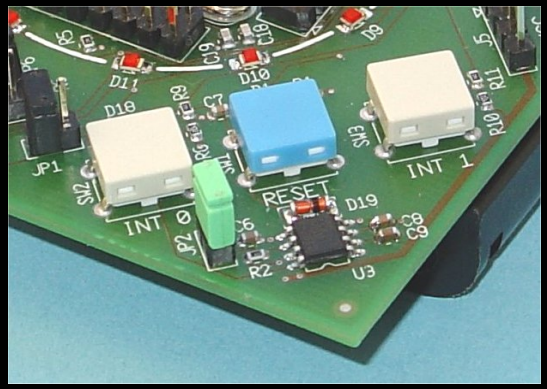
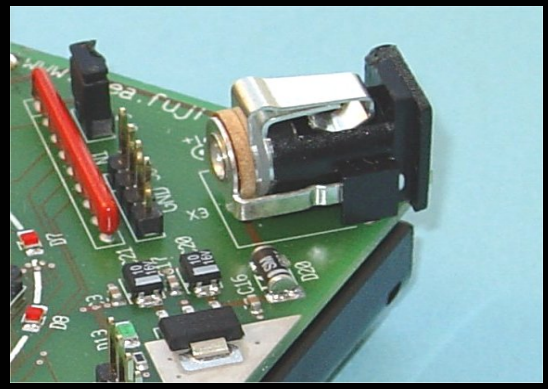
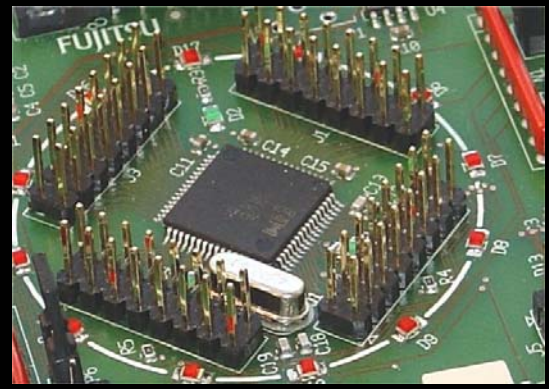
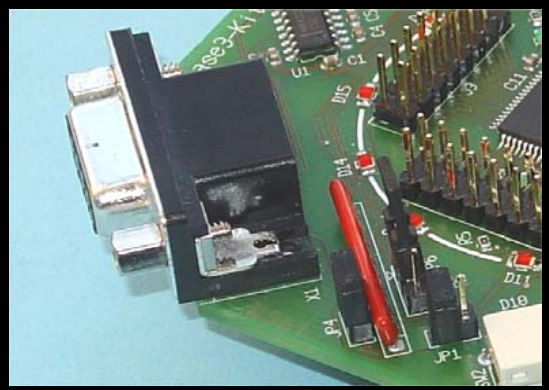


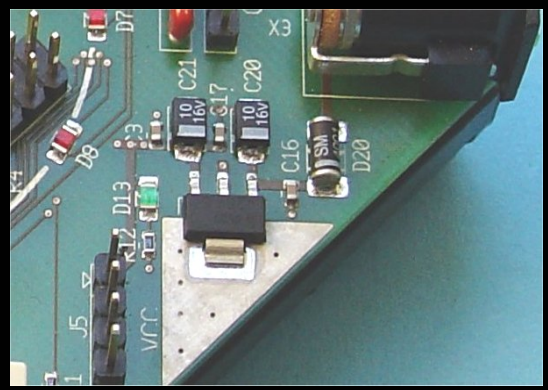


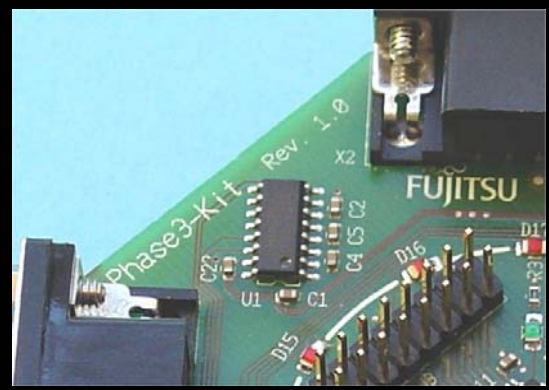


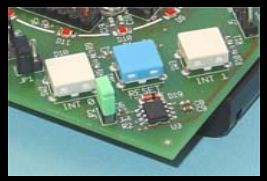
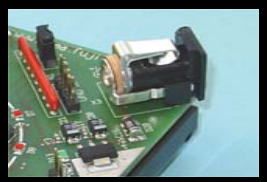
FUJITSU

Phase3-Kit



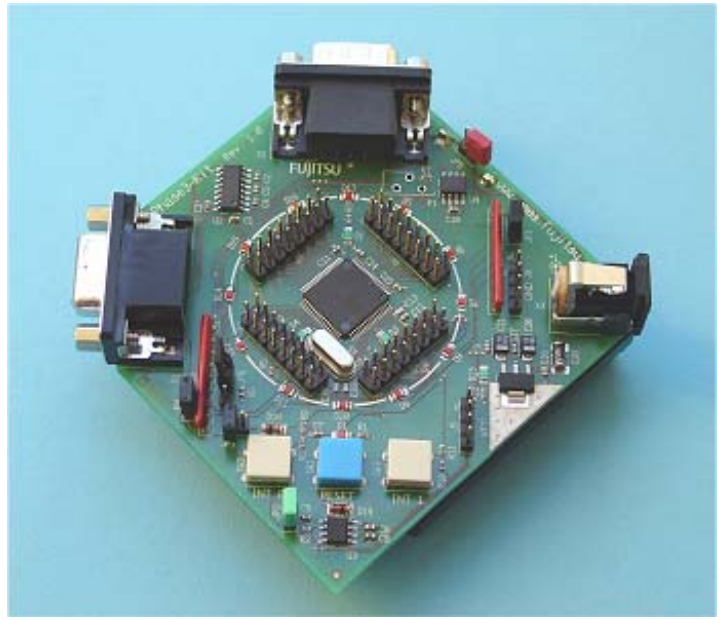




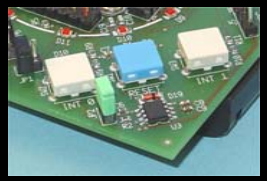

Overview

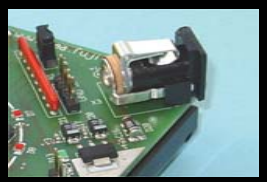
- **Introduction**
  - About the Phase3-Kit
  - Phase3-Kit content
  - Test it
  - The hardware
  - The software
- **Try yourself**
  - Software examples
  - Program download
  - New project
- **32-bit product overview**
- **Contacts**



- **Additional documents**
  - Schematic ‘Phase3-Kit’
  - Data sheet MB91265 Series
  - Correction of data sheet
  - Hardware manual MB91265 Series
  - Correction of hardware manual
  - Watchdog MB3793-42

About the Phase3-Kit

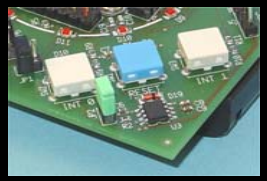
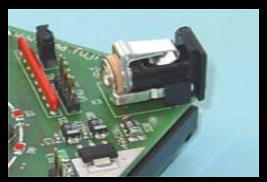




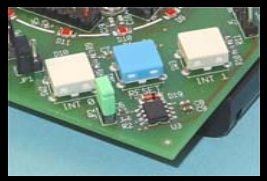
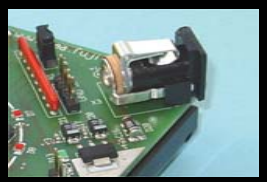
- **The Phase3-Kit is a low-cost evaluation board based on the Fujitsu 32-bit microcontroller MB91F267N**

- **The MB91F267 microcontroller includes the following features:**
  - 128 KByte Flash Memory
  - 4 KByte RAM
  - 6 channel output compare
  - 2x UART
  - 1x C-CAN
  - SUM of products macro
  - Timer (PPG, PWC, FRT others)
  - 5x DMA controller
  - External interrupts
  - Others

