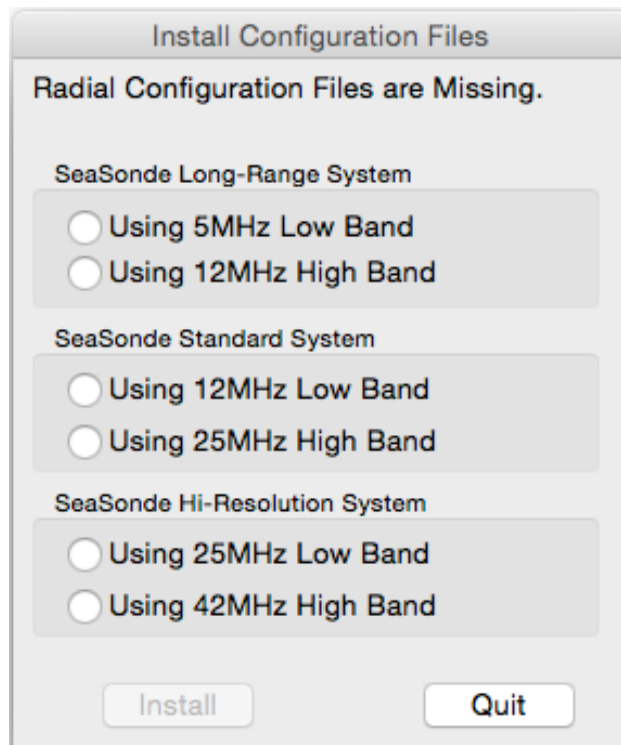




Release 8 Radial Site Setup

You've installed the hardware and you've either just installed the software, Radial Suite Release 8, and pressed the Software Installer's **Quit** button or you've just turned on a new system, only to see that **SeaSondeRadialSetup** has launched. The very first step is to select the SeaSonde that matches your receiver. This matters because we've set a number of default settings that work best depending on whether you're using the 5, 12, 25 or 42 MHz band.

