



**VERSION 1.0**

**USER'S GUIDE**

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## INTRODUCTION

This manual is divided into two main sections. Both sections are easy to read and provide valuable information for the most efficient use of SoftWave. It is not necessary to read the entire manual prior to installation and operation of your receiver. However it is very important to read GETTING STARTED and follow the installation instructions carefully.

The two main sections of this manual, and a brief description of their contents is as follows:

**GETTING STARTED.** This section provides an inventory list of what you should have received and a list of system requirements and specific instructions for proper installation of SoftWave.

**OPERATIONAL INSTRUCTIONS.** This section outlines specific instructions for the operation of SoftWave. It is purposefully written so that a novice user can take full advantage of the capabilities of SoftWave.

**CAUTION: The cable from SoftWave's DSP card must only be connected to the SoftWave external receiver module. This cable provides the power to the receiver. Serious damage could occur if this cable is connected to devices other than SoftWave.**

## HOW TO CONTACT COMFOCUS

Before beginning installation of SoftWave please fill out and return the registration card. This will allow us to serve you better when you call. By becoming a registered SoftWave user you will automatically be qualified for early releases and discounts on future upgrades.

If you are having difficulties installing the SoftWave DSP board, the Receiver unit, or the software, or if you have questions regarding the safe installation and use of SoftWave, please call our toll-free service line. Before calling the ComFocus service department, try to find the answer to the problem in this manual. If you cannot find a satisfactory answer in this manual and still need assistance, we encourage you to call. Be prepared to provide the following information:

- Your SoftWave Registration Number (on the bottom of the Receiver unit).
- The type of computer you are using: 386 / 386SX / 486, brand name, etc....
- Other peripheral devices connected to your computer: sound card, etc....
- Other electronic devices, (receivers, printers, TV's, etc.) located near your computer.
- The exact wording or error message which may have appeared on your screen.
- A description of what happened and what you were doing when the problem occurred.
- How you tried to correct the problem.

**COMFOCUS SERVICE:** 1-800 763-2750

If you would like to purchase another SoftWave version 1.0 package from ComFocus or would like to know the location of the nearest dealer, call our toll-free sales line:

**COMFOCUS SALES:** 1-800-763-8983

If you would like to contact ComFocus regarding other matters, please call our business office at:

**COMFOCUS OFFICES:** (619) 455-9934                      (619) 455-1259 (FAX)

Direct all written correspondence to ComFocus at:

ComFocus Corporation  
6160 Lusk Blvd., C-200  
San Diego, CA 92121



## WARRANTY

SoftWave hardware and software carry a warranty against defects in materials and workmanship for a period of one year from the date of purchase by the original user. During this warranty period, ComFocus will, at its option, either repair or replace components or products which prove to be defective.

Should ComFocus be unable to repair or replace SoftWave within a reasonable amount of time, a refund of the purchase price may be given upon the return of SoftWave to ComFocus. A Returned Merchandise Authorization number must be obtained from ComFocus prior to the return of any merchandise.

### Exclusions

The warranty on SoftWave does not apply to defects resulting from:

- Unauthorized modification or misuse.
- Removal of the front or back panels of the SoftWave receiver.
- Unauthorized integration with software manufactured by companies other than ComFocus Corporation.
- Use with cables other than the cable provided by ComFocus.
- Return of SoftWave in packaging other than the original packaging materials.

The warranty period begins on the date of customer purchase. If SoftWave fails during the warranty period contact the ComFocus service department at 1-800-763-2750.

If you do not have your original SoftWave packaging materials, call the ComFocus service department at 1-800-763-2750. Additional packaging materials will be sent to you for a nominal charge.

### Limitations

The warranty set forth above is exclusive and no other warranty, whether written or oral, is expressed or implied. ComFocus specifically disclaims any implied warranties of merchantability and fitness for a particular purpose.

## GETTING STARTED

Before you begin to use SoftWave, please read the following sections. These will help familiarize you with the items included in the product, the necessary requirements for your personal computer, and the most efficient method for system installation.

### *What You Received*

SoftWave Version 1.0 includes the following items:

- PC circuit card, also called the DSP board or simply DSP
- External Receiver unit (small aluminum chassis approx. 3.0 x 7.0 x 9.0 in.)
- Computer cable, 25 wire, 1 female, 1 male connector

**NOTE: Electrical power is provided to the external radio through this cable. Only this cable should be used with SoftWave. Do not connect this cable to any other computer device.**

- Registration Card
- SoftWave Technical Manual (this book)
- Floppy disk pack 3.5 inch disks (2)

All of the electronics have been carefully prepared at ComFocus and should reach you in excellent working condition. We calibrate and "burn-in" each unit to confirm that all systems are working **before** we ship.

## System Requirements

Installation of SoftWave requires the installation of the PC circuit card inside your computer and the loading of the software on your computer.

Recommended and required system configuration information follows in Table I:

Hardware/Software	Recommended	Minimum
DOS	5.0	3.2
Microsoft Windows	3.1	3.1
Processor	486	286
Coprocessor	Built-in, else 387 highly recommended	287
RAM	4 Megabytes	4 Megabytes
Disk Cache	500 kbyte min.	None required
Graphics	Super VGA 1024x768	VGA
Mouse	Required	Required
Hard Disk Space Required	6 Mb	6 Mb
Expansion Slots	1	1
Power Supply	From your PC	From your PC
Antenna	Better antenna will improve station reception. Std 50 ohm BNC female connector	Whip antenna

Table I. Minimum System Configuration Guidelines

SoftWave has been designed to properly function with MS-DOS 3.2 and higher. MS-DOS 5.0 or higher is recommended.

Unlike many add-on PC boards, the SoftWave DSP board **does not use** interrupts, DMA channels, or the high memory area. This was purposely done to minimize conflict with other installed hardware. SoftWave does use memory mapped input/output with a base address of 0x300. The base address is switch selectable on the DSP board. You must contact ComFocus for instructions on changing this setting.

SoftWave has been designed to properly function with Microsoft Windows version 3.1 and higher.

### ***Recommended Computer Resources***

SoftWave will operate on personal computers which use at least an Intel 286 microprocessor. Operation on 386 machines and particularly the 486 is encouraged. The built in spectrum analyzer function will operate much faster if a coprocessor is resident.

**Because SoftWave performs most of its processing on its own DSP, the speed of your processor does not affect the performance of the radio.** A slower PC will only affect the screen update rate for the spectrum analyzer, wideband spectrum analyzer, oscilloscope, and signal constellation.

Most systems sold in the last few years are based on the Intel 486 microprocessor and come with MS-DOS 5.0 or 6.0 and Windows 3.1 pre-installed. These systems are ideal for SoftWave

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## INSTALLATION

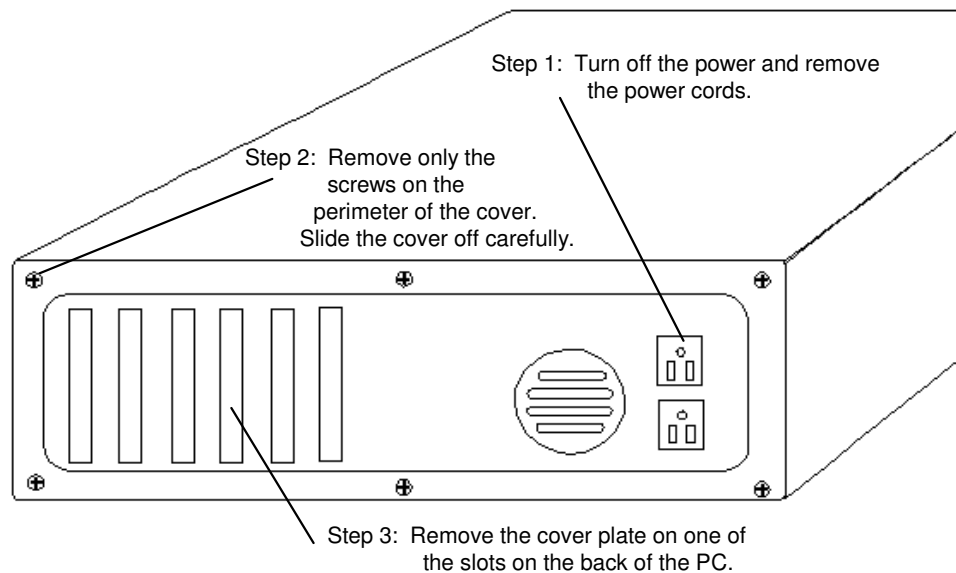
### ***Before you begin installation***

1. Read this entire chapter.
2. Have the manual on your personal computer available for reference. Review the chapter or section on removing the cover from your PC and installing an add-in card.
3. Unplug all power sources to your PC **now** so your PC's power supply will have time to discharge any residual charge.

### ***DSP Board***

Please take your time installing the DSP board in your computer. The procedure is fairly simple, however it is possible to cause injury to yourself or damage to your computer if you are not careful. If you follow the steps given below, the card should be installed in about 15 minutes.

1. Turn off the power to the computer and remove the power cord from the back panel. It is important to keep the power cord disconnected at all times during installation of the DSP board. If the power has been just turned off, residual charge will be present in the computer power supply. Therefore, to minimize any risk, it is recommended that the computer power remain off for at least 15 minutes prior to installation.
2. Remove the screws holding the cover on the computer. There are usually four, sometimes five or six, on the back and along the edge. It should not be necessary to remove all the screws on the back of the computer, just the screws that are used to secure the cover. Some computers have additional screws on the back cover - these hold the PC's power supply in place. Gently slide the cover off the computer.
3. Notice that several circuit boards or "cards" are nested in slots and connected to the back of the computer. Locate an empty full size slot with plenty of room around it for the installation of the DSP. Remove the one screw and cover plate at the back of the computer which corresponds to the slot. Save the screw, it will be needed for the DSP board. You should now have enough room to completely install the DSP board. Ideally, install the DSP board in a slot that is the farthest from the video board.



4. Slide the DSP board into the slot. Make sure that the electrical contacts on the edge of the DSP board line up with the contacts in the slot. Slowly and firmly push the DSP board into place.
5. Replace the screw taken out with the cover plate. The DSP card should now be tightly secured inside the computer. For best grounding results this screw should be replaced tightly. Otherwise excessive electromagnetic interference (EMI) may result which could impair your signal reception. Make sure that there are no open slots on the back of the computer.
6. Replace the cover on the computer. Tighten each of the screws to secure the cover.
7. Do not install the power cord to the computer just yet. Wait until the receiver is installed.

You are now ready to install the receiver.

## ***Receiver Installation***

Before installing the receiver make sure that the power cord is still disconnected from the back of the computer.

