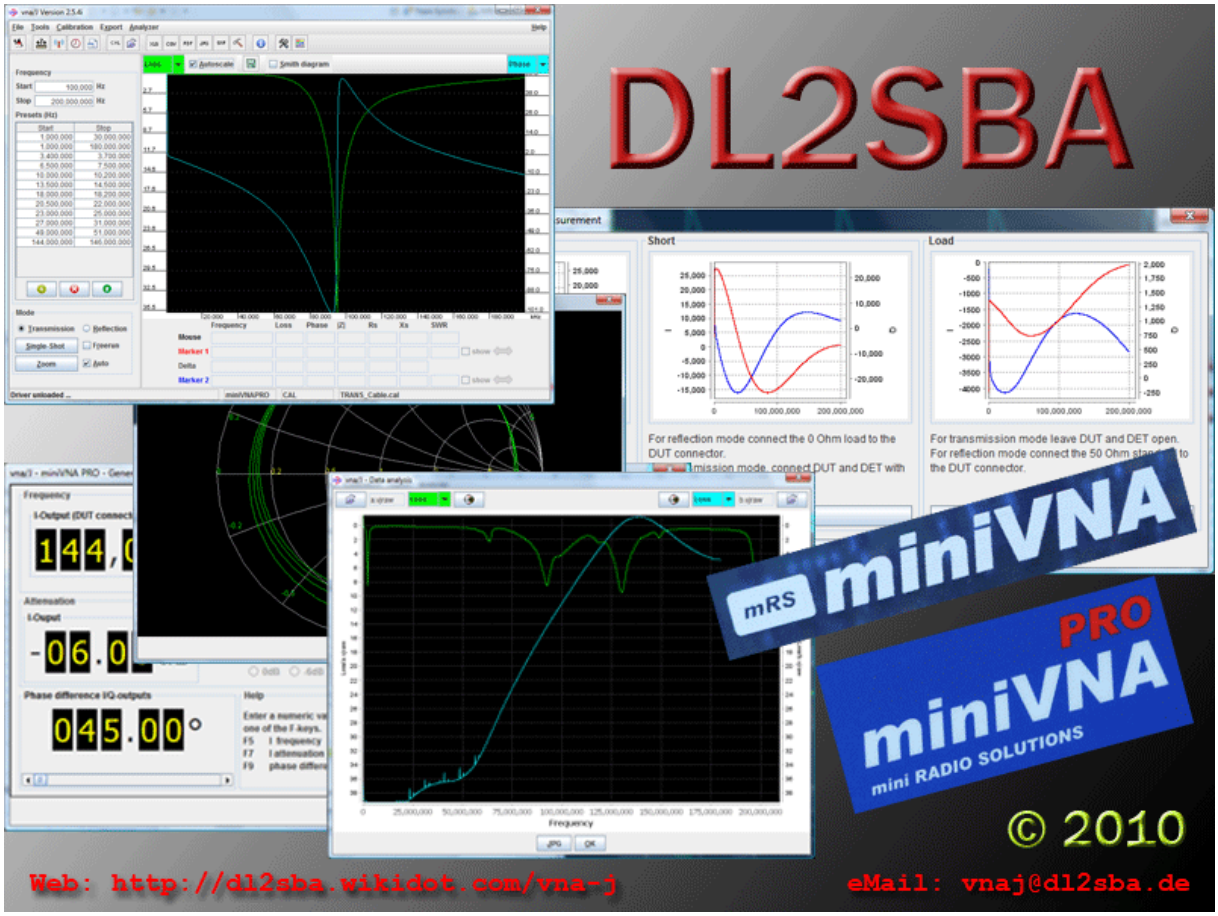

Image www.miniradiosolutions.com

vna/J 2.6.0
Users guide

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Sunday, 11. July 2010

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Changes

Version	Date	Who	Changes
2.0.2	14.02.2010	DL2SBA	Updated for new GUI and functions
2.1.0	15.02.2010	DL2SBA	Update new logic for calibration. Extended overview
2.1.3	17.02.2010	DL2SBA	Added first version of sample section Added hints and tips section. Statusbar updated.
2.2.0	18.02.2010	DL2SBA	Generator support explained. Driver info dialog added. DDS calibration explained.
2.2.1	19.02.2010	DL2SBA	Minor corrections
	20.02.2010	DL2SBA	Extensions
2.3.2	23.02.2010	DL2SBA	Extended description
2.4.0	26.02.2010	DL2SBA	Shortcut for calibration loading New marker panel Automatic scaling on scales Cable measurement extended
2.4.1	28.02.2010	DL2SBA	Added description for scheduler
2.4.3	05.03.2010	DL2SBA	GUI further described. Custom scaling added. Automatic reloading of calibration data added.
2.4.4	12.03.2010	DL2SBA	Fixed scheduler problem with multiple executed tasks. Added search functions to SWR, loss and phase marker. Added colour setup dialog for diagram area. Added export into S-parameter file.
2.4.10	09.04.2010	DL2SBA	Added descriptions for Data-analysis- and Smith-chart-dialogs. Added JAVA section for Mac OS
2.4.11	10.04.2010	DL2SBA	Corrected bug in "how to launch in a different language" chapter. Changed chapter "enable logging". Updated chapter "Application start Windows"
2.5.0	30.04.2010	DL2SBA	Support for miniVNApro enabled
2.5.1	03.05.2010	DL2SBA	Detailed frequency calibration for miniVNA PRO. Generator dialog for miniVNA PRO added
2.5.4	08.05.2010	DL2SBA	Updated section " Frequency calibration ". Updates section " How to launch in a different language"

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Version	Date	Who	Changes
2.6.0	06.06.2010	DL2SBA	Added - Marker math - Simple-tune dialog - Multi-tune dialog - Network support Updated - Sample calibration sets for miniVNA and miniVNAPRO - Error reporting details - S-Parameter export - Z-Plots export
	11.07.2010	DL2SBA	Added - Generator output waveforms - Load raw in main diagram

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- First of all I want to thank my wife **Monika, DL6SCF** being incredibly understanding, supportive, and most of all, patient.

- **Davide, IW3HEV** for these fine two little blue boxes.

- **Andy, G0POY**, for his permanent quality assurance of new releases, proof-reading this document, providing an excellent installation description for SUSE LINUX and giving useful tips regarding usability etc.

- **Dan, AC6LA**, author of ZPLOTS, for his support on writing ZPlots and SnP formats correctly.

- **Tamas, HG1DFB**, for his translation to Hungarian

- **Erik, OZ4KK**, for testing and useful tips.

- The numerous users worldwide giving me permanent feedback.

- And last but not least my cat **Ina**, which helped me many times solving complex situations at the keyboard ;-)

Overview

The **miniVNA** and **miniVNApro** instruments by mRS *http://www.miniradiosolutions.com* are popular and very useful test instruments.

The miniVNA instrument is a small blue box with two BNC connectors and a USB connector.

The newer miniVNApro is also small blue box now with two SMA connectors and much enhanced precision.

All the control of the instrument is performed by a software application running on a PC.

Many people have contributed to the development of this software, but the focus has been mainly on the Microsoft Windows operating system. There was a Linux based application but this is no longer supported, and the advancement of the various Linux distributions has rendered it inoperable.

I've started in 2007 to develop a control application based on the Java programming language. Initial ideas were taken from the Visual-Basic-Application that was provided by mRS.

Java is a cross-platform language, which allows the identical application binary to run on any supported Java enabled Operating System.

Currently I've tested the application on Windows98, WindowsXP, Windows7-32bit, WindowsVISTA-64bit, MacOSX 32-bit versions.

Andy has tested it successful on SUSE LINUX 11.1 and 11.2

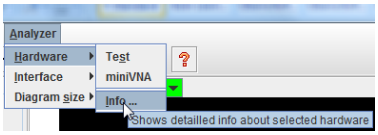
Remark:

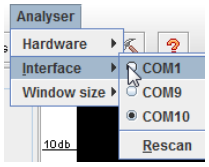
> Not all screenshots in this documentation are taken from the latest application version.
>
> Where it is necessary for understanding, I've tried to use the latest screenshots.

This user manual contains the following chapters:

Chapter	Main content	Read before 1st usage
Quick-start guide	Ten steps to do the first measurement	✓
GUI	A detailed description of the user interface	✓
Export	A detailed description, how to export data to images, PDF documents and other file formats.	
Tools	Describes the available tools in the application	
Measurement basic	Basic information of how to do measurements using this application	✓
Calibration	How to get good results	
Application start	How to start this application on various platforms	
Configuration	How to do internal configuration	
Installation	How to install the application on various platforms	
Samples	Shows some measurements taken with the miniVNA	
Hints & Tips	Some useful information	
Driver developer guide	Describes in detail, how to implement custom hardware drivers for this application.	
Links	Where to find more information	

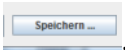
Quick-Start-Guide (32-bit Windows/OSX)

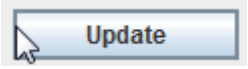
1. Plug-in the miniVNA into a free USB port on your PC.
2. Install the required FTDI serial port drivers for your PC.
3. Start the application using the command **java -jar vnaJ_X_Y_Z.jar**
4. Select your analyser hardware via the 

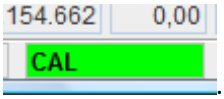
menu
5. Select the used communication port via this 

menu
6. Select the mode

7. Open the calibration dialog via this toolbar button

8. Follow the instructions for transmission or reflection mode calibration.
9. You can save the calibration data via this button 

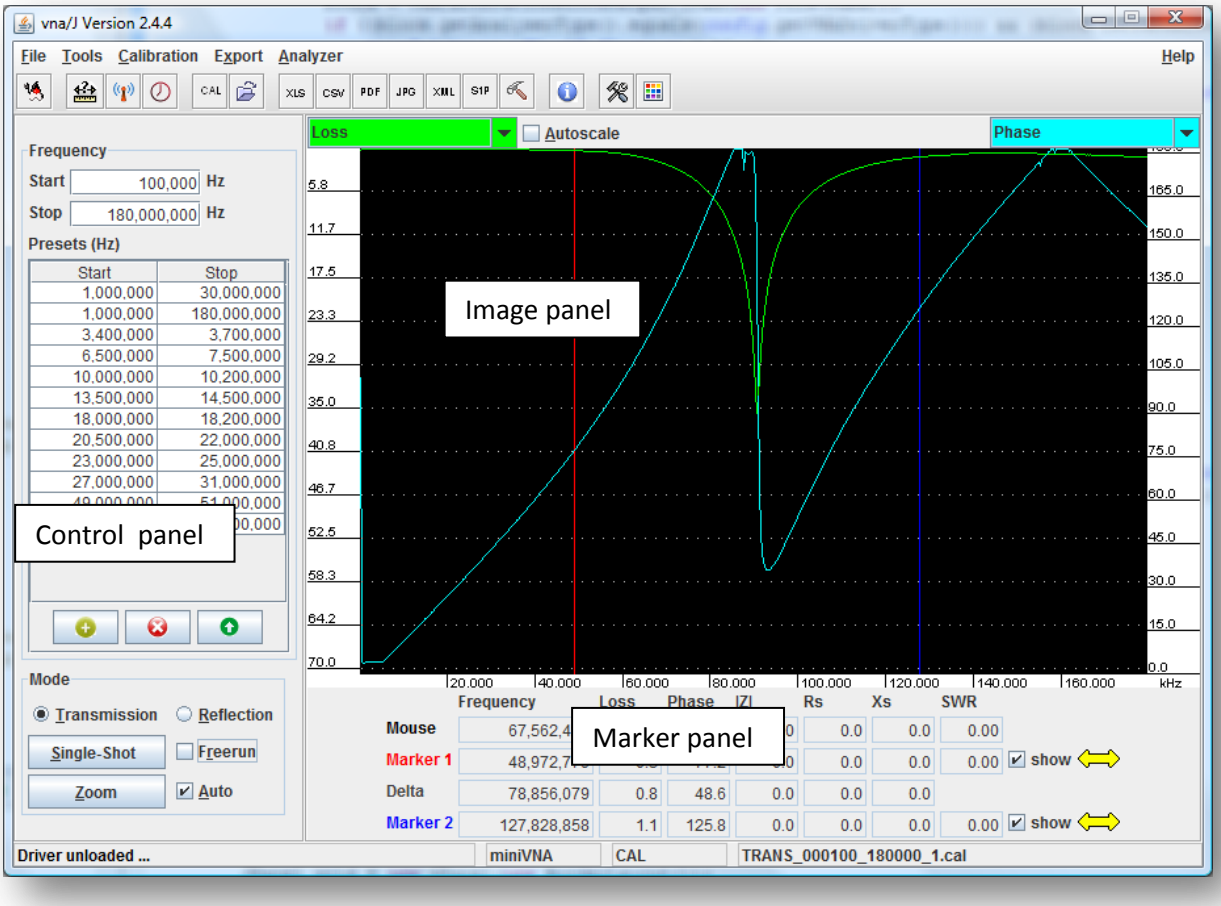
.
A meaningful filename is proposed.
10. Press 

and the program is ready to work 

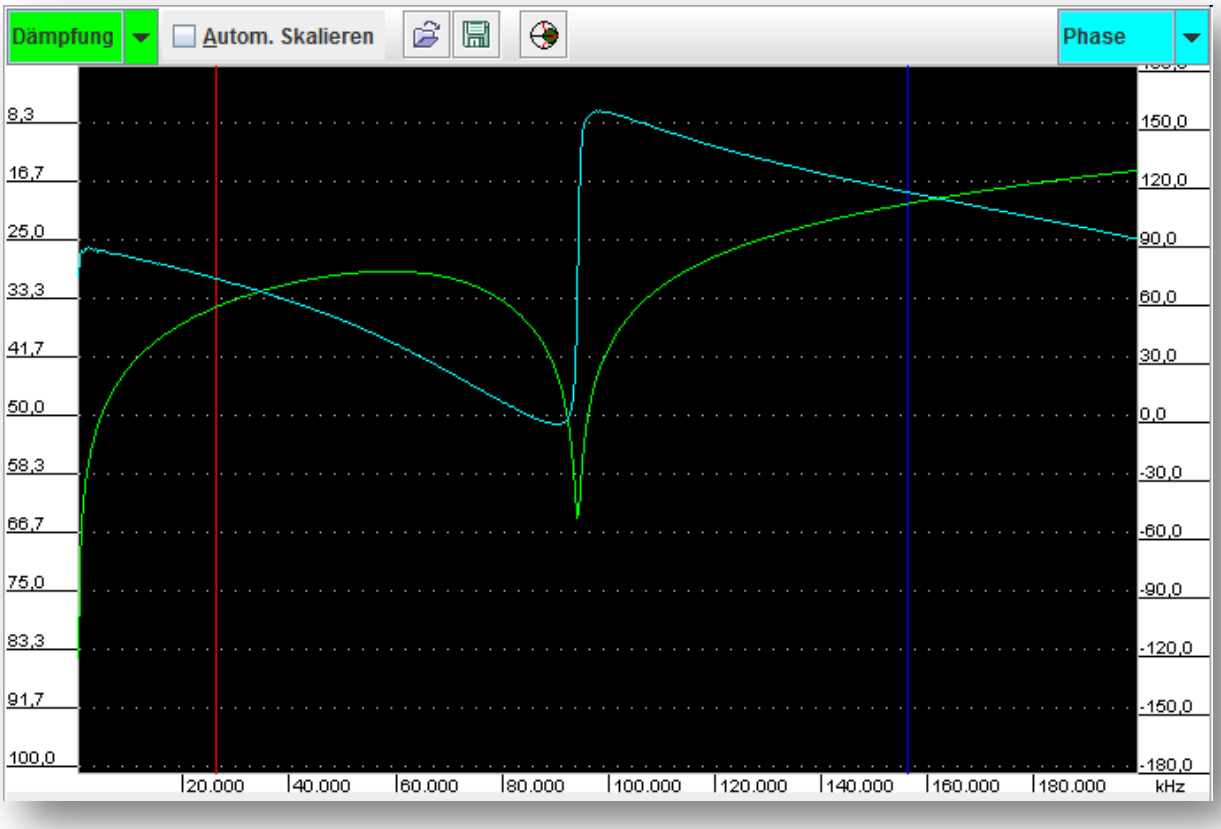
.

GUI

The applications main window contains the graphical representation of the scanned values in the image panel, as well as the control panel and the marker panel.



The image panel



The image panel contains the following parts:

- The scale selection drop down list boxes for the left and the right scale .
- The vertical scales matching the selected scale types in the drop down list boxes.
- The frequency scale at the bottom of the image panel.
- The display area showing the scanned results from the analyser.

For each tick on the left scale, a dotted line is drawn in the diagram area.

Scales

Currently the following measurements are available in the scale select dropdown lists:

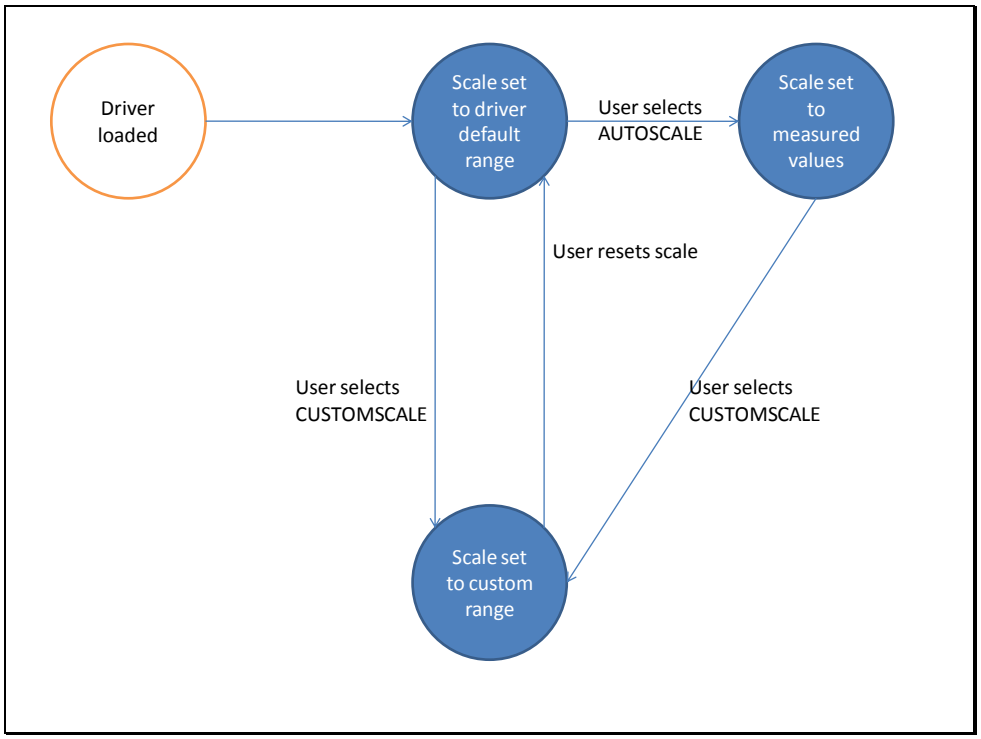
Name	Content	miniVNA minimum	miniVNA maximum	Auto scale
Loss	Display transmission or reflection loss	0dB	70dB	✓
Phase	Display the phase value	0°	180°	✓
SWR	Displays the SWR	1:1	1:10	-
|Z|	**ZComplex** is the complex impedance of the DUT referred to 50 ohm. |Z| the magnitude of the complex impedance.	0	1000	✓
Rs	Displays the series equivalent resistance of the load also called Rs	-3000	3000	✓
Xs	Displays the series equivalent reactance of the load also called Xs	-3000	3000	✓

Basically the ranges are dependent on the select analyzer hardware.

Scale-lifecycle

Each scale has currently three states:

State	
Scale set to driver default range	The range of the scale is set to fixed range. The scales Phase and Loss are scaled based on the used driver. The other scales have a identical range independent of the loaded driver.
Scale set to measured values	The user has selected the auto-scale option. The scales range is determined by the measured data. Except the SWR scale, all scales support auto-scaling.
Scale set to custom range	The scale is set to a fixed range. The range must be entered by the user. The range may not exceed the specified ranges of the scale.



Auto-scaling

Except the SWR scale, all scales are able to scale themselves to the measured data.

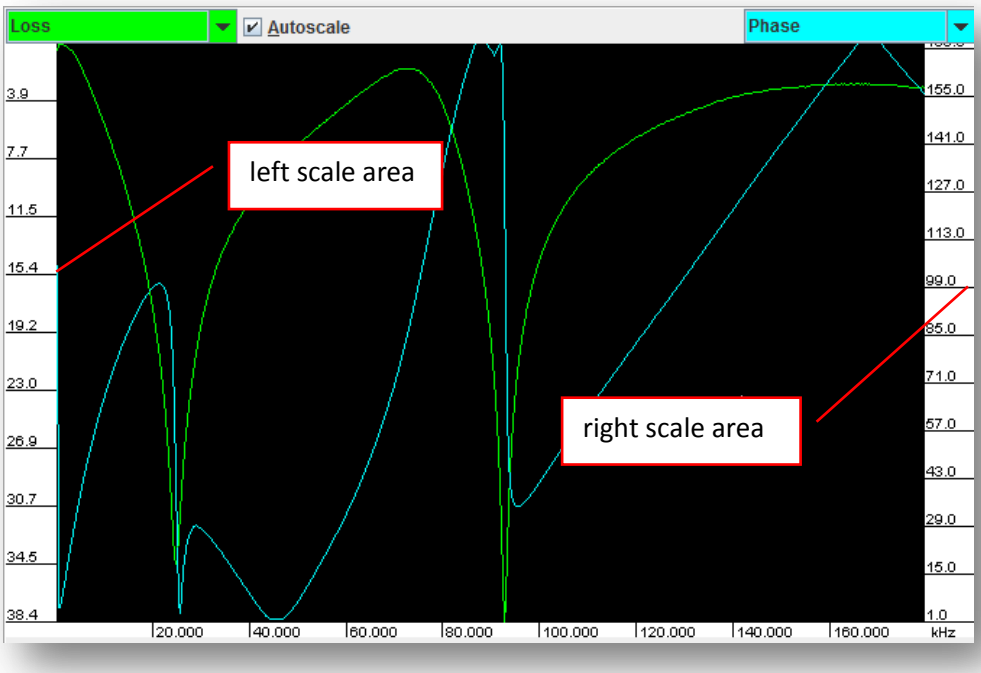
Selecting the AUTOSCALE checkbox above the diagram enables this auto scale functionality.

When deselecting the AUTOSCALE box, the scale uses the minimum and maximum values as described in the previous table.

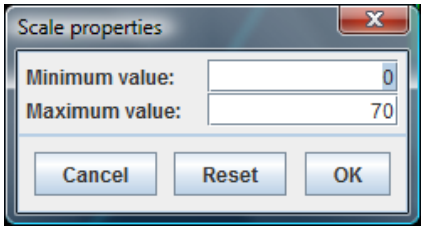
Clicking twice on the deselected AUTOSCALE box can be used to reset both scales to their default values.

Custom-scaling

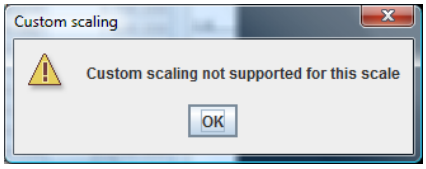
Except the SWR scale, all scales can be scaled by a user-entered range.



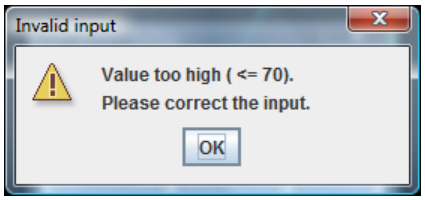
Clicking with the left mouse button on the scale area opens a small dialog, in which the user can enter the minimum (value at top of scale) and the maximum (value at bottom of scale):



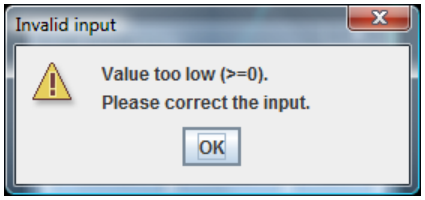
If custom scaling is not supported for this scale, a message is shown:



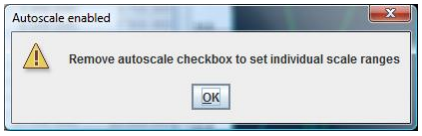
When the entered values is too low for the active scale, a message is displayed showing the maximum value.



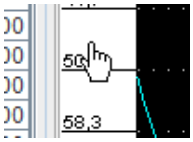
When the entered values is too high for the active scale, a message is displayed showing the maximum value.



Clicking on the scale area, when auto-scaling is enable notifies the user, to remove first the auto-scaling option.



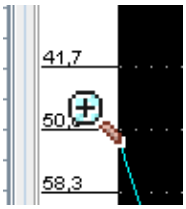
The scale ranges can also be set using the mouse. When the mouse is positioned on a scale area, the mouse cursor turns into a pointing hand.



Two modes are available:

- **Zoom**-in our zoom-out the scale.
- **Move** the scale up or down.

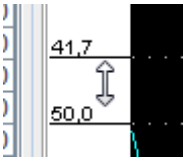
Zoom-mode



Pressing the **left** mouse button turns the mouse cursor into a loupe. Moving the mouse with pressed left button inside the scale area up or down increases or decreases the scale range.

… hard to explain - simply try it.

Move-mode



Pressing the **right** mouse button turns the mouse cursor into a double arrow. Moving the mouse with pressed right button inside the scale area up or down moves the scales range up or down up to the values given by the selected driver.

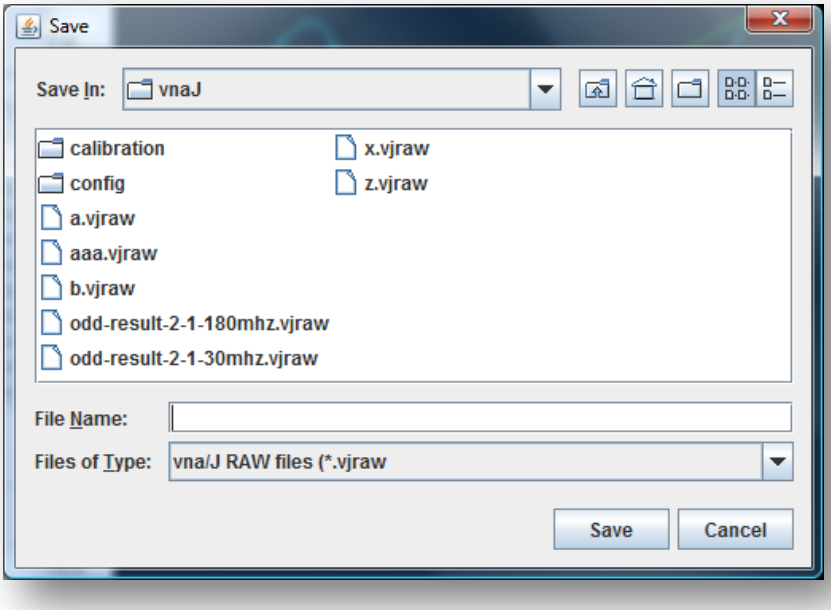
… hard to explain - simply try it.

Saving measured data

Selecting the SAVE button

saves the currently displayed data to an external file.

The location of the file can be selected in the default SAVE dialog:



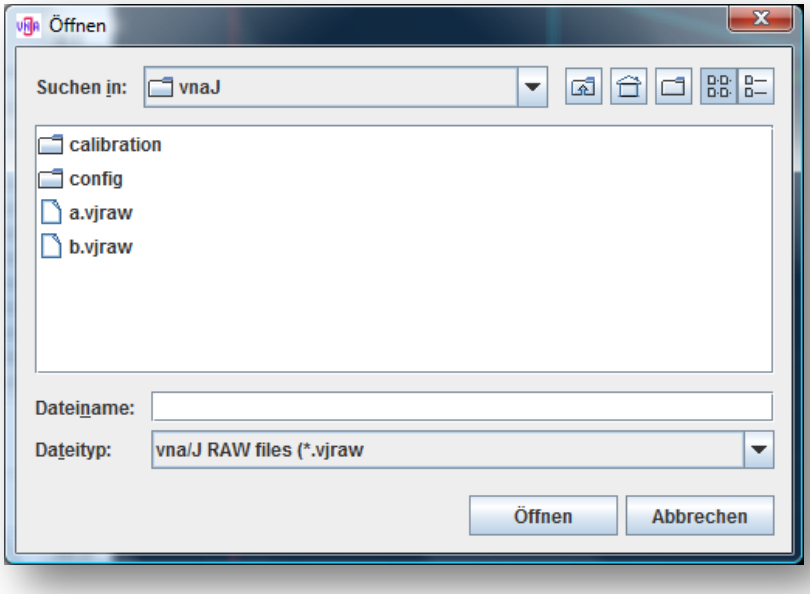
This data then can be later displayed in the analysis dialog (See chapter "Data analysis" on page 60) or reloaded into the diagram area to do cursor measurements etc.

Note: The exported files of type **vjraw** are simple XML-files which are compressed in GZIP-format. Adding the extension **.gz** to a file enables i.e. WINZIP to open the file correctly and show the contained XML-data.

Loading measured data

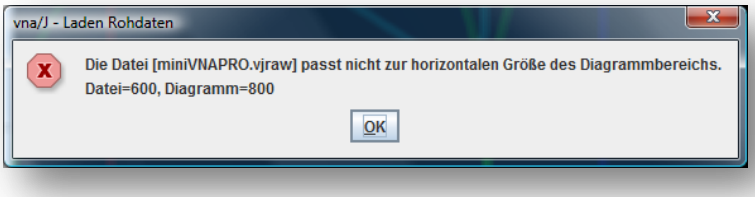
Selecting the LOAD button

opens the standard file-open dialog



The available raw-files are displayed and can be selected for loading.

If the horizontal size of the selected file does not match the current diagram width the file cannot be loaded and a message is shown:

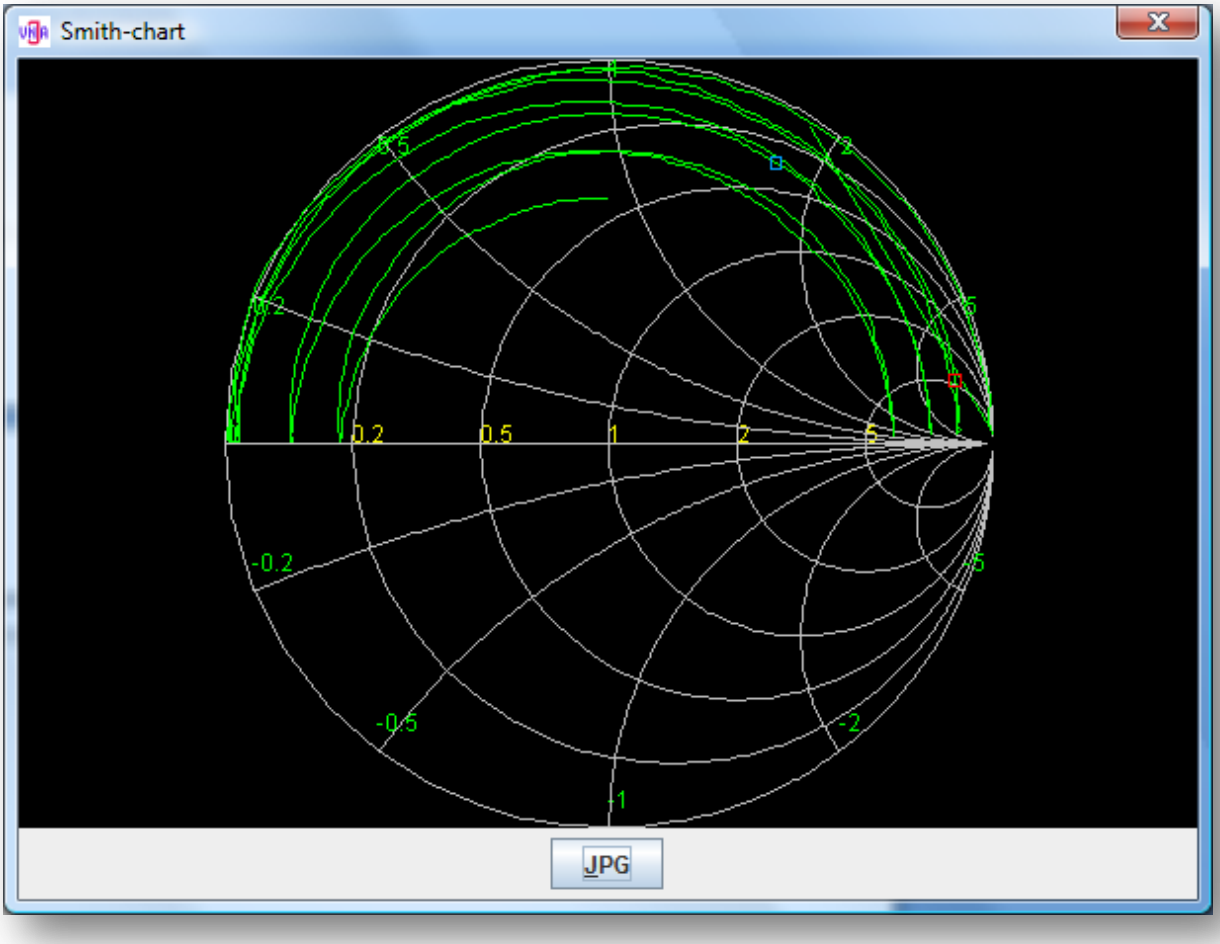


Note: This function is more or less to play around with the previously saved data and do basic measurements with the cursors etc.

