TRACE32®

Technical Information

WNDRVR

RTOS Debugger for VxWorks

ARM
Cortex
MIPS
PowerPC
X64
X86
XSCALE

- ■ Real time, non-intrusive display of VxWorks system resources
- ■ Task stack coverage
- ■ Task related breakpoints
- ■ Task context display
- ■ Debugging of dynamic kernel modules
- ■ Debugging of real time processes (RTPs)
- ■ SMP support
- ■ Task realated performance measurement
- ■ Statistic evaluation and graphic display of task run times
- ■ Task related evaluation of function run times
- ■ PRACTICE functions for OS data
- ■ Easy access via VxWorks specific menu

The TRACE32 System includes a configurable RTOS debugger to provide symbolic debugging in real time operating systems. Our software package contains a ready-to-run configuration for the VxWorks real-time kernel from Wind River.

In close cooperation with Wind River, we built a high sophisticated VxWorks awareness, which enables you to do a most effective debugging with the TRACE32 systems on targets running VxWorks.

RTOS-VxWorks

10.06.21

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# RTOS Awareness on TRACE32 with VxWorks

Real-Time, Non-Intrusive Display of VxWorks System Resources

The TRACE32 RTOS debugger for VxWorks provides display functions, closely mirroring the command set of the WindShell. The system resources of tasks, semaphores, message queues, memory partitions, modules and RTPs can be displayed. In addition, if the system allows reading memory while running, the display of all these regions can be viewed non-intrusively in real time. The tables are updated permanently ("On The Fly"), without affecting the application at all. Moreover, these functions are still available, when the WindShell is not linked to your software.
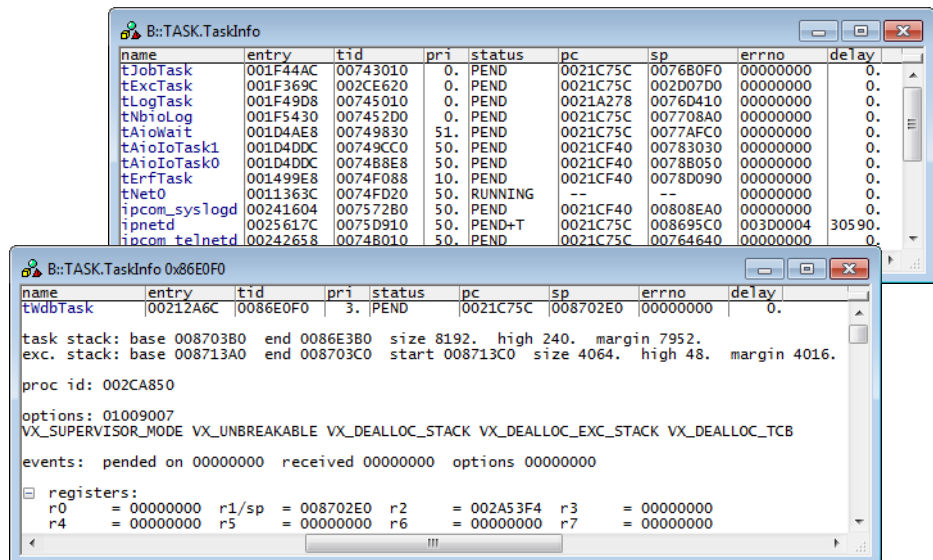
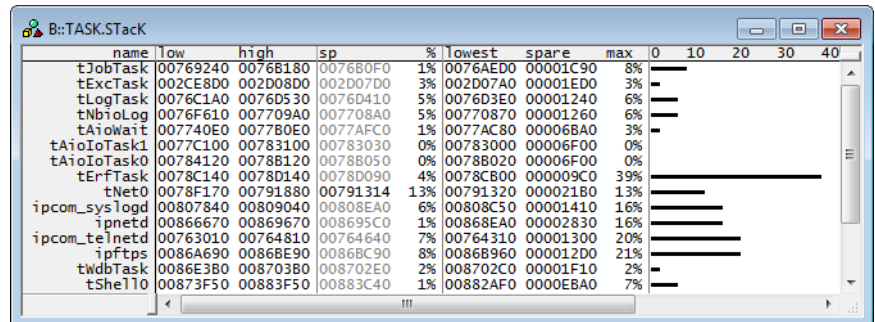Task list window and detailed window of one specific task
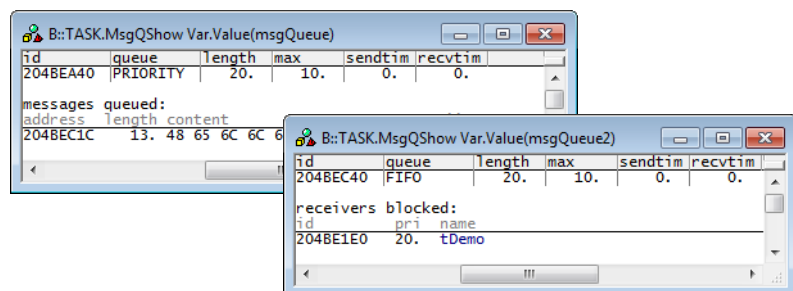
Detailed view of message queues

