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Starter kit User Guide

SK-FM3-100PMC-MB9BF516N

Hardware V1.1 / Documentation V1.3

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- 5. Should one of the above stipulations be or become invalid and/or unenforceable, the remaining stipulations shall stay in full effect.
- 6. The contents of this document are subject to change by SPANSION without a prior notice, thus contact SPANSION about the latest one.
- This board and its deliverables must only be used for test applications in an evaluation laboratory environment.

- For your convenience this user guide includes external links that simplify installing of drivers, software utilities, and quick jumps to documentation.
- Some PDF viewer do not allow access to external content by links because of security reasons.
- A viewer called “PDF XChange” is provided in the software package of this starter kit. It’s use is free of charge and no additional installation is required.
- Launching “start.bat” opens this user guide in the PDF XChange viewer.
- Please ensure you have copied the complete software package related to this starter kit in order to use and run the links and examples given on the next pages.
- Please contact the [SpanSION Support](#) in case of any question.

■ Introduction

- [About The SK-FM3-100PMC-MB9BF516N](#)
- [SK-FM3-100PMC-MB9BF516N content](#)
- [SK-FM3-100PMC-9BF516N-JL content](#)
- [Test it](#)
- [The Hardware](#)
- [The Software](#)

■ Try yourself

- [Software examples](#)
- [Program Download](#)
- [IAR-Embedded Workbench](#)
- [KEIL \$\mu\$ Vision](#)
- [Solutions](#)

■ [Workshops](#), [Contacts](#) & [More](#)



■ [Additional documents](#)

- [Schematic](#)
- [Factsheet](#)
- [Data sheet MB9B510R Series](#)
- [Peripheral Manual](#) and [Errata](#)
- [Peripheral Manual \(Timer Part\)](#) and [Errata](#)
- [Peripheral Manual \(Analog Part\)](#) and [Errata](#)
- [Peripheral Manual \(Communication Part\)](#) and [Errata](#)
- [Flash Programming Manual](#) and [Errata](#)

Please visit www.spansion.com to find latest releases of the above mentioned documents.

About the SK-FM3-100PMC-MB9BF516N

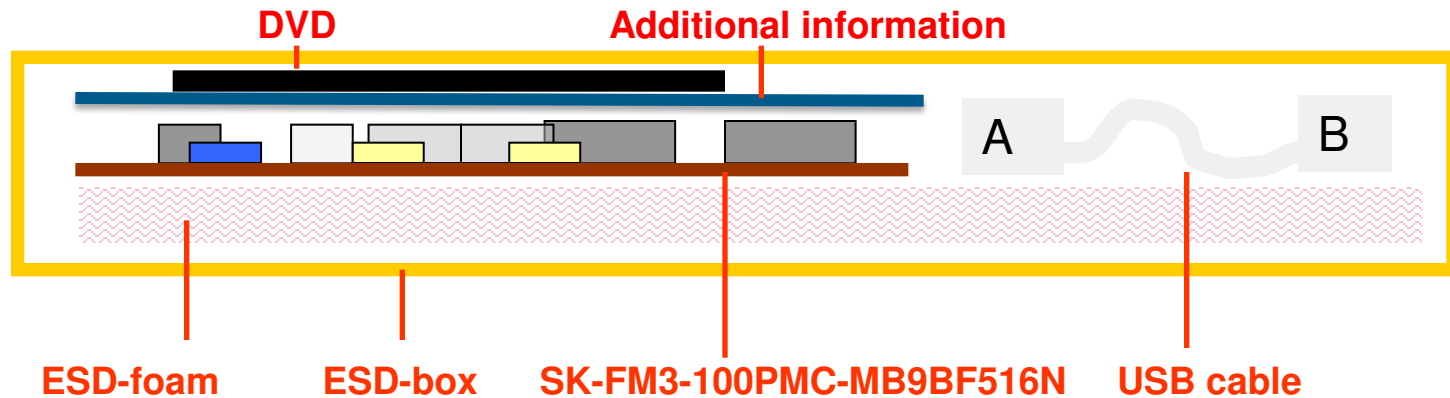
- The SK-FM3-100PMC-MB9BF516N is available in two versions:
 - The SK-FM3-100PMC-MB9BF516N includes a low-cost evaluation board based on the SPANSION FM3 microcontroller MB9B510 Series
 - SK-FM3-100PMC-9BF516N-JL includes a low-cost evaluation board based on the SPANSION FM3 microcontroller MB9B510 Series and the JTAG adapter J-Link
- The MB9B510 Series includes the following features:
 - Up to 512 KByte Flash Memory
 - 32 KByte Work Flash
 - Up to 64 KByte RAM
 - Up to 2 CAN controller 2.0A/B
 - Up to 8 LIN-USART-I²C interfaces
 - USB-Host/-Device interface
 - Timers (ICUs, OCUs, PPGs, others)
 - Three 12 Bit ADCs
 - External interrupts



