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## RTOS Debugger for Symbian OS (EKA2)

### ARM XSCALE

- Real-time non-intrusive display of SymbianOS system resources
- Thread related breakpoints
- Thread stack coverage
- Thread context display
- Full integrated MMU support
- Debugging drivers, processes, libraries and applications
- Debugging several processes and applications at once
- Dynamic thread performance measurement
- Symbian OS specific display of real time trace
- Statistic evaluation and graphic display of thread run times
- Thread related evaluation of function run times
- Statistic evaluation and graphic display of thread states
- PRACTICE functions for OS data
- Symbian OS related pull-down 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 Symbian OS (EKA2) Real Time Kernel from Symbian.

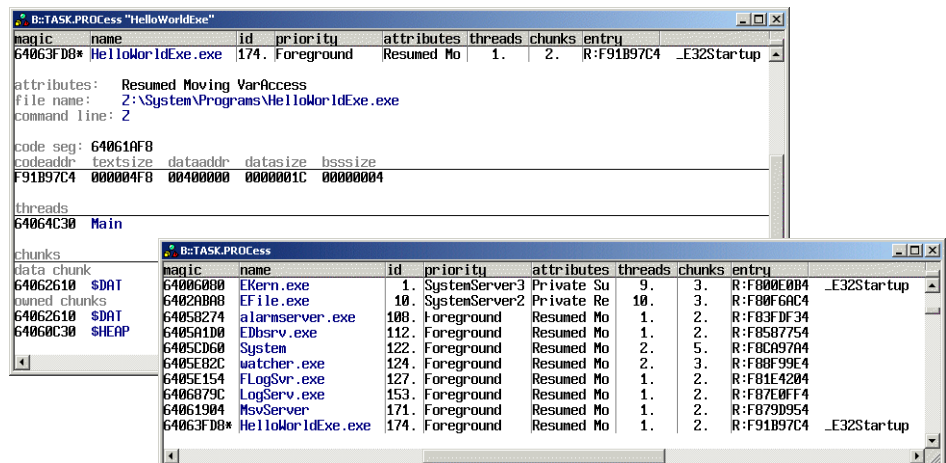
In close cooperation with Symbian, we built a highly sophisticated Symbian OS awareness, which enables you to do a most effective debugging with the TRACE32 systems on targets running Symbian OS.

## RTOS Awareness on TRACE32 for Symbian OS

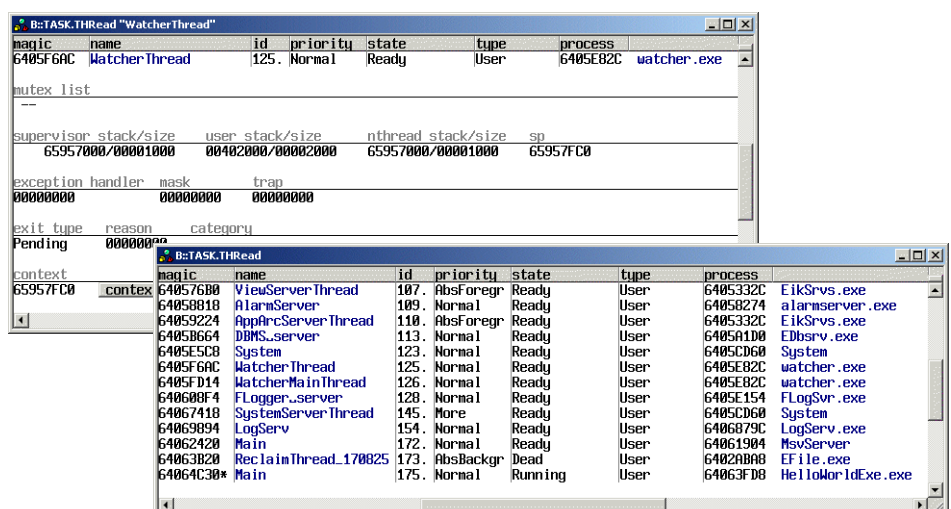
### Real Time, Non-Intrusive Display of Symbian OS System Resources

The TRACE32 RTOS debugger for Symbian OS provides display functions to show the system resources of Symbian OS. All objects, such as processes, threads, libraries and chunks can be displayed and inspected. In addition, by using the processors capability of reading the target memory

while the application is running, or by using the emulators dual-port memory (if available), 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.



