



# Dual Frequency Side Scan Sonar

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## Introduction

The GeoAcoustics Dual Frequency Side Scan Sonar system is the ideal tool for seabed feature mapping, offering flexibility and high quality results in a simple and reliable package. The system offers high resolution, switch selectable, dual frequency operation (114/410 kHz), which when combined with multiplexed data transmission enables a low drag coaxial tow cable to be used. The modular design of the system makes it ideal for combining with our GeoChirp and GeoPulse sub-bottom profilers.

The versatility, ease of operation and cost effectiveness of the system has made it a popular choice with commercial survey companies.

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## Transceiver

The transceiver unit allows the operator a simple means of controlling various Side Scan operating parameters. The unit includes standard controls such as: Gain, Time Varying Gain (TVG) and Automatic Gain Control (AGC), with duplicated controls for Port and Starboard channels. The operating frequency can also be switched from 114 kHz to 410 kHz directly from the Transceiver. The choice of frequencies means that long range scanning and short range high resolution investigations are both possible.

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## Multiplexer

The Multiplexer Unit (SS982) is the sub-sea processing section of the Side Scan Sonar system. The SS982 is mounted in the tail of the towfish, on the tail of a combined towfish or on a ROV, as required. The use of standard sub-sea connectors throughout allows easy installation in all situations. The SS982 includes all of the transmitter and multiplexing electronics, thereby ensuring that transmission power is not lost in the towcable and also reducing the risk of high voltage defects.

The multiplexed data transmission technique employed allows the system to be used with a wide selection of towcables, including twisted pair and coaxial cables. Data from the Dual Frequency Side Scan Sonar can be input to a wide range of third party sonar processing systems, or it can be displayed on a wide variety of industry standard graphic recorders.



The multiplexed data offers a resolution equivalent to a 16 bit analogue to digital converter operating at 50k samples/sec per channel, when used with short towcables.

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## Standard System

The standard system employs a lightweight towfish, which is easily deployed by one person and can operate to a depth of 1000 metres. There are separate controls for each channel, which makes the system very easy to operate.

The basic system includes the following:

- Transceiver (model SS981)
- Towfish (model 159D), which houses the Multiplexer (model SS982) and Two Dual Frequency Transducers (model 196D/Port and Starboard).

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## Features

- 1000 metre depth rating (standard)
- Switch selectable dual frequencies
- Fully multiplexed signals
- Simple user controls
- Low cost
- High efficiency/low power
- Operates over long towcables
- Outputs to all standard recorders/processors
- High reliability (MTBF > 10,000 hours)
- Simple maintenance
- Low drag coaxial towcable
- High system bandwidth and resolution



## Specifications

### Transceiver Model SS981

#### General

Power requirements:	95/265VAC switchable, 40-60 Hz, 50W optional 24VDC
Size:	43.2cm W x 45.7cm D x 18.7cm H
Weight:	16kg
Temperature:	Storage: -20 to 75°C Operating: -5 to 50°C
Humidity:	10% to 95% RH, non-condensing
Mounting:	The unit is suitable for either bench or rack mounting.

#### Operating Specification

Power output to tow vehicle:	150 VDC $\pm$ 3 VDC, 100 mA average, 320 mA peak
Key burst out:	455 kHz, pulse width selectable 16 Vpp, PRR determined by key source
Key input:	Positive CMOS to TTL, 10kW input impedance.

#### Receivers

Modulation freq.:	Port 135 kHz, Starboard 65 kHz
Bandwidth:	15 kHz
Sensitivity:	6mV rms input produces 800 mV rms output with a 20dB signal-to-noise ratio (all gain maximum)
Input impedance:	5k $\Omega$
Output impedance:	600 $\Omega$ on all outputs
Dynamic range:	Gain: adjustable over 60dB range TVG: -20 to +20dB maximum AGC: -34dB maximum
Output:	Selectable signal envelope or amplitude modulated 12 kHz
TVG delay:	3.3ms minimum, 330ms maximum
Event mark:	5Vpp, 12 kHz, front panel push button or BNC input requiring CMOS or TTL level pulse. Produces visual mark on recording media.
Key out:	0.6ms CMOS/TTL compatible
Modes:	100 kHz and 500 kHz operation Raw signal and processed signal

#### Front Panel connectors

BNC:	Seven each for signals & keys
Amphenol:	MS3102A-22-34S for deck cable
<b>Towfish Model 159D</b>	
Tow speed:	1 to 12 knots
Weight:	16.3kg, 22.5kg, or 38.6kg depending on ballast used
Dimension:	11.4cm D by 128.5cm L, 3 fins on tail protrude 7.5cm
Frame:	Cast aluminium with shear release carry handle/towpoint
Nose:	Shock absorbing, abrasive resistant urethane. Cavity can carry small auxiliary transducer.

### Multiplexer – Model SS982

#### Transmitter Section

Frequency:	114/410 kHz $\pm$ 1%
Power output:	3 kW pulse $\pm$ 20%
Pulse length:	167 $\mu$ sec/88 $\mu$ sec $\pm$ 1%
Pulse repetition rate:	50 pulses per second maximum
Protection:	Open and short circuit protected
Efficiency:	Greater than 80%

#### Receiver Section

Port channel:	114/410 kHz, heterodyned to 135 kHz
Starboard channel:	114/410 kHz, heterodyned to 65 kHz
Bandwidth:	20 kHz
TVG:	Transmission loss curve compensated at both frequencies. Approximately +40dB at 100m range

#### Keyburst:

Frequency:	455 kHz $\pm$ 2%
Pulse length:	300 $\mu$ sec for 114 kHz operation 600 $\mu$ sec for 410 kHz operation

#### General:

Power requirements:	150 VDC at 100mA
Size:	10.2cm D x 34.5cm L
Weight:	3.2kg in air, 0.45kg in water

### Transducers Model 196D

Source level:	223 $\pm$ 3dB re 1 $\mu$ Pa@ 1m
Beamwidth:	114 kHz - 50° by 1° 410 kHz - 40° by 0.3°
Sensitivity:	-190dB re 1V/ $\mu$ Pa
Depression angle:	10° $\pm$ 1° down

## Options

- Deeper rated towfish
- Stainless Steel towfish
- Lightweight Kevlar Towcable for shallow water use
- 60kHz operating frequency for increased range
- Towfish pitch, roll and heading sensors
- Towfish responder for acoustic tracking
- Towfish height off bottom measurement
- Towfish depth sensor

*Specification sheet subject to change without notice (9-SS940-69-A 05/2008)*



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