Setting Up and Running SAM and NAM

Introduction:

This document will detail setting up and running the SAM and NAM software to collect spectrum data. Please refer to other documents for detailed information on setting up the trailers and running the calibration procedures.

Using this Document:

This document will lead the user through the setup and operation of the SAM and NAM kits through the use of written instructions and example screen captures. Screen capture images can vary depending upon the nature of the data collection so the screen captures may not be exactly the same as yours.

The written instructions are broken up into primary steps indicated by step numbers, example 1,2 etc. Within each step there are often sub-steps or clarifications. These are designated with letters such as 2A, 3B etc. Sometimes a third level is utilized such as 2i or 3ii.

Pointers are utilized on the screen captures to call the users attention to the proper button, box, value etc. The pointers have 2 digit identifiers, i.e. 2-1 etc. The first number is the primary step with which the pointer is associated. The second number is the sequence within that step. For example, 2-1 is normally performed before 2-2.

We hope this helps you navigate the SAM/NAM environment.

Powering up the SAM/NAM Kit

1. Turn on the Signal Generator to allow it to stabilize
2. Open the SAM/NAM kit and set it up.
3. Plug in the power cord to a known reliable power source. If at a customer site, try to plug into an outlet that has UPS and/or Generator backup

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4. Be sure all the power and USB cables are properly attached.

5. Turn on the Battery Backup Key (Clockwise).

6. Turn on the Signal Hawks and make sure they have power. The yellow battery charge and green power lights should be lit.

7. Plug in the Verizon air card into an available USB port on the laptop.
    a. If no cellular coverage is available then skip this step.

8. Boot up the laptop and log into the SOS account (Password “Bird.sos”)

9. You may see more than one account selection. Click on the account named “Field Services” or on some computers “SOS”.

Internet Connection via Air Card:

When the computer completes the log on sequence, if Verizon cellular coverage is available, it should automatically connect to the internet. The top of the air card will light up Red to indicate that the unit has power. A little LED near the center of the air card will light up green when the card is connected to the internet. It may or may not flash depending upon the amount of data being transmitted and received. If there is no Verizon 3G or 4G cellular service available then skip ahead to “Alternate Internet Connections”.

Under most circumstances, as long as Verizon cellular service is available, the card will connect automatically with ***no user action required***. Resist the temptation to do anything until you have determined that the system has been unable to establish an internet connection. You can test the internet connection by using the Internet Explorer to connect to a common web site such as Google.

Alternate Internet Connections:

If there is no Verizon 3G or 4G cellular coverage available, connection to the internet can still be achieved via a hardwired Ethernet connection or via the computers Wi-Fi if one of these modes of access to the public internet is available.

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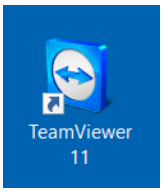
Air cards for other cellular providers can also be used but you MUST contact TX RX prior to the installation of any software or drivers.

If there is no internet connection available then simply proceed with the SAM/NAM startup.

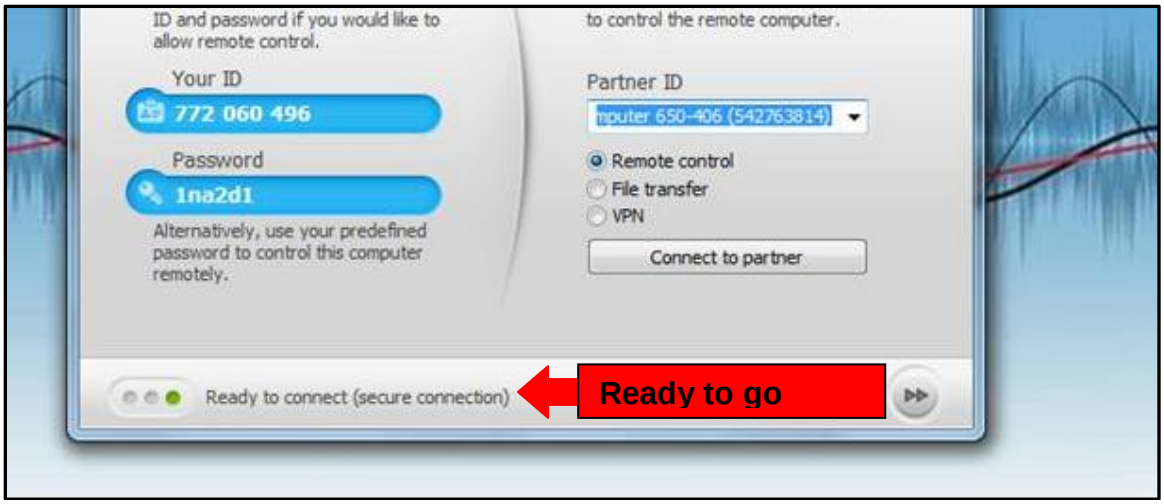
Team Viewer:

As part of the boot up sequence, the “Team Viewer” application will also connect automatically when internet access is available. This is the application we use to observe and control the ASL Kit remotely.

You can check to see if the Team Viewer has connected. Double click on the Team Viewer icon on the desktop and the Team Viewer dialog will open.



At the bottom left side of the dialog box there will be three simulated LEDs. If the first led is red, Team Viewer is not connected. If the middle LED is yellow, Team Viewer is in the process of connecting. If the third one is lit up green, the Team Viewer is connected to the network. If after a few minutes, Team Viewer does not connect, recheck the air card and the internet connection. If a Team Viewer connection cannot be established, contact the TX RX Field Services department for assistance.



Once Team Viewer connects there is nothing more that needs to be done. The Team Viewer dialog can be closed at this point to reduce screen clutter.

Software Updates:
Sometimes the various applications might ask if you want to install a software update or newer version. **DO NOT INSTALL ANY SOFTWARE UPDATES OR REVISIONS (including Windows updates) WITHOUT THE EXPRESS PERMISSION OF THE TX RX Field Engineering Department.** Incompatibilities due to differences in software versions can cause serious operational problems and/or a lack of remote connectivity.

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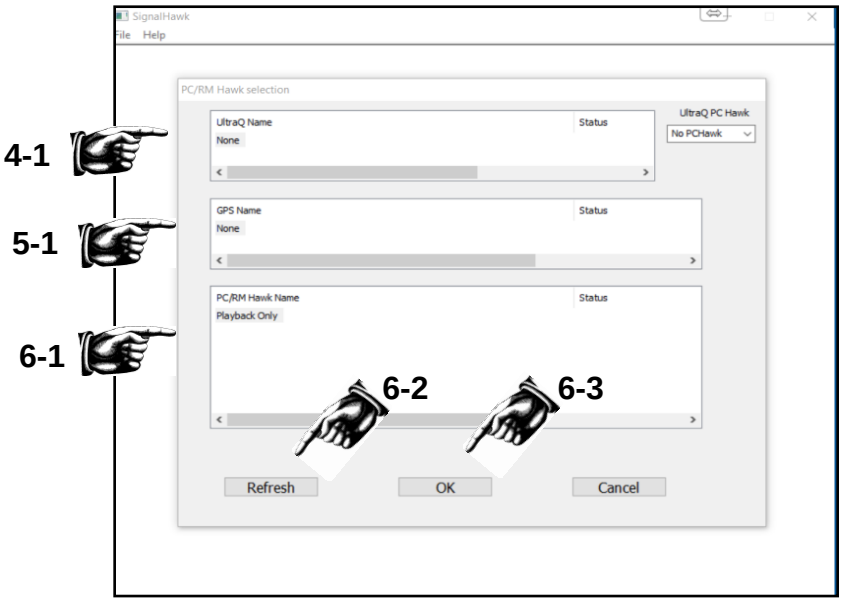
Starting the SAM Software

The SAM and NAM data collections run under separate instances of the Signal Hawk software. We recommend that you set up SAM first, followed by NAM.

1. Turn off or unplug the USB connection to the Signal Hawk that is to be used for NAM. This will make it easier to select the proper analyzer for SAM once the program launches.
2. Double click the Signal Hawk Icon on the Desktop.

3. When the program launches the first screen you will see is shown below.



4. For SAM, ignore the top ‘Ultra-Q” box.
    a. The Ultra-Q is used for NAM only and may or may not show an available device.
5. The middle box will show the GPS if one is connected.
    a. If a GPS is attached it will likely be captured by the first PC-Hawk program to be started and may show either “Not Connected” or “In Use”. No user action is required at this point.
6. If you turned off or unplugged the NAM analyzer there should only be 2 choices, “Playback only” and a Signal Hawk.
    a. If you forgot to turn off or unplug one of the Signal Hawks, turn off or unplug it now and click on Refresh.
    b. Select the Signal Hawk and Click on OK.

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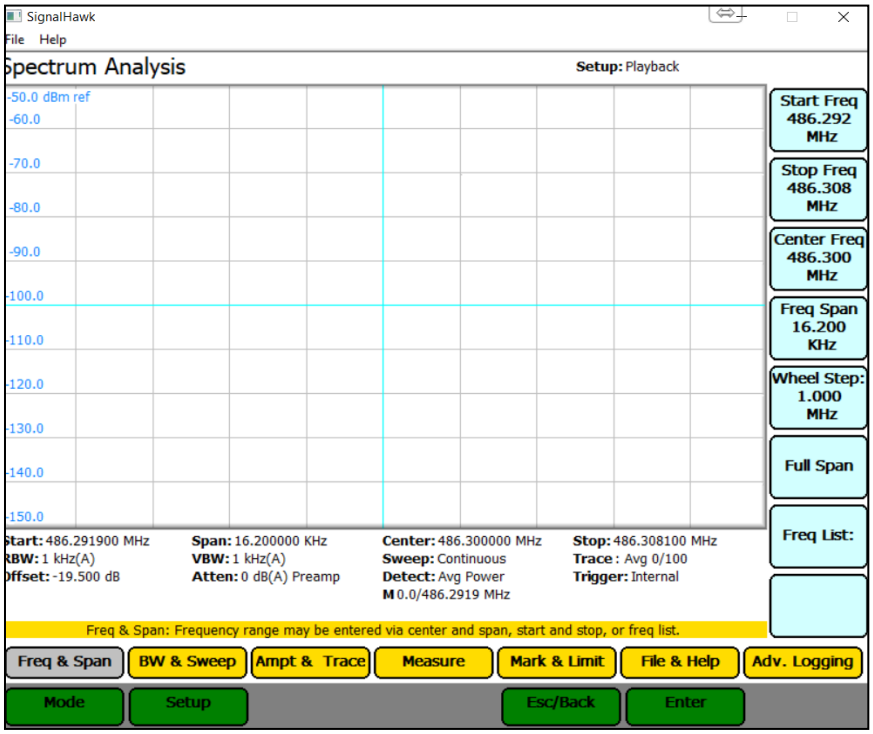
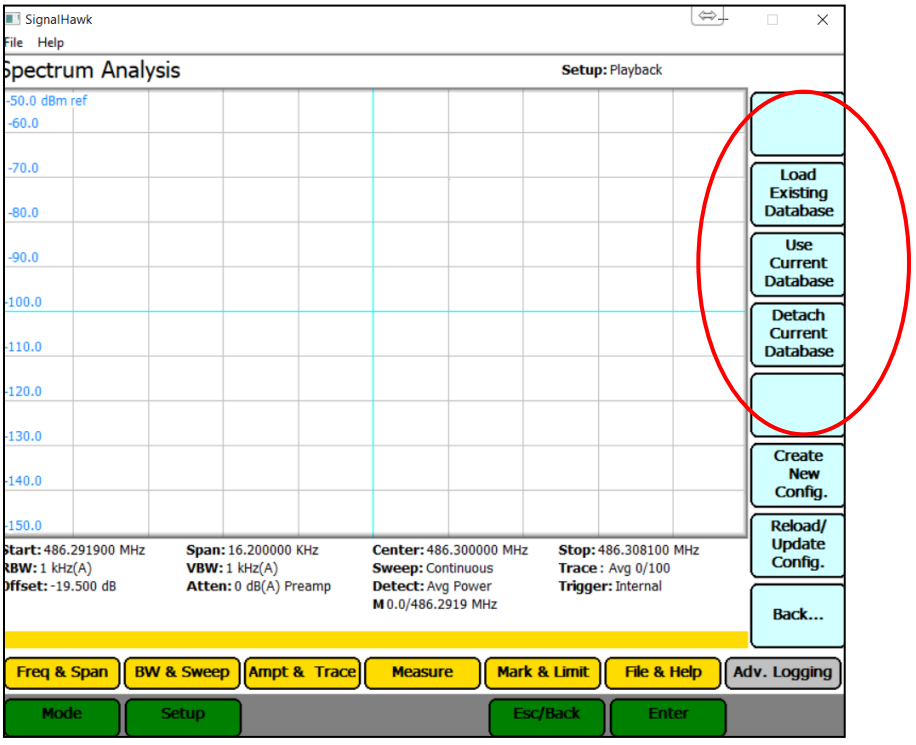
7. The Signal Hawk program will launch and you will see the screen below.



