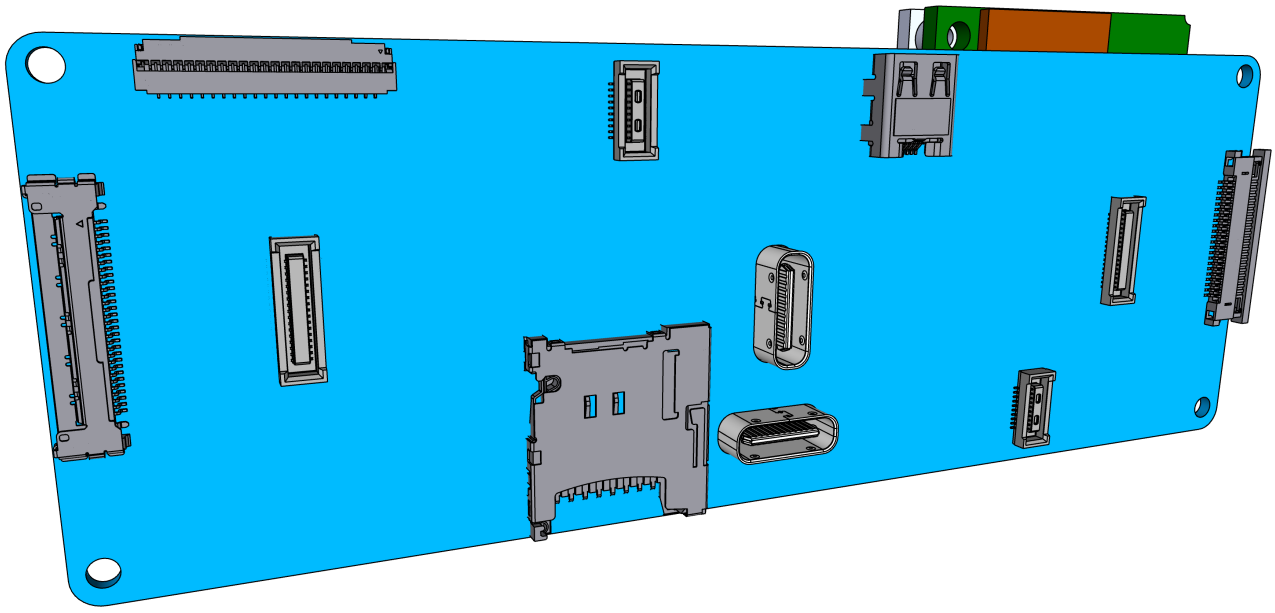
# Bridge Board 909c

The 909c is a Bridge Board version made for testing and experiementation with the Ziloo attachments without attaching the SB-UCM i.MX8 board or directly attaching it. The setup enables connecting a Compulab SB-UCM-iMX8PLUS, DART-MX8M-PLUS Evaluation Kit or I-Pi SMARC IMX8M Plus development board. Not all the 909 connectors will be mounted on the 801 production bridge board that mounts the i.MX8 board.

Of note in design,

- Some of the UCM-iMX8M-Plus carrier board interface pins are multifunctional. Up to 4 functions (ALT modes) are accessible through each multifunctional pin.
- All of the UCM-iMX8M-Plus digital interfaces operate at 3.3V voltage levels unless noted otherwise.
- RGMII ENET1 signals operate at 1.8V voltage level
- SD/SDIO port #2 can be configured to operate at 3.3V or 1.8V voltage levels. Voltage level is controlled by SoC pin GPIO1_IO04.



## Open points

- B2B sound/I2C connectors
- Mux chips shutdown mode
- Should there be Boot origin switches like EVK? (4 bits? EVK)
- Annotations and Logo on the board
- TEST The Mux pin configurations

## Difference from revision B

- The PD Controller is no longer on the bridge board
- The Power module connects to the bridge board to provide dual USB-C
- Two 50 pin connectors take high speed and low speed signals to USB-C connectors
- Two 20 pin sound connectors
- Only 1 alternative CSI connector for each side
- I2S Mic removed from debug connector, CAN1/CAN2 added.
- No soldering pads
- No Alt USB breakouts on bridge board
- No Alt mode on bridge board
- No I2C breakouts on bridge board
- No 45 pin Alt Mode Connectors
- Only m.2 Key B (no Key E)
- Pulled parts out in BRIDGE_BOARD_CAMERA, BRIDGE_BOARD_SOUND, BRIDGE_BOARD_M2_KEY_B documents.

## Core Components

- SB-UCM-iMX8PLUS System-on-Module
- 2 * Hirose DF40HC(3.0)-100DS-0.4V mated height 3.0mm
- 2 * Hirose DF40-50DS-0.4V mated height 1.5mm Mouser - JLCPCB socket
- M.2 key B connector H4.20mm Amphenol ICC 10128793001RLF
- 2 * Hirose DF40C-34DS-0.4V (Mouser
- 1 * microSD card slot (suggested Molex 5031821852) push-push, compact. Mouser, Molex
- 1 * CBTL04083 Multiplexer Switch ICs 3.3V CH 2:1 - Mouser
- 3 * PCA9555 I/O Expander
- 1 * TS5USBC410 Dual 2:1 USB 2.0 Mux/DeMux Switch. Mouser