- Features of the SK-FM3-100PMC-MB9BF516N board:
 - Microcontroller MB9BF516N
 - 1x UART-Transceiver (SUB-D9 connector)
 - 1x USB to serial converter (Type-B connector)
 - 1x High-speed CAN-Transceiver (SUB-D9 connector)
 - 1x USB-MiniHost (Type-A connector)
 - 1x USB-Device (Type-B connector)
 - JTAG- and TRACE-Interface each on a 20 pin-header
 - TSC-Interface to connect for example the SPANSION SK-TSC-1127S-SB
 - 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
 - Power supply via USB (UART'B'), USB-Device, JTAG or external with a 8V to 12V power connector

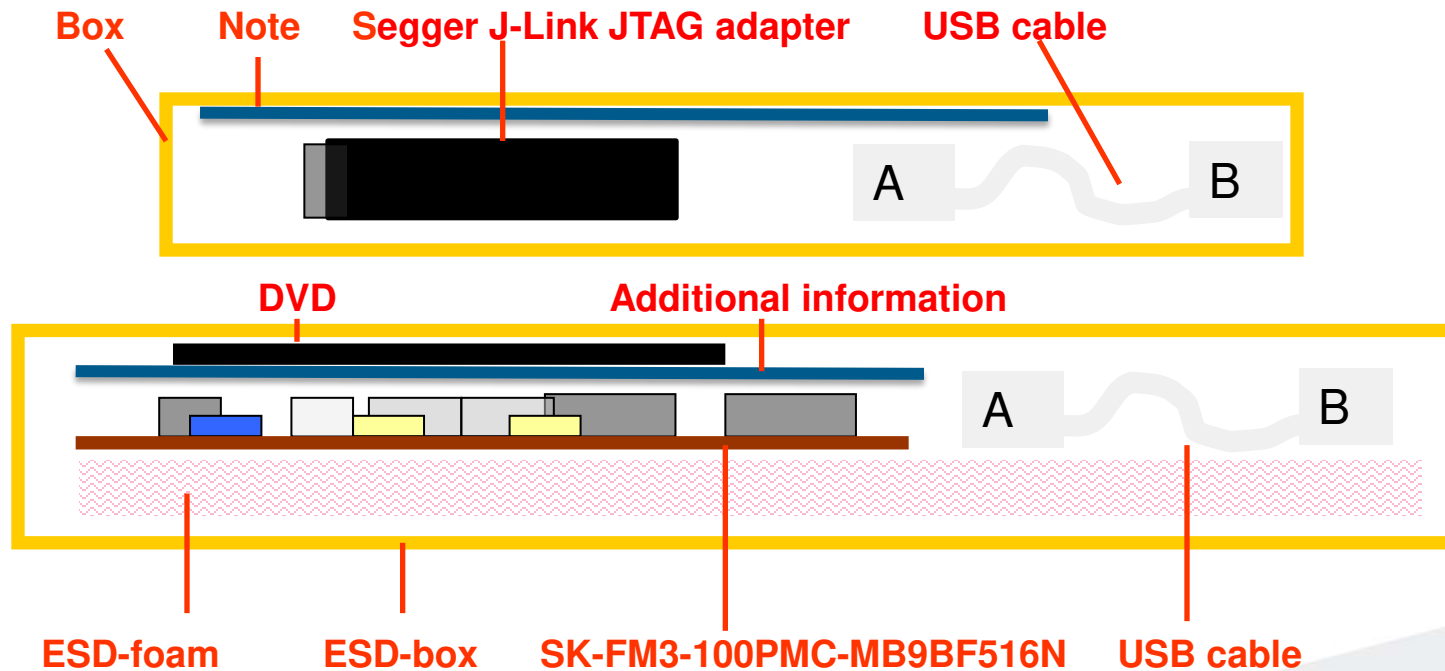
SK-FM3-100PMC-MB9BF516N content

- The SK-FM3-100PMC-MB9BF516N contains
 - SK-FM3-100PMC-MB9BF516N evaluation board with MB9BF516N
 - USB cable
 - DVD: Documentation, USB driver, Software examples, Programmer

