8011M ACOUSTIC DECK UNIT

USER HARDWARE MANUAL

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February 2016

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Storm Case™ is a trademark of Pelican.

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.

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—along with 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. Also, some options and features may not be active in the customer's unit at time of delivery. Upgrades will be made available when these features are implemented.

Contact *EdgeTech 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, it is our policy 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 continuously look for ways to improve them. 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 for any damages that result from the use of this manual or the equipment it documents. EdgeTech reserves the right to upgrade features of this equipment, and to make changes to this manual, without notice at any time.

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.*

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 performance of the equipment. No product is warranted as being fit for a particular purpose, and there is no warranty of merchantability. This warranty applies only if:

   i. The items are used solely under the operating conditions and in the manner recommended in 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 the approval of EdgeTech Customer Service.

 iii. Written notice of the failure within the warranty period is forwarded to Seller and the directions received for properly identifying items returned under warranty are followed.

  iv. The return notice authorizes 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, and 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 be warranted for the remaining portion of the original warranty period only.

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. The RMA will help us identify your equipment when it arrives at our receiving dock and track the equipment while it is at our facility. The material should be shipped to the address provided in the *EdgeTech Customer Service* section. Please refer to the RMA number on all documents and correspondences as well.

All returned materials must be shipped prepaid. Freight collect shipments will not be accepted. EdgeTech will pay freight charges on materials going back to the customer after they have been evaluated and/or repaired.

CAUTION!

If your product is a portable topside, never attempt to it in its Storm Case^{TM} alone. Although rugged, these cases are not intended to be used as shipping containers, and the delicate internal components could be damaged if used in this manner.

The following steps apply only to material being returned from outside the Continental United States. Follow them carefully to prevent delays and additional costs.

1. All shipments must be accompanied by three copies of your proforma invoice, showing the value of the material and the reason for its return. If the reason is for repair, it must be clearly stated in order to move through customs quickly and without duties being charged. Whenever possible, please send copies of original export shipping documents with the consignment.

2. If the value of the equipment is over $1000, the following Shipper's oath must be sent with the invoice. This oath can be typed on the invoice, or on a separate letterhead:

"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 _____

3. If there is more than one item per consignment, a packing list must accompany the shipment. It is acceptable to combine the proforma invoice and packing list as long as the contents of each carton are clearly numbered and identified on the invoice.

4. Small items can be shipped prepaid directly to EdgeTech by FedEx, DHL, UPS, Airborne, etc.

5. If the equipment is the property of EdgeTech (formerly EG&G Marine Instruments Division), please insure for full value.

6. Fax one invoice, packing list, and a copy of the airway bill to EdgeTech upon shipment.

CUSTOMER SERVICE

Customer service personnel at EdgeTech are always eager to hear from users of our products. Your feedback is welcome, and is a valuable source of information which we use to continually improve these products. 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.

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 45 years.

The company has responded to the needs of the scientific, Naval, and offshore communities by providing 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 has also consistently anticipated and responded to future needs through an active research and development program. Current efforts are focused on the application of cutting-edge CHIRP and acoustic technology.

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▂▃▅ 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 one of the acoustic release units offered separately through EdgeTech.

The 8011M comes standard with a deck unit, set of headphones, spare connector for the auxiliary port, and a model 8012M transducer for dropping off the side of a vessel to transmit and receive acoustic signals.

> ## CAUTION!
>
> *This deck unit is somewhat splash resistant, but it is not waterproof. It is not intended to be subjected to seawater, rain, spray, etc.*

⣿ SECTION 2: SPECIFICATIONS

The specifications for the 8011M Acoustic Deck Unit are shown in *Table 2-1* and *Table 2-2*:

GENERAL	
Frequencies	Interrogate and Reply frequencies select 7.5 to 15 kHz
Transmit	7.5 to 15.0 kHz - Operator adjustable
Receive	7.0 to 15.0 kHz - Operator selectable multiple channels
Transmit source level	192 dB re 1 micro-Pascal at 1 meter - Controllable by operator
Receive sensitivity	-80 dB re 1 micro-Pascal at 1 meter
Transmit pulse width	5 to 30 milliseconds - Operator selectable
Timing accuracy	0.1 millisecond
Range units	Meters and Seconds
Command codes	ORE Offshore, EdgeTech, EG&G, Benthos, Oceano, and MORS
Status receive	Automatic time-line display of acoustic status replies
Beeper	Audio confirmation of received signals
Case	Sealed, portable, polyethylene
Size	40.6 cm x 33 cm x 17.3 cm (16 in. x 13 in. x 6.8 in.)
Weight	7.3 kg (16.0 lbs)

Table 2-1: General Specifications

8012M TRANSDUCER	
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 Specifications

2.1.1.1 Serial Cable Pin Out

DB9 pin 2   AMP pin 8

DB9 pin 3   AMP pin 7

DB9 pin 5   AMP pin 2

2.1.1.2 Auxiliary Cable Pin Out

Pin 1   Ground

Pin 2   TX transmit envelope goes negative at the beginning of the transmit pulse.

Pin 3   Detect goes high on detection of 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.

.ıll SECTION 3: INSTALLATION

To install the 8011M:

1. Unlatch the cover on the deck unit and open it.

2. Attach the Model 8012M transducer to the TRANSDUCER connector, being sure to screw the connector down finger tight. (The user may need to apply pressure to the back of the connector while tightening the locking sleeve).

> **NOTE:** *On the early 8011M systems, the transducer connector is a Spirit, which is the same as used on earlier EG&G, EdgeTech, and ORE Offshore deck units. Transducers from these systems can be used with the 8011M. However, if the shorter (32 meter cable) transducer is used, the output power will be slightly reduced.*
>
> *On the later 8011M systems, the connector is an Amphenol.*
>
> *The pin out for the early spirit type connector transducer connectors is as follows:*
>
> > *1 shield*
> > *2 Black low side transducer*
> > *3 White high side transducer*
> > *4 shorted to 5*
> > *5 shorted to 4*
>
> *Pins 4 & 5 are shorted on the transducer side of the connection so that the deck unit can sense it.*
>
> *Pin out for the later Amphenol type connector transducer connectors is as follows:*
>
> > *A White high side transducer*
> > *B Black low side transducer*
> > *C shield*
> > *D shorted to E*
> > *E shorted to D*
>
> *Pins D & E are shorted on the transducer side of the connection so that the deck unit can sense it.*

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

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

4.   Attach the headphones to the HEADPHONE connector. Be certain that the power available matches the requirements of the Model 8011M, which is 100 to 230 VAC and 50 to 60 hertz. The deck unit will auto sense the input voltage, so there is no need to change anything on the deck unit for input voltages within this range.

5.   Once proper voltage is ascertained, plug the instrument into a grounded outlet.

6.   The 8011M has an internal rechargeable battery. To fully charge the internal battery, the system must be plugged in and turned on for 5 hours. The 8011M will run on the internal battery for 4 to 6 hours depending on use.

The battery is being charged or the charge is being maintained whenever it is plugged in and turned on. When running on the internal battery, the user should always be sure to turn the backlight off. The backlight severely degrades the charged life of the battery.

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

> **Green**   Means that the battery pack is being charged.
>
> **Red**   Means that the system temperature is too high to continue charging.

7.   The 8011M is now ready for operation.

⊿⊿⊿ SECTION 4: OPERATION

Although full knowledge of the operation of the Model 8011M is recommended to achieve best results, in many cases, the default operating parameters are adequate for getting the unit operating quickly. This section provides both a quick operation segment, as well as a full, in-depth usage segment. First-time users are encouraged to read through both portions entirely and then use the former as a reference during future deployments.

4.1 Quick Operation

Read *SECTION 3: INSTALLATION* and set up the 8011M as described before operating the unit.

4.1.1 Sending Commands (<CMD>)

1. If you expect a status reply from the transponder, press <MENU> and select item 2 (range setup) again select item 2 (reply freq.) use the up down arrows and the <ENTER> key to set the receive frequency to match the reply frequency of the underwater unit.

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. The display will change to (sending command now) and then (waiting for reply) until a reply is received. If the underwater unit answers with a status reply then each received pulse will cause a block to be printed on the display. After the first pulse received the cursor will start to move at one position every .5 seconds. By counting the positions and noting where the blocks are printed you can determine the status of the underwater unit. Press <ENT> to exit this mode.

3. To send a command other than the standard ORE Offshore and EdgeTech commands start by pressing the <MENU> key and selecting item 1 (command setup). Select the type of command you wish to send. After the type is selected you can press the <CMD> key to enter and send the command. If the manufacturers command type that you have chosen can contain alphanumeric characters (Letters) then you enter each character by following the instructions on the display and press enter to send it. When sending IXSEA type commands hold in the <GRD> key and press <1> through <6> to enter A through F. The 8011M can send both short and long IXEA/MORS/OCEANO commands simply enter the 4 or 8 digits and send it. For entering Benthos commands follow the instructions on the display. Due to the format of Benthos commands the up down arrows on the key pad must be used to select the frequencies used. "Until the 8011M is powered down and powered up again the command type will stay at the last one entered. The type of command can be changed at any time by using the menu.

4. If the command is a guarded command such as a release command or a command requiring extra security it will be necessary to press and hold in the <GRD> key while pressing <ENT> to transmit

the command. The deck unit will inform you if the command is guarded when you try to send it without holding the guard key pressed.

5. After an ORE type command has been sent and the first reply is received the display will start to graphically indicate the relative receive times of the status reply pings. Press <ENT> to send another command or to exit the listening mode.

6. After an IXSEA type command is sent the system will wait for a reply and when the first reply is received the range will be reported meters and seconds. There is a 4 second lockout after the range is reported and then the system will wait for a diagnostic reply. If the diagnostic reply is received the delay time will be reported in milliseconds. See your underwater unit manual for an explanation of the reported time.

4.1.2 Ranging (<RNG>)

1. Press <Menu> and select item 2 (range setup) and then items 1 and 2 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. The correct frequencies can be found on the configuration sheet supplied with the underwater unit. Note: If you are testing an underwater unit in air use item 5 to change the minimum range gate to "0". This will allow the deck unit to receive the replies in air even though the reported ranges will not be accurate.

2. Item 3 in the range set up menu is the TAT "Turn Around Time". 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 ORE Offshore and EdgeTech equipment. You will need to change this value when using other manufacturer's equipment. 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. Items 4 and 5 in the range set up menu are the upper and lower gates. 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 of the 8011M you will first need to enter a repetition rate. This can be changed under the range set up menu. Select item 6 (more options) and then item 1 (repetitive rate). When in ranging mode if you press the <M/R> key the system will switch between manual and repeat mode when in the repeat mode the 8011M will start a ranging operation once every (entered number of seconds). To exit the repeat mode, simply 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 set up menu. To enter a speed of sound first press <MENU> select item 2 (range set up) then item 6 (more options). Item 2 is sound speed select this item and enter the new sound speed that you wish to use. 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 in item 3 under more options reads (Switch to Slant range mode) then the system is calculating horizontal ranges, by selecting item 3 you will switch the system to Slant range mode. If the display in item 3 under more options reads (Switch to Horizontal range mode) then the system is calculating slant ranges by selecting item 3 you will switch the system to Horizontal range mode. When you switch to horizontal ranging you will need to enter the depth of the deck units dunking transducer and the depth of the underwater unit's transducer. The power on default mode is slant range.

4.2 Detailed Operating Instructions

The following instructions provide a more in-depth description of how to use the system and its functions:

4.2.1 Keypad Descriptions

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

Table 4-1: Keypad Descriptions

There are 5 function keys across the top of the keypad. These are used to change different levels in the deck unit. From left to right they are:

Transmit power out   (Picture of a transducer with an (O) in it). The output power can be adjusted from 0 to 9 with zero being the lowest output level.

Receive sensitivity   (Picture of a transducer with an (I) in it). The receive sensitivity can be adjusted from 0 to 9 with 0 being the least sensitive.

Display contrast   (Picture of an eye) Going up or down will change the contrast on the display 0 to 9.

Headphone volume   (picture of a set of headphones) Range is 0 to 9 with 9 being the loudest.

Backlight   (picture of a light bulb) Pressing this will toggle the backlight on and off.

4.2.2 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: <1> Command setup, <2> Range setup and <3> System setup.

4.2.2.1 Command Setup

In the command setup menu there are four choices:

1. EdgeTech/ORE which will send the standard 6 digit BACS commands sometimes referred to as Binary Acoustic Command System.

2. Benthos which will transmit the standard Benthos rate encoded type commands.

3. MORS / IXSEA will transmit the bit encoded commands which are the same for OCEANO.

4. University of Rhode Island Inverted Echo Sounder bit Encoded commands.

4.2.2.2 Range Setup

In range setup there are six choices:

1. Interrogate frequency allows the user to change the frequency that is transmitted by the 8011M 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 particular underwater unit being used for the ranging operation. This is the time from when pulse arrives at the underwater unit to when the underwater unit actually 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. 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. 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 is selected to enter a sub menu containing more settings.

   In the "more options" menu there are three items:

   o Repetitive rate is for setting the rate at which the system will start each ranging operation in repeat mode. Each increment of this value is one second.
   o Sound speed is for changing the value used for "speed of sound" in the range calculation. The default speed of sound used is 1500 meters per second. The allowable range is 100 to 2000 meters per second.
   o Slant / Horizontal range mode is used to switch between slant and horizontal ranging mode.

4.2.3 Commands <CMD>

The command mode is used to transmit commands to underwater equipment. ORE Offshore and EdgeTech commands are supported as well as other manufacturer's commands. In general, a command is sent as follows: press <CMD> to enter command mode. The command can then be entered. Enter the command code and press <ENT> key. Guarded commands require that the <GRD> key be pressed at the same time as the <ENT> key. If you wish to send another manufacturers command then it must be selected in the menus before entering the command mode.

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

No replies are indicated by a dot 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 pulse 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 which shows the commands and the frequencies used during ranging for that particular system.

4.2.4 Ranging <RNG>

The ranging function is use to determine the distance to the underwater unit. Ranging can be done in Horizontal or Slant mode. In horizontal mode the deck unit calculates the distance between the transducer of the underwater unit and the transducer of the deck unit after removing the depth of the underwater unit from the equation. In slant mode the straight line distance to the underwater unit from the deck unit's transducer is calculated. In order to use horizontal mode you must know and enter the depth of each transducer.

To calculate the range the deck unit subtracts the internal delays of the deck unit and the TAT (turnaround time) from the total two way travel time of interrogate and reply pulses. 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 they are 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 you should be sure to enter a repeat time long enough to allow the reply to come back before the unit sends another interrogate pulse. If you have trouble ranging try lowering the transducer deeper into the water.

In most cases when ranging problems exist it is because the deck unit does not receive the reply. This can be caused by ship and surface noise so lowering the transducer will help to avoid this noise. This can also be caused by thermo-clines reflecting the sound lowering the transducer can help by getting the transducer below the thermo-cline or at least changing the angle to the thermo-cline. You can also 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".

4.2.5 Serial Port Operations

The model 8011M acoustic deck unit has an RS232 port available to the user. The port can be used to log activity or to remotely control the deck unit. The 8011M serial port is always in logging mode when it is not under 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 total time of flight with the underwater unit's turnaround time subtracted from it. To determine range you would 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
```

Host mode is entered by either selecting it as a keypad menu item or by sending a "carriage return / line feed" thru the serial port. The LCD display will indicate that the 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 locally echo characters. Host mode commands must exactly match the prescribed format, otherwise they will be rejected.

Serial commands are case sensitive, must include all leading and trailing zeros and must not include spaces. A pound sign returned from the 8011M indicates a serial command error. All commands that are accepted in host mode are responded to with an asterisk.

Some examples of host mode operations is:

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 14.00kHz.

LG00000 *   Lower range gate set to 0 milliseconds.

UG02000 *   Upper range gate set to 2 seconds.

IN 00026 mS   Interrogate initiated, response received in 26 milliseconds.

IN 00000 mS   Interrogate initiated, no response received with range gates.

CM341256 * $..$...$...$...$...$...$...... # Command 341256 sent, status returned, 7 pings @ 1 second Note the #, this indicates that listening was terminated.

CM341256   BACS command 341256 was terminated during transmission (no asterisk sent)

Ranges displayed while in host mode are reported as total time of flight, it includes the underwater units turnaround time. To determine range you would 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 then the range is reported as 00000 milliseconds.

Any BACS acoustic command that is in the process of being transmitted acoustically will be terminated if any character is sent to the 8011M during transmission. BACS acoustic commands take approximately 9 seconds to transmit. If the command is terminated the 8011M will not return a pound sign, it will send a carriage return / line feed. After a BACS acoustic command is sent the 8011M will send an asterisk and then 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 sending a carriage return / line feed. Host mode can be exited by pressing any key on the 8011M keypad.

4.2.5.1 8011M Host Mode Serial Commands

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)
SIx	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) set to "0" in when using in air
CMxxxxxx	Send BACS command xxxxxx, then listens for status report.

NOTES:

 - *Port settings are: 9600,N,8,1*

 - *Serial commands are case sensitive, all are upper case.*

 - *Serial commands require strict attention to format, include all leading and trailing zeros and do not add spaces.*

 - *An asterisk response from the 8011M (*) indicates command accepted.*

 - *A pound sign response from the 8011M (#) indicates serial command error.*

 - *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).*

 - *When listening for command status format is a series question marks and periods. Question marks indicate a valid reply was detected, periods indicate no detect. Each character represents a 250mS time period.*

NOTE: *For any other questions regarding this system, contact* ***EdgeTech Customer Service****.*