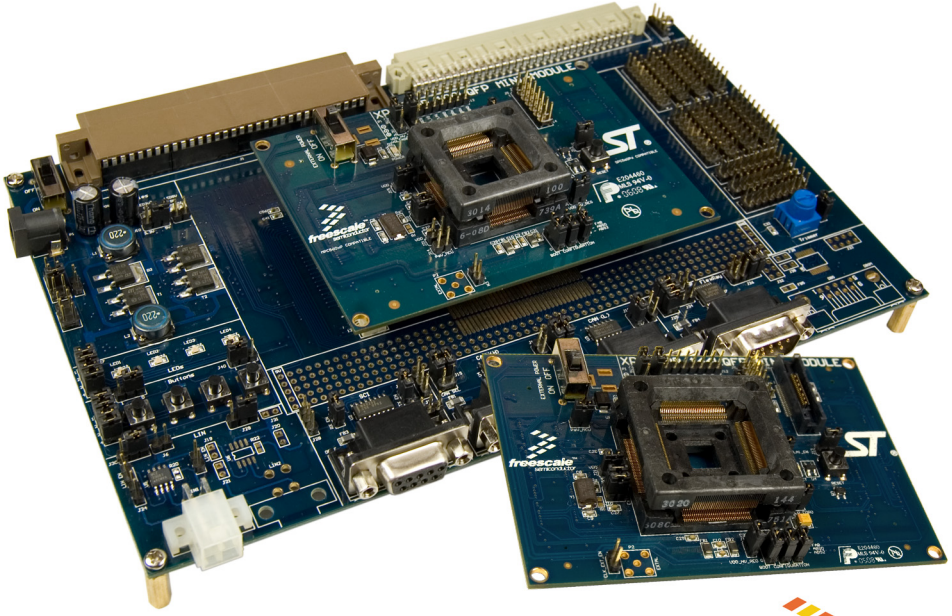
XPC560P EVB User Manual



XPC560PEVBUM
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Manual version 1.00

1 OVERVIEW

The xPC560P EVB is an evaluation system supporting Freescale MPC560xP microprocessors. The complete system consists of an xPC56XXMB Motherboard and an xPC560PADPT Mini-Module which plugs into the motherboard. Different Mini-Modules are available for evaluating devices with different footprints in the MPC560xP family of microprocessors. The evaluation system allows full access to the CPU, all of the CPU's I/O signals, and the motherboard peripherals (such as CAN, SCI, LIN). The Mini-Module may be used as a stand-alone unit, which allows access to the CPU, but no access to the I/O pins or any motherboard peripherals.

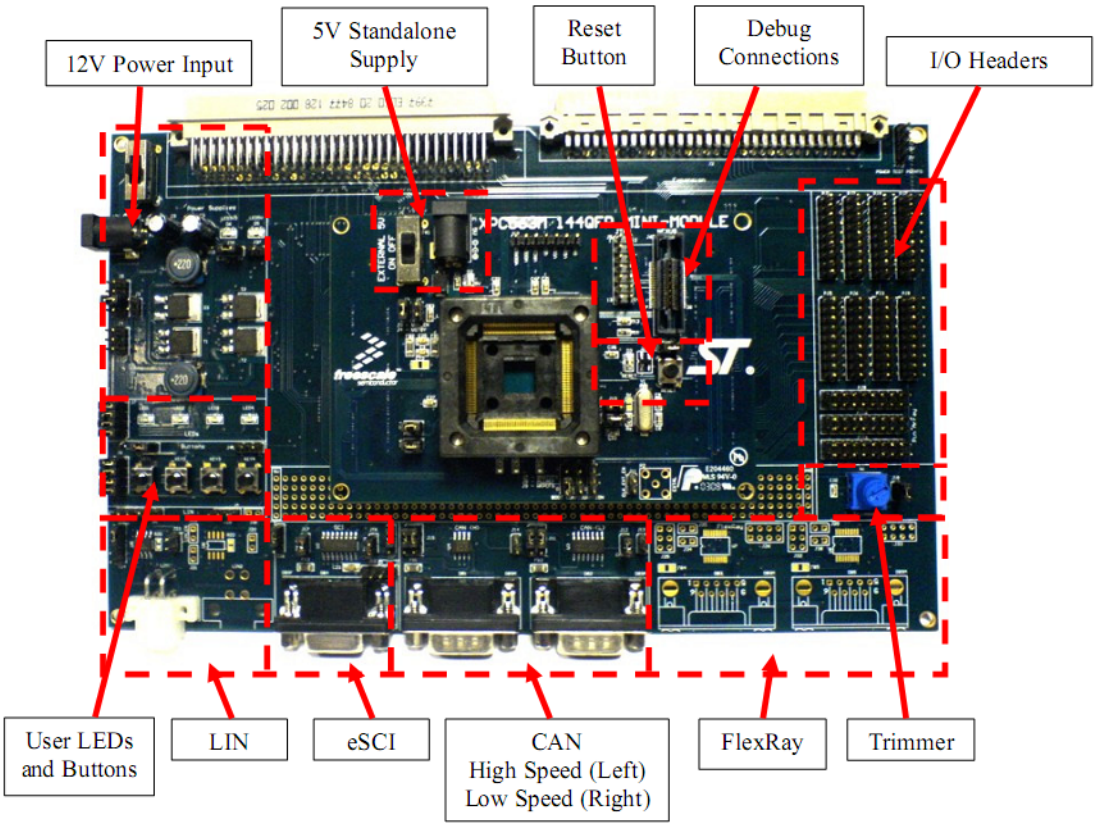


Figure 1-1: Overview of the xPC560P EVB

1.1 Package Contents

An xPC560P Evaluation Kit includes the following items:

- One xPC56XXMB Motherboard
- One xPC560PADPT100S or xPC560PADPT144S Mini-Module
- One xPC56XX Resources CD-ROM
- One P&E USB-ML-PPCNEXUS Hardware Interface Cable
- One USB A-to-B Cable
- Freescale Warranty Card

An xPC560P Adapter Package includes the following items:

- One xPC560PADPT100S or xPC560PADPT144S Mini-Module
- One xPC56XX Resources CD-ROM
- Freescale Warranty Card

1.2 Supported Devices

The xPC560PADPT100S Mini-Module supports the following devices:

- MPC5604PEFMLL (100LQFP)

The xPC560PADPT144S Mini-Module supports the following devices:

- MPC5604PEFMLQ (144LQFP)

1.3 Recommended Materials

- Freescale MPC5604P reference manual and datasheet
- xPC56XXMB schematic
- xPC560PADPT100S schematic
- xPC560PADPT144S schematic

1.4 Handling Precautions

Please take care to handle the package contents in a manner such as to prevent electrostatic discharge.

2 HARDWARE FEATURES

The xPC560P EVB is an evaluation system for Freescale's MPC560xP microprocessors. A 38-pin Mictor Nexus port and/or a 14-pin JTAG port are provided on the Mini-Module to allow usage of an external PowerPC Nexus interface such as P&E USB-ML-PPCNEXUS cable and Cyclone MAX automated programmer.

2.1 xPC56XXMB Board Features

- ON/OFF Power Switch w/ LED indicators
- A 12VDC power supply input barrel connector
- Onboard ST Microelectronics L9758 regulator provides three different power voltages simultaneously: 5V, 3.3V, and 1.2V
- Onboard peripherals can be configured to operate at 5V or 3.3V logic levels
- Two CAN channels with jumper enables
  - One CAN channel with High-Speed transceiver and DB9 male connector
  - One CAN channel with Low-Speed Fault Tolerant and High-Speed transceiver (selectable with jumpers) and DB9 male connector
- Two LIN channels with jumper enables
  - One channel with transceiver and pin header connector populated
  - One channel with footprints only
- One SCI channel with jumper enables
  - Transceiver with DB9 female connector
- Two FlexRay channels with jumper enables
  - One channel with transceiver and DB9 male connector
  - One channel with footprint only
- Four user push buttons with jumper enables and polarity selection
- Four user LED's with jumper enables

- One potentiometer for analog voltage input
- Pin array for accessing all I/O signals
- Expansion connectors for accessing all I/O signals
- Development zone with 0.1” spacing and SOIC footprint prototyping
- Specifications:
  - Board Size 5.5” x 9.0”
  - 12VDC Center Positive power supply with 2.5/5.5mm barrel connector

