



RTOS Debugger for CMX

68K

8051

ARM

C166/167

H83H

H8S

POWERPC

SH

Z80/180

- Improved support for the CMX debugger CMXBug
- Real time, non-intrusive display of CMX system resources
- CMX specific display of analyzer listing
- Statistic evaluation and graphic display of task run times
- Task related evaluation of function run times
- Statistic evaluation and graphic display of task states
- Task stack coverage
- PRACTICE functions for OS data
- CMX related pull-down menu

The TRACE32 System includes a configurable multitask debugger to provide symbolic debugging in real time operating systems. Our software package contains a ready-to-run configuration for the CMX Real Time Kernel from CMX Company.

In close cooperation with CMX Company we built a special multitask support for CMX on Infineon C166/167 controllers, 8051 Derivates, Renesas controllers and Z80 based microcontrollers. This leaflet will guide you through the additional implemented features in TRACE32, to do an effective debugging on CMX systems.

Multitask Debugging on TRACE32 with CMX-RTX

Improved support for the CMX Debugger CMXBug

CMX provides a kernel debugger called CMXBug, which runs on the target. TRACE32 provides an interface to this debugger. I.e. you can control the debugger and view its outputs inside the TRACE32 surface. The communication is set up via the emulator's dual

port memory, substituting the serial interface routines of CMXBug. This technique provides high speed, transparent communication with the target without the use of any serial hardware or other target resources.

```

E::TERM T32OUT T32IN
Your choice? 99

You have exited CMXBug(TM), press <+> (plus key) to enter CMXBug again!

Enter 1 TASKS
Enter 2 RESOURCES
Enter 3 CYCLIC_TIMERS
Enter 4 QUEUES
Enter 5 MAILBOXES
Enter 6 RAM display
Enter 7 STACK information
Enter 8 SYSTEM TICK SCALE
Enter 9 TIME SLICE SCALE
Enter 10 TIME SLICING select
Enter 11 GO and RESUME CMXBug
Enter 12 Quick GO and RESUME CMXBug
Enter 13 TIME ANALYSIS
Enter 14 TIME ANALYSIS reset
Enter 15 ADDITIONAL TASK functions
Enter 99 EXIT CMXBug
Enter P/p to toggle ECHO mode, currently ON
Your choice? 1

TASK dump, enter number, '*' for all, <return> to exit. Choice? █

```

Terminal window to the CMX debugger CMXBug

Task Stack Coverage

In real time systems it 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 each separate task.

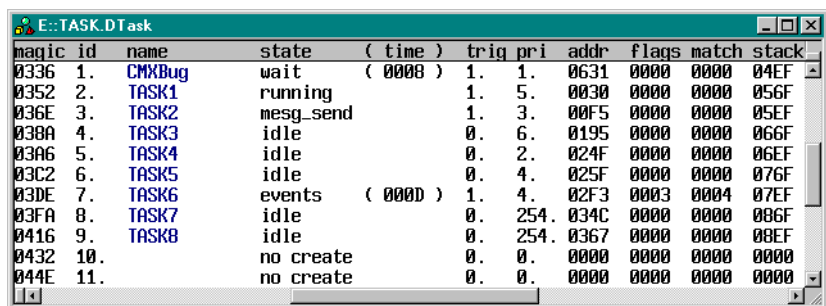
magic	botton	top	sp(stk)	sp(reg)	curr	max	usage	0	10	20
CMXBug	000004EF	000003C8	00000471		42%	000003E2	91%			
TASK4	000006EF	000005C8	00000671		42%					
TASK6	000007EF	000006C8	00000771		42%	00000771	42%			
(other)			00000028							

Task stack coverage window

Real time, non-intrusive display of CMX system resources

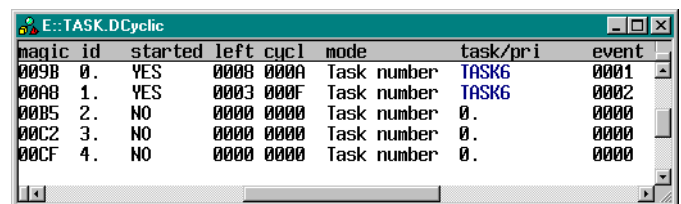
The TRACE32 multitask debugger for CMX provides display functions, closely mirroring the command set of CMXBug. The system resources tasks, resources, cyclic timers, queues and mailboxes can be displayed. In addition, by using the emulators dual-port memory, the display of all these

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 CMXBug is not linked to your software.



magic id	name	state	(time)	trig	pri	addr	flags	match	stack
0336	1. CMXBug	wait	(0008)	1.	1.	0631	0000	0000	04EF
0352	2. TASK1	running		1.	5.	0030	0000	0000	056F
036E	3. TASK2	mesg_send		1.	3.	00F5	0000	0000	05EF
038A	4. TASK3	idle		0.	6.	0195	0000	0000	066F
03A6	5. TASK4	idle		0.	2.	024F	0000	0000	06EF
03C2	6. TASK5	idle		0.	4.	025F	0000	0000	076F
03DE	7. TASK6	events	(000D)	1.	4.	02F3	0003	0004	07EF
03FA	8. TASK7	idle		0.	254.	034C	0000	0000	086F
0416	9. TASK8	idle		0.	254.	0367	0000	0000	08EF
0432	10.	no create		0.	0.	0000	0000	0000	0000
044E	11.	no create		0.	0.	0000	0000	0000	0000

