

# SEARAM Recorder & Auto Fire Module

SBE 17plus V2



## SUMMARY

Auxiliary equipment for use with SBE 9plus CTD and SBE 32 Carousel Water Sampler, allowing for autonomous operation without conducting winch cable:

- Memory and power module for SBE 9plus; CTD data is uploaded upon recovery.
- Auto-fire module, allowing SBE 32 Carousel Water Sampler to collect water samples at pre-programmed depths.

## DESCRIPTION

The SBE 17plus V2 SEARAM is used to operate any SBE 9plus CTD underwater unit in self-contained internal recording mode, without the need for conducting winch cable. Auxiliary sensors connected to the 9plus are also supported. The SEARAM also includes Carousel Auto-Fire capability: when the SEARAM and 9plus CTD are integrated with an SBE 32 Carousel Water Sampler, users can collect water samples at pre-programmed depths and record CTD data with one autonomous system. CTD profile data and separate bottle summary data are stored in memory, and can be quickly uploaded to a computer without opening the SEARAM. The SEARAM is typically installed in the CTD cage with the 9plus CTD. Other mounting options are possible for Compact Carousels (SBE 32C) or custom applications. Data acquired using the SEARAM has the same quality and resolution as real-time data obtained with conductive-cable systems.



## MEMORY AND DATA RECORDING

The SEARAM's 16 Megabyte FLASH RAM memory can record full-rate CTD and 8-channel auxiliary sensor data (24 scans/second) for approximately 6 hours. The SEARAM can be programmed to average scans (from 1 to 96), allowing recording for longer periods by sacrificing resolution. For example, averaging every 2 scans (12 Hz recording) provides approximately 12 hours of recording. Software suppression of any unused sensor channels further increases recording endurance. Data logging is controlled with a magnetic on/off plunger switch. Each time the unit is switched on, a file header containing date, time, and cast number is written to memory. The FLASH RAM is non-volatile; stored data will not be lost in the event of battery exhaustion, failure, or removal.

## AUTO-FIRE FEATURE FOR WATER SAMPLER OPERATION

Power is supplied to both CTD and Carousel by the SEARAM's internal battery. Using pressure data received from the SBE 9plus CTD and a programmable table of bottle closure pressures, the SEARAM commands the Carousel to close bottles on the upcast. Built-in logic and user-input parameters provide control in determining when the upcast begins, preventing accidental bottle closure caused by temporary upward movements (ship heave) during the downcast.

## BATTERIES

The standard battery pack consists of twelve nickel metal hydride (NiMH), rechargeable, D-cell batteries. The pack drops into the SEARAM battery compartment; no soldering, welding or other preparation is required. The battery compartment is separately sealed, minimizing risk to the electronics. Battery endurance is dependent on the system configuration. A standard 9plus without auxiliary sensors can operate for 10 hours; systems with auxiliary sensors can typically operate for 7 hours.

Individual alkaline D-cells can be used in place of the NiMH battery pack. With alkaline batteries, a standard 9plus without auxiliary sensors can operate for approximately 12 hours, depending on temperature.

## COMPUTER INTERFACE

The SEARAM communicates directly with a computer via standard RS-232 interface. An optional, AC-powered, interface junction box can provide external power to the SEARAM, permitting setup and data upload without sacrifice of battery capacity. Communications and upload baud rates up to 38,400 baud are selectable. Diagnostics and data extraction can be performed without opening the housing.

The SEARAM is supplied with a powerful Windows 2000/XP software package, SEASOFT® V2, which includes:

- SeatermAF -- terminal program for easy communication and data retrieval.
- SBE Data Processing -- programs for calculation, display, and plotting of CTD and auxiliary sensor data and derived variables such as salinity and sound velocity.



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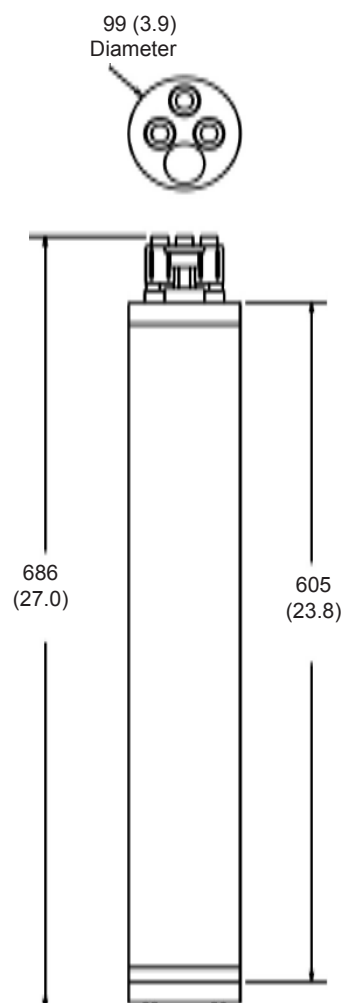
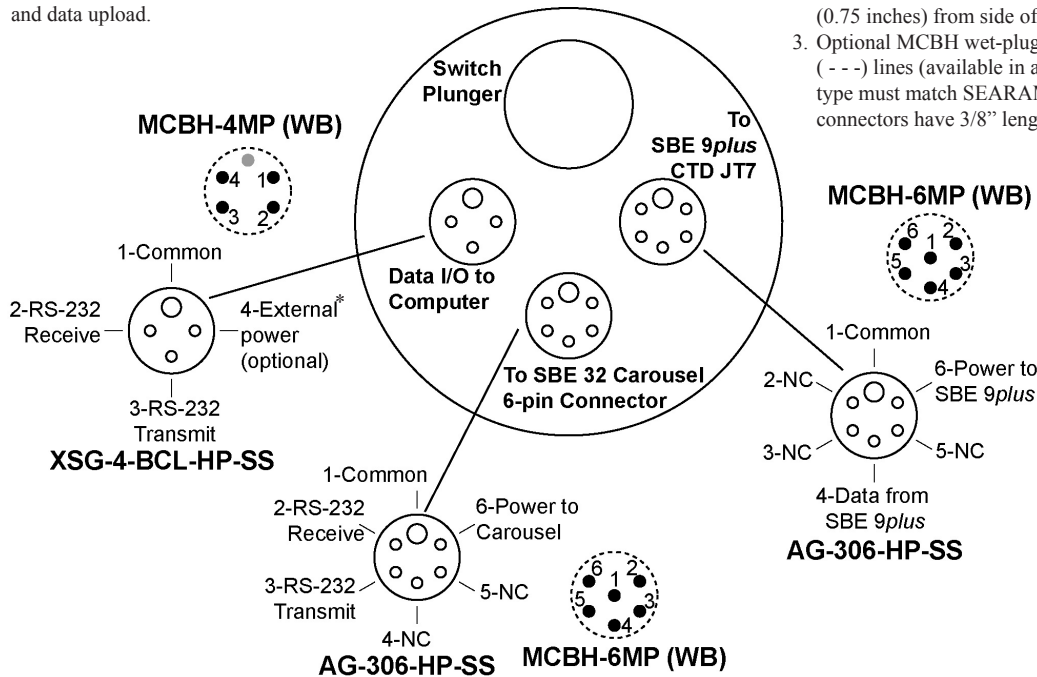
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\* Data I/O pin 4 = optional 12-15 VDC, for use with optional interface junction box to provide external power supply during setup and data upload.

**Notes:**

1. Dimensions in millimeters (inches).
2. For standard aluminum housing, zinc anode projects 19 mm (0.75 inches) from side of connector end cap.
3. Optional MCBH wet-pluggable connectors shown with dashed (---) lines (available in anodized aluminum or titanium; connector type must match SEARAM housing material). All wet-pluggable connectors have 3/8" length base, 1/2-20 thread.



**MECHANICAL**

- The SEARAM is available in two housing types:
- anodized 7075 aluminum, provided with zinc anode protection, for depths to 6800 meters (22,300 feet)
  - titanium, for depths to 10500 meters (34,400 feet)

Three bulkhead connectors (CTD, water sampler, computer) are mounted to one end cap, which is not removed except for service. The other end cap is easily removed for battery replacement.

**SPECIFICATIONS**

**Memory**

16M byte non-volatile FLASH RAM

**Real-Time Clock**

Watch-crystal type 32,768 Hz

**Internal Batteries**

**Standard:** Rechargeable, nickel metal hydride battery pack; 14.4 V, nominal 8 Amp-hours

**Optional:** 12 alkaline D-cells (LR20, 13A)

**Materials**

**Standard:** 7075-T6 anodized aluminum pressure case rated at 6800 meters (22,300 feet), with zinc anode protection

**Optional:** Titanium pressure case rated at 7000 or 10500 meters (22,900 or 34,400 feet)

**Interface**

RS-232C, factory-configured for 9600 baud, 8 data bits, 1 stop bit, and no parity

**Standard Shipment**

SEARAM, rechargeable NiMH battery pack, AC battery charger and accessories, SBE 9plus interface cable, data upload cable, mounting hardware, spare parts, and software

**Weight (with standard aluminum housing)**

**In water:** 4.5 kg (10 lbs)

**In air:** 9.0 kg (20 lbs)