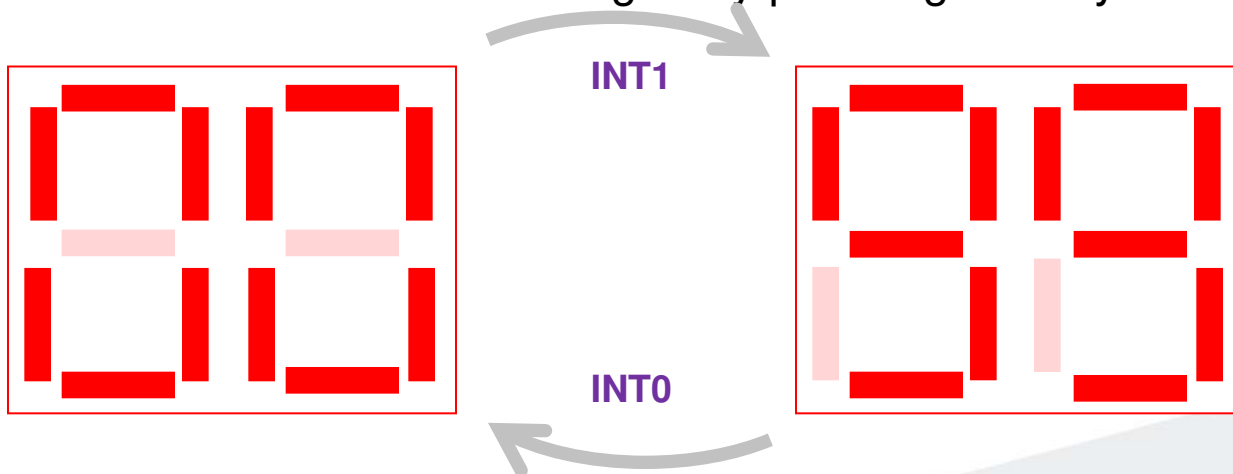


SK-FM3-100PMC-9BF516N-JL content

- The SK-FM3-100PMC-9BF516N-JL contains
 - SK-FM3-100PMC-MB9BF516N evaluation board with MB9BF516N
 - USB cable
 - DVD: Documentation, USB driver, Software examples, Programmer
 - Segger J-Link JTAG adapter incl. USB cable



- The microcontroller on the SK-FM3-100PMC-MB9BF516N is already preprogrammed with a simple application.
 - [Install the USB driver from the DVD](#)
 - Connect the SK-FM3-100PMC-MB9BF516N via USB (X5) with the PC , verify that jumper J5 is on the USBPWR position.
 - Press the ,Reset'- Button
 - The SK-FM3-100PMC-MB9BF516N will automatically start counting
 - The count direction can be changed by pressing the key buttons

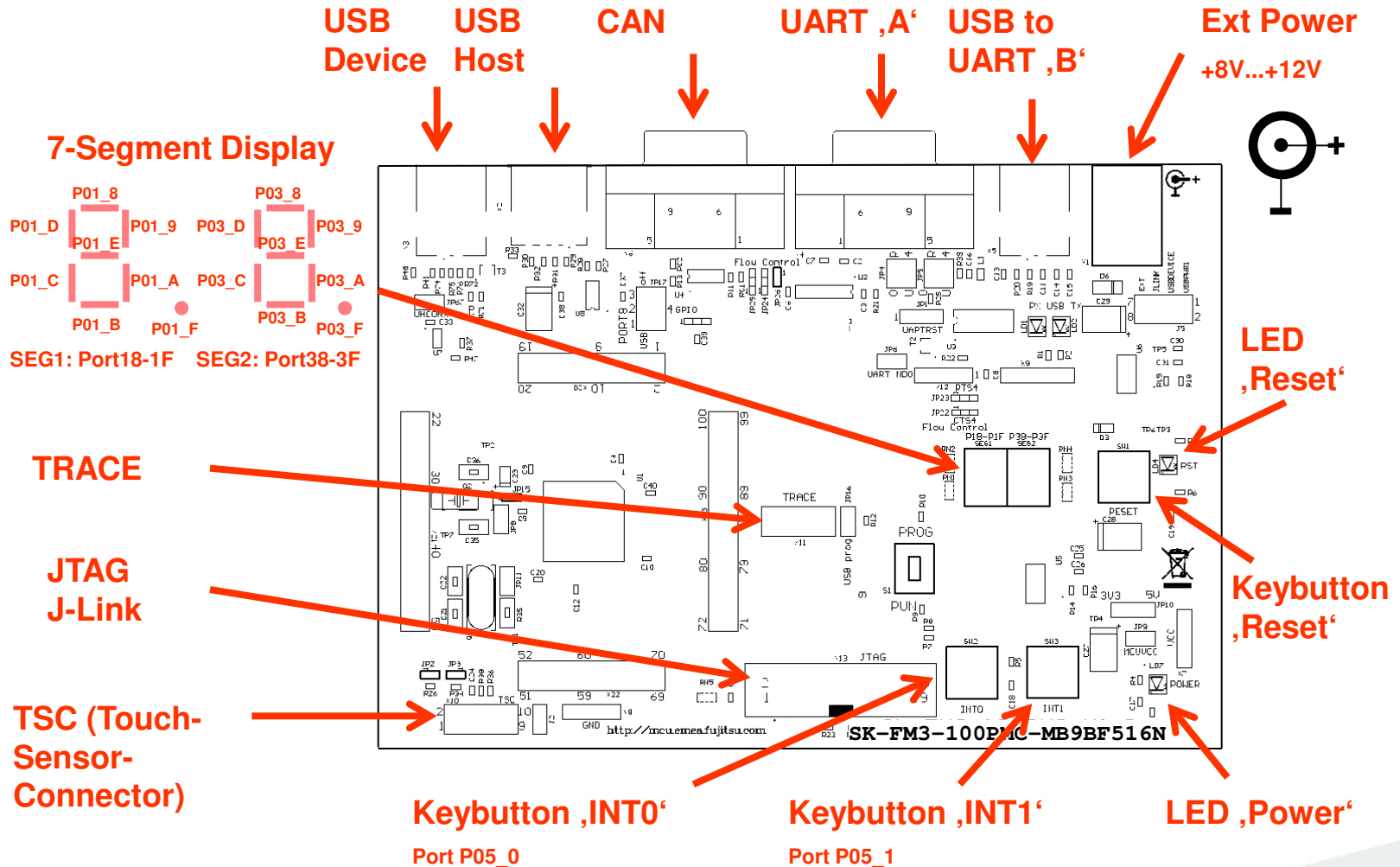


Congratulations!

