

MPC5777M EVB User Guide

Prototype Board

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1 Introduction

This user guide details the setup and configuration of the Freescale MPC5777M Evaluation Board (hereafter referred to as the EVB). The EVB is intended to provide a mechanism for easy customer evaluation of the MPC57xx family of microprocessors, and to facilitate hardware and software development.

At the time of writing this document, the MPC57xx family consists of the 55nm powertrain and safety devices. For the latest product information, please speak to your Freescale representative or consult the MPC57xx website at www.freescale.com.

The EVB is intended for bench or laboratory use and has been designed using normal temperature specified components (+70°C).

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1.1 Modular Concept

For maximum flexibility and simplicity, the EVB has been designed as a modular development platform. The EVB main board does not contain an MCU. Instead, the MCU is fitted to an MCU daughter card (occasionally referred to as an adapter board). This approach means that the same EVB platform can be used for multiple packages and MCU derivatives within the MPC57xx family. High density connectors provide the interface between the EVB and MCU daughter cards as shown [Figure 1](#). See [Section 4, “Configuration — Daughter card”](#) for more details on the daughter cards and [Section 5, “Board Interface Connector”](#) for more details on the interface connectors.

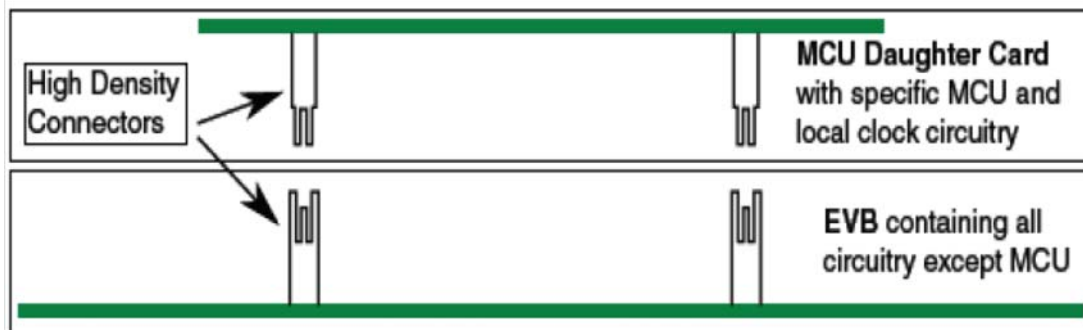


Figure 1. Modular concept – Mother board and MCU daughter card

Please consult the MPC57xx website at www.freescale.com or speak to your Freescale representative for more details on the availability of MCU daughter cards.

NOTE

For details on your specific daughter card, please consult the instructions included with the daughter card.

The EVB is designed to use the motherboard and the daughter in conjunction. However, it is possible to use the daughter cards standalone.

1.2 Daughter Card Availability

A number of compatible daughter cards are available for the motherboard across a number of devices. [Table 1](#) gives an overview of daughter cards that can be used with MPC57xx motherboard and associated devices, package sizes and part numbers.

Table 1. Daughter Card Overview

| Daughter card number | Device | Package | Socket | Nexus |
|----------------------|---------------------|-----------------|--------|-------|
| MPC5746M_176DS/C | MPC5746M / MPC5744K | 176LQFP | yes/no | no |
| MPC5746M_216DC | MPC5746M / MPC5744K | 216 Fusion Quad | no | yes |
| MPC5746M_292DS/DC | MPC5746M / MPC5744K | 292 BGA | yes/no | yes |
| MPC5777M_416DS | MPC5777M | 416 BGA | yes | yes |

Table 1. Daughter Card Overview

| Daughter card number | Device | Package | Socket | Nexus |
|----------------------|----------|-----------------|--------|-------|
| MPC5777M_512DS | MPC5777M | 512 BGA | yes | yes |
| MPC5744K_144DS/C | MPC5744K | 144LQFP | yes/no | no |
| MPC5744K_172DC | MPC5744K | 172 Fusion Quad | no | yes |
| TBD | MPC5726L | TBD | TBD | TBD |
| TBD | MPC5744P | 144LQFP | TBD | TBD |
| TBD | MPC5744P | 257 MAPBGA | TBD | TBD |

All daughter cards will be similar in design and concept. For details on the daughter cards please refer to [Section 4, “Configuration — Daughter card.”](#)

2 EVB features

The EVB system consists of a motherboard and a daughter card, both with distinct features.

The motherboard provides the following key features:

- Support provided for different MPC57xx MCUs by utilizing MCU daughter cards
- Single 12 V external power supply input with four on-board regulators providing all of the necessary EVB and MCU voltages; power supplied to the EVB via a 2.1mm barrel style power jack or a 2-way level connector; 12 V operation allows in-car use if desired
- Master power switch and regulator status LEDs
- Two 240-way high-density daughter card expansion connectors allowing connection of the MCU daughter card or a custom board for additional application specific circuitry
- All MCU signals readily accessible at a port-ordered group of 0.1in. pitch headers
- RS232/SCI physical interface and standard DB9 connector
- FlexRAY interface
- LINFlexD interface
- 2 CAN interfaces, one configurable to be connected to one out of two CAN modules, and one connected to a dedicated third CAN module
- Ethernet interface
- Variable resistor, driving between 5 V and ground
- 4 user switches and 4 user LEDs, freely connectable
- Liberal scattering of GND test points (surface mount loops) placed throughout the EVB

The daughter cards provide the following features:

- MCU (soldered or through a socket)
- Flexible MCU clocking options allow provision of an external clock via SMA connector or 40MHz EVB clock oscillator circuit. Jumpers on the daughter card allow selection between these external clocks. SMA connector on MCU-CLKOUT signal for easy access.
- User reset switch with reset status LEDs

Configuration—Motherboard

- Standard 14-pin JTAG debug connector and 34-pin Samtec Nexus3+ connector
- 10-pin Serial Interprocessor Interface (SIPI) connector
- Liberal scattering of ground and test points (surface mount loops) placed throughout the EVB

NOTE

To alleviate confusion between jumpers and headers, all EVB jumpers are implemented as 2 mm pitch whereas headers are 0.1in. (2.54 mm). This prevents inadvertently fitting a jumper to a header.

CAUTION

Before the EVB is used or power is applied, please fully read the following sections on how to correctly configure the board. Failure to correctly configure the board may cause irreparable component, MCU or EVB damage.

3 Configuration—Motherboard

This section details the configuration of each of the EVB functional blocks.

The EVB has been designed with ease of use in mind and has been segmented into functional blocks as shown in [Figure 2](#). Detailed silkscreen legend has been used throughout the board to identify all switches, jumpers and user connectors.

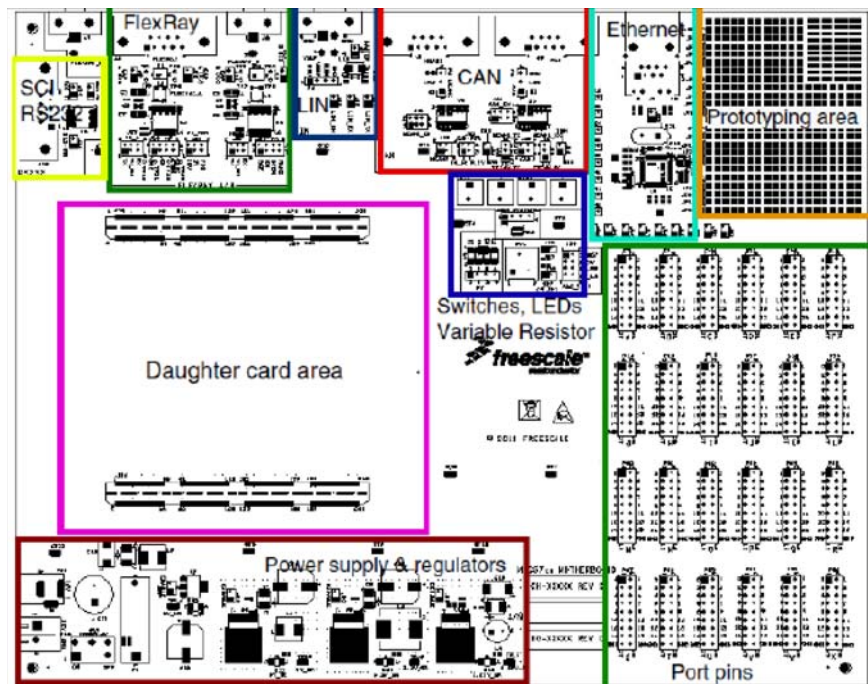


Figure 2. EVB Functional Blocks

3.1 Power Supply Configuration

The EVB requires an external power supply voltage of 12 V DC, minimum 1 A. This allows the EVB to be easily used in a vehicle if required. The single input voltage is regulated on-board using three switching regulators to provide the necessary EVB and MCU operating voltages of 5.0 V, 3.3 V and 1.25 V¹ and one 5 V linear regulator for the ADC supplies and references.

For flexibility there are two different power supply input connectors on the motherboard as detailed below. There is also a power supply option on the daughter card to use the daughter card in standalone mode. Please refer to [Section 4.1.2, “Daughter Card Standalone Power Input”](#) for details on the daughter card power input.

3.1.1 Motherboard Power Supply Connectors

2.1 mm Barrel Connector – P28:



Figure 3. 2.1 mm Power Connector

2-Way Lever Connector – P32:

This can be used to connect a bare wire lead to the EVB, typically from a laboratory power supply. The polarization of the connectors is clearly marked on the EVB. Care must be taken to ensure correct connection.

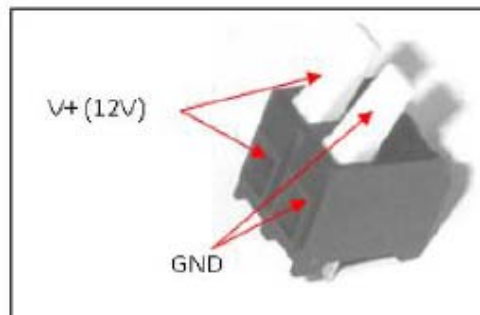


Figure 4. Lever Power Connector

3.1.2 Regulator Power Jumpers

There are four power regulator circuits on the MPC57xx motherboard that supply the required voltages to operate the MCUs:

¹To support the MPC5777M revision 2, the 1.25 V_{SR} voltage must increase from 1.25 V to 1.30 V.

Configuration—Motherboard

- 1.25V_SR: This voltage, also called VDD_LV_SR, shall be increased from 1.25 V to 1.30 V to support the MPC5777M revision 2.
- 5V_SR: 5 V switching regulator to supply the power management controller, I/O and peripherals
- 3.3V_SR: 3.3 V switching regulator for Ethernet, FlexRAY, debug and I/O
- 5V_LR: 5 V linear regulator for ADC supply and reference

All of the regulators have the option of being disabled/enabled if they are not required. By default (jumpers are off), all of the switching regulators are enabled and the 5 V linear regulator is disabled. The regulators can be enabled individually by the following jumper settings:

- Connecting J57 enables the 5 V linear regulator
- Disconnecting J58 enables the 5 V switching regulator
- Disconnecting J59 enables the 3.3 V switching regulator
- Disconnecting J60 enables the 1.25 V switching regulator

The regulators supply power to the daughter cards through the board connector. The individual selection and configuration of the MCU supplies are done on the daughter cards.

NOTE

Not all the supported daughter card MCUs require all the supplies to be switched on. Please refer to [Section 4, “Configuration — Daughter card”](#) for details.

