How To Install Xilinx ISE + Platform Cable USB II / parallel Drivers on OpenSuSE Linux

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Abstract: *Guideline to install the XILINX IDE ISE on OpenSuSE Linux systems. Focus is on installing drivers for platform cables.*

Contents

1 Preface

This document aims to help Open SuSE users installing the powerful ISE tool made by Xilinx. While the installation of ISE itself is easy the **Platform Cable USB II and parallel Cable IV driver** installation is a major issue of this document. The Xilinx drivers shipped with ISE are of no value since they have been compiled with a certain Linux kernel. Most of other Linux kernels are not supported.
There is no special focus on how to use ISE, how to manage licenses or how to write HDL code. Please refer to the official Xilinx documentation at www.xilinx.com .

I appreciate every hint or critics to improve the quality of this document.

Please send your comments to mario.blunk@blunk-electronic.de . Thank you !

2 ISE Installation on SuSE Linux 11.1

The procedure below applies to both ISE 10.1 and ISE 11.1.

1) Log in as non-root user.
2) Download file “Xilinx_11.1_WebPack_SFD.tar[1]” from www.xilinx.com
3) Save this file in your home directory.
4) Open console.
5) Run command “tar -xf Xilinx_11.1_WebPack_SFD.tar”.
6) Run command “su”
7) Type your root password.
8) Change into directory “Xilinx_11.1_WebPack_SFD”
9) Run command “./setup” for ISE 10.1 or “./xsetup” for ISE 11.1.
10) Follow instructions given by the ISE installation process. When you are asked to install cable drivers, **select** driver installation[2].

    Don't care about the box that informs you about any environment variables required for ISE (see section 4 Setting up a Start Up Script for ISE for more).

    Don't care about the message box in the end of the installation procedure saying that your cable driver installation has failed. We'll care about that later.
11) Do **not** start ISE.

1 The TAR-File name for ISE 10.1 differs from this notation of course.
2 This way the firmware files get installed in your system directory /usr/share .

2.1 Cable Driver Installation

2.1.1 Preparation for Platform Cable USB II

1) Log in as root
2) Do **not** start ISE. Close ISE if it is running already.
3) **Disconnect** your target hardware, your UUT or DUT (or however you call it) from the Platform USB II cable.
4) start YAST and install packages “fxload”, “make”, “gcc” and “libusb-devel”.
5) Plug in the Platform USB II cable[3]. The LED on the cable should light up yellow now.

   If the LED does not come up, run command: ls -l /usr/share/*.hex.

   There should be a bunch of files ending with “hex”. If they are not there **rerun** the basic ISE installation and make sure the driver installation **is** selected (see page 3 section 2 action point 10.

   If the yellow LED still does not come on, open a console and type command “lsusb | grep Xilinx”. If the firmware upload to the USB cable has failed it should output a line like:

   ```
   Bus 002 Device 002: ID 03fd:0013 Xilinx, Inc.
   ```

   So you know the cable is at least present and connected to the PC.

   If the firmware upload has succeeded the output is:

   ```
   Bus 004 Device 004: ID 03fd:0008 Xilinx, Inc.
   ```

   Important is the number marked in red. It states that the cable firmware has been loaded properly.

6) Change to directory /etc/udev/rules.d/
7) Run command “touch libusb-driver.rules”
8) Open file “libusb-driver.rules” with Kate or other text editor.
9) Paste this line into file “libusb-driver.rules” :

   ```
   ACTION=="add", SUBSYSTEMS=="usb", ATTRS{idVendor}=="03fd", MODE="666"
   ```

10) Save file “libusb-driver.rules”.
11) Close text editor.

3 I do not recommend any USB extension cords as they may influence the power supply negatively.

12) Do **not** start ISE.

13) Log out.

14) Restart your PC.

15) Do **not** start ISE.

2.1.2 Preparation for Parallel Cable IV[4]

1) Log in as root
2) Do **not** start ISE. Close ISE if it is running already.
3) **Disconnect** your target hardware, your UUT or DUT (or however you call it) from the cable.
4) **Disconnect** your Parallel Cable IV from your PC.
5) start YAST and install packages “fxload”, “make”, “gcc” and “libusb-devel”.
6) in YAST go to “Security and Users” then select “User and Group Management”.
7) Edit the user who is supposed to work with the cable and make it member of the group “lp”.
8) Exit YAST.
9) Shut down your PC.
10) Plug in the Parallel Cable IV on your PCs LPT port.
11) Power up the Parallel Cable IV.
12) Start your PC and enter PC BIOS.
13) Make sure your LPT (parallel) port is set to mode ECP or “Bidir”.
14) Exit BIOS.
15) Restart your PC.

