
SmartFusion2 SoC FPGA Advanced Development Kit

UG0557 User Guide



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1 - Introduction

The SmartFusion[®]2 system-on-chip (SoC) field programmable gate array (FPGA) Advanced Development Kit (M2S150-ADV-DEV-KIT) is RoHS compliant and enables you to develop applications that involve the following:

- Microprocessor applications
- Embedded ARM[®] Cortex[®]-M3 processor based systems
- Motor control
- Industrial automation
- High speed I/O applications
- Universal serial bus (USB) applications (OTG support)

SmartFusion2 Advanced Development Kit Contents

Table 1 shows the contents of the SmartFusion2 Advanced Development Kit.

Table 1 - Kit Contents

| Quantity | Description |
|----------|---|
| 1 | SmartFusion2 Advanced Development Board with the M2S150TS-1FCG1152 device |
| 1 | USB A to Micro B cable |
| 1 | USB Micro A to A cable |
| 1 | USB A to Mini B cable |
| 1 | Peripheral component interconnect express (PCIe) edge card ribbon cable |
| 1 | 12 V/5 A power adapter |

SmartFusion2 Advanced Development Kit Web Resources

The SmartFusion2 Advanced Development Kit web resources: <http://www.microsemi.com/products/fpga-soc/design-resources/dev-kits/smartfusion2-kits>

Board Description

The M2S150-ADV-DEV-KIT device offers a full-featured 150 K logic element (LE) SmartFusion2 SoC FPGA. This 150 K LE device has the following integrated on a single chip:

- Reliable flash-based FPGA fabric
- A 166 MHz Cortex-M3 processor
- Advanced security processing accelerators
- Digital signal processing (DSP) blocks
- Static random-access memory (SRAM)
- embedded nonvolatile memory (eNVM)
- High-performance communication interfaces.

The SmartFusion2 Advanced Development Kit has numerous standard interfaces such as:

- USB
- x4 serializer and deserializer (SERDES)
- DDR3 memory
- JTAG
- Inter-integrated circuit (I2C)
- Serial peripheral interface (SPI)
- Universal asynchronous receiver/transmitter (UART)
- Dual Giga Bit Ethernet

The SmartFusion2 memory management system supports 1 Giga Byte (4 × 256 MB) on-board DDR3 memory for data storage, 256 MB DDR3 memory for error detection and correction (ECC - SECDED), and 2 Giga bit (2 × 1Gb) SPI flash devices. The SERDES block can be accessed using the PCIe edge connector, high speed sub-miniature version-A (SMA) connectors or an on-board FPGA mezzanine card (FMC) connector-LPC (J60). The unused MSIOD signals are routed to the J60 connector from the SmartFusion2 device. The Advanced Development Kit has the current measurement feature, refer to [Current Measurement](#) section.

The unused MSIO signals are routed to another onboard FMC connector - HPC (J30) and although the Bread board connector (J350) space available for bank 4 (MSIO) pins. The SmartFusion2 device can be programmed through embedded FlashPro5.

Block Diagram

Figure 1 shows the SmartFusion2 Advanced Development Kit block diagram.

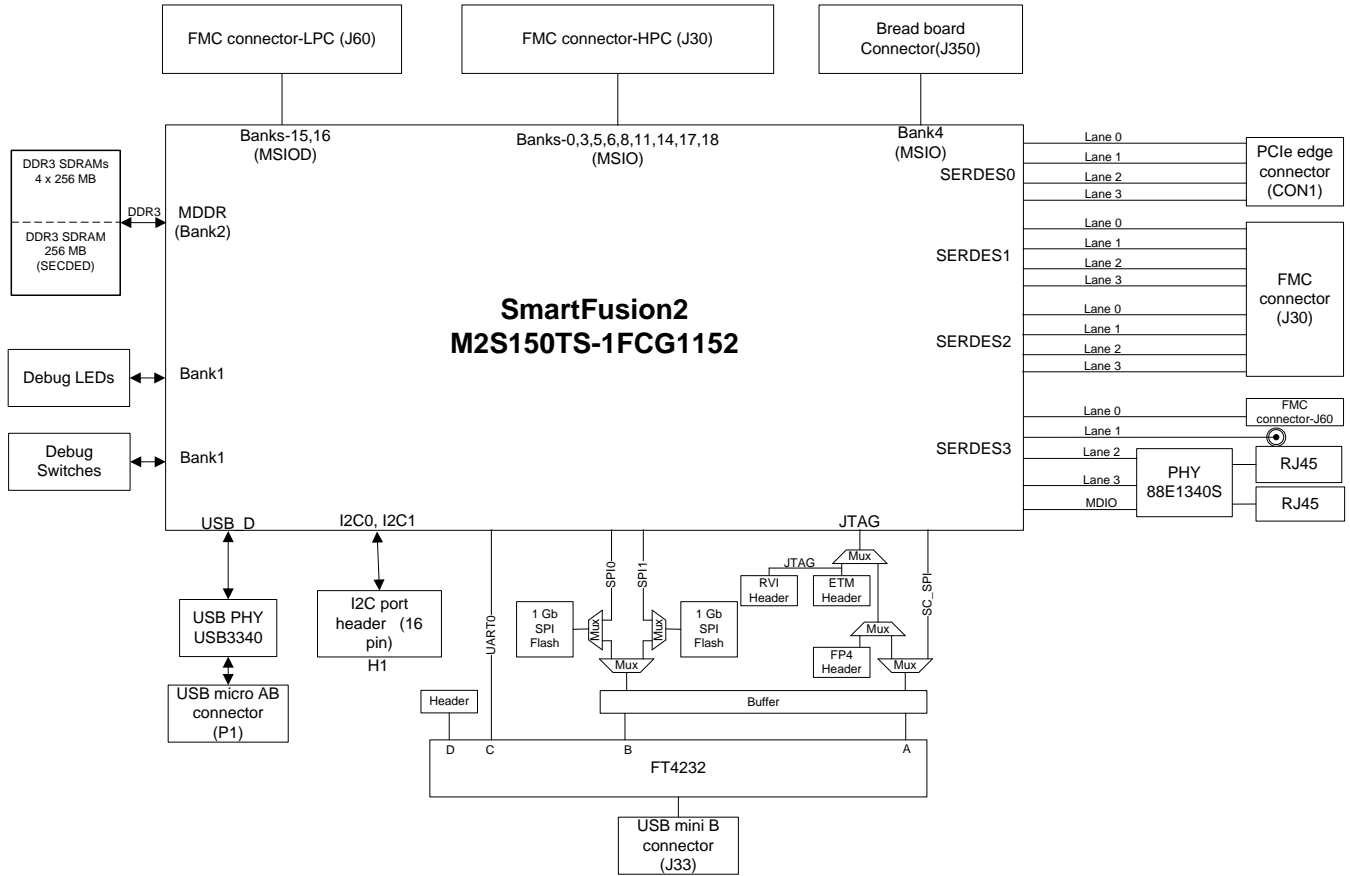


Figure 1 - SmartFusion2 Advanced Development Kit Block Diagram

Board Overview

Figure 2 shows the snapshot of the SmartFusion2 Advanced Development Kit Board with engineering silicon.

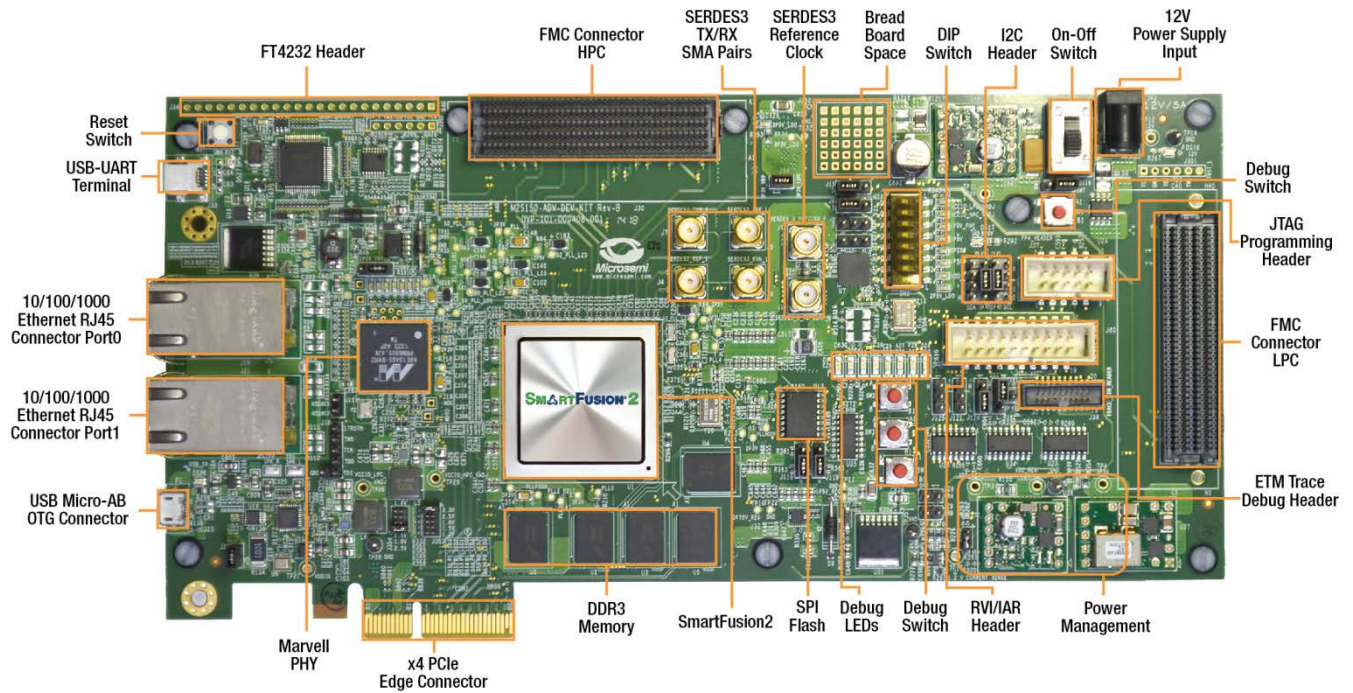


Figure 2 - SmartFusion2 Advanced Development Kit Board

Board Key Components

Table 2 describes the key components of the SmartFusion2 Advanced Development Kit board.

Table 2 - SmartFusion2 Advanced Development Kit Board Components

| Name | Description |
|---|---|
| M2S150TS-1FCG1152 | Microsemi® SmartFusion2 device with a hard Cortex-M3 processor. |
| DDR3 synchronous dynamic random access memory (SDRAM) | <ul style="list-style-type: none"> 4 × 256 MB (256 MB Micron DDR3 memories MT41K256M8DA-125 IT:K) for storing data. 256 MB (1 × 256 MB Micron DDR3 memory MT41K256M8DA-125 IT:K) for storing the ECC bits |
| SPI flash | <ul style="list-style-type: none"> 1 Giga bit SPI flash Micron N25Q00AA13GSF40G connected to SPI port 0 of the SmartFusion2 microcontroller subsystem (MSS). Another 1 Giga bit SPI flash Micron N25Q00AA13GSF40G connected to the SmartFusion2 fabric. |
| Ethernet | Two RJ45 connectors (Ethernet jack with magnetics) interfacing with a Marvell 10/100/1000 BASE-T PHY chip 88E1304S in Serial Gigabit Media Independent Interface (SGMII) mode, interfacing with the Ethernet port of the SmartFusion2 MSS (on-chip MAC and external PHY). |
| RVI header | RVI header for application programming and debug from Keil ULINK or IAR J-Link. |
| Embedded FlashPro5 | Embedded FlashPro5 can be used for SmartFusion2 programming and debugging with Microsemi tools. |
| Future Technology Devices International (FTDI) programmer | FTDI programmer interface (J33) to program the external SPI flash. An FTDI chip is also used to change the JTAG_SEL signal (High or Low) remotely for switching between the RVI header and JTAG mode. |
| Embedded trace macro (ETM) cell header | ETM header for debug. |
| PCIe edge connector | PCI Express edge connector with four lanes |
| Light-emitting diodes (LEDs) | Eight active high LEDs that are connected to some of the user I/Os for debugging. |
| Push-button reset | Push-button system reset for the SmartFusion2 device. |
| Push-button switches | Four push-button switches for test and navigation. |
| FMC connector - HPC (J30) | FMC header to connect the external daughter boards. Connector array Socket 400 pins (40 × 10), 1.27mm pitch. The unused MSIO pins are routed from the SmartFusion2 device to the J30 connector. |
| FMC connector - LPC (J60) | FMC header to connect the external daughter boards. Connector array Socket 160 pins (40 × 4), 1.27 mm. The unused MSIOD pins are routed from the SmartFusion2 device to the J60 connector. |
| USB interface | USB Micro AB connector, interfacing with the high speed USB2.0 ULPI transceiver chip USB3320, interfacing with USB-D port of the SmartFusion2 MSS. |
| DS1818 | DS1818 (3.3 V) Econo Reset is simple three-pin voltage monitor and power-on reset that holds reset for 150 ms for stabilization after the power returns to tolerance. |
| OSC-100 | 100 MHz clock oscillator (differential output) |
| OSC-125 | 125 MHz clock oscillator (differential output) |
| OSC-50 | 50 MHz clock oscillator |

| Name | Description |
|-----------------|---|
| OSC-32 | 32.768 KHz low power oscillator |
| FT4232H | USB to quad serial ports with a different configuration. |
| TPS3808G09DBVR | The TPS3808G09 supervisory circuit monitors system voltage of 0.9 V, asserting an open-drain Reset signal when the Sense voltage drops below a preset threshold or when the manual reset (MR) pin drops to a logic low. |
| DS1818 | DS1818 (3.3 V) Econo Reset is simple three-pin voltage monitor and power-on reset that holds reset for 150 ms for stabilization after the power returns to tolerance. |
| I2C port Header | 16 pin header is available for I2C0 and I2C1 interfaces of SmartFusion2. |

2 – Installation and Settings

Software Installation

Download and install the Microsemi Libero® System-on-Chip (SoC) software v11.4 or later, from the Microsemi website and register for a free Gold license. Libero v11.4 installer has FlashPro5 drivers. For instructions on how to install the Libero software and SoftConsole, refer to [Libero Software Installation and Licensing Guide](#).

For instructions on how to download and install Microsemi DirectCores, SGCores, and driver firmware cores, refer to [Installing IP Cores and Drivers User's Guide](#). These must be installed on the PC where the Libero software is installed while designing with Microsemi FPGAs and SoCs.

SmartFusion2 is supported by the latest IAR® Embedded Workbench™ from IAR Systems for ARM IPs. It is also supported by the latest Keil, MDK-ARM Microcontroller Advanced Development Kit.

Hardware Installation

Jumpers, Switches, LEDs, and DIP Switch Settings

The recommended default jumpers, switches, LEDs, and DIP switch settings are shown in [Table 3](#) through [Table 5](#).

- [Table 3 - Jumper Settings](#)
- [Table 4 - LEDs](#)
- [Table 5 - Test Points](#)

Connect the jumpers with the default settings to enable the pre-programmed demo design.

Note: Locations of all the jumpers and test points are searchable in Figure 20 (page 84) of [5 – Placement of the Board Components](#) section.

Table 3 - Jumper Settings

| Jumper | Description | Pin | Default Settings |
|---------------------|---|--|------------------|
| Power Supply | | | |
| J123 | Jumper to select the core voltage (VDD_REG) to either 1.0 V or 1.2 V | Pin 1–2 for 1.0 V core voltage | Open |
| | | Pin 2–3 for 1.2 V core voltage | Close |
| J353 | Jumper to select the core voltage (VCCIO_HPC_VADJ) to either 3.3 V or 2.5 V or 1.8 V or 1.5 V or 1.2V | Pin 1–2 for 3.3 V | Close |
| | | Pin 3–4 for 2.5 V | Open |
| | | Pin 5–6 for 1.8 V | Open |
| | | Pin 7–8 for 1.5 V | Open |
| | | Pin 9-10 for 1.2 V | Open |
| J354 | Jumper to select the core voltage (VCCIO_LPC_VADJ) to 2.5 V or 1.8 V or 1.5 V or 1.2V | Pin 1–2 for 2.5 V | Close |
| | | Pin 3–4 for 1.8 V | Open |
| | | Pin 5–6 for 1.5 V | Open |
| | | Pin 7-8 for 1.2 V | Open |
| J116 | Jumpers to select either SW7 input or signal ENABLE_FT4232 from FT4232H chip. | Pin 1–2 for SW7 selection | Close |
| | | Pin 2-3 for “Enable_FT4232” signal control | Open |

| Jumper | Description | Pin | Default Settings |
|--------------------|--|--|------------------|
| Clocks | | | |
| J10 | Jumper to select switch-side Mux inputs of A or B to the line side. | Pin 1-2 (Input A to the line side) that is external clock required to source the line side through FMC connector. | Open |
| | | Pin 2-3 (Input B to the line side) that is external clock required to source the line side through SMA connectors. | Open |
| J9 | Jumper to select the output enables control for the line side outputs. | Pin 1-2 (Line side output enabled) | Open |
| | | Pin 2-3 (Line side output disabled) | Open |
| J8 | Jumper to select the output enables control for the line side outputs. | Pin 1-2 (Line side output enabled) | Close |
| | | Pin 2-3 (Line side output disabled) | Open |
| J11 | Jumper to select switch-side Mux inputs of A or B to the line side. | Pin 1-2 (Input A to the line side) that is on board 125 MHz differential clock oscillator output is routed to line side. | Close |
| | | Pin 2-3 (Input B to the line side) that is on board 100 MHz differential clock oscillator output is routed to line side. | Open |
| Marvell PHY | | | |
| J14 | Jumper to select either PHY_CONFIG1 or M2S_PHY_CONFIG1 for Global hardware configuration CONFIG[1] | Pin 1-2 CONFIG [1] will connect to P2_LED[2] pin of 88E1340S. | Open |
| | | Pin 2-3 CONFIG [1] will connect to SmartFusion2- J8 pin MSIO80NB3. | Open |
| J15 | Jumper to short AC test points for debugging (It is recommended not to connect, refer to Mavell PHY Datasheet) | Two pin header | Open |
| J23 | Jumper to provide the VBUS supply to USB when used in Host mode. | Two pin header | Open |
| Programming | | | |
| J32 | JTAG selection jumper to select between RVI header or FP4 header for application debug. | Pin 1-2 FP4 for Soft Console/Flash Pro | Close |
| | | Pin 2-3 RVI for Keil ULINK™/IAR J-Link® | Open |
| | | Pin 2-4 for JTAG_SEL pin to DD1 signal of FT4232H chip. | Open |
| J121 | To select FTDI JTAG/ SPI Slave programming. | Pin 1-2 FTDI JTAG programming | Close |
| | | Pin 2-3 FTDI SPI Slave Programming | Open |
| J124 | To select JTAG programming via FP4 or FTDI | Pin 1-2 JTAG programming via FTDI | Open |
| | | Pin 2-3 JTAG programming via FP4 | Close |
| J125 | To select FTDI SPI-0 or FTDI SPI-1 slave programming | Pin 1-2 FTDI SPI-1 Slave programming | Open |
| | | Pin 2-3 FTDI SPI-0 Slave programming | Open |
| J118 | To select programming SPI-0 flash through FTDI SPI-0 (Port-B) or SmartFusion2 SPI-0 | Pin 1-2 Programming SPI-0 flash via SmartFusion2 SPI-0. | Close |

| Jumper | Description | Pin | Default Settings |
|--------|---|---|------------------|
| | | Pin 2-3 Programming SPI-0 flash via FTDI SPI-0 (Port-B) and J125 pin 2-3 must be shorted. | Open |
| J119 | To select programming SPI-1 flash through FTDI SPI (Port-B) or SmartFusion2 SPI-1 | Pin 1-2 Programming SPI-1 flash via SmartFusion2 SPI-1. | Close |
| | | Pin 2-3 Programming SPI-1 flash via FTDI SPI (Port-B) and J125 pin 1-2 must be shorted. | Open |

Table 4 - LEDs

| LED | Description |
|------|--|
| DS26 | Indicates USB_5V supply. |
| DS18 | Indicates 0P75V_REG supply. |
| DS19 | Indicates 1P5V_REG supply. |
| DS20 | Indicates VDD_REG supply. |
| DS21 | Indicates 2P5V_LDO supply. |
| DS22 | Indicates VCCIO_LPC_VADJ supply. |
| DS23 | Indicates VCCIO_HPC_VADJ supply. |
| DS24 | Indicates 1P0V_PHY supply. |
| DS25 | Indicates 1P8V supply. |
| DS28 | Indicates 3P3V_LDO supply. |
| DS17 | Indicates 5P0V supply. |
| DS29 | Indicates 3P3V supply. |
| DS16 | Indicates 12P0V supply. |
| DS27 | Indicates VSS_BUS supply. |
| DS8 | Indicates that DS8 is connected to parallel LED output port 0 (P0_LED[0]) of Marvell PHY. |
| DS9 | Indicates that DS9 is connected to parallel LED output port 0 (P0_LED[2]) of Marvell PHY. |
| DS10 | Indicates that DS10 is connected to parallel LED output port 0 (P0_LED[3]) of Marvell PHY. |
| DS14 | Indicates that DS14 is connected to parallel LED output port 1 (P1_LED[0]) of Marvell PHY. |
| DS13 | Indicates that DS13 is connected to parallel LED output port 1 (P1_LED[1]) of Marvell PHY. |
| DS12 | Indicates that DS12 is connected to parallel LED output port 1 (P1_LED[2]) of Marvell PHY. |
| DS11 | Indicates that DS11 is connected to parallel LED output port 1 (P1_LED[3]) of Marvell PHY. |

Table 5 - Test Points

| Test Point | Description |
|-----------------|--------------------------|
| TP20, TP33,TP16 | GND |
| TP7 | VDD_REG |
| TP12 | 12 V |
| TP11 | 5 V |
| TP4 | 3.3 V |
| TP29 | VCCIO_HPC_VADJ |
| TP28 | VCCIO_LPC_VADJ |
| TP30 | 3P3V_LDO |
| TP31 | 2P5V_LDO |
| TP9 | 1.5 V |
| TP10 | 0.75 V |
| TP14 | 1.8 V |
| TP27 | VDDIO for the USB device |
| TP24 | PHY 1.0 V |

Power Sources

Figure 3 shows the voltage rails (12 V, 5 V, 3.3 V, 2.5 V, 1.8 V, 1.5 V, 1.2 V, 1.0 V and 0.75 V) available in the SmartFusion2 Advanced Development Kit board.

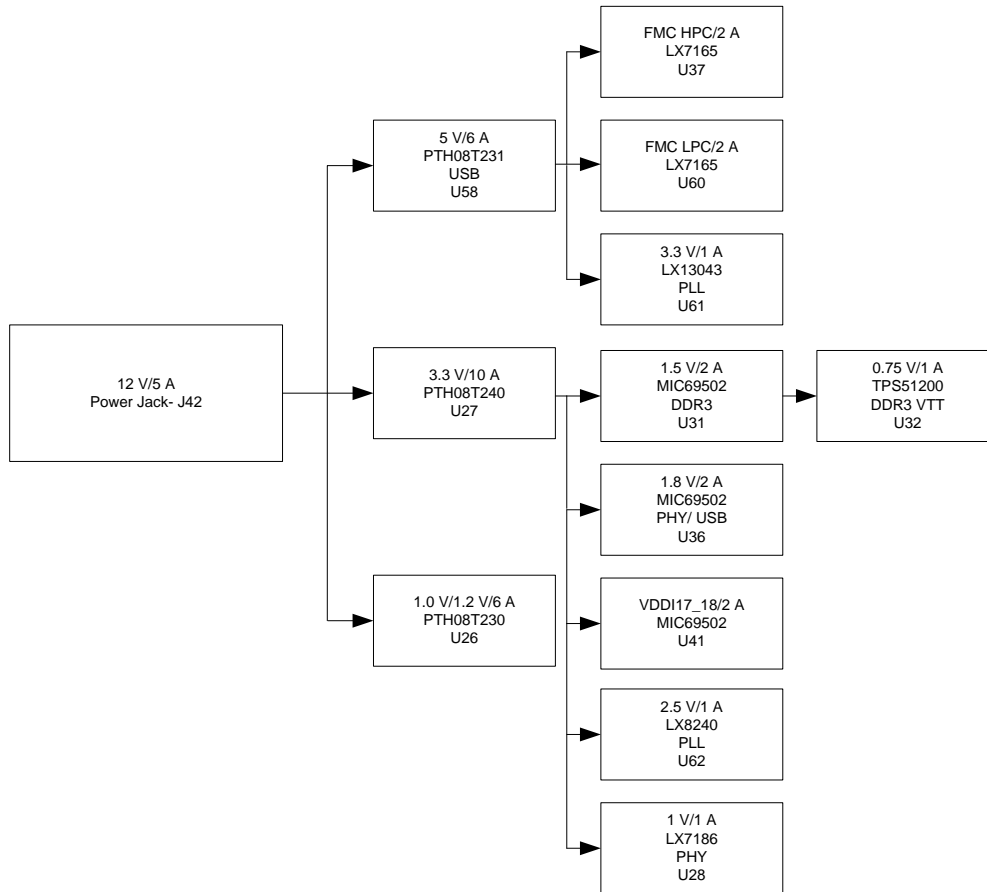


Figure 3 - Voltage Rails in the SmartFusion2 Advanced Development Kit Board

Voltage Rails

Table 6 lists the major power supplies for normal operation of the M2S150-ADV-DEV-KIT Kit.

Table 6 - I/O Voltage Rails

| SmartFusion2 Bank | I/O Rail | Voltage |
|-------------------|---------------------|--------------------------------------|
| Bank0 | VCCIO_HPC_VIO_B_M2S | 3.3 V, 2.5 V, 1.8 V, 1.5 V, or 1.2 V |
| Bank1 | 2P5V_LDO | 2.5 V |
| Bank2 | 1P5V_REG | 1.5 V |
| Bank3 | 3P3V | 3.3 V |
| Bank4 | 3P3V | 3.3 V |
| Bank5 | VCCIO_HPC_VIO_B_M2S | 3.3 V, 2.5 V, 1.8 V, 1.5 V, or 1.2 V |
| Bank6 | VCCIO_LPC_VADJ | 2.5 V, 1.8 V, 1.5 V, or 1.2 V |
| Bank7 | 3P3V | 3.3 V |

| SmartFusion2 Bank | I/O Rail | Voltage |
|----------------------|------------------|--------------------------------------|
| Bank8 | VCCIO_LPC_VADJ | 2.5 V, 1.8 V, 1.5 V, or 1.2 V |
| Bank9 | 2P5V_LDO | 2.5 V |
| Bank10 | 2P5V_LDO | 2.5 V |
| Bank11 | VCCIO_HPC_VADJ | 3.3 V, 2.5 V, 1.8 V, 1.5 V, or 1.2 V |
| Bank12 | 2P5V_LDO | 2.5 V |
| Bank13 | 2P5V_LDO | 2.5 V |
| Bank14 | VCCIO_HPC_VADJ | 3.3 V, 2.5 V, 1.8 V, 1.5 V, or 1.2 V |
| Bank15 | VCCIO_LPC_VADJ | 2.5 V, 1.8 V, 1.5 V, or 1.2 V |
| Bank16 | VCCIO_LPC_VADJ | 2.5 V, 1.8 V, 1.5 V, or 1.2 V |
| Bank17 | VCCIO_HPC_VADJ | 3.3 V, 2.5 V, 1.8 V, 1.5 V, 1.2 V |
| Bank18 | VCCIO_HPC_VADJ | 3.3 V, 2.5 V, 1.8 V, 1.5 V, or 1.2 V |
| VDD | VDD_REG | 1.2 V or 1.0 V |
| VPP | 3P3V_VPP | 3.3 V |
| VREF1 | VREF1 | 0.75 V |
| VREF2 | 0P75V_VTT_REF | 0.75 V |
| SERDES_x_PLL_VDDA | PLL_SERDESx_VDDA | 3.3 V |
| SERDES_x_L01_VDDAPLL | SERDESx_VDDPLL | 2.5 V |
| SERDES_x_VDD | VDD_REG | 1.2 V or 1.0 V |

3 – Key Components Description and Operation

This section describes the key component interfaces of the SmartFusion2 Advanced Development Kit. For device datasheets, refer to: <http://www.microsemi.com/products/fpga-soc/design-resources/dev-kits/smartfusion2-kits>

Powering Up the Board

The board is run a by 12 V power source using an external DC jack, refer to [Figure 4](#).

External DC Jack (12P0V_Ext)

1. Connect the 12 V power supply brick to J42 to supply power to the board.
2. Switch **ON** the SW7 power supply switch.

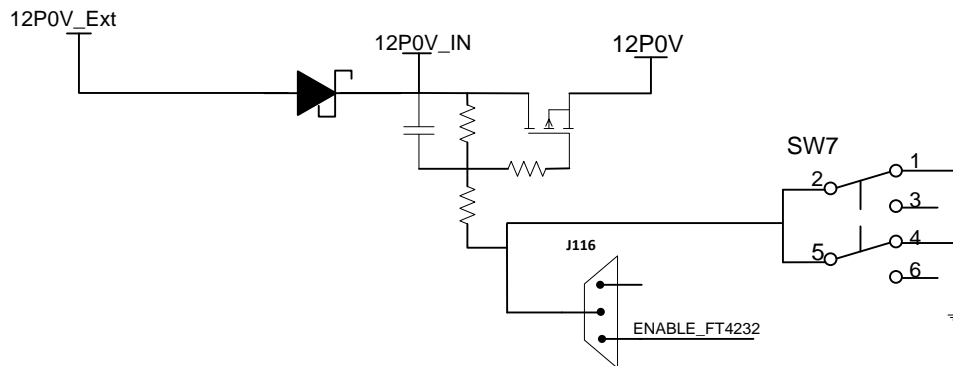


Figure 4 - Powering Up the Board

Current Measurement

1.0 V or 1.2 V Current Sensing for Normal Operation

For applications that require current measurement, a high precision Operational Amplifier circuitry (U59 with gain 100) is provided on the board to measure the output voltage at test point TP17.

The following steps describe how to measure the core power:

1. Measure the output voltage (V_{out}) at TP17.
2. $I = (V_{out}/5)$
3. Core Power consumed, $P = (1.2 V) * I$

For example, when the voltage measured across TP17 is 0.5 V then the consumed core power is 0.12 W.

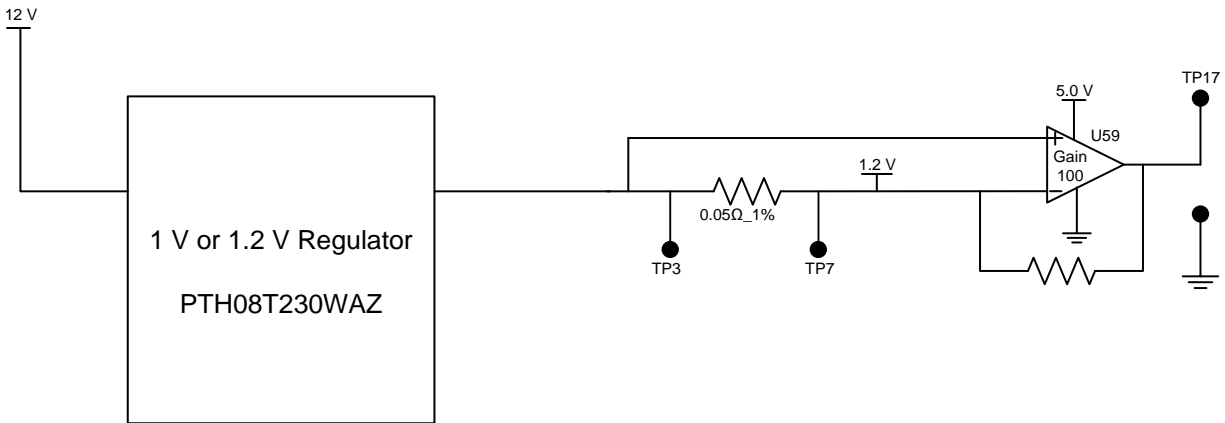


Figure 5 - Core Power Measurement

Figure 5 shows the on board core power measurement circuitry.

1.2 V Current Sensing for Flash*Freeze

The SmartFusion2 device consumes very less power in the Flash*Freeze mode. The voltage across the sense resistor (0.05 Ω) must be measured directly using a precision digital multi-meter that can read sub milli-volts. Use test points TP3 and TP7 to directly measure the voltage across the 1.2 V sense resistor.

To convert the voltage measured across sense resistor to power, use the following equation:

$$Power = \left(\frac{\text{voltage_measured_in_milli_volts}}{0.05} \right) * 1.2$$

EQ1

Note: Accuracy is ± 10%.

Memory Interface

Dedicated I/Os are provided for the MSS DRR and fabric DDR for the SmartFusion2 device. Refer to [Figure 5](#).

DDR3 SDRAM

Four chips having 256 MB DDR3 memory are provided as flexible volatile memories for storing user applications and a chip having 256 MB DDR3 memory is provided for ECC. You can enable SECDED feature using ECC. The DDR3 interface is implemented in Bank2.

- MT41K256M8: 32 Meg × 8 × 8 banks
- Density: 256 MB
- Clock rate: 800 MHz
- Data rate: DDR3 – 1600
- Total capacity: 1 GB from four chips

Note: For more information, refer to page 3 of Board Level Schematics document (provided separately).

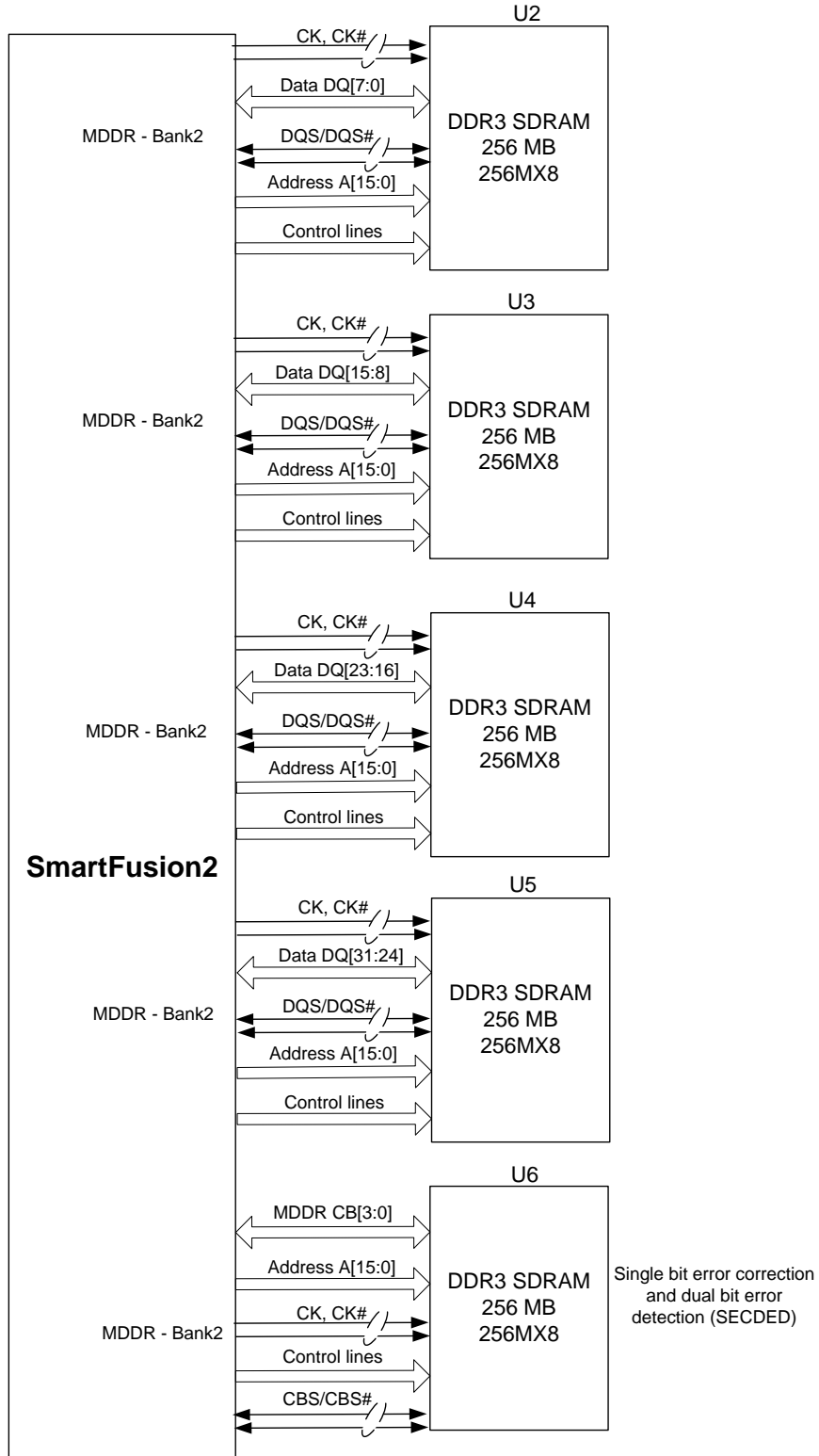


Figure 6 - Memory Interface

SERDES Interface

The Advanced Development Kit has x4 SERDES interfaces. The SERDES block can be accessed using the PCIe edge connector, high speed sub-miniature version-A (SMA) connectors, and/or an on-board FPGA mezzanine card (FMC) connector-LPC (J60).

SERDES0 Interface

The SERDES 0 (lane0/1/2/3) is directly routed to the PCIe connector.

- SERDES0 reference clock 0 is directly routed from the PCIe connector.
- SERDES0 reference clock 1 is directly routed from the 100 MHz differential clock source (LVDS clock oscillator) through the resistors.

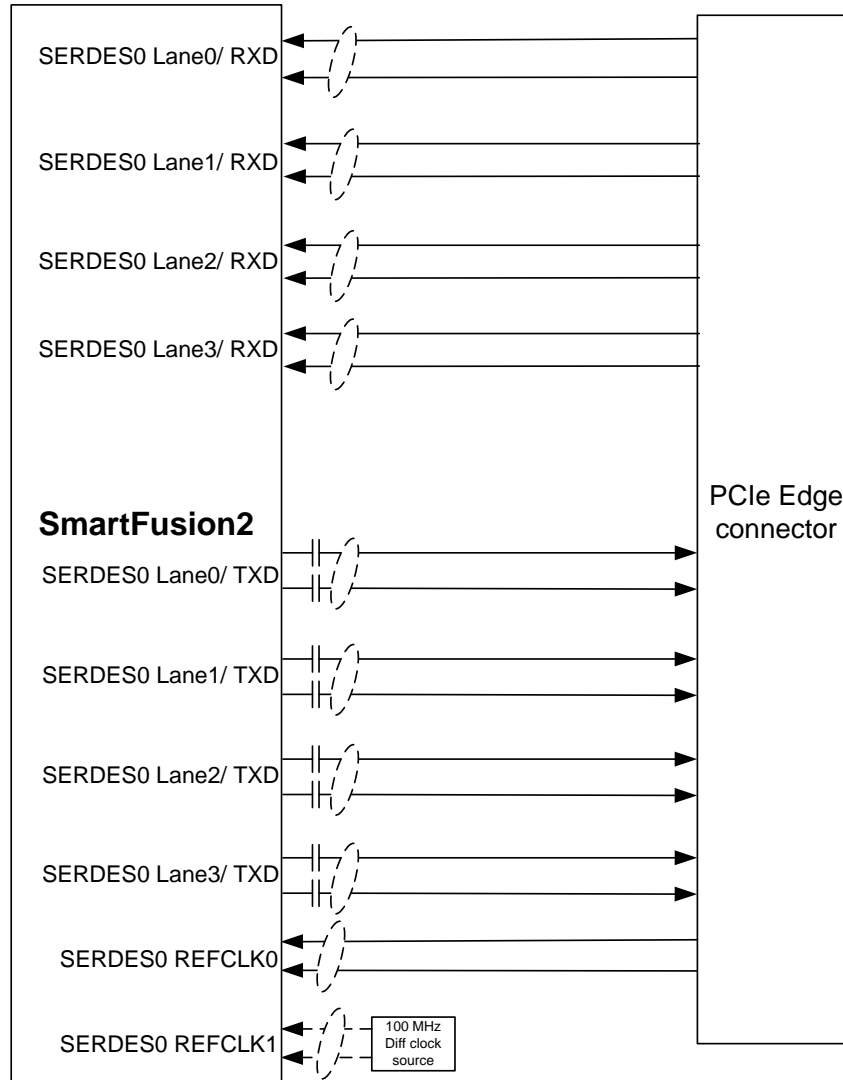


Figure 7 • SERDES0 Interface

Note:

- SERDES0 TXD pairs are capacitively coupled to the SmartFusion2 device. Series AC coupling capacitors are used to set the common mode voltage.
- Mount R977 and R978 to source the clock from 100 MHz differential oscillator to the SERDES0 REFCLK 1.
- For more information, refer to page 4 of Board Level Schematics document (provided separately).

SERDES1 Interface

The SERDES1 (lane 0/1/2/3) is routed to the FMC connector.

- SERDES1 reference clock 0 is routed from the FMC connector.
- SERDES1 reference clock 1 is routed from the FMC connector through the Clock buffer. The output of the clock buffer is additionally routed to the SmartFusion2 Advanced Development Kit board pins - AF18 and AG18. Refer to [Figure 8](#).

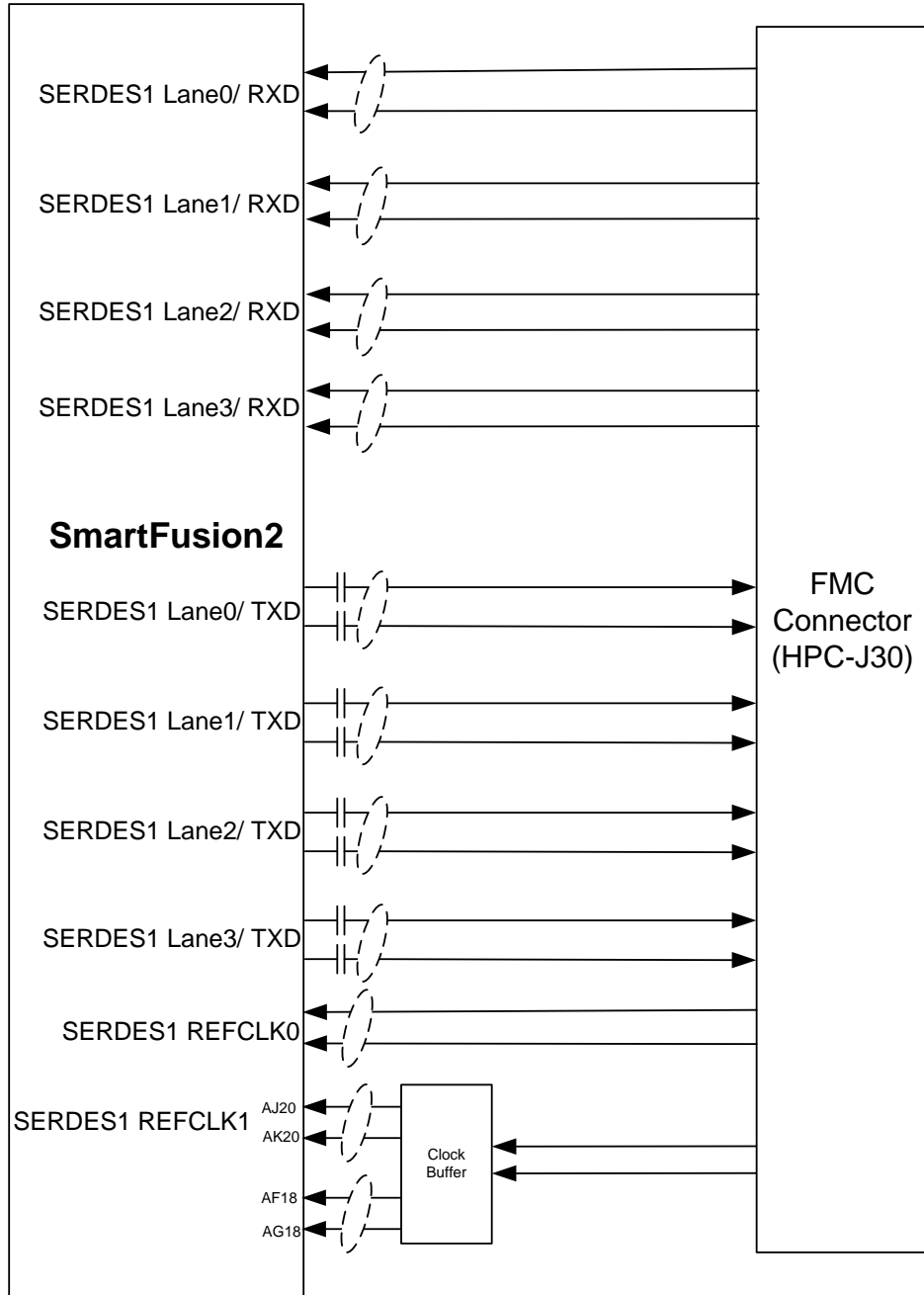


Figure 8 - SERDES1 Interface

Note:

- SERDES1 TXD pairs are capacitively coupled to the SmartFusion2 device. Series AC coupling capacitors are used to set the common mode voltage.
- For more information, refer to page 5 of Board Level Schematics document (provided separately).

SERDES2 Interface

The SERDES2 (lane 0/1/2/3) is routed to the FMC connector.

- SERDES2 reference clock 0 is routed from the FMC connector.
- SERDES2 reference clock 1 is routed from the FMC connector through the Clock buffer. The output of the clock buffer is additionally routed to the SmartFusion2 Advanced Development Kit board pins - AE17 and AF17. Refer to [Figure 9](#).

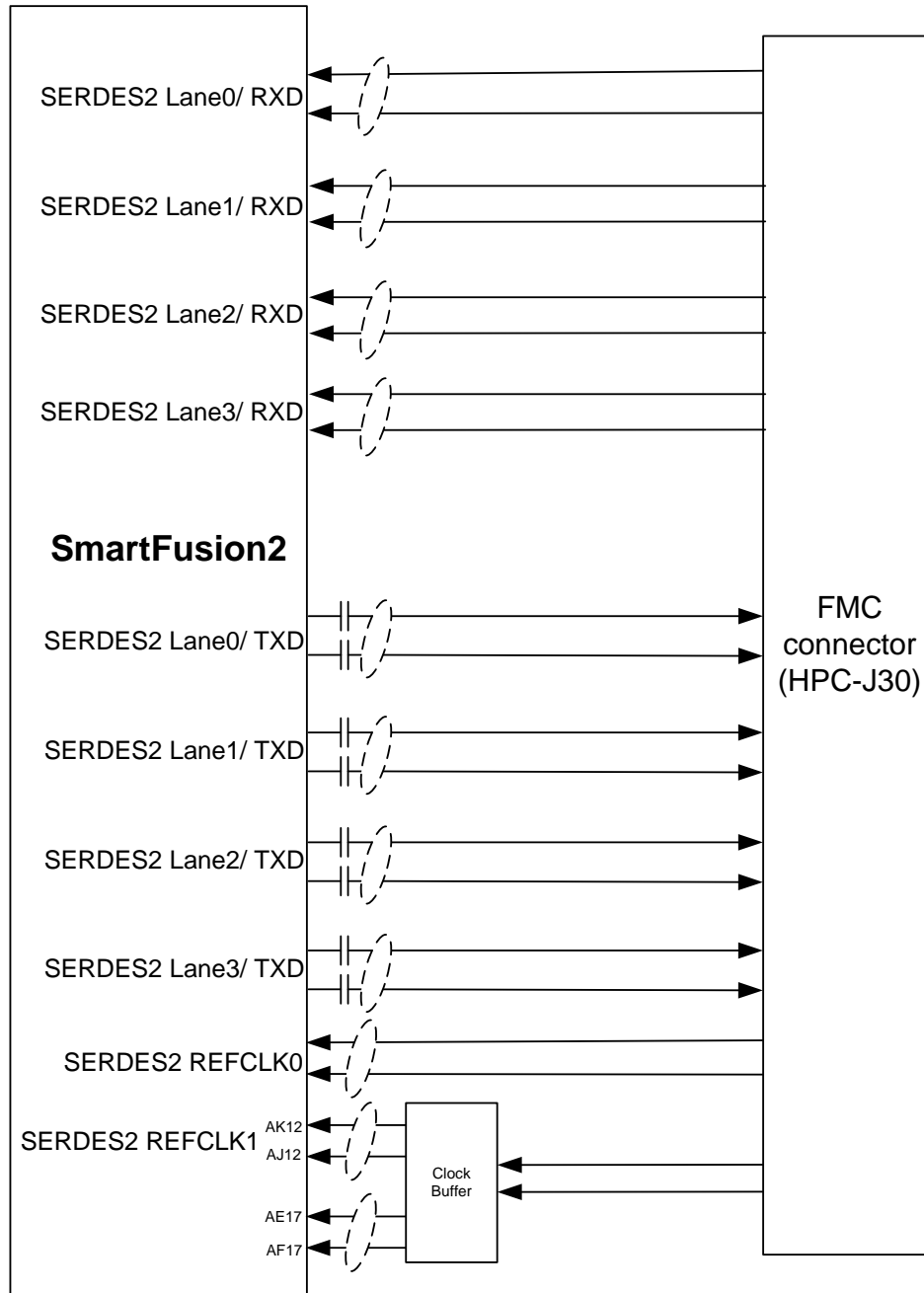


Figure 9 - SERDES2 Interface

Note:

- SERDES2 TXD pairs are capacitively coupled to the SmartFusion2 device. Series AC coupling capacitors are used to set the common mode voltage.
- For more information, refer to page 6 of Board Level Schematics document (provided separately).

SERDES3 Interface

The SERDES3 Lane-0 is connected to the FMC connector, Lane-1 is connected to the SMA connectors, and Lane-2 and 3 are connected to the Marvell PHY device of port-0 and 1, respectively.

- SERDES3 Reference clock 0 is connected from FMC connector or SMA connector options through MUX.
- SERDES3 Reference clock 1 is connected from 125 MHz or 100 MHz options through MUX. Refer to Figure 10.

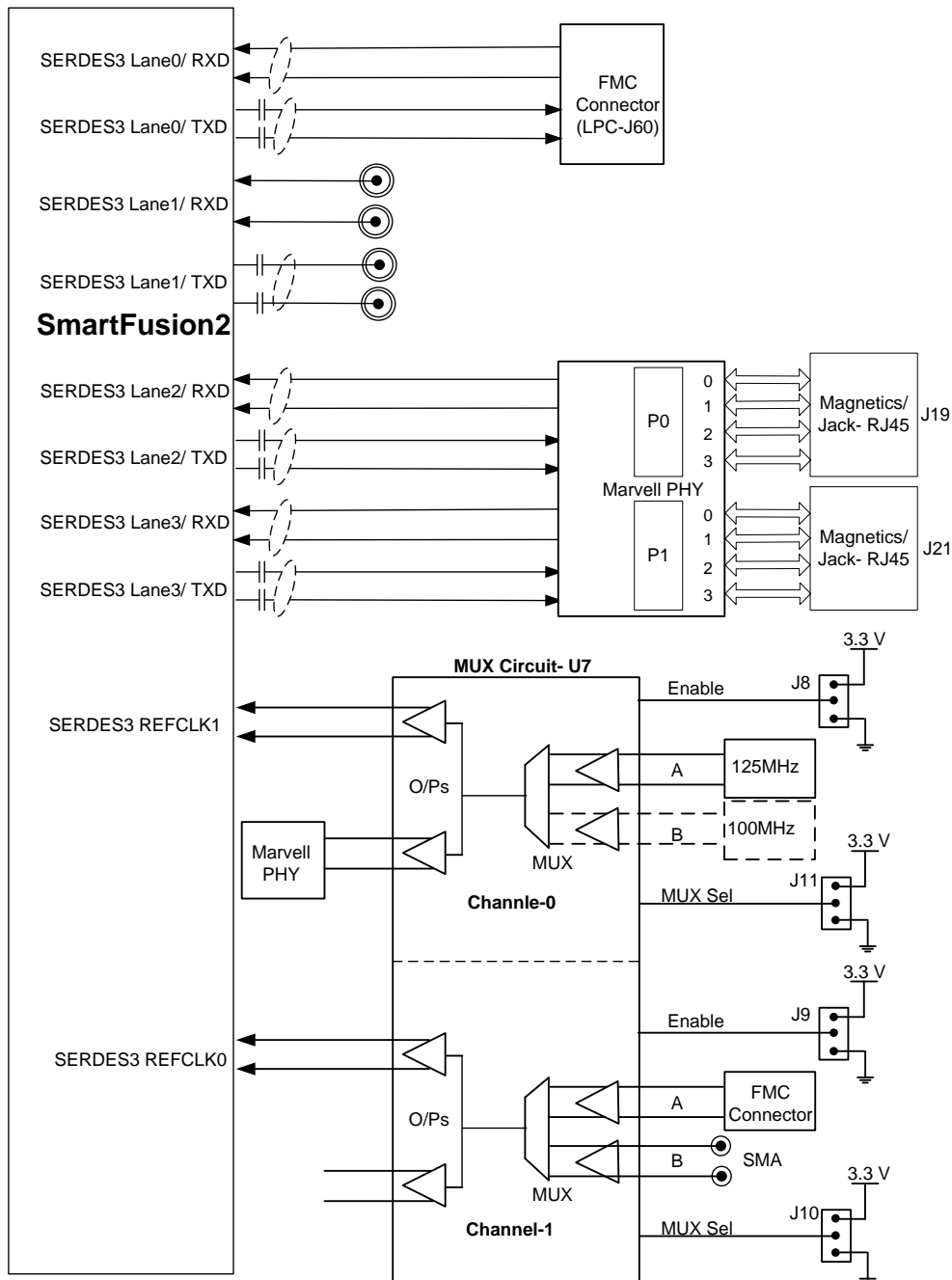


Figure 10 - SERDES3 Interface

Note:

- SERDES3 TXD pairs are capacitively coupled to the SmartFusion2 device. Series AC coupling capacitors are used to set the common mode voltage.
- For more information, refer to page 7 of Board Level Schematics document (provided separately).

USB Interface

The SMSC USB3320 is a high speed USB 2.0 ULPI transceiver. It uses the industry standard UTMI+ low pin count to connect the USB transceiver to the link. In the SmartFusion2 Advanced Development Kit, the USB interface operates in the Host, Device or OTG mode. For Device mode, J23 can be in open or short position.

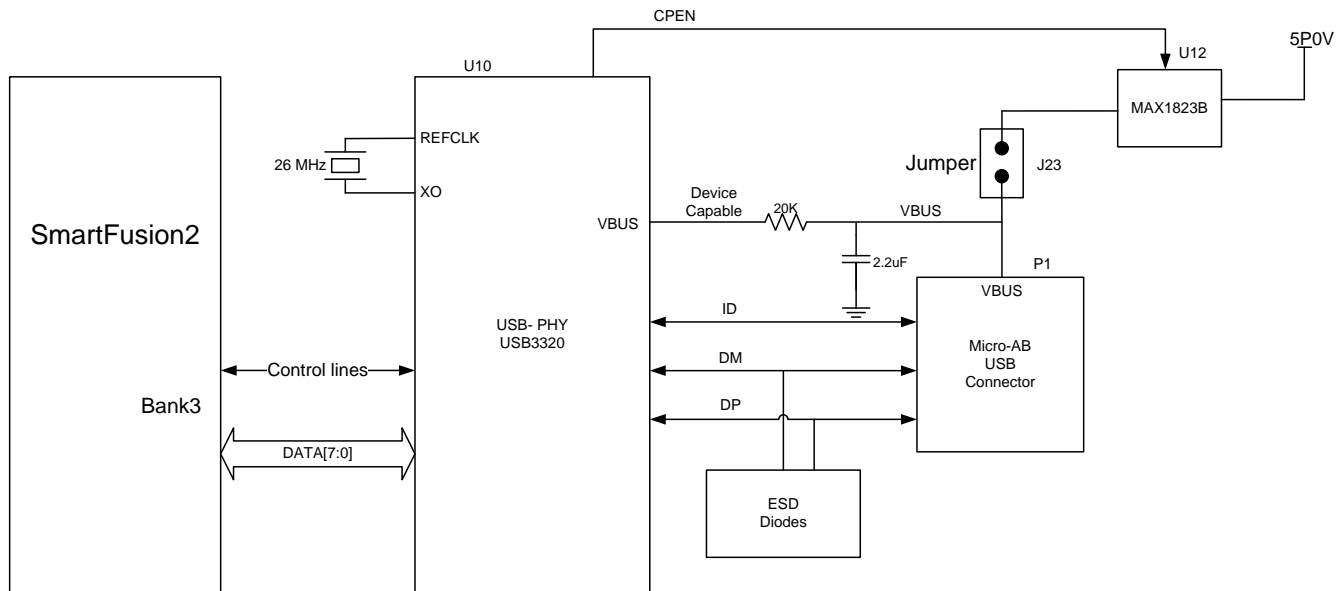


Figure 11 - USB Interface

Note: CPEN: External 5 V supply enables. It controls the external VBUS power switch.

Table 7 - USB Interface Operating Modes

| Operating Mode | Terminals |
|---|-----------------------|
| USB – Host or OTG | J23 - 1 and 2 - Close |
| Note: For more information, refer to page 10 of Board Level Schematics document (provided separately). | |

Marvell PHY (88E1340S)

The SmartFusion2 Advanced Development Kit uses the on board Marvell Alaska PHY device (88E1340S) for Ethernet communications at 100 or 1000 Mbps. The 88E1340S device has four independent Giga Bit Ethernet transceivers, but the board uses only two transceivers. Each transceiver performs all the physical layer functions for 100BASE-TX and 1000BASE-T full or half-duplex Ethernet on the CAT5 twisted pair cable. The PHY device is connected to a user-provided Ethernet cable through an RJ45 connector with built-in magnetics.

The 88E1340S device supports the quad SGMII for direct connection to a SmartFusion2 chip. Refer to [Figure 12](#). It is configured through the CONFIG [3:0] and CLK_SEL [1:0] pins.

CLK_SEL [1:0] is used to select the reference clock input option. On board, the status of the CLK_SEL0 pin is High and CLK_SEL1 pin is Low. REF_CLK is a 125 MHz reference differential clock input (Y11). It consists of LVDS differential inputs with a 100 Ω differential internal termination resistor.

- RCLK – Giga Bit recovered clock
- SCLK – 25 MHz synchronous input reference clock
- Expected reference clock (REF_CLK) specifications

1. Voltage level: 3.3 (± 0.3)V

2. Differential LVDS

- Symmetry: 50% (± 10%)
- Rise/Fall Time: 1 ns Max - 20% to 80% of supply (3.3 V)
- Output Voltage Levels: 0 = 0.90 Minimum, 1.10 Typical
1 = 1.43 Typical, 1.60 Maximum
- Differential Output Voltage: 247 mV Minimum, 454 mV Maximum

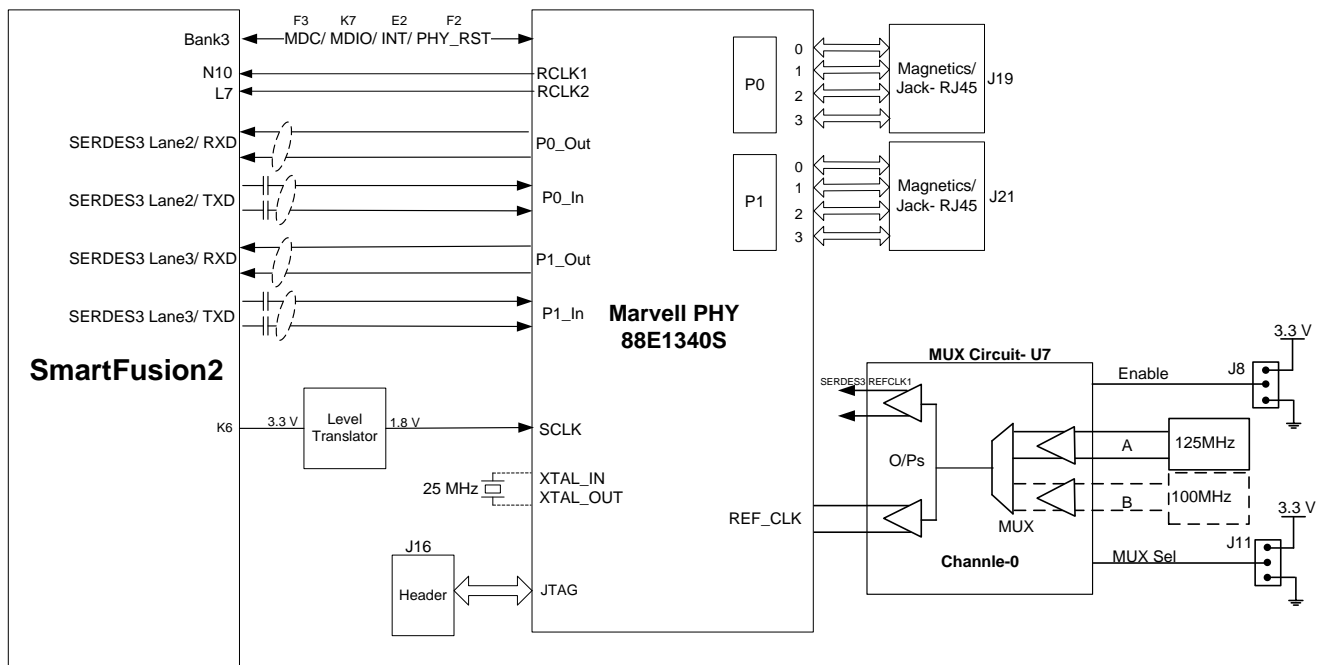


Figure 12 - SmartFusion2 Marvell PHY Interface

Note: For more information, refer to page 8 and 9 of Board Level Schematics document (provided separately).

