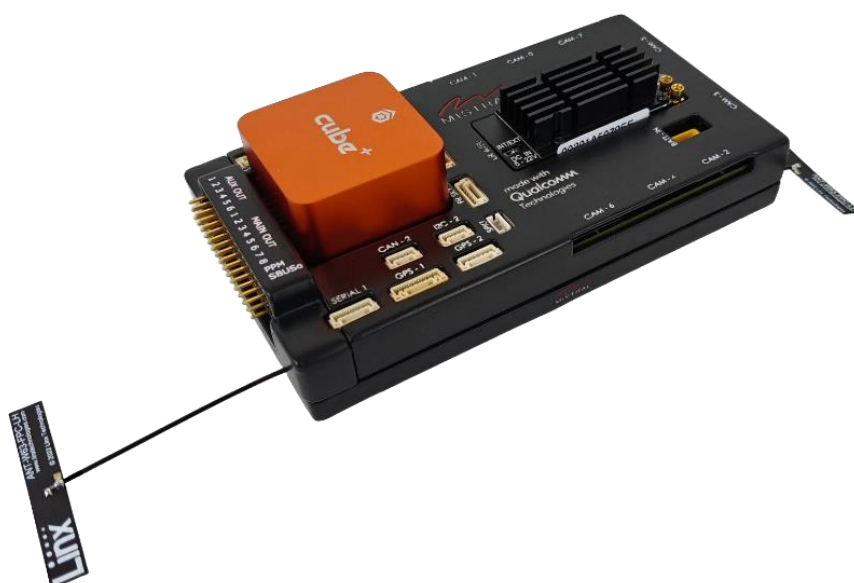


MRD8550 Merlin Kit

LR Wi-Fi

Hardware *User Guide*

Revision 1.0



Revision History

Revision	Date	Description
1.0	August 21, 2025	Preliminary version

ABSTRACT

This technical user's guide describes the hardware architecture, configuration options and connectors details of the MRD8550 Merlin Kit LR Wi-Fi.

Note: Information in this document is subject to change. Contact us for the most updated version of this document.

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Abbreviations & Acronyms

Many acronyms and abbreviations are used throughout this manual. Use the table below to navigate unfamiliar terms used in this document.

Acronym	Definition
AI	Artificial Intelligence
BLE	Bluetooth Low Energy
BT	Bluetooth
CSI	Camera Serial Interface
DP	Display Port
DPU	Display Processing Unit
DSI	Display Serial Interface
DSP	Digital Signal Processing
FCU	Flight Control Unit
GPIO	General Purpose Input/Output
GPU	Graphics Processing Unit
HDMI	High-Definition Multimedia Interface
I2C	Inter Integrated Circuit
I2S	Integrated Inter-IC Sound Bus
IO	Input-Output
IoT	Internet of Things
ISP	Image Signal Processor
JTAG	Joint Test Action Group
LGA	Land Grid Array
LPDDR	Low Power Double Data Rate Memory
MIPI	Mobile Industry Processor Interface
PCIe	Peripheral Component Interconnect Express
PMIC	Power Management Integrated circuits
PoP	Package On Package
LR	Long Range
FPV	First Person View
IMU	Inertial Measurement Unit
UFS	Universal Flash Storage
VPU	Vision Processing Unit
LTE	Long Term Evolution
HDR	High Dynamic Range
UART	Universal Asynchronous Receiver Transmitter
SPI	Serial Peripheral Interface
PWM	Pulse Width Modulation
CAN	Controller Area Network
GPS	Global Positioning System
ADC	Analog to Digital Converter
HS	High Speed
LS	Low Speed

1. Introduction

Take your IoT and drone innovations to new heights with the MRD8550 Merlin Kit LR Wi-Fi!

The MRD8550 Merlin Kit LR Wi-Fi- Mistral's Aero Intelligent Edge Controller, powered by the Qualcomm® QCS8550 SoC. Packed with cutting-edge technology, empowers developers to create high-performance industrial drones, autonomous robots, and AI-powered edge devices. With exceptional computing capabilities, advanced AI/ML inferencing and Qualcomm's AI-powered Spectra ISP, it ensures seamless computer vision and real-time data processing. Designed for power efficiency, it optimizes performance while extending operational time. High-speed LR Wi-Fi connectivity enables low-latency communication, making it ideal for industrial, enterprise, and professional applications. Whether you're building autonomous drones, robotics platforms, or edge AI gateways, the Merlin Kit LR Wi-Fi provides a robust and flexible foundation to accelerate innovation.

The MRD8550 SOM, the core of the Merlin Kit LR Wi-Fi, is a high-compute, superior-performance, power-efficient core, and extreme Edge AI processing capabilities around the Qualcomm® Snapdragon QCS8550 premium-tier SoC built on a cutting-edge 4nm process with LPDDR5x PoP memory, UFS3.1 storage, On-board wireless connectivity, and multiple PMICs for power supplies. Designed to deliver robust processing power, tailored for a wide variety of IoT applications, essential video, audio, and graphics processing power, Autonomous mobile robots, Industrial Drones, cloud gaming, Advanced Edge AI Engine computing, and versatile connectivity.

The MRD8550 Merlin board is a powerful platform for advanced autonomous systems, featuring an independent Flight Control Unit (FCU) with the Cubepilot Cube Orange+ and a high-performance AI/ML processing engine capable of delivering 48 TOPS (Trillion Operations Per Second) of advanced AI performance. With its LR Wi-Fi for high-speed wireless connectivity and cutting-edge AI and machine learning inferencing technology, the kit accelerates the development of innovative, power-efficient, high-computing robots and drones, making it ideal for enterprise, industrial, and professional service applications. It has Board-to-Board connectors which integrates the MRD8550 CAM LR Expansion Board features the LR Wi-Fi and 8x MIPI CSI Cameras.

For robotics developers, drone designers, and engineers, the MRD8550 Merlin Kit LR Wi-Fi is a highly integrated, modular form-factor design that enables users to construct intelligent machines that are tailored to their specific needs. The kit has been thoughtfully constructed to be easily incorporated into your creations!

The MRD8550 Merlin Kit LR Wi-Fi supports both the LE (Linux Embedded) and LA (Linux, Android), offering the flexibility to choose between power efficiency and feature requirements for development platforms. Enabling the rapid development of IoT products, with the Linux kernel 5.15 providing long-term product support also includes multiple software options including support for embedded Linux and a reference Root File system from Ubuntu. The kit supports Linux Kernel 5.4, Ubuntu, and ROS; and includes a suite of software packages for implementing various applications such as AI/ML, Neural Processing, Auto Pilot, Navigation, Machine Vision, Multimedia and User Interface among others.

1.1. Overview

The MRD8550 Merlin Kit LR Wi-Fi is a high performance, standalone development platform that allows users to evaluate the QCS8550 System-on-Chip (SoC).

Below are the MRD8550 Merlin Kit LR Wi-Fi key features:

- Solderable LGA MRD8550 SOM in modular form factor
 - 12GB of LPDDR5x PoP memory (Expandable up to 24GB)
 - 128GB UFS memory (Expandable up to 1TB)
 - 8x Kryo CPU @3.2GHz, Adreno 740 GPU
 - Adreno 765 VPU, Adreno 1295 DPU
 - Neural Processing Unit
 - Accelerators for depth-map, HDR, Face-detection
 - Video encode of 4K120 / 8K30
 - Wi-Fi 7 & BLE/BT 5.3 Connectivity
- 1x 10/100/1000/2500Mb/s and 1x 10/100/1000Mb/s Ethernet interfaces with IX connectors
- All-Ways aware sensor technology (IMU, Barometer, Magnetometer Sensors)
- USB Type-C (with DP-ALT mode) and USB Host port
- 8x MIPI CSI Ports, supports up to 5 cameras concurrently
- HDMI Input camera support
- Supports 5G/LTE Connectivity (With 2x Nano SIM)
- 2x Speaker out for audio interface and 2x on-board microphone
- Debug UART using USB to UART interfaces through the on board FTDI device
- JTAG interface
- User LED
- GNSS L1/L5 connectivity
- PMIC and DC-DC regulators are used to derive the required power for SOM and other on-board peripherals
- Four push-pull control switches and Boot configuration DIP Switch
- Micro SD card
- HS_LS Expansion connector: USB, DMIC, UART, SPI, I2C, CAN & GPIOs
- Flight Control unit supports Cube Orange+ and Cube peripherals like CAN, USB, UART, GPS, ADC, PWM, Debug, I2C, Serial port, SPKT and FR-SKY
- Input power: 12V-36V, (12V@5A (Typ))
- Dimensions: 141 x 76 x 41 mm
- Operating Temperature: -10° C to +70° C

1.2.MRD8550 Merlin Kit LR Wi-Fi Contents

The MRD8550 Merlin Kit LR Wi-Fi includes:

1. MRD8550 Merlin Board with embedded MRD8550 SOM
2. MRD8550 Flight Control Unit
3. MRD8550 CAM LR Expansion Board
4. Basic Accessories Kit
5. Vision Accessories Kit**
6. Cable Accessories Kit**
7. 5G Connectivity Accessories Kit**
8. Quick Start Guide

The MRD8550 Merlin Kit LR Wi-Fi include pre-installed system software.

**Additional accessories to be ordered separately.

Following table identifies the various components in each Accessories Kit.

Table 1-1: Basic Accessories Kit

Sl. No	Accessories	Description	Qty
1	DC Adapter	AC/DC Adapter, 240V input, 12V, 60W, certified	1
2	Power cord	Power cord for DC adapter	1
3	Custom Power cable	Custom power cable with DC Jack (2.10mm ID, 5.50mm OD)	1
4	I-PEX cable	Micro coaxial cable (100mm)	2
5	USB Type-C cable	Cable, USB3.0, Type-C (Male) to A (Male), 5Gbps, Shielded,1m	1
6	FCU Accessories kit	Cable set for FCU (Details are explained in Table 1-2)	1

*Available 300 mm and 400mm variants of IPEX cable.

Table 1-2: FCU Accessories Kit (MRD8550-ACC-FCU-101)

Sl. No	Accessories	Description	Qty
1	I2C cable	4-pin cables (Can be used for CAN1, CAN2, I2C2 ports)	2
2	CAN cable	4-pin cables (Can be used for CAN1, CAN2, I2C2 ports)	2
3	P SENSE cable	3-pin cable (Used for P SENSE port)	1
4	Buzzer cable	6-pin cable with Micro USB (Can be used for USB port)	1
5	GPS1 cable	8-pin cable (Can be used for GPS1 port)	1
6	USB cable	Micro USB cable (Can be used for Cube USB port)	1
7	Telemetry cable	6-Pin cables (Can be used for FR-SKY, SERIAL 1, GPS2 ports)	2

Table 1-3: Vision Accessories Kit (MRD8550-ACC-VK-101)

Sl. No	Accessories	Description	Qty
1	IMX577 Camera module	Main camera	1
2	OV9282 Camera module	Tracking camera	1
3	IMX577 Camera adapter	IMX577 Camera Adapter board	1
4	OV9282 Camera adapter	OV9282 Camera Adapter Board	1

Table 1-4: Cable Accessories Kit (MRD8550-ACC-CK-101)

Sl. No	Accessories	Description	Qty
1	USB Micro-B cable	USB 2.0 Micro-B to A cable	1
2	IX Ethernet cable	Ethernet IX Type A to RJ45 cable	1
3	HDMI cable	HDMI-A to HDMI Micro-D cable	1

Table 1-5: 5G Connectivity Accessories Kit (MRD8550-ACC-MK-101)

Sl. No	Accessories	Description	Qty
1	5G modem	5G /4G/3G FR1 Bands, M.2 FF Module with screws	1
2	5G antenna kit	5G/4G Monopole Antennas	1
3	5G MHF4 to UFL cable	SMA to MHF4 cable	4

2. MRD8550 Merlin Kit LR Wi-Fi Specifications

The key features of MRD8550 Merlin Kit LR Wi-Fi are listed below, **Table**

2-1 : MRD8550 Merlin Kit LR Wi-Fi Specifications

Category	Description
Platform	Octa Core Qualcomm® Kryo™ CPU @ 3.2 GHz Qualcomm® Adreno™ 740 GPU Qualcomm® Hexagon™ Tensor DSP Qualcomm® Spectra™ Image Processing Engine Qualcomm® Adreno 8550 VPU Qualcomm® Adreno 1295 DPU Manufactured in 4nm process
Memory Support	12GB LPDDR5x (Package on Package) 128GB UFS 3.1 SD v3.0 4-bit for SD card
Interface	1x USB Host port & 1x Type-C (with DP-ALT Mode) 2x Gigabit Ethernet 1x HDMI Input 2x Speakers
Connectivity	GNSS L1/L5 band Long Range Wi-Fi (802.11AX) Wi-Fi 7 (802.11a/b/g/n/ac/ax/be 2x2 MIMO) & BT 5.3/BLE 5G/ LTE (with 2x Nano SIM support)
Flight Control Unit	Flight Control Unit (FCU) supported by Cube Orange+ Customizable to multitude of vehicles (air-borne, land and water) • 2x Telemetry Header • 2x GPS Header • 2x CAN Header • ADC Header • SPKT Header • I2C Header • HMI Header (USB2.0, Buzzer) • PWM Header • P SENSE Header

Camera	Up to 5x concurrent cameras - 8x MIPI CSI Ports • 1x 4-lane MIPI-CSI Main Camera • 6x Low Resolution Tracking Cameras • 1x MIPI CSI ToF Camera/1x Depth Camera/1x HDMI Input Camera Accelerators for depth-map, HDR, Face-detection Video-encode of 4K120/8K30
Sensors	IMU Barometer Magnetometer Microphones
Expansion Connector	2x USB 3.0 ADC, UART, I2C, GPIOs SPI, CAN-FD, DMIC, SWR
Debug Interface	Micro USB Debug Port to access MPU JTAG Interface
Power	12V-36V (12V@5A Typ) - XT30 Power input
Form factor	Dimensions: 141 x 76 x 41 mm
Weight	352 g
Operating Temperature	-10° C to +70° C

3. Hardware Description

3.1. MRD8550 Merlin Kit LR Wi-Fi

The MRD8550 Merlin Kit LR Wi-Fi consists of MRD8550 SOM, MRD8550 Merlin Board, MRD8550 Flight Control Unit and MRD8550 CAM LR Expansion Board. The functional block diagram of each of the above is depicted below,

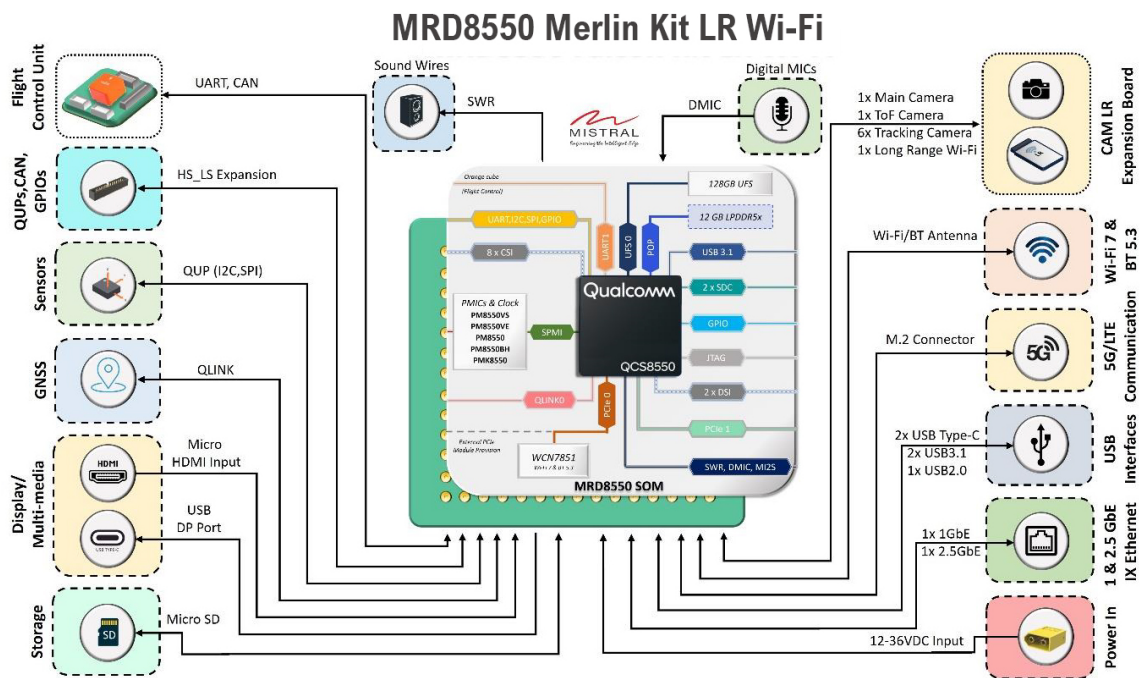


Figure 3-1: MRD8550 Merlin Kit LR Wi-Fi – Functional Block Diagram

3.1.1. MRD8550 SOM

The Mistral's MRD8550 SOM is a cutting-edge System on Module featuring the potent Qualcomm® premium tier QCS8550 processor, cutting-edge 4nm process with LPDDR5x PoP memory, UFS3.1 storage.

