SBE 48 Hull Temperature Sensor Reference Sheet

(see SBE 48 User's Manual for complete details)

Sampling Modes

- **Polled sampling** – SBE 48 takes one sample and sends data to computer. Useful for testing.

- **Autonomous sampling** – There are two types of Autonomous sampling:
  - *Interval sampling*: At pre-programmed intervals, SBE 48 wakes up, samples, stores data in memory, and powers off.
  - *Continuous sampling*: SBE 48 continuously samples and stores data in memory, and does not power off between samples.

  The SBE 48 also calculates a running average of up to 120 temperature samples, which can be transmitted while logging data.

- **Serial Line Sync** – A pulse on serial line causes SBE 48 to wake up, sample, store data in memory, and power off automatically. This mode provides easy integration with instruments that can synchronize SBE 48 sampling with their own.

Communication Set Up Parameters

1. Double click on Seaterm.exe.

2. Once main screen appears, in Configure menu select **SBE 39** (SBE 48 is not available in list of instruments, but SEATERM will be able to communicate with it if it is set up like an SBE 39). Click on COM Settings tab in dialog box. Input:
   - Serial Port: COM1 through COM10 are available
   - Baud Rate: 9600 (or other if applicable)
   - Data Bits: 8
   - Parity: No Parity
   - Mode: RS-232 (Full Duplex)

Deployment

1. Install I/O cable, and connect cable to computer and power source.

2. Program SBE 48 for intended deployment (see other side of this sheet for *Command Instructions and List*):
   A. Install a new battery if necessary.
   B. Set date and then time.
   C. Establish sampling parameters.
   D. Ensure all data has been uploaded, and then set **SampleNum=0** to make entire memory available for recording. If **SampleNum** is not set to 0, data will be stored after last recorded sample.
   E. Use one of following sequences to initiate logging:
      - **StartNow** to start logging now, taking a sample every **Interval** seconds (if **Interval=0**, SBE 48 samples continuously).
      - **StartMMDDYY=**, **StartHHMMSS=**, and **StartLater** to start logging at specified date and time, taking a sample every **Interval** seconds (if **Interval=0**, SBE 48 samples continuously).
      - **SyncMode=Y** to place SBE 48 in serial line sync mode, so that a simple pulse on RS-232 line will initiate a sample.

3. If desired, disconnect I/O cable from computer (SBE 48 will record data internally).

4. Generously coat the temperature sink with heat sink grease. Using magnets on housing, mount SBE 48 on inside of ship's hull below the waterline. Excess grease should squeeze out the side of the temperature sink; if it does not, remove the SBE 48 from the hull, apply more grease, and remount.

Command Instructions and List

- Input commands to SBE 48 in upper or lower case letters and register commands by pressing the Enter key.
- SBE 48 sends `?CMD` if invalid command is entered.
- If system does not return `S>` prompt after executing a command, press Enter key to get `S>` prompt.
- If new command is not received within 2 minutes after completion of a command, SBE 48 returns to quiescent (sleep) mode.
- If in quiescent mode, re-establish communications by clicking Connect on Toolbar or pressing Enter key to get `S>` prompt.

Shown below are the commands used most commonly in the field. See the Manual for complete listing and detailed descriptions.

CATEGORY	COMMAND	DESCRIPTION
Status	**DS**	Display status.
Setup	**MMDDYY=mmddyy**	Set clock month, day, year. Must follow with **HHMMSS=**.
	DDMMYY=ddmmyy	Set clock day, month, year. Must follow with **HHMMSS=**.
	HHMMSS=hhmmss	Set clock hour, minute, second.
	Baud=x	**x=** baud rate (1200, 2400, 4800, 9600, 19200, 38400). Default 9600.
	NAvg=n	**n=** number of scans to average in running average (1 - 120).
	TxRealTime=x	**x=Y:** Output real-time data to computer. Does not affect storing data to memory, but slightly increases current consumption. **x=N:** Do not output real-time data.
	SyncMode=x	**x=Y:** Enable serial line sync mode. When RS-232 RX line is high (3-10 VDC) for 1 - 1000 milliseconds, SBE 48 takes a sample, stores data in FLASH memory, transmits real-time data (if **TxRealTime=Y**), and powers down. **x=N:** Do not enable serial line sync mode.
	SampleNum=x	**x=** sample number for first sample when sampling begins. After uploading data, set to 0 before starting to sample again to make entire memory available for recording. If not set to 0, data is stored after last sample.
	QS	Enter quiescent (sleep) mode. Data logging and memory retention unaffected. Note: If **Interval=0** (continuous sampling), do not send **QS** after sending **StartNow** (**QS** puts SBE 48 to sleep, preventing further logging).
Autonomous Sampling (Logging)	**Interval=x**	**x=** interval (seconds) between samples (0, or 3 - 32767). When commanded to start sampling with **StartNow** or **StartLater**, SBE 48 takes sample, stores data in FLASH memory, transmits real-time data (if **TxRealTime=Y**), and powers down at **x** second intervals. If **x=0**, SBE 48 samples continuously without powering down between samples.
	StartNow	Start logging now. Reset running average to 0.
	StartMMDDYY= mmddyy	Delayed logging start: month day year. Must follow with **StartHHMMSS=**.
	StartDDMMYY= ddmmyy	Delayed logging start: day month year. Must follow with **StartHHMMSS=**.
	StartHHMMSS =hhmmss	Delayed logging start: hour, minute, second.
	StartLater	Start logging at delayed logging start date and time. Reset running average to 0.
	SA	Transmit running average of data.
	SAQS	Transmit running average of data, and turn power off.
	Stop	Stop logging or stop waiting to start logging. Press Enter key to get `S>` prompt before entering **Stop**. Must send **Stop** before uploading data.
Polled Sampling *Do not send these commands if SBE 48 is logging data.	**TS ***	Take sample and transmit converted data. Data not stored in FLASH memory.
	TSR *	Take sample and transmit raw data. Data not stored in FLASH memory.
	SLT *	Transmit converted data from last sample from buffer, and then take new sample. Data not stored in FLASH memory.
	SLTR *	Transmit raw data from last sample from buffer, and then take new sample. Data not stored in FLASH memory.
	TSS *	Take sample, store data in FLASH memory, transmit converted data, and turn power off.
	TSSOn *	Take sample, store data in FLASH memory, and transmit converted data.
	SL	Transmit converted data from last sample from buffer.
Data Upload	**DDb,e**	Upload data in **ASCII** from scan **b** to scan **e**. Send **Stop** before sending this command.
	DBb,e	Upload data in **binary** from scan **b** to scan **e**. Send **Stop** before sending this command.
	BinaryTime=x	**Applies to binary data upload only.** **x=Y**: Upload date and time for every scan from memory. **x=N**: Upload date and time only for beginning scan in each data block; use **Interval=** to calculate and insert date and time for all other scans.
	***DB**	Display binary upload parameters.
Testing	**TT**	Measure temperature for 100 samples or until Esc key is pressed, output converted data.
	TTR	Measure temperature for 100 samples or until Esc key is pressed, output raw data.
Coefficients	**DC**	Display calibration coefficients.