



MCF54418 Tower Modules

Quick Start Guide

Rev. 0.4



Revision History

Revision	Author	Date	Changes
0.1	TsiChung Liew	April 9, 2010	Initial Version, migrate from u-boot and Linux support
0.2	Phil Maggio	April 13, 2010	Comments and update
0.3	Jim Williams	April 15, 2010	Comments and update
0.4	Jim Williams	April 23, 2010	Comments and update

Contents

MCF54418 TOWER MODULES	1
QUICK START GUIDE.....	1
1 PURPOSE	5
2 REFERENCE DOCUMENTS	5
3 TOWER SYSTEMS.....	5
3.1 TOWER KITS	5
3.2 TOWER MODULES:	5
3.3 CABLES:	6
3.4 OPTIONAL REQUIREMENTS:.....	6
3.4.1 <i>Hardware:</i>	6
3.4.2 <i>Software:</i>	6
3.5 DEVELOPMENT PC REQUIREMENTS.....	6
4 GETTING STARTED.....	7
4.1 TWR-MCF54418 BASEBOARD CONNECTION DIAGRAM	7
4.2 TWR-SER1 DAUGHTER CARD CONNECTION DIAGRAM.....	8
4.3 TWR-SER2 DAUGHTER CARD CONNECTION DIAGRAM.....	9
4.4 TWR-ELEV PRIMARY CARD DIAGRAM.....	10
4.5 TWR-ELEV SECONDARY CARD DIAGRAM.....	11
4.6 TYPE OF USB INTERFACE PLUGS.....	12
5 QUICKSTART	13
5.1 TWR-MCF54418 OPERATES AS AN INDIVIDUAL CARD AND USING ONBOARD 25MHZ REFERENCE CLOCK.....	13
5.2 TWR-MCF54418 USE EXTERNAL CLOCK SOURCE FROM TWR-SER1 OR TWR-SER2	14
5.2.1 <i>Using TWR-SER1 Card.</i>	14
5.2.2 <i>Using TWR-SER2 Card.</i>	14
5.2.3 <i>Using TWR-ELEV Primary Card.</i>	15
5.3 CONSTRUCTING THE TOWER KIT	16
5.3.1 <i>With TWR-SER1, TWR-ELEV Primary and TWR-ELEV Secondary</i>	16
5.3.2 <i>With TWR-SER2 and two TWR-ELEV Primary</i>	17
5.4 CONNECTING THE TOWER KIT	17
6 PROGRAMMING THE BOOT LOADER.....	18
6.1 PROGRAM BOOT LOADER INTO NAND USING CFFLASHPROG.....	18
APPENDIX A TWR-MEM MODULE.....	19
A.1 TWR-MEM DAUGHTER CARD CONNECTION DIAGRAM	19
A.2 QUICK START	20
A.2.1 <i>Using TWR-MEM Card</i>	20
A.2.2 <i>Adding TWR-MEM to the Tower Kit</i>	20
A.3 PROGRAM BOOT LOADER INTO MRAM USING CF FLASHER	20
A.4 PROGRAM BOOT LOADER INTO SERIAL FLASH USING CF FLASHER	22
APPENDIX B COMPLETE TOWER BOARDS BREAKDOWN.....	23
B.1 TWR-MCF54418 BASEBOARD TOP DIAGRAM	23

B.2	TWR-MCF54418 BASEBOARD BOTTOM DIAGRAM	24
B.3	TWR-SER1 DAUGHTER CARD DIAGRAM.....	25
B.4	TWR-SER2 DAUGHTER CARD DIAGRAM.....	27
B.5	TWR-MEM DAUGHTER CARD TOP DIAGRAM	29
B.6	TWR-MEM DAUGHTER CARD BOTTOM DIAGRAM.....	30
B.7	TWR-ELEV PRIMARY CARD TOP DIAGRAM	31
B.8	TWR-ELEV PRIMARY CARD BOTTOM DIAGRAM.....	32
B.9	TWR-ELEV SECONDARY CARD DIAGRAM	33

1 Purpose

This document provides design and usage information for the Freescale TWR_M54418 evaluation, development and reference platform.

2 Reference Documents

[MCF54418 Reference Manual](#)

[TWR-MCF54418 Schematics](#)

[TWR-MCF54418 User Manual](#)

[TWR-SER User Manual](#)

[TWR-SER Schematics](#)

TWR-SER2 User Manual

[TWR-SER2 Schematics](#)

[TWR-MEM User Manual](#) and [Quick Start Guide](#)

[TWR-MEM Schematics](#)

[TWR-ELEV Primary Schematics](#)

[TWR-ELEV Secondary Schematics](#)

3 Tower Systems

3.1 Tower Kits

- TWR-MCF54418 Standalone KIT
- Includes TWR-MCF54418 Microcontroller Module and USB Cable (Type A-Mini B)
- TWR-MCF54418 with TWR-SER1 KIT
- Includes TWR-MCF54418 Microcontroller Module, TWR-SER1, TWR-ELEV Primary module, TWR-ELEV Secondary module, USB Cable (Type A-Mini B), Ethernet Cable, Serial Cable (DB9-DB9) and extra Jumpers
- TWR-MCF54418 with TWR-SER2 KIT
- Includes TWR-MCF54418 Microcontroller Module, TWR-SER1, Two TWR-ELEV Primary modules, USB Cable (Type A-Mini B), Ethernet Cable, Serial Cable (DB9-DB9) and extra Jumpers

3.2 Tower Modules:

- TWR-MCF54418 (Revision B)
- 128 MB DDR2 SDRAM, 256 MB NAND Flash, UART x2, DAC Audio, Temperature Sensor, Accelerometer, Potentiometer
- TWR-SER1 (Revision D)
- Ethernet x1, UART x3 (RS232), USB, and CAN
- TWR-SER2 (Revision A)
- Ethernet x2, UART x3, USB Host, USB OTG
- TWR-ELEV Primary (Revision D)
- Structural integrity, communications interfaces, power regulation circuitry with standardized bus
- TWR-ELEV Secondary
- Structural integrity
- TWR-MEM (Optional, does not include in the kits)
- CPLD, Compact Flash, MRAM (512 KB), SD Card, Serial Flash

3.3 Cables:

- Serial Cable DB9 Male to DB9 Female (Direct)
- USB Cable (Type A to Mini B plug) for Power
- Ethernet Cable – CAT5E

3.4 Optional requirements:

3.4.1 Hardware:

- ColdFire P&E Multilink USB Hardware Debugger (Required for NAND/Serial Flash Programming)
- USB Cable (Type A to Type B) for P&E Multilink USB version
- 10 Pins (2x5) Female Connector to DB9 Female

3.4.2 Software:

- Code Warrior IDE ColdFire version 7.2 and above with [M54418 patch](#)
- [CF Flasher](#) (M54418TWR_mem.cfg and MemCopy.alg) for TWR-MEM MRAM
- [CF Flasher](#) (M54418TWR_serial_atmel.cfg and AT26DF08.alg) for TWR-MEM Serial Flash
- [CFFlashprog](#) (Windows Command Prompt Version) for TWR-MCF54418 NAND Flash
- GCC 4.x.x (Linux version) for both u-boot bootloader and Linux BSP. The compiler can be downloaded at <http://www.codesourcery.com> (Optional)
- Console Terminal Windows. HyperTerminal or [TeraTerm-Pro](#) (preferred) for Windows, Minicom for Linux

3.5 Development PC Requirements

- 115200 baud rate capable RS-232 port (COM port)
- Tera Term Serial emulation program or equivalent
- USB port to utilize BDM interface
- Router or Ethernet Switch/HUB