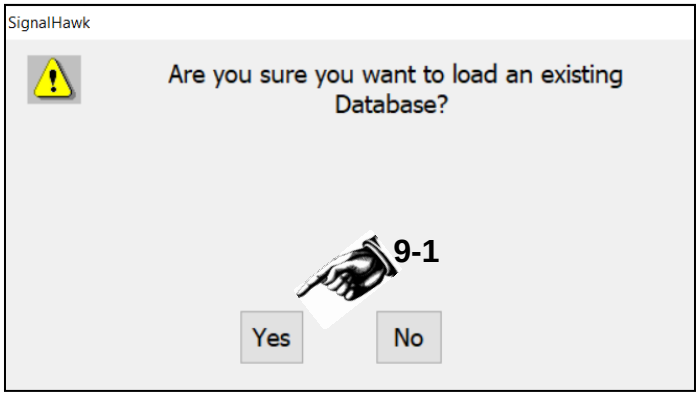
8-1

8. Click on “Adv Logging” and the Advanced Logging menu will come up on the right edge of the dialog.



8-2

9. This is where you will either create a new database or use an existing database.
    a. If you are setting up at a new site you will likely need to create a new database.
        i. Click on “Create New Database”.
        ii. The program will ask you if you want to create a new database, click on Yes
        iii. Select the desired Configuration and click on OK
        iv. A dialog box will open asking for a site name and your name.
            1. Type in the site name along with a data code. We prefer the following format: Name YYMMDDX.
            2. For example: TXRX 190218A. The last letter is a revision letter. If you need to create a new database at the same site on the same day, simply use the same name with the letter B etc.
            3. Click on OK. The program will create and attach the database. This might take a couple of minutes because it may need to copy the existing database to the archives.
    b. If you have already created and attached a database, for example; you have already set up the NAM data collection, or you are continuing a data collection that you stopped for some reason.
        i. Click on “Use Current Database”.
        ii. The program will check to see that at database is attached and initialize it.
    c. If you wish to use a database that was previously created and then detached, click on “Load Existing Database”
    d. The program will ask if you are sure. Click on Yes. If you selected this option by accident, click “No’ and you will be returned to the previous screen.



    e. When you click “Yes” the program will display a list of available databases. Select the one you wish to use and click OK

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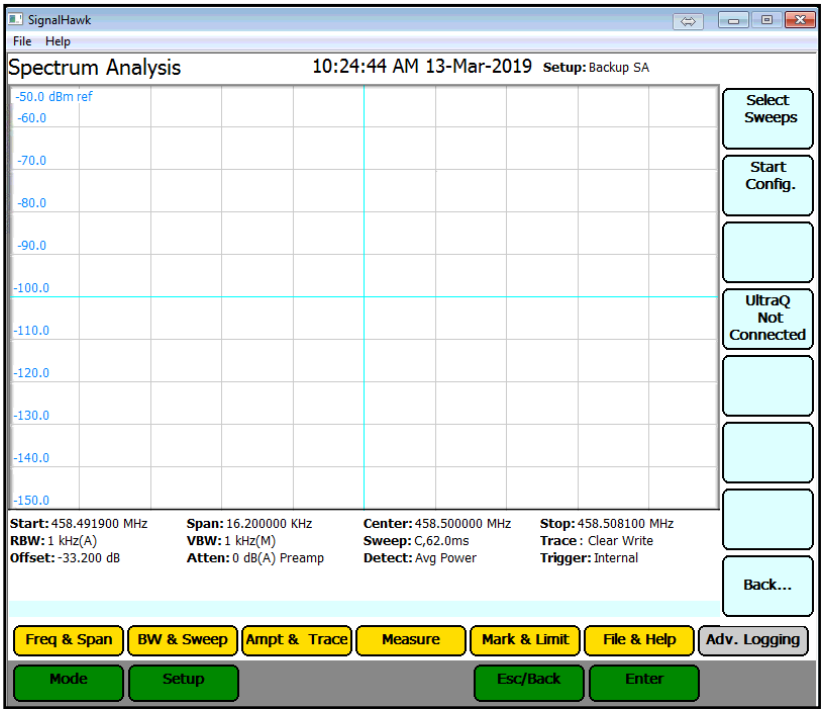
f. You will have to work down through a series of folders with numeric names until you see a file named “SignalHawkDB.mdf”. Click on this file and then click on OK.

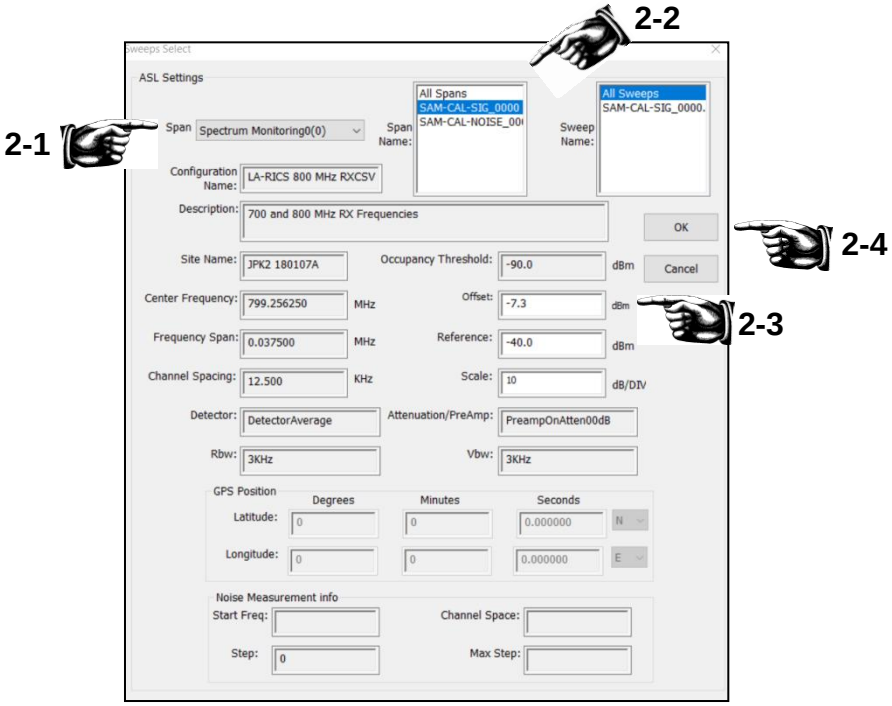
10. When you have either created or selected your database, the menu will change and the top button will be “Select Sweeps”.



10-1

Running the SAM Calibration

1. At this point we are ready to perform the SAM calibration.
    a. For details on the calibration process please refer to the Basic SAM-NAM Calibration Procedure or for more in depth information on calibration, refer to the SAM-NAM Calibration Procedure.
2. Click on “Select Sweeps” and the “Select Sweeps” dialog will open.
    a. Pull down the Span Group drop down menu and select Spectrum Monitoring (0). The calibration configurations are almost always in the Spectrum Monitoring (0) group unless otherwise specified.
        i. If you know the ‘Offset” value from a previous calibration, you can enter it at this time. This will get you very close to proper calibration.
    b. Select the SAM-CAL-SIG span and click on OK
    c. The “Select Sweeps” dialog will close and the program will return to the previous menu



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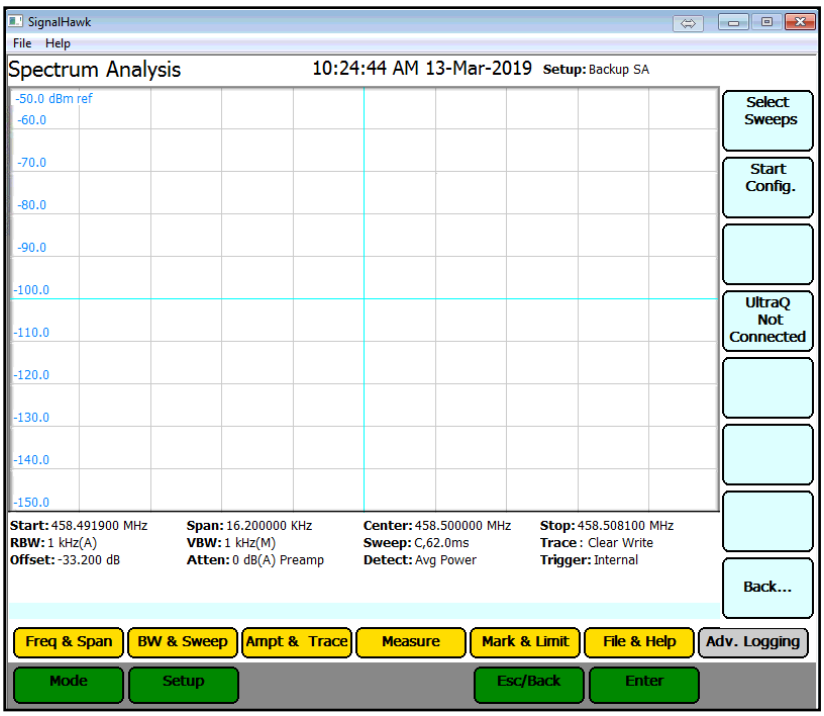
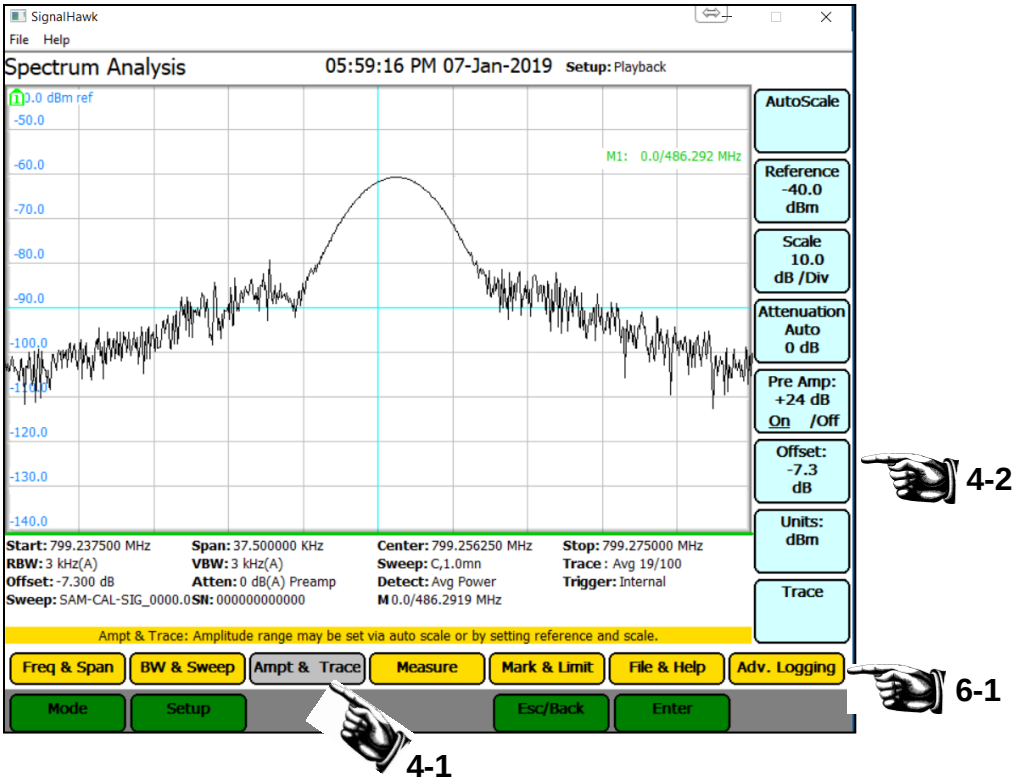


