC562
MPC563
MPC564
MPC565
MPC566

The Lauterbach product TRACE32-PowerTrace/NEXUS supports the NEXUS standard class 1 to 3. The hardware module for the NEXUS debugger is universal and allows to interface different target processors by simply changing the NEXUS adapter and starting a new software.

13.01.05

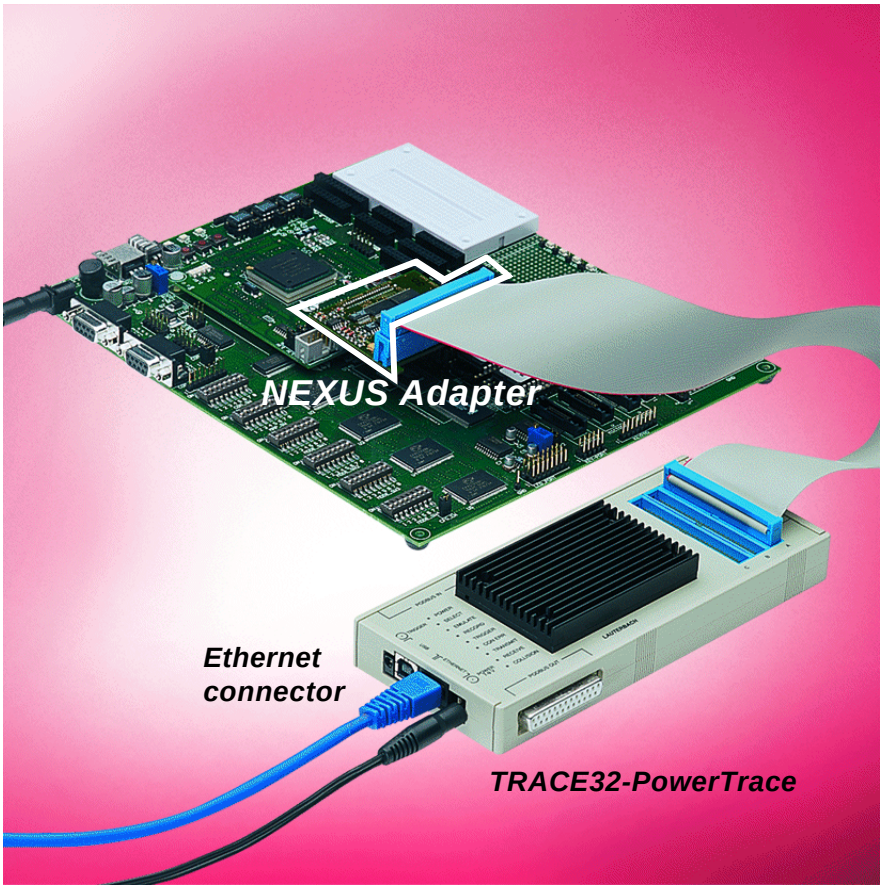
LAUTERBACH

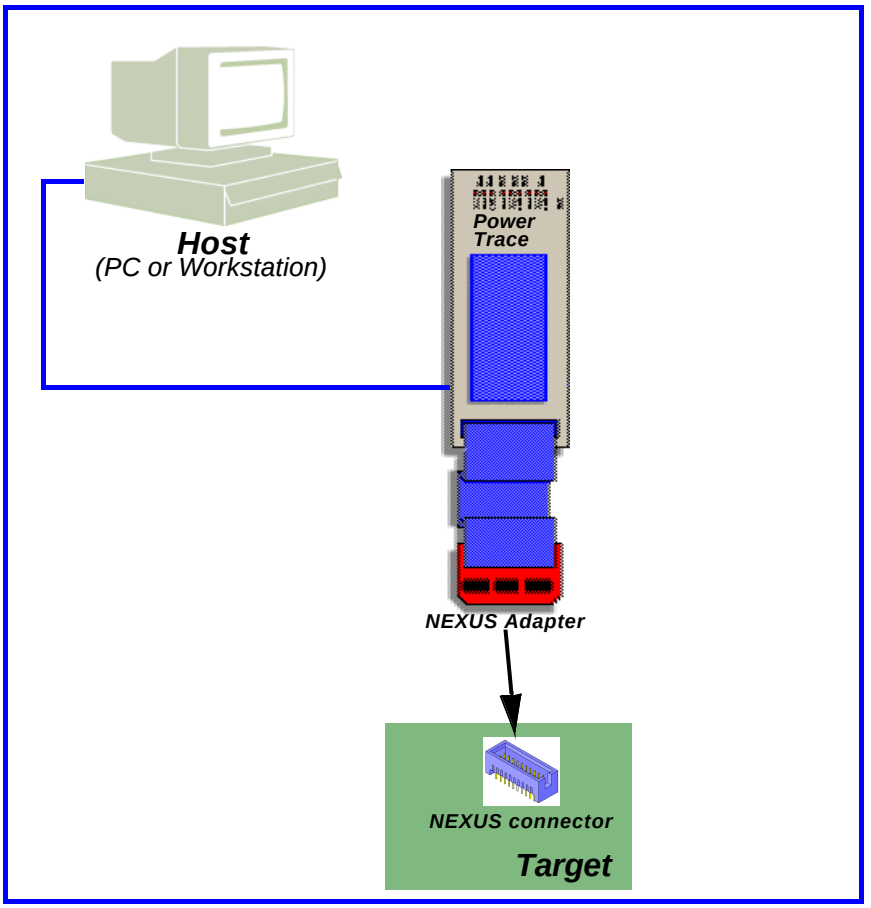
Hardware Concept

TRACE32-PowerTrace/NEXUS

The NEXUS support is based on the universal hardware module TRACE32-PowerTrace. The connection to the NEXUS interface on the target is done by a CPU specific NEXUS adapter.

TRACE32-PowerTrace includes a USB and Ethernet interface.





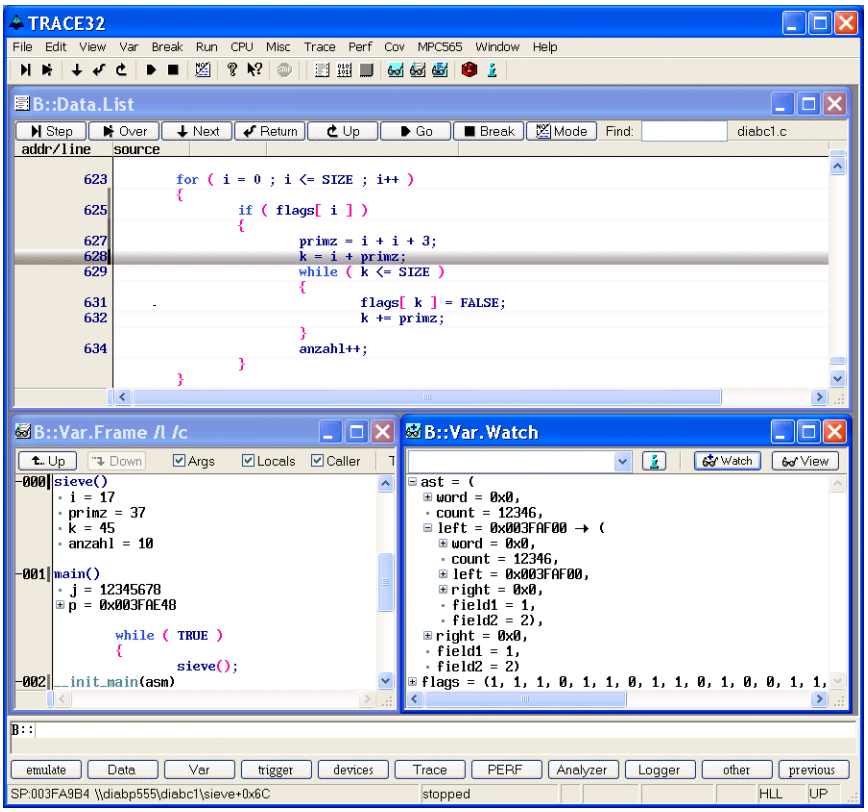
PowerTrace

- ❏ Universal debugger hardware for all architectures
- ❏ Ethernet or USB interface included
- ❏ Program and data flow trace for NEXUS up to 100MHz
- ❏ 16 MFrame trace memory
- ❏ 96 channels
- ❏ 32 bit time stamp, 20 ns resolution

