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**F<sup>2</sup>MC-FM3 FAMILY**  
32-BIT MICROCONTROLLER  
**ALL-SERIES**

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**OPENOCD GUI FRONTEND**

APPLICATION NOTE

## Revision History

Date	Issue
2012-02-01	V10, MSc, First Version
2012-02-24	V11, MSc, Additional Information Added

This document contains 28 pages.

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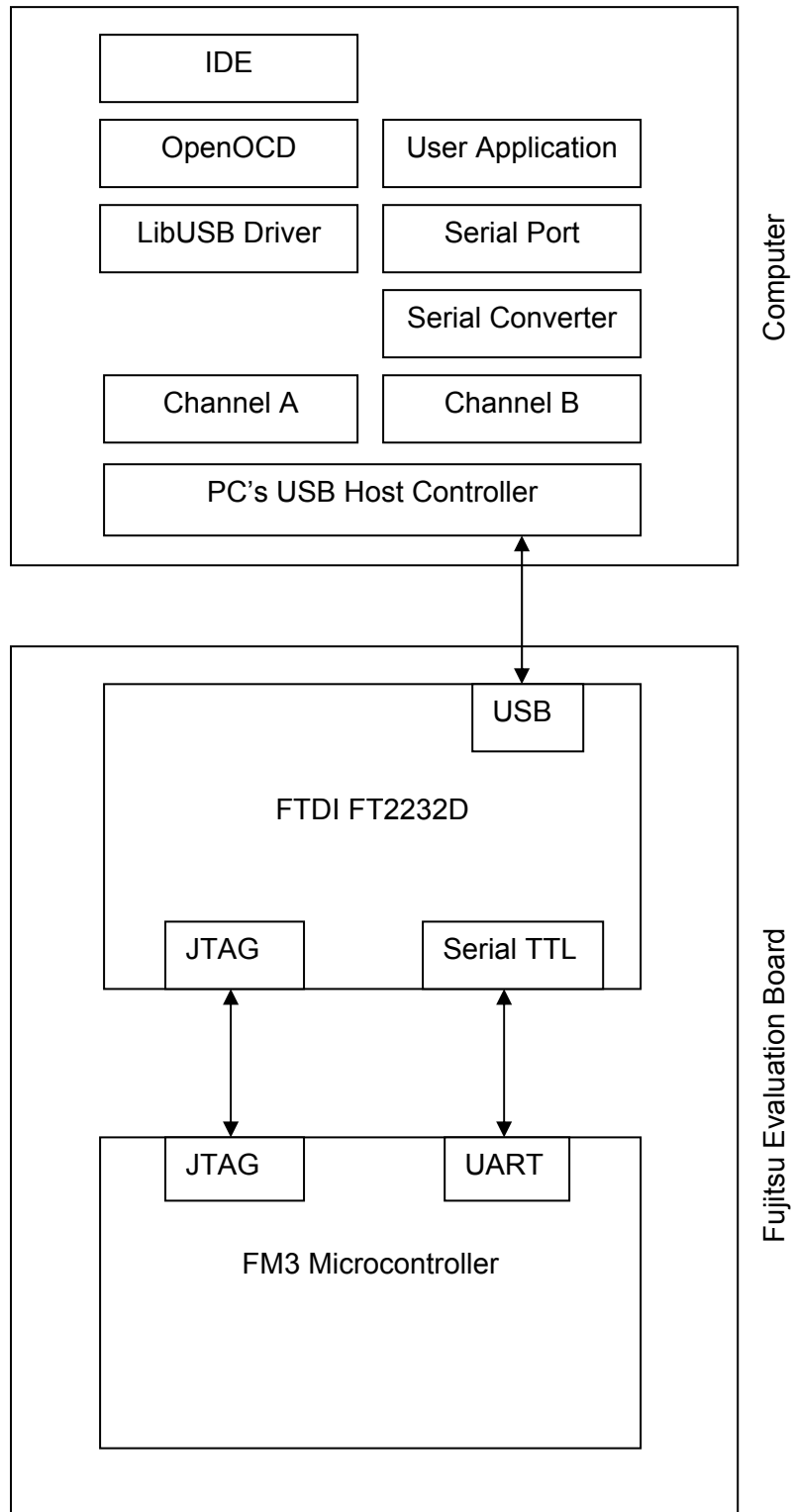
The contents of this document are subject to change without a prior notice, thus contact FSEU about the latest one.

## Contents

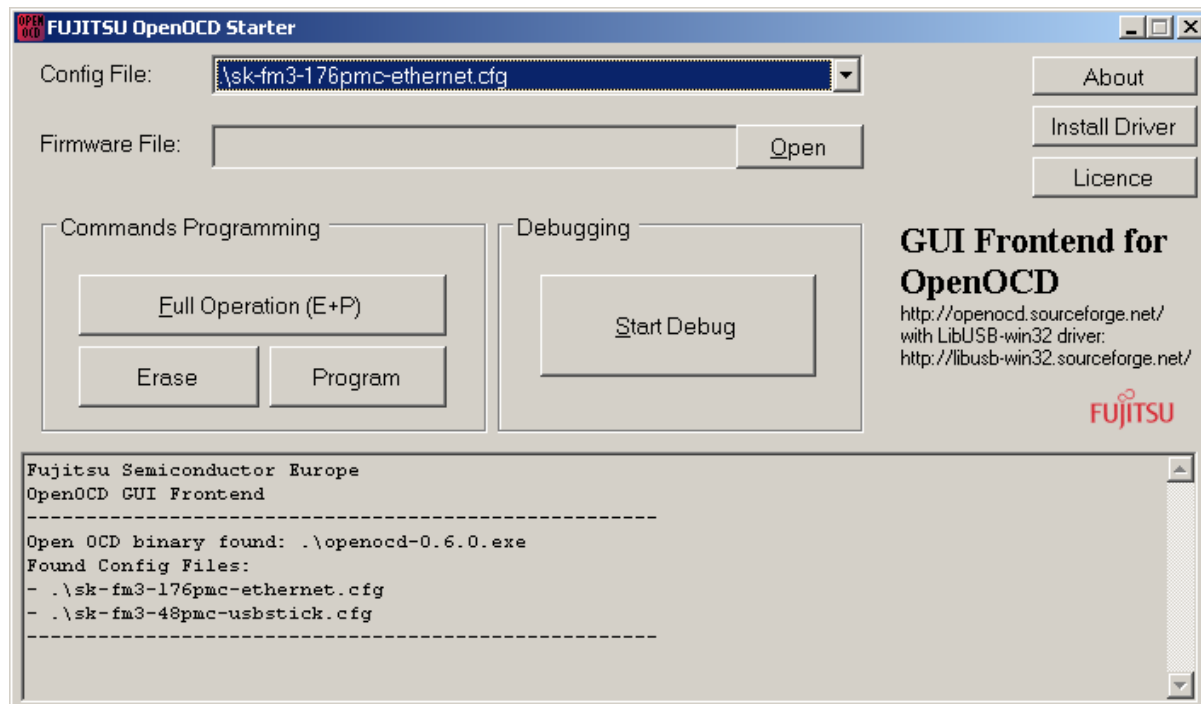
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# 1 Introduction

This Application Note explains how to use on-board Open On-Chip Debug hardware with some FM3 evaluation boards. For this the FTDI-Chip chip FT2232D is used to provide one serial port and one JTAG port.



For usage with a graphical frontend, Fujitsu developed the “Fujitsu OpenOCD Starter”.



It uses OpenOCD as backend and LibUSB as driver for the FT2232D channel A. OpenOCD is open source and can be found here: <http://openocd.sourceforge.net/>

See also <http://www.yagarto.de/#ocd> for OpenOCD binary versions.

Unfortunately it is not allowed to distribute binary version of OpenOCD, which is **linked** to the proprietary library FTD2XX provided by FTDI, so the binary within the installation uses LibUSB to drive the FTDI chip.