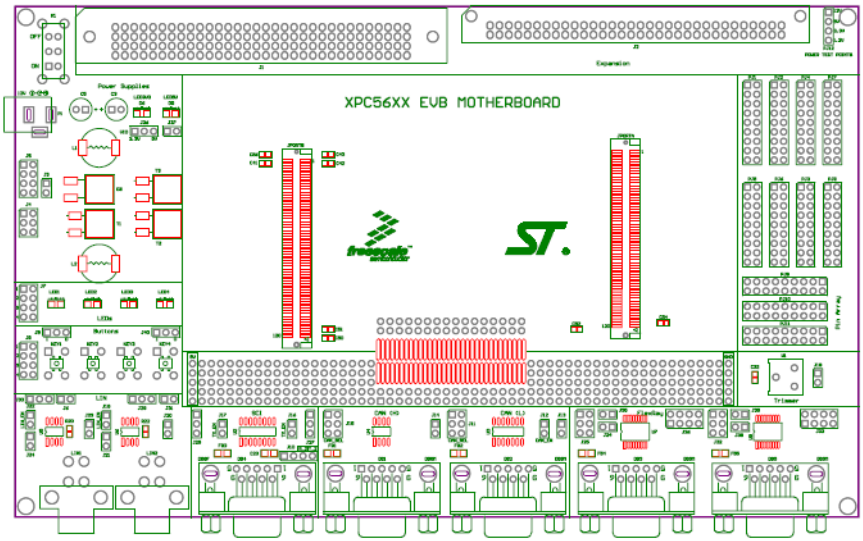


Figure 2-1: xPC56XXMB Top Component Placement

2.2 xPC560PADPT Mini-Module Board Features

- Can be used as a stand-alone board by providing external 5V power supply input
- ON/OFF Power Switch w/ LED indicator
- Reset button with filter and LED indicator
- xPC560PADPT100S has socket for MPC560xP in 100LQFP footprint

- xPC560PADPT144S has socket for MPC560xP in 144LQFP footprint
- Debug ports: 38-pin Mictor Nexus port and/or 14-pin JTAG port
- Direct clock input through SMA connector (footprint only)
- Jumpers for boot configuration

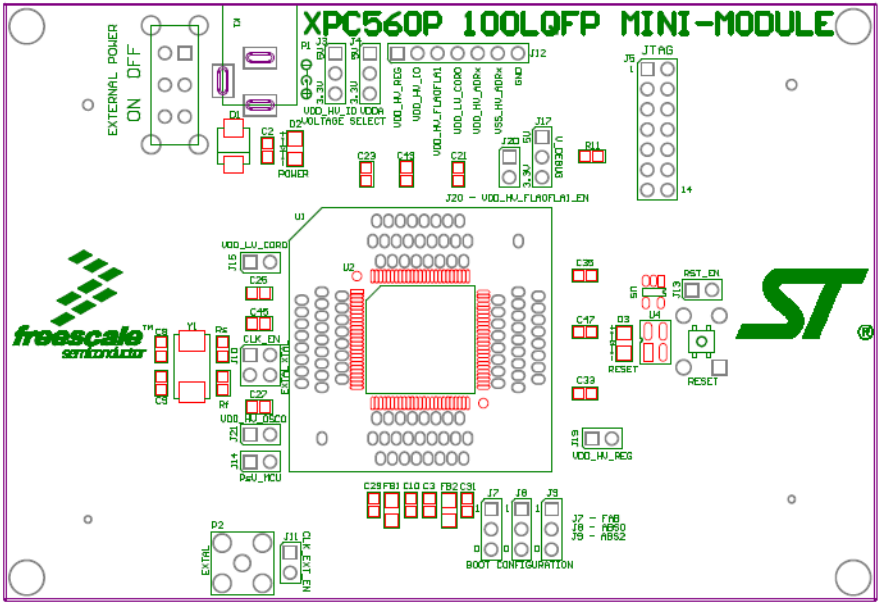


Figure 2-2: xPC560PADPT100S Top Component Placement

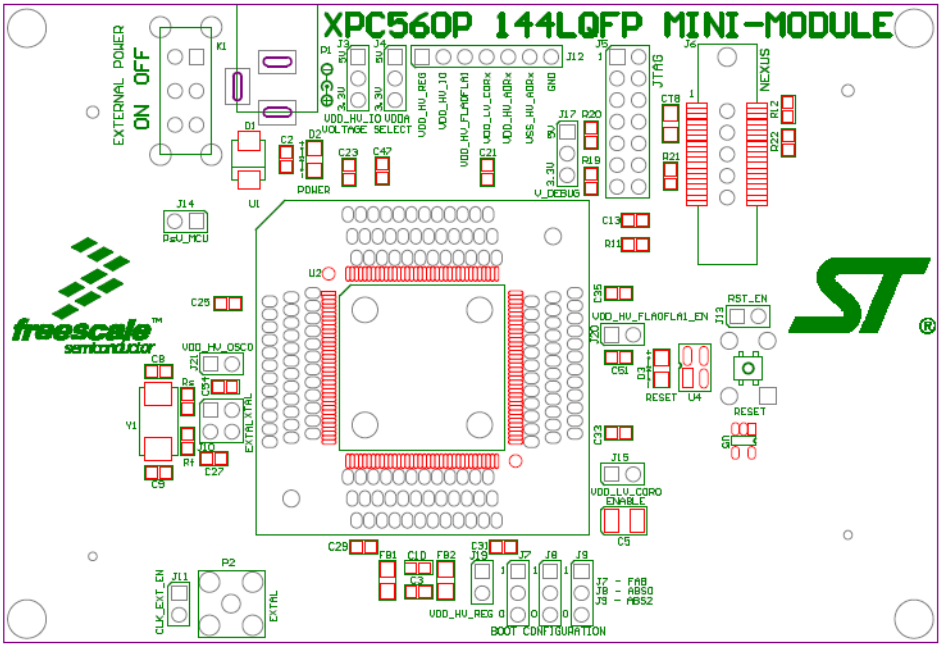


Figure 2-3: xPC560PADPT144S Top Component Placement

2.3 Pin Numbering for Jumpers

Jumpers for both the xPC56XXMB motherboard and the xPC560P Mini-Modules have a rounded corner to indicate the position of pin 1. See examples below for the numbering convention used in this manual for jumper settings.

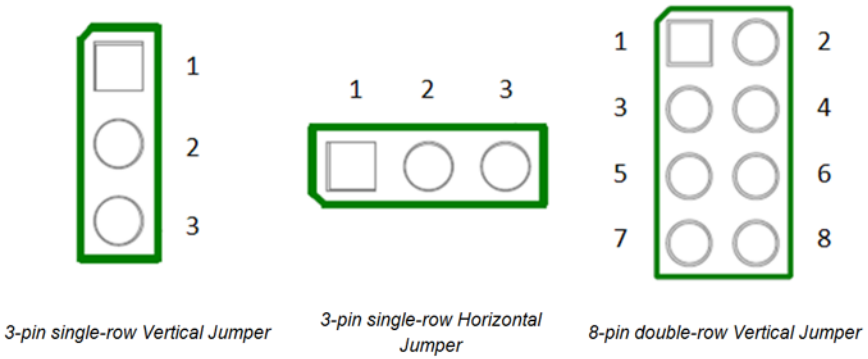


Figure 2-4: Pin Numbering

3 xPC56XXMB HARDWARE & JUMPER SETTINGS

3.1 Power Supplies

The xPC56XXMB obtains its power from the 12VDC Center Positive input barrel connector. The following jumpers are used to configure the power supply output:

J3 – VSA Tracking Regulator Configuration

Jumper Setting	Effect
On	The ST L9758 tracking regulator VSA tracks the input voltage at its TRACK_REF pin.
Off (default)	The ST L9758 tracking regulator VSA tracks 5V

J4 – VPROG Regulators Control

Jumper Setting	Position	Effect
1+2	On	V_{KAM} regulator output is programmed to 1V
	Off (default)	V_{KAM} regulator output is programmed to 1.5V
3+4	On	V_{STBY} regulator output is programmed to 2.6V
	Off (default)	V_{STBY} regulator output is programmed to 3.3V
5+6	On	V_{DLL} regulator output is programmed to 2.6V
	Off (default)	V_{DLL} regulator output is programmed to 3.3V

J5 – Regulators Enable & Standby

Jumper Setting	Position	Effect
1+2	On	The power regulator is always on
	Off (default)	The power regulator is in standby if jumpers 5+6 are also in the “off” position

3+4	On	VSB, VSC, and VSD tracking regulators are disabled
	Off (default)	VSB, VSC, and VSD tracking regulators are enabled
5+6	On (default)	The power regulator is always on
	Off	The power regulator is in standby if jumpers 1+2 are also in the “off” position
7+8	On	V_{DLL} and V_{CORE} regulators are disabled
	Off (default)	V_{DLL} and V_{CORE} regulators are enabled