Display Smith-chart

Selecting the Smith-chart checkbox

opens a non-modal dialog, that displays the current measured data inside a Smith-chart:



If the markers 1 or 2 are selected in the main window, a small rectangle in the marker colour is drawn on the smith-chart.

The diagram can be exported using the JPG-button right to the detail data. Selecting this button, opens the default SAVE default where the name and location of the diagram can be set.

The size (number of x/y-pixels) of exported JPG image is determined by the size of the Smith-chart inside the dialog. To get higher resolution, simply resize the dialog to the desired size and then use the export function.

Note: The relevant data for a Smith-chart is only available in reflection mode. In transmission mode, the miniVNA is not capable providing the relevant data.

The data in the smith-chart is updated whenever a **new** scan is done in the main window.

Marker panel

The marker panel displays the actual data of the three markers:

	Frequenz	Loss	Phase	|Z|	Rs	Xs	SWV	
Maus	66.662.926	18,94	134,4	42,7	42,2	6,9	1,25	
Marke 1	57.667.936	22,82	124,4	46,1	45,8	5,5	1,16	☑ Zeige
Delta	63.564.596	8,86	47,5	8,5	4,8	15,1		
Marke 2	121.232.532	13,96	76,9	54,6	50,6	20,6	1,50	☑ Zeige

Image 1 - marker panel

Mouse Displays values, when the mouse cursor is inside the image panel.

Marker 1 can be set by moving the mouse into the diagram panel and clicking the **left** mouse button.

Marker 2 can be set by moving the mouse into the diagram panel and clicking the **right** mouse button.

Delta Calculates the absolute differences between most of the Marker 1 and Marker 2 data.

Operations

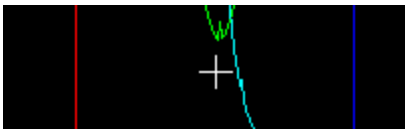
Un-checking the option button **right** to the marker, removes the marker from the diagram panel.

Clicking with left mouse button on the yellow double-arrow moves the marker one unit to the left.

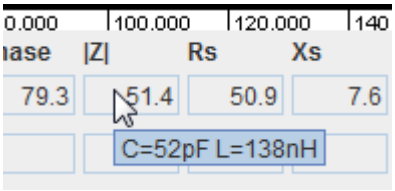
Clicking with right mouse button on the yellow double-arrow moves the marker one unit to the right.

Using the mouse-wheel is also possible, when the mouse cursor is positioned on the double-arrow.

When the mouse is positioned inside the diagram panel, the current values at the mouse position are displayed in the marker named **Mouse.**



When the mouse is positioned over the |Z| field, the calculated inductivity and capacity is displayed in the tool tip.



The formula for the capacity is: $C = \frac{1}{2\,\pi\,f\,|Z|}$

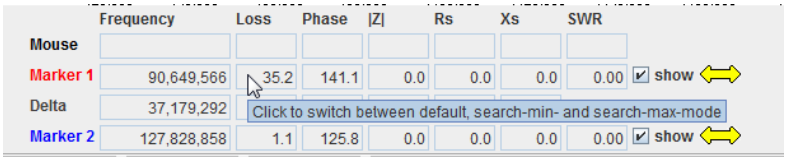
The formula for the inductivity is: $L = \frac{|Z|}{2\,\pi\,f}$

This works only for marker 1 and 2.

The LOSS, PHASE and SWR fields support search mode.

When the search mode is selected, the marker is automatically positioned on the maximum- or minimum-value in the diagram.

The search mode is selected by clicking on the respective fields in marker 1 or marker 2.



Two search-modes are supported:

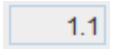
- min-search mode

- max-search mode

Min-search mode is indicated by a small * at the lower-left corner of the field:

Max-search mode is indicated by a small * at the upper-left corner of the field:

Standard-mode of the marker is enabled, if no * is visible in the field.



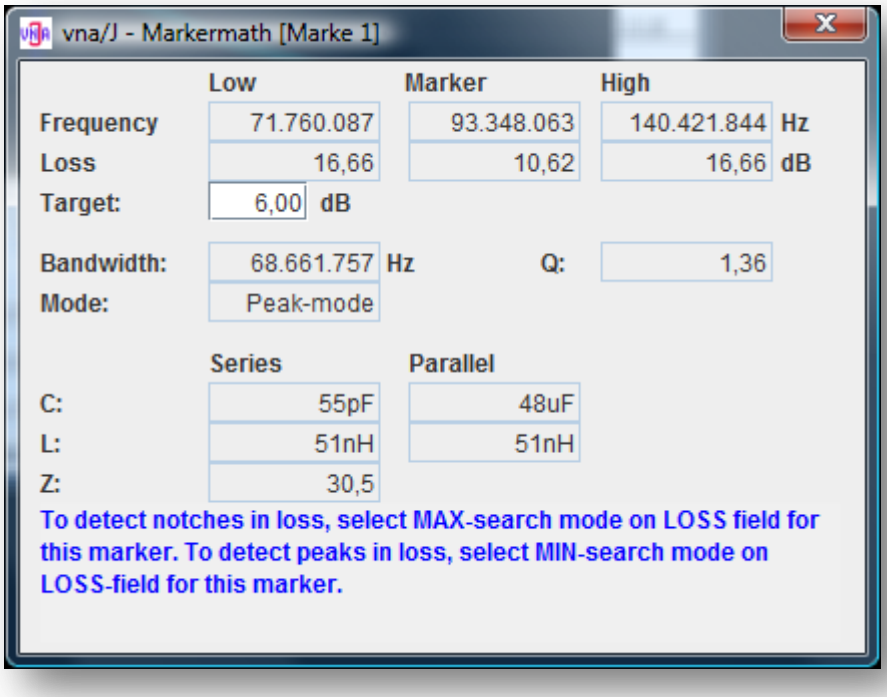
Opens or closes the marker math dialog for this marker

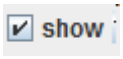
Opens or closes the tune dialog for this marker

Marker-math dialog

This dialog can be used i.e. to tune an antenna filter to a given centre frequency an a defined bandwidth.

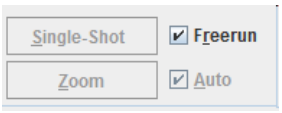
The marker-math dialog is bound to one of the two markers. The data displayed in this dialog is the data of this marker.





The dialog is available, when the corresponding marker is visible.

The dialog can be displayed by clicking on the toggle button.
The first click opens the dialog, a second click removes the dialog. The position, size and the entered limits are stored separately for each tune dialog.

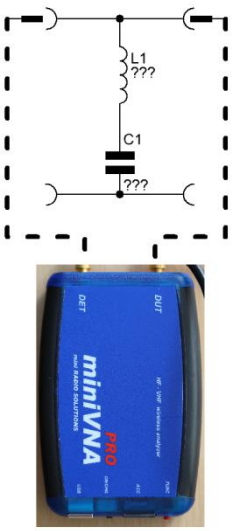


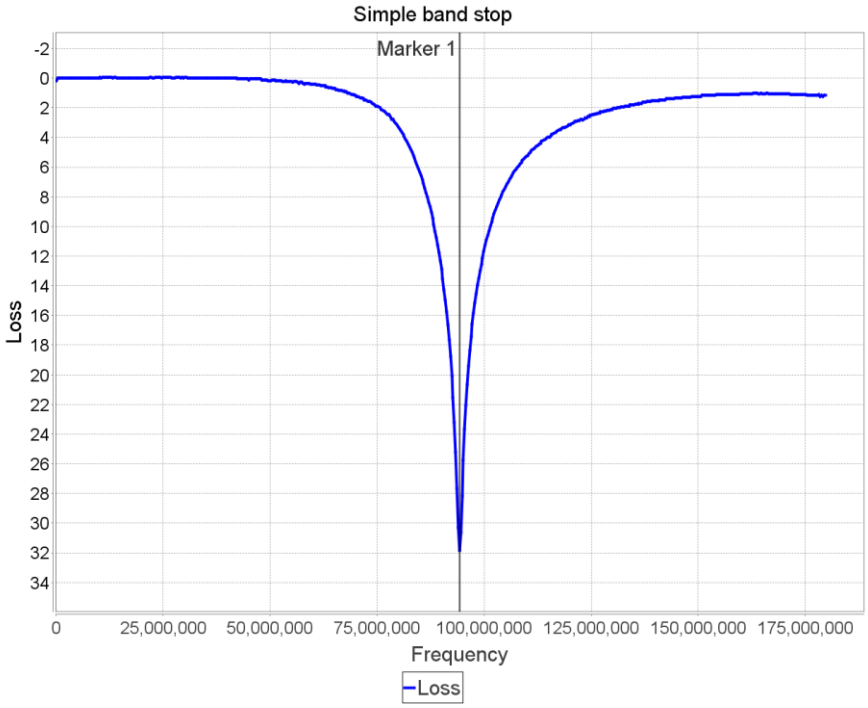
For a continuous reading ensure, that the free-run mode is enabled.

Remark: The data in the dialog is updated **after** a scan!

Example - Transmission mode

We have a simple serial LC filter used as a band stop. This gives a measurement curve with vna/J:

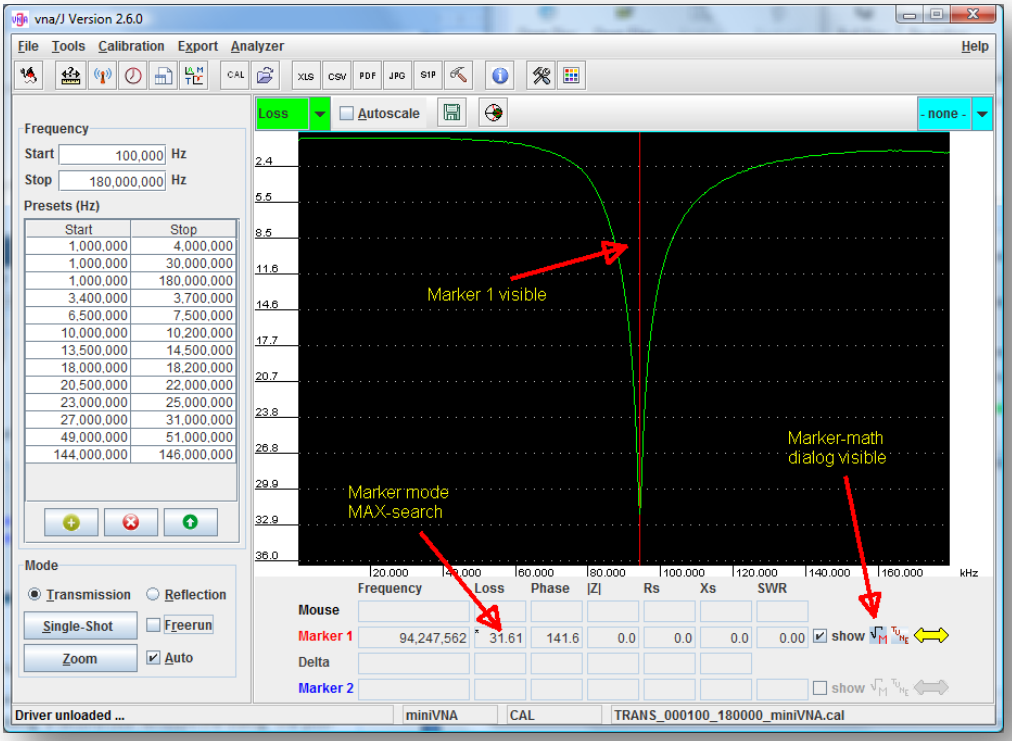




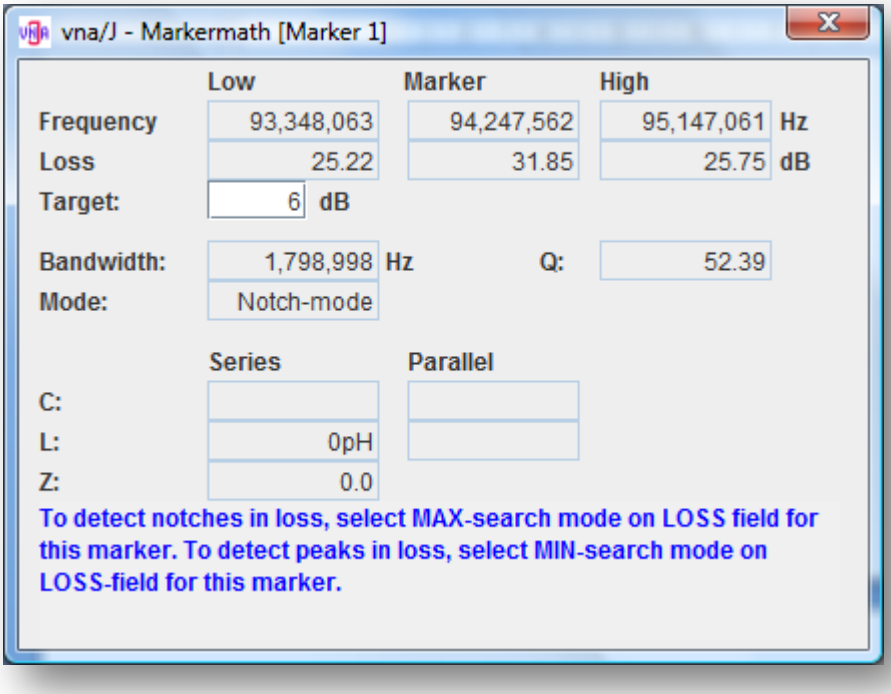
To measure the data for this filter, follow this procedure:

- Switch to transmission mode.
- Switch to free-run mode to get constant updates of the values.
- Click on the diagram area with the left-mouse button
- Select the MAX-search mode for the loss field of marker 1
- Click the math-symbol for marker 1.

The main window should look like this:

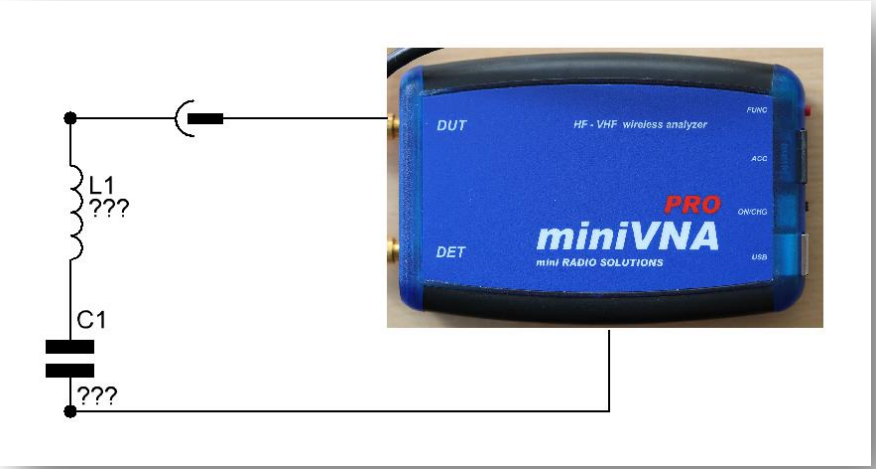


and the marker-math dialog should display these values:

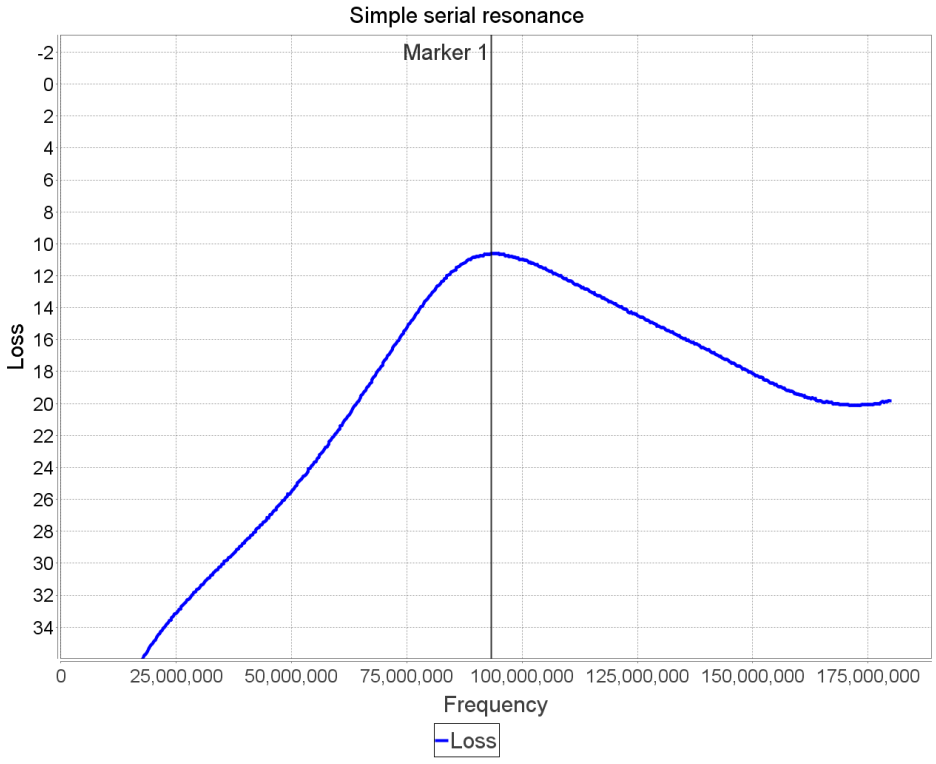


Example - Reflection mode

We have a simple serial LC circuit connected to DUT.



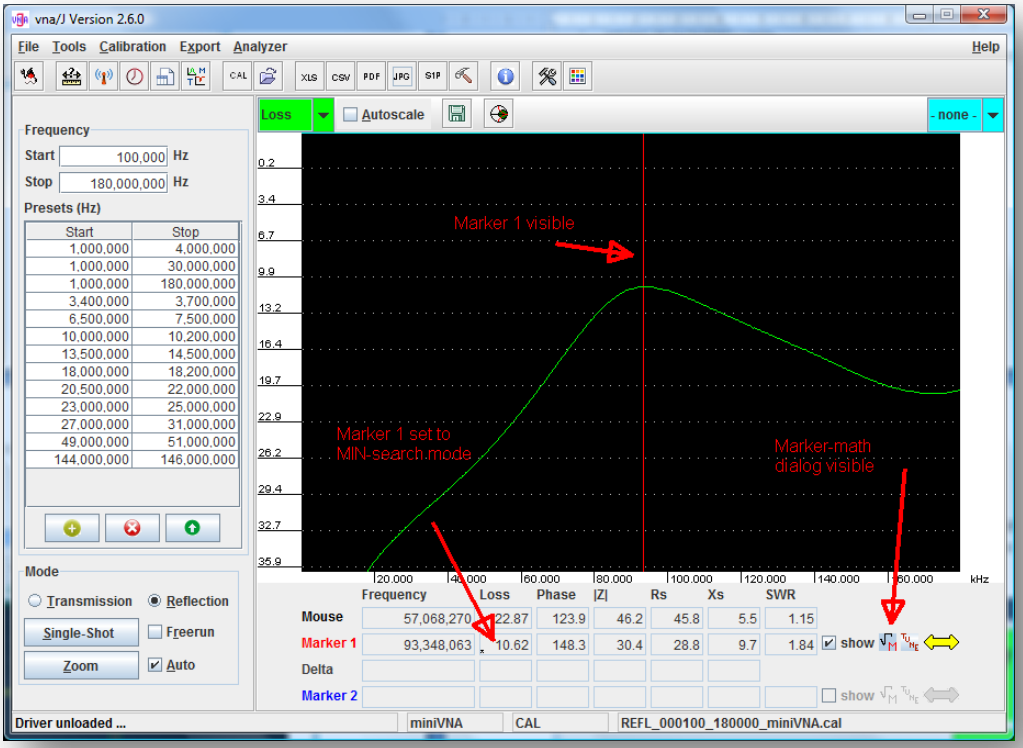
This gives a measurement curve with vna/J.



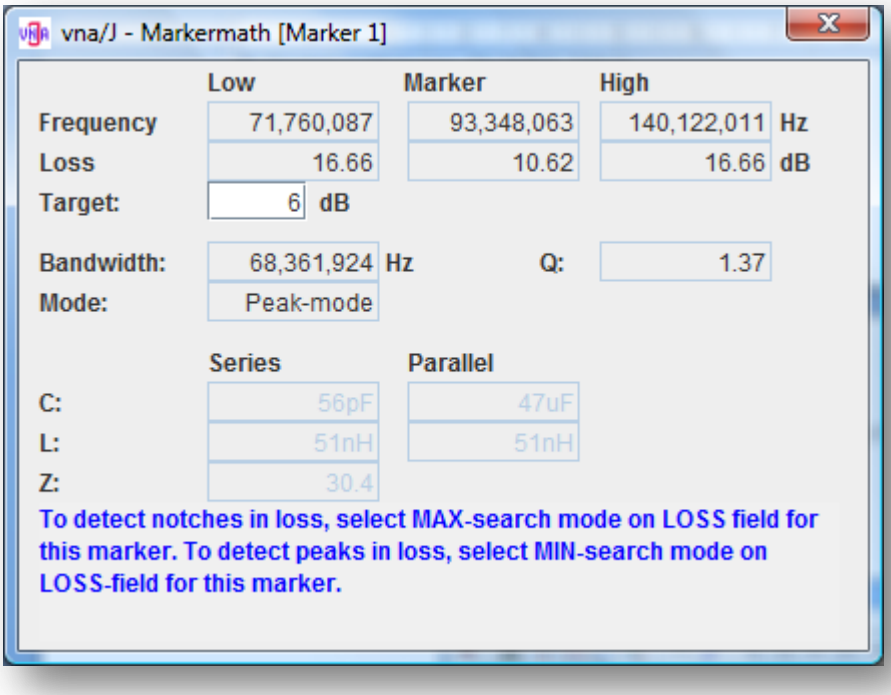
To measure the data for this circuit, follow this procedure:

- Switch to reflection mode
- Switch to free-run mode to get constant updates of the values.
- Click on the diagram area with the left-mouse button
- Select the MAX-search mode for the loss field of marker 1
- Click the math-symbol for marker 1.

The main window should look like this:

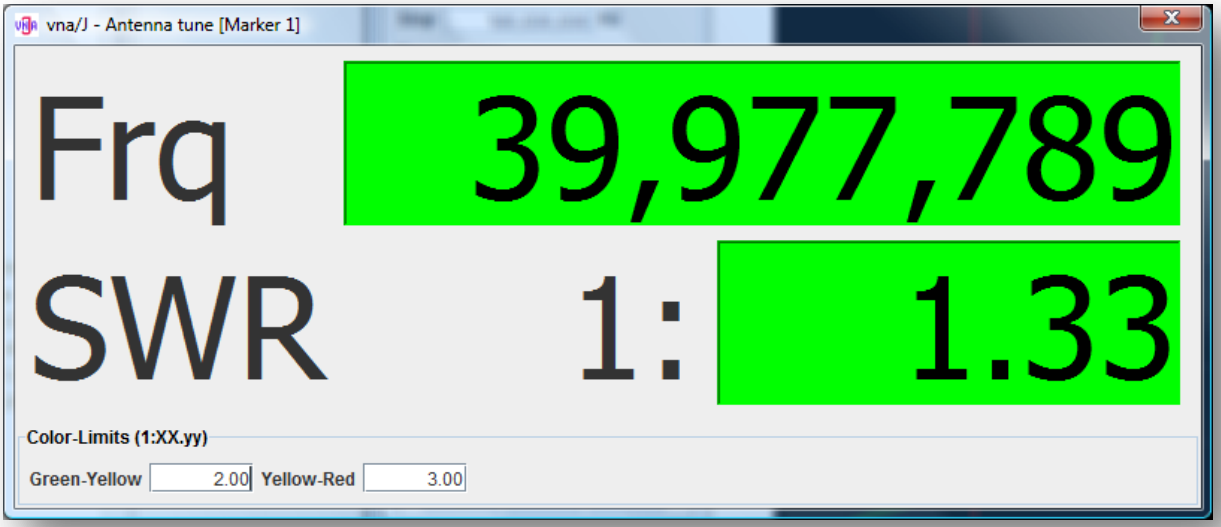


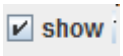
and the marker-math dialog should display these values:



Tune-dialog

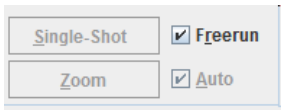
This dialog can be used i.e. to tune an antenna when the PC display is some distance away. The tune dialog is bound to one of the two markers. The data displayed in the tune-dialog is the data of this marker.





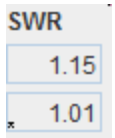
The dialog is available, when the corresponding marker is visible.

The dialog can be displayed by clicking on the toggle button.
The first click opens the dialog, a second click removes the dialog. The position, size and the entered limits are stored separately for each tune dialog.



For a continuous reading ensure, that the free-run mode is enabled.

If you want to display the SWR at a **fixed frequency**, ensure, that the marker search mode is **not enabled**, means no small star is shown in the marker fields.



If you want to display the minimum or maximum SWR value in the given scan range, enable the marker search mode for the SWR marker field.

The background colour of the frequency and SWR fields can be controlled by these two fields.
The background is green, if the SWR is below the entered value in field **Green-Yellow**. The background is yellow, if the SWR is between **Green-Yellow** and **Yellow-Red**. The background turns red, if the SWR is above the value in the field **Yellow-Red.**

Remark: The Close icon in the dialog does not work!

The control panel

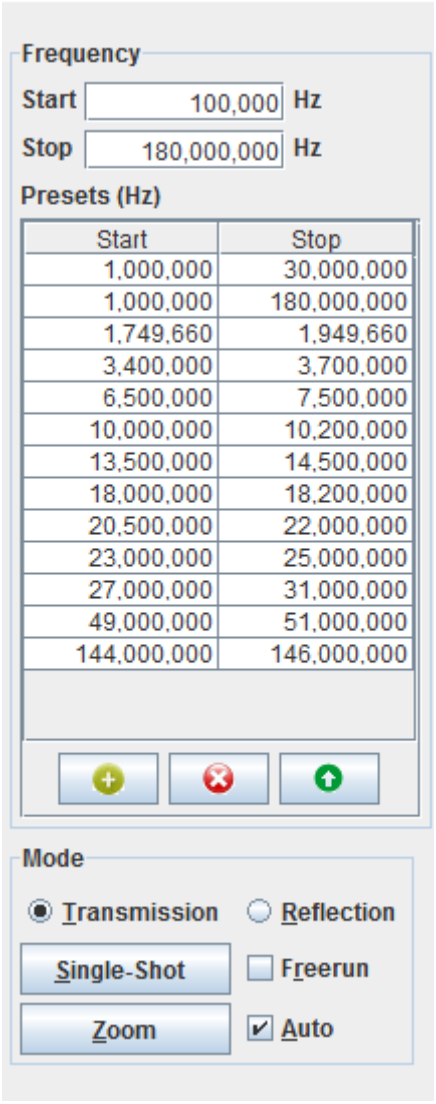


Image 2 - Control panel

Frequency

In the frequency control panel, you can enter the desired start and stop frequencies for the scan.

The frequencies entered must be between the lower and upper maximum which the selected analyzer device can handle. The range can be checked using the driver info (see chapter …).

You can enter the frequencies in Hz, kHz or MHz

Examples:	144750000	144.750.000 Hz
	144m	144.000.000 Hz
	7200k	7.200.000 Hz

The start frequency should be below the stop frequency.

By double-clicking with the left mouse button on an entry in the presets list, you can quickly set the start/stop frequencies to the desired range. A selected list entry can also be used clicking the button.

Entries in the presets list can be deleted by selection an entry in the list and clicking on .
A currently entered frequency can be added to the list clicking on the button.

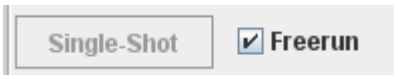
The presets for the common HAM bands are loaded at first application start.

The preset list is stored to the file system and loaded on application start.

Mode

Whether the VNA runs in **reflection** or **transmission** measurement mode can be selected with these radio buttons:

Selecting the checkbox enables the continuous measurement with the given parameters in the frequency and mode group. If the checkbox is deselected, the scanning of the VNA stops and the pushbutton for single shot is active.



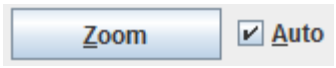
During continuous scanning, most of the menu entries and toolbar buttons are disabled to ensure a correct measurement.

Clicking the button triggers a single scan of the analyzer.

Zoom

There are two types of zoom modes supported:

- Min-Max-zoom
- Percentage zoom

If the AUTO checkbox right to the zoom button 

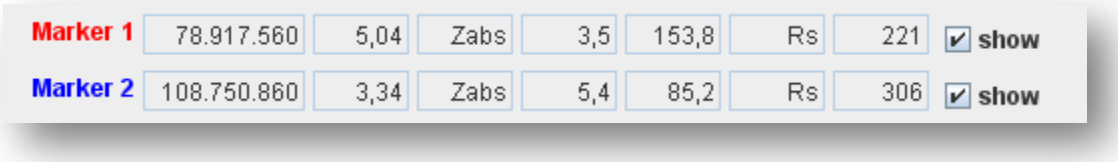
is checked, the analyzer automatically performs a scan after the ZOOM button was pressed.

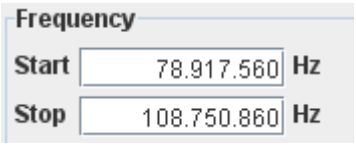
Min-Max-zoom

When both markers are visible inside the diagram, clicking the

button sets the start and stop frequencies to the range selected by the two markers.

Setting the markers to



And clicking the zoom button sets the scan range to 

.

Percentage-zoom

When only one marker is visible in the diagram, clicking the zoom button zooms into the current diagram with:

- The centre frequency is the marker frequency
- A frequency range of 20% of the current frequency range.

For example:

- Currently selected scan range from 1MHz to 100MHz. Marker is set to 60MHz.
- Now press ZOOM.
- New scan range is 50MHz to 70MHz with a centre frequency of 60MHz.

