

# RxWings

A computer program to support  
ShortWave Listening with your  
AR7030, NRD535/545 and/or RX320

Version 2,  
27 October 2003

Jan Arkesteijn

The Netherlands

E-mail : [rxwings@planet.nl](mailto:rxwings@planet.nl)  
Home page : <http://home.wxs.nl/~jarkest/home.html>

## Contents

<b>1.</b>	<b>Introduction</b>	<b>p 3</b>
1.1	The Receiver	
1.2	The Program	
1.3	Giving Feedback	
1.4	Getting the Source code	
<b>2.</b>	<b>Installation of program and set-up</b>	<b>p 9</b>
2.1	Connection between Receiver and Computer	
2.2	Directory structure and files	
2.3	Installation	
2.4	Set-up and GO	
<b>3.</b>	<b>Direct receiver control windows</b>	<b>p 20</b>
3.1	Main control window for the AR7030	
3.2	Main control window for the NRD-535	
3.3	Main control window for the NRD-545	
3.4	Main control window for the RX320	
<b>4.</b>	<b>Database to Receiver files (Db2Rx)</b>	<b>p 42</b>
4.1	BDXC and ADDX files	
4.2	OWN files	
4.3	.320 files	
4.4	ILGRadio files	
4.5	Aero files	
4.6	Combined use with Tracking	
<b>5.</b>	<b>Receiver to Database files (Rx2Db)</b>	<b>p 50</b>
5.1	Logbook facilities	
5.2	ILG and Aero Tracking facilities	
5.3	Combined use of Logging and Tracking	
5.4	ILGRadio database conversion	
5.5	Aerolist conversion	
<b>6.</b>	<b>Analysis of received signal strength</b>	<b>p 57</b>
6.1	S-meter	
6.2	Spectrum Analysis	
6.3	Scan Frequency List	
6.4	Scan Frequency Pairs	
6.5	Propagation	
<b>7.</b>	<b>Receiver Memory Management</b>	<b>p 67</b>
<b>8.</b>	<b>Timer programming</b>	<b>p 72</b>
8.1	PC system clock setting	
8.2	Receiver clock setting	
8.3	Long-term timer set-up	
8.4	Long term timer programming	

## 1. Introduction

In this Word file all information has been brought together to explain the use of **RxWings**, a program to support Short Wave Listening with the HF receivers AR7030 from AOR, the NRD-535(D) and NRD-545 from JRC and the RX320 from Ten Tec.

The program **RxWings** will support the following SWL activities :

- + Use of frequency databases, both for querying and tracking (a.o. ILG, Aerolist)
- + Logging of received transmissions
- + Analysis of received signal: S meter, scanning (spectrum, lists, pairs) and monitoring/propagation
- + Memory management
- + Programming for unattended reception
- + For each receiver type optimised full direct control

These possibilities are described in more detail in the next chapters.

As the name suggests, the program has the aim 'to give your receiver wings'.

For people who want to know how the source code looks like or who want some help to develop their own control program, the source code can be made available on request. Just [drop me an E-mail](#)

Additional developments for this program are for an important part fuelled by feedback I get from users. So if you have any question or suggestion [drop me an E-mail](#)

### 1.1 The Receivers

The program **RxWings** supports the Short Wave Listening activities with 4 different receiver types, the AR7030 from AOR, the NRD535 and NRD545 from JRC and the RX320 from Ten Tec. In the next paragraphs more info about each receiver is given.

#### 1.1.1 The AR7030 from AOR



It is no doubt that the AR7030 short-wave receiver from AOR is a peculiar product. The 'noise' around its introduction and the attention it got, both from enthusiastic supporters

and non-convinced opponents caused anyhow that the whole Short-Wave Listening (SWL) community knows about its existence. In case you want to check some of these yourself go to the following Internet websites : <http://www.aoruk.com/7030rev.htm> or a more independent source at <http://www.rnw.nl/realradio/ar7030.html> If you want an electronic version of the AR7030 manual, go to <http://www.aoruk.com/manuals.htm>. On that location you will find the file '7030m.pdf'. Also the AR7030 computer remote control protocol can be found on the AOR site at the AR7030 bulletins page at <http://www.aoruk.com/7030bulletin.htm> You can find a lot more web addresses with information about this receiver by just entering 'AR7030' in one of the well-known Internet search engines.

### 1.1.2 The NRD-535(D) from JRC

Certainly the NRD-535 short-wave receiver from JRC is one of the best receivers for SWL-ing. Especially its high sensitivity combined with a high dynamic range is very much appreciated by the many enthusiastic users.



If you want to know more about JRC and its SW receivers go to <http://www.jrc.co.jp/index-e.html> or find a more independent source at <http://www.rnw.nl/realradio/nrd535.html>.

As far as I know there is no file version of the NRD-535 manual nor about the remote control protocol. For both you need a paper copy of the 'Instruction manual for Model NRD-535' You can find a lot more web addresses with information about this receiver by just entering 'NRD-535' in one of the well-known Internet search engines.

### 1.1.3 The NRD-545 from JRC

The NRD-545 is the latest short-wave receiver from JRC making extensive use of the recent digital technology called Digital Signal Processing. The high frequency /analogue part is like the NRD-535, so it keeps the high sensitivity combined with a high dynamic range.

If you want to know more about JRC and its SW receivers go to <http://www.jrc.co.jp/eng/product/comm/e-comm/jst-e.html> or find a more independent source at <http://www.rnw.nl/realradio/nrd545.html>.

As far as I know JRC does not issue file version of the NRD-545 manual nor about the remote control protocol. For both you need in principle a paper copy of the 'Instruction manual for Model NRD-545'. However scanned copies are available on the web, for example at <http://www.qsl.net/ab9b/Manuals/>.



You can find a lot more web addresses with information about this receiver by just entering 'NRD-545' in one of the well-known Internet search engines.

#### 1.1.4 The RX320 from Ten Tec

The RX320 is quite different from the other receivers because it is an (external) "black box" receiver without controls that plugs into a computer's serial port. The receiver is completely controlled through software that runs on a PC.



More information can be found on the Ten Tec website at <http://www.tentec.com/TT320.htm>. Also the Programmers Reference Guide can be downloaded from this web site at <http://www.tentec.com/rx320prg.zip>. For a more independent review go to <http://www.rnw.nl/realradio/rx320a.html>.

## 1.2 The Program

It is already some years ago that I started the development of short-wave receiver control programs to support the SWL activities. I gained already a lot of experience programming for the NRD-535(D) and the AR7030.

The program for the NRD-535 is called TURBO535 and the latest version (version 6, released March 2001, filenames T535V6A.ZIP and T535V6B.ZIP) can be found via links on my homepage (<http://home.wxs.nl/~jarkest/home.html>) or directly on a number of sites on the Internet, certainly on those mentioned in the paragraph on download.

The program for the AR7030 is called ParaDise and the latest version of that one (version 4, released February 2002, filenames P7030V4A.ZIP and P7030V4B.ZIP) can be found on the same locations.

Because of the continuous developments on the programs during a number of years, the source code had become a little like 'spaghetti'. Therefore I decided mid 2002 to start totally from scratch using a new software approach, called 'Object Orientation'. For further information on this have a look in the paragraph on source code. Anyhow the advantages of this new approach, in relation to simplicity and transparency of source code were such, that I decided to integrate the programs for the different receivers in one program, called **RxWings**.

### 1.2.1 Release 1 notes

The program **RxWings** version 1 has basically the same functionality as found in the last version of its predecessors, TURBO535 version 6 (T535V6) and Paradise version 4 (PD7030V4).

The most important new parts are the addition of the control of the RX320 and the integration of the control for three different receivers in one program.

However also a number of refinements have been brought in that can make the program valuable to ParaDise and TURBO535 users. To mention a few :

- changing the frequency with your mouse wheel
- tracking can now be used in combination with almost all other database windows,
- frequency history and frequency scratchpad to go back easily to an earlier tuned frequency,
- with one mouse click part of the data in the tracking window can be copied to the 'Add Log' window.
- the last location of each window will be remembered and used the next time this window is opened.

For more information about the possibility of the program have a look at the next chapters.

### 1.2.2 Release 2 notes

The program **RxWings** version 2 expand the possibilities further by adding a new receiver type, the NRD-545 and adding extra functions, like

- Hotkeys to control the main radio functions from the keyboard only
- Early warning on propagation improvements with the scan frequency list option
- Querying and tracking functions with the Aerolist files of Risto Hirvonen
- Easily scanning of bands using different (but paired) frequencies for transmitting and receiving
- Printing option for the propagation impressions

For more information about the possibility of the program have a look at the next chapters.

### 1.2.3 System requirements

The program is developed using a standard AR7030, an NRD-535D, NRD-545 and a RX320.

The program can of course be used with the AR7030 Plus, but the special AR7030 Plus facilities are not supported.

The program can also be used with a standard NRD-535. The extra options like BWC and ECSS can be switched off in the set-up.

The NRD-545 has an option to add a wideband converter (CHE-199) to expand the

frequency range from 30 MHz to 2 GHz. This wideband converter is not supported in RxWings.

The program needs Windows 95, 98, ME, NT, 2000 or XP to run it.

For easy operations (especially with the dial-tracking facility and the filtering function) a 200 MHz Pentium, at least 32 MB of Ram and 800 x 600 SVGA is needed. If more windows are open at the same time 1024x768 XGA or better is the system of choice.

#### 1.2.4 Download sites

The 2nd release package of the **RxWings** application is split in 2 parts, named RxWing2A.ZIP and RxWing2B.ZIP. Also a separate HTML Help file with plenty of screenshots to show what the program is up to is separately available, named RxWing2H.ZIP

All these files are uploaded to : <ftp://ftp.funet.fi/pub/ham/rigctrl/>  
A lot of mirrors of <ftp.funet.fi> exist, so after some time it will also be available on a number of other sites

Moreover the full VB 6 source code can be made available on request. Just [drop me mail](#) and I will send you the RxWing2S.ZIP archive

### 1.3 Giving Feedback

Additional developments are for an important part fuelled by feedback I get from users. So if you find bugs or insufficient / lacking functionality just let me know and I will try to improve it. But NO guarantee, it is just a hobby.

You can give me feedback in several ways :

1. Internet E-mail : [rxwings@planet.nl](mailto:rxwings@planet.nl) (preferred)
2. Phone call : (+31) (0) 348 419651, between 20-21 L(S/W)T in NL
3. Letter to : Jan Arkesteijn, Fagellaan 7,NL-3445 EZ Woerden, The Netherlands

### 1.4 Open Source Development of RigControl Software

Already a number of years I have developed programs to control short wave receivers from a PC. Several versions of these programs (TURBO535 or T535V# for the NRD-535 and ParaDise or PD7030V# for the AR7030) have been released on the Internet as Freeware.

The Visual Basic 6 pro source code of these programs is already for some time made available to other developers.

Summer 2002 I started to set-up my control programs all over again from scratch, using a different approach, based on so-called object orientation. The basic idea is that all complexity about the data communication with the receiver(s) is hidden in an object or class with a simple interface to access the defined properties, methods and events that are available with this class. While doing I learned that this approach is so much more transparent and simpler that I decided to integrate the control for the AR7030, NRD535 and RX320 in one program, called **RxWings**. However I did not define a generic receiver class, because of the huge differences in control protocols and control possibilities of the different receivers. Therefore a class (and user interface form) dedicated for the AR7030 is defined, one for the NRD535 and new ones for the RX320 (in release 1) and the NRD-545 (in release 2)

Also the full Visual Basic v 6 pro source code of this program is available for other developers.

The purpose of making the source code available is:

1. To broaden the scope of the development of new functions and
2. To make them available to the SWL community faster
3. To give users having programming facilities, the possibility to adapt the programs to their personal needs
4. To give the possibility to port it (partly) to other receivers, to other programming languages and/or to other operating systems

I invite everybody having programming facilities and interested in the development of HF receiver control programs to [drop me an E-mail](#) to get the source code



## 2. Installation of program and set-up

In this part is described how the receiver should be connected to the computer, which files you need, in what directory structure these files have to be placed and an easy way to install the program and select the right set-up.

### 2.1 Connection between Receiver and Computer

Before the program can be used, the receiver should be connected to a serial port of a computer. Dependent on which receiver you have you need different connector types. For the PC a 25 pins or 9 pins serial connector is needed. Details for each receiver are described in the next paragraphs.

In case your PC does not have a (free) serial port you can also use an USB port in combination with a USB to Serial converter. Most but not all of the USB to Serial connectors will work. You better prevent buying those that do not implement the full RS232 protocol.

#### 2.1.1 Connection between the AR7030 and the computer

On the receiver side you need a 5 pin /240° Din plug

On the PC side a 9 or 25 pin serial type connector is needed, depending on what is mounted on your PC

The preferred cable type is : two wire symmetrical shielded

As can be found in the AR7030 Operating Manual the pins should be connected as given below :

<b>AR7030 Din plug</b>	<b>PC 9-D</b>	<b>PC 25-D</b>	<b>Remark</b>
pin 2	pin 3	pin2	
pin 3	pin 2	pin 3	
pin 5	pin 5	pin 7	ground/shield

Remark: Sometimes it is difficulty to find the required non-standard 5-pin 240-degree DIN connector. This can be solved very simply, get a standard 6-pin DIN connector, and pull out (using pliers) the central pin. What is left is exactly the 5-pin 240-degree plug.

#### 2.1.2 Connection between the NRD535 and the computer

On the receiver side you need a 25 pin male-type serial plug

On the PC side a 9 or 25 pin male or female type serial connector is needed, depending on what is mounted on your PC

The cable between the receiver and the PC is so-called cross-connected. This can also be realised using a standard RS232 cable in combination with a so-called null modem. If your PC has a 9 pins serial port connector you need in this case also a separate adapter between a 9 pin and 25 pin connectors

As can be found in the NRD-535 Operating Manual the pins should be connected as given in the table on the next page :

<b>NRD535*1</b>	<b>PC9-D</b>	<b>PC25-D</b>	Remark
pin 1	n.a.	pin 1	
pin 2	pin 2	pin 3	
pin 3	pin 3	pin 2	
pin 4	pin 8	pin 5	
pin 7	pin 5	pin 7	
pin 20	pin 6	pin 6	

\*1 pins not mentioned have no connection inside the NRD535

### 2.1.3 Connecting the NRD-545 to a PC

On the receiver side you need a 25 pin male-type serial plug

On the PC side a 9 or 25 pin male or female type serial connector is needed, depending on what is mounted on your PC

The cable between the receiver and the PC is so-called cross-connected, see pin layout below.

This can also be realised using a standard RS232 cable in combination with a so-called null modem. If your PC has a 9 pins serial port connector you need in this case also a separate adapter between a 9 pin and 25 pin connectors

To construct your own cable the following pin layout should be used

<b>NRD545</b>	<b>PC9-D</b>	<b>PC25-D</b>	Remark
pin 1	n.a.	pin 1	
pin 2	pin 2	pin 3	
pin 3	pin 3	pin 2	
pin 4	pin 8	pin 5	
pin 5	pin 7	pin 4	
pin 6	pin 4	pin 20	
pin 7	pin 5	pin 7	
pin 8	n.a.	pin 8	
pin 20	pin 6	pin 6	

### 2.1.4 Connection between the RX320 and then computer

On the receiver side of the cable you need a 9 pin male-type serial plug

On the PC side a 9 or 25 pin male or female type serial connector is needed, depending on what is mounted on your PC

You can connect the RX320 to your PC with the standard 9 pins female to 9 pins male cable provided with the set. If the serial port on your PC is 25 pins you need an additional 25 pin to 9 pin adapter

## 2.2 Directory structure and files

For a proper working of the program it is necessary that a (large) number of files are available and that they are placed in the prescribed directory structure.

The files needed are classified in two groups :

## 1. The application file **RXWINGS2.EXE** and the frequency data files I gathered or produced.

For these files C:\RXWINGS2 is proposed as default main directory. In case another main directory is preferred this should be changed during the installation and also the first line in the RxWings2.INI file should be adapted, see Set-up.

In the main directory the following subdirectories should be available for data files: BDXC, OWN, F320, RX2DB, LOG, MEM, RTTY, PAN, SAN, FSP, SFL and SFP

To understand how these files are organised and what type of data they contain, look in the next paragraphs for more detailed information. Details about the structure of these files and how to use them are explained in the next parts of this manual.

## 2. The many Visual Basic v6 system files (\*.dll, \*.ocx) required to run my application.

For example msvbvm60.dll, oleaut32.dll, olepro32.dll, asycfilt.dll, stdole2.dll, comcat.dll, dao360.dll, mscom32.ocx, grid32.ocx, spin32.ocx.

These files will be placed automatically somewhere in the windows or windows\system directory by the set-up wizard.

### 2.2.1 Main Directory

#### Default C:\RXWINGS2

Filename	Explanation
RxWings2.exe	the main executable file
RxWings2.ini	ini file with basic configuration data
formpositions.ini	ini file with all window screen positions
ilgquery.ini	ini file with ILG db filter preferences
loggridformat.ini	ini file for screen format of loggings
prop2prt.ini	ini file with address and other data
rx320settings.ini	ini file with saved RX320 settings
RxWings2.chm	The user manual in English (including screen shots) in HTML Help format

### 2.2.2 BDXC subdirectory

#### Default C:\RXWINGS2\BDXC

Filename	Explanation
BDX_EtoE.txt	(old) BDCX file with data on English broadcast TO Europe
ADX_EtoW.txt	(old) ADDX file with data on English broadcast TO the World
ILG_EtoW.txt	File on English broadcast to the World, deducted from ILG database

### 2.2.3 OWN Subdirectory

Default C:\RXWINGS2\OWN

Filename	Explanation
OWN_BCEU.txt	User collected data on Broadcasts to Europe
OWN_BCWW.txt	a combination (World Wide) of your favourites
OWN_HAMS.txt	user collected data on radio amateur transmissions
OWN_HFDL.txt	user collected data on HF Data Link for aircraft tracking
OWN_UTAE.txt	user collected data on aeronautical voice services ( <a href="http://www.ute-monitor.org">http://www.ute-monitor.org</a> )
OWN_UTCT.txt	user collected data on Cordless Telephony frequencies (AR7030)
OWN_UTFX.txt	user collected data on fax transmissions ( <a href="http://www.hffax.de">http://www.hffax.de</a> )
OWN_UTMA.txt	user collected data on maritime voice services
OWN_UTRY.txt	user collected data on telex over radio services (old)

### 2.2.4 F320 subdirectory

Default C:\RXWINGS2\F320

Filename	Explanation
UteWorldTop_160.320	example of a *.320 file

The \*.320 file format is defined to be used with other RX320 control programs. These files can also be used within the RxWings program not only with the RX320 but also with the AR7030 and NRD-535.

### 2.2.5 RX2DB Subdirectory

Default C:\RXWINGS2\RX2DB

Filename	Explanation
ILGSdata.ftl	converted ILG SW database, used for tracking and querying
aero.ftl	converted aero database from Risto Hirvonen, used for tracking and querying

### 2.2.6 Log Subdirectory

Default C:\RXWINGS2\LOG

Filename	Explanation
Log_BCWW.txt	file to log the received broadcast transmissions
Log_HAMS.txt	file to log received radio amateur transmissions
Log_UTIL.txt	file to log all type of received utility stations

### 2.2.7 MEM Subdirectory

**Default C:\RXWINGS2\MEM**

Filename *1	Explanation
Mem_1_HFDL.txt	example file with stored AR7030 memory contents
Mem_2_HFDL.txt	example file with stored NRD535 memory contents
Mem_3_HFDL.txt	example file with stored RX320 related contents
Mem_3_Start.txt	File to start with (virtual) memory management for the RX320
Mem_4_HFDL.txt	example file with stored NRD545 memory contents

\*1 Because the memory files for the different receiver types are different the name of the file contains info about the receiver type, MEM\_1\*.TXT for the AR7030, MEM\_2\*.TXT for the NRD535, MEM\_3\*.TXT for the RX320 and MEM\_4\*.TXT for the NRD545

### 2.2.8 RTTY Subdirectory

**Default C:\RXWINGS2\RTTY**

Because the NRD535 have an option to build-in a RTTY decoder and the NRD-545 has a built-in a RTTY decoder, a special subdirectory is set-up to save the received rtt data

Filename	Explanation
RTY_RYWW.txt	example file with rtt data

### 2.2.9 PAN Subdirectory

**Default C:\RXWINGS2\PAN**

Filename	Explanation
Pan_rdubai4.txt	example file with propagation impression (Radio Dubai)
Pan_vogreece1.txt	example file with propagation impression (Voice of Greece)

### 2.2.10 SAN Subdirectory

**Default C:\RXWINGS2\SAN**

Filename	Explanation
SAN_49m_18z.txt	example file with spectrum scan of 49m band at 18h UTC
SAN_49m_20z.txt	example file with spectrum scan of 49m band at 20h UTC

### 2.2.11 FSP subdirectory

**Default C:\RXWINGS2\FSP**

Filename	Explanation
FSP_example01.TXT	example of a Frequency ScratchPad file

### 2.2.12 SFL subdirectory

Default C:\RXWINGS2\SFL

Filename	Explanation
SFL_xband.TXT	example of a Scan Frequency List file

### 2.2.13 SFP subdirectory

Default C:\RXWINGS2\SFP

Filename	Explanation
SFP_example01.TXT	example of a Scan Frequency Pairs file

## 2.3 Installation

After downloading and unzipping the program in a temporary directory, select run 'set-up' from the Windows Start menu and follow the guidance given by the set-up program. As main application directory for this version C:\RxWings2 is proposed, but you can of course choose another one during the set-up. Do not forget to change the 1st line of the rxwings2.ini file if you select another directory.