Task Stack Coverage

In real-time systems its is quite important to know, how much stack space each task consumes. For this purpose, a special window shows the current and the maximum usage of the stack of each separate task.
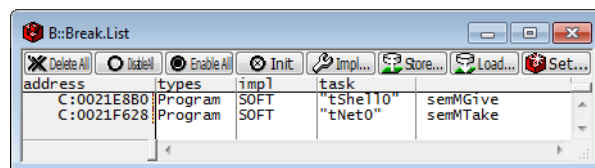

Task stack coverage window

Task Related Breakpoints

Any breakpoint set in the TRACE32 debugger can be set dependent to a specific task. This means, that the breakpoint will only halt, if hit by the specified task. This allows task related debugging even in shared code.


Breakpoint list with task dependent breakpoints

Task Context Display

The TRACE32 RTOS debugger provides an easy way to switch the current displayed context to another task. Normally all register related windows (e.g. listing at current PC, local variables of a f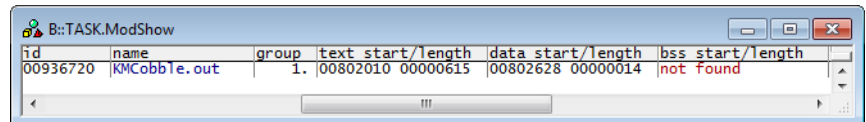unction call stack) are displayed related to the actual context (i.e. current executed task). You can switch to the context of another task to see al this information at the time this task was scheduled.
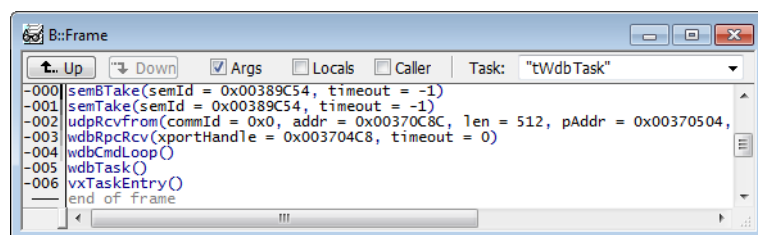
Function call hierarchy of a waiting task

Debugging of Dynamic Kernel Modules

TRACE32 is able to detect dynamically loaded kernel modules and to load the symbols of such modules. Hence, you can debug kernel modules and all tasks and functions therein without any limitation, side by side with other modules and the kernel application itself.
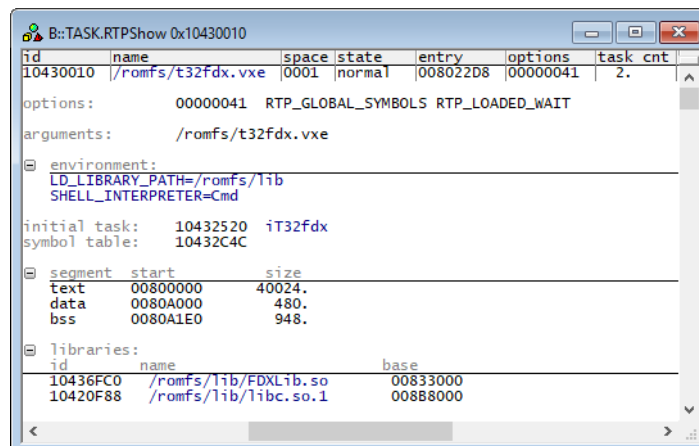

Dynamic kernel module

Debugging of Real Time Processes

The RTOS Debugger for VxWorks also detects real time processes (aka RTPs). Real time processes are separate, MMU mapped applications loaded dynamically to your kernel application. TRACE32 is aware of the MMU translations of each RTPs, and by reading these translations and loading the symbol files, the user can debug RTPs just the same way as the kernel application. Moreover, several RTPs can be debugged at the same time.

