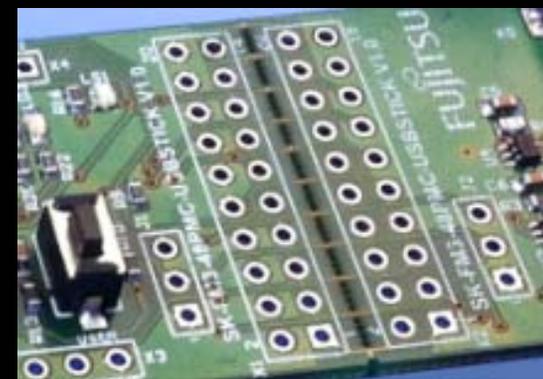
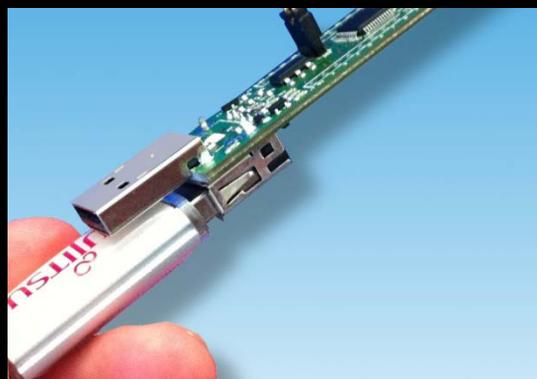


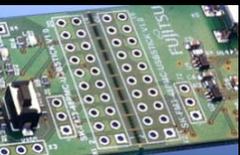
FUJITSU

SK-FM3-48PMC-USBSTICK Quick Start





Warranty and Disclaimer



The use of the deliverables (e.g. software, application examples, target boards, evaluation boards, starter kits, schematics, engineering samples of IC's etc.) is subject to the conditions of Fujitsu Semiconductor Europe GmbH ("FSEU") as set out in (i) the terms of the License Agreement and/or the Sale and Purchase Agreement under which agreements the Product has been delivered, (ii) the technical descriptions and (iii) all accompanying written materials.

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Regarding hardware deliverables, FSEU warrants that they will be free from defects in material and workmanship under use and service as specified in the accompanying written materials for a duration of 1 year from the date of receipt by the customer.

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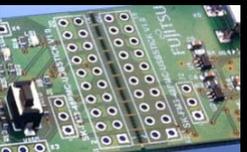
CD Contents

■ Software (Installation)

- [FLASH USB DIRECT Programmer](#)
- [FLASH Serial Programmer](#)
- [SerialPortViewerAndTerminal](#)
- [Fujitsu OpenOCD Starter \(GUI\)](#)
- [Fujitsu USB Assistant](#)

■ Documents

- Schematic: [‘SK-FM3-48PMC-USBSTICK’](#)
- User Guide: [‘SK-FM3-48PMC-USBSTICK’](#)
- Data Sheet: [MB9A310K Series](#)
- Manual: [Peripheral Manual](#)
- Manual: [Technical Reference Manual](#)
- Manual: [Flash Programming Manual](#)
- Application Note: [Virtual Com Port](#); Example Files: [Virtual Com Port](#)
- Application Note: [Using Fujitsu USB Assistant](#)
- Application Note: [FSEU USB Host](#)
- Application Note: [FujitsuUsbLib \(PC\)](#)
- Application Note: [FSEU Embedded USB Device Library](#)
- Application Note: [OpenOCD GUI Frontend](#)
- Application Note: [USB Host Mass Storage Bootloader](#)





CD Contents (continued)

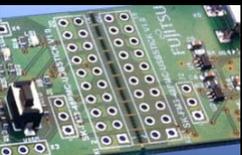
■ Examples

- Further examples are available on the [CD](#) and on our website
- Note: Please copy the examples to your local drive!

Download the latest version from the following website:

http://mcu.emea.fujitsu.com/mcu_tool/detail/SK-FM3-48PMC-USBSTICK.htm

Open Questions? Contact: mcu_ticket.FSEU@de.fujitsu.com





Overview

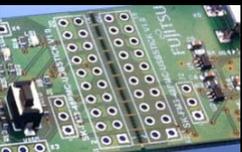
■ Introduction

- About the SK-FM3-48PMC-USBSTICK
- Requirements
- The hardware
- Installation of Serial Port Viewer & Terminal

■ Try yourself

- USB Host and Device
- Open OCD Debugger
- IAR-Embedded Workbench
- MCU Programming Via USB
- Create Own USB Applications

■ Contacts





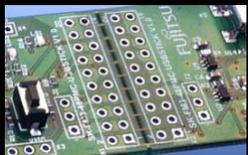
About the SK-FM3-48PMC-USBSTICK

- **The SK-FM3-48PMC-USBSTICK includes a low-cost evaluation board based on the Fujitsu FM3 microcontroller MB9A310k Series**



- **The MB9A310K Series includes the following features:**

- Up to 128 KByte Flash Memory
- Up to 16 KByte RAM
- Up to 4 LIN-USART-I²C interfaces
- USB-Host/-Device interface
- Timers (ICUs, OCUs, PPGs, others)
- Up to three 12 bit ADC
- External interrupts
- Low Power Mode
- DMA Controller (8 channels)
- Quadrature Position/Revolution Counter

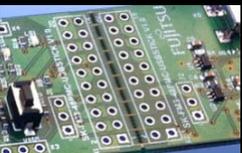




About the SK-FM3-48PMC-USBSTICK

■ Features of the SK-FM3-48PMC-USBSTICK board:

- Microcontroller MB9AF312K
- 1x USB to serial converter (Type-B connector)
- JTAG integrated
- 1x USB-MiniHost (Type-A connector)
- 1x USB-Device (Type-B connector)
- Optional USB On-The-Go (assembly option for USB Mini connector)
- 3x LED controlled with PWM
- 1x 'User'-button
- 1x 'Reset'-button
- All 48 pins routed to pin-header
- Power supply via USB
- Voltage filter for ADC
- Light sensor





Requirements

■ Embedded Development & MCU Flash Programming

- Windows 2000 , Windows XP or Windows7
- Administrator Rights
- For some applications .NET Framework 2.0 and higher is required

■ PC Frontend Development

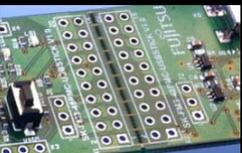
- Microsoft Visual C# Express
- Microsoft .NET Framework 2.0 and higher

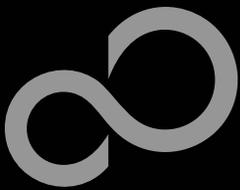
■ Virtual Com Port Example

- Windows 2000,XP, Vista or Windows 7 (32-bit)
- Mac OS X or Linux

■ HID Communication Example

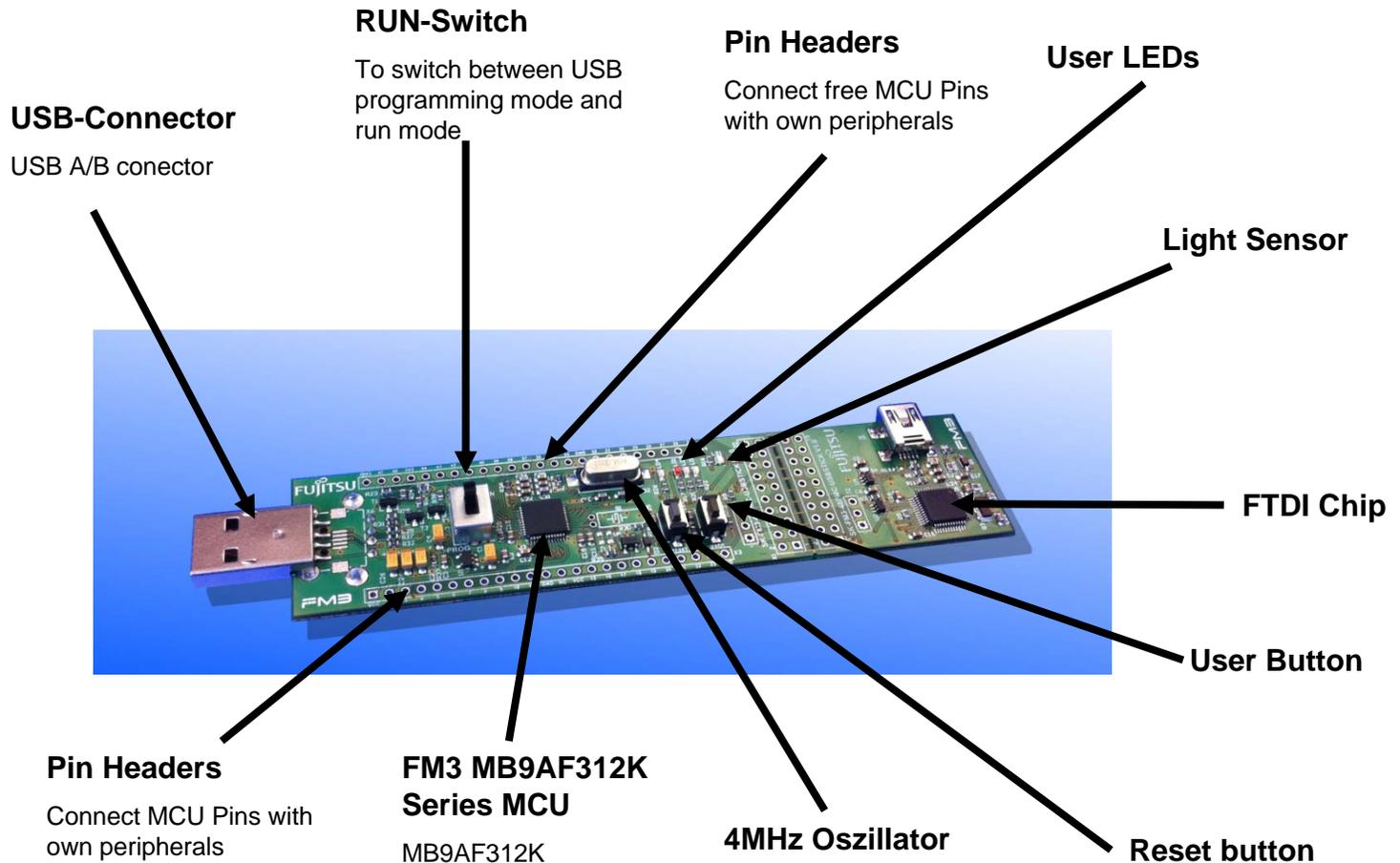
- Windows 2000,XP, Vista or Windows 7 (32- and 64-bit)
- Microsoft .NET Framework 3.5 and higher



