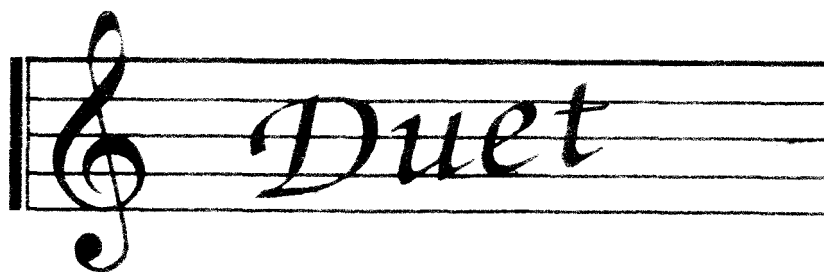


DESIGNED AND
MANUFACTURED
IN ENGLAND



**COMBINED LOG AND
ECHO SOUNDER**

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INTRODUCTION

The Clipper Duet is a combined log and depth sounder. It is supplied complete with paddlewheel unit, transducer, and alarm bleeper. The Duet is designed to be powered from the vessel's 12 volt battery supply.

INSTALLING THE DISPLAY

Select a convenient position for the display on a panel or bulkhead.

The site must be flat and the cavity behind the panel must remain dry at all times. (The cable entry is deliberately not sealed to ensure adequate ventilation. This prevents misting of the display).

Cut a hole in the panel 87mm wide and 67mm high. Bring the wiring through the hole in the panel and connect the black wire to negative and red to positive. (See Figure 1). It is wise to use a fused supply to provide protection should a fault occur. The current consumption is very small, so any supply with at least a $\frac{1}{4}$ amp fuse is more than adequate.

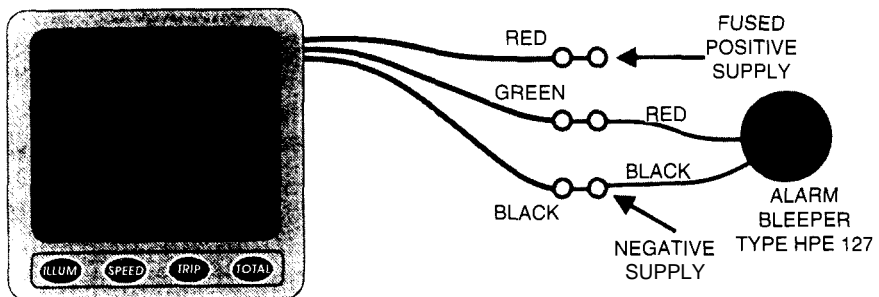


Figure 1- Wiring Installation

With the vessel out of water, drill a hole of 42mm diameter through the hull to take the paddle housing and use conventional methods for sealing. It is advisable to avoid the use of mastic materials - use a form of proprietary silicon sealant.

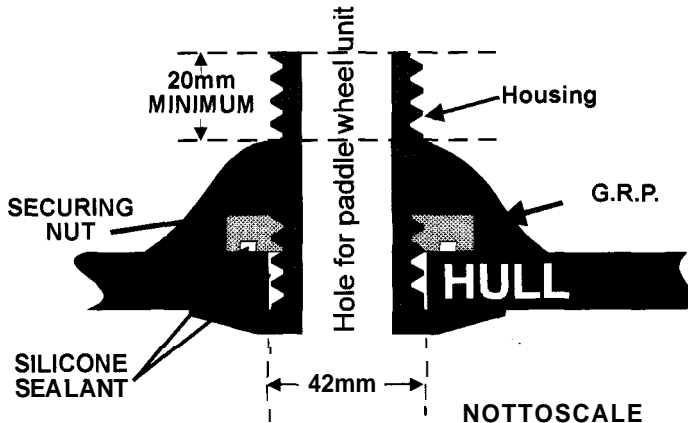


Figure 2 - Paddle Housing Installation (Sectioned view)

The securing nut has a groove on its underside which should also be filled with sealing compound. Take care not to over tighten this nut. After the sealing compound has set, wipe off the excess and encapsulate the whole assembly in G.R.P. as shown on Figure 2. Take care to ensure that a minimum of 20mm of thread is clear at the top of the paddle housing.

The paddle wheel unit can now be slid into the housing so that it is exposed to the water flow, with the arrow pointing forward along the centre line of the vessel. It is recommended that a little silicon grease is smeared over the rubber O-ring to keep the unit free. Tighten the retaining nut onto the top of the housing, and plug the cable into the 'paddlewheel' socket on the display. For added protection it is again recommended that the plug is lightly covered with silicon grease.

INSTALLING THE ECHO SOUNDER TRANSDUCER

The transducer can be mounted in one of three ways:

- (i) The transducer face can be bonded directly to the inside of the hull. (Some energy is lost to the hull but the loss in performance is, for most G.R.P hulls, hardly noticeable).
- (ii) A transom mount is available from your dealer.
- (iii) The transducer can be positioned inside a G.R.P. hull by means of an In Hull Transducer Kit.

The latter method of installation offers the advantage that the transducer can easily be removed for examination or installation elsewhere. It should be mentioned however, that although the accuracy will in no way be affected by installing the transducer inside the hull, the maximum range sensitivity may be reduced, depending on the thickness and quality of the glass fibre. The In Hull Kit is available direct from NASA Marine or your local chandler.

Whichever method is selected, the best location still has to be found.

Select a position below the water level where the transducer will point substantially vertically downwards towards the seabed, and where the transducer and its cable (do NOT shorten the transducer cable) will be well clear of equipment which might be a source of interference. Such sources might include the engine ignition and starting systems, alternators and dynamos, electric pumps, etc. This position should also be well clear of large masses of bubbles or cavitation near propellers or sudden changes in hull profile which could disrupt the signal.

To test the suitability of the location when the vessel is in the water at a reasonable depth, press a little sticky chewing gum on the surface of the transducer and stick it down to the inside of the hull (it may be necessary to remove dirt and oily residue first). The unit can then be tested over a range of speeds and depths. If the location is satisfactory, the chewing gum must be removed and the transducer permanently mounted using one of the methods described previously. (Note: do NOT shorten the transducer cable).

It is important that the face of the transducer is thoroughly bonded down to the hull. A single air bubble will cause a considerable loss in performance.

The transducer and the place of mounting must be kept entirely free of any antifouling compound as this can also effect the performance of the unit.

Plug the transducer into the 'transducer' socket on the display.

NOTES ON ELECTRICAL INTERFERENCE

External electrical interference is characterised by persistent, random numbers on the display which obscure the true depth reading on the depth sounder.

This is caused by large amplitude voltage "spikes" generally associated with the engine's alternator and/or ignition system which has not been properly suppressed. These "spikes" may find their way into the sensitive amplifier section of the depth sounder in **two** ways:

- (a) Through the craft's common power supply or
- (b) Through direct radiation from the source of interference.

To reduce the possibility of induced interference from the engine's generator and/or ignition system, choose a position as far away from the engine as possible and run the cable from the transducer as far as practicable from the engine. Do NOT cut the transducer cable, but stow excess away from any possible source of electrical interference.

USING THE INSTRUMENT

When power is connected to the instrument it will show the depth and boat speed. Pressing TRIP will show the trip distance, that is the distance since power was connected. Disconnecting the power will reset the TRIP to zero. Pressing TOTAL will show the accumulated total distance travelled. This total cannot be reset. Pressing ILLUM will turn on the display backlight. The lighting is concentrated over the active part of the display, the top corners being omitted. Pressing ILLUM again will turn the backlight off. Pressing SPEED will return to boat speed. The instrument will show depth at all times. If echo is temporarily lost then the depth units will momentarily flash. If the echo is completely lost then the display will show OUT.

SETTING THE MINIMUM DEPTH ALARM

This is done during normal operation. Press SPEED and TRIP simultaneously. The instrument will show SHA, the bell and the current minimum depth setting. Use TRIP to decrement the setting and TOTAL to increment the setting. When the required minimum depth setting has been selected press SPEED. This will enter the new value into memory and return to normal operation. To arm the alarm press TRIP and TOTAL simultaneously. Pressing TRIP and TOTAL simultaneously a second time will disable the alarm (without altering the alarm setting). The bell symbol will show only when the alarm is armed and will flash when the alarm is active.

SETTING THE SPEED ALARM

The speed alarm will give an audible and visual warning if the boat speed exceeds a preset limit. To set this speed limit press SPEED and TOTAL simultaneously. The lower half of the display will show SPD, the upper half will show the current speed limit setting. Use TRIP to decrement and TOTAL to increment this value. (To disable the speed alarm decrement the value to zero where upon the display will show OFF). Pressing SPEED will enter this value into memory and return to normal operation.

CHANGING THE OPERATING CONFIGURATION

This allows the user to program the instrument to operate in the units of choice i.e. feet/metres, miles, nautical miles or kilometres. It also gives access to the gain threshold, the keel offset, the speed alarm and the log calibration settings. To enter the configuration mode press and keep depressed the ILLUM key whilst power to the instrument is switched on. When the key is released the display will show SET ENG. The instrument is now in the configuration mode.

TO SELECT THE OPERATING UNITS

Put the instrument into the configuration mode. The display will show SET ENG. Press TOTAL. The display will now show SET followed by the current speed units. (i.e. knots, mile/hour or kilometres/hour). Use the TOTAL key to roster through the speed units. Press SPEED to enter the desired units. The display will briefly show CON to confirm the operation. The display will now show SET followed by the current depth units (i.e. feet or metres). Use the TOTAL key to select the desired units. Pressing SPEED will enter the desired units.

The display will briefly show CON to confirm the operation and then return to the SET ENG display. If no further settings are to be made then pressing the ILLUM key will exit the configuration mode and return to normal operation.

SETTING THE KEEL OFFSET

The Echo Sounder measures the depth from the transducer to the seabed. If the craft has a keel it is more often convenient to show the depth from the keel to the seabed. To operate in this way the depth of the keel (keel offset) must be entered into the instrument as follows:

Put the instrument into the configuration mode. The display will now show SET ENG. Press SPEED, the upper half of the display will show USET and the lower half the current keel offset value. Use TRIP to decrement and TOTAL to increment this value. Pressing SPEED will enter this new value. The display will briefly show CON to confirm the operation and then return to the SET ENG display. If no further settings are to be made then pressing the ILLUM key will exit the configuration mode and return to normal operation.

CHANGING THE GAIN THRESHOLD

The Echo Sounder emits a high frequency pulse which bounces off the seabed back to the transducer. Echoes from nearby objects are much stronger than those from distant objects so an automatic gain control compensates for these different strength signals. However, reflections from nearby turbulence or bubbles can sometimes be confused with those from the bottom. To prevent nearby reflections from causing a problem, the sensitivity to nearby objects can be reduced.

The depth at which the sensitivity returns to normal is called the Gain Threshold. For example, if the Gain Threshold is set at 2 metres then the gain is low for echoes between 0 and 2 metres. The gain remains normal for echoes over 2 metres. To adjust the gain threshold put the instrument into the configuration mode. The display will show SET ENG. Press SPEED. The display will show the keel offset value. Press SPEED again, the upper half of the display will show THR and the lower half the current Gain Threshold. Use TRIP to decrement and TOTAL to increment this value. Pressing SPEED will enter this new value. The display will briefly show CON to confirm the operation and then return to the SET ENG display. If no further settings are to be made then pressing the ILLUM key will exit the configuration mode and return to normal operation.

CHANGING THE LOG CALIBRATION

The calibration factor determines the number of revolutions of the paddle required to represent a fixed distance. The instrument is pre-calibrated in the factory. However, the type of hull and the position of the paddlewheel unit may affect the performance causing the speed (and distance) to under-read or over-read.

To correct any error, put the instrument into the configuration mode. The display will show SET ENG. Press TRIP. The display will show CAL and the current calibration factor (which is factory set to 100% to give correct readings in free flow conditions). The factor can be incremented to a total of 150% by pressing TOTAL and can be decremented to a minimum of 70% by pressing TRIP.

The general rule is that if the instrument over-reads, the factor must be reduced, and if it under-reads, the factor must be increased, the percentage error in the readings is the same percentage change that must be made. For example if the instrument is found to under-read by 6% then the calibration factor should be increased by 6%. Pressing SPEED will enter a new calibration factor and return to the SET ENG display. If no further settings are to be made then pressing the key will exit the configuration mode and return to normal operation.