The MRD8550 SOM offers wireless connectivity with Wi-Fi 7 and Bluetooth 5.3, using Qualcomm WCN7851 chip. It also possesses an array of 8x MIPI CSI ports and 2x MIPI DSI ports for versatile use, as well as multiple audio/video input/output interfaces. Moreover, the MRD8550 SOM supports 1x USB 3.1 ports, 2x PCIe slots, I2S, QLink various low-speed interfaces such as GPIOs, UART, SPI, I2C and more.

MRD8550 SOM has a form factor of 43 x 42mm comes with LGA pattern of 664 pins on the bottom side to interface with carrier boards.

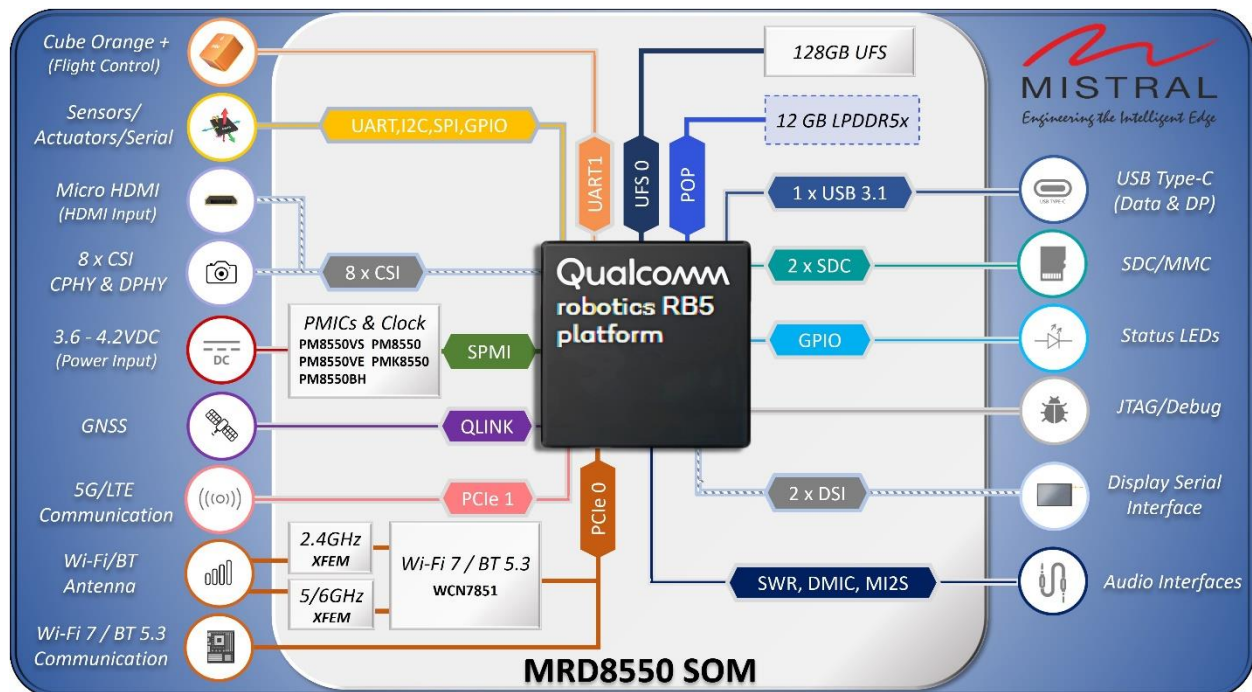


Figure 3-2 : MRD8550 SOM – Functional Block Diagram

3.1.2. MRD8550 Merlin Board

MRD8550 Merlin Board is designed to provide access to some of the most important features supported by the MRD8550 SOM. MRD8550 Merlin Board has a form factor of 137 x 71 mm.

A major part of the standard interfaces, which are supported by the MRD8550 SOM, are exposed on the solderable LGA pads. The connectors, LEDs, and push buttons are all placed on the board edge in MRD8550 Merlin Board in a way that easily allows for user access and integration.

A visual representation of the interfaces to subsystems, including the camera, display, speaker, GNSS and USB is presented. This depiction facilitates a clear understanding of the port and interface specifications essential for device operations.

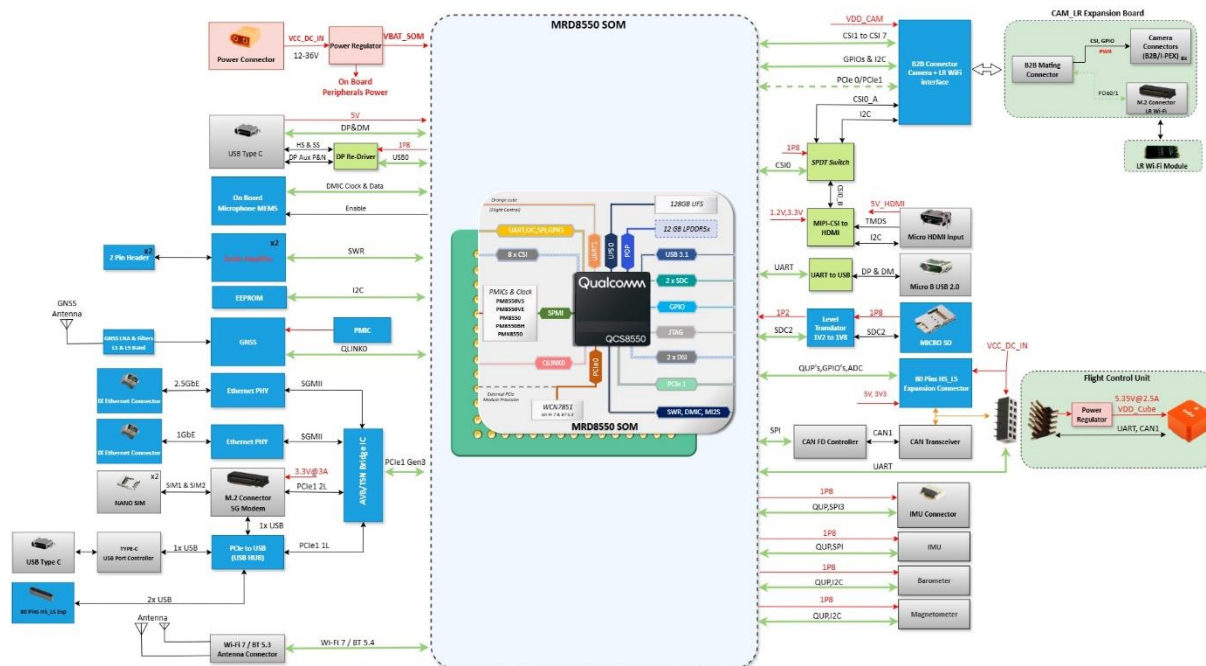


Figure 3-3: MRD8550 Merlin Board – Functional Block Diagram

3.1.3. MRD8550 Flight Control Unit

The MRD8550 Flight Control Unit facilitates seamless integration of flight control functionalities with the MRD8550 Merlin Board. The flight controller features are provided by the Cube Orange+ module from CubePilot. The Cube Orange+ autopilot is the latest and most powerful model in the CubePilot ecosystem. MRD8550 Flight Control Unit has a form factor of 71 x 59 mm.

The Flight control unit features Cube connector and peripheral B2B connector. With MRD8550 Flight Control Unit, you will be able to connect GPS, CAN, I2C, Telemetry, FR-SKY, UART, USB, Battery monitor, PPM modules to Cube Orange+ Module. AUX monitor is reserved for future use.

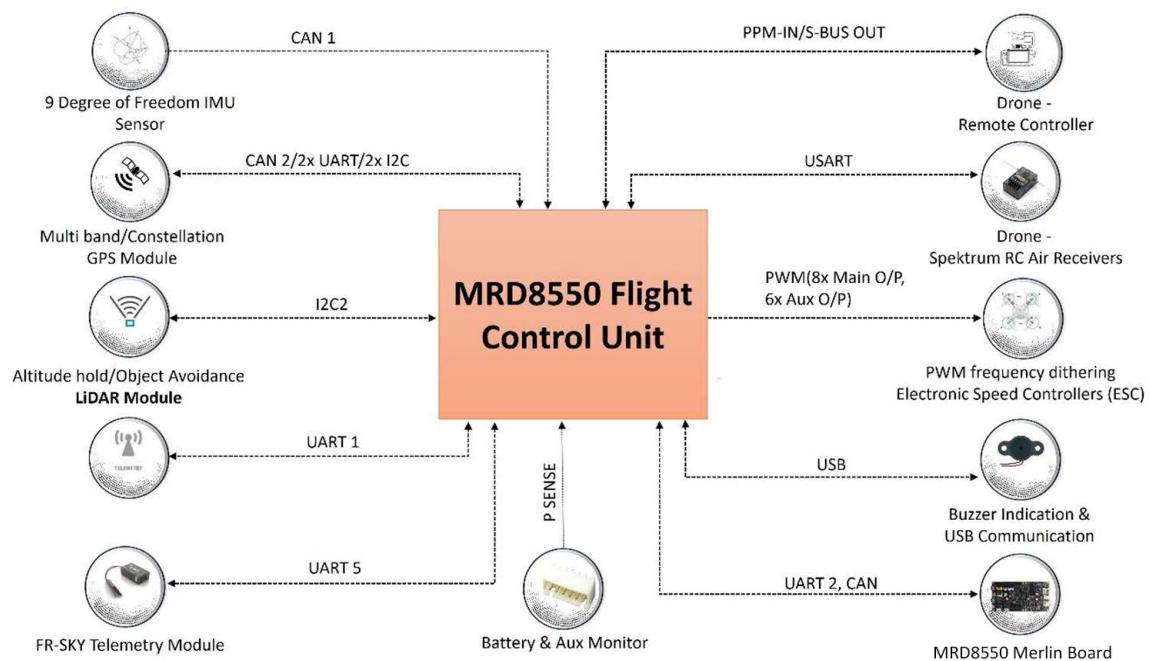


Figure 3-4: MRD8550 Flight Control Unit - Functional Block Diagram

Flight Control Unit is compatible with Cube Orange+ and other cube compatible modules.

Note: Either FCU board or HS_LS Expansion connector can be accessed.

3.1.4. MRD8550 CAM LR Expansion Board

The MRD8550 Merlin Board has the Board-to-Board connectors which integrates the MRD8550 CAM LR Expansion Board features the 8 Cameras and LR Wi-Fi. CAM LR Expansion Board has a form factor of 77 x 71 mm.