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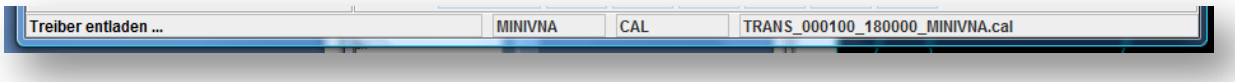
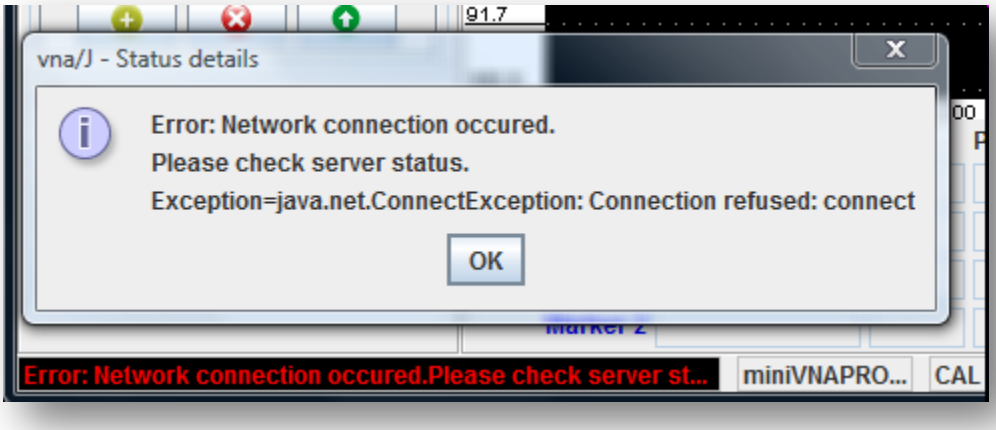
The status bar

The status bar at the bottom of the screen contains four sections:



1. In the leftmost section, tool tips for the menu entries and status information of running data acquisitions are displayed.
2. The selected type of the analyser is displayed here.
3. Here is displayed, whether the application contains calibration data CAL or no calibration data is loaded UNCAL.
4. Here is the filename of the currently loaded main calibration dataset shown.

Remark: If any text displayed in the status bar is not completely visible, simply click on it with the mouse to display a popup dialog, displaying the complete message.



The tool bar

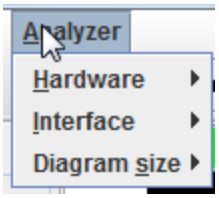
The tool bar below the menu bar contains useful shortcuts to commonly used commands.

Icon	Description
	Exit the application, same as menu FILE/EXIT
	Opens the cable length measurement dialog. Same as menu TOOLS/CABLELENGTH. For details see chapter"Cable length measurement" on page 49.
	Opens the generator dialog. Same as menu TOOLS/GENERATOR For details see chapter "Generator" on page 52.
	Opens the scheduler dialog. Same as menu TOOLS/SCHEDULER. For details see chapter "Scheduler" on page 56.
	Opens the data analysis dialog. For details see chapter "Data analysis" on page 60.
CAL	Opens the calibration dialog. Same as menu CALIBRATION/LOSS. For details see chapter "Calibration" on page 68.
	Opens the load calibration dialog. Same as menu CALIBRATION/LOAD. For details see chapter "Loading existing calibration data" on page 72.
XLS CSV PDF JPG XML S1P	Exports the measured data to a file in the selected format (XLS, CSV, PDF, JPG, XML or S1P). Same as menu MENU/XLS .. MENU/S-parameter. For details see chapter EXPORT
	Opens the export settings dialog. Same as menu EXPORT/SETTINGS. For details see chapter "Settings" on page 36.
	Opens the driver info dialog. Same as menu ANALYZER/HARDWARE/INFO. For details see chapter …tbd…
	If a network driver is selected, the network configuration dialog can be displayed using thing button. Same as menu ANALYZER/NETWORK. For details see chapter …tbd…
	Open the application settings dialog. Same as menu FILE/SETTINGS. For details see chapter "Configuration" on page 83.
	Configure the colours of the diagram area.

Menues

Analyzer

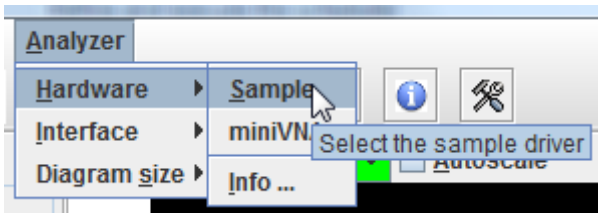
The configuration of the analyzer hardware can be found in the analyzer menu.



Hardware

Currently only one hardware driver is available for vna/J - the driver for the ***mini RADIO SOLUTIONS miniVNA***.

The second available driver named SAMPLE is only for testing and demo purposes.



Interface

After selecting the correct hardware, the driver performs a scan for available serial ports in the system.

The found ports are listed in this menu.

A rescan can be executed by clicking on the RESCAN menu entry. This may be useful when connecting the analyzer after application start to the computer.

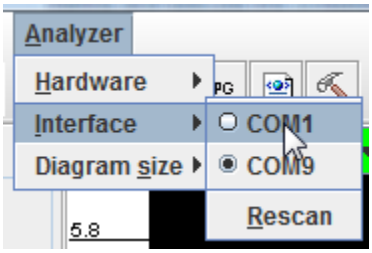


Diagram size

To get optimum performance and reduced influence of missing calibration data, the application supports only a fixed number of window sizes.

Menu	# of samples	Vertical resolution Phase	Vertical resolution Loss
600 x 400	600	0.450°	0.18 dB
800 x 600	800	0.300°	0.12 dB
1000 x 800	1000	0.225°	0.09 dB

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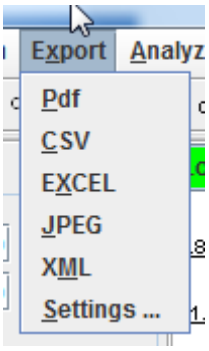
Export

Currently the application supports 4 ways to export the measurement data into an external files:

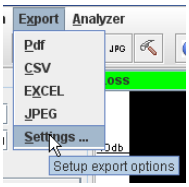
Format	Comment
PDF	Exports the currently displayed diagram along with the optional displayed markers
CSV	Exports the pure numerical data into a comma-separated file
EXCEL	Exports the pure numerical data into Microsoft© EXCEL Worksheet.
JPEG	Exports the currently display diagram into a JPEG-compatible file or to the clipboard.
XML	Exports the currently displayed data into an XML compatible file.
S1P	Export the currently displayed data into an S-parameter (S1P) comatible file.

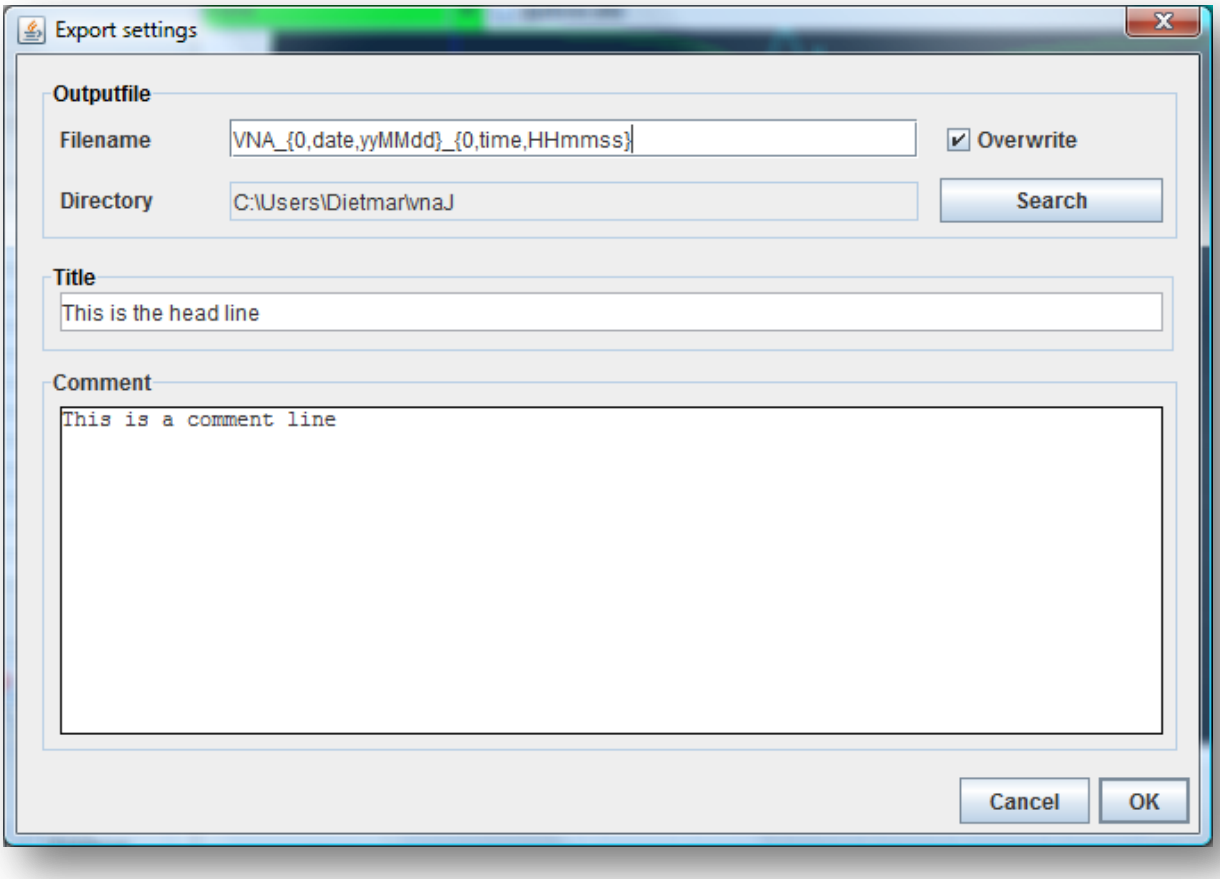
The export functions are available via the EXPORT menu or the corresponding toolbar buttons:



Settings

The settings dialog sets common parameters for all export formats.

It can be reached via the toolbar button or the menu entry 



Filename

Here you can enter the name for the exported files. Depending on the export type, the correct file-name extension (XLS, PDF, JPG and CSV) is appended to this name.

As a special feature, the filename supports parameter replacement. When calling the export function, the current timestamp is provided in parameter {0}. Here are some formatting examples for this timestamp 2010-02-15 17:12:45:

Format	Result
VNA_{0,date,yyMMdd}	VNA_100215.xls
VNA_{0,time , HHmmss }	VNA_171245.xls

The following replacement parameters are currently supported:

Shortcut	Represents	Example	Shortcut	Represents	Example
y	Year	1996; 96	H	Hour in day (0-23)	0
M	Month in year	07	k	Hour in day (1-24)	24
w	Week in year	27	K	Hour in am/pm (0-11)	0
W	Week in month	2	h	Hour in am/pm (1-12)	12
D	Day in year	189	m	Minute in hour	30
d	Day in month	10	s	Second in minute	55
F	Day of week in month	2	a	Am/pm marker	PM
E	Day in week	Tuesday			

Directory

Here the directory is displayed, into which all export files are written. The directory can be selected using the SEARCH button.

Overwrite

If the checkbox OVERWRITE is set, an existing file with the same name as the file to be created is overwritten.

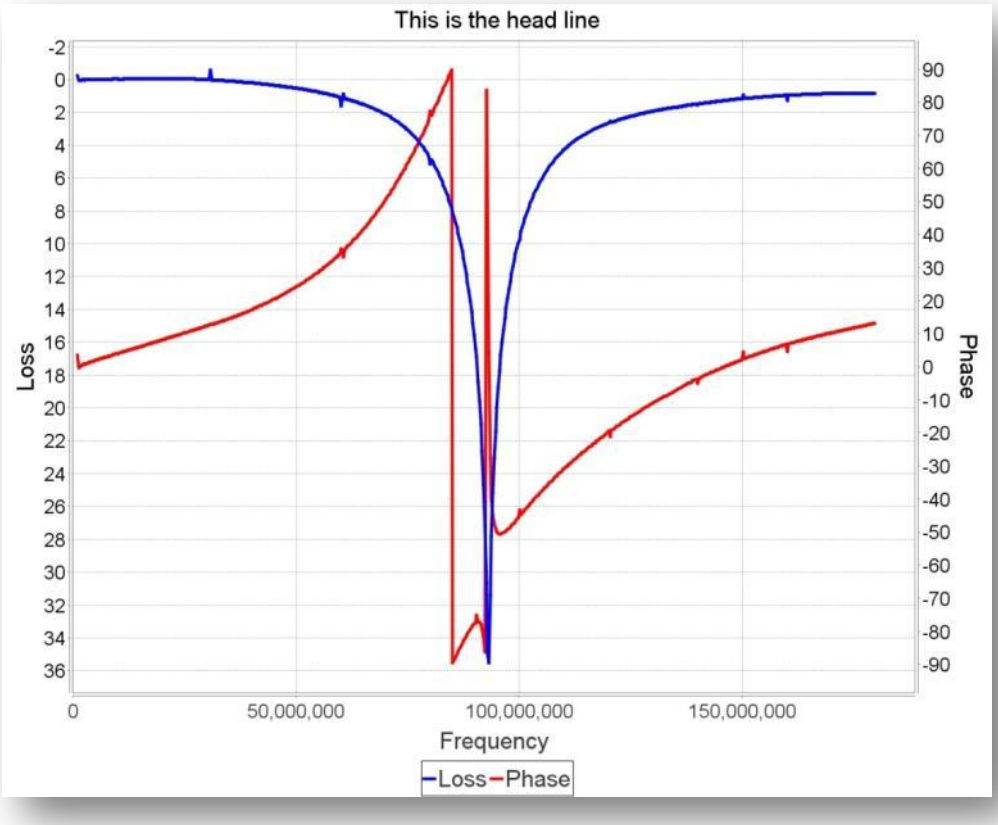
If the checkbox OVERWRITE is not set, a message is shown and you are asked, whether you want to overwrite this file.

Note: When a part of the filename is dynamic (i.e. inserted date or time parts) the overwrite warning is only shown, when exactly the same filename is already existing at the export location.

If you plan to use the scheduler to generate automatically export, ensure, that this checkbox is not set or that every time the scan runs, a different filename is generated!

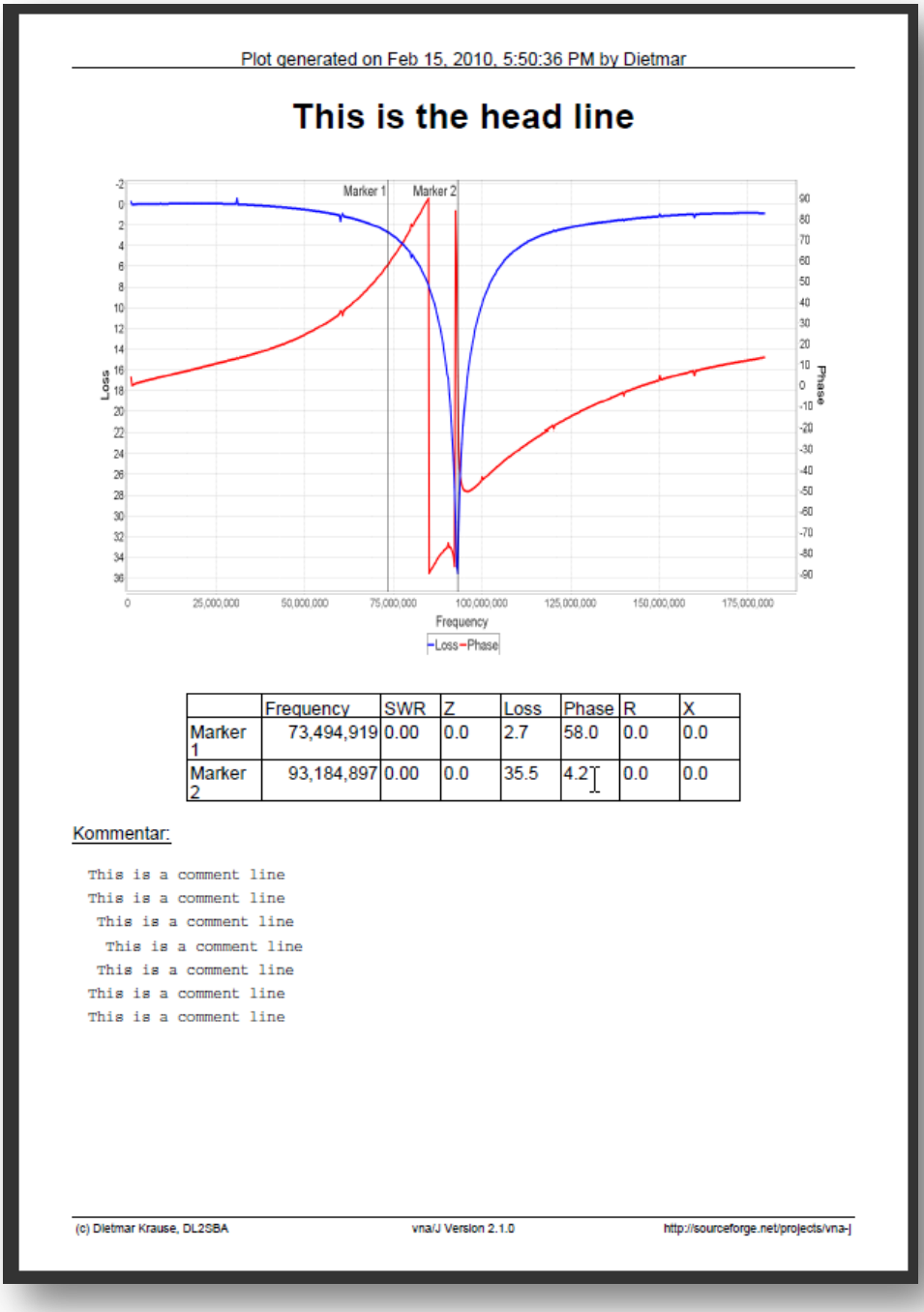
Title

Here you can enter a diagram title which is displayed in the head section of the exported diagrams (JPG and PDF format).



Comment

Here you can enter a detailed comment for the measurement which is printed in the generated PDF-document below the diagram.



	Frequency	SWR	Z	Loss	Phase	R	X
Marker 1	73,494,919	0.00	0.0	2.7	58.0	0.0	0.0
Marker 2	93,184,897	0.00	0.0	35.5	4.2	0.0	0.0

For printing a fixed-space-font is used, so fundamental formatting can be done using SPACES …

CSV export

Currently only the values

- frequency
- phase and
- loss

are exported in CSV format.

For EN/US locales, the comma is used as value separator. The dot is used as decimal separator:

```
1  Frequency;Phase;Returnloss
2  100;120,7;9,5
3  733433;122,6;3,9
4  1466766;124,0;0,6
5  2200099;124,8;-3,1
6  2933432;124,8;-4,4
7  3666765;123,9;-4,6
8  4400098;122,5;-3,3
9  5133431;120,0;-1,1
10 5866764;117,0;2,0
11 6600097;113,1;6,7
12 7333430;108,6;10,4
```

For DE/CH/AT locales, the semicolon is used as value separator. The comma is used as decimal separator.

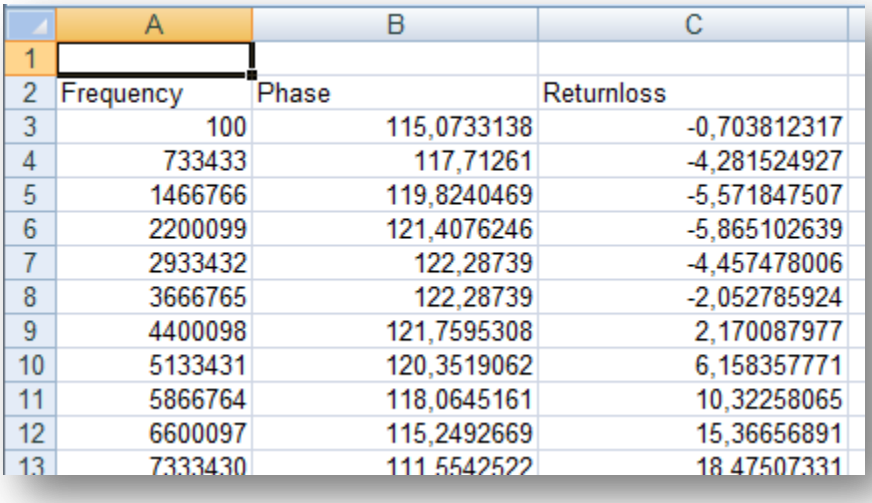
```
1  Frequency;Phase;Returnloss
2  100000;116,3;0,5
3  399833;5,1;0,0
4  699666;5,1;0,1
5  999499;7,2;0,1
6  1299332;9,9;0,1
7  1599165;12,5;0,2
8  1898998;15,1;0,2
9  2198831;17,9;0,2
10 2498664;20,4;0,4
11 2798497;23,0;0,5
12 3098330;25,7;0,6
```

Microsoft© Excel export

Currently only the values

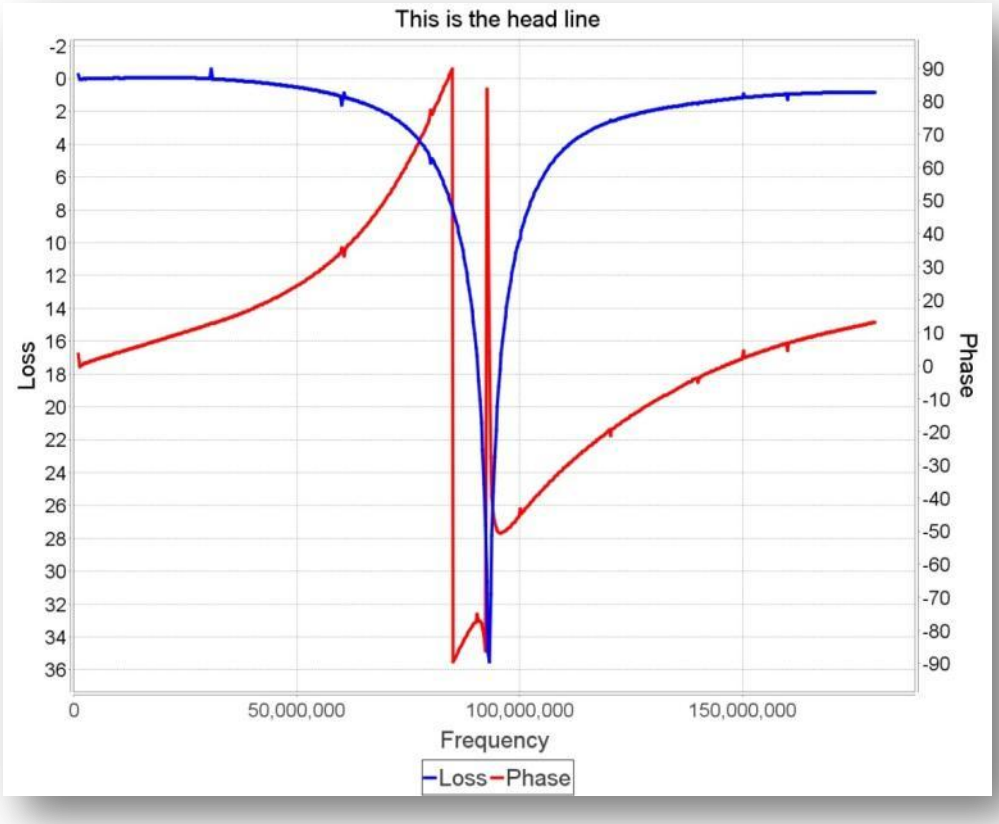
- frequency
- phase and
- loss

are exported in XLS format.



	A	B	C
1			
2	Frequency	Phase	Returnloss
3	100	115,0733138	-0,703812317
4	733433	117,71261	-4,281524927
5	1466766	119,8240469	-5,571847507
6	2200099	121,4076246	-5,865102639
7	2933432	122,28739	-4,457478006
8	3666765	122,28739	-2,052785924
9	4400098	121,7595308	2,170087977
10	5133431	120,3519062	6,158357771
11	5866764	118,0645161	10,32258065
12	6600097	115,2492669	15,36656891
13	7333430	111,5542522	18,47507331

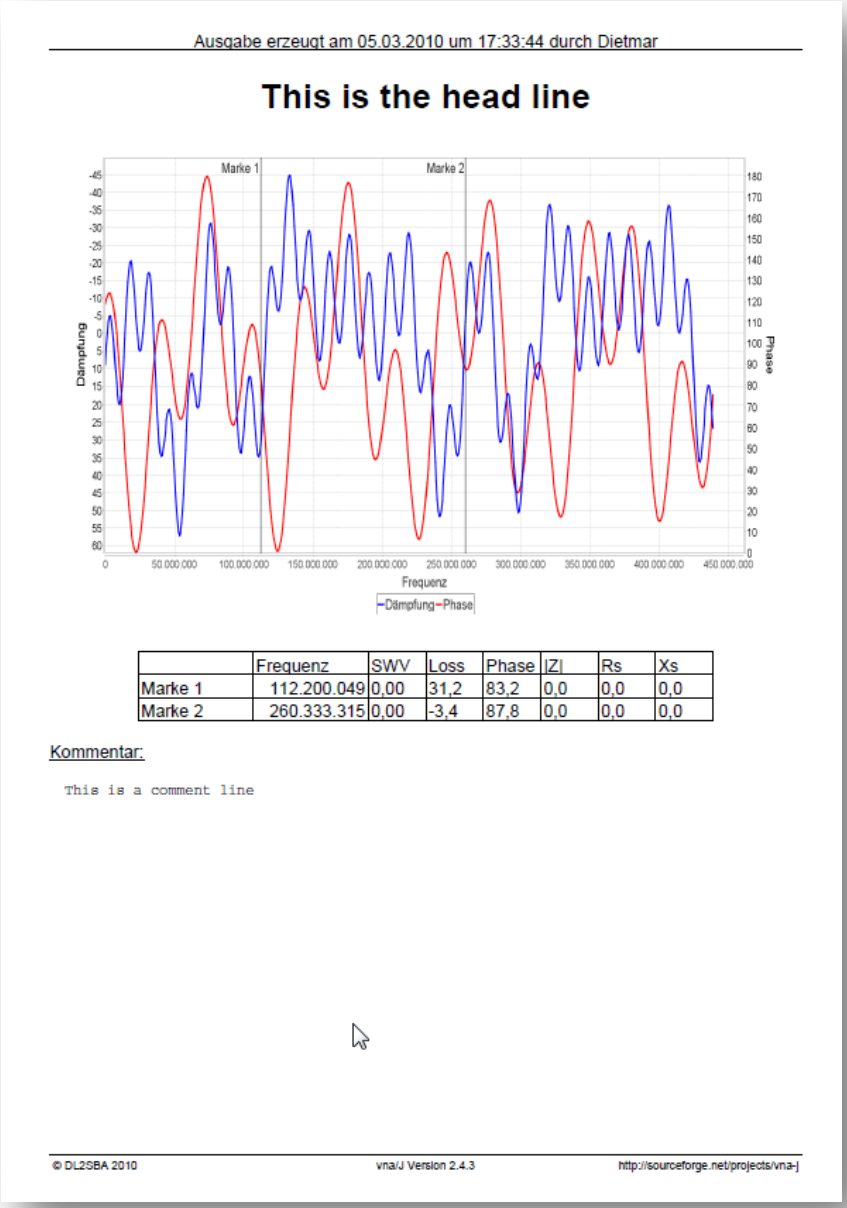
Jpeg export



When selecting the menu item or clicking the toolbar button, the diagram is saved to an external file.

When left-clicking the toolbar button with pressed shift-key on the keyboard, the image is copied to the systems clipboard as image. The image can be inserted in various applications like MS Word etc.

PDF export



Ausgabe erzeugt am 05.03.2010 um 17:33:44 durch Dietmar

This is the head line

	Frequenz	SWV	Loss	Phase	|Z|	Rs	Xs
Marke 1	112.200.049	0,00	31,2	83,2	0,0	0,0	0,0
Marke 2	260.333.315	0,00	-3,4	87,8	0,0	0,0	0,0

Kommentar:

This is a comment line

© DL2SBA 2010 vna/J Version 2.4.3 http://sourceforge.net/projects/vna-j

S-parameter export

This function can be used to export the measurement data for 3rd-party applications, that require data in Touchstone® File Format Specification format.

This format was published 2002 by Agilent. A detailed specification can be found here:

http://www.eda.org/pub/ibis/connector/touchstone_spec11.pdf

The parameters are defined for this model:

Currently the miniVNA is only capable of measuring the parameter S11 in reflection mode and S21 in transmission mode. The other parameters can only be measured, when manually reversing the DUT/DET connectors.

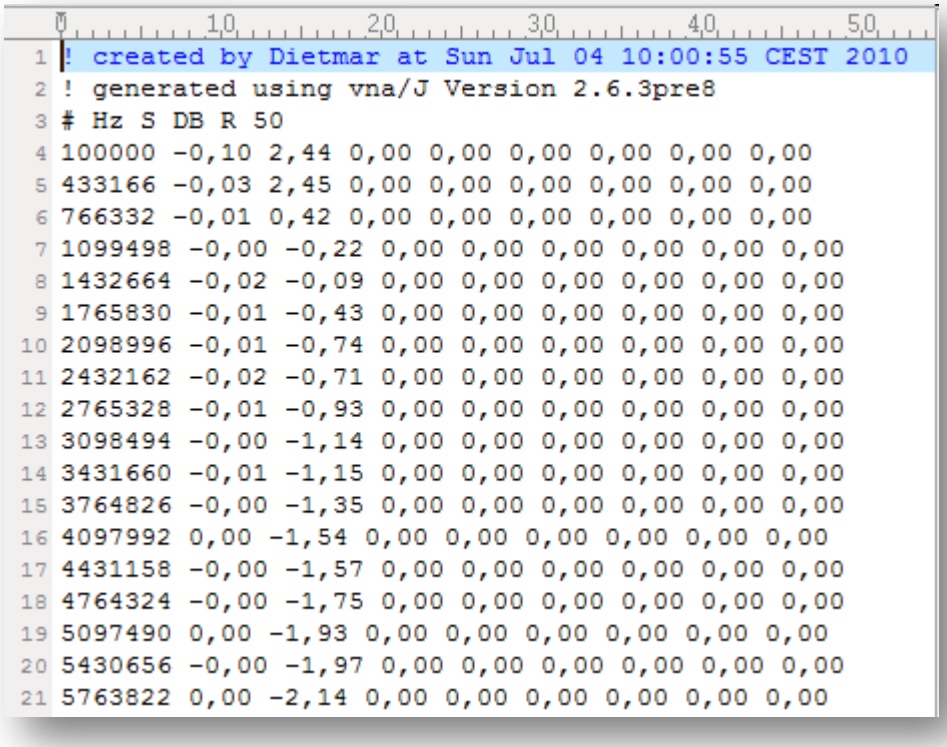
S1P-parameter export

In reflection mode a file with the extension S1P is generated with the following layout:

```
1  ! created by Dietmar at Sun Jul 04 10:54:33 CEST 2010
2  ! generated using vna/J Version 2.6.3pre8
3  # Hz S DB R 50
4  100000 -14,78 -64,13
5  433166 -24,23 -45,57
6  766332 -26,62 -32,36
7  1099498 -27,30 -25,38
8  1432664 -27,55 -22,14
9  1765830 -27,65 -20,20
10 2098996 -27,67 -19,08
11 2432162 -27,69 -18,74
12 2765328 -27,67 -18,64
13 3098494 -27,63 -18,99
```

S2P-parameter export

In transmission mode a file with an S2P extension is generated, having this layout:



```
! created by Dietmar at Sun Jul 04 10:00:55 CEST 2010
! generated using vna/J Version 2.6.3pre8
# Hz S DB R 50
100000 -0,10 2,44 0,00 0,00 0,00 0,00 0,00 0,00
433166 -0,03 2,45 0,00 0,00 0,00 0,00 0,00 0,00
766332 -0,01 0,42 0,00 0,00 0,00 0,00 0,00 0,00
1099498 -0,00 -0,22 0,00 0,00 0,00 0,00 0,00 0,00
1432664 -0,02 -0,09 0,00 0,00 0,00 0,00 0,00 0,00
1765830 -0,01 -0,43 0,00 0,00 0,00 0,00 0,00 0,00
2098996 -0,01 -0,74 0,00 0,00 0,00 0,00 0,00 0,00
2432162 -0,02 -0,71 0,00 0,00 0,00 0,00 0,00 0,00
2765328 -0,01 -0,93 0,00 0,00 0,00 0,00 0,00 0,00
3098494 -0,00 -1,14 0,00 0,00 0,00 0,00 0,00 0,00
3431660 -0,01 -1,15 0,00 0,00 0,00 0,00 0,00 0,00
3764826 -0,00 -1,35 0,00 0,00 0,00 0,00 0,00 0,00
4097992 0,00 -1,54 0,00 0,00 0,00 0,00 0,00 0,00
4431158 -0,00 -1,57 0,00 0,00 0,00 0,00 0,00 0,00
4764324 -0,00 -1,75 0,00 0,00 0,00 0,00 0,00 0,00
5097490 0,00 -1,93 0,00 0,00 0,00 0,00 0,00 0,00
5430656 -0,00 -1,97 0,00 0,00 0,00 0,00 0,00 0,00
5763822 0,00 -2,14 0,00 0,00 0,00 0,00 0,00 0,00
```

Only the parameter S21 is set in the generated file, all other parameters are set to dummy values, here 0.