CPU specific NEXUS Adapter

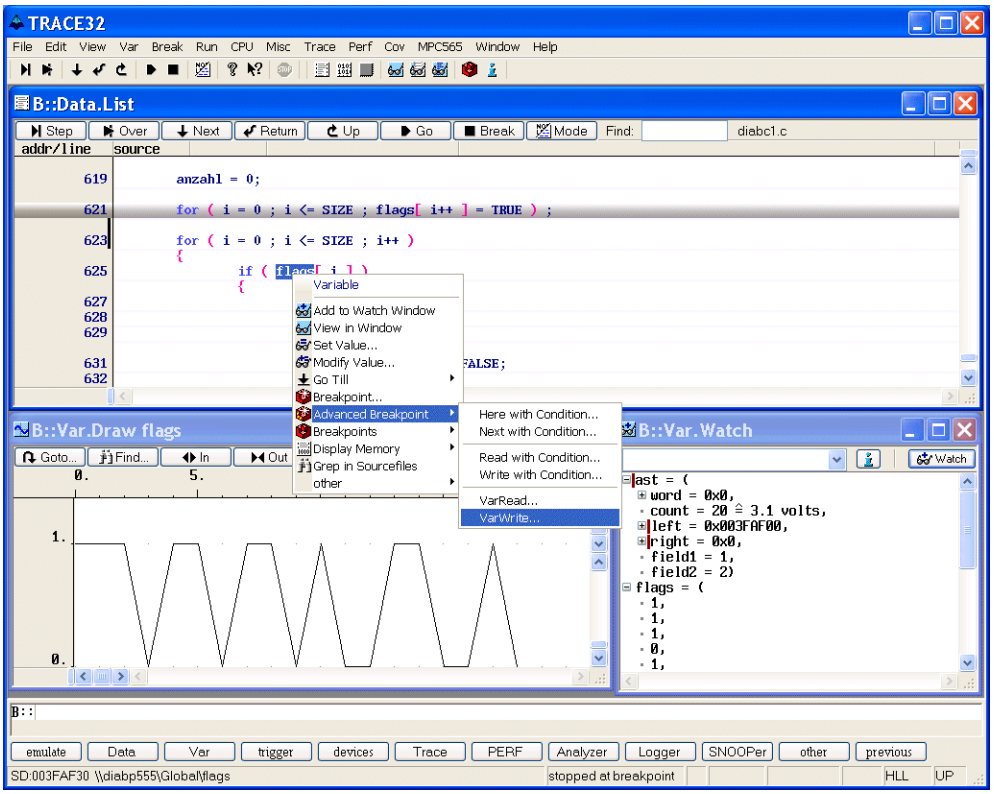
Software Concept Debugger

Symbolic Debugging



A hierarchical symbol database enables structured symbolic debugging. Symbol names can be used to show single program addresses, module names and memory classes. The disassembler can use the symbols for labels and/or operands. Demangling for C++ signatures is supported.

High-Level Language Debugging



TRACE32 can directly load the output of all standard compilers for C, C++, JAVA, Pascal, Modula2, PEARL and ADA from most compiler vendors. Program display and debugging can be done in assembler, high-level or in a mixture of both. It is possible to construct both assembler and high-level windows on the screen simultaneously. All variable types specific to the high-level language can be displayed and modified. Addresses can be absolute, relative or line number based.

Real-time update

Real-time update of memory and variables is possible while the CPU is running.

Debugging

The debugger uses the following breakpoint implementations to stop the program execution at a certain instruction:

- unlimited number of software breakpoints for code in RAM
- Umlimited Code Breakpoints in FLASH areas
- a limited number of onchip breakpoints for code in ROM/ FLASH

The onchip breakpoints can also be used to stop the program execution after a read/write access to a specific memory address.

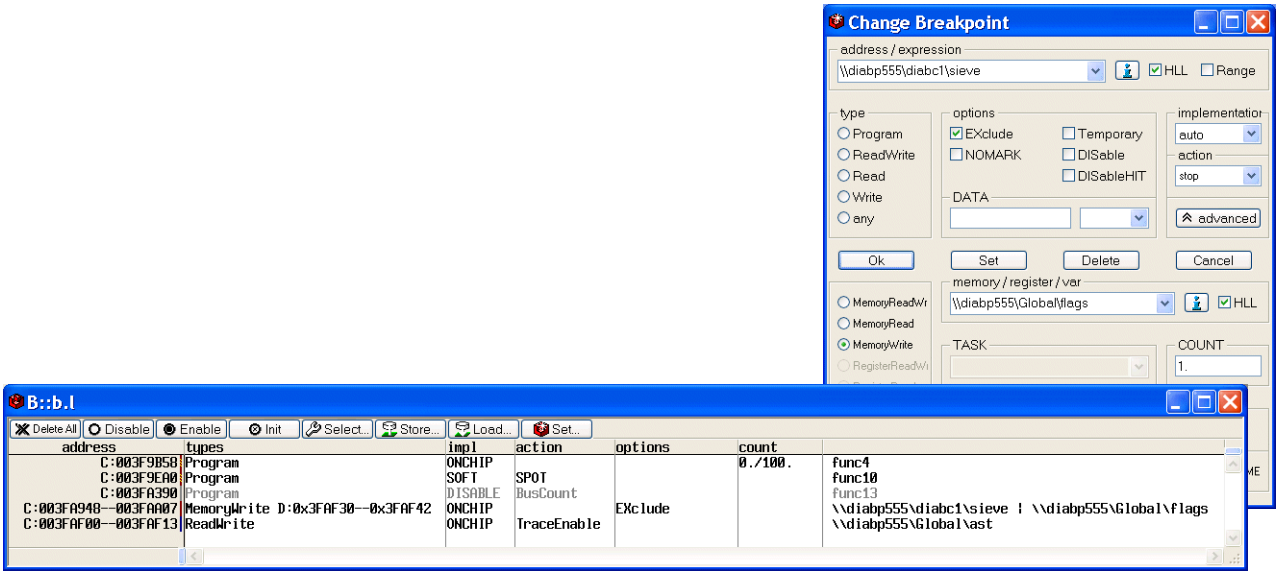
The number of available onchip breakpoints depends on the resources provided by the CPU used.

Advanced breakpoints

The NEXUS provides also a simple way to set complex break conditions:

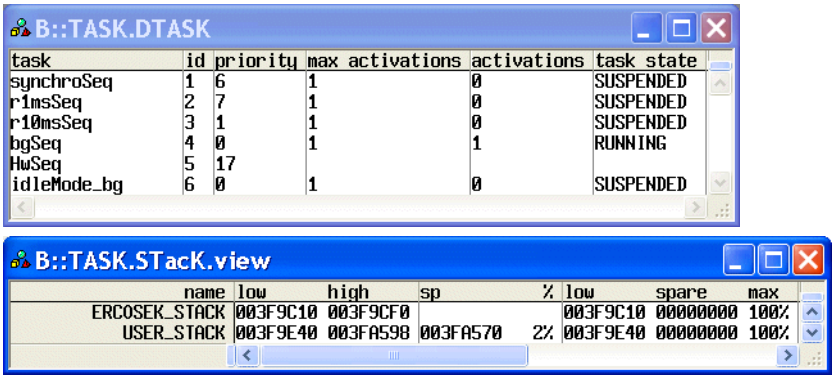
- ❏ Setting of breakpoints to the reading and writing of specific data values
- ❏ Linking the breakpoint with a condition
- ❏ Linking the breakpoint with commands that are executed whenever the breakpoint is reached
- ❏ Spot breakpoints on data accesses

A combination of all 4 new features is also possible.