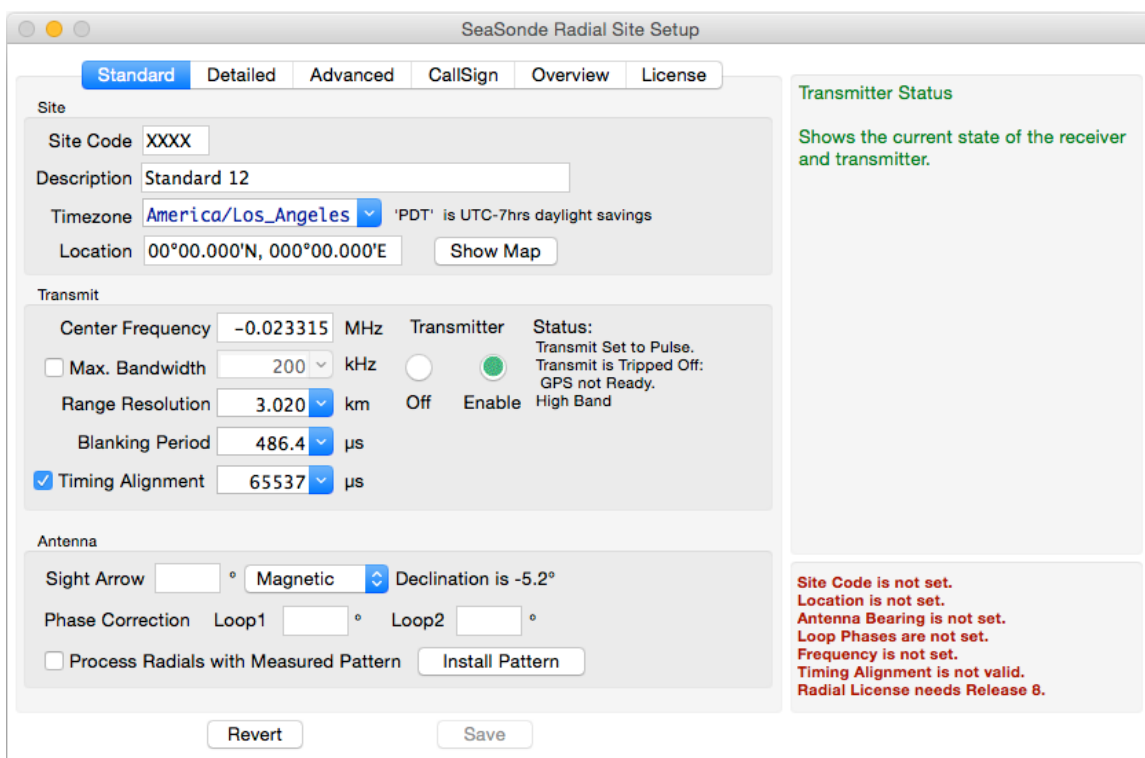


If you don't see this window and instead see the window below that's titled "SeaSonde Radial Site Setup", it's because the configuration files are already installed; otherwise, select the radio button here that best matches your receiver and click the **Install** button. This will install all the default configuration files for a Radial Site. In the future, if any configuration file is lost or corrupted, when the system starts it will automatically run SeaSondeRadialSiteSetup and prompt to install the missing file(s).

If you're upgrading from a previous Release, then you will also see the Install Configuration Files window prompting you so it can install a new SpectraAverager.plist.

Also with previous configuration files and running the first time, it will prompt you if your Music parameters, doppler interpolation, and glitch removal do not match the recommended defaults. In this case, you can pick whether to use the recommended setting or your existing setting.

After **SeaSondeRadialSetup** makes sure that all the configs are installed, it opens the following window. Example below is after a new **SeasSonde Standard System Using 12MHz Low Band** has been selected and installed.



The task of setting up the software is divided into sections as indicated by the task bar across the top. Clicking on any of these titles will jump to that section, but for the typical site setup, you will only need the Standard and the CallSign sections.



The blue highlighted "Standard" section is currently shown and is divided up into three panels: "Site", "Transmit", and "Antenna". We'll get to these in a moment, but first, note the panel with green text on the top right is a help panel which dynamically updates to show useful information about each entry

when the cursor is hovered above it or you're typing in an edit field. If you put the mouse over the Site Code field, you'll see the following.

Site Code

Enter the four character site code that describes this site.

It must be different than your other sites. It will be used to mark the filenames of the output cross spectra, radial, wave, and others.

The panel on the bottom right is an indication of what needs to be set in the system before it will run. You'll notice for this new example site, that we need to enter a site code, a location, an antenna bearing, frequency, and need a Release 8 license. I did not mention Loop Phases, because the system will still run, if not set. On a new system you do not know what the Loop Phases are, because you'll need to run it for a little while to obtain them from the diagnostics or do an antenna pattern; where upon, you'll need to come back to SeaSondeRadialSetup and enter them.

Site Code is not set.
Location is not set.
Antenna Bearing is not set.
Loop Phases are not set.
Frequency is not set.
Timing Alignment is not valid.
Radial License needs Release 8.

If you're upgrading from Release 7, you'll need a license update file (.KLU) from CODAR Support for Release 8. If you're upgrading from Release 6 or earlier, you'll need to contact CODAR Support to obtain a licensing key.

Standard – Site Panel

Standard Detailed Advanced CallSign Overview License

Site

Site Code

Description

Timezone 'PDT' is UTC-7hrs daylight savings

Location

Site Code

The first step is to select and enter a four character site code. All data files for the site will use this site code in the filename and metadata. Every site you have, should use a different site code or you will run into a lot of confusion. You might want to consult with CODAR Support to check for it being a unique site code among the world.

The first character must be an alphabet character or SeaSondeRadialSetup will beep. This is followed by three alphanumeric characters. SeaSondeRadialSetup won't let you type more than four. If you type less than four character the others will be set to 'X'. You cannot use "XXXX" as that's used by the system to decide that the site code is not set.

WARNING: Changing the site code later can have some unintended consequences such as data and log files that are no longer visible to the file management (Archivalist) and external browsing (RadialWebServer).

Description

Enter a description for the site that's a little more descriptive than the four character site code. This description will also be included in the Radial and Wave output files.

Timezone

On new sites, the timezone will show whatever the Computer's system timezone is set to. Most SeaSonde users use "UTC". Using a timezone that observes daylight savings is slightly problematic. While the software will record the UTC offset, the file time stamps and timed data within a file will have an hour jump once a year and an hour overlap once a year when the daylight saving changes. This entry accepts many differently named timezones by entering the abbreviation or major city or by entering UTC/GMT or UTC+x. Be sure the UTC offset looks correct as many abbreviations overlap and it will use only the first one in the system's list. Note, when you click the Save button, SeaSondeRadialSetup will update the Computer's system timezone. It's

important that the Computer and Radial Configuration timezones match.