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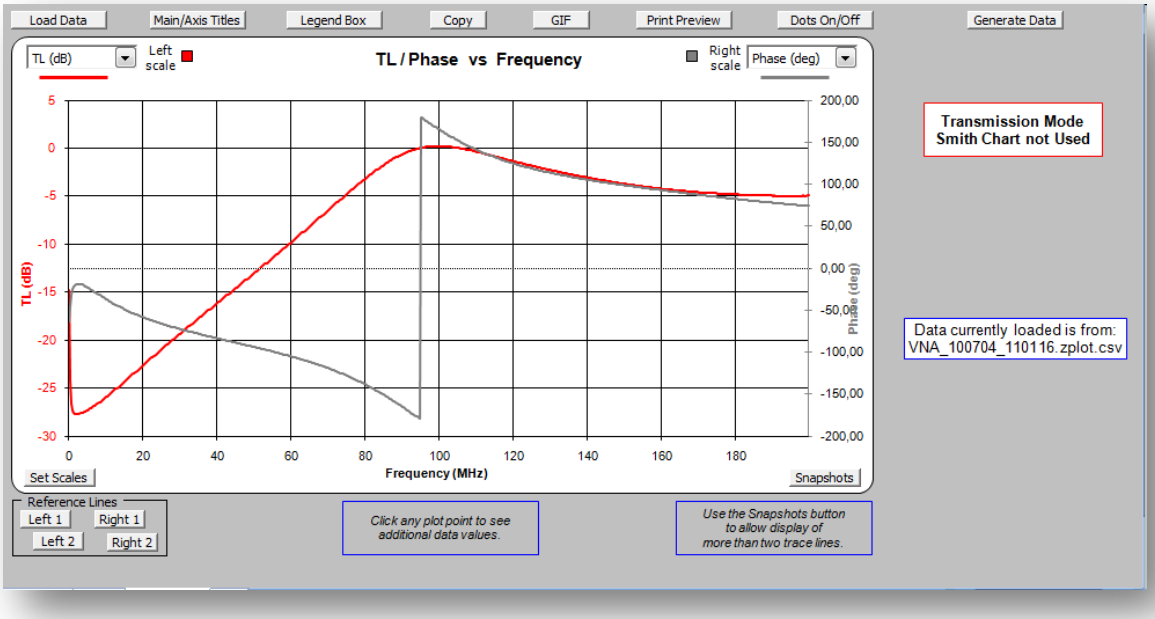
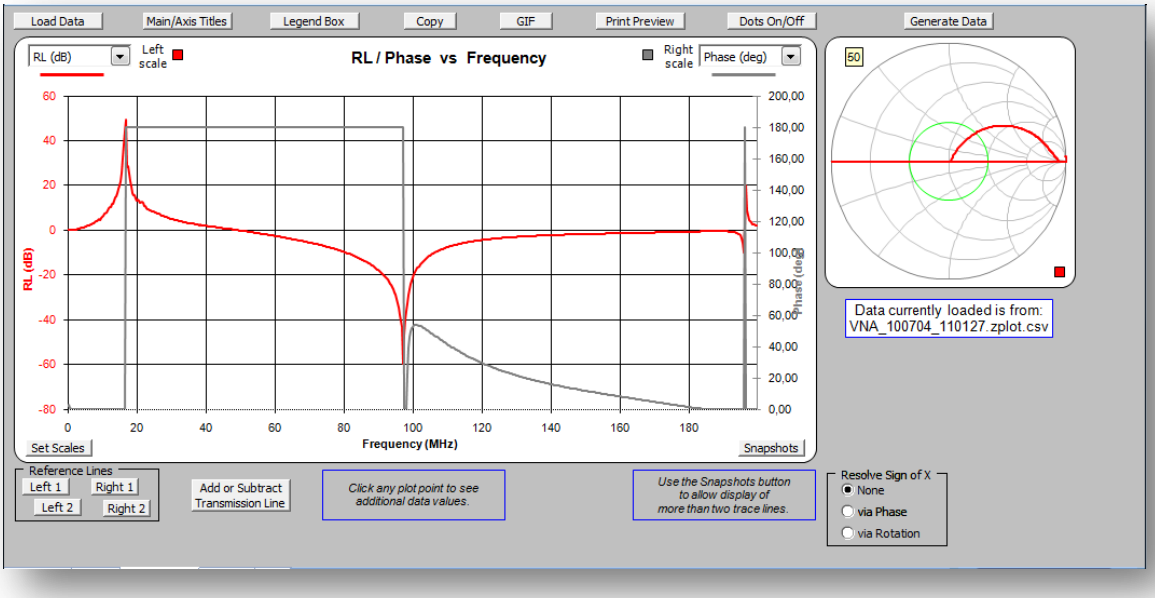
ZPlots export

This function exports the measurement data in a format, that can be read by the popular Zplots-EXCEL-Spreadsheet provided by Dan, AC6LA (http://www.ac6la.com/zplots.html).

The export filename also ends with **.csv**, so that Excel can load it without any renaming.

Importing the data into Zplots enables the user, to use the features of the Zplots-Spreadsheet even with newer MS-Office versions, where the serial port support currently no longer works.





Tools

Currently four tools are available in addition to the network analyser functionality:

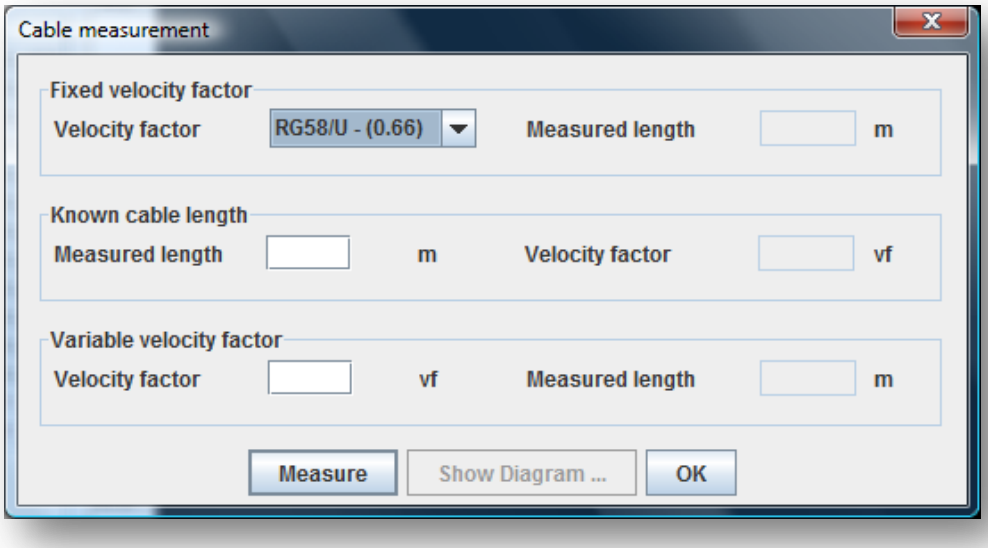
- Determine the length of a coaxial cable of a know type
- Use the miniVNA as a simple HF-signal generator
- Scheduler for measurements
- Display and compare previously saved data

These functions can be reached via the TOOLS menu or the corresponding toolbar buttons:

Cable length measurement

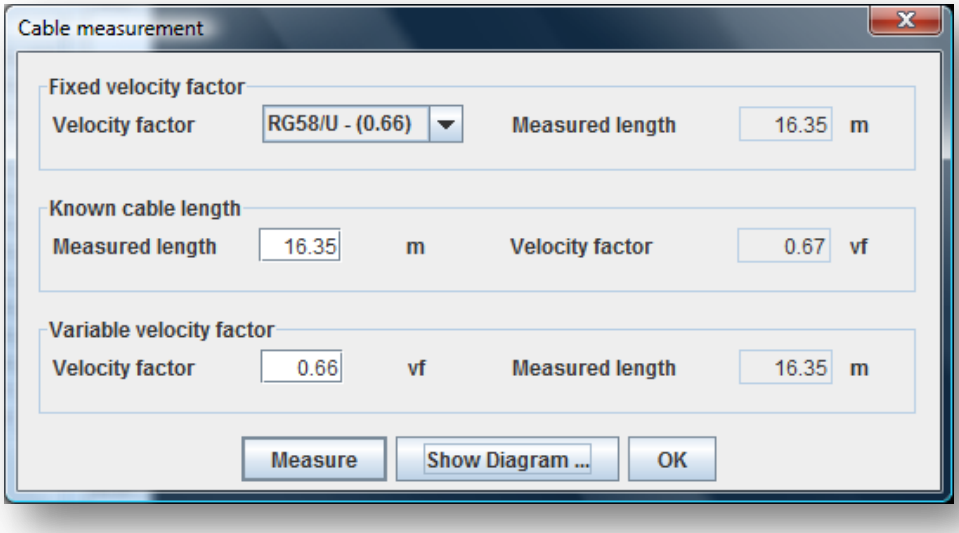
This tool enables the user

- to determine the length of a coaxial cable with known velocity factor
- to determine the velocity factor of a cable with known length



Pressing the MEASURE button starts a full scale scan of the attached analyser in reflection mode.

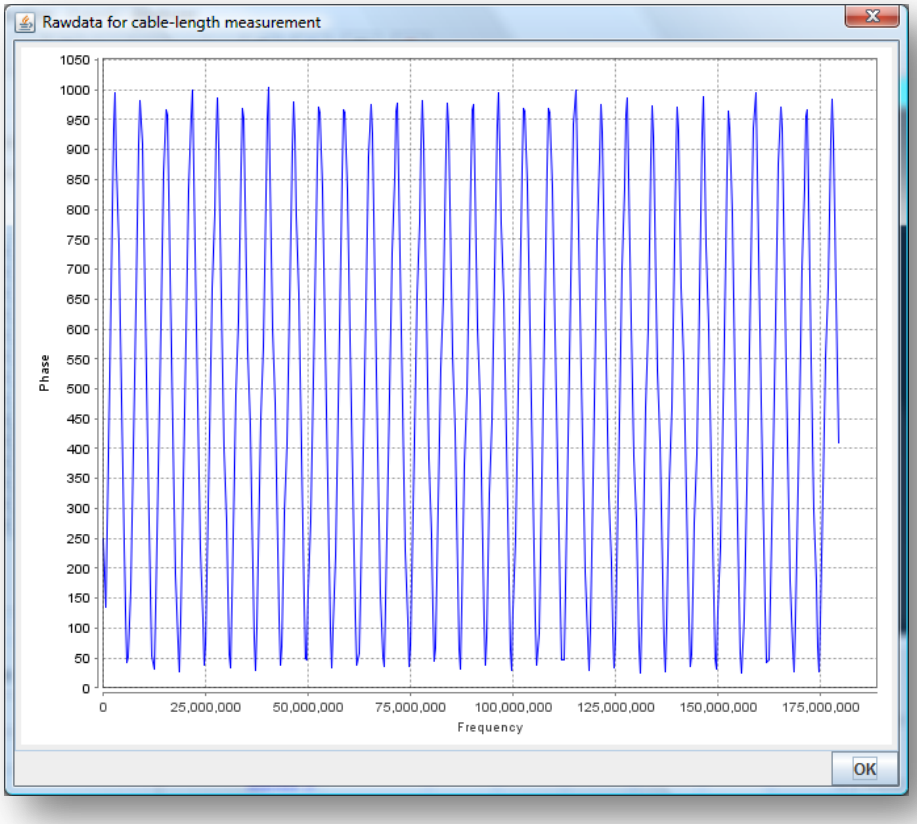
Depending on which values are filled in by the user, the results are calculated:



The data used for length calculation can be seen pressing the SHOW DIAGRAM button after the scan.

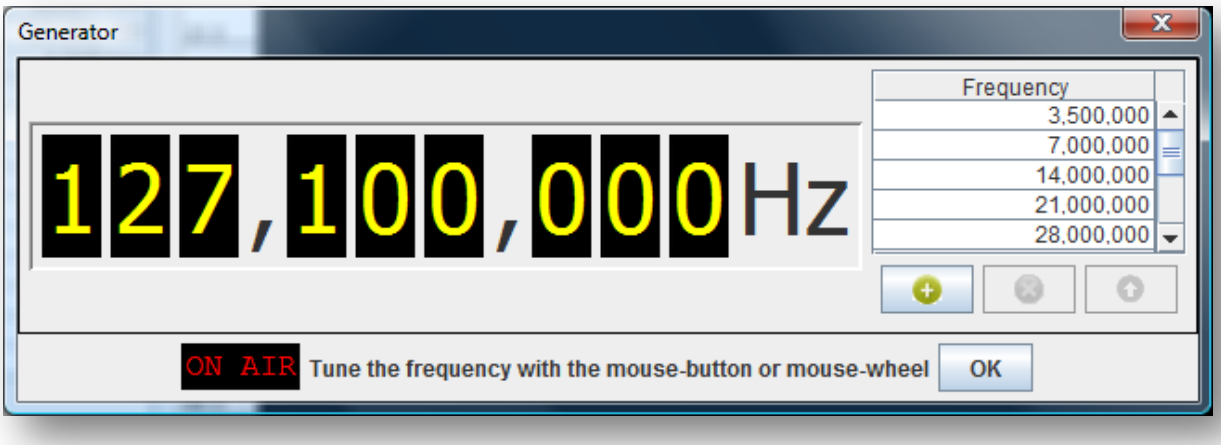
Measurement principle

The difference between each zero crossings and each maximum values are measured for the whole scan. Then based on the speed-of-light and the other know factors the cable length is calculated.



Generator miniVNA

Using this dialog, the attached VNA can be used as a simple frequency generator.



The frequency range is determined by the loaded driver. Details can be viewed in the driver info dialog.

Output control

The output is switched on, when clicking

. When the output is active, this field is inverted:

. To switch off the output, click on this field again.

Frequency control

Every digit

of the frequency panel can be controlled with the mouse:

- A left-click increases the number by one.
- A right-click decreases the number by one.
- The digit can also be controlled using the mouse-wheel.

Frequency list

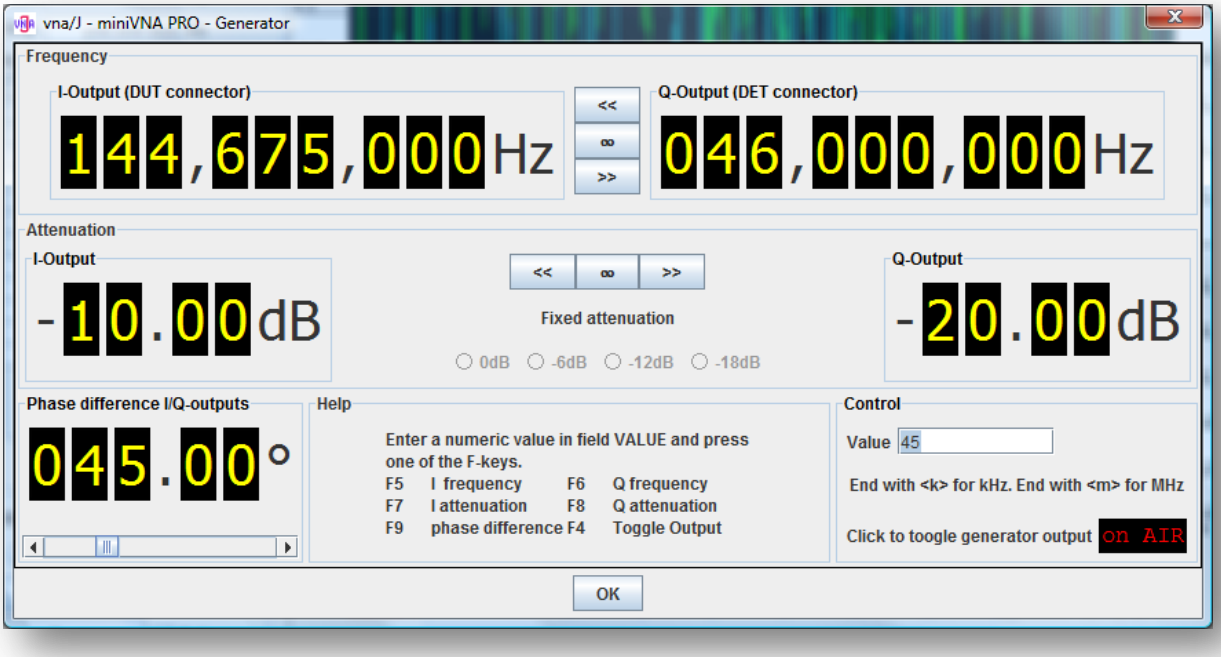
By double-clicking with the left mouse button on an entry in the presets list, you can quickly set the start/stop frequencies to the desired range. A selected list entry can also be used clicking the button.

Entries in the presets list can be deleted by selection an entry in the list and clicking on .

A currently entered frequency can be added to the list clicking on the button.

Generator miniVNA PRO

Using this dialog, the attached miniVNA PRO can be used as a simple frequency generator as well as a versatile I/Q-signal generator



Output control

The output is switched on, when clicking

. When the output is active, this field is inverted:

. To switch off the output, click on this field again.

Frequency control

Every digit of the I or Q frequency panel can be controlled with the mouse:

- A left-click increases the number by one.
- A right-click decreases the number by one.
- The digit can also be controlled using the mouse-wheel.

The values range is 100.000Hz to 200.000.000Hz.

Attenuation control

Every digit of the I or Q attenuation panel can be controlled with the mouse:

- A left-click increases the number by one.
- A right-click decreases the number by one.
- The digit can also be controlled using the mouse-wheel

The values range is 00.00dB to 60.20dB

Phase control

Every digit of the I or Q attenuation panel can be controlled with the mouse:

- A left-click increases the number by one.
- A right-click decreases the number by one.
- The digit can also be controlled using the mouse-wheel

The values range is 000.00° to 180.00°

The phase difference can also controlled using the slider below the five digits.

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General input

The values can be controlled via the separate digits of by entering a numerical value in the field **VALUE** and pressing one of the described function keys on the keyboard:

F5 Write the entered value to the I frequency field
F6 Write the entered value to the Q frequency field
F7 Write the entered value to the I attenuation field
F8 Write the entered value to the Q attenuation field
F9 Write the entered value to the phase field

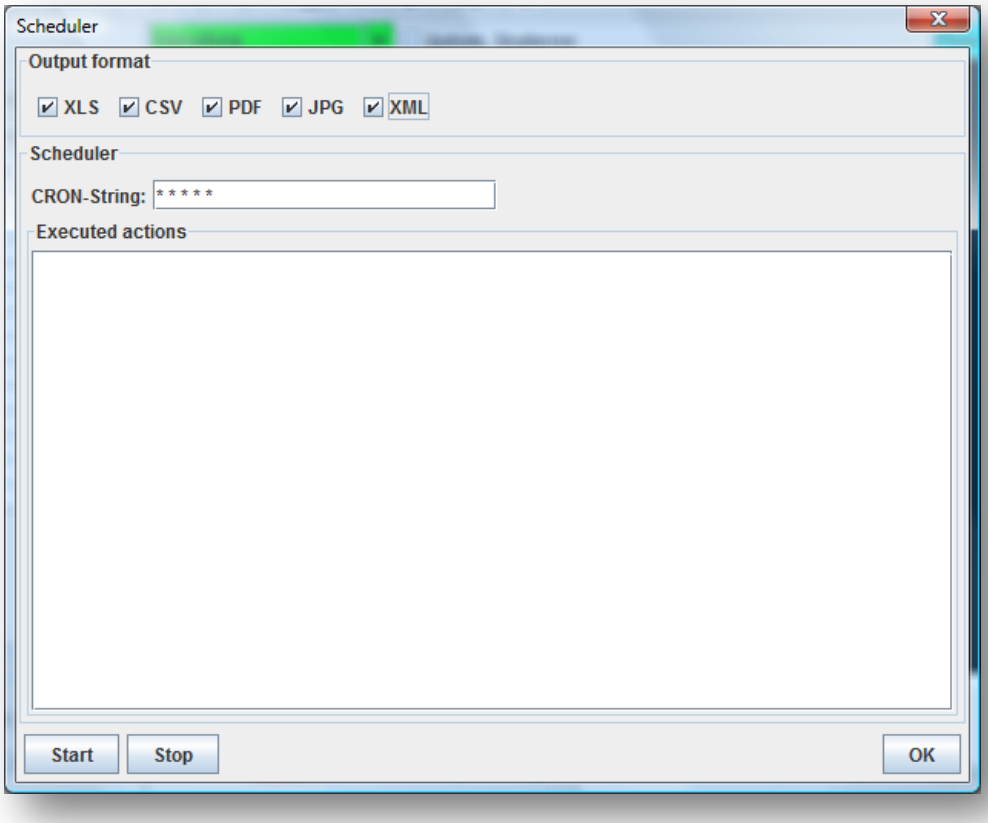
Copies the value from the Q field to the I field

Copies the value from the I field to the Q field

Link the I and Q fields. Means, changing i.e. the I field also changes the Q field by the same amount.

This works only when changing the field values using the digits

Scheduler



General

The scheduler enables the user, to create analyzer scans on a regular basis. Therefore the user has to define in which time periods a scan should be done. For details see chapter "Time definition" on page 58.

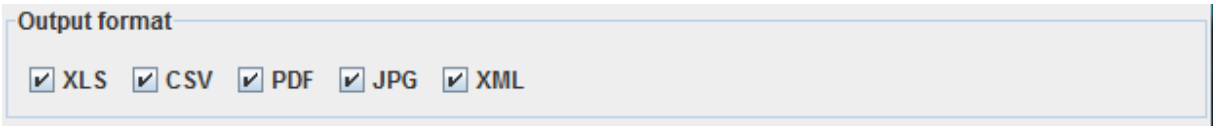
To give reasonable filenames, the user should define a filename pattern in the export settings like this:

```
VNA_{0,date,yyMMdd}_{0,time,HHmmss}
```

More details on filename pattern see chapter "Filename" on page 38.

The scheduler is very similar to the popular LINUX CRON daemon, so for detailed information consult the LINUX documentation.

Output format



The same export formats which are available through the toolbar are also available for scheduled output generation .

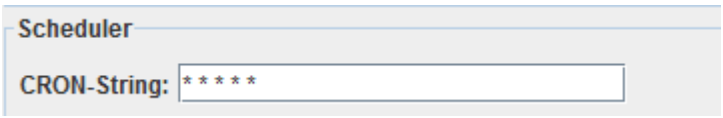
For each selected output format, a separate file is created as defined in the export settings.

Selecting all checkboxes and specifying a filename patter as described on the previous page gives these filenames:

Feb 28, 2010 11:21:01 AM c:\temp\VNA_100228_112101.xls
Feb 28, 2010 11:21:01 AM c:\temp\VNA_100228_112100.pdf
Feb 28, 2010 11:21:00 AM c:\temp\VNA_100228_112100.csv
Feb 28, 2010 11:21:00 AM c:\temp\VNA_100228_112100.jpg
Feb 28, 2010 11:21:00 AM c:\temp\VNA_100228_112100.xml

Time definition

The time definition must be entered in the field name **CRON-String** here:



The time definition consists always of five separate patterns:

Order	Pattern name	Comment	Range
1	Minute pattern	During which minutes of the hour should the task been launched?	0 .. 59
2	Hours pattern	During which hours of the day should the task been launched?	0 .. 23
3	Days of month pattern	During which days of the month should the task been launched?	1 .. 31 L specifies the last day of the month
4	Month pattern	During which months of the year should the task been launched?	1 ..12
5	Days-of-week pattern	During which days of the week should the task been launched?	0 == Sunday .. 6==Saturday

The universal quantifier ***** can be used, to indicate

- every minute
- every hour
- every day
- every month
- every weekday

A list of discrete values can be specified using a comma as separator. I.e. "* 0,12 * * *" means execute the task at noon and midnight.

A range of values can be specified using a hyphen as separator. I.e. "0-4 * * * *" means execute the task every minute in the first five minutes of every hour.

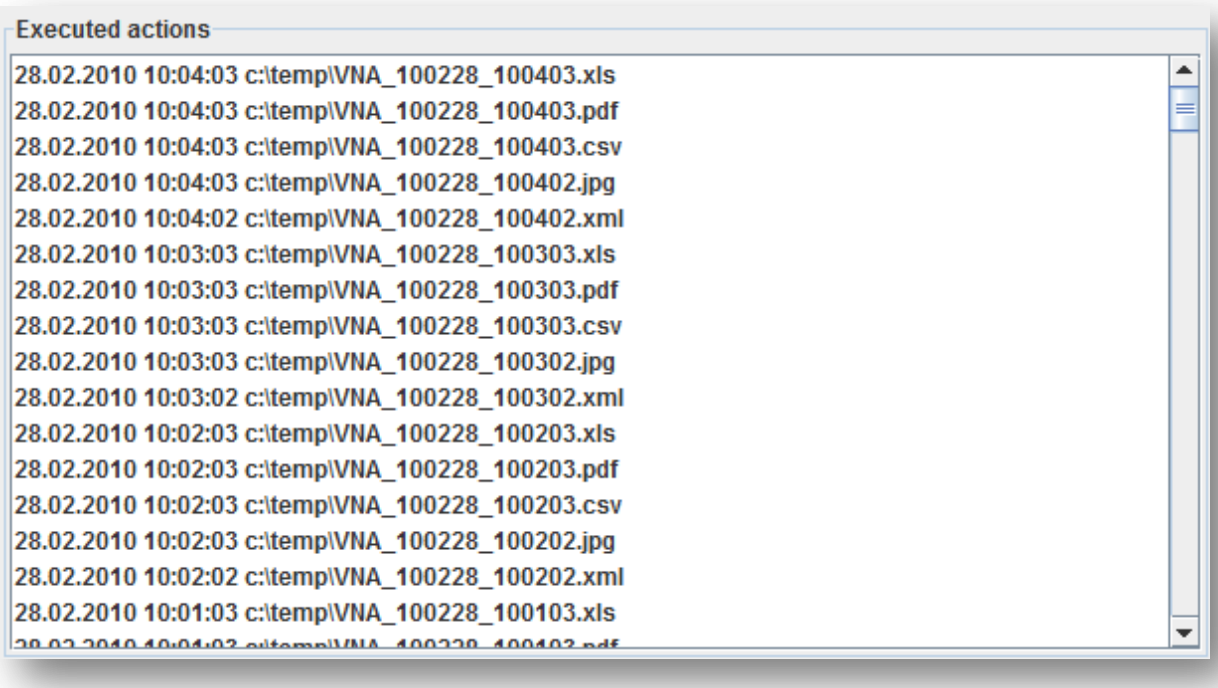
For more details see

http://www.sauronsoftware.it/projects/cron4j/manual.php#p02

or search the internet for "CRON UNIX".

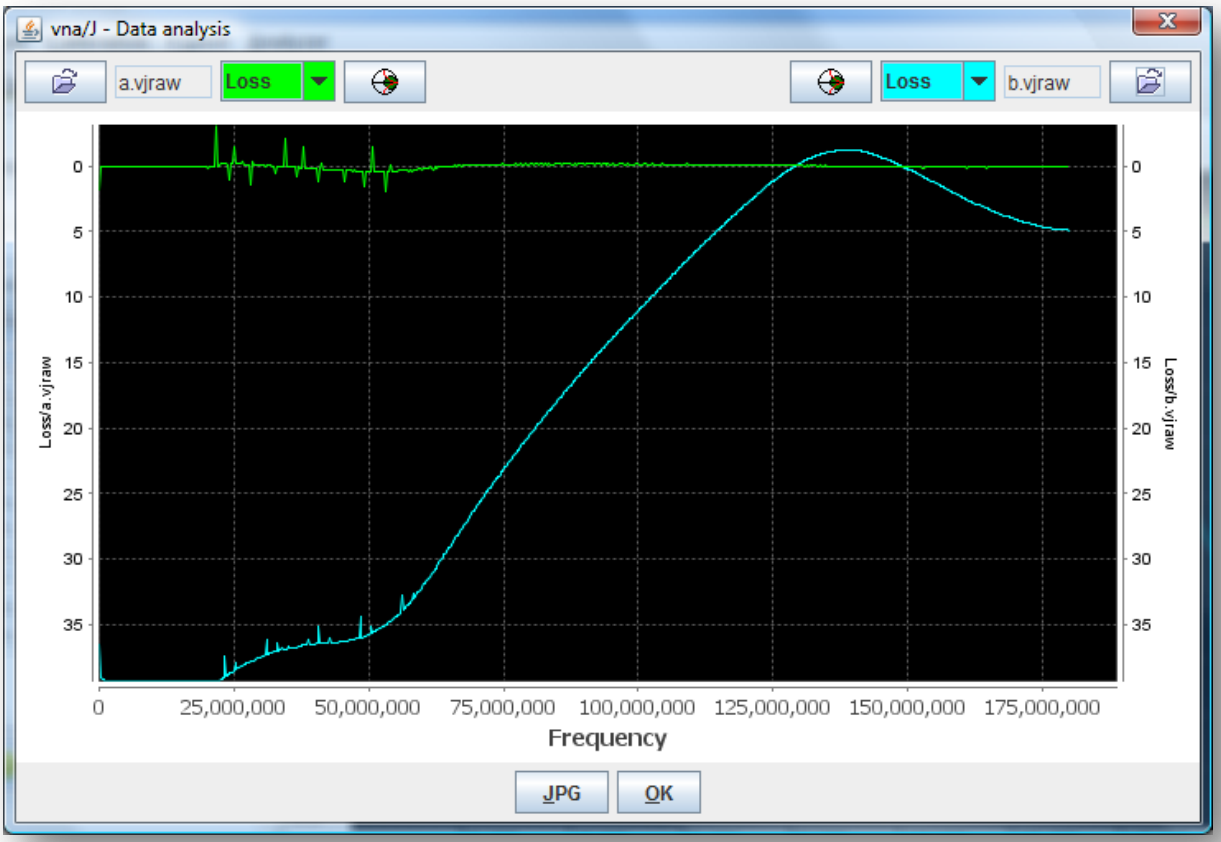
Execution log

Every action that was executed by the scheduler, is reported in the list box:



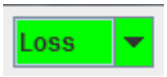
Data analysis

Previously saved data can be later displayed again, using the Data analysis dialog:



Here the user can load up to two previously recorded datasets. The available operations for the data-sets are:

Opens the default OPEN-dialog, where the user can select a previously recorded data set.
The name of the loaded data file is then displayed near the open icon.



Here the same scales are available as in the main diagram area.

The data-set is displayed inside a Smith-chart in a separate dialog window.
See details in chapter "Display Smith-chart" on page 20.

