

# FreescalE USB Stack Hardware Configuration

PRODUCT:	FreescalE USB Stack
PRODUCT VERSION:	4.1.0
DESCRIPTION:	FreescalE USB Stack Hardware Configuration
RELEASE DATE:	March 20 <sup>th</sup> , 2013

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03/2013

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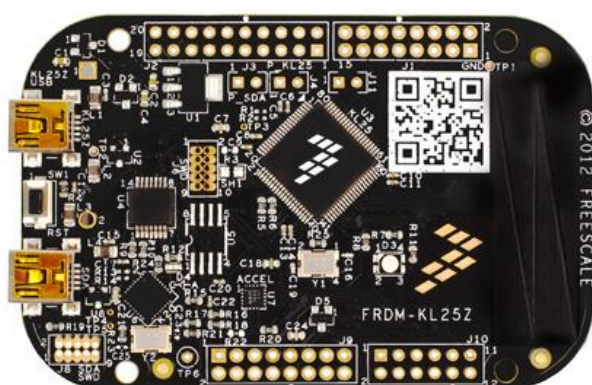
## 1 Board-specific Information Related to the USB Stack Functionality

This section provides more details about the boards supported by the Freescale USB Stack distribution.

All jumper and other hardware switches not specifically described below are expected in factory-default positions. Please refer to the board User's Guide for the default settings.

### 1.1 Kinetis

#### 1.1.1 FREEDOM-KL25Z



Core Clock	48 MHz
Bus Clock	48 MHz
Default Console	Open SDA-USB mini connector

This board (stand-alone) has no configuration options for USB functionality. The default USB port is the J5 mini-USB connector which can be used only as a full-speed USB device. The host and OTG support are not available on this board.

## 1.1.2 TWR-KL25Z48M



Core Clock	48 MHz
Bus Clock	48 MHz
Default Console	OSJTAG-USB mini connector

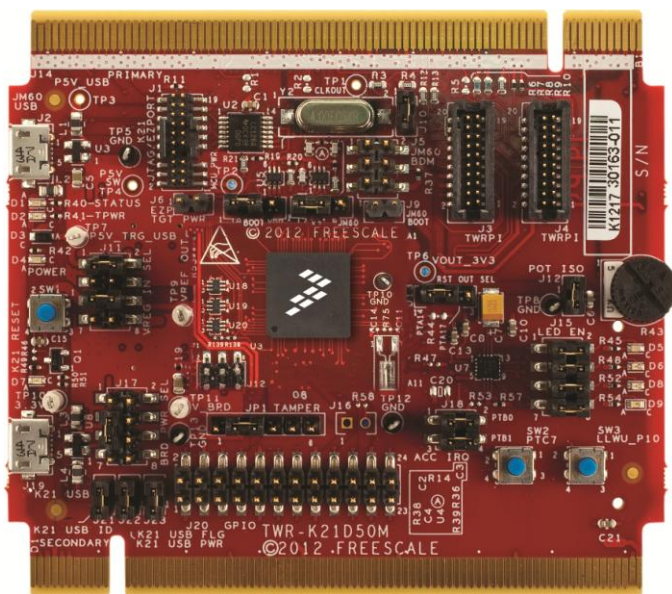
### Important jumper settings:

Jumper setting of TWR-SER for modes as following:

- Device:
  - J16: 3-4
- Host:
  - J16: 1-2
- OTG:
  - J16: 1-2, 5-6
  - J11: 5-6 and connect B48 - B59 of the primary board by an external wire because the hardware doesn't connect the #INT pin of the MAX3353 to an interrupt pin of the Kinetis L2K MCU.

The USB mini port on the TWR-SER is used by default by removing R32 and R33, installing R533 and R534, but the USB micro port on the TWR KL25Z48M also needs to be connected.

### 1.1.3 TWR-K21D50M



Core Clock	48 MHz
Bus Clock	48 MHz
Default Console	OSJTAG-USB micro connector

#### Important jumper settings:

Jumper setting of TWR\_SER for modes as following:

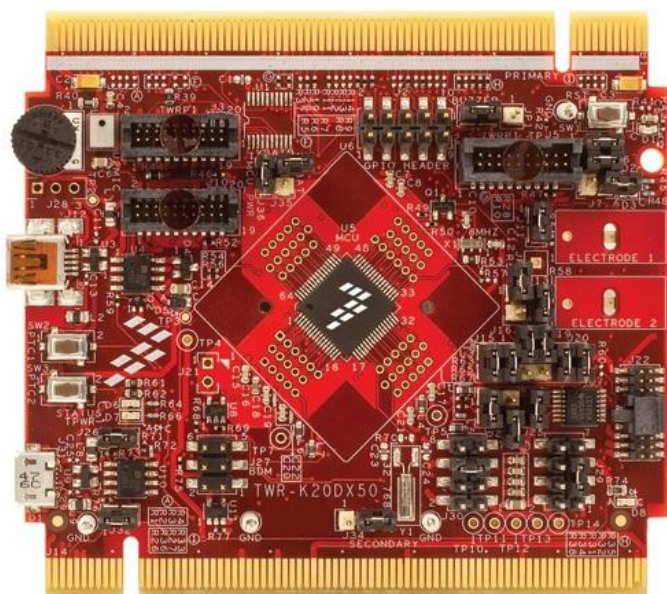
- Device:
  - J16: 3-4
- Host:
  - J16: 1-2
- OTG:
  - J16: 1-2, 5-6
  - J11: 5-6

