MPC5748G-LCEVB

QUICK START GUIDE (QSG)

Ultra-Reliable MCUs for Industrial and Automotive Applications

www.nxp.com/MPC5748G-LCEVB

SECURE CONNECTIONS
FOR A SMARTER WORLD

Contents

Quick Start Package Overview

Board:

MPC5748G-LCEVB	Low cost EVB with MPC5748G Auto quality MCU on board

Documents:

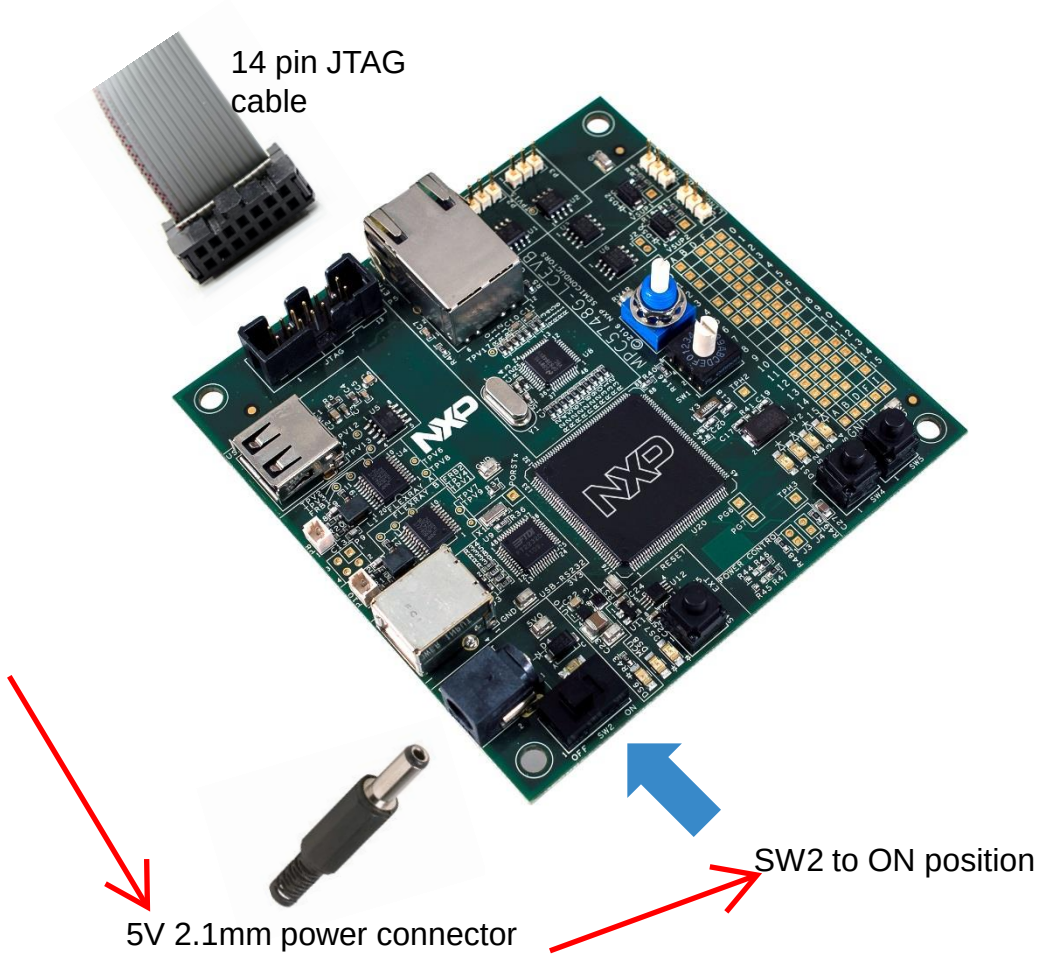
Name	Description
Quick Start Guide(QSG)	Detailed description on availability of Hardware, Software and Documents to quick start with MPC5748G project (this document)
Software Integration Guide(SWIG)	Detailed walk through on how to install and use S32 Design Studio IDE for Power Architecture
User Guide(UG)	PDF file with schematic and detail description for the MPC5748G-LCEVB board
Application Notes	Detailed documents covering topics from ‘how to design hardware’ to ‘how to write software’
Fact Sheets, Reference Manuals and Data Sheets	Detailed manuals for MPC5748G family of MCU and MPC5748G-LCEVB board

Downloads:

Name	Description
Integrated Development Environment (IDE)	Eclipse based S32DS IDE with free GCC compiler and Debugger support
MPC5748G-LCEVB Quick Start Package	All in one package: Software examples and supporting documents for getting started

Step-by-Step Installation Instructions

Let’s get started with how to set up the **MPC5748G-LCEVB** board and run the program.



1

Install Software and Tools

Install S32 Design Studio IDE for Power Architecture.
S32 Design Studio for Power and import “Demo” project from quick start package.
See Software Installation Guide (SWIG) for detailed procedure

2

Connect the Debugger and Power up

Connect S32DS supported debugger (list) to JTAG connecter.
Connect to Power input connector P12 to 5V power supply (using 2.1mm power connector) and put Switch SW2 to ON position.

3

Debug and Observe the Demo Program

The Demo project utilizes the **MPC5748G-LCEVB** user potentiometer and the user LEDs. Once the program is loaded hit on Resume, LEDs will start blinking. Use Potentiometer to change blinking speed

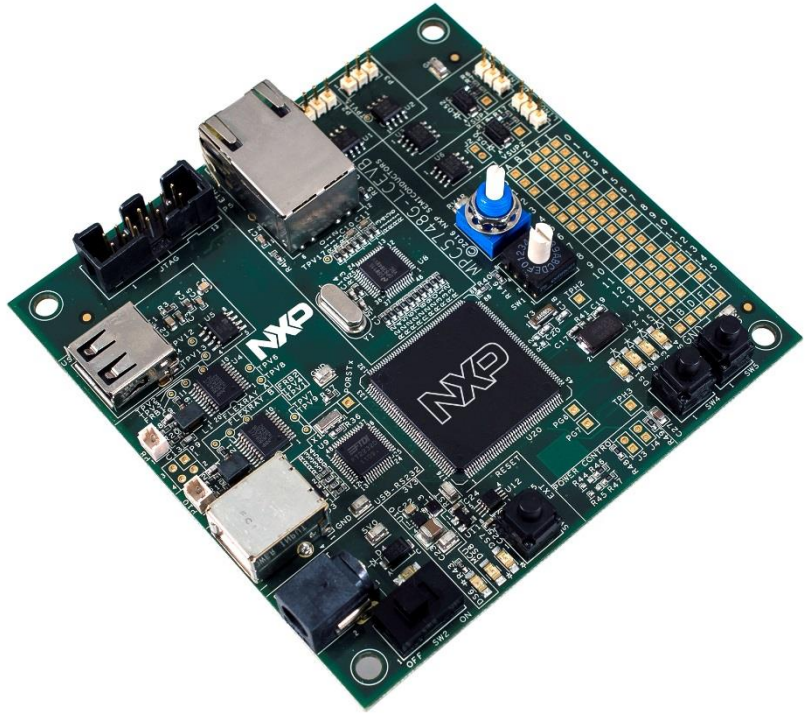
4

Learn More About the MPC5748G-LCEVB

Read release notes and documentation on the
nxp.com/MPC5748G-LCEVB
nxp.com/MPC5748G