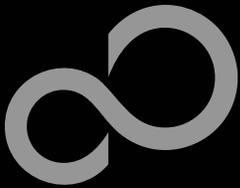


The Hardware

■ Main features

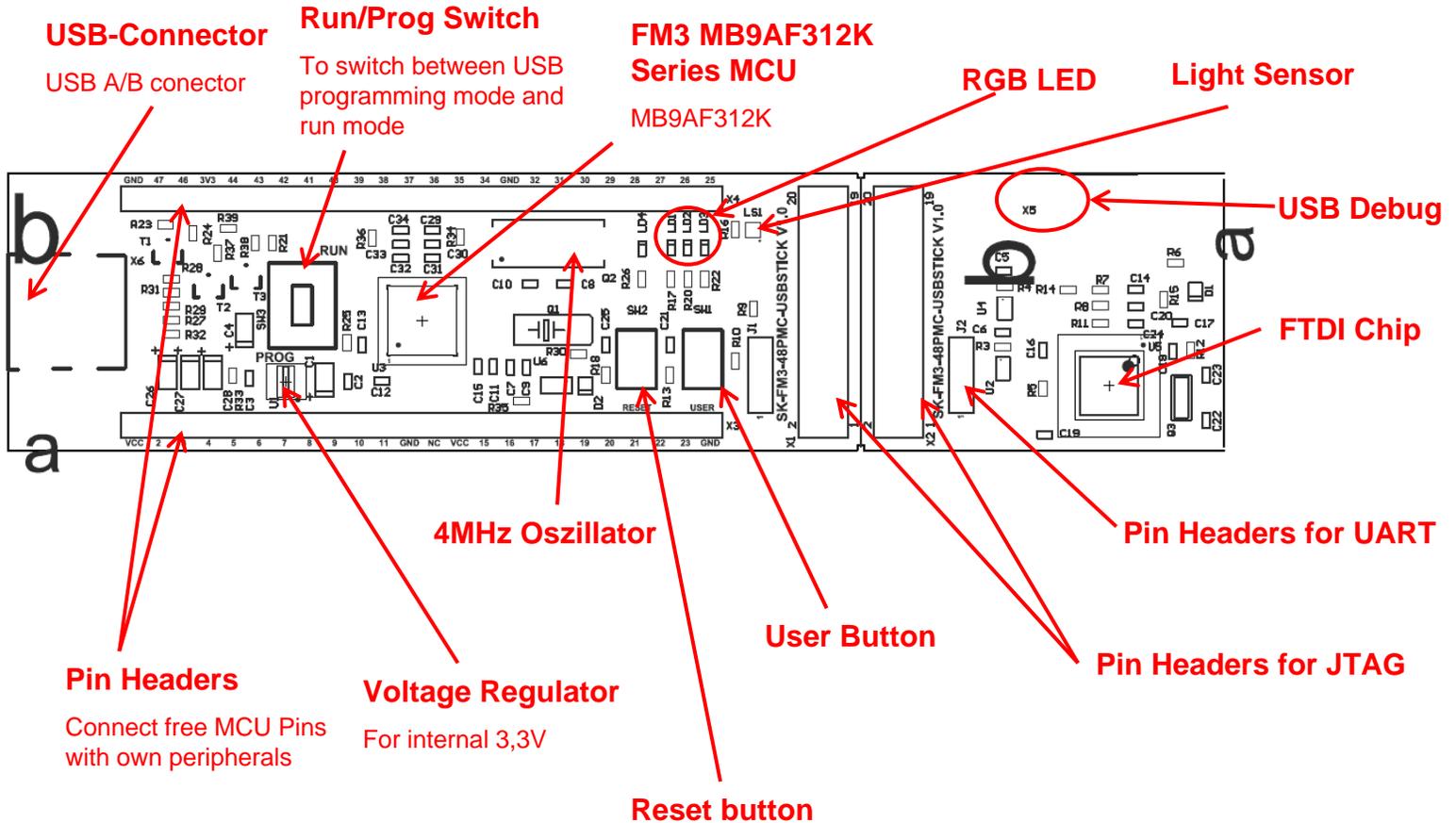
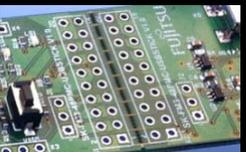


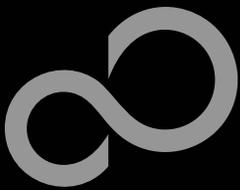
For a detailed description please see User Manual



The Hardware

Top side



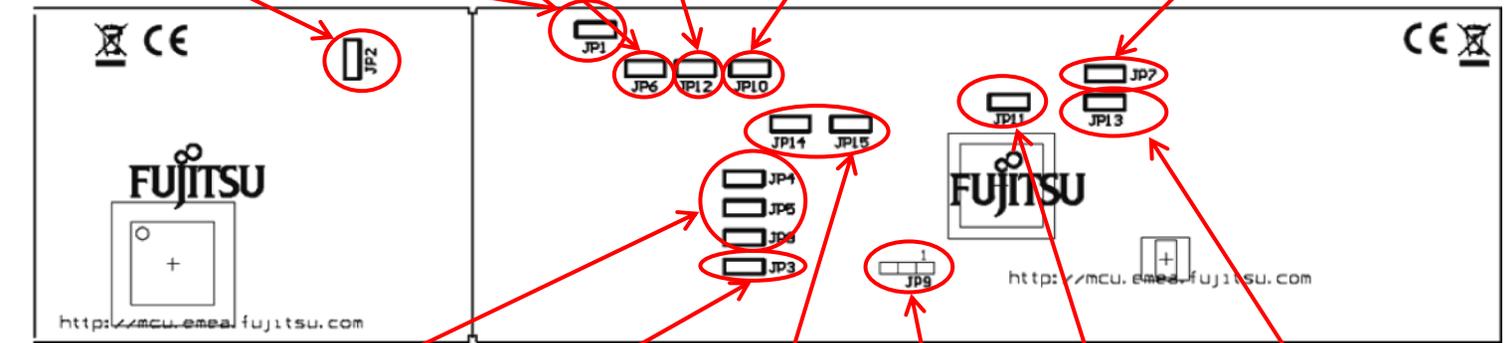
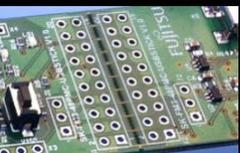
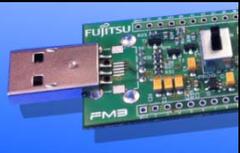


The Hardware

The jumpers (bottom side)

JP6: Light Sensor Default:Closed
JP12: USB Overcurrent Default:Closed
JP10: USB BUS Enable Default:Closed
JP7: USB Universal ID Default:Closed

JP1- JP2: JTAGPWR
 Default:Closed



JP4, JP5, JP8: RGB LEDs
 Default:Closed

JP13: USB Host
 Default:closed

JP3: Use SW1
 Default:Closed

JP11: AVRH Enable
 Default:Closed

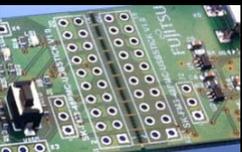
JP14-JP15: Use 32KHz Quartz
 Default:Open

JP9: USB BUS low/high
 Default:1-2



The Hardware

- The microcontroller pins



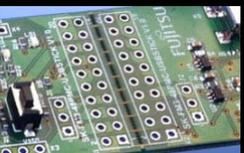
Pin	Pin-name	Pin-Function on SK-FM-100PMC
1	VCC	VCC
2	P50/ INT00_0/AIN0_2/ SIN3_1	
3	P51/INT01_0/BIN0_2/SOT3_1	
4	P52/INT02_0/ZIN0_2/SCK3_1	
5	P39/DTTIOX_0/ADTG_2	
6	P3A/RTO00_0/TIOA0_1/RTCCO_2/SUBOU T_2	R-RGB LED
7	P3B/RTO01_0/TIOA1_1	
8	P3C /RTO02_0 /TIOA2_1	G-RGB LED
9	P3D/ RTO03_0/ TIOA3_1	
10	P3E/ RTO04_0/ TIOA4_1	B-RGB LED
11	P3F/ RTO05_0/ TIOA5_1	
12	VSS	GND

Pin	Pin-name	Pin-Function on SK-FM-100PMC
13	C	N.C.
14	VCC	VCC
15	P46/ X0A	32KHz Crystal
16	P47/ X1A	32KHz Crystal
17	INITX	Reset
18	P49/ TIOB0_0	
19	P4A/ TIOB1_0	
20	PE0/ MD1	
21	MD0	SW3 Run Mode
22	PE2 X0	4MHz Crystal
23	PE3 X1	4MHz Crystal
24	VSS	GND



The Hardware

- The microcontroller pins (continued)



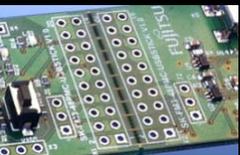
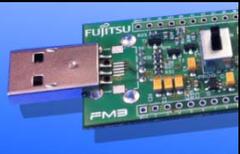
Pin	Pin-name	Pin-Function on SK-FM-100PMC
25	P10/ AN00	Fotoreistor LDR 03
26	P11/ AN01/SIN1_1 /INT02_1/ FRCK0_2/ IC02_0/ WKUP1	USB Overcurrent
27	P12/ AN02/ SOT1_1/ IC00_2	USB HOST Pull-Down
28	P13/ AN03/ SCK1_1/ IC01_2/ RTCCO_1/ SUBOUT_1	USB VBUS EN
29	P14/ AN04/ SIN0_1/ INT03_1/ IC02_2	
30	P15/ AN05/ SOT0_1/ IC03_2	USB ID
31	AVCC	VCC
32	AVRH	VCC
33	AVSS	GND
34	P23/ AN06/ SCK0_0/ TIOA7_1	
35	P22 / AN07 / SOT0_0 / TIOB7_1	UART0 (TXD)
36	P21 / SIN0_0 / INT06_1 / WKUP2	UART0 (RXD)

Pin	Pin-name	Pin-Function on SK-FM-100PMC
37	P00/ TRSTX	TRSTX
38	P01 /TCK / SWCLK	TCK
39	P02 /TDI	TDI
40	P03 / TMS / SWDIO	TMS
41	P04 /TDO /SWO	TDO
42	P0F/ NMIX / CROUT_1 / RTCCO_0 /SUBOUT_0 / WKUP0	SW2 Switch
43	P61 / SOT5_0 / TIOB2_2 / UHCONX /DTTIOX_2	UHCONX
44	P60 / SIN5_0/ TIOA2_2 / INT15_1/ IC00_0/ WKUP3	USB VBUS INT
45	USBVCC	VCC
46	P80/ UDM0	UDM0
47	P81 /UDP0	UDP0
48	VSS	GND



The Hardware

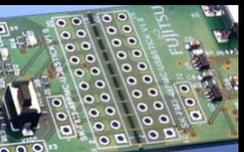
- The Jumpers



Jumper	Function	Default
JP1	JTAGPWR	Closed
JP2	JTAGPWR	Closed
JP3	Use SW1	Closed
JP4	RGB LEDs	Closed
JP5	RGB LEDs	Closed
JP6	Light sensor	Closed
JP7	USB ID Pin	Closed
JP8	RGB LEDs	Closed
JP9	USB BUS low/high	2-3
JP10	USB BUS enable	Closed
JP11	AVRH Enable	Closed
JP12	USB Overcurrent	Closed
JP13	USB Host	Closed
JP14	Use 32KHz Crystal	Open
JP15	Use 32KHz Crystal	Open



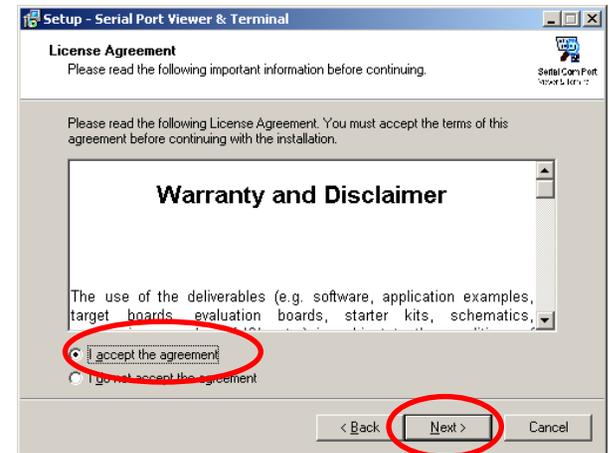
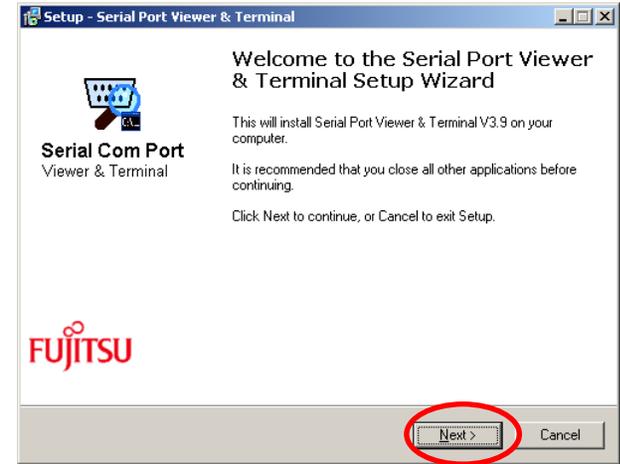
Installation of Serial Port Viewer & Terminal