Location

Enter in the latitude,longitude location of your receive antenna. Accuracy should be better than 10m times the range resolution in km to not add bias to the radials and measured pattern; any GPS reading near the antenna is good enough. This entry will support entering many different forms of lat, lon locations formats. Once you press enter or leave the field, it will change to dd °mm.mmmE, ddd°mm.mmm'N format. The Show Map button will open the entered location in the default Browser in Google Maps.

Standard – Transmit Panel

The screenshot shows a web interface for configuring a receiver. At the top, there are six tabs: Standard (selected), Detailed, Advanced, CallSign, Overview, and License. Below the tabs is a 'Transmit' section with the following controls:

- Center Frequency: MHz
- Max. Bandwidth: kHz
- Range Resolution: km
- Blanking Period: μs
- Timing Alignment: μs
- Transmitter: Off Enable
- Status: Transmit Set to Pulse. Transmit is Tripped Off: GPS not Ready. High Band

The transmit panel configures the receiver for the the first time. New un-configured Receivers will have a either a zero or this odd looking small negative frequency as a default.

Center Frequency

Type in your approved frequency to transmit on and hit enter. If you do not have the transmitter antenna set up yet, you should first click the round Off button and come back here later to click the Enable button.

Note that frequency authorities get rather upset when you broadcast on an unapproved frequency and/or exceed your allocated bandwidth.

Whenever you enter a frequency that changes the band such as this initial setup, SeaSondeRadialSetup will do a default on the receiver and configure it depending on the band. If you wish to re-trigger this default configuration, then enter 0 (be sure to hit return) and then enter your frequency again.

When you enter a frequency for the first time or one that changes bands, SeaSondeRadialSetup will configure a number of other settings for best defaults.

Frequency	Range Resolution	Blanking Rate	Sweep Rate	Doppler Bins
0 to <10 MHz	6 km	1945.6 μ s	1 Hz	1024
10 to <20 MHz	3 km	972.8 μ s	2 Hz	512
20 to <30 MHz	1.5 km	486.4 μ s	4 Hz	1024
\geq 30 MHz	500 m	212.8 μ s	4 Hz	1024

Note that when using SHARES, all SeaSondes on the multi-static network must have the exact same Frequency, Range Resolution, Blanking and Sweep Rate(Detailed Section).

Max. Bandwidth.

Sets the maximum bandwidth allocated for the range resolution. The smaller the range resolution the more bandwidth needed. If you need to change this, first click on the checkbox, then enter you allocated bandwidth.

Range Resolution

Enter the desired range resolution, if you need a different one that the default. The smaller the range resolution, the more bandwidth required by the system. The Help panel will show how much bandwidth is required for entered range resolution. When you hit return or exit the edit box, the receiver will be updated with this entry. The entry will change to the nearest value the hardware is capable of.

Blanking Period

Enter the desired blanking period, if you need a different one that the default. The blanking period also sets a maximum range roll off, which is shown in the Help panel. Setting this entry too small might reduce range while setting this entry too large will reduce signal in early ranges.

Timing Alignment

For sites using SHARES, each site must have a timing alignment that aligns its broadcast within the network so that they don't interfere with each other and can see the bistatic echo from the other sites. For one site, the alignment doesn't really matter. For two sites, it fairly simple to prevent interference. For three or more sites, the alignment can be very complex; see CODAR Support for help. When this setting is check marked, the receiver will monitor the align every 10 seconds look to see if the timing needs to be re-aligned.

Note, don't leave the entry at the default 65537.

Transmitter

The Off button disables the drive to the transmitter while the enable button enables the transmitter drive as long as there's no watch trips.

Standard – Antenna Panel

The screenshot shows a software interface for antenna configuration. At the top, there are six tabs: 'Standard' (highlighted in blue), 'Detailed', 'Advanced', 'CallSign', 'Overview', and 'License'. Below the tabs is a section titled 'Antenna'. It contains several input fields and a dropdown menu: 'Sight Arrow' with a text box and a degree symbol, a dropdown menu set to 'Magnetic', and 'Declination is -5.2°'. Below that are 'Phase Correction', 'Loop1' with a text box and degree symbol, and 'Loop2' with a text box and degree symbol. At the bottom, there is a checkbox labeled 'Process Radials with Measured Pattern' and a button labeled 'Install Pattern'.