LibUSB is also open source and can be found here: <http://libusb-win32.sourceforge.net/>

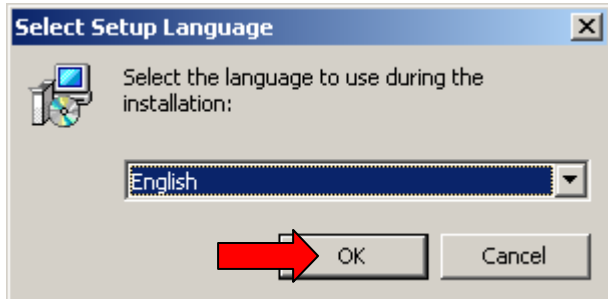
For auto detection in background mode, LibUsbDotNet library is used which is also open source and can be found here: <http://libusbdotnet.sourceforge.net>



## 2 Automatic Installation

### AUTOMATICALLY INSTALL OPENOCD GUI FRONTEND FROM FUJITSU

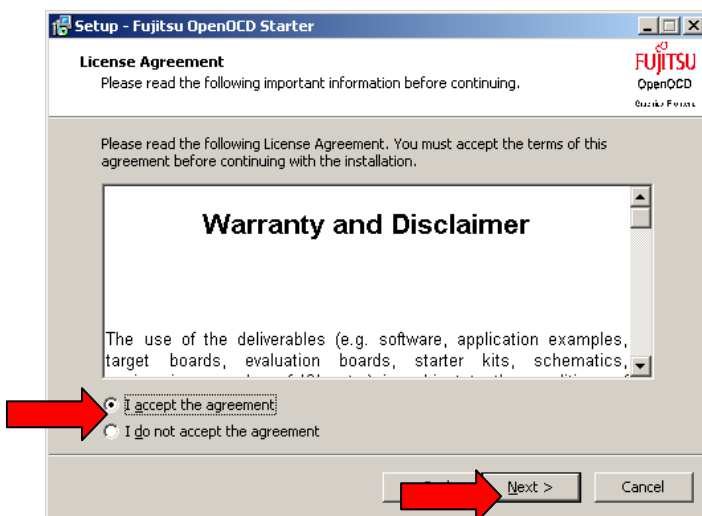
#### 2.1 Start Installation



Click "OK"



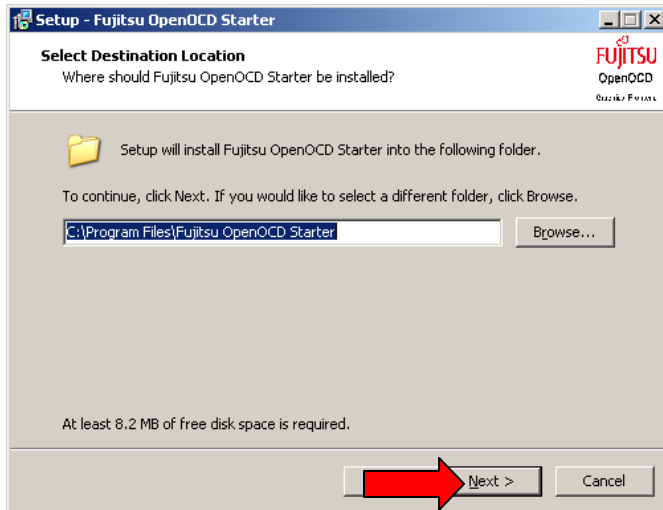
Click "Next"



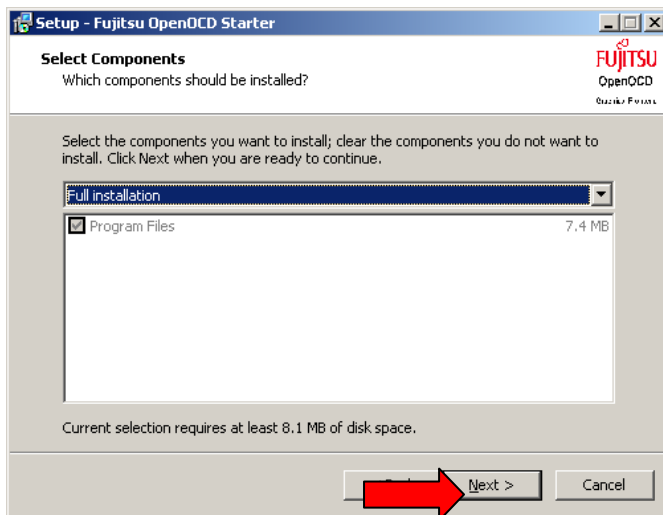
Read the disclaimer.

Agree the disclaimer.

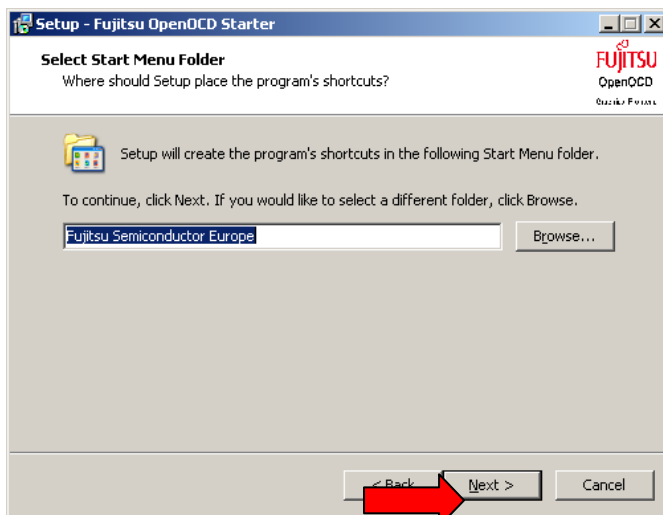
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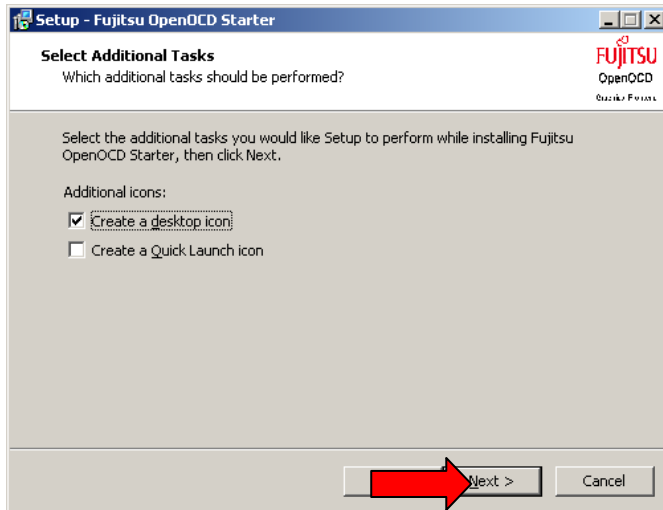
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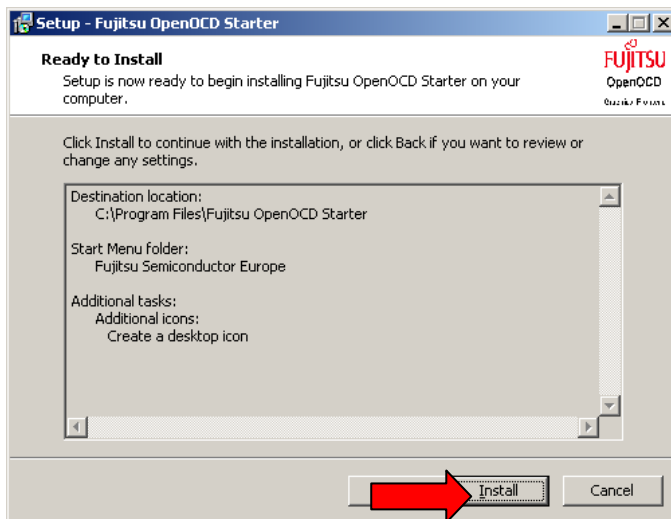
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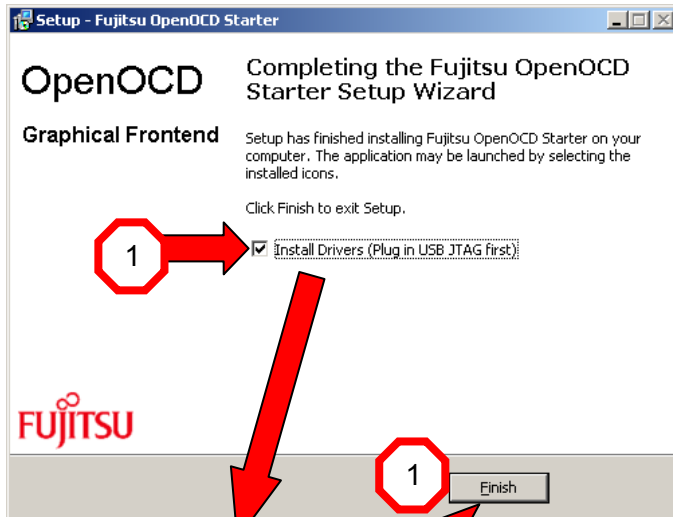
Click "Next"



Click "Next"

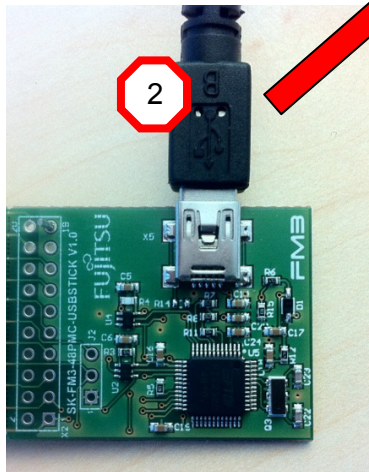


Click "Install"

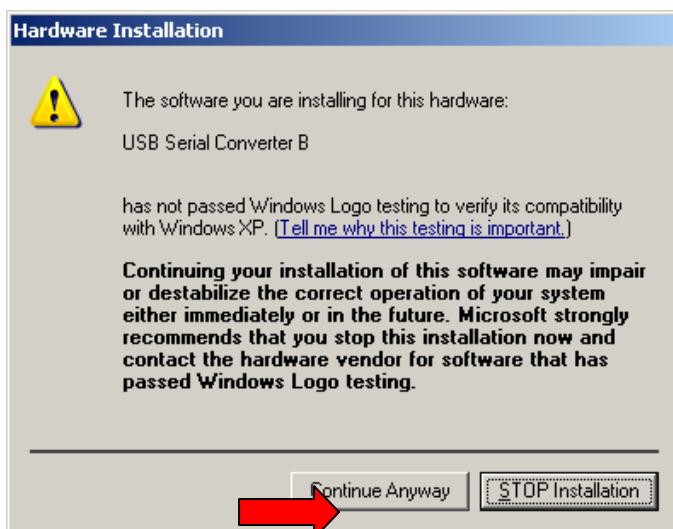


To install the drivers,

- 1.) Select "Install Drivers"
- 2.) Connect device via USB
- 3.) Click "Finish"



During driver installation following dialog appears.



This dialog should pop-up 4 times.

If this dialog appears, press "Continue Anyway".

### 3 Manual Installation

#### USED FOR MANUALLY INSTALL DRIVERS FOR FTDI FOR USE WITH LIBUSB

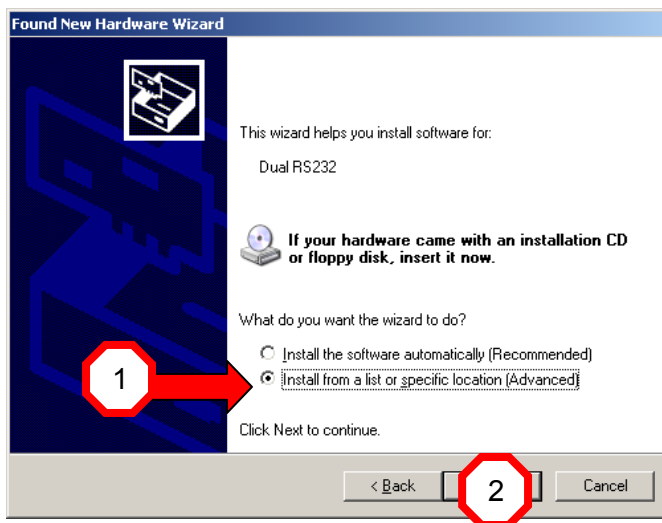
This section is normally not needed, because the Fujitsu OpenOCD Starter automatically installs all required drivers. In some environments manual driver install may be interesting.

#### 3.1 If no FTDI-Chip drivers are installed in the operating system



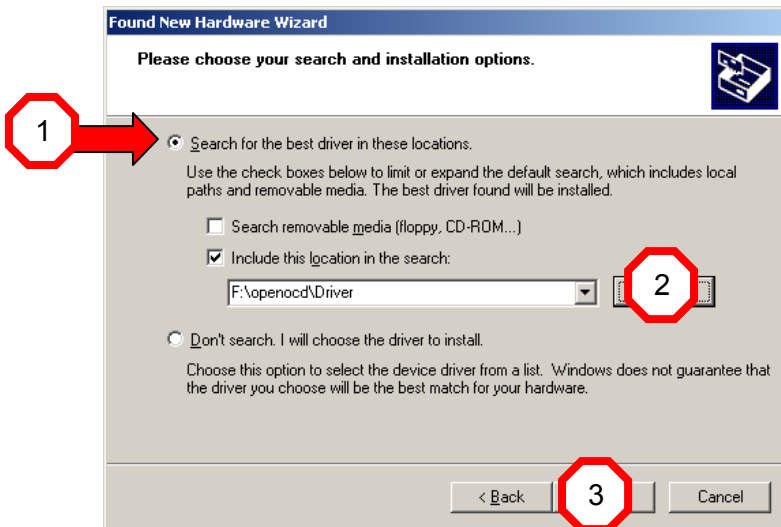
1.) Choose „No, not this time“

2.) Click “Next”



1.) Choose “Install from a list...”

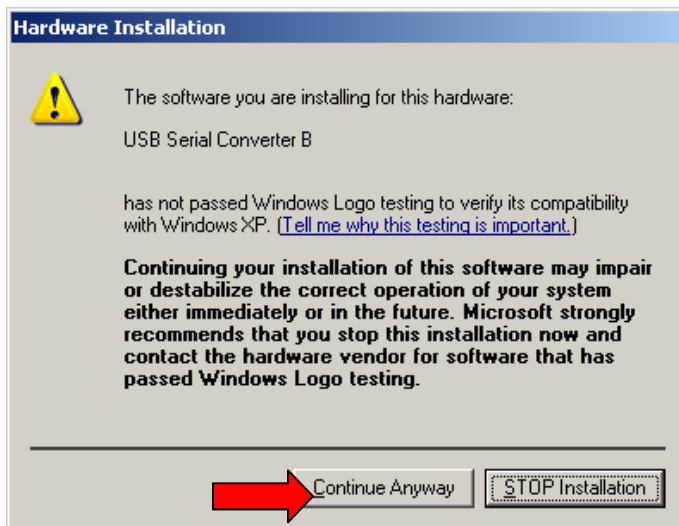
2.) Click “Next”



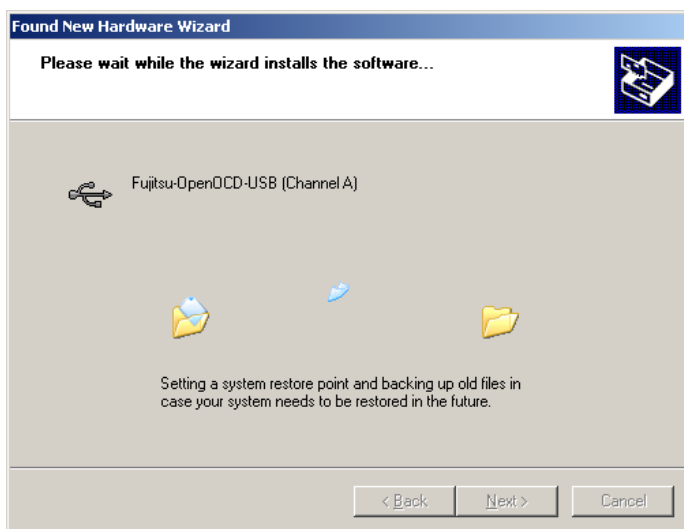
1.) Select „Search for the...“

2.) Choose the „Drivers“ directory in the openocd folder

3.) Click “Next”



If following dialogs opens, click “Continue Anyway”



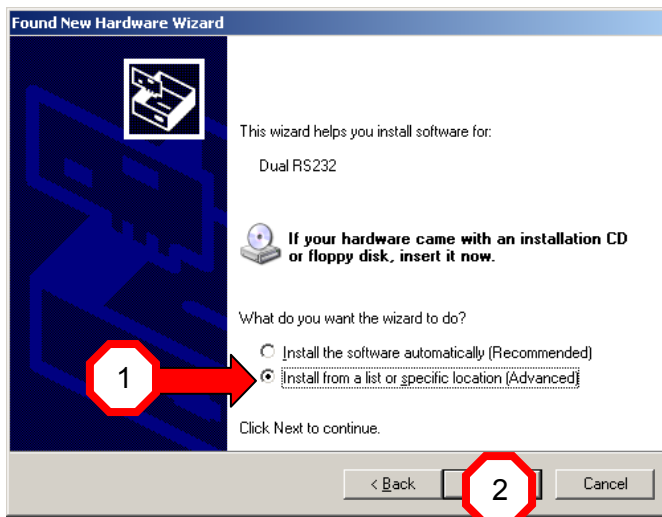


Click „Finish“



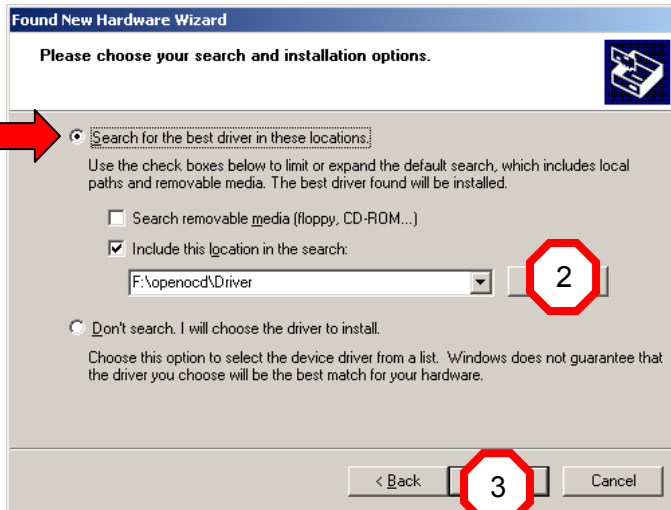
1.) Choose „No, not this time“

2.) Click “Next”



1.) Choose “Install from a list...”

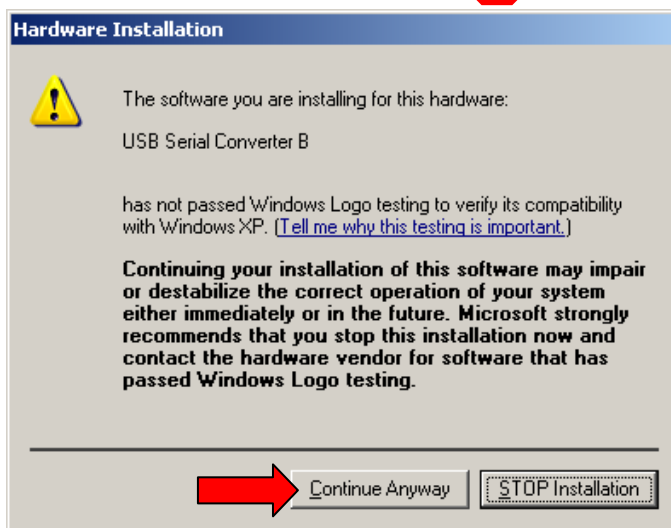
2.) Click “Next”



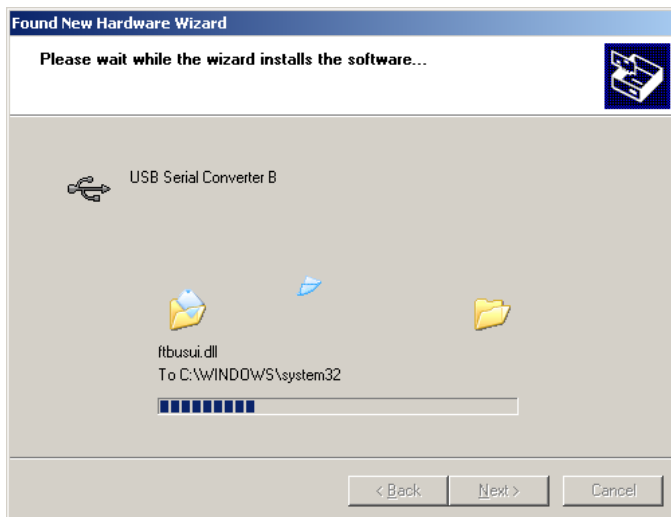
1.) Select „Search for the...”

2.) Choose the „Drivers“ directory in the openocd folder

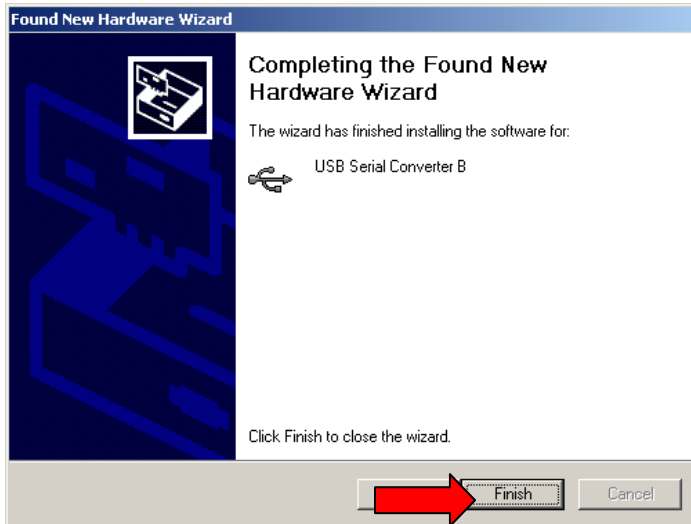
3.) Click “Next”



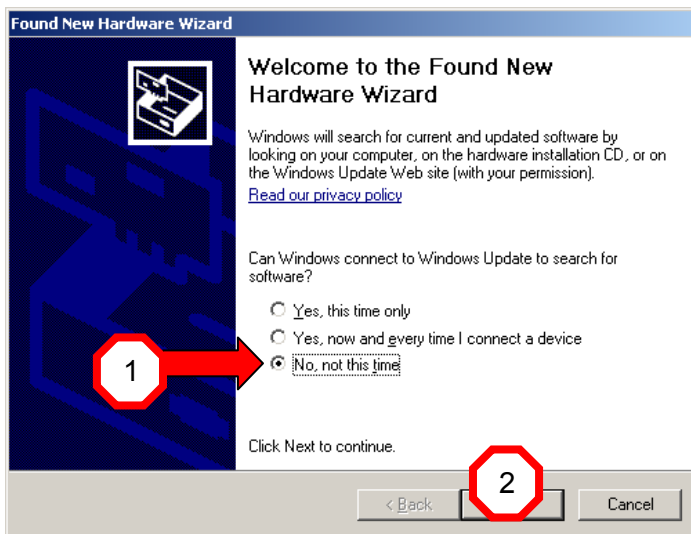
If following dialogs opens, click “Continue Anyway”





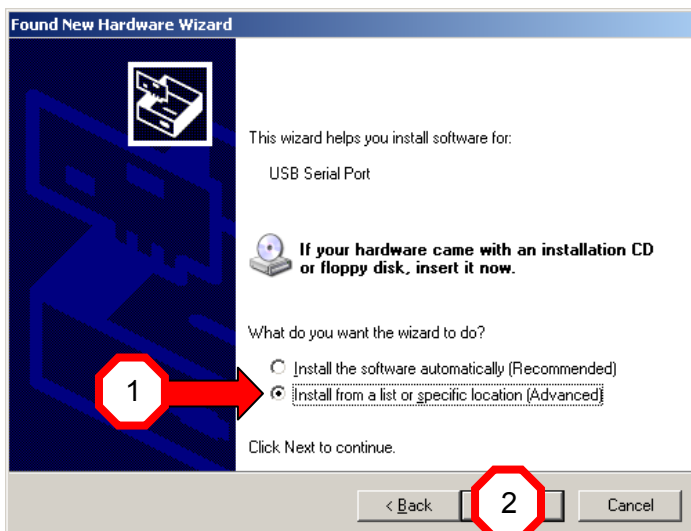


Click „Finish“



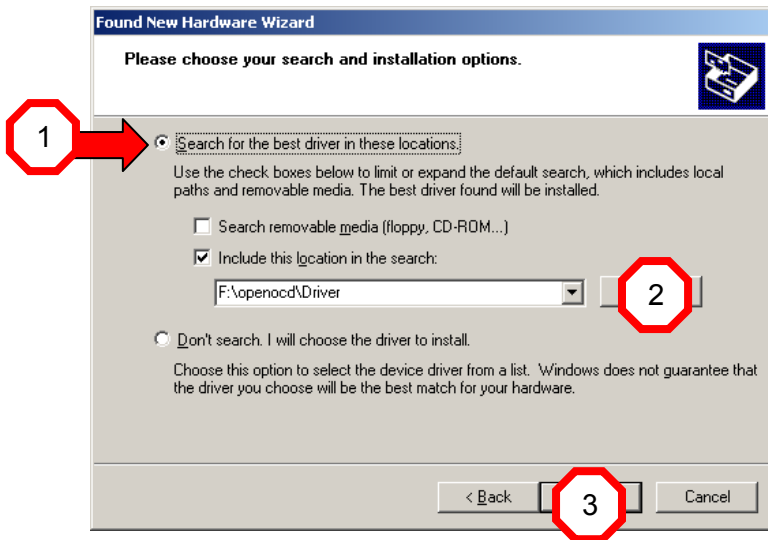
1.) Choose „No, not this time“

2.) Click “Next”



1.) Choose “Install from a list...”

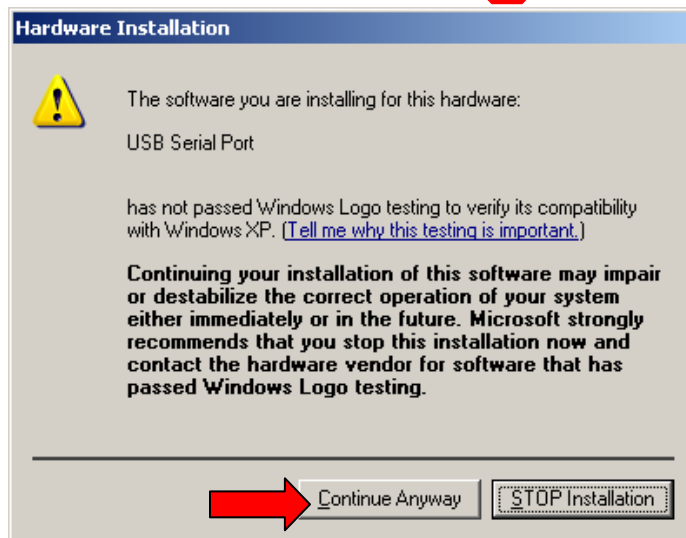
2.) Click “Next”



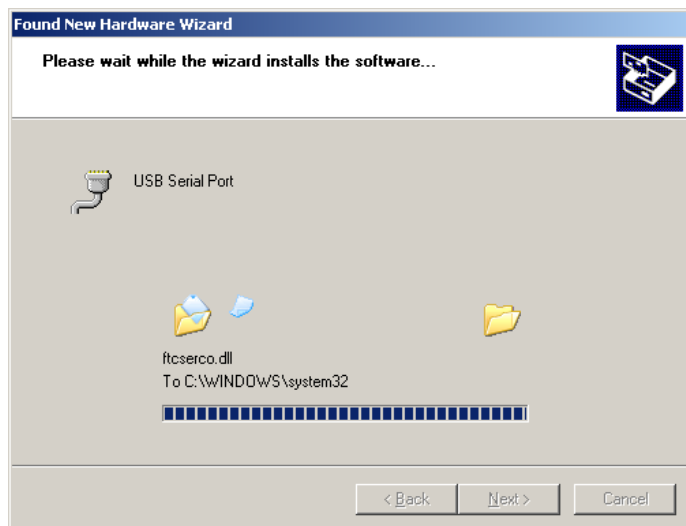
1.) Select „Search for the...”

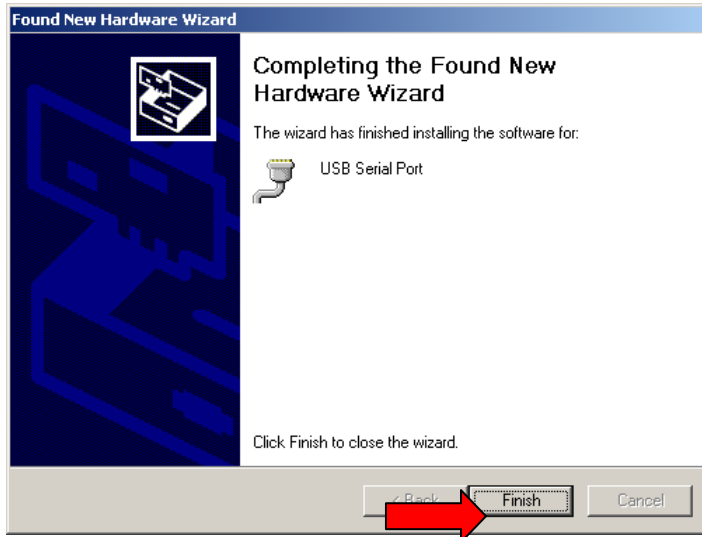
2.) Choose the „Drivers“ directory in the openocd folder

3.) Click “Next”



If following dialogs opens, click “Continue Anyway”



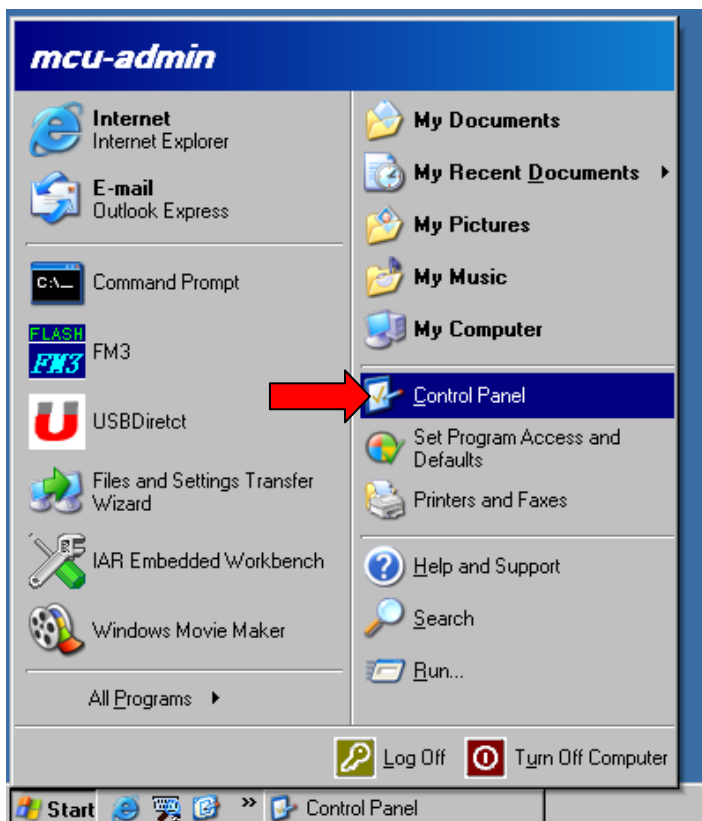


Click „Finish“

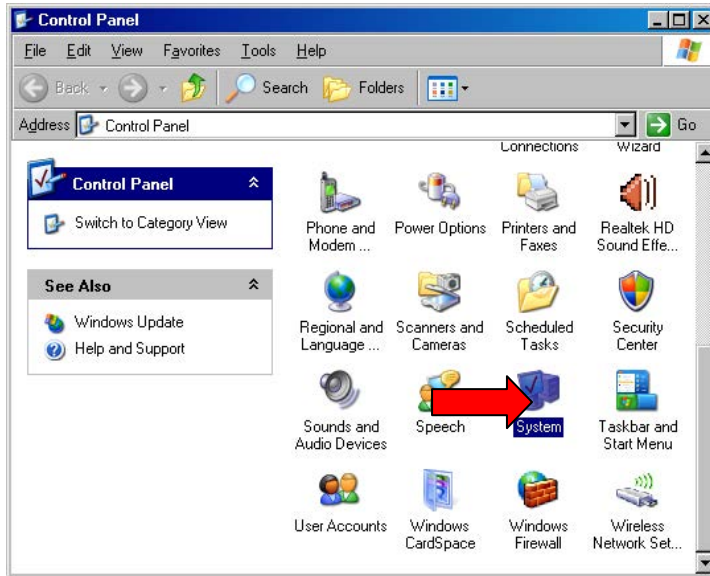
Now Drivers are installed and OpenOCD is ready to use.

### 3.2 If FTDI-Chip drivers are installed in the operating system

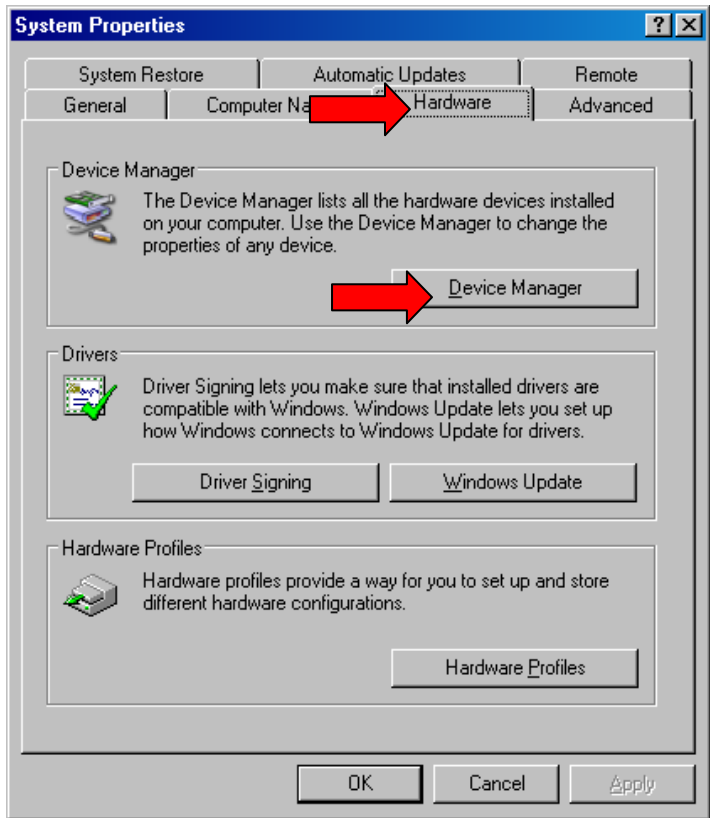
In this case Channel A of the USB to dual RS232 bridge will be recognized as Serial Converter A. To use it with LibUSB, the driver of “Serial Converter A” has to be patched to a LibUSB driver.



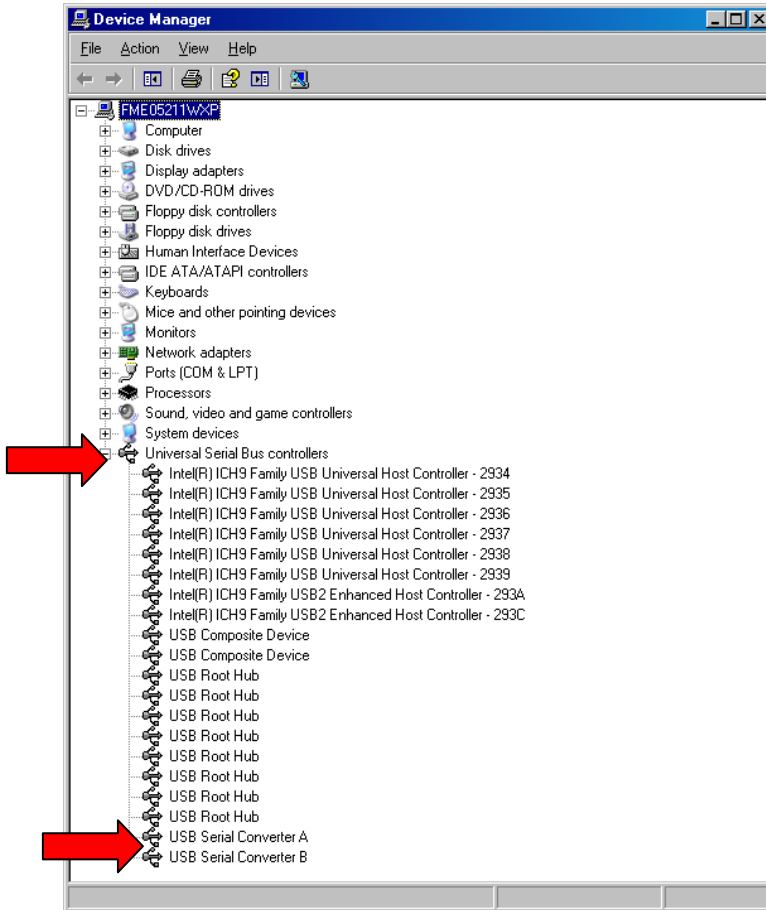
Go to Control Panel



Open "System" control panel

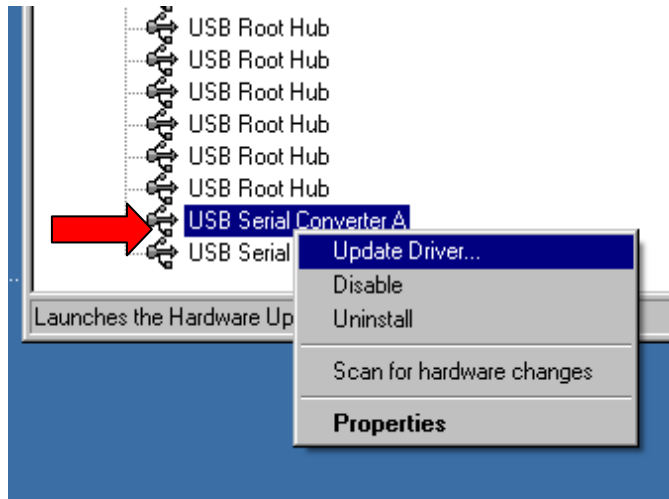


Open the "Device Manager"



Expand “Universal Serial Bus Controller”

Here the “USB Serial Converter A” is listed.

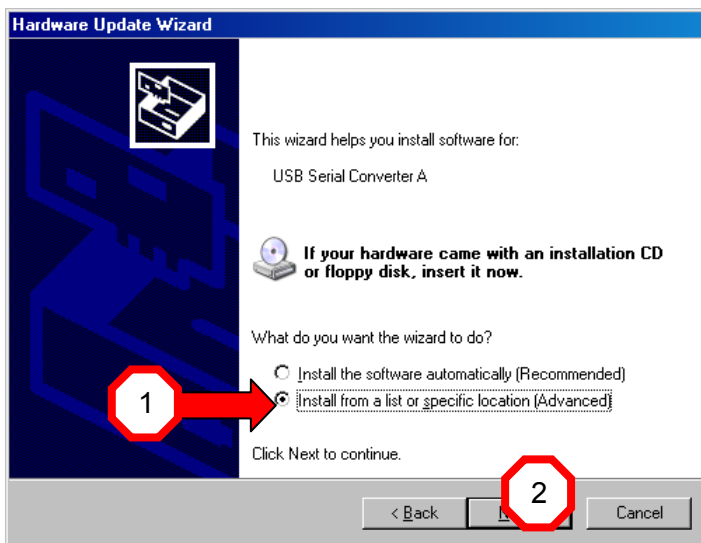


Click with right-mouse button “USB Serial Converter A” and choose “Update Driver...”



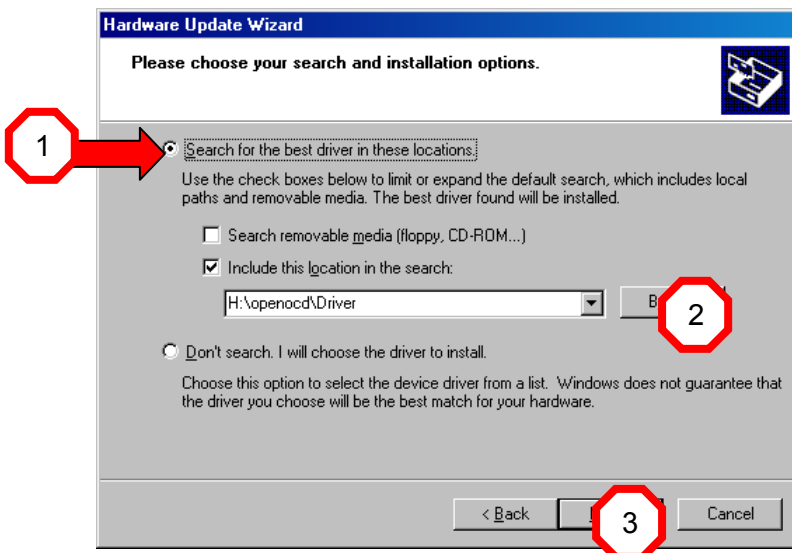
1.) Choose „No, not this time“

2.) Click “Next”



1.) Choose “Install from a list...”

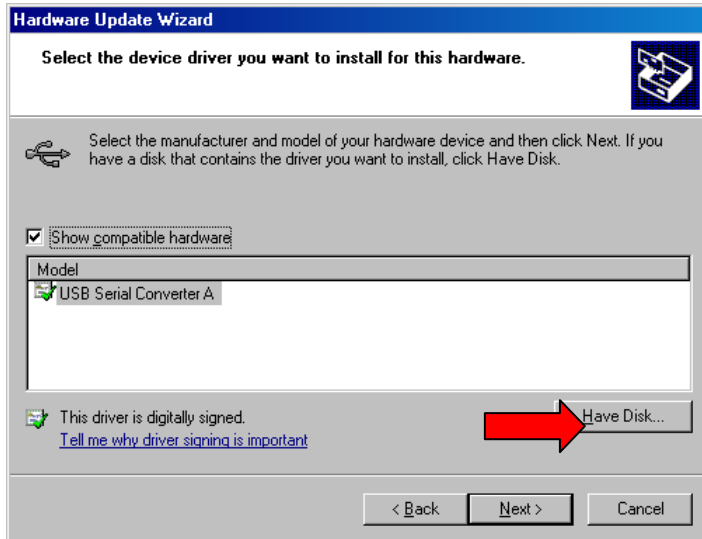
2.) Click “Next”



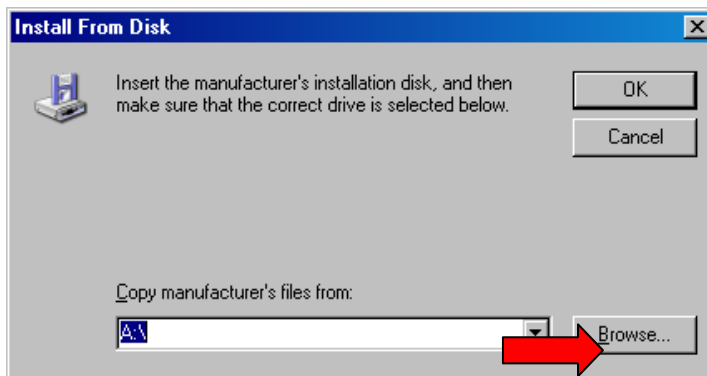
1.) Select „Search for the...”

2.) Choose the „Drivers“ directory in the openocd folder

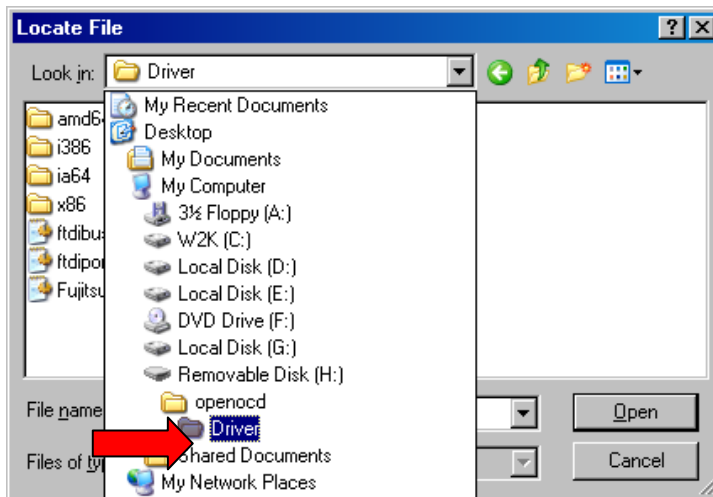
3.) Click “Next”



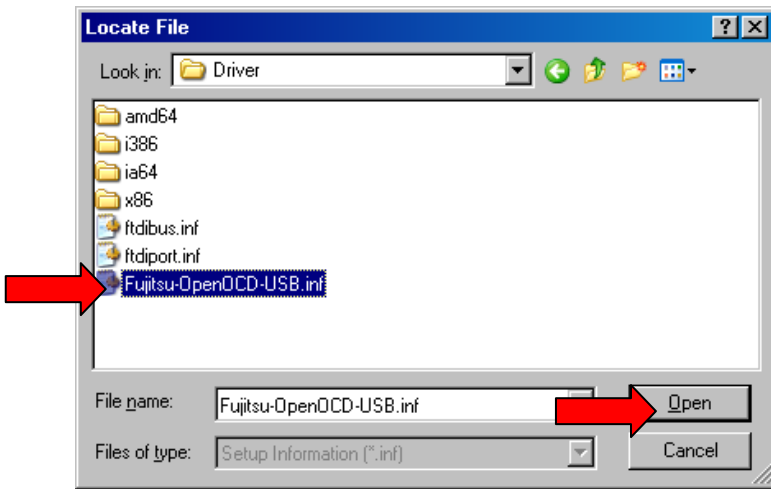
Click "Have Disk..."



Click "Browse"

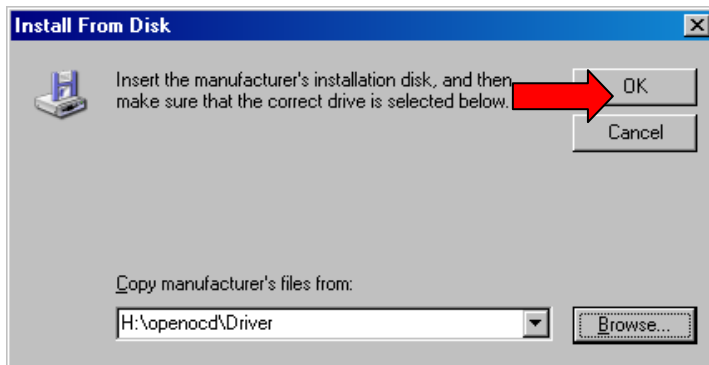


Navigate to "Drivers" folder in the openocd folder.

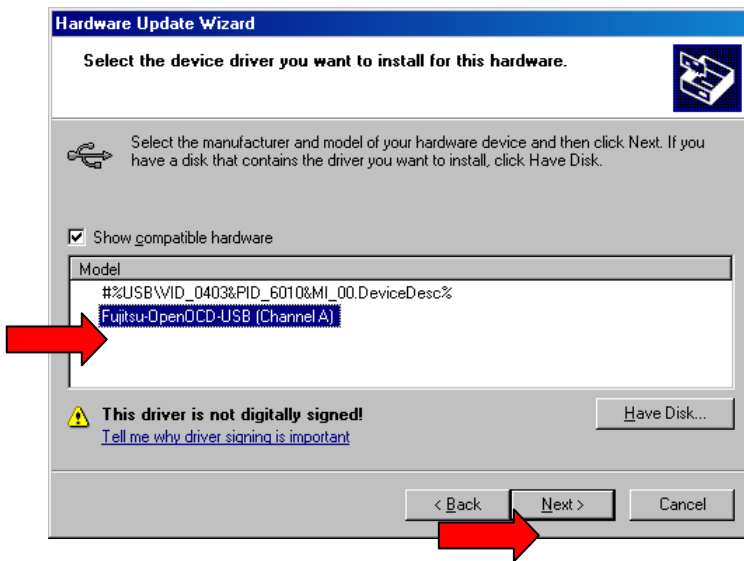


Choose "Fujitsu-OpenOCD-USB"

Click "Open"



Click "OK"



Choose "Fujitsu-OpenOCD-USB"

Click "Next"





Click „Finish“

Now Drivers are installed and OpenOCD is ready to use.


## 4 Use OpenOCD

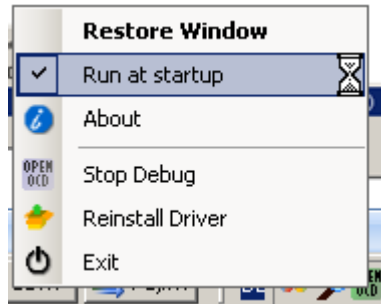
### HOW TO USE OPENOCD

The *Fujitsu OpenOCD Starter* can be used in different ways: As GUI or in background mode.

#### 4.1 Background Mode

If *Fujitsu OpenOCD Starter* is configured to start with windows start up, it automatically switches to background mode. If this was not configured at installation, this can be done via

tray icon :

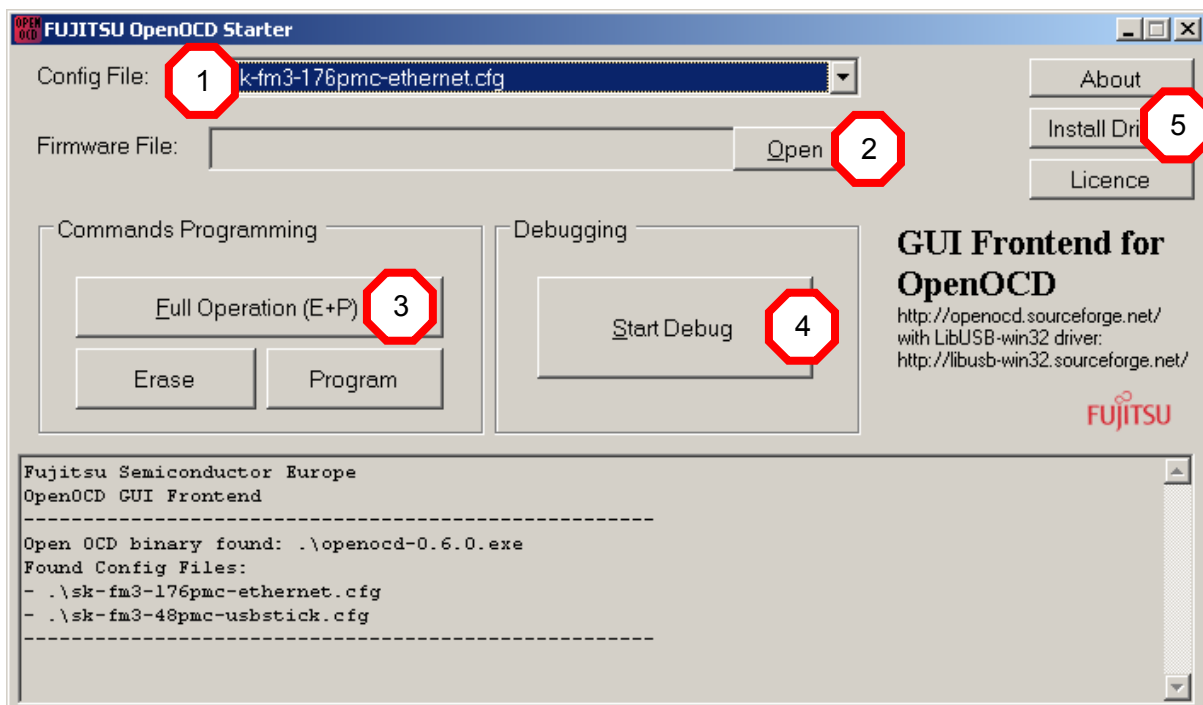
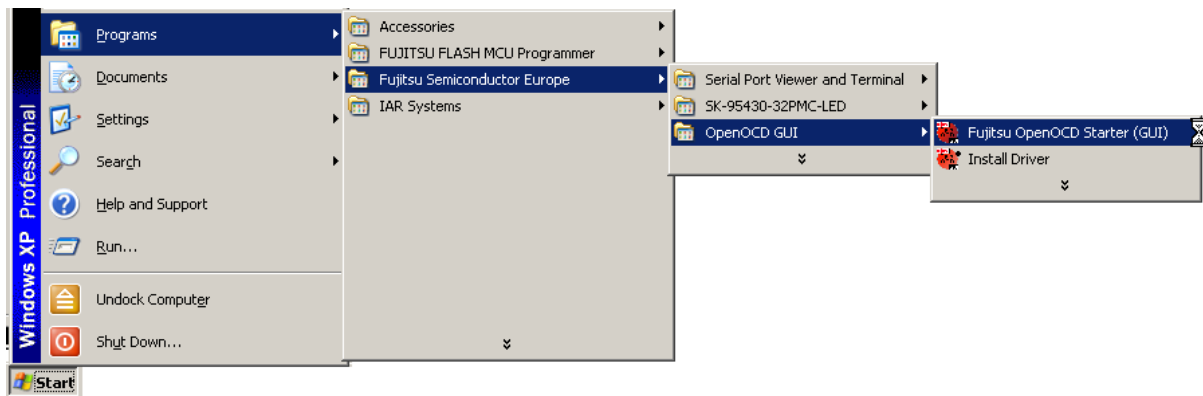


In background mode the *Fujitsu OpenOCD Starter* automatically detects the evaluation board and starts the debugger.

To switch into background mode, just minimize the *Fujitsu OpenOCD Starter*. You may have to reconnect the board, to start auto detection.

## 4.2 Graphical Interface

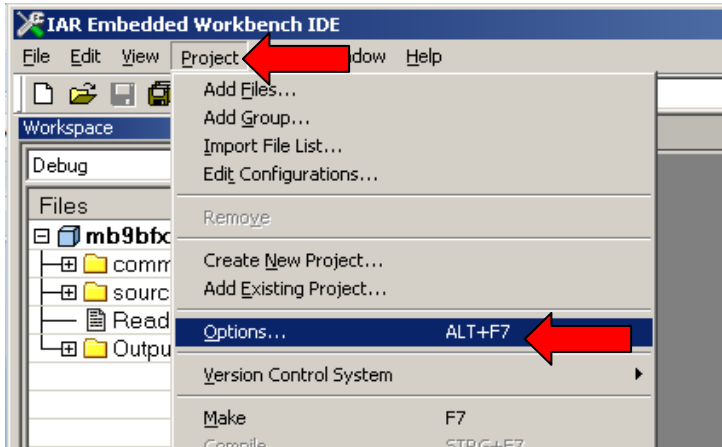
Start “Fujitsu OpenOCD Starter (GUI)”



- 1.) Select evaluation board
- 2.) Select firmware file (optional)
- 3.) Download Firmware into flash (optional and experimental)
- 4.) Start OpenOCD Debug Server
- 5.) Reinstall drivers if needed

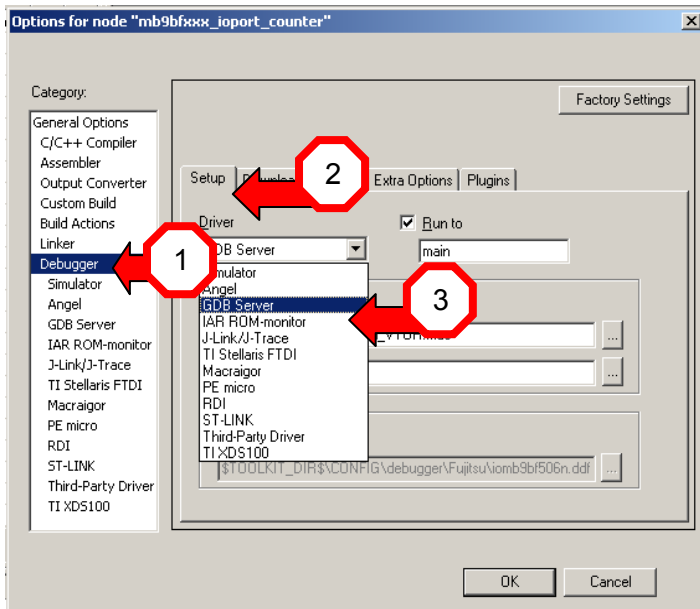
### 4.3 Configure IAR for use with OpenOCD

Start IAR Workbench.



Select "Project" in the menu

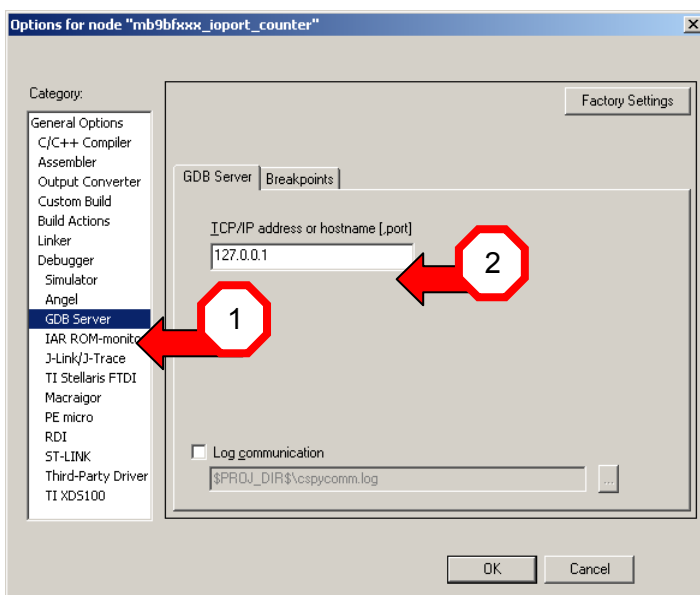
Choose "Options"



1.) Select Debugger

2.) Select Setup

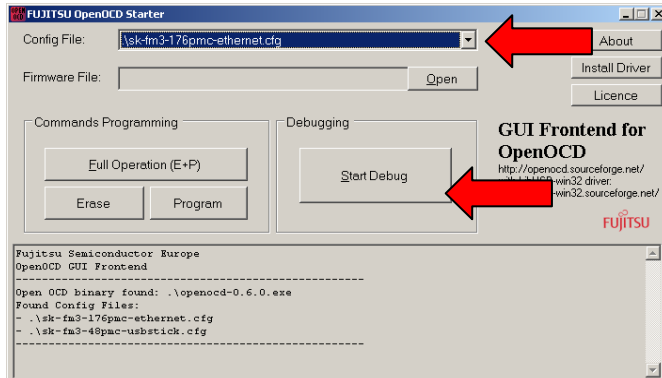
3.) As driver select "GDB Server"



1.) Select GDB Server

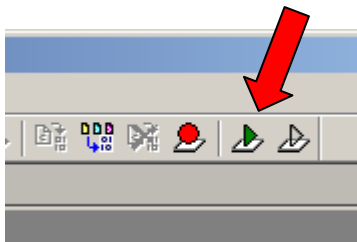
2.) Enter 127.0.0.1 in TCP/IP address

If *Fujitsu OpenOCD Starter* is not in background mode, the OpenOCD debugger has to be started manually:



In Open Fujitsu OpenOCD Starter select your evaluation board

Click “Start Debug”.



Start debug in IAR Workbench

## 5 Appendix

### 5.1 WWW

#### 5.1.1 Fujitsu Semiconductor Europe

<http://mcu.emea.fujitsu.com>

#### 5.1.2 OpenOCD at Sourceforge.net

<http://openocd.sourceforge.net/>

#### 5.1.3 LibUSB at Sourceforge.net

<http://libusb-win32.sourceforge.net/>