NOTE

The MPC5777M revision 2 nominal VDD_LV increase from 1.25 V to 1.30 V. This requires a change to the MPC5746MMB motherboard to increase the supply voltage to 1.30 V. This can be achieved by changing resistors R85 from 33.2 ohms to 75 ohms. R85 can be found on the bottom side of the motherboard directly underneath U10.

See also Errata e7355 Datasheet revision 3 and later for updated voltage monitor level, VDD_LV specification, and detailed change summary.

3.1.3 Power Switch, Status LEDs and Fuse

The main power switch (slide switch SW5) can be used to isolate the power supply input from the EVB voltage regulators if required.

- Moving the slide switch to the right (away from connector P33) will turn the EVB on
- Moving the slide switch to the left (towards connector P33) will turn the EVB off

When power is applied to the EVB, four green power LEDs adjacent to the voltage regulators show the presence of the supply voltages as follows:

- LED D9 – Indicates that the 5.0 V linear regulator is enabled and working correctly
- LED D11 – Indicates that the 5.0 V switching regulator is enabled and working correctly
- LED D12 – Indicates that the 3.3 V switching regulator is enabled and working correctly
- LED D13 – Indicates that the 1.25 V switching regulator is enabled and working correctly

If no LED is illuminated when power is applied to the EVB and the regulators are correctly enabled using the appropriate jumpers, it is possible that either power switch SW5 is in the “OFF” position or that the fuse F1 has blown. The fuse will blow if power is applied to the EVB in reverse-bias, where a protection diode ensures that the main fuse blows rather than causing damage to the EVB circuitry. If the fuse has blown, check the bias of your power supply connection then replace fuse F1 with a 20mm 1.5A fast blow fuse.

3.2 CAN Configuration

The EVB has two NXP TJA1041T high speed CAN transceivers and two standard DB9 connectors to provide physical CAN interfaces for the MCU.

The pinout of the DB9 connector (J2) is shown in [Figure 5](#).

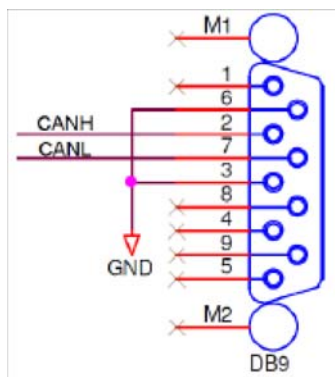


Figure 5. CAN DB9 connector pinout

For flexibility, the CAN transceiver I/Os are also connected to two standard 0.1 in. connectors (P4 and P5) at the top side of the PCB. The pin-out for these connectors is shown in [Figure 6](#).

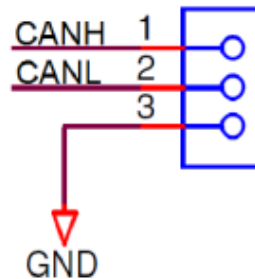


Figure 6. CAN 3pin header interface connector

By default the CAN interfaces are not enabled. To enable the CAN interfaces the jumpers detailed in [Table 2](#) need to be placed.

Table 2. CAN control jumpers

| Jumper | Label | Description |
|--------|---------|---|
| J23 | CAN2_EN | PHY U2 configuration 1-2: WAKE to GND 3-4: STB to 5V 5-6: EN to 5V |
| J32 | CAN2 | 1-2: PHY TX to MCU 3-4: PHY RX to MCU |
| J33 | CAN-PWR | 1-2: 5.0V_SR to PHY U2 VCC 3-4: 12V to PHY U2 VBAT |
| J34 | — | PHY U2 signal out 1: ERR 2: INH |
| J21 | CAN_EN | PHY U1 configuration 1-2: WAKE to GND 3-4: STB to 5V 5-6: EN to 5V |
| J35 | CAN | 1-2: 5.0V_SR to PHY U1 VCC 3-4: 12V to PHY U1 VBAT |
| J37 | CAN | PHY U1 TX to MCU 1-2: TTCAN TX 2-3: MCAN1 TX |
| J38 | — | PHY U1 RX to MCU 1-2: TTCAN RX 2-3: MCAN1 RX |
| J36 | — | PHY U1 signal out 1: ERR 2: INH |

3.3 RS232 Configuration

DB9 connector J19 and MAX3221E RS232 transceiver device provide a physical RS232 interface, allowing a direct RS232 connection to a PC or terminal.

The pin-out of these connectors is detailed in [Figure 7](#). Note that hardware flow control is not supported on this implementation.

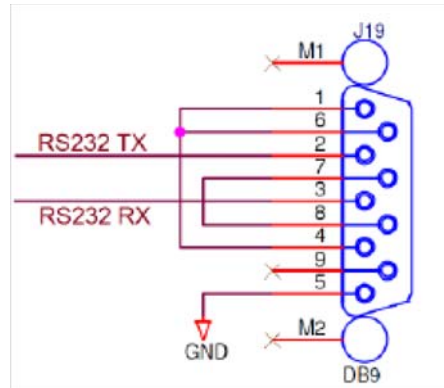


Figure 7. RS232 physical interface connector

On default the RS232 interface is not enabled. To enable the RS232 interface the user needs to place the jumpers detailed in [Table 3](#).

Table 3. RS232 control jumpers

| Jumper | Label | Description |
|--------|---------|----------------------|
| J13 | SCI TX | TX enable |
| J14 | SCI RX | RX enable |
| J25 | SCI_PWR | Transceiver power on |

3.4 LIN Configuration

The EVB is fitted with a Freescale MC33661F LIN transceiver (U50) and two different style connectors: A standard LIN Molex connector (J14) at the edge of the board and a standard 0.1 in. connector (P3).

The pin-out of the Molex connector J4 is shown in [Figure 8](#).

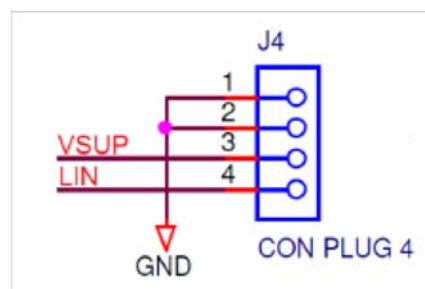


Figure 8. LIN Molex connector

For flexibility, the LIN transceiver is also connected to a standard 0.1 in. connector (P3) at the top side of the PCB as shown in [Figure 9](#). For ease of use, the 12 V EVB supply is fed to pin1 of P3 and the LIN transceiver power input to pin2. This allows the LIN transceiver to be powered directly from the EVB supply by simply linking pins 1 and 2 of connector P3 using a 0.1 in. jumper shunt.

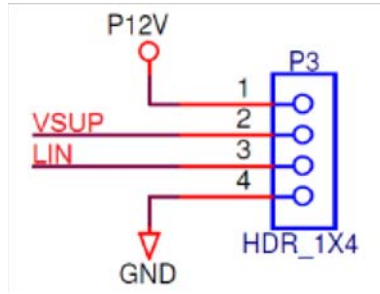


Figure 9. LIN 4pin header interface connector

By default the LIN interface is not enabled. To enable the LIN interface the jumpers detailed in [Table 4](#) need to be placed.

Table 4. LIN control jumpers

| Jumper | Label | Description |
|--------|--------|----------------------|
| J15 | LIN_EN | LIN PHY (U50) enable |
| J16 | LIN_RX | LIN RX enable |
| J17 | LIN_TX | LIN TX enable |

3.5 FLEXRAY Configuration

The EVB is fitted with two FlexRAY transceivers, a DB9 connector (for both transceivers) and two alternative connectors. Jumpers J27 and J30 are provided to route the respective MCU signals to the physical interfaces.

The pin-out of the DB9 connector (J2) is shown in [Figure 10](#).

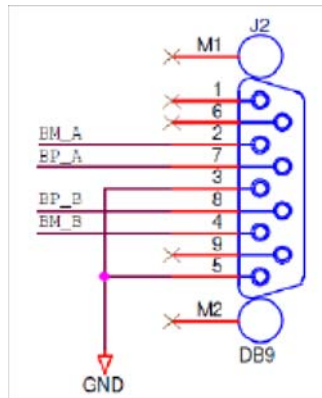


Figure 10. FlexRAY DB9 connector pinout

For flexibility, the FlexRAY transceiver is also connected to two FlexRAY connectors (P1 & P2) and two 2pin Molex connectors (J1 & J3, not populated by default) at the top side of the EVB. [Figure 11](#) shows the connections for both types of connectors.

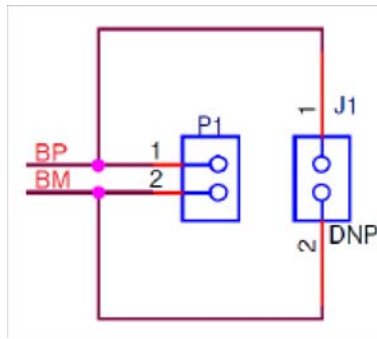


Figure 11. FlexRAY alternative connector pin-outs

By default the FlexRAY interface is not enabled. To enable the FlexRAY interface the jumpers detailed in [Table 5](#) need to be placed.

Table 5. FlexRAY control jumpers

| Jumper | Label | Description |
|--------|--------|---|
| J29 | FR_PWR | FlexRay transceiver VIO selection 1-2: 12V to VBAT 3-4: 5V_SR to VCC and VBUF 5-6: 3.3V_SR to VIO |
| J27 | FR_A | 1-2: PHY U4 TX to MCU 3-4: PHY U4 TXEN to MCU 5-6: PHY U4 RX to MCU |
| J28 | FR_A | PHY U4 configuration: 1-2: 3.3V (VIO) to BGE 3-4: 3.3V (VIO) to EN 5-6: 3.3V (VIO) to STBY 7-8: GND to WAKE |
| J30 | FR_B | 1-2: PHY U5 TX to MCU 3-4: PHY U5 TXEN to MCU 5-6: PHY U5 RX to MCU |
| J31 | FR_B | PHY U5 configuration: 1-2: 3.3V (VIO) to BGE 3-4: 3.3V (VIO) to EN 5-6: 3.3V (VIO) to STBY 7-8: GND to WAKE |

3.6 Ethernet Configuration

The EVB is fitted with a standard RJ45 ethernet connector (*J7*) and a DP83848C 10/100 ethernet transceiver (*U6*).

By default, the Ethernet interface is not enabled. To enable the Ethernet interface the jumpers detailed in [Table 6](#) need to be placed.

Table 6. Ethernet control jumpers

| Jumper | Description |
|--------|---|
| J22 | PHY power on (jumper placed on default) |
| J18 | RXCLK |
| J20 | CRS_LEDCFG |
| J24 | RXER_MDIXEN |
| J26 | RXDV_MIIIMODE |
| J39 | RXD0_PHYAD1 |
| J40 | RXD1_PHYAD1 |
| J41 | RXD2_PHYAD2 |
| J42 | RXD3_PHYAD3 |
| J44 | COL_PHYAD0 |
| J45 | TXEN |
| J46 | TXCLK |
| J47 | TXD0 |
| J48 | TXD1 |
| J49 | TXD2 |
| J50 | TXD3_SNIMODE |
| J51 | MDC |
| J52 | MDIO |

3.7 User Area

There is a rectangular prototype area on the EVB top right corner, consisting of a 0.1in. pitch array of through-hole plated pads. Power from all the three switching regulators is readily accessible along with GND through JP1 – JP16 next to the prototyping area. This area is ideal for the addition of any custom circuitry.

There are four active low user LEDs D2, D3, D4 and D5, these are driven by connecting a logic 0 signal to the corresponding pin on 0.1in. header P7 (USER LEDS). The LED inputs are pulled to VDD_HV_IO_MAIN through 10 kΩ resistors.