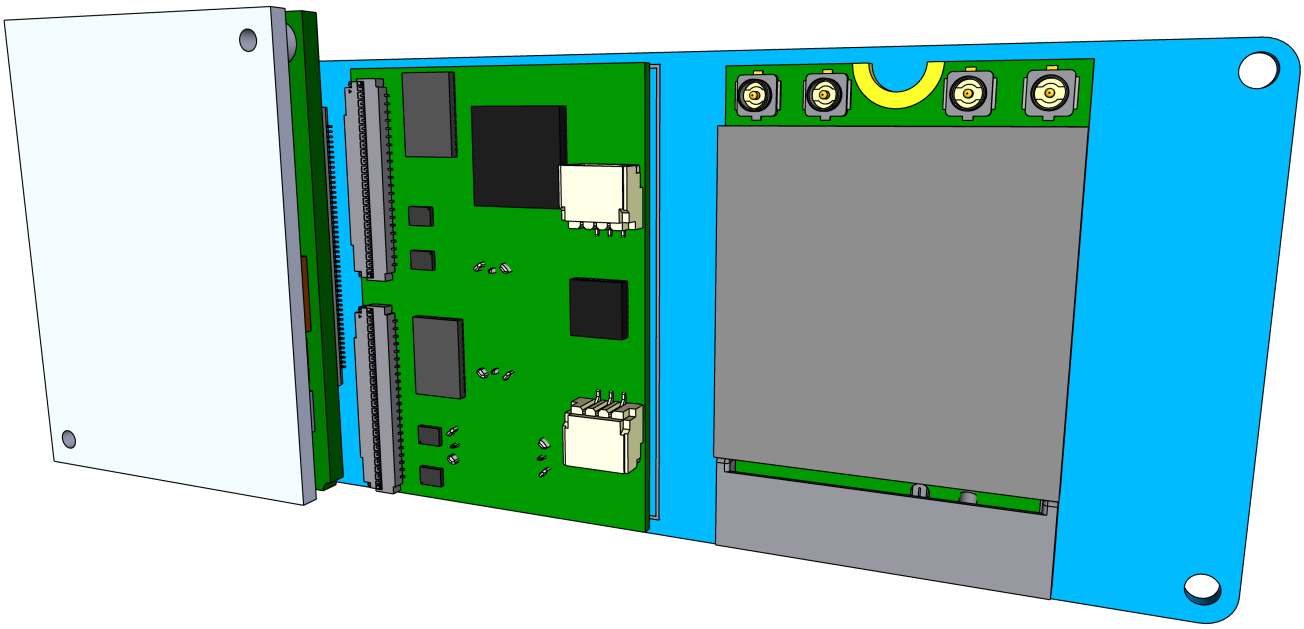
## Dev. Connectors

- 1 * MicroHDMI (suggested Molex 46765-1301) Mouser Molex
- 1 * Molex 22PIN 0.5mm pitch 54548-2271
- 1 * I-PEX 30PIN 0.4mm pitch 20525-030E-02
- 1 * TE Connectivity 45PIN 0.3MM 571-4-2328724-5 FPC 3-2328724-5 $0.41 ProductDetail/Hirose-Connector/DF40C-34DS-04V51?qs=vcbW%252B4%252BSTIpg26DsEbj1iQ%3D%3D))
- 2 * Hirose DF40-20DS-0.4V mated height 1.5mm Mouser - JLCPCB socket

## Other Components

Connectors placed on the board are,

- PI6CG18200 clock
- 1 * 24C08 Carrier-board EEPROM. Mouser
- 1 * TSM-120-01-F-DV Samtec 2*20 pins surface mounted .100 (Smiley model) Mouser
- SuperSpeed MUX PI5USB30213A may be an option intead of CBTL04083
- Alternate USB 2.0 Mux/DeMux Mouser JLCPCB part
- 5 * TXB0108 voltage shifters 3.3V to 1.8V



The back of the board connects for SB-UCM-iMX8PLUS, T-USB module and M.2 Key B module. The SB-UCM-iMX8PLUS is the center of the board and receives all signals.

# System Power Module

This is a new module

The system power is driven by the T-USB module via the two 50 pin connectors. There is no need to power the board from other connectors than USB-C.

According to the UCM-IMX8PLUS Referene Guide the Supply Voltage is 3.45V to 4.4V. VSOM from the Power module provides this level. From it 5V0, 3V3, 2V8, and 1V8 are derived. 5V is stepped up from VSOM. These should not be mixed with the VIN_5V and VIN_3V3 on the T-USB module connector, which are for experimenting with power source role.

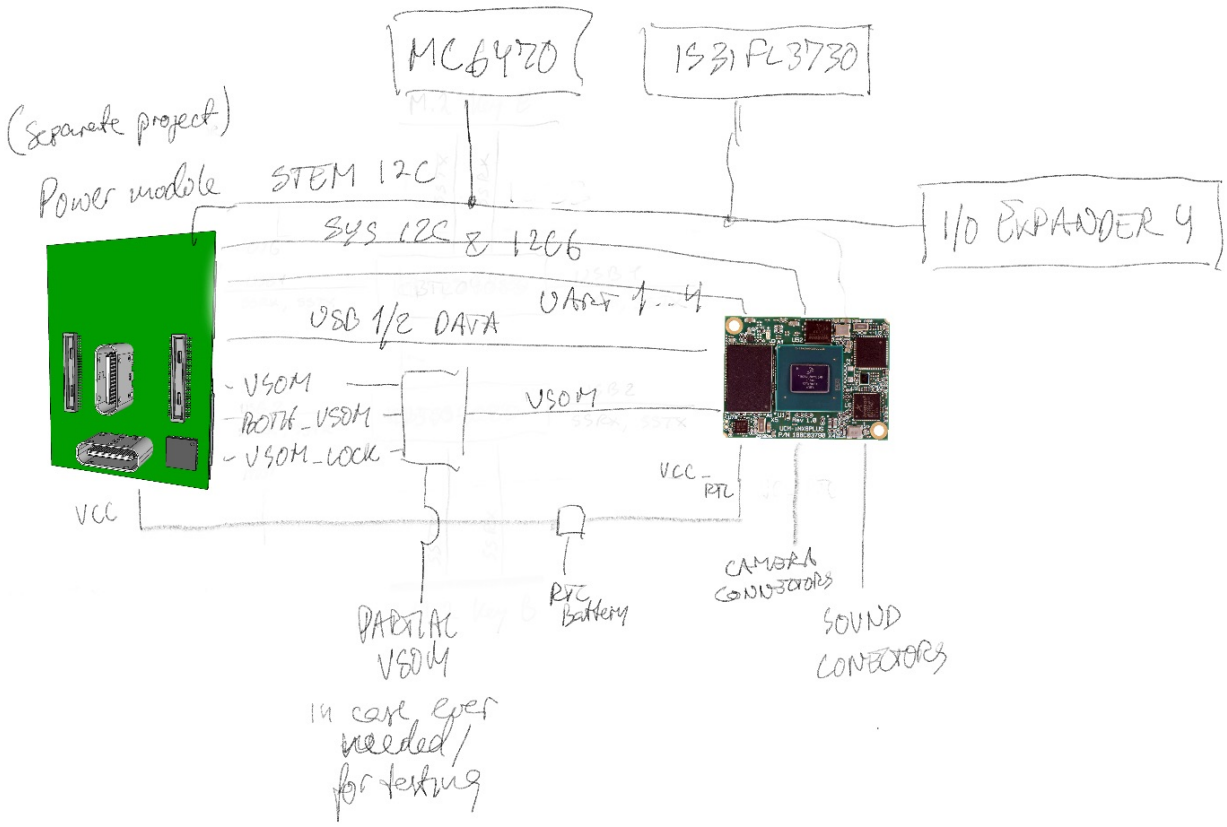
- m.2 connectors are based on 3V3 and 1V8
- Sound is based on 3V3 or 1V8
- Cameras are 1V8, 2V8 and 3V3
- HDMI can supply 5V / 50 mA
- HDMI signal level is 5V
- LED matrix may need 5V
- Debug connector has 5V

So there are in total three(four) uses of 5V

1. HDMI supply and signal (50 mA) from upregulated VSOM
2. LED matrix(not on 801/909 board) may need 5V

3. 5V supply (100 mA) to T-USB module which is externally supplied (VIN_5V).
4. Debug connector for measuring/testing (directly connected with VIN_5V soldering pad)

VIN_5V is optional and separate from the power on the board. It is supplied from the soldering pad/point.




