KMHYD-4900011, Rev 0.1
Seaglider® Piloting Parameters Manual – For Firmware Version 67.00
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Created from KMHYD-Tmpl-7231, Rev E

Huntington Ingalls Industries

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1. Introduction

The Seaglider Piloting Parameters Manual contains the commands available in the 67.00 firmware and the associated definition used by the pilot to operate the vehicle. Section 2 explains the parameter conventions and the use of the command file (cmdfile) state directives. Section 3 provides in alphabetical order a definition and the minimum, maximum and nominal value of each parameter followed by a section listing the parameters by function and ending with a listing of the parameters by frequency of editing required during a mission.

2. Details

2.1. Parameter Conventions

2.1.1. All parameters have a leading $ in their name. This guide uses boldface font to denote all parameters, and italic font for file names. Most parameters in this manual are provided with nominal values.
Note: Nominal values are not default values. The values for your glider may be different.

2.1.2. Parameters associated with a dive are reported by Seaglider in the .log file. These include all pilot modifiable parameters described in this document. The values generated on board the Seaglider such as glide angle, pitch angle, and desired heading are given parameter-like names with a leading $ for consistent parsing during post-dive data processing.

2.2. Command File (cmdfile) State Directives

2.2.1. The command file (cmdfile) directives control the state of autonomous Seaglider operations. The directives are given as the last (sometimes only) line of the command file. The command file is stored on the Basestation and transferred to Seaglider during communication sessions. Directives do not have associated values. Table 1 lists the three directives and their use. Table 2 outlines the effect of each directive on Seaglider in each of the autonomous run states: diving and recovery.

Table 1: Directives

Directive	Definition
$GO	This command will cause Seaglider to continue in its current mode of operation. If in an autonomous run, doing repeated dives, it will continue to dive according to its current set of parameters. If a **$GO** command is received while Seaglider is in the recovery state, Seaglider will stay in the recovery state. If **$GO** is received while Seaglider is in the diving state it will continue the dive state. **Note:** error conditions may cause the operating code to change the state of Seaglider from diving to recovery regardless of the directive.

$RESUME	This command will cause Seaglider to resume diving from within the recovery state, using its current set of parameters. If Seaglider is in dive state at the time the **$RESUME** command is received, it will continue diving. If Seaglider is in recovery state at the time it receives a **$RESUME**, it will start diving with existing parameters.
$QUIT	This command will cause Seaglider to go immediately to the recovery state. In recovery, the Seaglider will hold at the surface, sleeping **$T_RSLEEP** minutes between the end of one communication session and the start of the next. There are about two minutes of communication overhead associated with each session, so the sessions are approximately (**$T_RSLEEP+2**) minutes apart. Replacing the **$QUIT** directive with a **$RESUME** directive will cause Seaglider to initiate a new dive with the existing set of parameters.

Table 2: Effect of directive on dive or recovery state

State	Directive		
	$GO	**$RESUME**	**$QUIT**
Diving	Diving	Diving	Recovery
Recovery	Recovery	Diving	Recovery

3. Piloting Parameters

3.1. Parameter Format

Seaglider parameters are modifiable by the pilot via the command file (cmdfile), using the convention $NAME,value (Example: $SM_CC,475).

Note: There is no space between the comma and the value for the definition of a parameter.

3.2. Alphabetized Parameters

Table 3: Alphabetized parameters

Parameter	Glider Model	Nominal Value	Minimum Value	Maximum Value
$AH0_10V *Set by manufacturer. Do not change* The capacity of the secondary battery pack (Amp Hr) for a 24V/10V Seaglider system. There is a small safety factor in this number, and its accuracy has been verified in post-recovery depletion testing of Seaglider battery packs. Seagliders with the 24V/10V battery system go into the recovery state if the total secondary (10V) battery pack amp-hours used on a mission equals or exceeds this value. For Seagliders configured with the 15 V shared bus system, when either **$AH0_10V** or **$AH0_24V_**is zero, all the energy is charged to the other pack. To keep consistency between 15V glider systems, HII recommends setting **$AH0_10V** to zero and **$AH0_24V** to 310.	M1	10V: 95 15V: 0	1	100
$AH0_24V *Set by manufacturer. Do not change.* The capacity of the main battery pack (Amp Hr) for a 24V/10V Seaglider system. There is a small safety factor in this number, and its accuracy has been verified in post-recovery depletion testing of Seaglider battery packs. Seagliders with the 24V/10V battery system go into the recovery state if the total main battery pack (24 V) amp-hours used on a mission equals or exceeds this value. For Seagliders configured with the 15 V shared bus system, when either **$AH0_10V** or **$AH0_24V** is zero, all energy usage is charged to the other pack. To keep consistency between 15V glider systems, HII recommends setting **$AH0_24V** to 310 and **$AH0_10V** to 0.	M1	24V: 145 15V: 310	1	150
$ALT_TEL_NUM The alternate telephone number Seaglider dials to connect to the Basestation if it is unable to connect via the primary number, 13 digits maximum. The format for the number is: international country code without leading zeroes (for example, “1” for the US), then city/area code				

Parameter	Glider Model	Nominal Value	Minimum Value	Maximum Value
and number. There are no spaces or other interrupting characters between country code, city/area code or number. This parameter is an output from the Seaglider and can be found in each dive's .pvt file. The **$ALT**... mechanism allows for automatic switching between two telephone numbers in the event of a communication failure. If a communication session using the primary phone number (**$TEL_NUM**) does not successfully connect (after **$CALL_TRIES** attempts), the phone number is switched to the alternate number either during the same surfacing or for the next surfacing. When the phone number is switched is dependent on bit 8 setting in **$NOCOMM_ACTION**. If a communication session completes successfully on the alternate phone number, the phone number is switched back to the primary for the next surfacing. **NOTE:** The number is edited using either the pdoscmds.bat file, the **$PDOSCMD, altnum xxxxxxxxxxxx** parameter in the cmdfile, or through direct connection to Seaglider using the menus. The xxxxxxxxxxxx is the 12 digit the Iridium number.				
$ALTIM_BOTTOM_TURN_MARGIN The distance (in meters) from the altimeter detected sea floor (or obstacle) at which to initiate the apogee maneuver (bottom turn). A value of 0 disables the use of the altimeter to determine the start of the apogee maneuver.	M1	12	0	100
$ALTIM_FREQUENCY Frequency (kHz) used for altimeter pings. 13kHz is the most acoustically (and energy) efficient frequency for this transducer. However, if another sensor on the Seaglider operates at this frequency, the altimeter frequency should be changed to a different value within its operational range.	M1	13	10	25
$ALTIM_PING_DELTA If the altimeter does not receive a successful return and confirmation ping return at **$ALTIM_PING_DEPTH**, it continues to issue pings at depth intervals of **$ALTIM_PING_DELTA** meters until it receives a successful return and confirmation ping, or apogee is triggered by another means.	M1	5	0	1000
$ALTIM_PING_DEPTH The depth of the first altimeter ping (meters), if non-zero.	M1	90	0	1000

Parameter	Glider Model	Nominal Value	Minimum Value	Maximum Value
If the altimeter receives a return, and a return to an immediate second confirmation ping, it sets the bottom depth equal to the current depth plus the altimeter range to the bottom. The apogee maneuver is initiated at **$ALTIM_BOTTOM_TURN_MARGIN** meters above the bottom. If **$ALTIM_BOTTOM_TURN_MARGIN** = 0, the apogee maneuver is triggered by **$USE_BATHY** if activated, or **$D_TGT**. If **$ALTIM_PING_DEPTH** is non- zero, the altimeter timeout is set so that the maximum range is the larger of 0.75***$ALTIM_PING_DEPTH** and 1.2* **$ALTIM_TOP_PING_RANGE** if set. The first test is meant to exclude surface returns. **NOTE**: **$ALTIM_PING_DEPTH** and **$ALTIM_BOTTOM_PING_RANGE** modes are mutually exclusive. If **$ALTIM_BOTTOM_PING_RANGE** is set, it is honored to the exclusion of **$ALTIM_PING_DEPTH.**				
$ALTIM_PING_FIT** Range fit parameter for continuous ranging (mRN). mRN is a three-digit integer where m is a slope threshold, R is an R^2 threshold and N is number of pings to use in a linear fit. When **$ALTIM_PING_FIT is set the altimeter pings continuously during both dive and climb every **$ALTIM_PING_DELTA** meters. It uses the results from every N pings to try to fit a line between ping depth and altimeter range that indicates the presence of a boundary that is either getting closer or further away. It uses the m and R thresholds to determine the quality and validity of that fit to determine whether the detection is actionable according to **$ALTIM_BOTTOM_MARGIN**, **$ALTIM_TOP_MARGIN** and **$ALTIM_TOP_MIN_OBSTACLE**. A typical value might be 883 indicating use of three pings and checking the result against a slope of 0.8 and an R^2 of 0.8.	M1	0	0	999
$ALTIM_PULSE Pulse width (ms) of altimeter pings. This parameter is used in conjunction with **$ALTIM_SENSITIVITY** to tune the altimeter. Parameter Value — Pulse Width (ms) 1 — 1 2 — 2 3 — 3 4 — 4 5 — 5 6 — 6	M1	3	1	9

Parameter	Glider Model	Nominal Value	Minimum Value	Maximum Value
7 7 8 8 9 9 If the altimeter is receiving false hits, the values of **$ALTIM_PULSE** and **$ALTIM_SENSITIVITY** should be increased incrementally. If the altimeter is unable to find the bottom, the values of **$ALTIM_PULSE** and **$ALTIM_SENSITIVITY** should be decreased incrementally. Tuning is often best achieved by alternately adjusting **$ALTIM_PULSE** and **$ALTIM_SENSITIVITY** by one unit until the altimeter returns realistic depth values.				
$ALTIM_SENSITIVITY Sensitivity (volts) of the altimeter envelope detector. A value of 0 disables the envelope detector, causing the altimeter to trigger on any return of the receive frequency. Values between 1 and 5 require that the return signal sustain the specified voltage for the duration of the pulse width (**$ALTIM_PULSE**) before a triggering is received. Sensitivity DC Level 0 Altimeter circuitry not used 1 0.25 V 2 0.5 V 3 1.0 V 4 2.0 V 5 4.0 V This parameter is used in conjunction with **$ALTIM_PULSE** to tune an altimeter. If the altimeter is receiving false hits, the values of **$ALTIM_PULSE** and **$ALTIM_SENSITIVITY** should be increased incrementally. If the altimeter is unable to find the bottom, the values of **$ALTIM_PULSE** and **$ALTIM_SENSITIVITY** should be decreased incrementally. Tuning is often best achieved by alternately adjusting **$ALTIM_PULSE** and **$ALTIM_SENSITIVITY** by one unit until the altimeter returns realistic depth values.	M1	2	0	5
$ALTIM_TOP_MIN_OBSTACLE Minimum obstacle depth (in meters) to honor initiating a subsurface finish.	M1	1	0	100
$ALTIM_TOP_PING_RANGE Depth (meters) from the presumed surface to ping the altimeter. A value of 0 disables a ping.	M1	0	0	500

Parameter	Glider Model	Nominal Value	Minimum Value	Maximum Value
$ALTIM_TOP_TURN_MARGIN Distance (meters) from an altimeter detected obstacle to initiate the sub-surface finish. A value of 0 disables the use of the altimeter to determine the start of the sub-surface finish.	M1	0	0	100
$APOGEE_PITCH The pitch angle the glider transitions to when it observes a depth greater than the apogee depth **($D_TGT**, **$D_GRID** or a bottom detection from the altimeter). During this first stage of the apogee maneuver the Seaglider also rolls to neutral and pumps the VBD to 0 cc (neutral buoyancy). In the second stage of apogee, the pitch angle changes from **$APOGEE_PITCH** to the inverse of the dive angle, the VBD is pumped to the inverse of the amount of oil bled during the dive and the Seaglider begins its ascent.	M1	-5	-20	0
$C_PITCH The center (neutral or flat) position (A/D counts) for pitch. Obtain the initial value from the Seaglider's trim sheet (cal tab cell C15, Pitch Center) and adjust as needed during the deployment. The minimum and maximum software values ($PITCH_MIN and $PITCH_MAX) are also found on the vehicle's trim sheet (cal tab cells C12 and C13, respectively).	M1	2700		
$C_ROLL_CLIMB The center (neutral or straight flight) position (A/D counts) for roll during the climb (positive pitch control) phase. Obtain the initial value from the Seaglider's trim sheet (cal tab cell C30) and adjust as needed during the deployment. The minimum and maximum values, (**$ROLL_MIN** and **$ROLL_MAX**) are also found on the vehicle's trim sheet (cal tab cells C27 and C28, respectively). **NOTE**: The climb and dive roll centers are different due to roll biases induced by physical asymmetries in Seaglider.	M1	2025		
$C_ROLL_DIVE The center (neutral or straight flight) position (A/D counts) for roll during the dive phase (negative pitch control). Obtain the initial value from the Seaglider's trim sheet (cal tab cell C29) and adjust as needed during the deployment. The minimum and maximum software limit values (**$ROLL_MIN** and **$ROLL_MAX**) are also found on the vehicle's trim sheet (cal tab cells C27 and C28, respectively).	M1	2025		

Parameter	Glider Model	Nominal Value	Minimum Value	Maximum Value
NOTE: The climb and dive roll centers are different due to roll biases induced by physical asymmetries in Seaglider.				
$C_VBD The center (neutrally buoyant at a specified density) position (A/D counts) for VBD. Obtain the initial value from the Seaglider's trim sheet (cal tab cell C45) and adjust as needed during the deployment. The minimum and maximum software limit values ($VBD_MIN and $VBD_MAX) are also found on the vehicle's trim sheet (cal tab cells C42 and C43, respectively).	M1	2800		
$CALL_NDIVES The number of profiles (dive/climb cycles) to perform before attempting communications. Seaglider normally surfaces after each profile. GPS fixes 1 and 2 are obtained at the surface, independent of the value of **$CALL_NDIVES.** ⚠ **Caution:** If **$CALL_NDIVES** > 1 is used in conjunction with **$N_NOSURFACE** >= |2|, care must be taken to ensure that Iridium calls made by the Seaglider coincide with the glider completing a surface finish. Otherwise, the glider will not be heard from until it enters recovery state due to **$N_DIVES**, **$STOP_T** or low battery **($MINV_10V** or **$MINV_24V**).	M1	1	1	10
$CALL_TRIES The maximum number of phone calls to attempt between profiles. If the Seaglider is unable to make a call after **$CALL_TRIES**, and bit 8 of $NOCOMM_ACTION is 0, it resumes diving and the phone number is switched to **$ALT_TEL_NUM** for the next surfacing. If the Seaglider is unable to make a call after **$CALL_TRIES**, and bit 8 of **$NOCOMM_ACTION** is 1, it switches to **$ALT_TEL_NUM** and attempts to connect to the Basestation **$CALL_TRIES** times. If the glider is unable to connect to the Basestation, it resumes diving, and the phone number is switched back to **$TELNUM** for the next surfacing.	M1	5	1	20
$CALL_WAIT The time (seconds) between call attempts during a communications session. This wait interval provides time for the Iridium satellite geometry to change and perhaps improve the connection.	M1	60	0	600
$CAPMAXSIZE	M1	400000	1024	400000