Task list window



magic id	started	left	cycl	mode	task/pri	event
009B	0. YES	0008	000A	Task number	TASK6	0001
00A8	1. YES	0003	000F	Task number	TASK6	0002
00B5	2. NO	0000	0000	Task number	0.	0000
00C2	3. NO	0000	0000	Task number	0.	0000
00CF	4. NO	0000	0000	Task number	0.	0000

Cyclic Timers window

PRACTICE functions for OS data.

The support includes extended PRACTICE functions for process specific data. E.g. the function "TASK.CONFIG(magic)" returns the address of the so called magic value.

CMX specific display of analyzer listing

The data recorded in the analyzer can be displayed and interpreted specific to the operating system. The task switches can be displayed symbolically.

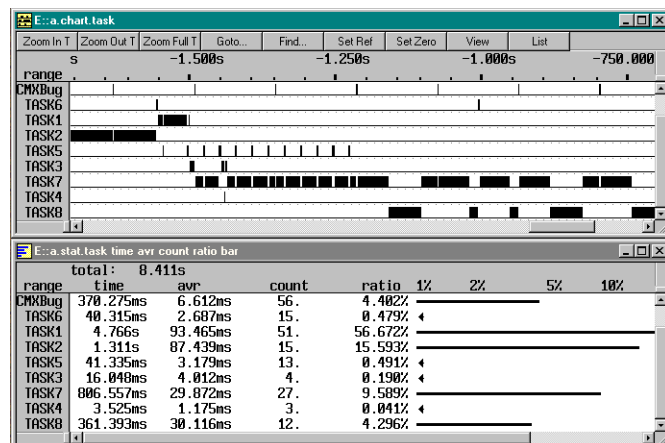
record	run	address	cycle	.b	ti.	fore	symbol
TASK = 0336 CMXBug							
+000002	f	r	X:0002B3	wr-ext	03	10.500us	\\bugsamp\BUG_INIT\activetcb
+000003	f	r	X:0002B4	wr-ext	36	2.197ms	\\bugsamp\BUG_INIT\activetcb+1
TASK = 03DE TASK6							
+000004	f	r	X:0002B3	wr-ext	03	10.500us	\\bugsamp\BUG_INIT\activetcb
+000005	f	r	X:0002B4	wr-ext	DE	0.900us	\\bugsamp\BUG_INIT\activetcb+1
+000006	f		P:004305	opfeth	D0	1.500us	
+000007	f		P:004306	rd-byte	83	1.500us	
pop dph							
+000008	f		P:004307	opfeth	D0	1.500us	
+000009	f		P:004308	rd-byte	82	1.500us	
pop dpl							
+000010	f		P:004309	opfeth	C0	0.750us	
+000011	f		P:00430A	rd-byte	82	2.250us	
push dpl							
+000012	f		P:00430B	opfeth	C0	0.750us	
+000013	f		P:00430C	rd-byte	83	2.250us	
push dph							

Analyzer listing, task selective recording, display of task switches, assembler mnemonics and cpu access cycles

Statistic evaluation and graphic display of task run times

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.