Programming

The SmartFusion2 SoC FPGAs support multiple programming interfaces and can address a wide range of platform requirements. A SmartFusion2 device can be programmed through the JTAG and SPI interfaces.

The dedicated programming SPI port can operate in SPI Slave or SPI Master mode.

For more details, refer to [SmartFusion2 and IGLOO2 Programming User Guide](#).

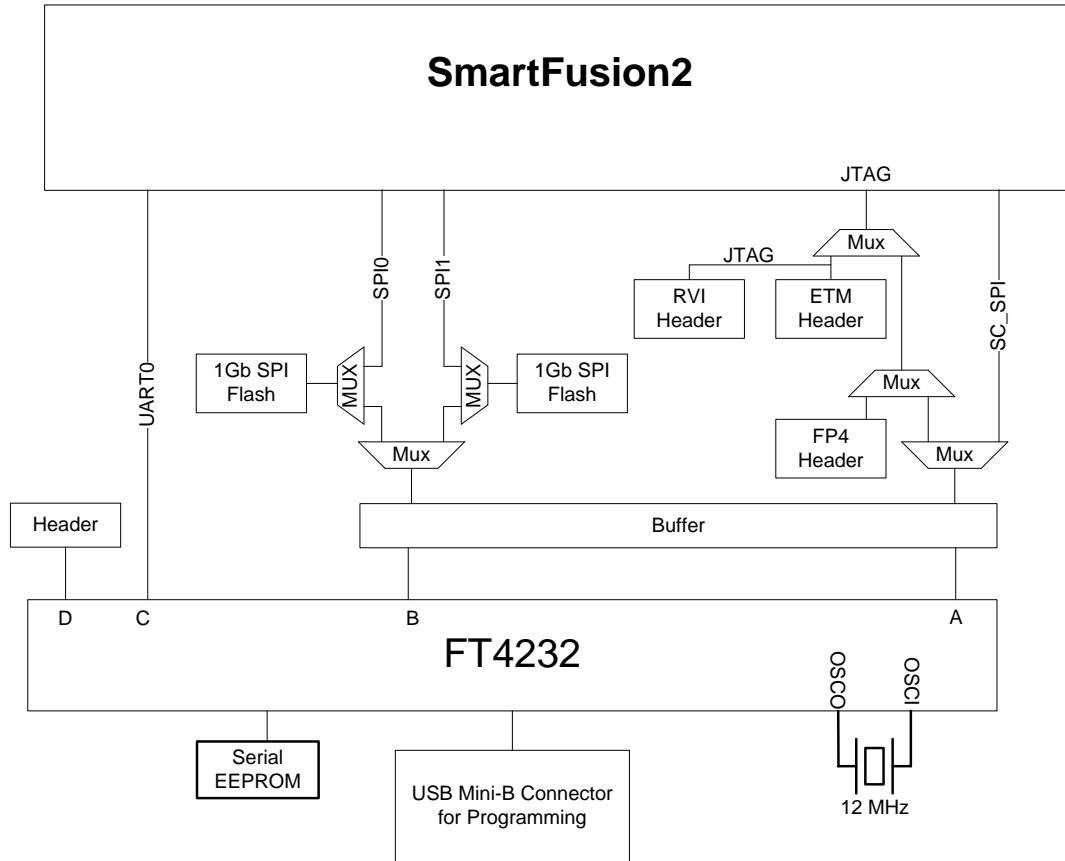


Figure 13 - Programming Interface

Table 8 - Programming Jumper Selection

| J121 | J124 | J125 | J32 | |
|------|------|------|-----|--|
| X | X | X | L | IAR Debugging |
| X | L | X | H | FP4 JTAG programming |
| H | H | X | H | FTDI JTAG programming (Embedded FlashPro5 programming) |
| L | X | X | H | FTDI SPI slave programming |
| X | X | L | X | FTDI SPI-0 Programming |
| X | X | H | X | FTDI SPI-1 Programming |

JTAG_SEL: The JTAG state machine is multiplexed with the CM3 debug port. JTAG_SEL is used to switch between JTAG Programming (High) and CM3 Debug (Low). When using the CM3 debug port, an option is available to switch to serial wire debug port.

FLASH_GOLDEN_N: Signal tied high always to the supply VCCIO_HPC_VADJ (3.3 V). It indicates the SPI goes to Slave mode.

RVI Header: A 10X2 RVI header is provided on the board for debugging. This header allows plugging in the Keil ULINK debugger or IAR J-Link debugger to easily debug or configure the Cortex-M3 processor during board power-up.

FlashPro4 Programming Header: The SmartFusion2 device on this Advanced Development Kit can be programmed using a FlashPro4 programmer. In addition, SoftConsole uses FlashPro4 for software debugging.

Note:

- For more information, refer to pages 24, 25, 26 of Board Level Schematics document (provided separately).
- For Jumper Settings, refer to Programming and Debugging.

FTDI Interface

The FT4232H chip is a USB 2.0 high speed (480 Mbps) to UART/MPSSE interface.

- Single-chip USB to quad serial ports with different configurations.
- Entire USB protocol is handled in the chip. USB specific firmware programming is not required.
- USB 2.0 high speed (480 Mbps) and full speed (12 Mbps) compatible.
- Two MPSSEs on channel A and channel B to simplify synchronous serial protocol (USB to JTAG, I2C, SPI, or bit-bang) design.
- Fully assisted hardware or X-On or X-Off software handshaking.
- +1.8 V (chip core) and +3.3 V I/O interfacing (+5 V tolerant).
- For interface details refer to [Figure 13](#).

System Reset

The M2S_RSTB signal (active low) is generated by SW6 (push-button switch), U21 chip (DS1818), or U22 chip (TPS3808G09). DEVRST_N is an input-only reset pad that allows assertion of a full reset to the chip at any time.

DS1818 maintains reset till 150 ms after the 3.3 V supply returns to an intolerance condition. The TPS3808G09DBVR device monitors the voltage of VDD_REG. If the voltage at this terminal SENSE drops below the threshold voltage of 0.9 V, the M2S_RSTB signal is asserted.

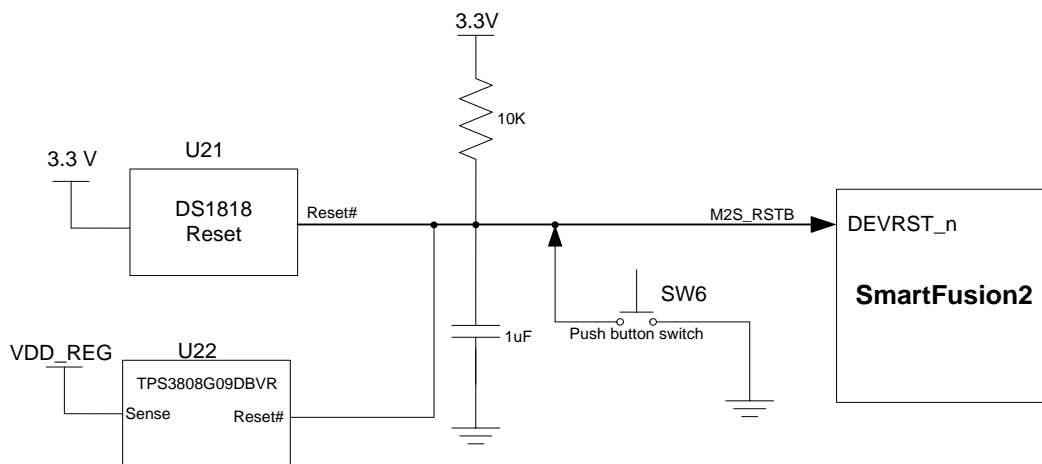


Figure 14 • System Reset Interface

Note: For more information, refer to page 26 of Board Level Schematics document (provided separately).

Clock Oscillator

A 50 MHz clock oscillator with an accuracy of +/-50 ppm is available on the board, refer to Figure 15. This clock oscillator is connected to the FPGA fabric to provide a system reference clock.

An on-chip SmartFusion2 PLL can be configured to generate a wide range of high precision clock frequencies.

Table 9 - 50 MHz Clock

| SmartFusion2 Advanced Development Kit Board Pin | SmartFusion2 Package Pin Number | SmartFusion2 Device Pin Name |
|---|---------------------------------|------------------------------|
| 50MHZ_SECLK_B4_P1 | P1 | MSIO39PB4/CCC_NE0_CLKI1 |

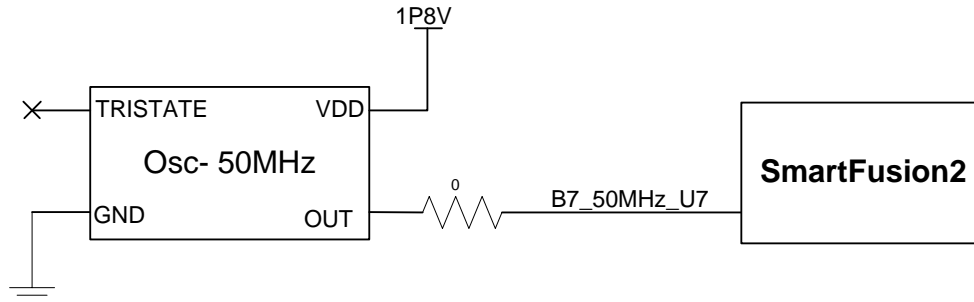


Figure 15 - 50 MHz - Clock Oscillator Interface

Note: For more information, refer to page 11 of Board Level Schematics document (provided separately).

A 100 MHz LVDS Clock Oscillator operating at 3.3 Volts with an accuracy of +/-50 ppm is available on the board (Figure 16). This clock oscillator is connected to the FPGA fabric to M1 and N1 pins.

Table 10 - 100 MHz Clock

| SmartFusion2 Advanced Development Kit Board Pin | SmartFusion2 Package Pin Number | SmartFusion2 Device Pin Name |
|---|---------------------------------|------------------------------|
| 100MHZ_DIFFCLK_P | N1 | MSIO40PB4/CCC_NE1_CLKI1 |
| 100MHZ_DIFFCLK_N | M1 | MSIO40NB4 |

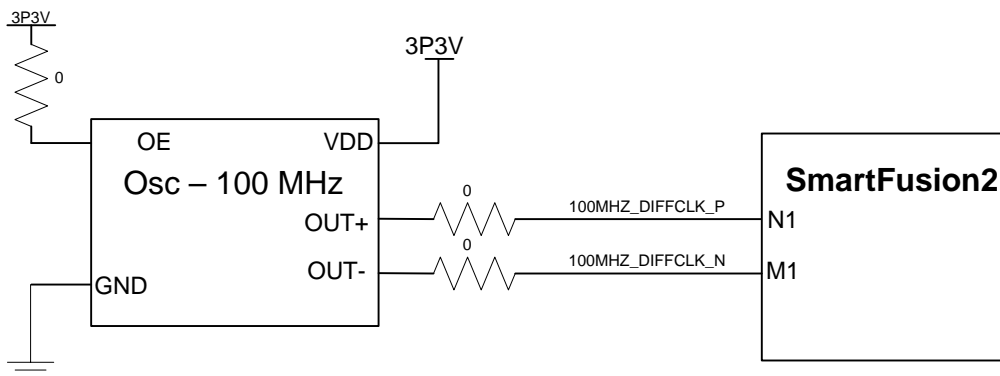


Figure 16 - 100 MHz - Clock Oscillator Interface

Note: For more information, refer to page 11 of Board Level Schematics document (provided separately).

Debugging

User LEDs

The board has eight active high LEDs that are connected to the SmartFusion2 device. You can use these LEDs to debug applications.

Table 11 · LEDs

| SmartFusion2 Advanced Development Kit Board Pin | SmartFusion2 Package Pin Number | SmartFusion2 Device Pin Name |
|---|---------------------------------|------------------------------|
| DS0 | D26 | DDRIO149PB1/FDDR_DQS2 |
| DS1 | F26 | DDRIO150PB1/FDDR_DQ18 |
| DS2 | A27 | DDRIO148PB1/FDDR_DM_RDQS2 |
| DS3 | C26 | DDRIO149NB1/FDDR_DQS2_N |
| DS4 | C28 | DDRIO151PB1/FDDR_DQ16 |
| DS5 | B27 | DDRIO148NB1/FDDR_DQ20 |
| DS6 | C27 | DDRIO151NB1/FDDR_DQ17 |
| DS7 | E26 | DDRIO150NB1/FDDR_DQ19 |

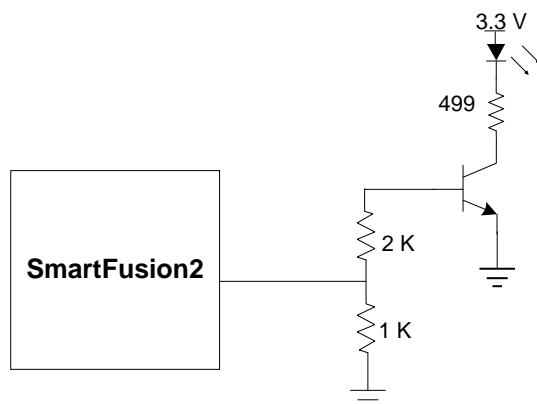


Figure 17 · LEDs Interface

Note: For more information, refer to page 25 of Board Level Schematics document (provided separately).

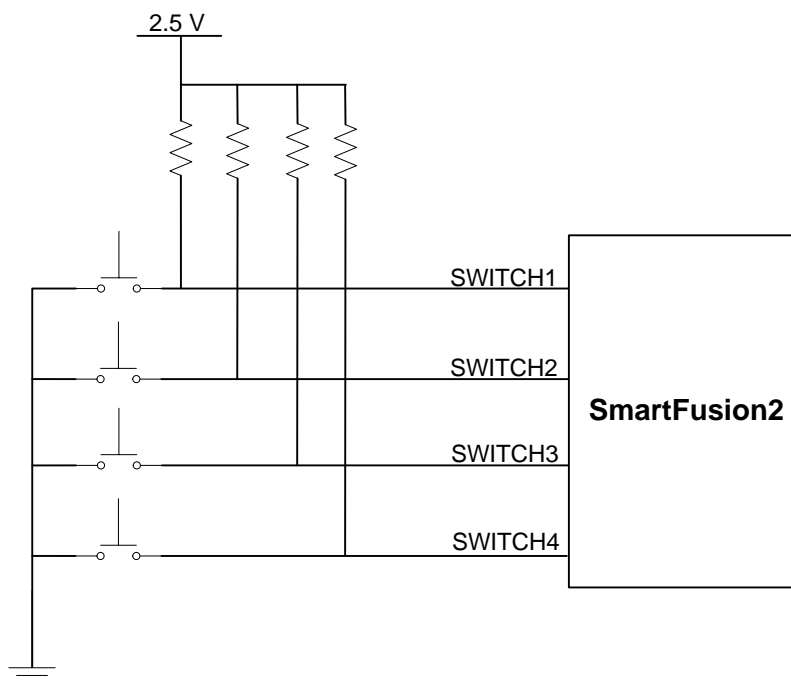
Push-Button Switches

The SmartFusion2 Advanced Development Kit comes with five push-button tactile switches that are connected to the SmartFusion2 device.

Table 12 · Push-Button Switches

| SmartFusion2 Advanced Development Kit Board Pin | SmartFusion2 Package Pin Number | SmartFusion2 Device Pin Name |
|---|---------------------------------|------------------------------|
| SWITCH1 | J25 | DDRIO156PB1/FDDR_DQ10 |
| SWITCH2 | H25 | DDRIO156NB1/FDDR_DQ11 |
| SWITCH3 | J24 | DDRIO157PB1/FDDR_DQ8 |
| SWITCH4 | H23 | DDRIO157NB1/FDDR_DQ9 |

| SmartFusion2 Advanced Development Kit Board Pin | SmartFusion2 Package Pin Number | SmartFusion2 Device Pin Name |
|---|---------------------------------|------------------------------|
| SW6 | AE5 | System Reset |


Figure 18 - Switches Interface

Note: For more information, refer to page 25 of Board Level Schematics document (provided separately).

Slide Switches - DPDT

SW7: Power ON or OFF switch from external DC Jack (J42), +12 V DC.

DIP Switch - SPST

SW5: A DIP switch that has eight connections to the SmartFusion2 device.

Table 13 - DIP Switches

| SmartFusion2 Advanced Development Kit Pin | SmartFusion2 Package Pin Number | SmartFusion2 Device Pin Name |
|---|---------------------------------|------------------------------|
| DIP0 | F25 | DDRIO152PB1/FDDR_DQ14 |
| DIP1 | G25 | DDRIO152NB1/FDDR_DQ15 |
| DIP2 | J23 | DDRIO153PB1/FDDR_DQ12 |
| DIP3 | J22 | DDRIO153NB1/FDDR_DQ13 |
| DIP4 | G27 | DDRIO154PB1/FDDR_TMATCH_0_IN |
| DIP5 | H27 | DDRIO154NB1/FDDR_DM_RDQS1 |
| DIP6 | F23 | DDRIO155PB1/FDDR_DQS1 |
| DIP7 | G23 | DDRIO155NB1/FDDR_DQS1_N |

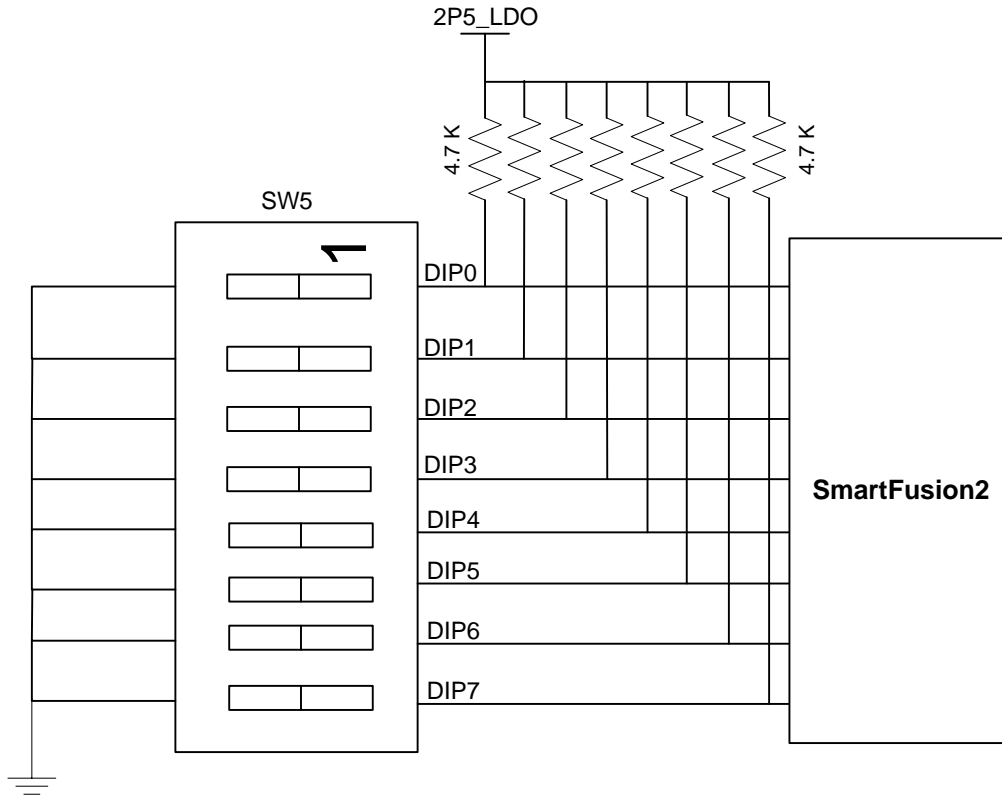


Figure 19 - SPST Interface

Note: For more information, refer to page 20 of Board Level Schematics document (provided separately).

FMC Connectors

The Advanced Development Kit has HPC (J30) and LPC (J60) FMC connectors on the board for the daughter cards for the future expansion of interfaces.

FMC Connector - HPC (J30)

The SmartFusion2 MSIOs from Bank 0, 3, 5, 6, 8, 11, 14, 17, 18, SERDES 1, and SERDES2 signals are routed to the FMC connector for the application to be developed.

If the FMC daughter board is designed as per VITA standard, bank-0 and bank-5 I/Os get power from the FMC daughter board. If it is not designed as per VITA standard, bank-0 and bank-5 I/Os get power from the onboard U37 regulator by mounting R1216 resistor.

Table 14 - FMC Connector - J30 Pin Out

| FMC Pin Number-J30 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin name |
|--------------------|------------------------|-------------------------|-----------------------|
| A1 | GND | | |
| A2 | FMC_HPC_SERDES2_RXD2_P | AM13 | SERDES_2_RXD2_P |
| A3 | FMC_HPC_SERDES2_RXD2_N | AL13 | SERDES_2_RXD2_N |
| A4 | GND | | |
| A5 | GND | | |

| FMC Pin Number-J30 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin name |
|--------------------|------------------------|-------------------------|-----------------------|
| A6 | FMC_HPC_SERDES2_RXD1_P | AM15 | SERDES_2_RXD1_P |
| A7 | FMC_HPC_SERDES2_RXD1_N | AL15 | SERDES_2_RXD1_N |
| A8 | GND | | |
| A9 | GND | | |
| A10 | FMC_HPC_SERDES2_RXD0_P | AM17 | SERDES_2_RXD0_P |
| A11 | FMC_HPC_SERDES2_RXD0_N | AL17 | SERDES_2_RXD0_N |
| A12 | GND | | |
| A13 | GND | | |
| A14 | FMC_HPC_SERDES1_RXD3_P | AL19 | SERDES_1_RXD3_P |
| A15 | FMC_HPC_SERDES1_RXD3_N | AM19 | SERDES_1_RXD3_N |
| A16 | GND | | |
| A17 | GND | | |
| A18 | FMC_HPC_SERDES1_RXD2_P | AL21 | SERDES_1_RXD2_P |
| A19 | FMC_HPC_SERDES1_RXD2_N | AM21 | SERDES_1_RXD2_N |
| A20 | GND | | |
| A21 | GND | | |
| A22 | FMC_HPC_SERDES2_TXD2_P | AN12 | SERDES_2_TXD2_P |
| A23 | FMC_HPC_SERDES2_TXD2_N | AP12 | SERDES_2_TXD2_N |
| A24 | GND | | |
| A25 | GND | | |
| A26 | FMC_HPC_SERDES2_TXD1_P | AN14 | SERDES_2_TXD1_P |
| A27 | FMC_HPC_SERDES2_TXD1_N | AP14 | SERDES_2_TXD1_N |
| A28 | GND | | |
| A29 | GND | | |
| A30 | FMC_HPC_SERDES2_TXD0_P | AN16 | SERDES_2_TXD0_P |
| A31 | FMC_HPC_SERDES2_TXD0_N | AP16 | SERDES_2_TXD0_N |
| A32 | GND | | |
| A33 | GND | | |
| A34 | FMC_HPC_SERDES1_TXD3_P | AP18 | SERDES_1_TXD3_P |
| A35 | FMC_HPC_SERDES1_TXD3_N | AN18 | SERDES_1_TXD3_N |

| FMC Pin Number-J30 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin name |
|--------------------|---------------------------|-------------------------|---------------------------------|
| A36 | GND | | |
| A37 | GND | | |
| A38 | FMC_HPC_SERDES1_TXD2_P | AP20 | SERDES_1_TXD2_P |
| A39 | FMC_HPC_SERDES1_TXD2_N | AN20 | SERDES_1_TXD2_N |
| A40 | GND | | |
| B1 | NC | - | - |
| B2 | GND | | |
| B3 | GND | | |
| B4 | NC | - | - |
| B5 | NC | - | - |
| B6 | GND | | |
| B7 | GND | | |
| B8 | NC | - | - |
| B9 | NC | - | - |
| B10 | GND | | |
| B11 | GND | | |
| B12 | FMC_HPC_SERDES1_RXD0_P | AL25 | SERDES_1_RXD0_P |
| B13 | FMC_HPC_SERDES1_RXD0_N | AM25 | SERDES_1_RXD0_N |
| B14 | GND | | |
| B15 | GND | | |
| B16 | FMC_HPC_SERDES1_RXD1_P | AL23 | SERDES_1_RXD1_P |
| B17 | FMC_HPC_SERDES1_RXD1_N | AM23 | SERDES_1_RXD1_N |
| B18 | GND | | |
| B19 | GND | | |
| B20 | FMC_HPC_SERDES1_REFCLK0_P | AJ22 | MSIOD271PB12/SERDES_1_REFCLK0_P |
| B21 | FMC_HPC_SERDES1_REFCLK0_N | AK22 | MSIOD271NB12/SERDES_1_REFCLK0_N |
| B22 | GND | | |
| B23 | GND | | |
| B24 | NC | - | - |
| B25 | NC | - | - |

| FMC Pin Number-J30 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin name |
|--------------------|------------------------|-------------------------|-----------------------|
| B26 | GND | | |
| B27 | GND | | |
| B28 | NC | - | - |
| B29 | NC | - | - |
| B30 | GND | | |
| B31 | GND | | |
| B32 | FMC_HPC_SERDES1_TXD0_P | AP24 | SERDES_1_TXD0_P |
| B33 | FMC_HPC_SERDES1_TXD0_N | AN24 | SERDES_1_TXD0_N |
| B34 | GND | | |
| B35 | GND | | |
| B36 | FMC_HPC_SERDES1_TXD1_P | AP22 | SERDES_1_TXD1_P |
| B37 | FMC_HPC_SERDES1_TXD1_N | AN22 | SERDES_1_TXD1_N |
| B38 | GND | | |
| B39 | GND | | |
| B40 | NC | - | - |
| C1 | GND | | |
| C2 | FMC_HPC_SERDES2_TXD3_P | AN10 | SERDES_2_TXD3_P |
| C3 | FMC_HPC_SERDES2_TXD3_N | AP10 | SERDES_2_TXD3_N |
| C4 | GND | | |
| C5 | GND | | |
| C6 | FMC_HPC_SERDES2_RXD3_P | AM11 | SERDES_2_RXD3_P |
| C7 | FMC_HPC_SERDES2_RXD3_N | AL11 | SERDES_2_RXD3_N |
| C8 | GND | | |
| C9 | GND | | |
| C10 | HPC_LA06_M32_191P_B18 | M32 | MSIO191PB18 |
| C11 | HPC_LA06_M31_191N_B18 | M31 | MSIO191NB18 |
| C12 | GND | | |
| C13 | GND | | |
| C14 | HPC_LA10_T23_206P_B17 | T23 | MSIO206PB17 |
| C15 | HPC_LA10_T24_206N_B17 | T24 | MSIO206NB17 |

| FMC Pin Number-J30 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin name |
|--------------------|---------------------------|-------------------------|---|
| C16 | GND | | |
| C17 | GND | | |
| C18 | HPC_LA14_P29_198P_B17 | P29 | MSIO198PB17 |
| C19 | HPC_LA14_P28_198N_B17 | P28 | MSIO198NB17 |
| C20 | GND | | |
| C21 | GND | | |
| C22 | HPC_LA18_CC_U29_215P_B17 | U29 | MSIO215PB17/CCC_NW1_CLKI0 |
| C23 | HPC_LA18_CC_U30_215N_B17 | U30 | MSIO215NB17 |
| C24 | GND | | |
| C25 | GND | | |
| C26 | HPC_LA27_P34_208P_B17 | P34 | MSIO208PB17 |
| C27 | HPC_LA27_N34_208N_B17 | N34 | MSIO208NB17 |
| C28 | GND | | |
| C29 | GND | | |
| C30 | I2C0_SCL | K10 | MSIO81NB3/I2C_0_SCL/GPIO_31_B/USB_DATA1_C |
| C31 | I2C0_SDA | K9 | MSIO81PB3/I2C_0_SDA/GPIO_30_B/USB_DATA0_C |
| C32 | GND | | |
| C33 | GND | | |
| C34 | GND | | |
| C35 | 12P0V | | |
| C36 | GND | | |
| C37 | 12P0V | | |
| C38 | GND | | |
| C39 | 3P3V | | |
| C40 | GND | | |
| D1 | HPC_PG_C2M_H6_77N_B3 | H6 | MSIO77NB3/MMUART_0_DSR/GPIO_20_B |
| D2 | GND | | |
| D3 | GND | | |
| D4 | FMC_HPC_SERDES2_REFCLK0_P | AK14 | MSIOD277PB10/SERDES_2_REFCLK0_P |
| D5 | FMC_HPC_SERDES2_REFCLK0_N | AJ14 | MSIOD277NB10/SERDES_2_REFCLK0_N |

| FMC Pin Number-J30 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin name |
|--------------------|--------------------------|-------------------------|-------------------------------|
| D6 | GND | | |
| D7 | GND | | |
| D8 | HPC_LA01_CC_U27_216P_B17 | U27 | MSIO216PB17/CCC_NW0_CLKI0 |
| D9 | HPC_LA01_CC_U26_216N_B17 | U26 | MSIO216NB17 |
| D10 | GND | | |
| D11 | HPC_LA05_N23_186P_B18 | N23 | MSIO186PB18 |
| D12 | HPC_LA05_N24_186N_B18 | N24 | MSIO186NB18 |
| D13 | GND | | |
| D14 | HPC_LA09_R23_200P_B17 | R23 | MSIO200PB17 |
| D15 | HPC_LA09_R24_200N_B17 | R24 | MSIO200NB17 |
| D16 | GND | | |
| D17 | HPC_LA13_R26_202P_B17 | R26 | MSIO202PB17 |
| D18 | HPC_LA13_R25_202N_B17 | R25 | MSIO202NB17 |
| D19 | GND | | |
| D20 | HPC_LA17_CC_U31_213P_B17 | U31 | MSIO213PB17/GB6/CCC_NW1_CLKI1 |
| D21 | HPC_LA17_CC_U32_213N_B17 | U32 | MSIO213NB17 |
| D22 | GND | | |
| D23 | HPC_LA23_T33_212P_B17 | T33 | MSIO212PB17 |
| D24 | HPC_LA23_T32_212N_B17 | T32 | MSIO212NB17 |
| D25 | GND | | |
| D26 | HPC_LA26_L33_190P_B18 | L33 | MSIO190PB18 |
| D27 | HPC_LA26_L32_190N_B18 | L32 | MSIO190NB18 |
| D28 | GND | | |
| D29 | HPC_TCK | | |
| D30 | HPC_TDI | | |
| D31 | HPC_TDO | | |
| D32 | 3P3V | | |
| D33 | HPC_TMS | | |
| D34 | HPC_TRST_L | | |
| D35 | GND | | |

