



**Overboard Recovery  
Communications  
Apparatus (ORCA<sup>®</sup>)  
RX-103 Receiver  
User's Manual**



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For technical support, contact BriarTek at 703-548-7892 or through our website at [www.briartek.com](http://www.briartek.com).

## 1.0 RX-103 Introduction

ORCA<sup>®</sup> (Overboard Recovery Communications Apparatus) is a personal water-activated man overboard (MOB) alarm system developed by BriarTek Incorporated and utilized by the US Navy and other mariners. The alarm system includes a transmitter, receiver and direction finder. The receiver is a single channel VHF (121.5 MHz) receiver with an embedded microprocessor, GPS and touchscreen LCD interface. The RX-103 is designed to receive a signal from any ORCA<sup>®</sup> transmitter. When an ORCA<sup>®</sup> transmitter is activated, the transmitter emits a radio frequency (RF) signal. A visual and audible (95 dB) alarm on the receiver sounds upon receipt of this signal indicating the identity of the MOB as well as GPS coordinates and time (GMT) of the MOB event.

## 2.0 Parts Overview

- A - Liquid Crystal Display (LCD)
- B – Piezoelectric Buzzer
- C – Power Connector
- D – RX Antenna Jack
- E – GPS Antenna Jack
- F – Power On/Off
- G – Helical antenna
- H – GPS antenna

## 3.0 Operating Instructions

### 3.1 Activation (see figure 1)

- a. When a transmitter from own ship is activated, an alarm signal (continuous warble) is activated at the receiver buzzer (B). The ship type, hull number, and the serial number of the transmitter are displayed on the LCD (A).
- b. When a transmitter from another vessel is activated and within range, an alarm signal (chirp) is sounded and the ship type and hull number, as well as the serial number of the transmitter, is displayed on the LCD.
- c. When an alarm signal is received, whether own ship or other, the display will indicate the transmitter's battery strength, either "Good" or "Weak."
- d. Received Signal Strength Indication (RSSI) - RSSI is displayed on the LCD. RSSI is a measure of the field strength (radio waves at 121.5MHz) at the antenna input.

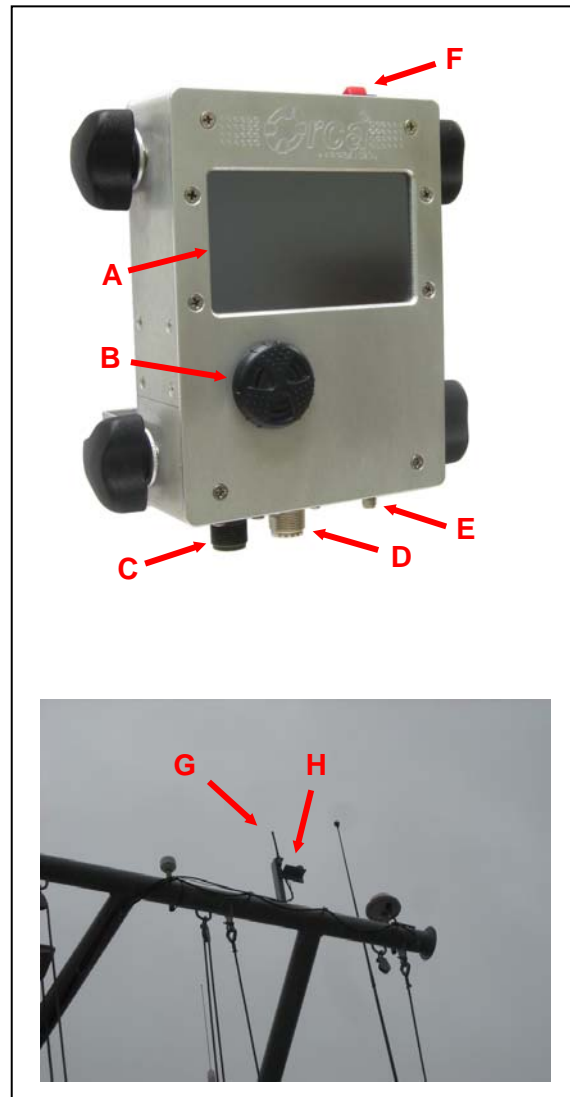


Figure 1

**NOTE**

RSSI is not a measure of beacon signal strength. This indicator is useful for several reasons: It can help determine if a non-ORCA® signal is interfering with the operation of the ORCA® system. It can help to diagnose problems with the ORCA® equipment, such as broken antenna cables.