- You finished successfully the first test
- Now you will get more details about the SK-FM3-100PMC-MB9BF516N board
- You will learn more about
 - The on-board features
 - How to program the Flash
 - How to start with IAR-Embedded-Workbench and KEIL μ Vision

The Hardware

- Main features



■ The jumpers

JP1: DTR-Reset

1-2: DTR-Signal of the UART connector is connected to the MCU reset-pin.

2-3: DTR-Signal of the USB connector is connected to the MCU reset-pin.

Some terminal-programs, e.g. SPANSION'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

S1: Mode selection

PROG: Program-mode

RUN: Run-mode

JP10: 5V / 3.3V

1-2: 5V supply is used

2-3: 3.3V supply is used

JP4: UART RX select

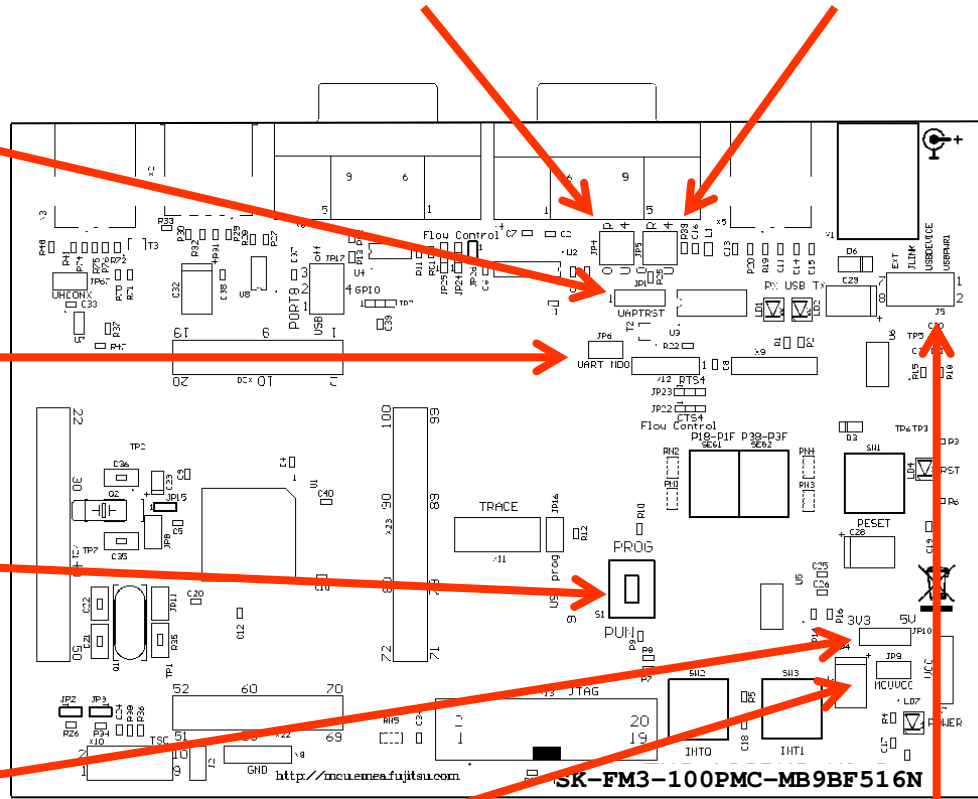
R-0: UART0=UART'A' / U-4: UART4=UART'B' (USB)

R-4: UART4=UART'A' / U-0: UART0=UART'B' (USB)

JP5: UART TX select

R-0: UART0=UART'A' / U-4: UART4=UART'B' (USB)

R-4: UART4=UART'A' / U-0: UART0=UART'B' (USB)



JP9: MCU Vcc

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

J5: Power Supply

1-2: USB (UART ,B') supply

5-6: JLINK supply

3-4: USB Device supply

7-8: External supply

■ The jumpers

JP24-JP26: Flow Control UART4

JP24

1-2: Flow control disabled
2-3: Flow control enabled

JP25

1-2: Flow control enabled
2-3: Flow control disabled

JP26

open: Flow control disabled
closed: Flow control enabled

JP17: Port8 (USB use)

1-2: USB in use
2-3: USB not in use
2-4: Use Port 8 as digital I/O

JP67: USB Function HCONX

Open: D+ is not pulled up
Closed: HCONX controls Pullup of D+

JP16: USB prog

(for PROG-Mode S1)

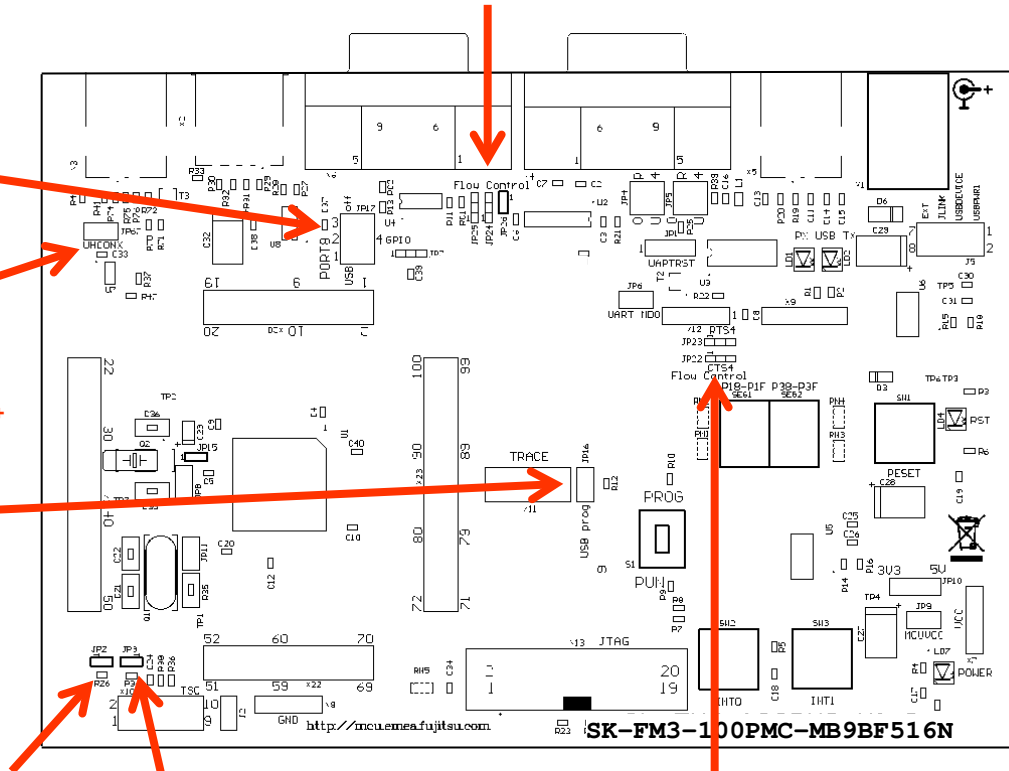
Open: UART programming enabled
Closed: USB programming enabled

JP2: Pullup resistor TSC
Closed: Pull up SCL3

JP3: Pullup resistor TSC
Closed: Pull up SDA3

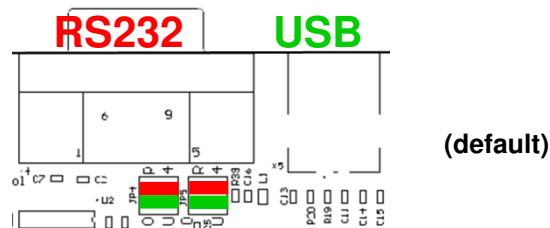
JP22,JP23: Flow Control CTS4, DTS4

JP22, JP23 1-2: Flow control on UART'A'
JP22, JP23 2-3: Flow control on UART'B'
JP22, JP23 Open: Flow control disabled

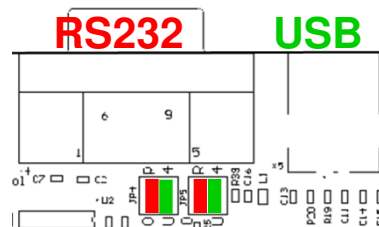


- JP4, JP5 : UART selection

- UART0 and UART4 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), UART4 = Sub-D9 (X4) (default)
 - ◆ Setting of Jumper JP4 and JP5: U-0 / R-4

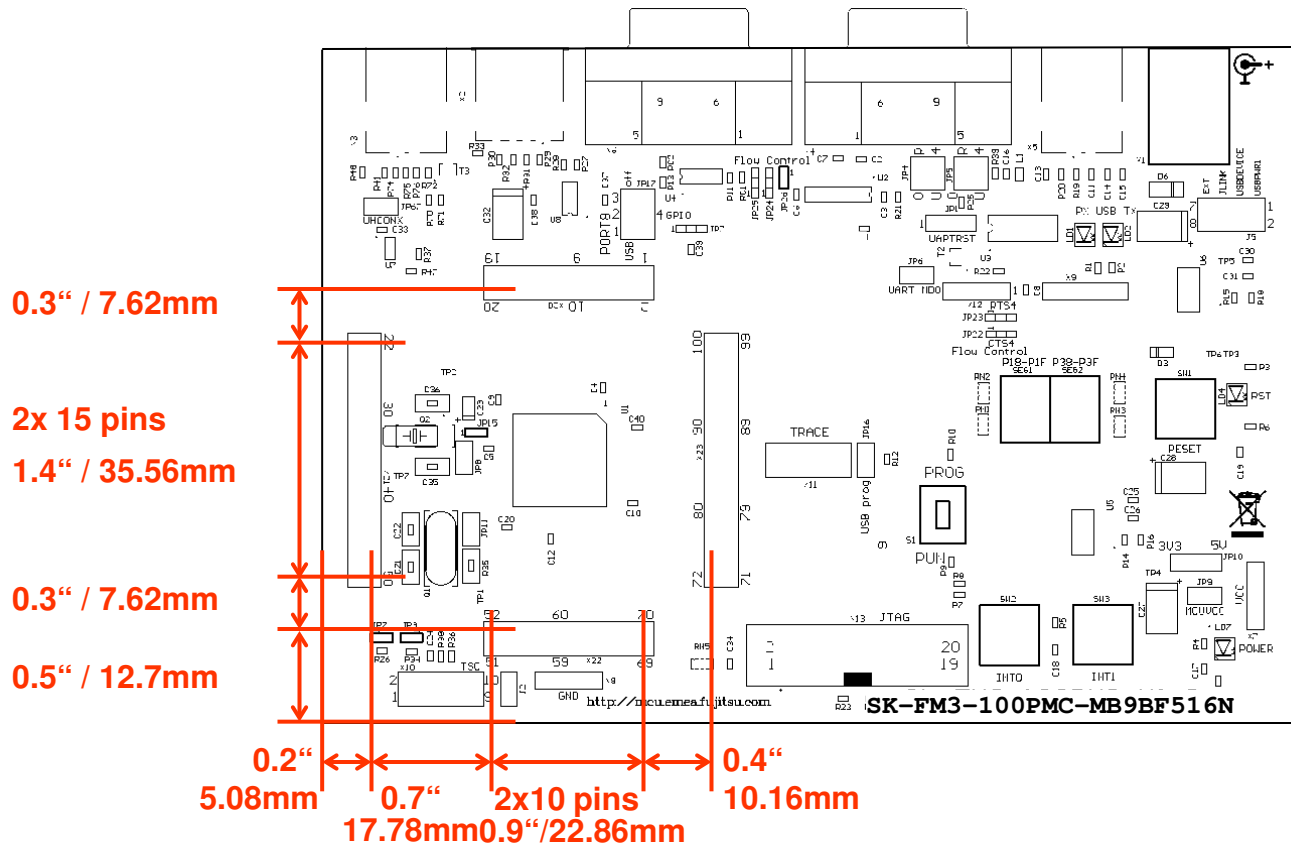


- UART0 = Sub-D9 (X4), UART4 = USB-connector (X5)
 - ◆ Setting of Jumper JP4 and JP5: U-4 / R-0



The Hardware

- Extension headers X20-X23
 - Standard 0.1" / 2.54mm grid for use with prototype boards



- The microcontroller pins

Pin	Pin-name	Pin-Function on SK-FM-100PMC-MB9BF516N
1	VCC	MCUVCC
2	P50/INT00_0/AIN0_2/SIN3_1/RTO10_0/MADATA00_0	Key button 'INT0'
3	P51/INT01_0/BIN0_2/SOT3_1/RTO11_0/MADATA01_0	Key button 'INT1'
4	P52/INT02_0/ZIN0_2/SCK3_1/RTO12_0/MADATA02_0	USB current limitation 'INT2'
5	P53/SIN6_0/TIOA1_2/INT07_2/RTO13_0/MADATA03_0	
6	P54/SOT6_0/TIOB1_2/RTO14_0/MADAT A04_0	
7	P55/SCK6_0/ADTG_1/RTO15_0/MADAT A05_0	
8	P56/INT08_2/DTTI1X_0/MADATA06_0	
9	P30/AIN0_0/TIOB0_1/INT03_2/MADATA 07_0	
10	P31/BIN0_0/TIOB1_1/SCK6_1/INT04_2/MADATA08_0	

Pin	Pin-name	Pin-Function on SK-FM-100PMC-MB9BF516N
11	P32/ZIN0_0/TIOB2_1/SOT6_1/INT05_2/MADATA09_0	
12	P33/INT04_0/TIOB3_1/SIN6_1/ADTG_6/MADATA10_0	
13	P34/FRCK0_0/TIOB4_1/TX0_1/MADAT A11_0	CAN0 TX
14	P35/IC03_0/TIOB5_1/RX0_1/INT08_1/M ADATA12_0	CAN0 RX
15	P36/IC02_0/SIN5_2/INT09_1/MADATA1 3_0	
16	P37/IC01_0/SOT5_2/INT10_1/MADATA1 4_0	
17	P38/IC00_0/SCK5_2/INT11_1/MADATA1 5_0	SEG2-A
18	P39/DTTI0X_0/ADTG_2	SEG2-B
19	P3A/RTO00_0/TIOA0_1/RTCCO_2/SUB OUT_2	SEG2-C
20	P3B/RTO01_0/TIOA1_1	SEG2-D

- The microcontroller pins (cont'd)

Pin	Pin-name	Pin-Function on SK-FM-100PMC-MB9BF516N
21	P3C/RTO02_0/TIOA2_1	SEG2-E
22	P3D/RTO03_0/TIOA3_1	SEG2-F
23	P3E/RTO04_0/TIOA4_1	SEG2-G
24	P3F/RTO05_0/TIOA5_1	SEG2-DP
25	VSS	GND
26	VCC	MCUVCC
27	P40/TIOA0_0/RTO10_1/INT12_1	TINT TSC-Connector 'INT12'
28	P41/TIOA1_0/RTO11_1/INT13_1	GINT TSC-Connector 'INT13'
29	P42/TIOA2_0/RTO12_1	
30	P43/TIOA3_0/RTO13_1/ADTG_7	

