



FIRE Fully Integrated RISC Emulator

- High-Speed RISC Emulator
- 64 Bit Data / 32 Bit Address Support
- Scalable 100 MHz Analyzer
- Highspeed Dualport Emulation Memory up to 16 MByte
- Wide Voltage Range
- Passive and Active Emulation Mode
- Controlled by High-Speed RISC CPU
- Fully Compatible with ICE and ICD Debug System

Since high speed RISC processors operate at bus frequencies of more than 100 MHz , a redefinition of the traditional emulator hardware was necessary. The result of this new concept TRACE32-FIRE was developed especially for applications with RISC Processors, Integrated Controllers and DSPs at highest clock frequencies, without losing the capabilities of a traditional In-Circuit Emulator. The INTEGRATED EMULATION guaranties highest reliability in quality and support

Universal RISC Emulator for 16- to 32-bit

Microprocessors

TRACE32-FIRE supports a wide range of microprocessors and microcontrollers at 3.3V or 5V.

Open Software Architecture

TRACE32-FIRE works seamlessly with

- Most programming languages (C, C++, Java, ADA, Pearl etc.)
- Most third party compilers in all object file formats
- A wide range of RTOS
- Third party debuggers
- Third party CASE tools

Interface to all Hosts

TRACE32-FIRE can be linked to a PC, any workstation or mainframe. Software drivers are available for all standard operation systems and all graphical user interfaces.

- Parallel, USB and ethernet interface
- Same "Look and Feel" on all supported host systems
- Fast download

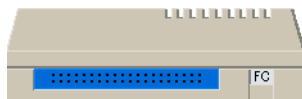
Scalable Tool Chain

TRACE32-FIRE is the high end tool of Lauterbach's TRACE32 tool chain. We also offer:

- TRACE32-ICD
ROM monitor based debugger
Debug interface based debugger (BDM, JTAG etc.)
- TRACE32-ICD TRACE
TRACE32-ICD enhanced by trace and trigger capabilities

The uniform, compatible GUI for all products of the TRACE32 series makes it easy to migrate to a more complex tool or to use different complex tools side by side in the same project.

System Architecture



FIRE System Controller

- provides the connection to the host system (LPT, ISA-Card, Ethernet, USB)
- runs the FIRE system software



FIRE Emulation Controller

- provides all CPU independent emulator functions (VCO, Pulse Generator, Universal Counter)
- provides the trace memory (64 k frames)
- provides the trigger unit



FIRE Emulation Memory

- 1, 2 or 4 MByte dual-ported emulation memory
- 1, 2 or 4 MByte address selector/flags memory



FIRE Probe

- provides the CPU dependent debugger, trace and trigger features
- Mapper, Dualport Controller