**NOTE**

RSSI is expressed in negative numbers, -141dBm being the weakest and -10 dBm being the strongest signal. Typically if no systems are interfering with the ORCA® system and there are no beacons turned on, the background signal strength level will be between -130 and -110 dBm. If the background RSSI is stronger than -90 dBm (-10dBm > RSSI > -90 dBm), then the ORCA® beacon will not be able to be received except in very close proximity to the ship.

- e. Audible Alarm - When the receiver detects the FM signal emitted by the transmitter, the buzzer (B) emits a 95 dB (max) audible alarm. The audible alarm will continue to sound until either the transmitter is turned OFF, sending an "All Clear" signal to the receiver; or the silence button on the LCD touchscreen is selected.

**NOTE**

The silence button only appears on the LCD when an own ship beacon is activated.

### 3.2 LCD Touchscreen Interface Components

- a. No ORCA® Signal Present

The word "Scanning..." will appear in the center of the display. Additional information including the date, time and signal strength will appear in the upper right hand corner. The "Settings" and "Backlight" buttons are located along the bottom of the screen. See figure 2.

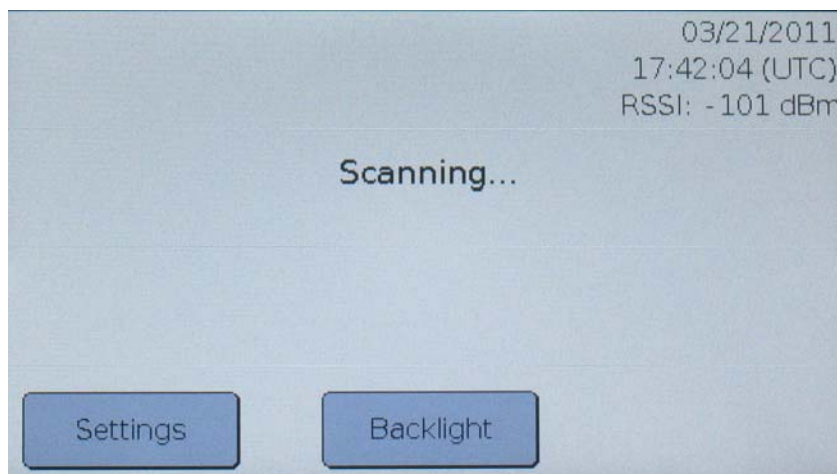


Figure 2

b. ORCA® Signal Present

**Non-Own Ship Beacon:** When a beacon that is programmed to another ship is activated and within range, the buzzer will chirp and the beacon information (Ship ID, Beacon ID, and battery condition) will appear in the lower left hand corner of the LCD. See figure 3.

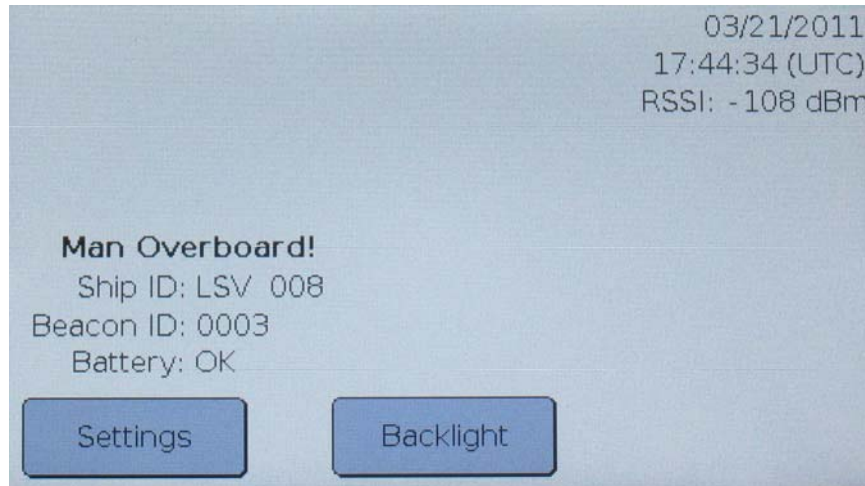


Figure 3

**Own Ship Beacon:** When a beacon that is programmed to your own ship is activated and within range, the buzzer will activate with a warble tone and the LCD screen will change to the alert screen. See figure 4. The words "Man Overboard!" will appear along with the beacon ID, elapsed time since the alarm sounded and the ship's position at the time of the MOB (if GPS antenna is installed and connected).

