Xeos Technologies Inc.

Brizo Hardware Manual

GNSS DIRECTIONAL WAVEHEIGHT RECEIVER

Version 2.0
September 2020

Shipped From

Contacts

Email	support@xeostech.com
Phone	1-902-444-7650
Fax	1-902-444-7651
Website	www.xeostech.com

Version History

Version No.	Date	Description
0.7	Apr 2018	Rough Manual Release
1.0	July 2018	Official Release
2.0	Sept 2020	Removed Radio Sections

This manual is written with respect to the Hardware aspects of the Brizo and is meant to be used in combination with the Brizo Firmware User Manual.

Table of Contents

Overview

The Brizo Directional Wave Height Sensor utilizes Global Navigation Satellite System (GNSS) to measure wave statistics. Since the Brizo uses GNSS to calculate its heading, no calibration is required. The sensor is housed in a robust enclosure for rough environments. The sensor runs autonomously and can record data to SD cards, output over RS-232 or send messages over one of the embedded telemetry options available.

Telemetry Configurations

The Brizo is a flexible and powerful platform that has multiple embedded telemetry configurations for near shore to deep ocean applications.

Iridium Transceiver

The Brizo has the option to be equipped with an Iridium satellite transceiver at the factory if requested. The transceiver can be used to transmit SBD (Short Burst Data) packets for coefficient transmission, or RUDICS to bring back full data files. Iridium has global coverage and is suitable for any location. An Iridium data plan is required to use these features. Contact Xeos Technologies for a plan suited to the application's needs.

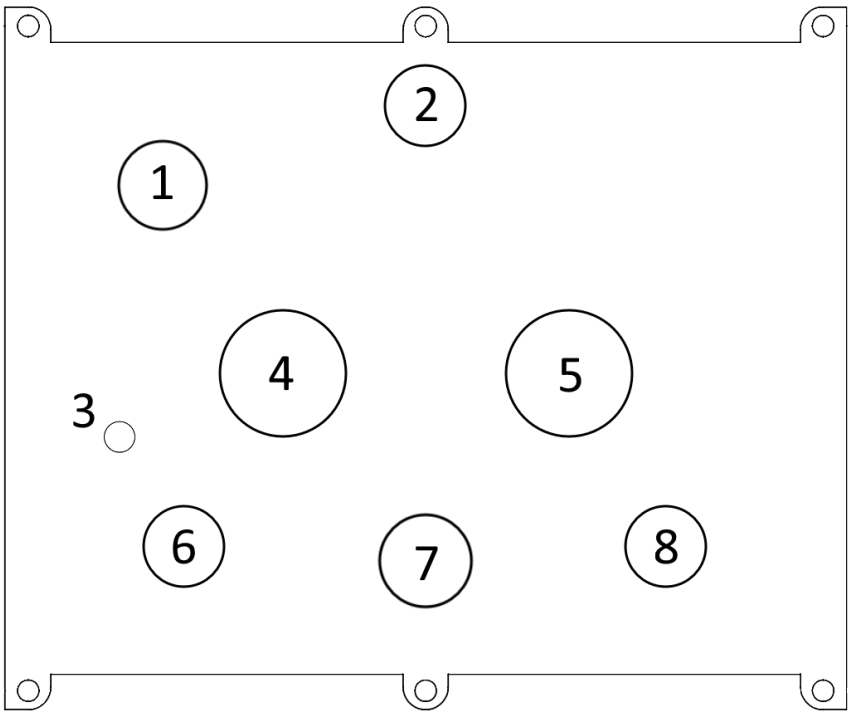
For more details on Iridium, see Appendix D: Iridium Service.

Cellular Transceiver

For near-shore application and in harbors, the cellular modem option allows the Brizo to transmit SMS and data over the local cellular network. A data plan with the local network is required.

Device Preparation

Making the Connection



Front Panel Diagram of the Brizo

No.	Name	Function
1	USB-Mini	Access for configuration of device for deployment via PC
2	Test Button	Used to initiate self-test of the device's connection to peripheral devices and Iridium transmission capability. Hold to reset device.
3	2 BA Ground Stud	Grounding connection for lightning and surge protection
4	Serial/SDI-12/SW LOAD	Connection to peripheral device via Serial/SDI-12, Auxiliary Serial output and/or Switched power for peripheral device (14-Pin Female)
5	Power/ENET/CBUS	Connection to power supply, ethernet and CBUS connection (10-Pin Female)
6	Iridium TNC	Connection to Iridium antenna via TNC connector
7	GNSS Type N	Connection to GNSS antenna via Type N connector
8	Cellular TNC	Connection to Cellular antenna via TNC connector

The front panel of the Brizo has up to 6 connectors depending on the configuration to connect to various antennas.

The USB (USB Mini) is used as a diagnostic I/O port for the device. Alternatively, Serial 1 on the 14-pin circular Souriau connector can be used as a diagnostic port. The user can set various

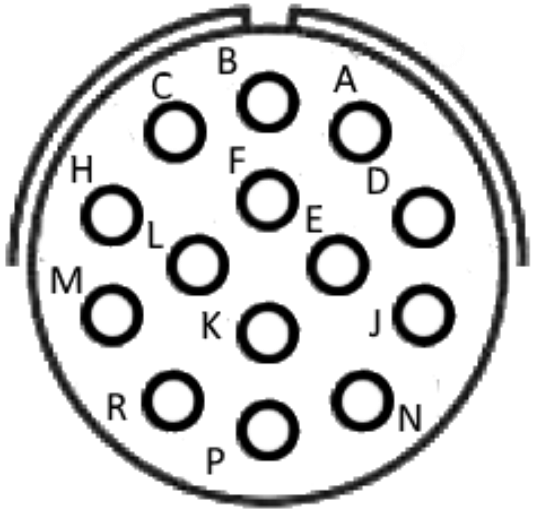
settings on the device through this port, as well as receive diagnostic output. It is also where the device will accept firmware upgrades.

