UM12021

MIMXRT1180-EVK Board User Manual

Rev. 1 — 27 May 2024 User manual

Document information

Information	Content
Keywords	UM12021, MIMXRT1180-EVK board, i.MX RT1180 crossover MCU, MCU-Link onboard (OB) debug probe
Abstract	The MIMXRT1180-EVK board is a comprehensive hardware platform for design and evaluation of the commonly used features of the NXP i.MX RT1180 crossover MCU, in a small and low-cost package.

1 Overview

The MIMXRT1180-EVK board is an evaluation and development platform for the NXP i.MX RT1180 crossover MCU, which uses the Arm Cortex-M7 and Cortex-M33 cores. The i.MX RT1180 MCU is optimized for real-time performance and high integration for industrial and IoT applications including industrial Internet, EtherCAT, and time-sensitive networking (TSN).

The MIMXRT1180-EVK board helps users to be familiar with the i.MX RT1180 MCU, before they invest a large amount of resources in more specific designs. The board has a small and low-cost package and is lead-free and RoHS-compliant.

This document provides details about MIMXRT1180-EVK board interfaces, power supplies, clocks, connectors, jumpers, user buttons, and LEDs.

The MIMXRT1180-EVK board uses an onboard debug probe, also known as MCU-Link OB for debugging the i.MX RT1180 MCU. MCU-Link OB (OB stands for "onboard") is based on another MCU, LPC55S69.

Note: *This document uses the following conventions:*

- *The i.MX RT1180 crossover MCU is referred to as the target MCU.*
- *The MCU-Link OB is referred to as "MCU-Link debug probe" or just "MCU-Link".*

Further information about the i.MX RT1180 MCU is available on the URL: https://www.nxp.com/products/processors-and-microcontrollers/arm-microcontrollers/i-mx-rt-crossover-mcus/i-mx-rt1180-crossover-mcu-with-tsn-switch-and-edgelock:i.MX-RT1180.

1.1 Block diagram

Figure 1 shows the MIMXRT1180-EVK block diagram.

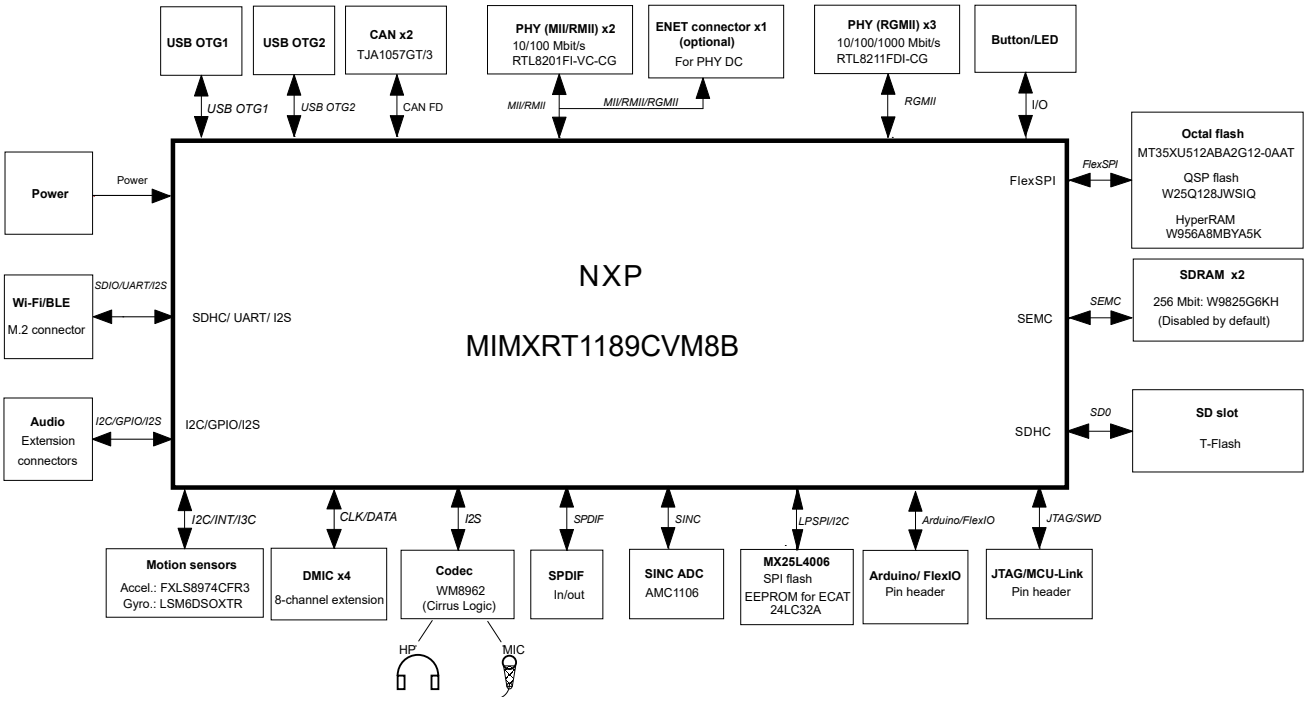

Figure 1. MIMXRT1180-EVK block diagram

1.2 Board kit contents

Table 1 lists the items included in the MIMXRT1180-EVK board kit.

Table 1. Board kit contents

Item	Quantity
MIMXRT1180-EVK board	1
USB Type-A to micro-B cable	1
Power adapter • 100 / 240 V input • 5 V, 4 A output	1
Quick Start Guide (QSG)	1

1.3 Board features

Table 2 lists the features of MIMXRT1180-EVK. Figure 2 shows different components of MIMXRT1180-EVK.

Table 2. MIMXRT1180-EVK features

MIMXRT1180-EVK feature	Target MCU module used	Description
Target MCU	-	• NXP crossover MCU MIMXRT1189CVM8B • Dual-core, real-time microcontroller • Features Arm Cortex-M7 (operating up to 800 MHz) and Arm Cortex-M33 core (running up to 240 MHz speed) for high performance and real-time functionality ***Note:*** *For details on the MIMXRT1189CVM8B MCU, refer to the i.MX RT1180 Reference Manual.*
Power supply	-	Use any of the following (+5 V) sources to power up the MIMXRT1180-EVK board: • External DC power supply connected to input power jack J2 • USB 2.0 Micro-AB connector J33, operating in OTG mode • USB 2.0 micro-AB connector J68, operating in Device mode • USB 2.0 micro-AB connector J53, for MCU-Link
Clock	-	Eight quartz crystals and a crystal oscillator: • Five 25 MHz clock sources for five Ethernet PHYs • One 32.768 kHz RTC source and one 24 MHz RF clock source for i.MX RT1180 MCU • One 32.768 kHz clock source for M.2 mini card connector J36 • One 16 MHz clock source for MCU-Link
Current measurement	-	Supports current measurement for i.MX RT1180 power domains (see Table 10)
SEMC	SEMC	• Two 16-bit SDRAM memories, W9825G6KH, U14 and U16 operating at frequencies of up to 200 MHz
uSDHC	USDHC1	• A micro-SDHC connector, J15, with 3.3 V / 1.8 V voltage support for connecting an external micro-SD 3.0 card
FlexSPI	FLEXSPI1	• Two 16 MB onboard QSPI NOR flash memories, U10 and U12 • One 8 MB octal flash, U11
	FLEXSPI2	8 MB onboard HyperRAM memory, W956A8MBYA5K (U15)
LPI2C	LPI2C2	LPI2C2 bus connects to audio codec U369, accelerometer U115, M.2 card connector J36, and Ethernet daughter card connector J134
	LPI2C3	LPI2C3 bus connects to EEPROM U48, audio main connector J47, and I2C extension connector J51
I3C	I3C2	I3C bus connects to a combined gyrometer and accelerometer, LSM6DSOXTR, U46, and an I3C extension connector J50
Ethernet	ETH0	Supports a 10/100 MBit/s MII/RMII Ethernet connection using an Ethernet PHY transceiver U121, accessible through RJ45 connector J28
	ETH1	Supports a 10/100/1000 MBit/s RGMII Ethernet connection using an Ethernet PHY transceiver U27, accessible through RJ45 connector J29

Table 2. MIMXRT1180-EVK features*...continued*

MIMXRT1180-EVK feature	Target MCU module used	Description
	ETH2	Supports a 10/100/1000 MBit/s RGMII Ethernet connection using an Ethernet PHY transceiver U29, accessible through RJ45 connector J30
	ETH3	Supports a 10/100/1000 MBit/s RGMII Ethernet connection using an Ethernet PHY transceiver U34, accessible through RJ45 connector J31
	ETH4	• Supports a 10/100 MBit/s MII/RMII Ethernet connection using an Ethernet PHY transceiver U123, accessible through RJ45 connector J32 • Also supports a daughter card connector J134 (supporting RMII/RGMII/MII) that can be used to connect to an external Ethernet Daughter card
EtherCAT	ECAT	• ECAT port 0 supports a 100 MBit/s RMII/MII Ethernet connection using the Ethernet PHY transceiver U121, accessible through RJ45 connector J28. RMII is supported by default and MII is supported only through resistor rework • ECAT port 1 supports a 100 MBit/s RMII /MII Ethernet connection using the Ethernet PHY transceiver U123, accessible through RJ45 connector J32. RMII is supported by default and MII is supported only through resistor rework
USB	Two USB 2.0 OTG modules with integrated PHYs • USB_OTG1 • USB_OTG2	• Supports high-speed (480 Mbit/s), full-speed (12 Mbit/s), and low-speed (1.5 Mbit/s) operations • Two USB 2.0 micro-AB connectors operating in OTG mode: – J33 (USB OTG1) with power switch U37 – J68 (USB OTG2) with power switch U39
LPUART	LPUART1	LPUART1 connects to MCU-Link U55
	LPUART10	LPUART10 connects to M.2 card connector, J36
	LPUART12	LPUART12 connects to MCU-Link U55 and USB-to-UART bridge U72
SAI	SAI1	SAI1 module connects to audio codec U369 and audio main connector, J47 Audio codec U369 supports: • Audio jack J101 • Microphone P2 • Connectors for speakers, J95 and J96 (DNP)
	SAI4	SAI4 module connects to the M.2 card connector J36 and audio auxiliary connector, J48
LPSPI	LPSPI1	Connects to SPI NOR flash memory U13
	LPSPI6	Connects to M.2 card connector J36
SPDIF	SPDIF	• Supports reception of SPDIF coaxial input signal through RCA connector J24 (DNP) • Supports transmission of SPDIF coaxial output signal through RCA connector J27 (DNP)
Digital Microphone (DMIC)	MIC	Supports: • Four digital microphones, U116, U117, U118, and U119 (SPH0641 LM4H-1)

Table 2. MIMXRT1180-EVK features*...continued*

MIMXRT1180-EVK feature	Target MCU module used	Description
		• 8-channel DMIC board extension connector, J67
Debug	-	Supports the following options for debugging i.MX RT1180 • Using the onboard MCU-Link debug probe, U55. • Using the JTAG connector, J37 (SWD) • Using an external debugger through J56 connector using the FT232 device U72
Digital accelerometer	LPI2C2	Supports 3-axis MEMS accelerometer NXP's FXLS8974CFR3, U115 • ±2/4/8/16 g user-selectable, full-scale measurement ranges • 12-bit acceleration data and 8-bit temperature sensor data • I2C address: WR:32, RD:33
Gyrometer and accelerometer	I3C2	Supports a combined gyrometer and accelerometer, LSM6DSOXTR, U46 (also referred to as IMU) • It is a 6-axis, serial interface supporting 12-bit acceleration data • Supports 8-bit temperature sensor data • It is connected to i.MX RT1180 MCU through I3C extension connector J50
Arduino connectors	-	• Headers compatible with Arduino daughter card • Arduino connectors (two 1x8 position receptacles J39 and J45, a 1x10 position receptacle J44, and a 1x6 position receptacle J41)
mikroBus connectors	-	Supports a mikroBUS socket with two 1x8 position receptacles, J62 and J70
M.2 connector and Wi-Fi/ Bluetooth module	USDHC1, SAI4, USB_OTG2, LPUART10, LPSPI6, and LPI2C2	Supports M.2/NGFF Key E mini card 75-pin connector, J36
CAN	FLEXCAN1 and FLEXCAN3	Supports 2 high-speed CAN transceivers, U41 and U42 (NXP TJA1057GT), to provide an interface for the CAN ports to send and receive CAN signals to and from the MCU
FLEXIO	FLEXIO2	Connects to a 2x10 pin FlexIO header J69
PCB	-	195 mm x 140 mm, 6-layer board

1.4 Board pictures

Figure 2 shows the connectors on the top-side view of the MIMXRT1180-EVK board.

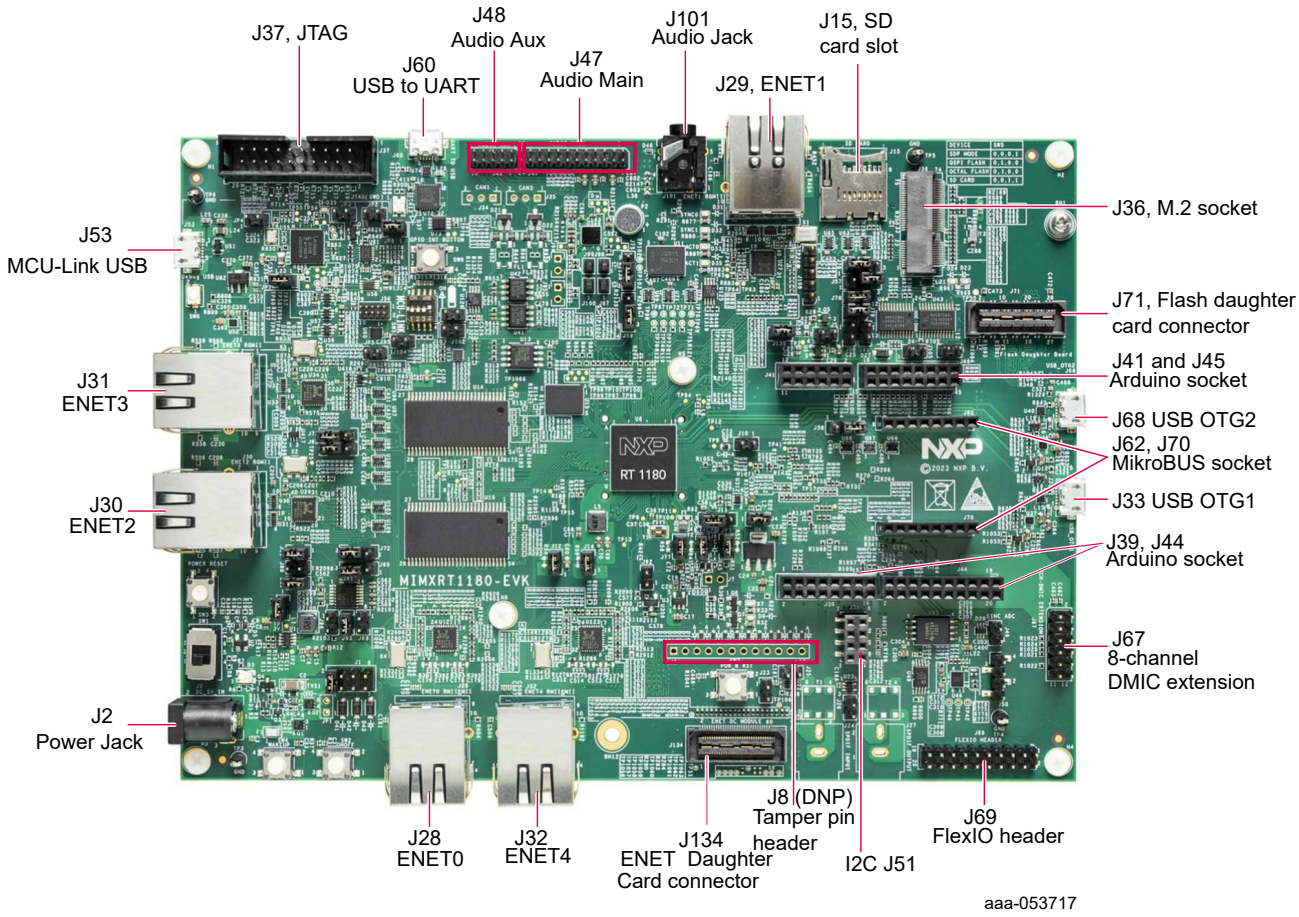

Figure 2. MIMXRT1180-EVK top view connectors

Figure 3 shows the connectors on the bottom side of the MIMXRT1180-EVK board.

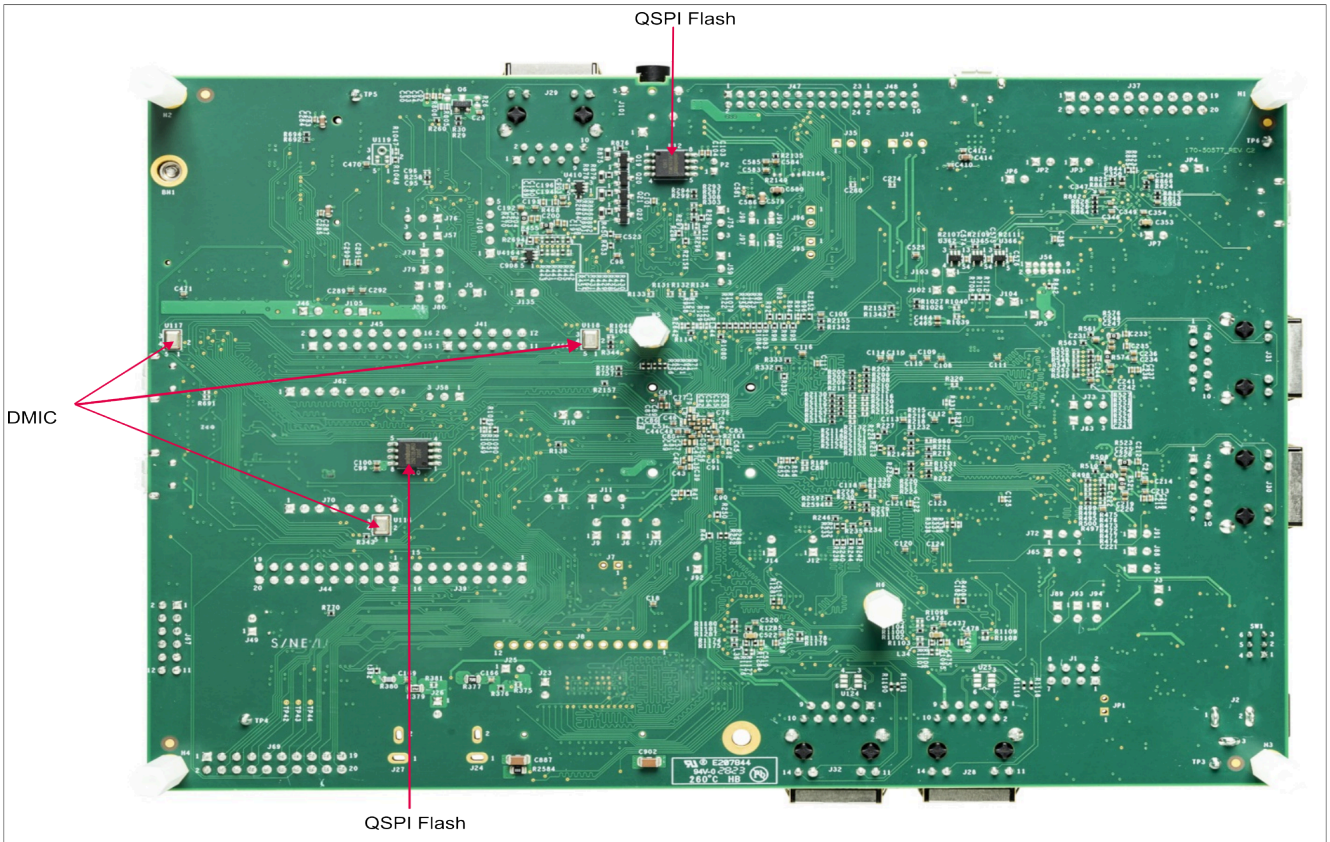

Figure 3. MIMXRT1180-EVK bottom view connectors

Figure 4 shows the jumpers on the top-side view of the MIMXRT1180-EVK board.

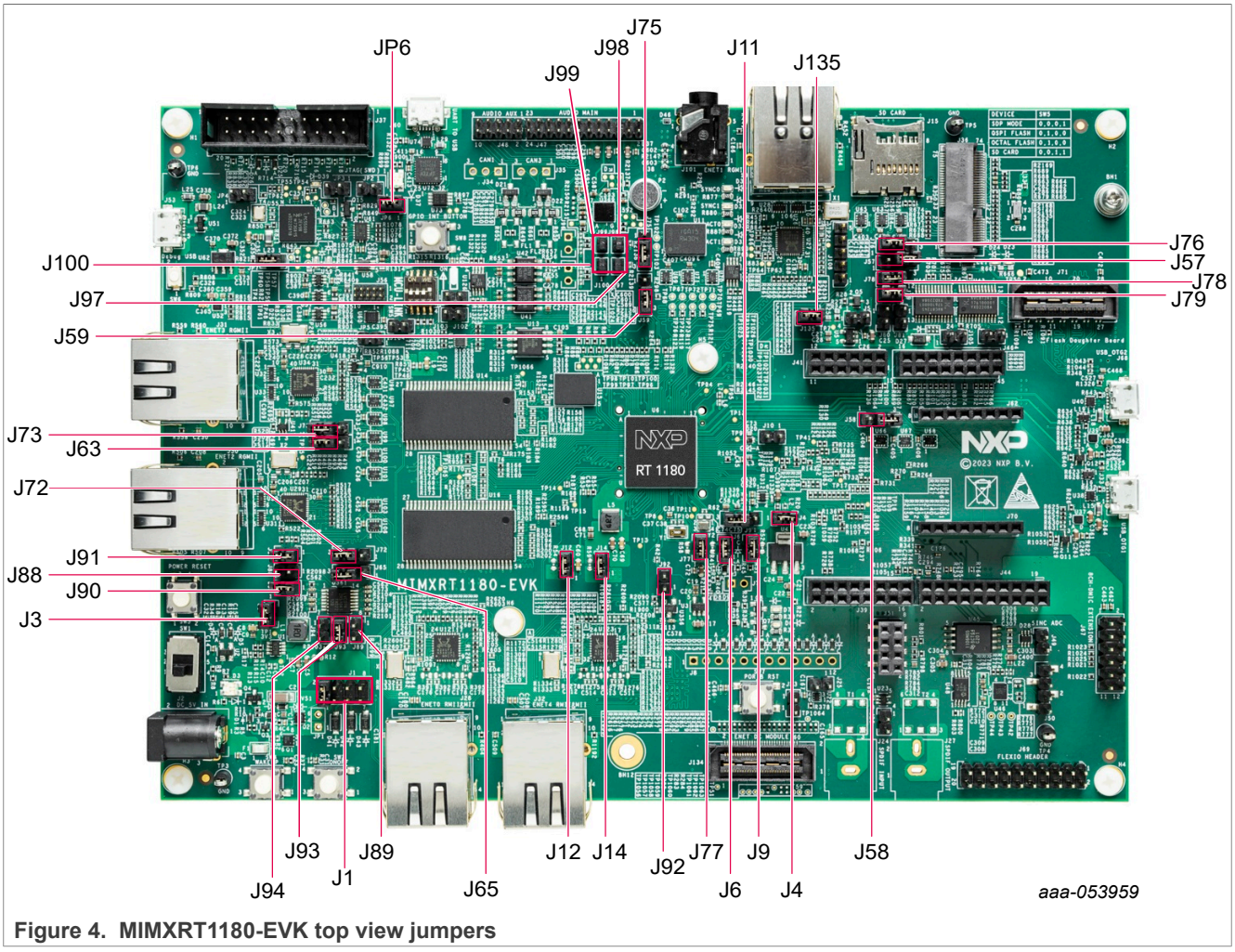

Figure 4. MIMXRT1180-EVK top view jumpers

Figure 5 shows the LEDs and push buttons on MIMXRT1180-EVK.

