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Starter kit User Guide

SK-FM3-48PMC-MB9BF524K
SK-FM3-48PMC-9BF524K-JL

Hardware V1.1 / Documentation V1.1

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

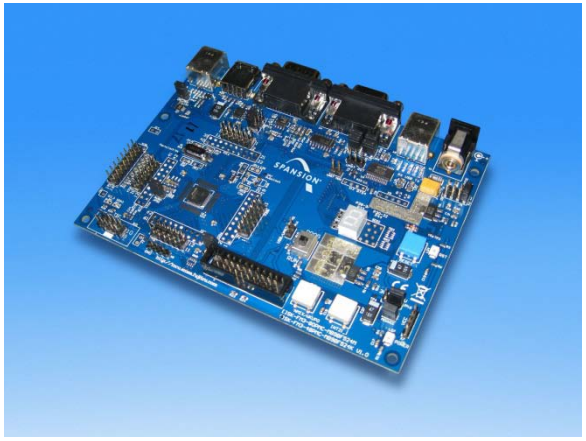
▪This board and its deliverables must only be used for test applications in an evaluation laboratory environment.

Information about this PDF document

- 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.

Overview

- **Introduction**
  - About the SK-FM3-48PMC-MB9BF524K
  - SK-FM3-48PMC-MB9BF524K content
  - SK-FM3-48PMC-9BF524K-JL content
  - Test it
  - The Hardware
  - The Software
- **Try yourself**
  - Software examples
  - Program download
  - IAR-Embedded Workbench
  - KEIL µVision
  - Solutions
- Workshops, Contacts & More



- **Additional documents**
  - Schematic
  - Factsheet
  - Data sheet MB9B520M Series
  - Peripheral Manual and Errata
  - Peripheral Manual (Timer Part) and Errata
  - Peripheral Manual (Analog Part) and Errata
  - Peripheral Manual (Communication Part) and Errata
  - Cortex M3 Technical Reference Manual
  - Flash Programming Manual

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

About

The SK-FM3-48PMC-MB9BF524K is available in two versions:

- The SK-FM3-48PMC-MB9BF524K includes a low-cost evaluation board based on the Spansion FM3 microcontroller MB9B520M Series
- SK-FM3-48PMC-9BF524K-JL includes a low-cost evaluation board based on the Spansion FM3 microcontroller MB9B520M Series and the JTAG adapter J-Link

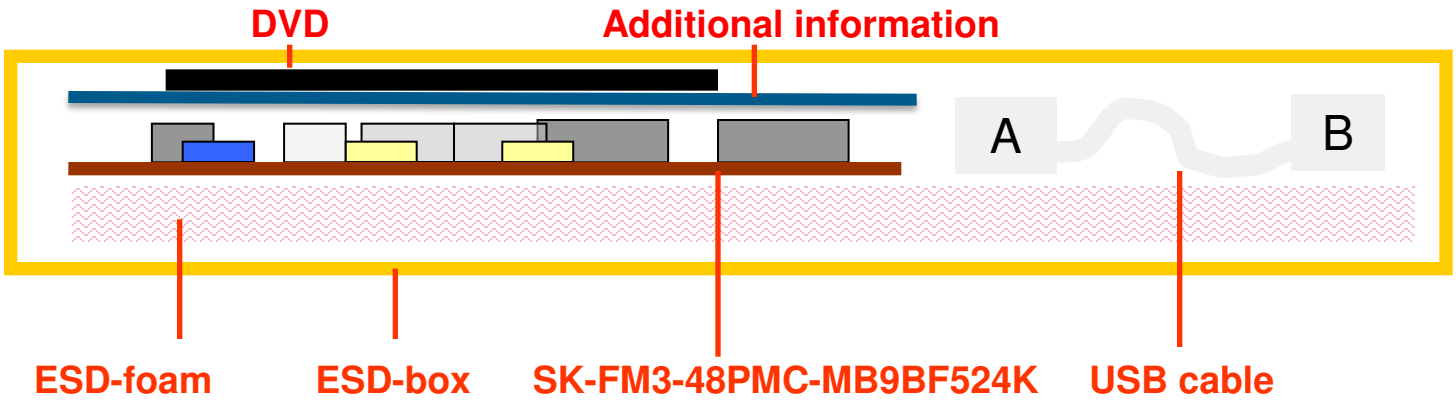
- The MB9B520M Series includes the following features:
  - Up to 288 KByte Dual Operation Flash Memory
  - Up to 64 KByte RAM
  - Up to 2 CAN controller 2.0A/B
  - Up to 8 LIN-USART-I²C interfaces
  - USB-Host/-Device interface
  - Timers (ICUs, OCUs, PPGs, others)
  - Two 12 Bit ADCs, up to 26 channels
  - External interrupts

Features

- Features of the SK-FM3-48PMC-MB9BF524K board:
  - Microcontroller MB9BF524K
  - 1x UART-Transceiver (SUB-D9 connector)
  - 1x USB to serial converter (Type-B connector)
  - 1x High-speed CAN-Transceiver (SUB-D9 connector)
  - 1x USB-Host (Type-A connector)
  - 1x USB-Device (Type-B connector)
  - 1x LED-Display (7-Segment)
  - 2x ‘User’-button
  - 1x ‘Reset’-button, ‘Reset’-LED
  - JTAG-Interface on a 20 pin-header
  - FMtouch connector interface for software touch solutions
  - TSC-Interface to connect for example the Spansion SK-TSC-1127S-SB
  - All 48 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

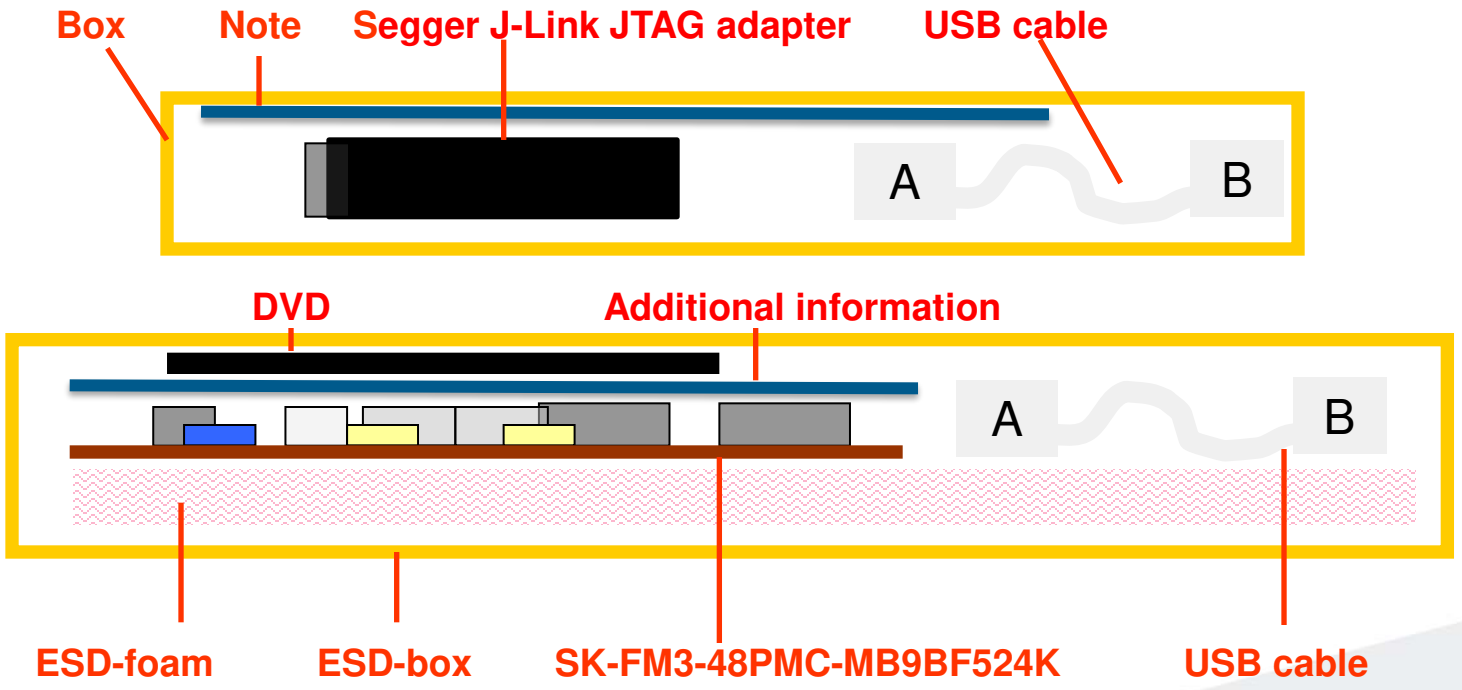
SK-FM3-48PMC-MB9BF524K content

- The SK-FM3-48PMC-MB9BF524K contains
  - SK-FM3-48PMC-MB9BF524K evaluation board with MB9BF524K
  - USB cable
  - DVD: Documentation, USB driver, Software examples, Programmer