The Type N connector on the panel is supplied to attach to one of the many supported GNSS antennae. Depending on what modems installed there may also be TNC connectors for the various telemetry options as indicated on the label.

Unused ports should be covered. The 10-pin circular Souriau connector contains the power connections. The 14-pin circular Souriau connector contains the serial port connections. Below are the pinouts for the two connectors; unused ports should be covered.

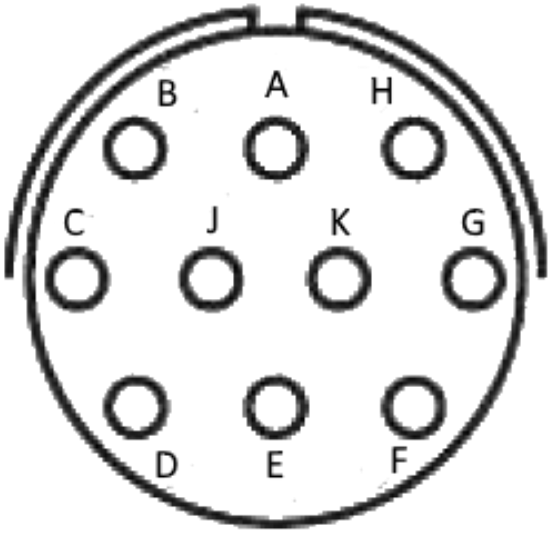
Circular Connector, 14-Pin Female

Pin	Function
A	TXD1-RS
B	N/C
C	SDI-12 BUS
D	RXD1-RS
E	CTS+RS
F	GND
H	PWR-SW3
J	RTS1+RS
K	GND
L	RTS8+RS
M	PWR-SW4
N	TXD8-RS
P	RXD8-RS
R	CTS8+RS



Circular Connector, 10-Pin Female

Pin	Function
A	VBAT
B	GND
C	ETH RD-
D	ETH RD+
E	ETH TD-
F	ETH TD+
G	GND
H	CAN-H
J	CAN-L
K	GND

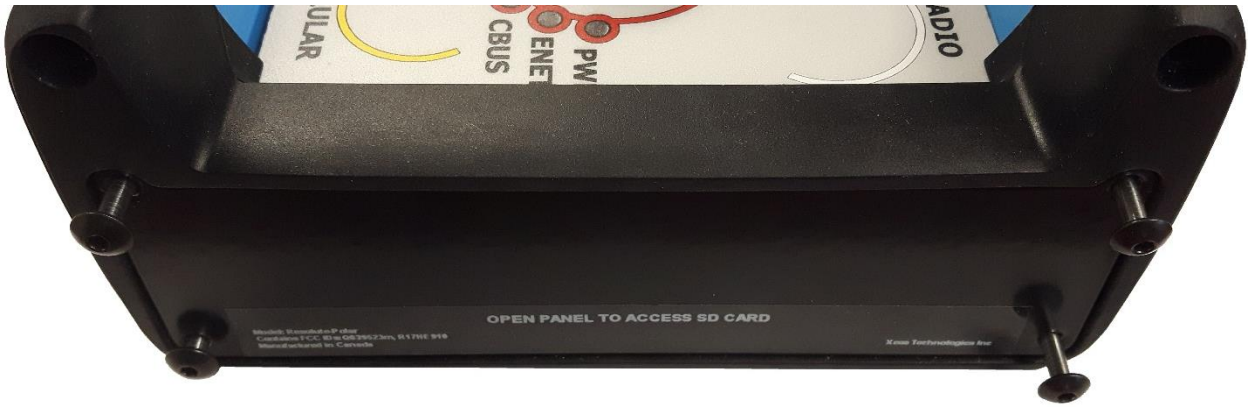


The power leads (A, B) are connected to the red (+) and black (-) flying leads on the supplied cable. They require a DC power supply of **11V (minimum) to 28V (maximum)**. For Brizo units with Cellular or Iridium telemetry a **3A supply is required.**

Removable Door: SD cards Access and SIM Installation

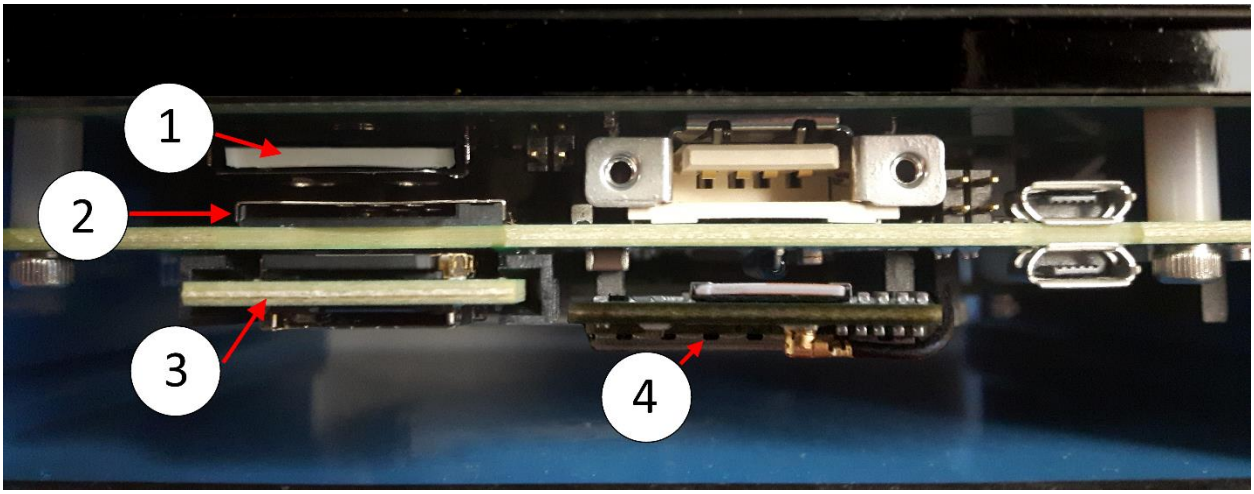
The Brizo has a removable door that allows for access to the SD cards that are shipped with the unit along with access to SIM slots for optional Cell and Iridium Telemetry.