Characteristics of an RTP

Task Related Performance Measurement

While VxWorks is running, TRACE32 is capable of recurrently evaluating the current running task and collecting the results. The percentage, each task consumes of the system, is then displayed graphically and updated permanently. The longer time you let the measurement run, the more exact are the results. This feature is available even without any hardware trace.
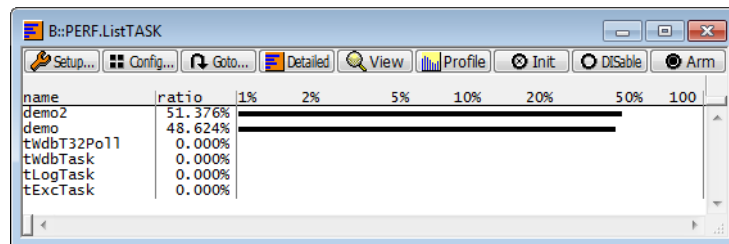
Performance measurement list

Statistic Evaluation and Graphic Display of Task Run Times

Out of the real time trace buffer (if available), the analyzer can calculate statistic tables of task run times and task switches. A graphical diagram shows which task was active at a specific time, giving a clear view of the behaviour of the system.
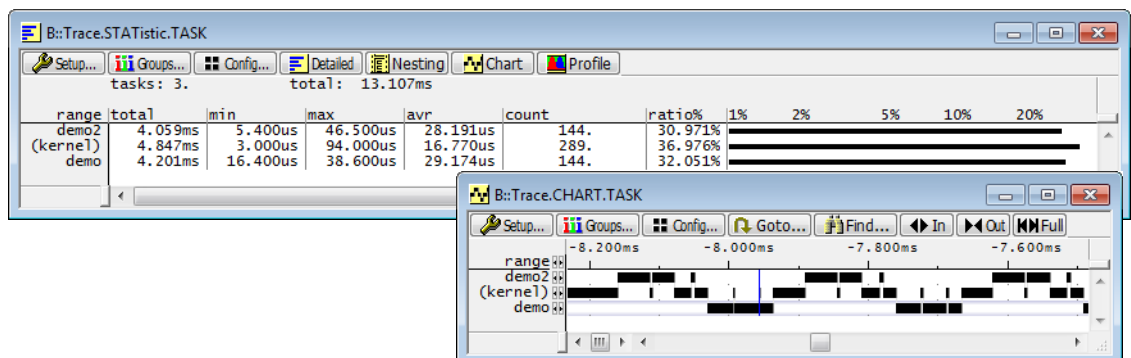
Statistics and flow of tasks

Task Related Evaluation of Function Run Times

The statistic and graphic evaluation of function calls and function run times (if available) can be done dependant on the actual running task. This is neces-sary, if different tasks call one single function at the same time, or if a task switch occurs in between the function.
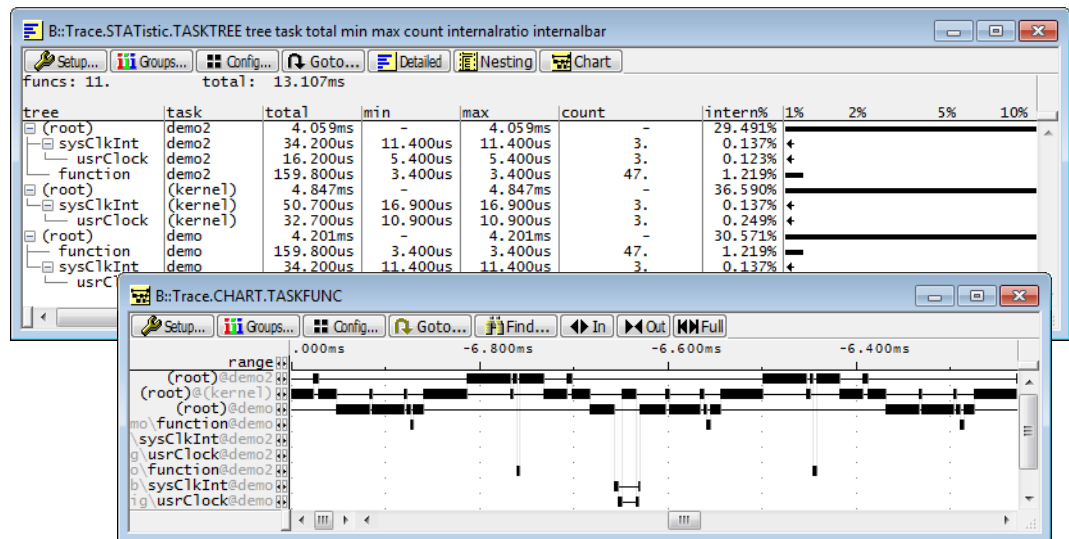
Function call hierarchy with statistics and flow of functions