Process list window and detailed window of one specific process



Thread List and detailed window of one thread

## Thread Related Breakpoints

Any breakpoint set in the TRACE32 debugger can be set dependent to a specific thread. This means, that the

breakpoint will then only halt, if hit by the specified thread. This allows thread related debugging even in shared code.

## Thread Stack Coverage

In real time systems it is quite important to know, how much stack space each thread consumes. For this pur-

pose a special window shows the current and the maximum usage of each separate thread.

name	low	high	sp	%	low	spare	max	0	10	20	30
c32exe.exe:PhikSyncServer	65939000	6593A000	65939FC0	1%	65939CEC	00000CEC	19%				
baksrvs.exe:BackupServer	65941000	65942000	65941FC0	1%	65941C4C	00000C4C	23%				
Start.exe:Main	65943000	65944000	65943FC0	1%	65943C4C	00000C4C	23%				
Sysagx.exe:SystemAgent	65945000	65946000	65945FC0	1%	65945CE4	00000CE4	19%				
LogServ.exe:LogServ	65947000	65948000	65947FC0	1%	65947D04	00000D04	18%				
MsvServer:Main	6595B000	6595C000	6595BFC0	1%	6595BC4C	00000C4C	23%				
.exe:Rec1aimThread_1708254	6595D000	6595E000	6595DF68	3%	6595DD04	00000D04	18%				
HelloWorld.exe:Main	6595D000	6595E000	6595DF88	2%	6595DD04	00000D04	18%				

Thread stack coverage window

## Thread Context Display

The TRACE32 RTOS Debugger provides an easy way to switch the current displayed context to another thread. Normally all register related windows (e.g. listing at current PC, local variables or function call stack)

are displayed related to the actual context (i.e. current executed thread). You can switch to the context of another thread to see all this information at the time this thread was scheduled.

## Debugging Drivers, Processes, Libraries and Applications

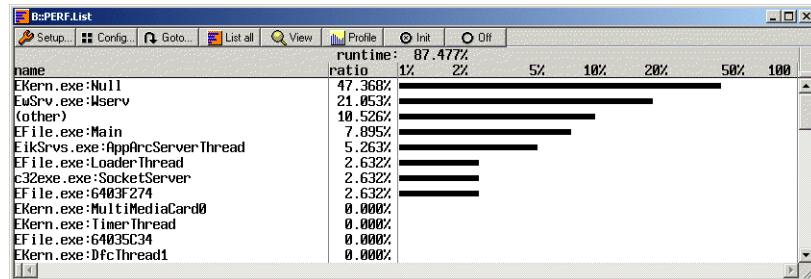
Due to the fact, that TRACE32 is a hardware debugging tool, you are able to debug anything you want, including bootstrap code, initialization phase, interrupt routines, drivers, kernel, etc. TRACE32 includes a complete MMU support, providing mechanisms to inspect the target memory using virtual addresses or physical addresses and to show the translation tables.

Additionally, TRACE32 has a special MMU support for several address spaces, which allows you to debug several Symbian OS processes and applications at once. An internal logic provides you with an easy access to all process memory spaces. A special process detection mechanism allows to halt the application exactly on the entry point of a process, allowing you to debug your process right from the beginning.

## Dynamic Thread Performance Measurement

While Symbian OS is running, TRACE32 is capable of recurrently evaluating the current running thread and collecting the results. The percentage, each thread 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

## Symbian OS Specific Display of Trace Listing

The data recorded in the trace buffer can be displayed and interpreted specific to the operating system.

The thread switches are displayed symbolically, either exclusively or in addition to other information.

## Statistic Evaluation and Graphic Display of Thread Run Times

The analyzer can calculate statistic tables of thread run times and thread switches. A graphical diagram shows

which thread was active at a specific time, giving a clear view of the behaviour of the system.

