SeaSonde Radial Site Release 6
SeaSondeController Application Guide
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About

SeaSondeController communicates with the SeaSonde Receiver to collect the receiver's current settings and to change the receiver's settings either temporarily or permanently. SeaSondeController communicates with one or two Receivers or Transponders simultaneously using the SeaSondeAwgiii USB driver. SeaSondeController communicates using USB directly to the Receiver.

In order for SeaSondeController to talk to a receiver the SeaSonde Extension will need to be already installed and the receiver powered and connected to a USB port on the computer.

With Release 6, basic setup (frequency and bw/range resolution) should be done using **SeaSondeRadialSetup** *which in turn will tell SeaSondeController what to do.*

The Release 6 SeaSondeController has changed so that a receiver is not immediately required in order to setup the site. When the receiver is unavailable and the settings are stored, SeaSondeController will keep track of the settings and will automatically update the receiver when next found.

Startup

When SeaSondeController starts, it automatically selects the first available Receiver. It will look for a receiver exactly matching the previously selected receiver. If not found, it will look for the closest receiver match.

Selecting a Receiver or Transponder

SeaSondeController is configured to automatically find the receiver, so you will probably not need to manually select the Receiver. You can select or reselect the receiver by use of the Control menu and item 'Select Port...' to bring up a dialog to select one of available receivers.
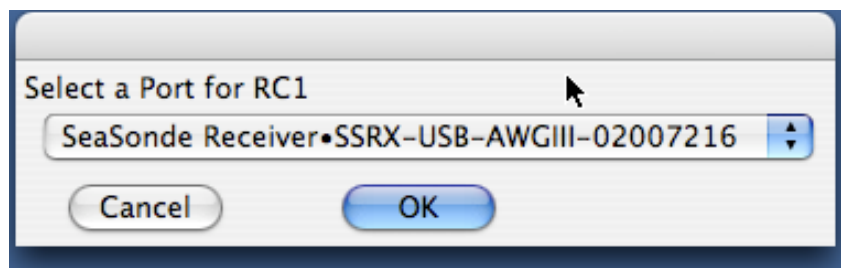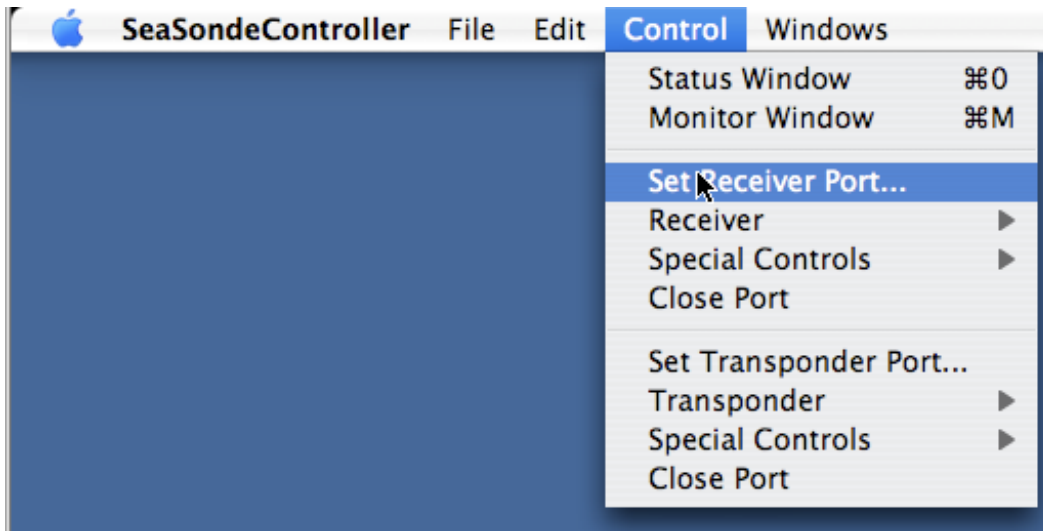
If there are no available receivers/transponders to select, then the Port popup menu will be empty. If empty, you will need to cancel, connect a receiver or transponder to the computer, and then select the 'Select Port...' menu item again.
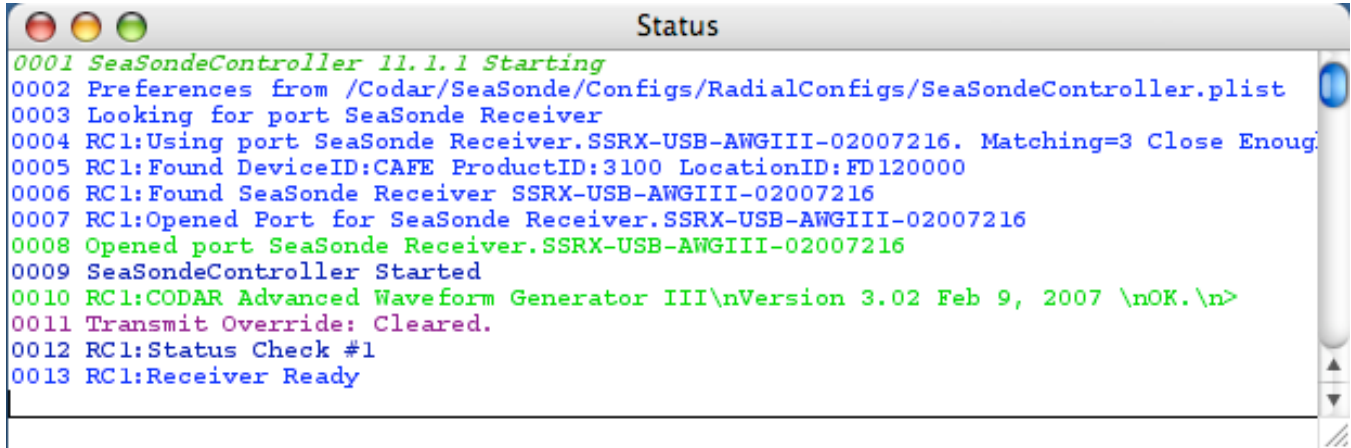After selecting a valid receiver, the status window will show the receiver's name and serial number it is connected to. SeaSondeController will issue a 'STAT' command to obtain the receiver's current settings.

When receiver settings are stored, SeaSondeController will also save the port name of the receiver and later match this name when SeaSondeController starts up or the receiver restarts.

Status and Monitor Windows

Status Window

The Status window shows messages about the communication with the receiver or transponder. All these messages except for the read/write messages are sent to Sentinel application so that Sentinel can write them into the Sentinel log files.
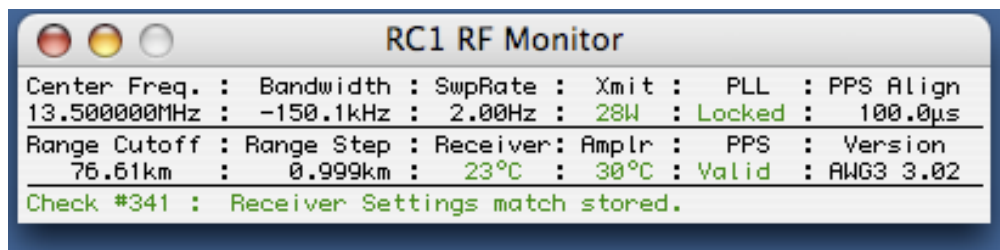

Since SeaSondeController can control two devices at once (Receivers and/or Transponders), the first device(receiver) communication messages start with 'RC1:' while the second device(transponder) messages start with 'RC2:'

Monitor Window

The Monitor Window shows some of the current settings plus some useful status information.

Center Freq. shows the current center frequency in MHz
Bandwidth shows the current bandwidth in kHz. A negative value indicates a down sweep.
SwpRate show the current sweep rate in Hz
Xmit shows the current forward transmit in Watts if possible otherwise Pulse. It might show OFF is set off or ON if forced on. It might also show OFF00 where 00 is 2digit hex code of the Transmit Watch trip code which is forcing the transmit drive off.
PLL shows either Locked if the main timing base is locked to the GPS 10MHz output.
PPS Align shows the current GPS timing alignment value.
Range Cutoff shows the expected cut off point due to blanking.
Range Step shows the distance resolution of each range cell. This is a function of the Bandwidth.
Receiver shows the receiver temperature. This will be red if greater than the TransmitWatch temperature.

Amplr shows the transmitter amplifier temperature. If the transmitter does not have this capability, the label will be **Xmit** and show the transmitter's chassis temperature.
PPS shows Valid if the receiver sweep timing is aligned to the GPS PPS Timing; otherwise, it show Unlocked. It will show Valid when the Discipline mode is normal, no critical GPS alarms, most minor alarms off, and the Align value is close to the measured PPS alignment.
Version shows the main receiver control module name and firmware version number.

Standard Receiver Controller

To change the Receiver settings, open the Standard or Advanced control window.
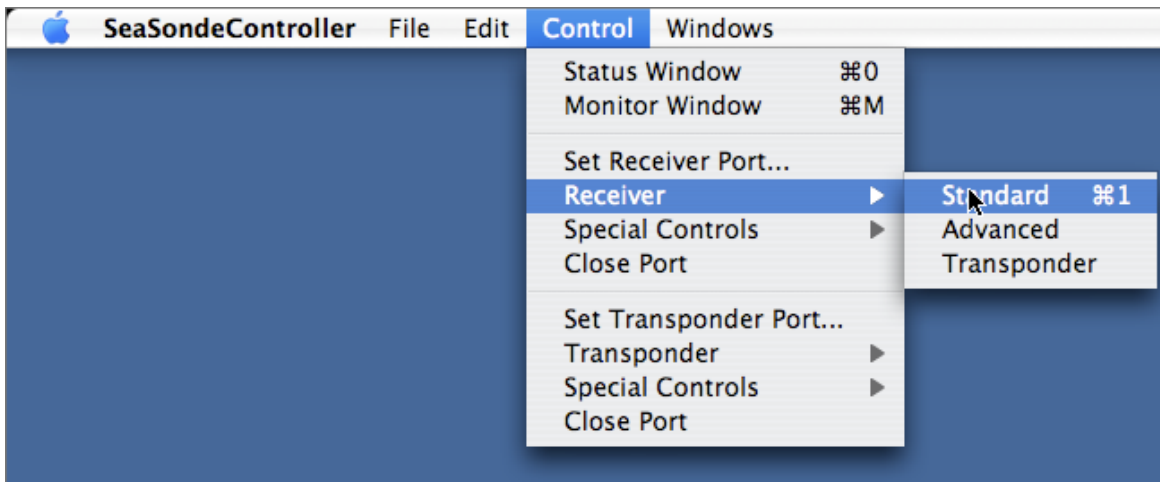
The standard window allows you to change basic operating characteristics.
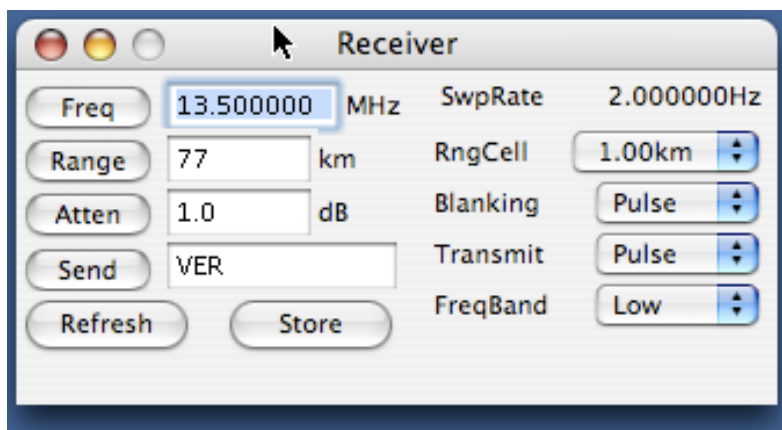
Freq entry is the **center** transmit frequency. *Be careful not to set a frequency for which you do not have approval for.* The band will automatically change depending on the entered frequency. If you enter a frequency outside the high or low band for your system the entry will automatically change to the lower or upper end of the closest band.

Range entry sets the range cut off filter, which is a function of the SeaSonde blanking period.

Atten entry attenuates the transmit power. 0dB is full power while 31dB is minimum power.

Send entry allows you to type in special commands; see the Special Commands section.

RngCell menu allows you to select a new range cell size. The smaller the range cells the larger the bandwidth. *Be careful not to set a bandwidth, which exceeds your allocated approval.*

Blanking menu controls receiver blanking which controls whether the receiver can measure external signals. Blanking is normally set to Pulse, which is normal SeaSonde operation. It can be set to OFF which will cause the cross spectra to contain only internally generated noise. It can also be set to ON, which is only used if transmit is OFF to look for possible interfering signals.

Transmit menu controls the transmit signal drive to the transmitter. Transmit is set to pulse for normal SeaSonde operation. It can be set to OFF, to shutdown the transmitter. It cannot be set to ON, to continuously broadcast; if desired, you will need to use the advanced controller. Note, if the transmit override is activated, it will override this control forcing the transmit drive to OFF.

Band menu controls the frequency band filters. Setting the freq will automatically select the band. This can be used to test the filter selection or if you just like to hear the relays click.

Refresh button will immediately query the receiver for its current settings. The control windows will update if any of the settings are different. The result of the query can also be seen in the Status window.

Store button will ask you if you want to permanently store the current settings of the receiver in non-volatile memory as the power on state. If you select "Yes", this will ensure that Transmit is not ON before saving the settings. If successful, the receiver will always return to these values after powering on.

Advanced Receiver Controller

The advanced receiver control window is selected by selecting the Advanced Controller under the Controller1/Receiver submenu under the Control menu. This control window has many more control options and many ways to prevent proper operation.

For normal operation and prevention of overdriving the transmitter and burning it out, you should NOT set the BW to 0 (zero), or Sweep to CW, or Transmit to ON. These options are meant only for bench testing into a dummy load.

The SeaSonde uses a continuous repetitive waveform at the SwpRate. For the typical SweepDir set Down, the waveform starts at the Freq + BW/2 and ends at Freq – BW/2.

The BW (bandwidth) is inversely proportional to the range cell resolution. BW is created by the receiver by stepping a DDS (Direct Digital Synthesizer) at the FreqInc rate.

During each waveform sweep, the receiver toggles between transmitting and receiving

(Blanking and Transmit should be Pulse) at the Blank period.
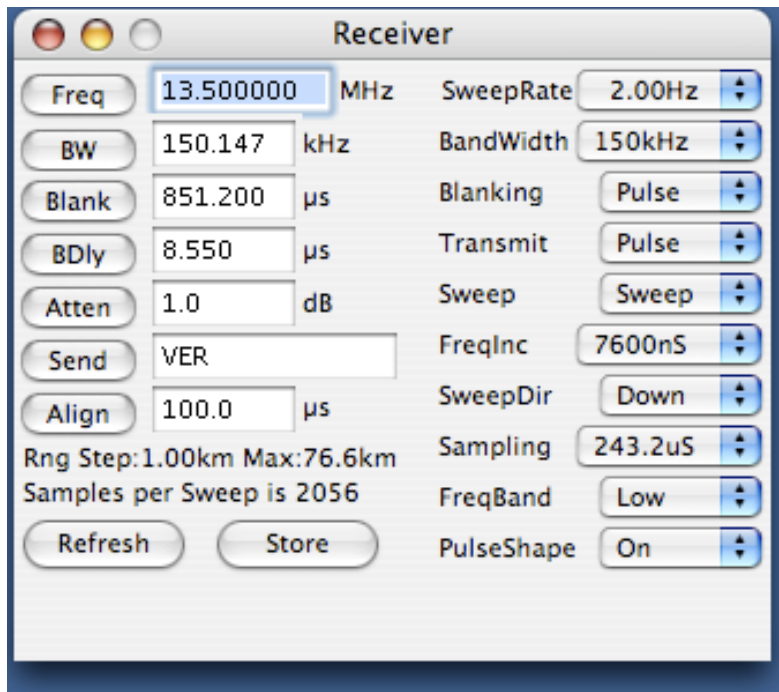
Freq sets the start frequency. After entering a new value and pressing return or the Freq button, the value will update with the actual setting. Since the DDS is capable of 28milliHz resolution this normally won't be a problem.

BW sets the bandwidth in kHz. *For normal operation it should never be 0 (zero).* After entering a new value and pressing return or the BW button, the value will update with the actual setting possible by the hardware. BW is converted to a frequency step size using the SwpRate and the FreqInc value. The larger FreqInc is, the more BW that can be obtained. The smaller FreqInc is, the more accurate the BW can be set. The faster the SwpRate is, the less BW that can be obtained. Farther down is text that shows what the range cell step size will be (i.e. Range Step: 1.00km) (Note, AwgController on OS9 set BW using MHz)

Blank sets the transmit/receive toggle rate. After entering a new value and pressing return or the Blank button, the value will update with the actual setting possible by the hardware. In order for normal operation, the SeaSonde must continuously transmit for a short while then receive for a short while over for the waveform sweep. A side effect of blanking is that it acts as a filter for maximum range. The filter cutoff point for range is shown below after the Range Step text (i.e. Max: 43.8km). During Transponder Antenna calibration measurements set this value is set to (60us) and turn off pulse shaping to filter out normal Bragg energy to see the transponder return more clearly.

BDly sets the time from stopping transmit to enabling receive for each blanking cycle (BDly stands for Blank Delay). Its purpose is to filter out the directly radiated signal from the transmit antenna into the receive antenna. The larger this value is, the more of early range cells will be filtered out. This value is normally (8.5us) and never changed.

Atten sets the transmit drive signal attenuation which directly affects how strong a signal is transmitted. You may have local restrictions on how much power can be broadcast. Enter an

integer from 0dB (maximum signal) to 30dB. Changing from 0dB to 3dB should cut the broadcast power wattage in half. Note that in the current receiver design 0dB is not very well calibrated and changing from 0 to 1dB is typically much more. Check the Transmitter Status window to see how much power you are broadcasting.

Send is an entry to send special commands to the receiver. See the Special Commands section for detail on some useful commands. Because we are continuously adding new features it is impossible and sometimes undesirable to keep the User Interface up-to-date for all possible configurations; hence, the Send entry. The default entry of 'VER' will output the Receiver's AWG (Advanced Waveform Generator) firmware version to the status window.

Align entry has two slightly different functions depending on whether you have a GPS or non-GPS receiver timing.
For GPS timing, this sets the offset of the SeaSonde waveform timing from the GPS PPS clock. This is critical to SeaSonde Radial Sites operating at the same frequency in order to keep them from interfering with each other. The alignment value is dependent on the distances between the sites and the number of range cells used by each site. This value is currently calculated by CODAR and should not be changed (unless requested to). A snapshot of the values set in the SeaSondeController window should be stored on the computer's desktop so that settings can confirmed whenever users or CODAR staff logon to check the site.
For standard (non-GPS) timing, this value sets a delay between waveform sweeps. It is usually set to its maximum value of 6553.5.

Popup menus:

SwpRate sets the repetition sweep rate of the waveform. For a standard SeaSonde this rate is 2Hz. The menu allows you to select alternate sweep rates. When the menu is selected and opened, the actual rate will be displayed. GPS Timing uses rates that are exact divisions of 1Hz while non-GPS timing uses intervals derived from 950ns. *Warning: changing SwpRate will also change the BW, so you might need to re-enter BW after a change of settings.* Changing SwpRate will also change the number of samples in a sweep.

BWidth provides a window for selecting commonly used bandwidths corresponding to commonly used range cell sizes. The actual hardware setting will be updated following the **BW** entry.

Blanking controls the sampling receive state. The normal setting is Pulse which means that the Blanking control signal toggles with the Blank period. Selecting On causes the receiver not to receive any external signal. When On, SeaSondeAcquisition should show cross spectra containing only internal noise which should be at least 10dB below the external noise floor.

Transmit controls the transmit signal drive to the transmitter. Transmit is set to pulse for normal SeaSonde operation. It can be set to OFF, to shutdown the transmitter or it can be set to ON, to continuously broadcast. *Warning: Setting Transmit to ON may soon burn out the transmitter as you will be broadcasting double the power from the pulse setting.* Also note, if the transmit override is activated, it will override this control forcing the transmit drive to OFF.

Sweep controls whether Sweep which frequency changes by the BW over the waveform sweep or CW, which is stuck at the Freq entry. *Warning: CW is only used for testing and*

should not be used in standard operation. Setting CW is the same as setting a 0 (zero) BW.

FreqInc controls the rate at which the frequency is incremented over the waveform sweep. *Warning: changing FreqInc will also change the BW, so you might need to re-enter BW after.* The receiver creates bandwidth by adding a frequency stepping value at the FreqInc Rate over the SwpRate period.

SweepDir controls whether the start frequency is incremented Up or decremented Down to its final BW. Standard SeaSonde operation always uses a down sweep.

Sampling controls the sampling rate. This and the SwpRate controls the number of samples taken by the receiver each waveform sweep.

FreqBand controls the frequency band in use, which controls which hardware filters to use. Unlike the standard control, which will automatically select the FreqBand, you will have to select the appropriate band here for the Freq entered.

PulsShape controls whether the transmit drive signal is pulse shaped, smooth transitions from power off to full power, and from power on to power off. The transmit pulse is a square wave control signal to turn the amplifier on and off, which causes spurious (outside the BW) transmit signals. The pulse shaping of the transmit drive causes a major reduction in the spuriously generated signals. The pulse shaping generated by the TR Module normally takes a 30μs transition to full On and a 30μs transition to full Off. Hence, if you set the Blank time to 60μs or lower you will seriously reduce the amount of transmitted power. This is why for the duration of transponder measurements, pulse shaping is turned off.

Refresh button will immediately query the receiver for its current settings. The control windows will update if any of the settings are different. The result of the query can also be seen in the Status window.

Store button will ask you if you want to permanently store the current settings into the receiver as the power on state. If yes, it will ensure that Transmit is NOT ON before saving the settings. If successful, the receiver will always return to these values after powering on.

Special Receiver Controls

Under the Control menu is a 'Special Controls' sub menu with the following.
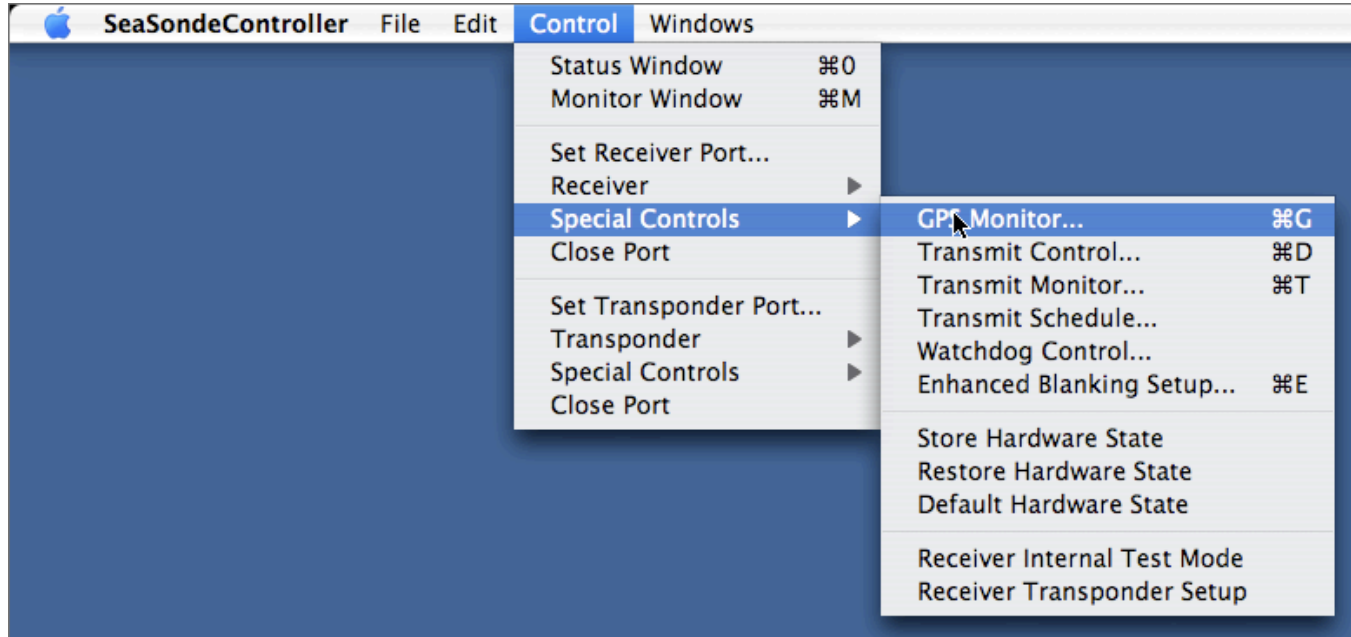
GPS Monitor...   Opens a GPS status and control window.
Transmit Control...   Opens a Transmit Drive/Watch control window.
Transmit Monitor...   Opens a Transmit status of temperature and power plots window.
Trasnmit Schedule...   Opens a scheduler to control transmit power throughout the day.
Watchdog Control...   Opens a window to edit the watchdog, status, and report intervals.
Enhanced Blanking Setup...   Opens a window to enable and configure enhance blanking.

Store Hardware State   After asking, stores the receiver power up state. (Same as Store
                        button is Standard and Advanced control windows)
Restore Hardware State After asking, reloads the receiver's power up state, removing any
                        unstored changes.
Default Hardware State After asking, sets the receiver to its default. Afterwards, you will need
                        set the frequency and all other desired settings.

Receiver Internal Test Mode   After asking, sets the receiver to an internal 10MHz test mode
                        which should show very nice sine waves in the analog display for all
                        three channels.
Receiver Transponder Setup   After asking, sets the receiver for typical usage with
                        Transponder antenna measurement test.

Special GPS Status Display
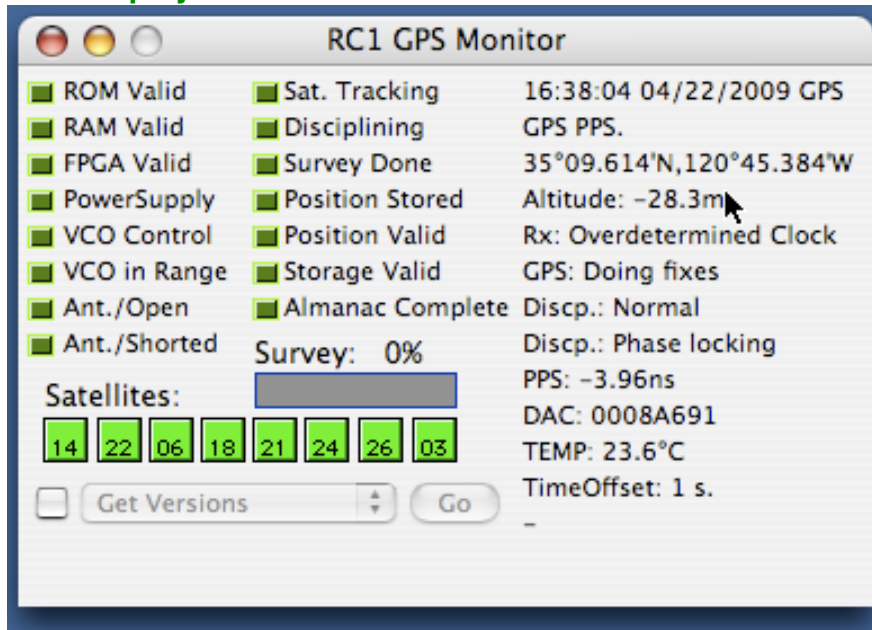
This shows everything about the GPS module on GPS equipped receivers.

If all the indicator boxes are gray, then the AWG Module is unable to communicate with the GPS module. This could be as simple as a loose or unplugged connector or the GPS module may not be working. All the indicators should be green. Red Indicators indicate a major fault with the GPS. Yellow indicators may be problems or not fully powered up issues. If the Ant. / Open or Ant./Shorted is yellow then the GPS antenna needs to be checked. The GPS location can be used as the Radial Site location provided that the GPS antenna is not significantly distant from the receive antenna.

Typically Position Store should also be green if the site has been set up; otherwise it will be yellow. If yellow, after the site has completed a survey (Survey: 100%), check the box next to Get Versions menu. Then select the Get Versions and select Store Position. Then click the Go button. This will store the current GPS location as the power on location. This allows the GPS Timing to recover quickly at power up. If the site is moved, then this position will be cleared, then have the GPS resurvey followed by Store Position again.

Special Transmit Drive Control
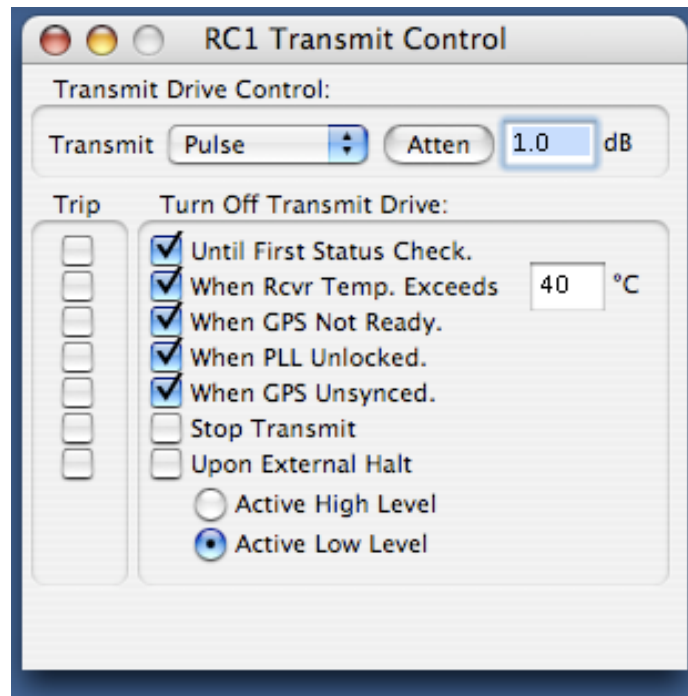
The first section is the same transmit control as in the standard control window. You can turn the Transmit drive ON, OFF, or PULSE. (Pulse is standard operation). Do NOT set to ON unless asked to do so; when set ON, you can overheat your transmitter and damage it after a while. You can set the transmit drive attenuation from 0 to 30dB. These controls affect only the drive signal sent to the transmitter and do not turn off/on AC power to the transmitter. The transmit popup will show Forced Off if any of the Turn Off Transmit Drive features are tripped.

The second section Turn Off Transmit Drive: sets options for what is called the *Transmit Watch* feature built into receivers with the AWGIII module. The receiver will periodically check these actions to decide wether to turn on or off drive to the transmitter. When any of these actions are activated (tripped), the receiver will override the current transmit settings to OFF, 30dB attenuation, and zero frequency. When all the actions are cleared, the transmit drive will resume using its configured settings. When any of these are tripped or cleared a message will appear in the status window indicating what has occurred. The Trip section shows which actions are currently tripped. A standard (non-GPS) SeaSonde should only set the first two. A GPS SeaSonde should set all except for the Upon External Halt. Upon External Halt should only be used in special cases where an external signal is connected to the receiver to tell it when it is OK to operate.

Until First Status Check. Tells the Receiver to keep the transmit drive off until the computer SeaSondeController issues a status check ('STAT' command). This prevents the transmitter from coming online unless the computer is up and running.
When Temperature Exceeds. Tells the Receiver to turn off the Transmit when the Front Panel board temperature sensor exceeds the entered value. This prevents the transmitter from burning out if the storage enclosure for the receiver and transmitter becomes too hot.
When GPS PPS Not Ready. Tells the Receiver to turn off the Transmit when the GPS is not ready or currently unstable for the PPS (Pulse Per Second) signal output on which the SeaSonde GPS timing depends on for synchronized use with other SeaSonde Radial Sites using the same frequency.

When PLL Unlocked. Tells the Receiver to turn off the Transmit when the AWG Control module's PLL (Phase Lock Loop) cannot lock to the GPS 10MHz Reference signal, which is also required for GPS Timing.

When GPS Unsynced. On receivers using GPS Timing, this tells the receiver when to turn off the transmit if the receiver's SeaSonde timing differs from the GPS PPS significantly.

**Stop Transmit**. Turns off the transmitter. Same as setting Transmit OFF.

Upon External Halt. With this set, an external signal on one of the pins of the communications connector can be toggled in TTL level to control whether transmit is on or off. Also when active, the receive stops sampling signals so that SeaSondeAcquisition will find no data to process during this time.

Special Transmit Schedule
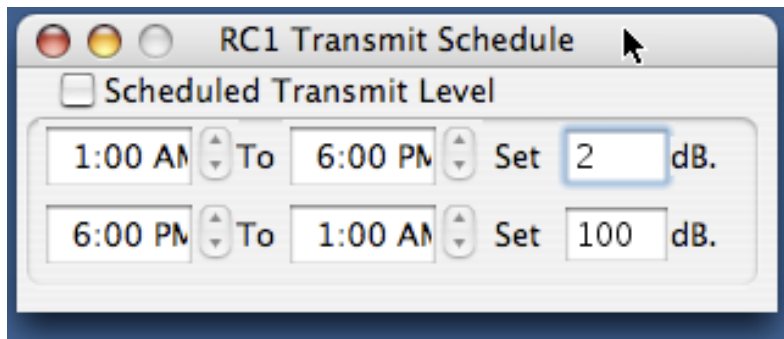
Transmit Schedule window is for setting the site to broadcast less power at times during the day/night. This is not used with a standard SeaSonde; It is used only for locations that have added restrictions on broadcast power. The checkbox enables the scheduling. The receiver will use its configured power attenuations setting for any time that is not within the two time intervals. An attenuation entry greater than 30dB tells the receiver to set the transmit control to OFF which is provides an additional 60dB of attenuation.

Special Transmitter Monitor
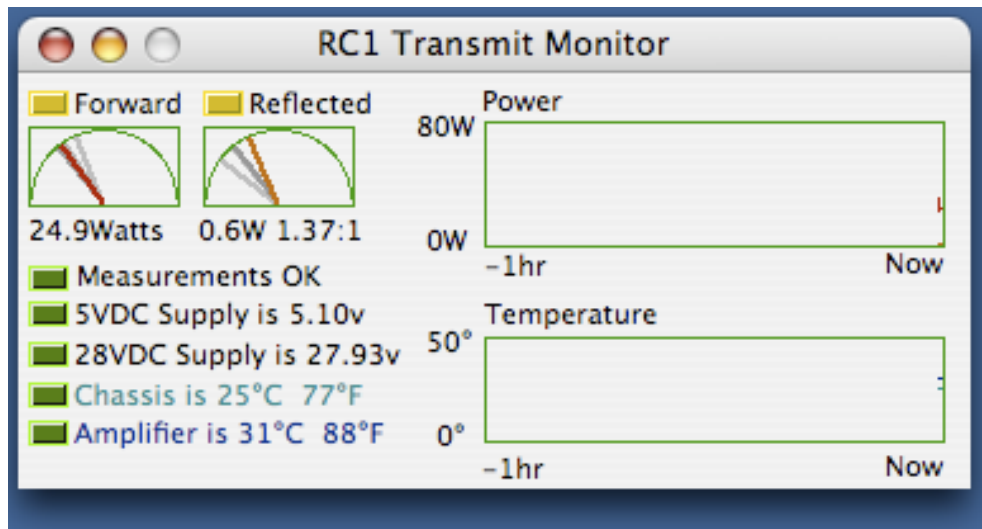
Transmitter Monitor window is only for newer transmitters and receivers having an AWGIII controller module.

Measurements OK if red shows that the receiver was unable to communicate with the transmitter to obtain any information. This may be due to the transmitter being off, transmitter

does not have the capability, or a hardware problem. It may also show red with bad measurement message, if there is a problem with the A/D converter hardware.

5VDC Supply shows the measured voltage for the transmitter's 5V supply. It will show red if the value is less than 4.6V

28VDC Supply shows the measured voltage for the transmitter's amplifier supply. It will show red if the value is less than 22V.

Chassis Temperature shows the measured temperature of the transmitter box. This value should be close the receiver's chassis temperature. It will show red if over 40°C.

Amplifier Temperature shows the measured temperature of the transmitter amplifier. It will show red if over 45°C. Note that this sensor is not implemented on all transmitters. It will show the minimum sensor value by default if the sensor is not installed. The amplifier currently has its own thermal cutoff switch, which is not linked to the SeaSondeController software.

Forward meter shows the average forward power to the antenna measured at the transmitter. If the forward power reading is less than 20 or greater than 70, then the Forward indicator will show red. If it is less than 30 or greater than 60, then Forward indicator will show yellow. The standard SeaSonde transmitter outputs100 Watts peak power with a 50 percent duty cycle for 50 w\Watts average. A mismatched antenna reduces forward power. A low forward reading with a low reflected reading indicates either that there is no drive to the transmitter from the receiver (check the status messages to see if a transmit watch setting is tripped) or the amplifier is not working correctly.

Reflected meter shows how much the average reflected power from the antenna is. A high reading shows a mismatch with the transmit cable and/or antenna. It shows the measurement in Watts and in VSWR. VSWR stands for voltage standing wave ratio. A value of 1:1 is a perfect match while higher ratios indicate increasing worst match. The indicator shows red when the ratio is 6:1 or more and the problem should be corrected.

Power graph shows the power over time since the window was opened for the past hour.

Temperature graph shows the transmitter chassis temperature since the window was opened for the past hour.

Special Watchdog Control
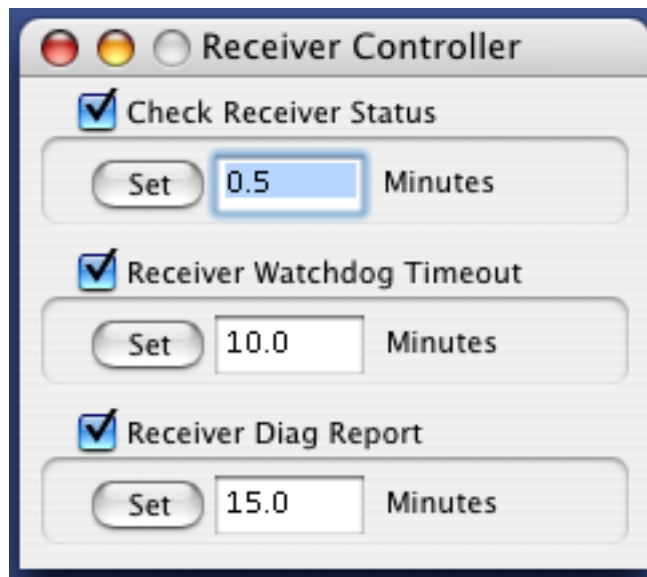
The Watchdog Control window allows you to change how often SeaSondeController checks the receiver's settings, change the receiver's watchdog time out value, and change how often for SeaSondeController to write out new entries into the hardware diagnostics file.

The Check Receiver Status controls how often SeaSondeController polls the receiver using a 'STAT' command check what the settings are. These settings are reported to the Monitor, and Control windows. These settings are also reported to SeaSondeAcquisition so that it can store certain settings into the collected data. The Check Receiver Status setting should not be greater than the Watchdog Timeout or the Diag Report interval. This setting is stored by SeaSondeController into its preference file.

The Receiver Watchdog Timeout controls how long the receiver will go without an expected Check Receiver Status from SeaSondeController before the receiver will cycle power to its external AC switch (which the computer is usually connected to) and then restart the receiver. This setting is exists in the receiver and is not permanently stored unless you do the 'Store' button in the Control window.

The Receiver Diag Report controls how often SeaSondeController adds a new entry to the hardware diagnostics logs. It will use the worse case values from all the Check Receiver Status during this interval. This new log for SeaSonde on OS X, records many receiver status values like temperature, power, and run time. The new DiagDisplay application will plot these logs. This setting is stored by SeaSondeController into its preference file.

Special Enhanced Blanking Setup
is used to setup a special blanking which puts more power closer to the site at the sacrifice of range which is used to improve wave processing. Ask CODAR Support for more information on configuring Enhanced Blanking before trying this on your own.
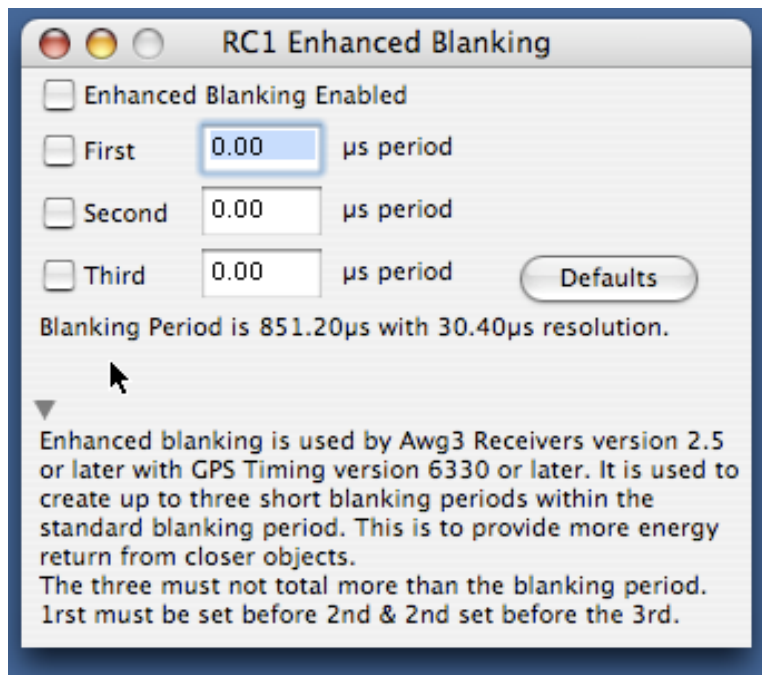
Special Save Hardware State
asks to permanently save the current settings as the receiver's or transponder's power up settings.

Special Restore Hardware State
asks to reload the receiver's or transponder's power up settings.

Special Default Hardware State

asks to reconfigure the receiver or transponder to its default settings. Afterwards, you will need set the frequency and all other desired settings.

Special Receiver Test Mode

puts the receiver into a special test mode where an internally generated 10MHz signal is supplied to the front end of the receiver module. The frequency difference between 10MHz and the entered freq can be measured by SeaSondeAcquisition's Analog Display. SeaSondeAcquisition normally shows two sine waves for I & Q where Q is 90 degrees in phase behind I. **Warning**, do NOT Store the settings when in this mode; otherwise, your receiver will always power up into the test mode. You should restore the receiver to normal operation by either cycle power to the receiver, or Restore Hardware State menu item, or enter a 'LOAD 1' into the **Send** entry in the control window.

Special Receiver Transponder Setup

adjusts the receiver settings for use with transponder when measuring antenna patterns. When configuring the receiver and transponder together, you can use the Transponder control window Setup button to perform the same function.

Warning, do NOT Store the settings when in this mode; otherwise, your receiver will always power up into the test mode. You should restore the receiver to normal operation by either cycle power to the receiver, or **Restore Hardware State** menu item, or enter a 'LOAD 1' into the **Send** entry in a control window.

Transponder Controller

The Transponder Control window controls a SeaSonde Transponder, which is typically used to perform an antenna pattern measurement.

The Transponder control window is designed to be simultaneously connected to a receiver and a Transponder. The reason behind this is to ensure that both the radial site and the transponder are configured to the same frequency. However, you can still use the Transponder control window without a receiver attached. Without a receiver, it is helpful if you use the SeaSondeController.plist from the radial site before running SeaSondeController as this will show what the Radial Site is set to or you can enter what the radial site is using for Freq, BWitdh, SwpRate, and SweepDir.

One the left side is the Transponder control section which is meant to be connect to SeaSondeControllers second controller (RC2) and on the right is the Receiver controller.
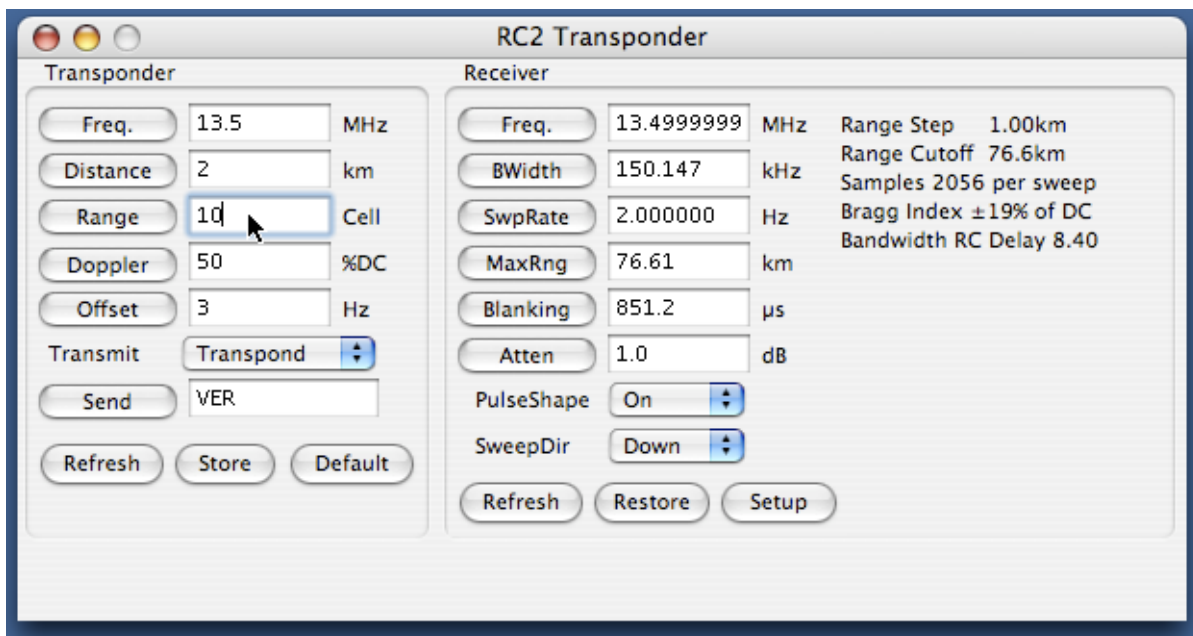
Receiver Section:

Click the Receiver Setup button one time to configure the Receiver for optimal usage with the transponder. If you have receiver attached, you shouldn't need to change the receiver Freq, BWitdh, SwpRate, and SweepDir. The Setup button will change the sweep rate, blanking, and Atten.

