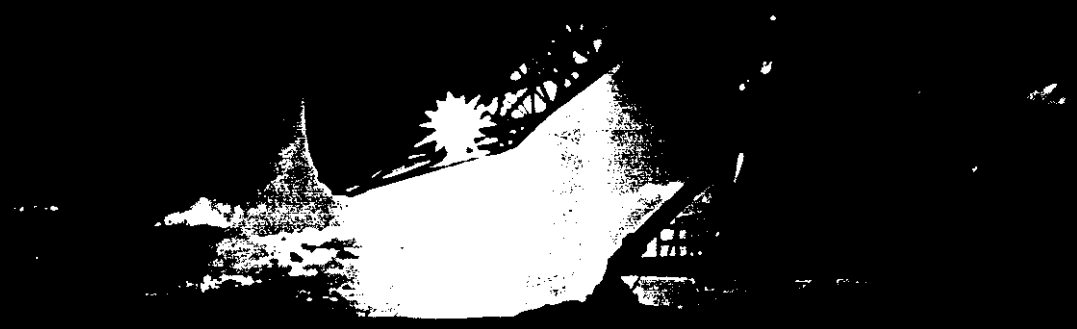
# APPENDIX E

## USER INSTRUCTIONS



Computer based communications receivers designed
for a wide range of professional and amateur applications.

- Sophisticated virtual control panel
- Wide-band coverage
- Fast scanning
- Powerful tuning and scanning options
- External and internal models
- Rich variety of innovative features

# WiNRADiO®

COMMUNICATIONS

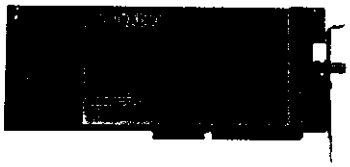
## Creating New Standards

The award-winning and immensely popular WiNRADiO WR-1000i is the world's first commercially available wide-band communications receiver. Integrating advanced radio receiver technology and the computing power of a PC, it sets a new standard in radio communications.

The synergy of radio and computing technology provides all WiNRADiO receivers with many unique features which are hard to find on the usual stand-alone communications receivers. These include a rich variety of tuning and scanning options, versatile memory and database facilities and innovative user interfaces, designed for flexibility and ease of use.

## Internal versus External

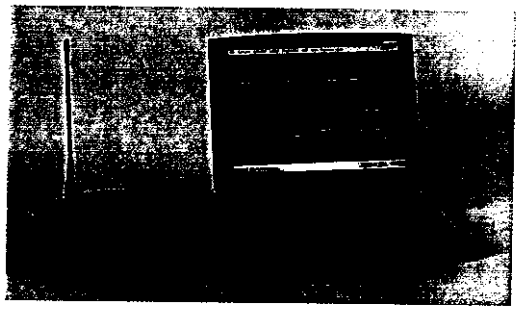
The 1000/1500 series products offer cost-effective solutions for a wide variety of applications. The products come in two forms: internal ISA-bus cards, and compact external units with an RS-232 interface (PCMCIA interface optional).



*Internal model (WR-1500i)*

The advantages of an internal card model are in its neatness – there are no external cables required, no external interface ports are occupied, no external power supplies or extra desk space are needed. And if you wish, nobody needs to know that you have a scanning receiver hidden inside your PC!

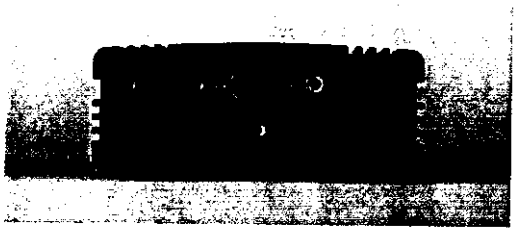
Multi-channel operation is simple to achieve, as up to eight WiNRADiO internal receivers can be used simultaneously in one PC.



*External model (WR-1500e)*

*(Computer not included)*

The advantage of an external model is in its portability – the optional plug-and-play PC card interface (PCMCIA) allows a very fast and simple installation for any portable PC. Serial RS-232 interface is also available as standard.

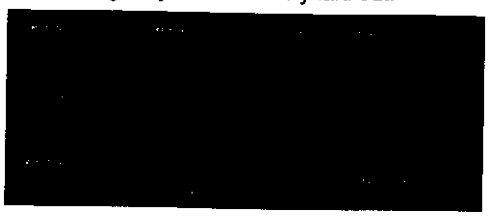


*The external models also feature a discriminator output.*

Both models are very well shielded from PC interference. We use specially developed shielding materials and innovative design methods to prevent any interference directly entering the receiver.

## WiNRADiO Software

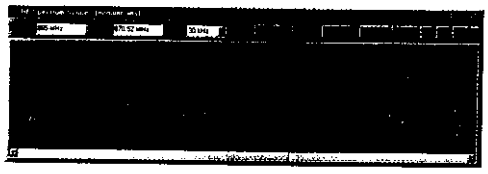
The 1000/1500 Series software works on Windows 3.11, 95, 98 and NT. Impressive high-resolution graphics combine with a variety of useful features, all logically and intuitively laid out.



*The WiNRADiO Virtual Control Panel*

The software offers a large variety of powerful features, many scanning and tuning options, and a virtually unlimited number of memories.

The Spectrum Scope facility of the 1000/1500 Series displays real time activity on the bands. It is complemented by our graphic tuning facility called Visitune ™ (patent pending). This facility allows you to tune the receiver continuously, using the mouse, across the frequency spectrum visible in the background.



*Spectrum Scope*

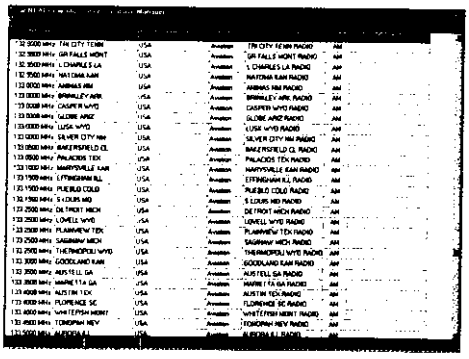
Click on a peak and you are instantly tuned. Alternatively, keep the left button down and drag your mouse across a scanned spectrum – you will see the frequency cursor moving, the frequency display updating accordingly and the receiver will be tuned following your hand movements!

WiNRADiO1000/1500 software sets new standards for computer-controlled radio receiver interfacing. Its features include automatic mode and step size selection, duplex separation, user-definable frequency offset, a rich variety of scanning modes including multiple-range scanning, as well as convenient auxiliary features such as "always on top", and many others.

From a software developer's perspective, WiNRADiO receivers are well supported. We encourage third party software development by making high-level interfacing documentation publicly available, including source code in a variety of programming languages, all free to download from our Web site www.winradio.com. WiNRADiO can also be controlled using Windows DDE, even from within applications such as common wordprocessors and spreadsheets.

## Optional Frequency Database Manager Software

The optional World Station Database Manager greatly simplifies the maintenance of frequency databases. It is fully integrated with the 1000/1500 Series software, and allows for instantaneous tuning to stations while browsing or searching within a database. Similarly, an unknown frequency can be readily identified by invoking the Database Manager.



The user can add, delete or edit database records as well as import data from other databases. The software comes with a ready to use database of over 300,000 stations world-wide.

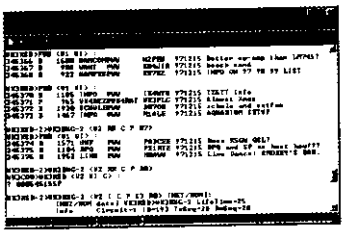
## Optional Digital Suite Software

The optional WiNRADiO Digital Suite is a collection of digital signal processing modules. Together, they represent a breakthrough in reception of digitally coded radio communications - never before has such a comprehensive collection been made available at such low cost and so elegantly integrated with a PC-based radio receiver.

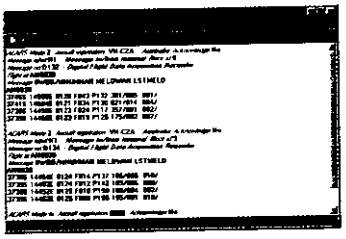
The WiNRADiO Digital Suite expands the power of a WiNRADiO receiver with numerous digital processing facilities, including:

- WEFAX (Satellite Weather Fax)
- HF Fax
- Packet Radio
- Aircraft Addressing and Reporting System (ACARS)
- Digital Tone Multi-Frequency Signalling (DTMF)
- Continuous Tone Coded Squelch System (CTCSS)
- Signal Classifier
- Audio Oscilloscope and Spectrum Analyzer
- Squelch-controlled Audio Recorder and Playback

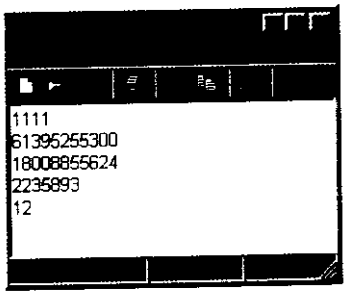
**Fax Module**
The facsimile module enables the reception of orbiting weather satellites and HF fax. Received images are decoded and displayed in real time. Sophisticated decoding and image processing methods are used to display received images with maximum clarity.