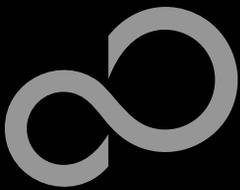


- Install Serial Terminal Program:
Serial Port Viewer & Terminal

- Click „Next“

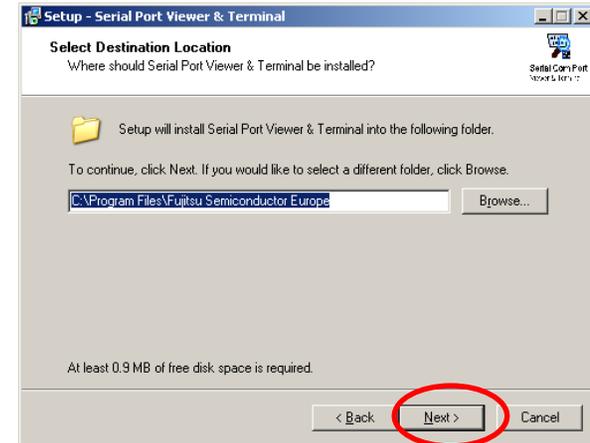
- Read and accept the disclaimer and click „Next“



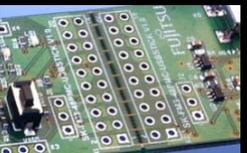
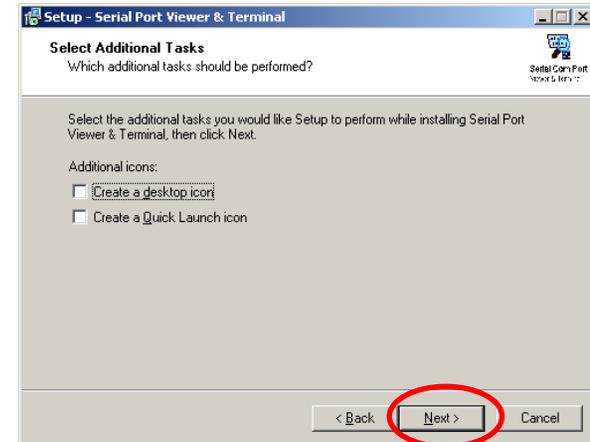


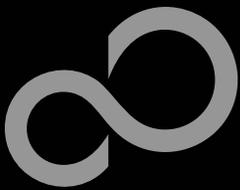
Installation of Serial Port Viewer & Terminal

- Choose a optional installation directory and click „Next“

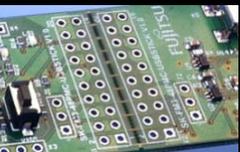
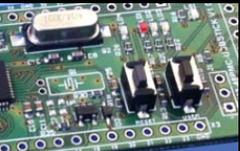


- Click „Next“



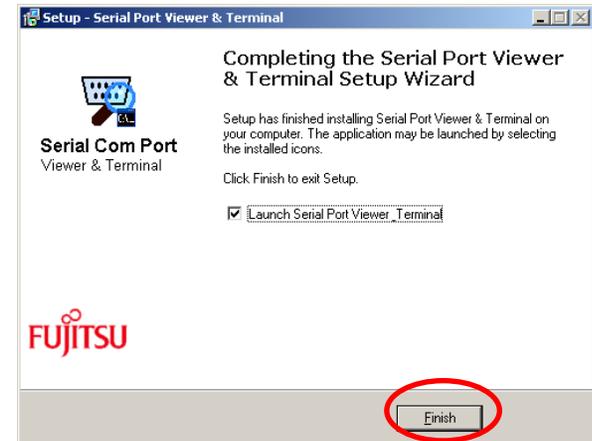
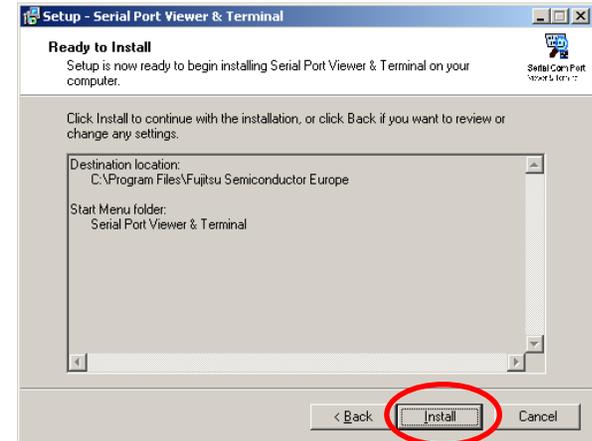


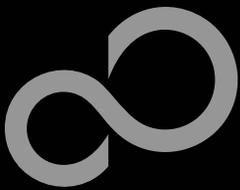
Installation of Serial Port Viewer & Terminal



- Click „Install“

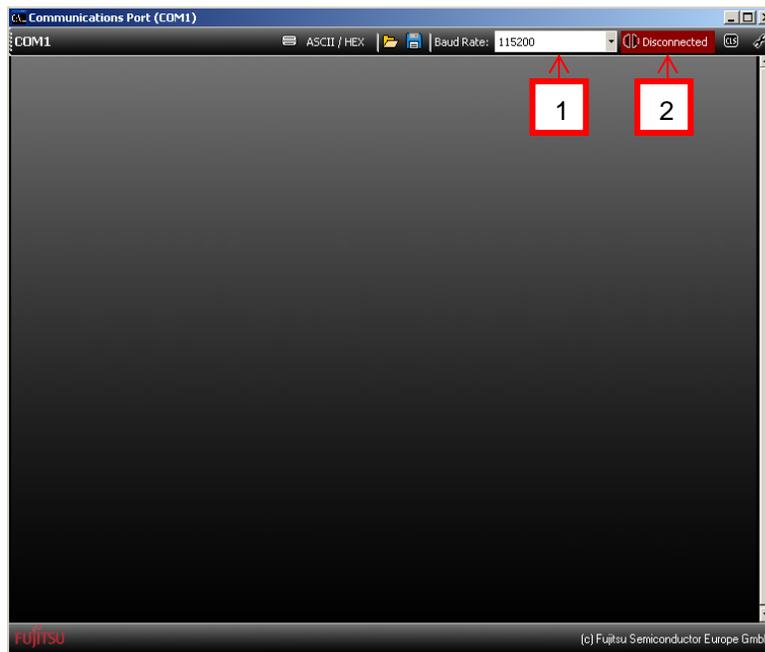
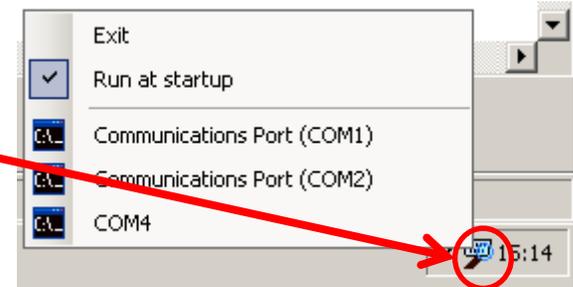
- Click „Finish“ and the Serial Port Viewer & Terminal will be opened.





Installation of Serial Port Viewer & Terminal

- The Serial Port Viewer & Terminal can be found as tray icon. Via right-click, the terminal for the specific com port can be opened.

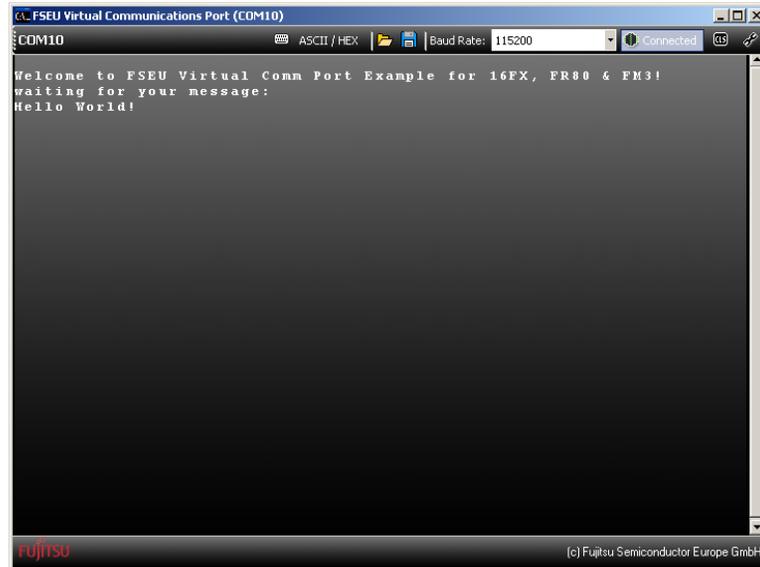
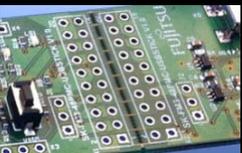


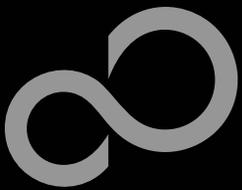
- 1. Select Baud rate
- 2. Click red blinking „Disconnected“ button to connect



Virtual Com Port Example

- Used to communicate via CDC class
- MCU source & binary
Examples\sk-fm3-48pmc-usbstick_usb_device_virtual_com_port-v10

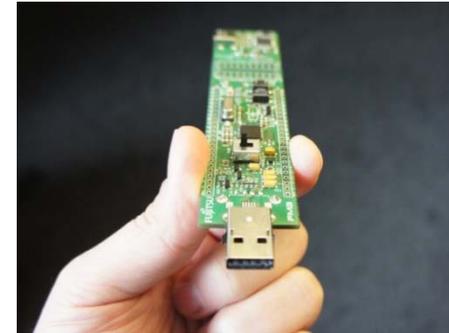
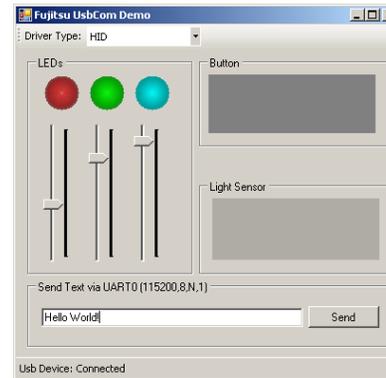




USB Host and Device (1)

■ Device Mode:

- HID Communication



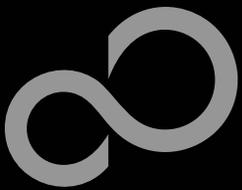
■ Host Mode:

- Mass Storage
- Mouse
- Keyboard



■ Example:

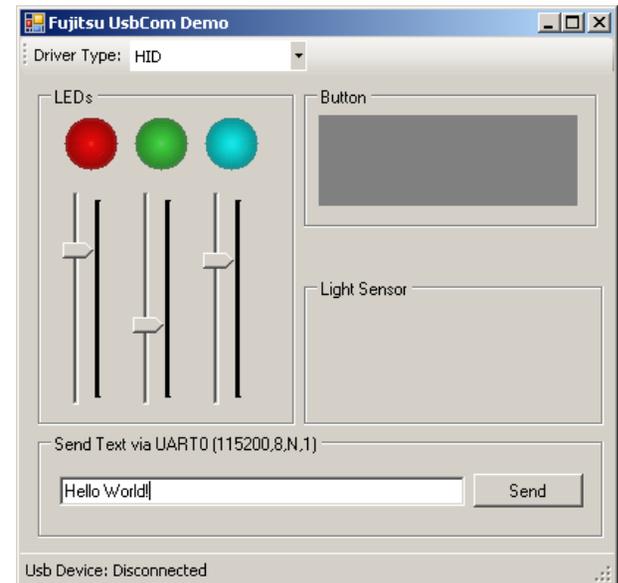
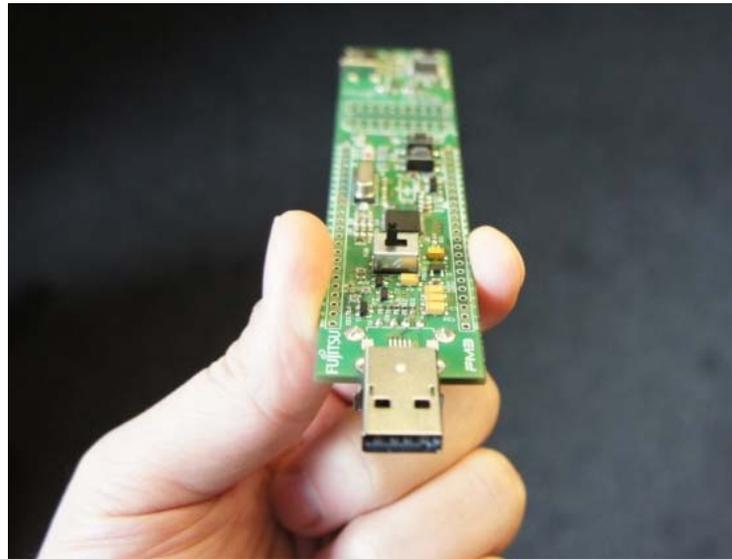
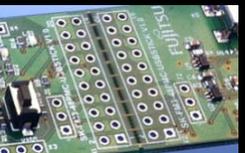
sk-fm3-48pmc-usbstick_usb_host_device-vXX

