

# 8011M ACOUSTIC DECK UNIT

## USER HARDWARE MANUAL

0004811\_REV\_F

9/7/2021



**EdgeTech**  
4 Little Brook Road  
West Wareham, MA 02576

Tel: (508) 291-0057  
Fax: (508) 291-2491  
[www.EdgeTech.com](http://www.EdgeTech.com)

The information, figures, and specifications in this manual are proprietary. They are issued in strict confidence on condition that they not be copied, reprinted, or disclosed to a third party, either wholly or in part, without the prior, written consent of EdgeTech. Any reproduction of EdgeTech supplied software or file sharing is strictly prohibited.

**Copyright © 2011 – 2021 EdgeTech. All rights reserved.**

Storm Case™ is a trademark of Pelican.

Benthos® is a registered trademark of Teledyne Marine

## ATTENTION – READ THIS FIRST!

All personnel involved with the installation, operation, or maintenance of the equipment described in this manual should read and understand the warnings and cautions provided below.

### **CAUTION!**

This equipment contains devices that are extremely sensitive to static electricity. Therefore, extreme care should be taken when handling them. Normal handling precautions involve the use of anti-static protection materials and grounding straps for personnel.

### **WARNING!**

High Voltage may be present in all parts of the system. Therefore, use caution when the electronics are removed from their containers for servicing.

### **CAUTION!**

Operation with improper line voltage may cause serious damage to the equipment. Always ensure that the proper line voltage is used.

## Warnings, Cautions, and Notes

Where applicable, warnings, cautions, and notes are provided in this manual as follows:

### **WARNING!**

Identifies a potential hazard that could cause injury or death.

### **CAUTION!**

Identifies a potential hazard that could damage equipment or data.

**NOTE:** Recommendations or general information that is particular to the material being presented.

## HARDWARE VARIATIONS AND COMPATIBILITY

The 8011M Acoustic Deck Unit contains both standard and proprietary hardware. At times, EdgeTech may change the standard components due to their availability or performance improvements. Although the component manufacturers and their models and styles may change from unit to unit, replacement parts will generally be interchangeable.

EdgeTech will make every effort to see that replacement components are interchangeable and use the same software drivers (if applicable). At times, however, direct replacements may not exist. When this happens, EdgeTech will provide the necessary drivers with the replacement part, if applicable.

EdgeTech may also change certain hardware per customer requirements. Therefore, portions of this manual, such as parts lists and test features, are subject to change. These sections should be used for reference only. When changes are made that affect system operation, they will be explicitly noted. Some options and features may not be active in the customer's unit at the time of delivery. Upgrades will be made available when these features are implemented.

Contact [EDGE TECH CUSTOMER SERVICE](#) with any questions relating to compatibility.

## ABOUT THIS DOCUMENT

We, the employees at EdgeTech, would like to thank you for purchasing 8011M. At EdgeTech, our policy is to provide high-quality, cost-effective products and support services that meet or exceed your requirements. We also strive to deliver them on time and to look for ways to improve them continuously. We take pride in the products we manufacture and want you to be entirely satisfied with your equipment.

### Purpose of this Manual

The purpose of this manual is to provide the user with information on the setup and use of EdgeTech's 8011M. Although this manual encompasses the latest operational features of the unit, some features may be periodically upgraded. Therefore, the information in this manual is subject to change and should be used for reference only.

### Liability

EdgeTech has made every effort to document the 8011M in this manual accurately and completely. However, EdgeTech assumes no liability for errors or any damages resulting from the use of this manual or the equipment it documents. EdgeTech reserves the right to upgrade this equipment's features and make changes to this manual without notice at any time.

### Revision History

REVISION	DESCRIPTION	DATE	APPROVAL
A	Transfer to Epicor	01/02/2011	GE
B	Changed Transducer Connection	02/17/2011	GE
C	Updated Format	09/03/2015	RM
D	Include URI Inverted Echo	02/25/2016	RM
E	Updates to content, images, and light indication	3/6/2019	RM
F	Added Benthos Instructions	9/7/2021	GM

## WARRANTY STATEMENT

All equipment manufactured by EdgeTech is warranted against defective components and workmanship for a period of one year after shipment. Warranty repair will be done by EdgeTech free of charge.

Shipping costs are to be borne by the customer. Malfunction due to improper use is not covered in the warranty, and EdgeTech disclaims any liability for consequential damage resulting from defects in the equipment's performance. No product is warranted as fit for a particular purpose, and there is no merchantability warranty. This warranty applies only if:

- i. The items are used solely under the operating conditions and in the manner recommended in the Seller's instruction manual, specifications, or other literature.
- ii. The items have not been misused or abused in any manner, nor have repairs been attempted thereon without EdgeTech Customer Service's approval.
- iii. Written notice of the failure within the warranty period is forwarded to the Seller, and the directions received for properly identifying items returned under warranty are followed.
- iv. The return notice authorizes the Seller to examine and disassemble returned products to the extent Seller deems necessary to ascertain the cause for failure.

The warranties expressed herein are exclusive. There are no other warranties, either expressed or implied, beyond those set forth herein. The Seller does not assume any other obligation or liability in connection with the sale or use of said products. Any product or service repaired under this warranty shall only be warranted for the remaining portion of the original warranty period.

Equipment not manufactured by EdgeTech is supported only to the extent of the original manufacturer's warranties.

## RETURNED MATERIAL AUTHORIZATION

Prior to returning any equipment to EdgeTech, a Returned Material Authorization (RMA) Number must be obtained from **CUSTOMER SERVICE**.

### RMA Purpose

The RMA Number identifies returned equipment when it arrives at our receiving dock and enables tracking while at our facility. Refer to the RMA number on all documentation and correspondences.

All returned materials must be shipped prepaid. Freight collect shipments will not be accepted. All equipment should be adequately insured for shipping, but equipment belonging to EdgeTech must be insured for full value.

If there is more than one item per consignment, include a packing with the shipment. An invoice can double as a packing slip only when the contents are clearly numbered and identified on the invoice.

**CAUTION!** Never attempt to ship a Portable Topside in its Storm Case™ alone. Although rugged, these cases are not shipping containers, and the delicate internal components could be damaged. Shipping in this manner will void any warranties.

**NOTE:** All shipping charges shall be the customer's responsibility, unless under warranty, as EdgeTech will pay for return shipping.

**NOTE:** For International Shipments valued over \$1000, the following Shipper's oath must be sent with the invoice.

Shipper's Oath:

"I, \_\_\_\_\_, declare that the articles herein specified are the growth, produce, or manufacture of the United States; that they were exported from the United States from the port of \_\_\_\_\_, on or about \_\_\_\_\_; that they are returned without having been advanced in value or improved in condition by any process of manufacture or any other means; and that no drawback, or allowance has been paid or admitted hereof."

Signed \_\_\_\_\_

## CUSTOMER SERVICE

Customer service personnel at EdgeTech are always eager to hear from users of our products. Your feedback is welcome and a valuable source of information that we use to improve these products continually. Therefore, we encourage you to contact EdgeTech Customer Service to offer any suggestions or to request technical support:

**NOTE:** Please have your system Serial Number available when contacting Customer Service.

**E-mail:** info@edgetech.com

**Mail:** 4 Little Brook Road  
West Wareham, MA 02576

**Telephone:** (508) 291-0057

**Facsimile:** (508) 291-2491

**24-Hour Emergency  
Technical Support Line:** (508) 942-8043

For more information, please go to [www.EdgeTech.com](http://www.EdgeTech.com).



## COMPANY BACKGROUND

EdgeTech (formerly EG&G Marine Instruments) traces its history in Underwater Data Acquisition and Processing back to 1966. EdgeTech has designed, developed, and manufactured products, instruments, and systems — for the acquisition of underwater data, including marine, estuarine, and coastal applications — for over 50 years.

