

SBE 16*plus*-IM SEACAT Reference Sheet

(see SBE 16*plus*-IM User's Manual for complete details)

Sampling Modes

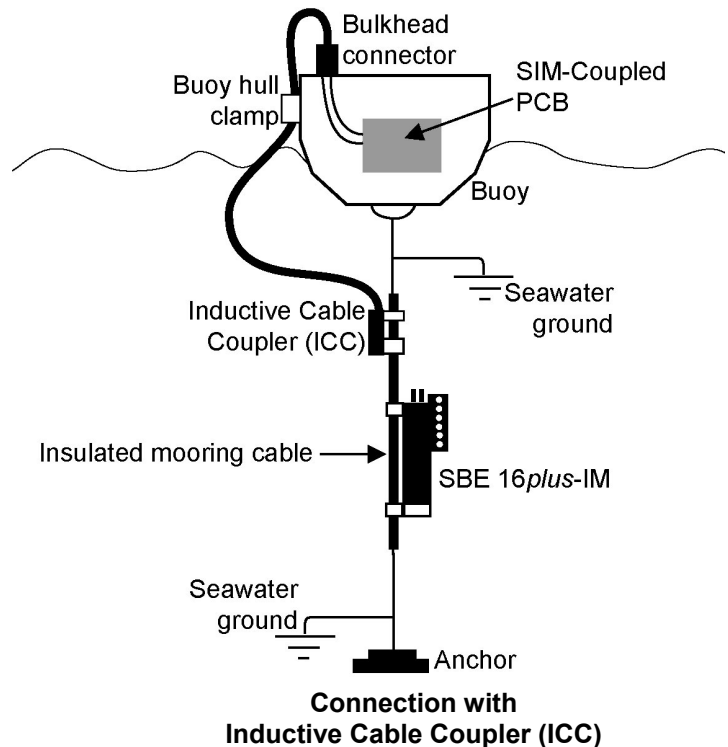
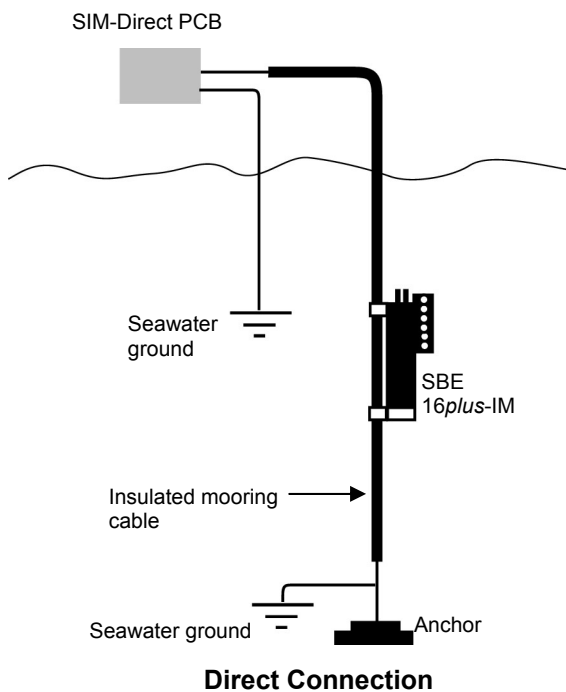
- **Polled** – 16*plus*-IM takes one sample and transmits data.
- **Autonomous** – At pre-programmed intervals, 16*plus*-IM wakes up, samples, stores data in FLASH memory, and powers off.
- **Combo** – Last Autonomous sampling data is transmitted.