Using a 3/32" Allen key, the four captive fasteners pictured below should be unscrewed from the main housing. Opening the door will automatically unmount the cards to protect the stored data. No data will be written while the door is removed.



Door fasteners in their unscrewed configuration. The door is free and able to be removed.

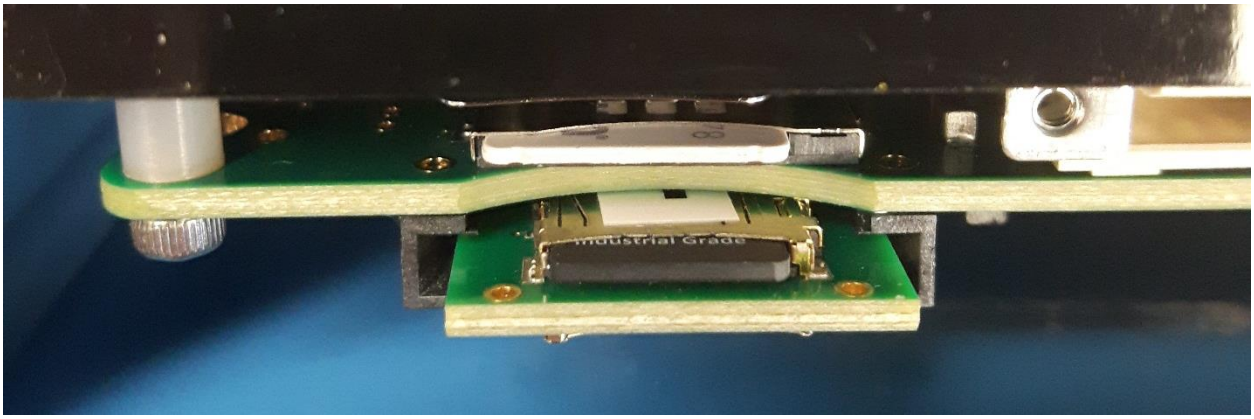
The below image shows the various components of note that can be viewed when the door is open.



No.	Name	Function
1	Clock Battery	Used to maintain the internal clock of the Brizo
2	Iridium SIM Holder	SIM Cards mandatory for use with Iridium are inserted here
3	SD Card Holder	PCB Holding both MicroSD cards is stored here
4	Cell Micro SIM	Module for holding a cellular Micro SIM card is installed here

Retrieving SD Cards

The SD cards are of the microSD form factor and are mounted on a single removable cartridge on the left side of the Brizo's access area. To remove the SD cartridge, grasp the edges and pull in the direction of the opening of the enclosure. When replacing the SD cartridge, note the orientation of the cartridge does not matter, so long as the cartridge is fully seated in its slot.

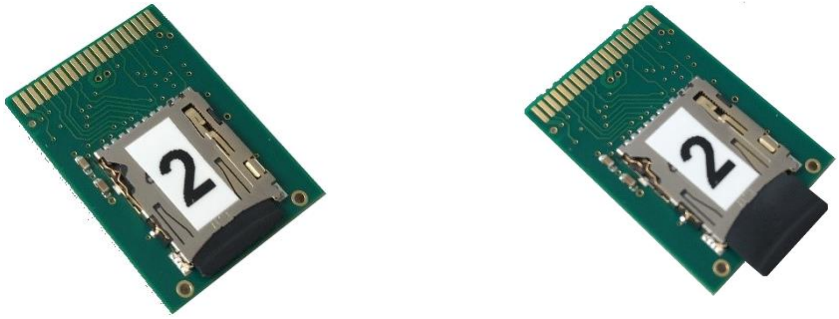


The SD cartridge fully mounted on the PCB chassis.

When the cartridge is removed, the SD cards are labeled on their holders, with one holder on either side of the cartridge. SD 1 is recording GNSS data, while SD 2 records diagnostic information.

If the SD cards are placed in the incorrect SD holders, the data will become mixed (diagnostic and GNSS data on the same card). This has no effect on the performance of the unit, but may cause GNSS data to be removed from the card sooner than desired. Each side is labelled at the factory to mitigate data mixing, with SD Card 1 mounted UP. Read about the memory management later in this section for more information.

The SD holders are of the push type. Simply push the SD card further into the holder to remove the SD. The card will pop free upon releasing the card from the push. Push again to mount.



SD 2 Mounted on Left, Push Ejected on Right

To resume recording after accessing the SD cards, mount the cards on the cartridge, then return the cartridge to the PCB chassis and close the side panel. Upon closing the panel, recording will

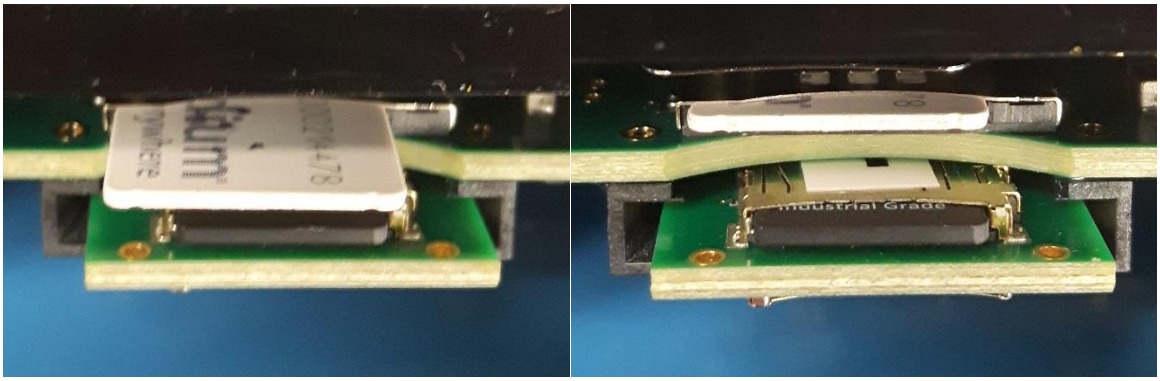
resume. Check that the SD LED is green to ensure both cards were mounted properly. Screw in the fasteners to ensure the door is retained by the enclosure.