J36 – VIO Peripherals Logic Level

Jumper Setting	Effect
1+2	Onboard peripherals are configured for 3.3V logic
2+3 (default)	Onboard peripherals are configured for 5V logic

J37 – VBat low voltage detection

Jumper Setting	Effect
On	Low battery detection is enabled

Off (default)	Low battery detection is disabled

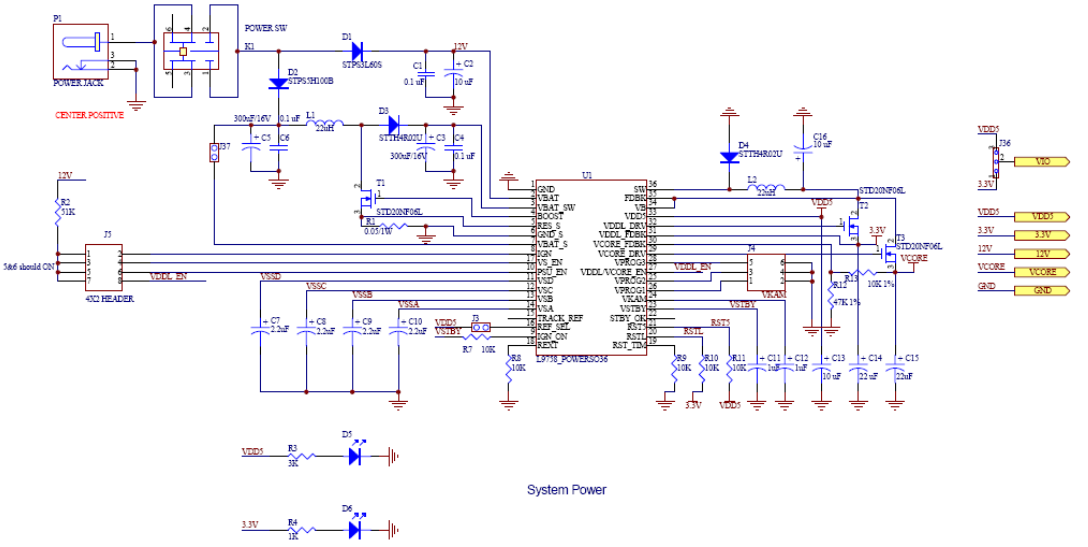


Figure 3-1: Power Supply circuitry schematic

3.2 LEDs

There are four user LEDs available on the xPC56XXMB. All LEDs are active low.

J7 – LEDs Enable

Controls whether the LEDs on the xPC56XXMB motherboard are connected to I/O pins of the processor. The jumpers can be removed and wires can be used to connect each LED to any processor I/O pin, if desired. Please note that although the schematics indicate that the processor I/O pins are eMIOSx, those are not the I/O pins for the xPC560P EVB. The table below has the correct pins listed.

Jumper Setting	Effect

1+2 (default on)	LED1 connected to PD4
3+4 (default on)	LED2 connected to PD5
5+6 (default on)	LED3 connected to PD6
7+8 (default on)	LED4 connected to PD7

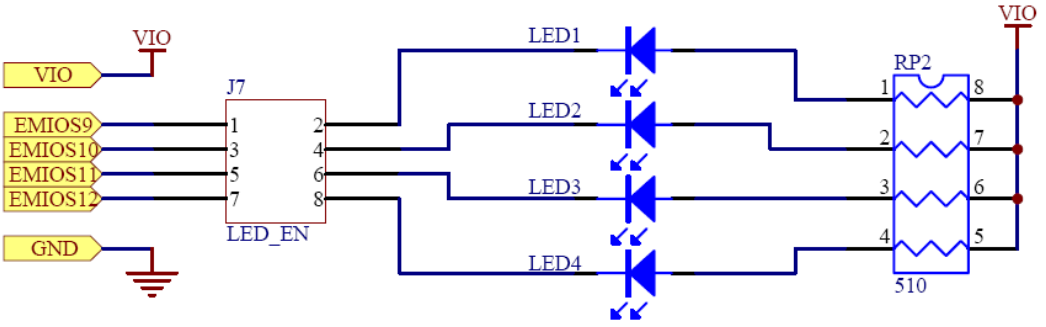


Figure 3-2: LEDs circuitry schematic

3.3 Buttons

There are four user buttons available on the xPC56XXMB.

J8 – Buttons Enable

Controls whether the buttons on the xPC56XXMB motherboard are connected to I/O pins of the processor. The jumpers can be removed and wires can be used to connect each button to any processor I/O pin, if desired. Please note that although the schematics indicate that the processor I/O pins are eMIOSx, those are not the I/O pins for the xPC560P EVB. The table

below has the correct pins listed.

Jumper Setting	Effect
1+2 (default on)	KEY1 connected to PD0
3+4 (default on)	KEY2 connected to PD1
5+6 (default on)	KEY3 connected to PD2
7+8 (default on)	KEY4 connected to PD3

J9 – Buttons Driving Configuration

Selects whether the buttons drive logic high or drive logic low when pressed.

Jumper Setting	Effect
1+2	When pressed, buttons will send logic high to the connected I/O pin
2+3 (default)	When pressed, buttons will send logic low to the connected I/O pin

J40 – Buttons Idle Configuration

Selects whether the I/O pins are pulled logic high or pulled logic low. This controls the defaultlogic level of the I/O pins when the buttons are not pressed.

Jumper Setting	Effect
1+2 (default)	I/O pins connected to the buttons are pulled up to logic high
2+3	I/O pins connected to the buttons are pulled down to logic low

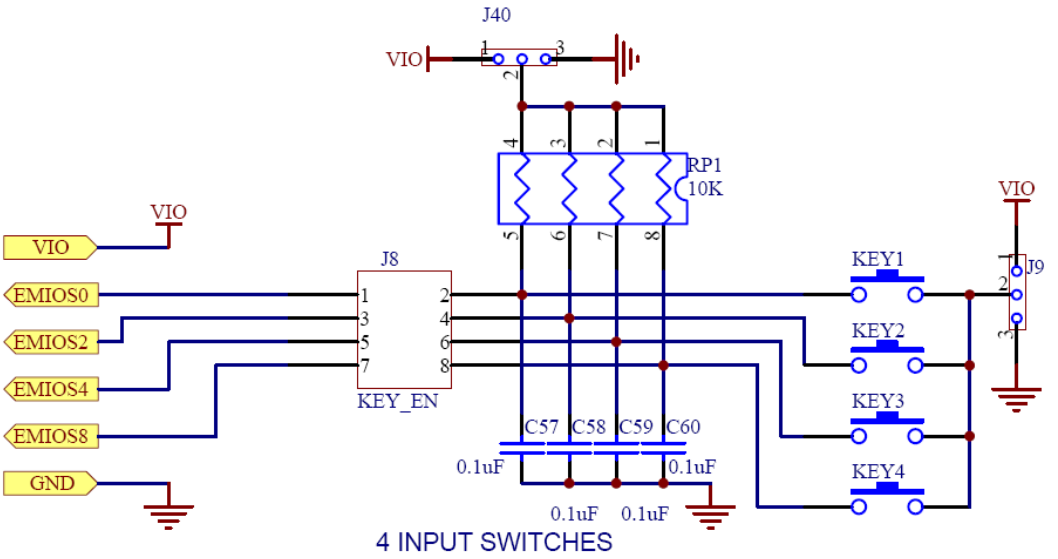


Figure 3-3: Buttons circuitry schematic

3.4 LIN

There are footprints for two LIN connections on the xPC56XXMB. By default,

one LIN circuit is assembled (LIN1) and the other circuit is left unpopulated (LIN2).

J6 – LIN1 pin2 configuration

Jumper Setting	Effect
On	Pin 2 of the LIN1 connector is connected to 12V
Off (default)	Pin 2 of the LIN1 connector is not connected to 12V

J22 – LIN1 enable

Jumper Setting	Effect
On (default)	Enables the LIN1 transceiver
Off	Disables the LIN1 transceiver

J23 – LIN1 master selection

Jumper Setting	Effect
On	LIN1 is configured as a master node
Off (default)	LIN1 is configured as a slave node

J24 – LIN1 pin1 configuration

Jumper Setting	Effect

On	Pin 1 of the LIN1 connector is connected to 12V
Off (default)	Pin 1 of the LIN1 connector is not connected to 12V

J27 – LIN1/SCI TxD selection

Controls whether the TxD pin on LIN1 or SCI is connected to the default I/O pin on the MPC560xP processor.

Jumper Setting	Effect
1+2	The LIN1 TxD pin is connected to the “PB2” pin on the MPC560xP processor. This should be set if enabling LIN1.
2+3	The SCI TxD pin is connected to the “PB2” pin on the MPC560xP processor.