Parameter	Glider Model	Nominal Value	Minimum Value	Maximum Value
Maximum size (bytes) of the capture file to upload via Iridium prior to compression. If the capture file exceeds this value, Seaglider creates a new capture file that is of the size requested, per the following strategy: If there are no critical lines of output, the first **$CAPMAXSIZE** bytes are sent. If there are critical lines of output, the new capture file consists of the first 20 lines of the critical output, with a window of output lines surrounding each critical line. Capture files are sent to the Basestation automatically in the cases of critical output or the completion of a self test, or as requested by **$CAPUPLOAD**.				
$CAPUPLOAD A Boolean value that determines if the capture file from the current dive should be uploaded to the Basestation. 0 - do not upload the capture file. 1 - upload the capture file. **Warning:** If a critical error occurs during a dive, the Seaglider Override a **$CAPUPLOAD** setting of 0 and force an upload of the capture file per the description in **$CAPMAXSIZE**. **Note:** Turn $CAPUPLOAD off while the Seaglider is under Normal operation to conserve energy and reduce surface time and Iridium charges.	M1	1	0	1

$COMM_SEQ Defines the sequence of file transfer. A value of zero indicates the standard communication file transfer sequence: command (*cmdfile*), *targets*, *science*, current dive .log and .dat files, current .cap file if $CAPUPLOAD = 1, earlier un-transferred .log and .dat files, earlier un-transferred .cap files if $CAPUPLOAD = 1, pdoscmds.bat, sgdddd.pz.nnn (the results of the pdoscmds.bat commands), and any other files as commanded in *pdoscmds.bat*. A value of 1 indicates skipping the normal data file transmissions and going directly to *pdoscmds.bat* after the cmdfile, targets, science have been sent, so the sequence for file transfers becomes command (*cmdfile*), *targets*, *science*, *pdoscmds.bat*, sgdddd.pz.nnn and any other files as commanded in *pdoscmds.bat*. This was implemented to quickly get the *pdoscmds.bat* file transferred to the Seaglider. It is a control mode to be used only when communications or other Seaglider problems exist.	M1	0	0	1
$COMPASS_DEVICE *Set by manufacturer. Do not change.* Configuration flag (integer) specifying the model and port for the compass and transponder/altimeter devices. This integer value is equal to (port_number + 16*type_number). For example, for a TCM2-50 (type **0**) on general purpose port 1, **$COMPASS_DEVICE** = 1+ 16*0 = 1. The array of available models is specific to each device. The compass device must be defined. This parameter cannot be -1. For transponders not connected to a serial port (for example, Benthos ENT- 380), the null port (0) can be specified.	M1 Rev B M1 Rev E	17 18		
$COMPASS2_DEVICE *Set by manufacturer. Do not change.* **This feature is not available on HII Seagliders.** Defines the second compass, as in **$COMPASS_DEVICE**. -1 means the device is not installed.	M1	-1		

$COMPASS_USE	M1	0	0	4095

During Seaglider development this parameter was used to assess compass problems. It allows manipulation of inputs and outputs in compass calibration and reporting.

For normal operations, use 0 for calibrated values from the compass.

When performing an in-water compass calibration set $COMPASS_USE to 4 (collect raw compass data).

$COMPASS_USE allows for faking input and outputs in compass calibration and reporting. The value is bitmapped as follows:

Bit 0 Heading source:

0 = calibrated magnetic field w/PR corrections

1 = direct from compass (effectively ignores PR bits)

Bit 1 Autocalibration mode (experimental):

0 = no auto calibration

1 = leave compass on throughout flight and run auto calibration

Bit 2 Offboard cal mode (experimental):

0 = do not report mag values in data file

1 = report mag values in data file for use in off board cal

Bits 3-4 pitch source for heading correction:

0 = calibrated from sensor inputs per normal routine

1 = use value direct from compass

2 = calculate based on pitch mass position and gain

Bits 5-6 roll source for heading correction

0 = calibrated from sensor inputs per normal routine

1 = use value direct from compass

2 = calculate based on pitch mass position and gain

Bits 7-8 pitch to report in data stream

0 = calibrated from sensor inputs per normal routine

1 = use value direct from compass

2 = calculate based on pitch mass position and gain

Bits 9-10 roll to report in data stream

0 = calibrated from sensor inputs per normal routine

1 = use value direct from compass

2 = calculate based on pitch mass position and gain

Bit 11 which compass device to use

0 = COMPASS_DEVICE

1 = COMPASS2_DEVICE A value of 40 (0x28) will calculate a pitch and roll from control positions for use in the heading calibration but will report calibrated pitch and roll in the data stream. A value of 680 (40 + 640) will use the control position calculated attitudes for reporting as well.				
$CP_NDIVE Modulo value that limits current profiler data collection to every nth dive. 0: disable, collect current profiler data every dive 1-N: only collect current profiler data every this many dives For example, if **$CP_DIVE,5** recorder is run every 5th dive.	M1	1	1	9999
$CP_PROFILE A Current Profiler command that specifies when the acoustic sensor will record data: never, downcast only, up-cast only or both down- and up-cast. 0 = never 1 = downcast only 2 = up-cast only 3 = downcast and up-cast **Note:** This parameter is only present in the log files of gliders with an installed Current Profiler (AD2CP).	M1	3	0	3
$CP_RECORDABOVE A Current Profiler command that sets the depth (meters) to which the sensor will sample. A value of 0 turns the sensor off. **Note:** This parameter is only present in the log files of gliders with an installed Current Profiler (AD2CP).	M1	1000	0	1000
$CP_STARTS A diagnostic value output by the Current Profiler, that keeps track of the number of times the sensor restarts during a mission. There should be two restarts per dive: one for the downcast and one for the upcast. **Note:** This parameter is only present in the log files of gliders with an installed Current Profiler (AD2CP).	M1			
$CP_UPLOADMAX This command is not used by the Current Profiler although it is listed in the .log file. Instead, the size of the decimated file sent from the Current Profiler at the end of a dive is specified in the NCP_GO file. The NCP_GO file can be modified by the user, is located on the Basestation, and is picked up by the glider at each surfacing.	M1			

Note: This parameter is only present in the log files of gliders with an installed Current Profiler (AD2CP).				
$CP_XMITPROFILE A Current Profiler command that specifies if the decimated data file from a dive is uploaded to the Basestation. The up-cast and down-cast data is contained in the same file. A value of 1 means the decimated data file will be transferred from the Current Profiler to the Basestation. A value of zero means no Current Profiler data will be uploaded to the Basestation. **Note:** This parameter is only present in the log files of gliders with an installed Current Profiler (AD2CP).	M1	1	0	1
$CURRENT An output from Seaglider of depth averaged current (m/s, degrees, Boolean validity check) calculated by the glider when **$NAV_MODE,2** is used. For example, an output of **$CURRENT**,0.035, 283.8,1 means the Seaglider calculated a depth averaged current of 3.5 cm/s at 283.8 degrees east of north and it judged the calculation to be valid.	M1			
$D_ABORT The maximum depth (meters) for Seaglider operations. If this depth is reached, the dive is aborted and Seaglider immediately enters the recovery state.	M1	1020	0	1020
$D_BOOST A VBD system parameter to define the depth (meters) above which only the boost pump will run. **$D_BOOST** is set based on the pump characteristics of the VBD system. The nominal values listed represent the most efficient use for the Standard Boost Pump (SBP). The maximum value should not be exceeded. Doing so can mean loss of your glider. If **$D_BOOST**=0, both the boost pump and the main pump run simultaneously at all depths. If Seaglider VBD starts pumping at a depth greater than **$D_BOOST**, both pumps are used. Both the boost and main pumps are used following a retry. **NOTE**: Some older gliders may still have a High Pressure Boost Pump (HPBP) installed, with a 200 psi check valve on the reservoir. While these vehicles can be operated on the boost pump alone at depths up to 120m, it is not recommended as doing so will significantly shorten the pump's life.	M1	SBP: 20	0	20
$D_CALL	M1	0	0	5

A depth (meters) above which the glider will initiate the GPS acquisition and Iridium phone call portion of the surface maneuver. If this depth is not reached, a subsurface finish is executed A value of 0 means the glider initiates the GPS acquisition and Iridium phone call at the surface.				
$D_FINISH The depth (meters) at which a dive is considered completed. Normally this is 0 but can be a number greater than zero to specify the depth at which subsurface finish maneuvers should be started. Used only when an additional trigger to initiate a subsurface finish is present (see **$N_NOSURFACE**). **NOTE**: If a subsurface finish has been triggered by **$N_NOSURFACE** and **$D_FINISH >=$D_SURF**, the dive will complete a subsurface finish. However, if a subsurface finish has been triggered by **$N_NOSURFACE** and **$D_FINISH < $D_SURF**, the dive will finish at the surface.	M1	0	0	1000
$D_FLARE The depth (meters) at which Seaglider flares to the target pitch angle. The guidance and control (G&C) action at the start of the dive phase maintains full pitch forward as VBD bleeding takes place. As soon as Seaglider reaches **$D_FLARE**, a new G&C action is initiated. Pitch is adjusted first (the flare), then VBD is adjusted (bleed to the target VBD as necessary), and finally roll is actuated to turn Seaglider to the correct heading.	M1	3	0	50
$D_NO_BLEED The depth (meters) below which Seaglider will not bleed (move) oil from the bladder into the internal reservoir on dives. This parameter also defines the depth at which the **$T_NO_W** parameter takes effect. **Caution:** Do not exceed the specified maximum value. Opening the bleed valve when at pressure can cause it to stick in the open position.	M1	200	10	500
$D_OFFGRID The depth (meters) that the bathymetry map look-up routine returns if the Seaglider is outside the area covered by the loaded bathymetry map/s. This parameter is used with **$USE_BATHY**.	M1	100	10	1000
$D_PITCH	M1	0	0	5

Depth (meters) to initiate a surface pitch maneuver. If a depth shallower than this value is not reached, then a subsurface maneuver is executed. A value of 0 means the surface pitch maneuver is executed at the surface.				
$D_SAFE The target depth (meters) to use when flying an escape route and limiting the dive depth for VBD safety reasons. The escape is triggered by either VBD max errors exceeded or uncommanded bleed. If set to 0, the parameter is disabled.	M1	0	0	990
$D_SURF The depth (meters) at which Seaglider begins its approach to the surface. To collect data all the way to the surface, at **$D_SURF** Seaglider computes how many more data samples to take, based on the observed vehicle vertical speed, depth, and the data sample interval. The number of additional points is limited to 50. Seaglider then enters the passive guidance and control (G&C) mode and collects that number of data points at the appropriate sample interval for the depth range. When complete, Seaglider enters the surface phase. **NOTE**: This approach occasionally results in the last few data samples being taken when the conductivity sensor is in air, giving unrealistic conductivity values. These samples can be removed in shore-side processing.	M1	3	0.5	10
$D_TGT The nominal depth (meters) at which Seaglider begins the apogee phase, the transition from the negatively buoyant, pitch down dive to positively buoyant, pitch up climb. This parameter is used in conjunction with **$T_DIVE** to determine the target vertical velocity for the dive and climb. The actual depth of the apogee maneuver starting point may be triggered by one of three means: **$D_TGT**, reading a digital bathymetric map (**$D_GRID**), or using the altimeter. If more than one depth trigger is in use, the apogee maneuver begins when the depth exceeds that of the shallowest depth returned by the activated trigger(s). In any case, the vertical velocity specified by the combination of **$D_TGT** and **$T_DIVE** is retained by appropriate scaling of **$T_DIVE**.	M1	30	1	990

⚠ Caution: Do not exceed the specified maximum value. The glider continues its descent during apogee until enough oil has been pumped into the bladder to make it neutrally buoyant. The pumping process takes several minutes. Setting $D_TGT to 990 allows the glider to descend several meters during the pumping activity without running the risk of exceeding the 1000m depth rating.				
$DBDW Overrides the hydro model calculated derivative of buoyancy with respect to w (vertical speed) used as a gain term in adjusting buoyancy to achieve the desired vertical speed. If the parameter is zero, then the on-board calculated value is used. Units are grams per m/s. Typical on-board calculated values are 2000-4000.	M1	0	0	10000
$DEEPGLIDER *Set by manufacturer. Do not change.* Indicates whether the glider is a standard Seaglider (M1) with a maximum depth capability of 1000m, a Coastal glider (C2) with a maximum depth capability of 200m or a Deepglider (M6) with a maximum depth capability of 6000m. A zero indicates the glider is standard; 1 indicates the glider is a Deepglider, and 2 indicates a glider is a C2 (200m).	M1	0		
$DEVICE[1/2/3/4/5/6] *Set by manufacturer. Do not change.* Configuration flags specifying device type and port for each of the six possible attached science sensors. Empty device slots are indicated with a parameter value of -1. Non-negative integer entries indicate that a device is attached. The encoding is specific to the version of the Seaglider software. These entries are set through the Seaglider menu system at HII.	M1		-1	1024
$DIVE The number of the next dive. **Note:** The dive number is updated to this value immediately after the *cmdfile* is picked up by the glider. This means that the dive number for the just completed dive (data not yet transferred) will be updated to this new value. For example: The glider is underwater collecting data on dive number 7. At the completion of dive 7 the glider obtains a GPS position and initiates a call to the Basestation. The glider picks up the *cmdfile* waiting for it on the Basestation. In the *cmdfile* is	M1	1	0	9999

the parameter **$DIVE,12**. The glider immediately changes the number of the just completed dive from 7 to 12. The dive data is then downloaded with the processed file name pxxx0012.y not pxxx0007.y. At the completion of the data download, the glider obtains another GPS position and begins dive 13. After the *cmdfile* with this parameter has been picked up by the glider (glider has started the next dive), the parameter should be deleted from the cmdfile unless further manipulation of dive numbers is desired. If **$DIVE,12** is left in the *cmdfile*, at the next surfacing the data collected on dive 13 will be renamed to dive 12 and overwrite the previous dive 12 data. If **$DIVE** is not listed in the *cmdfile*, the dive number will automatically increment by 1 at the start of a dive and the data from that dive will retain that dive number.				
$ES_NDIVE Modulo value that limits echo sounder data collection to every nth dive. 0: disable, collect echo sounder data every dive 1-N: only collect echo sounder data every this many dives For example, if **$ES_DIVE,5** recorder is run every 5th dive.	M1	1	1	9999
$ES_PROFILE An Echo Sounder command that specifies when the sensor will record data: never, down-cast only, up-cast only or both down- and up-cast. 0 = never 1 = down-cast only 2 = up-cast only 3 = down-cast and up-cast **Note:** This parameter is only present in the log files of gliders with an installed Echo Sounder.	M1	3	0	3
$ES_RECORDABOVE An Echo Sounder command that sets the depth (meters) to which the sensor will sample. A value of 0 turns the sensor off. **Note:** This parameter is only present in the log files of gliders with an installed Echo Sounder.	M1	1000	0	1000
$ES_STARTS A diagnostic value output by the Echo Sounder, that keeps track of the number of times the sensor restarts during a mission. There should be two restarts per dive: one for the downcast and one for the up-cast.	M1			