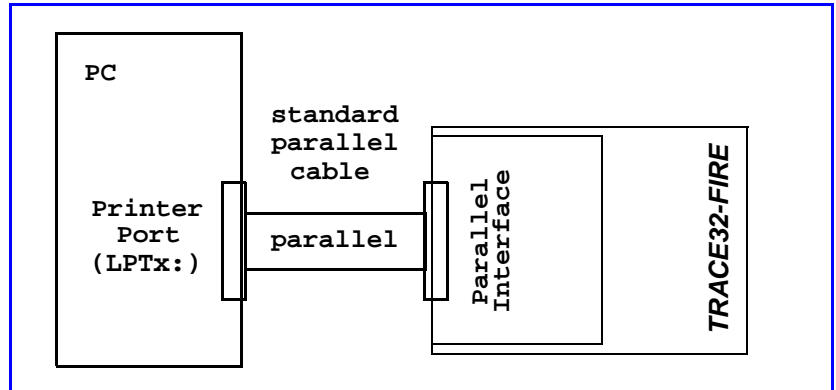


Target Adapter

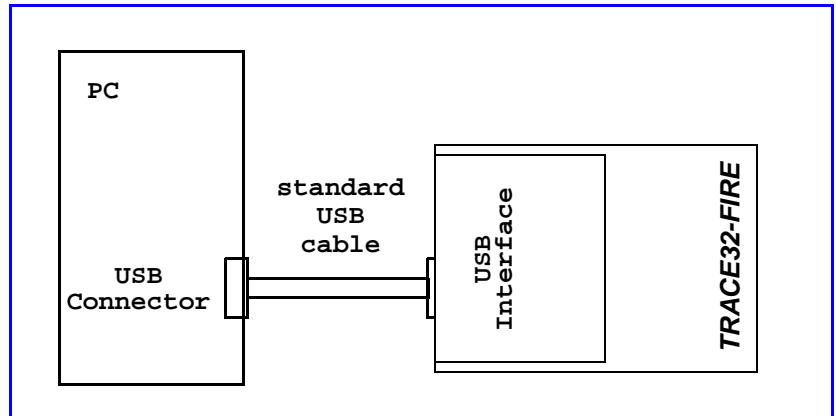
- BGA/QFP adapter

Host Interfaces

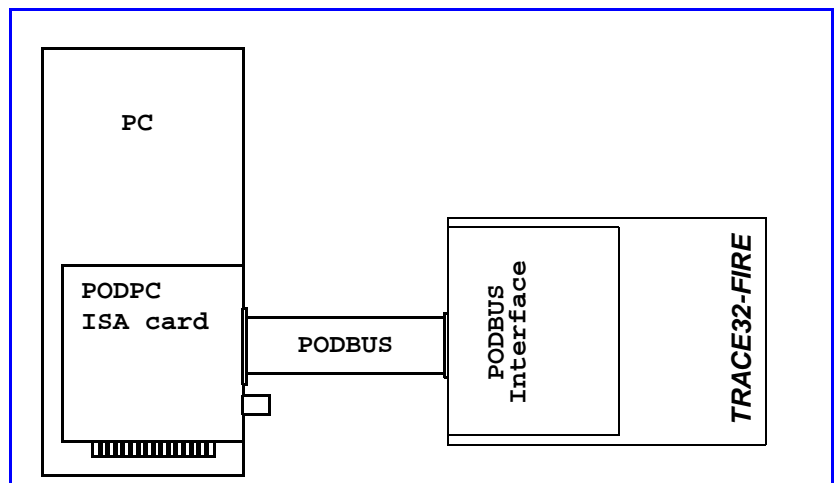
- Parallel Interface:



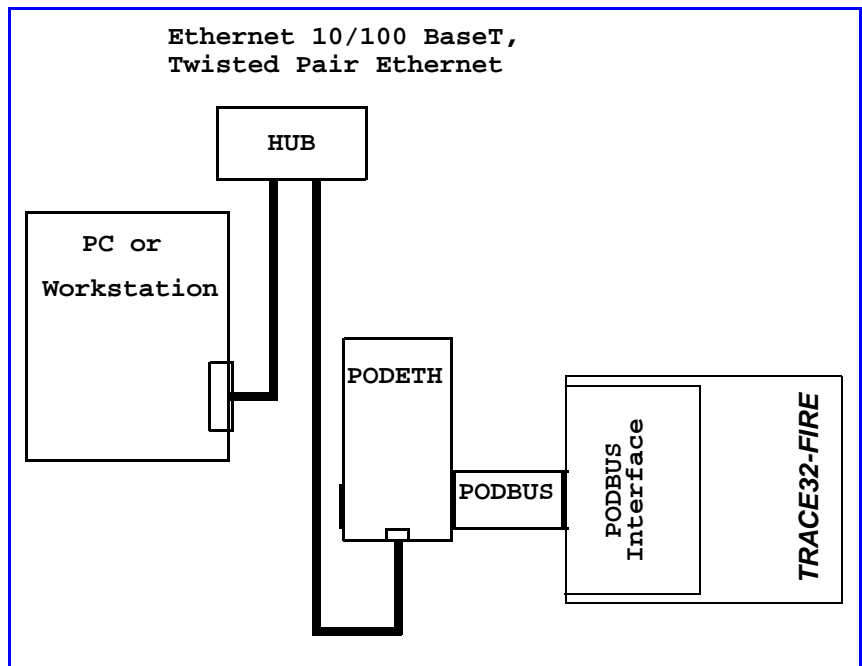
- USB Interface:



