



XMB User Manual

SUBMERSIBLE VHF BEACON



Version 2.5
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Shipped From



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Version History

Version No.	Date	Description
1.0	Oct 2013	Initial document
1.1	Sept 2014	Updated format and O-ring specification
2.0	Sept 2017	Document overhaul & LED info
2.1	Dec 2017	Re-formatting
2.2	Aug 2018	Expanded XMB Remote Head
2.3	Feb 2019	Link to manual page, LED versus build date, RH Picture
2.4	Apr 2019	Added Motion Only Firmware variant, O-ring swapping
2.5	Apr 2020	Added section detailing Direction Finder

Regular checks for the latest manual are suggested. Be sure to check [Xeos Technologies' manuals page](#) to compare versions and download the latest version.

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Overview

General Description

The XMB-11K is an independently powered, self-contained VHF beacon that is fully submersible up to 11,000m (36,089 ft). This beacon is designed to protect your valuable assets and make their recovery even easier. The XMB-11K features a miniaturized design in an all-titanium enclosure designed to meet or exceed your operational requirements for an ultra-deep-water submersible beacon. The XMB-11K is backed by a comprehensive warranty and excellent support.

The XMB is available with a remote head option (XMB-RH), providing tremendous flexibility during installation. A flexible cable measuring 6' joins the remote head to the main enclosure. The remote head retains all the critical specifications of the original device with the exception of depth rating (7500m).

XMB-11K is intended for subsurface deployments. Xeos Technologies Inc. (Xeos) manufactures other specific products for surface applications.

See xeostech.com for details or call (902) 444-7650.

Theory of Operation

The XMB-11K is intended for instantly and accurately locating and recovering high value, free drifting assets at sea. After being activated, the XMB-11K is submerged (to a maximum depth of 11,000 meters), where it enters an Underwater Mode. Here, it monitors water conductivity between the top disk and the bulkhead for up to 2 years.

Once it reaches the surface, XMB-11K will transmit a pre-programmed frequency. The XMB-11K can be located using a direction-finding device. XMB-11K will continue to transmit the frequency until it is manually turned off, the battery pack drops below the minimum voltage requirement of 7V, or the XMB-11K is re-submerged.

Operating Instructions

On/Off Modes and Operation

On/Off Operation

The XMB-11K beacon has three ways of turning ON and OFF:

- External magnet near an internal magnetic reed switch.
- Rotary dial located on the circuit board set to '0,' disabling the ability to transmit.
- Inverting the device while the tilt sensor is enabled; holding the XMB-11K upright will re-enable the device.

To turn XMB-11K ON using the magnet method, wipe the magnet back-and-forth quickly across the area directly below the antenna connection. Once the device is turned on, it will transmit a frequency depending on the DIP-switch settings.



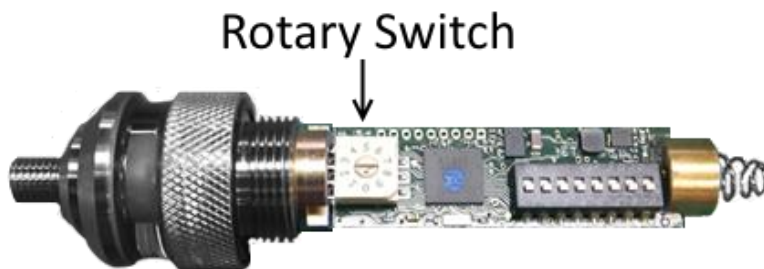
To turn the XMB-11K OFF using the magnet method, repeat the above procedure with the magnet swiped on the area below the antenna connection. Once the unit is turned off, it will no longer transmit a frequency.

Note: If you use the reed switch to turn the unit off and then manually cycle the Power by removing the batteries, the unit will begin to transmit.

LED

XMBs built after December 2015 (Serial Number 424 and above, check spring brass at the bottom of the electronics for the Serial Number) come equipped with a red LED inside the lens, which blinks at a constant rate when the XMB is in transmit mode. The LED will not blink when the XMB is submerged (if the water sensor is enabled), upside down (if the tilt sensor is enabled), or the XMB is turned off.

