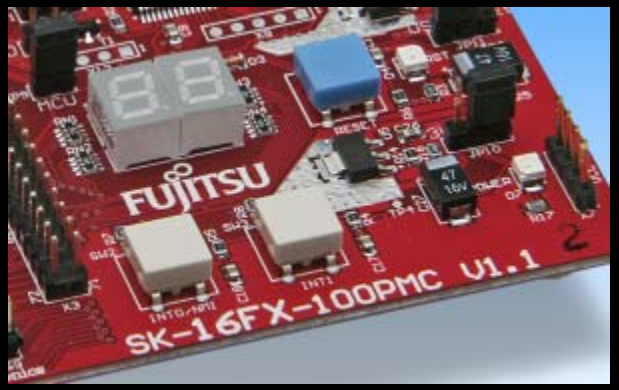
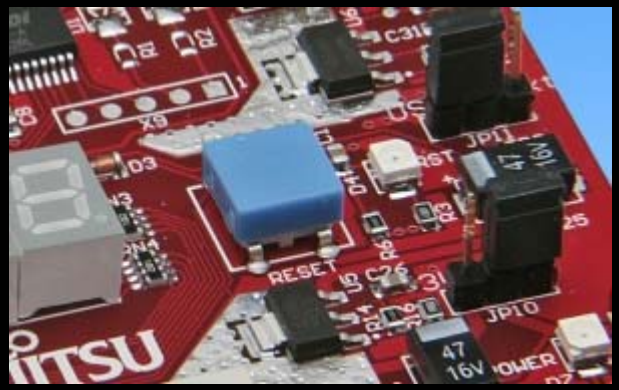


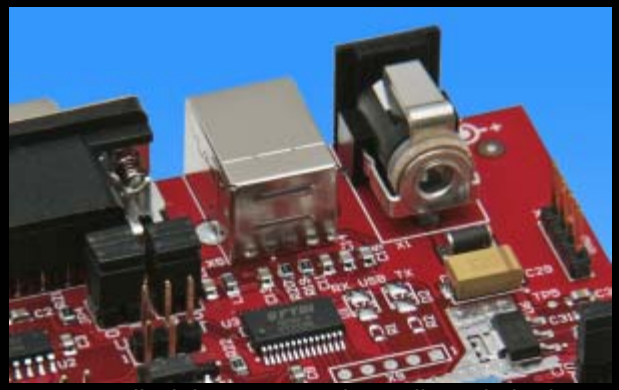


FUJITSU

Includes EUROScope lite16FX on-chip debugger

euros

SK-16FX-EUROSCOPE



CD V1.5

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Please note that the deliverables are intended for and must only be used for reference in an evaluation laboratory environment.

The software deliverables are provided on an as-is basis without charge and are subject to alterations. It is the user's obligation to fully test the software in its environment and to ensure proper functionality, qualification and compliance with component specifications.

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

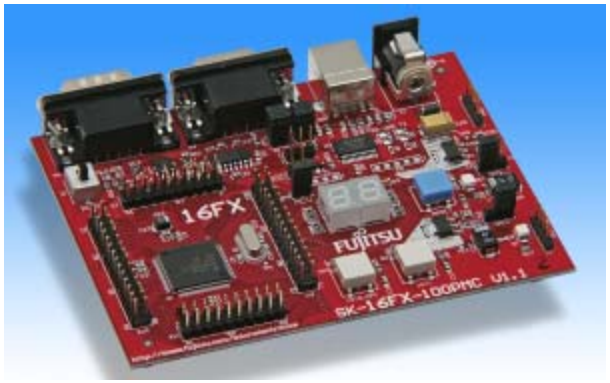
This board and its deliverables must only be used for test applications in an evaluation laboratory environment.





Overview

- **Introduction**
  - About the SK-16FX-EUROSCOPE
  - SK-16FX-EUROSCOPE content
  - Test it
  - The hardware
  - The software
- **Try yourself**
  - Software examples
  - Program download
  - New project
  - EUROScope
- **Optional tools**
- **Contacts**



- **Additional documents**
  - Schematic ‘SK-16FX-100PMC’
  - Data sheet MB96340 Series
  - Hardware manual 16FX Family
  - AppNote ‘16FX Hardware Setup’
  - AppNote ‘16FX Getting Started’
  - Customer Information 16FX
  - EUROScope Reference Manual
  - AppNote ‚EUROScope‘
  - Customer Information of ‚EUROScope‘ limitations

About the SK-16FX-EUROSCOPE

- **The SK-16FX-EUROSCOPE includes a low-cost evaluation board based on the Fujitsu 16FX microcontroller MB96340 Series**

- **The MB96340 Series includes the following features:**
  - Up to 576 KByte Flash Memory
  - Up to 24 KByte RAM
  - Up to 2 CAN controller 2.0B
  - Up to 7 LIN-USART interfaces
  - Two I^2C interfaces
  - Timers (ICUs, OCUs, PPGs, others)
  - ADC
  - External interrupts
  - Others

About the SK-16FX-EUROSCOPE

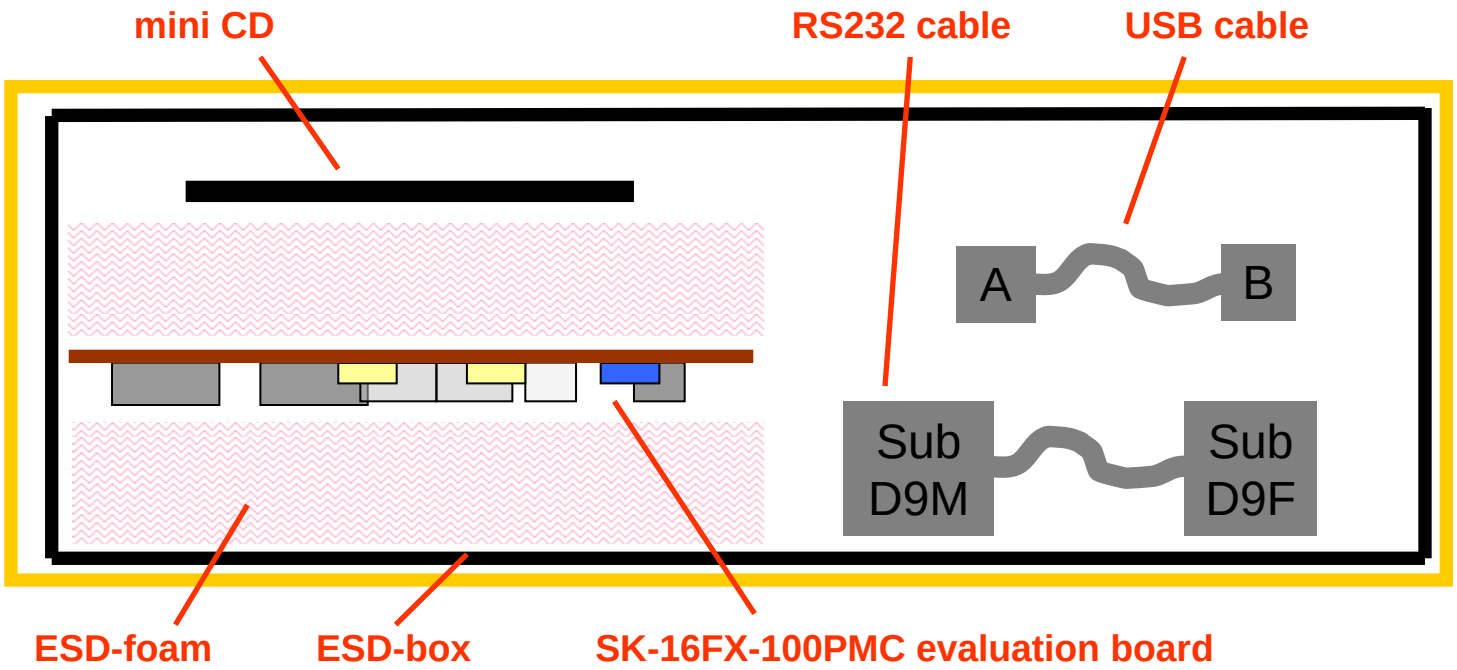
- **Features of the SK-16FX-100PMC (EUROScope) board:**
  - Microcontroller MB96F348HSB
  - 1x UART-Transceiver (SUB-D9 connector)
  - 1x USB to serial converter (Type-B connector)
  - 1x High-speed CAN-Transceiver (SUB-D9 connector)
  - 2x LED-Display (7-Segment)
  - 2x ‘User’-button
  - 1x ‘Reset’-button, ‘Reset’-LED
  - All 100 pins routed to pin-header
  - On-board 5V and 3V voltage regulators, ‘Power’-LED
  - USB power-supply (external power supply possible)

SK-16FX-EUROSCOPE content





- **The SK-16FX-EUROSCOPE contains**
  - SK-16FX-100PMC evaluation board with MB96F348HSB
  - USB cable, RS232 cable
  - Mini CD
    - Documentation, USB driver, Softune Workbench, Examples
    - „EUROScope lite 16FX“

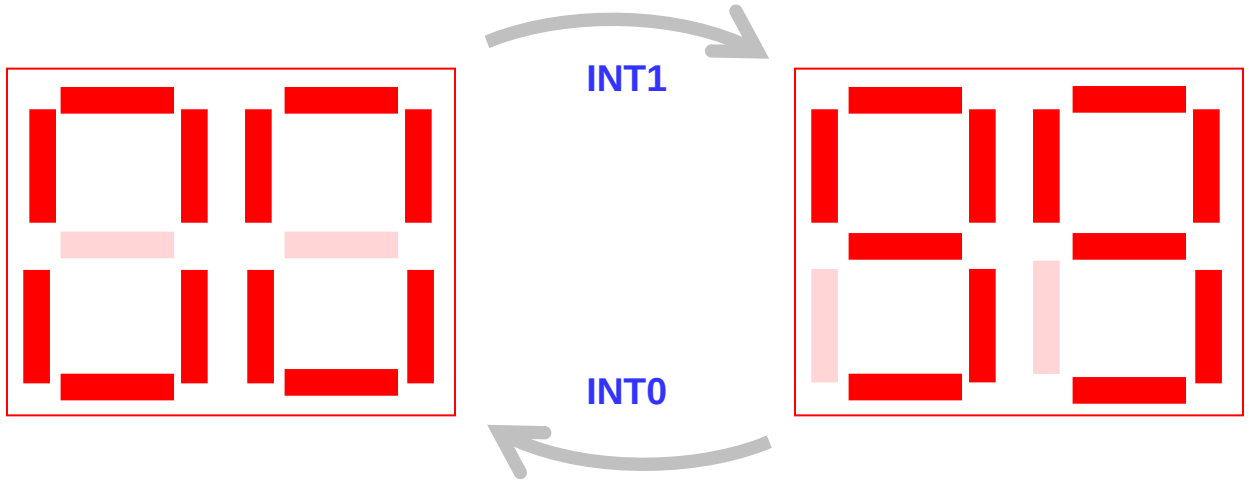






Test it

- **The microcontroller on the SK-16FX-100PMC is already preprogrammed with a simple application.**
  - Connect the USB cable to your PC and the SK-16FX-100PMC
  - Install the USB driver from the CD
  - Press the ‚Reset‘- Button
  - The SK-16FX-100PMC will automatically start counting
  - The count direction can be changed by pressing the key buttons



Test it

Congratulations!

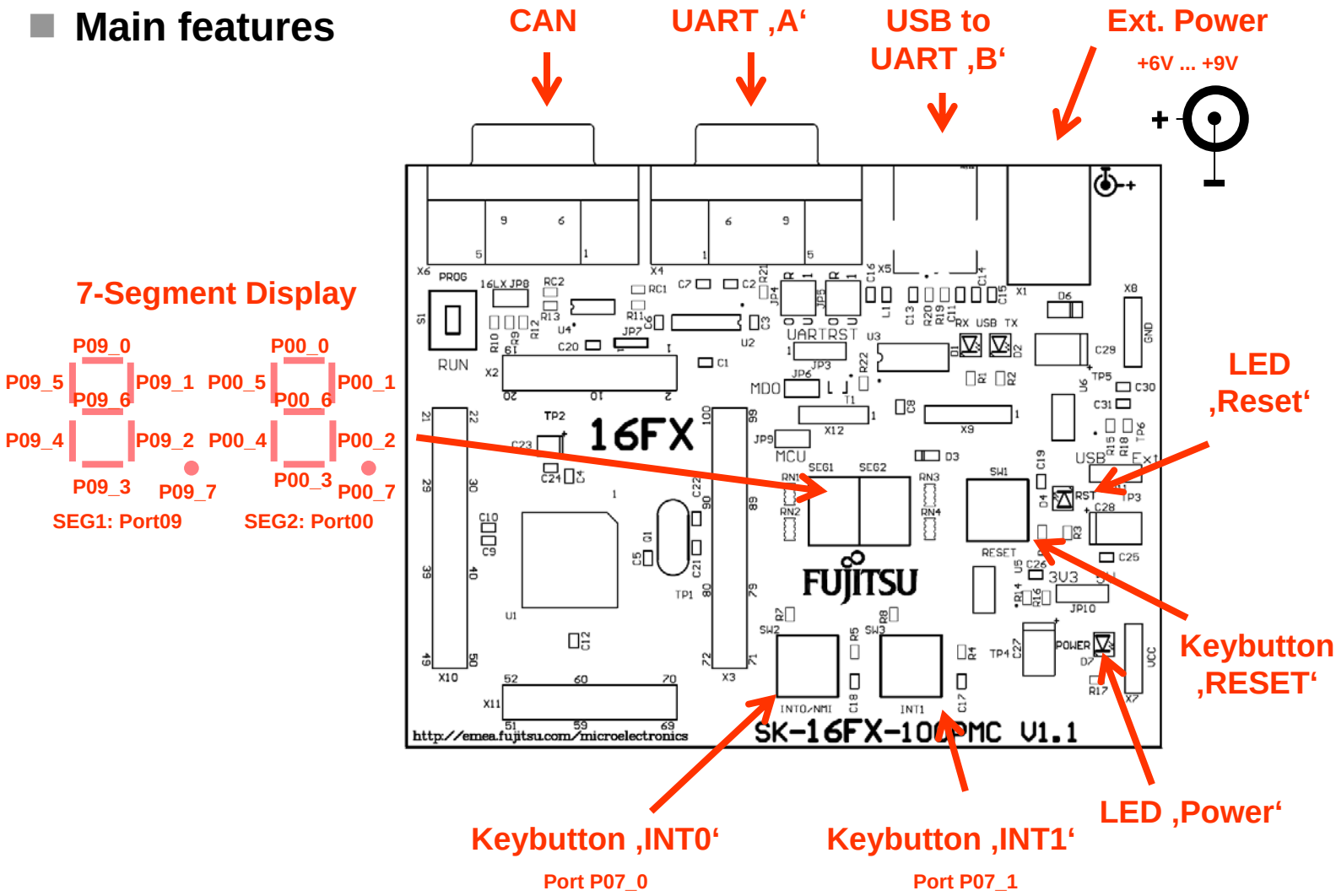
- **You finished successfully the first test**
- **Now you will get more details about the SK-16FX-100PMC**
- **You will learn more about**
  - The on-board features
  - How to program the Flash
  - How to start your own application
  - On-chip debugging with EUROScope