Pin	Pin-name	Pin-Function on SK-FM-100PMC-MB9BF516N
31	P44/TIOA4_0/RTO14_1/MAD00_0	
32	P45/TIOA5_0/RTO15_1/MAD01_0	
33	C	'C' capacitor
34	VSS	GND
35	VCC	MCUVCC
36	P46/X0A	Subclock (optional)
37	P47/X1A	Subclock (optional)
38	INITX	Key button 'Reset'
39	P48/DTT1X_1/INT14_1/SIN3_2/MAD02_0	
40	P49/TIOB0_0/IC10_1/AIN0_1/SOT3_2/MAD03_0	SDA3 TSC-Connector

- The microcontroller pins (cont'd)

Pin	Pin-name	Pin-Function on SK-FM-100PMC-MB9BF516N
41	P4A/TIOB1_0/IC11_1/BIN0_1/SCK3_2/MAD04_0	SCL3 TSC-Connector
42	P4B/TIOB2_0/IC12_1/ZIN0_1/MAD05_0	
43	P4C/TIOB3_0/IC13_1/SCK7_1/AIN1_2/MAD06_0	
44	P4D/TIOB4_0/FRCK1_1/SOT7_1/BIN1_2/MAD07_0	
45	P4E/TIOB5_0/INT06_2/SIN7_1/ZIN1_2/MAD08_0	
46	PE0/MD1	GND
47	MD0	Mode-Switch S1
48	PE2/X0	4 MHz Crystal
49	PE3/X1	4 MHz Crystal
50	VSS	GND

Pin	Pin-name	Pin-Function on SK-FM-100PMC-MB9BF516N
51	VCC	MCUVCC
52	P10/AN00	
53	P11/AN01/SIN1_1/INT02_1/RX1_2/FRC K0_2/MAD09_0	
54	P12/AN02/SOT1_1/TX1_2/IC00_2/MAD10_0	
55	P13/AN03/SCK1_1/RTCCO_1/SUBOUT_1/IC01_2/MAD11_0	
56	P14/AN04/SIN0_1/INT03_1/IC02_2/MAD12_0	
57	P15/AN05/SOT0_1/IC03_2/MAD13_0	
58	P16/AN06/SCK0_1/MAD14_0	
59	P17/AN07/SIN2_2/INT04_1/MAD15_0	
60	AVCC	MCUVCC

- The microcontroller pins (cont'd)

Pin	Pin-name	Pin-Function on SK-FM-100PMC-MB9BF516N
61	AVRH	MCUVCC
62	AVSS	GND
63	P18/AN08/SOT2_2/MAD16_0	SEG1-A
64	P19/AN09/SCK2_2/MAD17_0	SEG1-B
65	P1A/AN10/SIN4_1/INT05_1/IC00_1/MAD18_0	SEG1-C
66	P1B/AN11/SOT4_1/IC01_1/MAD19_0	SEG1-D
67	P1C/AN12/SCK4_1/IC02_1/MAD20_0	SEG1-E
68	P1D/AN13/CTS4_1/IC03_1/MAD21_0	SEG1-F
69	P1E/AN14/RTS4_1/DTTI0X_1/MAD22_0	SEG1-G
70	P1F/AN15/ADTG_5/FRCK0_1/MAD23_0	SEG1-DP

Pin	Pin-name	Pin-Function on SK-FM-100PMC-MB9BF516N
71	P23/SCK0_0/TIOA7_1	
72	P22/SOT0_0/TIOB7_1/ZIN1_1	UART0 (TXD)
73	P21/SIN0_0/INT06_1/BIN1_1	UART0 (RXD)
74	P20/INT05_0/CROUT_0/AIN1_1/MAD24_0	Reset TSC-Connector
75	VSS	GND
76	VCC	MCUVCC
77	P00/TRSTX/MCSX7_0	JTAG TRSTX
78	P01/TCK/SWCLK	JTAG/TRACE TCK
79	P02/TDI/MCSX6_0	JTAG/TRACE TDI
80	P03/TMS/SWDIO	JTAG/TRACE TMS

- The microcontroller pins (cont'd)