RTOS Awareness

The NEXUS Debuggers provide display functions, closely mirroring the command set of the integral debugger of the RTOS. The system resources e.g. tasks, objects, partitions, queues, regions and semaphores can be displayed. These functions are also available if the integral debugger is not linked to the software.

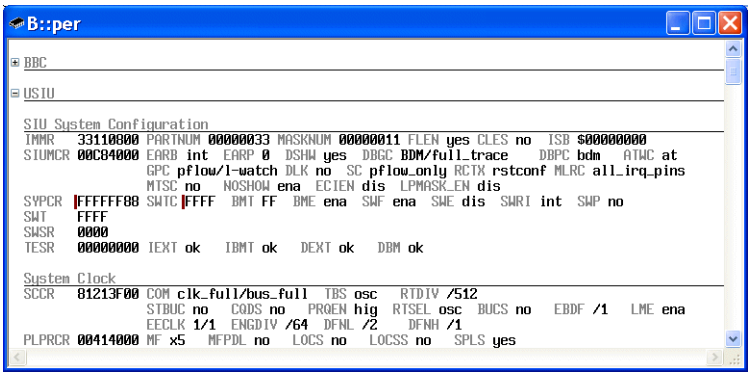


OSEK awareness with ORTI support

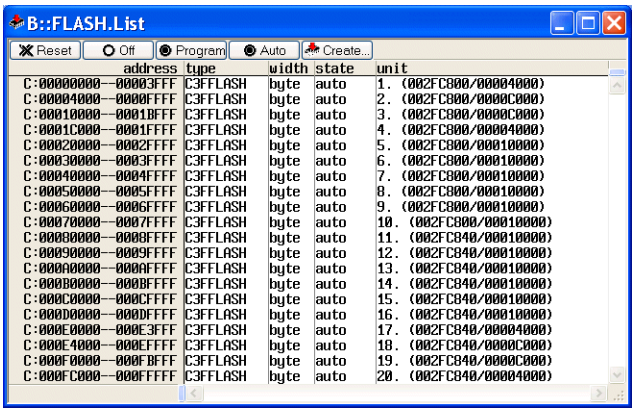
ASAP2 based scaled variable display

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



Flash Programming

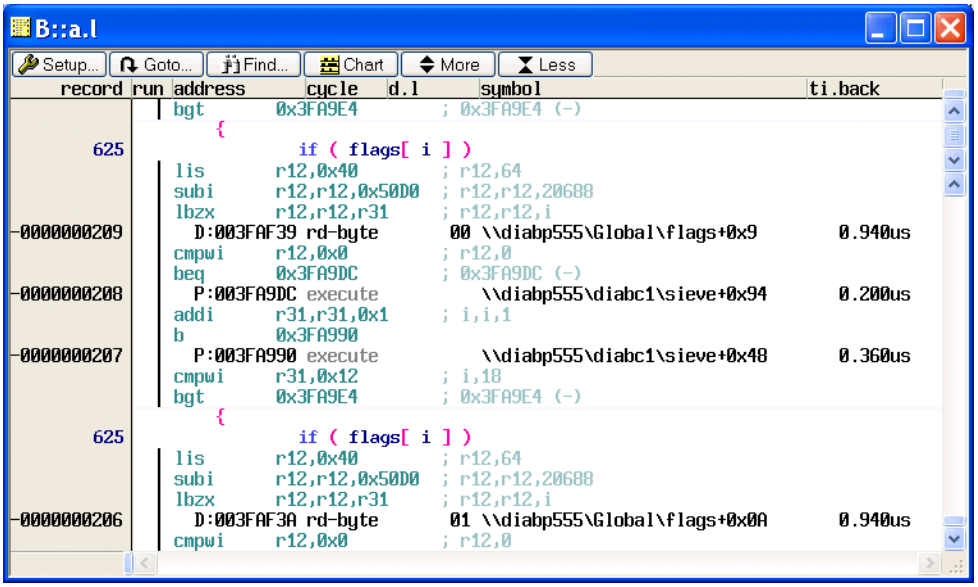


The NEXUS debugger support the programming of external flash memory as well as the programming of internal flash memory of microcontrollers. The programming can be controlled by the debugger or by a routine in the target system.