Note: This parameter is only present in the log files of gliders with an installed Echo Sounder.				
$ES_UPLOADMAX This parameter is not used by the Echo Sounder. Data is not transferred from the sensor to the Basestation during the mission. Instead, the stored data is downloaded directly from the Echo Sounder CF card at the end of the mission. **Note:** This parameter is only present in the log files of gliders with an installed Echo Sounder.	M1	0		
$ES_XMITPROFILE This parameter is not used by the Echo Sounder. Data is not transferred from the sensor to the Basestation during the mission. Instead, the stored data is downloaded directly from the Echo Sounder CF card at the end of the mission. **Note:** This parameter is only present in the log files of gliders with an installed Echo Sounder.	M1	0		
$ESCAPE_HEADING The base heading the Seaglider steers in an escape recovery situation when either no position fix is available, or no escape target was supplied in the *targets* file.	M1	0	0	360
$ESCAPE_HEADING_DELTA An offset, determined by the pilot, that is added or subtracted from **$ESCAPE_HEADING** to achieve the actual heading steered by Seaglider in an escape recovery situation. The **$ESCAPE_HEADING_DELTA** sign will switch (and thus the heading will toggle) when the bottom depth (as detected by altimetry or **$T_NO_W**) shallows by 5% relative to the depth at the last toggle.	M1	10	0	360
$FERRY_MAX Maximum correction (degrees) to apply to the rhumb line to the active (next) waypoint when **$NAV_MODE =** 2. This is a safety limit to prevent spurious depth-averaged current calculations from providing Seaglider a heading in the wrong direction.	M1	45	0	90
$FG_AHR_10V	M1			

Cumulative A-hr consumed from the 10V pack as tracked by the supervisor fuel gauge. This parameter is automatically updated whenever the fuel gauge is read, and the supervisor's onboard accumulators are cleared. When reported in the log file it reflects the fuel gauge state at the start of the dive. This parameter is only relevant for Rev C and later Seaglider motherboards. It does not trigger the $AH0_10V amp hours exceeded safety abort; the value in $10V_AH controls this abort. For Rev B and earlier, this parameter is always zero. [0]				
$FG_AHR_24V Cumulative A-hr consumed from the 24V pack as tracked by the supervisor fuel gauge. This parameter is automatically updated whenever the fuel gauge is read, and the supervisor's onboard accumulators are cleared. When reported in the log file it reflects the fuel gauge state at the start of the dive. This parameter is only relevant for Rev E and later Seaglider motherboards. It does not trigger the $AH0_24V amp hours exceeded safety abort; the value in $24V_AH controls this abort. For Rev B and earlier, this parameter is always zero. [0]	M1			
$FILEMGR *Set by manufacturer. Do not change.* An integer parameter for on-board file system management. 0 = No file management 1 = Only store compressed files 2 = Delete splits on failed phone call	M1	0	0	2
$FIX_MISSING_TIMEOUT Time in days to tolerate a lack of any valid navigation fix (GPS, RAFOS, Iridium geolocation) before triggering recovery. 0 disables this feature.	M1	0	0	365
$GLIDE_SLOPE The absolute value of the maximum glide slope (degrees) that may be commanded. The glide slope is calculated on-board Seaglider to best achieve the goals of the next dive. The stall angle provides the lower limit; this parameter is the upper limit.	M1	30	10	90
$GPS_DEVICE *Set by manufacturer. Do not change.* A configuration value specifying the model of the attached GPS device.	M1 Rev B 16	32 16	0 0	1023 1023

A GPS device must be defined; a value of -1 is not permitted. These devices have dedicated hardware ports on all motherboard revisions and as such a port specification is not necessary.	M1 Rev E			
$HD_A The hydrodynamic parameter representing the lift coefficient determined empirically and used in Seaglider's on-board performance prediction and guidance calculations.	M1	0.003548	0.001	0.007
$HD_B The hydrodynamic parameter representing the drag coefficient determined empirically and used in Seaglider's on-board performance prediction and guidance calculations.	M1	0.011220	0.004	0.02
$HD_C The hydrodynamic parameter representing the induced drag coefficient determined empirically and used in Seaglider's on-board performance prediction and guidance calculations. This parameter has little effect on Seaglider's hydrodynamic flight model and is generally left at the nominal value.	M1	7.5E-06	1.0E-06	3.0E-05
$HEAD_ERRBAND Deadband for heading (degrees). This value is used to determine if a correction to heading is required during an active guidance and control (G&C) mode. If the absolute value of the difference between the actual heading and the desired heading is less than or equal to **$HEAD_ERRBAND**, no heading correction is made. If the difference is greater than **$HEAD_ERRBAND**, a turn is performed until the desired heading is passed, or until the amount of time **$T_TURN** has elapsed.	M1	10	0	180

$HEADING A floating-point value between -1.0 and 360.0 (true degrees, 0.0 and 360.0 are equivalent values) used in conjunction with the **$NAV_MODE** parameter to determine the course steered by the Seaglider. If **$NAV_MODE** is 0, 1, or 2 and the value of **$HEADING** is between 0.0 and 360.0, the glider will use this value to synthesize a waypoint 20 km distant on the specified bearing from the current location. If **$NAV_MODE** is 3, **$HEADING** is added to the depth-averaged current calculated for the previous dive, to generate a current corrected heading for the present dive that is the specified amount to the right of the current. Note 1: If **$HEADING** = -1, the Seaglider will navigate using the *targets* file. If **$HEADING** does not equal -1 and a *targets* file is present, the value in **$HEADING** will take precedence. Note 2: If the user switches navigation method from heading to targets, the glider will fly toward the first waypoint in the *targets* file. The glider can be directed to fly toward a different waypoint in the *targets* file using the *pdoscmds.bat* file discussed in the Extended PicoDOS Reference Manual or by using the **$PDOSCMD,xxx** parameter (xxx = waypoint name) in the cmdfile.	M1	-1	-1	360
$ICE_FREEZE_MARGIN *Set by manufacturer. Do not change.* This feature is not available on HII manufactured Seagliders. Temperature margin (°C) to apply to the freezing point calculation, weighted by the ice condition for surfacing decisions. For in situ freezing point Tf and temperature T, the glider will only surface if: $T > Tf + (\$\mathbf{ICE\_FREEZE\_MARGIN})(ic - 1)$ Where: ic is the ice condition defined by the ice map and parameter **$USE_ICE**.	M1	.3	-2	2
$ID *Set by manufacturer. Do not change.* Seaglider identification (serial) number. Leading zeroes are not required. This identification number is used in many ways, including creating Seaglider's login on the Basestation, file naming conventions and as a serial number for manufacturing purposes.	M1		0	999
$INT_PRESSURE_SLOPE *Set by manufacturer. Do not change.*	M1 Rev B	9.7656E-3		

The slope calibration of the internal pressure sensor (psia per A/D count). There is a linear slope for the output voltage of the internal pressure sensor. At zero vacuum and zero pressurization the output voltage of the sensor is expected to be 0 mV. When pulling the vacuum, the output voltage increases by (1 mV/0.0097656 psi). To create uniformity between all gliders, the initial pressure reflected with zero vacuum should be 14.5 psi. To accomplish this, the gliders must use $INT_PRESSURE_SLOPE,0.0097656. The y-intercept should also be set such that the *Initial reading* + $INT_PRESSURE_YINT = 14.5. To accomplish this, subtract the initial reading from 14.5, set $INT_PRESSURE_YINT to this value and then pull the vacuum of the glider to 9.5 psi. The sensor has an operation range of 0 to 30 psia, with a 90 mV output at full-scale, at 12 VDC. The output is proportional to the supply. The Seaglider excitation is 4.096 V and the gain is 100; therefore: Output voltage @ 30 psia = 90 mV (4.096 Vs / 12 VDC) with gain of 100 = 30.72 mV or 0.0097656 psi/mV = 0.0097656 psi/AD counts with gain of 100**.**	M1 Rev E	1.96E-06		
$INT_PRESSURE_YINT *Set by manufacturer. Do not change.* The y-intercept of the linear calibration of the internal pressure sensor.	M1	0	-5	5
$KALMAN_USE The control parameter for the run state of the Kalman filter navigation program. The **$NAV_MODE** parameter controls whether the Kalman filter output heading is used to control Seaglider. Only $NAV_MODE,1 uses the Kalman filter output. This separation of functions allows the Kalman filter to be run, but not used, while it "learns" the currents. Bits 0 and 1 together indicate the command mode of the filter and control its operation as described below. 0 = Reset the Kalman state vector and origin of local Kalman coordinate system to 0 and restart the filter. 1 = Run the Kalman filter 2 = Do not run the Kalman filter **Examples** If **$KALMAN_USE** is 0 or 1, and **$NAV_MODE** is 1, the **$KALMAN_USE** filter results are used to determine the Seaglider	M1	2	0	2

heading.

If **$KALMAN_USE** is 2 and **$NAV_MODE** is 1, Seaglider will choose the heading directly to the target it is attempting to achieve and fly on that heading without attempting to make any corrections for currents.

$KERMIT M1 0

Set by manufacturer. Do not change.

The Kermit file transfer method is not available on HII Seagliders.

$LOGGERS M1 1 0 15

A bit mask to define which Autonomous Logger Interface (ALI) devices to enable or disable.

When **$LOGGERS** is set to 0, no ALI devices run during self tests, simulation dives or regular dives.

When **$LOGGERS** > 0, the installed ALI sensors are turned on according to the following bitmask. An X means the ALI sensor is running.

$LOGGER, value	Sensor 1	Sensor 2	Sensor 3	Sensor 4
0				
1	X			
2		X		
3	X	X		
4			X	
5	X		X	
6		X	X	
7	X	X	X	
8				X
9	X			X
10		X		X
11	X	X		X
12			X	X
13	X		X	X
14		X	X	X
15	X	X	X	X

$LOGGERDEVICE[1/2/3/4/5/6] M1 -1 -1 1024

Set by manufacturer. Do not change.

Configuration flags specifying the logger device on each port.

Empty device slots are indicated with a parameter value of -1.

Non-negative integer entries indicate that a device is attached.

The encoding is specific to the version of the Seaglider software. These entries are set through the Seaglider menu system at HII.				
$LOITER_D_BOTTOM Depth below which to always pump during loiter, in meters.	M1	0	0	1000
$LOITER_D_TOP Depth above which to always bleed (<0: not to pump) during loiter (m).	M1	0	0	1000
$LOITER_DBDW Buoyancy gain for w (vertical velocity) control in loiter (g/(m/s)).	M1	0	0	1000
$LOITER_N_DIVE Modulo for gliders to loiter at apogee. For example, if **$LOITER_N_DIVE,5** the glider will loiter every 5th dive.	M1	0	0	1000
$LOITER_W_DBAND Deadband for w (vertical velocity) adjust in loiter (cm/s). If the glider is rising faster than [dband], glider will pump or bleed according to $LOITER_DBDW to try to come back to w = 0. **$D_NO_BLEED** is honored.	M1	0	0	40
$MASS The mass of Seaglider in grams. This value is glider specific and can be found on the trim sheet (Weight Sheet tab, location H1). It is used in on-board buoyancy and current estimation calculations.	M1	52000	50000	56000
$MAX_BUOY The absolute value of the maximum negative buoyancy (gm) that Seaglider can develop during the dive phase. There is no restriction on positive buoyancy during the climb phase.	M1	150	0	600
$MAXI_10V The maximum allowable observed current draw in amperes from the 10-volt battery pack before the glider will stop diving and go into recovery.	M1	2.0	0	10

$MAXI_24V The maximum allowable observed current draw in amperes from the 24 volt battery pack before the glider will stop diving and go into recovery.	M1 Rev B	3.0	0	10
	M1 Rev E	5.0	0	10
$MINV_10V The minimum allowable observed voltage on the secondary battery pack. At this voltage the glider will stop diving and go into recovery. A zero disables the check. ⚠ Caution: Reducing this number could result in the loss the Seaglider.	M1	10/24 V: 8.5 15V: 10.0		
$MINV_24V The minimum allowable observed voltage on the main battery pack. At this voltage the glider will stop diving and go into recovery. A zero disables the check. ⚠ Caution: Reducing this number could result in the loss the Seaglider.	M1	10/24 V: 19 15V: 11.5		
$MISSION The current Seaglider mission number. This value is automatically updated at the start of a mission and is intended to be unique for each deployment of a particular Seaglider. It is reported back in data files to distinguish data from each mission. The user can override the mission number although it is not usually recommended.	M1	0	0	999
$MOTHERBOARD *Set by manufacturer. Do not change.* An integer value indicating the motherboard revision carried by Seaglider. This parameter should be set to 4 for vehicles with a Rev B motherboard and to 6 for vehicles with a Rev E motherboard.	M1 Rev B	4		
	M1 Rev E	6		
$N_DIVES The number of dives to complete before entering recovery state. A value of zero (default) means dive until stopped by the pilot command (**$QUIT**) or some other recovery condition.	M1	0	0	9999
$N_FILEKB An integer value representing the size (kilobytes) and type (gzip compressed or uncompressed) of file used for data uploading.	M1 Rev B	4	-16	16
	M1 Rev E	8	-16	16