| FMC Pin Number-J30 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin name |
|--------------------|---------------------------|-------------------------|--------------------------------|
| D36 | 3P3V | | |
| D37 | GND | | |
| D38 | 3P3V | | |
| D39 | GND | | |
| D40 | 3P3V | | |
| E1 | GND | | |
| E2 | HPC_HA01_CC_AF16_276P_B11 | AF16 | MSIO276PB11/GB11/VCCC_SE0_CLKI |
| E3 | HPC_HA01_CC_AG16_276N_B11 | AG16 | MSIO276NB11 |
| E4 | GND | | |
| E5 | GND | | |
| E6 | HPC_HA05_AA3_17P_B6 | AA3 | MSIO17PB6 |
| E7 | HPC_HA05_AA2_17N_B6 | AA2 | MSIO17NB6 |
| E8 | GND | | |
| E9 | HPC_HA09_AJ2_285P_B8 | AJ2 | MSIO285PB8 |
| E10 | HPC_HA09_AH3_285N_B8 | AH3 | MSIO285NB8 |
| E11 | GND | | |
| E12 | HPC_HA13_AH6_283P_B8 | AH6 | MSIO283PB8 |
| E13 | HPC_HA13_AH5_283N_B8 | AH5 | MSIO283NB8 |
| E14 | GND | | |
| E15 | HPC_HA16_AG7_284P_B8 | AG7 | MSIO284PB8 |
| E16 | HPC_HA16_AF7_284N_B8 | AF7 | MSIO284NB8 |
| E17 | GND | | |
| E18 | HPC_HA20_AB8_8P_B6 | AB8 | MSIO8PB6 |
| E19 | HPC_HA20_AB7_8N_B6 | AB7 | MSIO8NB6 |
| E20 | GND | | |
| E21 | HPC_HB03_W1_20P_B5 | W1 | MSIO20PB5 |
| E22 | HPC_HB03_W2_20N_B5 | W2 | MSIO20NB5 |
| E23 | GND | | |
| E24 | HPC_HB05_Y2_19P_B5 | Y2 | MSIO19PB5 |
| E25 | HPC_HB05_Y1_19N_B5 | Y1 | MSIO19NB5 |

| FMC Pin Number-J30 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin name |
|--------------------|-------------------------|-------------------------|---------------------------------|
| E26 | GND | | |
| E27 | HPC_HB09_V4_30P_B5 | V4 | MSIO30PB5/USB_DATA0_B |
| E28 | HPC_HB09_V5_30N_B5 | V5 | MSIO30NB5/USB_DATA1_B |
| E29 | GND | | |
| E30 | HPC_HB13_U2_29P_B5 | U2 | MSIO29PB5/USB_STP_B |
| E31 | HPC_HB13_U3_29N_B5 | U3 | MSIO29NB5/USB_NXT_B |
| E32 | GND | | |
| E33 | HPC_HB19_H31_175P_B0 | H31 | MSIO175PB0 |
| E34 | HPC_HB19_G31_175N_B0 | G31 | MSIO175NB0 |
| E35 | GND | | |
| E36 | HPC_HB21_L25_174P_B0 | L25 | MSIO174PB0 |
| E37 | HPC_HB21_L26_174N_B0 | L26 | MSIO174NB0 |
| E38 | GND | | |
| E39 | VCCIO_HPC_VADJ | | |
| E40 | GND | | |
| F1 | HPC_PG_M2C_J6_78P_B3 | J6 | MSIO78PB3/MMUART_0_RI/GPIO_21_B |
| F2 | GND | | |
| F3 | GND | | |
| F4 | HPC_HA00_CC_AJ4_282P_B8 | AJ4 | MSIO282PB8/VCCC_SE1_CLKI |
| F5 | HPC_HA00_CC_AJ3_282N_B8 | AJ3 | MSIO282NB8 |
| F6 | GND | | |
| F7 | HPC_HA04_AG3_287P_B8 | AG3 | MSIO287PB8 |
| F8 | HPC_HA04_AG4_287N_B8 | AG4 | MSIO287NB8 |
| F9 | GND | | |
| F10 | HPC_HA08_AD1_9P_B6 | AD1 | MSIO9PB6 |
| F11 | HPC_HA08_AC1_9N_B6 | AC1 | MSIO9NB6 |
| F12 | GND | | |
| F13 | HPC_HA12_AE4_4P_B6 | AE4 | MSIO4PB6 |
| F14 | HPC_HA12_AD4_4N_B6 | AD4 | MSIO4NB6 |
| F15 | GND | | |

| FMC Pin Number-J30 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin name |
|--------------------|----------------------------|-------------------------|---------------------------|
| F16 | HPC_HA15_AA7_15P_B6 | AA7 | MSIO15PB6 |
| F17 | HPC_HA15_Y7_15N_B6 | Y7 | MSIO15NB6 |
| F18 | GND | | |
| F19 | HPC_HA19_AB10_11P_B6 | AB10 | MSIO11PB6 |
| F20 | HPC_HA19_AA10_11N_B6 | AA10 | MSIO11NB6 |
| F21 | GND | | |
| F22 | HPC_HB02_V1_26P_B5 | V1 | MSIO26PB5/GPIO_27_A |
| F23 | HPC_HB02_U1_26N_B5 | U1 | MSIO26NB5/GPIO_28_A |
| F24 | GND | | |
| F25 | HPC_HB04_W3_25P_B5 | W3 | MSIO25PB5 |
| F26 | HPC_HB04_V3_25N_B5 | V3 | MSIO25NB5 |
| F27 | GND | | |
| F28 | HPC_HB08_Y6_18P_B5 | Y6 | MSIO18PB5 |
| F29 | HPC_HB08_Y5_18N_B5 | Y5 | MSIO18NB5 |
| F30 | GND | | |
| F31 | HPC_HB12_W8_27P_B5 | W8 | MSIO27PB5 |
| F32 | HPC_HB12_W9_27N_B5 | W9 | MSIO27NB5/USB_DATA7_B |
| F33 | GND | | |
| F34 | HPC_HB16_Y12_21P_B5 | Y12 | MSIO21PB5 |
| F35 | HPC_HB16_Y11_21N_B5 | Y11 | MSIO21NB5 |
| F36 | GND | | |
| F37 | HPC_HB20_W12_28P_B5 | W12 | MSIO28PB5/USB_XCLK_B |
| F38 | HPC_HB20_W11_28N_B5 | W11 | MSIO28NB5/USB_DIR_B |
| F39 | GND | | |
| F40 | VCCIO_HPC_VADJ | | |
| G1 | GND | | |
| G2 | HPC_CLK1_M2C_AH28_267P_B14 | AH28 | MSIO267PB14/CCC_SW0_CLKI2 |
| G3 | HPC_CLK1_M2C_AG27_267N_B14 | AG27 | MSIO267NB14 |
| G4 | GND | | |
| G5 | GND | | |

| FMC Pin Number-J30 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin name |
|--------------------|--------------------------|-------------------------|-------------------------------|
| G6 | HPC_LA00_CC_U23_214P_B17 | U23 | MSIO214PB17/GB2/CCC_NW0_CLKI1 |
| G7 | HPC_LA00_CC_U24_214N_B17 | U24 | MSIO214NB17 |
| G8 | GND | | |
| G9 | HPC_LA03_N32_201P_B17 | N32 | MSIO201PB17 |
| G10 | HPC_LA03_N31_201N_B17 | N31 | MSIO201NB17 |
| G11 | GND | | |
| G12 | HPC_LA08_M25_181P_B18 | M25 | MSIO181PB18 |
| G13 | HPC_LA08_M24_181N_B18 | M24 | MSIO181NB18 |
| G14 | GND | | |
| G15 | HPC_LA12_M27_183P_B18 | M27 | MSIO183PB18 |
| G16 | HPC_LA12_M26_183N_B18 | M26 | MSIO183NB18 |
| G17 | GND | | |
| G18 | HPC_LA16_T28_209P_B17 | T28 | MSIO209PB17 |
| G19 | HPC_LA16_T27_209N_B17 | T27 | MSIO209NB17 |
| G20 | GND | | |
| G21 | HPC_LA20_R31_205P_B17 | R31 | MSIO205PB17 |
| G22 | HPC_LA20_R30_205N_B17 | R30 | MSIO205NB17 |
| G23 | GND | | |
| G24 | HPC_LA22_R33_207P_B17 | R33 | MSIO207PB17 |
| G25 | HPC_LA22_R32_207N_B17 | R32 | MSIO207NB17 |
| G26 | GND | | |
| G27 | HPC_LA25_M34_197P_B17 | M34 | MSIO197PB17 |
| G28 | HPC_LA25_L34_197N_B17 | L34 | MSIO197NB17 |
| G29 | GND | | |
| G30 | HPC_LA29_J34_194P_B18 | J34 | MSIO194PB18 |
| G31 | HPC_LA29_J33_194N_B18 | J33 | MSIO194NB18 |
| G32 | GND | | |
| G33 | HPC_LA31_H34_196P_B18 | H34 | MSIO196PB18 |
| G34 | HPC_LA31_G34_196N_B18 | G34 | MSIO196NB18 |
| G35 | GND | | |

| FMC Pin Number-J30 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin name |
|--------------------|--------------------------|-------------------------|----------------------------------|
| G36 | HPC_LA33_E33_176P_B18 | E33 | MSIO176PB18 |
| G37 | HPC_LA33_D33_176N_B18 | D33 | MSIO176NB18 |
| G38 | GND | | |
| G39 | VCCIO_HPC_VADJ | | |
| G40 | GND | | |
| H1 | N36608719 | | |
| H2 | HPC_PRSNT_M2CL_J7_78N_B3 | J7 | MSIO78NB3/MMUART_0_DCD/GPIO_22_B |
| H3 | GND | | |
| H4 | HPC_CLK0_M2C_AJ6_281P_B8 | AJ6 | MSIO281PB8/GB15/VCCC_SE1_CLKI |
| H5 | HPC_CLK0_M2C_AJ5_281N_B8 | AJ5 | MSIO281NB8 |
| H6 | GND | | |
| H7 | HPC_LA02_K31_179P_B18 | K31 | MSIO179PB18 |
| H8 | HPC_LA02_K30_179N_B18 | K30 | MSIO179NB18 |
| H9 | GND | | |
| H10 | HPC_LA04_L30_182P_B18 | L30 | MSIO182PB18 |
| H11 | HPC_LA04_L29_182N_B18 | L29 | MSIO182NB18 |
| H12 | GND | | |
| H13 | HPC_LA07_P23_192P_B18 | P23 | MSIO192PB18 |
| H14 | HPC_LA07_P24_192N_B18 | P24 | MSIO192NB18 |
| H15 | GND | | |
| H16 | HPC_LA11_T30_210P_B17 | T30 | MSIO210PB17 |
| H17 | HPC_LA11_T29_210N_B17 | T29 | MSIO210NB17 |
| H18 | GND | | |
| H19 | HPC_LA15_M30_188P_B18 | M30 | MSIO188PB18 |
| H20 | HPC_LA15_M29_188N_B18 | M29 | MSIO188NB18 |
| H21 | GND | | |
| H22 | HPC_LA19_P31_199P_B17 | P31 | MSIO199PB17 |
| H23 | HPC_LA19_P30_199N_B17 | P30 | MSIO199NB17 |
| H24 | GND | | |
| H25 | HPC_LA21_P33_203P_B17 | P33 | MSIO203PB17 |

| FMC Pin Number-J30 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin name |
|--------------------|-----------------------|-------------------------|---------------------------------|
| H26 | HPC_LA21_N33_203N_B17 | N33 | MSIO203NB17 |
| H27 | GND | | |
| H28 | HPC_LA24_K33_187P_B18 | K33 | MSIO187PB18 |
| H29 | HPC_LA24_K32_187N_B18 | K32 | MSIO187NB18 |
| H30 | GND | | |
| H31 | HPC_LA28_H33_184P_B18 | H33 | MSIO184PB18 |
| H32 | HPC_LA28_H32_184N_B18 | H32 | MSIO184NB18 |
| H33 | GND | | |
| H34 | HPC_LA30_F34_185P_B18 | F34 | MSIO185PB18 |
| H35 | HPC_LA30_F33_185N_B18 | F33 | MSIO185NB18 |
| H36 | GND | | |
| H37 | HPC_LA32_D34_180P_B18 | D34 | MSIO180PB18 |
| H38 | HPC_LA32_C34_180N_B18 | C34 | MSIO180NB18 |
| H39 | GND | | |
| H40 | VCCIO_HPC_VADJ | | |
| J1 | GND | | |
| J2 | HPC_CLK3_M2C_P | AK12 | MSIOD278PB10/SERDES_2_REFCLK1_P |
| J2 | HPC_CLK3_M2C_P | AE17 | MSIO275PB11/VCCC_SE0_CLKI |
| J3 | HPC_CLK3_M2C_N | AJ12 | MSIOD278NB10/SERDES_2_REFCLK1_N |
| J3 | HPC_CLK3_M2C_N | AF17 | MSIO275NB11 |
| J4 | GND | | |
| J5 | GND | | |
| J6 | HPC_HA03_AA4_12P_B6 | AA4 | MSIO12PB6 |
| J7 | HPC_HA03_AA5_12N_B6 | AA5 | MSIO12NB6 |
| J8 | GND | | |
| J9 | HPC_HA07_AC3_10P_B6 | AC3 | MSIO10PB6 |
| J10 | HPC_HA07_AB3_10N_B6 | AB3 | MSIO10NB6 |
| J11 | GND | | |
| J12 | HPC_HA11_AD3_5P_B6 | AD3 | MSIO5PB6 |
| J13 | HPC_HA11_AD2_5N_B6 | AD2 | MSIO5NB6 |

| FMC Pin Number-J30 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin name |
|--------------------|-------------------------|-------------------------|-----------------------|
| J14 | GND | | |
| J15 | HPC_HA14_AG6_286P_B8 | AG6 | MSIO286PB8 |
| J16 | HPC_HA14_AG5_286N_B8 | AG5 | MSIO286NB8 |
| J17 | GND | | |
| J18 | HPC_HA18_AC9_3P_B6 | AC9 | MSIO3PB6 |
| J19 | HPC_HA18_AC8_3N_B6 | AC8 | MSIO3NB6 |
| J20 | GND | | |
| J21 | HPC_HA22_AA8_13P_B6 | AA8 | MSIO13PB6 |
| J22 | HPC_HA22_AA9_13N_B6 | AA9 | MSIO13NB6 |
| J23 | GND | | |
| J24 | HPC_HB01_R1_32P_B5 | R1 | MSIO32PB5/USB_DATA4_B |
| J25 | HPC_HB01_R2_32N_B5 | R2 | MSIO32NB5/USB_DATA5_B |
| J26 | GND | | |
| J27 | HPC_HB07_Y4_24P_B5 | Y4 | MSIO24PB5 |
| J28 | HPC_HB07_W4_24N_B5 | W4 | MSIO24NB5 |
| J29 | GND | | |
| J30 | HPC_HB11_W6_23P_B5 | W6 | MSIO23PB5 |
| J31 | HPC_HB11_W7_23N_B5 | W7 | MSIO23NB5 |
| J32 | GND | | |
| J33 | HPC_HB15_V9_34P_B5 | V9 | MSIO34PB5 |
| J34 | HPC_HB15_V10_34N_B5 | V10 | MSIO34NB5 |
| J35 | GND | | |
| J36 | HPC_HB18_T2_31P_B5 | T2 | MSIO31PB5/USB_DATA2_B |
| J37 | HPC_HB18_T3_31N_B5 | T3 | MSIO31NB5/USB_DATA3_B |
| J38 | GND | | |
| J39 | VCCIO_HPC_VIO_B_M2C_FMC | | |
| J40 | GND | | |
| K1 | N36626276 | | |
| K2 | GND | | |
| K3 | GND | | |

| FMC Pin Number-J30 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin name |
|--------------------|---------------------------|-------------------------|---------------------------------|
| K4 | HPC_CLK2_M2C_P | AJ20 | MSIOD272PB12/SERDES_1_REFCLK1_P |
| K4 | HPC_CLK2_M2C_P | AF18 | MSIO274PB11/CCC_SW1_CLKI2 |
| K5 | HPC_CLK2_M2C_N | AK20 | MSIOD272NB12/SERDES_1_REFCLK1_N |
| K5 | HPC_CLK2_M2C_N | AG18 | MSIO274NB11/CCC_SW1_CLKI3 |
| K6 | GND | | |
| K7 | HPC_HA02_AB2_16P_B6 | AB2 | MSIO16PB6 |
| K8 | HPC_HA02_AB1_16N_B6 | AB1 | MSIO16NB6 |
| K9 | GND | | |
| K10 | HPC_HA06_AC5_6P_B6 | AC5 | MSIO6PB6 |
| K11 | HPC_HA06_AC4_6N_B6 | AC4 | MSIO6NB6 |
| K12 | GND | | |
| K13 | HPC_HA10_AE6_288P_B8 | AE6 | MSIO288PB8 |
| K14 | HPC_HA10_AF5_288N_B8 | AF5 | MSIO288NB8 |
| K15 | GND | | |
| K16 | HPC_HA17_CC_AJ29_268P_B14 | AJ29 | MSIO268PB14/GB3/CCC_SW0_CLKI3 |
| K17 | HPC_HA17_CC_AJ28_268N_B14 | AJ28 | MSIO268NB14 |
| K18 | GND | | |
| K19 | HPC_HA21_AA12_14P_B6 | AA12 | MSIO14PB6 |
| K20 | HPC_HA21_AA11_14N_B6 | AA11 | MSIO14NB6 |
| K21 | GND | | |
| K22 | HPC_HA23_AB5_7P_B6 | AB5 | MSIO7PB6 |
| K23 | HPC_HA23_AB6_7N_B6 | AB6 | MSIO7NB6 |
| K24 | GND | | |
| K25 | HPC_HB00_CC_F32_172P_B0 | F32 | MSIO172PB0/GB0/CCC_NW0_CLKI3 |
| K26 | HPC_HB00_CC_E32_172N_B0 | E32 | MSIO172NB0 |
| K27 | GND | | |
| K28 | HPC_HB06_CC_J29_170P_B0 | J29 | MSIO170PB0/CCC_NW1_CLKI3 |
| K29 | HPC_HB06_CC_J28_170N_B0 | J28 | MSIO170NB0 |
| K30 | GND | | |
| K31 | HPC_HB10_Y10_22P_B5 | Y10 | MSIO22PB5 |

| FMC Pin Number-J30 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin name |
|--------------------|-------------------------|-------------------------|-----------------------------|
| K32 | HPC_HB10_Y9_22N_B5 | Y9 | MSIO22NB5 |
| K33 | GND | | |
| K34 | HPC_HB14_V6_33P_B5 | V6 | MSIO33PB5/USB_DATA6_B |
| K35 | HPC_HB14_U6_33N_B5 | U6 | MSIO33NB5 |
| K36 | GND | | |
| K37 | HPC_HB17_CC_U5_37P_B5 | U5 | MSIO37PB5/GB9/VCCC_SE0_CLKI |
| K38 | HPC_HB17_CC_T5_37N_B5 | T5 | MSIO37NB5 |
| K39 | GND | | |
| K40 | VCCIO_HPC_VIO_B_M2C_FMC | | |

FMC Connector - J60 Pin Out

The SmartFusion2 MSIODs from Bank 15, 16, and SERFDES3 lane-0 signals are routed to the FMC connector for the application to be developed.

Table 15 • FMC Connector - J60 Pin Out

| FMC Pin Number - J60 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin Name |
|----------------------|---------------------------|-------------------------|--|
| C1 | GND | | |
| C2 | FMC_LPC_SERDES3_TXD0_P | AN8 | SERDES_3_TXD0_P |
| C3 | FMC_LPC_SERDES3_TXD0_N | AP8 | SERDES_3_TXD0_N |
| C4 | GND | | |
| C5 | GND | | |
| C6 | FMC_LPC_SERDES3_RXD0_P | AM9 | SERDES_3_RXD0_P |
| C7 | FMC_LPC_SERDES3_RXD0_N | AL9 | SERDES_3_RXD0_N |
| C8 | GND | | |
| C9 | GND | | |
| C10 | LPC_LA06_AF33_248P_B15 | AF33 | MSIOD248PB15 |
| C11 | LPC_LA06_AE33_248N_B15 | AE33 | MSIOD248NB15 |
| C12 | GND | | |
| C13 | GND | | |
| C14 | LPC_LA10_AE30_250P_B15 | AE30 | MSIOD250PB15 |
| C15 | LPC_LA10_AD30_250N_B15 | AD30 | MSIOD250NB15 |
| C16 | GND | | |
| C17 | GND | | |
| C18 | LPC_LA14_W23_227P_B16 | W23 | MSIOD227PB16 |
| C19 | LPC_LA14_W24_227N_B16 | W24 | MSIOD227NB16 |
| C20 | GND | | |
| C21 | GND | | |
| C22 | LPC_LA18_CC_AA32_228P_B16 | AA32 | MSIOD228PB16 |
| C23 | LPC_LA18_CC_Y32_228N_B16 | Y32 | MSIOD228NB16 |
| C24 | GND | | |
| C25 | GND | | |
| C26 | LPC_LA27_V29_223P_B16 | V29 | MSIOD223PB16 |
| C27 | LPC_LA27_V28_223N_B16 | V28 | MSIOD223NB16 |
| C28 | GND | | |
| C29 | GND | | |
| C30 | I2C1_SCL | T8 | MSIO45NB4/I2C_1_SCL/GPIO_1_A/USB_DATA4_A |
| C31 | I2C1_SDA | T9 | MSIO45PB4/I2C_1_SDA/GPIO_0_A/USB_DATA3_A |
| C32 | GND | | |
| C33 | GND | | |
| C34 | GND | | |
| C35 | 12P0V | - | - |
| C36 | GND | | |

| FMC Pin Number - J60 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin Name |
|-----------------------------|---------------------------|--------------------------------|----------------------------------|
| C37 | 12P0V | - | - |
| C38 | GND | | |
| C39 | 3P3V | - | - |
| C40 | GND | | |
| D1 | LPC_PGC2M_N12_71P_B3 | N12 | MSIO71PB3/MMUART_1_RTS/GPIO_11_B |
| D2 | GND | | |
| D3 | GND | | |
| D4 | FMC_LPC_SERDES3_REFCLK0_P | AJ10 | MSIOD279PB9/SERDES_3_REFCLK0_P |
| D5 | FMC_LPC_SERDES3_REFCLK0_N | AK10 | MSIOD279NB9/SERDES_3_REFCLK0_N |
| D6 | GND | | |
| D7 | GND | | |
| D8 | LPC_LA01_CC_W34_219P_B16 | W34 | MSIOD219PB16/CCC_SW1_CLKI0 |
| D9 | LPC_LA01_CC_V34_219N_B16 | V34 | MSIOD219NB16 |
| D10 | GND | | |
| D11 | LPC_LA05_W29_226P_B16 | W29 | MSIOD226PB16 |
| D12 | LPC_LA05_W30_226N_B16 | W30 | MSIOD226NB16 |
| D13 | GND | | |
| D14 | LPC_LA09_Y28_231P_B16 | Y28 | MSIOD231PB16 |
| D15 | LPC_LA09_W28_231N_B16 | W28 | MSIOD231NB16 |
| D16 | GND | | |
| D17 | LPC_LA13_AC24_258P_B15 | AC24 | MSIOD258PB15 |
| D18 | LPC_LA13_AC23_258N_B15 | AC23 | MSIOD258NB15 |
| D19 | GND | | |
| D20 | LPC_LA17_CC_V23_220P_B16 | V23 | MSIOD220PB16/CCC_SW0_CLKI0 |
| D21 | LPC_LA17_CC_V24_220N_B16 | V24 | MSIOD220NB16 |
| D22 | GND | | |
| D23 | LPC_LA23_AG32_252P_B15 | AG32 | MSIOD252PB15 |
| D24 | LPC_LA23_AF32_252N_B15 | AF32 | MSIOD252NB15 |
| D25 | GND | | |
| D26 | LPC_LA26_V27_222P_B16 | V27 | MSIOD222PB16 |
| D27 | LPC_LA26_V26_222N_B16 | V26 | MSIOD222NB16 |
| D28 | GND | | |
| D29 | LPC_TCK | - | - |
| D30 | LPC_TDI | - | - |
| D31 | LPC_TDO | - | - |
| D32 | 3P3V | - | - |
| D33 | LPC_TMS | - | - |
| D34 | LPC_TRST_L | - | - |
| D35 | GND | | |

| FMC Pin Number - J60 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin Name |
|----------------------|---------------------------|-------------------------|--------------------------------|
| D36 | 3P3V | - | - |
| D37 | GND | | |
| D38 | 3P3V | - | - |
| D39 | GND | | |
| D40 | 3P3V | - | - |
| G1 | GND | | |
| G2 | LPC_CLK1_M2C_U34_217P_B16 | U34 | MSIOD217PB16/GB5/CCC_SW1_CLK11 |
| G3 | LPC_CLK1_M2C_T34_217N_B16 | T34 | MSIOD217NB16 |
| G4 | GND | | |
| G5 | GND | | |
| G6 | LPC_LA00_CC_Y33_224P_B16 | Y33 | MSIOD224PB16 |
| G7 | LPC_LA00_CC_W33_224N_B16 | W33 | MSIOD224NB16 |
| G8 | GND | | |
| G9 | LPC_LA03_AC34_232P_B16 | AC34 | MSIOD232PB16 |
| G10 | LPC_LA03_AB34_232N_B16 | AB34 | MSIOD232NB16 |
| G11 | GND | | |
| G12 | LPC_LA08_AC32_233P_B16 | AC32 | MSIOD233PB16 |
| G13 | LPC_LA08_AC33_233N_B16 | AC33 | MSIOD233NB16 |
| G14 | GND | | |
| G15 | LPC_LA12_W26_229P_B16 | W26 | MSIOD229PB16 |
| G16 | LPC_LA12_W25_229N_B16 | W25 | MSIOD229NB16 |
| G17 | GND | | |
| G18 | LPC_LA16_Y23_234P_B16 | Y23 | MSIOD234PB16 |
| G19 | LPC_LA16_Y24_234N_B16 | Y24 | MSIOD234NB16 |
| G20 | GND | | |
| G21 | LPC_LA20_AF27_257P_B15 | AF27 | MSIOD257PB15 |
| G22 | LPC_LA20_AE27_257N_B15 | AE27 | MSIOD257NB15 |
| G23 | GND | | |
| G24 | LPC_LA22_AG34_244P_B15 | AG34 | MSIOD244PB15 |
| G25 | LPC_LA22_AF34_244N_B15 | AF34 | MSIOD244NB15 |
| G26 | GND | | |
| G27 | LPC_LA25_AH33_255P_B15 | AH33 | MSIOD255PB15 |
| G28 | LPC_LA25_AH34_255N_B15 | AH34 | MSIOD255NB15 |
| G29 | GND | | |
| G30 | LPC_LA29_AC27_245P_B15 | AC27 | MSIOD245PB15 |
| G31 | LPC_LA29_AB27_245N_B15 | AB27 | MSIOD245NB15 |
| G32 | GND | | |
| G33 | LPC_LA31_AB24_251P_B15 | AB24 | MSIOD251PB15 |
| G34 | LPC_LA31_AB23_251N_B15 | AB23 | MSIOD251NB15 |

| FMC Pin Number - J60 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin Name |
|----------------------|---------------------------|-------------------------|----------------------------------|
| G35 | GND | | |
| G36 | LPC_LA33_AD24_261P_B15 | AD24 | MSIOD261PB15 |
| G37 | LPC_LA33_AD25_261N_B15 | AD25 | MSIOD261NB15 |
| G38 | GND | | |
| G39 | VCCIO_LPC_VADJ | - | - |
| G40 | GND | | |
| H1 | N36478604 | - | - |
| H2 | LPC_PRSNTM2CL_N11_71N_B3 | N11 | MSIO71NB3/MMUART_1_DTR/GPIO_12_B |
| H3 | GND | | |
| H4 | LPC_CLK0_M2C_V32_218P_B16 | V32 | MSIOD218PB16/GB1/CCC_SW0_CLKI1 |
| H5 | LPC_CLK0_M2C_V33_218N_B16 | V33 | MSIOD218NB16 |
| H6 | GND | | |
| H7 | LPC_LA02_AA33_225P_B16 | AA33 | MSIOD225PB16 |
| H8 | LPC_LA02_AA34_225N_B16 | AA34 | MSIOD225NB16 |
| H9 | GND | | |
| H10 | LPC_LA04_AD33_239P_B16 | AD33 | MSIOD239PB16 |
| H11 | LPC_LA04_AD34_239N_B16 | AD34 | MSIOD239NB16 |
| H12 | GND | | |
| H13 | LPC_LA07_AE31_247P_B15 | AE31 | MSIOD247PB15 |
| H14 | LPC_LA07_AE32_247N_B15 | AE32 | MSIOD247NB15 |
| H15 | GND | | |
| H16 | LPC_LA11_AF30_254P_B15 | AF30 | MSIOD254PB15 |
| H17 | LPC_LA11_AG31_254N_B15 | AG31 | MSIOD254NB15 |
| H18 | GND | | |
| H19 | LPC_LA15_AF28_256P_B15 | AF28 | MSIOD256PB15 |
| H20 | LPC_LA15_AE28_256N_B15 | AE28 | MSIOD256NB15 |
| H21 | GND | | |
| H22 | LPC_LA19_AG30_260P_B15 | AG30 | MSIOD260PB15 |
| H23 | LPC_LA19_AF29_260N_B15 | AF29 | MSIOD260NB15 |
| H24 | GND | | |
| H25 | LPC_LA21_W31_221P_B16 | W31 | MSIOD221PB16 |
| H26 | LPC_LA21_V31_221N_B16 | V31 | MSIOD221NB16 |
| H27 | GND | | |
| H28 | LPC_LA24_AD28_249P_B15 | AD28 | MSIOD249PB15 |
| H29 | LPC_LA24_AD29_249N_B15 | AD29 | MSIOD249NB15 |
| H30 | GND | | |
| H31 | LPC_LA28_AB25_246P_B15 | AB25 | MSIOD246PB15 |
| H32 | LPC_LA28_AB26_246N_B15 | AB26 | MSIOD246NB15 |
| H33 | GND | | |

| FMC Pin Number - J60 | FMC Net Name | SmartFusion2 Pin Number | SmartFusion2 Pin Name |
|----------------------|------------------------|-------------------------|-----------------------|
| H34 | LPC_LA30_AC25_253P_B15 | AC25 | MSIOD253PB15 |
| H35 | LPC_LA30_AC26_253N_B15 | AC26 | MSIOD253NB15 |
| H36 | GND | | |
| H37 | LPC_LA32_AE26_259P_B15 | AE26 | MSIOD259PB15 |
| H38 | LPC_LA32_AD26_259N_B15 | AD26 | MSIOD259NB15 |
| H39 | GND | | |
| H40 | VCCIO_LPC_VADJ | - | - |

4 – Pin List

Pin List

Table 17 lists the SmartFusion2 M2S150TS-1FCG1152 device pins.