Sight Arrow.

Using a compass, measure the antenna site arrow and enter it here. Using the previously entered receiver location, the siting is adjusted to store Loop1 bearing True in the configuration files. The help panel will show this Loop1 bearing as it's 45 clockwise plus the magnetic declination from the site arrow.

Phase Correction

These entries are the phase adjustments needed for an ideal pattern. When first setting up a site, these are unknown and should be left blank. After configuration, the system is then run for at least a few hours; longer is better and DiagDisplay is used to view the .rdt files to get an estimated correction to be entered later here. If measure pattern is done, then the measured pattern phases should be entered here instead.

Process Radials with Measured Pattern

When checked and a measured pattern is installed, radial and waves are processed with the measured pattern. Radial processing will still create ideal radials as well, since these become a good diagnostic to check if the measured pattern no longer fits the actual antenna pattern or something else has happened.

The **Install Pattern** button will ask you to select a pattern file. You will typically be looking in the pattern folder created by **CrossLoopPatterner** containing the filename MeasPattern.txt or PATT_*.patt. **SeaSondeRadialSetup** will copy it into RadialConfigs as MeasPattern.txt and ensure it's 1 deg resolution while

archiving any previous pattern.

Done with Standard Section

After you've you've entered the Standard settings it should look something similar to this example site.

The screenshot shows the 'SeaSonde Radial Site Setup' window with the 'Standard' tab selected. The window is divided into several sections:

- Site:** Site Code: LOBO; Description: My New Site Near Golden Gate; Timezone: UTC; Location: 37°00.470'N, 122°30.692'W.
- Transmit:** Center Frequency: 13.500000 MHz; Max. Bandwidth: 200 kHz; Range Resolution: 3.020 km; Blanking Period: 972.8 μs; Timing Alignment: 100 μs.
- Antenna:** Sight Arrow: 315°; Magnetic Declination: 13.5°; Phase Correction: Loop1 and Loop2 (empty); Process Radials with Measured Pattern: unchecked.

On the right side, there is a 'Location' section with green text: 'Enter the latitude and longitude location of receive antenna. Optimal GPS reading is the receive antenna. Accuracy here just needs to be less than half a range resolution. You may enter a wide variety of formats but it will be saved as dd°mm.mmm'N,ddd°mm.mmm'E. Use <option><shift>8 for degree symbol. Entry recognized as 37°00.470'N,122°30.692'W 37°00'28"N,122°30'42"W +37.0078333,-122.5115333'. Below this, red text states: 'Loop Phases are not set. Radial License needs Release 8. System will be configured after Save.'

Notice, that there's less red text in lower right. All that's left is Loop Phases not set, which is OK for now, and the need to update the license key which is done separately using **SeaSondeKey** application with a license upgrade file.

Next, select the Detailed Section to set up wave processing, if desired, or jump to setting up the CallSign.

Detailed – Spectra Panel

Standard **Detailed** Advanced CallSign Overview License

Spectra

Doppler Bins	512	Range Cells	32
Sweep Rate	2 Hz	Update Rate	1x
Averaging	15 min	Output Rate	10 min

The spectra settings were set to the best default values when you entered the frequency. If you need more range from the system, you might want to increase the number of Range Cells here. The maximum possible range is the number of Range Cells times the Range Resolution that you entered in the Standard Section. If in doubt, leave the Range Cells at 32 for now. Note that the last range cell that can be processed is the number of Range Cells minus 1.

Detailed – Wave Panel

Standard **Detailed** Advanced CallSign Overview License

Waves

Wave Processing Range Cells to

Coastline Cutoff From °True CW To °True

Wave Bearings Limit °True Width °

Waves follow the wind.

Coverage Time Output Interval

Wave Processing

Checkmark to enable wave processing.

Note: Wave Processing is not intended to be used with 42MHz band.

Range Cells

Sets the start to stop range cells to process. The start cannot be less than 1 and the stop cannot be greater than number of cross spectra range cells minus 1. Set start range cells farther out if the area around the site is too shallow for the frequency used. Early range cells also have a tendency for wave to saturate; hence the default start of 3. Set the stop to be as far as you can get reasonable second order to process.