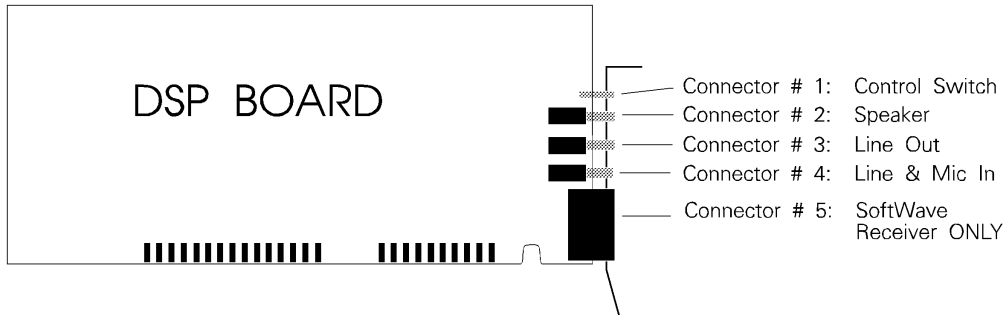
1. Choose a spot to place the receiver. It can be located next to your monitor or computer, or even under a desk. It is not necessary to place the receiver in the line of sight of the operator.
2. Connect the SoftWave receiver cable to the back of the receiver. **Do not connect this cable to any device other than SoftWave's receiver. Serious damage could occur to other devices if they are connected to SoftWave's DSP card.**
3. Connect the other end of the cable to the RS-232 connector on the DSP board, which should now be visible at the back of the computer. Secure both ends of the cable tightly. The DSP board will be distinguishable from other boards by the row of jack-type connectors on it.
4. Reattach the power cord to the computer.

## ***Connecting the Speaker to the DSP Board***

The SoftWave DSP Board has 5 connectors which are accessible at the back of the PC. Beginning at the top, the connectors are as follows:

- Connector # 1: Control 3/32" (2.5mm)
- Connector # 2: Speaker Out. 1/8" (3.5mm)
- Connector # 3: Line Out 1/8" (3.5mm)
- Connector # 4: Line In / Microphone In 1/8" (3.5mm)
- Connector # 5: SoftWave Receiver ONLY

Connectors 1 through 4 are designed for a standard banana plug. Connector # 5 is designed for the special RS-232 cable provided with SoftWave.



Connect the speaker to Connector # 2, the second from the top, as shown above.

Sit back and get comfortable, the hard part is over. You are now ready to install the software.

## Software

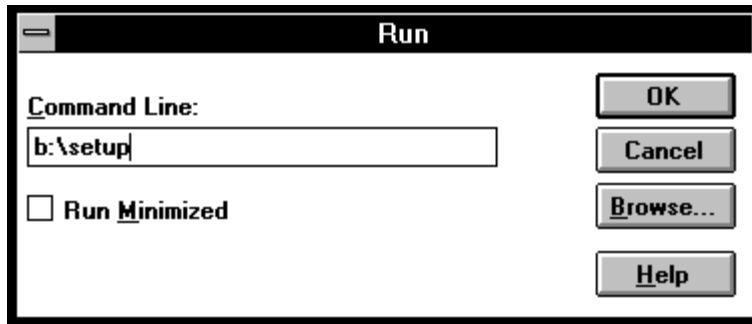
To load the SoftWave software:

1. Turn on the computer. Many computers begin with Windows immediately. If yours does not, start Windows by typing WIN after the prompt (C>WIN). Windows begins with "Program Manager".
2. Use the mouse to point to the word FILE and click it once. Your screen should look like this:

File	
<u>N</u> ew...	
<u>O</u> pen	Enter
<u>M</u> ove...	F7
<u>C</u> opy...	F8
<u>D</u> elete	Del
<u>P</u> roperties...	Alt+Enter
<u>R</u> un...	
<u>E</u> xit Windows...	

3. Point the mouse to the word RUN and click it once. A "command box" appears and the cursor is blinking on the line.



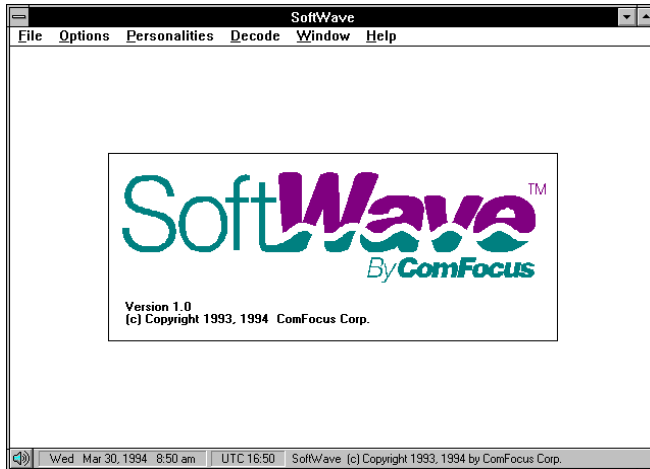


4. Insert Disk 1 into the disk drive on the computer.
5. At the command box type either A:\SETUP or B:\SETUP , depending upon the drive containing the SoftWave setup disk.
6. Follow the directions on the screen to complete the installation process.

## HOW TO TURN THE RECEIVER ON

Before SoftWave will operate, all components must be installed correctly. Please refer to the installation instructions in the "Getting Started" section for detailed information on installation. Once the installation is complete you can start SoftWave.

1. Turn on the computer.
2. Enter Windows. Many computers start directly with Windows. If your computer begins with DOS, you will see C>. Type WIN and press Enter. The Windows program will begin and stop at the Program Manager screen. The top "menu bar" looks like this:
3. The Program Manager screen shows "icons" for each of the individual Windows programs. Find the SoftWave "icon", use the mouse to point the arrow to it and double click.



At the top of this entry screen is a menu bar with the following selections:

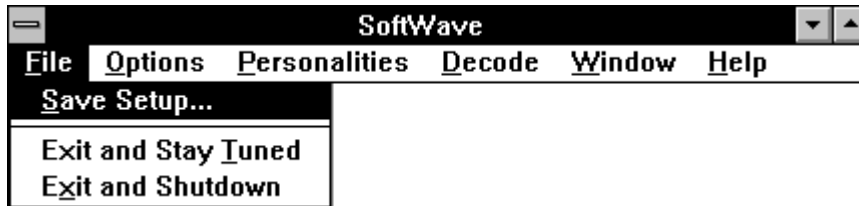
**File Options Personalities Decode Window Help**

Hold the left mouse button down and move the arrow across the menu bar. You will notice a variety of choices under each item. SoftWave includes six separate receiver products called "Personalities". To begin SoftWave you first need to select one of the "Personalities".

## HOW TO TURN THE RECEIVER OFF

You can exit SoftWave several ways. You can exit SoftWave the same way you exit Windows:

1. Click the minus sign ("close box") in the top left corner of the screen.
2. Click "Close" to exit SoftWave and return to the Windows Program Manager screen.



### ***Exit and Stay Tuned***

You can exit SoftWave by selecting one of two choices on the "File" menu. If you select "Exit and Stay Tuned" the SoftWave receiver will continue to operate after Softwave unloads. At this point you can work with other Windows applications such as spreadsheets or word processors. Please note that you do not have to exit SoftWave to use other programs. You can simply "minimize" SoftWave (by clicking the down-arrow in the upper right corner) or leave it in the background. SoftWave is fully Windows compliant.

Using Exit and Stay Tuned, you can work on the computer and listen to SoftWave at the same time. Since SoftWave uses the DSP board for most of the computations, the processing power of the computer is free for other applications.

### ***Exit and Shutdown***

If you select "Exit and Shutdown", SoftWave will turn off the receiver and return to the Program Manager screen.

## Save Setup

Perhaps you want to listen to the same station at the same time each day (or at different times) and don't want to go to the trouble of changing each of the receiver settings every time you turn on the receiver. With SoftWave you can save individual receiver settings for your favorite programming.

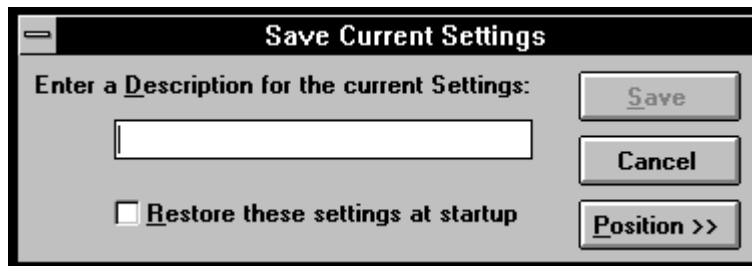
For example, say you like to listen to the BBC News in the morning. Start at the Communications Radio and tune to the desired frequency. (You can use Select Stations on the Option menu to choose the best frequency). Optimize the filter setting, the AGC, Volume, High and Low Filters and other controls. Now that the settings are exactly the way you want, you can use Save Setup to store the settings for future use.

To save the current settings:

1. Select File from the top menu bar.
2. Select "Save Setup". The window shown below will appear.
3. Type a description for the current setting. You may enter up to 40 characters.
4. Click "Save" to save the named setting.

Softwave can save up to 5 sets of settings. If you click the "Position" button on the Save Setup dialog you can decide which one of the five "slots" you want to save in. Or you can let SoftWave decide for you.

You can also click the "Restore these settings at startup" checkbox if you want the current settings to be restored whenever you start SoftWave.



# OPERATION INSTRUCTIONS

## PERSONALITIES

SoftWave, version 1.0 includes six different radio products or "personalities". Each has different characteristics. Some features are unique to one personality while other features are common to several. For example, SoftWave takes some of the best features of a top of the line shortwave receiver and implements them on the VHF Receiver.

Depending on the extent of your knowledge and interest in wireless communications, you will probably use the Communications Radio or VHF Radio first. However, to begin the discussion of personalities, we will start with the AM Radio.