Table 16 · Pin List

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|----------------------------|
| A2 | DDRIO82PB2/MDDR_ADDR14 |
| A3 | DDRIO86NB2/MDDR_ADDR7 |
| A4 | VSS |
| A5 | DDRIO88NB2/MDDR_ADDR4 |
| A6 | DDRIO87PB2/MDDR_ADDR5 |
| A7 | VSS |
| A8 | DDRIO97PB2/MDDR_DQ28 |
| A9 | VSS |
| A10 | DDRIO101PB2/MDDR_DQ24 |
| A11 | VSS |
| A12 | DDRIO112PB2/MDDR_DQ10 |
| A13 | VSS |
| A14 | DDRIO115PB2/MDDR_DQ5 |
| A15 | VSS |
| A16 | DDRIO119PB2/MDDR_DQ0 |
| A17 | VSS |
| A18 | DDRIO126NB1/FDDR_ADDR15 |
| A19 | DDRIO130PB1/FDDR_ODT |
| A20 | VSS |
| A21 | DDRIO140PB1/FDDR_DQ30 |
| A22 | VSS |
| A23 | DDRIO141PB1/FDDR_DQ28 |
| A24 | VSS |
| A25 | DDRIO147PB1/FDDR_DQ21 |
| A26 | VSS |
| A27 | DDRIO148PB1/FDDR_DM_RDQS2 |
| A28 | VSS |
| A29 | DDRIO162PB1/FDDR_DQ2 |
| A30 | VSS |
| A31 | DDRIO164PB1/FDDR_DQ_ECC1 |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|----------------------------|
| A32 | VSS |
| A33 | DDRIO165PB1/FDDR_DQ_ECC3 |
| AA1 | VSS |
| AA2 | MSIO17NB6 |
| AA3 | MSIO17PB6 |
| AA4 | MSIO12PB6 |
| AA5 | MSIO12NB6 |
| AA6 | VDDI6 |
| AA7 | MSIO15PB6 |
| AA8 | MSIO13PB6 |
| AA9 | MSIO13NB6 |
| AA10 | MSIO11NB6 |
| AA11 | MSIO14NB6 |
| AA12 | MSIO14PB6 |
| AA13 | VDDI6 |
| AA14 | VSS |
| AA15 | VPP |
| AA16 | VSS |
| AA17 | VPP |
| AA18 | VSS |
| AA19 | VPP |
| AA20 | VSS |
| AA21 | CCC_SW1_PLL_VSSA |
| AA22 | CCC_SW0_PLL_VSSA |
| AA23 | CCC_SW0_PLL_VDDA |
| AA24 | VSS |
| AA25 | MSIOD241PB16 |
| AA26 | VDDI16 |
| AA27 | MSIOD238PB16 |
| AA28 | MSIOD238NB16 |
| AA29 | MSIOD237PB16 |
| AA30 | MSIOD237NB16 |
| AA31 | VSS |
| AA32 | MSIOD228PB16 |
| AA33 | MSIOD225PB16 |
| AA34 | MSIOD225NB16 |
| AB1 | MSIO16NB6 |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|----------------------------|
| AB2 | MSIO16PB6 |
| AB3 | MSIO10NB6 |
| AB4 | VSS |
| AB5 | MSIO7PB6 |
| AB6 | MSIO7NB6 |
| AB7 | MSIO8NB6 |
| AB8 | MSIO8PB6 |
| AB9 | VDDI6 |
| AB10 | MSIO11PB6 |
| AB11 | CCC_SE1_PLL_VDDA |
| AB12 | CCC_SE0_PLL_VDDA |
| AB13 | CCC_SE0_PLL_VSSA |
| AB14 | SERDES_3_VDD |
| AB15 | VSS |
| AB16 | SERDES_2_VDD |
| AB17 | VSS |
| AB18 | SERDES_1_VDD |
| AB19 | VSS |
| AB20 | SERDES_0_VDD |
| AB21 | VSS |
| AB22 | VDDI15 |
| AB23 | MSIOD251NB15 |
| AB24 | MSIOD251PB15 |
| AB25 | MSIOD246PB15 |
| AB26 | MSIOD246NB15 |
| AB27 | MSIOD245NB15 |
| AB28 | VSS |
| AB29 | MSIOD242PB16 |
| AB30 | MSIOD242NB16 |
| AB31 | MSIOD236PB16 |
| AB32 | MSIOD236NB16 |
| AB33 | VDDI16 |
| AB34 | MSIOD232NB16 |
| AC1 | MSIO9NB6 |
| AC2 | VDDI6 |
| AC3 | MSIO10PB6 |
| AC4 | MSIO6NB6 |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|----------------------------|
| AC5 | MSIO6PB6 |
| AC6 | FLASH_GOLDEN_N |
| AC7 | VSS |
| AC8 | MSIO3NB6 |
| AC9 | MSIO3PB6 |
| AC10 | SC_SPI_SS |
| AC11 | SC_SPI_SDO |
| AC12 | CCC_SE1_PLL_VSSA |
| AC13 | SERDES_3_VDD |
| AC14 | VSS |
| AC15 | SERDES_2_VDD |
| AC16 | VSS |
| AC17 | VDD |
| AC18 | VSS |
| AC19 | SERDES_1_VDD |
| AC20 | VSS |
| AC21 | SERDES_0_VDD |
| AC22 | VSS |
| AC23 | MSIOD258NB15 |
| AC24 | MSIOD258PB15 |
| AC25 | MSIOD253PB15 |
| AC26 | MSIOD253NB15 |
| AC27 | MSIOD245PB15 |
| AC28 | MSIOD243PB16 |
| AC29 | MSIOD243NB16 |
| AC30 | VDDI16 |
| AC31 | MSIOD240NB16 |
| AC32 | MSIOD233PB16 |
| AC33 | MSIOD233NB16 |
| AC34 | MSIOD232PB16 |
| AD1 | MSIO9PB6 |
| AD2 | MSIO5NB6 |
| AD3 | MSIO5PB6 |
| AD4 | MSIO4NB6 |
| AD5 | VDDI6 |
| AD6 | VDDI8 |
| AD7 | MSIO289NB8 |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|----------------------------|
| AD8 | SC_SPI_SDI |
| AD9 | SC_SPI_CLK |
| AD10 | VSS |
| AD11 | VSS |
| AD12 | SERDES_3_L23_VDDAIO |
| AD13 | VSS |
| AD14 | SERDES_2_L23_VDDAIO |
| AD15 | VSS |
| AD16 | SERDES_2_L01_VDDAIO |
| AD17 | VSS |
| AD18 | SERDES_1_L23_VDDAIO |
| AD19 | VSS |
| AD20 | SERDES_1_L01_VDDAIO |
| AD21 | VSS |
| AD22 | SERDES_0_L01_VDDAIO |
| AD23 | VSS |
| AD24 | MSIOD261PB15 |
| AD25 | MSIOD261NB15 |
| AD26 | MSIOD259NB15 |
| AD27 | VDDI15 |
| AD28 | MSIOD249PB15 |
| AD29 | MSIOD249NB15 |
| AD30 | MSIOD250NB15 |
| AD31 | MSIOD240PB16 |
| AD32 | VSS |
| AD33 | MSIOD239PB16 |
| AD34 | MSIOD239NB16 |
| AE1 | JTAG_TDI/M3_TDI |
| AE2 | JTAG_TMS/M3_TMS/M3_SWDIO |
| AE3 | VSS |
| AE4 | MSIO4PB6 |
| AE5 | DEVRST_N |
| AE6 | MSIO288PB8 |
| AE7 | MSIO289PB8 |
| AE8 | VSS |
| AE9 | VSS |
| AE10 | VSS |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|----------------------------|
| AE11 | SERDES_3_L23_VDDAIO |
| AE12 | VSS |
| AE13 | SERDES_3_L01_VDDAIO |
| AE14 | VSS |
| AE15 | SERDES_2_L01_VDDAIO |
| AE16 | VSS |
| AE17 | MSIO275PB11/CCC_SE0_CLKI2 |
| AE18 | VSS |
| AE19 | SERDES_1_L23_VDDAIO |
| AE20 | VSS |
| AE21 | SERDES_0_L23_VDDAIO |
| AE22 | VSS |
| AE23 | SERDES_0_L01_VDDAIO |
| AE24 | VSS |
| AE25 | VSS |
| AE26 | MSIOD259PB15 |
| AE27 | MSIOD257NB15 |
| AE28 | MSIOD256NB15 |
| AE29 | VSS |
| AE30 | MSIOD250PB15 |
| AE31 | MSIOD247PB15 |
| AE32 | MSIOD247NB15 |
| AE33 | MSIOD248NB15 |
| AE34 | VDDI15 |
| AF1 | VDDI7 |
| AF2 | JTAG_TDO/M3_TDO/M3_SWO |
| AF3 | JTAG_TCK/M3_TCK |
| AF4 | VSS |
| AF5 | MSIO288NB8 |
| AF6 | VSS |
| AF7 | MSIO284NB8 |
| AF8 | VSS |
| AF9 | SERDES_3_PLL_VSSA |
| AF10 | SERDES_3_PLL_VDDA |
| AF11 | VSS |
| AF12 | SERDES_3_L01_VDDAIO |
| AF13 | VSS |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|--------------------------------|
| AF14 | SERDES_2_L23_VDDAIO |
| AF15 | VSS |
| AF16 | MSIO276PB11/GB11/CCC_SE0_CLKI3 |
| AF17 | MSIO275NB11 |
| AF18 | MSIO274PB11/GB7/CCC_SW1_CLKI2 |
| AF19 | VSS |
| AF20 | SERDES_1_L01_VDDAIO |
| AF21 | VSS |
| AF22 | SERDES_0_L23_VDDAIO |
| AF23 | VSS |
| AF24 | SERDES_0_L01_VDDAPLL |
| AF25 | SERDES_0_L01_REFRET |
| AF26 | VSS |
| AF27 | MSIOD257PB15 |
| AF28 | MSIOD256PB15 |
| AF29 | MSIOD260NB15 |
| AF30 | MSIOD254PB15 |
| AF31 | VDDI15 |
| AF32 | MSIOD252NB15 |
| AF33 | MSIOD248PB15 |
| AF34 | MSIOD244NB15 |
| AG1 | JTAG_TRSTB/M3_TRSTB |
| AG2 | JTAGSEL |
| AG3 | MSIO287PB8 |
| AG4 | MSIO287NB8 |
| AG5 | MSIO286NB8 |
| AG6 | MSIO286PB8 |
| AG7 | MSIO284PB8 |
| AG8 | VSS |
| AG9 | SERDES_3_L23_REXT |
| AG10 | SERDES_3_L23_VDDAPLL |
| AG11 | SERDES_3_L01_VDDAPLL |
| AG12 | VSS |
| AG13 | SERDES_2_PLL_VSSA |
| AG14 | VSS |
| AG15 | SERDES_2_L23_VDDAPLL |
| AG16 | MSIO276NB11 |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|----------------------------|
| AG17 | VDDI11 |
| AG18 | MSIO274NB11/CCC_SW1_CLKI3 |
| AG19 | SERDES_1_L23_VDDAPLL |
| AG20 | VSS |
| AG21 | SERDES_1_L01_VDDAPLL |
| AG22 | VSS |
| AG23 | SERDES_0_L23_VDDAPLL |
| AG24 | SERDES_0_L23_REFRET |
| AG25 | SERDES_0_L01_REXT |
| AG26 | VSS |
| AG27 | MSIO267NB14 |
| AG28 | MSIO263NB14 |
| AG29 | MSIO263PB14 |
| AG30 | MSIOD260PB15 |
| AG31 | MSIOD254NB15 |
| AG32 | MSIOD252PB15 |
| AG33 | VSS |
| AG34 | MSIOD244PB15 |
| AH1 | XTLOSC_AUX_EXTAL |
| AH2 | VSS |
| AH3 | MSIO285NB8 |
| AH4 | VDDI8 |
| AH5 | MSIO283NB8 |
| AH6 | MSIO283PB8 |
| AH7 | VDDI8 |
| AH8 | VSS |
| AH9 | SERDES_3_L23_REFRET |
| AH10 | SERDES_3_L01_REXT |
| AH11 | SERDES_3_L01_REFRET |
| AH12 | SERDES_2_PLL_VDDA |
| AH13 | SERDES_2_L23_REXT |
| AH14 | SERDES_2_L23_REFRET |
| AH15 | SERDES_2_L01_VDDAPLL |
| AH16 | SERDES_2_L01_REXT |
| AH17 | MSIO273PB11/PROBE_A |
| AH18 | SERDES_1_PLL_VSSA |
| AH19 | SERDES_1_L23_REXT |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|---------------------------------|
| AH20 | SERDES_1_L23_REFRET |
| AH21 | SERDES_1_L01_REFRET |
| AH22 | SERDES_1_L01_REXT |
| AH23 | SERDES_0_PLL_VSSA |
| AH24 | SERDES_0_PLL_VDDA |
| AH25 | SERDES_0_L23_REXT |
| AH26 | VSS |
| AH27 | VDDI14 |
| AH28 | MSIO267PB14/CCC_SW0_CLKI2 |
| AH29 | MSIO266PB14 |
| AH30 | MSIO265NB14 |
| AH31 | MSIO265PB14 |
| AH32 | MSIO264PB14 |
| AH33 | MSIOD255PB15 |
| AH34 | MSIOD255NB15 |
| AJ1 | XTLOSC_AUX_XTAL |
| AJ2 | MSIO285PB8 |
| AJ3 | MSIO282NB8 |
| AJ4 | MSIO282PB8/CCC_SE1_CLKI3 |
| AJ5 | MSIO281NB8 |
| AJ6 | MSIO281PB8/GB15/CCC_SE1_CLKI2 |
| AJ7 | VSS |
| AJ8 | MSIOD280PB9/SERDES_3_REFCLK1_P |
| AJ9 | VDDI9 |
| AJ10 | MSIOD279PB9/SERDES_3_REFCLK0_P |
| AJ11 | VSS |
| AJ12 | MSIOD278NB10/SERDES_2_REFCLK1_N |
| AJ13 | VDDI10 |
| AJ14 | MSIOD277NB10/SERDES_2_REFCLK0_N |
| AJ15 | VSS |
| AJ16 | SERDES_2_L01_REFRET |
| AJ17 | MSIO273NB11/PROBE_B |
| AJ18 | SERDES_1_PLL_VDDA |
| AJ19 | VSS |
| AJ20 | MSIOD272PB12/SERDES_1_REFCLK1_P |
| AJ21 | VDDI12 |
| AJ22 | MSIOD271PB12/SERDES_1_REFCLK0_P |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|---------------------------------|
| AJ23 | VSS |
| AJ24 | MSIOD270PB13/SERDES_0_REFCLK1_P |
| AJ25 | VDDI13 |
| AJ26 | MSIOD269PB13/SERDES_0_REFCLK0_P |
| AJ27 | VSS |
| AJ28 | MSIO268NB14 |
| AJ29 | MSIO268PB14/GB3/CCC_SW0_CLKI3 |
| AJ30 | MSIO266NB14 |
| AJ31 | VDDI14 |
| AJ32 | MSIO264NB14 |
| AJ33 | MSIO262NB14 |
| AJ34 | MSIO262PB14 |
| AK1 | XTLOSC_MAIN_EXTAL |
| AK2 | VSS |
| AK3 | VSS |
| AK4 | VSS |
| AK5 | VSS |
| AK6 | VSS |
| AK7 | VSS |
| AK8 | MSIOD280NB9/SERDES_3_REFCLK1_N |
| AK9 | VSS |
| AK10 | MSIOD279NB9/SERDES_3_REFCLK0_N |
| AK11 | VSS |
| AK12 | MSIOD278PB10/SERDES_2_REFCLK1_P |
| AK13 | VSS |
| AK14 | MSIOD277PB10/SERDES_2_REFCLK0_P |
| AK15 | VSS |
| AK16 | VSS |
| AK17 | VSS |
| AK18 | VSS |
| AK19 | VSS |
| AK20 | MSIOD272NB12/SERDES_1_REFCLK1_N |
| AK21 | VSS |
| AK22 | MSIOD271NB12/SERDES_1_REFCLK0_N |
| AK23 | VSS |
| AK24 | MSIOD270NB13/SERDES_0_REFCLK1_N |
| AK25 | VSS |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|---------------------------------|
| AK26 | MSIOD269NB13/SERDES_0_REFCLK0_N |
| AK27 | VSS |
| AK28 | VSS |
| AK29 | VSS |
| AK30 | VSS |
| AK31 | VSS |
| AK32 | VSS |
| AK33 | VSS |
| AK34 | VSS |
| AL1 | XTLOSC_MAIN_XTAL |
| AL2 | VSS |
| AL3 | SERDES_3_RXD3_N |
| AL4 | VSS |
| AL5 | SERDES_3_RXD2_N |
| AL6 | VSS |
| AL7 | SERDES_3_RXD1_N |
| AL8 | VSS |
| AL9 | SERDES_3_RXD0_N |
| AL10 | VSS |
| AL11 | SERDES_2_RXD3_N |
| AL12 | VSS |
| AL13 | SERDES_2_RXD2_N |
| AL14 | VSS |
| AL15 | SERDES_2_RXD1_N |
| AL16 | VSS |
| AL17 | SERDES_2_RXD0_N |
| AL18 | VSS |
| AL19 | SERDES_1_RXD3_P |
| AL20 | VSS |
| AL21 | SERDES_1_RXD2_P |
| AL22 | VSS |
| AL23 | SERDES_1_RXD1_P |
| AL24 | VSS |
| AL25 | SERDES_1_RXD0_P |
| AL26 | VSS |
| AL27 | SERDES_0_RXD3_P |
| AL28 | VSS |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|----------------------------|
| AL29 | SERDES_0_RXD2_P |
| AL30 | VSS |
| AL31 | SERDES_0_RXD1_P |
| AL32 | VSS |
| AL33 | SERDES_0_RXD0_P |
| AL34 | VSS |
| AM1 | VSS |
| AM2 | VSS |
| AM3 | SERDES_3_RXD3_P |
| AM4 | VSS |
| AM5 | SERDES_3_RXD2_P |
| AM6 | VSS |
| AM7 | SERDES_3_RXD1_P |
| AM8 | VSS |
| AM9 | SERDES_3_RXD0_P |
| AM10 | VSS |
| AM11 | SERDES_2_RXD3_P |
| AM12 | VSS |
| AM13 | SERDES_2_RXD2_P |
| AM14 | VSS |
| AM15 | SERDES_2_RXD1_P |
| AM16 | VSS |
| AM17 | SERDES_2_RXD0_P |
| AM18 | VSS |
| AM19 | SERDES_1_RXD3_N |
| AM20 | VSS |
| AM21 | SERDES_1_RXD2_N |
| AM22 | VSS |
| AM23 | SERDES_1_RXD1_N |
| AM24 | VSS |
| AM25 | SERDES_1_RXD0_N |
| AM26 | VSS |
| AM27 | SERDES_0_RXD3_N |
| AM28 | VSS |
| AM29 | SERDES_0_RXD2_N |
| AM30 | VSS |
| AM31 | SERDES_0_RXD1_N |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|----------------------------|
| AM32 | VSS |
| AM33 | SERDES_0_RXD0_N |
| AM34 | VSS |
| AN1 | VSS |
| AN2 | SERDES_3_TXD3_P |
| AN3 | VSS |
| AN4 | SERDES_3_TXD2_P |
| AN5 | VSS |
| AN6 | SERDES_3_TXD1_P |
| AN7 | VSS |
| AN8 | SERDES_3_TXD0_P |
| AN9 | VSS |
| AN10 | SERDES_2_TXD3_P |
| AN11 | VSS |
| AN12 | SERDES_2_TXD2_P |
| AN13 | VSS |
| AN14 | SERDES_2_TXD1_P |
| AN15 | VSS |
| AN16 | SERDES_2_TXD0_P |
| AN17 | VSS |
| AN18 | SERDES_1_TXD3_N |
| AN19 | VSS |
| AN20 | SERDES_1_TXD2_N |
| AN21 | VSS |
| AN22 | SERDES_1_TXD1_N |
| AN23 | VSS |
| AN24 | SERDES_1_TXD0_N |
| AN25 | VSS |
| AN26 | SERDES_0_TXD3_N |
| AN27 | VSS |
| AN28 | SERDES_0_TXD2_N |
| AN29 | VSS |
| AN30 | SERDES_0_TXD1_N |
| AN31 | VSS |
| AN32 | SERDES_0_TXD0_N |
| AN33 | VSS |
| AN34 | VSS |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|----------------------------|
| AP2 | SERDES_3_TXD3_N |
| AP3 | VSS |
| AP4 | SERDES_3_TXD2_N |
| AP5 | VSS |
| AP6 | SERDES_3_TXD1_N |
| AP7 | VSS |
| AP8 | SERDES_3_TXD0_N |
| AP9 | VSS |
| AP10 | SERDES_2_TXD3_N |
| AP11 | VSS |
| AP12 | SERDES_2_TXD2_N |
| AP13 | VSS |
| AP14 | SERDES_2_TXD1_N |
| AP15 | VSS |
| AP16 | SERDES_2_TXD0_N |
| AP17 | VSS |
| AP18 | SERDES_1_TXD3_P |
| AP19 | VSS |
| AP20 | SERDES_1_TXD2_P |
| AP21 | VSS |
| AP22 | SERDES_1_TXD1_P |
| AP23 | VSS |
| AP24 | SERDES_1_TXD0_P |
| AP25 | VSS |
| AP26 | SERDES_0_TXD3_P |
| AP27 | VSS |
| AP28 | SERDES_0_TXD2_P |
| AP29 | VSS |
| AP30 | SERDES_0_TXD1_P |
| AP31 | VSS |
| AP32 | SERDES_0_TXD0_P |
| AP33 | VSS |
| B1 | VSS |
| B2 | DDRIO82NB2/MDDR_ADDR15 |
| B3 | DDRIO86PB2/MDDR_ODT |
| B4 | DDRIO88PB2/MDDR_ADDR3 |
| B5 | DDRIO87NB2/MDDR_ADDR6 |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|----------------------------|
| B6 | DDRIO89PB2/MDDR_ADDR1 |
| B7 | VDDI2 |
| B8 | DDRIO97NB2/MDDR_DQ29 |
| B9 | VDDI2 |
| B10 | DDRIO101NB2/MDDR_DQ25 |
| B11 | VDDI2 |
| B12 | DDRIO112NB2/MDDR_DQ11 |
| B13 | VDDI2 |
| B14 | DDRIO115NB2/MDDR_DQ6 |
| B15 | VDDI2 |
| B16 | DDRIO119NB2/MDDR_DQ1 |
| B17 | VDDI2 |
| B18 | DDRIO126PB1/FDDR_ADDR14 |
| B19 | DDRIO130NB1/FDDR_ADDR7 |
| B20 | VDDI1 |
| B21 | DDRIO140NB1/FDDR_DQ31 |
| B22 | VDDI1 |
| B23 | DDRIO141NB1/FDDR_DQ29 |
| B24 | VDDI1 |
| B25 | DDRIO147NB1/FDDR_DQ22 |
| B26 | VDDI1 |
| B27 | DDRIO148NB1/FDDR_DQ20 |
| B28 | VDDI1 |
| B29 | DDRIO162NB1/FDDR_DQ3 |
| B30 | VDDI1 |
| B31 | DDRIO164NB1/FDDR_DQ_ECC0 |
| B32 | VDDI1 |
| B33 | DDRIO165NB1/FDDR_DQ_ECC2 |
| B34 | VSS |
| C1 | DDRIO84NB2/MDDR_ADDR11 |
| C2 | DDRIO84PB2/MDDR_ADDR10 |
| C3 | VDDI2 |
| C4 | DDRIO83NB2/MDDR_ADDR13 |
| C5 | DDRIO92PB2/MDDR_CLK |
| C6 | DDRIO89NB2/MDDR_ADDR2 |
| C7 | DDRIO96PB2/MDDR_DQ30 |
| C8 | DDRIO99NB2/MDDR_DQS3_N |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|----------------------------|
| C9 | DDRIO99PB2/MDDR_DQS3 |
| C10 | DDRIO100PB2/MDDR_DQ26 |
| C11 | DDRIO111NB2/MDDR_DQS1_N |
| C12 | DDRIO111PB2/MDDR_DQS1 |
| C13 | DDRIO113PB2/MDDR_DQ8 |
| C14 | DDRIO117NB2/MDDR_DQS0_N |
| C15 | DDRIO117PB2/MDDR_DQS0 |
| C16 | DDRIO118PB2/MDDR_DQ2 |
| C17 | DDRIO121PB2/MDDR_DQ_ECC3 |
| C18 | VDDI1 |
| C19 | DDRIO131NB1/FDDR_ADDR6 |
| C20 | DDRIO134NB1/FDDR_ADDR0 |
| C21 | DDRIO143NB1/FDDR_DQS3_N |
| C22 | DDRIO143PB1/FDDR_DQS3 |
| C23 | DDRIO144NB1/FDDR_DQ27 |
| C24 | DDRIO144PB1/FDDR_DQ26 |
| C25 | DDRIO146PB1/FDDR_DQ23 |
| C26 | DDRIO149NB1/FDDR_DQS2_N |
| C27 | DDRIO151NB1/FDDR_DQ17 |
| C28 | DDRIO151PB1/FDDR_DQ16 |
| C29 | DDRIO161NB1/FDDR_DQS0_N |
| C30 | DDRIO161PB1/FDDR_DQS0 |
| C31 | DDRIO167NB1/FDDR_DQS_ECC_N |
| C32 | DDRIO167PB1/FDDR_DQS_ECC |
| C33 | FDDR_IMP_CALIB |
| C34 | MSIO180NB18 |
| D1 | MSIO62NB3/USB_NXT_D |
| D2 | DDRIO85NB2/MDDR_ADDR9 |
| D3 | DDRIO85PB2/MDDR_ADDR8 |
| D4 | DDRIO83PB2/MDDR_ADDR12 |
| D5 | DDRIO92NB2/MDDR_CLK_N |
| D6 | VSS |
| D7 | DDRIO96NB2/MDDR_DQ31 |
| D8 | VSS |
| D9 | DDRIO100NB2/MDDR_DQ27 |
| D10 | VSS |
| D11 | DDRIO109PB2/MDDR_DQ12 |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|--|
| D12 | VSS |
| D13 | DDRIO113NB2/MDDR_DQ9 |
| D14 | VSS |
| D15 | DDRIO118NB2/MDDR_DQ3 |
| D16 | VSS |
| D17 | DDRIO121NB2/MDDR_DQ_ECC2 |
| D18 | DDRIO127PB1/FDDR_ADDR12 |
| D19 | DDRIO131PB1/FDDR_ADDR5 |
| D20 | DDRIO134PB1/FDDR_BA2 |
| D21 | VSS |
| D22 | DDRIO145PB1/FDDR_DQ24 |
| D23 | VSS |
| D24 | DDRIO146NB1/FDDR_TMATCH_1_OUT |
| D25 | VSS |
| D26 | DDRIO149PB1/FDDR_QS2 |
| D27 | VSS |
| D28 | DDRIO159PB1/FDDR_DQ5 |
| D29 | VSS |
| D30 | DDRIO163NB1/FDDR_DQ1 |
| D31 | VSS |
| D32 | DDRIO169NB1 |
| D33 | MSIO176NB18 |
| D34 | MSIO180PB18 |
| E1 | MSIO62PB3/USB_STP_D |
| E2 | MSIO74PB3/USB_XCLK_C |
| E3 | MSIO74NB3/MMUART_1_TXD/GPIO_24_B/USB_DATA2_C |
| E4 | VSS |
| E5 | DDRIO91PB2/MDDR_BA0 |
| E6 | DDRIO90NB2/MDDR_ADDR0 |
| E7 | DDRIO95PB2/MDDR_RAS_N |
| E8 | VDDI2 |
| E9 | DDRIO98PB2/MDDR_TMATCH_1_IN |
| E10 | VDDI2 |
| E11 | DDRIO109NB2/MDDR_DQ13 |
| E12 | VDDI2 |
| E13 | DDRIO114NB2/MDDR_TMATCH_0_OUT |
| E14 | VDDI2 |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|---|
| E15 | DDRIO116NB2/MDDR_DQ4 |
| E16 | VDDI2 |
| E17 | DDRIO123NB2/MDDR_DQS_ECC_N |
| E18 | DDRIO127NB1/FDDR_ADDR13 |
| E19 | VSS |
| E20 | DDRIO136PB1/FDDR_CLK |
| E21 | VDDI1 |
| E22 | DDRIO145NB1/FDDR_DQ25 |
| E23 | VDDI1 |
| E24 | DDRIO142PB1/FDDR_TMATCH_1_IN |
| E25 | VDDI1 |
| E26 | DDRIO150NB1/FDDR_DQ19 |
| E27 | VDDI1 |
| E28 | DDRIO159NB1/FDDR_DQ6 |
| E29 | VDDI1 |
| E30 | DDRIO163PB1/FDDR_DQ0 |
| E31 | DDRIO169PB1/FDDR_TMATCH_ECC_OUT |
| E32 | MSIO172NB0 |
| E33 | MSIO176PB18 |
| E34 | VDDI18 |
| F1 | VDDI3 |
| F2 | MSIO73PB3/MMUART_1_RI/GPIO_15_B |
| F3 | MSIO73NB3/MMUART_1_DCD/GPIO_16_B |
| F4 | MSIO79PB3 |
| F5 | DDRIO91NB2/MDDR_BA1 |
| F6 | DDRIO90PB2/MDDR_BA2 |
| F7 | DDRIO95NB2/MDDR_WE_N |
| F8 | DDRIO98NB2/MDDR_DM_RDQS3 |
| F9 | DDRIO102NB2/MDDR_TMATCH_1_OUT |
| F10 | DDRIO108NB2/MDDR_DQ15 |
| F11 | DDRIO108PB2/MDDR_DQ14 |
| F12 | DDRIO110NB2/MDDR_DM_RDQS1 |
| F13 | DDRIO110PB2/MDDR_TMATCH_0_IN |
| F14 | DDRIO114PB2/MDDR_DQ7 |
| F15 | DDRIO116PB2/MDDR_DM_RDQS0 |
| F16 | DDRIO120PB2/MDDR_DQ_ECC1/GB12/CCC_NE1_CLKI2 |
| F17 | DDRIO123PB2/MDDR_DQS_ECC |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|--|
| F18 | DDRIO128NB1/FDDR_ADDR11 |
| F19 | DDRIO132NB1/FDDR_ADDR4 |
| F20 | DDRIO136NB1/FDDR_CLK_N |
| F21 | DDRIO137NB1/FDDR_CAS_N |
| F22 | DDRIO137PB1/FDDR_RESET_N |
| F23 | DDRIO155PB1/FDDR_DQS1 |
| F24 | DDRIO142NB1/FDDR_DM_RDQS3 |
| F25 | DDRIO152PB1/FDDR_DQ14 |
| F26 | DDRIO150PB1/FDDR_DQ18 |
| F27 | DDRIO158NB1/FDDR_TMATCH_0_OUT |
| F28 | DDRIO158PB1/FDDR_DQ7 |
| F29 | DDRIO160NB1/FDDR_DQ4 |
| F30 | DDRIO166NB1/FDDR_DM_RDQS_ECC |
| F31 | DDRIO166PB1/FDDR_TMATCH_ECC_IN |
| F32 | MSIO172PB0/GB0/CCC_NW0_CLKI3 |
| F33 | MSIO185NB18 |
| F34 | MSIO185PB18 |
| G1 | MSIO61NB3/USB_DIR_D |
| G2 | MSIO69PB3/GPIO_7_B |
| G3 | MSIO69NB3/GPIO_8_B |
| G4 | VDDI3 |
| G5 | MSIO79NB3/MMUART_0_TXD/GPIO_27_B/USB_DIR_C |
| G6 | VDDI2 |
| G7 | DDRIO93NB2/MDDR_CAS_N |
| G8 | DDRIO93PB2/MDDR_RESET_N |
| G9 | VSS |
| G10 | DDRIO102PB2/MDDR_DQ23 |
| G11 | VSS |
| G12 | DDRIO105PB2/MDDR_DQS2 |
| G13 | VSS |
| G14 | DDRIO107PB2/MDDR_DQ16 |
| G15 | VSS |
| G16 | DDRIO120NB2/MDDR_DQ_ECC0/CCC_NE1_CLKI3 |
| G17 | VSS |
| G18 | DDRIO129NB1/FDDR_ADDR9 |
| G19 | DDRIO128PB1/FDDR_ADDR10 |
| G20 | DDRIO132PB1/FDDR_ADDR3 |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|--|
| G21 | DDRIO135PB1/FDDR_BA0 |
| G22 | VSS |
| G23 | DDRIO155NB1/FDDR_DQS1_N |
| G24 | VSS |
| G25 | DDRIO152NB1/FDDR_DQ15 |
| G26 | VSS |
| G27 | DDRIO154PB1/FDDR_TMATCH_0_IN |
| G28 | VSS |
| G29 | DDRIO160PB1/FDDR_DM_RDQS0 |
| G30 | MSIO171PB0/GB4/CCC_NW1_CLKI2 |
| G31 | MSIO175NB0 |
| G32 | VDDI0 |
| G33 | VSS |
| G34 | MSIO196NB18 |
| H1 | MSIO61PB3/USB_XCLK_D |
| H2 | VSS |
| H3 | MSIO70PB3/GPIO_9_B |
| H4 | MSIO70NB3/GPIO_10_B |
| H5 | MSIO77PB3/MMUART_0_CTS/GPIO_19_B/USB_DATA7_C |
| H6 | MSIO77NB3/MMUART_0_DSR/GPIO_20_B |
| H7 | MSIO80PB3/MMUART_0_RXD/GPIO_28_B/USB_STP_C |
| H8 | DDRIO94PB2/MDDR_CKE |
| H9 | VDDI2 |
| H10 | DDRIO103PB2/MDDR_DQ21 |
| H11 | VDDI2 |
| H12 | DDRIO105NB2/MDDR_DQS2_N |
| H13 | VDDI2 |
| H14 | DDRIO107NB2/MDDR_DQ17 |
| H15 | VDDI2 |
| H16 | DDRIO122PB2/MDDR_TMATCH_ECC_IN |
| H17 | VDDI2 |
| H18 | DDRIO129PB1/FDDR_ADDR8 |
| H19 | VSS |
| H20 | DDRIO135NB1/FDDR_BA1 |
| H21 | DDRIO138NB1/FDDR_CS_N |
| H22 | VDDI1 |
| H23 | DDRIO157NB1/FDDR_DQ9 |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|--|
| H24 | VDDI1 |
| H25 | DDRIO156NB1/FDDR_DQ11 |
| H26 | VDDI1 |
| H27 | DDRIO154NB1/FDDR_DM_RDQS1 |
| H28 | VDDI1 |
| H29 | MSIO171NB0 |
| H30 | VSS |
| H31 | MSIO175PB0 |
| H32 | MSIO184NB18 |
| H33 | MSIO184PB18 |
| H34 | MSIO196PB18 |
| J1 | MSIO56PB4/SPI_0_SS3/GPIO_10_A/USB_DATA7_A |
| J2 | MSIO56NB4/SPI_1_SS1/GPIO_14_A |
| J3 | MSIO65PB3/USB_DATA4_D |
| J4 | MSIO65NB3/USB_DATA5_D |
| J5 | VSS |
| J6 | MSIO78PB3/MMUART_0_RI/GPIO_21_B |
| J7 | MSIO78NB3/MMUART_0_DCD/GPIO_22_B |
| J8 | MSIO80NB3/MMUART_0_CLK/GPIO_29_B/USB_NXT_C |
| J9 | DDRIO94NB2/MDDR_CS_N |
| J10 | DDRIO103NB2/MDDR_DQ22 |
| J11 | DDRIO104NB2/MDDR_DQ20 |
| J12 | DDRIO104PB2/MDDR_DM_RDQS2 |
| J13 | DDRIO106NB2/MDDR_DQ19 |
| J14 | DDRIO106PB2/MDDR_DQ18 |
| J15 | DDRIO122NB2/MDDR_DM_RDQS_ECC |
| J16 | DDRIO125PB2/MDDR_TMATCH_ECC_OUT |
| J17 | DDRIO124NB2/GB8/CCC_NE0_CLKI3 |
| J18 | DDRIO124PB2/CCC_NE0_CLKI2 |
| J19 | DDRIO133NB1/FDDR_ADDR2 |
| J20 | DDRIO139PB1/FDDR_RAS_N |
| J21 | DDRIO138PB1/FDDR_CKE |
| J22 | DDRIO153NB1/FDDR_DQ13 |
| J23 | DDRIO153PB1/FDDR_DQ12 |
| J24 | DDRIO157PB1/FDDR_DQ8 |
| J25 | DDRIO156PB1/FDDR_DQ10 |
| J26 | DDRIO168NB1 |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|---|
| J27 | DDRIO168PB1 |
| J28 | MSIO170NB0 |
| J29 | MSIO170PB0/CCC_NW1_CLKI3 |
| J30 | MSIO177NB18 |
| J31 | MSIO177PB18 |
| J32 | VDDI18 |
| J33 | MSIO194NB18 |
| J34 | MSIO194PB18 |
| K1 | MSIO47PB4/SPI_0_SDO/GPIO_6_A/USB_STP_A |
| K2 | MSIO47NB4/SPI_0_SS0/GPIO_7_A/USB_NXT_A |
| K3 | VDDI4 |
| K4 | MSIO66PB3/USB_DATA6_D |
| K5 | MSIO66NB3/USB_DATA7_D/GPIO_23_B |
| K6 | MSIO72PB3/GPIO_13_B/MMUART_1_CTS |
| K7 | MSIO72NB3/MMUART_1_DSR/GPIO_14_B |
| K8 | VSS |
| K9 | MSIO81PB3/I2C_0_SDA/GPIO_30_B/USB_DATA0_C |
| K10 | MSIO81NB3/I2C_0_SCL/GPIO_31_B/USB_DATA1_C |
| K11 | MSS_MDDR_PLL_VSSA |
| K12 | MSS_MDDR_PLL_VDDA |
| K13 | VSS |
| K14 | VDDI2 |
| K15 | MDDR_IMP_CALIB |
| K16 | VSS |
| K17 | DDRIO125NB2 |
| K18 | VSS |
| K19 | DDRIO133PB1/FDDR_ADDR1 |
| K20 | DDRIO139NB1/FDDR_WE_N |
| K21 | VSS |
| K22 | VDDI1 |
| K23 | FDDR_PLL_VDDA |
| K24 | FDDR_PLL_VSSA |
| K25 | VSS |
| K26 | VDDI0 |
| K27 | MSIO173PB0/CCC_NW0_CLKI2 |
| K28 | MSIO173NB0 |
| K29 | VDDI18 |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|--|
| K30 | MSIO179NB18 |
| K31 | MSIO179PB18 |
| K32 | MSIO187NB18 |
| K33 | MSIO187PB18 |
| K34 | VSS |
| L1 | VSS |
| L2 | MSIO51PB4/SPI_1_SDO/GPIO_12_A |
| L3 | MSIO51NB4/SPI_1_SS0/GPIO_13_A |
| L4 | MSIO59PB4/GPIO_31_A |
| L5 | MSIO59NB4/GPIO_0_B |
| L6 | VDDI3 |
| L7 | MSIO68PB3/GPIO_5_B |
| L8 | MSIO68NB3/GPIO_6_B |
| L9 | MSIO75PB3/MMUART_1_CLK/GPIO_25_B/USB_DATA4_C |
| L10 | MSIO75NB3/MMUART_1_RXD/GPIO_26_B/USB_DATA3_C |
| L11 | VSS |
| L12 | CCC_NE0_PLL_VSSA |
| L13 | CCC_NE0_PLL_VDDA |
| L14 | VSS |
| L15 | VDDI2 |
| L16 | VSS |
| L17 | VDDI2 |
| L18 | VSS |
| L19 | VDDI1 |
| L20 | VSS |
| L21 | VDDI1 |
| L22 | VSS |
| L23 | CCC_NW0_PLL_VSSA |
| L24 | CCC_NW0_PLL_VDDA |
| L25 | MSIO174PB0 |
| L26 | MSIO174NB0 |
| L27 | MSIO178NB18 |
| L28 | MSIO178PB18 |
| L29 | MSIO182NB18 |
| L30 | MSIO182PB18 |
| L31 | VSS |
| L32 | MSIO190NB18 |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|--|
| L33 | MSIO190PB18 |
| L34 | MSIO197NB17 |
| M1 | MSIO40NB4 |
| M2 | MSIO48PB4/SPI_0_SS4/GPIO_19_A |
| M3 | MSIO48NB4/SPI_0_SS5/GPIO_20_A |
| M4 | VSS |
| M5 | MSIO55NB4/SPI_0_SS2/GPIO_9_A/USB_DATA6_A |
| M6 | MSIO60PB4/GPIO_1_B |
| M7 | MSIO60NB4/GPIO_2_B |
| M8 | MSIO63NB3/USB_DATA1_D |
| M9 | VDDI3 |
| M10 | MSIO76PB3/MMUART_0_RTS/GPIO_17_B/USB_DATA5_C |
| M11 | MSIO76NB3/MMUART_0_DTR/GPIO_18_B/USB_DATA6_C |
| M12 | CCC_NE1_PLL_VSSA |
| M13 | CCC_NE1_PLL_VDDA |
| M14 | VDDI2 |
| M15 | VSS |
| M16 | VDDI2 |
| M17 | VSS |
| M18 | VDDI1 |
| M19 | VSS |
| M20 | VDDI1 |
| M21 | VSS |
| M22 | CCC_NW1_PLL_VSSA |
| M23 | CCC_NW1_PLL_VDDA |
| M24 | MSIO181NB18 |
| M25 | MSIO181PB18 |
| M26 | MSIO183NB18 |
| M27 | MSIO183PB18 |
| M28 | VSS |
| M29 | MSIO188NB18 |
| M30 | MSIO188PB18 |
| M31 | MSIO191NB18 |
| M32 | MSIO191PB18 |
| M33 | VDDI17 |
| M34 | MSIO197PB17 |
| N1 | MSIO40PB4/CCC_NE1_CLKI1 |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|--|
| N2 | VDDI4 |
| N3 | MSIO49NB4/SPI_0_SS7/GPIO_22_A |
| N4 | MSIO49PB4/SPI_0_SS6/GPIO_21_A |
| N5 | MSIO55PB4/SPI_0_SS1/GPIO_8_A/USB_DATA5_A |
| N6 | MSIO53NB4/SPI_1_SS7/GPIO_24_A |
| N7 | VSS |
| N8 | MSIO63PB3/USB_DATA0_D |
| N9 | MSIO67PB3/GPIO_3_B |
| N10 | MSIO67NB3/GPIO_4_B |
| N11 | MSIO71NB3/MMUART_1_DTR/GPIO_12_B |
| N12 | MSIO71PB3/MMUART_1_RTS/GPIO_11_B |
| N13 | VDDI3 |
| N14 | VREF2 |
| N15 | VDDI2 |
| N16 | VREF2 |
| N17 | VREF2 |
| N18 | VREF1 |
| N19 | VDDI1 |
| N20 | VREF1 |
| N21 | VDDI1 |
| N22 | VREF1 |
| N23 | MSIO186PB18 |
| N24 | MSIO186NB18 |
| N25 | VSS |
| N26 | MSIO189NB18 |
| N27 | MSIO189PB18 |
| N28 | MSIO193NB18 |
| N29 | MSIO193PB18 |
| N30 | VDDI18 |
| N31 | MSIO201NB17 |
| N32 | MSIO201PB17 |
| N33 | MSIO203NB17 |
| N34 | MSIO208NB17 |
| P1 | MSIO39PB4/CCC_NE0_CLKI1 |
| P2 | MSIO39NB4 |
| P3 | MSIO43PB4 |
| P4 | MSIO43NB4/CAN_TX/GPIO_2_A/USB_DATA0_A |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|--|
| P5 | VDDI4 |
| P6 | MSIO53PB4/SPI_1_SS6/GPIO_23_A |
| P7 | MSIO52NB4/SPI_1_SS5/GPIO_18_A |
| P8 | MSIO58PB4/GPIO_29_A |
| P9 | MSIO58NB4/GPIO_30_A |
| P10 | VSS |
| P11 | MSIO64NB3/USB_DATA3_D |
| P12 | MSIO64PB3/USB_DATA2_D |
| P13 | VSS |
| P14 | VDD |
| P15 | VSS |
| P16 | VDD |
| P17 | VSS |
| P18 | VDD |
| P19 | VSS |
| P20 | VDD |
| P21 | VSS |
| P22 | VDDI18 |
| P23 | MSIO192PB18 |
| P24 | MSIO192NB18 |
| P25 | MSIO195NB18 |
| P26 | MSIO195PB18 |
| P27 | VDDI18 |
| P28 | MSIO198NB17 |
| P29 | MSIO198PB17 |
| P30 | MSIO199NB17 |
| P31 | MSIO199PB17 |
| P32 | VSS |
| P33 | MSIO203PB17 |
| P34 | MSIO208PB17 |
| R1 | MSIO32PB5/USB_DATA4_B |
| R2 | MSIO32NB5/USB_DATA5_B |
| R3 | VSS |
| R4 | MSIO38NB5 |
| R5 | MSIO44PB4/CAN_RX/GPIO_3_A/USB_DATA1_A |
| R6 | MSIO44NB4/CAN_TX_EN_N/GPIO_4_A/USB_DATA2_A |
| R7 | MSIO52PB4/SPI_1_SS4/GPIO_17_A |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|--|
| R8 | VDDI4 |
| R9 | MSIO54PB4/GPIO_25_A |
| R10 | MSIO54NB4/GPIO_26_A |
| R11 | MSIO57NB4/SPI_1_SS3/GPIO_16_A |
| R12 | MSIO57PB4/SPI_1_SS2/GPIO_15_A |
| R13 | VDDI4 |
| R14 | VSS |
| R15 | VDD |
| R16 | VSS |
| R17 | VDD |
| R18 | VSS |
| R19 | VDD |
| R20 | VSS |
| R21 | VDD |
| R22 | VSS |
| R23 | MSIO200PB17 |
| R24 | MSIO200NB17 |
| R25 | MSIO202NB17 |
| R26 | MSIO202PB17 |
| R27 | MSIO204NB17 |
| R28 | MSIO204PB17 |
| R29 | VSS |
| R30 | MSIO205NB17 |
| R31 | MSIO205PB17 |
| R32 | MSIO207NB17 |
| R33 | MSIO207PB17 |
| R34 | VDDI17 |
| T1 | VDDI5 |
| T2 | MSIO31PB5/USB_DATA2_B |
| T3 | MSIO31NB5/USB_DATA3_B |
| T4 | MSIO38PB5/GB13/CCC_SE1_CLKI0 |
| T5 | MSIO37NB5 |
| T6 | VSS |
| T7 | MSIO41NB4 |
| T8 | MSIO45NB4/I2C_1_SCL/GPIO_1_A/USB_DATA4_A |
| T9 | MSIO45PB4/I2C_1_SDA/GPIO_0_A/USB_DATA3_A |
| T10 | MSIO50NB4/SPI_1_SDI/GPIO_11_A |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|--|
| T11 | MSIO50PB4/SPI_1_CLK |
| T12 | MSIO46NB4/SPI_0_SDI/GPIO_5_A/USB_DIR_A |
| T13 | VSS |
| T14 | VPP |
| T15 | VSS |
| T16 | VDD |
| T17 | VSS |
| T18 | VDD |
| T19 | VSS |
| T20 | VDD |
| T21 | VSS |
| T22 | VDDI17 |
| T23 | MSIO206PB17 |
| T24 | MSIO206NB17 |
| T25 | MSIO211NB17 |
| T26 | VSS |
| T27 | MSIO209NB17 |
| T28 | MSIO209PB17 |
| T29 | MSIO210NB17 |
| T30 | MSIO210PB17 |
| T31 | VDDI17 |
| T32 | MSIO212NB17 |
| T33 | MSIO212PB17 |
| T34 | MSIOD217NB16 |
| U1 | MSIO26NB5/GPIO_28_A |
| U2 | MSIO29PB5/USB_STP_B |
| U3 | MSIO29NB5/USB_NXT_B |
| U4 | VDDI5 |
| U5 | MSIO37PB5/GB9/CCC_SE0_CLKI0 |
| U6 | MSIO33NB5 |
| U7 | MSIO41PB4/GB10/CCC_SE0_CLKI1 |
| U8 | MSIO36NB5 |
| U9 | VSS |
| U10 | MSIO42PB4/GB14/CCC_SE1_CLKI1 |
| U11 | MSIO42NB4 |
| U12 | MSIO46PB4/SPI_0_CLK/USB_XCLK_A |
| U13 | VDDI4 |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|--------------------------------|
| U14 | VSS |
| U15 | VDD |
| U16 | VSS |
| U17 | VDD |
| U18 | VSS |
| U19 | VDD |
| U20 | VSS |
| U21 | VDD |
| U22 | VSS |
| U23 | MSIO214PB17/GB2/CCC_NW0_CLKI1 |
| U24 | MSIO214NB17 |
| U25 | MSIO211PB17 |
| U26 | MSIO216NB17 |
| U27 | MSIO216PB17/CCC_NW0_CLKI0 |
| U28 | VDDI17 |
| U29 | MSIO215PB17/CCC_NW1_CLKI0 |
| U30 | MSIO215NB17 |
| U31 | MSIO213PB17/GB6/CCC_NW1_CLKI1 |
| U32 | MSIO213NB17 |
| U33 | VSS |
| U34 | MSIOD217PB16/GB5/CCC_SW1_CLKI1 |
| V1 | MSIO26PB5/GPIO_27_A |
| V2 | VSS |
| V3 | MSIO25NB5 |
| V4 | MSIO30PB5/USB_DATA0_B |
| V5 | MSIO30NB5/USB_DATA1_B |
| V6 | MSIO33PB5/USB_DATA6_B |
| V7 | VDDI5 |
| V8 | MSIO36PB5/CCC_NE1_CLKI0 |
| V9 | MSIO34PB5 |
| V10 | MSIO34NB5 |
| V11 | MSIO35NB5 |
| V12 | MSIO35PB5/CCC_NE0_CLKI0 |
| V13 | VSS |
| V14 | VPP |
| V15 | VSS |
| V16 | VDD |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|--------------------------------|
| V17 | VSS |
| V18 | VDD |
| V19 | VSS |
| V20 | VDD |
| V21 | VSS |
| V22 | VDDI16 |
| V23 | MSIOD220PB16/CCC_SW0_CLKI0 |
| V24 | MSIOD220NB16 |
| V25 | VDDI16 |
| V26 | MSIOD222NB16 |
| V27 | MSIOD222PB16 |
| V28 | MSIOD223NB16 |
| V29 | MSIOD223PB16 |
| V30 | VSS |
| V31 | MSIOD221NB16 |
| V32 | MSIOD218PB16/GB1/CCC_SW0_CLKI1 |
| V33 | MSIOD218NB16 |
| V34 | MSIOD219NB16 |
| W1 | MSIO20PB5 |
| W2 | MSIO20NB5 |
| W3 | MSIO25PB5 |
| W4 | MSIO24NB5 |
| W5 | VSS |
| W6 | MSIO23PB5 |
| W7 | MSIO23NB5 |
| W8 | MSIO27PB5 |
| W9 | MSIO27NB5/USB_DATA7_B |
| W10 | VDDI5 |
| W11 | MSIO28NB5/USB_DIR_B |
| W12 | MSIO28PB5/USB_XCLK_B |
| W13 | VDDI5 |
| W14 | VSS |
| W15 | VDD |
| W16 | VSS |
| W17 | VDD |
| W18 | VSS |
| W19 | VDD |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|----------------------------|
| W20 | VSS |
| W21 | VDD |
| W22 | VSS |
| W23 | MSIOD227PB16 |
| W24 | MSIOD227NB16 |
| W25 | MSIOD229NB16 |
| W26 | MSIOD229PB16 |
| W27 | VSS |
| W28 | MSIOD231NB16 |
| W29 | MSIOD226PB16 |
| W30 | MSIOD226NB16 |
| W31 | MSIOD221PB16 |
| W32 | VDDI16 |
| W33 | MSIOD224NB16 |
| W34 | MSIOD219PB16/CCC_SW1_CLKI0 |
| Y1 | MSIO19NB5 |
| Y2 | MSIO19PB5 |
| Y3 | VDDI5 |
| Y4 | MSIO24PB5 |
| Y5 | MSIO18NB5 |
| Y6 | MSIO18PB5 |
| Y7 | MSIO15NB6 |
| Y8 | VSS |
| Y9 | MSIO22NB5 |
| Y10 | MSIO22PB5 |
| Y11 | MSIO21NB5 |
| Y12 | MSIO21PB5 |
| Y13 | VSS |
| Y14 | VDD |
| Y15 | VSS |
| Y16 | VDD |
| Y17 | VSS |
| Y18 | VDD |
| Y19 | VSS |
| Y20 | VDD |
| Y21 | VSS |
| Y22 | CCC_SW1_PLL_VDDA |

