

Manual of Operation for WaveNode Model WN-2m .

Revision 2.0

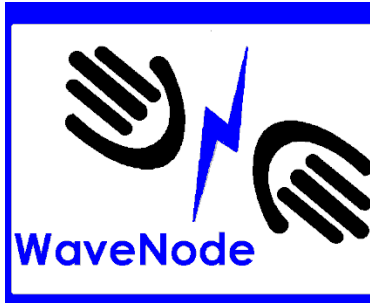


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1. GENERAL DESCRIPTION OF OPERATION

The Basic Station Monitor consists of the WN-2m display unit and in-line coax sensors. The WN-2m contains all signal processing for two coax in-line sensors, and can operate stand-alone or with Windows PC. The interface to the computer is made via USB.

Software updates are made available on the Wavenode website at:

<https://wavenodedevelop.com/downloads/>

Software Upgrades are promptly made available at no charge in the Downloads webpage on the Wavenode website.

2. **WN-2m FEATURES:**

Stand-alone operation, or run in conjunction with your PC for simultaneous viewing of both sensor. 16-bit RISC processor with 12-bit A/D converter allows fast sampling and data transfer via USB port. Local selection on the unit of sensor number, SWR reset, and bargraph selection.

- The R.F. thru-line sensor modules are factory calibrated. The user can add additional sensors at any time.
- Both input sensors are sampled **simultaneously** for forward and reflected power in the signal processing unit by a 12-bit A/D converter for maximum resolution and repeatability. The user will be surprised by the resolution and accuracy provided by this instrument at any power level.
- The sensor values are digitally processed to provide Peak, Average and accumulated power. Sensor values are compared for gain, linearity, and statistical views of transmitted RF. Continuous graphical displays are provided for gain, speech compression, SWR, peak and average power, and other data.
- The user can label the meter titles and add additional graphic information to the interface screen to personalize the screen as he likes. Meter titles can be changed as station equipment is changed or re-configured by the operator. Your screen is personalized to minimize confusion about which sensor is monitoring which antenna or feedline.
- The RF power is sampled each 50 milliseconds. All data and statistics are updated, and accurate data is provided in any transmission mode including SSB, digital and CW. This allows manual tuner optimizing in any mode. A single CW dit gives accurate power and SWR data that is held on the screen for a user selectable time up to 1 second.
- Excessive SWR messaging is provided on both input sensors. The operator selects which sensor is to be monitored. The SWR trip level and time duration can be set to provide protection for linear amplifiers and other SWR sensitive equipment. When SWR exceeds the level set by the operator, the sensor panel reporting an SWR failure flashes RED until the reset button on the graphical screen is pressed. If the software is running in Background mode, a message will pop up on the screen and an audio alert will sound.
- An LED indicates proper interface communication to the computer. Proper WN-2m operation is indicated on the graphical screen for network-based Monitoring.
- Supply power can be provided via the supplied wall transformer supply, or any station supply of 11 to 16 volts DC.
- Power Ranges are selected by the user, or an auto-ranging mode can be chosen. Each sensor has independent range selection.
- SWR display is shown on a panel for each sensor. In addition, SWR is shown on a graphical pie-chart-style indicator for easy adjustment of antenna tuners. No staring at crossed-needle SWR indicators again.
- Accurate Peak RF power is assured by use of an Analog Sample-and-Reset circuit for each sensor. The Peak Power reported is the true peak of the envelope power during each 50 millisecond sampling period.
- A complete menu for SWR graphing capability is provided. An SWR graph can be generated for any combination of the in-line R.F. sensors. Frequency range and frequency interval are chosen by the user. The minimum power required is 2 watts.

- Audio and/or tone announcing of RF Power, SWR, and SWR protection events. This is useful to the visually-impaired operator. Single key strokes make the announcement.
- All graphs, button selections, screen positions, etc are saved on power down. The software will return to the same state when re-opened. This saves you time when starting up the software.

3. INSTALLATION AND CHECK-OUT:

- Each sensor is factory calibrated and is ready for plug-in and use. Plug the sensor(s) into the 6-pin MiniDin connectors, and the USB cable to any computer USB port. Refer to figure 1 to locate the connector locations.
- Insert the installation disk into your CD-ROM. Go to the Software Installation folder and select Setup.exe. Follow the installation prompts. After the software is installed, a shortcut will be added on your desktop to the wn2.exe file. A hardcopy installation sheet is provided with the unit. Also note that the CD contains a separate folder with useful information about your WN-2m system.
- Choose how to power your interface unit. You can choose either wall transformer operation, or a simple connection to an external +13.8 Volt supply. A supply voltage between 12 and 16 volts must be supplied. Maximum current is 250 ma. (220 ma. typical).

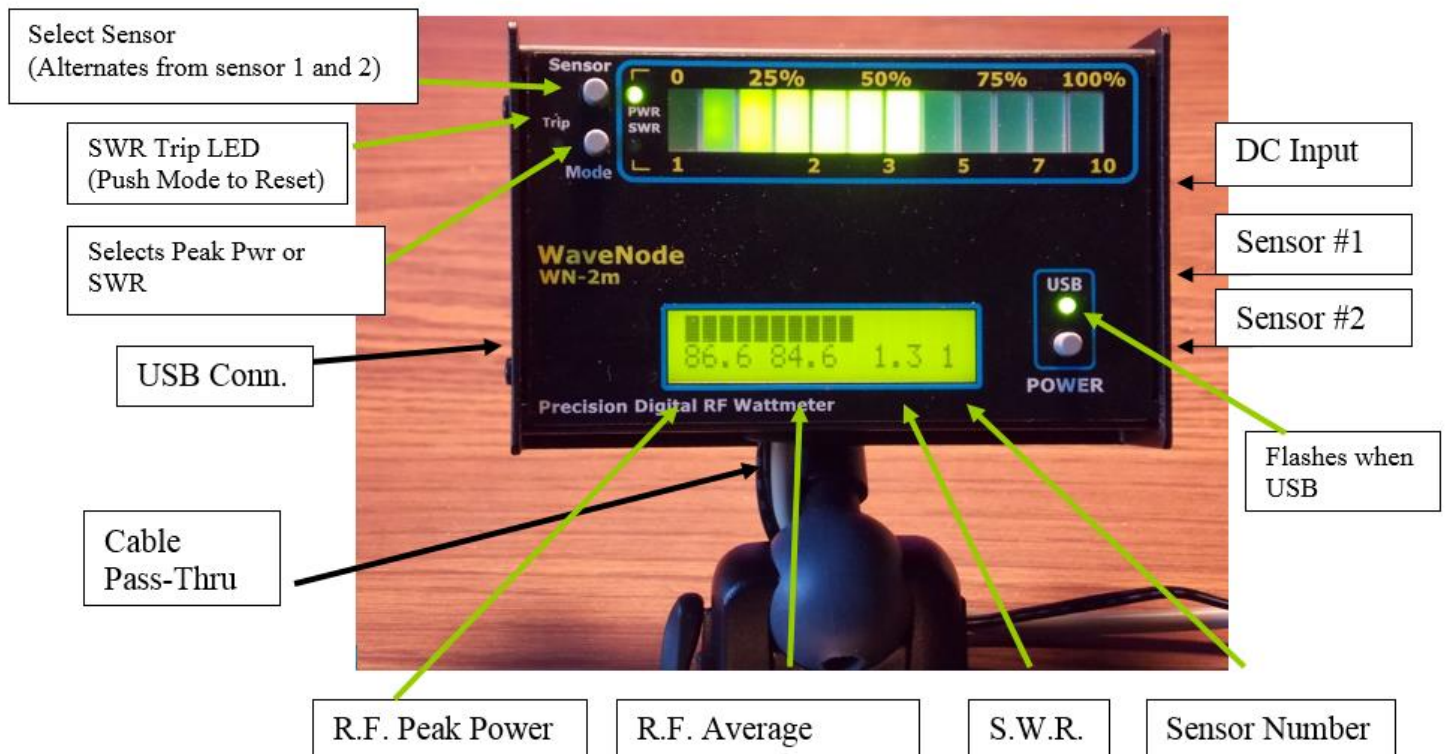


Figure #1 Connector and Button Locations

Power the WN-2m control box :

- Plug in a 12V DC supply (3.5mm plug, +12 volt center pin) into the WN-2m supply plug.
- Start the WN-2m application software. The flashing LED on the front panel will indicate the unit is communicating correctly with your computer. Each LED on or off represents a sample update of the video data. The round communication indication on the PC screen also indicates correct USB operation when flashing Green.
- Each RF sensor is placed in series with the coax cable to be monitored. Coax cables should be kept as short as possible between transceivers and sensors.
- If linear amplifier gain monitoring is desired, sensors must be installed in series with the amplifier's input and output.

4. GRAPHICAL MENUS:

The graphical screens consist of a top screen and several secondary screens that can be activated to provide additional graphical data screens. Closing a screen does not stop the data gathering functions for that screen, the data screen is simply not visible until re-activated. Pausing the mouse over a button or display will give a short text description for that item.

Also, clicking the Mouse button over any of the Meters will provide a large view of that meter for easy viewing at a distance.

A. TOP SCREEN:

The top screen has two meter panels as shown below. Each meter panel indicates updated data every 50 milliseconds. The main panel also has list boxes to select SWR metering, SWR trip level, and SWR fault time to trigger an SWR fault warning. Large versions of each meter can be turned ON by clicking on a meter. The SWR protection circuit operates even if the screen is closed to the system tray.

You can observe a single, large meter by clicking on any meter, then minimizing the large screen with the "Minimize" selection in the top row of the Main screen. Minimizing the Main screen will allow a small Message screen to pop up in the event of an SWR protection event, even if the Main Screen is not visible. Minimizing the screen with the Minimize selection on the Menu Bar is preferable to using the "-" button at the top-right.

A panel box allows selection of Peak or Average to be displayed in the meter panels. The peak hold time and averaging time are also selected by list boxes. Note that the graphical meters show peak and average power at all times.

At Bottom-Left a button is provided to toggle the Audio Announcing feature On or Off.