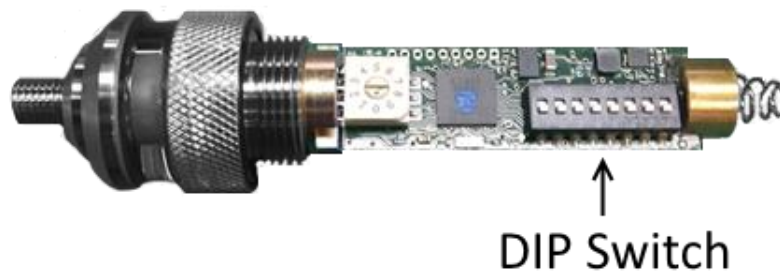
Rotary Switch



Rotary Switch Position	Result
0	Transmitter OFF
1	On Time = Pulse Duration
2	On Time = 2x Pulse Duration
3	On Time = 3x Pulse Duration
...	...
9	On Time = 9x Pulse Duration

The table above displays the operation of the rotary switch. Depending on what number the dial is set to, the off time (i.e. time between pulses) will change. For example, if the rotary switch is set to '3', the time between pulses will be three times the pulse duration.

DIP Switch



Note: When viewing with rotary switch at the top and the DIP switch at the bottom:
L = Left position R = Right position

Pulse Duration

Switch Number	1 Second	2 Seconds	3 Seconds	4 Seconds
1	L	L	R	R
2	L	R	L	R

The table above describes the operation of the transmitted pulse duration. For example, if Switch 1 is in the left position and Switch 2 is in the right position, the pulse duration will be 2 seconds.

Sensor Options

Switch Number	Left Position	Right Position
3	Reed Switch Enabled	Reed Switch Disabled
4	Tilt Sensor Enabled	Tilt Sensor Disabled
5	Fresh Water Sensitivity	Salt Water Sensitivity
6	Water Sensor Enabled	Water Sensor Disabled

The above table titled describes the operation of the sensors associated within the XMB-11K. Setting switches 3, 4, and 7 to the left position will enable the respective sensors. Switch 5 is used to choose the type of water unit is deployed in.

Channel Selection

Switch Number	154.585 MHz	159.480 MHz	160.725 MHz	160.785 MHz
7	L	L	R	R
8	L	R	L	R

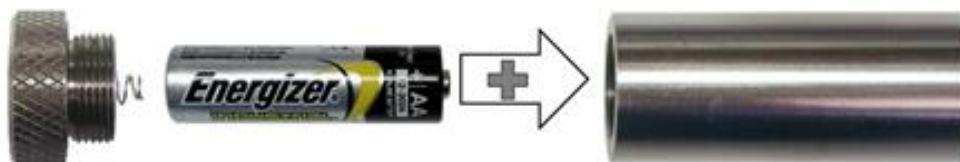
There are four preset selectable frequencies for the XMB-11K; 154.585 MHz, 159.480 MHz, 160.725 MHz and 160.785 MHz. The above table describes the operation for frequency selection. For example, if switch 7 is set to the right position and switch 8 is set to the left position, the transmitted frequency will be 160.725MHz.

Maintenance

Changing the Batteries

The chassis can easily be taken apart by unscrewing the top antenna end off of the unit. This must be done carefully as the circuit board is attached to the antenna, and will come out of the unit when the top is taken off the chassis. The batteries are inserted into the chassis with the positive end facing the circuit board, and the negative end facing the bottom of the chassis. When changing the batteries, ensure that the plastic protecting sleeve is still within the chassis.

The XMB-11K accepts 6 AA 1.5 Volt batteries in the standard chassis (9 CR123A could also be used upon request). A shorter chassis that accepts 7 CR123A 3V Lithium batteries is also available.



Ensure that all batteries are inserted into the chassis with the correct polarity. The negative terminal of the battery should be facing the bottom of the chassis. The positive terminal of the battery should be facing the antenna and the circuit board.

The batteries inside the chassis are protected by a plastic tube. When replacing batteries, ensure that the plastic tube is still intact inside the chassis.

