ECHOTRAC MKIII

USER MANUAL
Version: 4.03

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Revision History

Version	Date	Author	Remarks
0.1	09-19-2002	P. Oostenrijk	Initial version – draft
1.0	01-28-2003	S.F. Apsey	
1.1	03-27-2003	S.F. Apsey	Updated manual for firmware version 2.07;Changed default of Tracking Gate. Added Skip Alarms. Added Grey shades.
1.2	09-09-2003	S.F. Apsey	Updated manual for firmware version 2.14: Added Subottom TVG, SB TVG Range, Pre Amp Gain, Dual Light Shade parameters.
1.4	02-16-2005	S.F. Apsey	Changes from Echotrac MKIII 3.05 to 3.06 1-When the Echotrac MKIII is set to read in heave through com4 it will check to see if the first character in the string is an 'R' (remote heave). If the first character is an 'R' the Echotrac will use the remote heave value for corrections otherwise the Echotrac will use the local heave. 2-Added a parameter called HEAVECORR. This parameter will heave correct the chart when turned on or not heave correct the chart if turned off. The selection of the 'Heave Out' serial string will now no longer affect the heave correction on the chart. 3-The parameter DIGILINE will now have a range of 0,1,2,3,4,5,6,7,8,9,10 instead of on or off. When set to 0 the digitizer line will not be printed. If set to any other number, the digitizer line will be printed that many units above the raw bottom. 4-The parameter LIGHTSHADE will now have the selections Chnl2 Dark, Chnl1 Dark, Chnl2 Only and Chnl1 Only. This will reflect how the data and what data will be printed when both channels are turned on. If Chnl2 Dark is selected, Channel 2 will be printed darker than Channel 1. If Chnl2 only is selected then only Channel 2 will be printed.
3.08	04-14-2005	P. Oostenrijk	Updated manual for firmware version 3.08 Added section on how to request parameter settings through the serial port.
3.20	01-16-2006	P. Oostenrijk	Added UDP port, Hours of operation, Packet size 8/16 bits, outputstring DESO DDV, print German Help.
3.22	02-28-2006	P. Oostenrijk	New optimized Deso command handling routines. Re-enabled TVGgainref and Trackinggate in Echotrac Control program. Improved annotation handling.
3.23	05-22-2006	P. Oostenrijk	Improved Echotrac Control program network detection interface. Low Frequency pulse width increased to 256. Corrected auto-scaling when draft and index are used. Added support for Echotrac CVM.
3.25	08-03-2006	P. Oostenrijk	Fixed: Stopping the synchronization process disabled communication with Echotrac. Added compatibility check and warning for Echotrac Control Program version and Echotrac firmware version. If during synchronization a parameter is missing, the parameter name is now displayed. Improved version control in firmware and diagnostic window.

Revision History

Version	Date	Author	Remarks
			Added Echotrac and Subbottom mode to Control Program. This is not supported on the MK3. Added Datacheck for GPS and Heave. Depth values are red in case of depth alarm. Added transparency feature on depth monitor window. Added support for CV100. Added Power & Gain control to Depth Monitor window.
3.26	09-07-2006	P. Oostenrijk	Updated to 3.26 for Echotrac firmware version compliance.
3.27	09-25-2006	P. Oostenrijk	When a menu parameter value is changed, only the value is highlighted. But upon entering the edit mode for the menu value almost instantly the entire menu row would be highlighted. The problem appears when DESO_DDV+C is selected and Atlas Susy sends event commands to the MK3.
3.28	01-10-2007	P. Oostenrijk	Improved verification of power settings when scale changes occur.
3.29	05-22-2007	P. Oostenrijk	Added description for Missed Returns and Mode on Setup tab. Minor change in Grey Shades description. Updated COM port's baudrate options to include 38400. Removed chapter Overview Parameters and Settings. This is now refers to the Technical Specification Ethernet Interface document.
4.00	02-19-2008	P. Oostenrijk	Updated Odom Title and Logo on cover page. Updated Header and Footer according to new template. Updated uploading firmware and upgrading DSP firmware.
4.01	02-25-2008	P. Oostenrijk	Updated document version to match software/firmware version.
4.02	03-18-2008	P. Oostenrijk	Added support of extra fine scale grid. Added support for DESO DDV outputstring for all sounders.
4.03	05-23-2008	P. Oostenrijk	Updated Scale change functionality. Updated CVM channel handling as 1 and 2 instead of 1 and 3.

CONTENTS

1 INTRODUCTION

1.1 General

The Echotrac MKIII professional grade echo sounder Recorder, Digitizer, Transceiver, utilizes multiple processors including two dedicated Digital Signal Processors (DSPs), working in concert to accomplish specific analysis tasks while communicating effectively on a real-time basis in order to assure accurate measurements under difficult sea conditions and over all types of seabed.

1.2 Dual Frequency Operation

Two simultaneously transmitted frequencies are selectable in 100 Hz steps in the following bands: High Band - from 100 kHz to 1000 kHz and in the Low Band – from 10 kHz to 50 kHz.

1.3 Printer mechanism

The high-resolution thin-film thermal print head (216mm (8.5") wide, 8 dots per mm (203/in.) is capable of printing returns in up to 16 gray shades. Because of its construction, the print head consumes very little power compared to previous technologies. A stepper motor drives the print mechanism while a DC motor and associated slipping-clutch mechanism re-winds the printed chart independently.

1.4 LCD Chart Panel

An alternative to the Printer Module is the LCD Chart Panel. It is an 1024x768 pixel color active matrix display with a 500 NIT back light. The backlight is 2 times brighter than a typical notebook display for viewing in outdoor lighting conditions. The LCD Chart Panel includes a hard drive for recording data, removable PCMCIA flash card for transferring data and an Ethernet port.

1.5 Display

Transflective, Back-lighted Graphical LCD Module (64 x 240 dots). The display shows six dot rows, has an on board controller and LED backlighting. The transflective display was chosen because of its excellent visibility in all light conditions from bright sun to darkened wheelhouse.

1.6 Keypad

The 18 key-sealed micro-switch unit has good tactile feel and audible feedback. The keypad is used for direct parameter value entry and functional control of the sounder from the front panel.

1.7 Receivers

The MKIII gives immediate control of Receiver Gain via continuously variable front panel mounted potentiometers. The unit incorporates multiple, selectable TVG curves (10 log, 20 log, 30 log, and 40 log) and AGC as well.

1.8 Transmitter

Transmit frequencies are digitally synthesized and based on the stable frequency characteristics of a crystal controlled clock oscillator. Transmitted power for both high and low channels is individually adjustable via front panel mounted controls. Power is adjustable from the minimum of only 2 watts in high frequency shallow water applications to over 2000 watts in low frequency deepwater uses. Transmit Pulse Width is variable either automatically (actual value dependent on frequency and depth) or manually by keypad entry.

1.9 Communication Ports

The Echotrac MKIII has 4 serial ports that can be configured to interface with computers, positioning systems, motion reference units and remote displays. The MKIII also has an Ethernet port that outputs the 16 bit samples of the acoustic data for further processing or visualization.

2 INSTALLATION

2.1 Echotrac DF 3200 MKIII Recorder Installation

The Recorder is a flexible unit designed for tabletop, rack, or bulkhead mounting. Rack mounting can be accommodated with the included special hardware, while bulkhead mounting requires ordering additional optional hardware. Where tabletop mounting is preferred, it is highly recommended that the unit be secured with external 'tie-downs' for rough seas or heavy swells.

2.1.1 Power

The MKIII can be powered by either AC or DC power sources. Switch over between sources is automatic. DC operation requires an input voltage between 18 and 29 VDC (nominal 24 VDC). Average power consumption is approximately 75 watts. Frequently, power is derived from two 12 V lead-acid batteries connected in series. Two "car" batteries (24V configuration), fully charged, and in good condition, can normally power a unit for a full day without re-charging.
If using an AC source, the unit's internal switcher accommodates either 110 or 230 VAC (50/60HZ) operation without operator intervention. Regardless of the input source (AC or DC), the input power should be well regulated and monitored closely for voltage transients, spikes, etc. Regulated DC supplies should be able to source a short duration in-rush current spike of approximately 6 amps and an average current load of 3 amps. In the case of "charger" type (unregulated) supplies, the output should be "floated" across a battery load and not connected solely to the echo sounder's DC input. Details of the power cable are given in Section 2.3. Should the DC input voltage polarity be applied in reverse, an audible alarm within the unit will sound regardless of the POWER switch setting. In the event that the input voltage drops below the minimum threshold the unit will automatically shut down.

2.1.2 Cabling

All cabling is via the connectors located in the recessed panel at the top rear of the unit. A view of the connector arrangement is shown in Figure 2.1. Cable details are given in Section 2.3. Care should be taken to route cables using horizontal and vertical runs wherever possible. Avoid paths that run adjacent to transmitter feeder cables or close to heat radiating elements such as steam pipes. For permanent installations, cables should be clamped at regular intervals (1m) along their complete lengths.

Fig 2.1

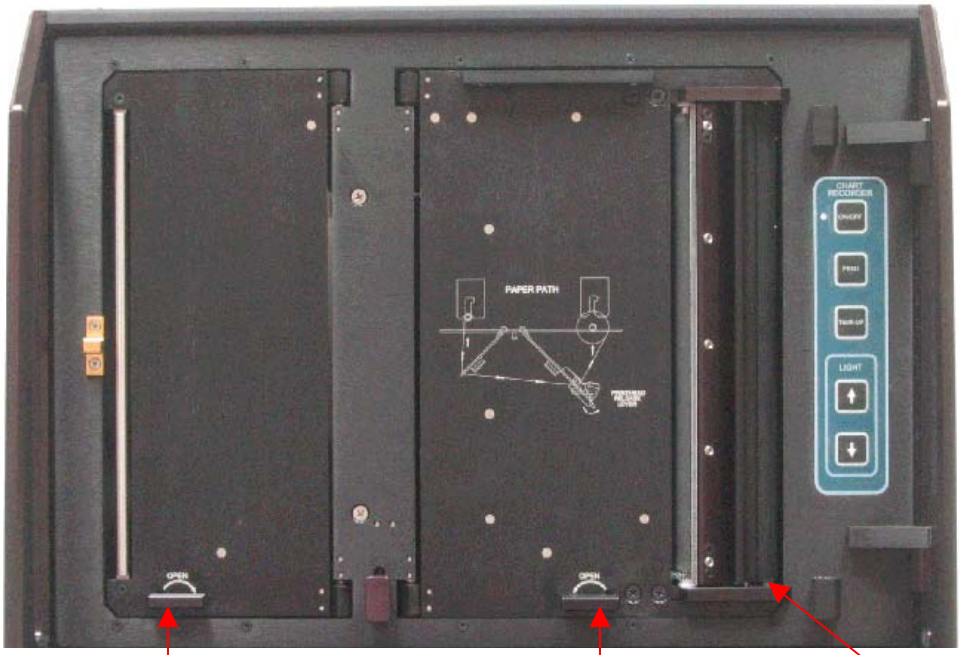
2.1.3 Fuses

For DC operation, both the positive and return lines are protected by fast blow standard glass tube (5-Amp/250 Volts) fuses. The two externally accessed fuses are mounted on the rear connector panel. The negative fuse protects the unit from damage resulting from contact with external peripherals that do not share a common return path potential. A 5-amp fuse is included in the AC input connector as well.

2.1.4 Chart Paper

2.1.4.1 General Paper Description

The Echotrac MKIII uses either thermal film or high quality thermal paper as the recording media for the analog chart. The rolls are 216mm (8.5") wide and contain approximately 52m (170') of paper (film rolls are approximately 30m long). The inside diameter of the core is 12.7mm (½"), and the outside diameter of the roll is about 64mm (2.5").



2.1.4.2 Loading paper

Loading paper is a multi-step process, but it need not be a difficult one if care is taken to assure that each step is accomplished properly. As in almost all thermal recorders (including FAX machines), paper is sourced from a supply roll, where it passes over a roller, which moves the paper past the thermal print head. A print head release mechanism lifts the head away from the roller to assist in initial paper loading.

The Echotrac's printed chart paper is taken up on a take-up spool behind the paper access door at the far left of the chart panel. The motor that drives the take up spool does not advance the paper, as is the case in some echo sounders. Movement of paper across the print head is accomplished by the stepper motor. In this configuration, previously printed chart can be pulled from the take up assembly for review and simply re-wound without disturbing the recording process.

Loading Paper Procedures:

1) Open and remove the plexiglass chart door. The door is opened by pulling on the handle at the left side of the door and is removed by lifting up on the hinged side.

2) If paper has been previously installed in the unit, place the power switch in the STANDBY position. Press the CHART FEED switch until sufficient paper has been advanced to clear any previously recorded data. Cut the paper at some point after the recorded data and press the Chart Take-up switch. This will allow the take-up mechanism to wind up the recorded chart.

3) Locate the print head release lever on the right side of the print head. Move the lever to the right in order to lift the print head away from the roller.

4) To gain access to the supply roll turn the supply side door release lever located on the lower right side of the chart panel counter clockwise and pull the door open.

5) Remove any remaining paper from the paper path and remove the spent supply roll from the holder mechanism by grasping the core and pushing it to the left and pulling out.

6) To gain access to the take-up roll turn the take-up door release lever located on the lower left side of the chart panel clockwise and pull the door open.

7) Remove the take-up roll by grasping it, pushing it to the left, and pulling out. To remove the old paper from the take up spool, spin the take-up spool in the opposite direction the paper is wound onto the take-up spool. Remove the plastic end cap using a twisting motion and pull the paper off.

***To Install a Fresh Paper Supply Roll**:*

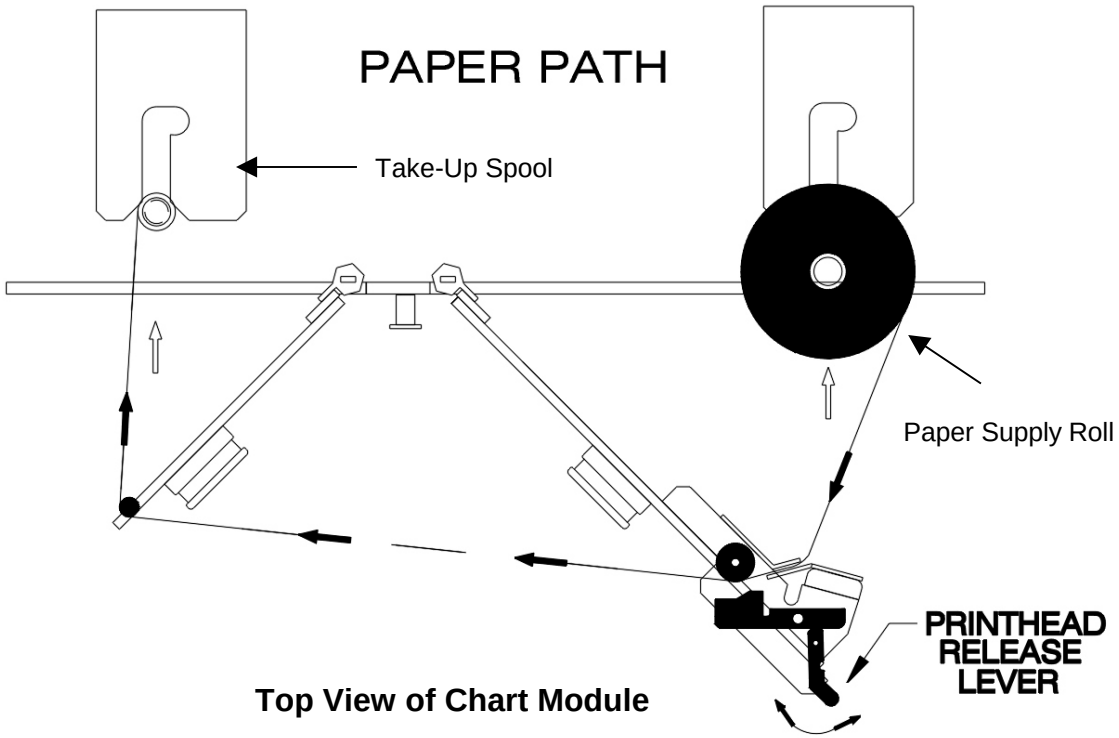
8) Remove the source paper ends from the spent core and insert them into a new paper supply roll.

9) Insert the roll in the slots until it reaches the end and shift to the right, locking into place. Make sure the paper is feeding from the right side of the roll.

10) Thread the paper past the print head and towards the take-up side as indicated in the paper path drawing.

11) The paper can be attached to the take-up spool either with a small piece of tape or by inserting the paper in the slot of the take-up spool. Inserting the paper in the slot requires folding up the edges of the paper. Replace the end cap to the take up spool and insert the take-up roll into the chart the same way as the supply roll.

12) Close both doors and press the feed button until the paper is aligned. Close the print head release lever. Now the unit is ready for normal operation



Top View of Chart Module

2.2 Transducer Installation

Proper mounting of the transducer is a crucial part of the installation of any "survey" echo sounder. An improperly mounted transducer will result in poor system operation and unacceptable data quality.

2.2.1 General Rules

In the case of temporary installations, the transducer may be mounted over-the-side. In permanent installations and “class 1 surveys", hull mounts are generally preferred and often required. In either case, transducers should be mounted at least 0.3 meters below the waterline. In cases where "over-the-side" mounts are exposed to wave action, ensure that the transducer is mounted sufficiently deep so that it does not break the surface during vessel roll motions.

A preferred mounting location is near the keel of the vessel, in an area where the planning attitude of the hull at speed, and the pitch and roll angles of the vessel in seas, have the least effect. The transducer should be mounted far enough aft of the bow so that bubbles generated by the bow wave will not pass over the face of the unit. Transducers should be located away from sources of turbulence and cavitation bubbles such as propellers, bow thrusters and hull protrusions. Considerations should also be given to sources of mechanical noise generated within the vessel (engines, props, pumps, generators, etc.). In some severe cases of mechanically coupled noise, vibration-isolating mounts may be required to decouple the transducer from the hull.

Transducer mounting can be accomplished in many different ways. To follow is a list of common configurations:

2.2.2 "THROUGH HULL" Installation

The topside of the transducer is accessible from inside the vessel while the transducer face is directly exposed to the water. Care should be taken to protect the transducer from damage and turbulence by installing a faring with a sloping forward edge ahead of the unit. The faring has the dual effect of both minimizing possible strike damage and smoothing the flow of water over the face of the transducer.

2.2.3 "SEA CHEST" Installation

In a "sea chest" mount, a fluid-filled enclosure, large enough to contain the entire transducer, is attached to the outer hull of the vessel. The outer hull is removed within the area of the chest and replaced with an acoustically clear "window", which is mounted flush with the hull immediately below the chest. Depending on construction, the material selected for the acoustic window, and the draft of the vessel, access can often be gained to the transducer from inside the hull without putting the vessel in dry-dock. In most installations, a water-filled standpipe is incorporated into the "sea chest" design in order to provide hydrostatic pressure equalization. Transducer cables generally leave these assemblies through “stuffing tubes” that are designed to maintain the watertight integrity of the chest.

2.2.4 "OVER-THE-SIDE" Transducer Installation

A temporary mount of this type is frequently constructed by welding a length of pipe to a flat plate that has been drilled to accommodate the mounting points of the transducer. This length of pipe should be chosen so as to position the transducer well below the waterline. A sturdy support on the vessel should be selected for the attachment point of the pipe. Guy lines are usually attached at the transducer plate and run fore and aft to tie-points on the gunnels. The guy lines and topside fixing point help to maintain a stable, horizontal transducer attitude. Care should always be taken to assure adequate protection for the transducer cable, particularly at the point where the cable leaves the transducer body.

2.2.5 “HULL MOUNT” Installation

Transducers which are “streamlined” and can be mounted directly to the outside of the hull or transducers which are fitted into a streamlined fairings that are welded or otherwise attached to the outside of the hull, often make for excellent installations. The advantage here is that the radiating face of the transducer is generally below the “bubble stream” in clear water and no acoustic window or transducer tank is involved to create extra reverberation (ringing). This type of installation requires a stuffing tube to be installed in the hull in order to allow the transducer cable to penetrate the hull.

In all of the above installations particular care should be taken to assure that the transducers radiating face remains as nearly parallel to the water surface as possible while the vessel is underway.

2.3 Echotrac MKIII Cable Connections

2.3.1 Serial 1

Serial 1 is the main communication port to and from the Echotrac MKIII. Use this port to receive depth values, send annotation information, change parameters, and to upgrade the firmware.

Connector PN:	Pin Number	Signal Description
DB9 Male	2	Transmitted data from Echotrac MKIII
	3	Received data to Echotrac MKIII
	5	GND

2.3.2 Serial 2

Serial 2 is used for connecting a remote display to the Echotrac MKIII. Serial 2 is the only port that can be configured as either RS232 or RS422.

Connector PN:	Pin Number	Signal Description
DB9 Male	2	Transmitted data from Echotrac MKIII
	3	Received data to Echotrac MKIII
	5	GND

2.3.3 Serial 3

Serial 3 is used for interfacing a positioning system to the Echotrac MKIII. The Echotrac MKIII will read NMEA GLL or GGA sentences though this port.

Connector PN:	Pin Number	Signal Description
DB9 Male	3	Data from the positioning system to the Echotrac MKIII
	5	GND

2.3.4 Serial 4

Serial 4 is used for interfacing a motion reference sensor to the Echotrac MKIII. The Echotrac MKIII will read the TSS1 string through this port.

Connector PN:	Pin Number	Signal Description
DB9 Male	3	Data from the motion sensoro the Echotrac MKIII
	5	GND

2.3.5 GPS In

GPS In is only used when the Echotrac MKIII has a built in GPS unit. If the Echotrac MKIII has a built in GPS then this is the configuration port for the GPS or can be used to input external RTCM correction to the GPS.

Connector PN:	Pin Number	Signal Description
DB9 Male	2	Transmitted data to the Internal GPS
	3	Received data from the Internal GPS
	5	GND

2.3.6 GPS Out

GPS Out is only used when the Echotrac MKIII has a built in GPS unit. If the Echotrac MKIII has a built in GPS then this is the output port for the GPS data.

Connector PN:	Pin Number	Signal Description
DB9 Male	2	Transmitted data to the Internal GPS
	3	Received data from the Internal GPS
	5	GND

2.3.7 VGA

VGA is only used when the Echotrac MKIII has an LCD module in place of the printer. The VGA connector also the user to connect a monitor the Echotrac MKIII to see the same data that is in the LCD display.

Connector PN:	Pin Number	Signal Description
VGA Male	1	Red
	2	Green
	3	Blue
	4	ID2
	5	GND TEST
	6	GND
	7	GND
	8	GND
	9	NC
	10	GND
	11	ID0
	12	ID1
	13	HS
	14	VS
	15	ID3

2.3.8 LAN

The LAN connection is the Ethernet port for the Echotrac MKIII.

Connector PN:	Pin Number	Signal Description
10BASE-T	1	TX +
	2	TX -
	3	RX +
	6	RX -

2.3.9 Aux

The Auxiliary port is used for acquiring the analog signal from the Echotrac MKIII.

Connector PN:	Pin Number	Signal Description
MS3116J10-6P	A	External Mark Input
	B	External Trigger Input
	C	TxRx or Start Signal
	D	Reply signal for low frequency
	E	Reply signal for high frequency
	F	GND

2.3.10 TX1

TX1 is the main transducer connection port for the Echotrac MKIII. If using Odom Hydrographic Systems, Inc. normal dual frequency transducer or a signal frequency transducer connect the transducer here.

Connector PN:	Pin Number	Signal Description
MS3116J14-5P	A	Shield
	B	High Frequency
	C	Low Frequency
	D	Low Frequency
	E	High Frequency

2.3.11 TX2

TX2 is used when there is a separate low frequency transducer from the high frequency transducer. The low frequency transducer is connected here.

Connector PN:	Pin Number	Signal Description
MS3116J14-5P	A	Shield
	C	Low Frequency
	D	Low Frequency

2.3.12 DC

The DC connector is used to supply DC input power. The range of the DC power is 18-30 VDC.

Connector PN:	Pin Number	Signal Description
MS3116J12-3S	A	+ 24 Volt DC
	C	GND

2.3.13 AC

The AC connector is used to supply AC input power. The range of the AC power is 100-230 VAC, 50-60 Hz. The Echotrac MKIII power supply automatically senses the input range and adjusts to it.

3 QUICK START OPERATING PROCEDURES

The Echotrac MKIII is designed to operate with minimal operator input yet still provide the flexibility required by a wide range of survey conditions.

1. With the unit's front panel power switch in the OFF position, confirm that the Power (either AC or 24VDC), Transducer and Computer cables are properly connected at the rear of the unit.

2. Check that sufficient chart paper is loaded for the survey at hand.

3. Turn the Power Switch from the OFF position to Stby. and confirm that the LCD display comes on showing first the Sign-on Message, and is followed shortly by display of the SYSTEM Menu. The printer should also print the Sign-on message.

NOTE: Should you feel that a return to the sounder's default parameter values is called for, then select the Default Reset parameter in the SYSTEM menu and press Enter.

4. Depending on water depth and bottom type, set the Tx Power switch to mid-range (position 6).

5. Turn the RxGAIN potentiometer to the 12 o'clock position.

6. Switch POWER to ON. The unit should print the "Key" parameters.

7. Adjust RxGAIN and TxPOWER to get a clear strong record with few alarms on the displayed depth or printed on the chart.

4 CHART RECORDER CONTROLS

Controls are located on the right-hand side of the Chart Panel and include the following:

- **ON/OFF**
- **FEED**
- **TAKE-UP**
- **LIGHT Up/Down**

4.1 ON/OFF

The panel-mounted micro-switch toggles the chart recorder ON and OFF. The status of the recorder is indicated by the Chart LED (and of course active printing) in the ON position. Selecting the OFF position disables printing only, the MKIII continues to sound and the Digitizer continues to function outputting digital depths.

4.2 FEED

Pressing the CHART FEED switch fast-advances blank paper from the printer. This feature is convenient in loading paper on the re-winder, but is often used to advance blank paper to make room for hand annotation.

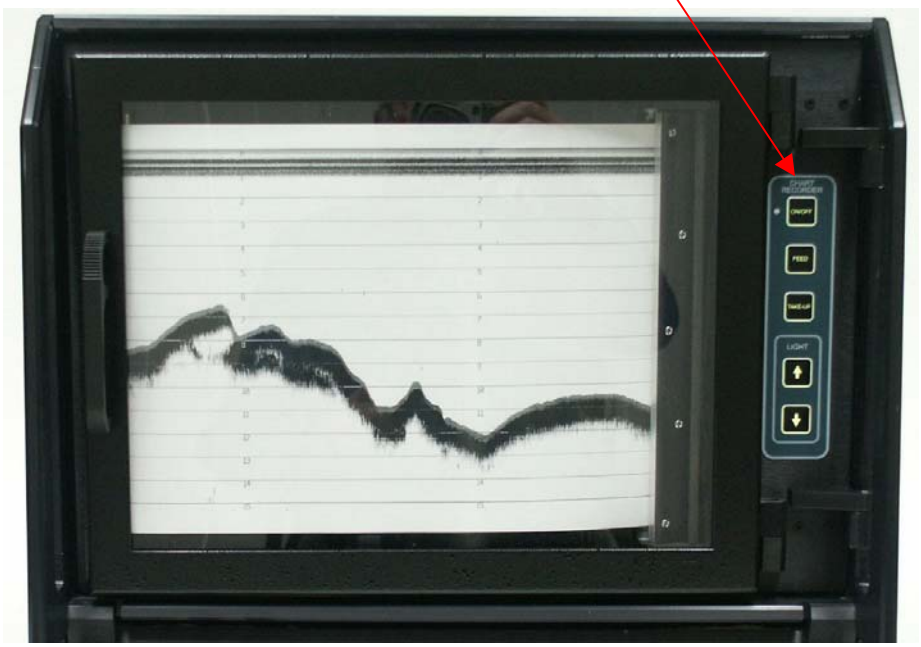
4.3 TAKE-UP

The CHART TAKE-UP push-button switch activates the fast take-up feature of the chart take-up drive assembly and is most often used while changing paper.

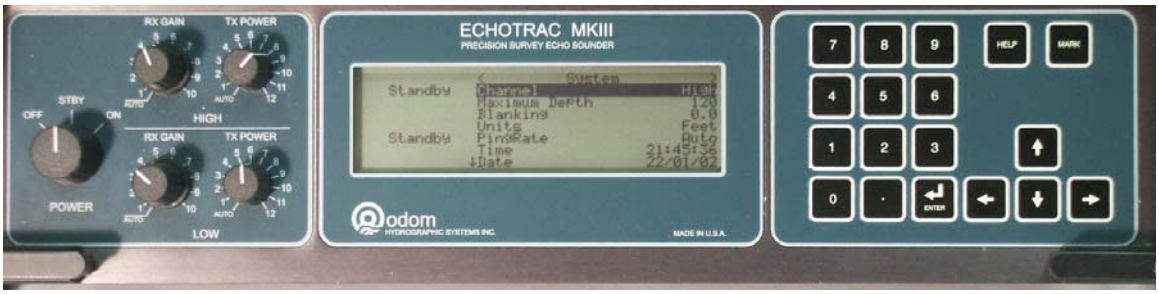
4.4 LIGHT

The UP and DOWN arrows should be pressed to either increase or decrease the brightness of the Chart Illumination LED's.

Chart Controls



5 DISPLAY PANEL CONTROLS



MKIII Display Panel

5.1 Operator Controls and Parameter Entry System

The Echotrac MKIII provides the operator with complete access to all system parameters and variables via front panel mounted controls. These controls are divided into two major groups:

- Conventional ANALOG controls (knobs)
- PARAMETER ENTRY SYSTEM consisting of the LCD Display and Keypad

Fig 5.2 - Analog Controls

5.2 Analog Controls

Front panel mounted knobs and switches control the following sounder functions:

- POWER to the unit's internal regulated supply
- GAIN to the receivers on both High and Low channels
- TRANSMITTER power output of both High and Low channels

Power, RxGain and TxPower

5.2.1 POWER

The POWER switch is located on the lower left-hand side of the Display Panel and has three positions: OFF, Stby, and ON.

5.2.1.1 OFF

The main power switching circuitry is open in this position. Please note that the MKIII switches automatically between AC and DC operation when an appropriate source of power is applied to the unit. Should both AC and 24VDC be applied to the unit at the same time, the MKIII will automatically favor the 24VDC supply.

5.2.1.2 STANDBY (Stby)

The main power circuitry is energized, drawing current from the mains and providing regulated DC voltages to all internal modules.

On "power-up", the unit performs a Self-test to check system memory and also tests the Non-volatile RAM battery voltage. Test status is displayed in the LCD. The software versions for all of the processor boards are then displayed.

The unit does not enter the sounding mode in the standby position. However, the Parameter Entry System is enabled.

5.2.1.3 ON

The unit enters the sounding mode and begins data acquisition.

5.2.2 Transmitter and Receiver Controls

Separate Transmit and Receiver Gain controls are dedicated to each channel. Independent control of both High and Low frequency channels is necessary in order to optimize the operation of the sounder in varying conditions. Traditional analog controls using knobs instead of menu item adjustments are employed to make adjusting the amplitude of the transmitted pulse and the gain of each channel instantly available to the operator. Although the controls maintain the look and feel of traditional analog devices, the actual output of each rotary switch and pot is digitized before being fed to its associated transceiver module.

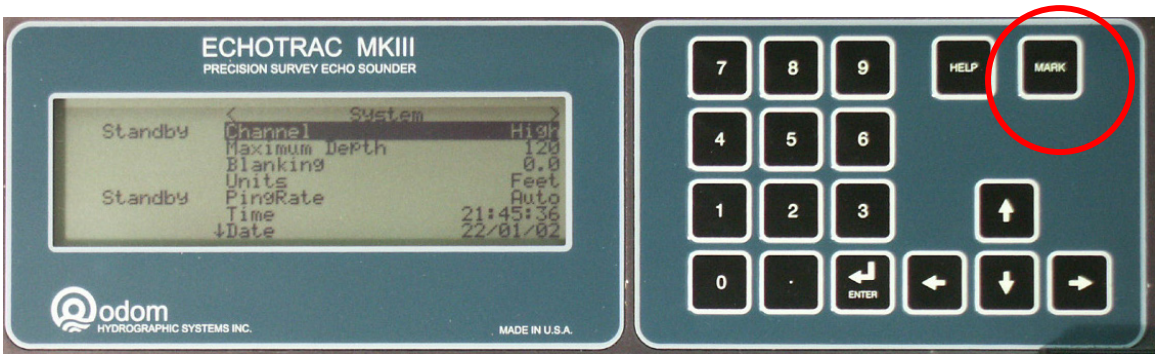
5.2.2.1 RxGain

The RxGain or sensitivity control adjusts the amount of attenuation or amplification applied to the return echo. Covering a range of approximately -20dB gain (20dB of attenuation) at the minimum position to +40dB gain at the highest position, the selected amount of gain or attenuation is applied in addition to the internal automatic TVG (time varied gain). In the **Auto** position, the amount of amplification or attenuation to be applied to the return signal is determined by the Digital Signal Processor. Located inside each transceiver module, the DSP attempts

to keep the bottom return at between 80 and 90 percent of full scale without allowing the signal to be over amplified and to saturate the receiver (resulting in clipping).

5.2.2.2 Tx Power

The amplitude of the transmit pulse applied to the transducer is set using the Tx Power control. Thirteen positions (AUTO and 1 - MAX (12)) allow for fine adjustment to suit varying conditions of water depth and bottom reflectivity. In the AUTO position, the transceiver DSP automatically adjusts TX POWER based on the Maximum Depth parameter. The 12 manual positions cover the full range of the TX POWER in even increments. The “1” position represents minimum power while the “12” position corresponds to full transmit power (up to 2,000 watts in low frequency).



5.2.3 MARK

Found near the upper right corner of the display panel, activation of the MARK push-button switch results in an event mark being printed on the chart record. A parallel circuit is located on the Auxiliary (Aux) Connector on the rear panel of the MKIII. A remote mark switch that supplies either a contact closure or a closure to Gnd. via the Aux connector will result in a Fix Mark on the chart as well. Annotation of the Fix Mark is controlled by the Annotation parameter.

The Mark button can also be used to reset the Echotrac MKIII incase the user can not select the reset parameter from the System Menu. To reset the Echotrac MKIII turn the power switch from OFF to STBY while holding down the Mark button.

5.3 Parameter Entry System

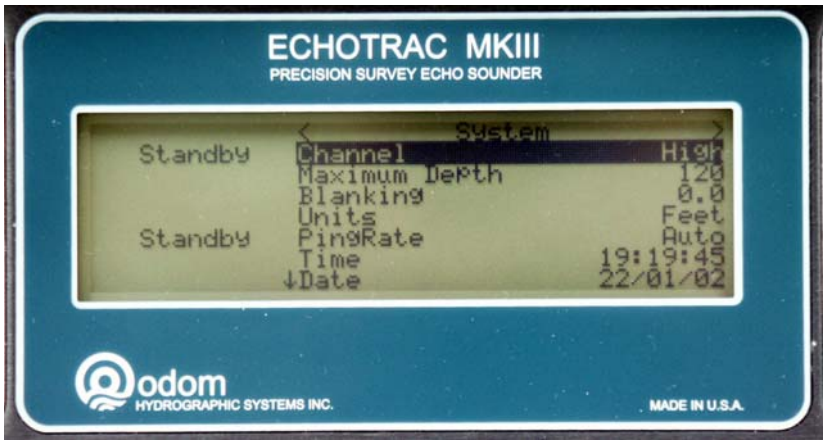
Parameter values are changed by accessing one of the six menus available on the LCD display. Changing between menus is accomplished using the right and left arrow keys located in the right side of the Display Panel. Selection of a particular parameter is made using the Up and Down arrow keys and the Enter Key.

Example: Change the Blanking value.
Using the Left or Right arrow key, scroll across the display until the System menu is displayed.
Press the Up or Down arrow key through the parameters until Blanking is displayed in “reverse video”.
Press the Enter key.
This puts the unit in the parameter change mode. At this point, the value for blanking should be displayed in blinking “reverse video”.
Slew the individual digits up or down, or enter a new value using the keypad.
Press the Enter key again to exit the parameter change mode.

HELP can be obtained for any parameter by highlighting the parameter and pressing the **HELP** key. A description of that parameter will be printed on the chart.

5.3.1 System Menu

The **System** menu contains parameters that are most frequently accessed during normal operation.



5.3.1.1 Hi Channnel

Select whether the high frequency channel is turned on and whether the type of data is bathymetry, side Scan port or side scan stbd.

5.3.1.2 Low Channel

Select whether the low frequency channel is turned on.

Note: Turning both channels on does not automatically change the serial output to DBT (dual bottom tracking). Changing the output string requires selecting the new configuration in the Communications menu.

5.3.1.3 Maximum Depth

This is the most extreme depth to which the tracking gate will be expected to expand in a search for valid return echoes. Limiting the Maximum Depth value to one that is not much larger than the deepest expected water depth in the work area, will enable the sounder to acquire the bottom more quickly. The default value is 45m or 150ft.. Minimum values are 10m and 15ft.

5.3.1.4 Blanking

Blanking is used to mask the transmit pulse, transducer ringing, or any other unwanted acoustic returns in the upper water column, from the digitizer. It is used when these returns could be mistaken as bottom echoes or when the operator needs to force the sounder to "see below" an interference layer. The value is entered as the distance from the water surface and is indicated on the chart as a solid black line printed at the selected depth. The default value for Blanking is “0” while the value can be increased to the Maximum Depth value.

5.3.1.5 Units

The operating measurement units of the sounder (feet or meters) can be changed at any time. Once the new unit of measure is selected and changed, all current parameters are reset to the default values appropriate for the new unit of measure.

5.3.1.6 Ping Rate

This parameter refers to the pulse repetition rate of the sounder. The default is AUTO, that is, the sounder "pings" as rapidly as possible as dictated by the end of scale value, the velocity of sound and a certain amount of processor overhead time. Selection of a fixed number of soundings per second from a minimum of 1 per second to a maximum of 20 per second is also possible.

5.3.1.7 Time and Date

Enter the current local time and date or the time and date at a reference point (GMT) using these parameters. The MKIII leaves the factory programmed for US CST.

In order to change the time, select the Time parameter and press the Enter key. Each digit is individually addressed starting with the second’s digit. Slew in the proper value for each digit (example 11:20:00) and press the Enter key again. The new time will be stored immediately and an updated time will appear in the display.

A new date is entered by selecting Date***,*** entering the proper values for day, month, and year (dd mm yy) and pressing ENTER. Please note that the unit’s internal calendar keeps track of the correct number of days in the month as well as compensating for leap years.

5.3.1.8 Min. Depth Alarm

Any digitized depths less than this value will activate the sonic alarm. This facility is most often used to warn the operator that a hazard to navigation exists.

5.3.1.9 No Echo Alarm

Turning this parameter “On” will make the Sonic Alarm indicator beep with every missed ping. This can serve to alert the operator to circumstances affecting the way the sounder is working. The alarm is disabled by turning the parameter “Off”.

5.3.1.10 Brightness

As one would expect, the illumination level of the backlight devices for the Keypad and LCD display are varied using the Brightness parameter. High, Medium, Low and OFF positions are available.

5.3.1.11 Language

All menus are available in English, Spanish, and German. Default is English

5.3.1.12 Default Reset

Selecting the Default Reset parameter and pressing the Enter key causes the display of the following message:

Press ENTER to reset
all parameters to default settings.
Press any other key
to cancel.

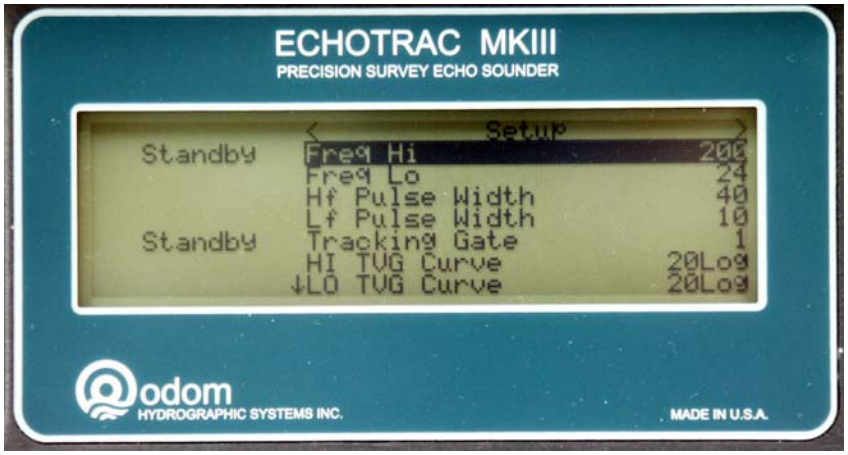
Follow this procedure if you wish parameters to be returned to factory settings. Please be aware that all parameters, even those that the operator has modified, such as Draft and Velocity, will be returned to factory values.

The Default Reset is the initial step to take should something inexplicable change in the operation of the sounder. Although every effort has been expended to guarantee seamless data flow among the processors in the MKIII, as in any multi-processor environment the possibility exists for one to lose “Sync” and cause the sounder to “act differently”.

5.3.1.13 Trigger

The two possibilities here are “Internal” and “TTL”. Default operation is Internal, whereby the sounder “Pings” at its own rate as determined either by the water depth or the Ping Rate parameter. Once the “TTL” parameter is chosen, the sounder will not “Ping” (transmit) until a falling edge is sensed at the Sync. input pin of the AUX connector. At that point, the MKIII will Ping one time, go through its normal receive cycle, and then wait to receive another falling edge. This synchronous mode is usually chosen in order to inhibit the MKIII from transmitting during the receive period of other acoustic devices aboard ship.

5.3.2 Setup Menu



5.3.2.1 Freq. Hi

Determine the frequency of operation of the High Channel here. Once the parameter value is selected, pressing the up or down arrows slews the transmit frequency in 1kHz. steps.

This feature should be used in order to get the best match between the sounder's transmit frequency and the transducer's frequency response. Characteristics to look for are excessive ringing of the transmit pulse and/or low amplitude of the bottom return. **NOTE:** Modifying the transmit frequency should only be attempted in a relatively controlled environment, one where the results of a step change (which of course affects both the transmit pulse and the return echo) can be monitored on the Chart Recorder.

5.3.2.2 Freq. Lo

As in the High Channel, the frequency of operation can be changed on the Low Channel as well. Principals which apply to the High Channel apply to the Low Channel also. If anything, the proper adjustment of the low frequency is more critical than that of the high. In particular, the amount of transmit ringing can directly impact the minimum depth to which the sounder will operate. Having the ability to adjust the transmit frequency to the particular transducer so that it produces the least amount of spurious oscillation, or ringing can truly optimize the sounder for a particular installation. It may also mean the difference between using an existing transducer installation or replacing it with another transducer.

5.3.2.3 Hf and Lf Pulse Width

Modifying the High Frequency or Low Frequency Pulse Width parameters results in a change to the number of cycles of the transmit signal applied to the transducer. The numerical values shown correspond to the actual number of cycles transmitted. For example, if the "***Freq. High***" Channel is set to 200, and the ***HF Pulse Width*** is set to 2, then 2 cycles of 200kHz signal (10µsec.worth) is transmitted.
A rule of thumb is, in shallow water use as few cycles as you can get by with, while in deep water use as many as it takes! Taken together with the Tx Power control setting, pulse width directly influences the total amount of acoustic energy generated.

5.3.2.4 Tracking Gate

Definition of the Parameter Value: The value entered under the Tracking Gate parameter is equal to the number of samples used to compute the moving average of return values. The default value for firmware version 2.07 and later has been changed from 3 to 1. A value is 3 and we find that value to be a good compromise between turning the averaging off (value of 1 or raw data) and working with highly "smoothed data" (value of 10).
Tracking Gate Operation: In normal operation, the DSP dedicated to each channel analyzes all returns within the dynamic tracking gate in order to qualify each as either a valid bottom return or a spurious echo. Among other tests, the DSP checks that the signal exceeds a certain threshold in amplitude and is at least as long in duration as the transmit pulse.

On the first sounding cycle, the tracking gate is open to its widest limits. The gate begins at the ***Blanking*** value and ends at ***Maximum Depth***. Each return within this wide-open gate is processed and compared against the bottom determination criterion. Once a return is determined to be the bottom, on each successive ping the gate is narrowed to a minimum width as determined by the water depth. Thereafter, only valid returns inside the gate are eligible for digitization. Once no valid return is found within the gate the opposite process takes effect, the gate begins to widen at a predetermined rate until either a valid return is recognized or it reaches the limits imposed by ***Blanking*** and ***Maximum Depth***.

5.3.2.5 Hi and Lo TVG Curve

Multiple TVG curves are programmed into each of the unit's transceivers. The 20Log Time Varied Gain curve is the generally accepted standard in single beam vertical echo sounders and the default value for the MKIII. The 20Log curve includes compensation for both spherical spreading loss and absorption losses. The 40Log curve is the standard for use with the Side Scan option while a 30Log curve is also made available for special conditions. The 10Log scale is intended for use in calibration (bar checks). The Manual parameter is intended for use in very shallow water applications where the special shallow water transducer is employed. Once Manual is selected, no TVG is applied to the signal so the Rx Gain setting becomes the sole controlling factor over receiver gain.

5.3.2.6 Hi and Low Step Interval

Hi and Low Step Interval set the initial starting point and then the update interval of the TVG Curve. Small increments, such as 0.25m (the minimum) mean that for instance, the 20Log curve applied to one channel would begin at 0.25m after the transmit pulse and that the curve would be implemented every 0.25m afterward until the maximum level of the curve is reached. Selecting a larger increment, say 1.0m means the curve starts later and extends longer (to a greater range). The maximum value of 8 translates to a curve beginning at 8 meters and continuing to its maximum level at a very large water depth (over 9,000m).

This additional control over the TVG curve allows the operator to optimize the receiver characteristic to the specific survey condition.

Shallow Water Application Example: If for instance, the transducer connected to the MKIII is installed in a sea chest, and because of the construction of the chest the transducer rings excessively, then the operator might increase the Step Interval to 0.5m to allow some of the ringing to decay before the TVG curve begins.

Deep Water Application Example: In areas of high volume reverberation and long ranges to the seabed, the operator would generally want the TVG curve to reach its peak at about the same time as the signal is completing its round trip from the source to the seabed and back to the receiver. This could be accomplished by selecting a larger value for Step Interval.

5.3.2.7 Threshold

This parameter sets the digitizer threshold. The digitizer will only detect the signal at the point it exceeds the percentage entered. The default of 25% is the threshold that can be seen on the paper chart. Use a higher value to detect a hard bottom in sea grass conditions. When set to none the digitizer will detect the signal with the highest energy. Use this setting in very deep depth conditions.

5.3.2.8 Min. Gate Width

The digitizer maintains a tracking gate that changes from ping to ping dependant on water depth and number of pings inside the gate. This parameter is the minimum gate width that the digitizer sets once it has received a number of good returns. The value entered is the percentage of water depth. Use a lower percentage for smooth bottoms and use a larger percentage for rapidly changing bottom where the bottom might move outside the tracking gate.

5.3.2.9 Skip Alarms

This parameter buffers the most recent valid bottom detection and will continue outputting that value through the serial port to the data acquisition software for the number of sounding cycles selected. When a value of 0 is entered the Echotrac will output a zero if it does not detect a valid return. This parameter is useful when the digitizer is having a difficult time detecting the bottom due to noise in the water column and the operator does not want to edit the resulting spikes in the data acquisition software.

5.3.2.10 Subbottom TVG

This parameter is used in areas with a lot of silt where the low frequency is having trouble getting a signal return from the hard bottom. The high frequency channel is used to determine the top of the silt layer which is sent to the low frequency board. The subbottom TVG parameter is then used to increase the gain to the low frequency board in 1db/meter steps beginning where the silt bottom starts. This has the effect of compensating for the increased loss of signal in the silt layer. Use the SB TVG Range parameter to limit the duration of the increased TVG gain so the second return is not amplified as well.

Using this parameter depends of having the high frequency reliably tracking the top of the silt layer.

To use this parameter set the MKIII to transmit dual frequency. Set the gain for the high frequency to Auto. As an initial step set the Subbottom TVG to a value of 3. Set the gain knob for the low frequency channel so that the top of the silt layer is not visible but the hard bottom is visible. Do not use the Auto gain for the low frequency channel. If the signal from the hard bottom is the same amplitude or weaker than the hard bottom increase the Subbottom TVG parameter. If the signal from the hard bottom is very strong and the signal from the silt bottom is still visible lower the gain setting.

5.3.2.11 SB TVG Range

Limits the duration of the Subbottom TVG parameter so that the second return is not amplified. The value entered is in meters or feet depending on the units used.

5.3.2.12 Pre Amp Gain

This parameter controls the gain to an optional signal interface card in the Echotrac MKIII. This gain does not affect the normal MKIII receiver.

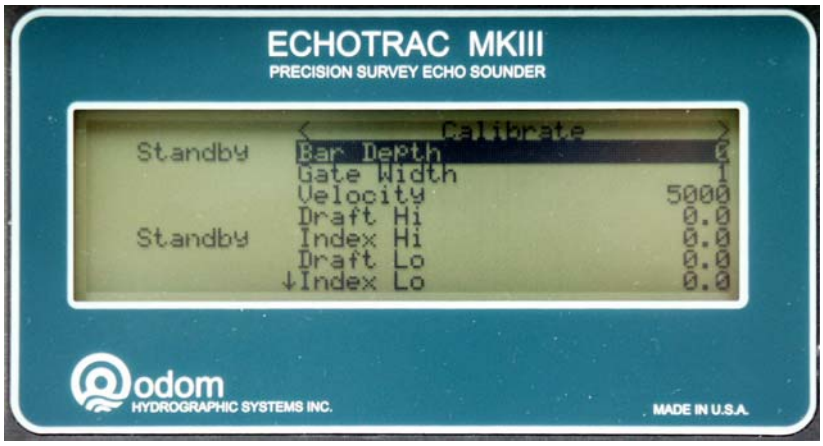
5.3.2.13 Missed Returns

Sets the number of returns the digitizer must miss before it starts expanding the gate. A value of 1 will cause the digitizer to react very quickly and 50 will cause the gate to react very slowly.

5.3.2.14 Mode

Only Echotrac CV2 and CV3 firmware 3.24 and higher support this feature. In regular Echotrac Mode the Echotrac CV will operate as a normal echo sounder. In Sub-bottom mode the Echotrac CV will output a large Low Frequency packet with 3200 samples, which is used for sub-bottom profiling. Some application may not be set-up to receive this large data packet.

5.3.3 Calibrate Menu



5.3.3.1 Bar Depth

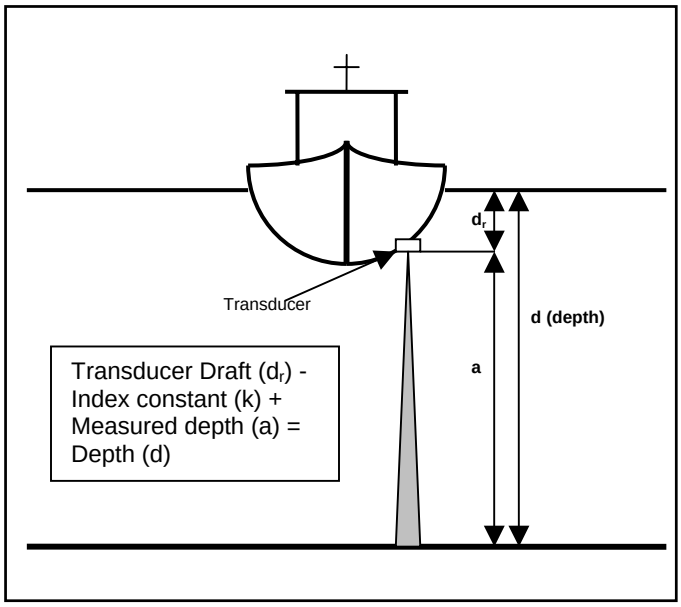
Sets the center of the digitizer's tracking gate to the depth entered. Once the expected depth of the bar is entered, the digitizer will only "see" the area defined by the Gate Width parameter (see below). As an example: Lower the bar to a depth of 5 meters, select Bar Depth and enter a value of 5m. Assuming the bar is within the ensonified cone of the transducer, the digitizer should lock on to the bar and ignore the return from the seabed. This parameter is used exclusively during bar check calibrations.

5.3.3.2 Gate Width

Used in concert with Bar Depth, Gate Width tells the digitizer how much of the water column to examine for a return from the bar. Centered about the Gate Depth value, its width should be selected in order to enable the digitizer to see the bar and only the bar. The value should not be so large that a bottom return or another reflector in the water column is included within the gate.

5.3.3.3 Velocity

This parameter sets the velocity of sound in water in feet or meters per second, as determined by the Units parameter. When modified, the new value is incorporated into the depth calculation formula immediately so that on the next ping the new depth resulting from the change can be seen on the chart and display. See calibration procedures 'bar checks' *(section 6.3).*



5.3.3.4 DRAFT and INDEX Hi and Lo

Draft is the correction value added to the measured depth to adjust for the difference between the depth of the transducer and the water's surface ($a + d_r - k$) where: "a" is the measured depth and "d_r" equals the draft (depth of the transducer below the water surface). Index constant "k" is system delays originating in both transducer and echo sounder circuitry. In the accompanying illustration, "d" is equal to the depth of the seabed below the water's surface.

Note: Many users may not be familiar with the parameter “Index” or “k”, although it is likely that they have seen the results of combining transducer draft and index constant into one draft figure. If you have noticed that the measured draft, or the distance from the face of the transducer to the water’s surface is not the same as the draft value entered into the sounder, then you have seen the result of lumping both together. This phenomenon is most evident when using dual frequency transducers where both high and low elements are in the same housing.

Often, the draft values are very different for the two frequencies if no adjustable “k” parameter is incorporated. The difference in “k” or electronic delay between a 200 kHz element and a 24 kHz array is substantial, and is the reason behind the difference between the two “Calculated Drafts”.

Once the “k” value is determined, it will not change until either the sounder or the transducer is changed. The Index parameter should be adjusted to make the measured draft and the calculated draft equal.

In the dual frequency MKIII, two DRAFT and INDEX values are required in order to compensate for possible separate locations of the high and low frequency transducers. As one would imagine, ***DRAFT HI*** and ***INDEX HI*** compensate for the high frequency channel and ***DRAFTLO*** and ***INDEXLO*** compensate for the low frequency channel. Depth is computed according to the General Formula shown below:

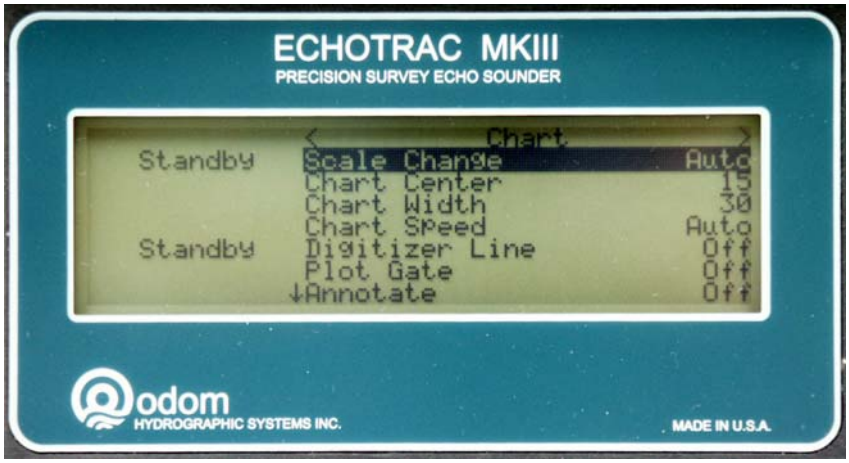
$$d = ½ (v * t) - k + d_r$$

d = depth from water's surface
v = average speed of sound in the water column
t = measured elapsed time of signal travel from transducer to seabed and back to the transducer
k = system index constant
d_r= difference from referenced water surface to transducer (draft)

5.3.3.5 Hi Channel and Low Channel

Select which channel (either High or Low) to calibrate using this parameter during calibration. Since only one channel or frequency can be calibrated at a time, and the Channel parameter resides in the System menu, an easier method of selecting which Channel to transmit had to be devised. The addition of another Channel parameter in the Calibration menu eliminates having to switch between menus during calibration. The Channel parameter in the Calibration menu is valid only during calibration.

5.3.4 Chart Menu



5.3.4.1 Scale Change

In ***Auto*** the digitizer is in an automatic scale change (auto phasing) mode. Auto is selected when the operator wants the MKIII to acquire the bottom and to automatically adjust the printed scale so that bottom returns always remain visible on the chart. In Auto, should the digitized depth approach either scale limit, a new scale center is computed which will place the bottom (digitized depth) at a point either 10%, 20%, or 30% of the way into the chart display area. This 'overlap' is necessary to prevent redundant scale changes in areas where the bottom varies near either edge of the chart. ***Auto 20%*** is the default and desirable in most bottom conditions. ***Auto 10%*** would be selected where steep banks or drop-offs cause rapid scale changes and use of as much of the chart as possible is desired. A 30% overlap would be used where deep subbottom data is being produced and one would wish to have the Scale change before possibly cutting off any subbottom data at the end of scale. Auto Scale changes are noted on the chart by the printing of solid vertical black lines.

In ***Manual*** the digitizer is constrained by the ***Chart Width*** and ***End of Chart*** values regardless of depth. It is therefore quite possible in Manual mode to lose both digital and printed return data altogether, since the depth can easily change to the point where the bottom will be out of range of the manual scale limits. Manual is most often used to eliminate unwanted automatic scale changes that can occur in very noisy conditions and where the limits of bottom depth changes are well known.

5.3.4.2 End of Chart

As the name implies, the ***End of Chart*** parameter refers to the depth value at the end or bottom of the printed record. When the Scale Change parameter is in AUTO mode, the End of Chart value is recomputed each time the digitized depth approaches either the upper of lower scale limit.
End of Chart is used to compute the echo travel time and thereby sets the auto ping rate of the unit.

5.3.4.3 Chart Width

The Chart Width parameter sets up the limits between which return echoes can be plotted on the chart (End of Chart - Chart Width). It is also the parameter with perhaps the most influence over the appearance of the record. One should consider the condition and purpose of the survey when selecting a ***Chart Width*** value. Selection of too small a value and too many scale changes appear. Too high a value and too little detail can be seen. It acts much like the zoom feature on your camera or the graphics program on your computer. “Zooming In” (the equivalent of small chart widths) gets you lots of detail, but makes it hard to see the whole picture.

5.3.4.4 Chart Speed

The thermal graphics printer is controlled by a dedicated microprocessor giving it independence from both the digitizer and front panel processors. The ***Chart Speed*** parameter can therefore move the thermal paper across the print head in measured increments (inches or centimeters) at speeds (1 thru 15 units per second) that are independent of the reply rate of the system. When ChartSpeed is set to ***Auto*** (0), the printer is synchronized to the Ping Rate and prints one line of graphics (one dot row) for every sounding cycle. ***Auto*** therefore provides the

highest sounding print density and best along-track resolution. When using the Deso DDV+C output string, the chart can be turned on or off with the Deso25 Vessel Speed command VS.

5.3.4.5 Digitizer Line

A digitizer confirmation line can be printed on the chart by enabling this function. The line is printed X number of units above the bottom. If the Units are set the Meters and the Digitizer Line is set to 2 then a line will be printed 2 meters above the bottom. The low frequency channel line is twice as thick as the high frequency line to differentiate it.

5.3.4.6 Plot Gate

The limits of the tracking gate can be printed on the chart by turning On the Plot Gate feature. Plotting the gate can be useful in confirming the operation of the digitizer.

5.3.4.7 Annotate

The three choices are available under this parameter:
1) On W Gap
2) On W/O Gap
3) Off

As explained earlier, pressing the Mark switch on the front panel (with Annotation Off) results in a solid line being printed across the chart. Selection of Annotation With Gap or Without Gap results in the printing of the Mark Line plus Date, Time, and Depth (High and Low) when the Mark switch is pressed. With Gap means the printer advances blank chart paper while printing the annotation. This will necessarily interrupt the graphical printing process, but due to the speed of the printer only one or two soundings will be missing from the printed record. This process does not affect the digitizing process so all soundings will continue to be output through the serial port. Should you select the Without Gap parameter, the annotation characters will be printed through the record with those characters printed during the return appearing in reverse shade (white instead of black).

5.3.4.8 Media Type

Paper or Film is the selectable values here. Depending on the type of media used, one would select Paper for “Fax” type thermal paper and Film for high resolution, archival thermal film. The Film setting can also with Paper if the print head is not printing dark enough.

5.3.4.9 Chart Grid

Default is ***Coarse*** while selection of ***Fine*** doubles the number of grid lines printed on the chart. ***Extra Fine*** doubles this number of grid lines an extra time, but this option is only available on the Deso firmware version. This parameter only affects the grid lines when the Units are set to Meters.

5.3.4.10 Print Parameters

Selecting Print Parameters and pressing the Enter key will cause all of the parameters and their associated values being printed on the chart. This feature is ideal for making a permanent record of the conditions of a survey. It also comes in handy as a troubleshooting tool.

5.3.4.11 Grey Shades

When selected to ON the printer will burn the return signal to 16 grey shades based on signal strength. When set to OFF the printer will burn any signal black. The OFF position will display the maximum contrast. If this parameter is changed from ON to OFF the Echotrac will change the setting of Threshold to 10%. This is done so the digitizer value agrees with the printed record since lower amplitude signals will now be visible on the chart. When changing this parameter from OFF to ON the Echotrac will change the setting of Threshold to 25%.

5.3.4.12 Aux Line

Prints a line on the chart that can be used as a transducer draft line, dredge depth line etc.

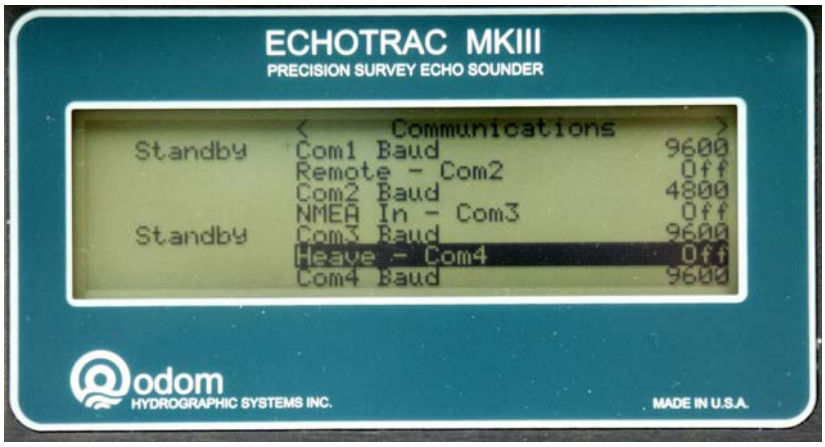
5.3.4.13 Dual Mode

This parameter determines how the data is printed on the chart when both channels are enabled. If Hi Dark is selected then the High frequency data is printed darker than the low frequency data. If Low Dark is selected then the Low frequency data is printed darker than the High frequency data. If High Only is selected then only the high frequency channel will be printed. If Low Only is selected, only the low frequency channel will be printed.

5.3.4.14 Heave Correction

This parameter determines if the data on the chart is corrected for heave if a motion sensor is connected to the Echotrac.

5.3.5 Communications Menu



The status and condition of all four serial ports can be modified or monitored in the Communications Menu.

5.3.5.1 I/O – Com1

Com 1 is the default port for connection to data acquisition systems. Five choices are possible for the standard bi-directional serial port. Out of Com 1 is sent depth data in the following formats:

1) Echotrac SBT, or Single Bottom Tracking
2) Echotrac DBT, or Dual Bottom Tracking
3) DESO 25 format
4) NMEA Out (DBS Proprietary String)
5) NO_COE (New Orleans Core of Engineers)
6) DESO_DDV_C (outputs Depth Draft and Sound Velocity every two seconds with Chart control.
7) DESO_DDV_NOC (outputs Depth Draft and Sound Velocity every two seconds without Chart control.
8) Heave (the depth is not corrected for heave, but the heave value is appended to the end of the output string (see the interfacing section later in this manual).

Refer to the computer interfacing section for details on each string.

Note: Turning on Com 4, the Heave input port, automatically corrects the depth output (SBT, DBT, DESO25 or NEMA) from Com 1, by the amount of the input heave value. Only the designated Heave string outputs the actual value of the heave correction and does not “correct” the depth output for that heave value.

Chart annotation is accepted from the data acquisition system via Com 1’s serial input line. The format should conform to the specifications set forth later in the interfacing section of this manual.

5.3.5.2 Com 1-2-3-4 Baud

Each port’s individual baud rate can be varied using the corresponding Com “X” baud parameter.

5.3.5.3 Remote – Com2

Com 2 is reserved for connection to the Echotrac Remote Display Unit (RDU). Choices are:

1) Off
2) On

Two-way communications between the Echotrac and RDU enables the operator at a remote location to both monitor the recorded depth.

5.3.5.4 NMEA In – Com3

Enabling Com 3 (selecting “NMEA In” in the display) instructs the MKIII to look for a NMEA string on the input of the serial port. The Echotrac will read either the GGA or GLL sentences. It is recommended to set the GPS to output only one of the sentences at a 1 Hz update rate. Outputting too much data to the Echotrac might interfere with the output of serial data. The two choices are:
1) Nmea In
2) Off
Selecting NEMA In causes the MKIII to print the latest Lat./Long available from the connected GPS receiver at each manual Fix mark and output the NMEA sentence out through the Ethernet port.

5.3.5.5 Heave – Com 4

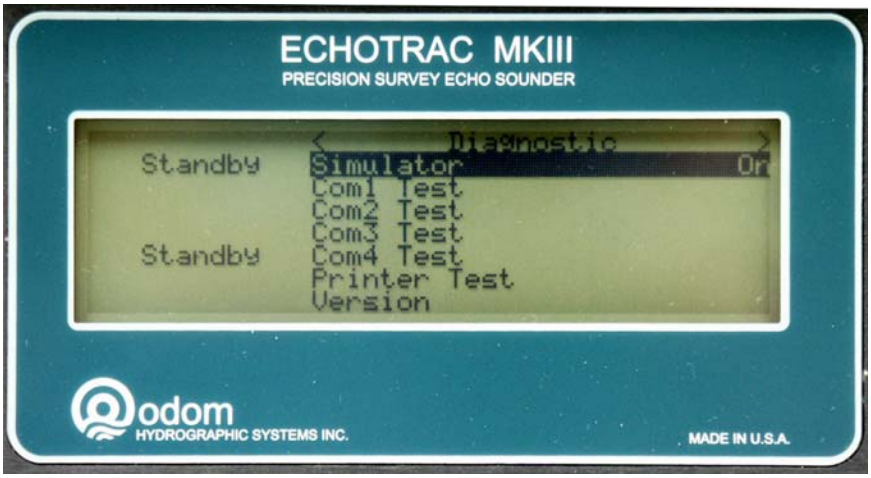
The dedicated Heave input port, Com 4, looks for heave data in the TSS1 (27 ASCII character) format. The two parameter value choices are:

1) Heave
2) Off

Selecting ***Heave*** enables the serial port and causes a thick black line to be printed near the top of the chart.
Upon reading a value on Com4, the “Raw” heave value is printed graphically about the dashed line.
TSS1 is the default string in the TSS line of motion sensors and an optional format from most other motion sensor manufacturers. The string contains heave, roll, pitch, and both vertical and horizontal acceleration values.
Only the value for heave is used in the MKIII to correct for the effects of transducer vertical displacement.

5.3.6 Diagnostic Menu

Functions designed to assist the operator in testing the operation of the instrument or that of connected systems, are grouped in the Diagnostic Menu.



5.3.6.1 Simulator

Enabling the simulator puts an artificially synthesized return into the digitizer, resulting in a return being printed on the Chart. The depth of the simulated return can be varied using the RxGain controls. This function is particularly useful when interfacing the MKIII to data acquisition systems or during training of new operators. It enables many of the features of the system to be demonstrated without ever leaving the office.

5.3.6.2 Com 1,2,3,4 Test

Enabling one of the communication port tests results in the string “ComX test….” being transmitted out of the port. The port is also configured to receive data. To test the port place a wire jumper between pins 2 and 3 of the connector. Now the message should be displayed on the screen.

This test can also be used to test the input of the GPS in Com 3 or a motion sensor in Com 4. Connect the GPS or motion sensor and start the test. Any data sent from the sensor to the Echotrac will be displayed on the screen. If no data is display try using a NULL Modem between the Echotrac and the sensor.

5.3.6.3 Printer Test

Selecting Printer test and pressing the Enter key starts the printer generating a “Zebra Pattern” in shades of gray across the full width of the chart. The printer will continue producing the pattern until the Enter key is pressed a second time. Using this function, one can check for missing dots in the record or test the printhead after cleaning.

5.3.6.4 Version

Selecting the Version parameter causes the unit to display the firmware version of code stored in each processor’s Flash RAM. Front Panel, Printer, and Communications Processors should all agree in their version numbers. The two DSP Processors should also agree in their versions, but their version number will not necessarily agree with that of the other three processors.

6 OPERATING PROCEDURES

The following sequences are typical operating procedures for Echotrac MKIII. The procedures may vary according to survey requirements and are intended only as a guide. It is assumed that the operator is familiar with the various controls and their associated functions as detailed in the preceding sections of this manual.

6.1 Shallow Water Operation

Insure that the unit has sufficient paper loaded for the survey task.

Set the ***POWER*** switch to ***STBY*** and monitor that the unit displays valid software versions for all the modules. Note that the proper "sign-on" takes place. The sign-on message should include: Odom Hydrographic Systems, Inc. address, key parameters and software version.

Enter the parameters required for the survey task using the Keypad. Should any of the stored parameters seem out of range or the unit cannot be made to accept a valid parameter value, a DEFAULT RESET may be called for (Instructions for accomplishing a DEFAULT RESET follow in section 5.4.1.11). This procedure restores all parameter values to default norms (the values which are stored in system memory).

Set the ***TXPOWER*** switch to midrange, adjust the ***RXGAIN*** controls to approximately midrange (this applies to both High and Low frequencies in dual mode) or Auto.

Turn the ***POWER*** switch to ***ON***. Insure that the key parameters velocity, channel, draft, and index are printed on the chart as the unit is turned from ***STBY*** to ***ON*** and that they are correct. Amend any of these parameters as required.

If necessary, slowly adjust the ***RXGAIN*** controls until the desired chart quality is obtained and no digitizer alarms are displayed. Adjustment of the ***Tx Power*** control may be called for at this point. A balance between ***RXGAIN*** and ***Tx Power*** is generally desired. In many situations AUTO power will satisfy record quality requirements while at other times, where local bottom conditions dictate some variation of the ***Tx Power/RXGAIN*** ratio, a manual position may work best. Note that the MAX setting on any of the above controls is seldom required.

Should the record show evidence of sporadic noise which cannot be overcome using the ***RXGAIN*** controls, and should the digitizer lose lock due to this noise, then several alternatives are available. First, determine whether the digitizer is attempting to lock to a false echo or to the end of the Transmit Pulse. In either of these cases, enter a value for ***Blanking*** which is deeper than the false return. This will force the digitizer to lock to the bottom. If the Echotrac is connected to an external computer/data logger, confirm that correct digitized depths are being transferred.