About the Phase3-Kit

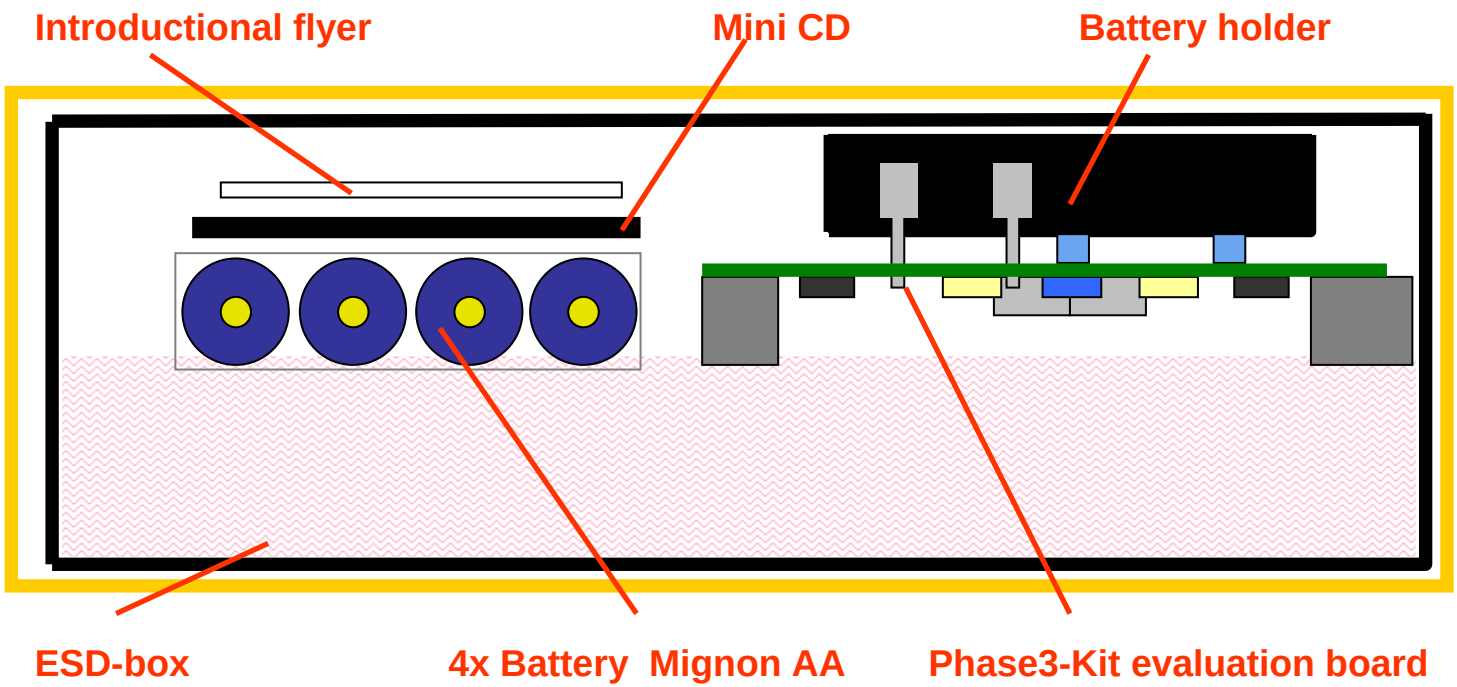




- **The Phase3-Kit evaluation board includes the following features:**
  - Microcontroller MB91F267N
  - 1x UART-Transceiver (SUB-D9 connector)
  - 1x high-speed CAN-Transceiver (SUB-D9 connector)
  - 1x external watchdog MB3793-42
  - 2x ‘User’-button
  - 1x ‘Reset’-button, ‘Reset’-LED
  - All 64 pins routed to pin-header
  - On-board 5V voltage regulator, ‘Power’-LED
  - Battery-supply (external power supply possible)

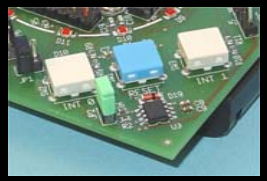
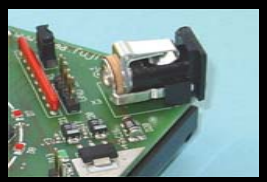




Phase3-Kit content

- **The Phase3-Kit contains**
  - Phase3-Kit evaluation board
  - 4x Battery Mignon AA
  - 1 page introductional flyer
  - Mini CD with documentation and software examples



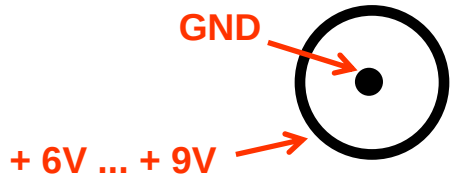
Test it

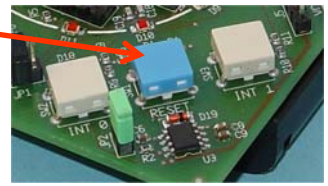

- **Put the batteries into the battery holder** (close JP5)

or

- **connect an optional external power supply**



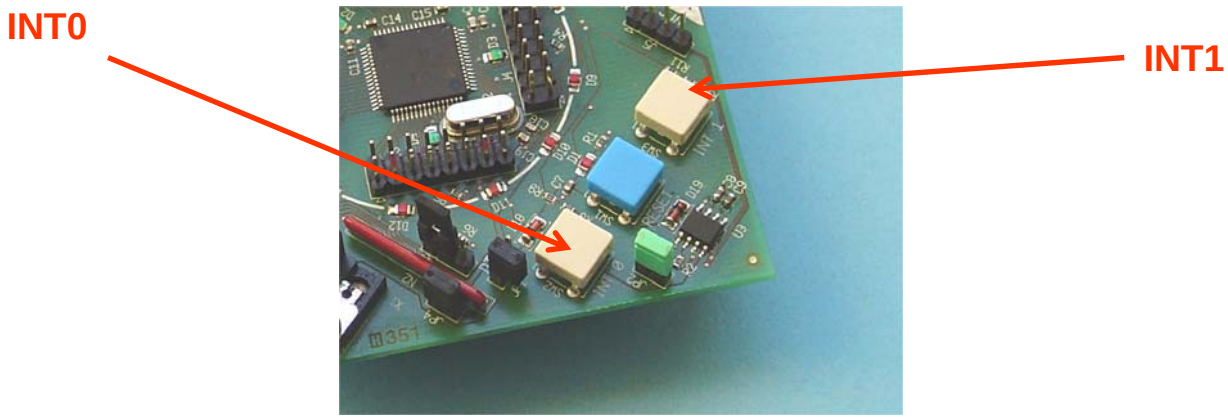
- **Press the ‚Reset'- Button**



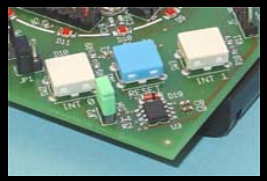
- **The software starts automatically**
  - The red LEDs will start flashing in clockwise rotation

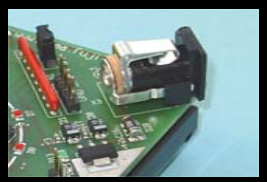
Test it

- **Press the ‚User'-Button ‚Int1' to:**
  - increase speed during clockwise rotation
  - decrease speed during counter-clockwise rotation
  - change rotation direction (if speed is minimum)
- **Press the ‚User'-Button ‚Int0' to:**
  - deacrease speed during clockwise rotation
  - increase speed during counter-clockwise rotation
  - change rotation direction (if speed is minimum)



Test it

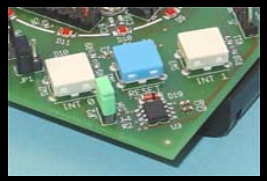
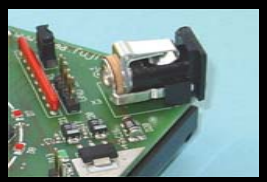




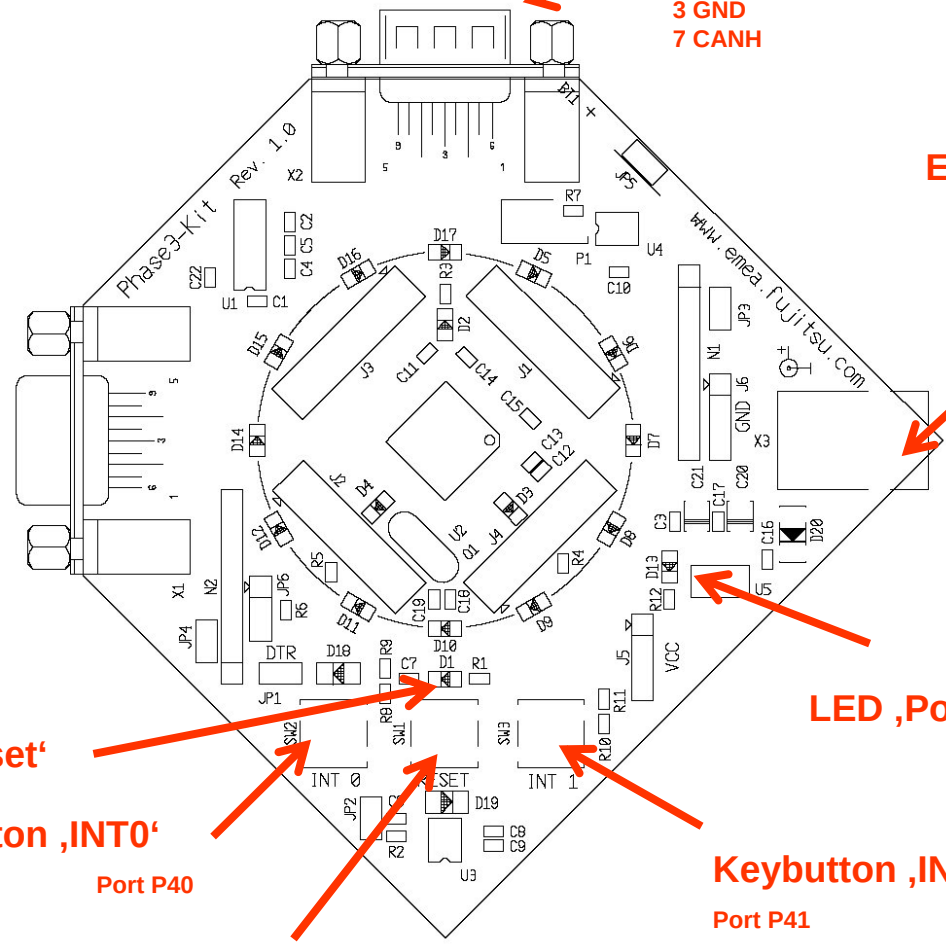
Congratulations!