4 Getting Started

4.1 TWR-MCF54418 Baseboard Connection Diagram

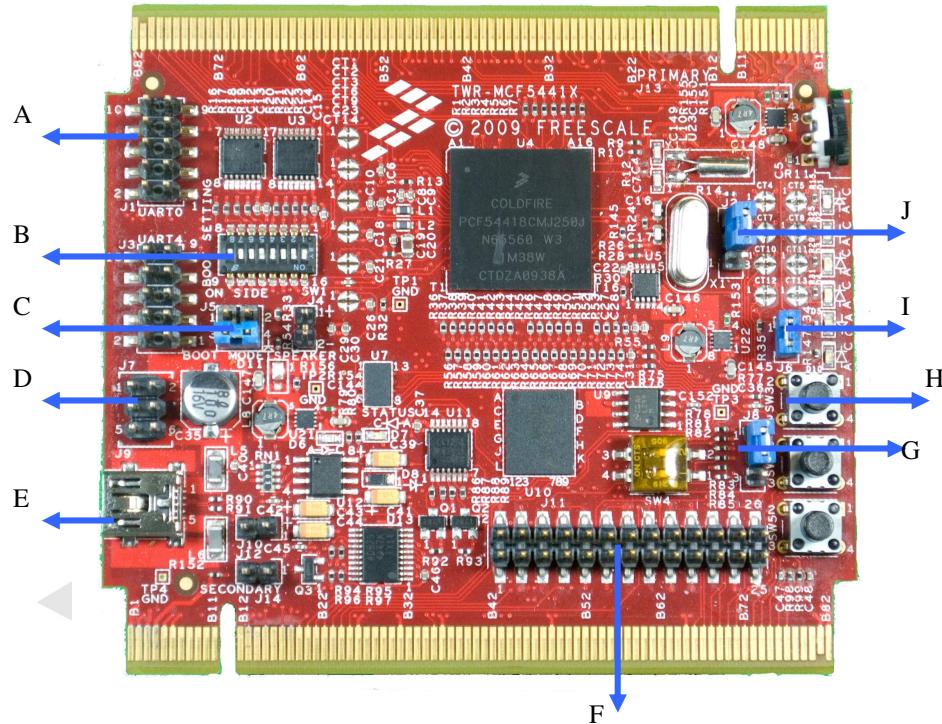


Figure 1 - TWR-MCF54418

A – UART0 RS232 Header	F - Standard 26-Pin BDM Header
B - 8-Way DIP Switch (Parallel Configuration) 25MHz NAND SW1[1:8]={0,1,0,1,1,0,1,1} 50MHz NAND SW1[1:8]={0,1,0,1,1,0,0,0} 25MHz Flexbus SW1[1:8]={1,1,0,0,1,0,1,1} 50MHz Flexbus SW1[1:8]={1,1,0,0,1,0,0,0}	G – TCK / PSTCLK Routing: *1-2 for routing PSTCLK to pin 24 of BDM header (F) 2-3 for routing PSTCLK to Pin 6 of BDM header (F)
C – Boot Mode Selection: 1-2 & 3-4 – Internal RCON *3-4 – External RCON No Jumper – Serial Boot	H – System Reset Button
D – JM60 Background Debugger Header	I – BDM EN: Shunt to enable*
E – OSBDM Interface or Power Supply Mini B Receptor	J – Input Clock Selection: 1-2 onboard 25MHz 2-3 external clock

* Denoted as default settings

4.2 TWR-SER1 Daughter Card Connection Diagram

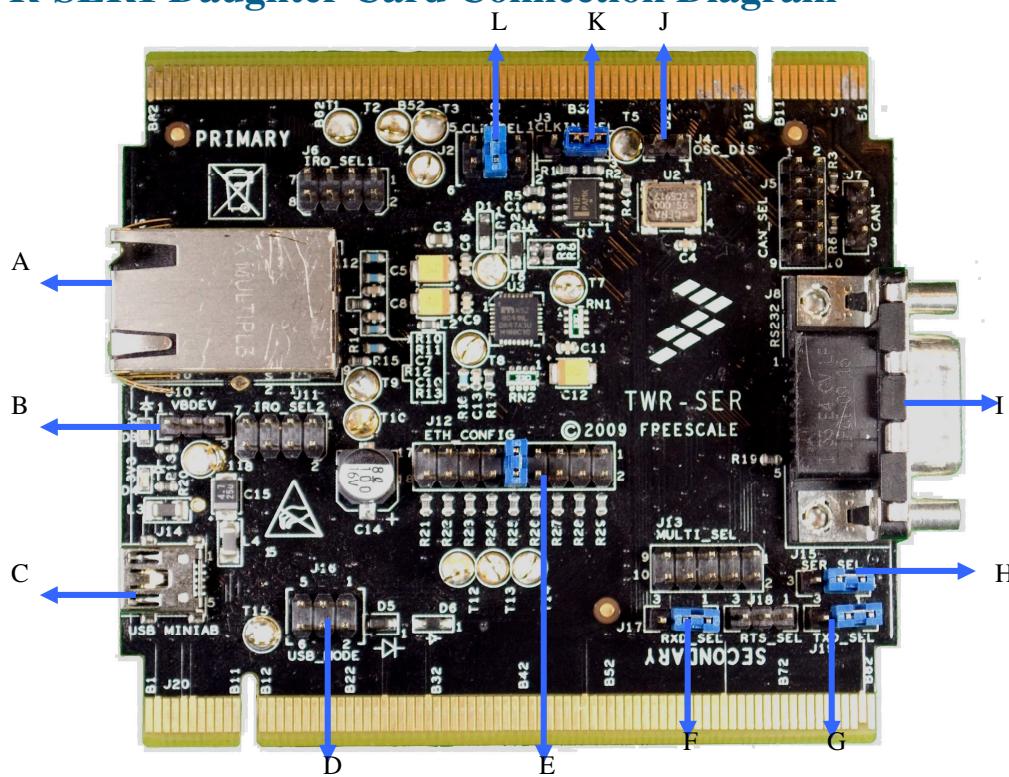


Figure 2 - TWR-SER

A – Ethernet Port	G – TXD Selection: *1-2 RS232, 2-3 RS485
B – USB Power: *1-2 Host, 2-3 Device	H – Serial Selection: *1-2 RS232, 2-3 RS485
C – USB Mini AB Port	I – UART1 RS232/RS485 Serial DB9
D – USB VBUS Mode: *1-2 Host 3-4 Device 5-6 OTG	J – Enable or Disable Oscillator: Shunt to Disable
E – Ethernet Configuration Options 1-2 PHYAD2 3-4 PHYAD1 5-6 PHYAD0 7-8 CONFIG2 *9-10 CONFIG0 11-12 ISO 13-14 LED1/SPEED 15-16 DUPLEX 17-18 LED0/NWAYEN	K – Output Clock Selection: 1-2 25MHz *2-3 To CPU card CLOCKIN
F – RXD Selection: *1-2 RS232, 2-3 RS485	L – Input Clock Selection: 1-2 25MHz to PHY *3-4 50MHz to PHY 5-6 CLOCKOUT to PHY

* Denoted as default settings

4.3 TWR-SER2 Daughter Card Connection Diagram

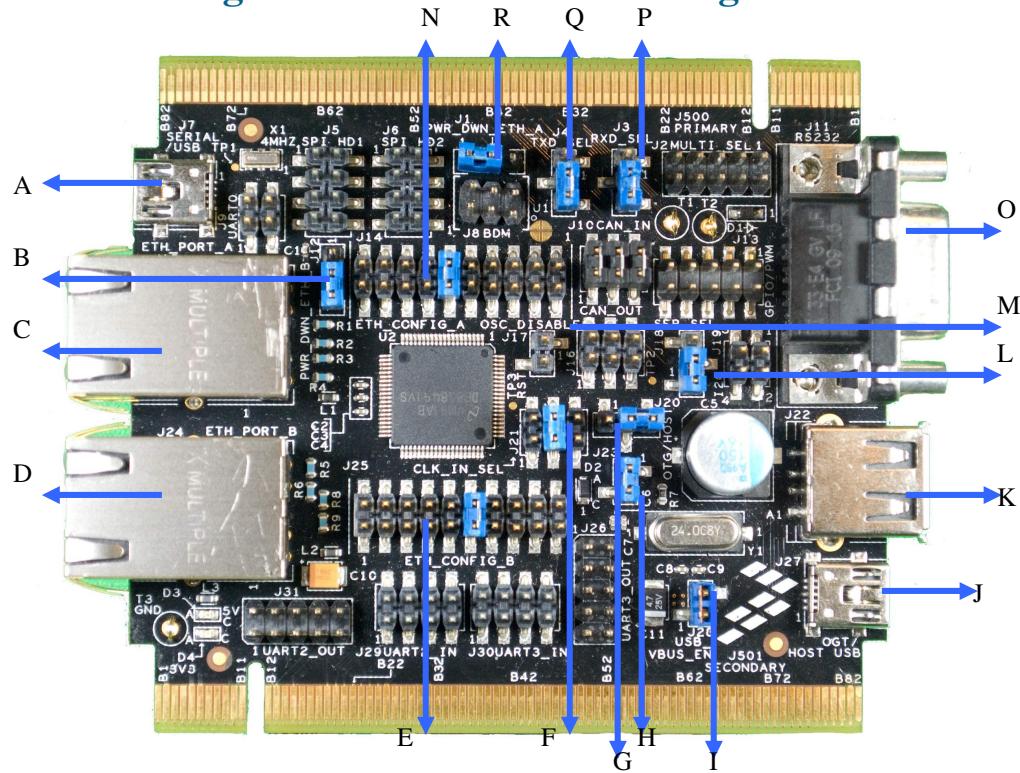


Figure 3 - TWR-SER2

A – minib USB (Serial-USB)	J – USB OTG Connector
B – Ethernet Port B PowerDown *1-2: Powered, 3-4: Powered Down	K – USB Host Connector
C – Ethernet Port A	L – Serial Selection: *1-2: RS232, 2-3: RS485
D – Ethernet Port B	M – OSC Disable: Shunt to Disable Oscillator
E – Ethernet Port B Configuration Options 1 – 2 PHYAD3 3 – 4 PHYAD4 5 – 6 AN_EN 7 – 8 LED_LINK 9 – 10 LED_SPEED *11 – 12 MII_MODE 13 – 14 MDIX_EN 15 – 16 ED_EN 17 – 18 EXTENDER_EN 19 – 20 GND	N – Ethernet Port A Configuration Options 1 – 2 PHYAD1 3 – 4 PHYAD2 5 – 6 AN_EN 7 – 8 LED_LINK 9 – 10 LED_SPEED *11 – 12 MII_MODE 13 – 14 MDIX_EN 15 – 16 ED_EN 17 – 18 CLK2MAC_DIS 19 – 20 GND
F – Ethernet Clock Selection 1-2: 25MHz, *3-4: 50MHz, 5-6: Ext Clock	O - DB9 RS232/RS485 Serial Connector
G – OTG/Host Select *1-2: Host Mode, 2-3: Device Mode	P - RXD Select: 1-2: RS485, *2-3: RS232
H – USB VBUS OC: Shunt to enable*	Q – TXD Select: 1-2: RS485, *2-3: RS232
I – USB VBUS EN : Shunt to enable*	R – Ethernet Port B PowerDown *1-2: Powered, 3-4: Powered Down