Export the displayed diagram to a JPEG file.
The size of the exported JPG is set fixed to 1000x800 pixels.

Closes the data analysis dialog.

Multi-tune

The idea of this "multi-tune" dialog is, to support the tuning of multiband antennas or multiband filters inside receivers etc.

The user can create one or more small scan windows with different frequency ranges to cover the necessary spectrum.

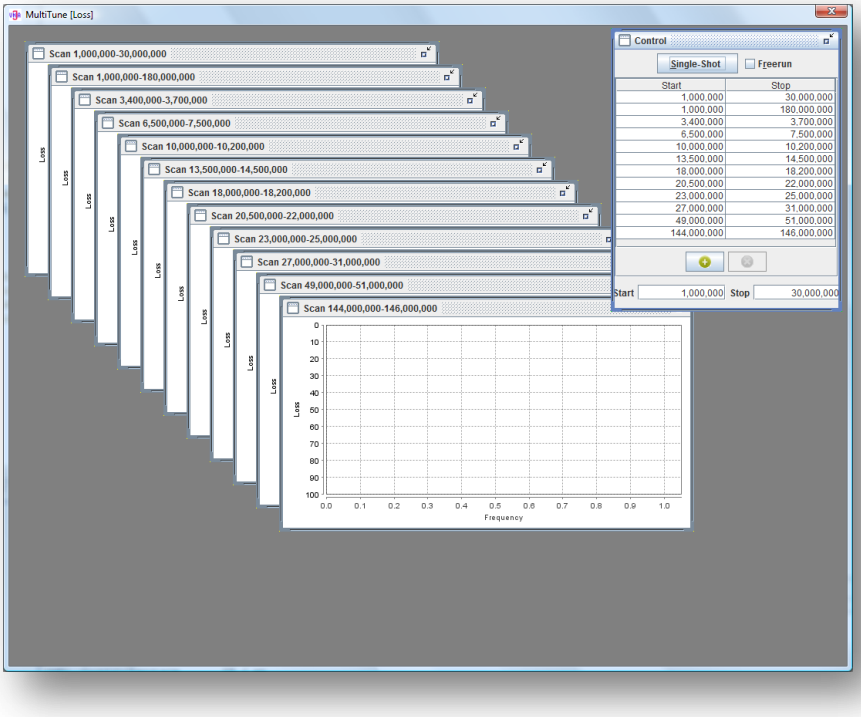
The window can be opened by selecting the menu bar entry TOOLS-MULTI TUNE or the corresponding toolbar button .

The mode (transmission or reflection) is determined by the selected mode in the main window.

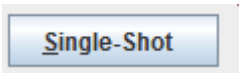
The type of scale displayed is also determined by the scale selected in in the left-scale of the main window.

The window is modal to the main window and must be closed selecting the close-icon in the upper-right corner.

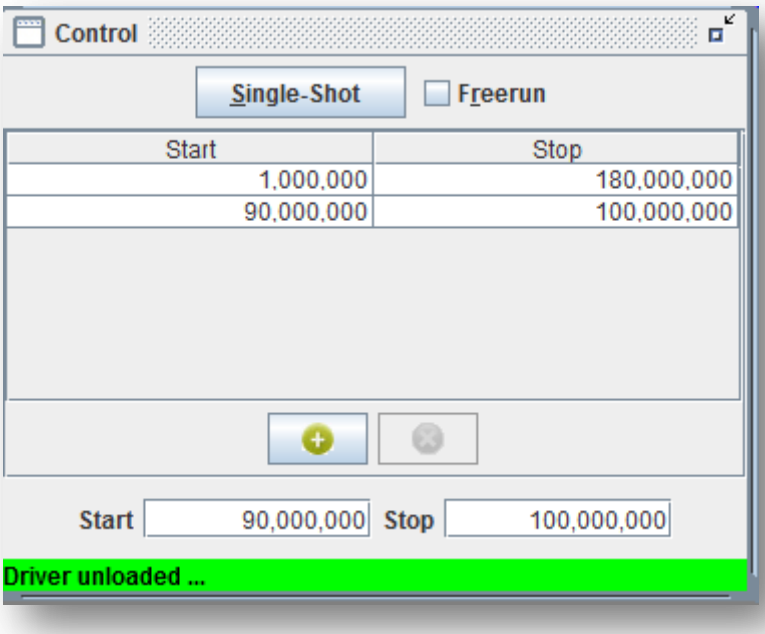
On the very first start of the multi-tune window, the frequency list is populated with the same defaults as the frequency list in the main window:

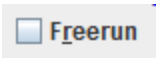


Control window

The window labeled "control" contains a list of scan-ranges that are executed whenever the button 

is pressed.:



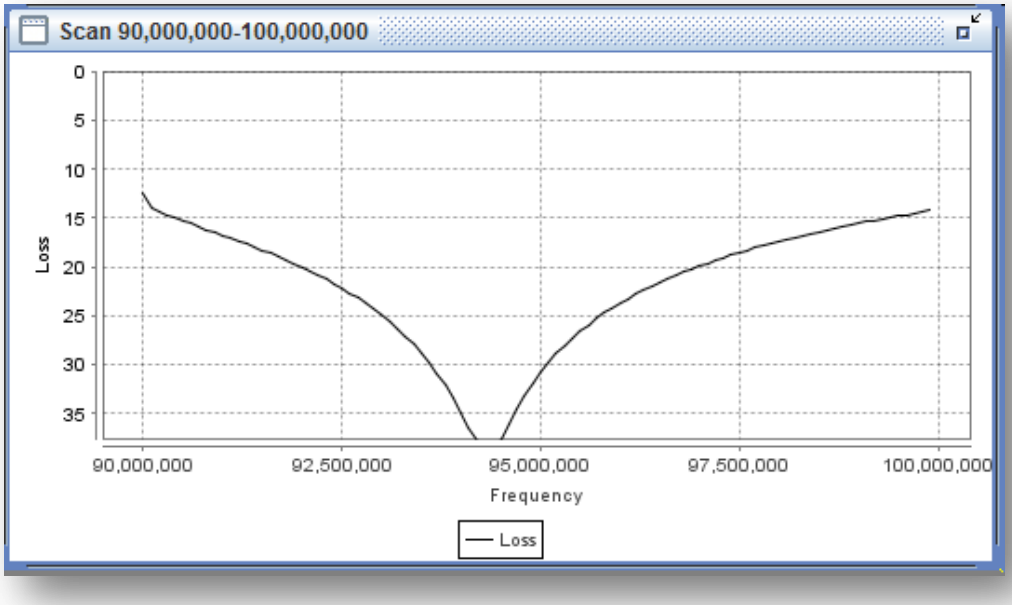
Selecting the checkbox 

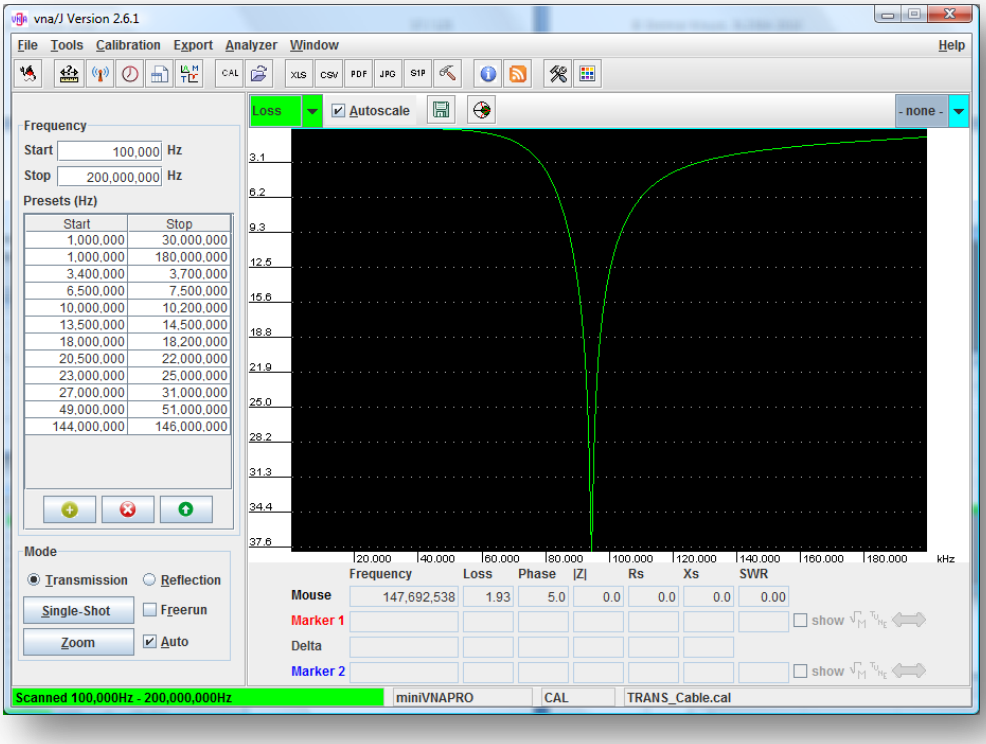
enables a free-running mode, same way as it is handled in the main window.

A new entry can be added to the list by entering the start and stop frequency in the entry fields and pressing the button. An existing can be deleted by selecting the entry in the list and pressing the button.

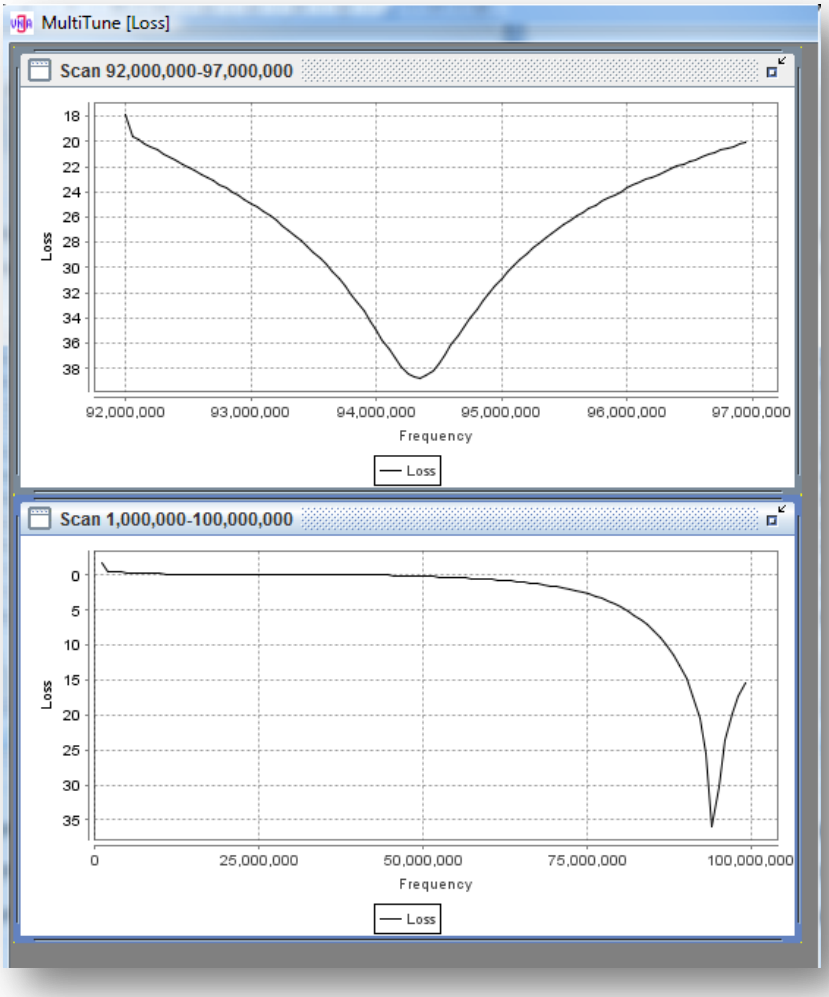
Scan-window

Each scan window contains the data for the given scan range. The measurement parameter (Loss, Phase, SWR, Xs, Rs, |Z|) is determined by the selected type of the left scale in the main window:





Each of the windows have personal-scaling settings:



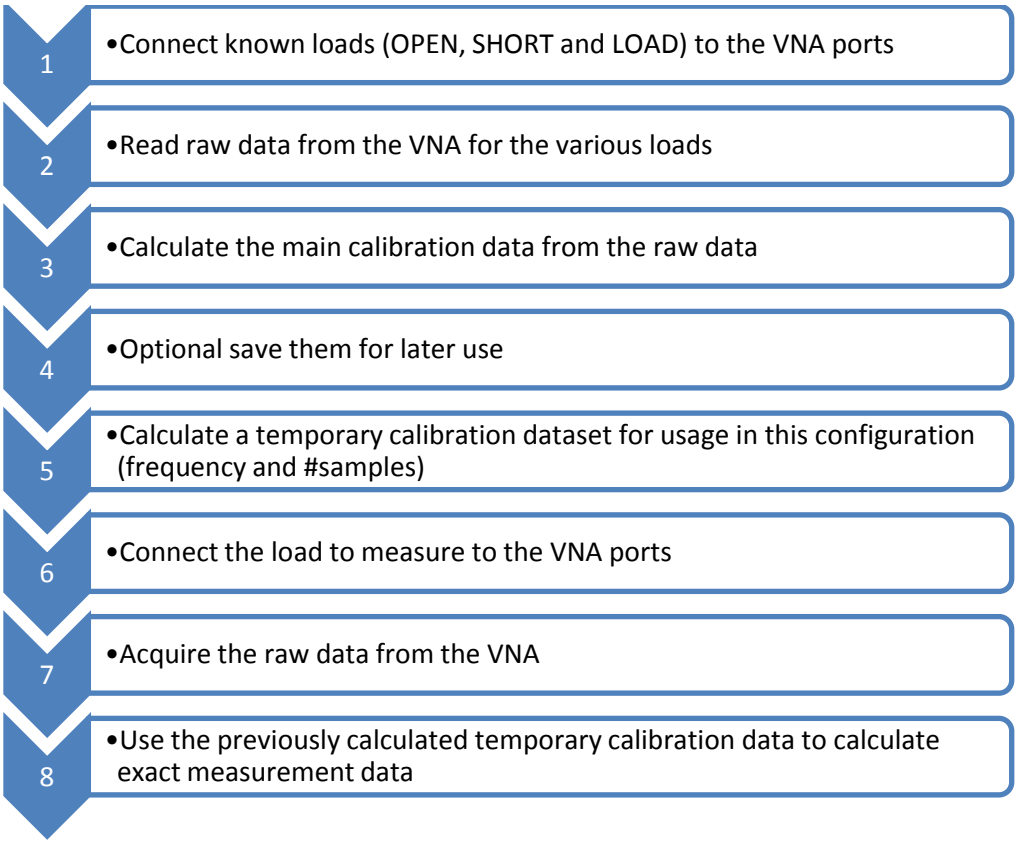
The diagrams support a number of operations like scaling, printing or exporting the data.

Simply click on the diagram area with the right-mouse button and selected the desired option.

Each diagram has its own options. These options are NOT retained when closing and reopening this window!

Measurement basics

The measurement process inside this application is a multi step one:



Calibration

To get maximum precision, the calibration data should match the current measurement parameters, means:

- Analyser type (currently only miniVNA and the sample driver)
- Start frequency
- Stop frequency
- Mode (transmission or reflection)
- Number of measurement steps

If the frequency range is changed, a new calibration set should be created for the new range. The number of calibration steps is directly controlled by the horizontal size of diagram window.

This implementation has the big drawback, in that whenever you zoom into a diagram, a new set of calibration data must be used.

To overcome this limitation, in the current implementation a **main calibration dataset** with 2.000 points is recorded and stored.

To correct a recorded set of raw data, a **temporary calibration dataset** is created from the **main calibration dataset** and used to transform the raw data.

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Mathematics

… Mathematics will be detailed later …

Calibration

Basics

As described in section "Measurement basics" on page 66, a **main calibration dataset** is always required for using the application.

Depending of the analyser type and mode, a number of calibration data sets is needed:

Analyzer	Mode	OPEN	SHORT	LOAD
miniVNA	Transmission	-	✓	-
	Reflection	✓	-	-
miniVNApro	Transmission	✓	✓	-
	Reflection	✓	✓	✓
Sample	Transmission	✓	✓	✓
	Reflection	✓	✓	✓

Storage

Location

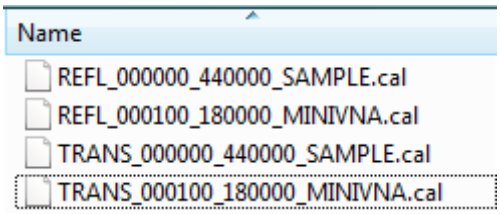
The **main calibration dataset** can be stored (see "Saving calibration data" on page 71) and retrieved from you local disk (see "Loading existing calibration data" on page 72).

The calibration files are stored in the following location on your local hard disk:

Platform	Location
Windows XP	C:\Einstellungen und Dokumente\<UserName>\vnaj\calibration C:\documents and settings\<UserName>\vnaj\calibration
Windows VISTA	C:\Benutzer\<UserName>\vnaj\calibration C:\users\<UserName>\vnaj\calibration
Windows7	??? /vnaj/calibration
Mac OSX	??? /vnaj/calibration
SUSE Linux 11	??? /vnaj/calibration

Format

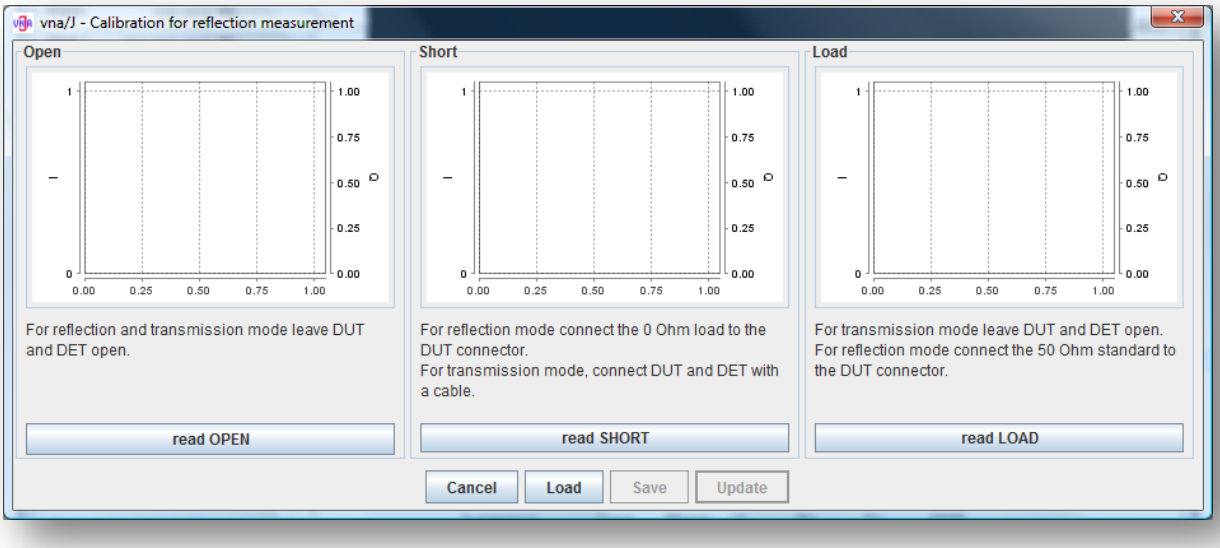
The calibration files are stored binary on the filesystem with the extension **.cal**.

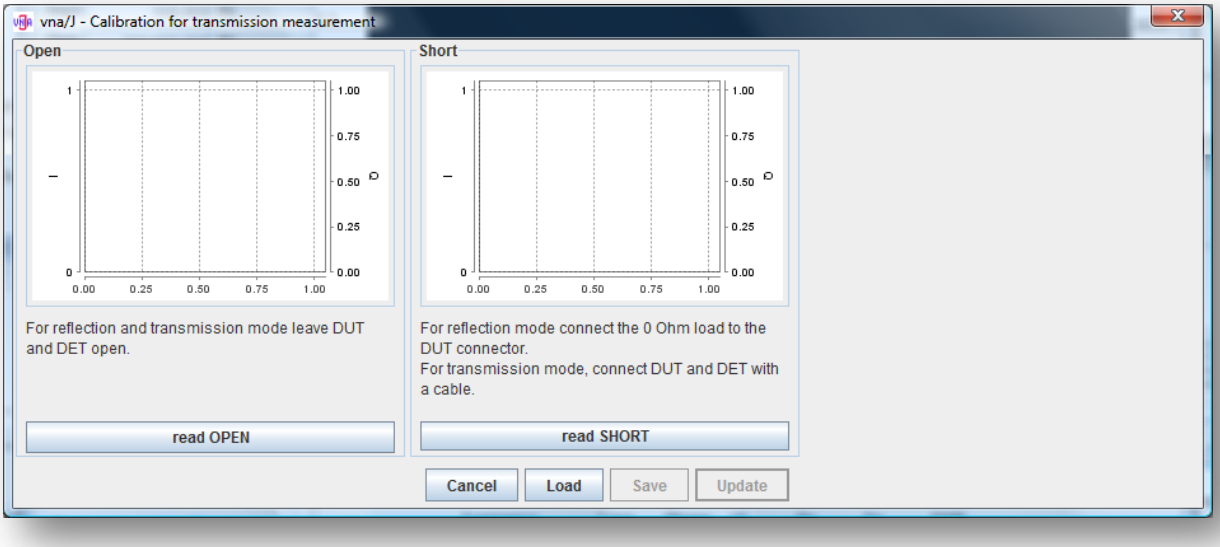


Procedure

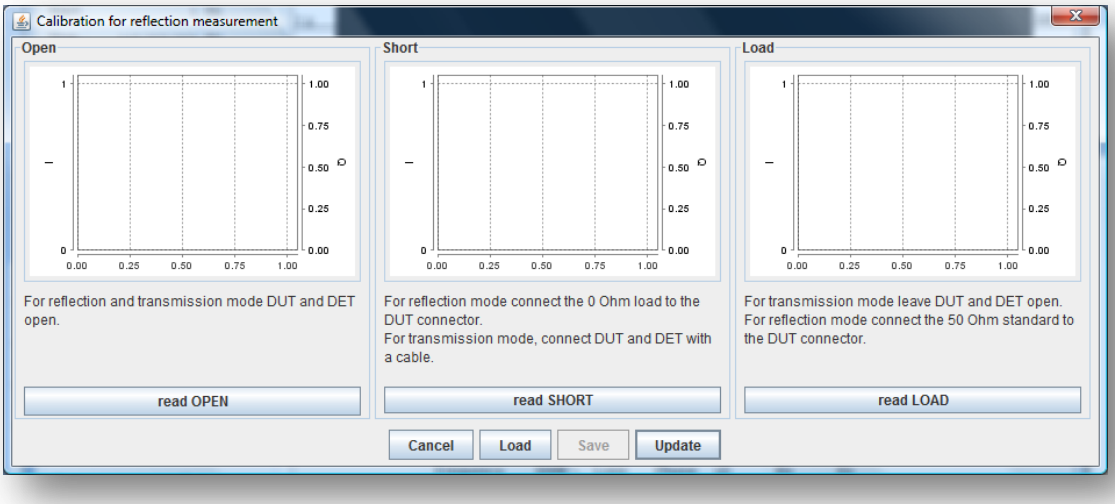
The calibration dialog is opened by selecting the menu CALIBRATION/LOSS or the corresponding button in the toolbar.

In the title bar of the calibration dialog, the currently selected mode (reflection or transmission) is always displayed.

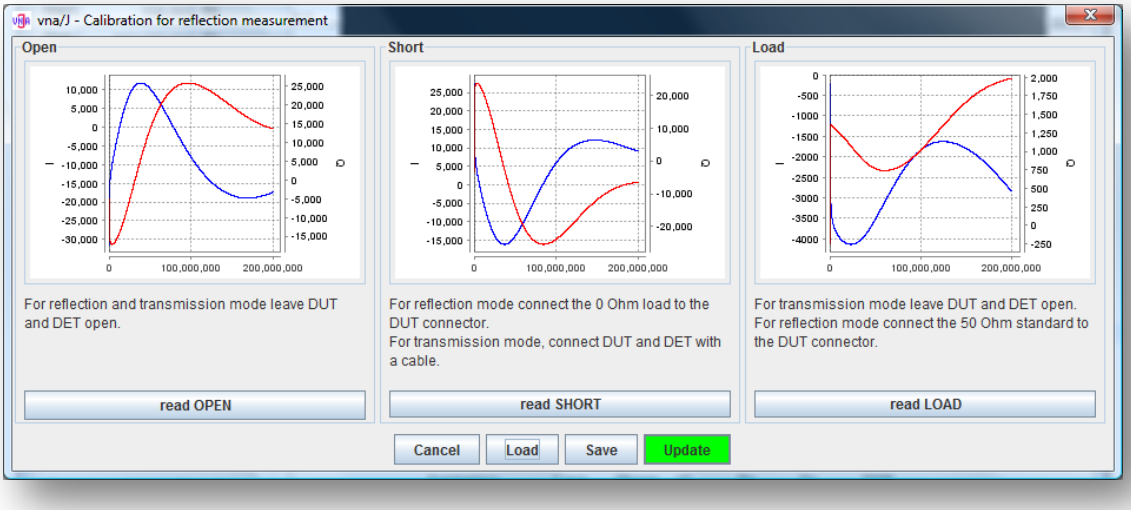




There are three diagram areas on this dialog. Depending of the selected mode and analyser type, one or more diagram areas are visible.



For every visible diagram, a measurement must be made to create a valid main calibration dataset. When all the required calibration data has been created, the SAVE button gets enabled and the UPATE button receives a green background to indicate, that a complete main calibration dataset is now recorded.



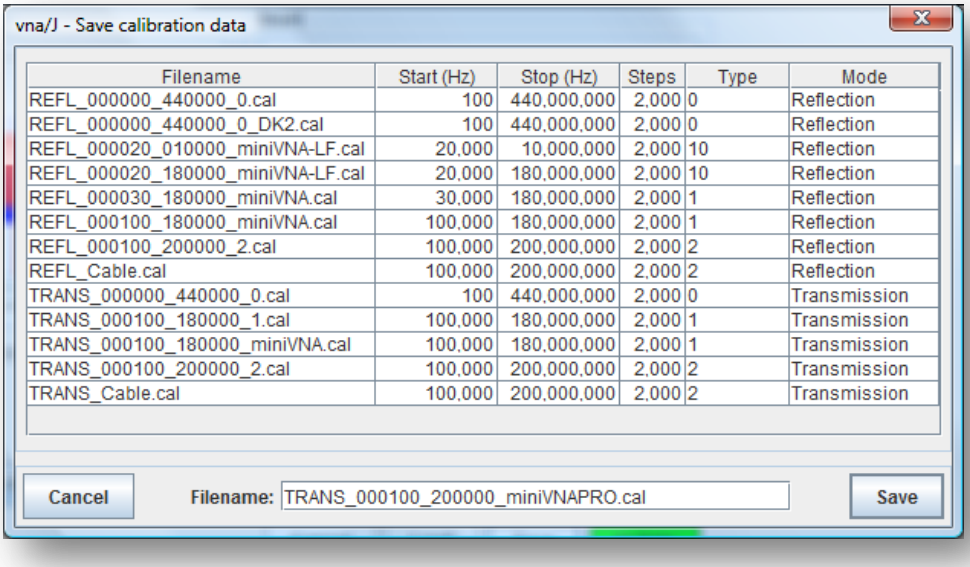
The created main calibration dataset can now be used in the application by simply pressing the UP-DATE button, which will also close the dialog..

If one or more curves do not match the expectations simply rerun the needed calibration by pressing the button below the diagram again.

When closing the dialog using the UPDATE button, the calibration status in the status bar is updated.

Saving calibration data

After creating a complete calibration data set in the calibration dialog, it is possible to save this calibration data set for later use by pressing the SAVE button. This opens this dialog:



In the upper list, all existing calibration files are listed for information.

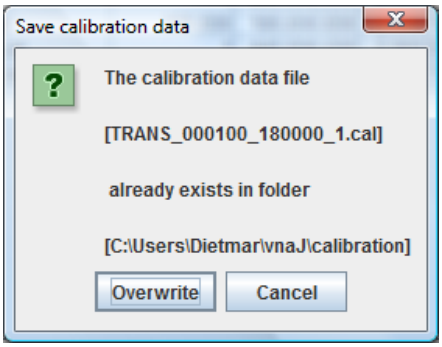
The filename of the new calibration files is preset. This filename is constructed following this pattern:

```
<Mode>_<StartFreq in kHz>_<StopFreq in kHz>_<Analysertype>.cal
```

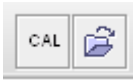
Mode	`REFL	TRANS`
StartFreq	`Frequency in 5-digit kHz`
StopFreq	`Frequency in 5-digit kHz`
Analyzertype	`miniVNA |miniVNAPRO	…`

Caution:

When an already existing file is selected, a warning is shown and when confirming it, the existing file is overwritten

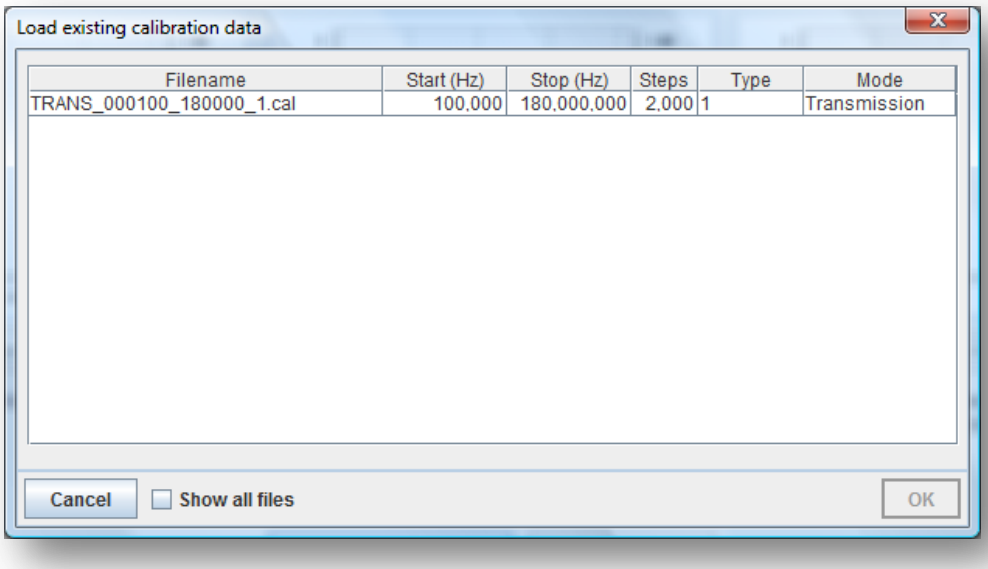


Loading existing calibration data

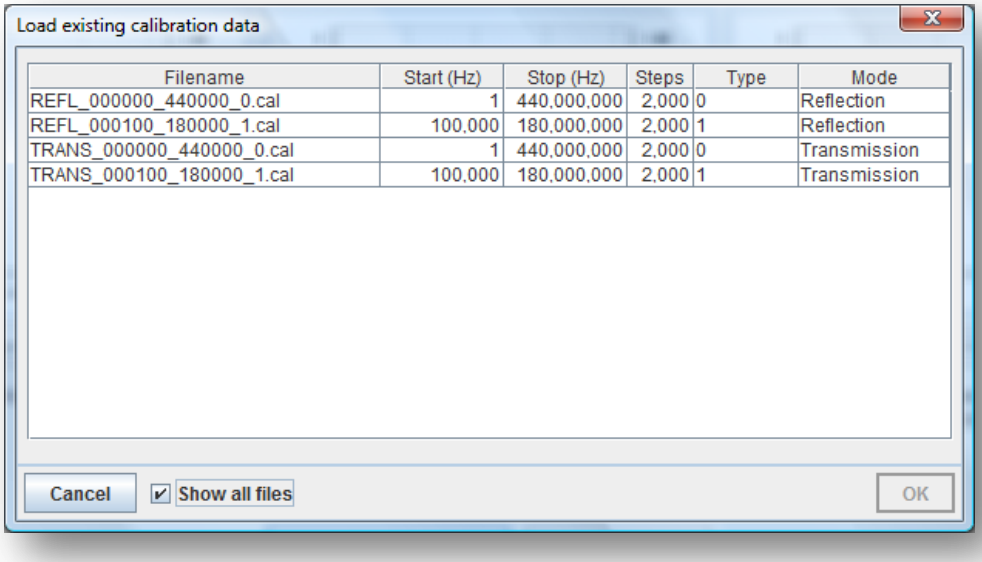
Existing calibration data files can be loaded via the OPEN icon 

in the toolbar or inside the calibration dialog, it is also possible to load a previously saved calibration data file.