Installing the Iridium SIM

If the unit comes equipped with an Iridium modem, it requires a SIM to operate. Iridium SIMs can be purchased through the parent company, Xeos Technologies, an Iridium Value Added Reseller. If only using SBDs, registration of SIM is required. If using RUDICS, the SIM will need to be activated for RUDICS use. **Before inserting or removing the Iridium SIM, verify no power is applied to the unit.**

To access the Iridium SIM slot, open the SD card door of the Brizo. Using a 3/32" Allen key, the four captive fasteners should be unscrewed from the main housing.

The Iridium SIM slot is immediately above the SD Cards. The contact plates of the SIM card must face the SD cards. Insert the SIM by pushing the SIM in place. An in-place SIM is flush with the SIM holder. For people with large fingers it may be easier to insert or remove the SIM if the SD cartridge is removed first.



Iridium SIM Ejected (Correct Orientation) on Left, Seated on Right

Installing Power to the Unit

The Brizo requires power supply capable of sourcing three amp surge currents at 12 V. This can be reduced to one amp if no Iridium or Cellular modem is present. The power cable supplied has a red ring that matches the red ring of the power connector on the box.

The majority of units in the field will be powered by battery and solar panel. It is recommended to utilize a charge controller for the battery equipped with a low voltage disconnect, which will increase the battery's lifespan.

It is important to ground the Brizo for lightning and surge protection. The ground stud is located to the left of the serial connector and is pictured below. The thread of the grounding stud is 2 BA.

2 BA Threaded Ground Stud

Test Button and LED Behavior

Test Button Operation

The test button operation is controlled by variable length button presses. Additional confirmation feedback to these button presses is provided by the response of the LEDs. A summary table is provided at the bottom of this subsection.

To turn on the lights, press the test button (roughly one second press). This will light up the LEDs for the next 15 minutes. This is useful for confirming the unit is working and communicating with the network.

Holding the test button longer than three seconds resets the unit. After three seconds of holding the test button, the LED's will begin to flash yellow to confirm the reset.

Holding the button for 20s cancels all the above operations and the LED's turn off. It is safe to release the button at that point if resetting the unit is not currently intended.

Press Length	Unit Response	LED indication
~1s - 3s	LEDs On	LEDs On
3s - 20s	Software Reset	Flashing Yellow LEDs
20s +	Cancel Above Responses	Off

LED Behavior

Confirming the correct operation of the unit is an important step in installing the unit. The LED's on the unit are designed to be a visual indicator of its current operational status. The LEDS are automatically on after power up for 15 minutes to assist with installation.

LEDS can be reactivated with a quick 1s button push at any point. The below table indicates the meanings of the LEDs.

Power LED	
Behaviour	Meaning
Red	Reverse voltage applied
Green	Unit is powered
No LED	Unit is not powered

GNSS LED	
Behaviour	Meaning
Red	GNSS receiver on, no valid positions received in last 30s, < 4 SV tracked
Yellow	Last position received valid (non RTK), Tracking 4 satellites minimum (standard Brizo operation)
Blue	Last position received RTK Float
Green	Last position received RTK Fix
No LED	GNSS is not powered

Iridium LED	
Behaviour	Meaning
Red	Modem on
Green	RUDICS Tunnel confirmed connected to XeosOnline
Flashing Green	SBD successfully sent to gateway
No LED	Iridium modem is not Powered

Cellular LED	
Behaviour	Meaning
Red	Modem on
Green	Cell is Registered to Network
No LED	Cell is not Powered

SD Cards LED	
Behaviour	Meaning
Red	No Cards mounted
Yellow	One Card mounted
Green	Two Cards mounted

Installation of the Brizo

Installing the GNSS Antenna

The GNSS Antenna is the measuring point of the Brizo. The ideal location for the Brizo antenna is at the top of the buoy along the central axis. This gives the Brizo the ideal view of all available GNSS satellites, along with ideal conditions to measure wave direction.

Because the Brizo measures direction from a single point in space it relies on the horizontal motion of the buoy to determine the wave direction. Placing the antenna off of the center of the buoy can add error into this measurement. Contact Xeos Technologies for help in determining the best position for the antenna if required.

Installing the Iridium Antenna

If the Brizo comes equipped with an Iridium modem, the Iridium antenna needs to be installed. This antenna must be installed with as clear a view of the entire sky as possible.

Similar to GNSS satellites, Iridium satellites travel closer to the horizon. There are a limited number of satellites in the sky, so to maintain the best possible connection, the larger the continuous volume of the sky the antenna can see the better.

If the Brizo is transmitting via SBD, the proximity of the iridium antenna to the GNSS antenna does not matter as the two operations are not simultaneous. If transmitting with Iridium RUDICS, the Iridium antenna can cause interference with the GNSS receiver so should be placed a minimum of 1 meter away from the GNSS antenna, preferably with a cavity trap filter.

Installing RF Cables

Connecting the RF cables to the antennae involves transitioning the cables through a weather protective enclosure for the Brizo and the power system. This can be done in various ways, but a sealing gland is the most effective. RF cables supplied by Xeos Technologies are marked with a part number and color code. The color code matches the ring around the connector on the panel to allow for easy tracing of cables.

Mounting the device

The device should not be exposed to water and should be placed in a sealed compartment of the buoy. Mounting nuts that can be inserted into the Brizo enclosure for attachment are available.

Confirming Device Operation

Confirm Power to the Unit

Plugging in the power connector to the unit, the unit should flash all its LEDs. Confirm the power LED is green. If red, reverse the voltage supplied to the unit.

Confirming SD Cards Mounted

Shortly after start up the processor will try to mount the SD cards, and the LED should change from Red to Green. If the LED is red or yellow check that the cartridge and SDs are correctly mounted.

Confirming GNSS Receiver Operation

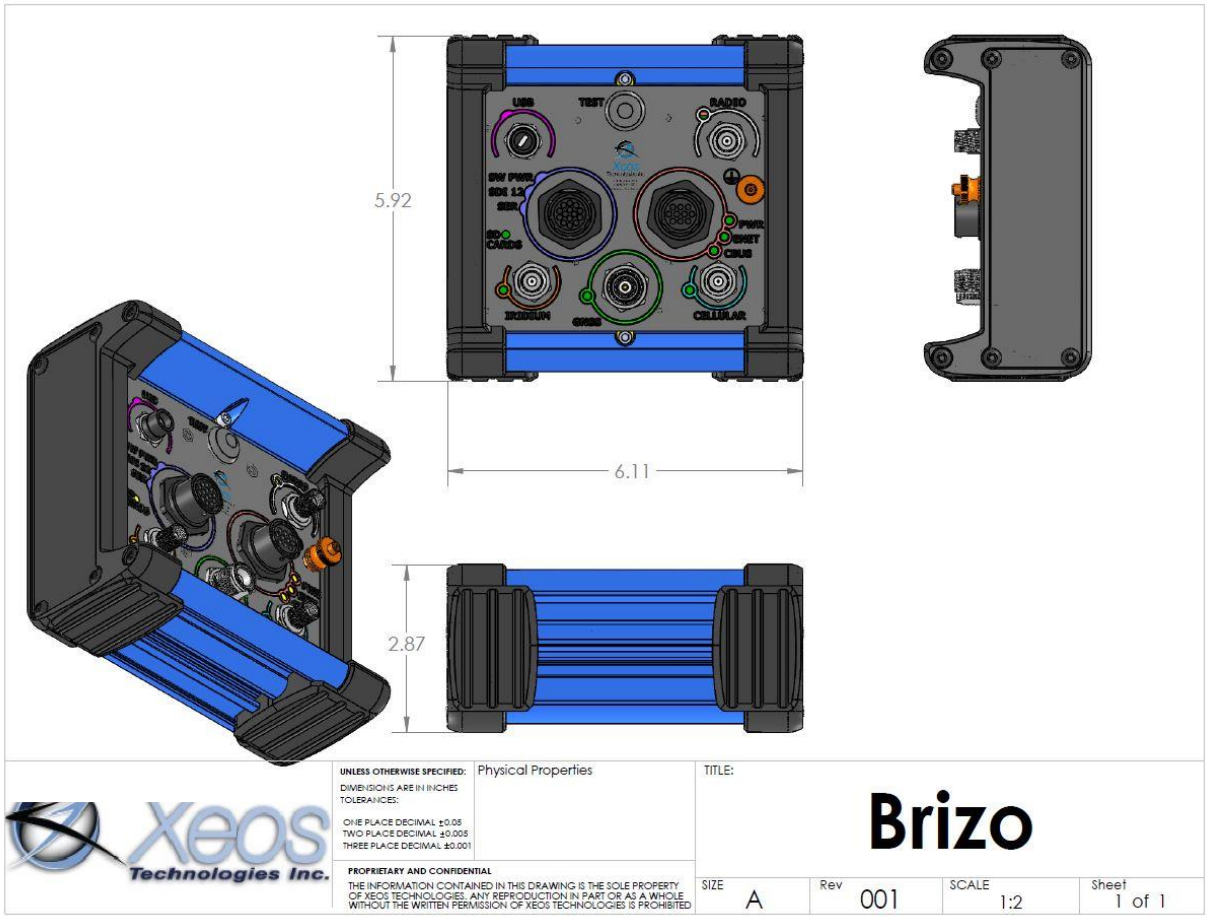
60 to 90 seconds after start-up, the GNSS receiver will power on and configure. The GNSS LED will initially be red. After configuring, the GNSS receiver will begin tracking satellites, and when the first valid position fix comes in (Tracking 4 satellites or more) the LED will turn yellow.

Confirming Iridium Operation

If the Brizo is equipped with Iridium, it will send an SBD on start up. After successfully sending this SBD, the Iridium LED will flash green for 10s. This indicates that the SBD has successfully made it to the Iridium gateway.

To confirm RUDICS operation, schedule the tunnel to start at the time desired. The modem will dial up a RUDICS connection at this time. If the unit is able to connect to XeosOnline, the Iridium LED will stay solid green. Any time the modem is powered on but has not yet successfully connected to the tunnel or sent an SBD, the Iridium LED will be Red.

Appendix A: Mechanical Specifications

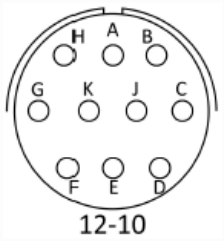


Appendix B: Cable Drawings

A-05-067 – Power Cable

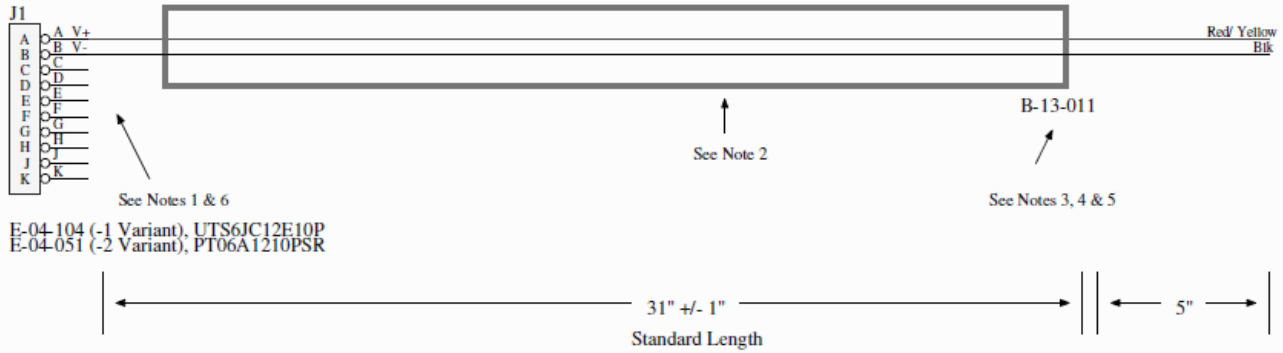
Rev	Details	Date
1.0	Initial Release	30 May 2018 SM
1.1	Added -3, -4 Variant	22 June 2018 SM
1.2	Part Updates	23 July 2018 SM

ARM-GNSS Power Connector (10 Pin Male)



A-05-067 -1, -2, -3. -4

B-01-046, Belden 8424 (-1, -2 Variant)
B-01-050, B-01-049, Arctic Ultraflex (-3 Variant)
B-01-048, B-01-049, Arctic Ultraflex (-4 Variant)



-1 (Regular)	-2 (Polar)	-3 (Polar Flex Yellow)	-4 (Polar Flex Red)	PN	Description	Quan
X				E-04-104	Connector, 10 pin Circular Plastic Type, Male, UTS6JC12E10P	1
X	X			B-01-046	Wire, 20 AWG (Water Resistant), Belden 8424	36"
X	X	X	X	B-13-011	Heat Shrink, Black, 3/8", 3-1 Ratio, Adhesive Lined	1"
X				M-08-058	Red PLA Ring	1
	X	X	X	E-04-051	Connector, 10 pin Circular Metal Type, Male, PT06A1210PSR	1
	X	X	X	B-13-034	Red 3/8" Heat Shrink	2"
X	X			B-13-015	Black 3/32" Heat Shrink, w/ glue	2"
X	X			B-13-032	Red 3/32" Heat Shrink	2"
		X		B-01-050	Wire, Arctic Ultraflex, 18 Gauge (Yellow)	36"
		X	X	B-01-049	Wire, Arctic Ultraflex, 18 Gauge (Black)	36"
			X	B-01-048	Wire, Arctic Ultraflex, 18 Gauge (Red)	36"
		X	X	B-15-011	WM, Abrasion Resist Jacket, 3/8"	31"

Note 1: Field Cables - encapsulate backshell
Note 2: Place a Cable label with Cable part number and Name, cover with clear heat shrink (B-13-017)
Note 3: Use Heat shrink as required
Note 4: Flying leads only - Strip & tin wires 0.5"
Note 5: Use Red and Black heat shrink on flying leads
Note 6: Add red heat shrink to ARM-GNSS side of cable (B-13-034, -2 and -3 Variant)

Title	ARM-GNSS, Power Cable		
Size: A4	Number: A-05-067	Revision: 1.2	
Date: 27-Jul-18		Sheet of 1 of 1	
File: A-05-067-ARM-GNSS_Power.SchDoc		Drawn By: S. Miller	

A-05-069 - Iridium

Rev	Details	Date	
1.0	Initial Release	11 June 2018	SM
1.1	Added -2 Var	28 June 2018	SM

ARM-GNSS, Iridium Connector (TNC Male)

A-05-069-1, -2

Iridium Antenna, Iridium Connector (TNC Male)

B-01-042 (-1 Variant), LMR-195
B-01-045 (-2 Variant), LMR-240

E-04-119 (-1 Variant), TC-195-TM-X
E-04-122 (-2 Variant), TC-240-TM-X

See Notes 1, 2 & 3

See Note 3

E-04-119 (-1 Variant), TC-195-TM-X
E-04-122 (-2 Variant), TC-240-TM-X

See Table For Standard Lengths

-1 (Iridium-SHORT)	-2 (Iridium-LONG)	PN	Description	Quan
X		E-04-119	TNC Male Plug, TC-195-TM-X	2
X		B-01-042	Cable, Coaxial, LMR-195	36"
X	X	B-13-028	Orange 3/8" Heat Shrink	2"
	X	B-01-045	Cable, Coaxial, LMR-240	180"
	X	E-04-122	TNC Male Plug, TC-240-TM-X	2

Note 1: Place a Cable label with Cable part number and Name
Note 2: Add orange heat shrink to ARM-GNSS side of cable (B-13-028)
Note 3: Add heat shrink to ends of cable

Title	ARM-GNSS, Iridium		
Size: A4	Number: A-05-069	Revision: 1.1	
Date: 28-Jun-18		Sheet of 1 of 1	
File: A-05-069_ARM-GNSS_Iridium.SchDoc		Drawn By: S. Miller	

A-05-066 – GNSS Outside

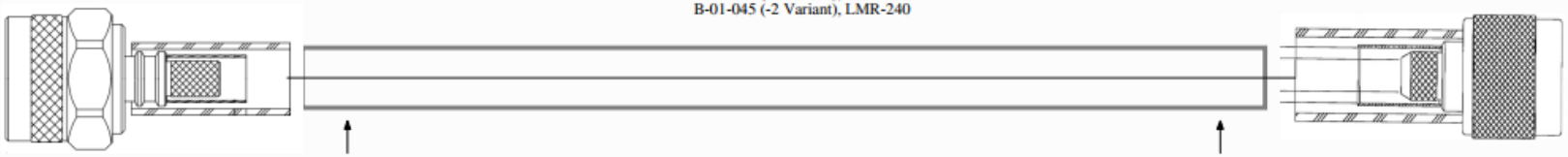
Rev	Details	Date	
1.0	Initial Release	11 June 2018	SM
1.1	Added -2 Var	28 June 2018	SM

ARM-GNSS, GNSS Connector (Type N Male)

A-05-066-1, -2

B-01-042 (-1 Variant), LMR-195
B-01-045 (-2 Variant), LMR-240

Antenna, GNSS Connector (TNC Male)



E-04-120 (-1 Variant), TC-195-NMH-X
E-04-123 (-2 Variant), TC-240-NMH-X

See Notes 1, 2 & 3

See Note 3

E-04-119 (-1 Variant), TC-195-TM-X
E-04-122 (-2 Variant), TC-240-TM-X

See Table For Standard Lengths

-1 (GNSS-SHORT)	-2 (GNSS-LONG)	PN	Description	Quan
X		E-04-119	TNC Male Plug TC-195-TM-X	1
X		E-04-120	Type N Male Plug TC-195-NMH-X	1
X		B-01-042	Cable, Coaxial, LMR-195	36"
X	X	B-13-029	Green 3/8" Heat Shrink	2"
	X	B-01-045	Cable, Coaxial, LMR-240	180"
	X			1
	X			1

Note 1: Place a Cable label with Cable part number and Name
Note 2: Add green heat shrink to Type-N side of cable (B-13-029)
Note 3: Add heat shrink to ends of cable

Title	ARM-GNSS, GNSS-Outside		
Size: A4	Number: A-05-066		Revision: 1.1
Date:	28-Jun-18	Sheet of	1 of 1
File:	A-05-066_ARM-GNSS_GNSS_Outside.SLDDRW	Drawn By:	S. Miller

A-05-053 – Serial Programming

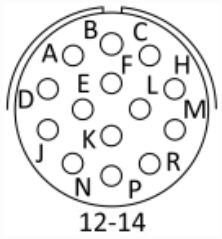
J1	J2	Color
A	2	White
D	3	Green
E	7	Black
F	5	Brown
J	8	Red

Rev	Details	Date	
1.0	Initial Release	1 June 2018	SM
1.1	Added Color Table	22 June 2018	SM
1.2	Fixed Pinout	26 June 2018	

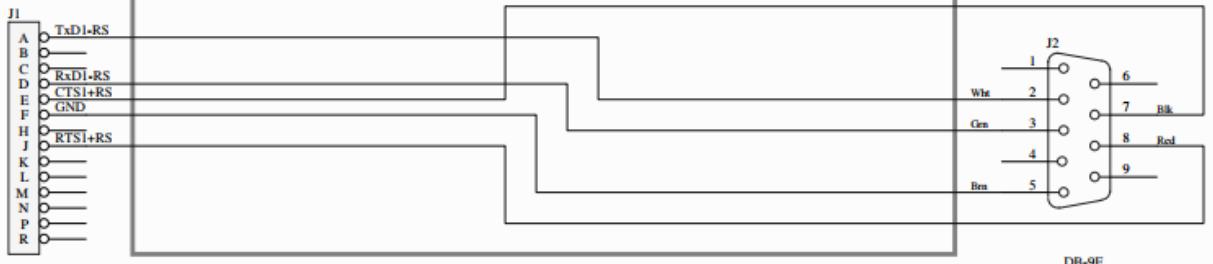
A-05-053 (-1, -2)

B-01-047 (Variant 1), Alpha 6305
B-01-010 (Variant 2), B-83509-500

ARM-GNSS Serial Connector (14 Pin Male)



(Front View)



E-04-124 (-1 Variant), UTS6JC12E14P
E-04-052 (-2 Variant), PT06A1214PSR

See Notes 1, 3 & 4

See Note 2

DB-9F

E-04-001, AE10143-ND

DB-9F

(Front View)

36" +/- 1"

-1 (Regular)	-2 (Polar)	Quan	PN	Description
X		1	E-04-124	Connector, 14 pin Circular Type, Plastic, Male, UTS6JC12E14P
X		36"	B-01-047	Cable, Alpha 6305, 5 Cond., 24 AWG
X	X	1"	B-13-011	Heat Shrink, 3/8", 3-1 Ratio, Adhesive Lined
X		1	M-08-059	Blue PLA Ring
	X	1	E-04-052	Connector, 14 pin Circular Type, Metal, Male, PT06A1214PSR
	X	36"	B-01-010	Wire, Red, 9 Conductor 24 AWG, Stranded, B-83509-500
X	X	1	E-04-001	Connector, DE-9, Female, AE10143-ND
	X	2"	B-13-033	Blue 3/8" Heat Shrink

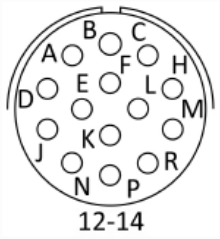
Note 1: Field Cables - encapsulate backshell
Note 2: Place a P-Touch Cable label with Cable part number and Name, cover with clear heat shrink (B-13-017)
Note 3: Use heat shrink as required
Note 4: Add blue heat shrink to ARM-GNSS side of cable (B-13-033, -2 Variant)

Title	ARM-GNSS, Serial Programming	
Size: A4	Number: A-05-053	Revision: 1.2
Date: 28-Jun-18	Sheet of 1 of 1	
File: A-05-053_ARM-GNSS_Programming.SchDoc	Drawn By: S. Miller	

A-05-070 – Serial Data

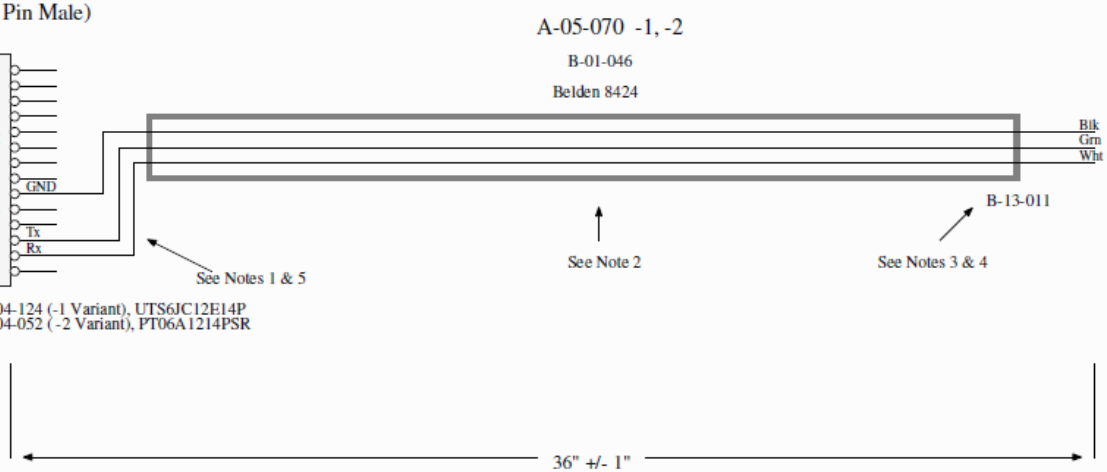
Rev	Details	Date	
1.0	Initial Release	30 May 2018	SM
1.1	Move Rx Pin	26 July 2018	SM

ARM-GNSS, Serial Connector (14 Pin Male)



(Front View)

E-04-124 (-1 Variant), UTS6JC12E14P
E-04-052 (-2 Variant), PT06A1214PSR



-1 (Regular)	-2 (Polar)	PN	Description	Quan
X		E-04-124	Connector, 14 pin Circular Plastic Type, Male - UTS6JC12E14P	1
X	X	B-01-046	Wire, 20 AWG (Water Resistant) - Belden 8424	36"
X	X	B-13-011	Heat Shrink, 3/8", 3-1 Ratio, Adhesive Lined	1"
X		M-08-059	Blue PLA Ring	1
	X	E-04-052	Connector, 14 pin Circular Metal Type, Male - PT06A1214PSR	1
	X	B-13-033	Blue 3/8" Heat Shrink	2"

Note 1: Field Cables - encapsulate backshell
Note 2: Place a P-Touch Cable label with Cable part number and Name, cover with clear heat shrink (B-13-017)
Note 3: Use heat shrink as required
Note 4: Flying leads only - Strip & tin wires 0.5"
Note 5: Add blue heat shrink to ARM-GNSS side of cable (B-13-033, -2 Variant)

Title	ARM-GNSS, Serial Data		
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Appendix C: Power Requirements

The following section specifies power requirements for various configurations of the Brizo with various use cases of duty cycling the GNSS. Measurements can fluctuate as receivers and modems use varying power depending on the rate of transmitting, tracking settings and other factors.

GNSS Measurement Periods
1 measure period per hour
Power Requirement: 0.7 W
2 measurement periods per hour
Power Requirement: 1 W
3 measurement periods per hour
Power Requirement: 1.3 W

IRIDIUM RUDICS (Average Continuous)
Iridium RUDICS Minimum Connection (Tunnel Connected, No Data)
Power Requirement: 1.85W
Iridium RUDICS Data Transfer
Power Requirement: 3.8W

IRIDIUM SBD
SBD Message Check (Average Power, per check, Average check 36 seconds)
Power Requirement: 0.5W (36 seconds)

Appendix D: Iridium Service

This section is relevant if the Brizo being used comes equipped with a 9523 Iridium Transceiver which makes use of the Iridium satellite system's RUDICS and Short Burst Data (SBD) services.

SBD service is a global, two-way, real-time, email-based data delivery service that has a maximum outbound (from unit) message size of 340 bytes and a maximum inbound (to unit) message size of 270 bytes.

Brizo end users/integrators must set up an approved data delivery account with their preferred service provider. Xeos is an Iridium VAR and can provide Iridium service if desired. Using our web form is a quick and easy way to setup service. It can be found at www.xeostech.com and selecting Iridium Service from the Product menu.

Setting up service requires the International Mobile Equipment Identity (IMEI) number. Each 9523 modem has a unique IMEI number that must be registered with the preferred service provider. Xeos will make these numbers available as the product is delivered.

Each IMEI number is capable of being associated with up to five (5) unique email addresses. This may vary between service providers. When registering the IMEI number, please provide the service provider with the temporary Xeos testing account email address. This account is:

xeosbeaconb@gmail.com

Setting up this email address allows for better technical support during the initial learning period for the product. Once service is activated, please notify the technical support team.

While any email application can be used to send and receive messages to the Brizo, XeosOnline is the easiest way to manage and monitor the unit. The messages contain a lot of information and XeosOnline presents the information in a "readable" format and displays it on street level maps.

If a RUDICS tunnel is desired, please contact Xeos for assistance in setting up and managing a RUDICS tunnel if one is not already established.

Warranty, Support and Limited Liability

Xeos Technologies Inc. warranties the Brizo to be free of defects in material or manufacturing for a period of one year following delivery. Liability is limited to repair or replacement of the defective part and will be done free of charge.

LIMITED WARRANTY: Xeos Technologies Inc. warrants that the product will perform substantially in accordance with the accompanying written materials for a period of one year from the date of receipt.

CUSTOMER REMEDIES: Xeos Technologies Inc. entire liability and your exclusive remedy shall be at Xeos Technologies Inc. option, either (a) return of the price paid or (b) repair or replacement of the product that does not meet Xeos Technologies Inc. Limited Warranty and that is returned to Xeos Technologies Inc. with a copy of your receipt. This Limited Warranty is void if failure of the product has resulted from accident, abuse, or misapplication. Any replacement product will be warranted for the remainder of the original warranty period or ninety (90) days, whichever is longer.

NO OTHER WARRANTIES: Xeos Technologies Inc. disclaims all other warranties, either expressed or implied, including but not limited to implied warranties of merchantability and fitness for a purpose, with respect to the product or the accompanying written materials. This limited warranty gives you specific legal rights. You may have others, which vary from state to state.

NO LIABILITY FOR CONSEQUENTIAL DAMAGES: In no event shall Xeos Technologies Inc. or its suppliers be liable for any damages whatsoever (including, without limitation, damages for loss of equipment, for loss of business profits, business interruption, loss of business information, or other pecuniary loss) arising out of the use of or inability to use this Xeos Technologies Inc. product, even if Xeos Technologies Inc. has been advised of the possibility of such damages.