Changing the O-rings

O-rings are critical to the waterproof nature of the XMB. The O-ring should be visually inspected to make sure that it is properly seated in the groove and to ensure there is no visible damage to the O-ring. If the O-ring fails visual inspection or the XMB has been deployed for longer than 2 months, the O-ring should be replaced prior to the next deployment.

- Remove the old O-ring and clean all dirt away from the o-ring groove and battery tube using a lint free cloth, cleaning alcohol, and a soft-brush
- Thoroughly inspect the O-ring groove as well as the point of contact on the inside of the battery tube; any scratches or dirt could compromise the O-ring seal
- Apply a thin layer of O-ring lubricant (Molykote 111 from Dow Corning) to the new O-ring and gently slide the new O-Ring down over the threads of the screw-cap and into the O-ring groove

Additional Models

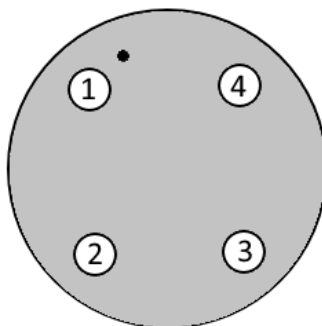
XMB Remote Head

The XMB has a remote head option to allow for better load balancing by separating the locations of the electronics package from the battery pack. The XMB Remote Head features all of the capabilities of the standard XMB and is supplied power via a waterproof cable to a 4-Pin SubConn connector.

The Y-Cable version of the XMB Remote Head is supplied with steering diodes to allow for battery back-up, should the connected vehicle lose power.



Connector Pinout



4-Pin	
Pin Number	Name
1	Ground
2	No Connection
3	+V Battery (7VDC – 36VDC)
4	+V Vehicle (7VDC – 36VDC, Y-Cable version)

XMB Motion Only

As a modification requested on order, the XMB can be modified to enter a lower power state when stationary for five minutes. When in this lower state, the XMB does not transmit, in identical behavior to a normal XMB. This version of the device continuously monitors its orientation until enough of a change is registered to return to an active state.

With this version of the XMB, the water sensor is disabled.