3-1

3. Click on “Start Config” and the analyzer will begin sweeping.
    a. Insure that the signal generator is set to the SAM-CAL-SIG frequency and the amplitude is set to create -60 dBm at the base of the antenna.
        i. The calibration signal should appear on the screen.
    b. Click on “Stop Config” and the analyzer should continue to display the calibration signal. At this point the Spectrum Hawk is running as a basic spectrum analyzer and all analyzer functions are available.



4. Select the “Ampt & Trace” menu and use the Offset button to enter gain offset values until the amplitude of the calibration trace is exactly -60.5 dBm.
    a. It might be helpful to utilize one of the markers to better determine the amplitude of the signal.
5. Once the Offset value has been determined, be sure to record it.
6. Click on the “Adv Logging” menu and then click on “Select Sweeps” to return to the “Select Sweeps” dialog.
    a. Pull down the Span Group drop down menu and select Spectrum Monitoring (0).
    b. If the value in the “Offset” box is not the value you just determined, enter the proper value.

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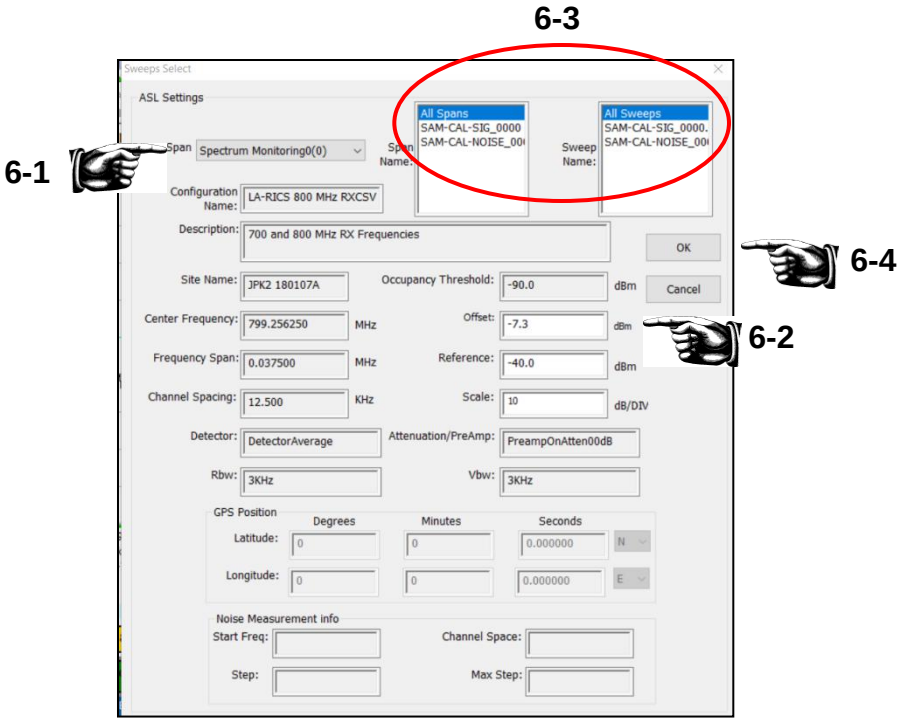
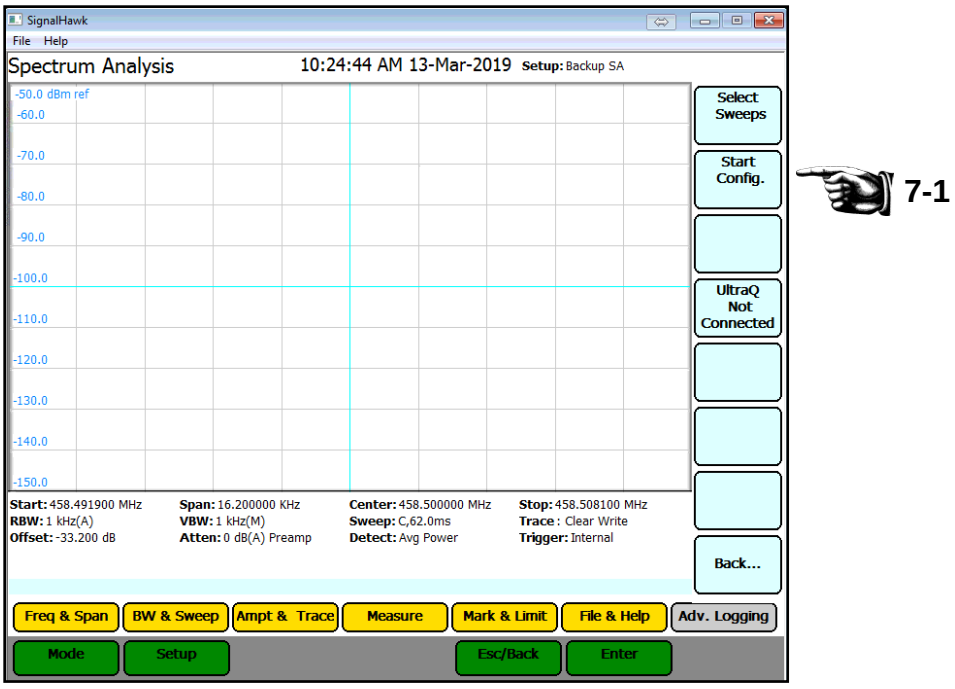


c. Select “All Spans” and “All Sweeps”.
   i. There should only be 2 entries under “All Spans” and 2 entries under “All Sweeps”. If that is not the case, recheck to make sure you have selected Spectrum Monitoring (0).
   ii. click on OK
d. The “Select Sweeps dialog will close and the program will return to the previous menu



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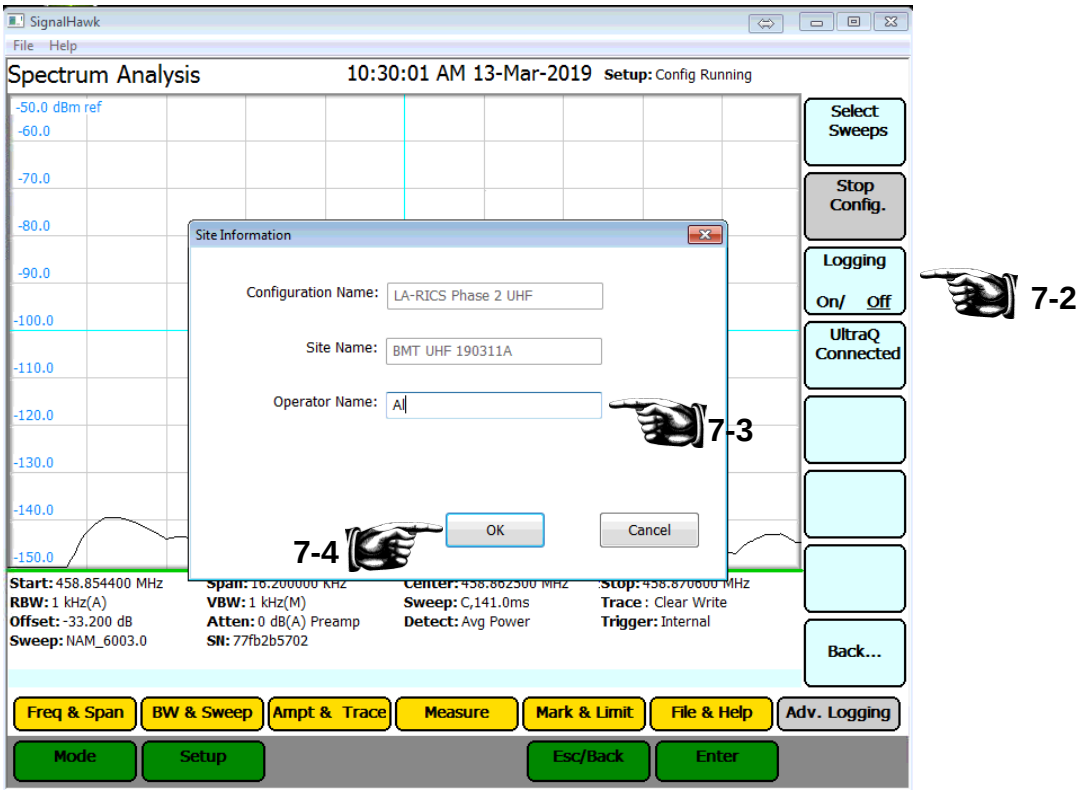
7. Click on “Start Config” and the analyzer will begin sweeping. Now it will sweep two different traces. One trace will show the calibration signal and the other trace will show only noise.
    a. If the program is only sweeping 1 span or more than 2 spans, stop the Configuration and find the error.
    b. If the calibration Configuration appears to be running properly, then click on “Logging On/Off”.



    c. The Logging dialog box will open. You must enter your name or initials into the “Operator Name” box and then click ok

8. Allow this Configuration to run for approximately 5 minutes.
9. Stop the Calibration Configuration.

If you are running only a SAM data collection, proceed to the “Starting the SAM Data Collection” section. Otherwise, continue with “Starting the NAM Software”.

Starting the NAM Software

The SAM and NAM data collections run under separate instances of the Signal Hawk software. We recommend that you set up SAM first, followed by NAM.

1. If you unplugged the USB connection to the NAM analyzer, reconnect it before proceeding
2. Double click the Signal Hawk Icon on the Desktop to launch a second instance of the PC-Hawk program.

3. When the program launches the first screen you will see is shown below.

4. The upper box should show an Ultra-Q is available and the status would be “not connected”
    a. If no Ultra-Q is shown, then you will need to stop and determine why.
5. The middle box will show the GPS if one is connected. No user action is required at this point
    a. If a GPS is attached it will likely be captured by the first PC-Hawk program to be started and may show either “Not Connected” or “In Use”.
6. There should be 3 choices, “Playback only” and 2 Signal Hawks. One will show “In Use” and the other will show “Not Connected”. Select the Signal Hawk that is not connected.
    a. If you forgot to reconnect the NAM Signal Hawk, connect it now and click on Refresh and then repeat step 6.