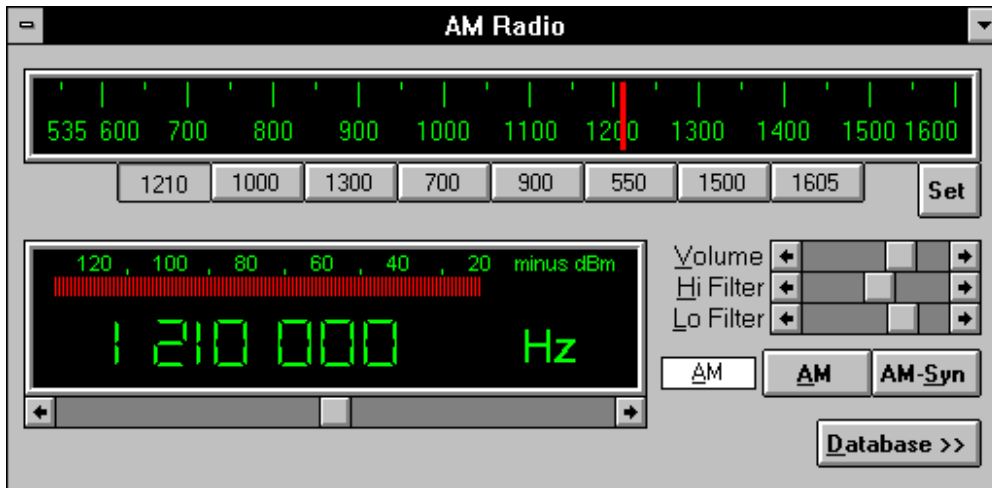
### THE AM RADIO

To start the AM Radio:

1. Pull down the Personalities menu.



2. Select the AM Radio by clicking with the left mouse button on the words AM Radio. The AM Radio will appear.



For information regarding the Audio settings and the AM or AM-Syn demodulators, see the Communications Radio section of this manual.

### ***Tuning the AM Radio***

There are five different methods of tuning the AM Radio

- Click the mouse in the AM-band Display
- Type the frequency
- Click a station preset (or use Alt + 1 to Alt + 8 to select a preset)
- Use the AM Database
- Use the frequency scroll bar

#### AM-Band Display

The AM-Band Display is that part of the AM Radio which looks like your old car radio. You can tune the radio by clicking the left mouse button in this display panel. This is especially helpful for quick changes.

#### Type the Frequency

You can type the frequency using the 10-key keypad or regular numbers on your keyboard. The frequency can be entered with the cursor in any location on the screen. The cursor does not need to be in the digital frequency display.

If your cursor is not in the frequency display, then when you begin typing a frequency, the cursor will jump to the left-most position in the display (ie. the 100 Mhz spot).

---

Note that the frequency display will attempt to keep your typed frequency within the 535 to 1610 AM band.

### Station Presets

SoftWave's AM Radio personality comes with 8 station preset buttons. To use a preset, simply click on it or press Alt + 1 through Alt + 8 (press and hold the "Alt" key while pressing a number 1 to 8 above the keyboard, not on the keypad).

To set the station presets:

1. Tune the radio to the desired frequency.
2. Click the "Set" button
3. Click the preset button you wish to set.

Note that when SoftWave ships, the presets are set to "?". The question mark will disappear as soon as you set the preset.

### The AM Database

SoftWave's AM Radio includes a database of all broadcast AM Radio Stations in the United States, Canada, Mexico, Cuba and the Caribbean. Over 5000 stations are included. The database is normally not shown. You can show the database by clicking the "Database >>" button (or pressing Alt+D which is the hotkey for that button). The AM screen will expand to show the entire AM database in frequency and station order.





## THE COMMUNICATIONS RADIO

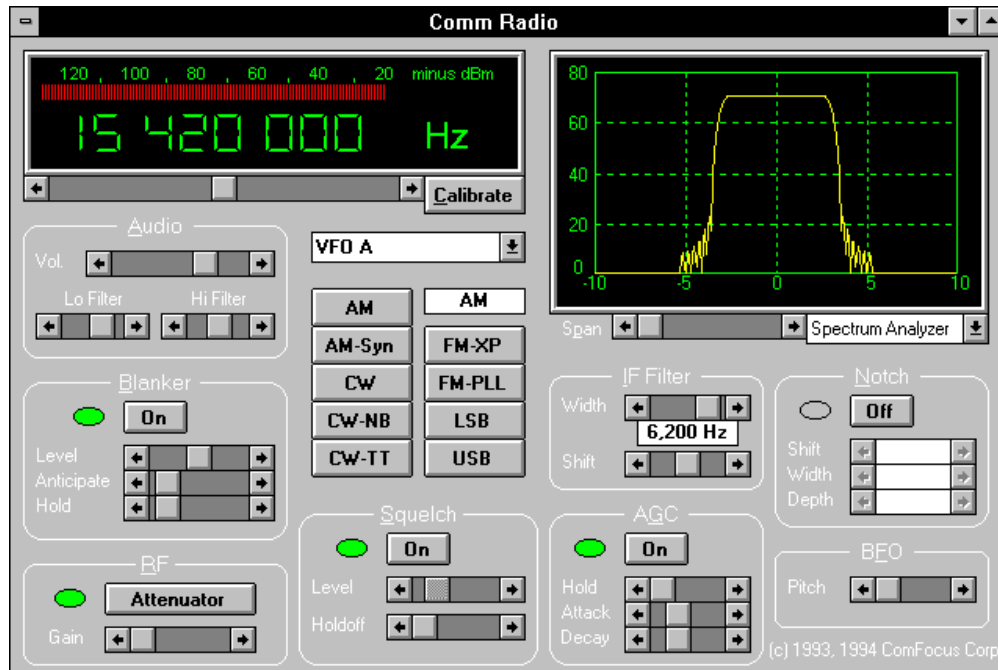
To start the Communications Radio:

1. Pull down the Personalities menu.



2. Select "Communications Radio". The entry screen will be replaced by the Communications Radio.

The Communications Radio will fill the screen at a resolution of 640 x 480. This radio will also operate at other screen resolutions such as 800 x 600 or 1024 x 768. The higher resolution may be desired if you want to overlay SoftWave on another screen. For a more detailed description of using different screen resolutions or combining several Windows programs on the same screen, refer to your Windows manual.



### ***Tuning the Receiver***

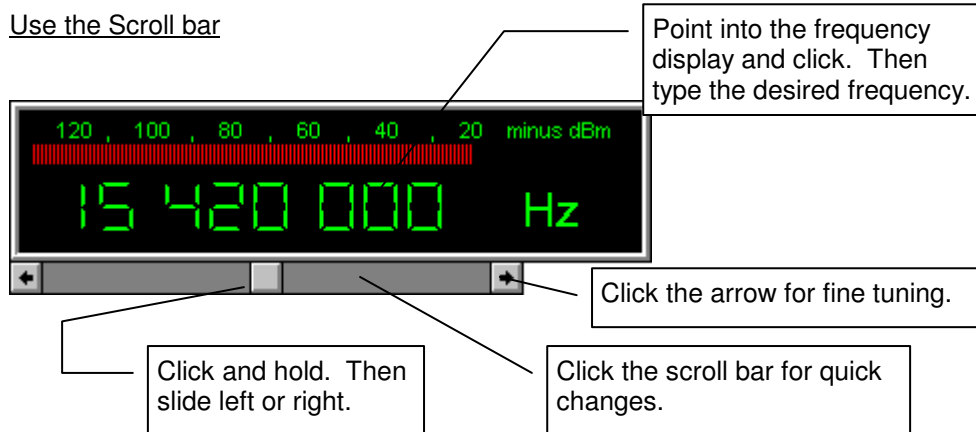
There are four methods of tuning the Communications Receiver:

- Type the frequency
- Use the scroll bar
- Use the "Select Stations" dialog on the Options menu
- Click on the Spectrum Analyzer.

#### Type the Frequency

The easiest method of tuning the receiver is simply to enter the desired frequency using the 10 key keypad on your keyboard. It is not necessary to type with the cursor in the frequency display. You can type the desired frequency with the cursor in any position on the screen. As you begin typing, the cursor will jump into the frequency display at the left-most position.

Please note that the backspace key does not work in the frequency display. Use the left arrow, right arrow, home, and end keys to move the cursor within the display.

Use the Scroll bar

The receiver can also be tuned using the scroll bar under the frequency display. This scroll bar can be moved three ways:

1. Point the mouse to the button shown in the center of the scroll bar above -- the scroll "thumb." Click the left mouse button and hold it down. While holding the button down, move the mouse left or right. As you hold the scroll thumb out, the frequency will continue to change. The size of the change is variable. The greater the distance from center the thumb is moved, the greater the rate of frequency change. So, for example, if you hold the scroll thumb slightly off center your frequency will change by 10 Hz. A little further and it will change by 100 Hz, 1 kHz, 10 kHz, etc.... Note that if this scrolling is too fast for your taste, you can change the rate of tuning on the "Miscellaneous Options" dialog found on the "Options" menu.
2. Point and click on one of the arrows at the end of the scroll bar. The frequency will change in 10 Hz steps.
3. Point and click on the scroll bar itself between the scroll thumb and the arrow. The frequency will change in increments 1 kHz.

Use the "Select Stations" dialog on the Options menu.

The third method of tuning the Communications Radio is by using the Select Stations Option. This option allows the user access to SoftWave's database of world wide shortwave programming. To select a station from the database, click OPTIONS at the top menu bar. A drop down menu will appear. Choose SELECT STATION to open the database. For detailed information on the use of the Select Station Option, please refer to the section on Options, later in this manual.

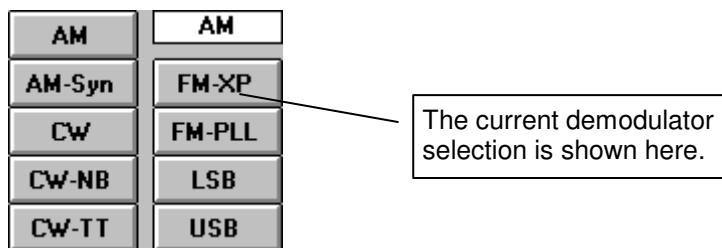
### Click on the Spectrum Analyzer

The fourth method of tuning the Communications Radio is by clicking directly on the spectrum analyzer. The radio will automatically tune to the frequency you clicked on. This is especially helpful for fine-tuning. Just click on the signal carrier and SoftWave will center it for you.

## **Demodulators**

SoftWave has seven different demodulators which provide the user a variety of listening options.

The demodulator selection can be changed by using the mouse to point and click on the desired demodulator. The presently selected demodulator is displayed in the box at the top of the columns.



Each of the demodulators have specific characteristics and default settings. When you change demods, SoftWave will automatically configure the other radio controls to the standard settings for the new demod. For example, when you select LSB or USB, SoftWave automatically engages the Notch over the signal carrier.

AM: Standard AM envelope detector.

AM-Syn (AM Synchronous): Synchronous detection is a superior means for detecting very weak AM stations which would otherwise be garbled using the AM detector.

CW: A transparent mode which is unlike any found on normal radios. Helpful for finding general unknown signals. In CW mode, the Hi and Lo filter scroll bars are disabled.

CW-NB (CW - Narrow Band): Sophisticated narrow band Morse code mode with adjustable bandwidths from 690 Hz down to 49 Hz. The frequency of any

audible CW signal may be changed by adjusting the beat frequency oscillator (BFO) scroll bar. In CW-NB mode, the Hi and Lo filter scroll bars are disabled.

