

ParaDise

**A computer program to support
Short-Wave Listening with your AR7030
and to bring you to the SWL 'ParaDise'**

4th version: PD7030V4
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1. Introduction

1.1 The Receiver

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.

If 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.

I bought an AR7030 mid '97 and I am very happy with it, also because it gives me again the possibility to combine two of my hobbies, SWL-ing and computer programming.

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 a lot of experience programming for the NRD-535(D). That program is called TURBO535 and the latest version (v6, filename T535V6A.ZIP, 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 chapter 1.3 below.

To have maximum freedom for the set-up of the 1st version (released Nov. '98) of the control program for the AR7030, I started to program from scratch, only using the good parts of TURBO535.

In the 2nd release (Feb. 2000) a number of additions and improvements have been brought in. The most important were :

1. Incorporating a conversion facility for the ILG LW/MW (>9000 records) and SW (>12000 records) database to make these data suited as tracking files and improving the tracking facility, to optimise for using the ILG data (see chapter 5.2 and 5.3)
2. In the Set-up you can select how many records (1000-30000) each BDX, OWN, LOG and ILG file as maximum can contain (see chapter 2.4, 4 and 5)
3. Solved partly the problem of resetting the synchro mode while changing other, not directly related settings like PBS
4. More flexible, programmable relation between mode selection and filter and PBS setting, using the programming facilities of the AR7030 itself. (see chapter 3.4)
5. Added in the Set-up the "NO RX" program option to prevent that the program immediately crashes as no AR7030 is connected to the serial port of the PC (see chapter 2.4)
6. Include the 'minimise' option in the receiver control main window.

In the 3rd release (sep 2000) again a number of additions and improvements were realised. The most important were :

1. The ILGRadio database can be searched on the following (combined) criteria : frequency, language, station name, transmitter location, time of broadcast, and target area, to find very fast the type of broadcast you want to listen to and the related frequencies can directly be sent to the AR7030 with one mouse double-click (see chapter 4.3)
This type of 'forward' control combined with the 'backward' control from the tracking facility gives the highest speed and accuracy in finding the station(s) you are looking for.
2. The co-operation between and the stability during combined use of the BDXC, OWN, ILGRadio, LOG and TRACKING windows has been considerably improved. (chapter 4.4)
3. Also the combined use of SPECTRUM scanning with TRACKING is now possible. (chapter 6.4)
4. Intelligent S-meter (see chapter 6.1)
5. To improve the look and feel of the program, even when no AR7030 is available, a lot of window screen prints are now incorporated in this documentation file

In preparation of this 4th release a lot of bug hunting was done and of course again a lot of additions and improvements were again brought in. The most important are

1. Redesign of the receiver main control window, adding a keypad to enter a frequency or memory cell setting using your mouse only and a number of scrollbars are used to have some fine setting possibilities (See chapter 3.1)
2. A frequency conversion option is added, to be used in combination with an additional VHF or UHF frequencyband conversion unit. (See chapter 3.2)
3. Totally renewed and improved memory management, including printing options (See chapter 7)
4. A possibility to print a propagation impression, to add to your reception reports (chapter 6.3)
5. A number of problems in relation to the different decimal separator sign used in different parts of the world (especially with the comma being the decimal separator in Europe) have now been solved by always forcing a dot to be the decimal separator indepent of the Windows setting
6. Also the bug that let ParaDise v3 crash during ILG db conversion when a empty cell occurs, is now history
7. Activation of frequencies in BDXC, OWN, ILG and LOG is now with single mouse click instead of double clicks

The program can of course also be used with the AR7030 Plus, but for the time being the special AR7030 Plus facilities are **not** supported.

The program has the aim to lead you to the SWL-ParaDise with your AR7030, therefore it is called 'ParaDise' and the release filenames will be P7030***.ZIP, with *** being the version type and number.

As programming tool Visual Basic version 6 professional is now used. Only a 32-bit version will be distributed, so you need Windows 95, 98, ME or NT, 2000 or XP to run it.

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

The 4th release package is split in 2 parts, named P7030V4A.ZIP and P7030V4B.ZIP and these are uploaded by me to

- An ftp-server in the Internet in Europe : <ftp://ftp.funet.fi/pub/ham/rigctrl/>
- An ftp-server in the Internet in the USA : <ftp://ftp.qrz.com/files/controls/>

Information about the latest developments on my RigControl programs can be found on my home page at the URL: <http://home.wxs.nl/~jarkest/home.html>

1.3 Giving Feedback

As everybody working with a computer knows, a program always can be improved. So if you find bugs or insufficient / lacking functionality just let me know and I will try to improve it. NO guarantee, it is just a hobby.

You can give me feedback in several ways :

1. Internet E-mail : jan.arkesteijn@wxs.nl (preferred)
2. Phone call : Contact me by phone (+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

2. Installation of program and set-up

In this chapter 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. You need for that a 5 pin /240° Din plug to connect to the receiver remote connector on the rear panel, a 9 or 25 pin plug to connect to a serial port connector, depending on what is available on your PC and, for example, a two wire symmetrical shielded cable.

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

AR7030	PC 9-D	or	PC25-D
pin 2	pin 3		pin 2
pin 3	pin 2		pin 3
pin 5	pin 5		pin 7 (ground/shield)

Remark:

Sometimes it is difficult 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.

2.2 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 can be classified in two groups :

1. The application file PD7030V4.EXE and the frequency data files I gathered or produced.

For these files C:\PD7030V4 is proposed as main directory. In case another main directory is preferred then this should be changed during the installation and also the first line in the INI file should be adapted, see chapter 2.4 Set-up.

In the main directory the following subdirectories should be available : BDXC, OWN, RX2DB, LOG, MEM, PAN and SAN. To understand how these files are organised and what type of data they contain, the following survey is given :

C:\PD7030V4

PD7030V4.EXE	: the main executable file
PD7030V4.INI	: the basic configuration file (see &2.4)
Converter.ini	: ini file for frequency conversion window (see &3.2)
Format.ini	: ini file for screen format of loggings (see &5.1)
ILGfilter.ini	: ini file with ILG db filter preferences (see & 4.3)
Prop2prt.ini	: ini file with user related data in printed Prop. Impression (see &6.3)
PD7030V4.PDF	: the user manual in English incl screen shots in PDF format
PD7030V4.DOC	: the user manual in English (without screen shots) in Word 97 format
PD7030N4.DOC	: the user manual in Dutch (without screen shots) in Word 97 format

C:\PD7030V4\BDXC

BDX_DTOE.TXT	: BDCX file with data on Dutch broadcast TO Europe
BDX_ETOE.TXT	: BDCX file with data on English broadcast TO Europe
BDX_FTOE.TXT	: BDCX file with data on French broadcast TO Europe

BDX_GTOE.TXT : BDCX file with data on German broadcast TO Europe
 ADX_ETOW.TXT : ADDX file with data on English broadcast TO the World
 ADX_FTOW.TXT : ADDX file with data on French broadcast TO the World
 ADX_GTOW.TXT : ADDX file with data on German broadcast TO the World
 ADX_RTOW.TXT : ADDX file with data on Russian broadcast TO the World
 ADX_STOW.TXT : ADDX file with data on Spanish broadcast TO the World
 ADX_TTOW.TXT : ADDX file with data on Turkish broadcast TO the World
 C:\PD7030V4\OWN
 OWN_BCAF.TXT : user collected data on broadcasts from Africa
 OWN_BCAM.TXT : the same but now from the America's
 OWN_BCAS.TXT : the same but now from Asia
 OWN_BCEU.TXT : the same but now for Europe
 OWN_BCME.TXT : the same but now for the Middle East
 OWN_BCPA.TXT : the same but now from the Pacific
 OWN_BCWW.TXT : a combination (World Wide) of your favourites
 OWN_HAMS.TXT : user collected data on radio amateur transmissions
 OWN_UTAE.TXT : user collected data on aeronautical voice services
 OWN_UTCT.TXT : user collected data on cordless telephony frequencies
 OWN_UTFX.TXT : user collected data on fax transmissions
 OWN_UTMA.TXT : user collected data on maritime voice services
 OWN_UTRY.TXT : user collected data on telex over radio services
 C:\PD7030V4\RX2DB
 ILGADATA.FTL : converted ILG MW database, used for tracking mode
 ILGSDATA.FTL : converted ILG SW database, used for tracking mode
 C:\PD7030V4\LOG
 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
 C:\PD7030V4\MEM
 MEM_BCWW.TXT : example file with stored AR7030 memory contents
 C:\PD703V1\PAN
 PAN_VoG1.TXT : example file with propagation impression
 C:\PD7030V4\SAN
 SAN_49m1.TXT : example file with spectrum scan

2. The many Visual Basic v6 system files (*.dll, *.ocx) required to run my application: msxbse.dll, vb5db.dll, msrepl35.dll, msrd2x.dll, expsrv.dll, vbajet32.dll, msjint35.dll, msjter35.dll, msjet35.dll, dao35.dll, mfc40.dll, mscomctl.ocx, mscomm32.ocx, dblist32.ocx, grid32.ocx, spin32.ocx, threed32.ocx. These files will be placed automatically somewhere in the windows or windows \ system directory by the set-up wizard.

2.3 Installation

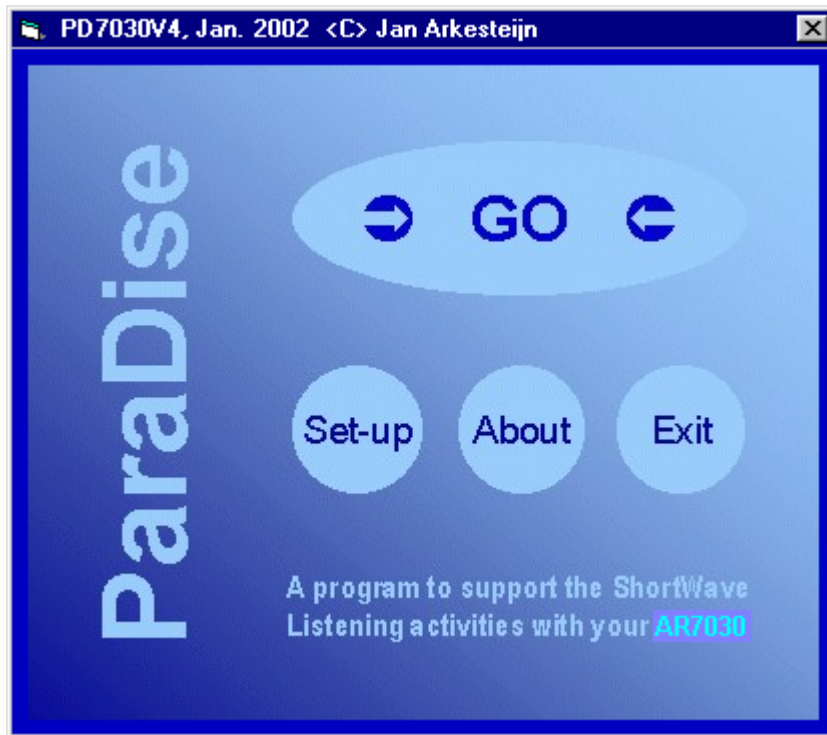
After downloading and unzipping the program in a temporary directory select run 'set-up' from the Windows Start menu and follow the guidance given by the set-up program.

As main application directory for this version C:\PD7030V4 is proposed, but you can of course choose another one during the set-up. Do not forget to change the 1st line of the pd7030v4.ini file if you select another directory.

If everything goes as planned, you will find a directory structure with files as described in 2.2 at the end of the installation procedure.

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.



Picture 1 Welcome window

At least the first time you should select the left-lower button 'Set-up' to get the Set-up window. This is shown in picture 2 on the next page :

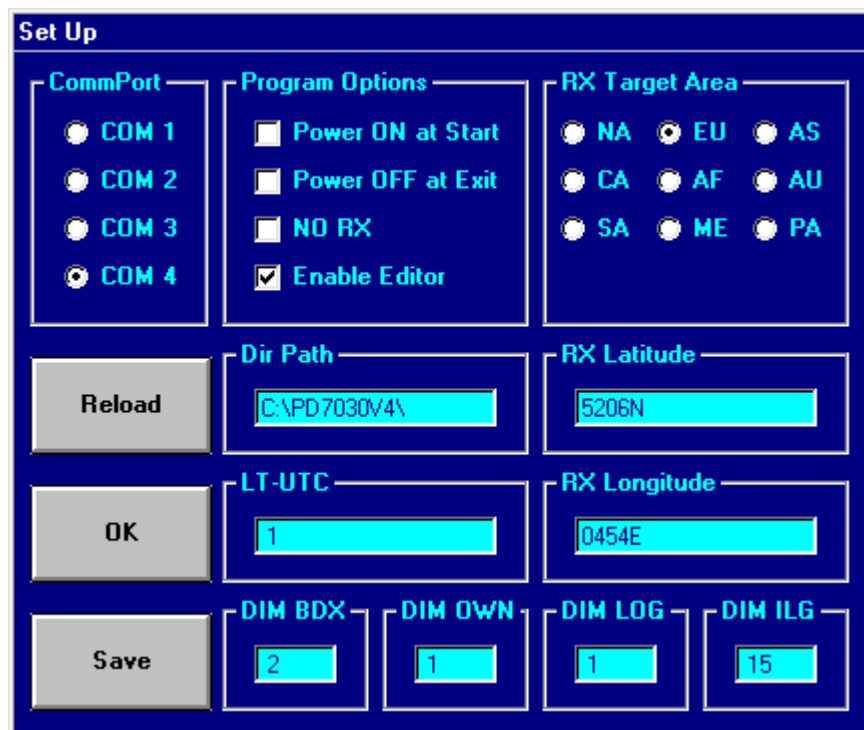
First set the CommPort to be used. Then, if you are not living in the Central European Time area (where summertime =UTC +2, wintertime = UTC +1), then you have to change the LT-UTC textbox to your Local Time minus UTC difference. Values between -13 and +13 will be accepted. Also half hour differences can be entered.

In case you selected another main directory to install the program in, you have to change the Dir(ectory) Path option.

In the program options frame you can select to power-on the receiver at the start of the program and to switch-off the receiver at closing the program.

The "NO RX" option gives the possibility to get a 'look and feel' of the program without an AR7030 connected to the serial port of the computer. If functions are used that send data to or expect to receive data from the serial port / receiver the program still can crash. If the 'NO RX' option is changed you have to 'Save' this and restart the program.

By selecting the 'Enable editor' checkbox you get fast and easy access to edit and printing facilities for the frequency data, memory data, log and tracking files in every 'File Load/Open' window.



Picture 2 Set-up window

In RX Target Area you inform the program in which area your receiver is located. This is used to give additional information during 'Tracking', see chapter 5.2

(NA= North America, CA= Central America, SA= South America, EU= Europe, AF= Africa, ME= Middle East, AS= Asia, AU= Australasia, PA = Pacific)

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'.

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 30 (=30000). The default is 2 (=2000) for the BDXC/ADDX type files, 1 (=1000) for the Own 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 30 (=30000) a total of 12 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.

The set-up can be saved in the pd7030v4.ini file by clicking in the 'Save' button.

Below an explanation of the contents of this ini-file (for the authors situation) is given :

```
C:\PD7030V4\ Main application directory path
5206N Receiver latitude (5 char)
0454E Receiver longitude (5 or 6 char)
1 Com Port ( 1= COM 1, 4=COM 4)
```

- 2 Difference between Local (S/W) Time and UTC(Range -13 to 13 h)
- 0 Power On at Start (1=yes)
- 0 Power Off at Exit (1=yes)
- 0 To use the program without receiver this should be 1
- 1 Enable Editor (1=yes)
- 3 Target area / Area where receiver is located (3= Europe, etc)
- 2 Maximum number of records (x 1000) in BDXC/ADDX files, up to 30 (x 1000)
- 1 Maximum number of records (x 1000) in OWN files, up to 30 (x 1000)
- 1 maximum number of records (x 1000) in LOG files, up to 30 (x 1000)
- 15 Maximum number of records (x 1000) in ILG files, up to 30 (x 1000)

If the set-up is done, click in 'GO' to get the receiver control window. If in the program set-up not the right commport is selected or if the computer is not correctly connected to the radio the program will crash. If the right set-up of the program is selected you can also click in the word 'AR7030' to switch the AR7030 power on (and off) before you click in 'GO'.

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.

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.

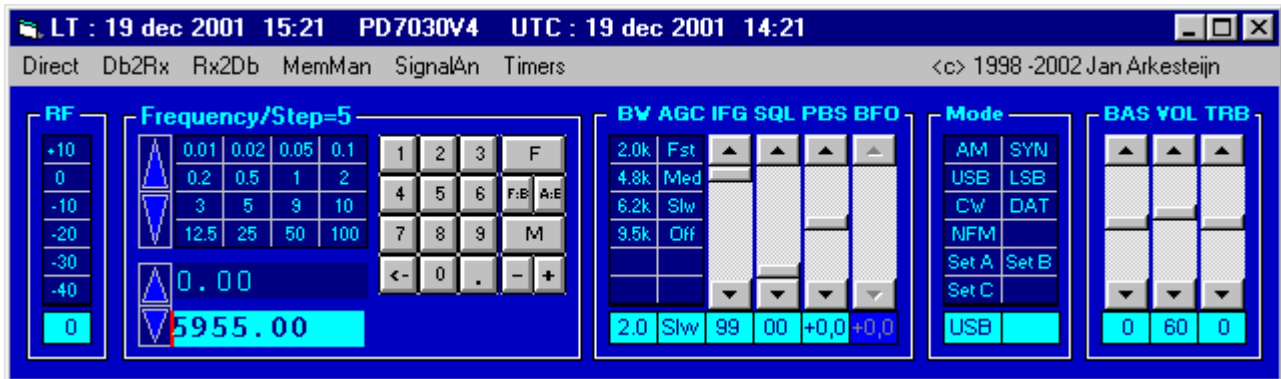
IMPORTANT NOTICE 3 :

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

3.1 Receiver main control window

The receiver control main 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. See picture 3 below :



Picture 3 Receiver main control window

In this chapter is described how the receiver can be controlled. A description of the use of the main menu items can be found in the next chapters.

The basic concept of the program is that the receiver controls are never locked, except in the tracking mode using the 'dial' option (see 5.2) and during signal analysis mode (see 6).

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 below, 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 :

3.1.1. Radio Frequency (RF)

In this block only the setting of the entrance pre-amplifier / attenuator can be selected. To select the value click in a cell with a dark blue background and light blue gain figure (in dB). The selected value will be shown at the bottom in the cell with the light blue background. To check if this has really happened, select on the receiver the menu showing the RF Gain and compare the figures

3.1.2. Frequency setting

The upper left part of this frame, is showing a grid with cells with a dark blue background and light blue figures with all possible frequency step values in kHz between .01 kHz (= 10 Hz) and 100 kHz. All frequency channel spacing 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 by clicking in the up/down spin button at the left side of this grid.

The lower left part of this frame shows the frequency setting of VFO B (dark blue background) and VFO A (light blue background). The value can also be directly changed. After double clicking in the textbox, the current value disappears and you can type the new value. Press enter to activate it. The spin button left of these textboxes has two functions, spin-up will copy the contents of all relevant settings belonging to VFO A to the VFO B memory cells and spin down will swap all relevant settings between VFO A and B

In the righthand side of this frame also a keypad is available for direct entry -with your mouse- of both frequencies (10-32016 kHz) and memory channels (0 to 99). 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'. By clicking in 'F:B' the frequency is sent to VFO B. By clicking in 'A:B' it is possible to copy the frequency present in VFO A to VFO B.

To activate the memory channel, click in 'M' By clicking in + or – you can tune the receiver to the settings stored in the adjacent memory cells.

3.1.3. Intermediate Frequency (IF)

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: IF filter bandwidth (BW), Speed of automatic gain control (AGC), the (maximum) gain of the IF amplifier (IFG, 0-99%), Squelch threshold (SQL, 0-99%), PassBand Shift (PBS, -4.2 to +4.2 kHz) and Beat Frequency Oscillator (BFO, -4.2 to +4.2 kHz).

For the first two clicking in a cell with a dark blue background directly select the value chosen and this will be shown in the relevant cell with light blue background at the bottom of that column.

For the others the value can be set by moving the scrollbars.

To mute the audio signal in case the rf signal strength drops below the squelch level double click in the label where the selected squelch level is shown. To show that mute is activated the background colour is changed to dark blue.

For certain reception modes some of the IF settings are not relevant. In those case the program disables the possibility to change its value. This is shown by changing the background colour of these parameters from light-blue to dark-blue.

3.1.4 Reception Mode (Mode)

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 grid cell in the 'Mode' block.

The receiver has also build-in possibilities to select automatically together with the mode selection one of several pre-saved filter-, pbs- and bfo- or squelch settings. How these settings can be prepared and saved can be found in the 'AR7030 Operating manual', chapter 9.1 'Set-up menu options. After you have saved your preferred mode/filter/pbs/bfo/squelch combination with SetA:Save, SetB:Save and/or SetC:Save, they can be easily accessed and activated by clicking in Set A, Set B or Set C in the 'Mode' block of the receiver control window.

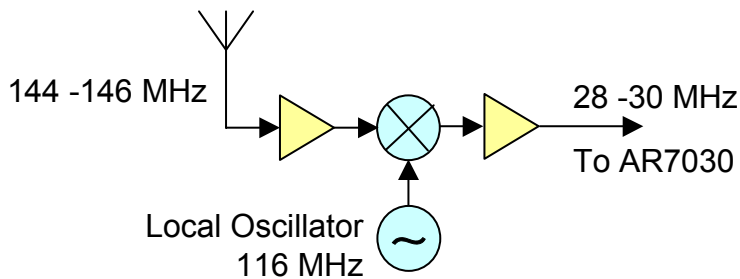
3.1.5. Audio Frequency (AF)

The AF frame is very straightforward and contains setting possibilities for audio tone control and volume. BAS is Bass control, VOL is Volume control and TRB is Treble control

3.2 Frequency Converter

Some people use the AR7030 in combination with simple frequency conversion equipment to create the possibility to receive also VHF and/or UHF transmissions.

As an example a block diagram of a conversion unit to receive the 2 meter amateur bands (144-146 MHz) is shown here :



The incoming signal in the 144 - 146 MHz is shifted to 28 - 30 MHz (inside the frequency range that a shortwave receiver can capture), by mixing it with a local oscillator frequency of 116 MHz. In this case the AR7030 itself can only show a reception frequency in the range of 28 - 30 MHz. In the frequency converter window the original frequency in the 144 - 146 MHz will be shown. This window can be loaded by clicking in the menu item 'Direct/Converter' and is shown in the picture below.



Picture 4 Frequency conversion window

Before you can use it, you have to fill in the local oscillator frequency in MHz and you have to select whether this local oscillator frequency is below or above the frequency band you want to receive. This data can be saved in a file 'converter.ini' by clicking in the 'Save' button. You can reload the saved data by clicking in 'Reload'. The data in the converter.ini file will also automatically be loaded if the Frequency converter window is opened.

All normal tuning is done, using all the possibilities in the receiver main control window (see chapter 3.1.2). To bring the AR7030 in the desired range and to start using this conversion facility, it is also

possible to double click in the frequency textbox in the Frequency converter window, then typing the wanted VHF/UHF frequency (in kHz) and hitting the Enter key. Be aware that in case the local oscillator frequency is chosen above the band you want to receive, that the frequencyband in the AR7030 will be reversed. For example a converter for the 50-52 MHz band, using a 80 MHz local oscillator, will result in a 30-28 MHz range on the AR7030. Moreover also USB will change to LSB.

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 (Own/BDXC/ADDX/ILGRadio) that can be *sent to* the AR7030 (Db2Rx)
2. Files that store (Log) or translate (Tracking) data *coming from* the AR7030 (Rx2Db)

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

4.1 BDXC en ADDX broadcast data files

A number of Public Domain files exist with data on short-wave transmissions. Some of these files are updated on a regular basis. Special attention should be given to the work that is done, as part of the activities of the BENELUX DX-CLUB (BDXC), by Jan Nieuwenhuis and Cees van Oudheusden and as part of the activities of the 'Assoziation Deutschsprachiger DX-er' (ADDX) by Andreas Volk

4.1.1 BDXC Files

Each month files are issued with data on Dutch, English and French broadcast transmissions on short wave. These files can be downloaded from the Internet at <http://www.425dxn.org/swls/bdxc/>. This data is also distributed in printed form in the 'BDXC Bulletin'.

Jan Nieuwenhuis keeps the English to Europe file updated. He can be reached on 'Jan-en-Annette@hetnet.nl'. Cees van Oudheusden keeps the Dutch to Europe and French to Europe files up to date. He can be reached at 'c.vanoudheusden@net.hcc.nl'.

After downloading the above mentioned html files, load the files with broadcasts in Dutch and in French in an ASCII text editor and delete all except the information sorted on time and save the part that is left to the files BDX_*TOE.TXT in the directory C:\PD7030V4\BDXC.

This will result in 2 files :

BDX_DTOE.TXT for Dutch broadcasts TO Europe

BDX_FTOE.TXT for French broadcasts TO Europe

The record structure of these files is/should be :

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)

As an example a few lines are shown from a BDX_ETOE.TXT file :

AUSTRALIA	R.Australia	0600-0830	9580,13605,15415,17750,21725
CROATIA	Croatian Radio	0605-0610 (g)	5920,7165,9830,13830
SWITZERLAND	Swiss Radio Int.	0615-0630	6165,9535

Don't change the record structure of these files otherwise the computer will get interpretation problems. The default for the maximum number of records is set to 2000 and the maximum record length is 100. The maximum number of records can easily be changed in the set-up between 1000 en 30000 by setting appropriate figure in DIM BDX.

The file with broadcasts in English from Jan Nieuwenhuis has a different record structure. So this file has to be converted before it can be used in PD7030. This facility is not yet build-in.

4.1.2 ADDX File

On a regular basis files are issued with data on English, French, German, Russian, Spanish and Turkey's broadcasts to all parts of the world. The filenames are hfp*.htm, with *= the first letter of the language and can be found on the Internet, URL <http://www.addx.de/hfpdat/plaene.htm>
 This data is also published in printed form in the 'KURIER'. Andreas Volk keeps the data up to date. He can be reached on 'hfp@addx.de'

The record structure of these files is different from that in the BDXC-files. So, to make it usable in PD7030V4, the record structure has to be changed to make it equal to the record structure of the BDXC-files. This has already been done with the files included in this packet.

After the conversion the ADX_*TOW.TXT file have the same record structure as any of the BDX_*TOE.TXT files so all what is said in the next paragraphs is also valid for these files.

4.1.3 Using the BDXC files and converted ADDX files

Click in the main menu item 'Db2Rx Files' on the receiver control panel and select 'BDXC'
 Then the BDXC window will be loaded. See picture below :

Country	Station Name	Frequency Range	Freq 1	Freq 2	Freq 3	Freq 4	Freq 5	Freq 6
UNITED	BBC World	0600-1700	15565					
UNITED	BBC World	0600-1800	12095					
UNITED	BBC World	0600-2000	9410	12095				
UNITED	BBC World	0600-2100	9410					
UNITED	BBC World	0700-1500	17640					
UNITED	BBC World	0700-1700	15565					
UNITED	BBC World	0700-1800	12095	15485	17640			
UNITED	Sunrise Radio	0700-1859	5850					
CROATIA	Croatian Radio	0800-1630	6165	7185	9830			
UNITED	BBC World	0900-1515	17705					
ECUADOR	HCJB	0900-1600	21455					
USA	WHRI	1000-1600	6040					
JORDAN	R. Jordan	1100-1730	11690					
USA	WEWN	1200-2000	15745					
USA	WWCR-1	1200-2100	15685					
TURKEY	V. of Turkey	1330-1430	15295	17815				
GERMANY	UniversellesLeben	1400-1430	9710					
USA	V. of America	1400-1500	15255					
UNITED	Merlin Network 1	1400-1600	9915	13680	17630			
GREECE	V. of Greece	1400-2050	7450	9420				
USA	WWCR-3	1400-2200	12160					
USA	WWCR-4	1400-2200	9475					
USA	WWCR-2	1400-2400	13845					

Picture 5 BDXC window

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. This 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, using standard AM broadcast receiver setting for HF attenuator (0 dB), IF filter bandwidth (5 kHz), mode (AM) and AGC (fast). To Change this click in the button 'RX control' to get the receiver control window and make the necessary change. After clicking in the BDXC window the receiver control window will move to the background again.

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 AR7030 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 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 Open Own window and Own files

Click in the main menu item 'Db2Rx Files' on the receiver control panel and select 'OWN' The Own window will then be loaded. See picture below

The screenshot shows a software window titled 'OWN_UTAE.TXT UTC : 19 dec 2001 14:18'. At the top, there are buttons for 'Load Own File', 'RX Control', and 'Exit'. The main area displays a table with columns for 'WW calling/distress', 'E', '0000-2400', and several frequency columns. The data is organized into two main groups: VOLMET and MWARA, each with sub-entries for different regions and stations.

WW calling/distress	E	0000-2400	3023	5680						
VOLMET Africa			2860	3404	5499	6538	8852	10057	13261	
VOLMET Caribbean			2950	5580	11315					
VOLMET Europa			2998	3413	5505	6580	8957	11378	13264	
VOLMET Middle East			2956	5589	8945	11393				
VOLMET N. Atlantic			2905	3485	5592	6604	8870	10051		
Volmet N. Atlantic			13270	13276						
VOLMET N. + C. Asia			3461	4663	5676	10090	13279			
VOLMET Pacific			2863	6679	8828	13282				
VOLMET S. America			2881	5601	10087	13279				
VOLMET S. E. Asia			2965	3458	5673	6676	8849	11387	13285	
VOLMET RAF			5450	11253						
MWARA Africa 1			2851	2878	3419	3425	3467	4657	5493	
MWARA Africa 2			5652	5658	6559	6574	6673	8894	8903	
MWARA Africa 3			11300	11330	13273	13288	13294	17961		
MWARA Caribbean 1			2887	3455	5520	5550	6577	6586	8846	
MWARA Caribbean 2			8918	11387	11396	13297	17907			
MWARA C/E Pacific 1			2869	3413	4657	5547	5574	6673	8843	
MWARA C/E Pacific 2			10057	11282	13300	17904				
MWARA C/W Pacific 1			2998	3455	4666	5652	5661	6532	6562	
MWARA C/W Pacific 2			8903	10081	11384	13300	17904			
MWARA East Asia 1			3016	3485	3491	5655	5670	6571	8897	

Picture 6 OWN window

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, using standard receiver setting for HF attenuator , IF filter bandwidth, mode and AGC, depending on which type of transmission is tuned to.

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

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 30000, by changing DIM OWN. 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 : abdg (basic AR7030 setting)
- Character positions 44 up to and including 49 : 'empty'
- Character positions 51 up to and including 92 : frequencies in use (max. 7)

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

The meaning of figures used to store the basic settings can be found in the document '7030 Computer remote control protocol' and is also given here :

- a is the RF pre-amplifier/attenuator setting:
0=+10 dB, 1= 0 dB 2= -10 dB, 3= -20 dB, 4= -30 dB, 5=-40 dB
- b is the IF filter bandwidth setting
1= 2 kHz, 2= 5 kHz, 3= 7 kHz, 4= 10 kHz
- d is the reception mode
1= AM, 2= Sync, 3= NFM, 4= Data, 5= CW, 6= LSB, 7= USB
- g is the AGC speed setting
0= Fast, 1= Medium, 2= Slow, 3= Off

4.3 ILG Radio broadcast data files

Given the easy availability (see also 5.3) and the accuracy of the ILG Radio database and the limitations of the ADDX/BDXC files, also a ILG Radio database search facility is now build in. For this search / filter function the same files are used as for the tracking function (see 5.3)

4.3.1 Open ILG Radio search window and search file

After selecting the menu-item Db2Rx/ILG Radio the search window will be opened. The ILG Radio window with some filtering results is shown in picture 7 on the next page. Clicking in the button 'Load file' will give access to the ILG Radio broadcast files. Select 'ILGADATA.FTL' (LW/MW) or 'ILGSDATA.FTL' (SW) and load it in RAM.

Information about the file structure and related items can be found in 5.2.1



Picture 7 ILGRadio window

4.3.2 Searching the ILGRadio broadcast database

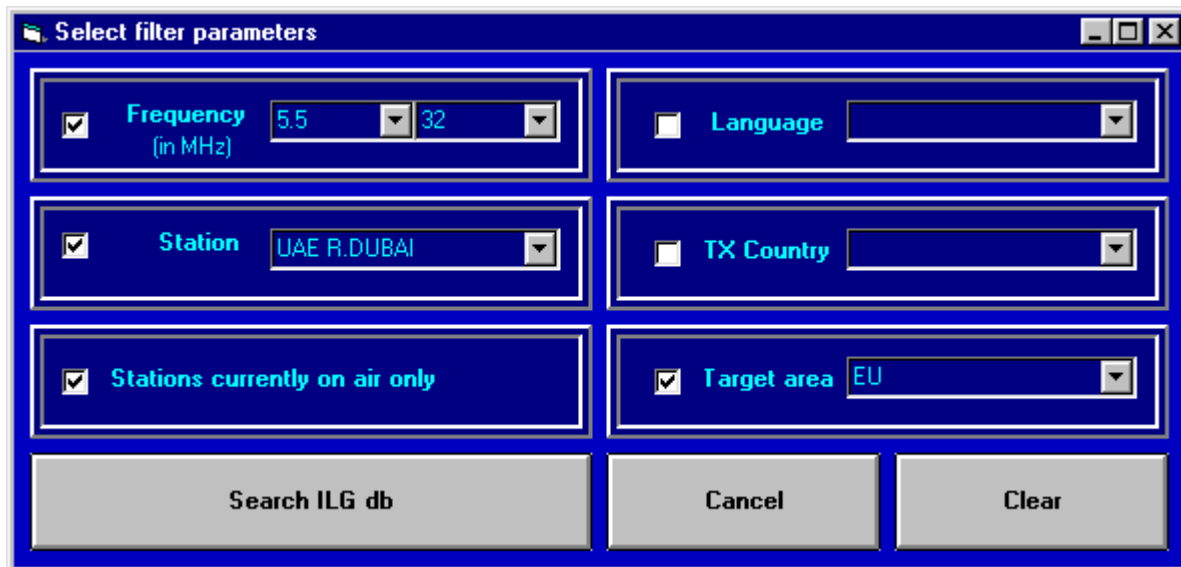
To set the search criteria click in 'Set Filter'. Then a new window appears with all the search criteria. See picture 8 on the next page.

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 4.3.3. After you have selected all the search criteria click in 'Search ILG Radio db' to start the actual search. The progress of the search is shown the right hand upper side of the window. After a 'few' seconds the result will appear.

If you now click on a line, the AR7030 will be set to the frequency shown in this line.

In case for certain frequencies more then 27 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 / ~180 records can be shown. Page number selection buttons are only enabled if that page really contains data. If a search contains more then 180 hits these will be lost.



Picture 8 Filter window

4.3.3 Customising the search criteria window

The search criteria available in the list boxes in the ILG filter window are read from the `ilgfilter.ini` file. To change or supplement these, load the `ilgfilter.ini` file from the main ParaDise directory in an ASCII text editor.

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 Combined use of BDXC and/or Own and/or ILG Radio 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 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 Filter 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 search window.

Also open the Tracking window and load also the `ILGSDATA.FTL`. In this situations of combined use **always set the 'dial' option** instead of the 'mouse' 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 search window, the AR7030 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)

As explained in the introduction to chapter 4, two main types of database uses are distinguished. In this chapter the use of files that store (see 5.1 Logging) or translate (see 5.2 Tracking) data coming from the AR7030 are described.

5.1 Logbook 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 Open Log window and Log file

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



Picture 9 Logging window

Clicking in the button 'Load Log File' will give access to a number of log files. Select a file and load it in RAM.

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 30.000, 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 (abdg)
- Character positions 156 up to and including 159 : Auxiliary (4 char.)

After a selected file is loaded, you can click on a frequency or a // frequency in the grid to tune your AR7030 to that frequency. If an Rx setting was saved then the main receiver parameters will be set accordingly.

5.1.2 File data manipulation

At the bottom of the Log Window you find a kind of toolbar to Add, Change or Delete records to/from the file, to change the Format of the data shown on your screen, to Sort the file and to Save or to save and Close the file. This toolbar will only be enabled after a log file is loaded.

The Add, Change and Delete commands are available to keep your logging up to date.

For large updates it is however easier to use an ASCII text editor, for example 'Notepad', to edit the file directly. The program 'Notepad' can also be used to print the files. See 'Set-up / Program options' in chapter 1 for easy access to this program.

A short description of all command buttons is given below:

- Add Record gives the possibility to add a new record. After clicking there, a new window appears to edit the record. See picture 10 on the next page.

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 find by simultaneous use of the tracking option. To add it 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 10 on the next page for the lay-out. 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.

- 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.

Input Record 082

Date (yyyymmdd)	<input type="text" value="20011219"/>	<input type="text" value="5955.00"/>	Frequency (kHz)
Start UTC (hhmm)	<input type="text" value="1408"/>	<input type="text"/>	SINPO (#####)
End UTC (hhmm)	<input type="text"/>	<input type="text"/>	Language [%%]
Organisation	<input type="text"/>		
TX Location	<input type="text"/>		
// Frequency 1	<input type="text"/>	<input type="text"/>	// Frequency 3
// Frequency 2	<input type="text"/>	<input type="text"/>	// Frequency 4
Remarks	<input type="text"/>		
Settings abmg	<input type="text" value="1210"/>	<input type="text"/>	Auxiliary

Picture 10 Add/Change record window

- 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 shown in the log grid. After clicking in format a window appears with a survey of all sub-records available in each record. See picture 11 on the next page

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.

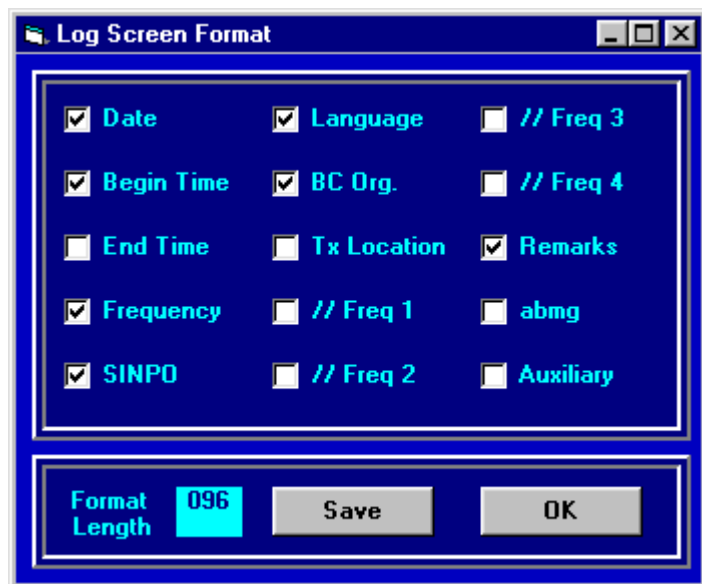
You can save the selected format also for later use, by clicking in save. The data will be saved in a file 'format.ini' to be found in the applications main directory path

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

- 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. 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_abcdefghijkl.TXT

-Close give the possibility to save and close the file.



Picture 11 Log screen format

5.2 Tracking facilities

In Tracking mode you can tune the receiver by turning the frequency dial on the receiver 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. See picture 12 on the next page.

From version 2 this is based on tracking files converted from the extended (and free) ILGRadio Medium Wave and Short Wave databases from Bernd Friedewald, see chapter 5.3 .

5.2.1 Open Tracking window and Tracking file

After selecting the menu-item Rx2Db/Tracking the tracking window will be opened. Then clicking in the button 'Load file' will give access to the ILG based tracking files. Select 'ILGADATA.FTL' (LW/MW) or 'ILGSDATA.FTL' (SW) and load it in RAM.

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 30000. Each record has the same structure. 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



Picture 12 Tracking window

5.2.2 Methods of changing the receiver 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 'Freq. Step' you can change the frequency step size for using the spin button.
The default value after loading of the MW tracking file is 9 kHz, being the frequency channel spacing in the LW and MW broadcast bands. The default with the SW tracking file is 5 kHz.
- Dial : change frequency by dialling around the frequency dial on the receiver
- It is recommended NOT to use the infrared remote control unit while using any of the tracking modes

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.

5.2.3 Explanation of presentation and presentation options

- Background Colours

In case there is only a frequency match, the background becomes (medium) blue. If there is also a match in time then the background will become (dark) pink and in case a frequency, time and target area match occurs, it becomes (dark) red. 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 27 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 / ~180 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.

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)

-Showing transmitter Latitude/Longitude or Distance and Direction from Rx to Tx or Country where the transmitter is located or Location of transmitter site

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.

- Catching (kHz)

In the Text Box called 'Catching' you can change the deviation (in kHz) between AR7030 frequency and frequency data in the database at which a match will be indicated. The default catch range is +/- 2 kHz.

5.3 ILGRadio database conversion

5.3.1 The ILGRadio LW/MW and SW databases

ILGRadio 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 a user name and password. This can also be asked for on the download page. The info you give is only used for statistics, the databases itself are free of charge.

It was agreed with Bernd Friedewald that no converted ILGRadio files will be distributed with the ParaDise program. 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 in 5.3.2.

The advantages of this approach are two-fold, Bernd can keep track of the usage of his databases as you can update the tracking files yourself as soon as they come available on the ILG website.

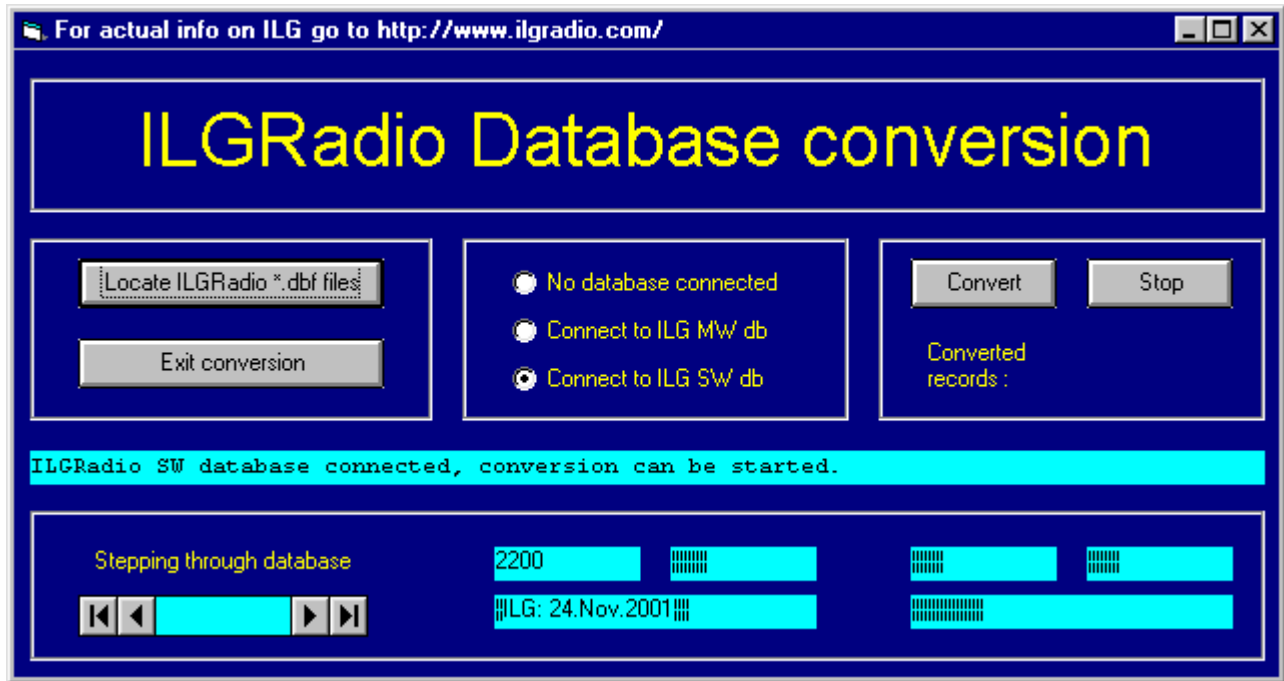
5.3.2 Conversion of ILGRadio-dbf files to 'Filtering'- and 'Tracking' files

After you have downloaded and unzipped the ilgadata.dbf and ilgdata.dbf files in your ILGRadio directory, start the ParaDise program and select the menu "Rx2Db\Convert ILGRadio". Then the conversion window will be loaded. See picture 13 on the next page.

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



Picture 13 ILG Radio database conversion window

During the conversion each hundredth record will be shown at the bottom of the conversion window. After a few minutes a message appears that the conversion is finalised. The converted file is automatically saved in the 'Rx2Db' sub-directory of the Paradise program. If now the ILG Radio filtering window (see 4.3) or the tracking window (see 5.2) is loaded the converted ILG Radio file can be used.

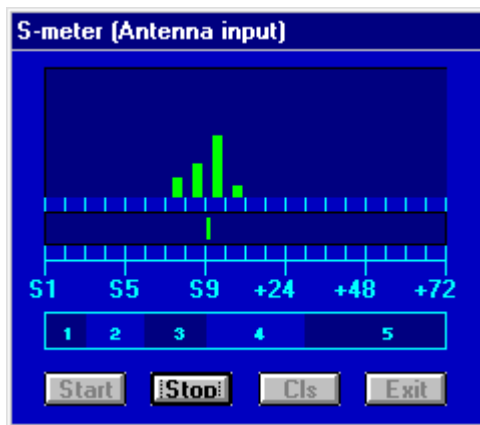
6. Analysis of received signal strength

All options under the menu-item 'SignalAn' (=Signal Analysis) are based on reading and processing the received signal strength (S-meter) of the AR7030. You can analyze in two dimensions :

- Time, resulting in a propagation impression over time for one frequency and the path between the selected transmitter and your antenna-receiver combination. See 6.1 and 6.3
- Frequency, resulting in a survey of signals that can be received at that moment in the selected part of the HF spectrum. See 6.2

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 :



Picture 14 S-meter window

Click in 'Start' to start 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.

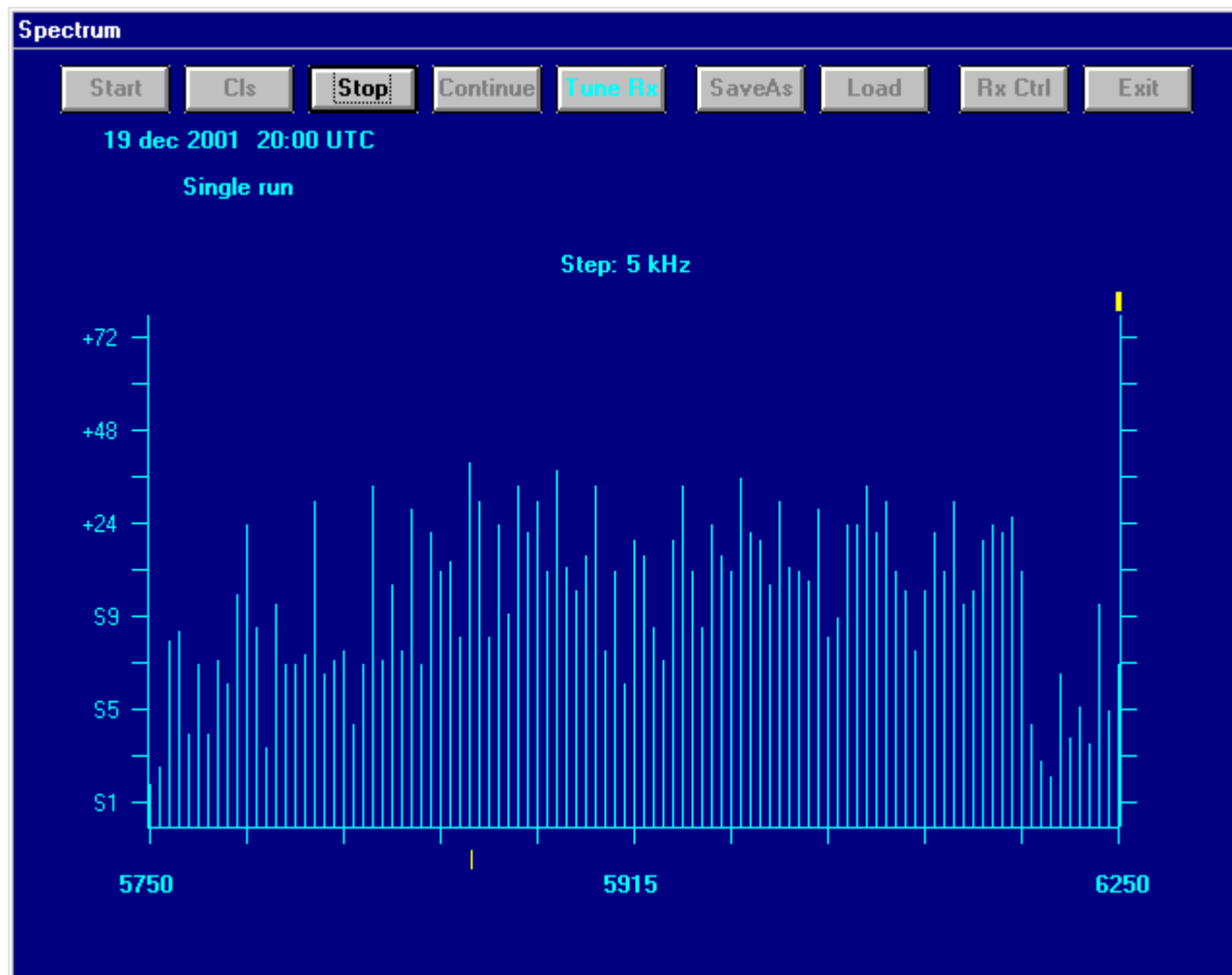
To prevent interference with data communications between other windows and the receiver a number of these windows, including the receiver main control window, are disabled during the S-meter measurements. If you want to use those other windows, then click first in 'Stop' to stop the S-meter measurements. 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.

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

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 picture below.



Picture 15 Spectrum scan window

After clicking in 'Start' a small window appears 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 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 :

LW Broadcast :lower limit 151 kHz, upper limit 238 kHz, channel spacing 9 kHz
MW Broadcast :lower limit 531 kHz, upper limit 1602 kHz, channel spacing 9 kHz
49 m band :lower limit 5900 kHz, upper limit 6200 kHz, channel spacing 5 kHz
25 m band :lower limit 11600 kHz, upper limit 12100 kHz, channel spacing 5 kHz
Aeronautical :lower limit 5480 kHz, upper limit 5730 kHz, channel spacing 3 kHz
Aeronautical :lower limit 8815 kHz, upper limit 9040 kHz, channel spacing 3 kHz
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 do not want only a single run of the spectrum scan you have to check the box 'Continuous loop' In the continuous loop situation you can also check to keep the highest measured S-value 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.

Depending on the place where you are, the type of antenna you use, the part of the band you want to investigate, the hour of the day and may be many other things the number of signals and the signal strength can be very different. Therefore it is sometimes necessary to adapt your receiver setting before you start a spectrum scan.

I propose you always set AGC to fast, and in a crowded band with strong signals (f.e. the 49 m band in Europe in the evening hours) use your smallest filter and the hf input attenuator.

On the screen always the signal strength on the antenna input is shown. This is done by compensating in the program for the setting of the pre-amplifier/ input attenuator.

After the spectrum scan is finalized or after clicking in 'Stop' you can set the AR7030 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 yellow line helps to find the signal level at this frequency 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.

To compare spectrum scans (f.e. for antenna comparison or propagation investigations) it is possible to save and load scan results. **If you want to save a spectrum scan for later comparison, let the program finalise 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 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.** 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.

Remark 1 : The saved spectrum scans are not compatible with the format used in v1. To prevent the incompatibility with the differences in used decimal separator in the different countries (. or ,) the S values are from V2 multiplied by 10 before saving and of course again divided by 10 after loading.

Remark 2 : 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.

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)

In case a high frequency signal generator is available also the characteristics of the mid-frequency filters of the AR7030 can be made visible with this option. Connect the HF generator to the antenna

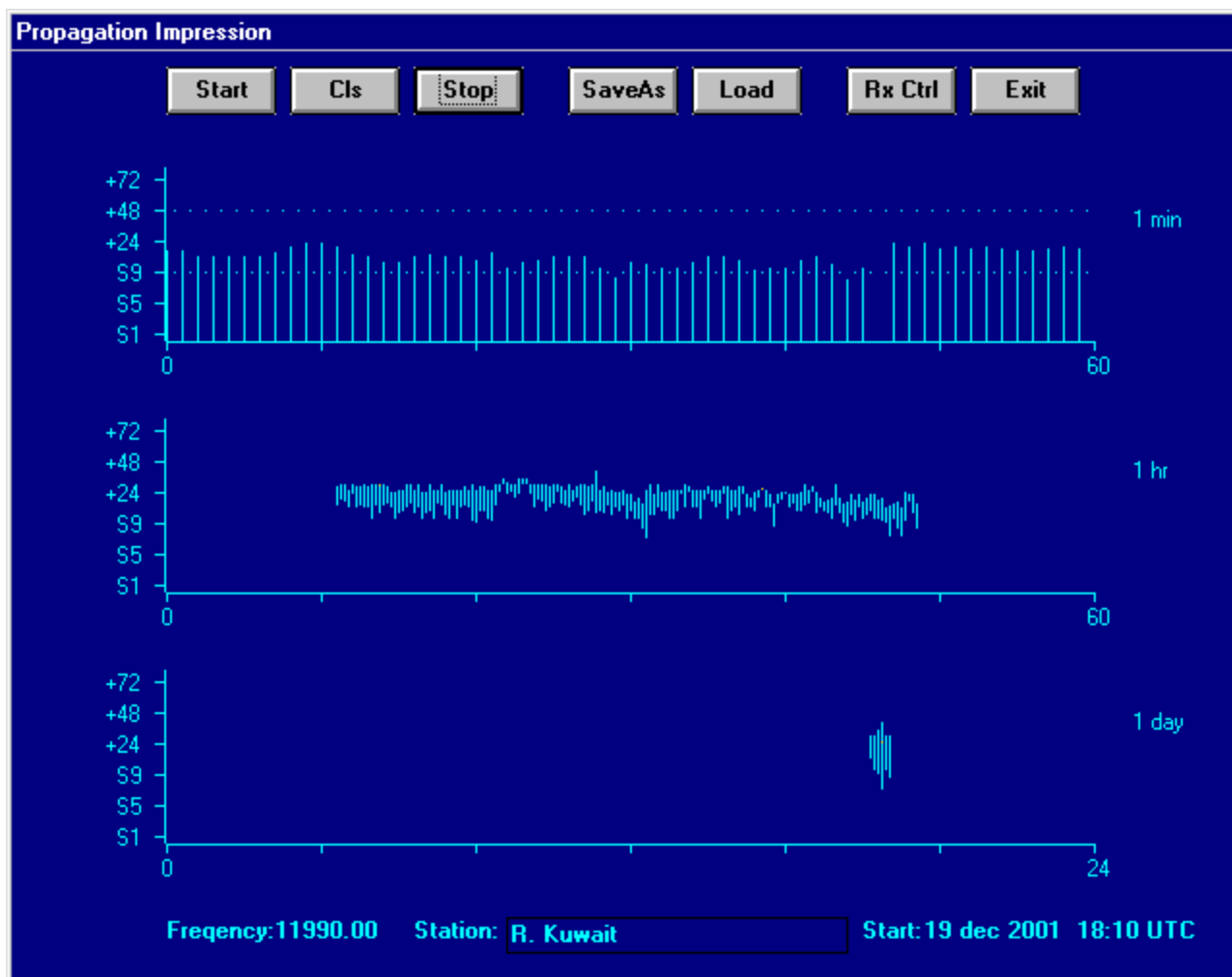
input, set the frequency to, for example, $f = 5 \text{ MHz}$ and tune the receiver to this frequency. Set the S-meter value to the maximum by fine-tuning the AR7030 and set this value to S9+50 dB by changing the output of the HF signal generator.

Select the filter to be measured and then select the spectrum option and enter as lower limit $f-10 \text{ kHz}$, as upper limit $f+10\text{kHz}$ and as step size 0,1 or 0,05 kHz and click in 'OK' . . .

6.3 Propagation

6.3.1 Time Analysis

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.



Picture16 Propagation impression window (Time analysis)

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.

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 charcters (for example pan_abcdefghijkl.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.

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

Remark : The saved propagation data is not compatible with the format used in v1. To prevent the incompatibility with the differences in used decimal separator in the different countries (. or ,) the S values are now multiplied by 10 before saving and off course again divided by 10 after loading.

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

First record : Date of measurement

Second record : Frequency

Third record : Station name

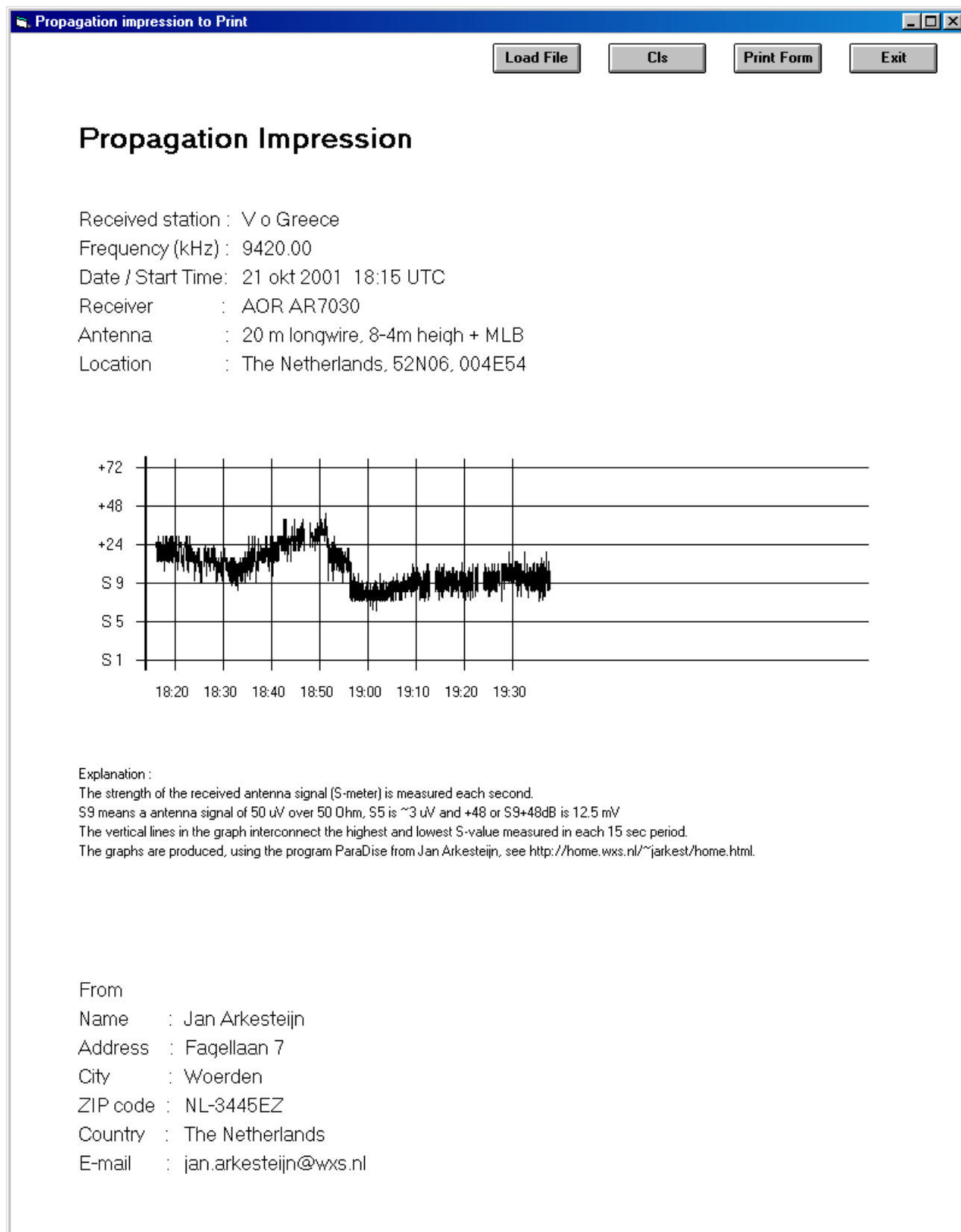
Successive records : Time + 4 x (lowest + highest measured S-value (x10) per 15 sec)

6.3.2 Time Analysis to Print

The 'propagation impression' data as gathered according to the method described in chapter 6.3.1, can contain information that is also relevant to shortwave broadcasters. Therefore a facility is built in to print this data in a graph and to add the necessary information about the used receiver, antennae and location. Furthermore information about the sender can be added.

An example of such a printed 'Propagation impression' is shown on the next page.

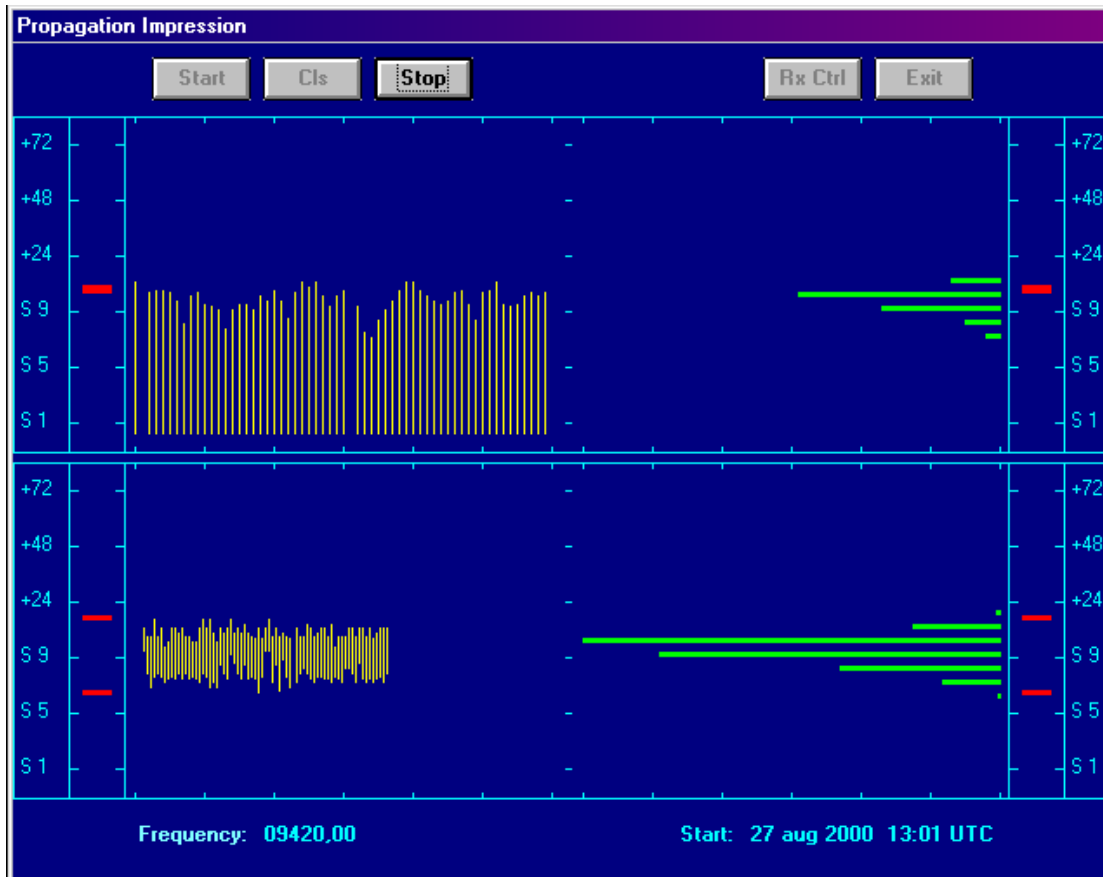
To prevent that you have to type all this information each time you want to add this information to a reception report, all this data is stored in the prop2prt.ini file. Use Notepad.exe or another plain ascii editor to directly adapt the data in this ini-file for your situation.



Picture 17 Example of printed propagation impression.

6.3.3 Time + Histogram

If you select the submenu SignalAn / Propagation / Time +Histogram another Propagation impression window will be loaded and shown on your screen. See picture below.



Picture 18 Propagation impression window (Time analysis and histograms)

The left-hand part is equal to the 1 min and 1 hr graph of the Propagation impression window described in 6.3.1. In the right hand part some statistical info on signal strength is added in the form of histograms.

The upper right hand part shows the distribution of the signal strength over the most recent 60 sec. The lower right hand part shows the distribution of the signal strength over the total measuring period and is updated each minute. This window has no saving options.

6.4 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 as described in chapter 6.2 in combination with the tracking facility described in chapter 5.2, 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 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 as described in chapter 6.2, using a delay time between successive scan steps of at least 1 sec. The TuneRx option or SaveAs option as described in chapter 6.2 are still available in this combined use situation.

7. Receiver Memory Management

The standard AR7030 has a total of 100 memory cells (00 to 99). Each cell can contain the setting of the frequency, bandwidth, mode, passband shift and squelch for AM, NFM and SSB modes or BFO for CW and data modes. In the Memory Management window all these 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 3 locations where data in relation to the receiver memories can be found. These are (1) the AR7030 memory, (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 AR7030 memory (for example with 'Fill RM') or the file on hard disk (by using 'Save').

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 content of each cell is made visible in a grid. Double clicking in a line in that grid will switch the receiver to the setting stored in the selected memory cell in the receiver. The Memory Management window is shown in the picture below :

The screenshot shows the 'Memory Management' window with the following controls and data:

Cell: 008
Freq: 00747.001
Add. info: [Empty field]

Buttons: Change, Dump, Copy, Delete, Scan, From: 0, To: 99, Delay: 1, Fetch RM, Sort Freq, Fill RM, Set R2M, Load, Save, Print, Clr, Exit, RX Ctrl

NR	FREQUENCY	MD	BW	PBS	SQL	SCN	ALPHA TAG
000	00009.999	AM	5.1k	+0,0k	00	Y	
001	00647.998	AM	6.1k	+0,0k	01	Y	
002	00648.001	NFM	9.5k	+0,0k	00	Y	
003	00674.998	AM	6.1k	+0,0k	00	Y	
004	00674.998	AM	6.1k	+0,0k	99	Y	
005	00675.001	AM	5.1k	+0,0k	00	Y	
006	00675.001	AM	5.1k	+0,0k	00	Y	
007	00746.999	Syn	6.1k	+0,0k	00	Y	
008	00747.001	AM	5.1k	+0,0k	00	Y	
009	00828.000	AM	5.1k	+0,0k	00	Y	
010	00927.000	AM	5.1k	+0,0k	00	Y	
011	01007.999	AM	6.1k	+0,0k	00	Y	
012	01007.999	AM	5.1k	+0,0k	00	Y	
013	01115.899	Syn	5.1k	+0,0k	00	Y	
014	01116.000	AM	5.1k	+0,0k	00	Y	
015	01224.001	AM	5.1k	+0,0k	00	Y	
016	01395.000	AM	5.1k	+0,0k	00	Y	

Picture 19 Memory Management window

The Memory Management window contains the following command buttons:

7.1 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 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 the remark just below.

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 1 to 12 characters (for example mem_myfavourites.txt.), otherwise the save action will not work properly. The save-action starts by clicking in OK .

Remark : Before the current contents of the AR7030 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 structure given below :

Character positions 1 up to and including 3	: memory cell number (###)
Character positions 5	: mode (#)
Character positions 7	: filter nr (#)
Character positions 9 up to and including 11	: passband shift setting (###)
Character positions 13 up to and including 15	: squelch or bfo setting (###)
Character positions 17	: scan incl/excl
Character positions 19 up to and including 27	: frequency (#####.###)
Character positions 29 up to and including 72	: alphanum with additional info (43 char)

7.2 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 printed range becomes: From-nr to 99 + 0 to To-nr

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'

7.3 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.

7.4 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.

7.5 Fetch RM

Clicking in 'Fetch RM' (RM= Receiver Memory) gives the possibility to copy the contents of all memory cells from the AR7030 in the computer RAM for fast and easy processing. This fetch result is also shown in the grid in the Memory Management window.

7.6 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

7.7 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.

7.8 Set R2M

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

7.9 Scan

The scan function can be used to automatically step through a selected range of the AR7030 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 then the 'To' number then the scanned range becomes: From-nr to 199 + 0 to To-nr.

In the 'Delay' box you can give the time in sec. that the program will wait until stepping to the next channel. Delay between 2 and 20 sec will be accepted.

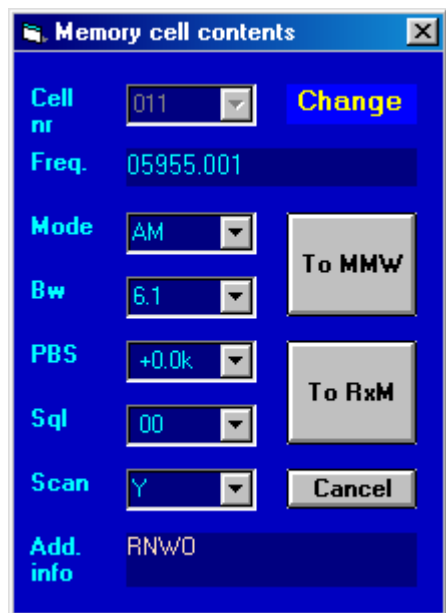
7.10 Change

With this command the individual memory cell window opens with the current Memory management window content of that cell. See picture 20 on the next page. 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 (click in 'To RxM') .

7.11 Dump

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 (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 (see 6.2) 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 'Dump' in the memory management window to store these receiver settings in the selected memory cells for later use.



Picture 20 Change Dump/Copy Memory cell window

7.12 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 (click in 'To RxM') .

7.13 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 tin the receiver memory (Clik RxM)

8. Timer programming

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. This item will only work properly if you use the standard Windows directory names and locations.

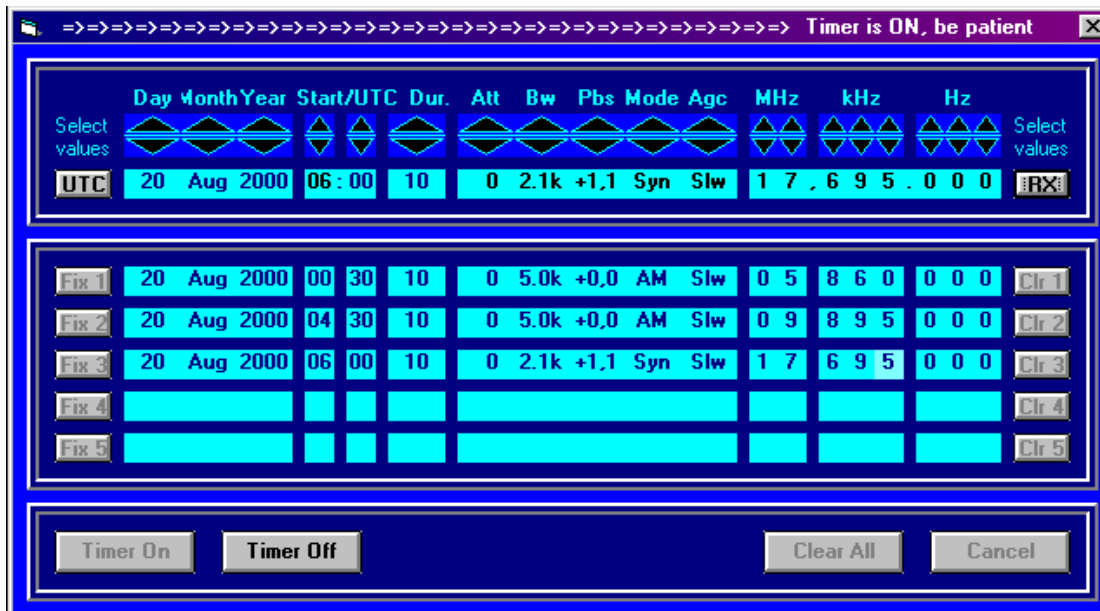
8.2 Receiver clock setting

This menu item offers the possibility to set the receiver clock to Local Time (PC Clock) or UTC. In case you want to use the long-term timer programming facility described in 8.3 then you should set the receiver clock to show UTC.

8.3 Long term timer programming

To support the unattended reception of selected transmissions, including the storing of the received program on a cassette recorder, a programmable timer is built in. The cassette recorder should be a type that can be remote controlled, so it can be started and stopped with the AR7030 timer relay that is controlled by the program. The right connection points on the rear panel of the AR7030 are shown in the AR7030 manual.

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



Picture 21 long term timer programming window

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 AR7030 settings by clicking in the spin buttons. You can select the actual time and date (in UTC) by clicking in the command button 'UTC' and the actual AR7030 setting by clicking in the command button 'RX'

After you have selected the time/date/duration and AR7030 setting 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 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 will be activated by clicking in 'Timer On'. At the moment the timer programming is activated the AR7030 power will be and should be switched off. Also between events the power will be switched off again. This is necessary because the timer programming is partly based on the software already available in the AR7030. Just 1 min before each event the receiver is switched on for about half a minute to transport all receiver and timing settings to the AR7030 for the next programmed event. In this transmission also the AR7030 clock will be set to the actual UTC time as calculated in the program.

In case the timer programming is not exactly working as expected check in the AR7030 configuration if the aux relays is really timer controlled and not squelch controlled.