4 Later I discovered the *Parallel Cable III* can also set up this way. It may not need the procedure at all since it is very simple regarding its innards. However it works perfectly on my system.

2.1.3 Downloading Driver Source Code

1) Log in as ordinary (non root) user.
2) In your home directory create a folder named for example “ise-usb-driver”.
3) Start your internet browser and go directly to
   http://git.zerfleddert.de/cgi-bin/gitweb.cgi/usb-driver?a=snapshot;h=HEAD;sf=tgz
   or alternatively to http://www.rmdir.de/~michael/xilinx/
   Note: If you don't get access to the file “usb-driver-HEAD.tar.gz” you may contact me via email so that I can send you the file.
4) Save the file “usb-driver-HEAD.tar.gz” in folder “ise-usb-driver”.

2.1.4 Compiling the driver

1) Log in as non-root user.
2) Open a console and change (cd) to to folder “ise-usb-driver”.
3) Run command “gunzip usb-driver-HEAD.tar.gz”.
4) Run comand “tar -xf usb-driver-HEAD.tar”.
5) Run command “cd usb-driver”.
6) Run command “make”.
7) Run command “ls libusb-driver.so”.
8) It should output: `libusb-driver.so`
9) Now the driver is compiled and ready for use.
10) Do **not** start ISE.

3 ISE Installation on SuSE Linux 12.1

The procedure below applies to both ISE 10.1 and ISE 11.1.

1) Log in as non-root user.
2) Download file “Xilinx_11.1_WebPack_SFD.tar[5]” from www.xilinx.com
3) Save this file in your home directory.
4) Open console.
5) Run command “tar -xf Xilinx_11.1_WebPack_SFD.tar”.
6) Run command “su”
7) Type your root password.
8) Change into directory “Xilinx_11.1_WebPack_SFD”
9) Run command “./setup” for ISE 10.1 or “./xsetup” for ISE 11.1.
10) Follow instructions given by the ISE installation process. When you are asked to install cable drivers, **select** driver installation[6].

    Don't care about the box that informs you about any environment variables required for ISE (see section 4 Setting up a Start Up Script for ISE for more).

    If you don't have a license file yet, **close** the window that asks you for licensing and proceed.

    Don't care about the message box in the end of the installation procedure saying that your cable driver installation has failed. We'll care about that later.
11) Do **not** start ISE.
12) Change into directory “/opt/Xilinx/11.1/ISE/bin/lin/” .
13) Run command “cp *.hex /usr/share” . This way the firmware files are copied where they belong[7].
14) Run command “cp xusbdfwu.rules /etc/udev/rules.d/”
15) Do **not** start ISE.

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5 The TAR-File name for ISE 10.1 differs from this notation of course.

6 In contrast to SuSe 11.1 the firmware files (*.hex) are not placed in /usr/share here. They will reside in directory /opt/Xilinx/11.1/ISE/bin/lin/ .

7 I have no clue why the ISE installation procedure does not copy them into /usr/share by default. Instead a directory /etc/hotplug/usb/xusbdfwu.fw is created by the Xilinx installation procedure where the *.hex files get stored.
It is also strange that the *.hex files in /opt/Xilinx/11.1/ISE/bin/lin/ are different from the ones stored in /etc/hotplug/usb/xusbdfwu.fw . However I ignored the latter.

