SkySweep Technologies

SkySweeper

Reference Manual for Versions
Std 3.10 / Std Plus 4.10 / Pro 5.10

1 Contents

2 Legal Notice

2.1 Radio Communication Legislation

A person who listens to radio communication not intended for him may not reveal the content of transmission nor may he use the content for his own personal gain. Check the corresponding local legislation of your country.
SkySweep Technologies accepts no responsibility for any possible illegal usage of the SkySweeper software.

2.2 Copyright Notice

 Information in this document is provided in connection with the SkySweeper software. The SkySweeper software and documentation is provided to you AS-IS. Software and documentation may contain errors. SkySweeper is not intended for use in medical, life saving, or life sustaining applications.

3 Overview of SkySweeper Software

3.1 SkySweep Technologies

SkySweep Technologies is a Finnish high-tech company which goal is to provide world class solutions for HF/VHF data decoding and radio networks.

3.2 SkySweeper

SkySweeper is a registered trademark of SkySweep Technologies. The SkySweeper product family provides the most advanced digital signal processing functions to the HF and VHF world.
The easiest way to get the overview of SkySweeper is to just run the automatic demo.
You can design your receiver characteristics by means of a user friendly Configuration Editor or use some of the pre-set receiver configurations. Several useful display tools (FFT, 3DFFT, spectrogram etc.) help the signal analysis. Also several decoders and DSP blocks are provided. In the demo mode, all of the SkySweeper functionality can be tested by reading the test signal (max 60 seconds) from a file. The configurations cannot be saved in the demo mode. In order to get access to all features of SkySweeper software without limitations, you have to register your copy. The minimum system requirements for SkySweeper are:

-Pentium 1.2 GHz
-Sound Card (Sound Blaster Live! 24-bit external (USB) sound card strongly recommended to achieve the best decoding results). Also it is possible to use other sound card as well, but the results are not guaranteed
-30 MB of Hard Disk space
-256 MB RAM
-Windows NT, Windows NT, Windows 2000 or Windows XP operating system

4 How to Start

4.1 General overview

The basic block structure of the program operation is shown in the picture (Figure 1) below:

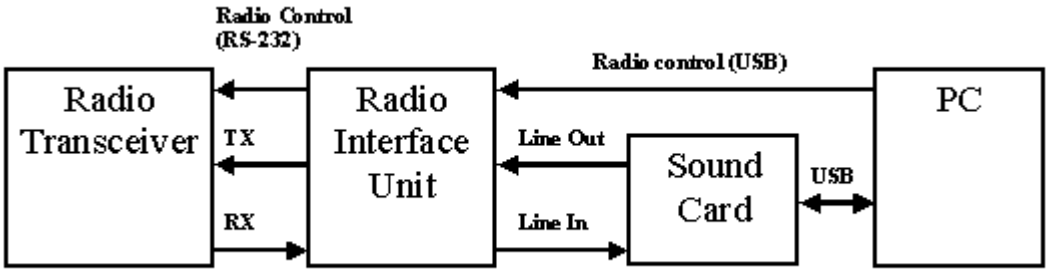


Figure 1

Radio Transceiver is the HF/VHF/UHF transceiver. If the target is only to decode, the transmitter is not needed.

Radio Interface Unit provides the galvanic or optical isolations between radio transceiver and the digital parts (PC and sound card). It also provides the USB<->RS-232 conversion. There are many suitable products for this. One recommended product is the USB Interface II by Microham: http://www.microham.com/USB%20interfaces.html

Sound Card makes the audio A/D and D/A conversions. Currently only recommended sound card is Sound Blaster Live! 24 bit External: http://www.soundblaster.com/

SkySweeper has advanced VOX (Voice Operated Transmission (Xmission) support. It means that carrier preamble and preamble text (typically couple of spaces) can be defined TX Settings Dialog. This enables error free VOX based operation. If the VOX based PTT is used no special cable is needed. If LPT or COM port is used for PTT control, suitable cable is needed. Also for TX control the needed parameters have to be also set TX Settings.

4.2 The start procedure

Initially, please follow this procedure:

Run setup.exe and install SkySweeper.

Open the SkySweeper program.

Open one of the sample signal files by pressing the radio icon. The *IO Settings* dialog should be opened. Select *rtty.wav* as an input. Click 'OK' in the IO Settings dialog.

Open next, for example, RTTY RX & TX configuration (RXTX->RTTY).
Start processing by pressing the *green button* in the Configuration Editor's toolbar.

Now SkySweeper is processing data. You can stop the processing by pressing the *red button* in the Configuration Editor's toolbar. You can modify the configuration only when the processing has been stopped.

You can test a new input file or perhaps connect the input back to the radio by pressing the radio/floppy disk icon

4.3 Sound Card Configuration

SkySweeper is based on the sound card, so it is very important to make the sound card settings very carefully.

1) Start the SkySweeper
2) Select the correct audio device (SB Live! 24-bit external). The used audio device can be selected Config (main menu) -> System->audio devices (select 'SB Live!'). See more details in 'Audio Devices'
3) Run the sound card clock calibration. The clock calibration is started from Config (main menu) -> System->Clock Calibration. Press 'start' (numbers should start to change) and wait about 15 minutes, press 'stop' and finally 'ok'. See more details in 'Clock Calibration'
4) Click the loudspeaker icon in the main menu to set the output volumes. Please mute 'Mic Volume' and 'Line In'. All the others should not be muted. Please set the 'Wave' and 'Volume Control' to the maximum levels. See more details in 'Volume Control'
5) Click the microphone icon in the main menu to set the input volumes. Please select the 'Line In' and set it's volume to the maximum level. The other lines should be unselected. See more details 'Record control'
6) Check that the all audio effects (echo etc) in the sound are disabled
7) Close SkySweeper to store the settings

4.4 Sound Card Configuration

SkySweeper uses the Windows system default sound card. You can change the used sound card from the menu "Config->system-Audio Devices. If the sound card seems configured improperly, then the objective is to get the sound card working in the duplex mode using the line input. Click the 'loudspeaker' icon in the toolbar. This will open the play control panel. Check, that your output is not muted, and set the volume to the desired level. Check also, that the inputs from Line-In and Microphone are muted. If they are activated, it will cause an unwanted echo effect, when running SkySweeper.

Next, click the 'microphone' icon. This will open the record control panel. If your radio unit is connected to the sound card's 'Line-In' input, then select 'Line-In' and set the Line-In volume to the maximum and mute (i.e. do not select) other inputs. If your input signal is connected to the sound card's 'microphone' input, then activate 'microphone' and mute the others (including 'Line-In').

Also open your sound card support software. If your sound card supports real time effects (for example echo), be sure that all effects are switched off. Make the same settings also for the sound card's mixer (if there is one).

4.5 Sound Card Problems

If there are decoding problems especially in HF FAX, or there are breaks in the signal, there's very probably sound card problem.

There are some sound cards where the input and output clocks are not synchronized. It means that these clocks are typically slightly different, which causes that sample rate is different in input and output devices. Different sample rate causes that the sample buffer of input or output devices runs out of samples.

To solve this problem:

Update the sound card driver
Try to find out if the input and output clock could be connected to the same clock source

If these actions will not solve the problem, then do the following actions:

In the decoding only configurations like HFFAX set the output as NULL (it can be set by clicking loudspeaker icon (out wav) in the configuration editor and selecting NULL as output).

Check that the configurations having transmitter like CW (RXTX) does not have "sum to RX" activated in the transmitter. When "sum to RX" is not activated input and output devices works independently which means that different sampling rates does not cause problems.

Try to calibrate the sound card again.

5 How Demo Mode Works

5.1 General

All the parts (including all the decoders) can be tested in the demo mode. In the demo mode the decoders will only support decoding the signal from a .WAV file. The file size is limited to 60 seconds in the demo mode. In the registered mode, all the decoders and analyzers will work in real time, supporting the sound card and unlimited file operation. To test the decoder in the demo mode, just record the signal using for example Windows sound recorder to .WAV file. The file format should be 11025 Hz, 8/16 bit, mono. Alternatively, use some of the pre-recorded .WAV signals found in SkySweeper's home directory. Then activate the required mode by clicking one of the mode buttons like RXTX->CW or opening some other pre-made configuration from the menu File->open. If you wish, you can design your own configuration by adding decoders, analyzers and other blocks (just select menu 'Config->Block->New'). To run the .WAV signal and test the decoder, just click the radio icon (In Wav) and open the .WAV file for the input. Finally press the green button.

5.2 The start procedure

More information about how to start can be found in **How to Start** chapter.

6 How to Register

6.1 Procedure

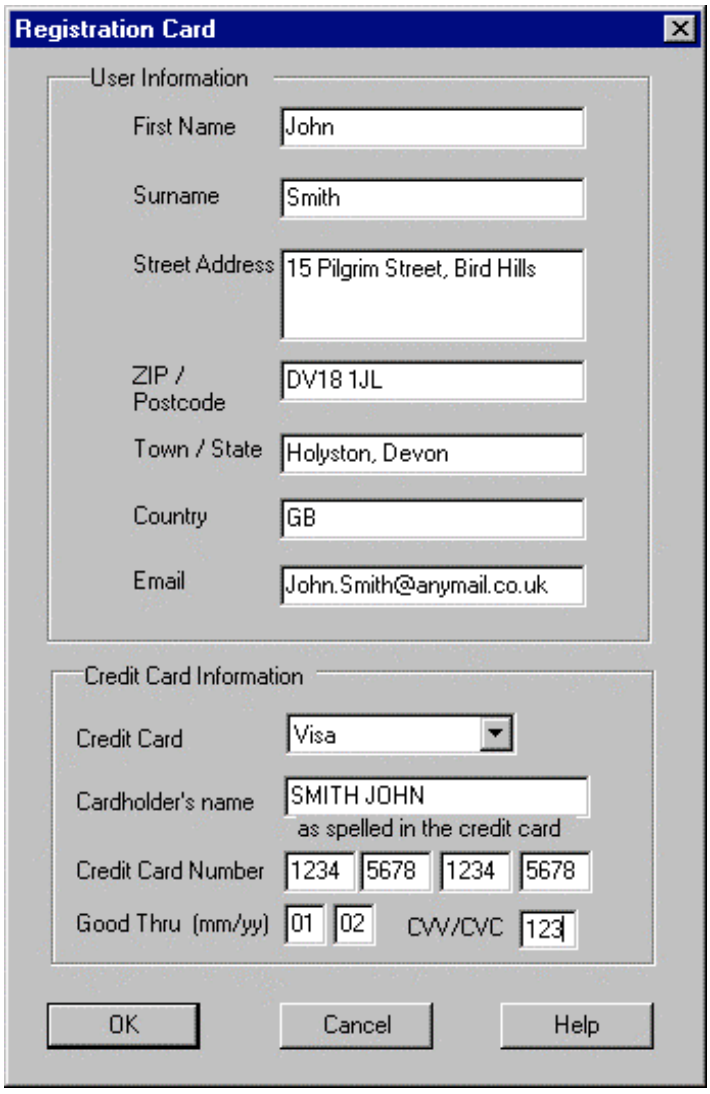
The registration of SkySweeper is very easy. Just follow the procedure below:

6.1.1 Step 1

The installation of SkySweeper is machine specific. Install it first on the machine where you are mainly going to use it. The machine specific codes are still easy and safe to use. We will provide new codes free of charge to our customers whenever needed (for installation to a laptop etc.).

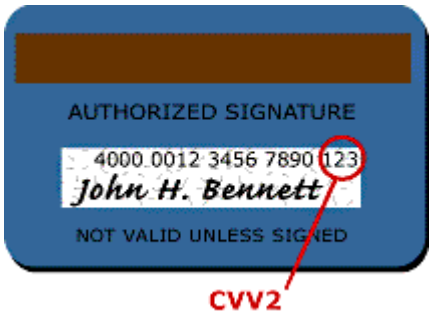
6.1.2 Step 2

To register, answer 'Yes' to the dialog shown below. You get the dialog either after start up or by selecting 'Register' from the menu.



6.1.3 Step 3

Please, fill the information fields of registration card carefully. Note! CVV/CVC number is mandatory. The number can be found in the signature strip of the card; it is the last three digits as shown in the following picture.



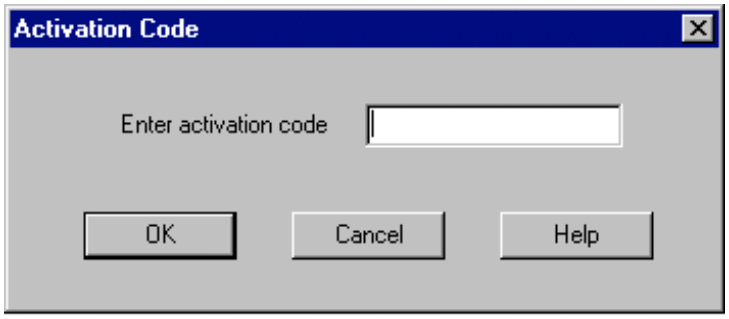
6.1.4 Step 4

After filling the card and pressing 'OK', the registration information is written into a file called '*regcard.txt'*. The regcard.txt file is in SkySweeper's installation directory. The '*regcard.txt*' file is opened automatically with Notepad after successful registration, as shown in the example below.

```
SkySweeper Registration Card

Name                    : John Smith
Street Address          : 15 Pilgrim Street, Bird Hills
ZIP / Postcode          : DV18 1JL
Town / State            : Holyston, Devon
Country                 : UK
Email                   : John.Smith@anymail.co.uk

(Copy the following five lines from your credit card)
Credit Card             : Visa
Cardholder's Name       : SMITH JOHN
Credit Card Number      : 1234 5678 1234 5678
Credit Card Good Thru   : 01 02
CVV/CVC                 : 123
(Note!  The CVV/CVC is mandatory. It is three digit extension to the card number.
You can find it in the signature strip of the card.)

Registration Code       : BM3EAYWBC5I8S4-F5

SkySweeper version      : 2.10
Date                    : 18-08-2001
```

Send the registration card file either via email or to the fax number given in the regcard.txt file.

Our response containing the activation code will be sent normally within 12 hours to your e-mail address. After receiving the activation code, just write it in the dialog box shown below. Note that the activation code is a case sensitive and requires UPPER CASE.



If there are any questions concerning registration, mail them to info2@skysweep.com or to your local distributor

After a successful activation, you can use all features of the SkySweeper program.

If you do not yet have the activation code, select Cancel. SkySweeper asks for the activation code when you start the program next time.

If you want to regenerate the registration card, use the Register Menu. Note that all old registration information is deleted. Do not regenerate whilst waiting for your Activation Code

6.2 Additional information after registration

Before the program is activated, you can use SkySweeper in the demo mode. In this mode you do not have access to all of the features. If a feature can be used only in the activated state, its configuration cannot be started. None of the decoders can be used in the demo mode with sound card as input.

You can check the registration status from the Help->About menu. If you have filled in the registration card, the registration code is also shown in the About box. If you have something to ask our help service (**info2@skysweep.com**), tell them the registration code of your SkySweeper program.

The update to a new version does not need re-registration.
Do not remove the SkySweeper program from the Control Panel.
You may delete all old downloaded SkySweeper .zip files from the installation directory by using Windows Explorer.
Install the new version into the same directory as the old version.
Unzip the files and then Run Setup from the Disk1 directory / folder. It will create the new version of SkySweeper

Removing SkySweeper using the Control Panel will remove the registration information (the state is changed to NOT REGISTERED) and a new registration is needed i.e. you have to generate a new registration form and wait for a new activation code from the SkySweeper help service.

7 Configuration Editor

The Configuration Editor is used to build a configuration for a desired purpose. The empty configuration contains only input and output blocks. The configuration Quick Load panel is on the top of the Configuration Editor window. Predefined configurations can be loaded by pressing any button. Buttons can be re-defined by pressing the right mouse key at the top of the required button.

If the system is not running, pressing the input or output block symbol opens an IO Settings dialog. If the system is running, a System Monitor will be opened. The Configuration Editor supports the “drag & drop” feature i.e. you can drag an input file by mouse and drop it to the Configuration Editor window.

A new block is inserted by using the Config->Block->New menu, which opens a block insertion dialog. The block is a real time block, and the system ensures that all samples are processed by blocks. If blocks cause too high a load on the processor, the system cannot process all samples in real time. In this case the user has to decrease the load caused by real time blocks. The load can be decreased by using some or all of the following methods:

-Decreasing the sample rate.
-Changing the block parameters for example by using a shorter FIR filter.
-Removing blocks.

Blocks are removed using the Config->Block->Delete menu which opens a block deletion dialog for deletion. A block cannot be deleted if analyzers are attached to the block output. Delete analyzers before block deletion.

Blocks cannot be inserted or deleted when the system is running.

The analyzer block is inserted using the Config->Analyzer->New menu, which opens an analyzer insertion dialog for insertion. Analyzers are not real time blocks. The number of input samples that get analyzed, depends on the processor load. The blocks have a higher priority than the analyzers.

The analyzers are removed using the Config->Analyzer->Delete menu which opens an analyzer deletion dialog for deletion. Analyzers can also be deleted by closing the analyzer window.

There are quick selection buttons for the block and the analyzer insertion and deletion. There are also buttons for starting and stopping processes.

8 Configuration Examples

The SkySweeper installation package contains many pre-made configurations. Configurations can be easily loaded from the Quick Load panel of the Configuration Editor. The following three configurations are just a few examples of the ready-made configurations.

8.1 CW RX/TX EXAMPLE

The example demonstrates simultaneous CW reception and transmission capabilities. The CW mode can be activated by selecting RXTX->CW. In the left corner of the picture there is a Configuration Editor showing the blocks currently activated in the CW mode. The user can freely add and remove blocks. Other displays like signal power and transmission spectrum or even other decoders (like PSK, RTTY or SSTV) can easily be added. In this picture there are two analyzer displays (Spectrogram/Waterfall and 3DFFT). The display parameters can easily be changed by clicking on them with the right mouse.

The Chat Box is SkySweeper's RX/TX communication application. It allows the user to configure the RX and TX separately (for example CW in RX and PSK in TX).

The Chat Box also supports the macros defined by the user.

8.2 ANALYSIS EXAMPLE

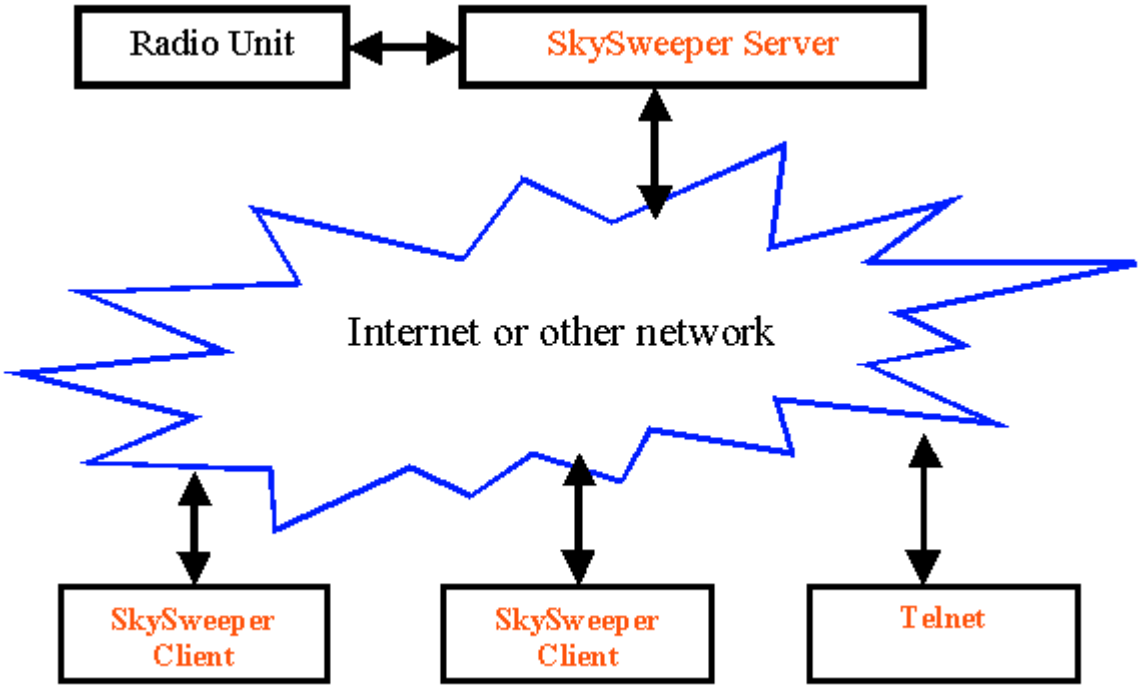
SkySweeper has wide range of signal analysis capabilities. This analysis configuration can be activated by selecting Analysis->Analysis. In the left corner of the picture there is a Configuration Editor showing the blocks currently active in the analysis. The user can freely add and remove blocks. In this picture there are eight different analyzer displays (Spectrogram/Waterfall, 3D-FFT, IQ constellation, autocorrelation, eye diagram, power spectrum, signal view and signal statistics). The display parameters can easily be changed by clicking on them with the right mouse.

8.3 SPEECH EXAMPLE

Here's an example of SkySweeper's wide range of DSP capabilities. This configuration has been optimized for speech quality improvement. This speech configuration can be activated by selecting DSP->Speech. In the left corner of the picture there is a Configuration Editor showing the blocks currently active in the speech configuration. The user can freely add and remove blocks. In this picture there are two different analyzer displays (Spectrogram/Waterfall and power spectrum). There are also two DSP blocks. The notch bank automatically removes up to eight peak frequencies from the speech and the noise reducer improves the signal to noise ratio of the speech. The display parameters can easily be changed by clicking on them with the right mouse.

8.4 INTERNET CONNECTIONS EXAMPLE

The figure below shows the basic idea of the remote use of SkySweeper.



SkySweeper supports two main types of remote use over the Internet:

TELNET CONNECTION over the Internet. In this case the decoded text from decoder (like CW, PSK, ACARS etc.) is sent from the PC running SkySweeper in server mode to another PC (=client) over the Internet. The client can be any software supporting TCP/IP protocol for example TELNET. The SkySweeper server using TELNET connection can be used for example for ACARS decoding applications. If there is a radio unit decoding ACARS or HFDL with SkySweeper and it is in the server mode, then other users can connect to the server and will get all the text on their displays decoded by the original SkySweeper server.

FULL REMOTE USE of SkySweeper over the Internet. In this case the signal is sent from the PC connected to a radio and running SkySweeper in server mode to another PC over the Internet. The client is SkySweeper. This allows all SkySweeper functions (decoders, analyzers etc.) to be used over the Internet and processing the signal received by the server. For example, if there is a radio unit somewhere receiving the aeronautical HF channel and SkySweeper is used in the server mode, then all others can get the same signal like the received one, individually, and decode the parts that they want (HFDL, SELCAL etc.).

8.5 GENERIC DECODER EXAMPLE

The generic decoders in SkySweeper Professional are universal tools to decode the bits of known and unknown transmissions. There are generic decoders for FSK, MFSK, MPSK (multi-tone-PSK), MSK, PAM (pulse-amplitude-modulation) and PSK. The decoder can be configured to decode the signal with given parameters like baud rate, tone number, frequency shift etc. The generic decoder produces the raw bit stream. The decoder output is then analyzed with SkySweeper's very sophisticated bit domain analysis tools. Bit domain tools will then display the decoded bit stream in the selected format. The supported number formats are binary, hexadecimal, octal and decimal. The supported character sets are (ASCII 7 bit, ASCII 7+1 bit, ASCII 8 bit, Baudot (ITA2), ITU 342-3 (ITA3), ITU 476-5 (SITOR), ARQ-E and BCD.
It is possible to use the bit analyzer tool in online or offline mode. In the online mode the bits are decoded and displayed in real time like in any other decoder. In the offline mode the decoded bits are first saved into a log file, which can be analyzed afterwards with the offline bit tool. The different modes and are shown in the pictures below.

DGPS EXAMPLE

The DGPS signal for example can easily be decoded by using the generic MSK decoder configured for 100 bauds. The bit tool is configured as message mode (sync word is '01100110'). If needed, the bit stream output can be then displayed in different formats like BCD.

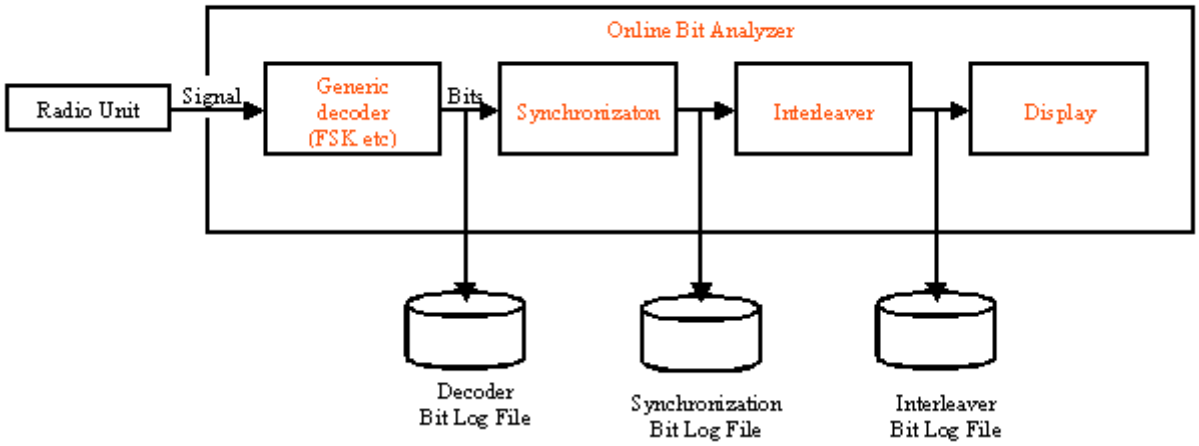
KG84 EXAMPLE

The KG84 signal can easily be decoded by using the generic FSK decoder configured for 75 bauds (with 850 Hz shift) The bit tool is configured as message mode (sync word is '11111011110011101011'). The sync word and also 32 next bits will be printed by the generic bit tool. The KG84 example configuration (KG84.cfg) can be found from the SkySweeper's home directory.

ONLINE MODE:

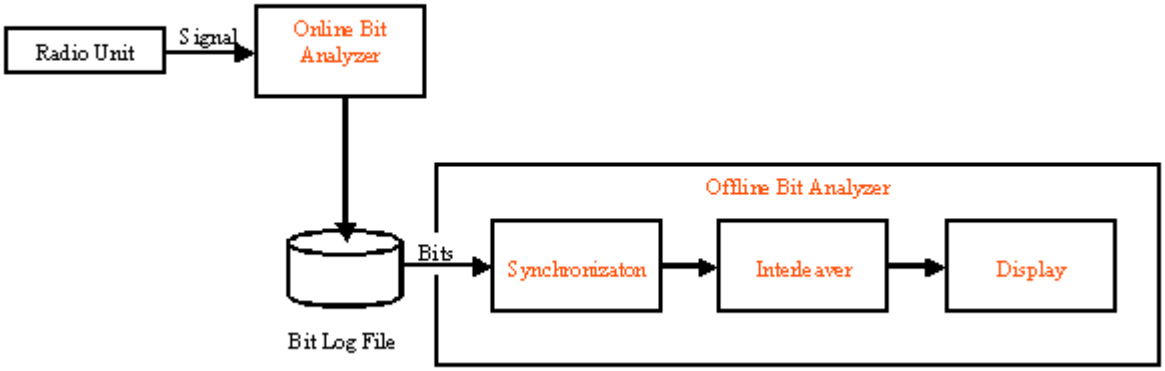
In online mode, the input signal is from the radio unit. The signal is decoded as bits, using any generic decoder. The synchronization block finds the bit synchronization from the bit stream. The interleaver is used to change the bit order. The display block prints to the screen in the chosen format.

The bit stream can be saved into a bit log file after the decoder, synchronization or the interleaver.



OFFLINE MODE:

The offline mode reads bits from a bit log file, which is recorded by the online bit analyzer. Because data is stored in a file, it can be scrolled back and forth without any limitations.



9 Menu commands

File	commands are used to load and save configurations
Processing	commands are used to start or stop signal processing
Config	commands which are used to create configurations
Register	menu is used to fill the register card
Window	commands are used to control multiple windows
Help	you can get help from SkySweeper program

10 File Menu Items

NEW	creates a new configuration
OPEN	loads configuration from a file
SAVE	saves configuration to file
SAVE AS	saves configuration to a file with new name
EXIT	ends SkySweeper program.

11 New Menu Command

The New Menu Command creates a new, empty configuration. If the current configuration is not saved, SkySweeper will ask you if you want to save the configuration. The New command cannot be used, when the system is processing samples.

There is also a quick selection button for the ‘New’ Menu command in the SkySweeper tool bar.

12 Open Menu Command

The Open Menu Command is used to load a configuration from disk. If the current configuration is not saved, SkySweeper will ask you if you want to save the configuration. The Open command cannot be used, when the system is processing samples.

There is also a quick selection button for the ‘Open’ Menu Command in the SkySweeper tool bar.

13 Save Menu Command

The Save Menu Command is used to save the current configuration to disk. If the configuration does not have name, it asks the user for a name.

There is also a quick selection button for the ‘Save’ Menu Command in the SkySweeper toolbar.

14 Save As Menu Command

This command displays the Save As File dialog box, where you can save the configuration under a different name, or in a different directory, or on a different drive.
You can enter the new configuration name, including the drive and directory.

There is also a quick selection button for the ‘Save As’ Menu Command in the SkySweeper toolbar.

15 Exit Menu Command

This command exits the SkySweeper program.

If you have modified a configuration without saving it, SkySweeper prompts you to do so before exiting.

16 Processing Menu Items

There are two menu items: Run and Stop. If processing is not already started it can be started with the Run menu command. Signal processing can be stopped with Stop menu command. There are also tool buttons in SkySweeper and the Configuration Editor toolbar to start and stop processing quickly.

17 Configure Menu Items

This system sub menu is used to set or monitor system wide parameters. The system sub menu contains the following items.

Parameters
Status
Audio Devices
Clock Calibration
Volume Control
Recording Control

The Quick Load menu is used to define Quick Configuration load buttons in the SkySweeper toolbar.

Quick Load

The Input / Output settings menu is used to define input and output devices.

IO Settings

The TX Settings menu is used to define common parameters for transmitter blocks.

TX Settings

The block sub menu is used to insert or delete configuration blocks. The sub menu contains the following items.

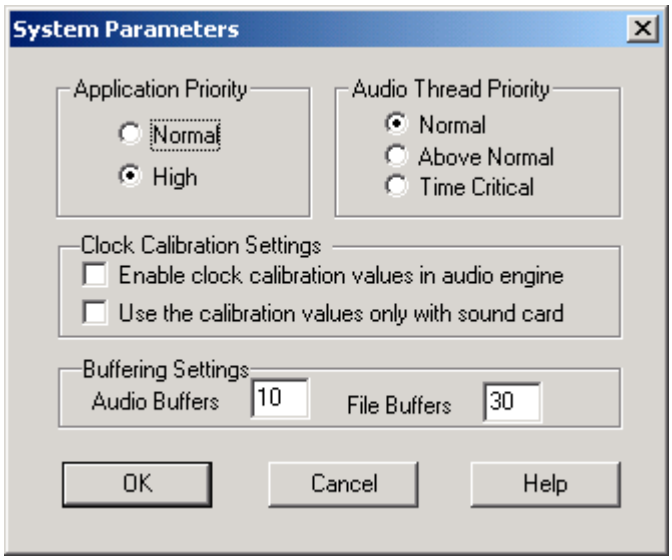
New
Delete

The analyzer sub menu is used to insert or delete analyzer configuration blocks. The sub menu contains the following items.

New
Delete

18 System Parameters Menu Command

The following System Parameter dialog is used to set the length of the input sample buffers..



18.1 Parameters

18.1.1 Priority Settings

18.1.1.1 Application Priority

This setting defines the windows thread priority for SkySweeper user interface and displays.

18.1.1.2 Audio Thread Priority

The setting defines the windows thread priority for audio processing operations. For example decoder signal processing tasks are executed in the audio thread. If the processing load is high it might be sensible to increase the audio thread priority.

18.1.2 Buffers

The buffer parameter tells how many 1024 byte buffers are used to buffer the data. Because Windows is not a real time operating system, it cannot guarantee exact response times. If too short a buffer is used, the output device can run out of samples, which decreases the voice quality. The bigger the buffer, the longer the delay. The audio and file buffers are saved with the configuration. There are two different kinds of buffer.

18.1.2.1 Audio buffers

The Audio buffers parameter is used when the input and output device is a sound card.

18.1.2.2 File buffers

The File buffers parameter is used when either the input or output device is a file. Typically, the Audio buffers parameter can be smaller.

18.1.3 Clock Calibration Settings

The following settings defines how clock calibration values are used. The clock calibration values are calibrated from Config -> System ->Clock Calibration menu.

18.1.3.1 Enable clock calibration values in audio engine

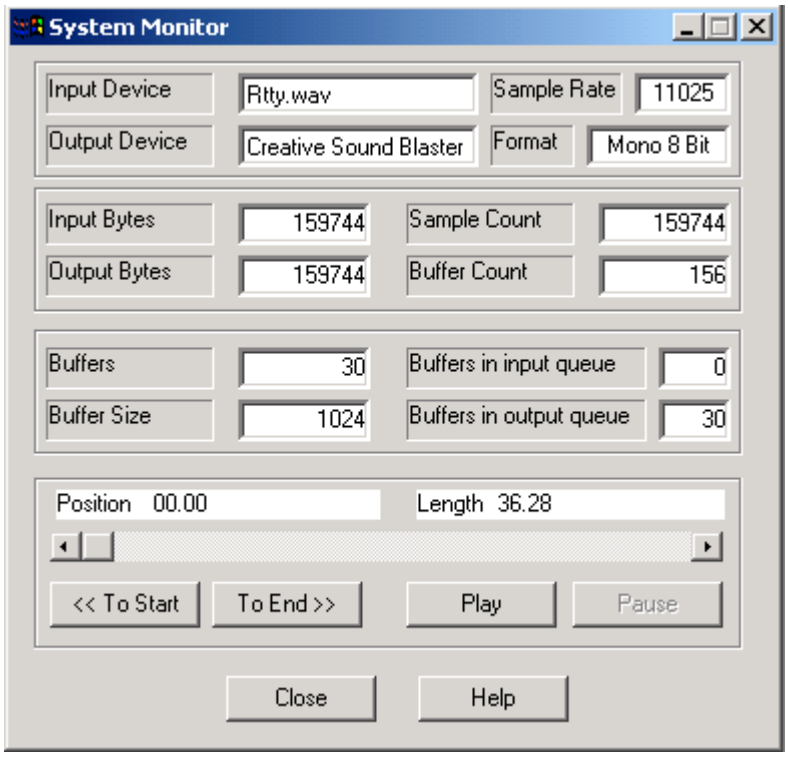
If selected, the clock calibration values are used.

18.1.3.2 Use the calibration values only with sound card

If selected, then clock correction is only affected when the input is from a sound card.

19 System Monitor Dialog

The System Monitor can be used to monitor the system whilst it is running. The following dialog is opened when the input or output box of the Configuration Editor is pressed during operation. The dialog can also be opened from Config->System->Monitor menu.



The dialog shows which input and output devices are selected and their sample rates and formats.

Input and output counters tell in bytes how many samples the system has read from the input device and written into the output device. The difference is the amount of bytes which are buffered by SkySweeper.

The Sample and Buffer Count tell how many samples and buffers SkySweeper has processed respectively.

The Buffers field tells the length of the internal buffer in buffer blocks. The buffer block length is shown in the buffer size field.

The Buffers in the input and output queue show the number of buffers allocated to those queues. If the input and output is a sound card, and the number of buffers in the output queue is small, there is a danger that the output device will run out of samples. In this case increase the number of buffers using system parameters dialog

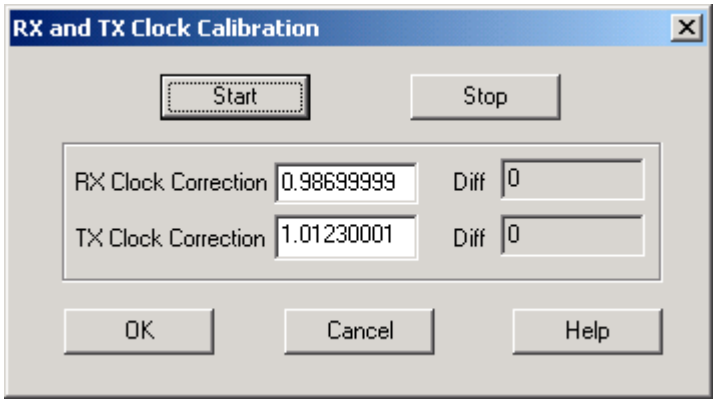
20 Audio Devices Menu Command

The Config->System->Audio devices menu let you select input and output audio device. The first one is always the default device of windows. After the default selection there is a list of installed sound cards in the system. Pressing the Show Details button opens a window, which lists the selected device capabilities such as the support for different formats.

Some sound cards do not support duplex operation, where the input and output are active at the same time. It is also possible that the sound card hardware supports duplex operation, but Windows drivers do not. Some old 16 bit Sound Blaster card drivers have that kind of problems. If this is the case, update new drivers from the manufacturer's web page.

21 Clock Calibration Menu Command

The Config->System->Clock Calibration menu opens the following sound card clock calibration dialog.



The calibration is started by clicking ‘Start’ button and stopped with ‘Stop’ button. The exact calibration values for RX and TX are shown in the separate window. The calibration routine should be run about 30 minutes. Finally click ‘Ok’ and the dialog will close and the values will be saved.

22 Volume Control Menu Command

The Config->System->Volume Control menu opens the volume control dialog which is used to adjust the sound card volume settings.

23 Recording Control Menu Command

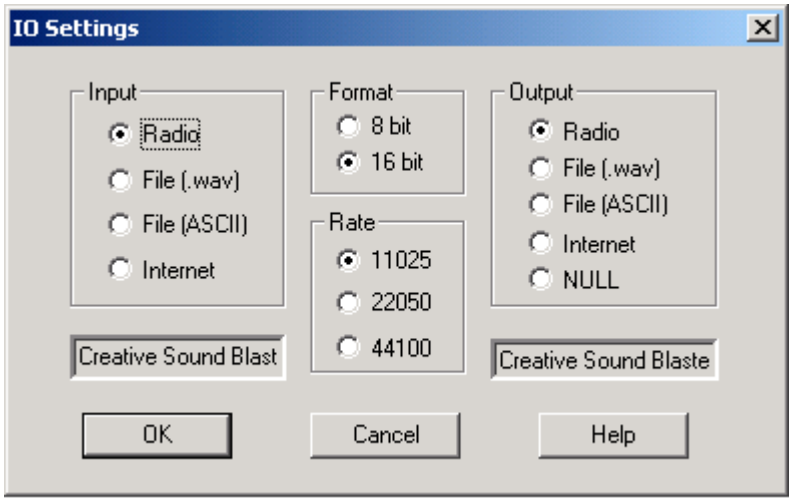
The Config->System->Recording Control menu opens the recording control dialog which is used to adjust the sound card recording settings.

24 Quick Load Menu Command

Config->Quick menu is used to open the ‘Quick Load’ button definitions dialog. The dialog is used to define the configuration ‘Quick Load’ buttons in the SkySweeper tool bar. There are eight ‘Quick Load’ buttons in the tool bar. The dialog is used to define which configuration file is loaded when the tool bar button is pressed. You may either type the name of the configuration into the Edit box or use the ‘Browse’ button to find the configuration file on the disk.

25 IO Settings Menu Command

The following IO Setting dialog is used to define the input and output devices. The IO Setting dialog is opened when either the input or output box is pressed in the configuration dialog. The dialog can also be opened from the Config->IO Settings menu.



25.1 Input parameters

25.1.1 Radio

If this is selected, the sound card (radio) is selected as an input signal source.

25.1.2 File (.wav)

When this is selected, a .WAV file is selected as an input signal source. The length of the file is limited to 60 seconds in the demo mode.

25.1.3 File (ASCII)

When this is selected, an ASCII file is selected as an input signal source. The length of the file is limited to 60 seconds in the demo mode.

25.1.4 Internet

When this is selected, the input data is read from the Internet. SkySweeper connects as a client to another SkySweeper, which works as server. SkySweeper asks for the IP address and port number, which are needed for connection. Note that you are also able to connect to SkySweeper on the same computer. In this case the IP address is 127.0.0.1. The user has to know the correct data format i.e. sample rate and bits per sample. If the server uses decimation in order to decrease sample rate, a correct interpolation factor has to be defined.

25.2 Format parameters

25.2.1 8 bit

If this is selected, the format used in the input & output files and Internet connections is 8 bit.

25.2.2 16 bit
If this is selected, the format used in the input & output files and Internet connections is 16 bit.

25.3 Rate parameters

25.3.1 11025
If this is selected, the format used in the input & output files and Internet connections is 8 bit.

25.3.2 22050
If this is selected, the format used in the input & output files and Internet connections is 16 bit.

25.4 Output parameters

25.4.1 Radio
If this is selected, the sound card (radio) is selected as an output .

25.4.2 File (.wav)
When this is selected, the .WAV file is selected as an output.

25.4.3 File (ASCII)
When this is selected, the ASCII file is selected as an output.

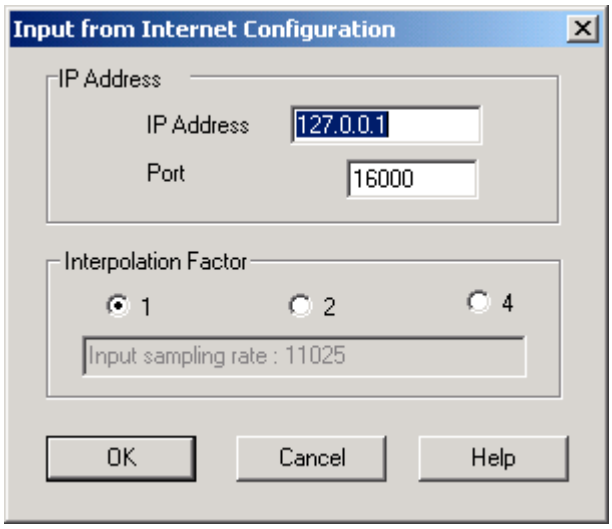
25.4.4 Internet
When this is selected, the Internet is selected as an output.

25.4.5 NULL
When this is selected, NULL is selected as output. The signal is then not connected anywhere.

25.5 Internet Configuration Parameters

25.5.1 Internet as input

This dialog configures the Internet as an input signal source.



25.6 Parameters

25.6.1 IP Address

This is the IP address of the server machine running SkySweeper. Note that if the server has a firewall application in use, the connections from your machine IP address must be allowed. If you want to connect another SkySweeper to the same machine, then the IP address is 127.0.0.1. The user must know the correct transmission parameters (sample rate, bits per sample and decimation factor) beforehand.

25.6.2 Port

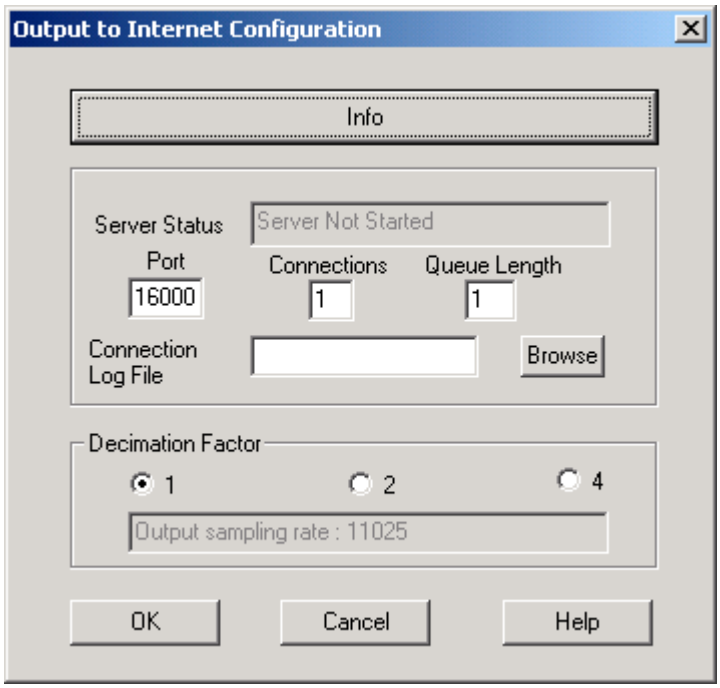
This is the port where the SkySweeper server application is connected on the server machine.

25.6.3 Interpolation Factor

If the signal is decimated (=bandwidth is lower) on the server machine, then it should be interpolated with the same factor on the client machine. The possible values are (1, 2 and 4).

25.6.4 Internet as output

This dialog configures the Internet as an output signal destination.



25.7 Parameters

25.7.1 Info

This will show the IP address and the name of the machine.

25.7.2 Server Status

This shows the status of the server

25.7.3 Port

This is the port where the SkySweeper server application is connected on the server machine.

25.7.4 Connections

This is the maximum number of simultaneous clients that may use the server.

25.7.5 Queue Length

This is the number of clients allowed to wait for server services.

25.7.6 Connection Log File

All of the connections (IP addresses etc.) to the server (also failed ones) are written to the log file.

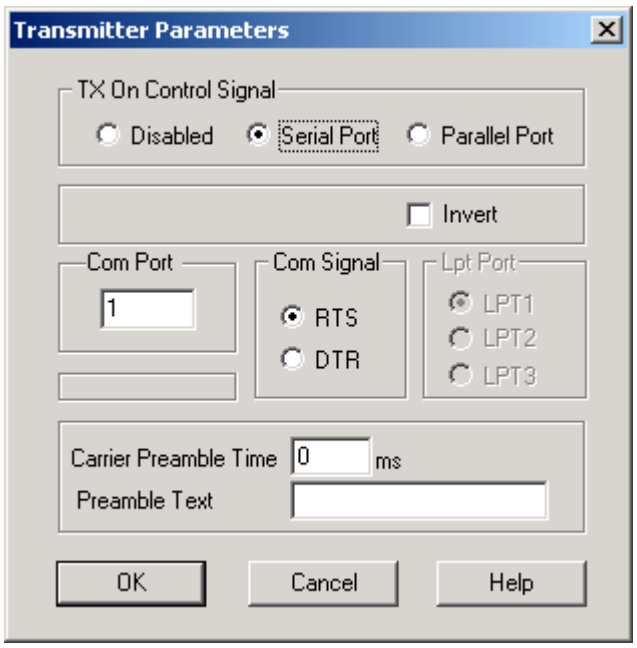
25.7.7 Decimation factor

This parameter limits the signal bandwidth with the given factor (1,2 or 4). It is used to minimize the amount of data transmitted over the Internet.

26 TX Settings Menu Command

26.1 General Description

The following TX Setting dialog is used to define the common transmitter control parameters. The dialog is opened from the Config->TX Settings menu. The most recommended way to control the transmitter is to use the VOX (Voice Operated Transmission (Xmission)). If the VOX based TX control is used no HW based control (or any extra cables) is needed. The SkySweeper offers advanced support for the VOX based operation by providing definable carrier preamble time and preamble text to ensure the VOX activation (takes 50-300s ms to activate).



26.2 Parameters

26.2.1 TX On Control Signal

If the check box is selected, the transmitter HW based control is enabled. The HW signal is generated either by the serial (COM1-COM4) or the parallel (LPT1-LPT3) port.

26.2.2 Com Port

The serial port (COMx), which is selected as a source of TX control signal.

26.2.3 Com Signal

The used signal for transmitter enabled in the COM port (RTS or DTR).

26.2.4 LPT port

The parallel port (LPTx) which is selected as a source of TX control signal. The TX control signals are in LPT pins D4…D0 and CW keying control is in pins D0…D3. Note! If LPT port is used, the **Inpout32.dll** driver is needed. It can be downloaded from:

http://www.logix4u.net/inpout32.htm . Just save the **hwinterface.sys** and **inpout32.dll** files to the SkySweeper's home directory.

26.2.5 Carrier Preamble Time

This defines (ms) how long time the carrier is sent (occurs every time the TX is started). If the time equals to zero, no carrier is sent.

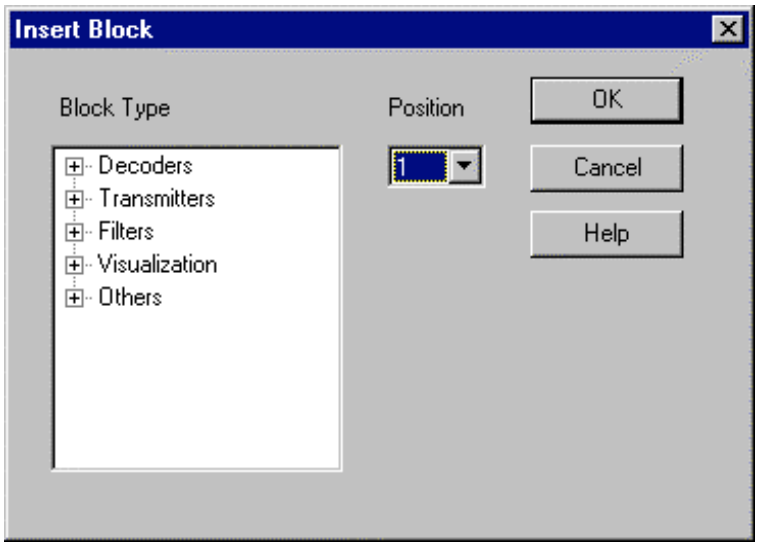
26.2.6 Preamble Text

This defines the text string, which is sent every time the TX is started. This is to ensure the information is sent without losing the first characters. Typically this text string is couple of spaces.

27 New Block Menu Command

Config Block->Block->New menu opens the Insert Block dialog. The Insert Block dialog can also be opened from the Configuration Editor toolbar. The dialog is used to insert a new real time block into the configuration. Select the block type from the left tree view control, and the position from right combo box. The position number indicates the position where the new block will be inserted. If there are blocks and analyzers after the new blocks, they are shifted forward.

Blocks cannot be inserted during processing.

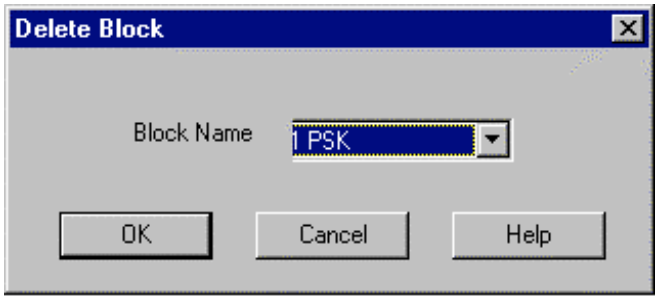


28 Delete Block Menu Command

The Config Block->Delete menu opens the Delete Block dialog. The Delete Block dialog can also be opened from the Configuration Editor toolbar. The dialog is used to delete a real time block from the configuration.

Select the block name from the combo box and press the ‘OK’ button to delete the block. The block cannot be deleted if analyzers are attached to a block output. Delete analyzers before deleting the block.

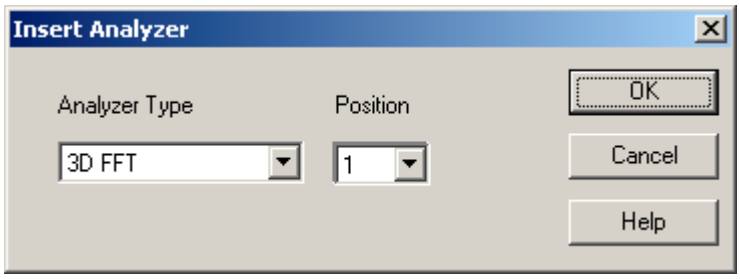
Blocks cannot be deleted during processing.



29 New Analyzer Menu Command

The Config->Analyzer->New menu opens the Insert Analyzer dialog. The Insert Analyzer dialog can also be opened from the Configuration Editor toolbar. The dialog is used to insert a new analyzer into the configuration. Select the analyzer type from the left combo box, and the position from right combo box. The position number tells the position where the new analyzer will be inserted. The position number one means that analyzer is situated after the input device and the highest position number means that the analyzer is situated immediately before the output device. The same position number can have many analyzers. The new analyzer is inserted at the end of the analyzer list in the Configuration Editor window.

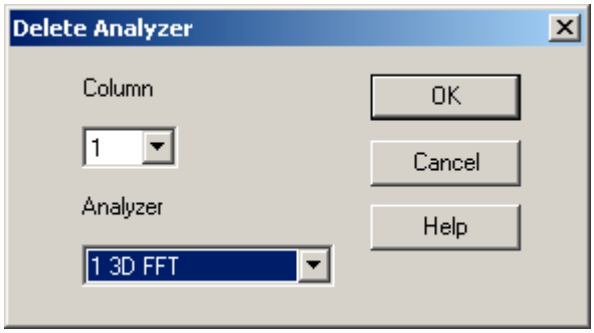
Analyzers can also be inserted during processing.



30 Delete Analyzer Menu Command

The Config->Analyzer->Delete menu opens the Delete Analyzer dialog. The Delete Analyzer dialog can also be opened from the Configuration Editor toolbar. The dialog is used to delete an analyzer from the configuration. First, select the column from where you want to delete an analyzer, then select the analyzer, which will now be deleted.

Analyzers can also be deleted by closing the analyzer window from the system menu. Deletion can be done during processing.



31 Register Menu Items

The Register Menu command is used to generate the registration card. The card may be generated in the unregistered or in the registered state. If software is activated, re-registration is not allowed because this would delete all of the old registration information. The whole registration procedure is described in the chapter How to Register

32 Windows Menu Items

The Window Menu items are used to select an active window and to specify how the windows are arranged on the screen.

Tile
Cascade
Arrange Icons

33 Tile Menu Command

This command arranges your open windows from top to bottom without overlapping one another.

34 Cascade Menu Command

This command stacks all open windows and overlaps them so that a part of each underlying window is visible.

35 Arrange Icons Menu Command

This command rearranges any icons on the desktop. The rearranged icons are evenly spaced, beginning at the lower left corner of the desktop.

This command is useful when you resize your desktop and it has minimized your windows. It is not available when no windows are minimized.

36 Help Menu Items

Index menu command opens the Index of the Help file.

Using Help menu command tells you how the online windows help system is used.

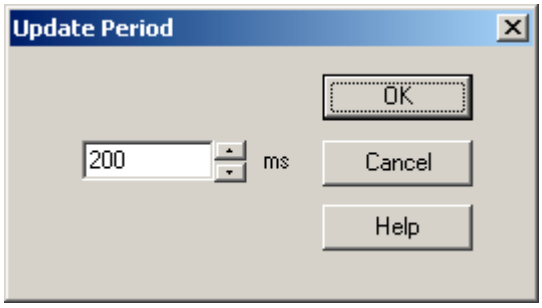
Demo menu command shows a SkySweeper Demo.

About menu command gives information about the SkySweeper software. The software version and registration status are shown here. The registration status can be one of the following: not registered, registered or activated. If the software is in the registered or activated state, the registration code is shown. Read more about these states from the Registration Procedure.

37 Update Interval Dialog

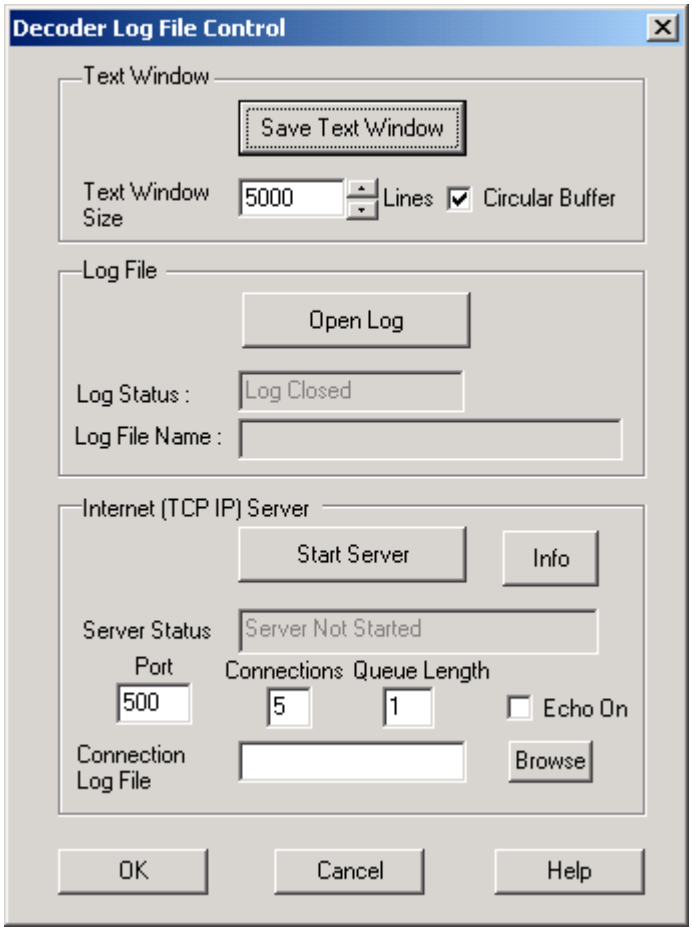
The update period of the analyzer windows can be specified using the update period dialog. The dialog is opened from a window pop-up menu, which is activated using the right mouse button. The cursor has to be on the analyzer icon area.

The Update Interval can be typed into the edit box or by pressing the up and down arrows. The interval is measured in milliseconds. If the interval is specified as 0, the window is updated as fast as the system can. The real time blocks have a higher priority than the analyzer windows, and if there is a lack of processing power, the analyzer windows cannot be updated as fast as required.



38 Decoder Log File Control Dialog

When the ‘Save’ button is pressed in the text decoder, SkySweeper opens the following Configuration dialog box. The dialog is used to control where the decoded text is stored.



38.1 Text Window

The ‘Save Text Window’ button saves the decoder text window into a file. The text window size can be set as a number of lines. If the ‘Circular Buffer’ is checked, the oldest text is deleted at the beginning of the text window. If the check box is not checked, printing to the text window is stopped when the text window is full. The ‘Circular Buffer’ check button does not have any effect on the log file.

38.2 Log File

When the log file is open all detected text is also written into the log file. Push the ‘Open Log’ button to open the log. Enter the log file name into the open dialog box. When the log is open, the ‘log status’ is Log Open and ‘Log File Name’ field tells you the log file name. To close the log file push the ‘Close Log’ button. Note that the ‘Open Log’ button name is changed to ‘Close Log’ button when the log file is open.

38.3 Internet Server

The decoder can send data to the Internet using a standard TCP/IP socket. The following parameters have to be configured before starting.

38.3.1 Port

The socket is identified with TCP/IP address and a host port number. The port number must be free i.e. any other service or SkySweeper block must not use the same port number.

38.3.2 Connections

The Connections edit box defines how many concurrent connections the server allows at the same time. The same data is sent to all clients.

38.3.3 Queue Length

If the maximum number of connections is in use, incoming connection requests go into a queue. When a connection is released, the first connection request is taken from the queue. The queue length can be adjusted.

38.3.4 Echo On

If the check box is selected SkySweeper echoes received data back to the sender.

38.3.5 Connection Log File

The server is able to store information about connections to the log file. You can use the ‘Browse’ button to select the log file name.

When all parameters are set, push the ‘Start Server’ button and close the dialog with the ‘OK’ button. The server status text box shows the current server status. More information is available by pressing the ‘Info’ button.

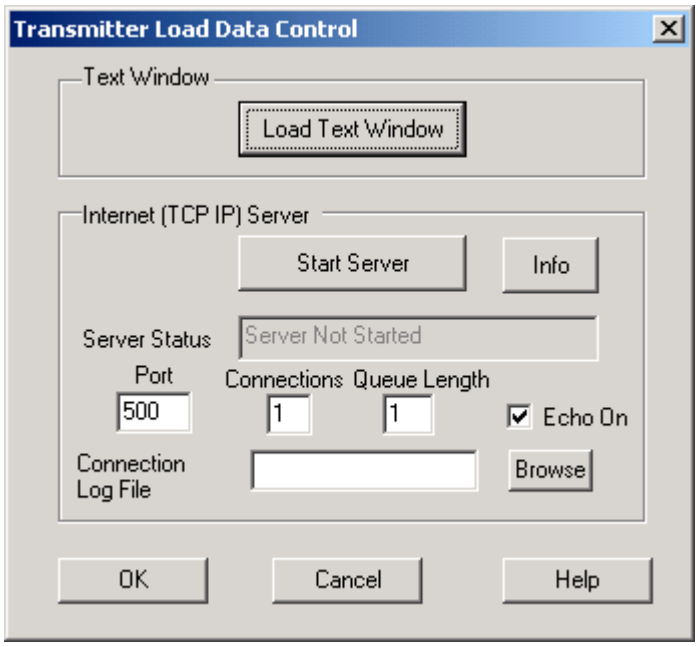
The server can be tested, for example, with a standard telnet terminal program. Start telnet with the following command.

```
telnet 127.0.0.1 port
```

where the IP address 127.0.0.1 means your own computer and the port number is the same as that which was configured into the server.

39 Transmitter Load Data Control Dialog

When the ‘Load’ button is pressed in the text transmitter, SkySweeper opens the following Configuration dialog box. The dialog is used to control where the transmitted text is loaded from.



39.1 Text Window

The ‘Load Text Window’ button loads the transmitter text from a file into the text window.

39.2 Internet Server

The decoder can send data to the Internet using standard TCP/IP socket. The following parameters have to be configured before starting.

39.2.1 Port

The socket is identified with TCP/IP address and a host port number. The port number must be free i.e. any other service or SkySweeper block must not use the same port number.

39.2.2 Connections

The Connections edit box defines how many concurrent connections the server allows at the same time. The same data is sent to all clients.

39.2.3 Queue Length

If the maximum number of connections is in use, incoming connection requests go into the queue. When a connection is released the first connection request is taken from the queue. The queue length can be adjusted.

39.2.4 Echo On

If the check box is selected, SkySweeper echoes received data back to the sender.

39.2.5 Connection Log File

The server is able to store information about connections to the log file. You can use the ‘Browse’ button to select the log file name.

When all parameters are set push ‘Start Server’ button and close the dialog with ‘OK’ button. The server status text box shows the current server status. More information is available by pressing the ‘Info’ button.

The server can be tested for example with a standard telnet terminal program. Start telnet with the following command.

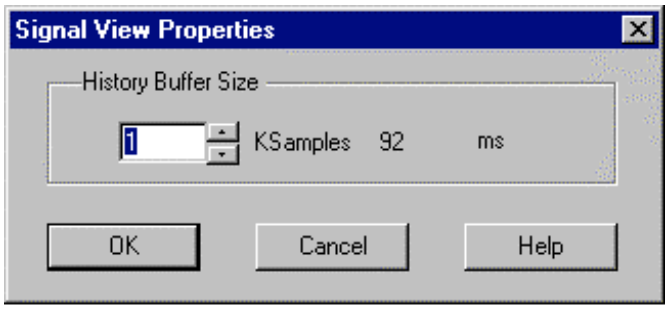
```
telnet 127.0.0.1 port
```

where the IP address 127.0.0.1 means your own computer and the port number is the same as that which was configured for the server.

40 Signal View Properties Dialog

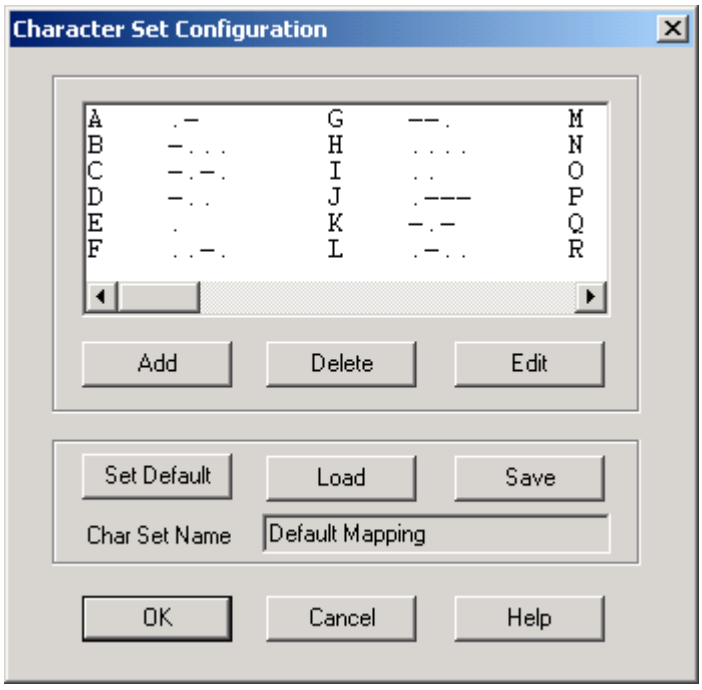
The history buffer size of the signal view window can be set by using the Signal View Properties dialog. The dialog is opened from the window pop-up menu, which is activated from the right mouse button. The cursor has to be at the top of the analyzer drawing area.

The size of history can be typed into the edit box or changed by pressing the up and down arrows. The size is specified as Kilo (1024) samples. The buffer length in milliseconds depends on the sampling rate. When the Signal View is stopped, the horizontal scroll bar can be used to scroll the old sample values.



41 Character Set Configuration Dialog

Both the CW and RTTY character sets are fully configurable. By pressing the ‘Character Set Definition’ button in the CW/RTTY RX or TX the configuration dialog will open the following Character Set Configuration dialog. The example dialog is for the CW decoder and transmitter. The Character Set Configuration dialog for RTTY is similar, but the code values are different ('-' (Dash) and '.' (Dot) in CW and '1' and '0' in RTTY where ‘1’ is the MARK state and ‘0’ is the SPACE state.



New characters can be added for CW by pressing the ‘Add’ button. In RTTY, the button is disabled, because the total amount of characters (=64) is fixed.

The ‘Edit’ button is used to change selected characters. It is not possible to edit the RTTY Control Characters like the Figure Shift and Letter Shift symbols.

The ‘Set Default’ button will load the default character set.

The ‘Load’ button loads the required character set into the editor.

The ‘Save’ button is used to save the current character set into a file. If the character set is saved to or loaded from a file, the character set is loaded automatically when the configuration is loaded.

42 TX Macro Panel

All text transmitter blocks and the Chat Application contain the Macro Panel. The Macro Panel is used to store predefined blocks of text, which can easily be copied into the transmission buffer. In transmitter blocks, the TX Macro Panel can be activated/deactivated by clicking ‘Macro’.

42.1 TX ON/OFF

This activates/deactivates the transmitter. Before transmission starts SkySweeper has to be in run mode (green button pressed).

42.2 Macros

The button will opens a dialog box, where user can define values for pre-define macro texts. It allows user to define also own macro keyword and corresponding texts for them.

42.3 Clear

This button clears the TX buffer. The transmitting has to be stopped first.

42.4 Load

Pressing the TX macro panel Load button, all macro definitions are loaded from file, which has been saved before with the Save button.

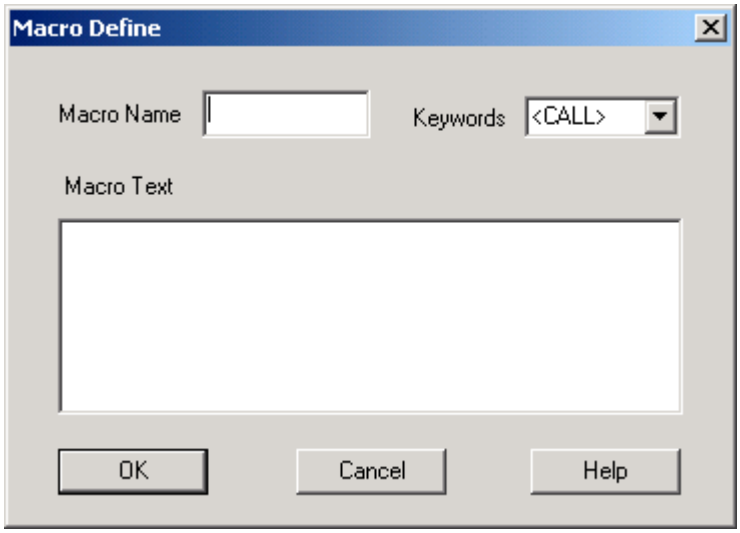
42.5 Save

Pressing the TX macro panel Save button, all macro definitions can be saved into file. Saved macro definitions can be loaded from any TX or chat transmitter macro panel. This makes possible to transfer macro definitions from one mode to another mode.

42.6 Macro Button Definitions

The macro and macro group can be named by clicking the right mouse button over the macro button (‘—‘) or macro group button(‘1’-‘5’). Clicking right mouse over the macro button will open a dialog shown below. It allows user to define macro’s name as well as a content of the macro. The macro can contain text and other macros mixed freely.

There is a quick selection for keywords in the right corner of the Macro Define box, so you don't have to write the keywords in the macro. Just select them when needed and they are inserted into your macro.



There are the following pre-defined macro keywords:

-*CallSign*	*c*all sign
-MyCallSign	my call sign
-*Name*	Name
-*RST*	Readability Strength Tone
-QTH	my location
-*RX*	When this is found, transmitting will be stopped
-*Date*	Current date
-*Time*	Current time
-UTC *Date*	Current UTC date
-UTC *Time*	Current UTC time
-File	Input text file
-Audio	Input audio file (.WAV file will be played when transmitter reaches this macro)

The user defined macro keywords are also visible in the quick selection drop down menu.

43 Decoder Spectrum Display

43.1 General Description

All of the SkySweeper decoders have an integrated spectrum display to help the decoder tuning. There are two different types of spectrum displays provided: FFT and waterfall spectrogram. The decoder frequency/frequencies are shown with a bar in the display. The decoder frequency can be changed by a mouse click if the frequency is not fixed (ACARS and some others are fixed). The decoder frequency can also be set from the keyboard by double clicking the left mouse button over the frequency value (located just below the bar). It then opens a dialog into which the frequency value can be typed.

The parameters and the type (FFT/waterfall) of spectrum display can be changed by a right mouse button click over the spectrum display. There is more information about the parameters below.

43.2 Parameters

43.2.1 Stop / Start

This switch allows the stopping and starting of the spectrum display update

43.2.2 Spectrogram / FFT

The used spectrum display type (spectrogram (waterfall) or FFT)

43.2.3 Autoscale

If this switch is selected the spectrum display is automatically scaled. If selected scaling sliders do not have any effect.

43.2.4 Zoom Out

If this switch is selected the spectrum view is zoomed out (returned to the original zoom)

43.2.5 Grid

If this switch is selected the grid is shown in the spectrum display. This switch is not active in waterfall mode.

43.2.6 LogX

If this switch is selected the X scale is shown as log (logarithmic) based. This switch is not active in waterfall mode.

43.2.7 Average

If this switch is selected the spectrum calculation will be averaged over the Update Interval. This switch is not active in waterfall mode.

43.2.8 Maximum

If this switch is selected the spectrum is shown as ‘max and hold’. This switch is not active in waterfall mode.

43.2.9 Update Interval
The interval of spectrum display updates in milliseconds. This parameter is not active in waterfall mode.

43.2.10 Copy To Clipboard
Copies the spectrum picture to the Windows Clipboard.

43.2.11 Help
Activates the HELP file.

43.2.12 Save
Saves the spectrogram picture to a file. This parameter is not active in FFT mode.

43.2.13 Properties
Allows a more detailed configuration of the waterfall/spectrogram display. This parameter is not active in FFT mode.

Spectrum resolution
: The points used in spectrum calculation (32-4096)

Number of lines
: The number of lines showed in the spectrum display

Input squared
: The input signal is squared before spectrum calculation

Orientation
: The drawing direction (vertical/horizontal) of the display

Palette
: Used palette (B&W/color) of the display

Draw
: The draw method used for scrolling or overdrawing

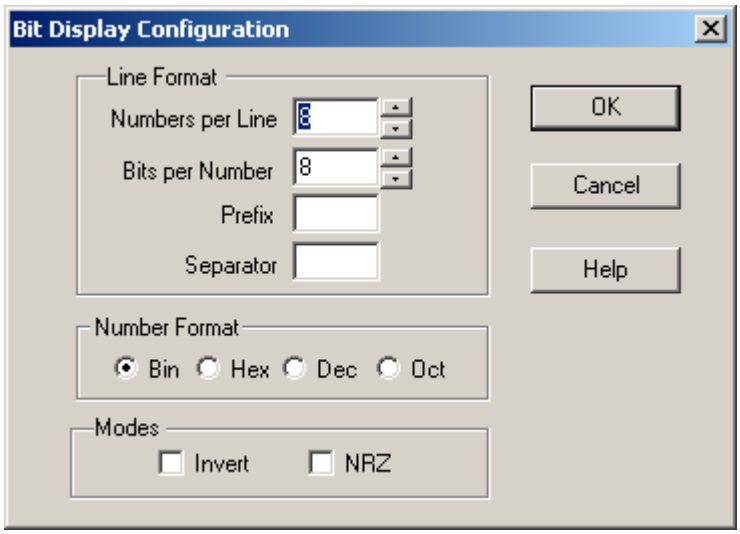
44 Generic Decoder Bit Display Configuration

44.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

44.2 General Description

The Generic Decoder print format can be changed by pressing the right mouse button over the text area window and selecting 'Properties' from the pop-up menu. The 'Properties' command opens the following dialog.



44.3 Parameters

44.3.1 Numbers per Line

How many numbers are printed in one line.

44.3.2 Bits per Number

How many bits there are in one number.

44.3.3 Prefix

The Character String which is printed before the number(s).

44.3.4 Separator

The Character String which is printed between numbers.

44.3.5 Number Format

The Number Format can be Binary (Bin), Hexadecimal (Hex), Decimal (Dec) or Octal (Oct).

44.3.6 Modes

Invert mode inverts bits received from the decoder.
NRZ mode turns on Non Return to Zero coding. The bit is 0 if the state of two consecutive bits does not change but becomes 1 if it does change.

45 Blocks

The block is a real time signal-processing block. Blocks can be combined freely. The output of a block can be the input to the next block. Some blocks pass input data to the output port without changes. For example the 3D FFT block plots a real time 3 dimensional power spectrum on the screen but does not change the input data. Some of the blocks can be either a real time block or a non real-time analyzer.

The system ensures that blocks process all samples. If blocks cause too high a load to the processor, the system cannot process all samples in real time. In this case the user has to decrease the load caused by real time blocks. The load can be decreased using the following methods:

- Decreasing the sample rate.
- Changing the block parameters for example using a shorter FIR filter.
- Changing a real time block to a non real-time analyzer if possible.
- Increasing buffering
- Removing blocks.

Blocks are inserted and deleted in the Config->Blocks menu or in the Configuration Editor toolbar.

The following block types are available.

3D FFT
ACARS
AX25
Bit Analyser
Bit Table
CHAT
COQUELET
CTCSS
CW RX
CW TX
DGPS
DLL
DTMF
EQU
EXPANDER
Eye Diagram
FIR
FSK Bit Analyzer
FSK Speed Analyzer
GFSK
GMDSS
GMFSK
GMPSK
GMSK
GQPSK

46 Online BIT Analyzer

46.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

46.2 General Description

The Online Generic Bit Analyzer provides the main interface for the generic decoders as well as tools for the decoded bit stream analyzing and character printing. The bit analyzer consists of several different applications connected together: Generic decoder, bit synchronization, interleaver, bit analyzer and output control (display/file).
The generic decoder frequency/frequencies can be set on the FFT window. 'Lock' will lock the decoder frequency. 'Reset' resets the decoder. 'FFT' switches the FFT display off. 'Save' saves the decoded bits and text into a file.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

46.3 Bit Analyzer Displays

The Bit Analyzer Displays will use the decoded bit stream ('1's and '0's) as an input. The bit value '0' is changed to '-1' in display calculations

46.3.1 Autocorrelation

In autocorrelation, position 0 (power) is always the same as the length of the autocorrelation calculation. The X scale is milliseconds.
Clicking the right mouse button on the autocorrelation display will open the pop-up menu. More information about autocorrelation configuration can be found from the Autocorrelation Analyzer help page.

46.3.2 Bit

This displays the decoded bits in time domain. The time scale and the amplitude scale can be changed with sliders. By clicking the right mouse button over the bit display, this will open the following pop-up menu.

Stop	stops the display
Autoscale	scales the display automatically
Grid	switches the display grid on
Update interval	defines the time period of window updates
Properties	the length of bit buffer
Copy to Clipboard	copies the display to the Windows Clipboard
Help	activates the help

46.3.3 FFT

This shows the spectrum analysis of the decoded bit stream. The time scale (X) depends on the baud rate. If the baud rate is 100 baud, then the FFT scale is from 0 to 50Hz. Clicking the

right mouse button on the FFT display will open the configuration dialog. More information about FFT can be found from the Power Spectrum help page.

46.3.4 Histogram

This displays the bit histogram for decoded bits. Clicking the right mouse button on the histogram display will open the pop-up menu. More information about bit histogram can be found from the Histogram help page.

46.3.5 Spectrogram

This displays the spectrogram for the bit stream. The time and frequency axis are in the same units as in the FFT display. Clicking the right mouse button on the spectrogram display will open the pop-up menu. More information about the spectrogram can be found from the Spectrogram help page.

46.3.6 Statistics

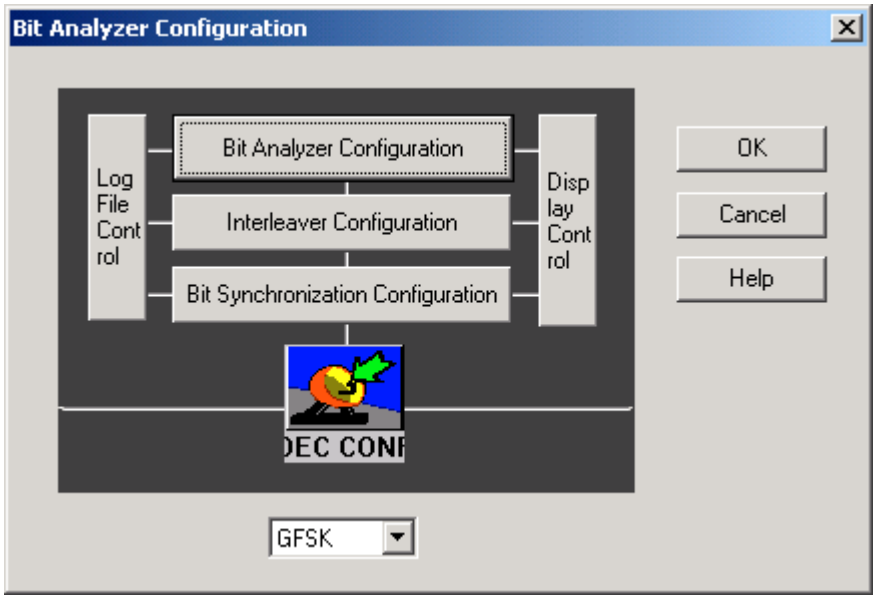
This displays statistic values of the bit stream like average, minimum and maximum. By clicking the right mouse button on the statistics display, this will open the pop-up menu. More information about statistics can be found from the Statistics help page.

46.3.7 Bit Table

This displays the bits drawn in the desired draw format (line length, number of lines etc.). Clicking the right mouse button on the bit table display will open the pop-up menu. More information about the bit table can be found from the Bit Table help page.

46.4 Configuration

The Bit Analyzer consists of several different applications connected together: a Generic decoder, bit synchronization, interleaver, a bit analyzer and output control (display/file). The bit stream goes from the decoder (bottom) to bit display (top). All parts can be configured by pressing the ‘Config’ button. It will open the following configuration dialog.



46.4.1 Bit Display Configuration

This is a tool for displaying the decoded bits in the desired format (binary, hexadecimal, decimal, octal). The characters can also be printed in several different formats (ASCII 7 bit, ASCII 7bits and one parity bit, ASCII 8 bit, Baudot (ITA2), ITU 342-3 (ITA3), ITU 476-5 (SITOR), ARQ-E and BCD). Clicking the bit display configuration icon will open the Bit Display Configuration Dialog

46.4.2 Bit Interleaver Configuration

This is a tool that allows you to change the number and order of the bits. For example any Interleaver can be easily implemented with it. Clicking the Interleaver Configuration icon will open the Interleaver Control Dialog

46.4.3 Bit Synchronization Configuration

This is a tool providing the several different bit domain synchronization schemes to the bit stream. Clicking the Bit Synchronization Configuration icon will open the Bit Synchronization Control Dialog

46.4.4 Display Control

This allows you to change the bit input source of the graphical bit displays. Clicking the Display Control icon opens the Bit Display Control Dialog

46.4.5 Log File Control

This provides the possibility of saving the bit streams to the log files. Clicking the Log File Control icon opens the Log File Control Dialog

46.4.6 Decoder Configuration

This provides the interface to configure the decoder (change bit rate etc.). Clicking the DEC CONF icon opens the decoder configuration dialog which is currently selected.

46.4.7 Decoder Selection

Selects the decoder which can be any of the following bit decoders

GFSK
GMFSK
GMPSK
GMSK
GPAM
GPSK
GQPSK
STANAG4285
STANAG4539

47 BIT Analyzer Display Configuration

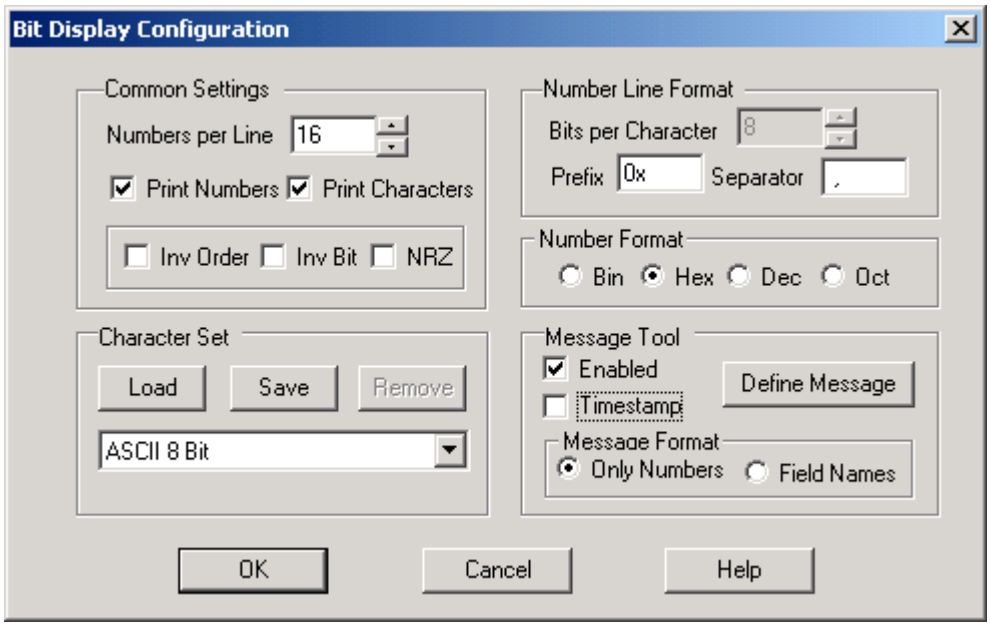
47.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

47.2 General Description

This controls the output of the Bit Analyzer's bit/character display. The bits can be printed in the desired format (binary, hexadecimal, decimal, octal). The characters can also be printed in several different formats (ASCII 7 bit, ASCII 7 bits and one parity bit, ASCII 8 bit, BAUDOT (ITA2), ITU 342-3 (ITA3), ITU 476-5 (SITOR), ARQ-E and BCD).

47.3 Configuration



47.3.1 Parameters

47.3.1.1 Numbers per line

This is the number of numbers in one line.

47.3.1.2 Print numbers

When this switch is active the numbers (in binary, hexadecimal, decimal or octal) will be printed on the display.

47.3.1.3 Print characters
When this switch is active the characters, using the selected character set, will be printed on the display.

47.3.1.4 Inv Order
When this switch is active the bit order of the input word is inverted.

47.3.1.5 Inv Bit
When this switch is active the input bits will be inverted (0->1, 1->0).

47.3.1.6 NRZ
If the bit value changes state from the previous bit, the NRZ value is 1 otherwise it is zero.

47.3.1.7 Bits per character
This is the number of bits used in the character. For example in BAUDOT this value is 5.

47.3.1.8 Prefix
The characters printed before the number.

47.3.1.9 Separator
The characters printed between the numbers.

47.3.1.10 Number format
The used number format (binary, decimal, hexadecimal etc).

47.3.1.11 Only Numbers
If this is selected, the message field names are not printed into screen.

47.3.1.12 Field Names
If this is selected, the message field names are also printed into screen.

47.3.1.13 Character set
The character set used (ASCII 7 bit, ASCII 7+'1' bit, ASCII 8 bit, BAUDOT (ITA2), ITU 342-3 (ITA3), ITU 476-5 (SITOR), ARQ-E and BCD).

There is also the capability to generate your own character sets as well as editing the existing ones. Save the character set to a file. This file can be opened with any text editor (for example with Notepad). The file format contains several fields:

47.3.1.13.1 Name
The name of the character set.

47.3.1.13.2 Bits per char
The number of bits per character.

47.3.1.13.3 Bit mask
The number of real bits in a character. For example in 7 bit ASCII where the parity bit is the MSB, the mask is 0x7f.

47.3.1.13.4 To Letter chars
There are two different character sets in some codes like BAUDOT where there is a Letter/Figure control character). These characters will switch the used set to the primary set (Letters).

47.3.1.13.5 To Figure chars

These characters will switch the used set to the secondary set (Figures).

47.3.1.13.6 Characters

The characters will be shown in format ‘T 5 ; 1’, where ‘T’ is the character in the primary set and ‘5’ in the secondary set. ‘1’ is the value (00001) in comments. The characters must be in the order from the first character as binary (0x00) to the last character in the character set. The character set has 2^n (where n = Bits per char) characters and every code must be defined i.e. in 5 bit Baudot $2^5 = 32$

The Character Set is loaded from a file by pressing The ‘Load’ button. The default file extension for character set files are .chr. After loading the character set, it is visible in the drop-down menu.
The Character Set can be removed by pressing the ‘Remove’ button. The build-in character sets are NOT removable.

47.3.1.14 Message Tool

With the message tool it is possible to define messages which have different amount of fields. The width of the different fields can be defined. If message tool is enabled, pressing ‘Define Message’ button opens the Message Definition Dialog
Messages can be printed in two different formats. ‘Only Numbers’ format does not print message field names. ‘Field Names’ format prints fields into separate lines and also the message field names. If timestamp check box is selected the timestamp is printed before every message.

48 BIT Analyzer Interleaver Configuration

48.1 Availability

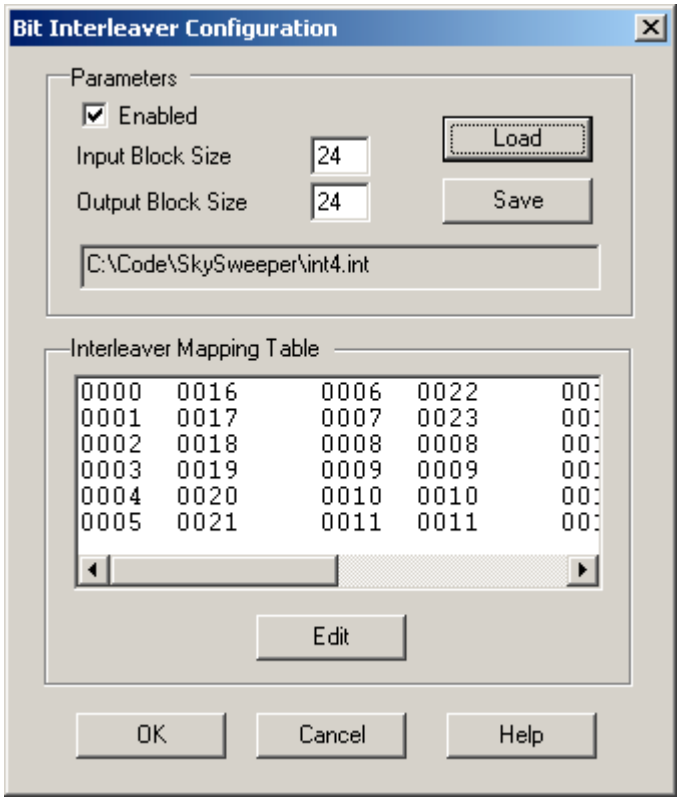
SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

48.2 General Description

The Interleaver is a tool for changing the bit orders and numbers (to produce a different number of bits, and bit order, in an output stream, relative to the original input stream). It operates as a block based function, which means that the input and output block sizes should be defined.

48.3 Configuration

The interleaver configuration dialog has the following parameters.



48.3.1 Parameters

48.3.1.1 Enabled

Enables the Interleaver.

48.3.1.2 Input block size
This is the size of the input block in bits.

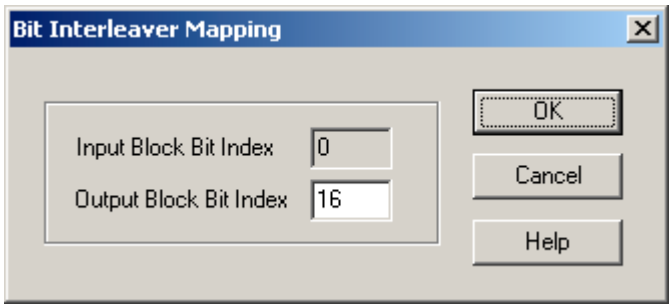
48.3.1.3 Output block size
This is the size of the output block in bits.

48.3.1.4 Load
Loads the Interleaver parameters from a file.

48.3.1.5 Save
Saves the Interleaver parameters to a file.

48.3.1.6 Interleaver mapping table
The active Interleaver mapping table is shown in the configuration dialog. In the left column there is the output bit index (meaning the bit order number in the output block) and in the right column there is the input bit index (meaning the bit order number in the input block). The bit number index starts from 0 (zero).

The table can be edited by double clicking the left mouse button over some bit index pair or pressing the 'Edit' button when the line is selected. It will open the dialog shown below where the input bit index for the selected output bit can be set. In this example the bit number 0 from the input bit stream is connected as bit number 16 in the output bit stream.



49 BIT Analyzer Synchronization Configuration

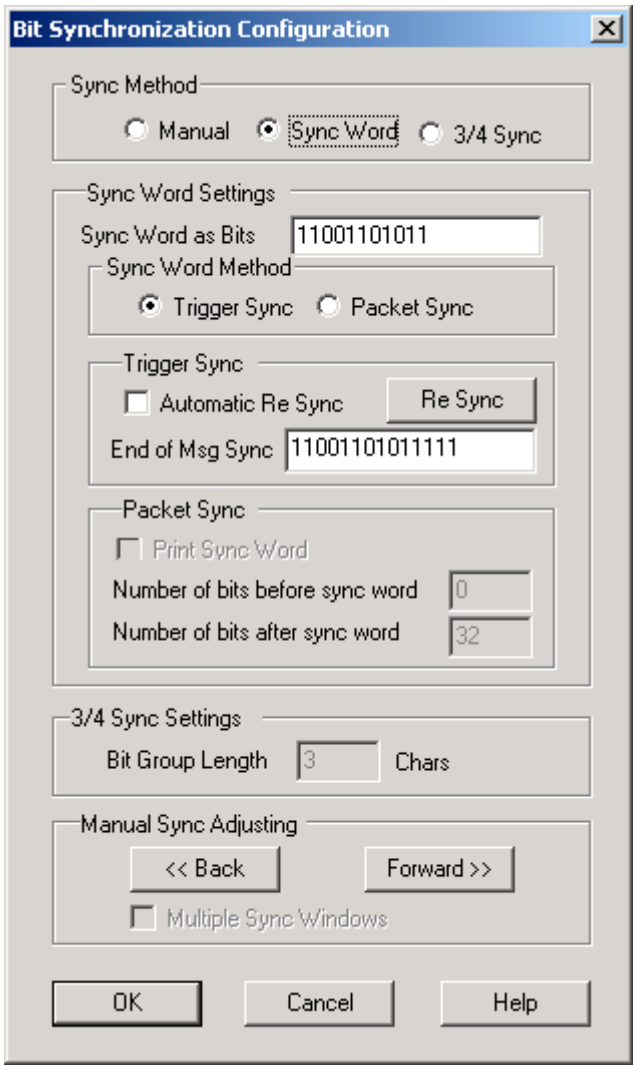
49.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

49.2 General Description

This is a tool for Bit Synchronizing. It provides three main types of synchronization: manual, sync word and ¾ sync. Manual sync means that the bit synchronization is adjusted manually, bit position by bit position forwards or backwards. Sync word means that the predefined sync word will be searched for in the bit stream (This is very useful in decoding transmissions like MPT-1327 and POCSAG). 3/4 sync means, that several sequential 7 bit figures containing (3 zeros and 4 ones) will be searched (this used in SITOR-A etc.).

49.3 Configuration



49.3.1 Parameters

49.3.1.1 Sync Method

This is the operational mode of the sync block. There are three main types of synchronization: manual, sync word and ¾ sync. Manual sync means that the bit synchronization is adjusted manually bit position by bit position forwards or backwards. Sync word means, that the predefined sync word will be searched for in the bit stream. 3/4 sync means, that several sequential 7 bit figures containing (3 zeros and 4 ones) will be searched (this used in SITOR-A etc.).

49.3.1.2 Sync Word

This is active only if the Sync Word Based Sync is in use. This is the sync word, in bits, to be searched for.

49.3.1.3 Print Sync Word

If the check box is selected the sync word bits are included in the bit data stream.

49.3.1.4 Trigger Sync

This is active only if Sync Word Based Sync is in use. When this is selected the given sync word is searched for once only. When the trigger word has been found, printing of the bits is started, without any breaks.

49.3.1.5 Packet Sync

This is active only if Sync Word Based Sync is in use. When this is selected the given sync word is searched for and when it has been found, the bits of this packet will be printed out. The packet is always limited in size (see packet sync). When this packet has been printed out, the next new packet will be searched for.

49.3.1.6 Trigger Sync parameters

49.3.1.6.1 Automatic Re Sync

This is active only if Sync Word Based Sync and Trigger Sync is in use. When this is selected the given sync word is always searched for and when it is found, the bit stream will be re-synchronized.

49.3.1.6.2 Re Sync Button

When the button is pressed synchronization is restarted.

49.3.1.6.3 End of Msg Sync

This is active only if Sync Word Based Sync and Trigger Sync is in use. When this is selected and decoder is synchronized the given end of sync word is searched for and when it is found, printing is stopped. If the Automatic Re Sync is enabled, resynchrnozation is restarted automatically.

49.3.1.7 Number of bits before the sync word

This is active only if Sync Word Based Sync and Packet Sync is in use. This is the number of bits that will be printed before the sync word of the packet.

49.3.1.8 Number of bits after the sync word

This is active only if Sync Word Based Sync and Packet Sync is in use. This is the number of bits that will be printed after the sync word of the packet.

49.3.1.9 ¾ sync settings

This is active only if 3/4 sync is in use. This is the number of characters used in determining the bit sync.

49.3.1.10 Back

This is active only if Manual Sync is in use. It shifts the bit stream back by one bit position.

49.3.1.11 Forward

This is active only if Manual Sync is in use. It shifts the bit stream forward by one bit position.

49.3.1.12 Multiple Sync Windows

This actives N sync windows (N equals the number of the bits in char). If 7 bit ASCII is received, then t windows with different sync will be opened (there's one window with correct bit sync in all the time). The sync windows can be opened by clicking the buttons "shift1 … shiftN" over the text box in the bit analyzer.

50 BIT Analyzer Display Control

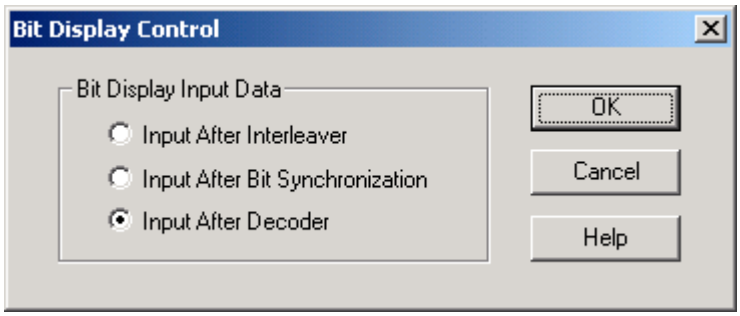
50.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

50.2 General Description

The dialog selects the input source for the graphical bit displays. The bit stream (decoder->synchronizer->interleaver->text bit display) intermediate results can be displayed with different graphical bit displays.

50.3 Configuration



50.3.1 Parameters

50.3.1.1 Input After Interleaver

The bits to the display will be taken after the Interleaver.

50.3.1.2 Input After Bit Synchronization

The bits to the display will be taken after the Bit Synchronization.

50.3.1.3 Input After Decoder

The bits to the display will be taken after the Decoder.

51 BIT Analyzer Log File Control

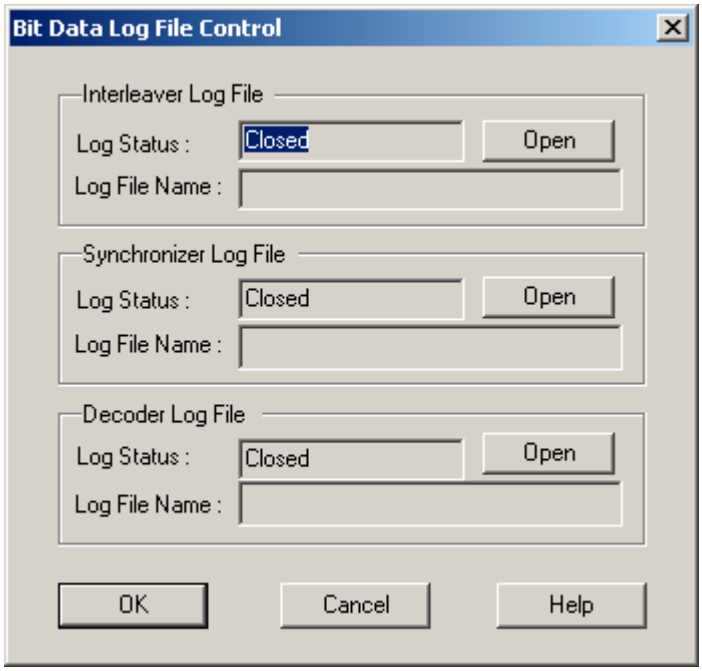
51.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

51.2 General Description

The bit stream (decoder->synchronizer->interleaver->bit display) intermediate results can be stored into log files. Pressing the 'Open' button asks for the file name and then opens the log file. Many log files for different intermediate results can be open simultaneously.

51.3 Configuration



51.3.1 Parameters

51.3.1.1 Interleaver Log File

This is a log file for Interleaver output bits

51.3.1.2 Synchronizer Log File

This is a log file for Synchronizer output bits

51.3.1.3 Decoder Log File

This is a log file for Decoder output bits

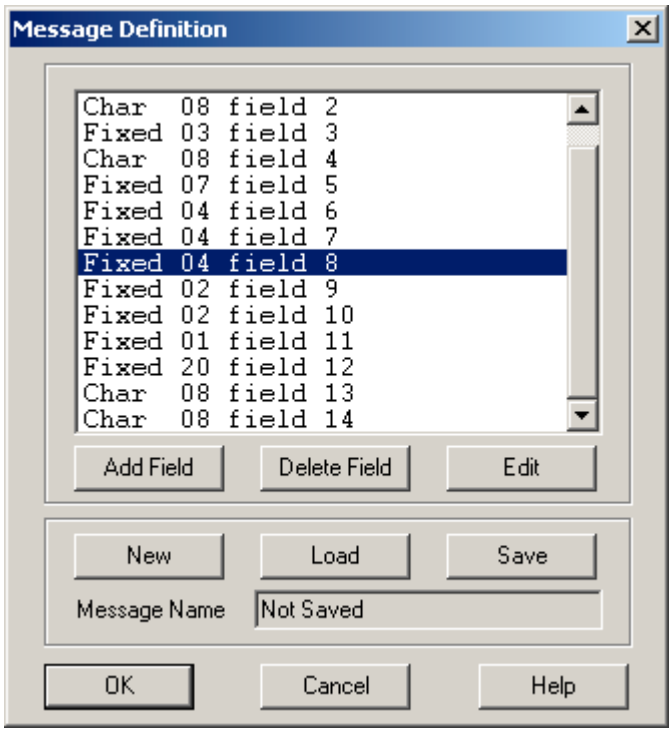
52 Bit Message Tool

52.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

52.2 General Description

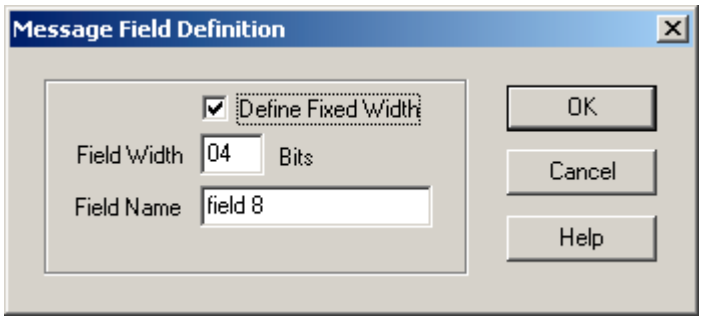
This is a tool for showing the bits in the message format. It means that the bit stream can be divided into several bit groups with different sizes. The contents of the bit fields are shown in the format (number/character) generally selected in the bit display tool. The messages are defined in the dialog shown below:



52.3 Parameters

52.3.1 Add Field

This will add a new field into the message. The position of a new field in the message can be selected with the mouse. Clicking the ‘Add Field’ or the ‘Edit’ button will open the dialog box shown below:



52.3.1.1 Define Field Width

If this is selected, the field size can be defined. Otherwise the value currently set in the bit display tool (bits/character) will be used.

52.3.1.2 Field Width

This is the number of the bits in the field.

52.3.1.3 Field Name

This is the name of the field.

52.3.2 Delete Field

This will delete the selected field of the message.

52.3.3 Edit

This will allow editing the selected field of the message.

52.3.4 New

This creates a new message. It asks for the number of fields in the message and creates as many fields with the currently used character size in bits as a default size of the field (in 8-bit ASCII it's 8).

52.3.5 Load

This loads the message definitions from a file.

52.3.6 Save

This saves the message definitions to a file.

53 Offline BIT Analyzer

53.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

53.2 General Description

The offline bit analyzer is a tool for post-analyzing the decoded bit stream. The bit stream can be displayed in the desired character/number format. Also, message formats are supported. The analysis can be started by opening the file where the bits are stored. Pressing the 'Load' button opens the bit file. The bit analyzer consists of several different applications connected together: Bit Synchronization, Interleaver and Bit Display. Also several graphic displays (autocorrelation, bit, FFT, histogram, spectrogram, statistics and bit table) can be used for the bit stream analysis. 'Config' will open the dialog for the configuration of different parts (Synchronization, Interleaver, Display etc). Clicking the right mouse button over the bit/text display also activates the Configuration Menu. Also, there are buttons for general bit/page shifting in the menu:

'_'	Displays the bit stream from the beginning of the file (it displays the first bit frame).
'<<'	Moves the display one page up. (The page means all the bits currently displayed. in the display)
'<'	Shifts the bit stream by one position to the left.
'>'	Shifts the bit stream by one position to the right.
'>>'	Moves the display one page down.
'='	Displays the bit stream from the end of the file (it displays the last bit frame).

The information showing the total number of bits, the bit position and the character set currently used is displayed below the offline bit analyzer display. There are also several short-cut keys (first, put the cursor on the text display to activate these commands):

'arrow left'	Shifts the bit stream by one position to the left.
'arrow right'	Shifts the bit stream by one position to the right.
'arrow up'	One row up in the bit display.
'arrow down'	One row down in the bit display.
'page up'	One page up in the bit display.
'page down'	One page down in the bit display.
'home'	To the beginning of the bit file.
'page down'	To the end of the of the bit file.
'H'	Hexadecimal number format
'D'	Decimal number format
'B'	Binary number format
'O'	Octal number format
'8/2'	Change character set (Num Pad)
'4/6'	Decrease / Increase numbers per line (Num Pad)

53.3 Bit Analyzer Displays

The Bit Analyzer Displays will use the decoded bit stream (‘1’s and ‘0’s) as an input. The bit value ‘0’ is changed to ‘-1’ in display calculations

53.3.1 Autocorrelation

In Autocorrelation, position 0 (power) is always the same as the length of the autocorrelation calculation. The X scale is milliseconds.
Clicking the right mouse button on the autocorrelation display will open the pop-up menu. More information about autocorrelation configuration can be found from the Autocorrelation Analyzer help page.

53.3.2 Bit

This displays the decoded bits in time domain. The time scale and the amplitude scale can be changed with sliders. By clicking the right mouse button over the bit display, this will open the following pop-up menu.

Stop	stops the display
Autoscale	scales the display automatically
Grid	switches the display grid on
Update interval	defines the time period of window updates
Properties	the length of bit buffer
Copy to Clipboard	copies the display to the Windows Clipboard
Help	activates the help

53.3.3 FFT

This displays the spectrum analysis of the decoded bit stream. The time scale (X) depends on the baud rate. If the baud rate is 100 baud, then the FFT scale is from 0 to 50Hz. Clicking the right mouse button on the FFT display will open the configuration dialog. More information about FFT can be found from the Power Spectrum help page.

53.3.4 Histogram

This displays the bit histogram for the decoded bits. Clicking the right mouse button on the histogram display will open the pop-up menu. More information about the bit histogram can be found from the Histogram help page.

53.3.5 Spectrogram

This displays the spectrogram for the bit stream. The time and frequency axis are in the same units as in the FFT display. Clicking the right mouse button on the spectrogram display will open the pop-up menu. More information about the spectrogram can be found from the Spectrogram help page.

53.3.6 Statistics

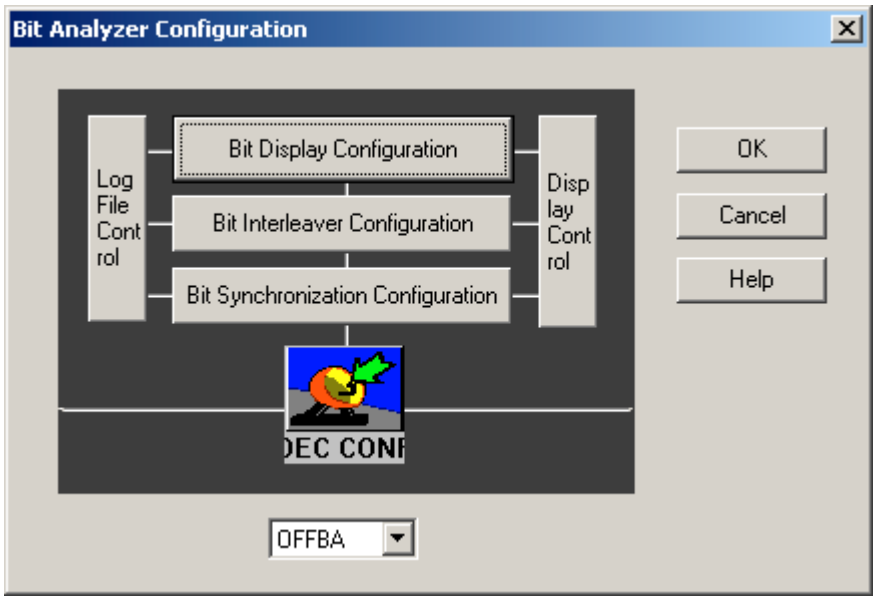
This displays statistic values of the bit stream like average, minimum and maximum. By clicking the right mouse button on the statistics display, this will open the pop-up menu. More information about statistics can be found from the Statistics help page.

53.3.7 Bit Table

This displays the bits drawn in the desired draw format (line length, number of lines etc.). Clicking the right mouse button on the bit table display will open the pop-up menu. More information about the Bit Table can be found from the Bit Table help page.

53.4 Configuration

The Bit Analyzer consists of several different applications connected together: decoder (in the offline bit tool this is simply a file containing the decoded bits), bit synchronization, interleaver, a bit analyzer and output control (display/file). The bit stream goes from the decoder (bottom) to bit display (top). All parts can be configured by pressing the 'Config' button. It will open the following configuration dialog.



53.4.1 Bit Display Configuration

This is a tool for displaying the decoded bits in the desired format (binary, hexadecimal, decimal, octal). The characters can also be printed in several different formats (ASCII 7 bit, ASCII 7 bits and one parity bit, ASCII 8 bit, Baudot (ITA2), ITU 342-3 (ITA3), ITU 476-5 (SITOR), ARQ-E and BCD). Clicking the bit display configuration icon will open the Bit Display Configuration Dialog

53.4.2 Bit Interleaver Configuration

This is a tool enabling you to change the number and order of the bits. For example any interleaver can be easily implemented with it. Clicking the Interleaver Configuration icon will open the Interleaver Control Dialog

53.4.3 Bit Synchronization Configuration

This is a tool providing several different bit domain synchronization schemes to the bit stream. Clicking the Bit Synchronization Configuration icon will open the Bit Synchronization Control Dialog

53.4.4 Display Control

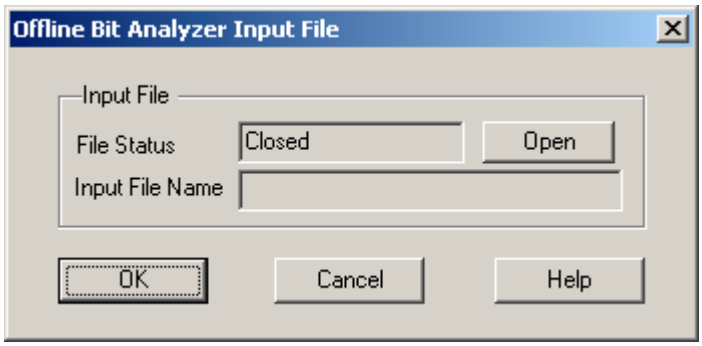
This allows changing the bit input source of the graphical bit displays. Clicking the Display Control icon opens the Bit Display Control Dialog

53.4.5 Log File Control

This lets you save the bit streams to the log files. Clicking the Log File Control icon opens the Log File Control Dialog

53.4.6 Decoder Configuration

In the offline bit tool the ‘decoder’ is actually a log file generated by the generic decoder in the online bit analyzer. Clicking the ‘Dec Conf’ icon will open the following dialog.



Press the ‘Open’ button to open bit log file. The file status shows if the file is already open and the input file name field gives the name of the bit log file.

54 Chat Application

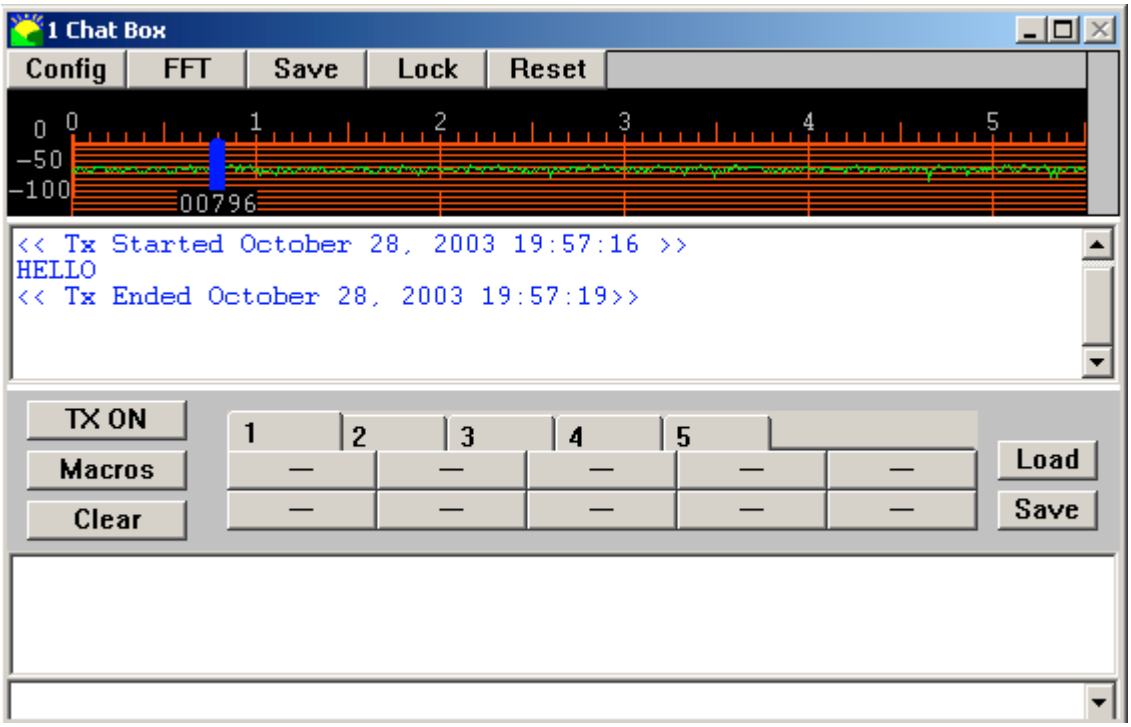
54.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

54.2 General Description

The CHAT is an application, which provides a very sophisticated user interface for real-time RX & TX communication. It supports up to 50 predefined (by the user) quick messages (with macros). The RX and TX mode can be selected from the list of supported RX & TX modes (RX and TX modes can be different). 'FFT', 'Save', 'Lock' and 'Reset' buttons in the CHAT user interface have the same use as in the corresponding decoder (which is currently in use). By clicking 'Config', you can configure RX and TX parameters as well as the Chat Application itself. The main interface is shown in the picture below:

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

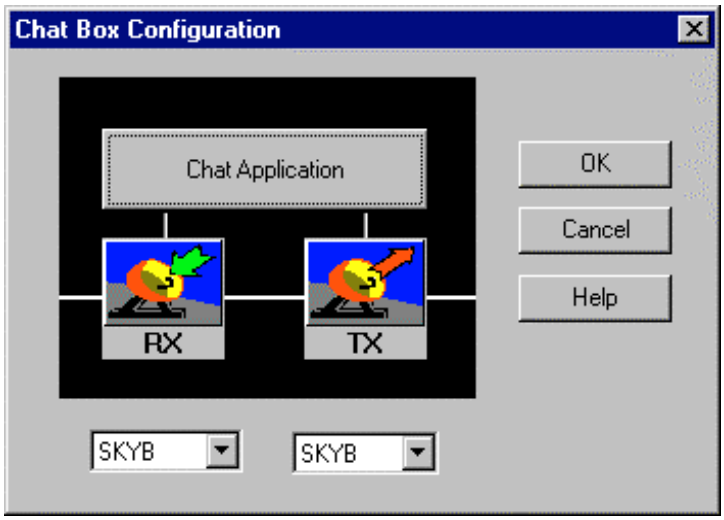


The upper window is called the RX window and the lower window is called the TX window. The TX window contains the TX macro panel, which is used to copy predefined blocks of text into the TX window. The TX window contains also the TX edit line, where test can be written when transmitter is on. Pressing enter the line is copied at the end of TX transmitter

buffer Transmitter is started automatically if enter is pressed when the line is empty. The edit line contains also the drop down list, which contains the latest lines.

54.3 Configuration

Pressing the ‘Config’ button opens the following Configuration dialog box.



54.3.1 Left (RX) Selection

Here you can select the received transmission mode. SkyBoost and Mfsk16 do not require program registration.

54.3.2 Right (TX) Selection

Here you can select the transmitted transmission mode. SkyBoost and Mfsk16 do not require program registration. How to Transmit chapter tells more about transmitting.

54.3.3 RX configuration

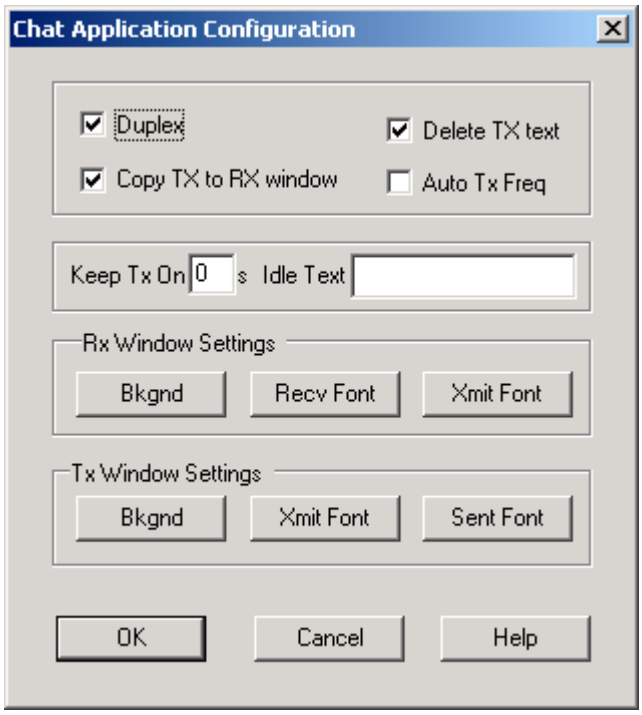
The receiver can be configured by clicking the ‘RX’ icon with the left mouse. The parameters of the RX mode are described in the help sections for the used modes. For example if ‘CW’ has been selected as a RX-mode , then CW’s configuration will be opened.

54.3.4 TX configuration

The receiver can be configured by clicking the ‘TX’ icon with the left mouse. The parameters of the TX mode are described in the help sections for the used modes. For example if ‘CW’ has been selected as a TX mode , then CW’s configuration will be opened.

54.3.5 Chat Application Configuration

The Chat Application receiver can be configured by clicking the ‘Chat Application’ icon with the left mouse. The dialog shown below is then opened.



54.3.5.1 Parameters

Duplex -If this is set, the RX is also active when transmitting

Delete TX text -If this is set, the transmitted text will be deleted from the TX window after it has been transmitted

Copy TX to RX Window -If this is set, the transmitted text will also be copied to the RX window, using the specified font

Auto TX Freq -If this is set, the transmission frequency is set automatically to the same frequency as receiver frequency.

Keep TX On -This parameter sets how many seconds the idle text (below) will be transmitted after the TX burst has been ended

Idle Text -This sets the idle text, which is sent when Keep TX On time >0

54.3.5.2 RX Window settings

Bkgnd -Background color of the RX window

Recv Font -RX font style & color in the RX window

Xmit Font -TX font style & color in the TX window

54.3.5.3 TX Window settings

Bkgnd -Background color of the TX window

Xmit Font -The font style & color of the text awaiting transmission, in the TX window

Sent Font -The font style & color of the already transmitted text, in the TX window

55 CTCSS Application

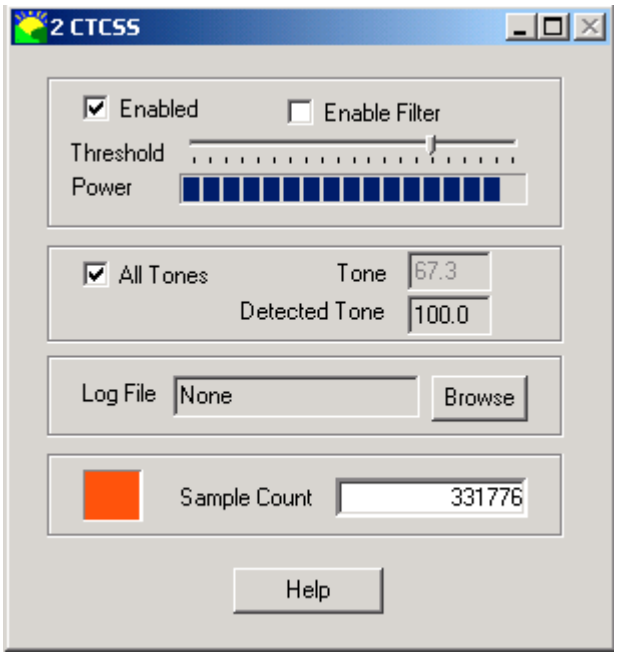
55.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : YES
SkySweeper PRO : YES

55.2 General Description

CTCSS application opens the noise squelch when some of the CTCSS tones is detected and the tone power exceeds the given threshold value. When the CTCSS tone power is again below the threshold the squelch is then closed.

CTCSS tones are (Hz):
67.0, 71.9, 74.4, 77.0, 79.7, 82.5, 85.4, 88.5, 91.5, 94.8, 97.4, 100.0, 103.5, 107.2, 110.9, 114.8, 118.8, 123.0, 127.3, 131.8, 136.5, 141.3, 146.2, 151.4, 156.7, 162.2, 167.9, 173.8, 179.9, 186.2, 192.8, 203.5, 210.7, 218.1, 225.7, 233.6, 241.8, 250.3



55.3 Parameters

55.3.1 Enabled

This enables the CTCSS functionality. If not enabled, signal is just passed through.

55.3.2 Enable Filter
If activated the filter removes all the CTCSS tones from the audio signal.

55.3.3 Threshold
When the CTCSS tone power exceeds this value the noise squelch will be opened

55.3.4 Power
This is the display of current CTCSS tone power.

55.3.5 All Tones
If this is selected the squelch, will be opened if ANY of the CTCSS tones is detected.

55.3.6 Tone
When this is set. The squelch will be opened only when this tone is detected.

55.3.7 Detected Tone
This dialog shows the frequency of the most recently detected CTCSS tone.

55.3.8 Log File
The detected tones can be saved to the log file.

56 DLL Plugin Application

56.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

The user can make his own real time blocks by making a DLL. SkySweeper calls routines in the DLL via the DLL block. To insert a DLL block into the configuration, either write the name of the DLL file or use the 'Browse' button. Press the 'Connect' button to connect to the DLL module. If the DLL module is compatible with SkySweeper the status will change to connected.

The DLL plug-in has to contain at least one routine called *Process*. SkySweeper calls the *Process* routine to pass data for processing. The routine contains two input parameters: InWaveHder and OutWaveHdr, which are the WAVEHDR (waveheader) structures. The WAVEHDR structure defines the header used to identify a waveform-audio buffer, and it is defined in the file called mmsystem.h. The data is in the floating point format.

The following routines are not mandatory, but they are useful for example to initialize variables.

The *Create* routine is called only once when SkySweeper connects to the DLL. The Create routine is the first routine which is called by SkySweeper.

The *Delete* routine is called only once when SkySweeper disconnects the DLL. The Delete routine is the last routine which is called by SkySweeper.

The *Start* routine is called every time the user starts processing. Start has two parameters SampleRate and BitsPerSample, which indicate the selected sample rate and bits per sample respectively. The BitsPerSample parameter indicates the bits per sample of input data. Internally the data is processed as floating-point numbers.

The *Stop* routine is called every time the user stops processing.

The *SupportSampleRate* routine is called by SkySweeper to ask whether the DLL supports the selected sample rate. If the DLL supports the sample rate, it must return 1 (true) otherwise it has to return 0 (false).

There are two examples in the installation directory. ‘Demo1’ is the simplest example. It multiplies the input signal by two. ‘Demo2’ sums a sine wave to the input signal. The example uses Intel’s native signal processing (nsp) library functions. To compile an example you have to download the nsp library from Intel’s web site in order to get the necessary header files. The control is a Windows program, which is used to set the signal generator frequency, amplitude and phase. The control program communicates with the signal generator DLL using shared memory.

You can try the example with the precompiled siggen.dll and control.exe files. You will already have nsp libraries in your computer because they are copied during SkySweeper installation.

Read the Windows manuals on ‘how to make and compile a DLL’. The Windows control program uses Borland’s OWL library.

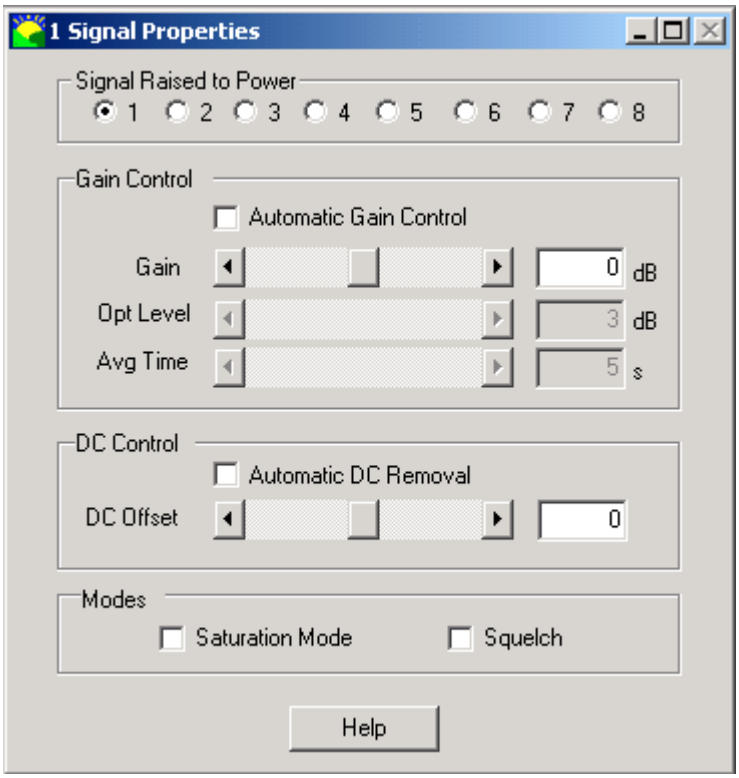
57 Signal Properties Application

57.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

57.2 General Description

This block provides a set of general settings, which can be used to modify the incoming signal. DC offset and gain can be set to a certain level. The automatic gain control can be activated. A DC offset can be automatically detected and removed. The saturation for D/A converters can be set active. The noise squelch may also be activated.



57.3 Parameters

57.3.1 Signal Raised to Power

In some signal analysis methods it is usable to raise signal to power of N. The selection allows power by anything between one and eight. If power is high it is usable to use Automatic Gain Control selection to scale signal back usable range.

57.3.2 Automatic DC Removal
The properties filter can remove the DC offset automatically. This ensures that the average value of the signal is zero.

57.3.3 Gain
The signal power can be adjusted by using the *Gain* field. The gain can be positive or negative. Negative gain means attenuation. Gain values are given as decibels i.e. 6 dB (voltage) gain doubles the amplitude of the output signal.

57.3.4 Automatic Gain Control
This switch activates the AGC. The maximum amplitude in the output is given by the optimum level parameter. So, for example, if the optimum level value is –3 dB the maximum output values are 3 dB below the maximum amplitude, which can be presented in either 8 or 16 bit values.

57.3.5 Opt Level
This is the optimum level value for the AGC. The optimal level shows how many decibels the output power is below the maximum power of the output device. The maximum output power depends on the output device format i.e. 8 or 16 bits per sample.

57.3.6 Average time
This is the time used to estimate the signal levels for the AGC. If this time is too short, the output level might change too rapidly. If the time is too long, it may cause signal overflows (this means that the signal amplitude exceeds the soundcard capability, or in other words, outside the ranges –128…127 in 8 bit mode or –32768…32767 in 16 bit mode).

57.3.7 DC offset
This is the DC offset (average) set by the user. The scale in the 8 bit mode is –128…127 and in the 16 bit mode –32768…32767.

57.3.8 Saturation Mode
This switch is used to activate the saturation mode. Saturation prevents large signal changes in the sound card's D/A converters. If the saturation mode is active, then all signal samples, which are over MAX_VAL are set to MAX_VAL or those less than MIN_VAL are set to MIN_VAL. In 8-bit mode MAX_VAL is 127 and MIN_VAL –128. In 16-bit mode MAX_VAL is 32768 and MIN_VAL is –32767. This is effectively a software amplitude limiter or clipper.

57.3.9 Squelch
This switch activates Noise Squelch. If the Noise Squelch is activated and pure white noise is detected, the set output is set to a quiet state. When a signal (not just the white noise) is detected, the squelch will re-connect the signal to the output.

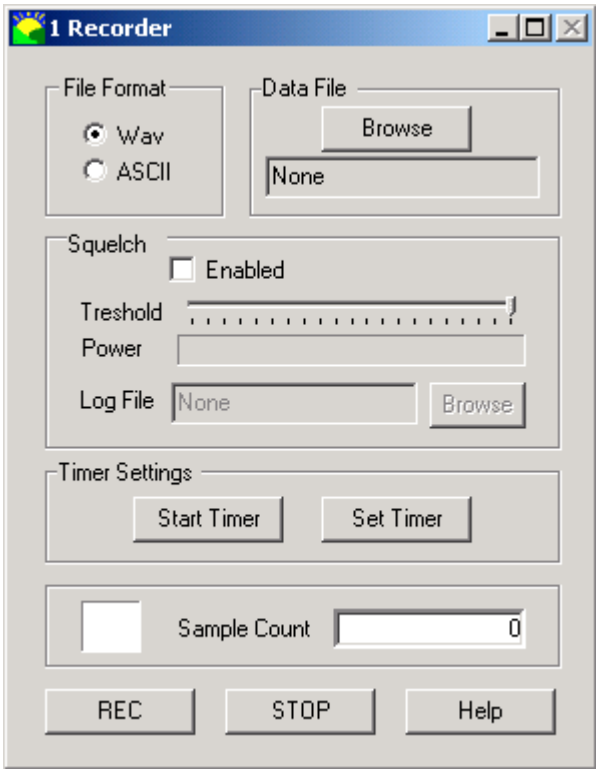
58 Recorder Application

58.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

58.2 General Description

The recorder application is used for signal recording to a file (in WAV/ASCII format). It also supports noise squelch based triggering. In the squelch mode the user can define the power threshold. When the average signal power exceeds the defined threshold, the recording is started and when the average signal power is below the threshold the recording is stopped. The signal is recorded to the same .WAV file. The locations and timestamps of the recordings are written to the text based log file. When the recorder status indicator is white, the recorder is stopped and the new recording starts from the beginning of the file. If the indicator is red, the recorder is currently recording the signal. If the recorder is paused, the indicator is green and when the 'REC' button is pressed again the recording continues from the current location. The recorder supports also timer based functionality allowing the user define the date, time and duration of the recording.



58.3 Parameters

58.3.1 File format
This selects the file format (WAV/ASCII).

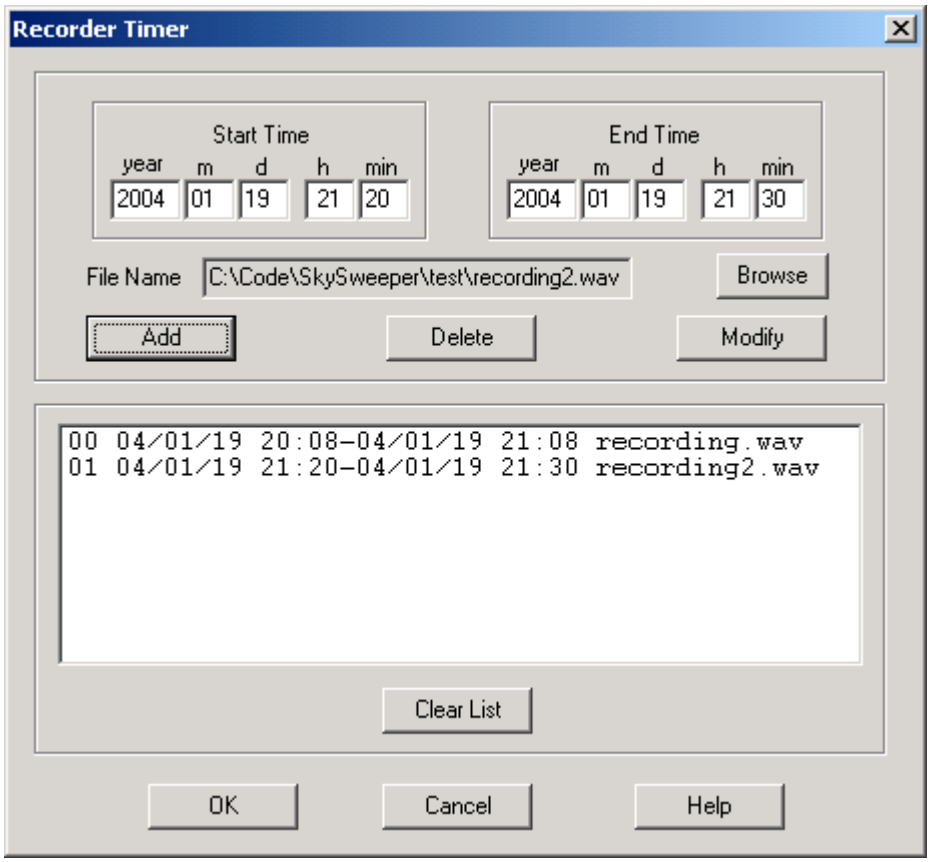
58.3.2 Data File
This is the name of the file, where the signal is stored.

58.3.3 Squelch
If the squelch is enabled, the recorder is using noise squelch. The threshold for the noise squelch is set manually. There is also a power indicator showing the current signal power. The log file is used to store the locations of the stops and starts of the recordings as well as time and date information.

58.3.4 Sample Count
This shows the number of signal samples in the recorded file.

58.3.5 Start/Stop Timer
This activates the recorder's timer. The activation requires that there's one or more timer settings configured.

58.3.6 Set Timer
Pressing this button will open the following timer configuration dialog.



To configure the timer please do the following actions:

1) Set the start time and end time
2) Set the file (.WAV) name where the recording is stored.

3) Click ‘Add’ to add the new recording time to the list

You can also edit the recording list by buttons clear list (clears whole list), modify (modify the selected item) or delete (deletes the selected item). Double click the line in the list window to select it into edit window. The timer has to be stopped to edit the list.

58.3.7 REC/PAUSE

The ‘REC button starts the recording and the status indicator will change its color to red. The ‘PAUSE’ button pauses the recording and the status indicator changes its color to green. When the ‘REC’ is pressed again, the recording continues from the current point.

58.3.8 STOP

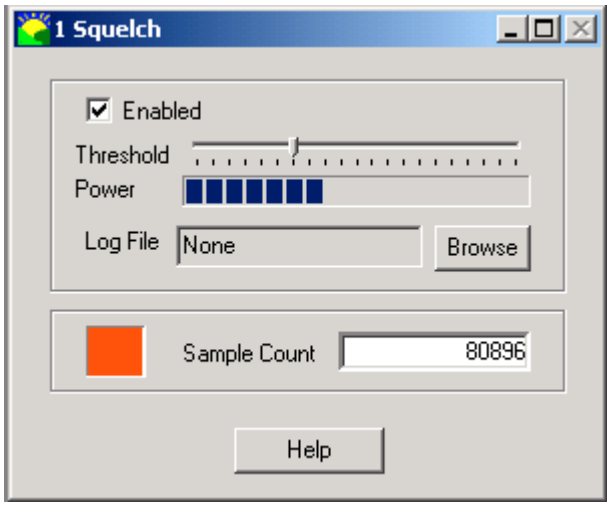
This button stops the recording and the status indicator will change its color to white. After pressing ‘STOP’ all following recordings will be started from the beginning of the file.

59 Squelch Application

59.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

The squelch application is used for noise squelch. When the average signal power exceeds the defined threshold, the block input is connected to the output, otherwise the output is muted The time information (about when the squelch has been in active state) is written to the text based log file (if defined).



59.2 Parameters

59.2.1 Squelch

If the squelch is enabled, the block is active. The threshold for the noise squelch is set manually. There is also a power indicator showing the current signal power. The log file is used to store the time and date information about when the squelch has been in active state. If 'None' is selected as log file name, the log file is not generated.

59.2.2 Sample Count

This shows the total number of signal samples, which are connected from the squelch input to it's output.

60 ACARS Decoder

60.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

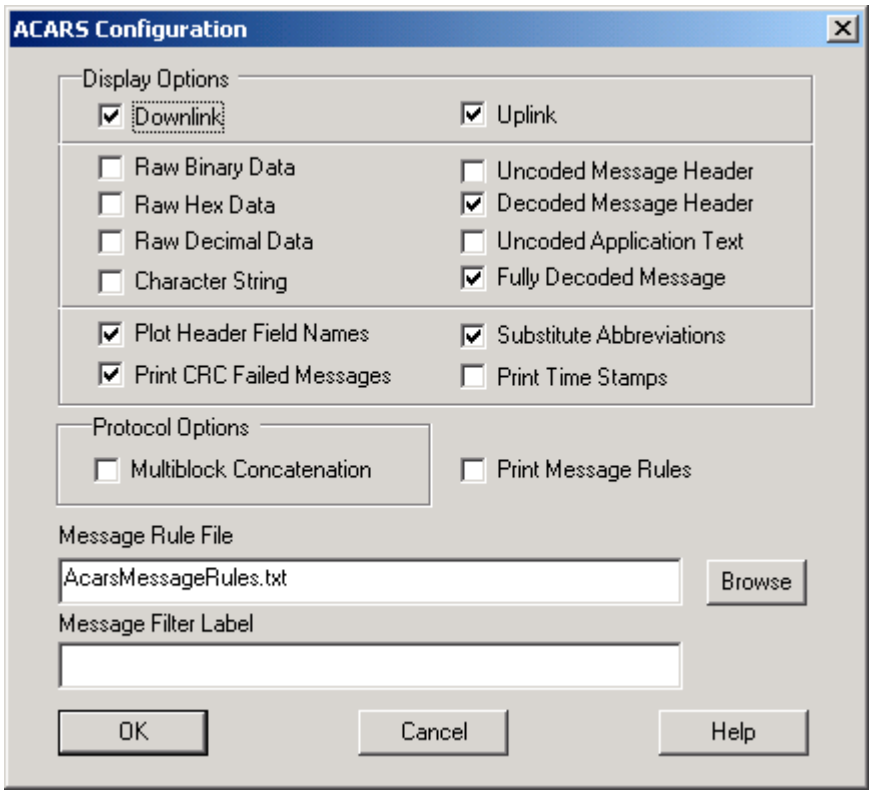
60.2 General Description

The SkySweeper ACARS decoder supports both ARINC 618-5 and 620-4 specification message types. Also, it supports the user specific message types by allowing the user to modify the message contents, if needed. The radio receiver should have enough bandwidth (>7 kHz) to allow SkySweeper to perform successful decoding. Many scanners do not provide enough bandwidth for successful ACARS reception. Please check the bandwidth first before starting. It can be checked by comparing the example ACARS signal (acars.wav) spectrum and received ACARS spectrum. Typical problem is that the signal is cut below 3 kHz. Also, the receiver should be in AM reception mode. The decoder is always tuned to the fixed 1800 Hz frequency and that cannot be changed. By default, the decoder only displays those messages which pass the error check (CRC). It is also possible to print all of the displayed messages. In the locked state, the carrier frequency is automatically monitored within the given frequency boundaries. If the carrier frequency changes, then the decoder moves to the new frequency. 'Reset' resets the decoder and the received text can be saved using 'Save'.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

60.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



60.3.1 Parameters

60.3.1.1 Display Options

The display options are used to define the output format of the received ACARS message. The same message can be plotted in many different formats. The following options are available:

60.3.1.1.1 Downlink

If selected, downlink messages are printed

60.3.1.1.2 Uplink

If selected, uplink messages are printed

60.3.1.1.3 Raw Binary Data

If selected, the received message is printed in the binary format without any message decoding

60.3.1.1.4 Raw Hex Data

If selected, the received message is printed in the hex decimal format without any message decoding

60.3.1.1.5 Raw Decimal Data

If selected, the received message is printed in the decimal format without any message decoding

60.3.1.1.6 Character String

If selected, the received message is printed in the character string format without any message decoding

60.3.1.1.7 Uncoded Message Header

If selected, the ACARS 618 message header is printed as it is received without any message decoding

60.3.1.1.8 Decoded Message Header

If selected, the ACARS 618 message header fields are decoded into more readable format. The message names, the message originator and the airline definition files must be defined in the message rule file.

60.3.1.1.9 Uncoded Application Text

If selected, the ACARS 618 application data are printed as it is received without any message decoding

60.3.1.1.10 Fully Decoded Application Text

If selected, the ACARS 618 application data are decoded into a more readable format. The decoder needs message rules, which are defined in the message rule file.

60.3.1.1.11 Plot Header Field Names

If selected, the ACARS 618 message header field names are printed

60.3.1.1.12 Print CRC Failed Messages

If selected, messages which has been received but where the CRC has failed are printed into on the screen. The CRC failed messages are printed only as raw or character string format. The character string is the default format.

60.3.1.1.13 Substitute Abbreviations

If selected, the abbreviations, which are defined in the message rule file, are decoded.

60.3.1.1.14 Print Time Stamps

If selected, the time of day and the message number are printed at the beginning of the message.

60.3.1.2 Protocol Options

60.3.1.2.1 Multiblock Concatenation

One ACARS 618 message can be concatenated from many individual messages. If the concatenation option is selected, SkySweeper concatenates one ACARS message from many different messages, before the message is printed on the display.

60.3.1.3 Print Message Rules

If selected, the message rules are printed onto the display when the configuration dialog is closed.

60.3.1.4 Message Rule File

The message rule file contains the message decoding rules such as from where the message names can be found and how the ACARS 618 application text is decoded into message fields

The format of the message rule file is as follows :-

```
MESSAGE_NAMES = "MessageListFileName"
MESSAGE_ORIGINATOR = "MessageOriginatorFileName"
AIRLINE = "AirlineCompaniesFileName"
ABBR = "AbbreviationsFileName"

MSG= Label|D/U|AirCompany|Cond1,…, Cond8
{
     Length    Type           "Field Print Rule"
…
     Length    Type           "Field Print Rule"
}


MSG=
{

}
```

MESSAGE_NAMES
: This variable tells you the file name from where the description of the message labels can be found.

MESSAGE_ORIGINATOR
: This variable tells you the file name from where the description of the message originator can be found.

AIRLINE
: This variable tells you the file name from where the description of the airline company names can be found.

ABBR
: This variable tells you the file name from where the description of the abbreviations can be found.

The message rule controls how the ACARS 618-application text is printed into display. The format of the message rule is as follows :-

```
MSG= Label|D/U|AirCompany|Cond1,…, Cond8
{
     Length    Type           "Field Print Rule"
…
     Length    Type           "Field Print Rule"
}
```

The first line of the message rule defines when the message rule is applied

Label The two character message label has to match the received message label (mandatory)

D/U D tells you that the definition is for a down-link message and U is for an up-link message.

AirCompany
If the AirCompany is defined, then the two-character air company abbreviation has to match the received message air company abbreviation

Cond
There can be eight conditions, which are separated by commas. If the conditions are defined, then all of them must be evaluated as true before the rule can be accepted. The format of the conditions is as follows :-
[*offset*]=”*string*”

offset
: is the number of bytes at the beginning of the ACARS 620 message. The offset tells you the position where the comparison is done.

string
: is any string which has to match the received message

If there are many message rules which could be used for a received message, the following selection rules are used:

1. The message *label* and *Down/Up* link flag must always match.
2. If the two character air company abbreviation matches the rule where the *AirCompany* is defined and there are also other matching conditions, this rule has the highest priority

3. If the two characters ‘air company’ abbreviation matches the rule where the *AirCompany* is defined and there are no other matching conditions, this rule has the second highest priority
4. If the *AirCompany* is not defined and there are other matching conditions, this rule has the third highest priority
5. If only the message *Label* matches, then the message rule has the lowest priority.
6. If there are many message rules which have the same priority, the first message rule in the file is selected.

The message rule contains one line for each message field. This line defines the input characters, the data type and the field format.

Length

The field length in bytes (number of characters)

Type

The type indicates the type of Character String. The following types are available.

string

The string is printed as such

abbr

The decoder replaces abbreviations with the descriptions which can be found in the ABBR file.

TypeFileName

The Character String is used as a key when a description text is found from the type file.

Print Rule

The print rule controls how the field is printed on the display. Typically the print rule contains the field name and %s format specifier. The following format specifiers are available:

%s

The specifier is replaced by decoded field value.

\n

New Line

The MESSAGE_NAMES, MESSAGE_ORIGINATOR, AIRLINE and type files have the following general file format.

KEY <TAB> *Description Text*
...
KEY <TAB> *Description Text*

KEY

Key has to match the key value when the description text is searched.

<TAB>

The tabulator character separates the key from the Description Text

Description Text

Describes the key.

60.3.1.5 Message Filter Label

The unwanted messages (Labels) can be filtered out by typing the message names separated with space. For example ‘QR16 QT SQ’ will filter the Position Report, Out/return/in report and Squitter messages. The message names can be found from the ‘AcarsMessageNames.txt’ file.

60.4 FFT

The ‘FFT’ button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

60.5 Save

The ‘Save’ button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

60.6 Lock

The ‘Lock’ button locks or unlocks the decoder frequency. Decoders have the ‘automatic frequency tracking’ feature. Push the ‘Lock’ button when you want to lock the decoder onto the selected frequency. Push the ‘Unlock’ button when you want to release frequency locking.

60.7 Reset

The ‘Reset’ button resets the decoder and clears the text window.

61 AX25 Decoder

61.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

61.2 General Description

The SkySweeper AX25 (packet) decoder has two main operational modes (300 baud (HF) and 1200 baud (VHF). SkySweeper AX25 decoder doesn't support the automatic tone search. So, the frequencies for space and mark has to be set manually. In 1200 baud (VHF) mode the tones are typically located at 1200 Hz and 2200 Hz (shift 1000 Hz). In HF mode the tones can be located more randomly, but the shift is typically 200 Hz.

In AX25 you can set the lower frequency by double clicking the mouse on the required frequency position, and then SkySweeper allows you to set a second (=higher) frequency, that can be set by a mouse click. The values of frequencies and the frequency offset are also shown on the screen.

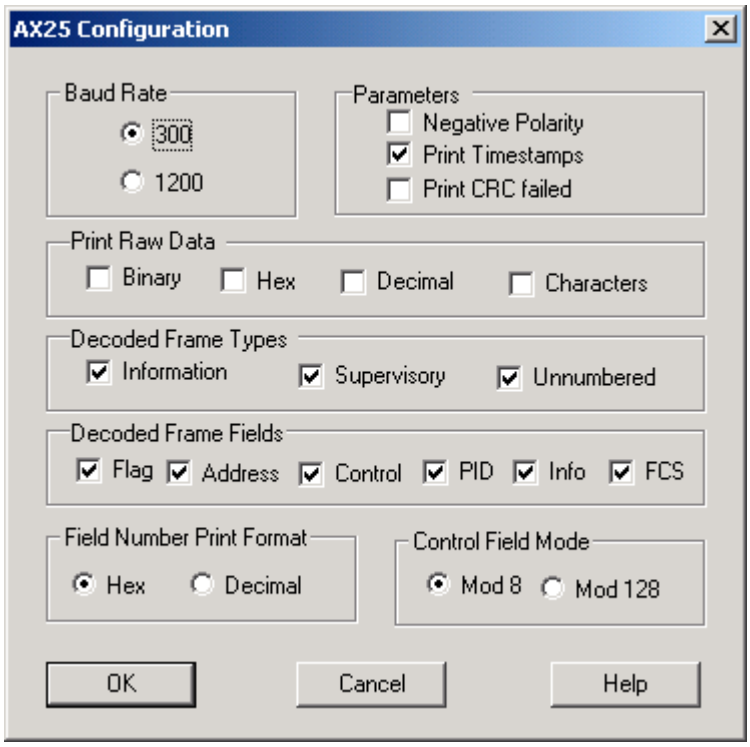
'Lock' is not used in AX25 (the tones stay where they are, because there's no automatic frequency search). 'Reset' resets the decoder and the received text can be saved by using 'Save'. The parameters can be modified by pressing the 'Config' button.

SkySweeper supports both FFT and waterfall display modes for the decoder tuning. The Decoder Spectrum Dialog chapter gives more information about the spectrum display options.

Parameters can be modified by pressing the 'Config' button. Note: you can install several decoders in one configuration, if required.

61.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



61.3.1 Parameters

61.3.1.1 Baud Rate

This selects the baud rate: 300 baud (HF) or 1200 baud (VHF)

61.3.1.2 Common Parameters

Negative Polarity	Enabled negative polarity in the decoder
Print Timestamps	Print times stamp for every message
Print CRC Failed	Prints a message even CRC has been failed

61.3.1.3 Print Raw Data

The received raw data (data without protocol information) print format can be selected from four options:

Binary	prints the data as bits
Hex	prints the data in hex format
Decimal	prints the data in decimal format
Characters	prints the data in character format

61.3.1.4 Decoded Frame Types

The AX25 packet frame types to be decoded can be selected. The possible choices are: Information, Supervisory and Unnumbered frames.

61.3.1.5 Decoded Frame Fields

The decoded fields in a frame can be selected from six options:

'Flag'	fixed character in the start and end of the packet
'Address'	call signs of source and destination etc
'Control'	frame type information
'PID'	the protocol type

'Info'	user data
'FCS'	frame check sequence

61.3.1.6 Field Number Print Format

This selects the print format of field numbers (hex/decimal).

61.3.1.7 Control Field Mode

This is the length of control field (8 or 128 bits). The most common value is 8.

61.4 FFT

The ‘FFT’ button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

61.5 Save

The ‘Save’ button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

61.6 Lock

The ‘Lock’ button locks or unlocks the decoder frequency. Decoders have the ‘automatic frequency tracking’ feature. Push the ‘Lock’ button when you want to lock the decoder onto the selected frequency. Push the ‘Unlock’ button when you want to release frequency locking.

61.7 Reset

The ‘Reset’ button resets the decoder and clears the text window.

62 COQUELET Decoder

62.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : YES
SkySweeper PRO : YES

62.2 General Description

SkySweeper's COQUELET decoder supports COQUELET-8 and COQUELET-13 modes. The COQUELET-8 sometimes uses two different speeds during one transmission. That's why there are two decoders in the default configuration (one for both speed variants).

COQUELET decoder searches the transmission automatically. Also you can set the decoded frequency manually by double clicking the left mouse on the required frequency position.

When the COQUELET transmission has been detected within the given range, the decoder will then lock itself to that frequency. When locked, the decoder draws a bold blue line on the spectrum display, at the currently locked frequency (blue line shown at the lowest tone). If the decoder is not locked, then the blue line is not shown as a bold line.

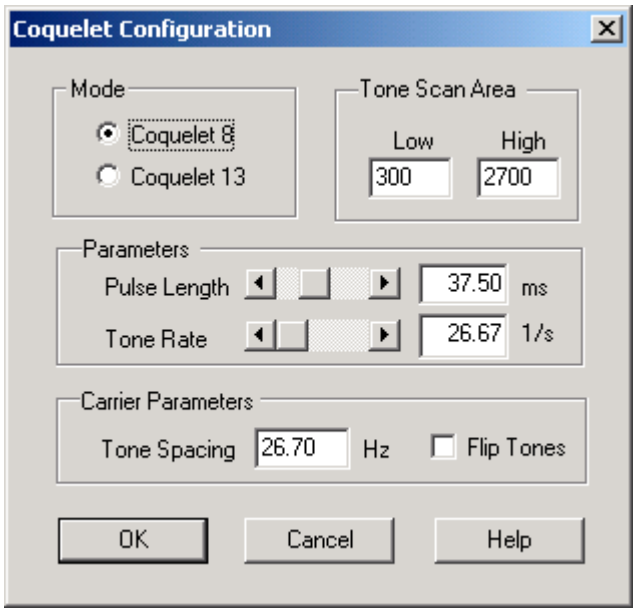
In the unlocked state, the carrier frequency is automatically monitored within the given frequency boundaries and if the carrier frequency changes, then the decoder moves to the new frequency. If 'Lock' is pressed in the user interface, then the decoder will not automatically change its frequency and also decoding speed is locked to it's current state. 'Reset' resets the decoder. Received text can be saved using 'Save'.

SkySweeper supports both FFT and waterfall display modes for the decoder tuning. The Decoder Spectrum Dialog chapter gives more information about the spectrum display options.

Parameters can be modified by pressing the 'Config' button. Note: you can install several decoders in one configuration, if required.

62.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



62.3.1 Parameters

62.3.1.1 Mode

This is the operational mode (COQUELET 8 / COQUELET 13)

62.3.1.2 Tone Scan Area

The scanned frequency range is given with two values – 'low' and 'high'. The COQUELET transmission is searched only within this frequency window. In most cases it is useful firstly to search the transmission visually, using the spectrogram, FFT and 3DFFT displays and then define the scan area for the COQUELET decoder.

62.3.1.3 Pulse Length

The pulse length/ tone rate can be set here. In COQUELET the tone rate is 13.3 or 26.7 1/s.

62.3.1.4 Tone Spacing

This parameter is the distance (in Hz) between tones. In COQUELET the distance is typically 26.7 Hz.

62.3.1.5 Flip Tones

If this is selected, the tone order is reversed (highest tone is considered as a lowest and vice versa). This is used when LSB is used instead of USB.

62.4 FFT

The 'FFT' button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

62.5 Save

The 'Save' button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

62.6 Lock

The ‘Lock’ button locks or unlocks the decoder frequency. Decoders have the ‘automatic frequency tracking’ feature. Push the ‘Lock’ button when you want to lock the decoder onto the selected frequency. Push the ‘Unlock’ button when you want to release frequency locking.

62.7 Reset

The ‘Reset’ button resets the decoder and clears the text window.

63 CW Decoder

63.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

63.2 General Description

The CW Decoder detects CW modulation using the most modern neural network technology and prints Morse code characters on the screen. It searches the CW transmission within the given frequency boundaries. Also, you can set the decoded frequency by double clicking the mouse on the required frequency position.

When the CW transmission has been detected within the given range, the decoder will then lock itself to that frequency. When locked, the decoder draws a bold blue line on the spectrum display, at the currently locked frequency. If the decoder is not locked, then the blue line is not shown as a bold line. After the frequency is locked, the decoder starts to guess the keying parameters of the transmission. When all of the parameters have been estimated, then the decoder starts to print characters on the screen.

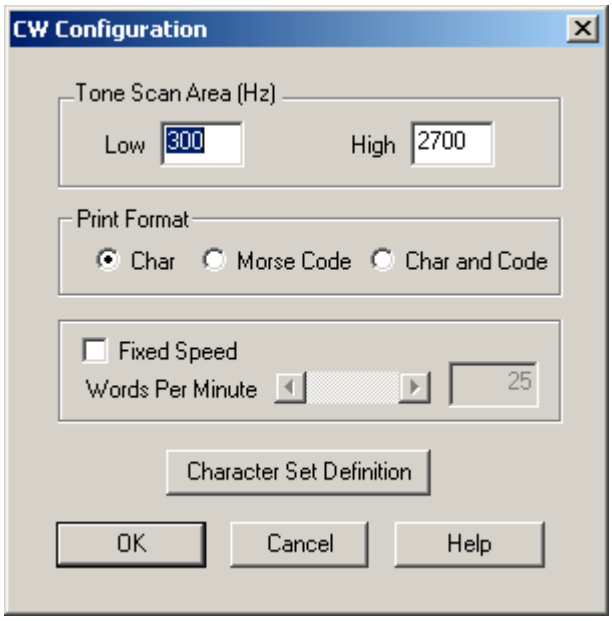
In the locked state, the carrier frequency is automatically monitored within the given frequency boundaries and if the carrier frequency changes, then the decoder moves to the new frequency. If 'Lock' is pressed in the user interface, then the decoder will not automatically change its frequency and also decoding speed is locked to it's current state. ‘Reset’ resets the decoder. Received text can be saved using ‘Save’.

SkySweeper supports both FFT and waterfall display modes for the decoder tuning. The Decoder Spectrum Dialog chapter gives more information about the spectrum display options.

Parameters can be modified by pressing the ‘Config’ button. Note: you can install several decoders in one configuration, if required.

63.3 Configuration

Pressing the ‘Config’ button opens the following Configuration dialog box.



63.3.1 Parameters

63.3.1.1 Tone Scan Area

The scanned frequency range is given with two values – 'low' and 'high'. The CW transmission is searched only within this frequency window. In most cases it is useful firstly to search the transmission visually, using the spectrogram, FFT and 3DFFT displays and then define the scan area for the CW decoder.

63.3.1.2 Print Format

The CW decoder print format can be selected from three options:

'Char'	prints the decoded Characters
'Morse Code'	prints the decoded Morse code
'Char and Code'	prints both the Characters and the Morse Code

63.3.1.3 Fixed Speed

The CW decoder can be configured to a fixed speed by setting the fixed WPM value. All speed adaptation is then disabled.

63.3.1.4 Character Set Definition

By clicking this button, the CW character set can be changed.in the Character Set Configuration Dialog.

63.4 FFT

The 'FFT' button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

63.5 Save

The 'Save' button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

63.6 Lock

The ‘Lock’ button locks or unlocks the decoder frequency. Decoders have the ‘automatic frequency tracking’ feature. Push the ‘Lock’ button when you want to lock the decoder onto the selected frequency. Push the ‘Unlock’ button when you want to release frequency locking.

63.7 Reset

The ‘Reset’ button resets the decoder and clears the text window.

64 DGPS Decoder

64.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

64.2 General Description

The Marine Differential GPS (DGPS) system provides the correction values to GPS decoders. SkySweeper DGPS decoder decodes the DGPS message types which will contain the ID, frequency or location information of the transmitting station. The speeds of 100 and 200 bauds are supported. DGPS is based on MSK modulation. The automatic frequency locking is not supported. The frequency can be set by double clicking the mouse on the required frequency position or by setting the default carrier value in the DGPS configuration dialog.

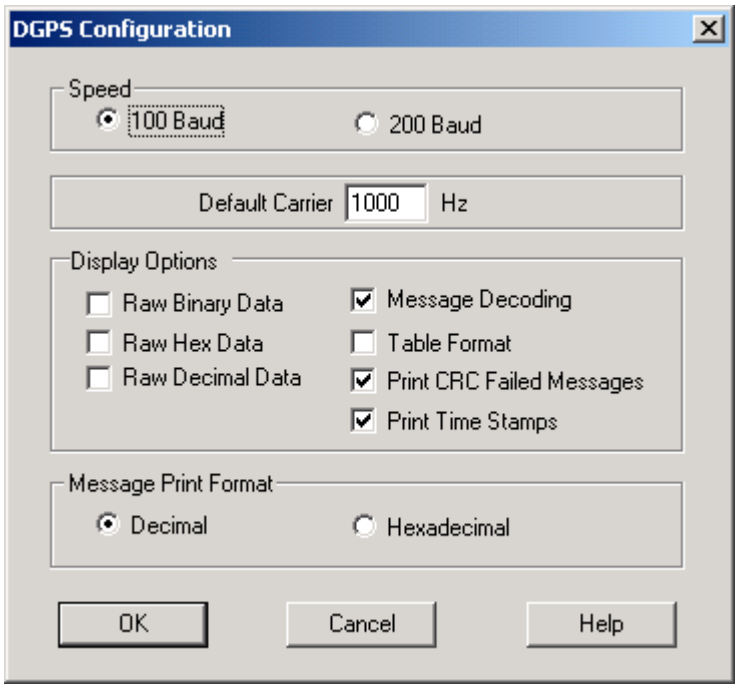
'Reset' resets the decoder. Received text can be saved using 'Save'.

SkySweeper supports both FFT and waterfall display modes for the decoder tuning. The Decoder Spectrum Dialog chapter gives more information about the spectrum display options.

Parameters can be modified by pressing the 'Config' button. Note: you can install several decoders in one configuration, if required.

64.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



64.3.1 Parameters

64.3.1.1 Speed

The modulation speed is selected here. SkySweeper supports 100 baud and 200 baud DGPS decoding.

64.3.1.2 Default Carrier

The modulation center frequency can be predefined here. It can be then changed by mouse, if needed.

64.3.1.3 Raw Binary Data

If this option is selected, the received data is printed in binary format.

64.3.1.4 Raw Hex Data

If this option is selected, the received data is printed in hexadecimal format.

64.3.1.5 Raw Decimal Data

If this option is selected, the received data is printed in decimal format.

64.3.1.6 Message Decoding

If this option is selected, the received data is printed in message format.

64.3.1.7 Table Format

If selected, DGPS GPS correction set messages 1 and 9 are printed as table format.

64.3.1.8 Print CRC Failed Messages

If this option is selected, the messages which CRC (error checking) has failed will also be printed.

64.3.1.9 Print Time Stamps

If this option is selected, a timestamp is printed before the actual message.

64.3.1.10 Message Print Format

The numeric values in a message can be printed in either decimal or hexadecimal format.

64.4 FFT

The ‘FFT’ button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

64.5 Save

The ‘Save’ button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

64.6 Lock

The ‘Lock’ button locks or unlocks the decoder frequency. Decoders have the ‘automatic frequency tracking’ feature. Push the ‘Lock’ button when you want to lock the decoder onto the selected frequency. Push the ‘Unlock’ button when you want to release frequency locking.

64.7 Reset

The ‘Reset’ button resets the decoder and clears the text window.

65 DTMF Decoder

65.1 Availability

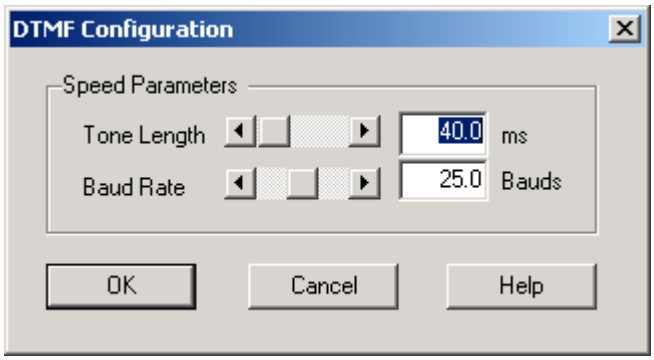
SkySweeper STD : NO
SkySweeper STD+ : YES
SkySweeper PRO : YES

65.2 General Description

The SkySweeper DTMF decoder supports the configurable DTMF tone rate decoding. This decoder assumes that the has the frequency accuracy of +-30 Hz to decode properly.

65.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



65.3.1 Parameters

65.3.1.1 Tone Length

This is the DTMF symbol length. One DTMF symbol consists of two tones.

65.3.1.2 Baud Rate

The is DTMF baud rate (1/Tone Length).

65.4 FFT

The 'FFT' button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

65.5 Save

The 'Save' button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

65.6 Lock

This button doesn’t have any effect in DTMF.

65.7 Reset

The ‘Reset’ button resets the decoder and clears the text window.

66 GMDSS / DSC Decoder

66.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

66.2 General Description

The GMDSS/DSC is a maritime safety system. It is defined by the ITU specification R-REC-M.493. There are two main operational modes: 100 baud FSK for HF/MF (offset 170 Hz) and 1200 baud FSK (offset 800 Hz) for VHF. SkySweeper supports both of these modes.

The decoder searches for the transmission within the given frequency boundaries. Also you can set the lower FSK frequency by double clicking the mouse on the required frequency position, and then SkySweeper allows you to set a second (=higher) frequency, that can be set by a mouse click. The values of frequencies and the frequency offset are also shown on the screen.

When a transmission has been detected within the given range, the decoder will then lock itself to that frequency. When locked, the decoder draws a bold blue line on the spectrum display at the currently locked frequency. If the decoder is not locked, then the blue line is not shown as bold.

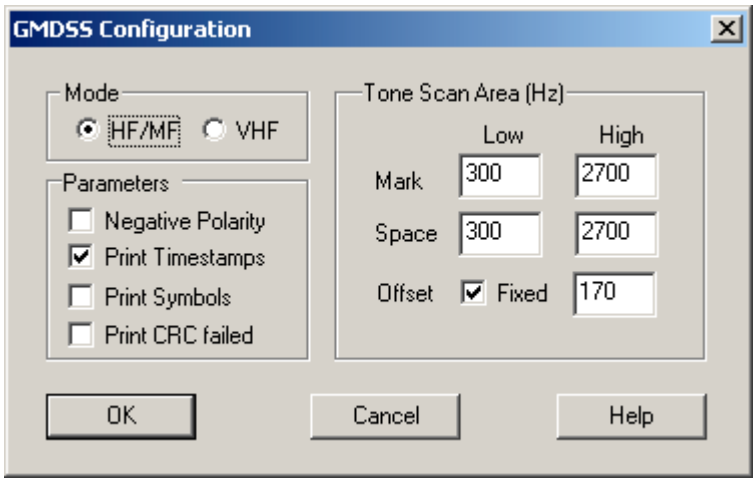
In the non-locked state, the carrier frequencies are automatically monitored within the given frequency boundaries. If the carrier frequency changes, then the decoder moves to a new frequency. If 'Lock' is pressed in the user interface, then the decoder will not automatically change the frequency. ‘Reset’ resets the decoder and the received text can be saved by using ‘Save’. The parameters can be modified by pressing the ‘Config’ button.

SkySweeper supports both FFT and waterfall display modes for the decoder tuning. The Decoder Spectrum Dialog chapter gives more information about the spectrum display options.

Parameters can be modified by pressing the ‘Config’ button. Note: you can install several decoders in one configuration, if required.

66.3 Configuration

Pressing the ‘Config’ button opens the following Configuration dialog box.



66.3.1 Parameters

66.3.1.1 Mode
This selects the operational mode (HF/MF or VHF).

66.3.1.2 Tone scan area
The FSK transmission has two tones named as *Mark* and *Space*. The scanned frequency range for Mark and Space will be set with two values, namely 'low' and 'high'. The Mark and Space tones are searched for only inside this frequency window.

66.3.1.3 Fixed Offset
If the Fixed Offset check box is selected, the user can enter the fixed frequency offset between the Mark and Space carrier frequencies. The fixed frequency offset is used in automatic scanning mode.

66.3.1.4 Negative Polarity
This negates the bits (1->0 and 0->1).

66.3.1.5 Print Timestamps
If this is selected, the timestamp is printed before the message

66.3.1.6 Print Symbols
If this is selected, the GMDSS symbol numbers are printed before the message

66.3.1.7 Print CRC Failed
If this is selected, also messages not passing the error check (CRC) will be printed.

66.4 FFT
The 'FFT' button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

66.5 Save
The 'Save' button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

66.6 Lock

The ‘Lock’ button locks or unlocks the decoder frequency. Decoders have the ‘automatic frequency tracking’ feature. Push the ‘Lock’ button when you want to lock the decoder onto the selected frequency. Push the ‘Unlock’ button when you want to release frequency locking.

66.7 Reset

The ‘Reset’ button resets the decoder and clears the text window.

67 HELLSCHREIBER Decoder

67.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

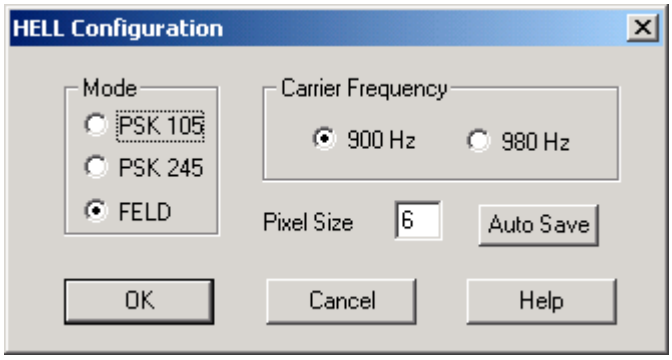
67.2 General Description

The HELLSCHREIBER decoder supports both the amplitude modulated (Feld-Hell) and the phase modulated HELL formats (PSK105 & PSK245).

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

67.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



67.3.1 Parameters

67.3.1.1 Mode

You can choose whether Feld-Hell, PSK105 Hell or PSK245 Hell will be detected

67.3.1.2 Carrier Frequency

The Carrier Frequency can be set to either to 900 Hz or 980 Hz.

67.3.1.3 Pixel Size

With this value the font size can be adjusted.

67.3.1.4 Auto Save

Pressing the Auto Save button opens the Picture Auto Save Configuration Dialog which is used to save automatically HELL pictures into file.

67.4 Save

The ‘Save’ button saves the received picture into a file in bitmap format.

67.5 Reset

The ‘Reset’ button resets the decoder and clears the window.

68 HFDL Decoder

68.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

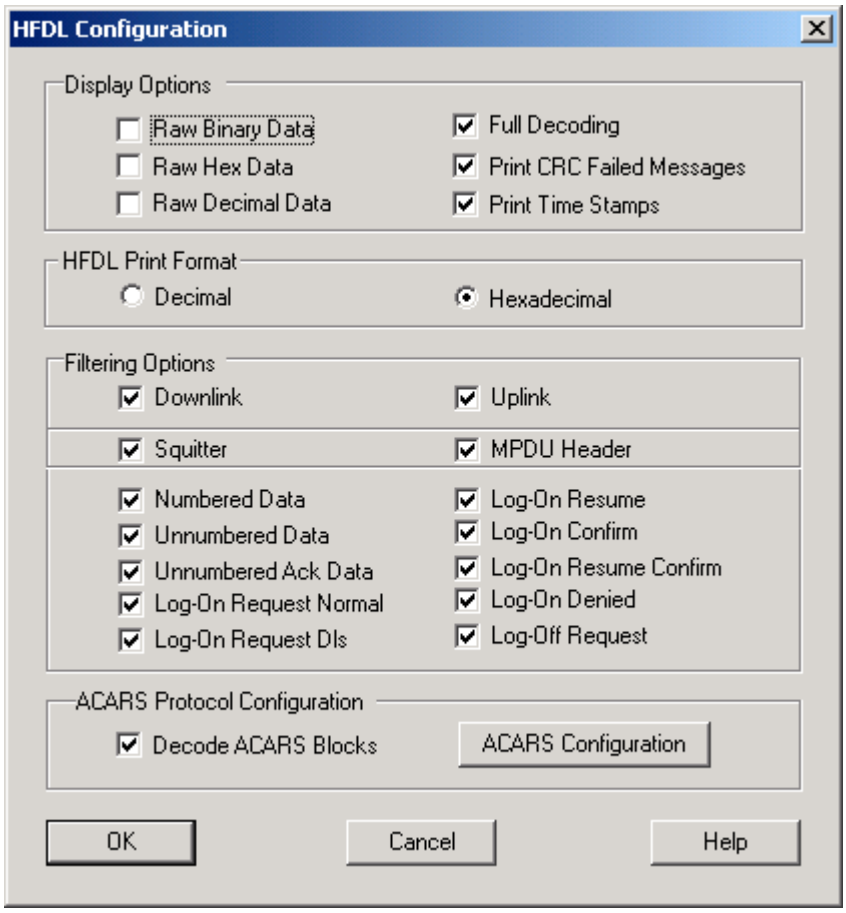
68.2 General Description

SkySweeper's HFDL (HF ACARS) decoder supports ARINC 635 specification up-link and down-link message types. The radio receiver should be in USB reception mode. The decoder frequency is always tuned to the fixed 1440 Hz frequency. The user cannot change the frequency. The SkySweeper HFDL decoder uses the cellular type of adaptive multipath channel equalizer to handle difficult channel conditions. A CRC error check is performed on every message and you can also select whether CRC failed messages are printed or not. Also, automatic frequency correction (AFC) is used to correct Doppler and other frequency error sources. AFC can be stopped (not recommended in the normal case) by pressing 'Lock'. 'Reset' resets the decoder and the received text can be saved using 'Save'.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

68.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



68.3.1 Parameters

68.3.1.1 Display Options

The display options are used to define the output format of the received HFDL message. The same message can be plotted in many different formats. The following options are available:

68.3.1.1.1 Raw Binary Data

If selected, the received message is printed in the binary format without any message decoding

68.3.1.1.2 Raw Hex Data

If selected, the received message is printed in the hexadecimal format without any message decoding

68.3.1.1.3 Raw Decimal Data

If selected, the received message is printed in the decimal format without any message decoding

68.3.1.1.4 Full Decoding

If selected, HFDL messages are decoded into readable format according to the ARINC 635-3 specification.

68.3.1.1.5 Print CRC Failed Messages

If selected, the messages, which have been received, but the CRC has failed, are printed on the display.

68.3.1.1.6 Print Time Stamps

If selected, the time of day and the message number is printed at the beginning of the message.

68.3.1.2 HFDL Print Format

Print format selection for numbers.

68.3.1.2.1 Decimal

Numbers are printed in the decimal format

68.3.1.2.2 Hexadecimal

Numbers are printed in the hexadecimal format

68.3.1.3 Filtering Options

The filtering options make possible to print only interesting messages. You can select for example only up or down link messages. There are two different kinds of basic PDU types: squitter and MPDU PDUs. It is possible to select which MPDU is printed.

68.3.1.4 ACARS Protocol Configuration

The HFDL protocol is able to carry ACARS data blocks. SkySweeper includes an ACARS message parser, which decodes encapsulated ACARS messages.

68.3.1.4.1 Decode ACARS Blocks

If selected, encapsulated ACARS messages are decoded.

68.3.1.4.2 ACARS Configuration

If ACARS block decoding is selected, the push button opens the ACARS Message Parser Dialog

68.4 FFT

The ‘FFT’ button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has locked onto the correct frequency in order to get more space for the text window.

68.5 Save

The ‘Save’ button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

68.6 Lock

In the HFDL mode, pressing ‘Lock’ stops the AFC (automatic frequency correction) and the decoder is tuned to the fixed 1440 Hz frequency. Note! Stopping AFC is not recommended in normal cases because the decoder loses its capability to handle frequency errors. Push the ‘Unlock’ button to re-activate AFC.

68.7 Reset

The ‘Reset’ button resets the decoder and clears the text window.

69 HF FAX Decoder

69.1 Availability

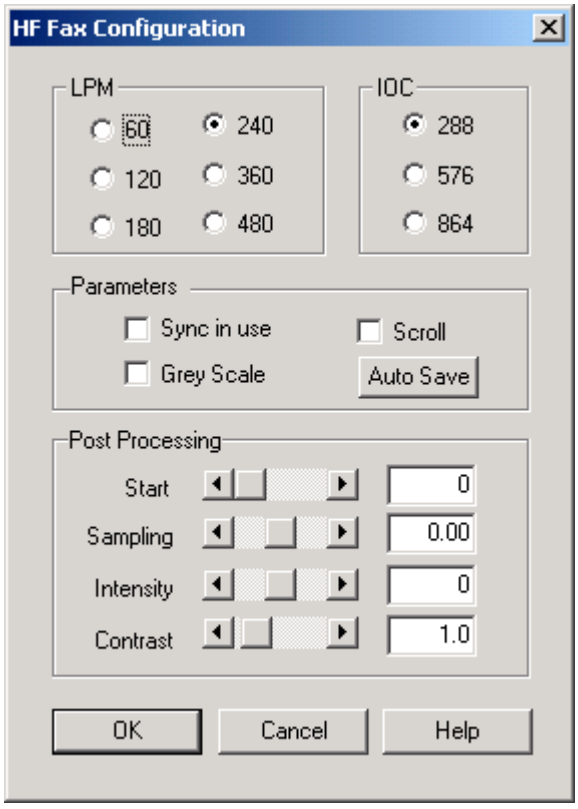
SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

69.2 General Description

The SkySweeper HF FAX decoder uses the most modern digital PLL synchronization technology. The received image can be saved with ‘Save’. ‘Reset’ resets the decoder and ‘Config’ is used to set the HF FAX parameters. The receiver should be set to the frequency carrier-1.9 kHz (USB used). If LSB is used the receiver frequency should be carrier + 1.9 kHz.When the received HFFAX transmission is seen between 1500 Hz and 2300 Hz, the decoder is properly tuned. The frequency bars (1500 and 2300 Hz) in the default HFFAX configuration are very useful in tuning.

69.3 Configuration

Pressing the ‘Config’ button opens the following Configuration dialog box.



69.3.1 Parameters

69.3.1.1 LPM
The switch selects how many lines per minute are sent / received.

69.3.1.2 IOC
The switch selects the IOC value (Index of Co-operation).

69.3.1.3 Sync in use
If 'Sync in use' is checked, SkySweeper synchronizes to the start of the picture. If 'Sync in use' is not selected, decoding is started immediately. Also if sync is used the FAX reception will be stopped when the stop pulse of FAX is detected.

69.3.1.4 Scroll
If the scroll checkbox is selected, the picture is scrolled from bottom up. Otherwise drawing is started at the top and re-started at the top when the picture area is full.

69.3.1.5 Grey Scale
If this parameter is selected, then the FAX picture is shown as a grayscale picture. Otherwise (as default) it is shown as a black & white picture.

69.3.1.6 Auto Save
Pressing the Auto Save button opens the Picture Auto Save Configuration Dialog which is used to save automatically fax pictures into file.

69.3.1.7 Post Processing Functions
Post processing functions can be used to correct properties of the picture after receiving. The post-processing functions are not enabled during receiving.

69.3.1.7.1 Start
If the picture is shifted in horizontally, the start slider can be used to set the left margin to the correct place.

69.3.1.7.2 Sampling
If the picture is slanted, the sampling slider is used to correct the slanting.

69.3.1.7.3 Intensity
The intensity of the picture can be changed with the Intensity slider.

69.3.1.7.4 Contrast
The contrast of the picture can be changed with the Contrast slider.

69.4 Save
The 'Save' button saves the received picture into a file in bitmap format.

69.5 Reset
The 'Reset' button resets the decoder and clears the window.

70 MFSK16 Decoder

70.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

70.2 General Description

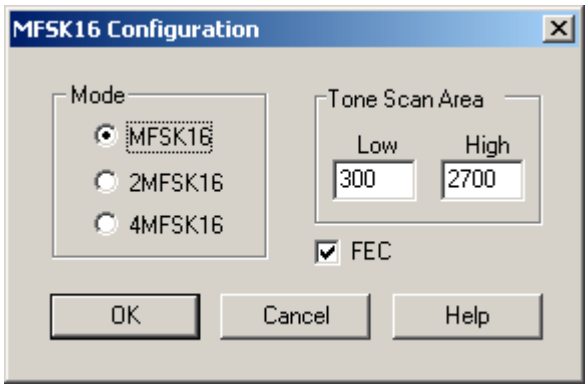
MFSK16 is based on multi-tone FSK modulation and also utilizes the most modern FEC (Forward Error Correction) techniques as well as interleaving. MFSK16 provides 31 WPM text throughput with FEC and 61 WPM with no FEC. SkySweeper uses soft bit Viterbi decoding in FEC mode. SkySweeper supports also 2MFSK16 (63WPM) and 4MFSK16(125 WPM) modes.

The decoder searches the MFSK16 transmission within the given frequency boundaries. Also you can set the first MFSK16 frequency by double clicking the mouse on the required frequency position. The value of the first MFSK16 frequency is shown on the screen. When an MFSK16 transmission has been detected in the given range, the decoder will then lock itself to that frequency. When locked, the decoder draws a bold blue line on the spectrum display at the currently locked frequency (the blue line is drawn on the 1st tone frequency). If the decoder is not locked, then the blue line is not shown as bold. When the frequency is locked, the decoder starts to estimate the keying parameters of the transmission. When all the parameters have been estimated, then the decoder starts to print characters on the screen. In the locked state, the carrier frequencies are automatically monitored within the given frequency boundaries and if the carrier frequency changes, then the decoder moves to a new frequency. If 'Lock' is pressed in the user interface, then the decoder will not automatically change its frequency. ‘Reset’ resets the decoder. Received text can be saved using ‘Save’. The parameters can be modified by pressing the ‘Config’ button. Note that you can install several decoders in one configuration, if required.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

70.3 Configuration

Pressing the ‘Config’ button opens the following Configuration dialog box.



70.3.1 Parameters:

70.3.1.1 Tone scan area

The scanned frequency range is given with two values - 'low' and 'high'. The MFSK16 transmission is searched for only within this frequency window.

70.3.1.2 FEC

If FEC is selected, the Forward Error Correction is used. This means that interleaving and convolution coding is used to protect the data. When FEC is selected, the text throughput will be dropped by 50%.

70.3.1.3 Mode

The used mode is selected here. MFSK16 is a standard MFSK16 transmission. 2MFSK16 is double speed version and 4MFSK16 is four times faster version of the standard mode.

70.4 FFT

The 'FFT' button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has locked into the correct frequency in order to get more space for the text window.

70.5 Save

The 'Save' button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

70.6 Lock

The 'Lock' button locks or unlocks the decoder frequency. Decoders have the automatic frequency tracking feature. Push the 'Lock' button when you want to lock the decoder onto a selected frequency. Push the 'Unlock' button when you want to release frequency locking.

70.7 Reset

The 'Reset' button resets the decoder and clears the text window.

71 MFSK36 Decoder

71.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : YES
SkySweeper PRO : YES

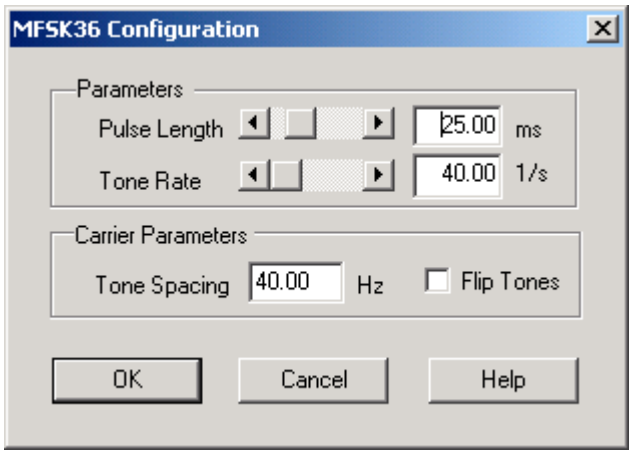
71.2 General Description

The MFSK36 decoder decodes 36 tone MFSK transmissions. The most commonly used MFSK36 system is CROWD-36. The frequency of MFSK36 (the lowest tone) is always set to the 900 Hz. 'Reset' resets the decoder. Received text can be saved using 'Save'.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

71.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



71.3.1 Parameters:

71.3.1.1 Pulse Length

The pulse length/ tone rate can be set here. In CROWD-36 the tone rate is 40 1/s.

71.3.1.2 Tone Spacing

This parameter is the distance (in Hz) between tones. In CROWD-36 the distance is 40 Hz.

71.3.1.3 Flip Tones

If this is selected, the tone order is reversed (highest tone is considered as a lowest and vice versa). This is used when LSB is used instead of USB.

71.4 FFT

The ‘FFT’ button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has locked into the correct frequency in order to get more space for the text window.

71.5 Save

The ‘Save’ button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

71.6 Lock

The ‘Lock’ button has no effect in this case.

71.7 Reset

The ‘Reset’ button resets the decoder and clears the text window.

72 MIL-ALE Decoder

72.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

72.2 General Description

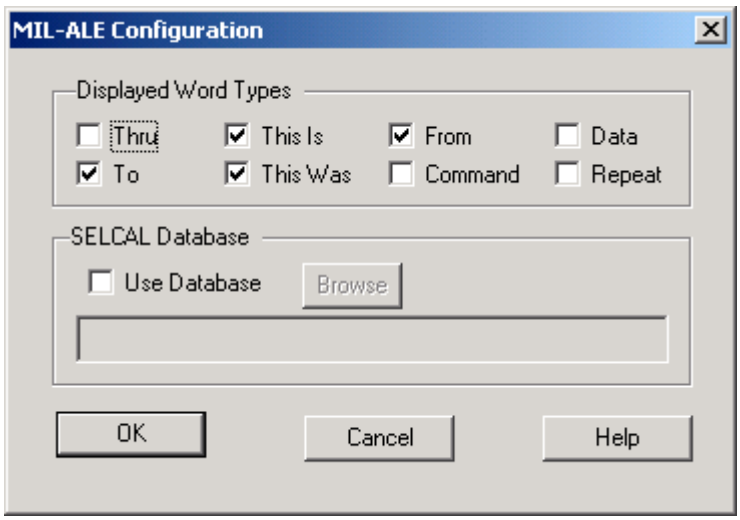
The MIL-ALE decoder supports the FS-1045A (MIL-STD-188-141A) standard. It decodes the basic ALE word types like selective calls (caller, and the ID which is called). It also prints the content of the control and data messages in ASCII format, if needed.

The frequency of the ALE decoder is always set to 800 Hz (the location of the lowest tone).'Reset' resets the decoder. The received text can be saved using 'Save'. The parameters can be modified by pressing the 'Config' button.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

72.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



72.3.1 Parameters:

72.3.1.1 Displayed Word Types

- ·Thru present multiple direct destinations for group calls
- ·To present direct destination

- ·From identification of the present transmitter
- ·Command ALE system-wide station orderwire for coordination, control, status, and special functions
- ·This Is identification of the present transmitter
- ·This Was identification of the present transmitter, the signal and the protocol termination
- ·Data extension of the data field of the previous ALE word
- ·Repeat duplication of the previous preamble, with a new data field

72.3.1.2 SELCAL Database

If the Use Database check box is selected, the Browse button is used to open the selective call database. The database format is the following.

SELCAL1 Description 1
SELCAL2 Description 2

The decoder shows corresponding selective call description if it is found from file. The SELCAL and description must be separated by tabulator. The description can contain any characters.

72.4 FFT

The 'FFT' button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has locked into the correct frequency in order to get more space for the text window.

72.5 Save

The 'Save' button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

72.6 Lock

The 'Lock' button has no effect in this case.

72.7 Reset

The 'Reset' button resets the decoder and clears the text window.

73 OLIVIA Decoder

73.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

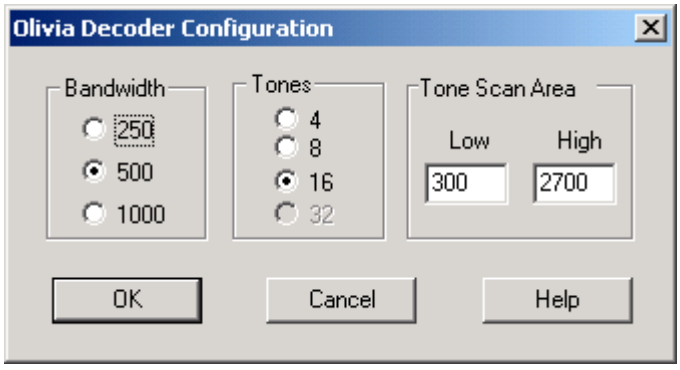
73.2 General Description

SkySweeper's Olivia decoder supports all the standardized combinations of bandwidths (250, 500, 1000 Hz) and the number of tones (4, 8, 16, 32). 'Config' allows user to change the transmitter parameters.
The decoder searches the Olivia transmission automatically within the given frequency boundaries. Also you can set the first Olivia tone frequency by double clicking the mouse on the required frequency position. The number value of the first Olivia tone frequency is shown on the screen. When Olivia transmission has been detected in the given range, the decoder will then lock itself to that frequency. When locked, the decoder draws a bold blue line on the spectrum display at the currently locked frequency (the blue line is drawn on the 1st tone frequency) and the decoder starts to print characters on the screen. In the locked state, the carrier frequencies are automatically monitored within the given frequency boundaries and if the carrier frequency changes, then the decoder moves to a new frequency. If 'Lock' is pressed in the user interface, then the decoder will not automatically change its frequency. 'Reset' resets the decoder. Received text can be saved using 'Save'. The parameters can be modified by pressing the 'Config' button. Note that you can install several decoders in one configuration, if required.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

73.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



73.3.1 Parameters

73.3.1.1 Tone Scan Area
The scanned frequency range is given with two values - ‘low’ and ‘high’. The Olivia transmission is searched for only within this frequency window.

73.3.1.2 Bandwidth
This is the transmission bandwidth.

73.3.1.3 Tones
This is the number of tones in the transmission.

73.4 FFT
The ‘FFT’ button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

73.5 Save
The ‘Save’ button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

73.6 Lock
The ‘Lock’ button locks or unlocks the decoder frequency. Decoders have the ‘automatic frequency tracking’ feature. Push the ‘Lock’ button when you want to lock decoder to a selected frequency. Push the ‘Unlock’ button when you want to release frequency locking.

73.7 Reset
The ‘Reset’ button resets the decoder and clears the text window.

74 QPSK Decoder

74.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

74.2 General Description

The QPSK decoder supports soft bit Viterbi decoding. The decoder uses the most modern digital PLL synchronization technology for bit synchronization and a neural network for detection. It prints QPSK varicode characters on the screen. It searches the QPSK transmission within the given frequency boundaries. Also you can set the decoded frequency by double clicking the mouse on the required frequency position.

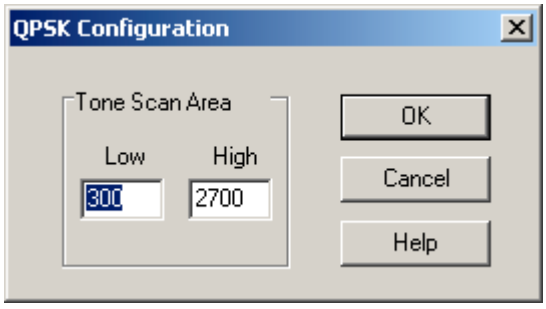
When QPSK transmission has been detected at some frequency within the given range, the decoder will then lock itself to that frequency. When locked, the decoder draws a bold blue line on the spectrum display, at the currently locked frequency. If the decoder is not locked, then the blue line is not shown as bold. After locking the frequency, the decoder starts to estimate the keying parameters of the transmission. When all the parameters have been estimated, then the decoder starts to print characters on the screen.

In the locked state, the carrier frequency is automatically monitored within the given frequency boundaries. If the carrier frequency changes, then the decoder moves to the new frequency. If 'Lock' is pressed in the user interface, then the decoder will not automatically change its frequency. When 'UnLock' is pressed the lock will be released and the automatic tuning starts again to work. 'Reset' resets the decoder and the received text can be saved using 'Save'.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

74.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



74.3.1 Parameters

74.3.1.1 Tone Scan Area

The scanned frequency range is given with two values - ‘low’ and ‘high’. The QPSK transmission is searched for only within this frequency window. In most cases it is useful to first search for the transmission visually using the spectrogram, FFT and 3DFFT displays and then define the scan area for the QPSK decoder.

74.4 FFT

The ‘FFT’ button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

74.5 Save

The ‘Save’ button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

74.6 Lock

The ‘Lock’ button locks or unlocks the decoder frequency. Decoders have the ‘automatic frequency tracking’ feature. Push the ‘Lock’ button when you want to lock decoder to a selected frequency. Push the ‘Unlock’ button when you want to release frequency locking.

74.7 Reset

The ‘Reset’ button resets the decoder and clears the text window.

75 PACTOR Decoder

75.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

75.2 General Description

The PACTOR decoder supports the listen mode for both PACTOR-1 ARQ and FEC transmissions. The Huffman coded and 8-bit ASCII coding are supported (Huffman is set as default).

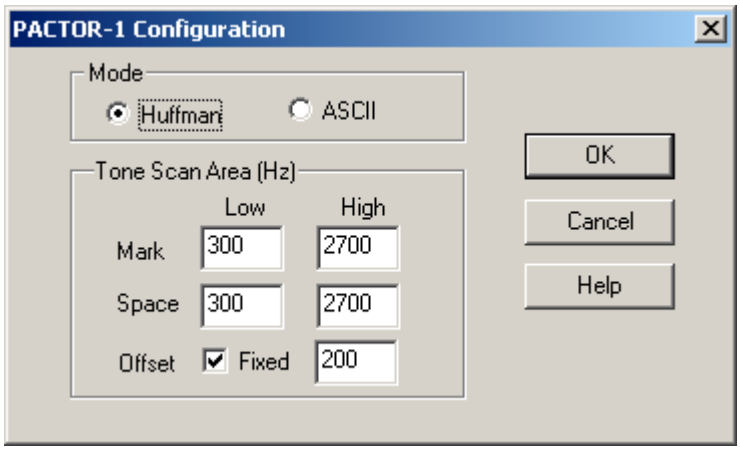
ASCII coding is normally used in selective calls and Huffman coding in other types of PACTOR transmissions.

The decoder uses the most modern digital PLL synchronization technology for bit synchronization and neural networks for detection, and prints characters on the screen. It searches the PACTOR transmission within the given frequency boundaries. Also you can set the first FSK frequency by double clicking mouse on the required frequency position and then SkySweeper allows you to set the second frequency (this can be set by a mouse click). The values of frequencies and the frequency offset are also shown on the screen. When a PACTOR transmission has been detected in the given range, the decoder will then lock itself to that frequency. When locked, the decoder draws a bold blue line on the spectrum display at the currently locked frequency. If the decoder is not locked, then the blue line is not shown as bold. After locking the frequency, the decoder starts to estimate the keying parameters of the transmission. When all the parameters have been estimated, then the decoder starts to print characters on the screen. In the locked state, the carrier frequencies are automatically monitored within the given frequency boundaries. If the carrier frequency changes, then the decoder moves to a new frequency. If 'Lock' is pressed in the user interface, then the decoder will not automatically change its frequency. When ‘UnLock’ is pressed the lock will be released and the automatic tuning starts to work again. ‘Reset’ resets the decoder. The received text can be saved using ‘Save’. The parameters can be modified pressing the ‘Config’ button. Note: You can install several decoders in one configuration, if needed.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

75.3 Configuration

Pressing the ‘Config’ button opens the following Configuration dialog box.



75.3.1 Parameters

75.3.1.1 Mode

With this switch you can select the coding to be received (Huffman/ASCII). If you wish, you can add two PACTOR decoders in your configuration (one decoding ASCII and another decoding Huffman).

75.3.1.2 Tone Scan Area

The PACTOR transmission has two tones - Mark and Space. The scanned frequency range for Mark and Space will be given with two values, namely ‘low’ and ‘high’. The Mark and Space tones are only searched for inside this frequency window.

75.3.1.3 Offset

If the fixed Offset check box is selected, the user can give a fixed frequency offset between the Mark and Space carrier frequencies. The fixed frequency offset is used in automatic scanning mode. In PACTOR, the default fixed offset is 200 Hz.

75.4 FFT

The ‘FFT’ button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

75.5 Save

The ‘Save’ button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

75.6 Lock

The ‘Lock’ button locks or unlocks the decoder frequency. The decoders have the automatic frequency tracking feature. Push the ‘Lock’ button when you want to lock the decoder onto a selected frequency. Push the ‘Unlock’ button when you want to release frequency locking.

75.7 Reset

The ‘Reset’ button resets the decoder and clears the text window.

76 PICCOLO Decoder

76.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : YES
SkySweeper PRO : YES

76.2 General Description

SkySweeper's PICCOLO decoder supports PICCOLO-6 and PICCOLO-12 modes.

PICCOLO decoder searches the transmission automatically. Also you can set the decoded frequency manually by double clicking the left mouse on the required frequency position.

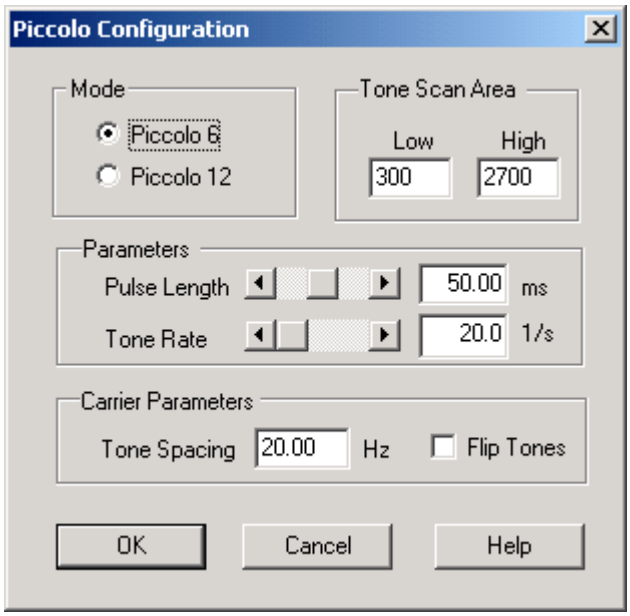
When the PICCOLO transmission has been detected within the given range, the decoder will then lock itself to that frequency. When locked, the decoder draws a bold blue line on the spectrum display, at the currently locked frequency (blue line shown at the lowest tone). If the decoder is not locked, then the blue line is not shown as a bold line

In the unlocked state, the carrier frequency is automatically monitored within the given frequency boundaries and if the carrier frequency changes, then the decoder moves to the new frequency. If 'Lock' is pressed in the user interface, then the decoder will not automatically change its frequency and also decoding speed is locked to it's current state. 'Reset' resets the decoder. Received text can be saved using 'Save'.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

76.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



76.3.1 Parameters

76.3.1.1 Mode

This is the operational mode (PICCOLO 6 / PICCOLO 12)

76.3.1.2 Tone Scan Area

The scanned frequency range is given with two values – 'low' and 'high'. The PICCOLO transmission is searched only within this frequency window. In most cases it is useful firstly to search the transmission visually, using the spectrogram, FFT and 3DFFT displays and then define the scan area for the PICCOLO decoder.

76.3.1.3 Pulse Length

The pulse length/ tone rate can be set here. In PICCOLO-6 the tone rate is typically10 or 20 1/s.

76.3.1.4 Tone Spacing

This parameter is the distance (in Hz) between tones. In PICCOLO the distance is typically 20 Hz.

76.3.1.5 Flip Tones

If this is selected, the tone order is reversed (highest tone is considered as a lowest and vice versa). This is used when LSB is used instead of USB.

76.4 FFT

The 'FFT' button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

76.5 Save

The ‘Save’ button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

76.6 Lock

The ‘Lock’ button locks or unlocks the decoder frequency. The decoders have the automatic frequency tracking feature. Push the ‘Lock’ button when you want to lock the decoder onto a selected frequency. Push the ‘Unlock’ button when you want to release frequency locking.

76.7 Reset

The ‘Reset’ button resets the decoder and clears the text window.

77 PSK Decoder

77.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

77.2 General Description

The PSK decoder PSK31(31 baud), PSK63 (63 baud) and PSK125 (125 baud) modes. The decoder uses the most modern digital PLL synchronization technology for bit synchronization and a neural network for detection. It prints PSK varicode characters on the screen. It searches the PSK transmission within the given frequency boundaries. Also you can set the decoded frequency by double clicking the mouse on the required frequency position.

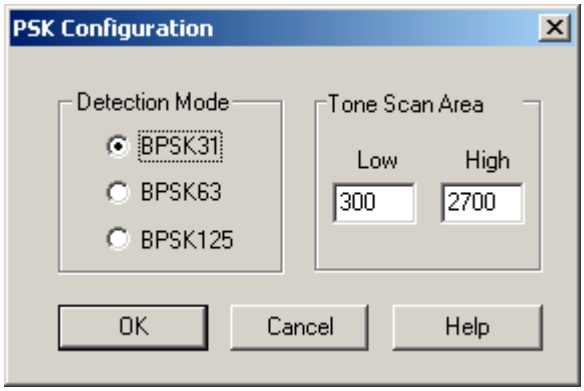
When PSK transmission has been detected at some frequency within the given range, the decoder will then lock itself to that frequency. When locked, the decoder draws a bold blue line on the spectrum display, at the currently locked frequency. If the decoder is not locked, then the blue line is not shown as bold. After locking the frequency, the decoder starts to estimate the keying parameters of the transmission. When all the parameters have been estimated, then the decoder starts to print characters on the screen.

In the locked state, the carrier frequency is automatically monitored within the given frequency boundaries. If the carrier frequency changes, then the decoder moves to the new frequency. If 'Lock' is pressed in the user interface, then the decoder will not automatically change its frequency. When 'UnLock' is pressed the lock will be released and the automatic tuning starts again to work. 'Reset' resets the decoder and the received text can be saved using 'Save'.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

77.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



77.3.1 Parameters

77.3.1.1 Detection Mode

The mode BPSK31, BPSK63 or BPSK125 is selected here.

77.3.1.2 Tone Scan Area

The scanned frequency range is given with two values - ‘low’ and ‘high’. The PSK transmission is searched for only within this frequency window. In most cases it is useful to first search for the transmission visually using the spectrogram, FFT and 3DFFT displays and then define the scan area for the PSK decoder.

77.4 FFT

The ‘FFT’ button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

77.5 Save

The ‘Save’ button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

77.6 Lock

The ‘Lock’ button locks or unlocks the decoder frequency. Decoders have the ‘automatic frequency tracking’ feature. Push the ‘Lock’ button when you want to lock decoder to a selected frequency. Push the ‘Unlock’ button when you want to release frequency locking.

77.7 Reset

The ‘Reset’ button resets the decoder and clears the text window.

78 ASCII / RTTY / SYNOP Decoder

78.1 Availability

	(no SYNOP/SHIP)
SkySweeper STD	: YES
SkySweeper STD+	: YES
SkySweeper PRO	: YES

78.2 General Description

The RTTY decoder supports BAUDOT, asynchronous ASCII and SYNOP decoding. The decoder searches for the transmission within the given frequency boundaries. Also you can set the lower FSK frequency by double clicking the mouse on the required frequency position, and then SkySweeper allows you to set a second (=higher) frequency (which can be set by a mouse click). The values of the frequencies and the frequency offset are also shown on the screen.

When a transmission has been detected within the given range, the decoder will then lock itself to that frequency. When locked, the decoder draws a bold blue line on the spectrum display at the currently locked frequency. If the decoder is not locked, then the blue line is not shown as bold. After locking the frequency, the decoder starts to estimate the keying parameters of the transmission. When all the parameters have been estimated, then the decoder starts to print characters on the screen.

In the RTTY's "autodetect" mode, the transmission mode is automatically recognised. The estimation takes about 20-30 seconds.

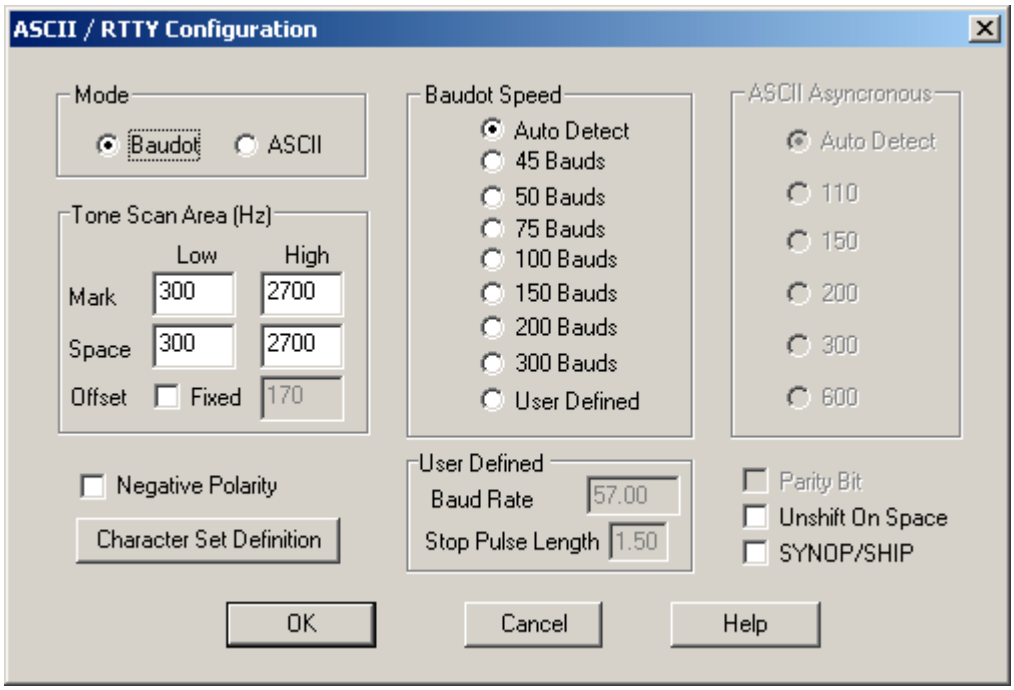
In the non-locked state, the carrier frequencies are automatically monitored between the given frequency boundaries. If the carrier frequency changes, then the decoder moves to a new frequency. If 'Lock' is pressed in the user interface, then the decoder will not automatically change its frequency. ‘Reset’ resets the decoder and the received text can be saved using ‘Save’. The parameters can be modified pressing the ‘Config’ button. Note that you can install several decoders in one configuration, if needed.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

The received text can be saved with ‘Save’. ‘Reset’ resets the decoder and ‘Config’ is used to set the parameters.

78.3 Configuration

Pressing the ‘Config’ button opens the following Configuration dialog box.



78.3.1 Parameters

78.3.1.1 Mode

This is the main operating mode of the decoder (ASCII or RTTY). If RTTY is selected, all of the RTTY modes are activated for selection. If ASCII is selected, then all of the ASCII modes are activated.

78.3.1.2 Baudot Speed

With this parameter the RTTY baud rate to be received can be selected. If the baud rate auto detection is switched on, it will take about 20 seconds to detect the correct transmission speed and start the decoding. If the speed (say 75 bauds) is selected by the user, then the decoder starts to decode immediately after the frequencies have been locked. If the user defined mode is selected, both the Baud Rate and the Stop Pulse Length can be defined.

78.3.1.3 User Defined

If the user defined Baudot mode is selected, the Baud Rate and Stop Pulse Length can be defined in the edit boxes.

78.3.1.4 ASCII Asynchronous

With this parameter the ASCII mode to be received can be selected. If 'Auto Detect' is selected SkySweeper automatically senses the mode of the transmission and starts to detect it.

78.3.1.5 Tone Scan Area

The RTTY transmission has two tones - Mark (typically 2125 Hz from the carrier) and Space (typically 2295 Hz from the carrier). The scanned frequency range for Mark and Space will be given with two values - 'low' and 'high'. The Mark and Space tones are searched for only inside this frequency window.

78.3.1.6 Fixed Offset

If the 'Offset – Fixed' check box is selected, the user can enter the fixed frequency offset between the Mark and Space carrier frequencies. The fixed frequency offset is used in automatic scanning mode.

78.3.1.7 Negative Polarity

If selected, the polarity is negative i.e. the Mark frequency is now higher than the Space.

78.3.1.8 Parity Bit

If selected, the parity bit is used. The parity bit parameter can only be used in the ASCII mode.

78.3.1.9 Unshift On Space

When this parameter is set as active, the decoder always returns to the LETTER character set when the ALL SPACE character is detected. This is a very useful feature when a noisy RTTY signal is received, and figure groups are not expected.

78.3.1.10 Synop Decoding

The SYNOP (FM-12) message decoding can be started by selecting this flag as active.

78.3.1.11 Character Set Definition

By clicking this button, the RTTY/BAUDOT character set can be changed. The RTTY control characters cannot be changed in the Character Set Configuration Dialog.

78.4 FFT

The 'FFT' button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

78.5 Save

The 'Save' button opens the log file control Dialog, which is used to Open or Close a log file. The detector text window can also be saved into a file or sent into a socket.

78.6 Lock

The 'Lock' button locks or unlocks the decoder frequency. The decoders have the 'automatic frequency tracking' feature. Push the 'Lock' button when you want to lock the decoder onto a selected frequency. Push the 'Unlock' button when you want to release frequency locking.

78.7 Reset

The 'Reset' button resets the decoder and clears the text window.

79 SELCAL (ICAO) Decoder

79.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

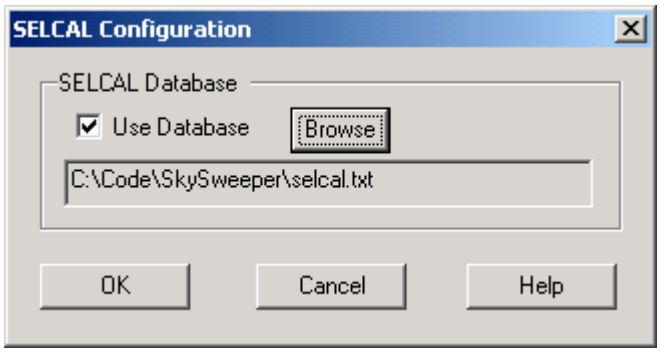
79.2 General Description

The SELCAL mode supports Aircraft Selective Call (ICAO, Annex 10). It is imperative that the receiver has been set to the correct frequency. The frequency error should be less than 10 Hz to provide correct decoding.
The SELCAL consists of 2x 2 tones (duration 1 sec), according to the following specification:

Designation	Frequency (Hz)
A	312.6
B	346.7
C	384.6
D	426.6
E	473.2
F	524.8
G	582.1
H	645.7
J	716.1
K	794.3
L	881.0
M	977.2
P	1083.9
Q	1202.3
R	1333.5
S	1479.1

79.3 Configuration

Pressing the ‘Config’ button opens the following Configuration dialog box.



79.3.1 Parameters

79.3.1.1 SELCAL Database

If the Use Database check box is selected, the Browse button is used to open the selective call database. The database format is the following.

SELCAL1 Description 1
SELCAL2 Description 2

The decoder shows corresponding selective call description if it is found from file. The SELCAL and description must be separated by tabulator. The description can contain any characters.

79.4 FFT

The 'FFT' button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

79.5 Save

The 'Save' button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

79.6 Lock

This button has no effect in the SELCAL decoder.

79.7 Reset

The 'Reset' button resets the decoder and clears the text window.

80 SITOR Decoder

80.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

80.2 General Description

The SITOR decoder supports both SITOR-A (also called AMTOR) and SITOR-B (also called NAVTEX). The decoder uses the most modern digital PLL synchronization technology for bit synchronization and a neural network for detection, and it prints SITOR characters on the screen. It searches for the SITOR transmission within the given frequency boundaries. Also you can set the first FSK frequency by double clicking the mouse on the required frequency position and then SkySweeper allows you to set the second frequency with a mouse click. The values of frequencies and the frequency offset are also shown on the screen.

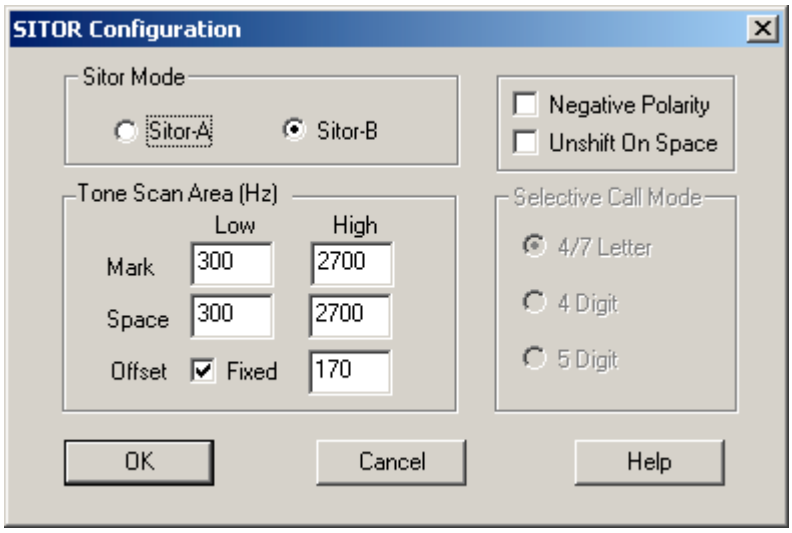
When the SITOR transmission has been detected within the given range, the decoder will then lock itself to that frequency. When locked, the decoder draws a bold blue line on the spectrum display at the currently locked frequency. If the decoder is not locked, then the blue line is not shown as bold. After locking the frequency, the decoder starts to estimate the keying parameters of the transmission. When all of the parameters have been estimated, then the decoder starts to print characters on the screen.

In the locked state, the carrier frequencies are automatically monitored within the given frequency boundaries and if the carrier frequency changes, then the decoder moves to a new frequency. If 'Lock' is pressed in the user interface, then the decoder will not automatically change its frequency. ‘Reset’ resets the decoder. Received text can be saved using ‘Save’. The parameters can be modified pressing the ‘Config’ button. Note that you can install several decoders in one configuration, if you wish.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

80.3 Configuration

Pressing the ‘Config’ button opens the following Configuration dialog box.



80.3.1 Parameters

80.3.1.1 Sitor Mode

The mode selector (SITOR-A or SITOR-B).

80.3.1.2 Selective Call Mode

With this switch, you can select how a SITOR-A selective call is decoded. Both four and seven letter modes are supported. The four letter call can also be presented as a four or five digit number. If the letter to digit conversion is not successful, string '****' will be printed.

80.3.1.3 Tone Scan Area

The SITOR transmission has two tones Mark (typically 2125 Hz from the carrier) and Space (typically 2295 Hz from the carrier). The scanned frequency range for Mark and Space will be given with two values - ‘low’ and ‘high’. The Mark and Space tones are searched for only inside this frequency window.

80.3.1.4 Fixed Offset

If the fixed Offset check box is selected, the user can enter the Fixed Frequency Offset between the Mark and Space carrier frequencies. The Fixed Frequency Offset is used in the automatic scanning mode.

80.3.1.5 Negative Polarity

If selected, the polarity is negative i.e. the Mark and Space tones are transposed.

80.3.1.6 Unshift On Space

When this parameter is set as active, the decoder always returns to the LETTER character set when the ALL SPACE character is detected. This is a most useful feature when a noisy RTTY signal is being received.

In most cases it is preferable firstly to search for the transmission visually using spectrogram, FFT and 3DFFT displays, and then define the scan areas for the SITOR decoder.

80.4 FFT

The ‘FFT’ button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

80.5 Save

The ‘Save’ button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

80.6 Lock

The ‘Lock’ button locks or unlocks the decoder frequency. The decoders have the ‘automatic frequency tracking’ feature. Push the ‘Lock’ button when you want to lock the decoder onto a selected frequency. Push the ‘Unlock’ button when you want to release the frequency locking.

80.7 Reset

The ‘Reset’ button resets the decoder and clears the text window.

81 SkyBoost Decoder

81.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

81.2 General Description

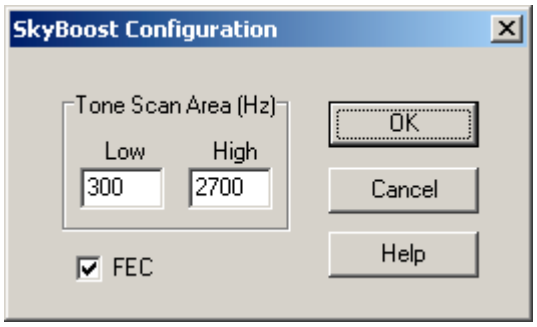
The SkyBoost mode has been developed according the specifications of our most demanding professional customers. It is perhaps the most modern operating mode for very long distance communications on HF (error free communication even 16 dB below noise level). SkyBoost is based on the multi-tone FSK modulation, and the bandwidth used is 344 Hz. It also utilizes the most modern FEC (Forward Error Correction) techniques as well as interleaving. SkyBoost provides 21.9 WPM text throughput with FEC and 43.8 WPM with no FEC. SkyBoost uses soft bit Viterbi decoding in FEC mode.

The decoder searches for a SkyBoost transmission within the given frequency boundaries. Also you can set the first SkyBoost frequency by double clicking the mouse on the required frequency position. The value of the first SkyBoost frequency is shown on the screen. When the SkyBoost transmission has been detected in the given range, the decoder will then lock itself to that frequency. When locked, the decoder draws a bold blue line on the spectrum display at the currently locked frequency (the bold blue line is drawn on the 1st tone frequency). If the decoder is not locked, then the blue line is not shown as bold. When the frequency is locked, the decoder starts to estimate the keying parameters of the transmission. When all the parameters have been estimated, the decoder starts to print characters on the screen. In the locked state, the carrier frequencies are automatically monitored within the given frequency boundaries. If the carrier frequency changes, then the decoder moves to a new frequency. If 'Lock' is pressed in the user interface, then the decoder will not automatically change its frequency. ‘Reset’ resets the decoder. Received text can be saved using ‘Save’. The parameters can be modified pressing the ‘Config’ button. Note: You can install several decoders in one configuration, if needed.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

81.3 Configuration

Pressing the ‘Config’ button opens the following Configuration dialog box.



81.3.1 Parameters:

81.3.1.1 Tone Scan Area

The scanned frequency range is given with two values - 'low' and 'high'. The SkyBoost transmission is searched for only inside this frequency window.

81.3.1.2 FEC

If FEC is selected, Forward Error Correction is used. This means that interleaving and convolution coding is used to protect the data. When FEC is selected, the text throughput will be dropped by 50%.

81.4 FFT

The 'FFT' button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

81.5 Save

The 'Save' button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

81.6 Lock

The 'Lock' button locks or unlocks the decoder frequency. The decoders have the 'automatic frequency tracking' feature. Push the 'Lock' button when you want to lock the decoder onto a selected frequency. Push the 'Unlock' button when you want to release frequency locking.

81.7 Reset

The 'Reset' button resets the decoder and clears the text window.

82 STANAG 4285 Decoder

82.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : YES
SkySweeper PRO : YES

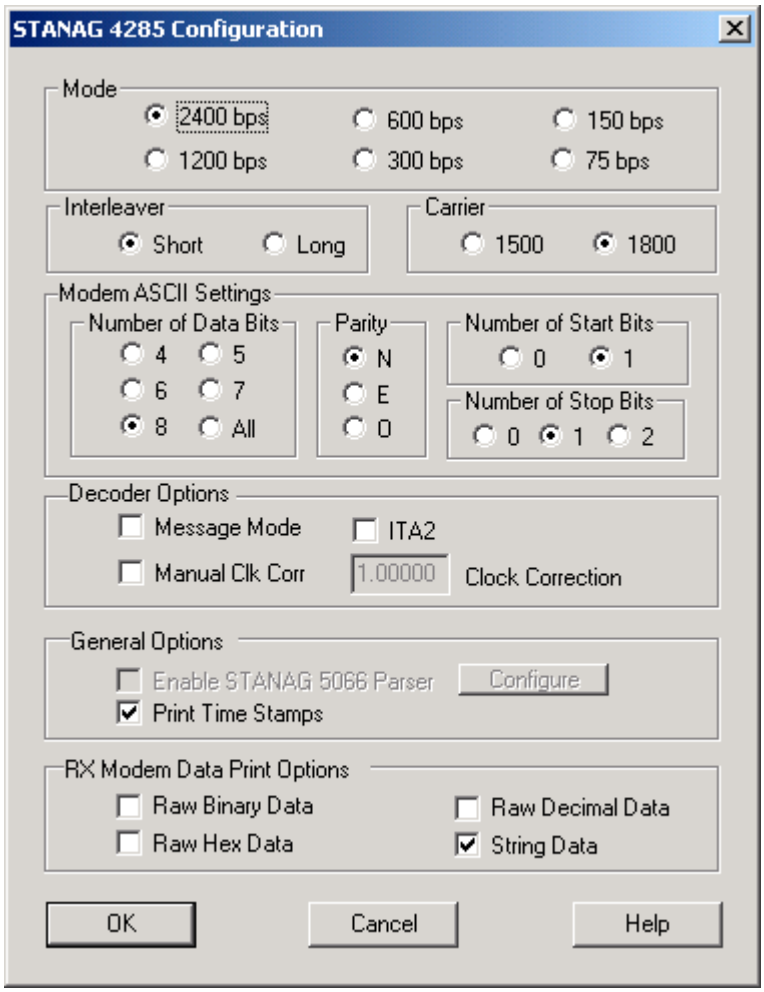
82.2 General Description

STANAG 4285 is the NATO standard for HF communication. It consists of several sub modes (75-2400 bps) and two different interleaving options (short and long). The receiver should be in USB mode and provide flat frequency response from 600 Hz to 3000 Hz.
STANAG modes are quite sensitive to sound card clock error. So, in case of decoding problems please try to calibrate the sound card and also some other sound card (if possible). If you are reading the STANAG signal from file, please be careful what clock correction is in use. It is also possible to set the clock correction value manually.

The center frequency is set to1800Hz and cannot be changed. The optimum signal level for the reception is when the spectrum display shows the signal power 40 dB lower than the maximum (0 dB). The decoder has two main operational modes: 'Slot Mode' and 'Message Mode'. In the Slot Mode the decoder prints every STANAG slot (length 0.1067 sec) it receives. In the Message Mode the whole STANAG4285 message (several slots) is printed at the same time. The STANAG5066 message decoder can only be activated in Message Mode. STANAG4285 doesn't provide any information about the used mode, so the correct mode has to be known beforehand or searched manually. In the slot mode the SYNC/NOSYNC information is printed to the decoder status bar. SYNC means that the decoder has synchronized itself to the transmission. NOSYNC means that the decoder is not syncronized. The value (0%) in the status bar means how probable the currently decoded mode is to be the correct mode. 0% means very unlikely to be correct mode and 100% mean quite surely the correct mode. To achieve high probability value the mode (speed and interleaver) and the bit format (start, data, parity and stop bits) has to be correct.

82.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



82.3.1 Parameters

82.3.1.1 Mode

This selects the mode based on the net bit rate. 'Auto' means the automatic mode search.

82.3.1.2 Interleaver

This selects the used interleaver (short/long).

82.3.1.3 Carrier

This selects the carrier frequency (1500/1800Hz). The 1800 Hz is the standard. The1500 Hz should be used only in cases when the frequency response of the receiver filters is not optimal.

82.3.1.4 Modem ASCII Settings

The ASCII mode is configured here:

- number of ASCII data bits (4 - 8, all)
- parity bit (None, Even, Odd)
- Number of start bits (0 or 1)
- Number of stop bits (0,1 or 2)

If all is selected as a number of data bits, all received bits including start, stop and parity bits will be displayed by the bit tool. The bit tool is included in SkySweeper PRO.
Typically STANAG modem uses 8N1 (1 start bit, 8 ASCII data bits, no parity, 1 stop bit) or 5N2 (1 start bit, 5 ITA2 data bits, no parity, 2 stop bits) formats. STANAG decoder supports

ASCII and ITA2 character sets. STANAG decoder can be also used with Bit Analyser tool, which supports many character sets and better bit analysis tools.

82.3.1.5 Message Mode

Selects the operational mode. If the Message Mode is activated the decoder prints STANAG4285 messages (multiple slots) otherwise every received slot is printed. The mode analysis (sync info as well the mode probability) is done only in the slot mode. In the normal communication 'Message Mode' should be activated.

82.3.1.6 ITA2

This can be activated if the number of data bits is five. When activated the characters are printed in ITA2 format. The most common ITA2 formats are 5N2 and 5N1.

82.3.1.7 Manual Clk Corr

If the manual clock correction is activated, the clock correction value given by the user is used instead of system clock correction value

82.3.1.8 Enable STANAG 5066 Parser

If check box selected enables STANAG 5066 Message Parser, which can be configure by pressing configure button. Parser can be used only in Message Mode.

82.3.1.9 Print Time Stamps

If checked time stamp is printed after every message.

82.3.1.10 RX Modem Data Print Options

These are the decoder print options. The data can be printed in the binary, hexadecimal, decimal or string format.

82.4 FFT

The 'FFT' button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

82.5 Save

The 'Save' button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

82.6 Lock

'Lock' doesn't have any effect in STANAG4285.

82.7 Reset

The 'Reset' button resets the decoder and clears the text window.

83 STANAG 4539 Decoder

83.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : YES
SkySweeper PRO : YES

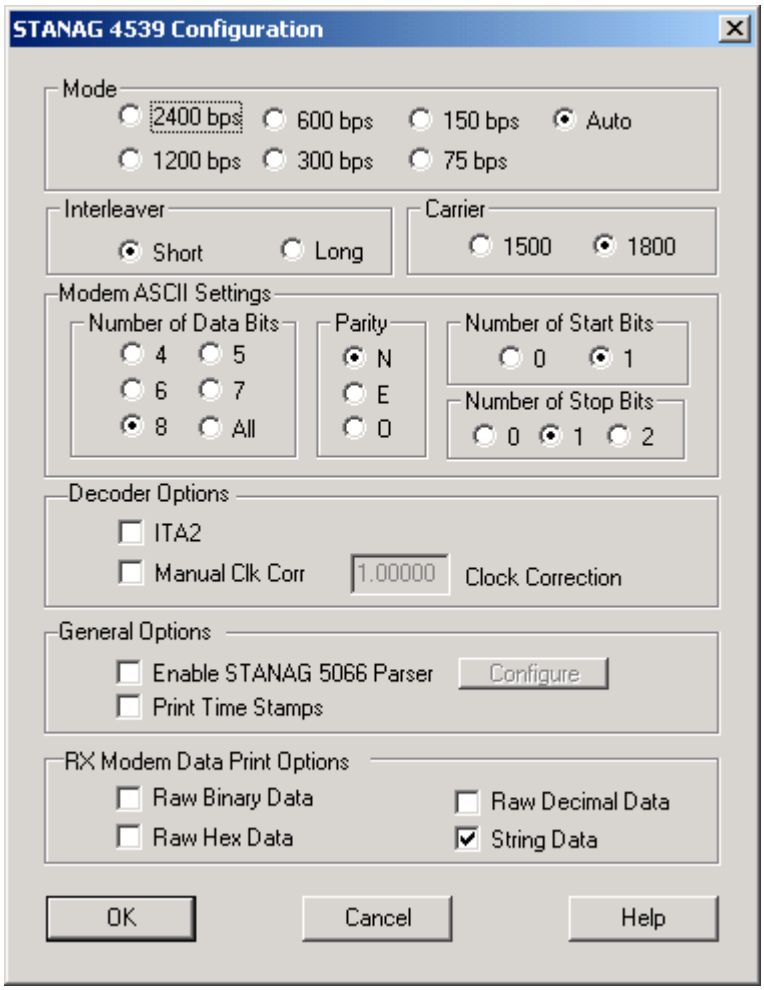
83.2 General Description

This mode is known as several names like MIL-STD-188-110A/B, FED-STD-1052 and STANAG 4539. The mode consists of several sub modes (75-2400 bps) and two different interleaving options (short and long). 75B is the frequency hopping variant and all the others are fixed mode variants. The receiver should be in USB mode and provide flat frequency response from 600 Hz to 3000 Hz. STANAG modes are quite sensitive to sound card clock error. So, in case of decoding problems please try to calibrate the sound card and also some other sound card (if possible). If you are reading the STANAG signal from file, please be careful what clock correction is in use. It is also possible to set the clock correction value manually.

The center frequency is at 1800Hz. The optimum signal level for the reception is when the spectrum display shows the signal power 40 dB lower than the maximum (0 dB). SkySweeper supports also possibility to set the center frequency to 1500 Hz in case of bad frequency response of analog filters around 3000Hz. The decoder identifies automatically the mode and the interleaver, so it is recommended to set the decoder to "Auto" mode. It is also possible to set the decoder to the desired mode. Auto mode detection is then disabled.

83.3 Configuration

Pressing the ‘Config’ button opens the following Configuration dialog box.



83.3.1 Parameters

83.3.1.1 Mode

This selects the mode based on the net bit rate. 'Auto' means the automatic mode search.

83.3.1.2 Interleaver

This selects the used interleaver (short/long).

83.3.1.3 Carrier

This selects the carrier frequency (1500/1800Hz). The 1800 Hz is the standard. The1500 Hz should be used only in cases when the frequency response of the receiver filters is not optimal.

83.3.1.4 Modem ASCII Settings

The ASCII mode is configured here:

- number of ASCII data bits (4 to 8, all)
- parity bit (None, Even, Odd)
- Number of start bits (0 or 1)
- Number of stop bits (0,1 or 2)

If all is selected as a number of data bits, all received bits including start, stop and parity bits will be displayed by the bit tool. The bit tool is included in SkySweeper PRO.

Typically STANAG modem uses 8N1 (1 start bit, 8 ASCII data bits, no parity, 1 stop bit) or 5N2 (1 start bit, 5 ITA2 data bits, no parity, 2 stop bits) formats. STANAG decoder supports ASCII and ITA2 character sets.

STANAG decoder can be used with Bit Analyser tool, which supports many character sets.

83.3.1.5 ITA2

This can be activated if the number of data bits is five. When activated the characters are printed in ITA2 format. The most common ITA2 formats are 5N2 and 5N1.

83.3.1.6 Manual Clk Corr

If the manual clock correction is activated, the clock correction value given by the user is used instead of system clock correction value

83.3.1.7 Enable STANAG 5066 Parser

If check box selected enables STANAG 5066 Message Parser, which can be configure by pressing configure button.

83.3.1.8 Print Time Stamps

If checked time stamp is printed after every message.

83.3.1.9 RX Modem Data Print Options

These are the decoder print options. The data can be printed in the binary, hexadecimal, decimal or string format.

83.4 FFT

The 'FFT' button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

83.5 Save

The 'Save' button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

83.6 Lock

'Lock' doesn't have any effect in STANAG4539.

83.7 Reset

The 'Reset' button resets the decoder and clears the text window.

84 STANAG 5066 Message Parser

84.1 Availability

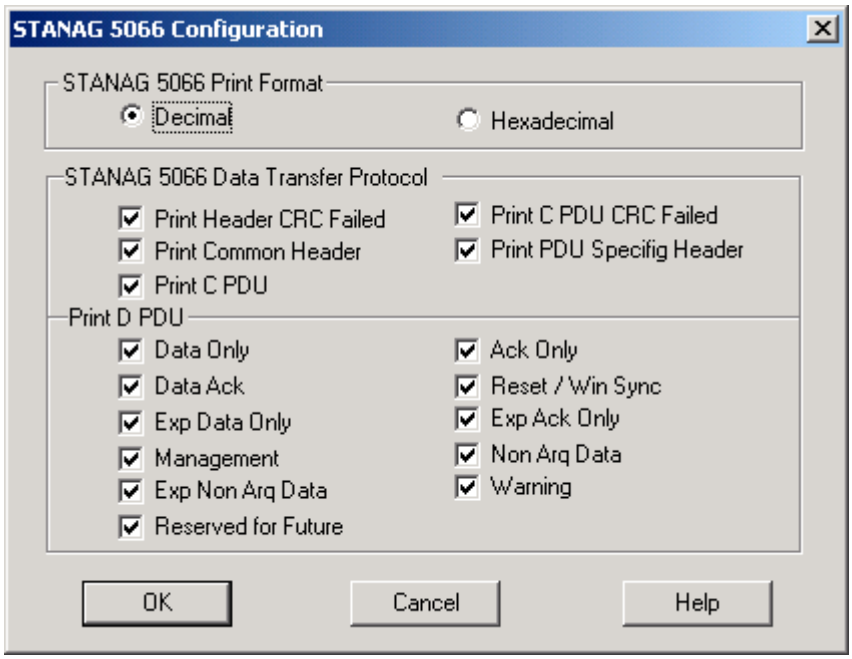
SkySweeper STD : NO
SkySweeper STD+ : YES
SkySweeper PRO : YES

84.2 General Description

STANAG5066 protocol is typically used with the modern NATO modems like STANAG4285 and STANAG4539. The parser opens the used data transper protocol D PDUs (PDU=Protocol Data Unit) and prints the data out from them. The STANAG PDU consists of header (header has two parts common and PDU specific) and the data (called also C_PDU). The header and the data have their own CRCs (checksums).

84.3 Configuration

Pressing the 'Configure' button in STANAG4285 configuration dialog opens the following Configuration Dialog box.



84.3.1 Parameters

84.3.1.1 STANAG 5066 Print Format

This selects the main print format (decimal or hexadecimal).

84.3.1.2 STANAG 5066 Data Transfer Protocol

There are several print options, which can be used to control the DTP prints:

Print Header CRC Failed	- prints headers even CRC has failed
Print Common Header	- prints the common header of the message
Print C_PDU	- prints the C_PDU (=data) of the message
Print C_PDU CRC failed	- prints the data even CRC has failed
Print PDU specific header	- prints the PDU specific part of the header

If the scroll checkbox is selected, a picture is scrolled from bottom up. Otherwise, drawing is started at the top and then re-started at the top, when the picture area is full.

84.3.1.3 Print D_PDU

The printed D_PDU message types can be selected here.

85 SSTV Decoder

85.1 Availability

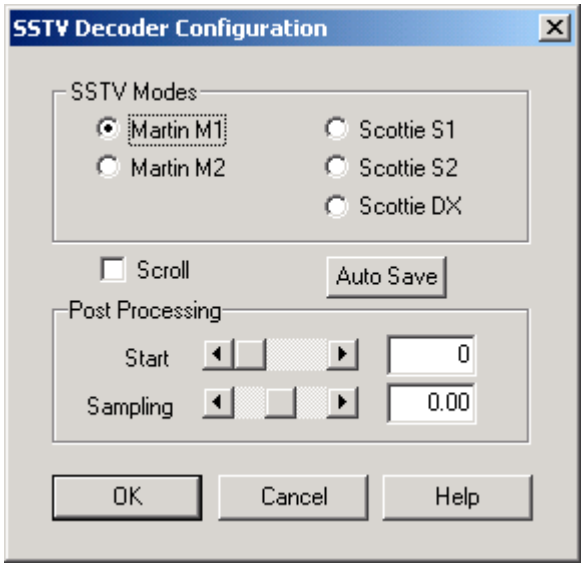
SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

85.2 General Description

The SkySweeper SSTV decoder uses the most modern digital PLL synchronization technology. The received image can be saved with 'Save'. 'Reset' resets the decoder and 'Config' is used to select the SSTV modes. The decoder supports the most commonly used SSTV modes in Europe and the US: Martin 1, Martin 2, Scottie 1, Scottie 2 and Scottie DX. When the received SSTV transmission is between 1500 Hz and 2300 Hz the decoder is properly tuned. The frequency bars (1500 and 2300 Hz) in the default SSTV configuration are very useful in tuning. Sometimes also the sync signal (1200 Hz) is used in tuning.

85.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



85.3.1 Parameters

85.3.1.1 SSTV modes

This switch selects the SSTV mode. Technical specifications of the modes are shown in the table below.

Mode	Color Type	Scan time (sec)	Scan lines

Martin 1	RGB	114	240
Martin 2	RGB	58	240
Scottie 1	RGB	110	240
Scottie 2	RGB	71	240
Scottie DX	RGB	269	240

85.3.1.2 Scroll

If the scroll checkbox is selected, a picture is scrolled from bottom up. Otherwise, drawing is started at the top and then re-started at the top, when the picture area is full.

85.3.1.3 Auto Save

Pressing the Auto Save button opens the Picture Auto Save Configuration Dialog which is used to save automatically SSTV pictures into file.

85.3.1.4 Post Processing Functions

Post processing functions can be used to correct properties of the picture after receiving. The post-processing functions are not enabled during receiving.

85.3.1.4.1 Start

If the picture is shifted horizontally, the start slider can be used to set the left margin to the correct place.

85.3.1.4.2 Sampling

If the picture is slanted, the sampling slider is used to correct the slanting.

85.4 Save

The ‘Save’ button saves the received picture into a file as bitmap format.

85.5 Reset

The ‘Reset’ button resets the decoder and clears the window.

86 WE FAX Decoder

86.1 Availability

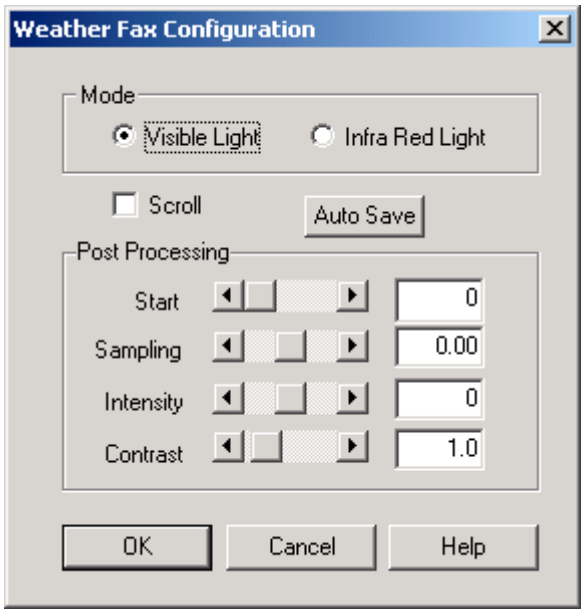
SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

86.2 General Description

This block decodes TIROS/NOAA APT satellite WEather FAX signal. The signal has two parts: Infra Red and Visible Light. The receiver should be in the FM detection mode. When receiver is properly tuned, carrier should be seen at 2400 Hz. 'Reset' resets the decoder. The received picture can be saved using 'Save'.

86.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



86.3.1 Parameters

86.3.1.1 Mode

With the 'Visible Light'/'Infra Red Light' switch, you can choose whether a visible light or an infrared picture will be received.

86.3.1.2 Scroll

If the scroll checkbox is selected, a picture is scrolled from the bottom up. Otherwise drawing is started at the top and then re-started at the top, when the picture area is full.

86.3.1.3 Auto Save

Pressing the Auto Save button opens the Picture Auto Save Configuration Dialog which is used to save automatically fax pictures into file.

86.3.1.4 Post Processing Functions

Post processing functions can be used to correct properties of the picture after reception. The post processing functions are not enabled during receiving.

86.3.1.4.1 Start

If the picture is shifted horizontally, the start slider can be used to set the left margin to the correct place.

86.3.1.4.2 Sampling

If the picture is slanted, the Sampling slider is used to correct the slanting.

86.3.1.4.3 Intensity

The intensity of the picture can be changed with the Intensity slider.

86.3.1.4.4 Contrast

The contrast of the picture can be changed with the Contrast slider.

86.4 Save

The ‘Save’ button saves the received picture into a file in the bitmap format.

86.5 Reset

The ‘Reset’ button resets the decoder and clears the window.

87 Audio Expander

87.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

87.2 General Description

The audio expander removes the offset from the audio signal and scales the audio again. Audio expander is an opposite function to audio compression. This block does not need any configuration

88 Picture Auto Save Configuration

88.1 Availability

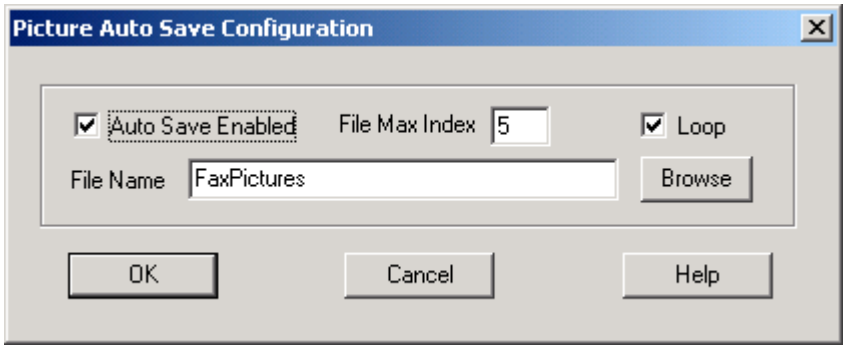
SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

88.2 General Description

This dialog is used to define automatic picture saving parameters in the HF-FAX, WE-FAX, SSTV and HELL decoders.

88.3 Configuration

Pressing the Auto Save button opens the following Configuration dialog box.



88.3.1 Parameters

88.3.1.1 Auto Save Enabled

When the check box is selected automatic saving feature is enabled.

88.3.1.2 File Max Index

The maximum index. -parameter defines how many picture files are saved into disk.

88.3.1.3 Loop

If the Loop check box is selected, the newest pictures overwrite the oldest pictures, if the File Max Index number of pictures has been already stored. If the Loop is not selected file saving is stopped when the maximum number of files have been stored into disk.

88.3.1.4 File Name

The filename defines the file base name for pictures. The filenames are in a format *filename1, filename2, ... filenameN*, where N is as big as the File Max Index parameter.

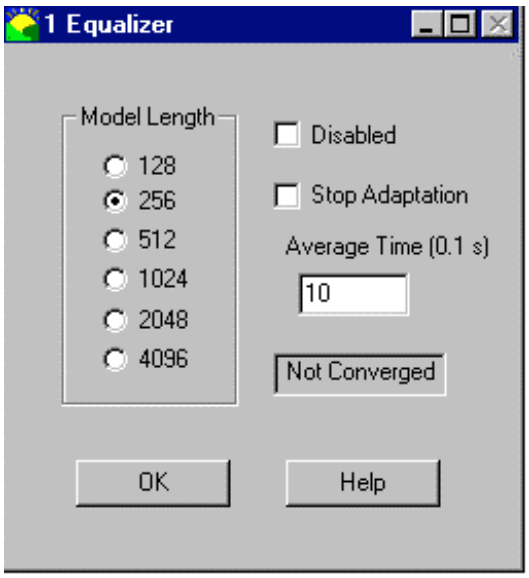
89 Equalizer Filter

89.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

89.2 General Description

The channel equalizer models the impulse response of the radio channel and removes unwanted phenomena (for example echo) from the signal, based on the estimation algorithms.



89.3 Parameters

89.3.1 Channel Model Length

This parameter describes how many taps are used in the modeling of the radio channel's impulse response. This parameter value can be from 128 to 4096 taps. Using more taps gives more accurate estimation but more computing power is needed.

89.3.2 Disabled

This deactivates the channel equalizer.

89.3.3 Stop Adaptation

This stops adaptation to the channel parameters. So, the channel impulse response model remains unchanged until this is switched off.

89.3.4 Average time (x0.1s)

With this parameter the channel estimation time can be adjusted. If the time is too short the noise can affect the model. If the time is too long the model might not be up to date.

90 FIR Filter

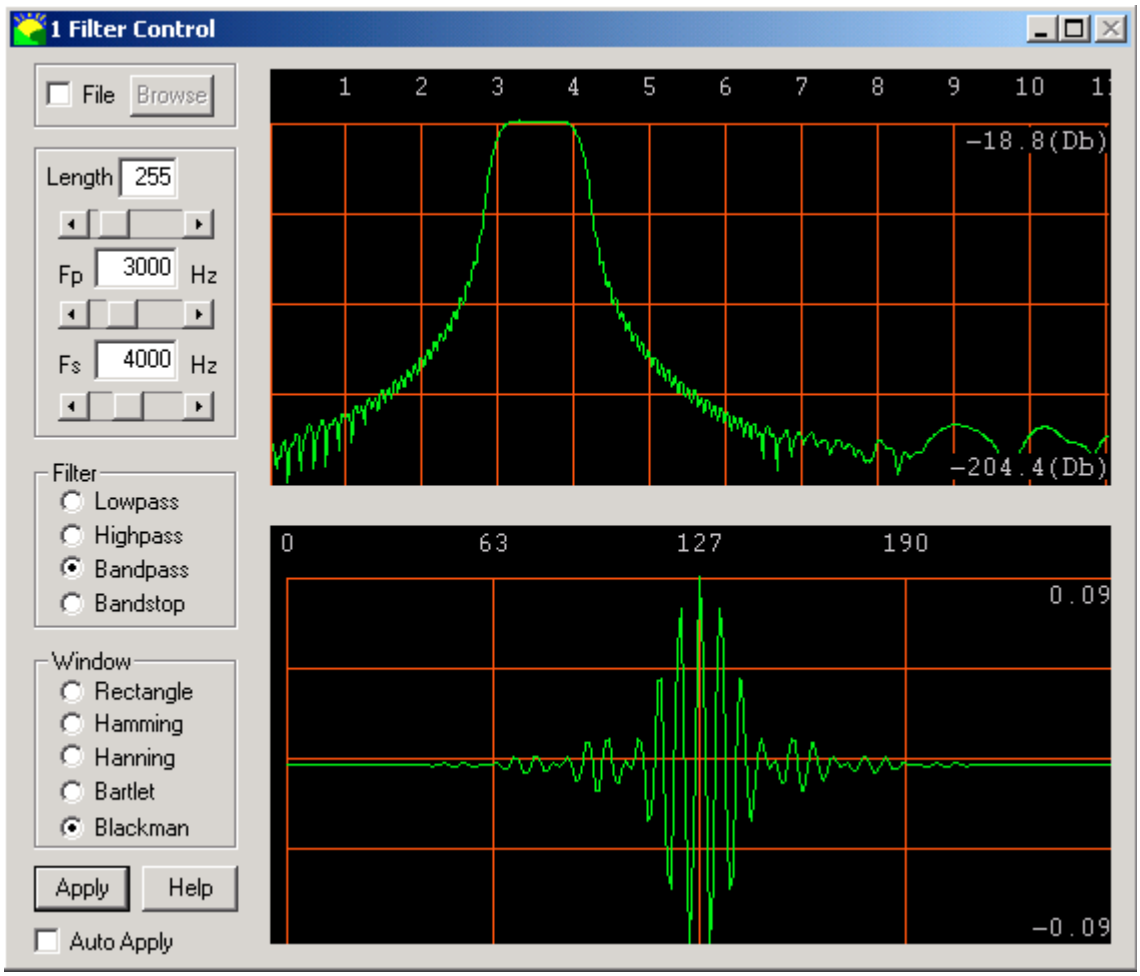
90.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

90.2 General Description

The main objective of this block is to provide digital filtering functions to the system. FIR (Finite Impulse Response) is one of the main types of digital filters.
The filters can be designed using the tool provided in the user interface. After the filter coefficients have been designed, the new coefficient values can be used with the 'Apply' button. If the Auto Apply check box is selected, the parameters are updated automatically. A filter can also be designed with some other tool (for example with Matlab), and the coefficients can be loaded from a file using the 'File' button.

The frequency response of a designed filter is shown in the upper window. The scale is from zero to the Nyquist frequency (half of the current sample rate). In the lower window the impulse response of the filter is shown. You can change your filter's frequency response properties by the window type. You can just select different window functions and see the effect on the frequency response. You can save the filter coefficients to a file by clicking the right mouse button and then select 'Save'.



90.3 Filter types

90.3.1 Taps

This is the length of FIR filter.

90.3.2 Lowpass

Design a Lowpass filter. Parameter **Fp** defines the cutoff frequency.

90.3.3 Highpass

Design a Highpass filter. Parameter **Fp** defines the cutoff frequency.

90.3.4 Bandpass

Design a Bandpass filter. Parameter **Fs** defines the start of the Bandpass area and **Fp** defines the end of the Bandpass area.

90.3.5 Bandstop

Design a Bandstop filter. Parameter **Fp** defines the start of the Bandpass area and **Fs** defines the end of the Bandpass area.

90.4 Window types

90.4.1 Rectangle
The filter is designed using a Rectangle window.

90.4.2 Hamming
The filter is designed using a Hamming window.

90.4.3 Bartlet
The filter is designed using a Bartlet window.

90.4.4 Blackman
The filter is designed using a Blackman window.

91 Frequency Shift Filter

91.1 Availability

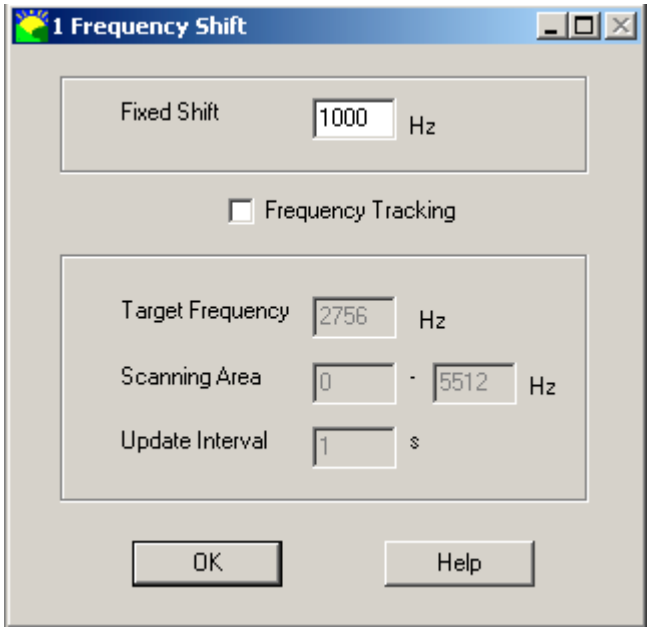
SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

91.2 General Description

Frequency Shift shifts the original signal in the frequency domain by the given amount, defined in Hz. With the frequency lock switch, an automatic 'frequency tracking' mode can be activated. In the scanning mode the user can enter the Target Frequency and Scanning Area. SkySweeper automatically tracks the most powerful frequency component in the scanning area, and then calculates the necessary amount of the frequency shift, so that the output signal frequency peak is in the given target frequency. This is especially useful in tracking sinusoidal signals.

91.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



91.3.1 Parameters

91.3.1.1 Frequency tracking

This switch activates the frequency tracking function. In the frequency-tracking mode the frequency shift value is automatically calculated in real time.

91.3.1.2 Target frequency

The Target frequency tells you the frequency where the frequency with the most power in the scanning area has been shifted to. This parameter is active only in the Frequency Tracking mode.

91.3.1.3 Scanning area

This is the area in which the frequencies are scanned. The frequency shift is automatically calculated so that the frequency with the most power will be the target frequency in the block's output. This parameter is active only in the Frequency Tracking mode.

91.3.1.4 Update Interval

The Update Interval is the interval between automatic frequency shift estimations. This parameter is active only in the Frequency Tracking mode.

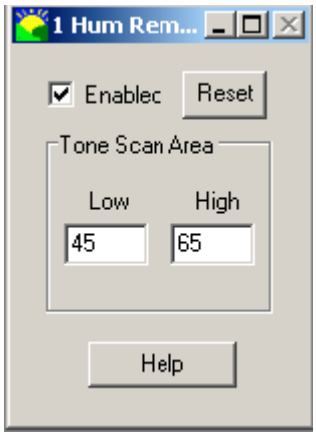
92 Hum Remove Filter

92.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

92.2 General Description

The HUM Remove filter removes the hum generated typically by AC power source. Typically it has base frequency of 50 Hz or 60 Hz and other components at frequencies N * base frequency. HUM remove filter estimates automatically the base frequency (takes 5-10 seconds) and then removes the HUM from the audio signal.



92.3 Parameter

92.3.1 Enabled

This enables/disables the HUM remove filter. If disabled, the signal is not filtered.

92.3.2 Tone Scan Area

This is the range of the frequencies where the base frequency is searched.

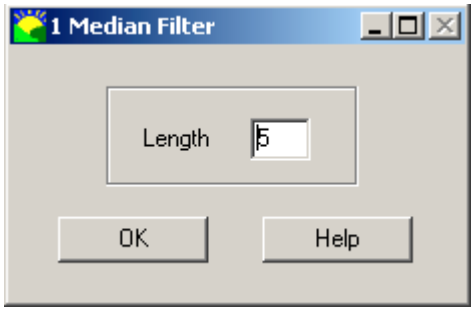
93 Median Filter

93.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

93.2 General Description

The median filtering is based on the theory of non-linear stack filters and it is a widely used concept in digital image processing. The main application is to remove the impulse noise from the pictures.



93.3 Parameter

93.3.1 Length

This is the length of the median filter. A typical value is 5. Median filtering requires quite a lot of computing power so in practice the length value should be kept as small as possible.

94 Mixer Filter

94.1 Availability

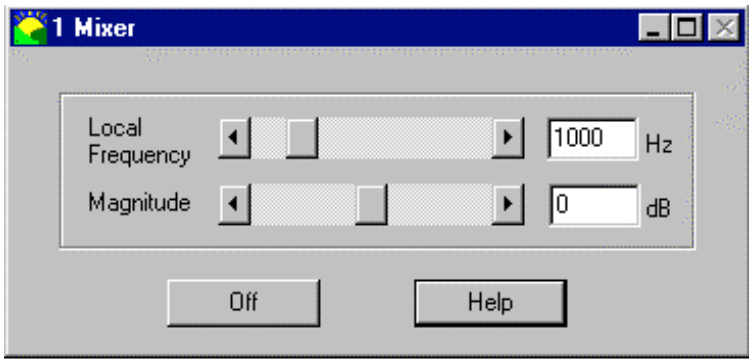
SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

94.2 General Description

The MIXER is a block with a built-in local signal generator and mixer. It generates a local frequency signal with a given frequency and magnitude. It multiplies the incoming signal by the generated signal and the result is written to the output.

94.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



94.3.1 Parameters:

94.3.1.1 Local Frequency

The frequency of the local signal in Hz.

94.3.1.2 Magnitude

The magnitude of the local signal. (<0 dB, means attenuation, =0 dB means no amplitude change, >0dB means amplification)

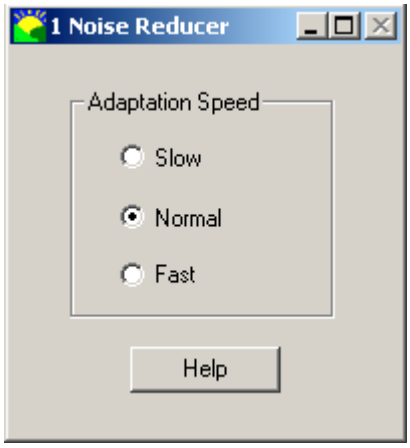
95 Noise Reducer Filter

95.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

95.2 General Description

The Noise Reducer optimizes the signal to noise ratio. So, in practice it eliminates the white noise. It estimates the optimum filter for the signal and then updates the noise eliminator filter in real time.



95.3 Parameters

95.3.1 Adaptation Speed

This is the speed at which the Noise Reducer adapts itself to the signal. If the speed is too fast, the noise eliminator might remove too many components of the signal (not just noise).

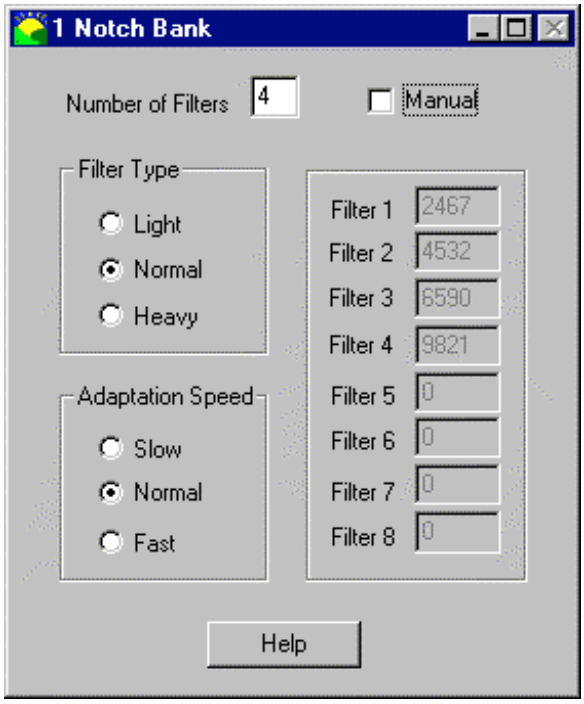
96 Notch Bank Filter

96.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

96.2 General Description

The notch bank removes up to eight discrete disturbing sinusoidal frequencies. There are two main types of operation of the notch bank: automatic and manual. In the automatic mode the notch bank detects the sinusoidal frequencies automatically and allocates a notch filter to remove the sinusoidal signal. In the manual mode the user can give the center frequencies of the notch filters.



96.3 Parameters

96.3.1 Number of Filters

This is the MAXIMUM number of notch filters. If the notch bank is in the automatic mode and the maximum number of filters is not needed, then all of the filters are inactive.

96.3.2 Manual

This is the switch to select either the Manual mode or the Automatic mode.

96.3.3 Filter type

There are three types of filters (light, normal and heavy). A heavier filter needs correspondingly more computing power.

Filter type	Length	Stopband Width	Stopband Attenuation
Light	200 taps	150 Hz	30 dB
Normal	400 taps	80 Hz	30 dB
Heavy	800 taps	70 Hz	35 dB

96.3.4 Adaptation speed

This parameter sets how often the situation is analyzed. The number of notch filters and their center frequencies are decided based on this analysis. This parameter is not active in the Manual mode.

96.3.5 Filter1-Filter8

These are the stop band center frequencies to be set by the user in the Manual mode.

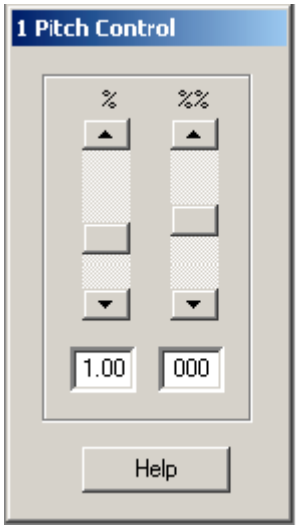
97 Pitch Filter

97.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

97.2 General Description

The pitch filter changes the sampling rate but retains the same time scale. Note: this is not the same as decimation or interpolation. The user can change the pitch using the slider or edit box in the following dialog. The pitch values can be between 0.5 and 2.



97.3 Parameters

97.3.1 Pitch %

This is the new sampling rate compared to the original (>1 means higher and <1 means lower frequency). Resolution is very coarse and this is usable with audio applications.

97.3.2 Pitch %%

The scroll bar's purpose is for the sampling rate fine tuning. This is usable, for example, with FAX decoders, which are very sensitive to sampling rate.

98 Generic FSK Decoder

98.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

98.2 General Description

The Generic FSK decoder is a universal decoder for FSK transmissions. It decodes FSK signals from 10 baud to 2500 baud. In most cases it is used together with the SkySweeper bit analyzing tool, which provides the synchronizing and character display functions. The Generic FSK decoder works in the same way as the other SkySweeper FSK decoders like PACTOR, RTTY etc..

The decoder searches for the transmission within the given frequency boundaries. Also you can set the lower FSK frequency by double clicking the mouse on the required frequency position, and then SkySweeper allows you to set a second (=higher) frequency, that can be set by a mouse click. The values of frequencies and the frequency offset are also shown on the screen.

When a transmission has been detected within the given range, the decoder will then lock itself to that frequency. When locked, the decoder draws a bold blue line on the spectrum display at the currently locked frequency. If the decoder is not locked, then the blue line is not shown as bold.

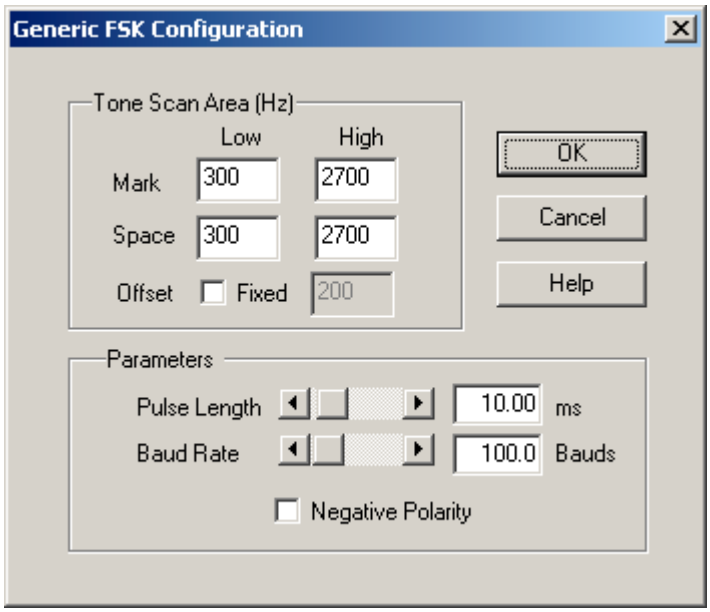
In the non-locked state, the carrier frequencies are automatically monitored within the given frequency boundaries. If the carrier frequency changes, then the decoder moves to a new frequency. If 'Lock' is pressed in the user interface, then the decoder will not automatically change the frequency. ‘Reset’ resets the decoder and the received text can be saved by using ‘Save’. The parameters can be modified by pressing the ‘Config’ button.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

The received text can be saved with ‘Save’. ‘Reset’ resets the decoder and ‘Config’ is used to set the parameters.

98.3 Configuration

Pressing the ‘Config’ button opens the following Configuration dialog box.



98.3.1 Parameters

98.3.1.1 Tone scan area

The FSK transmission has two tones named as *Mark* and *Space*. The scanned frequency range for Mark and Space will be set with two values, namely 'low' and 'high'. The Mark and Space tones are searched for only inside this frequency window.

98.3.1.2 Fixed Offset

If the Fixed Offset check box is selected, the user can enter the fixed frequency offset between the Mark and Space carrier frequencies. The fixed frequency offset is used in automatic scanning mode.

98.3.1.3 Pulse Length

The FSK bit length in milliseconds can be set here. If the decoded mode is already known, the pulse length is easy to set (for example SITOR/NAVTEX/AMTOR have a pulse length of 10 ms). If the pulse length is not known, it has to be analyzed, for example by using the FSK Speed Analyzer (FSA) block.

98.3.1.4 Baud Rate

The FSK baud rate can be set here. If the decoded mode is already known, then the baud rate is easy to set (for example SITOR/NAVTEX/AMTOR have a Baud Rate of 100 baud). If the baud rate is not known, it has to be analyzed for example by using the FSK Speed Analyzer (FSA) block.

98.3.1.5 Negative Polarity

If selected, the polarity is negative. It means that the output bit values will be reversed (0->1 and 1->0) or Mark->Space and Space->Mark.

98.3.2 Print Format

The generic decoder print format can be changed by pressing the right mouse button over the text area window and selecting 'Properties' from the pop-up menu. The 'Properties' command opens the Bit Display Configuration Dialog

98.4 FFT

The ‘FFT’ button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

98.5 Save

The ‘Save’ button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

98.6 Lock

The ‘Lock’ button locks or unlocks the decoder frequency. The decoders have the ‘automatic frequency tracking’ feature. Push the ‘Lock’ button when you want to lock the decoder onto a selected frequency. Push the ‘Unlock’ button when you want to release the frequency locking.

98.7 Reset

The ‘Reset’ button resets the decoder and clears the text window.

99 Generic MFSK Decoder

99.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

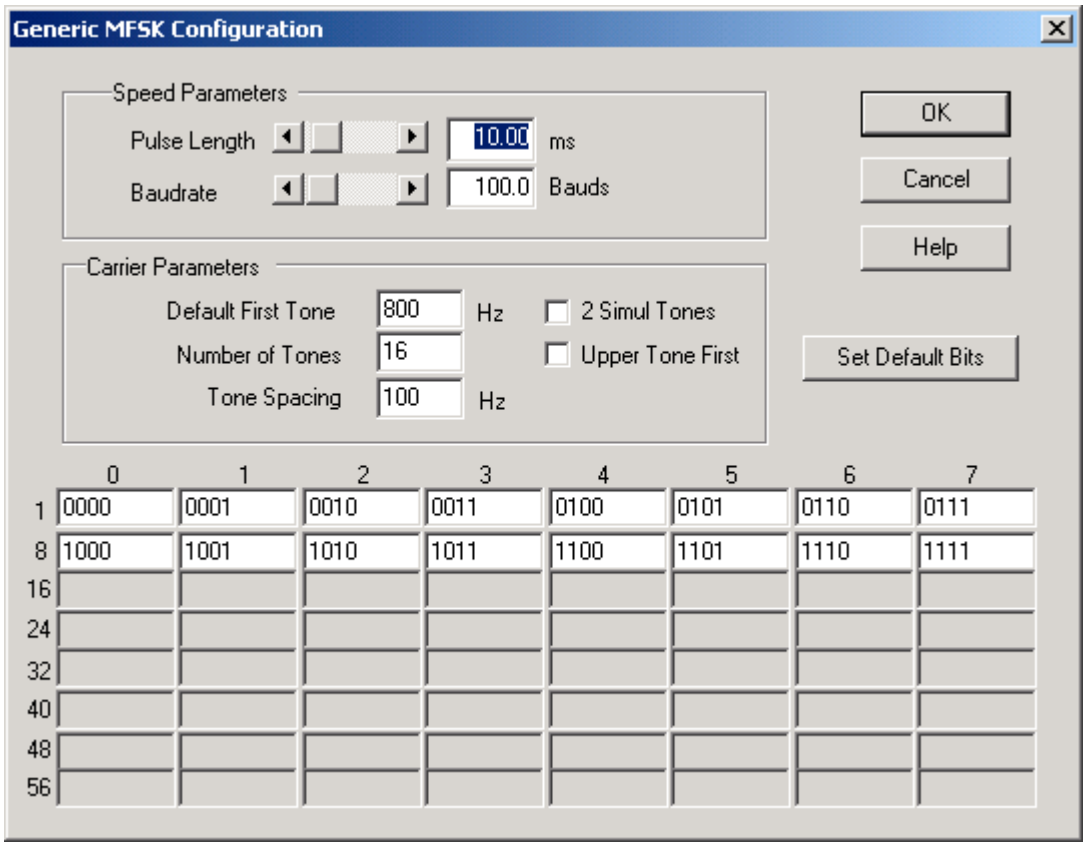
99.2 General Description

The Generic Multi-tone FSK (MFSK) decoder is a universal decoder for MFSK transmissions. It decodes MFSK signals from 10 baud/tone to 2500 baud/tone. It supports the decoding up to 64 MFSK tones. In most cases it is used together with the SkySweeper bit analyzing tool, which provides the synchronizing and character display functions. Generic MFSK does not support automatic frequency locking. The decoder frequency (=lowest tone frequency) must be set either by double clicking the left mouse button or by setting the *default first tone* parameter in the 'Config' dialog. The bold blue bar in the decoder's spectrum display indicates the frequency of the lowest MFSK tone.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

99.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



99.3.1 Parameters

99.3.1.1 Pulse Length

The MFSK tone length in milliseconds can be set here. If the mode is already known, the tone length is easy to set (for example COQUELET-13 has pulse length of 50 ms or 75 ms). If the pulse length is not known, it has to be analyzed for example by using the waterfall (spectrogram) or the HFFT display.

99.3.1.2 Baud Rate

The MFSK baud rate can be set here.

99.3.1.3 Default first tone

This is the default frequency for the first tone. (for COQUELET-13 this is 812 Hz)

99.3.1.4 Number of tones

Number of tones in MFSK transmission.

99.3.1.5 Tone Spacing

Tone spacing in MFSK transmission.

99.3.1.6 2 Simul(taneous) Tones

If this is active, the Generic MFSK decoder detects two active tones (instead of one) at the same time.

99.3.1.7 Upper Tone First

If this is active, the bits corresponding to the upper tone are printed first. This is active only when ‘2 Simul Tones’ is selected.

99.3.1.8 Set default bits

When this is pressed the tone bit values are set to their default values.

99.3.1.9 Tone bit table

In the lower part of the configuration dialog, there is a tone bit table. The bits corresponding to each tone can be set here.

99.3.2 Print Format

The generic decoder print format can be changed by pressing the right mouse button over the text area window and selecting 'Properties' from the pop-up menu. The 'Properties' command opens the Bit Display Configuration Dialog

99.4 FFT

The 'FFT' button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

99.5 Save

The 'Save' button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

99.6 Lock

The 'Lock' button locks or unlocks the decoder frequency. The decoders have the 'automatic frequency tracking' feature. Push the 'Lock' button when you want to lock the decoder onto a selected frequency. Push the 'Unlock' button when you want to release frequency locking.

99.7 Reset

The 'Reset' button resets the decoder and clears the text window.

100 Generic MPSK Decoder

100.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

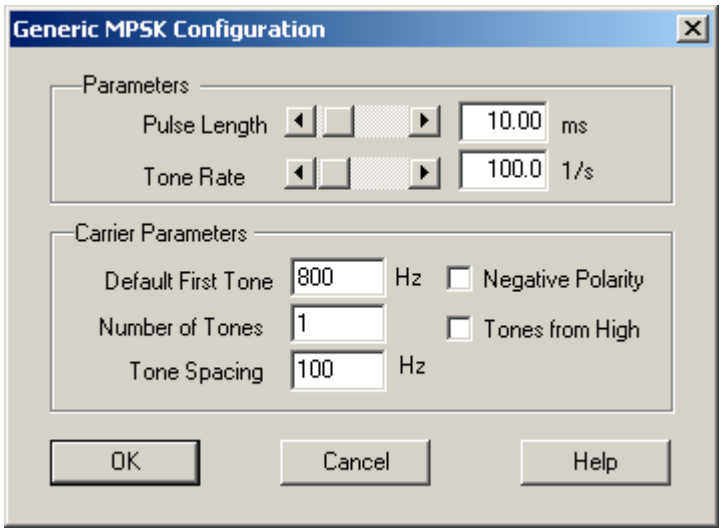
100.2 General Description

The Generic multi-tone PSK (MPSK) decoder is a universal decoder for MPSK (OFDM) transmissions. It decodes MPSK signals from 10 baud to 2500 baud/tone. It supports decoding up to 64 MPSK tones. In most cases it is used together with SkySweeper bit analyzing tool, which provides the synchronizing and character display functions. Generic MPSK does not support automatic frequency locking. The decoder frequency (=lowest tone frequency) must be set either by double clicking the left mouse button or setting the *default first tone* parameter in 'Config' dialog. The blue bar in the decoder's spectrum display indicates the frequency of the lowest MPSK tone.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

100.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



100.3.1 Parameters

100.3.1.1 Pulse Length

The MPSK tone length in milliseconds can be set here. If the mode is already known, the tone length is easy to set. If the pulse length is not known, it has to be analyzed, for example by using the PHASE display.

100.3.1.2 Tone Rate

The MPSK tone rate can be set here.

100.3.1.3 Default First Tone

This is the default frequency for the First Tone.

100.3.1.4 Number of Tones

Number of Tones in the MPSK transmission.

100.3.1.5 Tone Spacing

Tone Spacing in the MPSK transmission.

100.3.1.6 Negative Polarity

Inverts the bits. As a default 180 degrees phase shift means '1' and 0 degrees means bit '0'.

100.3.1.7 Tones from High

If this is selected, the decoded bits are sent to the output from the highest tone to the lowest. As a default, bits are sent from the lowest tone to the highest.

100.3.2 Print Format

The generic decoder print format can be changed by pressing the right mouse button over the text area window and selecting 'Properties' from the pop-up menu. The 'Properties' command opens the Bit Display Configuration Dialog

100.4 FFT

The 'FFT' button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

100.5 Save

The 'Save' button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

100.6 Lock

The 'Lock' button locks or unlocks the decoder frequency. The decoders have the 'automatic frequency tracking' feature. Push the 'Lock' button when you want to lock the decoder onto a selected frequency. Push the 'Unlock' button when you want to release frequency locking.

100.7 Reset

The 'Reset' button resets the decoder and clears the text window.

101 Generic MSK Decoder

101.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

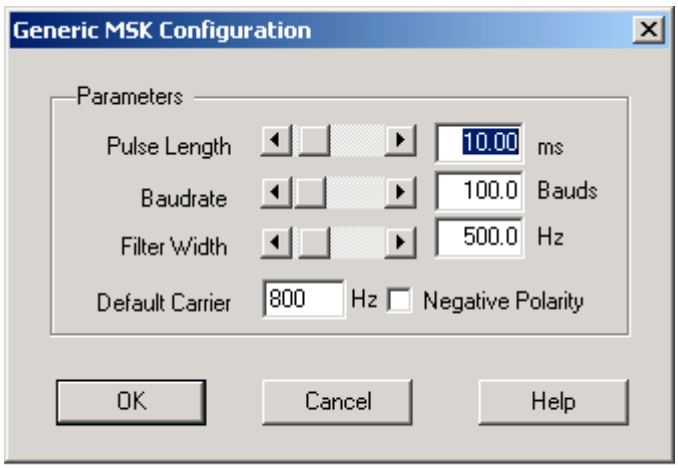
101.2 General Description

The Generic MSK (Minimum Shift Keying) decoder is a universal decoder for MSK transmissions. It decodes MSK signals from 10 baud to 2500 baud. In most cases it is used together with the SkySweeper bit analyzing tool, which provides the synchronizing and character display functions. Generic MSK does not support automatic frequency locking. The decoder frequency must be set either by double clicking the left mouse button or setting the *Default Carrier* parameter in 'Config' dialog. The blue bar in the decoder's spectrum display indicates the frequency of the decoder.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

101.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



101.3.1 Parameters

101.3.1.1 Pulse Length

The MSK tone length in milliseconds can be set here. If the mode is already known, the tone length is easy to set. If the pulse length is not known, it has to be analyzed for example by using PHASE, FSA or HFFT display.

101.3.1.2 Baud Rate
The MSK baud rate can be set here.

101.3.1.3 Filter Width
The bandwidth of the MSK decoder internal filter.

101.3.1.4 Default Carrier
Default frequency of MSK carrier. For example in ACARS this is always 1800 Hz.

101.3.1.5 Negative Polarity
Inverts the output bits. As a default, the higher tone means bit '1' and lower means bit '0'.

101.3.1.6 Tones from High
If this is selected the decoded bits are sent to the output from the highest tone to the lowest. As a default, bits are sent from the lowest tone to the highest.

101.3.2 Print Format
The generic decoder print format can be changed by pressing the right mouse button over the text area window and selecting 'Properties' from the pop-up menu. The 'Properties' command opens the Bit Display Configuration Dialog

101.4 FFT
The 'FFT' button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

101.5 Save
The 'Save' button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

101.6 Lock
The 'Lock' button locks or unlocks the decoder frequency. The decoders have the 'automatic frequency tracking' feature. Push the 'Lock' button when you want to lock the decoder onto a selected frequency. Push the 'Unlock' button when you want to release frequency locking.

101.7 Reset
The 'Reset' button resets the decoder and clears the text window.

102 Generic QPSK Decoder

102.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

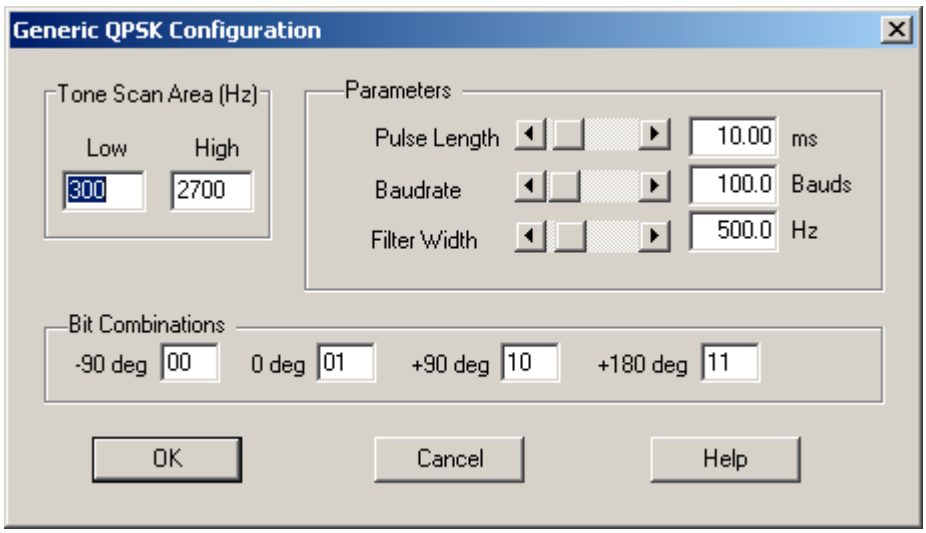
102.2 General Description

The Generic QPSK (Quadrature Phase Shift Keying) decoder is a universal decoder for QPSK transmissions. It decodes QPSK signals from 10 baud to 2500 baud. In most cases it is used together with the SkySweeper bit analyzing tool, which provides the synchronizing and character display functions. The decoder frequency must be set either by double clicking the left mouse button or by using the automatic carrier search function. The blue bar in the decoder's spectrum display indicates the frequency of the decoder.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

102.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



102.3.1 Parameters

102.3.1.1 Tone Scan Area

The QPSK transmission is scanned inside this area.

102.3.1.2 Pulse Length

The QPSK tone length in milliseconds can be set here. If the mode is already known, the tone length is easy to set. If the pulse length is not known, it has to be analyzed for example by using the PHASE analyzer.

102.3.1.3 Baud Rate

The PSK baud rate can be set here.

102.3.1.4 Filter width

The bandwidth of the PSK decoder internal filter.

102.3.1.5 Bit Combinations

The bit combinations corresponding different phase shifts (-90 degrees, 0 degrees, +90 degrees and +-180 degrees) is defined here.

102.3.2 Print Format

The generic decoder print format can be changed by pressing the right mouse button over the text area window and selecting 'Properties' from the pop-up menu. The 'Properties' command opens the Bit Display Configuration Dialog

102.4 FFT

The 'FFT' button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

102.5 Save

The 'Save' button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

102.6 Lock

The 'Lock' button locks or unlocks the decoder frequency. The decoders have the 'automatic frequency tracking' feature. Push the 'Lock' button when you want to lock the decoder onto a selected frequency. Push the 'Unlock' button when you want to release frequency locking.

102.7 Reset

The 'Reset' button resets the decoder and clears the text window.

103 Generic PAM Decoder

103.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

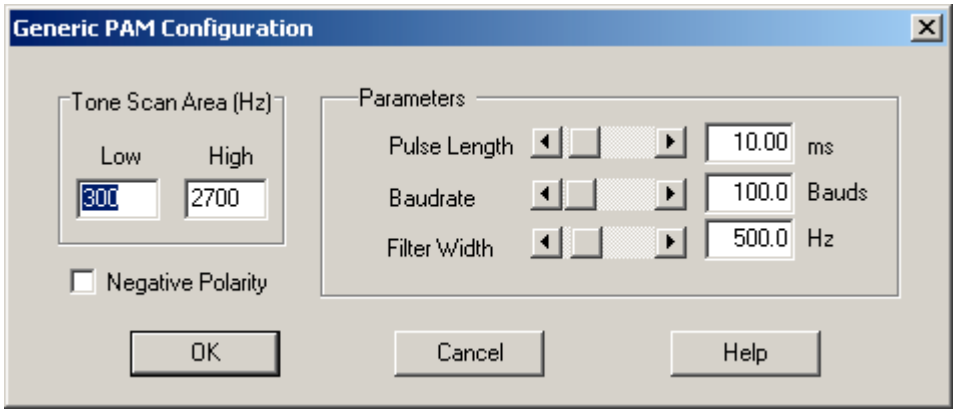
103.2 General Description

The Generic PAM (Pulse Amplitude Modulation) decoder is a universal decoder for PAM transmissions. It decodes PAM signals from 10 baud to 2500 baud. In most cases it is used together with the SkySweeper bit analyzing tool, which provides the synchronizing and character display functions. The decoder frequency must be set either by double clicking the left mouse button or by using the automatic carrier search function. The blue bar in the decoder's spectrum display indicates the frequency of the decoder.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

103.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



103.3.1 Parameters

103.3.1.1 Tone Scan Area

The PAM transmission is scanned inside this area.

103.3.1.2 Pulse Length

The PAM tone length in milliseconds can be set here. If the mode is already known, the tone length is easy to set.

103.3.1.3 Baud Rate
The PAM baud rate can be set here.

103.3.1.4 Filter width
The bandwidth of the PAM decoder internal filter.

103.3.1.5 Negative polarity
Inverts the output bits. As a default, the higher amplitude means bit '1' and the lower bit '0'.

103.3.2 Print Format
The generic decoder print format can be changed by pressing the right mouse button over the text area window and selecting 'Properties' from the pop-up menu. The 'Properties' command opens the Bit Display Configuration Dialog

103.4 FFT
The 'FFT' button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

103.5 Save
The 'Save' button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

103.6 Lock
The 'Lock' button locks or unlocks the decoder frequency. The decoders have the 'automatic frequency tracking' feature. Push the 'Lock' button when you want to lock the decoder onto a selected frequency. Push the 'Unlock' button when you want to release frequency locking.

103.7 Reset
The 'Reset' button resets the decoder and clears the text window.

104 Generic PSK Decoder

104.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

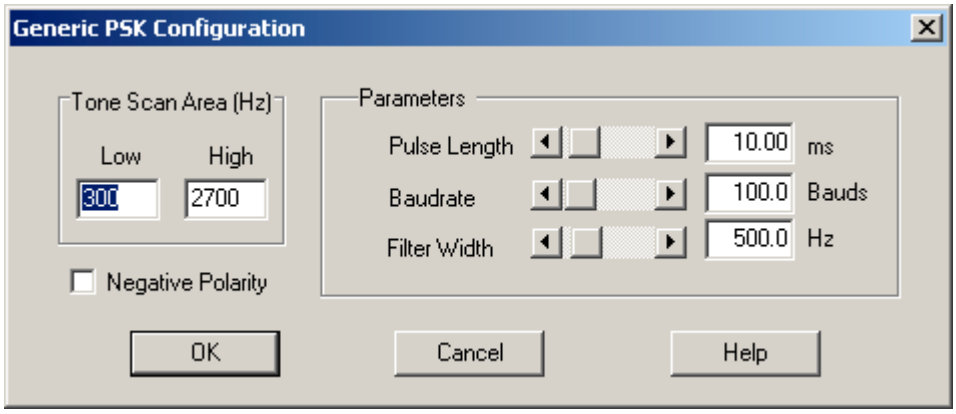
104.2 General Description

The Generic PSK (Phase Shift Keying) decoder is a universal decoder for PSK transmissions. It decodes PSK signals from 10 baud to 2500 baud. In most cases it is used together with the SkySweeper bit analyzing tool, which provides the synchronizing and character display functions. The decoder frequency must be set either by double clicking the left mouse button or by using the automatic carrier search function. The blue bar in the decoder's spectrum display indicates the frequency of the decoder.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

104.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



104.3.1 Parameters

104.3.1.1 Tone Scan Area

The PSK transmission is scanned inside this area.

104.3.1.2 Pulse Length

The PSK tone length in milliseconds can be set here. If the mode is already known, the tone length is easy to set. If the pulse length is not known, it has to be analyzed for example by using the PHASE analyzer.

104.3.1.3 Baud Rate
The PSK baud rate can be set here.

104.3.1.4 Filter width
The bandwidth of the PSK decoder internal filter.

104.3.1.5 Negative polarity
Inverts the bits. As a default 180 degrees phase shift means '1' and 0 degrees means bit '0'.

104.3.2 Print Format
The generic decoder print format can be changed by pressing the right mouse button over the text area window and selecting 'Properties' from the pop-up menu. The 'Properties' command opens the Bit Display Configuration Dialog

104.4 FFT
The 'FFT' button opens and closes the power spectrum window. You can, for example, close the power spectrum window when the decoder has been locked onto the correct frequency in order to get more space for the text window.

104.5 Save
The 'Save' button opens the log file control Dialog, which is used to open or close a log file. The detector text window can also be saved into a file or sent into a socket.

104.6 Lock
The 'Lock' button locks or unlocks the decoder frequency. The decoders have the 'automatic frequency tracking' feature. Push the 'Lock' button when you want to lock the decoder onto a selected frequency. Push the 'Unlock' button when you want to release frequency locking.

104.7 Reset
The 'Reset' button resets the decoder and clears the text window.

105 How To Transmit

105.1 General Description

SkySweeper's main user interface for two way communication is called *chat application.* It provides everything needed for efficient transmitting and receiving like predefined macros etc. When transmitting for the first time also the PTT controls as well as signal level settings should be configured.

105.2 PTT/TX control

The TX control is configured from config->TX settings. The most recommend way is to use VOX based TX control (no extra control cables needed, just the audio cables). The VOX settings as well as LPT/COM port can be set there. The COM/LPT port and the transceiver should have a common ground.

105.3 Used TX mode

There are pre-made configurations for all TX modes. All of them are located in RXTX configuration menu. If chat box is used, the RX and TX modes can be selected separately from 'Config' menu of the Chat Box.

105.4 Amplitude and frequency

TX amplitude (magnitude) and frequency can be set from the transmitter 'Config' menu. If chat box is used, then click chat box's 'Config' and then 'TX Conf' icon in the picture. It will open a configuration dialog for the used transmitter. If SkySweeper is running in 8 bit mode mode, the maximum amplitude (magnitude) is 127. If 16 bit mode is in use, the maximum amplitude is 32767. The used mode (8/16 bit) can be checked and changed by clicking the radio icon 'InWav' in the configuration editor.

105.5 Sum to RX

If SkySweeper transmitter is not transmitting and "Sum to RX" is selected, the signal goes through without any changes. When the transmission starts, the input signal (typically the RX signal) is muted and only TX signal will come out from the sound card. When the transmitting is over, the input signal is connected again to audio and the TX signal is added to input signal. This might be useful if, for example, several TX blocks will be connected in chain.

When "sum to RX" is not activated input signal is not added to the output even transmission is off. Input and output devices works independently, which means that different sampling rates in input and devices does not cause problems. Note that there are few sound cards in the market where input and output clocks are not synchronized.

As a default 'Sum to RX' is not activated. If mode is changed stop and re-start processing in order to break or connect the audio chain.

105.6 Sending text

Here's a quick guide, what to do to send text:

1 Start SkySweeper by pressing the green button in the main menu.
2 Type the text to be transmitted in the TX buffer window (the middle window).
3 Set the cursor in the beginning of the text
4 Press 'TX ON' button
5 Now the text should be transmitted. The transmission will stop when the whole text has been transmitted. If 'repeat' is selected, the transmission will start automatically from the beginning of the text.
6 You can write new text to the TX edit window (bottom window) during the transmission. Just press 'enter' to copy the text to the TX buffer window.

105.7 Sending SSTV picture

Here's a quick guide, what to do to send SSTV picture:

1 Start SkySweeper by pressing the green button in the main menu.
2 Load the picture to be transmitted in the TX. The picture is loaded by using 'Load' button in the SSTV TX block.
3 Press 'ON' button
4 Now the picture should be transmitted. The transmission will stop when the whole picture has been transmitted. If 'repeat' is selected, the transmission will start automatically from the beginning of the picture.

106 CW Transmitter

106.1 Availability

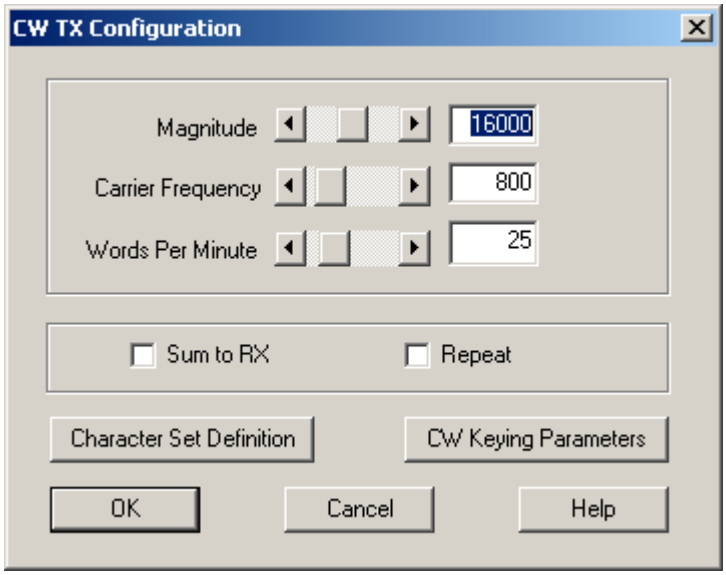
SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

106.2 General Description

The CW transmitter transmits Continuous Wave modulation with Morse code. With the 'Config' button you can configure transmission speed & frequency. With 'Load' you can load the text to be transmitted from a file. Note that the CW transmitter automatically converts lowercase letters to uppercase letters. 'Start/Stop' starts and stops the transmission. When the characters are transmitted, the Red text 'Transmitting' is shown in the dialog. If the Yellow text 'Ready to Transmit' is shown, you should press the Green button in the Configuration Editor to start the transmission. With 'Reset' you can reset the transmitter. The CW transmitter shows the currently transmitted character in inverted text. Transmission is always started from the cursor position. How to Transmit chapter tells more about transmitting.

106.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



106.3.1 Parameters

106.3.1.1 Magnitude

With this you can set the magnitude (maximum amplitude) of the transmitted signal. The amplitude value is set as an absolute value. When 16-bit processing is used, then the maximum magnitude will be 32767. If 8-bit processing is used the maximum is 127.

106.3.1.2 Carrier frequency

This sets the Carrier Frequency. Note that if the transmission is connected directly to one of SkySweeper's own decoders, the FFT resolution is limited, which might cause the situation when the decoder does not lock exactly to the transmitted frequency. This effect has no influence on the performance of the decoder.

106.3.1.3 Words per Minute

This sets the transmission speed.

106.3.1.4 Sum to RX

If this switch is selected, the TX signal is added to the block's input signal. Otherwise, the input signal is muted.

106.3.1.5 Repeat

With this switch you can set the text in the transmitter dialog to be repeated when the last character has been sent. The repeated block starts from the cursor position.

106.3.1.6 Character Set Definition

By clicking this button, the CW character set can be changed in the Character Set Configuration Dialog.

106.3.1.7 CW Keying Parameters

By clicking this button, the CW keying feature can be enabled. CW transmitter can control radio transmitter through serial port. Parameters can be changed in the CW Keying Configuration Dialog.

106.4 Macro

The 'Macro' button opens or closes the TX macro panel

106.5 Load

The 'Load' button opens the transmitter load data control Dialog, which is used to read text from a file, or a socket, into the transmission text window.

106.6 Start

The 'Start' button starts transmission from the cursor position. If there is text selected in the transmission window, only this text is sent. It is not possible to edit the transmission window during transmission. Transmission can be stopped at any time by pressing the 'Stop' button. If the TX control signal is enabled, the Start and Stop buttons turn the signal on and off.

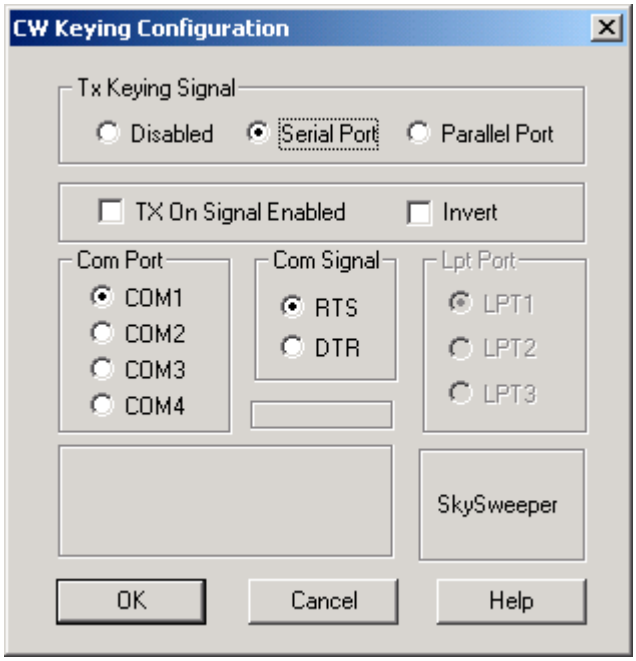
106.7 Reset

The 'Reset' button clears the transmission window and resets the transmitter.

107 CW Keying Configuration

107.1 General Description

The following CW Configuration dialog is used to define the CW transmitter keying parameters. The dialog is opened from CW transmitter configuration dialog.



107.2 Parameters

107.2.1 TX Keying Enabled

If the check box is selected, the CW transmitter keying HW signal is enabled. The HW signal is generated on the selected serial port.

107.2.2 Port

The CW keying signal is generated into selected serial port (COM1-4).

107.2.3 Signal

The 'transmitter enabled' signal can be generated either to the RTS or the DTR serial port pin.

107.2.4 LPT port

The parallel port (LPTx) which is selected as a source of TX control signal. The TX control signals are in LPT pins D4…D0 and CW keying control is in pins D0…D3. Note! If LPT port is used, the **Inpout32.dll** driver is needed. It can be downloaded from: **http://www.logix4u.net/inpout32.htm** . Just save the **hwinterface.sys** and **inpout32.dll** files to the SkySweeper's home directory.

107.2.5 Invert

If the invert check box is selected, the polarity of the ‘transmitter enabled’ signal is inverted.

107.2.6 TX On Signal Enabled

If the check box is selected, transmitter on/off status is generated into free signal. If RTS signal is selected for keying DTR signal is used for TX status signal and vice versa.

108 HELLSCHREIBER Transmitter

108.1 Availability

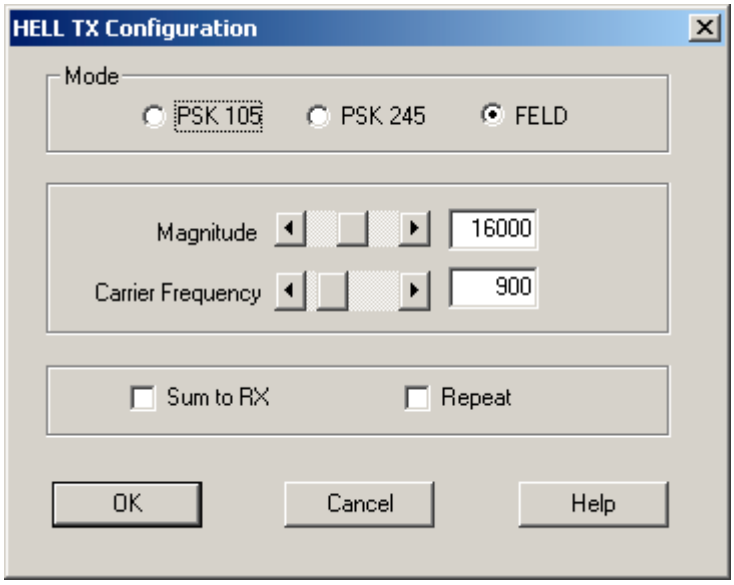
SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

108.2 General Description

SkySweeper's HELL transmitter supports Feld, PSK-105, and PSK-245 HELL modes. SkySweeper HELL transmitter supports only uppercase letters. The 'Start' button starts transmission. The 'Reset' button resets the transmitter. By pressing the 'Config' button you can select the mode to be transmitted and also some other parameters related to the transmission. How to Transmit chapter tells more about transmitting.

108.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



108.3.1 Parameters

108.3.1.1 Mode

With this parameter you can select the transmitted mode (Feld, PSK-105 or PSK-245).

108.3.1.2 Magnitude

With this you can set the magnitude (maximum amplitude) of the transmitted signal. The amplitude value is set as an absolute value. When 16-bit processing is used, the maximum magnitude will be 32767. If 8-bit processing is used the maximum is 127.

108.3.1.3 Sum to RX

If this switch is selected, the TX signal is added to the block's input signal. Otherwise, the input signal is muted.

108.3.1.4 Repeat

When this switch is selected, the same text will be transmitted again until this switch is deselected or the transmission is stopped.

108.4 Macro

The 'Macro' button opens or closes the TX macro panel

108.5 Load

The 'Load' button opens the transmitter load data control Dialog, which is used to read text from a file, or a socket, into the transmission text window.

108.6 Start

The 'Start' button starts transmission from the cursor position. If there is text selected in the transmission window, only the selected text is sent. It is not possible to edit the transmission window during transmission. Transmission can be stopped at any time by pressing the 'Stop' button. If the TX control signal is enabled, the Start and Stop buttons turn the signal on and off.

108.7 Reset

The 'Reset' button clears the transmission window and resets the transmitter.

109 MFSK16 Transmitter

109.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

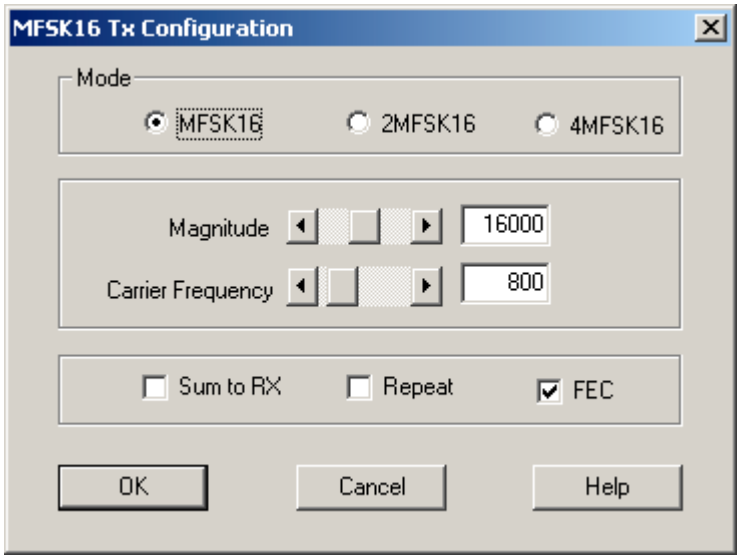
109.2 General Description

The MFSK16 is based on multi-tone FSK modulation and also utilizes the most modern FEC (Forward Error Correction) techniques as well as interleaving. The MFSK16 provides 31 WPM text throughput with FEC and 62 WPM with no FEC. SkySweeper supports also 2MFSK16 (63 WPM) and 4MFSK16 (125WPM) modes.

With the 'Config' button you can configure the transmission magnitude & frequency. With 'Load' you can load the text to be transmitted from a file. 'Start/Stop' starts and stops the transmission. When the characters have been transmitted, the Red text 'Transmitting' is shown in the dialog. If the Yellow text 'Ready to Transmit' is shown, you should press the Green button in the Configuration Editor to start the transmission. With 'Reset' you can reset the transmitter. The MFSK16 transmitter shows the currently transmitted character as inverted. Transmission is always started from the cursor position. How to Transmit chapter tells more about transmitting.

109.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



109.3.1 Parameters:

109.3.1.1 Mode

The used mode is selected here. MFSK16 is a standard MFSK16 transmission. 2MFSK16 is double speed version and 4MFSK16 is four times faster version of the standard mode.

109.3.1.2 Magnitude

With this you can set the magnitude (maximum amplitude) of the transmitted signal. The amplitude value is set as an absolute value. When 16-bit processing is used, the maximum magnitude will be 32767. If 8-bit processing is used the maximum is 127.

109.3.1.3 Carrier Frequency

This sets the carrier frequency. Note, that if the transmission is connected directly to one of SkySweeper's own decoders, the FFT resolution is limited, which might cause the situation when the decoder does not lock exactly to the transmitted frequency. This effect has no influence on the performance of the decoder.

109.3.1.4 FEC

If FEC is selected then Forward Error Correction is used. This means that interleaving and convolution coding is used to protect the data. When FEC is selected the text throughput will be dropped by 50%.

109.3.1.5 Sum to RX

If this switch is selected, the TX signal is added to the block's input signal. Otherwise, the input signal is muted.

109.3.1.6 Repeat

With this switch you can set the transmitter dialog text to be repeated when the last character has been sent. The repeated block starts from the cursor position.

109.4 Macro

The 'Macro' button opens or closes the TX macro panel

109.5 Load

The 'Load' button opens the transmitter load data control Dialog, which is used to read text from a file, or a socket, into the transmission text window.

109.6 Start

The 'Start' button starts transmission from the cursor position. If there is text selected in the transmission window, only the selected text is sent. It is not possible to edit the transmission window when transmission is on. Transmission can be stopped at any time by pressing the 'Stop' button. If the TX control signal is enabled the Start and Stop buttons turn the signal on and off.

109.7 Reset

The 'Reset' button clears the transmission window and resets the transmitter.

110 Olivia Transmitter

110.1 Availability

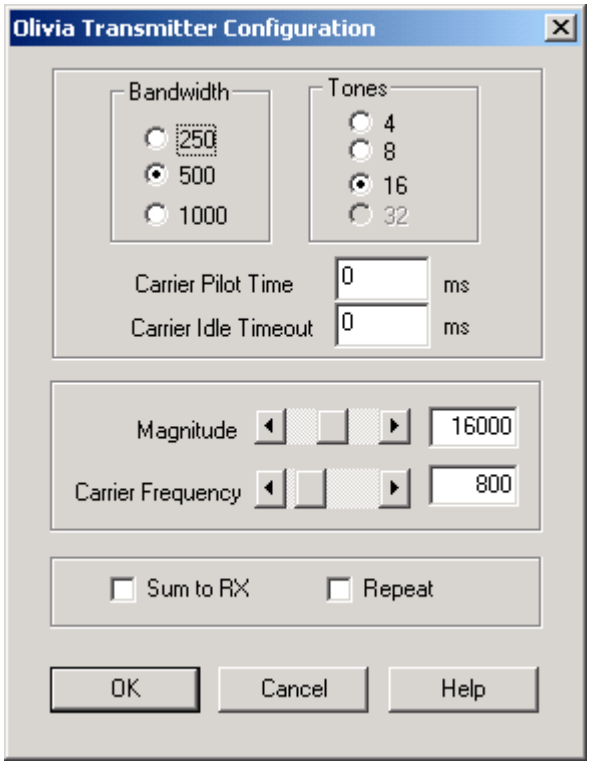
SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

110.2 General Description

SkySweeper supports Olivia bandwidths 250,500 and 1000 Hz and tone numbers of 2,4,16 and 32. With the 'Config' button you can configure the transmission parameters like magnitude and frequency. With 'Load' you can load text to be transmitted from a file or the Internet. 'Start/Stop' starts and stops the transmission. When characters have been transmitted, the Red text 'Transmitting' is shown in the dialog. If the Yellow text 'Ready to Transmit' is shown, you should press the Green button in the Configuration Editor to start the transmission. With 'Reset' you can reset the transmitter. The Olivia transmitter shows the currently transmitted character as inverted text. Transmission is always started from the cursor position. How to Transmit chapter chapter tells more about transmitting.

110.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



110.3.1 Parameters

110.3.1.1 Bandwidth
This defines the transmission bandwidth.

110.3.1.2 Tones
This defines the number of the tones in the Olivia MFSK transmission

110.3.1.3 Carrier Pilot Time
This defines the time for the pilot signals (toggling the lowest and highest tones) before the actual transmission starts

110.3.1.4 Carrier Idle Timeout
This defines the time which transmitter waits after the last sent character before the transmission is ended.

110.3.1.5 Magnitude
With this you can set the magnitude (maximum amplitude) of the transmitted signal. The amplitude value is set as an absolute value. When 16-bit processing is used, the maximum magnitude will be 32767. If 8-bit processing is used, the maximum is 127.

110.3.1.6 Carrier frequency
This sets the carrier frequency. Note that if transmission is connected directly to one of SkySweeper's own decoders, the FFT resolution is limited, which might cause the situation when the decoder does not lock exactly to the same frequency which is being sent. This effect has no influence on the performance of the decoder.

110.3.1.7 Sum to RX
If this switch is selected, the TX signal is added to the block's input signal. Otherwise, the input signal is muted.

110.3.1.8 Repeat
With this switch you can set the text in the transmitter dialog to be repeated when the last character has been sent. The repeated block starts from the cursor position.

110.4 Macro
The 'Macro' button opens or closes the TX macro panel

110.5 Load
The 'Load' button opens the transmitter load data control Dialog, which is used to read text from a file, or a socket, into the transmission text window.

110.6 Start
The 'Start' button starts transmission from the cursor position. If there is text selected in the transmission window, only the selected text is sent. It is not possible to edit the transmission window when transmitting. Transmission can be stopped at any time by pressing the 'Stop' button. If the TX control signal is enabled, the Start and Stop buttons turn the signal on and off.

110.7 Reset

The ‘Reset’ button clears the transmission window and resets the transmitter.

111 QPSK Transmitter

111.1 Availability

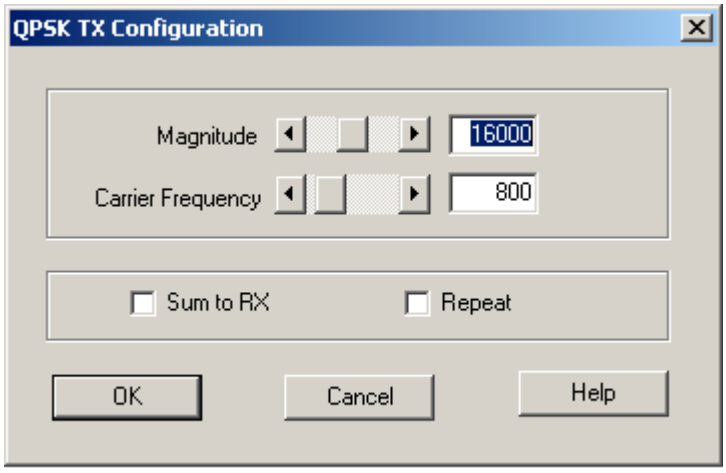
SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

111.2 General Description

With the 'Config' button you can configure the transmission magnitude & frequency. With 'Load' you can load text to be transmitted from a file. Note, that the QPSK transmitter automatically converts lowercase letters to uppercase letters. 'Start/Stop' starts and stops the transmission. When characters have been transmitted, the Red text 'Transmitting' is shown in the dialog. If the Yellow text 'Ready to Transmit' is shown, you should press the Green button in the Configuration Editor to start the transmission. With 'Reset' you can reset the transmitter. The QPSK transmitter shows the currently transmitted character as inverted text. Transmission is always started from the cursor position. How to Transmit chapter chapter tells more about transmitting.

111.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



111.3.1 Parameters

111.3.1.1 Magnitude

With this you can set the magnitude (maximum amplitude) of the transmitted signal. The amplitude value is set as an absolute value. When 16-bit processing is used, the maximum magnitude will be 32767. If 8-bit processing is used, the maximum is 127.

111.3.1.2 Carrier frequency

This sets the carrier frequency. Note that if transmission is connected directly to one of SkySweeper's own decoders, the FFT resolution is limited, which might cause the situation when the decoder does not lock exactly to the same frequency which is being sent. This effect has no influence on the performance of the decoder.

111.3.1.3 Sum to RX

If this switch is selected, the TX signal is added to the block's input signal. Otherwise, the input signal is muted.

111.3.1.4 Repeat

With this switch you can set the text in the transmitter dialog to be repeated when the last character has been sent. The repeated block starts from the cursor position.

111.4 Macro

The 'Macro' button opens or closes the TX macro panel

111.5 Load

The 'Load' button opens the transmitter load data control Dialog, which is used to read text from a file, or a socket, into the transmission text window.

111.6 Start

The 'Start' button starts transmission from the cursor position. If there is text selected in the transmission window, only the selected text is sent. It is not possible to edit the transmission window when transmitting. Transmission can be stopped at any time by pressing the 'Stop' button. If the TX control signal is enabled, the Start and Stop buttons turn the signal on and off.

111.7 Reset

The 'Reset' button clears the transmission window and resets the transmitter.

112 PSK Transmitter

112.1 Availability

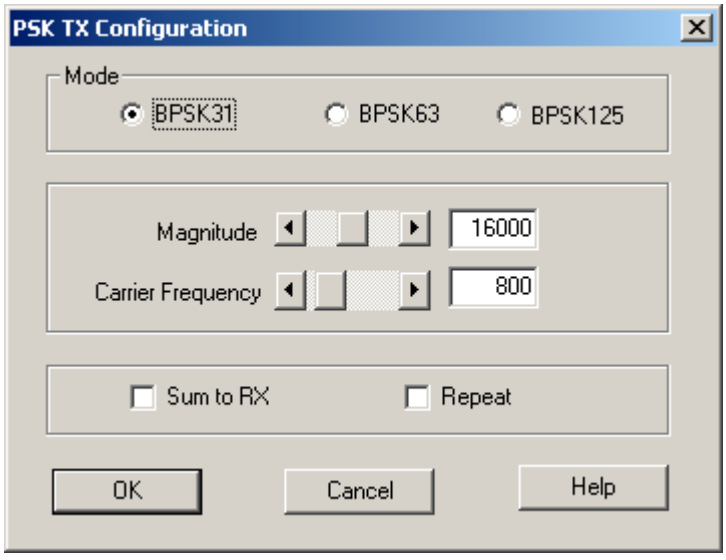
SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

112.2 General Description

The PSK transmitter supports PSK31, PSK63 and PSK125 modes. With the 'Config' button you can configure the transmission magnitude & frequency. With 'Load' you can load text to be transmitted from a file. Note, that the PSK transmitter automatically converts lowercase letters to uppercase letters. 'Start/Stop' starts and stops the transmission. When characters have been transmitted, the Red text 'Transmitting' is shown in the dialog. If the Yellow text 'Ready to Transmit' is shown, you should press the Green button in the Configuration Editor to start the transmission. With 'Reset' you can reset the transmitter. The PSK transmitter shows the currently transmitted character as inverted text. Transmission is always started from the cursor position. How to Transmit chapter tells more about transmitting.

112.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



112.3.1 Parameters

112.3.1.1 Mode

This sets transmission mode BPSK31, BPSK63 and BPSK125

112.3.1.2 Magnitude

With this you can set the magnitude (maximum amplitude) of the transmitted signal. The amplitude value is set as an absolute value. When 16-bit processing is used, the maximum magnitude will be 32767. If 8-bit processing is used, the maximum is 127.

112.3.1.3 Carrier frequency

This sets the carrier frequency. Note that if transmission is connected directly to one of SkySweeper's own decoders, the FFT resolution is limited, which might cause the situation when the decoder does not lock exactly to the same frequency which is being sent. This effect has no influence on the performance of the decoder.

112.3.1.4 Sum to RX

If this switch is selected, the TX signal is added to the block's input signal. Otherwise, the input signal is muted.

112.3.1.5 Repeat

With this switch you can set the text in the transmitter dialog to be repeated when the last character has been sent. The repeated block starts from the cursor position.

112.4 Macro

The 'Macro' button opens or closes the TX macro panel

112.5 Load

The 'Load' button opens the transmitter load data control Dialog, which is used to read text from a file, or a socket, into the transmission text window.

112.6 Start

The 'Start' button starts transmission from the cursor position. If there is text selected in the transmission window, only the selected text is sent. It is not possible to edit the transmission window when transmitting. Transmission can be stopped at any time by pressing the 'Stop' button. If the TX control signal is enabled, the Start and Stop buttons turn the signal on and off.

112.7 Reset

The 'Reset' button clears the transmission window and resets the transmitter.

113 ASCII / RTTY Transmitter

113.1 Availability

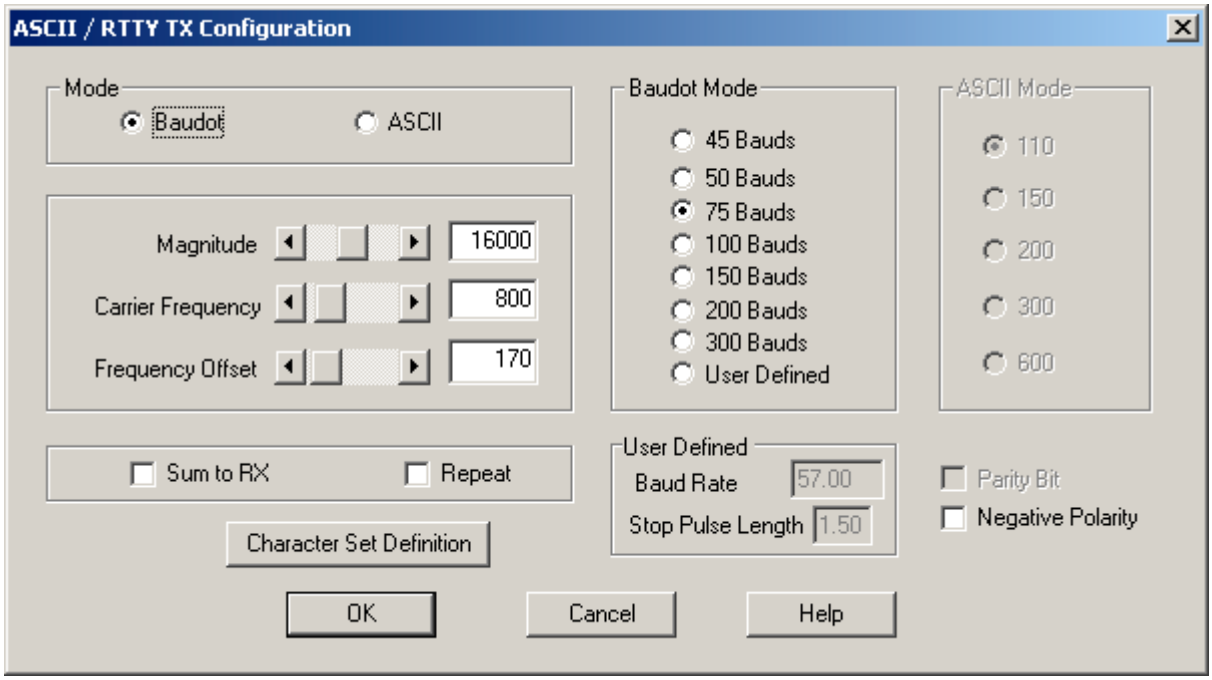
SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

113.2 General Description

The RTTY transmitter supports either Baudot or ASCII transmission. With the 'Config' button you can configure transmission mode, magnitude & frequency. With 'Load' you can load the text to be transmitted from a file. Note that the RTTY transmitter automatically converts lowercase letters to uppercase letters. 'Start/Stop' starts and stops the transmission. When the characters are transmitted the Red text 'Transmitting' is shown in the dialog. If the Yellow text 'Ready to Transmit' is shown, you should press the Green button in the Configuration Editor to start the transmission. With 'Reset' you can reset the transmitter. The RTTY transmitter shows the currently transmitted character block as inverted text. Transmission is always started from the cursor position. How to Transmit chapter tells more about transmitting.

113.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



113.3.1 Parameters

113.3.1.1 Mode
This sets the transmission mode (Baudot/ASCII). Only asynchronous ASCII is supported.

113.3.1.2 Magnitude
With this you can set the magnitude (maximum amplitude) of the transmitted signal. The amplitude value is set as an absolute value. When 16-bit processing is used, the maximum magnitude will be 32767. If 8-bit processing is used the maximum is 127.

113.3.1.3 Carrier Frequency
This sets the carrier frequency. Note that if the transmission is connected directly to one of SkySweeper's own decoders, the FFT resolution is limited, which might cause the situation when the decoder does not lock exactly to the transmitted frequency. This effect has no influence on the performance of the decoder.

113.3.1.4 Frequency Offset
This sets the frequency offset. The location of the second carrier is the carrier frequency + frequency offset.

113.3.1.5 Sum to RX
If this switch is selected, the TX signal is added to the block's input signal. Otherwise, the input signal is muted.

113.3.1.6 Repeat
With this switch you can set the text in the transmitter dialog to be repeated when the last character has been sent. The repeated block starts from the cursor position.

113.3.1.7 Negative Polarity
This reverses the frequency polarity.

113.3.1.8 Baudot Speed
Here you can select the Baudot transmission mode. This selection is active only when the Baudot mode is selected.

113.3.1.9 User Defined
If the user defined Baudot mode is selected, the Baud Rate and Stop Pulse Length can be defined in the edit boxes.

113.3.1.10 ASCII asynchronous
Here you can select the ASCII transmission mode. This selection is active only when the ASCII mode is selected.

113.3.1.11 Parity bit
Here you select whether the parity bit is used or not. This switch is active only when the ASCII mode is selected.

113.3.1.12 Character Set Definition
By clicking this button, the RTTY character set can be changed.in the Character Set Configuration Dialog.

113.4 Macro

The ‘Macro’ button opens or closes the TX macro panel

113.5 Load

The ‘Load’ button opens the transmitter load data control Dialog, which is used to read text from a file, or a socket, into the transmission text window.

113.6 Start

The ‘Start’ button starts transmission from the cursor position. If there is text selected in the transmission window, only the selected text is sent. It is not possible to edit the transmission window when transmitting. Transmission can be stopped at any time by pressing the ‘Stop’ button. If the TX control signal is enabled, The Start and Stop buttons turn the signal on and off.

113.7 Reset

The ‘Reset’ button clears the transmission window and resets the transmitter.

114 Signal Generator Transmitter

114.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

114.2 General Description

The Signal Generator block can be used to generate different kinds of test signals. The following test signals are supported.

- Sine Wave
- White Noise
- Pink Noise
- Gaussian Noise

The Sine Generator generates one sinusoidal frequency. The signal has a magnitude, frequency and phase.

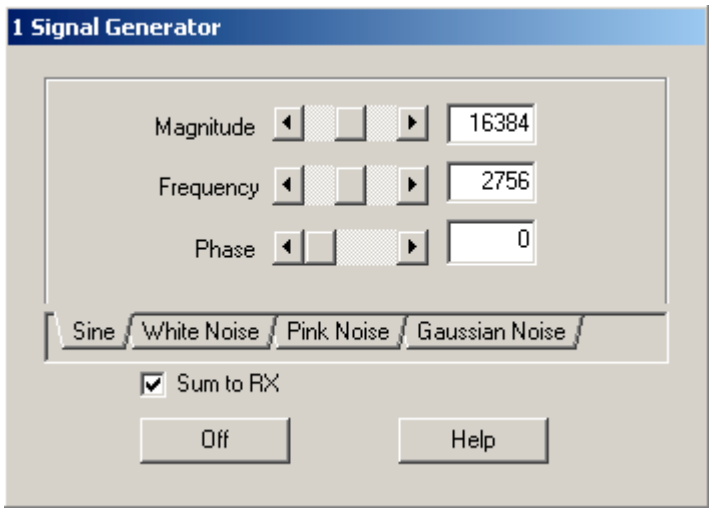
The White Noise Generator generates a white noise signal. The power of the white noise signal is equal at all frequencies i.e. the power spectrum function is flat.

The Pink Noise Generator is typically used in audio applications. The signal power of the pink noise signal decreases by 3 dB per octave

The Gaussian Noise Generator is commonly used in communication systems to model the signal noise. The noise amplitude follows the Gaussian distribution i.e. it has the mean and standard deviation.

114.3 Configuration

There are the following parameters in the signal generator display.



114.3.1 Parameters

114.3.1.1 Magnitude

Magnitude is the common parameter for all of the test signals. The magnitude is the signal amplitude. The magnitude is from 0 to 32767.

114.3.1.2 Frequency

The Sine test signal contains **frequency** and **phase** selections. The frequency is the frequency of the sine signal. The maximum frequency depends on the sampling rate.

114.3.1.3 Phase

This the phase offset of the sine signal.

114.3.1.4 Mean

Only used with the Gaussian test signal. Inciates the mean i.e. average of the test signal.

114.3.1.5 Std Dev

The standard deviation of the Gaussian noise signal.

115 SkyBoost Transmitter

115.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

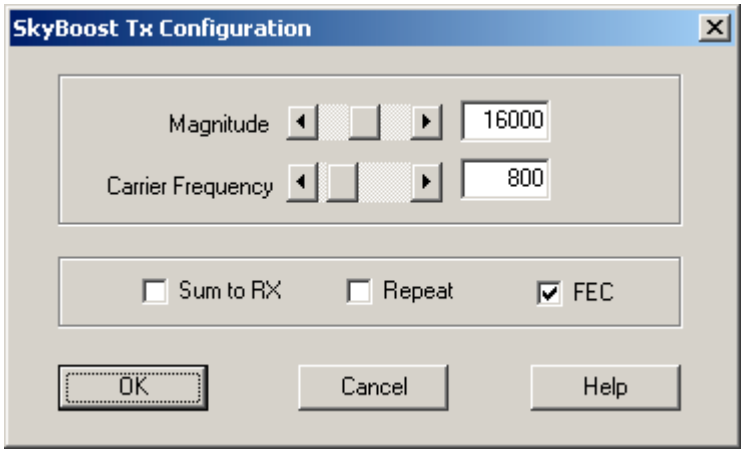
115.2 General Description

SkyBoost mode has been developed according the specifications of our most demanding professional customers. It is perhaps the most modern operating mode for very long distance communications on HF. SkyBoost is based on multitone FSK modulation and the bandwidth used is 344 Hz. It also utilizes the most modern FEC (Forward Error Correction) techniques as well as interleaving. SkyBoost provides 21.9 WPM text throughput with FEC and 43.8 WPM with no FEC.

With the 'Config' button you can configure transmission magnitude & frequency. With 'Load' you can load text to be transmitted from a file. 'Start/Stop' starts and stops the transmission. When the characters are being transmitted, the Red text 'Transmitting' is shown in the dialog. If the Yellow text 'Ready to Transmit' is shown, you should press the Green button in the Configuration Editor to start the transmission. With 'Reset' you can reset the transmitter. SkyBoost transmitter shows the currently transmitted character as inverted text. Transmission is always started from the cursor position. How to Transmit chapter tells more about transmitting.

115.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



115.3.1 Parameters

115.3.1.1 Magnitude

With this you can set the magnitude (maximum amplitude) of the transmitted signal. The amplitude value is set as an absolute value. When 16-bit processing is used the maximum magnitude will be 32767. If 8-bit processing is used the maximum is 127.

115.3.1.2 Carrier Frequency

This sets the Carrier Frequency. Note that if the transmission is connected directly to one of SkySweeper's own decoders, the FFT resolution is limited, which might cause the situation where the decoder does not lock exactly to the transmitted frequency. This effect has no influence on the performance of the decoder.

115.3.1.3 FEC

If FEC is selected then Forward Error Correction is used. This means that interleaving and convolution coding is used to protect the data. When FEC is selected the text throughput will be dropped by 50%.

115.3.1.4 Sum to RX

If this switch is selected, the TX signal is added to the block's input signal. Otherwise, the input signal is muted.

115.3.1.5 Repeat

With this switch you can set the text in the transmitter dialog to be repeated when the last character has been sent. The repeated block starts from the cursor position.

115.4 Macro

The 'Macro' button opens or closes the TX macro panel

115.5 Load

The 'Load' button opens the transmitter load data control Dialog, which is used to read text from a file, or a socket, into the transmission text window.

115.6 Start

The 'Start' button starts transmission from the cursor position. If there is text selected in the transmission window, only the selected text is sent. It is not possible to edit the transmission window when transmitting. Transmission can be stopped at any time by pressing the 'Stop' button. If the TX control signal is enabled, the Start and Stop buttons turn the signal on and off.

115.7 Reset

The 'Reset' button clears the transmission window and resets the transmitter.

116 SSTV Transmitter

116.1 Availability

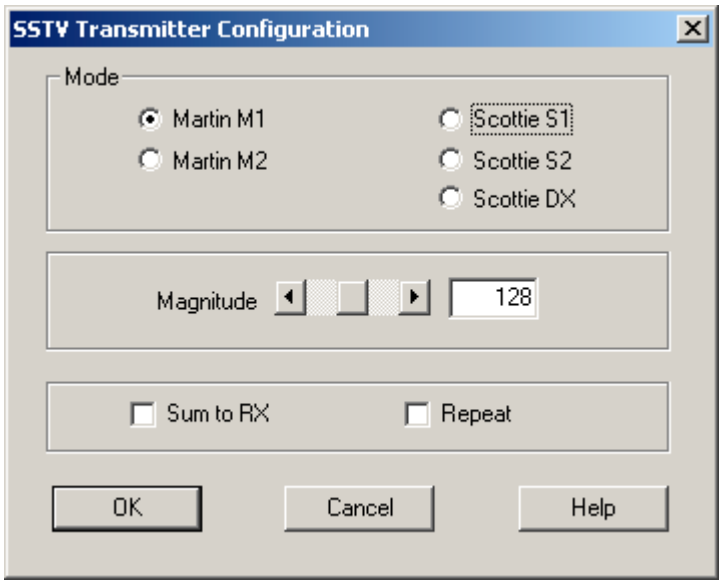
SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

116.2 General Description

SkySweeper's SSTV transmitter supports Martin-1, Martin-2, Scottie-1 and Scottie-2 modes. You can load the picture to be transmitted from a file using 'Load' (.BMP) or copy the picture from another application by using the Windows Clipboard. After the picture is loaded, the transmission can be started by pressing 'Start'. The transmitter can be reset by pressing 'Reset'. By pressing 'Config' you can select the mode to be transmitted and also some other parameters related to the transmission. How to Transmit chapter tells more about transmitting.

116.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



116.3.1 Parameters

116.3.1.1 Mode

With this parameter you can select the transmitted mode (Martin-1, Martin-2, Scottie-1, Scottie-2 or Scottie-DX).

116.3.1.2 Magnitude

With this you can set the magnitude (maximum amplitude) of the transmitted signal. The amplitude value is set as an absolute value. When 16-bit processing is used the maximum magnitude will be 32767. If 8-bit processing is used the maximum is 127.

116.3.1.3 Sum to RX

If this switch is selected, the TX signal is added to the block's input signal. Otherwise, the input signal is muted.

116.3.1.4 Repeat

When this switch is selected, the same picture will be transmitted again and again until this switch is deselected or the transmission is stopped.

116.4 Load

The 'Load' button is used to open a bitmap image into the transmission window.

116.5 Start

The 'Start' button starts transmission from the beginning of the picture. It is not possible to edit the picture when transmitting. Transmission can be stopped at any time by pressing the 'Stop' button. If the TX control signal is enabled, the Start and Stop buttons turn the signal on and off.

116.6 Reset

The 'Reset' button clears the transmission window and resets the transmitter.

117 STANAG 4285 Transmitter

117.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : YES
SkySweeper PRO : YES

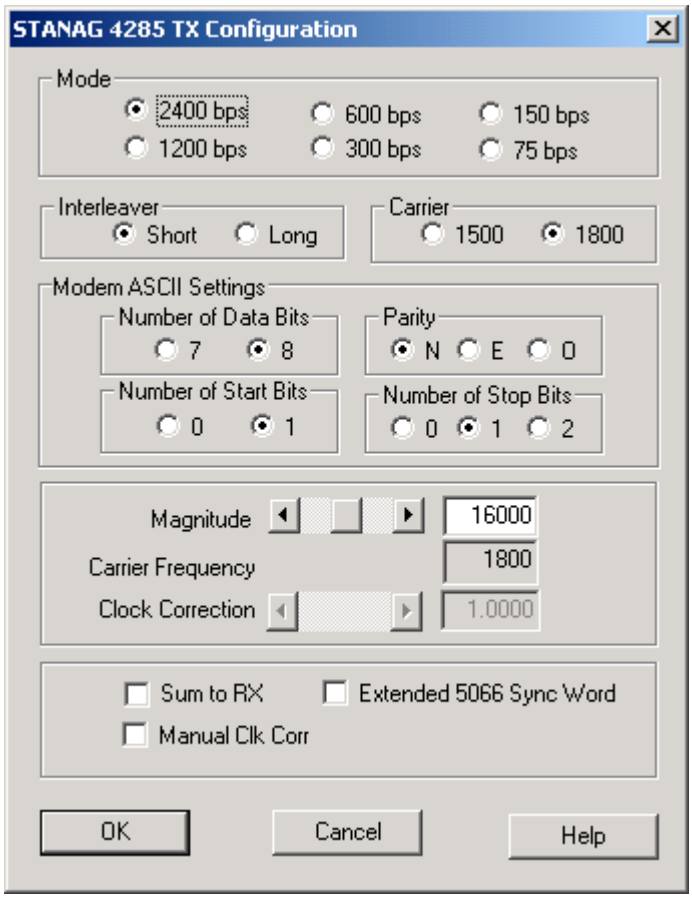
117.2 General Description

STANAG4285 transmitter supports the speeds from 75 baud to 2400 baud. With the 'Config' button you can configure transmission mode, magnitude & frequency. With 'Load' you can load the text to be transmitted from a file. 'Start/Stop' starts and stops the transmission. When the characters are transmitted the Red text 'Transmitting' is shown in the dialog. If the Yellow text 'Ready to Transmit' is shown, you should press the Green button in the Configuration Editor to start the transmission. With 'Reset' you can reset the transmitter. The STANAG4285 transmitter shows the currently transmitted character block as inverted text.
STANAG modes are quite sensitive to the sound card clock error. So, in case of decoding problems please try also some other sound card (if possible) or try to make the clock calibration again.

Transmission is always started from the cursor position. How to Transmit chapter tells more about transmitting.

117.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



117.3.1 Parameters

117.3.1.1 Mode

With this parameter you can select the transmitted mode (speed 75-2400 baud).

117.3.1.2 Interleaver

This selects the used interleaver (short/long)

117.3.1.3 Carrier

This selects the carrier frequency 1500/1800 Hz. 1800Hz is standard and 1500 HZ should be used only in special cases.

117.3.1.4 Modem ASCII Settings

The ASCII mode is configured here:

- number of ASCII data bits (7 or 8)
- parity bit (None, Even, Odd)
- Number of start bits (0 or 1)
- Number of stop bits (0,1 or 2)

Typically STANAG modem uses 7N1 (1 start bit, 7 ASCII data bits, no parity, 1 stop bit) or 8N1 (1 start bit, 8 ASCII data bits, no parity, 1 stop bit) formats.

117.3.1.5 Magnitude

With this you can set the magnitude (maximum amplitude) of the transmitted signal. The amplitude value is set as an absolute value. When 16-bit processing is used the maximum magnitude will be 32767. If 8-bit processing is used the maximum is 127.

117.3.1.6 Clock Correction

This used to compensate the sound card clock error. Value 1 means no compensation. It is recommended to use this compensation for STANAG instead of system level clock correction.

117.3.1.7 Sum to RX

If this switch is selected, the TX signal is added to the block's input signal. Otherwise, the input signal is muted.

117.3.1.8 Extended 5066 Sync Word

This activates the extended start sync word transmission used by some 4285+5066 systems.

117.3.1.9 Manual Clk Corr

If the manual clock correction is activated, the clock correction value given by the user is used instead of system clock correction value

117.4 Load

The Load button is used to open a bitmap image into the transmission window.

117.5 Start

The Start button starts transmission from the beginning of the picture. It is not possible to edit the picture when transmitting. Transmission can be stopped at any time by pressing the 'Stop' button. If the TX control signal is enabled, the Start and Stop buttons turn the signal on and off.

117.6 Reset

The Reset button clears the transmission window and resets the transmitter.

118 STANAG 4539 Transmitter

118.1 Availability

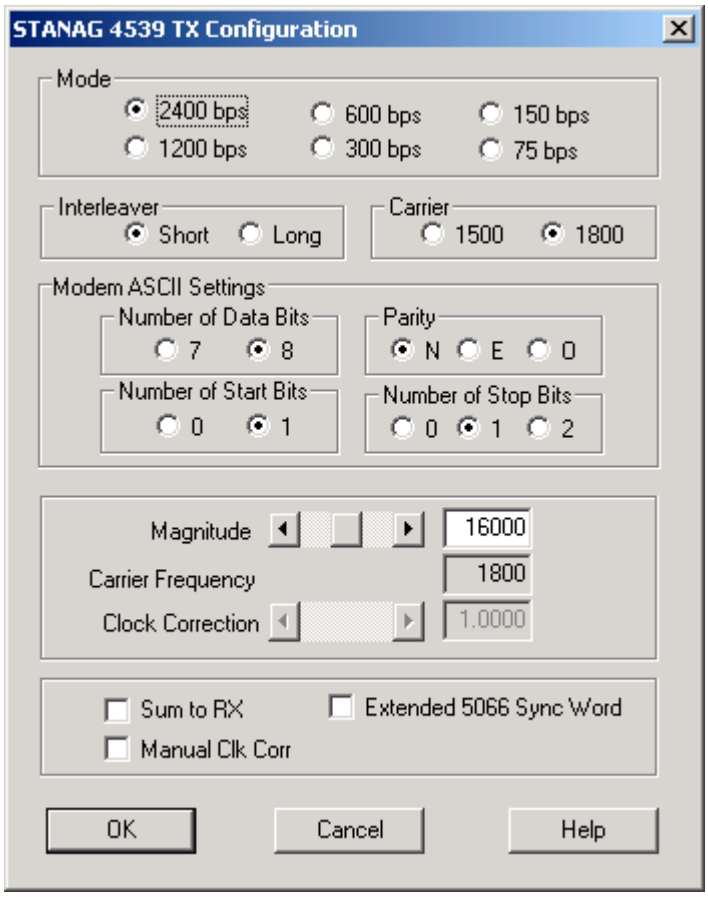
SkySweeper STD : NO
SkySweeper STD+ : YES
SkySweeper PRO : YES

118.2 General Description

STANAG4539 (also known as MIL-STD-188-110 and FED-STD-1052) transmitter supports the speeds from 75 baud to 2400 baud. The 75 baud mode is the frequency hopping mode all the others are fixed frequency modes. With the 'Config' button you can configure transmission mode, magnitude & frequency. With ‘Load’ you can load the text to be transmitted from a file. ‘Start/Stop’ starts and stops the transmission. When the characters are transmitted the Red text ‘Transmitting’ is shown in the dialog. If the Yellow text ‘Ready to Transmit’ is shown, you should press the Green button in the Configuration Editor to start the transmission. With ‘Reset’ you can reset the transmitter. The STANAG4539 transmitter shows the currently transmitted character block as inverted text. Transmission is always started from the cursor position. How to Transmit chapter tells more about transmitting.
STANAG modes are quite sensitive to the sound card clock error. So, in case of decoding problems please try also some other sound card (if possible) or try to make the clock calibration again.

118.3 Configuration

Pressing the ‘Config’ button opens the following Configuration dialog box.



118.3.1 Parameters

118.3.1.1 Mode

With this parameter you can select the transmitted mode (speed 75-2400 baud).

118.3.1.2 Interleaver

This selects the used interleaver (short/long)

118.3.1.3 Carrier

This selects the carrier frequency 1500/1800 Hz. 1800Hz is standard and 1500 HZ should be used only in special cases.

118.3.1.4 Modem ASCII Settings

The ASCII mode is configured here:

- number of ASCII data bits (7 or 8)
- parity bit (None, Even, Odd)
- Number of start bits (0 or 1)
- Number of stop bits (0,1 or 2)

Typically STANAG modem uses 7N1 (1 start bit, 7 ASCII data bits, no parity, 1 stop bit) or 8N1 (1 start bit, 8 ASCII data bits, no parity, 1 stop bit) formats.

118.3.1.5 Magnitude

With this you can set the magnitude (maximum amplitude) of the transmitted signal. The amplitude value is set as an absolute value. When 16-bit processing is used the maximum magnitude will be 32767. If 8-bit processing is used the maximum is 127.

118.3.1.6 Clock Correction

This used to compensate the sound card clock error. Value 1 means no compensation. It is recommended to use this compensation for STANAG instead of system level clock correction.

118.3.1.7 Sum to RX

If this switch is selected, the TX signal is added to the block's input signal. Otherwise, the input signal is muted.

118.3.1.8 Extended 5066 Sync Word

This activates the extended start sync word transmission used by some 4285+5066 systems.

118.3.1.9 Manual Clk Corr

If the manual clock correction is activated, the clock correction value given by the user is used instead of system clock correction value

118.4 Load

The 'Load' button is used to open a bitmap image into the transmission window.

118.5 Start

The 'Start' button starts transmission from the beginning of the picture. It is not possible to edit the picture when transmitting. Transmission can be stopped at any time by pressing the 'Stop' button. If the TX control signal is enabled, the Start and Stop buttons turn the signal on and off.

118.6 Reset

The 'Reset' button clears the transmission window and resets the transmitter.

119 Analyzers

The Analyzer is a non real-time block to analyze the signal and inspect it visually. Analyzers can be attached to the output of any real time block and to any input device. The same output can have many analyzer blocks. Most of the analyzer can also be the real time block.

Analyzers are inserted and deleted in the Config->Analyzer menu or in the Configuration Editor tool bar.

The following analyzer types are available.

- 3D FFT
- Auto Correlation
- FFT / Power Spectrum
- EYE Diagram
- IQ Constellation
- Signal Statistics
- Signal View
- SPECTROGRAM

120 3D FFT Analyzer

120.1 Availability

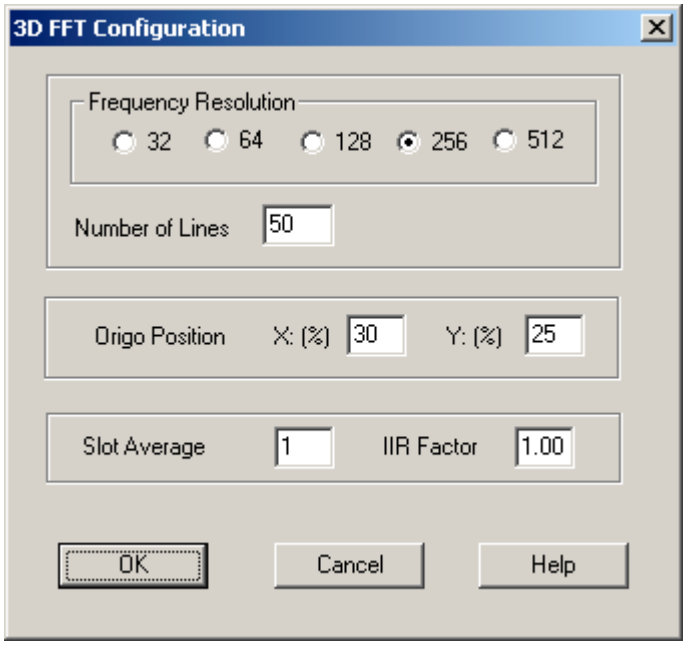
SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

120.2 General Description

The 3D FFT block draws three dimensional power spectrums in real time.

120.3 Configuration

The 'Config' button, which is on the top of the 3D FFT window, opens the following Configuration dialog box.



120.3.1 Parameters

120.3.1.1 Frequency Resolution

The *Frequency Resolution* sets the resolution of the frequency axis. The resolution is given in powers of two because the Fast Fourier Transformation (FFT) algorithm is used.

120.3.1.2 Number of Lines

The *Number of Line* parameter sets the number of lines that are drawn along the time axis.

120.3.1.3 Origo Position

The *Origo Position* gives the position of the origin. The origin position is given as percentages from the left and the top datum. For example, 50/50 means that the origin is in the middle of the 3D FFT window area.

120.3.1.4 Slot Average

The *Slot Average* tells how many 10 ms sample slots are averaged before the graph is plotted.

120.3.1.5 IIR Factor

This feature can be used to decrease the noise in the picture. If a small IIR factor is used, then the frequency plot cannot follow rapid changes.

121 Autocorrelation Analyzer

121.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

121.2 General Description

The AutoCORRelation Analyzer displays the autocorrelation function. The ‘x’ axis is the time as milliseconds. The ‘y’ axis is the correlation. If the input signal is white noise, the autocorrelation function is zero in theory. If the input signal contains a sine wave, the autocorrelation function is a periodic function. Maxima are in the following positions:

$t_n = n * (1 / f)$

where
f is the frequency of sine
t_n is the n^{th} maximum in time
n is the index 0,1,2, ...

There are two sliders on the right side of the ACORR window. The left slider is used to set the middle position of window. The right slider is used to set the dynamic range. The left mouse button is used for zooming.

121.3 Display Settings

The pop-up menu is activated when the right mouse button is pressed on the top of the signal view area. The pop-up menu contains the following menu items:

121.3.1 Stop / Start

The display can be started or stopped using this menu item.

121.3.2 Auto Scale

The window area is scaled automatically according to the signal

121.3.3 Zoom Out

The display area is scaled back to the original size. Use this selection when you want to scale “backwards”

121.3.4 Grid

If selected, the grid lines are drawn.

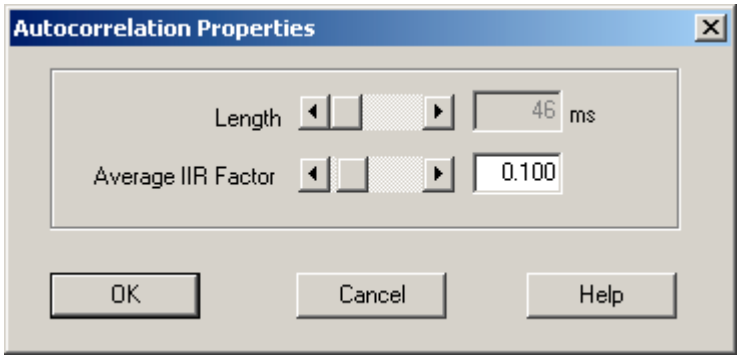
121.3.5 Average

If selected, the power spectrum function is averaged in time. Using this display mode, it is easier to see which frequencies contains energy, but fast changes are not shown.

121.3.6 Maximum
If selected, the maximum values are maintained.

121.3.7 Update Interval
Opens an update interval dialog, which is used to set the signal view update rate.

121.3.8 Properties
Opens the following Autocorrelation Properties dialog.



The length of autocorrelation can be selected with the horizontal scroll bar. The length of autocorrelation window is shown as milliseconds. The average IIR factor parameter is used as IIR gain factor in the averaging process. It is used only when averaging is on. A smaller gain factor means that new values have less gain compared to the old values.

121.3.9 Copy to Clipboard
Copies the window to the Windows Clipboard.

121.3.10 Help
Gives information about ACORR analyzer.

122 Bit Table Analyzer

122.1 Availability

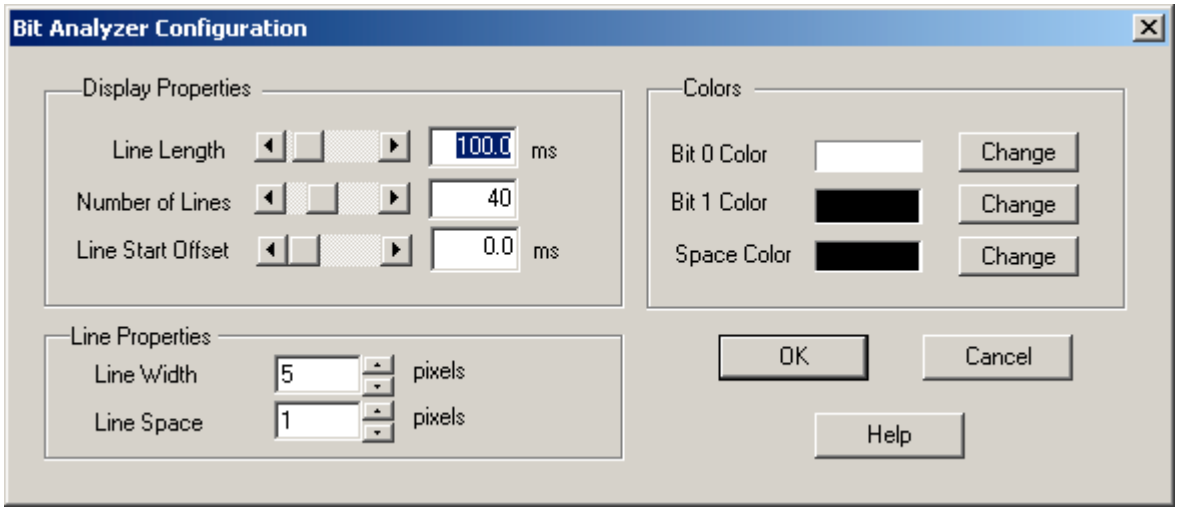
SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

122.2 General Description

The Bit Table Analyzer is part of the Bit Analyzer application. It shows the decoded bits in a graphical format.

122.3 Configuration

Selecting 'Properties' from the pop-up menu opens the following Configuration dialog box.



122.3.1 Parameters

122.3.1.1 Line length

Line length in milliseconds.

122.3.1.2 Number of lines

Number of lines in the display

122.3.1.3 Line start offset

The offset means how much the signal is delayed, in milliseconds, before printing starts from the zero position.

122.3.1.4 Line width

Line width in pixels.

122.3.1.5 Line space
Number of pixels between lines

122.3.1.6 Bit 0 color
Defines a color used in ‘0’ bit printing.

122.3.1.7 Bit 1 color
Defines a color used in ‘1’ bit printing.

122.3.1.8 Space color
Defines a color, which is used to separate lines.

122.3.2 Stop / Start
The pop-up menu command starts or stops the display updating

122.3.3 Fit
If selected from the pop-up menu, the bitmap is shown in original size. If not selected, the bitmap is re-sized to fit the window.

122.3.4 Copy to Clipboard
The pop-up menu command that copies the current window to the Windows Clipboard.

122.3.5 Help
The pop-up command which gives information about the analyzer.

123 FFT / Power Spectrum Analyzer

123.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

123.2 General Description

The FFT analyzer displays the signal power spectral density. The ‘x’ axis is the frequency in kHz. The ‘y’ axis is the signal power measured in decibels. The power is scaled so that the maximum possible input power of the selected input device corresponds to zero level.

There are two sliders on the right side of the FFT window. The left slider is used to set the middle position of the window. The right slider is used to set the dynamic range. The left mouse button is used for zooming. When the left mouse button is pressed, the selected frequency is shown at the bottom of the FFT window.

123.3 Display Settings

The pop-up menu is activated when the right mouse button is pressed on the top of the view area. The pop-up menu contains the following menu items:

123.3.1 Stop / Start

The display can be started or stopped by using this menu item.

123.3.2 Auto Scale

The window area is scaled automatically according to the signal parameters.

123.3.3 Zoom Out

The display area is scaled back to the original size. Use this selection when you want to scale ‘backwards’

123.3.4 Grid

Selected grid lines are drawn.

123.3.5 LogX

The selected ‘x’ axis is drawn in logarithmic scale. It is a useful display mode, for example, for viewing speech signals. Zooming is not supported in this display mode.

123.3.6 Average

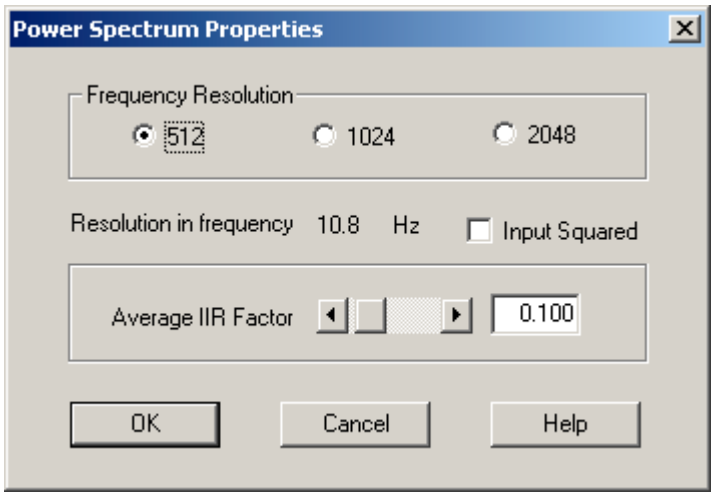
If selected, the power spectrum function is averaged over time. Using this display mode, it is easier to see which frequencies contain most energy, but fast changes are not shown.

123.3.7 Maximum

If selected, the maximum peak values are held.

123.3.8 Update Interval
Opens an update interval dialog, which is used to set the signal viewing update rate.

123.3.9 Properties
Opens the following 'Power Spectrum Properties' dialog.



The resolution of the power spectrum display can be selected at 512, 1024 or 2048 samples. The bigger the value, the better is the resolution in the frequency domain. The resolution also depends on the sampling frequency. The average IIR factor parameter is used as the IIR gain factor in the averaging process. It is used only when the averaging mode is on. A smaller gain factor means that new values have less gain compared to the old values.

123.3.10 Copy to Clipboard
Copies the current window to the Windows Clipboard.

123.3.11 Help
Gives information about the FFT analyzer.

124 FSK BIT Analyzer

124.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

124.2 General Description

The FSK BIT Analyzer (FBA) is a tool used for analyzing the FSK bit length. It provides a decoder part similar to the other SkySweeper FSK based decoders and the bit length display, as well as the text window, for printing out the analysis results in text format.

The FBA decoder searches the transmission within the given frequency boundaries. Also you can set the lower FSK frequency by double clicking the mouse on the required frequency position, and then SkySweeper allows you to set a second (=higher) frequency by a mouse click. The values of frequencies and the frequency offset are also shown on the screen.

When a transmission has been detected within the given range, the decoder will then lock itself to that frequency. When locked, the decoder draws a bold blue line on the spectrum display at the currently locked frequency. If the decoder is not locked, then the blue line is not shown as bold.

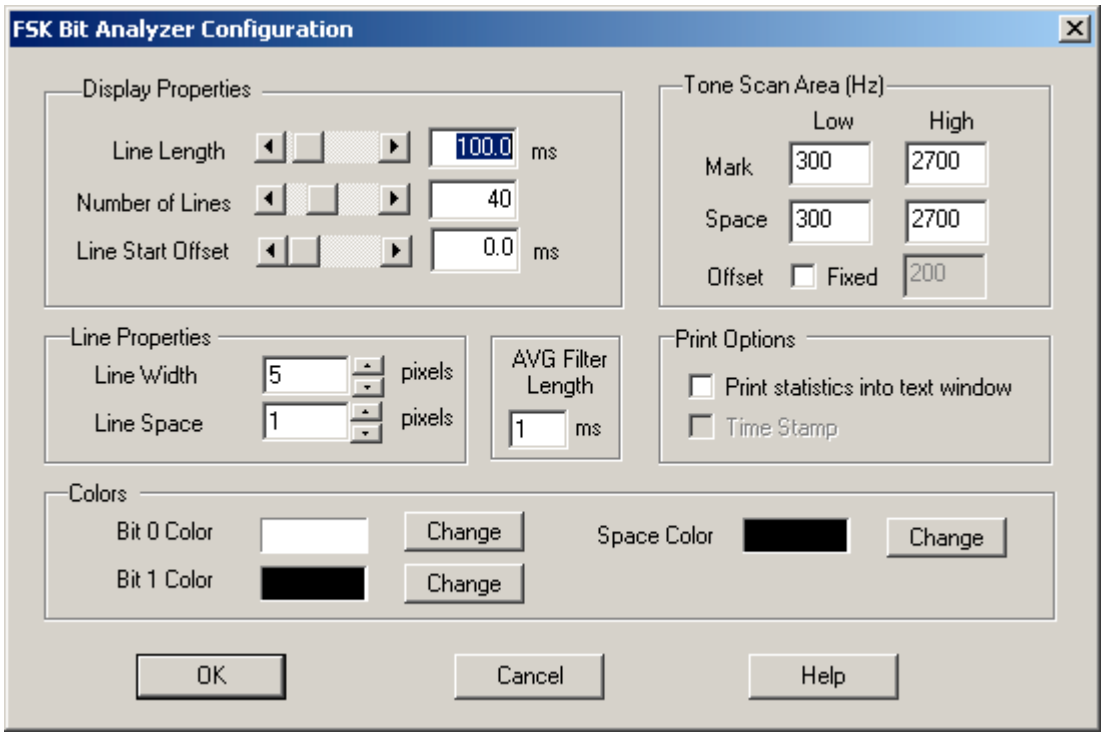
In the non-locked state, the carrier frequencies are automatically monitored within the given frequency boundaries. If the carrier frequency changes, then the decoder moves to a new frequency. If 'Lock' is pressed in the user interface, then the decoder will not automatically change its frequency. ‘Reset’ resets the decoder and the results can be saved by using ‘Save’. The parameters can be modified by pressing the ‘Config’ button.

The received text can be saved with ‘Save’

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about the spectrum display options.

124.3 Configuration

Pressing the ‘Config’ button opens the following Configuration dialog box.



124.3.1 Parameters

124.3.1.1 Tone Scan Area

The FSK transmission has two tones - Mark and Space. The scanned frequency range for Mark and Space will be given with two values, namely ‘low’ and ‘high’. The Mark and Space tones are searched for only inside this frequency window.

124.3.1.2 Fixed Offset

If the Fixed Offset check box is selected, the user can enter the fixed frequency offset between the Mark and Space carrier frequencies. The fixed frequency offset is used in automatic scanning mode.

124.3.1.3 Line length

Line length in milliseconds.

124.3.1.4 Number of lines

Number of lines in the display

124.3.1.5 Line Start Offset

This value shows how much the signal is delayed, in milliseconds, before printing starts from the zero position.

124.3.1.6 Line width

Line width in pixels.

124.3.1.7 Line space

Number of pixels between lines

124.3.1.8 AVG Filter Length

This is the Average Filter Length in milliseconds. If the baud rate is low, the longer average filter gives better analyzing performance.

124.3.1.9 Print statistics into text window

If this switch is selected, the analyzed results (bit lengths) will be printed into the text window.

124.3.1.10 Time stamp

If this switch is selected, the time stamp is added to the text. This works only if ‘Print statistics into text window’ is selected.

124.3.1.11 Bit 0 color

Defines a color used in ‘0’ bit printing.

124.3.1.12 Bit 1 color

Defines a color used in ‘1’ bit printing.

124.3.1.13 Space color

Defines a color, which is used to separate lines.

125 FSK Speed Analyzer

125.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

125.2 General Description

FSK Speed Analyzer (FSA) is a tool for the FSK baud rate analyzing. It provides a decoder part similar to the other SkySweeper FSK based decoders. Also, there is the baud rate histogram display as well as the text window for printing out the analysis results in text format.

The FSA decoder searches the transmission within the given frequency boundaries. Also you can set the lower FSK frequency by double clicking mouse on the required frequency position, and then SkySweeper allows you to set a second (=higher) frequency just by a mouse click. The values of the frequencies and the frequency offset are also shown on the screen.

When a transmission has been detected within the given range, the decoder will then lock itself to that frequency. When locked, the decoder draws a bold blue line on the spectrum display at the currently locked frequency. If the decoder is not locked, then the blue line is not shown as bold.

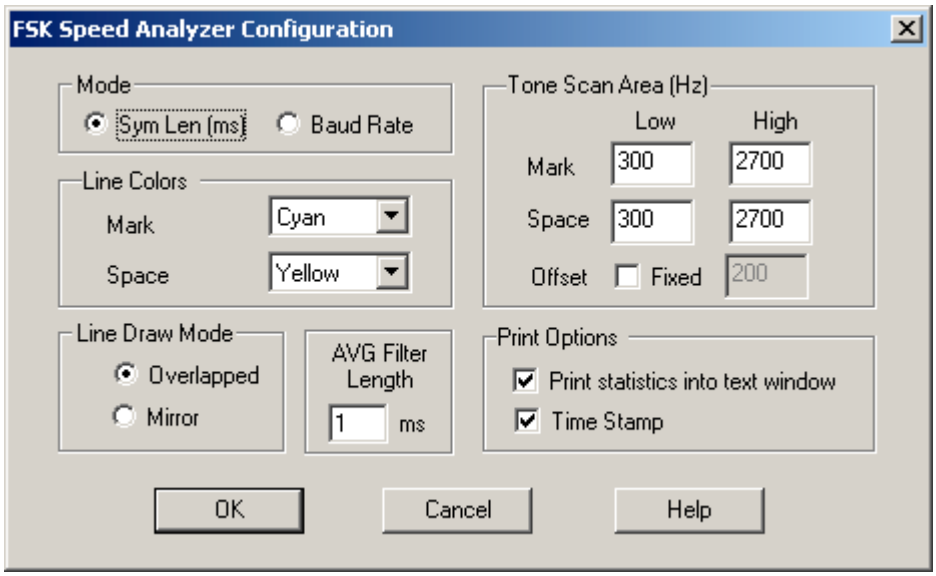
In the non-locked state, the carrier frequencies are automatically monitored within the given frequency boundaries. If the carrier frequency changes, then the decoder moves to a new frequency. If 'Lock' is pressed in the user interface, then the decoder will not automatically change the frequency. ‘Reset’ resets the decoder and the results can be saved using ‘Save’. The parameters can be modified pressing the ‘Config’ button.

The received text can be saved with ‘Save’.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

125.3 Configuration

Pressing the ‘Config’ button opens the following Configuration dialog box.



125.3.1 Parameters

125.3.1.1 Tone Scan Area

The FSK transmission has two tones - Mark and Space. The scanned frequency range for Mark and Space will be given with two values, namely 'low' and 'high'. The Mark and Space tones are searched for only inside this frequency window

125.3.1.2 Fixed Offset

If the Fixed Offset check box is selected, the user can enter the fixed frequency offset between the Mark and Space carrier frequencies. The fixed frequency offset is used in automatic scanning mode.

125.3.1.3 Mode

This selects the scale which is used to present the analyzed results. There are two choices for the scale (Baud Rate or **Sym**bol **Len**gth (ms)).

125.3.1.4 Line Colors

The sets the histogram line colors for Mark and Space symbols.

125.3.1.5 Line Draw Mode

The Space and Mark histograms can be drawn to the same scale (overlapped mode) or a different scale (when the Mark scale is negative). This is called 'Mirror' mode.

125.3.1.6 AVG Filter Length

This is the Average filter length measured in milliseconds. If the baud rate is low, then a longer average filter gives better analyzing performance.

125.3.1.7 Print statistics into text window

If this switch is selected, the analyzed results (bit lengths) will be printed into the text window.

125.3.1.8 Time stamp

If this switch is selected, the time stamp is added to the text. This works only if 'Print statistics into text window' is selected.

126 Eye Diagram Analyzer

126.1 Availability

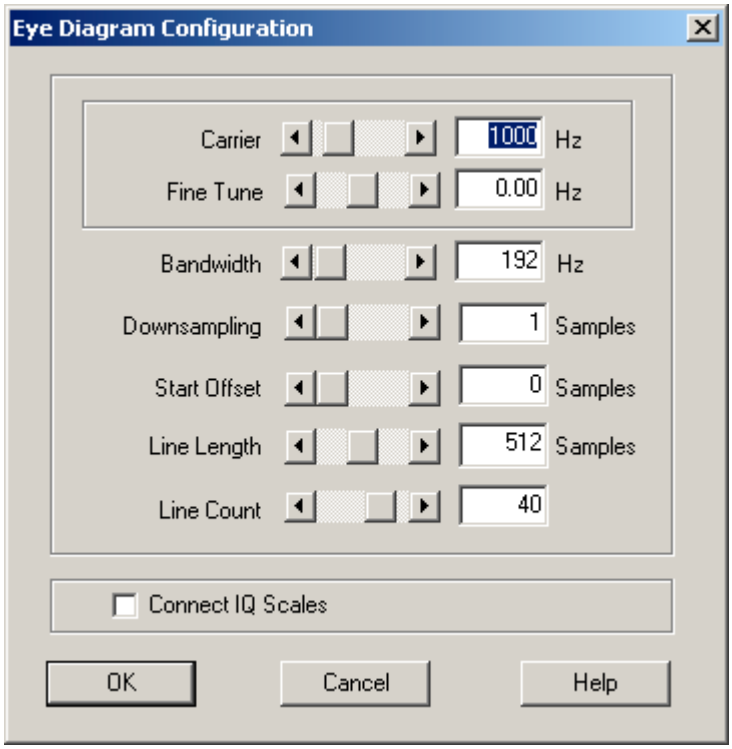
SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

126.2 General Description

In phase (I) and Quadrature (Q), the signal components are extracted from the Intermediate Frequency (IF) signal by multiplying it with sine and cosine. After multiplication, the I and Q components are low pass filtered in order to eliminate aliased components. I and Q samples are plotted separately into I and Q display. The user can select the carrier frequency from where the down conversion is done. The user can adjust the bandwidth of the IF signal with a low pass filter. If the signal is digitally modulated, the user can find the correct synchronization time by adjusting the downsampling and the start offset parameters.

126.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



126.3.1 Parameters

126.3.1.1 Carrier

The carrier frequency from where the IQ separation is done.

126.3.1.2 Fine Tune
The carrier frequency can be fine-tuned on the fly. The resolution is 0.01 Hz.

126.3.1.3 Bandwidth
The width of the low pass filter which is used to filter the I and Q signal after shifting the signal to the base-band.

126.3.1.4 Down Sampling
Every N^{th} of the I and Q signals are plotted on the screen.

126.3.1.5 Start Offset
Plotting of the I and Q signals is started from the N^{th} sample.

126.3.1.6 Line Length
How many samples are plotted into one line.

126.3.1.7 Line Count
Number of lines that are plotted into I and Q displays. The total buffer length for the I and Q samples is *Line Length* x *Line Count*. The x coordinate of the i^{th} sample is calculated with the following equation.

$$X_i = S_{(d*i)+s} \bmod L$$

where

S is the i^{th} sample in the I or Q buffer
d is the *Down Sampling*
s is the *Start Offset*
L is the *Line Length* parameter

126.3.1.8 Connect IQ Scales
If the check box is checked, the same scaling is used in the I and Q windows

126.4 Display Commands
By pressing the right mouse button in the plot area the pop down menu is opened. There are the following commands in the pop down menu.

126.4.1 Stop/Start
Display can started or stopped

126.4.2 Grid
When selected, a grid is drawn on the display.

126.4.3 Copy to Clipboard
The plot on the display is copied to the Windows Clipboard.

126.4.4 Help
Context sensitive help about Eye diagram display.

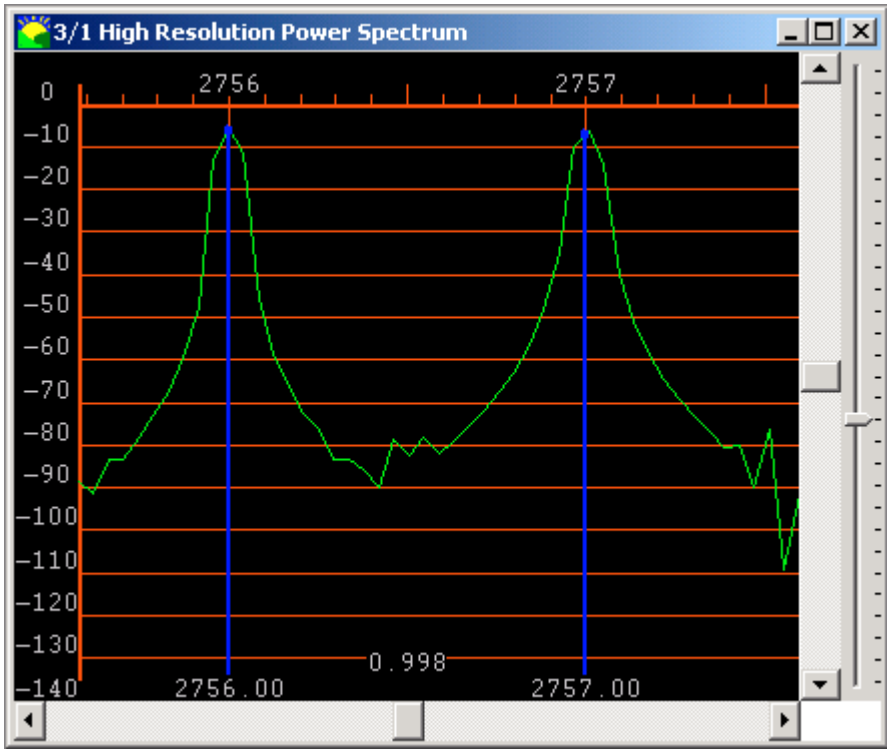
127 High Resolution FFT Analyzer

127.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : YES
SkySweeper PRO : YES

127.2 General Description

High resolution FFT display is used for very accurate spectrum analyzing. It provides frequency resolution down to 0.04 Hz (11025 Hz sampling rate, FFT length 262 144). It also provides the frequency markers. The display can be zoomed by selecting the viewed area by mouse (press the left mouse button over the spectrum to define the area). A frequency marker can also be set (press left mouse button twice). The marker can be removed by selecting the marker frequency (selected marker frequency is shown on white background) and pressing the 'd' character on the keyboard. The markers and selected frequency is shown in the picture below. There are two sine tones, with frequencies of 2756 and 2757 Hz.



127.3 Configuration

Pressing the right mouse button over the spectrum display will open the following menu.

127.3.1 Parameters

127.3.1.1 Stop/Start
The spectrum calculation and display updating can be started or stopped with this switch.

127.3.1.2 Zoom out
This returns the zoom to the original value.

127.3.1.3 Zoom back
This changes the zoom to the previous value in the Zoom value buffer.

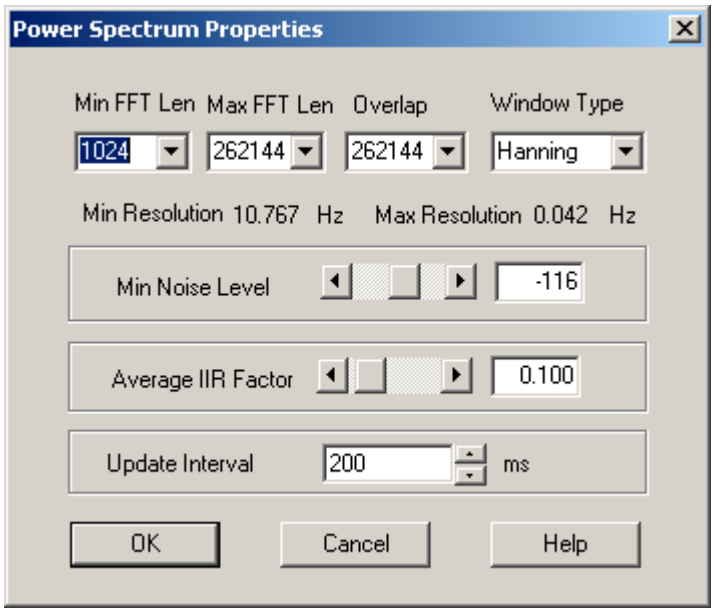
127.3.1.4 Zoom forward
This changes the zoom to the next value in the Zoom value buffer.

127.3.1.5 Grid
This activates the grid in the spectrum display.

127.3.1.6 Average
This activates the spectrum value averaging in the spectrum display.

127.3.1.7 Maximum
This activates the 'max and hold' function in the spectrum display.

127.3.1.8 Properties
This opens the configuration dialog shown below:



The 'Properties' parameters are:

127.3.1.9 MIN FFT LEN
This is the Minimum FFT length used in spectrum calculation with any zoom value.

127.3.1.10 MAX FFT LEN
This is the maximum FFT length used in spectrum calculation with any zoom value.

127.3.1.11 OVERLAP
This is the block size of FFT calculation. If this is low, then the display is updated more often than when the FFT length value is high.

127.3.1.12 WINDOW TYPE
This is the window type used in FFT calculation.

127.3.1.13 MIN NOISE LEVEL
With this parameter the background noise level can be adjusted. This allows better display dynamics to be used if the level is properly adjusted

127.3.1.14 AVERAGE IIR FACTOR
With this parameter the spectrum average filter bandwidth can be adjusted. A small value means narrow filter. This parameter is active only when averaging is activated.

127.3.1.15 UPDATE INTERVAL
This parameter defines how often the display will be updated. If the FFT length is large, the Update Interval can be much longer than the parameter value.

127.3.1.16 Copy to Clipboard
Copies the spectrum display to the Windows Clipboard

127.3.1.17 Help
Activates the help file

128 Histogram Analyzer

128.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

128.2 General Description

This is a tool for signal power and amplitude statistical analysis. It creates a histogram of different signal power values. This means, that in axis (Y) there are the number of values having the same power. The power value can be read from axis (X). It provides minimum, maximum, mean and standard deviation signal analysis.

128.3 Configuration

Pressing the right mouse button over the histogram display will open the following pop-up menu.

128.3.1 Parameters

128.3.1.1 Stop/Start

The histogram calculation and display updating can be started or stopped with this switch.

128.3.1.2 Auto scale

If this is switched on, the display is automatically scaled.

128.3.1.3 Zoom out

This returns the zoom to the original value.

128.3.1.4 Grid

This activates the grid in the histogram display.

128.3.1.5 Average

This activates the histogram value averaging in the display.

128.3.1.6 Maximum

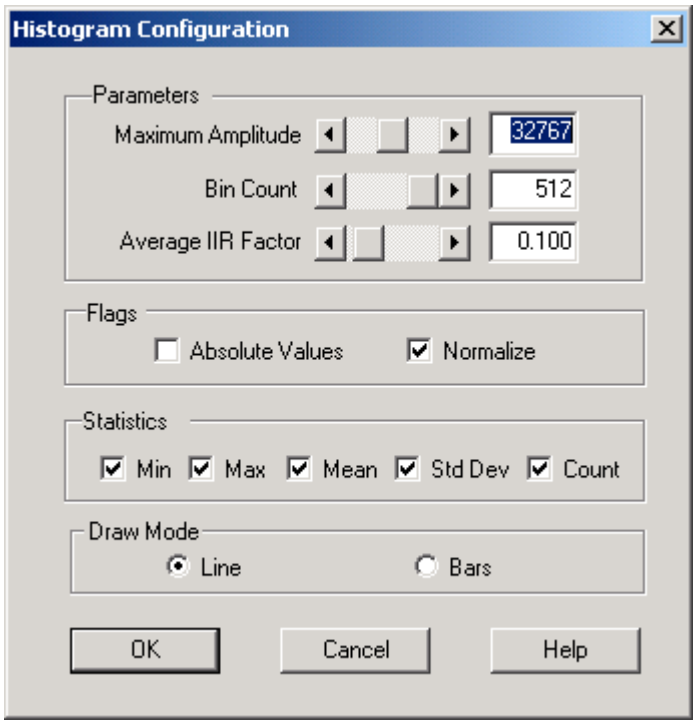
This activates the “max and hold” function in the histogram display.

128.3.1.7 Update interval

This defines an interval for the display updates.

128.3.1.8 Properties

This opens the configuration dialog shown below:



The 'Properties' parameters are:

128.3.1.9 MAXIMUM AMPLITUDE

This is the scale for the 'X' axis in the histogram display.

128.3.1.10 BIN COUNT

This is the number of different power levels in the 'Y' axis.

128.3.1.11 AVERAGE IIR FACTOR

This is the averaging filter parameter. If this number is small, the filter will be narrow. This parameter is active only when 'Averaging' is activated

128.3.1.12 ABSOLUTE VALUES

The histogram shows only the absolute values (these values are always positive)

128.3.1.13 NORMALIZE

The histogram maximum value will be normalized to 100.

128.3.1.14 MIN

If this is selected, the Minimum value will be shown on the display

128.3.1.15 MAX

If this is selected, the Maximum value will be shown on the display

128.3.1.16 MEAN

If this is selected, the Mean value will be shown on the display

128.3.1.17 STD DEV

If this is selected, the Standard Deviation value will be shown on the display

128.3.1.18 COUNT

If this is selected, the number of samples used in the analysis will be shown on the display

128.3.1.19 DRAW MODE

This defines the mode in which the results will be plotted (line/bar).

128.3.1.20 Copy to Clipboard

Copies the spectrum display to the Windows Clipboard

128.3.1.21 Help

Activates the help file

129 IQ Constellation Analyzer

129.1 Availability

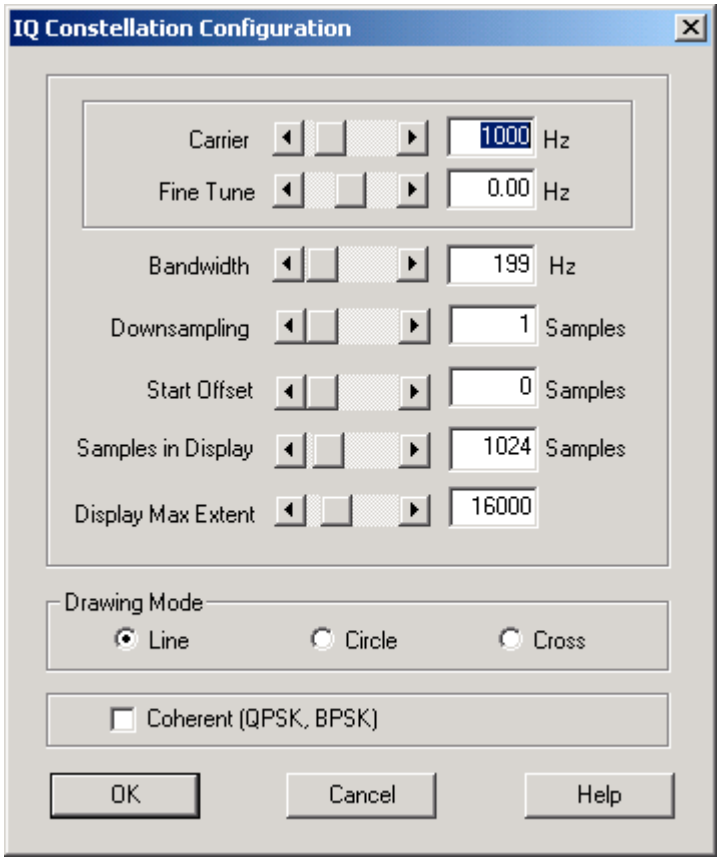
SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

129.2 General Description

In phase (I) and Quadrature (Q) signal components are extracted from the Intermediate Frequency (IF) signal by multiplying it with a sine and a cosine. After multiplication, the I and Q components are low pass filtered in order to eliminate aliased components. I and Q samples are plotted as an x and y coordinate display. The user can freely select the carrier frequency from where the down-conversion is done. The user can adjust the bandwidth of the IF signal with a low pass filter. If the signal is digitally modulated, the user can find the correct synchronization time adjusting the downsampling and the start offset parameters.

129.3 Configuration

When the 'Config' button is pressed, the following configuration dialog is opened.



129.3.1 Parameters

129.3.1.1 Carrier
The carrier frequency from where IQ separation is done.

129.3.1.2 Fine Tune
The carrier frequency can be fine-tuned on the fly. The resolution is 0.01 Hz.

129.3.1.3 Bandwidth
The width of the low-pass filter which is used to filter the I and Q signals after shifting the signal to the base-band.

129.3.1.4 Down sampling
Every N^{th} of the I and Q signals are plotted on the screen.

129.3.1.5 Start offset
Plotting of the I and Q signals is started from N^{th} sample.

129.3.1.6 Samples in Display
The number of the I and Q samples that are plotted on the display.

129.3.1.7 Display Max Extent
The maximum extent of the signal plot area. This parameter is used when the user zooms out on the display.

129.3.1.8 Drawing Mode
The I and Q pairs can be joined with a line or they can be plotted with circles or with crosses.

129.3.1.9 Coherent
If the received signal is a BPSK or QPSK modulated signal, the coherent IQ separation is able to detect the state transitions. This ensures that the constellation does not rotate.

129.4 Display commands
By pressing the right mouse button in the plot area, the pop-up menu is opened. There are the following commands in the pop-up menu.

129.4.1 Stop/Start
With this command, the display can started or stopped

129.4.2 Auto Scale
When Auto Scale is enabled, the display is scaled automatically in order to fit the IQ constellation optimally on the display. If Auto Scale is not on, the user can use the left mouse button to scale the plot area of interest.

129.4.3 Zoom Out
By using the Zoom Out command, the user can return the display to the maximum size. The maximum size depends on the maximum extent parameter, which is set from the Configuration Menu.

129.4.4 Grid
When selected, a grid is drawn on the display.

129.4.5 Copy to Clipboard
The plot on the display is copied to the Windows Clipboard.

129.4.6 Help
Context-sensitive Help about the IQ constellation display.

130 PAM BIT Analyzer

130.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

130.2 General Description

The PAM BIT Analyzer (PBA) is a tool for Pulse Amplitude Modulated (PAM) bit length analyzing.

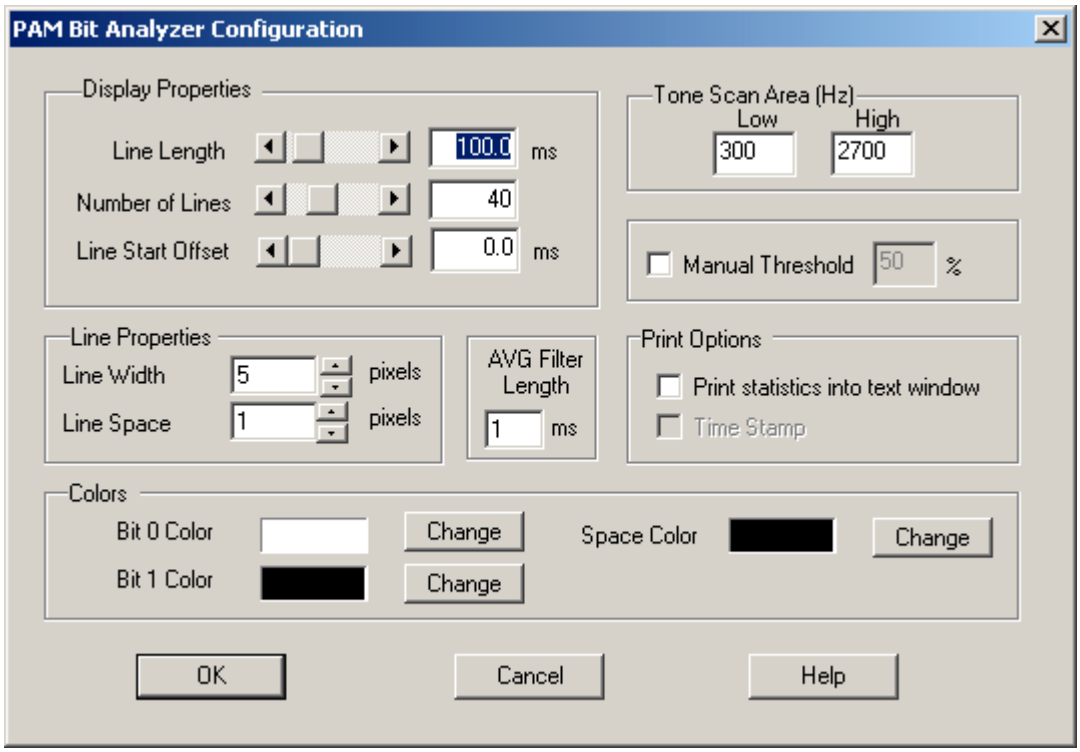
The PBA decoder searches the transmission within the given frequency boundaries. Also you can set the frequency by double clicking the mouse on the required frequency position. When a transmission has been detected within the given range, the decoder will then lock itself to that frequency. When locked, the decoder draws a bold blue line on the spectrum display at the currently locked frequency. If the decoder is not locked, then the blue line is not shown as bold.

In the non-locked state, the carrier frequencies are automatically monitored within the given frequency boundaries. If the carrier frequency changes, then the decoder moves to a new frequency. If 'Lock' is pressed in the user interface, then the decoder will not automatically change the frequency. ‘Reset’ resets the decoder and the results can be saved using ‘Save’. The parameters can be modified pressing the ‘Config’ button.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

130.3 Configuration

Pressing the ‘Config’ button opens the following Configuration dialog box.



130.3.1 Parameters

130.3.1.1 Tone Scan Area

The frequency range scanned for the PAM transmission. The transmission is only searched for inside this frequency window.

130.3.1.2 Line length

The Line length in milliseconds.

130.3.1.3 Number of Lines

The Number of Lines in the display

130.3.1.4 Line Start Offset

The offset indicates how much the signal is delayed in milliseconds before printing starts from the zero position.

130.3.1.5 Line Width

The Line Width in pixels.

130.3.1.6 Line space

The Number of pixels between lines

130.3.1.7 AVG Filter Length

This shows the Average filter length in milliseconds (ms). If the baud rate is low, the longer average filter gives better analyzing performance.

130.3.1.8 Manual Threshold

If checked, the user can adjust the detection threshold manually.

130.3.1.9 Print statistics into text window

If this switch is selected, the analyzed results (bit lengths) will be printed into the text window.

130.3.1.10 Time stamp

If this switch is selected, the time stamp is added to the text. This works only if ‘Print statistics into text window’ is selected.

130.3.1.11 Bit 0 color

Defines a color used in ‘0’ bit printing.

130.3.1.12 Bit 1 color

Defines a color used in ‘1’ bit printing.

130.3.1.13 Space color

Defines the color that is used to separate lines.

131 Phase Analyzer

131.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

131.2 General Description

The phase analyzer is a very powerful tool for signal phase analysis. In particular, different phase modulation types can easily be determined by using this tool as well as the IQ constellation display. It searches the transmission within the given frequency boundaries. Also you can set the decoded frequency by double clicking the left mouse button on the required frequency position.

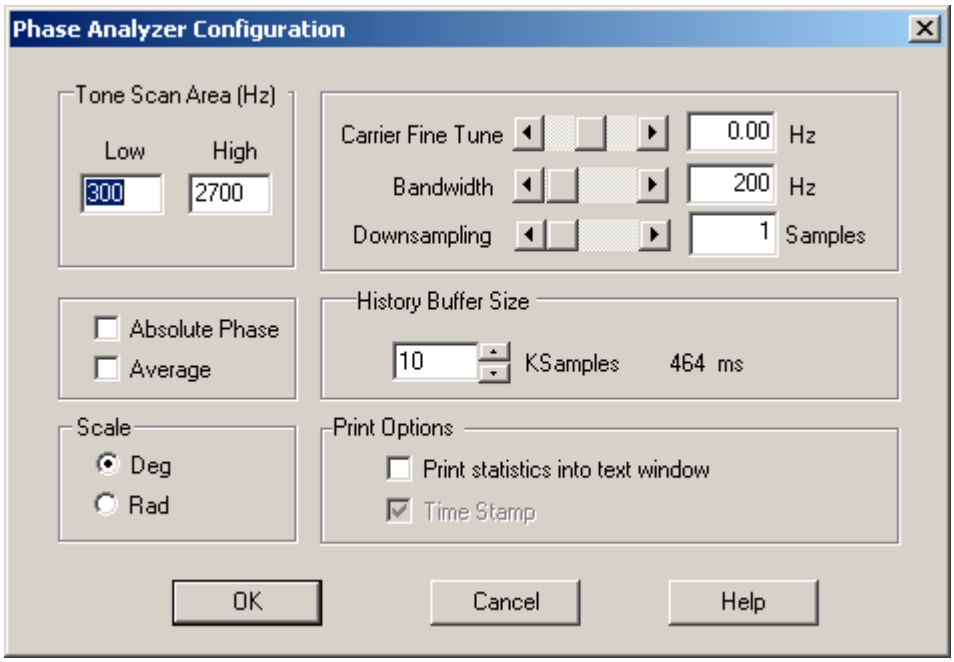
When the transmission has been detected at some frequency within the given range, the decoder will then lock itself to that frequency. When locked, the decoder draws a bold blue line on the spectrum display at the currently locked frequency. If the decoder is not locked, then the blue line is not shown as bold. After locking the frequency, the decoder starts to plot the phase onto the display.

In the locked state, the carrier frequency is automatically monitored within the given frequency boundaries. If the carrier frequency changes, then the decoder moves to the new frequency. If 'Lock' is pressed in the user interface, then the decoder will not automatically change its frequency. 'Reset' resets the decoder and the received text can be saved by using 'Save'

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

131.3 Configuration

When the 'Config' button is pressed, the following configuration dialog is opened.



131.3.1 Parameters

131.3.1.1 Tone Scan Area

The scanned frequency range is give two values - 'low' and 'high'. The transmission is searched for only within this frequency window. In most cases it is useful to firstly search the transmission visually using the spectrogram, FFT and 3DFFT displays and then define the scan area for the Phase Analyzer.

131.3.1.2 Carrier Fine Tune

This parameter is for fine-tuning the frequency. Accurate (coherent) tuning is needed to provide exact phase analysis so that the phase transitions etc. may be easily determined.

131.3.1.3 Bandwidth

This is analyzer internal filter bandwidth.

131.3.1.4 Downsampling

This is the downsampling ratio. If the ratio is N, then only every N^{th} signal sample is plotted on the screen.

131.3.1.5 Absolute phase

If this is selected, the phase is displayed as absolute phase. If this is not selected the phase is displayed as differential (the difference between consecutive samples)

131.3.1.6 Average

If this is selected the average phase is displayed.

131.3.1.7 History buffer size

This is the history buffer size of the phase display, in samples.

131.3.1.8 Scale

The 'Y' Scale of the phase display (either in degrees or radians).

131.3.1.9 Print Options

Defines which statistics are displayed in the text window.

132 PSK Speed Analyzer

132.1 Availability

SkySweeper STD : NO
SkySweeper STD+ : NO
SkySweeper PRO : YES

132.2 General Description

PSK Speed Analyzer (PSA) is a tool for the PSK/QPSK baud rate analyzing. It provides a decoder part similar to the other SkySweeper PSK based decoders. Also, there is the baud rate histogram display as well as the text window for printing out the analysis results in text format.

The PSA decoder searches the transmission within the given frequency boundaries. Also you can set the PSK frequency by double clicking mouse on the required frequency position. When a transmission has been detected within the given range, the decoder will then lock itself to that frequency. When locked, the decoder draws a bold blue line on the spectrum display at the currently locked frequency. If the decoder is not locked, then the blue line is not shown as bold.

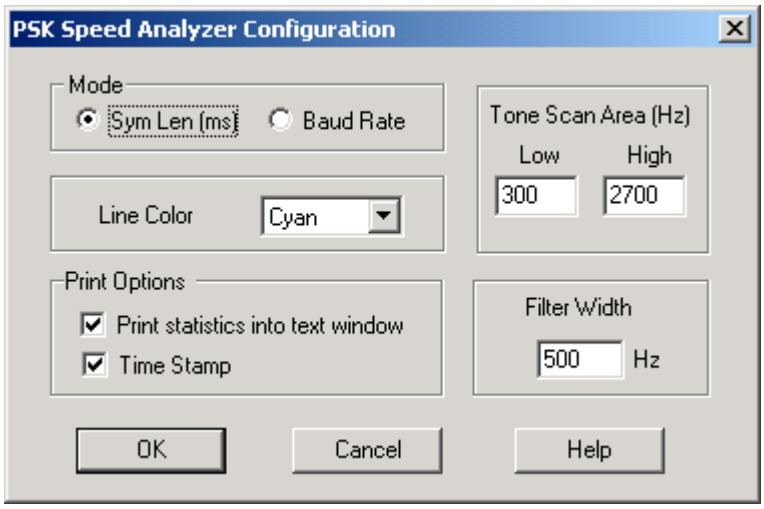
In the non-locked state, the carrier frequencies are automatically monitored within the given frequency boundaries. If the carrier frequency changes, then the decoder moves to a new frequency. If 'Lock' is pressed in the user interface, then the decoder will not automatically change the frequency. ‘Reset’ resets the decoder and the results can be saved using ‘Save’. The parameters can be modified pressing the ‘Config’ button.

The text can be saved with ‘Save’.

SkySweeper supports both FFT and waterfall display modes for decoder tuning. The Decoder Spectrum Dialog chapter gives more information about spectrum display options.

132.3 Configuration

Pressing the ‘Config’ button opens the following Configuration dialog box.



132.3.1 Parameters

132.3.1.1 Tone Scan Area

The PSK transmission is searched for only inside this frequency window

132.3.1.2 Mode

This selects the scale which is used to present the analyzed results. There are two choices for the scale (Baud Rate or **Sym**bol **Len**gth (ms)).

132.3.1.3 Line Colors

The sets the histogram line color.

132.3.1.4 Print statistics into text window

If this switch is selected, the analyzed results (bit lengths/baud rates) will be printed into the text window.

132.3.1.5 Time Stamp

If this switch is selected, the time stamp is added to the text. This works only if 'Print statistics into text window' is selected.

132.3.1.6 Filter Width

This is the PSA internal filter width. This should be adjusted according the transmission bandwidth provide optimal analysis results.

133 Signal Statistics Analyzer

133.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

133.2 General Description

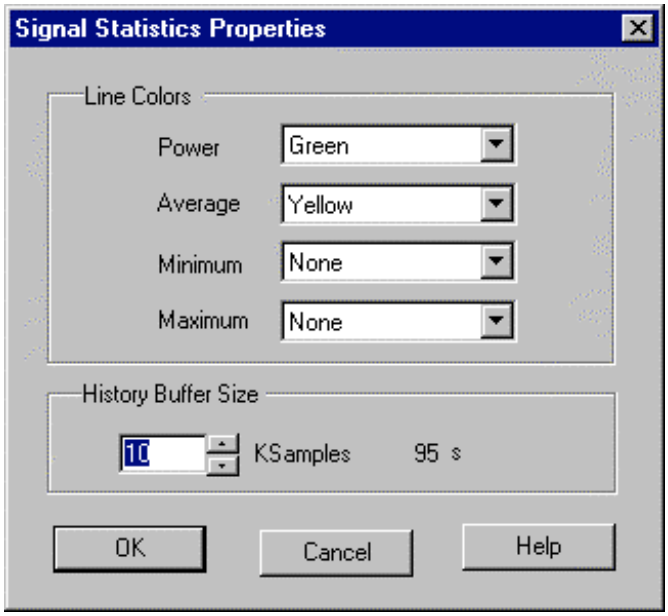
The Signal Statistics block displays real time information about signal statistics. The user can select any of the following statistics to be displayed: power, average, minimum and maximum. The statistic is calculated over the plotting period, which is about 250 samples.

Statistics are plotted on the screen, which is scrolled from right to left. The plot color of the signal statistics can be selected from the 'Properties' dialog.

Increasing the size of the history buffer increases the number of values from the past that are kept in the history buffer. The horizontal scroll bar is used to display the old values. The time scale on the display is in seconds.

133.3 Configuration

Pressing the 'Config' button opens the following Configuration dialog box.



133.3.1 Parameters

133.3.1.1 Power
The Power is the power of the input signal during the plot period. The drop-down list is used to select the plot color. If 'None' is selected, the power is not plotted.

133.3.1.2 Average
The Average is the average value of the input signal during the plot period. The drop-down list is used to select the plot color. If 'None' is selected, the average is not plotted.

133.3.1.3 Minimum
The Minimum is the minimum value of the input signal during the plot period. The drop-down list is used to select the plot color. If 'None' is selected, the minimum is not plotted.

133.3.1.4 Maximum
The Maximum is the maximum value of the input signal in the plot period. The drop-down list is used to select the plot color. If 'None' is selected, the maximum is not plotted.

133.4 Display Commands
By pressing the right mouse button in the plot area, a pop up menu is opened. There are the following commands in the pop up menu.

133.4.1 Stop/Start
The Display can started or stopped

133.4.2 Auto Scale
When Auto Scale is enabled, the display is scaled automatically in order to fit the signal statistics optimally onto the display. If Auto Scale is not on, the user can use the horizontal scroll bars to adjust the extent and the signal DC level on the display.

133.4.3 Grid
When selected, a grid is drawn on the display. The time scale is in seconds.

133.4.4 Copy to Clipboard
The plot on the display is copied to the Windows Clipboard.

133.4.5 Help
Context sensitive help about signal statistics display.

134 Signal View Analyzer

134.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

134.2 General Description

The Signal View Analyzer displays the signal in the time axis. The 'Y' axis is the signal amplitude. The 'X' axis is the time axis in milliseconds.

There are two sliders on the right side of the Signal View window. The left slider is used to set the signal middle position in the view area. The right slider is used to set the dynamic range of the signal area i.e. the maximum signal amplitude that can be shown. The maximum and minimum values of the signal window are shown on the right side of the window. If the history buffer size is more than 1, and plotting is stopped, the horizontal scroll bar is shown at the bottom of the window. The scroll bar is used to scroll the samples in the history buffer.

134.3 Display Settings

The pop-up menu is activated when the right mouse button is pressed on the top of the signal view area. The pop-up menu contains the following menu items:

134.3.1 Stop / Start

The display can be started or stopped using this menu item.

134.3.2 Auto Scale

The window area is scaled automatically according to the signal amplitude.

134.3.3 Grid

If selected, grid lines are drawn.

134.3.4 Update Interval

Opens an update interval dialog, which is used to set the signal update rate.

134.3.5 Properties

Opens a Signal View Properties dialog, which is used to set the size of the history buffer.

134.3.6 Copy to Clipboard

Copies the current window to the Windows Clipboard.

134.3.7 Help

Gives information about the Signal View Analyzer.

135 Spectrogram Analyzer

135.1 Availability

SkySweeper STD : YES
SkySweeper STD+ : YES
SkySweeper PRO : YES

135.2 General Description

The Spectrogram indicates the signal level using colors. Black and blue indicate that the frequency has little power whereas red indicates high power. If the grayscale palette is selected, white indicates high power and black indicates low power frequencies. There are two slider bars at the top of spectrogram window. The left slider bar is used to adjust the contrast (c) and the right one is used to control the signal base level (b). The pixel color is calculated using the following formula.

$$color_f = T(c*x_f + b)$$

where
x_f is the power at frequency *f*.
T is the mapping of the power level to the color.

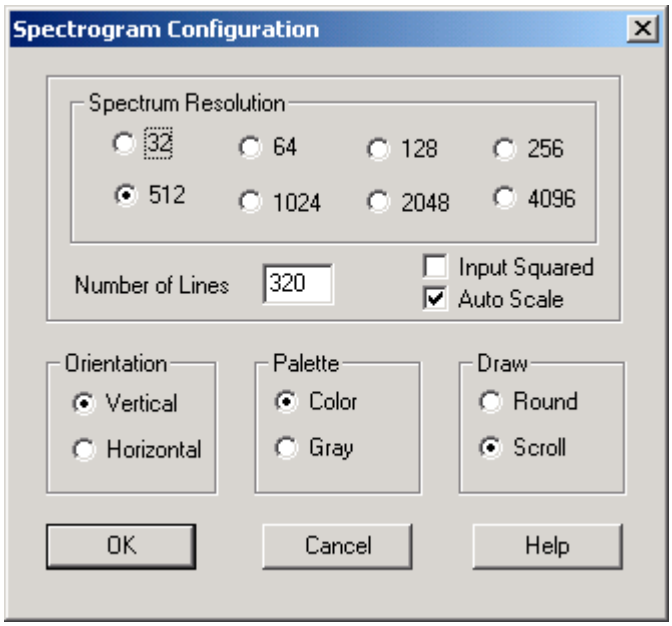
If the left mouse button is pressed over the spectrogram window, the frequency corresponding to the cursor position is shown in the bottom left corner. The left mouse button is also used to zoom into the required frequency band. Selecting ‘Zoom Out’ from the right mouse pop-up menu is used to expand the frequency band after zooming.

If the right mouse button is pressed over spectrogram window, a pop-up menu is shown. Using the pop-up menu, the bitmap can be copied to the Windows Clipboard.

Double clicking with left mouse button lets you to install two frequency markers. Drop the second marker into wanted position pressing left button once. Markers can be moved dragging them from frequency box. Double clicking the frequency box opens the dialog where you can type frequencies as Hertz. Pressing D button, when the frequency box is highlighted deletes the markers.

135.3 Configuration

The configuration dialog is used to adjust the parameters. Push the ‘Config’ button, which is at the top of the Spectrogram window and the following configuration dialog is shown.



135.3.1 Parameters

135.3.1.1 Spectrum Resolution

This sets the resolution of the frequency axis. The resolution is given in powers of 2 because the Fast Fourier Transformation (FFT) algorithm is used.

135.3.1.2 Number of Lines

This parameter sets how many lines are drawn in the time axis. The number of lines and the sampling frequency define how many seconds the signal is shown in the Spectrogram window.

135.3.1.3 Input Squared

Input data is squread before FFT. This increases dynamic, which improves detection of weak signals.

135.3.1.4 Auto Scale

Frequency samples are automatically scaled before plotted into window. Sliders does not have any effect if auto scale is enabled.

135.3.1.5 Orientation

If the orientation is *vertical*, the vertical axis is Time and the horizontal axis is Frequency. The orientation can also be *horizontal,* when the axes are reversed. The frequency axis is in kHz. The time axis is in seconds.

135.3.1.6 Palette

256 colors and grayscale palettes are supported.

135.3.1.7 Draw

If the scrolling drawing method is selected, the oldest frequency values are scrolled out of the picture. Note that this method needs more computation power than the rounding method.

135.4 Save

The ‘Save’ button saves the Spectrogram picture in bitmap (.BMP) format to a file. When the button is pressed, a save dialog is shown. Type a name for the bitmap picture and press the ‘Save’ button.

135.5 Reset

The ‘Reset’ button is used to clear the Spectrogram bitmap window.