PRACTICE Functions for OS Data

The support includes extended PRAC-TICE functions for VxWorks specific data, to be used in setup and test scripts. E.g. the function "TASK.CON-FIG(magic)" returns the address of the so called magic value, which corre-sponds to the id of the current execut-ing task.

Easy Access via VxWorks Specific Menu

Because the menu bar of the TRACE32 user interface can be fully customized, you can create a new pull down menu, including operating system specific commands. We deliver

VxWorks support with an example for such specific menues, which provides fast access to the VxWorks awareness features.
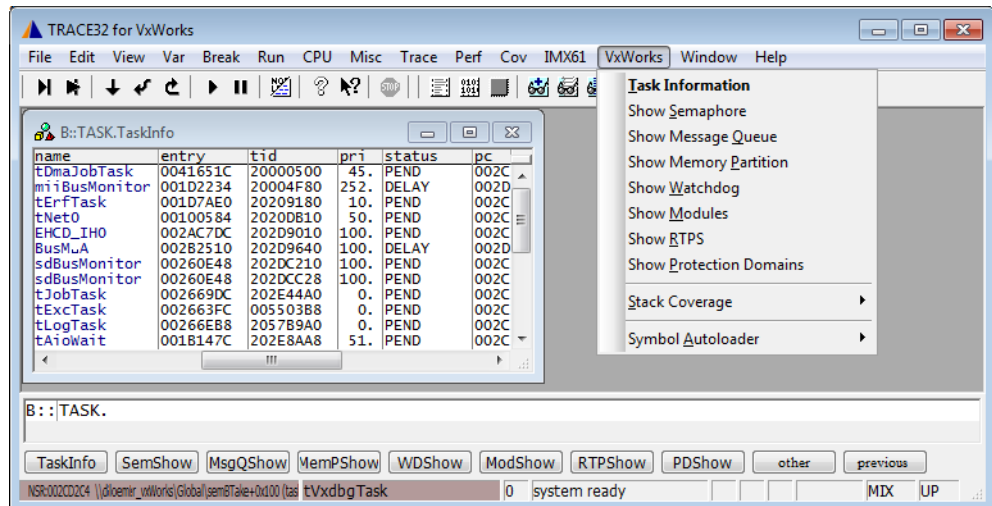
TRACE32 with VxWorks menu

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Wind River®, a wholly owned subsidiary of Intel® Corporation (NASDAQ: INTC), is a world leader in delivering software for intelligent connected systems. The company has been pioneering computing inside embedded devices since 1981, and its technology is found in nearly 2 billion products. Wind River offers the industry's most comprehensive embedded software portfolio supported by world-class global professional services and support, and a broad partner ecosystem. Wind River delivers the technology and expertise that enables the innovation and deployment of safe, secure, and reliable intelligent systems. To learn more, visit Wind River at www.windriver.com.

Contact

International Representative

Argentina

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

Australia

Embedded Logic Solutions P/L
Mr. Ramzi Kattan
Suite 2, Level 3
144 Marsden Street
Parramatta NSW 2150
Phone: +61 2 9687 1880
FAX: +61 2 9687 1881
EMAIL: sales@emlogic.com.au

Austria

Lauterbach GmbH
Altlaufstr. 40
D-85635 Höhenkirchen-Siegertsbrunn
Phone: +49 8102 9876 190
FAX: +49 8102 9876 187
EMAIL: sales@lauterbach.com

Belgium

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

Brazil

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

Canada

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

China Beijing

Lauterbach Technologies Co., Ltd
Mr. Linglin He
Beijing Office
A3,South Lishi Road, XiCheng District
Beijing 100037, P.R. China
Phone: +86 10 68023502
FAX: +86 10 68023523
EMAIL: linglin.he@lauterbach.com