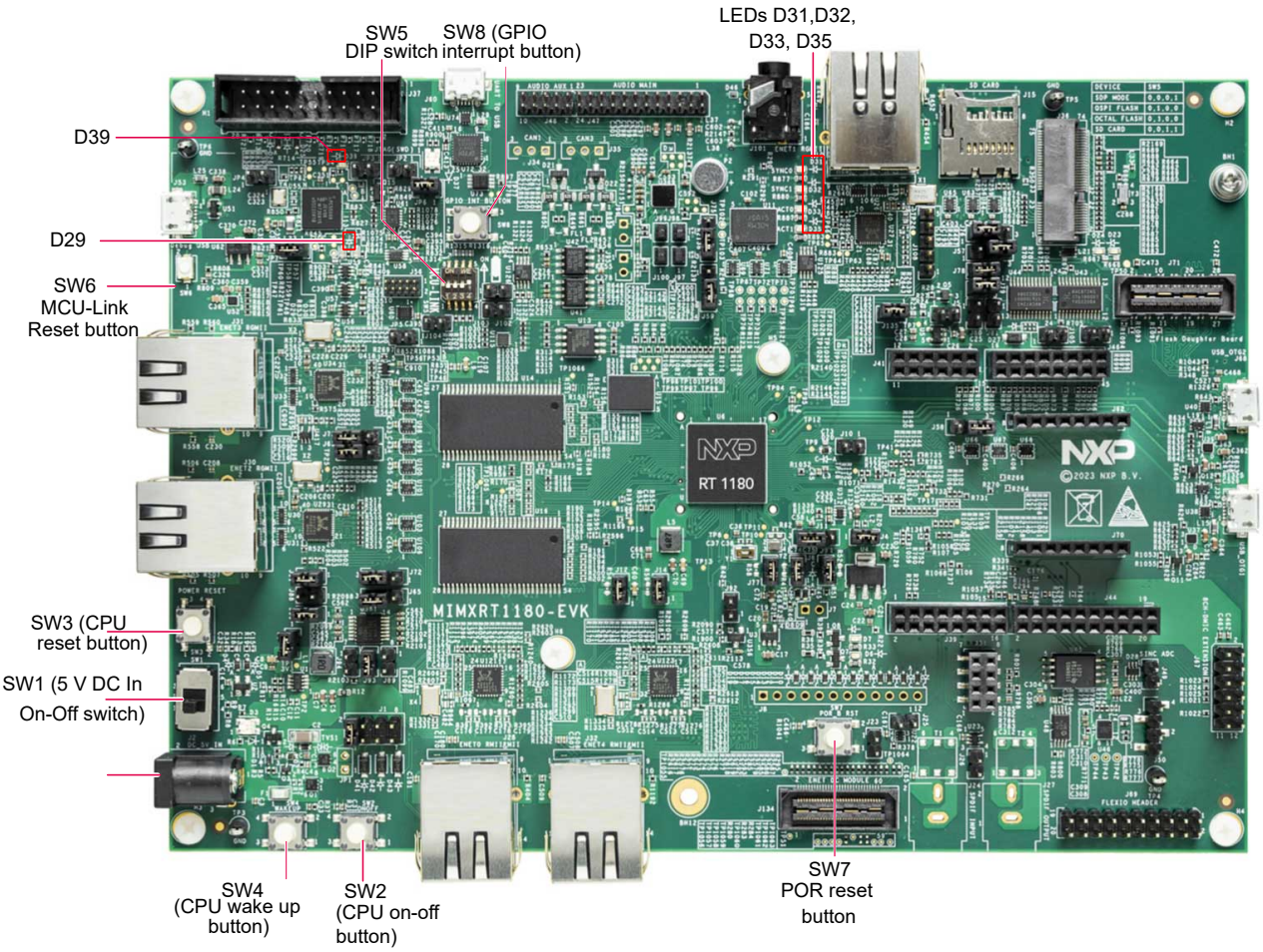

Figure 5. MIMXRT1180-EVK LEDs, switches, and push buttons

1.5 Connectors

Connectors are onboard devices that allow to connect external devices to the board. Figure 3 shows the MIMXRT1180-EVK connectors. Table 3 describes the connectors.

Table 3. MIMXRT1180-EVK connectors

Part identifier	Connector type	Description	Reference section
J2	DC power jack	5 V power supply connector	Power supply
J15	SD card slot	SD card connector	Section 2.6 "uSDHC interface"
J33	USB 2.0 micro-AB connector	USBOTG1	Section 2.11 "USB interface"
J68	USB 2.0 micro-AB connector	USB OTG2	
J69	2x10 pin header	FlexIO header	Section 2.17 "FlexIO interface"
J71	2x14 pin header	FlexSPI Daughter card connector	Section 2.4 "FlexSPI interface "
J29	RJ45 connectors	Ethernet 1 RGMII connector (ENET1)	Section 2.9 "Ethernet interface"

Table 3. MIMXRT1180-EVK connectors...*continued*

Part identifier	Connector type	Description	Reference section
J30		Ethernet 2 RGMII connector (ENET2)	
J31		Ethernet 3 RGMII connector (ENET3)	
J28		Ethernet 0 RMII and MII connector (ENET0)	Section 2.9 "Ethernet interface"Section 2.10 "EtherCAT interface"
J32		Ethernet 4 RMII and MII connector (ENET4)	
J134	2x30 connector	Ethernet daughter card module	Section 2.9 "Ethernet interface"
J47	2x12 pin header	Audio main connector	Section 2.7 "SAI interface "
J48	2x5 pin header	Audio AUX connector	
J101	Audio jack	Audio headset connector	
J67	2x6 pin header	8-channel DMIC extension	Section 2.20 "DMIC and external DMIC connector"
J50	2x4 pin header	I3C extension connector	Section 2.16 "I3C interface"
J51	2x4 position receptacle	I2C connector	Section 2.15 "LPI2C interface"
J39	1x8 position receptacle	I/O connectors compatible with the Arduino daughter card	Section 2.21 "Arduino connectors "
J41	1x6 position receptacle		
J44	1x10 position receptacle		
J45	1x8 position receptacle		
J62	1x8 position receptacle	mikroBUS socket connectors	Section 2.22 "mikroBUS socket"
J70	1x8 position receptacle		
J36	75-pin connector	M.2 mini card connector	Section 2.23 "M.2 connector and Wi-Fi/Bluetooth module"
J108	1x5 pin header	Connector to connect a radio module	
J24 (DNP)	2-line RCA receptacle	SPDIF input connector	Section 2.8 "SPDIF interface"
J27 (DNP)		SPDIF output connector	
J37	2x10 pin header	JTAG connector for debugging i.MX RT1180	Section 3.1 "JTAG connector "
J53	USB micro-AB connector	MCU-Link USB connector (Debug USB)	Power supply, Section 3.2 "MCU-Link OB debug probe"
J56	2x5 pin header	Connector to connect an external debug probe or external target MCU	Section 3.2.2 "Supported MCU-Link debug scenarios"
J60	USB micro-AB connector	FT232 USB connector	Section 3.3 "FT232 USB-to-UART bridge"

1.6 Jumpers

Jumpers (or shorting headers) are small connectors that allow you to choose from two or more options available. Figure 4 highlights the MIMXRT1180-EVK jumpers available for use. Table 4 describes the jumper settings on MIMXRT1180-EVK board.

Table 4. MIMXRT1180-EVK jumpers

Part identifier	Jumper type	Description	Jumper settings
J1	2x4 pin header	Main power supply (5V_SYS) source selection jumper	• Pin 1-2 shorted (default setting): Selects the external DC power supply (5V_DC_IN) as the source power for the 5V_SYS supply • Pin 3-4 shorted: Selects the 5V_USB_OTG1 supply from USB OTG1 connector (J33) as the source power for 5V_SYS supply • Pin 5-6 shorted: Selects the 5V_USB_OTG2 supply from USB OTG2 connector (J68) as the source power for 5V_SYS supply • Pin 7-8 shorted: Selects the 5V_SDA_PSW supply from the MCU-Link USB power switch (U52) as the source power for the 5V_SYS supply
J3	1x2 pin header	VDD_3V3 supply enable jumper	• Open: VDD_3V3 supply is OFF • Shorted (default setting): VDD_3V3 supply is produced from DCDC_3V3 supply
J4	1x2 pin header	VDD_1V8 supply enable jumper	• Open: VDD_1V8 supply is OFF • Shorted (default setting): VDD_1V8 supply is produced from VDD_3V3 supply through voltage regulator U4
J5	1x2 pin header	NVCC_SD supply voltage selection jumper	• Open (default setting): Sets the NVCC_SD supply level from the LDO regulator U5, to 3.3 V • Shorted: Sets the NVCC_SD supply level to 1.8 V. In this case, the signal from SD1_VSELECT is ignored
J6	1x2 pin header	Current test point jumper to measure VDD_BBSM_IN supply:	• Open: VDD_BBSM_IN supply is connected to Ground. • Shorted (default setting): VDD_BBSM_IN supply is high. This jumper can also be used for current measurement. Refer Table 10.
J7	1x2 pin header	Coin battery supply jumper	DNP
J8	1x12 header	ESD damage protection connector	DNP
J9	1x2 pin header	Current test point jumper to measure VDD_AON_IN supply	• Open: VDD_AON_IN supply is connected to Ground. • Shorted (default setting): VDD_AON_IN LDO supply is high. This jumper can also be used for current measurement. Refer Table 10.
J10	1x2 pin header	VREFH supply selection jumper	• Open (default setting): The target MCU ADC_VREFH pin receives internal VREF_OUT • Shorted: The target MCU ADC_VREFH pin receives external VREF through VDD_VREFH.
J11	1x3 pin header	ADC_1V8_IN supply selection jumper	• 1-2 shorted: ADC_1V8_IN is powered by VDD_1V8 • 2-3 shorted (default setting): ADC_1V8_IN is powered by the MCU LDO output, VDD_AON_ANA

Table 4. MIMXRT1180-EVK jumpers...*continued*

Part identifier	Jumper type	Description	Jumper settings
J12	1x2 pin header	Current test point jumper to measure MCU_DCDC_IN supply	• Open: MCU_DCDC_IN supply can be measured by adding a current meter. • Shorted (default setting): MCU_DCDC_IN supply is not used for current measurement. This jumper can also be used for current measurement. Refer Table 10.
J14	1x2 pin header	Current test point jumper to measure VDD_SOC_IN	• Open: VDD_SOC_IN supply is disconnected from the DC_DC_LP* pins of the i.MX RT1180 MCU • Shorted (default setting): VDD_SOC_IN supply is connected to the DC_DC_LPn pins of the i.MX RT1180 MCU. This jumper can also be used for current measurement. Refer Table 10.
J23	1x2 pin header	SPDIF_VCC supply enable jumper	• Open (default setting): SPDIF_VCC supply is not produced • Shorted: SPDIF_VCC supply is produced from VDD_3V3
J25	1x2 pin header	SPDIF COAX input enable	• Open (default setting): SPDIF_IN signal from dual inverter U22 (NC7WV04L6X) is disconnected from GPIO_AD_15 pin of i.MX RT1180 MCU • Shorted: Connects SPDIF_IN signal from U22 to the GPIO_AD_15 pin of the i.MX RT1180 MCU
J26	1x2 pin header	SPDIF COAX output enable	• Open (default setting): SPDIF_OUT signal from the i.MX RT1180 MCU is disconnected from the non-inverting 3-state buffer U23 (NL17SZ126DF) • Shorted: Connects the SPDIF_OUT signal from the i.MX RT1180 MCU as input to U23
J49	1x2 pin header	SINC ADC input jumper	• Open (default setting): SINC ADC input is enabled. • Shorted: SINC ADC input is disabled.
J58	1x3 pin header	FlexSPI1 port B enable jumper	• 1-2 shorted: FlexSPI1 port B 2-channel 2:1 switches U66, U67, and U68 are disabled • 2-3 shorted (default setting): U66, U67, and U68 are enabled
J59	1x3 pin header	FlexSPI1 port A enable jumper	• 1-2 shorted: FlexSPI1 port A 2-channel 2:1 switches, U69, U70, and U71 are disabled • 2-3 shorted (default setting): U69, U70, and U71 are enabled.
J75	1x3 pin header	QSPI flash /octal SPI flash selection jumper	• 1-2 shorted: i.MX RT1180 FlexSPI1 port A connects to octal SPI flash memory U11 • 2-3 shorted (default setting): i.MX RT1180 FlexSPI1 port A connects to QSPI flash memory U12
J65	1x3 pin header	PHY2 enable jumper	• 1-2 shorted: OE_NETC2_eCAT1_EN signal is high, disabling the dual-channel 2:1 muxes (TMUX136 MRSER), U103 and U106 • 2-3 shorted (default setting): OE_NETC2_eCAT1_ EN signal is low, enabling the muxes U103 and U106 allowing signals on COM1 and COM 2 ports of U103

Table 4. MIMXRT1180-EVK jumpers...*continued*

Part identifier	Jumper type	Description	Jumper settings
			and U106 to connect to either PHY2 RGMII or PHY4, depending on NETC2_eCAT1_SEL signal.
J72	1x3 pin header	PHY2_RGMII enable jumper	• 1-2 shorted: High signal on NETC2_eCAT1_SEL signal enables the signals on COM1 and COM2 ports of the 2-channel 2:1 muxes (TMUX136MRSER) U103 and U106 to PHY4 (U123, RTL8201FI-VC-CG) • 2-3 shorted (default setting): Low signal on NETC2_eCAT1_SEL signal enables the signals on COM1 and COM2 ports of the 2-channel 2:1 muxes (TMUX136MRSER) U103 and U106 to PHY2 RGMII (U29, RTL8211FDI-CG)
J63	1x3 pin header	PHY3 enable jumper	• 1-2 shorted: High signal on OE_NETC3_eCAT0_EN disables the 2-channel 2:1 muxes (TMUX136MRSER) U96, U97, U98, U99, U100, and U101 • 2-3 shorted (default setting): Low signal on OE_NETC3_eCAT0_EN enables the signals on COM1 and COM2 ports of the 2-channel 2:1 muxes (TMUX136MRSER) U96, U97, U98, U99, U100, and U101 to transmit to either to PHY3 RGMII, U34 or PHY U121, depending on select signal NETC3_eCAT0_SEL
J73	1x3 pin header	PHY3_RGMII enable jumper	• 1-2 shorted: High signal on NETC3_eCAT0_SEL switches the signals on COM1 and COM2 to RMII/MII PHY U121 (RTL8201FI-VC-CG) through 2-channel 2:1 muxes U96, U97, U98, U99, U100, and U101 • 2-3 shorted (default setting): Low signal on NETC3_eCAT0_SEL switches the signals on COM1 and COM2 to RGMII PHY U34 (RTL8211FDI-CG) through 2-channel 2:1 muxes U96, U97, U98, U99, U100, and U101
J57	1x3 pin header	SD mux enable jumper	• 1-2 shorted: SD Card multiplexers (TMUX136MRSER) U63, U64, and U65 are disabled • 2-3 shorted (default setting): SD Card multiplexers U63, U64, and U65 are enabled
J76	1x3 pin header	SDIO0_SD1_SEL signal enable jumper	• 1-2 shorted (default setting): High signal on SDIO0_SD1_SEL switches the signals on COM1 and COM2 to SD card connector interface through 2:1 switches U63, U64, and U65 • 2-3 shorted: Low signal on SDIO0_SD1_SEL switches the signals on COM1 and COM2 to M.2 connector J36 interface through 2:1 switches U63, U64, and U65
J77	1x2 pin header	Current test point jumper to measure DCDC_1P8 voltage level	• Open: Test point to check the DCDC_1P8 voltage level by adding a current meter • Shorted (default setting): DCDC_1V8_OUT is produced from DCDC_1P8 (internal LDO out from DCDC)
J78	1x2 pin header	BT_PCM_BCLK_1V8 signal enable jumper	• Open: BT_PCM_BCLK_1V8 signal from target MCU via voltage translator U43 is disconnected from M.2 card connector, J36 • Shorted (default setting): BT_PCM_BCLK_1V8 signal from target MCU via U43 is connected to M.2 card connector, J36

Table 4. MIMXRT1180-EVK jumpers*...continued*

Part identifier	Jumper type	Description	Jumper settings
J79	1x2 pin header	BT_PCM_SYNC_1V8 signal enable jumper	• Open: BT_PCM_SYNC_1V8 signal from target MCU via voltage translator U43 is disconnected from M.2 card connector, J36 • Shorted (default setting): BT_PCM_SYNC_1V8 signal from target MCU via voltage translator U43 is connected to M.2 card connector, J36
J80	1x2 pin header	BT_PCM_BCLK signal enable jumper	• Open (default setting): BT_PCM_BCLK signal from M.2 card connector (J36) via U44 is disconnected from the i.MX RT1180 MCU • Shorted: BT_PCM_BCLK signal from M.2 card connector (J36) via U44 is connected to the i.MX RT1180 MCU
J81	1x2 pin header	BT_PCM_SYNC signal enable jumper	• Open (default setting): BT_PCM_SYNC from M.2 card connector (J36) via U44 is disconnected from the i.MX RT1180 MCU • Shorted: BT_PCM_SYNC from M.2 card connector (J36) via U44 is connected to i.MX RT1180 MCU
J46	1x2 pin header	Target MCU reset enable	• Open: RT1180 MCU reset from the device connected to J45 connector is disabled. • Shorted: Reset signal RST_TGTMCU_B from the device connected to J45 connector causes reset of i.MX RT1180 MCU
J88	1x2 pin header	POR reset enable jumper	• Open (default setting): Disconnects the reset signal ST_TGTMCU_B from SW7/Arduino header J45/mikro BUS header J62 from POR_PIN_RST_B signal (which enables the target MCU power-on reset). • Shorted: Connects the reset signal ST_TGTMCU_B from SW7 / Arduino header J45 / mikroBUS header J62 to POR_PIN_RST_B signal for the target MCU power-on reset .
J89	1x2 pin header	Watchdog reset enable	• Open (default setting): The watchdog reset signal EWM_OUT_B is disconnected from the i.MX RT1180 MCU reset signal, POR_PIN_RST_B. • Shorted: The watchdog reset signal EWM_OUT_B is connected to i.MX RT1180 MCU reset signal, POR_PIN_RST_B enabling MCU watchdog reset.
J90	1x2 pin header	SW3 reset enable jumper	• Open: Disconnects the POR_CTL signal from switch SW3 from POR_PIN_RST_B signal of i.MX RT1180 MCU reset circuit • Shorted (default setting): Connects the POR_CTL signal from SW3 to the POR_PIN_RST_B signal enabling i.MX RT1180 MCU power-on reset.
J91	1x2 pin header	MCU-Link reset enable jumper	• Disconnects reset signal from MCU-LINK, TRG_RST, from POR_PIN_RST_B signal for i.MX RT1180 MCU power-on reset. Also disables the MCU-Link reset to octal flash (U11). • Shorted (default setting): Connects the MCU-LINK reset signal, TRG_RST to POR_PIN_RST_B signal enabling i.MX RT1180 MCU power-on reset. Also, enables the

Table 4. MIMXRT1180-EVK jumpers...*continued*

Part identifier	Jumper type	Description	Jumper settings
			MCU-Link reset to octal flash (U11) provided J93 is populated (default setting).
J92	1x2 pin header	External reset enable jumper	• Open (default setting): Reset of target MCU using an optional external reset circuit through the reset circuit U356 (UM803RS) is disabled • Shorted: Reset of i.MX RT1180 MCU using optional external reset circuit through U356 is enabled.
J93	1x2 pin header	Octal flash reset signal enable jumper	• Open: Octal flash reset signal is disconnected from reset circuit • Shorted (default setting): Octal flash reset signal is connected to reset circuit
J94	1x2 pin header	Flash reset control jumper	• Open (default setting): Flash_RST signal from the i.MX RT1180 MCU is disconnected from octal flash U11 • Shorted: Flash_RST signal from the i.MX RT1180 MCU initiates reset of octal flash, U11
J97	1x2 pin header	SAI1_TX_SYNC enable	• Open: SAI1_TX_SYNC signal from the i.MX RT1180 MCU is disconnected from audio codec, U369 • Shorted (default setting): Connects the SAI1_TX_SYNC signal from the i.MX RT1180 MCU to the LRCLK pin of audio codec, U369
J98	1x2 pin header	SAI Transmit Clock enable	• Open: SAI1_TX_BCLK signal from the i.MX RT1180 MCU is disconnected from the audio codec, U369 • Shorted (default setting): Connects the SAI1_TX_BCLK signal from the i.MX RT1180 MCU to the BCLK pin of audio codec, U369
J99	1x2 pin header	Audio output enable	• Open: SAI1_RXD[0] signal from of audio codec is disconnected from the i.MX RT1180 MCU • Shorted (default setting): Connects the SAI1_RXD[0] signal from the ADCDAT pin of audio codec, U369 to the i.MX RT1180 MCU
J100	1x2 pin header	Audio input enable	• Open: SAI1_TXD[0] signal from the i.MX RT1180 MCU is disconnected from the audio codec, U369 • Shorted (default setting): Connects the SAI1_TXD[0] signal from the i.MX RT1180 MCU to the DACDAT pin of audio codec U369 • Open: SAI1_TXD[0] signal from RT1180 MCU is disconnected from the audio codec U369 • Shorted (default setting): Connects the SAI1_TXD[0] signal from the i.MX RT1180 MCU to the DACDAT pin of audio codec, U369 • Open: SAI1_TXD[0] signal from the i.MX RT1180 MCU is disconnected from the audio codec, U369 • Shorted (default setting): Connects the SAI1_TXD[0] signal from the i.MX RT1180 MCU to the DACDAT pin of audio codec, U369
J102	1x2 pin header	Factory automation jumpers	• Open (default setting): BOOT_MODE[0] is disconnected from SW5[0]. • Shorted: BOOT_MODE[0] is connected to SW5[0].

Table 4. MIMXRT1180-EVK jumpers...*continued*

Part identifier	Jumper type	Description	Jumper settings
J103	1x2 pin header		• Open (default setting): BOOT_MODE[1] is disconnected from SW5[1]. • Shorted: BOOT_MODE[1] is connected to SW5[1].
J104	1x2 pin header		• Open (default setting): Target MCU ISP cannot be controlled by MCU-Link. • Shorted: Enables Target MCU ISP control by MCU-Link. ***Note:*** *The ISP control feature allows the Boot mode to be adjusted using MCU-Link instead of manually adjusting the boot switch. This feature is useful for factory mass production testing.*
J105	1x2 pin header	M.2 Wi-Fi wake-up signal enable jumper	• Open (default setting): M.2 Wi-Fi wake-up signal is disconnected from the target MCU. • Shorted: M.2 Wi-Fi wake-up signal is connected to the target MCU.
J135	1x2 pin header	SD1_VSELECT supply isolation jumper	• Open: SD1_VSELECT does not control the output of voltage regulator U5. • Shorted (default setting): SDI_VSELECT controls the output voltage of U5 (provided that J5 is open)
JP2	1x2 pin header	USB-to-UART bridge disable jumper	• Open (default setting): MCU-LINK VCOM is enabled as high signal on HW_VER_6. • Shorted: MCU-Link VCOM is disabled as low signal on HW_VER_6
JP3	1x2 pin header	MCU-Link (LPC55S69) ISP control enable jumper	• Open (default setting): MCU-Link follows normal boot sequence, and boots from internal flash if a boot image is found. With the internal flash erased, MCU-Link normal boot sequence falls through to ISP boot mode. • Shorted: MCU-Link is forced to ISP mode (J53). In ISP mode, MCU-Link internal flash can be reprogrammed with a new image. Alternatively, MCU-Link internal flash can be reprogrammed using MCUXpresso IDE with CMSIS-DAP protocol. ***Note:*** *The CMSIS-DAP firmware is programmed by default.*
JP4	1x2 pin header	MCU-Link serial wire debug (SWD) disable jumper	• Open (default setting): MCU-Link SWD feature is enabled. MCU-Link drives SWD of onboard target MCU or external target MCU. • Shorted: MCU-Link SWD feature is disabled. This setting of JP4 can be used when connecting an external debug probe for debugging the onboard target MCU.
JP5	1x2 pin header	MCU-Link target selection jumper	• Open (default setting): MCU-Link can be used for debugging the i.MX RT1180. • Shorted: MCU-Link can be used for debugging an external target through connector J56. Meanwhile, J37 (JTAG connector) is used to debug RT1180 MCU (via SWD).
JP6	1x2 pin header	V_TGTMCU supply enable jumper	• Open: V_TGTMCU supply is OFF.