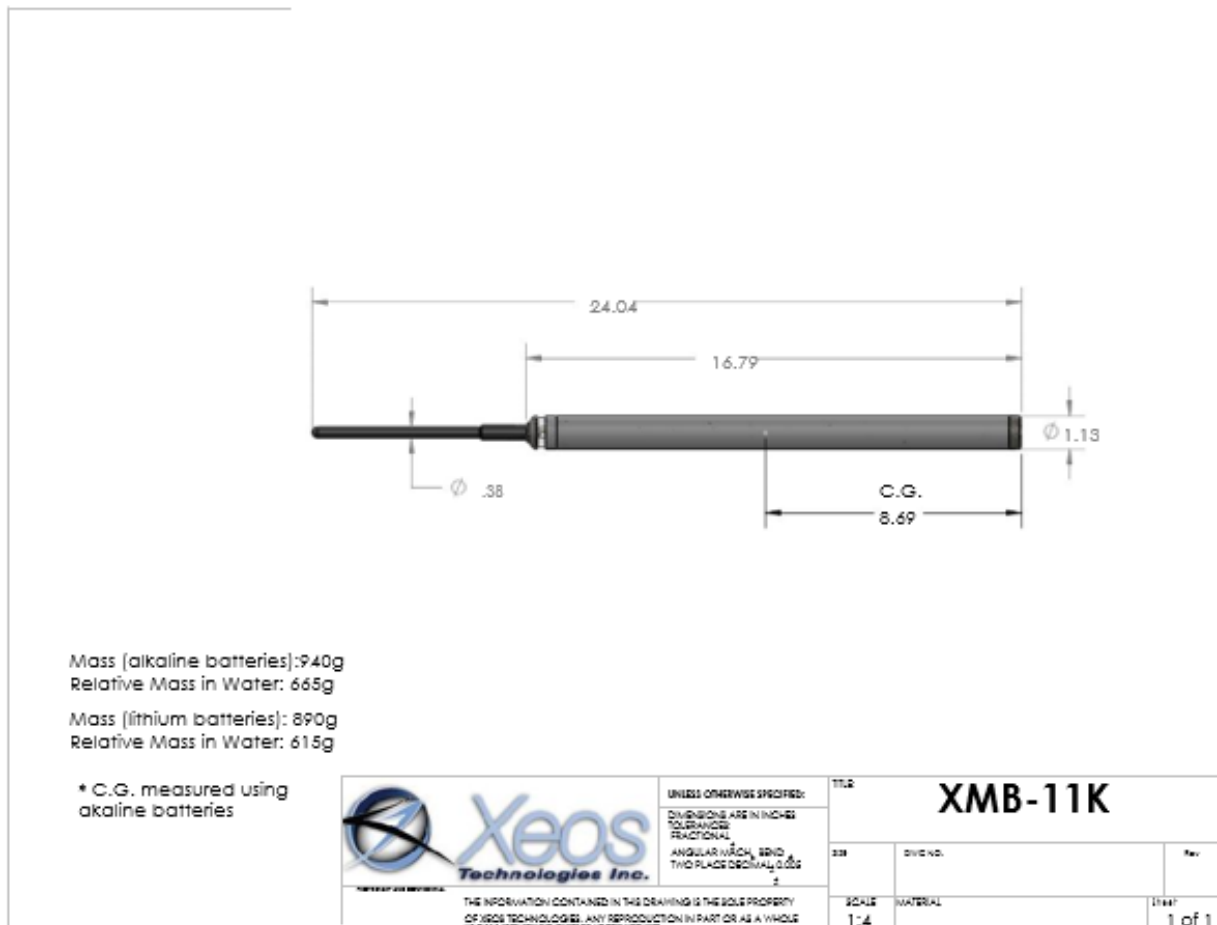
Direction Finder

As of April 2020, customers have the option of purchasing from Xeos the RX-150 Tracking System from Communications Specialists, Inc. This receiver comes equipped with a rechargeable battery and integrated Yagi antenna for retrieval of the XMB at the end of deployment.

Note: Since the RX-150 is customized to a 4Mhz band, these receivers will be set to detect VHF between **158 – 162MHz**. As a consequence, channel 1 of the XMB (154.585MHz) cannot be detected using this receiver.

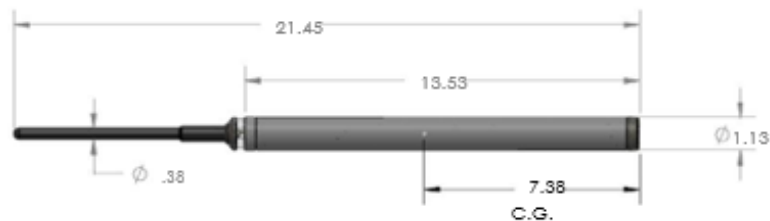
Appendix A - Technical Specifications - Standard

Materials	
Tube	Grade 9 Titanium housing
Antenna	Stainless Steel
Spacer	Glass
O-rings	
O-Ring Type	2-020 70 DURO BUNA-N
Seal Lubricant	Dow Corning compound
Material	Buna-N Nitrile Rubber
Dimensions	0.875 X 1.000 x 0.070"
Environmental	
Operating Temperature	-40°C to +60°C (-40°F to +140°F)
Depth Rating	Submersible to 11,000m (36,089 ft)



Appendix B - Technical Specification - Short

Materials	
Tube	Grade 9 Titanium housing
Antenna	Stainless Steel
Spacer	Glass
O-rings	
O-Ring Type	2-020 70 DURO BUNA-N
Seal Lubricant	Dow Corning compound
Material	Buna-N Nitrile Rubber
Dimensions	0.875 X 1.000 x 0.070"
Environmental	
Operating Temperature	-40°C to +60°C (-40°F to +140°F)
Depth Rating	Submersible to 11,000m (36,089 ft)



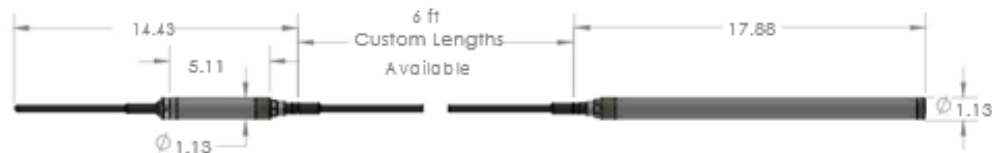
Mass: 790g
Relative Mass in Water: 560g

XMB-11K S

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	DIMENSIONS ARE IN INCHES		SIZE	DWG NO.
	TOLERANCES: FRACTIONAL, ANGULAR MATCH, .0010 & .0020 THIRD PLACE DECIMAL, .0020 THREE PLACE DECIMAL, .0010		SCALE	REVISION
	1:4			1 of 1

Appendix C - Technical Specification - Remote Head

Materials	
Tube	Grade 9 Titanium housing
Antenna	Stainless Steel
Spacer	Glass
O-rings	
O-Ring Type	2-020 70 DURO BUNA-N
Seal Lubricant	Dow Corning compound
Material	Buna-N Nitrile Rubber
Dimensions	0.875 X 1.000 x 0.070"
Environmental	
Operating Temperature	-40°C to +60°C (-40°F to +140°F)
Depth Rating	Submersible to 11,000m (36,089 ft)



Mass w/ Alkaline Batteries: 1520g
 Relative Mass in Water: 1020g
 Mass w/ Lithium Batteries: 1480g
 Relative Mass in Water: 970g

	UNLESS OTHERWISE SPECIFIED:		TITLE	
	DIMENSIONS ARE IN INCHES TOLERANCES FRACTIONAL ANGULAR (MCH) 2ND TWO PLACE DECIMALS 0.005 ±		XMB-11K RH	
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1:6		SCALE	MATERIAL	15447 1 of 1

Appendix D - Electrical

Remember: Do NOT mix battery types!

Electronic Input Voltage	7VDC – 36VDC maximum
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AA Energizer Industrial EN91 Alkaline (Standard Tube)	
Internal Battery Supply	6 x 1.5 Volt AA batteries
Voltage	9 Volts nominal
Capacity	Varies by manufacturer (1.8Ah – 2.8Ah)
Life Expectancy	6 Days, where off time = 2 x pulse duration, tilt sensor off 12 Days, where off time = 5 x pulse duration, tilt sensor off (Approximate values based on 2Ah alkaline)

AA Energizer Ultimate Lithium (Standard Tube)	
Internal Battery Supply	6 x 1.5 Volt AA Energizer Ultimate Lithium batteries
Voltage	9 Volts nominal
Capacity	3.0 Amp-hours
Life Expectancy	7 Days, where off time = 2 x pulse duration, tilt sensor off 15 Days, where off time = 5 x pulse duration, tilt sensor off (Approximate values)

CR123A Lithium (Standard Tube)	
Internal Battery Supply	9 x CR123A 3 Volt lithium batteries
Voltage	27 Volts nominal
Capacity	1.4 Amp-hours
Life Expectancy	10 Days, where off time = 2 x pulse duration, tilt sensor off 20 Days, where off time = 5 x pulse duration, tilt sensor off (Approximate values)

CR123A Lithium (Short Tube)	
Internal Battery Supply	7 x CR123A 3 Volt lithium batteries
Voltage	21 Volts nominal
Capacity	1.4 Amp-hours
Life Expectancy	8 Days, where off time = 2 x pulse duration, tilt sensor off 17 Days, where off time = 5 x pulse duration, tilt sensor off (Approximate values)

Note: All life expectancy ratings are based on a 1-year "below surface" time.

Electronics	
Digital Controller	Xeos VHF Beacon
ON/OFF Controls	Rotary Switch for storage and shipping Reed Switch for activating without opening tube Solid State tilt switch for upright activation and deactivation
RF Beacon Output	110 - 125mW
Output Signal	1 kHz Pulsed Tone:
Frequency Range	151MHz – 161MHz (user switchable)
Harmonics	-40dB

Warranty, Support and Limited Liability

Xeos Technologies Inc. warrants the XMB 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.

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