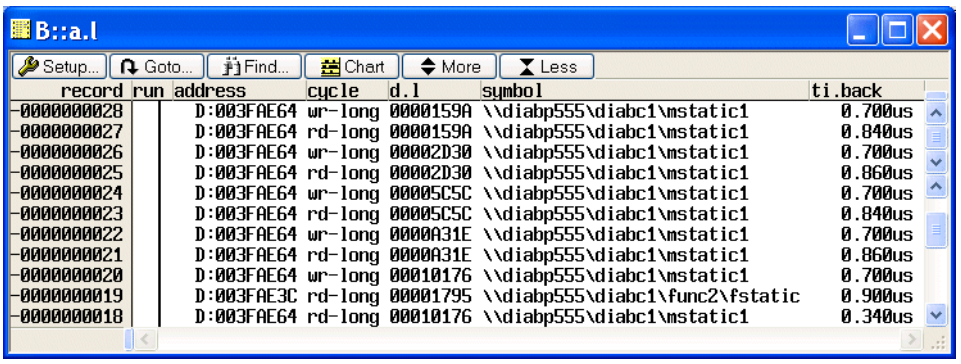
Software Concept Trace

Program/Data Flow Trace

TRACE32-PowerTrace for NEXUS samples all trace messages output via the NEXUS Auxiliary Output Port e.g. branch trace messages, data trace messages….



Selective Tracing

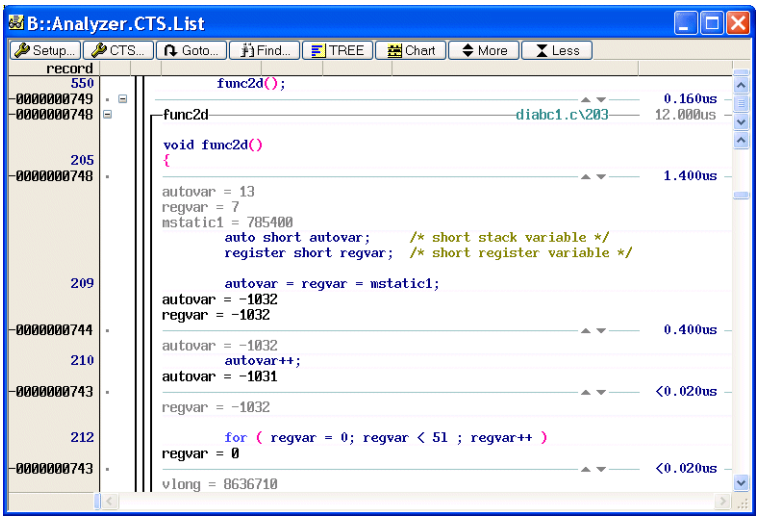


TRACE32-PowerTrace/NEXUS supports selective tracing on 2 data address ranges. Selective tracing is supported on:

- ❏ Specified data accesses only

- Specified data accesses plus the complete program flow information

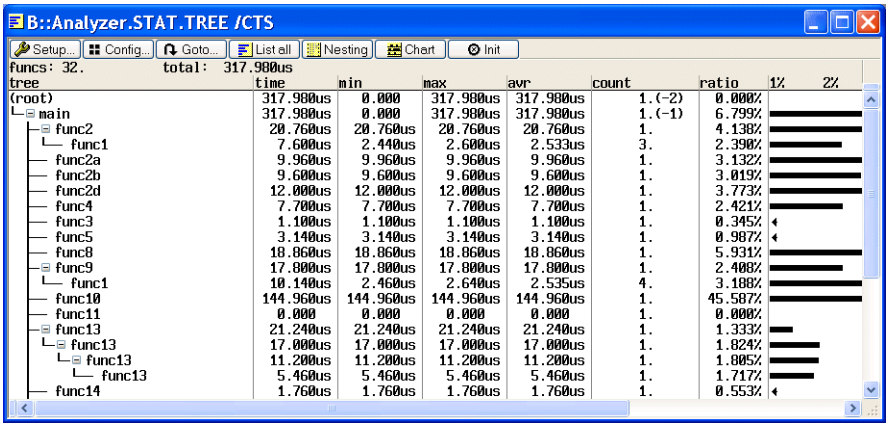
CTS Context Tracking System and SmartTrace



- Reconstucts registers and memory from trace
- SmartTrace fills trace gaps caused by buffer overflow

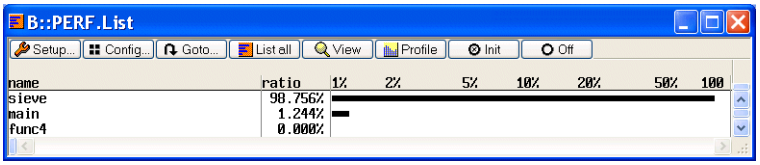
Statistic functions

The very large trace buffer allows function runtime analysis over a long period.