Table 4. MIMXRT1180-EVK jumpers...*continued*

Part identifier	Jumper type	Description	Jumper settings
			• Shorted (default setting): V_TGTMCU supply is produced from VDD_3V3 supply.
JP7	1x2 pin header	MCU-Link VCOM port 2 disable jumper	• Open (default setting): MCU-Link VCOM port 2 (FC1) is enabled. • Shorted: MCU-Link VCOM port 2 is disabled.

1.7 Push and slide buttons

The MIMXRT1180-EVK supports one slide switch and six push buttons. Table 5 explains the push buttons on MIMXRT1180-EVK.

Figure 5 shows the push buttons on MIMXRT1180-EVK board.

Table 5. Push buttons/Slide switches on MIMXRT1180-EVK board

Part identifier	Switch type	Description
SW1	4-pin slide switch	• 2-3 /5-6: 5V supply (DC_5V_IN) is ON. • 1-2/4-5: 5V supply (DC_5V_IN) is OFF.
SW2	Push button	CPU On-Off button for i.MX RT1180 (target) MCU. Pushing SW2 causes reset of i.MX RT1180 CPU.
SW3	Push button	System reset button for target MCU. Pushing this button causes board peripherals to reset to their default states and execute the boot code.
SW4	Push button	CPU wake-up button for target MCU
SW6	Push button	MCU-Link reset button. Pressing SW6 sends a reset signal to LPC55S69JEV98 (debug MCU).
SW7	Push button	Power-on reset button for target MCU. Pressing SW7 in the power on state forces to reset the system power except BBSM domain. The MCU immediately turns off and re-initiates a boot cycle from the MCU power off state.
SW8	Push button	GPIO Interrupt button.

1.8 DIP switch

MIMXRT1180-EVK has one 4-pin dual inline package (DIP) switch (SW5) for controlling the boot mode of the i.MX RT1180 MCU.

Each pin of the DIP switch has two positions:

- OFF position (pin has value 0)
- ON position (pin has value 1)

A DIP switch pin can be moved manually from OFF position to ON position and vice versa. Section 1.8 "DIP switch" describes the DIP switch settings.

Table 6. DIP switch settings

Switch	Supported function	Description
SW5[1]	Not connected	-
SW5[2:4]	i.MX RT1180 MCU boot mode selection ***Note:*** *For more details on i.MX RT1180 boot modes and boot mode configuration, refer to the "System Boot" chapter of the i.MX RT1180 Reference Manual.*	BOOT_MODE[2:0] = SW5[2:4] • 000: Boot from internal fuses • 001: Serial downloader (USB1 or LPUART1) [default setting] • 010: USDHC2 8-bit 1.8 V eMMC 5.1 • 011: USDHC1 4-bit SD 3.0 • 100: FlexSPI quad SPI serial NOR (or octal SPI NOR in quad SPI NOR mode) • 101: FlexSPI quad SPI serial NAND 2k page (or octal SPI NAND in quad SPI NOR mode) • 110: FlexSPI quad SPI serial NAND 4k page (or octal SPI NAND in quad SPI NOR mode) • 111: Test mode

For more details on the i.MX RT1180 MCU boot mode configurations, refer to the Section 2.1.1 "Boot mode configurations" and "*System Boot Flow*" chapter in the *i.MX RT1180 Reference Manual*.

1.9 LEDs

The MIMXRT1180-EVK board has light-emitting diodes (LEDs) to monitor system functions, such as power-on, reset, board faults, and so on. The information collected from LEDs can be used for debugging purposes.

LEDs are highlighted in Figure 5. Table 7 describes the MIMXRT1180-EVK LEDs.

The board also contains MCU-Link status LEDs, which are listed in Section 3.2.9 "MCU-Link status LEDs".

Table 7. MIMXRT1180-EVK LEDs

Part identifier	LED color	LED name/function	Description (when LED in ON)
D3	Red/Green	LED_RED-GRN	Main power supply LED • Red: Indicates that the DC_5V_IN supply is On • Green: Indicates that the 5V_SYS supply is On • Off: The board is not powered
D6	Green	USER LED1	User configurable
D7	Red	USER LED2	User configurable
D23	Red	M.2 module LED	WiFi LED
D24	Red	M.2 module LED	Bluetooth LED
D37	Red/Green	LED_RED-GRN	TX LED and RX LED for the debug USB-to-UART interface module
D31	Green	USER LED3	User configurable
D32	Red	USER LED4	User configurable
D33	Red	USER LED5	User configurable
D35	Green	USER LED6	User configurable

2 Functional description

This section contains the following subsections:

2.1 i.MX RT1180 MCU

The i.MX RT1180 Crossover MCU is a dual-core, real-time microcontroller featuring Arm Cortex M7 (CM7) and Cortex-M33 (CM33) cores. The CM7 core can operate at speeds of up to 800 MHz and the CM33 core can operate at speeds of up to 240 MHz with a 1.5 MB on-chip RAM. It provides high CPU performance and real-time response. In addition to supporting the standard Ethernet switch, the MCU includes an integrated Gbit/s time sensitive networking (TSN) switch and EtherCAT slave module, making it ideal for industrial and automotive communication applications.

The MCU provides several memory interfaces, including SDRAM, raw NAND flash, NOR flash, SD/eMMC, Quad SPI, and HyperFlash. It supports a wide range of other interfaces for connecting peripherals such as WLAN, Bluetooth, UART, SPI, I2C, USB, Ethernet, and CAN.

The MCU supports multiple protocols, bridging communications between real-time Ethernet and Industry 4.0 systems. It also offers advanced security with the integrated EdgeLock Secure Enclave.

For more information about the MCU, refer to these documents: *i.MX RT1180 Crossover Processors Data Sheet for Industrial Products*, *i.MX RT1180 Crossover Processors Data Sheet for Extended Industrial Products*

, and *i.MX RT1180 Reference Manual*, which are available at the URL: https://www.nxp.com/products/processors-and-microcontrollers/arm-microcontrollers/i-mx-rt-crossover-mcus/i-mx-rt1180-crossover-mcu-with-tsn-switch-and-edgelock:i.MX-RT1180#documentation

2.1.1 Boot mode configurations

i.MX RT1180 supports several boot modes. The boot mode is selected based on the binary value stored in the internal `BOOT_MODE` register. Boot mode configurations for the MIMXRT1180-EVK board are explained in Table 6.

For more information about the boot modes available for i.MX RT1180, refer to the Chapter "*System Boot*" in *i.MX RT1180 Reference Manual*. This provides details such as the boot modes, boot mode determination, boot mode fuse settings.

Note: *For more information about MIMXRT1180-EVK boot device selection and configuration, refer to the board schematics available on the URL below:*

https://www.nxp.com/products/processors-and-microcontrollers/arm-microcontrollers/i-mx-rt-crossover-mcus/i-mx-rt1180-crossover-mcu-with-tsn-switch-and-edgelock:i.MX-RT1180#design-resources.

2.2 Power supply

Use any of the following (+5 V) sources to power the MIMXRT1180-EVK board:

- External DC power supply connected to input power jack, J2
- External 5 V supply connected to USB 2.0 micro-AB connector J33, operating in OTG mode
- External 5 V supply connected to USB 2.0 micro-AB connector J68, operating in OTG mode
- External 5 V supply connected to USB 2.0 micro-AB connector J53, for MCU-Link

A slide switch SW1 turns ON/OFF the 5 V external DC power supply connected to J2:

- If SW1 is set to 2-3/5-6, the 5 V power supply is ON.
- If SW1 is set to 1-2/4-5, the 5 V power supply is OFF.

Configure jumper J1 to select the power supply that is used to power the board. Table 8 explains the J1 settings.

Table 8. Jumper J1 settings

Jumper setting	Selected power supply
1-2 (default setting)	DC_5V_IN power supply via J2
3-4	5V_USB_OTG1 power supply via J33
5-6	5V_USB_OTG2 power supply via J68
7-8	5V_SDA_PSW power supply via J53

Table 9 explains the power supplies on the board.

Table 9. MIMXRT1180-EVK board power supplies

Power source	Manufacturing part number	Power supply rail	Description
From external power source through input power jack J2	-	DC_5V_IN (5 V)	Primary power supply. It is one of the four power source options for producing 5V_SYS supply

Table 9. MIMXRT1180-EVK board power supplies*...continued*

Power source	Manufacturing part number	Power supply rail	Description
From external power source through USB connector J33 (when the connector operates in Host mode) From external power source through USB connector J33 (when the connector operates in Host mode) From external power source through USB connector J33 (when the connector operates in Host mode)	-	5V_USB_OTG1 (5V)	Second power source option for producing 5V_SYS supply
Power switch U37 (when USB connector J33 operates in Device mode)	NX5P3090UK (NXP)		
From external power source through USB connector J68 (when the USB connector operates in Host mode)		5V_SB_OTG2 (5 V)	Third power source option for producing 5V_SYS supply
Power switch U39 (when USB connector J68 operates in Device mode)	NX5P3090UK (NXP)		
MCU-Link USB connector J53	-	P5V_SDA (5V)	• Supplies power to power switch U52 • Supplies power to voltage regulator U62 • Supplies power to MCU-Link U55 (LPC55S69JEV98)
Power switch U52	NX5P3090UK (NXP)	5V_SDA_PSW (5 V)	Fourth power source option for producing 5V_SYS supply
Voltage regulator U62	XC6206P332PR (UMW)	P3V3_SDA (3.3 V) Max current = 200 mA	• Supplies power to MCU-link U55 and MCU-Link LEDs D29, D30, and D39 • One of the two power supplies for dual-supply translating transceivers, U56,U57, U58, U59, and U61 • Power supply for three non-inverting buffers 74LVC1 G07GW-Q100 (U362, U365, and U366) used for ISP control

Table 9. MIMXRT1180-EVK board power supplies*...continued*

Power source	Manufacturing part number	Power supply rail	Description
From DC_5V_IN / 5V_USB_OTG1 / 5V_USB_OTG2 / 5V_SDA_PSW through jumper J1	-	5V_SYS (5 V)	• Produces V_TGTMCU supply through jumper JP6 • Produces VCC_I3C supply for I3C device U46 • Supplies power to power switch U37 when USB connector J33 is in Device mode to produces 5V_USB_OTG1 supply • Supplies power to power switch U39 when USB connector J68 is in Device mode to produce 5V_USB_OTG2 supply • Produces the power supplies VLDO_3V3, VDD_3V3, VDD_BBSM_3V3, and NVCC_SD (described below in this table) • Produces V_TGTMCU through 2-pin jumper JP6 • Produces VCC_I3C for I3C device (U46) • Supplies power to power switch U37 when USB connector J33 is in Device mode to produces 5V_USB_OTG1 supply • Supplies power to power switch U39 when USB connector J68 is in Device mode to produce 5V_USB_OTG2 supply • Input power supply for voltage regulators U1, U3, and U5 • Supplies power to LED D3 • One of the three power supplies for audio codec U369 • One of the three power supplies for main audio connector J47 • Core (VCC) supply for CAN transceivers U41 and U42 • 5 V power supply source for Arduino connector J45 • One of the two power supplies for Ethernet daughter card J134 • One of the two power supplies for SINC ADC U45 • Supplies power to mikroBUS socket connector J70
Voltage Regulator U1	MP2143DJ (Monolithic Power Systems)	DCDC_3V3 (3.3 V)	Produces VDD_3V3 power supply through jumper J3
From DCDC_3V3 supply through jumper J3	-	VDD_3V3 (3.3 V) (Max. current: 3 A, quiescent current: 40 µA)	• Alternative option to produce FLASH_VCC supply • Produces VDD_AON_3V3 supply, which is used to provide VDD_AON_IN power to the i.MX RT1180 MCU • Produces V_TGTMCU supply through jumper JP6 • Produces VCC_I3C for I3C device (U46) • Alternative power source option for VDD_BBSM_3V3 through zero-ohm R43 resistor (DNP by default) • Produces WL_3V3 power supply for M.2 module (J36) • Produces SPDIF_VCC supply through jumper J23 • Produces VSD_3V3 supply through MOSFET Q6 • Produces SPDIF_VCC through 2-pin jumper J23 • Produces VSD_3V3 supply through Q6 • Produces SPDIF_VCC supply through jumper J23 • Produces VSD_3V3 supply through MOSFET Q6 • Supplies 3.3 V power to the following: – mikroBUS socket connector, J62

Table 9. MIMXRT1180-EVK board power supplies*...continued*

Power source	Manufacturing part number	Power supply rail	Description
			– Accelerometer device (U115) – JTAG connector J37 – 3.3 V supply for Arduino connector, J45 – Voltage regulator, U4 – User LEDs, D6 and D7 – Push buttons, SW7 and SW8 – Non-inverting buffers U416 and U418 – ENET3_RST_B_3V3 – Voltage buffers, U417 and U418 – Non-inverting buffers U416 and U418 – 3.3 V power supply to mutiplexers and switches:- U63, U64, U65, U66, U67, U68, U69, U70, U71, U96, U97, U98, U99, U100, U101, U103, U106 – Provides NVCC_EMC1 and NVCC_EMC2 powers to the i.MX RT1180 MCU – FLEXIO header J69 – SPI NOR flash memory, U13 – Produces SDRAM_3V3 supply for SDRAM memories U14 and U16 – HyperRAM, U15 – Second power supply for audio codec (U369) – Optional 3.3 V power supply for audio main connector, J47 – DMIC extension connector J67 and four onboard DMICs U116, U117, U118, and U119 – Connects to MIXVDD and DBVDD pins of Audio Codec (U369) – Optional 3.3 V power supply for audio main connector, J47 – DMIC extension J67 and four DMICs U116, U117, U118, and U119 – EEPROM, U48 – Ethernet PHY transceivers U29, U34, U121, and U123 – One of the two input power supplies for Ethernet PHY transceiver U27 – Another input power supply for Ethernet daughter card J134 – External boot switch SW5 – Another power supply for SINC ADC U45 (AMC1106 M05DWV)
Voltage regulator U3	UM1750S-00 (Union Semiconductor)	VLDO_3V3 (3.3 V) Max. current: 350 mA	Default power source option for producing VDD_BBSM_3V3 supply
From VDD_3V3 supply through MOSFET Q6	-	VSD_3V3 (3.3 V)	Power supply for SD Card connector J15
From VLDO_3V3 supply (default option) or VDD_3V3	-	VDD_BBSM_3V3 (3.3 V)	• Produces VDD_BBSM_IN power supply through jumper J6

Table 9. MIMXRT1180-EVK board power supplies*...continued*

Power source	Manufacturing part number	Power supply rail	Description
supply (alternative option)			• Power supply for push button SW3
Voltage regulator U5	UM1750S-00 (Union Semiconductor)	NVCC_SD (1.8 V/3.3 V) • Default is 3.3 V • Max. current: 350 mA	Provides NVCC_SD1 power to the i.MX RT1180 MCU
Voltage regulator U4	AMS1117-1.8 (Advanced Monolithic Systems)	VDD_1V8 (1.8 V)	Provides power supply for • Non-inverting buffer U410 • One of the two power supplies for dual-supply translating transceivers U43, U44, and U126 • Hex buffer U361 • Optional 1.8 V power supply for audio main connector, J47 • Third power supply for audio codec (U369) that connects to AVDD, CPVDD, and PLLVDD pins • Another input power supply for Ethernet PHY transceivers U27 • Non-inverting buffer U410 • Alternative power source option to produce ADC_1V8_IN • Produces VDD_VREFH when jumper J10 is shorted • Provides NVCC_GPIO1 power to i.MX RT1180 MCU • Default power source option for producing FLASH_VCC supply
From VDD_1V8 supply (default option) or VDD_3V3 supply (alternative option)	-	FLASH_VCC (max current: 1 A) • 1.8 V (if J4 is shorted) (default) • 3.3 V (if J4 is open and resistor R20 is populated)	Provides power supply for the below components: • Provides NVCC_SD2 and NVCC_GPIO2 powers to i.MX RT1180 MCU • Non-inverting buffer U417 • Quad SPI flash NOR memories, U10 and U12 • Octal SPI NOR flash memory, U11 • Flash daughter card connector, J71
From VDD_3V3 supply through jumper JP6	-	V_TGTMCU	Power supply for • Another power supply for dual-supply translating transceivers U56, U57, U58, U59, and U61 • Four-pole double-throw (4PDT) switch U60 • External debug connector, J56
From VDD_3V3 supply through jumper J23	-	SPDIF_VCC	Power supply for dual inverter U22 and non-inverting buffer U23
i.MX RT1180 MCU	MIMXRT1189CVM8B (NXP)	VDD_SOC_IN (0.925 V to 1.3 V)	Internal SoC supply (core supplies input voltage)
i.MX RT1180 MCU	MIMXRT1189CVM8B (NXP)	VDD_AON_ANA	Default power source option to produce ADC_1V8_IN supply
		VDD_BBSM_ANA	Produces NVCC_BBSM supply, which is used to power push buttons SW2 and SW4
		VDD_AON_DIG	Unused

Table 9. MIMXRT1180-EVK board power supplies*...continued*

Power source	Manufacturing part number	Power supply rail	Description
		VDDA_1P0	Unused

2.2.1 Current measurement

The MIMXRT1180-EVK supports current measurement using an ammeter on power supplies shown in Table 10.

Table 10. Power supplies with current measurement support

Power supply	Description	Current measurement jumper	Current measurement steps
VDD_BBSM_IN	i.MX RT1180BBSM domain supply rail	J6	Open J6. Connect the ammeter between pins 1 and 2 of J6.
VDD_AON_3V3	i.MX RT1180 AON domain supply rail	J9	Open J9. Connect the ammeter between pins 1 and 2 of J9.
MCU_DCDC_IN	i.MX RT1180 DCDC domain supply rail	J12	Open J12. Connect the ammeter between pins 1 and 2 of J12.
VDD_SOC_IN	i.MX RT1180 digital logic supply rail	J14	Open J14. Connect the ammeter between pins 1 and 2 of J14.

2.3 Clocks

MIMXRT1180-EVK provides the clocks required for the i.MX RT1180-EVK MCU and peripheral interfaces.

Table 11 describes the clocks available on MIMXRT1180-EVK.

Table 11. MIMXRT1180-EVK clocks

Clock generator	Clock	Frequency	Destination
Quartz crystal X1	PHY1_[XTALI, XTALO]	25 MHz	RGMII Ethernet PHY U27 (PHY1)
Quartz crystal X2	PHY2_[XTALI, XTALO]	25 MHz	RGMII Ethernet PHY U29 (PHY2)
Quartz crystal X3	PHY3_[XTALI, XTALO]	25 MHz	RGMII Ethernet PHY U34 (PHY3)
Quartz crystal X4	PHY0_[XTAL1, XTAL2]	25 MHz	RMII/MII Ethernet PHY U121 (PHY0)
Quartz crystal X6	PHY4_[XTAL1, XTAL2]	25 MHz	RMII/MII Ethernet PHY U123 (PHY4)
Quartz crystal Y1	RTC_[XTALI, XTALO]	32.768 kHz	i.MX RT1180 MCU (RTC clock)
Quartz crystal Y2	XTALI, XTALO	24 MHz	i.MX RT1180 MCU (RF clock)
Crystal oscillator Y3	SUSCLK	32.768 kHz	M.2 mini card connector J36
Quartz crystal Y4	XTAL32M_[P, N]	16 MHz	MCU-Link

2.4 FlexSPI interface

The i.MX RT1180 MCU has two Flexible Serial Peripheral Interface (FlexSPI) modules, FLEXSPI1 and FLEXSPI2. The MIMXRT1180-EVK board supports communication with both the FlexSPI modules.

Figure 6 shows the MIMXRT1180-EVK FlexSPI diagram.

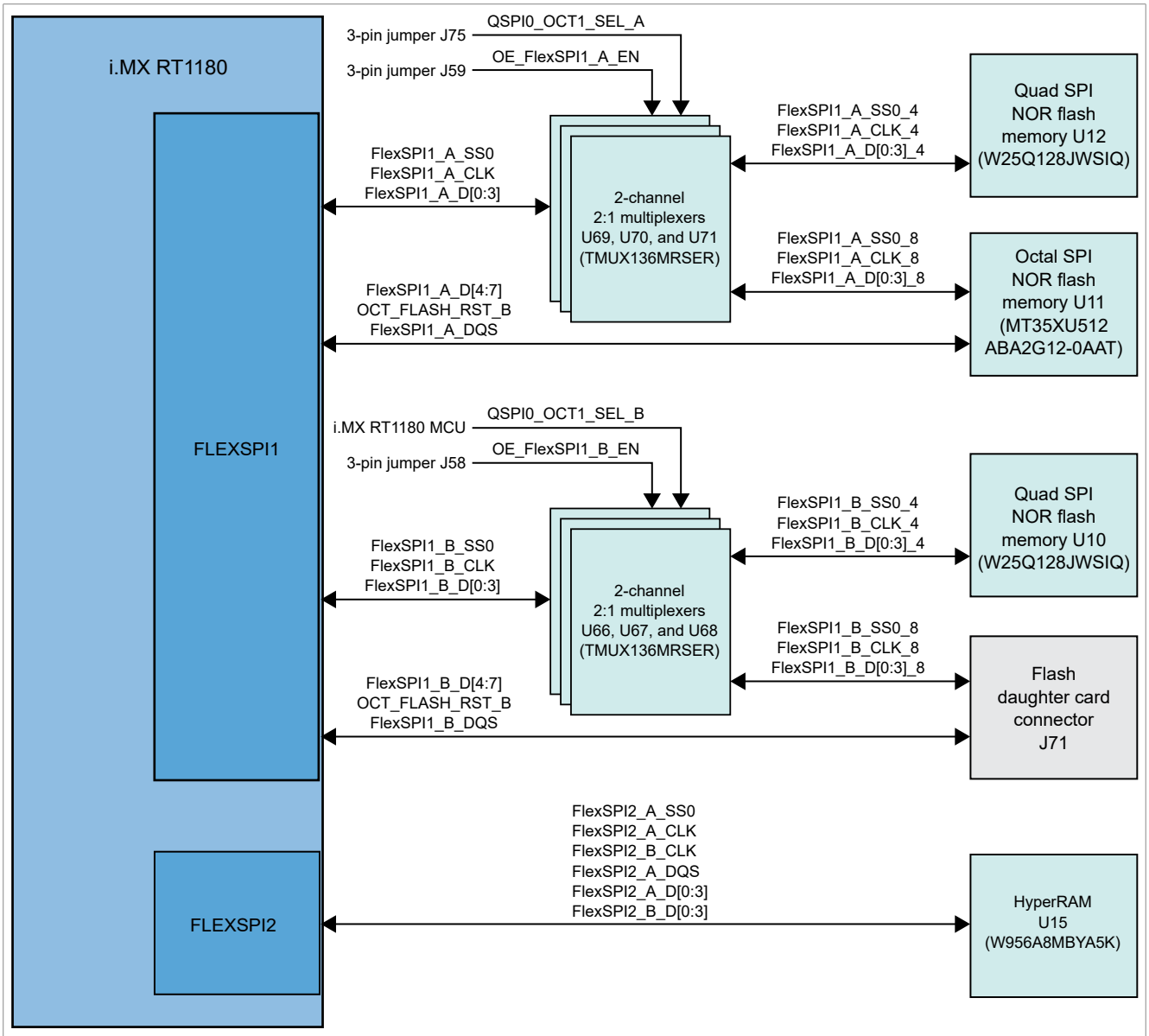

Figure 6. MIMXRT1180-EVK FlexSPI diagram

Table 12 describes the MIMXRT1180-EVK FlexSPI connections.