EdgeTech responds to the needs of the Scientific, Naval, and Offshore communities by providing industry-leading equipment — such as Sub-Bottom Profilers, Side Scan Sonar, Acoustic Releases, USBL Positioning Systems, and Bathymetric Systems — that have become standards in the industry.

EdgeTech consistently anticipates and responds to future needs with an active Research and Development Program. Current efforts are focused on adapting new cutting-edge acoustic technology.

# TABLE OF CONTENTS

<b>ATTENTION – READ THIS FIRST!</b> .....	<b>iii</b>
Warnings, Cautions, and Notes.....	iii
<b>HARDWARE VARIATIONS AND COMPATIBILITY</b> .....	<b>iv</b>
<b>ABOUT THIS DOCUMENT</b> .....	<b>v</b>
Purpose of this Manual .....	v
Liability .....	v
Revision History .....	v
<b>WARRANTY STATEMENT</b> .....	<b>vi</b>
<b>RETURNED MATERIAL AUTHORIZATION</b> .....	<b>vii</b>
RMA Purpose .....	vii
<b>CUSTOMER SERVICE</b> .....	<b>viii</b>
<b>COMPANY BACKGROUND</b> .....	<b>ix</b>
<b>TABLE OF CONTENTS</b> .....	<b>x</b>
<b>List of FIGURES</b> .....	<b>xii</b>
<b>LIST OF TABLES</b> .....	<b>xiii</b>
<b>SECTION 1: OVERVIEW</b> .....	<b>1-1</b>
1.1 Standard Package.....	1-1
<b>SECTION 2: SPECIFICATIONS</b> .....	<b>2-4</b>
2.1 8011M Deck Box Mechanical Specifications.....	2-4
2.2 8012M Transducer .....	2-5
2.2.1 8012M Transducer Mechanical Specifications .....	2-5
2.2.2 Serial Cable Pin Out.....	2-5
2.2.3 Auxiliary Cable Pin Out.....	2-5
<b>SECTION 3: SETUP AND ACTIVATION</b> .....	<b>3-6</b>
3.1 8011M Setup.....	3-6
3.1.1 8011M Connector .....	3-8
3.1.2 Legacy 8011M Connector .....	3-8
3.2 8011M Battery .....	3-9
<b>SECTION 4: OPERATION</b> .....	<b>4-10</b>
4.1.1 Keypad Descriptions.....	4-10

4.1.1.1 Function Keys .....	4-11
4.2 Quick-Start Operation Instructions .....	4-12
4.2.1 Sending Commands (<CMD>) .....	4-12
4.2.2 Ranging (<RNG>) .....	4-14
4.3 Detailed Operating Instructions .....	4-16
4.3.1 Menu (<MENU>) .....	4-16
4.3.1.1 Command Setup.....	4-16
4.3.1.2 Range Setup .....	4-16
4.3.2 Commands <CMD> .....	4-17
4.3.3 Ranging <RNG> .....	4-18
4.3.4 Serial Port Operations.....	4-18
4.3.4.1 Host Mode.....	4-19
4.3.4.2 8011M Host Mode Serial Commands .....	4-20
<b>SECTION 5: MAINTENANCE .....</b>	<b>5-21</b>
5.1 Basic Maintenance .....	5-21
5.1.1 8011M Deck Unit .....	5-21
5.1.2 Transducer .....	5-21
5.1.3 Battery Storage .....	5-21
5.1.3.1 Battery Pack Storage Guidelines .....	5-23
<b>SECTION 6: APPENDIX .....</b>	<b>6-24</b>
A.1 Sending Benthos Commands .....	6-24
A.1.1 Instructions.....	6-24

## LIST OF FIGURES

Figure 1-1: The 8011M Deck Unit .....	1-2
Figure 1-2: 8012M Transducer .....	1-3
Figure 3-1: 8011M Opened Deck Unit .....	3-6
Figure 3-2: 8012M Transducer Installed into the 8011M Deck Unit .....	3-7
Figure 4-1: Image of Keypad .....	4-10
Figure 5-1: The Screw Locations in the Front Panel.....	5-22
Figure 5-2: The Front Panel Removed from the Pelican Case .....	5-22
Figure 5-3: The Battery Connector Location at JP9 .....	5-23
Figure 5-4: Uninstall the Battery by Removing the Screws in the Stand-offs.....	5-23
Figure 6-1: 8011M Benthos Instructions- 8011M Command Menu.....	6-24
Figure 6-2: 8011M Benthos Instructions- Benthos Mode Selection.....	6-25
Figure 6-3: 8011M Benthos Instructions- Return to Command Menu.....	6-25
Figure 6-4: 8011M Benthos Instructions- IN BAND Frequency Display.....	6-25
Figure 6-5: 8011M Benthos Instructions- IN BAND Frequency Change .....	6-26
Figure 6-6: 8011M Benthos Instructions- REPETITION RATE Code Display .....	6-27
Figure 6-7: 8011M Benthos Instruction- Setting REPETITION RATE code .....	6-27
Figure 6-8: 8011M Benthos Instructions- IN BAND Frequency and REPETITION CODE Display.....	6-29

## LIST OF TABLES

Table 2-1: 8011M Deck Unit Mechanical Specifications.....	2-4
Table 2-2: 8012M Transducer Mechanical Specifications .....	2-5
Table 2-3: Serial Cable Pin Out Descriptions.....	2-5
Table 2-4: Auxiliary Cable Pin Out Descriptions.....	2-5
Table 3-1: Current 8011M Amphenol Connector Transducer Connection.....	3-8
Table 3-2: Legacy 8011M Spirit Type Connector Transducer Connections .....	3-8
Table 3-3: Front Panel LED Colors and Descriptions.....	3-9
Table 4-1: Keypad Functional Key Descriptions .....	4-11
Table 4-2: Keypad Function Adjustment Key Descriptions .....	4-11
Table 4-3: Important 8011M Host Mode Symbols and their Meanings .....	4-19
Table 4-4: Host Mode Examples .....	4-20
Table 4-5: Host Mode Serial Commands .....	4-20
Table 6-1: 8011M Benthos Instructions- Example of In-Band Codes and Frequencies.....	6-26
Table 6-2: 8011M Benthos Instructions- Example of Repetition Codes and Rates .....	6-28

## SECTION 1: OVERVIEW

EdgeTech's 8011M Acoustic Deck Unit Transceiver is a portable, rugged topside capable of sending and receiving messages to a deployed system, such as acoustic release units, offered separately.

The 8011M is the most versatile acoustic command-ranging deck unit available. This system can control and range on EdgeTech's full line of acoustic releases and other manufacturers' equipment. For more information on Configuring the 8011M with non-EdgeTech products, refer to the **DETAILED OPERATING INSTRUCTIONS** section of the manual. The 8011M's features include auto-switching between 115 and 230 VAC and an internal self-charging battery. In addition, the serial and auxiliary ports allow for simple interfacing with other onboard equipment.

### 1.1 Standard Package

The 8011M Deck Box comes standard with:

- Set of headphones
- Spare connector for the auxiliary port
- 8012M transducer (to drop off the side of a vessel to transmit and receive acoustic signals)

**CAUTION!** The 8011M Deck Unit is somewhat splash-resistant but not waterproof. It is not intended to be subjected to seawater or spray.



Figure 1-1: The 8011M Deck Unit



*Figure 1-2: 8012M Transducer*



## SECTION 2: SPECIFICATIONS

The specifications for the 8011M Deck Unit and 8012M Transducer are shown in [TABLE 2-1](#) and [TABLE 2-2](#):

### 2.1 8011M Deck Box Mechanical Specifications

The 8011M is the Deck Unit in the system, with mechanical specifications detailed below:

SPECIFICATION	VALUE
<b>Frequencies</b>	Interrogate and Reply frequencies select 7.5 to 15 kHz
<b>Transmit</b>	7.5 to 15.0 kHz - Operator adjustable
<b>Receive</b>	7.0 to 15.0 kHz - Operator selectable multiple channels
<b>Transmit source level</b>	192 dB re 1 micro-Pascal at 1 meter - Controllable by the operator
<b>Receive sensitivity</b>	80 dB re 1 micro-Pascal
<b>Transmit pulse width</b>	10/20 milliseconds
<b>Timing accuracy</b>	0.1 millisecond
<b>Range units</b>	Meters and Seconds
<b>Command codes</b>	EdgeTech, ORE Offshore, EG&G, Legacy Benthos, Oceano, MORS, and URI
<b>Status receive</b>	Automatic timeline display of acoustic status replies
<b>Beeper</b>	Audio confirmation of received signals
<b>Case</b>	Sealed, portable, polyethylene
<b>Size</b>	40.6 cm x 33 cm x 17.3 cm (16 in. x 13 in. x 6.8 in.)
<b>Weight</b>	7.3 kg (16.0 lbs)

*Table 2-1: 8011M Deck Unit Mechanical Specifications*

## 2.2 8012M Transducer

The 8012M is the Transducer in the system. This transducer is used to communicate commands sent from the 8011M Deck Unit to EdgeTech or other manufacturers' equipment.

### 2.2.1 8012M Transducer Mechanical Specifications

SPECIFICATION	VALUE
Acoustic frequency	7.5 to 15 kHz
Beam pattern	Omni-directional in the lower hemisphere
Cable length	67 meters (220 feet)
Weight in air	10 kg (22 lbs) including cable
Size	Diameter 11.4 cm (4.5 in); height 10 cm (4.0 in)

*Table 2-2: 8012M Transducer Mechanical Specifications*

### 2.2.2 Serial Cable Pin Out

DB9	AMP
DB9 pin 2	AMP pin 8
DB9 pin 3	AMP pin 7
DB9 pin 5	AMP pin 2

*Table 2-3: Serial Cable Pin Out Descriptions*

### 2.2.3 Auxiliary Cable Pin Out

PIN	DESCRIPTION
Pin 1	Ground
Pin 2	TX transmit envelope goes negative at the beginning of the transmit pulse.
Pin 3	Detect goes high on detecting a valid reply pulse. This signal is delayed by 11 milliseconds from the actual detection.
Pin 4	Trigger If the deck unit is in the ranging mode. A positive edge in on this pin will initiate a ranging operation.

**The auxiliary port is 5-volt logic.**

*Table 2-4: Auxiliary Cable Pin Out Descriptions*

## SECTION 3: SETUP AND ACTIVATION

### 3.1 8011M Setup

To set up the 8011M:

1. Plug the 8011M into a power source.
2. Open the deck unit by unlatching the cover of the deck unit.



Figure 3-1: 8011M Opened Deck Unit

3. Attach the Model 8012M transducer to the TRANSDUCER connector. It should be fully threaded and finger tightened.

**Note:** The user may need to apply pressure to the connector's back while tightening the locking sleeve.



Figure 3-2: 8012M Transducer Installed into the 8011M Deck Unit

### 3.1.1 8011M Connector

**NOTE:** In early 8011M systems, the transducer connector is a Spirit, which is the same as earlier EG&G, EdgeTech, and ORE Offshore deck units. Transducers from these systems can be used with the 8011M. However, the output power is slightly reduced if the shorter (32meter cable) transducer is used.

In the current 8011M systems, the connector is an Amphenol. The pin out for the later Amphenol type connector transducer connectors is as follows:

PIN	DESCRIPTION
A	White high side transducer
B	Black low side transducer
C	Shield
D*	Shorted to E
E*	Shorted to D

*Table 3-1: Current 8011M Amphenol Connector Transducer Connection*

*\*Pins D & E are shorted on the transducer side of the connection so that the deck unit can sense whether the Transducer is plugged in.*

### 3.1.2 Legacy 8011M Connector

The pin out for the early spirit type connector transducer connectors is as follows:

PIN	DESCRIPTION
1	Shield
2	Black low side transducer
3	White high side transducer
4*	Shorted to 5
5*	Shorted to 4

*Table 3-2: Legacy 8011M Spirit Type Connector Transducer Connections*

*\*Pins 4 & 5 are shorted on the transducer side of the connection so that the deck unit can sense whether the Transducer is plugged in.*

**Instructions on how to connect the 8011M Legacy Connector:**

1. Use the supplied Kellems grip to fasten the cable to a suitable anchor point and lower the transducer overboard.

**NOTE:** The 8012M Transducer is not designed for use on moving vessels.

2. Plug in the headphones. Ensure available power matches 100 to 230 VAC and 50 to 60 hertz 8011M power requirements. The Deck Unit auto senses the input voltage, so there is no need to change input voltages within this range on the Deck Unit.
3. Once the proper voltage is verified, plug the instrument into a grounded outlet.

## 3.2 8011M Battery

The 8011M has an internal actively rechargeable battery. The charge is maintained when the unit is plugged in and turned on. The system must be plugged in and left on for 5 hours to charge the internal battery fully. Depending on usage, the 8011M will run solely on the internal battery for four to six hours. The backlight should be turned off when running on the internal battery, as it drains the battery significantly.

The bi-color LED in the front panel displays the battery charge status. The color codes are:

LED COLOR	DESCRIPTION
Blue	Indicates the system is unplugged and running on battery.
Green	Indicates the battery is being fast-charged.
Green/Orange	Indicates the charge is transitioning from fast charge to trickle charge.
Red	Indicates the battery is discharged.

*Table 3-3: Front Panel LED Colors and Descriptions*

## SECTION 4: OPERATION

This section provides both a quick operation segment as well as a complete, in-depth usage segment. First-time users are encouraged to read through both portions and use the former as a reference during future deployments. For optimal results while using the 8011M, please read [SECTION 4-3: DETAILED OPERATING INSTRUCTIONS](#). In addition, the 8011M Should be set up before operation as described in [SECTION 3: SETUP AND ACTIVATION](#).

### 4.1.1 Keypad Descriptions



Figure 4-1: Image of Keypad

### 4.1.1.1 Function Keys

The five Keys at the keypad's top are functional controls used in controlling the Deck Unit. They are described in **TABLE 4-1**. The remaining Keys provide function adjustments and are described in **TABLE 4-2**.






KEY	DESCRIPTION	NAME	FUNCTION
	Transducer with an (O)	<b>Transmit Power Out</b>	Output power can be adjusted from 0 to 9, with zero being the lowest output level.
	Transducer with an (I)	<b>Receive Sensitivity</b>	Receive sensitivity can be adjusted from 0 to 9, with 0 being the least sensitive.
	Eye)	<b>Display Contrast</b>	Going up or down will change the contrast on the display 0 to 9.
	Headphones	<b>Headphone Volume</b>	The range is 0 to 9, with 9 being the loudest.
	Light bulb	<b>Backlight</b>	Pressing this will toggle the backlight on and off.

Table 4-1: Keypad Functional Key Descriptions



KEY	DESCRIPTION	NAME	FUNCTION
	<b>0-9</b>	Zero – nine	Place the digit on display or choose a menu item
	.	Decimal	Place a decimal point in number
<b>CLR</b>	<b>CLR</b>	Clear	Clear number from the display
<b>MENU</b>	<b>MENU</b>	Menu	Enter the menu for set up
<b>GRD</b>	<b>GRD</b>	Guard	Press and hold during guarded commands Also used as “shift” for entering letters
<b>RNG</b>	<b>RNG</b>	Ranging	Enter ranging mode
<b>CMD</b>	<b>CMD</b>	Command	Enter command mode
	▲	Up arrow	Increase the value displayed
	▼	Down arrow	Decrease the value displayed
<b>M/R</b>	<b>M/R</b>	Repeat mode	Switch between repetitive and manual ranging
<b>ENT</b>	<b>ENT</b>	Enter	Enter the number on the display

Table 4-2: Keypad Function Adjustment Key Descriptions



## 4.2 Quick-Start Operation Instructions

This section provides basic but critical instructions on how to use the system and its functions.

### 4.2.1 Sending Commands (<CMD>)

1. If expecting a status reply from the Transponder, press <MENU> select **Range Setup**, and then select **Reply Freq.** Use the Up / Down arrows and the <ENTER> key to set the receive frequency to match the underwater unit's reply frequency.
2. Press the <CMD> key to send a standard ORE Offshore or EdgeTech command. Then enter the 6-digit command and press <ENT> to send it or <CLR> to modify it, if needed.

**NOTE:** When sending commands, the command(s) may be detected by the receive circuitry, which causes the front panel beeper to beep. This is normal and will not affect system operation.

- a. The display will change from *Sending Command Now* to *Waiting for Reply* until a reply is received.
  - b. If the underwater unit answers with a status reply, each received pulse will cause a block to be printed on the display.
  - c. After the first pulse is received, the cursor will move one position every .5 seconds. Counting the positions and noting where the blocks are printed can determine the status of the underwater unit.
  - d. Press <ENT> to exit this mode.
3. To send commands other than the standard EdgeTech and ORE Offshore commands, start by pressing the <MENU> key and selecting **Command Setup**. Select command type.
    - a. After the type is selected, press the <CMD> key to enter and send the command. The manufacturer's command type can contain alphanumeric characters (letters). Enter each character by following the instructions on the display and press enter to send it.



## 4.2.2 Ranging (<RNG>)

Ranging parameters can be set on the 8011M. They are: Interrogate Frequencies, Reply Frequencies, Turn Around Time (TAT), Upper Range Gate, Lower Range Gate, and More Options.

1. Press <MENU> and select **Range Setup** and select **Interrogate Frequencies** and **Reply Frequencies** to set the proper interrogate and reply frequencies. The interrogate frequency is the frequency transmitted from the 8011M deck unit, and the reply frequency is the frequency received by the 8011M deck unit.
  - a. For correct frequencies, refer to the configuration sheet supplied with the Unit.

**NOTE:** If testing an underwater unit in the air, use item 5 to change the minimum range gate to "0". This will allow the deck unit to receive the replies in the air even though the reported ranges will not be accurate.

2. Press <MENU> and select **Range Setup**, and select **TAT**. This is the internal delay time in the underwater unit from when it receives the interrogate pulse until it responds.
  - The default is 13 milliseconds. This is the correct value for use with EdgeTech and ORE Offshore equipment.
  - When using other manufacturer's equipment, change this value.
  - The value is entered in milliseconds, and the range is 0 to 2000 milliseconds.
  - When calculating ranges, this time is subtracted from the total two-way travel time of the acoustic path.
3. Press <MENU> and select **Range Setup** and select **Upper Range Gate** and **Lower Range Gate**. Any replies received before the lower range gate or after the upper the upper range gate are ignored. These gates can help alleviate random noise being treated as a valid reply.
  - The default lower range gate is 50 meters an underwater unit closer than 50 meters will be ignored by the deck unit.
  - The upper range gate is 16383 meters. Any underwater units further away than 16383 meters will be ignored.

- The entered values will return to the defaults whenever the deck unit is powered down.
  - The deck unit will report “no return within range gates” when the max time for the maximum range gate has passed.
4. Press <RNG> to enter the ranging mode. The frequencies for interrogate and reply being used will be displayed. If changes are required, go to the menu.
  5. Press <ENT> to commence ranging. The range will be displayed when it is received. The range is displayed in meters and milliseconds.
  6. To use the repetitive ranging capability, first, enter a repetition rate. This can be changed under the range set up menu. Next, select **More Options** and then Repetitive Rate.
    - When pressing the <M/R> key in ranging mode, the system will switch between manual and repeat mode. The 8011M will start a ranging operation once every [entered number of seconds] when in the repeat mode.
    - To exit the repeat mode, press the <M/R> key to return to manual ranging. The power-up default value for the repeat rate is once every 8 seconds.
  7. The default speed of sound in water used by the 8011M is 1500 meters per second. This can be changed by using the range setup menu. To enter a speed of sound, first press <MENU> select **Range Set Up**, then **More Options**.
    - Item 2 is sound speed select this item and enter the new sound speed. The range for the speed of sound is 100 to 2000 meters per second.
  8. Slant or horizontal ranging can be used in the 8011M. If the display under **More Options** reads ‘Switch to Slant Range Mode,’ then the system calculates horizontal ranges. To switch to Slant Range Mode, select it.
    - If the display under **More Options** reads ‘Switch to Horizontal Range Mode,’ the system calculates slant ranges. To switch to Horizontal Range Mode, select it.
    - To switch to horizontal ranging, enter the depth of the deck unit's dunking transducer and the depth of the underwater unit's transducer.
    - The power-on default mode is slant-range.

## 4.3 Detailed Operating Instructions

This section provides instructions on how to use the system and its functions.

### 4.3.1 Menu (<MENU>)

The <MENU> key is used to access the setup capabilities of the Model 8011M. In general, when an item is selected in a menu, either that item is chosen or a value will need to be entered or adjusted up and down. To select an item, press the number key associated with that parameter. For example, when <MENU> is selected, one can change the system set up by pressing the <3> key.

Pressing a key will either bring up a sub-menu or allow changing a value by entering a number or toggling through choices. Once the value is entered and <ENT> is pressed, the menu moves back up one level.

There are three main items: **Command Setup**, **Range Setup**, and **System Setup**.

#### 4.3.1.1 Command Setup

There are four choices in the Command Setup menu:

1. **EdgeTech/ORE** – Standard 6-digit Binary Acoustic Command System (BACS) commands
2. **Legacy Benthos** – Standard Legacy Benthos rate encoded type commands. Detailed information on how to configure and use this mode is found in the **SENDING BENTHOS COMMANDS** section of this manual.
3. **MORS / IXSEA** – Bit encoded commands which are the same for OCEANO
4. **University of Rhode Island (URI)** – Pressure Inverted Echo Sounder (PIES) bit Encoded commands

#### 4.3.1.2 Range Setup

There are six choices in the Range Setup menu:

1. The Interrogate frequency allows the user to change the frequency that the 8011 M transmits to the underwater unit. The value can be from 7.5 kilohertz to 15.0 kilohertz in 500-hertz steps.
2. Reply frequency is used for setting the frequency that the 8011M will receive as a valid reply from the underwater unit. The value can be from 7.0 kilohertz to 15.0 kilohertz in 500-hertz steps.
3. Turnaround time is the internal delay in the underwater unit being used for the ranging operation. This is the time from when the pulse arrives at the underwater unit to when the underwater unit transmits in response. This time is subtracted from the total round-trip travel time when calculating ranges. The turnaround time can be set from 0 to 1 second in 1 millisecond increments.

4. The upper range gate is used to set the maximum allowable range during ranging operations. Any replies received after the upper range limit is reached will be ignored.
5. A lower range gate is used to set the shortest allowable range. Any reply received before the lower range gate is ignored. The range gates allow the user to lockout random noise and or other transponders in the area by only allowing replies from within a selected area
6. More options are selected to enter a sub-menu containing more settings. There are three options:
  1. **Repetitive rate** – Sets the rate at which the system starts each ranging operation in Repeat Mode only. Each increment of this value is one second.
  2. **Sound speed** – Changes value used for “Speed of Sound” in the range calculation. The Default Speed of Sound used is 1500 meters per second(m/s). **Allowable Range:** 100 to 2000(m/s).
  3. **Slant / Horizontal range mode** – Switches between slant and horizontal ranging mode

### 4.3.2 Commands <CMD>

The command mode is used to transmit commands to underwater equipment. EdgeTech, ORE Offshore, and other manufacturer’s commands are supported. Generally, commands are sent as follows:

<CMD> Command. Press <CMD> and then enter the command(s).

<ENT> Enter. Press <ENT> after entering a Command to initiate Command.

<GRD> Guarded command. Requires the <GRD> and <ENT> keys to be pressed at the same time.

**NOTE:** To send another manufacturer's command, it must be selected in the menus before entering commands. Contact [EDGE TECH CUSTOMER SERVICE](#) for communicating with another manufacturer’s equipment.

After the command is transmitted, and the receive lockout time has passed, the model 8011M goes into “listen” mode, where it waits for replies from the underwater equipment. Upon receipt of the first detection, the display becomes a timeline indicating the detector activity. The number of dots per time interval is (0.5 seconds). The detections of the reply pulses are counted and displayed at the current character position.

A dot indicates no replies at the particular character position. Depending on the arrival time of a reply, there may be 2 blocks displayed for 1 reply. This should not impair deciphering the status since the pulses are separated by at least 1 second. This display aids in deciphering the reply message from the underwater unit. To determine the status of the underwater unit, refer to the manual for that particular system.

Status is usually reported by a string of pulses at either a 1 per second or 1 per 2 seconds and either 7 to 8 pulses or 14 to 15 pulses long. Pressing <ENT> will exit the listening mode.

EdgeTech Acoustic Equipment uses a 16-bit FKS code. The actual code that the operator enters is a six-digit code. The first digit encodes the two frequencies used for transmission and must be between 1 and 6 inclusive. The last five digits represent the specific binary code transmitted, less a final parity bit, and must be between 0 and 7 inclusive. Each underwater unit is supplied with a configuration sheet that shows the commands and the frequencies used during ranging for that particular system.

### 4.3.3 Ranging <RNG>

The ranging function is used to determine the distance from the 8012M transceiver to the underwater unit. Ranging can be done in Horizontal or Slant mode.

In **Horizontal Mode**, the deck unit calculates the distance between the deck unit transducer and the underwater unit transducer after removing the underwater unit's depth from the equation.

In **Slant Mode**, the underwater unit's straight-line distance from the deck unit's transducer is calculated. To use horizontal mode, the user must know and enter the depth of each transducer.

The deck unit subtracts the deck unit's internal delays and the TAT (Turnaround Time) from the total two-way travel time of interrogate and reply pulses to calculate the range. TAT is the total internal delay of the underwater unit from the time a valid interrogate pulse arrives at the transducer to the time the reply pulse is transmitted.

Ranges are reported in meters and milliseconds on the display when received. Time is converted to meters using the speed of sound, which can be entered or changed using the menus. The default speed of sound is 1500 meters per second. When using the repetitive ranging capability, enter a repeat time long enough to allow the reply to come back before the unit sends another interrogate pulse. If trouble ranging occurs, try lowering the transducer deeper into the water.

In most cases, when ranging problems exist, it is because the deck unit does not receive a reply. This can be caused by the ship and surface noise, so lowering the transducer will help to avoid this noise. This can also be caused by thermoclines reflecting the sound. Lowering the transducer can help by getting the transducer below the thermocline or at least changing the angle to the thermocline. The user can change the sensitivity setting, if it is too sensitive, the deck unit will report random ranges, and if it is not sensitive enough, the system will report "no return."

### 4.3.4 Serial Port Operations

The model 8011M acoustic deck unit has an RS232 port available. The port can be used to log activity or to control the deck unit remotely. The 8011M serial port is always in logging mode when not in remote control (host mode).

When logging the 8011M reports, range information, and any BACS command that has been sent. Each logged line is followed by a carriage return and line feed. Logged ranges are reported as the total time of

flight with the underwater unit's turnaround time subtracted from it. To determine the range, divide the time by 2 and then multiply by the speed of sound. The format of logged events is as shown:

```
RNG: TX = 10.5 RX = 14.0 time = 00.016 Sec.
RNG: TX = 10.5 RX = 14.0 time = 00.015 Sec.
CMD: 341210
```

#### 4.3.4.1 Host Mode

**NOTE:** Serial port is always in logging mode when not in Host mode.

Host mode can be entered thru the keypad using the menus or thru the serial port by pressing enter (carriage return/line feed). The LCD indicates 8011M has switched to host mode by displaying:

```
HOST MODE: press any key to exit
```

While in host mode, the 8011M will echo all characters sent in the com port. If using a terminal emulation program, be sure to configure it not to echo characters locally. Host mode commands must exactly match the prescribed format; otherwise, they will be rejected. **Serial commands are case sensitive, all are upper case**, and require strict attention to format, include all leading and trailing zeros, and do not add spaces.

BACS acoustic commands take approximately 9 seconds to transmit. If any character is sent while a BACS acoustic command is transmitted, the command will be terminated. The 8011M will return a carriage return if the command is terminated, not the Pound sign (#). After a BACS acoustic command is sent, the 8011M will return an asterisk (\*) and listen for a response from the underwater unit.

After the first reply is detected, the 8011M will send a question mark (?) and then send either a period (.) or question mark (?) every 250mS. A question mark (?) indicates a valid reply was detected during that 250mS time period, a period (.) indicates nothing was detected. The listening mode is terminated by clicking 'ENT' To Exit Host mode, press any key on the 8011M keypad.

SYMBOL	MEANING
#	Indicates serial command error Indicates listening was terminated
*	Indicates a command has been accepted
?	Indicates a valid reply was detected. Represents a 250mS time period
.	Indicates no reply was detected. Represents a 250mS time period

*Table 4-3: Important 8011M Host Mode Symbols and their Meanings*



Some examples of Host Mode Operations are:

MODE	DESCRIPTION
in10.5 #	Attempt to change the interrogate frequency to 10.5 kHz rejected due to lower case characters
IN10.5 *	Interrogate frequency changed to 10.5 kHz
RX14.00 *	Receive frequency changed to 14.00 kHz
LG00000 *	Lower range gate set to 0 milliseconds
UG02000 *	Upper range gate set to 2 seconds
IN 00026 mS	Interrogate initiated. The response received in 26 milliseconds
IN 00000 mS	Interrogate initiated. Response received with range gates
CM341256 * \$..\$...\$...\$...\$...\$..... #	Command 341256 sent, status returned, 7 pings @ 1 second
CM341256	BACS command 341256 was terminated during transmission (no asterisk sent)

*Table 4-4: Host Mode Examples*

Ranges displayed while in host mode are reported as the total time of flight. It includes the underwater unit's turnaround time. To determine the range, subtract the TAT turnaround time for the particular underwater unit, then divide by 2 and multiply the result by the speed of sound. If no response is received before the upper range gate expires, the range is reported as 00000 milliseconds.

#### 4.3.4.2 8011M Host Mode Serial Commands

COMMAND	DESCRIPTION
RXxx.xx	Set receive freq. (reply), xx.xx in kHz (07.50 – 15.25, in 250 Hz steps)
INxx.x	Set transmit freq. (interrogate), xx.x in kHz (07.5 – 15.0, in 250 Hz steps)
IN	Interrogate initiation
RR	Sets the 8011M to return ranges automatically after receipt of "IN" (default)
NR	Do not report ranges automatically
GR	Report last range acquired
SOx	Set output power 0 – 9 (0 is not zero power, it's the lowest power setting)
Slx	Set receive sensitivity 0 – 9 (9 is most sensitive) (0 is the least sensitive)
UGxxxxx	Set upper range gate 00050 – 21844 milliseconds.
LGxxxxx	Set lower range gate 00000 – 21844 milliseconds. (Default 50). When used in air, set to "0".
CMxxxxxx	Send BACS command xxxxxx, then listens for a status report.

*Table 4-5: Host Mode Serial Commands*

## SECTION 5: MAINTENANCE

The 8011M Deck Unit is ruggedly built and therefore requires minimal maintenance. However, there are a few steps the user can take to prolong the life of the unit.

### 5.1 Basic Maintenance

The PACS Deck Unit requires basic care to ensure it is fully functional for use. Additional information on maintaining the PACS Deck Unit, Transducer, and Battery Storage Instructions are listed below.

**CAUTION!** Never attempt to ship Portable Topside in its Storm Case™ alone. Shipping Portable Topsides without an exterior shipping crate may cause damage sensitive internal components and void the warranty.

#### 5.1.1 8011M Deck Unit

- The Front Panel can be wiped down with a window or CRT cleaner. Do not use solvents.
- The Batteries should be charged before use.

#### 5.1.2 Transducer

- The Transducer should be rinsed with fresh water after use.
- The Transducer connector should be kept clean.

**CAUTION!** The 8011M should never be exposed to any liquid while open. The Deck Unit is only water-resistant when the cover is closed.

#### 5.1.3 Battery Storage

If the 8011M is going to be stored for a prolonged period (over 6 months), the battery pack should, at minimum, be unplugged. However, EdgeTech recommends removing the battery from the unit and stored separately. The battery should be discharged to approximately 15.0 volts before storage.

To remove the Battery Pack:

1. Remove the [10] Screws holding the Front Panel into Pelican Case using a Phillips screwdriver.



Figure 5-1: The Screw Locations in the Front Panel

2. Lift the Front Panel out of the Pelican Case and place it upside-down on top of the Pelican Case onto a tabletop, taking care not to bend any cables or components.

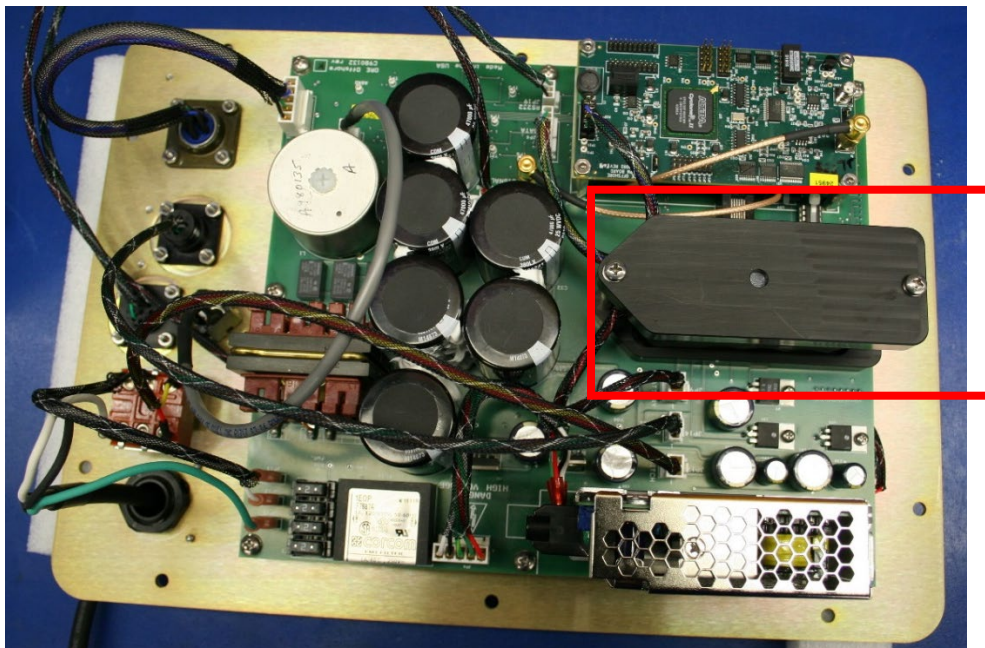
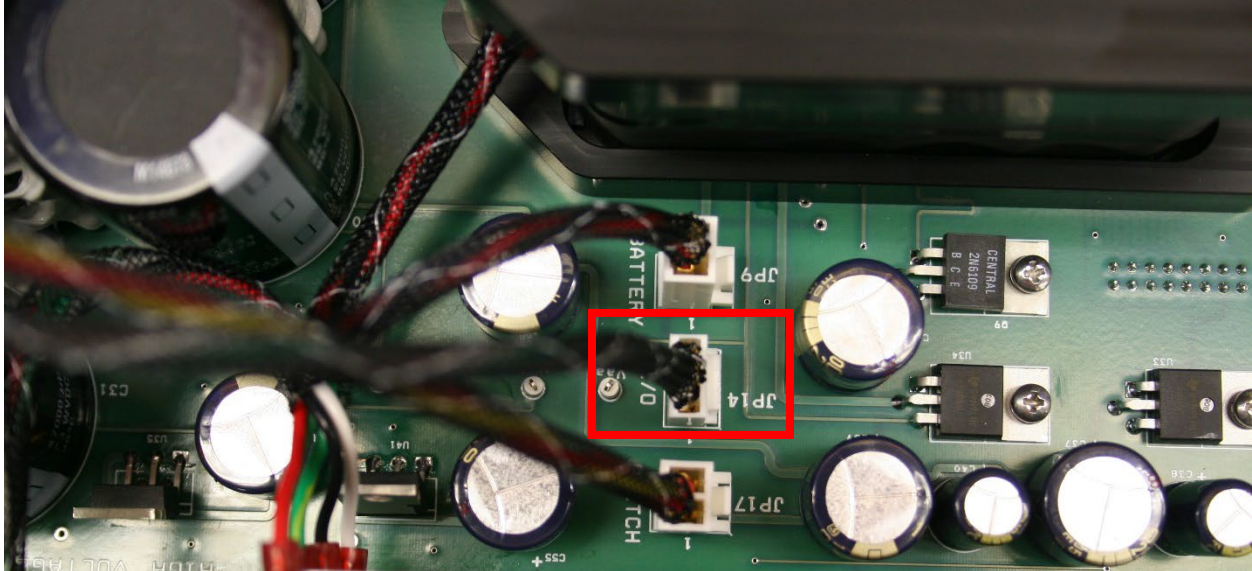


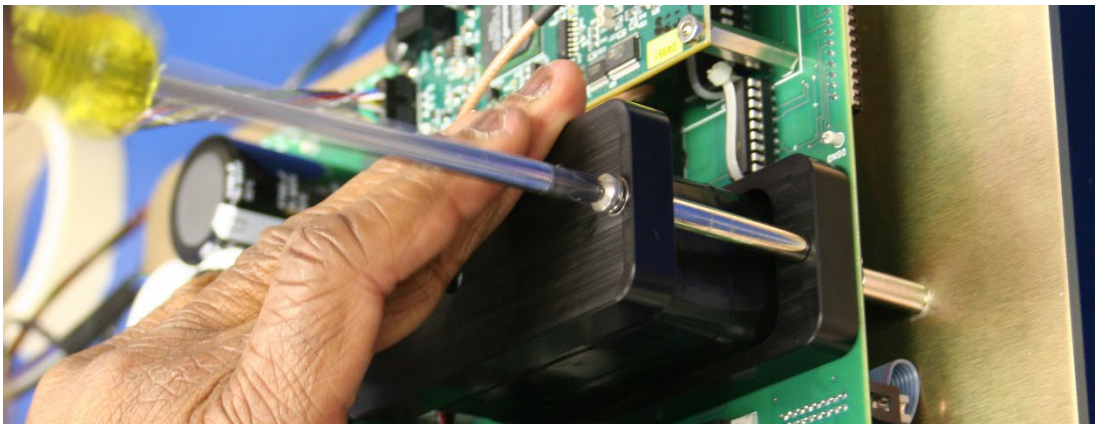
Figure 5-2: The Front Panel Removed from the Pelican Case

- Unplug the battery connector from JP9 BATTERY. All connectors are “locked” with RTV. Break the RTV as needed. EdgeTech recommends reapplying RTV when the battery is reinstalled.



*Figure 5-3: The Battery Connector Location at JP9*

- Remove the [2] Screws from Each side of the battery pack. EdgeTech recommends storing the screws by reinstalling the screws into the Standoffs on the board. Attempting to store the screws with the battery pack may result in them getting lost.



*Figure 5-4: Uninstall the Battery by Removing the Screws in the Stand-offs*

Reverse the instructions listed above to Reinstall the Battery

### 5.1.3.1 Battery Pack Storage Guidelines

The Deck Unit/Battery Packs should be stored at a temperature of approximately 20°C (68°F).

## SECTION 6: APPENDIX

### A.1 Sending Benthos Commands

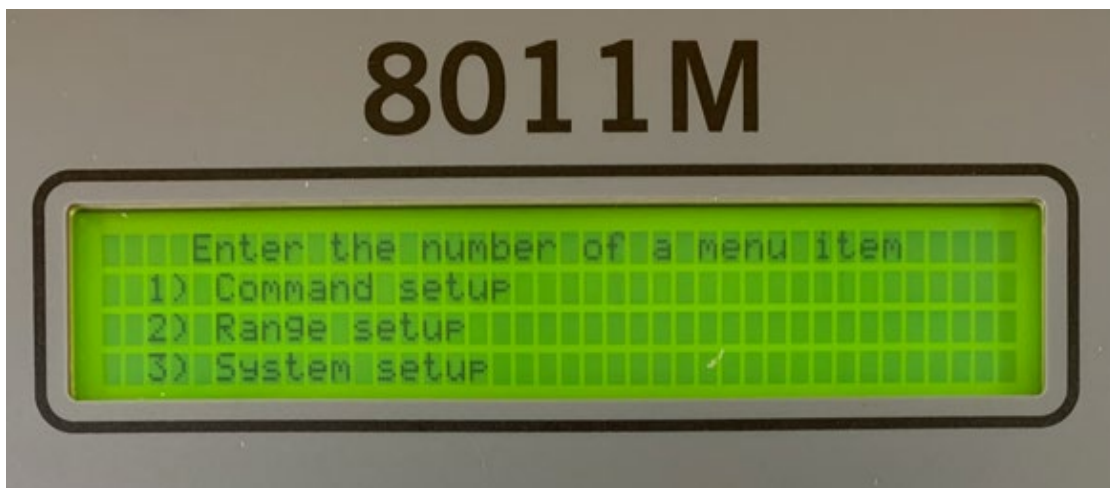
The EdgeTech 8011M Acoustic Deck Unit can communicate with legacy Benthos acoustic release models 865-A, 866-A, 867-A, and 875-A using Benthos rate encoded commands. This is accomplished by configuring the 8011M to Benthos command mode to transmit and receive specific frequencies that Teledyne Benthos describes as in-band and receive out-band codes and setting repetition rates. Compatible codes can be found in example tables in this manual addendum or printed on the labels of the acoustic releases.

#### A.1.1 Instructions

The 8011M Deck Unit is configured to Benthos mode by going into the command setup menu of the 8011M and selecting the Benthos Command Mode, and then configuring a frequency and repetition code of that mode.

**To do so:**

1. Press the Menu Button **MENU** and when the Command Menu Appears, press the **1** on the keypad to select **1) Command Setup**.



*Figure 6-1: 8011M Benthos Instructions- 8011M Command Menu*

2. The display will show a menu displaying a list of possible modes. Press **2** on the keypad to select **2) Benthos**. This will set the mode to Benthos and navigate the display back to the Command Menu.

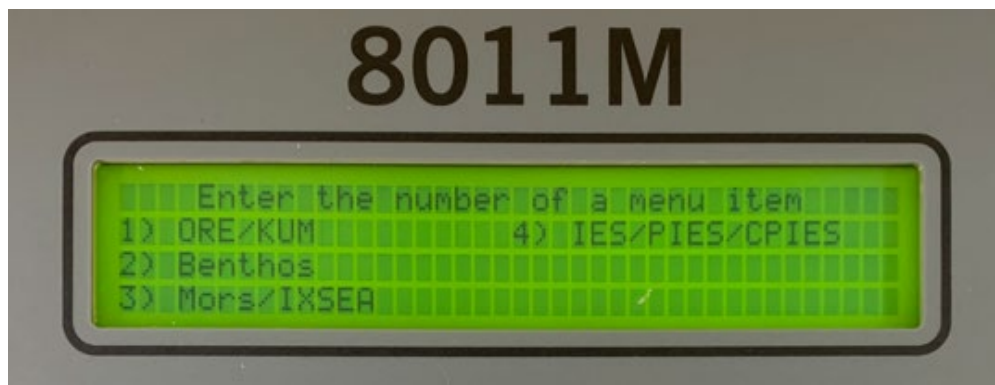


Figure 6-2: 8011M Benthos Instructions- Benthos Mode Selection

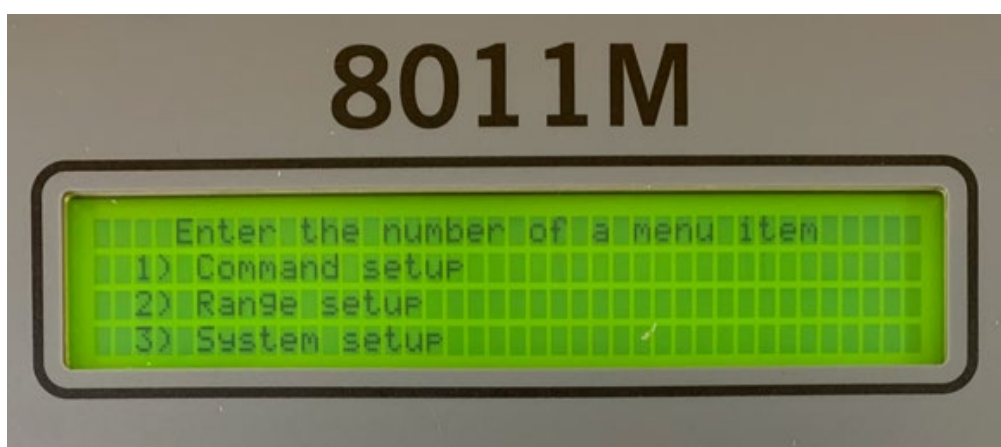


Figure 6-3: 8011M Benthos Instructions- Return to Command Menu

- Press the Command Button **CMD** on the keypad. The Benthos Command Mode Menu will be displayed.

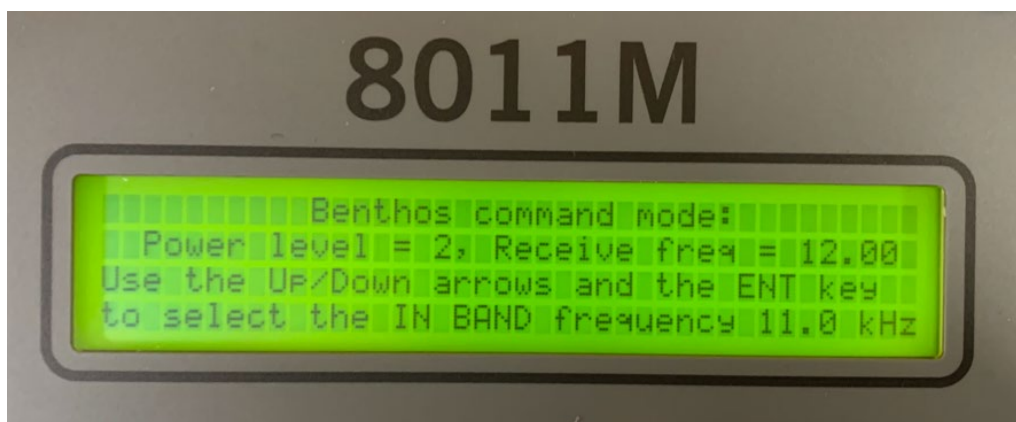


Figure 6-4: 8011M Benthos Instructions- IN BAND Frequency Display

4. An In-Band Frequency is set but pressing the up and down buttons on the keypad to manipulate the **IN BAND kHz frequency** value located on the lower-right side of the 8011M digital display.

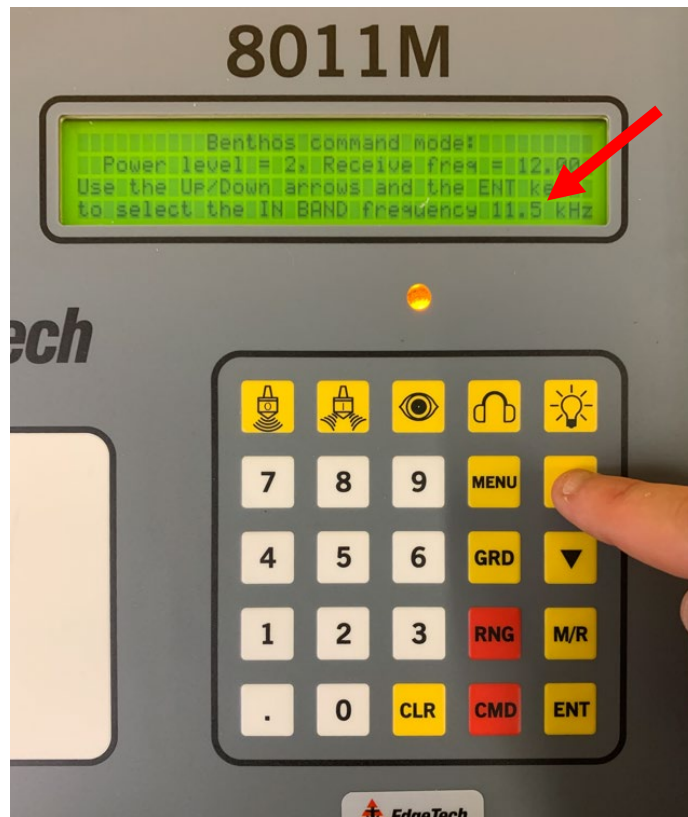


Figure 6-5: 8011M Benthos Instructions- IN BAND Frequency Change

Example codes are listed in the table below.

IN BAND CODES	FREQUENCY IN KHZ
F1	10.0
F2	10.5
F3	11.0
F4	11.5
F5	13.5
F6	14.0
F7	14.5
F8	15.0

Table 6-1: 8011M Benthos Instructions- Example of In-Band Codes and Frequencies

- Benthos describes their frequencies as in-band codes and out of band codes. **The out-of-band code is always 12.5 KHz.** The in-band codes can be seen in the table below or on the label on the release.
- The "In Band Code" or frequency is the same for the command and the interrogate pulse.

5. When the frequency is set, press the Enter Button **ENT** on the keypad to advance the Benthos Command Menu display to a second screen where a **REPETITION RATE code** is set.

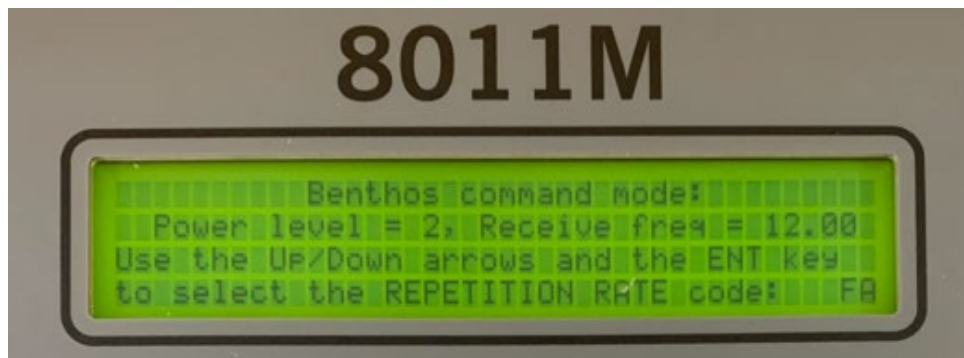


Figure 6-6: 8011M Benthos Instructions- REPETITION RATE Code Display

6. A **REPETITION RATE code** is set by pressing the up and down buttons on the keypad to manipulate one letter of the two-character code value located on the bottom right side of the digital display.



Figure 6-7: 8011M Benthos Instruction- Setting REPETITION RATE code



Repetition Rate Code examples are displayed in the table below.

REPETITION CODE	REPETITION RATE IN HZ
FA	83.0
FB	110.0
FC	137.0
FD	100.0
FE	72.0
FF	77.0
FG	119.0
FH	127.0
FI	123.0
FJ	132.0
FK	107.0
FL	115.0
FM	104.0

*Table 6-2: 8011M Benthos Instructions- Example of Repetition Codes and Rates*

- The repetition code is the actual repetition rate of the command. The repetition rates, as Benthos lists them (numerically), are not very accurate. The 8011M allows you to scroll thru the available repetition rates by their letter designation using the up/down arrow keys on the keypad. The duration of code transmission is set in the 8011M to approximately 5 seconds.
- Benthos has added frequencies over the years; however, you do not need the F designations since the frequency is listed on the release label.

7. When set, press the Enter Button **ENT** on the keypad to advance to the final Benthos Command Menu that displays your changes.

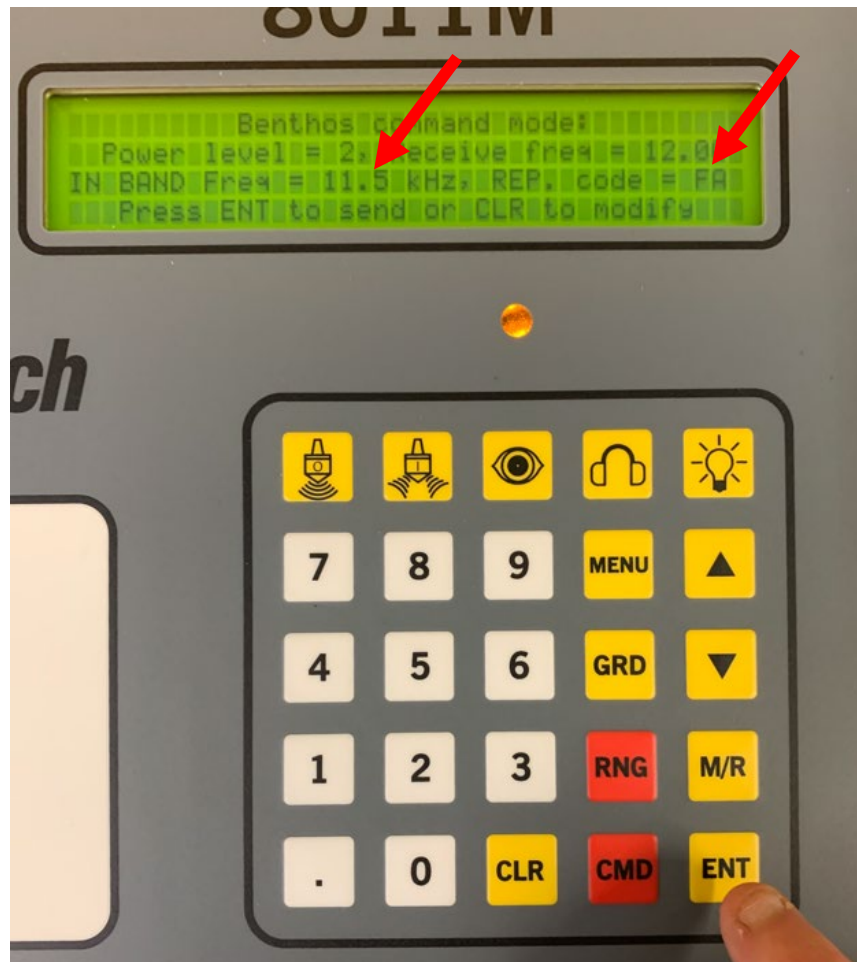


Figure 6-8: 8011M Benthos Instructions- IN BAND Frequency and REPETITION CODE Display

Press **ENT** to transmit the Benthos code pulse from an attached transducer.