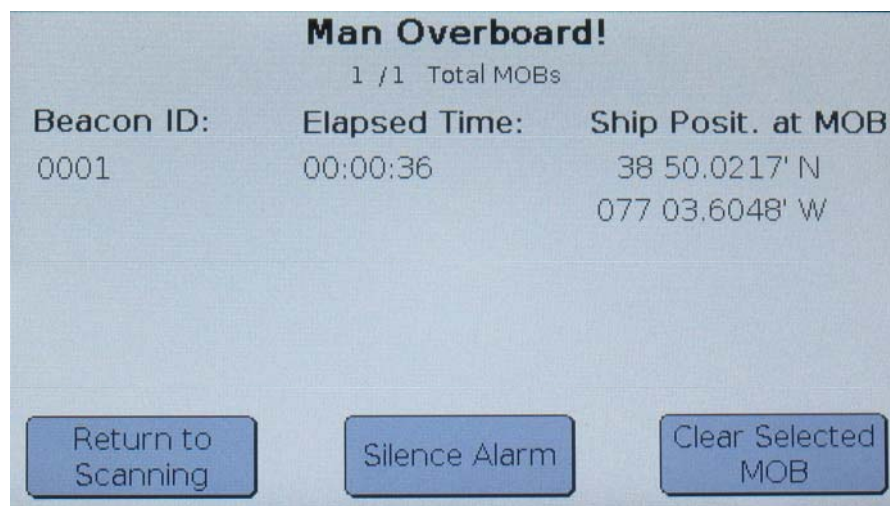


Figure 4

To silence the alarm without canceling the alarm, press the "Silence Alarm" button on the LCD. To cancel the alarm, press the "Clear Selected MOB" button on the LCD. This function is provided to allow the user the ability to remove the ID information from the

system in the event it did not receive the "All Clear" from a transmitter after a successful rescue or during testing. See figure 5.



Figure 5

To return to the home screen press the "Return to Scanning" button.

- c. Volume and Backlight - The receiver's volume and brightness can be adjusted by entering the Settings screen. From the home screen press the Settings button and a volume and backlight screen will appear. See figure 6. To adjust the volume or display brightness (backlight), press and slide the indicator to the desired level. (Right to increase, left to decrease.) The "Test Volume" button allows the user to activate the buzzer to test the volume settings. Once the desired adjustment has been made, press the "Apply" button and the display will return to the home screen. During low light or no-light situations, press the "Backlight" button on the home screen to toggle the backlight on and off.

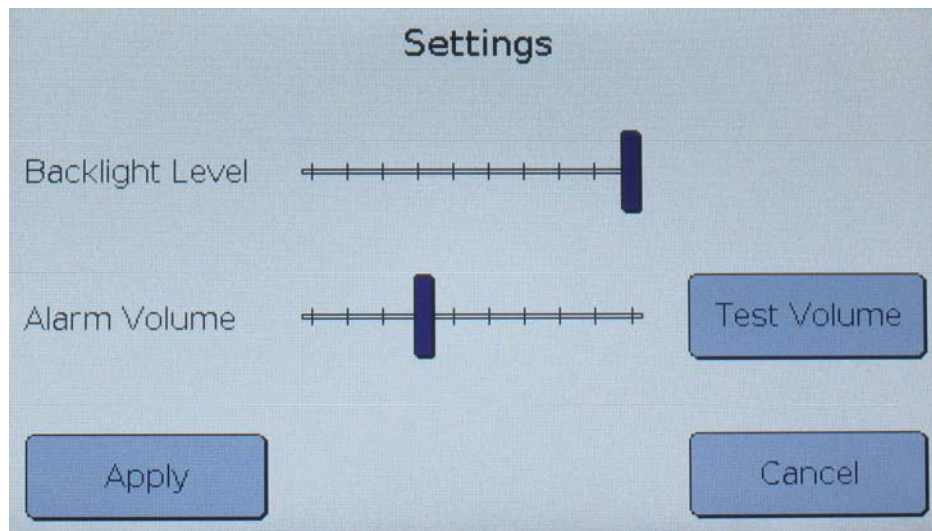


Figure 6

### **NOTE**

Pressing the Backlight button during "darken ship" operations is not recommended as this may impair watchstander night vision.

## **4.0 Installation Notes**

The installation notes provided herein are intended to serve as a guide only. They do not serve as material required for the certification of technicians for the installation, repair or alteration of the ORCA<sup>®</sup> system.

### **4.1 Receiver**

#### **a. General**

The RX-103 is typically installed in the pilothouse and should be mounted in a location so that the audible alarm is easily heard and the touchscreen control buttons are easily accessible and readable by watch standers.