Coastline Cutoff

In order to process correctly, the model needs to know where the ocean echo is coming from. Using SeaDisplay or Google Earth, measure bearings from the site's location to the left hand side to where it sees water and go clockwise to measure the stop bearing where you expect the site to not get any ocean echo.

Wave Bearings Limit

If you know where waves are expected to come from, enter them here as either an angular sector using a center bearing and coverage width or as a start to stop bearing like you did in Coastline Cutoff.

Waves follow the wind.

Checkmark if you know that all the wave results are following the wind direction.

Coverage Time and Output Interval

Set the averaging and output interval. Both are in terms of CSS processed.

CallSign Section

Standard Detailed Advanced **CallSign** Overview License

The CallSign Section manages the CallSign broadcast identification and scheduling.

The screenshot shows the 'SeaSonde Radial Site Setup' window with the 'CallSign' tab selected. At the top, there are navigation tabs: Standard, Detailed, Advanced, CallSign (highlighted), Overview, and License. Below the tabs, the 'CODAR' logo is displayed. A checkbox labeled 'Enable CallSign' is checked. The 'CallSign' field contains 'MYSIGN' and shows a duration of '4.12s' and a morse code representation '--- -- - . - .'. Below this, there are input fields for scheduling: 'Schedule every' (0 hours, 20 minutes), 'Schedule at' (0 minutes after the interval), and 'Send call sign' (1 times each broadcast). A 'Test CallSign by Transmitting now. Be sure frequency is configured!!!' message is present, with a 'Message' input field and a 'Transmit Now' button. At the bottom, there are 'Revert' and 'Save' buttons. On the right side, there is a 'Scheduling' section with green text explaining the scheduling logic: 'Schedule the time of day of every interval of (hours +minutes) at offset after the interval time. For Example: 0hrs + 30mins & 1min after, broadcasts at 00:01, 00:31, 01:01, 01:31...'. Below this, there is a red warning message: 'Loop Phases are not set. Radial License needs Release 8. System will be configured after Save. CallSign is scheduled!'.

Important: CallSign feature requires Release 8 and Receiver firmware v3.2 or higher installed. The firmware updater is in the Tools folder and is best updated by contacting CODAR Support at support@codar.com.

Enable CallSign

Checkmark this to enable the callsign broadcast on the specified periodic schedule. It won't actually be enabled until you Save.

CallSign

Enter your callsign here. The typically call sign is 6 alphanumeric characters and is assigned by a frequency authority. As you type, the time to broadcast this is shown to the right as well as a morse code representation with dots and dashes.

Schedule every

Enter the hours and minutes to periodically schedule the callsign through out the day. This means a 0 hours and 20 minutes will schedule the callsign to broadcast at 00:00, 00:20, 00:40, 01:00, 01:20 and so on. The default HF agreement for callsigns is to broadcast every 20 minutes.

Schedule at

Sets an offset in minutes after Schedule interval to start the broadcast. Each site within range, should have a different offset; otherwise, it might be very difficult to pick out who's who.

Send call sign

is the number of times to broadcast the call sign each scheduled time. The default is once. Repeats will take more time away from the data collection.

Message

is a test entry to immediately broadcast any message in morse code when you click the Transmit Now button. If you leave the message entry blank, it will use the CallSign entered above. After you type a message, it will show the message decoded below as morse code dot and dashes. You can type a long message, but the firmware sequencer can only handle about 8 chars (depends on message) at a time and will insert a word space where this happens.

Save

Once you've entered all the Standard, Wave and CallSign settings, the system is ready to go. Just need to click the **Save** button. Normally the Detailed and Advanced sections do not need be changed, which are covered next.

Revert

Save

The **Save** button updates all the appropriate Radial Configuration files and tells the receiver to store its settings as the power up settings. This cannot be undone, but previous configuration files are copied to a ./Previous folder in RadialConfigs.

Don't hit the **Revert** button, unless you want to discard all changes and revert back to the last saved configuration.

Standard

Detailed

Advanced

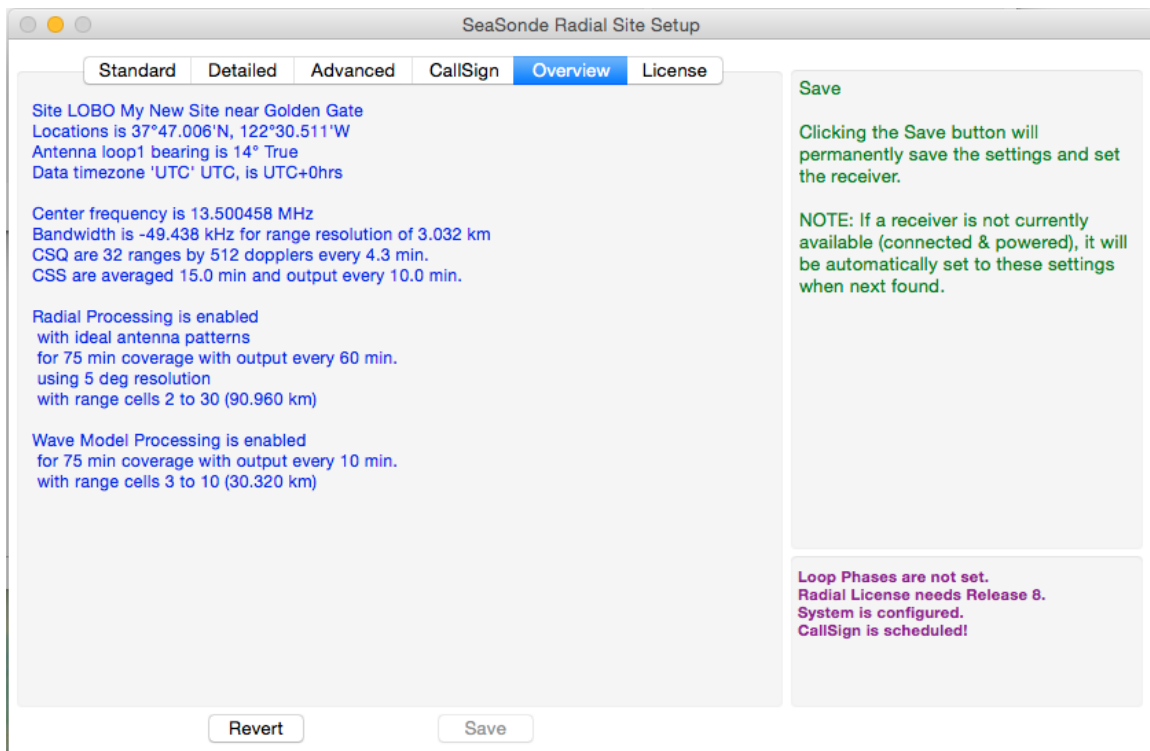
CallSign

Overview

License

Finished

After you **Save**, you should select the Overview Section to review your settings.



The purple text in lower right shows that the system is configured, but you'll still need to update to Release 8, then run the system by launching **Sentinel**.

More

Now that you're done setting up the system you might be wondering about the other settings in Detailed and Advanced sections. Every item is covered in the help information panel. All these items have been set for best operation by installing the default configuration files and setting the frequency band.

The Detailed Section has panels for setting cross spectra generation, radial processing, and wave processing.

The screenshot shows the 'Detailed' configuration panel for the SeaSonde Radial Site Setup. The interface includes several sections:

- Spectra:** Doppler Bins (512), Range Cells (32), Sweep Rate (2 Hz), Update Rate (1x), Averaging (15 min), and Output Rate (10 min).
- Radials:** Radial Processing (checked), Range Cells (2 to 30), Merge Min. Vectors (2), Angular Resolution (5 Deg), Coverage Time (75 min (7 css)), and Output Interval (60 min).
- Waves:** Wave Processing (checked), Range Cells (3 to 10), Coastline Cutoff (From 210 °True to 30 °True), Wave Bearings Limit (Center, 270 °True, Width 160 °), Waves follow the wind (unchecked), Coverage Time (75 min (7 css)), and Output Interval (10 min).

On the right side, there is a 'Wave Bearing Limits' section with the following text:

- Wave Bearing Limits
- Set the limits where dominant waves are expected to come FROM.
- Long Period waves typically come from the ocean direction.
- Short Period waves are typically wind driven.
- Coastline center 300°T width 180°
- Wave Limit from 190°T CW to 350°T

At the bottom, there are 'Revert' and 'Save' buttons. A red warning message at the bottom right states: 'Loop Phases are not set. System will be configured after Save.'