#### Other Notes:

- USB port on the TWR\_SER board is used by removing R225 and R227, installing R224 and R226, and installing jumper J11 on TWR-K21D50M as 1-2, 6-8



### 1.1.4 TWR-K20D50M



Core Clock	48 MHz
Bus Clock	48 MHz
Default Console	OSJTAG- USB mini connector

#### Important jumper settings:

- For using USB Device mode, jumpers on position
  - TWR-K20D50M board, J26 open
  - TWR-K20D50M board, J30 on position 5-6 (VREGIN)
- For using USB Host mode, jumpers on position
  - TWR-K20D50M board, J26 on position 1-2
  - TWR-K20D50M board, J30 on position 5-6 (VREGIN)

#### Known Issues:

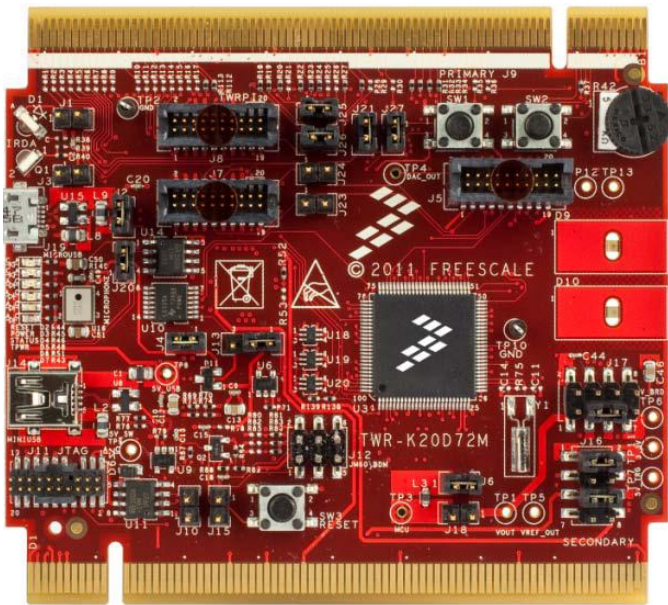
- The default console, which is used by the OSJTAG, is also routed to the RS232 TWR-SER interface, what sometimes may lead to conflicts.
- Timer interrupt wakeup from LLS power mode leads to chip reset with the reset cause set to core lockup.
- The switch to VLPR power mode does not work, the chip does not acknowledge the power mode change in PMSTAT register.

- Because the TWR-K20DX50 board has the D+ and D- USB lines hardwired to the on-board micro-USB connector, the OTG and DCD (battery charging) support has not been tested using a MAX3353 charge pump circuit. The OTG and DCD support is based on designs which include a MAX3353 circuit, which is used for VBUS detection purposes.

#### Other Notes:

- USB is only available on TWR-K20D50M board, it is not routed to the port on the TWR-SER board

### 1.1.5 TWR-K20D72M



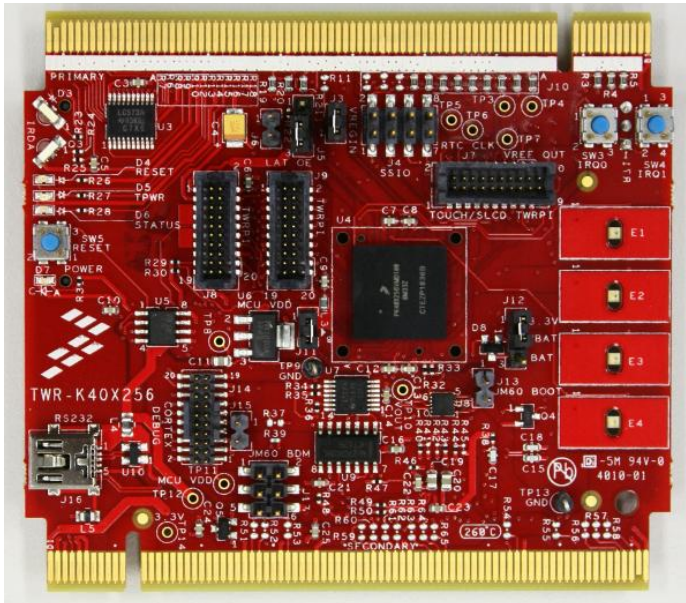
Core Clock	72 MHz
Bus Clock	36 MHz
Default Console	OSJTAG- USB mini connector

#### Important jumper settings:

- For using USB Host mode, jumpers on position
  - TWR-SER board, J16 on position 1-2(VB\_HOST)
  - TWR-SER board, J10 on default position 1-2(USB host)
- For using USB Device mode, jumpers on position
  - TWR-SER board, J16 on position 3-4(VB\_DEV)
  - TWR-SER board, J10 on position 2-3(USB device)
- For USB OTG operation:
  - J16[5-6] (P5V\_K20\_USB to VREGIN) J2[1-2 on]