MPC5748G-LCEVB Board : Features

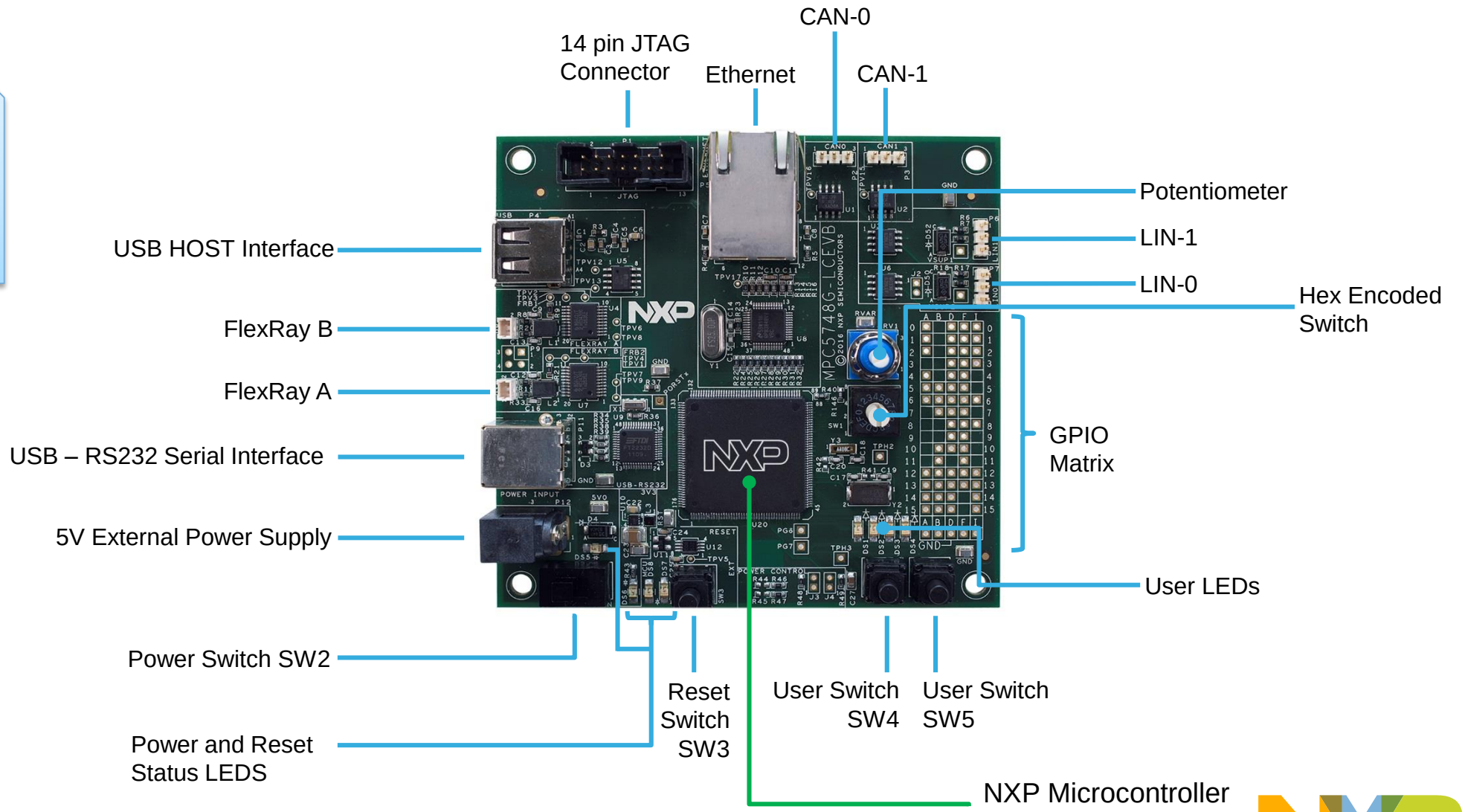
- MPC5748G has 2 x 160 MHz Power Architecture® e200Z4 Dual issue cores and 1 x 80 MHz Power Architecture® e200Z2 Single issue core
- MPC5748G qualified to AEC-Q100 Grade 1 and ambient temperature of -40 to +125 °C
- On board JTAG connector for debugging support
- Easy access to the MCU I/O header pins for prototyping
- On-chip connectivity for Ethernet, 2x FlexRay, USB, 2x CAN, 2x LIN, USB-RS232 and SPI
- Potentiometer for precise voltage and analog measurement
- Hex Encoded User Switch
- 4 user LED
- 2 user push-button switches



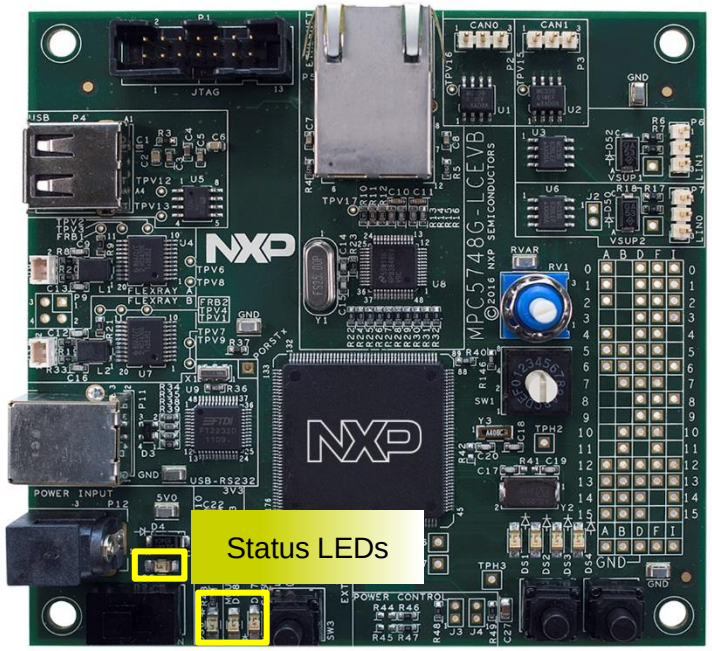
- Box includes:
  - MPC5748G-LCEVB Board
  - Warranty Card, Green Hills Flyer
- Downloads includes:
  - Quick Start Package
  - S32 Design Studio IDE
  - Application notes

MPC5748G-LCEVB Board : Overview

The MPC5748G-LCEVB is a low-cost development platform for MPC5748G Microcontrollers.



MPC5748G-LCEVB Board : Power, Reset & Debugging



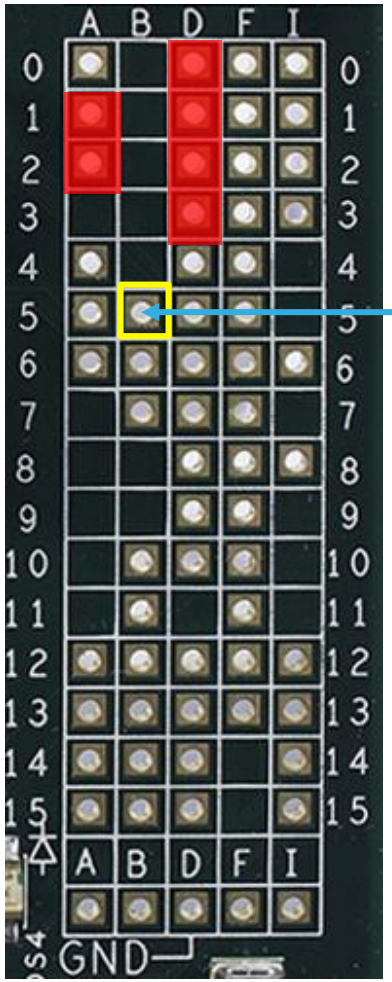
DESCRIPTION	Board PIN
5V Power Input	P12
Power Switch SW2	SW2
Reset Switch SW3	SW3
14 pin JTAG Connector	P1
Power Status LED: 5V supply OK	DS5
Power Status LED: 3.3V supply OK	DS6
Reset Status LED: YELLOW	DS7
Reset Status LED: RED	DS8

- 5 V power supply by 2.1 mm power connector is the only supply to the board
- Use SW1 to turn On/Off power to the board
- Use SW3 to reset the board
- 14 Pin JTAG Connector to connect debugger

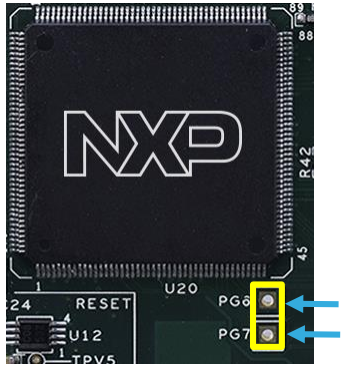
Reset LEDs

DS7 YELLOW LED	DS8 RED LED	DESCRIPTION
OFF	OFF	No Reset being issued from MCU or external logic
OFF	ON	MCU has issued a reset
ON	OFF	External reset issued from switch or debug BUT not being issued to MCU (check R137 has not been removed)
ON	ON	External reset issued from reset switch or debug and has been issued to MCU.

MPC5748G-LCEVB Board : GPIO Matrix



PB5



PG6
PG7
(For Clock Out)

A sub-set of available GPIO pins (available pins being those not already routed to LCEVB peripherals) are available at the GPIO matrix as detailed below. To use the matrix, simply read the port letter from the top or bottom row of text then the pad number from the columns on the left or right of the matrix. For example, the 1st pad available on Port B is PB5 as shown.

If a pad is populated in the matrix, it means this is available for exclusive use as GPIO. The exception to this are the port pins detailed below which are also shared with switches or user LED's (shaded red in the matrix).

1. PD0, PD1, PD2, PD3 – HEX Encoder Switch
2. PA1, PA2 – User pushbutton Switches

MPC5748G-LCEVB Board : Communication Interfaces

CAN_0

DESCRIPTION	NAME	Board PIN
Port PB0 & PB1	CANH	**P2-01**
	CANL	**P2-02**
	GND	**P2-04**

CAN_1

DESCRIPTION	NAME	Board PIN
Port PC10 & PC11	CANH	**P2-01**
	CANL	**P2-02**
	GND	**P2-04**

CAN 0

CAN 1

FlexRay_B

DESCRIPTION	MCU PORT
FR_B_TX	PE4
FR_B_TX_EN	PC4
FR_B_RX	PE5

FlexRay_B

DESCRIPTION	NAME	Board PIN
	FRB-DATA-B	**P8_2**
	FRB-DATA-A	**P8_1**

FlexRay B

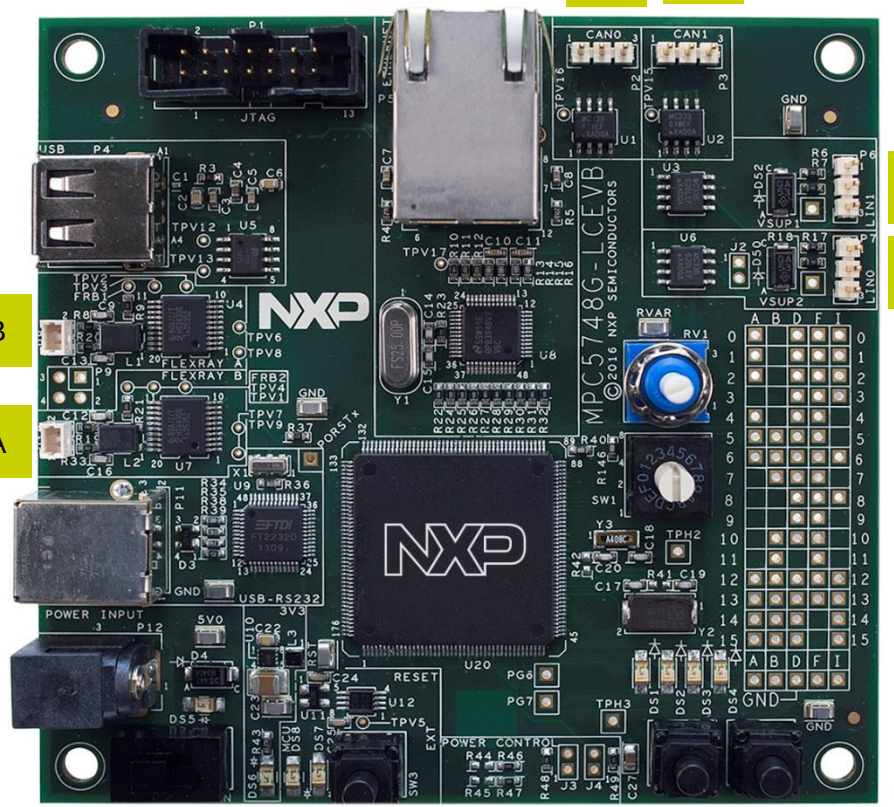
FlexRay_A

DESCRIPTION	NAME	Board PIN
	FRA-DATA-B	**P10_2**
	FRA-DATA-A	**P10_1**

FlexRay A

FlexRay_A

DESCRIPTION	MCU PORT
FR_A_TX	PC5
FR_A_TX_EN	PE2
FR_A_RX	PE3



LIN 1

LIN 0

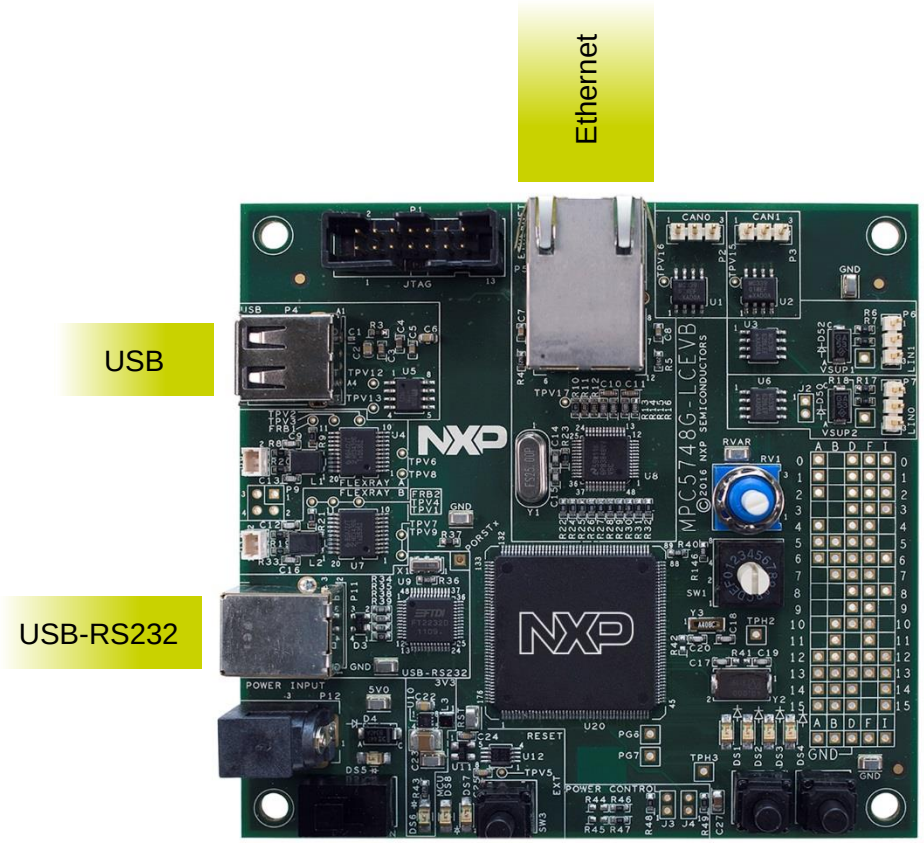
LIN_1

DESCRIPTION	NAME	Board PIN
	GND	**P6-01**
Connect to 12V	LIN1_VSUP	**P6-02**
Port PC6 & PC7	LIN	**P6-03**

LIN_0

DESCRIPTION	NAME	Boad PIN
	GND	**P7-01**
Connect to 12V	LIN0_VSUP	**P7-02**
Port PB2 & PB3	LIN	**P7-03**

MPC5748G-LCEVB Board : Communication Interfaces



USB_1 (Type A Host and Type AB OTG)
Board PIN: P4

DESCRIPTION	MCU PORT
ULPI1_D7	PH12
ULPI1_D6	PH11
ULPI1_D5	PG11
ULPI1_D4	PG10
ULPI1_D3	PE15
ULPI1_D2	PE14
ULPI1_D1	PG15
ULPI1_D0	PG14
ULPI1_STP	PI4
ULPI1_NXT	PI5
ULPI1_DIR	PC3
ULPI1_CLK	PC2

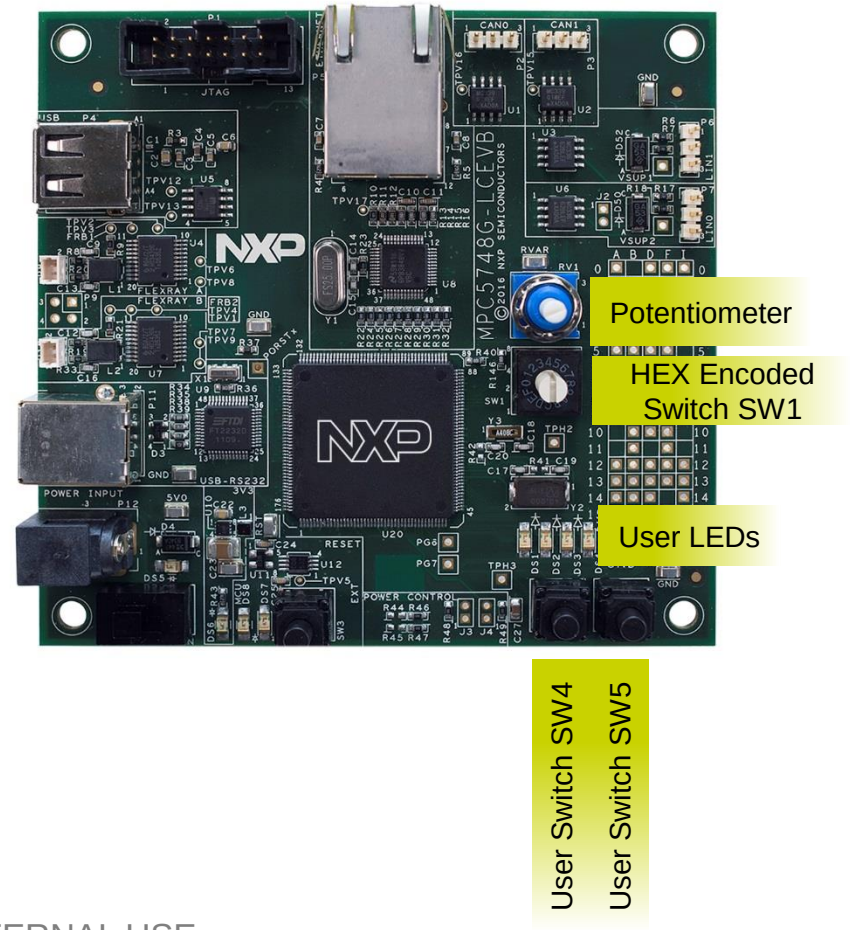
ETHERNET_0 (MII Mode)
Board PIN: P5

DESCRIPTION	MCU PORT
MII_0_TXD[0]	PH1
MII_0_TXD[1]	PH0
MII_0_TXD[2]	PG12
MII_0_TXD[3]	PG13
MII_RMII_0_TX_EN	PH2
MII_RMII_0_TX_CLK	PG1
MII_RMII_0_RXD[0]	PA9
MII_RMII_0_RXD[1]	PA8
MII_RMII_0_RXD[2]	PA7
MII_RMII_0_RXD[3]	PE13
MII_RMII_0_RX_DV	PF15
MII_RMII_0_RX_ER	PA11
MII_0_COL	PA10
MII_0_CRS	PE12
MII_0_RX_CLK	PA3
RMII_0_MDC	PG0
RMII_0_MDIO	PF14

USB-RS232 Serial Interface
(UART_2 – LinFlex_2)
Board PIN: P11

DESCRIPTION	MCU PORT
TX	PC8
RX	PC9

MPC5748G-LCEVB Board : User Peripherals



DESCRIPTION	Board PIN	MCU PORT
Potentiometer (ADC0 CH9)	RV1/POT	PB4
User Switch SW4	SW4	PA1
User Switch SW5	SW5	PA2
User LEDs	DS1	PG2
	DS2	PG3
	DS3	PG4
	DS4	PG5
Hex Encoded Switch SW1	HEX_SW1(least significant bit)	PD0
	HEX_SW2	PD1
	HEX_SW3	PD2
	HEX_SW4 (most significant bit)	PD3

Software Development Tools

- IDE & Compilers
  - Free S32 Design Studio IDE for Power Architecture with GCC compiler
  - GHS MULTI Integrated Development Environment
  - Cosmic IDE
  - iSystems winIDEA IDE
  - Sourcery™ CodeBench Development Tools

- Debuggers
  - Built-in S32 Design Studio IDE Support for P&E USB Multilink, Cyclone & TraceLink debuggers
  - iSystems iC6000
  - Lauterbach TRACE32 JTAG Debugger

Pre-Compiled Code Examples

- Pre-compiled example projects are available on nxp.com/MPC5748G-LCEVB for quick start

- Example projects also includes the projects from Application Note, AN4830: Qorivva Recipes for MPC574xG

List of code examples:

1. Hello
2. Hello+pll
3. Hello+pll+interrupts
4. eDMA+ PBridge
5. Semaphores
6. Register Protection
7. Low Power: STOP mode
8. Analog-to-digital Converter
9. Timed I/O (eMIOS)
10. CAN
11. CAN+DMA
12. LIN
13. UART
14. SPI
15. SPI+DMA
16. I2C
17. Ethernet
18. Body Cross Trigger Unit (BCTU)
19. System Memory Protection Unit (SMPU)
20. Flash

Documentation

General Documents

- MPC5748G Microcontroller Data Sheet
- MPC5748G Microcontroller Reference Manual
- MPC5748G Microcontroller Fact Sheet
- Software Integration Guide (SWIG)

Application Notes

- AN4830: Qorivva Recipes for MPC574xG
- AN5220: MPC5748G Hardware Design Guidelines
- AN5114: Migrating between MPC5748G and MPC5746C
- AN4868: EEPROM Emulation with NXP MPC55xx, MPC56xx, and MPC57xx Microcontrollers
- AN4805: A Practical Approach to Hardware Semaphores

MPC574xG/C/B/D Family : Phantom Feature Differences

Flash/RAM	Package			
	100MAPBGA (11x11mm, 1mm)	176LQFP-EP (24x24mm, 0.5mm)	256MAPBGA (17x17mm, 1mm)	324MAPBGA (19x19mm, 1mm)
6M/768k 6M/768k		**SPC5748G** **SPC5748C**	**SPC5748G** **SPC5748C**	**SPC5748G** **SPC5748C**
4M/768k 4M/512k		**SPC5747G** **SPC5747C**	**SPC5747G** **SPC5747C**	**SPC5747G** **SPC5747C**
3M/768k		**SPC5746G**	**SPC5746G**	**SPC5746G**
3M/384k (512k optional) 3M/384k (512k optional)	**SPC5746C** **SPC5746B**	**SPC5746C** **SPC5746B**	**SPC5746C** **SPC5746B**	**PPC5746C**
2M/256k 2M/256k	**SPC5745C** **SPC5745B**	**SPC5745C** **SPC5745B**	**SPC5745C** **SPC5745B**	
1.5M/192k 1.5M/192k	**SPC5744C** **SPC5744B**	**SPC5744C** **SPC5744B**	**SPC5744C** **SPC5744B**	

Color Coding:

- Triple Core, Ethernet, FlexRay, USB, SDHC, (optional HSM, 2nd Ethernet + switch)
- Dual Core, Ethernet, FlexRay (all: optional HSM, 5747C/5748C: 2nd Ethernet + switch)
- Single Core, FlexRay, Ethernet (optional HSM)
- Debug device for SPC5745B/C and SPC5746B/C - not for production

Recommendations

- For faster debugging, debug from RAM, because this cuts down the lengthy Flash erase operation cycles.
- Keep your IDE Up-to-date for best results
- Post Technical Questions on NXP community for MPC5xxx.
- Useful Links:
  - nxp.com/mpc5748g
  - nxp.com/mpc5748g-lcevb
  - nxp.com/s32ds
  - nxp.com/community

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