



ConnectCore[®] 8X

SBC Pro

Hardware Reference Manual -- Preliminary

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About the ConnectCore 8X SBC Pro

Overview

The ConnectCore 8X SBC Pro is an ultra compact Pico-ITX board featuring the Digi ConnectCore 8X System-on-Module that integrates an NXP i.MX8X application processor, LPDDR4 memory, eMMC flash memory, WLAN/Bluetooth, power management IC for optimized power consumption applications and a microcontroller assistant (MCA) for supporting additional functionality. This standalone product serves as the reference design for the ConnectCore 8X System-on-Module and can also be used on its own to accelerate time to market.

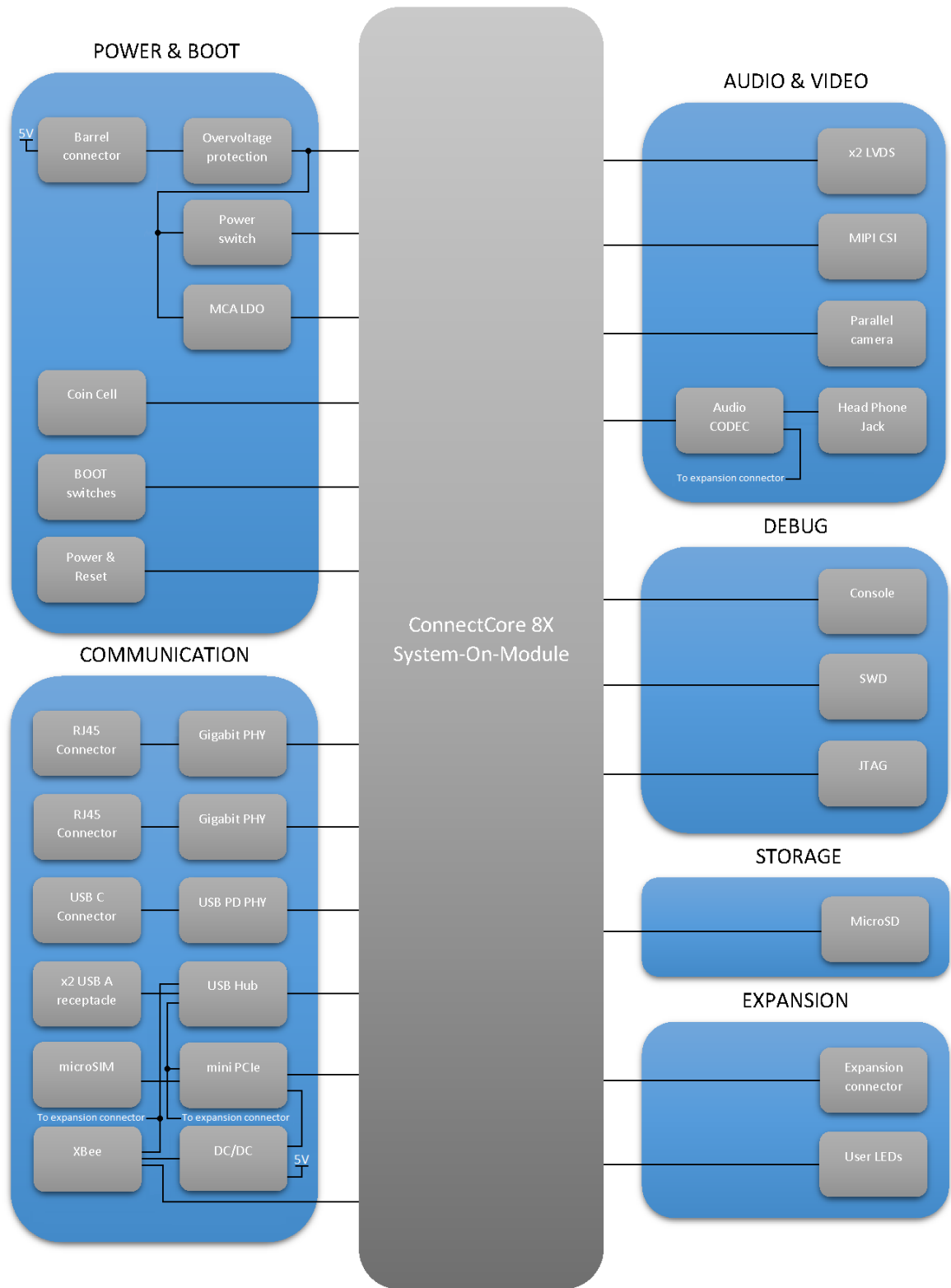
Features and functionality

- ConnectCore 8X System-on-Module:
 - MX8X Dual/Quad ARM Cortex-A35 and single Cortex-M4F cores
 - 2 GB, 32-bit LPDDR4-1200 memory
 - 8 GB, 8-bit eMMC memory
 - IEEE802.11 a/b/g/n/ac and Bluetooth 4.2
- Power:
 - Power jack and industrial dedicated 5V power connector
 - Coin-cell battery charger, supplying the on-module RTC
 - Power and reset buttons
- Boot source configuration: internal eMMC, microSD, USB
- Debug:
 - Standard IEEE 1149.1-2001 JTAG interface
 - Single Wired Debug (SWD) interface for the microcontroller assistant
 - TTL serial console
- Communication:
 - Two 10/100/1000 Mbps Ethernet interfaces
 - Two USB Host 2.0 interfaces on stacked USB A-type connector
 - USB3.0 on USB C-type connector
 - USB 2.0 OTG on micro AB-type connector
 - PCI Express Mini Card slot supporting full-size cards
 - XBee socket
 - MIMO IEEE 802.11 a/b/g/n/ac + Bluetooth 4.2 dual mode

- Multimedia:
 - Two LVDS interfaces, each one supporting up to four differential data pairs
 - One MIPI CSI-2 camera
 - One 8-bit parallel camera interface
 - Audio CODEC supporting stereo headphone jack, speakers, mic-in, line-out and two line-in lines
- Storage:
 - microSD card slot
- Expansion/User interfaces
 - Two 40-pin expansion connectors providing access to many different interfaces
 - Two user LEDs

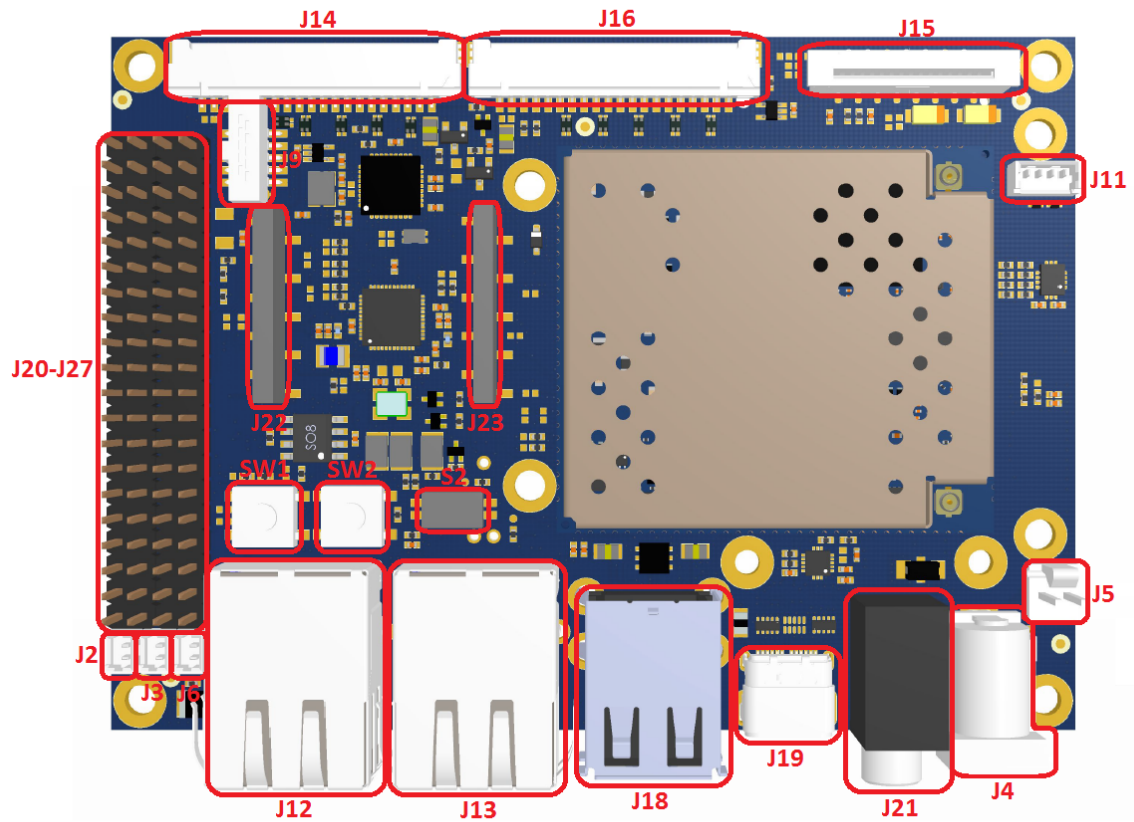
Note Some of the functionality mentioned above is specific to a ConnectCore 8X SBC Pro variant.