There are 4 active high pushbutton switches SW1, SW2, SW3 and SW4 which will drive 5V onto the respective pins on 0.1in. connector P6 when pressed. The switch outputs are pulled to GND via 10 kΩ.

Potentiometer RV1 can be connected to port pin PB[0] and is adjustable between GND and 5 V from the linear regulator. Power from all regulators can be connected to port pins as through J54:

- 1-2: 1.25V_SR to PB[1]
- 3-4: 3.3V_SR to PB[2]
- 5-6: 5V_SR to PB[3]

- 7-8: 5V_LR to PB[4]

The P12V rail from the 12 V input is scaled to 4.3V through the voltage divider of R81 and R82 and the scaled voltage can be connected to PB[5] via J55.

3.8 Testpoints — Motherboard

A number of test points of different shape and functionality is scattered around the EVB to allow easy access to MCU and reference signals. This chapter summarizes and describes the available test points. Motherboard test points are listed and detailed in [Table 7](#).

Table 7. Test points-motherboard

| Signal | TP name | Shape | Description |
|----------|---------|-------|--------------------|
| GND | GT1 | Hook | Ground reference |
| GND | GT2 | Hook | Ground reference |
| GND | GT3 | Hook | Ground reference |
| GND | GT4 | Hook | Ground reference |
| GND | GT5 | Hook | Ground reference |
| GND | GT6 | Hook | Ground reference |
| GND | GT7 | Hook | Ground reference |
| GND | GT8 | Hook | Ground reference |
| GND | GT9 | Hook | Ground reference |
| GND | GT10 | Hook | Ground reference |
| GND | GT11 | Hook | Ground reference |
| 1.25V_SR | JP1 | Pin | 1.25V_SR reference |
| 1.25V_SR | JP2 | Pin | 1.25V_SR reference |
| 1.25V_SR | JP3 | Pin | 1.25V_SR reference |
| 1.25V_SR | JP4 | Pin | 1.25V_SR reference |
| 3.3V_SR | JP5 | Pin | 3.3V_SR reference |
| 3.3V_SR | JP6 | Pin | 3.3V_SR reference |
| 3.3V_SR | JP7 | Pin | 3.3V_SR reference |

Table 7. Test points-motherboard (continued)

| | | | |
|----------|------|------|--------------------|
| 3.3V_SR | JP8 | Pin | 3.3V_SR reference |
| 5V_SR | JP9 | Pin | 5V_SR reference |
| 5V_SR | JP10 | Pin | 5V_SR reference |
| 5V_SR | JP11 | Pin | 5V_SR reference |
| 5V_SR | JP12 | Pin | 5V_SR reference |
| GND | JP13 | Pin | Ground reference |
| GND | JP14 | Pin | Ground reference |
| GND | JP15 | Pin | Ground reference |
| GND | JP16 | Pin | Ground reference |
| 5V_SR | TP15 | Hook | 5V_SR reference |
| 5V_LR | TP14 | Hook | 5V_LR reference |
| 3.3V_SR | TP16 | Hook | 3.3V_SR reference |
| 1.25V_SR | TP17 | Hook | 1.25V_SR reference |
| FRA-INH2 | TP5 | Pad | FlexRAY |
| FRA-INH1 | TP1 | Pad | FlexRAY |
| FRA-ERRN | TP2 | Pad | FlexRAY |
| FRA-RXEN | TP6 | Pad | FlexRAY |
| FRB-INH2 | TP7 | Pad | FlexRAY |
| FRB-INH1 | TP3 | Pad | FlexRAY |
| FRB-ERRN | TP4 | Pad | FlexRAY |
| FRB-RXEN | TP8 | Pad | FlexRAY |
| FR_DBG0 | TP10 | Pad | FlexRAY debug0 |

Table 7. Test points-motherboard (continued)

| | | | |
|-----------|------|-----|----------------|
| FR_DBG1 | TP11 | Pad | FlexRAY debug1 |
| FR_DBG2 | TP12 | Pad | FlexRAY debug2 |
| FR_DBG3 | TP13 | Pad | FlexRAY debug3 |
| FEC 25MHz | TP9 | Pad | Ethernet clock |

4 Configuration — Daughter card

This section details the configuration of each of the daughter card's functional blocks.

The daughter card has been designed with ease of use in mind and has been segmented into functional blocks as shown in [Figure 12](#). Detailed silkscreen legend has been used throughout the board to identify all switches, jumpers and user connectors.

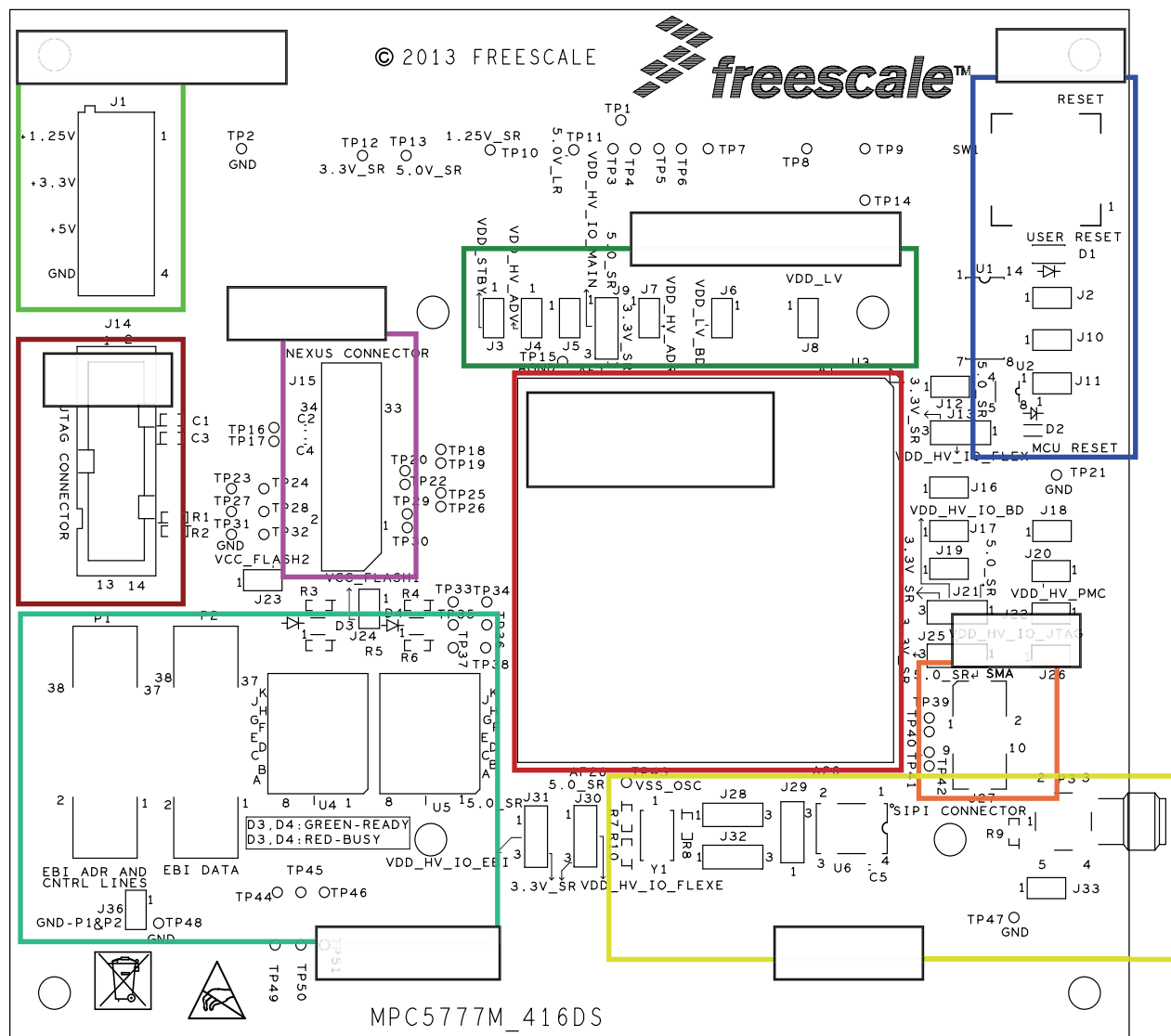


Figure 12. Daughter card — functional blocks

4.1 MCU Power

4.1.1 Supply Routing and Jumpers

The different MCU supplies are connected to the regulators on the motherboard through the interface connector. [Figure 13](#) shows how the MCU power domains are connected to the regulators.

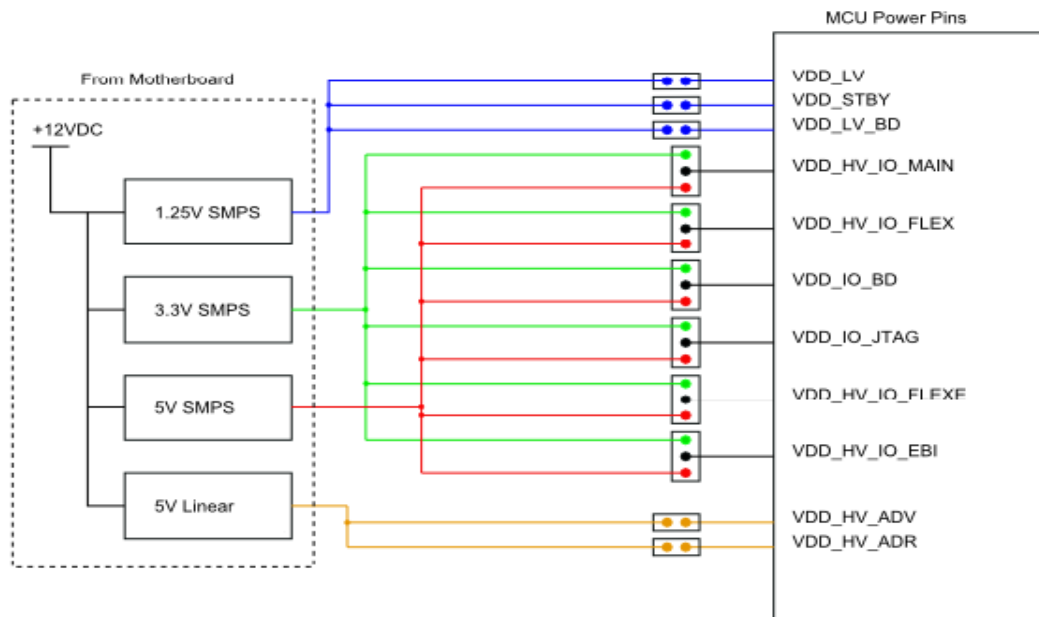


Figure 13. Daughter card power distribution

The connection of any power domain to a regulator has to be enabled by a dedicated jumper as described in [Table 8](#).

Table 8. MCU power selection jumpers

| Jumper | Description |
|--------|-----------------------------------|
| J1 | Connect ADC supplies to 5V_LR |
| J2 | Connect ADC supplies to 5V_LR |
| J3 | Select VDD_HV_JTAG_OSC |
| J4 | Connect PMC supply to 5V_SR |
| J6 | Select VDD_HV_IO_MAIN |
| J7 | Connect FlexRay supply to 3.3V_SR |
| J9 | Connect VDD_LV_STBY to 1.25V_SR |
| J10 | Connect core supply to 1.25V_SR |

4.1.2 Daughter Card Standalone Power Input

A terminal power input is provided on the daughter card to enable use of the daughter card without the motherboard.