SK-FM3-48PMC-9BF524K-JL content

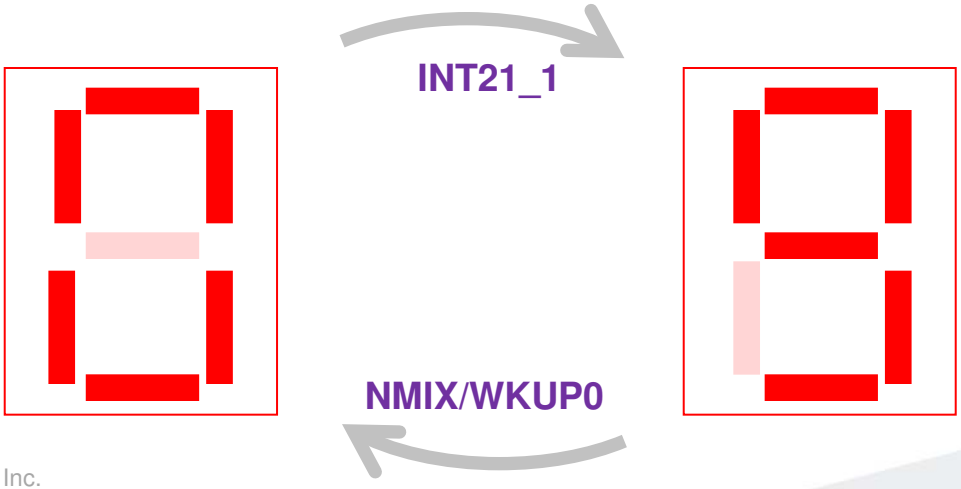
- The SK-FM3-48PMC-9BF524K-JL contains
  - SK-FM3-48PMC-MB9BF524K evaluation board with MB9BF524K
  - USB cable
  - DVD: Documentation, USB driver, Software examples, Programmer
  - Segger J-Link JTAG adapter incl. USB cable



Test it

- The microcontroller on the SK-FM3-48PMC-MB9BF524K is already preprogrammed with a simple application.

  - Connect the SK-FM3-48PMC-MB9BF524K via USB (X5) with the PC
  - Install the USB driver from the DVD
  - Press the ‚Reset‘- Button
  - The SK-FM3-48PMC-MB9BF524K will automatically start counting
  - The count direction can be changed by pressing the key buttons



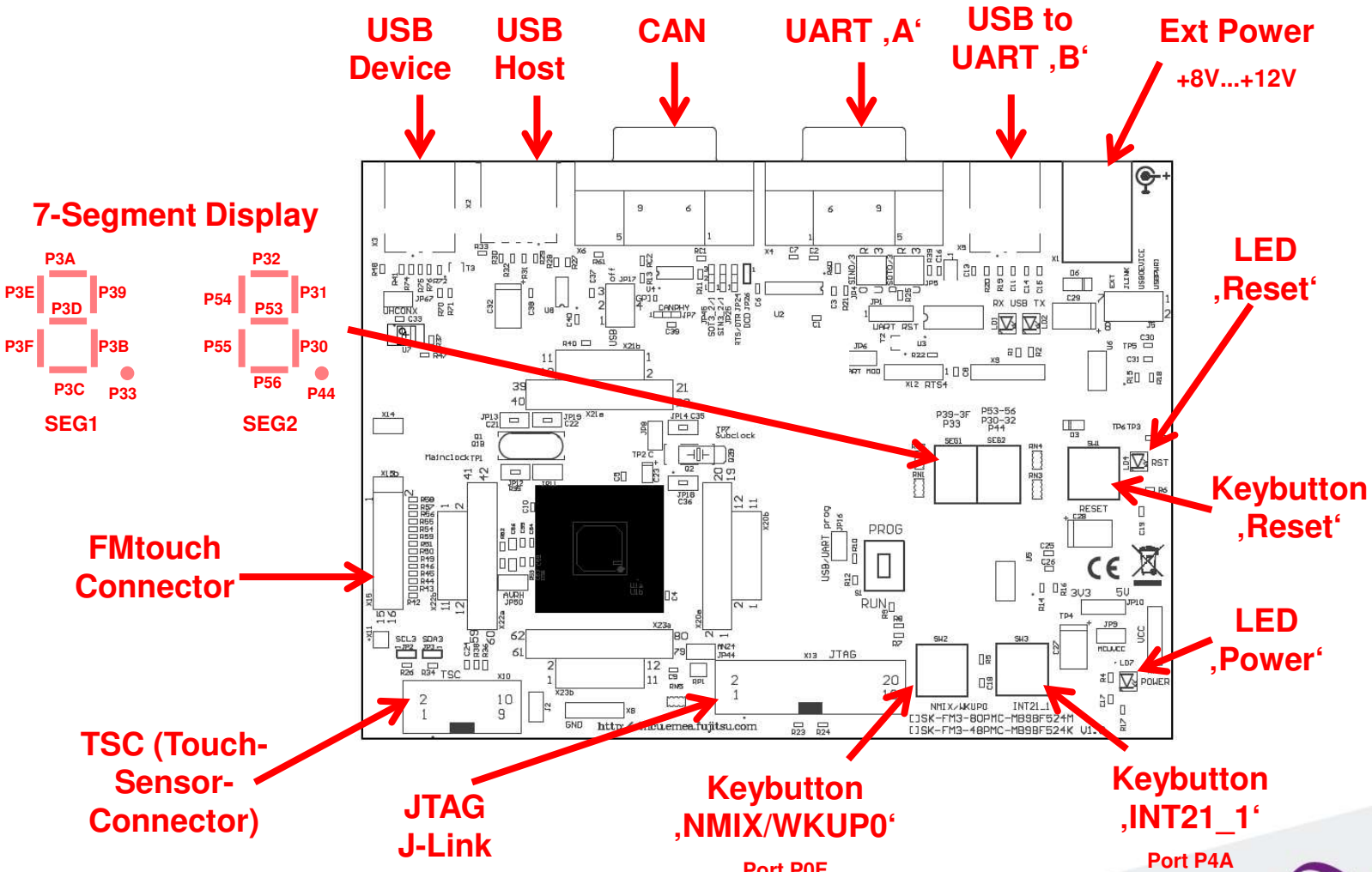
Test it

- You finished successfully the first test

- Now you will get more details about the SK-FM3-48PMC-MB9BF524K board
- You will learn more about
  - The on-board features
  - How to program the Flash
  - How to start with IAR-Embedded-Workbench and KEIL µVision

The Hardware

- Main features



The Hardware

- The jumpers

JP4: UART RX select

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

R-3: UART3=UART‘A‘ / U-0: UART0=UART‘B‘ (USB)

JP5: UART TX select

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

R-3: UART3=UART‘A‘ / U-0: UART0=UART‘B‘ (USB)

JP1: UART-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

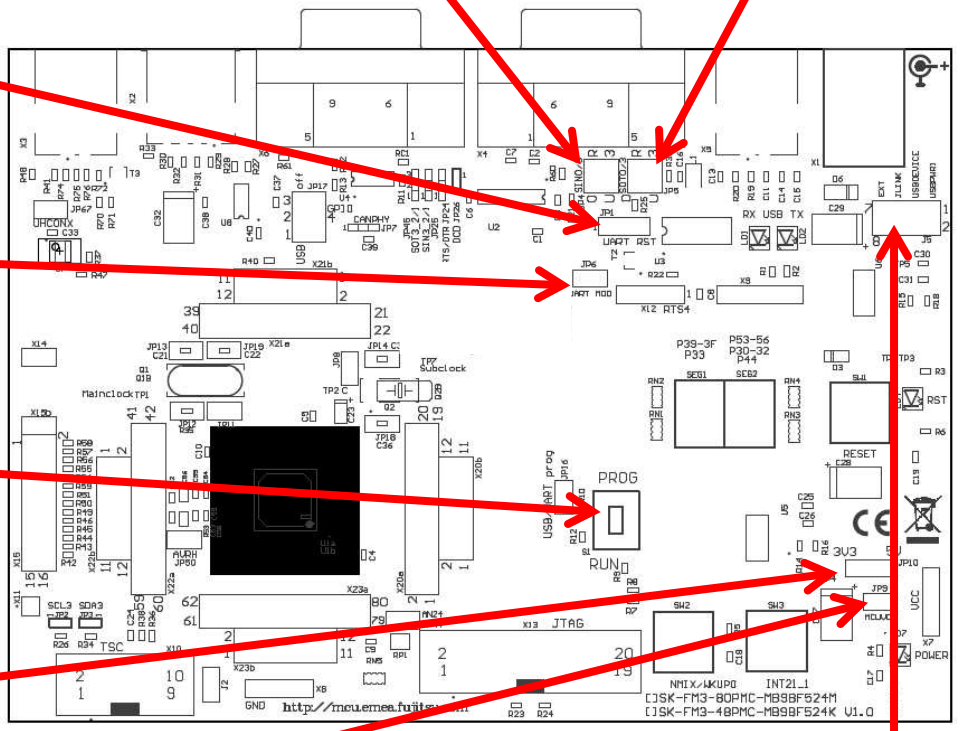
PROG: Program-mode

RUN: Run-mode

JP10: 5V / 3.3V

1-2: 5V supply is used

2-3: 3.3V supply is used



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

3-4: USB Device supply

5-6: JLINK supply

7-8: External supply

The Hardware

- The jumpers

JP25, JP45: UART3_2/1

JP25

1-2: SIN3_2
2-3: SIN3_1

JP45

1-2: SOT3_2
2-3: SOT3_1

JP24:RTS/DTR

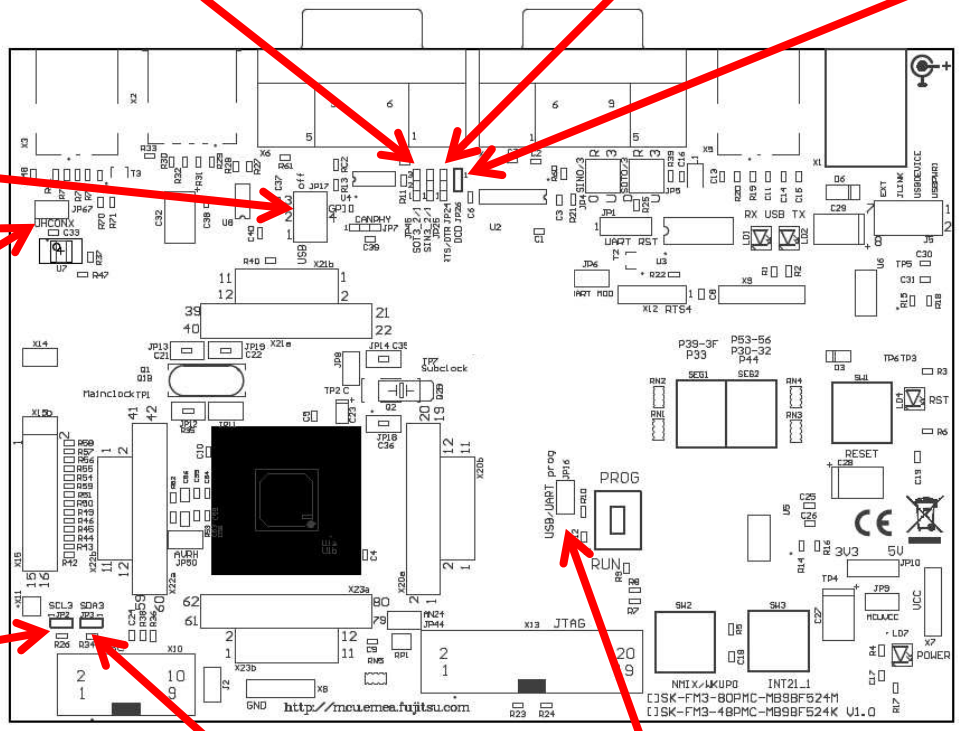
1-2: Flow control disabled
2-3: Flow control enabled

JP26: DCD

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+

JP2: Pullup resistor TSC

Open

JP3: Pullup resistor TSC

Open

JP16: USB prog

(for PROG-Mode S1)

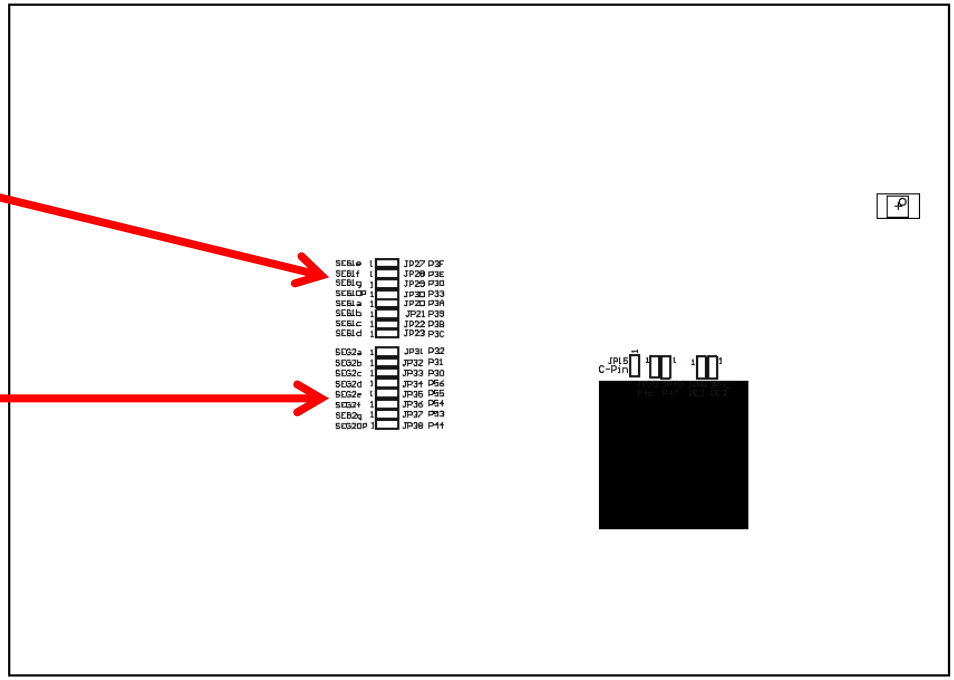
Open: UART programming enabled
Closed: USB programming enabled

The Hardware

- The jumpers(back)

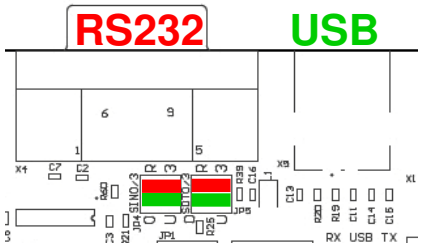
JP20-JP23, JP27-JP30: SEG1
Closed: SEG1a- SEG1DP active

JP31-JP38: SEG2
Closed: SEG2a- SEG2DP active



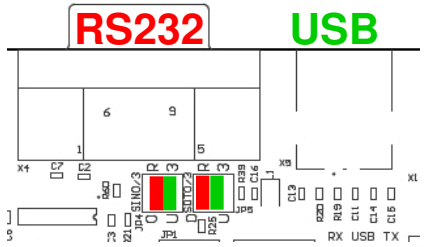
The Hardware

- JP4, JP5 : UART selection
  - UART0 and UART3 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), UART3 = Sub-D9 (X4) (default)
    - Setting of Jumper JP4 and JP5: U-0 / R-3



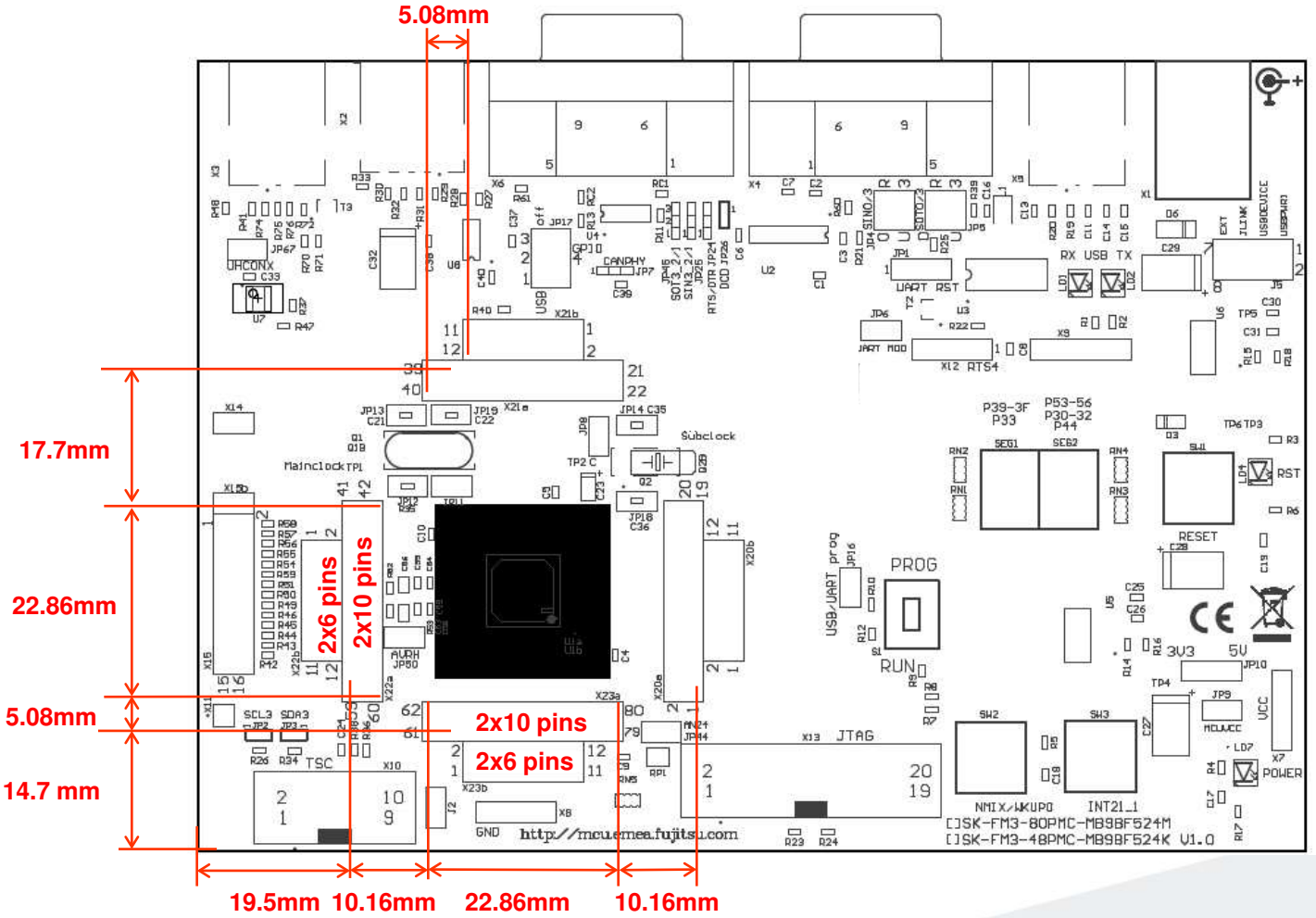
(default)

  - UART0 = Sub-D9 (X4), UART3 = USB-connector (X5)
    - Setting of Jumper JP4 and JP5: U-3 / R-0



Extension headers X20-X23

- Standard 0.1” / 2.54mm grid for use with prototype boards



The Hardware

- The microcontroller pins

Board Function	Pin Function	MB9BF524K
MCUVCC	VCC	1
(SW-Touch_4 , Connector X15)/(TSC_7, Connector X10)/ UART3_1	P50/INT00_0 /AIN0_2/SIN3_1/AN22	2
(SW-Touch _3, Connector X15)/(TSC _2, Connector X10)/ UART3_1	INT01_0/BIN0_2/SOT3_1/AN23	3
(SW-Touch_2, Connector X15)/ (TSC _4, Connector X10)	P52/INT02_0/ZIN0_2/SCK3_1/AN24	4
SEG1b	P39/DTTI0X_0/INT06_0/ADTG_2	5
SEG1a	P3A/RTO00_0/TIOA0_1/INT07_0/SUBOUT_2/RTCCO_2	6
SEG1c	P3B/RTO01_0/TIOA1_1	7
SEG1d	P3C/RTO02_0 /TIOA2_1/INT18_2	8
SEG1g	P3D/RTO03_0/TIOA3_1	9
SEG1f	P3E/RTO04_0/TIOA4_1/INT19_2	10

The Hardware

- The microcontroller pins

Board Function	Pin Function	MB9BF524K
SEG1e	P3F/RTO05_0/TIOA5_1	11
GND	VSS	12
C-Pin	C	13
MCUVCC	VCC	14
(32.768KHz Crystal)	P46/X0A	15
(32.768KHz Crystal)	P47/X1A	16
Key button- ‚Reset‘	INITX	17
	P49/TIOB0_0/INT20_1/DA0_0/SOT3_2/AIN0_1	18
Key button ‚INT‘	P4A/TIOB1_0/INT21_1/DA1_0/SCK3_2/BIN0_1	19
GND	MD1/PE0	20

The Hardware

- The microcontroller pins

Board Function	Pin Function	MB9BF524K
Mode-Switch ‚S1‘	MD0	21
4MHz Crystal	X0/PE2	22
4MHz Crystal	X1/PE3	23
GND	VSS	24
USB Switch Device/Host	P10/AN00	25
CAN RX	P11/AN01/SIN1_1/INT02_1/RX1_2/FRCK0_2/WKUP1	26
CAN TX	P12/AN02/SOT1_1/TX1_2/IC00_2	27
GND	AVSS	28
USB Current limitation	AN04/INT03_1/IC02_2/SIN0_1	29
USB Host Power enable	P15/AN05/IC03_2/SOT0_1/INT14_0	30

The Hardware

- The microcontroller pins

Board Function	Pin Function	MB9BF524K
AVCC	AVCC	31
AVRH	AVRH	32
GND	AVRL	33
(SW-Touch _13, Connector X15)	SCK0_0/TIOA7_1/AN12	34
UART0 TX	P22/SOT0_0/TIOB7_1/ZIN1_1/AN13	35
UART0 RX	P21/SIN0_0/INT06_1/WKUP2/BIN1_1/AN14	36
(JTAG TRSTX, Connector X13)	P00/TRSTX	37
(JTAG TCK, Connector X13)	P01/TCK/SWCLK	38
(JTAG TDI, Connector X13)	P02/TDI	39
(JTAG TMS, Connector X13)	P03/TMS/SWDIO	40

The Hardware

- The microcontroller pins

Board Function	Pin Function	MB9BF524K
(JTAG TDO, Connector X13)	P04/TDO/SWO	41
NMIX/ WKUP	P0F/NMIX/SUBOUT_0/CROUT_1/RTCCO_0/WKUP0/AN18	42
USB UHCONX	P61/SOT5_0/TIOB2_2/UHCONX/DTTI0X_2/AN20	43
Mode Switch ‚S1‘	P60/SIN5_0/TIOA2_2/INT15_1/WKUP3/IGTRG_1/AN21	44
USB-power supply	USBVCC	45
USB Data -	P80/UDM0/INT16_1	46
USB Data +	P81/UDP0/INT17_1	47
GND	VSS	48

The Software

- The SK-FM3-48PMC-MB9BF524K 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-FM3-48PMC-MB9BF524K

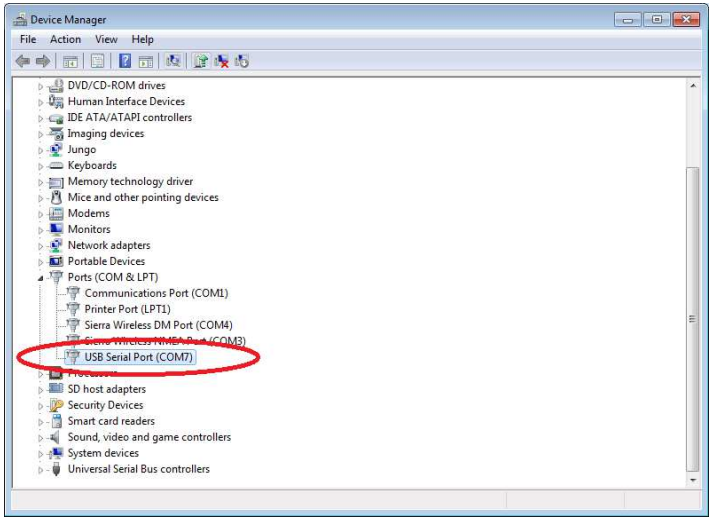
- Please check our dedicated microcontroller website:

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 priviliges
- 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!

Tools and Software Examples

- 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-FM3-48PMC-MB9BF524K for IAR Embedded Workbench V6 and KEIL µVision4:
  - mb9bf52xk_template ‚Empty' project as base for user applications
  - mb9bf52xk_adc_dvm Digital Voltage Meter based on the A/D-converter
  - mb9bf52xk_can_uart_terminal Simple CAN example (CAN0)
  - mb9bf52xk_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!**

Flash Programming

- There are three 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
  - JTAG
    - Use the JTAG-adapter supported by the development toolchain.