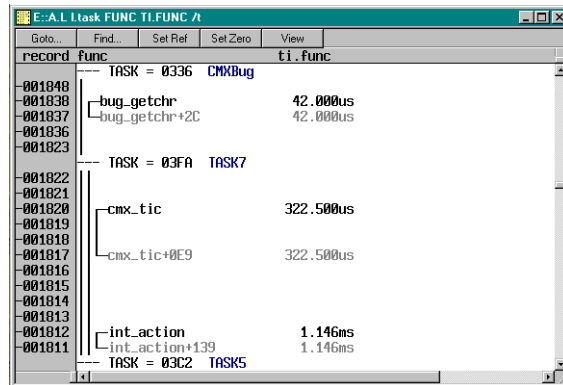


Statistics and flow of tasks

Task related evaluation of function run times

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

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



Analyzer listing, function call hierarchy and task switches

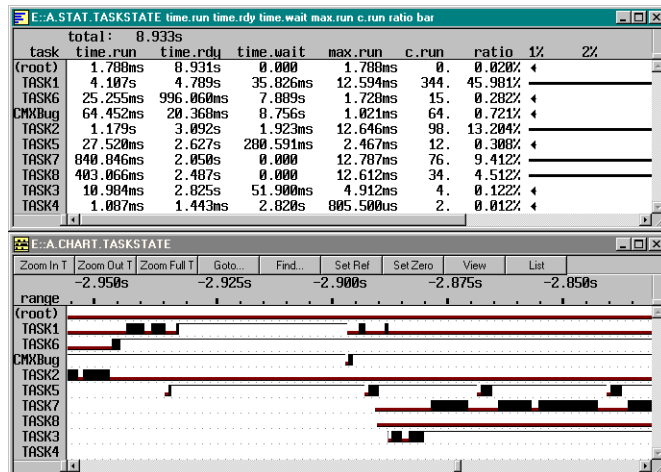
range	tree	time	avr	count	ratio	1%
(root)@TASK4	(root)@TASK4	3.525ms	3.525ms	1.(-2)	0.002%	▲
_task4@TASK4	└─_task4@TASK4	3.390ms	3.390ms	1.(-1)	0.047%	▲
cmx_tic@TASK4	└─└─cmx_tic@TASK4	200.500ms	200.500us	1.	0.003%	▲
(root)@TASK5	(root)@TASK5	41.335ms	41.335ms	1.(-2)	0.001%	▲
_task5@TASK5	└─_task5@TASK5	41.222ms	41.222ms	1.(-1)	0.613%	▲
(root)@TASK6	(root)@TASK6	249.543ms	249.543ms	1.(-2)	3.662%	▲
cmx_tic@TASK6	└─cmx_tic@TASK6	3.645ms	214.411us	17.	0.054%	▲
(root)@TASK7	(root)@TASK7	873.304ms	873.304ms	1.(-2)	0.002%	▲
_task7@TASK7	└─_task7@TASK7	873.167ms	873.167ms	1.(-1)	12.507%	▲
_action@TASK7	└─└─int_action@TASK7	11.460ms	1.146ms	10.	0.170%	▲
cmx_tic@TASK7	└─└─cmx_tic@TASK7	21.904ms	323.294us	68.	0.327%	▲
(root)@TASK8	(root)@TASK8	485.166ms	485.166ms	1.(-2)	0.002%	▲
_task8@TASK8	└─_task8@TASK8	485.031ms	485.031ms	1.(-1)	7.058%	▲
cmx_tic@TASK8	└─└─cmx_tic@TASK8	11.107ms	317.357us	35.	0.165%	▲

Statistics on function hierarchy, task related

Statistic evaluation and graphic display of task states

These tabular and graphical analyses of the status of tasks show the various states (i.e. running, ready, waiting, suspended and undefined) and times each task spent in each state. A graphical

view of the data can help to highlight prioritisation problems, critical paths etc.

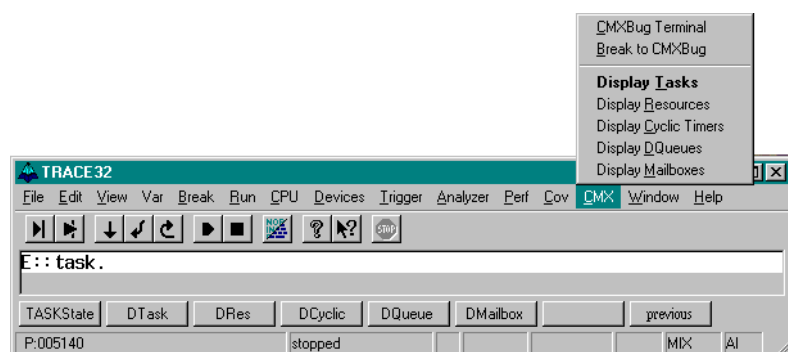


Statistics and flow of task states

CMX 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 CMX support with an example for such specific menus, which provides fast access to the CMX features.



TRACE32 with CMX 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
Alltaufstr. 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 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
Alltaufstr. 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 26, Plan 4
DK-2730 Herlev
Phone: +45 44 52 16 50
FAX: +45 44 52 26 55
EMAIL: info@nohau.dk

Egypt

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

Finland

Nohau Solutions Finland
Mr. Martti Viljainen
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. 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
Sales Team Germany
Alltaufstr. 40
D-85635 Höhenkirchen-Siegertsbrunn
Phone: +49 8102 9876 190
FAX: +49 8102 9876 187
EMAIL: sales@lauterbach.com

Greece

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

Hungary

Lauterbach GmbH
Alltaufstr. 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
11 Basepoint Enterprise Centre
Stroudley Road
Basingstoke, Hants RG24 8UP
Phone: 0044-118 328 3334
FAX:
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
Kohoku-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@emilogic.com.au

Norway

Nohau Solutions AB
Mr. Jörgen Nilsson
Derbyvägen 6D
SE-21235 Malmö
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. 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 130
FAX: +49 8102 9876 187
EMAIL: sales@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

Hancom MDS Inc.
Mr. Dongwook Jun
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@hancommds.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 6D
SE-21235 Malmö
Phone: +46 40 592 206
FAX: +46 40 592 229
EMAIL: Jorgen.nilsson@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-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 Battikent/Ankara
Phone: +90 312 3324769
FAX: +90 312 3324769
EMAIL: info@g3tek.com

UK

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

Disclaimer

The information presented is intended to give overview information only. Changes and technical enhancements or modifications can be made without notice.