**CW-TT (CW - Tone Tag):** SoftWave's automatic Morse decoding capabilities make it possible to listen to a highly processed version of the CW signal. This processing automatically tracks the incoming signal frequency and detects whether or not dots and dashes are present. When a signal is detected by the processing, a perfect noise free audio tone is output over the speaker. Regardless of signal fading, noise, or slight frequency changes, the output quality remains constant so long as the received signal exhibits a minimum required signal strength. In CW-TT mode, the Hi and Lo filter scroll bars are disabled. Like CW-NB, the pitch of the audible tone may be changed using the BFO scroll bar.

**FM-PLL:** The standard SoftWave FM demodulator is based upon coherent processing using a phase-locked loop. This approach delivers superior audio fidelity and linearity. In FM-PLL mode, the IF filter width is locked at 11 kHz and the IF Shift scroll bar is disabled.

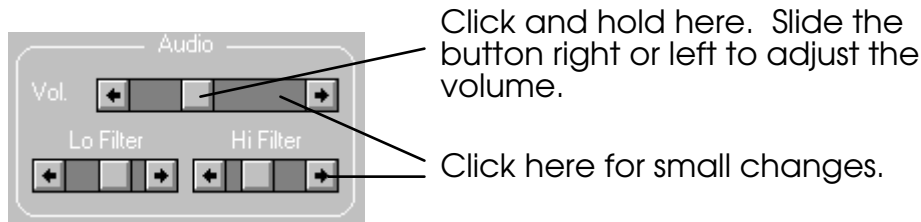
**FM-XP:** The cross product FM demodulator is recommended for use under severely poor signal-to-noise ratio conditions where the level of impulse noise is unacceptable to the FM-PLL demodulator.

**LSB (Lower Side Band):** Signal processing techniques are used to realize very sharp sideband filtering and demodulation. The notch filter is automatically engaged in this mode to heighten carrier rejection. This mode can also be used for AM reception under poor signal conditions. In LSB mode, the IF filter width is limited to 5.5 kHz maximum.

**USB (Upper Side Band):** Same as LSB, but the upper rather than the lower sideband is demodulated.

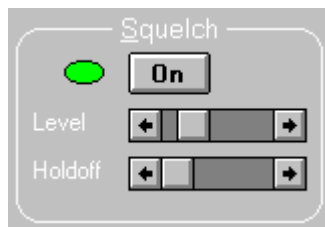
## Audio

The audio section of the Communications Radio gives the user control of the Volume, High Filter (treble) and Low Filter (bass) functions. The scroll bars can be adjusted vary the audio tone controls over a wide range. Cut & boost range for the bass and treble portions both span  $\pm 15$  dB. When either the Hi or Lo filter scroll bars are centered, the filtering is effectively turned off. To center one of these scroll bars, move the scroll thumb all the way over to the left then click on the scroll bar between the thumb and the arrow until the thumb looks centered. You should hear the filter turn off when you hit center.



## Squelch

The squelch control is used primarily with FM communications to disable the audio output during time intervals when the signal is extremely weak or absent.



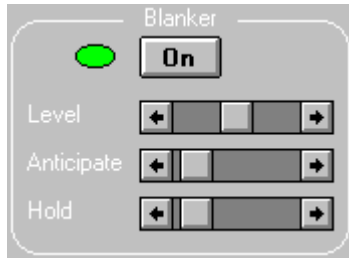
The Level control is calibrated in minus dBm -- which corresponds directly to the signal strength indicator at the top of the frequency display (see "Tuning the Receiver" above). When the scroll thumb is on the left side, it is at -130 dBm. Clicking on the scroll arrow will change the setting by 1 dBm. Clicking on the scroll bar beside the thumb will move it by 10 dBm.

For example, to squelch a signal that has a -110 dBm noise floor, move the Squelch Level scroll all the way to the left. Then click on the scroll bar (not the arrows), two (2) times. This will move the squelch level from -130 to -110. Then use the right

arrow on the scroll bar to pull the squelch level up two or three times to set it around -108 or -107.

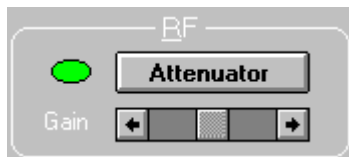
## ***Blanker***

The blanker function is normally used with AM and LSB/USB modes to mitigate severe impulsive noise like that from a car alternator, electric vacuum cleaner, etc. The blanker function uses a dynamic threshold computed within the DSP. The threshold may be varied with the "Level" scroll bar.



The anticipate control allows each blanking interval to be initiated before any portion of a noise impulse actually reaches the speaker. The hold function can be used to extend the blanking interval as desired beyond the disappearance of any noise impulse.

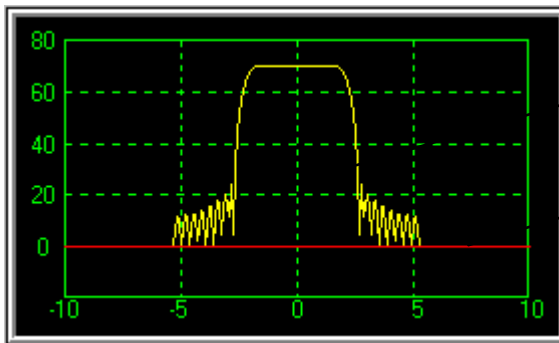
## ***RF Attenuator and RF Gain***



The RF Attenuator attenuates the entire signal -- noise and carrier alike. The attenuator is automatically engaged by SoftWave whenever the signal strength goes over -35 dBm.

The RF gain control makes it possible to limit the maximum receiver gain which the radio will use. This feature is primarily for those who wish to receive strong signals only. Normally the Gain should be set to the left-most position.

### ***Narrowband Spectrum Analyzer***



The filter bandwidth is displayed in yellow.

The received signal is displayed in red.

SoftWave is the first computer-based digital receiver featuring a spectrum analyzer. The spectrum analyzer shows the received signal spectrum in "real time". This means that there is very little delay between what is heard and what is shown on the screen. The user can see not only the desired signal, but also any unwanted signals or "noise" which may be close to the received signal. The spectrum display makes it easy to use the notch filter to eliminate any strong nearby sinusoidal carrier, or to adjust the receiver filtering to mitigate severe noise occurring in parts of the received spectrum. The spectrum display can be zoomed in or out using the scroll bar below the display. The spectrum span can be varied from +/-10 kHz to +/-200 Hz.

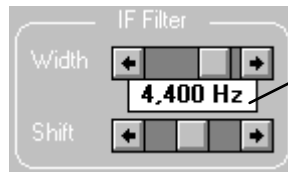
Depending upon your PC monitor and your antenna configuration, you may hear a rhythmic click in the audio output that coincides with a new spectrum sweep. This indicates poor or improper shielding of your antenna. It is picking up a broadband EMI burst from your PC monitor and relaying it to SoftWave as a noise burst. If you are unable to properly shield your antenna from this, you can adjust the rate of the spectrum update on the "Miscellaneous Options" dialog box on the Options menu. Slowing the plot speed down will slow the click sound. You can even turn off the spectrum completely from that dialog box.

### ***Oscilloscope and Signal Constellation***

The pulldown list below the narrowband spectrum analyzer also allows you to switch the screen into Oscilloscope or Signal Constellation mode.



## IF Filter



The current filter setting is displayed below the slider.

The IF (Intermediate Frequency) Filter can be adjusted to improve listening. The filter is overlaid on the narrowband spectrum analyzer in yellow. The filter characteristic is replotted for any changes made from the comm radio.

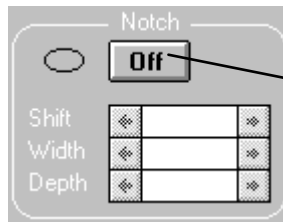
The Shift scroll bar allows you to shift the IF Filter within the spectrum analyzer -- effectively receiving a different portion of the displayed signal.

There are several benefits of simultaneously showing the filter and the received signal on the spectrum analyzer. For example, the filter can be set in a wide position and used to search for possible stations. Once the presence of a signal has been identified the filter can be narrowed to remove any extra signals or noise off to the sides of the center signal. In areas with a large amount of broadcast activity, the filter can be used to select one station while eliminating others.

SoftWave has the following 48 filter bandwidths:

11.00 kHz	1.740 kHz	275 Hz
9.810 kHz	1.550 kHz	244 Hz
8.750 kHz	1.380 kHz	217 Hz
7.800 kHz	1.230 kHz	194 Hz
6.960 kHz	1.100 kHz	173 Hz
6.200 kHz	970 Hz	154 Hz
5.530 kHz	870 Hz	137 Hz
4.900 kHz	780 Hz	122 Hz
4.400 kHz	690 Hz	109 Hz
3.900 kHz	620 Hz	97 Hz
3.480 kHz	550 Hz	87 Hz
3.100 kHz	488 Hz	77 Hz
2.770 kHz	430 Hz	69 Hz
2.470 kHz	380 Hz	61 Hz
2.200 kHz	346 Hz	55 Hz
1.950 kHz	308 Hz	49 Hz

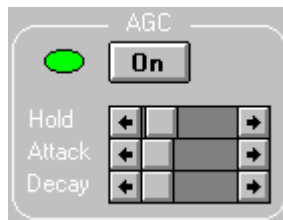
## Notch



Click here to engage the notch  
Use the sliders to adjust for  
optimum listening conditions.

The Notch filter can be adjusted in the same manner as the IF Filter. Point the arrow to the button and click once to turn the notch "on". You can now use the scroll bars to vary the width, shift and depth. Unwanted signal interference can be notched out for improved listening results. Notch is primarily intended for CW and U/LSB but can be used for any of the demods.

## AGC

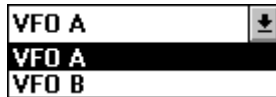


Received signal strength can vary dramatically over a short period of time, thus automatic gain control (AGC) is required to keep the audio output reasonably constant. This function can be engaged using the AGC on/off button.

The Attack scroll bar changes the speed at which the radio increases its gain. Similarly, the Decay scroll bar governs how quickly the receiver reduces its gain.

The Hold scroll bar delays the AGC Attack. This is particularly useful with Morse code signals where the presence and absence of the carrier is used to indicate the dots and dashes. A quick attack time on the AGC would cause the receiver itself to interfere with the signal by dramatically increasing the signal gain in every space. Hold allows for smooth reception.

## VFO



If two frequencies are being used back and forth, like monitoring split channel operation, two different frequency settings can be maintained by using VFO A and VFO B. The VFOs store only the frequency, not the radio settings.

## BFO



The beat frequency oscillator function is only used by SoftWave during CW-NB and CW-TT operation. This control determines the pitch of the frequency heard in these modes.


## Calibrate

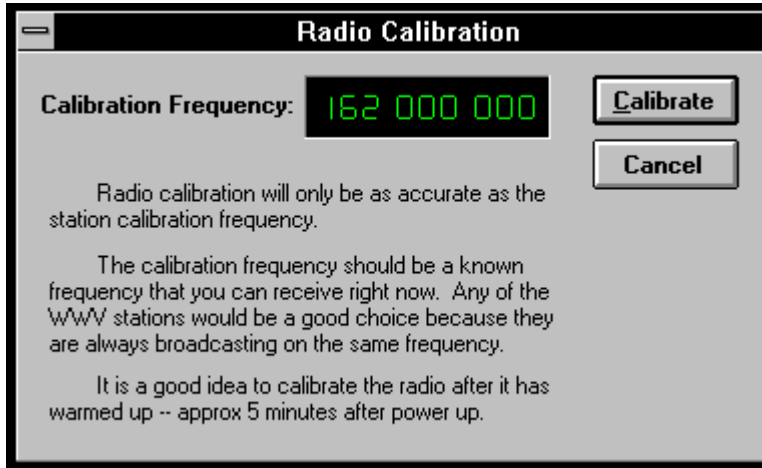
Using digital signal processing and the power of the personal computer, SoftWave can calibrate the receiver to frequency accuracy less than 1 part per million (1 PPM). When a receiver is accurate to one part per million the tuning error will be off no more than 1 Hz when receiving 1 MHz.

To calibrate your SoftWave receiver:

Wait for the receiver to warm up. Complete warm-up normally requires approximately 30 minutes.

1. Tune the receiver to a designated calibration frequency. For best results the calibration frequency should be a strong station in the VHF band (above 108 MHz). In most areas of the continental United States, NOAA broadcasts at around 162 MHz (in some areas it is 162.4 MHz). The calibration frequency could also be an accurate frequency standard such as WWV at 5, 10, 15 or 20 MHz. Note: SoftWave frequency calibration can be no more accurate than the actual precision of the calibration station frequency used. If the station is broadcasting 50 Hz off frequency, you will calibrate 50 Hz off.

2. Click the Calibrate button on the Communications Radio  The following window will appear.



3. Click the calibrate button on the Radio Calibration window.

Calibration settings are automatically saved from one session to the next, making frequent calibration unnecessary after the initial time.

## THE VHF RADIO

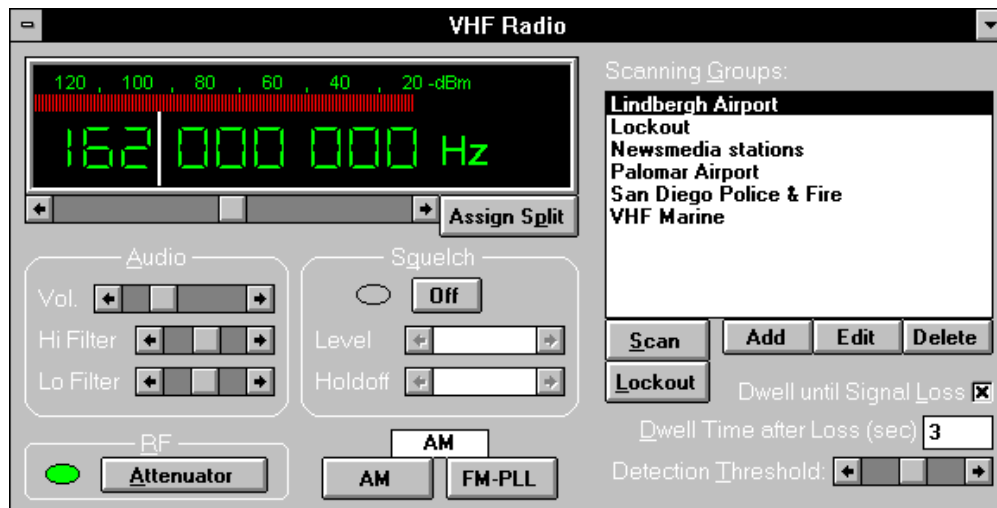
SoftWave includes a high performance VHF Radio with continuous coverage from 108 MHz to 174 MHz. To start the VHF Radio

1. Pull down the Personalities menu.



2. Select the VHF Radio by clicking on the words "VHF Radio".

The VHF Radio will appear on the screen. The controls and frequency display will not fill the entire monitor screen. The radio can be "dragged" to a convenient location on the screen. You can also use the "Cascade" or "Tile" options on the "Window" menu to arrange windows on the screen.



The Audio, RF, Squelch, and Demodulator controls on the VHF Radio operate in the same manner described for the Communications Radio. Additionally, the VHF radio contains controls specific to SoftWave's VHF scanning capabilities. These are described in the following sections.

## ***Assign Split***

SoftWave allows you to monitor two frequencies without going into Scanning mode. To do so, type the first frequency in and press the "Assign Split" button. This frequency is now pushed into the "Split hold" area in the top right of the frequency display. Type in the second frequency.

SoftWave will stay on the current frequency until signal loss (determined by the Squelch level scroll bar). Once signal loss has occurred, SoftWave will begin checking the secondary channel 2x per second. If a signal appears on either channel, SoftWave will make that the main channel and stop monitoring the secondary until signal loss occurs again.

The "Assign Split" button will change to "Clear Split" once a split is assigned. To cancel split monitoring, press the "Clear Split" button.

## ***Scan & Stop***

The "Scan" button loads the highlighted scanning group and begins scanning. When scanning starts, several changes occur to the VHF screen.

- The Squelch is turned on and cannot be turned off. The squelch level is used by SoftWave to determine "signal loss". This is important if the "Dwell until Signal Loss" option is checked. Once a signal is squelched, SoftWave starts the Dwell time countdown (see below). If the signal remains squelched for the whole dwell time then SoftWave automatically continues scanning.

- The "Scan" button becomes the "Stop" button. Press this button to stop scanning. Scanning will automatically stop whenever you leave the VHF radio or pull up a dialog box from the menu.

- The "Lockout" button is disabled. Lockout will automatically enable whenever scanning is stopped by signal detection or by the Stop button.

- The Frequency display clears and whenever a frequency appears it is light blue rather than green. This indicates you are in scan mode. During scan mode you cannot change the frequency.

## ***Lockout***

Lockout allows you to keep SoftWave from ever scanning certain frequencies. For example, suppose you are scanning and SoftWave continually stops at a data carrier in your scanning range. You can lockout this frequency from future access by the receiver. By clicking Lockout, the frequency is added to the "Lockout" scanning group. If there is no "Lockout" group in your Scanning Groups list, SoftWave will create one. Every time you direct SoftWave to scan a group, the frequencies in the Lockout group will be skipped.

The Lockout group can be edited, added to, or deleted just like any other group. You can even scan the Lockout group (SoftWave recognizes that it is the lockout group and won't try to lockout all the frequencies in it). Note as well that the Lockout group can contain over 128 channels. When this occurs SoftWave will still operate normally but you will be unable to scan the Lockout group itself.

When SoftWave locks out a frequency, it attempts to lockout the entire channel by creating a frequency range entry in the lockout group for the locked out frequency plus or minus half the IF filter width. This means that even if you hit near a frequency you wish to lock out, Lockout will still lock it out.

## ***Detection Threshold***

This scroll bar works closely with the Squelch Level scroll in SoftWave's scanning. The detection threshold is calibrated in minus dBm just like the Squelch Level. See the Squelch Level section of the Comm Radio for an explanation of how to determine the level for this scroll.

The Detection threshold and Squelch levels can never cross or be on the same number. The Squelch level must always be below the detection threshold. Thus, as you move the detection threshold down, the squelch level will move down as well. The opposite holds true when you move the squelch level up.

The Detection threshold and Squelch level can be within one dBm of each other. As soon as they are equal, SoftWave will push one of them off by 5 dBm. It is recommended that you keep them about 10 dBm apart. Typical settings are -80 for the Detection threshold (the scroll thumb will be centered in the scroll bar) and -100 for the Squelch level.

## ***Dwell until Signal Loss & Dwell Time***

SoftWave allows you to scan in two different ways. You can do timed scanning or signal loss scanning. This is controlled by the “Dwell until Signal Loss” check box. If this option is checked, SoftWave will do Signal Loss scanning. If the option is turned off, SoftWave will do Timed scanning.

### Timed Scanning

In Timed scanning, the “Dwell Time after Loss” prompt changes to “Dwell Time”. This time then determines how long SoftWave should stay on a “hit” until continuing scanning, regardless of signal presence. SoftWave ignores signal loss altogether.


### Signal Loss Scanning

In Signal Loss scanning, the “Dwell Time after Loss” prompt determines how long SoftWave waits after signal loss before continuing scanning. The length of time here allows for replies in conversations. Typically a value of 3 or 4 seconds works best. Signal Loss is determined by the “Squelch Level” control. Once a signal has been squelched for the dwell time, then SoftWave continues scanning. Note that for Split channels, as soon as signal loss occurs (ie. the signal is squelched), SoftWave begins checking the secondary channel. If signal appears on the secondary channel, SoftWave will automatically switch to it. Scanning will not continue until both channels have been squelched for the dwell time.

## ***Scanning Groups***

SoftWave's VHF scanner will scan groups of up to 128 channels at a rate of approximately 200 channels per second. The precise rate at which the receiver scans is dependent upon the distance between the frequencies selected. If the scanning group is full (maximum 128 frequencies per scanning group) and the frequencies range from a low of 108 MHz to a high of 174 MHz, SoftWave's scan speed could slow down to as low as 100 stations per second.

Because SoftWave is based in the PC, you can have as many scanning groups as you wish. Each group can contain up to 128 frequencies. The groups listed in the VHF screen-shot above are example groups shipped with the product. If the list in the display fills up, a scroll bar will appear attached to the list.

The  buttons below the list allow you to add or modify scanning groups. “Add” will add a new group. “Edit” will edit the currently highlighted group. “Delete” will delete the currently highlighted group. Add and Edit bring up the dialog below.



**Edit Scanning Group**

Group Name:

Range in steps of  kHz to:

Split with:

Single

**Items in the Group:**

- 156. MHz to 159. MHz in steps of 50 kHz
- 160. MHz [Split: 160.5 MHz]
- 161. MHz

The Group Name may contain up to 40 characters, spaces, symbols, etc... and may not be blank.