The Hardware





- **Main features**



The Hardware





- **The jumpers**

JP4: UART RX select

R-0: UART0=UART‘A‘ / U-1: UART1=UART‘B‘ (USB)

R-1: UART1=UART‘A‘ / U-0: UART0=UART‘B‘ (USB)

JP5: UART TX select

R-0: UART0=UART‘A‘ / U-1: UART1=UART‘B‘ (USB)

R-1: UART1=UART‘A‘ / U-0: UART0=UART‘B‘ (USB)

S1: Mode selection

PROG: Select the program-mode

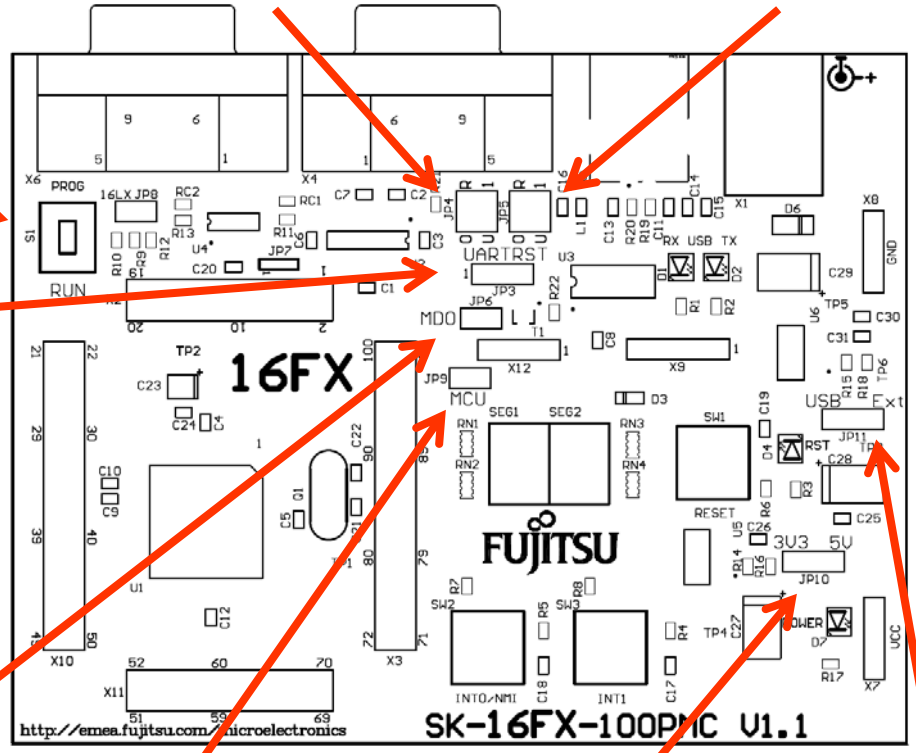
RUN: Select the run-mode

JP3: DTR-Reset

Set the jumper to 1-2 to connect the DTR-Signal of the UART connector to the microcontroller reset-pin.

Set the jumper to 2-3 to connect the DTR-Signal of the USB connector to the microcontroller reset-pin.

Some terminal-programs, e.g. Fujitsu‘s Skwizard, allow to reset the evaluation board by using the DTR-Signal.



JP6: MD0 selection

Close this jumper to control the MD0 level by the RTS signal of the USB interface

JP9: MCU Vcc

This jumper can be used to measure the current consumption of the MCU

JP10: 5V / 3.3V

1-2: 5V supply is used

2-3: 3.3V supply is used

JP11: Power Supply

1-2: USB supply is used

2-3: External supply is used



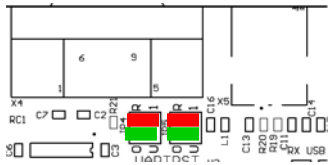


The Hardware

- **JP4, JP5 : UART selection**
  - UART0 and UART1 of the microcontroller can be used together with a typical RS232 SUB-D9 connector and a serial/USB converter
  - The jumpers JP4 and JP5 routes the channel to the connector

  - UART0 = USB-connector (X5), UART1 = Sub-D9 (X4) (default)
    - Setting of Jumper JP4 and JP5: U-0 / R-1

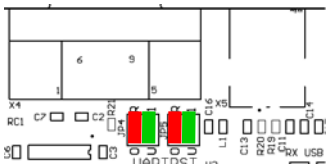
RS232 **USB**



(default)

  - UART0 = Sub-D9 (X4), UART1 = USB-connector (X5)
    - Setting of Jumper JP4 and JP5: U-1 / R-0

RS232 **USB**



The Hardware

The microcontroller pins

Pin	Pin-name	On SK-16FX-EUROSCOPE used by
1	P02_6/A22/IN2/TTG2/TTG10	
2	P02_7/A23/IN3/TTG3/TTG11	
3	P03_0/ALE/IN4/TTG4/TTG12	
4	P03_1/RDX/IN5/TTG5/TTG13	
5	P03_2/WRLX/WRX/INT10R	
6	P03_3/WRHX	
7	P03_4/HRQ/OUT4	
8	P03_5/HAKX/OUT5	
9	P03_6/RDY/OUT6	
10	P03_7/CLK/OUT7	
11	P04_0	
12	P04_1	
13	Vcc	+ Vcc
14	Vss	GND
15	C	‘C’ capacitors
16	P04_2/IN6/RX1/TTG6/TTG14	
17	P04_3/IN7/TX1/TTG7/TTG15	

Pin	Pin-name	On SK-16FX-EUROSCOPE used by
18	P04_4/SDA0/FRCK0	
19	P04_5/SCL0/FRCK1	
20	P04_6/SDA1	
21	P04_7/SCL1	
22	P05_0/AN8/ALARM0/SIN2	
23	P05_1/AN9/ALARM1/SOT2	
24	P05_2/AN10/SCK2	
25	P05_3/AN11/TIN3	
26	P05_4/AN12/TOT3/TIN2R	
27	P05_5/AN13/INT0R/NMIR	
28	P05_6/AN14/INT4R	
29	P05_7/AN15/INT5R	
30	AVcc	+ Vcc
31	AVRH	+ Vcc
32	AVRL	GND
33	AVss	GND
34	P06_0/AN0/PPG0	

The Hardware

The microcontroller pins (cont'd)

Pin	Pin-name	On SK-16FX-EUROSCOPE used by
35	P06_1/AN1/PPG1	
36	P06_2/AN2/PPG2	
37	P06_3/AN3/PPG3	
38	P06_4/AN4/PPG4	
39	P06_5/AN5/PPG5	
40	P06_6/AN6/PPG6	
41	P06_7/AN7/PPG7	
42	Vss	GND
43	P07_0/AN16/INT0/NMI	Key button 'INT0/NMI'
44	P07_1/AN17/INT1	Key button 'INT1'
45	P07_2/AN18/INT2	
46	P07_3/AN19/INT3	
47	P07_4/AN20/INT4	
48	P07_5/AN21/INT5/SCK9_R	
49	MD2	to GND (w/ JP8 to + Vcc)
50	MD1	to + Vcc
51	MD0	Mode-Switch S1

Pin	Pin-name	On SK-16FX-EUROSCOPE used by
52	RSTX	Key button ‚Reset'
53	P07_6/AN22/INT6/SOT9_R	
54	P07_7/AN23/INT7/SIN9_R	
55	P08_0/TIN0/CKOTX0/ADTG/INT12R	
56	P08_1/TOT0/CKOT0/INT13R	
57	P08_2/SIN0/TIN2/INT14R	UART0 (RXD)
58	P08_3/SOT0/TOT2	UART0 (TXD)
59	P08_4/SCK0/INT15R	
60	P08_5/SIN1/INT1R	UART1 (RXD)
61	P08_6/SOT1	UART1 (TXD)
62	P08_7/SCK1	
63	Vcc	+ Vcc
64	Vss	GND
65	P09_0/PPG8/UBX	SEG1-A
66	P09_1/PPG9/LBX	SEG1-B
67	P09_2/PPG10/CS5	SEG1-C
68	P09_3/PPG11/CS4	SEG1-D

The Hardware

The microcontroller pins (cont'd)

Pin	Pin-name	On SK-16FX-EUROSCOPE used by
69	P09_4/OUT0/CS3	SEG1-E
70	P09_5/OUT1/CS2	SEG1-F
71	P09_6/OUT2/CS1	SEG1-G
72	P09_7/OUT3/CS0	SEG1-DP
73	P10_0/RX0/INT8R	CAN0 (RX)
74	P10_1/TX0	CAN0 (TX)
75	P00_0/AD00/INT8/SCK7_R	SEG2-A
76	P00_1/AD01/INT9/SOT7_R	SEG2-B
77	P00_2/AD02/INT10/SIN7_R	SEG2-C
78	P00_3/AD03/INT11/SCK8_R	SEG2-D
79	P00_4/AD04/INT12/SOT8_R	SEG2-E
80	P00_5/AD05/INT13/SIN8_R	SEG2-F
81	P00_6/AD06/INT14	SEG2-G
82	P00_7/AD07/INT15	SEG2-DP
83	P01_0/AD08/CKOT1/TIN1	
84	P01_1/AD09/CKOTX1/TOT1	

Pin	Pin-name	On SK-16FX-EUROSCOPE used by
85	P01_2/AD10/INT11R/SIN3	
86	P01_3/AD11/SOT3	
87	P01_4/AD12/SCK3	
88	Vcc	+ Vcc
89	Vss	GND
90	X1	4 MHz Crystal
91	X0	4 MHz Crystal
92	P01_5/AD13/INT7R/SIN2R	
93	P01_6/AD14/SOT2R	
94	P01_7/AD15/SCK2R	
95	P02_0/A16/PPG12	
96	P02_1/A17/PPG13	
97	P02_2/A18/PPG14	
98	P02_3/A19/PPG15	
99	P02_4/A20/TTG8/IN0	
100	P02_5/A21/TTG9/TTG1/IN1/ADTGR	





The Software

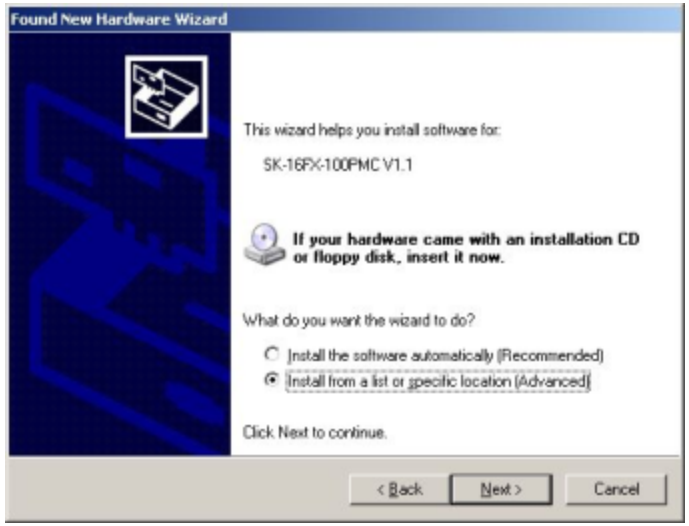
- **The SK-16FX-EUROSCOPE CD includes the following software:**
  - Softune Workbench (development platform for Fujitsu microcontroller)
  - MCU Flash programming tool and SKwizard terminal program
  - USB driver for on board USB-to-RS232 converter
  - On-chip debugger “EUROScope lite 16FX“
  - Software examples for the SK-16FX-EUROSCOPE
- **Additionally you can order the latest „Fujitsu MICROS DVD“**
  - Includes documentation & software for all Fujitsu microcontrollers
  - Please contact your local distributor
- **Please check our dedicated microcontroller website**

http://mcu.emea.fujitsu.com

  - for updates of the Flash programmer tool, utilities and examples
  - for data sheets, hardware manuals, application notes, etc.