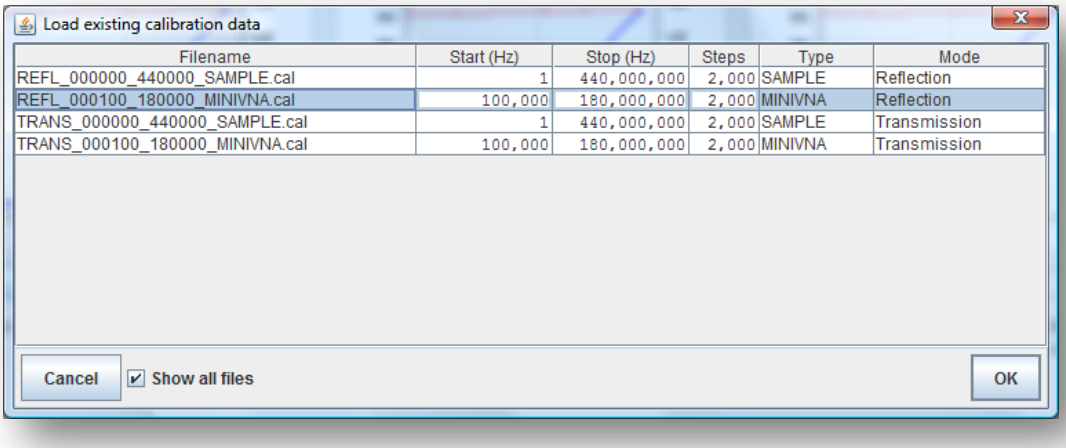
When pressing the LOAD button inside the calibration dialog, a special selection dialog opens, which shows detailed information on matching calibration files in the preferred directory.



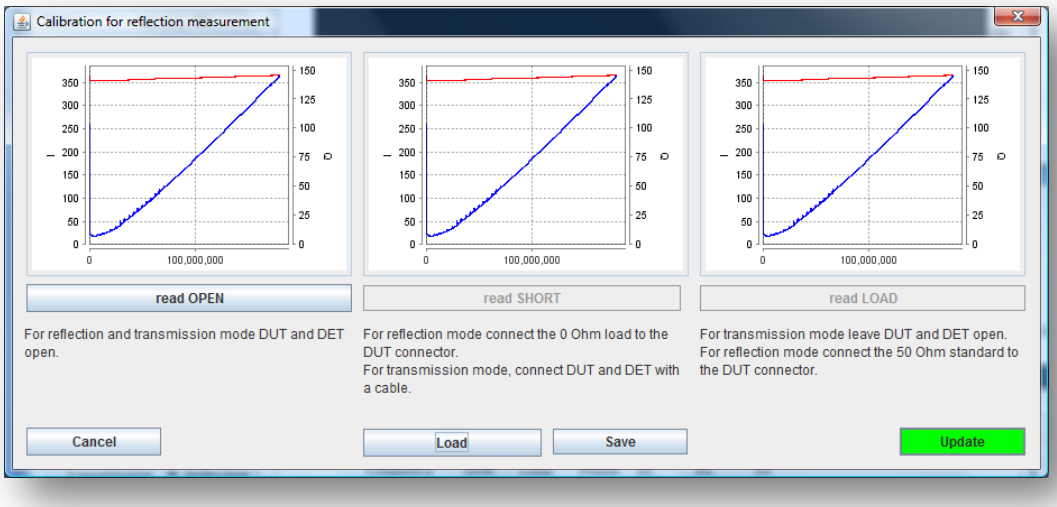
When selecting the SHOW ALL FILES checkbox, all calibration files in the preferred directory are displayed:



When the selected entry matches the current configuration (mode, frequency range, analyser type) the OK button is enabled.



Pressing the OK button loads the selected calibration data into the calibration dialog:



The calibration points are recalculated based on the current formulas implemented in the application to ensure also correct loading after update to internal mathematics…

Note: The type columns displays the internal number of the selected driver and is just for information purposes.

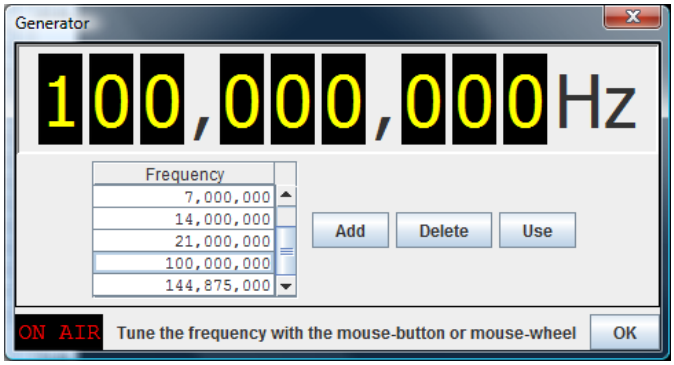
It is only possible to load calibration data sets, that exactly match the selected hardware in the aspects of analyzer-type, frequency-range, reflection or transmission mode and number of calibration steps.

Frequency calibration

The calibration can be done easily using a frequency counter connected to the DUT port.

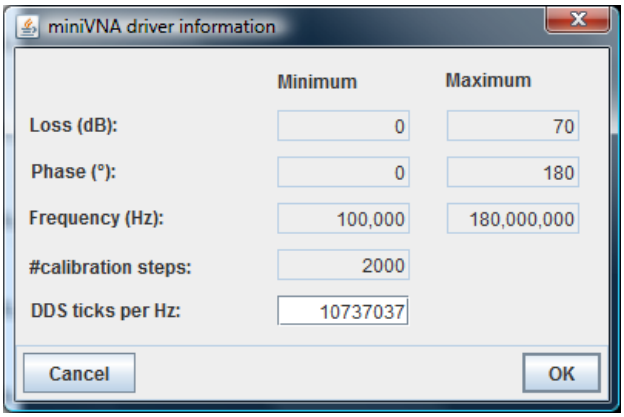
Execute the following steps:

1. Open the generator dialog

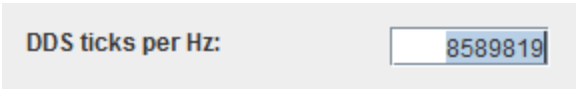


2. Enter as frequency 100 MHz
3. Switch on the generator signal by clicking ON-AIR

4. Now fine tune the frequency until 100.000.000 Hz are displayed on the frequency counter
5. Copy the frequency factor to the clipboard by right-clicking the ON-AIR field
6. Close the generator dialog



7. Open the driver info dialog.
8. Enter in the field **"DDS ticks per Hz"** the value from the clipboard.



9. Close the info dialog by pressing OK

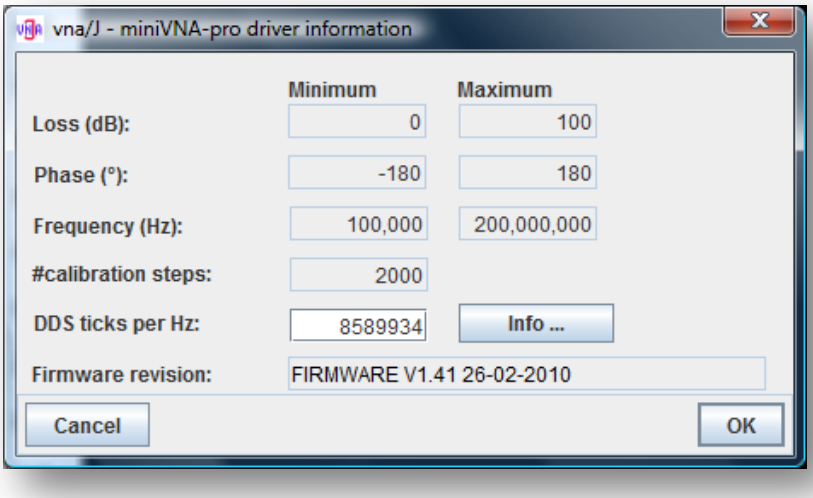
When closing the application, the correction value is saved to the file system and will be reloaded whenever the driver is loaded.

miniVNA PRO

The frequency calibration for the miniVNA PRO depends on which model of the miniVNA PRO you own. Currently two version exists:

- Internal DDS-clock 500MHz
- Internal DDS-clock 520MHz

In the **driver information** dialog for the miniVNA PRO there is an INFO button to explain these differ-



ences:

In the **DDS clock rate** dialog, the start values for the two DDS types are shown:

General information

The frequency calibration values (DDS ticks per MHz) can be calculated using this formula:

DDS-range	$Ticks_{max}$= 4294967296
DDS-Clockrate	f_{dds}
DDS-Ticks per MHz	$Ticks_{MHz}=Ticks_{max} / f_{dds}$
Testfrequency	f_{test} = 100 MHz
Frequency value	$Ticks_{test} = Ticks_{MHz} * f_{test}$

This gives as starting values:

Analyzer	F_{dds}	$Ticks_{MHz}$	f_{test}	$Ticks_{test}$
miniVNA	400MHz	10737418	100MHz	1073741800
miniVNApro	500MHz	8589934	100MHz	858993400
	520MHz	8259552	100MHz	825955200

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Application start

Windows

There are two ways to start the application:

- Start via a command-window
- Start via a shortcut on the windows desktop

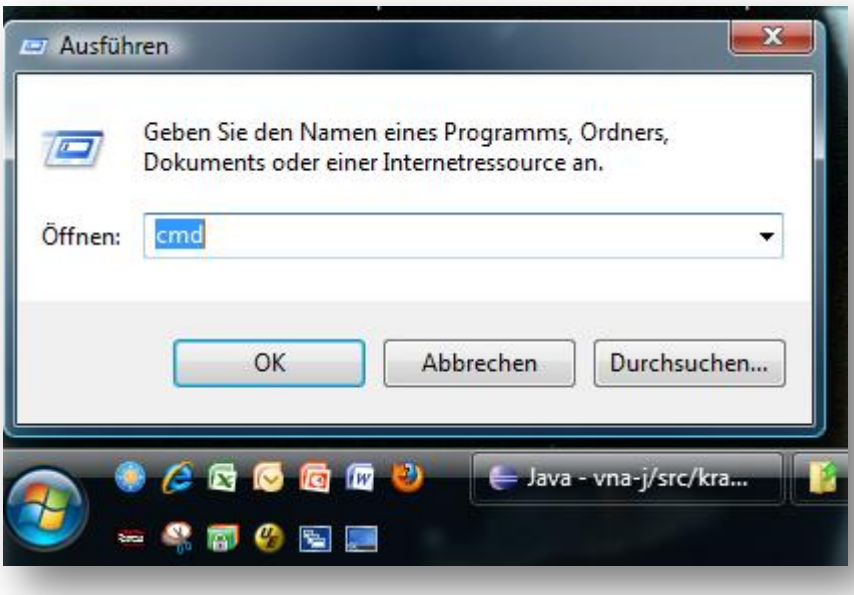
If you do not encounter any problems, I suggest to create a **shortcut** on your **windows desktop** to launch the application.

In case of problems, please launch the application from a **command window** and refer to chapter "

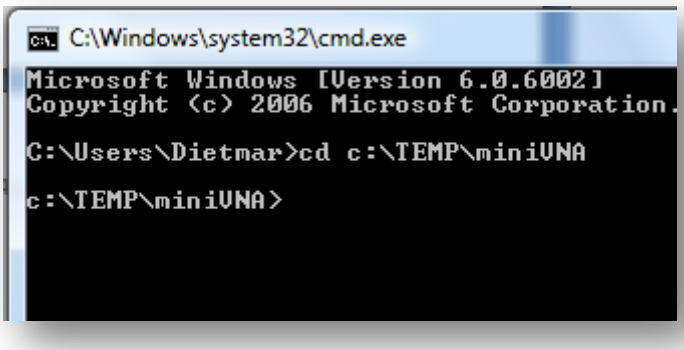
Hints and tips" starting on page 107 for further support.

Command window

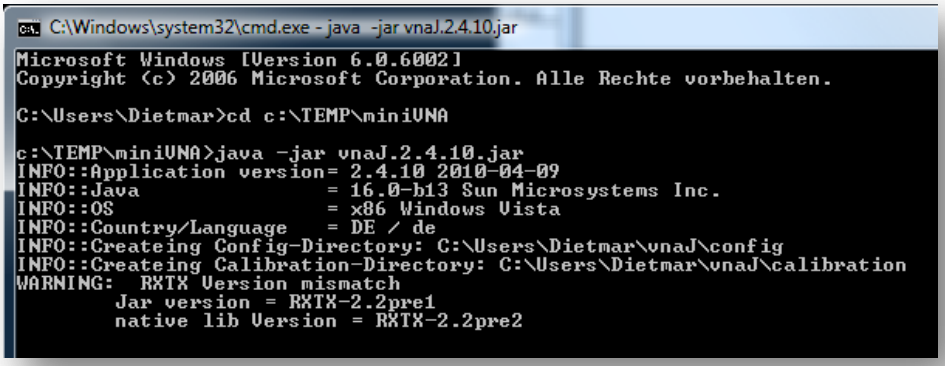
- Open a command window via the START-menu RUN entry (Windows-Key-R):



- In the opened command window navigate to the location where you've stored the jar-file and the rxtx-DLL.



- Start the application by entering the following command:

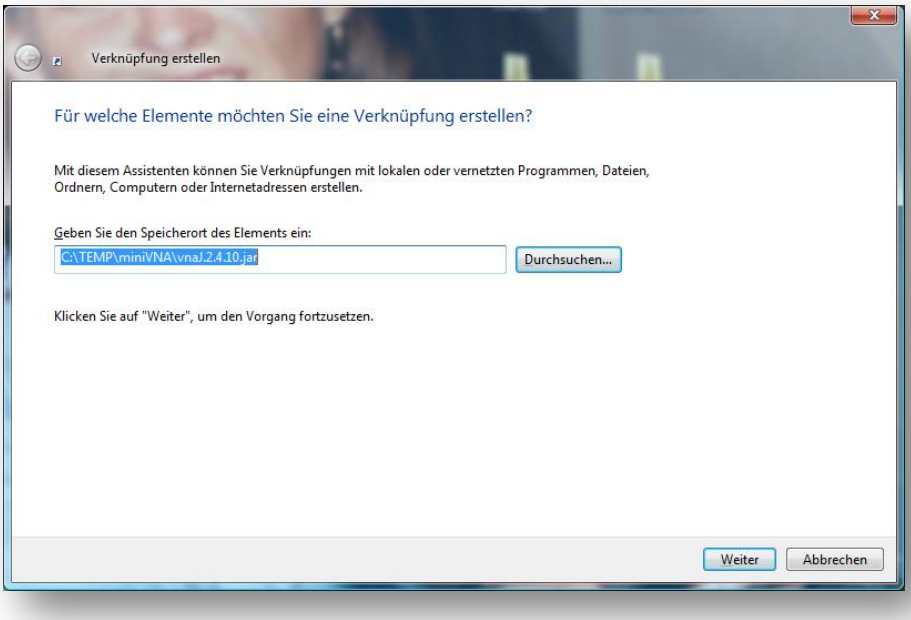


- Now the application should start successful.

Desktop-Shortcut

Create a new shortcut on your windows desktop by right-clicking a free place on your windows desktop.

- Select NEW/SHORTCUT in the appearing popup-menu.
- In the dialog select the jar-file you've downloaded previously:



- Click NEXT and give the shortcut a meaningful name.
- Doing a regular left-double-click on the newly created shortcut should start the application.

Mac OSX

To start the application, tbd

LINUX

To start the application, tbd

Configuration

All configuration data is stored in a user specific folder on the file system. No entries are made to the system registry or any other system configuration files.

All configuration and calibration files can be found here:

Platform	Location
Windows XP	C:\Einstellungen und Dokumente\<UserName>\vnaj
	C:\documents and settings\<UserName>\vnaj
Windows VISTA	C:\Benutzer\<UserName>\vna
	C:\users\<UserName>\vnaj
Windows7	??? \vnaj
Mac OSX	??? /vnaj
SUSE Linux 11	/home/user/<UserName> /vnaj

Remark: If you want to delete everything, simply delete the vnaJ directory, the used JAR-file and everything is gone.

Settings

The settings for the vna/J application are stored inside an XML-file named **vna.settings.xml**.

This file is created after first application start and successful termination and contains a set of valid parameters.

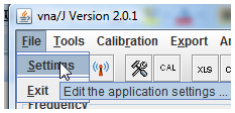
Platform	Location
Windows XP	C:\Einstellungen und Dokumente\<UserName>\vnaj\config
	C:\documents and settings\<UserName>\vnaj\config
Windows VISTA	C:\Benutzer\<UserName>\vna\config
	C:\users\<UserName>\vnaj\config
Windows7	??? \vnaj\config
Mac OSX	??? /vnaj/config
SUSE Linux 11	??? /vnaj/config

Additional configuration files may be created inside this directory.

Editing

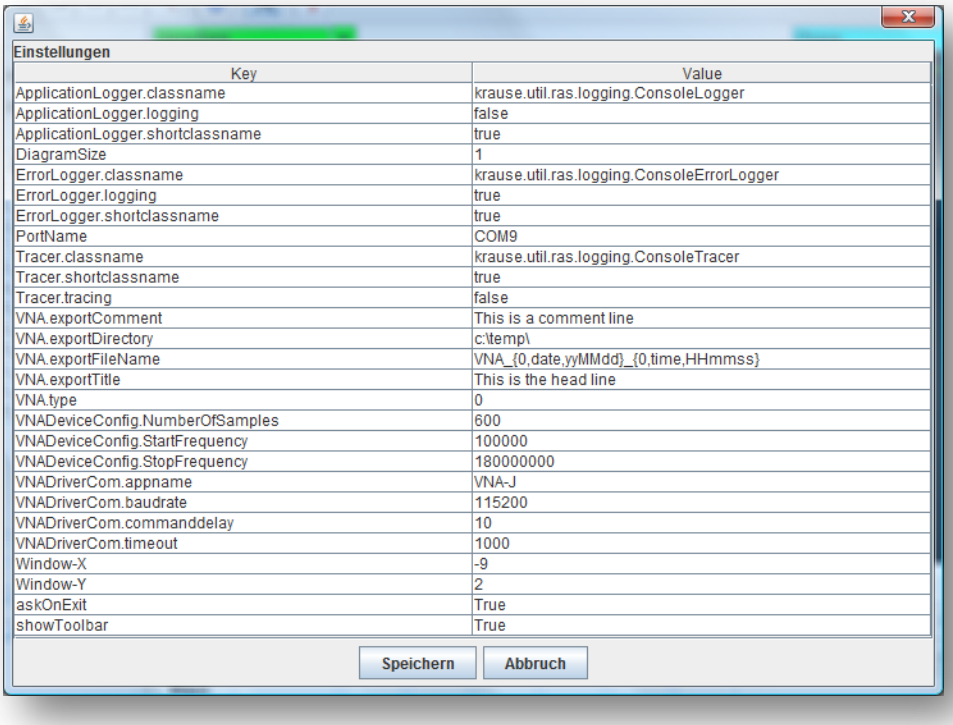
CAUTION: Make changes inside the configuration window with care! When the application does not work correctly, first try to delete the configuration files and start from scratch.

See chapter "Application does not start" on page 112

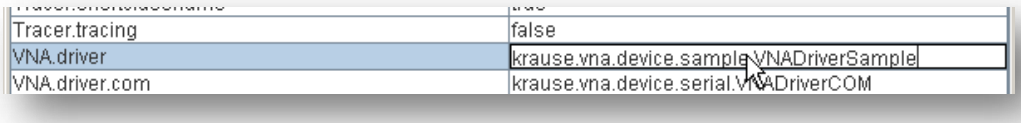
You can open the configuration dialog via the menu entry 

or this toolbar button

The internal configuration variables for the vna/J application are then displayed:



You can edit an entry (right column) by clicking in the value field and pressing F2:



End the editing by clicking on another entry in the table.

When finished, click the

button, to write it to the active configuration set. The configuration data is saved to disc when you close the application.

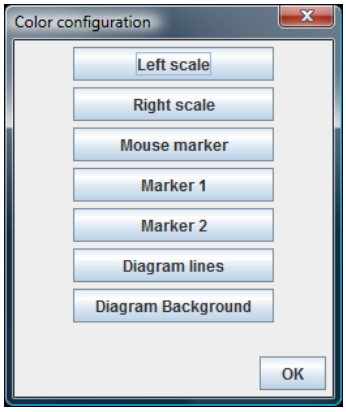
Colour settings

The colours used in the diagram area can be customized by the user.

Clicking on the toolbar icon or using the FILE/COLORS menu entry opens the colour configuration dialog:

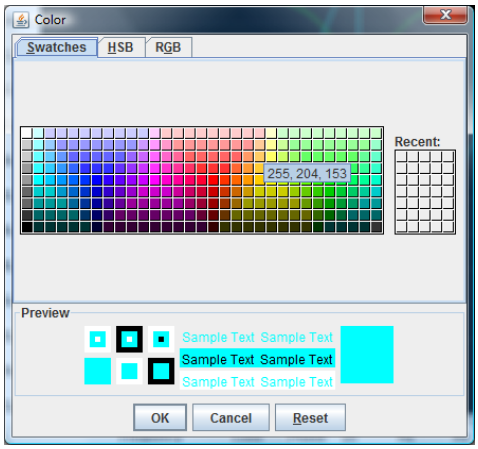
Here the user can change the colours of the following image panel components:

- The colour used to draw the values for the scale selected in the left dropdown list.
- The colour used to draw the values for the scale selected in the right dropdown list.
- The colour of the MOUSE marker text field. As the mouse marker is not drawn on the diagram, this sets only the colour of the marker name.
- The colour of MARKER 1. This sets the colour which is used to draw it on the diagram as well as the name of the marker.
- The colour of MARKER 2. This sets the colour which is used to draw it on the diagram as well as the name of the marker.
- The colour of the horizontal dotted-lines in the diagram
- The background colour of the diagram area.



Clicking the OK button uses the selected colours, updates the image panel and saves them to the configuration file on application termination.

Clicking on one of the buttons opens a colour selection dialog, where the user can fine tune the colour of the selected element.



Installation

… to be written ….

Hardware

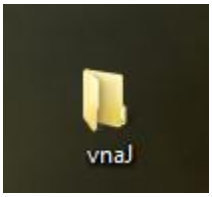
The miniVNA simply needs a free USB port at your computer. Connect the analyzer via a good USB2.0 cable to a free USB2.0 port on your host computer.

Windows

First decide where you want to install the vna/J application.

For demo purposes, I've simply installed it in a new folder on the desktop. You can choose any folder, on which you have full access.

For this documentation I use this folder on my desktop:



Prerequisites

You need a JAVA runtime installed on your machine. I've tested it on Windows by opening a command prompt from the start menu

In the window simply enter:

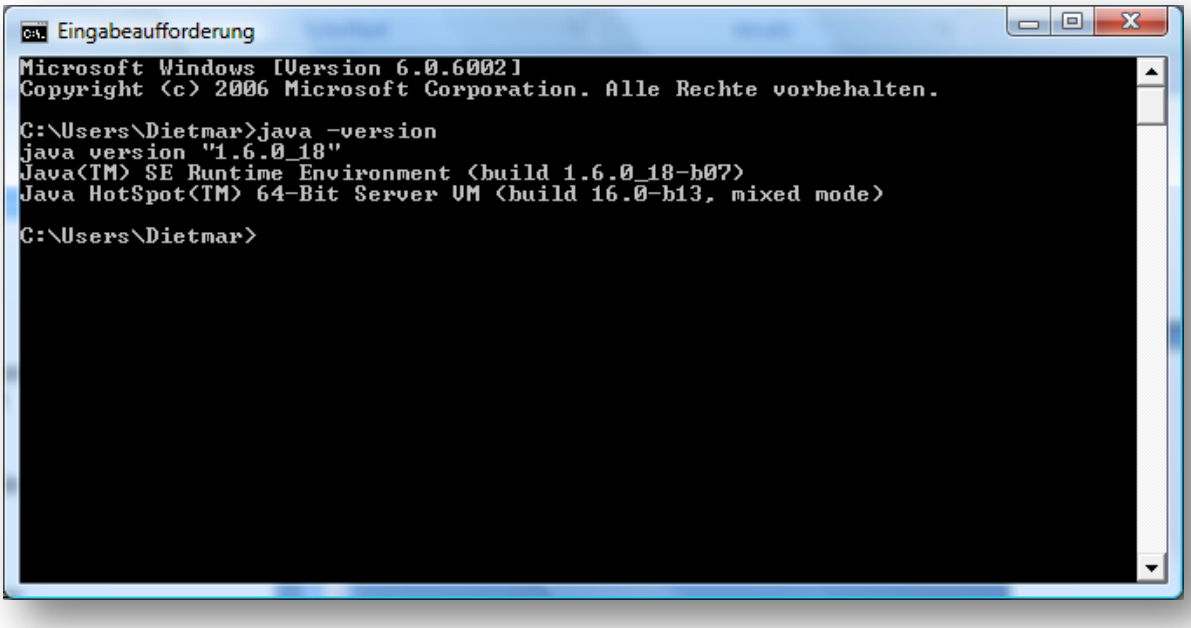


Image 3 – Windows JRE version

You can download it from SUN

http://www.java.com/de/download/index.jsp

The standard Java Runtime Environment (JRE) is sufficient.

USB driver for miniVNA

I downloaded the VCP driver version 2.04.16 dated 25th February 2009 for Windows from

http://www.ftdichip.com/Drivers/CDM/CDM%202.04.16%20WHQL%20Certified.zip

the simply installed it. The plugged in miniVNA then appears a standard COM port in the device manager

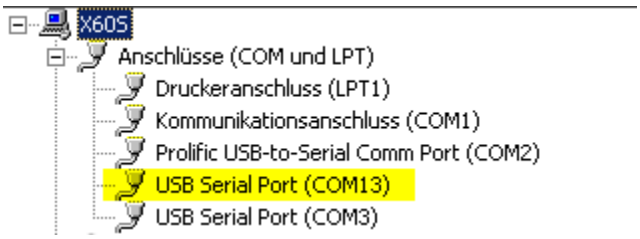


Image 4 - Windows COM ports

Note: These are the same drivers required for the Visual Basic application. So if the VB application runs on your computer, you don't need to install additional drivers:

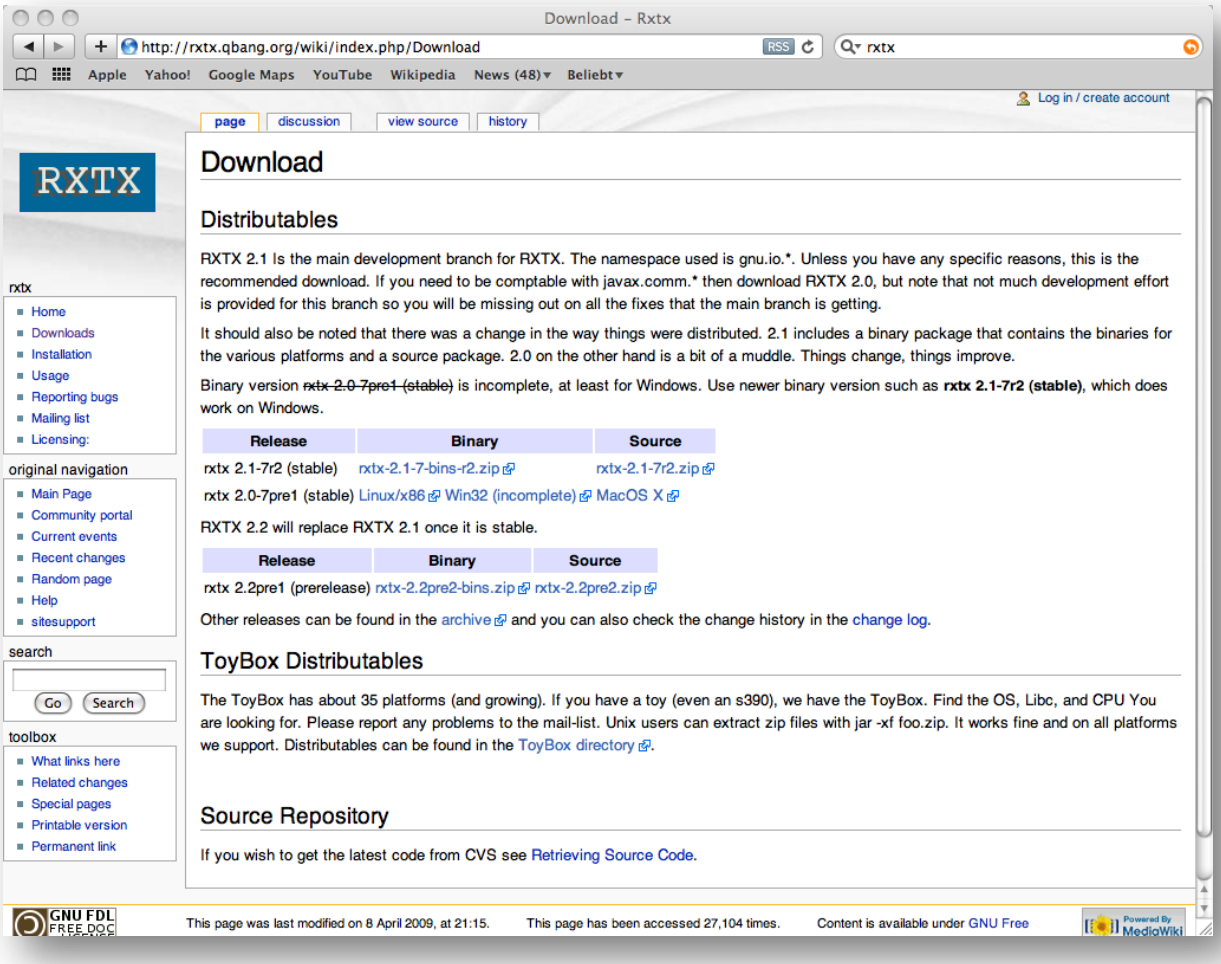
Serial driver for JAVA

Furthermore, please download the latest serial communication driver package for JAVA from

http://rxtx.qbang.org/wiki/index.php/Main_Page

I downloaded this file

http://rxtx.qbang.org/pub/rxtx/rxtx-2.2pre2-bins.zip



Open the downloaded file

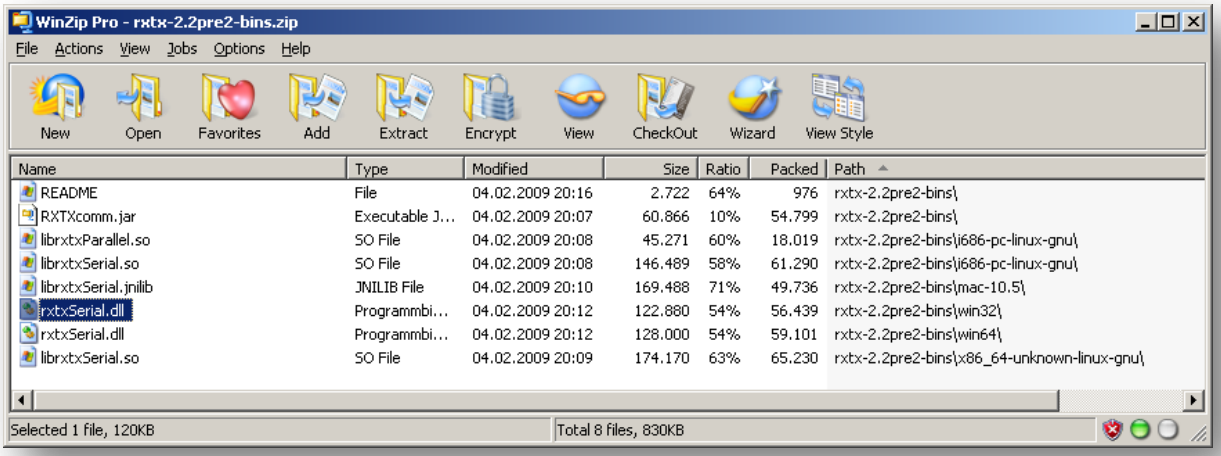


Image 5 - Windows DLL

and copy the file r**xtxSerial.dll** from the **win32** subdirectory to your preferred installation directory on your PC.

vna/J Application

The complete vna/J application is contained in a single archive file - a JAVA ARCHIVE (basically a ZIP-file with .jar-extension)

You require the following files to run the application:

vnaJ_2_5_0.jar

which denotes version 2.5.0 or any later archive.