Transponder Section:

Freq. The transponder Frequency should be set to the same as the receiver for the site under test. The frequency should also be what you plan to operate the radial site at.

Distance Sets how far you expect the transponder to be used from the site. This is used with the Receiver Range Step value to determine how much offset is needed to adjust for the

Range Cell entered.

Range Sets which range cell you desire the transponder to show up in the receiver cross spectra.

Doppler Sets the percentage from DC (0%) to maximum doppler cell(100%) where you desire the transponder to show up in the receiver cross spectra. A positive value puts the doppler peak on the positive doppler velocity side while a negative puts the peak on the negative doppler velocity side.

Offset Is the frequency offset of the transponder that positions where the transponder peak will show up in range and doppler. Range and doppler position are the whole and fractional portions of the this offset divided by the receiver sweep rate after adjusting for transponder distance and a bandwidth time delay factor.

When you change Range, Doppler, or Offset, the other two will automatically update to reflect the change.

Transmit allows you to turn off the transponder output which can be useful if trying to determine you can see the transponder in SeaSondeAcquisition.

Send button to send a command to the transponder. Common useful commands are listed in the Special Commands chapter.

Refresh button will immediately query the transponder for an update which is also done automatically every minute.

Store button saves the current settings at the power on transponder state. *You should do this after configuring the transponder. You should then turn the transponder off and back on then verify that it is using the settings you desire.*

Default button sets the transponder to its default hardware state. You should do this before the other settings or if you are having difficulties with the transponder.

Special Commands

In the standard or advance receiver control windows, you can enter many different commands directly to the receiver by way of the 'Send' button. The command sent and its response can be viewed in the 'Status' window. Here are some useful commands:

'STAT' returns a report of most of the current settings. This is the same command that SeaSondeController uses as a periodic status check and the 'Refresh' button in the control windows.

'POKE s' where **s** is seconds sets the receiver watchdog timeout. If the receiver does not receive a 'STAT' command within this time, it will cycle power to the computer AC outlet and restart the Receiver. If **s** is 0 (zero) then the watchdog is disabled. If you change this value and then 'Store' button, the setting will be permanently set in the receiver.

'VER' returns the firmware version of the controller.

'LOAD 1' loads the receiver stored power up settings. There are 6 more possible sets from LOAD 2' to LOAD 7'.

'SAVE n' permanently saves the receiver settings into **n** 1 through 7 sets. Set 1 is always the power on selection. 'SAVE 1' is what the "Store" button does after verifying that some settings are OK. The saved settings are stored in the Receiver's AWG Module using non-volatile memory, which is retained even when the receiver is unpowered.

'DEFAULT' sets the receiver or transponder to its default state. Frequency, Bandwidth, and other important setting will have to be set again after issuing this command.

The following commands work only on receivers equipped with an AWGIII control module. These are receivers shipped after Jan 2001.

'RPT' returns all possible reports.

'PRPT' returns a power supply report for the receiver and the transmitter report.

'XRPT' returns a transmitter report about its power supplies and measured power. (Requires a transmitter shipped after Jun 2001.

'HRPT' return installed hardware and firmware information.

'WRPT' returns more accurate temperature of the receiver (+/- 0.5°C) plus humidity.

'GRPT' returns GPS status and information on receiver equipped with a GPS.

'GMON s' where **s** is seconds, set the interval to check whether GPS Timing needs to be re-aligned to the 1 second GPS clock signal. A 0 (zero) turns off this feature.

'GS' performs an immediate GPS Timing alignment to the 1 second GPS PPS clock.

'MRESET' performs a hardware reset on the receiver. SeaSondeController will lose connection to the receiver and rediscover the receiver after 30 seconds.

AppleScript

SeaSondeController is scriptable and performs the following commands. You can drop SeaSondeController.app icon onto the Script Editor applicaiotn icon to view its dictionary of commands.

AwgCenterFrequencyMHz sets and/or gets the center frequency in MHz. The current setting is returned. This will work even when a receiver is not connected.

AwgCenterBandWidthkHz sets and gets the bandwidth in kHz while keeping the center frequency unchanged. A negative value indicates a down sweep, which is typical operation for SeaSonde. The current setting is returned.

AwgTransmit sets and gets transmit control state: "On", "Off", or "Pulse:". The current settings are returned. This will work even when a receiver is not connected. This will work even when a receiver is not connected.

AwgStatus get the current settings from SeaSondeController. The result is returned as an AwgInfo record, which contains all the current settings plus control, limits. This will work even when a receiver is not connected.

AwgControl sets all the control settings from an AwgInfo record. You should first get an AwgInfo record with AwgStatus, modify the settings you wish to change, and then do AwgControl with the new settings. You should then verify the result that the settings were actually changed. This will work even when a receiver is not connected.

AwgCommand sends any string command just like you would enter in the Send entry of the Controller window. The response is returned as a string. You will then need to analyze the expected response for the command sent. If no receiver is connected, then this will fail with an open failure.

AwgRefresh tells SeaSondeController to refresh current settings from the receiver just like the Refresh button in the controller window.

AwgDoGpsTimeSync tells SeaSondeController to set the computer time to the GPS UTC time. The time sync accounts for the computer's time zone. If the local time zone has daylight savings time, a large change may cause the daylight saving to kick in or out cause the resulting time to be different (typically an hour) from the desired GPS time. This may require a second time sync. Note that SeaSondeController requires BillsScripting to set the time otherwise the time cannot be changed. Note also, that this works only for receivers with a GPS module.

AwgGetGpsTimeDelta returns the difference in seconds from the computer clock and GPS UTC time accounting for the local time zone.

AwgGetGpsStatus returns the current GPS status as AwgGpsInfo record containing UTC time plus latitude, longitude, altitude.

Examples:

```
tell application "SeaSondeController"
        set freq to AwgStartFrequencyMHz
        set freq to freq + .01
        AWGStartFrequencyMHz freq
end tell

tell application "SeaSondeController"
        set delta to AwgGetGpsTimeDelta
        AwgDoGpsTimeSync
end tell

tell application "SeaSondeController"
        set theResult of AwgCommand "STAT"
end tell
```

You can also apple script from the command line by way of the tool osascript
osascript -e 'tell app "SeaSondeController" to AwgCommand "VER"'