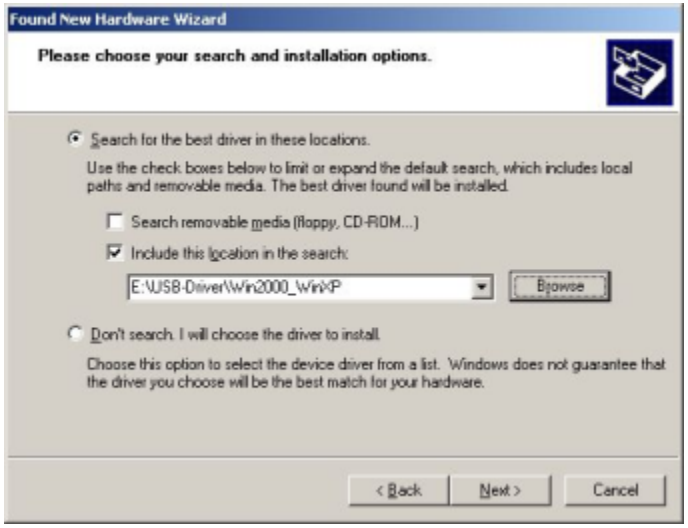
Installation of the USB-driver

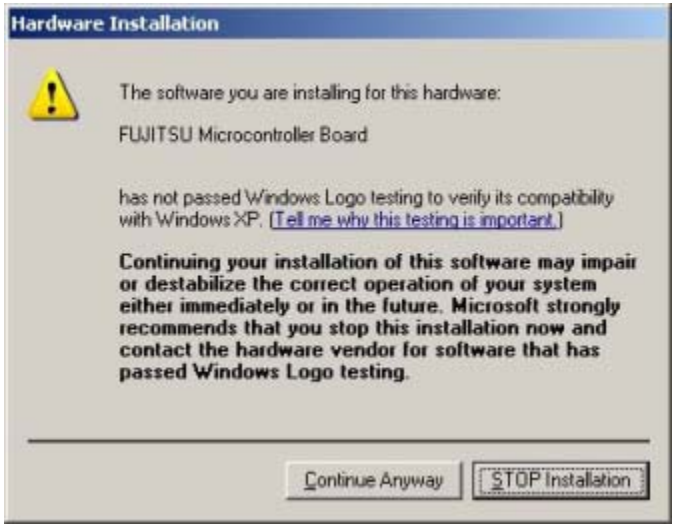
- **Connect the SK-16FX-100PMC to your PC's USB port**
  - Windows will 'Found New Hardware: SK-16FX-100PMC' and the Hardware Wizard should start automatically
    - **Note: The installation procedure may differ with different operating systems**



  - Do not connect to Windows Update to search for software
  - Select 'Install from a list or specific location (Advanced)'
  - Within next windows select 'Search for the best driver' and browse on the CD to the folder 'drive:\USB-Driver\Win2000_WinXP'

Installation of the USB-driver

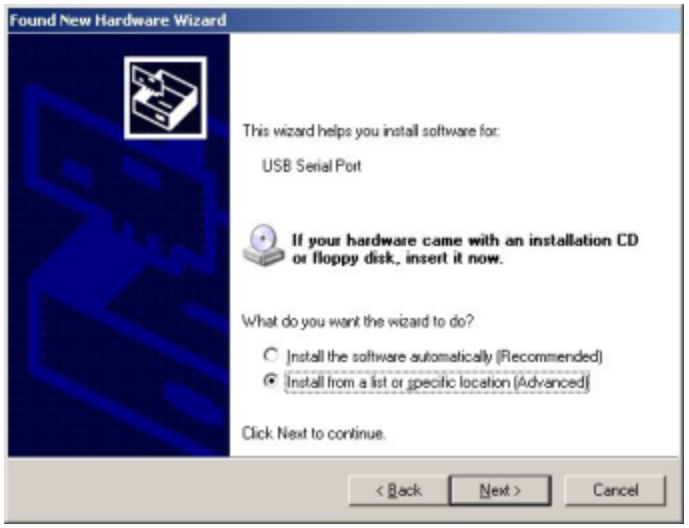




- 'Continue anyway' although the Windows Logo test may not be passed
- Windows completes the installation by copying some files
- 'Finish' will close the window

Installation of the USB-driver

- Again Windows will ‘Found New Hardware: USB Serial Port’ and the Hardware Wizard should start automatically
  - **Note: The installation procedure may differ with different operating systems**

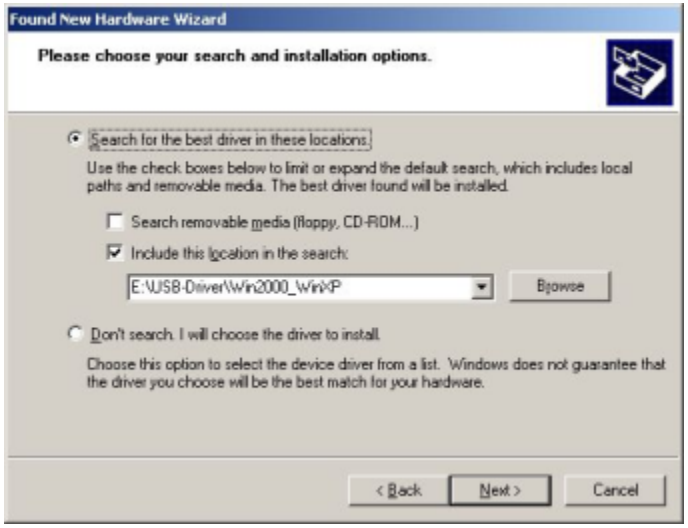


- Do not connect to Windows Update to search for software
- Select ‘Install from a list or specific location (Advanced)’
- Within next windows select ‘Search for the best driver’ and browse on the CD to the folder ‘drive:\USB-Driver\Win2000_WinXP’

Installation of the USB-driver







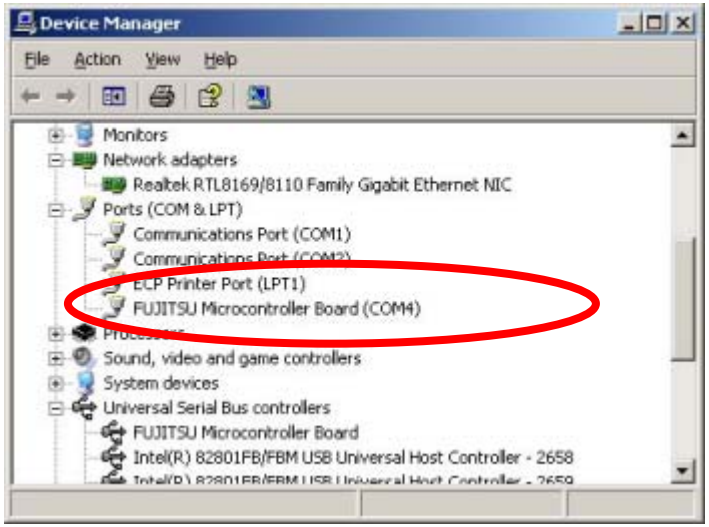
- 'Continue anyway' although the Windows Logo test may not be passed
- Windows completes the installation by copying some files

Installation of the USB-driver





- **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**
  - FUJITSU Microcontroller board (e.g.: COM4)



Note:
Currently EUROScope supports only COM1 - COM9.

If the assigned virtual COM-port is greater than COM9 then please re-assign it manually by help of the device manager within the Windows control panel / system.

- **Ready!**
  - The SK-16FX-100PMC can be powered via USB (default, JP11)
  - Depending on JP4 and JP5 one UART is connected to USB

The Development Software

- **Softune Workbench**
  - Free of charge (only registration is required)
  - Windows based development platform for all 16-bit microcontrollers
  - Includes: Editor, C-compiler, assembler, linker, core simulator
  - Supports optional hardware emulator
  - Requires ‘administration’ or ‘power user’ rights on the PC
  - Registration*1
    - https://mcu.emea.fujitsu.com/cusreg/htm/cusreg_form.htm
    - Receive your password for Softune Workbench by email
    - Receive your license file for EUROScope by email
  - Start installation
    - Enter password and choose destination folder (e.g. c:\Softune16)

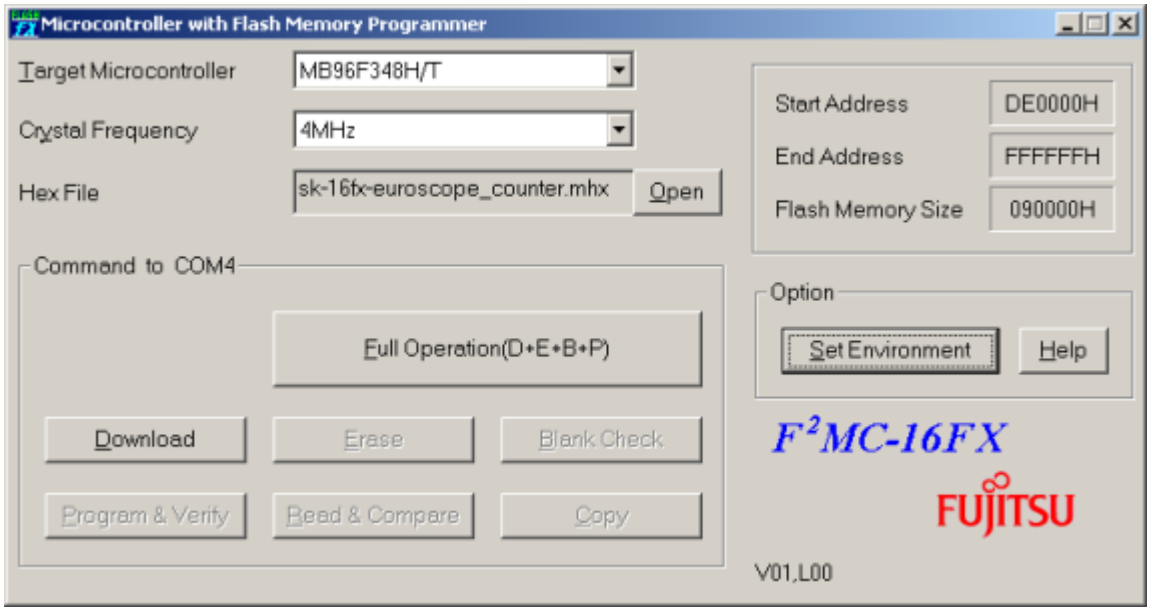
*1 Note: If you want to use EUROScope please install and run it first and note down the Host ID (MAC address) of your PC system. This ID is needed to be filled out in the registration form to obtain a license key.

The FLASH Programmer





- **MCU Flash programmer**
  - Free of charge, no registration required
  - Windows based programming tool for all 16-bit Fujitsu microcontroller
  - Uses PC serial port COMx (incl. virtual COM port: USB-to-RS232)
  - Start installation



Tools and Software Examples

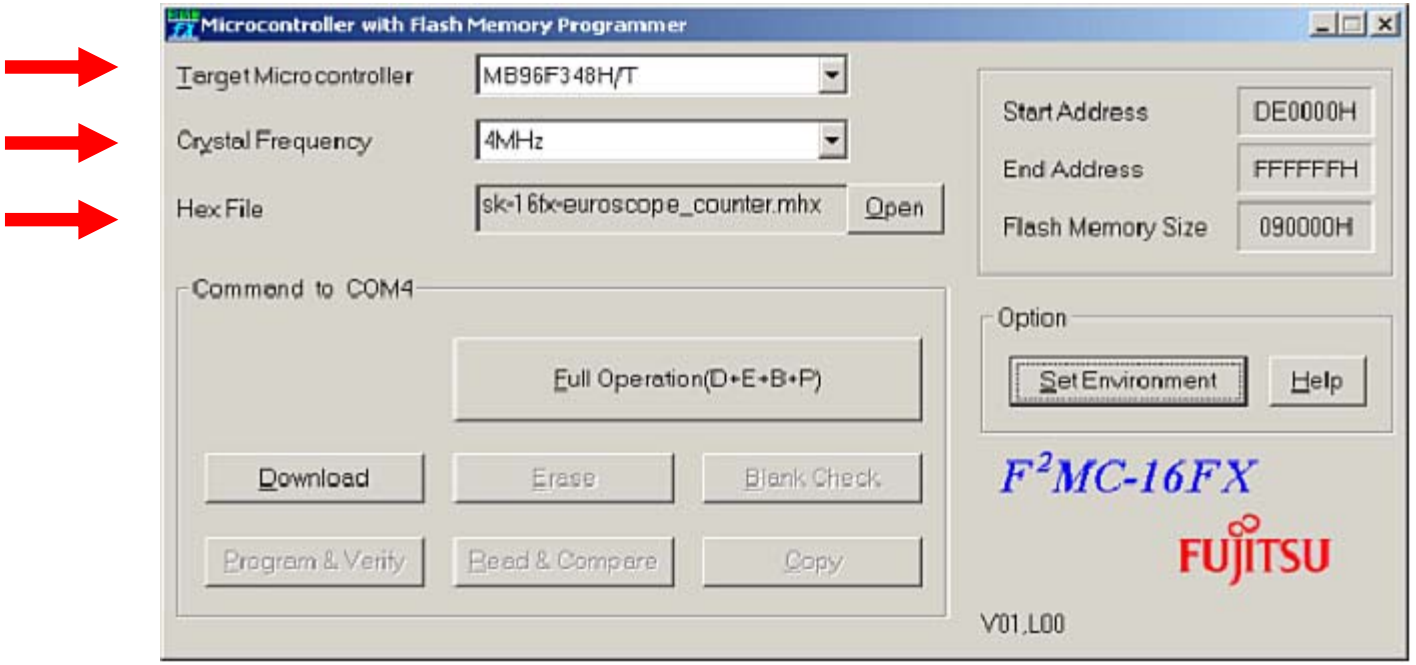
- **SKwizard**
  - Free of charge terminal program
  - Start installation

- **Following examples are provided with SK-16FX-EUROSCOPE:**
  - sk16fx-euroscope_adc_dvm
    - Digital Voltage Meter based on the A/D-converter
  - sk16fx-euroscope_can_uart_terminal
    - Simple CAN example controlled by UART1
  - sk16fx-euroscope_counter
    - Counts from 0 to 99 on the 7-segment Display
  - sk16fx-euroscope_template
    - ‚Empty' project as base for user applications
  - sk16fx-euroscope_uart
    - UART example using UART1

Note:
Do not connect other than EUROScope to UART0 (default: X5/USB).
All examples are prepared to be used with EUROScope and UART0 is reserved for this debugger.

