


[TRACE32 Online Help](#)

[TRACE32 Directory](#)

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Warning

NOTE:	<p>To prevent debugger and target from damage it is recommended to connect or disconnect the debug cable only while the target power is OFF.</p> <p>Recommendation for the software start:</p> <ol style="list-style-type: none">1. Disconnect the debug cable from the target while the target power is off.2. Connect the host system, the TRACE32 hardware and the debug cable.3. Power ON the TRACE32 hardware.4. Start the TRACE32 software to load the debugger firmware.5. Connect the debug cable to the target.6. Switch the target power ON.7. Configure your debugger e.g. via a start-up script. <p>Power down:</p> <ol style="list-style-type: none">1. Switch off the target power.2. Disconnect the debug cable from the target.3. Close the TRACE32 software.4. Power OFF the TRACE32 hardware.
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How This Manual is Organized

- **Brief Overview of Documents for New Users:** Informs new users about important architecture-independent and architecture-specific documents.
- **System Concept:** Provides information about and illustrations of the TRACE32 debug and trace tools.
- **Software Installation:** Describes the default installation of TRACE32 under MS Windows and PC Linux, SunOS and HP-UX. TRACE32 can also be installed under Mac OS.

Contacting Support

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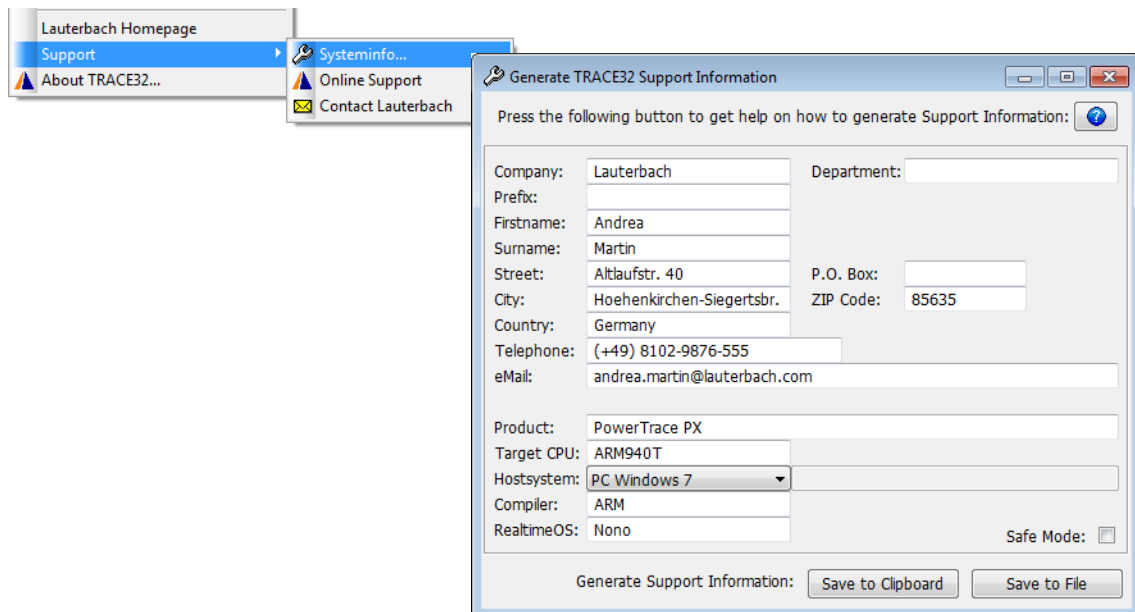
Fax (+49) 8102-9876-187

Internet <http://www.lauterbach.com/tsupport.html> or <http://www.lauterbach.com/report.html>
Here you'll find local and special support addresses.

E-mail support@lauterbach.com
General support address where your request will be answered within a short time if it is a basic support request or redirected to the appropriate address.

Be sure to include detailed system information about your TRACE32 configuration.

1. To generate a system information report, choose **TRACE32 > Help > Support > Systeminfo**.



NOTE: Please help to speed up processing of your support request. By filling out the system information form completely and with correct data, you minimize the number of additional questions and clarification request e-mails we need to resolve your problem.

2. Preferred: click **Save to File**, and send the system information as an attachment to your e-mail.
3. Click **Save to Clipboard**, and then paste the system information into your e-mail.

Architecture-independent information:

- **“Debugger Basics - Training”** (training_debugger.pdf): Get familiar with the basic features of a TRACE32 debugger.
- **“T32Start”** (app_t32start.pdf): T32Start assists you in starting TRACE32 PowerView instances for different configurations of the debugger. T32Start is only available for Windows.
- **“General Commands”** (general_ref_<x>.pdf): Alphabetic list of debug commands.

Architecture-specific information:

- **“Processor Architecture Manuals”**: These manuals describe commands that are specific for the processor architecture supported by your debug cable. To access the manual for your processor architecture, proceed as follows:
 - Choose **Help** menu > **Processor Architecture Manual**.
- **“RTOS Debuggers”** (rtos_<x>.pdf): TRACE32 PowerView can be extended for operating system-aware debugging. The appropriate RTOS manual informs you how to enable the OS-aware debugging.

A microcontroller can provide:

- An on-chip debug interface
- An on-chip debug interface plus a trace port
- A NEXUS interface

Depending on the debug resources, different debug features can be provided and different TRACE32 tools are offered.

On-chip Debug Interface

The TRACE32 debuggers allow you to test your embedded hardware and software by using the on-chip debug interface of the microcontroller. The most common on-chip debug interface is JTAG.

Debug Features

Depending on the microcontroller different debug features are available.

Debug features provided by all microcontrollers (if not in secure mode):

- Read/write access to CPU registers
- Read/write access to all memories
Prerequisite: The system permits debugger access.
- Start/stop of program execution

Debug features specific for each microcontroller:

- Number of on-chip breakpoints
- Read/write access to memory while the program execution is running
- Additional features as benchmark counters, triggers etc.

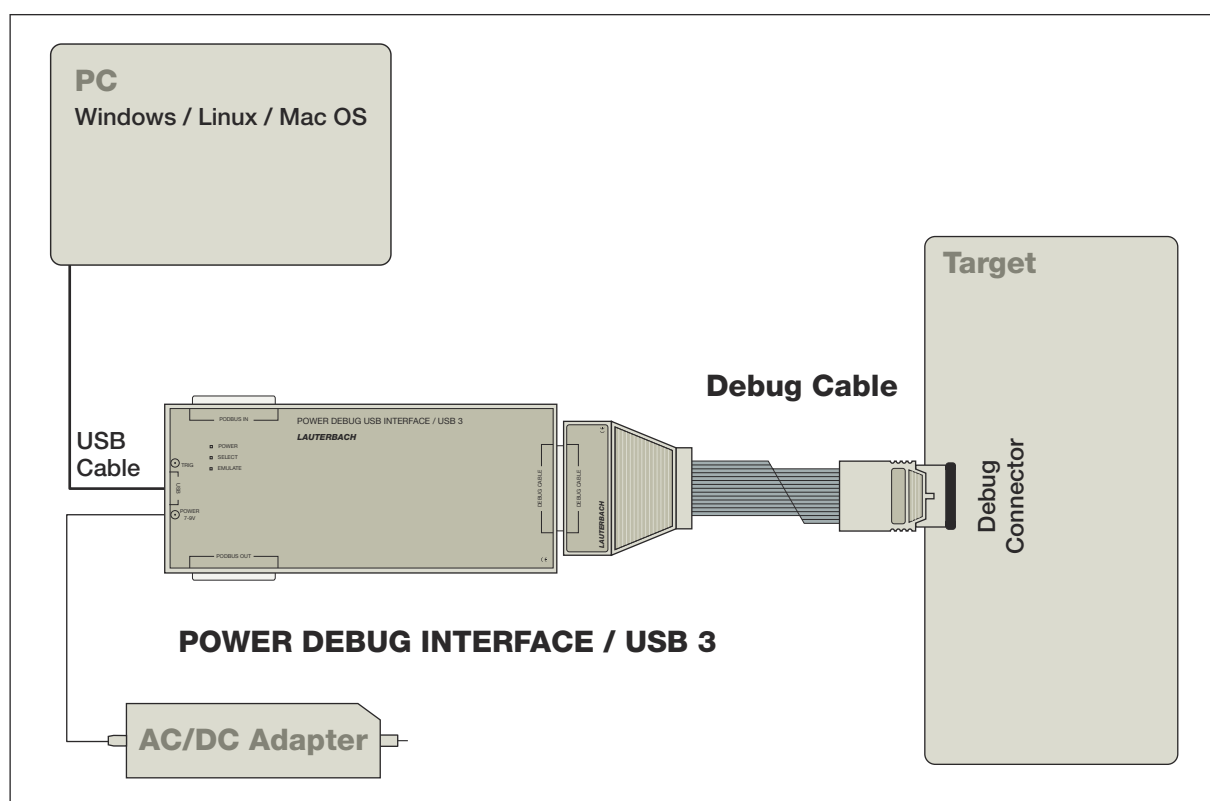
The TRACE32 debugger hardware always consists of:

- Universal debugger hardware
- Debug cable specific to the processor architecture

POWER DEBUG INTERFACE / USB 3

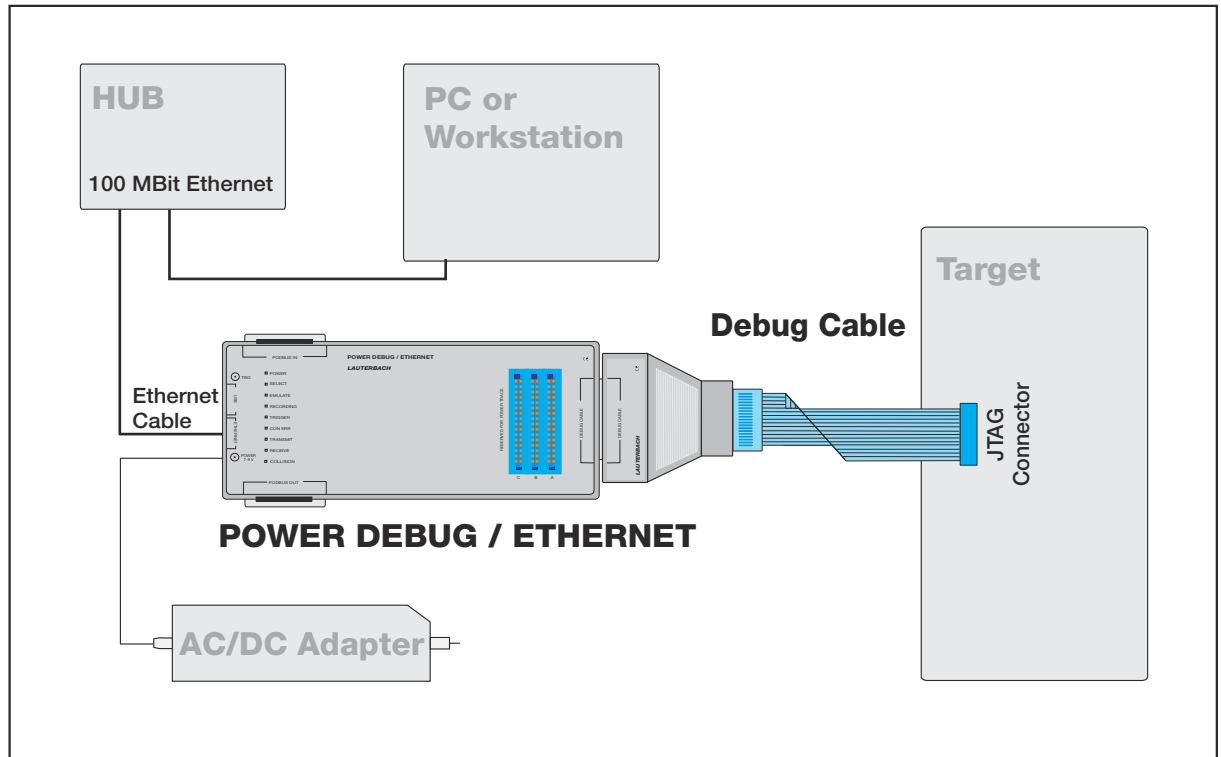
Debug controller with:

- 900+ DMIPS
- 400 MHz
- USB 3.0 as host interfaces
- Basic version without upgrade option to **POWER TRACE / ETHERNET**



Debug controller with:

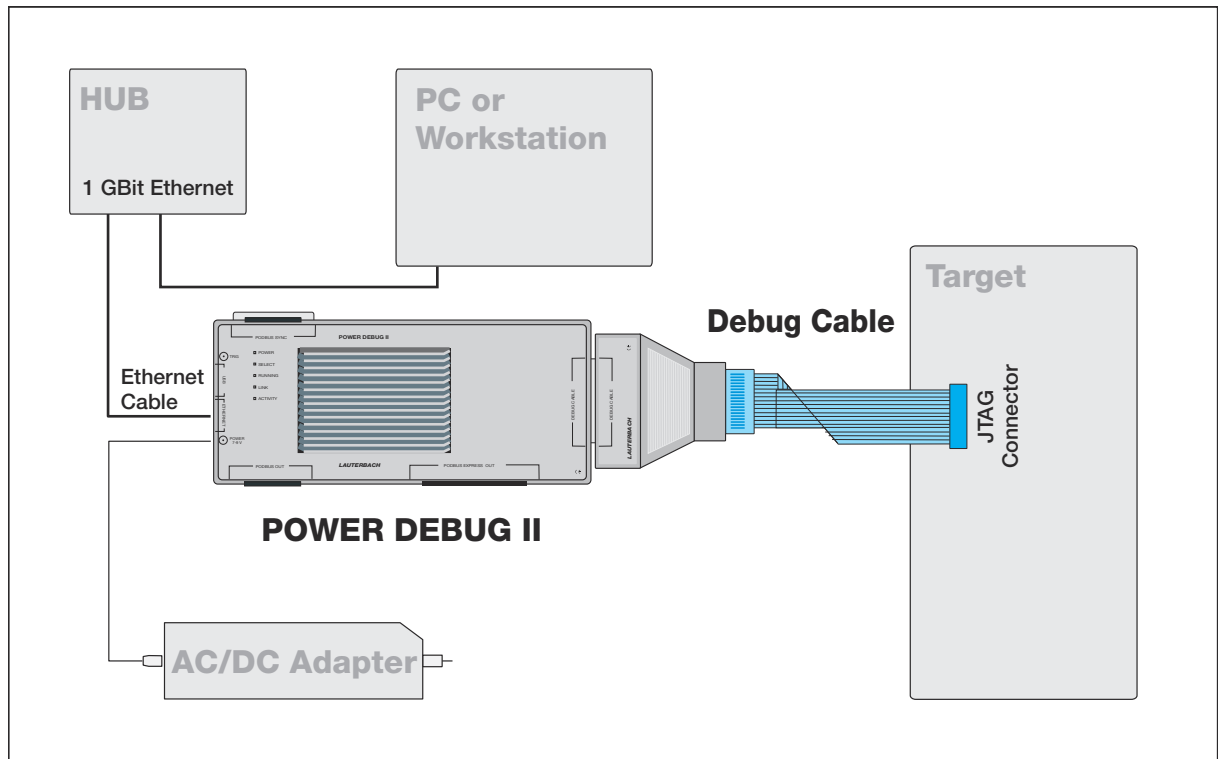
- 304 DMIPS
- 200 MHz
- 100 MBit ethernet or USB 2.x as host interface
- Upgradable to a **POWER TRACE / ETHERNET**



POWER DEBUG II

Debug controller with:

- 1000 DMIPS
- 500 MHz
- 1 GBit ethernet or USB2.0 as host interface
- Expandable with **POWER TRACE II** module



On-chip Debug Interface plus Trace Port

A number of microcontrollers offer, in addition to the on-chip debug interface, a so-called trace port. A typical trace port is the ETM for the ARM architecture.