Positive values direct Seaglider to gzip compress the data file, then split it into **$N_FILEKB**-sized pieces. Negative values disable the gzip compression. The binary data file is split into **$N_FILEKB**-sized pieces before transmission. A value of 0 means no splitting or compression is performed.				
$N_GPS The GPS termination criteria, encoded as *eeennff*, which, in addition to requiring horizontal dilution of precision (HDOP) to be less than 2.0, specifies the maximum estimated horizontal position error (HPE) permitted (*eee*, in meters), the minimum number of satellites required (*nn)* and the maximum number of valid fixes to acquire (*ff*). If either *eee* or *nn* are zero, the corresponding criteria is ignored; if both are zero the GPS code terminates acquisition upon the first fix with HDOP <= 2.0 and after no more than *ff* fixes. Thus, the default value, 100840, requires a fix with HDOP <= 2.0 and an HPE of less than 10 meters acquired from at least 8 satellites but waiting no more than 40 valid fixes. A negative value is treated as a specification of *ff* only (HPE and number of satellites criteria are ignored) and, when syncing time from GPS, forces a wait for that many valid fixes, independent of HDOP, HPE or number of satellites. A value of zero for all fields indicates that the NMEA data from the GPS should be copied to the glider's fix register at every update, regardless of the validity of the fix. Acquisition will cease on receipt of any valid fix with HDOD <= 2.0 or on timeout (**$T_GPS**). This might be useful when debugging lack of fix information to see if any of the NMEA fields are updating.	M1	100840	0	
$N_NOCOMM The number of dives that are allowed to occur without a complete and successful data communication session before actions are taken to improve communications, enter recovery state, or navigate to a rescue position according to the value of **$NOCOMM_ACTION**. The default (and traditional) behavior with a value for **$NOCOMM_ACTION** of 0 is for the surface buoyancy parameter **$SM_CC** to be set to the maximum allowed by the software limit of **$VBD_MIN**. This is a safety provision in the event **$SM_CC** is not sufficient to fully expose the antenna above the surface.	M1	1	0	10

$N_NOSURFACE	M1	0	-20	20

An integer value that determines when the Seaglider will finish at dive depth **$D_FINISH** (subsurface dives**)** and when it will finish at the actual surface. When **$N_NOSURFACE** is greater than 1, the glider will finish the profile at depth **$D_FINISH** when the remainder of **$DIVE/$N_NOSURFACE** = 0 and at the surface for non-zero remainders. For example, if **$DIVE** = 8 and **$N_NOSURFACE** = 4, the glider will complete the dive at **$D_FINISH**. If **$DIVE** = 5, 6 or 7 and **$N_NOSURFACE** = 4 the glider will complete the dive at the surface.

When **$N_NOSURFACE** is less than -1, the logic is reversed. The Seaglider will finish the profile at the surface when the remainder of **$DIVE / $N_NOSURFACE** = 0 and at **$D_FINISH** when the remainder is non-zero.

NOTE: $D_FINISH must be greater than or equal to **$D_SURF** for Seaglider to complete a subsurface finish. If **$D_FINISH** < **$D_SURF**, the Seaglider will always surface.

NOTE: $N_NOSURFACE values of 1 and -1 are invalid. A value of 0 disables this behavior.

NOTE: The glider only acquires a GPS fix and calls the Basestation at the surface. Subsurface dive data is transmitted the next time the dive surfaces.

Due to the infrequent GPS updates**,** current correction should not be turned on for dives using N_NOSURFACE. This can be accomplished by:

1) Setting **$NAV_MODE,0** and **$HEADING** to desired value greater than -1 or
2) Setting **$NAV_MODE,1**; **$KALMAN_USE,2**; **$HEADING,-1** and flying to a waypoint using the *targets* file

Caution: If **$N_NOSURFACE** > 1 is used in conjunction with **$CALL_NDIVES** > 1, care must be taken to ensure that Iridium calls made by the glider coincide with at least some of the Seaglider's surface finishes. Otherwise, the glider will not be heard from until it reaches **$N_DIVES, $STOP_T** or it goes into recovery state due to low battery **($MINV_10V** or **$MINV_24V**).

$NAV_MODE	M1	2	0	3

An integer specifying the method used to generate the heading for the next dive. The methods are defined by the following values:

0 = Steer constant heading using either waypoint (*targets* file) or heading **($HEADING**) navigation. Seaglider will synthesize a

waypoint 20 km away in the desired direction and steer to that waypoint. No current correction is done. The glider ignores **$KALMAN_USE** data when using **$NAV_MODE**,0.

1 = Use Kalman filter: Seaglider uses past current information gathered by the Kalman filter to correct the flight path for the next dive. Seaglider can use either waypoint (*targets* file) or heading **($HEADING**) navigation with this mode. **$KALMAN_USE** must be set to 1.

If the user wishes to fly a constant heading with no current correction while using **$NAV_MODE**,1, this can be accomplished by setting $**KALMAN_USE**,2.

See **$KALMAN_USE** for more information on Kalman filter options.

2 = Ferry angle correction with respect to calculated depth-averaged current: Seaglider adds the ferry angle correction it calculated on-board to the **$HEADING** or waypoint (*targets* file) value to obtain the corrected bearing to target. To prevent spurious depth-averaged current calculations from giving Seaglider a heading in the wrong direction, the maximum value for the ferry angle correction is governed by **$FERRY_MAX**.

In addition, **$SPEED_FACTOR** is applied to the target speed. Corrections for the horizontal speed through the water are calculated iteratively, to optimize the rate of travel toward the waypoint. The code uses a nonlinear solver to find the ferry angle for each iteration. Each iteration starts with predicted speed = to the maximum glider speed. If the predicted distance over ground (DOG) with the set correction is less than the range to target (typical case) the computation is complete. If not, the predicted speed is set to the minimum glider speed. The speed is accepted if the DOG is greater than the range to the target. If neither limit applies, we iterate via bisection to settle on the best speed. At convergence, Seaglider has a ferry angle to steer and a horizontal speed to apply. The predicted horizontal speed is used for the glide slope setting. The glider ignores **$KALMAN_USE** data when using **$NAV_MODE**,2.

3 = Steer relative to the depth averaged current The Seaglider steers **$HEADING** direction with respect to the previous dive's depth averaged current (DAC).

calculated heading = DAC direction + bearing from **$HEADING**.

targets file and **$KALMAN_USE** data are not used in this mode.

$NOCOMM_ACTION	M1	259	0	511

A bitmask parameter to control the behavior after **$N_NOCOMM**

dives have finished without successful communication with the Basestation. The parameter is a logical OR of the bits described below:

Bit 0: pump to max behavior:

0 = Pump to maximum vehicle buoyancy (defined by **$VBD_MIN**) after **$N_NOCOMM** dives.

1 = Pump to maximum vehicle buoyancy after 1 dive with no communication. This setting allows the value of **$N_NOCOMM** to be greater than 1 while still getting the typical behavior of pumping to maximum buoyancy after a single dive with failed communications

The remaining behaviors defined by **$NOCOMM_ACTION** only take effect when **$N_NOCOMM** dives occur without communication.

Bit 1: recovery:

0 = Use behavior defined by other **$NOCOMM_ACTION** bits.

1 = Seaglider enters recovery state after **$N_NOCOMM** dives without communications. This bit takes precedence over any values in bits 2-4.

Bit 2, EPIRB mode:

0 = Do not use EPIRB mode.

1 = Seaglider will loiter at the surface in low power sleep mode for **$T_EPRIB** seconds immediately before GPS2 acquisition. This feature is intended to enable visual, acoustic, or ARGOS based recovery while keeping the Seaglider diving and navigating. This bit can be used independently or in conjunction with bits 3 and 4.

Bit 3, escape:

0 = Seaglider continues to navigate as before.

1 = Seaglider navigates to the escape target defined in the *targets* file. If no escape target is present, Seaglider navigates by heading according to the **$ESCAPE_HEADING** parameter.

Bit 4, moor at position

0 = Do not moor at position.

1 = Set the current GPS position as the current waypoint. Seaglider will try to virtually moor at this position.

Bit 5, clear flow control

0 = Do not clear flow control.

1 = Clear the flow control bits on **$PHONE_DEVICE**.NOTE: For units where flow control is not supported by the hardware, the

flow control option is ignored.

Bit 6, increase $T_RSLEEP

0 = Maintain current **$T_RSLEEP**.

1 = Increase **$T_RSLEEP** by a factor of 30.

Bit 7, send SMS

0 = Do not send SMS.

1 = Send SMS containing the GPS status line to the sms_email address configured in NVRAM. The message is identical to the GPS status line that is emitted to the comm.log on the Basestation. SMS is not available on all Seagliders.

Bit 8, try $ALTNUM if $TELNUM unsuccessful

0 = if phone call to **$TELNUM** unsuccessful after **$CALL_TRIES** start next dive and at next surfacing call **$ALTNUM**

1 = if phone call to **$TELNUM** unsuccessful after **$CALL_TRIES**, switch to **$ALTNUM** and attempt **$CALL_TRIES** number of calls. If **$ALTNUM** calls are unsuccessful, start next dive. At next surfacing call **$TELNUM**. Example: If **$N_NOCOMM**,10 and **$NOCOMM_ACTION**,21, the glider will reset **$SM_CC** to maximum buoyancy any time one dive passes with no communications. If 10 dives pass with no communications, the glider will try to stay at its current position and loiter at the surface in low power sleep $T_EPRIB seconds between station keeping dives.

$PA_GAIN	M1	3	0	3

A PAM command specifying the pre-amplifier gain to use. Valid values are:

Gain Setting	dB of gain
0	0
1	6
2	12
3	18

Note: This parameter is only used for the WISPR passive acoustics system. There is no gain setting for the JASCO or PMAR systems.

$PA_NDIVE	M1	1	0	9999

Modulo value that limits passive acoustic data collection to every nth dive.

0: disable, collect passive acoustic data every dive

1-N: only collect passive acoustic data every this many dives

For example, if **$PA_DIVE,5** recorder is run every 5th dive.

$PA_PROFILE A PAM command that specifies when the passive acoustics sensor will record data: never, downcast only, upcast only or both down- and upcast. 0 = never 1 = downcast only 2 = upcast only 3 = downcast and upcast **Note:** This parameter is only present in the log files of gliders with an installed WISPR or JASCO (AMAR or Observer) PAM system.	M1	3	0	3
$PA_RECORDABOVE A PAM command that sets the depth (meters) above or below which the passive acoustics sensor will sample. A positive value will start the recording at the beginning of the dive and continue until the glider reaches the stated depth, at which time the recording will be turned off. The same behavior is translated to the climb phase. A negative value will start the recording once the glider has reached the stated depth. The glider will continue to record until apogee. The same behavior is translated to the climb phase. There is no RECORDBELOW parameter, but a negative RECORDABOVE value acts like a record below would. A value of 0 turns the sensor off. **Note:** This parameter is only present in the log files of gliders with an installed WISPR or JASCO (AMAR or Observer) PAM system.	M1	250	0	1000
$PA_STARTS A counter that keeps track of the number of profiles which have been recorded by the passive acoustics system. This parameter is an output from the sensor and can be found in the .log files of gliders with a WISPR or JASCO passive acoustics system installed. It is used as feedback on the health of the system. The value in a .log file represents the number of starts during the previous dive. If the sensor is sampling on both the down and up-casts (**$PA_PROFILE,3**) the number of starts should be 2.	M1			
$PA_UPLOADMAX	M1			

A PAM command that specifies the number of bytes of passive acoustic data file that should be transferred from Seaglider to shore over the satcomms link – i.e. the size of the 'snippet'. Use this parameter to keep file transfer times reasonable, thus limiting how long Seaglider remains on the surface uploading data. JASCO AMAR and Observer systems: - a snippet size of 1580 is sufficient to prove the health of the system - Formula to calculate proper snippet file size: File size (bytes) = # of samples x (bits/sample/8) + 44 WISPR system: - The WISPR software limits the snippet size to 10240 bytes. **Note:** This parameter is only present in the log files of gliders with an installed WISPR or JASCO (AMAR or Observer) PAM system.				
$PA_XMITPROFILE A PAM command that specifies which passive acoustic data snippets are transmitted to the Basestation: none, downcast only, upcast only or both down- and upcast. 0 = none 1 = downcast only 2 = upcast only 3 = downcast and upcast See **$PA_UPLOADMAX** to set snippet file size. **Note:** This parameter is only present in the log files of gliders with an installed WISPR or JASCO (AMAR or Observer) PAM system. Note: Since transferring an entire acoustic data file is impractical, Seaglider will send a 'snippet' of data to assist in validating that the PAM hardware and software are operating correctly and recording valid data. For additional information on the snippet refer to the respective passive acoustics systems documentation. At the start of a mission you may want to enable snippets briefly to ensure that audio collection is working. After receiving a snippet or two you can then turn snippets off by setting **$PA_XMITPROFILE,0**.	M1	3	0	3
$PC_INTERVAL A pumped CTD command that specifies the sampling interval in seconds. ***1-4 second sampling intervals***: The CTD is in Continuous Sampling Mode. The pump and all	M1	5	1	3600

sampling circuitry remain on continuously. Power consumption for any of these sampling intervals is the same. However, memory usage decreases with increasing sampling interval. ***5-14 second sampling intervals***: The CTD is in Fast Sampling Mode. The pump runs continuously, and measurements are made at the chosen interval. ***15-3600 second sampling intervals***: The CTD is in Slow Interval Sampling Mode. In this mode, CTD samples are taken but DO samples are not. The pump runs for 11.3 seconds prior to a measurement and an additional 2.1 seconds during the measurement. In-between sampling intervals, the pump is off and the CTD is in low power state. **Note:** This parameter is only present in the log files of gliders with an installed GPCTD.				
$PC_MINCONDFREQ Minimum conductivity frequency detected to cause the GPCTD pump to run. To turn the GPCTD pump on the value of this parameter should be 500 Hz greater than the frequency response of the sensor in fresh water. This value is listed in the OEM sensor calibration sheet. To disable the GPCTD pump, for example during in air testing, this parameter should be set to 10000. **Note:** The GPCTD pump should never be operated in air. Doing so will cause damage to, and possibly failure of, the pump. **Note:** This parameter is only present in the log files of gliders with an installed GPCTD.	M1		500	10000
$PC_NDIVE Modulo value that limits GPCTD data collection to every nth dive. 0: disable, collect GPCTD data every dive 1-N: only collect GPCTD data every this many dives For example, if **$PC_DIVE,5** recorder is run every 5th dive.	M1	1	0	9999
$PC_PROFILE A GPCTD command that specifies when the CTD will record data: never, downcast only, upcast only or both down- and upcast. 0 = never 1 = downcast only 2 = upcast only 3 = downcast and upcast **Note:** This parameter is only present in the log files of gliders with an installed GPCTD.	M1	3	0	3

$PC_RECORDABOVE A GPCTD command that sets the depth (meters) to which the sensor will sample. A value of 0 turns the sensor off. **Note:** This parameter is only present in the log files of gliders with an installed GPCTD.	M1	1000	0	1000
$PC_STARTS A diagnostic value output by the GPCTD, that keeps track of the number of times the sensor restarts during a mission. There should be two restarts per dive: one for the downcast and one for the upcast. **Note:** This parameter is only present in the log files of gliders with an installed GPCTD.	M1			
$PC_UPLOADMAX Specifies the size limit for uploaded GPCTD files. It is applied when the glider requests a file from the GPCTD via the .cnf file *xmodem =* or *download=* commands. The parameter value is sent to the logger via the '%m' command string substitution operator. The Seaglider does not process this value itself, it is strictly for use by the logger. Limiting the file size this way can be used to reduce the size of data files transferred from the GPCTD to the Seaglider compact flash, and from Seaglider compact flash to shore over an Iridium link. The procedure for using this parameter is: 1. Write a data transfer program from the logger that has a command-line option for maximum file size. 2. Add an 'xmodem=' or 'download=' command string to the logger's .cnf file that invokes the logger's data transfer program and include the '%m' substitution operator. 3. Add the **$PC_UPLOADMAX** parameter to the cmdfile in the glider's home directory on the Basestation and specify the desired maximum file size. **Note:** This parameter is only present in the log files of gliders with an installed GPCTD.	M1			
$PC_XMITPROFILE A GPCTD command that specifies which data profiles are transmitted to the Basestation: none, downcast only, upcast only or both down- and upcast. 0 = none 1 = downcast only 2 = upcast only 3 = downcast and upcast	M1	1	0	3

Note: This parameter is only present in the log files of gliders with an installed GPCTD.				
$PHONE_DEVICE *Set by manufacturer. Do not change.* A configuration value specifying the model of the phone. These devices have dedicated hardware ports on all motherboard revisions and, as such, a port specification is not necessary.	M1 Rev B, no flow control M1 Rev B, with flow control M1 Rev E	48 49 33	0	1023
$PHONE_SUPPLY *Set by manufacturer. Do not change.* A parameter that references the source of power to the Iridium phone. In the 24V/10V system, this option is intended to load balance the energy consumption between the two battery packs. |1| means that the phone is powered by the 10V battery. |2| means the phone is powered by the 24V battery. In the shared bus 15V system the user can select a value of either |1| or |2|. A positive value means that model value of current is used to compute power consumption. A negative value means that current draw of the phone is measured directly.	M1	2	1	2
$PITCH_ADJ_DBAND This parameter (degrees), along with **$PITCH_ADJ_GAIN**, enables and adjusts active (closed loop) control of Seaglider pitch during dive and climb. Seaglider automatically seeks to maintain the pitch angle by moving the pitch mass whenever |Pitch Observed – Pitch Desired| > **$PITCH_ADJ_DBAND.** **NOTE**: A value of 0 disables automatic pitch adjustment.	M1	0	0	40
$PITCH_ADJ_GAIN This parameter (cm/degree), with **$PITCH_ADJ_DBAND**, enables and adjusts active (closed loop) control of Seaglider pitch during a dive and climb. The amount of the adjustment is given by:	M1	0	0	0.1

(Pitch Desired - Pitch Observed) * **$PITCH_ADJ_GAIN** Adjustments are calculated at the beginning of the active guidance and control (G&C) phase, based on the pitch observed over the same samples for which observed vertical speed is calculated. Adjustments are not made during the first two active G&C phases following the start of a dive or climb. A value of zero disables automatic pitch adjustment. If the glider is driven into pitch oscillation by adjustments during a dive, reduce **$PITCH_ADJ_GAIN** until the system becomes stable. If the glider is not achieving the desired pitch during the dive, adjust **$PITCH_ADJ_GAIN** upward until the system becomes stable at the desired value over course of dive.				
$PITCH_CNV *Set by manufacturer. Do not change.* The pitch position conversion factor, from A/D counts to centimeters (cm/AD count). This is a constant determined by the pitch of the worm gear that drives the pitch motion and is set at the factory. Note: For the curious, neither iRobot nor HII have built any gliders with the 'Old Version Mass Shifter'.	M1	0.00312576 Old Version Mass Shifter: 0.0046		
$PITCH_DBAND The pitch position deadband (cm). Fine pitch adjustments are not commanded within the deadband.	M1	0.01	0	1
$PITCH_GAIN The vehicle pitch (degrees) corresponding to a 1 cm movement of the pitch mass.	M1	30	5	40
$PITCH_MAX *Set by manufacturer. Do not change.* Aft pitch software limit (A/D counts). **NOTE**: Value determined by the physical parameters of the system. Obtain this value from the vehicle's trim sheet (cal tab).	M1	3950		
$PITCH_MAXERRORS *Set by manufacturer. Do not change.* The number of pitch motor errors allowed before Seaglider goes into recovery state. An error occurs when the **$PITCH_TIMEOUT** expires prior to achieving the commanded pitch A/D position. **Caution:** An error of pitch could result in the loss of a Seaglider.	M1	1	0	100
$PITCH_MIN *Set by manufacturer. Do not change.*	M1	150		

Forward pitch software limit (A/D counts). This is also the pitch used for surface maneuvers (fully forward for maximum pitch down). **NOTE**: Value determined by the physical parameters of the system. Obtain this value from the vehicle's trim sheet (cal tab).				
$PITCH_TIMEOUT *Set by manufacturer. Do not change.* Pitch mass timeout (seconds). If the mass shifter does not achieve the desired pitch position before **$PITCH_TIMEOUT** seconds, a pitch error occurs.	M1	25	5	60
$PITCH_VBD_SHIFT Parameterization of the pitch compensation (cm/cm^3) required to balance the mass of hydraulic oil moving forward and aft with the VBD driven changes in buoyancy as an equivalent mass shifter displacement. During each guidance and control (G&C) maneuver, pitch control (cm) is computed as the sum of the pitch desired (in degrees, see the third field in **$MHEAD_RNG_PITCHd_Wd** in the .log file) divided by pitch gain (**$PITCH_CNV**) plus the VBD control (cc) times **$PITCH_VBD_SHIFT** (cm/cc). Use this parameter to fine tune pitch on well-trimmed vehicles exhibiting asymmetric dives. Start by reducing the nominal parameter value (0.00123) by 50%. If needed, continue to reduce the parameter value by 50% increments until the dive is symmetrical or the minimum value of 0.00005 is reached. It is used on ogive fairing gliders more often than on standard fairing gliders.	M1	0.00123	0	0.1
$PITCH_W_DBAND Deadband for pitch adjustments used to control vertical speed of the Seaglider with units of cm/s. If the observed vertical speed is outside the deadband, but not beyond **$W_ADJ_DBAND**, the glider will adjust pitch according to **$PITCH_W_GAIN** to try to maintain speed. This parameter is only valid when **$PITCH_W_GAIN** is also non-zero. A value of 0 means this parameter is not used. Note: This is a closed loop control and should only be used after the glider has been trimmed.	M1	0	0	40
$PITCH_W_GAIN Gain on pitch adjustments used for vertical speed control with units of cm/ m/s. If the observed vertical speed is outside **$PITCH_W_DBAND** then this parameter controls the adjustment made to pitch control to maintain the desired glider speed. If this parameter is negative, adjustments will be made to both slow	M1	0	-20	20

and speed the glider. If positive, adjustments will only be made if the glider is moving too slowly. This parameter is only used during climbs. This parameter cannot be used at the same time as **$PITCH_ADJ_GAIN**. A value of 0 means parameter is not used. Note: This is a closed loop control and should only be used after the glider has been trimmed.	
$PM_ACTIVECARD The PMAR SD card number presently being written to by the PMAR. The x represents the SD card number. This parameter is an output from the PMAR passive acoustics sensor and can be found in the .log files of gliders with a PMAR installed.	
$PM_FREEKB_00 The amount of free space available on PMAR SD card 0. This parameter is an output from the PMAR passive acoustics sensor and can be found in the .log files of gliders with a PMAR installed.	M1

$PM_FREEKB_01 The amount of free space available on PMAR SD card 1. This parameter is an output from the PMAR passive acoustics sensor and can be found in the .log files of gliders with a PMAR installed.	M1			
$PM_FREEKB_02 The amount of free space available on PMAR SD card 2. This parameter is an output from the PMAR passive acoustics sensor and can be found in the .log files of gliders with a PMAR installed.	M1			
$PM_FREEKB_03 The amount of free space available on PMAR SD card 3. This parameter is an output from the PMAR passive acoustics sensor and can be found in the .log files of gliders with a PMAR installed.	M1			
$PM_MOTORS Controls whether the glider notifies the PMAR when motors are about to be turned on/off. 0 = off, no notices sent to the PMAR 1 = on, notices sent to PMAR	M1	1	0	1
$PM_NDIVE Modulo value that limits PMAR data collection to every nth dive. 0: disable, collect PMAR data every dive 1-N: only collect PMAR data every this many dives For example, if **$PM_DIVE,5** recorder is run every 5th dive.	M1	0	0	9999
$PM_PROFILE A PMAR command that specifies when the passive acoustics sensor will record data: never, downcast only, upcast only or both down- and upcast. 0 = never 1 = downcast only 2 = upcast only 3 = downcast and upcast **Note:** This parameter is only present in the log files of gliders with an installed PMAR.	M1	3	0	3

$PM_RECORDABOVE A PMAR command that sets the depth (meters) to which the passive acoustics sensor will sample. A value of 0 turns the sensor off. **Note:** This parameter is only present in the log files of gliders with an installed PMAR system.	M1	1000	0	1000
$PM_SENDDEPTH A PMAR command that controls whether the glider sends depth data to the passive acoustics sensor at every sample interval for scheme-based logging. 1 = off, no depth data sent 2 = on, depth data sent **Note:** This parameter is only present in the log files of gliders with an installed PMAR system.	M1	1	0	1
$PM_XMITPROFILE A PMAR command that that specifies which data profiles are transmitted to the Basestation: none, downcast only, upcast only or both down- and upcast. 0 = none 1 = downcast only 2 = upcast only 3 = downcast and upcast **Note:** This parameter is only present in the log files of gliders with an installed PMAR system.	M1	3	0	3
$PM_XMITRAW A PMAR command that controls whether raw data files are sent to the Basestation: none, downcast only, upcast only or both down- and upcast. 0 = none 1 = downcast only 2 = upcast only 3 = downcast and upcast **Note:** This parameter is only present in the log files of gliders with an installed PMAR system.	M1	0	0	3
$PRESSURE_SLOPE *Set by manufacturer. Do not change.* Slope of linear fit between psig and pressure sensor output (after digitization to A/D counts through AD7714).	M1		0.0	1

The fit is calculated from calibration data received with each pressure sensor and converted to A/D counts via the known configuration of the AD7714 and associated circuitry. This number is a constant for each pressure sensor and associated calibration.				
$PRESSURE_YINT Y-intercept of linear fit between psig and pressure sensor output (after digitization to A/D counts through AD7714). This is the value that is adjusted in the field during the Sea Launch routine to correct the pressure sensor relative to atmospheric pressure at 0 m depth.	M1		-100	50
$PROTOCOL *Set by manufacturer. Do not change.* This feature is only available on HII gliders with flow control. For gliders without flow control this parameter value must be set to zero (0). A bit mask to define which file transfer protocol to use. Bits 0-2 define data protocol; bits 3-5 define control protocol. Bit 0 = xmodem, Bit 1 = raw, Bit 2 = kermit, Bit 3 = kermit batch (data only) and Bit 6 = encrypt upload. Note: Kermit is not available on HII Seagliders	M1	No flow control: 0 Flow Control: 9		
$RAFOS_CORR_THRESH **This feature is not available on HII Seagliders.** Correlation threshold to use when selecting RAFOS hits for navigation solutions.	M1	0		
$RAFOS_DEVICE **This feature is not available on HII Seagliders.** Configuration parameter specifying the model of the attached RAFOS device. These devices have dedicated hardware ports on all motherboard revisions and, as such, a port specification is not necessary. -1 specifies that the RAFOS device is not installed.	M1	-1		
$RAFOS_HIT_WINDOW **This feature is not available on HII Seagliders.** Size of the search window, in seconds, to use when clustering hits for navigation solutions.	M1	0	-100	86400
$RAFOS_MMODEM **This feature is not available on HII Seagliders.** Modem navigation device control bits.	M1	0	0	255
$RAFOS_PEAK_OFFSET	M1	0	-20	20

This feature is not available on HII Seagliders. Offset, in seconds, of actual arrival time from the receiver reported arrival index due to receiver firmware artifacts.				
$RB_INTERVAL A RBR CTD command that specifies the sampling interval in seconds.	M1	3	1	86,400
$RB_NDIVE Modulo value that limits RBR CTD data collection to every nth dive. 0: disable, collect RBR CTD data every dive 1-N: only collect RBR CTD data every this many dives For example, if **$RB_DIVE,5** recorder is run every 5th dive.	M1	1	0	9999
$RB_PROFILE A RBR CTD command that specifies when the CTD will record data: never, downcast only, upcast only or both down- and upcast. 0 = never 1 = downcast only 2 = upcast only 3 = downcast and upcast **Note:** This parameter is only present in the log files of gliders with an installed RBR CTD.	M1	3	0	3
$RB_RECORDABOVE A RBR CTD command that sets the depth (meters) to which the CTD will sample. A value of 0 turns the sensor off. **Note:** This parameter is only present in the log files of gliders with an installed RBR CTD system.	M1	1000	0	1000
$RB_STARTS A diagnostic value output by the RBR CTD, that keeps track of the number of times the sensor restarts during a mission. There should be two restarts per dive: one for the downcast and one for the upcast. **Note:** This parameter is only present in the log files of gliders with an installed RBR CTD.	M1			

$RB_UPLOADMAX A RBR CTD command that specifies the number of bytes of a CTD data file that should be transferred from Seaglider to shore over the satcomms link. When $RB_UPLOADMAX=0 the full file will be transferred to the Basestation at each surfacing regardless of size. **Note:** This parameter is only present in the log files of gliders with an installed RBR CTD.	M1	0	0	1000000
$RB_XMITPROFILE A RBR CTD command that that specifies which data profiles are transmitted to the Basestation: none, downcast only, upcast only or both down- and upcast. 0 = none 1 = downcast only 2 = upcast only 3 = downcast and upcast **Note:** This parameter is only present in the log files of gliders with an installed RBR CTD.	M1	3	0	3
$RELAUNCH *Set by manufacturer. Do not change.* A Boolean value, the **$RELAUNCH** parameter controls the behavior of the Seaglider when a reboot condition occurs. When **$RELAUNCH** is 0 the Seaglider automatically enters recovery state in the event of a crash to TOM8 or other watchdog timer reset. When **$RELAUNCH** is 1, the Seaglider automatically resumes diving in the event of a crash to TOM8 or other watchdog timer reset. Internally the Seaglider 'ORs' the Boolean value with a 2 during a commanded reboot and a 4 to indicate the glider is in recovery. If the internal indication for recovery is true, then the glider will enter into recovery on reboot, regardless of the original value of the **$RELAUNCH** parameter. The internal indicator for commanded reboot is cleared after reboot is complete, at self test and at launch and returns to the value specified in $RELAUNCH. The internal indicator for recovery is cleared upon exiting recovery, at self test and at launch and returns to the value in $RELAUNCH.	M1	0	0	1

Caution: Do not change default value of 0. Loss of Seaglider can result if this parameter is changed.