#### **b. Mounting the receiver**

The receiver should be mounted to a fiddleboard or part of the super structure such as a bulkhead. Mount the receiver brackets using appropriate fasteners (self-tapping screws or 1/4x20 machine screws with locknuts/washers). The receiver brackets are designed with slots to allow for flexibility in mounting the receiver. See section 6.0 for receiver mounting dimensions. Once the brackets are securely mounted, secure the receiver to the brackets by inserting the threaded mounts (4) into each of the bracket side slots (2 each x 2 brackets). Finally, adjust the angle of the receiver by tilting forward or back as desired and thread the knobs (4) onto each of the threaded mounts until snug.

#### **c. Power connection**

Twelve or twenty four volts DC is required to provide power to the system. An optional battery backup will supply power to the receiver for 1 hour in the event power to the circuit is lost.

### **4.2 Receiver Antenna**

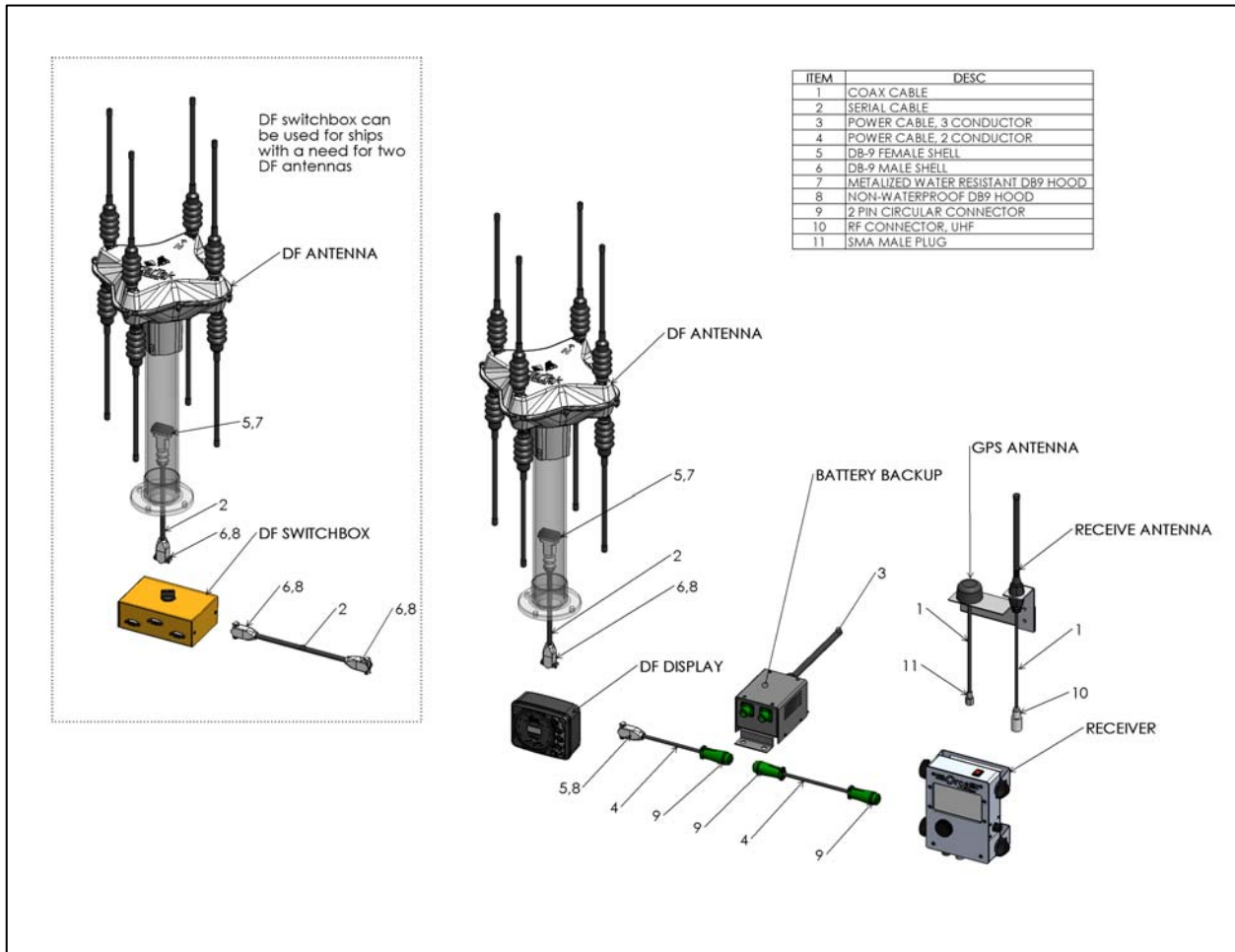
#### **a. General**

The receiver antenna should be located in an elevated location (above the pilothouse or vessel's mast) to ensure that the ORCA<sup>®</sup> signal is received. The higher the antenna is mounted, the better range can be expected. In addition, to avoid signal loss caused by excessive cable length, the coaxial cable length between the RX 103 receiver and antenna should not exceed 150 feet.



b. Mounting the receiver and GPS antennas

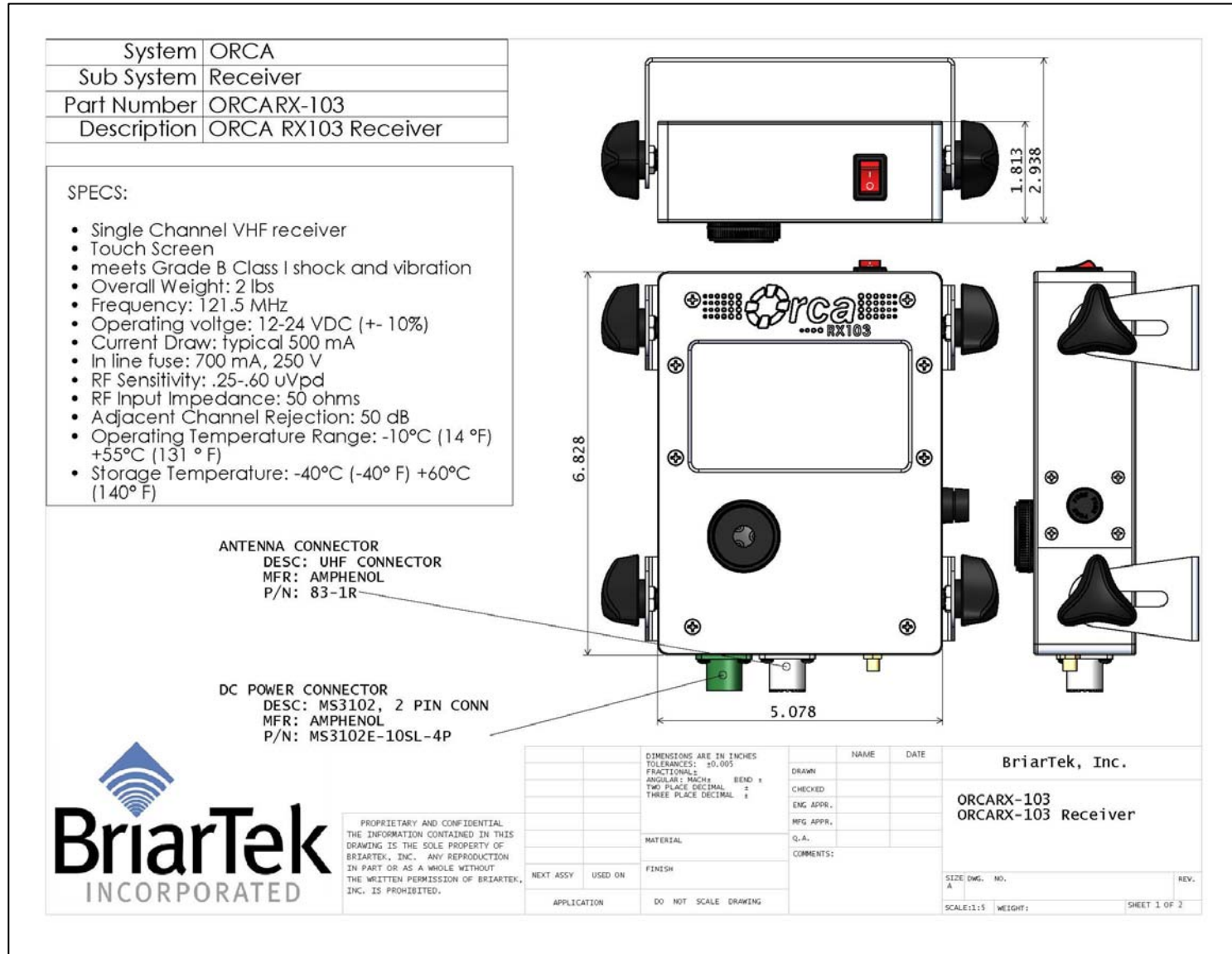
The receiver antenna is over molded to a 90° stainless steel bracket and coaxial cable. The GPS antenna is bolted to a 90° stainless steel bracket. Each bracket has 2 holes which are used for securing to a foundation (see section 6.0 for receiver and GPS antenna bracket hole dimensions). The foundation should be stainless steel and welded or bolted to the super structure or mast. A UHF connector is supplied with the antenna/cable. For cable assembly and installation instructions, follow the guidance provided in the Receiver Antenna/Cable Install Guide located on the BriarTek website.