Block diagram

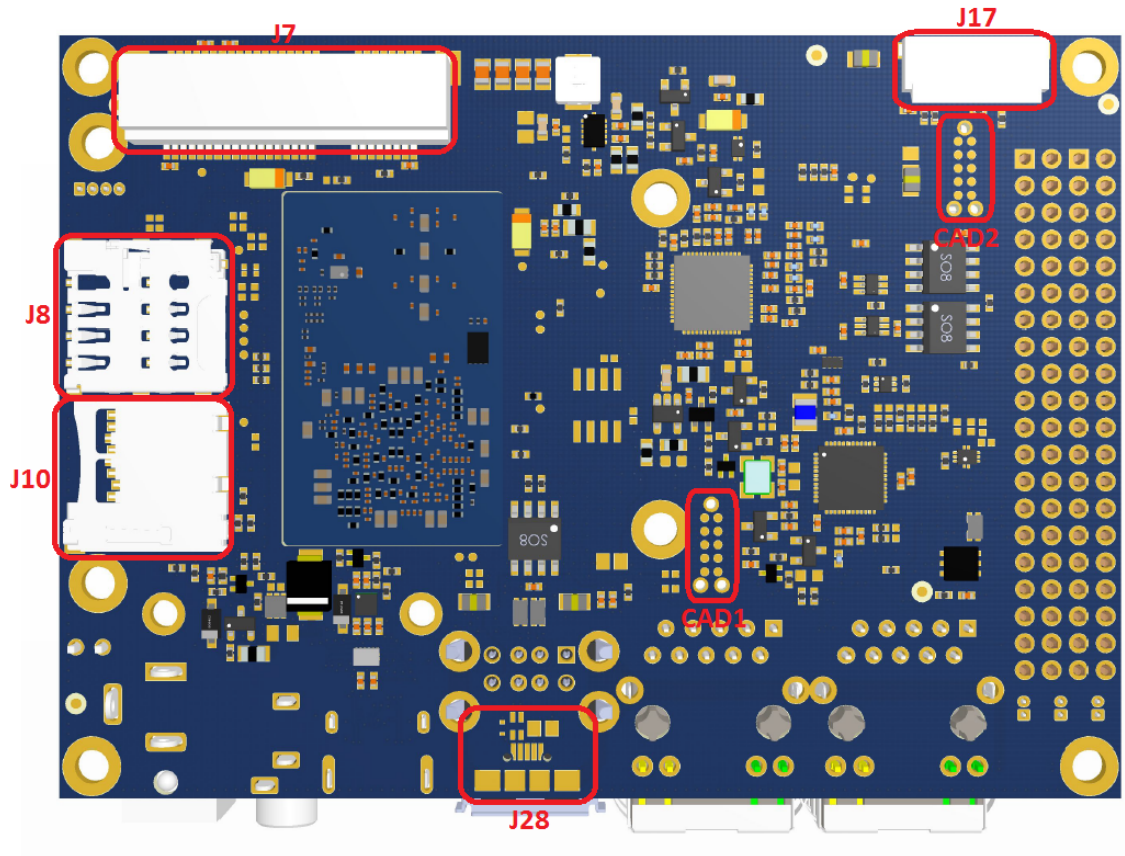


Connectors, jumpers, and switches

Top view



Bottom view



Description

Connector	Interface	Manufacturer	Manufacturer part number
J2	3.3V output	Molex	53047-0210
J3	5V output	Molex	53047-0210
J4	5V power-in jack	Bobbintron	CSCD443CCS011B00G
J5	5V power in	TE Connectivity	640456-2
J6	Coin cell	Molex	53047-0210
J7	Mini PCIe	Foxconn	AS0B226-S68Q-7H
J8	Micro SIM	Molex	78727-0001
J9	SWD	Samtec	FTSH-105-01-F-DV
J10	MicroSD	Molex	500873-0806

Connector	Interface	Manufacturer	Manufacturer part number
J11	Console	Molex	53047-0410
J12	Ethernet 1	XMultiple	XMG-J1B2211NPA-1-DIG
J13	Ethernet 2	XMultiple	XMG-J1B2211NPA-1-DIG
J14	LVDS 0	Hirose	DF14A-20P-1.25H
J15	MIPI camera	FCI	SFW15S-2STE1LF
J16	LVDS 1	Hirose	DF14A-20P-1.25H
J17	Parallel camera	Omron	XF2M-2015-1A
J18	Stacked USB A-type connector	KYCON	KUSBX-AS2N
J19	USB C-type connector	Molex	201267-0005
J20-J27	Expansion connectors	Würth Electronics Inc	61304021121
J22-J23	XBee socket	Samtec	SMM-110-02-F-S-P-TR
J28	USB micro AB-type connector	KYCON	KMMX-ABSMT5SG-30TR
CAD1	i.MX8X JTAG Tag Connect	-	-
CAD2	MCA SWD Tag Connect	-	-
SW1	Power button	ITT	KSC221JLFS
SW2	Reset button	ITT	KSC221JLFS
S2	Boot switches	TDA02H0SB1	C&K Components

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Power interfaces

DC-in jack connector

A 5V DC-in power jack connector (J4) provides power to the entire ConnectCore 8X SBC Pro system. An overvoltage circuit protects the SBC from voltages higher than 6.5V (up to 12V). Behind the overvoltage protection, a 5V load switch (U2) controls the power delivered to the SBC. The enable pin of the power switch is controlled through 5V_SBC_PWR_ON signal from the CPU (GPIO0_13).

Additional power connector

In addition to the power jack assembled on the SBC Pro, a 2-pin, 2.54 mm pitch, latched vertical connector on the top side of the board offers an alternative power rail to the whole system. This power input is also protected against overvoltage events.

The following table shows the pinout of the power connector (J5):

Pin	Signal name	Description
1	VIN	5 power supply line.
2	GND	

Coin cell connector

A 2-pin, 1.25 mm pitch straight connector (J6), provides battery charging functionality and power the real-time-clock (RTC) interface when the main supply of the board is off. The main power supply rail powers the RTC while it is connected. You can supply the RTC with a primary Lithium cell (non-rechargeable), a secondary Lithium cell (rechargeable) or a supercap.

The following table shows the pinout of the coin cell connector:

Pin	Signal name	Description
1	VCC_LICELL	Power supply line for RTC.
2	GND	

5V supply connector

The ConnectCore 8X SBC Pro provides a 2-pin, 1.25 mm pitch straight connector with a regulated 5V supply for powering external circuitry. The 5V supply is generated on the on-board 5V regulator, which is also used internally in the ConnectCore 8X SBC for powering the video interfaces. The following table shows the pinout of the 5V supply connector (J3):

Pin	Signal name	Description
1	5V	5V power supply line.
2	GND	

3.3V supply connector

Together with the 5V supply connector, another 2-pin, 1.25 mm pitch straight connector is supported on the ConnectCore 8X SBC Pro providing a regulated 3.3V supply for powering external circuitry. The 3.3V power supply is generated on a buck regulator of the ConnectCore 8X PMIC (3V3_EXT power rail), which is also used on-board for powering many interfaces of the ConnectCore 8X SBC Pro carrier board. The following table shows the pinout of the 3.3V supply connector (J2):

Pin	Signal name	Description
1	3V3_EXT	3.3V power supply line.
2	GND	

Power and reset buttons

The ON/OFF button (SW1) on the ConnectCore 8X SBC Pro is connected to the on-module MCA, and provides the following functionality:

Board status	Power button action	Response
OFF	Short press	Power on
ON or SLEEP	Long press for 5 seconds	Power off
SLEEP	Short press	Wake up
ON	Short press	Sleep

The RESET button (SW2) is also connected to the MCA, and by pressing it, the system will be reset.

Note The duration of some power button actions can be configured by the user. See the [ConnectCore 8X online documentation](#) for more information.

Boot mode

By default, the ConnectCore 8X module boots from the internal board settings, allowing it to boot from the internal eMMC flash memory. For advanced functionality, the ConnectCore 8X SBC Pro provides two switches (S2) to configure the SOM boot mode, as explained below:

SW2	SW1	Boot mode
Open	Open	eMMC
Open	Close	Fuses
Close	Open	microSD
Close	Close	Serial downloader

Serial downloader mode allows you to boot from USB. This booting process is ideal for recovery purposes, such as if the boot loader is erased or cannot boot. If the system is configured to boot from any other source (internal eMMC, microSD) but the booting process fails (e.g. wrong images loaded)

the system will also fall back to booting into USB debug mode, regardless the state of the switches. For more information about the boot mode configuration, see the [ConnectCore 8X System-on-Module Hardware Reference Manual](#).

Debug interfaces

JTAG

The ConnectCore 8X SBC Pro provides a Tag Connect footprint for accessing the i.MX8X JTAG debug port. This footprint is located on the bottom side of the board.

SWD

The ConnectCore 8X SBC Pro provides two options for programming and debugging the Microcontroller Assist carried by the ConnectCore 8X SOM:

The first option is a 2x5, 1.27 mm pitch pin header (J9) on the top side of the board that, by default, is not populated. The following table shows the pinout of the SWD connector:

Pin	Schematic signal name	Description
1	VCC_MCA	MCA power supply line.
2	SWD_DIO/PWR_IO	SWD bidirectional data line.
3	GND	
4	SWD_CLK/PWR_IO	SWD clock signal.
5	GND	
6	NC	
7	NC	
8	NC	
9	GND	
10	SYS_RESET	Reset signal for the MCA.

The second option is the ARM 10-pin standard-compliant Tag Connect footprint on the bottom side of the board.

Console port

As the debug console port, the ConnectCore 8X SBC Pro provides a 4-pin, 1.25 mm pitch connector (J11). The UART2 port of the ConnectCore 8X module is used for this purpose. The console signals is a serial TTL, which travels through the console connector directly to the i.MX8X processor. A TTL-to-USB cable can be used for accessing this console port from a host PC USB port. The following table shows the pinout of this console connector:

Pin	Signal name	Description
1	CONSOLE_TX	Transmission line.
2	CONSOLE_RX	Receiver line.
3	3V3_EXT	3.3V power supply line.
4	GND	

The default console setting are as follows:

Baud rate	115200
Data	8 bit
Parity	none
Stop	1 bit
Flow control	none

Communication interfaces

10/100/1000 Mbps Ethernet

The ConnectCore 8X SBC Pro provides two 10Base-T/100Base-Tx/1000Base-T Ethernet interfaces, by using two Qualcomm Atheros AR8031 10/100/1000 Ethernet PHYs. These Ethernet PHYs are connected to the i.MX8X ENET0 and ENET1 interfaces, respectively. Both Ethernet interfaces are accessible through RJ-45 connectors (J12 and J13) with integrated link/activity LEDs, as specified in the following table:

Green LED	Yellow LED	Link/activity status
ON	OFF	10M Link
BLINK	OFF	10M Active
ON	OFF	100M Link
BLINK	OFF	100M Active
ON	ON	1000M Link
BLINK	ON	1000M Active

For power management purposes, a dedicated power switch allows you to control the power over the Ethernet PHYs.

USB Host

The ConnectCore 8X SBC Pro offers support for four USB Host interfaces through a USB Hub controller:

- Two of them are available over a stackable dual USB A-type connector (J18) located on the front of the board.
- One USB host is connected to the PCI Express Mini card connector.
- One USB host is connected to the XBee socket.

Both the PCI Express and the XBee USB buses can be disconnected from these interfaces and accessed on the Expansion connector. These connections are managed through 0-ohm resistors:

USB_PCIe/EXPANSION_USB1 bus configuration		
	USB_PCIe connected	EXPANSION_USB1 connected
R228/R229	Populated	Not populated
R191/R192	Not populated	Populated

XBEE/EXPANSION_USB2 bus configuration		
	XBEE connected	EXPANSION_USB2
R76/R77	Populated	Not populated
R78/R79	Not populated	Populated

For power management purposes, a dedicated power switch allows you to control the power over the USB Hub.

USB 3.0

One USB 3.0 bus is available through a USB C-type connector (J19) located on the top side of the board. The USB 3.0 adds the SuperSpeed (SS) transfer rate, which works up to 5 Gb/s.

This interface can work at both USB 2.0 and USB 3.0 modes, and it can also work in both Host and Device modes.

When the interface is configured to work in Host mode, the power delivered to the device can be configured up to 3A.

Note In the first-availability kits of the ConnectCore 8X SBC Pro, the USB 3.0 bus is not supported on the USB C-type connector. It will only work as USB 2.0.

PCI Express

The ConnectCore 8X SBC Pro provides a Mini PCI Express connector with the following interfaces:

- I2C.
- USB Host port (see USB Host section).
- PCIe interface, only available in carrier boards with non-wireless ConnectCore 8X SOM variants.
- One GPIO for the low-level PCIe wake-up signal.
- One GPIO for the low-level PCIe disable signal.
- One GPIO for the low level PCIe reset signal.
- SIM interface. The micro-SIM card slot is located on the bottom side of the board (J10).

For power management purposes, a dedicated 3.3V regulator allows you to control the power over the PCIe interface.

The ConnectCore 8X SBC Pro has two 2.6 mm metalized drills supporting full-size PCI Express cards. The following table shows the pinout of the PCIe connector:

Pin	Signal name	Description
1	PCIE_WAKE_N	Wake-up signal.
2	PCIE_VCC	3.3V power supply line.
3	NC	Not connected.
4	GND	
5	NC	Not connected.
6	VLDO4_1V5	1.5V power supply line.
7	NC	Not connected.
8	PCIE_UIM_PWR	Power supply for SIM card.
9	GND	
10	PCIE_UIM_DATA	SIM card data line.
11	PCIE_CLK_N	PCIe clock pair line (-).
12	PCIE_UIM_CLK	SIM card clock line.
13	PCIE_CLK_P	PCIe clock pair line (+).
14	PCIE_UIM_RST	SIM card reset line.
15	GND	
16	PCIE_UIM_VPP	Power supply for SIM programming.
17	NC	Not connected.
18	GND	
19	NC	Not connected.
20	PCIE_DIS_N	Disable signal.
21	GND	
22	PCIE_RESET_N	Reset signal.
23	PCIE_RX_N	PCIe reception pair line (-).
24	PCIE_VCC	3.3V power supply line.
25	PCIE_RX_P	PCIe reception pair line (+).
26	GND	
27	GND	

Pin	Signal name	Description
28	VLDO4_1V5	1.5V power supply line.
29	GND	
30	PCIE_I2C_SCL	I2C clock line.
31	PCIE_TX_N	PCIe transmission pair line (-).
32	PCIE_I2C_SDA	I2C data line.
33	PCIE_TX_P	PCIe transmission pair line (+).
34	GND	
35	GND	
36	USB_PCIE_D_N	USB differential data line (-).
37	GND	
38	USB_PCIE_D_P	USB differential data line (+).
39	PCIE_VCC	3.3V power supply line.
40	GND	
41	PCIE_VCC	
42	NC	Not connected.
43	GND	
44	NC	Not connected.
45	NC	Not connected.
46	NC	Not connected.
47	NC	Not connected.
48	VLDO4_1V5	1.5V power supply line.
49	NC	Not connected.
50	GND	
51	NC	Not connected.
52	PCIE_VCC	3.3V power supply line.

XBee

The ConnectCore 8X SBC Pro provides an XBee socket supporting the connection of Digi XBee/XBee-PRO modules. The XBee socket consist of two 10-pin, 2 mm pitch connectors (J22 and J23) which follow the standard pinout of the XBee modules:

Description	Signal name	J12 pin	XBee standard pin		J13 pin	Signal name	Description
3.3V power supply line.	XBEE_VCC	1	1 - VCC	ADC0/DIO0 - 20	1	-	
XBee UART output data line.	MCA_UART2_RX	2	2 - DOUT	AD1/DIO1 - 19	2	-	
XBee UART input data line.	MCA_UART2_TX	3	3 - DIN/CONFIG_N	AD2/DIO2 - 18	3	-	
	-	4	4 - D08	AD3/DIO3 - 17	4	-	
XBee reset line, connected to MCA_IO15.	XBEE_RESET_N	5	5 - RESET_N	RTS_N/DIO6 - 16	5	MCA_UART2_RTS	XBee UART clear to send line.
	-	6	6 - PWM0/RSSI	AD5/DIO5 - 15	6	-	
	XBEE_D_P	7	7 - Reserved	VREF - 14	7	-	
	XBEE_D_N	8	8 - Reserved	ON/SLEEP_N - 13	8	XBEE_ON/SLEEP_N	XBee status line, connected to MCA_IO16.
XBee request line, connected to MCA_IO11.	XBEE_SLEEP_RQ	9	9 - DTR_N/SLEEP_RQ/DI8	CTS_N/DIO7 - 12	9	MCA_UART2_CTS	XBee UART request to send lind.
	GND	10	10 - GND	AD4/DIO4 - 11	10	-	

The XBee can communicate with the ConnectCore 8X SOM in two different ways:

- Using the UART2 bus of the ConnectCore 8X on-module MCA.
- Using the USB bus.

Note The USB bus connected to the XBee socket is also connected to the expansion header. See [USB Host](#) for detailed information.

Multimedia interfaces

LVDS/MIPI-DSI display

The two MIPI-DSI/LVDS combo PHYs supported by the ConnectCore 8X module are available over two different LVDS display connectors (J14 and J16) on the top side of the ConnectCore SBC Pro board:

- MIPI_DSI0 bus is connected to J14.
- MIPI_DSI1 bus is connected to J16.

These are 20-pin, 1.25 mm pitch connectors, which provides access to the following LVDS capabilities:

- Up to four LVDS differential data pairs.
- One LVDS differential clock pair.
- Interrupt signal with 10K pull-up resistor for touch screen.
- Control of the backlight contrast.
- I2C, shared with the MIPI-DSI connector.
- 3.3V power supply.
- 5V power supply.

Both the LVDS connectors exhibit the same pinout:

Pin	Signal name	Description
1	3V3_EXT	3.3V power supply line.
2	MIPI_DSI0/1_DATA0_N	Transmission pair 0 data line (-).
3	MIPI_DSI0/1_DATA0_P	Transmission pair 0 data line (+).
4	GND	
5	MIPI_DSI0/1_DATA1_N	Transmission pair 1 data line (-).
6	MIPI_DSI0/1_DATA1_P	Transmission pair 1 data line (+).
7	GND	
8	MIPI_DSI0/1_DATA2_N	Transmission pair 2 data line (-).
9	MIPI_DSI0/1_DATA2_P	Transmission pair 2 data line (+).
10	GND	
11	MIPI_DSI0/1_CLK_N	Transmission pair clock line (-).
12	MIPI_DSI0/1_CLK_P	Transmission pair clock line (+).
13	GND	
14	MIPI_DSI0/1_DATA3_N	Transmission pair 3 data line (-).
15	MIPI_DSI0/1_DATA3_P	Transmission pair 3 data line (+).
16	MIPI_DSI0/1_PWM0_OUT	Backlight PWM.
17	MIPI_DSI0/1_I2C0_SCL	I2C bus clock line.
18	MIPI_DSI0/1_I2C0_SDA	I2C bus data line.
19	MIPI_DSI0/1_IRQ_N	Display interrupt line.
20	VIN	5V power supply line.

MIPI camera

The ConnectCore 8X SBC Pro provides one MIPI camera interface compliant with the MIPI CSI-2 specification. A MIPI D-PHY is supported by the i.MX8X CPU, allowing direct connections between the module and a MIPI CSI-2 compliant camera sensor.

This MIPI interface is available over a 15-pin, 1mm pitch, FCC connector on the top side of the board (J15), whose pinout is described in the following table:

Pin	Signal name	Description
1	3V3_EXT	3.3V power supply line.
2	MIPI_CSI0_I2C0_SDA	I2C bus data line.
3	MIPI_CSI0_I2C0_SCL	I2C bus clock line.
4	NC	Not connected.
5	MIPI_CSI0_RESET_N	Camera reset line.
6	GND	
7	MIPI_CSI0_CLK_P	Transmission pair clock line (+).
8	MIPI_CSI0_CLK_N	Transmission pair clock line (-).
9	GND	
10	MIPI_CSI0_DATA1_P	Transmission pair 1 data line (+).
11	MIPI_CSI0_DATA1_N	Transmission pair 1 data line (-).
12	GND	
13	MIPI_CSI0_DATA0_P	Transmission pair 0 data line (+).
14	MIPI_CSI0_DATA0_N	Transmission pair 0 data line (-).
15	GND	

Parallel camera

The ConnectCore 8X SBC Pro provides one parallel camera interface (CSI). It is composed of an 8-bit data bus, a master clock from the i.MX8X CPU and three synchronization signals (PIXCLK, HSYNC and VSYNC).

This interface is available over a 20-pin, 0.5 mm pitch FCC connector (J17) located in top side of the board, which has the following pinout:

Pin	Signal name	Description
1	GND	
2	CSI_D00	Camera data line 0.
3	CSI_D01	Camera data line 1.

Pin	Signal name	Description
4	CSI_D02	Camera data line 2.
5	CSI_D03	Camera data line 3.
6	CSI_D04	Camera data line 4.
7	CSI_D05	Camera data line 5.
8	CSI_D06	Camera data line 6.
9	CSI_D07	Camera data line 7.
10	GND	
11	CSI_MCLK	Camera master clock line.
12	CSI_PCLK	Camera pixel clock line.
13	CSI_HSYNC	Camera horizontal sync line.
14	CSI_VSYNC	Camera vertical sync line.
15	CSI_EN	Camera enable signal.
16	CSI_RESET	Camera reset line.
17	GND	
18	CSI_SCL	I2C bus clock line.
19	CSI_SDA	I2C bus data line.
20	3V3_EXT	3.3V power supply line.

Audio

Audio functionality on the ConnectCore 8X SBC Pro supports headphone, speakers, line-out, two line-in and microphone signals. A Maxim MAX98089 audio codec manages the audio interface, which communicates with the i.MX8X CPU through I2C. For power management purposes, a dedicated power switch allows you to control the power over the audio codec.

The headphone audio output of the audio codec is connected to a stereo audio jack (J21) located on the front edge of the SBC Pro. The remaining audio signals mentioned above are available over the expansion connector. See [Expansion connector](#) for more information.

Storage interfaces

MicroSD

A microSD socket (J10) is located on the bottom side of the board. This interface is connected to the USDHC1 controller of the i.MX8X CPU.

Expansion and user interfaces

Expansion connector

Two 2-row, 40-pin, 2.54 mm pitch headers (J20 and J27) are supported by the ConnectCore 8X SBC Pro board. This headers acts as an expansion connector, offering access to many different interfaces of the CPU and the MCA.

The following table show the pinout of the expansion connectors:

Description	Signal name	Pin		Signal name	Description
J20					
MCA power supply line.	VCC_MCA	1	2	GND	
MCA 32 kHz clock output.	MCA_CLKOUT32K	3	4	1V8_EXT	1.8V power supply line.
MCA GPIO.	MCA_IO6	5	6	MCA_IO7	MCA GPIO.
MCA GPIO.	MCA_IO8	7	8	MCA_IO9	MCA GPIO.
MCA GPIO.	MCA_IO10	9	10	MCA_IO5	MCA GPIO.
MCA GPIO.	MCA_IO14	11	12	MCA_VREF_OUT	MCA voltage reference output.
i.MX8X GPIO.	GPIO4_20	13	14	GPIO4_21	i.MX8X GPIO.
3.3V power supply rail of the RF section of the SOM.	3V3_RF	15	16	MCA_IO17	MCA GPIO.
Connected to on-module wireless MAC and to MCA_IO12.	BT_WAKEUP_HOST	17	18	BT_WAKEUP_SLAVE	Connected to on-module wireless MAC.
Connected to on-module wireless MAC.	PCM_CLK	19	20	PCM_IN	Connected to on-module wireless MAC.
Connected to on-module wireless MAC.	PCM_OUT	21	22	PCM_SYNC	Connected to on-module wireless MAC.
Connected to on-module wireless MAC.	GPS_COEX	23	24	LTE_PRI	Connected to on-module wireless MAC.
Connected to on-module wireless MAC.	QOW	25	26	LTE_SYNC	Connected to on-module wireless MAC.
Audio codec line A1 input.	LINE1_IN_R	27	28	MIC_N	Negative differential microphone input.
Audio codec line A2 input.	LINE1_IN_L	29	30	MIC_P	Positive differential microphone input.
Audio codec line B1 input.	LINE2_IN_R	31	32	SPKL_P	Positive left-channel speaker output.