J28 – LIN1/SCI RxD selection

Controls whether the RxD pin on LIN1 or SCI is connected to the default I/O pin on the MPC560xP processor.

Jumper Setting	Effect
1+2	The LIN1 RxD pin is connected to the “PB3” pin on the MPC560xP processor. This should be set if enabling LIN1.
2+3	The SCI RxD pin is connected to the “PB3” pin on the MPC560xP processor.

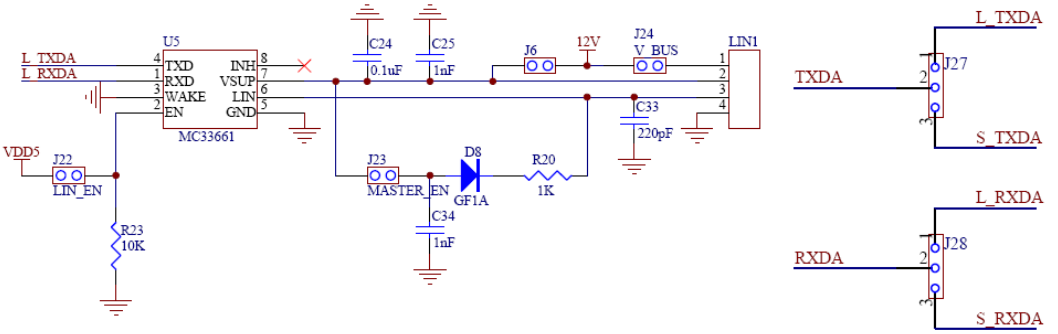


Figure 3-4: LIN1 Schematic

J31 – LIN2 pin2 configuration

Jumper Setting	Effect
On	Pin 2 of the LIN2 connector is connected to 12V
Off (default)	Pin 2 of the LIN2 connector is not connected to 12V

J19 – LIN2 enable

Jumper Setting	Effect
On	Enables the LIN2 transceiver
Off (default)	Disables the LIN2 transceiver

J20 – LIN2 master selection

Jumper Setting	Effect
On	LIN2 is configured as a master node
Off (default)	LIN2 is configured as a slave node

J21 – LIN2 pin1 configuration

Jumper Setting	Effect
On	Pin 1 of the LIN2 connector is connected to 12V
Off (default)	Pin 1 of the LIN2 connector is not connected to 12V

J29 – LIN2/SCI TxD selection

Controls whether the TxD pin on LIN2 or SCI is connected to the default I/O pin on the MPC560xP processor.

Jumper Setting	Effect
1+2	The LIN2 TxD pin is connected to the “F6” pin on the MPC560xP processor. This should be set if enabling LIN2.
2+3	The SCI TxD pin is connected to the “F6” pin on the MPC560xP processor.

J30 – LIN2/SCI RxD selection

Controls whether the RxD pin on LIN2 or SCI is connected to the default I/O pin on the MPC560xP processor.

Jumper Setting	Effect
1+2	The LIN2 RxD pin is connected to the “F7” pin on the MPC560xP processor. This should be set if enabling LIN2.
2+3	The SCI RxD pin is connected to the “F7” pin on the MPC560xP processor.

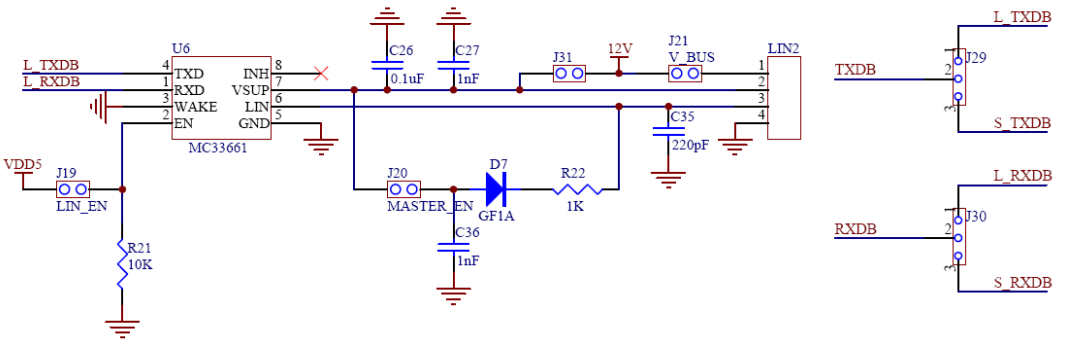


Figure 3-5: LIN2 schematic (Not populated by default)

3.5 SCI

One SCI interface is available on the xPC56XXMB.

J16 – SCI TxD Enable

Jumper Setting	Effect
On (default)	Enables SCI transmit
Off	Disables SCI transmit

J17 – SCI RxD Enable

Jumper Setting	Effect
On (default)	Enables SCI receive
Off	Disables SCI receive

J27 – LIN1/SCI TxD selection

Controls whether the TxD pin on LIN1 or SCI is connected to the default I/O pin on the MPC560xP processor.

Jumper Setting	Effect
1+2	The LIN1 TxD pin is connected to the “PB2” pin on the MPC560xP processor.
2+3	The SCI TxD pin is connected to the “PB2” pin on the MPC560xP processor. This should be set if enabling SCI.

J28 – LIN1/SCI RxD selection

Controls whether the RxD pin on LIN1 or SCI is connected to the default I/O pin on the MPC560xP processor.

Jumper Setting	Effect
1+2	The LIN1 RxD pin is connected to the “PB3” pin on the MPC560xP processor.
2+3	The SCI RxD pin is connected to the “PB3” pin on the MPC560xP processor. This should be set if enabling SCI.

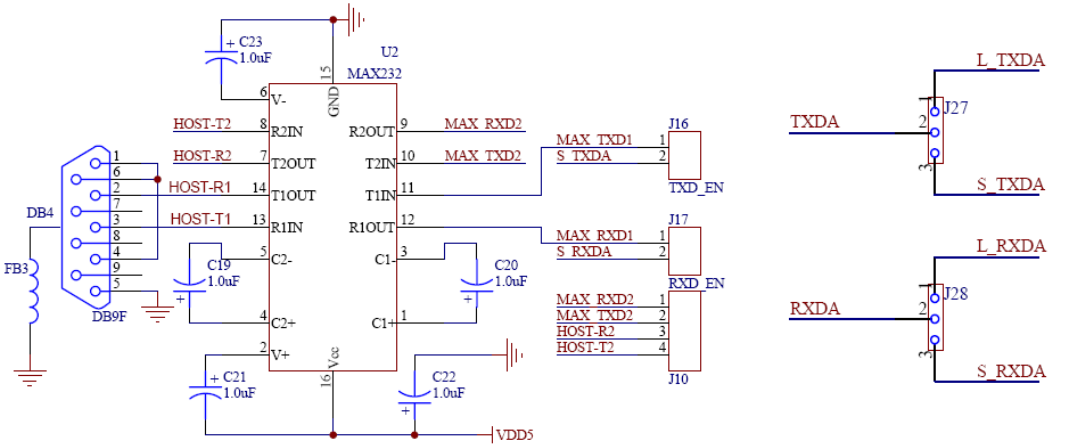


Figure 3-6: SCI schematic

3.6 CAN

Two CAN interfaces are implemented on the xPC56XXMB: a high-speed CAN interface and a low-speed CAN interface.

J14 – CAN (H) Transmit Enable

Jumper Setting	Effect
On	Enables CAN transmission
Off (default)	Disables CAN transmission

J15 – CAN (H) TxD/RxD Enable

Controls which I/O pins on the MPC560xP processor are connected to the TxD and RxD pins on CAN (H).

Jumper Setting	Effect
1+3 (default)	The RxD pin of the CAN (H) interface is connected to the “PB1” pin of the MPC560xP processor.
3+5	The RxD pin of the CAN (H) interface is connected to the “PA15” pin of the MPC560xP processor.
2+4 (default)	The TxD pin of the CAN (H) interface is connected to the “PB0” pin of the MPC560xP processor.
4+6	The TxD pin of the CAN (H) interface is connected to the “PA14” pin of the MPC560xP processor.

J13 – CAN (L) CTE

Jumper Setting	Effect

On	Enables CAN transmission
Off (default)	Disables CAN transmission

J11 – CAN (L) TxD/RxD Enable

Controls which I/O pins on the MPC560xP processor are connected to the TxD and RxD pins on CAN (L).

Jumper Setting	Effect
1+3	The RxD pin of the CAN (L) interface is connected to the “PB1” pin of the MPC560xP processor.
3+5 (default)	The RxD pin of the CAN (L) interface is connected to the “PA15” pin of the MPC560xP processor.
2+4	The TxD pin of the CAN (L) interface is connected to the “PB0” pin of the MPC560xP processor.
4+6 (default)	The TxD pin of the CAN (L) interface is connected to the “PA14” pin of the MPC560xP processor.

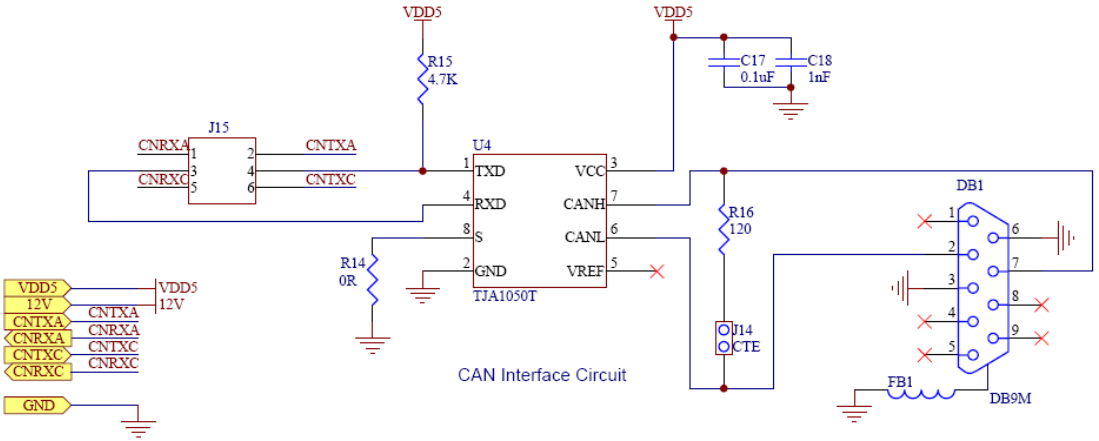


Figure 3-7: High Speed CAN schematic

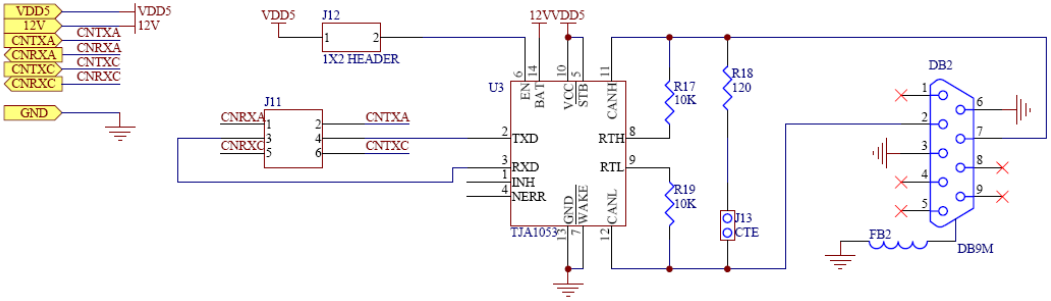


Figure 3-8: Low Speed CAN schematic

3.7 FlexRay

The xPC56XXMB has footprints for two FlexRay interfaces. However, only one circuit is assembled by default. The FlexRay circuit comprises of two DB9 connectors. DB3 contains signals for both FlexRay channels and is compatible with major FlexRay tools. DB5 contains channel B signal, thereby also allowing 2 separate FlexRay connectors for channel A and channel B operation. Currently only the MPC560xP processors support FlexRay.

J25 – FlexRay Bus Driver 1 Enable

Controls which I/O pins on the MPC560xP processor are connected to the TxD and RxD pins on FlexRay Bus Driver.

Jumper Setting	Effect
1+2 (default on)	The TXD pin on the FlexRay Bus Driver is connected to the “PD0” pin on the MPC560xP processor.
3+4 (default on)	The TXEN pin on the FlexRay Bus Driver is connected to the “PC15” pin on the MPC560xP processor.
5+6 (default on)	The RXD pin on the FlexRay Bus Driver is connected to the “PD1” pin on the MPC560xP processor.

J26 – FlexRay Bus Driver 1 Pull-up Enable

Controls which pins on the FlexRay Bus Driver are pulled up.

Jumper Setting	Effect
1+2	The BGE pin on the FlexRay Bus Driver is pulled up to 5V
3+4	The STBN pin on the FlexRay Bus Driver is pulled up to 5V
5+6 (default on)	The EN pin on the FlexRay Bus Driver is pulled up to 5V
7+8 (default on)	The WAKE pin on the FlexRay Bus Driver is pulled up to 5V

J34 & J35 FlexRay 1 Terminal Resistor Connection

Jumper Setting	Effect
On	Terminal resistors connected
Off (default)	Terminal resistors not connected

J32 – FlexRay Bus Driver 2 Enable

Controls which I/O pins on the MPC560xP processor are connected to the TxD and RxD pins on FlexRay Bus Driver.

Jumper Setting	Effect

1+2	The TXD pin on the FlexRay Bus Driver is connected to the “PD0” pin on the MPC560xP processor.
3+4	The TXEN pin on the FlexRay Bus Driver is connected to the “PC15” pin on the MPC560xP processor.
5+6	The RXD pin on the FlexRay Bus Driver is connected to the “PD1” pin on the MPC560xP processor.

J33 – FlexRay Bus Driver 2 Pull-up Enable

Controls which pins on the FlexRay Bus Driver are pulled up.

Jumper Setting	Effect
1+2	The BGE pin on the FlexRay Bus Driver is pulled up to 5V
3+4	The STBN pin on the FlexRay Bus Driver is pulled up to 5V
5+6	The EN pin on the FlexRay Bus Driver is pulled up to 5V
7+8	The WAKE pin on the FlexRay Bus Driver is pulled up to 5V

J38 & J39 – FlexRay 2 Terminal Resistor Connection

Jumper Setting	Effect
On	Terminal resistors connected
Off (default)	Terminal resistors not connected

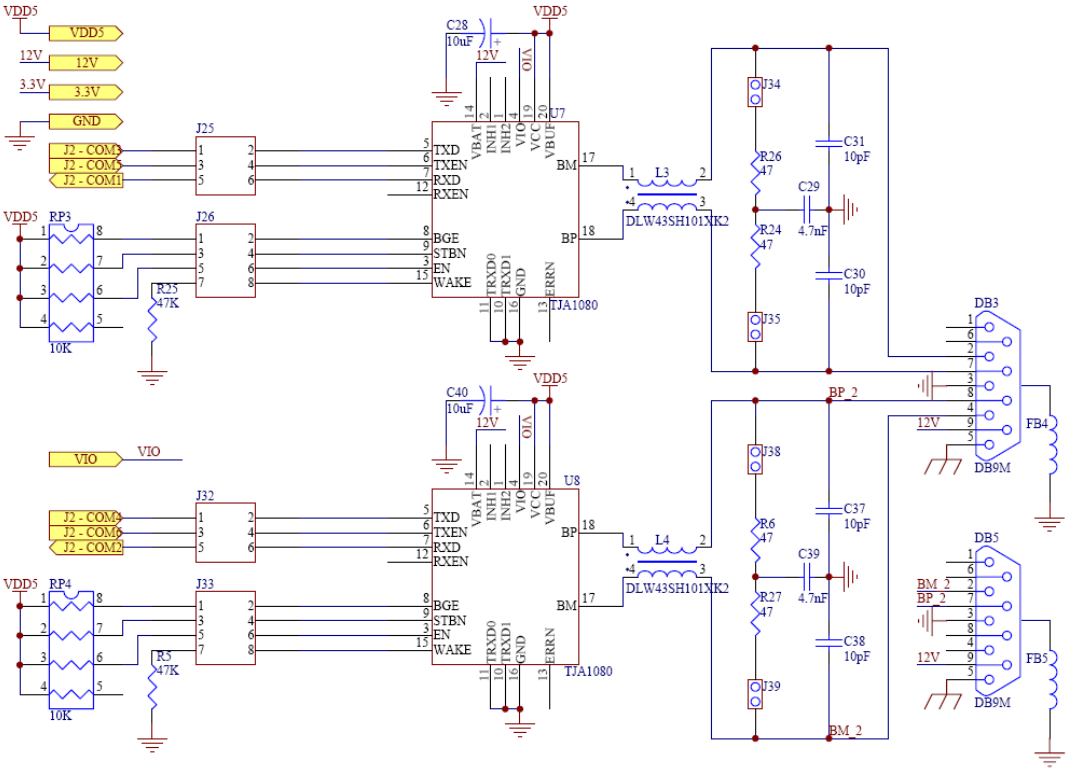


Figure 3-9: FlexRay schematic

3.8 Potentiometer

A potentiometer is available on the xPC56XXMB to allow an analog voltage input.

J18 – POT Enable

Jumper Setting	Effect
On (default)	The potentiometer wiper terminal is connected to the “PE0” pin on the MPC560xP processor.

Off	The potentiometer wiper terminal is left disconnected.

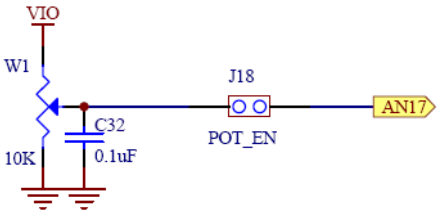
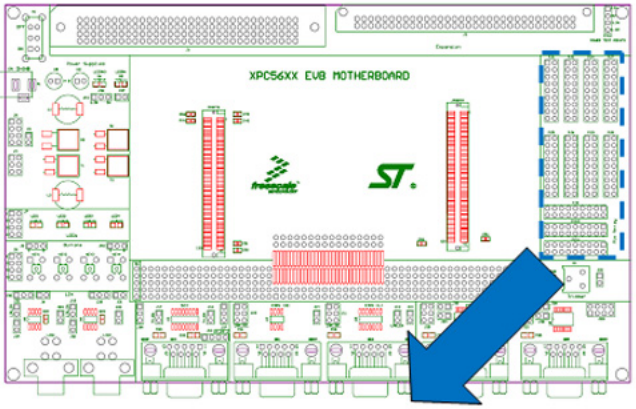


Figure 3-10: Potentiometer schematic

3.9 Pin Mapping

The following is the xPC560P EVB pin assignment for the Pin Array headers:



PJ1

RESET_B	RESET_B
B[1]	A[15]
B[0]	A[14]
C[7]	C[6]
C[5]	C[4]
C[3]	D[6]
B[3]	B[2]
F[15]	F[14]
GND	5V

PJ2

FAB - PA4	ABS0 - PA2
ABS2 - PA3	NMI
X	X
D[5]	X
X	X
D[1]	D[2]
D[0]	D[3]
C[15]	D[4]
GND	5V

PJ4 - Nexus

MCKO - F[7]	EVTO - F[10]
MSEO0 - F[9]	EVTI - F[11]
MSEO1 - F[8]	TDO - B[4]
MDO0	TDI - B[5]
MDO1 - F[6]	TCK
MDO2 - F[5]	TMS
MDO3 - F[4]	X
X	X
GND	5V

PJ7 - Port B

B[0]	B[1]
B[2]	B[3]
B[4]	B[5]
B[6]	B[7]
B[8]	B[9]
B[10]	B[11]
B[12]	B[13]
B[14]	B[15]
GND	5V

PJ5 - Port E

PE[0]	PE[1]
PE[2]	PE[3]
PE[4]	PE[5]
PE[6]	PE[7]
PE[8]	PE[9]
PE[10]	PE[11]
PE[12]	PE[13]
PE[14]	PE[15]
GND	5V

PJ6 - Port F

F[0]	F[1]
F[2]	F[3]
F[4]	F[5]
F[6]	F[7]
F[8]	F[9]
F[10]	F[11]
F[12]	F[13]
F[14]	F[15]
GND	5V

PJ3 - Port C

C[0]	C[1]
C[2]	C[3]
C[4]	C[5]
C[6]	C[7]
C[8]	C[9]
C[10]	C[11]
C[12]	C[13]
C[14]	C[15]
GND	5V

PJ8 - Port D

D[0]	D[1]
D[2]	D[3]
D[4]	D[5]
D[6]	D[7]
D[8]	D[9]
D[10]	D[12]
D[11]	D[13]
D[14]	D[15]
GND	5V

PJ9 - Port A

GND	A[14]	A[12]	A[10]	A[8]	A[6]	A[4]	A[2]	A[0]
5V	A[15]	A[13]	A[11]	A[9]	A[7]	A[5]	A[3]	A[1]

PJ10 - Port G

GND	X	X	G[10]	G[8]	G[6]	G[4]	G[2]	G[0]
5V	X	X	G[11]	G[9]	G[7]	G[5]	G[3]	G[1]

PJ11

GND	X	X	X	X	X	X	X	X
5V	X	X	X	X	X	X	X	X

Figure 3-11: Pin Mapping

4 xPC560PADPT100S HARDWARE & JUMPER SETTINGS

4.1 Boot Configuration

The following jumpers affect the operation of the processor as it initially comes out of the reset state:

J7 – FAB Configuration

Controls whether the processor boots from internal FLASH or from a serial interface (CAN, SCI)

Jumper Setting	Effect
1+2	The MPC560xP processor uses serial boot mode
2+3 (default)	The MPC560xP processor uses internal boot mode

J8 – ABS0 Configuration

This jumper configures the ABS[0] pin.

Jumper Setting	Effect
1+2	The ABS[0] pin is pulled up logic high
2+3 (default)	The ABS[2] pin is pulled down logic low

J9 – ABS2 Configuration

This jumper configures the ABS[2] pin.

Jumper Setting	Effect
1+2	The ABS[2] pin is pulled up logic high
2+3 (default)	The ABS[2] pin is pulled down logic low

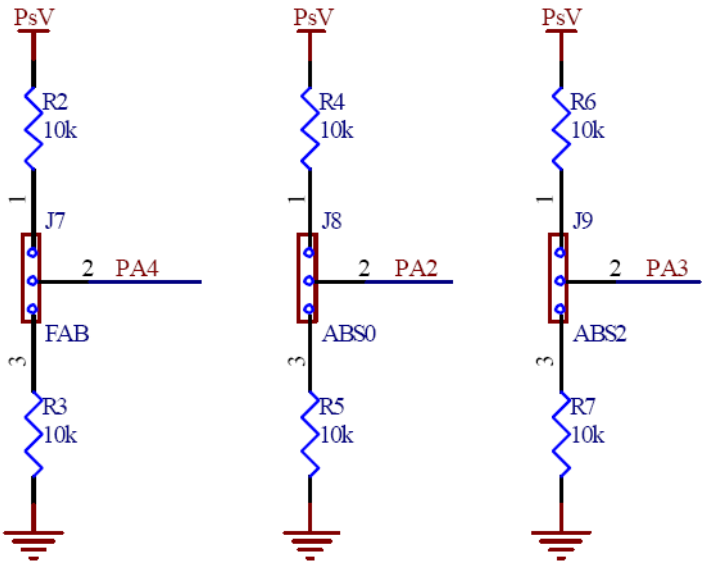


Figure 4-1: Boot Configuration Jumpers

4.2 Power Configuration

When the xPC560P Mini-Module is plugged into the xPC56XXMB motherboard, power is supplied directly by the motherboard. In this setup, the external power supply input available on the Mini-Module should NOT be used.

When the xPC560P Mini-Module is used as a stand-alone board, an external

5V or 3.3V power supply must be used.

The following jumpers affect the power supply pins of the MPC560xP processor:

J3 – Power Supply Voltage Selection

Controls whether the processor is powered using 5V or 3.3V. This selection can only be made if the xPC560P Mini-Module is plugged into the xPC56XXMB motherboard. If the xPC560P Mini-Module is used as a stand-alone board, the processor is powered directly by the external power supply and this jumper setting has no effect.

Jumper Setting	Effect
1+2 (default)	MPC560xP processor is powered by the 5V supply
2+3	MPC560xP processor is powered by the 3.3V supply

J4 – ADC Analog Supply Voltage Enable

Controls whether the reference voltage and analog supply pins for the A/D converter (VDD-REF ADC0, VDD-REF ADC1) is powered by 5V or 3.3V

Jumper Setting	Effect
1+2 (default)	MPC560xP ADC supply pins are connected to 5V
2+3	MPC560xP ADC supply pins are connected to 3.3V

J14 – Power Supply Pins Enable

Controls whether power is provided to the “Power Supply” pins (VDD_HV) on the MPC560xP processor.

Jumper Setting	Effect
On (default)	MPC560xP Power Supply pins are connected to 5V or 3.3V (determined by J3)
Off	MPC560xP Power Supply pins are unpowered

J15 – 1.2V Core Voltage Enable

Controls whether power is provided to the “VDD 1V2” pins on the MPC560xP processor.

Jumper Setting	Effect
On (default)	MPC560xP “VDD 1V2” pins are connected to 1.2V power
Off	MPC560xP “VDD 1V2” pins are left disconnected

J17 – Debug Port Voltage Configuration

Sets the logic voltage level on the 14-pin JTAG port and 38-pin MICTOR port (if available). These ports are used by external interface hardware to communicate with the processor.

Jumper Setting	Effect
1+2 (default)	Debug port(s) are configured for 5V logic

2+3	Debug port(s) are configured for 3.3V logic

J19 – VREG Voltage Enable

Controls whether power is provided to the “VDD VREG” pins on the MPC560xP processor.

Jumper Setting	Effect
On (default)	MPC560xP “VDD VREG” pins are connected to 3.3V or 5V (determined by J3)
Off	MPC560xP “VDD VREG” pins are left disconnected

J20 – FLA0FLA1 Voltage Enable

Controls whether power is provided to the “VDD” pin 69 on the MPC560xP processor.

Jumper Setting	Effect
On (default)	MPC560xP “VDD” pin 69 is connected to 3.3V or 5V (determined by J3)
Off	MPC560xP “VDD” pin 69 is left disconnected

4.3 System Clock Configuration

The xPC560P Mini-Modules support the usage of crystal clock sources as well as external clock sources.

J10 – Crystal clock source enable

Both of the jumpers below need to be installed to enable the crystal clock source.

Jumper Setting	Effect
1+2 (default)	The MPC560xP “XTAL” signal is connected to the crystal clock source on the xPC560P Mini-Module
3+4 (default)	The MPC560xP “EXTAL” signal is connected to the crystal clock source on the xPC560P Mini-Module

J11 – External clock source enable

The xPC560P Mini-Module contains a footprint for an SMA connector, which can be used to provide an external clock source to the system.

Jumper Setting	Effect
On	The MPC560xP “EXTAL” signal is connected to the SMA connector on the xPC560P Mini-Module
Off (default)	The SMA connector on the xPC560P Mini-Module is disconnected from the processor

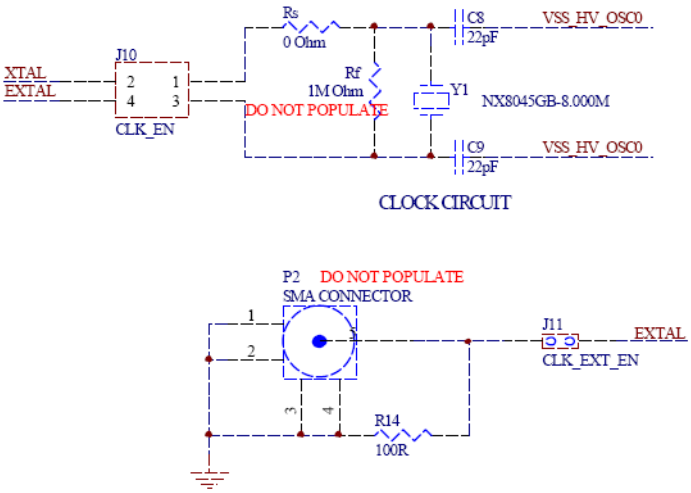


Figure 4-2: System Clock Schematic

4.4 General Configuration

J13 – Reset Enable

A RESET push button on the xPC560P Mini-Module can be used to reset the processor.

Jumper Setting	Effect
On (default)	The RESET button on the xPC560P Mini-Module is enabled
Off	The RESET button on the xPC560P Mini-Module is disabled

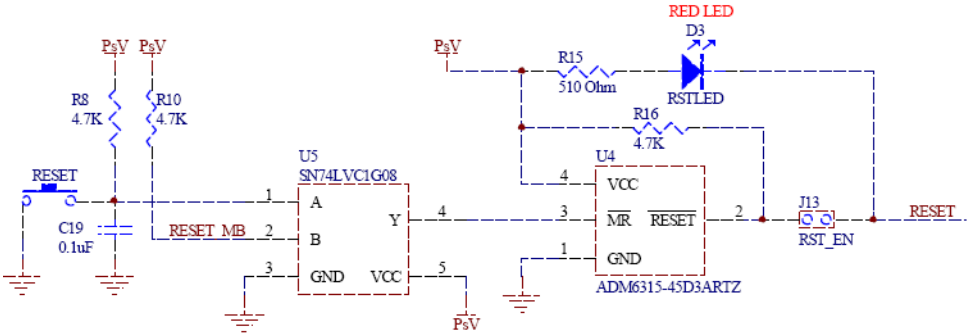


Figure 4-3: Reset circuitry schematic

5 xPC560PADPT144S HARDWARE & JUMPER SETTINGS

5.1 Boot Configuration

The following jumpers affect the operation of the processor as it initially comes out of the reset state:

J7 – FAB Configuration

Controls whether the processor boots from internal FLASH or from a serial interface (CAN, SCI)

Jumper Setting	Effect
1+2	The MPC560xP processor uses serial boot mode
2+3 (default)	The MPC560xP processor uses internal boot mode

J8 – ABS0 Configuration

This jumper configures the ABS[0] pin.

Jumper Setting	Effect
1+2	The ABS[0] pin is pulled up logic high
2+3 (default)	The ABS[2] pin is pulled down logic low

J9 – ABS2 Configuration

This jumper configures the ABS[2] pin.

Jumper Setting	Effect
1+2	The ABS[2] pin is pulled up logic high
2+3 (default)	The ABS[2] pin is pulled down logic low

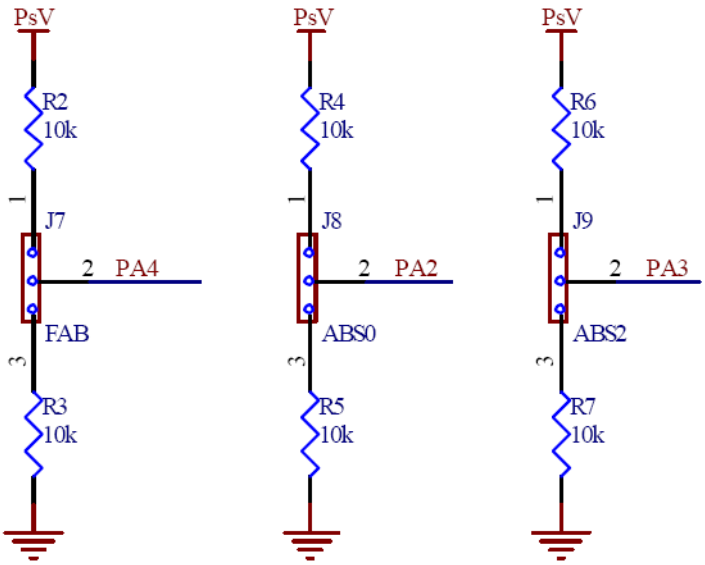


Figure 5-1: Boot Configuration Jumpers

5.2 Power Configuration

When the xPC560P Mini-Module is plugged into the xPC56XXMB motherboard, power is supplied directly by the motherboard. In this setup, the external power supply input available on the Mini-Module should NOT be used.

When the xPC560P Mini-Module is used as a stand-alone board, an external

5V or 3.3V power supply must be used.

The following jumpers affect the power supply pins of the MPC560xP processor:

J3 – Power Supply Voltage Selection

Controls whether the processor is powered using 5V or 3.3V. This selection can only be made if the xPC560P Mini-Module is plugged into the xPC56XXMB motherboard. If the xPC560P Mini-Module is used as a stand-alone board, the processor is powered directly by the external power supply and this jumper setting has no effect.

Jumper Setting	Effect
1+2 (default)	MPC560xP processor is powered by the 5V supply
2+3	MPC560xP processor is powered by the 3.3V supply

J4 – ADC Analog Supply Voltage Enable

Controls whether the reference voltage and analog supply pins for the A/D converter (VDD-REF ADC0, VDD-REF ADC1) is powered by 5V or 3.3V

Jumper Setting	Effect
1+2 (default)	MPC560xP ADC supply pins are connected to 5V
2+3	MPC560xP ADC supply pins are connected to 3.3V

J14 – Power Supply Pins Enable

Controls whether power is provided to the “Power Supply” pins (VDD_HV) on the MPC560xP processor.

Jumper Setting	Effect
On (default)	MPC560xP Power Supply pins are connected to 5V or 3.3V (determined by J3)
Off	MPC560xP Power Supply pins are unpowered

J15 – 1.2V Core Voltage Enable

Controls whether power is provided to the “VDD 1V2” pins on the MPC560xP processor.

Jumper Setting	Effect
On (default)	MPC560xP “VDD 1V2” pins are connected to 1.2V power
Off	MPC560xP “VDD 1V2” pins are left disconnected

J17 – Debug Port Voltage Configuration

Sets the logic voltage level on the 14-pin JTAG port and 38-pin MICTOR port (if available). These ports are used by external interface hardware to communicate with the processor.

Jumper Setting	Effect
1+2 (default)	Debug port(s) are configured for 5V logic

2+3	Debug port(s) are configured for 3.3V logic

J19 – VREG Voltage Enable

Controls whether power is provided to the “VDD VREG” pins on the MPC560xP processor.