**Packet Radio Decoder**
The AX.25 standard packet radio decoder implements protocol monitoring of the two most common modulation techniques used in packet radio: 1200 Baud FM AFSK and 300 Baud FSK.

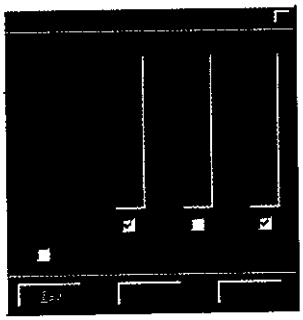


**ACARS Decoder**
The Aircraft Communications and Addressing System decoder displays digital communications between aircraft and ground control. Common types of messages are immediately decoded and shown on the screen, or logged in a file.

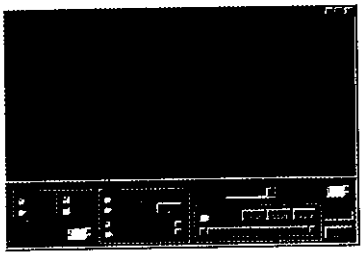



**DTMF Decoder**
In radiocommunications, DTMF (Dual Tone Multi-Frequency) coding is used in various signalling systems. This implementation of a DTMF decoder contains a logging facility, which allows later inspection of received codes together with time/date information.

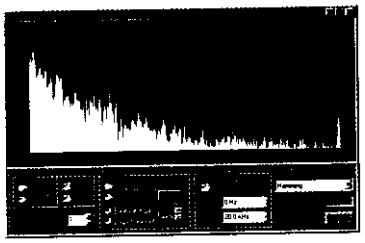
**CTCSS Decoder**
The Continuous Tone Coded Squelch System (sometimes referred to as PL or Private Line) is useful for the monitoring of communication channels with sub-audible tone signalling. This is particularly suitable for scanning purposes, where a particular user, or a desired group of users, can be selectively monitored. This decoder also implements recording of transmissions with a specified subcarrier into Windows standard ".wav" files.



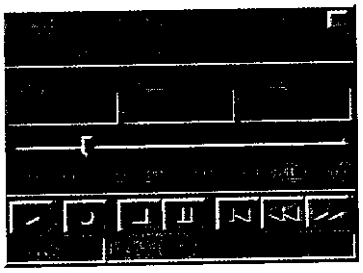
**Signal Classifier Module**
The Signal Classifier module differentiates between various types of common signals. By selecting only the desired signal types, scanning can be sped up quite substantially. The following classification categories are implemented: voice, data, noise or silent channel (unmodulated carrier).



**Audio Oscilloscope**
This module presents a fully-fledged storage oscilloscope with a scrollable Waveform Grabber. This tool is available for analysis of audio signals from DC to 20kHz, with dynamic range given by the quality of the sound card (usually better than 80 dB).



**Audio Spectrum Analyzer**
The Audio Spectrum Analyzer uses an advanced FFT algorithm to provide real time spectrum analysis with brilliant responsiveness. A user definable set of markers makes it possible to determine frequencies down to a resolution of a few Hz.



**Audio Recorder**
The squelch controlled recorder makes it possible to record and playback the received signal, using Windows standard ".wav" files. Recording can be turned on and off automatically depending on the received signal level - this is controlled by the squelch setting of the WiNRADiO receiver.

## Optional PC Card Interface

The PC Card interface (PCMCIA Type II) makes connecting a WiNRADiO receiver to a laptop or a notebook computer especially easy. The plug-n-play facility automatically registers the card, and the installation is very simple indeed. (Suitable for external models WR-1000e and WR-1500e.)

*The PC Card Interface comes with a cable to suit.*

## Optional Portable Power Source

Many external radio receivers neglect user convenience with respect to the availability of a suitable portable power supply. WiNRADiO provides a suitable external power source, to meet the most demanding standards.

The WiNRADiO Portable Power Source is based on high-capacity, long-life nickel-metal-hydride rechargeable batteries, coupled with intelligent, fast-charging circuitry which saves the battery life and guarantees maximum charging capacity. (Suitable for external models WR-1000e and WR-1500e.)

## Specifications

| | WR1000i/WR1000e | WR1500i/WR1500e |
|---|---|---|
| Type | Triple superheterodyne | Triple superheterodyne |
| Frequency range | 0.5-1300MHz * | 0.15-1500MHz* |
| Modes | AM,FM-N, FM-W, SSB/CW | AM,FM-N,FM-W,USB, LSB,CW |
| Tuning steps | 100Hz (5Hz BFO) | 100 Hz (1Hz USB/LSB/CW) |
| IF shift | - | +/- 2kHz |
| Audio output | 200mW into 8 ohm load | 200mW into 8 ohm load |
| Antenna conn. | 50 ohm BNC | 50 ohm BNC |
| Selectivity | | |
| SSB,CW | 6kHz/-6dB | 2.5 kHz/-6dB |
| AM | 6kHz/-6dB | 6 kHz/-6dB |
| FM-N | 17kHz/-6dB | 17kHz/-6dB |
| FM-W | 230kHz/-6dB | 230kHz/-6dB |

** In some countries, certain frequencies may be omitted to comply with local government regulations.*

Typical Sensitivity

| WR1000i/WR1000e | | | | |
|---|---|---|---|---|
| **Frequency range** | **AM** | **CW/SSB** | **FM-N** | **FM-W** |
| 0.5 - 1.5MHz | 5.0µV | 2.5µV | 1.0µV | - |
| 1.5 - 30MHz | 1.0µV | 0.5µV | 0.5µV | - |
| 30 - 1000MHz | 1.5µV | 0.7µV | 0.5µV | 2.0µV |
| 1.0 - 1.3GHz | 5.0µV | 2.5µV | 2.0µV | 4.0µV |
| **WR1500i/WR1500e** | | | | |
| **Frequency range** | **AM [1]** | **CW/SSB** | **FM-N [2]** | **FM-W [2]** |
| 0.15 - 0.5MHz | [3] | [3] | [3] | - |
| 0.5 - 1.8MHz | 5.0µV | 0.9µV | 1.0µV | - |
| 1.8 - 30MHz | 1.0µV | 0.3µV | 0.5µV | - |
| 30 - 1000MHz | 1.5µV | 0.3µV | 0.35µV | 1.8µV |
| 1.0 - 1.5GHz | 1.9µV | 0.35µV | 0.4µV | 3.5µV |

[1] For 10dB S+N/N [2] For 12dB SINAD [3] Not specified

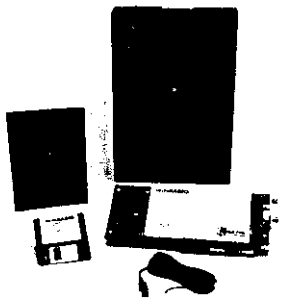
| | WR1000i/WR1500i | WR1000e/WR1500e |
|---|---|---|
| Power supply | internal (PC supplied) | 12V DC +/- 15% |
| Dimensions | 114x290x18mm (4.5x11.4x0.7in) | 122x216x48mm (4.8x8.5x1.8in) |
| In-built speaker | - | 8ohm 0.1W |

## System Requirements

IBM compatible PC with 486 CPU or higher, Windows 3.1, 95, 98 or NT 4.0
4MB of RAM minimum (Digital Suite requires Windows 95, 98 or NT 4.0 and Pentium 100 or higher)

## Unpacking

**WR1000i/WR1500i internal receiver card**



- User's manual
- Start-up antenna
- Distribution disk

**WR1000e/WR1500e external receiver unit**


- User's manual
- Start-up antenna
- RS-232 cable
- Multivoltage AC/DC power adaptor
- IEC power cable
- Distribution disk

## Ordering codes

| | |
|---|---|
| • WR-1000i | WiNRADiO WR1000i receiver (internal) |
| • WR-1000e | WiNRADiO WR1000e receiver (external) |
| • WR-1500i | WiNRADiO WR1500i receiver (internal) |
| • WR-1500e | WiNRADiO WR1500e receiver (external) |
| • WR-DBM | WiNRADiO Database Manager Option |
| • WR-DS | WiNRADiO Digital Suite Option |
| • WR-PPS | WiNRADiO Portable Power Source Option |
| • WR-PCA | WiNRADiO PC Card Adaptor Option |

*Visit our website www.winradio.com for a complete list of distributors and for more information about our products, including free software download.*

WiNRADiO®
COMMUNICATIONS

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# WiNRADiO

## 1000/1500 Series

User's Guide

Published by

WiNRADiO Communications
PO Box 6118, St Kilda Road, Melbourne 3004, Australia



**Trademarks**



**Patents**

WiNRADiO technology and Visitune are protected by pending international patent applications.

Documentation and Layout: Barry Naujok and Peter Nesbit

Printed in Australia

### FCC Notice

The WiNRADiO card has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the computer into a different outlet so that the two devices are on different branch circuits
- Consult an authorised dealer or an experienced radio/TV technician for help

### Caution

To comply with the limits for the Class B digital device, pursuant to Part 15 of the FCC rules, the WiNRADiO card must be installed in computer equipment certified to comply with the Class B limits. Only peripherals certified to comply with the Class B limits may be attached to the computer containing the WiNRADiO receiver. All cables used to connect the computer and peripherals must be shielded and grounded. Operation with non-certified peripherals may result in interference to radio and TV reception.

### Modifications

Any changes or modifications to WiNRADiO not expressly approved in this book could void the user's authority to operate this equipment.

### *Limitation of Liability and Remedies*

*The information published in this book has been compiled from several sources. While every effort has been made to ensure its accuracy, neither the authors nor the publisher can guarantee that all information is entirely correct or up-to-date. Furthermore, neither the authors nor the publisher can take any responsibility for the use of this information or any consequences arising therefrom.*

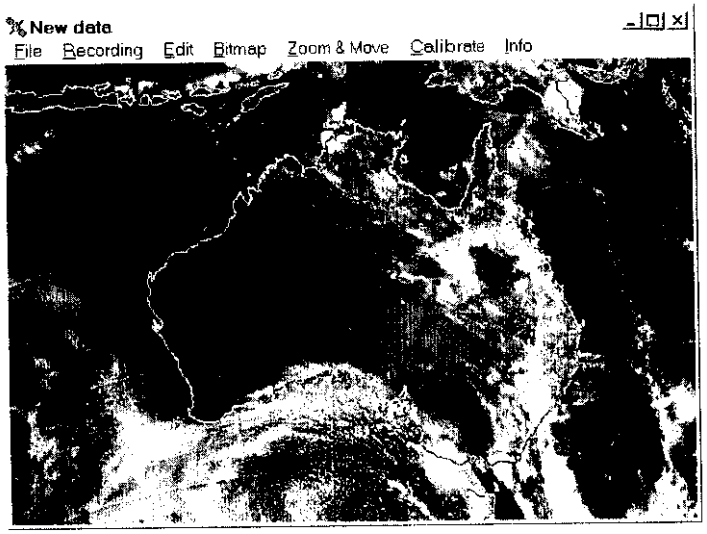
*WiNRADiO Communications shall have no liability for any damages due to lost profits, loss of use or anticipated benefits, or other incidental, special or punitive damages arising from the use of, or the inability to use, the WiNRADiO receiver, whether arising out of contract, negligence, tort or under any warranty, even if WiNRADiO Communications has been advised of the possibility of such damages. In no event shall WiNRADiO Communications' liability for damages exceed the amount paid for this product. WiNRADiO Communications neither assumes nor authorises anyone to assume for it any other liabilities.*

### *Warning*

*In certain countries or states it is illegal to listen to certain frequencies, such as police or cellular telephones. We cannot accept any responsibility for the consequences of your non-compliance with government regulations. If you are in doubt about the regulations in your country or state, please contact your nearest radio communications regulatory authority.*

# Table Of Contents

The WiNRADiO Digital Suite represents a substantial enhancement for you WiNRADiO and should be worth considering - receive satellite images, aircra communications and other interesting digital communications on your PC!




*Weather fax satellite image*

For more information about these and other available options, to downloa demo and to order, use a Web site closest to your location:

- North America: www.winradio.com
- Europe: www.winradio.co.uk
- Australia/Asia: www.winradio.net.au

We hope you will enjoy your WiNRADiO and look forward to remain touch – please don't forget to email us to register for your free WiNRAD Newsletter. Please let us know about your impressions of WiNRADiO. A comments and suggestions will be most welcome and will help us to m our product better for you!

The database can also be searched using a large variety of search keys and criteria, for example frequencies, countries, mode, power etc. For example, if you wish to list all AM broadcast stations in USA, the database will happily oblige: all you need to do to tune the receiver is click on a database record. Database search results can be saved in a file for later retrieval.

New database records can be added, edited or deleted. Comprehensive importing facilities also make it possible to import existing frequency lists from other sources in a variety of formats.

In addition to Frequency, Mode, Location, Country, Callsign and a Comment each database record can also contain Power, Class and Geographical Co-ordinates of each station.

The display is user-configurable allowing you to choose items for display and the space allocated to them. Displayed records can be sorted according to a variety of criteria. A powerful import facility makes it possible to import frequency lists from other sources.

The WiNRADiO World Station Database Manager comes with a ready-made database of hundreds of thousands stations worldwide.

## WiNRADiO Digital Suite

The WiNRADiO Digital Suite is an optional software package, a collection of digital signal processing modules, fully integrated with any type of WiNRADiO receivers. Together, they represent a breakthrough in reception of digitally coded radio communications - never before has such a comprehensive collection been made available at such a low cost and so elegantly integrated with a PC-based radio receiver.

The WiNRADiO Digital Suite expands the power of your WiNRADiO receiver with numerous digital processing facilities, including:

- WEFAX (Satellite Weather Fax)
- HF Fax
- Packet Radio
- Aircraft Addressing and Reporting System (ACARS)
- Dual-Tone Multi-Frequency signalling (DTMF)
- Continuous Tone Coded Squelch System (CTCSS)
- Signal Classifier
- Audio Oscilloscope and Spectrum Analyser
- Squelch-controlled Audio Recorder and Playback

Upon installation, the WiNRADiO Digital Suite will appear as a new menu entry in the WiNRADiO receiver software, and all the above modules can be invoked from there.

# INTRODUCTION

The award-winning and immensely popular WiNRADiO receivers are the world's first commercially available wide-band communications receivers, which combine advanced receiver technology and the computing power of a PC, to set new high standards in radio communications.

The WR-1000/1500 series receivers offer cost-effective solutions to a wide variety of receiving requirements. They are available in two versions: as ISA cards for internal PC mounting, and as compact external units mounted in an attractive shielded case for portable and desk-top use.

The internal versions conserve valuable desk-top space, and avoid the need for external cables and power supplies. They also have the advantage of not requiring any additional interface ports, as all communication with the PC is via the internal PC bus. Multi-channel operation is simple to achieve, as up to eight WiNRADiO internal receivers can be used simultaneously in the one PC.

The external versions can be controlled through an RS-232 serial interface, or the optional plug-and-play PCMCIA interface. The PCMCIA interface allows quick and simple connection to any laptop PC, providing complete portability for vehicle or field use. The external versions can be powered by the plug-pack (supplied), or from the optional WR-PPS battery pack with inbuilt charger.

The external models also include a direct discriminator output, for optimum reception of packet and other digitally modulated signals.

As a new user, you are invited to join the WiNRADiO User Club. As a club member, you will receive our WiNRADiO Newsletter free of charge, and be informed about any new products or software upgrades.

To register, please use the Web site closest to your location:

| | |
|---|---|
| North America | www.winradio.com/home/register.htm |
| Europe | www.winradio.co.uk/home/register.htm |
| Australia/Asia | www.winradio.net.au/home/register.htm |

Comments and suggestions are welcome, and can also be made from these sites.

Be sure to visit our Web site from time to time, and watch for new software upgrades and options as they become available.

Thank you for purchasing WiNRADiO, and we wish you many hours of listening pleasure!

The 'Sweep receiver' list allows you to specify which receiver card shoul used for sweeping. The list shows all currently available receiver cards.

'VisiTune manual refresh', when enabled, forces updating of the spect display under the frequency cursor (thus allowing a 'manual sweep' with mouse if the left mouse button is held down).

You can also control which sweeps are visible on the display by checking appropriate check box in the 'Visible sweeps' group.

## Developer Information

If you would like to develop your own software for the WiNRADiO recei full programming information is available from the WiNRADiO web sit the Internet at www.winradio.com. Full API and DDE specifications outlined including source and examples that can be downloaded for C Delphi and Visual Basic programmers.

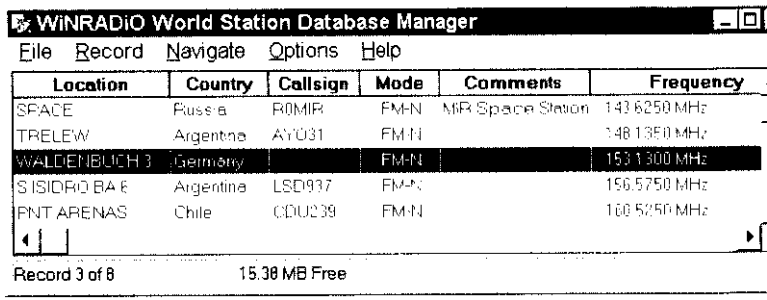
## Add-on Options

Two interesting options you might wish to consider are the WiNRADiO W Station Database Manager and the WiNRADiO Digital Suite.

### WiNRADiO World Station Database Manager

The WiNRADiO World Station Database Manager is a fully integrated op which adds powerful frequency database facilities to your WiNRA receiver, making it possible to keep track of hundreds of thousands frequen

Upon installation, the Database Manager will appear as a new menu ent the WiNRADiO receiver software, and can be invoked from there. The prog can be used in two different ways: to identify the station the receiver is curr tuned to, or to tune the receiver to a frequency from within the database



clicking with the right mouse button on the display. You can choose 'Tune to current frequency' and 'Tune to current peak' to tune the same as above. Alternatively, you can select 'Tune to maximum peak' and 'Tune to average peak' to tune to a peak on those calculated sweeps respectively.

You can also explicitly select a receiver to tune the frequency to, other than the default. If you have two or more WiNRADiO receivers you can tune one of these other receivers to the frequency or frequency peak. Click on the appropriate receiver under 'Tune other receiver to freq'.

Finally, if you have only one receiver, you might wish to enable the 'Manual refresh' feature under 'Options'. When enabled, the background spectrum graph will be updated while you are navigating around it with the left-hand mouse button held down (note that, with the fast hand movements over a large frequency range, the receiver's settling time might not allow accurate updating of the displayed spectrum).

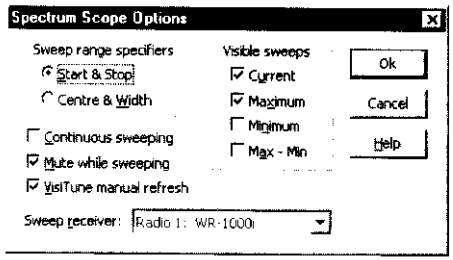
## Saving and Loading Files

Every sweep is recorded until a new sweep is performed with different parameters. To save sweep data, click on the 'File' button and select 'Save' from the pop up menu. Enter a file name in the dialog that appears and click on OK to save the file.

To load a previously saved file, click on 'Load' from the 'File' menu. Select the file and click on OK. Any previous sweep data will be immediately cleared.

## Options

Several aspects of the Spectrum Scope can be customised.




The first is the sweep range specification, you can choose either start and stop frequencies, or the centre frequency and the width of the sweep. Select the appropriate method in the dialog box.

You can configure WiNRADiO to mute the audio or not when it starts a sweep. It will mute the audio if the 'Mute while sweeping' check box is checked.

If 'Continuous sweeping' is checked, when the sweeper gets to the end of a sweep, it will start a new sweep immediately until this option is unchecked or you click on the 'Stop' button.

# INSTALLATION

The WiNRADiO internal version package contains the following items:

- WiNRADiO receiver card

The WiNRADiO external version package contains the following items:

- WiNRADiO receiver unit
- RS-232 cable
- Power adaptor
- PC Card Adaptor option (if ordered)
- Portable Power Source option (if ordered)

Both packages include the following items:

- WiNRADiO software installation disk
- Indoor test antenna
- This User's Guide
- The manufacturer's warranty information
- Any software option (such as the WiNRADiO Digital Suite or Database Manager), if ordered

*Note that you must supply your own antenna for optimum reception.*

In order for your WiNRADiO receiver to function, your IBM PC compatible computer must meet the minimum system requirements specified below.

## *System Requirements*

| | **Minimum** | **Recommended** |
|---|---|---|
| Processor: | 386 | Pentium or higher |
| RAM: | 4 MB | 16 MB or more |
| Display | VGA | SVGA: at least 800x600, 256 colours |
| OS: | Windows 3.1 | Windows 95 or NT 4 |

Spare serial port or PCMCIA socket for the external model, or a spare ISA slot for the internal model.

## *1000i/1500i Hardware Installation*

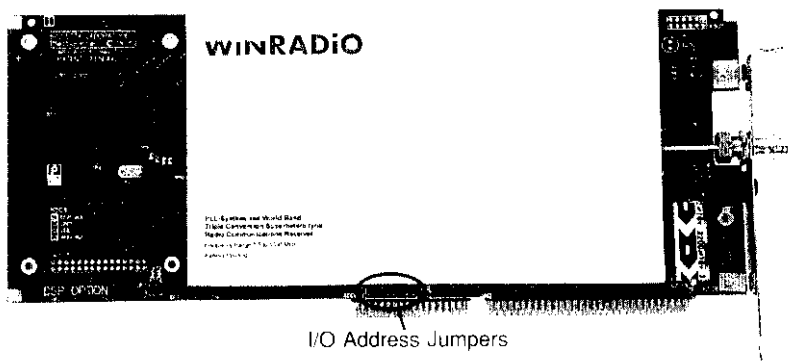
1. If your computer is on, shut down the computer first, turn it off and disconnect the power cord.
2. Remove the computer cover.
3. If other expansion cards are fitted, check their address assignments. If necessary, change any of the jumpers on the WiNRADiO receiver card to avoid conflicts. (The default I/O port 180 should normally work, however if you need to change any jumpers, see the following section about 'Jumper Settings'.)

4. Choose an empty 16-bit expansion slot, preferably with an empty slot immediately to the right (assuming you are facing the computer front).
5. Important: Before inserting the WiNRADiO card, touch the computer metalwork with your hand (to drain any static charge from your body), and also touch the metal bracket on the WiNRADiO card.
6. Carefully insert the card into the vacant slot, and push until it is firmly seated. Screw the metal bracket at the end of the card to the computer case (this must be done to minimise ground-conducted interference).
7. Replace the computer case and reconnect the power cord.
8. Plug a speaker or headphones into the audio jack at the rear of the card. Alternatively, if you have a sound card and wish to route WiNRADiO through it, you can plug an audio 'patch' cable from the audio jack to the 'Line In' jack on your sound card. Note that a 3.5mm **stereo** plug must be used, otherwise you will hear no audio from the receiver. A suitable patch cable is included with the WiNRADiO Digital Suite option.
9. Connect the antenna to the BNC jack at the rear of the card and extend the antenna up and as far away from the computer as possible.

## Jumper Settings

The WiNRADiO receiver card is provided with jumpers which select the desired I/O port address. The jumper may need to be changed from the factory default settings to avoid conflicts with other cards already installed in the computer.

There are eight possible I/O addresses which the WiNRADiO card can use: 180, 188, 190, 198, 1A0, 1A8, 1B0 and 1B8 (all specified in hexadecimal).




I/O Address Jumpers

If more than one WiNRADiO card is to be installed in the computer (up to 8 depending on available address lines), each card must be assigned a unique I/O address.



a slower, higher detail sweep, select a small step size, and in contrast, for quick, coarse sweep, select a large step size. For example, if you are using th 17 kHz RBW, step sizes below 10 kHz are not useful; all signals would captured at 10 kHz. A 5 kHz step is suitable for a fairly detailed sweep using RBW of 6 kHz. If you select a step size larger than the RBW, it is possible th signals will be missed that are located between two stepped frequencies.

Once you have specified the parameters, click on the 'Sweep' button to perfor a sweep.

To stop a sweep prematurely, click on the 'Stop' button (which is the 'Swee button with a different caption). If you stop, clicking on the sweep butt again will start a new sweep from the start (but the previous sweep will preserved until a parameter is changed).

Alternatively, you can click on the 'Pause' button to pause the sweeping a click on it again to let the scope resume from the frequency it was paused

## VisiTune™

A unique feature of the WiNRADiO Spectrum Scope makes it possible smoothly tune the receiver by dragging the mouse against a spectr background. This feature is called 'VisiTune'.

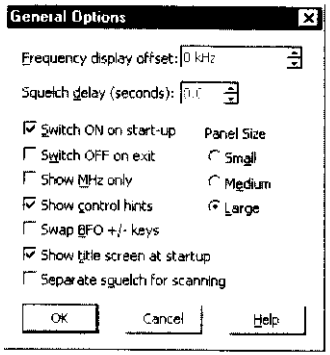
When you click on a spectrum sweep with the left mouse button, the recei will tune to the frequency where the mouse is located (the frequency displayed in the top-left corner of the scope window). If you hold the mou button down and drag it left or right, the receiver will immediately respond your movements, allowing you to directly inspect transmissions visible on spectrum sweep.

If you double-click at a point on the display, WiNRADiO will search for highest peak nearest the cursor depending on the slope of the sweep at cursor. It will check the level at either side of the frequency where you doub clicked. It will then follow the slope that rises towards a peak until it reac a peak. If you click at a valley, it will search both sides for the highest pe Clicking on a flat part will not start a search for a peak.

To make VisiTune more useful, you can configure the spectrum scope to another receiver for sweeping. If you have another WiNRADiO card install this allows you to let the spectrum scope to continually sweep the band are interested in and at the same time tune and listen to any frequency in sweep. See the 'Options' section for more information on configuring feature.

These tuning methods can be accessed from the context menu, invoked b

## General Options



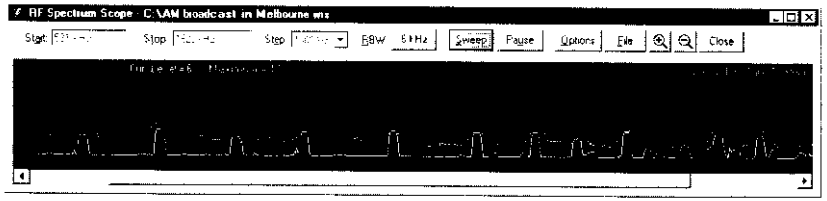

Other configurable options for WiNRADiO have been grouped into a common dialog box called 'General Options' which is accessed from the 'Configure' menu.

The Frequency readout offset specifies a value that is added to the displayed frequency. It is useful if you are receiving a transmission through a down-converter (to receive frequencies higher than upper limit of the receiver).

The other options are self-explanatory, if you need more explanation about a particular feature, refer to the on-line help.

# Spectrum Scope

The 'Spectrum Scope' is a utility to display and store the signal level across a frequency range. After a frequency sweep has been performed, you can tune to any frequency on the display. To tune to a frequency or peak on the display, click on it. You can hold down the mouse button and drag the cursor across the display quickly tuning to any frequency on the display (this facility will be described in greater detail under chapter heading 'VisiTune'). You can even configure it to tune another receiver card into the selected frequency. Double-clicking finds and tunes to the closest peak.




## Spectrum Sweeping

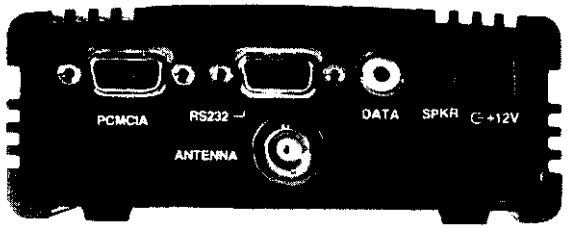
To perform a spectrum sweep, you have two methods of specifying the frequency range. You can either specify it by the start and stop frequencies, or by the centre frequency and the width of the sweep. To specify a sweep method, see the following section on 'Options'.

Next, you specify the step size depending on the resolution and speed you want. The resolution bandwidth (RBW) also has an effect on the step size. For



# 1000e/1500e Hardware Installation

1. First install the software (see below).
2. Connect the supplied power adaptor to the +12V DC power socket on the rear of the unit, and switch the unit on.
3. Connect the supplied RS-232 (or optional PC Card Adaptor) cable between the computer and the WiNRADiO unit.
4. Connect the antenna to the BNC connector at the rear of the unit, and extend the antenna up and as far away as possible.



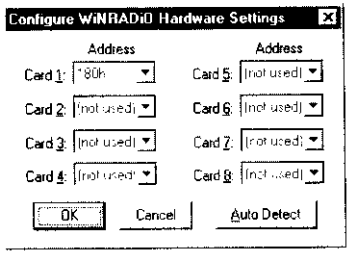

# Software Installation

1. Insert the WiNRADiO installation disk into your floppy drive.
2. If you are using Windows 95 or NT 4, click on the 'Run' command in the 'Start' menu. If you are using Windows 3.1x or NT 3.5x, Click on the 'Run' command in the 'File' menu in Program Manager or File Manager.
3. Type A:\INSTALL (or B:\INSTALL if your floppy drive is B).
4. After the Welcome dialog box and Licence agreement, you will be prompted to enter a directory to install the WiNRADiO software. You can either choose to accept the default, or you may enter your own.
5. The installation will then proceed to install the necessary files onto your hard disk. You will then be asked whether you want to add an icon to Windows. If you accept, you will then be asked which program group to add the icon to.
6. If this is the first installation in Windows 3.1x or 95, you will then be asked to restart Windows. The WiNRADiO receiver will not work until Windows has been restarted. In Windows NT, a hardware configuration utility will pop up allowing you to specify the hardware settings for the software (see the next section 'I/O Configuration' for more details).

*WiNRADiO software is periodically upgraded. Check out the newest software version on our Web site at www.winradio.com. If you wish to be automatically notified of upgrades and other WiNRADiO related information, please register with our user database by sending an e-mail message with subject heading REGISTER to support@winradio.com.*

## I/O Configuration

To inform the software of the internal hardware configuration, a Control Panel applet is used. Open Control Panel and double-click on the WiNRADiO icon. A dialog box will appear, which allows you to specify the hardware configuration for the software. As can be seen, up to 8 internal cards can be configured, and for each card installed, a suitable I/O address must be nominated. External WiNRADiO models will automatically be assigned the next available number.




In most situations, you can use the 'Auto Detect' feature, which will allow the software to find all the cards and settings for each. Only rare circumstances stop the auto-detection from working.

If there are any problems with the settings (such as an address conflict), you will be notified of the problem.

In Windows 3.1x and 95, after you click on OK and any setting has been changed, you will be prompted to restart Windows for the new settings to take effect. In Windows NT, the new settings take effect immediately without restarting.

## Uninstalling WiNRADiO

In Windows 95 and NT 4, start up Control Panel and double-click on the 'Add/Remove Programs' icon. Select 'WiNRADiO' from the list and click on the 'Add/Remove' button.

In Windows 3.1x and NT 3.5x, double-click on the 'Uninstall WiNRADiO' icon in the program group that contains the WiNRADiO icon.

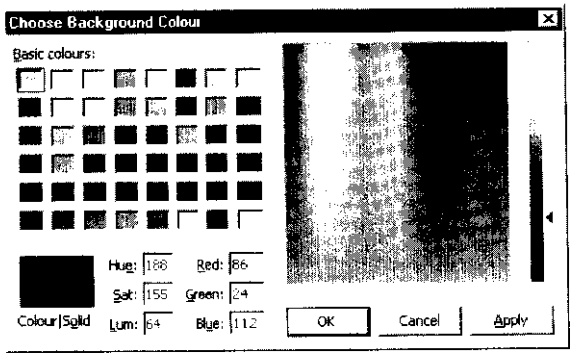
All software and changes to any configuration files will be removed from your hard disk.

# *Troubleshooting*

## Installation Problems

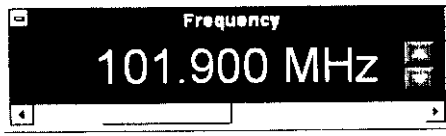
If you try to start-up your WiNRADiO receiver for the first time and you are presented with a dialog box stating that the WiNRADiO receiver card could not be found, you most likely have a configuration problem.





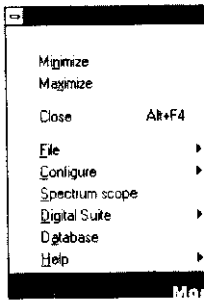

## Always On Top

This facility allows the WiNRADiO window to remain always visible, ev when using other programs (such as a word processor). To enable t WiNRADiO window to do this, select 'Always on top' from the 'Configu menu. A check mark will appear next to this menu command. To undo this option, select the menu command again, and the check mark will be removed and WiNRADiO will act like other normal windows.




## Hide Title Bar

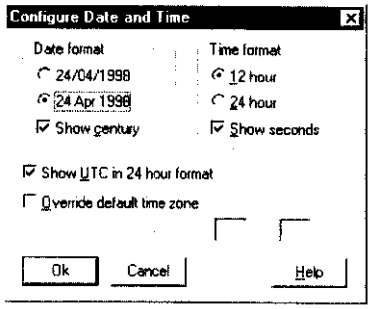
The ability to hide the title bar and menu allows you to reduce the overall size of the window. To activate this feature, select 'Hide title bar' in the 'Configure' menu.




This feature is especially useful in conjunction with the 'Always On Top' feature to allow a small window to sit on top of all windows. For example, you could just show the current frequency as shown above.

To access the menu commands, click on the little button that is visible in the top-left corner of the window. To move the wind around the screen, click-and-drag on any inactive part of the WiNRAI panel or background. To show the title bar and menu, select the 'Hide t bar' command in the 'View' menu.

The time difference between the local time and UTC is set under 'Date/Time' in the Control Panel in Windows 95 and NT, while in Windows 3.1 you have to manually specify it in the 'Date and Time' configuration dialog box.




If you are in a country with 12-hour time, you can specify whether to show the local time in 12 or 24-hour format and whether to show UTC in 24-hour format.

If you are in a country with 24-hour time, you have no option to show the time in the 12-hour format.

## Window Properties

There are several features that allow the customisation of your WiNRADiO interface. These include:

- size of the window
- position of the panel in the window if the window is smaller than the panel
- background colour
- whether it is always on top of all other windows
- whether the title and menu bars are hidden for a smaller window

The first two are basic Windows features. The window that contains the receiver panel can be positioned anywhere in the Windows desktop and can be sized to be as big or as small as you want. When the window is smaller than the actual panel, scroll bars will appear to allow you to access hidden parts of the panel (see the next page for an example of a small window).

### Background Colour

To adjust the background colour, select 'Background Colour' from the 'Configure' menu. A dialog box will appear that allows you to specify the colour you want for your background.

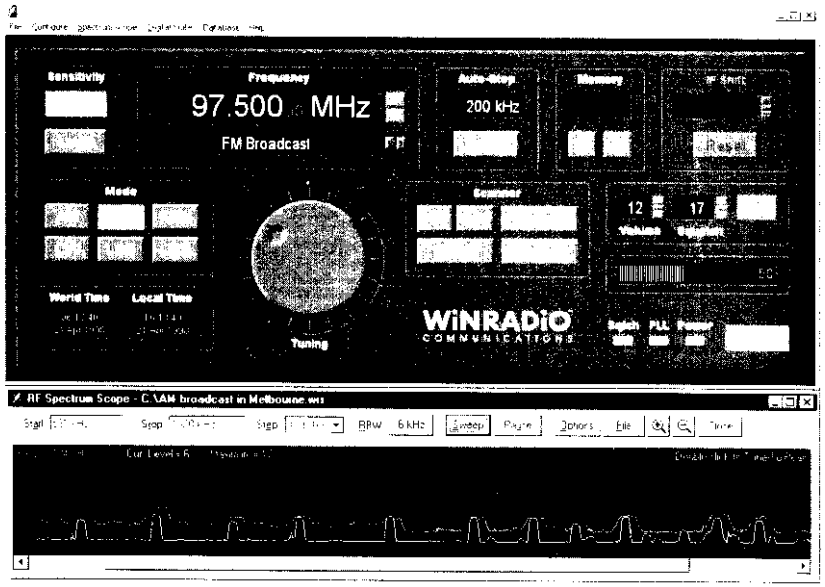
You can select one of several predefined colours, visually select a colour using the colour box (hue v saturation) and the 'luminance', or enter the colour specifying actual RGB or HSL values.

Click on 'Apply' to see the colour before closing the dialog box.

If you are using an internal WiNRADiO model, open the WiNRADiO configuration utility from Control Panel by double-clicking on it. Click on 'Auto Detect'. If no WiNRADiO card can be found, then you probably have a hardware address conflict. Shut down the computer, and try other jumper settings as described earlier in this chapter. Start up the computer and try auto-detecting again.

If you are using an external WiNRADiO model, make sure it is plugged in and the power is turned on (the red LED on the front panel should be illuminated).

If you are using the WiNRADiO software and find that the Spectrum Scope is obscuring the panel, try to reposition the main WiNRADiO control panel window by changing it from full-screen to a window, and positioning it in the top area of the screen. Shrink the size vertically so there is a thin border around the panel, as shown below. This should make your WiNRADiO receiver easier to use.




If you are finding that shortcut keys are not responding (including the tab and cursor keys), try clicking on the appropriate window with the mouse to activate the window. If you have more than one dialog box open at the same time, try closing them until only one is left open.

## Sensitivity Problems

The WiNRADiO receiver is very sensitive, so low sensitivity problems are usually due to noise induced into the antenna by the PC monitor, less commonly the PC, or some other external source. If the noise is strong enough, it can overload the receiver which responds by automatically reducing sensitivity using its AGC (Automatic Gain Control) mechanism. This problem is more common on low frequencies (under 30MHz). As a result, the reception can become noisy and the receiver appear to be 'deaf'.

This can happen if the antenna is poorly located, for instance if it is too close to the PC monitor, or used inside a building with steel-reinforced concrete walls. Try repositioning the antenna, or placing ferrite cores over its shielded lead close to the receiver, to break the transmission of interference back to the antenna.

Another remedy which is often effective is to place an RF (radio frequency) filter between the PC mains lead and the wall power outlet, to reduce interference caused by earth loops.

If these measures fail to produce the desired noise reduction , and if you are using an internal receiver model, try moving the receiver card to a different slot inside the PC, as far as possible from other potentially noisy cards, especially the video card, and the power supply.

Video monitors are also major sources of interference, and there are significant differences between brands in this respect. You can establish the noise contribution of your monitor by switching it off. If the noise diminishes substantially, check that the monitor lead is fitted with a ferrite suppressor bead (the rectangular or cylindrical moulding on the lead). If not, fit a suppressor, or acquire a quieter monitor.

## Intermodulation Problems

Your WiNRADiO receiver has been designed to be very sensitive in order for it to work with the moderately small antennas which are preferable for VHF/UHF. In areas with strong local broadcast stations, the WiNRADiO receiver front-end may overload and, as a result, intermodulation products may appear in the received band. By pressing the Local button on the control panel, the interference products will disappear.

It is advisable to use the Local setting if you are operating the receiver with larger outdoor antennas, especially on broadcast bands. For long-distance shortwave reception, a considerable improvement can be obtained by using a tuned antenna and preselector.



normal location.

On the 1000 in SSB mode, the BFO Offset control allows the receiving frequency to be set in precise 5 Hz steps, to ensure accurate reception of SSB and CW transmissions. An offset of up to 3000 Hz above or below the curren frequency can be set.

To use the control, click on the display and enter the frequency in Hz. To se the frequency from the keyboard, press I or Ctrl+B and enter the frequency To quickly reset the display to 0, press the Reset button or the 'star' key on th numeric keypad.

To adjust the frequency incrementally, click on the up/down buttons next t the display with the mouse, or use the + and - keys on the numeric keypac You can also use the slider button located in between the up/down buttons a described in the 'Volume Control' section. You may find it convenient t reverse the + and - keys (see 'Configure - General Options').

## Indicators


The three LED-like indicators indicate various states of your WiNRADiO receiver.

The squelch indicator, 'Sqlch', is green when the squelch is inactive (the audi output is open), and red when it is active or about to activate (depending o the 'Squelch delay' time specified under 'Configure - General Options').

The 'PLL' indicator shows the lock status of the receiver's Phase Lock Loo When operating normally, the indicator is green. If something goes wrong, will turn red indicating that the receiver cannot tune into a specific frequenc

The 'Power' indicator indicates that the receiver is powered up.

## Power Switch

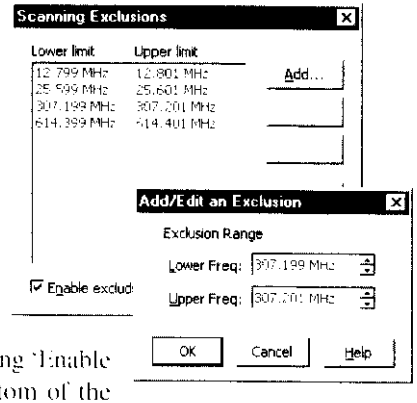
The power switch controls the radio receiver's power. When it is off, th actual receiver circuitry is powered down.

## Date and Time Displays


The date and time displays show the current local time and UTC standard time. The actual format of the displays is controlled by 'Regional Settings' in the Control Panel (or 'International' in Windows 3.1 and NT 3.5) and to a lesser degree in the 'Date and Tim dialog activated from the 'Configure' menu.

visible at the bottom of the dialog box. It allows you to specify the scanner squelch while the audio squelch remains controlled from the main panel.

### Exclusions




To avoid the scanner stopping at unwanted frequencies, your WiNRADiO software can maintain a frequency exclusion list. The exclusion list contains a list of frequency ranges which are skipped by the scanner.

During a scan, you have the option of adding frequencies to the exclusion list by clicking on the 'Exclude' button (this option is enabled by checking 'Enable excluding while scanning' at the bottom of the 'Scanning Exclusions' dialog box). The range that is excluded depends on the mode. In CW, LSB and USB modes, the default range excluded is ±999 Hz, AM is ±1.999 kHz, FMN is ±6.249 kHz and FMW is ±49.999 kHz of the current receiver frequency. If you want to change any of these default values after they have been added, select the exclusion from the list and click on the 'Edit' button.

You can also manually add exclusions by clicking on the 'Add' button, edit or delete existing ranges. There is no priority system; if the frequency is within any range in the list, it will be ignored by the scanner.

## *Miscellaneous*

### Mute

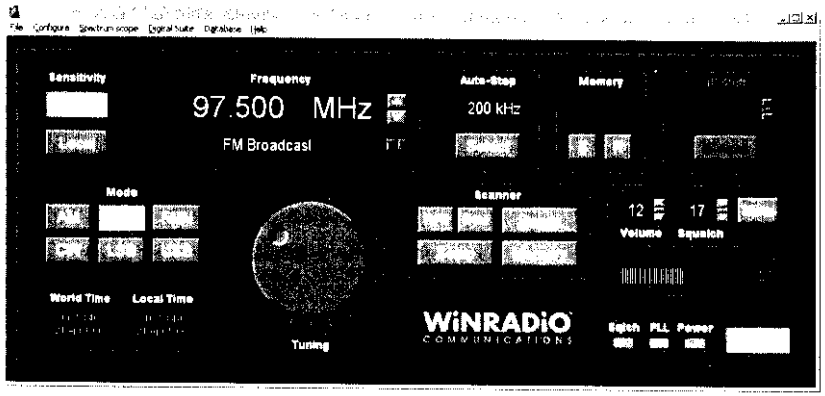
The mute button controls the audio output of your WiNRADiO receiver. If it is on, the output is muted (switched off). To activate (or deactivate) the mute control, click on it or press Ctrl+U.

### IF Shift and BFO Offset


On the 1500 in CW, LSB and USB modes, a control is enabled at the top-left corner of the panel to allow you to adjust the 'IF Shift' of the receiver. This controls the quality of the audio reception of an SSB transmission. The IF can be shifted up to 2000 Hz above or below the

# Using WiNRADiO

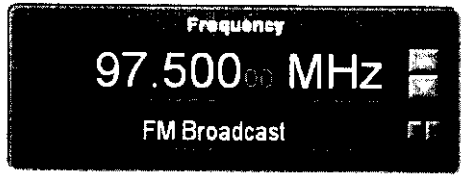
When you first start WiNRADiO, you are presented with a radio receiver interface. The image below shows the main parts of the control panel.




The following few sections document each of the parts in detail.

## *Basic Controls*

### Frequency Readout




The frequency readout shows the current receiver frequency.

Below this is another display which shows one of the following: the callsign and/or a comment relating to the current tuned frequency, taken from the frequency memory (entered by the user), or the description of the current band. The band description is user-definable under 'Auto-stepping' in the Configure menu.

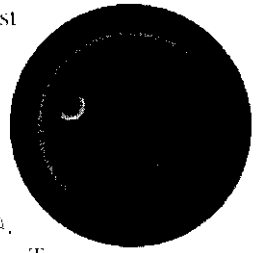
To enter a frequency, simply type the desired frequency using the keyboard. As soon as you press a number or the decimal point, the frequency readout will enter the edit mode, allowing you to enter the frequency. The old frequency is automatically overwritten. If you want to edit the existing frequency, click on the readout with the left mouse button to highlight the current frequency, position the cursor as desired, reclick the left mouse button, make the desired changes, then press the Enter key. To change the frequency unit (kHz, MHz or GHz), press k, m or g respectively while the display is highlighted or in edit mode.

To tune the receiver to the new frequency, press the Enter key. To cancel and return the previous display, press the Escape key.

In each mode, the frequency readout only displays the most significant digits which affect tuning and reception. On the WR-1500 series receivers, the display resolution is as follows: 1 Hz in CW, LSB and USB, 10 Hz in FMN, 100 Hz in AM and 1 kHz in FMW. On the WR-1000 series receivers, all modes except FMW have a display resolution of 100Hz (1 kHz in FMW).

In FMW, the lowest tunable frequency is 30 MHz. If you attempt to tune to a frequency below 30 MHz, the receiver will automatically change the mode to AM, and disable the FMW button.

## Tuning Knob



The tuning knob adjusts the frequency by the smallest suitable increment for the current mode. In LSB, USB and CW (WR-1500 series only) it is 10 Hz; SSB (WR-1000 series only) is 100 Hz; AM is 100 Hz; FMN is 500 Hz, and FMW is 50 kHz.

To use the knob, position the mouse cursor over the top half of the knob, and the cursor will look like this: . To decrease the frequency, click the left mouse button. To increase the frequency, click the right mouse button. On the bottom half, the cursor will flip vertically ( ). The mouse buttons will now operate in reverse, with the left increasing and the right decreasing the frequency.

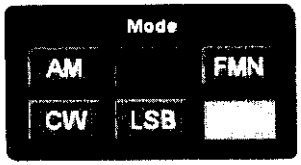
To tune the receiver from the keyboard, press the up/down cursor keys to increase and decrease the frequency respectively.

For faster tuning, use the Shift or Control keys simultaneously with the mouse or keyboard tuning commands to multiply the frequency step by 10 or 100 times respectively.

To reduce the step size to 1 Hz for more accurate tuning of LSB, USB or CW (WR-1500 series only), use the Alt key simultaneously with the mouse or keyboard tuning commands.

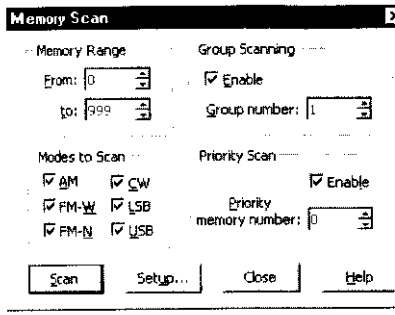
## Modes

WiNRADiO WR-1000 series supports four different reception modes (AM, FMN, FMW and SSB), while the WR-1500 series supports six different reception modes (CW, LSB, USB, AM, FMN and FMW).






## Memory Scan

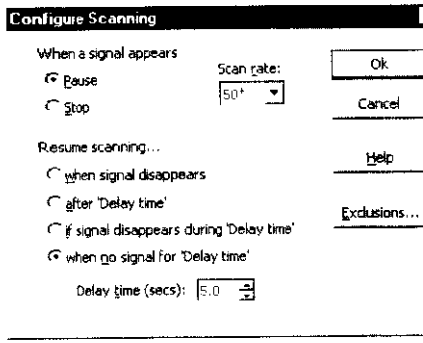



To scan frequencies stored in memory click on the 'Memory' button or press the M key, to open the memory scan dialog box.

You can select the range of memory numbers to scan, and also restrict the entries by specifying only certain modes and a group number.

You can also select priority scan, in which the scanner tunes to the priority frequency every second step.

## Scanner Options




There are several options that can be set for the scanner to suit your needs. You can specify how the scanner operates when it pauses at a signal and how fast it scans.

When the scanner finds a signal, it has two basic options: pause or stop. If 'pause' is specified, you can force the scanner to continue, stop, exclude or wait.

If you leave it waiting, there are four different options to allow it to contin automatically:

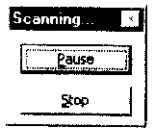
- When the signal disappears (drops below the squelch level)
- After a fixed period of time (regardless of the signal level)
- When the signal disappears during a fixed period of time or after fixed period of time (whichever comes first)
- After a signal disappears for at least a fixed period of time.

The fixed period of time is specified by the 'Delay time'.

The scan rate specifies the maximum number of frequencies per second scanner will check, but could be slower than specified if you have ot programs running.

Your WiNRADiO software offers have two separate squelch settings: one audio and one for scanning. This option is specified under 'Configure - Gen Options' in the 'Configure' menu. If this feature is enabled, another contro

## Immediate Scanning

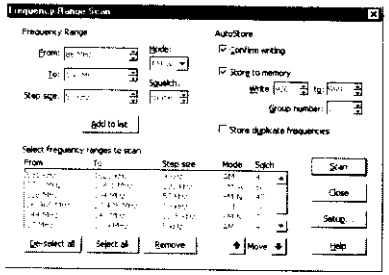



Immediate scanning is the quickest and simplest way to search for stations. To activate this, first set the desired stepping mode and step size if necessary, then click on the immediate scan up or scan down button. The receiver will then start scanning up or down from the current frequency, according to the selected step size.

If the receivers encounters a signal which has the same or higher strength than the current squelch threshold, it will either pause or stop, depending on the selected scanning options (see below).

To access immediate scanning from the keyboard, use the Insert or Delete keys to scan up or down respectively. To cancel immediate scanning, press the Escape key.

## Frequency Range Scanning




Frequency range scanning (called 'range scanning' from now on) allows you to specify multiple scanning ranges in a list. Each range is defined by the start and stop frequency, step size, mode and squelch setting. Changes to the list are automatically stored on the hard disk when the list box is closed.

To perform a range scan, you can either specify a range in the 'Frequency Range' area (and there must be no entries selected in the list below), or else select one or more ranges in the list below; then click on 'Scan' to commence scanning.

To access range scanning from the keyboard, press the G key.

To write active frequencies to memory, select 'Store to memory' in the 'AutoStore' group, and specify a range of memory numbers for the scanner to write to. You can also assign a group number for the particular scan. If you wish to manually confirm frequencies before they are written, check the 'Confirm' box. If you wish to store frequencies that already exist in the memory, check the 'Store duplicate frequencies' box.



These modes are abbreviations of Continuous Wave (CW), Lower Side Band (LSB), Upper Side Band (USB), Amplitude Modulation (AM), Frequency Modulation Narrow-band (FMN), FM Wide-band (FMW) and Single Side Band (SSB).

To select the desired mode, click on the appropriate mode button or use the keyboard shortcuts: A for AM, W for FMW, N for FMN, C for CW, L for LSB, U for USB and B for SSB.

## Volume


The volume control is located on the right hand side of the panel. The volume can range from 0 (no sound) to 31 (full volume).

There are several ways to adjust the volume. Using the mouse, you can increase or decrease it by clicking on the up/down volume control arrows respectively, or you can click on the scroll button between the two arrows and drag the volume up or down.

Using the keyboard, you can press V and enter the volume, or you can use the left and right cursor keys to decrease and increase the volume respectively.

## Signal Level Meter

The signal level meter, located under the volume control, shows the received signal strength. It represents the strength by a bar graph, and shows the equivalent numerical strength on the right side of the display.

The value represents the approximate signal level in dB above the receiver noise floor.

The signal level is also used to control squelch and scanning.

## Squelch

The squelch controls the audio output and scanner threshold.

In normal operation, if the signal level drops below the squelch threshold, the audio output is muted after a time delay specified under 'Configure - General Options'. If the signal rises above the squelch threshold, the audio is restored immediately.

The squelch indicator, at the bottom of the panel, shows whether the current signal level is above or below the squelch threshold. If it is above the threshold, the display is green, otherwise it is red.

The squelch threshold also controls scanning. When scanning, the receiver will pause or stop if it receives a signal above the squelch threshold, otherwise it will continue scanning until such a signal is found.

If you wish, you can have different squelch thresholds for normal reception and scanning. To activate this feature, go to 'Configure - General Options' and select 'Separate squelch for scanning'. The receiver will then accept different squelch thresholds on the front panel, and in the 'Scanner - Setup' dialog box (described later).

### Attenuator


The attenuator controls the level of the RF signal entering the receiver front-end. If a signal is too strong, it may overload the receiver and cause distortion. To combat this problem, the RF signal can be attenuated by 18 dB by clicking on the 'Local' button or by pressing the O key.

If the attenuator is active and the signals are too weak, click the 'DX' button or press the D key to turn the attenuator off.

## *Stepping*


Four stepping modes are available: fixed, auto, memory, and duplex. To select between fixed, auto and memory stepping, click on the 'Select' button or press the T key until the desired stepping mode appears. Duplex stepping is activated separately, as described below.

To step through frequencies, click on the up/down buttons located next to the frequency readout, or press the Page Up/Page Down keys to step up/down respectively.

The stepping modes are described below in more detail.

### Fixed Stepping

Where stations operate on fixed channels (e.g. AM or FM broadcast band, mobile radio, CB), it is usually more convenient to change the frequency in steps corresponding to the channel separation.

You can specify the desired step size for each mode from a minimum equal to the frequency resolution of the display, up to a maximum of 10 MHz. To enter the step size, either click on the step display with the mouse, or press the F key; then enter the desired step size and press Enter (or Escape to cancel the entry). Note that LSB/USB share the same step size.



You are able to modify every setting, including the frequency, except for th actual memory number.

To edit the next memory entry, click on the 'Next' button.

### Saving and Loading Memory Files

WiNRADiO stores 1000 frequencies in each memory file. You can choos which file is currently active, and you can also save the file under a differe name.

When you start your WiNRADiO receiver for the first time, it creates a memor file called *winradio.wrm*. Every time you close your WiNRADiO session, th memory is automatically saved to the active file. To perform an immedia save, select 'File - Memory file - Save'.

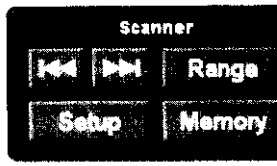
To open another memory file, select 'File - Memory file - Open'. Before th new file is opened, and if the current memory file has been modified duri the current session, you will be asked if you want to save the changes or n Next, a dialog box will appear which allows you to open a different memo file (or reopen the same one discarding any changes since it was last opene The selected file will now become the active memory file.

To rename the current active file and save it under a different name, sele 'Save as' from the same submenu. A similar dialog box will appear, whe you can specify the new filename and/or path.

### New Memory File

To clear all frequencies and start a new file, select 'File – Memory file New...'. Before the new file is opened, and if the current memory file h been modified during the current session, you will be asked if you want save the changes or not. A dialog box will then appear, prompting you enter the name of the new file.

## *Scanning*




WiNRADiO provides a variety of scanning functions and options, to allow you to optimise the way you search for stations. The following sections describe the available scanning methods and associated options.

- Use the memory recall/view dialog box:
- Use memory stepping.

## Hotkey

The quickest way to recall a frequency is to assign a function hotkey to it when you initially store the frequency. Any function key from F2 to F12 can be used. Note that F1 cannot be used, as it is reserved for help.

If desired, existing memories can be edited to add a function hotkey (see below).

To recall a frequency using a hotkey, simply press the appropriate function key (F2 to F12), and it will be recalled instantly. This assumes that a frequency has previously been assigned to that key, of course.

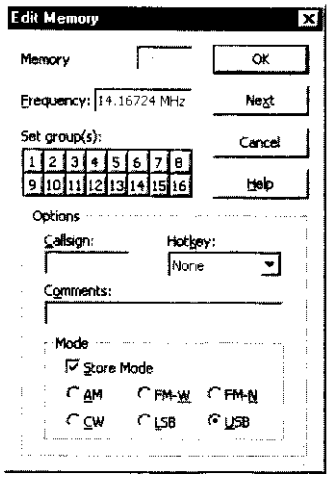
## Control-Number

To recall any memory, hold down the Control key down while typing the number of the memory. Alternatively you can click on the memory display, enter the number, and then press Enter to recall it.

## Memory Recall/View

The final alternative is to click on the 'R' button or press the R key, upon which a memory recall dialog box will pop up allowing you to view and recall any frequency from a list. You can limit the list to a subset of frequencies by specifying a search string, group number or selected modes. Then click on 'Find', upon which only those frequencies which match the search criteria will be shown.

To tune the receiver to a list entry and keep the memory viewer open, single-click on it with the left mouse button. To tune the receiver and close the viewer, double click on it. To tune the receiver to the frequency it was tuned to before opening the memory viewer, click on 'Previous'.




## Editing Memory

To edit an existing memory entry, first click on the 'R' button or press the R key. Select the memory to edit from the list, then click on 'Edit'.





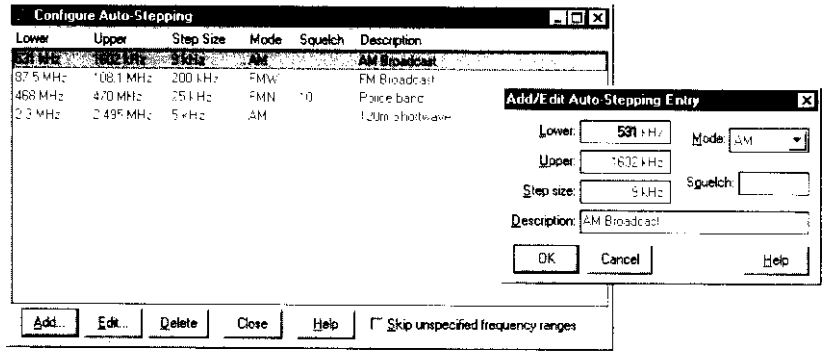
If you change the mode, the step size will be changed to the size previously entered for that mode.

Note that all modes retain the frequency to the nearest 1 Hz even though the extra digits might not be visible. For example if you change from LSB to FMW and back, the actual frequency is not rounded off, but remains the same. This ensures that accidental mode changes do not cause the exact current frequency to be lost.

## Auto-Stepping

Auto-stepping is an enhanced form of fixed stepping, in which the step size depends on the receiver frequency. This facility can also automatically set the mode and squelch threshold according to frequency.

Before this feature can be used, it is necessary to set up one or more stepping ranges. To do this, first select 'Auto-stepping' from the 'Configure' menu. A




dialog box will appear, allowing you to establish the auto-stepping ranges.

To add a range, click on the 'Add' button. Another dialog box will appear, allowing you to specify the lower and upper frequency limits, the desired step size for that range, the mode, squelch level, and a text description. The mode, squelch level and description are optional.

You can also edit, delete and move the ranges in the list. If ranges overlap, those at the top of the list will have higher priority over those lower in the list. You can move ranges higher or lower in the list by clicking on them and dragging them to the desired location.

If the receiver is not in a specified range, it will default to the fixed step size. If you enter a different value in the step display, it will change to that step. If the receiver is subsequently tuned to a defined auto-step range, the step size for that range will be automatically recalled and will replace the fixed step.

Whenever the receiver is tuned to a defined auto-step range, the display below the main frequency readout will show the text description for that range regardless of whether auto-stepping is active or not. If the current frequency coincides with a frequency previously stored in memory (see below), the memory comment will take precedence over the text description.

## Memory Stepping

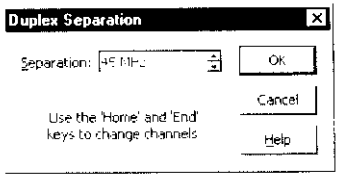
Memory stepping allows the user to step directly between frequencies previously stored in a memory file. In this mode, the callsign of the current memory entry is shown in the step display.

If the user types in a frequency which does not correspond to a memory frequency, the receiver will tune to this frequency without problem. If the user then steps the frequency up or down, the receiver will find the memory frequency closest to the current frequency in the same direction, and tune to it.

At least one frequency must be stored in memory for memory stepping to work. If the memory is empty, memory stepping will not function.

## Duplex Stepping

Duplex stepping simplifies listening to full duplex transmissions, which usually have widely different transmit and receive frequencies. It can also be used to step between other widely spaced transmissions, which have the same mode.




To set the frequency separation, select 'Duplex Separation' from the 'Configure' menu. Any separation can be entered, up to the maximum tuning range of the receiver.

To step up or down by an amount equal to this separation, press the Home or End keys respectively. If the user attempts to step outside the frequency limits of the receiver, the command will be ignored.

# *Memory*

WiNRADiO has the ability to store up to 1000 frequencies in a memory file, and the total number of memory files is limited only by hard disk capacity.


Each entry is assigned the following: a number from 0 to 999,

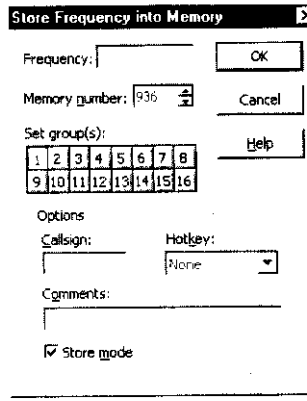


the frequency, mode, group number(s), callsign and comment.

If the receiver is tuned to a frequency stored in the memory, the associate callsign and comment is displayed in the area below the main frequenc readout.

## Storing a Frequency into Memory

To store a frequency into memory, first tune to that frequency and select the appropriate mode (if you wish the mode to be stored).




Click on the 'S' button (store to memory) or press the S key.

A dialog box will pop up allowing you to enter other details about the frequency. The initial memory number is the first empty memory entry, starting at zero. You can also specify a group number (or more), callsign and comment.

If you select a memory number which is already used, you will be asked to confirm overwriting the existing frequenc

## Recalling a Frequency from Memory

There are several ways to recall a frequency from memory:

- Use a hotkey;
- Type a number into the memory number display;
- Type a number while holding down the Control key;