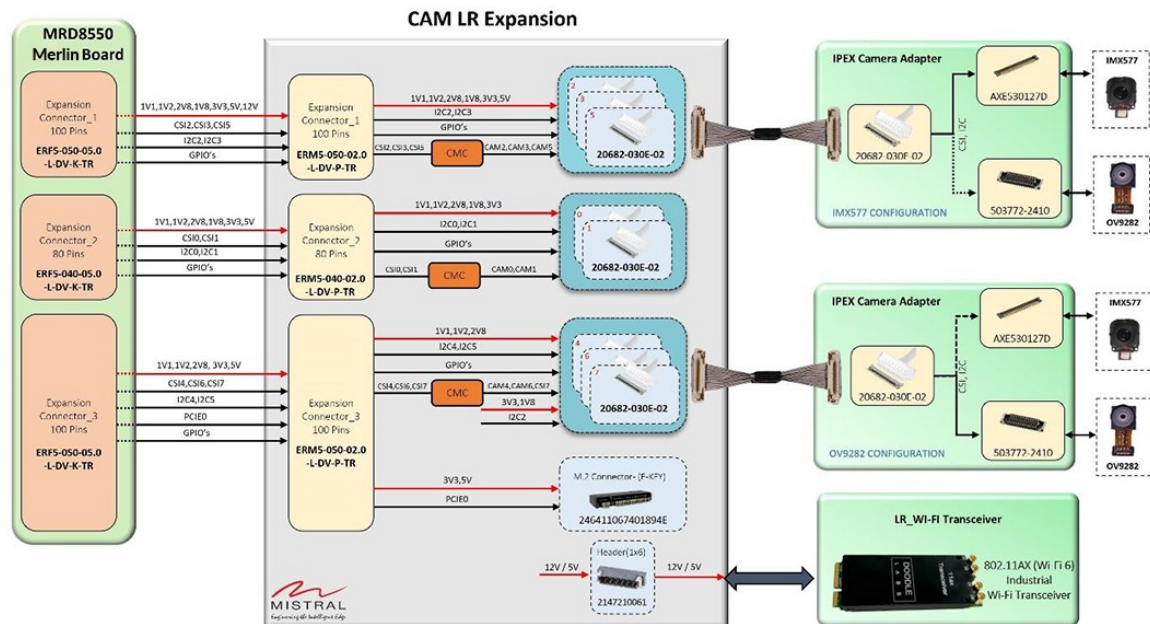


Figure 3-5: MRD8550 CAM LR Expansion Board – Functional Block Diagram

4. Board Placement Diagram

Various boards in the MRD8550 Merlin Kit LR Wi-Fi are explained below,

4.1.MRD8550 Merlin Kit LR Wi-Fi – Board location

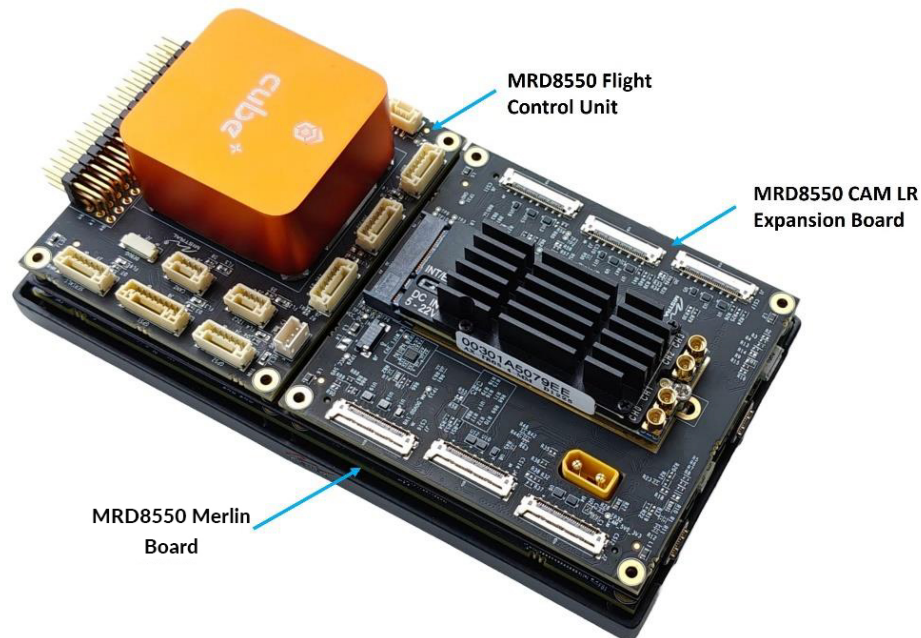


Figure 4-1: MRD8550 Merlin Kit LR Wi-Fi - Top View

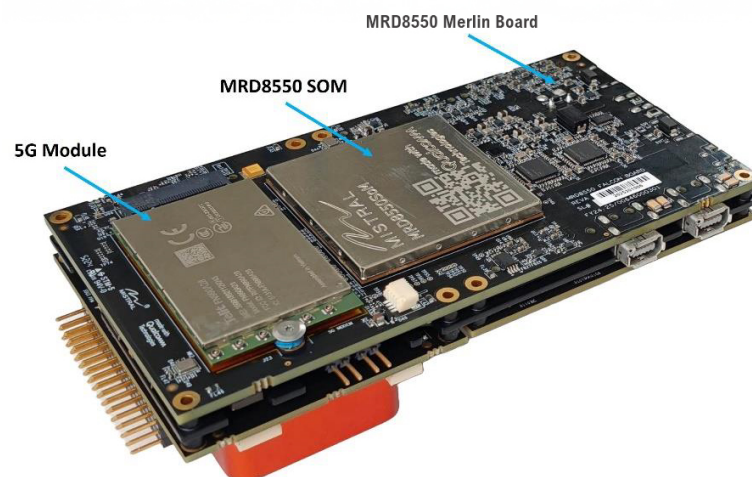


Figure 4-2: MRD8550 Merlin Kit LR Wi-Fi - Bottom View

4.2.MRD8550 Merlin Board Peripherals

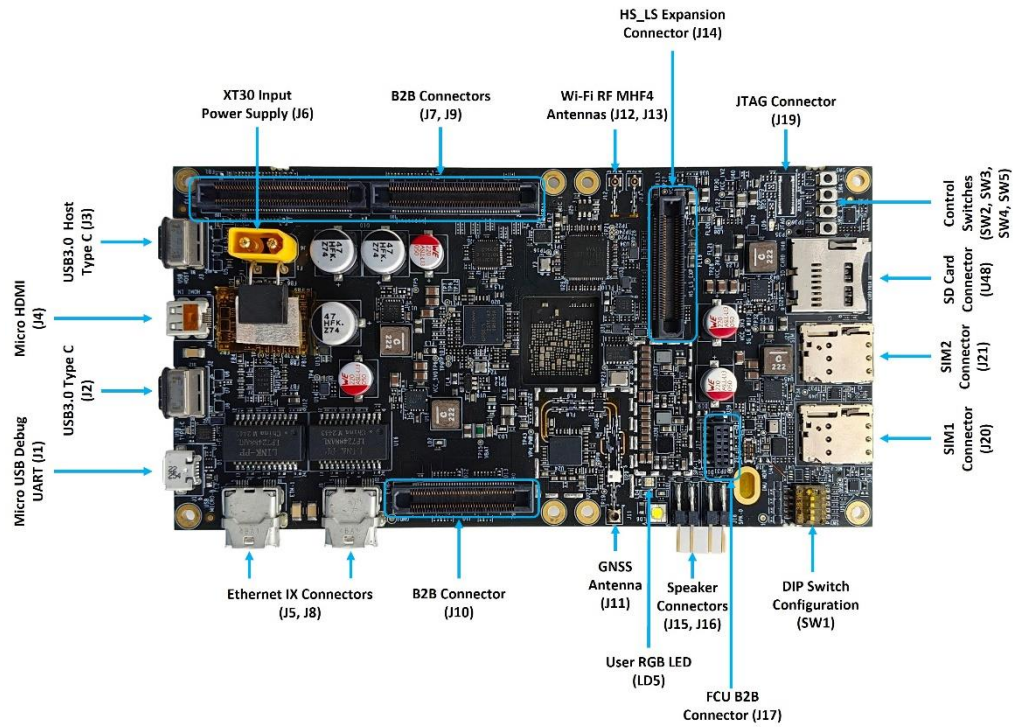


Figure 4-3: MRD8550 Merlin Board - Top View

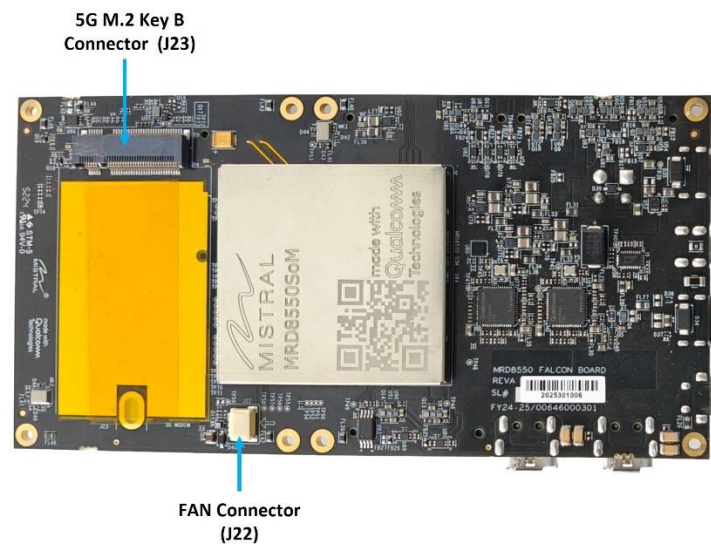


Figure 4-4: MRD8550 Merlin Board - Bottom View

4.3. MRD8550 Flight Control Unit Peripherals

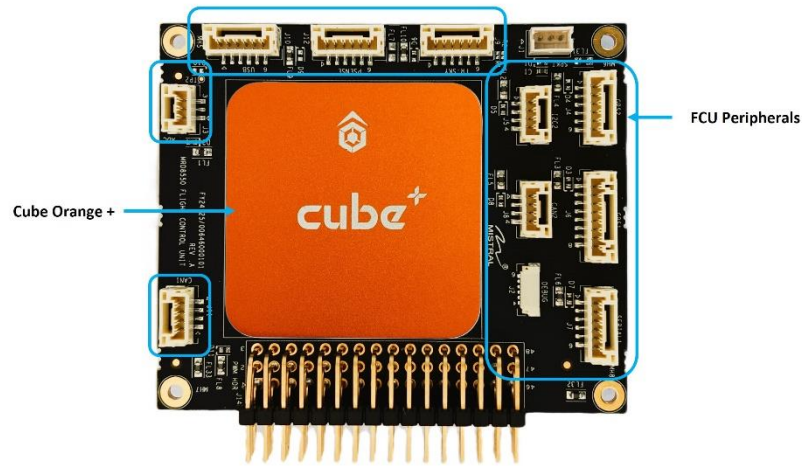


Figure 4-5: MRD8550 Flight Control Unit - Top View

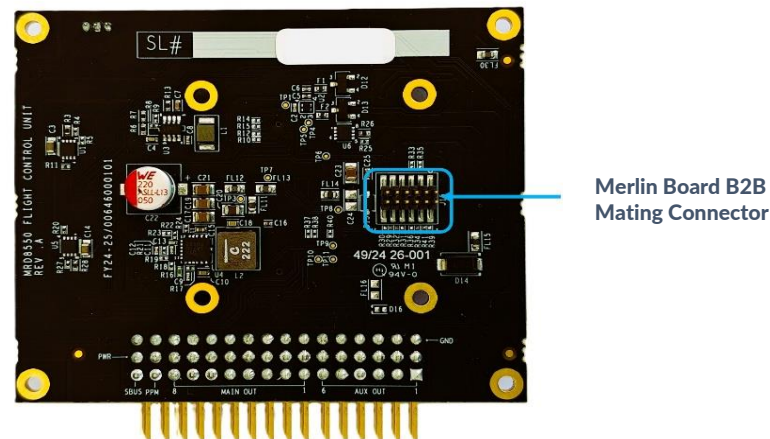


Figure 4-6: MRD8550 Flight Control Unit - Bottom View

4.4. MRD8550 CAM LR Expansion Board Peripherals



Figure 4-7: MRD8550 CAM LR Expansion Board- Top View

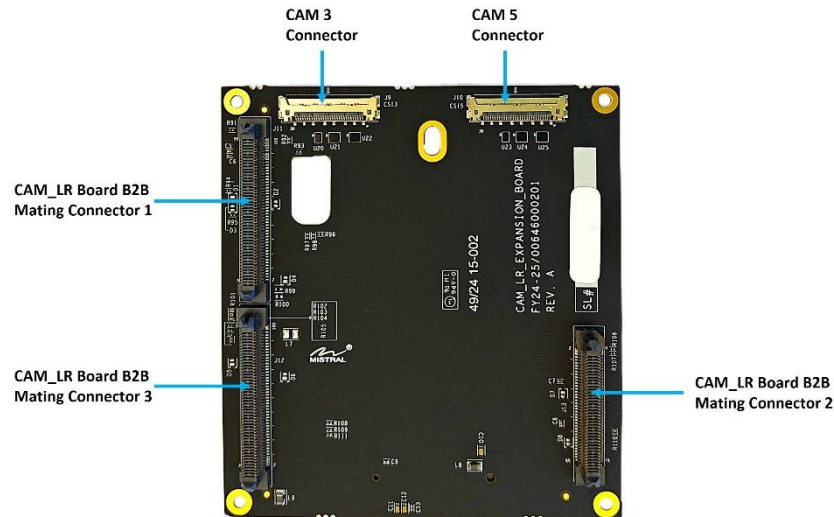


Figure 4-8: MRD8550 CAM LR Expansion Board – Bottom View

5. MRD8550 Merlin Board Interfaces

5.1. Power Input Connector

The MRD8550 Merlin Board supports a wide input range of 12V to 36V (12V@5A typ). To power up the board, minimum 12V needs to be applied to the XT30 male connector (J6) using the custom power cable and the DC adapter. When the power is provided, power LED (LD1) glows, indicating that the board is powered on.

Boot up messages can be observed by viewing the boot message logs by plugging a micro-USB cable into the debug port (J1) using a serial terminal.

Table 5-1: Power Connector (J6)

Pin No	Signal	Description
1	Supply	12V - 36V Input
2	Ground	Ground

5.2. Ethernet port

The MRD8550 Merlin Board provides a 2x Gigabit Ethernet port (via IX connector), supporting two different network speeds of 1GBE & 2.5GBE, which connects to the MRD8550 SOM through the QPS615 Ethernet-AVB/TSN bridge IC.

This port is utilized to transmit the captured data to the host PC over the network. The connector pin details can be found below table, with Figure 5-2 & Figure 5-3 illustrating the Ethernet IX connector.

Table 5-2: Ethernet IX Connector (J8)

Pin No	Signal	Description
1	LAN1_DA+	Gigabit Ethernet differential pair 0 positive
2	LAN1_DA-	Gigabit Ethernet differential pair 0 negative
3	Ground	Ground
4	LAN1_DC+	Gigabit Ethernet differential pair 2 positive
5	LAN1_DC-	Gigabit Ethernet differential pair 2 negative
6	LAN1_DB+	Gigabit Ethernet differential pair 1 positive
7	LAN1_DB-	Gigabit Ethernet differential pair 1 negative
8	Ground	Ground
9	LAN1_DD+	Gigabit Ethernet differential pair 3 positive
10	LAN1_DD-	Gigabit Ethernet differential pair 3 negative

Table 5-3: Ethernet IX Connector (J5)

Pin No	Signal	Description
1	LAN2_DA+	Gigabit Ethernet differential pair 0 positive
2	LAN2_DA-	Gigabit Ethernet differential pair 0 negative
3	Ground	Ground
4	LAN2_DC+	Gigabit Ethernet differential pair 2 positive
5	LAN2_DC-	Gigabit Ethernet differential pair 2 negative
6	LAN2_DB+	Gigabit Ethernet differential pair 1 positive
7	LAN2_DB-	Gigabit Ethernet differential pair 1 negative
8	Ground	Ground

9	LAN2_DD+	Gigabit Ethernet differential pair 3 positive
10	LAN2_DD-	Gigabit Ethernet differential pair 3 negative

5.3. USB Type C (DP Alt mode) port

Dedicated USB0 super speed signals from MRD8550 SOM are connected to USB Type C connector (J2). This port used for ADB Programming and DP alt mode. This CC controller supports Dual Role Port (DRP).

Table 5-4: USB Type C (DP Alt mode) Connector (J2)

Pin No	Signal	Description
A1	Ground	Ground
A2	USB0_SSTX_C1_P_CON	SuperSpeed Transmit+
A3	USB0_SSTX_C1_M_CON	SuperSpeed Transmit-
A4	USB_VBUS_TYPEC	Power
A5	USB_CC1	Configuration Channel 1
A6	USB_HSO_D_P	USB Data Signal Positive
A7	USB_HSO_D_M	USB Data Signal Negative
A8	USB_SBU1	Side Band Use 1
A9	USB_VBUS_TYPEC	Power
A10	USB0_SSRX_C2_M_CON	SuperSpeed Receive-
A11	USB0_SSRX_C2_P_CON	SuperSpeed Receive+
A12	Ground	Ground
B1	Ground	Ground
B2	USB0_SSTX_C2_P_CON	SuperSpeed Transmit+
B3	USB0_SSTX_C2_M_CON	SuperSpeed Transmit-
B4	USB_VBUS_TYPEC	Power
B5	USB_CC2	Configuration Channel 2
B6	USB_HSO_D_P	USB Data Signal Positive
B7	USB_HSO_D_M	USB Data Signal Negative
B8	USB_SBU2	Side Band Use 2
B9	USB_VBUS_TYPEC	Power
B10	USB0_SSRX_C1_M_CON	SuperSpeed Receive-
B11	USB0_SSRX_C1_P_CON	SuperSpeed Receive+
B12	Ground	Ground

5.4. Host USB port

The MRD8550 Merlin Board support another USB Type C host. It is interfaced with MRD8550 SOM with a Dual Role Port (DRP) Controller and USB hub controller. This port can support a maximum current (Source) of 5V @900mA.

Table 5-5: Host USB Connector (J3)

Pin No	Signal	Description
A1	Ground	Ground
A2	USB0_SSTX_C1_P_CON	SuperSpeed Transmit+
A3	USB0_SSTX_C1_M_CON	SuperSpeed Transmit-
A4	USB_VBUS_TYPEC	Power
A5	USB_CC1	Configuration Channel 1
A6	USB_HS0_D_P	USB Data Signal Positive
A7	USB_HS0_D_M	USB Data Signal Negative
A8	NC	Not Connected
A9	USB_VBUS_TYPEC	Power
A10	USB0_SSRX_C2_M_CON	SuperSpeed Receive-
A11	USB0_SSRX_C2_P_CON	SuperSpeed Receive+
A12	Ground	Ground
B1	Ground	Ground
B2	USB0_SSTX_C2_P_CON	SuperSpeed Transmit+
B3	USB0_SSTX_C2_M_CON	SuperSpeed Transmit-
B4	USB_VBUS_TYPEC	Power
B5	USB_CC2	Configuration Channel 2
B6	USB_HS0_D_P	USB Data Signal Positive
B7	USB_HS0_D_M	USB Data Signal Negative
B8	NC	Not Connected
B9	USB_VBUS_TYPEC	Power
B10	USB0_SSRX_C1_M_CON	SuperSpeed Receive-
B11	USB0_SSRX_C1_P_CON	SuperSpeed Receive+
B12	Ground	Ground

5.5. Debug serial console port

The standard micro-B USB connector is used as the debug port using USB to UART FTDI chipset. This provides access to the QCS8550 SoC through UART, using any serial console application with a baud rate of 115200 bps.

To detect the FTDI and emulate the UART host bus, connect a micro-USB cable to J1 on the MRD8550 Merlin Kit LR Wi-Fi.

Table 5-6: Debug USB Connector (J1)

Pin No	Signal	Description
1	VCC	5V input supply
2	DM	USB Data Signal Negative
3	DP	USB Data Signal Positive
4	ID	Not Connected
5	GND	Ground

5.6. HDMI-IN port

The Dedicated CSI0 interface of the QCS8550 is routed through an SPDT switch and a MIPI-CSI to HDMI converter and then connected to the HDMI Type-D (J4) connector. This serves as the default configuration for the HDMI-IN camera module.

Table 5-7: HDMI Connector (J4)

Pin No	Signal	Description
1	LT6911_HPD	Hot plug detect
2	NC	Not Connected
3	HDMI_RX2_P_CONN	Data Pair 2+
4	Ground	Ground
5	HDMI_RX2_N_CONN	Data Pair 2-
6	HDMI_RX1_P_CONN	Data Pair 1+
7	Ground	Ground
8	HDMI_RX1_N_CONN	Data Pair 1-
9	HDMI_RX0_P_CONN	Data Pair 0+
10	Ground	Ground
11	HDMI_RX0_N_CONN	Data Pair 0-
12	HDMI_RXC_P_CONN	Data Pair +
13	Ground	Ground
14	HDMI_RXC_N_CONN	Data Pair-
15	NC	Not Connected
16	Ground	Ground
17	LT6911_DDC_SCL	SCL clock
18	LT6911_DDC_SDA	SDA Data
19	HDMI_IN_5P0	5V supply

5.7. B2B Connectors

The MRD8550 Merlin Board can support eight cameras through three B2B connectors.

Here, there are two 100 pins & one 80 pins B2B connectors (Part number: ERF5-050-05.0-L-DV-K-TR, ERF5-040-05.0-L-DV-K-TR Mating Part number: ERM5-050-02.0-L-DV-P-TR, ERM5-040-02.0-L-DV-P-TR)

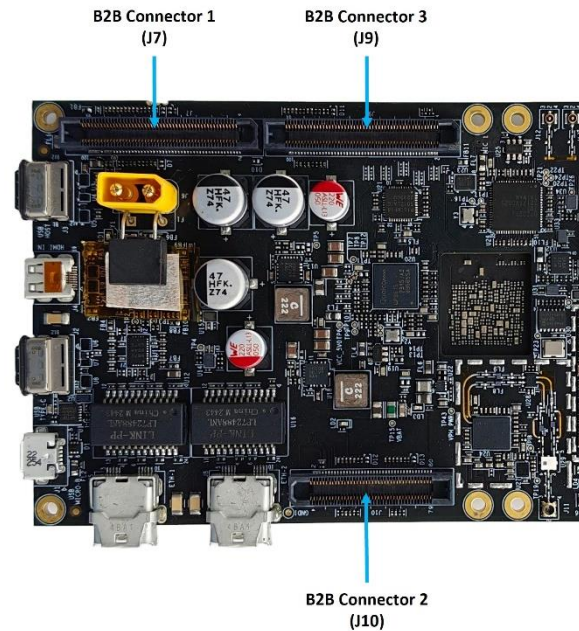


Figure 5-1: MRD8550 Merlin Board B2B Connectors

5.8. B2B Connector 1

Dedicated CSI2, CSI3 and CSI5 Interfaces from QCS8550 is connected to the B2B connector (J7).