6.2 Deep Water Operation

Please note that deep water operations require a bit more time to accomplish, due to the fact that returns from the bottom are received so much less frequently in deep water

In the ***CHART*** menu select either the ***Auto*** or ***Manual*** scale change.

Change the ***Frequency*** selected to ***LOW***.

Set the ***Chart Speed*** to ***AUTO***. Setting the chart to advance one dot row per sounding will improve the appearance of the chart and eliminate the “blocky” appearance of records produced with low ping rates but high chart speeds.

Set the ***RANGE*** value to encompass the greatest depth likely to be encountered. For example: if working in 2,000 meters of water, enter a ***RANGE*** value of at least 2,500.

LF Pulse Width should be set to a value of at least 30. Used in conjunction with the front panel control, ***TX Power***, the pulse width and amplitude determine how much acoustic energy is actually transmitted toward the bottom.

Back in the ***CHART*** menu, set the ***Chart Width*** value to suit the desired resolution. Remember, at a ***Chart Width*** of 1600, each dot represents 1 meter. If you have chosen to work in the ***Manual Scale Change*** (Scale) mode, then set the ***End of Chart*** value to the anticipated depth of the bottom.

Turn ***Blanking On*** by entering a value. A ***Blanking*** value which is a bit shallower than the "Shoalest" depth likely to be encountered, will help screen the digitizer from unwanted "false echoes" in the upper water column.

Begin by noting the position of the ***TX Power*** switch. In most cases of depths over 1,000 meters, the unit should be run at a fairly high power level (6 or greater). Slowly adjust the ***RXGAIN*** potentiometer to give the desired chart quality and to allow the digitizer to lock to the bottom.

6.3 Calibration

NOTE: Each frequency and transducer used should be calibrated independently and a separate index and draft determined for each.

1. ***Com4 Heave*** must be set to Off.

2. With the unit in single frequency ***HIGH*** (for velocity calibration purposes), and adjusted to provide reliable depth information from the project depth and bottom material, set the ***Scale Change*** parameter to manual. Set ***End Of Chart*** and ***Chart Width*** to values which include the depths to which the BAR will be lowered.

3. Deploy the BAR below the transducer to a depth of 5 meters or less.

4. Select the calibrate submenu and the ***Bar Depth*** parameter. Adjust the ***Bar Depth*** value until it agrees with the known depth of the BAR.

5. Select ***Gate Width*** and adjust the width parameter to a value which precludes returns from other sources from interfering with the Digitizer's lock on the BAR.

6. Select ***Draft Hi***. Enter the depth of the transducer from the water surface. Select ***Index Hi***. Enter the difference between the known depth of the BAR and the depth the Echotrac is displaying.

7. Lower the BAR to the deepest calibration depth. Select the ***Bar Depth*** parameter and adjust it so that it equals the depth of the BAR. Note that the tracking gate re-acquires lock on the BAR as soon as it comes within the limits of the Gate Width value.

8. Select the ***Velocity*** parameter and slew the value up or down until the digitized depth on the Echotrac display agrees with the known depth of the BAR. This process should be repeated as many times as is required until readings at both levels are correct. *IMPORTANT!* Adjust ***Index*** **only** when the BAR is at the shallowest depth and ***Velocity*** **only** when it is lowered to its greatest depth.

9. Repeat the ***DRAFT*** calibration (steps 2 through 6) for the Low frequency (***Draft Lo*** and ***Index Lo***). **NOTE**: Calibration should not be attempted in ***DUAL*** mode. Computer Interfacing

7 DATA I/O

7.1 Serial Ports – Serial 1

7.1.1 SERIAL OUTPUT STRING FORMATS

7.1.1.1 SBT (Single Bottom Tracking)

Example: <sp>et<sp><sp>DDDDD<CR>

Character #	*Character*	*Description*
1	<sp>/F	Space/Fix Mark
2,3	et/ET	Centimeter/Foot Units indicator
4	<sp> E	Normally Space, “E” indicates error (missed return)
5	<sp>	Always Space
6,7,8,9,10	DDDDD	Depth Digits
11	CR	Carriage Return

Echotrac **SBT** String - Example Table

SBT is the default output. With the unit operating in single frequency (High or Low) or dual frequency (High and Low), the SBT string is output until another string is selected in the Communications menu. When ***SBT*** is selected, but the unit is operating in dual frequency, the High frequency depth is output.

7.1.1.2 Echotrac DBT

The following description applies to the selection of ***D**ual **B**ottom **T**racking* in the Auxiliary Menu while only one frequency (either high or low) is active.

“DBT” One Frequency Active		
Character #	***Character***	***Description***
1	<sp>/F	Space/Fix Mark
2,3	et/ET	Centimeter/Foot Units indicator
4	<sp>, E, O	Normally Space, “E” indicates High Frequency error “O” indicates Lo Frequency error (missed return)
5	H, L	Frequency Indicator “H” = High, “L” = Low
6	<sp>	Always Space
7,8,9,10,11	DDDDD	Depth Digits
12	CR	Carriage Return

Example: <sp>ETOL<sp>DDDDDCR

Dual Bottom Tracking

The following description applies to the selection of ***D**ual **B**ottom **T**racking* while both frequencies (high and low) are active.

"DBT" Both Frequencies Active		
Character #	***Character***	***Description***
1	<sp>/F	Space/Fix Mark
2,3	et/ET	Centimeter/Foot Units indicator
4	<sp>, E, O, D	Normally Space, "E" indicates High Frequency error "O" indicates Lo Frequency error "D" High and Lo error (missed returns)
5	B	Frequency Indicator Both High and Low
6	<sp>	Always Space
7,8,9,10,11	DDDDD	High Depth Data
12	<sp>	Space
13, 14, 15, 16,17	DDDDD	Low Depth Data
18	CR	Carriage Return

Example: FetDB<sp>DDDDD<sp>DDDDDCR

7.1.1.3 HEAVE

The following description applies to the selection of the *HEAVE* output string in the Communications Menu while only one frequency (either high or low) is active.

"HEAVE" One Frequency Active		
Character #	*Character*	*Description*
1	<sp>/F	Space/Fix Mark
2,3	et/ET	Centimeter/Foot Units indicator
4	<sp>, E, O	Normally Space, "E" indicates High Frequency error "O" indicates Lo Frequency error (missed return)
5	H, L	Frequency Indicator "H" = High, "L" = Low
6	<sp>	Always Space
7,8,9,10,11	DDDDD	Depth Data
12	+ or -	Heave Direction
13, 14, 15, 16	HHHH	Heave Data (x.xx) Always Centimeter Resolution
17	CR	Carriage Return

Example: <sp>etEH<sp>DDDDD+HHHHCR

The following description applies to the selection of *HEAVE* while both frequencies (high and low) are active.

"HEAVE" Two Frequencies Active		
Character #	***Character***	***Description***
1	<sp>/F	Space/Fix Mark
2,3	et/ET	Centimeter/Foot Units indicator
4	<sp>, E, O, D	Normally Space, "E" indicates High Frequency error "O" indicates Lo Frequency error (missed return)
5	B	Frequency Indicator "B" = Both or dual Frequency Operation
6	<sp>	Always Space
7,8,9,10,11	DDDDD	High Frequency Depth Data
12	<sp>	Always Space
13, 14, 15, 16, 17	DDDDD	Low Frequency Depth Data
18	+ or -	Heave Direction
19, 20,21.22	HHHH	Heave Data (x.xx) Always Centimeter Resolution
23	CR	Carriage Return

Example: FET<sp>B<sp><sp><sp>184<sp><sp><sp>193+1234<CR> ;
Fix Mark, Dual Freq., 18.4FT for High, 19.3 for Low, +12.34m heave

7.1.1.4 DESO25

The following description applies to the selection of *DESO25* while only one frequency (either high or low) is active.

DESO25 One Frequency Active		
Character #	***Character***	***Description***
1	D	Always D
2	A,B	“A” for High Frequency, “B” For Low Frequency
3-10	DDDDDDDD	Depth Data
11	<sp>, f	Space or “f” indicating feet units
12	m, t	“m” indicates meters, “t” indicates feet
13	CR	Carriage Return
14	LF	Line Feed

Example: DB12345.69<SP>m<CR><LF>; Lo, 12345.69 meters
*<CR><LF> ; Terminator symbol

7.1.2 DESO DDV

The following description applies to the selection of *DESO DDV* while only one frequency (either high or low) is active. Once every 2 seconds, the following two strings will also be output immediately after the DESO 25 outputstring has been output. This feature is only available upon request for Deso echo sounders.

DESO DDV Heave		
Character #	***Character***	***Description***
1	D	Always D
2	G	Always H
3-5	DD	Heave Data
6	.	Period
7-8	DD	Heave Data decimal
9	<sp>	Space
10	m	“m” indicates meters
11	CR	Carriage Return
12	LF	Line Feed

DESO DDV Draft		
Character #	***Character***	***Description***
1	D	Always D
2	G	Always G
3-5	DD	Draft Data
6	.	Period
7-8	DD	Draft Data decimal
9	<sp>	Space
10	m	“m” indicates meters
11	<sp>	Space
12	CR	Carriage Return
13	LF	Line Feed

DESO DDV Sound Velocity		
Character #	***Character***	***Description***
1	C	Always C
2	S	Always S
3-6	DDDD	Sound Velocity Data
9	<sp>	Space
10-12	m/s	"m/s" indicates meters per second
13	CR	Carriage Return
14	LF	Line Feed

Example: DA12345.69<SP>m<CR><LF> ; Hi, 12345.69 meters
DG<SP>0.00<SP>m<SP><CR><LF> ; Draft 0.00 meters
CS1500<SP>m/s<CR><LF> ; Sound Velocity 1500 meters per second
*<CR><LF> ; Terminator symbol

7.1.3 DESO COMMANDS

The following DESO commands are supported when a DESO outputstring is selected:

- TXx…80 characters max…xCL example: TXthis is a test
- VSsxx.xx_m/sCL example: VS+01.23 m/s
- EMxCL example: EM0, EM1, EM2 or EM3
- *CL Terminator command

x = single character
s = sign "-" or "+"
C = Carriage Return
L = Line Feed
_ = space
_m = units stated as meters [m]
ft = units stated as feet [ft]

7.1.4 NMEA DBS

The following description applies to the selection of *NMEA DBS* when the high frequency is active.

OUTPUT format

Char. #	**Description**
1 – 7	$SDDBS,
	Depth in feet. Single decimal floating point number.
	,f,
	Depth in meters. Single decimal floating point number.
	,M,
	Depth in fathoms. Single decimal floating point number.
	,F*
	8 bit hexadecimal value checksum calculated over the entire string excluding the leading '$'
	Carriage return
	Line Feed

Example: $SDDBS,29.1,f,8.9,M,4.8,F*36<CR><LF>

7.2 SERIAL DATA INPUT/CHART ANNOTATION

Information that in the past was handwritten on the chart record can be transmitted to the Echotrac via the RS232 return line (ASCII Serial Input). Up to 80 ASCII characters per line can be accommodated.

Event Line (*Fix Mark)*
A single line across the chart is produced by sending HEX 06 (ASCII "ACK" or "Control F"). An event line will be printed across the chart at the end of the current sounding cycle and will not delay or interfere with normal operation of the unit.

Event Annotation
When required, the event line can be annotated with up to 80 characters of information. This is achieved by following the HEX 06 with HEX 01 (ASCII "SOH" or "Control A"). Once the HEX 02 is transmitted, annotation characters can be sent sequentially or with breaks between characters. The ASCII string should be delimited by a HEX 04 (ASCII "EOT" or "Control D"). This will cause the annotation to be printed and will return the ECHOTRAC to normal operation.

** Note: Event annotation must contain at least one character before the HEX 04 delimiter even if it is only a HEX 20 ("space"). Care should also be taken to avoid annotation overrun, which is caused by grouping annotated events so closely together that they obscure the record.

Header Information (*multiple line annotation*):
This type of information would normally be hand-written at the start or end of a survey line and would include information relating to date, time, work area, etc. Using the Heading Information input facility it is possible to have this information printed automatically on a blank section of chart. Each line is still limited to the maximum of 80 characters but there is no limit to the number of lines of annotation.

Header information is sent in the same way as Event Annotation (see above) except that a HEX 0D (ASCII "CR") delimits each line of information. The HEX 04 ("Control D") is transmitted only at the end of the complete header text. The following procedure steps through each phase of the Header Information input:

1 Transmit HEX 01 to request an annotation input.
2 Transmit a line of header information to a maximum of 80 characters.
3 Transmit HEX 0D ("CR") to print the line.
4 Transmit next line of Header Information.
5 Repeat step 3 and 4 as required until all Header Information is sent.
6 After the last "CR", send the HEX 04 delimiter to return ECHOTRAC to normal operation.

(In order to advance blank paper, send the HEX 0D ("CR") as many times as necessary.)

7.2.1 EXTERNAL SERIAL CONTROL OF ECHOTRAC PARAMETERS

Many of the parameters entered via the front panel keypad may also be entered via the serial port or LAN port from an external computer or terminal. The external control feature allows remote input of the operating parameters from data files or through the computer keyboard.

Some restrictions apply to external parameter inputs, which, because of their absolute nature, are only tested against minimum and maximum limits. Front panel changes on the other hand are always processed in a controlled fashion in order to prevent possible system errors. Most often problems arise if the external parameter input is not in the correct multiple for the parameter addressed.

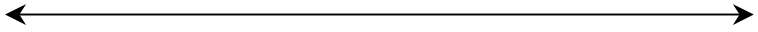
Protocol overview

13 ASCII bytes maximum are necessary to complete a parameter transfer as shown below:
The sequence begins when the Echotrac receives a CONTROL P (ASCII DLE, HEX 10) followed immediately.

<Parameter Number>'Space'<New Value>CR

13 Characters Maximum

Ex: '0' '1' 'SPACE' '1' '4' '6' '4' CR



Protocol format

The Echotrac CV input communication protocol is defined by 13 bytes.

	Header	Parameter #		SPACE	New Value								Delimiter
Byte	1	2	3	4	5	6	7	8	9	10	11	12	13
HEX	0x10 <DLE>	0x00..0xFF	0x00..0xFF	0x20	n	n	n	n	n	n	n	n	0x0D <CR>
DEX	16	0…255	0…255	32	n	n	n	n	n	n	n	n	13

Note:
HEX Hexadecimal
DEC Decimal
DLE Data Link Escape (also known as Control-P)
CR Carriage Return
SPACE This character will be represented by "_" in the examples below.
N The letter "n" represents each single digit of the New Value.
Minimum is 1 digit. Maximum is 8 digits.

Examples:

Bar depth	<DLE>08_12<CR>	Identifier is 08, value is 12 feet
Index	<DLE>07_1500<CR>	Identifier is 07, value is 1500 meters

The sequence begins when ECHOTRAC receives a CONTROL P (ASCII DLE, HEX 10) followed immediately by the parameter control string (The parameter number (2 characters) followed by a SPACE (HEX 20) then the parameter value itself (which can be up to 8 characters long) followed by a carriage return). The transfer is then complete and the ECHOTRAC returns to normal operation using the new value. In the above example the VELOCITY identified by the parameter number 08 was changed to a new value of 1464 m/s. The string delimiter (CR) will always terminate the input. Use Control T (HEX 14) to stop the chart and Control R (HEX 12) to restart the chart.

The parameter IDs that you use to send settings are the same as when you request settings. For example, to set the chartspeed you would use a parameter ID '15'.

Querying Parameter settings
To query a setting use the following 6 character sequence: <CTRL+P><Request ID><space><Parameter ID>

The Request ID is a command that the Echotrac recognizes as the command for a parameter value request.
The Echotrac will then reply with "#MK3,P,"<UNITS><PING NUMBER><PARAMETER ID><VALUE>.
The Units is a single character F or M for Feet or Meters. The ping number is 8 characters, the Parameter ID is 2 characters and the value is 8 characters. Example:
<CTRL+P>187 00
#MK3,P,F000000010000000168

Note: The Serial Parameter Request feature is supported in the following firmware versions only (See table below). Also, as of version 3.06 the ID used to request a parameter value changed from 86 to 187.

Firmware	Request ID
3.01 – 3.05	86
3.06 –	187

See chapter 8 Overview parameters and settings for a table listing all the parameters and their unique identifier.

8 OVERVIEW PARAMETERS AND SETTINGS

An overview of parameters and settings can be found in the Technical Specification Ethernet Interface.
Any setting that is changed in the control program is automatically sent to the Echotrac.

8.1 External Ethernet Control of Echotrac Parameters

The Echotrac ETHERNET port runs at 10 Mbps and outputs 16 or 8 bit samples of the acoustic data. The ETHERNET port also sends out all parameters . See the Technical Specification Ethernet Interface for more details.

8.2 Serial Ports – Serial 2

Serial port 2 is dedicated to connecting the optional remote display to the Echotrac MKIII. The Remote display can be set up to communicate through a RS232 or RS422 protocol.

8.3 Serial Ports – Serial 3

Serial port 3 is dedicated to connecting a GPS to the Echotrac MKIII. The MKIII will accept NMEA GLL or GGA sentences. It is best to only configure the GPS to output only one of these strings as to much data can interfere with the communication processors other tasks. When receiving position information the Echotrac MKIII will output it through the Ethernet port.

8.4 Serial Ports – HEAVE

The Heave port enables the Echotrac MKIII to accept data from a motion compensator to apply corrections for the vertical movement caused by swells. The Echotrac MKIII will only correct the depth for Heave. No corrections are done for Roll and Pitch. If the Echotrac is set up to output data on any string other than HEAVE and is reading data from the motion sensor it will print a line at the top of the chart which represents the raw heave data. The data on the chart is also then corrected for heave. If HEAVE is selected as the output string then the Echotrac will print a raw heave line at the top of the chart, the data is not corrected for heave and a corrected bottom line is printed above the bottom trace.

The only string the Echotrac MKIII will accept is the TSS1 string. Below is a description of the string.

TSS1 String		
Character #	***Character***	***Description***
1	:	Start Character
2-3	X	Horizontal acceleration data
4-7	A	Vertical acceleration data
8	<sp>	Space
9	<sp>,-	Space if positive, minus if negative
10-13	H	Heave data
14	Q	Status flag
15	<sp>,-	Space if positive, minus if negative
16-19	R	Roll data
20	<sp>	Space
21	<sp>,-	Space if positive, minus if negative
22-25	P	Pitch data
26	CR	Carriage Return
27	LF	Line Feed

8.5 ETHERNET Port

Refer to the Technical_Specification_Ethernet_Interface manual for information in the Ethernet interface.

9 UPLOADING FIRMWARE

The Echotrac MKIII has a total of 8 processors, 5 of which can be uploaded with new firmware through the serial ports. The other 3 processors perform low-level tasks and require only infrequent upgrades. The firmware in the three modules use Motorola processors. The Front Panel CPU, Printer CPU and Communication CPU are upgradeable through Com 1 on the Echotrac MKIII. The Motorola processors are the main processors in the system. The version numbers of these three processors should match each other. The firmware on the two DSP processors needs to be upgraded from the serial ports on each of the DSPs. The firmware on both DSPs should match each other but do not have to match the three Motorola processors.

This section refers to the Echotrac Control Program, but the sounder can also be controlled by Odom eChart, the serial port or third party applications.

9.1 Upgrading Motorola Processor Firmware

The flash upgrading program will run on computers running Windows 95/98, Win NT, Windows 2000 and Windows XP. The other requirement is that the computer must have an on board serial port number 1 through 4. We have had success using PC Card serial ports but not USB adaptor serial ports.

Care must also be taken to ensure the Echotrac MKIII does not loose power or the serial connection become disconnected when performing the software upgrade.

The Echotrac must be functioning correctly and all version numbers valid in order for the flash upgrade to work. The Printer Module must also be connected.

1-Install the Odom Flash Utility by Unzipping the OdomFlash.zip file in a directory. After the file is uncompressed, run the setup.exe file to install the program. Follow the instructions.

2-To upgrade the Motorola processors you need the new binary files. These are named MK3FPNL.bin, MK3COMM.bin and MK3PRINT.bin. These files must be obtained from Odom Hydrographic Systems Inc.. We normally do not put these on our web site, but we can email them to you or they will be sent on a CD disk. Once these files have been obtained put them in a known folder in the computer with the Odom Flash Program.

3-Power the Echotrac MKIII to Standby, go to the System Menu and reset the unit. Go to the Communication Menu and set the baud rate of Com1 to 19200.

4-Connect the serial port of the computer to Com1 on the back panel of the Echotrac MKIII.

5-Start the Odom Flash program. Under Select Model, make sure Echotrac MK3 is selected. Under the Bin Folder, click on the Browse button and select the folder that contains the MK3FPNL.bin, MK3COMM.bin and MK3PRINT.bin files. Click on the Upload button.

6-The LCD display on the Echotrac MKIII panel should display a "Flash Mode" message and the Flash Program will upgrade the firmware. Do not interrupt the process.

If the upgrading procedure fails and the Echotrac MKIII fails to display a version number for one of the modules after cycling the power then the flash chips in that module will need to be replaced with a working set of flash chips.

9.2 Upgrading DSP Firmware and Transceiver Processor Firmware.

Upgrading the firmware on the DSPs is a little more involved than upgrading the firmware on the three main processors but should not need to be done to often. Upgrading of the firmware requires a special serial cable that can be ordered from Odom Hydrographic Systems, Inc. The firmware for the DSPs is not on our web site so it needs to be obtained by email or sent on a disk. There are two methods for upgrading the DSP: Serhost.exe and OdomFlash. We recommend using OdomFlash and the DSP2407(A).hex file which would be the easiest way to flash upgrade the DSP. The steps below explain using the serhost.exe or OdomFlash utility (2.1 or higher).

The flash upgrading software for the DSPs will run on a computer under Windows 95/98, Win NT and Windows 2000. We have had problems running the upgrade program with Windows XP. The computer must have a serial port numbered 1 or 2.

Upgrading the firmware in the DSPs requires removing the transceiver cover. To do this:

1-Ensure the Echotrac is turned OFF.

2-Remove the Printer Module by disconnecting the power cable and bus ribbon cable to the Printer Module. Lift the Printer Module up of its hinges.

3-Remove the cover from the Communication Module by removing the two nuts on the left and right side of the cover. Disconnect the all the connections to the Communication Module but leave the board on its mounting plate. Note: on later models of Echotrac MKIII removal of this cover is not necessary, the connectors can be removed without taking the cover off.

4-Remove the transceiver cover by removing the two screws securing it.

5- The DSP board is the long, thin board that is on the bottom of the transceiver board. There are two on each Echotrac MKIII.

6-Connect the DSP flash cable to JP13 of the DSP.

7-Move shunt on JP10 from the left two pins to the right two pins.

8-Turn the power switch of the Echotrac MKIII from Off to Standby.

9- There are two versions of DSP chips and each on has its own program. Look at U3 on the DSP board, if it is a TMS320LF2407FGEA use the files in the MK3 2407 Serial Flash Programming directory. If is a TMS320LF2407**A**FGEA chip then use the MK3 2407A Serial Flash Programming directory directory.

10-Run the serhost1.exe file if the DSP is connected to com1 of the computer or serhost2.exe file if the DSP is connected to com2 of the computer. When prompted with a file name type in MK3Digi.hex, the program should then upgrade the firmware on the DSP.

11-Switch the Echotrac MKIII to Off and move the shunt from JP10 to the two left most pins.

12-Repeat steps 6-11 for the other DSP.

13- If the transceiver processor needs upgrading then the whole chip has to be replaced. These can be obtained from Odom Hydrographic Systems Inc. along with the tool to remove the chip. To remove the chip insert the tool into the corners of the U5 socket on the transceiver board and squeeze the tool together until the chip comes out. Replace it with the new version. Make sure the chip is align in the correct direction. The chip for both the transceiver boards is the same.

13-Replace the transceiver cover taking care not the pinch the Echotrac MKIII Bus ribbon cable.

14-Re-connect the Communication Module and replace the cover.

15-Connect the Printer Module to the Echotrac MKIII.

16-Turn the Echotrac MKIII from OFF to Standby and ensure all the version numbers are valid.