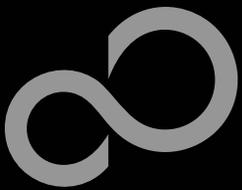


USB Host and Device (2)

■ USB Device connected to PC

- LEDs turns off
- Within example sk-fm3-48pmc-usbstick_usb_host_device-vXX in folder „forwindows\Binary“ the PC Demo can be found:
„Fujitsu_UsbCom_Demo.exe“
- LEDs, Sensors, Buttons and UART can be used via GUI

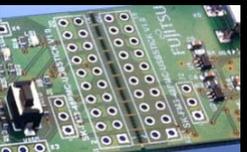


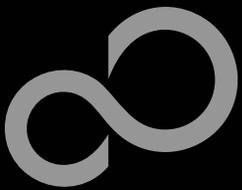


USB Host and Device (3)

■ USB Mass Storage via Host

- Red LED turns on after a few seconds
- Content of USB Stick will be displayed via UART 0, 115200,8,N,1
- *fujitsu.txt* file will be written
- Red LED turns off and green LED turns on for ready to disconnect

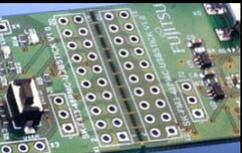




USB Host and Device (4)

■ USB Mouse via Host

- Green LED turns on after a view seconds
- Position will be displayed via UART 0, 115200,8,N,1
- LEDs can be dimmed via X/Y movement and scroll wheel

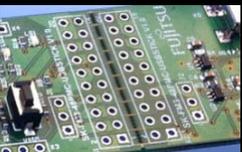




USB Host and Device (5)

■ USB Keyboard via Host

- Green LED turns on after a view seconds
- Text typed will be displayed via UART 0, 115200,8,N,1
- LEDs can be switched via key 1-3

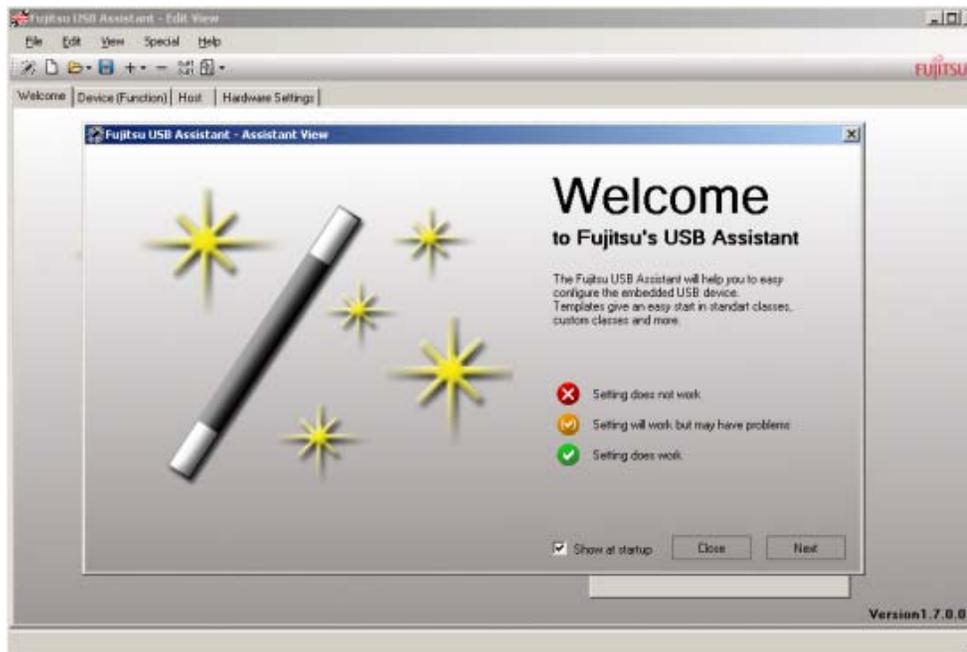
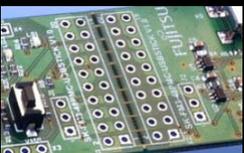


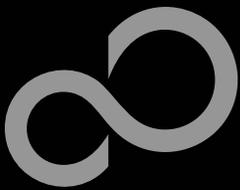


Create own USB Applications

■ Using the Fujitsu USB Assistant

- Easy to use, step by step
- Creates USB Host / Device Projects
- Combines microcontroller templates, board support and USB use case
- Start installation of [Fujitsu USB Assistant](#)





Installation of OpenOCD Debugger

1) Start installation of [Fujitsu OpenOCD Starter \(GUI\)](#)

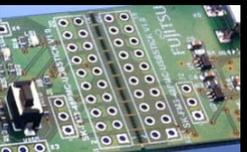
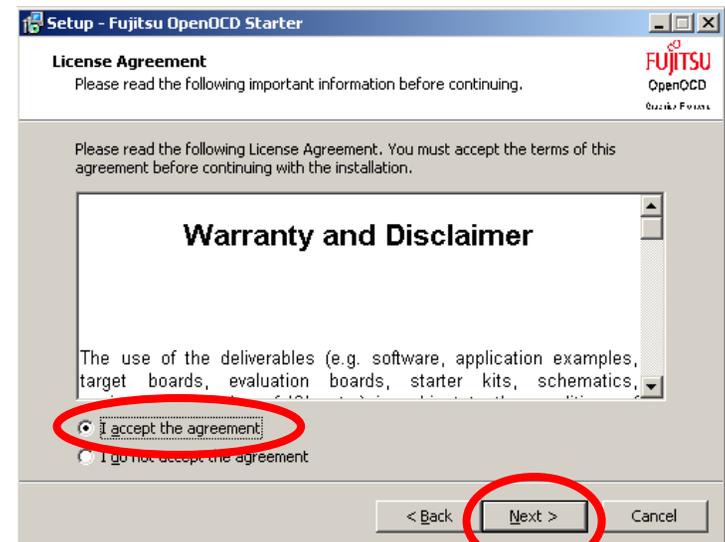
2) The following window should appear.
Select your preferred language

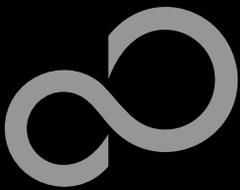


3) Press Next



4) Select „I accept agreement“ and press next



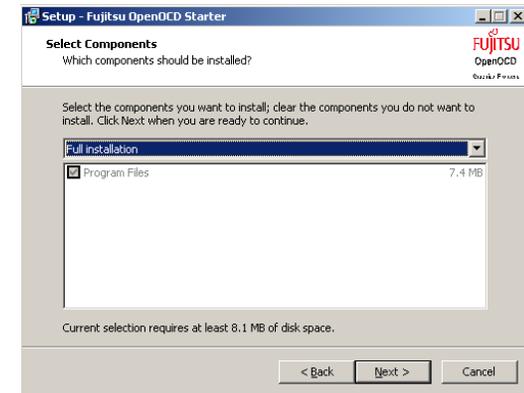


Installation of OpenOCD Debugger

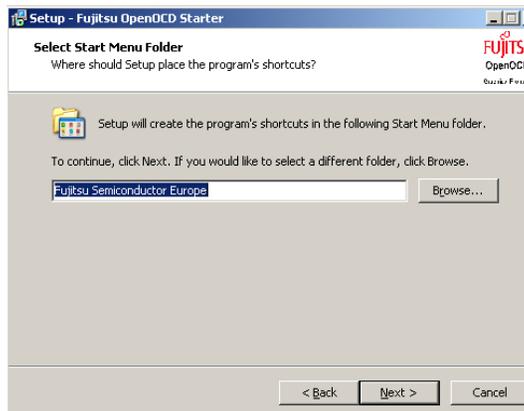
5) Select the installation folder and press next



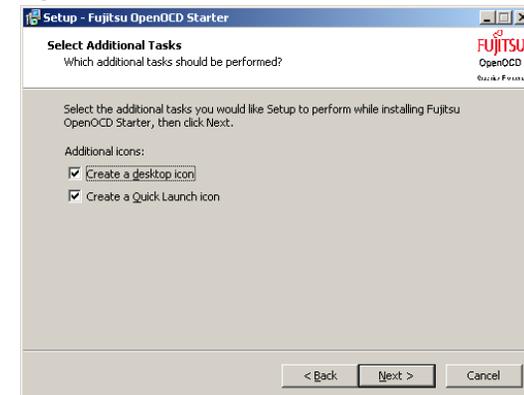
6) Select „Full installation“ push next

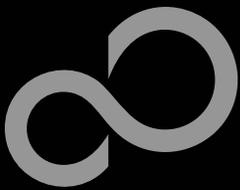


7) Select shortcuts folder and press next



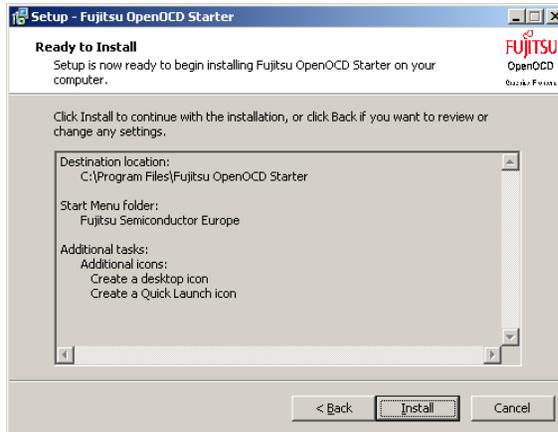
8) Select „Create a desktop icon“ and „create quick launch icon“ and press next



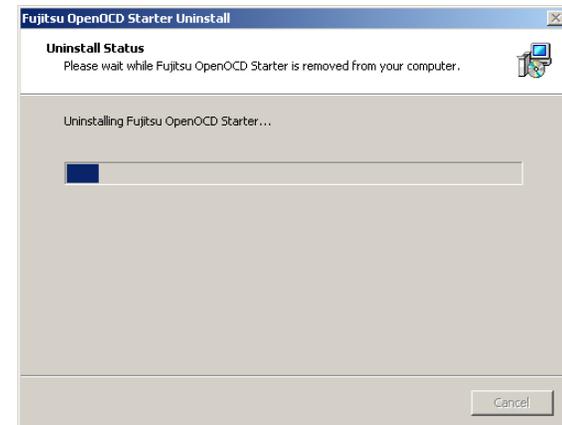


Installation of OpenOCD Debugger

9) Push „Install“



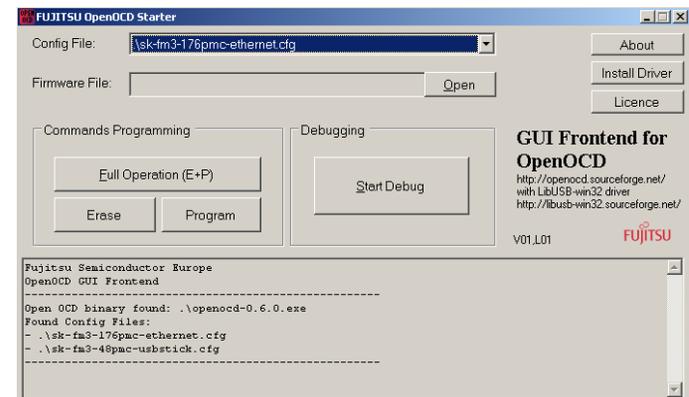
10) Installation will begin

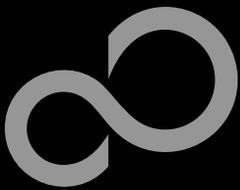


11) Select to Install Drivers, and push finish



12) Open the OpenOCD

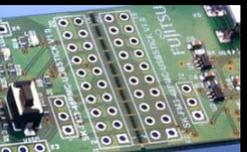


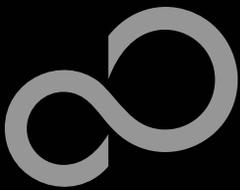


Installation of the USB-driver

- Connect the SK-FM3-48PMC-USBSTICK via mini-USB (X5) to your PC
- The Installation of the drivers will be done through OpenOCD. **Only in case the following dialog box appears, follow the next steps.**
 - Windows will 'Found New Hardware: FT232R USB UART' and the Hardware Wizard should start automatically
 - Note: The dialog box may differ with different operating systems

