

# DS10

## Digital Depth Sounder

### Contains:

- General Information
- Performance Specifications
- Operation
- Installation
- Maintenance
- Drawings
- Parts Lists

## Owner's Manual



# General Information

The Standard Communications Corp. (SCC) Model DS10 is a digital depth sounder specifically designed for sailboat applications. It mounts easily on a dashboard, overhead, or in a panel, and requires 12 VDC input power. All solid-state, the speed log is controlled by an internal microprocessor, which enables such features:

- Continual reading of depth from 2.6 to 400 feet.
- Shallow alarm with setting of 5, 10, or 15 feet.
- Anchor alarm for deviation of 2.5, 5, 10 or 20 feet from depth at time of anchoring.
- Depth alarm for crossing 10, 20, 40, or 80 feet threshold depth.
- Large liquid crystal display (LCD) for maximum visibility, even in direct sunlight. Backlit for night use.
- Adjustable shallow gain control to adapt to local bottom conditions.
- Automatic decimal display at depths of less than 10 feet.
- Simple internal wiring change to convert unit of measure from feet to fathoms or meters.

This Owner's Operating and Maintenance Manual will assist you in the installation and operation of the DS10, and provide guidelines for maintenance should it ever be required. We urge you to read this manual carefully to obtain optimum performance from your depth sounder.

We at SCC thank you for buying Standard, and are sure you will be impressed with the accuracy, reliability, and durability of your Standard Communications equipment for many years to come.

# Performance Specifications

Performance specifications are nominal, unless otherwise indicated, and are subject to change without notice.

Depth Range	2.6 to 400 feet
Alarm Modes/Settings:	
Shallow	5, 10, or 15 feet
Depth	10, 20, 40, or 80 feet
Anchor	$\pm 2.5, 5, 10, \text{ or } 20$ feet
Input Voltage (12 volt battery system)	$\pm 13.8$ VDC $\pm 20\%$
Transmitter Power	40 W min. (RMS)
Sounding Rate	2.3 Hz
Transmitter Frequency	200 kHz
Sensitivity	10 mV p-p max.
Shallow Gain Control	Adjustable
Transducer Requirement	1300 pF/350 ohms
Current Drain	
Nominal	50 mA
Max. Brightness	300 mA
Temperature Range	0 to +50 degrees C.
Display	0.5 in. liquid crystal with internal backlight
Dimensions	5 face x 4 body x 4 inches deep
Weight	1-1/4 lbs.

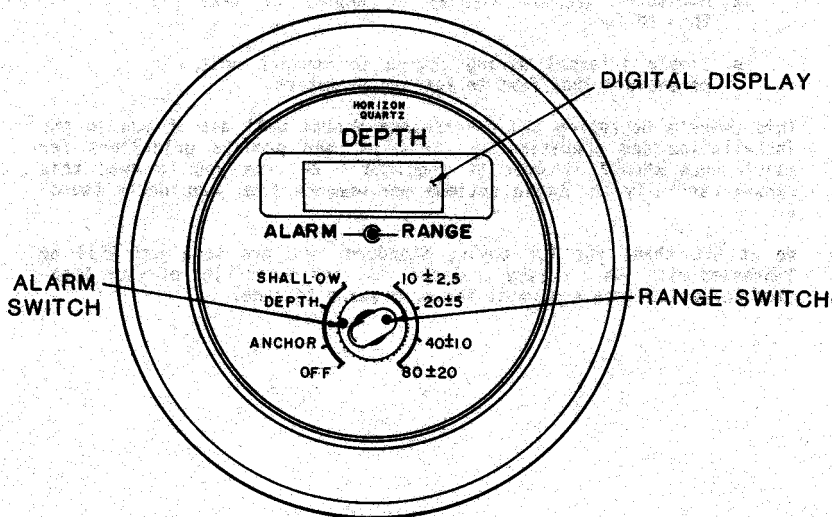


FIGURE 1. DS10 FRONT PANEL

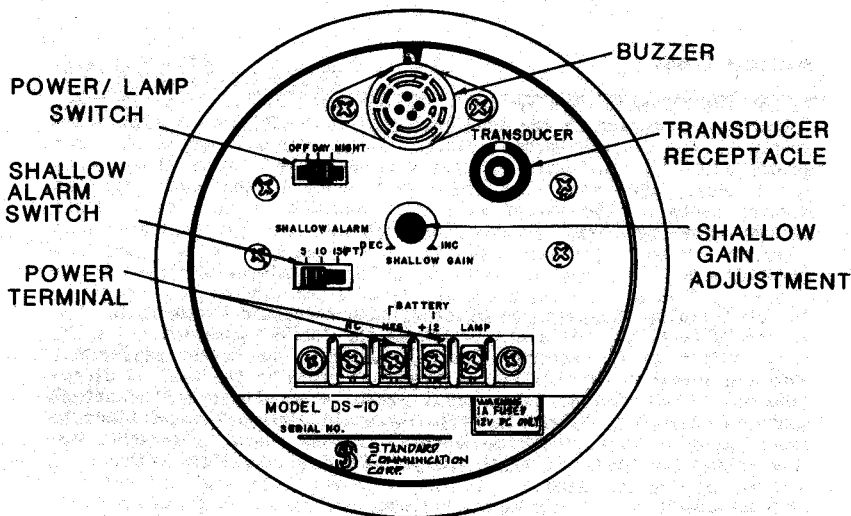


FIGURE 2. DS10 REAR PANEL

## Operation

For location of controls described in the following paragraphs, refer to Figures 1 and 2.

### DEPTH READING

Any time power is applied to the unit, the display will indicate the depth of the water (however, a display of two horizontal lines will appear if a measurement is not possible, such as when the boat is out of the water, or if the bottom is beyond the measurement range). To apply power, slide the power/lamp switch to the "Day" position (or the "Night" position if you wish to illuminate the display). For depths under 10 feet, the display will automatically scale the depth in tenths to provide accurate shallow depth measurement.

The shallow gain adjustment should be used to decrease sensitivity (turn adjustment counterclockwise) to fresh wakes and aerated water, which may cause false indications of shallow depth. However, if decreased too severely, contact may be lost with soft, shallow bottoms, in which case it should be increased (turn adjustment clockwise). It may be necessary to experiment to determine the best setting to insure maximum wake rejection and reliable shallow depth indication, depending on local bottom conditions and boat traffic.

#### SHALLOW ALARM

To set the alarm to warn you of a shallow depth of 5, 10, or 15 feet, set the alarm switch to the "shallow" position. Set the shallow alarm switch to the desired warning depth. The buzzer will sound when the actual depth is shallower than the warning depth (intermittent tones for 5 secs., then stop when the actual depth is shallower than the warning depth). The buzzer will stop sounding if the actual depth returns to a level deeper than the warning depth.

#### DEPTH ALARM

To set the alarm to warn you of crossing a threshold depth of 10, 20, 40, or 80 feet, set the alarm switch to the "DEPTH" position. Set the range switch to the desired threshold depth. The buzzer will sound when the actual depth crosses the threshold depth in the shallow direction only (intermittent tones for 5 secs., then stop when the actual depth is only more shallow than the threshold depth), then continue to sound each time the threshold depth is crossed again. To reset, either change the threshold depth (range switch) or the alarm switch.

#### ANCHOR ALARM

To set the alarm to warn you of deviation in depth after anchoring, set the alarm switch to the "Anchor" position (thus establishing the "pre-set" depth). Set the range switch to the desired position ( $\pm 2.5$ ,  $\pm 5$ ,  $\pm 10$ , or  $\pm 20$ ). The buzzer will sound when the actual depth deviates from the pre-set depth by more than the amount selected by the range switch (as with the depth alarm, a deeper depth than the pre-set depth produces one continuous tone; a shallower depth than the pre-set depth produces many short tones). The buzzer will stop sounding if the actual depth returns to the allowed deviation from the pre-set depth.

# Installation

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For location of connections described in the following paragraphs, refer to Figures 1 and 2.

## GENERAL

When selecting the location for mounting the depth sounder, keep in mind that the controls must be accessible to the user, and the electrical connections should be routed to their connections as directly as possible. To preserve the life of the depth sounder, mount the instrument in a location that avoids direct exposure to water or rain.

## MECHANICAL

With the mounting bracket (003V, Figure F) removed from the depth sounder, insert the unit into a standard 4-inch instrument aperture until the back of the face is flush with the outside mounting wall. Slide the bracket over the body of the depth sounder, then tighten it with the hex head bolt (002V, Figure F). Secure the bracket to the inside mounting wall with the supplied hardware.

## ELECTRICAL

Connect the power cord to the unit. The black lead connects to the "Battery" terminal marked "Neg" (negative) on the back of the unit, and the red lead connects to the specified power source (obtain the power as directly from the battery as possible, avoiding power circuits which share loads with ignition, alternators, radio transmitters, etc. Excessive electrical noise associated with such devices may prevent the depth sounder from operating properly).

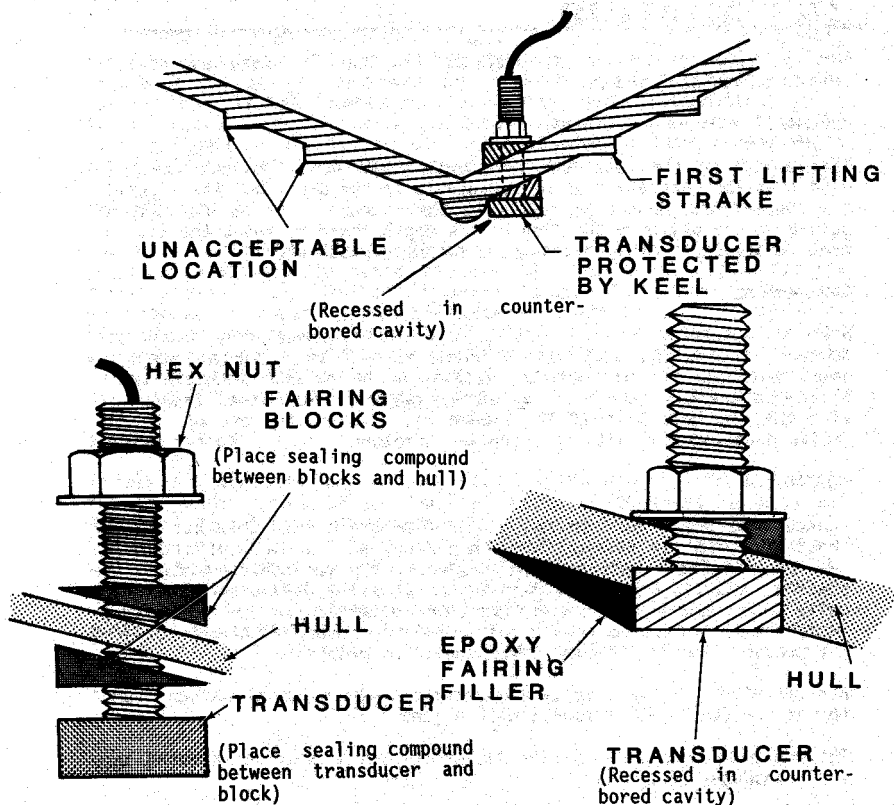
For operation of the display lamp, connect the terminal marked "Lamp" to the "Switch, +12V" terminal with a jumper.

The RCA plug on the end of the transducer cable must be inserted into the transducer receptacle.

## TRANSDUCER

Correct installation and maintenance of the transducer is essential for optimum operation of the depth sounder. Select a location for the transducer using the following guidelines:

- a. Mount as close as possible to the centerline to insure contact with water at all times (however, avoid location at the centerline to prevent damage to the transducer in case of grounding).
- b. Avoid location close to deep keels, rudders, shafts, thru-hulls, propellers, etc., to minimize turbulence, and thus aeration, upon the face of the transducer.



**FIGURE 3. DS10 TRANSDUCER INSTALLATION AID**

- c. Generally, a location approximately 2/3 aft is best. However, this may vary depending on the hull of your boat.

The method employed for mounting will also vary, dependent upon the type of transducer and the deadrise angle of the hull location used. In general, always insure that the transducer is mounted facing directly downward, using a fairing block if necessary. A recessed mounting may also be used for minimum projection and low drag. If the transducer is projected rather deeply, an epoxy may be used to form a fairing filler to minimize drag. A good underwater sealing compound should be used to secure all parts of the transducer system. See Figure 3 for a transducer installation aid.