The frequency boxes and radio buttons in the center of the dialog are the entry area. This is where new frequencies are entered. Type a frequency in the first box then select the appropriate radio button. A frequency range may go in steps of 1 to 1000 kHz. Remember, however, that there may only be 128 channels in a group. So, for example, attempting to create a range from 108 Mhz to 174 Mhz in steps of 1 kHz results in 66,000 channels - too many for SoftWave to handle.

The list at the bottom of the dialog shows what frequencies, frequency ranges, and split frequencies have been placed in the group. The example above contains one of each. The first item is a frequency range from 156 to 159 Mhz in steps of 50 kHz. This results in 61 channels ( $159 - 156 = 3 \text{ Mhz}$ ;  $3 \text{ Mhz} / 50 \text{ kHz} = 60 \text{ channels}$ ; add one channel for 159 Mhz).

The second item is a split frequency. It counts as two channels. If the VHF scanner stops on a split set, it will load the split frequency into the VHF display. If the scanner is set to dwell until signal loss, it will dwell until there is signal loss on both channels in the split. The last item is a single channel, 161 Mhz.

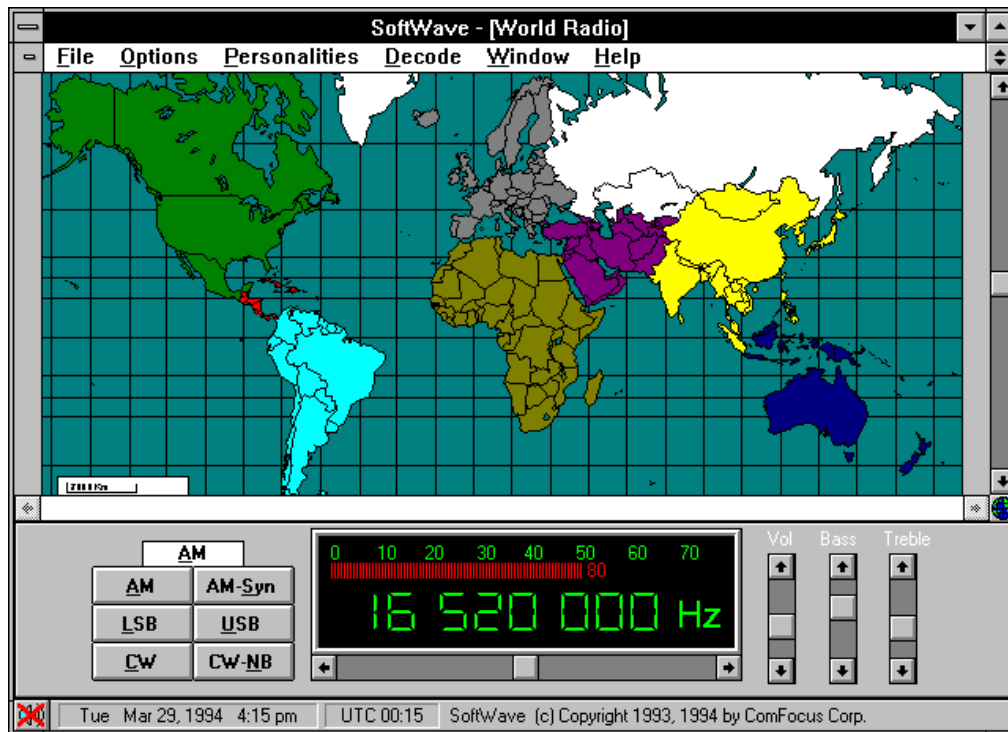
## WORLD RADIO

To start the World Radio:

1. Pull down the Personalities menu.



2. Select the World Radio by clicking on the words "World Radio".



The World Radio is designed for the novice Shortwave Listener who may not be familiar with the controls on the Communications Radio. This radio has only the essential controls to receive worldwide shortwave broadcasting. By clicking on a particular country or continent, the user can zoom-in to a detailed map of the selected area. At this point the user can select a station from the database of worldwide programming. The database is automatically narrowed to include only stations in the selected area.

To return to the global map (from a detailed map) click once on the globe in the lower right corner of the map, or click the right mouse button.

For more information about the database, see the section of this manual on "Select Station".

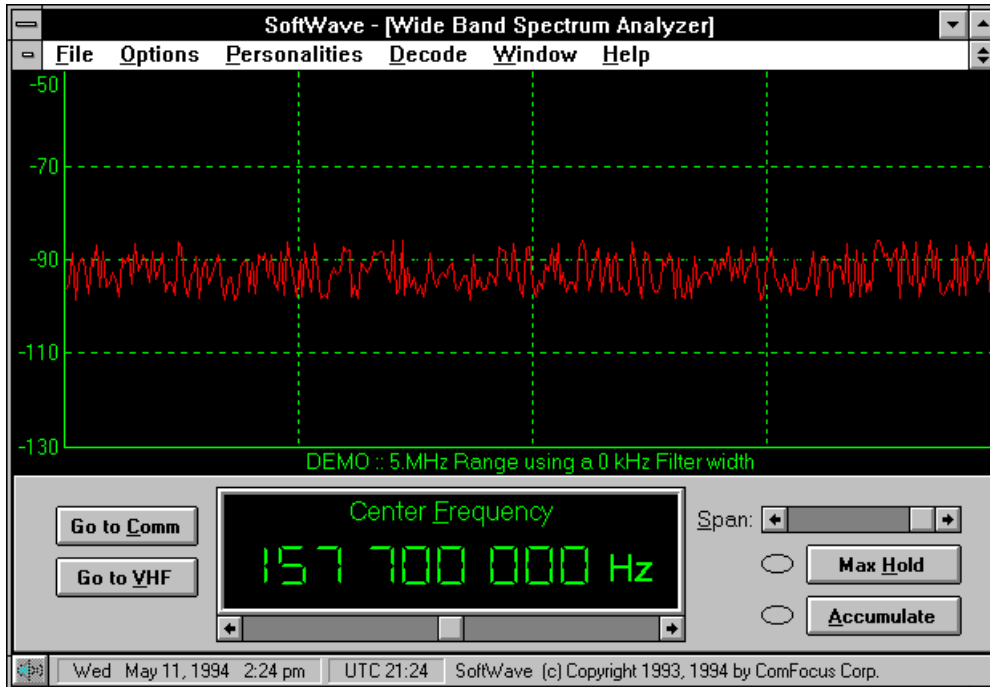
## WIDE BAND SPECTRUM ANALYZER

To start the Spectrum Analyzer:

1. Pull down the Personalities menu.



2. Select Spectrum Analyzer by clicking on the words Spectrum Analyzer.



SoftWave includes a Wideband Spectrum Analyzer which allows the user to search for band activity in a sweep of up to 5 MHz at a time. This spectrum analyzer is useful in many ways. For example you can look for activity on the entire 2 meter FM band in one sweep. Note that this spectrum analyzer will work in both HF and VHF bands. If you are curious about a certain signal, you can tune the SoftWave receiver by clicking directly on the signal in the spectrum analyzer.

### ***Span***

The spectrum analyzer is shown above with a span of 5 MHz. The span is variable from 200 kHz to 5 MHz. The Span scroll bar will change the span to 200, 400, 600, or 800 kHz, and 1 - 5 MHz.

The spectrum analyzer displays signal amplitudes ranging from roughly -130 dBm to -50 dBm. In this range, displayed level accuracy is typically better than 5 dB. The user is nonetheless cautioned that this mode is intended for finding active stations rather than for precision signal power measurements.

### ***Frequency***

The frequency shown on the screen is the "center frequency" -- the frequency at the center of the plot. To tune the spectrum analyzer, you can type in a new frequency, scroll the tuning scroll bar, or click on the spectrum itself. The new frequency you select becomes the center frequency.

### ***Accumulate***

The accumulate option is most useful for finding weak carriers - such as morse code. It normalizes the noise floor then begins, with each plot, to exaggerate the signals received. As the noise floor raises in the plot, any carriers buried in the noise floor will raise at a faster rate and, after 5 or 6 plots, will be easily identifiable.

### ***Max Hold***

Max Hold is most useful in the VHF band. It holds the highest point seen across multiple plots. So if a VHF carrier jumps onto the plot then goes away, the spectrum analyzer will still hold it there so you can accurately tune to it.

### ***Go to Comm, Go to VHF***

These buttons take you directly to the Comm or VHF radios. You can also use the Personalities menu.

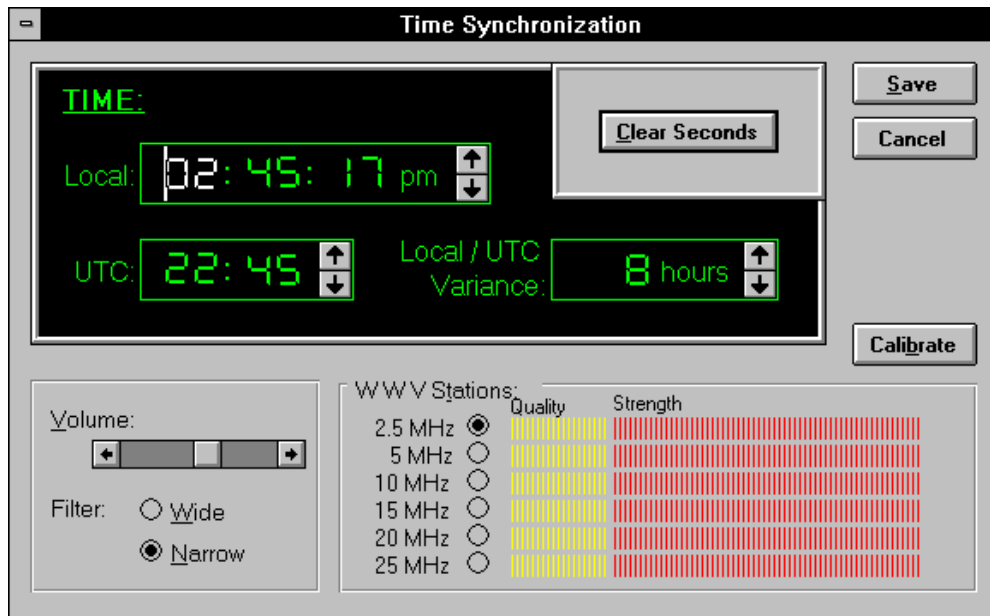
## TIME SYNC RADIO

To start the Time Sync Radio:

1. Pull down the Personalities menu.



2. Select the Time Sync by clicking once on the words "Time Sync".



The Time Sync Radio automatically scans the six WWV frequencies. A bar showing the relative quality and strength of each signal is shown. SoftWave picks the signal with the best "Quality" (see Select Station for a description of quality) and tunes to that one. Its signal strength indicator will update once per second.