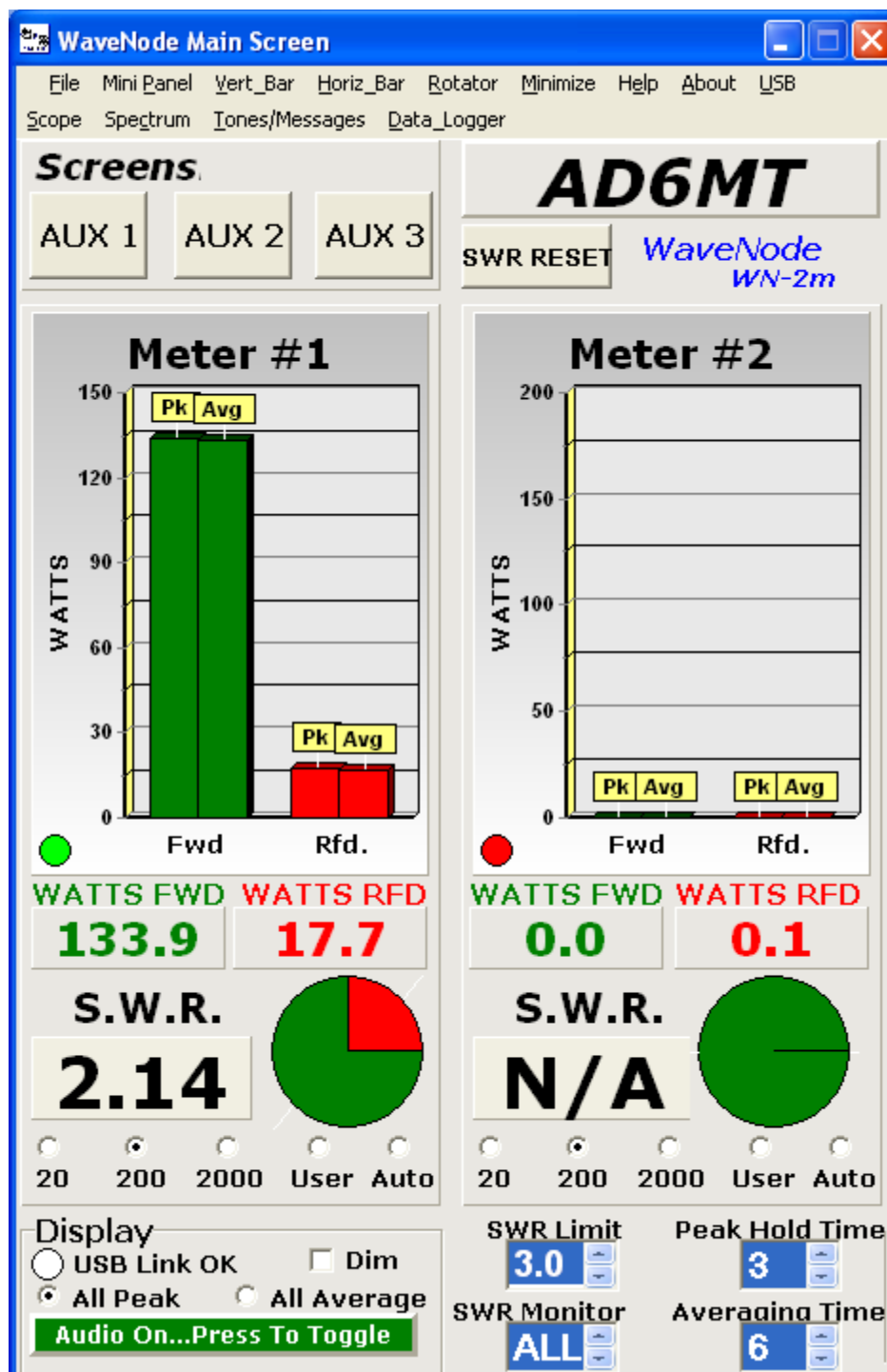


FIGURE 2. - Main screen of Wavenode Interface.

The “Callsign”, Meter Titles, and preferences are input by the operator and saved.

B. POWER SCREEN (Aux #1):

This panel displays the elapsed average RF power.

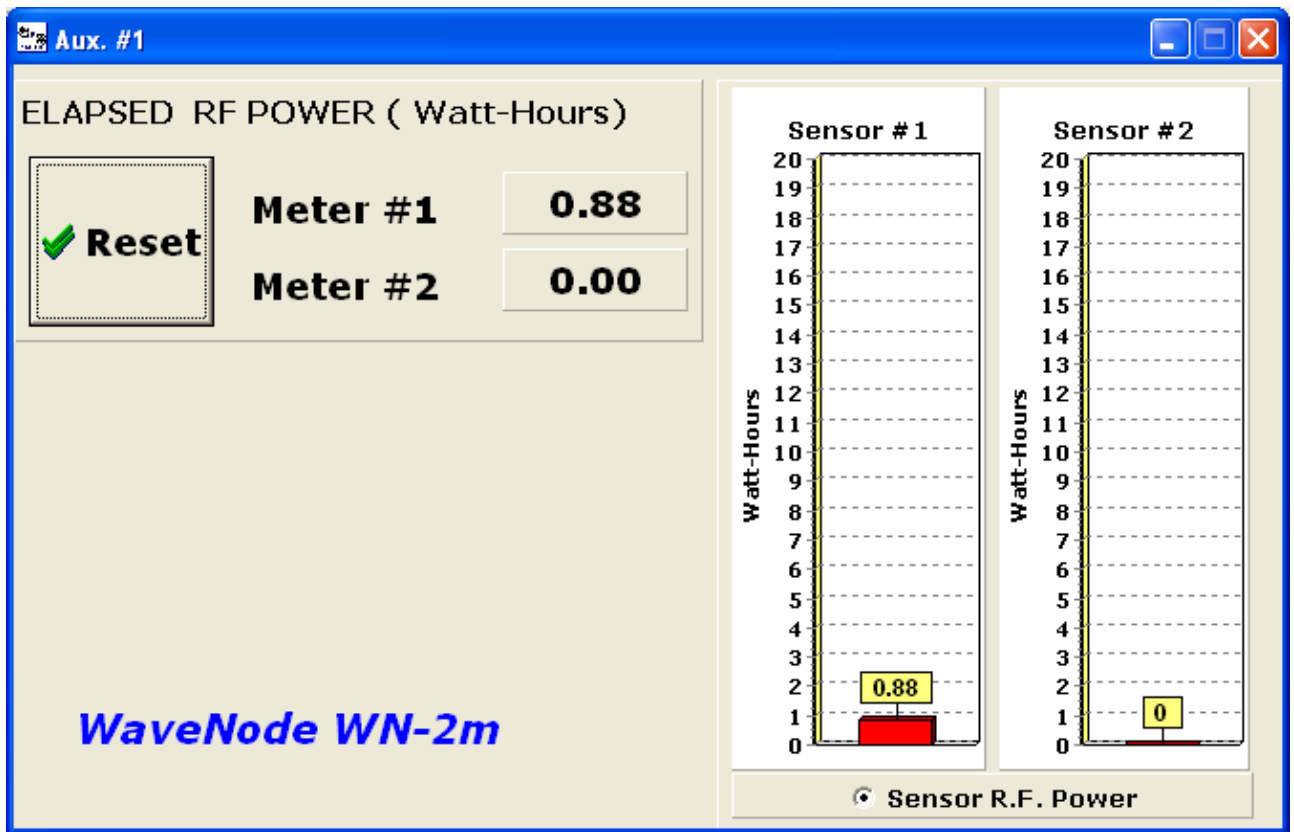


FIGURE 3 – The Aux.#1 Screen

The left panel displays watt-hours of radiated RF power for each sensor.

C. RF POWER GRAPH SCREEN (Aux. #2)

This panel has three graph panels. Each graph displays the data for the sensor selected in the list box for that graph. The top and middle panel can display data for the sensor selected and the bottom graph is used to display gain data for the top two graphs. The graph can be set to display sensor level vs time, or a histogram of samples and power levels. The data can be reset and started with the "RUN GRAPHS" button.

The peak or average data shown on the graphs is the peak or average power for THAT specific 50 millisecond time sample point on the graph, and updated data is provided for each data point.