## Thread Related Evaluation of Function Run Times

The statistic and graphic evaluation of function calls and function run times can be done dependant to the actual running thread. This is necessary, if dif-

ferent threads call one single function at the same time, or if a thread switch occurs in between the function.

## Statistic Evaluation and Graphic Display of Thread States

These tabular and graphical analyses of the status of threads show the various states (i.e. running, ready, waiting, suspended and undefined) and times

each thread spent in each state. A graphical view of the data can help to highlight prioritisation problems, critical paths etc.

## PRACTICE functions for OS data.

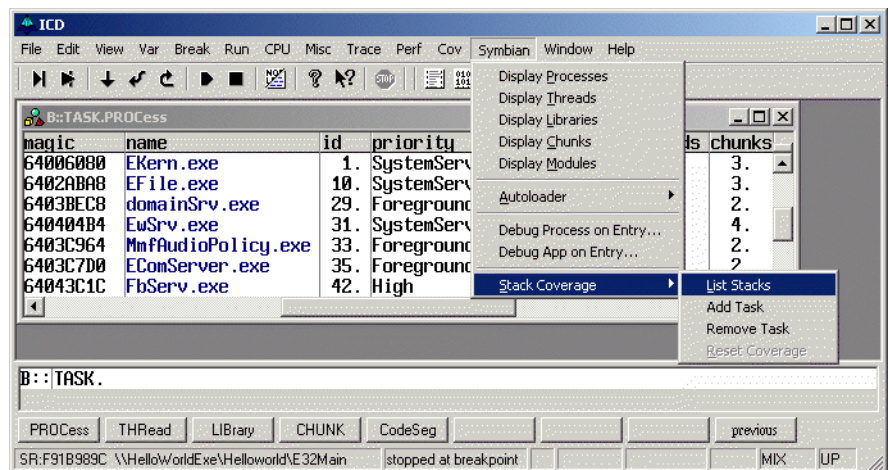
The support includes extended PRACTICE functions for Symbian OS specific data. E.g. the function "TASK.CONFIG

(magic)" returns the address of the so called magic value, which corresponds to the id of the current executed thread.

## Symbian OS related pull-down menu

Because the menu bar of the TRACE32 user interface can be fully customized, you can create a new pull-down menu, including operating sys-

tem specific commands. We deliver Symbian OS support with an example for such specific menus, which provides fast access to the features.



TRACE32 with Symbian OS menu

## 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 Kaffan  
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-Siegersbrunn  
Phone: +49 8102 9876 0  
FAX: +49 8102 9876 999  
EMAIL: info@lauterbach.com

#### Belgium

Tritec Benelux B.V.  
Mr. Robbert de Voogt  
Stationspark 550  
NL-3364 DA Slidrecht  
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 709  
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-Siegersbrunn  
Phone: +49 8102 9876 0  
FAX: +49 8102 9876 999  
EMAIL: info@lauterbach.com

#### Denmark

Nohau Danmark A/S  
Mr. Flemming Jensen  
Klausdalsbrovej 493  
DK-2730 Herlev  
Phone: +45 44 52 16 50  
FAX: +45 44 52 26 55  
EMAIL: info@nohau.dk

#### Egypt

Wantech Egypt  
Mr. Wagih A. Nawara  
5 Shafik Ghalie St., Suite 2  
Off Pyramids Road, Giza  
Cairo 12111  
Phone: +20 100 1251955  
FAX: +20 100 1250349  
EMAIL: sales@wantech.net.com

#### Finland

Nohau Solutions Finland  
Mr. Martti Viljainen  
Teknobulevardi 3-5  
FI-01531 Vantaa  
Phone: +358 40 546 1469  
FAX: +358 9 2517 8101  
EMAIL: sales@nohau.fi

#### France

Lauterbach S.A.R.L.  
Mr. Jean-Pierre Paradiso  
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  
Altlaufstr. 40  
D-85635 Höhenkirchen-Siegersbrunn  
Phone: +49 8102 9876 0  
FAX: +49 8102 9876 999  
EMAIL: info@lauterbach.com

#### Germany North

Lauterbach GmbH  
Mr. Klaus Hommann  
Leonhardring 5  
D-31319 Sehnde  
Phone: +49 8102 9876 174  
FAX: +49 5138 6185 3  
EMAIL: klaus.hommann@lauterbach.com

**Germany South**

Lauterbach GmbH  
 Andreas Grimm  
 Altlaufstr. 40  
 D-85635 Höhenkirchen-Siegersbrunn  
 Phone: +49 8102 9876 190  
 FAX: +49 8102 9876 187  
 EMAIL: andreas.grimm@lauterbach.com

**Greece**

Lauterbach GmbH  
 Altlaufstr. 40  
 D-85635 Höhenkirchen-Siegersbrunn  
 Phone: +49 8102 9876 0  
 FAX: +49 8102 9876 999  
 EMAIL: info@lauterbach.com

**Hungary**

Lauterbach GmbH  
 Altlaufstr. 40  
 D-85635 Höhenkirchen-Siegersbrunn  
 Phone: +49 8102 9876 0  
 FAX: +49 8102 9876 999  
 EMAIL: info@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"  
 Bhagyannagar Colony, Kukat pally  
 India - Hyderabad 500 072  
 Phone: +91 40-23063346  
 FAX: +91 40-23063346  
 EMAIL: hyderabad@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. Barry Lock  
 11 Basepoint Enterprise Centre  
 Stroudley Road  
 Basingstoke, Hants RG24 8UP  
 Phone: +44-1256-333-690  
 FAX: +44-1256-336-661  
 EMAIL: info\_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  
 Via Enzo Ferrieri 12  
 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@emlogi.com.au

**Norway**

Nohau Solutions AB  
 Mr. Jörgen Nilsson  
 Derbyvägen 4  
 SE-21235 Malmö  
 Phone: +46 40 592 206  
 FAX: +46 40 592 229  
 EMAIL: sales@nohau.se

**Poland**

QUANTUM Sp. z o.o.  
 Mr. Aleksander Bil  
 ul. Jeleniogorska 6  
 54-056 Wrocław  
 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  
E-08031 Barcelona  
Phone: +34 93 429 5730  
FAX: +34 93 407 0778  
EMAIL: info@captura-el.com

**Romania**

Lauterbach GmbH  
Altlaufstr. 40  
D-85635 Höhenkirchen-Siegersbrunn  
Phone: +49 8102 9876 0  
FAX: +49 8102 9876 999  
EMAIL: info@lauterbach.com

**Russia**

RTSoft  
Mr. Alexey Isaev  
Nikitinskaya 3  
RUS-105037 Moscow  
Phone: +7 495 742 6828  
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, Pangyo**

MDS Technology Co., Ltd.  
Mr. Sangheon Lee  
3FL, Hancom Tower  
49, Daewangpangyo-ro 644, Bundang-gu  
Seongnam-si, Gyeonggi-do, 463-400, ROK  
Phone: +82-31-627-3000  
FAX: +82-31-627-3100  
EMAIL: trace32@mdstec.com

**Spain**

Captura Electronica, SCCL  
Mr. Juan Martinez  
c/Duero, 40  
E-08031 Barcelona  
Phone: +34 93 429 5730  
FAX: +34 93 407 0778  
EMAIL: info@captura-el.com

**Sweden**

Nohau Solutions AB  
Mr. Jörgen Nilsson  
Derbyvägen 4  
SE-21235 Malmö  
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: +216-74611730  
FAX: +216-74611723  
EMAIL: info\_tn@lauterbach.com

**Turkey-1**

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

**Turkey-2**

G3TEK Embedded Technologies Ltd.  
Mr. Celal Aygun  
Ilkyerlesim Mah. 445.  
Sok. No: 48  
06370 Batikent/Ankara  
Phone: +90 312 3324769  
FAX: +90 312 3324769  
EMAIL: info@g3tek.com

**UK**

Lauterbach Ltd.  
Mr. Barry Lock  
11 Basepoint Enterprise Centre  
Stroudley Rd  
Basingstoke, Hants RG24 8UP  
Phone: +44 1256 333 690  
FAX: +44 1256 350 301  
EMAIL: info\_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



---

## 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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