Trace Features

After configuring the trace port, the trace port broadcasts in real-time:

- The instruction flow (information on the instructions executed)
- The data flow (information on performed load/store instructions)

The display and the evaluation of the trace information is described in the following documents:

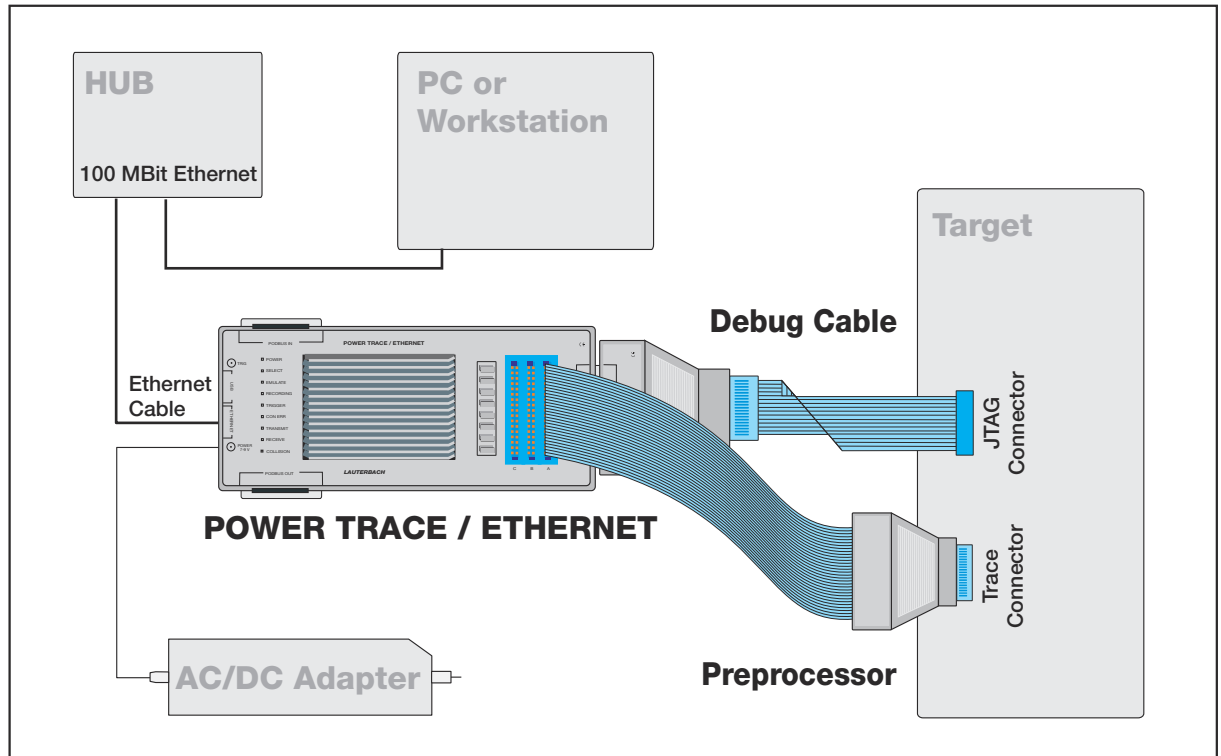
- **“ARM-ETM Training”** (training_arm_etm.pdf)
- **“Hexagon-ETM Training”** (training_hexagon_etm.pdf)
- **“AURIX Trace Training”** (training_aurix_trace.pdf)

For tracing, the TRACE32 debugger has to be extended by:

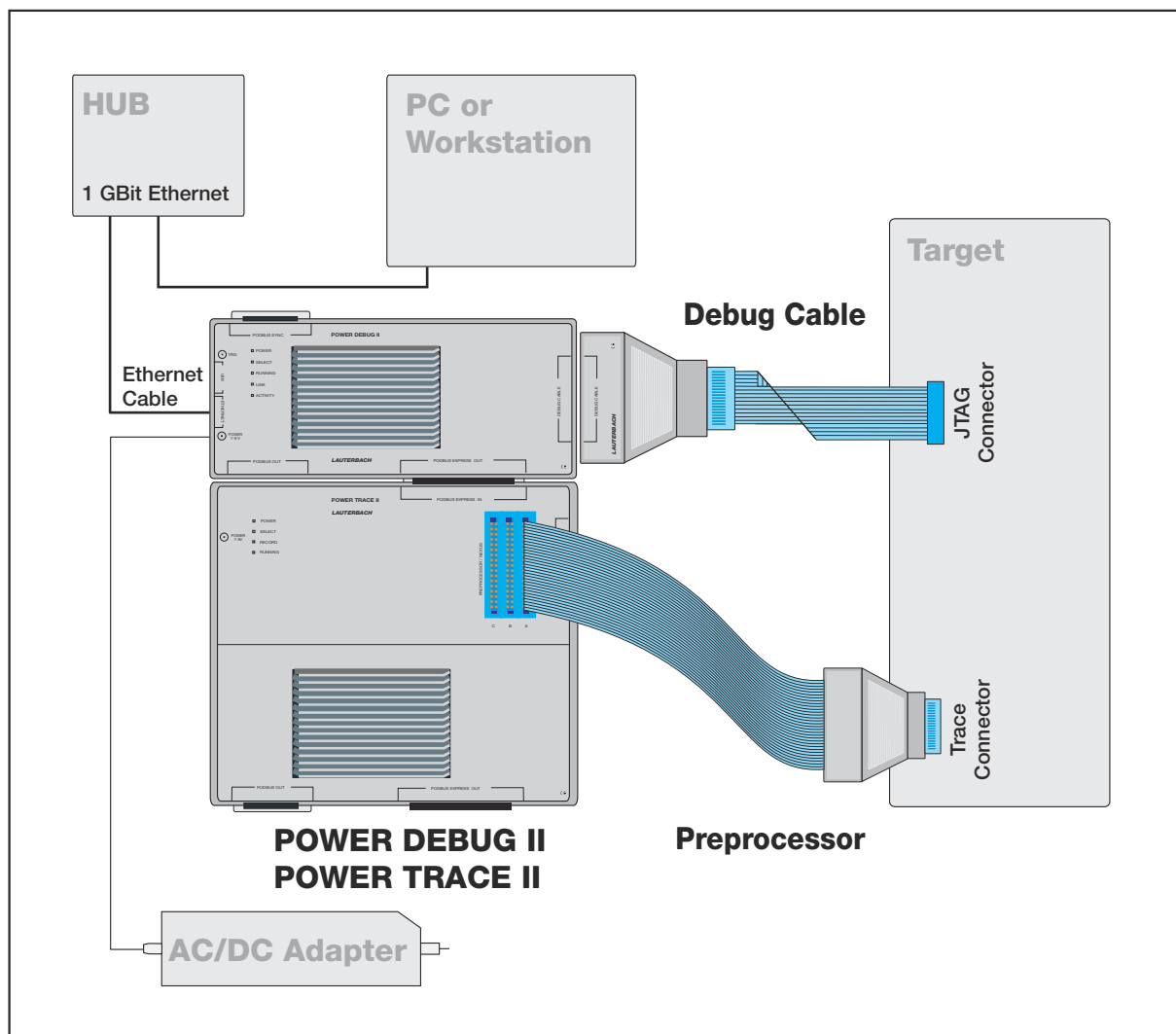
- An universal trace hardware
- A preprocessor specific to the processor architecture

POWER TRACE / ETHERNET

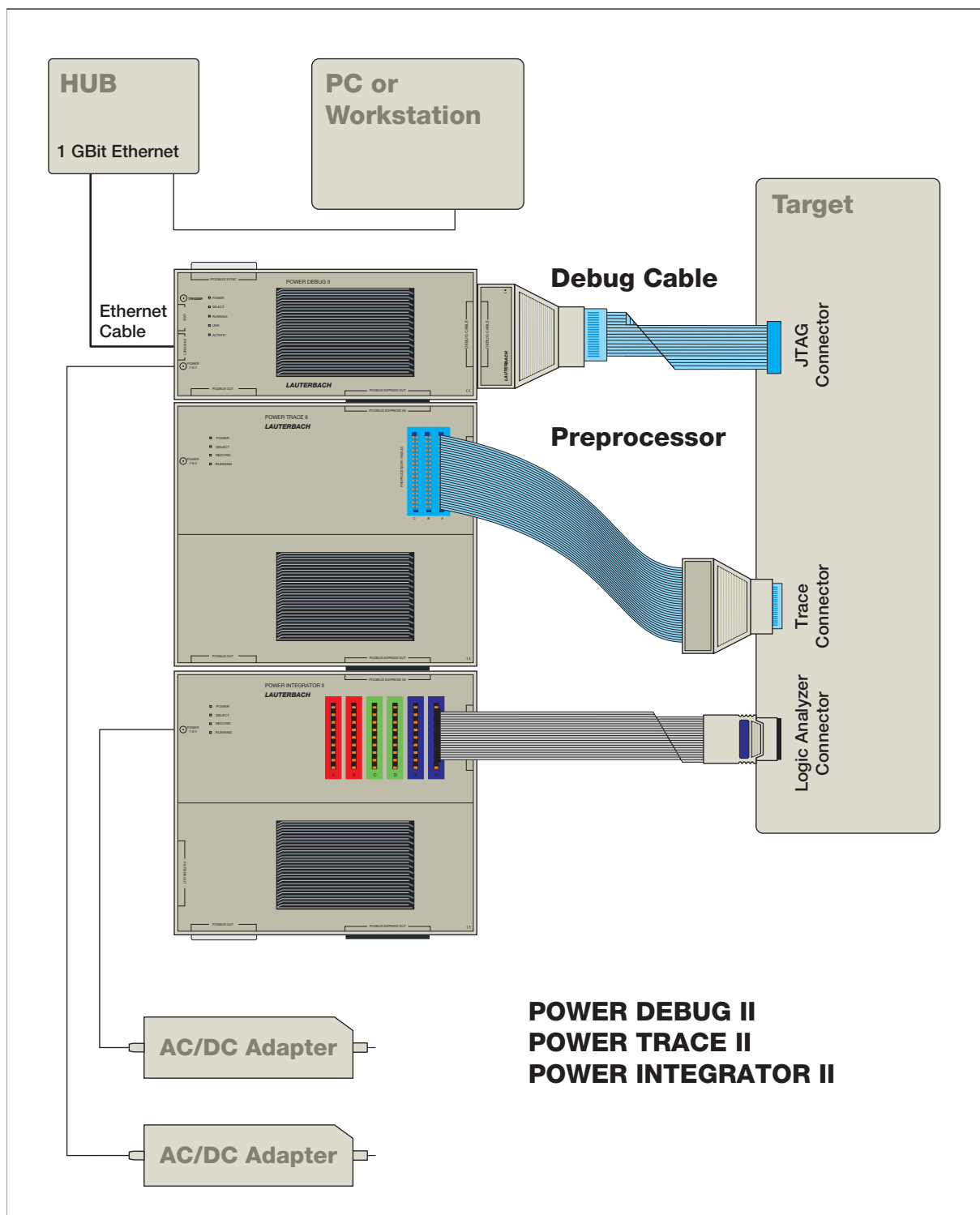
Trace memory with a depth of 256 MByte or 512 MByte.



POWER DEBUG II can be extended by a **POWER TRACE II** with 1 GByte, 2 GByte or 4 GByte trace memory.



POWER DEBUG II can be extended by a **POWER TRACE II** with 1 GByte, 2 GByte or 4 GByte trace memory, and a **POWER INTEGRATOR II** Logic Analyzer with a 1 GByte, 2 GByte or 4 GByte logic analyzer memory.



NOTE:

- For the first two devices, only one AC/DC adapter is required. Each additional device requires an additional AC/DC adapter.
- An additional device in a PODBUS device chain **cannot** be damaged if it is **not** connected to its required AC/DC adapter.
- In case of a missing AC/DC adapter, an error message is displayed in the **AREA** window.
To view the error message, choose **View** menu > **Message Area**.
Or type **AREA** at the TRACE32 command line.

NEXUS is a standardized interface for on-chip debugging and real-time trace especially for the automotive industry.

NEXUS Features

Debug features provided by all microcontrollers:

- Read/write access to CPU registers
- Read/write access to all memories
- Start/stop of program execution
- Read/write access to memory while the program execution is running

Debug features specific for each microcontroller:

- Number of on-chip breakpoints
- Benchmark counters, triggers etc.

Trace features provided by all microcontrollers:

- The instruction flow (information about the instructions executed)

Trace features specific for each microcontroller:

- The data flow (information on performed load/store instructions)

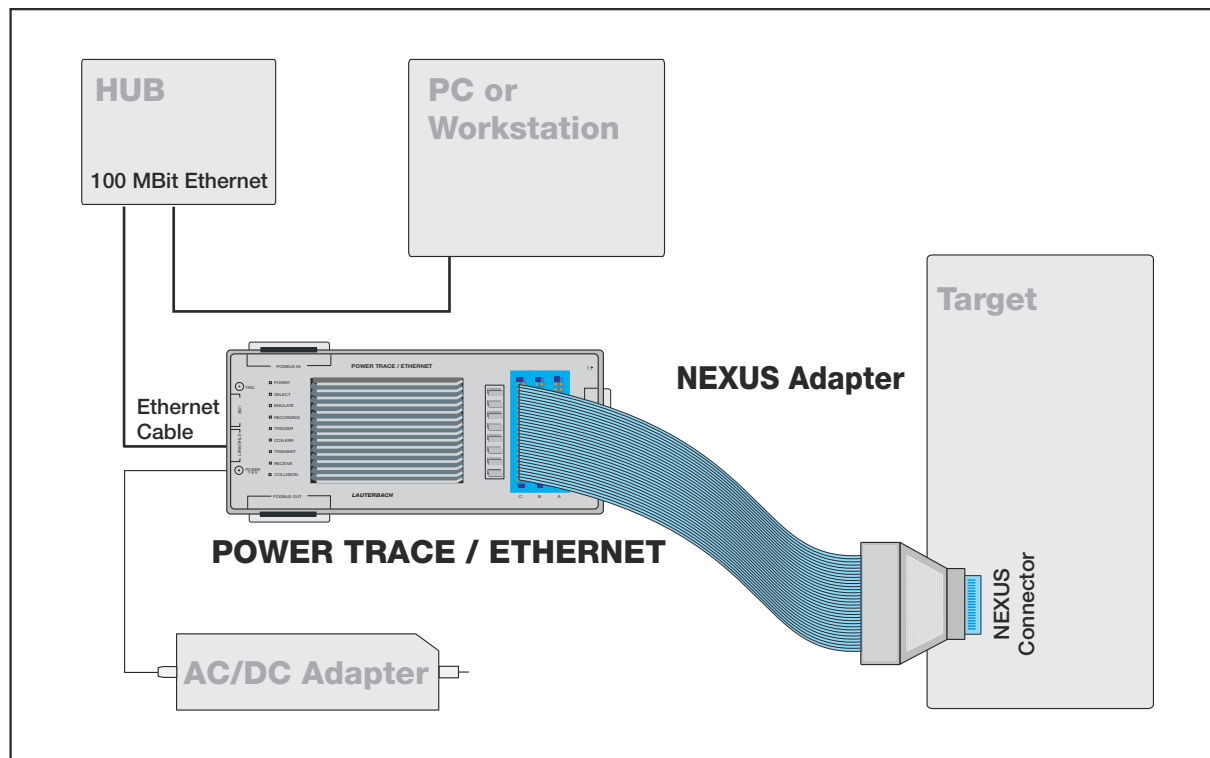
The display and the evaluation of the trace information is described in [“Nexus Training”](#) (training_nexus.pdf).