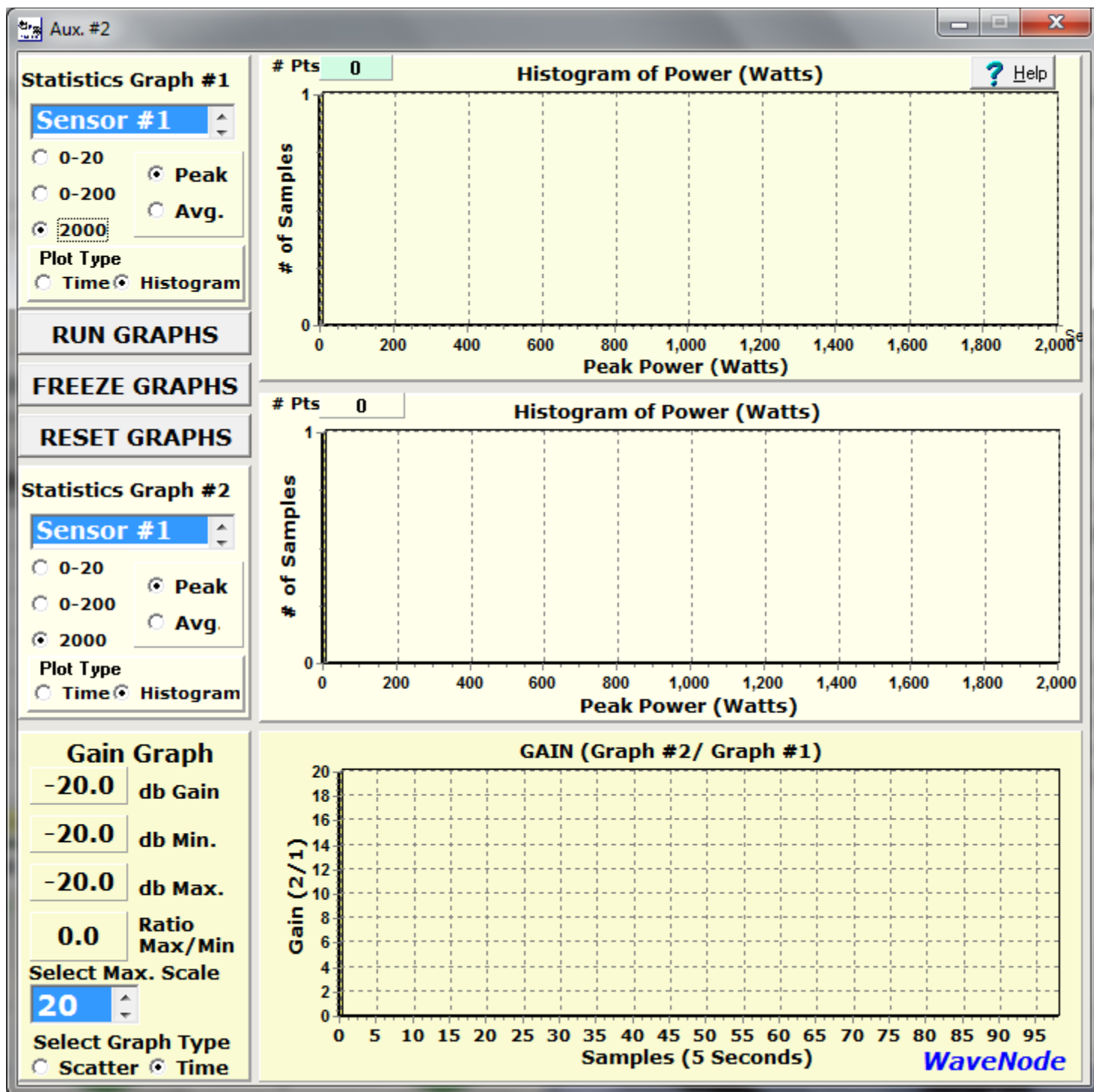


FIGURE 4- The Aux. #2 Screen

THE REAL-TIME STATISTICS SCREEN

D. SWR GRAPHING SCREEN (Aux. #3)

This screen is used to plot antenna SWR. The screen prompts the user for the frequency range to be plotted and the frequency datapoint intervals. The user tunes the transceiver to the frequency prompt, and keys the transmitter with a short pulse (CW, FM, etc.). The SWR data is entered on the graph and prompts the user for the next frequency point. When the desired frequency end point is reached, the graph data is automatically updated. Multiple sensors can be plotted on the same graph by selecting the sensors in the Sensor Selection panel at the top/right.

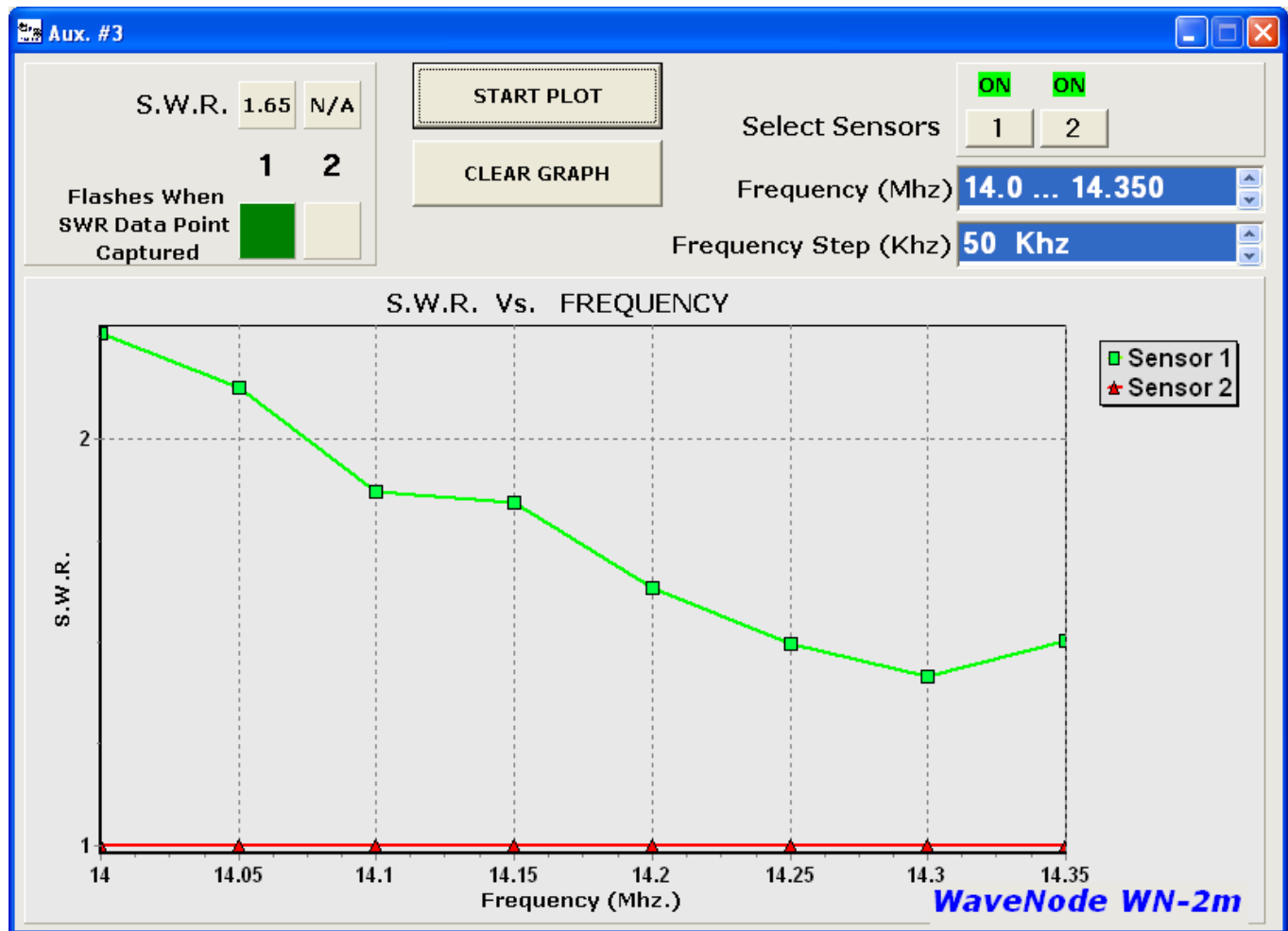


FIGURE 5- The Aux #3 Screen

THE SWR GRAPHING SCREEN (Aux. #3)

Figure 5 shows an SWR plot from 14.0 to 14.35 MHz using both sensors.

5. INFORMATION FOR SOFTWARE EXPANSION:

The WaveNode website provides information for programmers wishing to write their own software to show the Wavenode data. This is done with Windows Messaging, and avoids the use of dll files. A complete description of how to use this messaging is provided in the "Windows Messaging Demo Software" folder on the CDROM and on the Software support page of the WaveNode website. The information on your CDROM includes:

- A.** A sample program with source files written in Microsoft C++. The program demonstrates how to send data to, and receive data from, the WaveNode software. Using Windows Messaging allows the user to import the power/SWR data to their application in C++ or Visual Basic.
- B.** The sample program demonstrates that power, SWR display, rotator signals, and all the WaveNode data can be accessed with your application.
- C.** A complete source code listing for the "WN_demo.exe" demonstration software that sends and receives the Wavenode power/SWR data. This file is commented completely for easy understanding.

6. DETAILED DIRECTIONS OF OPERATION:

A. Main Screen

1. The top screen shows the meters and digital values for both power sensors. The meters display forward peak, reflected peak, forward and reflected average power for both sensors simultaneously. The rectangular panels show forward, reflected power and SWR for each sensor. The power display can be set to a selected range, or the "Auto" button will automatically select the correct range. This is a matter of operator preference.
2. Several list boxes are provided to select the following operator preferences:
 - The level at which the SWR protection relay will trip.
 - The Averaging time for meter display. The number chosen represents the number of samples averaged together for the average power display on the panel.
 - The Peak Hold Time. The number of sample times that the peak envelope power and SWR will be displayed. A larger number will hold the Peak detector for a longer period.
 - SWR Monitor. This selects which of the power sensors will be monitored for excess SWR and trip the SWR relay. The "NO" selection is used when SWR protection is not desired. The "ALL" selection allows monitoring all the sensors for high SWR protection.
 - The SWR reset button. This button resets the SWR trip LED.
 - SWR Tuning Indicators: These are provided to allow easy tuning of the station antenna tuners. The operator has immediate feedback of SWR as the tuner is adjusted. Simply adjust your tuner for maximum green in the pie-chart, the chart will turn completely red when the SWR exceeds 5:1.

B. The Aux. #2 Screen:

This screen is used to provide various data regarding power, linearity, gain, etc. There are three graphs shown on this screen. The upper two are identical, and can display data for either of the two sensors. The sensor is selected in the list box for that graph. The graphs can be stopped, or will run continuously. The user can clear the graphs by stopping, then starting, the graphs again.

The power range for each graph is selected in the panels on the left. The top two graphs can be chosen to show a histogram of power level vs number of samples. This is a visual graphic of your transmitted power samples and is updated each sample period. The effect of speech compression is to push more samples to the upper end of the power spectrum, and this can be observed if compression is turned off. The other graph option is a traveling waveform of sample value vs time (much like an oscilloscope).

The bottom graph is used to display the relationship of the sensors plotted in graphs 1 and 2 above it. The user can graph gain vs power output (to show linearity) as a scatter graph, or gain as a function of time. The samples are collected in SSB or AM mode, and a linear system shows the gain as constant with power. CW operation has only one power, either ON or OFF, so linearity can be plotted by sending a string of dits while varying the linear amplifier drive power. This graph is especially useful with linear amplifiers, with one sensor on the input and the second sensor on the amplifier output.

C. The Aux. #3 Screen:

This screen is used to plot SWR of antennas. Either, or both, sensors can be selected for the plot.

The user follows the steps outlined below:

- Select the sensors to be plotted
- Select the frequency range to be plotted in the listbox.
- Select the frequency step size increments (more increments take longer).
- Follow the message box instructions. They will remind you what the next frequency is to be set on the transmitter.
- Send a single dit at each frequency prompted by the message box.
- A green box on the top left will flash when a good SWR value is computed at each frequency.
- You should see the box flash green before moving to the next frequency point.
- When the last point is entered, the graph will be complete.

D. The Configuration Menu:

The configuration Menu is used by the operator to make the screen titles suit your station equipment. The menu is accessed by the button at the top left of the Main Screen labeled "File". The software comes with default titles, such as "METER #1", however, you may not remember what Meter #1 means, so you could change it to "40 MTR DIPOLE" or "LINEAR AMP". Also, the top panel can contain your callsign.

For both sensors, click on the button that describes the sensor you have installed for that meter number.