## 5.0 Parts List

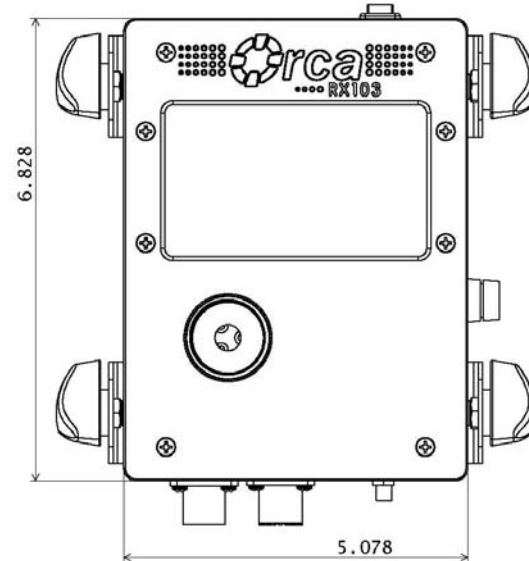
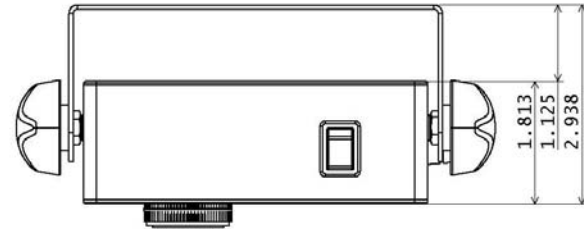
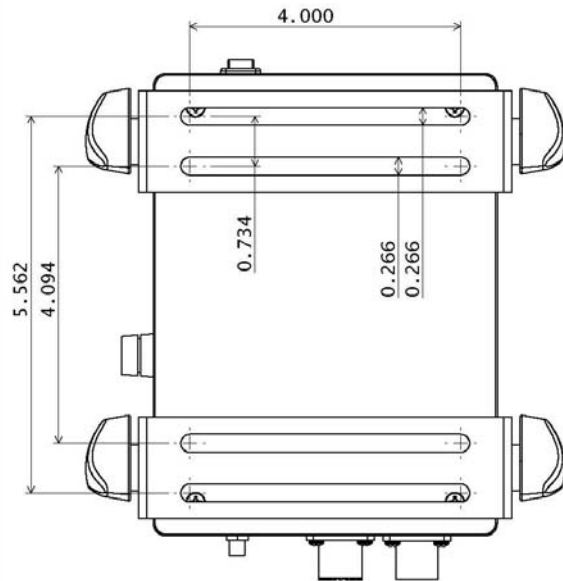
| System | Subsystem | Part Number   | Component Description (Nameplate Data)                                                                                               | Mfr      |
|--------|-----------|---------------|--------------------------------------------------------------------------------------------------------------------------------------|----------|
| ORCA   | Receiver  | ORCARX-103    | <b>Receiver:</b> 95 dB audible alarm; touchscreen LCD; hardened enclosure; mounting bracket; 121.5 MHz; power requirement: 12-24 VDC | BriarTek |
| ORCA   | Receiver  | ORCARX-A102   | <b>Receive antenna:</b> overmolded helical antenna with mounting bracket and 25' coaxial cable, UHF connector, fasteners             | BriarTek |
| ORCA   | Receiver  | ORCARX-GA102A | <b>GPS antenna:</b> Screw-mounted GPS antenna with 25' coaxial cable and mounting bracket, SMA connectors, heat shrink and fasteners | BriarTek |

## 6.0 Specifications



|             |                     |
|-------------|---------------------|
| System      | ORCA                |
| Sub System  | Receiver            |
| Part Number | ORCARX-103          |
| Description | ORCA RX103 Receiver |