Table 5-8: B2B Connector 1 (J7)

Pin No	Signal	Description
1	Ground	Ground
2	Ground	Ground
3	Ground	Ground
4	CLK4/CSI4_MCLK	MIPI 4 Master Clock
5	CSI5_CLK_P	MIPI 5 Clock Lane Differential Pair +
6	Ground	Ground
7	CSI5_CLK_M	MIPI 5 Clock Lane Differential Pair -
8	CSI5_D1_P	MIPI 5 Data Lane 1 Differential Pair +
9	Ground	Ground
10	CSI5_D1_M	MIPI 5 Data Lane 1 Differential Pair -
11	CSI5_D0_P	MIPI 5 Data Lane 0 Differential Pair +
12	Ground	Ground
13	CSI5_D0_M	MIPI 5 Data Lane 0 Differential Pair -
14	CSI5_D2_P	MIPI 5 Data Lane 2 Differential Pair +
15	Ground	Ground
16	CSI5_D2_M	MIPI 5 Data Lane 2 Differential Pair -
17	CSI3_CLK_P	MIPI 3 Clock Lane Differential Pair +
18	Ground	Ground
19	CSI3_CLK_M	MIPI 3 Clock Lane Differential Pair -
20	CSI5_D3_P	MIPI 5 Data Lane 3 Differential Pair +

21	Ground	Ground
22	CSI5_D3_M	MIPI 5 Data Lane 3 Differential Pair -
23	CSI3_D0_P	MIPI 3 Data Lane 0 Differential Pair +
24	Ground	Ground
25	CSI3_D0_M	MIPI 3 Data Lane 0 Differential Pair -
26	CSI3_D2_P	MIPI 3 Data Lane 2 Differential Pair +
27	Ground	Ground
28	CSI3_D2_M	MIPI 3 Data Lane 2 Differential Pair -
29	CSI3_D3_P	MIPI 3 Data Lane 3 Differential Pair +
30	Ground	Ground
31	CSI3_D3_M	MIPI 3 Data Lane 3 Differential Pair -
32	CSI3_D1_P	MIPI 3 Data Lane 1 Differential Pair +
33	Ground	Ground
34	CSI3_D1_M	MIPI 3 Data Lane 1 Differential Pair -
35	CSI2_D1_P	MIPI 2 Data Lane 1 Differential Pair +
36	Ground	Ground
37	CSI2_D1_M	MIPI 2 Data Lane 1 Differential Pair -
38	CSI2_D0_M	MIPI 2 Data Lane 0 Differential Pair -
39	Ground	Ground
40	CSI2_D0_P	MIPI 2 Data Lane 0 Differential Pair +
41	CSI2_D2_P	MIPI 2 Data Lane 2 Differential Pair +
42	Ground	Ground
43	CSI2_D2_M	MIPI 2 Data Lane 2 Differential Pair -
44	CSI2_D3_P	MIPI 2 Data Lane 3 Differential Pair +
45	Ground	Ground
46	CSI2_D3_M	MIPI 2 Data Lane 3 Differential Pair -
47	SM_GPIO_40	Camera 4 Reset Pin
48	Ground	Ground
49	STROBE4	Strobe Pin 4
50	CSI2_CLK_M	MIPI 2 Clock Lane Differential Pair -
51	Ground	Ground
52	CSI2_CLK_P	MIPI 2 Clock Lane Differential Pair +
53	CLK3/CSI3_MCLK	MIPI 3 Master Clock
54	Ground	Ground
55	Ground	Ground
56	CLK5/CSI5_MCLK	MIPI 5 Master Clock
57	CLK2/CSI2_MCLK	MIPI 2 Master Clock
58	Ground	Ground
59	Ground	Ground
60	CAM5_DVDD_1V1_1V2	Camera 5 supply voltage 1.1V/1.2V
61	SM_GPIO_16	Camera 5 Reset Pin
62	STROBE2	Strobe Pin 2
63	STROBE5	Strobe Pin 5
64	VSYNC	Vertical synchronization pin
65	CAM5_AVDD_2V8	Camera 5 supply voltage 2.8V
66	SM_GPIO_207	Camera 3 Reset Pin
67	Ground	Ground
68	SM_GPIO_108	Camera 5 Power Down
69	CCI_I2C_SCL3	I2C Clock
70	Ground	Ground
71	CCI_I2C_SDA3	I2C Data
72	CAM3_DVDD_1V8-TOF_5V	Camera 3 supply voltage 1.8V/5V
73	CAM3_DVDD_1V8-TOF_5V	Camera 3 supply voltage 1.8V/5V
74	CAM2_AVDD_2V8	Camera 2 supply voltage 2.8V
75	CAM3_AVDD_2V8-TOF_5V	Camera 3 supply voltage 2.8V/5V
76	SM_GPIO_167	Camera 3 Power Down
77	CCI_I2C_SCL2	I2C Clock
78	SM_GPIO_119	Camera 2 Power Down
79	CCI_I2C_SDA2	I2C Data
80	STROBE3	Strobe Pin 3

81	CAM3_DVDD_1V2-TOF_5V	Camera 3 supply voltage 1.2V/5V
82	SM_GPIO_118	Camera 2 Reset Pin
83	CAM2_DVDD_1V1_1V2	Camera 2 supply voltage 1.1V/1.2V
84	Ground	Ground
85	SLEEP_CLK_CAM_2	Sleep clock
86	CAM_5V0_3V3	Camera supply voltage 5V/3.3V
87	CAM_DOVDD_1V8	Camera supply voltage 1.8V
88	CAM_5V0_3V3	Camera supply voltage 5V/3.3V
89	CAM_DOVDD_1V8	Camera supply voltage 1.8V
90	CAM_5V0_3V3	Camera supply voltage 5V/3.3V
91	Ground	Ground
92	Ground	Ground
93	VCC_DC_IN	LR WIFI External supply
94	VCC_DC_IN	LR WIFI External supply
95	VCC_DC_IN	LR WIFI External supply
96	VCC_DC_IN	LR WIFI External supply
97	VCC_DC_IN	LR WIFI External supply
98	VCC_DC_IN	LR WIFI External supply
99	VCC_DC_IN	LR WIFI External supply
100	VCC_DC_IN	LR WIFI External supply

5.9. B2B Connector 2

Dedicated CSI0 and CSI1 Interfaces from QCS8550 is connected to the B2B connector (J10).

Table 5-9: B2B Connector 2 (J10)

Pin No	Signal	Description
1	VCC_5V0	Supply voltage 5V
2	VCC_5V0	Supply voltage 5V
3	VCC_5V0	Supply voltage 5V
4	VCC_5V0	Supply voltage 5V
5	VCC_5V0	Supply voltage 5V
6	VCC_5V0	Supply voltage 5V
7	Ground	Ground
8	Ground	Ground
9	I2C4_SDA	I2C Data
10	SM_GPIO_197	Spare pin 2
11	I2C4_SCL	I2C Clock
12	SM_GPIO_61	Spare pin 6
13	Ground	Ground
14	SM_GPIO_140	Spare pin 7
15	SM_GPIO_24	Spare pin 5
16	Ground	Ground
17	SM_GPIO_25	Spare pin 4
18	WSA_SWR1_CLK	Sound wire clock
19	SM_GPIO_128	Spare pin 3
20	WSA_SWR1_DATA	Sound wire data
21	Ground	Ground
22	CAM0_DVDD_1V1_1V2	Camera 0 supply voltage 1.1V/1.2V
23	STROBE0	Strobe Pin 0
24	CAM_5V0_3V3	Camera supply voltage 5V/3.3V
25	SM_GPIO_170	Spare pin 0
26	CAM_DOVDD_1V8	Camera supply voltage 1.8V
27	CAM0_AVDD_2V8	Camera 0 supply voltage 2.8V
28	CCI_I2C_SDA0	I2C Data
29	VSYNC	Vertical synchronization pin
30	CCI_I2C_SCL0	I2C Clock
31	SM_GPIO_126	Camera 0 Reset Pin

32	SM_GPIO_120	Camera 0 Power Down
33	Ground	Ground
34	Ground	Ground
35	CSIO_D0_P_CAM0A	MIPI 0 Data Lane 0 Differential Pair +
36	CLK1/CSI1_MCLK	MIPI 1 Master Clock
37	CSIO_D0_M_CAM0A	MIPI 0 Data Lane 0 Differential Pair -
38	Ground	Ground
39	Ground	Ground
40	CSIO_D3_P_CAM0A	MIPI 0 Data Lane 3 Differential Pair +
41	CSIO_D2_P_CAM0A	MIPI 0 Data Lane 2 Differential Pair +
42	CSIO_D3_M_CAM0A	MIPI 0 Data Lane 3 Differential Pair -
43	CSIO_D2_M_CAM0A	MIPI 0 Data Lane 2 Differential Pair -
44	Ground	Ground
45	Ground	Ground
46	CSIO_CLK_P_CAM0A	MIPI 0 Clock Lane Differential Pair +
47	CSIO_D1_M_CAM0A	MIPI 0 Data Lane 1 Differential Pair -
48	CSIO_CLK_M_CAM0A	MIPI 0 Clock Lane Differential Pair -
49	CSIO_D1_P_CAM0A	MIPI 0 Data Lane 1 Differential Pair +
50	Ground	Ground
51	Ground	Ground
52	CAM1_DVDD_1V1_1V2	Camera 1 supply voltage 1.1V/1.2V
53	CAM1_AVDD_2V8	Camera 1 supply voltage 2.8V
54	CAM_5V0_3V3	Camera supply voltage 5V/3.3V
55	STROBE1	Strobe Pin 1
56	CAM_DOVDD_1V8	Camera supply voltage 1.8V
57	SM_GPIO_160	Spare pin 1
58	SM_GPIO_155	Camera 1 Power Down
59	SM_GPIO_127	Camera 0 Reset Pin
60	CCI_I2C_SDA1	I2C Data
61	Ground	Ground
62	CCI_I2C_SCL1	I2C Clock
63	CSI1_D0_P	MIPI 1 Data Lane 0 Differential Pair +
64	Ground	Ground
65	CSI1_D0_M	MIPI 1 Data Lane 0 Differential Pair -
66	CLK0/CSIO_MCLK	MIPI 0 Master Clock
67	Ground	Ground
68	Ground	Ground
69	CSI1_D2_P	MIPI 1 Data Lane 2 Differential Pair +
70	CSI1_CLK_M	MIPI 1 Clock Lane Differential Pair -
71	CSI1_D2_M	MIPI 1 Data Lane 2 Differential Pair -
72	CSI1_CLK_P	MIPI 1 Clock Lane Differential Pair +
73	Ground	Ground
74	Ground	Ground
75	CSI1_D1_P	MIPI 1 Data Lane 1 Differential Pair +
76	CSI1_D3_M	MIPI 1 Data Lane 3 Differential Pair -
77	CSI1_D1_M	MIPI 1 Data Lane 1 Differential Pair -
78	CSI1_D3_P	MIPI 1 Data Lane 3 Differential Pair +
79	Ground	Ground
80	Ground	Ground

5.10. B2B Connector 3

Dedicated CSI4, CSI6, CSI7 and PCIe Interfaces from QCS8550 is connected to the B2B connector (J9).

Table 5-10: B2B Connector 3 (J9)

Pin No	Signal	Description
1	VCC_3V3_LR_WIFI	LR WIFI Supply voltage 3.3V
2	VCC_3V3_LR_WIFI	LR WIFI Supply voltage 3.3V
3	VCC_3V3_LR_WIFI	LR WIFI Supply voltage 3.3V
4	VCC_3V3_LR_WIFI	LR WIFI Supply voltage 3.3V
5	VCC_3V3_LR_WIFI	LR WIFI Supply voltage 3.3V
6	VCC_3V3_LR_WIFI	LR WIFI Supply voltage 3.3V
7	VCC_3V3_LR_WIFI	LR WIFI Supply voltage 3.3V
8	VCC_3V3_LR_WIFI	LR WIFI Supply voltage 3.3V
9	LR_WIFI_PCIE_CLK_REQ_N	LR WIFI PCIe clock request
10	LR_WIFI_PCIE_RESET_N	LR WIFI PCIe reset
11	LR_WIFI_PCIE_WAKE_N	LR WIFI PCIe wake
12	Ground	Ground
13	Ground	Ground
14	LR_WIFI_PCIE_TX0_P	PCIe Gen 3 transmit 0 - plus
15	CSI6_D3_P	MIPI 6 Data Lane 3 Differential Pair +
16	LR_WIFI_PCIE_TX0_M	PCIe Gen 3 transmit 0 - minus
17	CSI6_D3_M	MIPI 6 Data Lane 3 Differential Pair -
18	Ground	Ground
19	Ground	Ground
20	LR_WIFI_PCIE_RX0_P	PCIe Gen 3 receive 0 - plus
21	CSI6_CLK_P	MIPI 6 Clock Lane Differential Pair +
22	LR_WIFI_PCIE_RX0_M	PCIe Gen 3 receive 0 - minus
23	CSI6_CLK_M	MIPI 6 Clock Lane Differential Pair -
24	Ground	Ground
25	Ground	Ground
26	LR_WIFI_PCIE_REFCLK_P	PCIe Gen 3 reference clock - plus
27	CSI6_D0_P	MIPI 6 Data Lane 0 Differential Pair +
28	LR_WIFI_PCIE_REFCLK_M	PCIe Gen 3 reference clock - minus
29	CSI6_D0_M	MIPI 6 Data Lane 0 Differential Pair -
30	Ground	Ground
31	Ground	Ground
32	LR_WIFI_PCIE_TX1_P	PCIe Gen 3 transmit 1 - plus
33	CSI6_D1_P	MIPI 6 Data Lane 1 Differential Pair +
34	LR_WIFI_PCIE_TX1_M	PCIe Gen 3 transmit 1 - minus
35	CSI6_D1_M	MIPI 6 Data Lane 1 Differential Pair -
36	Ground	Ground
37	Ground	Ground
38	LR_WIFI_PCIE_RX1_P	PCIe Gen 3 receive 1 - plus
39	CSI6_D2_P	MIPI 6 Data Lane 2 Differential Pair +
40	LR_WIFI_PCIE_RX1_M	PCIe Gen 3 receive 1 - minus
41	CSI6_D2_M	MIPI 6 Data Lane 2 Differential Pair -
42	Ground	Ground
43	Ground	Ground
44	CSI7_D1_M	MIPI 7 Data Lane 1 Differential Pair -
45	CSI7_D0_M	MIPI 7 Data Lane 0 Differential Pair -
46	CSI7_D1_P	MIPI 7 Data Lane 1 Differential Pair +
47	CSI7_D0_P	MIPI 7 Data Lane 0 Differential Pair +
48	Ground	Ground
49	Ground	Ground
50	CSI7_D2_M	MIPI 7 Data Lane 2 Differential Pair -
51	CSI7_CLK_P	MIPI 7 Clock Lane Differential Pair +
52	CSI7_D2_P	MIPI 7 Data Lane 2 Differential Pair +
53	CSI7_CLK_M	MIPI 7 Clock Lane Differential Pair -

54	Ground	Ground
55	Ground	Ground
56	CSI4_CLK_M	MIPI 4 Clock Lane Differential Pair -
57	CSI7_D3_M	MIPI 7 Data Lane 3 Differential Pair +
58	CSI4_CLK_P	MIPI 4 Clock Lane Differential Pair +
59	CSI7_D3_P	MIPI 7 Data Lane 3 Differential Pair -
60	Ground	Ground
61	Ground	Ground
62	CSI4_D3_P	MIPI 4 Data Lane 3 Differential Pair +
63	CSI4_D2_P	MIPI 4 Data Lane 2 Differential Pair +
64	CSI4_D3_M	MIPI 4 Data Lane 3 Differential Pair -
65	CSI4_D2_M	MIPI 4 Data Lane 2 Differential Pair -
66	Ground	Ground
67	Ground	Ground
68	CSI4_D0_M	MIPI 4 Data Lane 0 Differential Pair -
69	CSI4_D1_M	MIPI 4 Data Lane 1 Differential Pair -
70	CSI4_D0_P	MIPI 4 Data Lane 0 Differential Pair +
71	CSI4_D1_P	MIPI 4 Data Lane 1 Differential Pair +
72	Ground	Ground
73	Ground	Ground
74	CLK7/CSI7_MCLK	MIPI 7 Master Clock
75	CLK6/CSI6_MCLK	MIPI 6 Master Clock
76	Ground	Ground
77	Ground	Ground
78	SM_GPIO_72	Camera 7 Reset Pin
79	STROBE7	Strobe Pin 7
80	SM_GPIO_66	Camera 7 Power Down
81	CCI_I2C_SCL5	I2C Clock
82	CAM7_AVDD_2V8	Camera 7 supply voltage 2.8V
83	CCI_I2C_SDA5	I2C Data
84	STROBE6	Strobe Pin 6
85	CAM7_DVDD_1V1_1V2	Camera 7 supply voltage 1.1V/1.2V
86	SM_GPIO_153	Camera 6 Reset Pin
87	CCI_I2C_SCL4	I2C Clock
88	Ground	Ground
89	CCI_I2C_SDA4	I2C Data
90	CAM6_DVDD_1V1_1V2	Camera 6 supply voltage 1.1V/1.2V
91	SM_GPIO_129	Power down pin
92	SM_GPIO_142	Power down Pin
93	CAM6_AVDD_2V8	Camera 6 supply voltage 2.8V
94	CAM4_DVDD_1V1_1V2	Camera 4 supply voltage 1.1V/1.2V
95	Ground	Ground
96	Ground	Ground
97	VSYNC	Vertical synchronization pin
98	VCC_5V0	Supply voltage 5V
99	CAM4_AVDD_2V8	Camera 4 supply voltage 2.8V
100	VCC_5V0	Supply voltage 5V

5.11. RF Antennas

MRD8550 Merlin Kit LR Wi-Fi uses tri-band, 2.4/5/6 GHz, WLAN/Bluetooth technology antennas on the Merlin board.