Mac OS X

First decide where you want to install the vna/J application.

For demo purposes, I've simply installed it in a new folder on the desktop. You can choose any folder, on which you have full access (R/W/X).

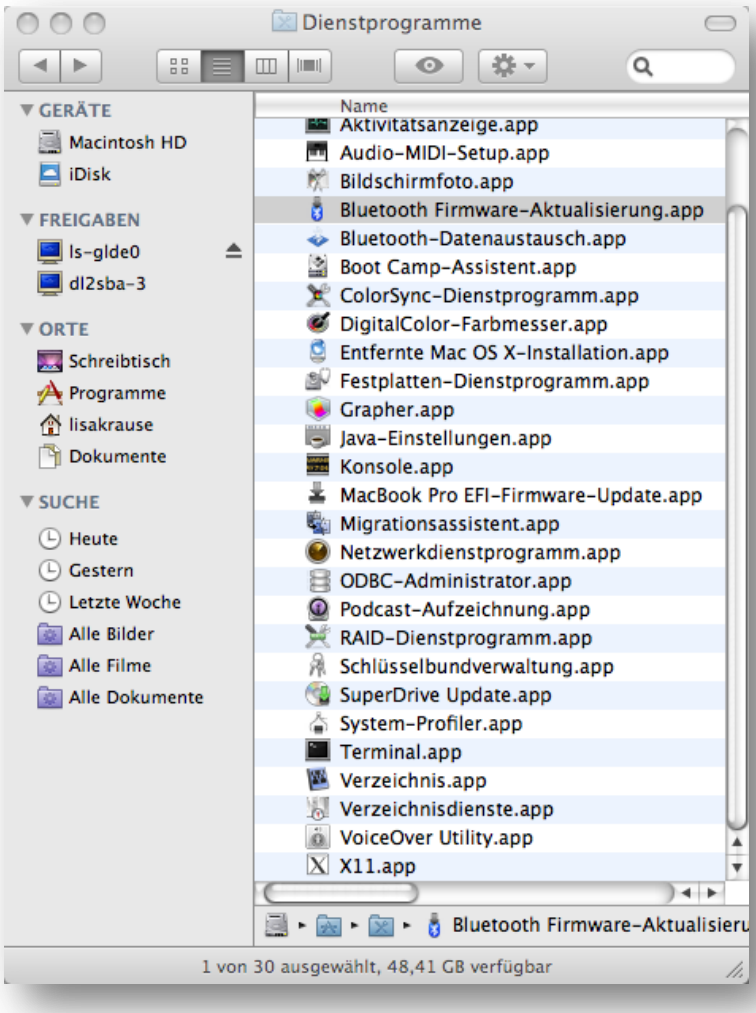
Prerequisites

Currently I've used an MBP with this JAVA version installed:

```
lisa-krauses-macbook-pro:Desktop dietmar$ java -version
java version "1.5.0_19"
Java(TM) 2 Runtime Environment, Standard Edition (build 1.5.0_19-b02-304)
Java HotSpot(TM) Client VM (build 1.5.0_19-137, mixed mode, sharing)
```

Image 6 – Mac OS X JRE version

On the Mac which I have available for development and testing, a number of JAVA version are available. The JAVA control panel can be started using the JAVA CONTROL application in the accessories folder (in German its named **Java-Einstellungen.app**)



When launching this application, the current JAVA settings are displayed:

In the lower list (Java-Application) ensure, that at least a JAVA 5 version is available (means check-mark set) and that this version 5 is used prior to the 1.4 version.

USB driver for miniVNA

I've tested the application also with the Apple Mac OS X. I've downloaded the FTDI VCP driver version 2.2.10 dated 6th August 2008 from

http://www.ftdichip.com/Drivers/VCP/MacOSX/UniBin/FTDIUSBSerialDriver_v2_2_10.dmg

and installed it.

The port names on the Mac are a little bit different from the ones on Windows.

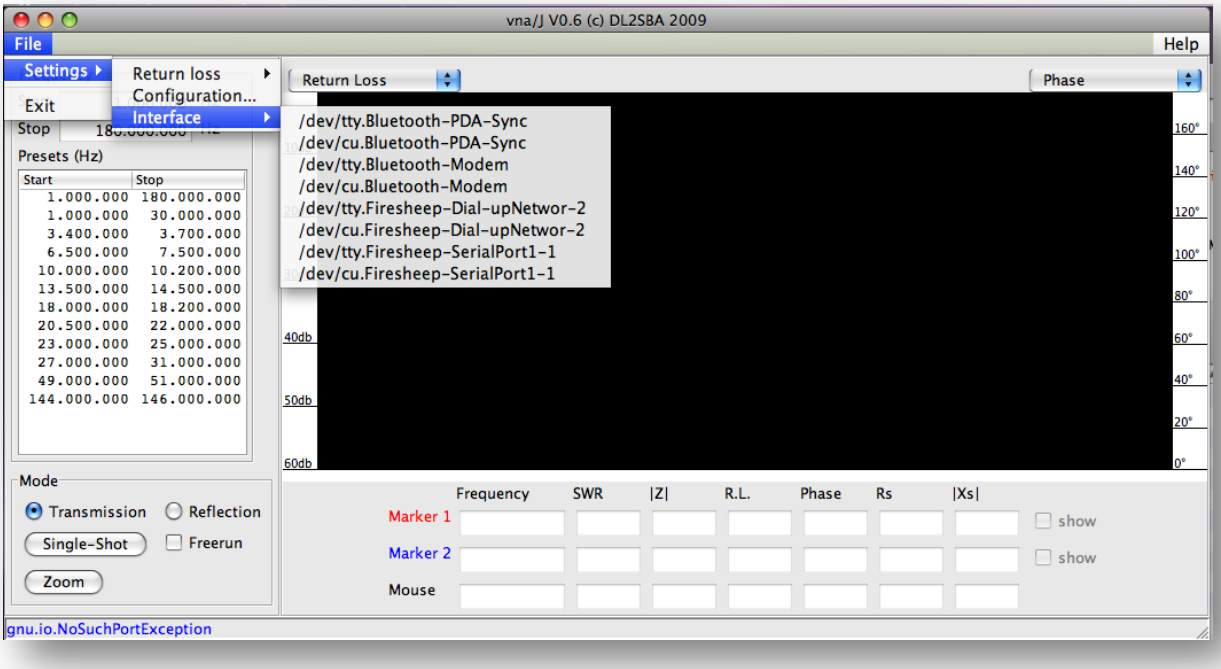


Image 7 – Mac OS X - COM ports

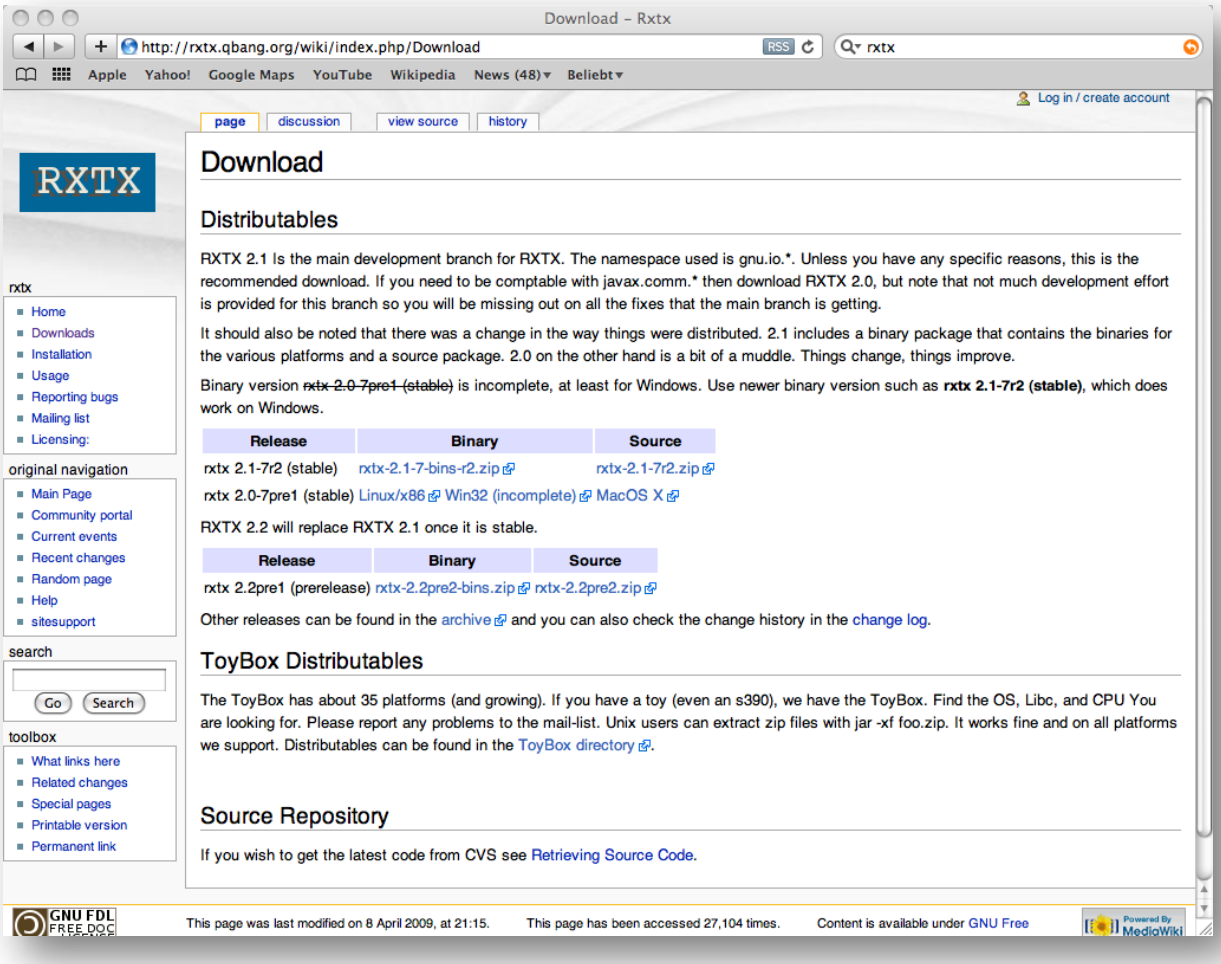
Serial driver for JAVA

Furthermore, please download the latest serial communication driver package for JAVA from

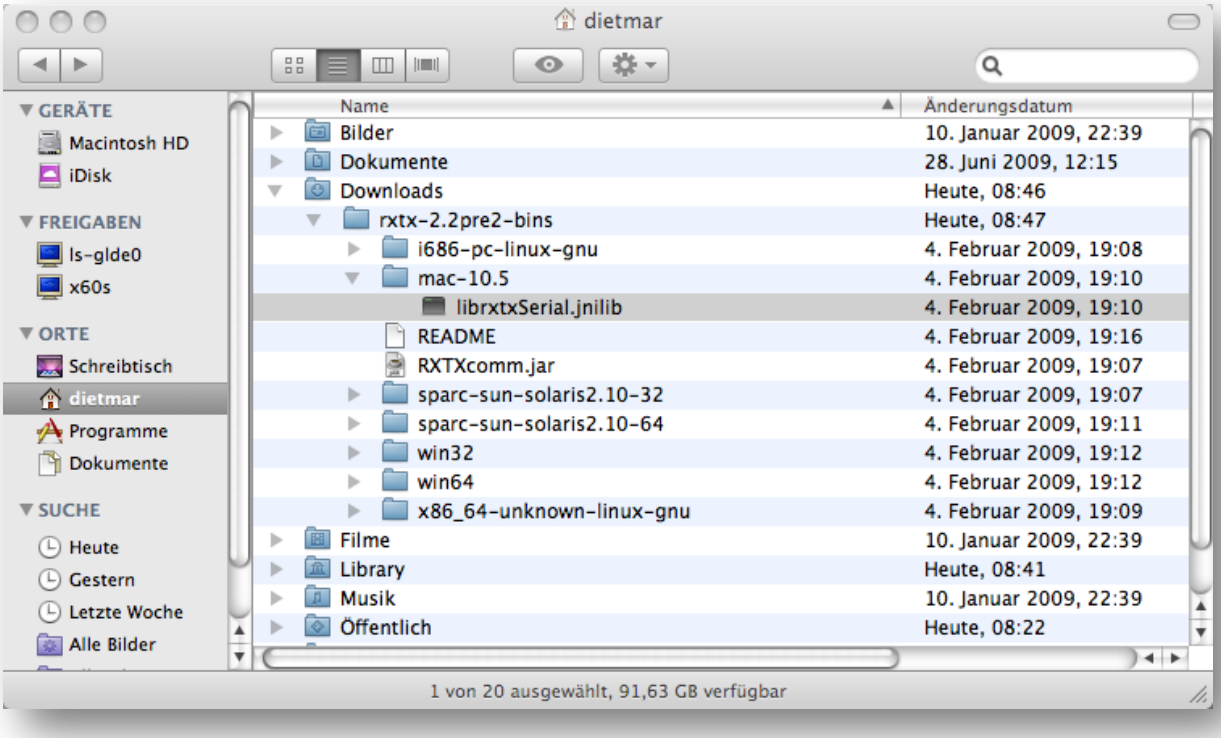
http://rxtx.qbang.org/wiki/index.php/Main_Page

I downloaded this file

http://rxtx.qbang.org/pub/rxtx/rxtx-2.2pre2-bins.zip



In the download folder open the just loaded file



And copy the file **librxtxSerial.jnilib** from the **mac-10.5** subdirectory to your preferred installation directory on your Mac.

Controller software

You require the following files to run the application:

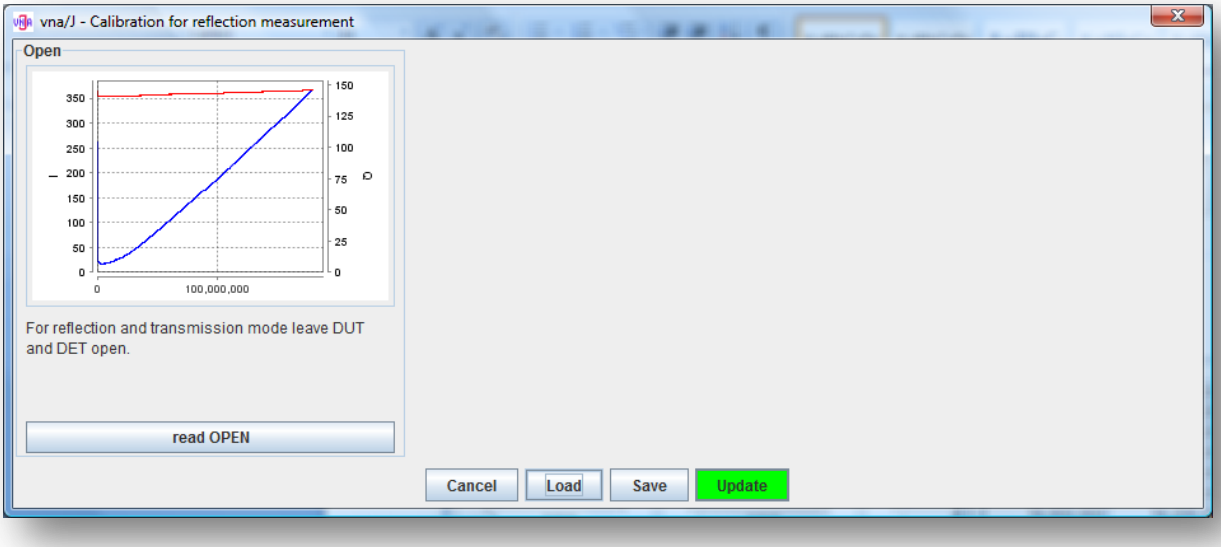
- vnaJ_XXXX.jar (XXX is a version specific identifier).

Only the Java-archive is needed to run the application.

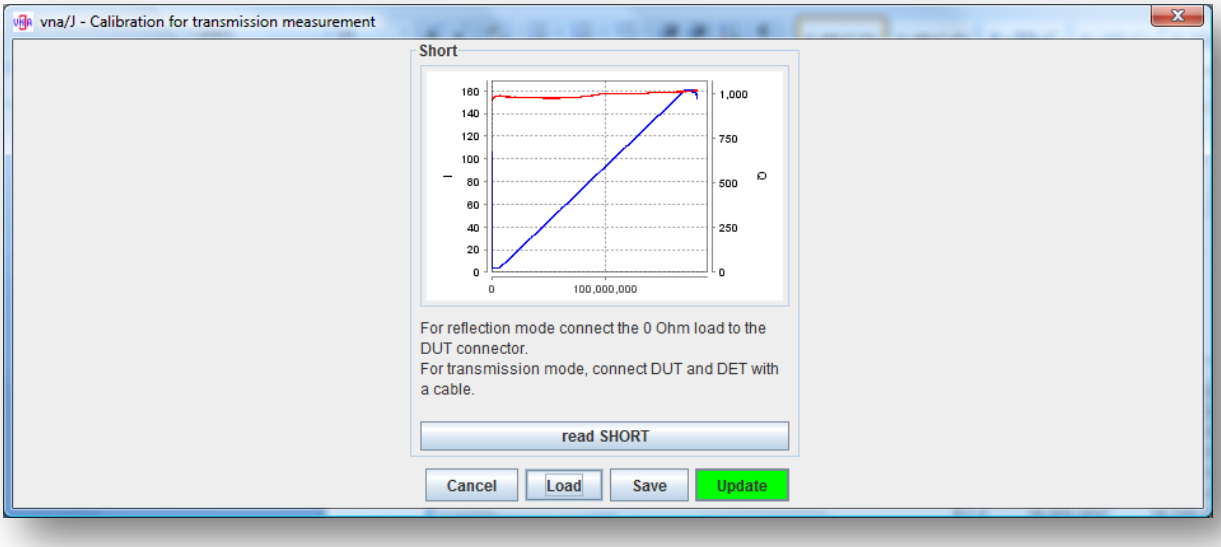
Samples

Main calibration datasets miniVNA

Reflection

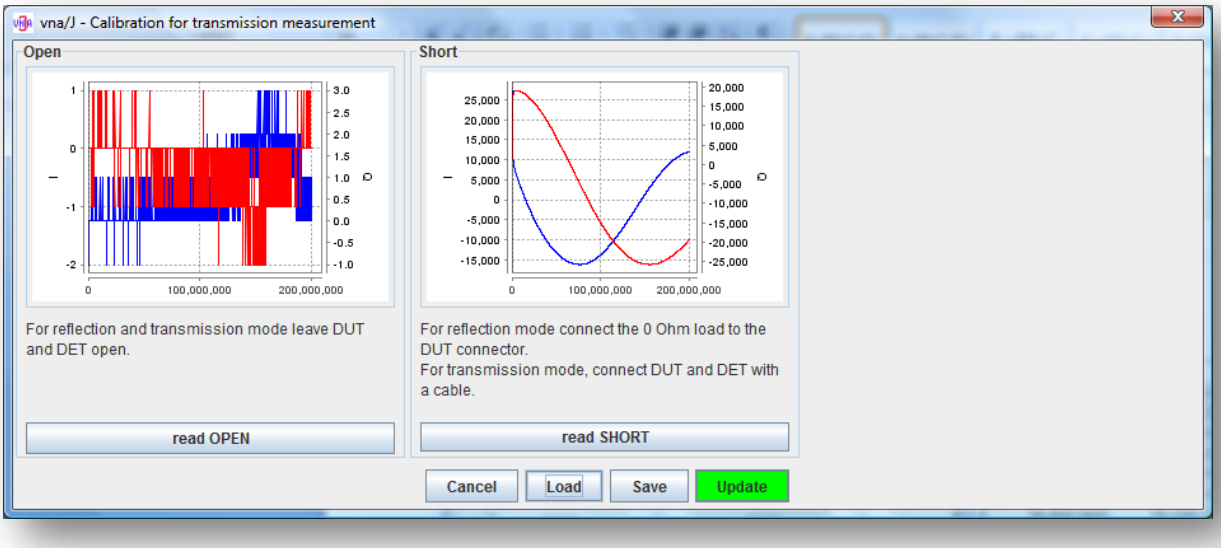


Transmission

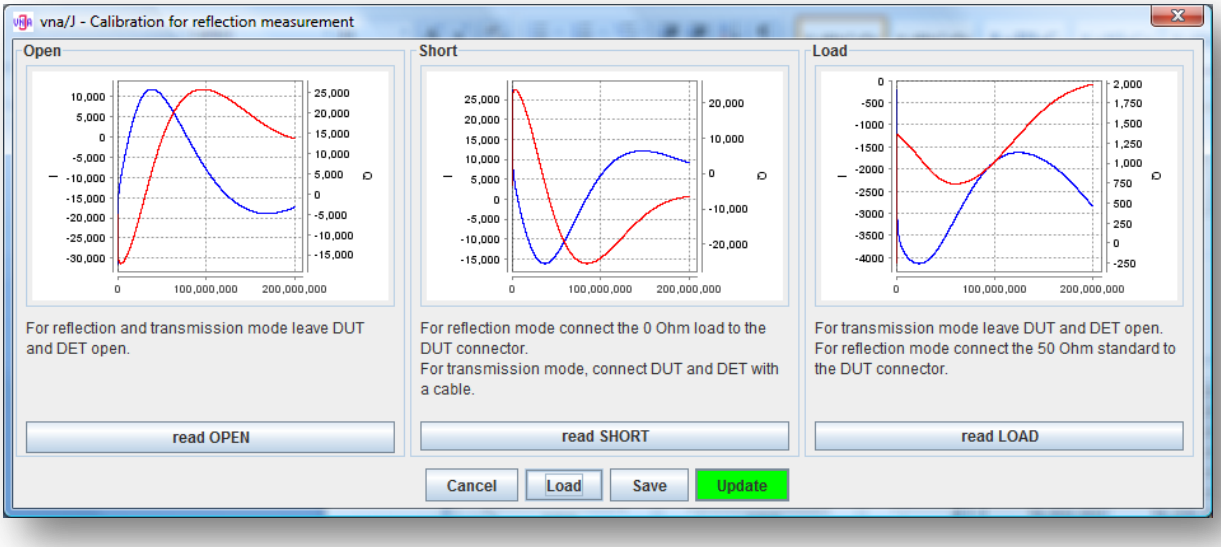


Main calibration datasets miniVNA PRO

Reflection



Transmission

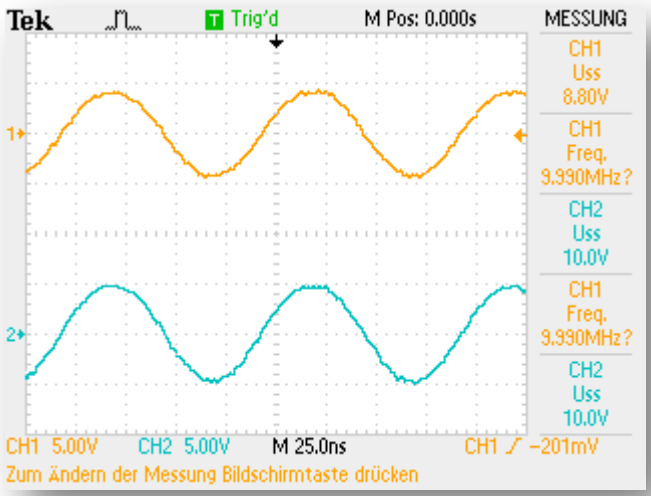


Generator signals

miniVNA pro

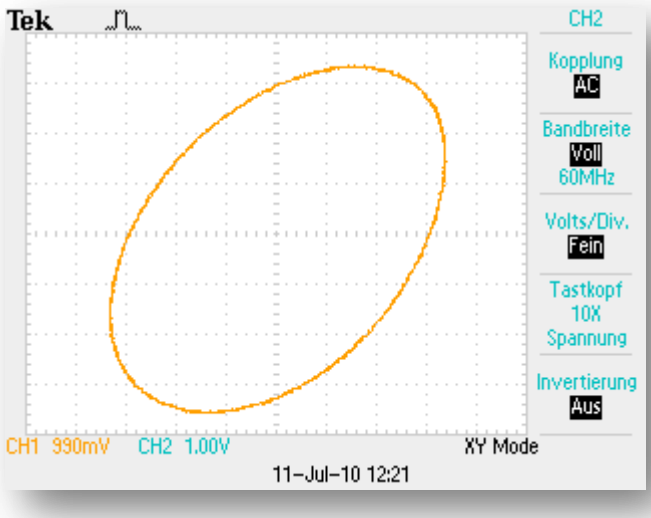
All signal are measured using a Tektronix low-cost digital scope TDS 2002B.

The generator signals are fed into the scope using about 25cm of RG58 coax cable. The cables where terminated with 50Ohm resistors.