1) Ignore this dialog box

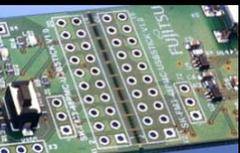




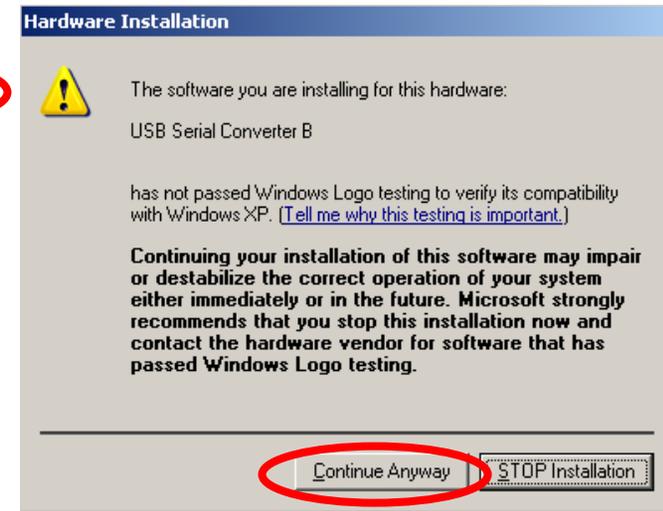
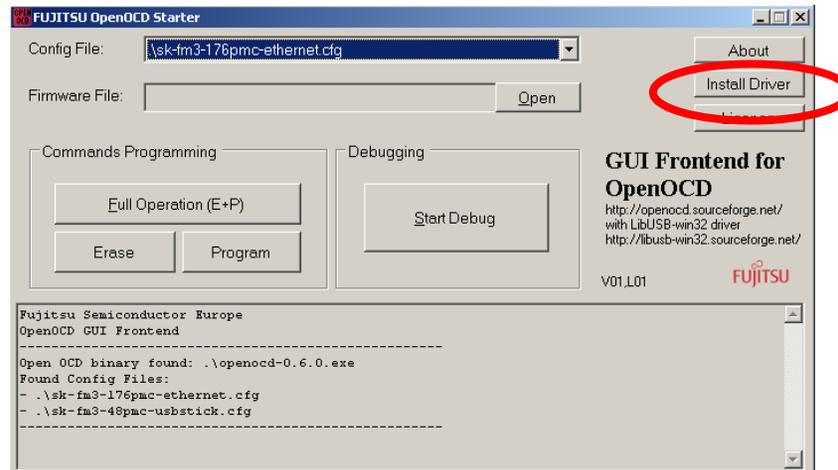
Installation of the USB-driver



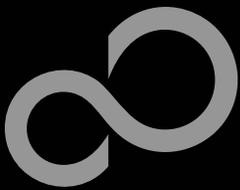
- 2) Open OpenOCD
- 3) Push the button „Install Driver“



- 4) If a warning window appears click on „Continue Anyway“. This window could appear more than one time



5) READY!!!!

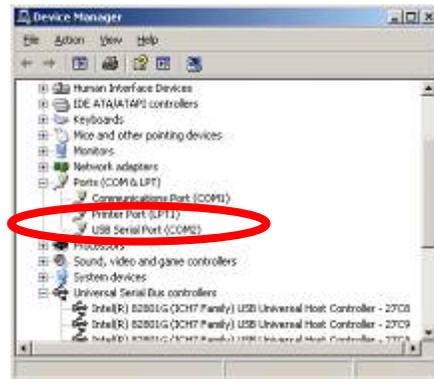


Installation of the USB-driver

There are two options to check that your installation was successful:

- **Start the Device Manager of the Windows Control Panel**
 - START -> Settings -> Control Panel
 - Control Panel -> System -> Hardware -> Device Manager
- **Check 'Ports' for the assigned virtual COM-port number**
 - USB Serial Port (e.g.: COM2)

- **Open the Fujitsu's „SerialPort Viewer and Terminal“**
 - Double click on the icon  of the taskbar.
- **It will show the opened ports, check for the assigned virtual COM-port number**
 - USB Serial Port (e.g.: COM2)



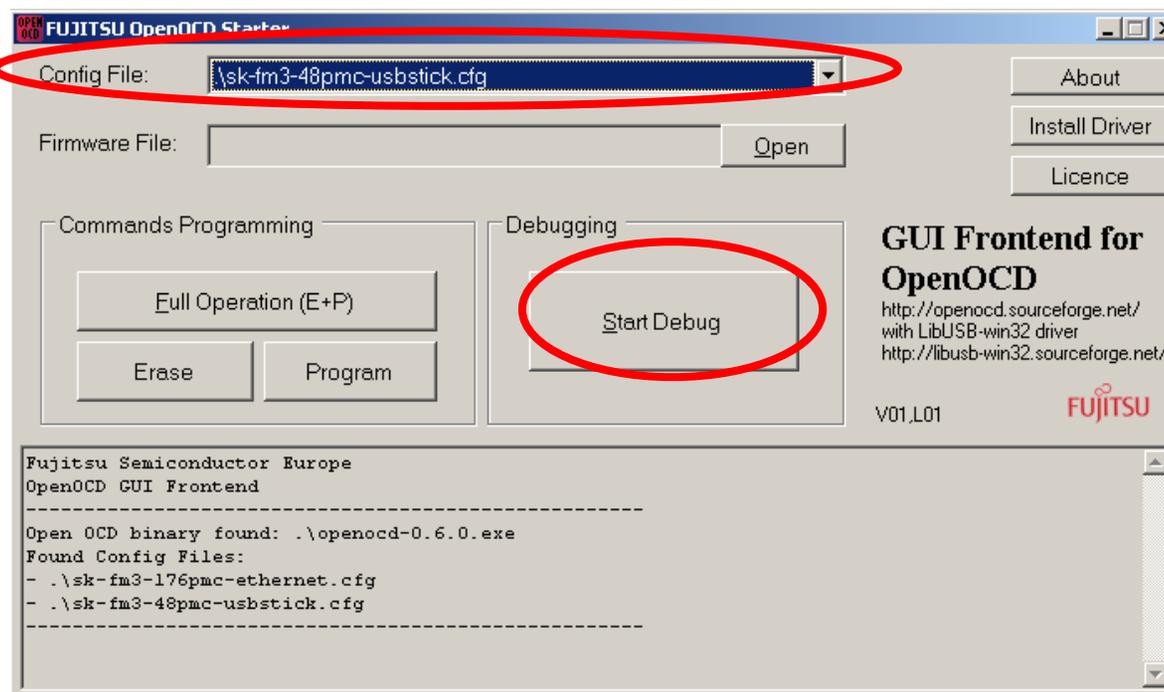
Ready!



Debugging with OpenOCD

■ SK-FM3-176PMC-ETHERNET offers an on-chip debugger via USB X5

1. Connect the board on X15 to the USB-Port of your PC
2. Open OpenOCD
3. Select the sk-fm3-176pmc-ethernet in config file
4. Push Start Debug

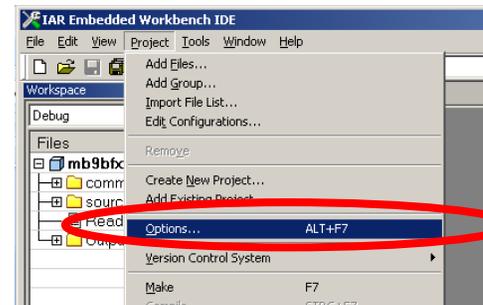




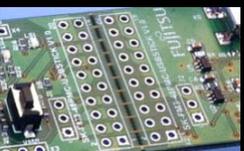
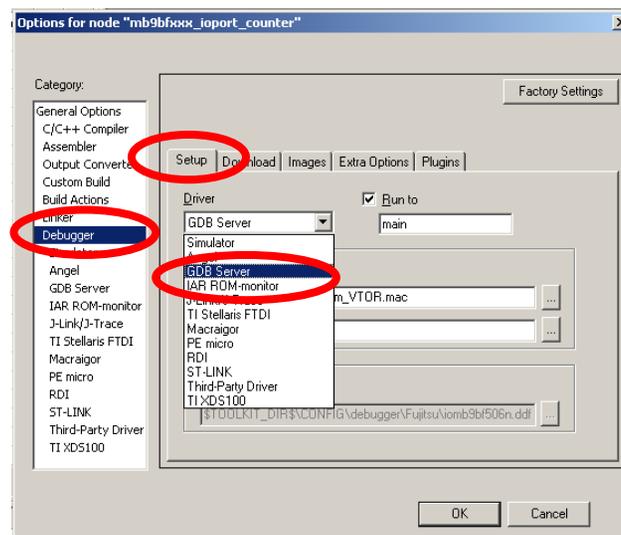
Debugging with OpenOCD

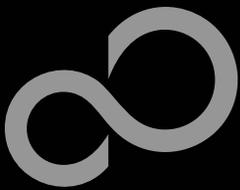
■ IAR Workbench configuration

1. Open the project you want to debug.
2. Go to Project->Options



3. Select Debugger
4. Select Setup
5. As driver select "GDB Server"

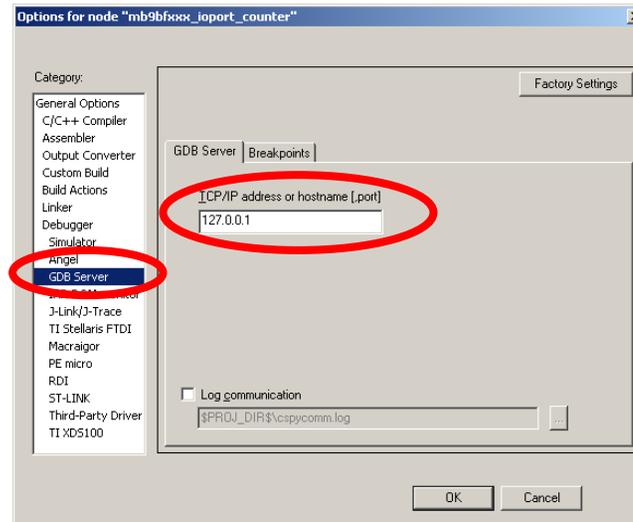




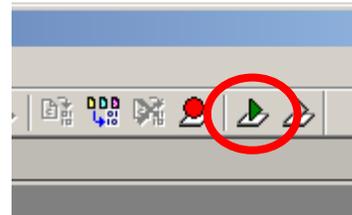
Debugging with OpenOCD

■ IAR Workbench configuration

6. Select GDB Server
7. Type „127.0.0.1“ on the field of TCP/IP adress



8. Start debug in IAR Workbench (See next section)



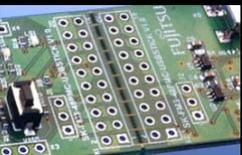


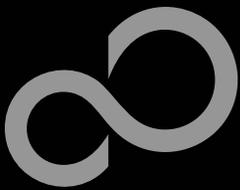
IAR Workbench Getting Started

■ Install EWARM from IAR-CD or download latest version from IAR Website

- EWARM 30-day Evaluation Version
 - <http://supp.iar.com/Download/SW/?item=EWARM-EVAL>
- EWARM 32K Kickstart Version
 - <http://supp.iar.com/Download/SW/?item=EWARM-KS32>

■ Start EWARM Workbench



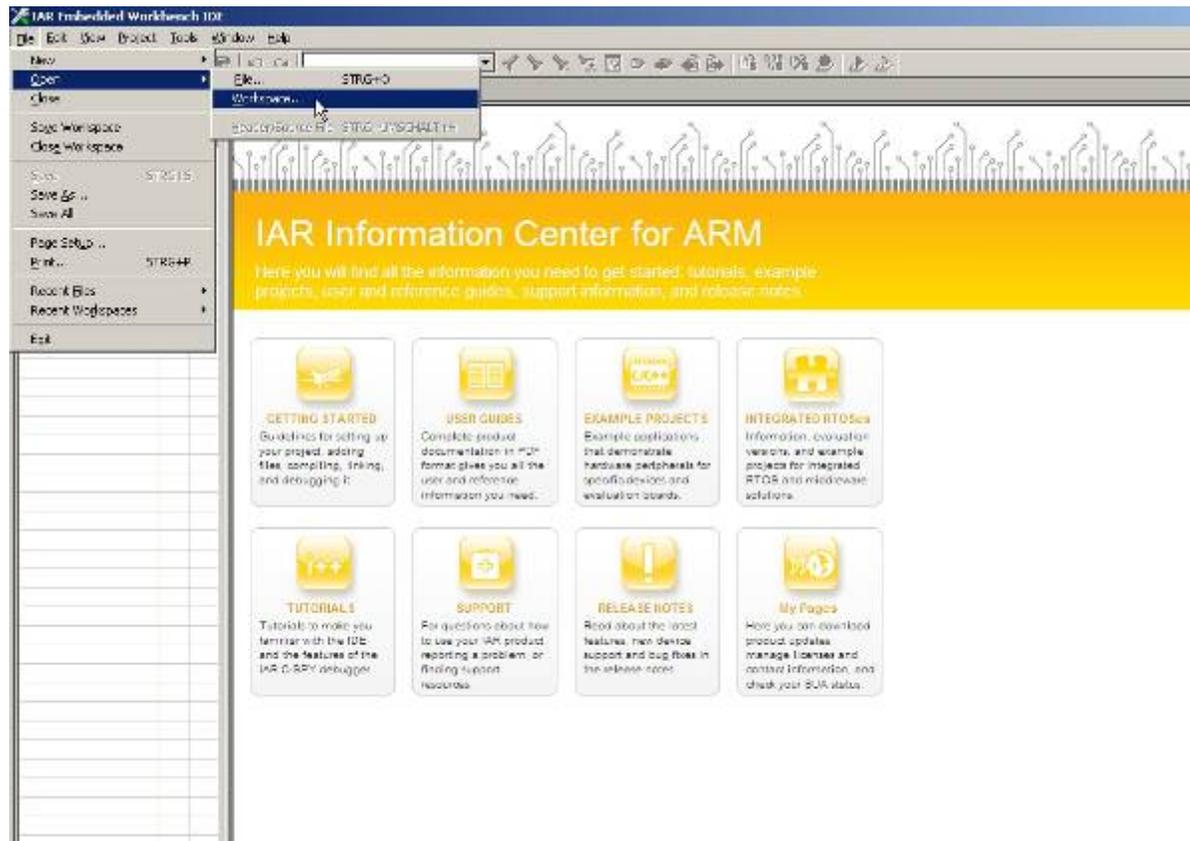
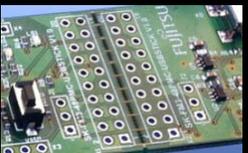


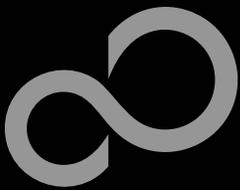
IAR Workbench Getting Started

■ Choose **File** → **Open** → **Workspace**

■ Select e.g.

\\ Examples\sk-fm3-48pmc-usbstick_usb_device_virtual_com_port-v10\example\IAR\
sk-fm3-48pmc-usbstick_usb_device_virtual_com_port.eww

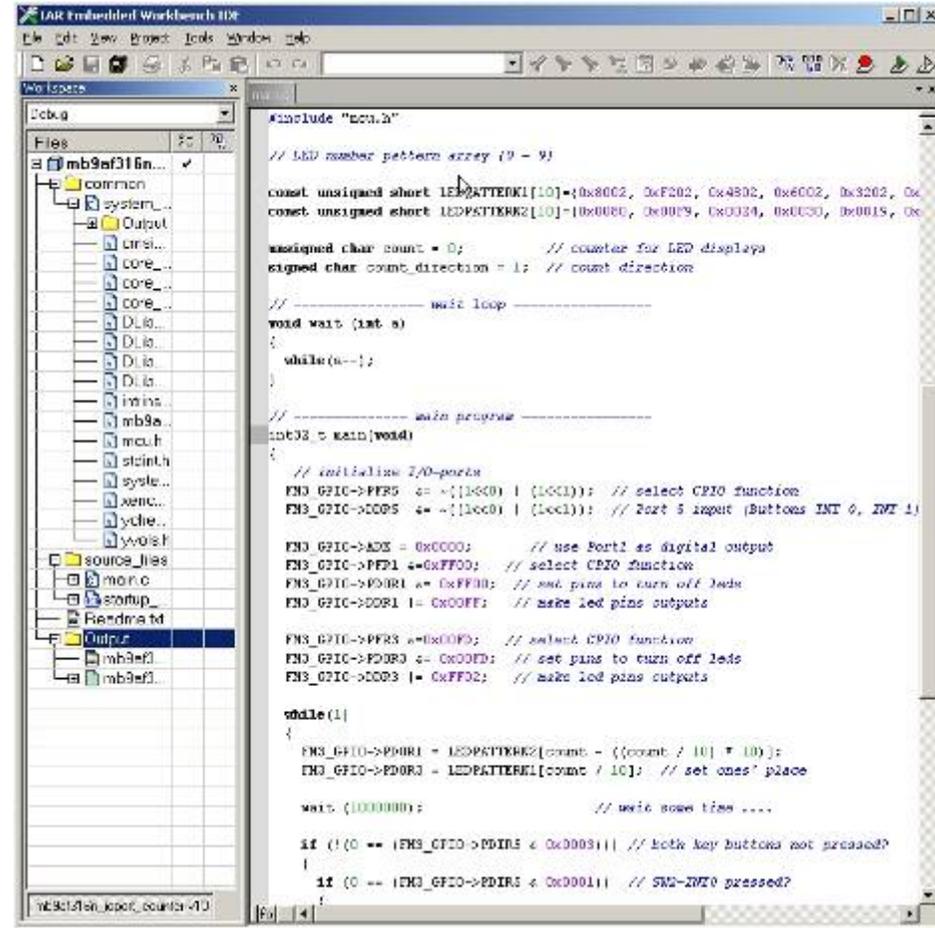
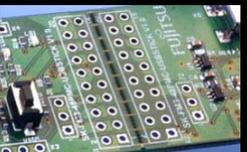


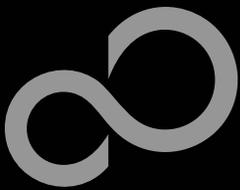


IAR Workbench – Main Window

■ IAR Workbench

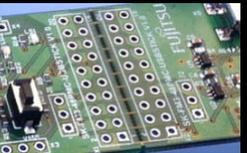
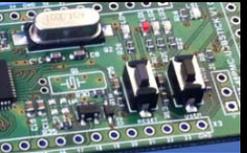
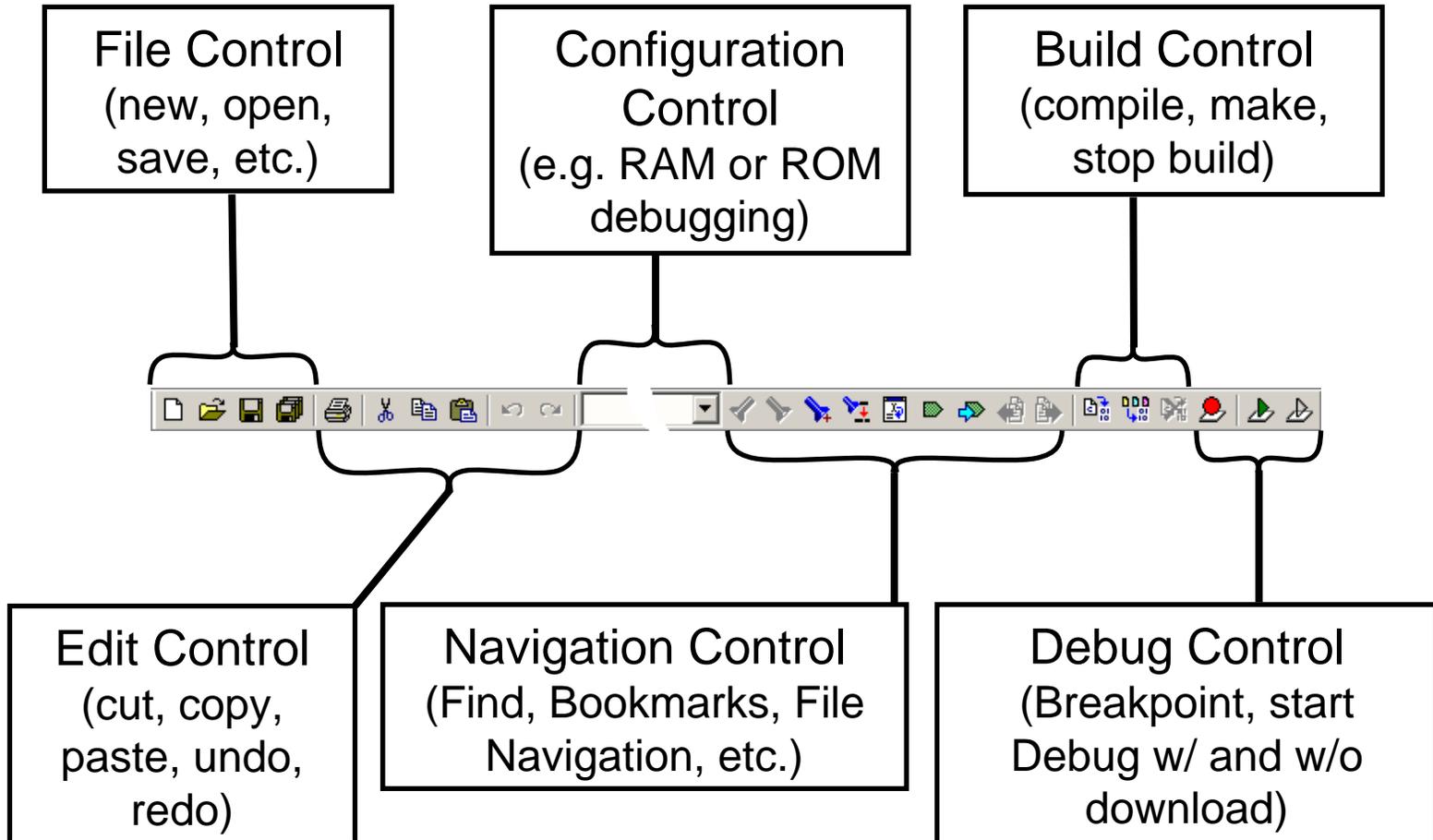
- Workspace on left side of Workbench window
 - Choose:
View→*Workspace*, if hidden
 - Open main.c on source files.
- Source files on right side of Workbench window as tabbed windows
- Project can alternatively be opened by:
File→*Open*→*Workspace*→*.eww

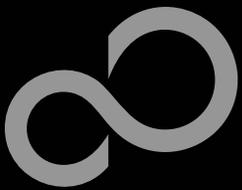




IAR Workbench - Menu Bar

■ Menu Bar

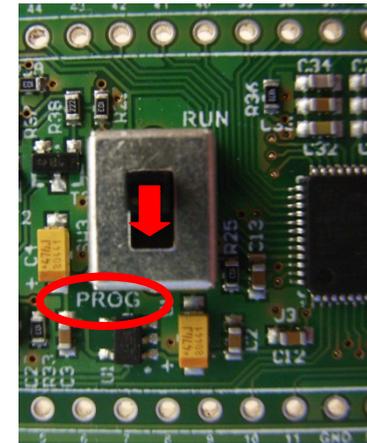




MCU Programming via USB

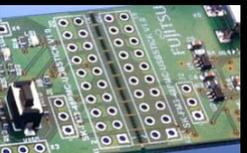
■ Step 1

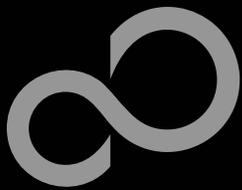
- Insert the CD ROM
- Switch SW3 to Prog Mode



■ Step 2

- Connect the evaluation board to the PC

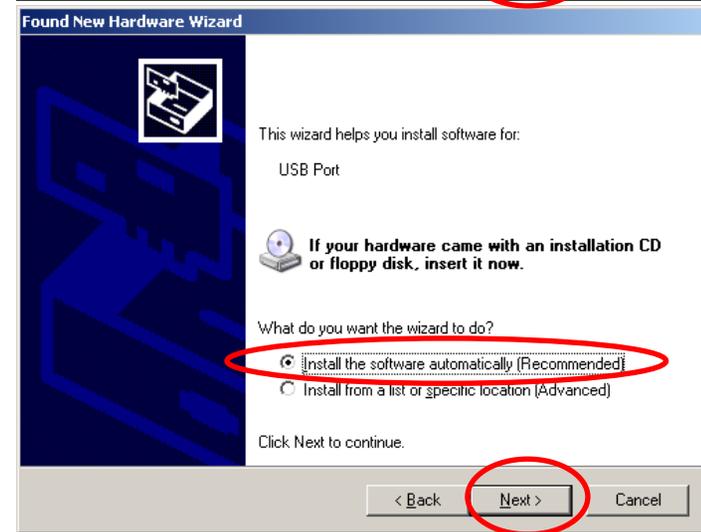
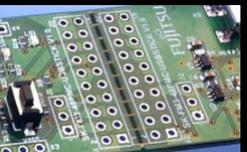


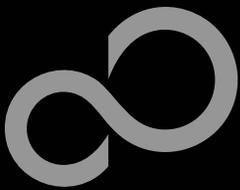


MCU Programming via USB

■ Step 3

- The hardware wizard will be opened.
- Select „No, not this time“ and click „Next“
- Select „Install the software automatically (Recommended)“ and click „Next“





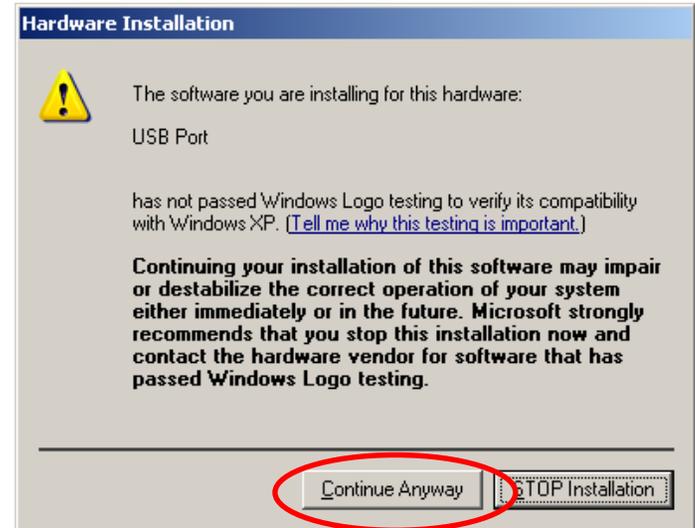
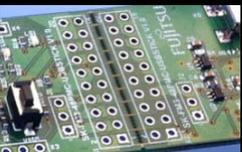
MCU Programming via USB

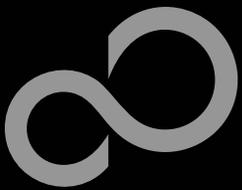
■ Step 3 (continued)

- While asking for Windows Logo certification, click „Continue Anyway“
- The driver installation was successful.

■ Step 4

- Push finish

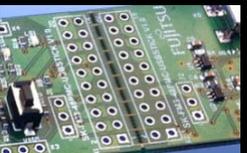
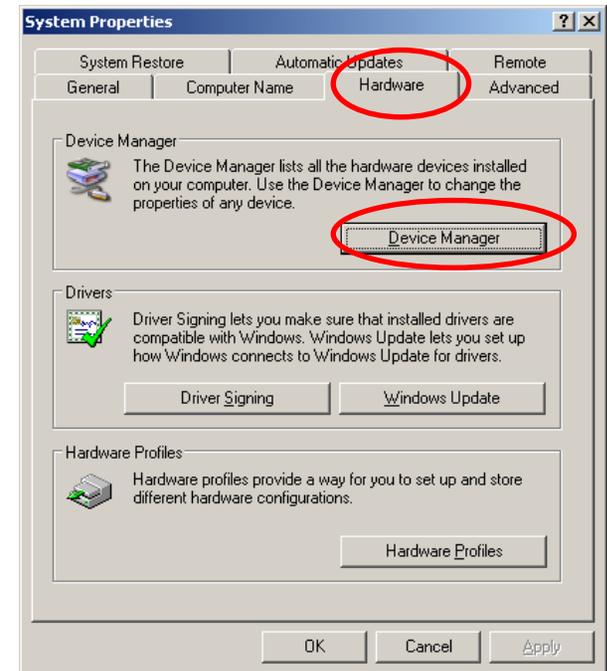


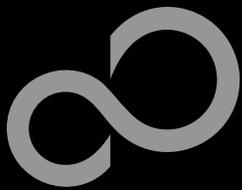


MCU Programming via USB

■ Step 5

- Find the virtual com port number via the device manager. It can be found in the „System“ Control Panel.
- Select the „Hardware“ and click at „Device Manager“

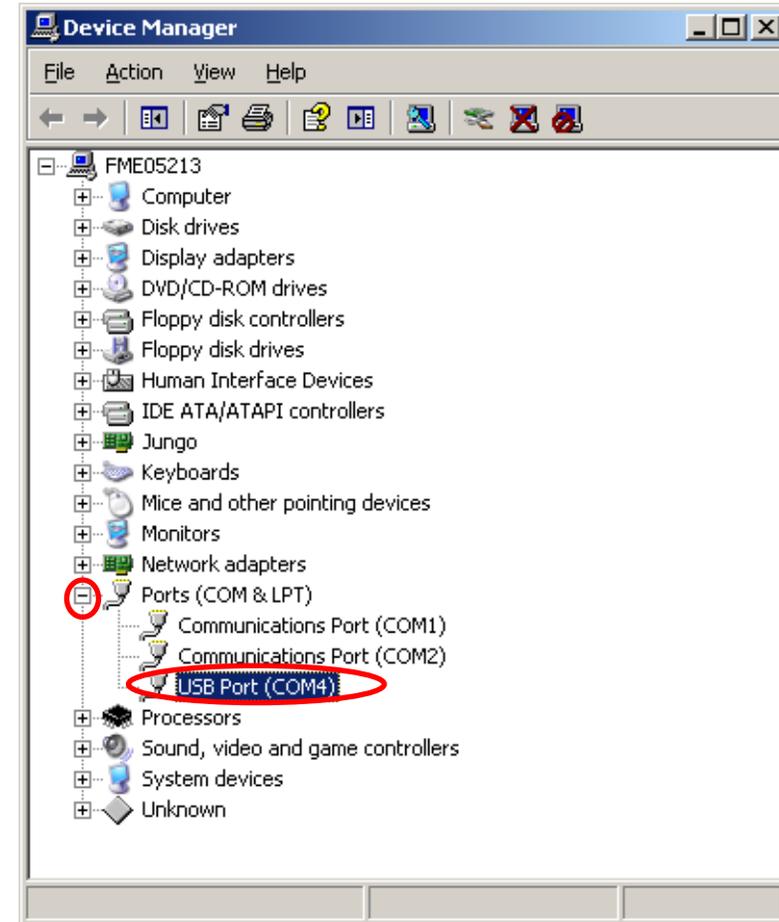
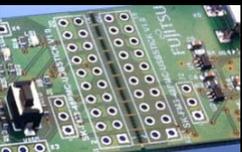


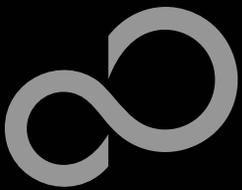


MCU Programming via USB

■ Step 5 (continued)

- Open the tree „Ports (COM & LPT“ by clicking on the „+“.
- Look for the „USB Port“ entry. In this case it is com port 4

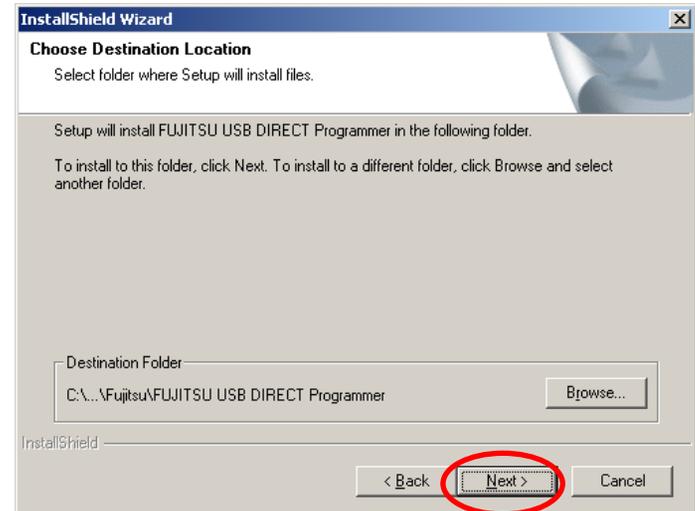
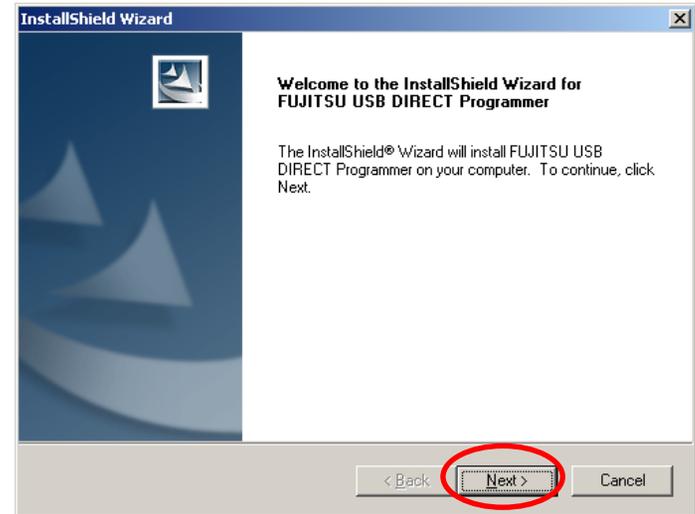
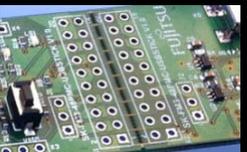


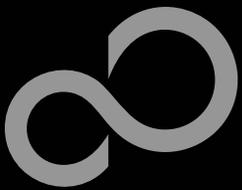


MCU Programming via USB

■ Step 5

- Start the installation of the USB DIRECT Programmer
- Click „Next“
- Choose a optional installation directory and click „Next“

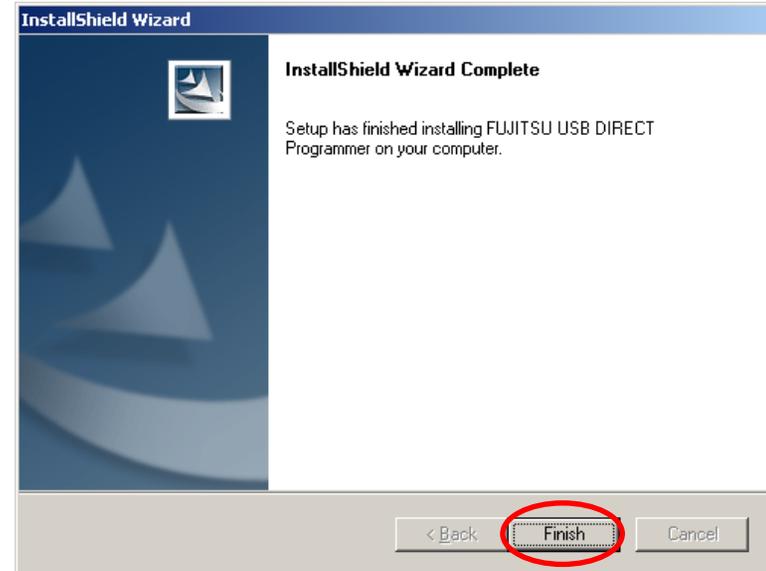




MCU Programming via USB

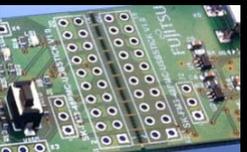
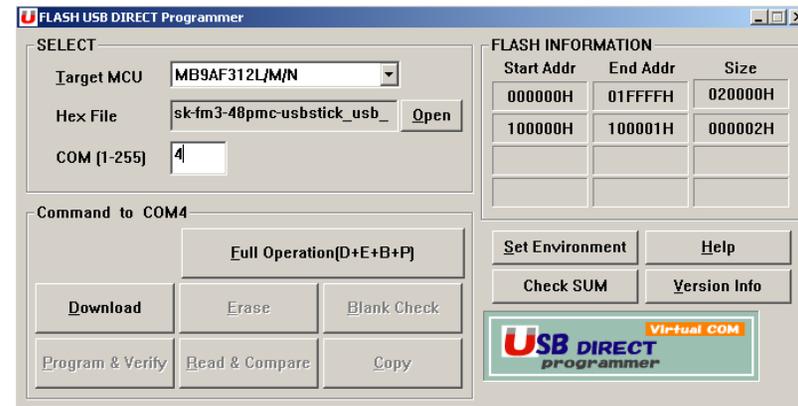
■ Step 5 (continued)

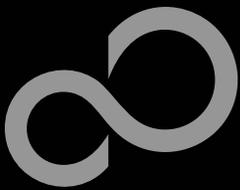
- The USB DIRECT Programmer was now succesfull installed.



■ Step 6

- Start the USB DIRECT Programmer from Start Menu





MCU Programming via USB

Step 7

- Choose Target MCU
- Enter the com port number
- Open the firmware file

- Located in:

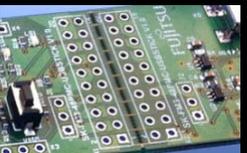
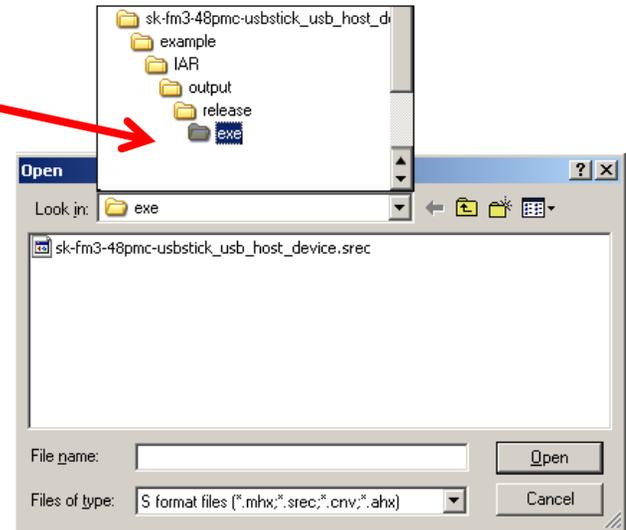
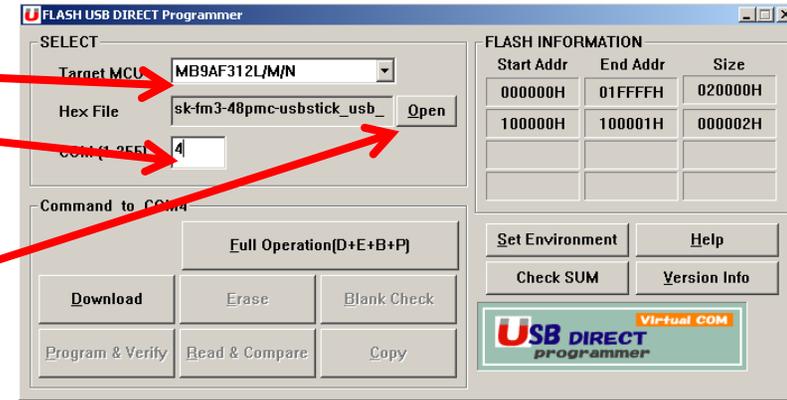
Examples\

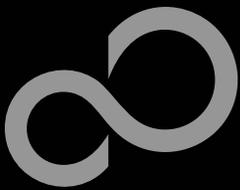
`sk-fm3-48pmc-usbstick_usb_host_device-vxx\`

Example\IAR\output\release\exe

- Choose here

`sk-fm3-48pmc-usbstick_usb_host_device.srec`

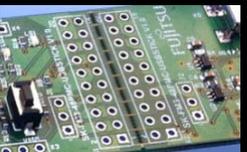
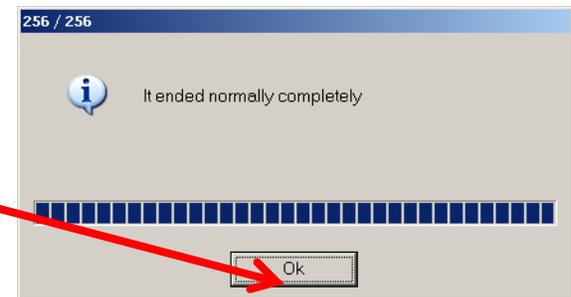
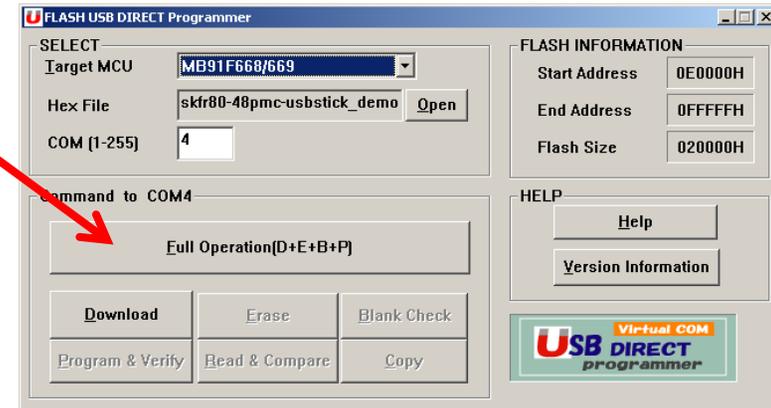


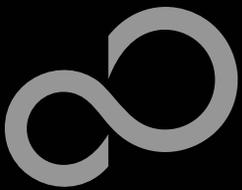


MCU Programming via USB

■ Step 7 (continued)

- Click at „Full Operation“
- Do NOT reset the MCU and click at „OK“
- The firmware was programmed.

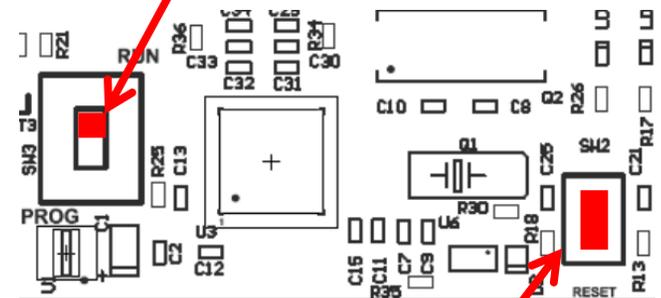




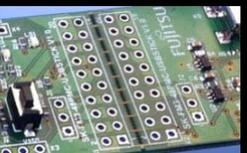
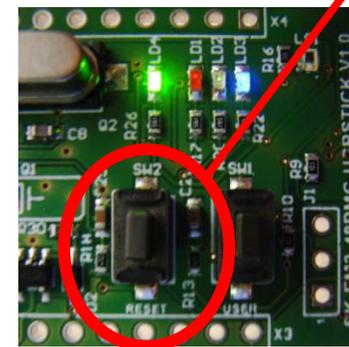
MCU Programming via USB

■ Step 8

- Switch SW3 to RUN



- Press the reset button





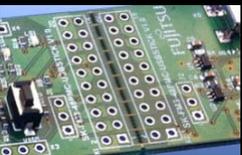
Further Steps

■ In order to learn more about Fujitsu's microcontrollers

- Visit our microcontroller website
 - <http://mcu.emea.fujitsu.com>
 - http://mcu.emea.fujitsu.com/mcu_product/detail/MB9AF312KPMC.htm
 - http://mcu.emea.fujitsu.com/mcu_tool/detail/SK-FM3-48PMC-USBSTICK.htm
- See our application notes
 - http://mcu.emea.fujitsu.com/mcu_product/mcu_all_appnotes.htm
- See our software examples
 - http://mcu.emea.fujitsu.com/mcu_product/mcu_all_software.htm

■ Contact your local distributor ...

- for individual support
- to register for our monthly FM3 seminar
- to order the latest 'Fujitsu Micros DVD' containing all information regarding Fujitsu's 8-bit, 16-bit, and 32-bit microcontrollers





Contacts - Distribution

■ European distributors

■ Anatec

www.anatec.ch

■ EBV Elektronik

www.ebv.com

■ Farnell

www.farnell.com

■ Glyn

www.glyn.de , www.glyn.ch

■ Ineltek

www.ineltek.com

■ Melchioni Electronica

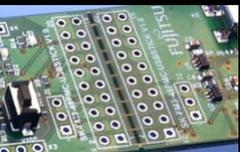
www.melchioni.it

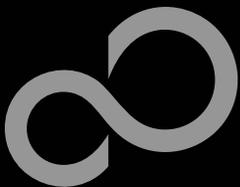
■ PN Electronics

www.pne.fr

■ Rutronik Elektronische
Bauelemente

www.rutronik.com





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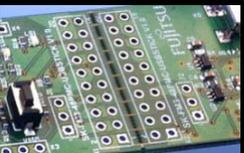
■ Turkey

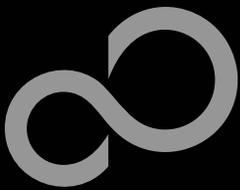
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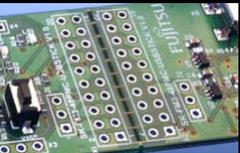
■ World Wide Web

- <http://emea.fujitsu.com/microelectronics>
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EG-Konformitätserklärung / EC declaration of conformity

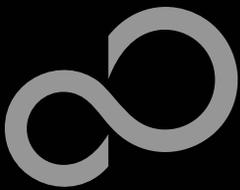


Hiermit erklären wir, Fujitsu Semiconductor Europe GmbH, Pittlerstrasse 47, 63225 Langen, Germany dass dieses Board aufgrund seiner Konzipierung und Bauart sowie in den von uns in Verkehr gebrachten Ausführung(en) den grundlegenden Anforderungen der EU-Richtlinie 2004/108/EC „Elektromagnetische Verträglichkeit“ entspricht. Durch eine Veränderung des Boards (Hard- und/ oder Software) verliert diese Erklärung ihre Gültigkeit!

We, Fujitsu Semiconductor Europe GmbH, Pittlerstrasse 47, 63225 Langen, Germany hereby declare that the design, construction and description circulated by us of this board complies with the appropriate basic safety and health requirements according to the EU Guideline 2004/108/EC entitled 'Electro-Magnetic Compatibility'. Any changes to the equipment (hardware and/ or software) will render this declaration invalid!

Note:

All data and power supply lines connected to this starter kit should be kept as short as possible, with a maximum allowable length of 3m. Shielded cables should be used for data lines. As a rule of thumb, the cable length used when connecting external circuitry to the MCU pin header connectors for example should be less than 20cm. Longer cables may affect EMC performance and cause radio interference.



Recycling

■ Gültig für EU-Länder:

- Gemäß der Europäischen WEEE-Richtlinie und deren Umsetzung in landesspezifische Gesetze nehmen wir dieses Gerät wieder zurück.
- Zur Entsorgung schicken Sie das Gerät bitte an die folgende Adresse:

■ Valid for European Union Countries:

- According to the European WEEE-Directive and its implementation into national laws we take this device back.
- For disposal please send the device to the following address:

Fujitsu Semiconductor Europe GmbH

Warehouse/Disposal

Monzastraße 4a

D-63225 Langen



■ This board is compliant with China RoHS