$RHO The water density (g/cm^3) for converting buoyancy force in grams to seawater displacement in cm^3. This parameter is also used in the on-board performance prediction computations. Set this value to match the predicted bottom water density of the Seaglider operating environment (i.e. the density that the glider is ballasted for).	M1	1.026	1	1.04
$ROLL_ADJ_DBAND **$ROLL_ADJ_DBAND (**degrees/second), used in conjunction with **$ROLL_ADJ_GAIN**, controls the automatic adjustment of the roll centers based on observed turn rate. At the end of a complete passive phase, a full guidance and control (G&C) interval, Seaglider adjusts the appropriate dive or climb roll center based on the turn rate over the last half of the passive phase if: \|turn rate\| > **$ROLL_ADJ_DBAND**. A value of zero disables automatic adjustment of the roll centers. Note: This is a closed loop control and should only be used after the glider has been trimmed.	M1	0	0	1000
$ROLL_CNV *Set by manufacturer. Do not change.* Roll position conversion factor, from A/D counts to degrees. This is a constant determined by the configuration of the roll gear train, motor, and potentiometer.	M1	0.028270001	0	0.1
$ROLL_DEG The number of degrees to roll the mass shifter during a turn. The roll software limits, found on the trim sheet (cal tab) provide the effective roll maximums.	M1	40	0	60
$ROLL_MAX *Set by manufacturer. Do not change.* Starboard roll software limit (A/D counts). The glider operating software prevents the mass shifter from rolling past this limit. **$ROLL_MAX** value is determined by the physical parameters of the system. This value can be found on the vehicle's trim sheet (cal tab).	M1	3900		
$ROLL_MAXERRORS *Set by manufacturer. Do not change.*	M1	1	1	100

The number of roll motor errors allowed before Seaglider goes into recovery state. An error occurs when **$ROLL_TIMEOUT** expires prior to achieving the commanded roll A/D position.				
$ROLL_MIN *Set by manufacturer. Do not change.* Port roll software limit (A/D counts). The glider operating software prevents the mass shifter from rolling past this limit. **$ROLL_MIN** value is determined by the physical parameters of the system. This value is found on the vehicle's trim sheet (cal tab).	M1	150		
$ROLL_TIMEOUT *Set by manufacturer. Do not change.* Roll maneuver timeout (seconds). If the mass shifter does not achieve the desired roll position before **$ROLL_TIMEOUT** seconds, a roll error occurs.	M1	15	5	20
$RS_NDIVE Modulo value that limits RSI micro turbulence data collection to every nth dive. 0: disable, collect RSI micro turbulence data every dive 1-N: only collect RSI micro turbulence data every this many dives For example, if **$RS_DIVE,5** recorder is run every 5th dive.	M1	1	1	9999
$RS_PROFILE A RSI Micro-T command that specifies when the micro-turbulence sensor will record data: never, downcast only, upcast only or both down- and upcast. 0 = never 1 = downcast only 2 = upcast only 3 = downcast and upcast **Note:** This parameter is only present in the log files of gliders with an installed RS Micro-T.	M1	3	0	3
$RS_RECORDABOVE An RSI Micro-T command that sets the depth (meters) to which the micro-turbulence sensor will sample. A value of 0 turns the sensor off. **Note:** This parameter is only present in the log files of gliders with an installed RSI Micro-T.	M1	1000	0	1000
$RS_STARTS A diagnostic value output by the RSI Micro-T, that keeps track of the number of times the sensor restarts during a mission. There	M1			

should be two restarts per dive: one for the downcast and one for the upcast. **Note:** This parameter is only present in the log files of gliders with an installed RS Micro-T.				
$RS_UPLOADMAX Specifies the size limit for uploaded RSI Micro-T files. It is applied when the glider requests a file from the RS MICRO-T via the .cnf file *xmodem=* or *download=* commands. The parameter value is sent to the logger via the '%m' command string substitution operator. The Seaglider does not process this value itself, it is strictly for use by the logger. Limiting the file size this way can be used to reduce the size of data files transferred from the RS Micro-T to the Seaglider SD card, and from Seaglider SD card to shore over an Iridium link. The procedure for using this parameter is: 4. Write a data transfer program from the logger that has a command-line option for maximum file size. 5. Add an 'xmodem=' or 'download=' command string to the logger's .cnf file that invokes the logger's data transfer program and include the '%m' substitution operator. 6. Add the **$PC_UPLOADMAX** parameter to the cmdfile in the glider's home directory on the Basestation and specify the desired maximum file size. **Note:** This parameter is only present in the log files of gliders with an installed RS Micro-T.	M1			
$RS_XMITPROFILE An RSI Micro-T command that specifies which micro-turbulence data profiles are transmitted to the Basestation: none, downcast only, upcast only or both down- and upcast. 0 = none 1 = downcast only 2 = upcast only 3 = downcast and upcast **Note:** This parameter is only present in the log files of gliders with an installed RS Micro-T.	M1	3	0	3
$SHORTING_PLUG **This feature is not available on HII Seagliders.** Latches the shorting plug power. When set to 0, the glider will power down when the shorting plug is removed. When set to 1, the glider will remain powered on if the shorting plug is removed.	M1	0	0	1

$SIM_W Simulated Seaglider vertical velocity (m/s) desired for deck dives. For simulated dives a value of 0.1 is often used. A value of 0 disables this feature. This parameter is automatically zeroed during the Sea Launch procedure.	M1	0.1	0	1
$SM_CC The specified minimum buoyancy position of the VBD (cm^3) that Seaglider attains at the surface. If Seaglider enters the surface maneuver with less buoyancy than **$SM_CC**, it pumps to this value. If Seaglider enters the surface maneuver with more than **$SM_CC**, it does not change the VBD and continues to the next part of the surface maneuver.	M1	650	150	800
$SPEED_FACTOR A factor to compensate for Seaglider's inability to maintain the desired horizontal velocity during a profile. It is a measure of efficiency of Seaglider progress along a specified track. Factors that lower the efficiency of Seaglider include turns, leaving the surface at arbitrary headings, and reduced horizontal speed during the apogee maneuver. Over long dives the effects of these factors are minimal and **$SPEED_FACTOR** approaches zero. For short dives, however, the effects of these factors are substantial and so the **$SPEED_FACTOR** is typically 0.8 which implies that the glider will only make 0.8 of the distance Kalman desires. **$SPEED_LIMITS** are multiplied by this factor and **$KALMAN_CONTROL** components are divided by it.	M1	1	0.1	1

$STOP_T Date and time after which the glider will stop diving and enter recovery. The stop time is only checked upon surfacing. The glider will not stop in the middle of a dive if this time is reached. The time must be specified in the form mmddyyhh where: mm = month dd = day yy = the last two digits of the year hh = hour in UTC A value of zero turns this check off.	M1		0	
$STROBE **This feature is not available on HII Seagliders.** Controls the blinking LED function available on Seagliders with Rev. C motherboards. 0 disables all blinking 1 turns on strobe when Seaglider in recovery 2 turns on strobe whenever Seaglider is at the surface		0	0	2
$SURFACE_URGENCY **This feature is not available on HII Seagliders.** Active on under ice Seagliders only, this parameter controls the number of dives to accumulate before trying extra surfacings.		0	0	5000
$SURFACE_URGENCY_FORCE **This feature is not available on HII Seagliders.** Active on under ice Seagliders only, this parameter is the dive number modulo for forced surfacing attempts.		0	0	5000
$SURFACE_URGENCY_TRY **This feature is not available on HII Seagliders.** Active on under ice Seagliders only, this parameter is the dive number modulo for extra surfacing attempts.		0	0	5000
$T_ABORT The maximum time (minutes) to elapse on a profile before the Seaglider enters recovery state. This is a safety feature used to bring the glider back to the surface if too much time has passed.	M1	10	10	4320
$T_BOOST Time (seconds) to run the boost pump when the glider is deeper than **$D_BOOST** meters. If **$T_BOOST** = 0, then the boost pump will run continuously.	M1	0	0	255

If **$T_BOOST** is > 0, the boost pump runs by itself for the first 2 seconds. Then, both pumps (main and boost) run simultaneously for the remainder of **$T_BOOST** seconds. At the end of **$T_BOOST** seconds, the boost pump turns off while the main pump continues to run. **NOTE**: If **$T_BOOST** is active, HII recommends a minimum **$T_BOOST** value of 3 seconds. This allows a 1 second operational overlap of the main and boost pumps. N**OTE**: **$T_BOOST** must = 0 (not active) for iRobot era Standard Buoyancy Engine (SBE) systems. While most of these systems have been updated, contact Seaglider Customer Support at seaglidersupport@hydroid.com if you have a question regarding which buoyancy system is installed in your glider.				
$T_DIVE The time (minutes) for Seaglider to complete dive-climb cycle to the depth **$D_TGT** and back to the surface. It does not include the time in apogee phase. This value does not include the time for pumping during the apogee phase. The value is used to calculate the desired vertical velocity (w_d) in a particular dive using the naive calculation: w_d (cm/s) = 2***$D_TGT***100/(***$T_DIVE***60). **$MAX_BUOY** is applied in conjunction with w_d, the range to the target and the Seaglider hydrodynamic model to calculate the Seaglider's desired pitch angle on any given dive.	M1	10	5	2820
$T_EPIRB The time (seconds) to loiter on the surface when **$N_NOCOMM** is exceeded and bit 2 (EPIRB mode) of **$NOCOMM_ACTION** is set.	M1	0	0	14400
$T_GPS The maximum allowed time (minutes) to obtain a GPS position (GPS timeout). **$T_GPS** is typically set longer than 12.5 minutes, to ensure that the GPS receiver has time to receive a complete set of almanac entries in the event that a new almanac is required.	M1	15	1	30
$T_GPS_ALMANAC Time to wait (minutes) for GPS almanac acquisition. The wait happens the next time the GPS is turned on. After the wait, the parameter resets to zero and the regular GPS operation (presumably a fix) will proceed.	M1	0	-15	15

If the parameter is greater than zero, the almanac sentences are checked every minute. The wait halts when the time has expired or at least ten satellites have recent almanac sentences. If the parameter is negative, the wait only halts after the time has expired. A negative value also forces a complete NVRAM reset before the wait starts.				
$T_LOITER The time (seconds) to loiter after going neutral at apogee and before pitching up and becoming positively buoyant for the climb. While in the loiter state Seaglider will attempt to maintain zero vertical velocity. It will pump, but never bleed to do this. Seaglider does not servo on depth in this state. All other timeouts and depths are honored in this state. **$T_MISSION** and **$T_ABORT** need to be adjusted manually to account for the total dive duration of **$T_DIVE + $T_LOITER**. G&C and sampling intervals during the loiter state are controlled by the appropriate depth bins in the *science* file.	M1	0	0	86400
$T_MISSION The maximum mission time (minutes) allowed. If time **$T_MISSION**/2 elapses during a dive, the Seaglider transitions from dive phase to apogee phase and then to the climb phase. If **$T_MISSION** is reached before the Seaglider reaches depth, **$D_SURF**, Seaglider immediately enters the surface phase. **$T_MISSION** time includes the dive, apogee, and climb phases.	M1	15	10	4320
$T_NO_W The time (seconds) for Seaglider to wait with no significantly non-zero vertical velocity (less than 1 cm/s, as measured by dP/dt) before proceeding to the next phase of a dive. This is primarily used to move from the dive phase to the climb phase (initiate an apogee maneuver) when Seaglider unexpectedly encounters the bottom. **NOTE**: This protection is only in place at depths below **$D_NO_BLEED.**	M1	120	30	86400

$T_RSLEEP The sleep time interval (minutes) during the recovery phase. During the recovery phase, Seaglider gets a GPS fix, calls the Basestation up to **$CALL_TRIES** times to upload the GPS fix, then goes into low power sleep for **$T_RSLEEP** minutes. The surface evolution has about 2 minutes of "overhead," so that Seaglider calls are actually (**$T_RSLEEP** + 2) minutes apart.	M1	3	0	14400
$T_TURN The maximum amount of time (seconds) allowed for the vehicle to complete a turn during the active G&C mode. If this timeout is reached before the desired heading is reached, Seaglider rolls back to neutral and continues until the next G&C maneuver.	M1	500	10	720
$T_TURN_SAMPINT The sample interval (seconds) for pitch, roll and VDB measurements when the vehicle is turning during active and passive G&C. This should be short enough so that Seaglider cannot pass entirely through the heading deadband without sampling. If the parameter is positive, the sampled data are used by the vehicle to determine how much of the turn has been completed and then discarded. If the parameter is negative, the sampled data are used to determine how much of the turn has been completed and then saved as a line of output in the data file.	M1	5	-60	60
$TEL_NUM The primary telephone number Seaglider dials to connect to the Basestation, 13 digits maximum. The phone number starts with the international country code, without leading zeros (for example, 1 for the US), then city/area code and number. There are no spaces or other interrupting characters between the country code, city/area code, or number. This parameter is an output from the Seaglider and can be found in each dive's .pvt file. If a communication session using **$TEL_NUM** does not successfully connect (after **$CALL_TRIES** tries), the phone number switches to the alternate number (**$ALT_TEL_NUM**), if available, for the next surfacing. If a communication session completes successfully on the alternate phone number, the phone number is switched back to	M1			

the primary for the next surfacing. **NOTE**: This parameter is not adjustable from the *cmdfile*. The number is edited using the pdoscmds.bat file, or through direct connection to Seaglider using the menus.				
$TGT_AUTO_DEFAULT A Boolean parameter. **$TGT_AUTO_DEFAULT,1** automatically updates the default target in NVRAM. **$TGT_AUTO_DEFAULT,0** does not update the default target in NVRAM.	M1	0	0	1
$TGT_DEFAULT_LAT The latitudinal component of the default waypoint target when the *targets* file cannot be read. It is a floating point value (degrees decimal minutes) between -9000.000 and 9000.000. For example, latitude 47 degrees 43.456 minutes is 4743.456. Latitudes in the northern hemisphere use positive values, while latitudes in the southern hemisphere use negative values.	M1	4743.4	-9000.00	9000.00
$TGT_DEFAULT_LON The longitudinal component of the default waypoint target when the *targets* file cannot be read. It is a floating point value (degrees decimal minutes) between -18000.000 and 18000.000. For example, longitude -122 degrees 23.456 minutes is -12223.456. Longitudes in the eastern hemisphere use positive values, while longitudes in the western hemisphere use negative values.	M1	-12224.2	-18000.00	18000.00
$UNCOM_BLEED *Set by manufacturer. Do not change.* The uncommanded change in A/D counts of VBD bleed triggers the following actions in an attempt to save Seaglider: 1. Stop whatever motor is running (the assumption is that electrical noise from one of the motors causes the Skinner valve to open) and disable it. 2. Close the Skinner valve. 3. Enter the recovery state (go to the surface and call home).	M1	60	0	400