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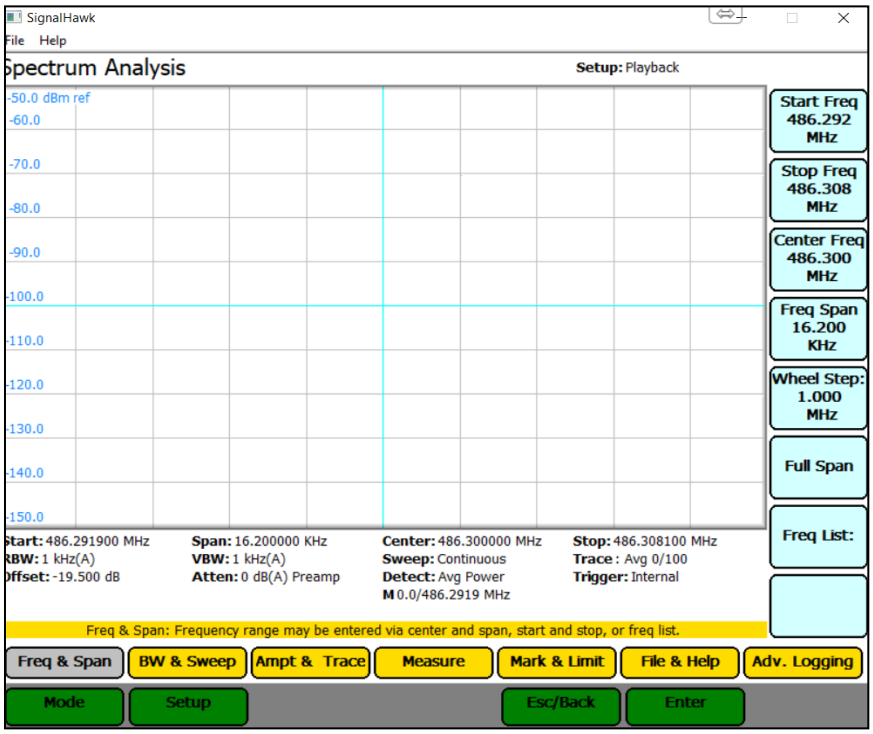
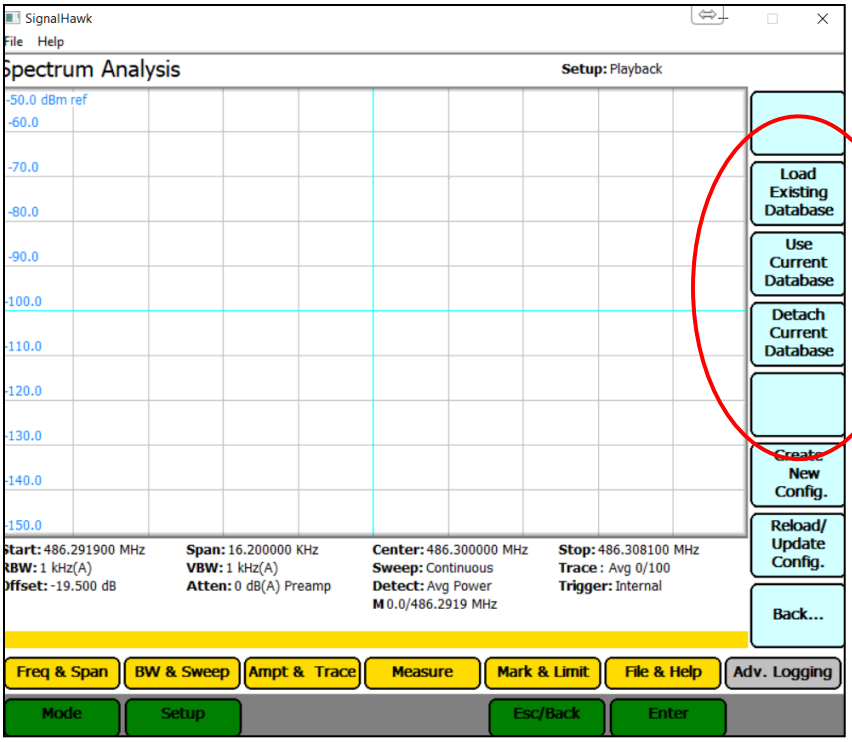
7. Click on OK and the Signal Hawk program will launch and you will see the screen below.



8-1

8. Click on Adv Logging and the Advanced Logging menu will come up on the right edge of the dialog.



9-1

9. This is where you will either create a new database or use an existing database.
    a. If you have already created a database, for example; you have already set up the SAM data collection or you are continuing a NAM data collection that you stopped for some reason;
        i. Click on “Use Current Database”.
        ii. The program will check to see that at database is attached and initialize it.
    b. If you are setting up at a new site and are going to collect only NAM data or you have not yet set up the SAM collection, you will likely need to create a new database.
        i. Click on Create New Database.
        ii. The program will ask you if you want to create a new database, click on Yes
        iii. Select the proper Configuration and click on OK
        iv. A dialog box will open asking for a site name and your name.
            1. Type in the site name along with a data code. We prefer the following format: Name YYMMDDX.
            2. For example: TXRX 190218A. The last letter is a revision letter. If you need to create a new database at the same site on the same day, simply use the same name with the letter B etc.
            3. Click on OK. The program will create and attach the database. This might take a couple of minutes because it may need to copy the existing database to the archives.

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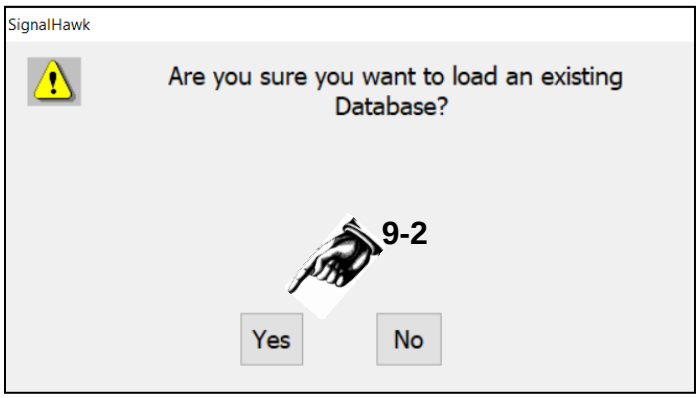
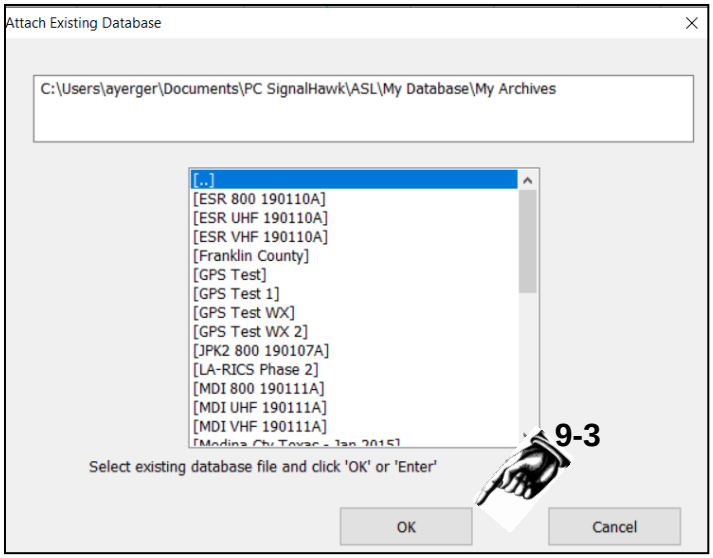
c. If you wish to use a database that was previously created and then detached, click on “Load Existing Database”
d. The program will ask if you are sure. Click on Yes. If you selected this option by accident, click “No’ and you will be returned to the previous screen.

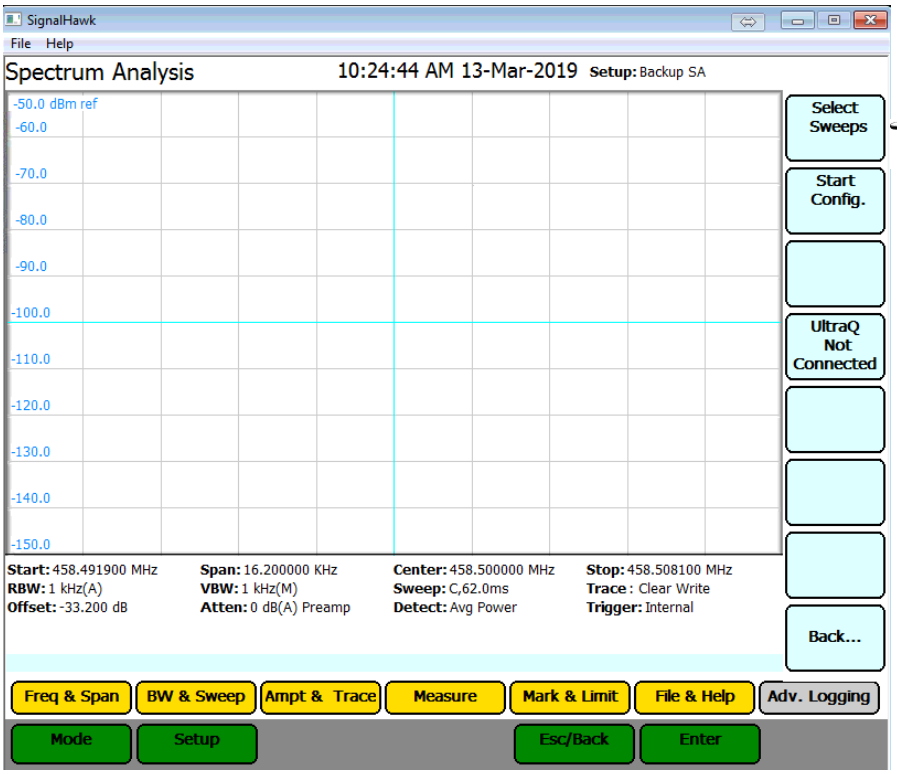


e. When you click “Yes” the program will display a list of available databases. Select the one you wish to use and click OK



f. You will have to work down through a series of folders with numeric names until you see a file named “SignalHawkDB.mdf”. Click on this file and then click on OK.

10. When you have either created or selected your database, the menu will change and the top button will be “Select Sweeps”.



10-1

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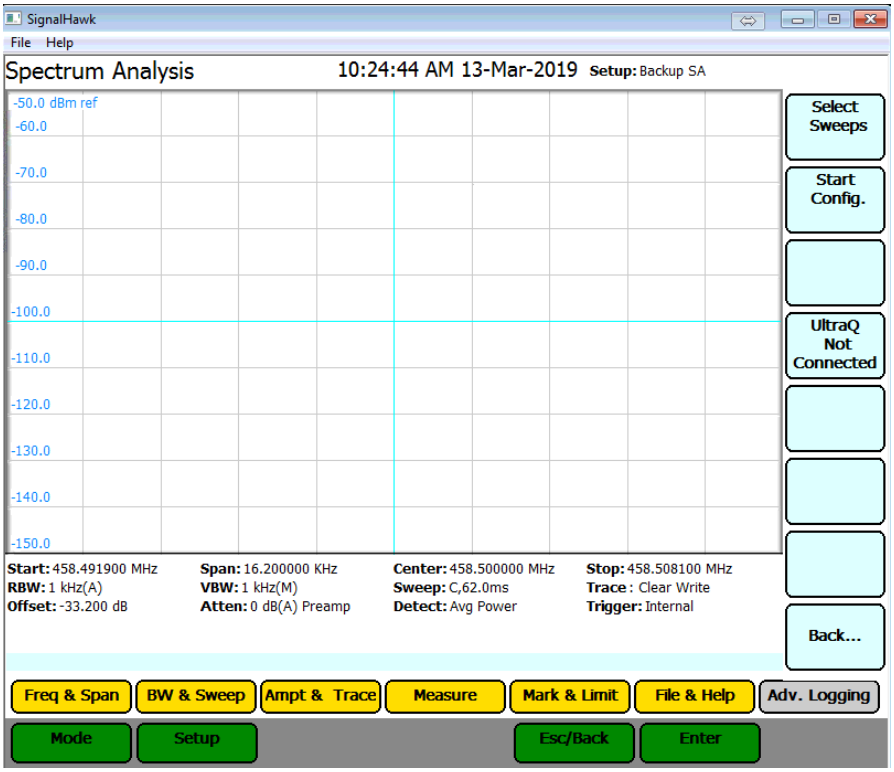
Running the NAM Calibration

1. We are now ready to perform the NAM calibration.
    a. For details on the calibration process please refer to the Basic SAM-NAM Calibration Procedure or for more in depth information on calibration, refer to the SAM-NAM Calibration Procedure.
2. Click on “Ultra-Q Not Connected” to associate the Ultra-Q with the Signal Hawk.



2-1

3. The Menu button will change to “Ultra-Q Connected” to show that the Ultra-Q has been successfully linked to the Signal Hawk

Note: If the Ultra-Q fails to connect properly please refer to the document titled “Untangling the Ultra-Q” for detailed instructions on how to reset the Ultra-Q.

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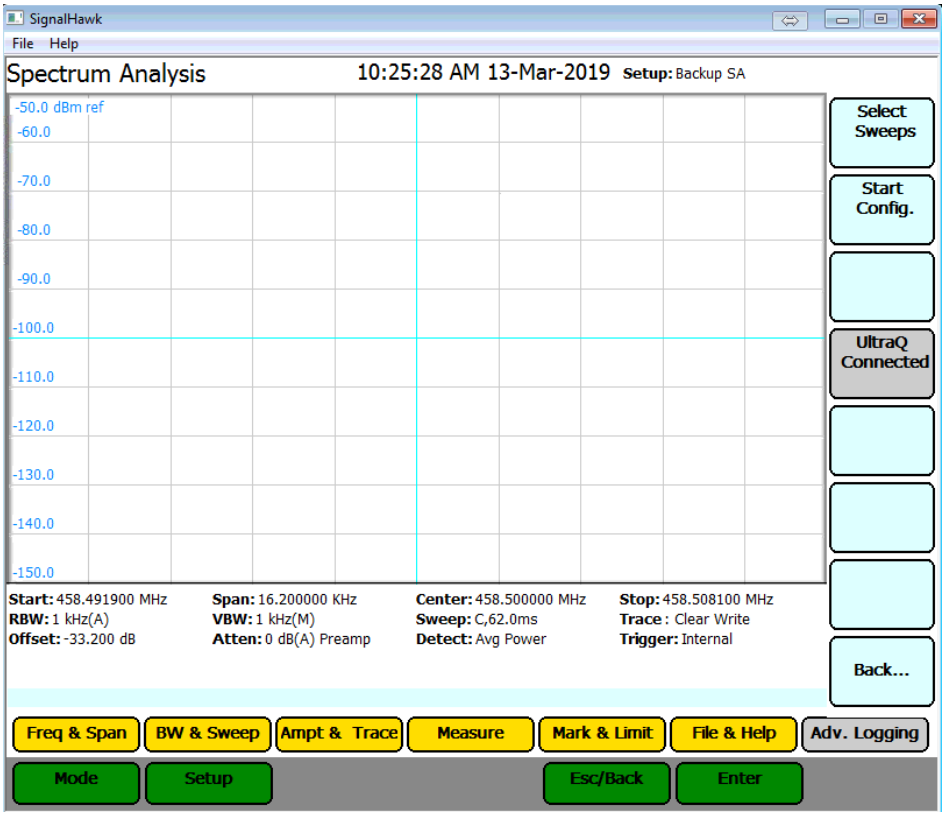
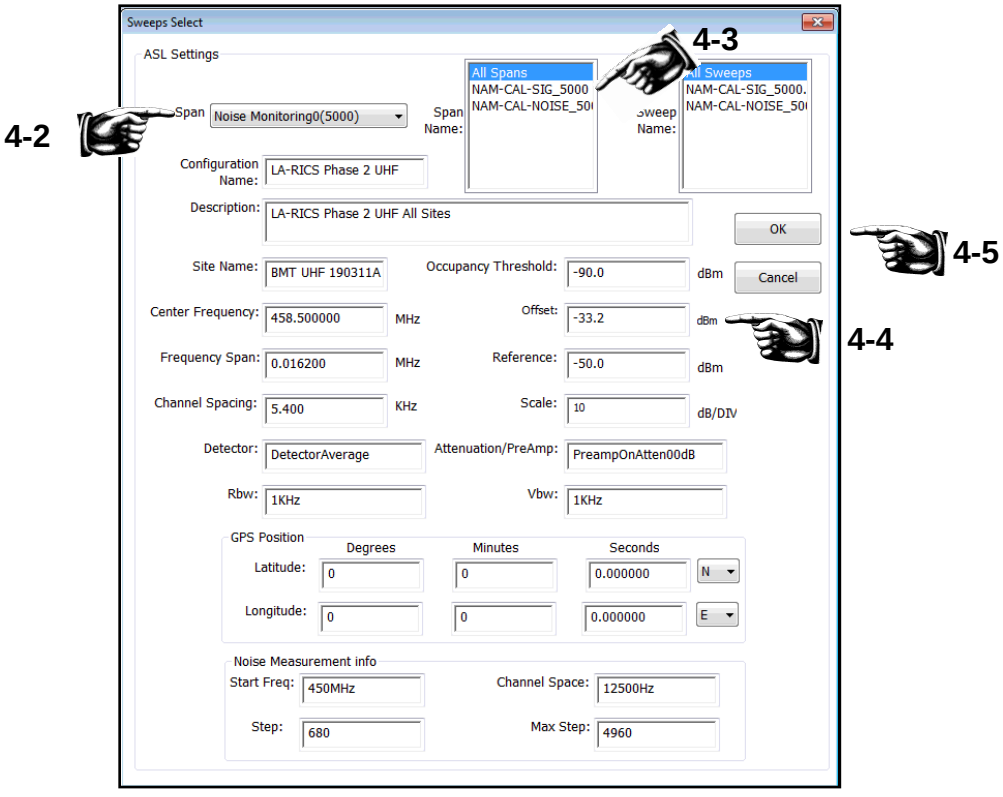


4-1

4. Click on “Select Sweeps” and the “Select Sweeps” dialog will open.



4-2

4-3

4-4

4-5

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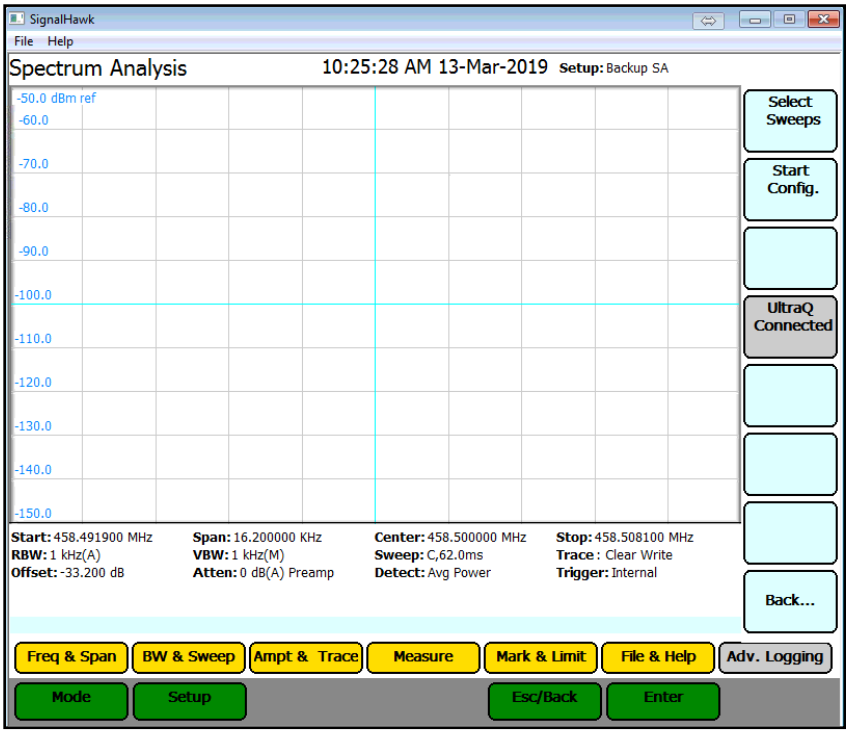
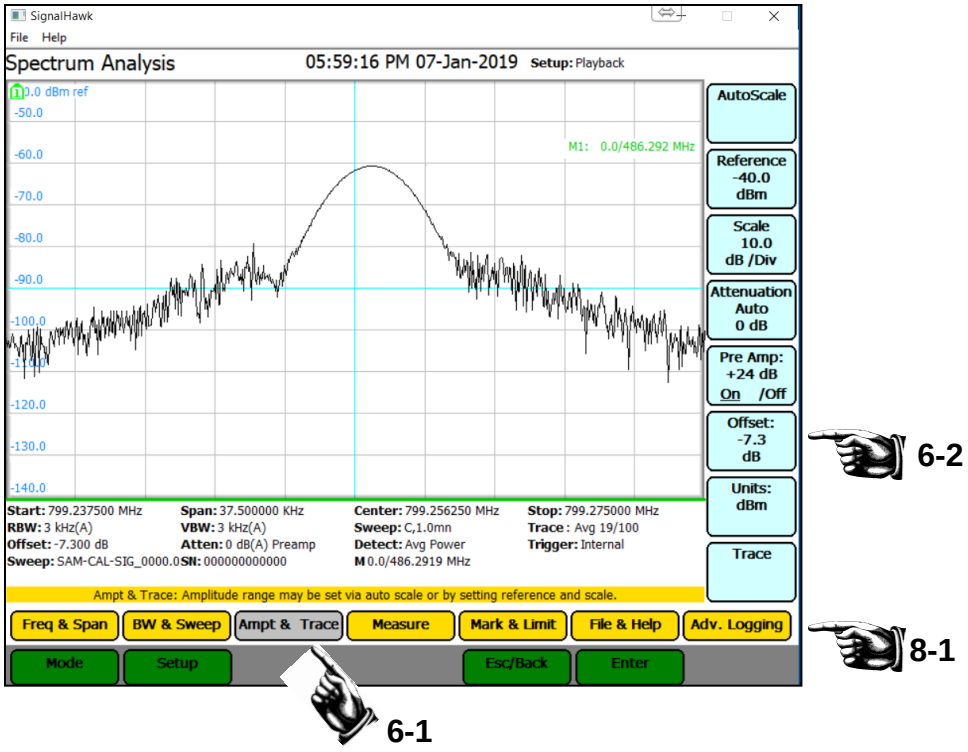
a. Pull down the Span Group drop down menu and select Spectrum Monitoring (5000). The NAM calibration configurations are almost always in the Spectrum Monitoring (5000) group unless otherwise specified.
    i. If you know what the 'Offset" value should be you can enter it at this time.
b. Select only the "NAM-CAL-SIG" span and click on OK
c. The "Select Sweeps dialog will close and the program will return to the previous menu

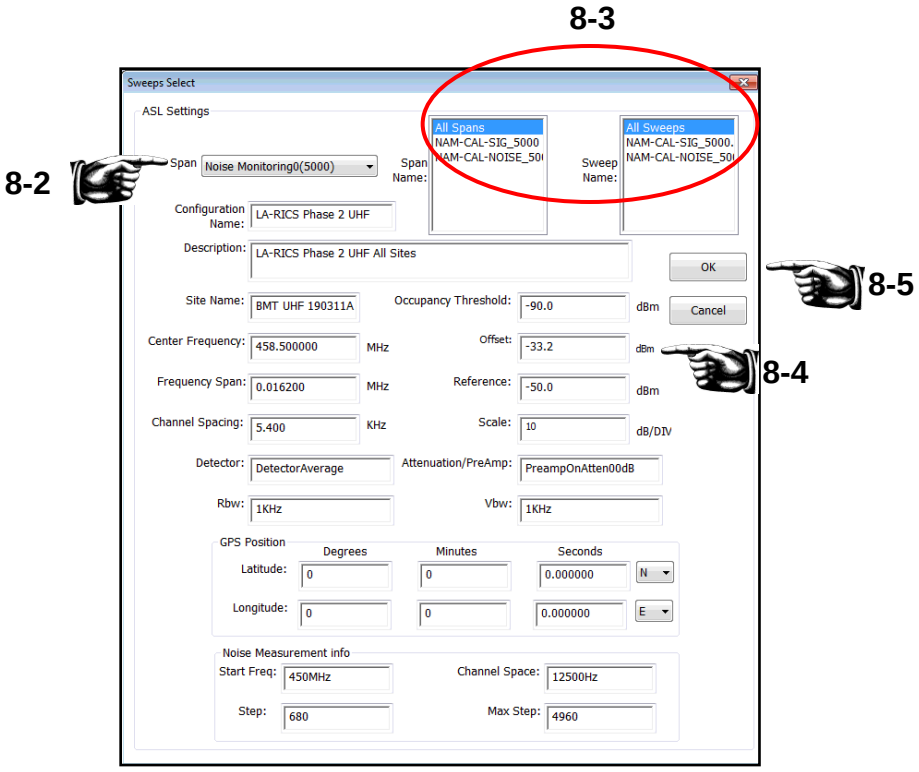


5-1

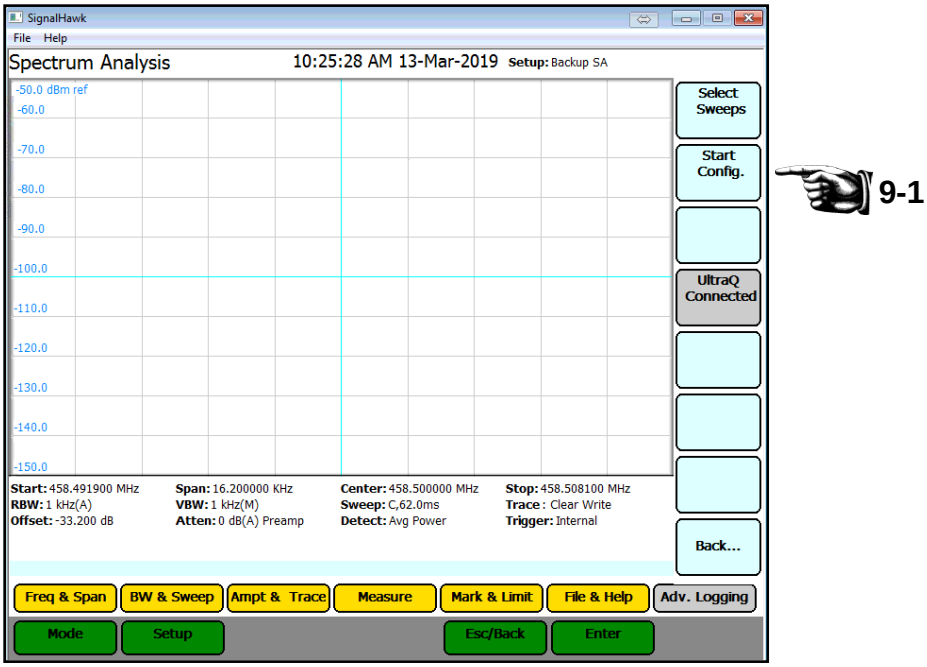
5. Click on "Start Config" and the analyzer will begin sweeping.
    a. Insure that the signal generator is set to the NAM-CAL-SIG frequency and the amplitude is set to equal -90 dBm at the base of the antenna.
        i. The calibration signal should appear on the screen.
    b. Click on "Stop Config" and the analyzer should continue to display the calibration signal. The Signal Hawk is now running in basic spectrum analyzer mode and all analyzer functions are available.



6. Select the “Ampt & Trace” menu and use the Offset button to enter gain offset values until the amplitude of the calibration trace is exactly -92.0 dBm.
    a. It might be helpful to utilize one of the markers to better determine the amplitude of the signal.
7. Once the Offset value has been determined, be sure to record it.
8. Click on the “Adv Logging” menu and then click on “Select Sweeps” to return to the “Select Sweeps” dialog.
    a. Pull down the Span Group drop down menu and again select Spectrum Monitoring (5000).
    b. If the value in the “Offset” box is not the value you just determined, enter the proper value.



c. Select “All Spans” and “All Sweeps”.
   i. There should only be 2 entries under “All Spans” and 2 entries under “All Sweeps”. If that is not the case, recheck to make sure you have selected Spectrum Monitoring (5000).
   ii. click on OK
d. The “Select Sweeps dialog will close and the program will return to the “Adv. Logging” menu



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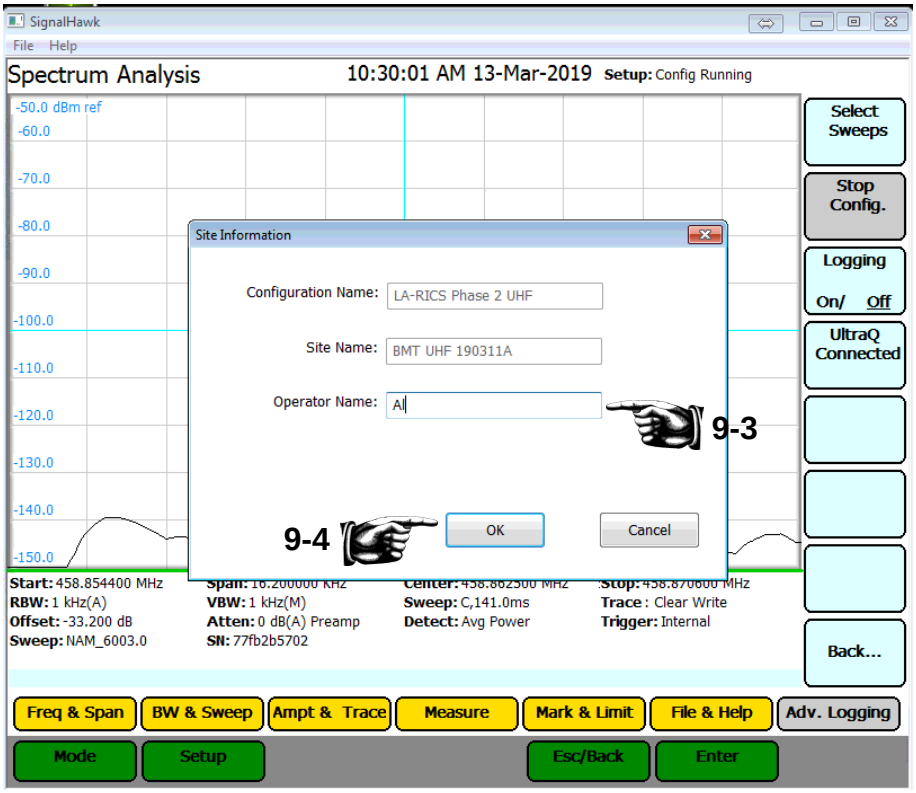
9. Click on “Start Config” and the analyzer will begin sweeping. Now it will sweep two different traces. One trace will show the calibration signal and the other trace will show only noise.
    a. If the program is only sweeping 1 trace or more than 2 traces, stop the Configuration and find the error.
    b. If the calibration Configuration appears to be running properly, then click on “Logging On/Off”.
    c. The Logging dialog box will open. Enter your name or initials into the”Operator Name” box and click on OK.



10. Allow this Configuration to run for approximately 5 minutes.

11. Stop the NAM Calibration Configuration.

If the SAM and NAM software have both been setup and the calibration has been completed for both, then proceed to “Starting the SAM Data Collection”.

If you are running only a NAM data collection, proceed to “Starting the NAM Data Collection”.

If you are also running a SAM data collection and have not yet set up the SAM program and done the calibration, then go back to “Starting the SAM Software.

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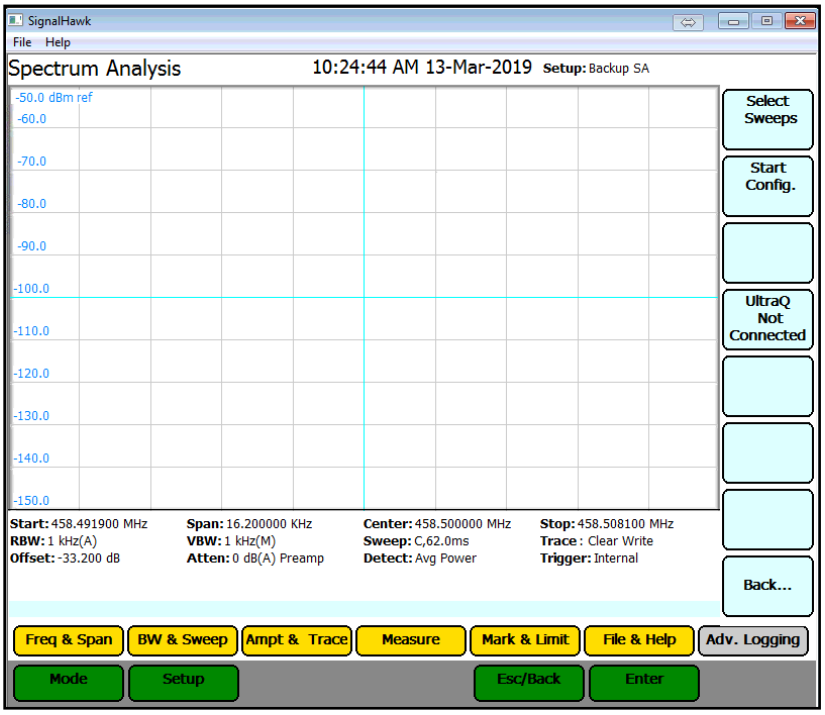
Starting the SAM Data Collection

When the calibration is complete you are ready to start the actual SAM data collection.

1. Insure that the external antenna is properly connected to the SAM kit.
2. There are often 2 instances of the PC-Hawk program running, One for SAM and one for NAM. Be sure to utilize the correct instance.
3. Return to the “Adv. Logging” menu.
    a. The SAM instance should show “Ultra-Q Not Connected”.



4. Click on the “Adv Logging” menu and then click on “Select Sweeps” to return to the “Select Sweeps” dialog.
    a. Pull down the Span Group drop down menu and select Spectrum Monitoring (1000).
        i. The SAM data collection Spans will normally be located in Span Group 1000 unless otherwise instructed.
    b. If the value in the “Offset” box is not the value you determined when performing the SAM calibration, enter the proper value.