The connections of the power terminal are detailed in [Figure 14](#).

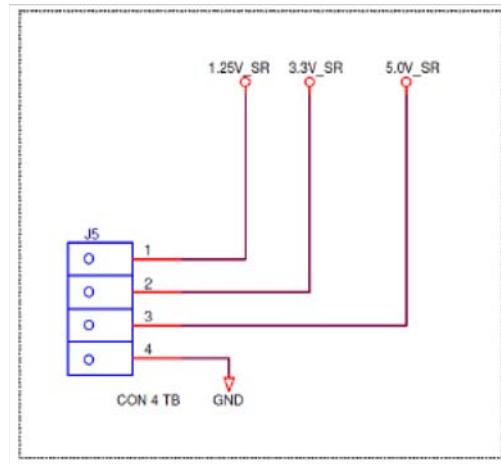


Figure 14. Terminal power input connections

NOTE

The power terminal does not connect to the 5.0V_LR power rail which is powered by the 5 V linear regulator when used with the motherboard. This rail is powering the VDD_HV_ADV (ADC supply) and VDD_HV_ADR (ADC reference voltage). When using the daughter card standalone (without the motherboard) it is required to connect the 5.0V_LR and the 5.0V_SR rail in order for the microcontroller to come out of reset. Refer to [Section 4.8, “Configuring the Daughter Card for Standalone Use”](#) for more information.

4.2 Reset Circuit

To enable standalone use, the reset circuitry is placed on the daughter card. It consists of a reset switch that is connected to both reset pins, ESR0 and PORST, via jumpers. It is also connected to the signal RST-SW that is connected to the mother board to reset peripherals. Additionally LEDs are used to indicate the individual reset situations.

Due to the existence of chip internal low voltage detect (LVD) and high voltage detect (HVD) circuits the EVB does not provide external voltage monitoring.

The EVB reset circuit provides the following functionality: It is indicated if the device is in reset through the red LED D4. The reset switch SW1 can be used to reset the MCU when jumper J27 is set. The reset switch signal is connected to the MCU reset signals ESR0 (through jumper J25) and PORST (through

jumper J26) and the connections can be released by lifting the respective jumper. Pushing the reset switch will also reset peripherals that are connected to the board reset signal RST-SW. LED D1 indicates when this signal is driven low by the reset switch.

Table 9. Reset circuit jumper settings

| Jumper | Description |
|--------|---|
| J25 | Connect reset switch circuit to ESR0 pin |
| J26 | Connect reset switch circuit to PORST pin |
| J27 | Connect reset switch (SW1) to reset circuit |

4.3 MCU External Clock Circuit

In addition to the internal 16 MHz oscillator, the MCU can be clocked by different external sources. The EVB system supports three possible MCU clock sources:

1. 40 MHz crystal Y1
2. 8 MHz external crystal oscillator U2
3. External clock input to the EVB via the SMA connector (P1), driving the MCU EXTAL signal

The clock circuitry for the 40 MHz crystal is shown in [Figure 15](#).

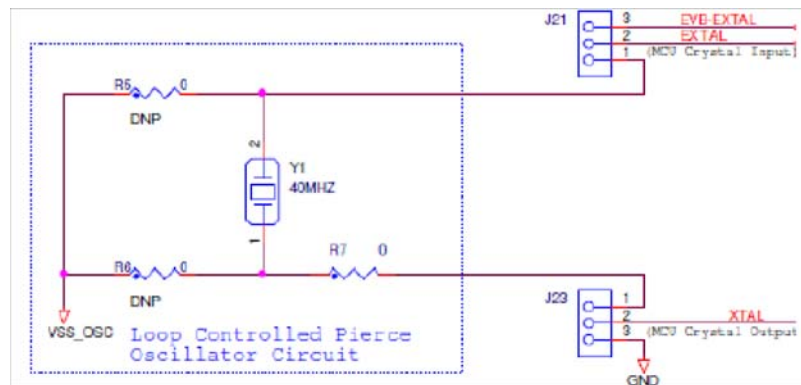


Figure 15. 40 MHz crystal circuit

The default configuration routes the signals of oscillator module (Y1) to the MCU. Jumpers are set as follows:

- J21 is set to position 1-2 to connect the crystal (pin2) to the MCUs EXTAL signal
- J23 is set to position 1-2 to connect the crystal (pin1) to the MCUs XTAL signal

To use either the 8 MHz oscillator or the external clock input both jumpers J21 and J23 need to be moved to position 2-3 to connect the MCUs EXTAL signal to the EVB-EXTAL signal and to connect the MCUs XTAL signal to ground. The circuit of the EVB-EXTAL signal is shown in [Figure 16](#).

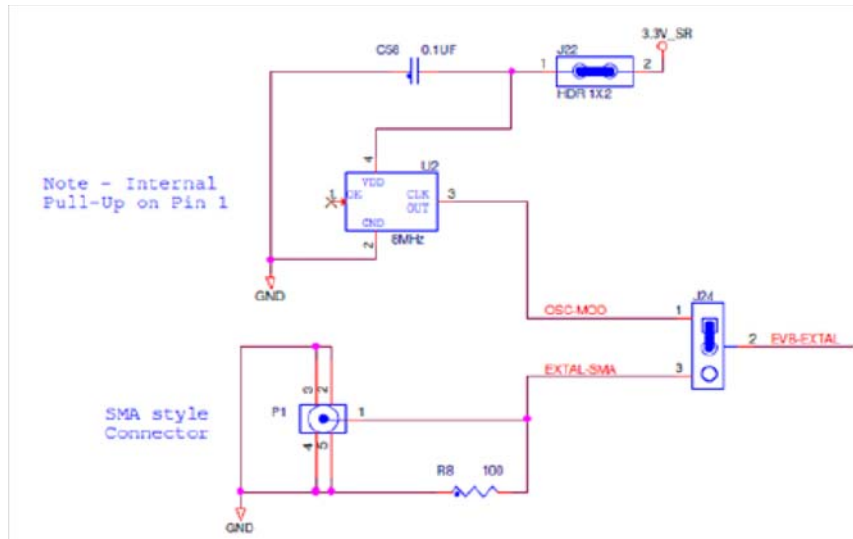


Figure 16. EVB-EXTAL clock circuit

If it is required to use 8 MHz oscillator jumper J22 has to be set to power the oscillator and jumper J24 must be set to 1-2 (MOD) to connect to oscillator signal to the EVB-EXTAL signal.

If it is required to use the SMA connector (P1) to supply a clock signal, jumper J24 must be moved to position 2-3 (SMA).

4.4 JTAG Connector

The EVB is fitted with 14-pin JTAG debug connector. The following diagram shows the 14-pin JTAG connector pinout (0.1in. keyed header).

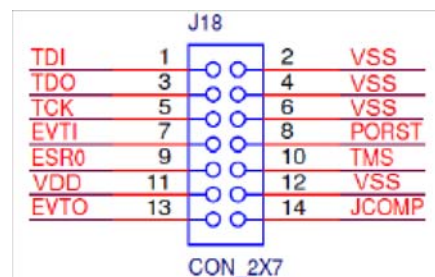


Figure 17. JTAG connector point

4.5 Nexus Aurora Connector

Table 10 shows the pinout of the 34-pin Samtec connector for the MPC5777M (emulation device).

Table 10. Trace Connector Pinout

| Pin No | Function | Pin No | Function |
|--------|-------------------|--------|------------------|
| 1 | TX0+ | 2 | VREF |
| 3 | TX0- | 4 | TCK/TCKC/DRCLK |
| 5 | VSS | 6 | TMS/TMSC/TxDataP |
| 7 | TX1+ | 8 | TDI/TxDataN |
| 9 | TX1- | 10 | TDO/RxDataP |
| 11 | VSS | 12 | JCOMP/RxDataN |
| 13 | TX2+ | 14 | EVTI1 |
| 15 | TX2- | 16 | EVTI0 |
| 17 | VSS | 18 | EVTO0 |
| 19 | TX3+ | 20 | PORST |
| 21 | TX3- | 22 | ESR0 |
| 23 | VSS | 24 | VSS |
| 25 | TX4+ ¹ | 26 | CLK+ |
| 27 | TX4+ ¹ | 28 | CLK- |
| 29 | VSS | 30 | VSS |
| 31 | TX5+ ¹ | 32 | EVTO1/RDY |
| 33 | TX5+ ¹ | 34 | N/C |
| GND | VSS | GND | VSS |

¹ These signals are not implemented on MPC5777M.

NOTE

The existence of a Nexus interface depends on the package the MCU is delivered. Generally, production devices do not have the Nexus interface implemented. Daughter cards which are intended solely for the production devices will not come with the Nexus connector. Please refer to [Table 1](#) for information which daughter cards have the Nexus connector.

4.6 Serial Interprocessor Interface (SIPI)

A dedicated SIPI interface connector is provided on the daughter card. For signal integrity the SIPI signals are not routed to the mother board. Test points are provided on the signals so they can be accessed if required to be used as a different function.

A 10pin Samtec connector (J20: ERF8-005-05.0-LDV-L-TR) is used for the SIPI interface. The pin-out of the connector is shown in [Figure 18](#).

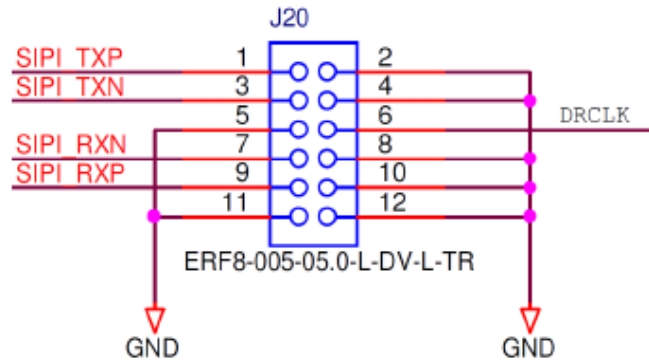


Figure 18. SIPI connector pinout

4.7 Test points — Daughter Card

Daughter card test points are listed and detailed in [Table 11](#).

Table 11. Test points — daughter card

| Signal | TP name | Shape | Description |
|----------|---------|-------|-----------------------------|
| VSS_OSC | TP1 | Hook | Oscillator ground reference |
| AGND | TP2 | Hook | Analog ground reference |
| GND | GT1 | Hook | Ground reference |
| GND | GT2 | Hook | Ground reference |
| GND | GT3 | Hook | Ground reference |
| GND | GT4 | Hook | Ground reference |
| GND | GT5 | Hook | Ground reference |
| JCOMP | TP3 | Pad | JCOMP access |
| TCK | TP4 | Pad | TCK access |
| TMS | TP5 | Pad | TMS access |
| TDI | TP6 | Pad | TDI access |
| TDO | TP7 | Pad | TDO access |
| SIPI_RXN | TP9 | Pad | SIPI_RXN access |
| SIPI_TXN | TP11 | Pad | SIPI_TXN access |
| SIPI_RXP | TP13 | Pad | SIPI_RXP access |
| SIPI_TXP | TP15 | Pad | SIPI_TXP access |
| MB PA5 | TP22 | Pad | Motherboard connection PA5 |
| MB PA9 | TP23 | Pad | Motherboard connection PA9 |
| MB PA14 | TP24 | Pad | Motherboard connection PA14 |
| MB PA7 | TP25 | Pad | Motherboard connection PA7 |

Table 11. Test points — daughter card

| | | | |
|---------|------|-----|-----------------------------|
| MB PA8 | TP26 | Pad | Motherboard connection PA8 |
| MB PD7 | TP27 | Pad | Motherboard connection PD7 |
| MB PA6 | TP28 | Pad | Motherboard connection PA6 |
| MB PD6 | TP29 | Pad | Motherboard connection PD6 |
| MB PF13 | TP30 | Pad | Motherboard connection PF13 |

4.8 Configuring the Daughter Card for Standalone Use

It is possible to use the daughter cards without the motherboard to run code on the microcontroller. Power to the daughter cards must be supplied through the terminal power connector J5 – PWR_IN. It is required to connect all three voltages (1.25 V, 3.3 V and 5 V) and ground.