## Physical T-USB Connection Establishment

When connecting the T-USB module to the Bridge Board VSOM is provided over multiple pins on both connectors. The bridge board can draw a limited current from individual pins, but must only drive the System Module with power when all VSOM pins are connected. This allows for avoiding damage or strange behavior, if the power module is partially inserted.

Stages of insertion are,

- No VSOM pins connected
- At least one VSOM pin is connected
- VSOM Pins from both connectors connected
- All VSOM pins connected (including VSOM_LOCK)

When at least one pin is connected the Bridge Board can power components that are low power and always-on. It should provide VCC_RTC to the System Module from the T-USB module whenever it is plugged in or from a VCC_RTC pad/connector.

When pins from both connectors are supplying VSOM the Bridge Board should raise BOTH_VSOM. The Power Module may restrict VSOM to some pins dependent on BOTH_VSOM.

The locking mechanism of the backplate is also used to drive one of the VSOM connectors, named VSOM_LOCK. This prevents the system activating until modules are locked in place

As the first step in the detachment of the power module the physical unlock button must be pressed which raises PMIC_STBY_REQ. The next step is to turn the back plate which will disconnect the conditional VSOM_LOCK pin.

This requires logic on the 701/801/909/919 boards.

### Powering Sensors and Camera modules

- Camera modules should receive power regardless of VSOM_LOCK supplying.
- Sensors (MC6470, VM3011) should receive power regardless of VSOM_LOCK supplying.
- EEPROM 24C08 should receive power regardless of VSOM_LOCK supplying.
- PCA9555 EX4 should receive power regardless of VSOM_LOCK supplying.
- USB Multiplexers should not receive power unsless all 10 VSOM are connected.

### Power Logic on Bridge board

The T-USB module is inserted onto the bridge board. As this gets inserted the bridge board must detect it and enable power as connection is established. This relates to when to provide the System Module and m.2 module with VSOM

a) If at least one VSOM pin on both connectors is high, BOTH_VSOM is raised high by the bridge board. b) Directly connect VCC_RTC on T-USB connectors, soldering pad and System Module. c) If all 9 VSOM pins are supplying power, use it to power the System Module d) If all 10 VSOM and VSOM_LOCK pins are supplying power, deliver upregulated 5V e) If all 10 VSOM and VSOM_LOCK pins are supplying power, deliver 2.8V to camera modules f) If all 10 VSOM and VSOM_LOCK pins are supplying power, deliver power to m.2 modules g) If some VSOM pins are powered deliver it to always running circuits(like IMU) on bridge board(not on 909c).

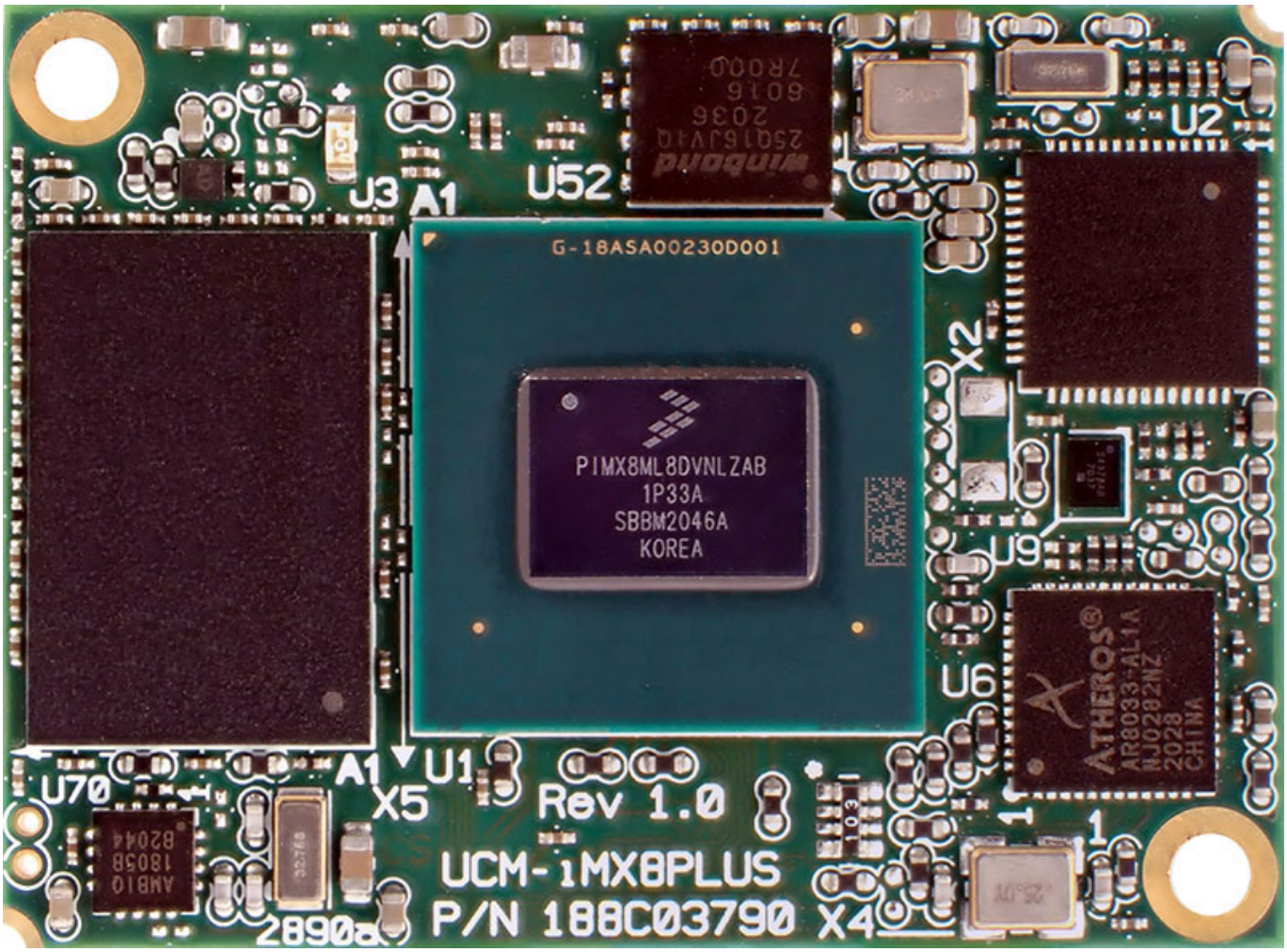
The module connectors have pins that are used for different setups. Not all should be connected to the 909 board.

# System SB-UCM-iMX8PLUS Module (SoM)

The daughter board clicks into the two Hirose 100 pin board-to-board connectors.

For further details see Product Page.

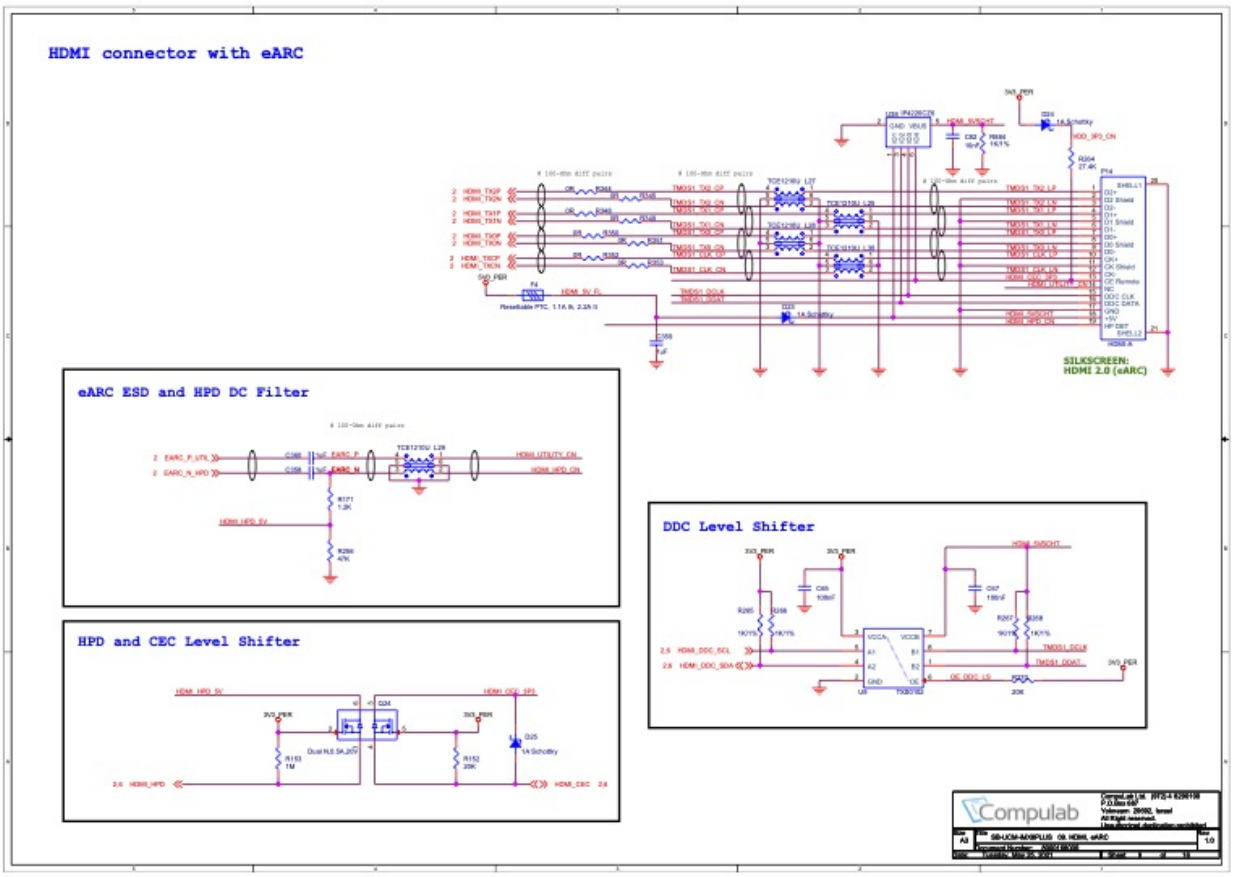
- The CSI1 & CSI2 are wired from the 100pin connectors to relevant CSI connectors.
- The CSI1 lanes are connected to Left CSI.
- The CSI2 lanes are connected to Right CSI.
- The USB1(OTG) data connects to 50 pin high speed connector.
- The USB2(Host) data connects to multiplexer between 50 pin high speed connector and m.2. Switched with MUX_HOST on EX0.
- 50 pin controlls takes in signals from SoM (LVDS, UART, I2C, INTs)
- The 45 pins Debug connector will break out many additional signal lines.
- The Debug connector can be placed near the 100 pin connectors if it helps the board layout.

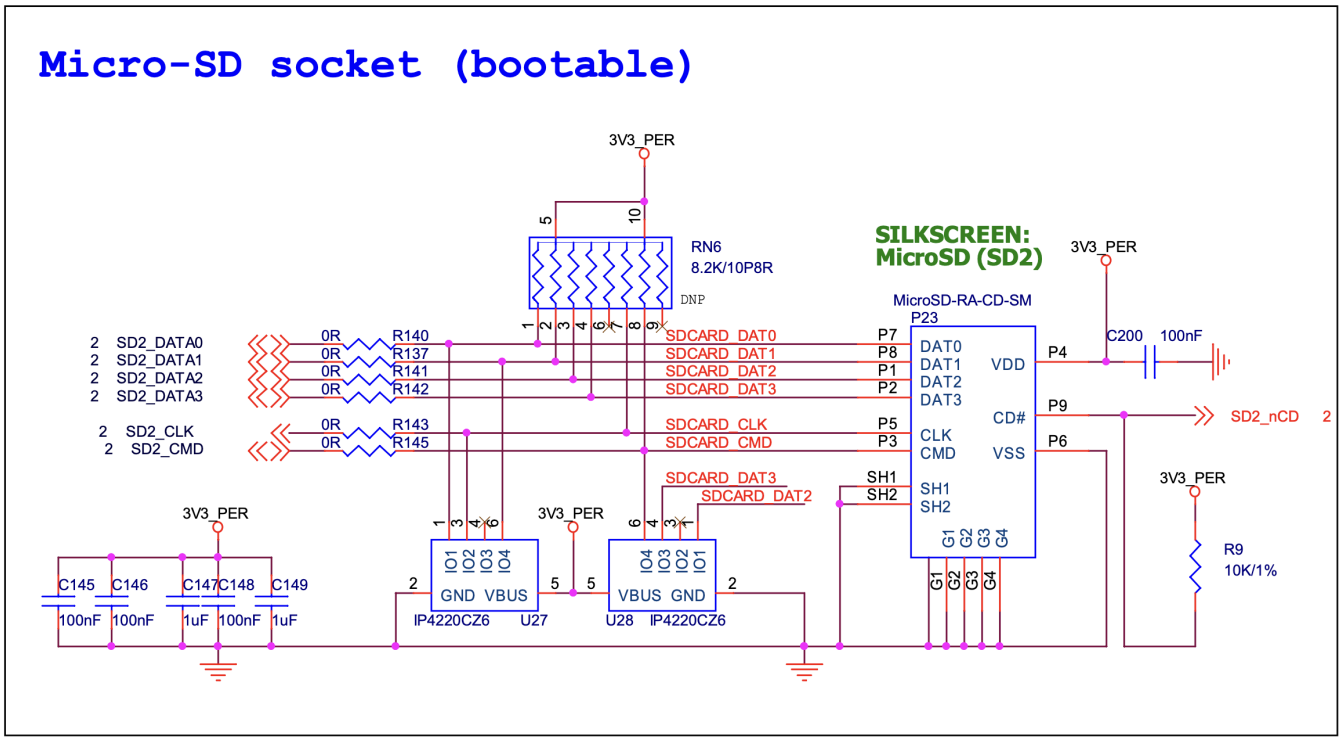



# MicroSD and MicroHDMI

The MicroHDMI connector is connected to the HTMI_TX*, HDMI_DDC_*, HDMI_CEC, HDMI_HPD pins from the i.MX8 module.

The MicroSD connector is connected to SD2_DATA*, SD2_CLK, SD2_CMD, SD2_nCD on the i.MX8 module.




Debugging Breakout connector

See end of this document for pinouts.

# T-USB Module Data Connection

The T-USB module connects two USB-C connectors to the board via multiplexers and a Power Delivery Controller. USB Data is routed over the 50 pins data connector as well as the M.2 Expansion connector. The Host USB connection is multiplexed between thw two.

## T-USB connector 3.0 data mapping

Two USB 2.0/3.0 connections are provided by the T-USB module. T-USB module 50 pin connectors supply/consume:

- USB1 v2 / v3 data
- USB2 v2 / v3 data
- LVDS data pairs
- UART 1/2/3/4
- I2C SYS/3
- GPIO4_IO19, GPIO1_IO0, GPIO1_IO1
- SYS_RST_PMIC / POR_B_3P3 / PMIC_ON_REQ / PMIC_STBY_REQ / PWRBTN / ALT_BOOT / QSPI_BOOT_EN_3P3
- VCC_RTC

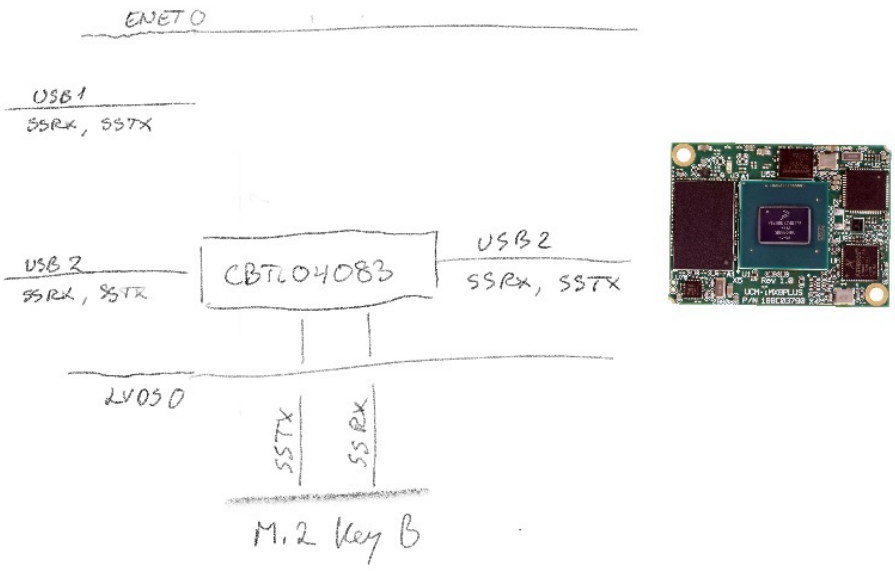
T-USB module 50 pin connectors not connected:

- SPI
- SWD

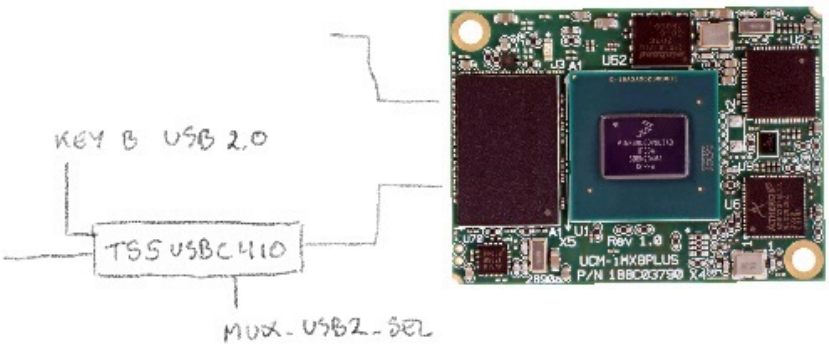
## Multiplexing USB

The i.MX8 has two USB busses. USB1(supports OTG) and USB2(Host mode only).

The USB 3.0 superspeed Host/USB2 from the SoM are multiplexed using CBTL04083 and controlled by MUX_USB3_SEL pins.



The USB 2.0 Host/USB2 from the SoM are multiplexed using TS5USBC41 and controlled by MUX_USB2_SEL pins. The USB-C connector USB 2.0 signals(A/B 6/7) are managed separately and multiplexed using TS5USBC41. This allows routing an Extra USB 2.0 signal selectively via the Debug Breakout connector.




| SEL | Connect to |
|---|---|
| High | m.2 |
| Low | T-USB |

### I2C EEPROM

Add an EEPROM like 24C08 present on the UCM carrier board. Unlike reference design it should be connected to Stem I2C from 50 pin connector

## Wiring and Connecting

The board can be used in different ways

1. Adding a daughterboard, two OV2735 camera modules and connecting a USB cable with power.
2. Adding a daughterboard, two RPi camera modules and connecting a USB cable with power.
3. Use the board to connect two OV2735 camera modules to Compulab SB-UCM-iMX8PLUS
4. Use the board to connect two OV2735 camera modules to I-Pi SMARC IMX8M Plus

Required distances/location

- Camera module distance 70mm
- USB-C connectors cannot be moved
- Board size can only be increased to save cost
- Holes in the corners should be the regular sort for mounting.
-

## I/O Expanders

The pins on I/O Expanders are rearranged

Three expanders are placed on the bridge board and a fourth is on the Power Module.

**Expander 0**

The development board uses a single Expander. The 909 and 801 uses 2x PCA9555 to control more states

The system expander #0 is used by the SoM via SYS I2C. The system expander input triggers interrupt via SYS_EX_nINT (GPIO4_IO19). This expander deals with activity relevant during waking state.

This first expander, which is also on the dev. board maps,

| Expander | Connected to |
|---|---|
| EX0.0 | IO0_0 mPCIe_PERST on M2 Key B |
| EX0.1 | - reserved for second mPCIe - |
| EX0.2 | IO0_2 MCU_SYS_INT from T-USB module or other MCUs |
| EX0.3 | |
| EX0.4 | |
| EX0.5 | |
| EX0.6 | IO0_6 LVDS_DISP_RESET |
| EX0.7 | IO0_7 LVDS_TOUCH_RESET |
| EX0.8 | IO1_0 CSI1_PWR_DWN_B |
| EX0.9 | IO1_1 LEFT_CAM_RESET |
| EX0.10 | IO1_2 LEFT_ATT_INT |
| EX0.11 | IO1_3 LEFT_ATT_XSHUT |
| EX0.12 | IO1_4 CSI2_PWR_DWN_B |
| EX0.13 | IO1_5 RIGHT_CAM_RESET |
| EX0.14 | IO1_6 RIGHT_ATT_INT |
| EX0.15 | IO1_7 RIGHT_ATT_XSHUT |

I/O Expander like Compulab Carrier Board to map Camera interrupts. (SYS I2C)

## SYS I2C adresses

SYS I2C addresses

Reduced the devices connected to SYS bus

| Address | Chipset | Description |
|---|---|---|
| 0x20 | PCA9555 | 16 bit expander EX0 |
| 0x25 | PCA9450 | Reserved 7 bit address |
| 0x26 | PCA9555 | 16 bit expander EX6 |
| 0x4A 0x4B | PCA9450 | Power Management IC |
| 0x68 | PI6CG18200 | PCIe clock generator |
| 0x70 0x71 | TPS65988 | RESERVED for PD Controller Port 1 / SYS |
| 0xD2/D3 | RTC | AM1805 real time clock (RTC) |

## Signal Interrupt(INT) pins

Various chips have internal state changes that should cause interrupts by the SoM(CPU). It is essential that inputs are flagged so communication can be reliable.

On the reference board these are triggered via USB1_TCPC_nINT(P1.60) It is used for I/O Expander 0 and input IRQs.

Events that we want to catch

- T-USB OTG plug events
- T-USB Host plug events
- PD Controller state changed
- Camera sensors input ready
- I/O Expander input ready
- m.2 connectors
- PCIe

Interrupts from the PD Controller are input to I/O Expander 0 (or 3). It in turn triggers an interrupt on SYS_EX_nINT or STEM_nINT.

Interrupts from the Left and right cameras interrupt signal(ATT_INT) is connected to I/O Expander 0. It in turn triggers an interrupt on SYS_EX_nINT.

Direct/Indirect interrupt triggers

| Chip | Chip pin | Output to | Description |
|---|---|---|---|
| PDA9555 EX 0 | INT | SYS_EX_nINT | Original Expander - P1.60 |
| PDA9555 EX 4 | INT | STEM_INT | 50 pin connector to T-USB module |
| PDA9555 EX 6 | INT | SYS_EX_nINT | m.2 Expander for SYS - P1.60 |
| PCIe m.2 Key B | WAKE# | PCIE_WAKE_B | m.2 Key B - P2.52 |
| PCIe m.2 Key B | CLKREQ# | PCIE_CLKREQ_B | m.2 Key B - P2.90 |
| Left Sensors | ATT_INT | EX0.10 | Left Camera Module sensors |

| Chip | Chip pin | Output to | Description |
|---|---|---|---|
| Right Sensors | ATT_INT | EX4.14/EX0.14 | Right Camera Module sensors |

# 909c Connector Pinouts

## Debugging Breakout connector

| No. | Pin | Description | Voltage |
|---|---|---|---|
| 1 | 5V | Board Power 5V | |
| 2 | 3V3 | Board Power 3.3V | |
| 3 | VIN | USB Power input direct | |
| 4 | GND | GND | |
| 5 | UART2_RX | Debug UART2 RX | |
| 6 | UART2_TX | Debug UART2 TX | |
| 7 | GND | GND | |
| 8 | UART4_RX | Debug UART4 RX | |
| 9 | UART4_TX | Debug UART4 TX | |
| 10 | GND | GND | |
| 11 | TDI | JTAG | |
| 12 | TMS | JTAG | |
| 13 | TCK | JTAG | |
| 14 | RTCK | NC? JTAG | |
| 15 | TDO | JTAG | |
| 16 | RESET | SYS_RST_PMIC SoM | |
| 17 | PWRBTN | Power Button SoM | |
| 18 | QSPI_BOOT_EN_3P3 | FLEXSPI BOOT | |
| 19 | ALT_BOOT | PB_ALT_BOOT | |
| 20 | | | |
| 21 | | | |
| 22 | CAN2_TX | CAN bus 2 P1.33 | 3.3V |
| 23 | CAN2_RX | CAN bus 2 P1.49 | 3.3V |
| 24 | CAN1_RX | CAN bus 1 P1.51 | 3.3V |

| No. | Pin | Description | Voltage |
|---|---|---|---|
| 25 | CAN1_TX | CAN bus 1 P1.53 | 3.3V |
| 26 | ECSPI2_MISO | SPI2 MISO | |
| 27 | ECSPI2_SCLK | SPI2 Clock | |
| 28 | ECSPI2_SS0 | SPI2 SS0 | |
| 29 | ECSPI2_MOSI | SPI2 MOSI | |
| 30 | L_CAM_FSIN | Left Frame sync input | |
| 31 | L_CAM_STROBE | Left Frame sync output | |
| 32 | L_EXTCLK | Left External Clock Input (MCLK) | |
| 33 | L_ATT_XSHUT | Left Attached Shutdown | |
| 34 | L_RESET | Left Camera Reset | |
| 35 | L_PWRDN | Left Camera Shutdown | |
| 36 | R_CAM_FSIN | Right Frame sync input | |
| 37 | R_CAM_STROBE | Right Frame sync output | |
| 38 | R_EXTCLK | Right External Clock Input (MCLK) | |
| 39 | R_ATT_XSHUT | Right Attached Shutdown | |
| 40 | R_RESET | Right Camera Reset | |
| 41 | R_PWRDN | Right Camera Shutdown | |
| 42 | SYS_SCL | System I2C SCL | |
| 43 | SYS_SDA | System I2C SDA | |
| 44 | I2C3_SCL | Stem/3 I2C SCL | |
| 45 | I2C3_SDA | Stem/3 I2C SDA | |

