

S32R372141EVB QUICK START GUIDE (QSG)

Ultra-Reliable MCUs for Industrial and Automotive Applications

S32R372141EVB Webpage



EXTERNAL USE



SECURE CONNECTIONS
FOR A SMARTER WORLD

Contents

- [Quick Start Package Overview](#)
- [Step-by-Step Installation Instructions](#)
- [Hardware: S32R372141EVB Board](#)
 - [Features](#)
 - [S32R372141EVB Overview](#)
 - [S32R372141EVB Pinout Settings](#)
 - [Communication and Debug Interfaces](#)
 - [Power Supply](#)
- [Software:](#)
 - [Software Development Tools](#)
 - [Pre-compiled Code Examples](#)
- [Documentation](#)
- [Radar Family Comparison](#)
- [Recommendations](#)



Quick Start Package Overview

Board:

S32R372141EVB	S32R372 evaluation board for 141 BGA package. Can run standalone or with Radar front-end
---------------	------------------------------------------------------------------------------------------

Documents:

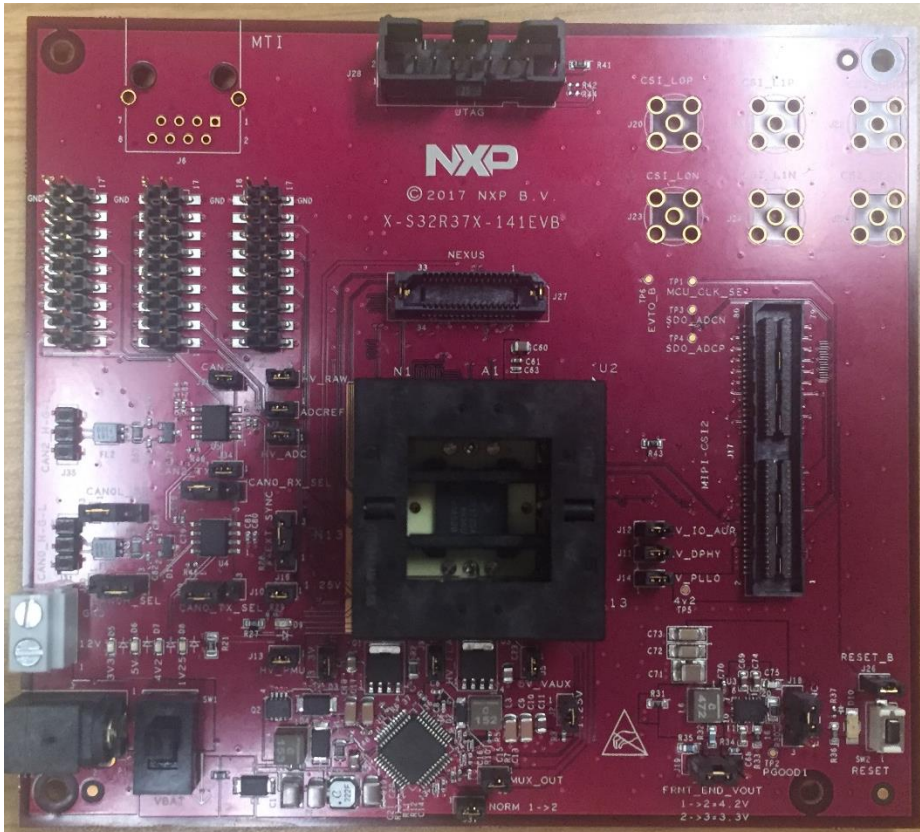
Name	Description
Quick Start Guide(QSG)	Detailed description on availability of Hardware, Software and Documents to quick start with S32R372 project (this document)
Software Installation Guide(SWIG)	Detailed walk through on how to install and use S32 Design Studio for Power Architecture
Application Notes	Detailed documents covering topics from 'how to design hardware' to 'how to write software'
Fact Sheets, Reference Manuals and Data Sheets	Detailed manuals for S32R family of MCU and S32R372141EVB board

Downloads:

Name	Description
Integrated Development Environment (IDE)	Eclipse based S32DS IDE with free GCC compiler and Debugger support
S32R372141EVB Quick Start Package	Software examples and supporting documents for getting started with the S32R372141EVB
S32R372141EVB Schematics	PDF schematic files for the S32R372141EVB board
S32R372141EVB PCB Design Package	Gerber files and Bill of Material

Step-by-Step Installation Instructions

In this quick start guide, you will learn how to set up the **S32R372141EVB** board and run the default program.



Install Software and Tools

Install S32 Design Studio IDE for Power Architecture.
[S32 Design Studio for Power](#)
 See Software Installation Guide (SWIG) for detailed procedure

Connect the Debugger

Connect the debugger (e.g. P&E USB Multilink) to the board.

Observe the Default Program reaction

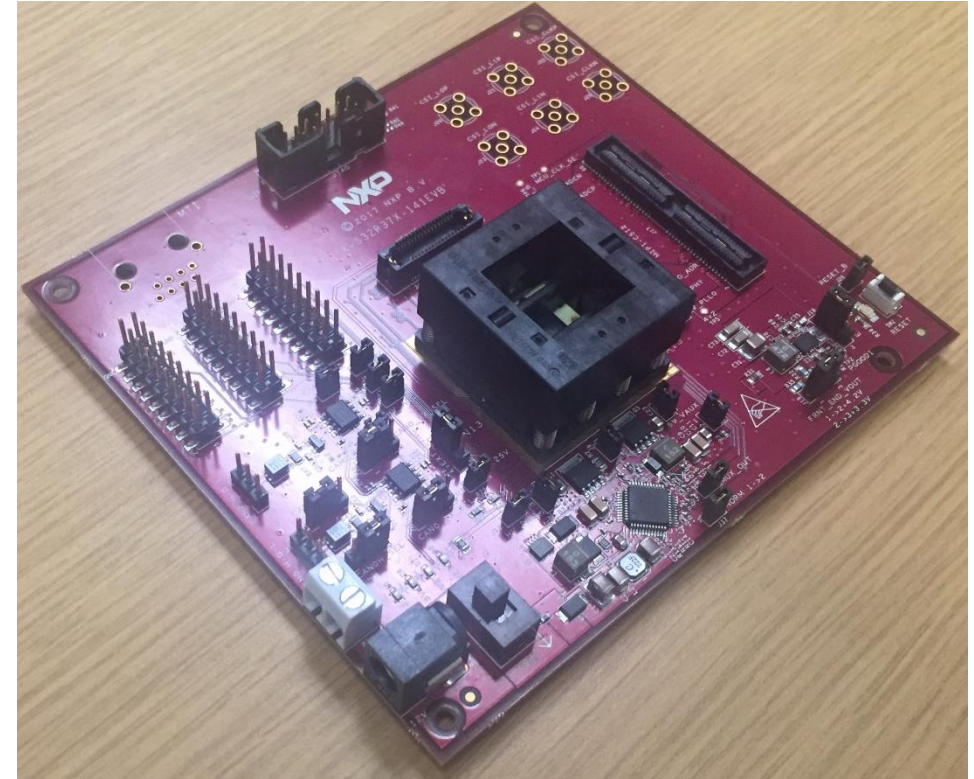
The pre-loaded example project utilizes the **S32R's multiple cores**. Once the board is plugged in, the S32R's PLLs will be programmed to max frequency. The CLKOUT pin will display the frequency of each PLL in a round-robin fashion as each core takes turns controlling CLKOUT.

Learn More About the S32R37x-141BGA

Read release notes and documentation on the
S32R372 Product Page
S32R274RRUEVB Product Page

S32R372141EVB Board : Features

- S32R27 has 2 x 240 MHz Power Architecture® e200Z7 computation cores
- S32Rx qualified to AEC-Q100 Grade 1 and ambient temperature of -40 to +150 °C
- S32R372141EVB is a low cost standalone radar EVB. Attach a radar transceiver to the MIPI-CSI2 connector to take advantage of its radar processing capability
- Integrated JTAG interface for easy debugging
- Easy access to the MCU I/O header pins for prototyping
- Nexus traceport
- Solder points for Gb Ethernet port
- MIPI_CSI2 connector
- Flexible power supply options
 - 12V and GND pins to allow you to supply from DC generator
 - 12V External power supply via barrel connector

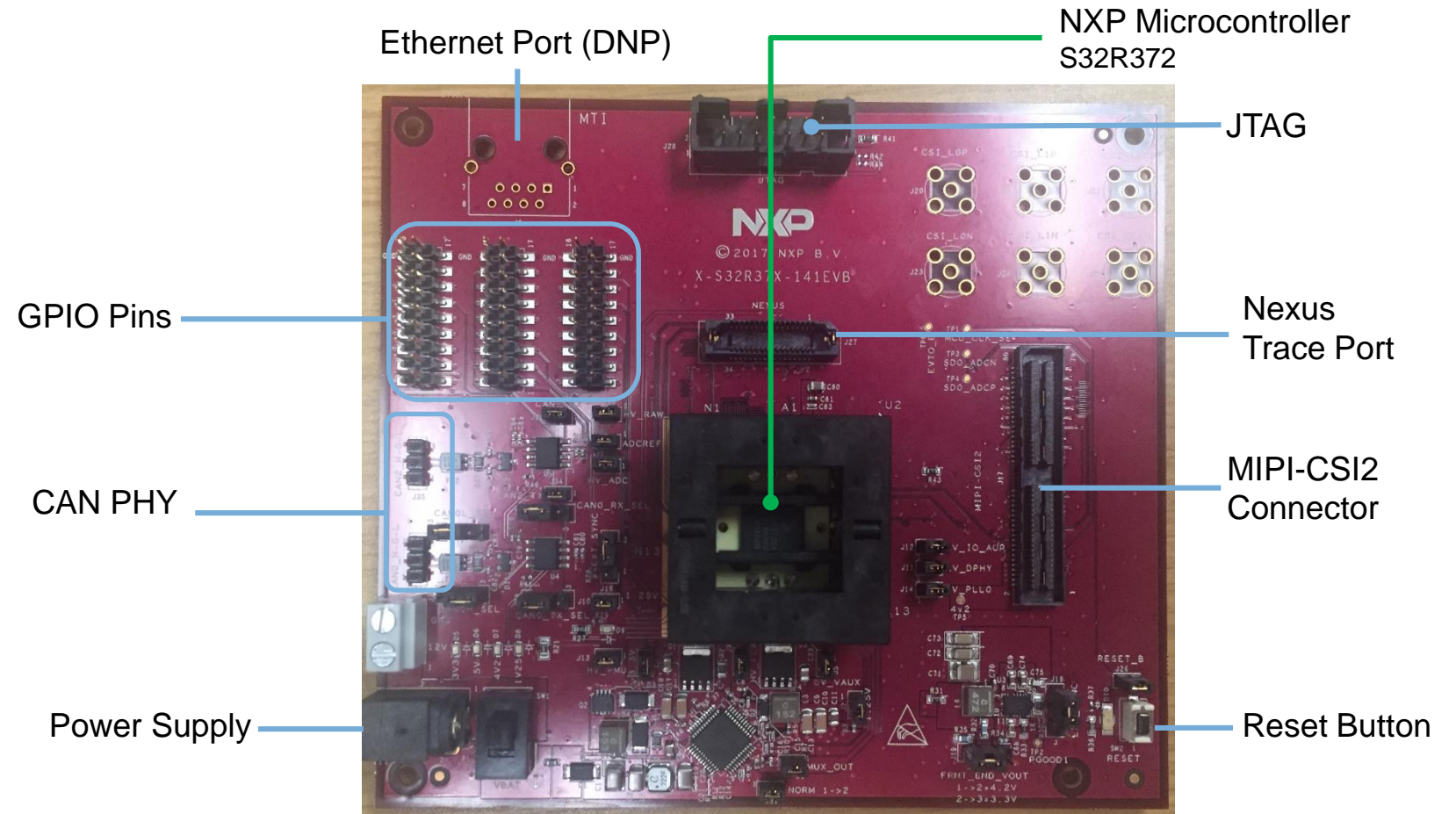


- Box includes:
 - S32R372141EVB Board
- Downloads includes:
 - Quick Start Package
 - S32 Design Studio IDE
 - Application notes

S32R372141EVB Board : Overview

The S32R372141EVB is NXP's evaluation board for the S32R372 radar processor. It is designed to be paired with an analog front end. NXP supports the TEF810 and MR3003 radar transceivers, but third-party options are possible.

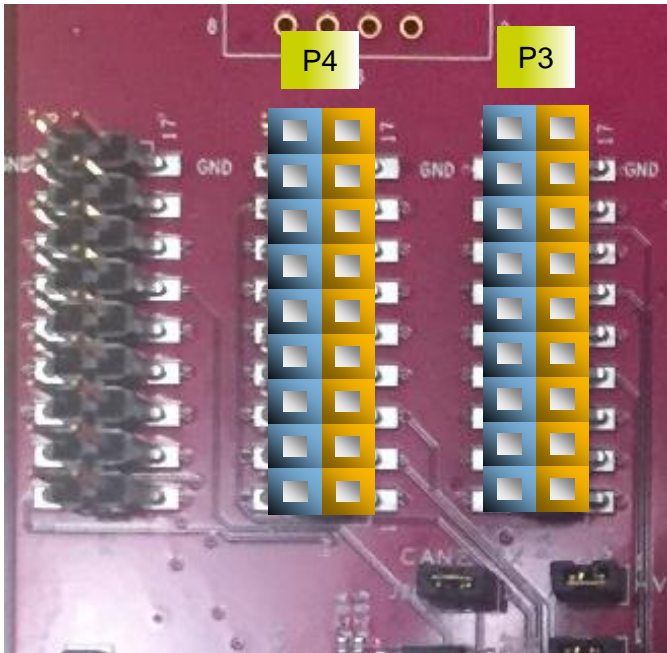
This EVB features I/O headers, trace ports, and CAN ports to meet any prototyping needs at a low cost.



Note: "DNP" stands for "Do not populate", meaning pin is disconnected by default. You must solder on the relevant component to the solder points.

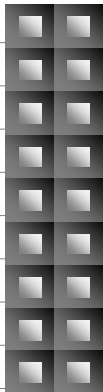
S32R372141EVB: Pinout

1 of 2



FUNCTION	PORT	PIN
	GND	GND
GPIO[15]	PA15	P3-16
DSPI2_SIN	PA13	P3-14
DSPI2_SCK	PA11	P3-12
GPIO[9]	PA9	P3-10
TX2_PS	PA7	P3-8
EIRQ_5	PA5	P3-6
SSN-MEM	PA3	P3-4
EIRQ_1	PA1	P3-2

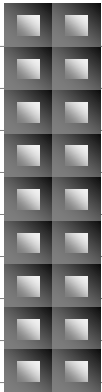
P3



PIN	PORT	FUNCTION
GND	GND	
P3-15	PA14	SIUL_EIRQ13
P3-13	PA12	DSPI2_SOUT
P3-11	PA10	DSPI2_CS0
P3-9	PA8	TX1_PS
P3-7	PA6	TX3_PS
P3-5	PA4	ERROR_RST
P3-3	PA2	SBC_FS0B
P3-1	PA0	ERROR_N

FUNCTION	PORT	PIN
	GND	GND
GPIO[62]	PD14	P4-16
GPIO[51]	PD3	P4-14
ETIMER_ETC0	PC15	P4-12
GPIO[32]	PC0	P4-10
ADC1_AN0	PB13	P4-8
TDI	PB5	P4-6
GPIO[19]	PB3	P4-4
CAN0_RXD	PB1	P4-2

P4

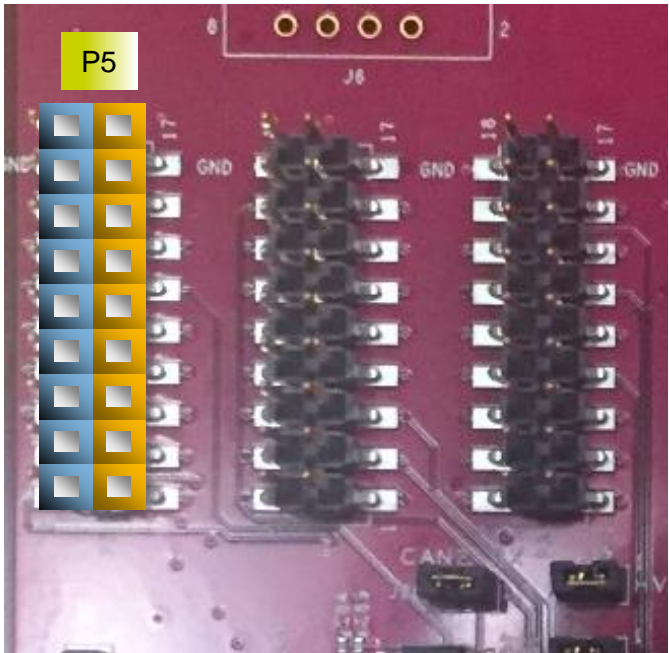


PIN	PORT	FUNCTION
GND	GND	
P4-15	PD6	GPIO[54]
P4-13	PD1	ETIMER_ETC2
P4-11	PC12	ETIMER_ETC2
P4-9	PB15	ADC1_AN2
P4-7	PB6	GPIO[22]_CLKOUT
P4-5	PB4	TDO
P4-3	PB2	GPIO[18]
P4-1	PB0	CAN0_TXD



S32R372141EVB: Pinout

2 of 2



FUNCTION	PORT	PIN
	GND	GND
	NC	P5-16
FCCU_1	FCCU_F1	P5-14
NMI	NMI	P5-12
RESET	PI4	P5-10
GPIO[104]	PG8	P5-8
CTE_RCS	PF0	P5-6
GPIO[77]	PE13	P5-4
GPIO[68]	PE4	P5-2

P5



PIN	PORT	FUNCTION
GND	GND	
P5-15	NC	
P5-13	FCCU_F0	FCCU_0
P5-11	PI5	CAN2_TXD
P5-9	PH7	GPIO[119]
P5-7	PF15	CAN2_RXD
P5-5	PE15	GPIO[79]_CLKOUT
P5-3	PE6	GPIO[70]
P5-1	PE2	GPIO[66]



S32R372141EVB: Communication Interfaces

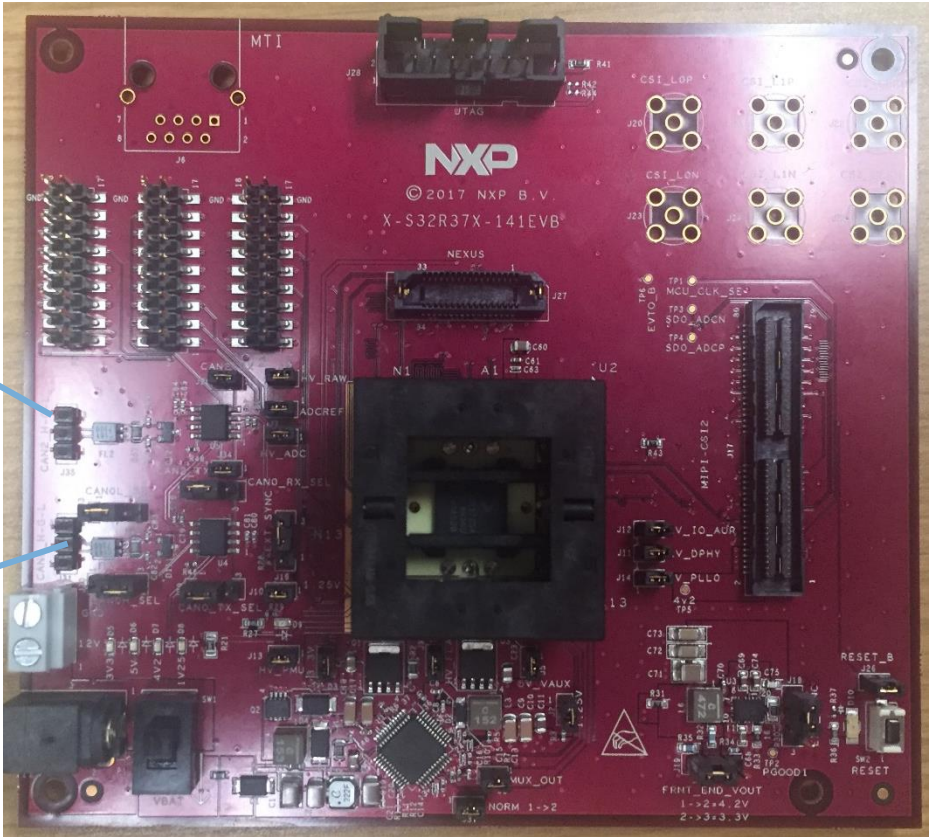
CAN_2

DESCRIPTION	NAME	PIN
Port PI5 & PF15	CANL	J35-03
	GND	J35-02
	CANH	J35-01



CAN_0

DESCRIPTION	NAME	PIN
Port PB0 & PB1	CANL	J31-03
	GND	J31-02
	CANH	J31-01

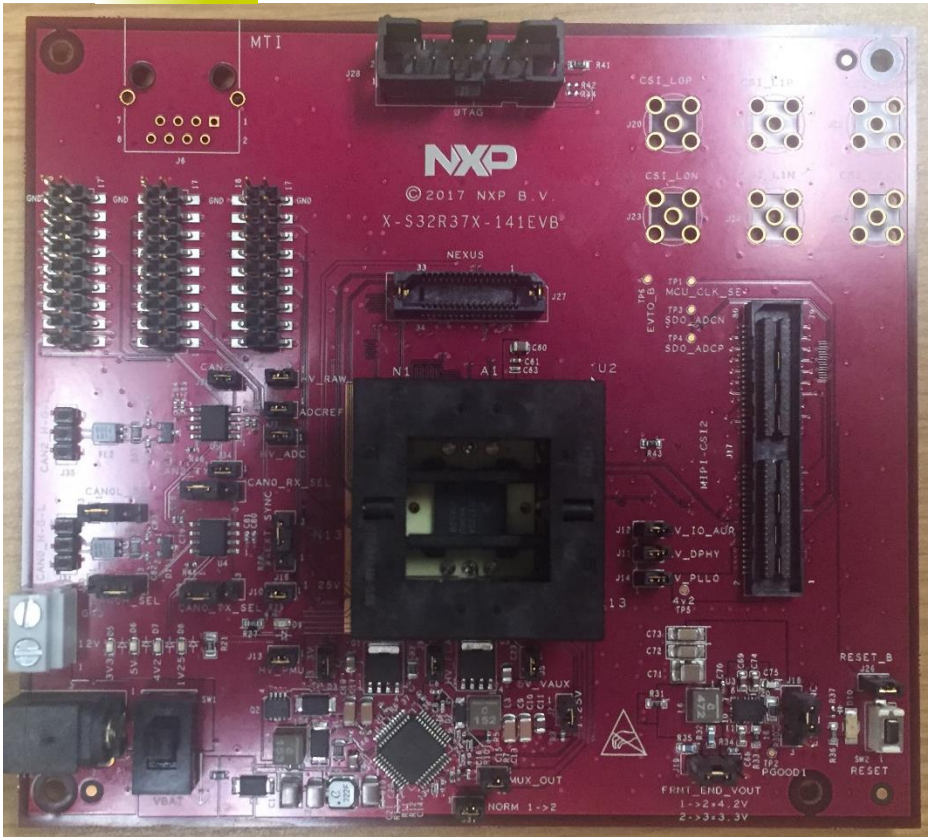


S32R372141EVB: Communication Interfaces

Ethernet

Ethernet (DNP)

DESCRIPTION	PORT
MTI_P0_IUC	MTI_P0
MTI_N0_IUC	MTI_N0
MTI_N2_IUC	MTI_N2
MTI_P1_IUC	MTI_P1
MTI_N1_IUC	MTI_N1
MTI_P2_IUC	MTI_P2
MTI_N3_IUC	MTI_N3
MTI_P3_IUC	MTI_P3



*These pins map to special purpose pads on the S32R274 MCU instead of general purpose ports as controlled by the SIUL module. Information for these can be found under “Misc Pins” of “S32R274_IO_Signal_Description_and_Input_multiplexing_tables_Revn.xlsx”.

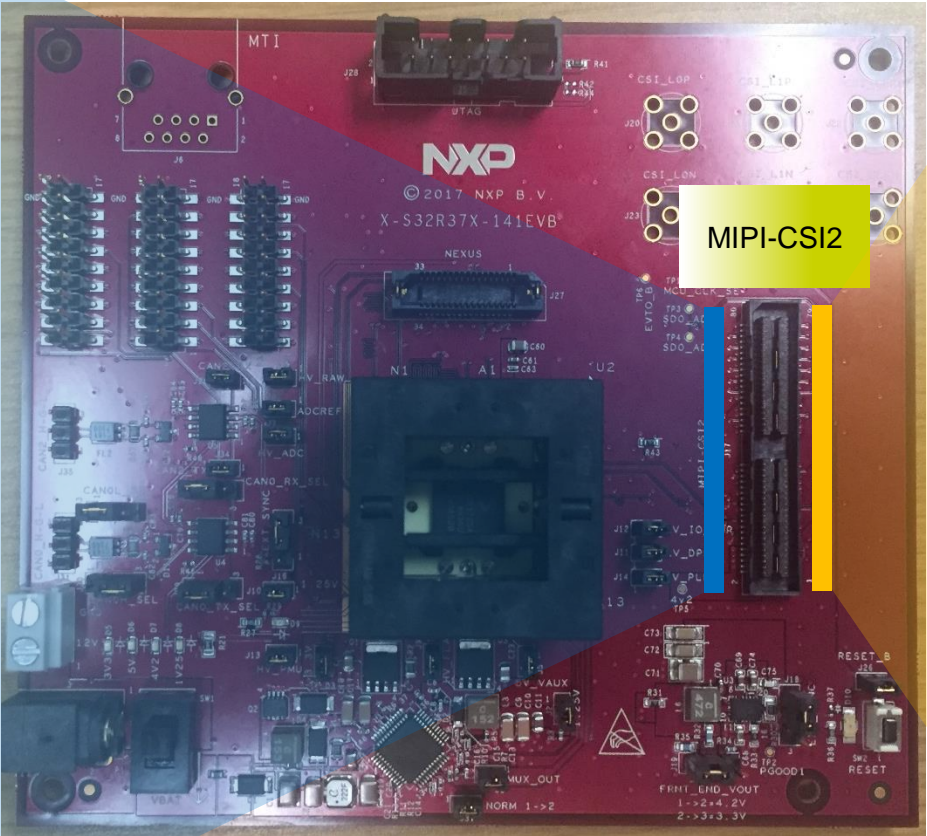


S32R372141EVB: Communication Interfaces

3 of 3

MIPI-CSI2

DESCRIPTION	PORT
GND	GND
GND	GND
GND	GND
TX2_PS	PA7
GND	GND
TX3_PS	PA6
GND	GND
TX1_PS	PA8
GND	GND
RESET	PI4
GND	GND
ERROR_N	PA1
GND	GND
ERROR_RST	PA4
GND	GND
SSN_MEM	PA3
GND	GND
GND	GND
RESET_B	RESET_B
GND	GND
GND	GND
GND	GND
GND	GND
GND	GND
EIRQ_5	PA5
GND	GND
GND	GND
GND	GND
CSI_LANE1P	CSI_LANE1P
CSI_LANE1N	CSI_LANE1N
GND	GND
CSI_LANE0N	CSI_LANE0N
CSI_LANE0P	CSI_LANE0P
GND	GND
CSI_CLKP	CSI_CLKP
CSI_CLKN	CSI_CLKN
GND	GND
FRNT_END_REG	FRNT_END_REG
FRNT_END_REG	FRNT_END_REG
FRNT_END_REG	FRNT_END_REG
FRNT_END_REG	FRNT_END_REG
FRNT_END_REG	FRNT_END_REG
GND	GND



MIPI-CSI2

DESCRIPTION	PORT
GND	GND
ETIMER_ETC0	PC15
GND	GND
CTE_RCS	PF0
GND	GND
CTE_RFS	PE13
GND	GND
SIUL_EIRQ13	PA14
GND	GND
DSPI2_SCK	PA11
GND	GND
DSPI2_CS0	PA10
GND	GND
DSPI2_SIN	PA13
GND	GND
DSPI2_SOUT	PA12
GND	GND
ETIMER_ETC2	PD1
GND	GND
GND	GND
GND	GND
GND	GND
GND	GND
GND	GND
ADC1_AN_0	PB13
GND	GND
GND	GND
GND	GND
GND	GND
GND	GND
GND	GND
SD_0_ADCP	TP4 (EVB Test Pt.)
SD_0_ADCN	TP3 (EVB Test Pt.)
GND	GND
GND	GND
GND	GND
GND	GND
MCU_CLK_SE	TP1 (EVB Test Pt.)
GND	GND
GND	GND
MCU_CLK_N	XOSC_XTAL
MCU_CLK_P	XOSC_EXTAL
GND	GND
GND	GND
GND	GND
GND	GND



S32R372141EVB: Communication Interfaces

2 of 2

Ethernet (DNP)

DESCRIPTION	PORT
MTI_P0_IUC	MTI_P0
MTI_N0_IUC	MTI_N0
MTI_N2_IUC	MTI_N2
MTI_P1_IUC	MTI_P1
MTI_N1_IUC	MTI_N1
MTI_P2_IUC	MTI_P2
MTI_N3_IUC	MTI_N3
MTI_P3_IUC	MTI_P3



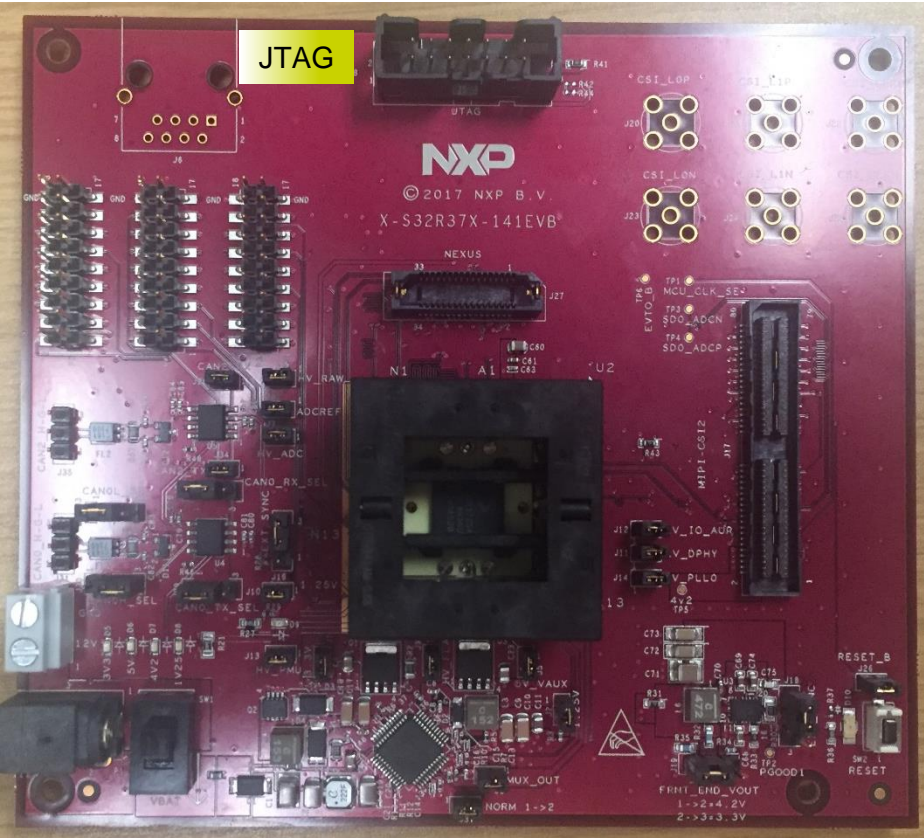
MIPI-CSI2

DESCRIPTION	PORT
ETIMER2_ETC3	PC12
SD_0_ADCN*	SDADC0 Neg. Inp.
SD_0_ADCP*	SDADC0 Pos. Inp.
CTE_RFS	PE13
DSPI2_SOUT	PA12
DSPI2_SIN	PA13
DSPI2_CS0	PA10
DSPI2_SCK	PA11
SIUL_EIRQ5	PA5
MCU_CLK_P*	XOSC_XTAL (DNP)
MCU_CLK_N*	XOSC_EXTAL (DNP)
ETIMER2_ETC0	PB2
MCU_CLK_SE*	XOSC_EXTAL (DNP)
ADC0_AN_0	PB7
RESET_B*	RESET_B
CTE_RCS	PF0
CSI_LANE2N*	Lane2 Neg. Inp.
CSI_LANE2P*	Lane2 Pos. Inp.
CSI_LANE0P*	Lane0 Neg. Inp.
CSI_LANE0N*	Lane0 Pos. Inp.
CSI_CLKN*	Clock Neg. Inp.
CSI_CLKP*	Clock Pos. Inp.
CSI_LANE1P*	Lane1 Pos. Inp.
CSI_LANE1N*	Lane1 Neg. Inp.
CSI_LANE3N*	Lane3 Neg. Inp.
CSI_LANE3P*	Lane3 Pos. Inp.

*These pins map to special purpose pads on the S32R274 MCU instead of general purpose ports as controlled by the SIUL module. Information for these can be found under “Misc Pins” of “S32R274_IO_Signal_Description_and_Input_multiplexing_tables_Revn.xlsx”.



S32R372141EVB: Programing Interface



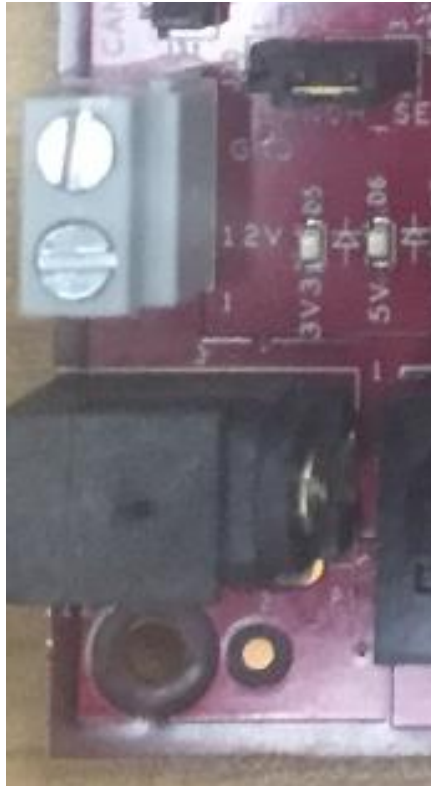
JTAG	
DESCRIPTION	PIN
Support for JTAG-capable debugger such as USB Multilink	J28



S32R372141EVB: Power Supply

P2

P1



The S32R372141EVB supports two power options. You can generate 12V from a DC generator and connect that to P2; or you can plug in a 12V power supply through the barrel connector P1. NXP does not directly sell 12V power supplies. You can obtain a power supply through a third-party vendor.

Power supply specifications:

Fully regulated Switching Power Supply

Input Voltage 100-240V AC 50/60Hz

Output 12V 1A/2A DC

Plug size: 5.5mm x 2.1 mm, Center Positive



Package Level Pinout Diagram – S32R372 (141 BGA)

Software Development Tools

- S32 Design Studio IDE for Power Architecture
- IDE & Compilers
 - Free S32 Design Studio IDE with GCC compiler
 - GHS MULTI Integrated Development Environment
 - Cosmic IDE
 - iSystems winIDEA IDE
 - Sourcery™ CodeBench Development Tools
- Debuggers
 - Free OpenSDA debugger on board and supported by S32DS IDE
 - P&E USB Multilink
 - iSystems iC6000
 - Lauterbach TRACE32 JTAG Debugger



Pre-Compiled Code Examples

- Quick start examples for S32R372141EVB are available in the Quick Start Package to help familiarize you to the board
- The QSP also includes application examples that demonstrate the S32R37's radar capabilities. These include tutorial videos and a radar transceiver (COMING SOON)

List of code examples:

1. Hello World
2. Hello World + PLL
3. Hello World + PLL + Interrupts
4. FlexCAN (coming soon)

NOTE: Run these examples with S32DS for Power Architecture v2017.R1 or later



Documentation and Reference Material

- **Documentation Links**

- S32R372 Datasheet
- S32R372 Factsheet

- **Application Notes**

- [S32R Radar Signal Compression](#)
- [S32R27/37 Hardware Design Guide](#)
- [Clock Monitor Unit Guide](#)
- [e200 Core Memory Protection Unit Guide](#)

- **Reference Manuals**

- S32R372 Family Reference Manual
- S32R372 Family Safety Manual

Radar Family – Product Feature Differences

- S32R372 is the low-cost counterpart to the S32R274 radar processor
- Selected features below

MCU	FEATURES				
	Flash*	RAM	EE PROM	Security	Transceiver Interface
S32R274	2.0MB	1.5MB	Emulate	Yes	1 x 4-lane MIPI-CSI2
S32R372					

*Differences in memory are all in the Large Flash Block



Recommendations

- For faster debugging, debug from RAM, because this cuts down the lengthy Flash erase operation cycles. Follow the Software Integration Guide (SWIG) for details.
- By default “New Project” in S32 Design Studio IDE makes application to run at 16 MHz Internal RC (IRC) oscillator. For faster performance, configure PLL to desired frequency and switch clock source to PLL before executing application code.
- Keep S32 Design Studio IDE and OpenSDA firmware Up-to-date for best results
- Post Technical Questions on NXP community for [MPC5xxx](#).
- Useful Links:
 - S32R372 Webpage
 - S32R372141EVB Webpage
 - nxp.com/s32ds
 - nxp.com/community



SECURE CONNECTIONS
FOR A SMARTER WORLD