Additional to connecting the board to the power supply it is required to connect the 5V_SR power rail to the 5V_LR power rail of the daughter card that powers the VDD_HV_ADV and VDD_HV_ADR pins. It is recommended to do that by installing a jumper connecting J5-1 (5.0V_LR) to (5.0V_SR).

5 Board Interface Connector

This chapter provides a useful cross reference to see the connection from the motherboard to the board interface connector, and what MCU pins are connected to the interface connector on the daughter card.

[Table 12](#) lists all the connections to the board interface connector on both motherboard and daughter card. The columns on the left lists the 240 connections for the first interface connector (J43), the table on the right lists the 240 connections for the second interface connector (J56):

- The column “Motherboard” shows the motherboard connections to the interface connectors like power supply connections and user area port pins.
- The columns BGA416 PD and BGA416 ED shows the connections from the MCU pins to the interface connector on daughter card for the BGA416 Production Device (PD) and Emulation Device (ED) packages. It is ensured that the MCU port pins are routed to the associated user area port pin on the motherboard.
- The columns show BGA512 PD and BGA512 ED show the connections from the MCU pins to the interface connector on daughter card for the BGA512 PD and BGA512 ED packages. It is ensured that the MCU port pins are routed to the associated user area port pin on the motherboard.
- Green fields indicate power signals, power signals are connected to all the appropriate pins on the MCU
- Orange fields indicate MCU signals that are not connected to the motherboard through the interface connector (usually to retain signal integrity).
- Ground signals are not listed here. A solid ground connection is achieved through the middle bar of the interface connector.

Table 12. Board interface connector details

| Daughter Card to Motherboard Connector Pin | Motherboard | BGA416 PD | BGA416 ED | BGA512 PD | BGA512 ED |
|--|--------------------------|-----------|-----------|-----------|-----------|
| J34A-1 | VDD_LV_SR ^[1] | | | | |
| J34A-2 | VDD_LV_SR[1] | | | | |
| J34A-3 | VDD_LV_SR[1] | | | | |
| J34A-4 | VDD_LV_SR[1] | | | | |
| J34A-5 | PA[0] | A21 | A21 | F22 | F22 |
| J34A-6 | PA[1] | C22 | C22 | F23 | F23 |
| J34A-7 | PA[2] | - | - | G25 | G25 |
| J34A-8 | PA[3] | AF15 | AF15 | AD21 | AD21 |
| J34A-9 | PA[4] | A22 | A22 | M21 | M21 |
| J34A-10 | PA[5] | JCOMP | JCOMP | JCOMP | JCOMP |
| J34A-11 | PA[6] | TCK | TCK | TCK | TCK |
| J34A-12 | PA[7] | TMS | TMS | TMS | TMS |
| J34A-13 | PA[8] | TDI | TDI | TDI | TDI |
| J34A-14 | PA[9] | TDO | TDO | TDO | TDO |
| J34A-15 | PA[10] | C21 | C21 | G21 | G21 |
| J34A-16 | PA[11] | D21 | D21 | F20 | F20 |
| J34A-17 | PA[12] | B21 | B21 | H24 | H24 |
| J34A-18 | PA[13] | D18 | D18 | G22 | G22 |
| J34A-19 | PA[14] | SIPI TXP | SIPI TXP | SIPI TXP | SIPI TXP |
| J34A-20 | PA[15] | AC14 | AC14 | AD23 | AD23 |
| J34A-21 | 5.0V_SR | | | | |
| J34A-22 | 5.0V_SR | | | | |
| J34A-23 | 5.0V_SR | | | | |
| J34A-24 | 5.0V_SR | | | | |
| J34A-25 | PC[0] | M2 | M2 | N6 | N6 |

| | | | | | |
|---------|---------|----|----|-----|-----|
| J34A-26 | PC[1] | M3 | M3 | M7 | M7 |
| J34A-27 | PC[2] | M4 | M4 | M6 | M6 |
| J34A-28 | PC[3] | J3 | J3 | L6 | L6 |
| J34A-29 | PC[4] | H1 | H1 | L7 | L7 |
| J34A-30 | PC[5] | H2 | H2 | K6 | K6 |
| J34A-31 | PC[6] | D4 | D4 | K7 | K7 |
| J34A-32 | PC[7] | C1 | C1 | J6 | J6 |
| J34A-33 | PC[8] | F2 | F2 | J7 | J7 |
| J34A-34 | PC[9] | E2 | E2 | H6 | H6 |
| J34A-35 | PC[10] | C5 | C5 | G13 | G13 |
| J34A-36 | PC[11] | D6 | D6 | F13 | F13 |
| J34A-37 | PC[12] | D5 | D5 | G14 | G14 |
| J34A-38 | PC[13] | B5 | B5 | F14 | F14 |
| J34A-39 | PC[14] | C6 | C6 | J14 | J14 |
| J34A-40 | PC[15] | A5 | A5 | G15 | G15 |
| J34A-41 | 3.3V_SR | | | | |
| J34A-42 | 3.3V_SR | | | | |
| J34A-43 | 3.3V_SR | | | | |
| J34A-44 | 3.3V_SR | | | | |
| J34A-45 | PE[0] | M1 | M1 | N7 | N7 |
| J34A-46 | PE[1] | N4 | N4 | P6 | P6 |
| J34A-47 | PE[2] | N3 | N3 | P7 | P7 |
| J34A-48 | PE[3] | T2 | T2 | R9 | R9 |
| J34A-49 | PE[4] | N2 | N2 | R7 | R7 |
| J34A-50 | PE[5] | - | - | L25 | L25 |
| J34A-51 | PE[6] | - | - | K22 | K22 |
| J34A-52 | PE[7] | - | - | K24 | K24 |

Board Interface Connector

| | | | | | |
|---------|--------------|-----|-----|------|------|
| J34A-53 | PE[8] | - | - | J25 | J25 |
| J34A-54 | PE[9] | - | - | H25 | H25 |
| J34A-55 | PE[10] | C14 | C14 | G19 | G19 |
| J34A-56 | PE[11] | D13 | D13 | G20 | G20 |
| J34A-57 | PE[12] | D10 | D10 | F15 | F15 |
| J34A-58 | PE[13] | AA3 | AA3 | AE14 | AE14 |
| J34A-59 | PE[14] | AB4 | AB4 | AB13 | AB13 |
| J34A-60 | PE[15] | AC4 | AC4 | AD13 | AD13 |
| J34A-61 | VDD_LV_SR[1] | | | | |
| J34A-62 | VDD_LV_SR[1] | | | | |
| J34A-63 | VDD_LV_SR[1] | | | | |
| J34A-64 | VDD_LV_SR[1] | | | | |
| J34A-65 | PG[0] | N1 | N1 | R10 | R10 |
| J34A-66 | PG[1] | - | - | U7 | U7 |
| J34A-67 | PG[2] | - | - | U6 | U6 |
| J34A-68 | PG[3] | - | - | V7 | V7 |
| J34A-69 | PG[4] | - | - | V6 | V6 |
| J34A-70 | PG[5] | AD7 | AD7 | AD6 | AD6 |
| J34A-71 | PG[6] | AC7 | AC7 | AD7 | AD7 |
| J34A-72 | PG[7] | AD3 | AD3 | AB10 | AB10 |
| J34A-73 | PG[8] | AC3 | AC3 | AD10 | AD10 |
| J34A-74 | PG[9] | - | - | AD11 | AD11 |
| J34A-75 | PG[10] | - | - | AA12 | AA12 |
| J34A-76 | PG[11] | AF3 | AF3 | AD12 | AD12 |
| J34A-77 | PG[12] | AE3 | AE3 | AE13 | AE13 |
| J34A-78 | PG[13] | - | - | L22 | L22 |
| J34A-79 | PG[14] | - | - | L24 | L24 |

| | | | | | |
|----------|---------|------|------|------|------|
| J34A-80 | PG[15] | D19 | D19 | K19 | K19 |
| J34A-81 | 5.0V_SR | | | | |
| J34A-82 | 5.0V_SR | | | | |
| J34A-83 | 5.0V_SR | | | | |
| J34A-84 | 5.0V_SR | | | | |
| J34A-85 | PI[0] | Y3 | Y3 | Y6 | Y6 |
| J34A-86 | PI[1] | W3 | W3 | W9 | W9 |
| J34A-87 | PI[2] | AC1 | AC1 | AB6 | AB6 |
| J34A-88 | PI[3] | AB1 | AB1 | AB7 | AB7 |
| J34A-89 | PI[4] | AB2 | AB2 | AC6 | AC6 |
| J34A-90 | PI[5] | AA2 | AA2 | AC7 | AC7 |
| J34A-91 | PI[6] | AF2 | AF2 | AD8 | AD8 |
| J34A-92 | PI[7] | AE2 | AE2 | AD9 | AD9 |
| J34A-93 | PI[8] | P2 | P2 | T6 | T6 |
| J34A-94 | PI[9] | P1 | P1 | T7 | T7 |
| J34A-95 | PI[10] | AF11 | AF11 | AE16 | AE16 |
| J34A-96 | PI[11] | AE11 | AE11 | AD16 | AD16 |
| J34A-97 | PI[12] | AD11 | AD11 | AE15 | AE15 |
| J34A-98 | PI[13] | AC11 | AC11 | AD15 | AD15 |
| J34A-99 | PI[14] | J23 | J23 | R22 | R22 |
| J34A-100 | PI[15] | G24 | G24 | P22 | P22 |
| J34A-101 | N.C. | x | x | x | x |
| J34A-102 | N.C. | x | x | x | x |
| J34A-103 | N.C. | x | x | x | x |
| J34A-104 | N.C. | x | x | x | x |
| J34A-105 | PK[0] | U1 | U1 | T9 | T9 |
| J34A-106 | PK[1] | T1 | T1 | T10 | T10 |