* Denoted as default settings

4.4 TWR-ELEV Primary Card Diagram

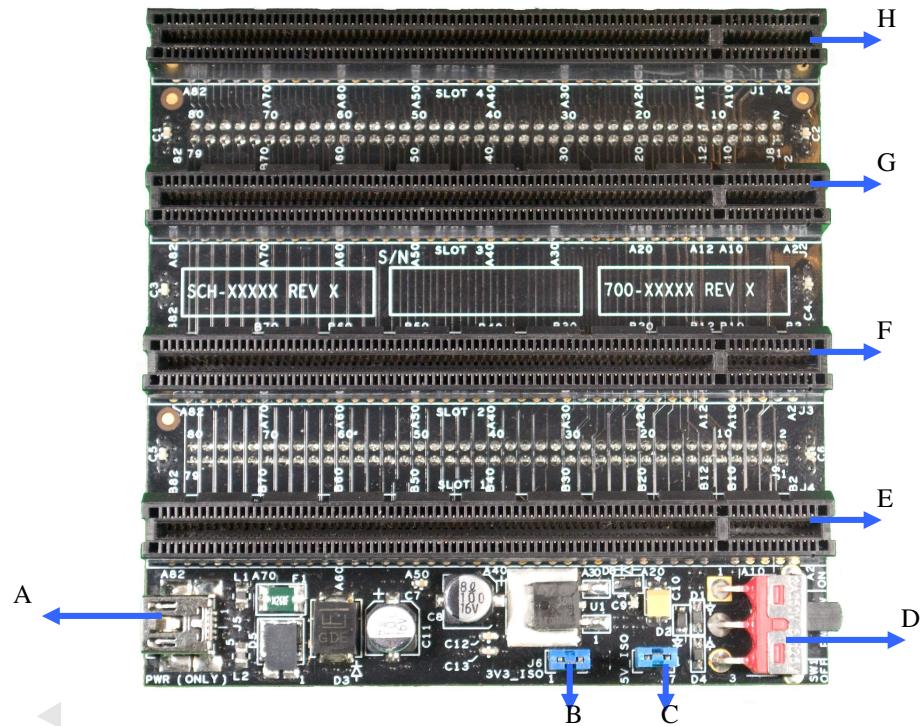


Figure 4 - TWR-ELEV Primary

A – USB mini B Receptor (Power)	E – PCI express Slot 1 connector (J4)
B – +3.3V Supply: Shunt to enable*	F – PCI express Slot 2 connector (J3)
C – +5.0V Supply: Shunt to enable*	G – PCI express Slot 3 connector (J2)
D – Power On/Off Switch	H – PCI express Slot 4 connector (J1)

* Denoted as default settings

4.5 TWR-ELEV Secondary Card Diagram

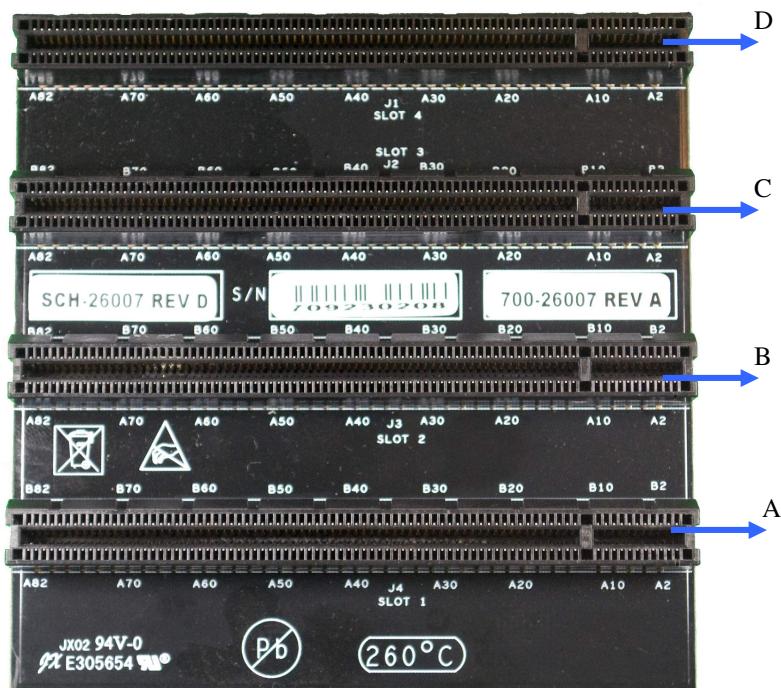


Figure 5 - TWR-ELEV Secondary

A – PCI express Slot 1 connector (J4)	C – PCI express Slot 3 connector (J2)
B – PCI express Slot 2 connector (J3)	D – PCI express Slot 4 connector (J1)

* Denoted as default settings

4.6 Type of USB Interface Plugs

The following image is obtained from OTG_mechanical specification.



Figure 6 - USB Connector Types

5 QuickStart

The following table provides the summary of MCF54418 Tower Modules Kits that is required:

	TWR-ELEV Secondary	TWR-ELEV Primary	TWR-SER2	TWR-SER1	TWR-MCF54418
TWR-MCF54418 Standalone KIT					*
TWR-MCF54418 with TWR-SER1 KIT	*	*		*	*
TWR-MCF54418 with TWR-SER1 KIT	*	*		*	*
TWR-MCF54418 with TWR-SER1 KIT	*	*		*	*
TWR-MCF54418 with TWR-SER2 KIT	*		*	*	* x2
TWR-MCF54418 with TWR-SER2 KIT	*		*	*	* x2
TWR-MCF54418 with TWR-SER2 KIT	*		*	*	* x2

5.1 TWR-MCF54418 operates as an individual card and using onboard 25MHz reference clock

There is a 256 MB NAND Flash located at the bottom of the TWR-MCF54418 board. A boot loader will be booted from the NAND Flash.

- Shunt 2-3 of J2 (See J of Figure 1 - TWR-MCF54418) for 25 MHz input clock from onboard crystal.
- Shunt 3-4 only of J5 for external RCON boot mode (See C of Figure 1 - TWR-MCF54418)
- Setup SW1 (See B of Figure 1 - TWR-MCF54418) boot settings. On - 0 (active low), and off - 1 (high). SW1[1:8] should set to Pin 1 - {0,1,0,1,1,0,1,1} - Pin 8.

Bit	SW1	Current Function Settings
1	0	NAND mode
2	1	PLL Enabled
3	0	Crystal OSC mode
4	1	FB_ALE
6 – 5	01	8-bit / 24-bit no muxed address
8 – 7	11	25 MHz x 20 multiplier = 500 MHz VCO

- Connect Serial Adaptor (2x5 Pin connector – DB9 Female) to UART0 of J1 (See A of Figure 1 - TWR-MCF54418)
- Connect Serial Cable (DB9 Male – DB9 Female) to above DB9 Female connector and PC Host
- Connect USB Cable (Type A – Mini B plug) to Power source such as PC Host or USB power adaptor and to USB mini B receptor of J9 (See E of Figure 1 - TWR-MCF54418)
- An orange LED and green LED of D6 and D10 will light up. (See H & R of Figure 12 - TWR-MCF54418 Top View (B1))
- Press SW3 (See H of Figure 1 - TWR-MCF54418) to reset the board.

5.2 TWR-MCF54418 use external clock source from TWR-SER1 or TWR-SER2

- Shunt 1-2 of J2 (See J of Figure 1 - TWR-MCF54418) for 50 MHz input clock from TWR-SER1 or TWR-SER2 .
- Shunt 3-4 only of J5 for external RCON boot mode (See C of Figure 1 - TWR-MCF54418)
- Setup SW1 (See B of Figure 1 - TWR-MCF54418) boot settings. On - 0 (active low), and off - 1 (high). SW1[1:8] should set to {0,1,0,1,1,0,0,0}.