Table 12. MIMXRT1180-EVK FlexSPI connections

i.MX RT1180 FlexSPI controller	Connected devices			
	Part identifier	Part number	Manufacturer	Description
FlexSPI1	U69, U70, U71	TMUX136MRSER	Texas Instruments	Multiplexers: 6-GHz, 2-channel, 2:1 switch, with power-off Isolation • Use 3.3 V supply voltage • OE_FlexSPI1_A_EN signal enables the selection of FlexSPI signals
	U12	W25Q128JWSIQ	Winbond Electronics	• Type: Quad SPI NOR flash memory • Density: 128 Mbit (16 MB) • Operating voltage: 1.8 V
	U11	MT35XU512ABA2G12-0AAT	Micron Technology	• Type: Octal SPI NOR flash memory • Density: 512 Mbit (64 MB) • Operating voltage: 1.8 V
	U66, U67, U68	TMUX136MRSER	Texas Instruments	Multiplexers: 6-GHz, 2-channel, 2:1 switch, with power-off Isolation • Use 3.3 V supply voltage • OE_FlexSPI1_B_EN signal enables the selection of FlexSPI signals
	U10	W25Q128JWSIQ	Winbond Electronics	• Type: Quad SPI NOR flash memory • Density: 128 Mbit (16 MB) • Operating voltage: 1.8 V
	J71	-	-	• Type: 2x14 flash daughter card connector • Operating voltage: 1.8 V
FlexSPI2	U15	W956A8MBYA5K	Winbond Electronics	• Type: HyperRAM memory • Density: 64 Mbit (8 MB) • Operating voltage: 3.3 V

Note: *By default, the HyperRAM memory is enabled on the board. Instead of HyperRAM, SDRAM can also be used. For the rework required, refer Section 4.1 "SDRAM interface hardware rework".*

Note: *For more details about i.MX RT1180 boot device settings, see Table 6.*

2.5 SEMC interface

The i.MX RT1180 MCU includes Smart External Memory Controller (SEMC), which is a multi-standard memory module optimized for both high-performance and low pin-count. It can support multiple external memories in the same application with shared address and data pins.

SEMC on i.MX RT1180 supports SDRAM interface with:

- Both 8/16/32 bit modes
- Four chip selects (CSs) and each CS up to 1024 Mbit
  By default, the SDRAM is disabled and HyperRAM (U15) is enabled. To enable SDRAM function, resistor reconfiguration must be performed as described in Section 4.1 "SDRAM interface hardware rework".
  Figure 7 illustrates the SEMC connections on MIMXRT1180-EVK. The SDRAM devices are described in Table 13.

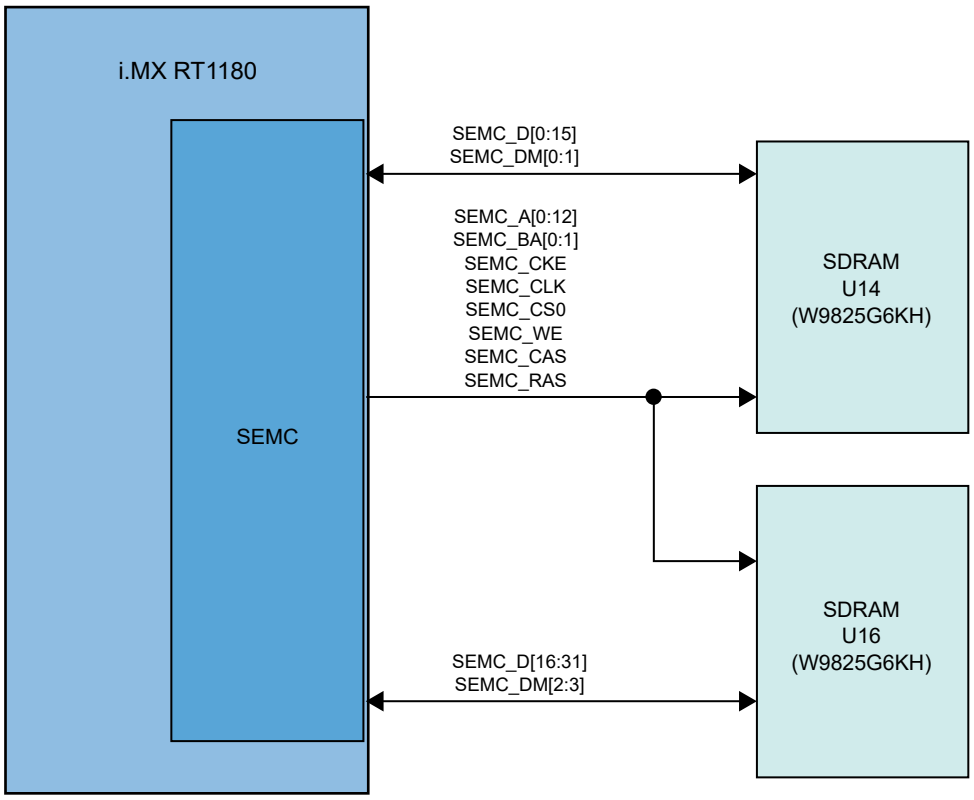

Figure 7. SEMC connections on MIMXRT1180-EVK

On MIMXRT1180-EVK, SEMC is connected to two 256 Mbit SDRAM devices, U14 and U16, operating at 3.3 V with frequency up to 166 MHz, as described in Table 13.

Table 13. SDRAM memories

Part identifiers	Part number	Manufacturer	Description
U14, U16	W9825G6KH	Winbond Electronics	• Type: Onboard SDRAM memory • Density: 256 Mbit organized as 4 M * 4 banks * 16 bits • Up to 200 MHz clock frequency ***Note:*** *For SDRAM operation at 200 MHz, the SEMC_DQS pin should be left floating.* • Operating voltage: 3.3 V

2.6 uSDHC interface

The i.MX RT1180 MCU supports two Ultra Secured Digital Host Controller (uSDHC) modules, USDHC1 and USDHC2, which provide an interface between the host system and the eMMC, SD card, and SDIO. The modules act as a bridge, passing host bus transactions to the eMMC, SD card, and SDIO by sending commands and performing data accesses to/from the cards.

The MIMXRT1180-EVK supports connections with the USDHC1 module of the i.MX RT1180 MCU through an SD card connector J15, which accepts an external SD card. The SD card is one of the boot sources for the board. Figure 8 shows the uSDHC connections on MIMXRT1180-EVK.

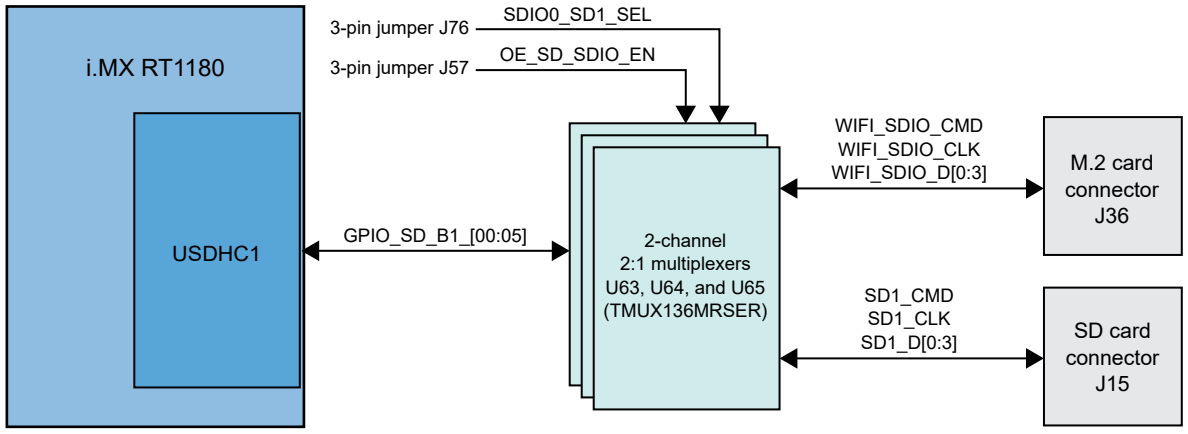

Figure 8. uSDHC diagram

Table 14 shows the details of the uSDHC components on MIMXRT1180-EVK board. The SD card connector, J15, is powered by 3.3 V VSD_3V3 supply, produced by a power switch, Q6 (IRLML6401). The multiplexers U63, U64, and U65 are used to drive SD card signals between the i.MX RT1180 MCU and the M.2 card connector or SD card. Refer Section 2.23 "M.2 connector and Wi-Fi/Bluetooth module" more information about these signals.

Table 14. uSDHC interface on MIMXRT1180-EVK board

Part identifier	Part number	Manufacturer	Description
J15	95220030-14RRF	Anytronic Corporation Limited	SD card connector • Use 3.3 V supply voltage
U63, U64, U65	TMUX136MRSER	Texas Instruments	Multiplexers: 6-GHz, 2-channel, 2:1 switch, with power-off Isolation • Use 3.3 V supply voltage • SDIO0_SD1_SEL signal enables the selection of SD card signals
Q6	IRLML6401	Infineon Technologies	SD card power switch • Ultra Low On-Resistance • Uses 3.3 V supply voltage
J36	-	-	75-pin M.2 Key-E mini card connector

Table 15 shows the pinout details of the SD card connector, J15.

Table 15. SD card connector connections

Pin number	Signal	Direction with respect to i.MX RT1180 MCU
1	SD1_D2	Bidirectional
2	SD1_D3	Bidirectional
3	SD1_CMD	Bidirectional
4	VSD_3V3	N/A
5	SD1_CLK	From i.MX RT1180 MCU
6	GND	N/A
7	SD1_D0	Bidirectional
8	SD1_D1	Bidirectional

Table 15. SD card connector connections...*continued*

Pin number	Signal	Direction with respect to i.MX RT1180 MCU
9	SD1_CD_B	To i.MX RT1180 MCU

The `SD1_CD_B` signal of the SD card connector indicates the presence or absence of a card in the connector slot as follows:

- If a card is detected, the value of SD1_CD_B is `0`.
- If no card is detected, the value of SD1_CD_B is `1`.

For SD boot, SD_CD_SW signal should be set to `0`. In addition, SW5[2:4] must be set as `011`. For more details, see Table 6.

2.7 SAI interface

The i.MX RT1180 MCU has the following four Synchronous Audio Interface (SAI) modules:

- SAI1
- SAI2
- SAI3
- SAI4

The MIMXRT1180-EVK board only supports communication with the SAI1 and SAI4 modules. On the MCIMXRT1180-EVK board, a set of four 2-pin jumpers are used to enable/disable the following signals between SAI1 module of the MCU and audio codec:

- SAI1_TX_BCLK (from SAI1 module) through jumper J98
- SAI1_TX_SYNC (from SAI1 module) through jumper J97
- SAI1_TXD[0] (from SAI1 module) through jumper J100
- SAI1_RXD[0] (to SAI1 module) through jumper J99

Note: *SAI1_RX_SYNC and SAI1_RX_BCLK signals can only be used after disabling the SAI1_TX_SYNC and SAI1_TX_BCLK signals respectively.*

A pair of 2-pin jumpers are used on the board to enable/disable the following signals from SAI4 module (via voltage translator U43) of the MCU to M.2 card connector J36:

- BT_PCM_BCLK_1V8 through jumper J78
- BT_PCM_SYNC_1V8 through jumper J79

Another pair of 2-pin jumpers are used on the board to enable/disable the following signals from M.2 card connector J36 (via voltage translator U44) to SAI4 module of the MCU:

- BT_PCM_BCLK through jumper J80
- BT_PCM_SYNC through jumper J81

Note: *One pair of these jumpers must be used at a time.*

Figure 9 shows the MIMXRT1180-EVK SAI diagram.

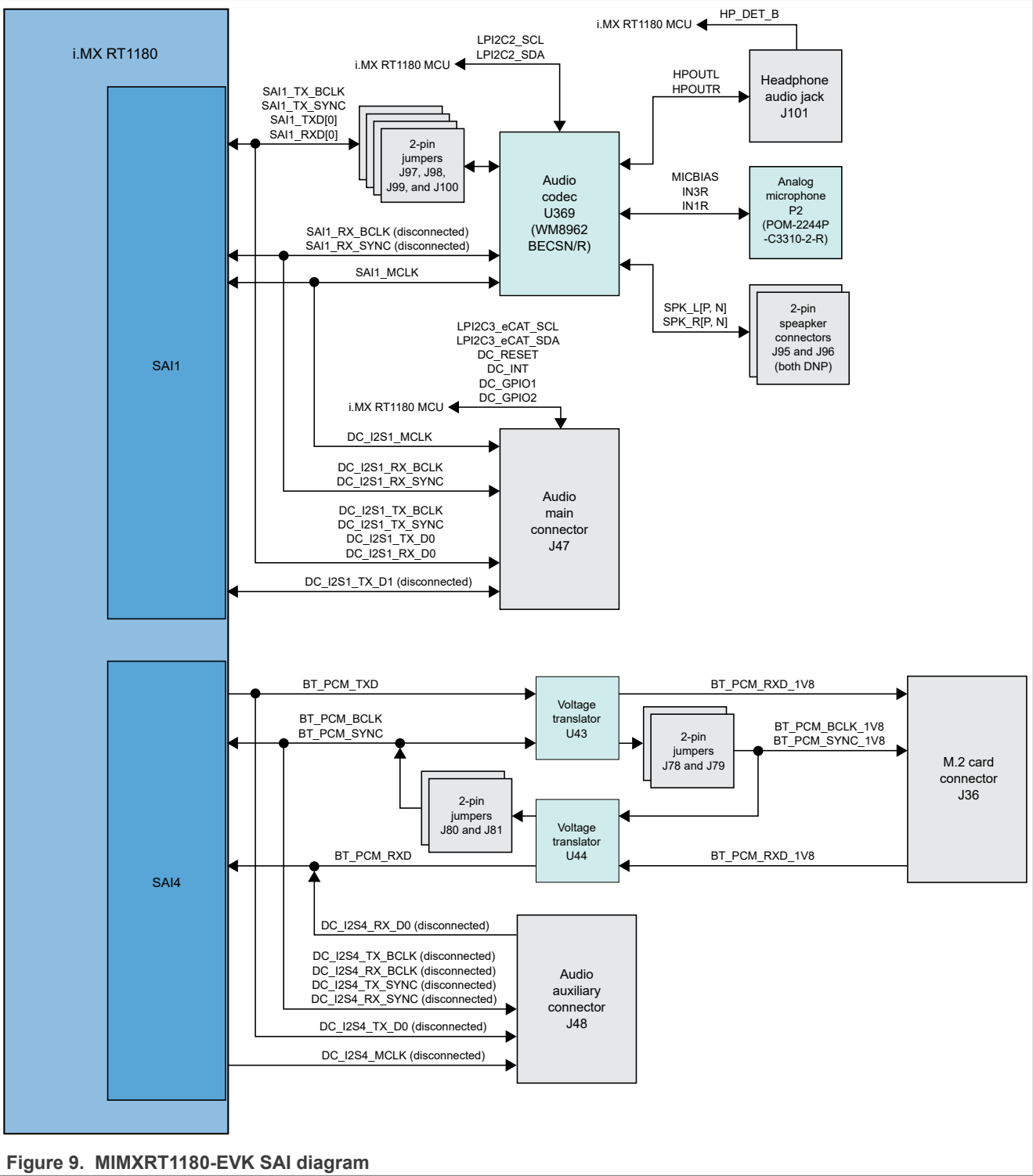

Figure 9. MIMXRT1180-EVK SAI diagram

Table 16 describes the MIMXRT1180-EVK SAI connections.

Table 16. MIMXRT1180-EVK SAI connections

i.MX RT1180 SAI controller	Connected devices		
	Part identifier	Manufacturer and part number	Description
SAI1	U369	Cirrus Logic WM8962BECSN/R	Low-power, high-performance stereo codec for encoding/decoding audio data • Stereo Class D speaker drivers • Supports 24-bit I2S data and 8 kHz to 96 kHz sample rate
	P2	PUI Audio POM-2244P-C3310-2-R	Analog microphone electret condenser ***Note:*** *Instead of POM-2244P-C3310-2-R, you can use WM-63PR or CMC-2242PBL-A.*
	J47	-	Audio main connector • 2x12 header
	J101	-	Headphone audio jack supporting • 3.5 mm audio-stereo • Jack detect
SAI4	J48	-	Audio auxiliary connector • 2x5 header ***Note:*** *To use the Audio AUX connector (J48), mount the following resistors:* • *R125, R127, R129, R131, R132, R133, R134*
	J36	-	75-pin M.2 Key-E mini card connector
	U43	Nexperia 74AVC8T245PW	8-bit, dual supply,. dual port transceivers that enables bidirectional voltage translation • BT_PCM_BCLK and BT_PCM_SYNC signals from target MCU are sent to J36 via U43. • BT_PCM_BCLK and BT_PCM_SYNC signals from J36 are sent back to target MCU via U44.
	U44		

The audio interface also includes:

- SPDIF connectors, J7 and J14 [DNP]
- Connectors for speakers, J95 and J96 [DNP]

The audio codec and target MCU communicate with each other using I2C (for control signals) and SAI (for data signals). Refer to Section 2.15 "LPI2C interface".

2.8 SPDIF interface

The i.MX RT1180 MCU has one Sony/Philips Digital Interface (SPDIF) module, which is a stereo transceiver that allows the MCU to receive and transmit digital audio. The MIMXRT1180-EVK board supports communication with the SPDIF module.

Figure 10 shows the MIMXRT1180-EVK SPDIF diagram.

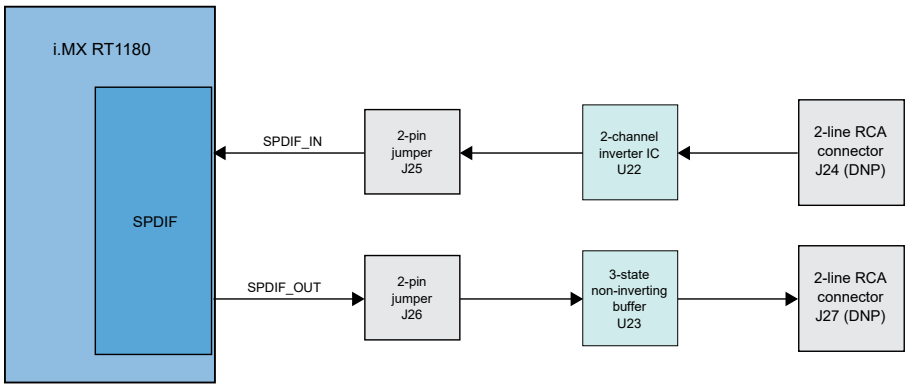

Figure 10. MIMXRT1180-EVK SPDIF diagram

J24 receives the coaxial SPDIF input signal for the i.MX RT1180 MCU from an external RCA cable. J27 sends the coaxial SPDIF output signal from the i.MX RT1180 MCU to an external RCA cable.

2.9 Ethernet interface

The i.MX RT1180 MCU has five Ethernet modules: ETH0, ETH1, ETH2, ETH3, and ETH4. The ports ETH0, ETH1, ETH2, and ETH3 are switch ports, whereas ETH4 is a ENETC0 port. The MIMXRT1180-EVK board supports connections with all the Ethernet modules. ETH2 and ETH3 signals are multiplexed with ECAT signals on the MCU.

Note: *ETH0, ETH1, ETH2, and ETH3 are switch ports, whereas ETH4 is a ENETC0 port.*

On the MIMXRT1180-EVK board, the multiplexing between ETH2 and ECAT (EtherCAT port 1) signals is implemented through a pair of muxes, U103 and U106. By default, the ETH2 connection is enabled. Similarly, the multiplexing between ETH3 and ECAT (EtherCAT port 0) signals is implemented through a set of six muxes (U96, U97, U98, U99, U100, and U101). By default, the ETH3 connection support RGMII is enabled.

ETH2 and ETH3 signals are also multiplexed with SDRAM signals. It implies that both types of signals cannot be used at the same time.

Figure 11 illustrates the MIMXRT1180-EVK Ethernet diagram.

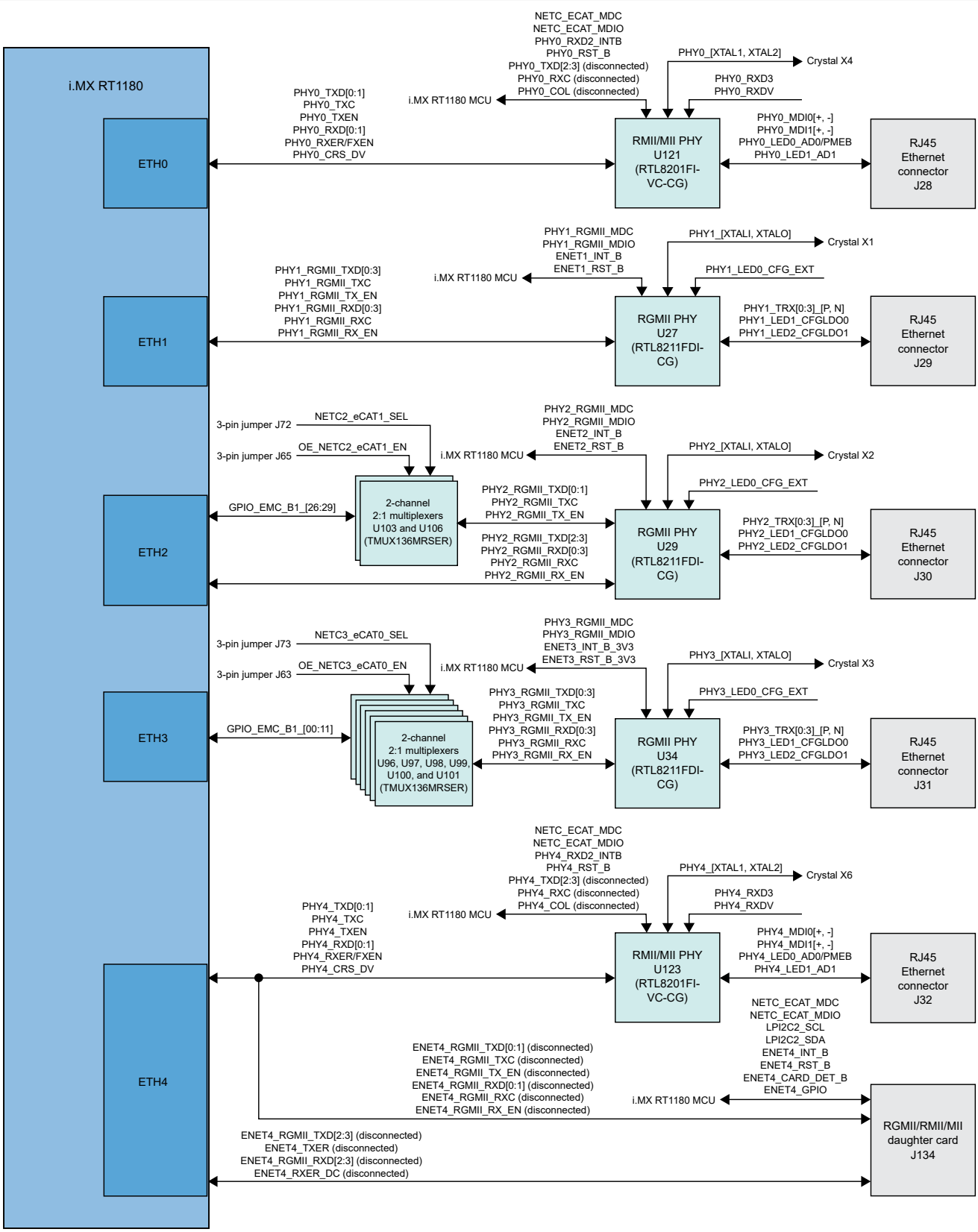

Figure 11. MIMXRT1180-EVK Ethernet diagram

The MIMXRT1180-EVK board supports five PHYs as described in Table 17. These PHYs use RJ45 connectors with link and activity status.

