SeaSonde®
Configuration Guide for FileExchange

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1. Overview

This document describes how to configure and schedule automated file transfers for SeaSonde10 running on OS X. On SeaSonde4 on OS 9, file transfer was handled by MacCentral application running AppleScripts. For SeaSonde10 Combine Suite, file transfer is scheduled using Cron running the FileExchange PERL scripts.

Cron is a scheduling daemon included with all UNIX systems. It can run any command that is executable from a Terminal prompt. For more information, type ‘man cron’ at a Terminal prompt.

The Terminal application can be found in /application/utilities. AnalyzeCurrents script, which combines radials into total vectors, runs in its own Terminal window. You can create a new window to perform other activities. Closing the AnalyzeCurrents window will disable combining until you open ‘RunCurrentAnalysis’ or relaunch Sentinel.

PERL (Practical Extraction and Reporting Language) is an open source scripting language commonly used for UNIX system tasks in place of shell scripts. It has many advantages with its powerful built-in commands for manipulating lists and ASCII data as well as interacting with UNIX system functions. For more information on PERL, visit www.perl.com or type ‘man perl’ at a Terminal prompt.

Currently, FlieExchange provides these scripts for file transfers.

Filexch_ssh.pl script uses ssh (Secure Shell) and is the best method of these scripts to over the Internet. It provides for a secure session transfer in which the client and the remote site use pre authorized keys to enable the transfer.

Filexch_t2.pl script uses Timbuktu 7.0.4 to transfer files over Internet or DialDirect phone connections. The client side must have **Timbuktu 7.0.4** while the remote side must have Timbuktu 7.x with TCP/IP or Answer Dial Direct enabled. If using phone lines, this method is much preferred over ppp.

Filexch_ftp.pl script does FTP transfers.
If both the Combine Site and Radial Site computers have Internet connections and the Radial Site has a unique, static IP address that is routable from the Combine Site, then FTP transfers should be used. (SSH is more secure than FTP.)

(PPP script is no longer installed. PPP has been somewhat unstable on OS X, so Timbuktu dial direct is preferred.)
Filexch_ppp.pl script does FTP transfers over a PPP modem connection.
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2. System Requirements

The minimum computer configuration is an Apple Macintosh computer equipped with:

Macintosh G4 500MHz, (iBook, PowerBook or Desktop)
512MB RAM
10GB Hard disk with OS X 10.3.9 or later.

If using the filexch_t2 script then you will need Timbuktu installed on both the local and remote computers. The client computer must have at least version **7.0.4** installed.

3. Transferring radials for Combine Processing

The main purpose of FileExchange is to have the central Combine Site automatically retrieve the remote Radial files and then combine them into total vectors. The combine processing runs in its own Terminal shell window and quietly waits for matching new radial files to appear in the Site_# folders located in the /CODAR/SeaSonde/Data/RadialSites/ folder. When at least two radials with the same time stamp appear from different sites, combine processing will generate a total vector. If more than two sites are used in the combine processing, the total vector will be regenerated each time a radial file appears from the additional sites.

In the SeaDisplay site map and combine grid file, the radial sites are labeled sequentially as 1,2,3 etc. You will need to configure your file transfers so that you copy the remote radial files from each site into the /CODAR/SeaSonde/Data/RadialSites/Site_# where # is the corresponding site number used in the grid. This # will also match the site numbers in the SeaDisplaySite map used to create the grid.

On the remote Radial Sites, the radials are located in /CODAR/SeaSonde/Data/Radials/ folder. The types of radials in the folder depend on two different settings:

1. The first setting tells the software whether to produce the old style radial files or the new style LonLatUV radials or both. As of SeaSonde10 Release 3, the SeaSonde's default configuration is to produce both, but the new LonLatUV radials are immediately archived leaving the old style radial files. This is so that current users of SeaSonde4 running Combine Processing on OS 9 can read and combine the old style radials. In the next major release, the SeaSonde will be configured to only output the new LonLatUV files. It is highly recommended to re-configure your Radial Sites to produce the new LonLatUV radial files and transfer those.

2. The second setting tells the software whether to produce radials using measured or ideal antenna patterns or both. If producing both measured and ideal pattern radials, you will need to decide which one is worth combining and configure the file transfer to filter only those kind of files. (Note, it is common to process for both ideal and measure patterns so comparisons can be done to assure the quality of the measured pattern.)

To help you filter which files to transfer, each radial type starts with a different four characters. The Radial files possibilities are:
'Rads' for old style radials using ideal antenna pattern.
'Radz' for old style radials using measured antenna pattern.
'RDLi' for new LonLatUV radial using ideal antenna pattern.
'RDLm' for new LonLatUV radial using measured antenna pattern.

4. Configuring a File Transfer

Every file transfer involves unique connection, file type, and file location information that the PERL scripts need. OSX uses property list files for preference/configuration information for its applications and the SeaSonde file transfer scripts were written to do the same. Property list files are ASCII XML formatted files that are particularly useful for storing hierarchical configuration information. After installing the Combine Site software, you will find the following directory has been created:

/CODAR/SeaSonde/Configs/FileExchangeConfigs

This is the directory where the PERL scripts will look for configuration information. In it you will find two template files, one for each type of transfer:

template_ftp.plist
template_ppp.plist
template_t2.plist

You will need to create at least one configuration file for each site you wish to transfer files from. For combining, you will need to configure these files to transfer the remote radials into the 'Radial/Site_#' folders that match your combining grid site entries.

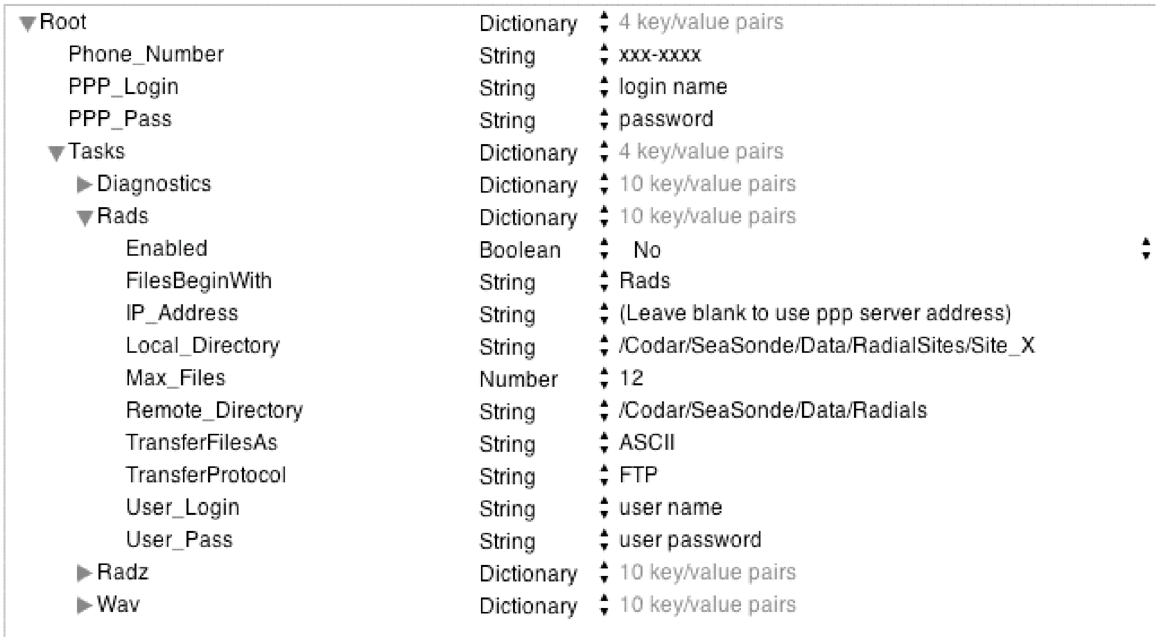
To create a new configuration file, select one of the templates based on the type of file transfer you need (ftp for internet, ppp for dial-up) and duplicate it (make a copy).
Rename the copy's filename to something more meaningful.
We suggest you rename the duplicated template using this format:
'Site#_XXXX_kind_xfer.plist'
Change the # in Site# to match your selected site number in your SeaDisplay_Site map and grid files.
Change XXXX to the site code of the remote SeaSonde Site you want to transfer from.
If you are going to configure the config file to copy one type of file then change '_kind' to the type of file. Eample '_Rads', '_Wavs', '_Diag'.
If you are going to configure the config file to copy many different types (see tasks in the config file) then leave the '_kind' out of the file name.
Change the '_xfer' to the type of file transfer template you are using ('_ftp' or '_ppp')
Leave the '.plist' on the end of the filename as it helps property list editors to recognize the file.

The new config file might now have one of these names:

Site1_LOC1_ppp.plist
Site2_LOC2_Rads_ftp.plist
Site2_LOC2_Diag_ftp.plist
Site3_LOC3_ppp.plist
Site4_LOC4_t2.plist

The new configuration file can then be edited with a property list editing application or with a simple text editor. There are several Property list Editing applications available, including Apple's Property List Editor, bundled with the developer's tools. Below is an example of a new configuration file opened in Property List Editor. You will need to edit the specified values to transfer files from your remote SeaSonde Site.

Please read the Guide_FileExchange_T2 for the details on the filexch_t2 Timbuktu property list.



```
▼Root                      Dictionary  4 key/value pairs
   Phone_Number            String      xxx-xxxx
   PPP_Login               String      login name
   PPP_Pass                String      password
  ▼Tasks                   Dictionary  4 key/value pairs
    ▶Diagnostics           Dictionary  10 key/value pairs
    ▼Rads                  Dictionary  10 key/value pairs
       Enabled             Boolean       No
       FilesBeginWith      String      Rads
       IP_Address          String      (Leave blank to use ppp server address)
       Local_Directory     String      /Codar/SeaSonde/Data/RadialSites/Site_X
       Max_Files           Number      12
       Remote_Directory    String      /Codar/SeaSonde/Data/Radials
       TransferFilesAs     String      ASCII
       TransferProtocol    String      FTP
       User_Login          String      user name
       User_Pass           String      user password
    ▶Radz                  Dictionary  10 key/value pairs
    ▶Wav                   Dictionary  10 key/value pairs
```

The configuration file being a property list is organized into key/value pairs. The key is the name of the variable. Do not change the name of the key; change only the value data. The PPP configuration template has four main keys: Phone_Number, PPP_Login, PPP_Pass, and Tasks. The Tasks key is a Dictionary type, which means that it contains a list of sub keys. The Task key has been expanded above to show four task keys. Each of these tasks represents a different type of file to transfer from the site. Multiple file transfers are organized into one PPP configuration file to minimize the number of phone calls made to a Radial Site where multiple file types are to be retrieved.

Each task contains the following subkeys:

Enabled.................. Set to YES or TRUE to run that task
FilesBeginWith....... Filters the files to retrieve based on filename beginning
IP_Address .... IP address of the remote computer
Local_Directory...... Local directory of files already transferred
Max_Files .... Maximum number of files to transfer at a time
Remote_Directory.. Remote directory to look for files to transfer
TransferFilesAs...... Set to ASCII for text files and BIN for others*
TransferProtocol .... Currently, only FTP is used**
User_Login .... FTP username
User_Pass .... FTP password

*Radial, Wave, DIAG, and STAT files are ASCII. CSS, CSA and Sentinel Logs are binary.
**The PPP script establishes a PPP link between the computers (much like dialing into an internet service provider) then transfers data via FTP over the PPP link.

When editing a property list file, be sure to only edit the value fields and be careful not to leave any white space characters (tabs, spaces, etc.) at the beginning or end of your value field. Editing the key name fields will prevent the PERL scripts from working properly. The only exceptions to this are the task keys (Diagnostics, Rads, Radz, and Wav in the above template). They can be renamed, deleted or you may add your own as long as they contain all of the subkeys listed above.

If you choose not to use a property list editing application, you may use a plain text editor. The XML code will look like the following:

```
<?xml version=”1.0” encoding=”UTF-8”?>
<!DOCTYPE plist PUBLIC “-//Apple Computer//DTD PLIST 1.0//EN”
“http://www.apple.com/DTDs/Property list-1.0.dtd”>
<plist version=”1.0”>
<dict>
        <key>FilesBeginWith</key>
        <string>Radz</string>
        <key>IP_Address</key>
        <string>xxx.xxx.xxx.xxx</string>
        <key>Local_Directory</key>
        <string>/CODAR/SeaSonde/Data/RadialSites/Site_X</string>
        <key>Max_Files</key>
        <integer>12</integer>
        <key>Remote_Directory</key>
        <string>/CODAR/SeaSonde/Data/Radials</string>
        <key>TransferFilesAs</key>
        <string>ascii</string>
        <key>TransferProtocol</key>
        <string>FTP</string>
        <key>User_Login</key>
        <string>user name</string>
        <key>User_Pass</key>
        <string>user password</string>
</dict>
</plist>
```

Be careful to edit only the values (integers, strings, etc.) and leave the <key> lines unchanged.

5. Running a File Transfer Manually

Once a configuration file has been saved in the default directory, you can test your transfer by running the script from a Terminal prompt. Open the Terminal application in the /Applications/Utilities folder. If Terminal is already running, just make a New Shell under the file menu to open a new window. In the shell window, change the current directory to the default transfer script directory by typing the following:

```
cd /CODAR/SeaSonde/Apps/CombineTools/FileExchange/Perl
```

In this directory should be three files:

filexch_ftp.pl is for FTP file transfers over Ethernet TCP/IP connections.
filexch_ppp.pl is used when transferring files using PPP over a modem connection.
filexch_t2.pl is use to transfer files using Timbuktu with either TCP/IP or DialDirect.
ChadsMod.pm is a PERL module file containing functions required by the scripts.

To run the FTP script, type the following at the prompt replacing 'Site1_LOC1_Rads_ftp' with the name of your configuration file, which is expected to be in the /CODAR/SeaSonde/Configs/FileExchangeConfigs/ folder:

```
./filexch_ftp.pl Site1_LOC1_Rads_ftp
```

The "./" is necessary to tell the shell to look in the present working directory for the script to run. If you are not in the default directory, replace the "." With the full default directory path. The first command line argument that the script is expecting is the name of the property list file. Notice that the '.plist' extension is not included in the example – it is optional and will work with or without it.

The script will create a log of the file transfer with confirmations and errors, if any. Each script execution will create a separate log file in the following directory:

```
/CODAR/SeaSonde/Logs/FileExchangeLogs
```

Each log will be named according to the following convention:

Exch_xxxxx_YYYYMMDD_hhmm.log

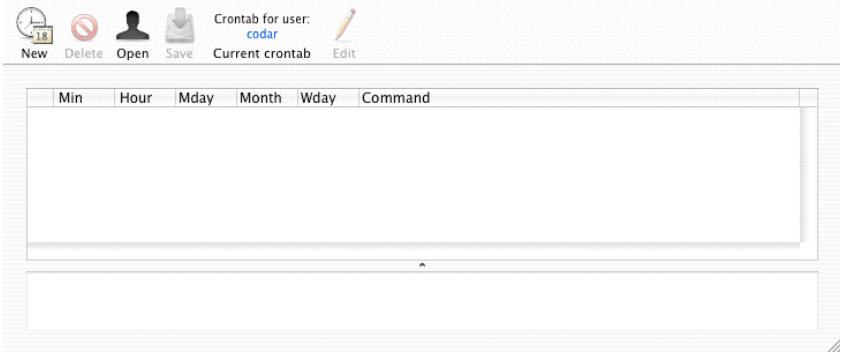
xxxxx	config name	DD	two digit day of month (01 – 31)
YYYY	four digit year	hh	two digit hour (00 – 23)
MM	two digit month (01 – 12)	mm	two digit minute (00 – 59)