ORCA-RX103 Mounting Specifications



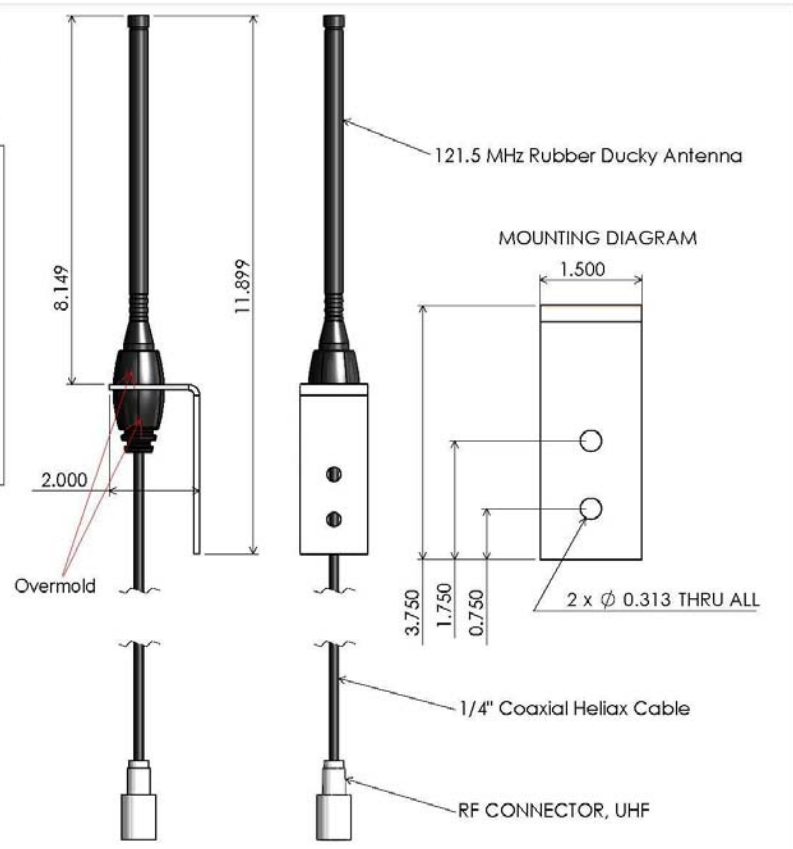
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|                          |         |                      |      |                                   |
|--------------------------|---------|----------------------|------|-----------------------------------|
| DIMENSIONS ARE IN INCHES |         | NAME                 | DATE | BriarTek, Inc.                    |
| TOLERANCES: ±0.005       |         | DRAWN                |      |                                   |
| FRACTIONAL: ±0.005       |         | CHECKED              |      | ORCARX-103<br>ORCA RX103 Receiver |
| ANGULAR: MACH ±          |         | ENG APPR.            |      |                                   |
| TWO PLACE DECIMAL ±      |         | MFG APPR.            |      | SIZE: DWG. NO. REV.<br>A          |
| THREE PLACE DECIMAL ±    |         | Q. A.                |      |                                   |
| MATERIAL                 |         | COMMENTS:            |      | SCALE: 1:1.5 WEIGHT: SHEET 2 OF 2 |
| NEXT ASSY                | USED ON |                      |      |                                   |
| FINISH                   |         |                      |      |                                   |
| APPLICATION              |         | DO NOT SCALE DRAWING |      |                                   |

|                    |                  |
|--------------------|------------------|
| <b>System</b>      | ORCA             |
| <b>Sub System</b>  | Receiver         |
| <b>Part Number</b> | ORCARX-A102      |
| <b>Description</b> | Receiver Antenna |

**SPECS:**

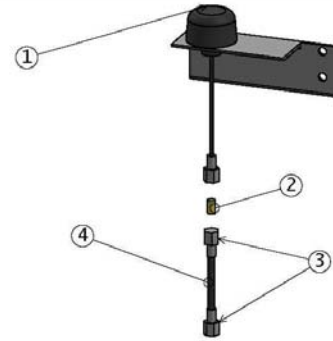
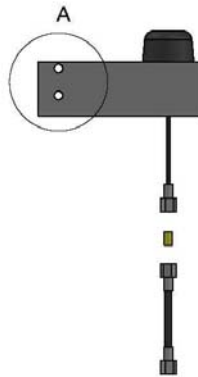
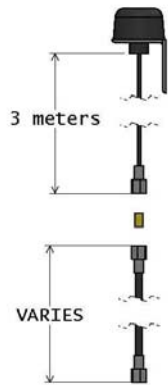
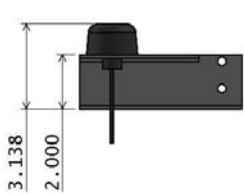
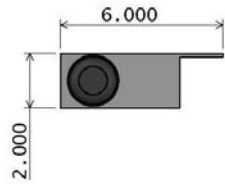
- Application: ship mounted receive antenna
- Operating frequency: 121.5 MHz
- Antenna Connector
  - DESC: UHF Connector
  - MFR: AMPHENOL RF
  - MFR P/N: 83-ISP-1050
- Coaxial Cable
  - DESC: HELIAX CABLE, 1/4", 50Ω
  - MFR: ANDREW
  - MFR P/N: FSJ1-50A
- Weights:
  - Antenna Element: 47 g
  - Bracket: 132 g
  - Overmold material: 37 g