## 1.1.6 TWR-K40X256



Core Clock	96 MHz
Bus Clock	48 MHz
Default Console	OSJTAG- USB mini connector

### Important jumper settings:

- For USB OTG operation:
  - J3(VREGIN) 1-2(open) and J3-1 to A1(5V) via wire

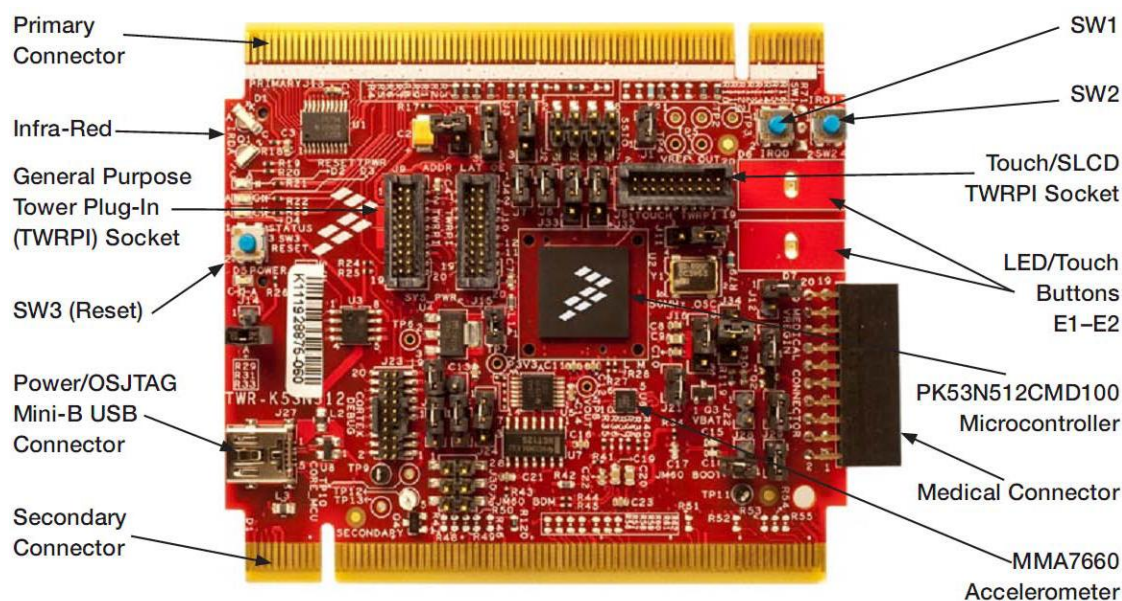
### Known Issues:

- The FlexBus FB\_OE\_B signal is directly connected to OE pin of the address latch on the TWR-MEM card. This prevents using FlexBus for communication with MRAM and CF-CARD on TWR-MEM card.

### Other Notes:

- The default console interface is routed to OSJTAG-COM (USB mini connector). Use the P&E Micro OSJTAG terminal to access board serial line.

## 1.1.7 TWR-K53N512

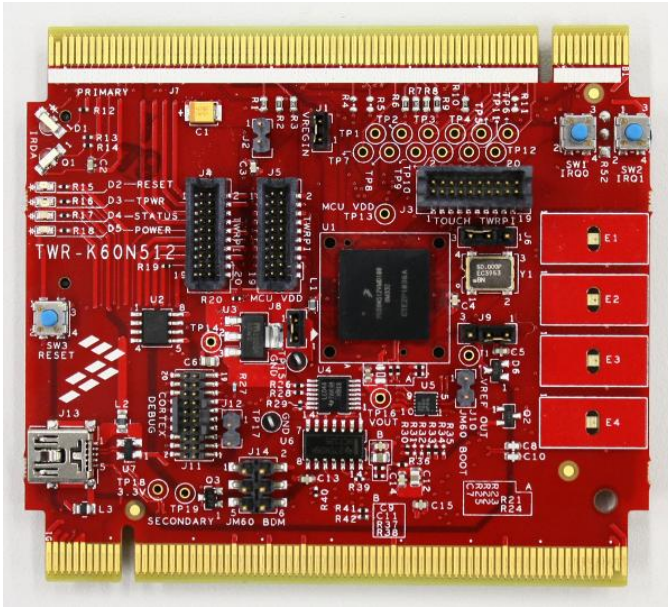


Core Clock	96 MHz
Bus Clock	48 MHz
Default Console	OSJTAG- USB mini connector

### Important jumper settings (board REV C)

- For standalone operation (using clock from TWR-K53N512 board)
  - To use 50MHz, Jumper J11 on position 1-2
- For using USB Host mode, jumpers on position
  - TWR-SER board, J16 on position 1-2(VB\_HOST)
  - TWR-SER board, J10 on default position 1-2(USB host)
- For using USB Device mode, jumpers on position
  - TWR-SER board, J16 on position 3-4(VB\_DEV)
  - TWR-SER board, J10 on position 2-3(USB device)
- For USB OTG operation:
  - J18 (VREGIN) 1-2 (open) and J1-1 to A1(5V) across wire

## 1.1.8 TWR-K60N512

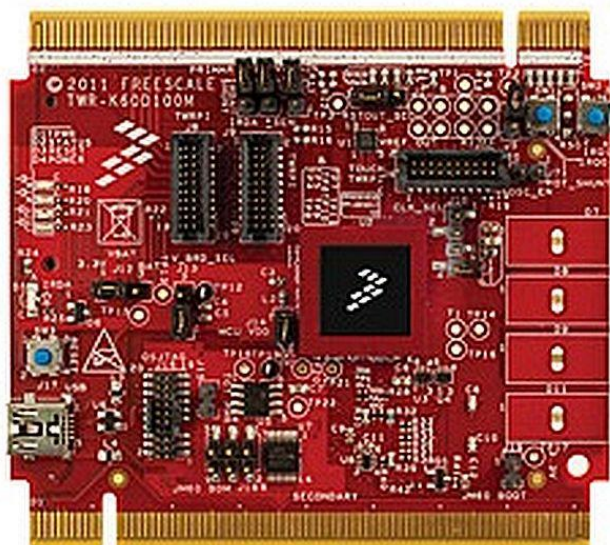


Core Clock	96 MHz
Bus Clock	48 MHz
Default Console	OSJTAG- USB mini connector

### Important jumper settings (board REV C)

- For standalone operation
  - TWR-K60N512 - Jumper J6 on position 1-2
- For USB OTG operation:
  - J1(VREGIN) 1-2 (open) and J1-1 to A1 (5V) across wire to provide 5V to the VREGIN
- For using USB Host mode, jumpers on position
  - TWR-SER board, J16 on position 1-2(VB\_HOST)
  - TWR-SER board, J10 on default position 1-2(USB host)
- For using USB Device mode, jumpers on position
  - TWR-SER board, J16 on position 3-4(VB\_DEV)
  - TWR-SER board, J10 on position 2-3(USB device)