Board Interface Connector

| | | | | | |
|----------|---------|-----|-----|------|------|
| J34A-107 | PK[2] | U3 | U3 | U9 | U9 |
| J34A-108 | PK[3] | U4 | U4 | U10 | U10 |
| J34A-109 | PK[4] | - | - | Y9 | Y9 |
| J34A-110 | PK[5] | - | - | W10 | W10 |
| J34A-111 | PK[6] | - | - | Y10 | Y10 |
| J34A-112 | PK[7] | - | - | AA9 | AA9 |
| J34A-113 | PK[8] | - | - | AA10 | AA10 |
| J34A-114 | PK[9] | - | - | AA11 | AA11 |
| J34A-115 | PK[10] | AD4 | AD4 | AB12 | AB12 |
| J34A-116 | PK[11] | - | - | AB11 | AB11 |
| J34A-117 | PK[12] | - | - | T22 | T22 |
| J34A-118 | PK[13] | - | - | T21 | T21 |
| J34A-119 | PK[14] | B10 | B10 | J13 | J13 |
| J34A-120 | PK[15] | A10 | A10 | K13 | K13 |
| J34B-121 | 5.0V_SR | | | | |
| J34B-122 | 5.0V_SR | | | | |
| J34B-123 | 5.0V_SR | | | | |
| J34B-124 | 5.0V_SR | | | | |
| J34B-125 | PM[0] | C8 | C8 | J12 | J12 |
| J34B-126 | PM[1] | C9 | C9 | K12 | K12 |
| J34B-127 | PM[2] | C7 | C7 | J11 | J11 |
| J34B-128 | PM[3] | B9 | B9 | K11 | K11 |
| J34B-129 | PM[4] | C11 | C11 | K14 | K14 |
| J34B-130 | PM[5] | D11 | D11 | K15 | K15 |
| J34B-131 | PM[6] | C10 | C10 | J15 | J15 |
| J34B-132 | PM[7] | B11 | B11 | K16 | K16 |
| J34B-133 | PM[8] | A11 | A11 | K17 | K17 |

| | | | | | |
|----------|--------|-----|-----|-----|-----|
| J34B-134 | PM[9] | B20 | B20 | F21 | F21 |
| J34B-135 | PM[10] | B7 | B7 | F11 | F11 |
| J34B-136 | PM[11] | B6 | B6 | B8 | B8 |
| J34B-137 | PM[12] | C4 | C4 | B7 | B7 |
| J34B-138 | PM[13] | - | - | B6 | B6 |
| J34B-139 | PM[14] | C3 | C3 | B5 | B5 |
| J34B-140 | PM[15] | B3 | B3 | A6 | A6 |
| J34B-141 | RST_SW | - | - | - | - |
| J34B-142 | N.C. | x | x | x | x |
| J34B-143 | N.C. | x | x | x | x |
| J34B-144 | N.C. | x | x | x | x |
| J34B-145 | N.C. | x | x | x | x |
| J34B-146 | N.C. | x | x | x | x |
| J34B-147 | N.C. | x | x | x | x |
| J34B-148 | N.C. | x | x | x | x |
| J34B-149 | N.C. | x | x | x | x |
| J34B-150 | N.C. | x | x | x | x |
| J34B-151 | N.C. | x | x | x | x |
| J34B-152 | N.C. | x | x | x | x |
| J34B-153 | N.C. | x | x | x | x |
| J34B-154 | N.C. | x | x | x | x |
| J34B-155 | N.C. | x | x | x | x |
| J34B-156 | N.C. | x | x | x | x |
| J34B-157 | N.C. | x | x | x | x |
| J34B-158 | N.C. | x | x | x | x |
| J34B-159 | N.C. | x | x | x | x |
| J34B-160 | N.C. | x | x | x | x |

Board Interface Connector

| | | | | | |
|----------|--------------|-----|-----|-----|-----|
| J34B-161 | VDD_LV_SR[1] | | | | |
| J34B-162 | VDD_LV_SR[1] | | | | |
| J34B-163 | VDD_LV_SR[1] | | | | |
| J34B-164 | VDD_LV_SR[1] | | | | |
| J34B-165 | PQ[0] | R2 | R2 | U2 | U2 |
| J34B-166 | PQ[1] | P3 | P3 | T2 | T2 |
| J34B-167 | PQ[2] | P4 | P4 | U1 | U1 |
| J34B-168 | PQ[3] | A19 | A19 | A20 | A20 |
| J34B-169 | PQ[4] | A15 | A15 | B19 | B19 |
| J34B-170 | PQ[5] | B19 | B19 | A19 | A19 |
| J34B-171 | PQ[6] | B15 | B15 | B18 | B18 |
| J34B-172 | PQ[7] | B14 | B14 | A18 | A18 |
| J34B-173 | PQ[8] | B17 | B17 | B16 | B16 |
| J34B-174 | PQ[9] | A17 | A17 | A16 | A16 |
| J34B-175 | PQ[10] | A16 | A16 | B15 | B15 |
| J34B-176 | PQ[11] | B16 | B16 | A15 | A15 |
| J34B-177 | PQ[12] | - | - | B14 | B14 |
| J34B-178 | PQ[13] | C12 | C12 | A14 | A14 |
| J34B-179 | PQ[14] | A13 | A13 | B13 | B13 |
| J34B-180 | PQ[15] | B12 | B12 | B12 | B12 |
| J34B-181 | 5.0V_SR | | | | |
| J34B-182 | 5.0V_SR | | | | |
| J34B-183 | 5.0V_SR | | | | |
| J34B-184 | 5.0V_SR | | | | |
| J34B-185 | N.C. | x | x | x | x |
| J34B-186 | N.C. | x | x | x | x |
| J34B-187 | N.C. | x | x | x | x |

| | | | | | |
|----------|-------|------|------|------|------|
| J34B-188 | N.C. | x | x | x | x |
| J34B-189 | N.C. | x | x | x | x |
| J34B-190 | N.C. | x | x | x | x |
| J34B-191 | N.C. | x | x | x | x |
| J34B-192 | N.C. | x | x | x | x |
| J34B-193 | N.C. | x | x | x | x |
| J34B-194 | N.C. | x | x | x | x |
| J34B-195 | N.C. | x | x | x | x |
| J34B-196 | N.C. | x | x | x | x |
| J34B-197 | N.C. | x | x | x | x |
| J34B-198 | N.C. | x | x | x | x |
| J34B-199 | N.C. | x | x | x | x |
| J34B-200 | N.C. | x | x | x | x |
| J34B-201 | N.C. | x | x | x | x |
| J34B-202 | N.C. | x | x | x | x |
| J34B-203 | N.C. | x | x | x | x |
| J34B-204 | N.C. | x | x | x | x |
| J34B-205 | PY[0] | - | - | AC2 | AC2 |
| J34B-206 | PY[1] | - | - | AC1 | AC1 |
| J34B-207 | PY[2] | - | - | AA2 | AA2 |
| J34B-208 | PY[3] | - | - | AA1 | AA1 |
| J34B-209 | PY[4] | AA25 | AA25 | AG29 | AG29 |
| J34B-210 | N.C. | x | x | x | x |
| J34B-211 | N.C. | x | x | x | x |
| J34B-212 | N.C. | x | x | x | x |
| J34B-213 | N.C. | x | x | x | x |
| J34B-214 | N.C. | x | x | x | x |

Board Interface Connector

| | | | | | |
|----------|----------------|---|---|-----|-----|
| J34B-215 | N.C. | x | x | x | x |
| J34B-216 | N.C. | x | x | x | x |
| J34B-217 | N.C. | x | x | x | x |
| J34B-218 | N.C. | x | x | x | x |
| J34B-219 | N.C. | x | x | x | x |
| J34B-220 | N.C. | x | x | x | x |
| J34B-221 | VDD_HV_IO_MAIN | | | | |
| J34B-222 | VDD_HV_IO_MAIN | | | | |
| J34B-223 | VDD_HV_IO_MAIN | | | | |
| J34B-224 | VDD_HV_IO_MAIN | | | | |
| J34B-225 | N.C. | x | x | x | x |
| J34B-226 | N.C. | x | x | x | x |
| J34B-227 | N.C. | x | x | x | x |
| J34B-228 | N.C. | x | x | x | x |
| J34B-229 | N.C. | x | x | x | x |
| J34B-230 | N.C. | x | x | x | x |
| J34B-231 | N.C. | x | x | x | x |
| J34B-232 | N.C. | x | x | x | x |
| J34B-233 | N.C. | x | x | x | x |
| J34B-234 | N.C. | x | x | x | x |
| J34B-235 | N.C. | x | x | x | x |
| J34B-236 | N.C. | x | x | x | x |
| J34B-237 | N.C. | x | x | x | x |
| J34B-238 | N.C. | x | x | x | x |
| J34B-239 | N.C. | x | x | x | x |
| J34B-240 | N.C. | x | x | x | x |
| J33A-1 | PX[15] | - | - | AE1 | AE1 |

| | | | | | |
|---------|----------------|-----|-----|-----|-----|
| J33A-2 | PX[14] | - | - | AE2 | AE2 |
| J33A-3 | PX[13] | - | - | AK6 | AK6 |
| J33A-4 | PX[12] | - | - | AJ6 | AJ6 |
| J33A-5 | PX[11] | - | - | A22 | A22 |
| J33A-6 | PX[10] | - | - | B22 | B22 |
| J33A-7 | PX[9] | - | - | A23 | A23 |
| J33A-8 | PX[8] | - | - | B23 | B23 |
| J33A-9 | PX[7] | - | - | A24 | A24 |
| J33A-10 | PX[6] | - | - | B24 | B24 |
| J33A-11 | PX[5] | - | - | B25 | B25 |
| J33A-12 | PX[4] | - | - | A11 | A11 |
| J33A-13 | PX[3] | - | - | A12 | A12 |
| J33A-14 | PX[2] | A12 | A12 | B11 | B11 |
| J33A-15 | PX[1] | B13 | B13 | A13 | A13 |
| J33A-16 | PX[0] | A2 | A2 | A5 | A5 |
| J33A-17 | VDD_HV_IO_MAIN | | | | |
| J33A-18 | VDD_HV_IO_MAIN | | | | |
| J33A-19 | VDD_HV_IO_MAIN | | | | |
| J33A-20 | VDD_HV_IO_MAIN | | | | |
| J33A-21 | N.C. | x | x | x | x |
| J33A-22 | N.C. | x | x | x | x |
| J33A-23 | N.C. | x | x | x | x |
| J33A-24 | N.C. | x | x | x | x |
| J33A-25 | N.C. | x | x | x | x |
| J33A-26 | N.C. | x | x | x | x |
| J33A-27 | N.C. | x | x | x | x |
| J33A-28 | N.C. | x | x | x | x |

Board Interface Connector

| | | | | | |
|---------|---------|---|---|---|---|
| J33A-29 | N.C. | x | x | x | x |
| J33A-30 | N.C. | x | x | x | x |
| J33A-31 | N.C. | x | x | x | x |
| J33A-32 | N.C. | x | x | x | x |
| J33A-33 | N.C. | x | x | x | x |
| J33A-34 | N.C. | x | x | x | x |
| J33A-35 | N.C. | x | x | x | x |
| J33A-36 | N.C. | x | x | x | x |
| J33A-37 | 3.3V_SR | | | | |
| J33A-38 | 3.3V_SR | | | | |
| J33A-39 | 3.3V_SR | | | | |
| J33A-40 | 3.3V_SR | | | | |
| J33A-41 | N.C. | x | x | x | x |
| J33A-42 | N.C. | x | x | x | x |
| J33A-43 | N.C. | x | x | x | x |
| J33A-44 | N.C. | x | x | x | x |
| J33A-45 | N.C. | x | x | x | x |
| J33A-46 | N.C. | x | x | x | x |
| J33A-47 | N.C. | x | x | x | x |
| J33A-48 | N.C. | x | x | x | x |
| J33A-49 | N.C. | x | x | x | x |
| J33A-50 | N.C. | x | x | x | x |
| J33A-51 | N.C. | x | x | x | x |
| J33A-52 | N.C. | x | x | x | x |
| J33A-53 | N.C. | x | x | x | x |
| J33A-54 | N.C. | x | x | x | x |
| J33A-55 | N.C. | x | x | x | x |

| | | | | | |
|---------|--------------|-----|-----|-----|-----|
| J33A-56 | N.C. | x | x | x | x |
| J33A-57 | 5.0V_SR | | | | |
| J33A-58 | 5.0V_SR | | | | |
| J33A-59 | 5.0V_SR | | | | |
| J33A-60 | 5.0V_SR | | | | |
| J33A-61 | PR[15] | V1 | V1 | W2 | W2 |
| J33A-62 | PR[14] | U2 | U2 | W1 | W1 |
| J33A-63 | PR[13] | W1 | W1 | Y2 | Y2 |
| J33A-64 | PR[12] | V2 | V2 | Y1 | Y1 |
| J33A-65 | PR[11] | Y1 | Y1 | AB1 | AB1 |
| J33A-66 | PR[10] | W2 | W2 | AB2 | AB2 |
| J33A-67 | PR[9] | AA1 | AA1 | AD2 | AD2 |
| J33A-68 | PR[8] | Y2 | Y2 | AD1 | AD1 |
| J33A-69 | PR[7] | AB3 | AB3 | AF2 | AF2 |
| J33A-70 | PR[6] | AA4 | AA4 | AF1 | AF1 |
| J33A-71 | PR[5] | AF7 | AF7 | AK4 | AK4 |
| J33A-72 | PR[4] | AE7 | AE7 | AJ4 | AJ4 |
| J33A-73 | PR[3] | AF6 | AF6 | AK5 | AK5 |
| J33A-74 | PR[2] | AE6 | AE6 | AJ5 | AJ5 |
| J33A-75 | PR[1] | AE1 | AE1 | AJ7 | AJ7 |
| J33A-76 | PR[0] | AD2 | AD2 | AK7 | AK7 |
| J33A-77 | VDD_LV_SR[1] | | | | |
| J33A-78 | VDD_LV_SR[1] | | | | |
| J33A-79 | VDD_LV_SR[1] | | | | |
| J33A-80 | VDD_LV_SR[1] | | | | |
| J33A-81 | N.C. | x | x | x | x |
| J33A-82 | N.C. | x | x | x | x |

Board Interface Connector

| | | | | | |
|----------|--------|----|----|----|----|
| J33A-83 | N.C. | x | x | x | x |
| J33A-84 | N.C. | x | x | x | x |
| J33A-85 | N.C. | x | x | x | x |
| J33A-86 | N.C. | x | x | x | x |
| J33A-87 | N.C. | x | x | x | x |
| J33A-88 | N.C. | x | x | x | x |
| J33A-89 | N.C. | x | x | x | x |
| J33A-90 | N.C. | x | x | x | x |
| J33A-91 | N.C. | x | x | x | x |
| J33A-92 | N.C. | x | x | x | x |
| J33A-93 | N.C. | x | x | x | x |
| J33A-94 | N.C. | x | x | x | x |
| J33A-95 | N.C. | x | x | x | x |
| J33A-96 | N.C. | x | x | x | x |
| J33A-97 | N.C. | x | x | x | x |
| J33A-98 | N.C. | x | x | x | x |
| J33A-99 | N.C. | x | x | x | x |
| J33A-100 | N.C. | x | x | x | x |
| J33A-101 | PN[15] | L1 | L1 | P1 | P1 |
| J33A-102 | PN[14] | L2 | L2 | P2 | P2 |
| J33A-103 | PN[13] | L3 | L3 | N1 | N1 |
| J33A-104 | PN[12] | L4 | L4 | N2 | N2 |
| J33A-105 | PN[11] | K1 | K1 | M1 | M1 |
| J33A-106 | PN[10] | K2 | K2 | M2 | M2 |
| J33A-107 | PN[9] | J1 | J1 | L2 | L2 |
| J33A-108 | PN[8] | K3 | K3 | L1 | L1 |
| J33A-109 | PN[7] | G1 | G1 | K2 | K2 |

| | | | | | |
|----------|---------|------|------|------|------|
| J33A-110 | PN[6] | J2 | J2 | K1 | K1 |
| J33A-111 | PN[5] | F1 | F1 | J2 | J2 |
| J33A-112 | PN[4] | D2 | D2 | G1 | G1 |
| J33A-113 | PN[3] | E1 | E1 | G2 | G2 |
| J33A-114 | PN[2] | D1 | D1 | F1 | F1 |
| J33A-115 | PN[1] | D3 | D3 | F2 | F2 |
| J33A-116 | PN[0] | A3 | A3 | A7 | A7 |
| J33A-117 | 5.0V_LR | | | | |
| J33A-118 | 5.0V_LR | | | | |
| J33A-119 | 5.0V_LR | | | | |
| J33A-120 | 5.0V_LR | | | | |
| J33B-121 | PL[15] | - | TX0P | - | TX0P |
| J33B-122 | PL[14] | AC13 | AC13 | AA19 | AA19 |
| J33B-123 | PL[13] | - | TX0N | - | TX0N |
| J33B-124 | PL[12] | AD10 | AD10 | AA18 | AA18 |
| J33B-125 | PL[11] | - | TX1P | - | TX1P |
| J33B-126 | PL[10] | AC10 | AC10 | AA17 | AA17 |
| J33B-127 | PL[9] | - | TX1N | - | TX1N |
| J33B-128 | PL[8] | - | - | T1 | T1 |
| J33B-129 | PL[7] | E3 | E3 | P10 | P10 |
| J33B-130 | PL[6] | F3 | F3 | N9 | N9 |
| J33B-131 | PL[5] | G4 | G4 | N10 | N10 |
| J33B-132 | PL[4] | H3 | H3 | M10 | M10 |
| J33B-133 | PL[3] | G3 | G3 | M9 | M9 |
| J33B-134 | PL[2] | C2 | C2 | L9 | L9 |
| J33B-135 | PL[1] | E4 | E4 | K9 | K9 |
| J33B-136 | PL[0] | F4 | F4 | L10 | L10 |

Board Interface Connector

| | | | | | |
|----------|---------|------|-------|------|-------|
| J33B-137 | N.C. | x | x | x | x |
| J33B-138 | N.C. | x | x | x | x |
| J33B-139 | N.C. | x | x | x | x |
| J33B-140 | N.C. | x | x | x | x |
| J33B-141 | PJ[15] | - | - | U21 | U21 |
| J33B-142 | PJ[14] | - | - | U22 | U22 |
| J33B-143 | PJ[13] | - | - | V21 | V21 |
| J33B-144 | PJ[12] | - | - | V22 | V22 |
| J33B-145 | PJ[11] | - | - | W22 | W22 |
| J33B-146 | PJ[10] | - | - | W21 | W21 |
| J33B-147 | PJ[9] | K26 | K26 | Y22 | Y22 |
| J33B-148 | PJ[8] | - | - | Y21 | Y21 |
| J33B-149 | PJ[7] | - | CLK_N | - | CLK_N |
| J33B-150 | PJ[6] | AD14 | AD14 | AA20 | AA20 |
| J33B-151 | PJ[5] | - | CLK_P | - | CLK_P |
| J33B-152 | PJ[4] | L26 | L26 | AA24 | AA24 |
| J33B-153 | PJ[3] | L25 | L25 | AB25 | AB25 |
| J33B-154 | PJ[2] | M26 | M26 | AC25 | AC25 |
| J33B-155 | PJ[1] | AF13 | AF13 | AE24 | AE24 |
| J33B-156 | PJ[0] | AE13 | AE13 | AE23 | AE23 |
| J33B-157 | 3.3V_SR | | | | |
| J33B-158 | 3.3V_SR | | | | |
| J33B-159 | 3.3V_SR | | | | |
| J33B-160 | 3.3V_SR | | | | |
| J33B-161 | PH[15] | A9 | A9 | F12 | F12 |
| J33B-162 | PH[14] | A8 | A8 | G11 | G11 |
| J33B-163 | PH[13] | B4 | B4 | F8 | F8 |

| | | | | | |
|----------|--------------|----------|----------|----------|----------|
| J33B-164 | PH[12] | A4 | A4 | G9 | G9 |
| J33B-165 | PH[11] | - | - | M24 | M24 |
| J33B-166 | PH[10] | D12 | D12 | J18 | J18 |
| J33B-167 | PH[9] | A14 | A14 | F18 | F18 |
| J33B-168 | PH[8] | C19 | C19 | J17 | J17 |
| J33B-169 | PH[7] | C15 | C15 | J16 | J16 |
| J33B-170 | PH[6] | K25 | K25 | AA22 | AA22 |
| J33B-171 | PH[5] | K24 | K24 | AA25 | AA25 |
| J33B-172 | PH[4] | C13 | C13 | G18 | G18 |
| J33B-173 | PH[3] | C20 | C20 | F19 | F19 |
| J33B-174 | PH[2] | D20 | D20 | K18 | K18 |
| J33B-175 | PH[1] | D16 | D16 | J19 | J19 |
| J33B-176 | PH[0] | A20 | A20 | J20 | J20 |
| J33B-177 | VDD_LV_SR[1] | | | | |
| J33B-178 | VDD_LV_SR[1] | | | | |
| J33B-179 | VDD_LV_SR[1] | | | | |
| J33B-180 | VDD_LV_SR[1] | | | | |
| J33B-181 | PF[15] | - | - | M25 | M25 |
| J33B-182 | PF[14] | A24 | A24 | N25 | N25 |
| J33B-183 | PF[13] | SIPI RXN | SIPI RXN | SIPI RXN | SIPI RXN |
| J33B-184 | PF[12] | J26 | J26 | Y24 | Y24 |
| J33B-185 | PF[11] | J25 | J25 | Y25 | Y25 |
| J33B-186 | PF[10] | J24 | J24 | W24 | W24 |
| J33B-187 | PF[9] | K23 | K23 | W25 | W25 |
| J33B-188 | PF[8] | L24 | L24 | AB24 | AB24 |
| J33B-189 | PF[7] | AC17 | AC17 | AD22 | AD22 |
| J33B-190 | PF[6] | AD17 | AD17 | AE22 | AE22 |

Board Interface Connector

| | | | | | |
|----------|---------|----------|----------|----------|----------|
| J33B-191 | PF[5] | A7 | A7 | F10 | F10 |
| J33B-192 | PF[4] | B8 | B8 | G12 | G12 |
| J33B-193 | PF[3] | A6 | A6 | G10 | G10 |
| J33B-194 | PF[2] | G2 | G2 | F9 | F9 |
| J33B-195 | PF[1] | AC12 | AC12 | AD17 | AD17 |
| J33B-196 | PF[0] | AD12 | AD12 | AE17 | AE17 |
| J33B-197 | 3.3V_SR | | | | |
| J33B-198 | 3.3V_SR | | | | |
| J33B-199 | 3.3V_SR | | | | |
| J33B-200 | 3.3V_SR | | | | |
| J33B-201 | PD[15] | B1 | B1 | H7 | H7 |
| J33B-202 | PD[14] | B2 | B2 | G6 | G6 |
| J33B-203 | PD[13] | T3 | T3 | R6 | R6 |
| J33B-204 | PD[12] | R3 | R3 | P9 | P9 |
| J33B-205 | PD[11] | AC2 | AC2 | AA14 | AA14 |
| J33B-206 | PD[10] | AC15 | AC15 | AE18 | AE18 |
| J33B-207 | PD[9] | AE12 | AE12 | AD18 | AD18 |
| J33B-208 | PD[8] | AE15 | AE15 | AE21 | AE21 |
| J33B-209 | PD[7] | SIPI RXP | SIPI RXP | SIPI RXP | SIPI RXP |
| J33B-210 | PD[6] | SIPI TXN | SIPI TXN | SIPI TXN | SIPI TXN |
| J33B-211 | PD[5] | - | - | J24 | J24 |
| J33B-212 | PD[4] | - | - | K25 | K25 |
| J33B-213 | PD[3] | C17 | C17 | G17 | G17 |
| J33B-214 | PD[2] | C18 | C18 | F17 | F17 |
| J33B-215 | PD[1] | D17 | D17 | G16 | G16 |
| J33B-216 | PD[0] | C16 | C16 | F16 | F16 |
| J33B-217 | 5.0V_SR | | | | |