16) Open file xusbdfwu.rules in directory /etc/udev/rules.d/ with a text editor and change the words $TEMPNODE to $tempnode. See Text 1 and Text 2 on page 9.

```
# version 0003
SYSFS{idVendor}=="03fd", SYSFS{idProduct}=="0008", MODE="666"
BUS=="usb", ACTION=="add", SYSFS{idVendor}=="03fd", SYSFS{idProduct}=="0007", RUN+="/sbin/fxload -v -t fx2 -I
/usr/share/xusbdfwu.hex -D $TEMPNODE"
BUS=="usb", ACTION=="add", SYSFS{idVendor}=="03fd", SYSFS{idProduct}=="0009", RUN+="/sbin/fxload -v -t fx2 -I
/usr/share/xusb_xup.hex -D $TEMPNODE"
BUS=="usb", ACTION=="add", SYSFS{idVendor}=="03fd", SYSFS{idProduct}=="000d", RUN+="/sbin/fxload -v -t fx2 -I
/usr/share/xusb_emb.hex -D $TEMPNODE"
BUS=="usb", ACTION=="add", SYSFS{idVendor}=="03fd", SYSFS{idProduct}=="000f", RUN+="/sbin/fxload -v -t fx2 -I
/usr/share/xusb_xlp.hex -D $TEMPNODE"
BUS=="usb", ACTION=="add", SYSFS{idVendor}=="03fd", SYSFS{idProduct}=="0013", RUN+="/sbin/fxload -v -t fx2 -I
/usr/share/xusb_xp2.hex -D $TEMPNODE"
BUS=="usb", ACTION=="add", SYSFS{idVendor}=="03fd", SYSFS{idProduct}=="0015", RUN+="/sbin/fxload -v -t fx2 -I
/usr/share/xusb_xse.hex -D $TEMPNODE"
```

Text 1: xusbdfwu.rules before

```
# version 0003
SYSFS{idVendor}=="03fd", SYSFS{idProduct}=="0008", MODE="666"
BUS=="usb", ACTION=="add", SYSFS{idVendor}=="03fd", SYSFS{idProduct}=="0007", RUN+="/sbin/fxload -v -t fx2 -I
/usr/share/xusbdfwu.hex -D $tempnode"
BUS=="usb", ACTION=="add", SYSFS{idVendor}=="03fd", SYSFS{idProduct}=="0009", RUN+="/sbin/fxload -v -t fx2 -I
/usr/share/xusb_xup.hex -D $tempnode"
BUS=="usb", ACTION=="add", SYSFS{idVendor}=="03fd", SYSFS{idProduct}=="000d", RUN+="/sbin/fxload -v -t fx2 -I
/usr/share/xusb_emb.hex -D $tempnode"
BUS=="usb", ACTION=="add", SYSFS{idVendor}=="03fd", SYSFS{idProduct}=="000f", RUN+="/sbin/fxload -v -t fx2 -I
/usr/share/xusb_xlp.hex -D $tempnode"
BUS=="usb", ACTION=="add", SYSFS{idVendor}=="03fd", SYSFS{idProduct}=="0013", RUN+="/sbin/fxload -v -t fx2 -I
/usr/share/xusb_xp2.hex -D $tempnode"
BUS=="usb", ACTION=="add", SYSFS{idVendor}=="03fd", SYSFS{idProduct}=="0015", RUN+="/sbin/fxload -v -t fx2 -I
/usr/share/xusb_xse.hex -D $tempnode"
```

Text 2: xusbdfwu.rules after

17) Run command “cp /usr/lib/libstdc++.so.6 /opt/Xilinx/11.1/ISE/bin/lin/”

18) Log off the root user and

19) log in as non-root user.

20) In case of ISE other than version 10.1: Copy your Xilinx license file (mostly Xilinx.lic) into directory “/home/yours/.Xilinx .

21) Do **not** start ISE.

3.1 Cable Driver Installation

3.1.1 Preparation for Platform Cable USB II

1) Log in as root
2) Do **not** start ISE. Close ISE if it is running already.
3) **Disconnect** your target hardware, your UUT or DUT (or however you call it) from the Platform USB II cable.
4) start YAST and install packages “fxload”, “make”, “gcc” , “libpng12-0” and “libusb-compat-devel”.
5) Probably you may need to reboot now.
6) Plug in the Platform USB II cable[8]. The LED on the cable should light up yellow now.

   If the LED does not come up, run command: ls -l /usr/share/*.hex.

   There should be a bunch of files ending with “hex”. If they are not there see page 8 action point and following steps.

   If the yellow LED still does not come on, open a console and type command “lsusb | grep Xilinx”. If the firmware upload to the USB cable has failed it should output a line like:

   ```
   Bus 002 Device 002: ID 03fd:0013 Xilinx, Inc.
   ```

   So you know the cable is at least present and connected to the PC.

   If the firmware upload has succeeded it should read:

   ```
   Bus 004 Device 004: ID 03fd:0008 Xilinx, Inc.
   ```

   Important is the number marked in red. It states that the cable firmware has been loaded properly.

7) Change to directory /etc/udev/rules.d/
8) Run command “touch libusb-driver.rules”
9) Open file “libusb-driver.rules” with Kate or other text editor.

8 I do not recommend any USB extension cords as they may influence the power supply negatively.

10) Paste this line into file “libusb-driver.rules” :

```
ACTION=="add", SUBSYSTEMS=="usb", ATTRS{idVendor}=="03fd", MODE="666"
```

11) Save file “libusb-driver.rules”.

12) Close text editor.

13) Log out.

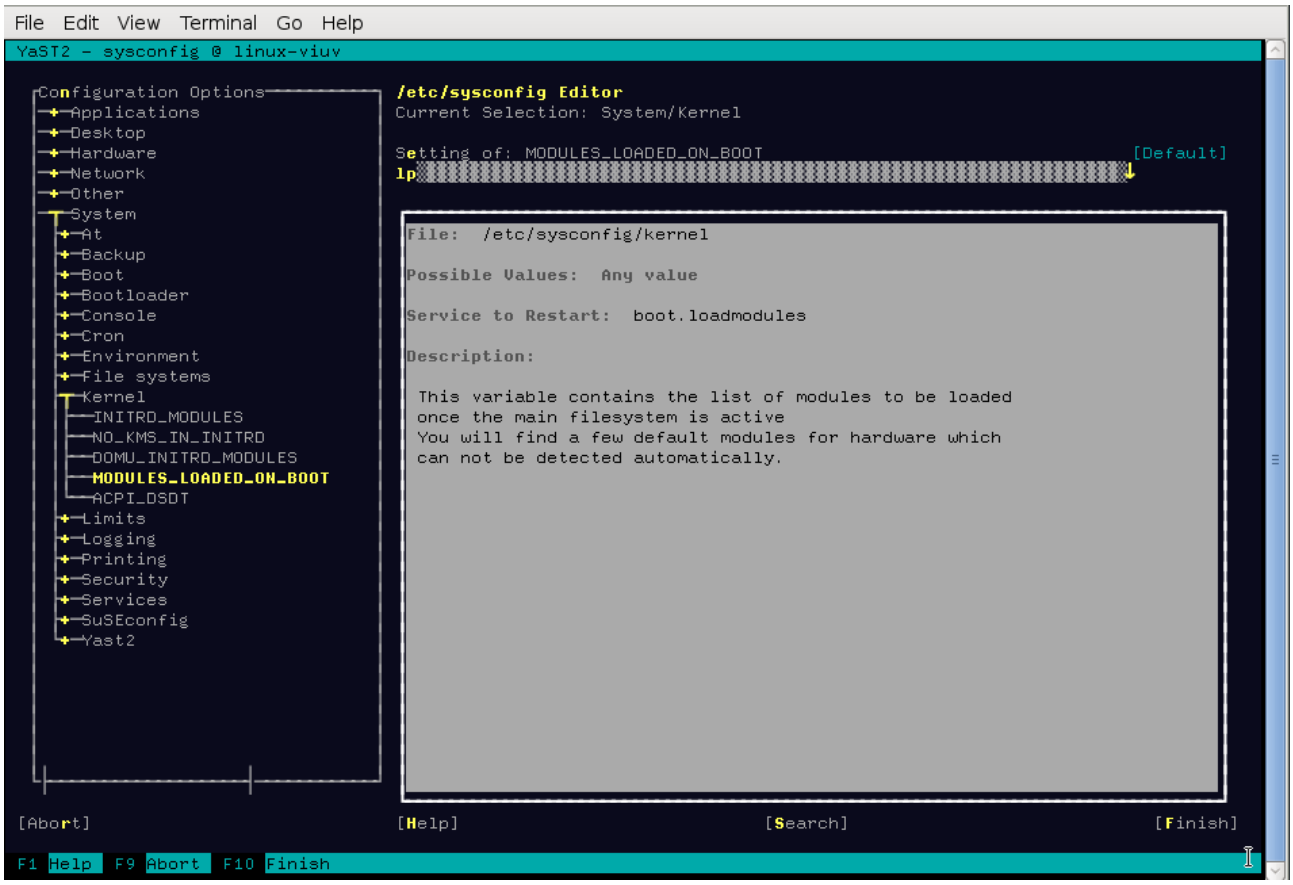
14) Do **not** start ISE.

15) Restart your PC.

16) Do **not** start ISE.