To select a different WWV station, click on its frequency or strength graph. You will hear the radio tune to the new frequency.

### ***Changing the Time***

The time, in UTC or local time, can only be changed by clicking on the up and down arrows (spinners) next to the numbers. Click the mouse on the number you want to change (such as the minutes), then click on the appropriate spinner.

Note that there are two forces at work here. The current time ("Local Time") and the Local / UTC time variance. If you change the time shown in the "UTC Time" slot, the local time will also change. **If you want to keep the local time the same and just change the UTC time, change the Local / UTC time variance.**

### ***Clear Seconds and Save***

To set your PC clock to the accurate time using WWV:

1. Select the strongest signal on which WWV is transmitted.
2. Select the wide or narrow filter and adjust the volume control to optimize listening conditions.
3. When the tone is given on WWV to indicate the accurate time click "Clear Seconds".
4. Click the "Save" button to set your PC clock.

### ***Calibrate***

For a full description of the calibration function, see "Calibration" in the Comm Radio section.

## DECODE

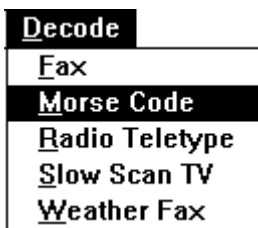
SoftWave has the ability to decode digital signals and display them on the computer screen. Version 1 of SoftWave includes a Morse Code Decoder. Later versions will include a multitude of additional capabilities.

### MORSE CODE TRANSLATOR

To begin the Morse Code Translator, you must first start the Communication personality. Next find a Morse code signal. If you are having difficulty finding a Morse code signal, try using the Wideband Spectrum Analyzer with frequencies around 8.5 MHz, (8,500,000 kHz) -- the Accumulate option might be helpful there. On the Comm Radio, select CW or CW-NB. (The CW-TT demodulator is most effective after a CW signal is identified). After a Morse code signal is found, you can begin to use the Morse Code Translator.

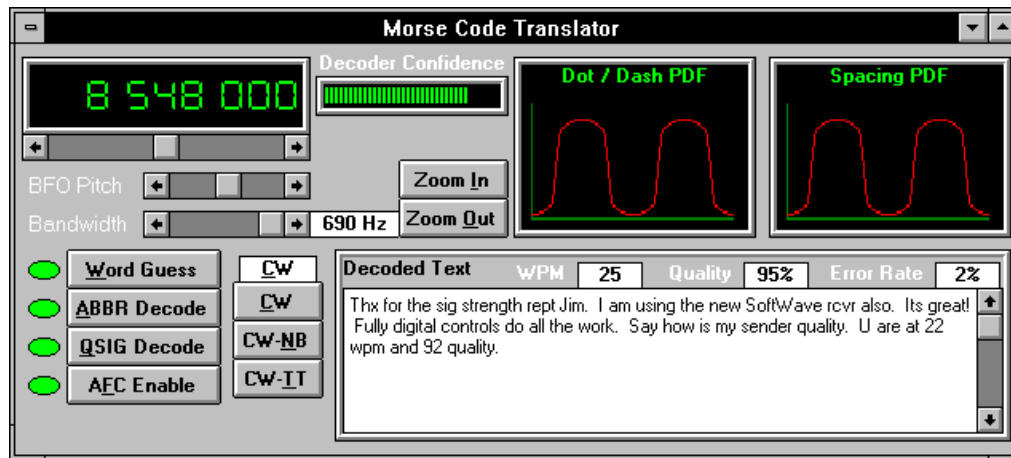
To start the Morse Code Translator:

1. Pull down the "Decode" menu.



2. Click Morse Code. The Morse Code Translator window will appear.





3. To resize the morse code window, move the mouse to the bottom border of the Translator window. When it is exactly on the border the single arrow will change to a double arrow. Click and hold the double arrow and drag the border to the new size.
4. To move the morse code window, click and hold the title bar (it contains the words "Morse Code Translator"). Drag the window to the bottom half of the screen or a location where you can quickly move from the radio to the translator. (Note: This is a circumstance where you may want to consider a screen resolution of 1024 x 768 or 800 x 600. For additional information on different screen resolutions refer to chapter.....). Typically, once you have zoomed in on a frequency on the Comm Radio everything else you'll need to do can be done right from the Translator window.

The Morse Code Translator will begin to display text shortly after the screen appears.

### ***Morse Code Menu***

When the morse code decoder is the active window it places its own menu pulldown on the menu bar. This pulldown contains options to turn on or off the two PDFs, select the buffer size for translated characters, and select a log file.

### ***Word Guess***

There are certain rules of spelling in the English language which are never violated. Some rules have exceptions, but only under a few circumstances. Additionally, some letters have a far higher probability of appearing in a word than others. SoftWave uses these principles as the basis for the Word Guess command.

For Example, there are no English words which have four consonants in a row. Therefore, by enabling Word Guess, SoftWave will look for a vowel after translating three consonants. As another example, if the first letter in a word is "T", what is the probability that the next letter will be "H", or "E", or "B"?

Word Guess has been optimized for unabbreviated English text and is most helpful under poor signal-to-noise conditions or when sender quality is poor.

When Word Guess determines that a word needs correction the corrected word will appear in *italics*.

### ***ABBR Decode***

Most experienced senders of Morse code use abbreviations. Words can be sent faster and more efficiently if commonly used words are abbreviated. For example, the abbreviation "thx" is commonly used for "thanks". SoftWave includes a library of these words, and their typical abbreviation. When the ABBR Decode command is enabled and an abbreviation is decoded, SoftWave will look to the library, find the correct extension of the abbreviation and show both on the screen. The extended word is shown in *italics*.

### ***QSIG Decode***

Another form of abbreviations used by experienced Morse code enthusiasts are Q signals. Q signals are three letter abbreviations, which begin with the letter Q, and have a specific meaning. For example, "QTH" is the abbreviation for location. When SoftWave receives "QTH" it means that the sender is either asking "what is your location?" or stating "my location is .....".

SoftWave includes a library of Q signals. When the QSIG command is enabled and a three letter word beginning with "Q" is decoded, SoftWave will look to the library to determine if it is a Q signal. If a Q signal is identified, SoftWave will show both the transmitted letters and the meaning.

### ***AFC Enable***

### ***Words Per Minute***

SoftWave will keep track of the speed of the received signal. It is assumed that a typical word is 5 characters long. Therefore SoftWave will take into account the

transmission of both long and short words. The number of words per minute is shown in the translation window.

### ***Sender Quality***

Using the values determined by the Dot / Dash probability distribution function, the Spacing probability distribution function, the character error rate and the speed, SoftWave can determine a value for the quality of the signal sent. This value is shown next to words per minute.

### ***Character Error Rate***

Morse code signals transmitted by hand often include errors for a particular character. Perhaps the character should have been transmitted with one more dot or dash. SoftWave will identify this type of error and display a "character error rate". The Character Error Rate is shown in the box next to the Sender Quality.

### ***Log File***

To record the text decoded by the translator follow these steps:

1. Pulldown the "MorseCode" menu and select "Log File..."
2. Select an appropriate directory and type a file name. If you do not specify a file extension, SoftWave will give it the extension .LOG. When logging begins, the log file's name will appear in the translator window.

To Close a log file:

1. Pulldown the "MorseCode" menu and select "Log File..."
2. Select the "Cancel" button or press Escape.

### ***BFO Pitch***

For a complete description of BFO, see the Comm Radio section.

### ***Bandwidth***

The Morse Code Translator allows you to vary the filter bandwidth from 690 Hz to 49 Hz. This can be done using the scroll bar. As the scroll bar is adjusted, the filter bandwidth is shown on the indicator box.

### ***Zoom-In, Zoom-Out***

SoftWave allows the user to return to a previous narrow filter bandwidth very quickly by selecting the Zoom-In command. When this command is selected the filter will be automatically reduced to the previous narrow setting.

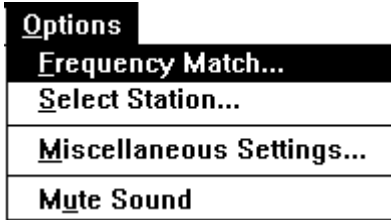
Zoom-In will only go in to as narrow a filter as you've previously been to on the morse code translator. Zoom-Out will return you to 690 Hz.

Note: Unless the filter is centered exactly on the desired signal the Zoom In command may cause SoftWave to miss the signal completely. To avoid this potential problem, tune the receiver so that the signal is centered on the filter. The easiest method of centering the signal is by using the spectrum analyzer in the Communications Radio. Remember to switch out of CW-TT while you're trying to find the signal and then jump back in when you've centered on it.




## OPTIONS

SoftWave provides several options to make shortwave and VHF listening easier for the user. To review the options available, select Options at the top menu bar. A drop down menu will appear listing the options.



### Mute Sound

This menu option simply provides an easily keyboardable method for muting the audio. You can also mute by clicking on the mute button in the lower left portion of the screen.  When the sound is muted, a red X will cover the button.

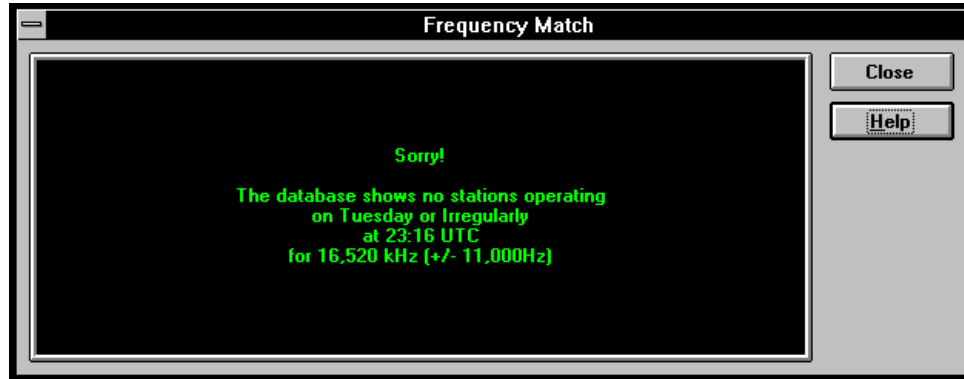
### Audio Loss

The audio output may disappear for several reasons, not just mute. These reasons are listed below. If, after checking these items, you are unable to make the audio return, please call ComFocus technical support at the number listed in the front of the manual:

- The sound is muted (the mute button has a red X on it).
- The signal is squelched (squelch is on and the signal strength is below the squelch level)
- The RF Gain is too high (set the RF Gain all the way to the left to fix).
- The speaker is plugged into the wrong port in the DSP card (it should be plugged into the second port down from the top of the card).