China Shenzhen

Lauterbach Technologies Co., Ltd
1406/E Xihaimingzhu Building
No.1 Taoyuan Road, Nanshan District
Shenzhen 518052, P.R. China
Phone: +86 755 8621 0671
FAX: +86 755 8621 0675
EMAIL: emily.zhang@lauterbach.com

China Suzhou

Lauterbach Technologies Co., Ltd
Mr. Linglin He
Hengyu Square, Rm 1207
No. 188, Xing Hai Street
Suzhou, 215021 P.R. of China
Phone: +86 512 6265 8030
FAX: +86 512 6265 8032
EMAIL: info_cn@lauterbach.com

Czech. Republic

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

Denmark

Nohau Danmark A/S
Mr. Flemming Jensen
Hørkær 18, 3. Sal
DK-2730 Herlev
Phone: +45 44 52 16 50
FAX: +45 44 52 26 55
EMAIL: info@nohau.dk

Egypt

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

Finland

Nohau Solutions Finland
Mr. Marko Repo
Tekniikantie 14
FI-02150 Espoo
Phone: +358 40 546 0142
FAX: +358 9 2517 8101
EMAIL: sales@nohau.fi

France

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

Germany

Lauterbach GmbH
Sales Team Germany
Altlaufstr. 40
D-85635 Höhenkirchen-Siegertsbrunn
Phone: +49 8102 9876 190
FAX: +49 8102 9876 187
EMAIL: sales@lauterbach.com

Greece

Lauterbach GmbH
Altlaufstr. 40
D-85635 Höhenkirchen-Siegertsbrunn
Phone: +49 8102 9876 190
FAX: +49 8102 9876 187
EMAIL: sales@lauterbach.com

Hungary

Lauterbach GmbH
Altlaufstr. 40
D-85635 Höhenkirchen-Siegertsbrunn
Phone: +49 8102 9876 190
FAX: +49 8102 9876 187
EMAIL: sales@lauterbach.com

India-Bangalore

Electro Systems Associates Pvt. Ltd.
Mr. G. V. Gurunatham
S-606, World Trade Center
Malleswaram West, No.26/1, Dr. Rajkumar
   Road
India - Bangalore 560055
Phone: +91 80 67648888
FAX: +91 80 23475615
EMAIL: Trace32sales@esaindia.com

India-Chennai

Electro Systems Associates Pvt. Ltd.
Mr. D. Kannan
No.109 /59A , Ground Floor
IV Avenue, Ashok Nagar
India - Chennai - 600 083 Tamilnadu
Phone: +91 044-24715750
FAX: ++91 44 24715750
EMAIL: chennai@esaindia.com

India-Delhi

Electro Systems Associates Pvt. Ltd.
Mr. R.K. Bhandari
No. 705, 7th Floor, Laxmi Deep
Shivajinagar
India - Delhi - 110 092
Phone: +91 11-22549351
FAX:
EMAIL: delhi@esaindia.com

India-Hyderabad

Electro Systems Associates Pvt. Ltd.
Mr. C.V.M. Sri Ram Murthy
Shop No. 14, "Global Enclave"
Bhagyanagar Colony, Kukat pally
India - Hyderabad 500 072
Phone: +91 40-23063346
FAX: +91 40-23063346
EMAIL: hyderabad@esaindia.com

India-Kolkata

Electro Systems Associates Pvt. Ltd.
Mr. Arun Roy
India - Kolkata
Phone: +91 98305 78843
FAX:
EMAIL: kolkata@esaindia.com

India-Pune

Electro Systems Associates Pvt. Ltd.
Mr. R K Bhandari
Shriram Complex,1126/1, Model Colony
Shivajinagar
India - Pune - 411 016
Phone: +91 20 - 30462035 / 25663
FAX: +91 20-25677202
EMAIL: pune@esaindia.com

Ireland

Lauterbach Ltd.
Mr. Richard Copeman

Phone: +44-118 328 3334
FAX:
EMAIL: sales_uk@lauterbach.com

Israel

Itec Ltd.
Mr. Mauri Gottlieb
P.O.Box 10002
IL-Tel Aviv 61100
Phone: +972 3 6491202
FAX: +972 3 6497661
EMAIL: general@itec.co.il