The Advanced Section has extra controls for SeaSondeAcquisition, Radial Processing and Measure Pattern handling.

The screenshot shows the 'Advanced' configuration panel for the SeaSonde Radial Site Setup. The interface includes several sections:

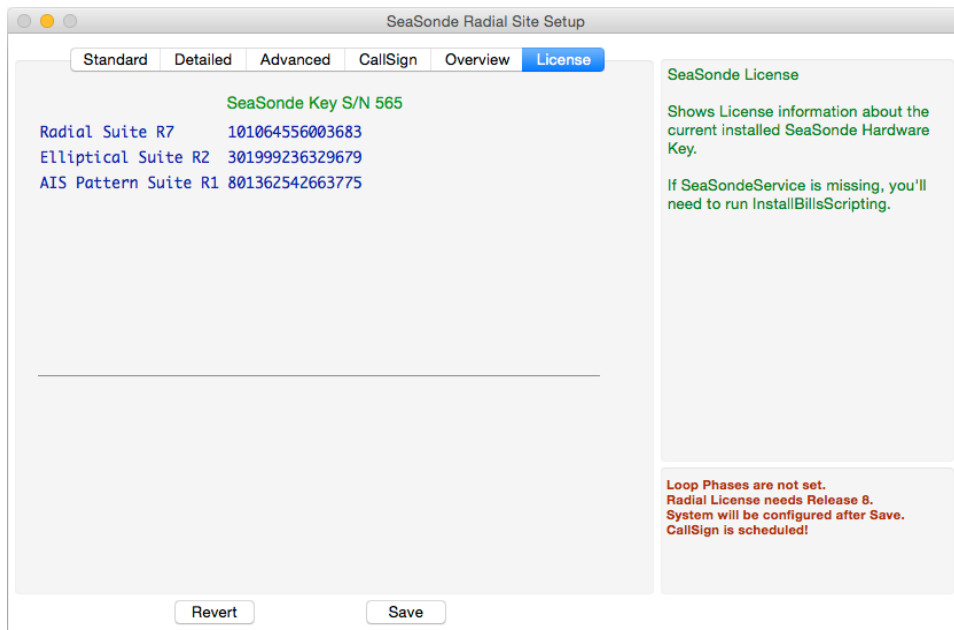
- Acquisition:** Log Time-Series (unchecked), Log Range-Series (checked), and Glitch Removal (checked).
- Radials:** Doppler Interpolation (checked, 2x), Short-time Radial Output (unchecked), Filtered Radial Output (unchecked), and Filtered and Filled (checked).
- Pattern:** Adjust Measured Pattern to follow sea-echo amplitudes (unchecked), and Sea-echo amplitudes are averaged over last 6.0 hours.

On the right side, there is an 'Advanced Settings' section with the following text:

- Advanced Settings
- These settings should not typically be changed.

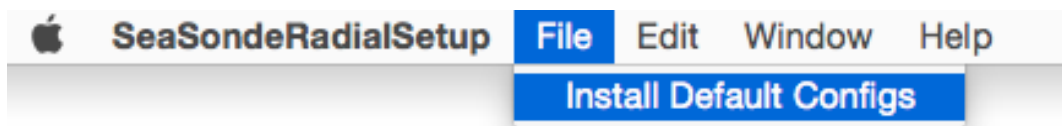
At the bottom, there are 'Revert' and 'Save' buttons. A red warning message at the bottom right states: 'Loop Phases are not set. Radial License needs Release 8. System will be configured after Save.'

The License Section shows the current license key.



Installing new Configs

Under the file menu, you can install new default configuration files.



This will bring up the Install Configuration Files windows seen at the start of this document. The previous configuration folder will be renamed to RadialConfigs_YYYY_MM_DD_HHHMMSS

If a Radial configuration file is missing, then when the system starts up or you run SeaSondeRadialSetup, it will prompt you to re-install the missing file. Be sure to check your settings.

Revision History

First Draft Oct 7, 2016

Copyright and Disclaimer

This document is copyrighted(c) by CODAR Ocean Sensors, Ltd and cannot be copied or reproduced in all or partial without expressed written consent by CODAR Ocean Sensors, Ltd.