- PODBUS Interface (ISA Card):



- ❑ PODBUS Interface (Ethernet)



Download Performance

- ❑ Parallel Interface: 50 KByte/s
- ❑ Parallel Interface (ECP): 350 KByte/s
- ❑ USB Interface: 400 KByte/s
- ❑ Isa Card: 350 KByte/s
- ❑ Ethernet 10 BaseT: up to 600 KByte/s
- ❑ Ethernet 100 BaseT: up to 700 KByte/s

Debugging

Runtime control via the on-chip debug interface or via a debug monitor.

Breakpoint types

- Program breakpoints
- Spot (watch) breakpoint
- Read, Write, Access breakpoint
- Alpha, Beta, Charly, Delta, Echo breakpoints (for trigger purpose)

Breakpoint implementation

- Software breakpoints (unlimited)
- On-chip breakpoints (CPU dependent)
- Hardware breakpoints (unlimited)

Flexible breakpoint handling

- Enable/disable breakpoints
- Store breakpoint settings

address	types	state	
C:010E00	P	SOFT	\\iarh8s\iarh8\sieve+0x34
C:010E06	S	SOFT	\\iarh8s\iarh8\sieve+0x5A
C:010E08	A	HARD	\\iarh8s\iarh8\sieve+0x64
C:010E06	B	HARD	\\iarh8s\iarh8\sieve+0x6A
C:20A03A--20A03B	D	DISable	\\iarh8s\iarh8\wint
C:20A0F6--20A0F7	W	Onchip	\\iarh8s\iarh8\ast+0x4
C:20A368--20A368	W	Onchip	\\iarh8s\iarh8\enumvar
C:20A37E--20A390	R	DISable	\\iarh8s\iarh8\flags

Powerful, Integrated High Level Language Debugger

Multitask Debugger

TRACE32-FIRE provides symbolic debugging of complex multitask applications and the detailed analysis of the real time behaviour of the system. It

supports internally developed and a wide range of off-the-shelf realtime kernels.

Code coverage

Up to 4 MByte ReadFlag memory traces all opfetches in realtime for comprehensive code coverage.

The screenshot shows a window titled "F::D.L.P:0x10AAE /FLAG NOREAD". The table below represents the data shown in the window:

write	read	addr/line	code	label	mnemonic
		P:010AB8	1096		shl.w r6
	read	451		return x*x;	
		P:010ABA	0065		mov.w r6,r5
		P:010ABC	5265		mulx.w r6,r5
		P:010ABE	0056		mov.w r5,r6
		P:010AC0	5470		rts
READ		P:010AC2	79260002		cmp.w #0x2,r6
READ		P:010AC6	4608		bne 10AD0
				case 2:	
	read	453		return x*x;	
READ		P:010AC8	0065		mov.w r6,r5
		P:010ACA	0965		add.w r6,r5
		P:010ACC	0056		mov.w r5,r6
		P:010ACE	5470		rts
READ		P:010AD0	79260003		cmp.w #0x3,r6
READ		P:010AD4	4608		bne 10AD0
				case 3:	
	read	455		return x-x;	

Stack depth verification

Up to 4 MByte ReadFlag memory traces all write accesses in realtime for comprehensive stack depth verification.

The screenshot shows a window titled "F::Data.dump Register(sp) /Track /Flag Write". The table below represents the data shown in the window:

write	read	address	0	1	2	3	4	5	6	7	01234567
		D:210408	00	00	00	00	00	00	00	00	00
write		D:210408	00	00	00	00	00	15	00	04	00000000
WRITE		D:210408	07	84	00	01	08	3A	00	34	00000000
WRITE		D:2104C0	00	00	00	07	00	02	01	3B	00000000
WRITE		D:2104C8	00	04	08	3A	00	15	00	04	00000000
WRITE		D:2104D0	00	02	00	03	00	2A	00	04	00000000
WRITE		D:2104D8	08	3A	00	07	00	20	00	00	00000000
WRITE		D:2104E0	00	04	04	34	00	04	61	4E	00000000
WRITE		D:2104E8	00	04	0E	4A	00	00	00	00	00000000
WRITE		D:2104F0	30	3A	00	20	A0	F2	00	00	00000000
WRITE		D:2104F8	00	00	00	09	00	04	03	2A	00000000
		D:210500	00	00	00	00	00	00	00	00	00000000

Real time trace and trigger

Up to 64K trace buffer

- Bus trace and clock trace
- Up to 100 MHz
- Up to 160 channels
- 20 ns time stamp

Real time trigger

The multilevel trigger system allows to use advanced trigger sequences to find even the most complex errors in record time.

Context tracking system

The context tracking system allows fast, easy-to-follow trace analysis. If all CPU cycles are sampled it can be used for

- Debugging from the trace memory
- High level analysis of the trace with all register and stack variables
- Analysis of the function nesting

record	run	address	cycle	d.w	symbol	ti.back
					flags = (1, 1, 1, 0, 1, 1, 0, 1, 1, 0, 1, 1, 0, 1, 1, 0, 1, 1, 0)	
					k = 6	
					{	
					flags[k] = FALSE;	1.600us
					...	
					k = 6	
					primz = 5	
					k += primz;	0.900us
					k = 11	
					k = 11	
					while (k <= SIZE)	0.600us

Performance analysis

TRACE32-FIRE offers comprehensive performance analysis on program, function or module base or on areas defined by the user.

Statistic functions

TRACE32 allows detailed analysis of:

- Functions
 - Min. and max. time
 - Passes
 - Include and exclud time
- Link analysis
 - Callers
 - min. and max. times
 - Calls
- Duration
 - Execution time
 - Response time
- Distance

Powerful graphical analysis functions

Most statistic and runtime analysis can also be displayed in a graphical way to offer an intuitive interpretation.

Powerful batch language

TRACE32-FIRE offers a powerful batch language for automatic set ups and automatic testing. It is supported by its own debugger.

Contact

International Representative

Argentina

ANACOM Software e Hardware Ltd
Mr. Rafael Sorice
Rua Nazareth, 807, Barcelona
BR-09551-200 S,o Caetano do Sul, SP
Phone: 0055 11 3422-4200
FAX: 0055 11 3422-4242
EMAIL: rsorice@anacom.com.br

Australia

Embedded Logic Solutions P/L
Mr. Ramzi Kattfan
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
Mr. Stefan Kolbinger
Altlaufstr. 40
D-85635 Höhenkirchen-Siegertsbrunn
Phone: ++49 8102 9876 129
FAX: ++49 8102 9876 170
EMAIL: stefan.kolbinger@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 Software e Hardware Ltd
Mr. Rafael Sorice
Rua Nazareth, 807, Barcelona
BR-09551-200 S,o Caetano do Sul, SP
Phone: 0055 11 3422-4200
FAX: 0055 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

Suzhou Lauterbach Technologies Co.,Ltd.
Mr. Linglin He
Beijing Office
A3,South Lishi Road, XiCheng District
Beijing 100037, P.R. China
Phone: 0086-10-68023502
FAX: 0086-10-68023523
EMAIL: linglin.he@lauterbach.com

China Shenzhen

Suzhou Lauterbach Technologies Co.,Ltd.
1406/E Xihaimingzhu Building
No.1 Taoyuan Road, Nanshan District
Shenzhen 518052, P.R. China
Phone: 0086-755 8621 0671
FAX: 0086-755 8621 0675
EMAIL: emily.zhang@lauterbach.com

China Suzhou

Suzhou Lauterbach Technologies Co.,Ltd.
Mr. Tom Meyer
Room 1605, Xing Hai International Square
No.200, Xing Hai Street
Suzhou, 215021 P.R. of China
Phone: 0086-512 6265 8030
FAX: 0086-512 6265 8032
EMAIL: info_cn@lauterbach.com

Denmark

Nohau Danmark A/S
Mr. Flemming Jensen
Klausdalsbrøvej 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 10 1251955
FAX: ++20 2 35877303
EMAIL: sales@wantech.net.com

Finland

Nohau Solutions Finland
Mr. Leevi Lehtinen
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 CrEteil 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-Siegertsbrunn
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 5138 6185 5
FAX: ++49 5138 6185 3
EMAIL: klaus.hommann@lauterbach.com

Germany South

Lauterbach GmbH
Mr. Stefan Kolbinger
Altlaufstr. 40
D-85635 Höhenkirchen-Siegertsbrunn
Phone: ++49 8102 9876 129
FAX: ++49 8102 9876 170
EMAIL: stefan.kolbinger@lauterbach.com

India-Bangalore

Electro Systems Associates Pvt. Ltd.
Mr. G. V. Gurunatham
Subramanyanagar
4215 JK Complex First Main Rd.
India-Bangalore 560 021
Phone: ++91 80 23577924
FAX: ++91 80 23475615
EMAIL: sales@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:
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, Kukkat 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. Milind Pathak
Shriram Complex, 1126/1, Model Colony
Shivajinagar
India-Pune - 411 016
Phone: ++91 20 - 30462035 / 2566
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
3-9-5 Shinyokohama
Kouhoku-ku
Yokohama-shi, Japan 222-0033
Phone: ++81-45-477-4511
FAX: ++81-45-477-4519
EMAIL: info@lauterbach.co.jp

Luxemburg

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@emlogics.com.au

Norway

Nohau Solutions Norway
Mr. Tom Traelvik
Skoyenasveien 5 D
N 0686 Oslo
Phone: ++47 92 44 22 09
FAX: ++47 94 76 10 19
EMAIL: sales@nohau.no

Poland

Quantum Sp.z o.o. Korp. Transf
Mr. Czeslaw Bil
ul. Wystawowa 1
51-618 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
E-08031 Barcelona
Phone: ++34 93 429 5730
FAX: ++34 93 407 0778
EMAIL: info@captura-el.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-1

MDS Technology Co.,Ltd.
Mr. Sangheon Lee
15F Kolon Digital Tower Vilant
#222-7, Guro-3dong, Guro-gu
Seoul, 152-777, ROK
Phone: ++82 2 2106 6000
FAX: ++82 2 2106 6004
EMAIL: trace32@mdstec.com

South Korea-2

MDS Technology Co.,Ltd.
Mr. Hyungkwan Oh
299-2 Sincheon-dong, Dong-gu
Daegu, ROK
Phone: ++82 53 744 1994
FAX: ++82 53 744 1995
EMAIL: hyungkwan@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. Magnus Engström
Derbyvägen 4
SE-21235 Malmö
Phone: ++46 40 59 22 04
FAX: ++46 40 59 22 29
EMAIL: sales@nohau.se

Switzerland

JDT Jberg DatenTechnik
Mr. Andreas Iberg
Zimmereistrasse 2
CH-5734 Reinach AG
Phone: ++41 62 7710 886
FAX: ++41 62 7717 187
EMAIL: Andreas.Jberg@jdt.ch

Taiwan

Superlink Technology Corp.
Mr. Sulin Huang
3F-8, No.77, Shin-Tai-Wu Rd, Sec1
Taipei Hsien 221, Taiwan, R.O.C.
Phone: ++886 2 26983456
FAX: ++886 2 26983535
EMAIL: info.stc@superlink.com.tw

Turkey-1

Tektronik Muh. ve Tic. Ltd.
Mr. Hakan Yavuz
Mahatma Gandhi Cad 68A/2
G.O.Pasa
06700 Ankara
Phone: ++90 312 437 3000
FAX: ++90 312 437 1616
EMAIL: info@tekntronik.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 (0) 1256-333690
FAX: ++44 (0) 1256-336661
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. Jerry Flake
1111 Main Street, Suite 115
USA-Vancouver, WA, 98660
Phone: ++1 503 524 2222
FAX: ++1 503 524 2223
EMAIL: jerry.flake@lauterbach.com

Additional Information

<http://www.lauterbach.com>

Lauterbach GmbH

Altlaufstr. 40
D-85649 Hofolding
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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