Jumper Setting	Effect
On (default)	MPC560xP “VDD VREG” pins are connected to 3.3V or 5V (determined by J3)
Off	MPC560xP “VDD VREG” pins are left disconnected

J20 – FLA0FLA1 Voltage Enable

Controls whether power is provided to the “VDD” pin 69 on the MPC560xP processor.

Jumper Setting	Effect
On (default)	MPC560xP “VDD” pin 97 is connected to 3.3V or 5V (determined by J3)
Off	MPC560xP “VDD” pin 97 is left disconnected

5.3 System Clock Configuration

The xPC560P Mini-Modules support the usage of crystal clock sources as well as external clock sources.

J10 – Crystal clock source enable

Both of the jumpers below need to be installed to enable the crystal clock source.

Jumper Setting	Effect
1+2 (default)	The MPC560xP “XTAL” signal is connected to the crystal clock source on the xPC560P Mini-Module
3+4 (default)	The MPC560xP “EXTAL” signal is connected to the crystal clock source on the xPC560P Mini-Module

J11 – External clock source enable

The xPC560P Mini-Module contains a footprint for an SMA connector, which can be used to provide an external clock source to the system.

Jumper Setting	Effect
On	The MPC560xP “EXTAL” signal is connected to the SMA connector on the xPC560P Mini-Module
Off (default)	The SMA connector on the xPC560P Mini-Module is disconnected from the processor

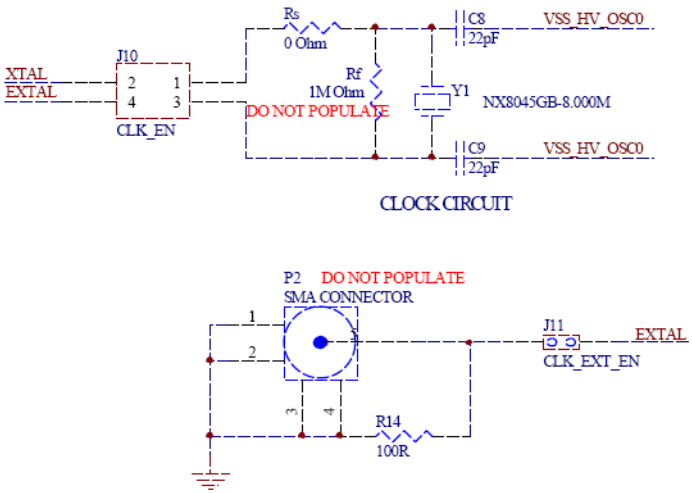


Figure 5-2: System Clock schematic

5.4 General Configuration

J13 – Reset Enable

A RESET push button on the xPC560P Mini-Module can be used to reset the processor.

Jumper Setting	Effect
On (default)	The RESET button on the xPC560P Mini-Module is enabled
Off	The RESET button on the xPC560P Mini-Module is disabled

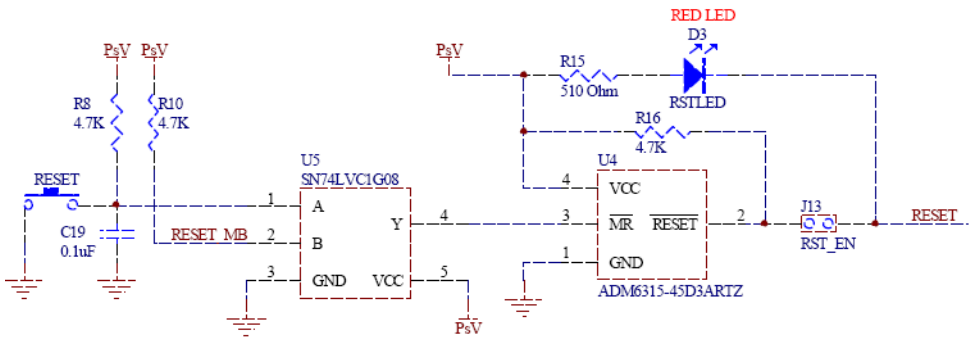


Figure 5-3: Reset circuitry schematic

6 DEBUGGING/PROGRAMMING xPC560P EVB

P&E provides hardware and software tools for debugging and programming the xPC560P EVB system.

P&E's USB-ML-PPCNEXUS and Cyclone MAX offer two effective hardware solutions, depending on your needs. The USB-ML-PPCNEXUS is a development tool that will enable you to debug your code and program it onto your target. The Cyclone MAX is a more versatile and robust development tool with advanced features and production programming capabilities, as well as Ethernet support.

More information is available below to assist you in choosing the appropriate development tool for your needs.

6.1 Hardware Solutions At A Glance

The USB-ML-PPCNEXUS offers an affordable and compact solution for your development needs, and allows debugging and programming to be accomplished simply and efficiently. Those doing rapid development will find the USB-ML-PPCNEXUS easy to use and fully capable of fast-paced debugging and programming.

The Cyclone MAX is a more complete solution designed for both development and production. The Cyclone MAX features multiple communications interfaces (including USB, Ethernet, and Serial), stand-alone programming functionality, high speed data transfer, a status LCD, and many other advanced capabilities.

Below is an overview of the features and intended use of the USB-ML-PPCNEXUS and Cyclone MAX.

6.2 USB-ML-PPCNEXUS Key Features

- Programming and debugging capabilities
- Compact and lightweight
- Communication via USB 2.0
- Supported by P&E software and Freescale's CodeWarrior

6.3 Cyclone MAX Key Features

- Advanced programming and debugging capabilities, including:

- PC-Controlled and User-Controlled Stand-Alone Operation
- Interactive Programming via Host PC
- In-Circuit Debugging, Programming, and Testing
- Compatible with Freescale's ColdFireV2/3/4, PowerPC 5xx/8xx/55xx/56xx, and ARM7 microcontroller families
- Communication via USB, Serial, and Ethernet Ports
- Multiple image storage
- LCD screen menu interface
- Supported by P&E software and Freescale's CodeWarrior

6.4 Working With P&E's USB-ML-PPCNEXUS

Figure 6-1: P&E's USB-ML-PPCNEXUS

6.4.1 Product Features & Implementation

P&E's USB-ML-PPCNEXUS Interface (USB-ML-PPCNEXUS) connects your target to your PC and allows the PC access to the debug mode on Freescale's PowerPC 5xx/8xx/55xx/56xx microcontrollers. It connects between a USB port on a Windows 2000/XP/2003/Vista machine and a standard 14-pin JTAG/Nexus connector on the target.

By using the USB-ML-PPCNEXUS Interface, the user can take advantage of the background debug mode to halt normal processor execution and use a PC to control the processor. The user can then directly control the target's execution, read/write registers and memory values, debug code on the processor, and program internal or external FLASH memory devices. The USB-ML-PPCNEXUS enables you to debug, program, and test your code on your board.

6.4.2 Software

The USB-ML-PPCNEXUS Interface works with Codewarrior as well as P&E's in-circuit debugger and flash programmer to allow debug and flash programming of the target processor. P&E's USB-ML-PPCNEXUS Development Packages come with the USB-ML-PPCNEXUS Interface, as well as flash programming software, in-circuit debugging software, Windows IDE, and register file editor.

6.5 Working With P&E's Cyclone MAX

P&E's Cyclone MAX

6.5.1 Product Features & Implementation

P&E's Cyclone MAX is an extremely flexible tool designed for debugging, testing, and in-circuit flash programming of Freescale's ColdFireV2/3/4, PowerPC 5xx/8xx/55xx/56xx, and ARM7 microcontrollers. The Cyclone MAX connects your target to the PC via USB, Ethernet, or Serial Port and enables you to debug your code, program, and test it on your board. After development is complete the Cyclone MAX can be used as a production tool on your manufacturing floor.

For production, the Cyclone MAX may be operated interactively via Windows-based programming applications as well as under batch or .dll commands from a PC. Once loaded with data by a PC it can be disconnected and operated manually in a stand-alone mode via the LCD menu and control buttons. The Cyclone MAX has over 3Mbytes of non-volatile memory, which allows the on-board storage of multiple programming images. When connected to a PC for programming or loading it can communicate via the ethernet, USB, or serial interfaces.

6.5.2 Software

The Cyclone MAX comes with intuitive configuration software and interactive programming software, as well as easy to use automated control software. The Cyclone MAX also functions as a full-featured debug interface, and is supported by Freescale's CodeWarrior as well as development software from P&E.

P&E's Cyclone MAX is also available bundled with additional software as part of various Development Packages. In addition to the Cyclone MAX, these Development Packages include in-circuit debugging software, flash programming software, a Windows IDE, and register file editor.

XPC560PEVBUM
Rev. 1.00
June 2008

Freescale Controller Continuum

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