

PowerTrace for NEXUS



- Support for NEXUS standard class 1 to 3+
- Programming support for on-chip and external flashes
- Real-time access to memory
- Hardware breakpoints and trigger
- Program and data flow trace up to 400 MHz
- Up to 4 GByte trace memory
- Upload to host within 10 seconds typically
- Selective data flow trace for 2 address ranges
- Trigger on instruction execution or data access
- Statistic functions/Performance analysis
- Code coverage
- External trigger input and output
- USB and ETHERNET interface included

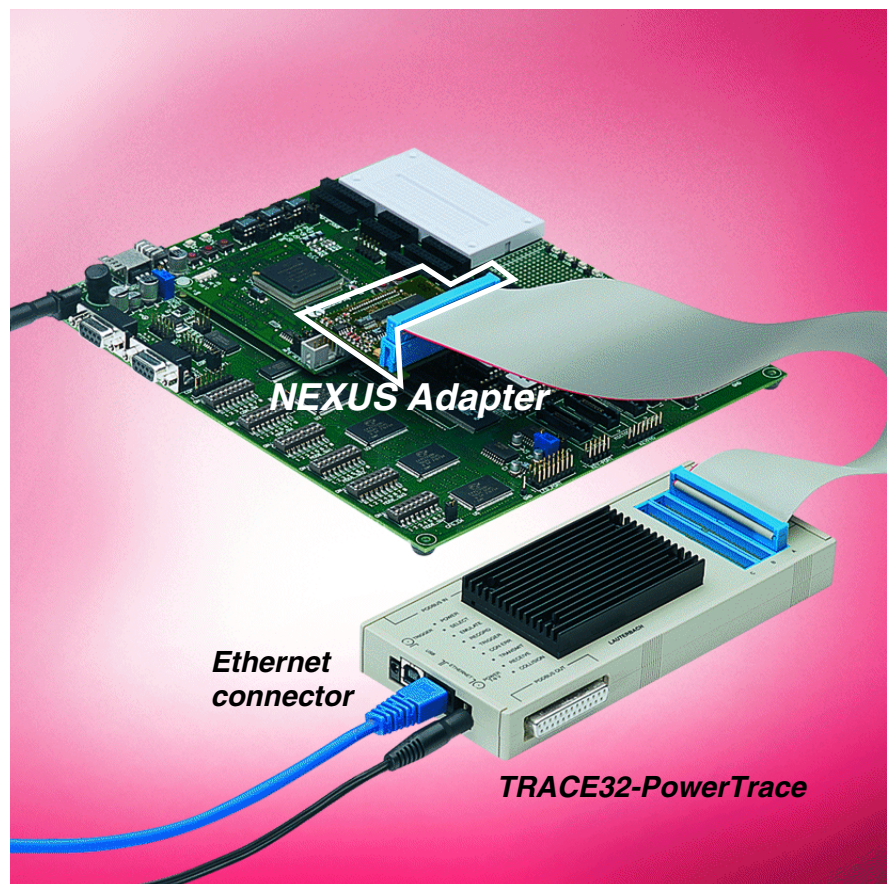
The Lauterbach product TRACE32-PowerTrace/NEXUS supports the NEXUS standard class 1 to 3. The hardware module for the NEXUS debugger is universal and allows to interface different target processors by simply changing the NEXUS adapter and starting a new software.