- WCN7851 supports 2 × 2 MIMO with 2x Wi-Fi antenna ports and 1x Bluetooth technology antenna port (Bluetooth technology antenna can be dedicated or shared with one of the Wi-Fi antennas).

5.12. GNSS Antenna

MRD8550 Merlin Kit LR Wi-Fi uses multiband GNSS receiver IC that interfaces with the modem device through QLink interface.

- RF IC that supports GNSS L1 and L5 bands.
- Supports GPS, GLONASS, Galileo, and BeiDou.
- Dedicated L1 and L5 receiver paths.

5.13. Micro SD Card Connector

Dedicated SDC2 interface of the QCS8550 processor is made available at SD card connector (U48) in MRD8550 Merlin Board. The card-detect pin from the SD card connector is connected to the PM8550 GPIO12 to detect the presence of SD card.

Table 5-11: Micro SD Card Connector (U48)

Pin No	Signal	Description
1	SDC2_DATA_2	Data line 2
2	SDC2_DATA_3	Data line 3
3	SDC2_CMD	SD card command
4	VREG_L9B_2P9	Power supply 2.96V
5	SDC2_CLK_CONN	SD card Clock
6	Ground	Ground
7	SDC2_DATA_0	Data line 0
8	SDC2_DATA_1	Data line 1
9	SD_CARD_DET_N	SD Card detection

5.14. 5G M.2 Connector

PCIe1 interface from QPS615 is connected to M.2 B key connector for interfacing off-the-shelf 5G/LTE solutions in the MRD8550 Merlin Board.

Table 5-12: 5G M.2 Connector (J23)

Pin No	Signal	Description
1	CONFIG_3	Based on the state of the configuration pins on the module, being tied to GND or left NC
2	VCC_5G	5G Module Power supply
3	Ground	Ground
4	VCC_5G	5G Module Power supply
5	Ground	Ground
6	MODULE_PWRKEY	Module On/Off High - Default on condition Low - Power OFF condition
7	USB_HS_DP_DN2_5G	USB 2.0 Data Plus
8	MODULE_W_DISABLED_N	RF disable
9	USB_HS_DM_DN2_5G	USB 2.0 Data Minus
10	MODULE_STATUS	LED control
11	Ground	Ground
12	NC	Not connected
13	NC	Not connected
14	NC	Not connected
15	NC	Not connected
16	NC	Not connected

17	NC	Not connected
18	NC	Not connected
19	NC	Not connected
20	SEL_MODE	Switch Host Interface High: USB (default) Low: PCIe
21	CONFIG_0	Based on the state of the configuration pins on the module, being tied to GND or left NC
22	PCM_DIN	Not connected
23	WAKE_ON_WAN_N	Coexistence transmit/Wake Host
24	PCM_DOUT	Not connected
25	DYN_PWR_CTRL	Dynamic power control
26	GPS_DISABLE_N	RF function can also be enabled or disabled through AT commands
27	Ground	Ground
28	PCM_SYNC	Not connected
29	M2_MODULE_PIN29	USB 3.1 super-speed receive - Minus
30	USIM1_RST	Reset output to an external UIM1 card
31	M2_MODULE_PIN31	USB 3.1 super-speed receive - Plus
32	USIM1_CLK	Clock output to an external UIM1 card
33	Ground	Ground
34	USIM1_DATA	Data connection with an external UIM1 card
35	M2_MODULE_PIN35	USB 3.1 super-speed transmit - Minus
36	USIM1_VDD	Supply output for an external UIM1 card
37	M2_MODULE_PIN37	USB 3.1 super-speed transmit - Plus
38	DEVSLP	Test Point
39	Ground	Ground
40	5G_GPIO_0	SIM card detection signal for SIM connector 2
41	5G_PCIE1_RX0_M	PCIe 1 Receive 0 – minus
42	5G_GPIO_1	Data signal for SIM connector 2
43	5G_PCIE1_RX0_P	PCIe 1 Receive 0 – plus
44	5G_GPIO_2	Clock signal for SIM connector 2
45	Ground	Ground
46	5G_GPIO_3	Reset signal for SIM connector 2
47	5G_PCIE1_TX0_M	PCIe1 Transmit 0 – minus
48	5G_GPIO_4	Power supply for SIM connector 2
49	5G_PCIE1_TX0_P	PCIe 1 Transmit 0 – plus
50	PCIE1_RST_N_3V3	Functional reset to the PCIe bus: Active LOW
51	Ground	Ground
52	PCIE1_CLK_REQ_3V3	PCIe 1 reference clock request signal: Active LOW
53	5G_PCIE1_REFCLK_M	PCIe 1 differential reference clock – minus
54	PCIE1_WAKE_N_3V3	PCIe1 wake-up: Active LOW
55	5G_PCIE1_REFCLK_P	PCIe 1 differential reference clock – plus
56	NC	Not connected
57	Ground	Ground
58	NC	Not connected
59	WL_XFEM_CTRL_LAA_TXEN_GPIO	General Purpose I/O
60	WL_XFEM_CTRL_WL_TXEN_GPIO	General Purpose I/O
61	ANTCTL1	Test Point
62	COEX_TXD_GPIO	General Purpose I/O
63	ANTCTL2	Test Point
64	COEX_RXD_GPIO	General Purpose I/O
65	RFFE_VIO_1V8	Reference Voltage
66	USIM1_DET_M2_MOD	UIM1 Card Present Detect
67	MODULE_RESET_N	Reset Input: Active high signal
68	SUSCLK	Not connected
69	CONFIG_1	Based on the state of the configuration pins on the module, being tied to GND or left NC

70	VCC_5G	5G Module Power supply
71	Ground	Ground
72	VCC_5G	5G Module Power supply
73	Ground	Ground
74	VCC_5G	5G Module Power supply
75	CONFIG_2	Based on the state of the configuration pins on the module, being tied to GND or left NC

Mistral tested and validated the following 5G Module,

Table 5-13: 5G Modules

Sl. No	Manufacturer	Part Number	Power supply	SIM Slot Support
1	Telit	FN990A28	3.3V	USIM1 and USIM2

The mode selection of 5G M.2 Pin 20 is detailed in the following table,

Table 5-14: Mode Selection

Sl. No	Mode	M.2 Pin 20 Configuration
1	USB mode	High (Default Hardware configuration)
2	PCIe mode	Low

5.15. Nano SIM Connectors

The MRD8550 Merlin Board has 2x Nano SIM connector for 5G Module connectivity.

Table 5-15: Nano SIM Connector (J21 - USIM1)

Pin No	Signal	Description
C1	USIM1_VDD	Power supply 1.8V
C2	RST_SIM	Reset signal
C3	CLK_SIM	Clock signal
C5	Ground	Ground
C6	NC	Not Connected
C7	DATA_SIM	Data signal
CSW	Ground	Ground
DSW	USIM1_DET_M2	SIM card detection pin

Table 5-16: Nano SIM Connector (J20 - USIM2)

Pin No	Signal	Description
C1	USIM2_VDD	Power supply 1.8V
C2	RST_SIM2	Reset signal
C3	CLK_SIM2	Clock signal
C5	Ground	Ground
C6	NC	Not Connected
C7	DATA_SIM2	Data signal
CSW	Ground	Ground
DSW	SIM2_CARD_DETECT	SIM card detection pin

5.16. HS_LS Expansion Connector

USB, SWR Interface and few QUPs from QCS8550 are connected to the expansion connectors on the MRD8550 Merlin Board.

Table 5-17: High Speed & Low Speed Expansion Connector (J14)

Pin No	Signal	Description
1	Ground	Ground
2	Ground	Ground
3	CUBE_UART0_RX	UART RX Provision (3V3 Logic Level)
4	WSA_SWR_DATA	I2S data
5	CUBE_UART0_TX	UART TX Provision (3V3 Logic Level)
6	WSA_SWR_CLK	I2S clock
7	SERIAL2_RTS	UART RTS Signal (3V3 Logic Level)
8	DMIC_CLK3	DMIC clock
9	SERIAL2_CTS	UART CTS Signal (3V3 Logic Level)
10	DMIC_DATA3	DMIC data
11	EXP_SPI0_MISO	SPI0 Data input
12	SM_GPIO_139_EXP	General Purpose I/O
13	EXP_SPI0_MOSI	SPI0 Data output
14	SLEEP_CLK	Sleep clock
15	EXP_SPI0_SCLK	SPI0 Clock input
16	CANL_CUBE	CAN low level I/O voltage
17	EXP_SPI0_CS0	SPI0 Chip select
18	CANH_CUBE	CAN high level I/O voltage
19	DMIC_CLK1	DMIC clock
20	PM8550BH_SYS_THERM8	PMIC ADC pin
21	DMIC_DATA1	DMIC data
22	SSC_EXP_I2C0_SDA	I2C0 Data
23	SM_GPIO_149_EXP	General Purpose I/O
24	SSC_EXP_I2C0_SCL	I2C0 Clock
25	Ground	Ground
26	Ground	Ground
27	SM_GPIO_87_EXP	General Purpose I/O
28	SM_GPIO_41_EXP	General Purpose I/O
29	SM_GPIO_88_EXP	General Purpose I/O
30	SPI1_CLK	SPI1 Clock input
31	SM_GPIO_141_EXP	General Purpose I/O
32	SPI1_CS	SPI1 Chip select
33	SM_GPIO_166_EXP	General Purpose I/O
34	SPI1_MOSI	SPI0 Data output
35	EXP_UART1_TX	UART TX Provision
36	SPI1_MISO	SPI0 Data input
37	EXP_UART1_RX	UART RX Provision
38	SSC_EXP_I2C1_SDA	I2C1 Data
39	SPI2_CS1	SPI2 Chip select
40	SSC_EXP_I2C1_SCL	I2C1 Clock
41	SPI2_SCLK	SPI2 Clock input
42	SM_LGA742_EXP	General Purpose I/O
43	SPI2_MISO	SPI1 Data input
44	SM_LGA97_EXP	General Purpose I/O
45	SPI2_MOSI	SPI1 Data output
46	SM_LGA176_EXP	General Purpose I/O
47	Ground	Ground
48	PM8550_AMUX_3_EXP	PMIC ADC pin
49	USB1_SS_TX_P_DN3	USB super speed 3 Transmit - plus
50	SM_GPIO_65_EXP	General Purpose I/O
51	USB1_SS_TX_M_DN3	USB super speed 3 transmit - minus
52	SM_GPIO_117_EXP	General Purpose I/O

53	Ground	Ground
54	SM_GPIO_116_EXP	General Purpose I/O
55	USB1_SS_TX_P_DN4	USB super speed 4 Transmit - plus
56	Ground	Ground
57	USB1_SS_TX_M_DN4	USB super speed 4 transmit - minus
58	USB1_SS_RX_P_DN3_C	USB super speed 3 receive - plus
59	Ground	Ground
60	USB1_SS_RX_M_DN3_C	USB super speed 3 receive - minus
61	USB_HS_DP_DN4	USB high speed data 4 - plus
62	Ground	Ground
63	USB_HS_DM_DN4	USB high speed data 4 - minus
64	USB1_SS_RX_P_DN2_HS	USB super speed 4 receive - plus
65	Ground	Ground
66	USB1_SS_RX_M_DN2_HS	USB super speed 4 receive - minus
67	USB_HS_DM_DN3	USB high speed data 3 - minus
68	Ground	Ground
69	USB_HS_DP_DN3	USB high speed data 3 - plus
70	SM_GPIO_125_EXP	General Purpose I/O
71	Ground	Ground
72	USB1_PWRCTL3	Load switch enable for the third port for the USB hub
73	VREG_L15B_1P8	Power supply 1.8V
74	USB1_OVERCUR3Z	Load switch interrupt for third port for USB hub
75	VCC_DC_IN_EXP	Power supply 12-36V
76	USB1_PWRCTL4	Load switch enable for the fourth port for the USB hub
77	VCC_5V0_EXP	Power supply 5V
78	USB1_OVERCUR4Z	Load switch interrupt for fourth port for USB hub
79	Ground	Ground
80	VCC_3V3_EXP	Power supply 3.3V

5.17. Cube B2B Connector

The MRD8550 Flight Control Unit is mating to the MRD8550 Merlin Board using a B2B Connector (J17). Cube Orange+ is interfaced to QCS8550 through UART0.

Table 5-18: Cube B2B Connector (J17)

Pin No	Signal	Description
1	Ground	Ground
2	Ground	Ground
3	CANL_CUBE	CANL Signal
4	SERIAL2_RTS	UART RTS Signal
5	CANH_CUBE	CANH Signal
6	SERIAL2_CTS	UART CTS Signal
7	Ground	Ground
8	AP_LS_EXP_UART0_TX	UART TX Signal
9	VCC_DC_IN	12V-36V DC Input Power Supply
10	AP_LS_EXP_UART0_RX	UART RX
11	VCC_DC_IN	12V-36V DC Input Power Supply
12	Ground	Ground

5.18. Control Switches

The MRD8550 Merlin Board supports multiple user Push button control switches for providing different modes and functions like fast boot and EDL mode to the processor.

Table 5-19: Control Switch

Pin No	Push button	Signal	Description
1	SW2	PHONE_ON_N	Power On button
2	SW3	KYPD_VOLP_N	Volume Up button
3	SW4	PM_RESIN_N	Volume Down & Fast boot mode
4	SW5	SDM_FORCE_USB_BOOT	Forced USB Boot (EDL)

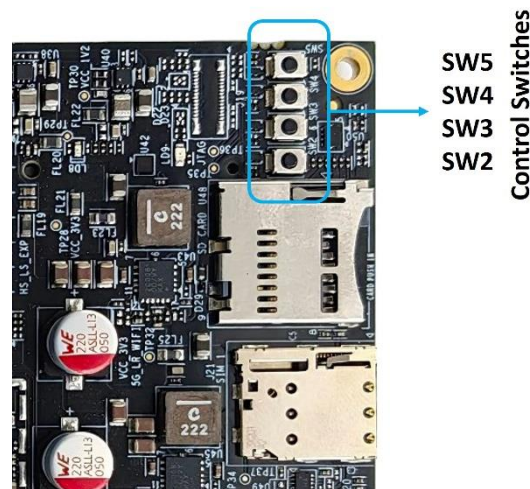


Figure 5-2: Control Switches

5.19. Boot switch

The DIP switch can be used to control the Boot modes. Default state of the various pins is mentioned in the below table,

Table 5-20: DIP Switch Configuration

SI No	Signal	Function	Default Condition
1	GPIO_161_BOOT_CONFIG_1	Boot configuration (1)	OFF
2	SM_GPIO_158_QLINK0_WMSS_RESET_N	Boot configuration (2)	OFF
3	SM_GPIO_150	Boot configuration (3)	OFF
4	GPIO_164_WDOG_DISABLE	Boot configuration (0)	OFF
5	CBL_PWR_N	CBL power for SOM	ON

The MRD8550 Merlin Board supports booting from UFS0 as default option. The boot modes shall be selected by configuring the boot pins as stated below,

Note: The current platform supports booting from UFS, while other options can be evaluated in future.