If everything goes as planned, you will find a directory structure with files as described in directory structure and files, at the end of the installation procedure.

In the past several people have reported problems while unpacking RxWings with WinZip. To prevent this I advise to use WinZip in 'Classic' setting and not to use the install wizard.

## 2.4 Set-up and GO

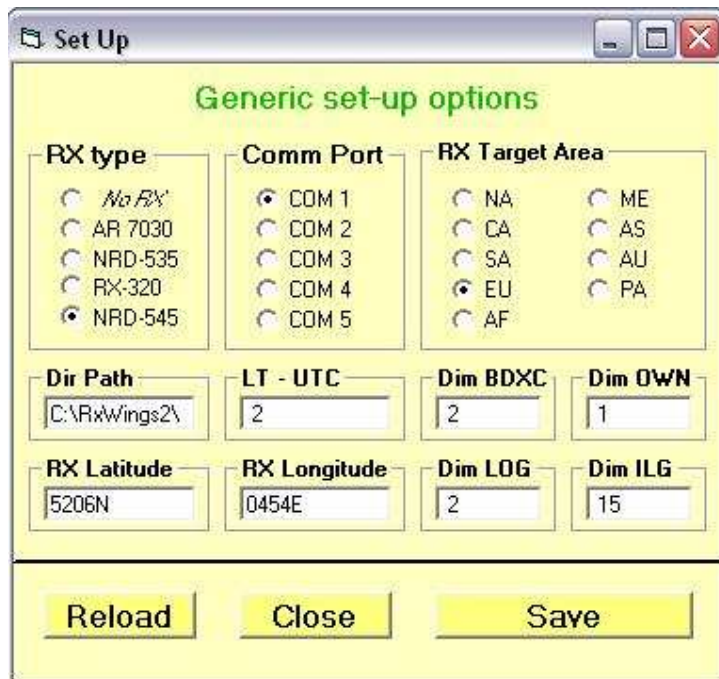
After successful installation and connecting the computer serial port to the radio, run the program. A welcome screen will appear with several buttons. See the picture below.



At least the first time you should select the left-lower button 'Set-up' to get the Set-up window.

## 2.4.1 Set-up of the program

The generic part of the set-up window is shown in the picture below



For each frame a short explanation is given on the next page:

1. First select your receiver type. If you select 'No RX' you can get a 'look and feel' of the program without any receiver connected to your PC
2. Then set the CommPort to be used.
3. In RX Target Area you inform the program in which area your receiver is located. This is used to give additional information during 'Tracking'. (NA= North America, CA= Central America, SA= South America, EU= Europe, AF= Africa, ME= Middle East, AS= Asia, AU= Australasia, PA = Pacific)
4. In case you selected another main directory to install the program in, you have to change the Dir(ectory) Path option.
5. Then, if you are not living in the Central European Time area (where summertime =UTC +2, wintertime = UTC +1), then you have to change the LT-UTC textbox to your Local Time minus UTC difference. Values between -13 and +13 will be accepted. Also half hour differences can be entered.
6. In RX Latitude and RX Longitude the precise location of the receiver should be entered. This is also used during 'Tracking', to calculate the distance between transmitter and receiver. The format for latitude has to be in degrees and minutes N(orth) or S(outh) and a total of 5 characters, for example: '5206N' or '0530S'. The format for longitude is also in degrees and minutes E(ast) or W(est) and 5 or 6 characters, for example '0454E' or '14520W'.
7. In the DIM frames the dimension or the maximum number of records (x 1000) that can be loaded in the program from the various frequency data files can be set. The selectable range is 1 (=1000) to 50 (=50000). The default is 2 (=2000) for the BDXC/ADDX type files, 1 (=1000) for the Own/\*.\*320 type files, 1 (=1000) for Log type files and 15 (=15000) for ILG based filtering and tracking files. This option makes it possible to optimise between available RAM in the PC and the file sizes. For each 1000 records, about 100 KB additional RAM should be available. In case all 4 file types are set to 50 (=50000) a total of 20 MB of RAM should be available for these files only. In case the number of records in a file is higher then the limit set for this file type, the program will crash.

To find more about the receiver specific set-up options read the next paragraphs

The set-up can be saved in the rxwings2.ini file by clicking in the 'Save' button.

#### 2.4.1.1 Specific AR7030 set-up

LL+LR Scrollbars	Standard IF filter
Disabled <input checked="" type="checkbox"/>	For AM <input type="text" value="2"/>
Level L <input type="text" value="00"/>	For SSB <input type="text" value="1"/>
Level R <input type="text" value="00"/>	For CW <input type="text" value="1"/>
	For FM <input type="text" value="4"/>

To prevent unintended changes in the setting of the auxiliary line out levels (for example used for recordings or input to the soundcard of the PC) it is possible to set the values and then disable the software potentiometers on the main control window. To change the setting the menu options 'Direct/Enable LL+LR' and 'Direct/Disable LL+LR' can be used. In Level L(ef) and Level R(ight) you can preset the start-up setting (0-99) of these potentiometers. The preset Left level will also be used in the programmable timer. In the AR7030 set-up part you can also adapt the program to the specific if filters available in your receiver. In the receiver main control window is shown which filters are built-in. They are numbered from the top (=1) up to 4 (factory default) or 5 or 6 (if you added extra filters). If you fill in a certain filter number for the reception modes as shown in the table above then this mode/filter combination will be used if you work with Own and Log files.

#### 2.4.1.2 Specific NRD-535 set-up

NRD-535 options
<input checked="" type="checkbox"/> 1 kHz
<input checked="" type="checkbox"/> BWC
<input checked="" type="checkbox"/> ECSS
<input checked="" type="checkbox"/> RTTY

With the 'NRD535 options' you can adapt the program to the options available in your receiver configuration :

- + BWC : BandWidth Control option (unit CFL-243(W) is needed)
- + 1 Khz : Narrow filter option (unit CFL-233 or eq. is needed)
- + ECSS: Synchronous AM reception (unit CMF-78 is needed)
- + RTTY: RTTY decoding option (unit CMF-530 is needed)

If you possess an NRD-535D you can certainly check the first three.

NB: It is not necessary to check the RTTY option if you use external programs like Code 3 to decode 'digital' traffic. It is only relevant in relation to the use of the CMF-530 unit.

#### 2.4.1.3 Specific NRD-545 set-up

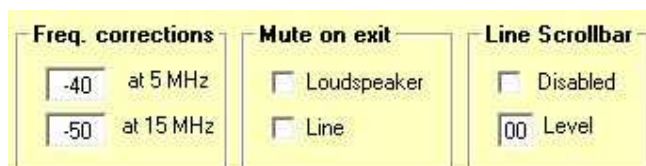
NR/BC default	AGC (x 200msec)
NR <input type="text" value="50"/>	Fast <input type="text" value="1"/>
BC <input type="text" value="20"/>	Med <input type="text" value="3"/>
	Slow <input type="text" value="9"/>



The NRD-545 has a lot of advanced Digital Signal Processing facilities built-in. The effect of the noise reduction and beat cancelling can be changed in the Advanced DSP window. In the NR/BC default frame you can select your own default values to be used

The NRD-545 has, for certain reception modes, a wide range of AGC time constant settings. In this set-up window three values can be selected, one for fast, one for medium and one for slow increase of IF gain. Values can be selected in the 1 to 9 range (0.2 to 1.8 sec)

#### 2.4.1.4 Specific RX320 set-up



As TenTec specifies on their web pages, the tuned frequency can deviate up to 100 Hz from the real value. In the 'Frequency corrections' text boxes values can be filled in to compensate for this deviation by testing on two frequencies, one near 5 MHz and one near 15 MHz.

A simple way to test this is to tune in to a AM broadcast station near the above mentioned frequencies of which the frequency accuracy is known or trusted and then to change the frequency in steps not greater than 10 Hz until USB and LSB sound as much as possible the same. If you fill in the frequency deviation found in the frequency correction box and do the test again then the frequency to tune should be the same as the nominal frequency of the broadcast used for testing.

In the 'Mute on exit' check boxes can be selected whether or not the loudspeaker volume and/or line out level is set to 0 automatically at close down of the program.

To prevent unintended changes in the setting of the Line out level (for example used for recordings or input to the soundcard of the PC) it is possible to set the value and then disable the software potentiometer on the main control window. To change the setting the menu options 'Direct/Enable Line out' and 'Direct/Disable Line out' can be used. In Level you can preset the start-up setting (0-99) of this potentiometer. The preset Level will also be used in the programmable timer.

#### 2.4.2 Explanation of the RXWINGS2.INI File

Below an explanation of the contents of the ini-file is given :

Value	Explanation
C:\RxWings2\	Main application directory path
5206N	Receiver latitude (5 char)
0454E	Receiver longitude (5 or 6 char)
0	Receiver type: 0=NoRx, 1=AR7030, 2=NRD535, 3=RX320, 4=NRD545
1	Com Port ( 1= COM 1, 5=COM 5)
3	Target area / Area where receiver is located (3= Europe, etc)
2	Difference between Local (S/W) Time and UTC(Range -13 to 13 h)
2	Maximum number of records (x 1000) in BDXC/ADDX files.

	up to 50 (x 1000)
1	Maximum number of records (x 1000) in OWN or .320 files, up to 50 (x 1000)
2	Maximum number of records (x 1000) in LOG files, up to 50 (x 1000)
15	Maximum number of records (x 1000) in ILG files, up to 50 (x 1000)
0	Reserved for future use
0	Reserved for future use
0	NRD535 / 1 kHz filter option (1= yes)
0	NRD535 / BWC option (1=yes)
0	NRD535 / ECSS option (1=yes)
0	NRD535 / RTTY option (1=yes)
2	AR7030 / Standard IF filter for AM
1	AR7030 / Standard IF filter for USB/LSB
1	AR7030 / Standard filter for CW
4	AR7030 / Standard filter for FM
0	RX320 / Mute Volume at exit (1=yes)
0	RX320 / Mute Line at exit (1=yes)
0	RX320 / Frequency correction at 5 MHz
0	RX320 / Frequency correction at 15 MHz
0	AR7030 / Disable LL + LR Scrollbars
1	NRD545 / AGC time constant factor (fast)
3	NRD545 / AGC time constant factor (medium)
9	NRD545 / AGC time constant factor(slow)
50	NRD545 / Default noise reduction effect
20	NRD545 / Default beat canceller effect
0	AR7030 / Left aux line out level
0	AR7030/ Right aux line out level
0	RX320 / Disable Line out Scrollbar
0	RX320 / Line out level

### 2.4.3 GO

If the set-up is done, click in the ellipse where the selected receiver type is shown to get the main control window of the selected receiver type

#### **IMPORTANT NOTICE 1 :**

If in the program set-up not the right Comm port is selected or if the computer is not correctly connected to the radio, the program will not work and probably will crash. With the NRD535/545 it also needed to switch on the power before starting the program  
If you get an 'Port already open' error, you can check if not an old (invisible) instance of the program is running. Press ctrl+alt+del and look in the list of running programs and if so, remove it.

#### **IMPORTANT NOTICE 2 :**

To make the program independent of the selected decimal operator ( . or , ) in the Windows Set up (See Country settings / Number tab) the decimal operator shown in the

program is, will and should always be a . (dot). To prevent any problems also do not use any thousand-separator sign. More over frequency data in any database file used with this program, with the exception of the memory files, is given in KHz and has/must have a dot as decimal separator.

**IMPORTANT NOTICE 3 :**

The set-up of the windows and text boxes in the program is based on the use of the standard font size in your Windows setting. If you use enlarged or double size fonts, possibly part of the data will become invisible or result in a distorted window with locations of clickable area's outside the places indicated

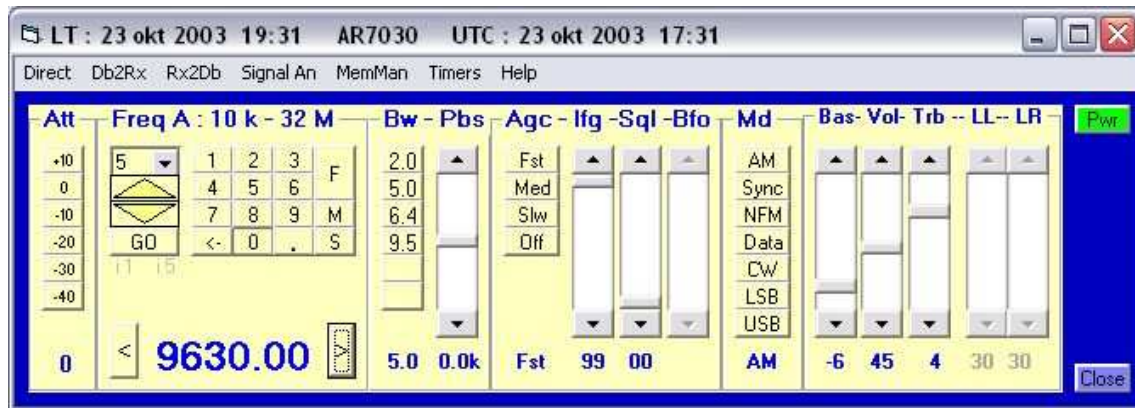
### 3. Receiver control windows

The receiver main control window is the part of the program that always should be active. It contains a very flexible and direct access to all receiver settings and it gives also access to the main menu items to use, for instance, databases etc.

To make optimum use of the control possibilities of each receiver type, the program contains a separate receiver control windows for each receiver type, see next paragraphs.

#### 3.1 Receiver main control window for the AR7030

The picture below shows the AR7030 panel

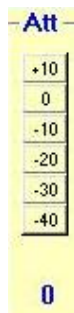


The basic concept of the program is that the receiver controls are never locked. You always can change the receiver setting with buttons and dials on the receiver or with the remote control unit.

At the start up of the program the current receiver setting as described in the next parts will be read into the program automatically. After you have changed the receiver setting by using the dials and / or buttons on the receiver itself or the remote control unit, you can update the program by double clicking in the receiver control window outside any frame, or by pressing the F5 key, or by clicking in the menu item 'Direct/Update'.

The receiver control window is divided in 5 parts more or less according to the block schematic diagram of the receiver. The five blocks are : RF frame, Frequency setting frame, IF frames, Mode frame and AF frame. In the next paragraphs will be explained how all options can be used and also which Hot Keys are available for direct receiver control

##### 3.1.1 AR 7030 Radio Frequency (RF) frame



In this block only the setting of the entrance pre-amplifier / attenuator can be selected. To select the value click in a button with a gain / attenuation figure (in dB), in which +10 db is equivalent to an amplification of 3 times, -20 db is equivalent to a weakening of the signal to 1/10th of the incoming signal on the antenna entrance, etc. The selected value will be shown at the bottom. To check if this has really happened, select on the receiver the menu showing the RF Gain and compare the figures

### 3.1.2 AR7030 Frequency setting frame



In the top line of this frame the nominal frequency range of the receiver is shown. The upper left part, contains a combo box (showing the default of 5 kHz) to select the step size to 'browse' through a certain part of the HF band. Click in the small black downward pointing triangle to get the list of step sizes to choose from values between .01 kHz (= 10 Hz) and 100 kHz. All frequency channel spacings used in the spectrum covered by the AR7030 can be directly selected for easy channel-wise stepping through those parts of the frequency band. Examples are 9 (Europe) or 10 kHz (USA, Japan) in the long wave and medium wave broadcast bands, 3 kHz in the Aero bands and 25 kHz in the Cordless Telephony band just above 31 MHz. The default frequency step value is 5 kHz, as used for the channel spacing in the HF broadcast bands.

After the frequency step value is selected, the frequency can be changed in several ways:

1. By clicking in the *up/down spin button* just below the combo box. After clicking in 'GO' the frequency will continuously change with the selected step size. To change the direction of the change, click in the up or down part of the spin button.
2. By clicking in the *buttons left and right of the frequency textbox*, where '<' lowers the frequency and '>' increase the frequency with the selected step size.
3. By pressing the *arrows key on the keyboard*. After clicking in the frequency textbox he left or down arrow will lower the frequency and the right or up arrow will increase the frequency with the selected step size.
4. By *turning your mouse wheel*. If you put your mouse pointer in the frequency textbox and turn your mouse wheel then with each step the frequency will change with the step size selected in the combo box.

The frequency can be 'trimmed' to the nearest kHz or 5 kHz channel by clicking in the labels showing 'i1' or 'i5' below the 'GO' command button. Clicking in 'i1' will set the frequency to the nearest 'full' kHz value and clicking in 'i5' will set the frequency to the nearest 5 KHz channel frequency.

The frequency can also directly be changed. After double clicking in the text box showing the actual frequency, the current value disappears and you can type the new value. Press enter to activate it.

In the right-hand side of this frame also a keypad is available for direct entry -with your mouse- of (a) frequencies (10-32016 kHz), (b) memory channels (0 to 99) and (c) frequency step size (.01 to 100 kHz). The frequency and step size should be in KHz with

the dot as the decimal separator. With '<=' you can remove the last added figure. To activate the frequency, click in 'F'. To activate the memory channel, click in 'M'. To activate the step size change click in 'S'.

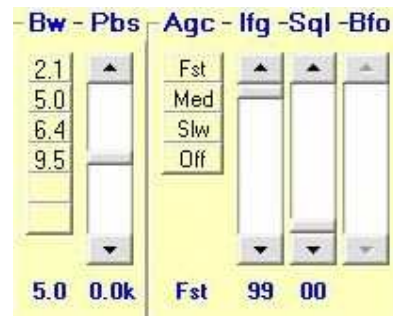
If you click in the menu-item 'Direct / Last 20 Freqs' a new small window appears that can contain the most recent 20 selected frequencies. If you want to go back to a certain frequency from this list, just click on it

If you click in the menu item 'Direct / Freq Scratchpad' a frequency ScratchPad window will appear. If you then click in the 'To Scratchpad' button, the actual frequency as shown in the main receiver control window, will be copied to any selected cell in the frequency scratchpad. The other way around, if you click in the 'To Receiver' button, the receiver will be tuned to the frequency value available in the selected cell.

Moreover if you double click in an empty cell the receiver frequency will be directly copied to that cell and if you double click in a cell containing valid frequency data then the receiver is directly tuned to that frequency.

The data in the frequency scratchpad can be saved and later on loaded. Be aware that the filenames to be used are according to the fsp\_\*.txt pattern.

### 3.1.3 AR7030 Intermediate Frequency (IF) frame



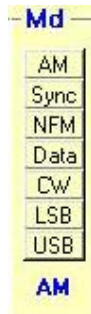
A lot of signal processing takes place in the IF part of the receiver. Therefore also many settings can be controlled in this part. From left to right the following parameters can be selected in this frame:

1. IF filter bandwidth (BW), up to 6 filter can be used
2. Pass Band Shift (PBS, -4.2 to +4.2 kHz) **\*1**
3. Speed of automatic gain control (AGC, Fast, medium, Slow and Off),
- 4 The (maximum) gain of the IF amplifier (IFG, 0-99%),
5. Squelch threshold (SQL, 0-99%),
6. Beat Frequency Oscillator (BFO, -4.2 to +4.2 kHz) **\*1**.

For certain reception modes some of the IF settings are not relevant. In those case the program disables the possibility to change its value.

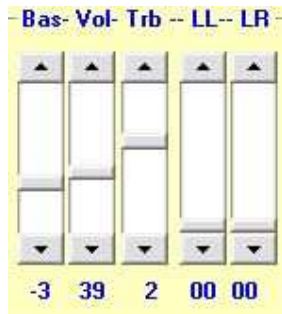
**\*1** If PBS or BFO is enabled you can put it to its neutral position (=0) by just clicking in the text label below the scrollbar

### 3.1.4 AR7030 Mode frame



The AR7030 is equipped with seven reception modes, these being DATA, CW, USB, LSB, AM, Synchronous AM and NFM. These can be easily selected with one mouse click in the relevant command button in the 'Mode' block.

### 3.1.5 AR7030 Audio Frequency (AF) frame



The AF frame is very straightforward and contains setting possibilities for audio tone control and volume. BAS is Bass control, VOL is Loudspeaker Volume control, TRB is Treble control and LL is Left Auxiliary Line Out channel control and LR is Right Auxiliary Line Out channel control.

To prevent unintended changes in the setting of the auxiliary line out levels (for example used for recordings or input to the soundcard of the PC) it is possible to set the values and then disable the software potentiometers on the main control window. To change the setting the menu options 'Direct/Enable LL+LR' and 'Direct/Disable LL+LR' can be used. Vol and LL / LR can be put to 0 and Bas and Trb to its neutral position (=0) by just clicking in the text labels below each scrollbar

### 3.1.6 AR7030 Hot Keys

Possibilities are also built-in to control the main receiver settings, using the keyboard only. For that purpose the hot keys as shown in the tables on the next page can be used. Be aware first to take away your cursor from the frequency textbox or frequency step textbox, otherwise the values shown there will be garbled.