Italy

Lauterbach SRL
Mr. Maurizio Menegotto
Regus EasyPoint (Building F) 1st floor
Via Caldera 21
I-20153 Milano
Phone: +39 02 45490282
FAX: +39 02 45490428
EMAIL: info_it@lauterbach.com

Japan

Lauterbach Japan, Ltd.
Mr. Kenji Furukawa
3-8-8 Shinyokohama
Kouhoku-ku, Nisso 16th Building
Yokohama-shi, Japan 222-0033
Phone: +81 45 477 4511
FAX: +81 45 477 4519
EMAIL: info@lauterbach.co.jp

Luxembourg

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

Malaysia

Flash Technology
Mr. Teo Kian Hock
No 61, # 04-15 Kaki Bukit Av 1
Shun Li Industrial Park
SGP-Singapore 417943
Phone: +65 6749 6168
FAX: +65 6749 6138
EMAIL: teokh@flashtech.com.sg

Mexico

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

Netherlands

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

New Zealand

Embedded Logic Solutions P/L
Mr. Ramzi Kattan
Suite 2, Level 3
144 Marsden Street
Parramatta NSW 2150
Phone: +61 2 9687 1880
FAX: +61 2 9687 1881
EMAIL: sales@emlogic.com.au

Norway

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

Poland

QUANTUM Sp. z o.o.
Mr. Aleksander Bil
ul. Jeleniogórska 6
54-056 Wroclaw
Phone: +48 71 362 6356
FAX: +48 71 362 6357
EMAIL: info@quantum.com.pl

Portugal

Captura Electronica SCCL
Mr. Juan Martinez
c/Duero, 40 bajos
E-08031 Barcelona
Phone: +34 93 429 57 30
FAX:
EMAIL: info@captura-el.com

Romania

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

Russia

RTSoft
Mr. Alexey Isaev
Nikitinskaya 3
RUS-105037 Moscow
Phone: +7 495 967 1505
FAX: +7 495 742 6829
EMAIL: sales@rtsoft.msk.ru

Singapore

Flash Technology
Mr. Teo Kian Hock
No 61, # 04-15 Kaki Bukit Av 1
Shun Li Industrial Park
SGP-Singapore 417943
Phone: +65 6749 6168
FAX: +65 6749 6138
EMAIL: teokh@flashtech.com.sg

South Korea, Rep. of Korea

Hancom MDS Inc.
Mr. Dongwook Jun
4FL. Hancom Tower
49, Daewangpangyo-ro 644, Beon-gil,Bun-
   dang-gu
Seongnam-si, Gyeonggi-do, 13493, ROK
Phone: +82-31-627-3000
FAX: +82-31-627-3100
EMAIL: trace32@hancommds.com

Spain

Captura Electronica SCCL
Mr. Wenceslao Rodríguez
c/Duero, 40 bajos
E-08031 Barcelona
Phone: +34 93 429 57 30
FAX:
EMAIL: info@captura-el.com

Sweden

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

Switzerland

JDT Jberg DatenTechnik
Mr. Andreas Jberg
Zimmereistrasse 2
CH-5734 Reinach AG
Phone: +41 62 7710 886
FAX:
EMAIL: Andreas.Jberg@jdt.ch

Taiwan

Superlink Technology Corp.
Mr. Sulin Huang
3F-8,No.77,Sec.1,Xintaiwu Rd.,Xizhi District,
New Taipei City 22101, Taiwan, R.O.C.
Phone: +886 2 26983456
FAX: +886 2 26983535
EMAIL: info.stc@superlink.com.tw

Tunisia

Lauterbach Consulting S.A.R.L.
Mr. Khaled Jmal
Route El Ain Km 3.5
TN-3062 Sfax
Phone: +216-31361061
FAX: +216-74611723
EMAIL: info_tn@lauterbach.com

Turkey

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

UK

Lauterbach Ltd.
Mr. Richard Copeman

Phone: +44-118 328 3334
FAX:
EMAIL: sales_uk@lauterbach.com

USA East

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

USA West

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

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Additional Information

http://www.lauterbach.com

Lauterbach GmbH

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

Lauterbach Inc.

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

Lauterbach Ltd.

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

Lauterbach S.A.R.L.

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

Lauterbach Japan, Ltd.

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

Lauterbach s.r.l.

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

Suzhou Lauterbach Consulting Co.,Ltd.

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

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Contact

LAUTERBACH
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