

PERSEUS SOFTWARE V4.0C RELEASE NOTES

(c) 2007-2012 Microtelecom s.r.l. - Pavia di Udine, Italy
30 November 2012

Important notice to External Down-Converter Software Plugin users

If you bought the External Down-Converter Plugin for Perseus, please copy the “*perseuslf.dat*” file from the previous release folder to the 4.0c install folder.

You must overwrite the “*perseuslf.dat*” file supplied in the 4.0c package with the copy you received via e-mail after the purchase.

Backup your Memory Banks Files.

Memory banks are stored in files named “*membankx.dat*” (where x=1, 2, ..., 6) in the same directory where the software is executed. The Perseus software generates blank (empty) user memory files if they do not exist in the folder where the software is executing.

Please make a backup of the memory banks files “*membankx.dat*” created by the previous software versions and copy them in the folder where you are going to install the new software version.

This operation will allow the new Perseus software to use the memory banks you may have stored with older versions.

4.0c VERSION FEATURES

Client

Audio Delay function

Starting from release 4.0c a new function named Audio Stream Delay is configurable under the Settings window. The actual signal demodulation is done after a user selectable delay (1 to 30 seconds). This feature allows seeing the signals on the spectrum/waterfall first and tune the demodulator to the right frequency before the actual signal reaches it. This option can be used to correctly copy short communications or simply not to miss the beginning of a transmission. The button labeled “**Fn**” in the Perseus window controls whether the function is enabled or not.

Please note that right after enabling the function, it is normal for the secondary spectrum window and audio signal to disappear for the specified number of seconds (as buffering is taking place), while the main view is still updated in realtime. Server-side support is enabled only from release 1.0c on.

FM Deemphasis

When using the FM demodulator, FM Deemphasis is now enabled by default. The de-emphasis time constant (50-300 us) is user adjustable from the software Settings window.

Perseus servers network

The Perseus servers map is no longer integrated in the Perseus executable. It is now possible to keep the map open while listening to a station and using the Perseus client. The map view is adjustable to users' preferences (right-click on the map for speed/availability filters); favorite stations can be saved as clickable icons/links (to save a station to your hard drive, just click on the star icon in the popup menu shown when hovering the mouse over a server).

This added flexibility required the use of another executable called *mttps.exe* that will request user confirmation and administrative privileges when starting Perseus for the first time.

Minor bugfixes

Fixed a potential race condition while connecting to servers.

Buttons font rendering should be now fixed for users experiencing readability problems.

Reversed RTTY and CW are now stored in the registry and restored at startup.

Notch filter stays enabled after stop and re-start while playing a recorded file.

Default connection timeout when trying to reach offline servers is now 5 seconds.

Setting a negative offset is now allowed in "Set Filter Bandwidth" command through CI-V.

Server

Automatic update of DNS records

The server will periodically check that the proper address is being used for the updates on the Perseus map (only if "List on the Perseus Directory" option is enabled in configuration).

Support for blacklisting IP addresses

Starting from version 1.0c, the Perseus Server software allows to specify a list of IP addresses that will not be allowed to connect. This function is controlled from the Server settings window under the section "Access control". If enabled, the server software will read the *blacklist.txt* file in the same directory where it is started from. The *blacklist.txt* file is a textual file, where a single IP address (or family) should be written on each line (up to 32 lines). Wildcards are supported (in the form of *x* or ***) and will be automatically added if missing. Any line can be commented (and skipped while filtering) adding a '#' at the beginning of it; a user comment can also be specified after the IP address, up to 100 characters in length. A working example of a blacklist file, showing various admitted parameters is the following:

```
# IP Blacklist file
192.168.1.2    A local IP Address
#192.168.1.3  Commented – not filtered
192.*.*.*    All networks starting with 192 (192.0.0.0/8)
192*         Same effect as previous line
82.56.35.15   A public IP
```

Any filtered-out connection attempt will be reported on the server window, along with the rule that was used.

Support for Audio stream delay

Using a Perseus release from 4.0c up, it is possible to use the audio stream delay function while connecting to remote servers, if they are equipped with version 1.0c or later of the Perseus Server software. Please read the 4.0c client release notes for more details.

Various fixes

A minor bug was addressed that lead to the server being reported as busy even if no client was connected.

Enjoy this new version,
The Microtelecom Development Team
Microtelecom s.r.l.

PERSEUS SOFTWARE V4.0B RELEASE NOTES

(c) 2007-2011 Microtelecom s.r.l. - Pavia di Udine, Italy
05 August 2011

Important notice to External Down-Converter Software Plugin users

If you bought the External Down-Converter Plugin for Perseus, please copy the “*perseuslf.dat*” file from the previous release folder to the 4.0b install folder.

You must overwrite the “*perseuslf.dat*” file supplied in the 4.0b package with the copy you received via e-mail after the purchase.

Backup your Memory Banks Files.

Memory banks are stored in files named “*membankx.dat*” (where x=1, 2, ..., 6) in the same directory where the software is executed. The Perseus software generates blank (empty) user memory files if they do not exist in the folder where the software is executing.

Please make a backup of the memory banks files “*membankx.dat*” created by the previous software versions and copy them in the folder where you are going to install the new software version.

This operation will allow the new Perseus software to use the memory banks you may have stored with older versions.

4.0b VERSION FEATURES

Client/Server Architecture for Remote Operations over Local or Wide Area Networks

Please read carefully the file *Client-Server Perseus Software Reference - EN02.pdf* provided with this distribution for a detailed description of the new network features of the Perseus client and server software.

Improvements

Decimation filters alias image rejection has been raised to 150 dB.

A second userlist button has been added under the memories window. The default filenames for the user's memory list are now “userlist1.txt” and “userlist2.txt”. Please rename any userlist.txt file you may have created with userlist1.txt.

CW and RTTY LSB modes have been added; this feature can be toggled clicking a second time on the desired demodulation mode button. A line over the CW and RTTY mode button will appear when the selected mode is in the reverse (LSB) demodulation mode.

Fixed Bugs

For a list of addressed bugs, please refer to the Bugs/Reports Database hosted online on the *Perseus_SDR* Yahoo group (http://groups.yahoo.com/group/perseus_SDR/).

Enjoy this new version,
The Microtelecom Development Team
Microtelecom s.r.l.

PERSEUS SOFTWARE V3.0Beta RELEASE NOTES

(c) 2007-2010 Microtelecom s.r.l. - Pavia di Udine, Italy
04 June 2010

Important notice to External Down-Converter Software Plugin users

If you bought the External Down-Converter Plugin for Perseus, please copy the “*perseuslf.dat*” file from the 2.1i folder to the 3.0Beta install folder.

You must overwrite the “*perseuslf.dat*” file supplied in the 3.0Beta package with the copy you received via e-mail after the purchase.

Backup your Memory Banks Files.

Memory banks are stored in files named “*membankx.dat*” (where x=1, 2, ..., 6) in the same directory where the software is executed. The Perseus software generates blank (empty) user memory files if they do not exist in the folder where the software is executing.

Please make a backup of the memory banks files “*membankx.dat*” created by the previous software versions and copy them in the folder where you are going to install the new software version.

This operation will allow the new Perseus software to use the memory banks you may have stored with older versions.

3.0Beta VERSION FEATURES

Please note that this version is released as “Beta”. As many changes were made in the underlying processing and graphics updating layers, some minor issues might show up and will be addressed in the next stable software release. The latest fixes and improvements include the following:

Windows Taskbar and Keyboard Shortcut fixes

Closing the Perseus executable with the Alt-F4 keyboard shortcut is now working as expected. While the software is running, clicking on the Perseus Windows Taskbar Icon allows window minimizing (hiding the main window in the Taskbar) and maximizing (restoring the main window view).

Graphics behaviour

Graphic updates management was reviewed to obtain better performance; S-Meter panel view updates were also addressed for issues reported with low-end systems.

New Vectorial Noise Blanker

A new Noise Blanker mode was added. It is meant to be used only in AM or CW. It is based on vectorial analysis and processing, thus its button name on the main Perseus window is “*NBV*”.

Signal processing stages

Signal processing stages were rewritten to obtain a smoother performance when switching among the available filter bandwidths (50 kHz, 25 kHz, ..., 0.8 kHz).

New CI-V commands

As described in the “*CI-V Interface-EN01.pdf*”, commands were added to allow better control of the Perseus software through the CAT interface. The following sliders/controls can now be set by CAT commands: audio output volume, NB, NR, AGC, CW Peak and Auto Notch filters.

Moreover, commands for setting the pass band filter edges and retrieving the current software versions and receiver serial number were added. For further details, please refer to the “*CI-V Interface-EN01.pdf*” file.

Enjoy this new version,
The Microtelecom Development Team
Microtelecom s.r.l.

PERSEUS SOFTWARE V2.1i RELEASE NOTES

(c) 2007-2010 Microtelecom s.r.l. - Pavia di Udine, Italy
21 January 2010

Things to remember prior to install the V2.1i Software Version

Install the new WinUSB drivers.

If you have never installed the Perseus software on your PC or if you are upgrading from a version software prior to version v2.1h, you need to install the WinUSB drivers on your system.

The WinUSB drivers installation is required only if the Perseus software is used in conjunction with a Perseus receiver. If you are using the Perseus software in demonstration mode please skip this section.

Please read the documents WinUSB_xxx_R1.pdf provided with this distribution for information on how to install the new drivers on your system.

If this is not the first Perseus software version you have installed on your system

If this is your first Perseus software installation you may skip this section.

Once the new WinUsb drivers are installed, the Perseus receiver will be no more visible to the system through its old *CyUsb.sys* drivers and by the software versions which make use of the old *perseususb.dll*.

In the case you wish to continue to use also older versions of the Perseus software, you must overwrite the *perseususb.dll* file contained in the folders where you have installed the older version with the *perseususb.dll* file provided in this v2.1i software release.

Please make a backup of your older software versions prior to overwrite any file provided with it.

Even if Windows XP automatically creates a System Restore Point during the drivers update, it is suggested to execute a manual System Restore Point on your system prior to install the new drivers. Give the manual Restore Point the name "Prior to WinUsb drivers installation" so that it will be easy to find it, restore your system to its original status and retry the drivers installation in the case something should go wrong.

Backup your Memory Banks Files.

Memory banks are stored in files named *membankx.dat* (where $x=1,2,...,6$) in the same directory where the software is executed.

The Perseus software generates blank (empty) user's memory files if they do not exist in the folder where the software is executing.

Please make a backup of the memory banks files *membankx.dat* created by the previous software versions and copy them in the folder where you are going to install the new software version.

This operation will allow the new Perseus software to use the memory banks you may have stored with older versions.

2.1i VERSION FEATURES

Version 2.1i fixes some minor issues contained in the previous software version v2.1h:

Preselection filters button misalignment in the Front-End panel

System Date changes prevent software to be run unless fully registered

New Marker Log File Format

Besides the above fixes, Version 2.1i implements the same features of v2.1h software, as listed hereafter:

Works as fully featured demonstration version

WinUSB drivers and control DLL for Windows Vista and Windows 7 support.

🕒 **Multiple receivers attached to a single PC.**

New FPGA cores with 48, 96, 192 kHz output sample rates. Direct CW Skimmer support.

Optional support for external frequency down-converters

Spectrum Display Max Hold/Clear/ Pause Functions

Waterfall Automatic Gain Control

New Waterfall Processing Mode

Waterfall Time Ticks

Markers Log

S-Meter and Marker Units

Waterfall color palettes

Fully featured demonstration version

The Perseus software runs in a fully featured file playback mode for those who would like to evaluate its features before buying the Perseus receiver.

The Perseus software can be freely evaluated for a 60 days trial period.

A permanent license for those who would like to use the Perseus software beyond the trial period will be available upon request.

The Perseus software is permanently enabled to owners of the Perseus receiver.

WinUSB drivers and control DLL. Windows Vista and Windows 7 support.

The Perseus control DLL *perseususb.dll* now supports also the Microsoft operating systems Windows XP/Vista/Windows 7, in both their 32 and 64 bit versions and interface directly to the Windows WinUSB library, which is native in Vista and 7 OSs.

The software drivers folder provided in this version include the WinUSB library software required by Windows XP (in which the library is not native and should be installed on the system).

Multiple receivers attached to a single PC.

The Perseus software now accepts multiple Perseus receivers attached to a single PC.

Multiple instances of the software can be run in real-time and up to the number of the receivers connected to the system.

Once a new Perseus application instance is run, the software automatically checks for unused Perseus receivers attached to the system and connects to the first of them. If no more unused receivers are available on the system, further Perseus software instances will run in playback mode.

Please note that multiple runs of the Perseus software require a huge amount of digital signal processing, especially when the highest DDC sample rates are selected, which can easily surpass the processing capability of the system CPU. As a rule of thumb each software instance should be run at a DDC sample rate so that summing all of the rates the total does not exceed the sample rate that a single instance can process (2000 kS/s).

When using multiple software instances always monitor the CPU load with the task manager.

Reduce the receiver's DDC sample rate if the load on any of the cores of the CPU of your system approaches a 100 % utilization.

New FPGA cores with 48, 96, 192 kHz output sample rates.

Direct CW Skimmer support.

New FPGA digital down converter cores have been made available to provide a direct support to software applications which require the hardware to produce a data stream at sample rates commonly used by audio peripheral devices, 48 kHz, 96 kHz and 192 kHz, like i.e. in the popular *CW Skimmer* designed by Alex VE3NEA.

This distribution includes three new FPGA cores which provide the required sample rates, as indicated in the following list:

perseus48k24v31.sbs – Nominal Sample Rate: 48 kHz.

perseus96k24v31.sbs – Nominal Sample Rate: 96 kHz.

perseus192k24v31.sbs – Nominal Sample Rate: 192 kHz.

The sample rates provided by these cores are only approximate to about 0.16% of the nominal rate. The true output sample rate provided by these three core is obtained dividing the receiver ADC clock (80 MHz) respectively by 416, 832 and 1664.

These three files, along with the new Perseus control DLL *perseususb.dll*, should be copied in the folder where CW Skimmer has been installed, as explained in the CW Skimmer help.

Support for external frequency down-converters

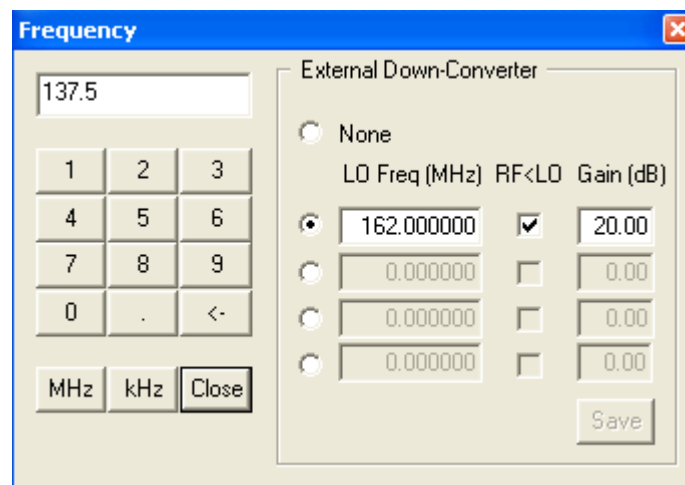
A full support for external frequency down converters has been added.

Up to four external down converter configurations can be stored and accessed from the tuning frequency dialog.

Once an optional external down converter is connected to the receiver input, the Perseus software will display the true tuning frequency and signal amplitudes provided that the frequency of the down-converter local oscillator frequency and the down converter gain are entered in one of the available entries of the tuning frequency dialog.

Since the Perseus is an HF receiver with a frequency coverage from 10 kHz to 30 MHz, only down converters with an IF output in this frequency range are supported.

Both inverting (RF frequency < LO frequency) and non inverting ((RF frequency > LO frequency) converters are supported. For inverting down converter the button RF<LO should be checked as shown in the following picture:



The Perseus software will not place any limit in the tuning frequency beyond the limits dictated by the fact that the IF signals at the receiver input must fall within the range [0..40 MHz].

With the setting shown in the above picture the software will accept a tuning frequency from 122 MHz to 162 MHz.

In general, for inverting down-converters the software will accept a tuning frequency in the range $[F_{LO}-40 \text{ MHz} .. F_{LO}]$. For non inverting down-converters the tuning frequency must be in the range $[F_{LO} .. F_{LO} + 40 \text{ MHz}]$.

Once the LO frequency, the inverting flag and the gain of the down-converter are entered click the button “Save” to store them (the “enter” key will simply close the dialog without saving).

The maximum LO frequency accepted by the software is 960 MHz. For operations above 1 GHz, please omit the GHz digits when tuning the receiver and when entering them in the external down converter dialog (i.e. for a 2.120 GHz LO, only the value 120 MHz should be entered).

Once one of the four external down converters radio button is selected, the software assumes that the receiver will operate above the HF frequency range and set the S-Meter S scale so that S9 corresponds to -93 dBm (5 uV rms). When the external down converter option is set to “None”, the S-Meter scale is reverted to the HF convention ($S9 = -73 \text{ dBm}$ or 50 uV rms into a 50 Ohm load).

The external down converter dialog is disabled during file playback and recording to prevent inconsistent frequency reading or receiver control.

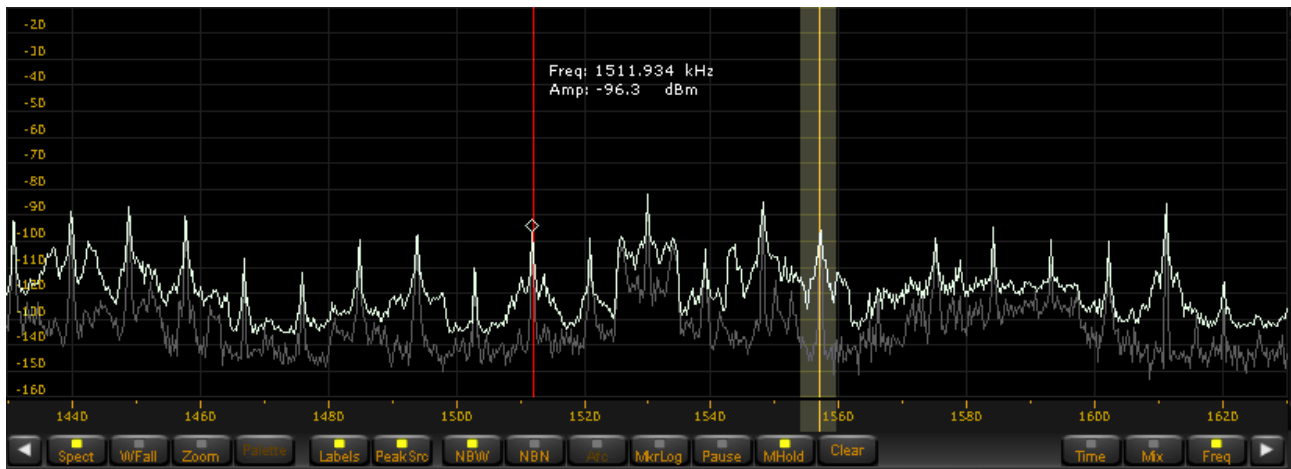
IMPORTANT NOTICE: The support for external down converters is offered for a limited evaluation time. A permanent software license for this option will be offered for free to owners of original Microtelecom s.r.l. frequency converter products once they will be available.

Spectrum Display Max Hold/Clear/ Pause Functions

A spectrum Max Hold function (MHold button in the main menu control bar right below the spectrum display) has been added.

The Max Hold function can be activated only in Spectrum mode and is disabled when the Waterfall mode is selected.

When the Max hold function is activated two traces will be visible in the main spectrum display as indicated in the following picture:



The Pause button suspends only the spectrum update (not the audio signal or the playback of a file). The Clear button reset the Max trace for a new Max Hold calculation.

Waterfall Automatic Gain Control

Three waterfall automatic gain control modes are now available: OFF, Auto1, Auto2.

The mode Auto1 is the automatic gain control provided in all the software versions prior to this version and effectively mitigates sudden noise level variations.

The mode Auto 2 is the default mode in this software version. It offers an improved waterfall visualization in the cases when the wide band signals are analyzed or the band is crowded by many narrow band signals, but is less effective in controlling the background brightness of the waterfall in presence of sudden noise level variations.

The automatic gain control can be excluded selecting the option OFF in the software settings dialog (see Waterfall AGC entry). This option is effective when it is preferable to have a waterfall background brightness which is proportional to the background noise level. When the automatic gain control is excluded the background brightness of the waterfall has to be adjusted manually each time the frequency span of the waterfall display is changed.

New Waterfall Mode

A new “v2.1h” waterfall processing mode has been added to improve the quality of the waterfall display when the main spectrum average function is used.

With this new mode the spectral data is computed at a fixed and much higher speed than in the previous versions, disregarding the waterfall speed control slider which now controls how much fast this data output is sampled and shown on the screen.

This has the main advantage that the lines output to the waterfall display are much less correlated even if the spectral data is being averaged.

The old “Legacy” processing mode has been maintained and can be selected in the software settings dialog (see the WF Mode entry).

The difference between the “v2.1h” and the “Legacy” mode can be appreciated setting the waterfall speed control to a moderate to low speed and increasing the Main Average slider up to when the waterfall lines begin to show a correlation effect. Switching to the Legacy mode with the same speed and average settings will produce a much more blurred waterfall, as shown in the following picture.

As the new mode allows to increase the average constant without producing as much blurring as the Legacy one, it effectively improves the waterfall sensitivity to weak signals.



Please note that the v2.1h mode is more processing intensive than the Legacy mode and should not be used on low end systems unless the CPU load is at an acceptable level.

Waterfall Time Ticks

Time ticks at regular intervals (1, 2, 5, 10, 30, 60, 120, 600 s) have been added to the waterfall display. The ticks time interval is computed automatically by the software. The time ticks can be enabled/disabled with the “Labels” button in the main spectrum display control bar.

Markers Log (File Format Updated)

This software version handles up to eight markers which can be set right-clicking the main spectrum display as in the previous software releases.

The markers can be logged to a text file named *markers.log* for further data processing. The marker log function is activated/deactivated clicking the MkrLog button in the main display menu bar. The markers log interval can be set to 0.1, 0.2, 0.5, 1, 2, 5 s from the software settings dialog (see Mkr Log Interval).

Markers are saved to the markers.log file accordingly to the selected unit as shown in the following sample file and can be imported by external software (i.e. Matlab) for further processing. (Note that the v2.i Markers Log File format is different from the format of v2.1h)

```
# PERSEUS RECEIVER - MARKERS LOG FILE
#
# Creation date : 21-01-2010 19:02:48 UTC
# Log interval : 0.2 s
# Frequency units: kHz
# Amplitude units: dBm
# Data format : UTC Frequency Amplitude Frequency Amplitude ...
19:02:48.204 14125.097 -125.77 14151.709 -113.26 14152.929 -105.19
19:02:48.407 14125.097 -121.21 14151.709 -111.88 14152.929 -103.13
19:02:48.610 14125.097 -120.38 14151.709 -118.14 14152.929 -103.93
19:02:48.813 14125.097 -120.26 14151.709 -117.18 14152.929 -102.91
19:02:49.016 14125.097 -120.54 14151.709 -114.94 14152.929 -103.48
19:02:49.219 14125.097 -124.41 14151.709 -115.31 14152.929 -105.01
19:02:49.422 14125.097 -120.65 14151.709 -111.11 14152.929 -104.25
19:02:49.625 14125.097 -126.14 14151.709 -113.74 14152.929 -104.01
19:02:49.829 14125.097 -124.92 14151.709 -109.50 14152.929 -103.39
19:02:50.032 14125.097 -120.09 14151.709 -116.02 14152.929 -103.44
19:02:50.235 14125.097 -122.06 14151.709 -107.36 14152.929 -102.86
19:02:50.438 14125.097 -118.12 14151.709 -109.66 14152.929 -103.77
19:02:50.641 14125.097 -128.17 14151.709 -107.63 14152.929 -105.23
19:02:50.844 14125.097 -124.06 14151.709 -110.13 14152.929 -103.51
19:02:51.047 14125.097 -122.65 14151.709 -108.38 14152.929 -104.45
19:02:51.250 14125.097 -121.96 14151.709 -105.49 14152.929 -103.30
19:02:51.454 14125.097 -123.01 14151.709 -105.86 14152.929 -102.86
19:02:51.657 14125.097 -118.71 14151.709 -108.86 14152.929 -102.99
19:02:51.860 14125.097 -119.55 14151.709 -110.32 14152.929 -104.84
19:02:52.063 14125.097 -120.63 14151.709 -107.29 14152.929 -104.14
19:02:52.266 14125.097 -128.92 14151.709 -110.50 14152.929 -103.78
19:02:52.469 14125.097 -121.03 14151.709 -108.87 14152.929 -103.50
19:02:52.672 14125.097 -124.80 14151.709 -111.98 14152.929 -103.18
19:02:52.875 14125.097 -122.97 14151.709 -113.50 14152.929 -104.88
19:02:53.079 14125.097 -120.28 14151.709 -112.65 14152.929 -103.81
19:02:53.282 14125.097 -124.10 14151.709 -106.84 14152.929 -103.85
19:02:53.485 14125.097 -127.00 14151.709 -112.45 14152.929 -102.90
19:02:56.125 14125.097 -127.27 14151.709 -112.77 14152.929 -104.09
```

S-Meter and Marker Units

The units used by the S-Meter, the markers and the labels in the main spectrum display can be set to dBm or dBuV accessing the software settings dialog (see SMTR/Mkr Units).

When an external down converter is selected in the tuning frequency dialog the scale of the S-Meter is calibrated so that S9 corresponds to a -93 dBm (5uV rms on a 50 Ohm load) input instead of the value used for operation in the HFs (S9 = -73 dBm or 50 uV rms).

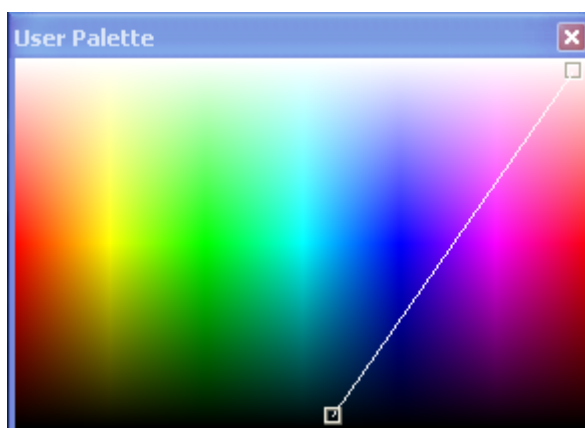
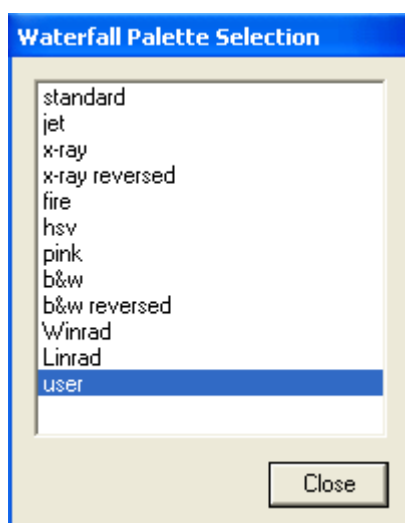
Waterfall color palettes

Three new color palette have been added, the Winrad palette (thanks to Winrad author Alberto di Bene, I2PHD), the Linrad palette (thanks to Linrad author Leif Asbrink, SM5BSZ) and a user configurable palette.

When the “user” palette is selected, the colors of the waterfall palette can be chosen by the user dragging the terminal points of the line shown in the “User Palette” color dialog.

The default configuration indicated in the following picture will produce a waterfall with a deep blue background and signals appearing from purple to white.

The brightness and contrast sliders affect the way the signal amplitude is mapped to the colors lying on the selected line of the User Palette dialog, as much as done with the other, non configurable, color palettes provided by the software.



Bugs Fixed in v2.1h

- Squelch/Mute and Noise Reduction overflows.
- Frequency dialog issues dependent on monitor DPI settings.
- Memory window doesn't display correctly the stations list when the tuning frequency is changed.
- CI-V protocol issues as pointed out by third party software developers.

Enjoy this new version,
Nico Palermo – IV3NWV
Microtelecom s.r.l.