The TRACE32 hardware consists of:

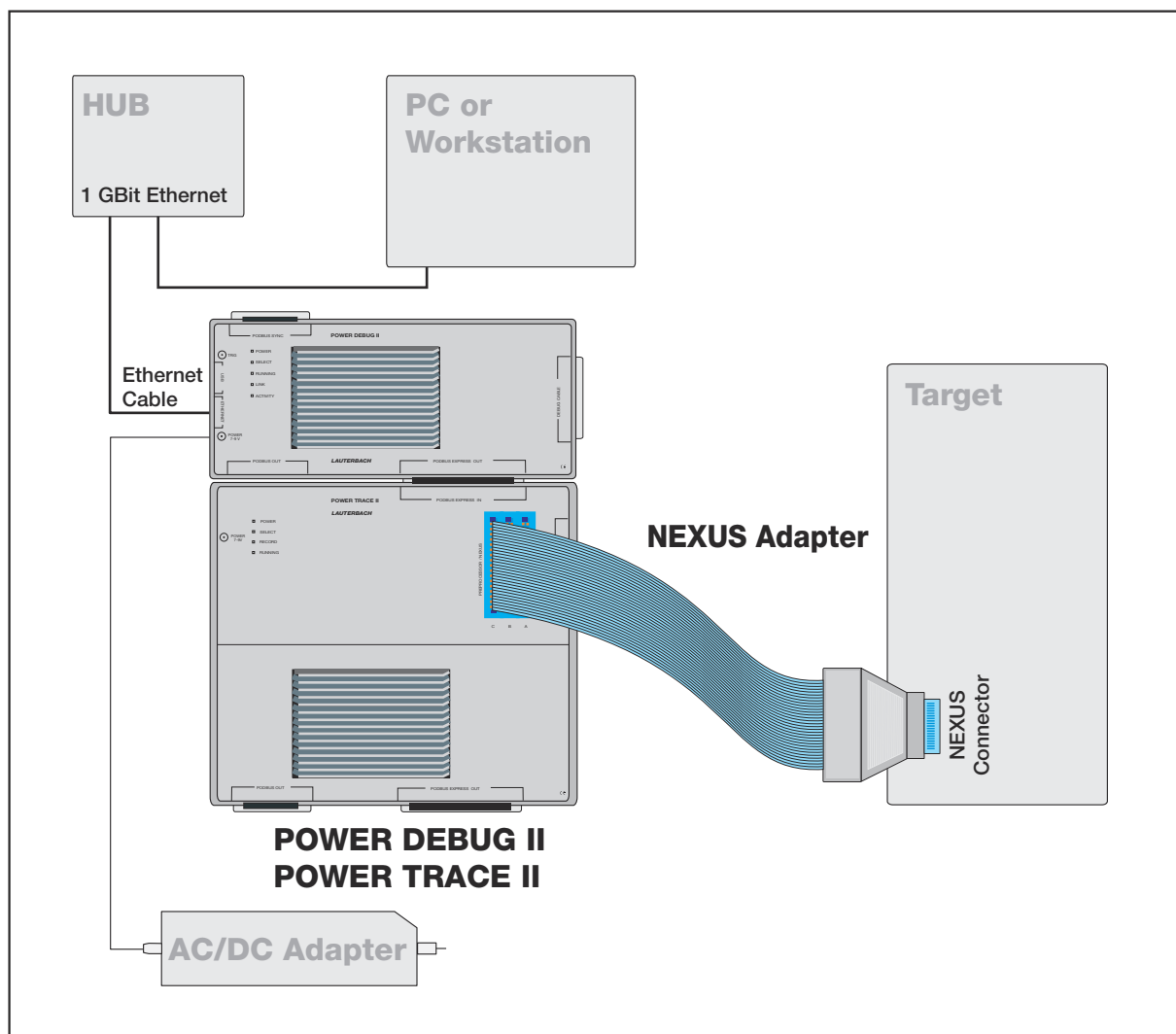
- A universal POWER TRACE hardware
- A NEXUS adapter specific to the processor architecture

POWER TRACE / ETHERNET for NEXUS

Trace memory with a depth of 256 MByte or 512 MByte.

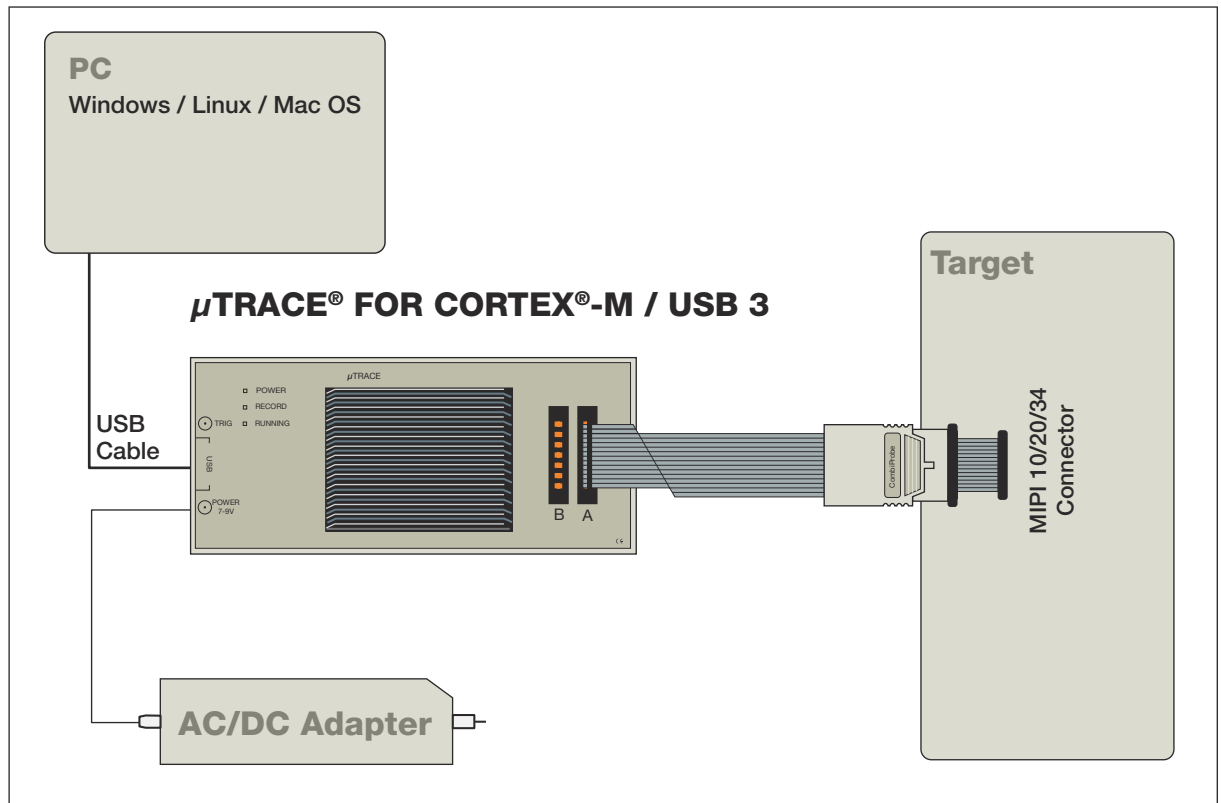


POWER DEBUG II can be extended by a **POWER TRACE II** for NEXUS with 1 GByte, 2 GByte or 4 GByte trace memory.



μTrace for Cortex-M

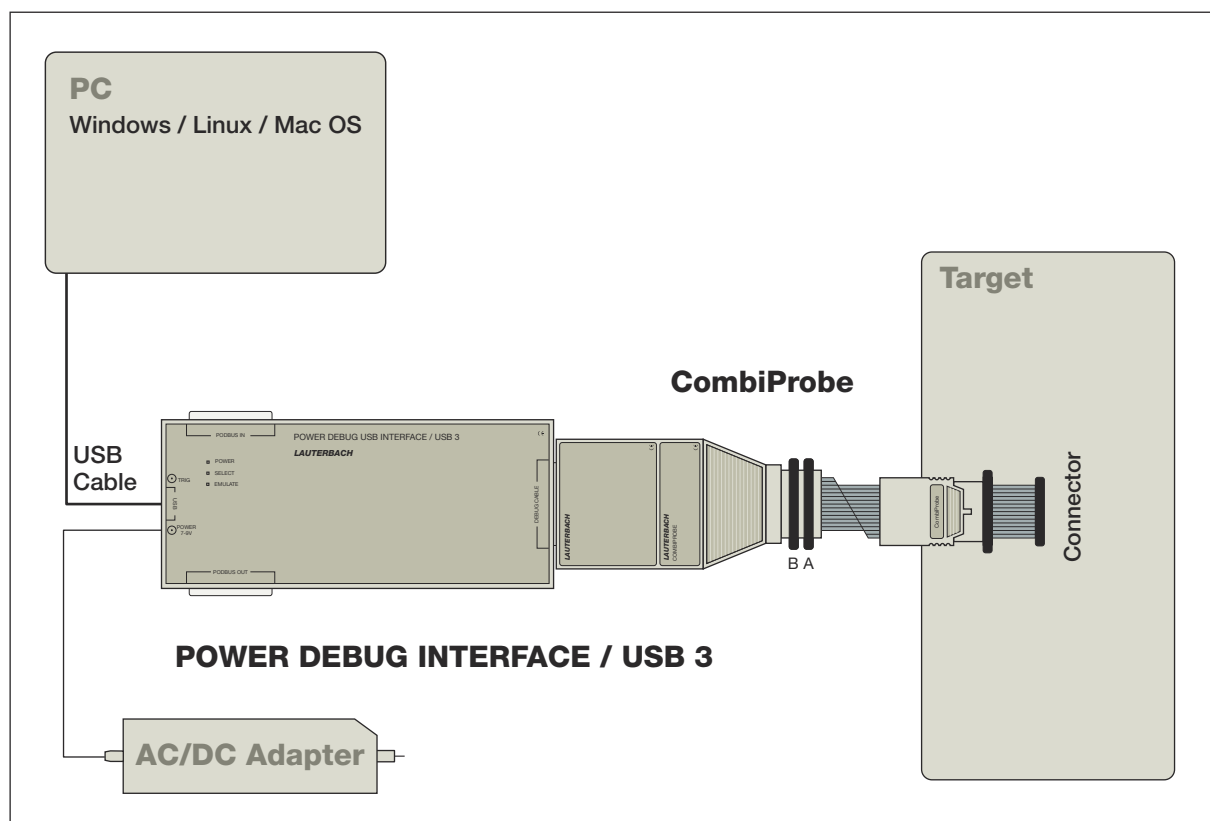
For a description of the highlights as well as debug and trace features of the μTrace, refer to <http://www.lauterbach.com/microtrace.html>.