| Package Pin | M2S150TS-1FCG1152 Pin Name |
|-------------|----------------------------|
| Y23 | MSIOD234PB16 |
| Y24 | MSIOD234NB16 |
| Y25 | MSIOD241NB16 |
| Y26 | MSIOD235PB16 |
| Y27 | MSIOD235NB16 |
| Y28 | MSIOD231PB16 |
| Y29 | VDDI16 |
| Y30 | MSIOD230PB16 |
| Y31 | MSIOD230NB16 |
| Y32 | MSIOD228NB16 |
| Y33 | MSIOD224PB16 |
| Y34 | VSS |

5 – Placement of the Board Components

Figure 20 and Figure 21 show the SmartFusion2 Advanced Development Kit components placement for the top and bottom sides.

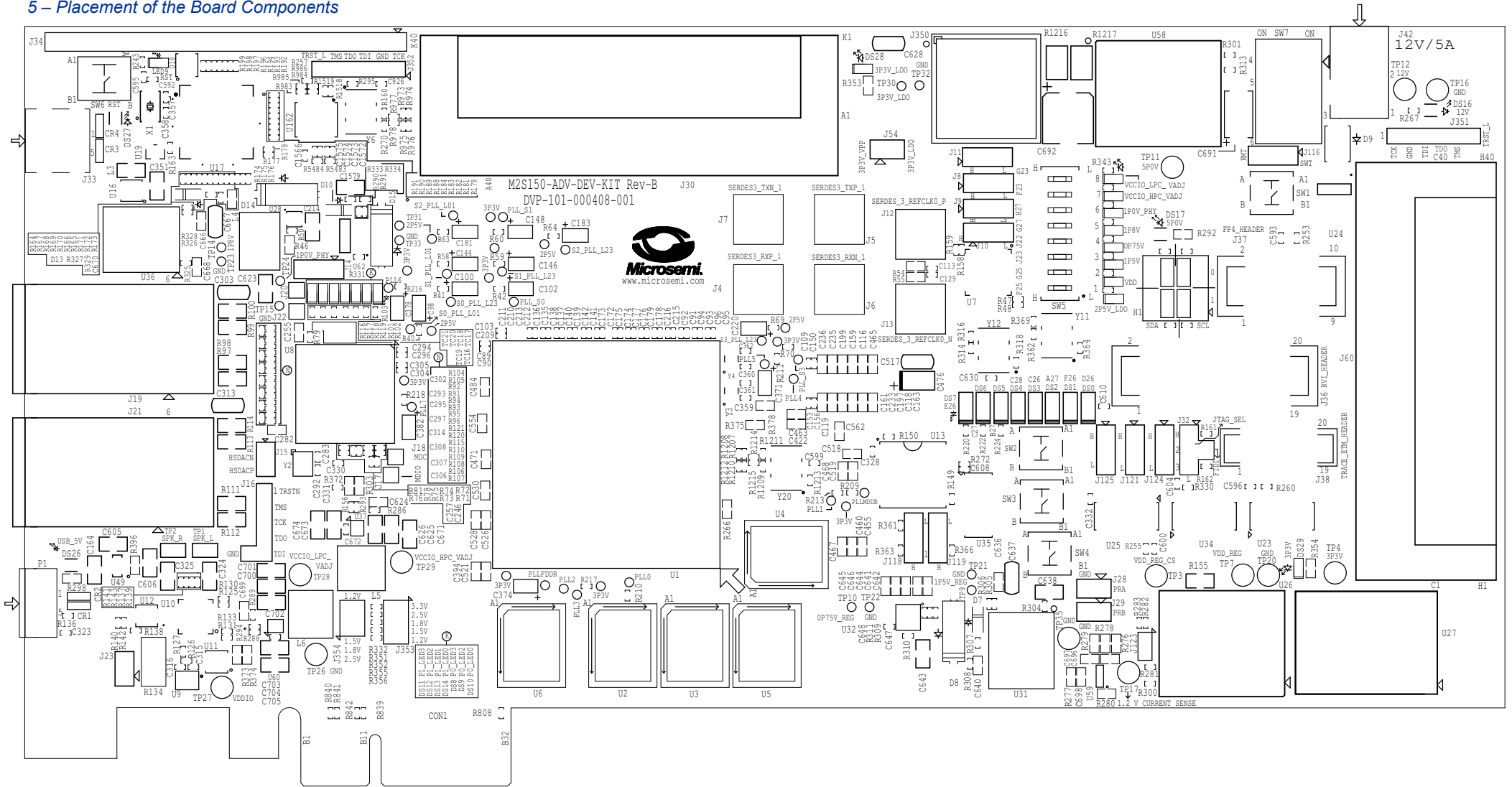


Figure 20 · SmartFusion2 Advanced Development Kit Board Silkscreen Top View

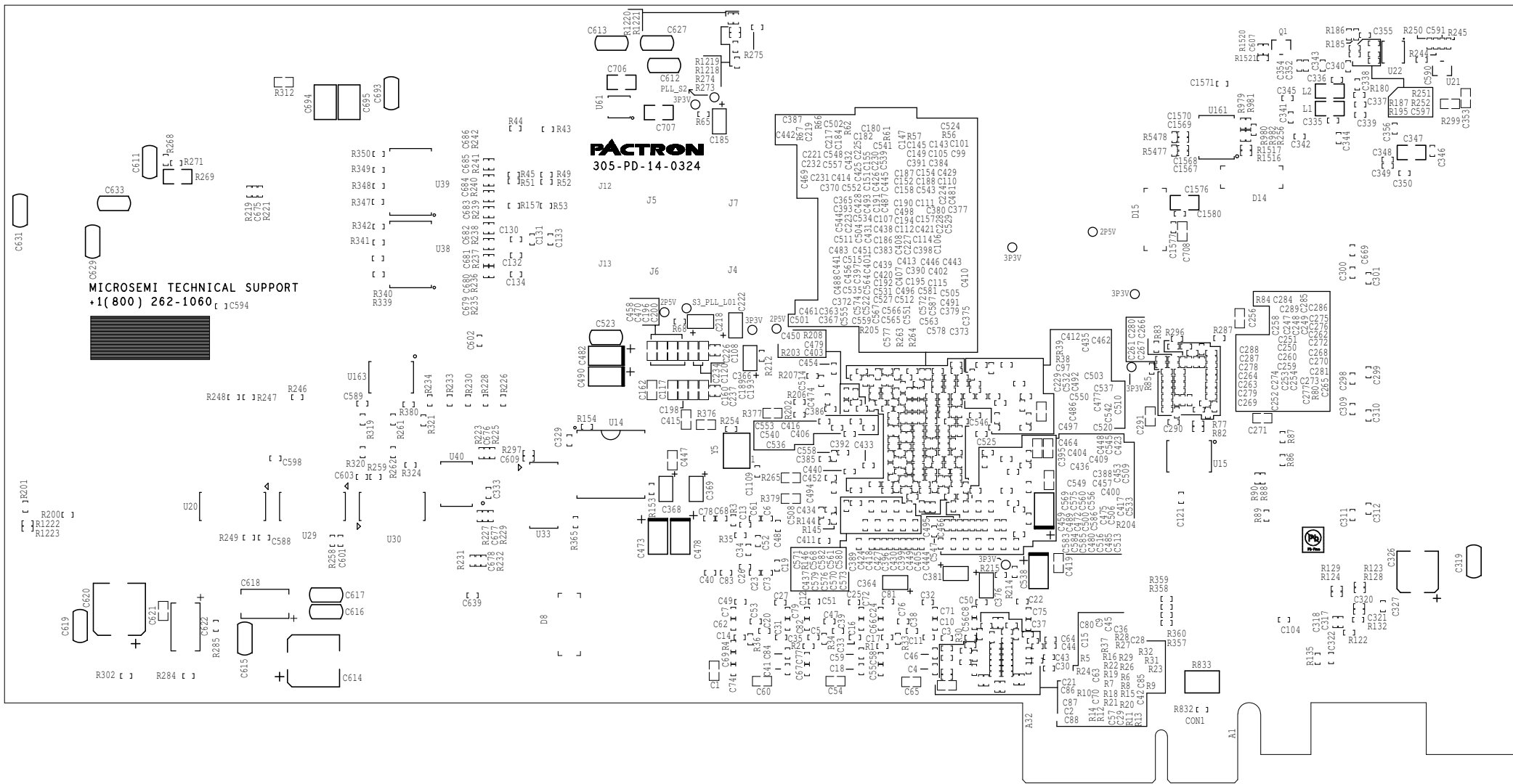


Figure 21 - SmartFusion2 Advanced Development Kit Silkscreen Bottom View

6 – Demo Design

M2S150-ADV-DEV-KIT Board Demo Design

The SmartFusion2 M2S150-ADV-DEV-KIT comes with a preloaded demo design. This demo design demonstrates PCIe interface of the SmartFusion2 device.

For more information on running the demo design, refer to the [SmartFusion2 SoC FPGA PCIe Control Plane Demo Guide for Advanced Development Kit](#).

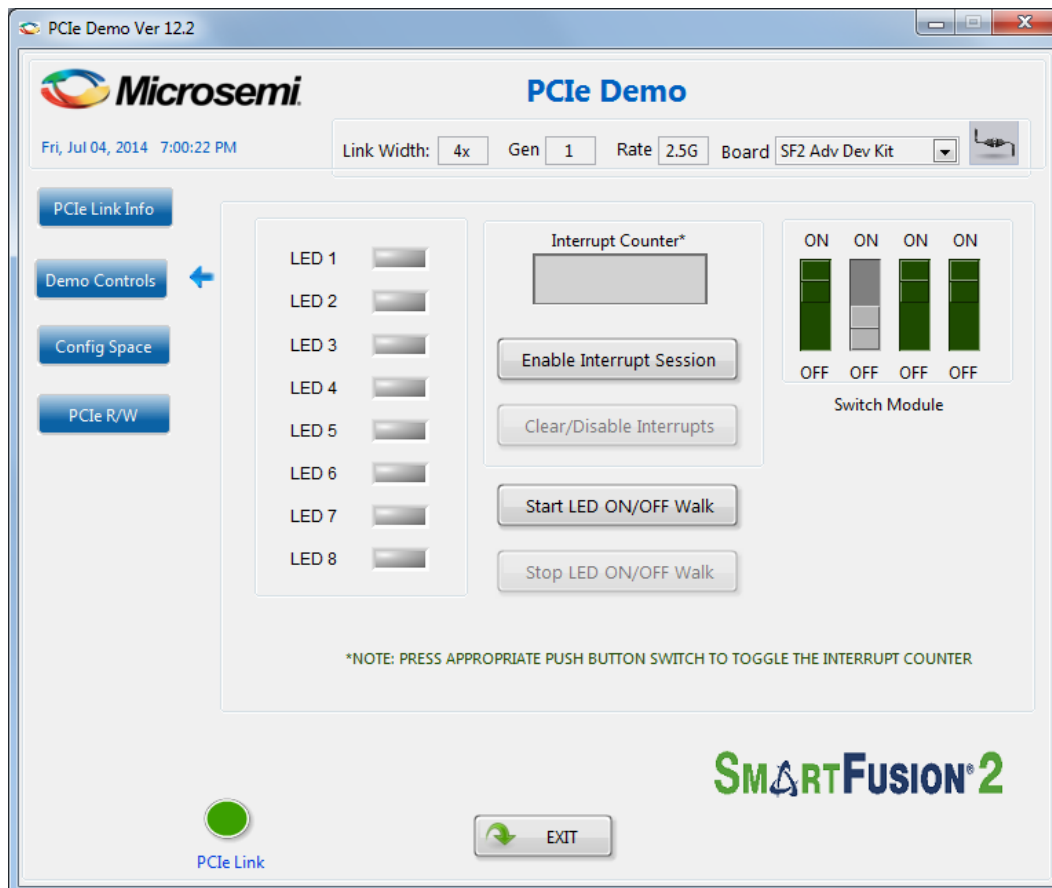


Figure 22 - PCIe Demo Design Window

7 – Manufacturing Test

The SmartFusion2 M2S150-ADV-DEV-KIT device contains a manufacturing test program that can be run to verify the functionality of the board. This program contains a list of options that can be run as diagnostics. After setting up the Tera Term and the board is powered up, the tests are displayed, refer to [Figure 29](#). From the list of options, any test(s) can be selected to verify the functionality.

Note: For more information on manufacturing the test procedures, associated files, and updated information, refer to [//link to be provided//](#)

Before testing the SmartFusion2 Advanced Development Kit board:

- Download `SEC_KIT_MTD_top.stp` file from http://www.microsemi.com/document-portal/doc_download/134344-smartfusion2-advanced-development-kit-mtd
- Download and install the FTD drivers from: <http://www.ftdichip.com/Drivers/D2XX.htm>

M2S150-ADV-DEV-KIT Power and Programming Test

Power Supply Validation

The following steps describe how to test and validate the power supply to the board:

1. Connect the following jumpers on the SmartFusion2 Advanced Development Kit board:
 - J116 short pin 1-2
 - J123 short pin 2-3
 - J353 short pin 1-2
 - J354 short pin 1-2
 - J54 short pin 1-2

Note: Before making the jumper connections, switch off the power supply switch, **SW7**.

2. Connect the **12V/5 Amps** power supply brick to the **J42** jumper.
3. Switch **ON** the **SW7** power supply switch.

FPGA Programming

M2S150-ADV-DEV-KIT has an embedded FlashPro5 programmer on the board. It does not require external programmer to program the device. The board can also be programmed using FlashPro4. To program the board using FlashPro4, connect the FlashPro4 header to J37 and change the J124 jumper position to pin 2-3.

Programming the Device using Embedded FlashPro5

FlashPro 11.4 must be installed in the Host PC to program the device using embedded FlashPro5.

The following steps describe how to program the device using embedded FlashPro5:

1. Connect the following jumpers on the SmartFusion2 Advanced Development Kit board:
 - Short Jumper J124 to 1-2 position.
 - Short Jumper J121 to 1-2 position.
 - Short Jumper J32 to 1-2 position.
2. Connect USB cable (mini USB to Type A USB cable) to J33 and other end of the cable to the USB port of the Host PC.
3. Open the FlashPro v11.4 software.

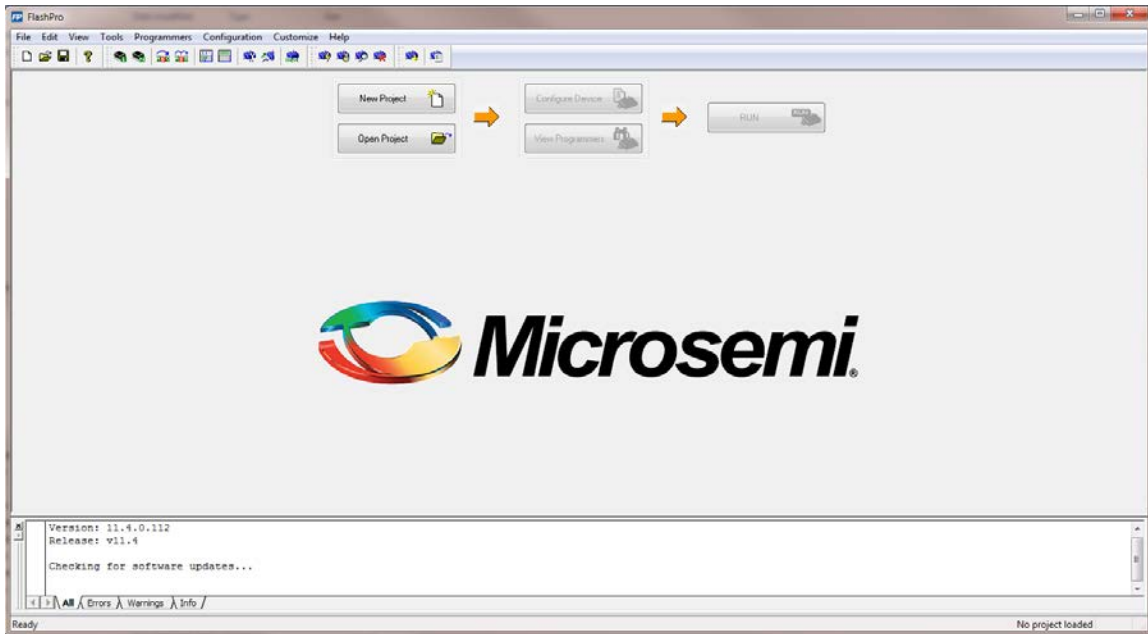


Figure 23 · FlashPro Window

4. Click **New Project** to create a new project. Refer to [Figure 24](#).

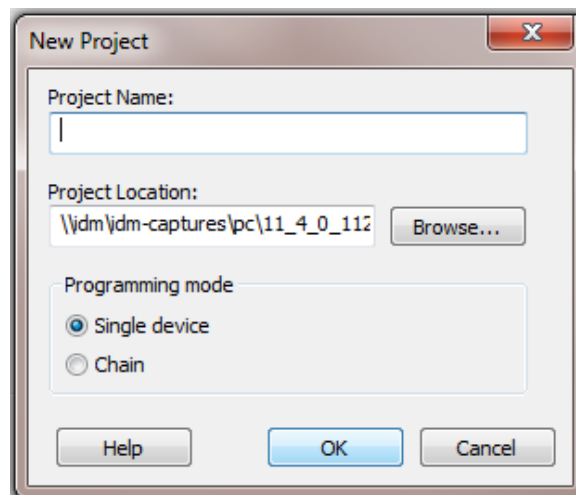


Figure 24 · Creating a New Project

- a. Enter the **Project Name**.
- b. Select **Single device** as the Programming mode and click **OK**.
5. Click **Configure Device**.

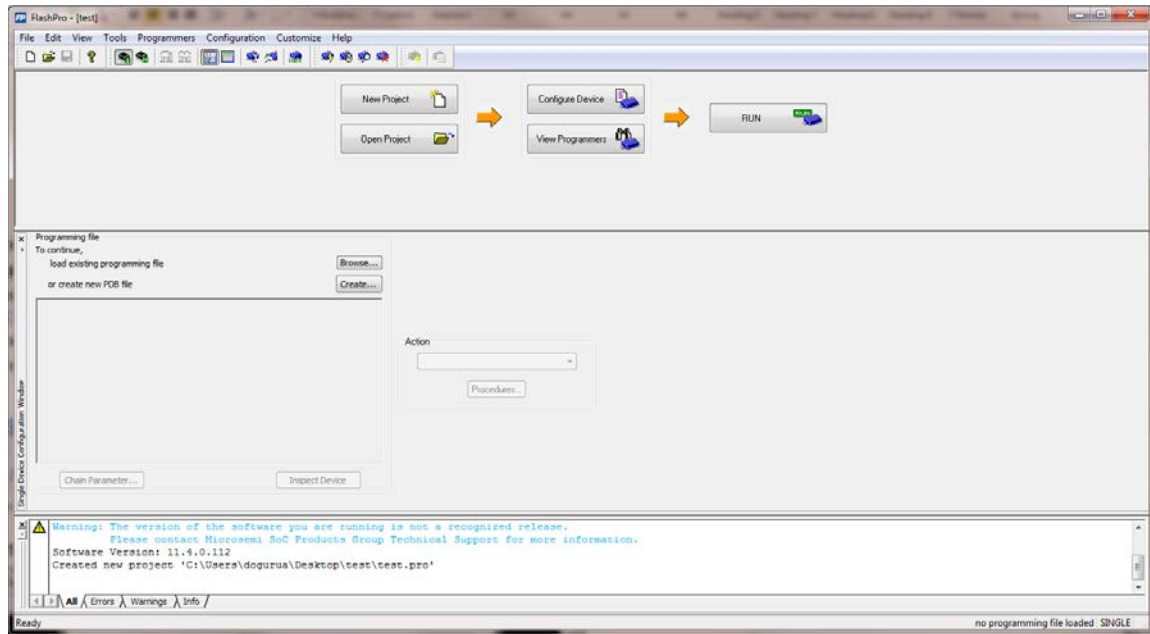


Figure 25 - Configuring the Device

- a. Click **Browse** and select the `SEC_KIT_MTD_top.stp` file from the **Load Programming File** window.
6. Click **Program** to program the device.
7. Press **SW4** switch, the respective DS7 LED will glow. This confirms that the program is passed.

Running the Manufacturing Test

Setting Up the Tera Term

The following steps describe how to set up Tera Term to perform the manufacturing test:

1. Connect the USB cable (mini USB to Type A USB cable) to J33 and other end of the cable to the USB port of the Host PC.
2. Open **Tera Term** from the Start menu.

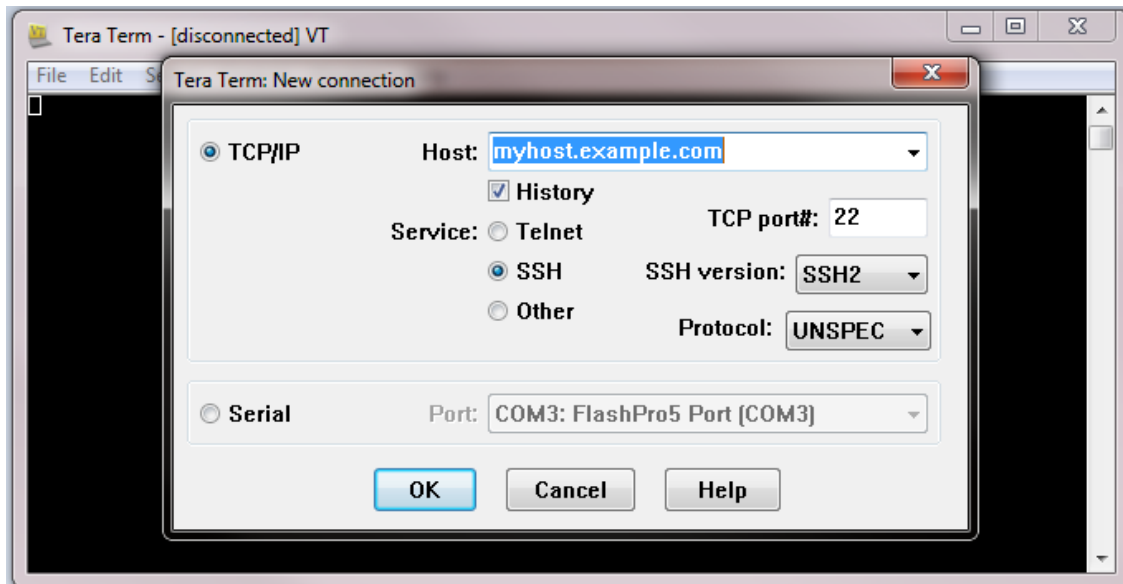


Figure 26 - Tera Term New Connection Window

3. Select **Serial**.
4. Select a port from the **Port** drop-down list and click **OK**.

Note:

- When using the USB cable for Tera Term communication, four FlashPro5 COM ports (FlashPro5 Port) are available in the Port drop-down list. Select the **Third** FlashPro5 COM port to establish the connection with the Host PC.
- If the FlashPro5 drivers are not installed properly, the Port drop-down list does not list the FlashPro5 COM ports.

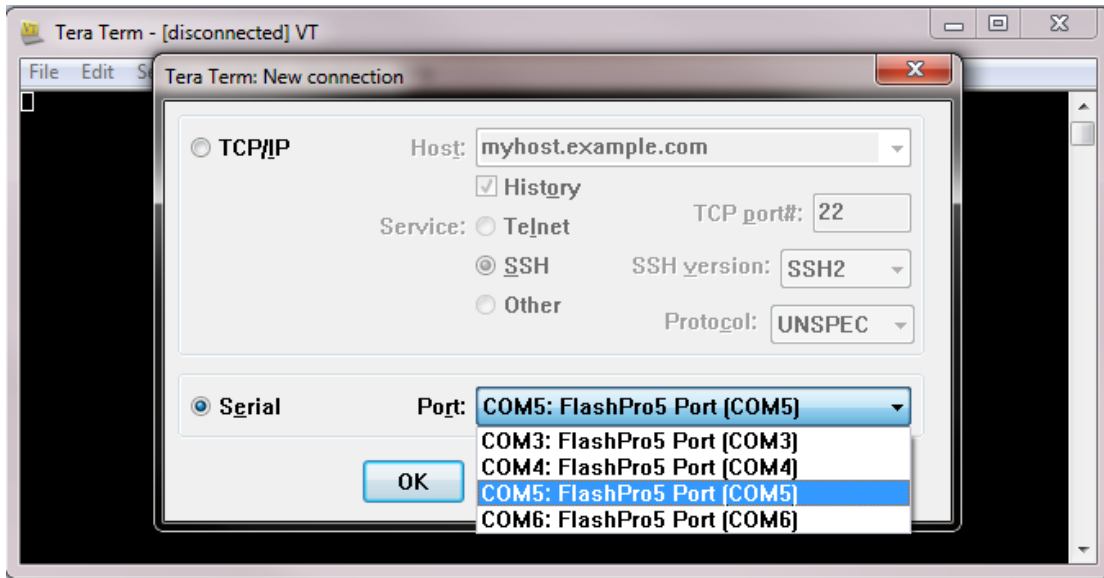


Figure 27 · Tera Term New Connection Window

5. From the **Setup** menu, select **Serial Port** and enter the following Tera Term settings:
 - Baud rate = 57600
 - Data = 8
 - Parity = none
 - Stop = 1
 - Flow control = none

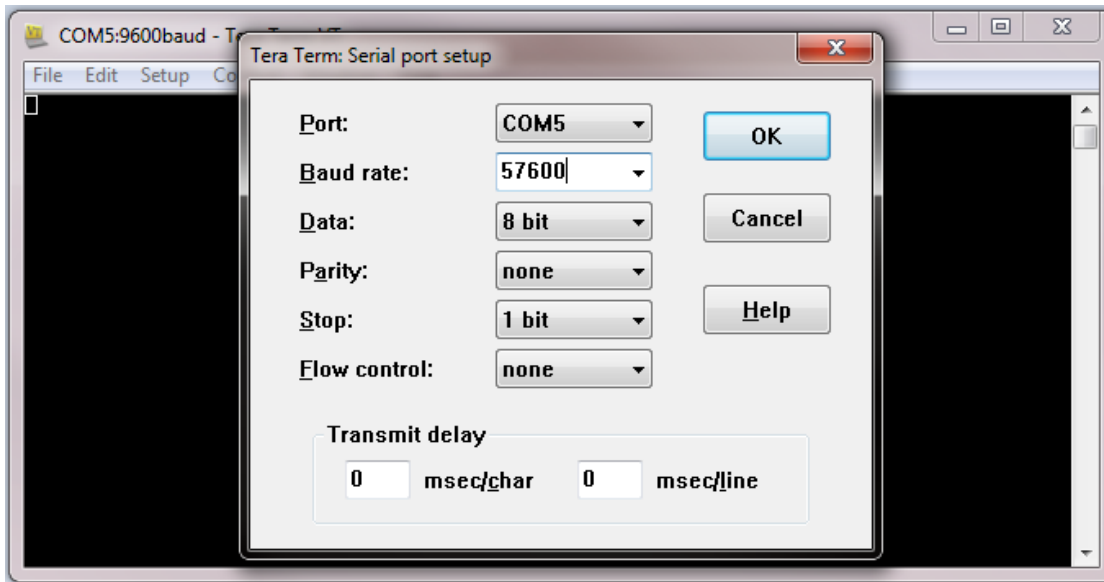


Figure 28 · Tera Term Serial Port Setup Window

Jumper Settings

Table 18 describes the jumper settings required to perform the tests on the SmartFusion2 Advanced Development Kit board.

Table 17 - Jumper Settings

| Interface | Jumper Settings |
|----------------------|---|
| RTC Test | - |
| I2C Test | On Header (H1) short (10-6) and (11-7) |
| DDR3 Memory Test | - |
| SPI0 Memory Test | Short J118 pin 1-2 |
| SPI1 Memory Test | Short J119 pin 1-2 |
| USB Device Test | Connect Micro B to P1 and connect other end of the cable to the Host PC (type A). This cable is required for testing on board USB device interface. |
| | Short J23 pin 1-2 |
| SGMII Test | Connect Ethernet cable to J19 and connect other end of the cable to the Ethernet switch or network (1 Gbps) |
| | Short J11 pin 1-2 |
| | Short J8 pin 1-2 |
| SERDES Loopback Test | Short J14 pin 1-2 |
| | Connect (J4 to J5) and (J6 to J7) using SMA to SMA cable |
| | Loopback cable (5 Gbps data rate) |
| | Short J11 pin 1-2 |
| | Short J8 pin 1-2 |

Running the Manufacturing Test

Program the board `SEC_KIT_MTD_top.stp` file and make the required Tera Term and jumper settings. For more information on settings, refer to [Running the Manufacturing Test](#).

The following steps describe how to run the manufacturing test:

1. Press the **SW6** reset switch on the M2S150-ADV-DEV-KIT board to reset and begin the tests.

Note: All the tests are listed in the Tera Term, when the setup is ready for the test, refer to [Figure 29](#). If this message does not appear, press the **SW6** reset switch again. If the message still does not appear, then check all the jumpers and the Tera Term settings.

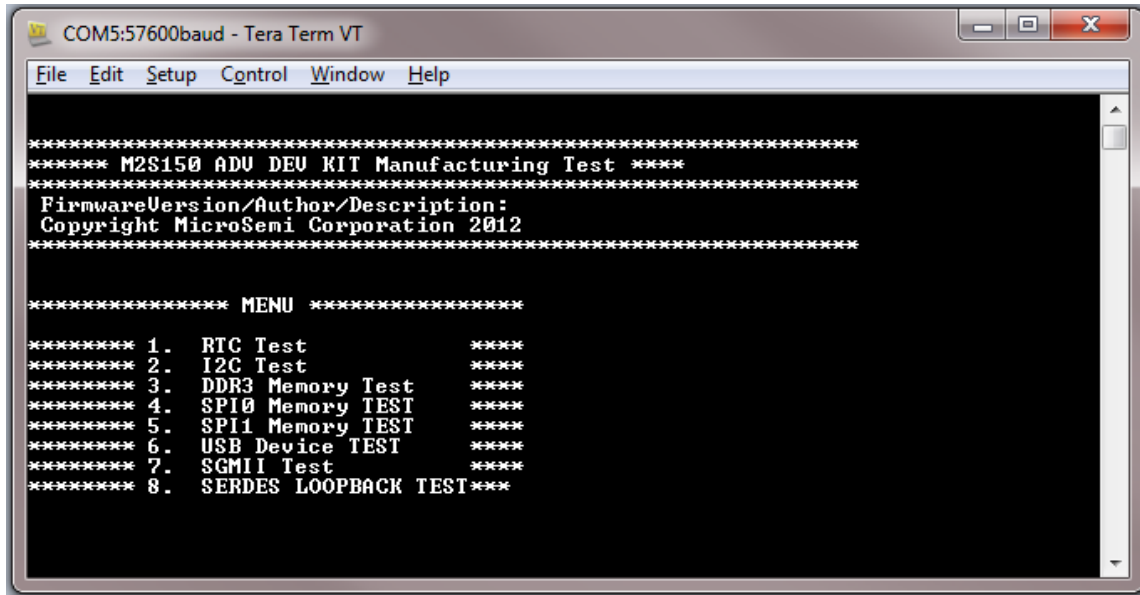


Figure 29 - Test Menu

2. Press 1 to run the RTC test.

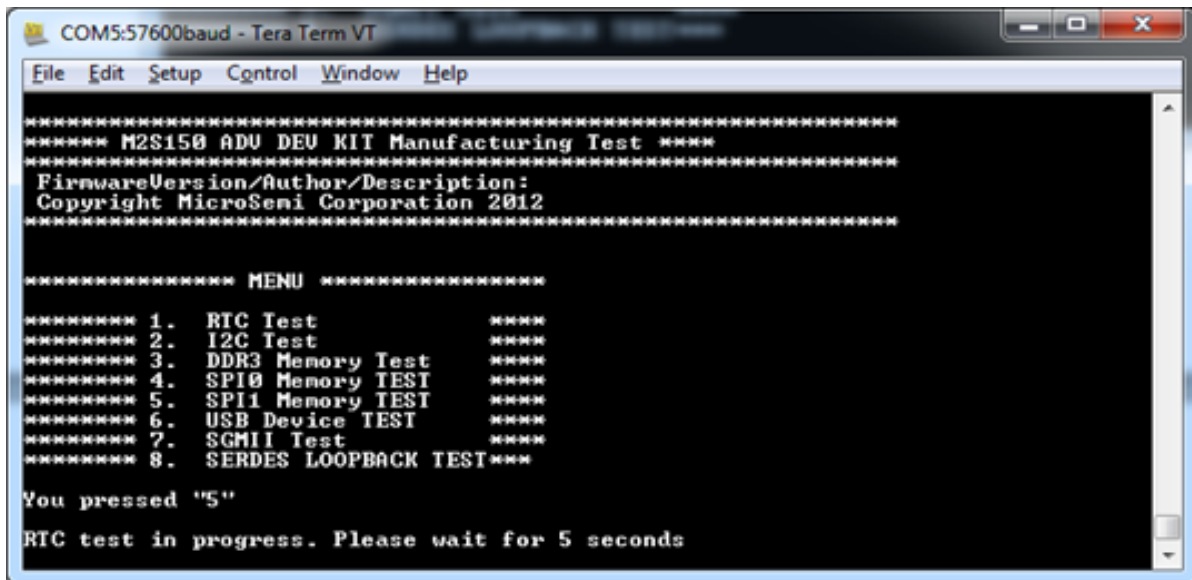
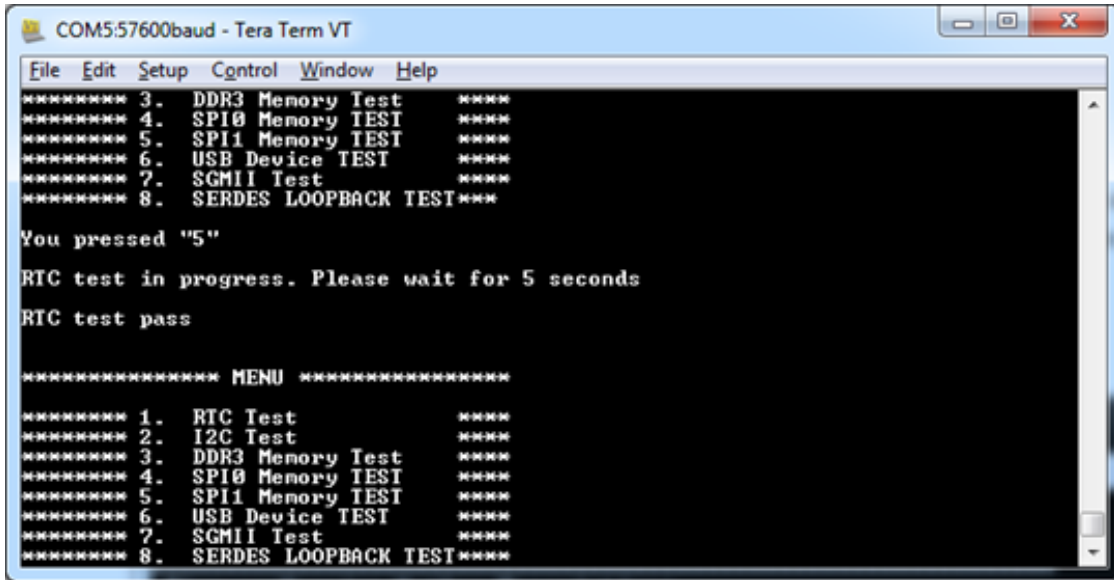


Figure 30 - Running RTC Test

When the test is passed, a message is displayed. Refer to [Figure 31](#).



```

COM5:57600baud - Tera Term VT
File Edit Setup Control Window Help
***** 3.  DDR3 Memory Test      ****
***** 4.  SPI0 Memory TEST     ****
***** 5.  SPI1 Memory TEST     ****
***** 6.  USB Device TEST      ****
***** 7.  SGMII Test           ****
***** 8.  SERDES LOOPBACK TEST****

You pressed "5"
RTC test in progress. Please wait for 5 seconds
RTC test pass

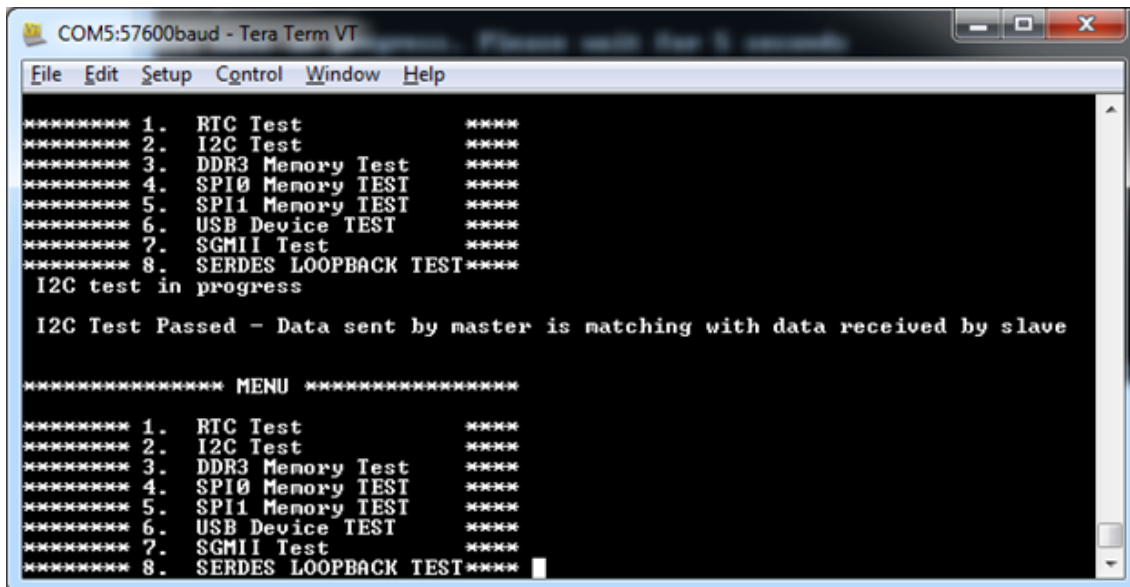
***** MENU *****
***** 1.  RTC Test             ****
***** 2.  I2C Test            ****
***** 3.  DDR3 Memory Test    ****
***** 4.  SPI0 Memory TEST    ****
***** 5.  SPI1 Memory TEST    ****
***** 6.  USB Device TEST     ****
***** 7.  SGMII Test          ****
***** 8.  SERDES LOOPBACK TEST****

```

Figure 31 - RTC Test Passed

3. Press 2 to run the I2C loopback test.

Wait for 5 seconds to complete the test. When the test is passed, a message is displayed. Refer to [Figure 32](#).



```

COM5:57600baud - Tera Term VT
File Edit Setup Control Window Help
***** 1.  RTC Test             ****
***** 2.  I2C Test            ****
***** 3.  DDR3 Memory Test    ****
***** 4.  SPI0 Memory TEST    ****
***** 5.  SPI1 Memory TEST    ****
***** 6.  USB Device TEST     ****
***** 7.  SGMII Test          ****
***** 8.  SERDES LOOPBACK TEST****
I2C test in progress
I2C Test Passed - Data sent by master is matching with data received by slave

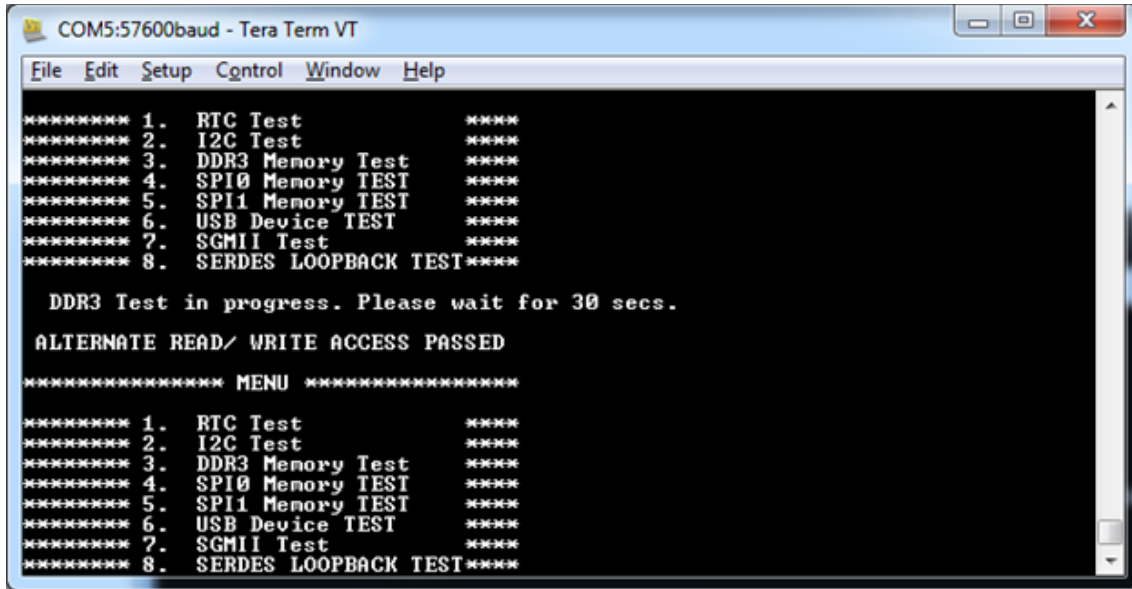
***** MENU *****
***** 1.  RTC Test             ****
***** 2.  I2C Test            ****
***** 3.  DDR3 Memory Test    ****
***** 4.  SPI0 Memory TEST    ****
***** 5.  SPI1 Memory TEST    ****
***** 6.  USB Device TEST     ****
***** 7.  SGMII Test          ****
***** 8.  SERDES LOOPBACK TEST****

```

Figure 32 - I2C Test Passed

- Press **3** to run the DDR3 memory test.