Description	Signal name	Pin		Signal name	Description
Audio codec line B2 input.	LINE2_IN_L	33	34	SPKL_N	Negative left-channel speaker output.
Right output line.	LINE_OUT_R	35	36	SPKR_P	Positive right-channel speaker output.
Left output line.	LINE_OUT_L	37	38	SPKR_N	Negative right-channel speaker output.
Input reset line of the ConnectCore 8X SOM.	SYS_RESET	39	40	POWER_BUTTON	Power button of the ConnectCore 8X SOM.
J27					
3.3V power supply line.	3V3_EXT	1	2	GND	
i.MX8X SPI0 clock line.	SPI0_SCK	3	4	SPI0_CS0	i.MX8X SPI0 chip select 0 line.
i.MX8X SPI0 bus input data line.	SPI0_SDI	5	6	SPI0_CS1	i.MX8X SPI0 bus chip select 1 line.
i.MX8X SPI0 bus output data line.	SPI0_SDO	7	8	SPI0_IRQ_N	i.MX8X SPI0 bus interrupt line.
CAN1 low line.	CAN1_L	9	10	CAN2_L	CAN2 low line.
CAN1 high line.	CAN1_H	11	12	CAN2_H	CAN2 high line.
i.MX8X I2C3 bus clock line.	EXP_I2C_SCL	13	14	EXP_I2C_IRQ_N	i.MX8X I2C3 bus interrupt line.
i.MX8X I2C3 bus data line.	EXP_I2C_SDA	15	16	EXP_I2C_GPIO	i.MX8X I2C3 bus dedicated GPIO.
i.MX8X UART0 bus transmission line.	UART0_TX	17	18	UART0_RTS_B	i.MX8X UART0 bus request to send line.
i.MX8X UART0 bus receiver line.	UART0_RX	19	20	UART0_CTS_B	i.MX8X UART0 bus clear to send line.
i.MX8X M40 UART bus transmission line.	M40_UART_TX	21	22	RS485_A	RS485 A line.
i.MX8X M40 UART bus receiver line.	M40_UART_RX	23	24	RS485_B	RS485 B line.
i.MX8X ADC channel 0.	ADC_IN0	25	26	ADC_IN4	i.MX8X ADC channel 4.
i.MX8X ADC channel 1.	ADC_IN1	27	28	ADC_IN5	i.MX8X ADC channel 4.
Connected to SN65HVD233DR Rs pin (8).	CAN1_MODE	29	30	GPIO4_19	i.MX8X GPIO.

Description	Signal name	Pin		Signal name	Description
Connected to SN65HVD233DR Rs pin (8).	CAN2_MODE	31	32	EXPANSION_USB1_D_P	USB expansion bus 1 differential data line (+).
USB expansion bus 2 differential data line (+).	EXPANSION_USB2_D_P	33	34	EXPANSION_USB1_D_N	USB expansion bus 1 differential data line (-).
USB expansion bus 2 differential data line (-).	EXPANSION_USB2_D_N	35	36	GPIO0_12	i.MX8X GPIO.
i.MX8X GPIO.	GPIO5_09	37	38	VCC_LICELL	Power supply line for RTC.
	GND	39	40	5V	5V power supply line.

GND	2	1	VCC_MCA	GND	2	1	3V3_EXT
1V8_EXT	4	3	MCA_CLKOUT32K	SPIO_CS0	4	3	SPIO_SCK
MCA_IO7	6	5	MCA_IO6	SPIO_CS1	6	5	SPIO_SDI
MCA_IO9	8	7	MCA_IO8	SPIO_IRQ_N	8	7	SPIO_SDO
MCA_IO5	10	9	MCA_IO10	CAN2_L	10	9	CAN1_L
MCA_VREF_OUT	12	11	MCA_IO14	CAN2_H	12	11	CAN1_H
GPIO4_21	14	13	GPIO4_20	EXP_I2C_IRQ_N	14	13	EXP_I2C_SCL
MCA_IO17	16	15	3V3_RF	EXP_I2C_GPIO	16	15	EXP_I2C_SDA
BT_WAKEUP_SLAVE	18	17	BT_WAKEUP_HOST	UART0_RTS_B	18	17	UART0_TX
PCM_IN	20	19	PCM_CLK	UART0_CTS_B	20	19	UART0_RX
PCM_SYNC	22	21	PCM_OUT	RS485_A	22	21	M40_UART_TX
LTE_PRI	24	23	GPS_COEX	RS485_B	24	23	M40_UART_RX
LTE_SYNC	26	25	QOW	ADC_IN4	26	25	ADC_IN0
MIC_N	28	27	LINE1_IN_R	ADC_IN5	28	27	ADC_IN1
MIC_P	30	29	LINE1_IN_L	GPIO4_19	30	29	CAN1_MODE
SPKL_P	32	31	LINE2_IN_R	EXPANSION_USB1_D_P	32	31	CAN2_MODE
SPKL_N	34	33	LINE2_IN_L	EXPANSION_USB1_D_N	34	33	EXPANSION_USB2_D_P
SPKR_P	36	35	LINE_OUT_R	GPIO0_12	36	35	EXPANSION_USB2_D_N
SPKR_N	38	37	LINE_OUT_L	VCC_LICELL	38	37	GPIO5_09
POWER_BUTTON	40	39	SYS_RESET	5V	40	39	GND

User LEDs

Two user LEDs are located on the top side of the ConnectCore 8X SBC Pro board. Both LEDs are connected to GPIOs from the MCA as follows:

Device	MCA port
User LED0	PTD5
User LED1	PTD6

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