Table 5-21 : MRD8550 SOM Boot Modes

FAST_BOOT GPIO [3:0]	GPIO no.				Boot device
	151	150	158	161	
0000	0	0	0	0	Default: UFS0 -> eDL (USB0)
0001	0	0	0	1	SDC2 -> eDL (USB0)
0010	0	0	1	0	QSPI NOR -> eDL (USB0)
0011	0	0	1	1	SPI NOR -> eDL (USB0)
0100	0	1	0	0	UFS0 -> eDL (USB0)
0101	0	1	1	1	eDL (USB0)
Others					Reserved

5.20. External IMU Connector

The MRD8550 Merlin Board supports external IMU.

Note: To validate the external IMU, require modification on Merlin board to disable the On Board IMU with resistor DNI option (Future use)

On-Board Connector Part number: 5054730810

Table 5-22: IMU Connector (J18)

Pin No	Signal	Description
A1	Ground	Ground
A2	Ground	Ground
P1	VREG_VSENSOR_1P8	Power supply 1.8V
P2	Ground	Ground
1	SPI2_CLK	SPI1 Clock input
2	SPI2_ACCEL_CS	SPI1 Chip select
3	ACCEL_INT	Interrupt
4	SPI2_MISO	SPI1 Data input
P3	GYRO_INT	Interrupt
P4	SPI2_MOSI	SPI1 Data output
B1	Ground	Ground
B2	Ground	Ground

5.21. FAN Connector

The MRD8550 Merlin Board includes an on-board FAN connector with a 12V power supply and PWM control.

On-Board Connector Part number: SM04B-SRSS-TB

Table 5-23: FAN Connector (J22)

Pin No	Signal	Description
1	VCC_DC_IN	Power supply 12V
2	PM_GPIO-B	PWM Control Signal
3	VCC_5V0	The pin is internally pulled up to 5V with a 100kΩ resistor
4	Ground	Ground

5.22. Speaker Connector

The MRD8550 Merlin Board includes a two-speaker connector for audio amplification which supports high output power with high performance.

On-Board Connector Part number: HDR_1X2

Table 5-24: Speaker Connector (J16)

Pin No	Signal	Description
1	SPK0_P	Positive terminal of the speaker
2	SPK0_M	Negative terminal of the speaker

On-Board Connector Part number: HDR_1X2

Table 5-25: Speaker Connector (J15)

Pin No	Signal	Description
1	SPK1_P	Positive terminal of the speaker
2	SPK1_M	Negative terminal of the speaker

5.23. Microphone

The MRD8550 Merlin Board includes a two-inbuilt Digital Microphone.

- Left DMIC
- Right DMIC

Table 5-26: Left DMIC (MK1)

Pin No	Signal	Description
1	DMIC_DATA0	Data line
2	DMIC_CLK0	Clock line

Table 5-27: Right DMIC (MK2)

Pin No	Signal	Description
1	DMIC_DATA0	Data line
2	DMIC_CLK0	Clock line

6. MRD8550 Flight Control Unit Peripherals

The MRD8550 Flight Control Unit which provides provision for connecting the Flight control unit peripherals is mating to the MRD8550 Merlin Board using a B2B Connector.

Various peripherals of the MRD8550 Flight Control Unit are depicted below.

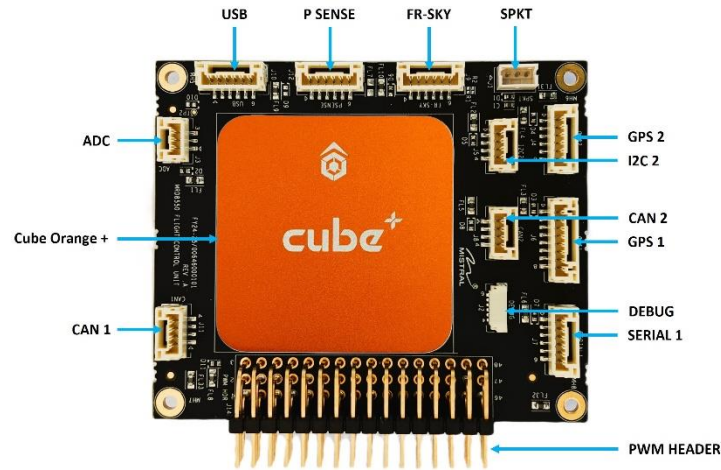


Figure 6-1: MRD8550 Flight control unit Peripherals

6.1. B2B Connector

The MRD8550 Flight Control Unit has a B2B connector (J13) for mounting the Cube pilot's Cube Orange+ module.

Table 6-1: B2B connector (J13)

Pin No	Signal	Description
1	FMU_SWDDIO	FMU serial wire debug I/O
2	FMU_LED_AMBER	Boot error LED (drive only, controlled by FET)
3	FMU_LED_AMBER	FMU serial wire debug clock
4	I2C2_SDA	I2C Serial Data Tx/Rx (3V3)
5	EXTERN_CS	Chip select for external SPI (NC, just for debugging)
6	I2C2_SCL	I2C Serial Clock Signal (3V3)
7	FMU_RESETh	Reset pin for the FMU
8	NC	Not connected
9	VDD_SERVO_IN	5V Power Supply
10	NC	Not connected
11	EXTERN_DRDY	Interrupt pin for external SPI (NC, just for debugging)
12	SERIAL5_RX	UART 5 RX (Receive Data) (3V3)
13	GROUND	System GND
14	SERIAL5_TX	UART 5 TX (Transmit Data) (3V3)
15	GROUND	System GND
16	SERIAL4_RX	UART 4 RX (Receive Data) (3V3)
17	SAFETY	Safety button input
18	SERIAL4_TX	UART 4 TX (Transmit Data) (3V3)
19	VDD_3V3_SPEKTRUM_EN	Enable for the Spektrum voltage regulator
20	SERIAL3_RX	UART 3 RX (Receive Data) (3V3)
21	PRESSURE_SENS_IN	Analogue Signal port, for pressure sensor, Laser range finder, or Sonar
22	SERIAL3_TX	UART 3 TX (Transmit Data) (3V3)
23	AUX_BATT_VOLTAGE_SENS	Voltage sense for Aux battery input

24	ALARM	Buzzer PWM Signal
25	AUX_BATT_CURRENT_SENS	Current sense for Aux battery input
26	IO_VDD_3V3	Not connected
27	VDD_5V_PERIPH_EN	Enable voltage supply for Peripherals
28	IO_LED_SAFET_PORT	IO-LED_SAFETY (safety LED) pinned out for IRIS
29	VBUS	USB VBus (VDD)
30	SERIAL2_RTS	UART 2 RTS (Request to Send)
31	OTG_DP1	USB Data+ (D)
32	SERIAL2_CTS	UART 2 CTS (Clear to Send)
33	OTG_DM1	USB Data- (M)
34	SERIAL2_RX	UART 2 RX (Receive Data)
35	I2C1_SDA	I2C Serial Data Tx/Rx
36	SERIAL2_TX	UART 2 TX (Transmit Data)
37	I2C1_SCL	I2C Serial Clock Signal
38	SERIAL1_RX	UART 1 RX (Receive Data)
39	CAN2_L	FMU CAN bus Low Signal Driver
40	SERIAL1_TX	UART 1 TX (Transmit Data)
41	CAN2_H	FMU CAN bus High Signal Driver
42	SERIAL1_RTS	UART 1 RTS (Request to Send)
43	VDD_5V_PERIPH_OC	Error state message from Peripheral power supply
44	SERIAL1_CTS	UART 1 CTS (Clear to Send)
45	VDD_5V_HIPOWER_OC	Error state message from High power Peripheral power supply
46	IO_USART1_TX	I/O USART 1 TX
47	BATT_VOLTAGE_SENS_PORT	Voltage sense from main battery
48	IO_USART1_RX_SPKT_DSM	Signal from Spectrum receiver
49	BATT_CURRENT_SENS_PORT	Current sense from main battery
50	FMU_CH1_PORT	FMU PWM output channel 1
51	SPI_EXT_MOSI	External SPI, for debug only
52	FMU_CH2_PORT	FMU PWM output channel 2
53	VDD_SERVO	VDD_Servo, for monitoring servo bus
54	FMU_CH3_PORT	FMU PWM Output Channel 3
55	VDD_BRICK_VALID	Main Power valid signal
56	FMU_CH4_PORT	FMU PWM Output Channel 4
57	VDD_BRICK_VALID	Backup Power valid Signal
58	FMU_CH5_PORT	FMU PWM Output Channel 5
59	VBUS_VALID	USB bus valid signal
60	FMU_CH6_PORT	FMU PWM Output Channel 6
61	VDD_5V0_IN_PORT	Main power (5V) into FMU from power selection
62	PPM_SBUS_PORT	PPM / S.Bus Signal Input
63	VDD_5V0_IN_PORT	Main power (5V) into FMU from power selection
64	SBUS_OUT	S.Bus Signal Output
65	IO_VDD_5V5	Not connected
66	IO_CH8_PORT	I/O PWM Output Channel 8
67	SPI_EXT_MISO	External SPI, for Debug only
68	IO_CH7_PORT	I/O PWM Channel 7
69	IO_SWDIO	I/O serial wire debug
70	IO_CH6_PORT	I/O PWM Output Channel 6
71	IO_SWCLK	I/O Serial Wire Debug Clock
72	IO_CH5_PORT	I/O PWM Output Channel 5
73	SPI_EXT_SCK	External SPI, for Debug only
74	IO_CH4_PORT	I/O PWM Output Channel 4
75	IO_RESETh	I/O Reset Pin
76	IO_CH3_PORT	I/O PWM Output Channel 3
77	CAN1_L	FMU CAN bus Low Signal Driver
78	IO_CH2_PORT	I/O PWM Output Channel 2
79	CAN1_H	FMU CAN bus High Signal Driver
80	IO_CH1_PORT	I/O PWM Output Channel 1

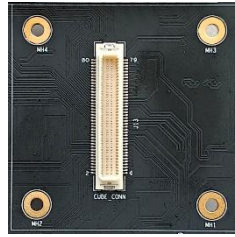


Figure 6-2: Cube B2B Connector

6.2. P Sense Connector

The MRD8550 Flight Control Unit has a P Sense connector to sense the current and voltage. The power supply 5.35V is coming from the flight control unit.

On-Board Connector Part number: BM06B-GHS-TBT(LF)(SN)(N)

Mating Connector Part number: GHR-06V-S

Table 6-2: P Sense Connector (J12)

Pin No	Signal	Description
1	VDD_5V0_IN_PORT	5V35 Power supply (Out)
2	BATT_VOLTAGE_SENS_PORT	Battery Voltage Sense (3.3V)
3	BATT_CURRENT_SENS_PORT	Battery Current Sense (3.3V)
4	AUX_BATT_VOLTAGE_SENS	Auxiliary Battery Voltage (3.3V)
5	AUX_BATT_CURRENT_SENS	Auxiliary Battery Current (3.3V)
6	GROUND	Ground

P Sense Mating Cable Details: We can sense the voltage and Current using 3-pin P Sense cable by connecting with Power Brick Mini (PBM). The cable will have 3 pin connection (2,3,6), it has two markings at each corner. Connect the PBM side to Power Brick Module and connect the other end which is mentioned as FCU side to the P Sense connector located on the FCU board.

6.3. CAN1 Connector

The MRD8550 Flight Control Unit has a CAN1 connector for connecting the device supports CAN like GPS.

On-Board Connector Part number: BM04B-GHS-TBT(LF)(SN)(N)

Mating Connector Part number: GHR-04V-S

Table 6-3: CAN1 Connector (J11)

Pin No	Signal	Description
1	VDD_5V_PERIPH	5V Power supply
2	CAN1_H	CAN High
3	CAN1_L	CAN Low
4	GROUND	Ground

6.4. USB Connector

The MRD8550 Flight Control Unit has a USB connector for connecting device supports USB.

On-Board Connector Part number: BM06B-GHS-TBT(LF)(SN)(N)

Mating Part number: GHR-06V-S

Table 6-4: USB Connector (J10)

Pin No	Signal	Description
1	VBUS	5V Power supply
2	OTG_DP1	USB Data Positive (D+)
3	OTG_DM1	USB Data Minus (D-)
4	GROUND	Ground
5	BUZZER_OUT	Buzzer Output
6	FMU_LED_AMBER	Boot / Error LED (FW updates)

6.5. FR-SKY Connector

The MRD8550 Flight Control Unit has a FR-SKY connector for connecting device supports serial UART.

On-Board Connector Part number: BM06B-GHS-TBT(LF)(SN)(N)

Mating Connector Part number: GHR-06V-S

Table 6-5: FR-SKY Connector (J9)

Pin No	Signal	Description
1	VDD_SERVO	5V35 Power supply
2	SERIAL5_TX	TX of AP FMU_uart5 TX (3.3V)
3	SERIAL5_RX	RX of AP FMU_uart5 RX (3.3V)
4	FMU_SWIDIO	Serial wire debug I/O(3.3V)
5	FMU_SWCLK	Serial wire Clock (3.3V)
6	GROUND	Ground

6.6. CAN2 Connector

The MRD8550 Flight Control Unit has a CAN2 connector for connecting the device supports CAN like GPS.

On-Board Connector Part number: BM04B-GHS-TBT(LF)(SN)(N)

Mating Connector Part number: GHR-04V-S

Table 6-6: CAN2 Connector (J8)

Pin No	Signal	Description
1	VDD_5V_PERIPH	5V35 Power supply
2	CAN2_H	CAN2 High
3	CAN2_L	CAN2 Low
4	GROUND	Ground

6.7. Serial1 Connector

The MRD8550 Flight Control Unit has a Serial1 connector for connecting telemetry serial devices.

On-Board Connector Part number: BM06B-GHS-TBT(LF)(SN)(N)

Mating Connector Part number: GHR-06V-S

Table 6-7: SERIAL1 Connector (J7)

Pin No	Signal	Description
1	VDD_5V_HIPOWER	5V35 Power supply
2	SERIAL1_TX	UART1 TX (Transmit Data) (3.3V)
3	SERIAL1_RX	UART 1 RX (Receiver Data) (3.3V)
4	SERIAL1_CTS	UART 1 CTS (Clear to Send) (3.3V)
5	SERIAL1_RTS	UART 1 RTS (Request to Send) (3.3V)
6	GROUND	Ground

6.8. GPS1 Connector

The MRD8550 Flight Control Unit has a GPS1 connector for connecting the GPS device like Here3+ to track the location.

On-Board Connector Part number: BM08B-GHS-TBT(LF)(SN)(N)

Mating Connector Part number: GHR-08V-S

Table 6-8: GPS1 Connector (J6)

Pin No	Signal	Description
1	VDD_5V_PERIPH	5V35 Power supply
2	SERIAL3_TX	UART3 TX (Transmit Data) (3.3V)
3	SERIAL3_RX	UART 3 RX (Receiver Data) (3.3V)
4	I2C1_SCL	I2C1 Clock (3.3V)
5	I2C1_SDA	I2C1 Data (3.3V)
6	SAFETY	Signal shorted to GND on press
7	IO_LED_SAFETY_PORT	LED Driver For Safety Button(12V)
8	GROUND	Ground

6.9. I2C2 Connector

The MRD8550 Flight Control Unit has an I2C2 connector for connecting the I2C support devices.

On-Board Connector Part number: BM04B-GHS-TBT(LF)(SN)(N)

Mating Connector Part number: GHR-08V-S

Table 6-9: I2C2 Connector (J5)

Pin No	Signal	Description
1	VDD_5V_PERIPH	5V35 Power supply
2	I2C2_SCL	I2C2 Clock (3.3V)
3	I2C2_SDA	I2C2 Data (3.3V)
4	GROUND	Ground

6.10. GPS2 Connector

The MRD8550 Flight Control Unit has a GPS2 connector for connecting the GPS devices like Here3+ to track the location.

On-Board Connector Part number: BM06B-GHS-TBT(LF)(SN)(N)

Mating Connector Part number: GHR-06V-S

Table 6-10: GPS2 Connector (J4)

Pin No	Signal	Description
1	VDD_5V_PERIPH	5V35 Power supply
2	SERIAL4_TX	Universal asynchronous transmit 4(3.3V)
3	SERIAL4_RX	Universal asynchronous receiver 4(3.3V)
4	I2C2_SCL	I2C Clock (3.3V)
5	I2C2_SDA	I2C Data (3.3V)
6	GROUND	Ground

6.11. SPKT Connector

The MRD8550 Flight Control Unit has a SPKT connector for spectrum satellite receivers to connect with FCU using serial protocol for transferring the control signals and telemetry data.

On-Board Connector Part number: B3B-ZR(LF)(SN)

Mating Connector Part number: ZHR-3

Table 6-11: SPKT Connector(J1)

Pin No	Signal	Description
1	VDD_3V3_SPEKTRUM	Power supply 3.3V
2	GROUND	Ground
3	IO_USART1_RX_SPKT_DSM	Universal synchronous/asynchronous receiver (3.3V)

6.12. ADC Connector

The MRD8550 Flight Control Unit has an ADC connector for measuring pressure sense value.

On-Board Connector Part number: BM03B-GHS-TBT(LF)(SN)(N)

Mating Connector Part number: GHR-03V-S

Table 6-12: ADC Connector(J3)

Pin No	Signal	Description
1	VDD_5V_PERIPH	5V35 Power supply
2	PRESSURE_SENS_IN	Pressure sense (6V max)
3	GROUND	Ground

6.13. DEBUG Connector

The MRD8550 Flight Control Unit has I/O connector for debugging.

On-Board Connector Part number: SM06B-SURS-TF(LF)(SN)

Mating Connector Part number: SUHR-06V-S-B

Table 6-13: DEBUG Connector(J2)

Pin No	Signal	Description
1	VDD_5V_PERIPH	Power supply 5V
2	IO_USART1_TX	Universal asynchronous transmit (3.3V)
3	IO_USART1_RX_SPKT_DSM	Universal asynchronous receiver (3.3V)
4	IO_SWDIO	Serial Wire Debug data (3.3V)
5	IO_SWCLK	Serial Wire Debug clock (3.3V)
6	GROUND	Ground

6.14. PWM Header

The MRD8550 Flight Control Unit has a PWM header for connecting motors/servos for running vehicle in the airframe.

Table 6-14: PWM Header(J14)

Pin No	Signal	Description
1	FMU_CH1_PORT	3.3 V Servo Signal, Servo Rail Power
2	GROUND	Ground
3	GROUND	Ground
4	FMU_CH2_PORT	3.3 V Servo Signal, Servo Rail Power
5	GROUND	Ground
6	GROUND	Ground
7	FMU_CH3_PORT	3.3 V Servo Signal, Servo Rail Power
8	GROUND	Ground
9	GROUND	Ground
10	FMU_CH4_PORT	3.3 V Servo Signal, Servo Rail Power
11	GROUND	Ground
12	GROUND	Ground
13	FMU_CH5_PORT	3.3 V Servo Signal, Servo Rail Power
14	GROUND	Ground
15	GROUND	Ground
16	FMU_CH6_PORT	3.3 V Servo Signal, Servo Rail Power
17	GROUND	Ground
18	GROUND	Ground
19	IO_CH1_PORT	3.3 V Servo Signal, Servo Rail Power
20	GROUND	Ground
21	GROUND	Ground
22	IO_CH2_PORT	3.3 V Servo Signal, Servo Rail Power
23	GROUND	Ground
24	GROUND	Ground
25	IO_CH3_PORT	3.3 V Servo Signal, Servo Rail Power
26	GROUND	Ground
27	GROUND	Ground
28	IO_CH4_PORT	3.3 V Servo Signal, Servo Rail Power
29	GROUND	Ground
30	GROUND	Ground
31	IO_CH5_PORT	3.3 V Servo Signal, Servo Rail Power
32	GROUND	Ground

33	GROUND	Ground
34	IO_CH6_PORT	3.3 V Servo Signal, Servo Rail Power
35	GROUND	Ground
36	GROUND	Ground
37	IO_CH7_PORT	3.3 V Servo Signal, Servo Rail Power
38	GROUND	Ground
39	GROUND	Ground
40	IO_CH8_PORT	3.3 V Servo Signal, Servo Rail Power
41	GROUND	Ground
42	GROUND	Ground
43	PPM_SBUS_PORT	3.3 V / 4.5 V Powered
44	RX_5V0_OUT	Power supply 5V
45	GROUND	Ground
46	SBUS_OUT	Serial bus out
47	GROUND	Ground
48	GROUND	Ground

7. MRD8550 CAM LR Expansion Board Interfaces

7.1. LR Wi-Fi M.2 Connector

The QCS8550 provides PCIe0 and PCIe1 interfaces, which are routed to the M.2 E-key connector for connecting off-the-shelf LR Wi-Fi modules.

Note: By default, the 5G module operates in USB mode. To verify LR Wi-Fi using the PCIe1 interface, the Merlin board must be modified by disabling the on-board resistor (DNI option). Otherwise, the Wi-Fi resistor DNI option on the SOM board can be used in the future to access the PCIe0 interface.

Table 7-1: LR Wi-Fi M.2 Connector (J5)

Pin No	Signal	Description
1	Ground	Ground
2	VCC_3V3_LR_WIFI	Power supply 3.3V
3	NC	Not Connected
4	VCC_3V3_LR_WIFI	Power supply 3.3V
5	NC	Not Connected
6	TP6	Test Point
7	Ground	Ground
8	TP7	Test Point
9	NC	Not Connected
10	TP8	Test Point
11	NC	Not Connected
12	NC	Not Connected
13	NC	Not Connected
14	NC	Not Connected
15	VCC_LR_XPA	Power supply 5V
16	NC	Not Connected
17	VCC_LR_XPA	Power supply 5V
18	Ground	Ground
19	VCC_LR_XPA	Power supply 5V
20	NC	Not Connected
21	VCC_LR_XPA	Power supply 5V
22	NC	Not Connected
23	VCC_LR_XPA	Power supply 5V
24	NC	Not Connected
25	NC	Not Connected
26	NC	Not Connected
27	NC	Not Connected
28	NC	Not Connected
29	NC	Not Connected
30	NC	Not Connected
31	NC	Not Connected
32	NC	Not Connected
33	Ground	Ground
34	NC	Not Connected
35	PCIE0_TX0_LR_P	PCIE 0 Gen 3 transmit 0 - plus
36	NC	Not Connected
37	PCIE0_TX0_LR_M	PCIE 0 Gen 3 transmit 0 - minus
38	TP11	Test Point
39	Ground	Ground
40	TP10	Test Point
41	PCIE0_RX0_LR_P	PCIE 0 Gen 3 receive 0 - plus
42	TP9	Test Point
43	PCIE0_RX0_LR_M	PCIE 0 Gen 3 receive 0 - minus
44	TP3	Test Point
45	Ground	Ground

46	TP4	Test Point
47	PCIE0_REFCLK_LR_P	PCIE 0 Gen 3 reference clock - plus
48	TP5	Test Point
49	PCIE0_REFCLK_LR_M	PCIE 0 Gen 3 reference clock - minus
50	NC	Not Connected
51	Ground	Ground
52	PCIE0_RST_N_3V3	PCIE 0 Gen 3 reset
53	PCIE0_CLK_REQ_3V3	PCIE 0 Gen 3 clock
54	NC	Not Connected
55	PCIE0_WAKE_N_3V3	PCIE 0 Gen 3 wake
56	NC	Not Connected
57	Ground	Ground
58	NC	Not Connected
59	PCIE0_TX1_LR_P	PCIE 0 Gen 3 transmit 1 - plus
60	NC	Not Connected
61	PCIE0_TX1_LR_M	PCIE 0 Gen 3 transmit 1 - minus
62	NC	Not Connected
63	Ground	Ground
64	NC	Not Connected
65	PCIE0_RX1_LR_P	PCIE 0 Gen 3 receive 1 - plus
66	NC	Not Connected
67	PCIE0_RX1_LR_M	PCIE 0 Gen 3 receive 1 - minus
68	NC	Not Connected
69	Ground	Ground
70	NC	Not Connected
71	NC	Not Connected
72	VCC_3V3_LR_WIFI	Power supply 3.3V
73	NC	Not Connected
74	VCC_3V3_LR_WIFI	Power supply 3.3V
75	Ground	Ground

7.2. LR Wi-Fi Power Connector

To improve long-range communication, a dedicated power connector on the board allows users to connect a 5V supply or battery power directly to the LR Wi-Fi Module.

Note: Optionally, the user can connect an external power source directly to the module if the on-board power supply connection is not used.

Pin No	Signal	Description
1	LR_WIFI_12V	LR WIFI External supply 5-12V
2	LR_WIFI_12V	LR WIFI External supply 5-12V
3	LR_WIFI_12V	LR WIFI External supply 5-12V
4	Ground	Ground
5	Ground	Ground
6	Ground	Ground

Mistral tested and validated the following LR Wi-Fi Module,

Table 7-2: LR Wi-Fi Module

Sl. No	Manufacturer	Part Number	Power supply
1	Doodle Labs	AX-TB6S-4-MM	3.3V

7.3. CAM0 Connector

Dedicated CSI0 Interface from QCS8550 is connected to the CAM0 connector (J3).

Note:

- To use the MRD8550 Merlin Board Camera interface, user shall use the CAM LR Expansion board, which connects to the camera module connector as shown in Figure 8-2.
- At any given time, either CAM0 or HDMI can be active, but not both simultaneously.

Table 7-3: CAM0 Connector (J3)

Pin No	Signal	Description
1	CSI0_VSYNC	Vertical synchronization pin
2	CSI0_STROBE	Strobe Pin
3	CAM0_D3_P_F	MIPI Data Lane 3 Differential Pair +
4	CAM0_D3_M_F	MIPI Data Lane 3 Differential Pair -
5	Ground	Ground
6	CAM0_CLK_P_F	MIPI Clock Lane Differential Pair +
7	CAM0_CLK_M_F	MIPI Clock Lane Differential Pair -
8	CSI0_SPARE	Spare Pin
9	CSI0_MCLK	MIPI Master Clock
10	CSI0_RST	Camera reset
11	CAM0_D0_P_F	MIPI Data Lane 0 Differential Pair +
12	CAM0_D0_M_F	MIPI Data Lane 0 Differential Pair -
13	Ground	Ground
14	Ground	Ground
15	CAM0_D1_P_F	MIPI Data Lane 1 Differential Pair +
16	CAM0_D1_M_F	MIPI Data Lane 1 Differential Pair -
17	Ground	Ground
18	CAM0_AVDD_2V8	2.8V supply voltage
19	CSI0_SPARE	Spare Pin
20	CAM0_D2_P_F	MIPI Data Lane 2 Differential Pair +
21	CAM0_D2_M_F	MIPI Data Lane 2 Differential Pair -
22	Ground	Ground
23	I2C_SDA_CSI0	I2C Data
24	I2C_SCL_CSI0	I2C Clock
25	CSI0_PWDN	Camera Power Down
26	CAM0_DVDD_1V1_1V2	1.1V/1.2V supply voltage
27	CAM0_DVDD_1V1_1V2	1.1V/1.2V supply voltage
28	CAM_DOVDD_1V8	1.8V supply voltage
29	CAM_5V0_3V3	5V/3.3V supply voltage
30	CAM_5V0_3V3	5V/3.3V supply voltage
31-49	Ground	Ground

7.4. CAM1 Connector

Dedicated CSI1 Interface from QCS8550 is connected to the CAM1 connector (J6).

Note: To use the MRD8550 Merlin Board Camera interface, user shall use the CAM LR Expansion board, which connects to the camera module connector as shown in Figure 8-2.

Table 7-4: CAM1 Connector (J6)

Pin No	Signal	Description
1	CSI1_VSYNC	Vertical synchronization pin
2	CSI1_STROBE	Strobe Pin
3	CAM1_D3_P_F	MIPI Data Lane 3 Differential Pair +

4	CAM1_D3_M_F	MIPI Data Lane 3 Differential Pair -
5	Ground	Ground
6	CAM1_CLK_P_F	MIPI Clock Lane Differential Pair +
7	CAM1_CLK_M_F	MIPI Clock Lane Differential Pair -
8	CSI1_SPARE	Spare Pin
9	CSI1_MCLK	MIPI Master Clock
10	CSI1_RST	Camera reset
11	CAM1_D0_P_F	MIPI Data Lane 0 Differential Pair +
12	CAM1_D0_M_F	MIPI Data Lane 0 Differential Pair -
13	Ground	Ground
14	Ground	Ground
15	CAM1_D1_P_F	MIPI Data Lane 1 Differential Pair +
16	CAM1_D1_M_F	MIPI Data Lane 1 Differential Pair -
17	Ground	Ground
18	CAM1_AVDD_2V8	2.8V supply voltage
19	CSI1_SPARE	Spare Pin
20	CAM1_D2_P_F	MIPI Data Lane 2 Differential Pair +
21	CAM1_D2_M_F	MIPI Data Lane 2 Differential Pair -
22	Ground	Ground
23	I2C_SDA_CSI1	I2C Data
24	I2C_SCL_CSI1	I2C Clock
25	CSI1_PWDN	Camera Power Down
26	CAM1_DVDD_1V1_1V2	1.1V/1.2V supply voltage
27	CAM1_DVDD_1V1_1V2	1.1V/1.2V supply voltage
28	CAM_DOVDD_1V8	1.8V supply voltage
29	CAM_5V0_3V3	5V/3.3V supply voltage
30	CAM_5V0_3V3	5V/3.3V supply voltage
31-49	Ground	Ground

7.5. CAM2 Connector

Dedicated CSI2 Interface from QCS8550 is connected to CAM2 connector (J2).

Note: To use the MRD8550 Merlin Board Camera interface, user shall use the CAM LR Expansion board, which connects to the camera module connector as shown in Figure 8-2.

Table 7-5: CAM2 Connector (J2)

Pin No	Signal	Description
1	CSI2_VSYNC	Vertical synchronization pin
2	CSI2_STROBE	Strobe Pin
3	CAM2_D3_P_F	MIPI Data Lane 3 Differential Pair +
4	CAM2_D3_M_F	MIPI Data Lane 3 Differential Pair -
5	Ground	Ground
6	CAM2_CLK_P_F	MIPI Clock Lane Differential Pair +
7	CAM2_CLK_M_F	MIPI Clock Lane Differential Pair -
8	CSI2_SPARE	Spare Pin
9	CSI2_MCLK	MIPI Master Clock
10	CSI2_RST	Camera reset
11	CAM2_D0_P_F	MIPI Data Lane 0 Differential Pair +
12	CAM2_D0_M_F	MIPI Data Lane 0 Differential Pair -
13	Ground	Ground
14	Ground	Ground
15	CAM2_D1_P_F	MIPI Data Lane 1 Differential Pair +
16	CAM2_D1_M_F	MIPI Data Lane 1 Differential Pair -
17	Ground	Ground
18	CAM2_AVDD_2V8	2.8V supply voltage
19	CSI2_SPARE	Spare Pin
20	CAM2_D2_P_F	MIPI Data Lane 2 Differential Pair +

21	CAM2_D2_M_F	MIPI Data Lane 2 Differential Pair -
22	Ground	Ground
23	I2C_SDA_CSI2	I2C Data
24	I2C_SCL_CSI2	I2C Clock
25	CSI2_PWDN	Camera Power Down
26	CAM2_DVDD_1V1_1V2	1.1V/1.2V supply voltage
27	CAM2_DVDD_1V1_1V2	1.1V/1.2V supply voltage
28	CAM_DOVDD_1V8	1.8V supply voltage
29	CAM_5V0_3V3	5V/3.3V supply voltage
30	CAM_5V0_3V3	5V/3.3V supply voltage
31-49	Ground	Ground

7.6. CAM3 Connector

Dedicated CSI3 Interface from QCS8550 is connected to CAM3 connector (J9).

Note: To use the MRD8550 Merlin Board Camera interface, user shall use the CAM LR Expansion board, which connects to the camera module connector as shown in Figure 8-2.