- **You finished successfully the first test**
- **In the following you will get more details about the Phase3-Kit**
- **You will learn more about**
  - The on-board features
  - How to program the flash
  - How to start your own application

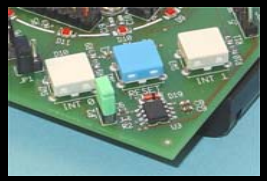
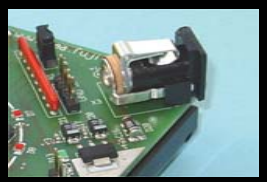
The Hardware


- **Main-features**



The Hardware


The jumpers

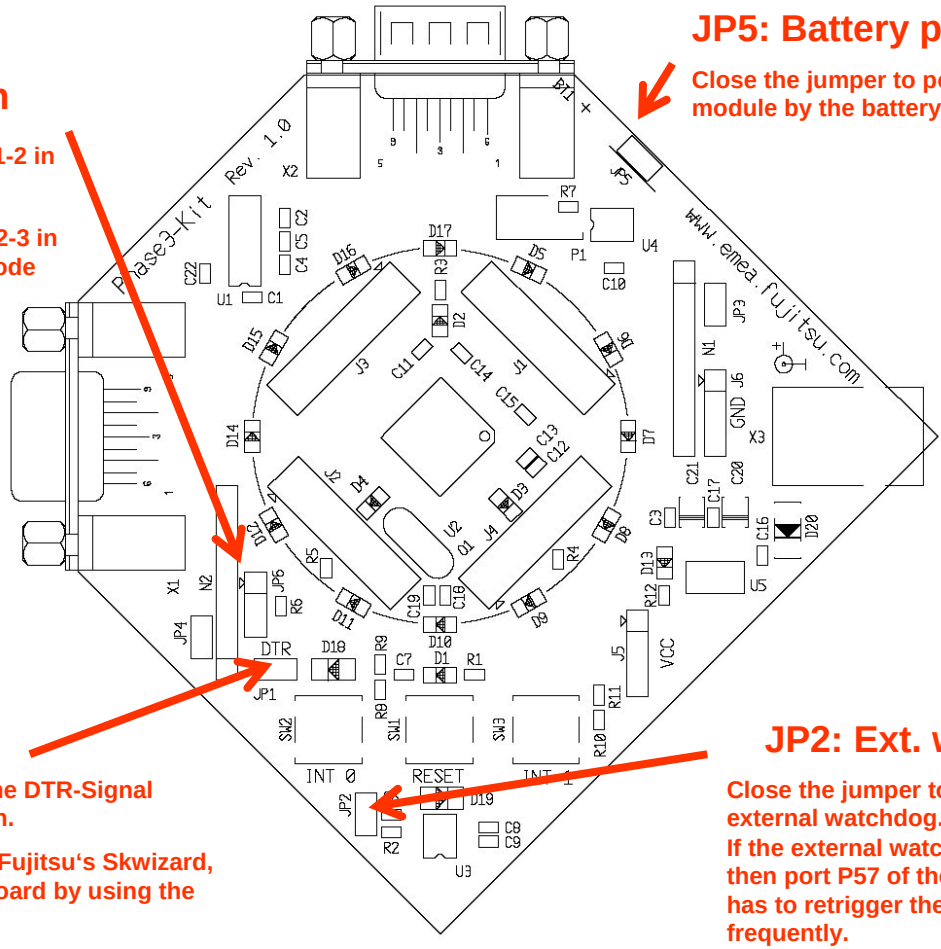
JP6: Mode selection

RUN: Set jumper to position 1-2 in order to select the run-mode

PGM: Set jumper to position 2-3 in order to select the program-mode

JP5: Battery power

Close the jumper to power the module by the battery pack



JP1: DTR-Reset

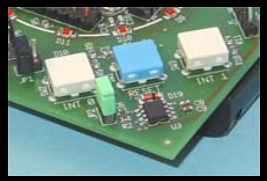
Close the jumper to connect the DTR-Signal to the microcontroller reset-pin.

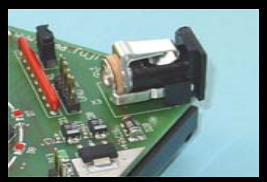
Some terminal-programs, e.g. Fujitsu's Skwizard, allow to reset the evaluation board by using the DTR-Signal.

JP2: Ext. watchdog

Close the jumper to enable the external watchdog.
If the external watchdog is enabled, then port P57 of the microcontroller has to retrigger the watchdog frequently.

The Hardware



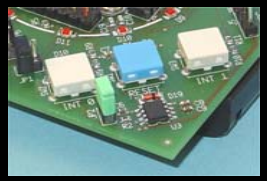
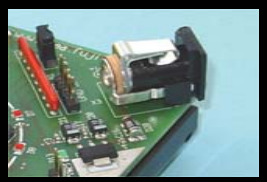


The microcontroller pins

Pin	Pin-name	On Phase3-Kit used by
1	AVSS	GND
2	ACC	100n ‚C' Capacitor
3	AN0/P50	LED D5
4	AN1/P51	LED D6
5	AN2/P52	LED D7
6	AN3/P53	LED D8
7	AN4/P54	LED D9
8	AN5/P55	LED D10
9	AN6/P56	LED D11
10	AN7/P57	LED D12 (ext. watchdog trigger)
11	AN8/P44	
12	AN9/P45	
13	AN10/P46	
14	NMIx	
15	C	
16	VSS	GND

Pin	Pin-name	On Phase3--Kit used by
17	VCC	+Vcc
18	P00/PPG1/INT4	
19	P01/PPG2	
20	P02/PPG3/INT5	
21	P03/TIN0	LED D14
22	P04/ITIN1	LED D15
23	P05/TIN2	LED D16
24	P06/TOT1	LED D17
25	P07/TOT2	
26	P10/SOT0	UART (TXD)
27	P11/SIN0	UART (RXD)
28	P12/SCK0	
29	P13/SOT1	
30	P14/SIN1	
31	P15/SCK1	
32	P16/PPG5/INT6/RX0	CAN-Transceiver RX

The Hardware

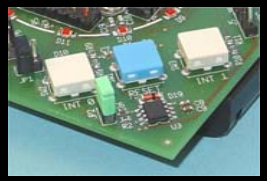
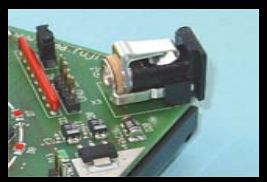




The microcontroller pins (cont'd)

Pin	Pin-name	On Phase3--Kit used by
33	P17/PPG6	CAN-Transceiver TX
34	P20/ADTG1/IC2	
35	P21/ADTG2/IC3	
36	P22/PWIO	
37	P23/DTTI	
38	P24/CKI	
39	P25/IC0	
40	P26/IC1	
41	P27	
42	PG1/PPG0	
43	MD2	Jumper JP6
44	MD1	GND
45	MD0	GND
46	X0	4MHz crystal
47	X1	4MHz crystal
48	VSS	GND

Pin	Pin-name	On Phase3--Kit used by
49	P37/PPG4	+ VCC
50	P36/PPG7/INT7	
51	INT	Keybutton ‚Reset'
52	P35/RTO5	LED D4
53	P34/RTO4	
54	P33/RTO3	LED D3
55	P32/RTO2	
56	P31/RTO1	LED D2
57	P30/RTO0	
58	P40/INT0	Keybutton ‚INT0t'
59	P41/INT1	Keybutton ‚INT1t'
60	P42/INT2	
61	P43/INT3	
62	AVRH1	
63	AVRH2	
64	AVCC	+VCC