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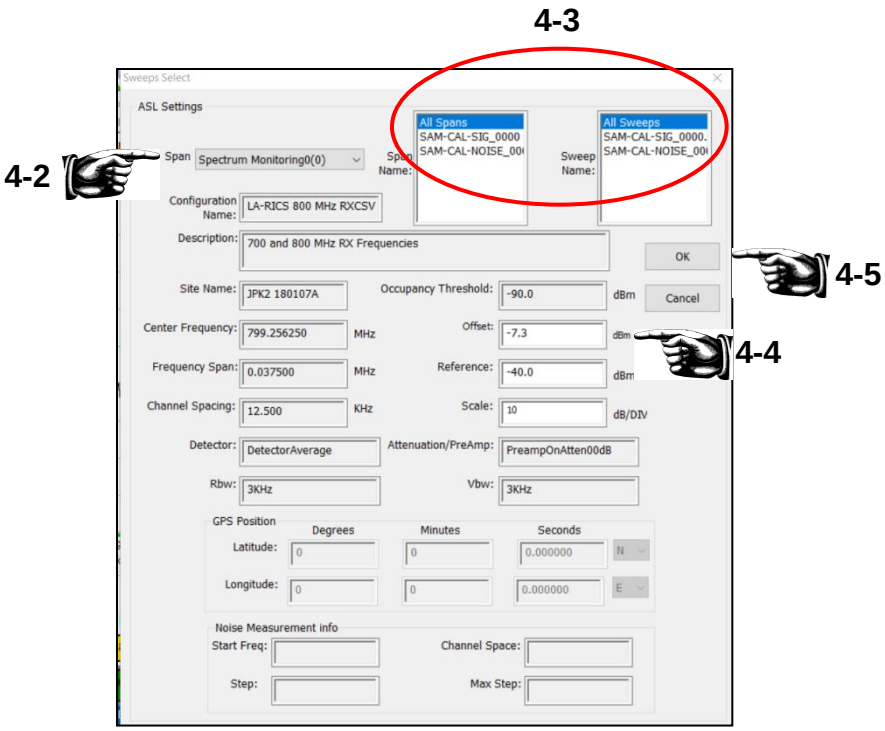

c. Select “All Spans” and “All Sweeps”.
   i. There will usually be many entries under “All Spans” and at lease an equal number of entries under “All Sweeps”. If that is not the case, recheck to make sure you have selected Spectrum Monitoring (1000).
   ii. click on OK
d. The “Select Sweeps dialog will close and the program will return to the previous menu

Please note that anytime you click on the “Select Sweeps” menu and the “Select Sweeps” dialog box opens, the “Span Type” drop down menu will reset to “All Span Types” and the proper Span Type must be selected prior to clicking OK.

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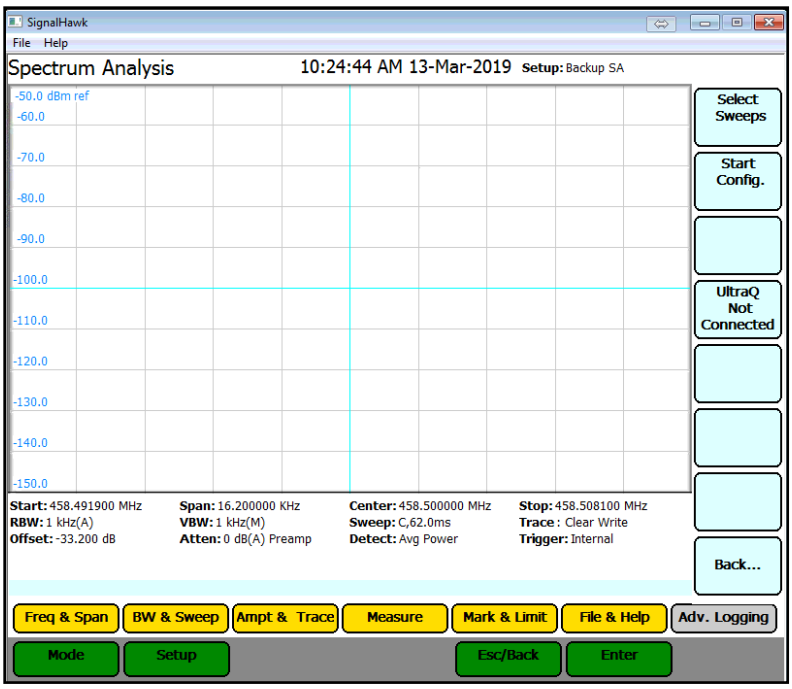
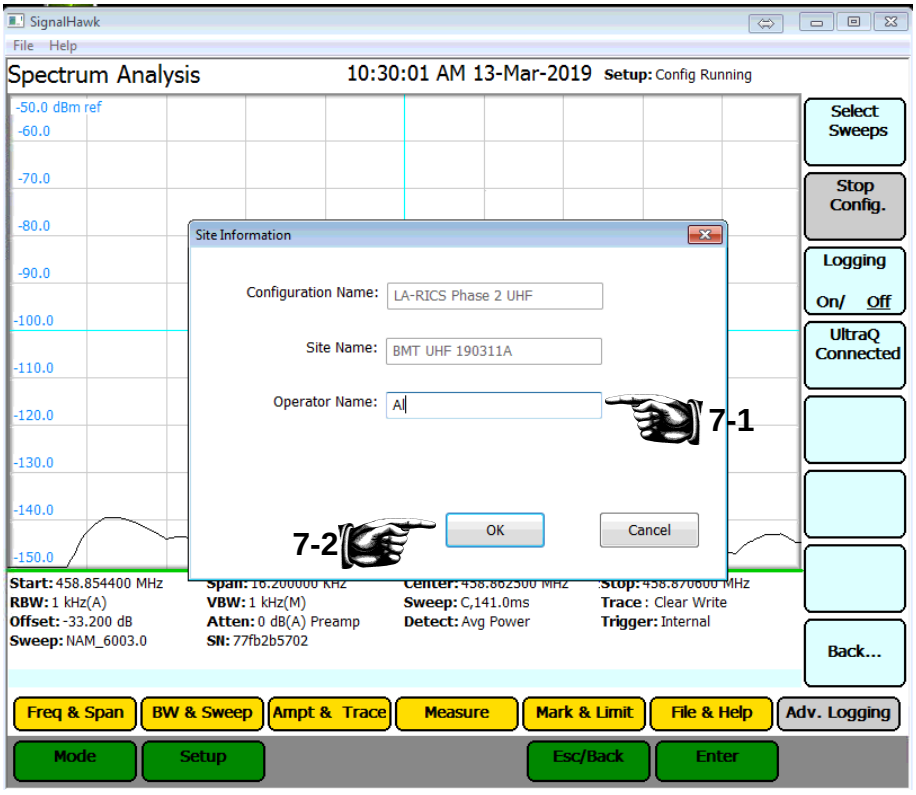


5-1

5. Click on “Start Config” and the analyzer will begin sweeping. Now it will sweep many different frequency spans depending upon the configuration.
    a. If the program does not appear to be sweeping the correct number of spans, stop the Configuration and find the error.



6-1

7-1

7-2

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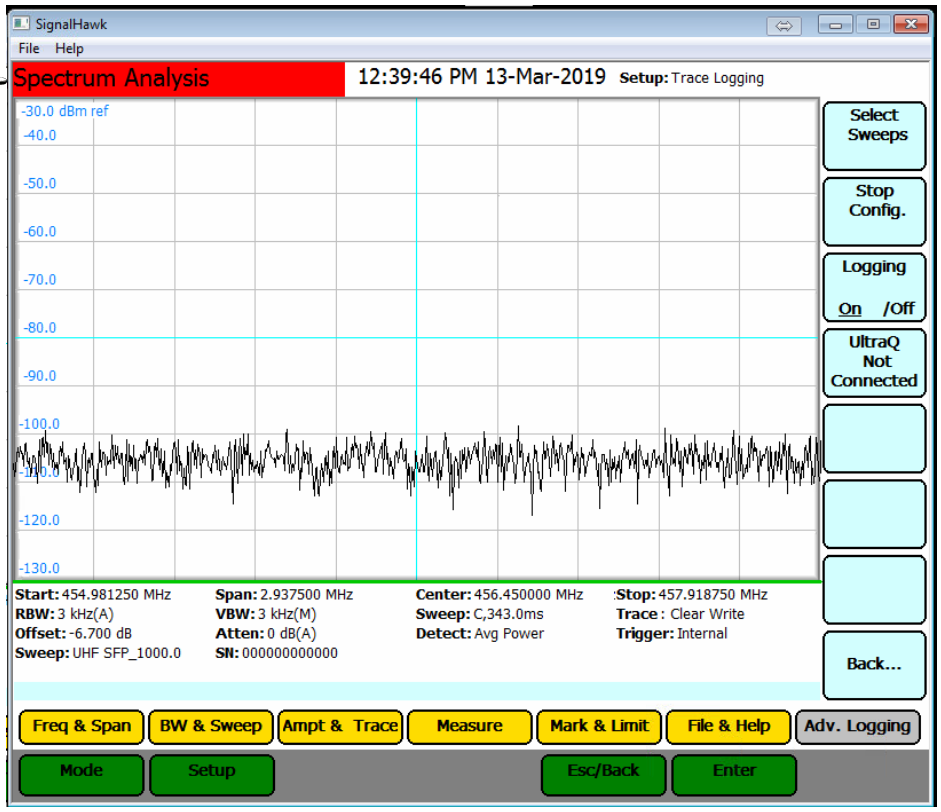
6. If the Configuration appears to be running properly, then click on “Logging On/Off”.
7. The Logging dialog box will open. You must enter your name or initials into the “Operator Name” box and then click OK.
    a. When the system starts logging, the “Spectrum Analysis” banner at the top left of the analyzer screen will have a red background.

7-3



The SAM Data Collection is now running and logging the spectrum data. Observe the traces for a while to insure that no excessively strong signals are overloading the analyzer.

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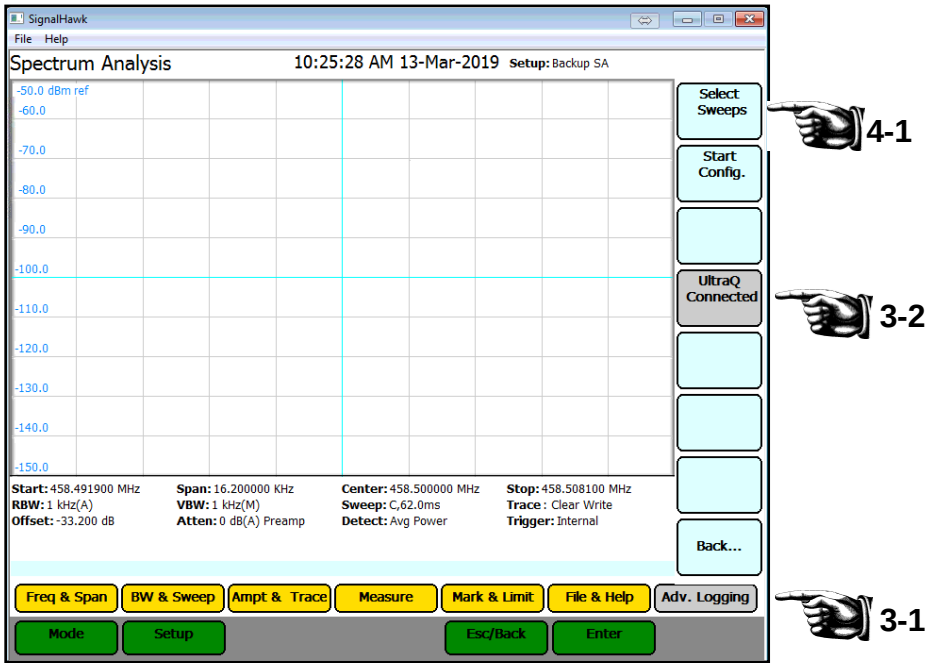
Starting the NAM Data Collection

When the calibration is complete you are ready to start the actual NAM data collection.