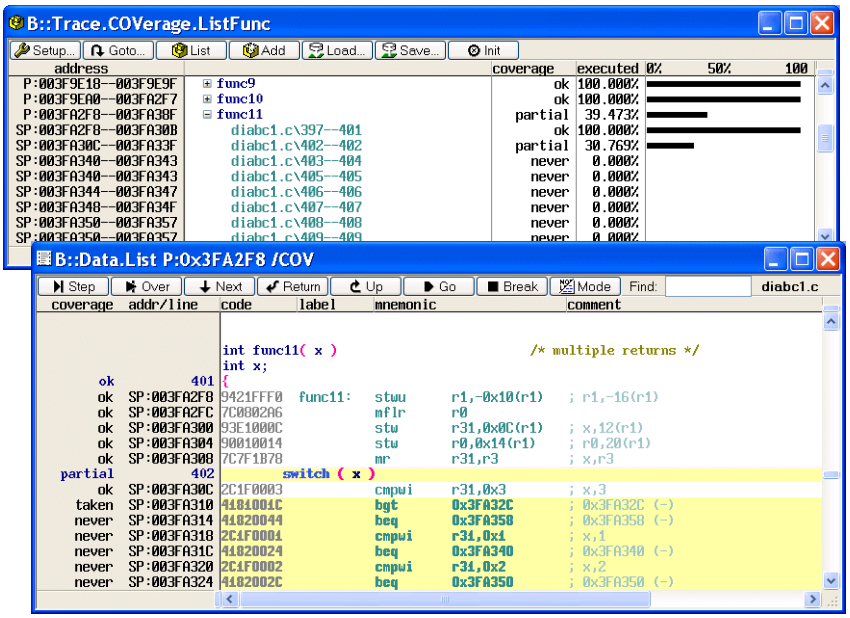
Trace-based Performance Analysis

The performance measurement used by TRACE32-PowerTrace/NEXUS is a statistical process. To determine for example which function or which module uses the greatest proportion of the total runtime the recording into the trace memory is stopped briefly to determine the current program counter contents. This measurement has absolutely no influence on the real-time behaviour.



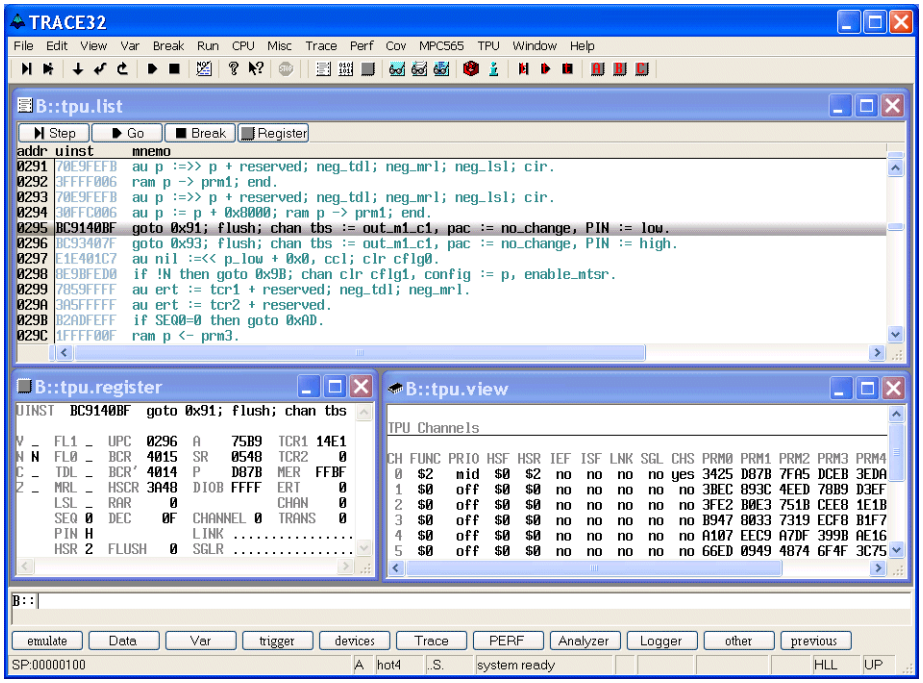
Code Coverage

It is also possible to perform a code coverage analysis based on the comprehensive information from the trace memory.



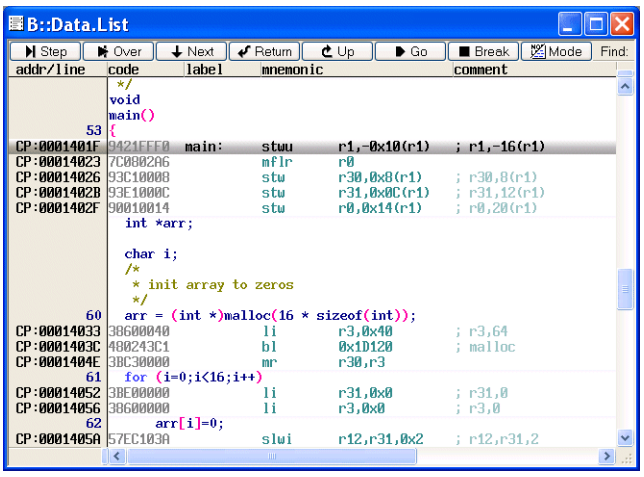
TPU Support

The TPU Debugger allows debugging the TPU (Timing Processor Unit) found on many Motorola Devices. It allows setting break conditions on different events and single stepping the TPU microcode while watching the internal registers of the TPU.