## 50 pin B2B connectors

These connectors are new

Two connectors tie the daughterboard to the bridge board. Both are of a 50 pin Highrose B2B type.

- JLCPCB plug
- JLCPCB socket

default height 1.5mm

Connector 1: High Speed Data Connector 2: PD Controller, Debug, USB 2.0

| Power | Max Current | Pins |
|---|---|---|

| Power | Max Current | Pins |
|---|---|---|
| VSOM | 3.0 A | 10 |
| GND | 3.0 A | 10 |
| VCC_RTC | 600 mA | 2 |
| VIN_3V3 | 300 mA | 1 |
| VIN_5V | 600 mA | 2 |
| LDO_3V3 | 300 mA | 1 |

**Connector 1 high-speed data, close to Alt Mode Breakout connectors**

- 6 * GND
- 7 * VSOM

One side

| Pin | Code | Type | Details | Voltage | to Baseboard | Misc | MCU pin. |
|---|---|---|---|---|---|---|---|
| 1 | VSOM | Power | Main power for board 3.45V - 4.5V | | VSOM | Conn. detect | |
| 2 | USB1_RX_DP | USB | USB1 RX D+ (OTG) | | P1.6 | HD3SS460 SSRX | |
| 3 | USB1_RX_DN | USB | USB1 RX D- (OTG) | | P1.8 | HD3SS460 SSRX | |
| 4 | GND | Power | Ground | | | | |
| 5 | USB1_TX_DP | USB | USB1 TX D+ (OTG) | | P1.16 | HD3SS460 SSTX | |
| 6 | USB1_TX_DN | USB | USB1 TX D- (OTG) | | P1.18 | HD3SS460 SSTX | |
| 7 | GND | Power | Ground | | | | |
| 8 | USB2_RX_DP | USB | USB2 RX D+ (Host) | | CBTL04083 A0 | HD3SS460 SSRX | |
| 9 | USB2_RX_DN | USB | USB2 RX D- (Host) | | CBTL04083 A0 | HD3SS460 SSRX | |
| 10 | GND | Power | Ground | | | | |
| 11 | USB2_TX_DP | USB | USB2 TX D+ (Host) | | CBTL04083 A1 | HD3SS460 SSTX | |

| Pin | Code | Type | Details | Voltage | to Baseboard | Misc | MCU pin. |
|---|---|---|---|---|---|---|---|
| 12 | USB2_TX_DN | USB | USB2 TX D- (Host) | | CBTL04083 A1 | HD3SS460 SSTX | |
| 13 | GND | Power | Ground | | | | |
| 14 | | | | | | | |
| 15 | | | | | | | |
| 16 | | | | | | | |
| 17 | STEM SCL | I2C | STEM SCL | | P1.94 | GP21 I2C0 | |
| 18 | STEM SDA | I2C | STEM SDA | | P1.96 | GP20 I2C0 | |
| 19 | STEM INT | I2C | Sensor interrupts | | P1.98 | | |
| 20 | GND | Power | Ground | | | | |
| 21 | T_SBWTCK | MSP430 | SBWTCK / TEST / RTS | | | | |
| 22 | T_EXTRA | MSP430 | | | | | |
| 23 | T_SBWTDIO | MSP430 | SBWTDIO / RST / NMI / DTR | | | | |
| 24 | PWR_CHARGE | Battery | Internal charge current for testing | | | | |
| 25 | BAT_STAT | Battery | Internal charging status for testing | | | | |

Other side

| Pin | Code | Type | Details | Voltage | to Baseboard | Misc | MCU pin. |
|---|---|---|---|---|---|---|---|
| 50 | LVCLK+ | LVDS | LVDS CLK+ | | P1.80 | | |
| 49 | LVCLK- | LVDS | LVDS CLK- | | P1.82 | | |
| 48 | VSOM | Power | Main power for board 3.45V - 4.5V | | VSOM | | |
| 47 | LVD0+ | LVDS | LVDS D0+ | | P1.42 | | |
| 46 | LVD0- | LVDS | LVDS D0- | | P1.44 | | |
| 45 | VSOM | Power | Main power for board 3.45V - 4.5V | | VSOM | | |
| 44 | LVD1+ | LVDS | LVDS D1+ | | P1.46 | | |

| Pin | Code | Type | Details | Voltage | to Baseboard | Misc | MCU pin. |
|---|---|---|---|---|---|---|---|
| 43 | LVD1- | LVDS | LVDS D1- | | P1.48 | | |
| 42 | VSOM | Power | Main power for board 3.45V - 4.5V | | VSOM | | |
| 41 | LVD2+ | LVDS | LVDS D2+ | | P1.50 | | |
| 40 | LVD2- | LVDS | LVDS D2- | | P1.52 | | |
| 39 | VSOM | Power | Main power for board 3.45V - 4.5V | | VSOM | | |
| 38 | LVD3+ | LVDS | LVDS D3+ | | P1.56 | | |
| 37 | LVD3- | LVDS | LVDS D3- | | P1.58 | | |
| 36 | VSOM | Power | Main power for board 3.45V - 4.5V | | VSOM | | |
| 35 | | | | | | | |
| 34 | | | | | | | |
| 33 | GND | Power | Ground | | | | |
| 32 | CAN_RX | | CAN1_RX | | P1.51 | P21.12 | |
| 31 | CAN_TX | | CAN1_TX | | P1.53 | P21.14 | |
| 30 | BAT_LDO | Battery | 4.9V 50mA LDO for STAT LED | | | | |
| 29 | BOTH_VSOM2 | MSP430 | High if any VSOM pin on this connector supplies on Faceboard side. | | | | |
| 28 | UART_T_TXD | MSP430 | | | | | |
| 27 | UART_T_RXD | MSP430 | | | | | |
| 26 | VSOM | Power | Main power for board 3.45V - 4.5V | | VSOM | | |