Communication Setup Parameters

1. Double click on SeaTerm.exe.
2. Once main screen appears, in Configure menu select *SBE 16plus*. Click on COM Settings tab in dialog box. Input:
 - Serial Port: COM1 through COM10 are available
 - Baud Rate: 1200, 2400, 4800, or 9600
 - Data Bits: 8
 - Parity: No Parity
 - Mode: Inductive Modem
 - Modem/RS-485 ID:
Pre-deployment testing: Automatically get ID
Deployment with multiple SBE 16plus-IMs: Prompt ID

Deployment

1. Install fresh batteries:
 - A. *Remove modem end cap:* Wipe dry housing/end cap seam. Remove 3 flat Phillips-head screws from end cap. Pull end cap out. Disconnect Molex connector connecting end cap to battery pack. Wipe O-ring mating surfaces in housing with lint-free cloth.
 - B. *Remove battery cover plate and batteries:* Remove 3 Phillips-head screws and washers from battery cover plate; remove cover plate. Turn 16*plus*-IM over and remove batteries.
 - C. *Reinstall batteries, cover plate, and end cap:* Install new batteries, with + terminals against flat battery contacts and - terminals against spring contacts. Reinstall battery cover plate and 3 screws/washers. Remove water from O-rings and mating surfaces with lint-free cloth. Inspect O-rings and mating surfaces for dirt, nicks, and cuts. Clean as necessary. Apply light coat of O-ring lubricant to O-ring and mating surfaces. Plug Molex connector together. Fit end cap into housing. Reinstall 3 Phillips-head screws to secure.
2. Attach 16*plus*-IM to insulated mooring cable with Sea-Bird mounting brackets. Install (optional) ICC on mooring cable.
3. SIM wiring and configuration:
 - A. *Power* – Normal Setting: Power common to JP1 pin 1, 7-25 VDC to JP1 pin 2, jumper on J3.
 - B. *Interface* – Connect I/O cable to JP2 and to computer serial port.
 RS-232: J1 pins 2 and 3, J2 pins 2 and 3, J4 no jumper. RS-485: J1 pins 1 and 2, J2 pins 1 and 2, J4 jumper.
 - C. *Inductive Cable Connection* –
 With ICC: Connect ICC to JP4; Without ICC: Connect mooring cable and seawater ground to JP4.
Instrument Setup and Lab Testing – No jumper on J5.
 - D. *Deployed Operation* – Jumper J5



Command Instructions and List

- Input commands in upper or lower case letters and register commands by pressing Enter key.
 - 16plus-IM 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, 16plus-IM communications microcontroller returns to quiescent (sleep) state.
 - If in quiescent (sleep) state, re-establish communications by clicking Connect on Toolbar or entering **PWRON** command to get S>.
- Shown below are the commands used most commonly in the field. See the Manual for complete listing and detailed descriptions.