### 1.1.9 TWR-K60D100M



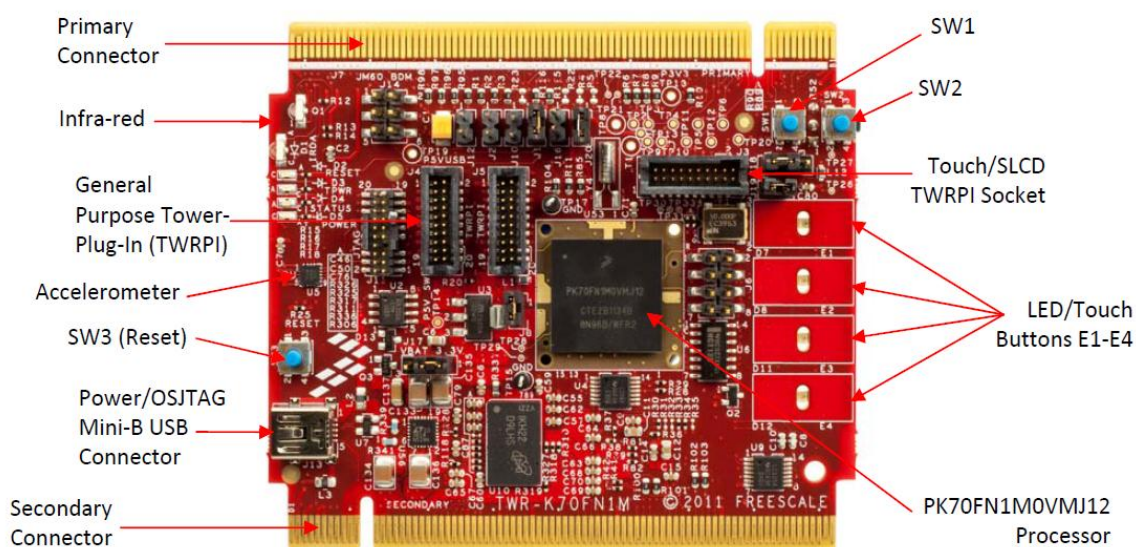
Core Clock	96 MHz
Bus Clock	48 MHz
Default Console	OSJTAG- USB mini connector

#### Important jumper settings

- For standalone operation
  - TWR-K60D100M - Jumper J10 on position 1-2
- For USB OTG operation:
  - J4(VREGIN) 1-2 (open) and J1-1 to A1 (5V) across wire to provide 5V to the VREGIN
- For using USB Host mode, jumpers on position
  - TWR-SER board, J16 on position 1-2(VB\_HOST)
  - TWR-SER board, J10 on default position 1-2(USB host)
- For using USB Device mode, jumpers on position
  - TWR-SER board, J16 on position 3-4(VB\_DEV)
  - TWR-SER board, J10 on position 2-3(USB device)



### 1.1.10 TWR-K70F120M



Core Clock	120 MHz
Bus Clock	60 MHz
Default Console	OSJTAG- USB mini connector

#### Important jumper settings (board REV A)

- For standalone operation
  - TWR-K70FN1M - Jumper J18 on position 1-2
- To enable USB communication:
  - TWR-SER2 – J21 (USB\_VBUS\_EN) shunt for USBHS
  - TWR-SER2 - J24 connected for device mode and disconnected for host mode

#### Known Issues:

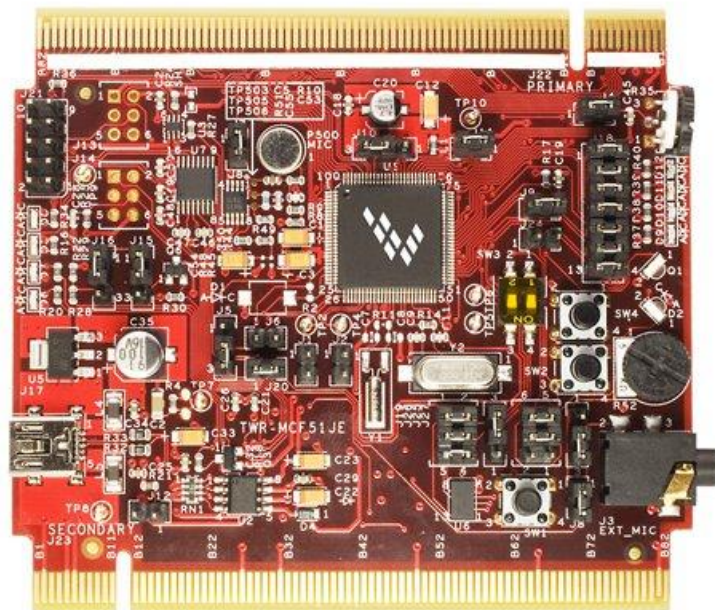
- Because the SMSC USB3300 ULPI transceiver share signal wires with the debug interface, in debug mode the module will fail to initialize. It's recommended to run the code from flash.

