SBE 16*plus*-IM V2 SeaCAT Reference Sheet
(see SBE 16*plus*-IM V2 User's Manual for complete details)

Sampling Modes
- **Polled** – 16*plus*-IM V2 takes one sample and transmits data.
- **Autonomous** – At pre-programmed intervals, 16*plus*-IM V2 wakes up, samples, stores data in FLASH memory, and powers off.
- **Combo** – Last Autonomous sampling data is transmitted.

Setup
1. Double click on SeatermV2.exe. In Instruments menu, select *SBE 16plus V2 IM*. SeatermIM opens.
2. In Communications menu, select *Configure*. In dialog box, input Comm port and baud rate. Set ID to *Automatically get ID* for 1 16*plus*-IM V2 on line; set ID to *Use fixed ID* for multiple IM instruments on line. Click OK.
3. SeatermIM automatically connects to 16*plus*-IM V2. As it connects, it sends **#iiGetHD** and displays response, and then fills Send Commands window with list of commands for your 16*plus*-IM V2.
4. Ensure all data has been uploaded from memory, and then send **#iiInitLogging** to make entire memory available for recording. If **#iiInitLogging** is not sent, data will be stored after last recorded sample.
5. Set Date and Time (**#iiDateTime=**).
6. Set up other parameters as desired — see *Command Instructions and List*.

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 V2 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 V2 to insulated mooring cable with Sea-Bird mounting brackets. Install (optional) ICC on mooring cable.
3. See 16*plus*-IM V2 manual for SIM wiring and configuration; see IMM manual for IMM wiring and configuration.

Direct Connection

Connection with Inductive Cable Coupler (ICC)
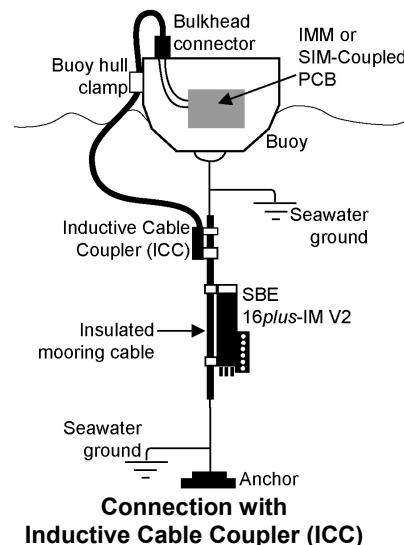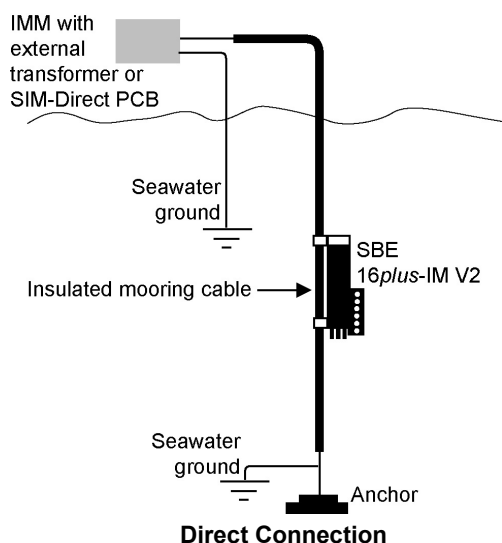
Data Upload (see manual for fast upload via internal RS-232 connector)
1. Double click on SeatermV2.exe. In Instruments menu, select *SBE 16plus V2 IM*. SeatermIM opens.
2. In Communications menu, select *Configure*. In dialog box, input Comm port and baud rate. Set ID to *Automatically get ID* for 1 16*plus*-IM V2 on line; set ID to *Use fixed ID* for multiple IM instruments on line. Click OK.
3. SeatermIM automatically connects to 16*plus*-IM V2. As it connects, it sends **#iiGetHD** and displays response, and then fills Send Commands window with list of commands for your 16*plus*-IM V2.
4. If sampling autonomously (logging), command 16*plus*-IM V2 to stop logging by sending **#iiStop**.
5. Click Upload menu to upload stored data.
6. Run SBE Data Processing to convert uploaded .hex file to .cnv file for use by other modules in data processing software. Process file and review data to ensure all data has been uploaded.

Command Instructions and List

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

Function	Category	Command	Description
IMM Commands	-		See IMM manual.
SIM Commands	**Power-On**	**PwrOn**	Send wakeup tone to **all** 16*plus*-IM V2s.
		PwrOff	Send power off command to **all** 16*plus*-IM V2s. Logging and memory unaffected.
		AutoPwrOn=x	**x=Y** (default): Send **PwrOn** to 16*plus*-IM V2s when power applied to SIM. **x=N**: Do not.
	Status	**DS**	Display SIM firmware version and setup parameters.
	Comms	**Baud=x**	**x=** baud from SIM to computer (1200, 2400, 4800, or 9600). Default 9600.
		DataNNMax=x	**x=** timeout that applies to **iiData** or **Dataii**; default 1000 millisec.
		RelayMax=x	**x=** timeout that applies to all other commands; default 20 seconds.
		EchoOn EchoOff	Echo characters received from computer. Do not.
16*plus*-IM V2 Communication Microcontroller Commands	**Global**	**DateTime= mmddyyyyhhmmss**	Set **all** real-time clocks: month, day, year, hour, minute, second.
		GData	Command **all** 16*plus*-IM V2 communication microcontrollers to get data from acquisition microcontrollers. Communication microcontrollers hold data in buffer until receiving **iiData** or **Dataii**.
	Get Data	**iiData** or **Dataii**	Get data obtained with **GData** from 16*plus*-IM V2 with ID=ii.
	16*plus*-IM V2 ID	**ID?**	Display 16*plus*-IM V2 ID (ID = ii, where ii=0 to 99)
		***ID=ii**	Set ID to **ii** (ii=0 to 99). Only one 16*plus*-IM V2 can be on line or all 16*plus*-IM V2s on line will have same ID. Computer responds by requesting verification.
	Status	**!iiDS**	Display communication microcontroller status.
	Timeout	**!iiWait=x**	**x=** time to wait for response from acquisition microcontroller. Range 2 – 600 sec.
16*plus*-IM V2 Acquisition Microcontroller Commands (ii = 16*plus*-IM V2 ID)	**Status**	**#iiGetCD**	Get and display configuration data (setup parameters).
		#iiGetSD	Get and display status data.
		#iiGetCC	Get and display calibration coefficients.
		#iiGetEC	Get and display event counter data.
		#iiResetEC	Reset all events in event counter.
		#iiGetHD	Get and display hardware data.
		#iiDS	Display status and setup parameters.
		#iiDCal	Display calibration coefficients.
	General Setup	**#iiDateTime= mmddyyyyhhmmss**	Set real-time clock month, day, year, hour, minute, second.
		#iiOutputExecutedTag=x	**x=Y**: Display XML Executing and Executed tags. **x=N**: Do not.
		#iiPumpMode=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.
		#iiBioWiper=x	**x=Y**: Configuration includes WET Labs sensor with Bio-Wiper. **x=N**: Does not.
	Pressure Setup	**#iiRefPress=x**	**x=** reference pressure (decibars) (for 16*plus*-IM V2 without pressure sensor).
		#iiParosIntegration=x	**x=** integration time (sec) for Quartz pressure sensor (1 – 600 sec; default 1 sec).
	Voltage Sensor Setup	**#iiVolt0=x, #iiVolt1=x, #iiVolt2=x, #iiVolt3=x, #iiVolt4=x, #iiVolt5=x**	**x=Y**: Enable external voltage (voltage 0, 1, 2, 3, 4, or 5). **x=N**: Do not.
		#iiDelayBeforeSampling=x	**x=** time (sec) to wait after powering external voltages and RS-232 sensors before sampling (0-600 sec; default 0).
		#iiDelayAfterSampling=x	**x=** time (sec) to wait after sampling complete, before turning off power to external voltage and RS-232 sensors (0-100 sec; default 0).
	RS-232 Setup	**#iiSBE63=x**	**x=Y**: Enable SBE 63 optical dissolved oxygen sensor. **x=N**: Do not.
		#iiSBE38=x	**x=Y**: Enable SBE 38 secondary temperature sensor. **x=N**: Do not.
		#iiSBE50=x	**x=Y**: Enable SBE 50 secondary pressure sensor. **x=N**: Do not.
		#iiWetLabs=x	**x=Y**: Enable WET Labs RS-232 sensor. **x=N**: Do not.
		#iiGTD=x	**x=Y**: Enable GTD. **x=N**: Do not.
		#iiDualGTD=x	**x=Y**: Enable dual GTDs. **x=N**: Do not.
		#iiOptode=x	**x=Y**: Enable Aanderaa Optode. **x=N**: Do not.
	Output Format Setup	**#iiOutputFormat=x**	**x=0**: output raw data, Hex. **x=1**: converted data, Hex. **x=2**: raw data, decimal. **x=3**: converted data, decimal. **x=5**: converted data, decimal, XML.
		#iiOutputSal=x	**x=Y**: Calculate salinity (psu) (if **#iiOutputFormat=3** or **5**). **x=N**: Do not.
		#iiOutputSV=x	**x=Y**: Calculate sound velocity (m/sec) (if **#iiOutputFormat=3** or **5**). **x=N**: Do not.
		#iiOutputUCSD=x	**x=Y**: Calculate sigma-t, battery voltage, operating current (if **#iiOutputFormat=3** or **5**). **x=N**: Do not.
		#iiOutputSampleNumber=x	**x=Y**: Output sample number with data (if **#iiOutputFormat=3** or **5**). **x=N**: Do not.
	Autonomous Sampling (Logging)	**#iiSampleInterval=x**	**x** = interval between samples (10 - 14400 sec).
		#iiStartNow	Start logging now. Data stored in FLASH memory.
		#iiStartDateTime= mmddyyyyhhmmss	Delayed logging start: month day year, hour, minute, second.
		#iiStartLater	Start logging at delayed start date and time. Data stored in FLASH memory.
		#iiStop	Stop logging or waiting to log. Must send this command before uploading data.
	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.
		#iiTSS	Take sample, **store in buffer and FLASH memory**, and output data.
		GetLastSamples:x	Output last **x** samples from FLASH memory.
	Data Upload	**GetSamples:b,e** or **#iiDDb,e**	Upload data from scan **b** to **e**. Send **#iiStop** before sending this.
		GetHeaders:b,e or **#iiDHb,e**	Upload headers from header **b** to **e**.