FUNCTION	CATEGORY	COMMAND	DESCRIPTION
SIM Commands	-	PWRON	Send wakeup tone to all 16plus-IMs.
		PWROFF	Send power off command to all 16plus-IMs. Logging and memory unaffected.
		DS	Display SIM firmware version and setup parameters.
		BAUD=x	x= baud from SIM to computer (1200, 2400, 4800, or 9600). Default 9600.
		DATANMAX=x	x= timeout that applies to DATAii ; default 1000 milliseconds.
		RELAYMAX=x	x= timeout that applies to all other commands; default 20 seconds.
		ECHOON ECHOOFF	Echo characters received from computer. Do not.
		AUTOPWRON=x	x=Y (default): Send PWRON to 16plus-IMs when power applied to SIM. x=N: Do not send PWRON .
16plus-IM Communication Microcontroller Commands	Global	GDATA	Command all 16plus-IM communication microcontrollers to get data from 16plus-IM acquisition microcontrollers. Communication microcontrollers hold data in buffer until receiving DATAii .
		MMDDYY=mmddy	Set all real-time clocks: month, day, year. Must follow with HHMMSS= .
		DDMMYY=ddmmy	Set all real-time clocks: day, month, year. Must follow with HHMMSS= .
		HHMMSS=hmmss	Set all real-time clocks: hour, minute, second.
	Get Data	DATAii	Get data obtained with GDATA from 16plus-IM with ID=ii.
	16plus-IM ID	ID?	Display 16plus-IM ID (ID = ii, where ii=0 to 99)
		*ID=ii	Set ID to ii (ii=0 to 99). Only one 16plus-IM can be on line or all 16plus-IMs on line will have same ID. Computer responds by requesting verification.
Firmware	!iiDS	Display communication microcontroller firmware version.	
Status	#iiDS	Display status and setup parameters.	
16plus-IM Acquisition Microcontroller Commands (ii = 16plus-IM ID)	General Setup	#iiMMDDYY=mmddy	Set real-time clock month, day, year. Must follow with #iiHHMMSS= .
		#iiDDMMYY=ddmmy	Set real-time clock day, month, year. Must follow with #iiHHMMSS= .
		#iiHHMMSS=hmmss	Set real-time clock hour, minute, second.
		#iiMOOREDUMPMODE=x	x=0: No pump. x=1: Run pump for 0.5 seconds before each sample. x=2: Run pump during each sample.
		#iiNCYCLES=x	x= number of samples to take and average every #iiSAMPLEINTERVAL seconds.
		#iiINITLOGGING	After uploading all data, send this command before starting to log to make entire memory available for recording. If not sent, data stored after last sample.
	Pressure Sensor Setup	#iiPTYPE=x	x=0: No pressure sensor. x=1: Strain gauge pressure sensor. x=3: Quartz pressure sensor with temperature compensation.
		#iiREFPRESS=x	x= reference pressure (decibars) (for 16plus-IM without pressure sensor).
	Voltage Sensor Setup	#iiVOLT0=x #iiVOLT1=x #iiVOLT2=x #iiVOLT3=x	x=Y: Enable external voltage (voltage 0, 1, 2, or 3). x=N: Do not.
		#iiDELAYBEFORESAMPLING=x	x= time (seconds) to wait after switching on external voltage before sampling (0-32,000 seconds). Default 0 seconds.
		#iiBIOWIPER=x	x=Y: Configuration includes ECO-FL fluorometer with Bio-Wiper. x=N: Does not.
	RS-232 Setup	#iiSBE38=x	x=Y: Enable SBE 38 secondary temperature sensor. x=N: Do not.
	Output Format Setup	#iiOUTPUTFORMAT=x	x=0: output raw data in Hex. x=1: output converted data in Hex. x=2: output raw data in decimal. x=3: output converted data in decimal.
		#iiOUTPUTSAL=x	x=Y: Calculate salinity (psu) (if #iiOUTPUTFORMAT=3). x=N: Do not.
		#iiOUTPUTSV=x	x=Y: Calculate sound velocity (m/sec) (if #iiOUTPUTFORMAT=3). x=N: Do not.
		#iiOUTPUTSN=x	x=Y: Output sample number with data (if #iiOUTPUTFORMAT=3). x=N: Do not.
	Autonomous Sampling (Logging)	#iiSAMPLEINTERVAL=x	x = interval between samples (10 - 14400 seconds).
		#iiSTARTNOW	Start logging now.
		#iiSTARTMMDDYY=mmddy	Delayed logging start: month day year. Must follow with #iiSTARTEHHMMSS= .
		#iiSTARTDDMMYY=ddmmy	Delayed logging start: day month year. Must follow with #iiSTARTEHHMMSS= .
		#iiSTARTEHHMMSS=hmmss	Delayed logging start: hour, minute, second.
		#iiSTARTLATER	Start logging at delayed start time. Data stored in FLASH memory.
	Data Upload	#iiSTOP	Stop logging or waiting to log. Must send this command before uploading data.
		#iiDdb,e #iiDHb,e	Upload data from scan b to e . Send #iiSTOP before sending this. Upload headers from header b to e .
	Polled Sampling	#iiSL	Output last sample from buffer.
		#iiSLT	Output last sample from buffer, take new sample, and store in buffer.
		#iiTS	Take sample, store data in buffer, and output data.
#iiTSSON		Take sample, store in buffer and FLASH memory , and output data.	
Coefficients	#iiDCAL	Display calibration coefficients.	