Table 17. MIMXRT1180-EVK Ethernet connections

MCU module used	Connected devices		
	Part identifier	Part number (Manufacturer)	Description
ETH0	U121 (PHY0)	RTL8201FI-VC-CG (Realtek Semiconductor)	Ethernet transceiver that complies with 10Base-T and 100Base-TX IEEE 802.3 standards. • Supports RMII mode by default. For supporting MII mode, refer to Figure 13. • Uses crystal X4 for clock source • Operating voltage: 3.3 V (PHY0_AVDD33 and PHY0_AVDD33)
	J28	-	RJ45 Ethernet connector for PHY0
ETH1	U27 (PHY1)	RTL8211FDI-CG (Realtek Semiconductor)	Ethernet transceiver that complies with 10Base-T, 100 Base-TX, and 1000Base-T IEEE 802.3 standards. • Uses RGMII for transmission/reception • Uses crystal X1 for clock source • Signals ENET1_RST_B and ENET1_INT_B operate at 1.8 V using voltage translators U410 and U416 respectively • Operating voltage: 3.3 V (VDD_3V3) • Uses ESD protection devices (IP4292CZ10-TBR) U26 and U28
	J29	-	RJ45 Ethernet connector for PHY1
ETH2	U29 (PHY2)	RTL8211FDI-CG (Realtek Semiconductor)	Ethernet transceiver that complies with 10Base-T, 100 Base-TX, and 1000Base-T IEEE 802.3 standards. • Use RGMII for transmission/reception • Uses Crystal X2 for clock source • Uses muxes U103 and U106 to mux signals with PHY4 • Uses voltage translators U1410 and U416 • Uses ESD protection devices (IP4292CZ10-TBR) U30 and U31
	J30	-	RJ45 Ethernet connector for PHY2
	U103 and U106	TMUX136MRSER (Texas Instruments)	Muxes to enable multiplexing between ECAT1 (Ethernet port 1) and ETH2 signals • 2-channel analog switch • Operating voltage: 3.3 V
ETH3	U34 (PHY3)	RTL8211FDI-CG (Realtek Semiconductor)	Ethernet transceiver that complies with 10Base-T, 100 Base-TX, and 1000Base-T IEEE 802.3 standards. • Use RGMII for transmission/reception • Uses crystal X3 for clock source • Uses muxes U96, U97, U98, U99, U100, and U101 • Uses ESD protection devices (IP4292CZ10-TBR) U32 and U33
	J31	-	RJ45 Ethernet connector for PHY3
	U96, U97, U98, U99, U100, and U101	TMUX136MRSER	Muxes to enable multiplexing between ECAT (Ethernet port 0) and ETH3 signals

Table 17. MIMXRT1180-EVK Ethernet connections*...continued*

MCU module used	Connected devices		
	Part identifier	Part number (Manufacturer)	Description
		(Texas Instruments)	• 2-channel analog switch • Operating voltage: 3.3 V
ETH4	U123 (PHY4)	RTL8201FI-VC-CG (Realtek Semiconductor)	• Ethernet transceiver that complies with 10Base-T and 100Base-TX IEEE 802.3 standards. • Supports RMII mode by default. For supporting MII mode, refer Figure 14. • Uses crystal X6 for clock source • Operating voltage: 3.3 V (PHY4_AVDD33 and PHY4_AVDD33)
	J32	-	RJ45 connector for PHY4
	J134	QSH-030-01-L-D-A-K-TR (Samtec)	Ethernet daughter card (expansion card) connector • Mezzanine connector (0.5 mm) with a ground plane • 60-contact receptacle in 2 rows • Surface mount connector • Only 3.3 V Ethernet IO daughter cards are supported • Supports connection with two expansion card modules (see Table 18)

Note: *On MIMXRT1180-EVK, the PHY device (RTL8201FI-VC-CG) cannot work in the10 Mbit/s mode. Refer Table 44 for the list of supported PHYs.*

Note: *Refer to Section 4.2 "NETC daughter card interface hardware rework" for the details to use ENETC daughter card connector, J134.*

2.9.1 Ethernet daughter card module

The MIMXRT1180-EVK board also supports two Ethernet daughter card (DC) modules that can be used with J134 to provide more connectivity. The board supports only the 3.3 V Ethernet IO daughter cards as listed in Table 18:

Table 18. Supported Ethernet daughter card modules

Module name	Manufacturer	Description
TJA1103SDB Sabre Development Board	NXP Semiconductors	The TJA1103SDB SABRE development board is a purpose-built tool to evaluate the xMII data path in an application context together with a NXP processor and is specifically designed for software engineering tasks.It provides: • ASIL B compliant 100BASE-T1 Ethernet PHY interface • Simple Automotive Ethernet system setup for prototype applications • SABRE Adapter for connection to S32K3, S32G, and i.MX8 PLUS boards • Chip status reporting via onboard LEDs
SJA1105Q-EVB Automotive Ethernet Switch	NXP Semiconductors	SJA1105Q-EVB is an evaluation system that supports the SJA1105P/Q/R/S Automotive Ethernet switch family in conjunction with the TJA1102 Dual Port 100BASE-T1 Ethernet PHY Transceiver. • Connects to i.MX 6, i.MX 8 and S32x processor evaluation boards

Table 18. Supported Ethernet daughter card modules*...continued*

Module name	Manufacturer	Description
		• Directly connects to PC via USB • Enables fast prototyping of ECUs • Switch is compatible with OPEN Alliance TC10 Wake Up feature

Note: *These daughter cards are not provided with the board kit.*

Note: *Refer to Section 4.2 "NETC daughter card interface hardware rework" for the details to use ENETC daughter card connector, J134.*

For more information about these two daughter cards, refer to the links below:

- **TJA1103 SABRE Development Board**:https://www.nxp.com/products/interfaces/ethernet-/automotive-ethernet-phys/tja1103-sabre-development-board:TJA1103SDB
- **SJA1105Q Evaluation Board**: https://www.nxp.com/design/design-center/development-boards/ethernet-switch-and-phy-evaluation-board:SJA1105Q-EVB

2.10 EtherCAT interface

The i.MX RT1180 MCU has an EtherCAT (ECAT) module with two Ethernet ports: ECAT0 and ECAT1. ECAT signals are multiplexed with ETH2, ETH3, and FLEXSPI2 signals on the i.MX RT1180 MCU.

The MIMXRT1180-EVK board supports communication with the ECAT module of the MCU.

- Multiplexing between ETH2 signals and ECAT (EtherCAT port 1) is implemented through a pair of muxes. By default, the ETH2 connection is enabled.
- Multiplexing between ETH3 signals and ECAT (EtherCAT port 0) is implemented through a set of six muxes. By default, the ETH3 connection is enabled.
- Multiplexing between ECAT and FLEXSPI2 signals is implemented through resistor reconfiguration. By default, the FLEXSPI2 connection is enabled.

Figure 12 shows the MIMXRT1180-EVK EtherCAT diagram.

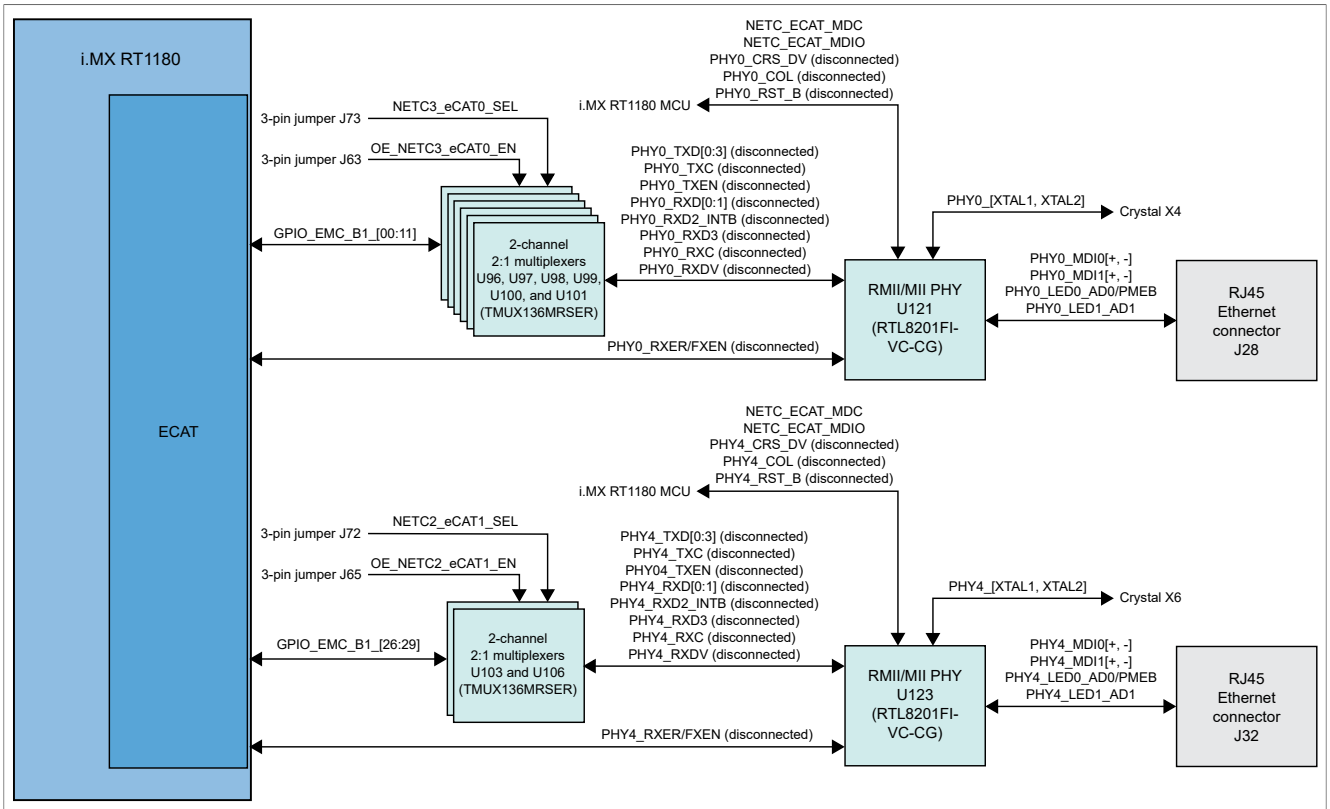

Figure 12. EtherCAT connections on MIMXRT1180-EVK

Table 19 describes the MIMXRT1180-EVK EtherCAT connections.

Table 19. MIMXRT1180-EVK EtherCAT connections

MCU module used	Connected devices		
	Part identifier	Part number (Manufacturer)	Description
ECAT	U121 (PHY0)	RTL8201FI-VC-CG (Realtek Semiconductor)	• Supports 10/100 Mbit/s IEEE 802.3 standards • Operating voltage: 3.3 V (PHY0_AVDD33 and PHY0_AVDD33) • Supports RMII mode by default. See List item 1. • Supports UTP cable by default. See List item 2.
	J28	-	RJ45 connector for PHY0
	U96, U97, U98, U99, U100, and U101	TMUX136MRSER (Texas Instruments)	Muxes to enable multiplexing between ECAT (EtherCAT port 0) and ETH3 signals • 2-channel analog switch • Operating voltage: 3.3 V
	U123 (PHY4)	RTL8201FI-VC-CG (Realtek Semiconductor)	• Supports 10/100 Mbit/s IEEE 802.3 standards • Operating voltage: 3.3 V (PHY4_AVDD33 and PHY4_AVDD33) • Supports RMII mode by default. See List item 3. • Supports UTP cable by default. See List item 4.
	J32	-	RJ45 connector for PHY4
	U103 and U106	TMUX136MRSER	Muxes to enable multiplexing between ECAT (EtherCAT port 1) and ETH2 signals

Table 19. MIMXRT1180-EVK EtherCAT connections*...continued*

MCU module used	Connected devices		
	Part identifier	Part number (Manufacturer)	Description
		(Texas Instruments)	• 2-channel analog switch • Operating voltage: 3.3 V

Note:

1. *To use the PHY0 in MII mode, resistor rework is required as shown in Figure 13.).*
2. *To use PHY0 in Fiber mode, PHY0_RXER/FXEN should be pulled high. To do this, depopulate resistor R1109 (4.7 kΩ) and populate R1108 (4.7 kΩ).*
3. *To use the PHY4 in MII mode, resistor rework is required as shown in Figure 14.)*
4. *To use PHY4 in Fiber mode, PHY4_RXER/FXEN signal should be pulled high. To do this, populate R1179 (4.7 kΩ) and depopulate resistor R1178 (4.7 kΩ).*

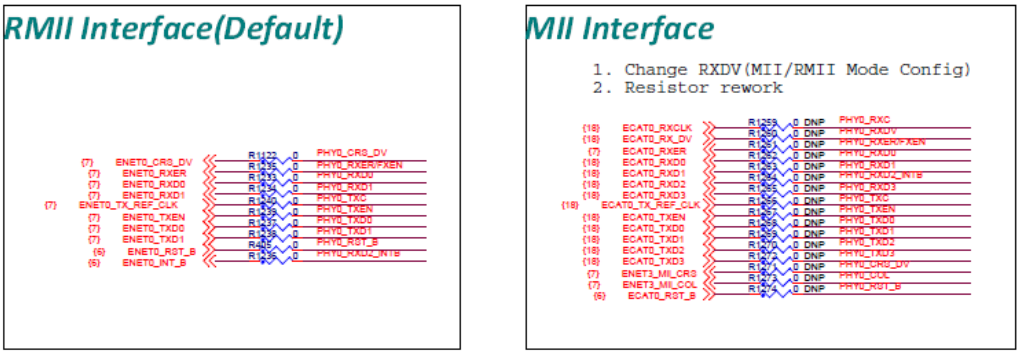

Figure 13. Resistor rework to support MII using ENET0

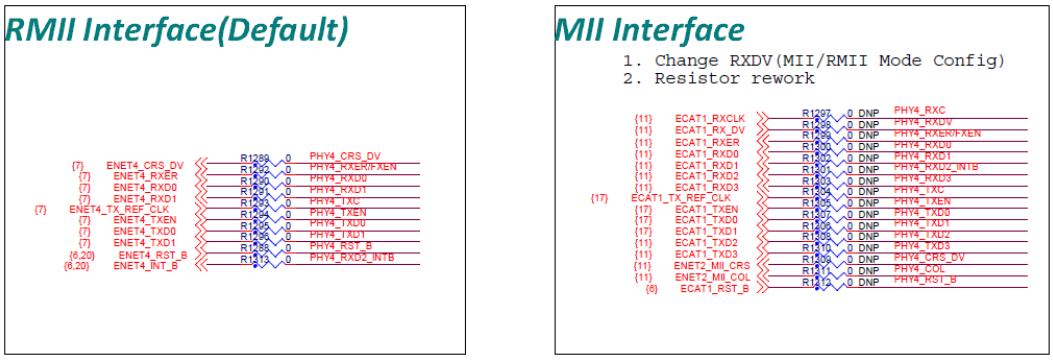

Figure 14. Resistor rework to support MII using ENET4

Attention: *On MIMXRT1180-EVK, the PHY device (RTL8201FI-VC-CG) cannot work in the 10 Mbit/s mode. Refer Table 44 for the list of supported PHYs.*

2.10.1 EEPROM memory

MIMXRT1180-EVK supports a 32 kbit, 2-wire serial EEPROM memory 24LC32A for the EtherCAT Slave Information (ESI) storage. Table 20 descibes the EEPROM supported on MIMXRT1180-EVK.

Table 20. EEPROM memory

Part identifier	Part number	Manufacturer	Description
U48	24LC32A	Microchip Technology	• Type: EEPROM memory • Density: 32 kbit (4K x 8 bit) • Operating voltage: 3.3 V • Maximum clock frequency: 400 kHz

It has the following I2C addresses:

• **Read address**: 0xA1

• **Write address**: 0xA0

2.11 USB interface

The i.MX RT1180 MCU supports two USB 2.0 On-The-Go (OTG) modules, capable of operating at:

- Low-speed (LS) rate of 1.5 Mbit/s
- Full-speed (FS) rate of 12 Mbit/s
- High-speed (HS) rate of 480 Mbit/s

The OTG modules can operate in Host mode and Device (Peripheral) mode. See Figure 15.

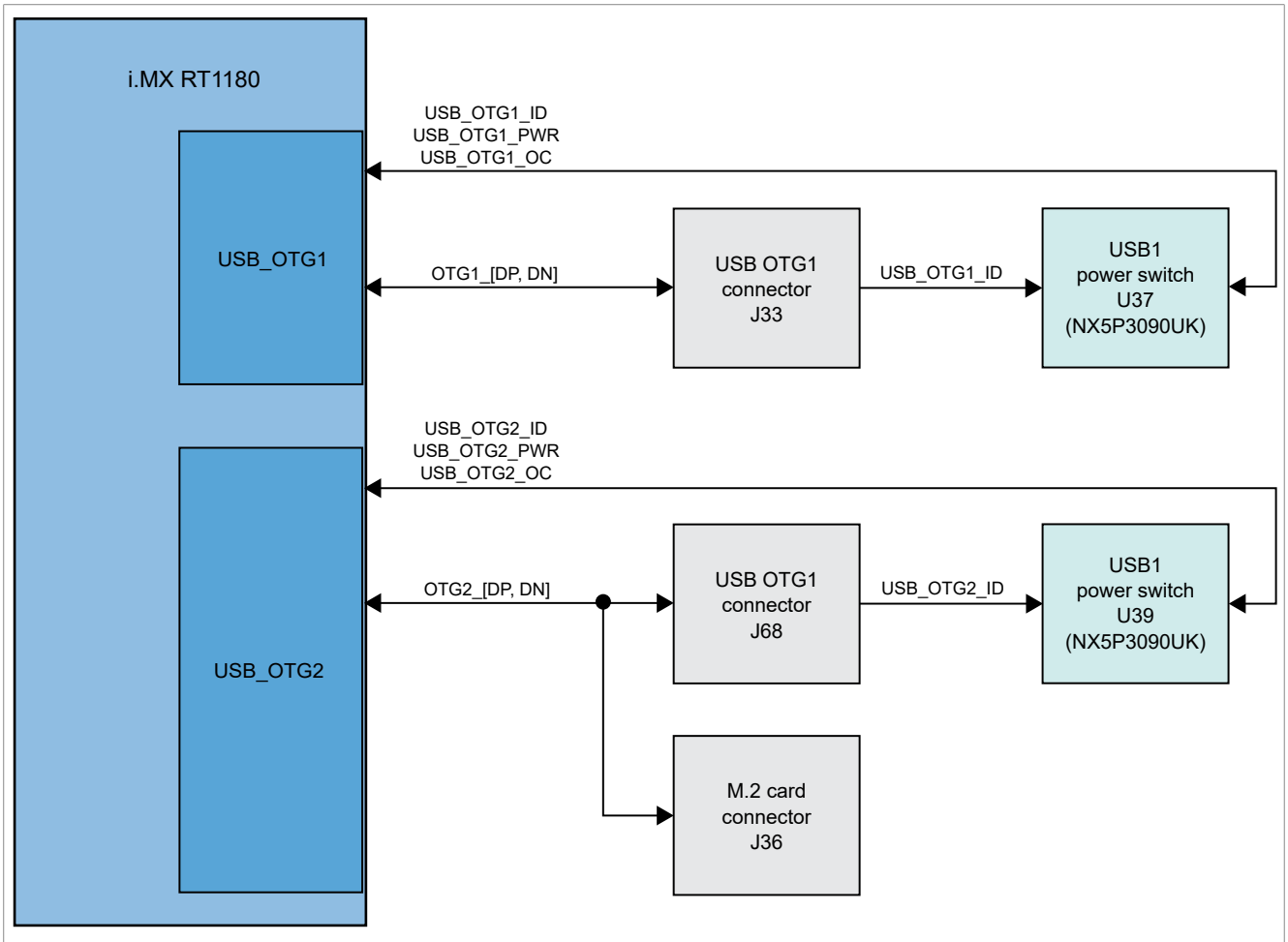

Figure 15. USB interface on MIMXRT1180-EVK

Table 21 describes the MIMXRT1180-EVK USB connectors.

Table 21. USB details

USB OTG module	Connected devices			
	Part identifier	Part number and supplier	Device/Connector type	Description
USB_OTG1	J33	-	USB 2.0 micro-AB connector	USB 2.0 micro-AB connector. Connects to the USB 2.0 OTG1 module of the target MCU. This USB port operates in OTG (Host or Device) mode.
	U37	NX5P3090UK (NXP)	USB PD and Type-C current-limited power switch	Power switch for USB1
USB_OTG2	J68	-	USB 2.0 micro-AB connector	Connects to the USB 2.0 OTG2 module of the target MCU. The USB port operates in OTG (Host or Device) mode.
	U39	NX5P3090UK (NXP)	USB PD and Type-C current-limited power switch	Power switch for USB2
	J36	-	M.2 Key-E connector	75-pin M.2 mini card connector

2.12 FlexCAN interface

The Flexible Controller Area Network (FLEXCAN) module is a communication controller implementing the CAN protocol according to the CAN 2.0B protocol specification.

The MIMXRT1180-EVK supports two high-speed CAN buses CAN1 and CAN3. The CAN1 bus connects the CAN transceiver, U41 (NXP TJA1057GT) to the FLEXCAN1 module in the MCU. CAN3 bus connects CAN transceiver U42 (NXP TJA1057GT) to the FLEXCAN13 module in the MCU. These transceivers operate on 5V_SYS supply and provide an interface for the CAN ports to send and receive CAN signals to and from the i.MX RT1180 MCU. The i.MX RT1180 CAN ports are available for external connection through the CAN connectors (1x3 pin headers), J34 and J35. These connectors are not populated on the board, by default.

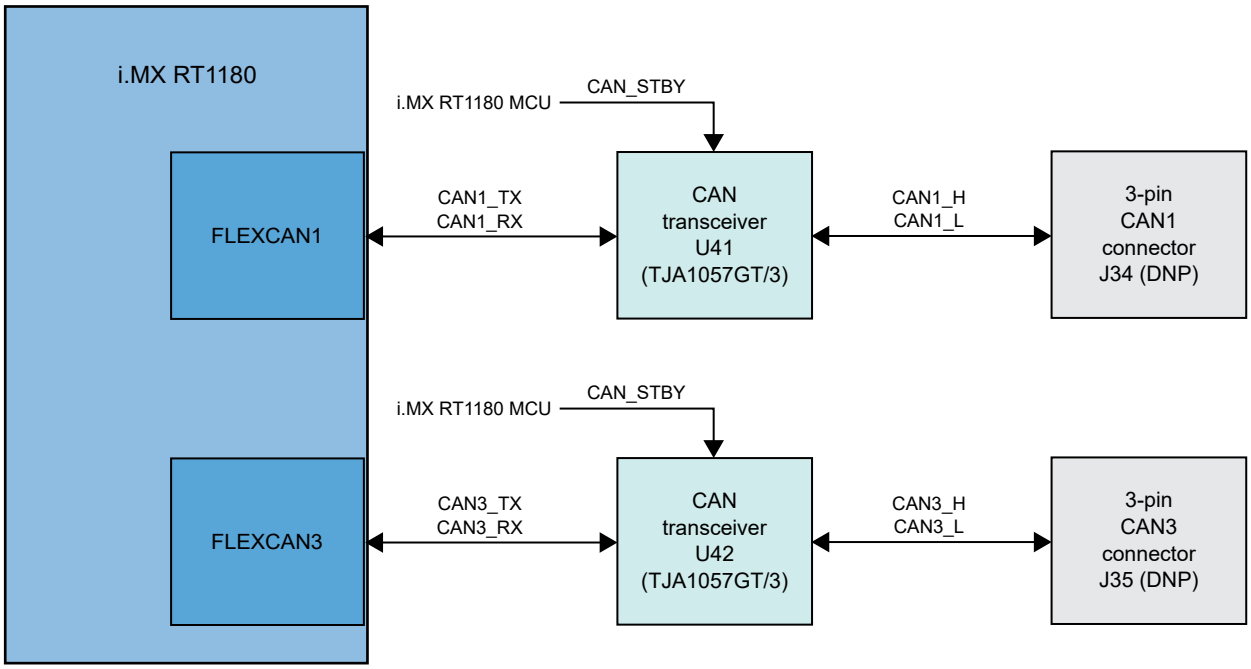

Figure 16. FlexCAN in MIMXRT1180-EVK

Table 22 describes the MIMXRT1180-EVK FlexCAN module.