3.1.2 Preparation for Parallel Cable IV[9]

1) Log in as root
2) Do **not** start ISE. Close ISE if it is running already.
3) **Disconnect** your target hardware, your UUT or DUT (or however you call it) from the cable.
4) **Disconnect** your Parallel Cable IV from your PC.
5) start YAST | /etc/sysconfig Editor and set “lp” to be loaded on boot. see screen shot below



6) start YAST and install packages “fxload”, “make”, “gcc”, “libpng12-0” and “libusb-compat-devel”.
7) in YAST go to “Security and Users” then select “User and Group Management”.
8) Edit the user who is supposed to work with the cable and make it member of the group “lp”.
9) Exit YAST.
10) Shut down your PC.

9 Later I discovered the *Parallel Cable III* can also set up this way. It may not need the procedure at all since it is very simple regarding its innards. However it works perfectly on my system.

11) Plug in the Parallel Cable IV on your PCs LPT port.
12) Power up the Parallel Cable IV.
13) Start your PC and enter PC BIOS.
14) Make sure your LPT (parallel) port is set to mode ECP or “Bidir”.
15) Exit BIOS.
16) Restart your PC.

3.1.3 Downloading Driver Source Code

1) Log in as ordinary (non root) user.
2) In your home directory create a folder named for example “ise-usb-driver”.
3) Start your internet browser and go directly to

   http://git.zerfleddert.de/cgi-bin/gitweb.cgi/usb-driver?a=snapshot;h=HEAD;sf=tgz

   or alternatively to http://www.rmdir.de/~michael/xilinx/

   Note: If you don't get access to the file “usb-driver-HEAD.tar.gz” you may contact me via email so that I can send you the file.
4) Save the file “usb-driver-HEAD.tar.gz” in folder “ise-usb-driver”.

3.1.4 Compiling the driver

1) Log in as non-root user.
2) Open a console and change (cd) to to folder “ise-usb-driver”.
3) Run command “gunzip usb-driver-HEAD.tar.gz”.
4) Run comand “tar -xf usb-driver-HEAD.tar”.
5) Run command “cd usb-driver”.
6) Run command “make”.
7) Run command “ls libusb-driver.so”.
8) It should output: `libusb-driver.so`
9) Now the driver is compiled and ready for use.

4 Setting up a Start Up Script for ISE

Since ISE requires some environment variables set I prefer to initialize them by means of a shell script. This script gets called by an ordinary user.

1) Create a folder named “scripts” for example in your home directory.
2) Open console.
3) Change into folder “scripts”.
4) Run command “touch ise-go”.
5) Run command “chmod 755 ise-go”.
6) Open file “ise-go” with a text editor.
7) Paste the following lines into file “ise-go” :

```
#! /bin/sh
source /opt/Xilinx/11.1/ISE/settings32.sh
export LD_PRELOAD=/home/yours/ise-usb-driver/usb-driver/libusb-driver.so
ise
#impact
exit
```

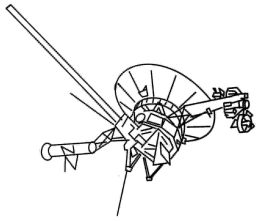
Note 1: If you use ISE 10.1 change the second line to:

```
source /opt/Xilinx/10.1/ISE/settings32.sh
```

Note 2: If you want to start **Impact** directly (in a **production line** for example), comment out the word “ise” and remove the hash before the word “impact”.

8) Save script file “ise-go”.
9) Close text editor.
10) Create a link-icon to the script file “ise-go” on your desktop.
11) Click on this icon. ISE should start up. Do your cable setup in ISE. Your Platform USB II or Parallel IV cable is now ready for use.

5 Useful Links



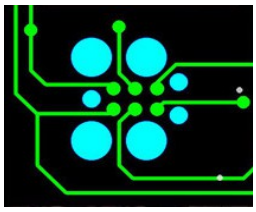
- Find updates of this document at www.blunk-electronic.de

- What is Boundary Scan ?

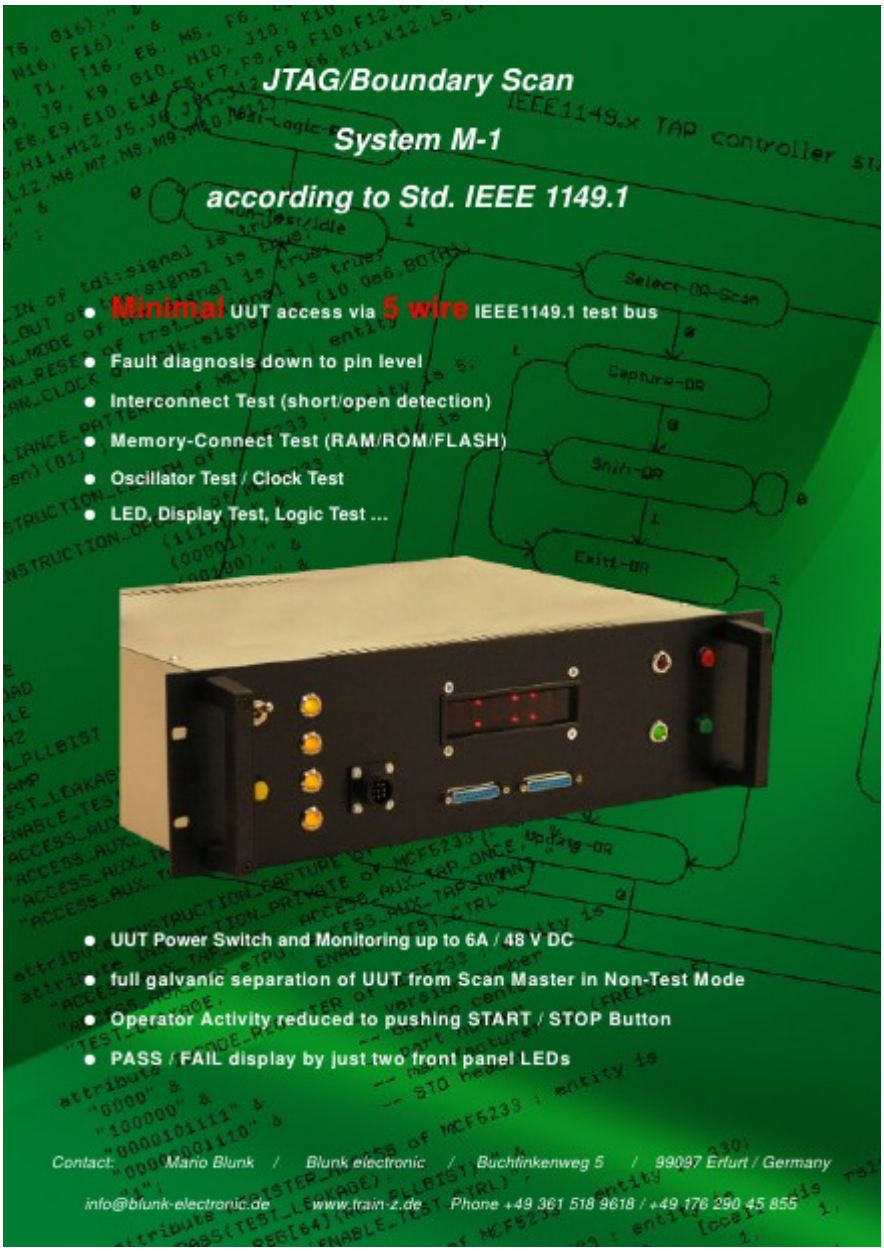
- Mario Blunk, "*A Guide to test methods and why to go for Boundary Scan*" at http://www.blunk-electronic.de/bsm/how_to_test.pdf

- Debug SPI, I²C, Boundary Scan/JTAG and other hardware with the *Logic Scanner* at http://www.blunk-electronic.de/logic_scanner/Logic_Scanner_UM.pdf

- Connect your Boundary Scan UUT with a Plug of Nails at www.Tag-Connect.com



- Looking for a lean **Boundary Scan Test System** ? Please have a look **here !**



- *CadSoft EAGLE Training and Consulting* – a reasonable way to reasonable work at www.blunk-electronic.de

- ADA - the programming language for safe coding at www.adacore.com

- The office alternative : *LibreOffice* at http://www.libreoffice.org

6 Thanks to

Michael Gernoth for libusb-driver - a Jungo windrvr replacement for XILINX JTAG tools.

http://www.gernoth.net/michael/

7 Disclaimer

This document is believed to be accurate and reliable. I do not assume responsibility for any errors which may appear in this document. I reserve the right to change it at any time without notice, and do not make any commitment to update the information contained herein.

My Boss is a Jewish Carpenter !

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