For instance, if you have installed the LP-1 HF sensor in meter #2 position, click the button in the LP-1 column adjacent to Meter #2. This will instruct the software what type of sensors are in each meter position. You only need to do this one time, the settings are saved in a separate .ini file. You can put any sensor in any location, just select the appropriate sensor next to each meter on the configuration menu.

The Maximum Meter Range for either sensor on the Main software page can be set to any integer number desired by the operator. For example, if the user wants Meter #1 full scale to be 150 watts, enter "150" in the User Meter #1 Range box at the top-right. Both meter maximum scales can be set by the operator, and then selected whenever they wish by clicking the "User" Radio button under the corresponding meter.

The Bargraph Range edit box allows the bargraph range on the WN-2m LCD and LED display to be changed. For example, if the maximum power to be displayed on the bargraph is 500 watts, set the bargraph range to 500 watts.

Configuration File Editor

Main Form

Select Sensor Type

Meter #1 Title: Meter #1 ☐ LP-1 ☒ HF1/UHF1 ☐ 8KW ☐ SHF ☒ User Meter #1 Range: 150

Meter #2 Title: Meter #2 ☐ LP-1 ☒ HF1/UHF1 ☐ 8KW ☐ SHF ☒ User Meter #2 Range: 300

Your Call Sign: AD6MT

Bargraph Range (Watts): 500

Sample Rate:

☒ Double Update Rate

Tones/Messages Button Labels

Message #1 Text: Message #1 Message #4 Text: Message #4

Message #2 Text: Message #2 Message #5 Text: Message #5

Message #3 Text: Message #3 Message #6 Text: Message #6

Save **Close** **WaveNode WN-2m**

FIGURE #6

7. OPERATION WITH SOUND:

The WN-2m will give an audio announcement of RF Power, Peak Power, SWR, and SWR protection status on either meter. Start by pressing the 1 or 2 key to get an announcement of the power on that sensor.

Press again for each voice announcement. Now press the "t" key to select the tone mode.

Now press the "p" or "s" key to start the tone for SWR or Power.

Each time you press the "p" or "s" key again, the power or swr will be announced, then the tone will resume. To turn off the tone, press the "t" key again. To hear an announcement or tone for another meter, press the number key for that sensor. The operator should set the "Peak Hold Time" selection on the Main Menu to "1" if using the tone mode. This will allow the tone to respond most quickly when adjusting antennas, tuners, and amplifiers.

The audio feature can be turned OFF/ON with the Toggle button at the bottom-left of the Main screen.

The computer must have a sound card and headphones/speaker to provide the audio announcement.

1. Press 1 or 2 to hear the power on that meter.
2. Press "t" to enable the tone mode on the meter number most recently pressed.
"Not Available" will be announced if the power is less than 2 watts forward power.
3. Press the "s" key for SWR tone, or the "p" key for power mode. When using power tone, the tone will increase in pitch as the power increases. The pitch will increase

about 20 Hz for each power increase of 20 watts. Press "s" key for SWR tone. The pitch will decrease as the SWR decreases toward 1:1 SWR.

With no RF present, the tone will be at it's lowest pitch for power or SWR. If the tone mode is enabled, you can press "s" or "p" for a voice announcement, then the tone will immediately resume. **Remember:** you must press the "t" key to enable the tone mode for either SWR or Power tone.

4. Press "a" to toggle the audio feature On and OFF.
5. Press "r" to reset the the SWR tripped condition. You must correct the SWR fault condition, or select another sensor, to prevent the SWR trip feature from activating again when transmitting.
6. Press the "h" key to access the Help file. An announcement is made when the the help file is ready to be read.
7. Press the "e" key to exit the Help file and return to normal operation.
8. If the SWR protection is tripped, an audible announcement will be made to alert the operator. When the SWR protection has been successfully reset, an audio announcement will indicate that.

8. CORRECT OPERATION OF WN-2m to COMPUTER INTERFACE

When the computer and WN-2d are communicating correctly, a green flashing indicator on the software screen will show. When the interface is not correctly working (power off, computer stopped, etc), the indicator will flash RED and a message is shown adjacent. This is useful for LAN or Internet connection to the host computer, since proper WN-2m operation can be monitored from a remote site when no RF power is present.

9. HOW TO VIEW ONLY ONE METER or SAVE SCREEN SPACE

Click directly on the meter you wish to view as a separate meter. A small view of that meter will pop up. Click on the small meter to create a large meter on the screen. Close the small meter if you don't wish to keep it on the screen. Then click the "Minimize" button at the top left of the main screen. This will hide the main screen, and only the one meter will be visible. SWR monitoring is still operating. When you want to view the main screen again, click the double-box button on the small window bar that is probably at the lower left of your screen.

At the bottom of the large meter, there is a checkbox labeled "Peak Hold". When checked, this will allow the meter to hold the maximum power levels detected, and hold them until the user clicks the "Reset" button. This allows the meter to act as an infinite-time, peak hold meter.

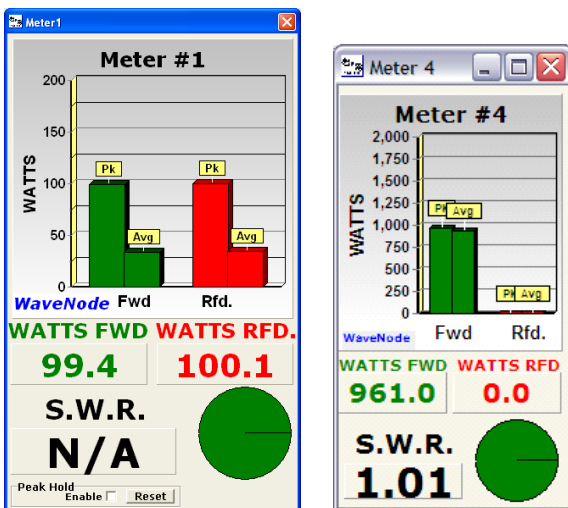


FIGURE #7 (Large or Small Meters)

10. THE STAND-ALONE GAIN GRAPH

This graph is opened by clicking on the bottom graph on the AUX #2 screen, the gain graph. This graph provides a large view of the gain scatter and gain time charts to allow easy viewing for amplifier tune-up. The sensors to be compared for gain are still chosen from the bottom chart on the Aux #2 page, but you can set the gain scale and stop/start the chart separately from the Aux #2 chart.

The two sensors being compared are shown at the upper-left as "GAIN = Sensor/Sensor" so there will be no confusion about which two sensors are being measured. The name you have chosen for your sensors on the configuration page will be shown on the "GAIN=" position.

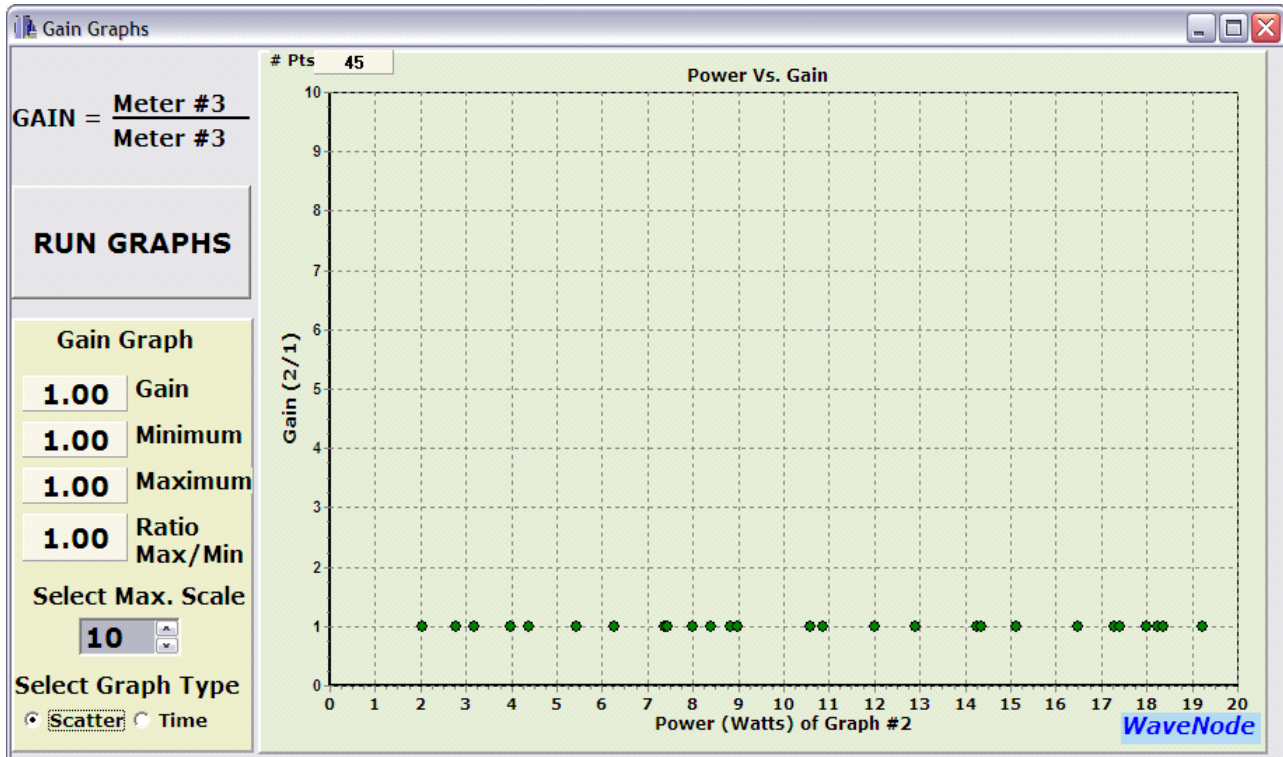


FIGURE #8 (Opened by clicking on Aux #2 Bottom Graph)

11. THE MINI-PANEL:

The Mini-Panel is opened by clicking on Mini-Panel on the Menu bar, or just click on the "Callsign" Panel. This is a small panel showing power and SWR on all meters. Click the "HIDE" and "SHOW" buttons to hide or view the main screen. The color bars on either side of each panel flash when RF power is present on that meter.

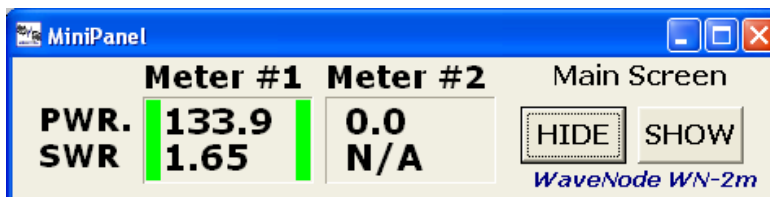


FIGURE #9

12. Horizontal and Vertical Bar Graphs

These graphs are to provide a fast visual indication of power in a minimum amount of screen space. The "Hide" and "Show" buttons allow the Main screen to be hidden quickly.

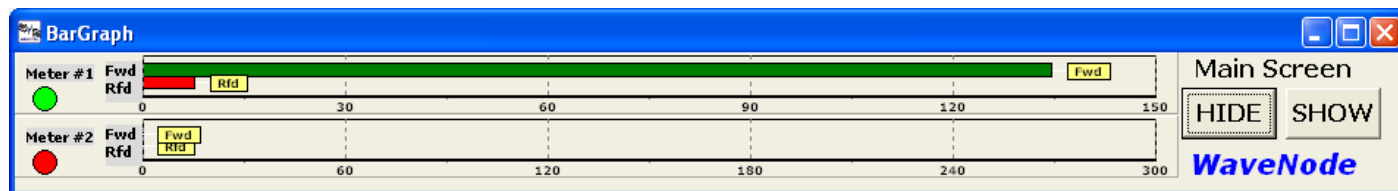
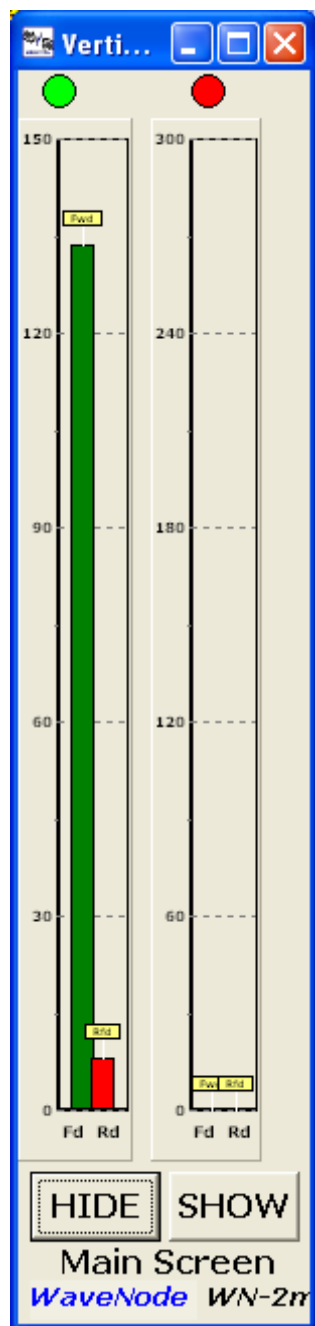


FIGURE #10 The Bar Graphs

13. Modulation Oscilloscope Operation

The modulation Oscilloscope allows the user to continuously monitor the waveform of the modulation present on the RF envelope. All the features found on a Digital Oscilloscope are available.

Vertical Gain: Select the appropriate gain button for your RF power to be observed.

Sensor: Select sensor #1 or #2 to be observed.

Scan: Changes color each time the scope display is updated.

Trigger:

Auto: Triggers the display at time=0.

Norm: Triggers when the data exceeds the trigger level chosen by the Trigger Level buttons.

Stop: Stops the scope to allow the user to examine the waveform.

Persistence: Saves 10 sweeps of the oscilloscope.

Main Page: Hides the Main Page.

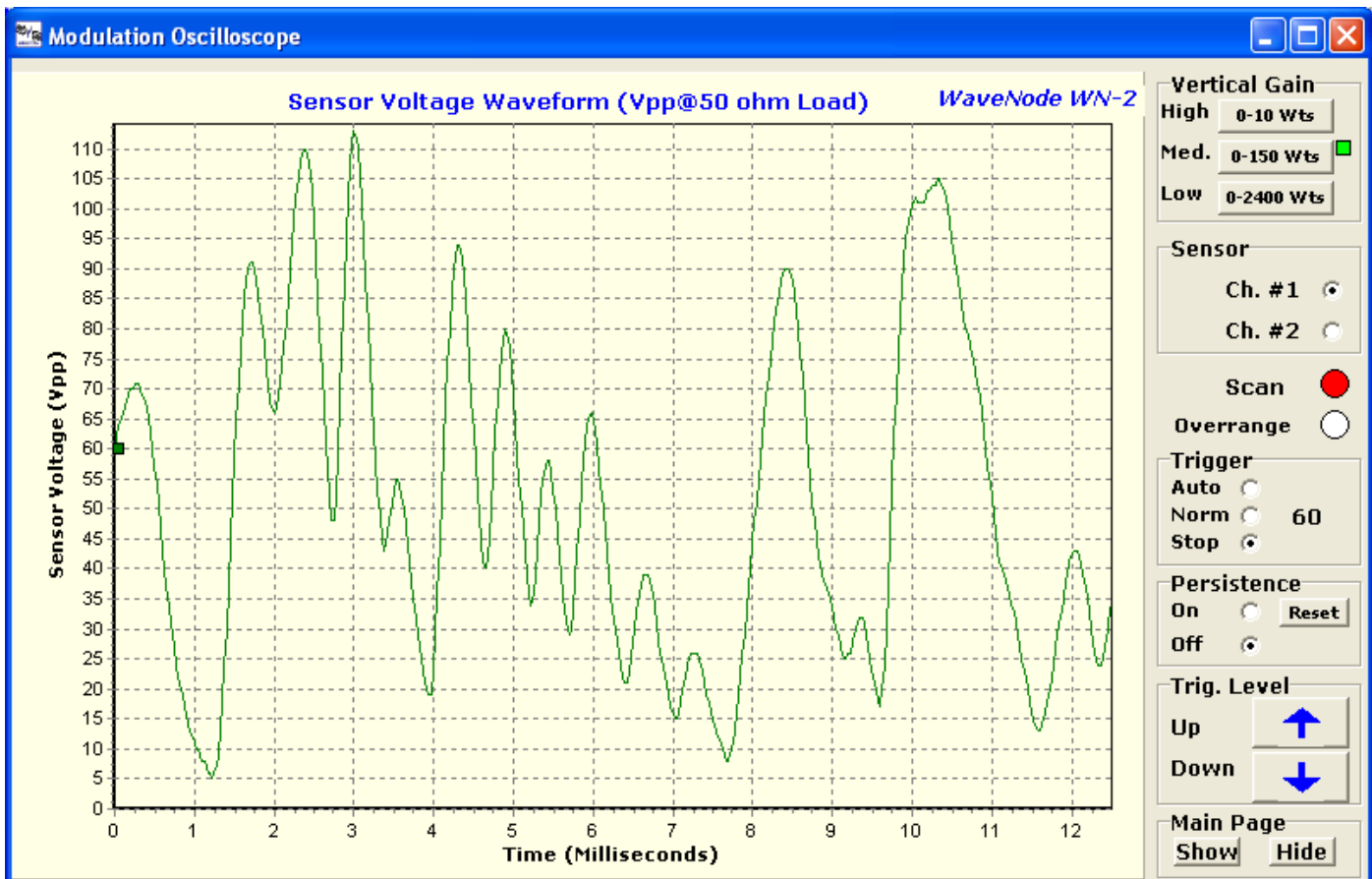


FIGURE #11 The Modulation Oscilloscope (SSB Speech Pattern)

14. Modulation Spectrum Analyzer

The Spectrum Analyzer displays the frequency spectrum of the modulation envelope. The analyzer does an FFT (Fast Fourier Transform) on 1024 sample points. This allows the operator to view the bandwidth of the transmitted signal directly on the coax sensors in real time. The operation of the spectrum analyzer buttons:

- Vertical Gain:** Select the gain appropriate for the RF level being measured.
- Sensor:** Select Sensor #1 or #2 to be observed.
- Horizontal:** Select the horizontal scale on the display.
- Trigger:** Select the trigger mode required. The Stop button allows the viewer to examine the data.
- Averaging:** Averages the data over 20 sweeps. This is very helpful for averaging the display with audio modes or when using the tones menu.

The analyzer allows the user to set transmitter bandwidth, power levels, and linear amplifier drive levels while monitoring the RF for undesirable splatter, intermodulation products, etc. The display below shows a typical SSB modulation spectrum with little or no energy above 2.4 KHz. Remember that each 10 db represents a 10:1 ratio of power.

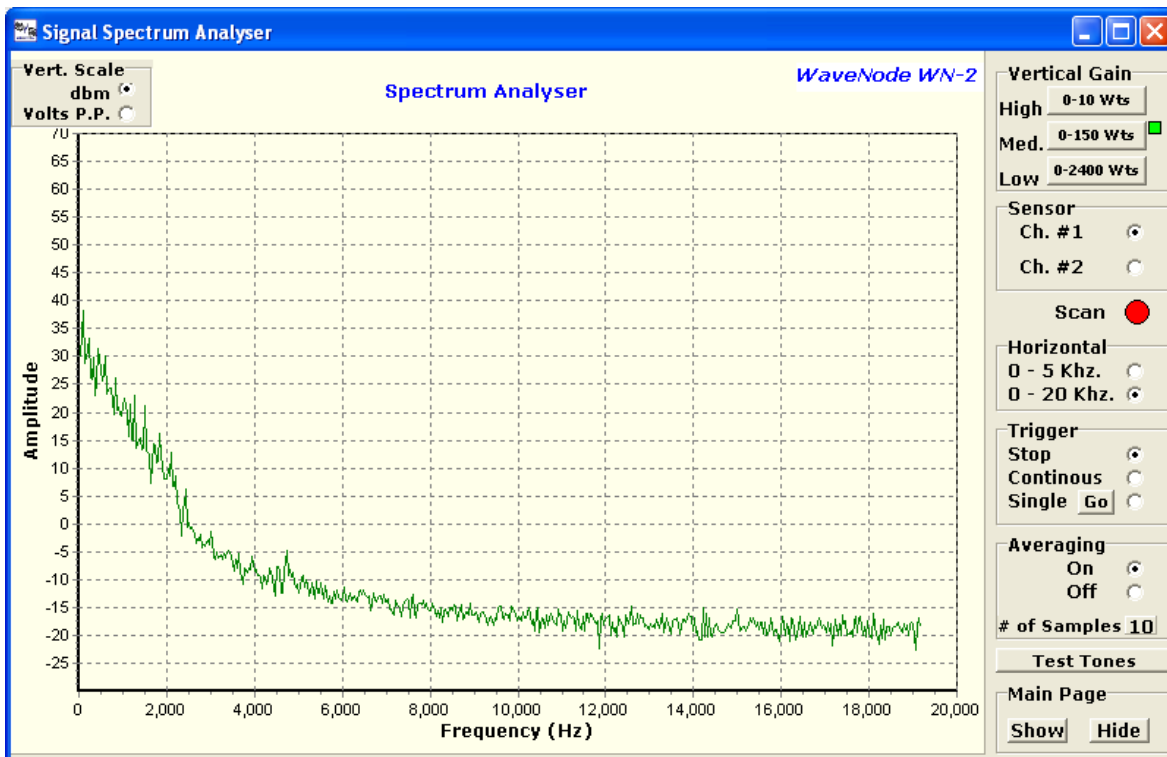


FIGURE #12 A typical SSB Modulation Envelope.