Table 22. FlexCAN interface

FlexCAN module	Connected devices			
	Part identifier	Part number and supplier	Device/ Connector type	Description
FLEXCAN1	U41	(NXP Semiconductors) TJA1057GT/3	High-speed CAN transceiver	• Fully ISO 11898-2:2016, SAE J2284-1 to SAE J2284-5 and SAE J1939-14 compliant • Optimized for use in 12 V automotive systems
FLEXCAN3	U42	TJA1057GT/3		
FLEXCAN1	J34	-	1x3 header, CAN connector for CAN1 bus	Not populated on the board
FLEXCAN3	J35	-	1x3 header, CAN connector for CAN3 bus	Not populated on the board

2.13 LPUART interface

The i.MX RT1180 MCU supports twelve Low-Power Universal Asynchronous Receiver/Transmitter modules: LPUART1, LPUART2, LPUART3, LPUART4, LPUART5, LPUART6, LPUART7, LPUART8, LPUART9, LPUART10, LPUART11, and LPUART12. However, only three of them (LPUART1, LPUART12, and LPUART10) are supported on the MIMXRT1180-EVK board as shown in Figure 17.

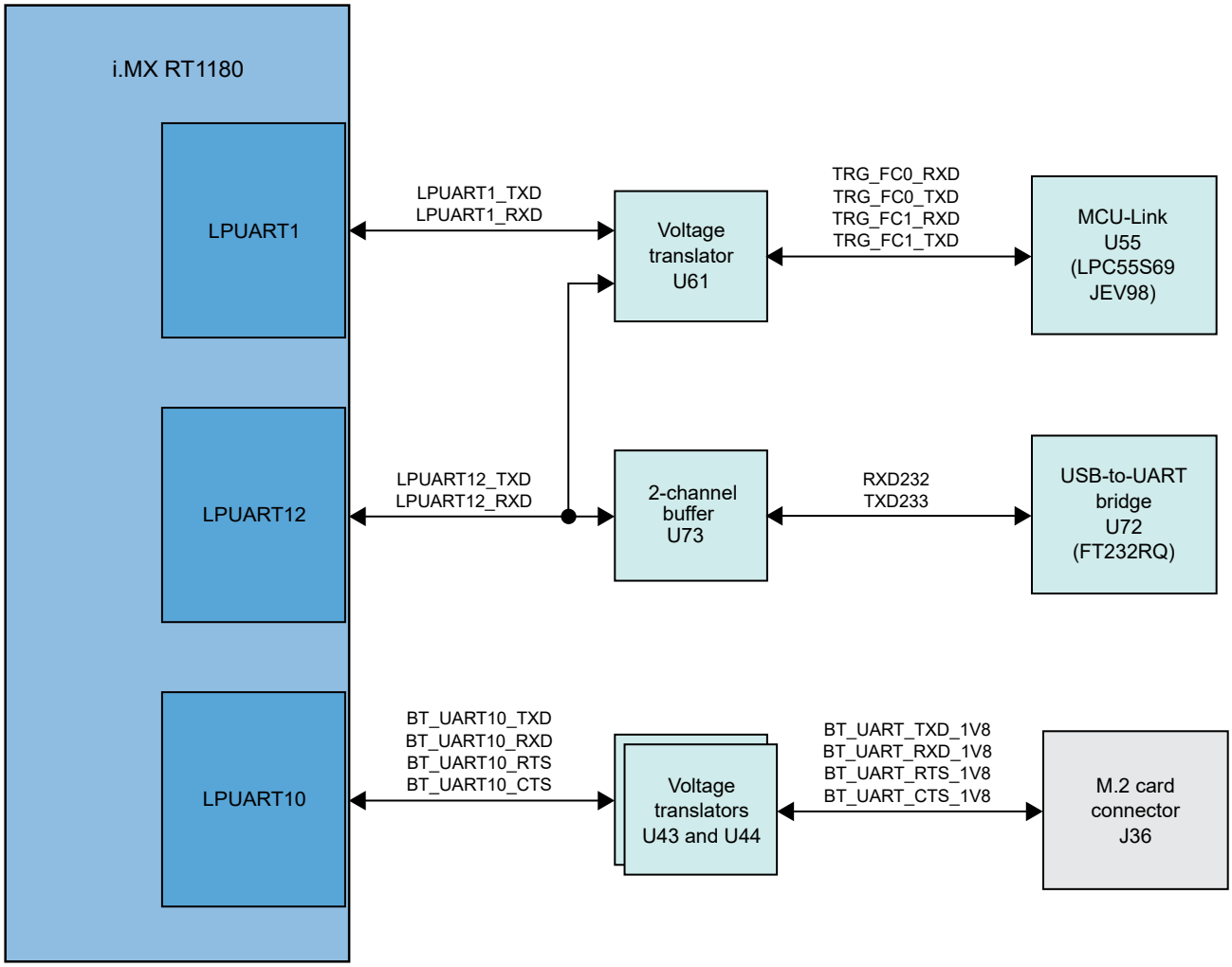

Figure 17. MIMXRT1180-EVK LPUART diagram

Table 23 describes the MIMXRT1180-EVK LPUART connections.

Table 23. MIMXRT1180-EVK LPUART connections

LPUART module	Connected devices		
	Part identifier	Part number (manufacturer)	Description
LPUART1	U61	74AVC4TD245BQ (Nexperia)	Voltage translator • 4-bit, dual supply transceiver • Enables bidirectional level translation • Has eight 1-bit input-output ports • Uses P3V3_SDA (3.3 V) or V_TGTMCU (1.8 V) supply as input
	U55	LPC55S69JEV98 (NXP Semiconductors)	Debug MCU, see Section 3.2 "MCU-Link OB debug probe" For details, refer https://www.nxp.com/part/LPC55S69JEV98

Table 23. MIMXRT1180-EVK LPUART connections*...continued*

LPUART module	Connected devices		
	Part identifier	Part number (manufacturer)	Description
			On the MIMXRT1180-EVK board, the MCU-Link supports the following two VCOM (USB-to-UART) ports: • Primary VCOM port (always available) with LPUART1 module of the i.MX RT1180 MCU • Secondary VCOM port (when jumper JP7 is open; JP7 is open by default) with LPUART12 module of the i.MX RT1180 MCU
LPUART10	U43 and U44	74AVC8T245PW (Nexperia)	A pair of 8-bit dual supply level translators that enable bidirectional level translation on UART signals between the i.MX RT1180 MCU and M.2 card connector J36. Each level translator features two 8-bit input/output ports.
	J36	-	75-pin M.2 Key-E mini card connector
LPUART12	U73	SN74LVC2G126 (Texas Instruments)	A 2-channel buffer to ensure that no UART signal backfeeds between the i.MX RT1180 MCU and USB-to-UART bridge U72.
	U72	FT232RQ (FTDI)	USB-to-UART bridge, U72

Refer to Table 37 for the LPUART signal connections on the M.2 card connector, J36.

2.14 LPSPI interface

The i.MX RT1180 MCU has the following six Low-Power Serial Peripheral Interface (LPSPI) modules:

- LPSPI1
- LPSPI2
- LPSPI3
- LPSPI4
- LPSPI5
- LPSPI6

Each of the LPSPI modules of the i.MX RT1180 MCU supports four peripheral chip selects: PCS0, PCS1, PCS2, and PCS3.

The MIMXRT1180-EVK board only supports the LPSPI1 (with PCS0) and LPSPI6 (with PCS0) modules.

Figure 18 shows the MIMXRT1180-EVK LPSPI diagram.

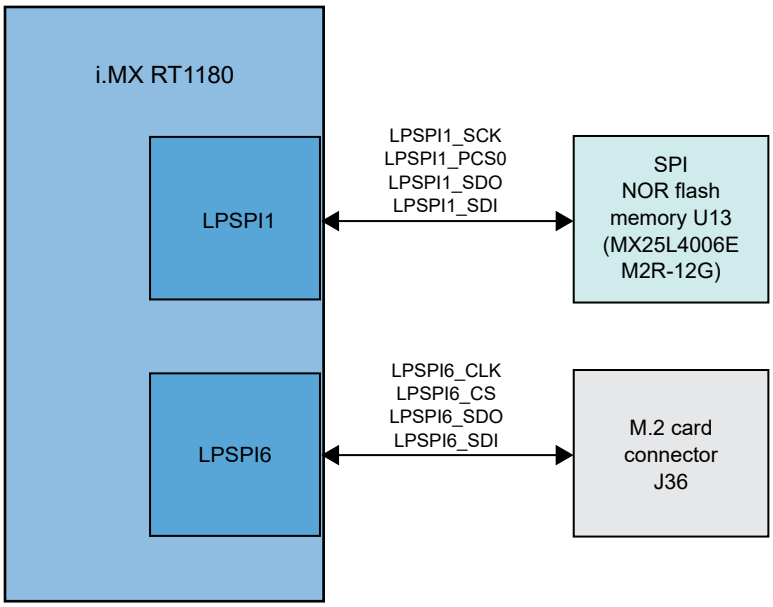

Figure 18. MIMXRT1180-EVK LPSPI diagram

Table 24 describes the LPSPI devices supported on the MIMXRT1180-EVK board.

Table 24. LPSPI devices on MIMXRT1180-EVK

LPSPI module	Peripheral chip select used	Connected devices on board		
		Part identifier	Part number and manufacturer	Description
LPSPI1	PCS0	U13	MX25L4006EM2R-12G (Macronix Technology)	SPI NOR flash memory • 64 Mbit, 86 MHz Serial NOR flash memory for secondary boot • Uses VDD_3V3 supply
LPSPI6	PCS0	J36	-	M.2 card connector. For more details, refer to Section 2.23 "M.2 connector and Wi-Fi/ Bluetooth module"

Note: *For the details about supported MIMXRT1180-EVK boot devices and their settings, see Table 6.*

2.15 LPI2C interface

The i.MX RT1180 MCU supports six LPI2C modules: LPI2C1, LPI2C2, LPI2C3, LPI2C4, LPI2C5, and LPI2C6. The MIMXRT1180-EVK board uses only the LPI2C2 and LPI2C3 modules. Figure 19 shows the LPI2C connections on MIMXRT1180-EVK board.

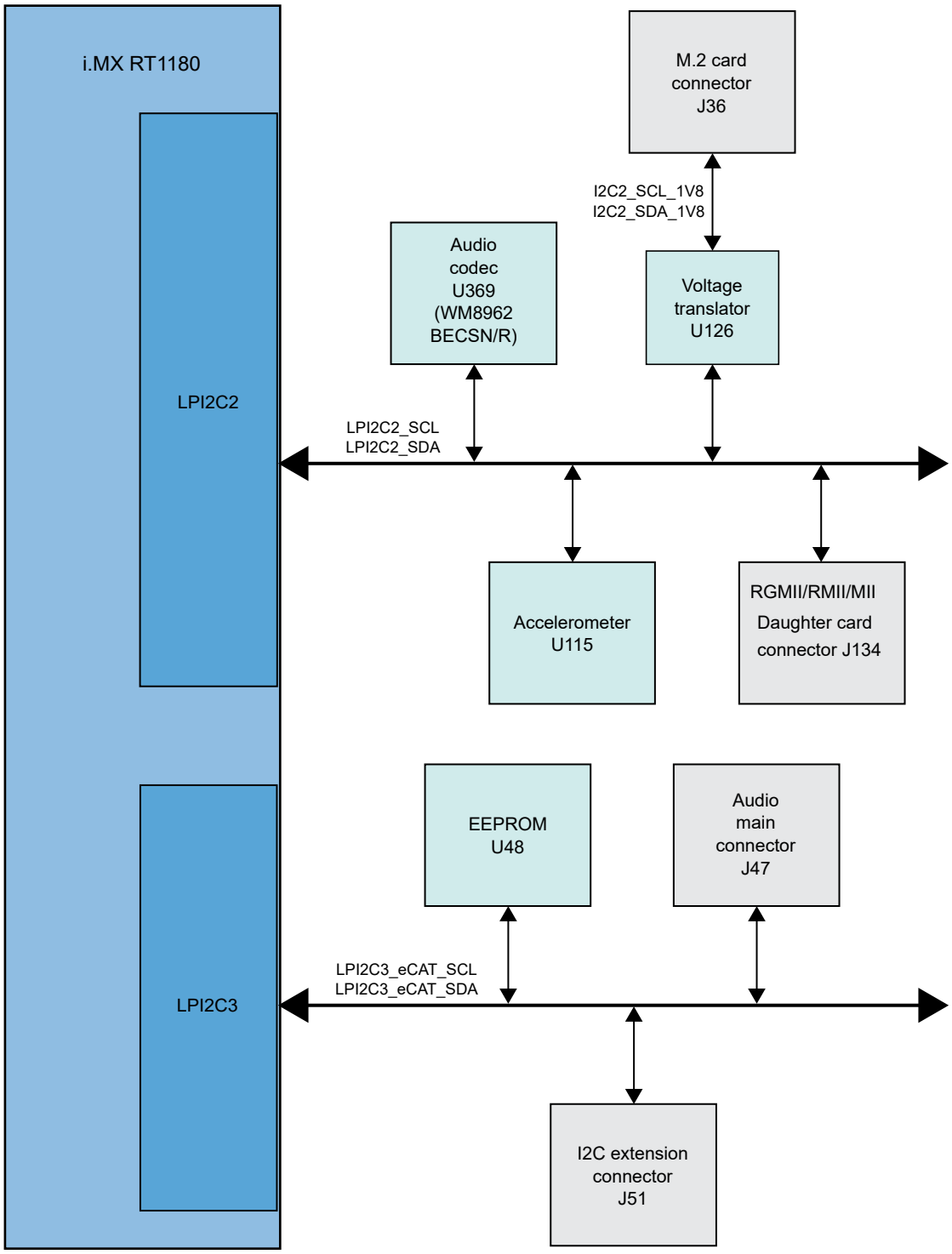

Figure 19. LPI2C interface on MIMXRT1180-EVK

Table 25 shows the I2C bus mapping in MIMXRT1180-EVK board.

Table 25. I2C bus device mapping

I2C bus	I2C address	Device	Description
LPI2C2	Depends on the plugged in I2C device	M.2 card	M.2 card is inserted into M.2 card connector, J36. It is connected to the LPI2C2 bus via voltage translator U126
	Depends on the plugged in I2C device	Audio codec (U369)	Pins GPIO_AON_15 and GPIO_AON_16 connect to LPI2C2_SDA and LPI2C_SCL signals respectively
	• 0x32 = write address • 0x33 = read address	Accelerometer (U115)	3-axis accelerometer
	Depends on the plugged in I2C device	Daughter card connected to daughter card connector (J134)	Connected to LPI2C2 bus
LPI2C3 (LP12C3_eCAT_SCL and LPI2 C3_eCAT_SDA signals)	• 0xA0 = write address • 0xA1 = read address	EEPROM (U48)	Connected to LPI2C3 bus
	Depends on the plugged in I2C device	Audio main connector, J47	Connected to LPI2C3 bus
	Depends on the plugged in I2C device	External I2C device connected to I2C extension connector, J51	2x4 PCB receptacle (SSMJ51 SSM-104-L-DV). It is a board-to-board, surface mount connector.

I2C bus signals are used by the audio codec (U369), accelerometer (U115), voltage translator (U126), expansion card connector (J134) and M2.card connector (J36). MIMXRT1180-EVK also supports a 2x4 pin I2C extension connector, J51, which uses the VDD_3V3 supply. J51 connects the signals, LP12C3_eCAT_SCL and LPI2C3_eCAT_SDA, from EEPROM (U48) and the Audio main connector J47 to the LPI2C3 module of the target MCU.

2.16 I3C interface

The i.MX RT1180 MCU has two Improved Inter-Integrated Circuit (I3C) modules: I3C1 and I3C2. The MIMXRT1180-EVK board only supports communication with the I3C2 module. Figure 20 shows the MIMXRT1180-EVK I3C diagram. These signals allow the data from U46 (gyroscope and accelerometer) to be communicated to i.MX RT1180 (target MCU). The I3C extension connector, J50 connects the I3C2 signals from U46 to the I3C2 module of the target MCU.

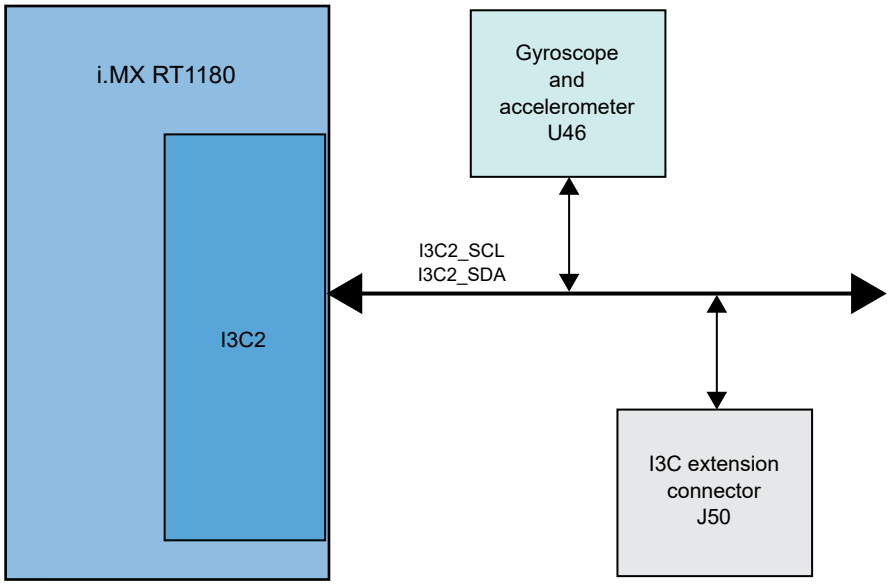

Figure 20. MIMXRT1180-EVK I3C diagram

MCU module used	Connected devices		
	Part identifier		
I3C2	U46	LSM6DSOX (ST Microelectronics)	Combined 3D accelerometer and 3D gyroscope • Supports an acceleration range of ±2/4/8/16 g • Supports an angular rate range of ±125/250/500/1000/2000 dps. • Operating voltage: 3.3 V
	J50	-	I3C extension connector • 4x1 header

2.17 FlexIO interface

The i.MX RT1180 MCU has two Flexible (FlexIO) modules, FLEXIO1 and FLEXIO2. The MIMXRT1180-EVK board supports communication only with the FlexIO2 module through FlexIO header J69.

Figure 21 shows the MIMXRT1180-EVK FlexIO diagram.

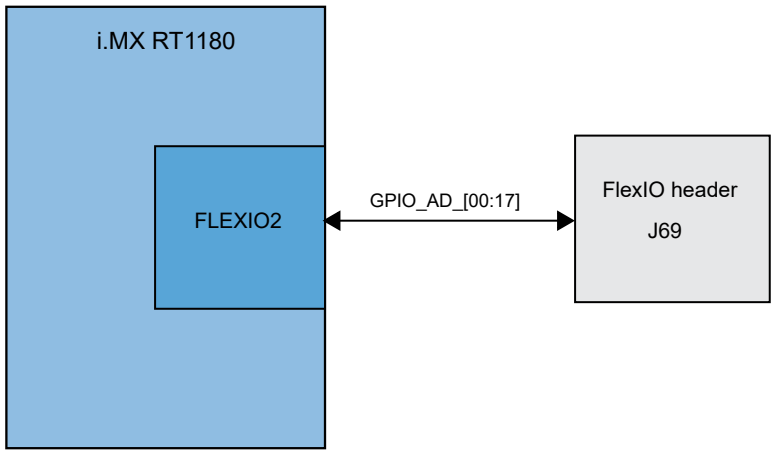

Figure 21. MIMXRT1180-EVK FlexIO diagram

Table 26 describes the MIMXRT1180-EVK FlexIO connections.

Table 26. MIMXRT1180-EVK FlexIO connections

i.MX RT1180 FlexIO module	Connected device and description
FLEXIO2	FlexIO header J69 connects GPIO signals [GPIO_AD_00: 17] with the FLEXIO2 module of the i.MX RT1180 MCU

2.18 Sensors

Table 27 describes the onboard sensors available on MIMXRT1180-EVK:

Table 27. Sensor devices on MIMXRT1180-EVK

Part identifier	Part number (manufacturer)	Description
U115	FXLS8974CFR3 (NXP Semiconductors)	3-axis accelerometer: • Supports ±2/4/8/16 g user-selectable, full-scale measurement ranges. • 12-bit acceleration data and 8-bit temperature sensor data • Operates on VDD_3V3 and SENSOR_3V3 supplies • Maximum current 180 mA • Extended temperature range –40 °C to +105 °C • It has the following I2C addresses: – Read address: 0x33 – Write address: 0x32 For more information, refer https://www.nxp.com/part/FXLS8974CF
U46	LSM6DSOX (ST Microelectronics)	Combined 3D accelerometer and 3D gyroscope • Supports an acceleration range of ±2/4/8/16 g • Supports an angular rate range of ±125/250/500/1000/2000 dps.

Table 27. Sensor devices on MIMXRT1180-EVK*...continued*

Part identifier	Part number (manufacturer)	Description
		• Operating voltage: 3.3 V

- The accelerometer U115 is designed for use in a wide range of industrial and medical IoT applications. It has various advanced, integrated digital features that enable low power consumption and host data collection The accelerometer requires ultra-low-power wake-up on motion. It is connected to i.MX RT1180 through the LPI2C2 signals as shown in Section 2.15 "LPI2C interface".
- U46 (LSM6DSOXTR) is connected to the I3C2 module of the target MCU through I3C extension connector J50 (1x4 pin header). The connection is shown in Section 2.16 "I3C interface".

2.19 SINC ADC

MIMXRT1180-EVK supports SINC ADC the details of which are described in Table 28.

It uses the differential pair of inputs, SINC_VDDA_5V and SINC_AGND.

Signals SINC2_EMBIT (inout) and SINC_EMCLK (MCU output) connect the ADC to the i.MX RT1180 MCU.

Table 28. SINC ADC

Part identifier	Part number	Supplier	Description
U45	AMC1106M05 DWV	Texas Instruments	• Type: 1 channel delta-sSigma modulator • Input range: -320 mV ~ +320 mV • Operating voltage: 3.3 V (min) to 5 V (max) • Requires analog ground plane

2.20 DMIC and external DMIC connector

The i.MX RT1180 MCU has a digital microphone interface subsystem, which includes a dual-channel (channels 0 and 1) digital PDM microphone (DMIC) module. MIMXRT1180-EVK board supports communication with the DMIC module through a digital PDM microphone (DMIC) device.

The MIMXRT1180-EVK board provides four DMICs modules and a DMIC connector. This connector can be used for connecting an external eight-channel DMIC plug-in board, which can be used as an alternative to the onboard DMIC.

The onboard DMICs and external DMIC connector are described in Table 29.

Table 29. Onboard DMICs and external DMIC connector

Part identifier	Part number (Manufacturer)	Part description
U116, U117, U118, and U119	SPH0641LM4H-1 (Knowles)	Bottom port silicon digital microphone with a single bit PDM output. • +/- 5mA input current • uses VDD_3V3 supply
J67	-	2x6 pin header for connecting an external DMIC

Note: *The microphone must be placed on that side of the PCB that is open to face the user.*

The 6-channel DMIC extension connector, (J67) is available on the MIMXRT1180-EVK board to connect the microphones to i.MX RT1180 MCU. DMIC clock and data signals are connected to the i.MX RT1180 MCU through GPIO signals as described in Table 30.

Table 30. J67 (DMIC extension) connections

Pin number	Connected to DMIC signal	Target signal
1, 2	VDD_3V3	-
3,5,7,9	DMIC_CLK	GPIO_AD_00
11, 12	GND	-
4	DMIC_DATA0	GPIO_AD_01
6	DMIC_DATA1	GPIO_AD_02
8	DMIC_DATA2	GPIO_AD_03
10	DMIC_DATA3	GPIO_AD_04

2.21 Arduino connectors

Table 31, Table 32, Table 33, and Table 34 list the pinouts for Arduino connectors.

Table 31. J39 pinouts

Pin Number	Pin function	Target MCU port
2	D0/UART_RX	GPIO_AD_AON_09
4	D1/UART_TX	GPIO_AD_AON_08
6	D2/INT0	GPIO_AD_15
8	D3/INT1/PWM/OC2B	GPIO_AD_06
10	D4/T0/XCK	GPIO_AD_12
12	D5/TI/PWM	GPIO_AD_13
14	D6/AIN0/PWM/OC0A	GPIO_AD_07
16	D7/AIN1	GPIO_AD_08

Table 32. J41 pinouts

Pin	Pin function	Target MCU port
1	A0/ADC0	GPIO_AD_B1_10
2	A1/ADC1	GPIO_AD_B1_11
3	A2/ADC2	GPIO_AD_B1_04
4	A3/ADC3	GPIO_AD_B1_05
5	A4/ADC4/SDA	GPIO_AD_B1_01
6	A5/ADC5/SCL	GPIO_AD_B1_00

Table 33. J44 pinouts

Pin	Pin function	Target MCU port
1	D8/CLKO/ICP1	GPIO_AD_B0_03
2	D9/OC1A/PWM	GPIO_AD_B0_02
3	D10/SPI_CS	GPIO_SD_B0_01
4	D11/OC2A/PWM/SPI_MOSI	GPIO_SD_B0_02

Table 33. J44 pinouts*...continued*

Pin	Pin function	Target MCU port
5	D12/SPI_MISO	GPIO_SD_B0_03
6	D13/SPI_CLK	GPIO_SD_B0_00
7	GND	NA
8	AREF	NA
9	D14/I2C_SDA	GPIO_AD_B1_01
10	D15/I2C_SCL	GPIO_AD_B1_00

Table 34. J45 pinouts

Pin	Pin function
1	NC
2	IOREF
3	RESET_b
4	3.3 V
5	5 V
6	GND
7	GND
8	VIN

2.22 mikroBUS socket

A mikroBUS socket is a pair of 1x8 position receptacles (connectors) with a proprietary pin configuration. It allows maximum hardware expandability with smallest number of pins.

The MIMXRT1180-EVK board has a mikroBUS socket with two 1x8 position receptacles, J62 and J70. Refer to Table 35 and Table 36 for the pinouts of the mikroBUS socket connectors. Few of these signals are shared with the Arduino connectors.

Table 35. mikroBUS socket connector J62 pinout

Pin number	Signal name	Target MCU port
1	AN	GPIO_AD_08
2	RST	RST_TGTMCU_B
3	CS	GPIO_SD_B1_00
4	SCK	GPIO_SD_B1_01
5	MISO	GPIO_SD_B1_03
6	MOSI	GPIO_SD_B1_02
7	+3.3V	-
8	GND	-

Table 36. mikroBUS socket connector J70 pinout

Pin number	Signal name	Target MCU port
1	PWM	GPIO_AD_06
2	INT	GPIO_AD_15
3	RX	GPIO_AON_09
4	TX	GPIO_AON_08
5	SCL	GPIO_AD_18
6	SDA	GPIO_AD_19
7	+5V	-
8	GND	-

2.23 M.2 connector and Wi-Fi/Bluetooth module

MIMXRT1180-EVK supports M.2/NGFF Key E mini card 75-pin connector, J36. The M.2 mini card connector supports I2C, I2S, UART, GPIO, SDIO, PCI Express, and USB connections. The connector can also be used to connect Wi-Fi/Bluetooth card. The I2C signals connect to the voltage level translator U126 (NTS0102) and are connected to the M.2 connector, J36.

The M.2 mini card connector is powered by the WL_3V3 (3.3 V) power supply.

Table 37. M.2 card connector (J36) pinouts

Pin numbers	M.2 mini card connector signal names	Connection details
2, 4, 72, 74	3V3_1, 3V3_2, 3V3_3, 3V3_4	Connected to WL_3V3 power supply
56	WL_RST#	Reset signal WL_RST# is connected to i.MX RT1180 MCU
54	BT_RST#	Signal BT_RST# is connected to i.MX RT1180 MCU
6	WIFI_LED1_B	Connected to WiFi LED, D23 (red)
16	BT_LED2_B	Connected to Bluetooth LED, D24 (red)
50	SUSCLK	Connected to CLKOUT signal of clock Y3
44	COEX3	Connected to pin 5 of radio module connector, J108
46	COEX2	Connected to pin 4 of radio module connector, J108
48	COEX1	Connected to pin 3 of radio module connector, J108
8	BT_PCM_BCLK_1V8	Signals used for SAI communication between M.2 card connector and SAI4 module of the i.MX RT1180 MCU. For details, refer Figure 9
10	BT_PCM_SYNC_1V8	
12	BT_PCM_RXD_1V8	
14	BT_PCM_TXD_1V8	
20	UART_WAKE	Used for LPUART communication between the target MCU. Refer to Section 2.13 "LPUART interface"
22	UART_RXD	
32	UART_TXD	
34	UART_CTS	

Table 37. M.2 card connector (J36) pinouts*...continued*

Pin numbers	M.2 mini card connector signal names	Connection details
36	UART_RTS	
58	I2C2_SDA_1V8	These signals are used for I2C communication between i.MX RT1180 MCU (master) and M.2 card connector (slave). For more details, refer to Section 2.15 "LPI2C interface".
60	I2C2_SCL_1V8	
38	SPI_TXD_1V8	Can be used for connecting to LPSPI6 module of the i.MX RT1180 MCU if DNP resistors R2639, R2640, R2641, and R2642 are populated.
40	SPI_RXD_1V8	
42	SPI_CLK_1V8	
3	OTG2_DP	If R690 is populated, this pin is connected to OTG2_DP signal. OTG2_DP signal connects to USB2 connector J68 and USB2_DP pin of target MCU.
5	OTG2_DN	If R691 is populated, this pin is connected to OTG2_DN signal. OTG2_DN signal connects to USB2 connector J68 and USB2_DN pin of target MCU
9	WIFI_SDIO_CLK	Used for communication between the USDHC1 module of i.MX RT1180 MCU via switches U63, U64, and U65. For details, refer to Figure 8
11	WIFI_SDIO_CMD	
13	WIFI_SDIO_D0	
15	WIFI_SDIO_D1	
17	WIFI_SDIO_D2	
19	WIFI_SDIO_D3	
21	SDIO_WAKE	
23	SDIO_RST	
64	SPI_FRM_1V8	Reserved
1,7,18, 39, 33, 45, 51, 57, 63, 69, 75	GND1 to GND11	Ground supply
35, 37, 41, 43, 52, 53, 55, 59, 61, 62, 65, 66, 67, 68, 70, 71, 73,	-	Not connected

2.24 PCB information

The MIMXRT1180-EVK board is based on the standard 6-layer technology. The material used is HTG FR-4 and the board thickness is 2.0 mm. The PCB stack-up information is shown in Table 38.

Table 38. MIMXRT1180-EVK PCB stack-up information

Layer	Description	Copper (Oz)	Dielectric thickness (mil)
1	Signal	1	—
	Dielectric	—	3.48
2	GND	1	—
	Dielectric	—	3.94

Table 38. MIMXRT1180-EVK PCB stack-up information*...continued*

Layer	Description	Copper (Oz)	Dielectric thickness (mil)
3	Signal	1	—
	Dielectric	—	53.68
4	Power	1	—
	Dielectric	—	3.94
5	GND	1	—
	Dielectric	—	3.48
6	Signal	1	—

3 Debug functionality

MIMXRT1180-EVK board supports debugging the i.MX RT1180 MCU through any of the following methods:

- Using the onboard MCU-Link debug probe, U55. (Refer Section 3.2 "MCU-Link OB debug probe")
- Using the JTAG connector, J37 (SWD). (Refer Section 3.1 "JTAG connector ")
- Using an external debugger through J56 connector (Refer Section 3.2.2 "Supported MCU-Link debug scenarios")
  Note: *The MCU-Link probe on the MIMXRT1180-EVK board can also be used for debugging an external MCU connected through J102 connector, when JP5 is shorted. Refer Section 3.2.2 "Supported MCU-Link debug scenarios").*
- Using the USB-to-UART bridge created with U72 (FT232RQ)

3.1 JTAG connector

By default, the MIMXRT1180-EVK board supports SWD debugging. i.MX RT1180 has four JTAG signals muxed with other pins, and one reset signal, `JTAG_nTRST`. The JTAG and reset signals are directly connected to the standard 20-pin 2.55 mm JTAG connector, J37. The JTAG signals used by the i.MX RT1180 MCU are listed in Table 39.

Table 39. JTAG / SWD signals

Pin number	Signal name	Description	Direction
3	JTAG_nTRST	Sends JTAG reset signal to i.MX RT1180 MCU	To i.MX RT1180 MCU
5	JTAG_TDI	JTAG TAP data in	To i.MX RT1180 MCU
7	• JTAG_TMS (JTAG mode) • SWD Data (SWD mode)	• Tap machine state when JTAG is enabled. • When SWD is enabled, it receives SWD data.	To i.MX RT1180 MCU and MCU-Link
13	• JTAG_TDO (JTAG mode) • SWDIO (SWD mode)	• TAP data out in JTAG is enabled. • When SWD is enabled, it is mapped to SWD_IO (serial wire output).	From i.MX RT1180 MCU
15	JTAG_nSRST	• JTAG software reset signal	To i.MX RT1180 MCU
9	• JTAG_TCK (JTAG mode) • SWD_CLK (SWD mode)	• JTAG test clock in JTAG mode • SWD_CLK in SWD mode	To i.MX RT1180 MCU
1	JTAG_VREF	JTAG reference power (VDD_3V3)	Not applicable (NA)
2	JTAG_PWR	JTAG power (VDD_3V3)	NA
11	JTAG_RTCK (or SWD_CLK)	Connected to Ground	NA
17	JTAG_DE	JTAG debug enable	NA
19	JTAG_DACK	Connected to Ground	NA
4, 6, 8, 10, 12, 14, 16, 18, 20	-	Connected to Ground	NA

Figure 22 shows the J37 connections. Refer to the schematic for further information.

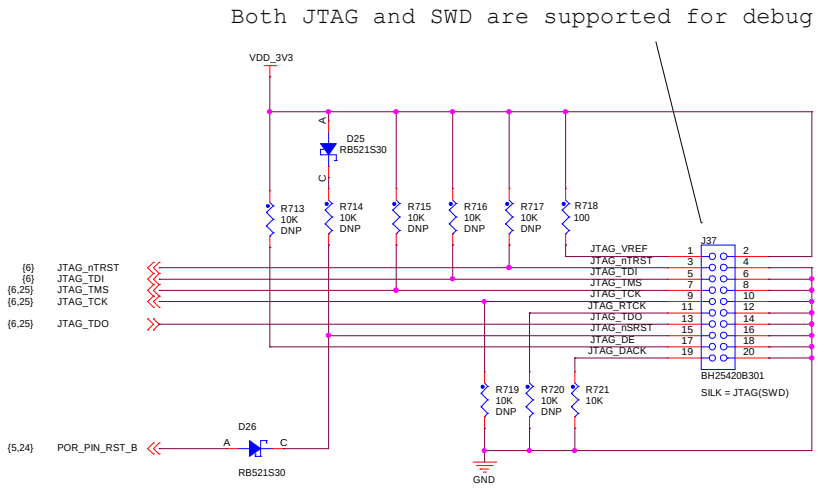

Figure 22. J37 pin definitions

3.2 MCU-Link OB debug probe

This section describes the MCU-Link OB debug probe and explains how to connect it to the target MCU (i.MX RT1180).

MCU-Link is a debug probe architecture jointly developed by NXP and Embedded Artists. The MCU-Link architecture is based on the NXP LPC55S69 MCU, which is based on the Arm Cortex-M33 core. NXP uses MCU-Link OB (OB stands for "onboard"), on its evaluation boards, for example, MIMXRT1180-EVK.

3.2.1 Supported MCU-Link features

MCU-Link includes several mandatory and optional features. Table 40 summarizes the MCU-Link features supported on the MIMXRT1180-EVK board.

Table 40. Supported MCU-Link features

Feature	Description
Serial wire debug (SWD) / serial wire debug trace output (SWO)	Allows SWD-based debugging with SWO for profiling and/or low overhead debug standard I/O communication
Virtual communication (VCOM) serial port	Adds a serial COM port on the host computer, and connects it to the target MCU by using MCU-Link as a USB-to-UART bridge
External debug probe support	Allows debugging the target MCU (i.MX RT1180) using an external debug probe, instead of MCU-Link. Support for external debug probe is enabled by disabling SWD feature.
External target support ***Note:*** *J-Link firmware does not support this feature.*	Allows debugging an external target MCU using MCU-Link

3.2.2 Supported MCU-Link debug scenarios

Table 41 describes the debug scenarios supported on the MIMXRT1180-EVK board.

Table 41. Supported debug scenarios

Debug scenario	Feature support	Jumper / Connector setting required
Use MCU-Link as debugger for the target MCU (i.MX RT1180)	• SWD is enabled. • VCOM feature is enabled	• JP4 must be open. • JP5 must be open.
Use an external debugger to debug the target MCU (i.MX RT1180)	• SWD is disabled. • VCOM feature is enabled.	• JP4 must be shorted. • JP5 must be open. • Connect the external debugger to connector J2.
Use MCU-Link as debugger for an external target MCU	• SWD is enabled • VCOM is not supported	• JP4 must be open • JP5 must be shorted • Connect the external target MCU to the connector J56.

Note: *VCOM indicates the Virtual communication feature, described in Section 3.2.8 "Connecting to a target through a USB-to-UART bridge (VCOM) ".*

3.2.3 MCU-Link host driver and utility installation

The MCU debug probe is supported on Windows 10/11, MacOS X, and Ubuntu Linux platforms. The probe uses standard OS drivers. For Windows, the installation program also includes information files to provide user-friendly device names.

MCU-Link is supported by the Linkserver utility. Running the Linkserver installer also installs all the drivers and a firmware update utility required for MCU-Link. The Linkserver utility is a GDB server and flash utility from NXP with support for many NXP debug probes. You are recommended to use the Linkserver installer unless you are using MCUXpresso IDE version 11.6.1 or earlier. For more details on this utility, refer https://nxp.com/linkserver.

Note: *Installing the LinkserServer utility (using the Linkserver installer) only installs the required device drivers. LinkServer does not update the firmware, but the LinkerServer installation package includes the utilities that are used to update the firmware. In case you are using MCUXpresso IDE version 11.6.1 or earlier, you must install the firmware update utility version 2.263, which is not included in the LinkServer installation.*

For Linux OS, MCU-Link installation package 2.263 is available for download at the following link:

https://www.nxp.com/design/design-center/software/development-software/mcuxpresso-software-and-tools-/mcu-link-debug-probe:MCU-LINK#design-resources

Note: *If the MCU-Link firmware version is 3.122 or later, an automatic firmware update can be done using LinkServer installer version 1.4.85 or later. For more details on automatic firmware update, refer to the Readme mark-down file in the LinkServer installation package. However, if the current firmware version is earlier than 3.122, you have to run manually the MCU-Link firmware update utility, which is included in the LinkServer installation package. To update the MCU-Link firmware using the firmware update utility, see Section 3.2.4 "Updating MCU-Link firmware using firmware update utility".*

Before updating the firmware by using the steps listed in Section 3.2.4 "Updating MCU-Link firmware using firmware update utility", check the compatibility between the MCU-Link firmware and the MCUXpresso IDE (see Table 42).

Table 42. Compatibility between MCU-Link firmware and MCUXpresso IDE

MCU-Link firmware version	USB driver type	CMSIS-SWO support	FreeMASTER support via		Supported MCUXpresso IDE versions
			SWD/JTAG	USB bridge	
V1.xxx and V2.xxx	HID	No	Yes	Yes	MCUXpresso 11.3 or later
V3.xxx (up to and including V3.108)	WinUSB	No	Yes	FreeMASTER V3.2.2 or later	MCUXpresso 11.7.0 or later
V3.117 and later	WinUSB	Yes	Yes	FreeMASTER V3.2.2 or later	MCUXpresso 11.7.1 or later

3.2.4 Updating MCU-Link firmware using firmware update utility

To update the MCU-Link firmware using the firmware update utility included in the LinkServer installation package, the MCU-Link must be powered up in ISP mode. Follow these steps to configure MCU-Link in ISP mode and update MCU-Link firmware:

1. Disconnect the board from the host computer, short jumper JP3, and reconnect the board. The board enumerates on the host computer as a WinUSB or HID device (depending on the firmware version). The red MCU-Link status LED D39 lights up and stays on. For more details, see Section 3.2.9 "MCU-Link status LEDs".
2. Download the LinkServer installation package from https://nxp.com/linkserver and install the LinkServer utility. For example, download and install "Linkserver 1.4.85 installer for Windows".

3. Navigate to the `MCU-LINK_installer_Vx_xxx` directory, where `Vx_xxx` indicates the version number, for example, V3.108 board.
4. Follow the instructions in the `readme.txt` to find and run the firmware update utilities for CMSIS-DAP or J-Link versions.
5. Disconnect the board from the host computer, open jumper JP3, and reconnect the board.

Note:

- *Starting version V3.xxx, the MCU-Link firmware uses WinUSB instead of HID for higher performance. However, it is not compatible with earlier MCUXpresso IDE versions.*
- *To enable SWO-related features in non-NXP IDEs, CMSIS-SWO support was introduced in firmware version V3.117.*
- *For developers using older MCUXpresso IDE versions, the last MCU-Link firmware V2.xxx release (2.263) is available at https://nxp.com/mcu-link.*

3.2.5 Using MCU-Link with MCUXpresso IDE

The MCUXpresso IDE recognizes any type of MCU-Link probe that uses either CMSIS-DAP or J-Link firmware. When you start a new debug session, the IDE checks for all the available debug probes. For all the probes it finds, the IDE displays the probe types and unique identifiers in the **Probes discovered** dialog box.

If a debug probe requires firmware update, the probe is displayed with a warning in the **Probes discovered** dialog box. For each such probe, the latest firmware version is indicated and a link to download the latest firmware package is provided. To update the firmware for MCU-Link debug probe, see the instructions provided in Section 3.2.4 "Updating MCU-Link firmware using firmware update utility".

You are advised to use the latest MCU-Link firmware to take the benefit of the latest functionality. However, the MCU-Link firmware version you can use depends on the MCUXpresso IDE version you are using. Therefore, before updating the MCU-Link firmware, perform a compatibility check between the firmware version you are planning to use and the MCUXpresso IDE version you are using currently. MCUXpresso IDE 11.3 or later must be used when using MCU-Link.

Table 42 shows the compatibility between the MCU-Link firmware and the MCUXpresso IDE.

3.2.6 Using MCU-Link with MCUXpresso for Visual Studio Code

MCU-Link debug probe can be used with the MCUXpresso for Visual Studio Code extension from NXP. This extension uses the LinkServer debug server. Install this using the MCUXpresso Installer or as described in Section 3.2.4 "Updating MCU-Link firmware using firmware update utility". For more details, refer https://nxp.com/vscode.

3.2.7 Using MCU-Link with 3rd party IDEs

MCU-Link debug probe can be used with IAR Embedded Workbench and Arm Keil MDK, and may also work with other 3rd party tools. Refer to the documentation for these products, covering use of generic CMSIS-DAP probes or J-Link probes (depending on the firmware image you are using).

3.2.8 Connecting to a target through a USB-to-UART bridge (VCOM)

MCU-Link supports the VCOM serial port feature. When this feature is enabled, the host computer adds a serial communication port to connect to the target MCU by using MCU-Link as a USB-to-UART bridge.

On the MIMXRT1180-EVK board, MCU-Link is connected to the LPUART1 port of the target MCU through a voltage translator (U61). This enables communication between MCU-Link and the target MCU, by shifting voltage levels of signals between the two devices from P3V3_SDA to V_TGTMCU and vice versa.

MCU LINK can support two LPUARTs on this board. One is LPUART1 and the other one is LPUART12. LPUART1 is always available. However, in order to use LPUART12, you must ensure that the jumper JP7 is in open position.

To use MCU-Link as a USB-to-UART bridge, verify the following jumper settings and connect the J53 connector on the board to the USB port of the host computer:

- Jumper JP3 is open (MCU-Link is not configured for ISP mode).
- Jumper JP2 is open (USB-to-UART bridge is enabled).

MIMXRT1180-EVK board also has the USB-UART bridge, U72 (FT232RQ), which can be used to connect to the LPUART12 port of the target MCU through the 2-channel buffer (U73) and voltage translator, U61. For details, refer to Figure 17.

When you boot the MIMXRT1180-EVK board, a VCOM port with the name MCU-Link Vcom Port (COMxx) is enumerated on the host computer, where “xx” may vary from one computer to another. The VCOM device is configurable via the host computer (for example, Device Manager in Windows), with the below parameters:

- Word length 7 or 8 bits
- Stop bits: 1 or 2
- Parity: none / odd / even
- Baud rates of up to 5.33 Mbits/s are supported

3.2.9 MCU-Link status LEDs

Table 43 lists the MCU-Link LEDs available on the MIMXRT1180-EVK board.

Table 43. MCU-Link LEDs

Part identifier	LED name / color	Normal operation (with CMSIS-DAP)	Normal operation (with J-Link)	ISP mode
D29	Green	Indicates USB enumeration. The LED lights up after successful USB enumeration at startup, and then stays ON.	Indicates USB enumeration and SWD activity. The LED lights up after successful USB enumeration at startup, and then blinks when SWD activity happens.	The LED remains OFF.
D39	Red	Indicates heartbeat (fades in/out repeatedly), with SWD activity overlaid. If an error occurs at startup, then the LED blinks rapidly.	The LED remains OFF.	Lights up when LPC55S69 (MCU-Link) boots in ISP mode.

3.3 FT232 USB-to-UART bridge

The MIMXRT1180-EVK board also has an FTDI device U72 (FT232RQ) for debugging the i.MX RT1180 MCU. U72 acts as a USB-to-UART bridge between the host computer and the i.MX RT1180 MCU.

The UART port of the USB-to-UART bridge connects to the LPUART12 module of the i.MX RT1180 MCU. The USB port of the USB-to-UART bridge connects to the USB micro-AB connector J60, which allows USB connection with the host computer for creating the USB-to-UART bridge.

4 Board errata

The lists the board errata present in the current MIMXRT1180-EVK board:

- Section 4.1 "SDRAM interface hardware rework"
- Section 4.2 "NETC daughter card interface hardware rework"
- PHY compatibility evaluation report

4.1 SDRAM interface hardware rework

4.1.1 Description

Hardware rework is required to use SDRAM instead of hyperRAM on MIMXRT1180-EVK. Rework is applicable to MIMXRT1180-EVK, 50577, SCH-50577 C2, LAY-50577 C2

4.1.2 Workaround

Follow the steps below for the workaround:

1. Remove resistor R203 and resistors R205 to R227 as shown in Figure 23.
2. Populate the resistors R151 to R165 and R168 to R188 with 0 Ω resistors as shown in Figure 24.
3. Remove the resistors R2114, R2115, R2118, R2119, R2122, R2123, R2126, R21217, R2130, R2131, R332, and R333 to disconnect the HyperRAM interface.
4. Use signal multiplexing as shown in Figure 25.
5. Populate these resistors with 0 Ω resistor, such as R1329, R2594, R2595, R189-R202, R204. See Figure 26
6. Remove the resistors R2596, R2597, R228-R235, R238, R240, R242, R244, R246, R248, R250, R252. See Figure 27.

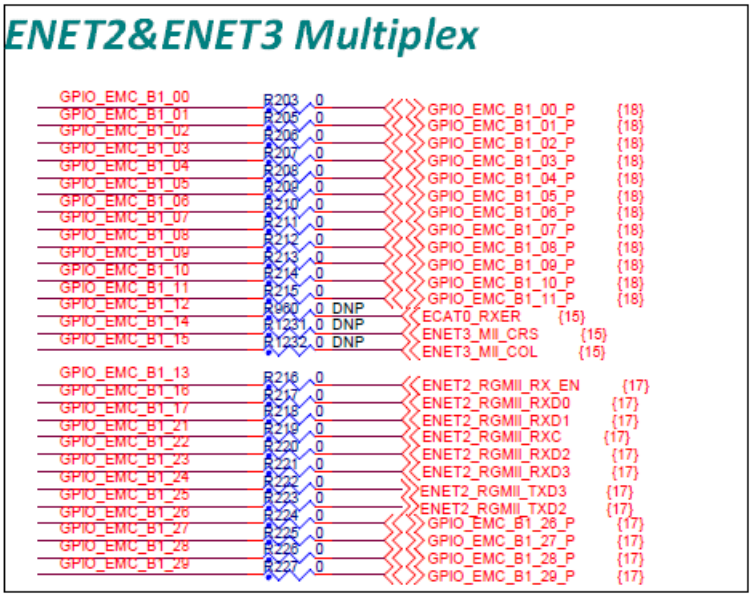

Figure 23. Step1

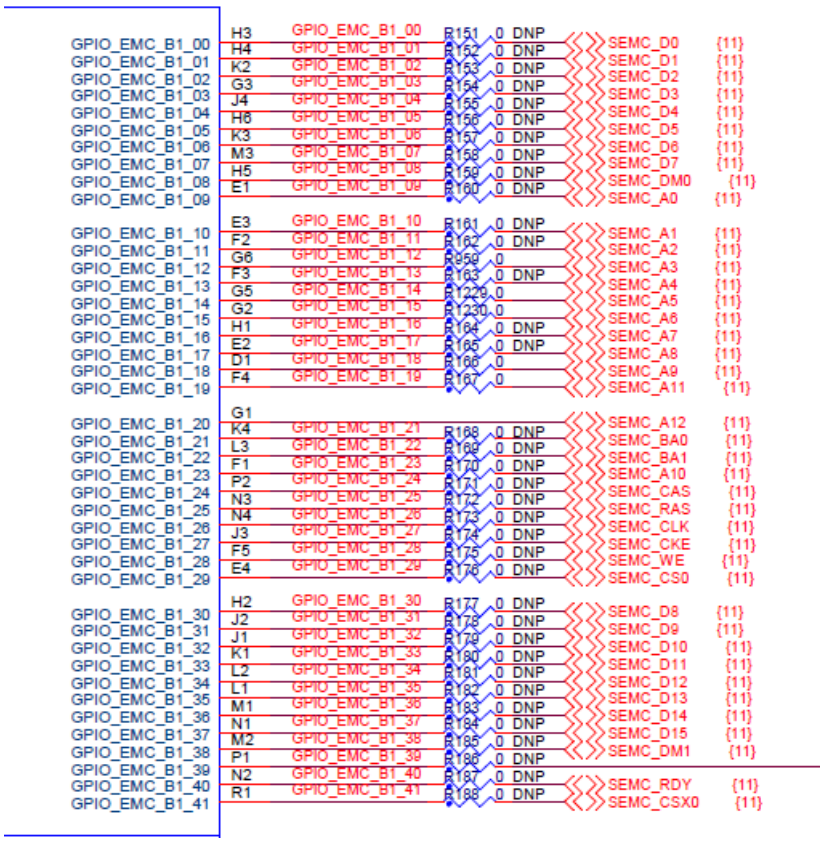

Figure 24. Step 2

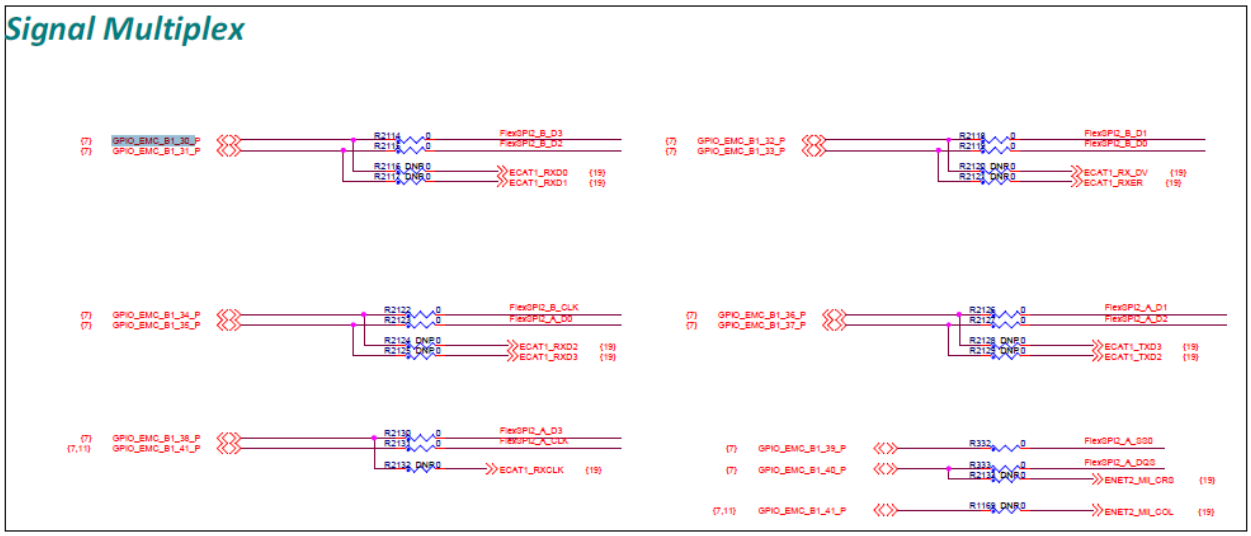

Figure 25. Step 3

Figure 26. Step 4

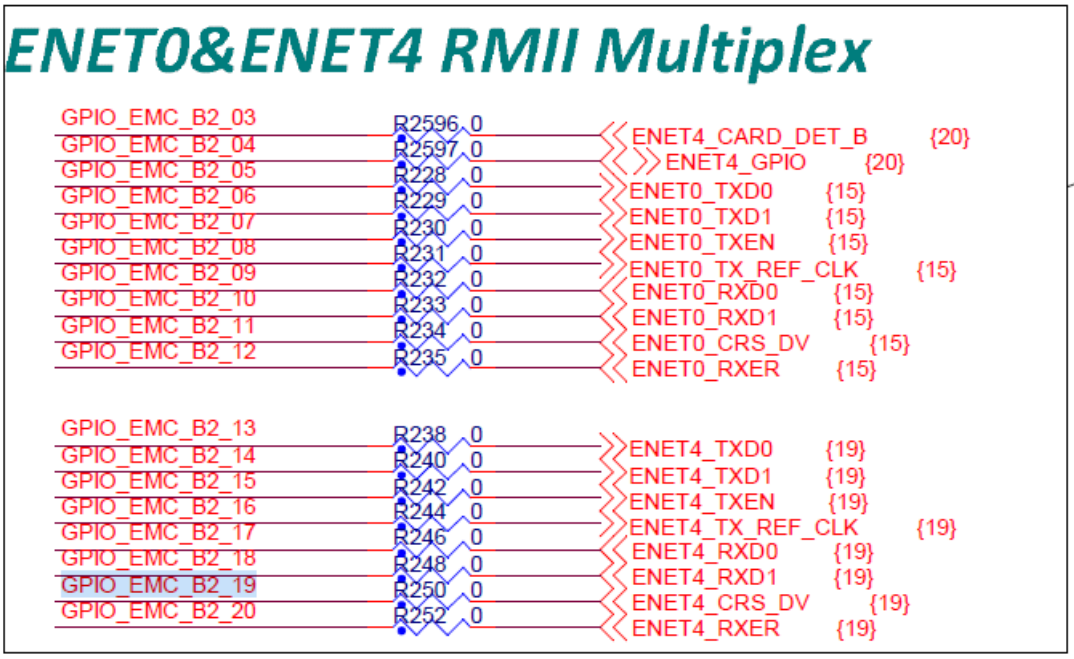

Figure 27. Step 5

4.2 NETC daughter card interface hardware rework

4.2.1 Description

Hardware rework is required to use the NETC daughter card interface (J134) on MIMXRT1180-EVK. The rework is applicable to the board MIMXRT1180-EVK, schematic version: SCH-50577 C2, LAY-50577 C2

4.2.2 Workaround:

Follow the steps below for NETC daughter card interface rework on MIMXRT1180-EVK:

1. Remove the resistors R1122, R1239, R1240, and resistors R1233 to R1235 as shown in Figure 28.
2. Remove the resistors R1289 to R1296 as shown in Figure 29.
3. Populate R2603 to R2615 and R2620 with 0 Ω resisters as shown in Figure 30.

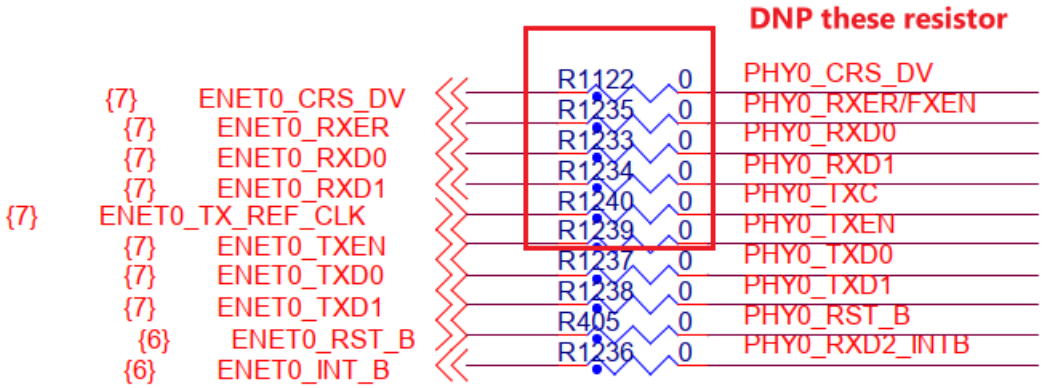

Figure 28. Step 1

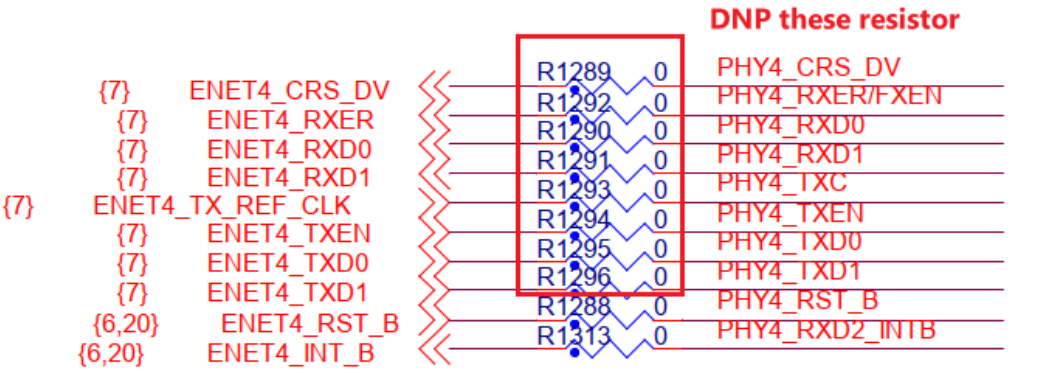

Figure 29. Step 2

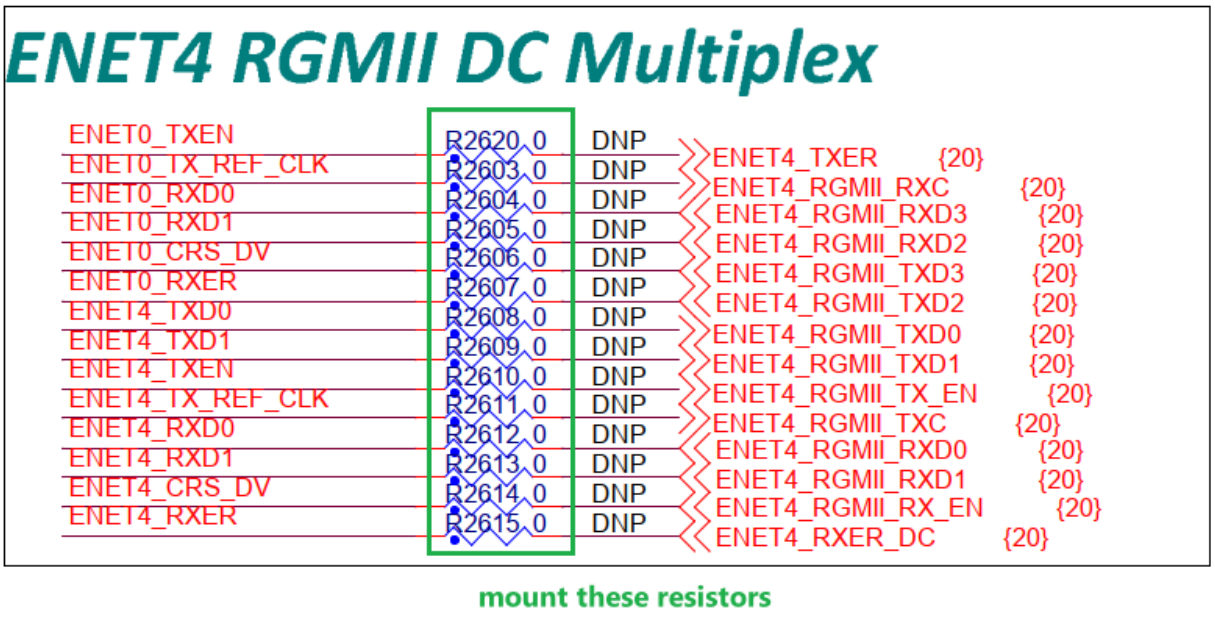

Figure 30. Step 3

4.3 PHY compatibility evaluation report

4.3.1 Description

On the MIMXRT1180-EVK board, the PHY device (RTL8201FI-VC-CG) cannot work in 10 Mbit/s mode. The use of 10 Mbit/s is restricted to PHYs that support octet alignment for preamble with minimum 1B.

4.3.2 Workaround

i.MX RT1180 NETC cannot support all PHY devices from different vendors. Use the PHY devices listed in Table 44 that are validated on the MIMXRT1180-EVK board.

Table 44. PHYs compatible with the MIMXRT1180-EVK board

Type	PHY	Vender
10Base-T1S	LAN8670 (RevC)	Microchip
10Base-T1L	DP83TD510E	TI
	ADIN1100	ADI
100Base-T1	TJA1103	NXP
	DP83TC812x	TI
1000Base-T1	TJA1120	NXP
10/100/1000Base-T	VSC8541 (RevC)	Microchip
	ADIN1300	ADI
10/100Base-T	DP83848C	TI
	DP83826	TI

5 Related documentation

Table 45 lists and explains the additional documents and resources that can be referred to for more information about the MIMXRT1180-EVK board. Some of the documents listed below may be available only under a non-disclosure agreement (NDA). To request access to these documents, contact your local field applications engineer (FAE) or sales representative.

Table 45. Related documentation

Document	Description	Link/how to access
i.MX RT1180 Reference Manual	Provides a detailed description about the i.MX RT1180 and its features, including memory maps, power supplies, and clocks.	Contact your local NXP field applications engineer (FAE) or sales representative.
i.MX RT1180 Crossover MCUs for Consumer Products Data Sheet	Provides information about electrical characteristics, hardware design considerations, and ordering information	
i.MX RT1180 Crossover MCUs for Industrial Products Data Sheet	Provides information about electrical characteristics, hardware design considerations, and ordering information	
Security Reference Manual for the i.MX RT1180 Processor	Provides detail about various chip security components	
Board design files	Schematics, layout files, and gerber files (including Silkscreen)	MIMXRT1180-EVK-design-resources
MCUXpresso Software Development Kit (SDK) documentation	MCUXpresso Software Development Kit (SDK) is a comprehensive software enablement package designed to simplify and accelerate application development with NXP MCUs based on Arm Cortex -M cores.	MCUXpresso Software Development Kit (SDK) documentation
MCU-Link documentation	User Manual, Getting Started Guide, Quick Reference Guide	• https://www.nxp.com/design/software/development-software/mcuxpresso-software-and-tools-/mcu-link-debug-probe:MCU-LINK#documentation • https://www.nxp.com/document/guide/getting-started-with-the-mcu-link-pro:GS-MCU-LINK-PRO

6 Acronyms

Table 46 lists the acronyms used in this document.

Table 46. Acronyms

Acronym	Description
4PDT	Four-pole double-throw
AON	Always on (domain)
ADC	Analog-to-digital converter
BBSM	Battery backed secure module
CAN	Controller area network
CLK	Clock
Codec	Coder/decoder
DIP	Dual inline package
DMIC	Digital PDM microphone
DNP	Do not populate (not present on the board)
EtherCAT	Ethernet for control automation technology
EEPROM	Electrically erasable programmable read-only memory
ENETC	EtherNET controller
FlexCAN	Flexible controller area network
Flex-SPI	Flexible serial peripheral Interface
GPIO	General-purpose input/output
HID	Human interface device
I2S	Integrated inter-IC sound bus
I2C	Inter-Integrated circuit
I3C	Improved inter-Integrated circuit
ISP	In-system programming
IMU	Inertial measurement unit
JTAG	Joint test action group
LED	Light emitting diode
LDO	Low-dropout regulator
LPI2C	Low-power inter-integrated circuit (I2C)
LPSPI	Low-power serial peripheral interface
MFI	Made for iPhone/iPod/iPad
MISO	Master In slave out (terminal of SPI interface)
MOSI	Master out slave In (terminal of SPI interface)
MOSFET	Metal-oxide-semiconductor field-effect transistor
MII	Media-independent interface
MCU	Microcontroller Unit

Table 46. Acronyms...*continued*

Acronym	Description
OTG	On-the-Go
PCB	Printed circuit board
PWM	Pulse width modulation
RCA	Radio Corporation of America
RGMII	Reduced gigabit media-independent interface
RMII	Reduced media-independent interface
SAI	Serial audio interface
SDRAM	Synchronous dynamic random access memory
SEMC	Smart external memory controller
SPDIF	Sony/Philips digital interconnect format
SWD	Serial wire debug
UART	Universal asynchronous receiver transmitter
TSN	Time sensitive networking
uSDHC	Ultra secured digital host controller
USB	Universal serial bus
UTP	Unshielded twisted pair

7 Revision history

Table 47 summarizes the revisions to this document.

Table 47. Revision history

Document ID	Release date	Description
UM12021 v.1.0	27 May 2024	Initial public release

Legal information

Definitions

Draft — A draft status on a document indicates that the content is still under internal review and subject to formal approval, which may result in modifications or additions. NXP Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included in a draft version of a document and shall have no liability for the consequences of use of such information.

Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. NXP Semiconductors takes no responsibility for the content in this document if provided by an information source outside of NXP Semiconductors.

In no event shall NXP Semiconductors be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, NXP Semiconductors' aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the Terms and conditions of commercial sale of NXP Semiconductors.

Right to make changes — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental damage. NXP Semiconductors and its suppliers accept no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using NXP Semiconductors products, and NXP Semiconductors accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the NXP Semiconductors product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

NXP Semiconductors does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using NXP Semiconductors products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). NXP does not accept any liability in this respect.

Terms and conditions of commercial sale — NXP Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at https://www.nxp.com/profile/terms, unless otherwise agreed in a valid written individual agreement. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. NXP Semiconductors hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of NXP Semiconductors products by customer.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

Suitability for use in non-automotive qualified products — Unless this document expressly states that this specific NXP Semiconductors product is automotive qualified, the product is not suitable for automotive use. It is neither qualified nor tested in accordance with automotive testing or application requirements. NXP Semiconductors accepts no liability for inclusion and/or use of non-automotive qualified products in automotive equipment or applications.

In the event that customer uses the product for design-in and use in automotive applications to automotive specifications and standards, customer (a) shall use the product without NXP Semiconductors' warranty of the product for such automotive applications, use and specifications, and (b) whenever customer uses the product for automotive applications beyond NXP Semiconductors' specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies NXP Semiconductors for any liability, damages or failed product claims resulting from customer design and use of the product for automotive applications beyond NXP Semiconductors' standard warranty and NXP Semiconductors' product specifications.

Translations — A non-English (translated) version of a document, including the legal information in that document, is for reference only. The English version shall prevail in case of any discrepancy between the translated and English versions.

Security — Customer understands that all NXP products may be subject to unidentified vulnerabilities or may support established security standards or specifications with known limitations. Customer is responsible for the design and operation of its applications and products throughout their lifecycles to reduce the effect of these vulnerabilities on customer's applications and products. Customer's responsibility also extends to other open and/or proprietary technologies supported by NXP products for use in customer's applications. NXP accepts no liability for any vulnerability. Customer should regularly check security updates from NXP and follow up appropriately.

Customer shall select products with security features that best meet rules, regulations, and standards of the intended application and make the ultimate design decisions regarding its products and is solely responsible for compliance with all legal, regulatory, and security related requirements concerning its products, regardless of any information or support that may be provided by NXP.

NXP has a Product Security Incident Response Team (PSIRT) (reachable at PSIRT@nxp.com) that manages the investigation, reporting, and solution release to security vulnerabilities of NXP products.

NXP B.V. — NXP B.V. is not an operating company and it does not distribute or sell products.

Trademarks

Notice: All referenced brands, product names, service names, and trademarks are the property of their respective owners.

NXP — wordmark and logo are trademarks of NXP B.V.

Contents

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Development Boards & Kits - ARM ***category:***

Click to view products by NXP ***manufacturer:***

Other Similar products are found below :

CY4541 OM13090UL YR0K77210B000BE B-U585I-IOT02A NUCLEO-WL55JC1 ZDSD-Pinboard LKS32MC034DOF6Q8-k LKS32MC077MBS8-K LKS32MC038Y6P8B-K LKS32MC071DOC8T8-K LKS32MC074DOF8Q8-K LKS32MC071CBT8-K LKS32MC038Y6P8-k Ai-WB2-32S-Kit GD32E103T-START GD32L233K-START XDS601 RP2040-Tiny M6G2C-256LI YT37 LKS32MC033H6P8B-K VC-02-Kit_EN Ra-08H-Kit Hi-12FL-Kit PB-03M-Kit Ai-WB2-13-Kit PB-03F-Kit Ra-08-Kit Hi-07SL-Kit Hi-07S-Kit Ai-WB2-12F-Kit PB-03-Kit Hi-12F-Kit AT-START-F407 E104-BT40-TB APM32F072VBT6 APM32F091VC MINI APM32F407IG-MINIBOARD APM32F051R8 MINI GD32FPRT-START GD32407H-START-1 GD32E503V-EVAL GD32E507R-START GD32403V-START-1 EPC1EVK-ECGPPG(FS) NS4EVKA-LC ENS1EVKD .ENS1EVKB ENS1EVKE HLK-7621-ALL-SUIT