Code Compression

- ❏ Full support of Phase B code conpression

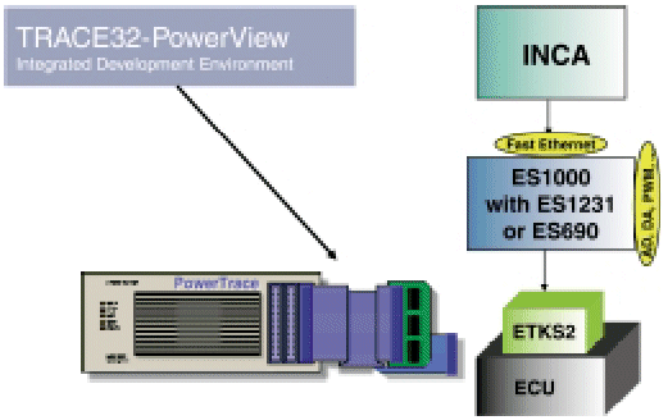


Standby Mode

Standby mode and debugging thru power-down cycle is supported.

ETK Support

The NEXUS for PowerPC can work with ETAS ETK



Supported Processors

CPU	ICE	FIRE	ICD DEBUG	ICD MONITOR	ICD TRACE	POWER INTEGRATOR	INSTRUCTION SIMULATOR
MPC533			YES		YES		YES
MPC534			YES		YES		YES
MPC535			YES		YES		YES
MPC536			YES		YES		YES
MPC561			YES		YES		YES
MPC562			YES		YES		YES
MPC563			YES		YES		YES
MPC564			YES		YES		YES
MPC565			YES		YES		YES
MPC566			YES		YES		YES

Operation Voltage and Frequency

Operation 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.

Adapter	Code	OrderNo	Voltage Range
Nexus Adapter for MPC56x family/ AMP40NS	NEXUS-MPC565-AMP40NS	LA-7781	2.3 .. 3.0 V
Nexus Adapter for MPC56x family/ Glenair51	NEXUS-MPC565-GLEN51	LA-7782	2.3 .. 3.0 V
Nexus Adapter for MPC56x family/ AMP50	NEXUS-MPC565-AMP50	LA-7783	2.3 .. 3.0 V
Nexus Adapter for MPC56x family/ Mictor38	NEXUS-MPC565-MICTOR	LA-7791	2.3 .. 3.0 V

Frequency Trace

The maximum operation frequency of TRACE32-RISC Trace or PowerTrace depends on:

- ❏ The max. frequency of the CPU
- ❏ The number of waitstates (bus trace)
- ❏ The divide factor between trace clock and core clock
- ❏ The speed of the trace adapter

Module	CPU	TRACE
LA-7781	MPC533	80.0 MHz
LA-7781	MPC534	80.0 MHz
LA-7781	MPC535	80.0 MHz
LA-7781	MPC536	80.0 MHz
LA-7781	MPC561	80.0 MHz
LA-7781	MPC562	80.0 MHz
LA-7781	MPC563	80.0 MHz
LA-7781	MPC564	80.0 MHz
LA-7781	MPC565	80.0 MHz
LA-7781	MPC566	80.0 MHz
LA-7782	MPC533	80.0 MHz
LA-7782	MPC534	80.0 MHz
LA-7782	MPC535	80.0 MHz

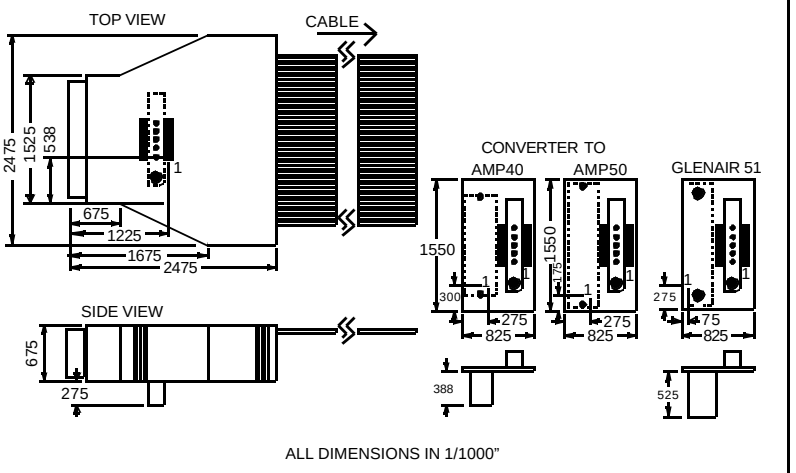
Module	CPU	TRACE
LA-7782	MPC536	80.0 MHz
LA-7782	MPC561	80.0 MHz
LA-7782	MPC562	80.0 MHz
LA-7782	MPC563	80.0 MHz
LA-7782	MPC564	80.0 MHz
LA-7782	MPC565	80.0 MHz
LA-7782	MPC566	80.0 MHz
LA-7783	MPC533	80.0 MHz
LA-7783	MPC534	80.0 MHz
LA-7783	MPC535	80.0 MHz
LA-7783	MPC536	80.0 MHz
LA-7783	MPC561	80.0 MHz
LA-7783	MPC562	80.0 MHz
LA-7783	MPC563	80.0 MHz
LA-7783	MPC564	80.0 MHz
LA-7783	MPC565	80.0 MHz
LA-7783	MPC566	80.0 MHz
LA-7791	MPC533	80.0 MHz
LA-7791	MPC534	80.0 MHz
LA-7791	MPC535	80.0 MHz
LA-7791	MPC536	80.0 MHz
LA-7791	MPC561	80.0 MHz
LA-7791	MPC562	80.0 MHz
LA-7791	MPC563	80.0 MHz
LA-7791	MPC564	80.0 MHz
LA-7791	MPC565	80.0 MHz
LA-7791	MPC566	80.0 MHz

Dimensions and Adapters

Modules

Dimension

LA-7791 NEXUS-MPC565-MICTOR



Connectors (MICTOR)

Signal	Pin	Pin	Signal
HRESET-	1	2	VREF
EVTI-	3	4	RSTI-
MSEI-	5	6	MDI0
GND	7	8	GND
MCKI	9	10	MDO0
GND	11	12	GND
MCKO	13	14	EVTO-
GND	15	16	GND
MSEO0-	17	18	ARBREQ
GND	19	20	GND
MDO1	21	22	MDO2
GND	23	24	GND
MDO3	25	26	MDI1
N/C	27	28	N/C
MSEO1-	29	30	MDO4
GND	31	32	VENDEF1
MDO5	33	34	MDO6
VENDEF0	35	36	NRES0
MDO7	37	38	ARBGRANT

Order Information

Module Description

OrderNo Code	Text
LA-7781 NEXUS- MPC565- AMP40NS	**Nexus Adapter for MPC56x family/AMP40NS** Adapter for NEXUS on Spanish Oak (MPC565), Silver Oak (MPC561) and Green Oak (MPC563) 40 pin AMP connector (non standard) includes debug and trace software TRACE32-PowerView
LA-7782 NEXUS- MPC565- GLEN51	**Nexus Adapter for MPC56x family/Glenair51** Adapter for NEXUS on Spanish Oak (MPC565), Silver Oak (MPC561) and Green Oak (MPC563) 51 pin Glenair connector includes debug and trace software TRACE32-PowerView
LA-7783 NEXUS- MPC565- AMP50	**Nexus Adapter for MPC56x family/AMP50** Adapter for NEXUS on Spanish Oak (MPC565), Silver Oak (MPC561) and Green Oak (MPC563) 50 pin nonrobust AMP50 connector (AMP 104549-7) includes debug and trace software TRACE32-PowerView
LA-7785 NEXUS-CONV- SMALL-50	**Conv. Large NEXUS Model to Small Model AMP50** Converter from large NEXUS model AMP50 to small NEXUS model AMP50 for adapter for NEXUS on Spanish Oak (MPC565), Silver Oak (MPC561) and Green Oak (MPC563)
LA-7791 NEXUS- MPC565- MICTOR	**Nexus Adapter for MPC56x family/Mictor38** Adapter for NEXUS on Spanish Oak (MPC565), Silver Oak (MPC561) and Green Oak (MPC563) with 38 pin mictor connector AMP40NS NEXUS connector requires LA-7793 AMP50 NEXUS connector requires LA-7794 GLENAIR51 NEXUS connector requires LA-7797 includes debug and trace software TRACE32-PowerView requires PowerTrace hardware
LA-7793 CONV- MICTOR38- AMP40	**Converter Mictor38 to NEXUS/AMP40 for MPC56x** Converter from the 38 pin mictor connector on Nexus Adapter for MPC56x family/Mictor38 (LA-7791) to NEXUS/AMP40NS
LA-7794 CONV- MICTOR38- AMP50	**Converter Mictor38 to NEXUS/AMP50 for MPC56x** Converter from the 38 pin mictor connector on Nexus Adapter for MPC56x family/Mictor38 (LA-7791) to NEXUS/AMP50
LA-7797 CONV-MIC38- GL51-56X	**Conv. Mictor38 to NEXUS/GLENAIR51 for MPC56x** Converter from the 38 pin mictor connector on Nexus Adapter for MPC56x family/Mictor38 (LA-7791) to NEXUS 51 pin Glenair connector

Detailed Order Information

Order No.	Code	Text
LA-7781	**NEXUS-MPC565-AMP40NS**	**Nexus Adapter for MPC56x family/AMP40NS**
LA-7782	**NEXUS-MPC565-GLEN51**	**Nexus Adapter for MPC56x family/Glenair51**
LA-7783	**NEXUS-MPC565-AMP50**	**Nexus Adapter for MPC56x family/AMP50**
LA-7785	**NEXUS-CONV-SMALL-50**	**Conv. Large NEXUS Model to Small Model AMP50**
LA-7791	**NEXUS-MPC565-MICTOR**	**Nexus Adapter for MPC56x family/Mictor38**
LA-7793	**CONV-MICTOR38-AMP40**	**Converter Mictor38 to NEXUS/AMP40 for MPC56x**
LA-7794	**CONV-MICTOR38-AMP50**	**Converter Mictor38 to NEXUS/AMP50 for MPC56x**
LA-7797	**CONV-MIC38-GL51-56X**	**Conv. Mictor38 to NEXUS/GLENAIR51 for MPC56x**
Additional Options		
LA-1370	MICTOR-FLEXEXT	Mictor Flex Extension

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