## Frequency Match

Perhaps you are listening to a shortwave station and are curious about its origin. By selecting the Frequency Match option you can quickly search SoftWave's database of worldwide programming. If the broadcast is included in the database the frequency match command will identify the station, language, origin, time of broadcast, target area and other interesting information. See "Select Station" for more about the types of information displayed.



If the station on which the receiver is tuned is not in the database, the above message will appear on the screen. Note that the database was searched for the exact frequency tuned, plus or minus the IF filter bandwidth. This powerful advantage means that you don't have to be tuned precisely on the frequency in order to match up with the database.

## Select Station

The select station option gives the user access to SoftWave's database of worldwide programming. To start this option:

1. Pull down the Options menu.
2. Choose the Select Stations option.

Select Station

**Target Region**

**Country**

**Frequency**

**Type of Program**

India

Middle East

North Africa

North America

Pacific Rim

Russia

South America

South Asia

South Pacific

Southeast Asia

**Auto Tune**

**Preferred Only**

**On-the-Air Now Only**

**Include AM Stations**       **On-the-Air during the next**  **Hrs**

P	Station	Content	Days	Times	Freq.	
	BBC	General	SMTWHFA	11:00-17:15	9515	↑
X	BBC	General	SMTWHFA	23:00-23:59	6175	
	BBC	General	Irregular	11:00-11:30	5965	
	BBC	General	SMTWHFA	11:00-12:00	6195	
	BBC	General	SMTWHFA	22:00-23:59	9590	
X	BBC	General	SMTWHFA	02:00-06:00	5975	
	BBC	General	SMTWHFA	00:00-03:30	9915	
	BBC	General	SMTWHFA	00:00-03:30	7325	
	BBC	General	SMTWHFA	00:00-03:30	6175	
	BBC	General	SMTWHFA	00:00-03:30	5975	



## Sorting the Database

SoftWave's database can be sorted a number of different ways. The primary categories of sorting include Target Region, Country, Frequency and Type of Program. To select one of the primary categories click on it.

After the primary sort is selected, SoftWave gives the user a list of secondary sorting options. The secondary sorting options are shown in the box in the top middle portion of the Select Station window. For example under the Target Region category (shown above) the user can select from several choices, mostly continents. These selections narrow the database further. To select a secondary sort, use the mouse to click on the preferred item.

The database can be further sorted by clicking on the "Preferred Only", "On-the-Air Now Only" or "On-the-Air during the next \_\_\_\_ Hrs" options. To select one of these options click on the box next to the desired item. Note that the number next to the words "On-the-Air during the next \_\_\_\_ Hrs" can be changed by clicking in the box after the word "next" and typing the desired number. The default number provided with SoftWave is 2.

## The Station Spreadsheet

The station spreadsheet contains columns for:

- Preferred - will contain an X if you click in it. This makes a station "Preferred". If you check the "Preferred Only" check box, the spreadsheet will contain only those stations which you've indicated as preferred.
- Station - The name of the broadcast. If the broadcast is being carried by some other station the station name will appear in parenthesis. For example, if Radio Egypt decided to carry the BBC, the Station entry would show: BBC (Radio Egypt)
- Content - this is the type of the program. Ie. News, General, Music, etc....
- Days - this contains a letter for each of the days of the week. It may also say "Irregular" indicating that the broadcast is seasonal. For example, Radio Australia broadcasts rugby games in a certain time slot on the day they were played. If no game was played on a particular day, the broadcast does not occur.
- Times - UTC start and stop times
- Frequency - the frequency in kHz.

Note that there are other columns which you can get to by using the horizontal scroll bar at the bottom of the spreadsheet. These columns are:

- Quality - a bar graph showing the relative signal-to-noise ratio at that frequency. This number is computed just before the station is

shown in the spreadsheet so it is real-time. The greater strength the carrier has as compared to the noise, the better the radio.

Target Region - where this broadcast is aimed.

Language

Country - of origin

Transmit Location - for shortwave stations this is usually the same as country. For AM stations, this is a city or state of origin.

Entry Expiration - the date of expiration of the program the data came from.

### Selecting a Station

Use the mouse to scroll up and down to view the stations in the database. By clicking on a particular station it will become highlighted. The receiver will not tune to this selected station unless the "Auto Tune" button is selected or the "Select" button is clicked.

Remember that if you use the Auto Tune command you may first want to select the "On-the-Air Now Only" button.

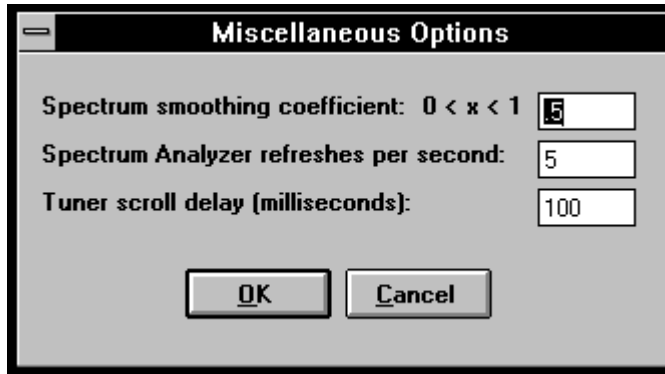
By choosing the Select button the receiver will tune to the selected station and return to the prior screen.

The Close button will return you to the previous screen without selecting the currently highlighted station.

### Adding a Station

The Add, Edit, and Delete buttons at the bottom of the dialog allow you to add your own entries to the database. Note that you may only delete entries that you've added.

## Miscellaneous Settings



### Spectrum smoothing coefficient:

The narrowband spectrum analyzer on the Comm Radio applies a smoothing algorithm. The smoothing ensures that a jumpy carrier such as a CW signal stays on the analyzer's plot long enough for you to visually identify it. This does, however, make the analyzer seem a bit unresponsive at times. Changing the coefficient will make the spectrum more or less responsive. At .1 the spectrum is more responsive. At .9 it is less.

### Spectrum Analyzer Refresh Rate

This setting determines the number of times per second SoftWave attempts to update the narrowband spectrum analyzer. Note that your computer may not be able to update as fast as the setting is set. You may set this from 0 to 18. At a setting of 0, the spectrum analyzer is turned off.

### Tuner Scroll Delay

This number controls the speed of the tuner when you are holding the scroll thumb of the tuner scroll bar of center. The default setting is 350 milliseconds. This means that the tuner will increment once every 350 milliseconds (or 3x per second). You may set this value anywhere from 55 ms to 65000 ms to suit your tastes.

## HELP

To access SoftWave's on-line help, select "Help" at the top menu bar. A drop down menu will appear.

<b>H</b> elp
<b>F</b> requency Chart
<b>H</b> elp Index
<b>H</b> elp Contents
<b>R</b> epair <b>D</b> atabase
<b>A</b> bout

### Repair Database

SoftWave Version 1.0 includes a database of over 5000 AM and 3000 shortwave stations. The AM database consists of the FCC Broadcast AM Database, and includes all stations in the US., Canada, Mexico, Cuba and the Caribbean. The shortwave database includes the current program schedules of many worldwide broadcasters. All of the program information was entered by ComFocus from program schedules provided directly by the host broadcaster.

It is not possible to omit or edit the database provided by ComFocus. However it is possible to add to the database. Station information added by the user can be edited or deleted.

In the event of a hard disk failure, computer power failure, or incident that affects your data, you may not be able to open the SoftWave database. An appropriate message will appear and you will be given the opportunity of running the system without the database.

SoftWave Version 1.0 includes a database repair system that can be initiated by selecting the Repair Database command on the Help menu. To select the Repair Database command:

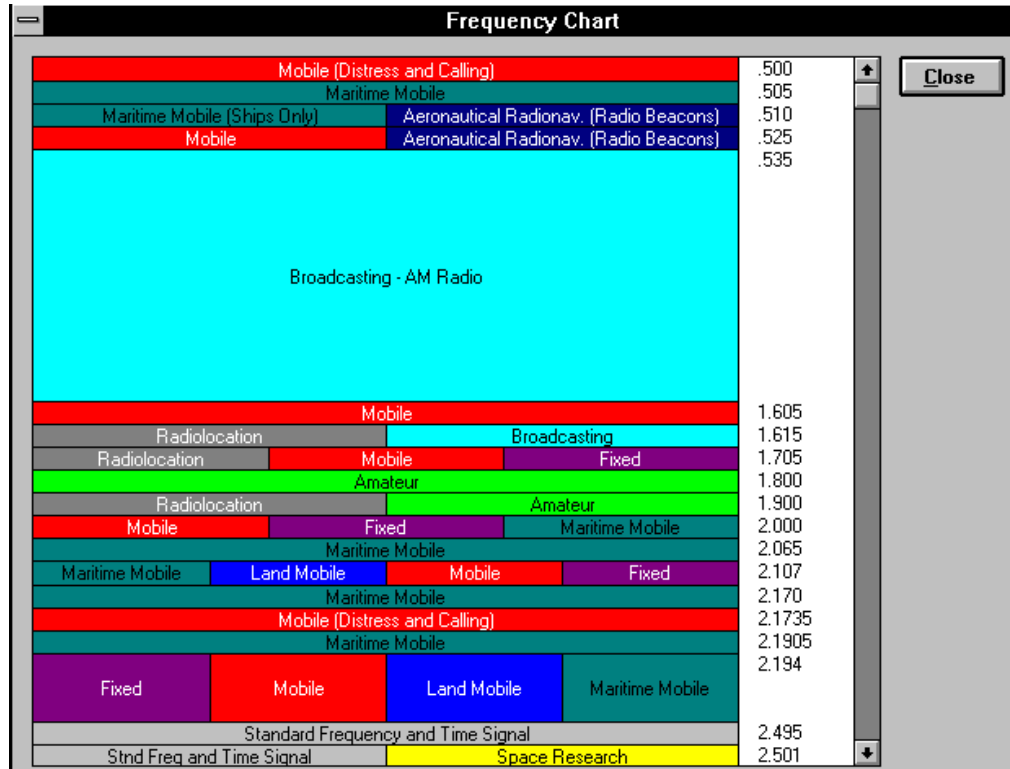
1. Select "Help" at the top menu bar.
2. Select "Repair Database". The repair and re-compression functions could take several minutes, depending upon the size of the database.

## Frequency Chart

For those of us who have not memorized the frequency assignments or privileges between 500 kHz to 30 MHz and 108 MHz to 174 MHz, SoftWave provides an easy to read frequency chart. This colorful chart displays the assignments for frequencies which can be received by SoftWave.

To open the Frequency Chart:

Select "Frequency Chart" from the Help menu.



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