#### Other Notes:

- The USB high speed device and EHCI support on K70 requires the TWR-SER2 peripheral board for the SMSC USB3300 ULPI transceiver circuit mounted on it. This board should be used in a TWR setup with the TWR-K70FN1M controller tower board.

## 1.2 ColdFire V1

### 1.2.1 TWR-MCF51JE



Core Clock	48 MHz
Bus Clock	24 MHz
Default Console	RS232

#### Jumper settings (board REV C)

- SW3: 1-off, 2-off
- J1: off
- J2: off
- J4: on
- J5: 1-2
- J6: off
- J7: on
- J8: on
- J9: on
- J10: 2-3
- J11: on
- J12: off
- J15: 1-2

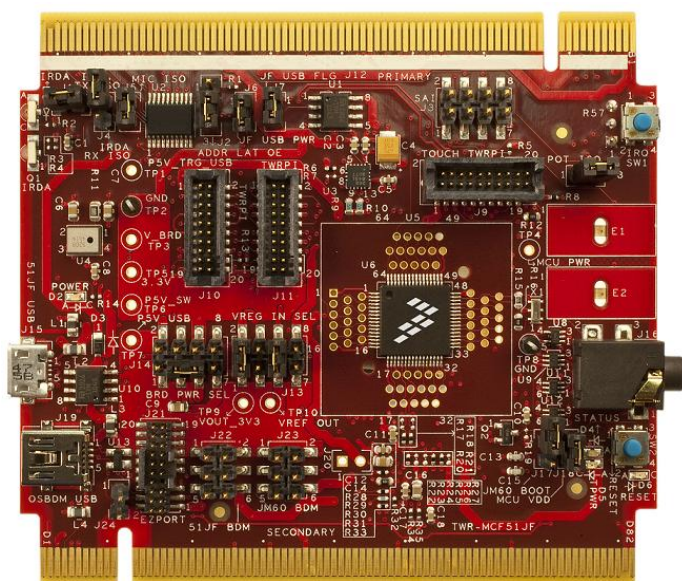


- J16: 1-2
- J18: 1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14
- J19: 1-2, 3-4, 5-6
- J20: off
- J24: off
- J25: 5-6
- J26: 2-3
- J27: 1-2
- To use TWR-LCD board with eGUI
  - TWR-LCD board, SW5 all switches to on (enable touch screen)
  - TWR-LCD board, SW1 switches depending on usage either SPI (01111110) or 16 bits FlexBus (10111110)
  - TWR-MCF51JE board, J9 open (IRDA off)
  - TWR-MCF51JE board, J18 remove 9-10, 11-12, 13-14 (accelerometer off)
  - TWR-MCF51JE board, to enable navigation buttons set:
    - J4 open (potentiometer OFF),
    - J7 open (audio-in disabled),
    - J25 open 1-2

### 1.2.2 TWR-MCF51JF128-KIT

The MCF51JF128 BSP was tested with following hardware configuration:

- TWR-MCF51JF128 Rev. A processor board
- TWR-SER Rev. C serial board
- TWR-ELEV Primary and Secondary - four-storey elevator boards
- TWR-MEM Rev. B memory extension board. [optional]



Core Clock	48 MHz
Bus Clock	24 MHz
Default Console	RS232 on TWR-SER board

### Important jumper settings:

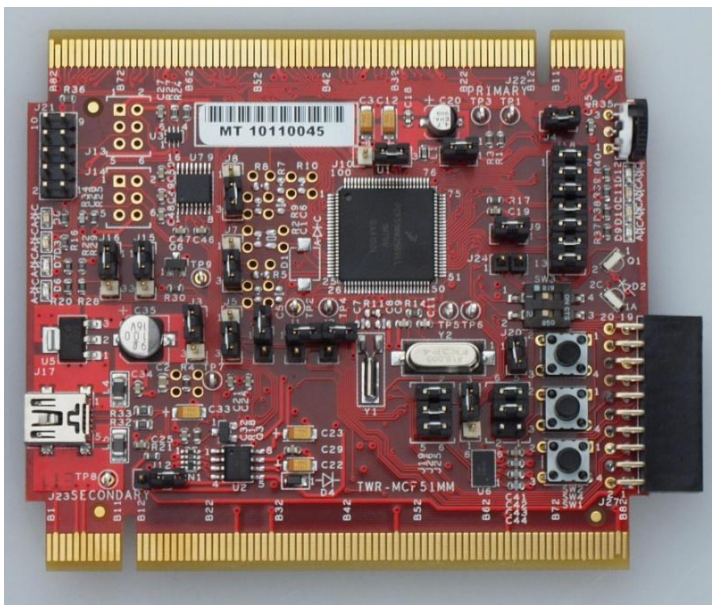
For basic operations, make sure following jumper settings are applied:

- For using the USB in OTG mode
  - J13[5-6] (P5V\_JF\_USB to JF\_VREGIN) and J6[1-2] For using CHIP in normal mode
  - TWR-MCF51JF board, J17 no Shunt (Disable Bootloader)
- For using CRC module
  - TWR-SER board, J3 on position 2-3 (external clock 50MHz)
  - TWR-MCF51JF board, J2 on default position 1-2 (external clock 50MHz)
- For using USB MICRO AB5 port for USB DCD module, connecting by supported cable
  - TWR-MCF51JF board, J13 on default position 1-2(P5V\_TRG\_USB)
  - TWR-MCF51JF board, J13 on default position 5-6(P5V\_JF\_USB)
- For using USB Device Charger Detection, jumpers on position
  - TWR-MCF51JF board, J8 removed
  - Pin1 on J8 connect to position 5-6 on J13( PTD5 connect to JF\_VREGIN)
- For using ADC, connect to POTENTIOMETER, jumpers on position
  - TWR-MCF51JF board, J8 on position 1-2(ADC0\_SE12)
- For using USB host or device, jumpers on position
  - TWR-MCF51JF board, J6 on position 1-2(JF\_USB\_ENA)
  - TWR-MCF51JF board, J7 on position 1-2(JF\_USB\_FLGA)
- For using USB Host mode, jumpers on position

- TWR-SER board, J16 on position 1-2(VB\_HOST)
- TWR-SER board, J10 on default position 1-2(USB host)
- For using USB Device mode, jumpers on position
  - TWR-SER board, J16 on position 3-4(VB\_DEV)
  - TWR-SER board, J10 on position 2-3(USB device)
- For using RAM disk, jumpers on position
  - TWR-MEM board, J16 remove
  - TWR-MEM board, J11 remove (default)
- For using USBDCD jumpers on position
  - Remove J8 jumper and short between pin 1 of J8 and pin 5 of J13 on TWR-MCF51JF board.
- For using SD Card
  - TWR-MEM board, J3 (SD\_CS) jumper on position 1-2 to enable SD Card CS signal
  - TWR-MEM board, J12 (SD\_SEL1) remove jumper from 1-2 and insert jumper on 3-4

### 1.2.3 TWR-MCF51MM-KIT

All jumper and other hardware switches not specifically described below are expected in factory-default positions. Please refer to the board User's Guide for the default settings.



Core Clock	48 MHz	16MHz Xtal used
Bus Clock	24 MHz	
Default Console	ttya:	RS232
BSP Timer	TPM1	

### The MCF51MM BSP was tested in the following configuration:

- TWR-MCF51MM Rev. B processor board
- TWR-SER Rev. B serial board
- TWR-ELEV Rev. A four-storey elevator boards
- TWR-MEM Rev. B memory extension board

### Important jumper settings:

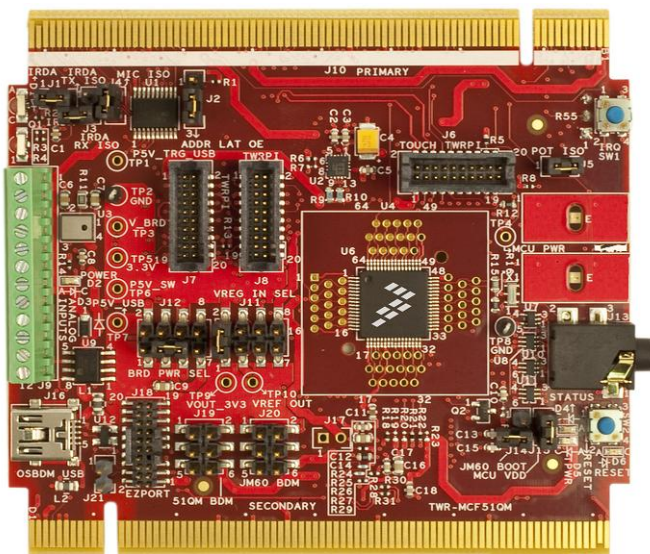
- For a basic operation, make sure the following settings is applied:
  - TWR-MCF51MM board, J3 jumper on 2-3 (connects VINP0 to GND)
  - TWR-MCF51MM board, J4 shorted (POT R35 to ADP4)
  - TWR-MCF51MM board, J5 jumper on 2-3 (DACO to DACO\_TEST TP7)
  - TWR-MCF51MM board, J6 opened
  - TWR-MCF51MM board, J7, J8 jumper on 2-3
  - TWR-MCF51MM board, J9 jumper on 1-2 (IR circuit)
  - TWR-MCF51MM board, J10 jumper on 2-3
  - TWR-MCF51MM board, J11 jumper on 1-2
  - TWR-MCF51MM board, J12 opened
  - TWR-MCF51MM board, J14 opened for SD card operation, jumper installed for potentiometer
  - TWR-MCF51MM board, J15, J16 both shorted 1-2
  - TWR-MCF51MM board, J18 all shorted
  - TWR-MCF51MM board, J19 jumper (1-2, 3-4, 5-6)
  - TWR-MCF51MM board, J20 jumper 1-2
  - TWR-MCF51MM board, J24 opened
  - TWR-MCF51MM board, J25 jumper (1-2, 3-4)
  - TWR-MCF51MM board, J26 jumper (2-3)
- To enable USB operation in HOST mode
  - TWR-MCF51MM, J3 1-2 not connected (jumper removed)
  - TWR-SER board, J16 jumper on pins 1-2
  - TWR-SER board, J10 jumper on pins 1-2
- To enable USB operation in DEVICE mode
  - TWR-SER board, J16 jumper on pins 3-4
  - TWR-SER board, J10 jumper on pins 2-3
- To enable SD Card operation
  - TWR-MCF51MM board, J4 opened
  - TWR-MEM board, J3 (SD\_CS) jumper on position 1-2 to enable SD Card CS signal