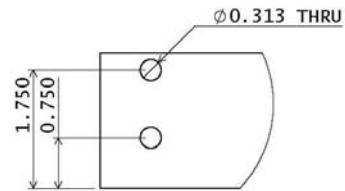
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|             |                      | DIMENSIONS ARE IN INCHES<br>TOLERANCES: ±0.005 |  | NAME       | DATE     | BriarTek, Inc. |  |
|             |                      | FRACTIONAL ±                                   |  | DRAWN      |          |                |  |
|             |                      | ANGULAR: MACH ± BEND ±                         |  | CHECKED    |          |                |  |
|             |                      | TWO PLACE DECIMAL ±                            |  | ENG APPR.  |          |                |  |
|             |                      | THREE PLACE DECIMAL ±                          |  | MFG APPR.  |          |                |  |
|             |                      | MATERIAL                                       |  | Q.A.       |          | ORCARX-A102    |  |
|             |                      | FINISH                                         |  | COMMENTS:  |          |                |  |
| NEXT ASSY   | USED ON              |                                                |  |            |          |                |  |
| APPLICATION | DO NOT SCALE DRAWING |                                                |  |            |          |                |  |
|             |                      |                                                |  | SIZE       | DWG. NO. | REV.           |  |
|             |                      |                                                |  | <b>A</b>   |          |                |  |
|             |                      |                                                |  | SCALE: 1:1 | WEIGHT:  | SHEET 1 OF 1   |  |

|             |                            |
|-------------|----------------------------|
| System      | ORCA                       |
| Sub System  | Receiver                   |
| Part Number | ORCARX-GA102A              |
| Description | ORCA GPS Antenna and cable |



| Item | Description                    |
|------|--------------------------------|
| 1    | GPS Antenna with 3m coax cable |
| 2    | SMA Adapter, Female-Female     |
| 3    | SMA Connector, Male            |
| 4    | Heliax Cable, FSJ1-50A         |



DETAIL A  
MOUNTING



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|             |  | DIMENSIONS ARE IN INCHES<br>TOLERANCES: ±0.005<br>FRACTIONAL<br>ANGULAR: MACH ±<br>TWO PLACE DECIMAL ±<br>THREE PLACE DECIMAL ± |  | NAME      | DATE | BriarTek, Inc.                    |  |
|             |  | MATERIAL                                                                                                                        |  | DRAWN     |      | ORCARX-GA102A<br>ORCA GPS Antenna |  |
|             |  | FINISH                                                                                                                          |  | CHECKED   |      | REV.                              |  |
| NEXT ASSY   |  | USED ON                                                                                                                         |  | ENG APPR. |      | SIZE DWG. NO.                     |  |
| APPLICATION |  | DO NOT SCALE DRAWING                                                                                                            |  | MFG APPR. |      | SCALE:1:2                         |  |
|             |  |                                                                                                                                 |  | Q.A.      |      | WEIGHT:                           |  |
|             |  |                                                                                                                                 |  | COMMENTS: |      | SHEET 1 OF 1                      |  |

## 7.0 Warranty

BriarTek will provide a one-year warranty on the ORCA<sup>®</sup> system following the date of original purchase.

If a component fails to function properly during its warranty period (one year), the manufacturer will proceed according to its warranty as follows:

BriarTek Inc. guarantees each product it distributes to be free from defective materials and workmanship and agrees to remedy any such defect, or to furnish a new or equal part in exchange (at its option) for a period of one year from the date the component is purchased. For an exchange of the product, please contact BriarTek at 703-548-7892 or on the web at [www.briartek.com](http://www.briartek.com) and a customer service representative will provide the necessary instructions.

This warranty is void if:

- ◆ any component has been subject to misuse or improper installation by a non-BriarTek employee or a non-BriarTek certified technician, or has been repaired or altered by a non-BriarTek employee or a non-BriarTek certified technician.
- ◆ any component fails to function properly after being put into service due to something other than defective materials or workmanship, i.e. excessive temperature, humidity or shock while component is in storage.

Notes: