Testing LI6400Term for iPhone

Version 2.0.0

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Contents

Background

The LI-COR LI-6400XT is a scientific instrument used to measure photosynthesis and other physiological parameters of plants. It has been available for nearly 20 years, and has become the world-wide standard for this type of measurement.

The iOS app LI6400Term allows an iOS device to control the LI-6400, providing the same user interface on the device as the user sees on the instrument.

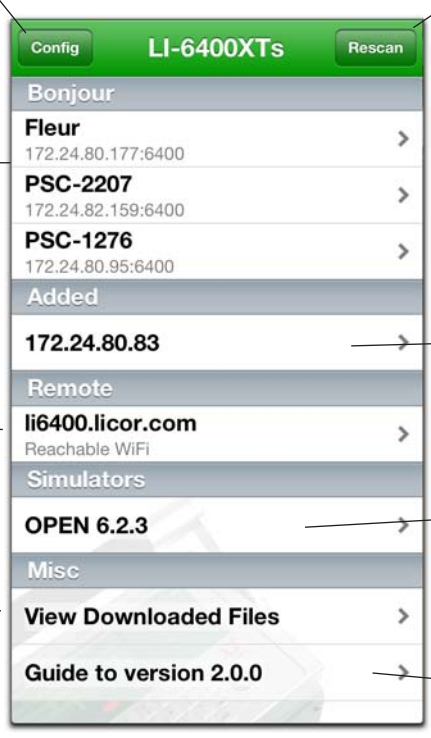
Version 1 of this app has been available since Nov. 2010.

Version 2 of this app, which you are testing, adds some features:

- replaces the custom keypad with the iOS keyboard, plus some toolbars with special keys.
- allows file transfer between the LI-6400 and the iOS device.
- allows files to be viewed, plotted, and emailed.
- adds a built-in LI-6400 simulator, useful for learning, testing, etc.

The App's Main Screen

LI6400Term's main screen is shown below.



Manually enter IP address, enable instrument simulator.

Re-scan for LI-6400XTs on LAN.

LI-6400XTs discovered on the LAN to which the iOS device is currently joined.

Manually added address, via Config.

Connect to an LI-6400 via our server. See "Use li6400.licor.com" on page 3.

LI-6400XT Simulator, enabled via Config. See "Use a Simulator" on page 4.

This is the local portion of what is described in ???

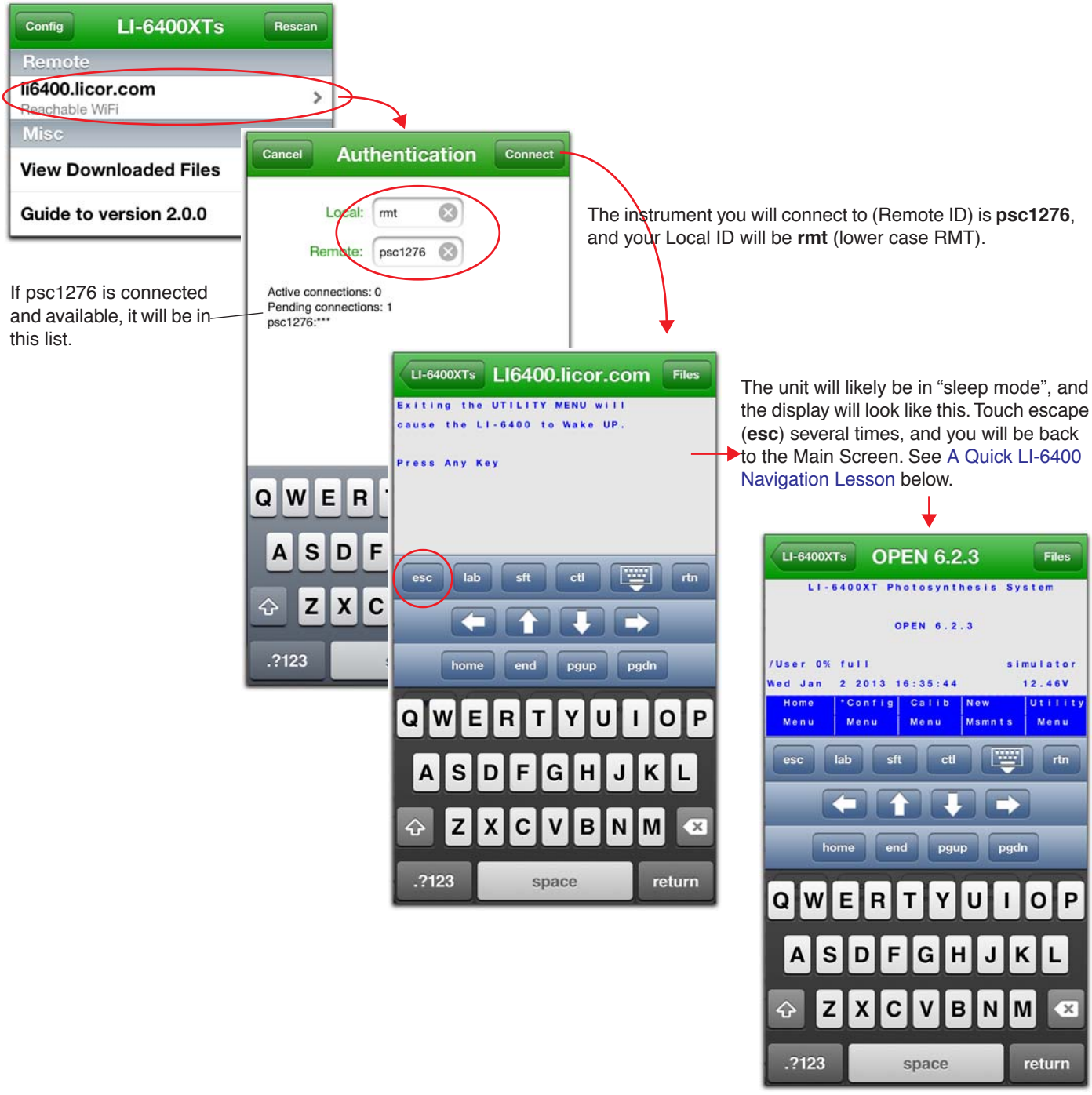
Users guide for this App. Document is in the app's bundle. Uses a UIWebView.

Options for Testing

Since it is not likely you have an LI-6400 with which to test this app, there are two options: 1) connect to an actual instrument using a server (li6400.licor.com) as was done the first time, or 2) use the built-in simulator. The simulator runs in a separate thread, and it communicates with the main view controller in the same method as with an actual instrument.

Use li6400.licor.com

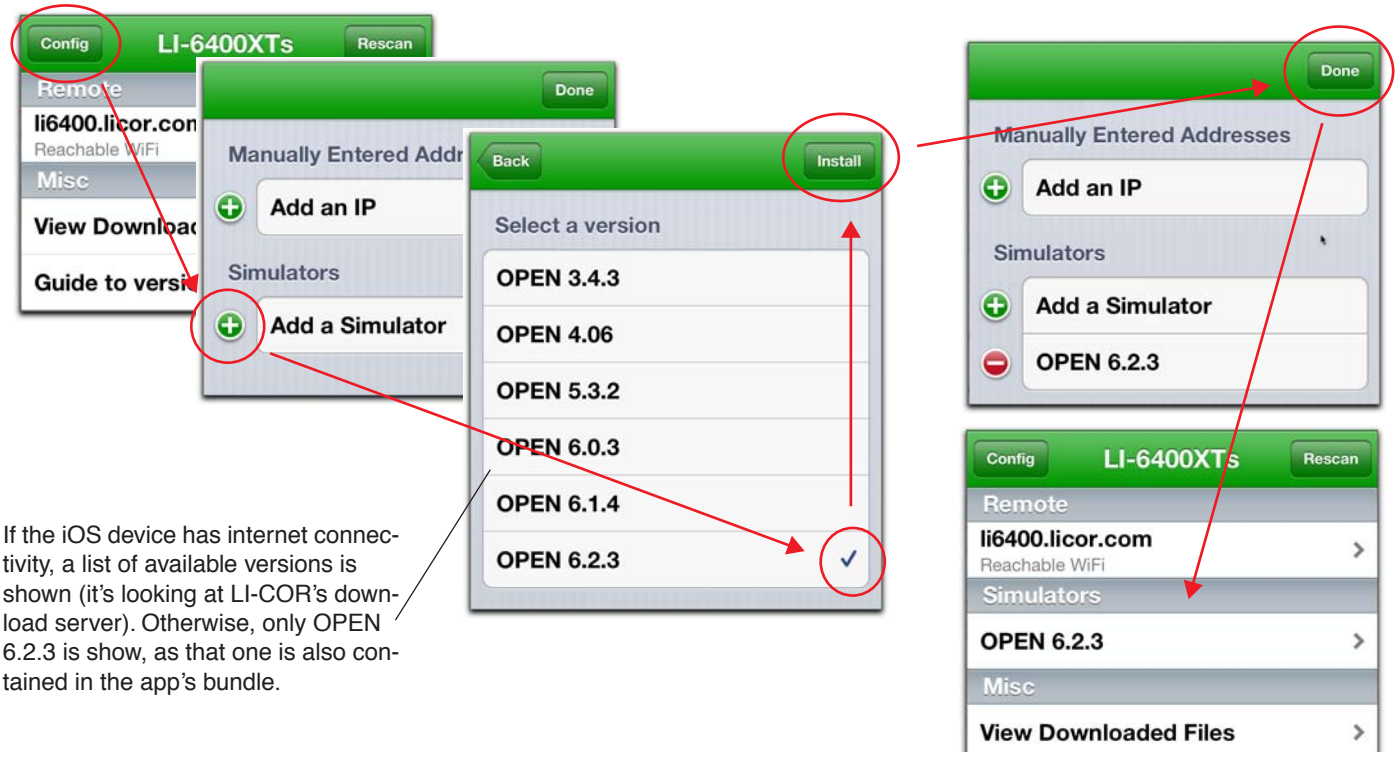
The figure below shows how to connect through the server. If you contact me (jon.welles@licor.com) prior to testing, I will be sure a unit is connected for you to use.



Use a Simulator

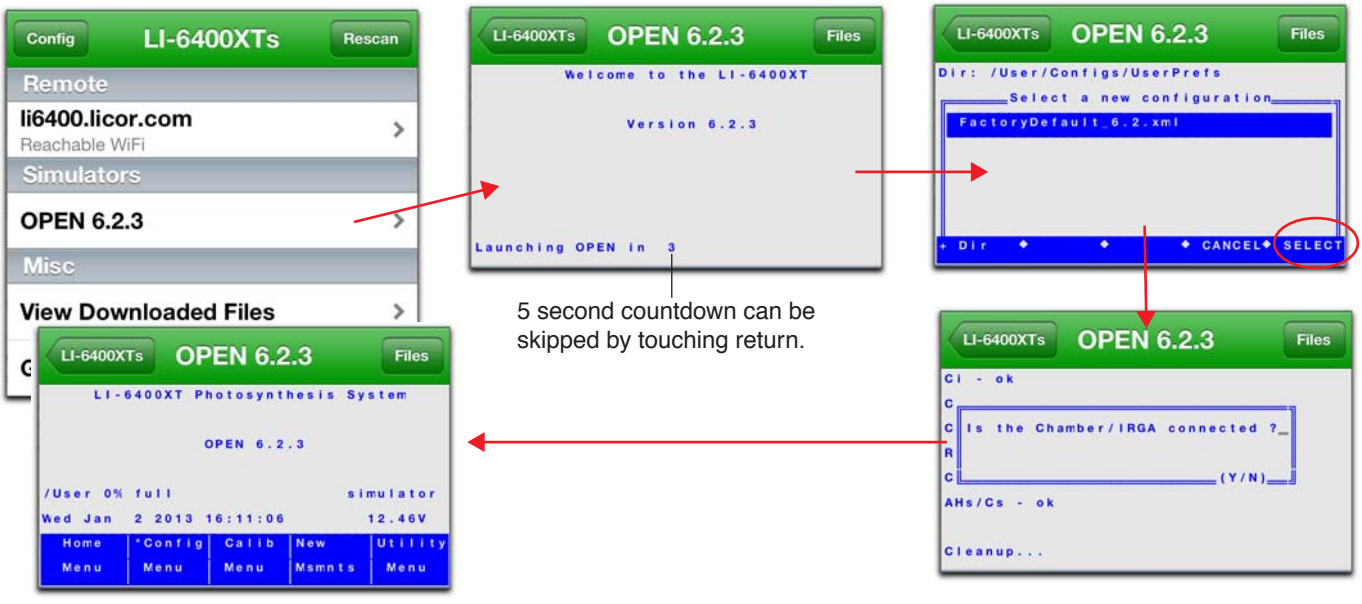
LI-6400 programming is done in a home-made scripting language (LPL). LPL has been ported, over the years, to DOS, Windows, Linux, Mac 9, OS X, and now iOS. The collection of script files that defines any given version of OPEN (the name of the software on the LI-6400) can run unchanged on any of these operating systems. The OS in an LI-6400 is embedded Linux.

To “install” a simulator (i.e. to unpack the collection of script files and copy them to the app’s Document directory), start with the Config button in the app’s main screen.



If the iOS device has internet connectivity, a list of available versions is shown (it’s looking at LI-COR’s download server). Otherwise, only OPEN 6.2.3 is show, as that one is also contained in the app’s bundle.

Running a simulator begins a bit differently than connecting to an instrument, since the simulator starts at “power up”. Basically, if you are asked something, either press **return** or, if it is a y/n, press **y**.



5 second countdown can be skipped by touching return.

Testing the New Features

A Quick LI-6400 Navigation Lesson

Below are OPEN's main screen, New Measurements mode, and an example Menu.

Gestures supported by the simulated LCD:

Pan Up, Down - 1 up or down arrow key generated for each row height panned.

Pan Left, Right - 1 right or left arrow key generated for each character width panned.

Touch (in a Fct key label) - Function Key labels act as button on the app, and are the main way to get around.

The **lab** key rotates through function key levels, if more than one is defined.

Main Screen

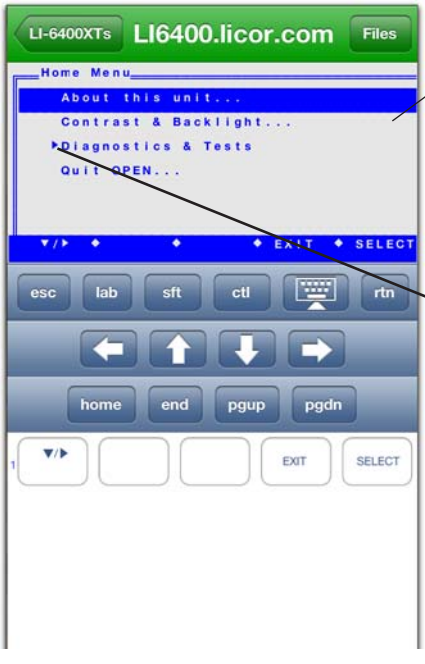
rtn is return

New Measurements Mode

Use **escape** to back out of things. Enough **esc** touches will eventually get you back to the Main Screen.

Fct keys can have multiple levels, as in New Measurements Mode, (with 7 and sometimes 10 levels). All currently defined Fct keys also appear as active buttons in a scrollable view.

Home Menu

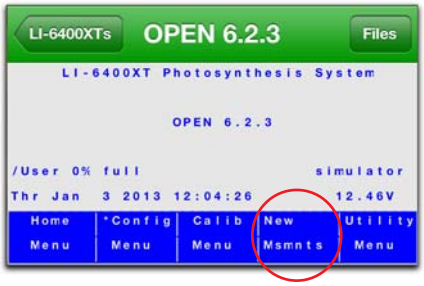


In Menus, use the cursor control keys to move the highlighted bar up and down. You can also move the bar with pan gestures on the simulated display. Pan down = down arrow, Pan up = up arrow, etc.

To open a node in a menu, highlight the bar, then touch the node toggle key, Fct key 1/

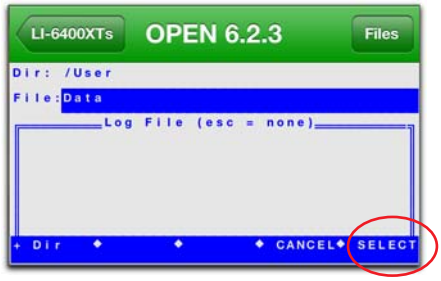
How to Create a Data File

One of the new features of this app involves viewing and plotting data files. If you are using the simulator, you will need to create a data file to play with, and the step-by-step is below. If you are connected to psc1276, it already has data files on it you can use; but feel free to create additional ones.

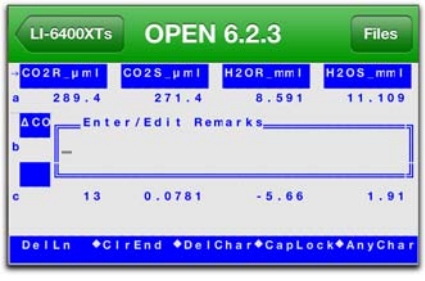


1. Starting at the Main Screen, touch F4 to go to New Measurements.

2. Touch F1 to open a log file.



3. Name the file. If you enter a name that exists, you will be asked if you want to overwrite it. It will be OK if you do, so you can touch **o** (for overwrite) if you get that message.



4. You will be prompted for a remark. You can leave it blank, or enter anything you wish. Touch **rtn** in the tool bar, or else **return** on the iOS keyboard.

5...10. Touch **F1** 5 or 6 times, with a few seconds in between each touch. This will log an observation to the file each time.

11. Touch **f3** to close the file.

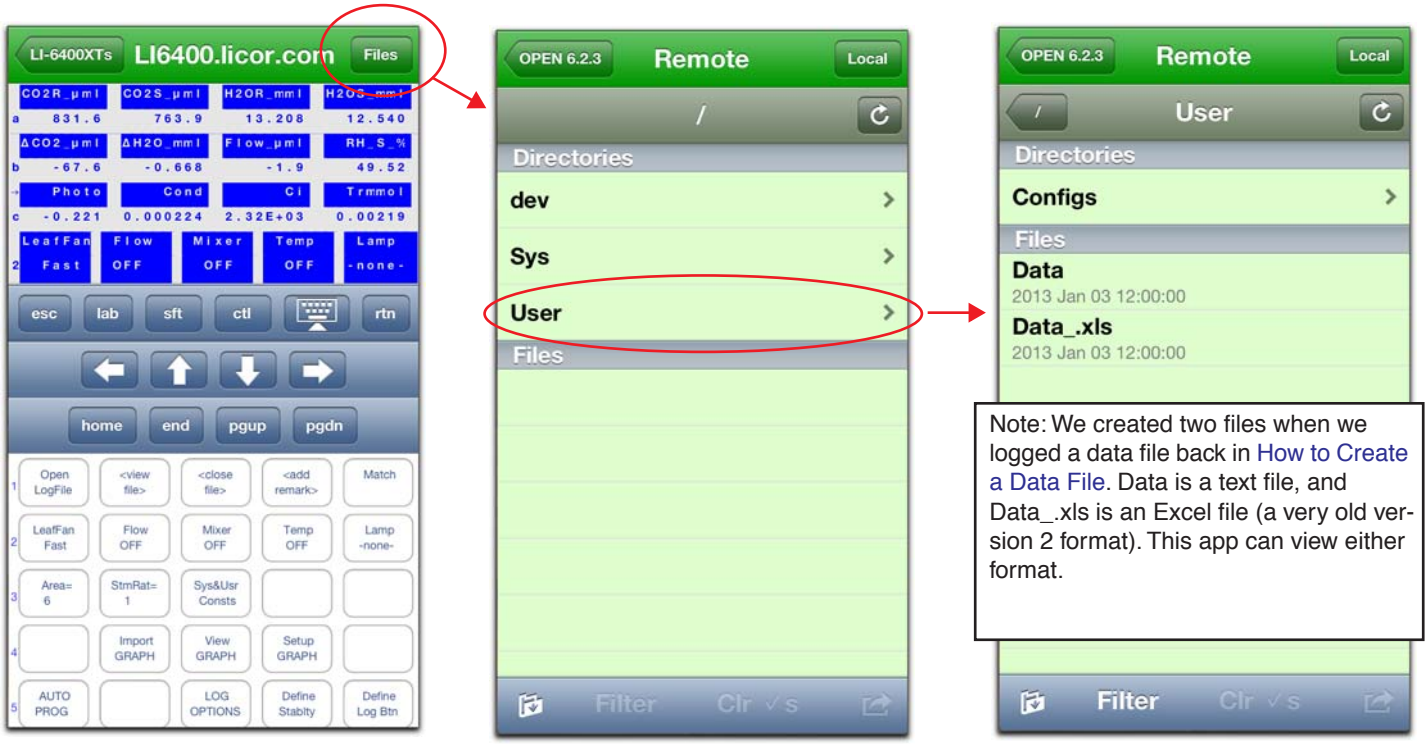
By the way, if you are using the simulator, you'll probably get this annoying red message. You can ignore it, or clear it by sending a control z. That is, touch the **ctl** key, then touch the **z** key. (The **sft** (shift) and **ctl** keys in the toolbar are "sticky" for one subsequent key press).

The LI-6400 File System

The file system (or at least the portion of it that users access) on an LI-6400 (or a simulator) has three directories in the "root":

/dev	*contains a handful of calibration files*
/Sys	*a hierarchy of LPL (script) files and directories that constitute OPEN*
/User	*contains user data, and a directory named Configs, which hold configurations.*

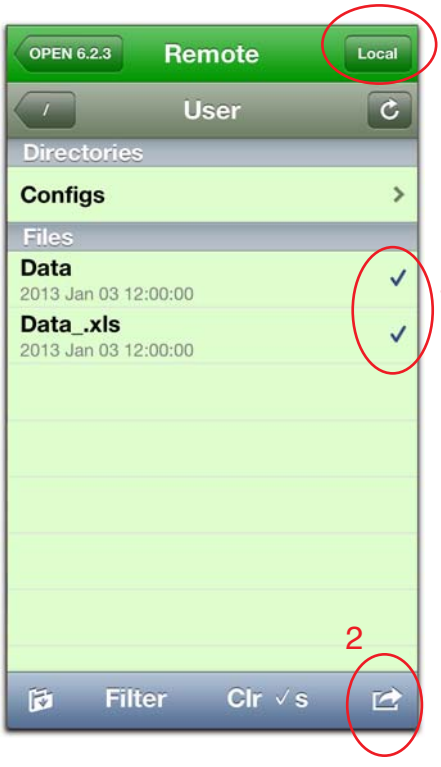
Thus, when you test downloading files, etc., you will find them in the /User directory. For example:



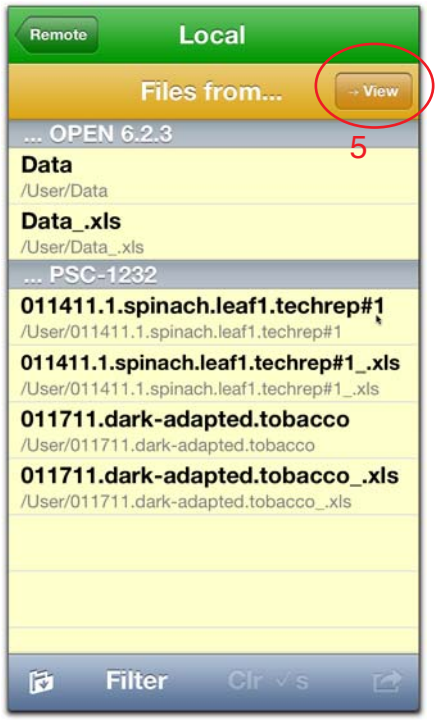
FYI, the way one explores the file system from an LI-6400 is to use the Filer, in the Utility Menu.

Viewing and Plotting Downloaded Files

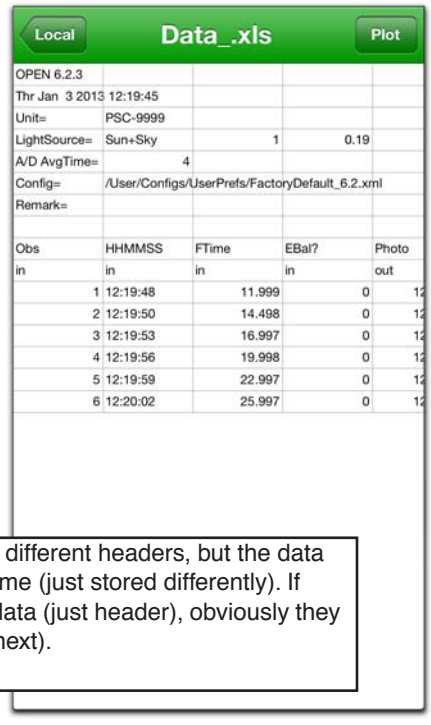
Below is a step-by-step for how one downloads and views a data file. We'll use the simulator, and the file (actually two files) we created above in How to Create a Data File. First, we need to move the files to our Downloaded files section.



1. Select both files
2. Touch the action button
3. Touch Save
4. After the files copy, touch Local
5. Touch the ->View button



Touching the ->View button (step 5 above) puts us in a mode where we can view the files.



These files contain different headers, but the data portions are the same (just stored differently). If data files have no data (just header), obviously they won't be plotable (next).

Plotting data is fairly straight forward.