The Hardware

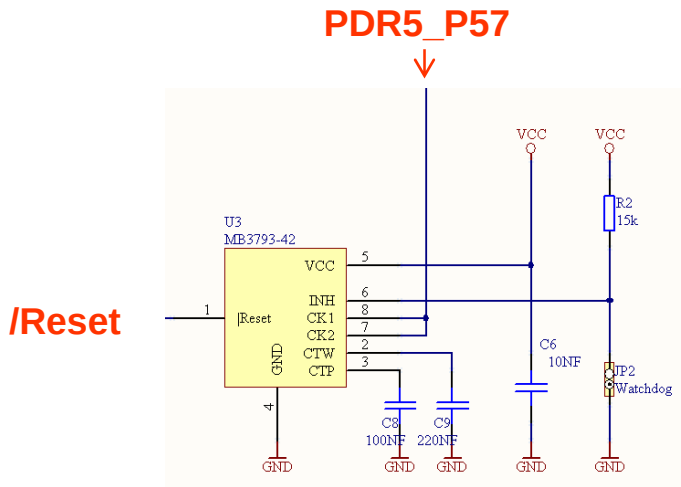

- **Power Supervisor and watchdog MB3793-42**
  - Generates reset-signal, if power goes below 4.2V

    $t_{Reset\ (typ.)}$ [ms] = 1300 x CTP [µF] = 130ms (with CTP = C8 = 100nF)

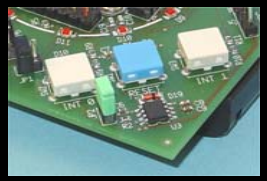
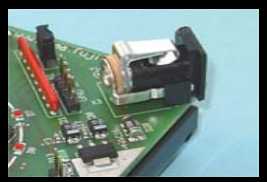
  - Watchdog feature can be enabled by jumper JP2
    Use port P57 for retriggering by rising edge (connected to CK1 & CK2)

    $t_{Retrigger\ (typ.)}$ = [1500 x CTW [µF] + 3 x CTP [µF]] / 2 = 160ms (with CTW = C9 = 220nF)

    $t_{WatchdogReset\ (typ.)}$ [ms] = 100 x CTP [µF] = 10ms



The Software

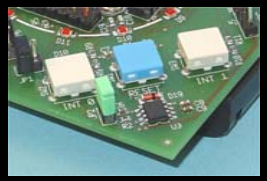
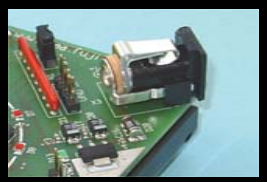




- **The Phase3-Kit CD includes the following software packages**
  - Softune Workbench (development platform for Fujitsu microcontroller)
  - MCU flash programmer tool
  - Utilities (SKwizard terminal, CAN Bitmixer, etc.)
  - Software examples for the Phase3-Kit
- **Additionally you can order the ‚Fujitsu MICROS CD V3.6‘**
  - Includes documentation & software for all Fujitsu microcontrollers
  - Please contact your local distributor
- **Please check our dedicated microcontroller web-site**

www.fme.gsdc.de/gsdc.htm

  - for updates of the flash programmer tool, utilities and examples
  - for datasheets, hardwaremanuals, application notes, etc.

The Software


- **Softune Workbench**
  - Free of charge (only registration is required)
  - Windows based development platform for all 32-bit microcontrollers
  - Includes: Editor, C-Compiler, assembler, linker and core simulator
  - Supports optional hardware emulator

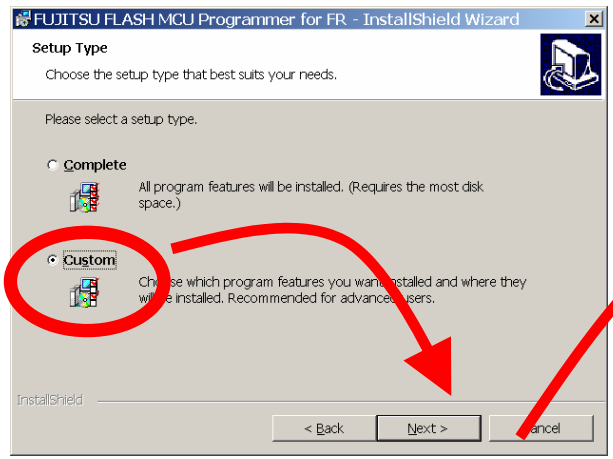
  - Please fill in the registration-form and send it to
    - micro_info@fme.fujitsu.com or FAX: ++49-(0)6103-690-122
    - Receive your password by email

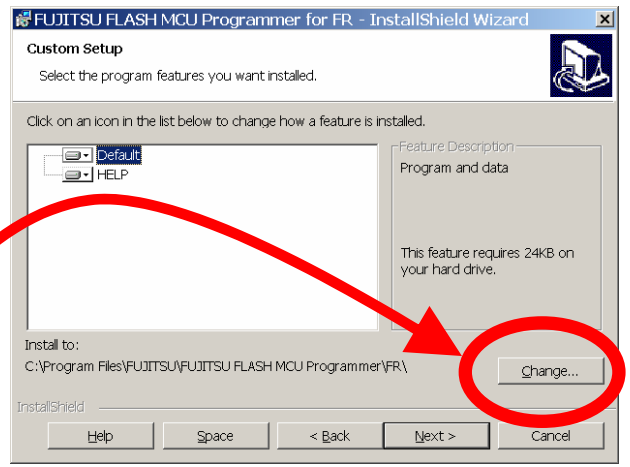
  - Requires ‘administration’ or ‘power user’ rights on the PC

  - Start installation
    - Enter password and choose destination folder (e.g. C:\SoftuneFR)

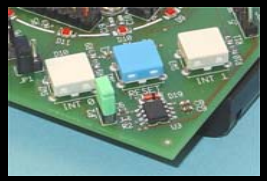
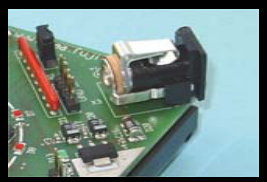
The Software

- **MCU flash programmer**
  - Free of charge, no registration required
  - Windows based programming tool for all 32-bit Fujitsu microcontrollers
  - Uses PC serial port COMx
  - Start installation
    - Select custom installation and select “change…” in order to choose the destination folder (e.g. C:\Softune\Utilities\FRprogrammer)





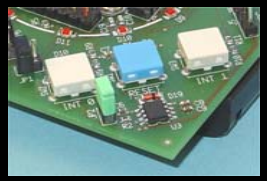
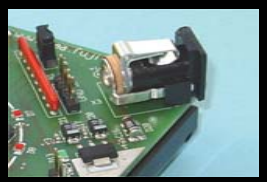
The Software


- **Some more tools are available....**

- **SKwizard**
  - Free of charge, no registration required
  - Windows based terminal program
  - Start installation
    - choose destination folder (e.g. C:\Softune\Utilities\SKwizard)

- **Bitmixer**
  - Free of charge, no registration required
  - Windows based program to easy CAN-settings of Fujitsu microcontrollers
  - Start installation
    - choose destination folder (e.g. C:\Softune\Utilities\Bitmixer)


Software Examples

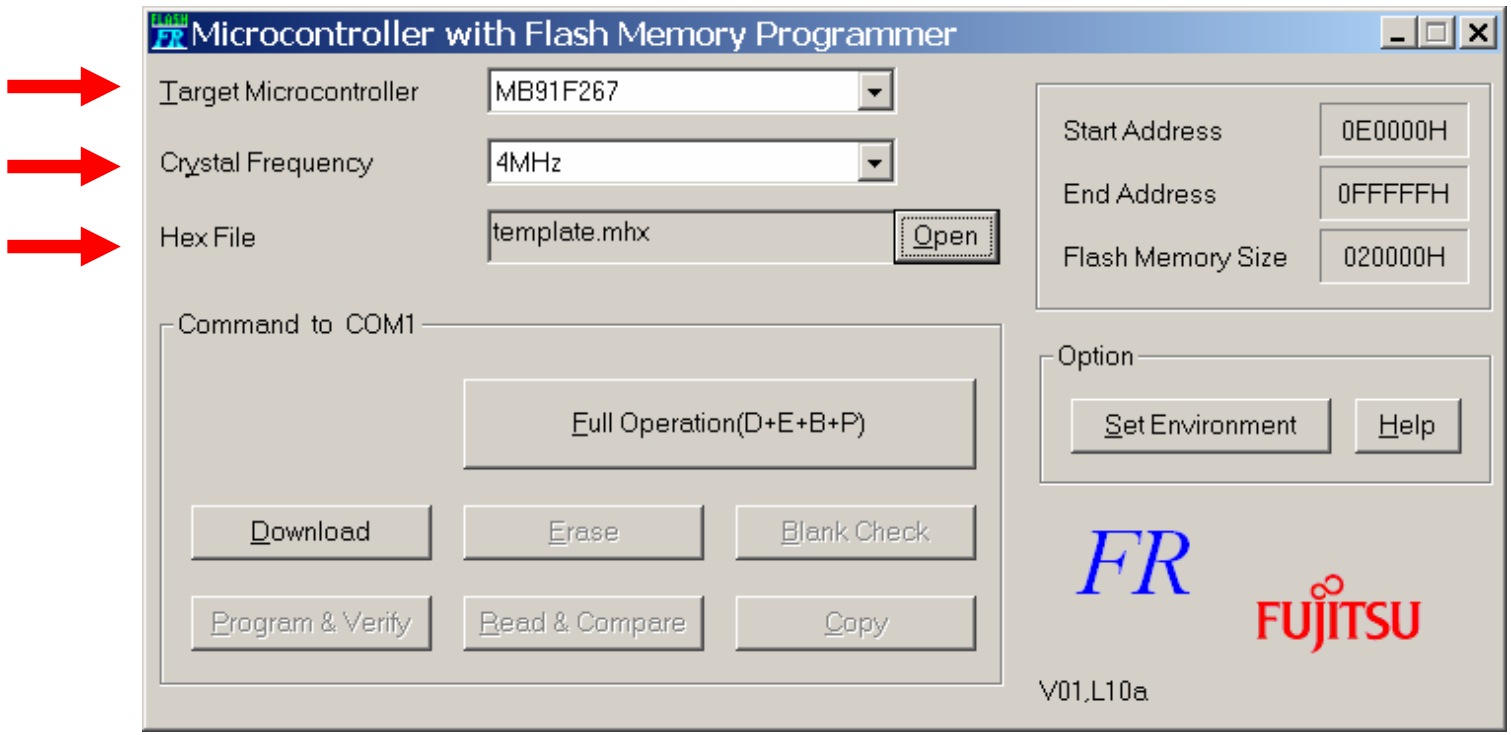
- **The following examples are provided with the Phase3-Kit CD**
  - Template ‚Empty' project as base for the user-application
  - Examples Software examples which show the functionality of some MCU blocks (e.g. UART, CAN etc.)

(Detailed program description can be found in each project's 'readme.txt')

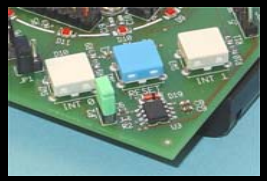
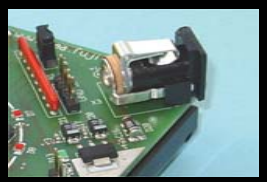
- Start installation
  - choose destination folder (e.g. C:\Softune\sample\Smpl32\Phase3-Kit)
- **Remove jumper JP2 (watchdog) for all examples!**

Program Download

- Start the Fujitsu MCU flash programmer
- Select the target microcontroller (MB91F267)
- Select the crystal frequency (4 MHz)
- Choose the software example from the example\‘ABS‘-folder (e.g. C:\SoftuneFR\smpl32\Phase3-Kit\standalone\abs\template.mhx)



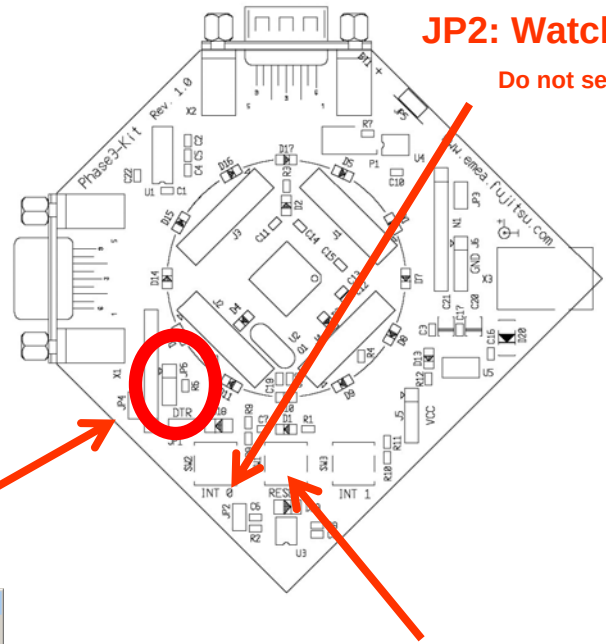
Program Download

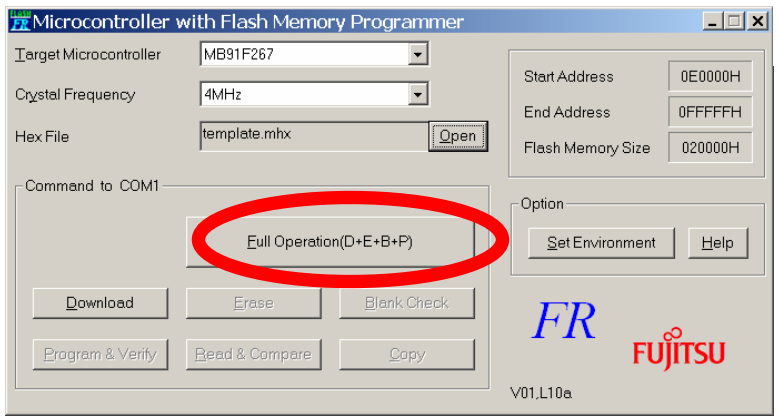



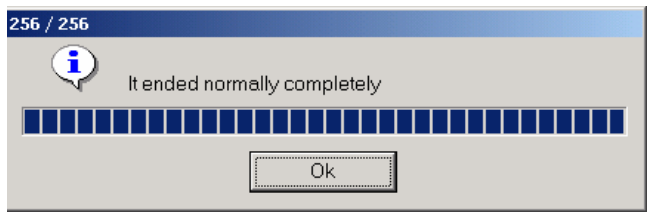

- **Connect X1 to the PC‘s COM port**
- **Set jumper JP6 to position ‚PGM‘**
- **Remove JP2**
- **Connect power supply**
- **Press ‚Reset‘**
- **Start ‚Full operation‘**

COM port

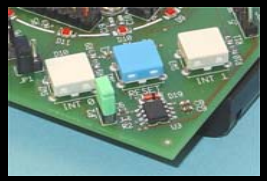
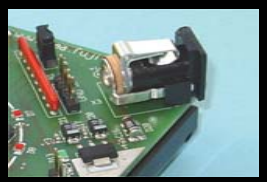
Use 1:1 cable for PC-connection







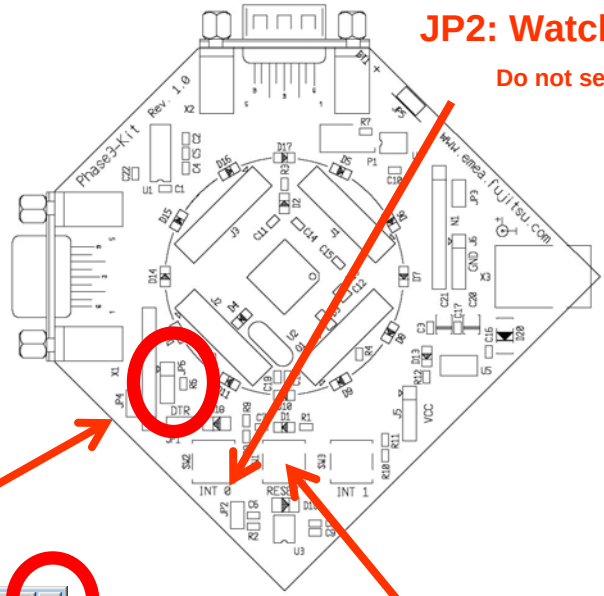
Program Download

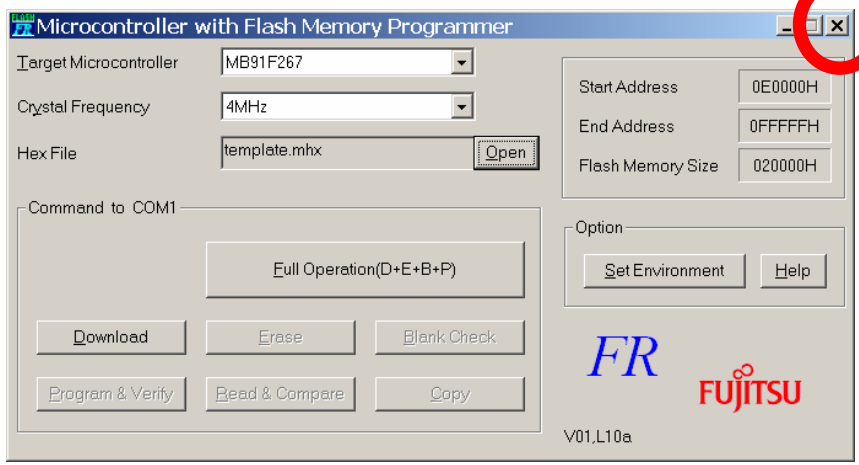




- **Close the MCU flash programmer**
- **Power off the board**
- **Set jumper JP6 to position ‚RUN‘**
- **Power on the board**
- **Press ‚Reset‘**

COM port

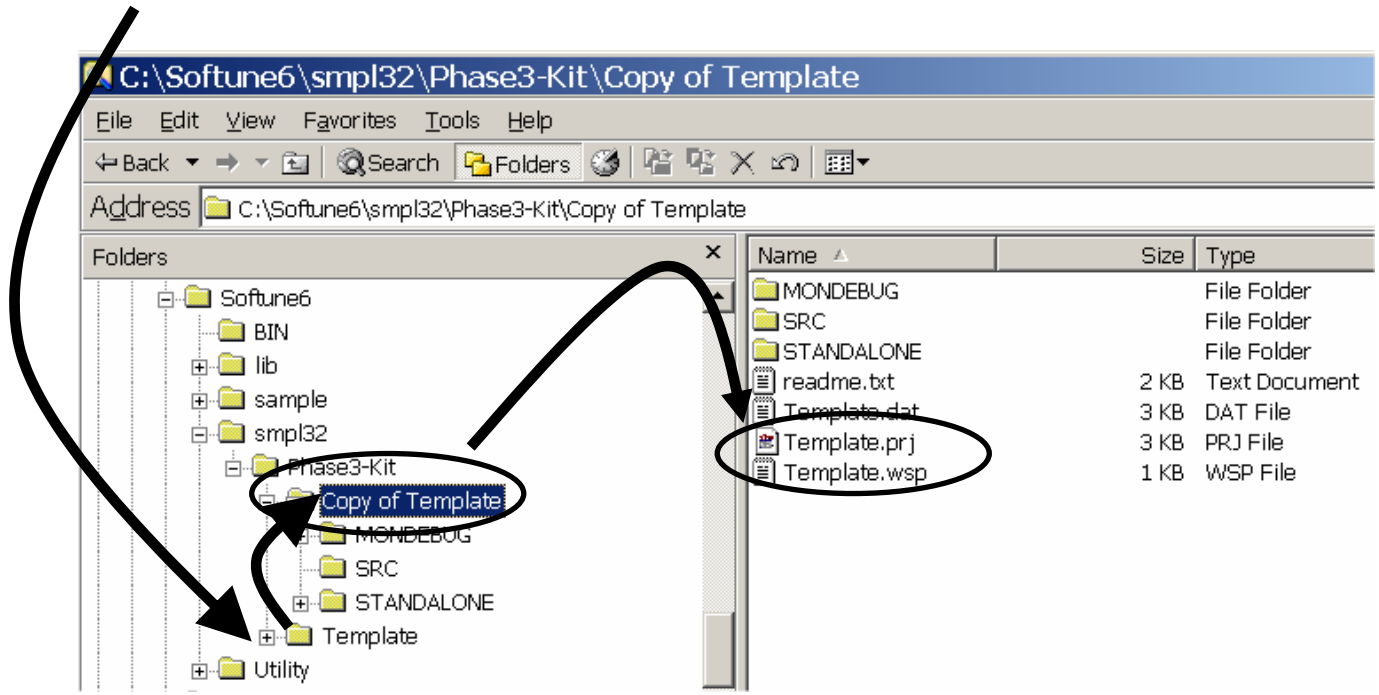
Use 1:1 cable for PC-connection





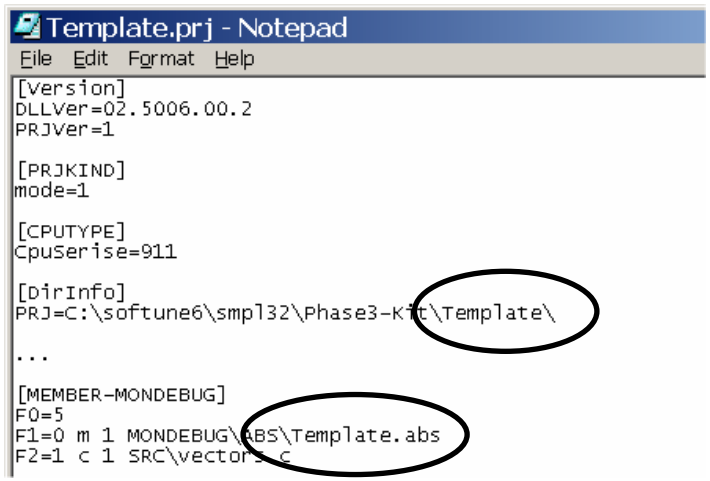
New Project

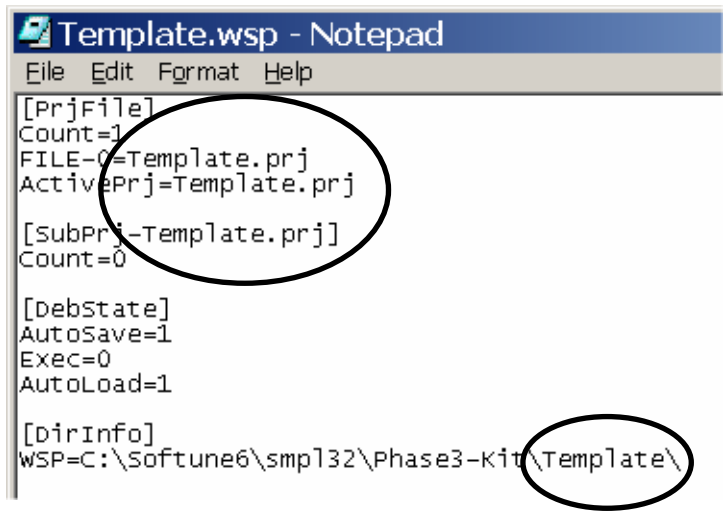
- **In order to start a new user-project use the template project**
  - This project includes the startup code, header files and vector table
- **Copy the folder ‘Template’ within the example-folder**
  - Rename ‘Copy of Template’ into ‘my_application’



New Project

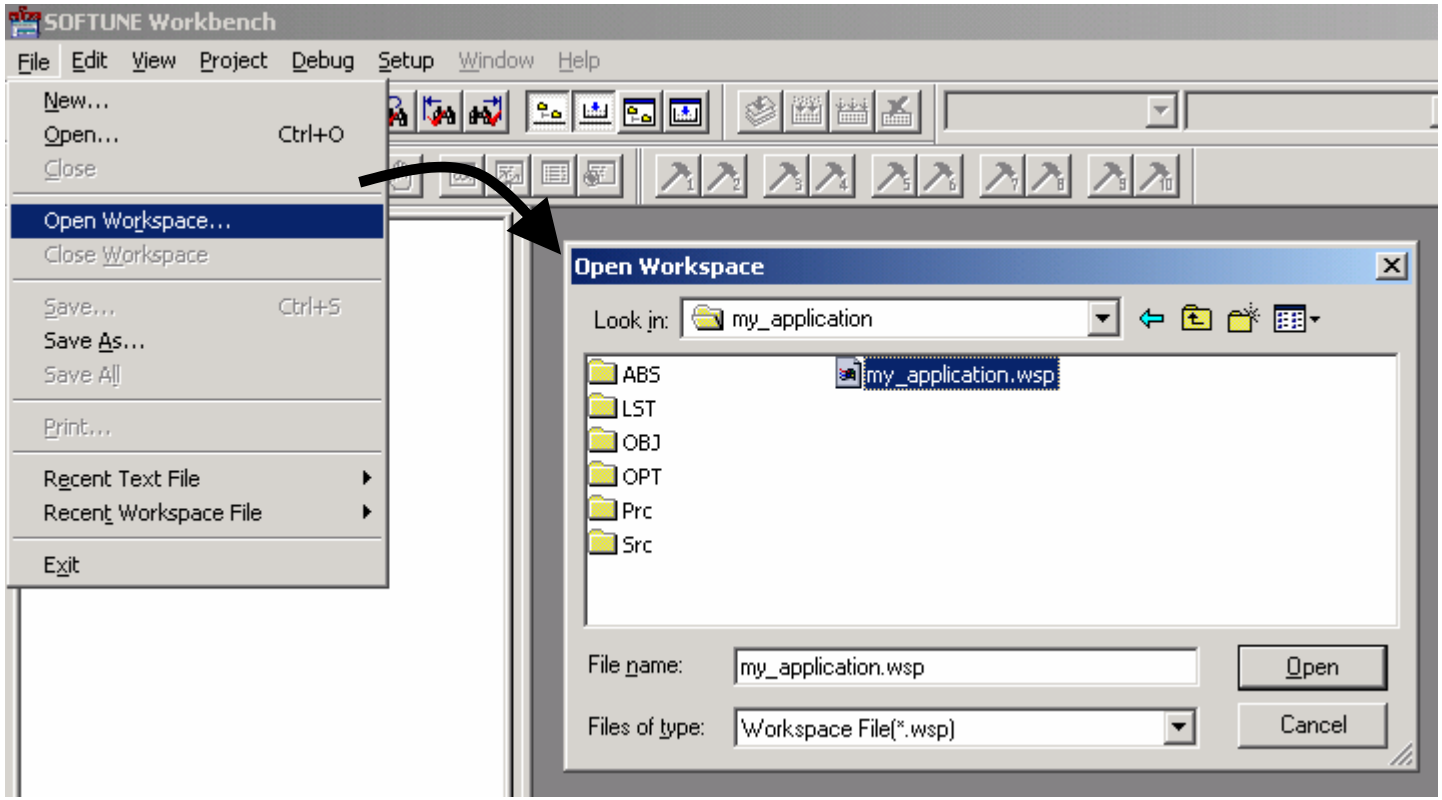
- **Enter ‘my_application’-folder**
  - Rename ‘template.prj‘ into ‘my_application.prj‘
  - Rename ‘template.wsp‘ into ‘my_application.wsp’
- **Edit ’my_application.prj’**
  - rename ‘template’ -> ‘my_application’
- **Edit ‘my_application.wsp’**
  - rename ‘template’ -> ‘my_application’





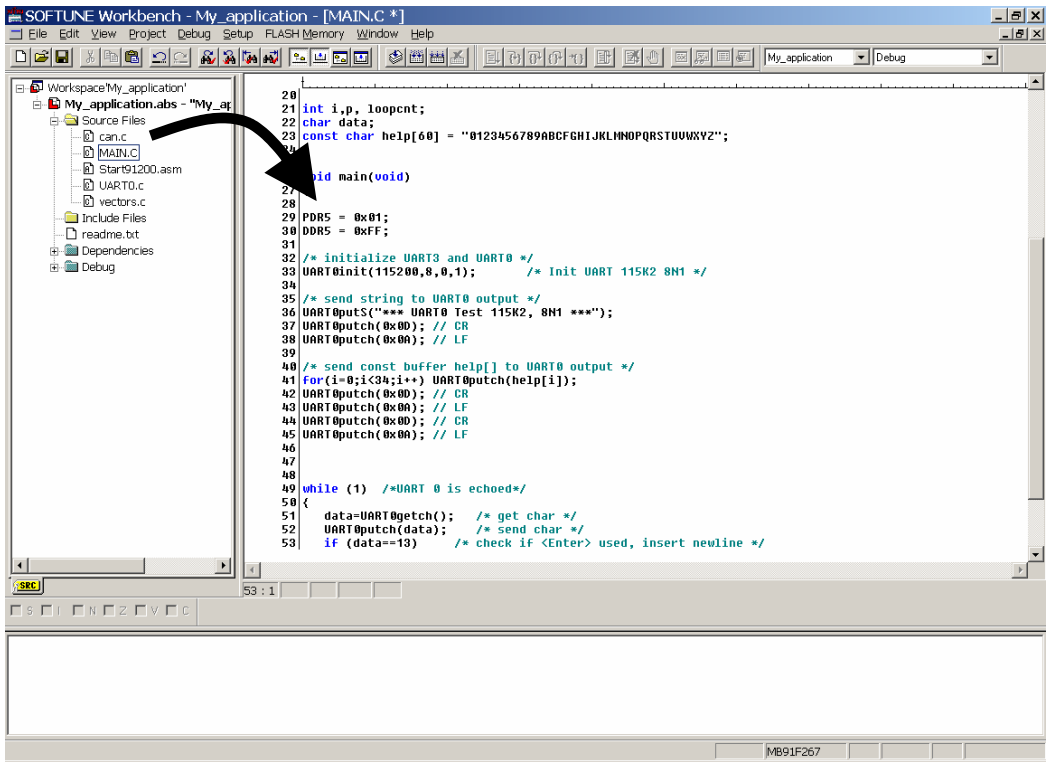
New Project

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



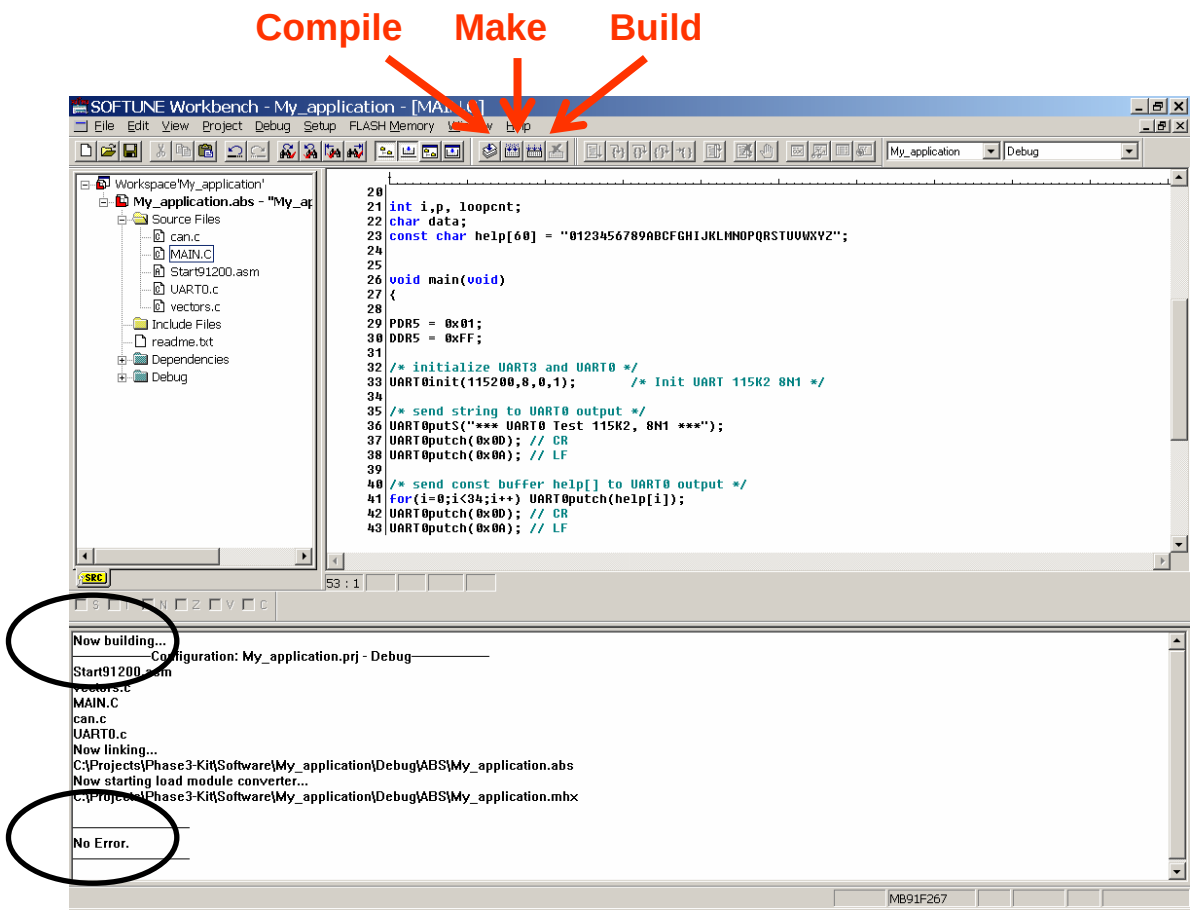
New Project

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

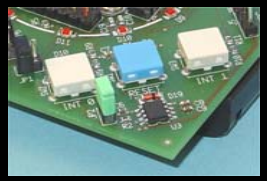


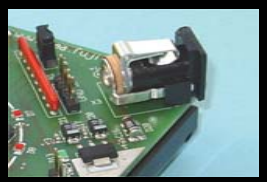
New Project

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



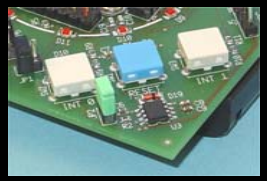
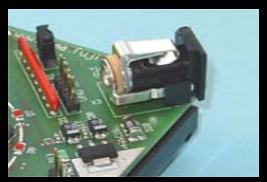
New Project





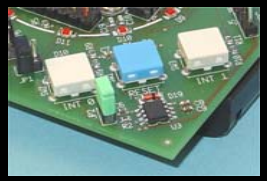
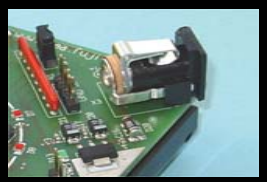
- **You have finished your first project**

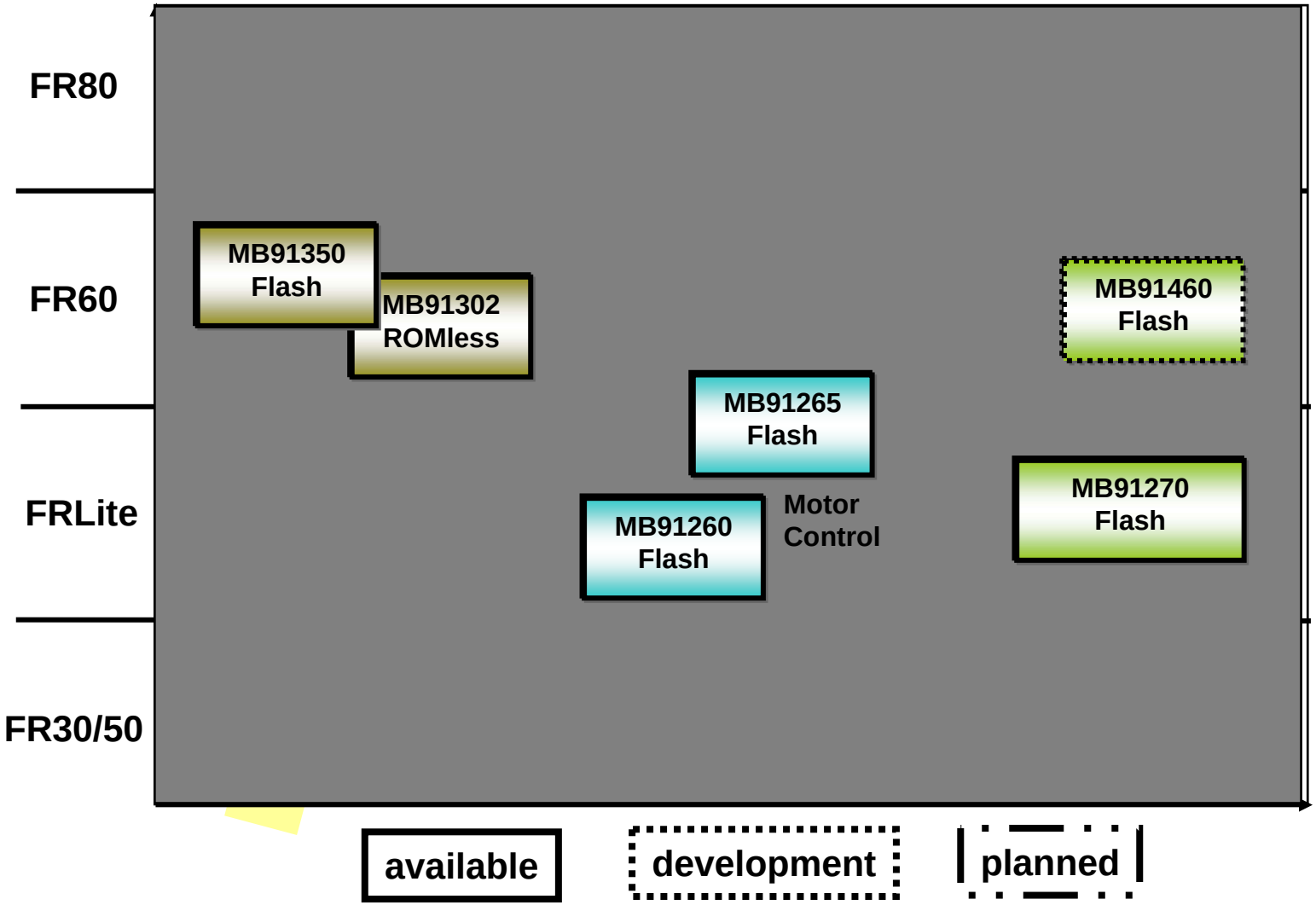
Further Steps

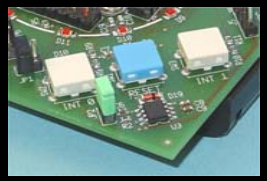
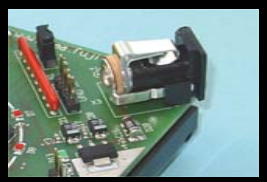

- **In order to learn more about Fujitsu's microcontrollers**
  - See our application notes
    - http://www.fme.gsdc.de/macrofam/applica0.htm
  - See our software examples
    - www.fme.gsdc.de/products/samples.htm
- **Contact your local distributor …**
  - for individually support
  - to order the latest "Fujitsu Micros CD" containing all information regarding Fujitsu's 8-bit, 16-bit and 32-bit microcontroller

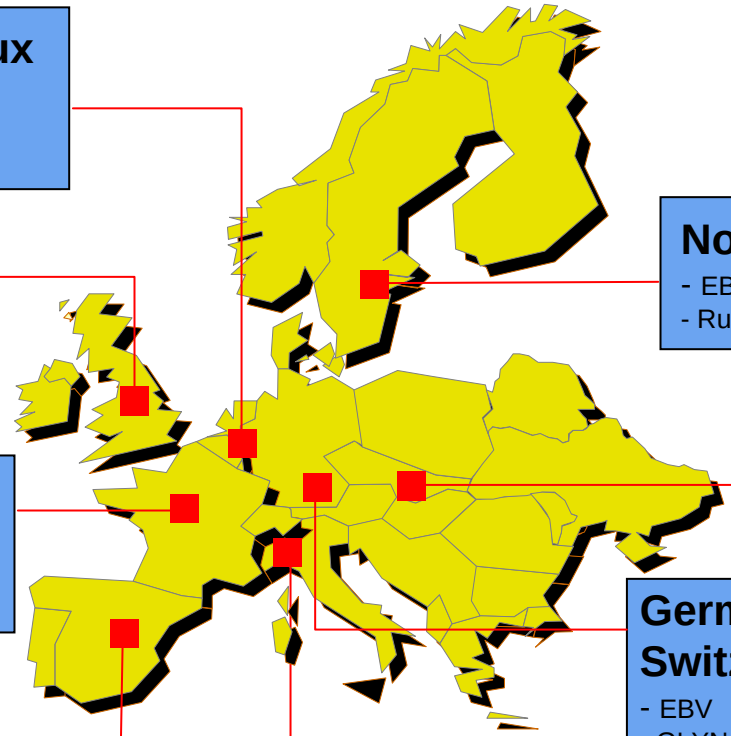
FR Lineup

Contacts - Distribution

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- Rutronik

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- GLYN
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- EBV
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- Rutronik

East Europe
- EBV
- AteG, Ineltek
- Rutronik

Germany/Austria/ Switzerland
- EBV
- GLYN
- AteG (Ineltek & Anatec)
- Rutronik

Spain/Portugal
- EBV
- Sagitron
- ATeG, Anatronic
- Rutronik

Italy
- EBV
- Melchioni
- Malpassi
- Rutronik

In alphabetical order:

www.anatec.ch
www.ebv.com
www.gd-technik.com
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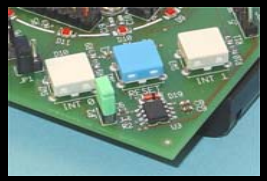
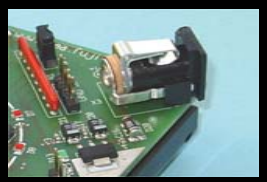
www.pne.fr
www.rutronik.com
www.sagitron.es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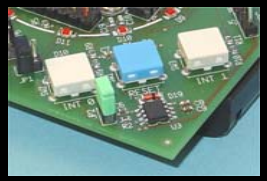
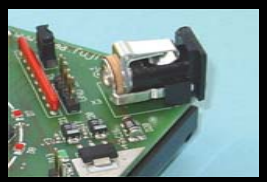
- **World-Wide-Web (Internet)**
  - www.fme.gsdc.de/gsdc.htm
  - www.emea.fujitsu.com
  - Contact: micro_info@fme.fujitsu.com


‘Phase3-Kit’-CD Link-List

- Software
  - Softune Workbench
  - MCU flash programmer
  - SKwizard
  - Bitmixer
  - Software examples
- Documents
  - Schematic ‘Phase3-Kit’
  - Data sheet MB91F265 Series
  - Correction of data sheet
  - Hardware manual MB91F265 Series
  - Correction of hardware manual
  - Watchdog MB3793-42