| | | | | | |
|----------|--------------|------|------|------|------|
| J33B-218 | 5.0V_SR | | | | |
| J33B-219 | 5.0V_SR | | | | |
| J33B-220 | 5.0V_SR | | | | |
| J33B-221 | PB[15] | - | - | W6 | W6 |
| J33B-222 | PB[14] | - | - | V10 | V10 |
| J33B-223 | PB[13] | V3 | V3 | W7 | W7 |
| J33B-224 | PB[12] | V4 | V4 | V9 | V9 |
| J33B-225 | PB[11] | AD15 | AD15 | AD19 | AD19 |
| J33B-226 | PB[10] | AF12 | AF12 | AE19 | AE19 |
| J33B-227 | PB[9] | AE14 | AE14 | AD20 | AD20 |
| J33B-228 | PB[8] | AF14 | AF14 | AE20 | AE20 |
| J33B-229 | PB[7] | AD8 | AD8 | AE7 | AE7 |
| J33B-230 | PB[6] | AC8 | AC8 | AE8 | AE8 |
| J33B-231 | PB[5] | - | - | Y7 | Y7 |
| J33B-232 | PB[4] | AD1 | AD1 | AA13 | AA13 |
| J33B-233 | PB[3] | AF4 | AF4 | AB14 | AB14 |
| J33B-234 | PB[2] | AE4 | AE4 | AD14 | AD14 |
| J33B-235 | PB[1] | AD5 | AD5 | AB15 | AB15 |
| J33B-236 | PB[0] | AC5 | AC5 | AA15 | AA15 |
| J33B-237 | VDD_LV_SR[1] | | | | |
| J33B-238 | VDD_LV_SR[1] | | | | |
| J33B-239 | VDD_LV_SR[1] | | | | |
| J33B-240 | VDD_LV_SR[1] | | | | |

[1] For MPC5777M revision 1, VDD_LV_SR = 1.25V. For MPC5777M revision 2, VDD_LV_SR = 1.30V

Some of the port pins on the mother board share functionality with other peripherals like communication interfaces. [Table 13](#) shows what port pins are used for peripherals on the motherboard.

Table 13. Port pins alternate function - on motherboard

| Port Pin | Function | Port Pin | Function |
|----------|-----------------------|----------|------------------|
| PC2 | FEC MDIO | PE9 | FlexRay0Debug0 |
| PC3 | FEC MDC | PE10 | FlexRay0Debug1 |
| PC8 | RX MCAN2 | PE11 | FlexRay0Debug2 |
| PC9 | TX MCAN2 | PE12 | FlexRay0Debug3 |
| PC10 | FEC RXCLK | PF14 | DRCLK (SIPI) |
| PC11 | FEC CRS_LEDG | PF15 | EVTI/EVTO (JTAG) |
| PC12 | FEC RXD0 | PG14 | RX TTCAN |
| PC13 | FEC RXD1 | PH3 | TXD FlexRay_B |
| PC14 | FEC TXEN | PH4 | TXEN FlexRay_B |
| PC15 | FEC TXD0 | PH7 | TXD FlexRay_A |
| PD14 | TXD eSCI/LINFlex_2 | PH8 | TXEN FlexRay_A |
| PD15 | RXD eSCI/LINFlex_2 | PH9 | RXD Flexray_A |
| PE5 | TX TTCAN | PH10 | RXD FlexRay_B |
| PE6 | RX LINFlexD_1 | PL3 | TX MCAN1 |
| PE7 | TX LINFlexD_1 | PL4 | RX MCAN1 |

Some of the port pins of the MCU share functionality with a peripheral that is used on the daughter card and these pins might not be routed to the motherboard. [Table 14](#) lists port pins that are not routed to the motherboard and shows what they are used for on the daughter card.

Table 14. Port pins alternate function — not on motherboard

| Port Pin | Function | Port Pin | Function |
|----------|------------|----------|-------------|
| PA5 | JCOMP | PK14 | Nexus EVT11 |
| PA6 | TCK | PL9 | Nexus TX1N |
| PA7 | TMS | PL11 | Nexus TX1P |
| PA8 | TDI | PL13 | Nexus TX0N |
| PA9 | TDO | PL15 | Nexus TX0P |
| PA14 | SIPI_TXP | PM4 | Nexus EVT10 |
| PD6 | SIPI_TXN | PM5 | Nexus EVTO0 |
| PD7 | SIPI_RXP | PM6 | Nexus EVTO1 |
| PF13 | SIPI_RXN | — | Nexus TX2N |
| PJ6 | Nexus CLKP | — | Nexus TX2P |
| PJ7 | Nexus CLKN | — | Nexus TX3N |
| | | — | Nexus TX3P |

6 Default Jumper Summary Table

The following table details the DEFAULT jumper configuration of the EVB as set up on delivery.

6.1 Default Jumper Table - Motherboard

On delivery the motherboard comes with a default jumper configuration. [Table 15](#) lists and describes briefly the jumpers on the MPC57xx motherboard and indicates which jumpers are on/off on delivery of the board.

Table 15. Default Jumper Table-Motherboard

| Jumper | Default | PCB Legend | Description |
|--------|---------|------------|---|
| J8 | Off | MASTER | LIN Master/Slave select |
| J9 | Off | CAP A DIS | Disable capacitor circuitry for FlexRAY_A signals |
| J10 | Off | CAP A DIS | Disable capacitor circuitry for FlexRAY_A signals |
| J11 | Off | CAP B DIS | Disable capacitor circuitry for FlexRAY_B signals |
| J12 | Off | CAP B DIS | Disable capacitor circuitry for FlexRAY_B signals |
| J13 | Off | SCI TX | Connect SCI TX signal |
| J14 | Off | SCI RX | Connect SCI RX signal |
| J15 | Off | LIN_EN | Enable LIN PHY U50 |
| J16 | Off | LIN_RX | Connect LIN RX signal |
| J17 | Off | LIN_TX | Connect LIN TX signal |

Table 15. Default Jumper Table-Motherboard

| | | | |
|-----|-----|---------|---|
| J18 | Off | — | Ethernet signal: RXCLK |
| J20 | Off | — | Ethernet signal: CRS_LED_CFG |
| J21 | Off | CAN2_EN | PHY U2 configuration: |
| | | | 1-2: WAKE to GND |
| | | | 3-4: STB to 5V |
| | | | 5-6: EN to 5V |
| J22 | On | — | Ethernet phy power-on |
| J23 | Off | CAN-EN | PHY U1 configuration: |
| | | | 1-2: WAKE to GND |
| | | | 3-4: STB to 5V |
| | | | 5-6: EN to 5V |
| J24 | Off | — | Ethernet signal: RXER_MDIXEN |
| J25 | Off | SCI-PWR | SCI phy power-on |
| J26 | Off | — | Ethernet signal: RXDV_MIIMODE |
| J27 | Off | FR-A | 1-2: PHY U4 TX to MCU |
| | | | 3-4: PHY U4 TXEN to MCU |
| | | | 5-6: PHY U4 RX to MCU |
| J28 | Off | FR-A | PHY U4 configuration: |
| | | | 1-2: 3.3V (V _{IO}) to BGE |
| | | | 3-4: 3.3V (V _{IO}) to EN |
| | | | 5-6: 3.3V (V _{IO}) to STBY |
| | | | 7-8: GND to WAKE |
| J29 | Off | FR_PWR | FlexRAY transceiver VIO selection |
| | | | 1-2: 12V to V _{BAT} |
| | | | 3-4: 5V _{SR} to V _{CC} and V _{BUF} |
| J30 | Off | FR_B | 1-2: PHY U5 TX to MCU |
| | | | 3-4: PHY U5 TXEN to MCU |
| | | | 5-6: PHY U5 RX to MCU |
| J31 | Off | FR_B | PHY U5 configuration: |
| | | | 1-2: 3.3V (V _{IO}) to BGE |
| | | | 3-4: 3.3V (V _{IO}) to EN |
| | | | 5-6: 3.3V (V _{IO}) to STBY |
| | | | 7-8: GND to WAKE |
| J32 | Off | CAN2 | 1-2: PHY TX to MCU |
| | | | 3-4: WAKE to GND |

Table 15. Default Jumper Table-Motherboard

| | | | |
|-----|-----|------------|--|
| J33 | Off | CAN-PWR | 1-2: 5V_SR to PHY U2 V _{CC} |
| | | | 3-4: 12V to PHY U2 V _{BAT} |
| J34 | Off | — | MCAN2 signal out: |
| | | | 1: ERR |
| | | | 2: INH |
| J35 | Off | CAN | 1-2: 5V_SR to PHY U1 V _{CC} |
| | | | 3-4: 12V to PHY U1 V _{BAT} |
| J36 | Off | — | CAN PHY U1 signal out |
| J37 | Off | — | CAN TX connect |
| J38 | Off | — | CAN RX connect |
| J39 | Off | — | Ethernet signal: RXD0_PHYAD1 |
| J40 | Off | — | Ethernet signal: RXD1_PHYAD1 |
| J41 | Off | — | Ethernet signal: RXD2_PHYAD2 |
| J42 | Off | — | Ethernet signal: RXD3_PHYAD3 |
| J44 | Off | — | Ethernet signal: COL_PHYAD0 |
| J45 | Off | — | Ethernet signal: TXEN |
| J46 | Off | — | Ethernet signal: TXCLK |
| J47 | Off | — | Ethernet signal: TXD0 |
| J48 | Off | — | Ethernet signal: TXD1 |
| J49 | Off | — | Ethernet signal: TXD2 |
| J50 | Off | — | Ethernet signal: TXD3_SNIMODE |
| J51 | Off | — | Ethernet signal: MDC |
| J52 | Off | — | Ethernet signal: MDIO |
| J53 | Off | RV1 | Connect RV1 to analog input AN0 |
| J54 | Off | ADC_VSUP | Connect EVB supply voltages to analog inputs |
| J55 | Off | 12V (4.3V) | Connect 12V (scaled to 4.3V) EVB power to analog input |
| J57 | On | ENABLE | Enable 5V linear regulator |
| J58 | Off | DISABLE | Disable 1.25V switching regulator |
| J59 | Off | DISABLE | Disable 3.3V switching regulator |
| J60 | Off | DISABLE | Disable 5.0V switching regulator |

7 List of Acronyms

Table 16. List of Acronyms

| Acronym | Description |
|----------------|---|
| 1.25V_SR | Supply voltage from the 1.25V switching regulator |
| 3.3V_SR | Supply voltage from the 3.3V switching regulator |
| 5V_LR | Supply voltage from the 5.0V linear regulator |
| 5V_SR | Supply voltage from the 5.0V switching regulator |
| ADC | Analog-to-Digital converter |
| ESR0 | External signal reset |
| EVB | Evaluation board |
| FEC | Fast ethernet controller module |
| GND | Ground |
| HV | High voltage (3.3V and/or 5V) |
| LED | Light emitting diode |
| LV | Low voltage (1.25V) |
| MCU | Microcontroller |
| OSC | Oscillator |
| P12V | 12 V EVB supply power domain |
| PORST | Power-on reset |
| PWR | Power |
| RX | Receive |
| SIPI | Serial Interprocessor Interface |
| TBD | To be defined |
| TX | Transmit |
| VSS | Ground |

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