The Spectrum Analyzer has an additional screen labeled "ModView". This screen allows quick visual feedback of out-of-band power relative to the normal speech bandwidth of 0-3.2 kHz. Below is a view of the screen with normal AM or SSB modulation. Notice that the peak speech power between 400-800 Hz is at 47 dbm and the largest out-of-band energy is between 4.6-5.0 kHz at -8 dbm. A contextual "Help" button is provided that provides additional technical information about the screen and the measurement it is providing.

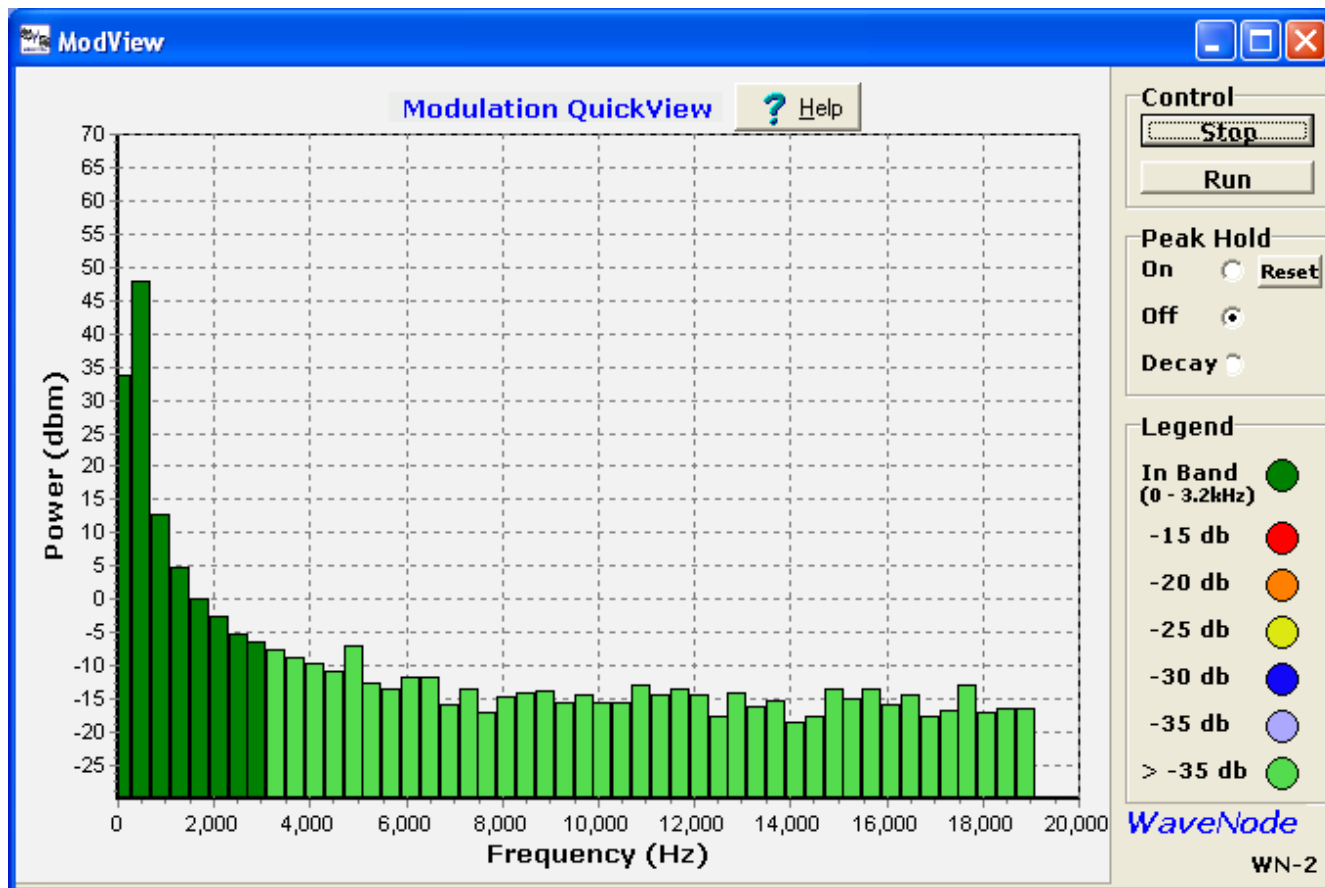


FIGURE #13. A typical SSB Speech Energy Plot.

15. The Tones and Messages Menu

This menu provides useful tones to use with the oscilloscope and/or Spectrum Analyzer. These are generated by the sound card in the PC and should be input to the transmitter in the same way audio in sent for digital modes. The tones will play for ~ 3 seconds in normal operation, but can be made continuous by checking the "Continuous" select box. The tone will continue until the "STOP" button is pressed.

Single Tones:

Three second sinusoidal tone at the frequency selected.

Tune Tones:

Three buttons that generate a sinusoid with different duty cycles. The 440/30Hz tone is a 440 Hz sinusoid modulated with 30 Hz half-sine pulses. This allows low duty-cycle amplifier tuning with minimum bandwidth.

Single Tone + Impulse:

A sinusoidal tone with 50 microsecond pulses superimposed. These tones are especially useful with SSB, since a single tone would produce only a steady RF level. The pulses insert audio energy from 200 Hz to 10 KHz.

Messages:

These are .wav files that the user can record for announcement, station ID or other purposes. These messages are files named "message_one.wav" through "message_six.wav". Use any PC recorder such as "Sound Recorder" to record your messages. Save the files with the file name in the Wavenode software folder.

The top Checkbox will sample the waveform five times and average. It will then stop the display so the data can be examined in the spectrum analyzer.

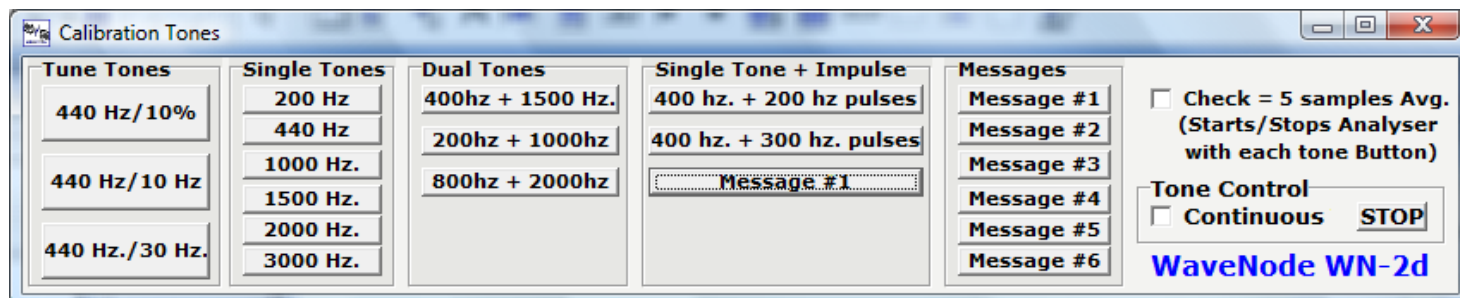


FIGURE #14: The Tones and Messages Menu

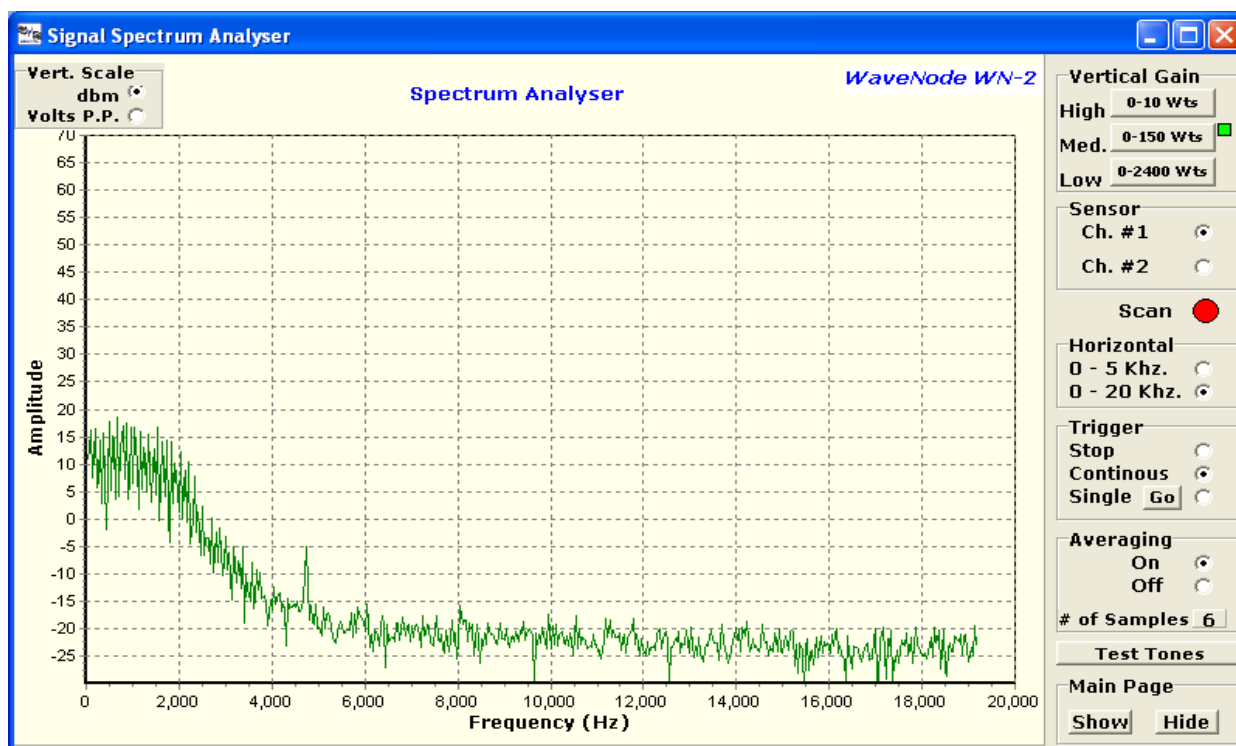


FIGURE #15: Modulation Envelope Using (400Hz + 200 Hz Pulses) in SSB Mode

The view in Figure #17 shows the Modulation Bandwidth using the 400Hz + 200 Hz Pulse tone. Note that the bandwidth of the transmitted signal is 20 db down at about 2.5 KHz. The display shows that no appreciable energy is transmitted above 2.5 KHz, which is desirable in closely-spaced band conditions.