1. Insure that the external antenna is properly connected to the NAM kit.
2. There are often 2 instances of the PC-Hawk program running, One for SAM and one for NAM. Be sure to utilize the correct instance.
3. Return to the “Adv. Logging” menu.
    a. The NAM instance should show “Ultra-Q Connected”.



4. Click on “Select Sweeps” to return to the “Select Sweeps” dialog.
    a. Pull down the Span Group drop down menu and select Spectrum Monitoring (6000).
        i. The NAM data collection Spans will normally be located in Span Group 6000 unless otherwise instructed.
    b. If the value in the “Offset” box is not the value you determined when performing the NAM calibration, enter the proper value.

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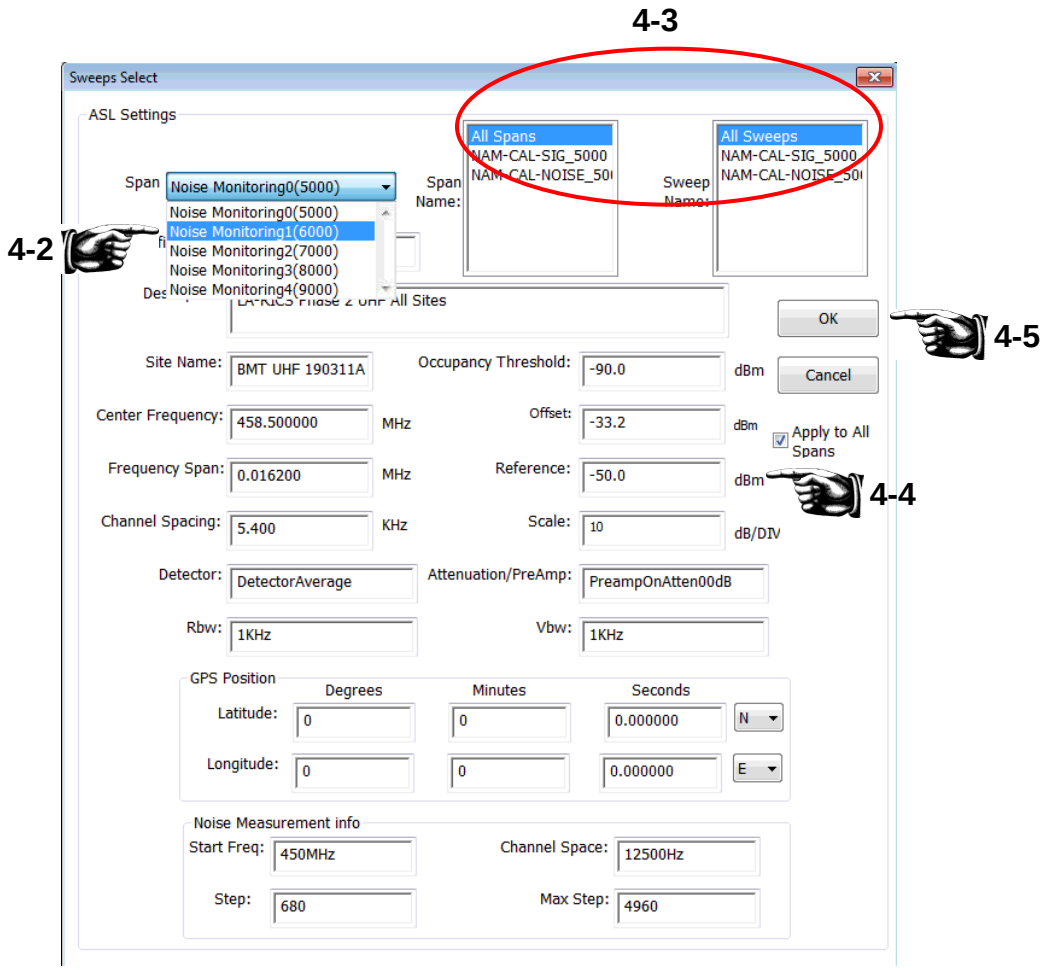

c. Select “All Spans” and “All Sweeps”.
   i. There will usually be many entries under “All Spans” and the same number of entries under “All Sweeps”. If that is not the case, recheck to make sure you have selected Spectrum Monitoring (6000).
   ii. click on OK
d. The “Select Sweeps dialog will close and the program will return to the previous menu

Please note that anytime you click on the “Select Sweeps” menu and the “Select Sweeps” dialog box opens, the “Span Type” drop down menu will reset to “All Span Types” and the proper Span Type must be selected prior to clicking OK.

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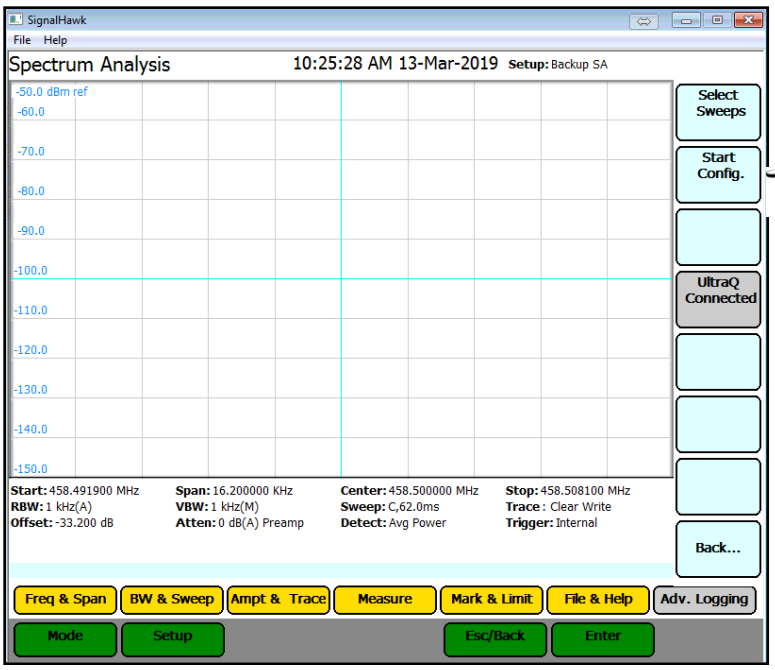
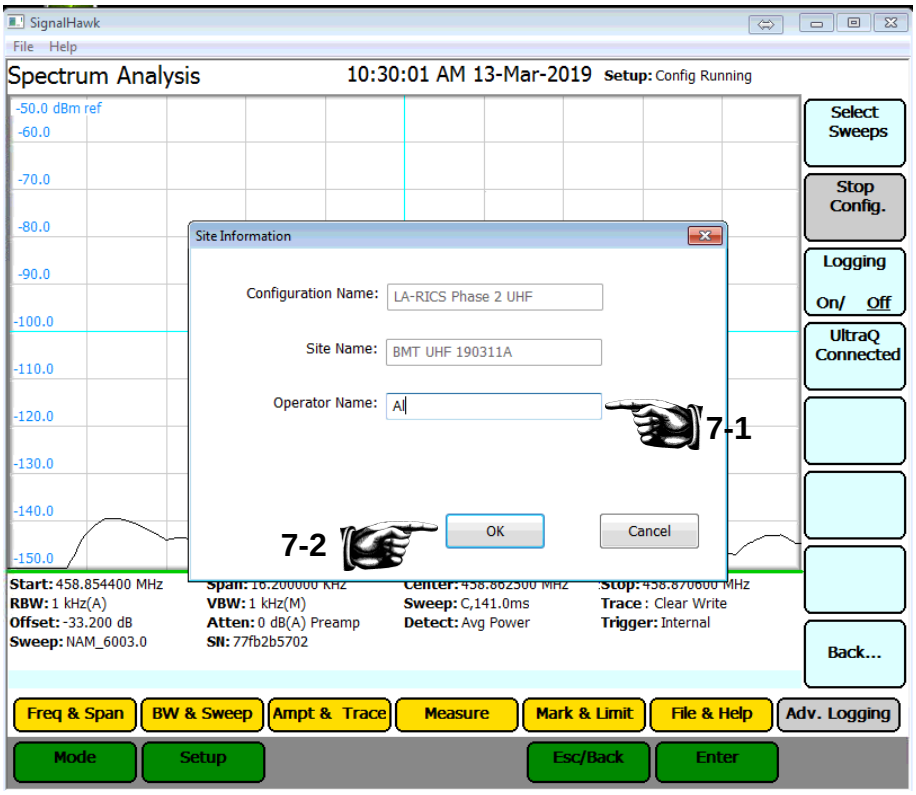


5-1

5. Click on “Start Config” and the analyzer will begin sweeping. Now it will sweep many different frequency spans depending upon the configuration.
    a. If the program does not appear to be sweeping the correct number of spans, stop the Configuration and find the error.



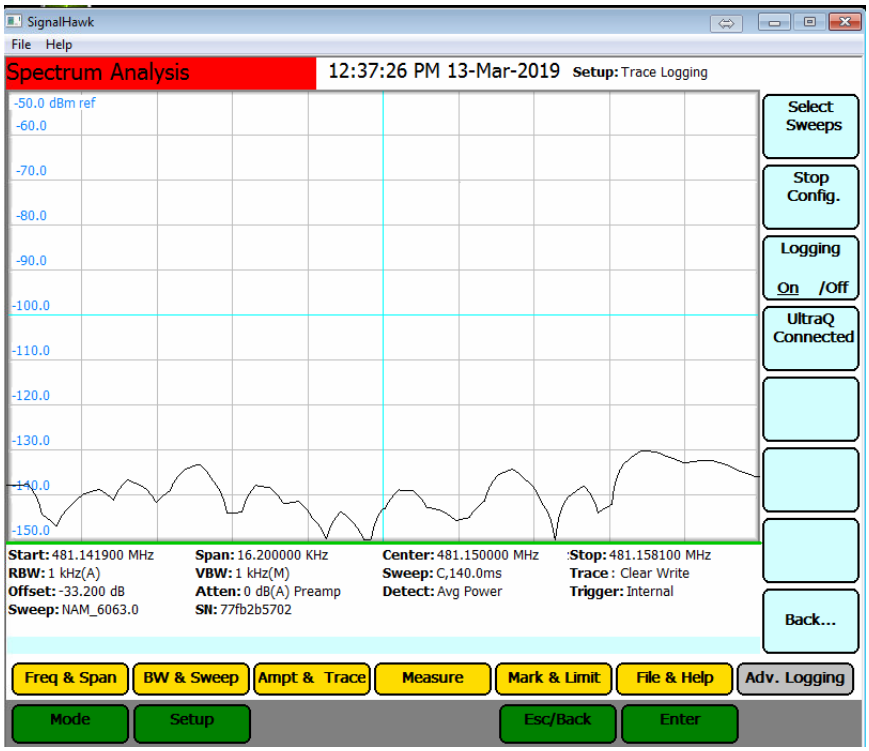
6-1

7-1

7-2

6. If the Configuration appears to be running properly, then click on “Logging On/Off”.
7. The Logging dialog box will open. You must enter your name or initials into the “Operator Name” box and then click OK.
    a. When the system starts logging, the “Spectrum Analysis” banner at the top left of the analyzer screen will have a red background.

7-3



The NAM Data Collection is now running and logging the spectrum data. Observe the traces for a while to insure that no excessively strong signals are overloading the analyzer.

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