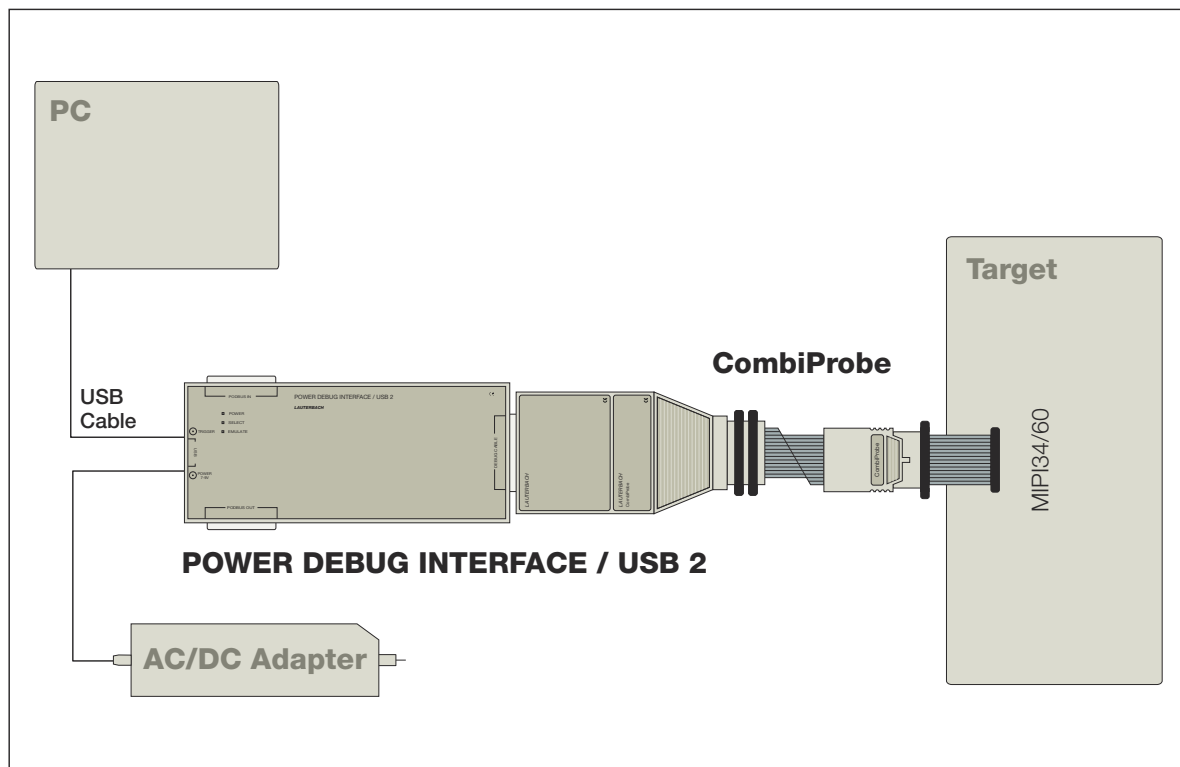


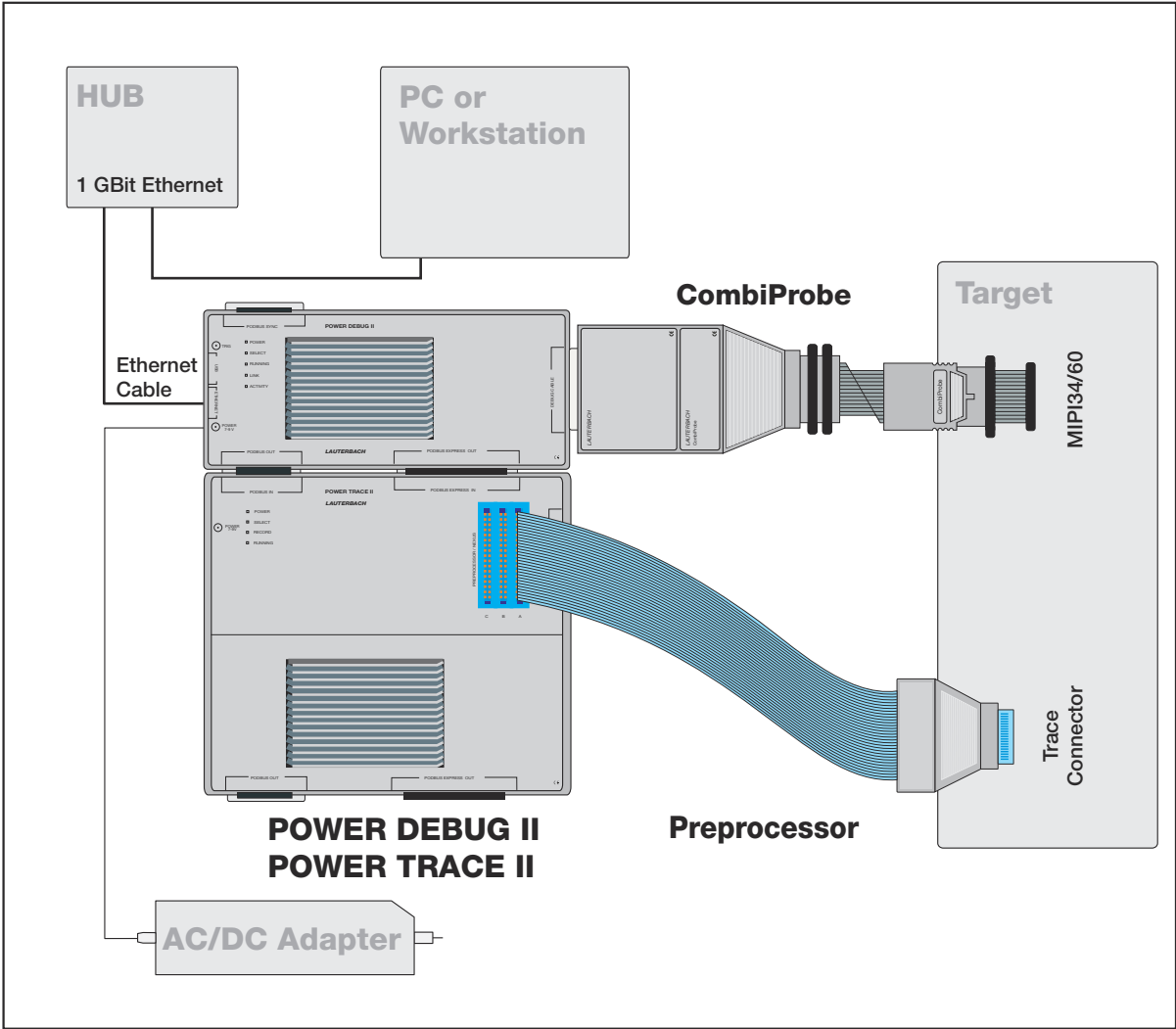
Hardware configuration options for the CombiProbe:

- **Option 1:** Universal Debugger Hardware with CombiProbe for USB 3
- **Option 2:** Universal Debugger Hardware with CombiProbe for USB 2
- **Option 3:** Power Debug II and Power Trace II with CombiProbe as debug cable
- Option 4: PowerTrace with CombiProbe as debug cable, see <http://www.lauterbach.com/cobstm.html>

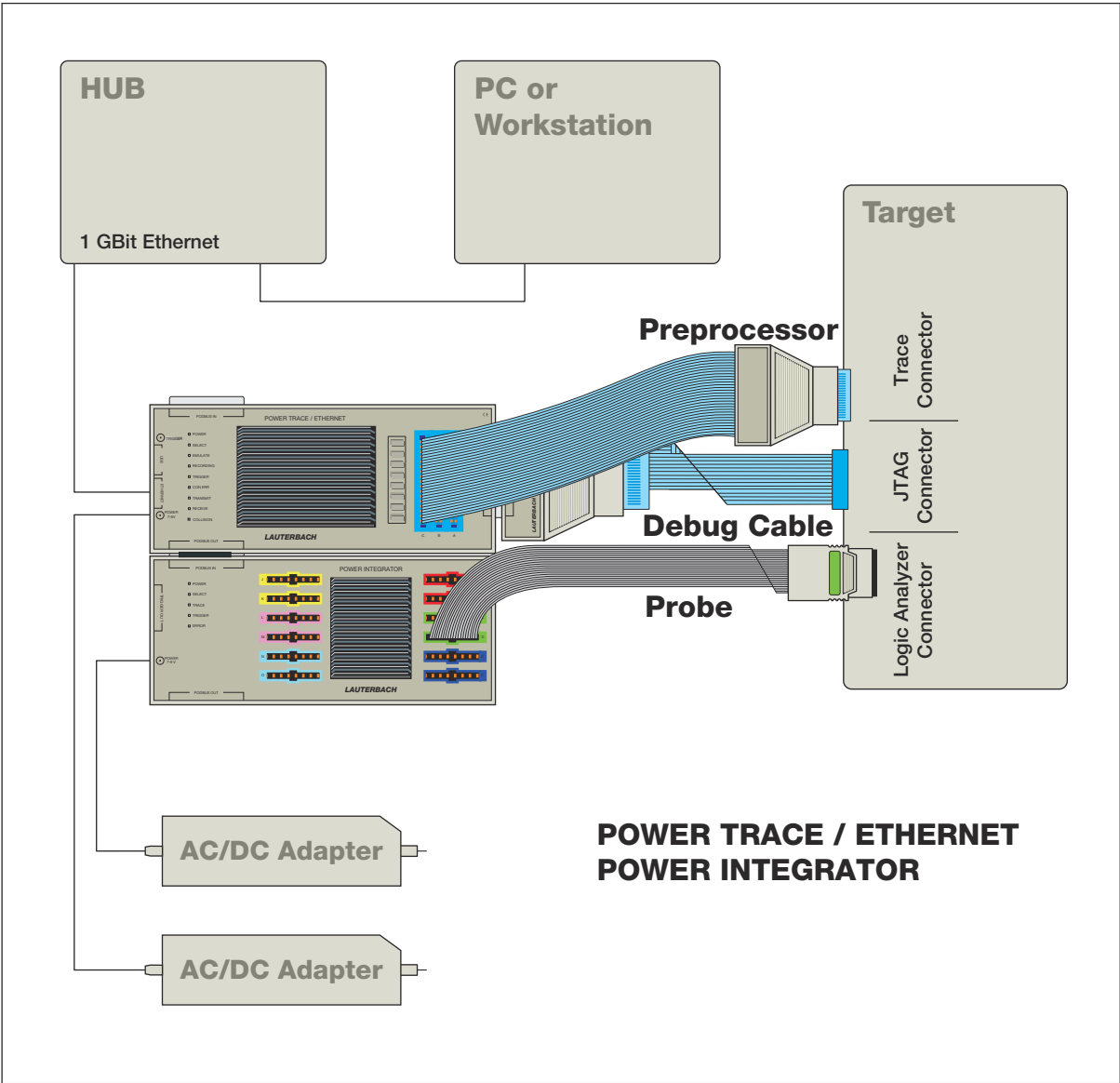
Hardware Configuration Option 1







Typical configuration:



This chapter describes the installation of TRACE32 under:

- MS Windows
 - Quick Installation
 - Ethernet
 - USB
- PC_Linux
 - Ethernet
 - USB
- SunOS, Solaris (SUN), HP-UX
- Mac OS

MS Windows

Quick Installation

NOTE:	For installing TRACE32 on WINDOWS you have to be logged in as an administrator.
--------------	--

1. Recommendation: Download Acrobat Reader from <http://www.adobe.com> and install it if not already installed on the system.
The TRACE32 online help uses the Adobe Reader for displaying the information in PDF format.
2. Insert the installation DVD into the DVD drive.
3. Install TRACE32 by double-clicking “setup.bat” or “files\bin\setup64\setup.exe” (WIN2000/XP/WIN Server 2003/WIN Vista/WIN7/WIN8/WIN10).
4. Follow the on-screen instructions.
5. Upon completion of the installation, start TRACE32 via the Windows **Start** button as described in [“ICD Tutorial”](#) (icd_tutorial.pdf).

In multicore/multiprocessor debug environments, it is recommended that Windows users start TRACE32 via the **T32Start** application.

1. Start **T32Start** via the Windows **Start** button.
2. Configure **T32Start** according to your requirements. See chapter [“Quick Start”](#) (app_t32start.pdf).
3. Configure the TRACE32 help system with a few mouse-clicks to display the PDF help files in your favorite PDF viewer; see [“Configure the Help System”](#) (ide_user.pdf).

First a new node must be created for TRACE32. The Ethernet address of the emulator is on a sticker located on the reverse side of the system. The administrator must add an entry containing the IP address and node name to the name server, or the following line must be added to the file HOSTS:

```
192.9.200.5      t32
```

Note, the above used INTERNET address is an example only. Contact your network administrator for a new INTERNET address for TRACE32.

The INTERNET address is requested by a DHCP/RARP protocol by TRACE32. If no DHCP/RARP server is running, the address for the first connect must be set in the host table. After the first successful connect the INTERNET address is stored in the non-volatile memory within TRACE32. The following command sets the host translation table:

```
arp -s t32 0-c0-8a-0-0-0
```

NOTE:	Windows 95 has a bug, that may cause the arp command to fail, when the arp cache is empty. In this case 'ping' another host before executing the arp command, this will fill the arp cache.
-------	---

NOTE:	On Windows the ARP command is only available if you are logged in as an administrator.
-------	--

If the ARP command is not available, the internet address must be set by connecting the system via fiber optic link or parallel interface or USB.

To use the network access, the net driver must be activated. The node name can be changed, when not identical to 't32'.

Configuration Command:

PBI=NET	Used for controller-based debugging
NODE=<nodename>	(default: t32)
PACKLEN=1024	Limits the size of the UDP packages to 1024

USB Interface

The USB driver must be selected. Windows 2000 / XP or Vista or Windows 7 or Windows 8 or Windows 10 is required.

When the device is first connected to the system, the hardware assistant detects a new USB device and asks for a driver directory.

If the TRACE32 software is already installed, the required file (t32usb.inf) can be found in the TRACE32 installation directory (e.g. c:\t32\). Otherwise please insert the TRACE32 installation DVD and navigate to the directory ~\bin\windows\drivers or let the system search for it.

Configuration Command:

PBI=USB	Select PODBUS interface via USB connection
---------	--

Quick Installation

Since November 2012, the TRACE32 PowerView GUI for Linux is available in two versions:

- **Qt** GUI (MWI and MDI) (executables **with** the suffix “-qt” : e.g. t32marm-qt)
- **Motif** GUI (MWI) (executables **without** the suffix “-qt” : e.g. t32marm)

Common steps

In the following **example** the **directory /opt/t32** is used as the system directory.

The system directory is created by the following commands:

```
mkdir /opt/t32 # or similar
```

The files are extracted from the CD to the system directory with the following commands:

```
mount /mnt/cdrom # or similar
cd /opt/t32
cp -r /mnt/cdrom/files/* ./
chmod -R u+w *
cp ./demo/practice/t32.cmm ./
mv bin/pc_linux64/config.t32 ./ # not necessary if the TRACE32
                                # executable is called with
                                # configuration filename parameter
                                # e.g. t32marm-qt -c /opt/t32/bin/pc_linux64/config.t32

/mnt/cdrom/files/bin/pc_linux64/filecvt ./
                                # converts all filenames to lower
                                # case and files into UNIX format and
                                # uncompresses all files if necessary
```

The following environment variables must be set (e.g. in .bashrc for the BASH-shell):

```
export T32SYS=/opt/t32
export T32TMP=/tmp
export T32ID=T32
```

The **TRACE32 online help system** uses an external PDF viewer for displaying the information in PDF format.

Please execute the TRACE32 command **SETUP.PDFViewer.state** inside the TRACE32 GUI once. If the autodetection fails, a manual setting will be necessary.

Legacy information for Acrobat Reader usage:

Download Acrobat Reader from <http://www.adobe.com> and install it if not already installed on the system. Usually, you have to be root for the installation!

```
tar -xvzf linux-508.tar.gz      # or similar filename
./INSTALL                      # run the install script
```

Set the environment variable “ACROBAT_PATH” to the Acrobat installation path::

```
export ADOBE_PATH=/opt/Adobe/Reader8    # added in ~/.bashrc for BASH
or
export ACROBAT_PATH=/opt/Acrobat5        # added in ~/.bashrc for BASH
```

Copy the TRACE32 plug-in into the Acrobat plug_ins folder (without new line):

```
cp /mnt/cdrom/files/bin/pc_linux/trace32.api
                                $ADOBE_PATH/Reader/intellinux/plug_ins
or
cp /mnt/cdrom/files/bin/pc_linux/trace32.api
                                $ACROBAT_PATH/Reader/intellinux/plug_ins
```

Verify that you have write permission to the system directory and prepare the configuration file **config.t32**:

```
cd /opt/t32/bin/pc_linux64      # depends on the location of the actual used
# or                            # configuration file
cd /opt/t32                    # default file location is /opt/t32 ($T32SYS)

vi config.t32                  # define interface type, ...

...

                                # e.g. when using ethernet interface
PBI=                           #
NET                             # please replace t32 with the actual assigned
NODE=t32                       # network node name for the ICD module

                                # e.g. when using USB interface
PBI=
USB
```

Uncompress the executable files before usage (not necessary when filecvt was used before):

```
cd /opt/t32/bin/pc_linux64
gzip -d t32m*.gz           # or   gunzip t32m*.gz
```

Include the executable file in the PATH variable:

```
export PATH=$PATH:/opt/t32/bin/pc_linux64 # added in ~/.bashrc for BASH
                                           # preferred solution
```

Starting the TRACE32 executable file could be done in several ways:

```
# preferred solutions
export PATH=$PATH:/opt/t32/bin/pc_linux64 # added in ~/.bashrc for BASH
./t32marm-qt -c /opt/t32/bin/pc_linux64/config.t32
                                           # TRACE32 executable is called with
                                           # configuration filename parameter

# starting executable with a
# PRACTICE startup script file
./t32marm-qt -c /opt/t32/bin/pc_linux64/config.t32 -s /opt/t32/t32.cmm
```

Configure the TRACE32 help system with a few mouse-clicks to display the PDF help files in your favorite PDF viewer; see [“Configure the Help System”](#) (ide_user.pdf).

Qt GUI specific steps

The minimum requirements for the Qt GUI are:

- Kernel: 2.6.32
- libc: 2.11.1
- Qt libs: 4.6.2

Minimum versions of some popular Linux distributions:

Distribution	minimum release	required packages
Ubuntu	10.04	libqtcore4, libqtgui4
Debian	6.0	libqtcore4, libqtgui4
Mint	9.0	libqtcore4, libqtgui4
RedHat	RHEL 6.1	qt, qt-x11
CentOS	6.0	qt, qt-x11

Fedora	13	qt, qt-x11
SUSE	11-SP1	libqt4
openSUSE	11.3	libqt4

Font settings in the configuration file `config.t32`:

No special font settings are required. Each installed fixed width font can be used. The default font is Courier..

```
SCREEN=
FONT=Liberation Mono      ; Selects font Liberation Mono for data output
FONT=NOANTIALIAS         ; disables font aliasing (default: ANTIALIAS)
```

GUI Configuration in the configuration file `config.t32`:

The GUI can be configured with STYLE options in the **SCREEN=** section of the configuration file `config.t32`. The following STYLE options can be set:

STYLE=STATUSBAR ON	Enables the status bar of the main window (default)
STYLE=STATUSBAR OFF	Disables the status bar of the main window
STYLE=TOOLBAR ON	Enables the tool bar of the main window (default)
STYLE=TOOLBAR OFF	Disables the tool bar of the main window
STYLE=TOOLBAR TOP	Places the tool bar on the top edge of the main window (default)
STYLE=TOOLBAR RIGHT	Places the tool bar on the right edge of the main window
STYLE=TOOLBAR BOTTOM	Places the tool bar on the bottom edge of the main window
STYLE=TOOLBAR LEFT	Places the tool bar on the left edge of the main window
STYLE=COMMANDLINE TOP	Places the command line and the soft keys to the top edge of the main window (default)
STYLE=COMMANDLINE BOTTOM	Places the command line and the soft keys to the bottom edge of the main window
STYLE=MDISCROLL OFF	disables MDI area scroll bars (default)
STYLE=MDISCROLL ON	enables MDI area scroll bars
STYLE=SMALLSIZE	Reduces the size of dialog elements (e.g. buttons, check boxes, ...) on some systems (Ubuntu Unity, ...)

STYLE=NORMALSIZE

Selects normal size of dialog elements (e.g. buttons, check boxes, ...) on some systems (Ubuntu Unity, ...) (default)

STYLE=PLASTIQUE¹

Selects Qt predefined theme Plastique

STYLE=CLEANLOOKS¹

Selects Qt predefined theme Cleanlooks

STYLE=WINDOWS¹

Selects Qt predefined classic Windows theme

STYLE=CDE¹

Selects Qt predefined CDE theme

STYLE=MOTIF¹

Selects Qt predefined Motif theme

**PALETTE <n> =
<red><green><blue>²**

Change color value, the intensities will vary from **0 to 255 for Qt.**

For Motif are the valid color values **0 to 65535.**

<n> is the object type displayed in a **SETUP.COLOR** window.

1: If no predefined theme is set, the theme of the current desktop is used.

2: If no special color is set, the TRACE32 default is used.

Prepare and install the fonts:

Since TRACE32 software release April 2010 the font installation is simplified.

It's necessary to place a subdirectory named fonts (e.g. /opt/t32/fonts) under the TRACE32 system directory (e.g. /opt/t32). The TRACE32 PowerView software automatically searches for the required TRACE32 fonts in this directory if the fonts are not provided by the host operating system.

When bitmap fonts are blocked/locked from the host operating system, a usage overwrite can be activated by adding the following lines inside the actual used TRACE configuration file e.g. config.t32.

```
SCREEN=                                ; bitcoded values (0..3 allowed)
FONTMODE=3                            ; bit0: bitmap system fonts activated
                                       ; bit1: bitmap TRACE32 client fonts activated
```

Font installation for TRACE32 software releases older than April 2010:

```
cd /opt/t32/fonts
mkfontdir ./

xset +fp /opt/t32/fonts                # must be done under the original
xset fp rehash                         # Xserver user (normally not as root)
                                       # only temporary adding of TRACE32
                                       # font directory or

chkfontpath -a /opt/t32/fonts          # permanent adding of the fontdirectory
                                       # not available under SUSE distribution

ln -s /opt/t32/fonts                  # permanent adding of the fontdirectory
/etc/X11/fontpath.d/t32-fonts         # available under FEDORA distribution
```

The xset commands add the TRACE32 fonts only temporary. After the next booting or logout the setting will be lost. A solution could be adding the xset commands into the login script of the actual shell from the actual user e.g. ~/.bashrc for BASH shell or just in the batch script for starting TRACE32.

The TRACE32 fonts can be added alternatively to an existing font server configuration.
e.g. add path /opt/t32/fonts to the catalog entry inside the font server configuration file /etc/X11/fs/config.

Or add the TRACE32 fonts permanent with an administration tool.
e.g. under **SUSE**: N -> Control Center -> System Administration -> Font Installer

When the 'TRACE32 menu or softkey text are displayed as graphic characters under **Fedora Core Linux** versions, some fonts are missing. Install them with:

```
yum install xorg-x11-fonts-ISO8859-1-75dpi
```


Before the installation a new node must be created. The Ethernet address of the system is placed on the bottom side of the system. The following line must be added to the file `/etc/hosts`:

```
192.168.0.5    t32
```

Note, that the INTERNET address given here is an example only. Contact your network administrator for a new INTERNET address for TRACE32.

The Ethernet address of the system must be entered in the file `/etc/ethers` (not common - only when using a RARP server):

```
0:c0:8a:0:0:0    t32
```

The INTERNET address is requested by a RARP protocol by TRACE32. If no RARP server is running, the address for the first connect must be set in the host table. After the first successful connect the INTERNET address is stored in nonvolatile memory within TRACE32. The following command sets the host translation table:

```
arp -s t32 0:c0:8a:0:0:0
```

This command must be executed **immediately before** the first startup of the emulator. It is not required for future startups because the INTERNET address is stored in the emulator. The arp cache table should be checked just before the first startup with the command 'arp -a'.

NOTE: A ping will only work after the TRACE32 software was booted once and the new IP address was stored automatically during boot phase into the flash of the TRACE32 modul.

The net driver must be activated. The node name can be changed, when not identical to 't32'.

Configuration Command:

PBI=
NET

NODE=<nodename>

Node name of TRACE32 (default: t32)

POOL=<nodename>, ...

Define a set of nodes, which are scanned for connection.

In addition to the generic requirements, USB needs:

kernel >= 2.4 for FullSpeed USB support (12 MBit/s)
kernel >= 2.4.22 for HighSpeed USB support (480 MBit/s)
udev filesystem requires kernel >= 2.6
or
usbdevfs mounted on /proc/bus/usb and hotplug package

UDEV method (kernel >= 2.6):

The newer udev file system support needs a special rule file for TRACE32 USB devices inside the directory /etc/udev/rules.d/.

```
su
cp bin/pc_linux64/udev.conf/kernel_starting_2.6.32/10-lauterbach.rules /etc/udev/rules.d
```

Legacy support of hotplug method (devfs):

The hotplug package is no strict requirement, but highly recommended, if you want to avoid running the TRACE32 executables as root all the time.

To enable proper TRACE32 hotplugging, change to the directory on the CD (or with an extracted update) with the Linux executables and issue the following commands in a shell:

```
su
grep -iq trace32 /etc/hotplug/usb.usermap || cat usb.usermap.trace32
                                         >>/etc/hotplug/usb.usermap
install -m 0755 trace32 /etc/hotplug/usb/
exit
```

You can verify proper operation with the t32usbchecker tool coming with the CD or update.

The USB driver must be activated. The minimum settings in the configuration file **config.t32** are:

```
;Configuration Command:

PBI=
USB
```

NOTE: USB can only be used with the host-based executables (name matches t32m*), NOT with t32cde*.

Installation of the TRACE32 Debugger Software

In the following example the directory `/home/t32` is used as the system directory.

The system directory is created with the following command:

```
mkdir /home/t32                      # or similar
mkdir /home/t32/bin
```

The files are extracted from the CD to the system directory with the following commands:

```
mount -F hsfs -o ro /dev/dsk/c0t6d0s2 /cdrom/trace32

                                     # or similar

cd /home/t32
cp -r /cdrom/trace32/files/* .
chmod -R u+w *
cp ./demo/practice/t32.cmm .
mv bin/suns/config.t32 .           # not necessary if the TRACE32
                                   # executable is called with
                                   # configuration filename
                                   # parameter
                                   # e.g.
                                   # t32marm -c/home/t32/bin/
                                   #         suns/config.t32

                                   # converts all filenames to
/cdrom/trace32/files/bin/suns/filecvrt . # lower case and files into
                                   # UNIX
                                   # format and uncompresses all
                                   # files if necessary
```

The following environment variables must be set (e.g. in `.cshrc` for the C-shell):

```
setenv T32SYS /home/t32
setenv T32TMP /tmp
setenv T32ID T32
```

Prepare and install the fonts:

```
cd /home/t32/fonts
mkfontdir .
xset +fp /home/t32/fonts
xset fp rehash
```

The xset commands add the TRACE32 fonts only temporary. After the next booting or logout the setting will be lost. A solution could be adding the xset commands into the login script of the actual shell from the actual user e.g. ~/.bashrc for BASH shell or just in the batch script for starting TRACE32.

The TRACE32 fonts can be added alternatively to an existing fontserver configuration.

The TRACE32 online help uses the Adobe Acrobat Reader for displaying the information in PDF format. Download Acrobat Reader from <http://www.adobe.com> and install it if not already installed on the system. Usually, you have to be root for the installation!

```
gzip -d sol-508.tar.gz      # or similar filename
tar -xvf sol-508.tar        # run the install script
./INSTALL
```

Set the environment variable “ACROBAT_PATH” to the Acrobat installation path::

```
setenv ACROBAT_PATH /opt/Acrobat5      # added in ~/.cshrc for C-shell
```

Copy the TRACE32 plug-in in the Acrobat plug_ins folder (without newline):

```
cp /cdrom/files/bin/suns/trace32.api
                                     $ACROBAT_PATH/Reader/sparcsolaris/plug_ins
```

Verify that you have write permission to the system directory and prepare the configuration file **config.t32**:

```
cd /home/t32/files/bin/suns          # depends on the location of the
                                     # actual used configuration file
# or                                  # the default file location
cd /home/t32                          # is /home/t32 (==T32SYS)
vi config.t32

...

PBI=
NET                                     # please replace t32 with the actual
NODE=t32                               # assigned node name for the ICD modul
```

Uncompress the executable files before usage (not necessary when filecvf was used before):

```
cd /home/t32/bin/suns
gzip -d t32m*.gz          # or   gunzip t32m*.gz
```

Include the executable file in the PATH variable:

```
setenv PATH $PATH:/home/t32/bin/suns    # added in ~/.cshrc for C-shell
                                          # preferred solution
```

Preparations for the Ethernet Interface

Before the installation a new node must be created. The Ethernet address of the system is placed on the bottom side of the system. The following line must be added to the file `/etc/hosts`:

```
192.168.0.5    t32
```

Note, that the INTERNET address given here is an example only. Contact your network administrator for a new INTERNET address for TRACE32. The Ethernet address of the system must be entered in the file `/etc/ethers`:

```
0:c0:8a:0:0:0    t32
```

The INTERNET address is requested by a RARP protocol by TRACE32. If no RARP server is running, the address for the first connect must be set in the host table. After the first successful connect the INTERNET address is stored in nonvolatile memory within TRACE32. The following command sets the host translation table:

```
arp -s t32 0:c0:8a:0:0:0
```

This command must be executed **immediately before** the first startup of the emulator. It is not required for future startups because the INTERNET address is stored in the emulator. The arp cache table should be checked just before the first startup with the command 'arp -a'.

NOTE: A ping will only work after the TRACE32 software was booted once and the new IP address was stored automatically during boot phase into the flash of the TRACE32 modul.

The net driver must be activated. The node name can be changed, when not identical to 't32'.

;Configuration commands in the configuration file **config.t32**:

PBI=

NET

NODE=<nodename> ;Node name of TRACE32 (default: t32)

POOL=<nodename>, ... ;Define a set of nodes, which are scanned
for connection.

Installation of the TRACE32 Debugger Software

In the following example the directory `/home/t32` is used as the system directory and the connection is made by Ethernet.

The system directory is created by the following commands:

```
mkdir /home/t32                      # or similar
mkdir /home/t32/bin
```

Extracting the files from CD (the device name is only an example):

```
pfs_mountd &
pfsd &
pfs_mount -t iso9660 -x unix /dev/dsk/c0t2d0 /cdrom      # or similar
cd /home/t32
cp -r /cdrom/files/* .
chmod -R u+w *
cp ./demo/practice/t32.cmm .
mv bin/hp700/config.t32 .      # not necessary if the TRACE32 executable
                                # is called with configuration
                                # filename parameter   e.g. t32marm
                                # t32marm -c/home/t32/bin/hp700/config.t32
/cdrom/files/bin/hp700/filecvt . # converts all filenames to lower case
                                # and files into UNIX format and
                                # uncompresses all files if necessary
```

The following environment variables must be set (e.g. in `.cshrc` for the C-shell):

```
setenv T32SYS /home/t32
setenv T32TMP /tmp
setenv T32ID T32
```

Prepare and install the fonts:

```
cd /home/t32/fonts
/usr/bin/X11/mkfontdir .
xset +fp /home/t32/fonts
xset fp rehash
```

The `xset` commands add the TRACE32 fonts only temporary. After the next booting or logout the setting will be lost. A solution could be adding the `xset` commands into the login script of the actual shell from the actual user e.g. `~/.cshrc` for C shell or just in the batch script for starting TRACE32.

The TRACE32 fonts can be added alternatively to an existing fontserver configuration.

The TRACE32 online help uses the Adobe Acrobat Reader for displaying the information in PDF format. Download Acrobat Reader from <http://www.adobe.com> and install it if not already installed on the system. Usually, you have to be root for the installation!

```
gzip -d hpux-508.tar.gz          # or similar filename
tar -xvf hpux-508.tar
./INSTALL                        # run the install script
```

Set the environment variable “ACROBAT_PATH” to the Acrobat installation path::

```
setenv ACROBAT_PATH /opt/Acrobat5      # added in ~/.cshrc for C-shell
```

Copy the TRACE32 plug-in in the Acrobat plug_ins folder (without newline):

```
cp /cdrom/files/bin/hp700/trace32.api
                                     $ACROBAT_PATH/Reader/hppahpux/plug_ins
```

Verify that you have write permission to the system directory and the boot.t32 file and prepare the configuration file **config.t32**:

```
cd /home/t32/bin/hp700          # depends on the location of the actual used
# or                             # configuration file
cd /home/t32                    # default file location is /home/t32
                                # (== $T32SYS)

vi config.t32

...

PBI=
NET                                # please replace t32 with the actual
NODE=t32                          # assigned node name for the ICD modul
```

Uncompress the executable files before usage (not necessary when filecvt was used before):

```
cd /home/t32/bin/hp700
gzip -d t32m*.gz                # or   gunzip t32m*.gz
```

Include the executable file in the PATH variable:

```
setenv PATH $PATH:/home/t32/bin/hp700 # added in ~/.cshrc for C-shell
                                         # preferred solution
```


Preparations for the Ethernet Interface

For the adaptation to Ethernet a new node must be created. The Ethernet address of the system is placed on the bottom side of the system. The following line must be added to the file `/etc/hosts`:

```
192.168.0.5      t32
```

Note, that the INTERNET address given here is an example only. Contact the network administrator for a new INTERNET address for TRACE32.

The INTERNET address is not available to the TRACE32 system. Therefore it can't response to ARP requests. For the first connection, the Ethernet address of the system must be entered in the host table by the following command:

```
arp -s t32 0:c0:8a:0:0:0
```

NOTE: A ping will only work after the TRACE32 software was booted once and the new IP address was stored automatically during boot phase into the flash of the TRACE32 modul.

The net driver must be activated. The node name can be changed, when not identical to 't32'.

On **HP-9000/300 and HP-9000/400** and also some HP-9000/700 workstations the packet size must be **limited to 1024** bytes. Use the command **PACKLEN=1024** for these type of workstations!

Configuration Command:

PBI=

NET

NODE=<nodename> (default: t32)

PACKLEN=<psize> (default: 1472)

Prerequisites

The TRACE32 debug software for the Mac requires OS X 10.7 or newer.

Installation of the TRACE32 Software

In the following example the directory `/opt/t32` is used as the system directory.

1. Create the system directories

Open a terminal and create the system directories with the following commands:

```
mkdir ~/t32                                # or similar
mkdir ~/t32/bin
```

2. Copy the files

The files are copied from the CD to the system directory with the following commands:

```
# The CD will be mounted in /Volumes/TRACE_<Rel_Tag> e.g.
# /Volumes/TRACE_201302 for the Release R.2013.02
cd ~/t32
cp -r /Volumes/TRACE_201302/files/* .
cp -r /Volumes/TRACE_201302/files/bin/macosx64 ./bin
chmod -R u+w *
cp ./demo/practice/t32.cmm .
mv bin/macosx64/config.t32 . # not necessary if the TRACE32
                             # executable is called with
                             # configuration filename parameter
                             # e.g. t32marm-qt -c ~/t32/bin/macosx64/config.t32
```

3. Set up environment

The following environment variables must be set (e.g. in `.bashrc` for the BASH-shell):

```
export T32SYS=~ /t32
export T32TMP=/tmp           # or similar
export T32ID=T32
```

Include the executable file in the PATH variable:

```
export PATH=$PATH:~/t32/bin/macosex64 # added in ~/.bashrc for BASH
```

4. Configure TRACE32

Verify that you have write permission to the system directory (set with environment variable T32SYS) and edit the configuration file `config.t32`.

Interface setting:

Ethernet interface

For the adaptation to ethernet a new node must be created. The following line must be added to the file `/etc/hosts`:

```
192.168.0.5    t32
```

Note, that the IP address given here is an example only. Contact the network administrator for a new IP address for TRACE32. Add the following lines to your `config.t32` file:

```
PBI=
NET           # please replace t32 with the actual
NODE=t32      # assigned nodename for the ICD modul
```

USB interface

Add the following lines to your `config.t32` file

```
PBI=
USB
```

Fontsettings :

No special font settings are required. Each installed fixed width font can be used. The default font is Courier..

```
SCREEN=
FONT=Liberation Mono      ; Selects font Liberation Mono for data output
FONT=NOANTIALIAS          ; disables font aliasing (default: ANTIALIAS)
```

GUI Configuration:

The GUI can be configured with STYLE options in the SCREEN section of the configuration file. The following STYLE options can be set:

STYLE=STATUSBAR ON	Enables the status bar of the main window (default)
STYLE=STATUSBAR OFF	Disables the status bar of the main window
STYLE=TOOLBAR ON	Enables the tool bar of the main window (default)
STYLE=TOOLBAR OFF	Disables the tool bar of the main window
STYLE=TOOLBAR TOP	Places the tool bar on the top edge of the main window (default)
STYLE=TOOLBAR RIGHT	Places the tool bar on the right edge of the main window
STYLE=TOOLBAR BOTTOM	Places the tool bar on the bottom edge of the main window
STYLE=TOOLBAR LEFT	Places the tool bar on the left edge of the main window
STYLE=COMMANDLINE TOP	Places the command line and the soft keys to the top edge of the main window (default)
STYLE=COMMANDLINE BOTTOM	Places the command line and the soft keys to the bottom edge of the main window
STYLE=MDISCROLL OFF	disables MDI area scroll bars (default)
STYLE=MDISCROLL ON	enables MDI area scroll bars

If you can not solve your problem with the following hints contact our support line:

telephone: ++49 8102/9876-555

facsimile: ++49 8102/9876-999

e-mail: support@lauterbach.com

System doesn't response to ping on Ethernet

Internet address already setup in system, or arp used?

When arp is used, it must be used on the same workstation short before.

Ethernet address correct?

System on the correct subnet?

Cables and transceiver o.k.?

Ethernet software in host (PC) configured correctly?

xset +fp fontpath gives error 'bad value ...'

Does the font directory exist?

Does the fonts.dir file exist (created by mkfontdir)?

Is the directory seen under the same name by the X-server?

Have all directories that lead to the font directory read and execute permissions for everybody?

Executable program does not start or gives fatal error

When transferring between different OS-systems, files copied in binary mode?

Access rights to file in directory o.k.?

Configuration file contents o.k.?

Executable program displays 'FATAL ERROR selecting device-driver ...'

Using configuration file for MS-DOS for the WINDOWS-Driver?

WINDOWS and workstation drivers cannot load new drivers.

Environment variable 'T32CONFIG' and/or 'T32SYS' correctly set?

Executable program displays 'error reading config.t32:'

Configuration file contents o.k.?

Commands in file in uppercase?

Blanks inserted/not inserted?

Device specific commands placed after device header?

Device configuration blocks separated by empty lines?

Environment variable 'T32CONFIG' and/or 'T32SYS' correctly set?

Executable program stops without message, but with window opened

Access rights to directory o.k.?

On UNIX host, try with 'NOLOCK' feature.

When using the RS232 interface: Is a login process active on the tty?

Program stops with message 'font xxxx not found'

Do fonts appear in the 'xlsfonts' command?

Can one font (e.g. t32-lsys-16) be displayed by 'xfont -fn t32-lsys-16'?

Fonts added to X-Windows FONTPATH?

Fonts converted, when required, and .bdf files removed?

Command to generate font directory executed with correct parameters?

Fonts installed on the X-Windows server, not client?

If using an X-Terminal, use the conversion programs for the X-Terminal?

Executable program displays 'boot.t32 not found'

Access rights to directory o.k.?

Read and write access to boot.t32 (write required on UNIX without NOLOCK)?

Configuration file contents o.k.?

Environment variable 'T32SYS' correctly set?

Executable program stops after displaying 'error reading boot.t32'

When transferring between different OS-systems, files copied in binary mode?

Access rights granted?

Try again after switching off the TRACE32 system?

Executable program stops after displaying 'booting ...' or 'finished.'

When transferring between different OS-systems, files copied in binary mode?

Packet size set correctly on Ethernet, handshake set when required?

Bootloader stops with message “fatal error ...”

When transferring between different OS-systems, files copied in binary mode?

Mixing different versions of the software, e.g. MCC.T32 and MCCxxx.t32?

Bootloader displays “cannot save image ...”

Write access right on system directory?

Disk full?

Existing read-only file?

Software crashes or stops after booting is finished

Boot image file maybe destroyed, remove all boot0x.t32 files?

Connection of modules o.k., connector bend?

Software doesn't work stable

Boot image file maybe destroyed, remove all boot0x.t32 files?

Connection of modules o.k., connector bend?

Check connection of Fibre Optic, Ethernet or Parallel interface.

On Ethernet try with smaller packet size and/or handshake.

Emulation system doesn't work correctly

Check Emulation Probe Manual in “Targets” part of the manual.

Parallel Port not working stable

Check that the port is on the correct mode. Choose either EPP 1.9 or compatible mode. The mode selection can usually be done in the BIOS setup (can be activated during booting).

USB debugger not detected at all by LINUX

There are a few reasons why this can happen:

- the running kernel does not support USB yet
- USB not enabled during kernel configuration
- USB enabled as modules in the kernel configuration, but module autoloader did fail or isn't configured
- usbdevfs is not mounted
- usbdevfs is mounted, but not at /proc/bus/usb
- bad USB cable, use the original one or make sure it is at max. 3 meters long
cable type lettering: 28AWG/1PR 24AWG/2C
- old debugger firmware - version V6.5 or later needed

Menu or softkey text is displayed wrong under LINUX

On systems which use a mixed set of 8bit and 16bit menu fonts, and have only *-iso10646-* system fonts installed, no meaningful glyphs are rendered in the menu or softkeys of TRACE32 main window.

If this happens, please install the additional iso8859 system font package(s).

e.g. `yum install xorg-x11-fonts-ISO8859-1-75dpi`

Fixed width font t32sys not found under WINDOWS

When you start the TRACE32 executable the fonts are loaded. If a SW update will be done, which replaces the TRACE32 font file named t32font.fon, the new fonts will not be activated as long as the old fonts are loaded.

This happens even if both font files are identical.

Please reboot your Windows PC to solve this issue.

<p>Communication with Acrobat Reader failed under Linux</p> <p>Ref: 0343</p>	<p>What needs to be done ? I receive the error message regarding communication with Adobe Reader failed under Linux.</p> <p>If you use an Acrobat Reader version higher than 7 on a Linux host, you might receive the error message:</p> <p>"Communication with Acrobat Reader failed - check if plugin <trace32.api> is started correctly"</p> <p>In such case you need to update the plugin trace32.api on your host. The new plugin is also available at the download link below:</p> <p>http://www.lauterbach.com/faq/trace32.api_linux.zip TRACE32 Acrobat Reader Plugin (Linux platforms)</p>
<p>Config File PBI Parameters</p> <p>Ref: 0318</p>	<p>Why does the connection to my debugger via ethernet fail? It starts always as a monitor instead.</p> <p>It looks like you set in the config file:</p> <pre>PBI=NET 11.22.33.44 ; driver to run TRACE32 without HW</pre> <p>But this starts the TRACE32-SW as a monitor program for connection via ethernet.</p> <p>If you want to connect to a TRACE32 HW by ethernet you need to write the keyword to a second line instead:</p> <pre>PBI= NET ; host interface to connect to TRACE32 HW NODE=11.22.33.44</pre> <p>You can find a complete description in the installation manual "installation.pdf".</p> <p>http://www.lauterbach.com/faq/config32-pbi.pdf Section of the installation manual:</p>

<p>ERROR about missing entrypoint EncodePointer information (WINDOWS)</p> <p>Ref: 0364</p>	<p>Why I get under WINDOWS XP the error message "The procedure entry point EncodePointer could not be located in dynamic link library KERNEL32.dll" ?</p> <p>If you get one of the following Windows error messages during startup of the TRACE32 executable</p> <p>"The procedure entry point EncodePointer could not be located in dynamic link library KERNEL32.dll" respectively</p> <p>"Der Prozedureinsprungpunkt "EncodePointer" wurde in der DLL "KERNEL32.dll" nicht gefunden."</p> <p>under Windows XP, then the PC operating system installation doesn't fulfill the following requisite:</p> <p>Windows XP SP2 or higher</p>
<p>ERROR about missing entrypoint HeapSet information (WINDOWS)</p> <p>Ref: 0359</p>	<p>Why I get under WINDOWS 2000 the error message "Entry point HeapSet information could not be found in dynamic Link library Kernel32.dll" ?</p> <p>If you get one of the following Windows error messages during startup of the TRACE32 executable</p> <p>"Entry point HeapSet information could not be found in dynamic Link library Kernel32.dll" respectively</p> <p>"Der Prozedureinsprungpunkt "HeapSetInformation" wurde in der DLL "KERNEL32.dll" nicht gefunden."</p> <p>under Windows 2000, then the PC operating system installation doesn't fulfill all of the following requisites:</p> <p>Windows 2000 SP4</p> <p>UpdateRollup for Windows 2000 SP4 (KB891861)</p> <p>TRACE32 software version must be build 25715 or higher</p>

<p>File version conflict after software update or patch install</p> <p>Ref: 0378</p>	<p>Why do I get a file version conflict after software update?</p> <p>The new TRACE32 executable isn't copied manual to an old previous installation directory.</p> <p>The internal subdirectory structure of the update packages has been changed since software version November 2010. Now the TRACE32 executables are inside a subdirectory <code>bin\<operating_systemtype></code> e.g. <code>bin\windows64</code>. For older installations the executable must be moved manual to the TRACE32 system directory e.g. <code>C:\t32</code> or the shortcut property must be corrected.</p> <p>We recommend to modify the shortcut property, due to the fact that this kind of subdirectory structure will be used from the installer in the future too.</p> <p>When the TRACE32 software for more than one processor architecture is installed in the same TRACE32 system directory, but not a software update for all architectures is done.</p> <p>When the update package is used without a preceding TRACE32 software installation.</p> <p>The software update doesn't contain a config file. If you create a copy of the original config file, please don't forget to adapt the SYStem directory in the config file.</p> <pre> OS= ID=T32 SYS=<new system directory> tmp=C:\temp </pre> <p>Otherwise the version of the executable doesn't match with the rest of the TRACE32 files.</p>
<p>Fixed Width Font t32sys not found</p> <p>Ref: 0264</p>	<p>How do I proceed if I get the error message "Fixed width font t32sys not found"?</p> <p>When you start TRACE32 the fonts are loaded. If you update your TRACE32 software and the update package includes TRACE32 fonts, these new fonts will not be activated as long as the old fonts are loaded. This happens even when old and new font file are identical. Reboot your Windows PC.</p>

<p>Floating Licenses (Virtual Prototypes)</p> <p>Ref: 0303</p>	<p>How can I use TRACE32 for Virtual Prototypes with Floating Licenses?</p> <p>TRACE32 versions from July 2008 and later support floating licenses for Virtual Prototype debugging.</p> <p>Download and install the RLM License Administration Bundle to obtain your License Server binary and use it to look up your RLM Host ID:</p> <p>http://www.reprisesoftware.com/license_admin_kits/license-admin-download.php</p> <p>Download the Lauterbach Certificate (lauterbach.set - for RLM this replaces the Daemon executable) and copy it into your RLM License Server installation directory.</p> <p>Register your TRACE32 Serial Number together with your RLM Host ID.</p> <p>When you receive your Lauterbach License File, copy it into the RLM License Server installation directory. Do NOT rename it.</p> <p>Modify the first lines of your Lauterbach License File: replace localhost with the hostname and 5055 with the port you want to use.</p> <p>Configure your system boot scripts to automatically start the RLM License Server.</p> <p>Set the environment variable <code>RLM_LICENSE=<port>@<hostname></code> of your RLM server.</p> <p>http://www.lauterbach.com/faq/lauterbach-cert-rlm9.zip Lauterbach Certificate (for RLMv9.0 and all later versions)</p>
<p>Font Problems on Linux (Motif version)</p> <p>Ref: 0158</p>	<p>What should I do if I get an error message about missing fonts during driver startup?</p> <p>The host driver imposes several requirements for fixed fonts and font size. The font size requirement can lead to unexpected failure during startup, if one or more of the needed sizes are missing.</p> <p>In addition to the default, <code>FONT=SMALL</code> and <code>FONT=LARGE</code> settings via <code>config.t32</code>, the driver supports 3 small variations of each setting.</p> <p>On systems which use a mixed set of 8bit and 16bit menu fonts, and have only <code>*-iso10646-*</code> system fonts installed, no meaningful glyphs are rendered in the menu or softkeys of TRACE32 main window. If this happens, please install the additional iso8859 system font package(s).</p> <p>e.g. <code>yum install xorg-x11-fonts-ISO8859-1-75dpi</code></p>

<p>Font Problems on Linux (Motif Version) II</p> <p>Ref: 0334</p>	<p>How to add the TRACE32 font directory under Fedora distributions ?</p> <p>To add the TRACE32 font directory permanently to the system font directory list, you might do:</p> <p>e.g. <code>ln -s /opt/t32/fonts /etc/X11/fontpath.d/t32-fonts</code></p> <p>Please don't forget to invoke the <code>mkfontdir</code> command inside the directory <code>/opt/t32/fonts</code> for building a fontdirectory file named <code>fonts.dir</code> .</p>
<p>Hidden Instance of TRACE32</p> <p>Ref: 0404</p>	<p>How do I start a hidden instance of TRACE32?</p> <p>For information about how to start TRACE32 as a hidden instance, refer to "TRACE32 as a Hidden Instance" (installation.pdf, www.lauterbach.com/pdf/installation.pdf).</p>
<p>Interface Converter</p> <p>Ref: 0333</p>	<p>Is it possible to use an interface converter for TRACE32?</p> <p>Most available USB-to-Parallel converters can not be used to drive Parallel-Port TRACE32 tools from the PC USB interface.</p> <p>Because the communication between TRACE32 and PC is timing- and latency-sensitive, and many applications in the market do not work with those converters, we do not investigate deeper about the possible reasons.</p> <p>If you find 3rd party converters usable for TRACE32, please contact us.</p> <p>We know one customer used a USB-to-Parallel interface converter (USB2PAR) successfully. We were told that debugging with it works, but - due to the conversion - downloading files to flash devices on the target is very slow:</p> <p>http://www.lauterbach.com/faq/usb2par-converter.html.en.htm Example of one USB to Parallel Converter (from TU Chemnitz)</p>

<p>Linux isn't booting anymore after installing USB driver</p> <p>Ref: 0373</p>	<p>Why isn't booting LINUX after installing USB driver file 10-lauterbach.rules?</p> <p>If a LINUX system isn't booting anymore after the TRACE32 USB driver files 10-lauterbach.rules was installed, then please check, whether an irritating CR character is inside this file or not. A check can be done with command:</p> <pre>cat -et /etc/udev/rules.d/10-lauterbach.rules</pre> <p>No ^M should be displayed at all.</p> <p>In the directory /dev/lauterbach/trace32 you can find a lot of links from system devices which shouldn't exists there (e.g. audio, disk, dvd, ..)</p> <pre># conversion steps # if package tofrodos isn't already installed sudo apt-get install tofrodos cd /etc/udev/rules.d/ # converts all CF+LF pairs to LF sudo fromdos -d 10-lauterbach.rules</pre>
<p>Mac OSX El Capitan</p> <p>Ref: 0436</p>	<p>What can I do if the USB interface is not working on MacOSX 10.11 El Capitan?</p> <p>The minimum version for USB debuggers on OS X El Capitan is 10.11.4.</p> <p>If the Qt4.8 libraries area not installed, follow these steps:</p> <p>boot into "Recovery mode" by immediately holding down Command + R keys when you hear the startup chime</p> <p>open "Terminal" in the "Utilities" pulldown</p> <p>enter "csrutil disable; reboot" and hit return</p> <p>back in OS X 10.11 start the installation of qt-4.8</p> <p>after qt installation boot into "Recovery mode" and open "Terminal" again</p> <p>enter "csrutil enable; reboot" and hit return</p> <p>* Notes regarding OS X 10.11 El Capitan: Installation of qt-4.8 must be done with "System Integrity Protection" disabled, otherwise it won't succeed.</p>

<p>Minimized client windows with virtual desktops</p> <p>Ref: 0402</p>	<p>Why are some or all client windows minimized, when switching virtual desktops?</p> <p>Some window managers minimize the client windows when switching to other virtual desktops and back. In such a case add the line FIXVDESK to the screen section of your config file.</p> <p>This workaround has some side effects:</p> <p>When closing the main TRACE32 window, normally all entries of the client windows in the taskbar will be removed and only the entry of the main window will remain.</p> <p>With activated workaround entries of client windows, which are closed before the main window, will remain in the task bar.</p>
<p>Missing shared library "libstdc++.so.5"</p> <p>Ref: 0324</p>	<p>What needs to be done? I receive the error message regarding the shared library "libstdc++.so.5".</p> <p>If you have updated to a TRACE32-SW later than February 2009 on a Linux host or virt. machine - (VM) you might receive the error message:</p> <p>"/t32marm: error while loading shared libraries: libstdc++.so.5: cannot open shared object file: No such file or directory"</p> <p>In such case you need to contact you system administrator to get this library from CD or via internet for your specific Linux machine type to install it on your host.</p> <p>Here an example for details on Ubuntu and the related command: http://ubuntuforums.org/archive/index.php/t-78758.html</p> <p>sudo apt-get install libstdc++5 libstdc++5-3.3-dev</p> <p>Starting with TRACE32 software DVD April 2010 and newer this effect doesn't occur anymore.</p>

<p>Missing shared library for Linux</p> <p>Ref: 0298</p>	<p>What to do when a system library is missing ?</p> <p>Generally you will have to install the corresponding package (which contains the missing library), too.</p> <p>Examples:</p> <p>Fedora7: error while loading shared libraries: libXp.so.6: cannot open shared object file: No such file or directory yum install libXp # note the upper case "X" and lower case "p"</p> <p>RHEL5/64bit: /opt/t32/bin/pc_linux/t32mppc: error while loading shared libraries: libXmu.so.6: wrong ELF class: ELFCLASS64 Not all necessary 32-bit packages are installed. The 32-bit "libXmu" package and all it's dependencies should be installed.</p> <p>Ubuntu 12.04/64bit: error while loading shared libraries: libjpeg.so.62: cannot open shared object file: No such file or directory sudo apt-get install libjpeg62</p> <p>OpenSUSE 13.1/64bit: error while loading shared libraries: libjpeg.so.62: cannot open shared object file: No such file or directory Install missing package libjpeg62 with YaST error while loading shared libraries: libXp.so.6: cannot open shared object file: No such file or directory Install missing package libXp6 with YaST</p>
<p>Missing shared library for Solaris</p> <p>Ref: 0300</p>	<p>What to do when a system library is missing ?</p> <p>error while loading shared libraries:</p> <p>e.g. ld.so.1: t32marm: fatal: libm.so.2: open failed: No such file or directory killed</p> <p>This happens when a TRACE32 executable built for Solaris 10 is used on Solaris 8. Please request a Solaris 8 executable from Lauterbach.</p> <p>As a temporary workaround, you can create a libm.so.2 soft link with:</p> <pre>su ln -s /usr/lib/libm.so.1 /usr/lib/libm.so.2</pre>

<p>Multiple PODBUS USB devices</p> <p>Ref: 0289</p>	<p>How can I use multiple USB devices with several TRACE32 instances?</p> <p>More than one Lauterbach USB device can be used at the same time from the same host. For each USB device, a TRACE32 instance needs to be started.</p> <p>To use multiple USB devices with one PC or workstation, you need</p> <p style="padding-left: 40px;">for WINDOWS: the current T32USB driver (see below)</p> <p style="padding-left: 40px;">current TRACE32 software (at least April 2007)</p> <p style="padding-left: 40px;">TRACE32 device firmware revision V8 or later (see below)</p> <p>Please download the applicable packages here: http://www.lauterbach.com/faq/t32usb_multi_device.zip USB multi device update procedure</p>
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<p>Network Preparation for Access by Lauterbach Support</p> <p>Ref: 0209</p>	<p>What do I need to tell my network administrator if Lauterbach support wants direct access to my debugger?</p> <p>There are cases when direct access to the Trace32 debugger of the customer simplifies the support task for the engineers at Lauterbach a lot. But nowadays this involves usually at least 2 levels of network firewalls and various address and port translations.</p> <p>What does you have to tell to your network administrator to properly configure the company firewall?</p> <p>What we need:</p> <p>Access to UDP destination port 20000 from the Lauterbach.com IP address range 192.149.90.0/24.</p> <p>What your network administrator needs to do:</p> <p>Allow UDP destination port 20000 to debugger from Lauterbach.</p> <p>Forward UDP destination port 20000 to debugger (if address NAT is involved).</p> <p>Open the reverse path as well if the firewall does not do that automatically.</p> <p>Make sure debugger firmware (VERSION.HARDWARE) is V6.9 or later (if port NAT is involved).</p> <p>Simple Cisco example:</p> <p>Entry for the IP access-list controlling the packets from Internet:</p> <pre> permit udp 192.149.90.0 0.0.0.255 host Your.Debugger.IP.address eq 20000 </pre> <p>Entry for the IP access-list controlling the packets to the Internet:</p> <pre> permit udp host Your.Debugger.IP.address eq 20000 192.149.90.0 0.0.0.255 </pre>
<p>No menu icons with Gnome on Ubuntu</p> <p>Ref: 0396</p>	<p>How do I enable icons on the pull down menus on Ubuntu?</p> <p>On Ubuntu/Gnome the menu icons are off by default.</p> <p>To enable the menu icons:</p> <pre> gconftool-2 --type Boolean --set /desktop/gnome/interface/menus_have_icons True </pre>

What could be the reason for the "no response from InterCom" message?

You are using Intercom communication for TRACE32 on your PC. This was activated by a setting in the active configuration for your TRACE32-SW. Either by the Intercom setting in the t32start configuration or inside your TRACE32 config file (default name config.t32).

The Intercom communication is typically needed if two or more TRACE32 applications shall communicate together (via UDP) as that could be the case in AMP Multicore debug sessions.

The "no response from InterCom" message appears if the default time-out of 500ms to acknowledge an intercom command exceed. That typically happens if several PoverView Instances have to share the bandwidth of only one debug port. The needed bandwidth could be reduced by decreasing the update rate for each TRACE32 application.

SETUP.URATE <time> or <frequency>

If that is not sufficient or the resulting update rate becomes unacceptable the InterCom acknowledge time-out could be increased since Build Revision 34366 with following command as well.

SETUP.INTERCOMACKTIMEOUT <time>

The default InterCom command acknowledge time-out has been hold as low as possible to keep PRACTICE execution performance, in case of non existent InterCom participants, in an acceptable range!

No TRACE32
window comes
up on Unix

Ref: 0246

Why is no TRACE32 main window coming up under Unix ?

No TRACE32 main window is displayed due to one of the following reasons:

The TRACE32 software doesn't find the TRACE32 system directory.
environment variable T32SYS isn't set or points to a wrong directory

e.g.

```
export T32SYS=/opt/t32/bin/pc_linux      // wrong
export T32SYS=/opt/t32                  // correct
```

SYS definition inside the TRACE32 configuration file (default name config.t32) is commented, omitted or points to a wrong or not existing directory

e.g.

```
OS=
SYS=/opt/t32/bin          // wrong, should be
SYS=/opt/t32
```

The hostdriver t32cde tries to open the file boot.t32 with write access and will fail, when the TRACE32 system directory respectively the file boot.t32 is write protected.

This is a kind of file semaphore mechanism to avoid problems when several instances will boot and create Trace32 boot images at the same time.

Please add the following lines inside the used TRACE32 configuration file (default name: config.t32):

```
                                // empty line necessary
BOOT=
NOLOCK
                                // empty line necessary
```

or give at least write access to the file boot.t32 via command

e.g. `chmod a+w boot.t32`

<p>PCF Bitmap Font disabled on Ubuntu</p> <p>Ref: 0375</p>	<p>What to do if I get a error message under Ubuntu regarding PCF bitmap fonts?</p> <p>After installation of TRACE32 for Ubuntu and trying to use the TRACE32 fonts you might get an error message like:</p> <p>FATAL ERROR from X-windows: XFT available, but not working with PCF bitmap fonts. Please check your FontConfig configuration, possibly bitmap fonts are explicitly disabled.</p> <p>To enable the PCF bitmap fonts please use the following settings inside Ubuntu:</p> <pre># "Un-disable" bitmap fonts sudo rm /etc/fonts/conf.d/70-no-bitmaps.conf # Clear the font cache # (path for the T32 font directory is an example, adjust according to your installation) sudo fc-cache -f -v ~/t32/fonts</pre>
<p>PerformanceCounter of PC seems to be buggy</p> <p>Ref: 0356</p>	<p>TRACE32 says the PerformanceCounter of my PC seems to be buggy. What does this mean?</p>
<p>Popup menu problem under Ubuntu 10.04</p> <p>Ref: 0349</p>	<p>Why doesn't occur a popup menu by a right-mouse button click ?</p> <p>Under Ubuntu 10.04 context sensitive popup menus don't occur due to a Xserver bug.</p> <p>Solution: Update to a newer xserver-common package, version 2:1.7.6-1ubuntu7.4 or later. For 64bit kernel the additional package xserver-xorg-core, version 2:1.7.6-2ubuntu7.5 or later must be installed too.</p> <p>Explanations: https://bugs.launchpad.net/xorg-server/+bug/605565 https://bugs.launchpad.net/ubuntu/+source/xorg-server/+bug/574157 http://bugs.freedesktop.org/show_bug.cgi?id=25400 </p>

What are the prerequisites for the Trace32 host driver(s) on Linux?

The Trace32 host driver for Linux tries to be distribution independent and is currently only available for Linux/x86 and Linux/x86_64 (Linux/PPC and Linux/ARM on request).

Nevertheless there are some requirements inherited through the build environment.

For Linux/x86 and Linux/x86_64 these are:

glibc >= 2.5

X.org X11 >= 6.9

These requirements resolve for example to RHEL >= 5 or Suse >= 10.

In any case make sure you have all available X font packages (especially both the 75dpi and 100dpi versions) of your distribution installed to get the best possible display.

What are the prerequisites for the Trace32 QT host driver(s) on Linux?