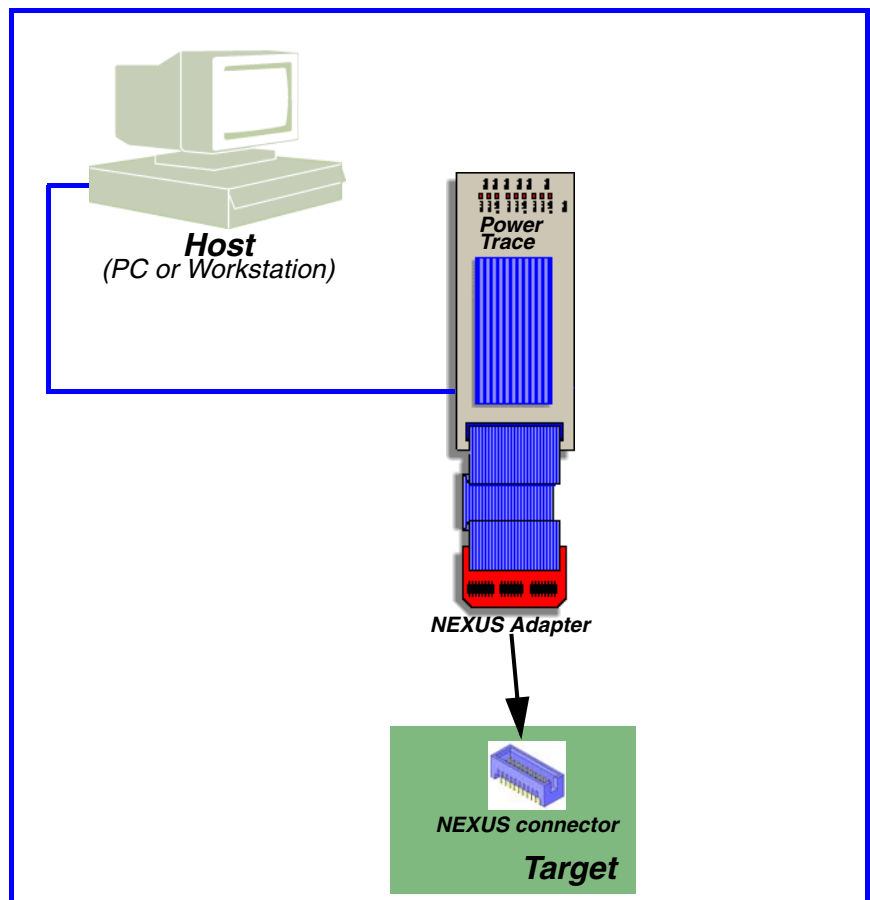
Hardware Concept

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.

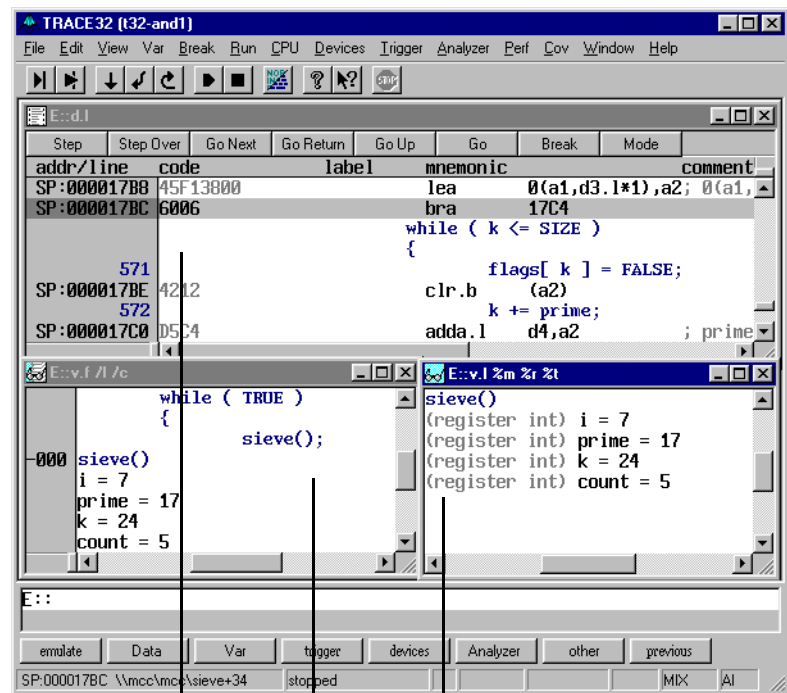


**PowerTrace**

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

Software Concept Debugger

Symbolic Debugging



Local variables of the current function

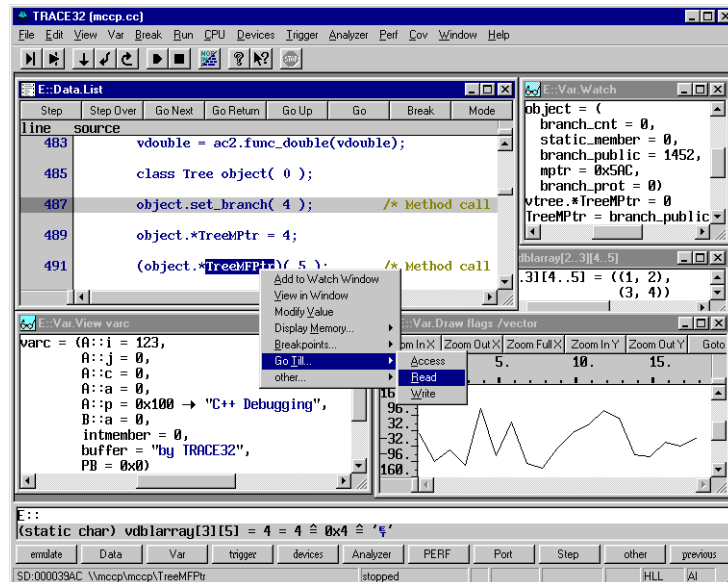
Stack frame to display function nesting

Source listing in mixed mode

A hierarchical symbol database enables structured symbolic debugging. Symbol names can be up to 255 significant characters long and 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 con-

struct 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
- a limited number of so-called 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.

magic	name	id	prio	mode	status	susp	parameters	ticks
00065310	IDLE	00010000	00	0000	Ready			
00065588	MEM1	00030000	30	0000	Wkafter			00000002
000656C4	MEM2	00040000	2F	0000	Running			
00065800	I01	00050000	1E	0002	Ready			
0006593C	I02	00060000	1E	0002	Ready			
00065A78	SRCE	00070000	80	0000	Ready	YES		
00065BB4	SINK	00080000	50	0000	Wkafter			00000001
00065CF0	NUMS	00090000	10	0002	Ready			
00065E2C	CHAR	000A0000	10	0002	Ready			

magic	name	id	prio	mode	status	susp	parameters	ticks
00065588	MEM1	00030000	30	0000	Wkafter			00000002

utr= 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000

str= 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000

initial pc = 000324C4 initial pri = 30

initial sp = 000FDC80 initial mode = 0000

asr addr = 00000000 asr mode = 0000

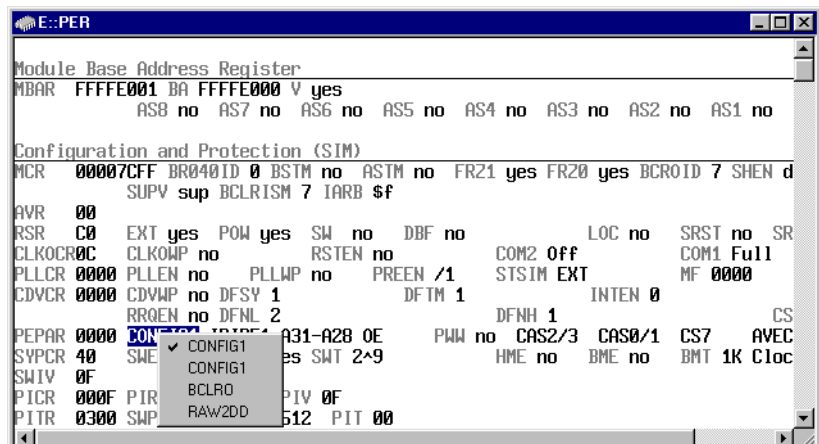
pending events = 00000000 pending asr = 00000000

timers: NONE

Task list window and detailed window of one specific task

Peripherals

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



Flash Programming

address	type	width	state	unit
C:00000000--00007FFF	CMFFLASH	byte	program	1 (002FC800/00000000)
C:00008000--0000FFFF	CMFFLASH	byte	program	2 (002FC800/00000000)
C:00010000--00017FFF	CMFFLASH	byte	program	3 (002FC800/00000000)
C:00018000--0001FFFF	CMFFLASH	byte	program	4 (002FC800/00000000)
C:00020000--00027FFF	CMFFLASH	byte	program	5 (002FC800/00000000)
C:00028000--0002FFFF	CMFFLASH	byte	program	6 (002FC800/00000000)
C:00030000--00037FFF	CMFFLASH	byte	program	7 (002FC800/00000000)
C:00038000--0003FFFF	CMFFLASH	byte	program	8 (002FC800/00000000)
C:00040000--00047FFF	CMFFLASH	byte	program	9 (002FC840/00000000)
C:00048000--0004FFFF	CMFFLASH	byte	program	10 (002FC840/00000000)
C:00050000--00057FFF	CMFFLASH	byte	program	11 (002FC840/00000000)
C:00058000--0005FFFF	CMFFLASH	byte	program	12 (002FC840/00000000)
C:00060000--00067FFF	CMFFLASH	byte	program	13 (002FC840/00000000)
C:00068000--0006FFFF	CMFFLASH	byte	program	14 (002FC840/00000000)
C:00070000--0007FFFF	AM29LV100	long	program	15
C:00080000--0008FFFF	AM29LV100	long	program	15

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....

record	run address	cycle	d.l	symbol	ti.back
-00000020 629	TCODE-03 PT-DBM S-0011	while (k <= SIZE)	f	P:003FA9B0 execute	0.360us
631		{			
		flags[k] = FALSE;			
-00000019 632	TCODE-05 DT-DBM A-00000079 V-00000000	k += printz;	f	D:003FAF40 ur-byte	1.900us
-00000018 629	TCODE-03 PT-DBM S-0007	while (k <= SIZE)	f	P:003FA9B0 execute	0.520us

Selective Tracing

B::Break.Set

Address / Expression: [flags[3]]

Types: Program Alpha Spot Beta Read Charly Write Delta Read/Write Echo

Options: Temporary ENable

Implementation: auto

Action: TTraceEnab

B::Break.List

address	types	state	action
C:003FAF33-003FAF33	W	HARD	TTraceEnable

B::Trace.List

record	run address	cycle	d.l	symbol	ti.back
-00000016	f	D:003FAF33	ur-word	0000	0.000us
-00000015	f	D:003FAF30	ur-word	0001	101.180us
-00000014	f	D:003FAF31	ur-word	0001	2.280us
-00000013	f	D:003FAF32	ur-word	0001	2.280us
-00000012	f	D:003FAF33	ur-word	0001	2.260us

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

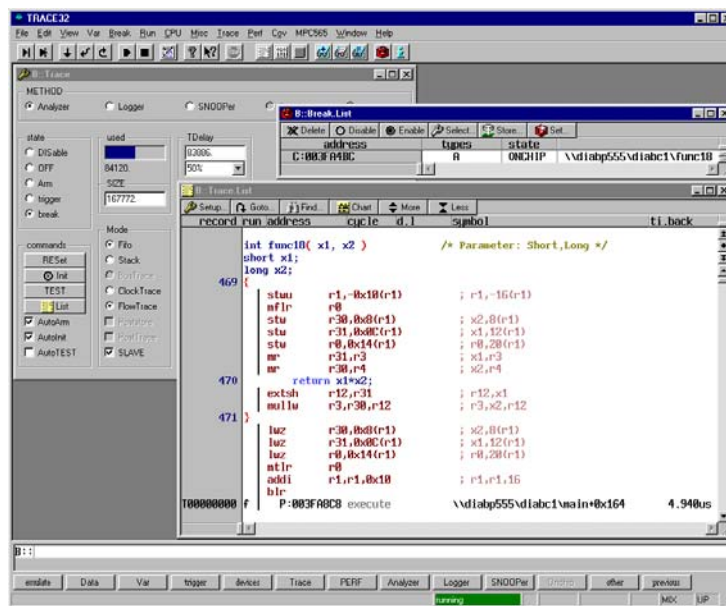
Triggering

TRACE32-PowerTrace/NEXUS can stop the sampling into the trace buffer on:

- the execution of a specific instruction
- a specified data access

- an external trigger event

The trigger can be delayed by a specific number of records that should be sampled into the trace buffer after the trigger event occurred.



Statistic functions

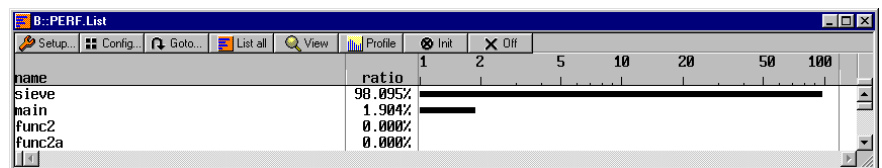
The very large trace buffer allows function runtime analysis over a long period.

range	time	min	max	avg	count	ratio	1%	2%
pp555\dl\abc1\Func14	3.620us	3.620us	3.620us	3.620us	1.	0.000%		
pp555\dl\abc1\Func15	3.900us	3.900us	3.900us	3.900us	1.	0.000%		
pp555\dl\abc1\Func16	3.620us	3.620us	3.620us	3.620us	1.	0.000%		
pp555\dl\abc1\Func17	5.140us	5.140us	5.140us	5.140us	1.	0.000%		
pp555\dl\abc1\Func18	4.880us	4.880us	4.880us	4.880us	1.	0.000%		
pp555\dl\abc1\Func19	4.880us	4.880us	4.880us	4.880us	1.	0.000%		
pp555\dl\abc1\Func20	6.660us	6.660us	6.660us	6.660us	1.	0.000%		
pp555\dl\abc1\Func21	6.380us	6.380us	6.380us	6.380us	1.	0.000%		
pp555\dl\abc1\Func22	6.380us	6.380us	6.380us	6.380us	1.	0.000%		
pp555\dl\abc1\Func23	6.380us	6.380us	6.380us	6.380us	1.	0.000%		
pp555\dl\abc1\Func24	2.580us	2.580us	2.580us	2.580us	1.	0.000%		
pp555\dl\abc1\Func25	2.920us	2.920us	2.920us	2.920us	1.	0.000%		
pp555\dl\abc1\Func26	2.660us	2.660us	2.660us	2.660us	1.	0.000%		
pp555\dl\abc1\sieve	32.104s	149.000us	167.740us	149.375us	214922. (-1)	99.642%		

Trace-based Performance Analysis

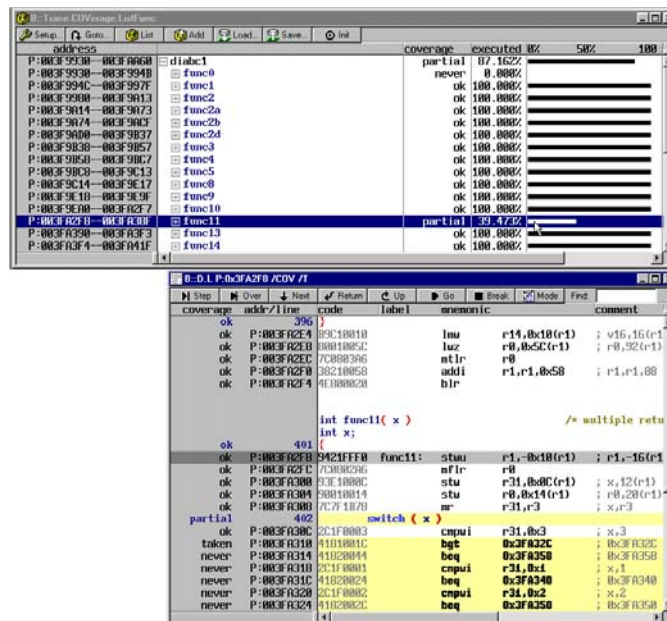
The performance measurement used by TRACE32-PowerTrace/NEXUS is a statistical process. To determine for example which function or which module uses the greatest proportion of the total runtime the recording into the

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.



Supported Processors

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Operation Frequency and Voltage

Operation Frequency

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

tbd

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 Super10 3.3V	NEXUS-SUPER10-3.3V	LA-7600	2.6 .. 3.3 V
Nexus Adapter for Super10 5V	NEXUS-SUPER10-5V	LA-7602	2.6 .. 3.3 V
NEXUS Debugger and Trace for MAC71xx/MAC72xx	NEXUS-MAC71XX	LA-7620	1.6 .. 3.6 V
NEXUS Debug/Trace for Qorivva MPC5xxx/SPC5xxx	NEXUS-MPC5500-AF	LA-7630	1.0 .. 5.2 V
Debug/Trace Lic. for MPC5xxx NEXUS AutoFocus	NEXUS-MPC5500-AF-ADD	LA-7630A	1.0 .. 5.2 V
Debug/Trace License for MAC-71xx NEXUS AF	NEXUS-MAC71XX-AF-ADD	LA-7635A	1.6 .. 3.6 V
NEXUS Debugger/Trace for AVR32 AutoFocus	NEXUS-AVR32-AF	LA-7645	1.6 .. 3.6 V
Debug/Trace Lic. for AVR32 NEXUS AutoFocus	NEXUS-AVR32-AF-ADD	LA-7645A	1.6 .. 3.6 V
Nexus Adapter for M*Core Device Flex Cable	NEXUS-MCORE	LA-7651	2.6 .. 3.3 V
Nexus Adapter for MPC56x family/Mictor38	NEXUS-MPC565-MICTOR	LA-7791	2.3 .. 3.0 V

Order Information

Module Description

OrderNo Code	Text
LA-7707 POWER- TRACE-ETH- 256M	PowerTrace Ethernet 256 MB Universal NEXUS/debug controller Ethernet for PC LAN/LINUX included Ethernet for Workstation requires Host Driver Package for Workstations on CD (LA-8616) USB 2.0 interface (Win98/2000/XP/Linux) included PODBUS Interface, 200 MHz PowerPC, 64 MB DRAM, NEXUS Controller, 256 MByte Trace Storage, Simple and Complex Trigger

Detailed order information

Order No.	Code	Text
LA-7707	POWER-TRACE- ETH-256M	PowerTrace Ethernet 256 MB
Additional Options		
LA-7710	BDM-68K	BDM Debugger for 68K (ICD)
LA-7732	BDM-COLDFIRE	BDM Debugger for ColdFire (ICD)
LA-7735	BDM-DSP56300	BDM Debugger for DSP56300 (ICD)
LA-7738	BDM-DSP56800	BDM Debugger for DSP56800 and DSP56800E (ICD)
LA-7730	BDM-DSP56K	BDM Debugger for DSP56K (ICD)
LA-7712	BDM-HC16	BDM Debugger for 68HC16 (ICD)
LA-7733	BDM-MCS08	BDM Debugger for MCS08 (ICD)
LA-7717	BDM-MCS12	BDM Debugger for MCS12 (ICD)
LA-7736	BDM-MCS12X	BDM Debugger for MCS12X (ICD)
LA-7722	BDM-MPC500/ 800	BDM Debugger for MPC500/800 (ICD)
LA-7750	DEBUG-196EA	Debugger for 196EA (ICD)
LA-7661	DEBUG-M32R	Debug Adapter for M32R SDI-3 (ICD)
LA-7753	DEBUG- MPC5500	JTAG Debugger for MPC55xx/MPC56xx (ICD)
LA-7729	DEBUG- MPC8260	JTAG Debugger for MPC82xx/MPC83xx(ICD)
LA-7764	DEBUG- MPC8560	JTAG Debugger for MPC8560/MPC8540 (ICD)

Order No.	Code	Text
LA-3735	DEBUG-MPC86XX	JTAG Debugger for MPC86xx (ICD)
LA-7723	DEBUG-PPC400	JTAG Debugger for PPC400 (ICD)
LA-7752	DEBUG-PPC44X	JTAG Debugger for PPC44x (ICD)
LA-7721	DEBUG-PPC603	JTAG Debugger for PPC603/MPC74x/75x (ICD)
LA-7719	DEBUG-PPC74XX	JTAG Debugger for MPC74xx (ICD)
LA-3754	DEBUG-PWRFICIENT	JTAG Debugger for PWRficient (ICD)
LA-7760	EJTAG-MIPS32	JTAG Debugger for MIPS32 (ICD)
LA-7761	EJTAG-MIPS64	JTAG Debugger for MIPS64 (ICD)
LA-3750	JTAG-ARC	JTAG Debugger for ARC (ICD)
LA-7744	JTAG-ARM10	JTAG Debugger for ARM10 (ICD)
LA-7765	JTAG-ARM11	JTAG Debugger for ARM11 (ICD)
LA-7746	JTAG-ARM7-20	JTAG Debugger for ARM7 20 Pin Connector (ICD)
LA-7742	JTAG-ARM9	JTAG Debugger for ARM9 (ICD)
LA-7833	JTAG-BLACKFIN	JTAG Debugger for BLACKFIN (ICD)
LA-7831	JTAG-C54X	JTAG Debugger for TMS320C54X (ICD)
LA-7830	JTAG-C55X	JTAG Debugger for TMS320C55X (ICD)
LA-7839	JTAG-C6200	JTAG Debugger for TMS320C6200 (ICD)
LA-7838	JTAG-C6400	JTAG Debugger for TMS320C6400 (ICD)
LA-7841	JTAG-C6700	JTAG Debugger for TMS320C6700 (ICD)
LA-3711	JTAG-CEVAX	JTAG Debugger for CEVA-X (ICD)
LA-7843	JTAG-CORTEX-A/R	JTAG Debugger for CORTEX-A/R (ICD)
LA-7844	JTAG-CORTEX_M	JTAG Debugger for CORTEX-M (ICD)
LA-3760	JTAG-DIAMOND-CORES	JTAG Debugger for Xtensa Diamond Cores
LA-7766	JTAG-H8S	JTAG Debugger for H8S (ICD)
LA-3745	JTAG-H8SX	JTAG Debugger for H8SX (ICD)
LA-7739	JTAG-JANUS	JTAG Debugger for JANUS (ICD)
LA-7848	JTAG-M8051EW-14	JTAG Debugger for M8051EW 14 Pins (ICD)
LA-3730	JTAG-MICROBLAZE	Debugger for MicroBlaze (ICD)
LA-7836	JTAG-MMDSP	JTAG Debugger for MMDSP (ICD)
LA-7734	JTAG-MPC5200	JTAG Debugger for MPC5200/MPC512x (ICD)
LA-7837	JTAG-NIOS-II	Debugger for NIOS-II (ICD)
LA-7789	JTAG-OAK-SEIB	JTAG Debugger for OAK/TeakLite SEIB (ICD)
LA-7758	JTAG-SH4-14	JTAG Debugger for SH2/SH3/SH4 14 Pin (ICD)
LA-7834	JTAG-STARCORE-14	JTAG Debugger for StarCore 14 Pin (ICD)
LA-7845	JTAG-STARCORE-20	JTAG Debugger for StarCore 20 Pin (ICD)
LA-7763	JTAG-SUPER10	JTAG Debugger for Super10 (ICD)
LA-7774	JTAG-TEAK-JAM-20	JTAG Debugger for Teak/TeakLite JAM 20 (ICD)
LA-7847	JTAG-TMS320C28X	JTAG Debugger for TMS320C28X (ICD)
LA-7835	JTAG-V850	N-Wire Debugger for V850 (ICD)
LA-7842	JTAG-VR	N-Wire Debugger for NEC VR-Series (ICD)
LA-7762	JTAG-XSCALE	JTAG Debugger for XSCALE (ICD)
LA-7832	JTAG-ZSP400	JTAG Debugger for ZSP400 DSP Core
LA-3712	JTAG-ZSP500	JTAG Debugger for ZSP500 DSP Core (ICD)
LA-7606	NEXUS-ARGON+	Nexus Adapter for Argon+
LA-7620	NEXUS-MAC71XX	NEXUS Debugger and Trace for MAC71xx/MAC72xx
LA-7651	NEXUS-MCORE	Nexus Adapter for M*Core Device Flex Cable
LA-7625	NEXUS-MMDSP	NEXUS Debugger and Trace for MMDSP+

Order No.	Code	Text
LA-7630	NEXUS-MPC5500-AF	NEXUS Debugger/Trace for MPC55xx/MPC56xx AF
LA-7791	NEXUS-MPC565-MICTOR	Nexus Adapter for MPC56x family/Mictor38
LA-7600	NEXUS-SUPER10-3.3V	Nexus Adapter for Super10 3.3V
LA-7755	OCDS-C166CBC	OCDS Debugger for C166CBC (ICD)
LA-7759	OCDS-C166S-V2	OCDS Debugger for C166S V2 (ICD)
LA-7756	OCDS-TRICORE	OCDS Debugger for TriCore (ICD)
LA-3732	OCDS-XC800	OCDS Debugger for XC800 (ICD)
LA-7745	ONCE-MCORE	ONCE Debugger for M-CORE (ICD)
LA-7991	PP-ARM-ETM-AF	Preprocessor for ARM-ETM with AUTOFOCUS Flex
LA-7992	PP-ARM-ETM-AF-2	Preproc. for ARM-ETM/AUTOFOCUS II 500 Flex
LA-7923	PP-ARM-ETM-TWO	Preprocessor for ETM 2-MICTOR 2 flex cables
LA-7889	PP-ARM-ETM/120	Preprocessor for ARM-ETM 120
LA-7921	PP-ARM-ETM/200	Preprocessor for ARM-ETM 200 flex cable
LA-7874	PP-ARM7-BUS	Preprocessor for ARM7 family
LA-7880	PP-C166-FAMILY	Preprocessor for C166 family
LA-7873	PP-COLDFIRE	Preprocessor for ColdFire family
LA-7881	PP-EGOLD	Preprocessor for EGOLD family
LA-7893	PP-EGOLD+	Preprocessor for EGOLD+ family
LA-7857	PP-EGOLD+V3	Preprocessor for complete EGOLD family
LA-7894	PP-MIPS	Preprocessor for MIPS flex cable
LA-7883	PP-MPC500/800-D	Preprocessor for MPC500/800 Family Data
LA-7856	PP-MPC500/800-V2	Preprocessor for MPC500/800 Family Data V2
LA-7886	PP-MPC555-TC	Preprocessor for MPC555 TCON
LA-9662	PP-MPC561-TC	Preprocessor for MPC561/MPC563 TCON320
LA-7885	PP-MPC850-TC	Preprocessor for MPC850 and MPC823-TCON
LA-7884	PP-MPC860-TC	Preprocessor for MPC860 and MPC821 TCON
LA-7905	PP-MPC880-TC	Preprocessor for MPC880 and MPC885 TCON
LA-3801	PP-NIOSII	Preprocessor for NIOS-II Flex Cable
LA-3900	PP-PPC4XX-AF-2	Preproc. for PPC4XX AUTOFOCUS II Flex
LA-7929	PP-PPC4XX-F	Preprocessor for PPC4xx family fast flex
LA-7898	PP-SH3/4	Preprocessor for SH3 and SH4 (AUD)
LA-7942	PP-TRACE-VR	Preprocessor for VR-Flex
LA-7928	PP-TRICORE-3.3V	Preprocessor TriCore OCDS-L2 3.3V Samtec 60
LA-7879	PP-TRICORE-5V	Preprocessor TriCore OCDS-L2 5V Samtec 60
LA-7660	TRACE-M32R	Debug/Trace Adapter for M32R SDI-3

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