Botlink XRD2 *Datasheet*

The Botlink XRD2 is UAS command and control hardware and software solution, allowing drone control from anywhere in the world via cellular networks. An enabling technology for safe beyond visual line of sight (BVLOS) flights, the XRD2 uses carrier-approved LTE components for airborne operations. The Botlink XRD2 system consists of two components — a desktop or laptop based connection application, and a small hardware device that's connected to the drone autopilot, making integration simple and effective with the ability to read live data, track telemetry, and control multiple UAVs, the XRD2 is ideal for managing large drone fleets. The flight-proven XRD2 system allows you to easily integrate LTE command and control in the same nature as a traditional point-to-point radio.

Features

- Socketed cellular modem allowing use with different carriers throughout different countries
- Modems operate on multiple frequency bands
- 1.6GHz Quad Cortex™-A53 NXP i.MX 8M Plus processor
- Optional 1080p camera and supports out-of-the-box video streaming over LTE network
- USB connectivity for autopilot, cameras, and peripherals
- Easily updated via USB-C port
- All data processed by XRD2 is encrypted from end-to-end using 128 or 256-bit TLS
- Built-in authentication for enhanced security
- All communication data is routed through AWS servers based in USA
- Compatible with MAVLink autopilots such as the Pixhawk, Pixhawk 2, and ArduPilot Mega, running PX4 or APM firmware
- Companion software, Botlink Relay, features inforgraphics such as latency, packet loss, etc.
- Fully compliant with Section 889 of the National Defense Authorization Act
- Dedicated UAS support team based in Fargo, ND

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Botlink XRD2 Technical Specifications

Power Requirements

Input Voltage	6.5V to 30V
Typical Power	4.5W
Peak Power	Up to 20.5W + 2.5W per USB Port

Dimensions

Weight (w/o Enclosure)	54 grams (1.90 oz)
Weight (w/ Enclosure)	88 grams (3.10 oz)
Height	25.4 mm (1.0 in)
Width	68.6 mm (2.7 in)
Depth	68.6 mm (2.7 in)

Supported Message Protocols

	MAVLink 1
	MAVLink 2

Supported Groundstation

	QGroundControl
	Mission Planner
	Custom (SDK Available)

Processor

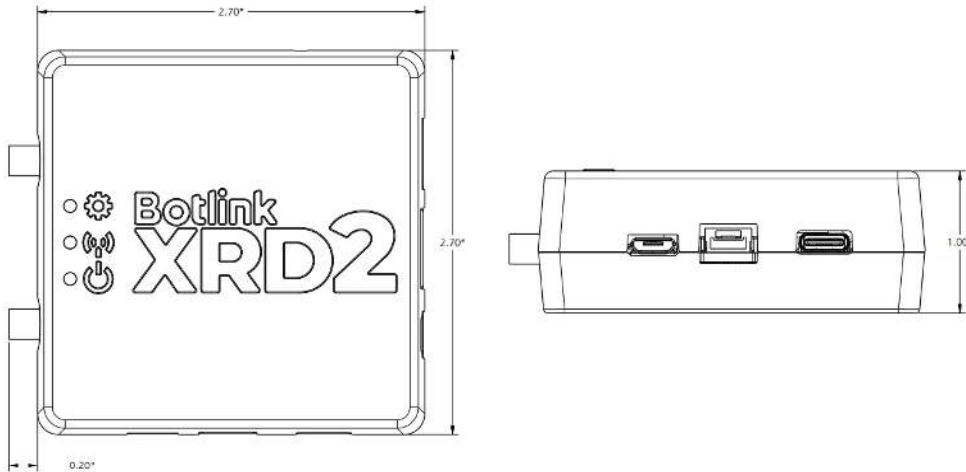|	
CPU	1.6GHz Quad Cortex™-A53 NXP i.MX 8M Plus
High Speed Interfaces	2x USB3.0, 2x GbE, PCIe, HDMI
Multimedia	1080p H265/H264 encode/decode, AI/ML acceleration, HD 2D/3D GPU
RAM	4 GB LPDDR4
eMMC	8 GB

Cellular Modem

Throughput	150 Mbps Download/42 Mbps Upload
Network Technology	4G LTE with 3G Fallback

Camera

|	
Sensor	SONY 2MP IMX291
Resolution	2MP 1945H x 1109V
Frame Rate (H264)	30fps@1920×1080 (Maximum)
View Angle	160 degree super wide view angle (diagonal)
Dimensions	1.73"×1.4"
Weight, w/ enc:	83 grams (1.7 oz)

Size, Weight, and Power

Power

- XT-60 Connector
- 5.46V to 30.19V battery cells
- 4.5W typical power consumption
- Up to 20.5W + 2.5W per USB Port

Operating Limits

- -20 to 50 C (-4 to 122F)
- 0 - 85% Relative Humidity

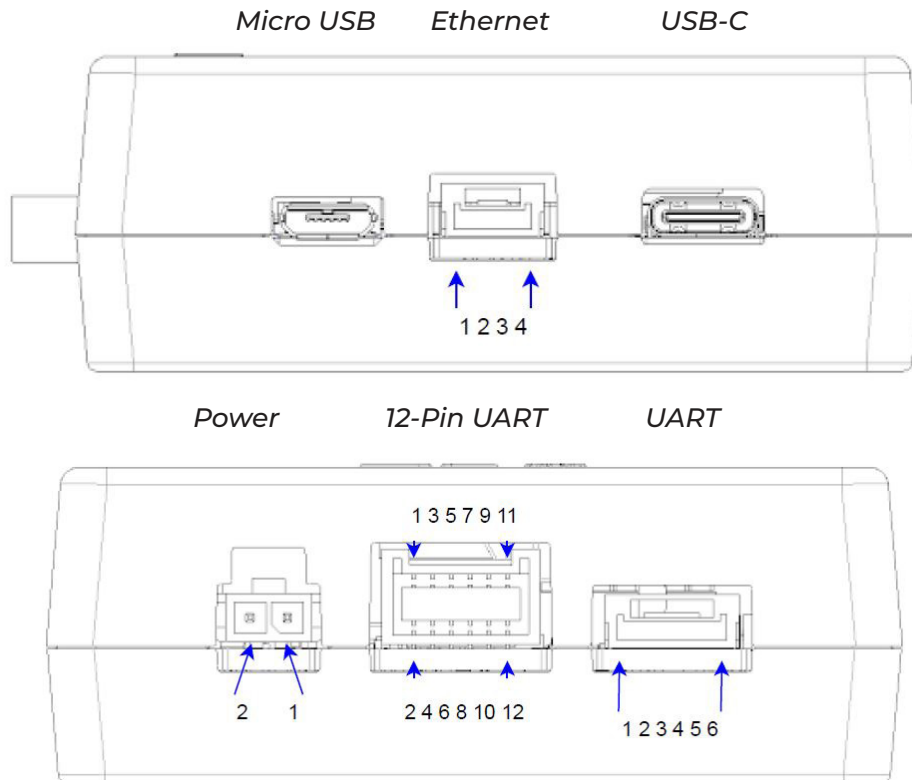|	Metric	Imperial
Weight, w/o enc:	54 grams	1.90 oz
Weight, w/ enc:	88 grams	3.10 oz
Height:	25.4 mm	1.0 in
Width:	68.6 mm	2.7 in
Depth:	58.6mm	2.7 in

XRD2 Secure Communication Routing
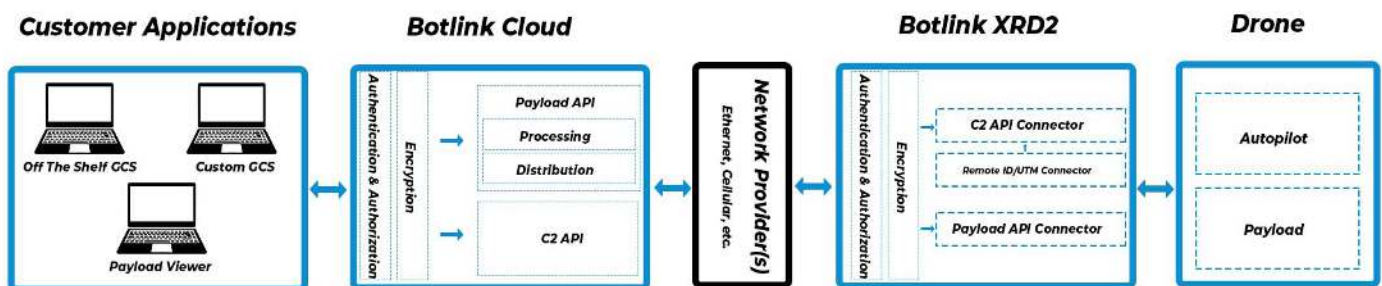
All communication between the XRD2, cloud services, and Relay App/SDK are encrypted using 128 or 256-bit TLS, and all connections are authenticated. These requirements are enforced by the Botlink cloud services, which operate as a bridge for all connections between XRD2s and clients, ensuring that no unauthorized parties are able to connect to drones over the cellular network. Each XRD2 is registered to a specific organization, and only users in that organization are allowed to connect to and control a drone using that XRD2. The Botlink system does not store the contents of the C2 data that passes through the system. It is simply passed from one end of the authorized connection to the other.

![Botlink XRD2 logo] **Datasheet**

XRD2 Ports

The Botlink XRD2 includes 1host-only Micro-USB B port, 1 UART port, 1 power port, 1 USBC port, one ethernet port and 1 12-pin UART port.

Micro USB   Ethernet   USB-C

1 2 3 4

Power   12-Pin UART   UART

1 3 5 7 9 11

2   1

2 4 6 8 10 12

1 2 3 4 5 6

Ethernet
P/N SM04B-GHS-TB(LF)(SN)
(This channel is typically used for communicating with a camera. Uses 2 pair 100BaseT 100Mb/s ethernet communication. Uses the 4pin JST-GH connector.)

Pin Description
1. XRD2_RX_P
2. XRD2_RX_N
3. XRD2_TX_P
4. XRD2_TX_N

Power
P/N 0436500200
(This connector is used for connecting to a battery. It uses the 2pin molex connector.)

Pin Description
1. Battery +
2. Battery -

12-Pin UART (3.3V)
P/N SM12B-ZPDSS-TF(LF)(SN)
(This channel is configured to be used for future Iridium satellite communication It uses UART communication with 2 data pins 6 flow control pins as well as power and ground pins. This channel uses the 12pin JST connector.)

Pin Description
1. 5V0_IRIDIUM
2. 5V0_IRIDIUM
3. XRD2 RX
4. XRD2 TX
5. XRD2 RTS
6. XRD2 CTS
7. XRD2 DF_DCD
8. XRD2 DF_DSR
9. XRD2 DF_RI
10. XRD2 DF_DTR
11. Ground
12. Ground

UART (3.3V)
P/N SM06B-GHS-TB(LF)(SN)
(This channel is primarily used for communicating with an autopilot. It communicates using UART with 2 data pins, 4 flow control pins and 1 ground pin. This channel uses the 6pin JST-GH connector.)

Pin Description
1. No Connect
2. XRD2 RX
3. XRD2 TX
4. XRD2 RTS
5. XRD2 CTS
6. Ground

Micro USB
P/N 0473460001
(This channel is used to power and communicate with a micro USB camera. It communicates using USB 2.0 which has data transfer up to 480MBps. We supply 5V and limit the current to 500mA. On the XRD2 side of this connector, the ID pin is held in host mode such that the camera will be held in device mode.)

USB-C
P/N USB4105-GF-A
(This channel is used to power the XRD2 board or supply power to a device. It uses 5V power which limits the current to 500mA. It communicates using USB 2.0 with data transfer up to 480Mbps. On the XRD2 side of the connector, a CC controller chip will place the XRD2 in either USB Host or USB device mode depending on what is connected to it.)

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Botlink Relay Features

Botlink Relay is an app that runs on your Windows or Mac computer that handles the process of connecting to your drone using the Botlink system. Once Botlink Relay is running, connecting to a drone is as simple as launching the ground control software.

Available Botlink Relay SDK makes integrating cellular connectivity directly into your custom flight control software quick and easy.
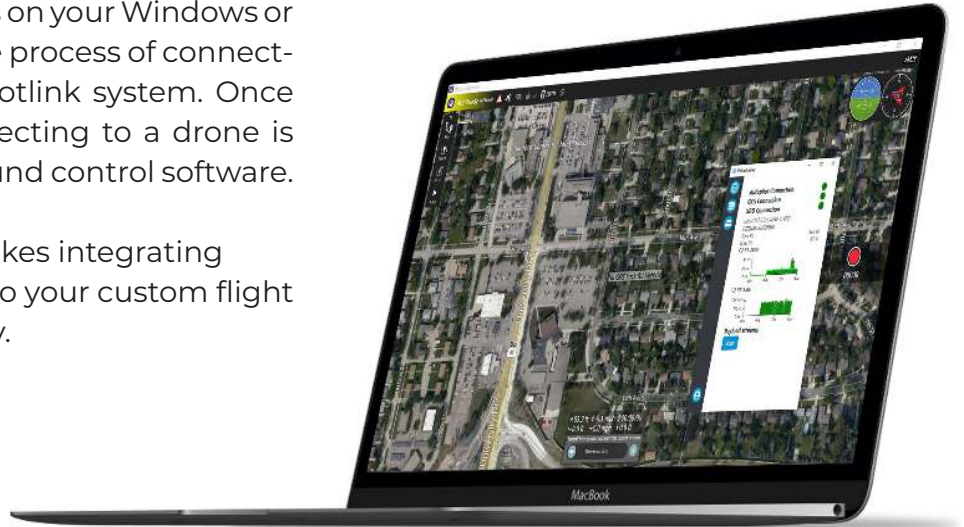
- Available for Windows and Mac
- Easily connects to QGroundControl or Mission Planner
- Custom SDK available for custom integration
- Live video feed from drone displayed in Relay

- Control video feed quality directly from interface
- Intilegent graphs return real-time communication statistics and health reports
- Can connect multiple Botlink Relays to a single XRD, ideal for video broadcasting

Optional Video Camera

Botlink's included high-definition camera takes the guess work out of video-streaming over a cellular network. Out-of-the-box compatibility means less time integrating, and more time streaming live video during operations.

The XRD's processor allows for H265 video encoding, including video down sampling to 480p at 5 FPS allows user to choose the minimal video quality necessary for flight, while minimizing the data transmission rates.

- Resolution: 2MP 1945 x 1109
- Sensor: 1/2.8" IMX291
- H.264 data format
- 30 FPS at 1920x1080
- Field of View: 160°

- USB interface
- MAX 300mA working current
- Dimension: 1.73"x1.4"
- M12 Mount
- Enclosed metal case

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Modem Variants
(single modem per XRD2)

Variant	4G Bands	3G Bands	Carrier Supported	Certifications
NL-SW-LTE-TC4NAG	B2, B4, B5*, B12, B13, B14, B66, B71	DC-HSPA+ - B2, B4, B5*	AT&T, T-Mobile, Firstnet, Rogers, Telus	RoHS Certificate of Compliance FCC Certification IC Certification Verizon ODI Certification AT&T IoT Device Certification
NL-SW-LTE-TSVG	B4, B13	None	Verizon	Verizon ODI Certification 15.00.573 Verizon ODI Certification 15.01.571 ROHS Certificate of Compliance – NL-SW-LTE-TSVG ROHS Certificate of Compliance – NL-SW-LTE-TNAG ROHS Certificate of Compliance – NL-SW-LTE-TEUG PTCRB Certification 17.01.502 Rogers Certification 17.01.502 AT&T IoT Device Certification
NL-SW-LTE-TNAG-B	B2, B5*, B4, B17	B2, B5*	AT&T, TMobile	Verizon ODI Certification 15.00.573 Verizon ODI Certification 15.01.571 ROHS Certificate of Compliance – NL-SW-LTE-TSVG ROHS Certificate of Compliance – NL-SW-LTE-TNAG ROHS Certificate of Compliance – NL-SW-LTE-TEUG PTCRB Certification 17.01.502 Rogers Certification 17.01.502 AT&T IoT Device Certification
NL-SW-LTE-TEUG	B3, B7, B20	B1, B5*, B8	Various European	Verizon ODI Certification 15.00.573 Verizon ODI Certification 15.01.571 ROHS Certificate of Compliance – NL-SW-LTE-TSVG ROHS Certificate of Compliance – NL-SW-LTE-TNAG ROHS Certificate of Compliance – NL-SW-LTE-TEUG PTCRB Certification 17.01.502 Rogers Certification 17.01.502 AT&T IoT Device Certification
NL-SW-LTE-QBG96	LTE-M/NB-IoT: B1, B2 B3, B4,B5*, B8, B12, B13, B18,B19, B20, B26, B28, B39	None - 2G fallback on GSM850, GSM900, DCS1800, PCS1900	TMobile, AT&T, Telus, Various European	AT&T Certification Telus Network Ready Certification Verizon ODI Certification PTCRB Certification FCC Certification IC Certification CE Mark ROHS Certificate of Compliance
NL-SW-LTE-TC4EU	LTE-FDD: B1, B3, B7, B8, B20	B1, B8 2G fallback on GSM900, DCS 1800	Various European	CE Mark RoHS Certificate of Compliance
XRD-ALO	B4, B13	None	Verizon ALO	*In Progress*

*B5 disabled by default