The minimum requirements for the Qt GUI are:

Kernel: 2.6.32

libc: 2.11.1

Qt libs: 4.6.2

Minimum versions of some popular Linux distributions:

Distribution packages	minimum release	required
Ubuntu libqtgui4	10.04	libqtcore4,
Debian libqtgui4	6.0	libqtcore4,
Mint libqtgui4	9.0	libqtcore4,
RedHat RHEL	6.1	qt, qt-x11
CentOS	6.0	qt, qt-x11

How do I use USB with the Trace32 host driver(s) on Linux?

In addition to the generic requirements, USB needs:

kernel >= 2.4 for FullSpeed USB support (12 MBit/s)

kernel >= 2.4.22 for HighSpeed USB support (480 MBit/s)

filesystem supporting USB devices

udev filesystem needs kernel >= 2.6

or

usbdevfs mounted on /proc/bus/usb

hotplug package

The udev or hotplug setup is no strict requirement, but highly recommended if you want to avoid running the Trace32 executables as root all the time.

udev method:

```
su
cp bin/pc_linux/udev.conf/10-lauterbach.rules
/etc/udev/rules.d
```

hotplug method:

To enable proper Trace32 hotplugging, change to the directory on the CD (or with an extracted update) with the Linux executables and issue the following commands in a shell:

```
su
grep -iq trace32 /etc/hotplug/usb.usermap || cat
usb.usermap.trace32 >>/etc/hotplug/usb.usermap
install -m 0755 trace32 /etc/hotplug/usb/
exit
```

You can verify proper operation with the t32usbchecker tool coming with the CD or update.

Minimum settings in config.t32 to use USB:

```
PBI=
USB
```

NOTE: USB can only be used with the host-based executables (name matches t32m*), NOT with t32cde.

Remote Control for POWER DEBUG INTERFACE / USB Ref: 0421	<p>Where is t32tcpusb, mentioned in the training manual?</p> <p>If you don't find these files on your Lauterbach DVD, please download binaries for Linux and Windows here:</p> <p>http://www.lauterbach.com/faq/t32tcpusb-2015-01-30.zip t32tcpusb support package</p>
Sending Commands Remote via t32rem.exe Ref: 0265	<p>How can I send commands remote to TRACE32?</p> <p>syntax: t32rem.exe <localhost or IP address of PC> [port=<n>] <cmd></p> <p>e.g. t32rem.exe my_pcname do testfile e.g. t32rem.exe localhost port=20123 Data.List main</p> <p>T32rem.exe (not automatically installed from CD) can be used to send commands remote to a running TRACE32 application. Here in the example it starts testfile.cmm (only cmm extensions can be omitted in the command). Use "localhost" or the TCP/IP address of the host where TRACE32 is running. The port nummer can be omitted if it is default (= 20000). "RCL=NETASSIST" separated by empty lines above and below has to be activated in the config file. If you use "T32Start" for configuration you can activate "RCL" by setting "API Port, Use Port" to "yes".</p>

How can I realize a silent installation under Windows?

1. For a simple software roll out of a company unique TRACE32 software installation
a network mount/drive will be used and the content of the TRACE32 DVD should
be in a special directory on a server

```
xcopy D:\*.* N:\TRACE32DVD_201011 /E /V /L  
// drive and directory name are only an example
```

2. Record once a TRACE32 installation with the following instructions inside a command shell window:

```
cd N:\TRACE32DVD_201011\bin\setup64  
// drive name N: and the directory is only an  
example and must be replaced by the actual  
user-defined values  
setup.exe /r  
/f1"N:\TRACE32DVD_201011\bin\setup64\setup.iss"  
/r stands for enabling recording the  
installation process  
/f1 defines the file which will contain the  
recorded installation actions
```

Step through the complete TRACE32 installation process.

3. Start a silence TRACE32 installation with the following instruction on a different PC:

```
setup.exe /s  
/f1"N:\TRACE32DVD_201011\bin\setup64\setup.iss"  
/s means silence installation mode
```

Troubleshooting:

- A) If InstallShield didn't work correctly with a record file on the network drive, please use the following default place C:\ru\setup.iss instead.
- B) If the silent installation fails during USB driver installation, please check whether the file
bin\windows*\drivers\dpinst.xml contains a line <quietInstall/>.

<p>Switch off cleartype font usage</p> <p>Ref: 0293</p>	<p>How can I reactivate the old fashioned font usage ?</p> <p>Since 2008 cleartype fonts are used as default.</p> <p>Please add the following lines inside the used TRACE32 configuration file (default name: config.t32) to use the old fonts:</p> <pre> // empty line necessary SCREEN= FONT=NOCLEARTYPE // empty line necessary </pre>
<p>UDP Intercom Port Collision</p> <p>Ref: 0320</p>	<p>What's the meaning of the error message: "FATAL ERROR from InterCom-driver: can not bind read socket" ?</p> <p>You are using Intercom communication for TRACE32 on your PC. This was activated by a setting in the active configuration for your TRACE32-SW. Either by the Intercom setting in the t32start configuration or inside your TRACE32 config file (default name config.t32). Please see the screen-shots.</p> <p>The Intercom communication is typically needed if two or more TRACE32 applications shall communicate together (via UDP). This is for example needed for multicore debugging or debugging coprocessors like eTPU or PCP.</p> <p>The problem is caused by using the same Intercom port address by different applications. Maybe several TRACE32 executables or other applications. You can check the used ports by command: "netstat -a" on your PC.</p> <p>For TRACE32 you can avoid this problem in the configuration of t32start by "Use Auto Increment Port: Yes". If using a config file like config.t32 you need to set a different Intercom Port manually.</p>

<p>USB Debugger not detected by Linux</p> <p>Ref: 0157</p>	<p>Why is my USB debugger not detected at all by Linux?</p> <p>There are a few possible reasons:</p> <p>The currently running Linux kernel does not yet support USB</p> <p>USB support was not enabled during Linux kernel configuration</p> <p>USB "kernel module" support was enabled, but module auto-load failed or is not set up properly</p> <p>usbdevfs is not mounted</p> <p>usbdevfs is mounted, but not at /proc/bus/usb</p> <p>using a bad USB cable: please try the original one which came with your debugger, or use 28AWG/1PR 24AWG/2C, not longer than 3 meters</p> <p>the firmware of the debugger is too old: you need V6.5 or later</p> <p>insufficient rights to access the USB device: please try again as root ("sudo", "su -s", or log in as root), and check with "lsusb" if you can see the device at all (Lauterbach USB devices have VendorID 0897).</p> <p>udev.rules were not set up properly to assign the necessary directories and rights to the uSB device</p>
<p>USB Debugger not detected by Windows</p> <p>Ref: 0279</p>	<p>Why is my USB debugger not detected at all by Windows or doesn't work anymore?</p> <p>We've had reports that Intel 82801 USB controllers under some circumstances may cause trouble with USB 2.0 devices.</p> <p>The problems should (this is unconfirmed) be fixed with the 82801F chipset series.</p> <p>Plugging in a USB2.0 device to the PC (e.g. "CPU Switch Lite USB 2.0" from Lindy) could cause the effect that running other USB2.0 devices - e.g. PowerDebug Usb 2, or e.g. a USB2.0 memory stick - couldn't be accessed any more, or were not recognized from Windows anymore next time they were used. USB1.0 devices - e.g. keyboard, mouse,... - seem not to be affected. Some issues concerning cable lengths were reported too.</p> <p>In the case of "CPU Switch Lite USB 2.0" from Lindy, the problems stopped instantly when a separate USB cable was used than the USB cable that is part of the combined KVM cable (USB+VGA).</p> <p>Noteworthy is the fact that the KVM USB cable part was used for keyboard and mouse functionality only.</p>

<p>USB problem under MacOSX</p> <p>Ref: 0387</p>	<p>Why do I get the error message "FATAL EROR from PODBUS-driver: could not get nodename" ?</p> <p>If you use a TRACE32 PowerDebug/USB module on a Mac OS-X host, you might receive the error message:</p> <p>"FATAL EROR from PODBUS-driver: could not get nodename"</p> <p>In this case the firmware version of the PowerDebug/USB module is too old. Please use a Windows or Linux host to update at least to version V8.x. The current firmware version and a PRACTICE script for updating is available on your Lauterbach TRACE32 Software DVD, in the directory files/demo/etc/hardware or can be download from</p>
<p>Using 3 GB RAM for TRACE32 task under Windows</p> <p>Ref: 0211</p>	<p>How can I permit 3 GB memory allocation for the TRACE32 task under Windows?</p> <p>The Windows system file boot.ini must be modified. Please add boot switch /3GB.</p> <p>e.g. <code>multi(0)disk(0)rdisk(0)partition(1)\WINDOWS="Microsoft Windows XP Professional" /fastdetect /NoExecute=OptIn /3GB</code></p> <p>Without special bootswitch /3GB the linker option -LARGEADDRESSAWARE will be ignored!</p>
<p>Using TRACE32 via USB with VMware</p> <p>Ref: 0278</p>	<p>What can I do if the USB interface is not working properly or very slowly with VMware?</p> <p>These problems are caused by VMware virtualizing the USB interface.</p> <p>VMware Player 1.x only supports USB 1.1, limiting the transfer speed to 100..300 KB/s.</p> <p>VMware Player 2.x and later supports USB 2.0 and thus allows USB speeds up to 1.500KB/s.</p> <p>To use USB 2.0 you need to update your VMX file (virtualHW.version = "6" and ehci.present = "true").</p> <p>If this does not help, please use TRACE32 with "real" PC hardware.</p> <p>If your PC and TRACE32 tool have an ethernet interface available you can use ethernet together with VMware. Transfer speeds will be lower than with real hardware, too, but not as low as with USB (we observed speeds up to 50% of real hardware).</p> <p>If you use a Virtualized Desktop environment (e.g. VMware View), added latency can also severely degrade USB performance.</p>

<p>WARNING about obsolete Driver (WINDOWS only)</p> <p>Ref: 0266</p>	<p>Why does TRACE32 warn about an obsolete driver?</p> <p>You have seen this message:</p> <p>WARNING: Found active PODBUS USB device using obsolete driver.</p> <p>Please update the driver for your Lauterbach PODBUS USB Controller.</p> <p>Different USB ports may use different driver versions!</p> <p>Please see http://www.lauterbach.com/faq_hostdriver.html</p> <p>FALLBACK: connecting PODBUS USB device NUMBER=1 via obsolete driver</p> <p>The USB driver you are using for TRACE32 supports an obsolete interface class that could conflict with other USB drivers.</p> <p>Please note:</p> <p>Using the old driver does not affect the functionality of your Lauterbach device or software.</p> <p>The warning is a precaution to avoid potential problems with other USB driver software.</p> <p>Windows Vista/XP/2003 users: Please update the driver with your latest Lauterbach CD.</p> <p>Windows 2000/ME/98 users: A new driver is available on CDs issued after 2007-APR-18.</p> <p>The new USB driver is also available at the download link below:</p>
<p>Win7 "loses" PodBus/USB device after one hour idle time</p> <p>Ref: 0344</p>	<p>Why does my PodBus/USB device connected to Windows 7 not work anymore after some time ?</p> <p>From the Microsoft Knowledge base entry with a hotfix for this problem: "You connect a USB device to a computer that is running Windows 7 or Windows Server 2008 R2. When the computer is idle for more than one hour, the USB device may not work any longer. When this problem occurs, the USB device is not displayed in Device Manager."</p> <p>Title: "USB devices that are connected to a computer may not work after the computer is idle for more than one hour Windows 7 or in Windows Server 2008 R2"</p>

Windows 7
does not install
TRACE32 USB
driver

Ref: 0328

Why does Windows 7 report "installation failed" when I connect TRACE32 to USB?

When Windows 7 detects a new device and does not find a driver pre-installed or online, it reports failure (incorrectly: the TRACE32 USB driver is fully compatible with Windows 7).

How to install the driver using "TRACE32 USB Driver installer for Windows":

Download the "TRACE32 USB Driver installer" (t32usb_setup.exe, see link below)

Start the installer by double-clicking on t32usb_setup.exe

Follow the installation wizard

How to install the driver manually:

connect your TRACE32 USB Power Device and wait for the "install failed" bubble note

open "Device Manager" (e.g. run "devmgmt.msc")

right-click "Lauterbach PODBUS USB Controller"

select "update driver software"

select "search on this computer"

"browse" to your TRACE32 installation directory (or on the Lauterbach DVD to "bin/windows/driver")

"continue" to install the driver

Note_1: The installer (link below) is a self-extracting RAR file that contains the driver files and the Microsoft "Driver Package Installer" (DPinst) binaries for Windows 32bit and 64bit. (Lauterbach added "dpinstselect.exe", a small program to auto-invoke dpinst32.exe or dpinst64.exe depending on your Windows platform.)

Note_2: Due to a certificate problem (not caused by Lauterbach), with the 2010-05-28 version of the installer archive on some Windows 7 64bit installations the driver installation would succeed, but then the driver would not start. This problem has been fixed in the 2010-06-24 version of the driver binary. If you are affected, please download the current t32usb_setup.exe below.

Installer downloads:

Why do I have to install a Lauterbach PODBUS USB driver for each USB port?

Microsoft Windows needs a way to assign the proper type of device driver to an instance of a device.

To achieve this for USB devices, prior to Windows 7, Microsoft did not use the USB VendorID/ProductID/bcdDevice fields, but either (a) the USB Serial Number or (b) the exact device position in the USB tree.

(a) If a device has a "USB Serial Number" set, each individual USB device instance used on a given PC requires an extra driver installation. In other words, if you e.g. swap a device with a co-worker, you need to install a driver.

(b) Without a "USB Serial Number", Windows wants a driver installed once for each USB port where a certain type of device is used. (E.g. swapping devices with a co-worker does not need additional driver installation.)

The USB device design choice was to go for a maximum of one driver installation once per (used!) USB port. Then you don't need to install additional drivers for any Lauterbach PodBus device with a different serial number.

Administrators maintaining restricted user right environments have problems with user-triggered driver installations.

As one pre-requisite, please use the most current installation package. E.g. the "t32usb_setup.exe" binary from this website (see download link below) is a self-extracting RAR archive that contains the Microsoft "DPinst" driver package pre-installation tool. "DPinst" copies the USB driver to the "Windows Driver Store" and allows subsequent installations to be "automatic".

This should already get rid of most "restricted environment" problems.

If you still have problems, we see two possibilities to further improve the situation:

(1) Allow "standard users" to install the Lauterbach driver by adding the embedded driver certificate to the "Trusted Vendor" certificate store (group settings). This should enable restricted user to install the driver. (Of course you need to test this with your specific version of Windows and your set of group policy settings.)

(2) If all affected Host PCs are identical, a System Administrator can configure one "Template Machine" with all ports installed, and export its USB enumeration tree for the PodBus USB device type from the Registry.

After installing the Lauterbach PODBUS USB driver once on a hardware- and OS-identical target machine, the administrator could then import the enumeration subtree.

(For e.g. XP the subtree would be "HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Enum\USB\Vid_0897&Pid_0002". It is unknown if this also works on newer Windows versions. Also any added hub will change the USB tree and require additional installation.)