Bit	SW1	Current Function Settings
1	0	NAND mode
2	1	PLL Enabled
3	0	Crystal OSC mode
4	1	FB_ALE
6 – 5	01	8-bit / 24-bit no muxed address
8 – 7	00	50 MHz x 10 multiplier = 500 MHz VCO

5.2.1 Using TWR-SER1 Card

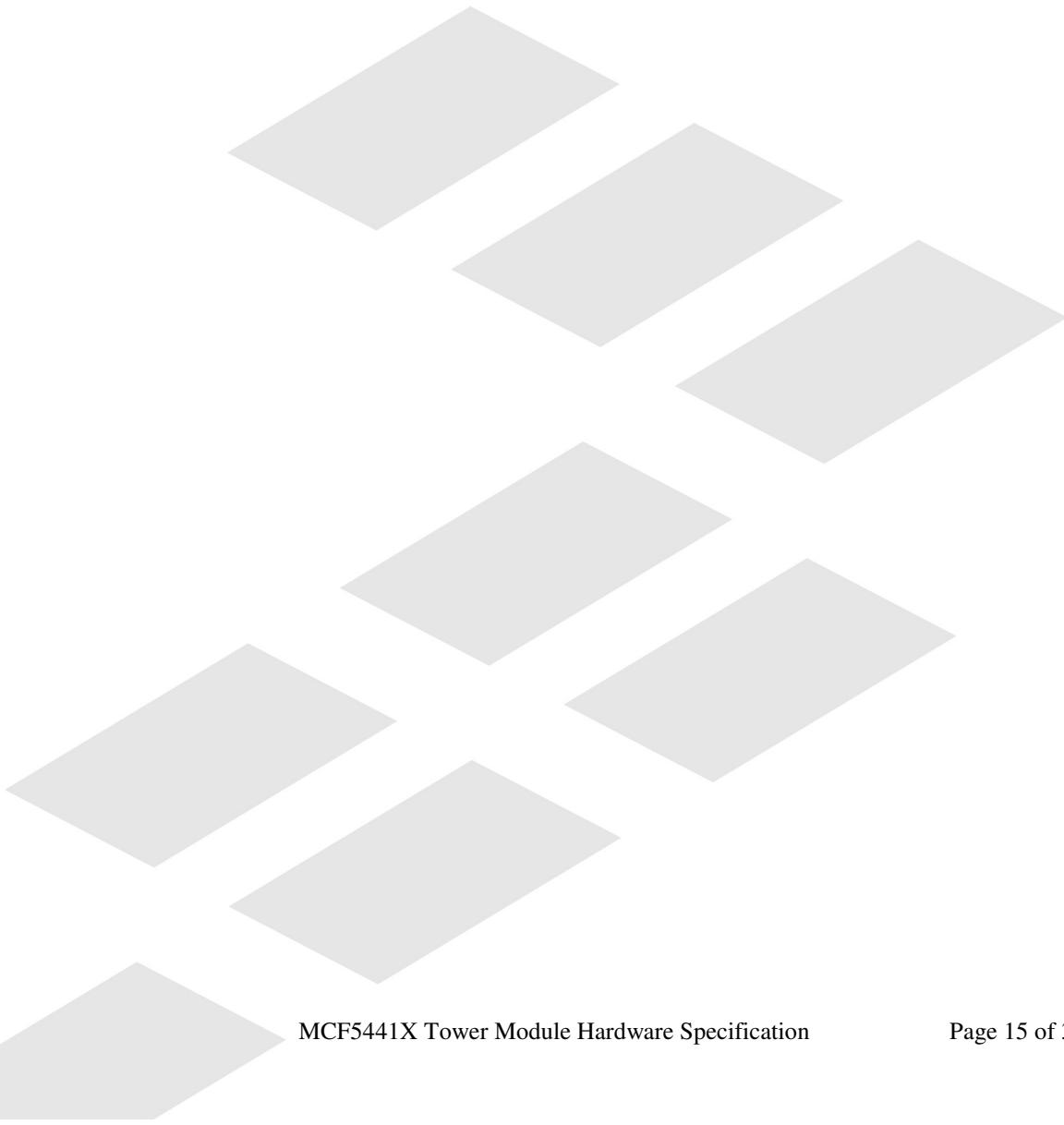
- Clock Setup:
 - No Jumper for J4 (See J of Figure 2 - TWR-SER)
 - Shunt 2-3 of J3 to provide CPU reference clock (See K of Figure 2 - TWR-SER)
 - Shunt 3-4 of J2 for 50MHz reference clock for Micrel PHY, No Jumper for 1-2 and 5-6. (See L of Figure 2 - TWR-SER)
- Ethernet Port Setup:
 - Shunt only 9-10 of J12 for setting up the Micrel PHY as RMII mode (See E of Figure 2 - TWR-SER)
- Serial Port Setup:
 - Shunt 1-2 of J15 (See H of Figure 2 - TWR-SER)
 - Shunt 1-2 of J19 (See G of Figure 2 - TWR-SER)
 - Shunt 1-2 of J17 (See F of Figure 2 - TWR-SER)

5.2.2 Using TWR-SER2 Card

- Clock Setup:
 - No jumper for J17 (See M of Figure 3 - TWR-SER2)
 - Shunt 2-3 of J21 to provide CPU reference clock (See F of Figure 3 - TWR-SER2)
- Ethernet Port A Setup:
 - Shunt 1-2 of J1 to enable the port (See R of Figure 3 - TWR-SER2)
 - Shunt 11-12 of J14 for setting up as RMII mode (See N of Figure 3 - TWR-SER2)
- Ethernet Port B Setup:
 - Shunt 1-2 of J12 to enable the port (See B of Figure 3 - TWR-SER2)
 - Shunt 11-12 of J25 for setting up as RMII mode (See E of Figure 3 - TWR-SER2)
- Serial Port Setup
 - Shunt 1-2 of J18 for RS232 (See L of Figure 3 - TWR-SER2)
 - Shunt 2-3 of J3 for RS232 RXD (See P of Figure 3 - TWR-SER2)
 - Shunt 2-3 of J4 for RS232 TXD (See Q of Figure 3 - TWR-SER2)
- USB Setup
 - Shunt 2-3 of J12 to disable the Ethernet Port B (See B of Figure 3 - TWR-SER2)
 - Shunt 1-2 of J28 for USB_VBUS enable (See I of Figure 3 - TWR-SER2)
 - Shunt 1-2 of J23 for USB_VBUS Over current (See H of Figure 3 - TWR-SER2)
 - Shunt 2-3 of J20 for USB Host (See G of Figure 3 - TWR-SER2)

5.2.3 Using TWR-ELEV Primary Card

- Shunt 1-2 of J6 (See B of Figure 4 - TWR-ELEV Primary)
- Shunt 1-2 of J7 (See C of Figure 4 - TWR-ELEV Primary)



5.3 Constructing the Tower Kit

Insert the Primary side of TWR-MCF54418 into the top most PCI express slot (J1 – Slot 4 see H of Figure 4 - TWR-ELEV Primary) of TWR-ELEV Primary Card

5.3.1 With TWR-SER1, TWR-ELEV Primary and TWR-ELEV Secondary

- Insert the Primary side of TWR-SER1 into the second slot from the top of the PCI express slot (J2 – Slot 3 see G of Figure 4 - TWR-ELEV Primary) of TWR-ELEV Primary Card
- Attach the TWR-ELEV Secondary side of Slot 4 (J1, see D of Figure 5 - TWR-ELEV Secondary) to secondary side of TWR-MCF54418 and Slot 3 (J2) to secondary side of TWR-SER1



Figure 7 - TWR Kits with Secondary Elevator

5.3.2 With TWR-SER2 and two TWR-ELEV Primary

- Insert the Primary side of TWR-SER2 into the second slot from the top of the PCI express slot (J2 – Slot 3 see G of Figure 4 - TWR-ELEV Primary) of TWR-ELEV Primary Card
- Attach the TWR-ELEV Primary Card of Slot 4 (J1) to secondary side of TWR-MCF54418, and Slot 3 (J2) to secondary side of TWR-SER2

5.4 Connecting the Tower Kit

- Connect the RS232 serial cable to the serial port connector on the TWR-SER1 or TWR-SER2 and to a COM port on the host PC
- Connect the RJ45 Ethernet cable to the Ethernet port connector on the TWR-SER2 or TWR-SER2 port A and to a Ethernet port on the host PC or a network hub/switch/router
- Connect the USB Power cable (Type A - mini B) of Type A to either PC Host's USB receptor or USB Power Adaptor.
- Connect the USB Power Cable (Type A- mini B) of mini B to USB mini B receptor on the TWR-ELEV Primary Card of the primary side of TWR-MCF54418, TWR-SER1/TWR-SER2
- Flip the On-Off Switch on the TWR-ELEV Primary Card of the primary side of TWR-MCF54418, TWR-SER1/TWR-SER2 to power on or power off the Tower Kit.



6 Programming the boot loader

- Shunt 1-2 of J6 on the TWR-MCF54418 card (See I of Figure 1 - TWR-MCF54418)
- Shunt 1-2 of J8 on the TWR-MCF54418 card (See G of Figure 1 - TWR-MCF54418)
- Connect USB P&E Multilink to J11 on the TWR-MCF54418 card (See F of Figure 1 - TWR-MCF54418)

6.1 Program boot loader into NAND using CFFlashprog

- Setup SW1 of pin 1 to On (0) (See B of Figure 1 - TWR-MCF54418) boot settings
- Obtain and extract [CFFlashprog.zip](#). It contains three folders (alg, BDMPacket & cfg) and cf.exe
- Open Windows DOS command prompt and change directory to the extracted CFFlashprog folder
- To erase NAND at offset 0 and 4 blocks in size. The size must be 0x20000 aligned. The erase must be execute first before write command can be proceeded
C:/> cf nand erase m54418twr_nand 0 40000
- To program the bootable NAND at offset 0. If bootloader.bin is smaller than 0x40000, then the bootloader.bin size will be used
C:/> cf nand write m54418twr_nand 0 40000 1 bootloader.bin
- To verify the bootable NAND at offset 0
C:/> cf nand verify m54418twr_nand 0 40000 1 bootloader.bin
- Remove P&E Hardware debugger from J11. Issue a system reset via reset button (SW3)