Table 7-6: CAM3 Connector (J9)

Pin No	Signal	Description
1	CSI3_VSYNC	Vertical synchronization pin
2	CSI3_STROBE	Strobe Pin
3	CAM3_D3_P_F	MIPI Data Lane 3 Differential Pair +
4	CAM3_D3_M_F	MIPI Data Lane 3 Differential Pair -
5	Ground	Ground
6	CAM3_CLK_P_F	MIPI Clock Lane Differential Pair +
7	CAM3_CLK_M_F	MIPI Clock Lane Differential Pair -
8	CSI3_SPARE	Spare Pin
9	CSI3_MCLK	MIPI Master Clock
10	CSI3_RST	Camera reset
11	CAM3_D0_P_F	MIPI Data Lane 0 Differential Pair +
12	CAM3_D0_M_F	MIPI Data Lane 0 Differential Pair -
13	Ground	Ground
14	Ground	Ground
15	CAM3_D1_P_F	MIPI Data Lane 1 Differential Pair +
16	CAM3_D1_M_F	MIPI Data Lane 1 Differential Pair -
17	Ground	Ground
18	CAM3_AVDD_2V8	2.8V supply voltage
19	CSI3_SPARE	Spare Pin
20	CAM3_D2_P_F	MIPI Data Lane 2 Differential Pair +
21	CAM3_D2_M_F	MIPI Data Lane 2 Differential Pair -
22	Ground	Ground
23	I2C_SDA_CSI3	I2C Data
24	I2C_SCL_CSI3	I2C Clock
25	CSI3_PWDN	Camera Power Down
26	CAM3_DVDD_1V1_1V2	1.1V/1.2V supply voltage
27	CAM3_DVDD_1V1_1V2	1.1V/1.2V supply voltage
28	CAM_DOVDD_1V8	1.8V supply voltage
29	CAM_5V0_3V3	5V/3.3V supply voltage
30	CAM_5V0_3V3	5V/3.3V supply voltage
31-49	Ground	Ground

7.7. CAM4 Connector

Dedicated CSI4 Interface from QCS8550 is connected to CAM4 connector (J4).

Note: To use the MRD8550 Merlin Board Camera interface, user shall use the CAM LR Expansion board, which connects to the camera module connector as shown in Figure 8-2.

Table 7-7: CAM4 Connector (J4)

Pin No	Signal	Description
1	CSI4_VSYNC	Vertical synchronization pin
2	CSI4_STROBE	Strobe Pin
3	CAM4_D3_P_F	MIPI Data Lane 3 Differential Pair +
4	CAM4_D3_M_F	MIPI Data Lane 3 Differential Pair -
5	Ground	Ground
6	CAM4_CLK_P_F	MIPI Clock Lane Differential Pair +
7	CAM4_CLK_M_F	MIPI Clock Lane Differential Pair -
8	CSI4_SPARE	Spare Pin
9	CSI4_MCLK	MIPI Master Clock
10	CSI4_RST	Camera reset
11	CAM4_D0_P_F	MIPI Data Lane 0 Differential Pair +
12	CAM4_D0_M_F	MIPI Data Lane 0 Differential Pair -
13	Ground	Ground
14	Ground	Ground
15	CAM4_D1_P_F	MIPI Data Lane 1 Differential Pair +
16	CAM4_D1_M_F	MIPI Data Lane 1 Differential Pair -
17	Ground	Ground
18	CAM4_AVDD_2V8	2.8V supply voltage
19	CSI4_SPARE	Spare Pin
20	CAM4_D2_P_F	MIPI Data Lane 2 Differential Pair +
21	CAM4_D2_M_F	MIPI Data Lane 2 Differential Pair -
22	Ground	Ground
23	I2C_SDA_CSI4	I2C Data
24	I2C_SCL_CSI4	I2C Clock
25	CSI4_PWDN	Camera Power Down
26	CAM4_DVDD_1V1_1V2	1.1V/1.2V supply voltage
27	CAM4_DVDD_1V1_1V2	1.1V/1.2V supply voltage
28	CAM_DOVDD_1V8	1.8V supply voltage
29	CAM_5V0_3V3	5V/3.3V supply voltage
30	CAM_5V0_3V3	5V/3.3V supply voltage
31-49	Ground	Ground

7.8. CAM5 Connector

Dedicated CSI5 Interface from QCS8550 is connected to CAM5 connector (J10).

Note: To use the MRD8550 Merlin Board Camera interface, user shall use the CAM LR Expansion board, which connects to the camera module connector as shown in Figure 8-2.

Table 7-8: CAM5 Connector (J10)

Pin No	Signal	Description
1	CSI5_VSYNC	Vertical synchronization pin
2	CSI5_STROBE	Strobe Pin
3	CAM5_D3_P_F	MIPI Data Lane 3 Differential Pair +
4	CAM5_D3_M_F	MIPI Data Lane 3 Differential Pair -
5	Ground	Ground

6	CAM5_CLK_P_F	MIPI Clock Lane Differential Pair +
7	CAM5_CLK_M_F	MIPI Clock Lane Differential Pair -
8	CSI5_SPARE	Spare Pin
9	CSI5_MCLK	MIPI Master Clock
10	CSI5_RST	Camera reset
11	CAM5_D0_P_F	MIPI Data Lane 0 Differential Pair +
12	CAM5_D0_M_F	MIPI Data Lane 0 Differential Pair -
13	Ground	Ground
14	Ground	Ground
15	CAM5_D1_P_F	MIPI Data Lane 1 Differential Pair +
16	CAM5_D1_M_F	MIPI Data Lane 1 Differential Pair -
17	Ground	Ground
18	CAM5_AVDD_2V8	2.8V supply voltage
19	CSI5_SPARE	Spare Pin
20	CAM5_D2_P_F	MIPI Data Lane 2 Differential Pair +
21	CAM5_D2_M_F	MIPI Data Lane 2 Differential Pair -
22	Ground	Ground
23	I2C_SDA_CSI5	I2C Data
24	I2C_SCL_CSI5	I2C Clock
25	CSI5_PWDN	Camera Power Down
26	CAM5_DVDD_1V1_1V2	1.1V/1.2V supply voltage
27	CAM5_DVDD_1V1_1V2	1.1V/1.2V supply voltage
28	CAM_DOVDD_1V8	1.8V supply voltage
29	CAM_5V0_3V3	5V/3.3V supply voltage
30	CAM_5V0_3V3	5V/3.3V supply voltage
31-49	Ground	Ground

7.9. CAM6 Connector

Dedicated CSI6 Interface from QCS8550 is connected to CAM6 connector (J7).

Note: To use the MRD8550 Merlin Board Camera interface, user shall use the CAM LR Expansion board, which connects to the camera module connector as shown in Figure 8-2.

Table 7-9: CAM6 Connector (J7)

Pin No	Signal	Description
1	CSI6_VSYNC	Vertical synchronization pin
2	CSI6_STROBE	Strobe Pin
3	CAM6_D3_P_F	MIPI Data Lane 3 Differential Pair +
4	CAM6_D3_M_F	MIPI Data Lane 3 Differential Pair -
5	Ground	Ground
6	CAM6_CLK_P_F	MIPI Clock Lane Differential Pair +
7	CAM6_CLK_M_F	MIPI Clock Lane Differential Pair -
8	CSI6_SPARE	Spare Pin
9	CSI6_MCLK	MIPI Master Clock
10	CSI6_RST	Camera reset
11	CAM6_D0_P_F	MIPI Data Lane 0 Differential Pair +
12	CAM6_D0_M_F	MIPI Data Lane 0 Differential Pair -
13	Ground	Ground
14	Ground	Ground

15	CAM6_D1_P_F	MIPI Data Lane 1 Differential Pair +
16	CAM6_D1_M_F	MIPI Data Lane 1 Differential Pair -
17	Ground	Ground
18	CAM6_AVDD_2V8	2.8V supply voltage
19	CSI6_SPARE	Spare Pin
20	CAM6_D2_P_F	MIPI Data Lane 2 Differential Pair +
21	CAM6_D2_M_F	MIPI Data Lane 2 Differential Pair -
22	Ground	Ground
23	I2C_SDA_CSI6	I2C Data
24	I2C_SCL_CSI6	I2C Clock
25	CSI6_PWDN	Camera Power Down
26	CAM6_DVDD_1V1_1V2	1.1V/1.2V supply voltage
27	CAM6_DVDD_1V1_1V2	1.1V/1.2V supply voltage
28	CAM_DOVDD_1V8	1.8V supply voltage
29	CAM_5V0_3V3	5V/3.3V supply voltage
30	CAM_5V0_3V3	5V/3.3V supply voltage
31-49	Ground	Ground

7.10. CAM7 Connector

Dedicated CSI7 Interface from QCS8550 is connected to CAM7 connector (J1).

Note: To use the MRD8550 Merlin Board Camera interface, user shall use the CAM LR Expansion board, which connects to the camera module connector as shown in Figure 8-2.

Table 7-10: CAM7 Connector (J1)

Pin No	Signal	Description
1	CSI7_VSYNC	Vertical synchronization pin
2	CSI7_STROBE	Strobe Pin
3	CAM7_D3_P_F	MIPI Data Lane 3 Differential Pair +
4	CAM7_D3_M_F	MIPI Data Lane 3 Differential Pair -
5	Ground	Ground
6	CAM7_CLK_P_F	MIPI Clock Lane Differential Pair +
7	CAM7_CLK_M_F	MIPI Clock Lane Differential Pair -
8	CSI7_SPARE	Spare Pin
9	CSI7_MCLK	MIPI Master Clock
10	CSI7_RST	Camera reset
11	CAM7_D0_P_F	MIPI Data Lane 0 Differential Pair +
12	CAM7_D0_M_F	MIPI Data Lane 0 Differential Pair -
13	Ground	Ground
14	Ground	Ground
15	CAM7_D1_P_F	MIPI Data Lane 1 Differential Pair +
16	CAM7_D1_M_F	MIPI Data Lane 1 Differential Pair -
17	Ground	Ground
18	CAM7_AVDD_2V8	2.8V supply voltage
19	CSI7_SPARE	Spare Pin
20	CAM7_D2_P_F	MIPI Data Lane 2 Differential Pair +
21	CAM7_D2_M_F	MIPI Data Lane 2 Differential Pair -
22	Ground	Ground
23	I2C_SDA_CSI7	I2C Data

24	I2C_SCL_CSI7	I2C Clock
25	CSI7_PWDN	Camera Power Down
26	CAM7_DVDD_1V1_1V2	1.1V/1.2V supply voltage
27	CAM7_DVDD_1V1_1V2	1.1V/1.2V supply voltage
28	CAM_DOVDD_1V8	1.8V supply voltage
29	CAM_5V0_3V3	5V/3.3V supply voltage
30	CAM_5V0_3V3	5V/3.3V supply voltage
31-49	Ground	Ground

8. System Setup



Figure 8-1: MRD8550 Merlin Kit LR Wi-Fi - System setup

8.1. Pre-requisites

- The power input shall be connected through power cable in BATT-IN (J6) connector and supplied through 12V DC Adapter.
- The MRD8550 Merlin Kit LR Wi-Fi shall be connected to the host PC through an Ethernet IX cable for the data transfer.
- The MRD8550 Merlin Kit LR Wi-Fi shall be connected to a host PC through a USB Type C cable for ADB access of the board.
- The HDMI Micro Type-D to Type-A cable shall be connected to host PC for data transfer.
- The USB Micro-B cable shall be connected in debug port for verifying the boot logs.
- Pre-install any serial console application (say Tera term, Minicom, Putty) in the host PC.
- Connect the MRD8550 Flight Control Unit peripherals.
- Connect the IMX577/OV9282 Camera Adapter to the MRD8550 CAM LR Expansion board camera port.
- Connect the antenna Kit to the LR Wi-Fi module to establish LR Wi-Fi connectivity.
- The DIP switch setting shall be set as per the instructions in Table 5-20.

8.2. Camera integration & Testing

Follow below steps for camera integration and testing,

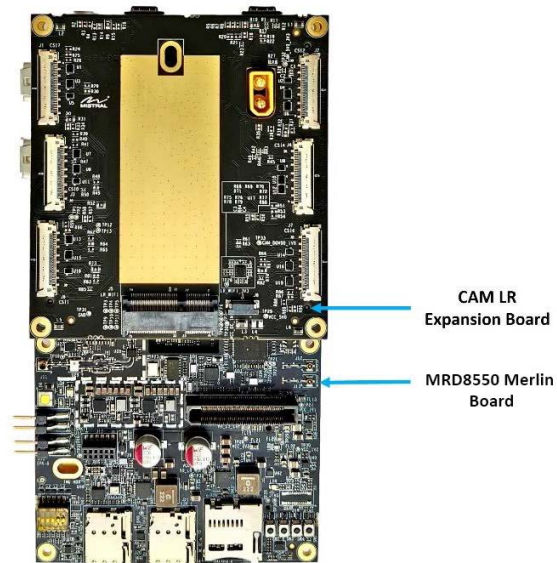


Figure 8-2 : MRD8550 Merlin Board with CAM LR Expansion Board

- Connect the CAM LR Expansion board to Merlin board as shown above.
- Connect the IPEX cable to CAM LR Expansion Board.
- Connect the IMX577 Camera Adapter or OV9282 Camera Adapter at the other end of IPEX cable provided by Mistral.
- Connect the IMX577 or OV9282 camera provided by Mistral.

9. Mechanical Specifications

9.1. Device Physical Dimensions – 141 x 76 x 41 mm

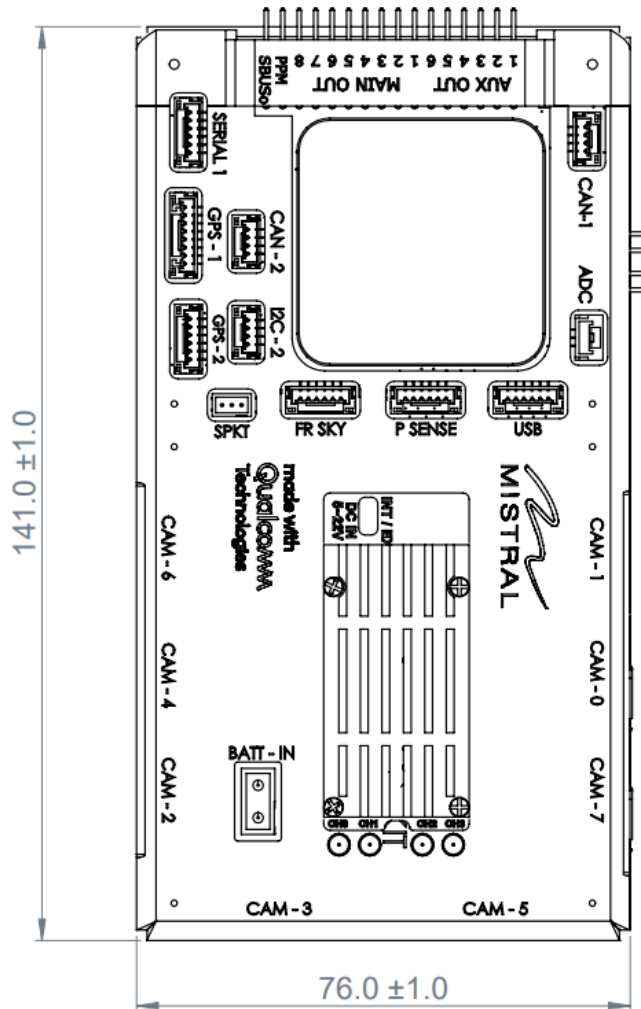


Figure 9-1: Top View

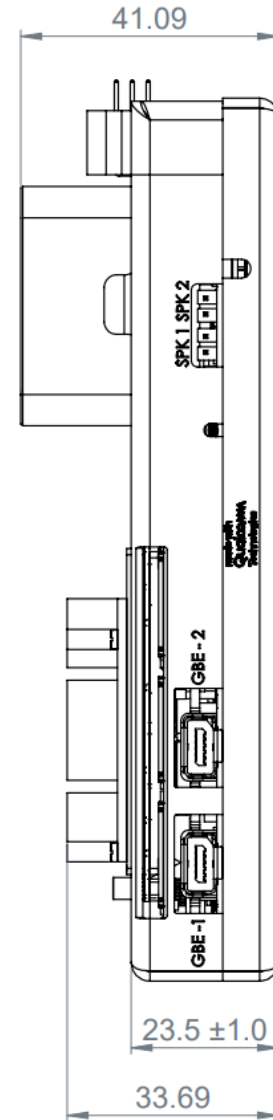


Figure 9-2: Side View

9.2.Exploded view – MRD8550 Merlin Kit LR Wi-Fi



Figure 9-3: Exploded view of Merlin Kit LR Wi-Fi

10. Thermal Management

The standard MRD8550 Merlin Kit LR Wi-Fi comes with Metal enclosure for mechanical stability and thermal management.

Please contact Mistral Solutions for more technical information.

11. Environmental specification

Please contact Mistral Solutions for more information.

12. Ordering information

12.1. Orderable PN

Table 12-1: Orderable Part Number

Sl. No	Order Model	Orderable PN#
1	MRD8550 Merlin Kit + Basic Accessories Kit	MRD8550-FLCN-BK-101
2	Vision Accessories Kit	MRD8550-ACC-VK-101
3	Cable Accessories Kit	MRD8550-ACC-CK-101
4	5G Connectivity Accessories Kit	MRD8550-ACC-MK-101

13. Additional Assistance

Please contact our support team for further assistance:

Phone: India: +91-80-4562 1100

Email: info@mistralsolutions.com

Web: <https://www.mistralsolutions.com/MRD8550-Merlin-Drone-Controller>

Note: Information contained in this document is subject to change