# SBE 37-SM (RS-485) MicroCAT Reference Sheet
## (see SBE 37-SM [RS-485] MicroCAT User's Manual for complete details)

Note: *ii* in commands is MicroCAT's user-assigned ID (0 – 99). For example, #01gethd sends gethd to MicroCAT with ID=01.

## *Setup*

1.  Install AA lithium cells (Note: **SM MicroCATs use a battery pack with a red cover plate**):
    A.  *Remove connector end cap*: Wipe dry housing/end cap seam. Remove 2 flat Phillips-head screws from end cap. Pull end cap out. Disconnect Molex connector connecting end cap to battery pack. Wipe dry O-ring mating surfaces in housing with lint-free cloth.
    B.  *Remove battery pack and install cells*: Loosen captured screw in battery pack cover. Use handle to lift battery pack out of housing. Keep handle upright. Unscrew red cover plate from top of battery pack assembly. Roll 2 O-rings on side of battery pack out of grooves. Insert cells into battery pack, and roll 2 O-rings into grooves on side of battery pack. Align pin on battery cover plate PCB with post hole, keep handle upright, and screw red cover plate onto battery pack assembly.
    C.  *Reinstall battery pack and connector end cap*: Align D-shaped opening and notch. Lower battery pack into housing; push gently to mate. Tighten captured screw to secure battery pack in housing. 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 2 screws.
2.  Install cable. Connect to computer serial port.
3.  Double click on SeatermV2.exe. SeatermV2 opens; in Instruments menu, select *SBE 37 RS485*. Seaterm485 opens.
4.  In Seaterm485's Communications menu, select *Configure*. In dialog box, select Comm port and baud rate (factory set to 9600). Set ID to *Automatically get ID* for 1 MicroCAT on line; set ID to *Use fixed ID* for multiple MicroCATs on line. Click OK.
5.  Seaterm485 should automatically connect to MicroCAT. As it connects, it sends **#iiGetHD** and displays response, and then fills Send Commands window with list of commands for your MicroCAT.
6.  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.
7.  Set Date and Time ((**#iiDateTime=**)).
8.  Set up other parameters if desired — see Command Instructions and Command List. User-selectable sampling modes include:
    *   **Autonomous** – At pre-programmed intervals, wake up, sample, store data in memory, and go to sleep.
    *   **Polled** – On command, take 1 sample and send data to computer. Useful for integrating with satellite, radio, or wire telemetry equipment.
    *   **Serial Line Sync** - In response to simple pulse (or single character) on serial line, wake up, sample, store data in memory, transmit data (if **#iiTxSyncMode=Y**), and go to sleep.

## *Deployment*

1.  Wiring – deploy with dummy plug or cable (for external power and/or serial communication during deployment). Install locking sleeve.
2.  Mount MicroCAT, using Sea-Bird or customer-supplied hardware.

## *Data Uploading*

1.  Connect cable from MicroCAT to computer.
2.  Double click on SeatermV2.exe. SeatermV2 opens; in Instruments menu, select *SBE 37 RS485*. Seaterm485 opens.
3.  In Seaterm485's Communications menu, select *Configure*. In dialog box, select Comm port and baud rate (factory set to 9600). Set ID to *Automatically get ID* for 1 MicroCAT on line; set ID to *Use fixed ID* for multiple MicroCATs on line. Click OK.
4.  Seaterm485 should automatically connect to MicroCAT. As it connects, it sends **#iiGetHD** and displays response, and then fills Send Commands window with list of commands for your MicroCAT.
5.  If sampling autonomously (logging), command MicroCAT to stop logging by sending **#iiStop**.
6.  Click Upload menu to upload stored data.
7.  Seaterm485 prompts you to 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*

*   Input commands in upper or lower case letters, and register commands by pressing Enter key.
*   MicroCAT sends an error message if invalid command is entered.
*   If new command is not received within 2 minutes after completion of a command, MicroCAT returns to quiescent (sleep) state.
*   If in quiescent (sleep) state, re-establish communications by selecting *Connect* in Seaterm485's Communications menu, sending two @ characters, or pressing any key.
*   For reliable operation, all commands *may* need to be preceded with two @ characters.
    *Example* (status command for MicroCAT 01):      `@@#01DS`

Shown on page 2 are the commands used most commonly in the field. See the Manual for complete listing and detailed descriptions.

## Command List

| CATEGORY | COMMAND | DESCRIPTION |
|---|---|---|
| **Global** | **DateTime= mmddyyyyhhmmss** | Set clock month, day, year, hour, minute, second. |
| | **GData** | Command **all** MicroCATs to take 1 sample. MicroCATs hold data in buffer until receiving **Dataii**. Data not stored in FLASH memory. |
| | **PwrOff** | Enter quiescent (sleep) state. Main power turned off, but data logging and memory retention unaffected. |
| **Get Data** | **Dataii** | Get data obtained with **GData**. |
| **ID** | **ID?** | Get MicroCAT ID. |
| | **\*ID=ii** | Set MicroCAT ID to **ii**, where **ii**= 0-99. Command must be sent twice. |
| **Status** | **#iiGetCD** | Get and display configuration data. |
| | **#iiGetSD** | Get and display status data. |
| | **#iiGetCC** | Get and display calibration coefficients. |
| | **#iiGetEC** | Get and display event counter data. |
| | **#iiResetEC** | Reset event counter. |
| | **#iiGetHD** | Get and display hardware data. |
| | **#iiDS**   or   **!iiDS** | Get and display status. |
| | **#iiDC** | Get and display calibration coefficients. |
| **General Setup** | **#iiBaudRate=x** | **x**= baud rate (600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, or 115200). |
| | **#iiRxDelay=x** | **x**= delay after MicroCAT receives command until transmitter enabled (1 - 500 msec). Default 25 msec. |
| | **#iiTxDelay=x** | **x**= delay after MicroCAT transmits reply until transmitter disabled (1 - 500 msec). Default 25 msec. |
| | **#iiDateTime= mmddyyyyhhmmss** | Set clock month, day, year, hour, minute, second. |
| | **#iiOutputExecutedTag=x** | **x=Y**: output XML Executed and Executing tags.                                    **x=N**: do not. |
| | **#iiReferencePressure=x** | **x**= reference pressure (gauge) in db (used when MicroCAT has no pressure sensor). |
| **Memory Setup** | **#iiInitLogging** | Initialize logging to make entire memory available for recording. |
| | **#iiSampleNumber=x** | **x**= sample number for last sample in memory. **#iiSampleNumber=0** equivalent to **#iiInitLogging**. |
| **Output Format Setup** | **#iiOutputFormat=x** | **x=0**: output raw decimal data.                          **x=2**: output converted decimal data in XML.<br>**x=1**: output converted decimal data.          **x=3**: output converted decimal data, alternate format. |
| | **#iiOutputSal=x** | **x=Y**: calculate and output salinity (psu).                                    **x=N**: do not. |
| | **#iiOutputSV=x** | **x=Y**: calculate and output sound velocity (m/sec).                        **x=N**: do not. |
| | **#iiOutputDepth=x** | **x=Y**: calculate and output depth (m).                                    **x=N**: do not. |
| | **#iiOutputDensity=x** | **x=Y**: calculate and output density sigma ($kg/m^3$).                        **x=N**: do not. |
| | **#iiLatitude=x** | **x**= latitude (degrees) to use in depth calculation. |
| **Autonomous Sampling (Logging)** | **#iiSampleInterval=x** | **x** = interval between samples (6 - 21600 sec). When commanded to start sampling with **#iiStartNow** or **#iiStartLater**, at **x** second intervals MicroCAT takes sample, stores data in FLASH memory, and goes to sleep. |
| | **#iiStartNow** | Start logging now. |
| | **#iiStartDateTime= mmddyyyyhhmmss** | Delayed logging start: month, day, year, hour, minute, second. |
| | **#iiStartLater** | Start logging at delayed logging start time. |
| | **#iiStop** | Stop logging or waiting to start logging. Send **#iiStop** before uploading data. |
| **Polled Sampling** | **#iiTS** | Take sample, store data in buffer, output data. |
| | **#iiTSR** | Take sample, store data in buffer, output data in raw decimal form (regardless of **#iiOutputFormat=**). |
| | **#iiTSH** | Take sample, store data in buffer, do not output data. |
| | **#iiTSS** | Take sample, store data in buffer and in FLASH memory, output data. |
| | **#iiTSN:x** | Take **x** samples, output data. |
| | **#iiSL** | Output last sample stored in buffer. |
| | **#iiSLT** | Output last sample stored in buffer, then take new sample and store data in buffer. |
| **Serial Line Sync** | **#iiSyncMode=x** | **x=Y**: Enable serial line sync mode.                                    **x=N**: disable serial line sync mode. |
| | **#iiTxSyncMode=x** | **x=Y**: Transmit real-time data in serial line sync mode.                        **x=N**: do not. |
| **Data Upload** | **#iiDDb,e** | Upload data from scan **b** to **e**, in alternate converted decimal form (**#iiOutputFormat=3**) (regardless of setting for **#iiOutputFormat**). |
| | **#iiGetSamples:b,e** | Upload data from scan **b** to **e**, in format defined by **#iiOutputFormat**. |
| **Calibration Coefficients** | *See manual.* | |