6. Scheduling a File Transfer

File transfers can be automated using the cron scheduling daemon built into the UNIX system underlying OS X. Setting up a scheduled transfer can be done in two ways. Users familiar with UNIX can use the crontab command at the Terminal prompt just as they would on other UNIX systems. For those not familiar with the crontab function, we include the Cronnix application with our Combine Site software. It provides an OS X graphical user interface to the cron daemon. Cronnix can be found in:

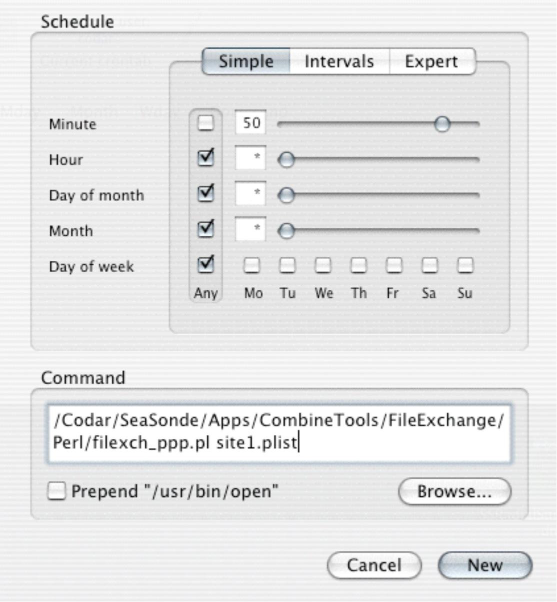
/CODAR/SeaSonde/Apps/CombineTools/FileExchange

When you first open Cronnix you will see the empty task list shown below. To create a new task, click “New”.



Crontab for user: codar

The new task panel is shown below. The example here shows the setup for a ppp transfer to take place at 50 minutes past the hour, every hour of every day of every month. The intervals tab is currently disabled, but you can set more complex schedules in the expert tab. Type ‘man 5 crontab’ at the Terminal prompt for more details.



Schedule

Minute □ 50

Hour ☑ *

Day of month ☑ *

Month ☑ *

Day of week ☑ Any □ Mo □ Tu □ We □ Th □ Fr □ Sa □ Su

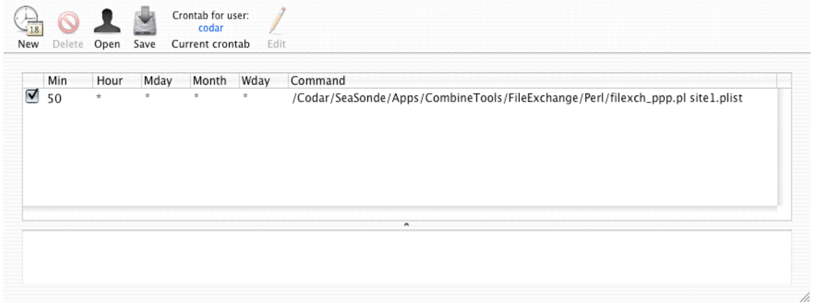
Command

```
/Codar/SeaSonde/Apps/CombineTools/FileExchange/
Perl/filexch_ppp.pl site1.plist
```

□ Prepend "/usr/bin/open"

The command you choose to run can be entered manually in the text field at the bottom of the panel or you can browse and choose the script you would like to run. Keep in mind you will still need to add the configuration name separated by a space after the script filename. Click ‘New’ at the bottom right of the panel to apply it.

The task list should now include your new entry as shown below. The check box on the left side of your task enables or disables it while still keeping the information in your cron table. If you want to remove it altogether, select the task and click Delete in the button bar. Remember to save you cron task list before exiting.



Crontab for user: codar
Current crontab

	Min	Hour	Mday	Month	Wday	Command
☑	50	*	*	*	*	/Codar/SeaSonde/Apps/CombineTools/FileExchange/Perl/filexch_ppp.pl site1.plist

If you would prefer a cleaner command field, you can remove the preceding directory path if you put it in the default path for cron to look for commands. Press ζ-E to open the Environmental Variables panel. Add an environmental variable named “PATH” and edit the value field to be the full preceding directory path of the executable script. If you have multiple directories containing executables that you want to use in your cron jobs, be sure to separate the paths with a colon.