$UPLOAD_DIVES_MAX The maximum number of dives to upload at one surfacing. A value of -1 means upload all available dives that have not been previously uploaded.	M1	-1	-1	9999
$USE_BATHY This parameter defines the use of the bathymetry maps. If **$USE_BATHY** is 0, the feature is disabled and Seaglider either dives to **$D_TGT** or uses the on-board altimeter to command a depth-based apogee maneuver. If **$USE_BATHY** is -4, the software searches for an on-board bathymap.nnn that includes the current position of Seaglider. This is the standard usage in operating areas covered by more than one map. If **$USE_BATHY** is a positive integer, the software searches for that on-board bathymap. If the map is present, the glider will use it to determine $D_GRID. If **$USE_BATHY** does not equal 0 but there is no map available for the present location of the glider, the glider will use the depth value in **$D_OFFGRID**. If bathymaps and/or the altimeter are used in conjunction with **$D_TGT**, the glider will begin the apogee maneuver based on the shallowest of the bottom depth values provided.	M1	0	-50	50
$USE_ICE **This feature is not available on HII Seagliders.** This parameter has the same functionality as **$USE_BATHY** but is used for ice maps.		0	-50	50
$VBD_CNV *Set by manufacturer. Do not change.* VBD position conversion factor from A/D counts to cm^3. This is a constant determined by the geometry of the internal hydraulic fluid reservoir and the potentiometers. The sign is negative to mean that higher A/D counts reflect more oil in the internal reservoir, hence, less oil in the external bladder, a lower Seaglider displacement, and thus lower Seaglider buoyancy.	M1	-0.245296	-1	0
$VBD_DBAND VBD deadband ($cm^3$). Fine VBD adjustments are not commanded within the deadband.	M1	2	0	10

$VBD_LP_IGNORE Provides capability to instruct the glider to ignore readings on one of the VBD linear potentiometers (linpot) when computing VBD position and continue flying. 0 = average values from both linpots 1 = ignore value from linpot A 2 = ignore value from linpot B **Note:** Use with caution. Ignoring a problem with the VBD can lead to loss of the glider.	M1	0	0	2
VBD_MAX *Set by manufacturer. Do not change.* Variable Buoyancy Device (VBD) position software limit (A/D counts) when the internal reservoir is almost full (external bladder fully bled/minimum Seaglider buoyancy). The Seaglider operating software closes the VBD main bleed valve (Skinner valve) when this value is reached. **NOTE:** Value determined by physical parameters of the system. Obtain the value from the vehicle's trim sheet (cal tab).	M1	3960		
$VBD_MAXERRORS Number of VBD errors permitted before the Seaglider enters recovery state. This is an attempt to keep Seaglider at the surface (prevent another dive) when it reports a VBD error. **Caution:** Loss of VBD function can result in the loss of a Seaglider.	M1	1	0	5
$VBD_MIN *Set by manufacturer. Do not change.* Variable Buoyancy Device (VBD) software limit (A/D counts) when the internal reservoir is almost empty (external bladder fully pumped). The Seaglider operating software stops the VBD pump when this value is reached. **NOTE:** Value determined by physical parameters of the system. Obtain the value from the vehicle trim sheet (cal tab).	M1	600		
$VBD_TIMEOUT The time (seconds) allowed for any commanded change in VBD position. If the VBD does not achieve the desired position before **$VBD_TIMEOUT** seconds, a VBD error occurs.	M1	720	180	900

$W_ADJ_DBAND Seaglider adjusts its buoyancy to maintain a desired vertical velocity (w) in the presence of strong density changes. If the observed w is too low, the glider may attempt to bleed on dives (subject to **$D_NO_BLEED** and **$MAX_BUOY**) or pump on climbs. However, in the presence of strong internal waves, the glider may appear to slow transiently because of upwelling on the dive or down welling on the climb, triggering unneeded buoyancy adjustments. Unnecessary buoyancy adjustments can also occur after the apogee VBD pump from neutral to positive buoyancy when the glider's vertical velocity is still accelerating from near 0 to the desired value but is seen in snapshot data grabs by the glider as being too slow. This parameter limits active control on VBD changes during a dive and climb. The Seaglider will automatically seek to maintain the desired vertical velocity by changing the VBD when: $$|Wobserved| < |Wdesired| - \$\boldsymbol{W_ADJ_DBAND}$$ **$W_ADJ_DBAND** has units of cm/s, should be positive, and correspond to the typical RMS variance of observed w found in VBD regressions. A value of 0 ignores internal wave effects (assumes still water). NOTE: If W_ADJ_DBAND is negative, it will force higher w on climbs (since w is limited by MAX_BUOY on dives) but this will cause an expensive extra pump at depth immediately after apogee. If that is what is desired, consider changing C_VBD instead. Note: This is a closed loop control and should only be used after the glider has been trimmed.	M1	0	0	40
$XPDR_DEVICE *Set by manufacturer. Do not change.* A configuration value specifying the model of the attached device. These devices have dedicated hardware ports on all motherboard revisions and, as such, a port specification is not necessary.	M1 Rev B M1 Rev E	24 5	-1	1023
$XPDR_INHIBIT A configuration value specifying the transponder inhibit time in deciseconds. The inhibit time is the time after a transponder reply during which the transponder will not reply to subsequent interrogation. Shorter times mean the transponder can be interrogated more rapidly.	M1	90	0	99 (9.9 seconds)

$XPDR_PINGS This is an output from the glider, representing the number of times the glider's transducer responded to an external stimulus at the interrogate frequency during a dive. The interrogate and respond frequencies can be found on the vehicle's trim sheet (cal tab). During missions, this value should be zero. While an occasional ping is acceptable, frequent pings are not as they consume battery power. If excessive pings are seen in **$XPDR_PINGS**, tune the transponder using **$XPDR_INHIBIT** and **$XPDR_VALID**.	M1	0	0	No limit
$XPDR_VALID A configuration value specifying the transponder interrogation validation sensitivity in units of 0.5 ms. Valid values are from 0 (no validation) to 6 (3 ms). The validation value is the total time over a 10 ms window following initial triggering that the detector circuit must remain triggered. Longer validation times reduce spurious interrogation replies but could result in decreased range.	M1	2	0	6

3.3. Parameters Listed by Category

Table 4: Parameters listed by category

Class	Category	Parameter
Factory Set	⚠ **Caution:** Use caution when changing these parameters.	

Table 4: Parameters listed by category

Class	Category	Parameter
		$AH0_10V,*AmpHours*
		$AH0_24V,*AmpHours*
		$COMPASS_DEVICE,*integer*
		$COMPASS2_DEVICE,*integer*
		$DEEPGLIDER,*boolean*
		$DEVICE[1/2/3/4/5/6],*integer*
		$FILEMGR,*integer*
		$GPS_DEVICE,*integer*
		$ID,*integer*
		$INT_PRESSURE_SLOPE,*calibration value*
		$INT_PRESSURE_YINT,*value*
		$LOGGERDEVICE1,*integer*
		$LOGGERDEVICE2,*integer*
		$LOGGERDEVICE3,*integer*
		$LOGGERDEVICE4,*integer*
		$MINV_10V,*voltage*
		$MINV_24V,*voltage*
		$MOTHERBOARD,*boolean*
		$PHONE_DEVICE,*integer*
		$PITCH_CNV,*cm/AD counts*
		$PITCH_MAX,*AD counts*
		$PITCH_MIN,*AD counts*
		$PRESSURE_SLOPE,*calibration value*
		$PRESSURE_YINT,*value*
		$ROLL_CNV,*degree,AD counts*
		$ROLL_MAX,*AD counts*
		$ROLL_MIN,*AD counts*
		$VBD_CNV,*cc/AD counts*
		$VBD_MAX,*AD counts*
		$VBD_MIN,*AD counts*
		$XPDR_DEVICE,*integer*

Table 4: Parameters listed by category

Class	Category	Parameter
Not Used By HII		**$ICE_FREEZE_MARGIN**,*degrees* **$KERMIT**,*integer* **$RAFOS_CORR_THRESH**,*value* **$RAFOS_DEVICE**,*integer* **$RAFOS_HIT_WINDOW**,*seconds* **$RAFOS_MMODEM,***bit mask* **$RAFOS_PEAK_OFFSET**,*seconds* **$SHORTING_PLUG,***integer* **$STROBE**,*boolean* **$SURFACE_URGENCY**,*integer* **$SURFACE_URGENCY_FORCE**,*integer* **$SURFACE_URGENCY_TRY**,*integer* **$USE_ICE**,*integer*
Piloting	Altimeter / Transponder	**$ALTIM_BOTTOM_PING_RANGE**,*0/off or meters* **$ALTIM_BOTTOM_TURN_MARGIN**,*0/off or meters* **$ALTIM_FREQUENCY**,*kHz* **$ALTIM_PING_DELTA**,*0/off or meters* **$ALTIM_PING_DEPTH**,*0/off or meters* **$ALTIM_PING_FIT,***integer* **$ALTIM_PULSE**,*milliseconds* **$ALTIM_SENSITIVITY**,*integer* **$ALTIM_TOP_MIN_OBSTACLE**,*0/off or meters* **$ALTIM_TOP_PING_RANGE E**,*0/off or meters* **$ALTIM_TOP_TURN_MARGIN**,*0/off or meters* **$D_OFFGRID**,*meters* **$USE_BATHY**,*integer* **$XPDR_VALID**,*integer* **$XPDR_INHIBIT**,*1/10 seconds*
	Buoyancy Limits	**$MAX_BUOY**,*gm* **$SM_CC**,*cc*
	Communications and File Management	**$CALL_NDIVES**,*integer* **$CALL_TRIES**,*integer* **$CALL_WAIT**,*seconds* **$CAPMAXSIZE**,*bytes* **$CAPUPLOAD**,*boolean* **$COMM_SEQ**,*integer* **$D_CALL**,*integer* **$N_FILEKB**,*integer* **$PROTOCOL**,*integer* **$T_RSLEEP**,*minutes* **$UPLOAD_DIVES_MAX**,*integer*

Table 4: Parameters listed by category

Class	Category	Parameter
	Dive Profile	**$D_TGT**,*meters* **$T_DIVE**,*minutes*
	Dynamic flight feedback system	**$DBDW**,*gm / m/s* **$PITCH_ADJ_GAIN,***0/off or cm/deg* **$PITCH_ADJ_DBAND**,*0/off or degrees* **$PITCH_W_DBAND**,cm/s **$PITCH_W_GAIN**,*cm / m/s* **$ROLL_ADJ_GAIN**,*0/off or deg/seconds* **$ROLL_ADJ_DBAND**,*0/off or degrees* **$W_ADJ_DBAND**,*integer*
	Flight Behavior and Improvement	**$APOGEE_PITCH**,*degrees* **$C_PITCH**,*AD counts* **$C_ROLL_CLIMB**,*AD counts* **$C_ROLL_DIVE**,*AD counts* **$C_VBD**,*AD counts* **$D_BOOST**,*meters* **$D_FINISH**,*meters* **$D_FLARE**,*meters* **$D_PITCH**,*meters* **$D_SURF**,*meters* **$GLIDE_SLOPE**,*degrees* **$N_NOSURFACE**,*integer* **$PITCH_DBAND**,*cm/AD counts* **$PITCH_GAIN**,*degrees/cm* **$PITCH_VBD_SHIFT**,*value* **$ROLL_DEG**,*degrees* **$SPEED_FACTOR**,*value* **$T_BOOST**,*seconds* **$T_LOITER**,*seconds* **$VBD_DBAND**,*cc*
	G&C Turn Length and Sampling Rate	**$T_TURN**,*seconds* **$T_TURN_SAMPINT**,*seconds*

Table 4: Parameters listed by category

Class	Category	Parameter
	Navigation	**$COMPASS_USE**,*value* **$COURSE_BIAS**,*degrees* **$FERRY_MAX**,*degrees* **$FIX_MISSING_TIMEOUT**,integer **$HEADING**,*-1 or degrees* **$HEAD_ERRBAND**,*degrees* **$KALMAN_USE**,*integer* **$N_GPS**,*seconds* **$NAV_MODE**,*integer* **$T_GPS**,*minutes* **$T_GPS_ALMANAC**,*integer* **$TGT_AUTO_DEFAULT**,*boolean* **$TGT_DEFAULT_LAT**,*degrees decimal minutes* **$TGT_DEFAULT_LON,***degrees decimal minutes*
Safety	⚠ **Caution:** Use caution when changing these parameters	

Table 4: Parameters listed by category

Class	Category	Parameter
		$D_ABORT,*meters* **$D_NO_BLEED**,*meters* **$D_SAFE**,*meters* **$ESCAPE_HEADING**,*degrees* **$ESCAPE_HEADING_DELTA**,*degrees* **$MAXI_10V,***amps* **$MAXI_24V,***amps* **$N_DIVES,***integer* **$N_NOCOMM**,*integer* **$NOCOMM_ACTION**,*integer* **$PITCH_MAXERRORS**,*integer* **$PITCH_TIMEOUT**,*seconds* **$RELAUNCH**,*integer* **$ROLL_MAXERRORS**,*integer* **$ROLL_TIMEOUT**,*seconds* **$STOP_T**,*mmddyyhh* **$T_ABORT**,*minutes* **$T_EPIRB**,*seconds* **$T_MISSION**,*minutes* **$T_NO_W**,*seconds* **$VBD_LP_IGNORE**,*integer* **$VBD_MAXERRORS**,*integer* **$VBD_TIMEOUT**,*seconds* **$XPDR_INHIBIT,***integer* **$XPDR_VALID,***integer*
Seaglider Hydrodynamics	⚠ **Caution:** Use caution when changing these parameters. Always save a copy of the old values and update the new ones in the cmdfile and sg_calib_constants.m.	
	Flight and Model	**$HD_A,***value* **$HD_B,***value* **$HD_C,***value* **$MASS,***grams* **$RHO,***gm/cc*
Seaglider Modified		**$DIVE**,*integer* **$MISSION,***integer*

Table 4: Parameters listed by category

Class	Category	Parameter
Sensors (Loggers)	These parameters are only visible when the respective logger is installed in the Seaglider	
	Nortek AD2CP Current Profiler	**$CP_NDIVE,***modulo* **$CP_PROFILE,***integer* **$CP_RECORDABOVE,***meters* **$CP_STARTS,***integer* **$CP_UPLOADMA**X*,bytes* **$CP_XMITPROFILE,***integer*
	Imagenix Echo Sounder	**$ES_NDIVE,***modulo* **$ES_PROFILE,***integer* **$ES_RECORDABOVE,***meters* **$ES_STARTS,***integer* **$ES_UPLOADMAX,***bytes* **$ES_XMITPROFILE,***integer*
	Passive Acoustic Monitoring (PAM) for WISPR and JASCO	**$PA_GAIN,***integer* **$PA_NDIVE,***modulo* **$PA_PROFILE,***integer* **$PA_RECORDABOVE,***meters* **$PA_UPLOADMAX,***bytes* **$PA_XMITPROFILE,***integer*
	GPCTD (Glider Payload Conductivity, Temperature, and Depth) parameters	**$PC_INTERVAL,***seconds* **$PC_MINCONDFREQ,***integer* **$PC_NDIVE,***modulo* **$PC_PROFILE,***integer* **$PC_RECORDABOVE,***meters* **$PC_STARTS,***integer* **$PC_UPLOADMAX,***bytes* **$PC_XMITPROFILE,***integer*
	Passive Acoustic Monitoring (PAM) for PMAR	**$PM_MOTORS,***boolean* **$PM_NDIVE,***modulo* **$PM_PROFILE,***integer* **$PM_RECORDABOVE,***meters* **$PM_SENDDEPTH,***boolean* **$PM_XMITPROFILE,***integer* **$PM_XMITRAW,***integer*

Table 4: Parameters listed by category

Class	Category	Parameter
	RBR Legato CTD	**$RB_INTERVAL,***seconds* **$RB_NDIVE,***modulo* **$RB_PROFILE,***integer* **$RB_RECORDABOVE,***meters* **$RB_STARTS,***integer* **$RB_UPLOADMAX,***bytes* **$RB_XMITPROFILE,***integer*
	Rockland Scientific Micro-Turbulence	**$RS_NDIVE,***modulo* **$RS_PROFILE,***integer* **$RS_RECORDABOVE,***meters* **$RS_STARTS,***integer* **$RS_UPLOADMAX,***bytes* **$RS_XMITPROFILE,***integer*
Sensors (Serial)	CT Sail Coefficients (coefficient values located on OEM calibration sheets)	**$SEABIRD_T_G,***calibration value* **$SEABIRD_T_H,***calibration value* **$SEABIRD_T_I,***calibration value* **$SEABIRD_T_J,***calibration value* **$SEABIRD_C_G,***calibration value* **$SEABIRD_C_H,***calibration value* **$SEABIRD_C_I,***calibration value* **$SEABIRD_C_J,***calibration value*
Simulated Dives		**$SIM_W,***off/0 or cm/seconds*
Output from Glider		**$CURRENT,***m/s,degrees,Boolean* **$FG_AHR_24Vo,***amp-hr* **$FG_AHR_10Vo,*amp-hr*** **$HUMID,***value in %* **$INTERNAL_PRESSURE,***value in psia* **$MEM,***bytes* **$TCM_TEMP,***value* **$10V_AH,voltage,***amphr* **$24V_AH,voltage,***amp-hr* **$XPDR_PINGS,***integer*

Table 5: Parameters listed by frequency of change

Class	Category	Parameter
Adjusted During a Mission		**$APOGEE_PITCH**,*degrees* **$C_PITCH**,*AD counts* **$C_ROLL_CLIMB**,*AD counts* **$C_ROLL_DIVE**,*AD counts* **$C_VBD**,*AD counts*

	$CALL_NDIVES,*integer* **$D_FINISH**,*meters* **$D_TGT**,*meters* **$HEADING**,*-1 or degrees* **$LOITER_D_BOTTOM,***meters* **$LOITER_D_TOP,***meters* **$LOITER_N_DIVE,***integer* **$MAX_BUOY**,*gm* **$N_DIVES**,*integer* **$N_NOSURFACE**,*integer* **$PITCH_GAIN**,*degrees/cm* **$PITCH_VBD_SHIFT**,*value* **$SM_CC**,*cc* **$SPEED_FACTOR**,*value* **$T_DIVE**,*minutes* **$T_LOITER**,*seconds* **$T_MISSION**,*minutes* **$T_RSLEEP**,*minutes*
Checked/Adjusted Prior to Start of Mission	**$MASS**,*grams* **$RHO**,*gm/cc* **$SIM_W**,off/0 or *cm/seconds*
Checked/Adjusted at Beginning of Mission but Rarely Later in Mission	**$ALTIM_BOTTOM_PING_RANGE**,*0/off or meters* **$ALTIM_BOTTOM_TURN_MARGIN**,*0/off or meters* **$ALTIM_PING_DELTA**,*0/off or meters* **$ALTIM_PING_DEPTH**,*0/off or meters* **$ALTIM_PING_FIT,***integer* **$ALTIM_PULSE**,*milliseconds* **$ALTIM_SENSITIVITY**,*integer* **$ALTIM_TOP_MIN_OBSTACLE**,*0/off or meters* **$ALTIM_TOP_PING_RANGE E**,*0/off or meters* **$ALTIM_TOP_TURN_MARGIN**,*0/off or meters* **$CALL_TRIES**,*integer* **$CALL_WAIT**,*seconds*

$CAPMAXSIZE,*bytes*
$CAPUPLOAD,*boolean*
$COMM_SEQ,*integer*
$COMPASS_USE,*value*
$COURSE_BIAS,*degrees*
$CP_NDIVE,*modulo**
$CP_PROFILE,*integer**
$CP_RECORDABOVE,*meters**
$CP_XMITPROFILE,*integer**
$CP_INTERVAL,*seconds**
$D_ABORT,*meters*
$D_BOOST,*meters*
$D_CALL,*integer*
$D_FLARE,*meters*
$D_OFFGRID,*meters*
$D_PITCH,*meters*
$D_SAFE,*meters*
$D_SURF,*meters*
$ES_NDIVE,*modulo**
$ES_PROFILE,*integer**
$ES_RECORDABOVE,*meters**
$ES_XMITPROFILE,*integer**
$ES_INTERVAL,*seconds**
$ESCAPE_HEADING,*degrees*
$FERRY_MAX,*degrees*
$FIX_MISSING_TIMEOUT,integer
$GLIDE_SLOPE,*degrees*
$HEAD_ERRBAND,*degrees*
$KALMAN_USE,*integer*
$LOGGERS,*boolean*
$N_FILEKB,*integer*
$N_GPS,*meters,satellites,seconds*
$NAV_MODE,*integer*
$P_OVSHOOT,*degree*
$PA_GAIN,*integer**
$PA_NDIVE,*modulo**
$PA_PROFILE,*integer**
$PA_RECORDABOVE,*meters**
$PA_UPLOADMAX,*bytes**

$PA_XMITPROFILE,*integer**
$PC_INTERVAL,*seconds**
$PC_MINCONDFREQ,*integer**
$PC_NDIVE,*modulo**
$PC_PROFILE,*integer**
$PC_RECORDABOVE,*meters**
$PC_UPLOADMAX,*bytes**
$PC_XMITPROFILE,*integer**
$PITCH_DBAND,*cm/AD counts*
$PM_MOTORS,*Boolean**
$PM_NDIVE,*modulo**
$PM_PROFILE,*integer**
$PM_RECORDABOVE,*meters**
$PM_SENDDEPTH,*Boolean**
$PM_XMITPROFILE,*integer**
$PM_XMITRAW,*integer**
$PROTOCOL,*integer*
$RB_INTERVAL,*seconds*
$RB_NDIVE,*modulo*
$RB_PROFILE,*integer*
$RB_RECORDABOVE,*meters*
$RB_STARTS,*integer*
$RB_UPLOADMAX,*bytes*
$RB_XMITPROFILE,*integer*
$ROLL_DEGREE,*degrees*
$RS_NDIVE,*modulo**
$RS_PROFILE,*integer**
$RS_RECORDABOVE,*meters**
$RS_UPLOADMAX,*bytes**
$RS_XMITPROFILE,*integer**
$SEABIRD_T_G,*calibration value*
$SEABIRD_T_H,*calibration value*
$SEABIRD_T_I,*calibration value*
$SEABIRD_T_J,*calibration value*
$SEABIRD_C_G,*calibration value*
$SEABIRD_C_H,*calibration value*
$SEABIRD_C_I,*calibration value*
$SEABIRD_C_J,*calibration value*
$STOP_T,*mmddyyhh*

	$T_BOOST,*seconds* **$T_EPIRB**,*seconds* **$T_GPS**,*minutes* **$T_GPS_ALMANAC**,*integer* **$T_TURN**,*seconds* **$T_TURN_SAMPINT**,*seconds* **$TGT_AUTO_DEFAULT**,*boolean* **$TGT_DEFAULT_LAT**,*degrees decimal minutes* **$TGT_DEFAULT_LON**,*degrees decimal minutes* **$UPLOAD_DIVES_MAX**,*integer* **$USE_BATHY**,*integer* **$VBD_DBAND**,*cc* **$XPDR_INHIBIT**, *deciseconds* **$XPDR_VALID**,*integer* *Parameter present only when sensor is installed in the Seaglider
Never Changed During a Mission Unless Directed to do so by HII Customer Support	**$AH0_10V**,*AmpHours* **$AH0_24V**,*AmpHours* **$ALTIM_FREQUENCY**,*integer* **$CF8_MAXERRORS**,*integer* **$COMPASS_DEVICE**,*integer* **$COMPASS2_DEVICE**,*integer* **$D_NO_BLEED**,*meters* **$DEEPGLIDER**,*boolean* **$DEVICE[1/2/3/4/5/6]**,*integer* **$ESCAPE_HEADING**,*degrees* **$ESCAPE_HEADING_DELTA**,*degrees* **$FG_AHR_10V**,*amp-hr* **$FG_AHR_24V**,*amp-hr* **$FILEMGR**,*integer* **$GPS_DEVICE**,*integer* **$ICE_FREEZE_MARGIN**,*degrees* **$ID,***integer* **$INT_PRESSURE_SLOPE**,*calibration value* **$INT_PRESSURE_YINT,***value* **$KERMIT**,*integer*

$LOGGERDEVICE1,*integer*
$LOGGERDEVICE2,*integer*
$LOGGERDEVICE3,*integer*
$LOGGERDEVICE4,*integer*
$MINV_10V,*voltage*
$MINV_24V,*voltage*
$MOTHERBOARD,*boolean*
$N_NOCOMM,*integer*
$NOCOMM_ACTION,*integer*
$PHONE_DEVICE,*integer*
$PHONE_SUPPLY,*integer*
$PITCH_CNV,*cm/AD counts*
$PITCH_MAX,*AD counts*
$PITCH_MAXERRORS,*integer*
$PITCH_MIN,*AD counts*
$PITCH_TIMEOUT,*seconds*
$PRESSURE_SLOPE,*calibration value*
$PRESSURE_YINT,*value*
$RAFOS_CORR_THRESH,*value*
$RAFOS_DEVICE,*integer*
$RAFOS_HIT_WINDOW,*seconds*
$RAFOS_PEAK_OFFSET,*seconds*
$RELAUNCH,*integer*
$ROLL_CNV,*degree,AD counts*
$ROLL_MAX,*AD counts*
$ROLL_MAXERRORS,*integer*
$ROLL_MIN,*AD counts*
$ROLL_TIMEOUT,*seconds*
$STROBE,*boolean*
$SURFACE_URGENCY,*integer*
$SURFACE_URGENCY_FORCE,*integer*
$SURFACE_URGENCY_TRY,*integer*
$T_ABORT,*minutes*
$T_EPIRB,*seconds*
$T_NO_W,*seconds*
$T_WATCHDOG,*minutes*
$UNCOM_BLEED,*AD counts*
$USE_ICE,*integer*
$VBD_CNV,*cc/AD counts*

	$VBD_LP_IGNORE,*integer* **$VBD_MAX**,*AD counts* **$VBD_MAXERRORS**,*integer* **$VBD_MIN**,*AD counts-* **$VBD_TIMEOUT**,*seconds* **$XPDR_DEVICE**,*integer*
Expert Mode Used Only After Glider is Well Trimmed; Settings Based on Dive Plot and Regression Analysis	**$DBDW**,*gm/m/s* **$HD_A**,*value* **$HD_B**,*value* **$HD_C**,*value* **$LOITER_DBDW,***gm/m/s* **$LOITER_W_DBAND,***cm/s* **$PITCH_ADJ_DBAND**,*0/off or degrees* **$PITCH_ADJ_GAIN,***0/off or cm/deg* **$PITCH_W_DBAND**,cm/s **$PITCH_W_GAIN**,*cm / m/s* **$ROLL_ADJ_GAIN**,*0/off or deg/seconds* **$ROLL_ADJ_DBAND**,*0/off or degrees* **$W_ADJ_DBAND**,*integer*
Seaglider Modified but can be Overridden by Expert Users	**$DIVE**,*integer* **$MISSION**,*integer*

4. Summary

If you have additional questions regarding use of the Extended PicoDOS commands, please contact Seaglider Customer Service at seagliderssupport@hydroid.com.