Pin	Pin-name	Pin-Function on SK-FM-100PMC-MB9BF516N
81	P04/TDO/SWO	JTAG/TRACE TDO
82	P05/TRACED0/TIOA5_2/SIN4_2/INT00_1/MCSX5_0	TRACE TRACED0
83	P06/TRACED1/TIOB5_2/SOT4_2/INT01_1/AIN2_1/MCSX4_0	TRACE TRACED1
84	P07/TRACED2/ADTG_0/SCK4_2/BIN2_1/MCLKOUT_0	TRACE TRACED2
85	P08/TRACED3/TIOA0_2/CTS4_2/ZIN2_1/MCSX3_0	TRACE TRACED3
86	P09/TRACECLK/TIOB0_2/RTS4_2/RTO20_1/MCSX2_0	TRACE TRACECLK
87	P0A/SIN4_0/INT00_2/FRCK1_0/FRCK2_0/RTO21_1/MCSX1_0	UART4 (RXD)
88	P0B/SOT4_0/TIOB6_1/IC10_0/IC20_0/RTO22_1/MCSX0_0	UART4 (TXD)
89	P0C/SCK4_0/TIOA6_1/IC11_0/IC21_0/RTO23_1/MALE_0	
90	P0D/RTS4_0/TIOA3_2/IC12_0/IC22_0/RTO24_1/MDQM0_0	RTS4 Flow control

Pin	Pin-name	Pin-Function on SK-FM-100PMC-MB9BF516N
91	P0E/CTS4_0/TIOB3_2/IC13_0/IC23_0/RTO25_1/MDQM1_0	CTS4 Flow control
92	P0F/NMIX/CROUT_1/RTCCO_0/DTTI2X_0/DTTI2X_1/SUBOUT_0	
93	P63/INT03_0/SIN5_1/RX0_2/MWEX_0	USB-Switch Device/Host
94	P62/SCK5_0/ADTG_3/TX0_2/MOEX_0	Current limitation enable
95	P61/SOT5_0/TIOB2_2/UHCONX	USB UHCONX
96	P60/SIN5_0/TIOA2_2/INT15_1/MRDY_0	Mode-Switch S1
97	USBVCC	USB-power supply
98	P80/UDM0	USB Data-
99	P81/UDP0	USB Data+
100	VSS	GND

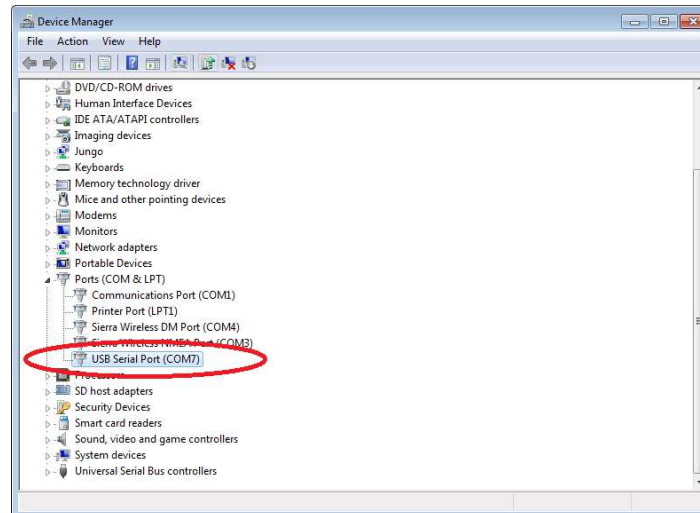
- The SK-FM3-100PMC-MB9BF516N DVD includes the following software:
 - MCU Flash programming tools
 - ◆ FLASH MCU Programmer for FM3
 - ◆ FLASH USB DIRECT Programmer
 - USB driver for on-board USB-to-RS232 converter
 - The terminal program ,Serial Port Viewer‘
 - The USB configuration tool ,USB Wizard‘
 - Software examples for the SK-FM3-100PMC-MB9BF516N
- Please check our dedicated microcontroller website:

www.spansion.com

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

Installation of the USB-driver

- Install the USB driver from the [DVD](#) with administrator privileges
- 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.: COM7)



- Ready!

- Serial Port Viewer
 - Free of charge terminal program, [Start installation](#)
- USB Wizard
 - Free of charge USB configuration tool, [Start installation](#)
- Following examples are provided with SK-FM3-100PMC-MB9BF516N for IAR Embedded Workbench V6 and KEIL μ Vision4:
 - [mb9bf51xn template](#), 'Empty' project as base for user applications
 - [mb9bf51xn adc dvm](#) Digital Voltage Meter based on the A/D-converter
 - [mb9bf51xn can uart terminal](#) Simple CAN example (CAN0)
 - [mb9bf51xn ioport counter](#) Counts from 0 to 99 on the 7-segment Display
 - Further examples on [DVD](#) and on our website

Note: **Please copy the examples to your local drive!**



- There are two options to program the flash:
 - UART Programming (X4, X5)
 - ◆ Check jumper JP16 is opened
 - ◆ Connect UART0 of the board to the USB-Port of the PC
 - via USB (JP4,JP5: U-0, R-4)
 - via RS232 (JP4,JP5: U-4, R-0)
 - ◆ Use the [FLASH MCU Programmer](#)
 - USB Programming (X3)
 - ◆ Check jumper JP16 is closed
 - ◆ Connect the board via USB-Device (X3) to the USB-Port of the PC
 - ◆ Use the [FLASH USB DIRECT Programmer](#)

FLASH MCU Programmer for UART Programming

- FLASH MCU Programmer
 - Free of charge, no registration required
 - Windows based programming tool for FM3 microcontroller
 - Uses PC serial port COMx (incl. virtual COM port: USB-to-RS232)
 - [Start installation](#)