After installation, always keep the transducer face clean. Do not strike the transducer face with a sharp blow.

#### CAUTION

DO NOT USE A BRONZE TRANSDUCER IN A STEEL OR ALUMINUM HULL. SPECIAL PRECAUTIONS MUST BE TAKEN IN THIS INSTANCE TO AVOID DAMAGE DUE TO ELECTROLYSIS OF DISSIMILAR METALS.

## Theory of Operation

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Operation of the speed log is accomplished through the following stages, as illustrated in Figure 4.

1. **Transducer:** Converts the transmitted signal into an ultrasonic wave and radiates it into the water, and vice versa.
2. **Power Amplifier:** Amplifies the transmitted signal to a 700 V p-p level to drive the transducer.
3. **Amplifier:** Amplifies the received (reflected) signal from the transducer.
4. **Detector:** Shapes the waveform of the received signal, used for the shallow gain control, which compensates for variation in the amplitude of the reflected wave according to variations in depth.
5. **Gate Circuit:** Determines the transmission and reception intervals according to the gate signal from the divider and the mute interval data from the microcomputer.
6. **Divider:** A flip-flop circuit which divides the oscillator signal to generate the transmission frequency.
7. **Oscillator:** Generates the 400 kHz reference signal (6 V p-p) for the divider, and 1000 kHz reference signal for the microcomputer.
8. **Measurement Pulse Generator:** Supplies the 24 kHz clock pulse signal used for measurement to the microcomputer.
9. **LCD:** 7-segment liquid crystal display.



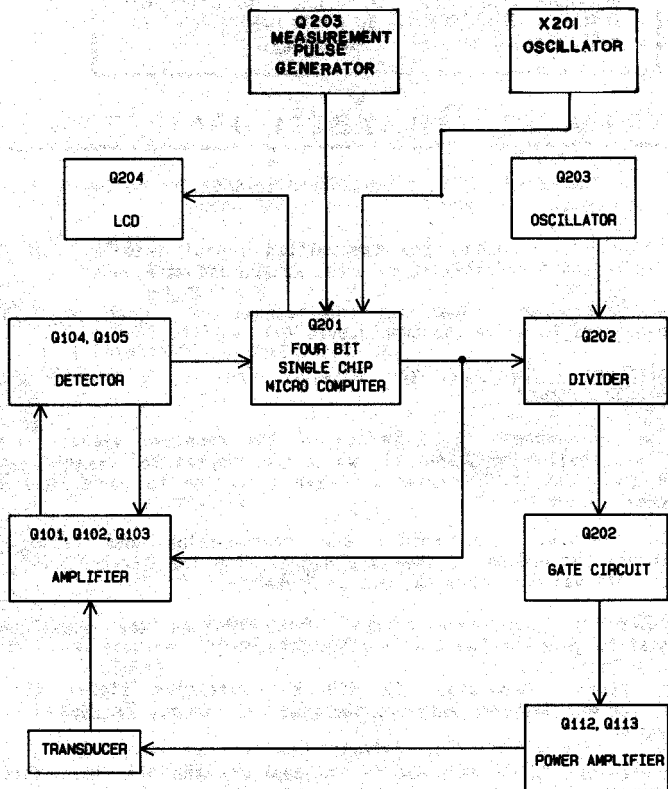


FIGURE 4. DS10 BLOCK DIAGRAM

# Maintenance

## GENERAL

Your DS10 is designed for years of trouble-free operation assuming proper installation and care of the unit are provided. Following the operation and installation guidelines in this manual should insure optimum performance of the unit. However, should operational problems occur, the following alignment procedure and troubleshooting guide should assist in the isolation and repairing of any such problems. SCC strongly advises that any maintenance of the speed log be performed by an experienced technician familiar with similar types of equipment.

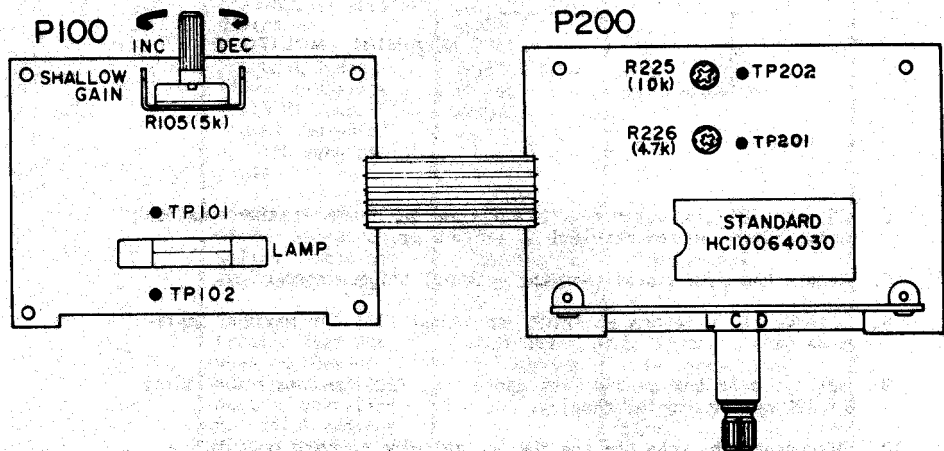
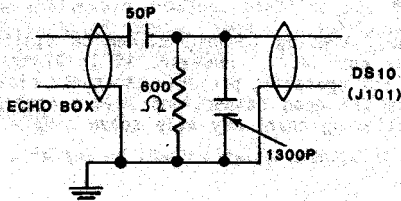
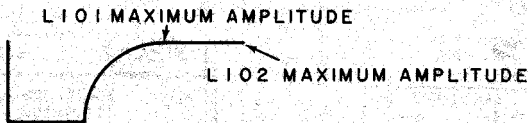


FIGURE 5. DS10 TEST POINTS LOCATIONS

1. Connect a frequency counter to TP201 and adjust R226 for a reading of 400 kHz ( $\pm 4$  kHz).
2. Set an echo box to 100 feet and switch the box to the "internal" position.
3. Connect the following circuit to J101 on the DS10.



4. Apply the mute signal appearing at PIN 31 of Q201 to the external trigger connection of an oscilloscope and observe the waveform at TP101.
5. Adjust L102 for maximum waveform amplitude at the location shown below.



6. Adjust L101 for maximum echo waveform amplitude at the location shown above (approximately 1 to 1.5 V p-p).
7. Remove the mute signal from the external trigger connection.
8. Observe the waveform at TP102 and adjust L103 for maximum amplitude (approximately 2 to 2.5 V p-p).
9. Set the echo box to 390 feet and adjust R225 to obtain a reading of 390 on the digital display.
10. Disconnect the echo box and the accompanying circuit from J101.
11. Connect the transducer to J101 and point its face towards an iron plate, approximately two feet away.
12. Repeat Steps 4 and 6.
13. Reconnect the echo box and accompanying circuit to J101, and confirm that the buzzer sounds correctly in the shallow, depth, and anchor alarm modes.

#### TROUBLESHOOTING

Conventional signal tracing techniques can be utilized to isolate a faulty circuit or component. However, it is always a good idea, if the speed log is not operating properly, to check closely all installation requirements for good connections before opening the unit. In addition, the following chart may help solve simple operational problems.

SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Blank display at all settings.	No power.	Check input voltage fuse, power cord interconnection, and power switch.
Erratic reading at depths under 30' only. Reliable readings at greater depths.	Shallow gain is insufficient for good bottom contact.	Increase shallow gain adjustment.
Frequent indications of shallow depth at deep depths, no wakes or fish seen as cause.	Shallow gain is too strong.	Decrease shallow gain adjustment.
Erratic readings at higher speeds only. Reliable readings at lower speeds.	Cavitation at higher speeds affecting impeller operation.	Review impeller location. Relocate if necessary.
Erratic readings when engines or auxiliary equipment is operating. Reliable readings with quiet boat.	Electrical interference.	Review electrical interconnections. Consider filter for noise suppression.

## Miscellaneous

### REVISIONS

The parts lists in this manual are for the current build of the unit, as of the printing date. If a different part was used in a previous build, details of the parts changes are included in the revision table on the back of the applicable drawing, enabling you to determine the correct replacement part (if the new part is the recommended replacement part for all units, the old part is not listed in the revision table).

### AVAILABLE TRANSDUCERS

The DS10 will work with any of the following transducers: