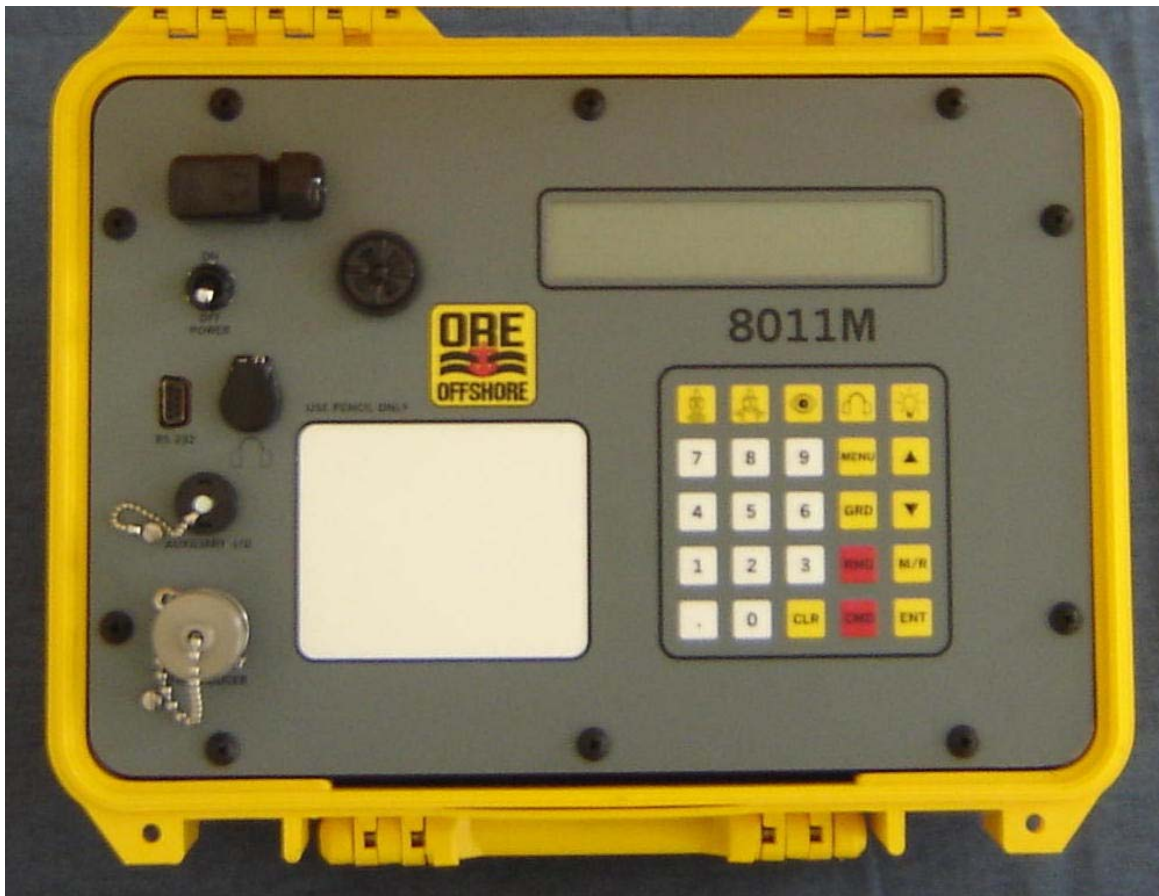




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MODEL 8011M Acoustic Deck Unit Transceiver



Standard Commercial Warranty

All equipment manufactured by ORE Offshore is warranted against defective components and workmanship for repair at the plant in Wareham, Massachusetts, free of charge for a period of one year after shipment. Shipping costs are to be borne by the customer. Malfunction due to improper use is not covered in this warranty and ORE Offshore 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 or repairs attempted thereon; (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; and (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 express 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 unexpired portion of the original warranty period only.

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

Return Procedure

It is necessary to obtain from ORE Offshore a Returned Material Evaluation (RME) number prior to returning equipment. This is to assist tracking and arrival recognition. Follow the procedure listed below when returning U.S. origin goods to prevent delays and additional costs on Returned American Goods.

New Import Procedure/Returned American Goods

1. All shipments must be accompanied by two copies of your commercial invoice showing value of material and any reason for return.
 - * Whenever possible, please send copies of original export shipping documents with the consignment.
2. If the value is over \$1,000.00, the following shipper's oath must be sent with the invoices. (This 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, that no drawback, bounty, or allowance has been paid or admitted thereof.

Signed _____"
3. If more than one part per consignment, a packing list must also accompany the shipment. It is acceptable to combine the commercial invoice and packing list as long as the contents of each carton are clearly numbered and identified on the commercial invoice.
4. Consign all air freight shipments to ORE Offshore in care of Intercontinental Air Frt., Inc., Logan Int'l Airport, East Boston, Mass. 02128.
5. If the equipment is property of ORE Offshore please insure for full value.
6. Route via Logan International Airport only as the final destination.
7. Mail one invoice, packing list and copy of airway bill to ORE Offshore upon shipment.
8. Please refer to issued Returned Material Evaluation number on all documents and correspondence.
9. Air freight must be prepaid on all returns.

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Installation and Operation

Base Unit

The operation of the Model 8011M is straight forward. It is highly recommended that the operator read this entire section of the manual in order to realize the full potential of this equipment. The operation of the Model 8011M is divided into the following sections: installation, quick (default) operation, keypad and description of keys, setup menus (<MENU>), command transmission (<CMD>), ranging (<RNG>). (In general, angle brackets '<>' enclose keypad names).

Installation

The standard system includes a Model 8011M deck unit with a headphone set, spare connector for the auxiliary port, and a Model 8012A transducer.

Unlatch the cover on the deck unit and open it. Note the transducer connector 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. Attach the Model 8012A transducer to the TRANSDUCER connector, being sure to screw the connector down finger tight. (YOU MAY NEED TO APPLY PRESSURE TO THE BACK OF THE CONNECTOR WHILE TIGHTENING THE LOCKING SLEEVE) Use the supplied Kellems grip to fasten the cable to a suitable anchoring point and lower the transducer overboard. Note: The Model 8012A is not designed for use when the ship is moving. 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 there is no need to change anything on the deck unit for input voltages with in this range. Once proper voltage is ascertained, plug the instrument into a grounded outlet. The 8011M has an internal rechargeable battery. To fully charge the internal battery the system must be plugged in and turned on for 8 hours. The 8011M will run on the internal battery for 3 to 4 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 you should always be sure to turn the backlight off. The backlight severely degrades the charged life of the battery.

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

Green means that the battery pack is being charged at the high rate. The LED will be green when the system is first turned until it goes into maintenance charge.

Blue means the system is running on the battery pack not external power.

Red/Blue Mixed means that the system is running on batteries and the charge is getting low. It should be plugged in soon and recharged.

Quick 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 in getting the unit operating quickly. This section is a “no-frills” guide to using the Model 8011M:

Read the installation section and set up the Model 8011M as described.

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 anytime 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.

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.

Keypad Descriptions

The functions of the keys are as follows:

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.

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.

(Leaving the back light on during battery powered operations will reduce the charged battery life substantially)

Menus <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.

<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.

<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 7.5 kilohertz to 15.0 kilohertz in 500 hertz steps.

- <3> Turn around 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 turn around 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:
 - <1> 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.
 - <2> 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.
 - <3> Slant / Horizontal range mode is used to switch between slant and horizontal ranging mode.

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.

ORE and EdgeTech acoustic equipment use 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.

Ranging <RNG>

The ranging function is used 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 (turn around 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".

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 units turn around 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

8011M host mode serial commands:

RXxx.xx	set receive freq. (reply), xx.xx in kHz (07.50 – 15.25, in 250Hz steps)
INxx.x	set transmit freq. (interrogate), xx.x in kHz (07.5 – 15.0, in 500Hz 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
CMxxxxxxx	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.

Serial cable pin out:

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

Customer Service:

Customer Service is available 24 hours a day 7 days a week. The after hours telephone number is on our website at www.ore.com