Could also take in HDMI or PCIe lanes instead of LVDS

**Connector 2 PD controller, close to power connectors**

- 2 * VSOM, 3 * GND, 1 * VCC_RTC, 1 * VIN_3V3
- 1 * VSOM, 1 * GND, 2 * VIN_5V

One side

| Pin | Code | Type | Details | Voltage | to Baseboard | Misc |
|---|---|---|---|---|---|---|
| 1 | VSOM | Power | Main power for board 3.45V - 4.5V | | VSOM | Conn. detect |
| 2 | GND | Power | Ground | | | |
| 3 | USB1_DP | USB | USB1 D+ | | P1.12 | |
| 4 | USB1_DN | USB | USB1 D- | | P1.14 | |
| 5 | GND | Power | Ground | | | |
| 6 | USB2_DP | USB | USB2 D+ | | P1.3 | |
| 7 | USB2_DN | USB | USB2 D- | | P1.5 | |
| 8 | GND | Power | Ground | | | |
| 9 | PD_SWD_CLK | Debug | PD Controller GPIO12 | | | |
| 10 | PD_SWD_DAT | Debug | PD Controller GPIO13 | | | |
| 11 | BOTH_VSOM | Enable | Bridge board signal;VSOM connected on both sides | 3V3 | | |
| 12 | MCU_SYS_INT | IRQ | When state of MCUs change -> SoM | | P20.20<br>P2.67<br>EX:P1.3<br>EX0.2 | |
| 13 | SYS I2C SCL | I2C | | | P21.7 | GP15 I2C1. |
| 14 | SYS I2C SDA | I2C | | | P21.5 | GP14 I2C1. |
| 15 | VSOM_LOCK | Power | Main power for board 3.45V - 4.5V, if mechanical lock shorted | | VSOM | Mech. lock |
| 16 | SYS_RST_PMIC | Reset | PMIC reset input pin. Internally pulled up with LDO1 power rail. Once low, PMIC performs reset. | | P1.2 | P10.9 |
| 17 | POR_B_3P3 | Reset | Power On reset output pin. Open drain output requiring external pull up resistor. | | P2.66 | P10.7 |

| Pin | Code | Type | Details | Voltage | to Baseboard | Misc |
|---|---|---|---|---|---|---|
| 18 | PMIC_ON_REQ | Reset | PMIC ON input from Application processor. When high, the device starts power on sequence. | | P1.68 | P10.5 |
| 19 | PMIC_STBY_REQ | Reset | Standby mode input from Application processor. When high, device enters STANDBY mode. | | P1.66 | P10.3 |
| 20 | VCC_RTC | Power | Low power mode supply | | P1.93 | |
| 21 | PWRBTN | Boot | Power button trigger | | P2.64 | |
| 22 | ALT_BOOT | Boot | Alternate boot | | P1.90 | |
| 23 | QSPI_BOOT_EN_3P3 | Boot | SPI boot | | P1.95 | P21.18 |
| 24 | BAT_CE# | Charger | Charge Enable Active-Low. Connect CE to a high logic level to place the battery charger in standby mode. | | | |
| 25 | PD_VIN_EN | Future | Enable VIN_5V/3V3 from PWR_SYS (TBD) | | | |

Other side

| Pin | Code | Type | Details | Voltage | to Baseboard | Misc | mcu pin |
|---|---|---|---|---|---|---|---|
| 50 | PD_HRESET | Future | PD Controller HRESET (High) | | | | |
| 49 | GND | Power | Ground | | | | |
| 48 | UART1_TXD | UART | UART1 Tx | | P1.72 | P20.9 | GP4 UART1 |
| 47 | UART1_RXD | UART | UART1 Rx | | P1.19 | P20.11 | GP5 UART1 |
| 46 | UART2_TXD | UART | UART2 Tx | | P1.74 | P20.1 | GP8 UART1. |
| 45 | UART2_RXD | UART | UART2 Rx | | P1.76 | P20.3 | GP9 UART1 |

| Pin | Code | Type | Details | Voltage | to Baseboard | Misc | mcu pin |
|---|---|---|---|---|---|---|---|
| 44 | UART3_TXD | UART | UART3 Tx | | P1.61 | P20.2 | GP12 UART0 |
| 43 | UART3_RXD | UART | UART3 Rx | | P1.21 | P20.4 | GP13 UART0 |
| 42 | UART4_TXD | UART | UART4 Tx | | P1.86 | P20.8 | GP20 UART1 |
| 41 | UART4_RXD | UART | UART4 Rx | | P1.84 | P20.10 | GP21 UART1 |
| 40 | MIC_CLK | Sensor | frontboard mic | | | | |
| 39 | MIC_DATA | Sensor | | | | | |
| 38 | MIC_INT | Sensor | | | | | |
| 37 | MOTION_INT | Sensor | Spare interrupt pin for future | | | | |
| 36 | NIGHT SCL | I2C | I2C6 SCL | | P1.87 | P21.2 | GP19 I2C1. |
| 35 | NIGHT SDA | I2C | I2C6 SDA | | P1.89 | P21.4 | GP18 I2C1. |
| 34 | NIGHT INT | I2C | Sensor interrupts | | | | |
| 33 | SPI_CS | RP2040 | RP SPI | 3.3V | | | GP29 SPI1 |
| 32 | SPI_CLK | RP2040 | RP SPI | 3.3V | | | GP10 SPI |
| 31 | SPI_MISO | RP2040 | RP SPI | 3.3V | | | GP28 SPI |
| 30 | SPI_MOSI | RP2040 | RP SPI | 3.3V | | | GP11 SPI |
| 29 | VIN_3V3 | | Supply for TPS64988 circuitry and I/O | 3.3V 50 mA | | | |
| 28 | VIN_5V | Power | System 5V src (PPHV1/2, PP1/2_CABLE) | 5V 500 mA | | | |
| 27 | VIN_5V | Power | System 5V src (PPHV1/2, PP1/2_CABLE) | 5V 500 mA | | | |

| Pin | Code | Type | Details | Voltage | to Baseboard | Misc | mcu pin |
|---|---|---|---|---|---|---|---|
| 26 | VSOM | Power | Main power for board 3.45V - 4.5V | | VSOM | Conn. detect | |

SPI pins will be exchanged for SDIO (MIC_INT / MOTION_INT / PD_HRESET likely to go away)

Consider SPI for PD Controller PD Controller IRQ I2C1