- TWR-MEM board, J12 (SD\_SEL1) remove jumper from 1-2 and insert jumper on 3-4
- To enable CF Card operation
  - TWR-MEM board, J16 on position 2-3
- To enable external MRAM memory (available on Memory Storey board)
  - TWR-MEM board, J10 on position 1-2
  - TWR-MEM board, J16 on position 2-3
- To use TWR-LCD board with eGUI
  - TWR-LCD board, SW5 all switches to ON (enable touch screen)
  - TWR-LCD board, SW1 switches depending on usage either SPI (01111110) or 16 bits FlexBus (10111110)
  - TWR-MCF51MM board, J9 open (IRDA OFF)
  - TWR-MCF51MM board, J18 remove 9-10, 11-12, 13-14 (accelerometer off)
  - TWR-MCF51MM board, to enable navigation buttons set:
    - J4 open (potentiometer OFF)
    - J19 open (disable accelerometer self test)

### 1.2.4 TWR-MCF51QM128-KIT

The MCF51QM128 BSP was tested with following hardware configuration:

- TWR-MCF51QM128 Rev. A processor board
- TWR-SER Rev. C serial board
- TWR-ELEV Primary and Secondary - four-storey elevator boards
- TWR-MEM Rev. B memory extension board.





Core Clock	48 MHz	
Bus Clock	24 MHz	
Default Console	ttya:	RS232 on TWR-SER board
BSP Timer	MTIM1	

### Important jumper settings:

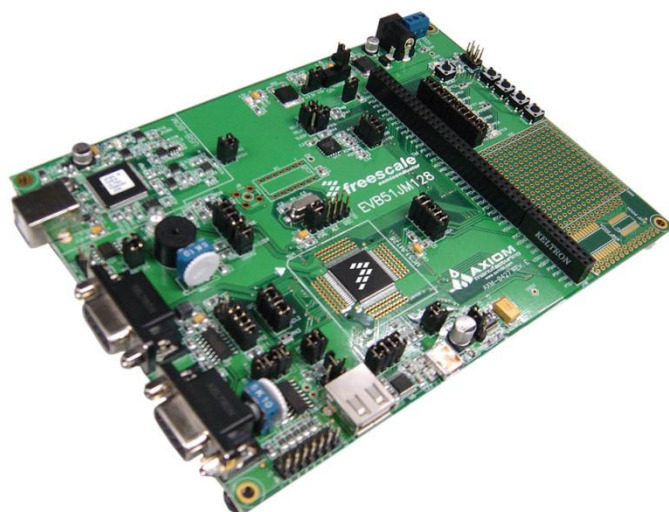
For basic operations, make sure following jumper settings are applied:

- For using CHIP in normal mode
  - TWR-MCF51QM board, J14 no Shunt (Disable Bootload)
- For using CRC module
  - TWR-SER board, J3 on position 2-3 (external clock 50MHz)
  - TWR-MCF51QM board, J2 on default position 1-2 (external clock 50MHz)
- For using ADC, connect to POTENTIOMETER, jumpers on position
  - TWR-MCF51QM board, J5 on position 1-2(ADC0\_SE12)
- For using RAM disk, jumpers on position
  - TWR-MEM board, J13 remove
  - TWR-MEM board, J8 remove (default)

### Board-specific build targets:

- Internal Flash (Debug and Release) - these targets enable to build applications suitable for booting the system up from Internal Flash memory. After the reset the code will be executed from Internal Flash
- See chapter **Error! Reference source not found.** for details about standard build targets.

## 1.2.5 EVB51JM128 Board





Core Clock	48 MHz	
Bus Clock	24 MHz	
Default Console	ttyb:	RS232
BSP Timer	TPM1	

#### Important jumper settings (board rev. E):

- For USB Host operation
  - VBSEL 1-2 H
  - HOST\_EN both shunts on
  - OTG\_EN all shunts off
  - USPD shunt removed

#### Board-specific build targets:

See chapter **Error! Reference source not found.** for more details about standard build targets. The build targets in application projects are configured properly for on-board USB P&E BDM interface.

## 1.3 ColdFire V2

### 1.3.1 TWR-MCF52259-KIT

#### TWR-MCF52259-KIT (Rev.A) consists of

- MCF52259 microcontroller module board
- TWR-ELEV four-storey elevator boards
- TWR-SER serial board
- [optional] TWR-MEM memory extension board
- [optional] TWR-LCD display board



Core Clock	80 MHz	
Bus Clock	40 MHz	
Default Console	ttyb:	RS232
BSP Timer	PIT0	

#### Important jumper settings:

- For a basic operation, make sure the following settings is applied:
  - TWR-SER board, J2 on default position 1-2 (PHY CLK\_SEL 25MHz)
  - TWR-SER board, J3 shunt removed (CLKIN\_SEL)
  - TWR-SER board, J15 on default position 1-2 (SER\_SEL enabling RS232 operation)
  - TWR-SER board, J17 on default position 1-2 (RXD\_SEL enabling RS232 operation)
  - TWR-SER board, J18 shunt removed (RTS\_SEL no RS232 flow control)
  - TWR-SER board, J19 on default position 1-2 (TXD\_SEL enabling RS232 operation)
- To enable external MRAM memory (available on Memory Storey board)
  - TWR-MEM board, J10 on position 1-2
  - TWR-MEM board, J11 shunt removed
- To enable correct Ethernet duplex operation
  - TWR-SER board, J12 shunt on pins 15-16
- To enable USB operation in HOST mode
  - TWR-SER board, J16 shunt on pins 1-2
  - TWR-SER board, J10 shunt on pins 1-2
- To enable USB operation in DEVICE mode
  - TWR-SER board, J16 shunt on pins 3-4

