



## SeaSonde Radial Site Release 6 SpectraShortener Application Guide

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The SpectraShortener application reduces the size of cross spectra files created by SeaSondeAcquisition and CSPro. Cross spectra files are intermediate files produced for Radial Processing. Cross spectra can be archived to allow re-processing radials and or waves with different processing configuration. Cross spectra are also a good way to judge the health of a SeaSonde Radial Site.

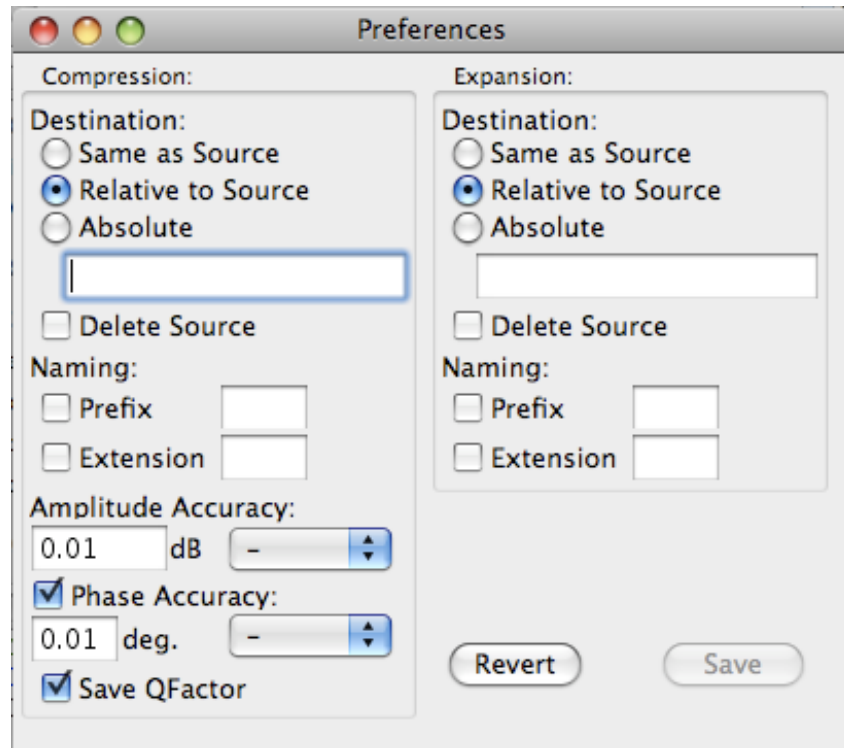
On a standard SeaSonde, SeaSondeAcquisition application produces a cross spectra file (CSQ\_XXXX\_yyyy\_mm\_dd\_hhmmss.cs) every four and a half minutes. At 628KB per file, a day's worth would take up 200MB a day. After three months, a 20GB hard disk would fill up and Acquisition would stop; however, we do not normally archive these files. CSPro produces an averaged cross spectra (CSS\_XXXX\_yyyy\_mm\_dd\_hhmm.cs) every ten minutes for 88MB a day. These files are archived to the depth set in Archivalist. If Archivalist is turned off, then a 20GB hard disk would fill up after 32 weeks. Optionally, if you archive cross spectra onto CDs you can fit only seven days of CSS files.

If you try to compress cross spectra files using a zip utility, you will find that they shrink less than 15% and sometimes even grow larger. SpectraShortener shrinks the cross spectra to about 66% of its original size. A standard SeaSonde cross spectra of 628KB file size becomes about 200KB. A long range SeaSonde cross spectra at 2.2MB will shrink to about 750KB.

The binary floating point data in a cross spectra tends to be very random due to real world noise. SpectraShortener reduces the cross spectra in a slightly lossy manner. It converts the cross spectra voltages of 32bit floating point real and imaginary voltage squared values to dB and degrees. It then rounds the dB and degree values to a fixed precision, which can be represented by a 16bit integer for a 2 to 1 reduction. Further, most values in adjacent Doppler bins do not change significantly and can be represented as an 8bit integer delta from the preceding value for a 4 to 1 reduction. Also the cross spectra contains a quality factor field which is not currently in use and can be omitted. In the end, this gives an overall reduction of about 3 to 1. The reduced cross spectra file can then be run through a stuffit or zip application to be compressed another 10 to 20%.

You can use SpectraShortener one of two ways. The first is to run it, select the item 'Open' in the 'File' menu, and select a cross spectra to reduce or a CSR (cross spectra reduced file) to expand. The second method is to drag and drop the cross spectra file icon onto the SpectraShortener icon or drop a folder onto SpectraShortener to reduce or expand every item in the folder. Warning: If using drag and drop by selecting multiple cross spectra, do not select more than a thousand files. Try instead to drop the folder containing the thousands of cross spectra on SpectraShortener. You can also use AppleScript to 'tell SpectraShortener to open <file>'.

SpectraShortener can be configured on how it performs its compression and expansion. Select the 'Edit' menu item 'Preferences' to bring up the preference window.



There are two areas of control; left side is for compression while the right side is for expansion.

### **For Compression settings:**

#### Destination:

The three radio buttons, under destination, allow you to select where newly created CSR (reduced cross spectra) files will be placed. The edit box, under the radio buttons, allows you to enter a folder path to specify with the radio buttons where the compressed CSR file should go. The first button 'Same as Source' directs that the CSR files will be created in the same folder as the cross spectra and ignores the edit box file path entry.

The second button 'Relative to Source' directs that the CSR files should be placed in a subfolder where the cross spectra is and the folder name is specified by the edit box.

The third button 'Absolute' directs that CSR files should be placed in the location specified by the edit box path entry.

The edit box below the radio buttons is a pathed location to store the compressed spectra if 'Relative to Source' or 'Absolute' is selected. To create a path, use POSIX which specifies using a '/' slash character between names of subfolders.

To put the CSR into a subfolder from where the source is then select 'Relative to Source' and enter the subfolder's name (ie. "/Reduced") . To put the CSR in a folder next to the folder containing the source, select 'Relative to Source' and enter "../Reduced". The two dots "../" signify to go to the parent folder of the source folder. You can keep going up the folder hierarchy by chaining the two dot path. To go up two folder use "../../".

To specify a fixed folder to put the CSR files, select 'Absolute' and enter the folder path starting with a "/". "/" specifies the root directory of the system disk. "/Reduced" specifies a "Reduced" folder just inside the disk that the system started up with. To specify another disk you will need to enter "/volumes/otherdiskname/Reduced". If you select 'Absolute', but do not start the path with a "/" then the path will be relative to source.

The check box “Delete Source” specifies whether to delete the original cross spectra after creating the reduced cross spectra. Set this if you archiving processed cross spectra that you do not intend to use for a while and just want to keep the reduced cross spectra archived. *Warning: This actually deletes the original cross spectra; it does not place it in the trash.*

### Naming:

There are two file naming controls: a prefix and a suffix.

SpectraShortener creates compressed filenames using the following format:

<prefix>\_XXXX\_YYYY\_MM\_DD\_HHMM<suffix>

<prefix> is the preference entered text to use at the begging of the filename. If not entered, ‘CSR’ is automatically used. Don’t enter more than five chars, and use alphanumeric characters only to keep your file cross platform compatible. Illegal characters which will cause problems are \* : .

XXXX is the four character site name which is found in the cross spectra. If it is not valid or missing then ‘XXXX’ will be used.

YYYY is the 4digit year of the cross spectra date stamp.

MM is the 2digit month of the cross spectra date stamp.

DD is the 2digit day of the cross spectra date stamp.

HH is the 2digit 24hour of the cross spectra date stamp.

MM is the 2digit minute of the cross spectra date stamp.

<suffix> is text to append to the end of the filename. If not entered, no suffix is added. To make the file more compatible with PC and UNIX platforms, use a suffix like ‘.csr’ .

### Delete Source

If checked, the source spectra file is deleted after reducing.

### Amplitude Accuracy

The Amplitude Accuracy section allows you to specify how much rounding to use. The popup menus allow you to select other values. The larger these values the smaller the compressed cross spectra will be and more original information will be lost due to the rounding. We recommend you do not set these higher than 0.1.

### Phase Accuracy

If checked, cross spectra ratios are stored as ampl & phase instead of ampl real & imag.

The Phase Accuracy section allows you to specify how much rounding to use on phase. The popup menus allow you to select other values. The larger these values the smaller the compressed cross spectra will be and more original information will be lost due to the rounding. We recommend you do not set these higher than 0.1.

The check box for ‘Save QFactor’ specifies whether the quality factor section in the cross spectra is stored in the compressed spectra. Currently, none of the SeaSonde Radial processing uses this information; however, it’s sometimes useful to see what CSPro removed in the way of interference or ship echo.

## For Expansion settings:

### Destination:

The three radio buttons, under destination, allow you to select where to put the recreated cross spectra files. The edit box under the radio buttons allows you to enter a folder path to specify with the radio buttons where new reduced cross spectra file(s) should go. The first button 'Same as Source' directs that the cross spectra files will be created in the same folder as the CSR and ignores the edit box file path entry. The second button 'Relative to Source' directs that the cross spectra files should be placed in a subfolder where the CSR is, and the folder name is specified by the edit box. The third button 'Absolute' directs that cross spectra files should be placed in the location specified by the edit box path entry.

The edit box below the radio buttons is a pathed location to store the expanded spectra if 'Relative to Source' or 'Absolute' is selected. To create a path, use POSIX which specifies using a '/' slash character between names of subfolders.

To put the expanded CS into a subfolder from where the source is then select 'Relative to Source' and enter the subfolder's name (ie. "/Expanded") . To put the expanded CS in a folder next to the folder containing the source, select 'Relative to Source' and enter "../Reduced". The two dots "../" signify to go to the parent folder of the source folder. You can keep going up the folder hierarchy by chaining the two dot path. To go up two folder use "../../".

To specify a fixed folder to put the Expanded CS files, select 'Absolute' and enter the folder path starting with a "/". "/" specifies the root directory of the system disk. "/Expanded" specifies a "Expanded" folder just inside the disk that the system started up with. To specify another disk you will need to enter "/volumes/otherdiskname/ Expanded". If you select 'Absolute', but do not start the path with a "/" then the path will be relative to source.

The check box "Delete Source" specifies whether to delete the CSR file after creating the expanded cross spectra. Set this if you copied a bunch of CSR files to the hard disk from your archives and want to delete them automatically after expansion.

### Naming:

There are two file naming controls, a prefix and a suffix.

SpectraShortener creates expanded cross spectra using the name of the original cross spectra file. (It's stored in the CSR file). If you set a prefix to use, the prefix will overwrite the beginning of the original cross spectra name. For example, if the original name is 'CSS\_SALN\_02\_01\_01\_2400' and you enter a prefix of 'CSA' then the created expanded cross spectra will have a name of 'CSA\_SALN\_02\_01\_01\_2400'. Please note that changing the prefix can have unwanted side effects or not even be recognized anymore if you try to re-use it in Radial Processing. If you set a suffix, the suffix will be appended onto the original name. This is useful if you want to distinguish the expanded cross spectra from the original cross spectra while maintaining recognition for Radial Processing.

After changing the preferences you can store them permanently by pressing the 'Save' button. Every time you run SpectraShortener, these are the settings that will be used. If you don't press the 'Save' button, whatever settings you have changed will be used while SpectraShortener is still running. Press the 'Revert' button before the 'Save' button if you want revert the settings to last saved settings.