Program Download

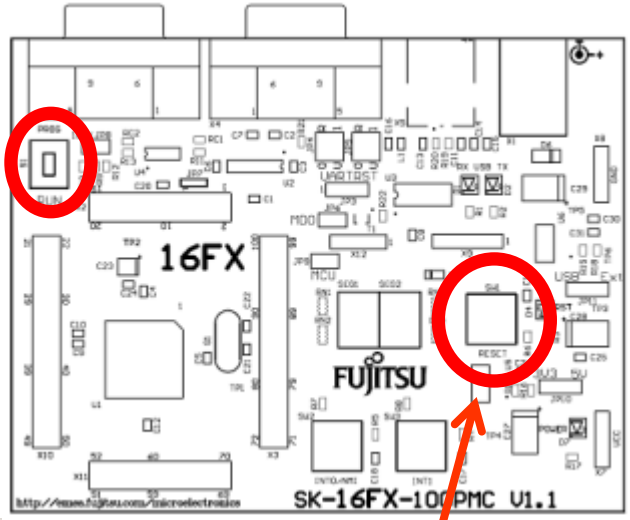
- **Start the Fujitsu MCU Flash programmer**
- **Select the target microcontroller (MB96F348H/T)**
- **Select the crystal frequency (4 MHz)**
- **Choose the software example from the example ‘ABS‘-folder**
  (e.g. D:\Examples\sk-16fx-euroscope_counter-v10\ABS\sk-16fx-euroscope_counter.mhx)



Program Download

- **Connect to the PC**
  - RS232 or USB can be used
  - Select COM port (‚Set Environment‘)
- **Set jumper S1 to position ‚Prog‘**
- **Press ‚Reset‘**
- **Start ‚Full operation‘**

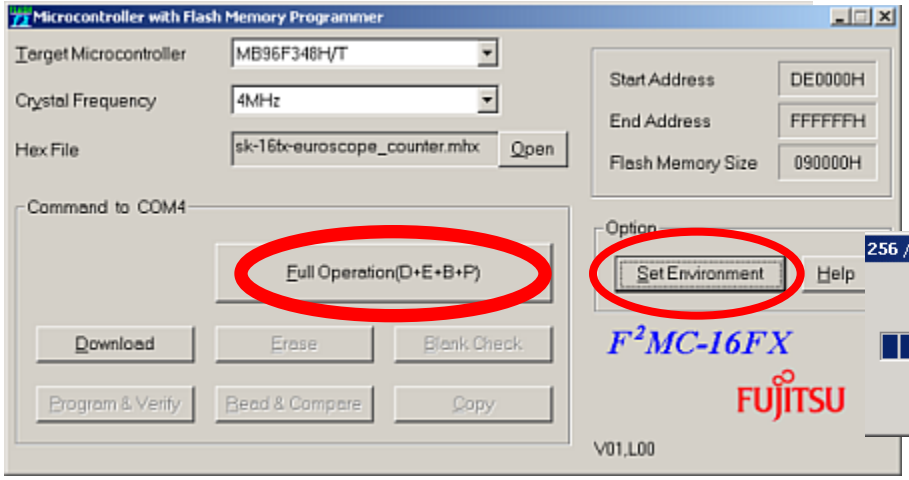
RS232 USB port
(see chapter Jumper seetings)



S1: Mode selection

Prog: Set switch to position ‚Prog‘ in order to select the program-mode

Keybutton ‚RESET‘

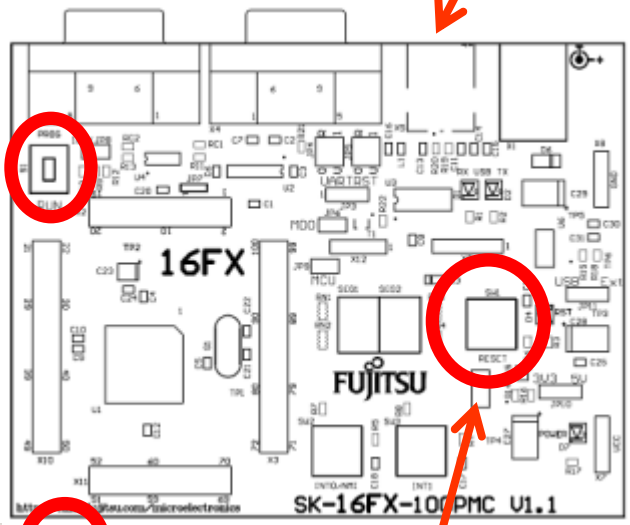


Program Download

- **Close the MCU Flash programmer**
- **Set jumper S1 to position ‚RUN‘**
- **Press ‚Reset‘**





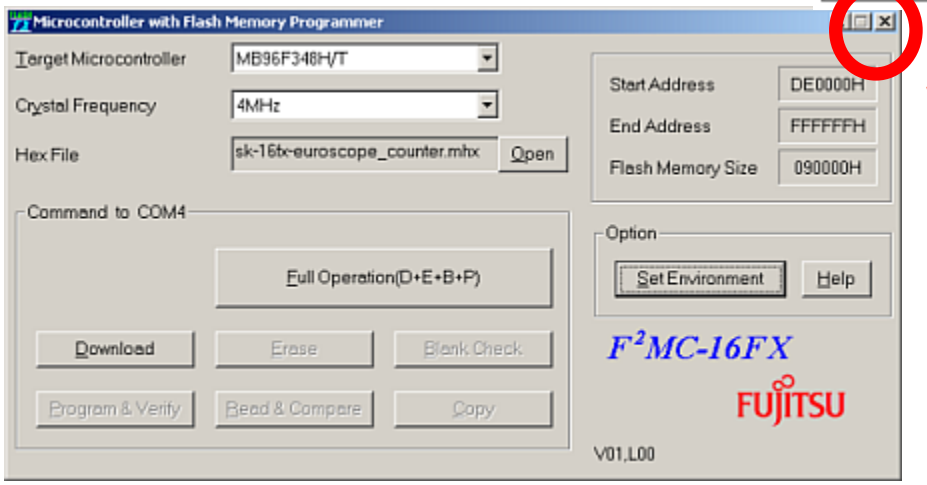


S1: Mode selection

Prog: Set switch to position ‚RUN‘ in order to select the RUN-mode

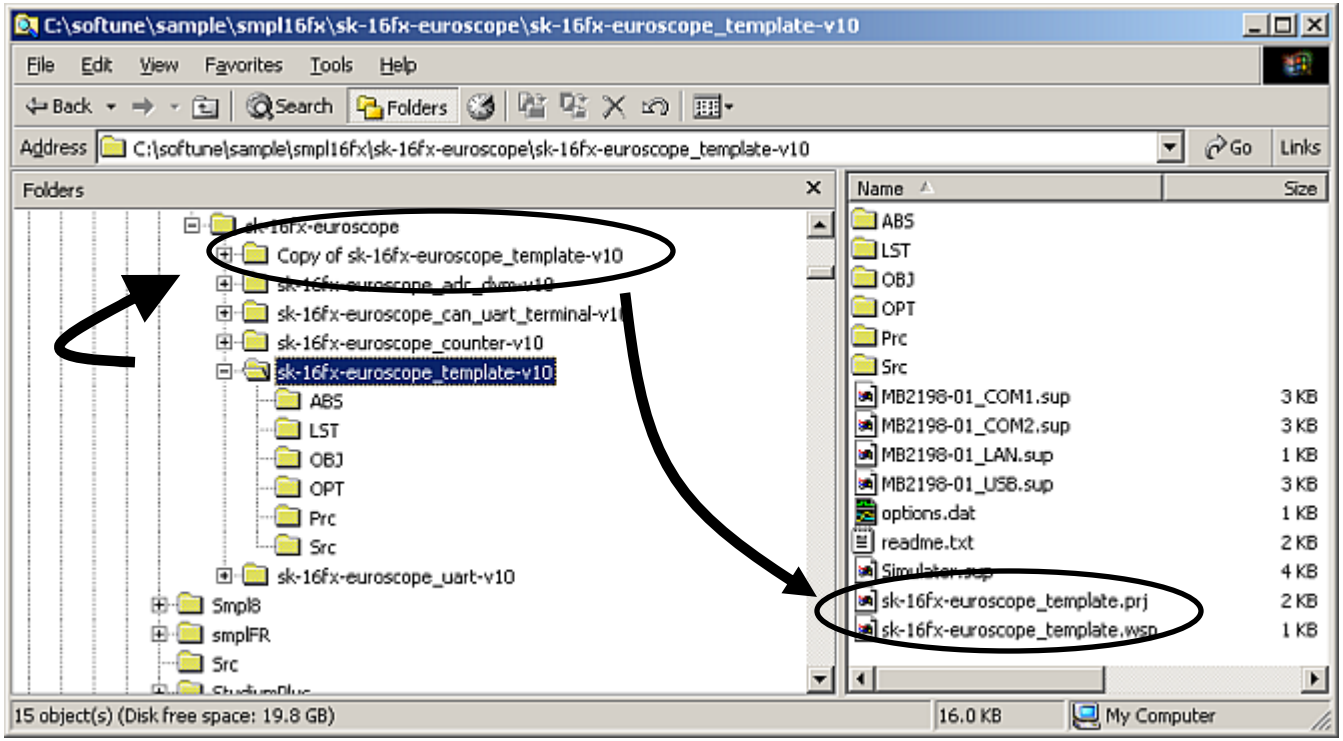
Keybutton ‚RESET‘

Close the Flash programmer



New Project

- **In order to start a new user project use the template project**
  - This project includes the startup code, header files, and vector table
- **Copy the folder ‘Template’ within the example folder**
  - Rename ‘Copy of sk-16fx-euroscope_template-v10’ to ‘my_application’

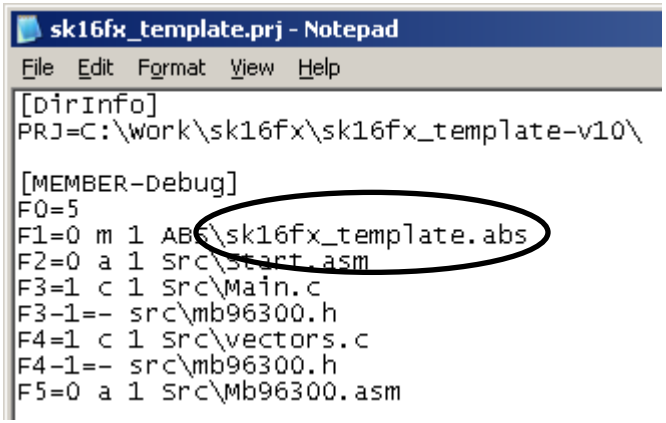


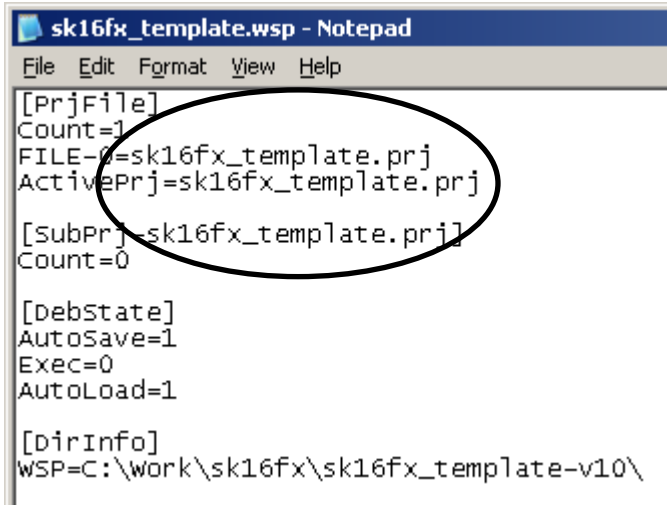
New Project





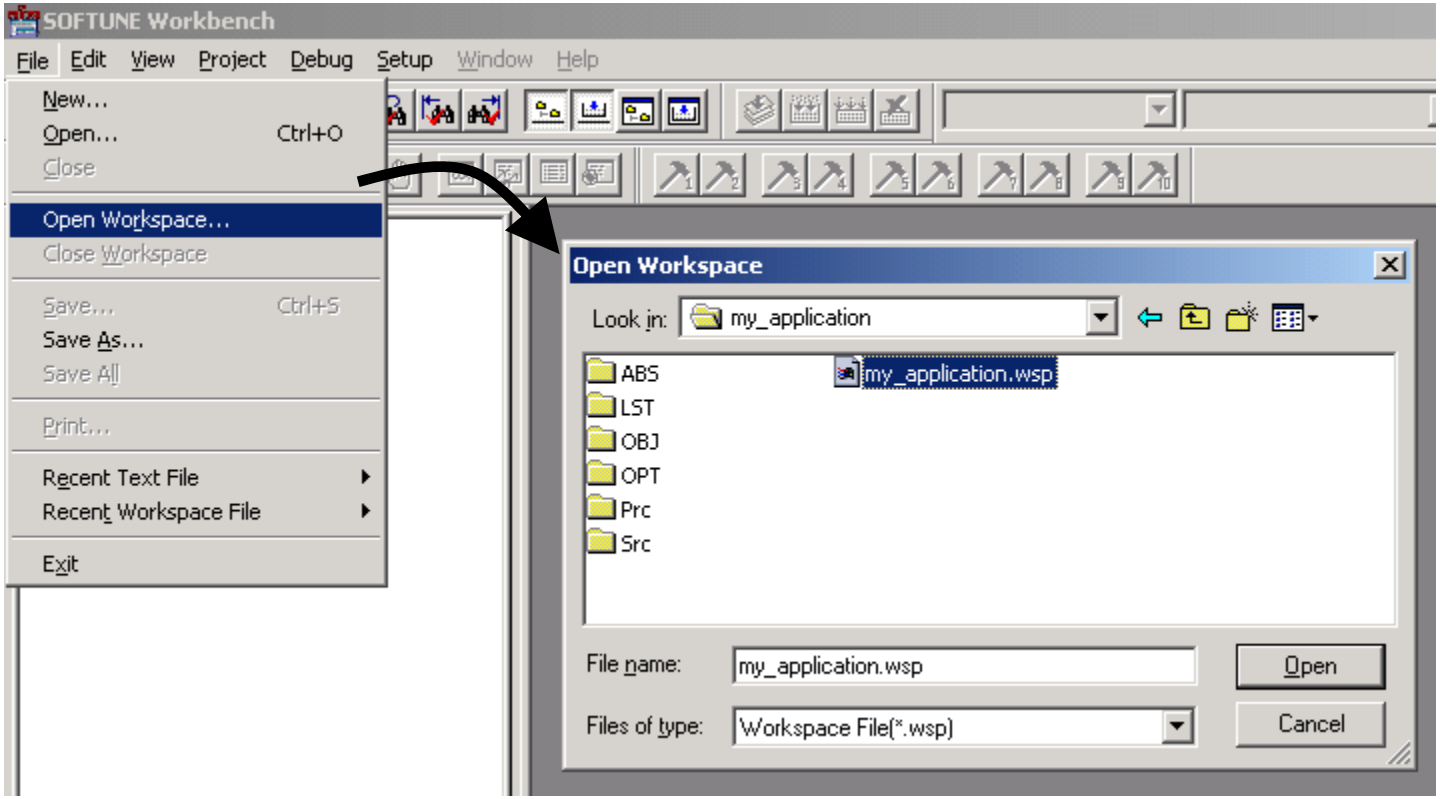
- **Enter ‘my_application’-folder**
  - Rename ‘template.prj‘ into ‘my_application.prj‘
  - Rename ‘template.wsp‘ into ‘my_application.wsp’
- **Edit ’my_application.prj’**
  - rename ‘sk16fx_template’ -> ‘my_application’
- **Edit ‘my_application.wsp’**
  - rename ‘sk16fx_ template’ -> ‘my_application’





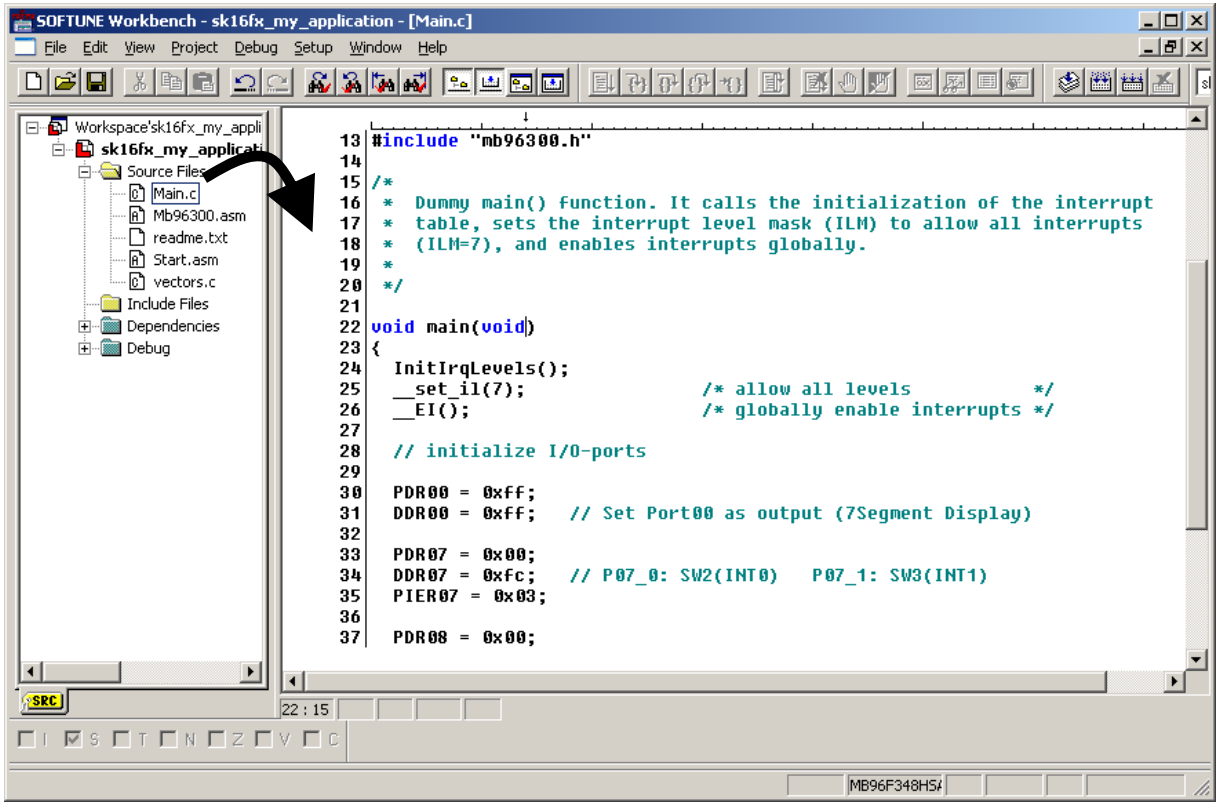
New Project

- **Start Softune Workbench and open your project**



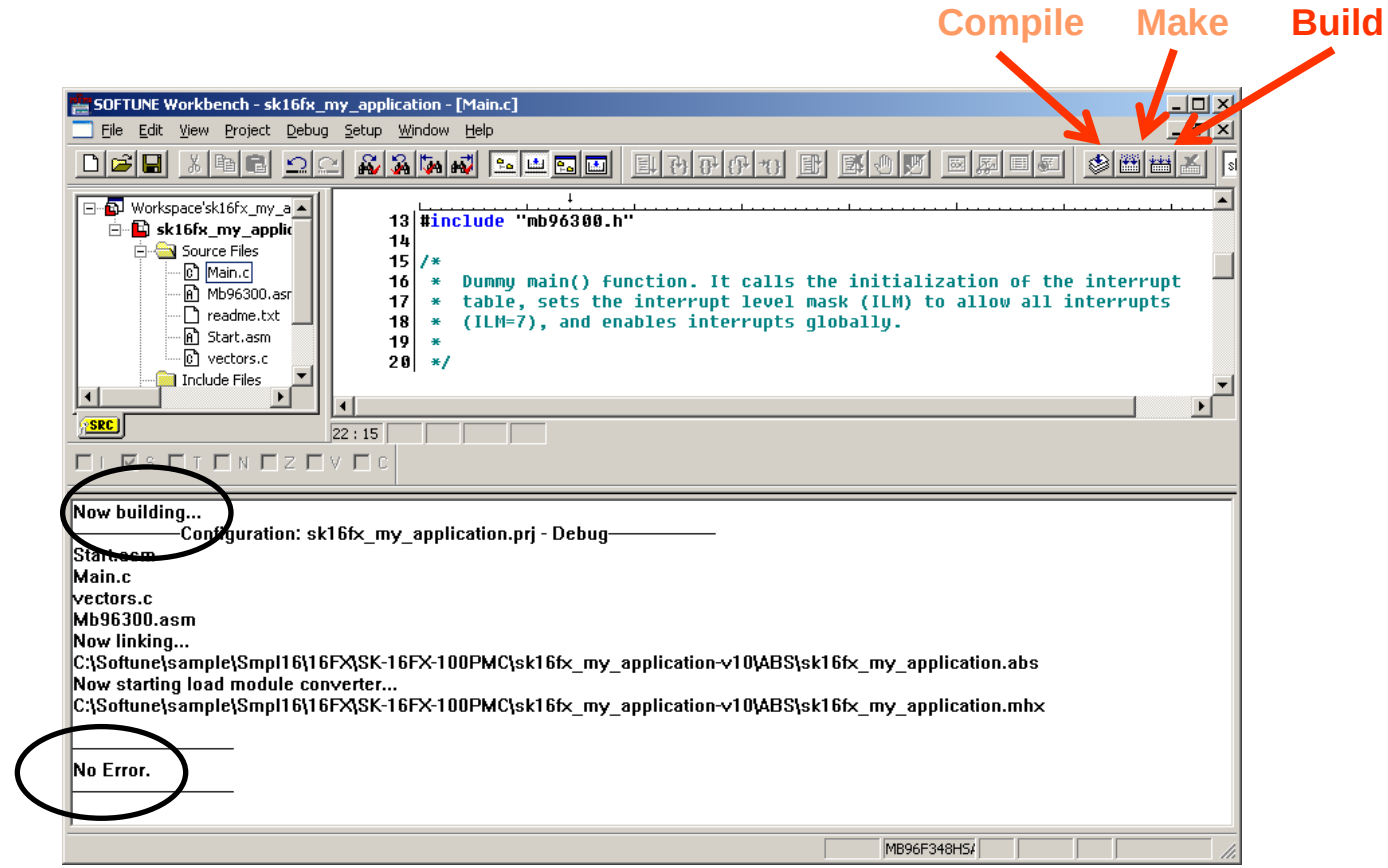
New Project

- **Write your application code**
  - `Start.asm` : Startup code
  - `Vectors.c` : Vector table
  - `Main.c` : Your application



New Project

- **Compile and build your project**
  - Generates the MHX-file, which can be programmed to the Flash



New Project

Congratulations!

- **You have finished your first project**
  - Please see our application note ‘16FX Getting Started’ for a more detailed introduction.

EUROScope lite 16FX

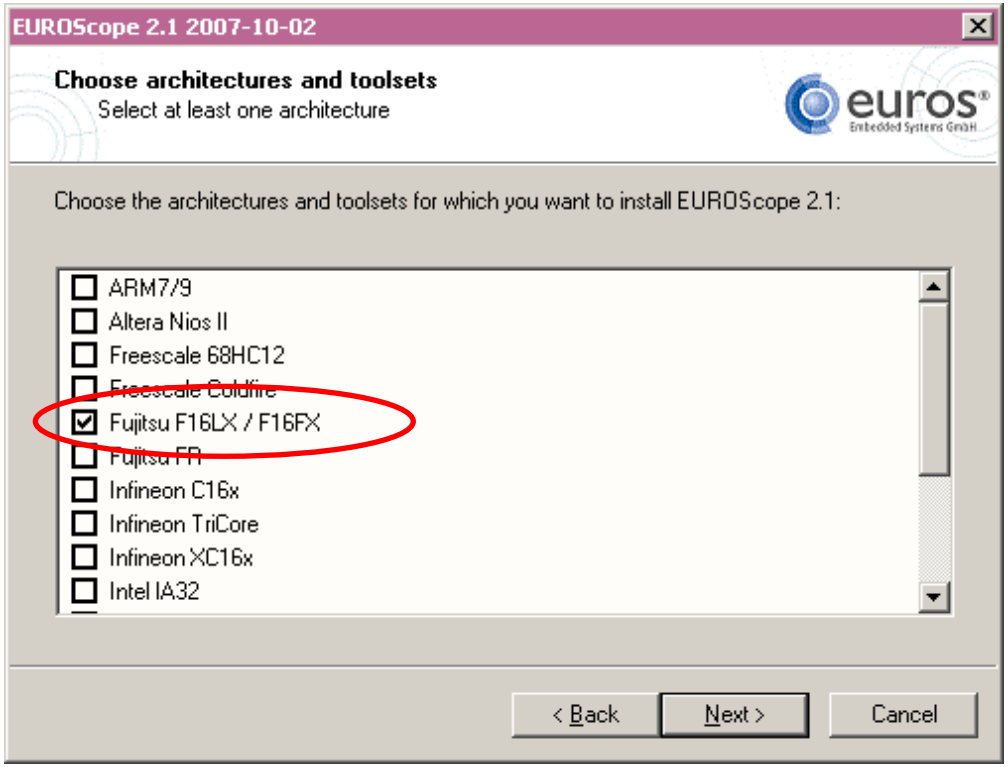
- **„EUROScope lite 16FX“ source-level debugger**
  - On-chip debugging for 16FX microcontroller
  - No kernel linkage / upload required
  - Breakpoints
  - Single step debugging (step, step-in, step-out)
  - Windows for memory, watch, mixed source code, register
  - Plug-ins available for operating systems etc.

EUROScope lite 16FX Installation





- **Installation of „EUROScope lite 16FX“**
  - Start „EUROScope lite 16FX“ for installation
  - Choose „Fujitsu F16LX / F16FX“ from list



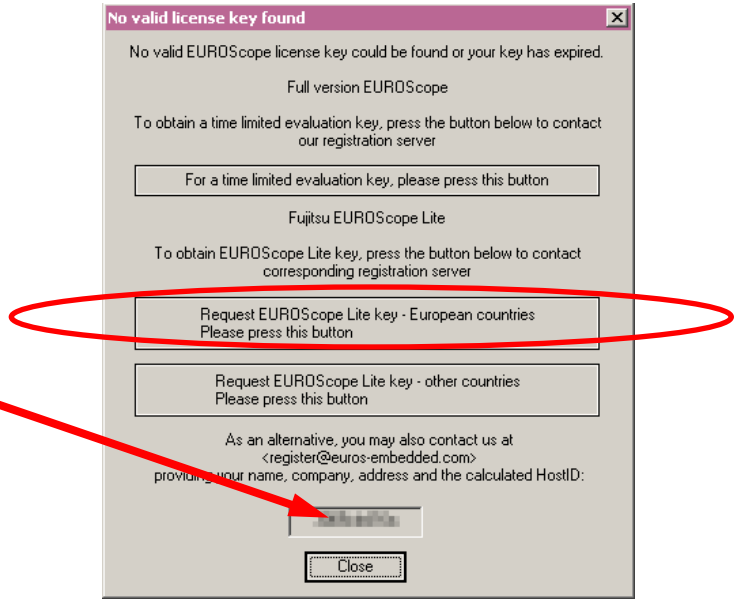
EUROScope lite 16FX Installation





- **License for „EUROScope lite 16FX“**
  - Run EUROScope.exe
    - Copy Host ID (MAC address) of your PC system
    - Request Lite key at
      https://mcu.emea.fujitsu.com/cusreg/htm/cusreg_form.htm
    - Receive license key file from company EUROS by email
    - Copy license key file (*euros-license.key*) to your local installation path

Host ID of your PC system



EUROScope lite 16FX Project preparation

- **All examples within this package are already prepared for the use with EUROScope**
  - Default connection: UART0 routed to X5/USB.

- **In case of new projects or project modifications**
  - Use Softune Workbench
  - Setup the Background Debugging area
    - See *Start.asm* (V1.28), chapter 4.18 (Enable Background Debugging Mode) and chapter 5.9 (Debug Address Specification)
      - See always the latest 'sk-16fx-euroscope_template' example
  - Built your application project with Softune Workbench
    - Loadmodule (*.*abs*) format is required for debugging

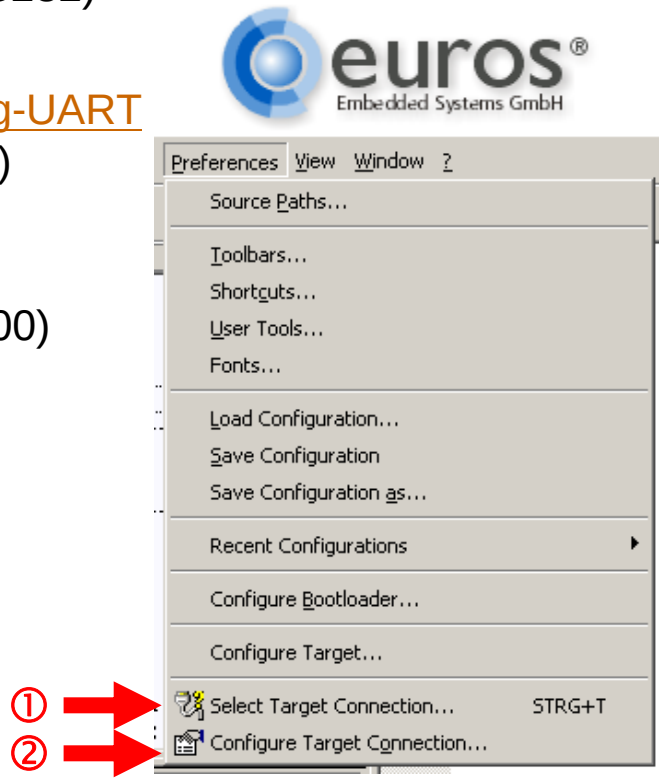
- **Download your project (*.*mhx*) to the board**
  - Use the Fujitsu MCU Flash programmer

EUROScope lite 16FX Configuration





- **Start EUROScope**
- **Ensure the following settings**
  - Select Target Connection ①
    - Choose Fujitsu 16FXBootROM (RS232)
  - Configure Target Connection ②
    - Choose the COM port of the Debug-UART (Default: UART0 routed to X5/USB)
    - Choose the baudrate used in the Debug Address Specification of the *Start.asm* file (Default: 115200)
    - Choose „asynchronous communication“ and „Int/Ext vector mode“

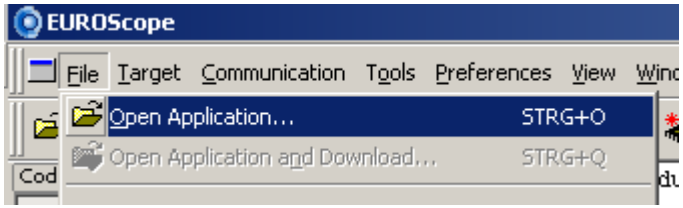


EUROScope lite 16FX
Load ABS file



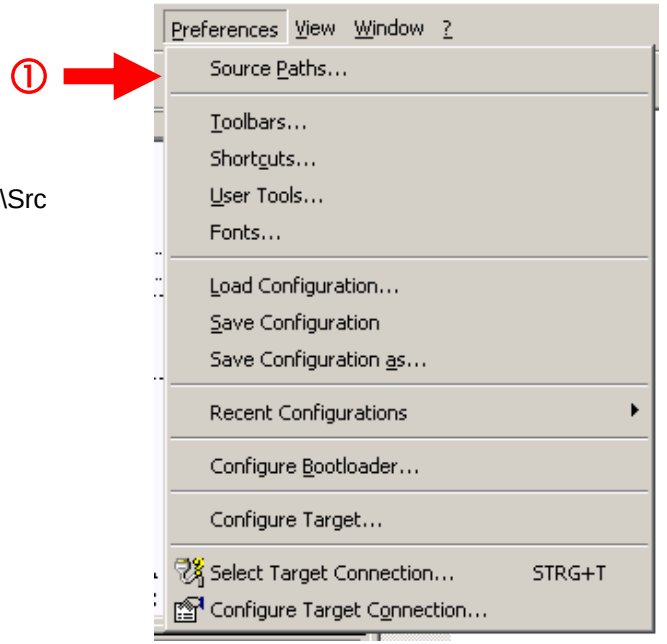


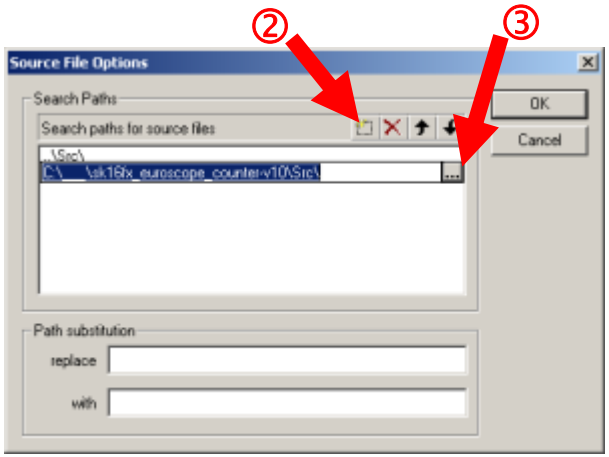
- **Load the *abs* file of your project**
  - File / Open Application ...



E.g.: <drive>:\Examples\sk16fx_euroscope_counter-v10\ABS\sk16fx_euroscope_counter.abs

- **Projects may be compiled on another PC or folder structure than the debug PC**
  - Adjust the source path ①
    - Click New (Insert) ②
    - Browse to source folder ③
    - E.g.: <drive>:\Examples\sk16fx_euroscope_counter-v10\Src





EUROScope lite 16FX
Connect to device

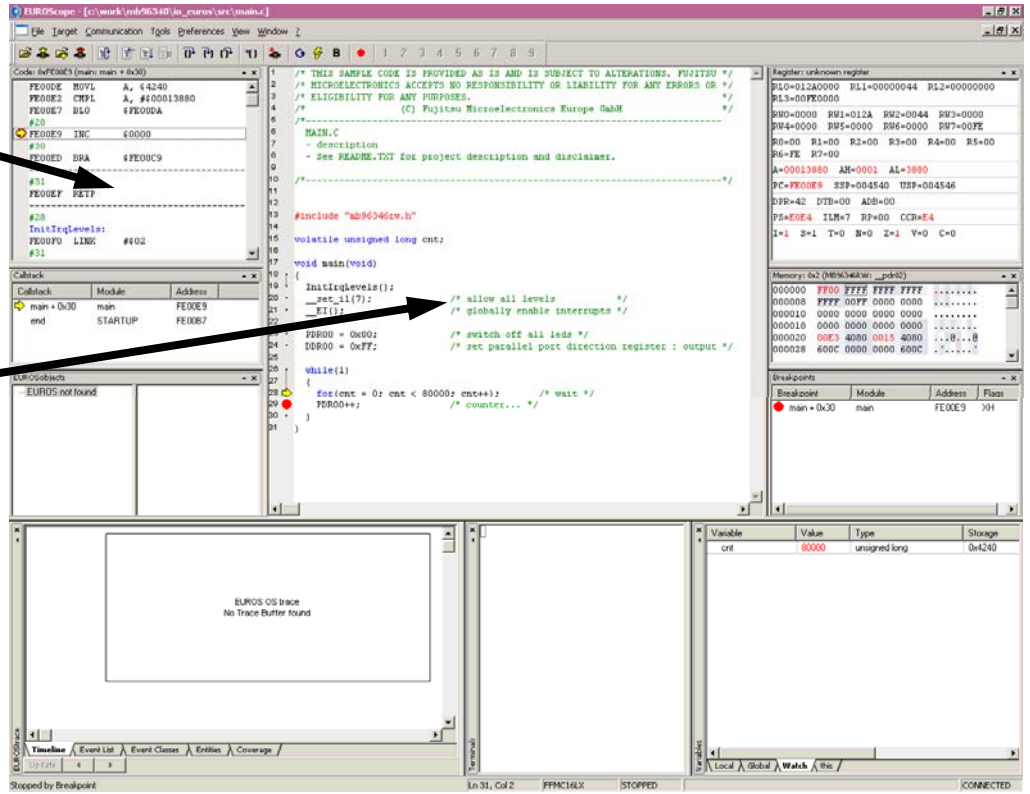




- **Start communication (*Communication -> Open*)**
- **Press reset button**
- **Communication is established, if code in the assembly and source code window is visible**

Assembly window

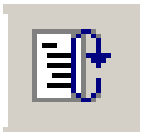
Source code window

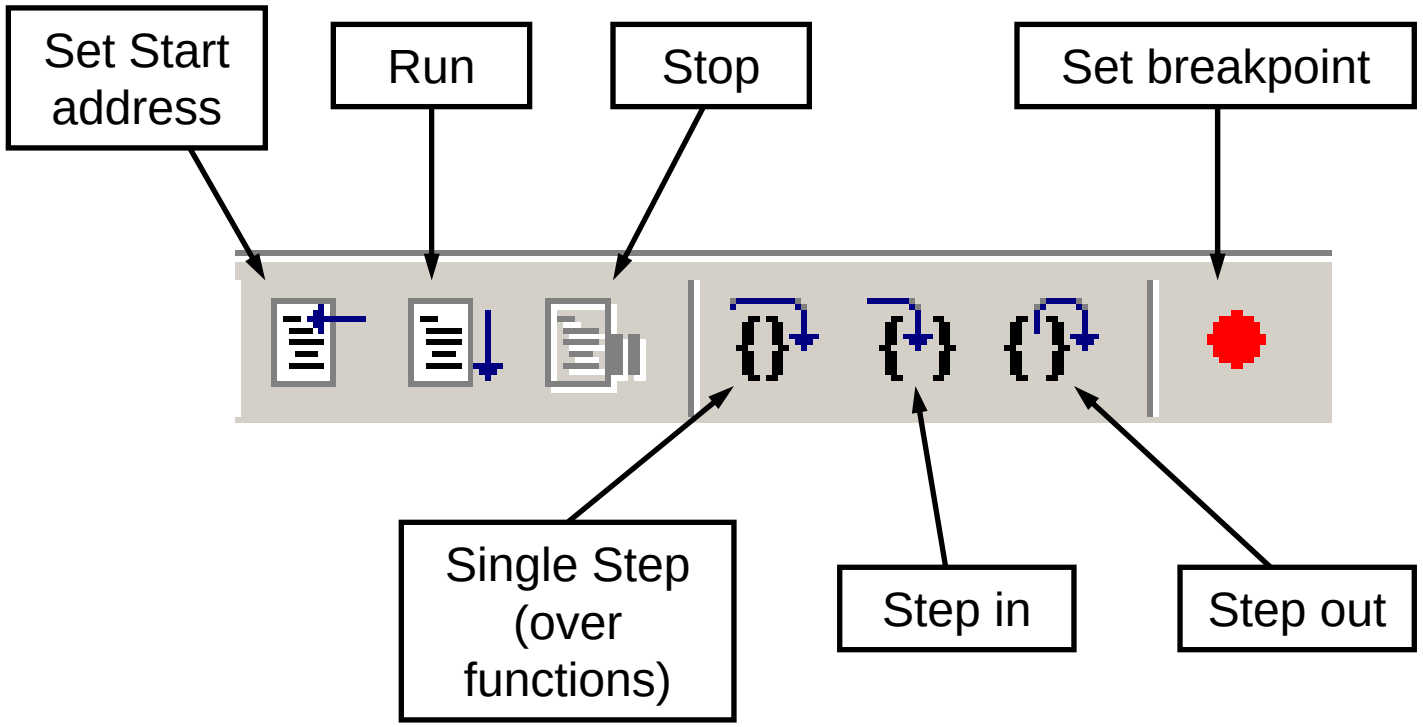






EUROScope lite 16FX Start Debugging

- **Initialize target and run until main function**
  - 
- **Use menu bar for debugging**



EUROScope lite 16FX Breakpoints

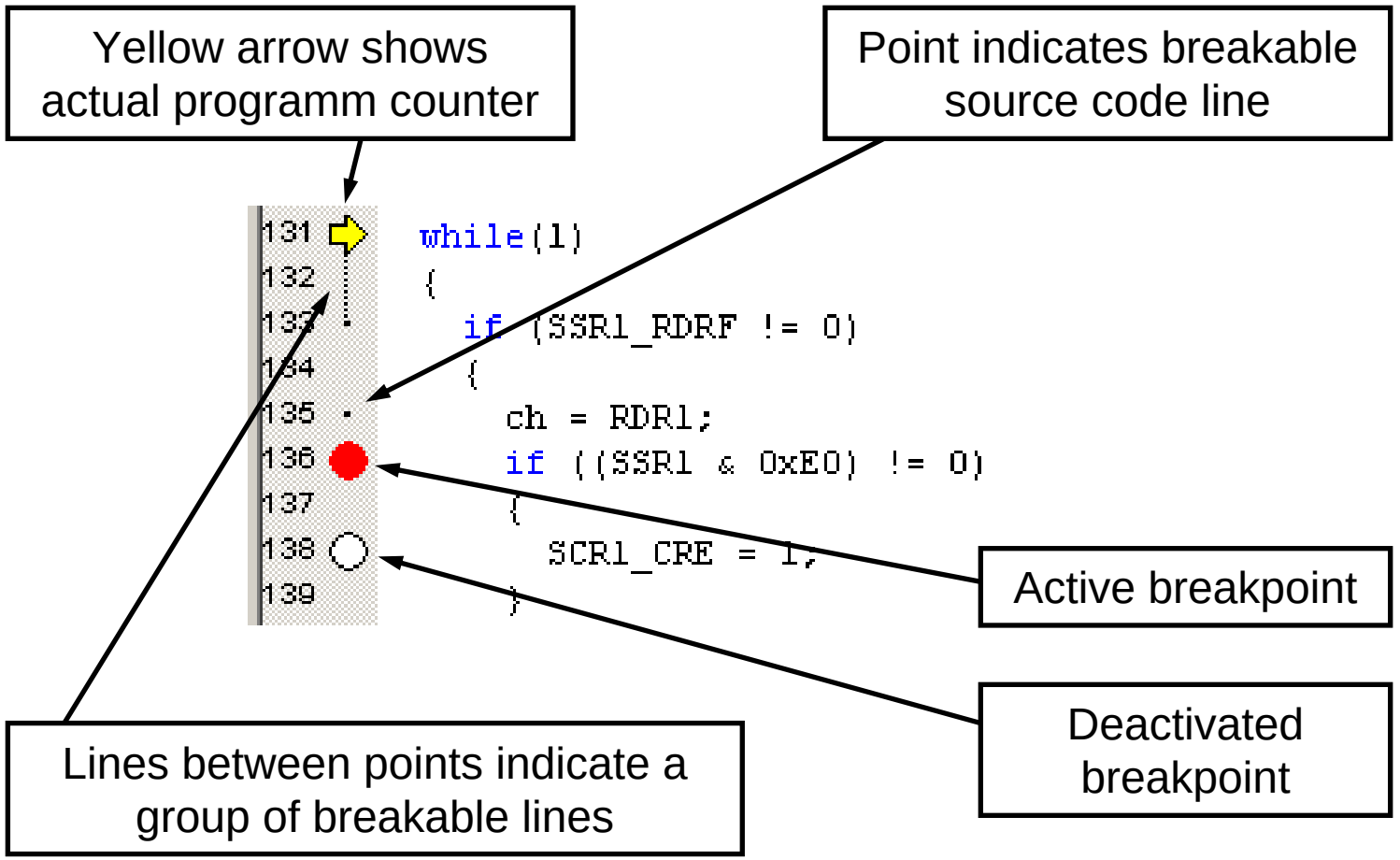
- **Set a breakpoint**
  - Double-click to desired line
    - ‚C' code source: selectables lines are marked by small dot in front
    - ‚Assembly' window: all lines with an instruction can hold a breakpoint
    - Some lines in source code window are grouped. When setting a breakpoint all grouped lines getting the red filled circle, but this is treated as only one breakpoint
- **Activate/deactivate breakpoints**
  - Single-click to breakpoint
- **Delete breakpoint**
  - Double-click to breakpoint until red filled (or white filled) circel disappears

EUROScope lite 16FX Breakpoints





- **Short explanation of EUROScope source code window**



EUROScope lite 16FX Processor Status

- **Processor window provides most important registers**
- **All processor flags are shown individually**
- **All values can be changed**
- **Window is updated on any stop or break of the application**
- **Changes in values are displayed in red due to prior update**

Register: unknown register

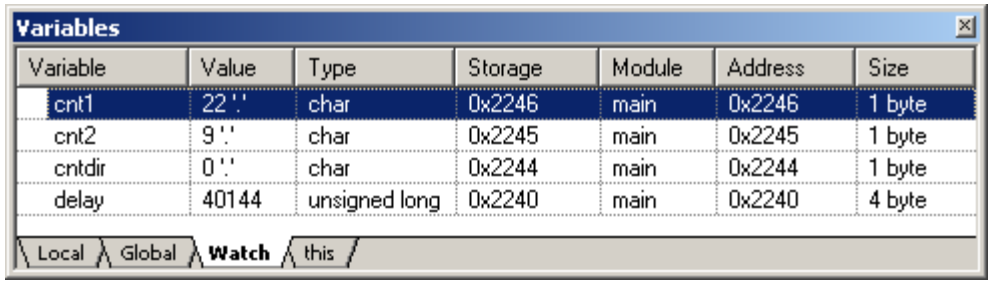
```
RL0=01CC0000  RL1=00F80004  RL2=00020000
RL3=00F80000

RW0=0000  RW1=01CC  RW2=0004  RW3=00F8
RW4=0000  RW5=0002  RW6=0000  RW7=00F8

R0=00  R1=00  R2=02  R3=00  R4=00  R5=00
R6=F8  R7=00

A=00660066  AH=0066  AL=0066

PC=F80169  SSP=00253E  USP=002544

DPR=22  DTB=00  ADB=00

PS=E0E5  ILM=7  RP=00  CCR=E5

I=1  S=1  T=0  N=0  Z=1  V=0  C=1  TBR=0000
```

EUROScope lite 16FX Variable Window





- **Local**
  - Local variables are automatically collected in view „Local“
- **Watch**
  - All local and up to 8 global variables can be added individually to the ‘Watch‘ window
- **Variables are updated on any stop or break of the application**
- **Changed values are displayed in red**
- **Variable values can be changed in ‘value‘ entry**

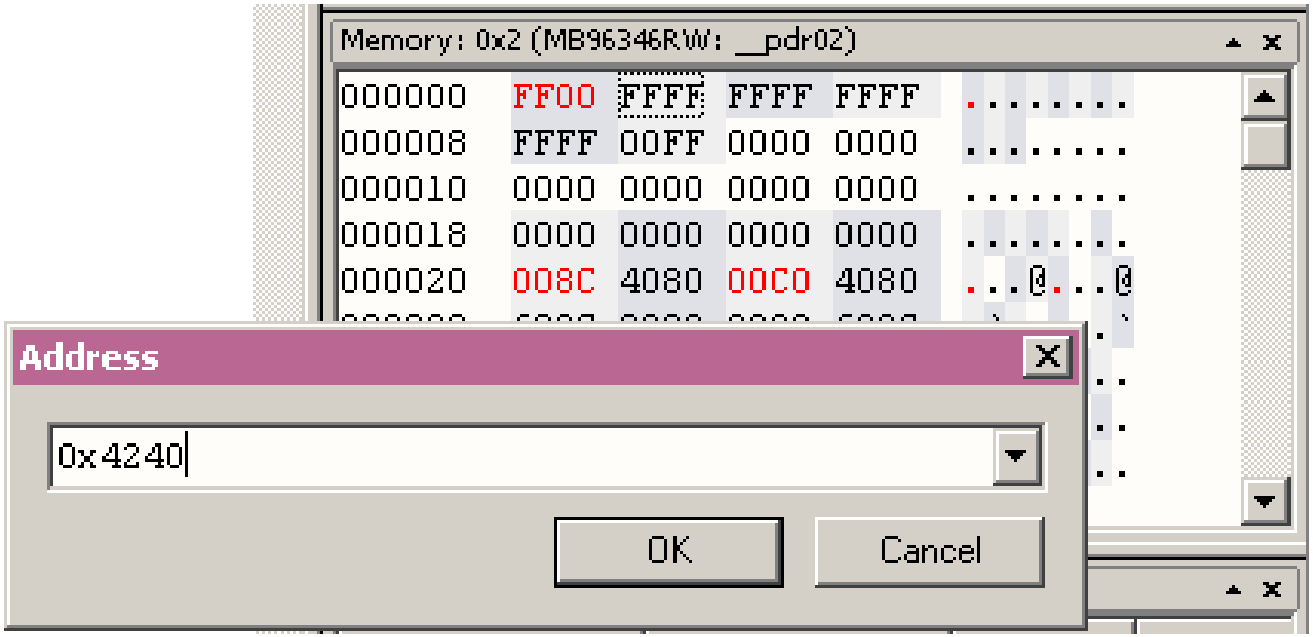


EUROScope lite 16FX Memory View





- **Memory view is updated on every stop or break**
- **Value change is displayed in red due to prior update**
- **Memory content can be changed**
- **Memory can be filled with a user byte and size**

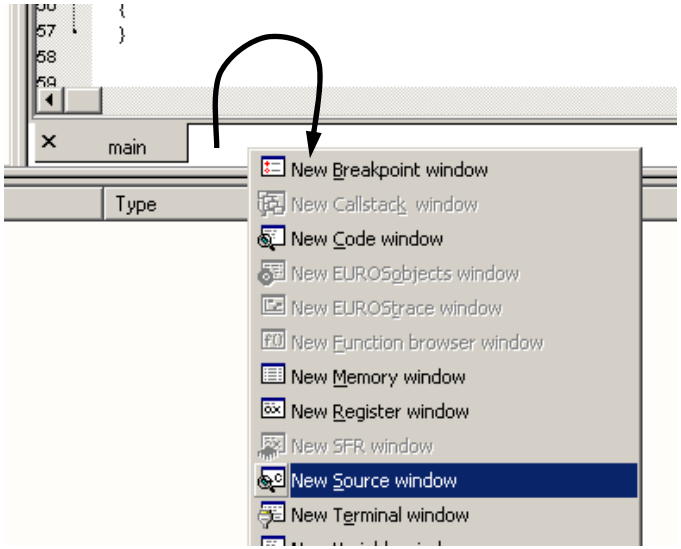


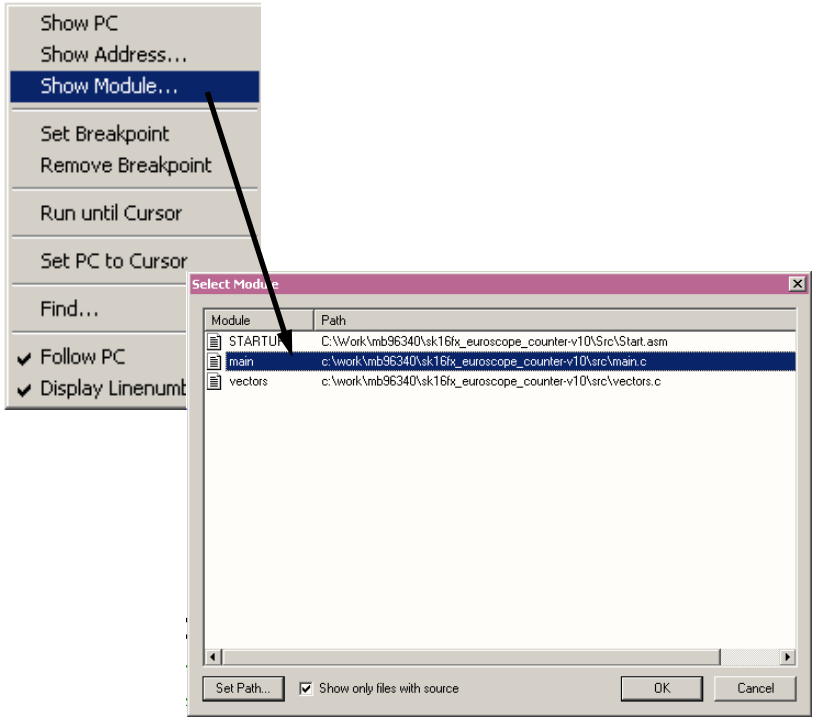
EUROScope lite 16FX Changing/Adding Source Window





- **New source module window**
  - Go in window tab area and right-button click
  - Choose „New Source window“
- **Change source window**
  - Get menu by right-mouse-button-click in the source window
  - Choose „Show Module...“
  - Browse to Module File





EUROScope lite 16FX Flash Programming

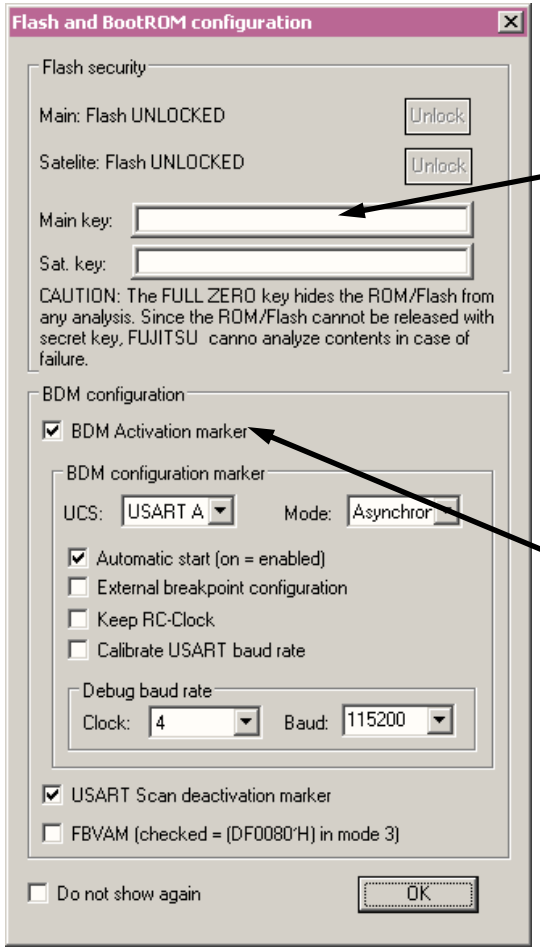
- **Flash programming is available via the Flash button:**
  - BDM configuration can be set before programming
  - Chip erase is supported
  - Flash programming is supported
  - User has to press reset button after Flash programming
  - Fujitsu Flash programming kernels are reused

EUROScope lite 16FX BDM Configuration





- **Background debugging mode configuration**
- **Flash security unlock**



Flash security unlock keys

BDM Activation

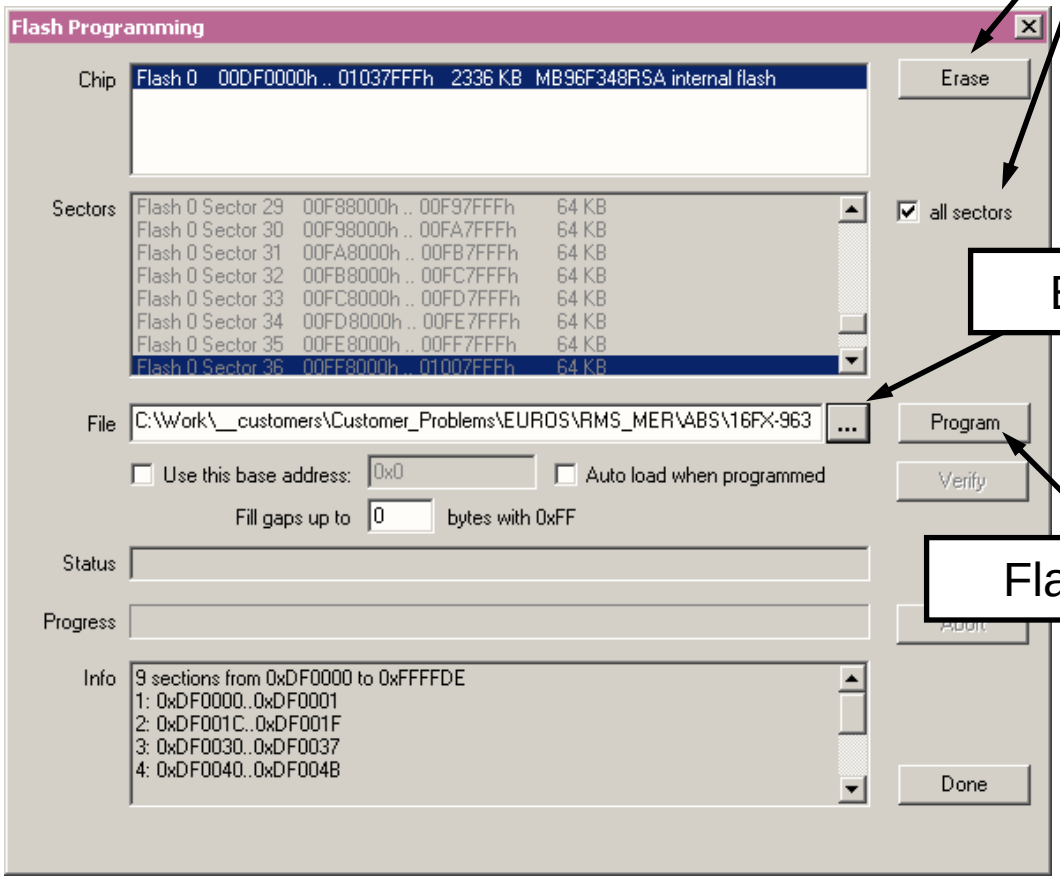
[√] Use EUROScope configuration
[ ] Use MHX file configuration

EUROScope lite 16FX Flash Programming Dialog





- **Chip erase and Flash programming**
  - Click on ‚Done‘ and reset board after programming



Chip erase (‚all sectors‘ must be checked)

Browse to MHX file

Flash programming

EUROScope lite 16FX Prospect

- **All SK16FX-EUROSCOPE examples are configured as follows:**
  - UART0 for debugging
  - UART1 may be used by the application
  - Asynchronous communication
  - 115200 Bits/s
  - Autorun after reset
  - No breakpoint predefinition

- **For more details of „EUROScope lite 16FX“ please refer to application note:**
  - mcu-an-300235-e-16fx_using_EUROScope





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/MB96F348HSBPMC.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 16FX seminar
  - to order the latest 'Fujitsu Micros DVD' containing all information regarding Fujitsu's 8-bit, 16-bit, and 32-bit microcontrollers

Optional Tools

- **High-end evaluation board**
  - Flash-Can-100P-340 (Supports QFP package M06/M22)
  - ADA-91270-90340-100PFV (Adapter for LQFP/PMC package M05/M20)
- **Hardware emulator**
  - MB2198-01 + MB2198-500
  - Emulation chip MB96V300B
  - Probe header MB2198-502 for LQFP package M05/M20
    - Socket NQPACK100SD-ND, HQPACK100SD
  - Probe header MB2198-501 for QFP package M06/M22
    - Socket NQPACK100RB179 +HQPACK100RB179
- **Programmer**
  - Conitec GALEP-4
- **Operating systems**

Evaluation Board

- **Flash-Can-100P-340 V2.0**
  - Evaluation board for MB96340 Series (for QFP package M06/M22)
  - Emulator target board
  - Access to all on-chip peripherals
  - 2x UART
  - 2x CAN
  - 2x LIN
  - 8x ‘User’-LEDs
  - 5x ‘User’-Buttons
  - Flash-Kit connector
  - Connector for LC-Display
  - Example projects

Evaluation Board

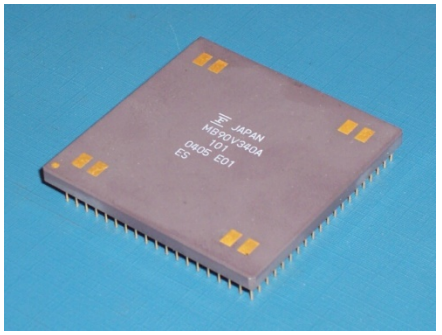
- **ADA-91270-90340-100PFV**
  - Adapter for LQFP package M05/M20
  - Optional for Flash-Can-100P-340

Hardware Emulator

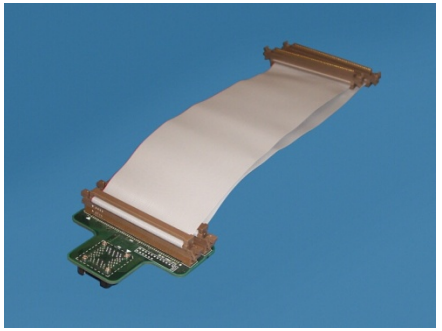
- **In-Circuit emulator for F2MC-16FX**
  - Main unit (MB2198-01), Adapter (MB2198-500), V-Chip (MB96V300B)
  - USB, LAN, and RS232 communication interface
  - Connected to target system via standard Fujitsu probe cable
  - High speed operating frequency
  - 2052 code / 4 data event breakpoints
  - Sequential breakpoints (4 conditions / 3 levels)
  - Trace function

Hardware Emulator

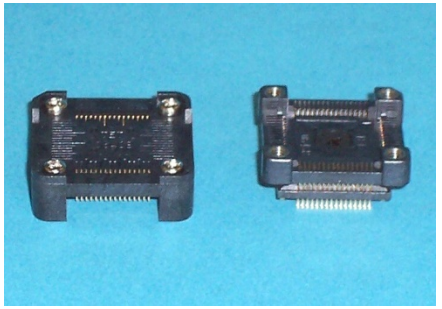
- **Emulation chip MB96V300B**
  - Superset supports all features of 16FX



- **Probe header**
  - MB2198-502 for LQFP package M05/M20
  - MB2198-501 for QFP package M06/M22



- **Socket for LQFP package M05/M20**
  - NQPACK100SD-ND, HQPACK100SD
- **Socket for QFP package M06/M22**
  - NQPACK100RB179, HQPACK100RB179



Programmer

- **GALEP-4 / GALEP-5**
  - Supports parallel programming
  - Supports serial synchronous and asynchronous programming
  - Optional programming cable for serial synchronous programming
  - Allows programming in volume production
  - www.conitec.com

Operating Systems

- **ProOSEK®**
  - Real-time operating system, OSEK/VDX
  - www.elektrobit.com
- **EUROS**
  - RTOS including TCP/IP, IrDA, IDE, CAN-Bus, CANopen, Profibus, etc.
  - www.euros-embedded.com
- **RTA-OSEK**
  - Realogy Real-Time Architect (RTA) ,OSEK, incl. timing analysis tool
  - www.etasgroup.com
- **embOS**
  - Small memory footprint for single-chip applications incl. PC viewer
  - www.segger.com
- **osCAN (OSEK/VDX)**
  - osCAN (OSEK/VDX) and further networking software CAN, LIN, FlexRay, etc.
  - www.vector-informatik.de
- **FreeRTOS**
  - Free and open source mini Real Time Scheduler
  - www.FreeRTOS.org





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- **World Wide Web**
  - http://emea.fujitsu.com/microelectronics
  - http://mcu.emea.fujitsu.com
  - Contact: mcu_ticket.FSEU@de.fujitsu.com

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**

EU-Konformitätserklärung / EU 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**

Fujitsu Semiconductor Europe

- **‘SK-16FX-EUROSCOPE’-CD Link-List**
  - Software
    - Softune Workbench
    - EUROScope lite 16FX
    - MCU Flash programmer
    - SKwizard
  - Software Examples
    - sk16fx-euroscope_adc_dvm
    - sk16fx-euroscope_can_uart_terminal
    - sk16fx-euroscope_counter
    - sk16fx-euroscope_template
    - sk16fx-euroscope_uart
  - Documents
    - Schematic ‘SK-16FX-100PMC’
    - Data sheet MB96340 Series
    - Hardware manual 16FX Family
    - AppNote ‘16FX Hardware Setup’
    - AppNote ‘16FX Getting Started’
    - Customer Information 16FX
    - EUROScope Reference Manual
    - AppNote ‚EUROScope‘
    - Customer Information of ‚EUROScope‘ limitations