Appendix A TWR-MEM module

A.1 TWR-MEM Daughter Card Connection Diagram

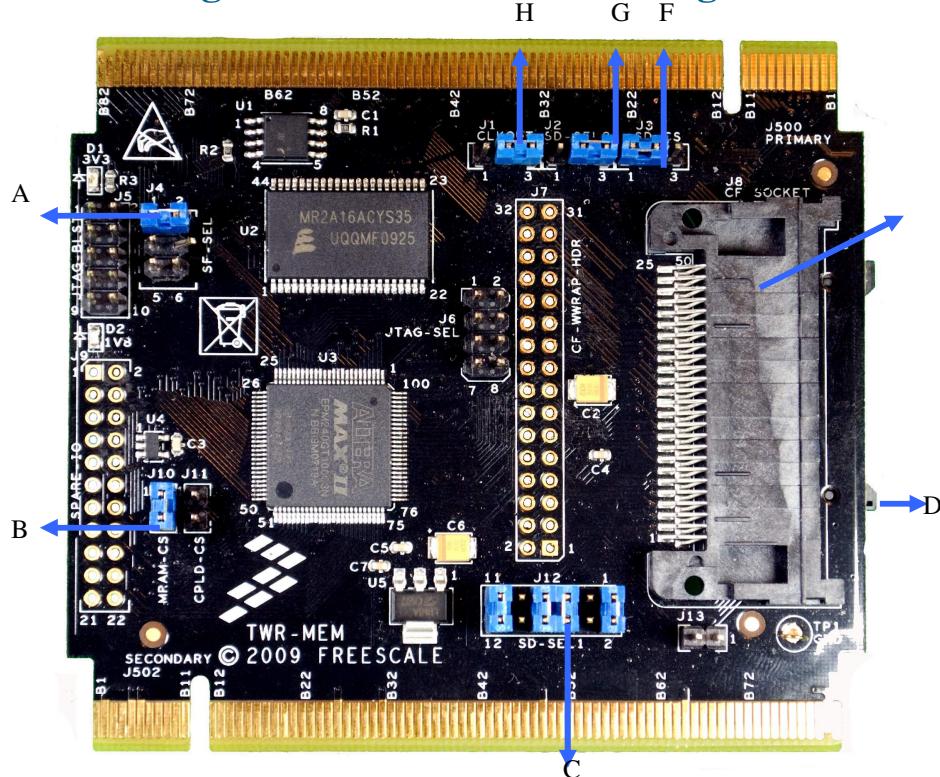


Figure 8 - TWR-MEM

A – Serial Flash Selection: *1-2 SF Chip Select 3-4 SF Write protect 5-6 Use GPIO5 for HOLD	E – Compact Flash Adaptor
B – MRAM Chip Select: Shunt to enable*	F – SD CS: 1-2 for SPI1_CS0 *2-3 for SPI1_CS1
C – SD Selection: *1 – 2 IRQH for SD Card Detect 3 – 4 IRQA for SD Card Detect *5 – 6 SD_D1 – GPIO2 *7 – 8 SD_D2 – JTAG2 9 – 10 SD_PU1 (pull up option) *11 – 12 SD_PU2 (pull up option)	G – SDHC selection: *1-2 for SDHC mode 2-3 for SD over SPI mode
D – SDHC Adaptor (Bottom of the board)	H – SD Clockout: 1-2 CLKOUT1 drives FBCLK *2-3 CLKOUT0 drives FBCLK

* Denoted as default settings

A.2 Quick Start

A.2.1 Using TWR-MEM Card

- MRAM Setup
 - Shunt 1-2 of J10 (See B of Figure 8 - TWR-MEM)
- Serial Flash Setup
 - Shunt 1-2 of J4 (See A of Figure 8 - TWR-MEM)
- SDHC Setup
 - Shunt 2-3 of J1 for SD CLKOUT (See H of Figure 8 - TWR-MEM)
 - Shunt 2-3 of J2 for SD Selection (See G of Figure 8 - TWR-MEM)
 - Shunt 1-2 of J3 for SD CS (See J of Figure 8 - TWR-MEM)
 - Shunt 1-2 of J12 (See C of Figure 8 - TWR-MEM)
 - Shunt 5-6 of J12 (See C of Figure 8 - TWR-MEM)
 - Shunt 7-8 of J12 (See C of Figure 8 - TWR-MEM)
 - Shunt 11-12 of J12 (See C of Figure 8 - TWR-MEM)

A.2.2 Adding TWR-MEM to the Tower Kit

- Insert the Primary side of TWR-MEM into the third slot from the top of the PCI express slot (J3 – Slot 2 see F of Figure 4 - TWR-ELEV Primary)
- Attach the TWR-ELEV Primary or TWR-ELEV Secondary side of Slot 2 (J3) to secondary side of TWR-MEM

A.3 Program boot loader into MRAM using CF Flasher

- Setup SW1 of pin 1 to Off (1) (See B of Figure 1 - TWR-MCF54418) boot settings
- Obtain and extract [CF Flasher.zip](#). It contains three folders (alg, BDM Protocol & cfg) and CFFlasher.exe
- Start the CF Flasher program utility
- Click on Target Configuration button after opened up the CF Flasher. Select M54418TWR_mem under Target Configuration
- Select PE_USB_ML under BDM Communication, then press OK to return to the main page
- Click on Program button. Select desired file under File Select. Press OK if prompt for Start Address (Default is 0). Click on Program button to program the MRAM
- Once it is finished, click on Verify button to verify the data after program. If it is unable to program and generate error message “Could not force processor into background mode. Check your connections, power, and specified parallel port”, press the reset button (SW3) and click on Program button again
- Remove P&E Hardware debugger from J11. Issue a system reset via reset button (SW3)

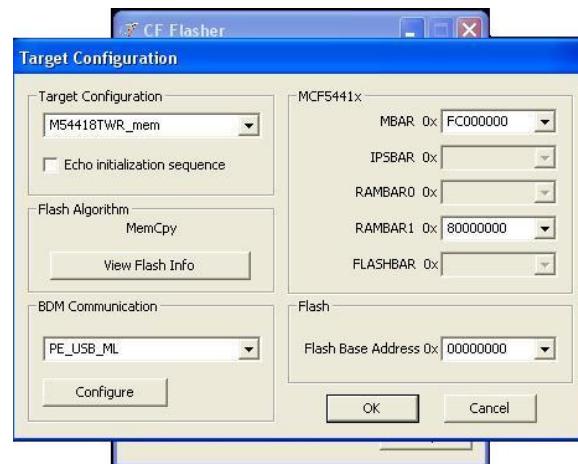


Figure 9 - CF Flasher Target Configuration

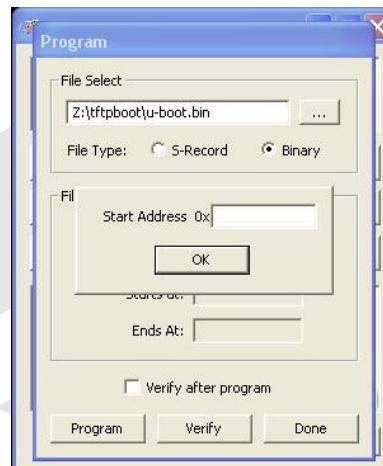


Figure 10 - CF Flasher Program



Figure 11 - U-boot Screen Shot boot from MRAM

A.4 Program boot loader into Serial Flash using CF Flasher

- Setup SW1 of pin 1 to Off (1) (See B of Figure 8 - TWR-MEM) boot settings
- Obtain and extract [CF Flasher.zip](#). It contains three folders (alg, BDM Protocol & cfg) and CFFlasher.exe
- Start the CF Flasher program utility
- Click on Target Configuration button after opened up the CF Flasher. Select M54418TWR_sbf under Target Configuration
- Select PE_USB_ML under BDM Communication, then press OK to return to the main page
- Click on Erase button. Select desired range or erase all.
- Click on Program button. Select desired file under File Select. Press OK if prompt for Start Address (Default is 0). Click on Program button to program the Serial Flash
- Once it is finished, click on Verify button to verify the data after program. If it is unable to program and generate error message “Could not force processor into background mode. Check your connections, power, and specified parallel port”, press the reset button (SW3) and click on Program button again
- Set boot setting to serial boot by removing 1-2 & 3-4 jumpers
- Remove P&E Hardware debugger from J11. Issue a system reset via reset button (SW3)

Appendix B Complete tower boards breakdown

B.1 TWR-MCF54418 BaseBoard Top Diagram

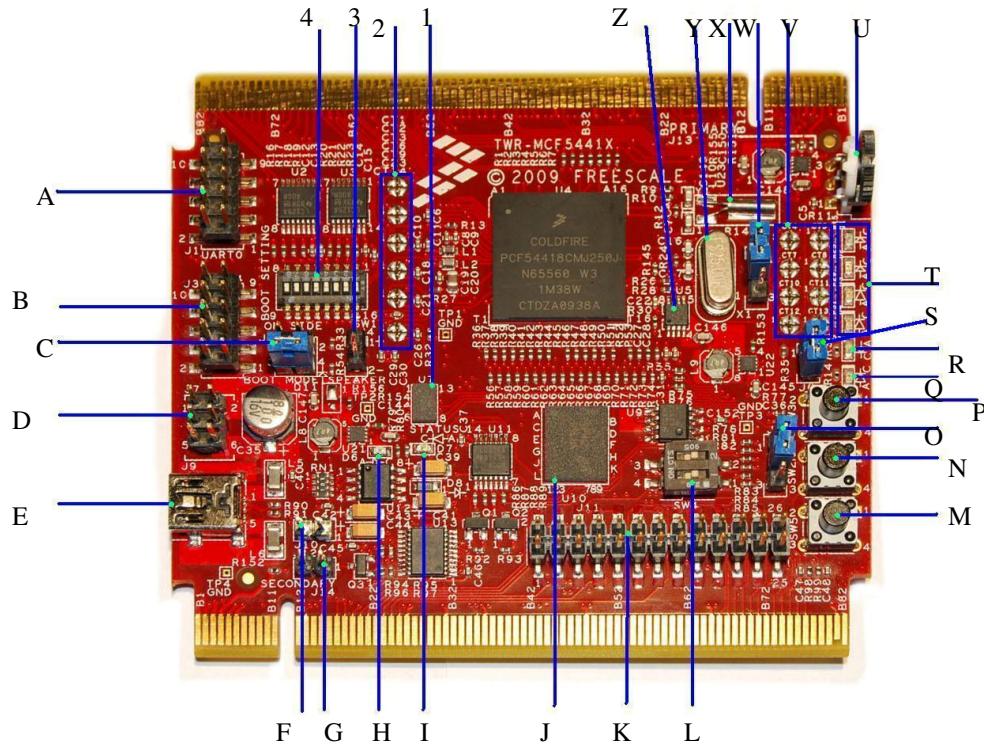


Figure 12 - TWR-MCF54418 Top View (B1)

A – UART0 RS232 Header	P – System Reset
B – UART4 RS232 Header	Q – Reset LED Indicator
C – Boot Mode Selection: 1-2 & 3-4 – Reset RCON *3-4 – External RCON No Jumper – Serial Boot	R – Power LED Indicator
D – JM60 Background Debugger Header	S – BDM EN: *1-2 EN No Jumper - DIS
E – OSBDM Interface or Power Supply (Mini B)	T – General Purpose LEDs
F – JM60 IRQ	U – Potentiometer
G – MCU Reset Header	V – Signal Routing
H – Power LED Indicator from E (USB Mini B)	W – Input Clock Selection: 1-2 onboard 25MHz 2-3 external clock
I – Link Status LED Indicator from E (USB Mini B)	X – 32KHz Crystal
J – 128MB DDR2 SDRAM	Y – 25MHz Crystal
K – Standard 26-Pin BDM Header	Z – Temperature Sensor
L – 2-way DIP Switch	1 – Accelerometer
M – Auxiliary button - IRQ1	2 – Signal Routing
N – Auxiliary button - IRQ2	3 – Audio Headers

* Denoted as default settings

O – TCK / PSTCLK Routing: *1-2 for routing PSTCLK to pin 24 of BDM header (F) 2-3 for routing PSTCLK to Pin 6 of BDM header (F)	4 – 8-Way DIP Switch (Parallel Configuration) 25MHz NAND SW1[1:8]={0,1,0,1,1,0,1,1} 50MHz NAND SW1[1:8]={0,1,0,1,1,0,0,0} 25MHz Flexbus SW1[1:8]={1,1,0,0,1,0,1,1} 50MHz Flexbus SW1[1:8]={1,1,0,0,1,0,0,0}
---	---

* Denoted as default settings

B.2 TWR-MCF54418 BaseBoard Bottom Diagram

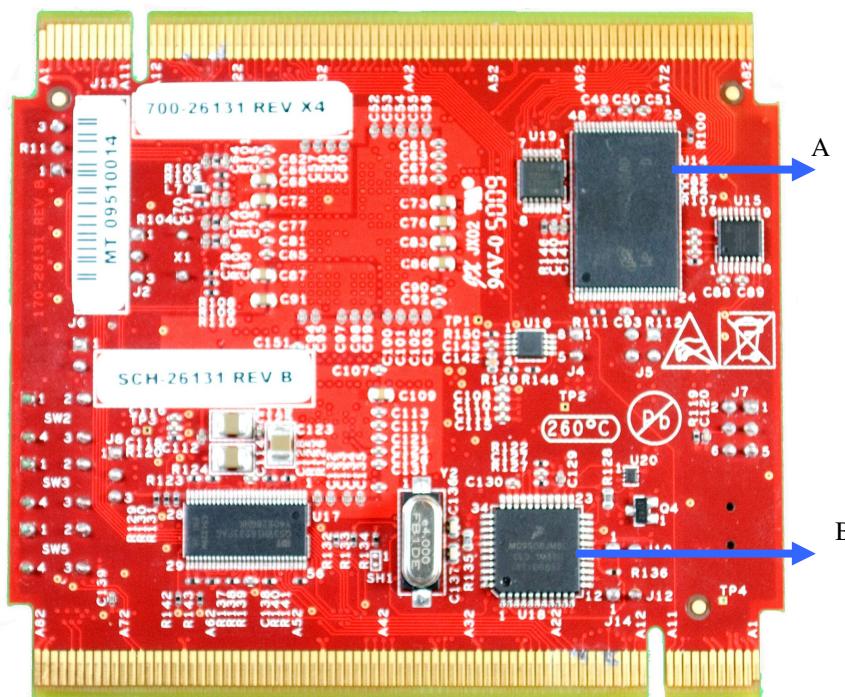


Figure 13 - TWR-MCF54418 Bottom View (B2)

A – NAND Flash	B – JM60
----------------	----------

B.3 TWR-SER1 Daughter Card Diagram

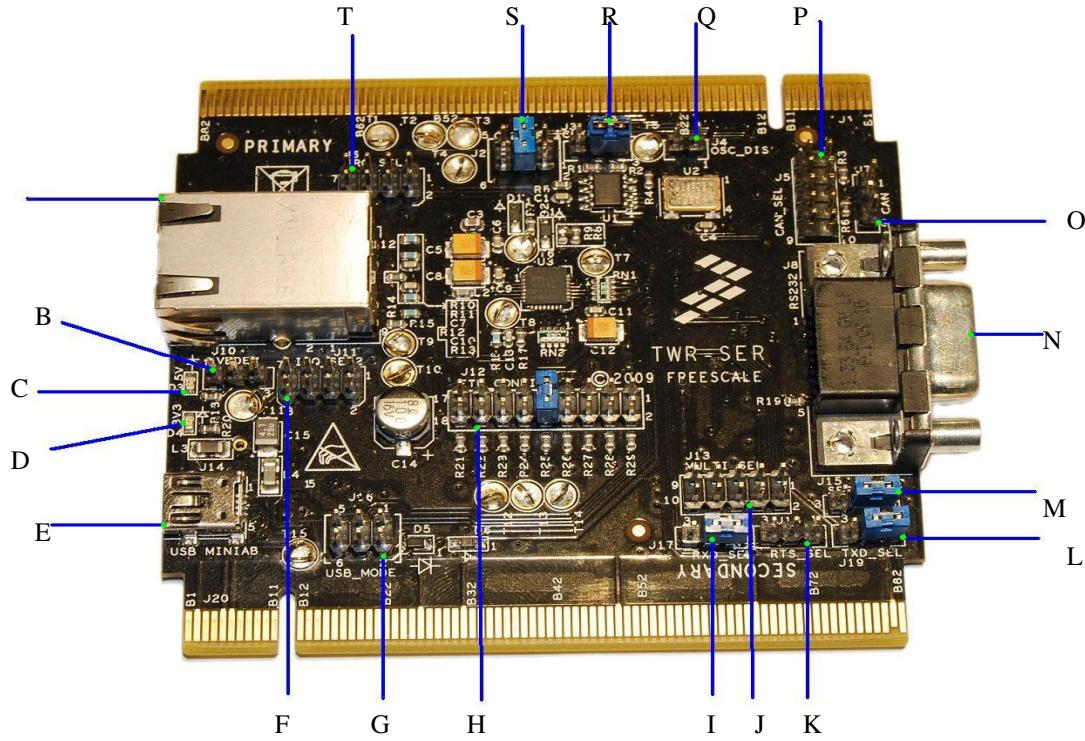


Figure 14 - TWR-SER1 (B3)

A – Ethernet Port	K – RTS Selection: 1-2 RS232, 2-3 RS485
B – USB Power: *1-2 Host, 2-3 Device	L – TXD Selection: *1-2 RS232, 2-3 RS485
C – +5V Power LED	M – Serial Selection: *1-2 RS232, 2-3 RS485
D – +3.3V Power LED	N – UART1 RS232/RS485 Serial DB9
E – USB Mini AB Port	O – CANH/L Selection: 1-2 CANL, 2-3 CANH
F – IRQ Selection 1	P – CAN Selection: 1-2 CAN TRX Sleep mode 3-4 CAN_S Grounded 5-6 CANRX – C_RXD 7-8 CANTX – C_TXD 9-10 120ohm on CANH and CANL
G – USB VBUS Mode: *1-2 Host 3-4 Device 5-6 OTG	Q – Enable or Disable Oscillator: Shunt to Disable

* Denoted as default settings

H – Ethernet Configuration Options 1-2 PHYAD2 3-4 PHYAD1 5-6 PHYAD0 7-8 CONFIG2 *9-10 CONFIG0 11-12 ISO 13-14 LED1/SPEED 15-16 DUPLEX 17-18 LED0/NWAYEN	R – Input Clock Selection: 1-2 25MHz to PHY *3-4 50MHz to PHY 5-6 CLOCKOUT to PHY
I – RXD Selection: *1-2 RS232, 2-3 RS485	S – Output Clock Selection: 1-2 25MHz *2-3 To CPU card CLOCKIN
J – RS485 Multi Selection	T – IRQ Select 2

* Denoted as default settings

B.4 TWR-SER2 Daughter Card Diagram

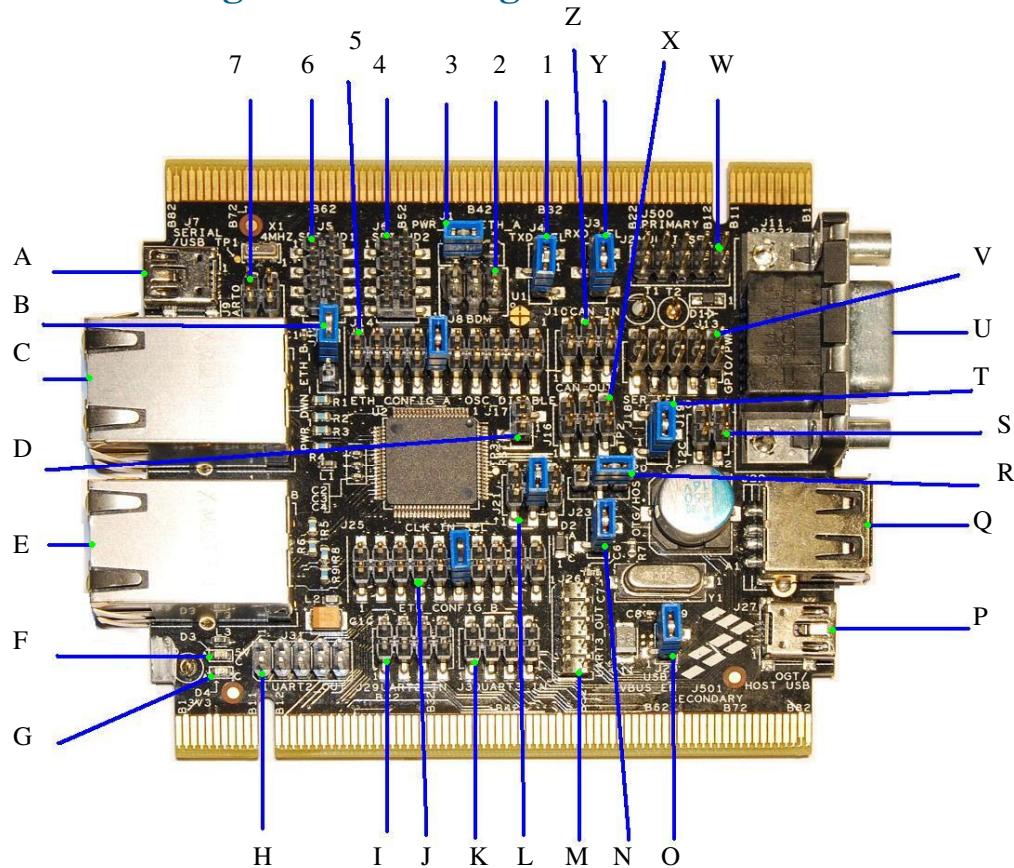


Figure 15 TWR-SER2 (B4)

A – miniB USB (Serial-USB)	R – OTG/Host Select *1-2: Host Mode, 2-3: Device Mode
B – Ethernet Port B PowerDown *1-2: Powered, 3-4: Powered Down	S – I2C Header
C – Ethernet Port A	T – Serial Select Jumper *1-2: RS232, 2-3: RS485
D – OSC Disable – Shunt to turn off 25MHz	U – UART1 RS232/RS485 Serial DB9
E – Ethernet Port B	V – GPIO/PWM Expansion Header
F – +5V Power LED	W – UART1 Multi-Select Jumpers (Enables RS485 LoopBack)
G – +3.3V Power LED	X – CAN 2x3 Header
H – UART2 RS232 2x5 Header	Y – RXD Select 1-2: RS485, *2-3: RS232
I – UART2 Isolation Jumpers	Z – CAN Isolation Jumpers

* Denoted as default settings

J – Ethernet Port B Configuration Options 1 – 2 PHYAD3 3 – 4 PHYAD4 5 – 6 AN_EN 7 – 8 LED_LINK 9 – 10 LED_SPEED *11 – 12 MII_MODE 13 – 14 MDIX_EN 15 – 16 ED_EN 17 – 18 EXTENDER_EN 19 – 20 GND	1 – TXD Select 1-2: RS485, *2-3: RS232
K – UART3 Isolation Jumpers	2 – JS16 BDM Header
L – Ethernet Clock Selection 1-2: 25MHz, *3-4: 50MHz, 5-6: Ext Clock	3 – Ethernet Port A PowerDown *1-2: Powered, 3-4: Powered Down
M – UART3 RS232 2x5 Header	4 – SPI 2x4 Expansion Header (SPI CS1)
N – USB VBUS OC: Shunt to enable*	5 – Ethernet Port A Configuration Options 1 – 2 PHYAD1 3 – 4 PHYAD2 5 – 6 AN_EN 7 – 8 LED_LINK 9 – 10 LED_SPEED *11 – 12 MII_MODE 13 – 14 MDIX_EN 15 – 16 ED_EN 17 – 18 CLK2MAC_DIS 19 – 20 GND
O – USB VBUS EN: Shunt to enable*	6 – SPI 2x4 Expansion Header (SPI CS0)
P – HiSpeed OTG USB (ULPI) Connector	7 – UART0 Isolation Jumpers
Q – FullSpeed Host USB Connector	

* Denoted as default settings

B.5 TWR-MEM Daughter Card Top Diagram

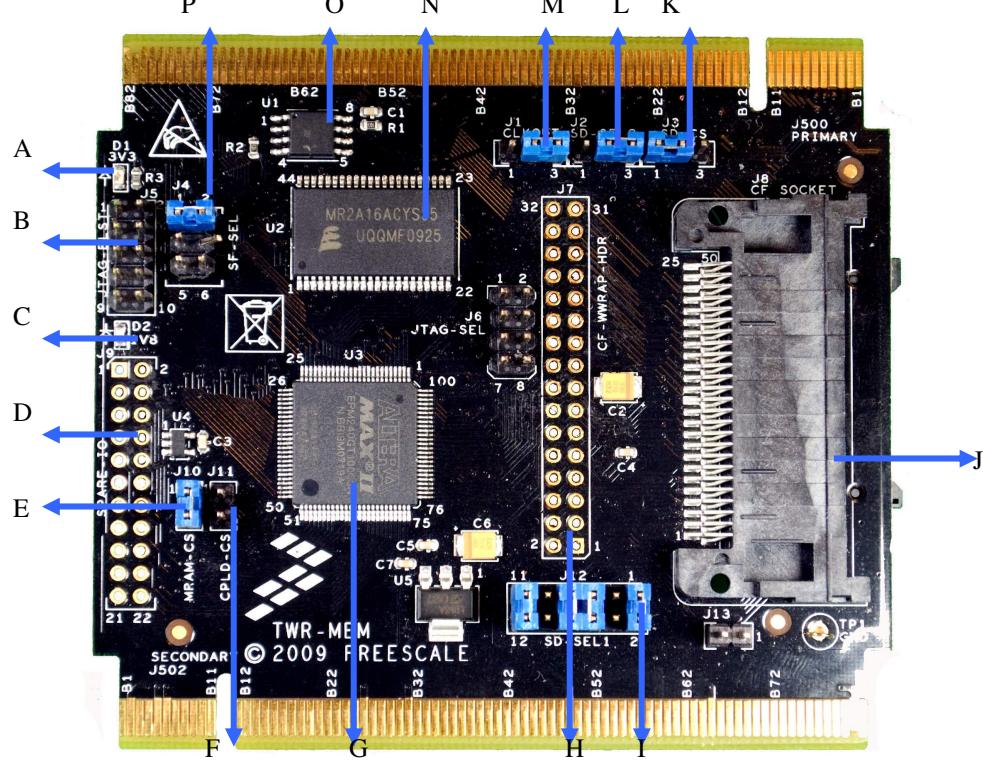


Figure 16 - TWR-MEM Top View (B5)

A – +3.3V Power LED	I – SD Selection: *1 – 2 IRQH for SD Card Detect 3 – 4 IRQA for SD Card Detect *5 – 6 SD_D1 – GPIO2 *7 – 8 SD_D2 – JTAG2 9 – 10 SD_PU1 (pull up option) *11 – 12 SD_PU2 (pull up option)
B – CPLD JTAG Header	J – Compact Flash Adaptor
C – +1.8V Power LED	K – SD CS: 1-2 for SPI1_CS0 *2-3 for SPI1_CS1
D – Spare IO	L – SDHC selection: *1-2 for SDHC mode 2-3 for SD over SPI mode
E – MRAM Chip Select: Shunt to enable*	M – SD Clockout: 1-2 CLKOUT1 drives FBCLK *2-3 CLKOUT0 drives FBCLK
F – CPLD Chip Select: Shunt to enable	N – 512 KiB MRAM
G – Altera MAXII CPLD	O – Serial Flash
H – CompactFlash WWRAP header	P – Serial Flash Selection: *1-2 SF Chip Select 3-4 SF Write protect 5-6 Use GPIO5 for HOLD

* Denoted as default settings

B.6 TWR-MEM Daughter Card Bottom Diagram

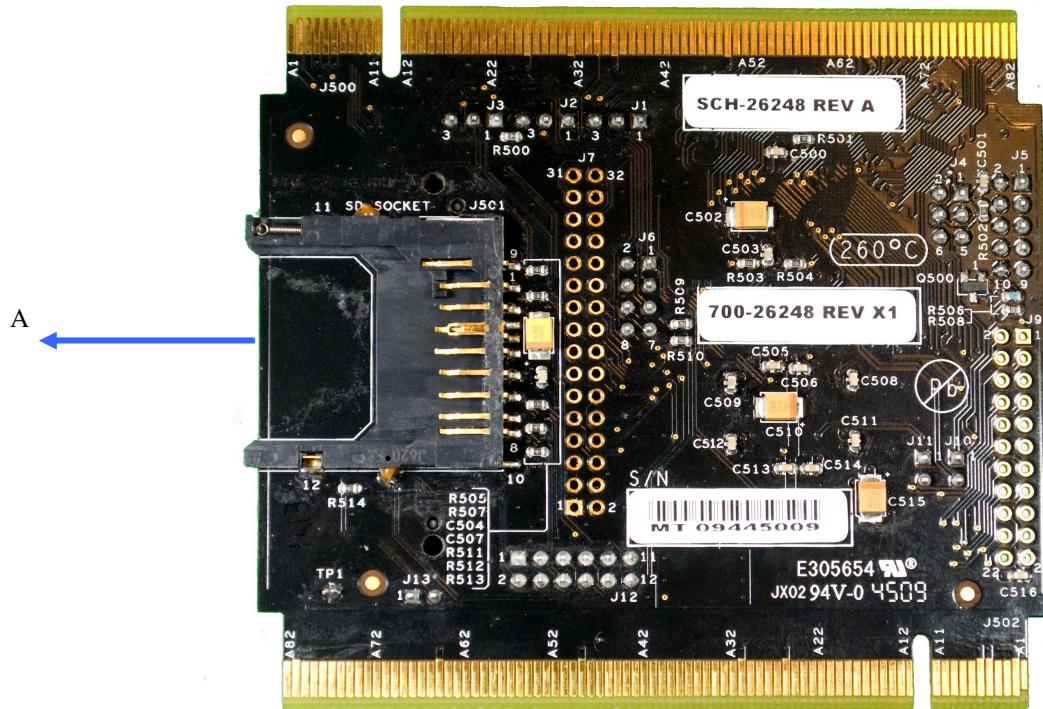


Figure 17 - TWR-MEM Bottom View (B6)

A- SDHC adaptor

B.7 TWR-ELEV Primary Card Top Diagram

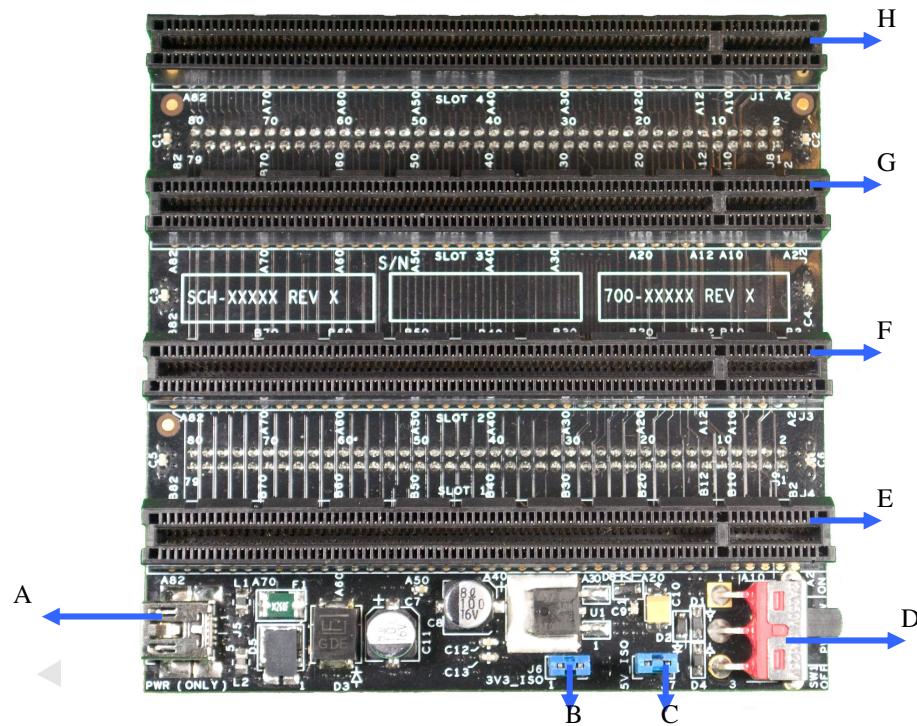


Figure 18 - TWR-ELEV Primary Front View (B7)

A – USB mini B Receptor (Power)	E – PCI express Slot 1 connector (J4)
B – +3.3V Supply: Shunt to enable*	F – PCI express Slot 2 connector (J3)
C – +5.0V Supply: Shunt to enable*	G – PCI express Slot 3 connector (J2)
D – Power On/Off Switch	H – PCI express Slot 4 connector (J1)

* Denoted as default settings

B.8 TWR-ELEV Primary Card Bottom Diagram

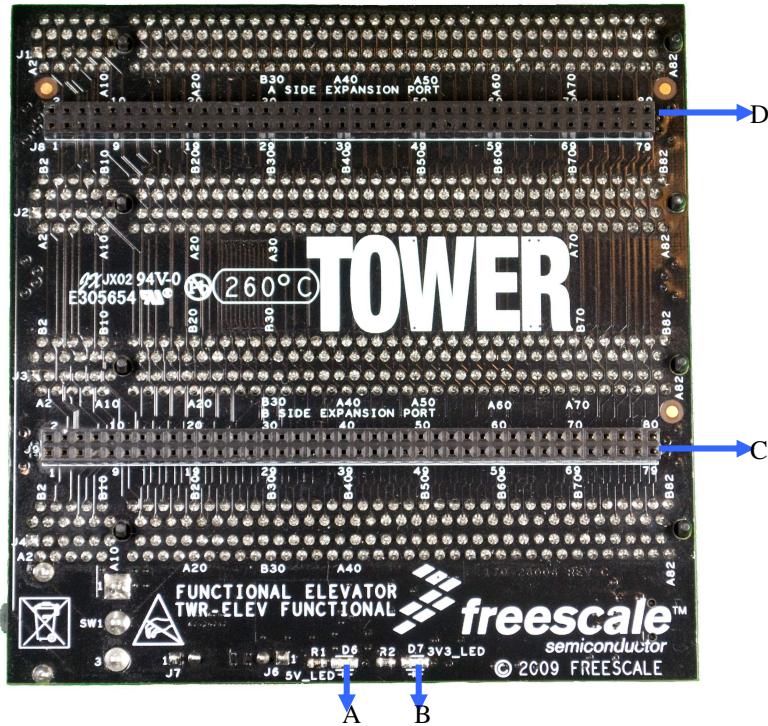


Figure 19 - TWR-ELEV Primary Back View (B8)

A – +5V Power LED Indicator	C – Expansion Port Side B (J9)
B – +3.3V Power LED Indicator	D – Expansion Port Side A (J8)

B.9 TWR-ELEV Secondary Card Diagram

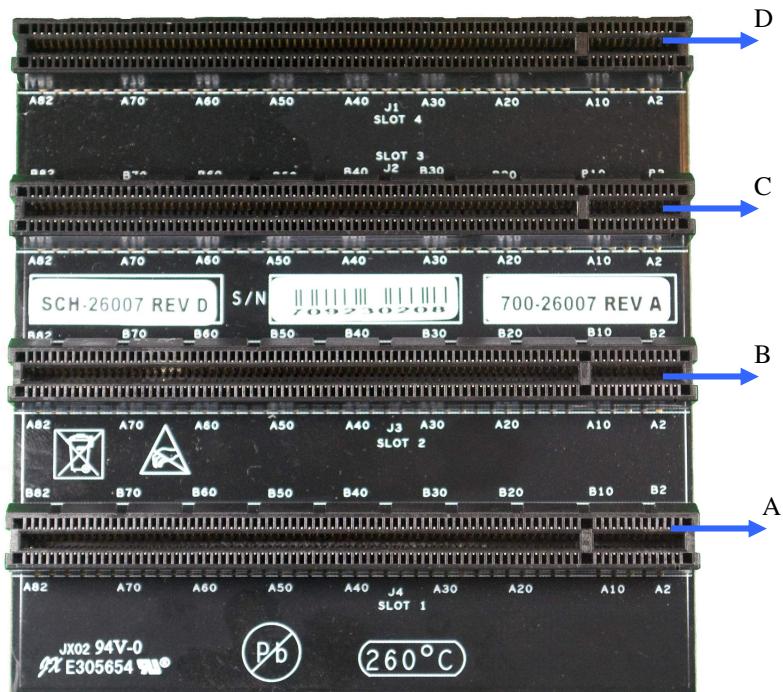


Figure 20 - TWR-ELEV Secondary Front View (B9)

A – PCI express Slot 1 connector (J4)	C – PCI express Slot 3 connector (J2)
B – PCI express Slot 2 connector (J3)	D – PCI express Slot 4 connector (J1)



Freescale™ and the Freescale logo are trademarks of
Freescale Semiconductor, Inc. All other product or service names
are the property of their respective owners.

© Freescale Semiconductor, Inc. 2008. All rights reserved.