16. **Data Logger Operation:**

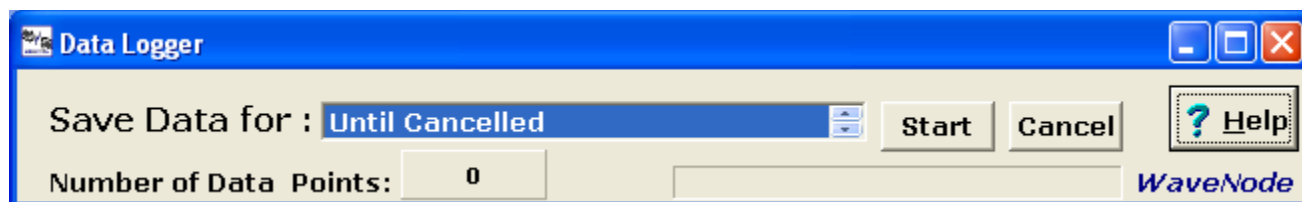


Figure #16. The Data Logger Screen

- A. The Data logger utility will capture the following data approximately one time each second. The data captured is time and date stamped at the beginning of each row of data. A maximum of 100,000 points can be captured in a single file, which allows the accumulation of data over a 7 day period. The data collected is:

Date and time
Peak Power Channel #1
Peak Power Reflected #1
Average Power Channel #1
Peak Power Channel #2
Peak Power Reflected #2
Average Power Channel #2

Total Accumulated RF Power #1
Total Accumulated RF Power #2

- B. The Data capture begins when the “Start” button is pushed, and ends when either the Cancel button is pressed, or the pre-selected number of data points has been reached. The data is stored in a file in the Wavenode program folder with the name “DataLog~date~time”.
- C. To bring the data into an Excel file for graphing, open the file using Excel. Excel will prompt you asking how to open the file:

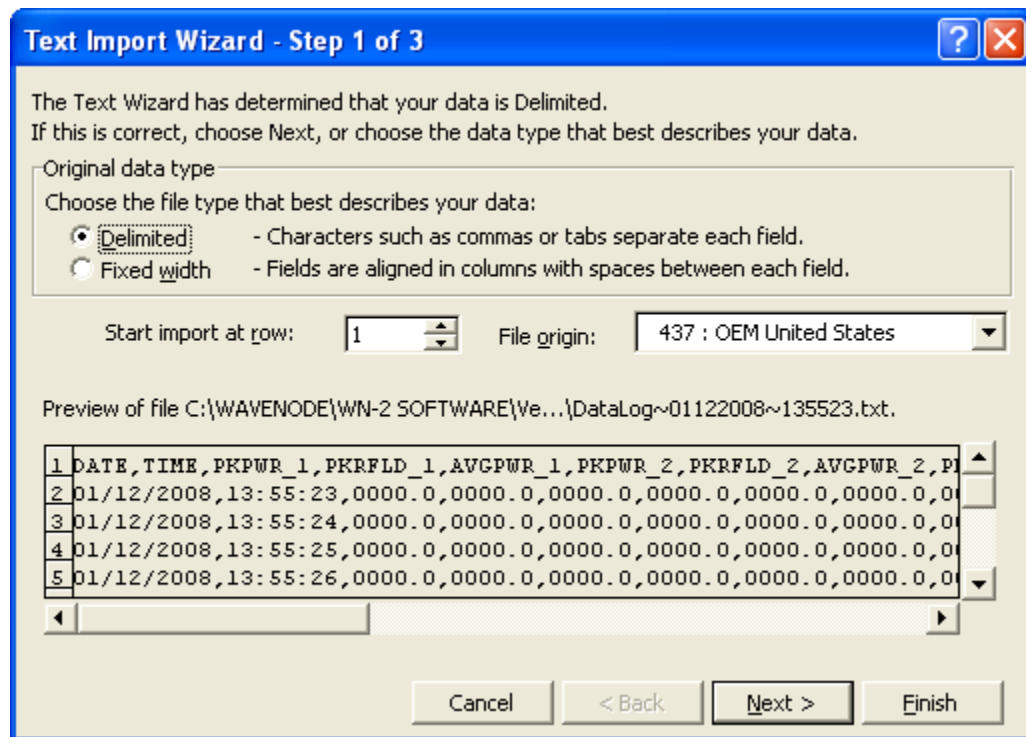


Figure #17. Opening the data file in Excel

When the data format screen is shown as in Figure #23, click the “Comma” box:

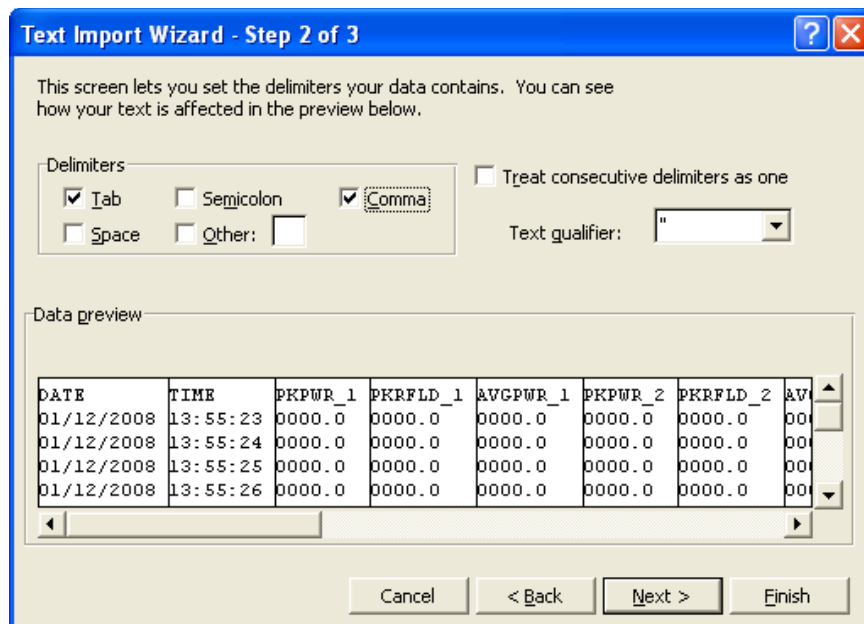


Figure #18. Opening the data file in Excel

Now the data is organized in rows of data for each time point. Use the Excel utilities to graph or organize the data in the desired format.

Example: Plot the Peak Power over the entire time of the data.

1. Import the data to Excel.
2. Click on the "B" column at the top box and while holding down the "CTRL" button, click the "C" column at the top. Both columns should be highlighted.
3. Click on the Graph Icon in Excel, then "XY(scatter)" selection. The graph is ready and can be labeled as desired.

17. Fault Email/Text Message Menu;

The WN-2 has provision to send the user a text or email when an SWR fault occurs. Select the Email item from the Menu:

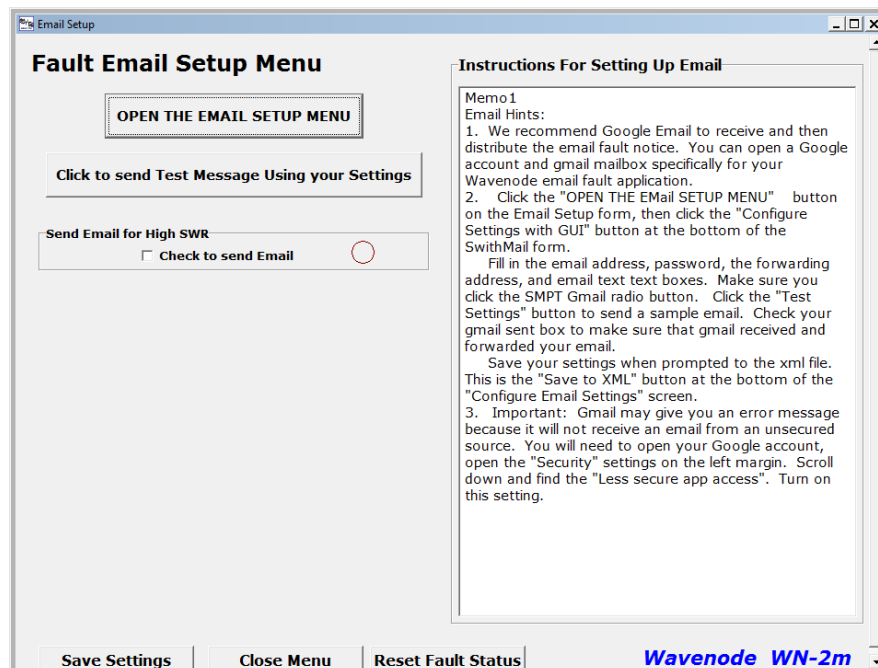


Figure #19. Email Fault Selection

Click the “Save Settings” button. Now click the “Open the Email Setup Menu” button. Click on the “Configure Settings with GUI” button. View Figure #20.

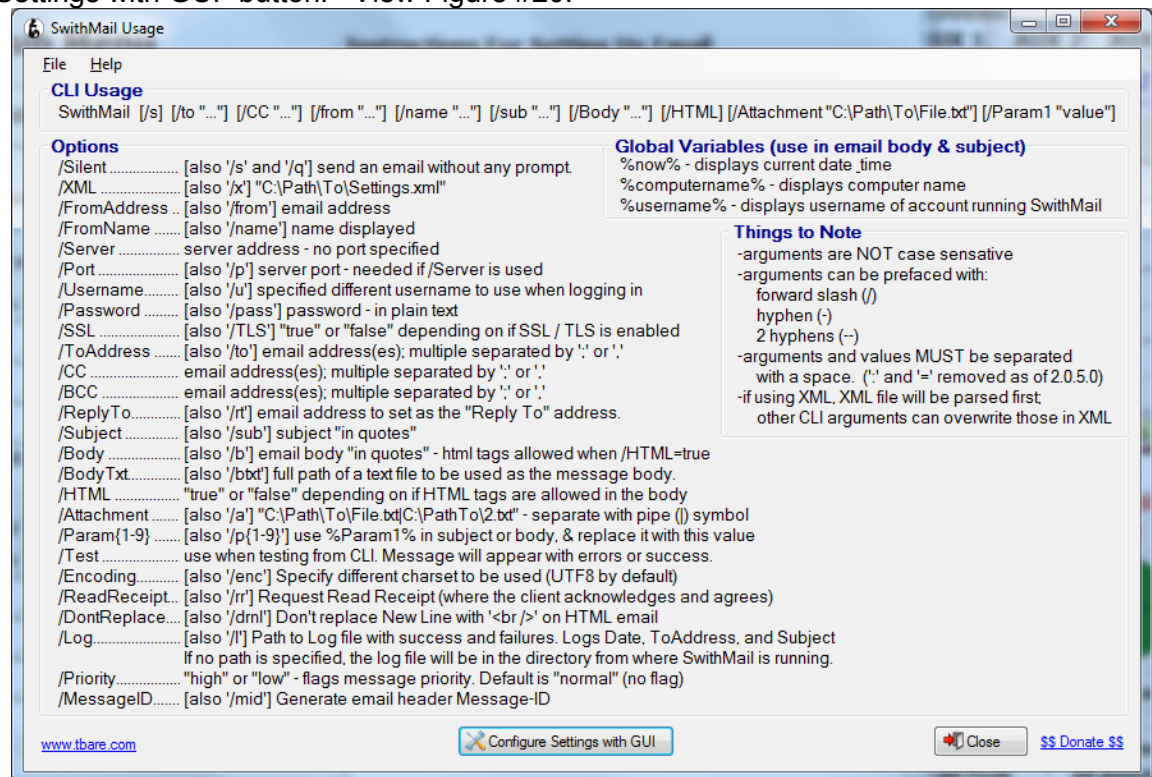


Figure #20. Email Usage

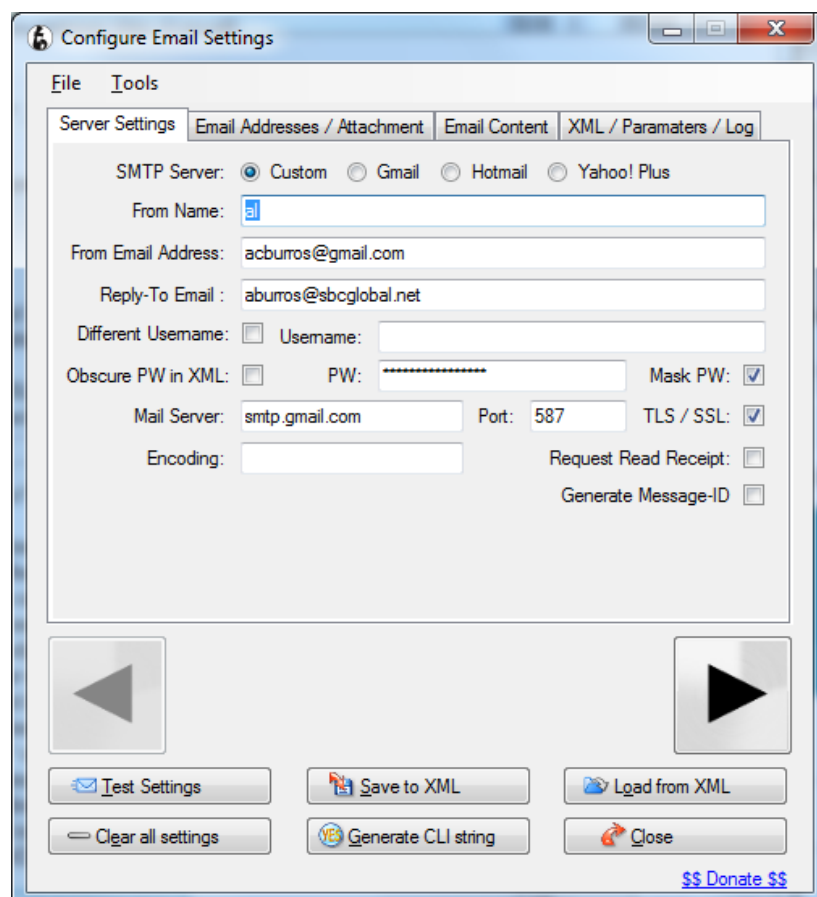


Figure #21. Email Settings

Viewing Fig. #21, fill in your email address/password to send the fault message to. Add message content as you like. When finished, click "Save to XML" to save your settings. Click the "Test Settings" button to send yourself a test email. We suggest using Gmail, but you will need to go to your Gmail account to reduce the security settings. You may want to open a new Gmail account just to handle fault emailing, then set that account to forward your emails to their intended recipients. If your test email was received, you are ready.

If a fault email is sent, you will see the message below in Figure #22. No new fault messages will be sent until you click "Reset". This prevents multiple messages being sent unnecessarily. Click the "Reset Fault Status" button to reset the indicated faults, and allow another fault email.

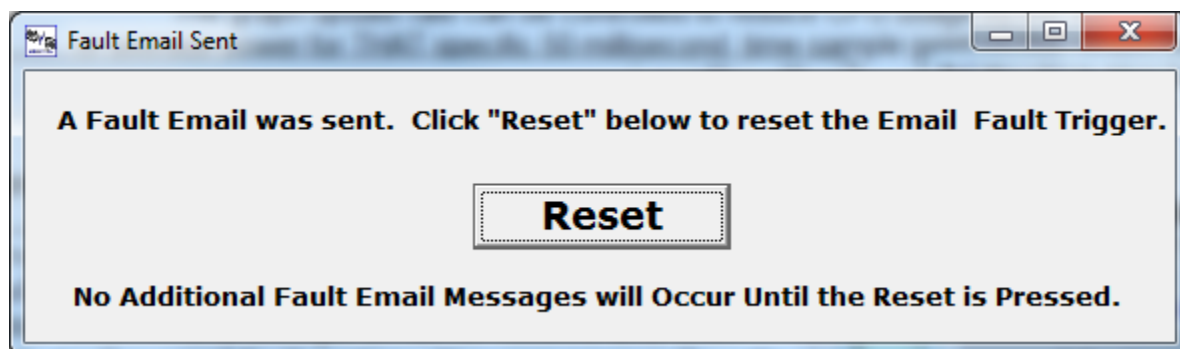


Figure #22

18. Specifications:

<i>RF Power measurement accuracy:</i>	<i>+/- 10% full scale. +/-5% @ 100 watts.</i>
<i>Power Requirements:</i>	<i>12-16 Volts DC @ 350ma maximum. (power supplied via standard 5mm connector)</i>
<i>PC requirements (if PC interconnect required):</i>	<i>Windows XP, 2000, Vista, OS7, OS8. USB interconnect. (USB type-A to type-B cable) supplied.</i>
<i>LCD Display:</i>	<i>Yellow Backlit, high contrast, 16X2 display. Data update rate 20X/second.</i>
<i>LED Display</i>	<i>Green 12-element Bargraph. 85 mcdl brightness.</i>
<i>Size and Weight</i>	<i>5.3 inches wide X 1.4 inches deep X 3.1 inches high. 1 pound (without sensors)</i>
<i>Peak detector capture time (full scale). Peak detector hold time</i>	<i>75 Microseconds 50 milliseconds to infinite (user selectable)</i>
<i>Modulation Oscilloscope update time. Viewing Bandwidth.</i>	<i>2 updates/second 20 Khz (-3db bandwidth)</i>
<i>Modulation Spectrum Analyser update time. Viewing Bandwidth. Resolution</i>	<i>2 updates/second 20 Khz. (-6dBm Bandwidth) 20 Hz.</i>
<i>Completely backward compatible with all WaveNode RF sensors.</i>	

19. Front Panel View and Operation:

A. Front Panel.

Power Switch: Powers the unit On and Off.

USB LED: Blinking LED indicates correct USB data transfer to/from the PC.

LCD Display: Displays the data that is selected by the "Display" button.

Display Button: Toggles the display each time it is pushed between sensor #1 and #2.

1. Sensor #1 Peak, Average power, and SWR.

2. Sensor #2 Peak, Average power, and SWR.



SWR RESET switch: Used to reset the SWR LED if it trips. Also, when held down, it will display to the user the following items:

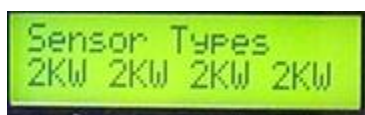
1. The sensor number and SWR trigger value to cause an SWR alarm .
2. The sensor types that the WN-2m has been programmed for.
3. The maximum bargraph power value.



View when "RESET" button is held down

Sensor #3 will trip the SWR relay if SWR exceeds 3.0

This sensor selection and trip level can be changed with the software running on host PC.



Sensor types for four RF sensors selected

These sensor types are selected on the Configuration Menu on the host software.



Power Range for the bargraph.

This is selected on the Configuration Menu on the host software.



The values shown in the photos above are saved in EEPROM when the RESET button is held down and the SWR LED blinks three times. The SWR trip LED will blink 3 times to indicate the new values are stored into the WN-2m internal flash memory.

These values can be modified ONLY by selection from the PC software.

The default programmed values are:

1. Sensor #1 is the SWR protected sensor and the trip SWR = 3:1.
2. The sensors types are all HF-1 or UHF-1 sensor.
3. The maximum bargraph power value is 1500 watts.

SWR TRIP LED: When lit, indicates the SWR trip level has been exceeded. It is important to remember that the sensor SWR being monitored by the WN-2m hardware is set to default sensor #1. Both, or none of the sensors can be the protected sensor, but it must be selected on the Main page of the WN-2m software. When monitoring SWR on the LCD display, the SWR being monitored is the same as the channel number at the right of the LCD display.