- TWR-SER board, J10 shunt on pins 2-3
- To enable SD Card operation
  - TWR-MEM Board, J3 on position 1-2 to route QSPI\_PCS0 to SD Card Chip Select
  - TWR-MEM Board, J4 remove shunt on pins 1-2 to disable QSPI\_PCS0 routing to serial Flash
  - TWR-MEM board, J13 on position 1-2 to enable SD Card write protect signal
- To enable CompactFlash Card operation (available on Memory Storey board)
  - TWR-MEM board, J16 on position 2-3
- To use write protect detection signals with SD Card on the Memory Storey board
  - TWR-MCF52259 board, turn off switch 3 on SW2 dip-switch.
- To select either CS0 or CS1 for SPI Flash
  - TWR-MEM board, J14 on position 1-2 (CS0)
- To use TWR-LCD board with eGUI
  - TWR-LCD board, SW5 all switches to ON (enable touch screen)
  - TWR-LCD board, SW1 switches depending on usage either SPI (01111110) or 16 bits FlexBus (10111110)
  - TWR-MCF52259 board, to enable navigation buttons set SW2 dip 2 and SW2 dip 3 to OFF

#### Board-specific build targets:

- None. See Freescale chapter **Error! Reference source not found.** for more details about standard build targets. The Ext. **MRAM Debug** target can be used only with Memory Storey Board.

#### Other notes:

The OSBDM Firmware compatibility issue may affect application debugging. See Freescale MQX Release Notes for more details about OSBDM Firmware Compatibility.

### 1.3.2 M5223EVB

#### Important jumper settings:

- None.

#### Board-specific build targets:

- None. See for more details about standard build targets.

### 1.3.3 M52233DEMO



Core Clock	60 MHz	
Bus Clock	30 MHz	
Default Console	ttya:	RS232
BSP Timer	PIT0	

#### Important jumper settings:

- None

#### Board-specific build targets:

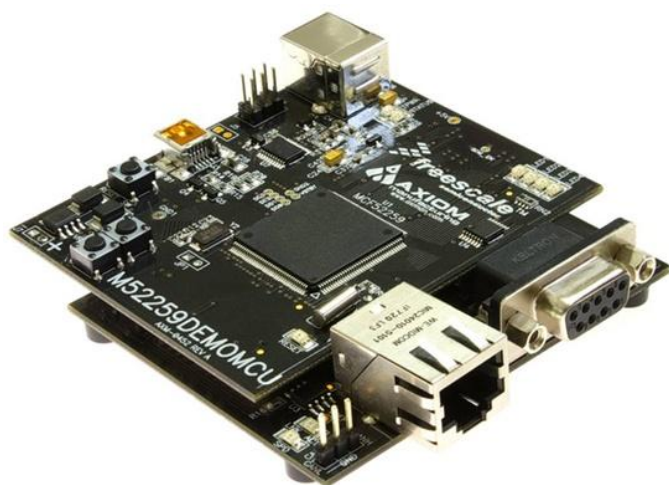
- None. See chapter **Error! Reference source not found.** for more details about standard build targets.

#### Known issues:

- A problem of BDM communication loss was occasionally observed when debugging M52235DEMO applications. This issue is not related to MQX RTOS.

**Workaround:** This issue may be solved by decreasing the BDM communication speed by factor 2 or higher in the “*Remote Debugging*” settings panel for PEMICRO\_USB connection. Press the “*Edit Connection*” button and specify the *Speed* factor value “2”. See the screenshot bellow in the **Error! Not a valid bookmark self-reference.** section.

### 1.3.4 M52259DEMO



Core Clock	80 MHz	
Bus Clock	40 MHz	
Default Console	ttya:	RS232
BSP Timer	PIT0	

#### Important jumper settings:

- None.

#### Other notes:

The FEC\_MDC pin is shared with GPIO signal used to sense the SW1 button state. The Ethernet link status monitoring is not functional in demos which use SW1 button (all HVAC demos).

The OSBDM Firmware compatibility issue may affect application debugging. See Freescale MQX Release Notes for more details about OSBDM Firmware Compatibility.

#### Board-specific build targets:

- None. See chapter **Error! Reference source not found.** for more details about standard build targets.

### 1.3.5 M52259EVB



Core Clock	80 MHz	
Bus Clock	40 MHz	
Default Console	ttya:	RS232
BSP Timer	PIT0	

#### Important jumper settings:

- To enable MDIO/MDC communication between processor and Ethernet PHY device (needed in RTCS applications to detect Ethernet link status)
  - J9 at position 2-3 (FEC\_MDC)
  - J10 at position 2-3 (FEC\_MDIO)
- To enable RTC operation from external crystal
  - H2 at position 1-2
- To enable RTC sourced from battery
  - J17 at position 1-2

#### Board-specific build targets:

None. See chapter **Error! Reference source not found.** for re details about standard build targets.

#### Other information:

Firmware source code for Altera CPLD is available in

`<MQX install dir>\mqx\source\io\pccard\m52259evb_pccard_cpld` directory.



### 1.3.6 M52277EVB



Core Clock	136 MHz	
Bus Clock	68 MHz	
Default Console	ttya:	USB port J26 (UART0)
BSP Timer	PIT0	

#### Important jumper settings (board rev B, schematic D1):

- For USB operation
  - **J7** shunt on position 3-4 (VBUSON)
  - **J9** shunt on position 1-2 (USB\_VBUC\_OC)

#### Board-specific build targets:

- Ext Flash (Debug and Release) – This target enables a standalone operation from on-board flash memory. External SDRAM memory is used for variables by default. The linker command file can be changed easily to allocate variables in the internal SRAM memory.