IF BandWidth		Mode	
Shift + F1	Filter nr 1	Shift + A	AM
Shift + F2	Filter nr 2	Shift + S	Sync
Shift + F3	Filter nr 3	Shift + F	NFM
Shift + F4	Filter nr 4	Shift+ D	Data
Shift + F5	Filter nr 5	Shift + C	CW

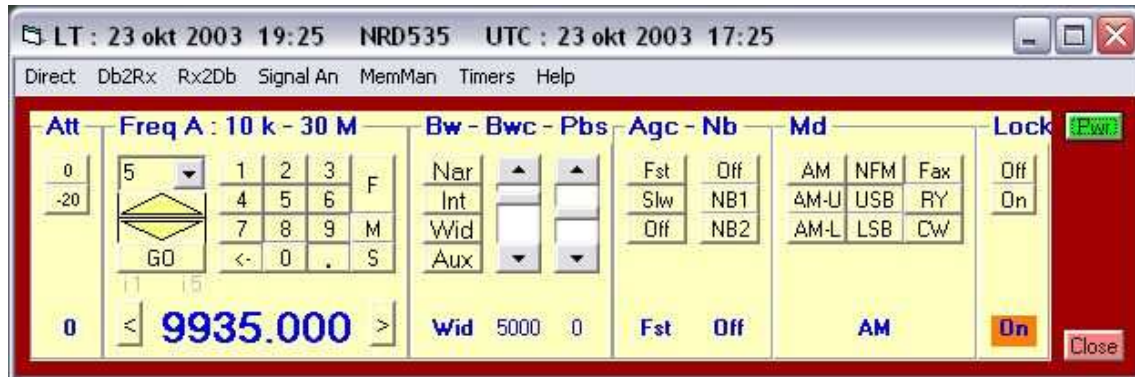
Shift + F6	Filter nr 6	Shift + L	LSB
		Shift + U	USB
<b>Pass Band Shift</b>		<b>Loudspeaker volume</b>	
Shift + '+'	Move Up	Alt + '+'	Increase
Shift + '-'	Move Down	Alt + '-'	Decrease
Shift + 0	Set to Neutral	Alt + 0	Set to 0

<b>Tune Frequency</b>	
Ctrl + Number keys or dot key	Select new frequency (kHz)
Ctrl + F	Activate new frequency
Ctrl + Number keys or dot key	Select new freq step size (kHz)
Ctrl + S	Activate new freq. step size
Ctrl + G	Start/Stop auto freq. stepping (GO)
Ctrl + Left or Down arrow	Lower freq. with 1x freq. step
Ctrl + Right or Up arrow	Increase freq. with 1x freq. step
<b>Tune to Memory cell</b>	
Ctrl + Number keys	Select new memory cell
Ctrl + M	Activate new memory cell



## 3.2 Receiver main control window for the NRD-535

The picture below shows the NRD-535 panel



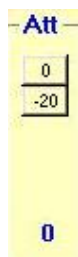
To keep the possibility to use the dials and buttons on the receiver itself while using RxWings, the receiver is normally NOT locked. However to communicate with the receiver it must be locked (=remote is on) and some functions will only work while the receiver is continuously locked to the PC. Therefore a 'Short lock' and a 'Long lock' are introduced. The 'Short lock' (remote is on for a very short time) is for example used at the start-up of the program to get the status of the main receiver parameters, to change a receiver setting with a command button on the receiver main control window or to send a new frequency to the receiver from one of the databases.

The 'Long lock' is used when a continuous data stream between the receiver and the PC is necessary, for example all functions reading the S-meter values and tracking using the 'Dial' option, or functions like PBS and BWC that need a continuous lock to be used from the program.

At the start up of the program the most important current receiver settings as described in the next parts will be read into the program automatically. After you have changed the receiver setting by using the dials and / or buttons on the receiver itself you can update the program by double clicking in the receiver control window outside any frame, or by pressing the F5 key, or by clicking in the menu item 'Direct/Update'.

The receiver control window is divided in 5 parts more or less according to the block schematic diagram of the receiver. The five blocks are : RF frame, Frequency setting frame, IF frames, Mode frame and Lock frame. In the next paragraphs will be explained how all options can be used and also which Hot Keys are available for direct receiver control and how the User settings can easily be adapted in the User definitions settings window

### 3.2.1 NRD535 Radio Frequency (RF) frame



In this block only the setting of the entrance attenuator can be selected. To select the value click in a button with attenuation figure (in dB), in which -20 db is equivalent to a

weakening of the signal to 1/10th of the incoming signal on the antenna entrance. The selected value will be shown at the bottom.

If in the User Definition Setting window the front end Variable Band pass Tuning filter has been bypassed, as a warning the background color of the attenuator textbox is changed to orange. If the receiver control window is loaded this setting is always switched to the default with the VBT **not** bypassed.

### 3.2.2 NRD535 Frequency setting frame



In the top line of this frame the nominal frequency range of the receiver is shown. The upper left part, contains a combo box (showing the default of 5 kHz) to select the step size to 'browse' through a certain part of the HF band. Click in the small black downward pointing triangle to get the list of step sizes to choose from values between .001 kHz (= 1 Hz) and 100 kHz. All frequency channel spacings used in the spectrum covered by the NRD535 can be directly selected for easy channel-wise stepping through those parts of the frequency band. Examples are 9 (Europe) or 10 kHz (USA, Japan) in the long wave and medium wave broadcast bands, 3 kHz in the Aero bands. The default frequency step value is 5 kHz, as used for the channel spacing in the HF broadcast bands.

After the frequency step value is selected, the frequency can be changed in several ways:

1. By clicking in the *up/down spin button* just below the combo box. After clicking in 'GO' the frequency will continuously change with the selected step size. To change the direction of the change, click in the up or down part of the spin button.
2. By clicking in the *buttons left and right of the frequency textbox*, where '<' lowers the frequency and '>' increase the frequency with the selected step size.
3. By pressing the *arrows key on the keyboard*. After clicking in the frequency textbox he left or down arrow will lower the frequency and the right or up arrow will increase the frequency with the selected step size.
4. By *turning your mouse wheel*. If you put your mouse pointer in the frequency textbox and turn your mouse wheel then with each step the frequency will change with the step size selected in the combo box.

The frequency can be 'trimmed' to the nearest kHz or 5 kHz channel by clicking in the labels showing 'i1' or 'i5' below the 'GO' command button. Clicking in 'i1' will set the frequency to the nearest 'full' kHz value and clicking in 'i5' will set the frequency to the nearest 5 KHz channel frequency.

The frequency can also directly be changed. After double clicking in the text box showing the actual frequency, the current value disappears and you can type the new value. Press enter to activate it.

In the right-hand side of this frame also a keypad is available for direct entry -with your mouse- of both frequencies (10-29999.999 kHz), memory channels (0 to 199) and the step size (0.001-100 kHz). The frequency should be in KHz with the dot as the decimal separator. With '<=' you can remove the last added figure. To activate the frequency,

click in 'F', to activate the memory channel, click in 'M' and to activate step size, click in 'S'.

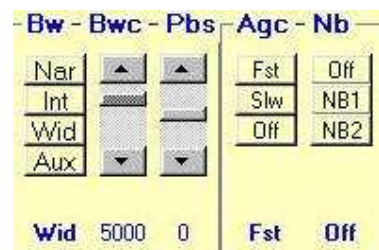
If you click in the menu-item 'Direct / Last 20 Freqs' a new small window appears that can contain the most recent 20 selected frequencies. If you want to go back to a certain frequency from this list, just click on it.

If you click in the menu item 'Direct / Freq Scratchpad' a frequency ScratchPad window will appear. If you then click in the 'To Scratchpad' button, the actual frequency as shown in the main receiver control window, will be copied to any selected cell in the frequency scratchpad. The other way around, if you click in the 'To Receiver' button, the receiver will be tuned to the frequency value available in the selected cell.

Moreover if you double click in an empty cell the receiver frequency will be directly copied to that cell and if you double click in a cell containing valid frequency data then the receiver is directly tuned to that frequency.

The data in the frequency scratchpad can be saved and later on loaded. Be aware that the filenames to be used are according to the fsp\_\*.txt pattern.

### 3.2.3 NRD535 Intermediate Frequency (IF) frame



A lot of signal processing takes place in the IF part of the receiver. Therefore also many settings can be controlled in this part. From left to right the following parameters can be selected in this frame:

1. IF filter bandwidth (BW, narrow, intermediate, wide and auxiliary), **\*1**
2. BandWidth Control to continuously vary the if bandwidth, if BW=Int from 500 to 2200 Hz and if BW=Wid from 2000 to 5500 Hz **\*2,3**
3. Pass Band Shift (PBS, -2000 and +2000 Hz), **\*3,\*4**
4. Speed of automatic gain control (AGC, fast, slow and off)
5. Noise blanker

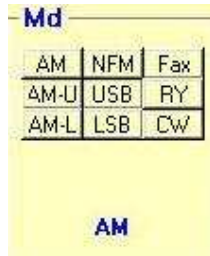
**\*1.** The narrow filter will only be available if an optional unit (CFL-233 / 1 kHz, CFL-232 / 500Hz, CFL-231 / 300Hz) is build-in in the receiver. This should then also be checked in the RxWings Set-up window

**\*2.** The Bandwidth Control possibility will only be available if the optional BWC unit (CFL-243) is build-in in the receiver. This should then also be checked in the RxWings Set-up window

**\*3.** BWC and PBS can only be controlled as long as the receiver is locked to the PC

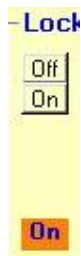
**\*4** If PBS is enabled you can put it to its neutral position (=0) by just clicking in the text label below the scrollbar

### 3.1.4 NRD535 Mode frame



The NRD-535 is equipped with a maximum of nine reception modes, these being RTTY, CW, USB, LSB, AM, NFM, FAX, ECSS-USB (AM-U) and ECSS-LSB (AM-L). These can be easily selected with one mouse click in the relevant command button in the 'Mode' block. The ECSS possibilities are only available if the optional ECSS unit (CMF-78) is build-in in the receiver. This should then also be checked in the RxWings Set-up window

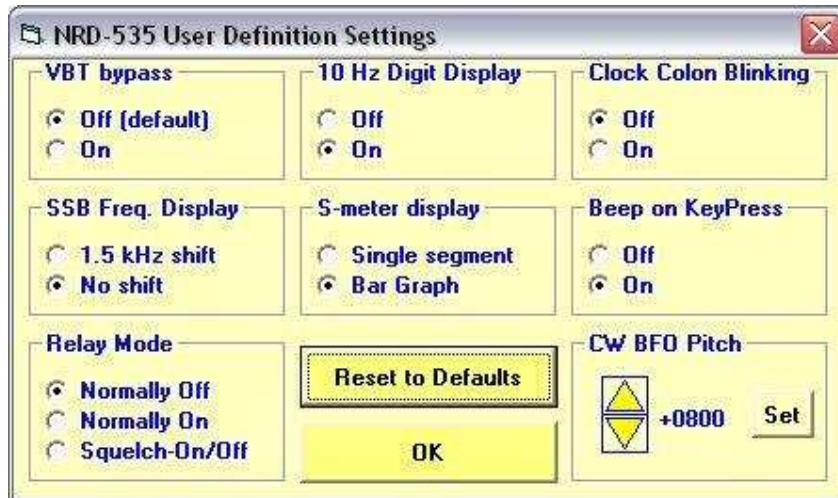
### 3.2.5 NRD535 Lock frame



The Lock frame contains only an 'On' command button to bring the receiver under full PC control and an 'Off' command button to release the receiver from PC control

### 3.2.6 NRD535 User Definition Settings window

The NRD535 user can preset a number of settings to its own preference. To do this on the receiver itself is rather cumbersome. Using the facilities in RxWings can make it straightforward and simple. Click in the menu 'Direct\Userdefs' to open the User Definition Setting window, see picture below.



For each of the items a short explanation is given below:

a) VBT bypass

Special feature of the NRD-535 is its front-end Variable Band pass Tuning (VBT) filter. This filter is

necessary to give the receiver its high dynamic range. Small disadvantage is that it adds some extra attenuation. In some rare cases it can be helpful to bypass the VBT. To do so, click in bypass 'On'. To warn you that you bypassed the VBT the background color of the attenuator textbox in the main control window changes to orange. Normally this filter should be used and bypass should be 'Off'. If the NRD535 main control window is loaded the filter is automatically made active by setting VBT bypass to 'Off'.

b) 10 Hz display

This toggles the 10 Hz digit on and off in the receivers frequency display panel

c) Clock colon blinking

Allows for blinking or always on colon when the clock is displayed on the receiver panel

d) SSB frequency display

Makes it possible to select between showing the carrier frequency or a 1.5 kHz shift from the carrier frequency on the receiver panel

e) S meter display

Selects between a single segment Smeter pointer or a bar graph on the receiver panel

f) Beep on Key press

When on, the receiver will beep every time a button on the receiver is pressed

g) Relay mode

This let you select between different ways the relay in the receiver can be used: cut off contact when active, make contact when active or carrier/squelch controlled

h) CW BFO pitch

To adjust beat note offset from carrier during CW operations. First set the pitch you want and then activate it by clicking in de 'Set' button

### 3.2.7 NRD-535 Hot Keys

Possibilities are also built-in to control the main receiver settings, using the keyboard only. For that purpose the hot keys as shown in the tables below can be used.

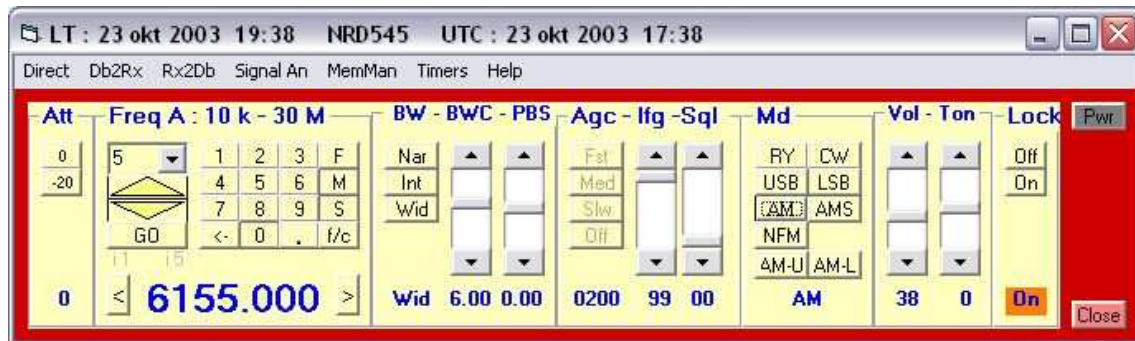
Be aware first to make your main control window the active one and to take away your cursor from the frequency textbox or frequency step textbox, otherwise the values shown there will be garbled.

Mode		Receiver Locking	
Shift + A	AM	Shift + Ctrl + '+'	Lock
Shift + F	FM	Shift + Ctrl + '-'	Unlock
Shift + C	CW		
Shift + L	LSB	<b>IF BandWidth</b>	
Shift + U	USB	Shift + F1	Narrow
Shift + R	RTTY	Shift + F2	Inter
Shift + X	FAX	Shift + F3	Wide
Shift + P	ECSS-USB	Shift + F4	Aux
Shift + M	ECSS-LSB	<b>BandWidth Control</b>	
<b>Pass Band Shift</b>		Ctrl+ F1	Min.
Shift + '+'	Move Up	Ctrl+ F2	Decrease
Shift + '-'	Move Down	Ctrl+ F3	Increase
Shift + 0	Set to Neutral	Ctrl+ F4	Max.

<b>Tune Frequency</b>	
Ctrl + Number keys or dot key	Select new frequency (kHz)
Ctrl + F	Activate new frequency
Ctrl + Number keys or dot key	Select new freq step size (kHz)
Ctrl + S	Activate new freq. step size
Ctrl + G	Start/Stop auto freq. stepping (GO)
Ctrl + Left or Down arrow	Lower freq. with 1x freq. step
Ctrl + Right or Up arrow	Increase freq. with 1x freq. step
<b>Tune to Memory cell</b>	
Ctrl + Number keys	Select new memory cell
Ctrl + M	Activate new memory cell

### 3.3 Receiver main control window for the NRD-545

The picture below shows the NRD-545 panel



To keep the possibility to use the dials and buttons on the receiver itself while using RxWings, the receiver is normally NOT locked. However to communicate with the receiver it must be locked (=remote is on) and some functions will only work while the receiver is continuously locked to the PC. Therefore a 'Short lock' and a 'Long lock' are introduced. The 'Short lock' (remote is on for a very short time) is for example used at the start-up of the program to get the status of the main receiver parameters, to change a receiver setting with a command button on the receiver main control window or to send a new frequency to the receiver from one of the databases.

The 'Long lock' is used when a continuous data stream between the receiver and the PC is necessary, for example all functions reading the S-meter values and tracking using the 'Dial' option, or functions like PBS, IFG, SQL, Vol and Ton that need a continuous lock to be used from the program.

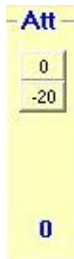
At the start up of the program the most important current receiver settings as described in the next parts will be read into the program automatically. After you have changed the receiver setting by using the dials and / or buttons on the receiver itself you can update the program by double clicking in the receiver control window outside any frame, or by pressing the F5 key, or by clicking in the menu item 'Direct/Update'.

The receiver control window is divided in 6 parts more or less according to the block schematic diagram of the receiver. The five blocks are : RF frame, Frequency setting frame, IF frames, Mode frame, AF frame and Lock frame.

In the next paragraphs will be explained how all options can be used and also how to use the Advanced DSP window, which Hot Keys are available for direct receiver control and how the User settings can easily be adapted in the User definitions settings window

#### 3.3.1 NRD545 Radio Frequency (RF) frame

In this block only the setting of the entrance attenuator can be selected. To select the value click in a button with attenuation figure (in dB), in which -20 db is equivalent to a weakening of the signal to 1/10th of the incoming signal on the antenna entrance. The selected value will be shown at the bottom.



If in the User Definition Setting window the front end Variable Band pass Tuning filter (nr 24) has been bypassed, as a warning the background color of the attenuator textbox is changed to orange. If the receiver control window is loaded this setting is always switched to the default with the VBT **not** bypassed.

### 3.3.2 NRD545 Frequency setting frame



In the top line of this frame the frequency range of the receiver is shown. Be aware however that to use the part below 100 kHz you have to power on the receiver while pressing the Ent/kHz button on the receiver

The upper left part, contains a combo box (showing the default of 5 kHz) to select the step size to 'browse' through a certain part of the HF band. Click in the small black downward pointing triangle to get the list of step sizes to choose from values between .001 kHz (= 1 Hz) and 100 kHz. All frequency channel spacings used in the spectrum covered by the NRD545 can be directly selected for easy channel-wise stepping through those parts of the frequency band. Examples are 9 (Europe) or 10 kHz (USA, Japan) in the long wave and medium wave broadcast bands, 3 kHz in the Aero bands. The default frequency step value is 5 kHz, as used for the channel spacing in the HF broadcast bands.

After the frequency step value is selected, the frequency can be changed in several ways:

1. By clicking in the *up/down spin button* just below the combo box. After clicking in 'GO' the frequency will continuously change with the selected step size. To change the direction of the change, click in the up or down part of the spin button.
2. By clicking in the *buttons left and right of the frequency textbox*, where '<' lowers the frequency and '>' increase the frequency with the selected step size.
3. By pressing the *arrows key on the keyboard*. After clicking in the frequency textbox the left or down arrow will lower the frequency and the right or up arrow will increase the frequency with the selected step size.
4. By *turning your mouse wheel*. If you put your mouse pointer in the frequency textbox and turn your mouse wheel then with each step the frequency will change with the step size selected in the combo box.

The frequency can be 'trimmed' to the nearest kHz or 5 kHz channel by clicking in the labels showing 'i1' or 'i5' below the 'GO' command button. Clicking in 'i1' will set the frequency to the nearest 'full' kHz value and clicking in 'i5' will set the frequency to the nearest 5 KHz channel frequency.



The frequency can also directly be changed. After double clicking in the text box showing the actual frequency, the current value disappears and you can type the new value. Press enter to activate it.

In the right-hand side of this frame also a keypad is available for direct entry -with your mouse- of frequencies (10-29999.999 kHz), memory channels (0 to 199) or the step size (0.001- 100 kHz). The frequency should be in KHz with the dot as the decimal separator. With '<=' you can remove the last added figure. To activate the frequency, click in 'F', to activate the memory channel, click in 'M' and to activate the step size click in 'S'. By clicking in the 'f/c' button you can select between the frequency view and the channel view of the NRD545

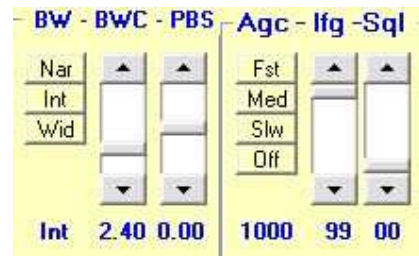
If you click in the menu-item 'Direct / Last 20 Freqs' a new small window appears that can contain the most recent 20 selected frequencies. If you want to go back to a certain frequency from this list, just click on it.

If you click in the menu item 'Direct / Freq Scratchpad' a frequency ScratchPad window will appear. If you then click in the 'To Scratchpad' button, the actual frequency as shown in the main receiver control window, will be copied to any selected cell in the frequency scratchpad. The other way around, if you click in the 'To Receiver' button, the receiver will be tuned to the frequency value available in the selected cell.

Moreover if you double click in an empty cell the receiver frequency will be directly copied to that cell and if you double click in a cell containing valid frequency data then the receiver is directly tuned to that frequency.

The data in the frequency scratchpad can be saved and later on loaded. Be aware that the filenames to be used are according to the fsp\_\*.txt pattern.

### 3.3.3 NRD545 Intermediate Frequency (IF) frame



A lot of signal processing takes place in the IF part of the receiver. Therefore also many settings can be controlled in this part. From left to right the following parameters can be selected in this frame:

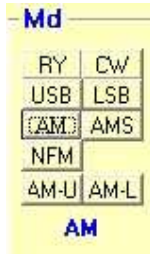
1. IF filter bandwidth presets (BW, narrow, intermediate, wide and auxiliary),
2. BandWidth Control to continuously vary the if bandwidth from 100 Hz to 10 kHz
3. Pass Band Shift (PBS, -2300 and +2300 Hz),
4. Presets of speed of automatic gain control (AGC, fast, medium, slow and off)
5. The (maximum) gain of the IF amplifier (IFG, 0-99%),
6. Squelch threshold (SQL, 0-99%),

BWC, PBS, IFG and SQL will only be active if the receiver is locked to the PC

If PBS is enabled you can put it to its neutral position (=0) by just clicking in the text label below the scrollbar

If you have changed the PBS, IFG or SQL setting while the receiver is under PC control these values will go back to their original positions as set on the receiver itself if you unlock the receiver.

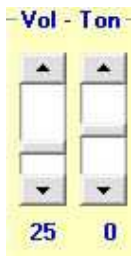
### 3.3.4 NRD545 Mode frame



The NRD-545 is equipped with of nine reception modes, these being RTTY, CW, USB, LSB, AM, AMS, NFM, ECSS-USB (AM-U) and ECSS-LSB (AM-L). These can be easily selected with one mouse click in the relevant command button in the 'Mode' block.

The ECSS possibilities (called here AM-U, AM-L) are only available if first AM mode is selected.

### 3.3.5 NRD545 AF frame

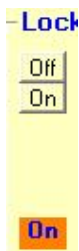


The AF frame is very straightforward and contains setting possibilities for volume and audio tone control. These controls will only be active if the receiver is locked to the PC.

Volume can be put to 0 and Tone to its neutral position (=0) by just clicking in the text labels below each scrollbar

If you have changed the Volume or Tone setting while the receiver is under PC control these values will go back to their original positions as set on the receiver itself if you unlock the receiver.

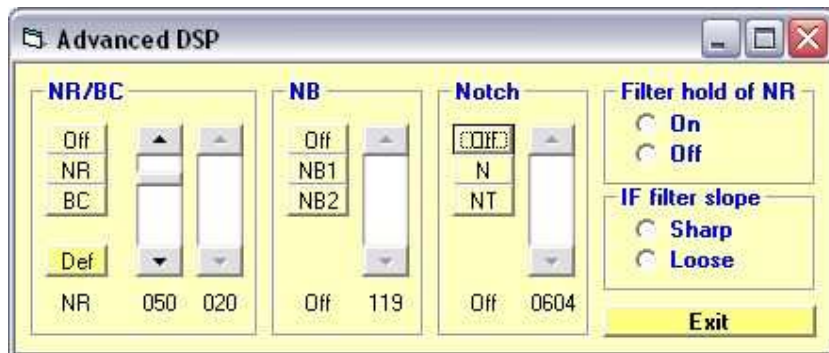
### 3.3.6 NRD545 Lock frame



The Lock frame contains only an 'On' command button to bring the receiver under full PC control and an 'Off' command button to release the receiver from PC control

### 3.3.7 Advanced DSP

The NRD-545 uses Digital Signal Processing for many functions. The most used controls are accessible on the main control window. In this separate window the more advanced DSP functions can be controlled, see picture below.



For each of the items a short explanation is given below

a. Noise Reduction / Beat Cancellor

With the command buttons you can activate NR or BC. With the enabled slide bar you can adapt the effectiveness (see User set-up nr 29 and 30). With the Def(ault) command button you can set the slidebars/effectiveness to the default values as chosen in the receiver specific set-up.

b. Noise Blanker

With the command buttons you can select different types of Noise Blankers, where NB1 is best for short/ignition type pulses and with the slide bar the sensitivity can be set

c. Notch

After clicking in N(otch) you can tune the notch filter with the slide bar. After clicking in NT (Notch Tracking) automatically any change in the disturbing frequency will be compensated.

d. Filters

Here User set-up nr 27 and 32 can be changed.

### 3.3.8 NRD545 User Definition Settings window

The NRD545 user can preset a large number of settings to its own preference. To do this on the receiver itself is rather cumbersome. Using the facilities in RxWings can make it straightforward and simple. Click in the menu 'Direct\Userdefs' to open the User Definition Setting window, see picture on the next page.

For each of the items (numbered according to the userdef descriptions in the NRD-545 manual) a short explanation is given below:

1. Add/remove 1 Hz tuning to/from the tuning steps
2. Same as nr 1 but now for 10 Hz
3. Select 1/5/6.25/9 kHz tuning steps
4. Same as nr 1 but now for 100Hz
8. Pulses/turn of the main tuning dial
9. Smeter display options
10. Select 'Beep on key press' on/off
11. Scan auto stop on/off
12. Skip unwritten channel(s) on/off
13. Select timer relay operation

14. CW BFO offset frequency

18. SSB frequency display: carrier or 1.5 kHz shifted from carrier

19. Clock colon blinking on/off

- 20. Set delay time per channel during channel scan
- 21. Set delay time per step while sweeping/band scanning
- 22. Scan auto stop time
- 24. Input tuning circuit (variable band pass tuning filter) on/off
- 28. Main tuning dial or all dials and buttons locked during panel lock
- 31. Squelch LED lights when squelch closed/open

The items not mentioned here are not relevant because they are only used for frequencies above 30 MHz or because they are described elsewhere.



### 3.3.9 NRD-545 Hot Keys

Possibilities are also built-in to control the main receiver settings, using the keyboard only.

For that purpose the hot keys as shown in the tables below can be used.

Be aware first to make your main control window the active one and to take away your cursor from the frequency textbox or frequency step textbox, otherwise the values shown there will be garbled.

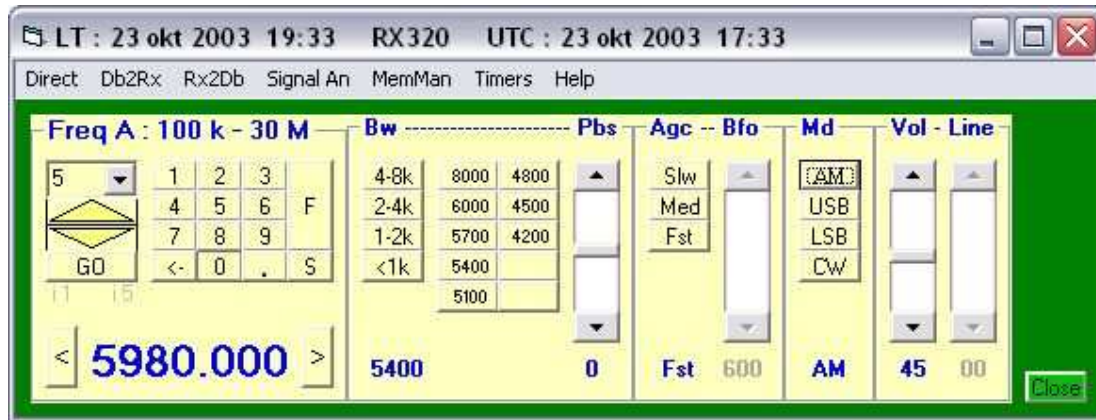
**Important : PBS and BWC will work only when the receiver is locked to the PC**

<b>Mode</b>		<b>Receiver Locking</b>	
Shift + A	AM	Shift + Ctrl + '+'	Lock
Shift + F	FM	Shift + Ctrl + '-'	Unlock
Shift + C	CW		
Shift + L	LSB	<b>IF BandWidth</b>	
Shift + U	USB	Shift + F1	Narrow
Shift + R	RTTY	Shift + F2	Inter
Shift + X	FAX	Shift + F3	Wide
Shift + P	ECSS-USB		
Shift + M	ECSS-LSB	<b>BandWidth Control</b>	
<b>Pass Band Shift</b>		Ctrl+ F1	Min.
Shift + '+'	Move Up	Ctrl+ F2	Decrease
Shift + '-'	Move Down	Ctrl+ F3	Increase
Shift + 0	Set to Neutral	Ctrl+ F4	Max.
<b>Loudspeaker volume</b>			
Alt + '+'	Increase		
Alt + '-'	Decrease		
Alt + '0'	Set to 0		

<b>Tune Frequency</b>	
Ctrl + Number keys or dot key	Select new frequency (kHz)
Ctrl + F	Activate new frequency
Ctrl + Number keys or dot key	Select new freq step size (kHz)
Ctrl + S	Activate new freq. step size
Ctrl + G	Start/Stop auto freq. stepping (GO)
Ctrl + Left or Down arrow	Lower freq. with 1x freq. step
Ctrl + Right or Up arrow	Increase freq. with 1x freq. step
<b>Tune to Memory cell</b>	
Ctrl + Number keys	Select new memory cell
Ctrl + M	Activate new memory cell

### 3.4 Receiver main control window for the RX320

The picture below shows the RX320 panel



Because this receiver does not have any direct control possibilities it will always be under full control of the program.

At the start up of the program the receiver setting at shutdown of the previous use will be read into the program automatically and the receiver will start-up in this setting.

The receiver control window is divided in 4 parts more or less according to the block schematic diagram of the receiver. The four blocks are : Frequency setting frame, IF frames, Mode frame and AF frame. In the next paragraphs will be explained how all options can be used and also which Hot Keys are available for direct receiver control.

#### 3.4.1 RX320 Frequency setting frame



In the top line of this frame the nominal frequency range of the receiver is shown. The upper left part, contains a combo box (showing the default of 5 kHz) to select the step size to 'browse' through a certain part of the Hf band. Click in the small black downward pointing triangle to get the list of step sizes to choose from values between .0001 kHz (= 1 Hz) and 100 kHz. All frequency channel spacings used in the spectrum covered by the RX320 can be directly selected for easy channel-wise stepping through those parts of the frequency band. Examples are 9 (Europe) or 10 kHz (USA, Japan) in the long wave and medium wave broadcast bands, 3 kHz in the Aero bands. The default frequency step value is 5 kHz, as used for the channel spacing in the HF broadcast bands.

After the frequency step value is selected, the frequency can be changed in several ways:

1. By clicking in the *up/down spin button* just below the combo box. After clicking in 'GO' the frequency will continuously change with the selected step size. To change the direction of the change, click in the up or down part of the spin button.

2. By clicking in the *buttons left and right of the frequency textbox*, where '<' lowers the frequency and '>' increase the frequency with the selected step size.
3. By pressing the *arrows key on the keyboard*. After clicking in the frequency textbox the left or down arrow will lower the frequency and the right or up arrow will increase the frequency with the selected step size.
4. By *turning your mouse wheel*. If you put your mouse pointer in the frequency textbox and turn your mouse wheel then with each step the frequency will change with the step size selected in the combo box.

The frequency can be 'trimmed' to the nearest kHz or 5 kHz channel by clicking in the labels showing 'i1' or 'i5' below the 'GO' command button. Clicking in 'i1' will set the frequency to the nearest 'full' kHz value and clicking in 'i5' will set the frequency to the nearest 5 KHz channel frequency.

The frequency can also directly be changed. After double clicking in the text box showing the actual frequency, the current value disappears and you can type the new value. Press enter to activate it.

In the right-hand side of this frame also a keypad is available for direct entry -with your mouse- of frequencies (100-30000 kHz) and step size (0.001-100 kHz). The frequency should be in KHz with the dot as the decimal separator. With '<=' you can remove the last added figure. To activate the frequency, click in 'F'. To activate the step size click in 'S'.

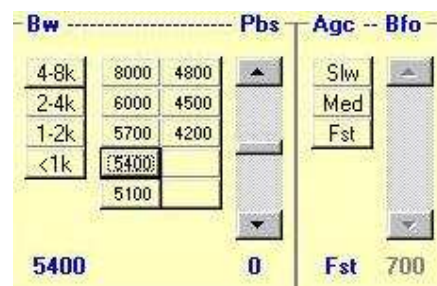
If you click in the menu-item 'Direct / Last 20 Freqs' a new small window appears that can contain the most recent 20 selected frequencies. If you want to go back to a certain frequency from this list, just click on it.

If you click in the menu item 'Direct / Freq Scratchpad' a frequency ScratchPad window will appear. If you then click in the 'To Scratchpad' button, the actual frequency as shown in the main receiver control window, will be copied to any selected cell in the frequency scratchpad. The other way around, if you click in the 'To Receiver' button, the receiver will be tuned to the frequency value available in the selected cell.

Moreover if you double click in an empty cell the receiver frequency will be directly copied to that cell and if you double click in a cell containing valid frequency data then the receiver is directly tuned to that frequency.

The data in the frequency scratchpad can be saved and later on loaded. Be aware that the filenames to be used are according to the fsp\_\*.txt pattern.

### 3.4.2 RX320 Intermediate Frequency (IF) frame



A lot of signal processing takes place in the IF part of the receiver. Therefore also many settings can be controlled in this part. From left to right the following parameters can be selected in this frame:

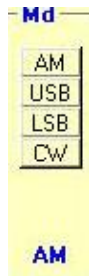
1. IF filter bandwidth (BW), because 33 different bandwidth values can be selected this is divided in 4 groups that can be selected with the command buttons 4-8k (for bandwidth between 4 and 8 kHz), 2-4k, 1-2k and <1k. In the other command buttons the individual

values in each group are shown

2. Pass Band Shift (PBS, -2000 to +2000 Hz) \*1
3. Speed of automatic gain control (AGC, slow, medium and fast)
4. Beat Frequency Oscillator (BFO, -3000 to +3000 kHz) \*1

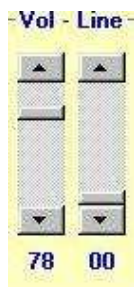
\*1 PBS and BFO can be put into its neutral position (=0) by just clicking in the text label below the scrollbar

### 3.4.3 RX320 Mode frame



The RX320 is equipped with 4 reception modes, these being AM, USB, LSB, CW. These can be easily selected with one mouse click in the relevant command button in the 'Mode' block.

### 3.4.4 RX320 Audio Frequency (AF) frame



The AF frame is very straightforward and contains setting possibilities for loudspeaker Volume and Line Out level

To prevent unintended changes in the setting of the Line out level (for example used for recordings or input to the soundcard of the PC) it is possible to set the value and then disable the software potentiometer on the main control window. To change the setting the menu options 'Direct/Enable Line out' and 'Direct/Disable Line out' can be used. Vol and Line can be put to 0 by just clicking in the text labels below each scrollbar

### 3.4.5 RX320 Hot Keys

Possibilities are also built-in to control the main receiver settings, using the keyboard only. For that purpose the hot keys as shown in the tables below can be used. Be aware first to take away your cursor from the frequency textbox or frequency step textbox, otherwise the values shown there will be garbled.



<b>IF BandWidth</b>		<b>Mode</b>	
Shift + F1	Filters <1k	Shift + A	AM
Shift + F2	Filters 1-2k	Shift + C	CW
Shift + F3	Filters 2-4k	Shift + L	LSB
Shift + F4	Filters 4-8k	Shift + U	USB
Shift + F5	Filter nr 7		
Shift + F6	Filter nr 5		
Shift + F7	Filter nr 3		
Shift + F8	Filter nr 1		
<b>Pass Band Shift</b>		<b>Loudspeaker volume</b>	
Shift + '+'	Move Up	Alt + '+'	Increase
Shift + '-'	Move Down	Alt + '-'	Decrease
Shift + 0	Set to Neutral	Alt + 0	Set to 0

<b>Tune Frequency</b>	
Ctrl + Number keys or dot key	Select new frequency (kHz)
Ctrl + F	Activate new frequency
Ctrl + Number keys or dot key	Select new freq step size (kHz)
Ctrl + S	Activate new freq. step size
Ctrl + G	Start/Stop auto freq. stepping (GO)
Ctrl + Left or Down arrow	Lower freq. with 1x freq. step
Ctrl + Right or Up arrow	Increase freq. with 1x freq. step

## 4. Database to Receiver files (Db2Rx)

Structuring of the program in relation to database use is based on two main types :

1. Files with frequency data (BDXC or ADDX / Own / ILGRadio) that can be **sent to** the receivers (Db2Rx)
2. Files that store (Log) or translate (Tracking) data **coming from** the receivers (Rx2Db)

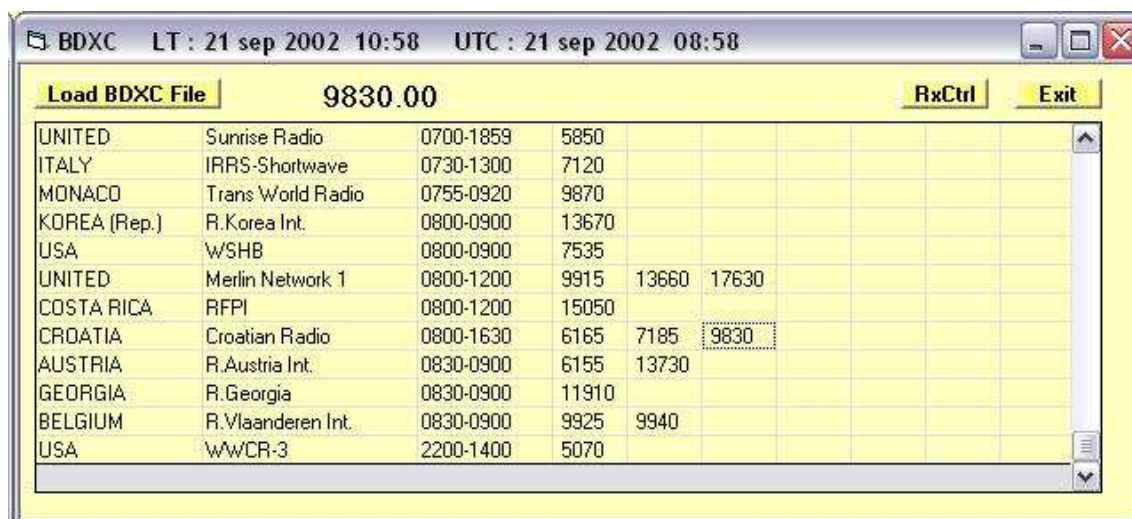
This chapter gives information on the first type and the next chapter describes the use of the second.

### 4.1 BDXC and ADDX broadcast data files

A number of years ago there were only limited sources of frequency data free available on the Internet. The BDXC and ADDX files were some of the few. These files are still available today but there are other, more extensive sources available, especially ILG. However the BDXC window has been kept because there are users that convert their own data to this file- and record structure.

#### 4.1.1 BDXC window

To open the BDXC window click in the main menu item 'Db2Rx Files' on the receiver control panel and select 'BDXC', see picture below :



Country	Station Name	Frequency Range	Frequency			
UNITED	Sunrise Radio	0700-1859	5850			
ITALY	IRRS-Shortwave	0730-1300	7120			
MONACO	Trans World Radio	0755-0920	9870			
KOREA (Rep.)	R.Korea Int.	0800-0900	13670			
USA	WSHB	0800-0900	7535			
UNITED	Merlin Network 1	0800-1200	9915	13660	17630	
COSTA RICA	RFPI	0800-1200	15050			
CROATIA	Croatian Radio	0800-1630	6165	7185	9830	
AUSTRIA	R.Austria Int.	0830-0900	6155	13730		
GEORGIA	R.Georgia	0830-0900	11910			
BELGIUM	R.Vlaanderen Int.	0830-0900	9925	9940		
USA	WWCR-3	2200-1400	5070			

After the BDXC window is loaded click in 'Load BDXC/ADDX File' to get a survey of files to select from. Select one file by double clicking in the file name.

Then a message box appears giving the possibility to select the records to be loaded on a time criteria. After clicking in OK here the relevant records of the file will now be loaded in the grid in the BDXC window. If you now click on a grid cell with frequency data the receiver is directly tuned to that frequency

To change the receiver setting click in the button 'RxCtrl' to get the receiver control window and make the necessary change(s). After clicking in the BDXC window the receiver control window will move to the background again.

#### 4.1.2 Record structure of BDXC files

The default for the maximum number of records in a file is set to 2000. This can easily be changed in the set-up between 1000 and 50000, by changing DIM BDXC in the set-up window.

All records in these files have the same structure i.e. each line in the file is build-up as given:

Character positions 1 up to and including 16 : Country name

Character positions 18 up to and including 34 : Broadcast organisation

Character positions 36 up to and including 43 : hhmm-hhmm, UTC start-end time

Character positions 49 up to and including 77 : frequencies in use (max. 7)

For the proper working of the program it is absolutely necessary that the described record structure be maintained.

## 4.2 OWN frequency data files

The basic idea behind this menu item is that a user has the possibility to send self-collected frequency data in a fast and direct way to the receiver to support his/her listening activities. For an easy start I have set-up already a number of these files with data I have collected recently (and not so recently) from several sources. In collecting the data for the files on broadcasts from the various regions of the world the focus has been on frequencies used for English broadcasts to Europe. It needs of course continuous attention to keep all these files updated. For updating the utility data a lot of information can be found on the web page from the World Utility News club (WUN), see <http://www.wunclub.com/> with also many links to other relevant sites.

### 4.2.1 Own window

To open the Own window click in the main menu item 'Db2Rx Files' on the receiver control panel and select 'OWN', see picture below :



The screenshot shows a window titled 'OWN' with a status bar indicating 'LT : 11 okt 2002 21:05' and 'UTC : 11 okt 2002 19:05'. The window contains a table with columns for file names and frequency data. The table is titled 'OWN\_UTAE.TXT' and has a 'Load Own File' button on the left and 'RxCtrl' and 'Exit' buttons on the right. The table data is as follows:

File Name	Frequency 1	Frequency 2	Frequency 3	Frequency 4	Frequency 5	Frequency 6	Frequency 7
MWARA/EUR	5661	10084					
MWARA/MID-1	2992	5667	8918	13312	17961		
MWARA/MID-2	3467	5658	10018	13288	17961		
MWARA/MID-3	2944	4669	6631	8951	17961		
MWARA/NAT-A	3016	5598	8906	13306	17946		
MWARA/NAT-B	2899	5616	8864	13291			
MWARA/NAT-C	2872	5649	8879	11336	13306		
MWARA/NAT-D	2971	4675	8891	11279	13291	17946	
MWARA/NAT-E	2962	6628	8825	11309	13354	17946	
MWARA/NAT-F	3476	6622	8831	13291	17946		
MWARA/NCA-3	5664	6865	10039				
MWARA/NP-1	2932	5628	10048	13273	17946	21925	
MWARA/NP-2	2932	6655	8951	11330	17946	21925	

After the OWN window is loaded click in 'Load OWN File' to get a survey of files to select from. Select one file by double clicking in the file name. This file will now be loaded in the grid in the OWN window. If you now click on a grid cell with frequency data, the receiver is directly tuned to that frequency.

To change the receiver setting click in the button ' RxCtrl' to get the receiver control window and make the necessary change(s). After clicking in the OWN window the receiver control window will move to the background again.

### 4.2.2 Record structure of Own files

The default for the maximum number of records in a file is set to 1000. This can easily be changed in the set-up between 1000 and 50000, by changing DIM OWN in the set-up

window. All records in these files have the same structure i.e. each line in the file is build-up as given:

- Character positions 1 up to and including 19 : Organisation name
- Character positions 21 up to and including 23 : ITU country code
- Character positions 25 up to and including 27 : Language of transmission
- Character positions 29 up to and including 37 : hhmm-hhmm (UTC start-end time)
- Character positions 39 up to and including 42 : In use by the earlier programs Turbo535 and ParaDise
- Character positions 44 up to and including 44 : coded data for mode, filter and agcspeed setting (a=AM, u=USB, l=LSB, c=CW, f=FM, d=DATA)
- Character positions 46 up to and including 49 : not in use
- Character positions 51 up to and including 92 : frequencies in use (in KHz, max. 7)

For the proper working of the program it is absolutely necessary that the described record structure be maintained.

Also use only the . (dot) as decimal separator in the frequencies.

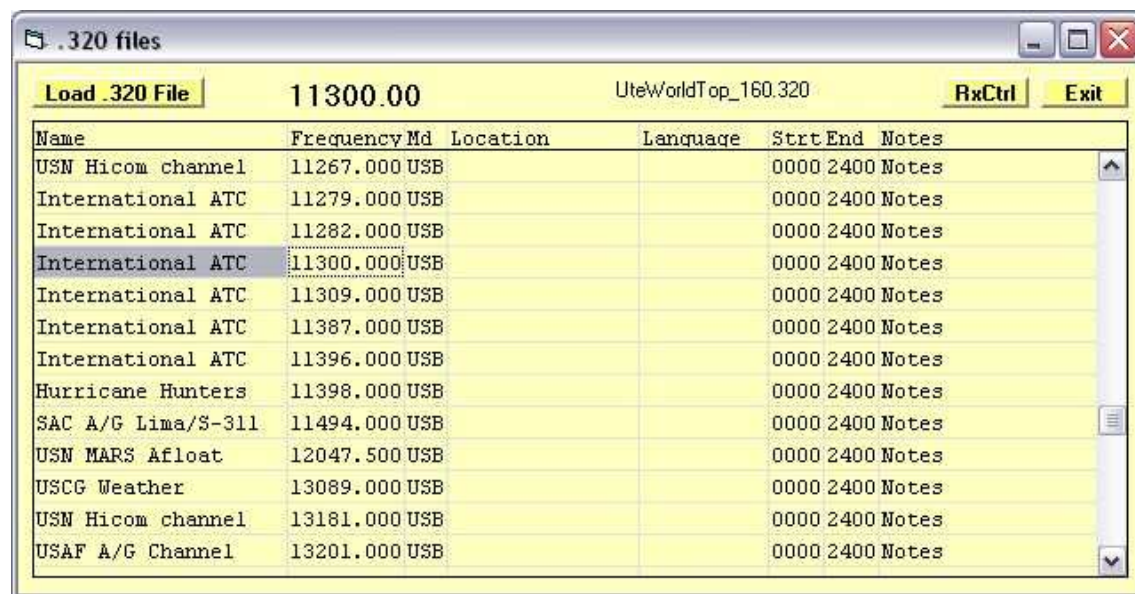
### 4.3 .320 Frequency data files

Several other RX320 control programs exist which use a kind of 'de facto' standard for frequency data file structure. These files can be recognised because they use .320 as filename extension. The defined record structure is copied in the paragraph Record structure of .320 files

Also in RxWings this file type can be used, not only with the RX320 but also with the AR7030 and NRD-535/545.

#### 4.3.1 .320 Window

To open the .320 window click in the main menu item 'Db2Rx Files' on the receiver control panel and select '.320', see picture below :



After the .320 window is loaded click in 'Load .320 File' to get a survey of files to select from. Select one file by double clicking in the file name. This file will now be loaded in the grid in the .320 window. If you now click on line with frequency data, the receiver is directly tuned to that frequency.

To change the receiver setting click in the button ' RxCtrl' to get the receiver control

window and make the necessary change(s). After clicking in the .320 window the receiver control window will move to the background again.

### 4.3.2 .320 Record structure

The default for the maximum number of records in a file is set to 1000. This can easily be changed in the set-up between 1000 and 50000, by changing DIM OWN in the set-up window.

All records in a .320 file have the same structure and are, as described below, built-up of 14 comma separated fields :

```
"80m PSK-31",3.533000,USB,3300,3,100,0,"","","0000","2400","Notes",0,0
```

1. Name String, up to 20 char in length, enclosed in quotes
2. Frequency Numeric, real. Frequency in MHz. (You don't need to add trailing zeros)
3. Mode AM, USB, LSB, or CW. This field is not enclosed in quotes. An entry in this field is required.
4. Filter Numeric, integer. Filter bandwidth in Hz
5. AGC Numeric, integer. 1 = slow, 2 = medium, 3 = fast
6. Tuning step Numeric, integer. Tuning step in Hz
7. Pass Band Tuning offset. Numeric, integer. Pass band tuning value in Hz
8. Location String, up to 15 char in length, enclosed in quotes
9. Language String, up to 10 char in length, enclosed in quotes
10. Start time String: 4 digits, enclosed in quotes. This, and the end time field, may be left blank (just the quotes) but, if you include it, the format must be a 4-digit integer between 0000 and 2400.
11. End time. Same as above
12. Notes String, up to 64 char in length, enclosed in quotes.
13. Offset Numeric, integer.
14. Lockout Numeric, integer.

You may leave any of the string fields blank. If you do, however, make sure that you leave the empty quotes.

Be aware that not all data available in a .320 record is presented in the .320 window and/or used by the RxWings program.

## 4.4 ILGRadio broadcast data files

Given the easy availability (see the ILGRadio conversion topic) and the accuracy of the ILGRadio database and the limitations of the ADDX/BDXC files, also an ILGRadio database search facility is build in. For this search / filter function the same files are used as for the tracking function.

### 4.4.1 ILGRadio window

After selecting the menu-item Db2Rx/ILG Radio the ILGRadio window will be opened. Clicking in the button 'Load file' will give access to the ILGRadio broadcast files. Select 'ILGADATA.FTL' (LW/MW) or 'ILGSDATA.FTL' (SW) and load it in RAM. The total file is then available in the list box, see on next page.



#### 4.4.1.1 ILG database querying

After clicking in 'Query ILG db' in the ILGRadio window the ILG database query window will appear, see picture below:



To use a search criterion, check its check box and type the value/text to search for. Instead of typing you can also select an option from each of the list boxes. These list boxes can be customised, see below. After you have selected all the search criteria click in 'Search ILG db' to start the actual search. The progress of the search is shown the right hand upper side of the window. After a 'few' second the result will appear. If you now double-click on a line, the receiver will be set to the frequency shown in this line. In case more than 12 records are available, automatically a scroll bar will be introduced to let you view the other records.

#### Customising the querying window

The search criteria as available in the list boxes in the ILG filter window are read from the ilgquery.ini file. To change or supplement these, load the ilgquery.ini file from the main RxWings directory in an ASCII type text editor, like Notepad. The start of the content of a list box is shown with "\*\*\*\* + item name" and end of file is with "####" Do NOT change these lines. All the other lines can be changed or lines can be added. Check what

you change or add carefully with the exact typing used in the different sub-records in the ILGADATA.FTL and ILGSDATA.FTL files, otherwise it will not work properly.

#### 4.4.1.2 Sort ILGRadio Query results

Sort gives the possibility to change the order of the records in the list, depending on the purpose of it. The sort orders that can be selected are shown in the window below.



#### 4.4.1.3 Scan ILGRadio Query results

To test reception quality it is possible to let the program set the receiver successively to each frequency coming out of a query. Just click in 'Start scan' to begin the survey. In the text box directly left to the start button you can adapt the delay between steps from 1 to 10 sec. The default value is 2 sec. If you first click on a frequency in the list and then in 'Start scan' then the scan will start/continue from that frequency.

This scan possibility can also be combined with the tracking facility.

#### 4.4.2 Record structure of the converted ILGRadio database

In the conversion the items mentioned below are taken from the ILG \*.dbf database and put in the \*.ftl ascii file

The default of the maximum number of records in a tracking file is set to 15000. This can easily be changed in the set-up between 1000 and 50000.

The length of each record is max. 126 characters and is/should be build-up as given :

Character positions 1 up to and including 8 : Frequency (mmkkk.uu)

Character positions 10 up to and including 13 : Start time UTC (hhmm)

Character positions 15 up to and including 18 : End time UTC (hhmm)

Character positions 20 up to and including 41 : Broadcast organisation

Character positions 43 up to and including 50 : Target Area

Character positions 52 up to and including 68 : Language

Character positions 70 up to and including 76 : Transmitter power in kW (####.###)

Character positions 78 up to and including 82 : Transmitter Latitude

Character positions 84 up to and including 89 : Transmitter Longitude

Character positions 91 up to and including 99 : Coded data about target area(s)

Character positions 101 up to and including 112 : Country where transmitter is located

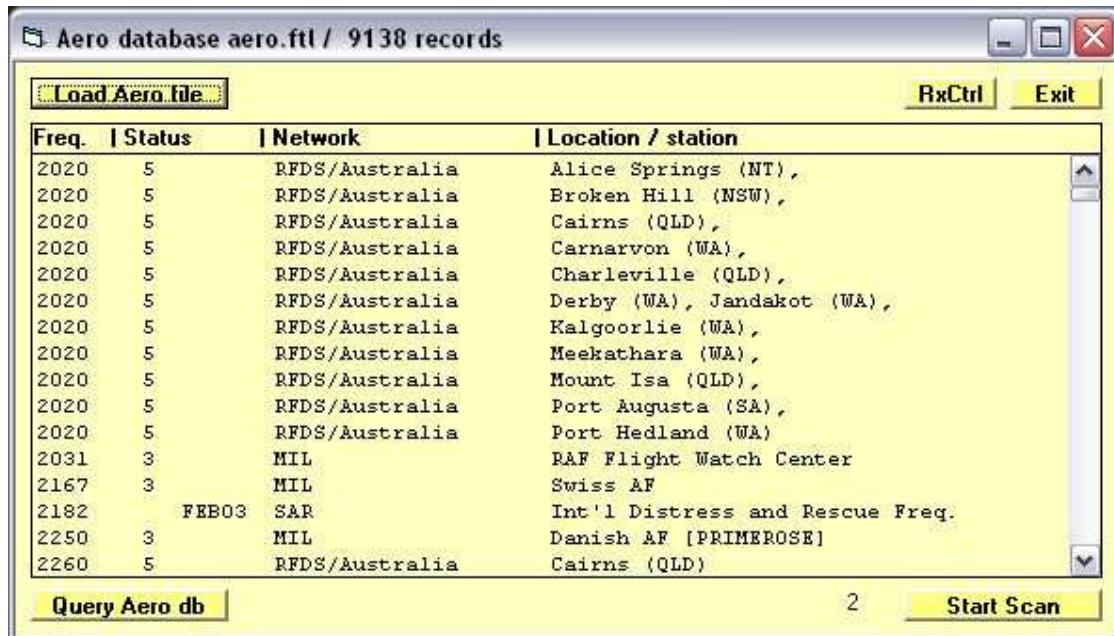
Character positions 114 up to and including 125 : Location of transmitter site

#### 4.5 Aero files

Already for some time an extensive and accurate database with data on aero hf services exist (see also the Aerolist conversion topic) therefore also an Aerolist search facility is now build in. For this search / filter function the same file is used as for the tracking function

### 4.5.1 Aerolist window

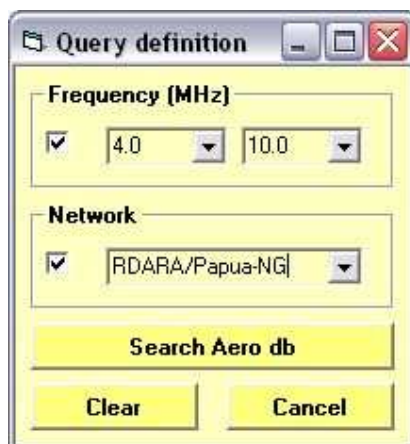
After selecting the menu-item Db2Rx/Aero the Aerolist window will be opened. Clicking in the button 'Load file' will give access to the Aerolist file. Select 'Aero.ftl' and load it in RAM. The total file is then available in the list box, see picture below.



Freq.	Status	Network	Location / station
2020	5	RFDS/Australia	Alice Springs (NT),
2020	5	RFDS/Australia	Broken Hill (NSW),
2020	5	RFDS/Australia	Cairns (QLD),
2020	5	RFDS/Australia	Carnarvon (WA),
2020	5	RFDS/Australia	Charleville (QLD),
2020	5	RFDS/Australia	Derby (WA), Jandakot (WA),
2020	5	RFDS/Australia	Kalgoorlie (WA),
2020	5	RFDS/Australia	Meekathara (WA),
2020	5	RFDS/Australia	Mount Isa (QLD),
2020	5	RFDS/Australia	Port Augusta (SA),
2020	5	RFDS/Australia	Port Hedland (WA)
2031	3	MIL	RAF Flight Watch Center
2167	3	MIL	Swiss AF
2182	FEB03	SAR	Int'l Distress and Rescue Freq.
2250	3	MIL	Danish AF [PRIMEROSE]
2260	5	RFDS/Australia	Cairns (QLD)

#### 4.5.1.1 Aerolist querying

After clicking in 'Query Aero db' in the Aerolist window the Aero database query window will appear, see picture below:



Query definition

Frequency (MHz)

4.0 10.0

Network

RDARA/Papua-NG

Search Aero db

Clear Cancel

To use a search criterion, check its check box and type the value/text to search for. Instead of typing you can also select an option from each of the list boxes. These list boxes can be customised, see below. After you have selected all the search criteria click in 'Search ILG db' to start the actual search. The progress of the search is shown the right hand upper side of the window. After a 'few' second the result will appear. If you now double-click on a line, the receiver will be set to the frequency shown in this line. In case more than 12 records are available, automatically a scroll bar will be introduced to let you view the other records.



### Customising the querying window

The search criteria as available in the list boxes in the Aero filter window are read from the aeroquery.ini file. To change or supplement these, load the aeroquery.ini file from the main RxWings directory in an ASCII type text editor, like Notepad. The start of the content of a list box is shown with "\*\*\*\* + item name" and end of file is with "####". Do NOT change these lines. All the other lines can be changed or lines can be added. Check what you change or add carefully with the exact typing used in the different sub-records in the AERO.FTL file, otherwise it will not work properly.

#### 4.5.1.2 Scan Aero Query results

To check if something is 'On the air', it is possible to let the program set the receiver successively to each frequency coming out of a query. Just click in 'Start scan' to begin the survey. In the text box directly left to the start button you can adapt the delay between steps from 1 to 60 sec. The default value is 2 sec. If you first click on a frequency in the list and then in 'Start scan' then the scan will start/continue from that frequency.

This scan possibility can also be combined with the tracking facility

#### 4.5.2 Record structure of the converted Aero database

In the conversion the items mentioned below are taken from the aerolist.txt database and put in the aero.ftl file  
The default of the maximum number of records in an aero file is set to 15000. This can easily be changed in the set-up (DIM ILG) between 1000 and 50000.  
The length of each record is max. 126 characters and is/should be build-up as given :  
Character positions 1 up to and including 7 : Frequency (mmkkk or mmkkk.h)  
Character positions 9 up to and including 16 : Status or reception report date  
Character positions 19 up to and including 38 : Network name  
Character positions 40 up to and including 78 : Location /station

### 4.5 Combined use of Database to receiver (Db2Rx) files with Tracking

In case your video screen is large enough you can easily combine the use of the 'forward' control facilities in the BDXC and/or Own and/or ILG Radio and/or Aero windows with the 'backward' control form the Tracking window.

Open for example the ILG Radio window and load the ILGSDATA.FTL file and open the Query window and set the criteria for your search and start the search. After some time the result of the search is shown in the ILG Radio window. Also open the Tracking window and load also the ILGSDATA.FTL.

In this situations of combined use **always set the 'mouse' option** (instead of the 'dial' option) otherwise the tracking window will not follow the receiver frequency change. If you now click on one of the lines in the ILG Radio window, the receiver is tuned to the frequency shown on that line and the tracking window shows the same data and in addition what else could be possibly found on this frequency.

## 5. Receiver to Database files (Rx2Db)

Structuring of the program in relation to database use is based on two main types :

1. Files with frequency data (Own/BDXC/ADDX/ILGRadio) that can be sent to the receivers (Db2Rx)
2. Files that store (Log) or translate (Tracking) data coming from the receivers (Rx2Db)

This part gives information on the use of the second type.

### 5.1 Logging facilities

With the menu item logging a range of logbook facilities come available. Above the features you find in the BDXC and OWN menu, it gives the possibility to add and to change log records, to change the screen format and to sort the records. The result can of course be saved to a log file for future use.

#### 5.1.1 Logging window

After selecting the menu-item Rx2Db/Logging the log window will be opened, see picture below:



After a selected file is loaded, you can click on a frequency or a // frequency in the grid to tune your receiver to that frequency. If an Rx setting was saved then the main receiver parameters will be set accordingly.

##### 5.1.1.1 Add or change or delete a log record

Add Record gives the possibility to add a new record. After clicking there, a new window appears to edit the record. See picture below. By clicking in 'Get current setting', the current time and receiver setting will be automatically inserted in the right textboxes. You can also type the necessary data in the other boxes. Part of it can be found by simultaneous use of the tracking option, see 'Combined use of Logging and Tracking'. To add the new record to the list click in OK

Change Record gives the possibility to change an existing record. First click once in a grid cell to select the row, then click on the 'Change Record' button to get the edit window with the old record, see picture below. Change it as wanted and click in 'OK' to bring the changes back in the list. In case you want to add data, first delete some spaces at the

end of the item that has to be changed, because all sub-records are brought at the same max. length by adding spaces.

**Input Record 004**

Date (yyyymmdd)   Frequency (kHz)

Start UTC (hhmm)   SINPO (#####)

End UTC (hhmm)   Language (%%%)

Organisation

TX Location

// Frequency 1   // Frequency 3

// Frequency 2   // Frequency 4

Remarks

RX setting   Auxiliary

Delete Record gives the possibility to delete a record from the list. First click in a grid cell of the record that has to be deleted, then click the Delete Record button and click in Yes to confirm it.

### 5.1.1.2 Change Log screen format

Format gives the possibility to change the parts of the records that are shown on the screen, especially to keep the parts shown within about a total of 70 characters, the maximum that can be visible in the log grid. After clicking in format a window appears with a survey of all sub-records available in each record, see picture below. By checking the sub-records you want to be shown and at the same time keeping an eye on the total record length given at the bottom of the same window, you can compose your best view of the record.

**Log Screen Format**

Date  Language  // Freq 3

Start Time  BC org.  // Freq 4

End Time  Tx Loc.  Remarks

Frequency  // Freq 1  RX setting

SINPO  // Freq 2  Auxiliary

Format Length **067**

### 5.1.1.3 Sort Log records

Sort gives the possibility to change the order of the records in the list, depending on the purpose of it.

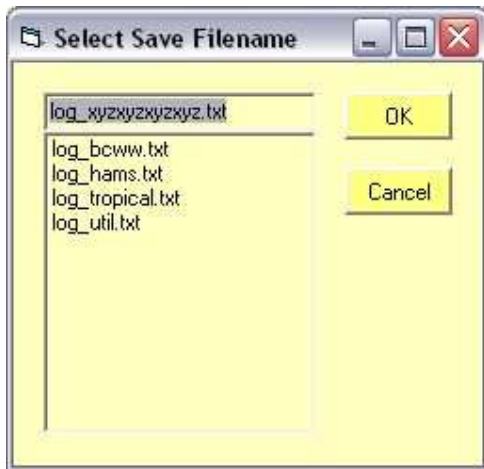
The sort orders that can be selected are shown in the window below.



### 5.1.1.4 Save Loggings

Save gives the possibility to save all records to the existing file any time you want, without closing the file.

Save As gives the possibility to save all records in a new file by selecting another filename in the Save file combo box, see picture below. This filename should fulfil the following criteria, the name should start with 'log\_' and end with '.txt' In between you can use 1 to 12 characters. Examples are 'log\_myfavourites.txt' or LOG\_abcdefghij.TXT. Close give the possibility to save and close the file.



### 5.1.2 Record structure of Log files

The default for the maximum number of records in a log file is set to 1000. This can easily be changed in the set-up between 1000 and 50.000, by changing DIM LOG. Each record has the same structure. The maximum length of a record is 160 characters and is build-up as follows:

- Character positions 1 up to and including 3 : Record number (###)
- Character positions 5 up to and including 12 : Date (yyyymmdd)
- Character positions 14 up to and including 17 : Start time (hhmm)
- Character positions 19 up to and including 22 : End time (hhmm)
- Character positions 24 up to and including 32 : Frequency (in kHz, #####.###)
- Character positions 34 up to and including 38 : SINPO
- Character positions 40 up to and including 42 : Language
- Character positions 44 up to and including 63 : Broadcast organisation

- Character positions 65 up to and including 84 : Transmitter location
- Character positions 86 up to and including 91 : // Frequency 1 (in kHz, #####)
- Character positions 92 up to and including 96 : // Frequency 2 (in kHz, #####)
- Character positions 98 up to and including 102 : // Frequency 3 (in kHz, #####)
- Character positions 104 up to and including 108 : // Frequency 4 (in kHz, #####)
- Character positions 110 up to and including 149 : Remarks
- Character positions 151 up to and including 154 : Rx setting
- Character positions 156 up to and including 159 : Auxiliary

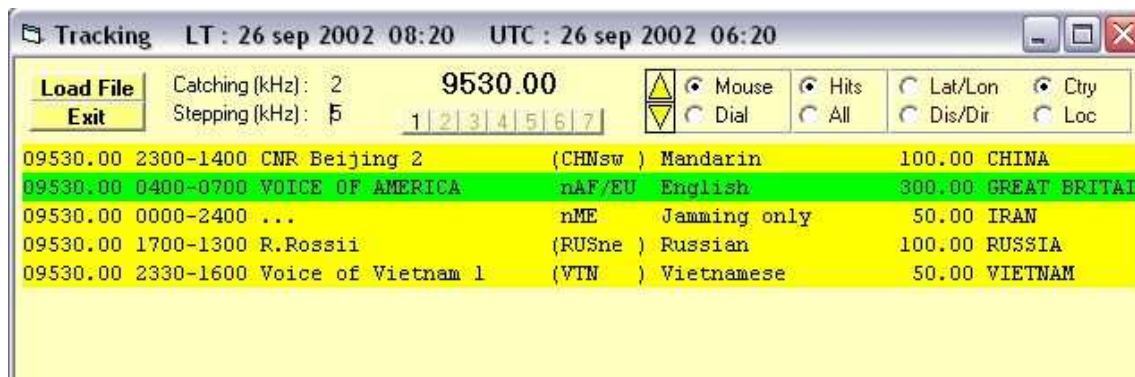
## 5.2 Tracking facilities

In Tracking mode you can tune the receiver by turning the frequency dial on the receiver (AR7030 and NRD-535/545) or by mouse clicks in a spin control in the tracking window of the program, while the program continuously gets the receiver tuned frequency and tries to find a frequency or frequency and time or frequency, time and target area match in a open database, to show to which station you are (possibly) tuned. Several databases can be used for tracking purpose, for example the converted ILGRadio file or the Aerolist file.

### 5.2.1 Tracking window

After selecting the menu-item Rx2Db/Tracking the tracking window will be opened, see picture. Then clicking in the button 'Load file' will give access to the available tracking files. Select the one you want to use and load it in RAM.

Be aware that the tracking window is optimised for use with the converted ILGRadio files. If you use other files, like the Aerolist then not all function will be available because that database does not contain all the necessary data.



#### 5.2.1.1 Methods of changing the frequency

After a file is loaded the tracking mode is automatically activated. By clicking in the option box upper right in the tracking window at the right-hand side of the receiver frequency, you can choose between two methods of changing the receiver frequency.

- Mouse : change frequency by clicking in the up/down spin button left of this option box. In the textbox 'Stepping (kHz)' you can change the frequency step size for using the spin button. The default value is 5 kHz, being the channel spacing for broadcast transmissions in the SW bands. Also using one of the methods to change the frequency in the main control window will have the same effect.
- Dial : change frequency by dialling around the frequency dial on the receiver. (Not available on the RX320)

Large frequency changes are also easily possible in both modes. Double clicking in the frequency textbox will let disappear the current frequency setting. Then type the new frequency and activate it by pressing the <Enter> key.

In the Text Box called 'Catching (kHz)' you can change the deviation (in kHz) between the receiver frequency and frequency data in the database at which a match will be indicated. The default catch range is +/- 2 kHz.

### **5.2.1.2 Presentation options**

#### **Background Colours (ILG db only)**

In case there is only a frequency match, the background becomes light yellow. If there is also a match in time then the background will become strong yellow and in case a frequency, time and target area match occurs, it becomes green.

This will only work correctly if you have set in the Set-up window the right RX Target Area option.

#### **Select page to be presented**

In case for certain frequencies more than 25 records are available, it is possible to show them page by page by clicking in the page number just below the receiver frequency. Up to 7 pages / 175 records can be shown. Page number selection buttons are only enabled if that page really contains data.

#### **Showing all records for one frequency or only frequency plus time /target area hits. (ILG db only)**

In the option selection box at the right-hand top you can select between a presentation of all the records in relation to the tuned frequency ('All') or only those with a match on frequency and time or frequency and time and target area ('Hits')

**If you are using databases other than ILG, for example Aerolist, you always should select the 'All' option**

#### **Showing transmitter Latitude/Longitude or Distance and Direction from Rx to Tx or Country where the transmitter is located or Location of transmitter site (ILG db only)**

In the option box Lat/Lon or Dis/Dir or Ctry or Loc you can select whether (1) the Latitude and Longitude of a transmitter is shown or (2) the distance between your receiver and the transmitter and the (great circle) direction from your receiver to that transmitter or (3) the country where the transmitter is located or (4) the site where the transmitter is located.

This will only work correctly if you have filled-in in the Set-up window the accurate location (RX Latitude and RX Longitude) and Target Area of your receiver.

### **5.3 Combined use of Logging and Tracking**

If you use the logging facility to save your loggings you can use the data available with the tracking facility to fill in some of the log input fields.

First open the log window and click in add record. Then also open the tracking window and load the relevant tracking file. If one or more records are shown for the currently received frequency, you can click in the line of the record of the station you are receiving and then the data about broadcast organisation, language and transmitter location will be copied from the tracking window to the log input window. The data about transmitter location will depend on the type selected in the tracking window : longitude/latitude or distance/direction, or country, or city.

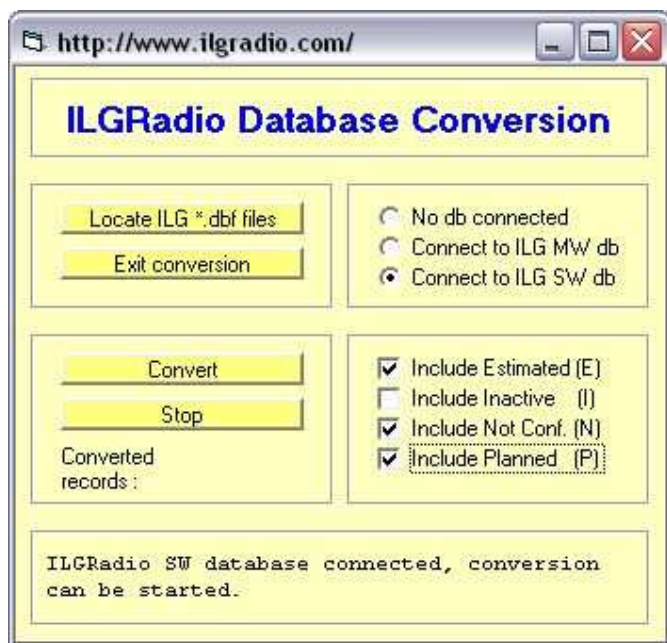
### **5.4 ILG Radio database conversion**

ILG Radio is the amateur version of the ILG (International Listening Guide) professional databases, set-up and kept up to date by Bernd Friedewald from Germany. All info about these databases can be found on his web pages, starting at <http://www.ilgradio.com/>.

A lot of specific info about ILGRadio, including access to download facilities, can be found at <http://www.ilgradio.com/ilgradio.htm>. To download these files you need (from August 2003) no longer a user name and password.

It was agreed with Bernd Friedewald that no converted ILGRadio files will be distributed with my programs. So if you want to use the converted ILGRadio files with the program you have to download the LW/MW (ILGADATA.DBF) and SW (ILGSDATA.DBF) database files -in dbase /\*.dbf format- from the ILG website mentioned above and convert them as described below. The advantages of this approach are two-fold, Bernd can keep track of the usage of his databases and you can update the tracking files yourself as soon as they come available on the ILG website.

After you have downloaded and unzipped the ilgsdata.dbf files in your ILGRadio directory, start the RxWings program and select the menu "Rx2Db\Convert ILGRadio". Then the conversion window will be loaded. See picture below.



Click first in 'Locate ILGRadio \*.dbf files'. Then you get a window with a drive list box, a directory list box and a file list box. Select the drive where your ILGRadio files are located and then the directory. If you select the right directory the filenames (only ilgadata.dbf and/or ilgsdata.dbf will be sought for, so do not change the names) will appear in the file list box and the OK command button will become enabled. Click in 'OK'. Now, if not automatically done, connect to the database you want to convert, by clicking in the option button 'Connect to ILG MW db' or 'Connect to ILG SW db'.

In the past some people have reported that they get a 'Could not connect to database. Check path and/or filename' error message if they try to connect to the database. In case there are really no path or filename errors this is caused by missing system files for database processing. One of the places to download these files are <http://www.ilgradio.com/gnpdb/gnpdb.html> especially the Data Access Objects (DAO) installation.

The ILG database contains also information about the status of each record. Over 90 % is of the type 'Confirmed' (C). These will always be included in the conversion. For the others you can check the relevant checkbox if you want them included in the converted database.

After that click in 'Convert' to start the conversion.

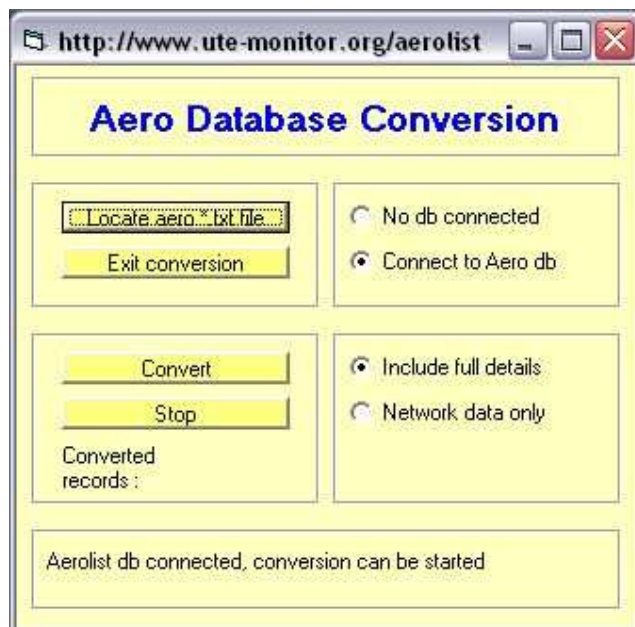
During the conversion each hundredth record that has been converted will be shown at

the bottom of the conversion window. After some time a message appears that the conversion is finalised. The converted file is automatically saved in the 'Rx2Db' sub-directory of the RxWings program. If now the ILGRadio filtering window or the tracking window is loaded the converted ILGRadio file can be used.

## 5.5 Aerolist conversion

The Aerolist is a database with data about different type of aero related services, set-up and kept up to date by Risto Hirvonen. Risto can be reached at the following E-mail address [Risto.Hirvonen@finnair.com](mailto:Risto.Hirvonen@finnair.com). The database is made available on the Internet at : <http://www.ute-monitor.org/aerolist/>  
Risto has confirmed that it is OK to convert and use his database in the way as described in this document.

After you have downloaded and unzipped the aerotxt.zip files in your Aerolist directory, start the RxWings program and select the menu "Rx2Db\Convert Aero". Then the conversion window will be loaded. See picture below.



Click first in 'Locate aero\*.txt files'. Then you get a window with a drive list box, a directory list box and a file list box. Select the drive where your Aerolist files are located and then the directory. If you select the right directory the filenames (only aero\*.txt will be sought for, so do not change the names) will appear in the file list box and the OK command button will become enabled. Click in 'OK'. Now, if not automatically done, connect to the database you want to convert, by clicking in the option button 'Connect toAero db'. Then you have to select if you want also details about possible transmitter locations or only the name of the network.

After that click in 'Convert' to start the conversion.

The converted file is automatically saved in the 'Rx2Db' sub-directory of the RxWings program. If now the Aerolist filtering window or the tracking window is loaded, the converted Aerolist file can be used.



## 6. Analysis of received signal strength

All options under the menu-item 'SignalAn' (=Signal Analysis) are based on reading and processing the received signal strength (S-meter) of the receivers.

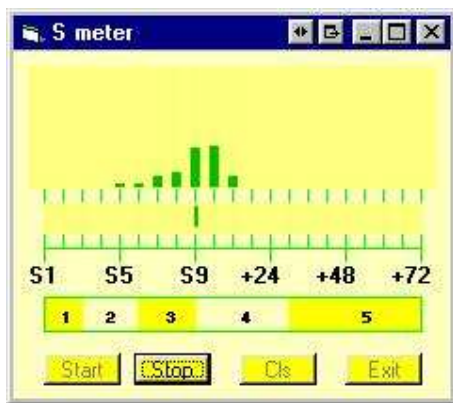
You can analyse in two dimensions :

1. **Time**, resulting in a propagation impression over time for one frequency and the path between the selected transmitter and your antenna-receiver combination.  
This is elaborated in 6.1 Intelligent S meter and 6.5 Propagation impression

2. **Frequency**, resulting in a survey of signals that can be received at that moment in the selected part of the HF spectrum or on certain selected frequencies  
This is elaborated in 6.2 Spectrum analysis, 6.3 Scan frequency list and 6.4 Scan frequency pairs

### 6.1 S meter

After clicking in the menu-item 'SignalAn/S-meter' a small separate S-meter window will be opened. See the picture below :



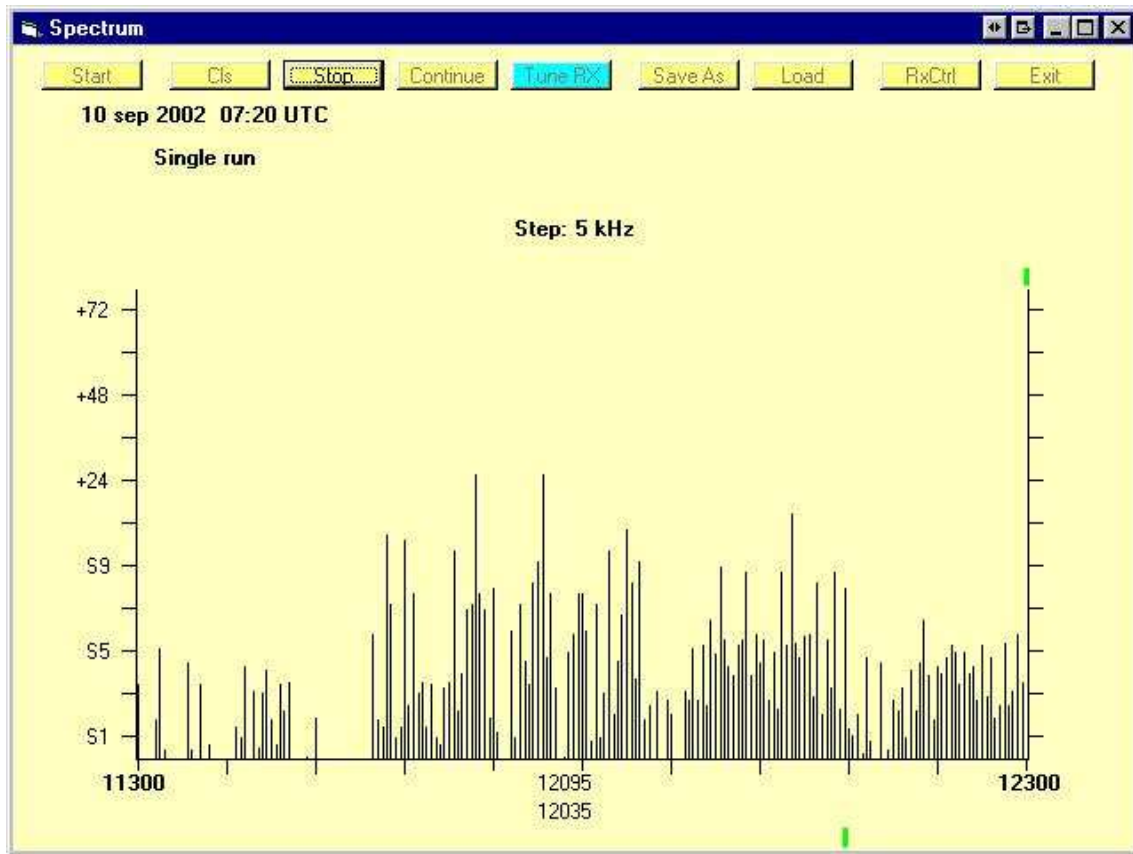
Click in 'Start' to begin the measuring process. In the middle the real time S-meter value, updated each second, is shown. In the upper part a histogram is shown, giving a statistical overview of the occurrence of certain S-values the most recent 60 seconds. To prevent interference with data communications between other windows and the receiver a number of these windows, including the receiver main control window, are disabled during the S-meter measurements. If you want to use those other windows, then click first in 'Stop' to stop the S-meter measurements. Then the other windows are active again.

The S-meter values shown are the signal strength at the antenna input of the receiver. This means that a correction is brought in, to compensate for the input attenuator setting, if any.

In the lower part of the S-meter window a translation is given of the S-meter values to the signal strength part (1-5) of the SINPO rating.

### 6.2 Spectrum analysis

Click on the main menu item 'SignalAn' and select the sub-menu item 'Spectrum' The Spectrum window will now be loaded and shown on your screen, see next page.



### 6.2.1 Start spectrum scan

After clicking in 'Start' a small window appears (see below) that gives the possibility to enter the lower and upper limit (in kHz) of the frequency band to be shown. Use the Tab-key to jump to the next textbox.

The 'Define Spectrum Scan' dialog box is shown with the following settings:

- Enter bandlimits and stepsize in kHz**
- Lower Limit:** 11300
- Upper Limit:** 12300
- Stepsize:** 5
- Scan Delay in sec.:** 1
- Continuous loop:**
- Keep highest measured value:**
- Buttons:** Cancel, OK

The maximum part of the spectrum that can be shown is 500 x the step size. The step size (in kHz) should of course be related to the use of the band. Some examples are (all frequencies in kHz) :

<b>Band part</b>	<b>Lower limit</b>	<b>Upper limit</b>	<b>Channel spacing</b>
LW (EU)	151	238	9
MW (EU)	531	1602	9
MW (US,J)	540	1700	10
49 m band	5900	6200	5
25 m band	11600	12100	5
Aero	5480	5730	3
Aero	8815	9040	3
etc, etc			

The next item that can be selected is the Scan Delay time, being the time that one frequency is being monitored. Values between 0.5 and 5 sec can be selected. The default is 1 sec.

If you want the spectrum scan automatically repeated, you have to check the box 'Continuous loop'. In the continuous loop situation you can also check to keep the highest measured S-value (instead of the actually measured) for each frequency. After filling in all 4 textboxes (and possibly the check boxes) click in 'OK' or just press enter. A validity check is done on the values typed in the textboxes. If everything is correct then the spectrum scan will start.

### **6.2.2 Tune Rx**

After the spectrum scan is finalized or after clicking in 'Stop' you can set your receiver easily to any interesting-looking channel in the investigated part of the spectrum, by first clicking in 'Tune Rx' and then clicking the left mouse button after bringing the mouse pointer to the right place in the spectrum graph. The selected frequency is shown at the mid-bottom of the screen and the small green line helps to find the signal level at this frequency as found during the spectrum scan. In case the received signal sounds blurred you can try to improve it by changing the receiver setting for filter bandwidth and/or mode. To get access to the receiver control panel click first in 'Stop' and then in 'RX Ctrl'. Go back to the spectrum graph by just clicking in that window and click in 'TuneRx' again.

### **6.2.3 Save spectrum files**

If you want to save a spectrum scan for later comparison, let the program finalize a started spectrum scan or click in 'Stop' during a running scan. Then click in 'Save As' to get a survey of earlier saved scans (see picture below) and select a filename for the scan to be saved. As default 'san\_xyzxyzxyz.txt' is proposed. It is necessary always to use the san\_\*.txt layout, with \* is 1 to 12 characters, otherwise the save option will not work correctly. Click in 'OK' to save the file

### **6.2.4 Load spectrum files**

To load a previous saved scan, click in 'Load' and then double click in the filename you want to load. For easy comparison, successive loaded files will show their results in up to four different colours.

Be aware that the file load window only will show filenames that are in accordance with the san\_\*.txt pattern.

Remark : To compare different spectrum scans it is advised that is checked if they cover the same frequency range. The program has no protection to prevent loading successively spectrum scans for different frequency ranges.

At the right-hand lower side of each file open window an 'Edit' command button is shown. If you click in this command button the selected file will be loaded in the ascii text editor 'Notepad.exe' for direct viewing, editing, printing etc.

### **6.2.5 Combined use of Spectrum scan and Tracking**

To get a quick and still rather detailed overview of what is 'on the air' in a certain broadcast band, you can do a band scan of that (part of the) band in combination with the tracking facility, to get direct information for each scanned frequency whether and, if yes, which broadcast is (most probably) received.

First open the Tracking window and load the ILGRadio file that contains the data about the part of the broadcast band you want to investigate. If not already done automatically, **select the 'mouse option'** (instead of the 'dial' option) in this tracking window, otherwise the tracking window will not 'see' the frequency changes coming from the spectrum scan window, especially while using the TuneRx option.

Now load the Spectrum scan window and start the scan, using a delay time between successive scan steps of at least 1 sec. The TuneRx option or SaveAs option of the Spectrum scan facility are still available in this combined use situation.

### **6.2.6 File / record structure of Spectrum files**

The file structure for spectrum scans is given below:

First record : date and time (UTC) of measurement

Second record : lowest frequency

Third record : highest frequency

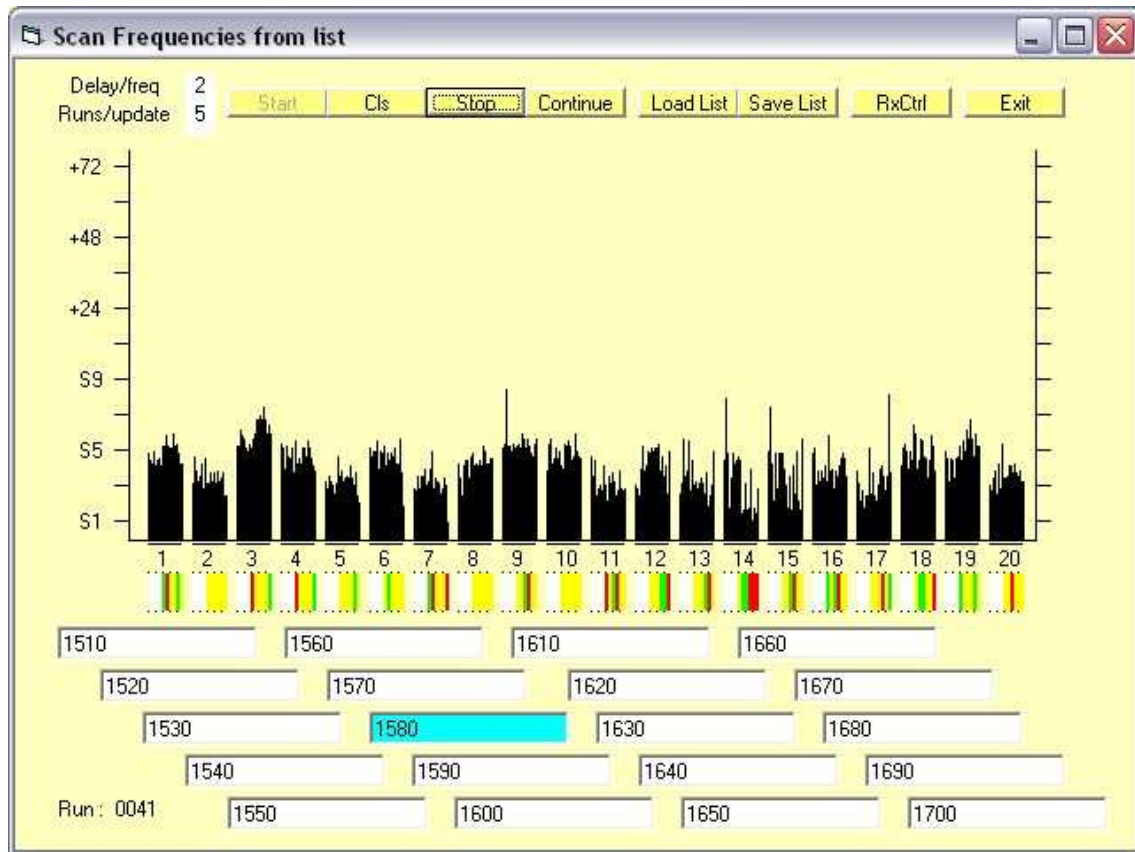
Fourth record : frequency step size

Fifth record : number of scan samples

Successive records : S-value x 10 (Value of 090 = S9, value of 210 = S9+72 dB, etc)

## 6.3 Scan Frequencies from a List

Click on the main menu item 'Signal An' and select the sub-menu item 'Scan/Freq List'. The Scan Freq List window will now be loaded and shown on your screen, see below.



### 6.3.1 Start scanning frequency list

After you have typed in the textboxes below the graph the frequencies you want to scan, or you have loaded a frequency list, click in 'Start' to begin the scanning process. The actual measured S-value will be drawn in the upper part of the graph at the right-hand side of the graph part dedicated to each frequency. Each run the previous S-values moves one pixel to the left. That means that also after many runs always the last 20 measurement results for each frequency are visible on your screen.

After a number of runs ( $= 3 \times n$ ), when sufficient data has been gathered, an additional process will start, showing, after each  $n$  runs, small changes in the measured S-values, by comparing the last  $n$  measured S-values for each frequency with the  $n$  previous measured S-values on the same frequency. If the mean value of both S-values groups differ less than 0.5 S-point ( $= 3\text{dB}$ ) then a yellow line is drawn on the right-hand side in the white square just below the measured S-values graph. If the mean value of the last 5 S-values is more than 0.5 S-point higher than the mean S-values of the  $n$  previous, then a green line appears and if the last  $n$  mean S-values are more than 0.5 S-point lower than the previous  $n$  mean S-values then a red line appears.

After each  $n$  runs a new evaluation is done, while the previous result is moved to the left. A total of 10 evaluations can be shown. This means that also after many evaluations always the last 10 are shown on your screen.

Keeping an eye on the number of green lines that appear for a frequency can be a kind of 'early warning help' to identify propagation improvement.

The parameter n, called runs/update, can be set between 3 and 10.  
The delay between setting the receiver to the next frequency and measuring the S-value (Delay/freq) can be set between 1 and 10 seconds

If no scan is running, or after clicking in 'Stop' you can tune your receiver directly to any of the frequencies in the list, by just a single left mouse click in the textbox showing the frequency you want to listen to. To continue the scan just click in 'Continue'.

### 6.3.2 Load frequency list file

To load a previous saved frequency list files, click in 'Load List' and then double click in the filename you want to load. Be aware that the file load window only will show filenames that are in accordance with the sfl\_\*.txt pattern.

At the right-hand lower side of each file open window an 'Edit' command button is shown. If you click in this command button the selected file will be loaded in the ascii text editor 'Notepad.exe' for direct viewing, editing, printing etc.

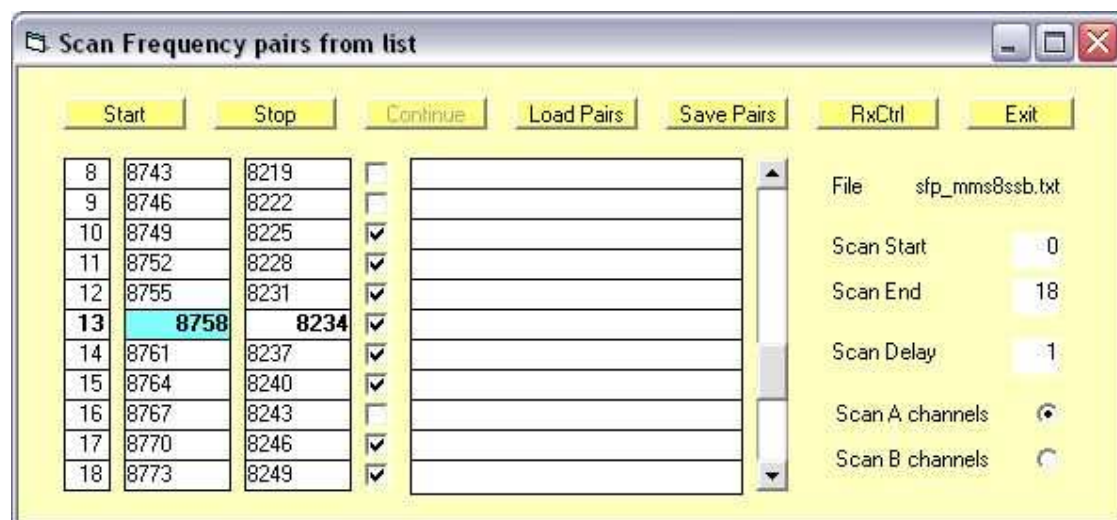
### 6.3.3 Save frequency list file

It is possible to save a frequency list for later use. If a scan is running, first click in 'Stop'. Then click in 'Save As' to get a survey of earlier saved scans (see picture below) and select a filename for the frequency list to be saved. As default 'sfl\_xyzxyzxyz.txt' is proposed. It is necessary always to use the sfl\_\*.txt layout, with \* is 1 to 12 characters, otherwise the save option will not work correctly. Click in 'OK' to save the file

### 6.3.4 Record structure of frequency list file

File and record structure of a scan frequency list file are rather straightforward. An sfl\_\*.txt file contains a maximum of 20 records and each record contains only a frequency (for example : 4890) or a frequency and some additional information about the transmitter (for example : 4890 PNG Port Moresby). It is also possible to leave records empty. These will be skipped during scanning

## 6.4 Scan Frequencies used in Pairs



Some HF services (for example Marine mobile) do not use the same frequency for transmit and receive. Instead different but paired frequencies are used. This function

makes it possible to scan those channels and when any activity is noted to switch easily and fast between the send- and receive frequency.

Click on the main menu item 'Signal An' and select the sub-menu item 'Scan/Freq Pairs. .'. The Scan Freq Pairs window will now be loaded and shown on your screen, see below.

The frequency pair's data to be used for the scanning cannot be entered in this window directly, but only with the 'Load Pairs' option. So any new set of data should be set-up using an ascii text editor.

#### **6.4.1 Start scanning frequencies used in pairs**

After loading a frequency pair's file you can browse through the data using the vertical scrollbar. The second column shows the A channel frequencies and the third the B channel frequencies. In the fourth column you can check or uncheck, to choose between scanning and skipping that frequency during the scan. The fifth column can contain up to the 30 characters of note you have added or want to add

Before you start the scan you can (1) change for each frequency pair whether it is scanned or skipped during the scan by clicking in the relevant check box, (2) set the range of frequency pairs to scan by entering the right numbers in the scan start and scan end text boxes (it is also possible to choose a higher start number than end number) and (3) the scan delay time between each frequency (between 0,5 and 60 sec, with 1 sec as the default).

Before you start or after you click in 'Stop' you can also type your personal notes in relation to a frequency pair in the 5th column of the scan frequency pair window. To save these notes click in 'Save pairs'

If during scanning any activity is noted you can click in 'Stop' and go direct to any A- or B-channel frequency shown in the table by just clicking in the relevant label showing that frequency.

#### **6.4.2 Load frequency pairs**

To load a previous saved frequency pairs files, click in 'Load Pairs' and then double click in the filename you want to load. Be aware that the file load window only will show filenames that are in accordance with the sfp\_\*.txt pattern.

At the right-hand lower side of each file open window an 'Edit' command button is shown. If you click in this command button the selected file will be loaded in the ascii text editor 'Notepad.exe' for direct viewing, editing, printing etc.

Be aware that you cannot set-up new frequency pair files in the scan frequency pair window. This should be done using an ascii text editor. Information about the record structure can be found in paragraph 6.4.4 'Record structure of freq pair files'.

#### **6.4.3 Save frequency pairs**

It is possible to save a frequency list for later use. If a scan is running, first click in 'Stop'. Then click in 'Save As' to get a survey of earlier saved scans (see picture below) and select a filename for the frequency pair file to be saved. As default 'sfp\_xyzxyzxyz.txt' is proposed. It is necessary always to use the sfp\_\*.txt layout, with \* is 1 to 12 characters, otherwise the save option will not work correctly. Click in 'OK' to save the file.

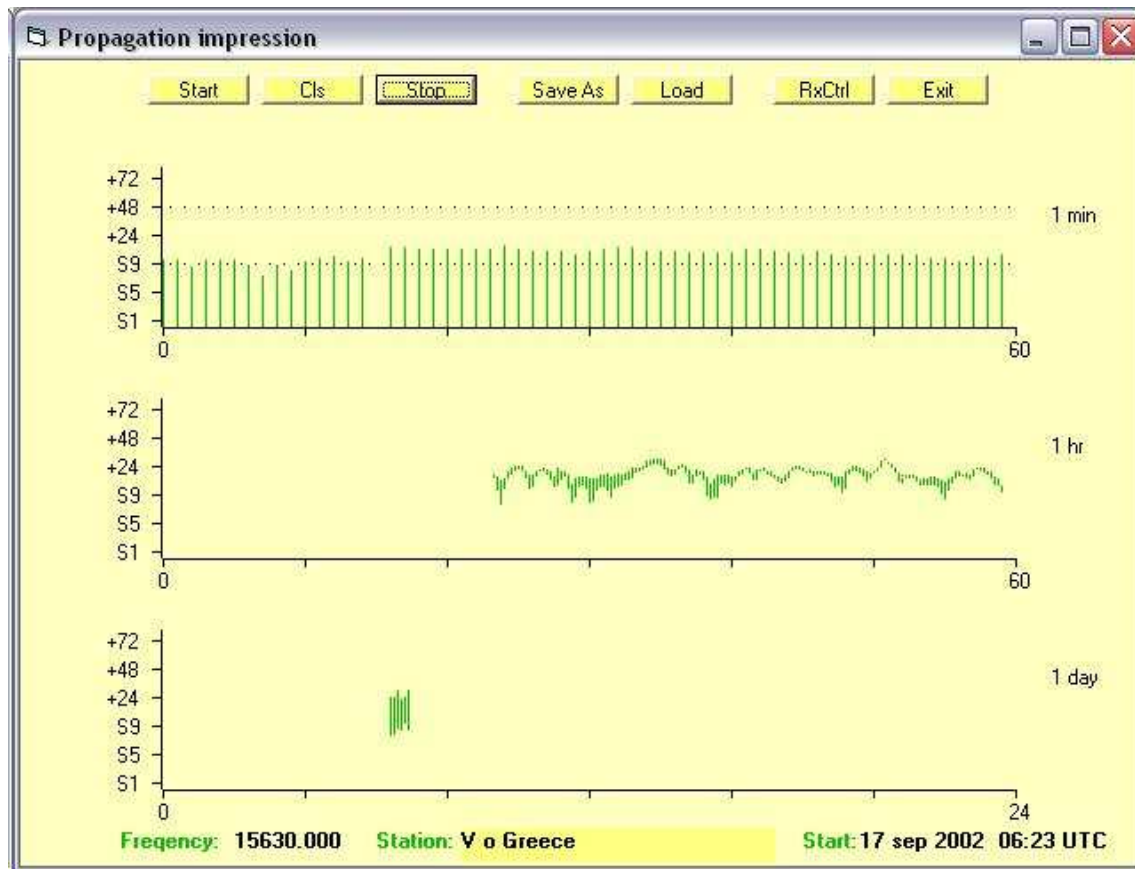
Be aware that the only data that can be changed in the scan frequency pair's window is the 'scan or skip' option and the remarks column. Therefore you only need to save the file again if one of these has been changed.

#### 6.4.4 Record structure of frequency pairs files

File and record structure of a scan frequency pair's file are rather straightforward. There is -in principle- no limitation to the number of records and each record has four comma delimited entries : the two paired frequencies, a 1 or 0 for scan or skip and up to 30 characters of remarks (for example : 8761, 8237, 1, remarks)

### 6.5 Propagation impression

Set the receiver to the frequency you want to monitor. Click on the main menu item 'SignalAn' and select the sub-menu item 'Propagation/Time Analysis' a Propagation impression window will now be loaded and shown on your screen. See the picture below.



#### 6.5.1 Start propagation impression

Click in 'Start' to start the measurement process. The basis of the analysis is that roughly each second the S-meter value is read. This is processed directly, to be presented on the screen in the '1 min' graph. Every 15 seconds a line is plotted in the '1 hr' graph connecting the highest and lowest measured S-value in that 15-second period. In the '1 day' graph the same happens on a 6-minute basis. Before you start, check if the AGC is set to fast. You can always get access to the receiver control panel after clicking in 'Stop' and 'RX Ctrl'. Click in the Propagation window and then in 'Start' again to continue.

#### 6.5.2 Save propagation impression files

If you want to save propagation data for later use, you should stop any running measurement, then first type in the textbox at the bottom of the window to which station you are tuned and then click in 'SaveAs'. Select a filename and click in "OK" in the file



save window. Use always the pan\_\*.txt layout, with \* is 1 to 12 characters (for example pan\_abcdefghij.txt) for the filename, otherwise the save option will not work properly. After the file save window is closed, click immediately in the 'Start' command button to start the measurements including the saving to file of the calculated data. Just below the 'SaveAs' button is shown in which file the data is stored. If you click in 'Stop', the measurements will end and the file will be closed automatically.

**Important** : As described above, you should do the 'save as' action in this case **before** you start the measurements

### 6.5.3 Load propagation impression files

To load a previous saved file with propagation data, click in 'Load' and then double click in the file name to be loaded. For easy comparison of results only the highest and lowest values are shown and for each successive file in up to four different colors.

Be aware that the file load window only will show filenames that are in accordance with the pan\_\*.txt pattern.

At the right-hand lower side of each file open window an 'Edit' command button is shown. If you click in this command button the selected file will be loaded in the ascii text editor 'Notepad.exe' for direct viewing, editing, printing etc.

### 6.5.4 File / record structure of Propagation impression files

The structure of the file with propagation data is as follows:

First record : Date of measurement

Second record : Frequency

Third record : Station name

Successive records : Time + 4 x (lowest + highest measured S-value (x10) per 15 sec)

### 6.5.5 Printing a propagation impression

The 'propagation impression' data as gathered according to the method described in the previous topics can contain information that is also relevant to short wave broadcasters. Therefore a facility is built in to print this data in a graph and to add the necessary information about the used receiver, antenna and location. Furthermore information about the sender can be added.

To open this page click in the menu item SignalAn/Propagation/Time Analysis to print.

To prevent that you have to type all this information, each time you want to add this information to a reception report, all this data is stored in the prop2prt.ini file. Use Notepad.exe or another plain ascii editor to directly adapt the data in this ini-file for your situation.

A part of an example of such a printed 'Propagation impression', without address information, is shown on the next page.

## Propagation Impression

Received station : V o Greece

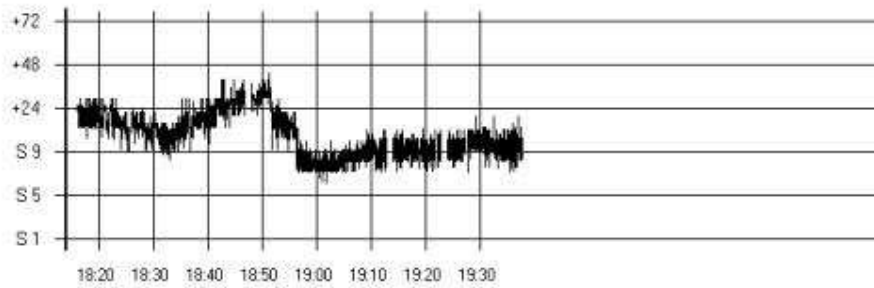
Frequency (kHz) : 9420.00

Date / Start Time : 21 okt 2001 18:15 UTC

Receiver : AOR AR7030

Antenna : 20 m longwire, 8-4m heigh + MLB

Location : The Netherlands, 52N06, 004E54



## 7. Receiver Memory Management

The four receiver types have rather different properties in relation to build in memories.

1. The standard AR7030 has a total of 100 memory cells (00 to 99). Each cell can contain the setting of the frequency, mode, bandwidth, attenuator, pass band shift and squelch for AM, NFM and SSB modes or BFO for CW and data modes.
2. The NRD535 has a total of 200 memory cells (000 to 199). Each cell contains the setting of frequency, mode, bandwidth, attenuator and agcspeed
3. The RX320 has no build-in receiver memory at all. However you can still use most of the functionality in a kind of virtual receiver memory
4. The NRD545 has a total of 1000 memory cells (000 to 999). Each cell contains the setting of frequency, mode, bandwidth, attenuator and agcspeed.

In the Memory Management window all memory cells can be easily selected and manipulated. It is also possible to sort the contents of the memory cells on frequency.

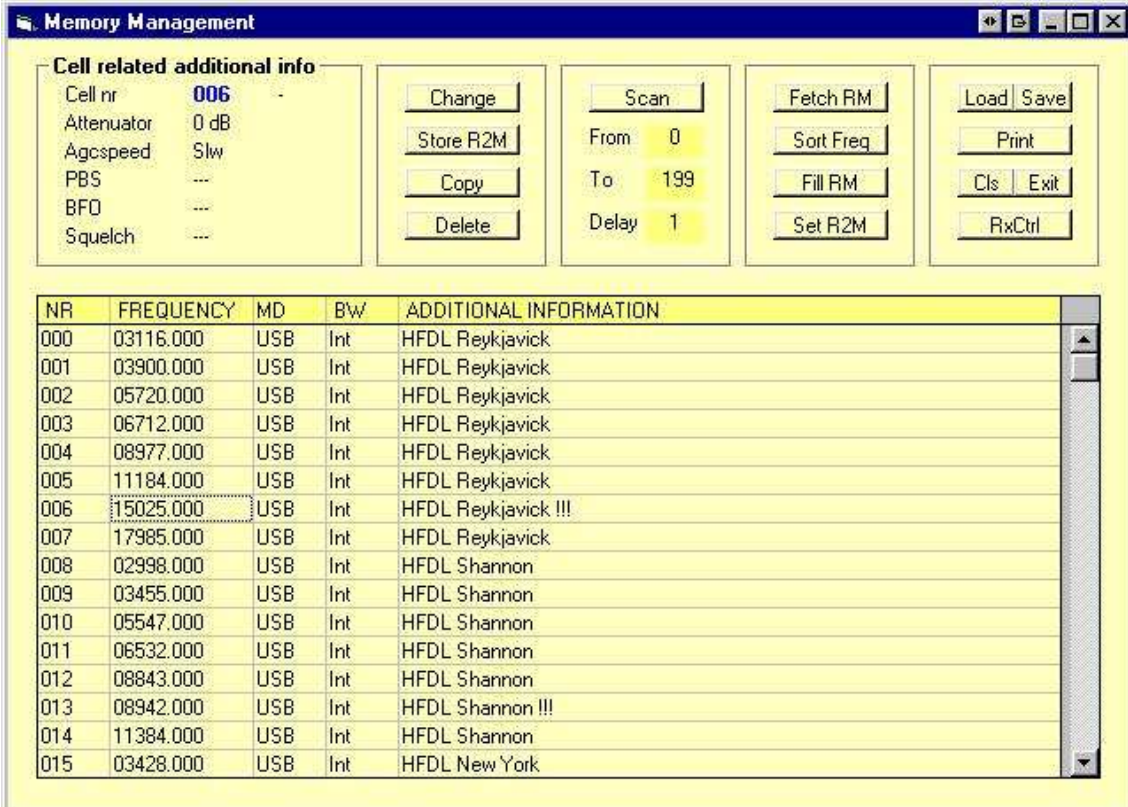
While using memory management, you should keep in mind that there are 2 or 3 locations where data in relation to the receiver memories can be found. These are

- (1) the receiver memory (AR 7030 and NRD535/545),
- (2) the memory files on the hard disk and
- (3) the data available in the Memory Management window.

When data is changed, at first only the data in the Memory Management windows is changed. So, separate action is necessary to update the receiver memory (for example with 'Fill RM') or the file on hard disk (by using 'Save').

### 7.1 Memory management window

The Memory Management window is shown in the picture below.

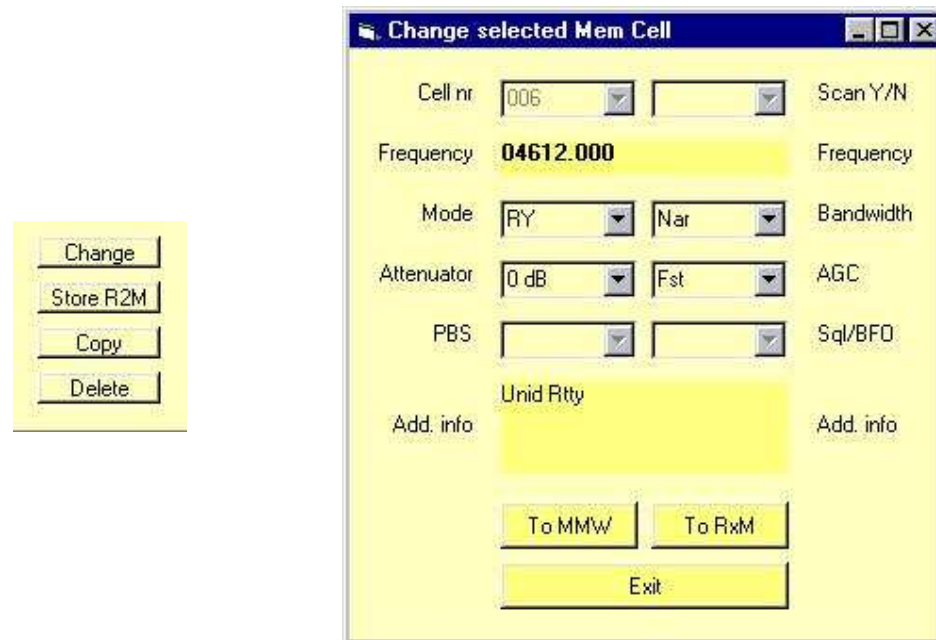


The screenshot shows the 'Memory Management' window. It features a 'Cell related additional info' section with fields for Cell nr (006), Attenuator (0 dB), Agcspeed (Slw), PBS, BFO, and Squelch. To the right are buttons for Change, Store R2M, Copy, Delete, Scan, From (0), To (199), Delay (1), Fetch RM, Sort Freq, Fill RM, Set R2M, Load Save, Print, Cls, Exit, and RxCtrl. Below this is a table of memory cells.

NR	FREQUENCY	MD	Bw	ADDITIONAL INFORMATION
000	03116.000	USB	Int	HFDL Reykjavick
001	03900.000	USB	Int	HFDL Reykjavick
002	05720.000	USB	Int	HFDL Reykjavick
003	06712.000	USB	Int	HFDL Reykjavick
004	08977.000	USB	Int	HFDL Reykjavick
005	11184.000	USB	Int	HFDL Reykjavick
006	15025.000	USB	Int	HFDL Reykjavick !!!
007	17985.000	USB	Int	HFDL Reykjavick
008	02998.000	USB	Int	HFDL Shannon
009	03455.000	USB	Int	HFDL Shannon
010	05547.000	USB	Int	HFDL Shannon
011	06532.000	USB	Int	HFDL Shannon
012	08843.000	USB	Int	HFDL Shannon
013	08942.000	USB	Int	HFDL Shannon !!!
014	11384.000	USB	Int	HFDL Shannon
015	03428.000	USB	Int	HFDL New York

After the content of the memory cells is copied to the PC (with 'Fetch RM'), or a memory file is loaded in the PC (with 'Load') the basic content of each cell is made visible in a grid. Clicking once in a line in this grid will make the additional info of this cell visible in the left upper frame in the Memory Management window. Double clicking in a line in that grid will switch the receiver to the setting shown.

### 7.1.1 Adapt individual memory cell data



#### Change

With this command the individual memory cell window opens with the current Memory management window content of that cell. Bring in the necessary changes. The result can be stored in the Memory Management window for further processing (click in 'To MMW') or stored in the selected memory cell of the AR7030 or NRD535 (click in 'To RxM').

#### Store R2M

With this command the individual memory cell window opens with the current receiver parameters visible in the different boxes. This can be stored in the Memory Management window for further processing (click in 'To MMW') or stored in the selected memory cell of the AR7030 or NRD535 (click in 'To RxM'). It can be very interesting to combine this functionality with the SignalAn/Spectrum/TuneRX possibility. Open both the spectrum analysis- and the memory management window. Do a spectrum scan in the part of the band you are interested in. After the spectrum scan click in the TuneRx button and click in the graph at interesting looking frequencies to tune the receiver to it. Then click in 'Store R2M' in the memory management window to store these receiver settings in the selected memory cells for later use.

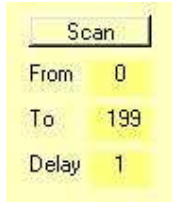
#### Copy

With this command the individual memory cell window opens with the contents of the selected memory cell visible in the different boxes. After changing the cell number to the new number this can be stored in the Memory Management window on the new place for further processing (click in 'To MMW') or stored in the newly selected memory cell of the AR7030 or NRD535 (click in 'To RxM').

## Delete

With this command the individual memory cell window opens. Then you can select to empty the cell in the Memory Management Window (Click To MMW) or in the AR7030 or NRD535 receiver memory (Click RxM)

### 7.1.2 Scan memory cells



The image shows a software interface for scanning memory cells. It features a yellow background with a 'Scan' button at the top. Below the button are four input fields: 'From' with the value '0', 'To' with the value '199', and 'Delay' with the value '1'. The 'Scan' button is highlighted with a black border.

The scan function can be used to automatically step through a selected range of the memory channels. Type the first cell to scan in the 'From' box and the last cell to scan in the 'To' box. If the 'From' number is higher than the 'To' number then the two numbers will be automatically exchanged.

In the 'Delay' box you can give the time in seconds that the program will wait until stepping to the next channel. Delays between 1 and 60 sec will be accepted.

The 'From' and 'To' fields can also be used together with the memory file print option, to limit the printout to the relevant cell range

### 7.1.3 Get and set Receiver Memory



The image shows a software interface for Receiver Memory management. It features a yellow background with four buttons stacked vertically: 'Fetch RM', 'Sort Freq', 'Fill RM', and 'Set R2M'. Each button is highlighted with a black border.

#### Fetch RM

Clicking in 'Fetch RM' (RM= Receiver Memory) gives the possibility to copy the contents of all memory cells from the receiver in the computer RAM for fast and easy processing. This fetch result is also shown in the grid in the Memory Management window. Because the RX320 does not have build-in memories, this is disabled for this receiver. Because the NRD545 has 1000 memory cells built-in it is also possible only to fetch a part of these by typing the start / end cell number in the 'From' / 'To' box in the scanning frame before clicking in 'Fetch RM'

#### Sort Freq

Clicking in 'Sort Freq' will sort the contents in the Memory Management window on frequency. To make it active in the receiver memory also the 'Fill RM' action should be done. Empty memory cells have a value 0 for its frequency. During sort this will be changed to 32016 kHz. This is to prevent that empty cells appear at the beginning of the list

#### Fill RM

Clicking in 'Fill RM' will fill /replace the Receiver Memory with the current contents of the grid in the Memory Management window. The range of cells to be filled can be set by typing the start value in the 'From' field and the end value in the 'To' field right below the scan start/stop button.

Because the RX320 does not have build-in memories, this is disabled for this receiver.

## Set R2M

Clicking in 'Set R2M' will change the receiver parameters to those present in the selected (virtual) receiver memory cell.

### 7.1.4 Memory files manipulation



#### Load/Save

Load gives the possibility to fill or replace the contents of the grid in the Memory Management window with data from a file. After selecting this item, a list box with all available memory files (for the receiver type used) is shown. Double clicking on one of these filenames or clicking once plus clicking in 'OK' will load this file in the memory management window.

The record structure in the file to be loaded should be equal to the one described in memory file naming convention and record structure section.

Save gives the possibility to store the contents in the grid in the Memory Management window in a file. After selecting this item a list box with already existing memory files will appear. You can either enter a new filename in the top of the box, or, by clicking once on one of the filenames in the list, you can select to overwrite an existing file. The filename should always have the following layout : MEM\_#\*.TXT, with # is the number (1, 2 or 3) representing your receiver type and \* is 1 to 11 characters (for example mem\_1mycathes.txt.), otherwise the save action will not work properly. The save-action starts by clicking in OK.

Remark : Before the current content of the receiver memory is removed you better check whether the saved file is faultless. Therefore check whether the record structure of the saved file is in accordance with the defined memory file record structure.

#### Print

With the 'Print' command you can send the contents of the memory cells, as loaded in the Memory Management window including the added 'alpha tags', to a printer.

The range of cells to print can be set by typing the start value in the 'From' field and the end value in the 'To' field right below the scan start/stop button. If the 'From' number is higher then the 'To' number then the number will automatically be exchanged. The start cell can also be selected by first clicking in the start row in the grid and then in the word 'From'. Equally the end cell can be selected by clicking in the last row in the grid you want to print and then click in 'To'

#### Clr / Exit

Clicking in 'Clr' will clear the grid in the memory management window and remove all related data. Click in the 'Exit' command button to leave the Memory Management option.

#### RX Ctrl

If you have not enough room on you screen to show several windows at the same time, click in the button 'RX Ctrl' to get the receiver control window on top and make any necessary change. After clicking in the Memory management window the receiver control window will move to the background again.

### 7.1.5 Memory file naming conventions and record structure

The memory files for the different receiver types are not inter-exchangeable. Therefore also an indication of the receiver type is added to the memory filenames, in which '**mem\_1\*.txt**' for the AR7030, '**mem\_2\*.txt**' for the NRD-535, '**mem\_3\*.txt**' for the RX320 and '**mem\_4\*.txt**' for the NRD-545. Do not change these parts because otherwise the files cannot be used by the program.

Independent of receiver type each record is / should be build-up as shown below :

**'MEMccc mmkkkhhh m bw a g pbs sqb s %-up-to-45-char-text-%'** in which:

Position	Contents	AR7030	NRD535	RX320	NRD545
1-3	MEM or XXX	y	y	y	y
4-6	mem. cell number (ccc)	y	y	y	y
8-15	frequency (mmkkkhhh)	y	y	y	y
17	mode (m)	y	y	y	y
19-20	if filter (bw)	y	y	y	y
22	attenuator (a)	n	y	n	y
24	agcspeed (g)	n	y	y	y
26-28	pbs (pbs)	y	n	n	n
30-32	sqelch or bfo (sqb)	y	n	n	n
34	scan incl/excl (s)	y	n	n	n
36-80	up to 45 char. add. info	y	y	y	y

In the last four columns is shown for each receiver type which parameters are actually used. This is indicated with 'y' (yes). If a certain parameter is not used for a certain receiver '@' is/are placed in the record.

## 8. Timers

The program has build-in facilities to read and set the PC system clock and clocks build-in in the AR7030 and NRD-535/545.

It is also possible, in the same way as with a video recorder to record a received program, while absent or asleep, using the long-term timer programming option.

### 8.1 PC system clock setting

After choosing this menu-item the current PC system time and date is shown in the well-known W95+ window for that purpose.

If it is necessary to change this, enter new time and / or new date in the relevant boxes. PC system time and date is supposed to be Local (summer/winter) Time and Date.

### 8.2 Receiver clock settings

This menu item offers the possibility to set the receiver clock to Local Time (=equal to PC Clock) or to UTC (=Universal Time co-ordinated, previous called GMT and also called Zulu-time).



The RX320 has no build-in clock, so in that case the RxClock menu is disabled

### 8.3 Long term timer set-up

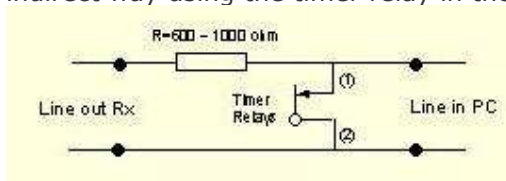
To support the unattended reception of certain transmissions, including the storing of the received program(s), a programmable timer is built in.

The received broadcast should be saved to the hard disk of your PC as \*.wav file, using recording software like VoxRecorder or ScanRec.

To make this possible, the line out connector of the receiver has to be connected to the line input of the sound card of your PC

The following remarks apply to the different receivers:

- AR7030: only the left aux channel (pin 4) is used.
- NRD535/545: because no direct software line level control is possible, it is done in a indirect way using the timer relay in the receiver, see circuit diagram below





For proper operation make sure the Timer Relay Mode in the User Definitions window is set to 'Normally On'

c. RX320: no special remarks

The right connection points on the rear panel of the receivers are shown in the manuals.

### Testing volume settings

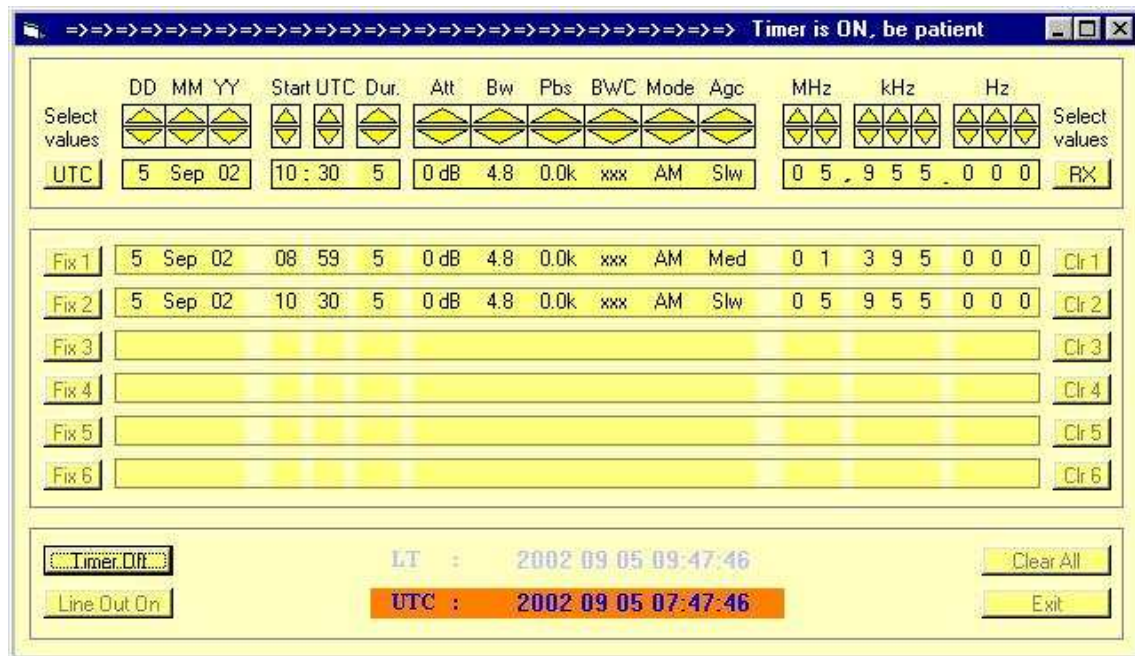
To prevent overloading or a too low level of the recording software/soundcard, the line input volume control of the soundcard should be used to adapt the input level.

This should be done before the programmed timer is started. To do so, start your recording software. In the description here I will take Scanrec as an example. Click in the Scanrec window in 'Open' and select your directory and filename for the \*.wav file. Then select the compression format you wish (I Propose telephone quality or sampling at 11 kb/s 8 bit mono). Set the 'Squelch level to 2%. Then click in 'Record'

Then tune your receiver to a rather strong station and open also the long-term timer-programming window of RxWings and click in 'Line Out on'. (Be aware that the line out levels of the AR7030 and RX320 are dependent on the levels preset in the specific AR7030 set-up or RX320 set-up.) Now you should see in the Scanrec window the signal amplitude you receive. Use the 'Line in' level control of your soundcard to prevent the amplitude of surpassing the upper or lower boundary of the picture it is presented in. If you are done, click in 'Line out Off' in the long term timer programming window and close Scanrec and delete the test wav file.

## 8.4 Long term timer programming

The long-term timer-programming window is shown in the picture below :



In the upper part of window you can set the start time/date (UTC!) and duration of the program to be recorded and also the receiver settings by clicking in the spin buttons. Depending on receiver type some of the receiver setting spin buttons are disabled. The main reason will be that that option is not available in the selected receiver type, but in some cases this is done to prevent mutual influencing between different but overlapping setting-options (for example Bw and BWC in the NRD-545)

You can select the actual time and date (in UTC) by clicking in the command button 'UTC' and the actual receiver setting by clicking in the command button 'RX'

After you have selected the time/date/duration and receiver settings for the event you want to program, click in the command button 'Fix1'. Then select the next event you want to program with the spin buttons and fix it by clicking in 'Fix2', etc. You can always clear the settings fixed the latest by clicking in the relevant 'Clr#' button.

Keep in mind that the start of the first event to be programmed should be at least 1 minute ahead of current time and also the time between successive events should be at least 1 minute, otherwise the program will not accept it.

After all necessary settings are 'fixed', the programmed timer can be activated by clicking in 'Timer On'. But before you do so you have of course to make sure that your recording software is prepared to save the received transmissions. See 'Long term timer set-up'

At the moment the actual time (in UTC) is equal to the programmed time, the receiver is switched to the programmed receiver settings and the line out level is set to 100 % (NRD535/545) or the value preset in the Set-up (see set-up AR7030 or set-up RX320).

Then automatically the software recorder will save any signal above the selected threshold level