Wait for 30 seconds to complete the test. When the test is passed, a message is displayed. Refer to [Figure 33](#).



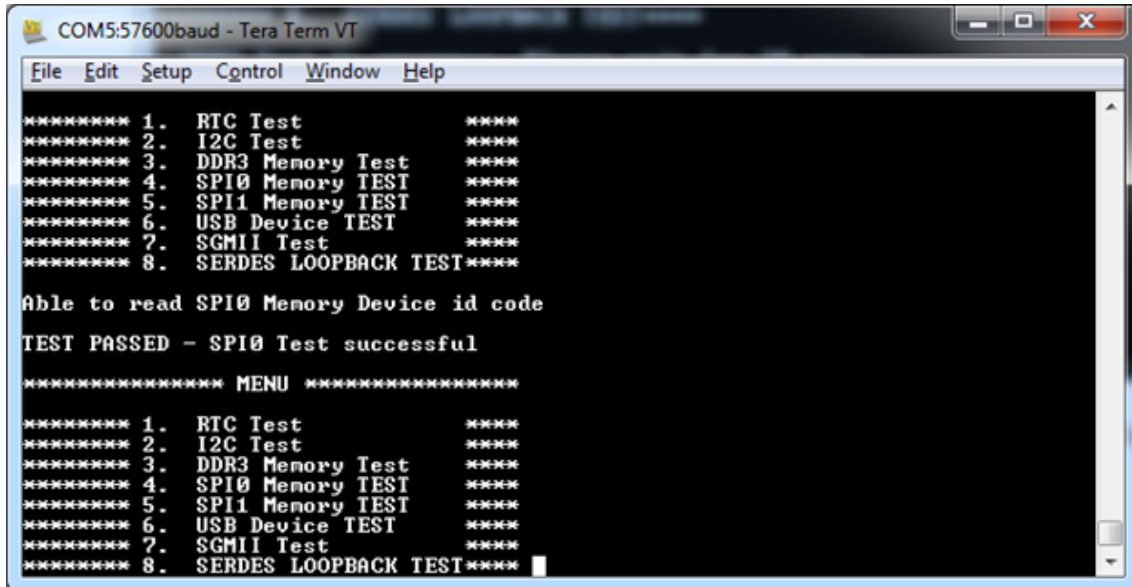
```
COM5:57600baud - Tera Term VT
File Edit Setup Control Window Help
***** 1. RTC Test *****
***** 2. I2C Test *****
***** 3. DDR3 Memory Test *****
***** 4. SPI0 Memory TEST *****
***** 5. SPI1 Memory TEST *****
***** 6. USB Device TEST *****
***** 7. SGMII Test *****
***** 8. SERDES LOOPBACK TEST*****

DDR3 Test in progress. Please wait for 30 secs.
ALTERNATE READ/ WRITE ACCESS PASSED
***** MENU *****
***** 1. RTC Test *****
***** 2. I2C Test *****
***** 3. DDR3 Memory Test *****
***** 4. SPI0 Memory TEST *****
***** 5. SPI1 Memory TEST *****
***** 6. USB Device TEST *****
***** 7. SGMII Test *****
***** 8. SERDES LOOPBACK TEST*****
```

Figure 33 - DDR3 Memory Test Passed

- Press **4** to run the SPI0 memory test.

When the test is passed, a message is displayed. Refer to [Figure 34](#).



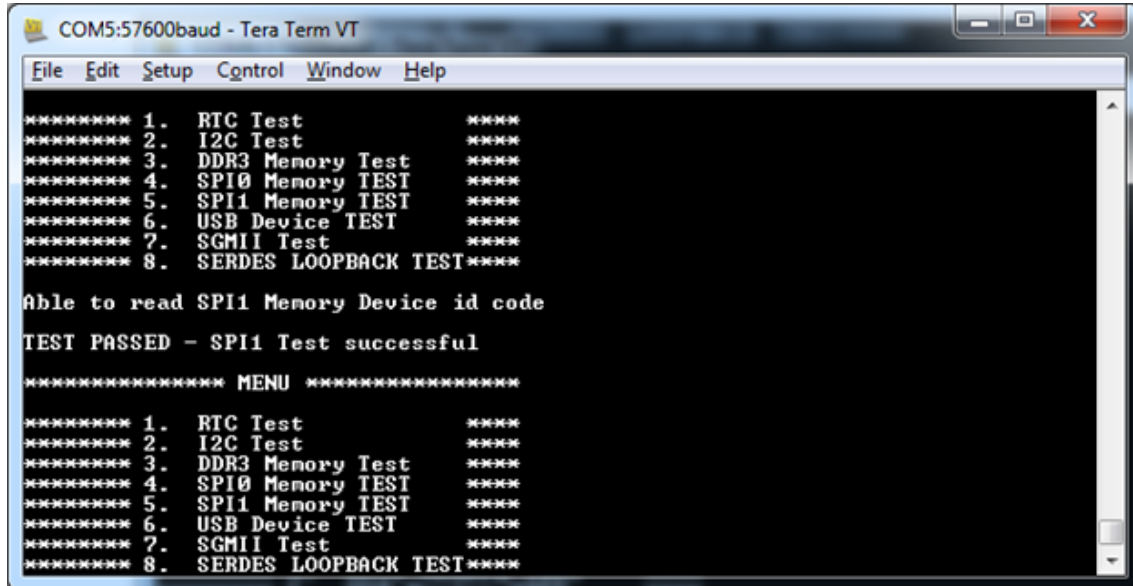
```
COM5:57600baud - Tera Term VT
File Edit Setup Control Window Help
***** 1. RTC Test *****
***** 2. I2C Test *****
***** 3. DDR3 Memory Test *****
***** 4. SPI0 Memory TEST *****
***** 5. SPI1 Memory TEST *****
***** 6. USB Device TEST *****
***** 7. SGMII Test *****
***** 8. SERDES LOOPBACK TEST*****

Able to read SPI0 Memory Device id code
TEST PASSED - SPI0 Test successful
***** MENU *****
***** 1. RTC Test *****
***** 2. I2C Test *****
***** 3. DDR3 Memory Test *****
***** 4. SPI0 Memory TEST *****
***** 5. SPI1 Memory TEST *****
***** 6. USB Device TEST *****
***** 7. SGMII Test *****
***** 8. SERDES LOOPBACK TEST*****
```

Figure 34 - SPI0 Memory Test Passed

6. Press **5** to run the SPI1 memory test.

When the test is passed, a message is displayed. Refer to [Figure 35](#).



```

COM5:57600baud - Tera Term VT
File Edit Setup Control Window Help
***** 1. RTC Test *****
***** 2. I2C Test *****
***** 3. DDR3 Memory Test *****
***** 4. SPI0 Memory TEST *****
***** 5. SPI1 Memory TEST *****
***** 6. USB Device TEST *****
***** 7. SGMII Test *****
***** 8. SERDES LOOPBACK TEST*****

Able to read SPI1 Memory Device id code
TEST PASSED - SPI1 Test successful

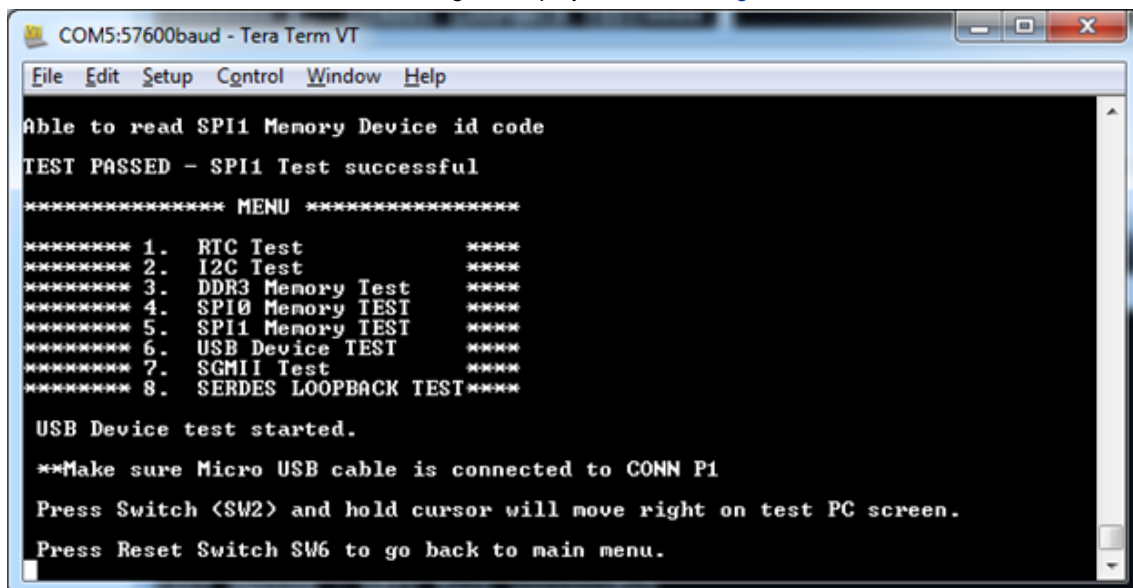
***** MENU *****
***** 1. RTC Test *****
***** 2. I2C Test *****
***** 3. DDR3 Memory Test *****
***** 4. SPI0 Memory TEST *****
***** 5. SPI1 Memory TEST *****
***** 6. USB Device TEST *****
***** 7. SGMII Test *****
***** 8. SERDES LOOPBACK TEST*****

```

Figure 35 · SPI1 Memory Test Passed

7. Press **6** to run the USB device test.

When the test is started, a message is displayed. Refer to [Figure 36](#).



```

COM5:57600baud - Tera Term VT
File Edit Setup Control Window Help

Able to read SPI1 Memory Device id code
TEST PASSED - SPI1 Test successful

***** MENU *****
***** 1. RTC Test *****
***** 2. I2C Test *****
***** 3. DDR3 Memory Test *****
***** 4. SPI0 Memory TEST *****
***** 5. SPI1 Memory TEST *****
***** 6. USB Device TEST *****
***** 7. SGMII Test *****
***** 8. SERDES LOOPBACK TEST*****

USB Device test started.

**Make sure Micro USB cable is connected to CONN P1
Press Switch <SW2> and hold cursor will move right on test PC screen.
Press Reset Switch SW6 to go back to main menu.

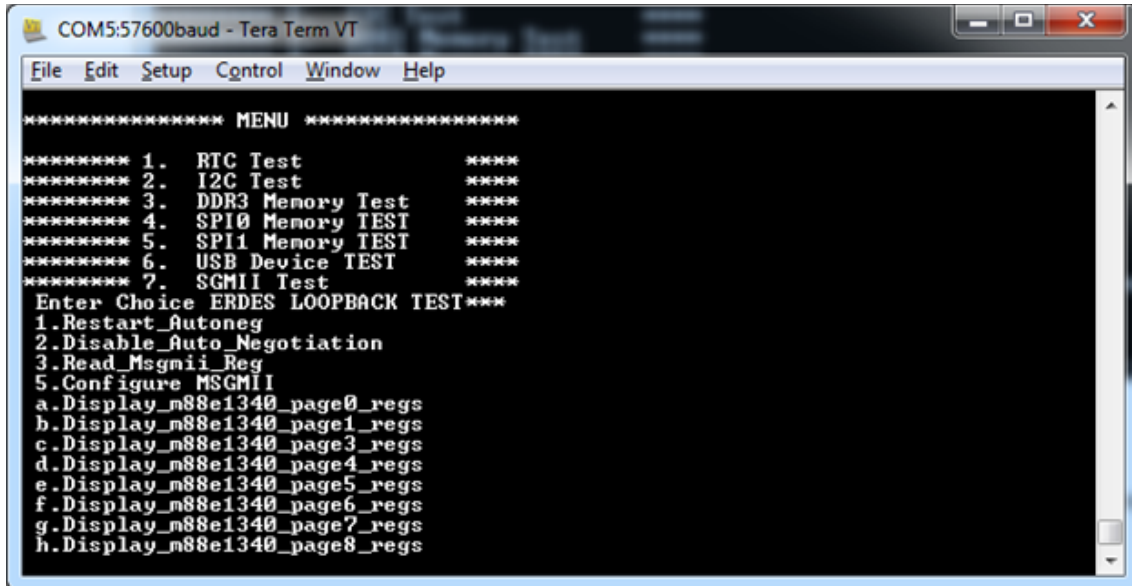
```

Figure 36 · USB Device Test Passed

- a. Press and hold the **SW2** switch on the board and observe the mouse cursor moving to the right side.
- b. Press **SW6** reset switch go back to the main menu.

8. Press 7 to run the SGMII test.

When the test is started, the DS1 LED will be OFF. The DS10 LED will glow and the DS8 LED will start blinking. A message is displayed, refer to [Figure 37](#).



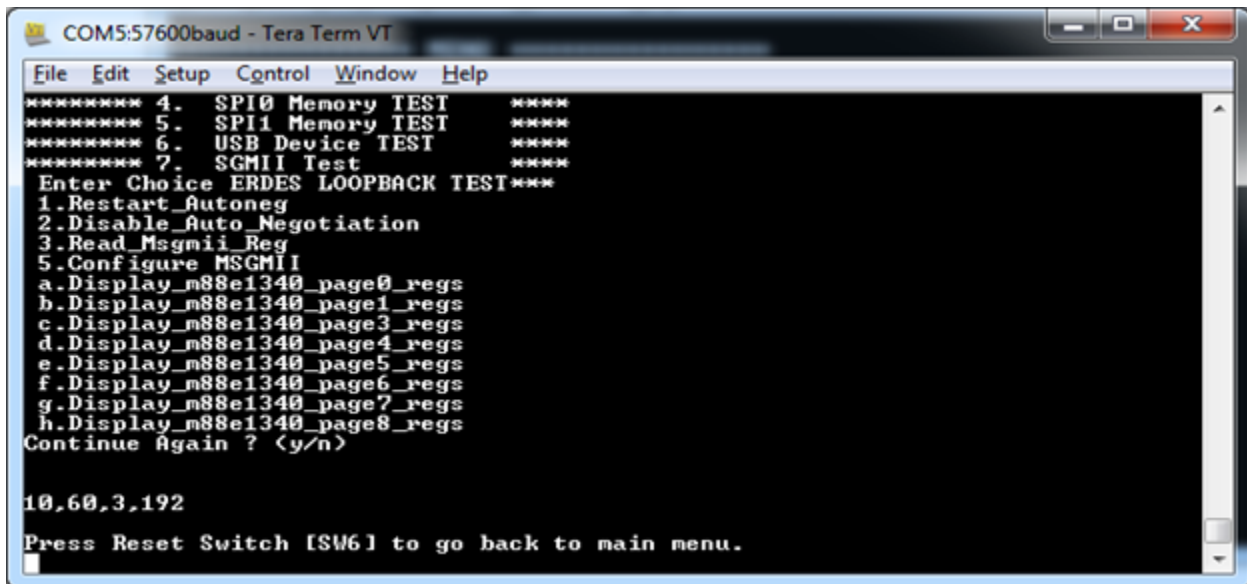
```

COM5:57600baud - Tera Term VT
File Edit Setup Control Window Help
***** MENU *****
***** 1. RTC Test *****
***** 2. I2C Test *****
***** 3. DDR3 Memory Test *****
***** 4. SPI0 Memory TEST *****
***** 5. SPI1 Memory TEST *****
***** 6. USB Device TEST *****
***** 7. SGMII Test *****
Enter Choice ERDES LOOPBACK TEST***
1.Restart_Autoneg
2.Disable_Auto_Negotiation
3.Read_Msgmii_Reg
5.Configure MSGMII
a.Display_m88e1340_page0_regs
b.Display_m88e1340_page1_regs
c.Display_m88e1340_page3_regs
d.Display_m88e1340_page4_regs
e.Display_m88e1340_page5_regs
f.Display_m88e1340_page6_regs
g.Display_m88e1340_page7_regs
h.Display_m88e1340_page8_regs

```

Figure 37 - SGMII Test

- a. If the message is not displayed or DS10 and DS8 LEDs do not blink, switch **ON** and **OFF** the SW7 power supply switch on the board, and run the DDR3 test by pressing **3**.
- b. Press **7** to repeat the SGMII test.
- c. A confirmation message is displayed, Press **n** twice. Refer to [Figure 38](#). When the test is passed, the IP address of the Host PC is displayed.



```

COM5:57600baud - Tera Term VT
File Edit Setup Control Window Help
***** 4. SPI0 Memory TEST *****
***** 5. SPI1 Memory TEST *****
***** 6. USB Device TEST *****
***** 7. SGMII Test *****
Enter Choice ERDES LOOPBACK TEST***
1.Restart_Autoneg
2.Disable_Auto_Negotiation
3.Read_Msgmii_Reg
5.Configure MSGMII
a.Display_m88e1340_page0_regs
b.Display_m88e1340_page1_regs
c.Display_m88e1340_page3_regs
d.Display_m88e1340_page4_regs
e.Display_m88e1340_page5_regs
f.Display_m88e1340_page6_regs
g.Display_m88e1340_page7_regs
h.Display_m88e1340_page8_regs
Continue Again ? (y/n)

10.60.3.192
Press Reset Switch [SW6] to go back to main menu.

```

Figure 38 - SGMII Test Passed

- d. Press the **SW6** reset switch on the board to go back to the main.
Note: IP address may vary from one PC to the other PC.

If the IP address is not displayed, perform the following steps to get the IP address.

- i. Press 7 to run the SGMII test. Refer to [Figure 39](#).

```
Enter Choice
1.Restart_Autoneg
2.Disable_Auto_Negotiation
3.Read_Msgmii_Reg
5.Configure_MSGMII
a.Display_m88e1340_page0_regs
b.Display_m88e1340_page1_regs
c.Display_m88e1340_page3_regs
d.Display_m88e1340_page4_regs
e.Display_m88e1340_page5_regs
f.Display_m88e1340_page6_regs
g.Display_m88e1340_page7_regs
h.Display_m88e1340_page8_regs
```

Figure 39 - SGMII Debug Test

- ii. Press 1 to restart the auto negotiation and press y to continue. Refer to [Figure 40](#).

```
Continue Again ? (y/n)
y
Enter Choice
1.Restart_Autoneg
2.Disable_Auto_Negotiation
3.Read_Msgmii_Reg
5.Configure_MSGMII
a.Display_m88e1340_page0_regs
b.Display_m88e1340_page1_regs
c.Display_m88e1340_page3_regs
d.Display_m88e1340_page4_regs
e.Display_m88e1340_page5_regs
f.Display_m88e1340_page6_regs
g.Display_m88e1340_page7_regs
h.Display_m88e1340_page8_regs
```

Figure 40 - SGMII Debug Test

- iii. Press 2 to disable auto negotiation and press y to continue. Refer to [Figure 41](#).

```
Continue Again ? (y/n)
y
Enter Choice
1.Restart_Autoneg
2.Disable_Auto_Negotiation
3.Read_Msgmii_Reg
5.Configure_MSGMII
a.Display_m88e1340_page0_regs
b.Display_m88e1340_page1_regs
c.Display_m88e1340_page3_regs
d.Display_m88e1340_page4_regs
e.Display_m88e1340_page5_regs
f.Display_m88e1340_page6_regs
g.Display_m88e1340_page7_regs
h.Display_m88e1340_page8_regs
```

Figure 41 - SGMII Debug Test

- iv. Press **n** twice for not to repeat the action and get the IP address. Refer to [Figure 42](#).

```

Enter Choice
1.Restart_Autoneg
2.Disable_Auto_Negotiation
3.Read_Msgmii_Reg
5.Configure MSGMII
a.Display_m88e1340_page0_regs
b.Display_m88e1340_page1_regs
c.Display_m88e1340_page3_regs
d.Display_m88e1340_page4_regs
e.Display_m88e1340_page5_regs
f.Display_m88e1340_page6_regs
g.Display_m88e1340_page7_regs
h.Display_m88e1340_page8_regs
Continue Again ? (y/n)

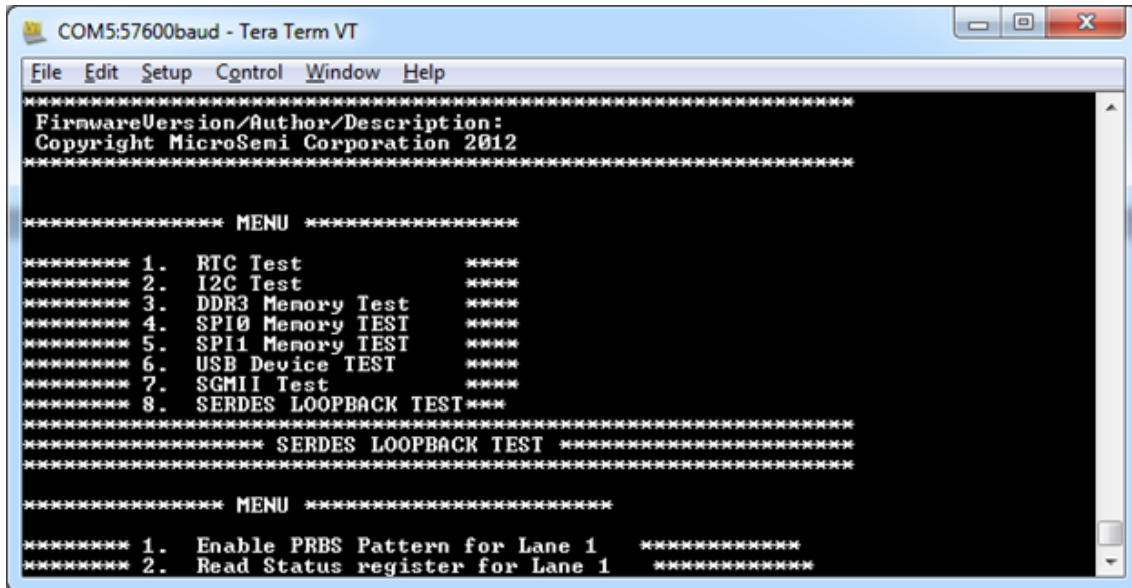
10,60,3,192

Press Reset Switch [SW6] to go back to main menu.

```

Figure 42 · SGMII Debug Test Passed

- v. Press **SW6** to go back to the main menu.
9. Press **8** to run the SERDES loopback test. Refer to [Figure 43](#).
Make sure that the loopback cable is connected. Refer to [Jumper Settings](#).



```

COM5:57600baud - Tera Term VT
File Edit Setup Control Window Help
*****
FirmwareVersion/Author/Description:
Copyright MicroSemi Corporation 2012
*****

***** MENU *****

***** 1. RTC Test *****
***** 2. I2C Test *****
***** 3. DDR3 Memory Test *****
***** 4. SPI0 Memory TEST *****
***** 5. SPI1 Memory TEST *****
***** 6. USB Device TEST *****
***** 7. SGMII Test *****
***** 8. SERDES LOOPBACK TEST***
*****

***** SERDES LOOPBACK TEST *****
*****

***** MENU *****

***** 1. Enable PRBS Pattern for Lane 1 *****
***** 2. Read Status register for Lane 1 *****

```

Figure 43 · SERDES Loopback Test

- a. Press 1 to enable PRBS pattern for Lane 1. Refer to Figure 44.

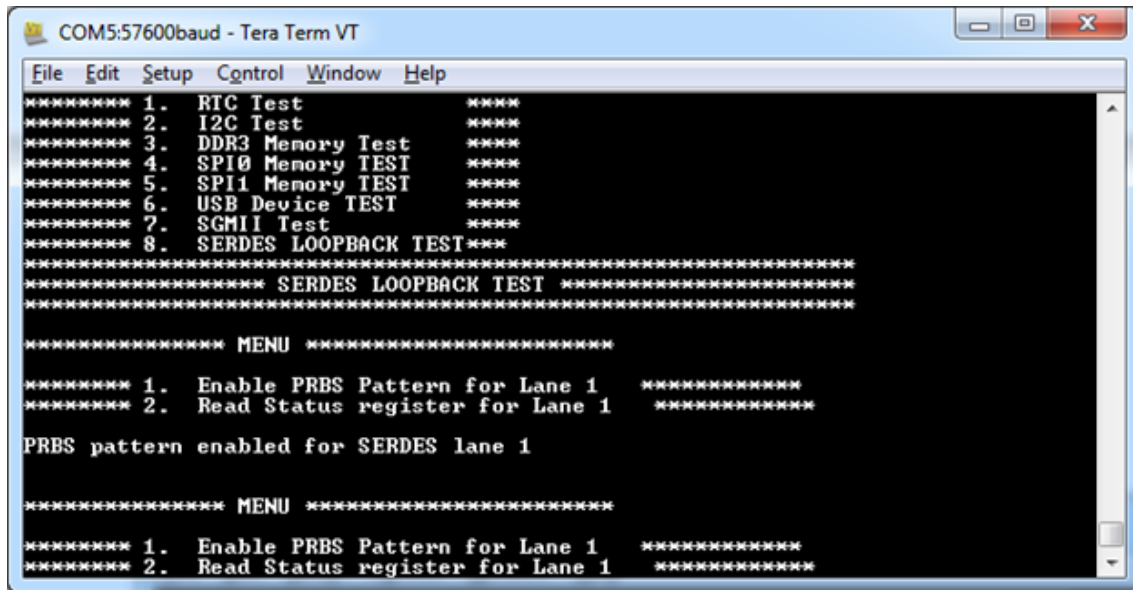


Figure 44 - SERDES Loopback Test

- b. Press 2 to read Status register for Lane 1.
When the test is started, a message is displayed. Refer to Figure 45.

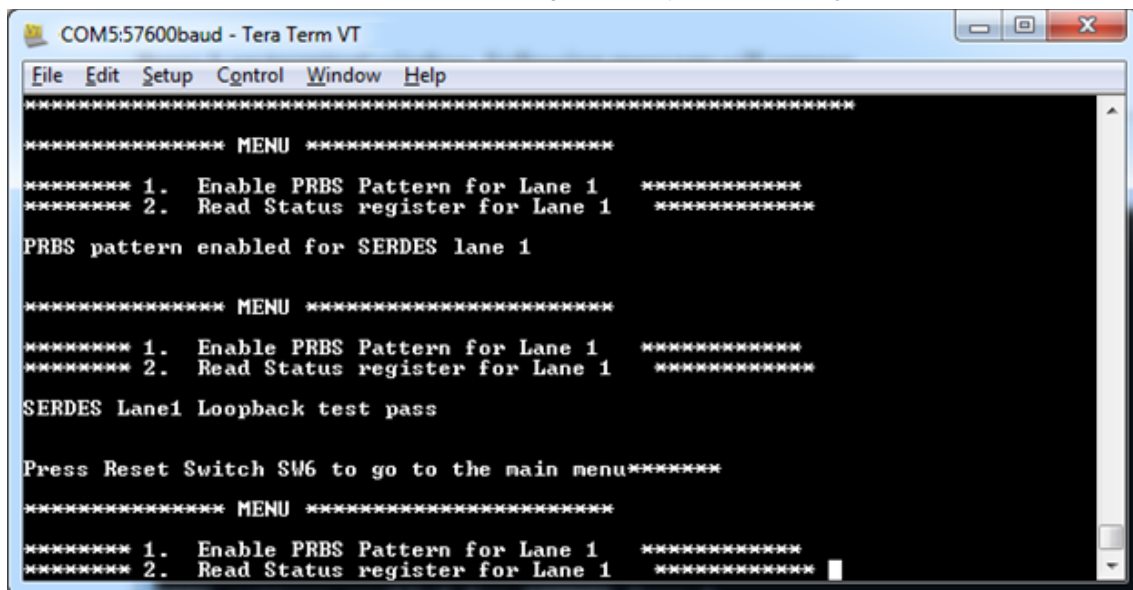


Figure 45 - SERDES Loopback Passed

- c. Press the SW6 reset switch to go back to the main menu.

List of Changes

The following table shows important changes made in this document for each revision.

| Revision | Changes | Page |
|---------------------------|---|------|
| Revision 2 (July 2015) | Updated the part number from M2S150-ADV-DEV-KIT-ES to M2S150-ADV-DEV-KIT throughout the document (SAR 66855). | NA |
| | Updated the device number from M2S150T-1FCG1152ES to M2S150TS-1FCG1152 throughout the document (SAR 66855). | NA |
| | Updated Manufacturing Test section by adding MTD files link (SAR 60671 and 68260). | 86 |
| | Updated Power Supply Validation section with updated correct pin details (SAR 61171). | 86 |
| | Updated FMC Connectors section (SAR 67950) | 30 |
| Revision 1 (July 2014) | Initial release | NA |

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Fax, from anywhere in the world **408.643.6913**

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Website

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