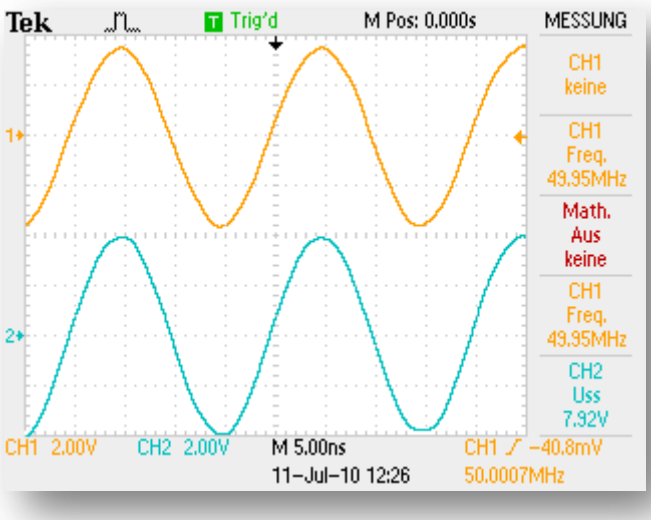


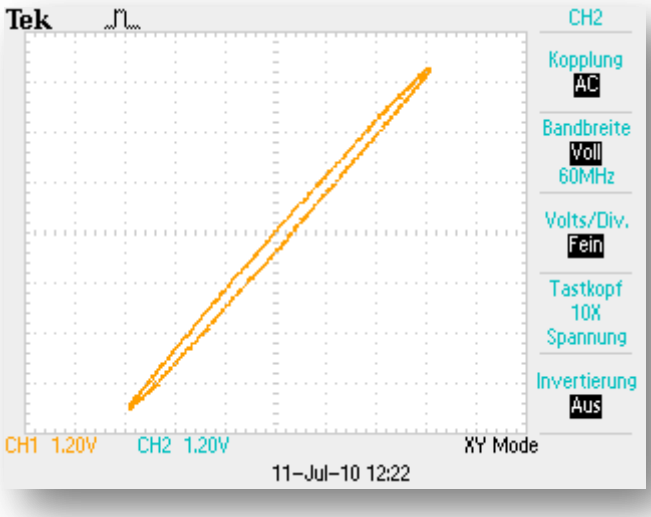
Phase difference

Both channels fed with DUT signal

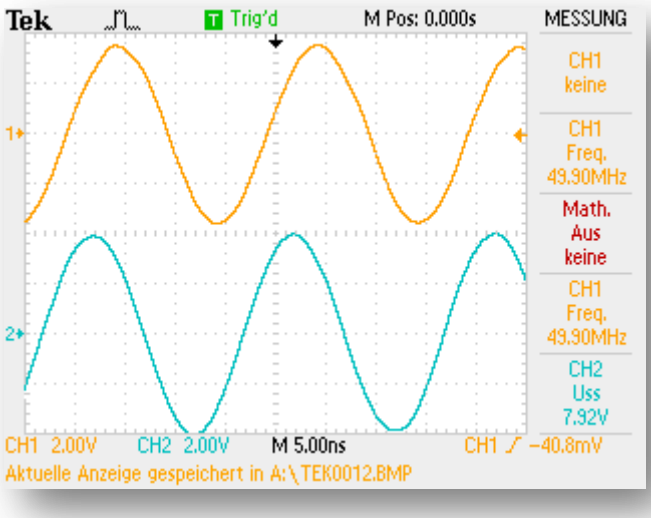


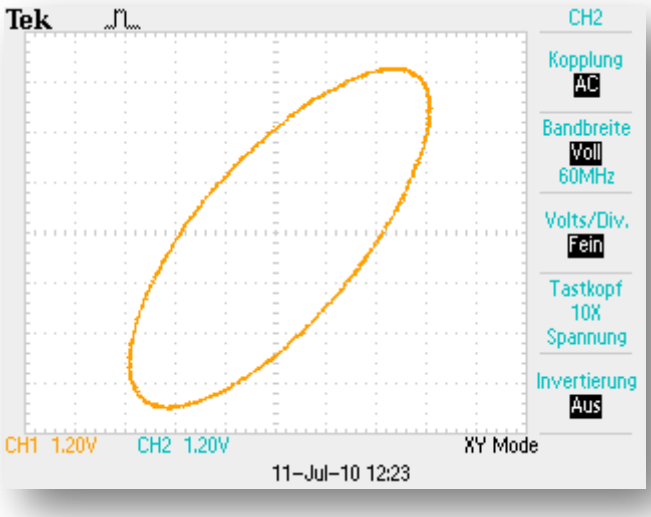
Phase difference 0°



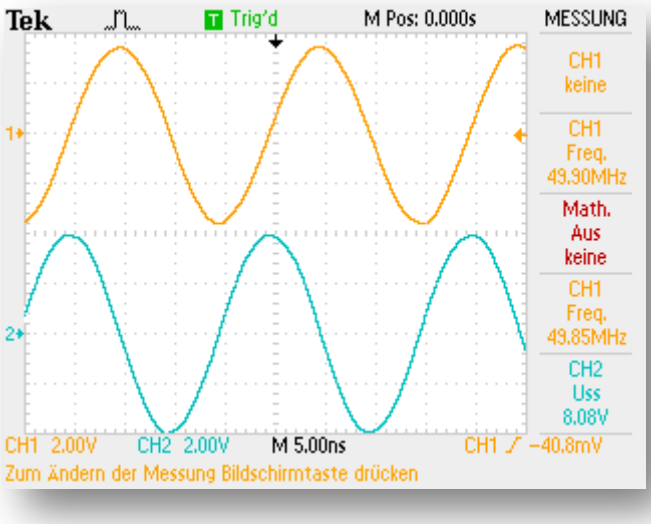


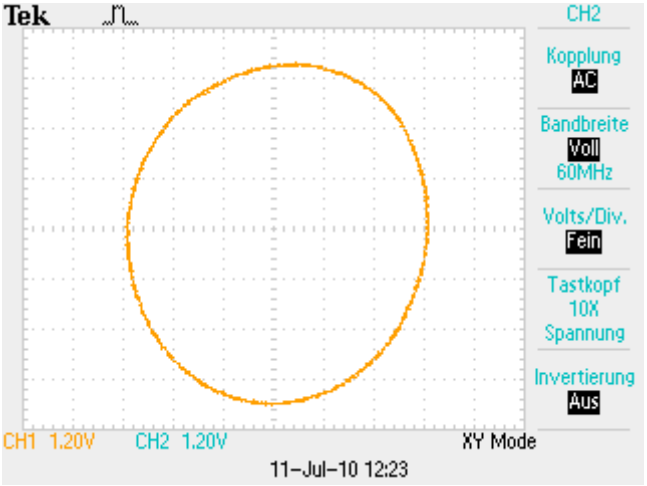
Phase difference 45°





Phase difference 90°

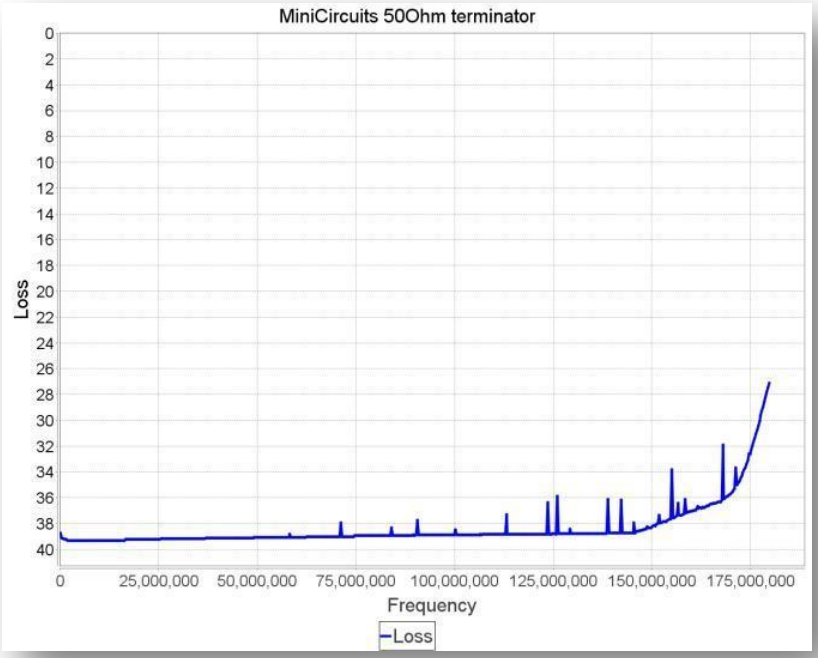




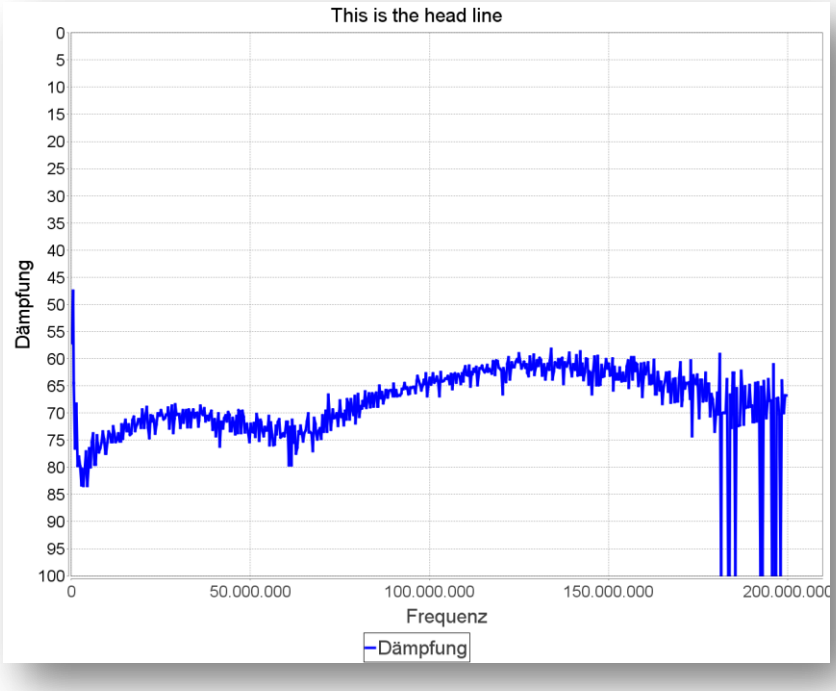
Sample measurement

MiniCircuits 50Ω terminator

miniVNA

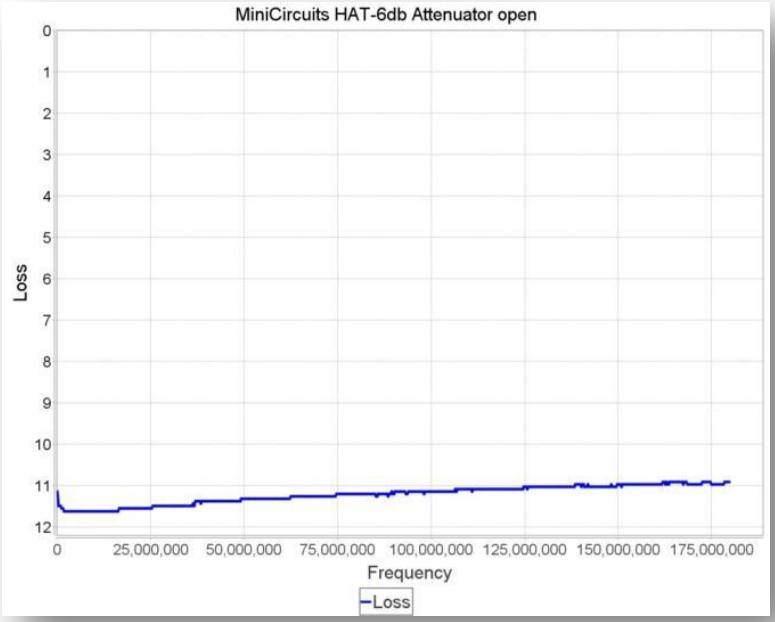


miniVNA PRO

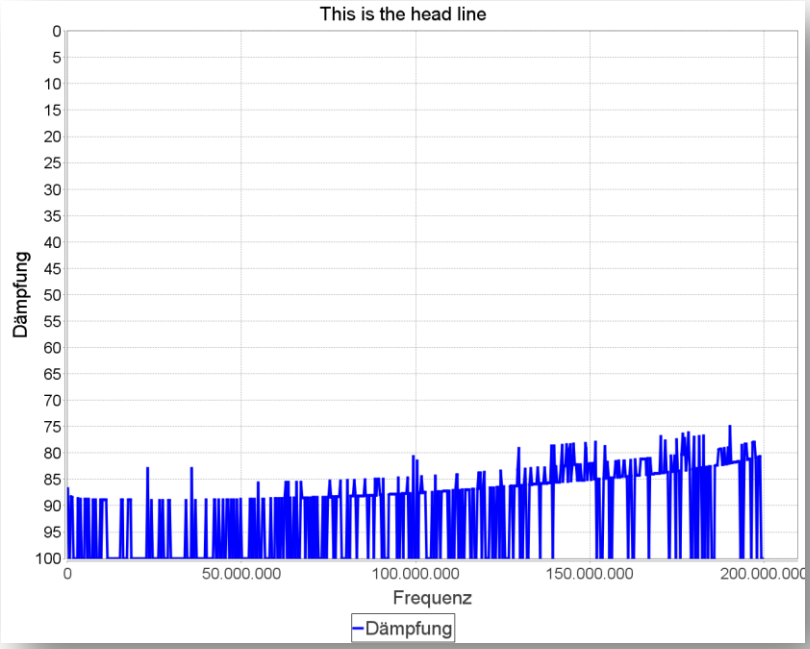


MiniCircuits HAT-6dB attenuator open end

miniVNA

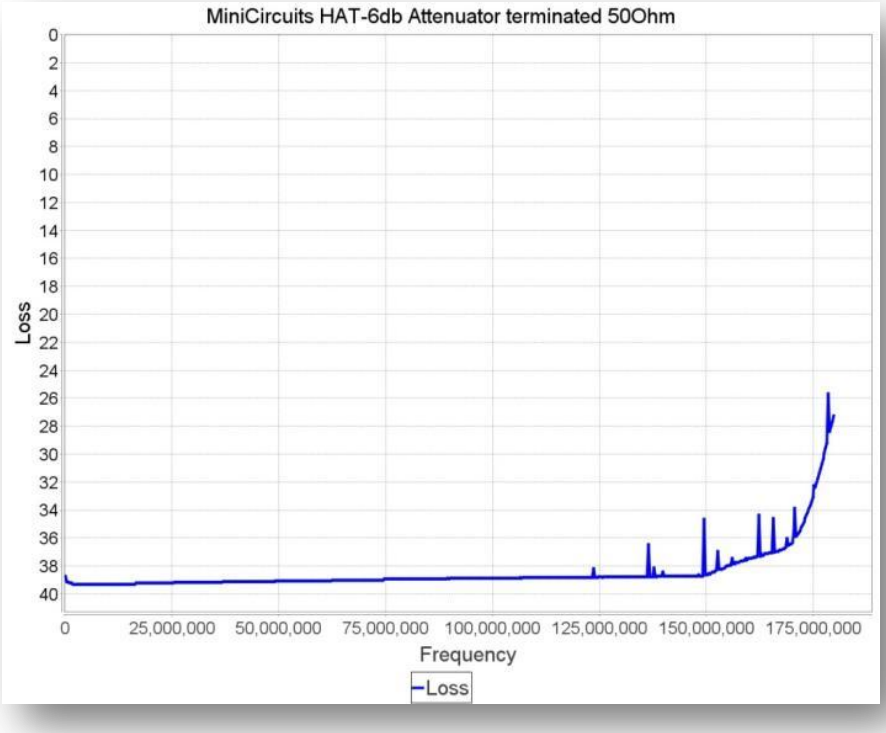


miniVNA PRO

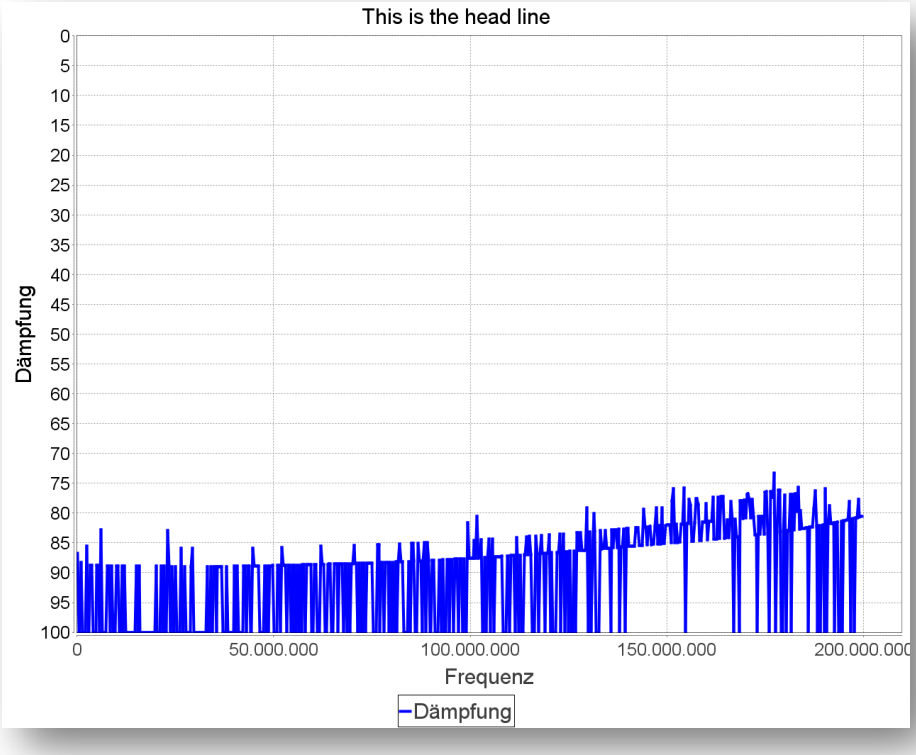


MiniCircuits HAT-6dB attenuator terminated 50Ohm

miniVNA



miniVNA PRO



Hints and tips

How to launch in a different language

The application currently supports German and English as languages for the user interface.

Usually the language for the application is determined by the environment under which the application is launched.

When launching the application on a Windows© PC with locale GERMAN, all messages, GUI elements and printout will be in German.

All other locales will be treated as English and the elements will be labelled in English.

If this detection does not work correctly or you want to force the application to start in a specific locale, the application can be launched from a command window entering:

In German: `java -jar -Duser.language=de -Duser.country=DE vnaJ_2_x_x.jar`

In English: `java -jar -Duser.language=en -Duser.country=US vnaJ_2_x_x.jar`

In Polish: `java -jar -Duser.language=pl -Duser.country=PL vnaJ_2_x_x.jar`

In Italian: `java -jar -Duser.language=it -Duser.country=IT vnaJ_2_x_x.jar`

Automatic: `java -jar vnaJ_2_x_x.jar`

Remark: If someone has some spare-time, he can provide translations for his native language.

Simply send me mail at vnaj@dl2sba.de and I will provide you the necessary files.

Reporting a problem

If you encounter any problems with vna/J please provide me the following details in your error report. Without these information, I cannot assist you effectivly.

Operating system

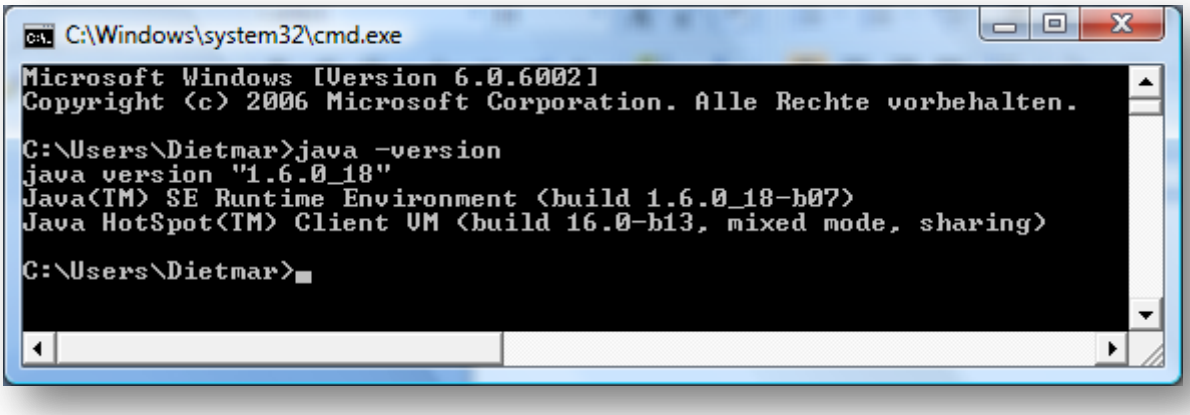
Provide me some details regarding the operating system you're using (i.e. Type, Name, Version, Patchlevel, …)

JAVA environment

Open a command shell in your operating system an enter the following command:

```
java -version
```

This should give you a display like this:



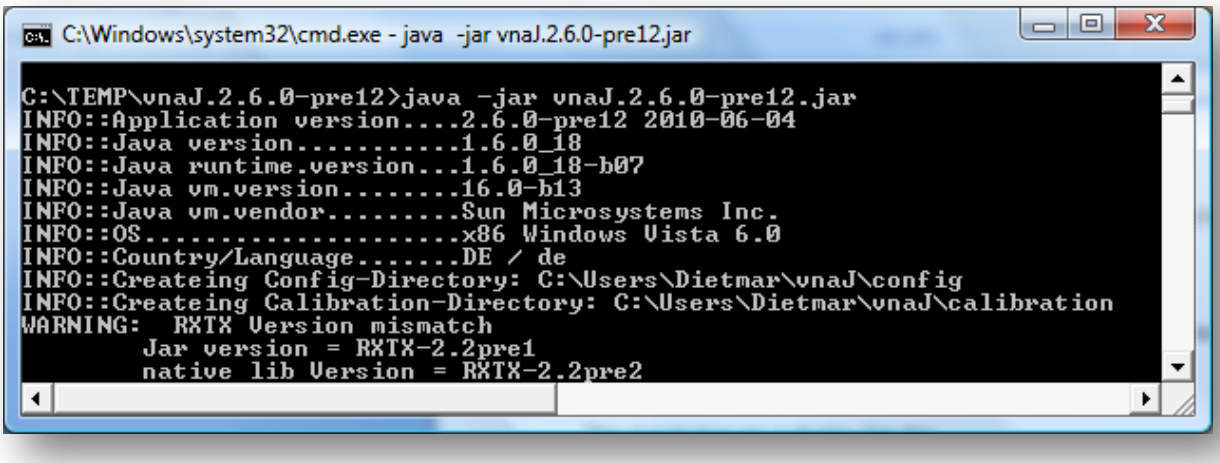
Send me the information displayed after you've entered the command.

vna/J startup info

Open a command shell in your operating system an enter the following command:

```
java -jar vnaJ.2.6.0.jar
```

Replace the name of the jar-file with the one, you're using. This should give a display like this:



Send me the information displayed after you've entered the command.

vna/J

Send me screenshots of the errors, you've found in the application with a detailed description, how I can reproduce this problem.

Enable logging

To debug problems using this application, it may be sometime necessary to enable the build in logging of the application.

Please follow these steps:

1. Open a command line window and navigate to the directory, where you've stored the JAR-file and the rxtx*-files.

2. Launch the application by entering

   ```
   java -jar -DTracer.tracing=true vnaJ????.jar 1>trace.txt 2>error.txt
   ```

   in the command line window.

   Note: Replace ??? with the current name of the JAR you are currently using.

3. Now the application should start as usual.

4. Now try to reproduce the failure etc.

5. When finished, terminate the application via the **FILE/EXIT** menu.

6. As tracing will slow down the application on not so powerful machines, switch off tracing by starting the application again this way:

   ```
   java -jar -DTracer.tracing=false vnaJ????.jar
   ```

7. SAVE and close the application via the menu **FILE/EXIT**

8. Send the files **trace.txt** and **error.txt** together with a detailed description of your environment (hardware, software …) and the found problem to **vnaj@dl2sba.de**.

9. … hope ☺

Application does not start

First of all, try to remove all previously created configuration information.

This can be easily done, by renaming the configuration directory as outlined in chapter "Settings" on page 83.

When the application is restarted, the directory is recreated and the settings are initialized with default values.

If this does not cure the problem please follow the steps described in chapter "Reporting a problem" on page 109 to create detailed logging information.

Driver developer guide

Supported devices

Currently the following drivers are available:

Name	Type Local/remote	Frequency from	Frequency to	ID
miniVNA	Local	100.000	180.000.000	1
miniVNA-LF	Local	15.000	100.000	10
miniVNA-NET	Remote	100.000	180.000.000	21
miniVNA-PRO	Local	100.000	200.000.000	2
miniVNA-PRO-NET	Remote	100.000	200.000.000	22
Sample	Local	100	440.000.000	0
Sample-NET	Remote	100	440.000.000	20

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Driver architecture

Local driver

tbd

Remote driver

tbd

Network sample

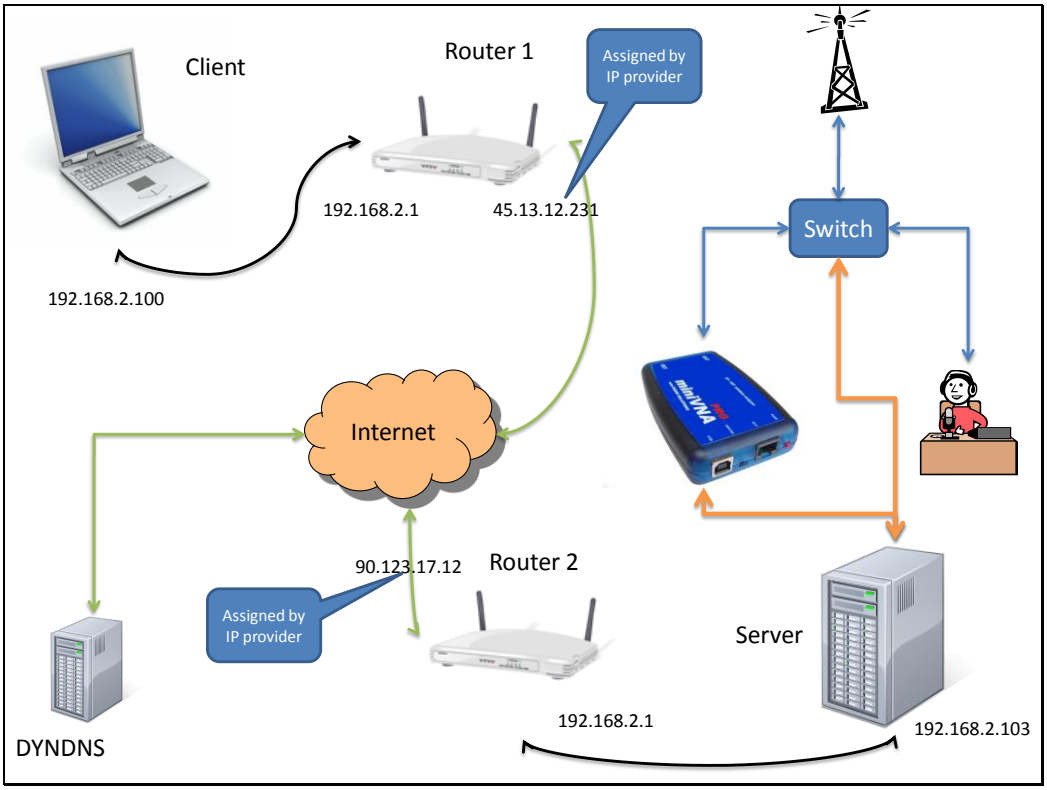
This is an experimental implementation of a network-accessible vna.

The idea behind is, that from remote locations it is possible to do regular measurements i.e. on an installed antenna or other device.

The following scenario is a remote operated station with a transmitter connected to an antenna which should be checked on a regular base for full functionality. The antenna can be connected either to the transmitter or to the network analyser.

The switch and the transmitter are remotely controlled but not further discussed here!

Overview



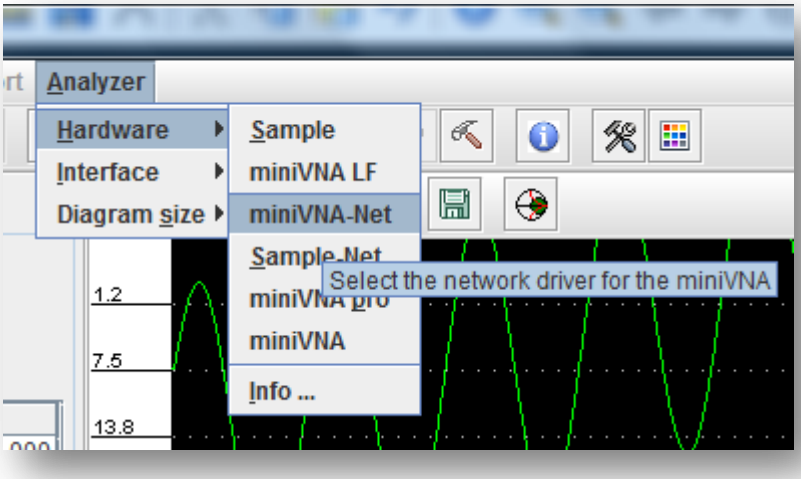
Components

Component	Description
CLIENT	On this computer the vna/J application runs. The user executes his measurement task on the computer. This computer is connected to the internet via ROUTER1
ROUTER1	This router connects the CLIENT to the internet. No special configurations are needed on this router.
Internet	…
DYNDNS	Provides DNS name resolution, if ROUTER2 has no fixed IP-address assigned by the internet provider
ROUTER2	This router connects the SERVER to the internet. Some special configurations are needed on this router to enable incoming request routed to the SERVER.
SERVER	This computer is connected via ROUTER2 to the internet. The analyser hardware is connected to this computer. The vna/J server application runs on this machine.
SWITCH	A remote controllable switch to connect the antenna either to the transmitter or the network analyser.

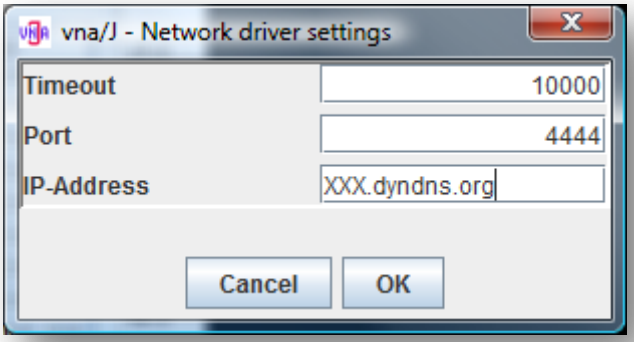
Configuration

Client

Select a network vna driver inside the vna/J application on the CLIENT.



Setup network address and port for remote server inside vna/J application on the CLIENT.

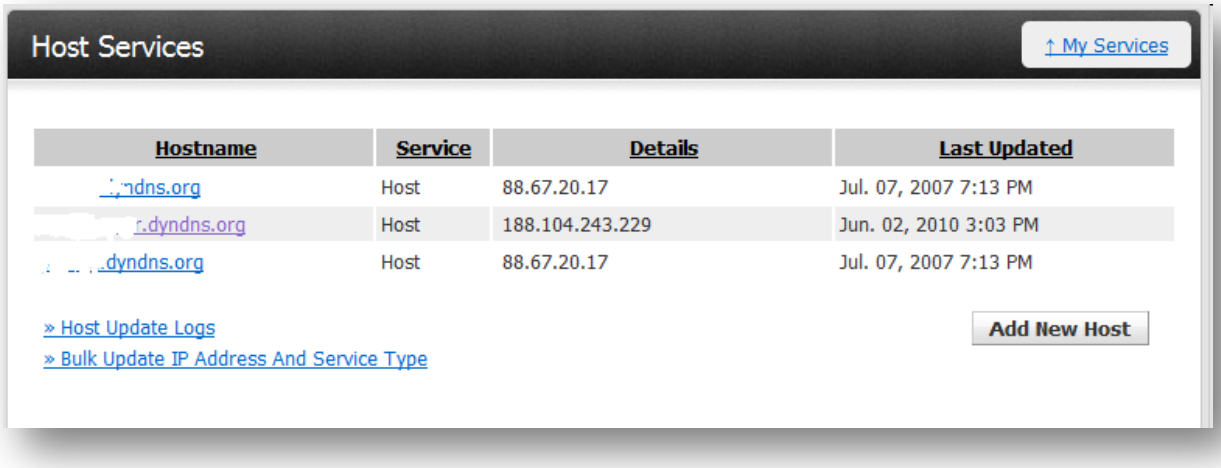


ROUTER1

No special configuration is necessary. Usually the router does not block any outgoing TCP ports.

DYNDNS

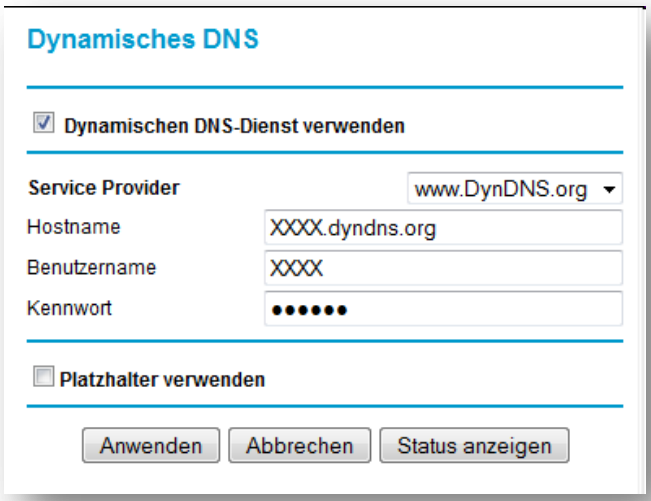
Create a host at your favourite dynamic DNS provider.



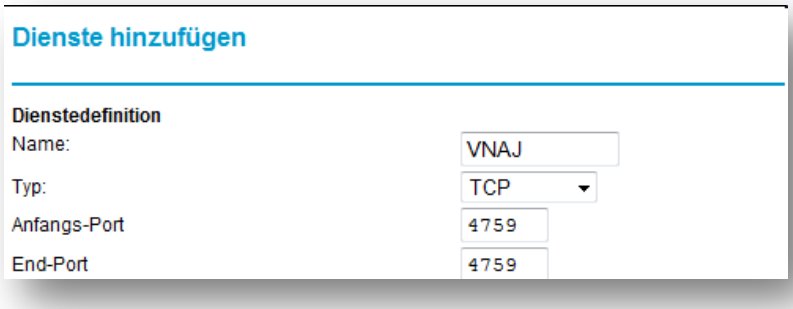
For details on DYNDNS etc. ask WIKIPEDIA ☺

ROUTER2

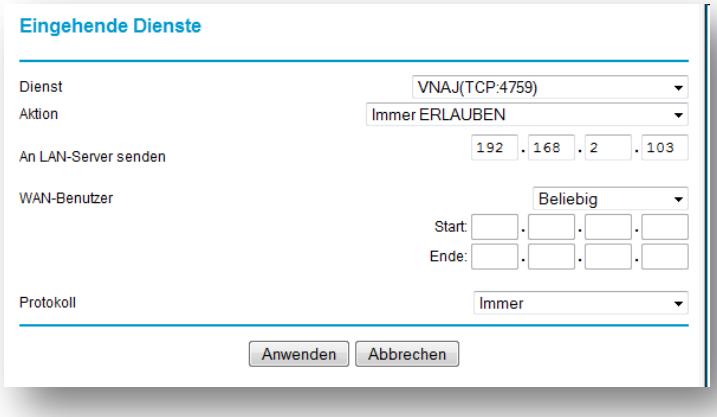
Enable DYNDNS support in ROUTER2:



Configure the router to enable incoming TCP request on Port 4759:



Enable routing of incoming TCP-request on port 4759 to a specified computer on the local network.



For details consult your routers manual.

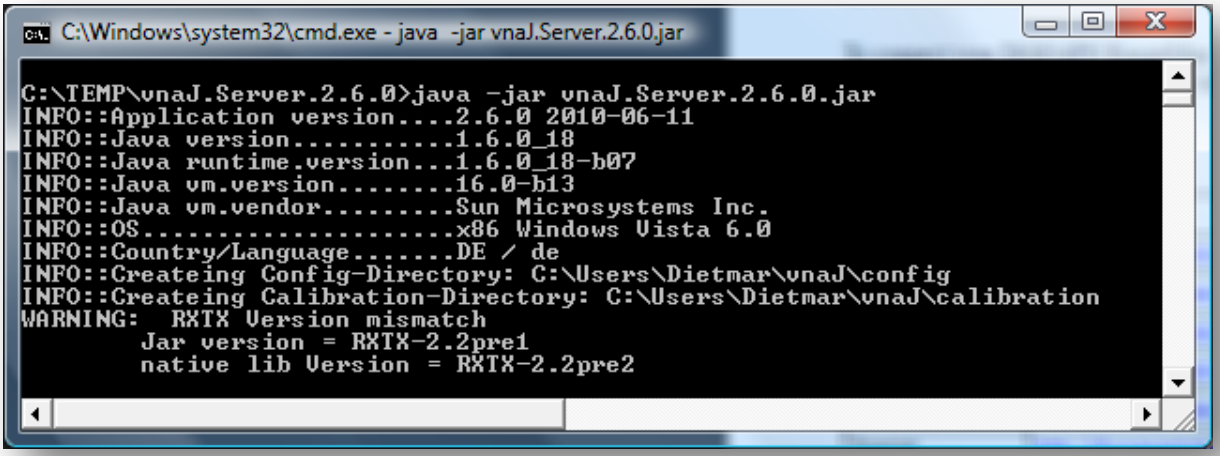
SERVER

Same software requirements as the vna/J client application

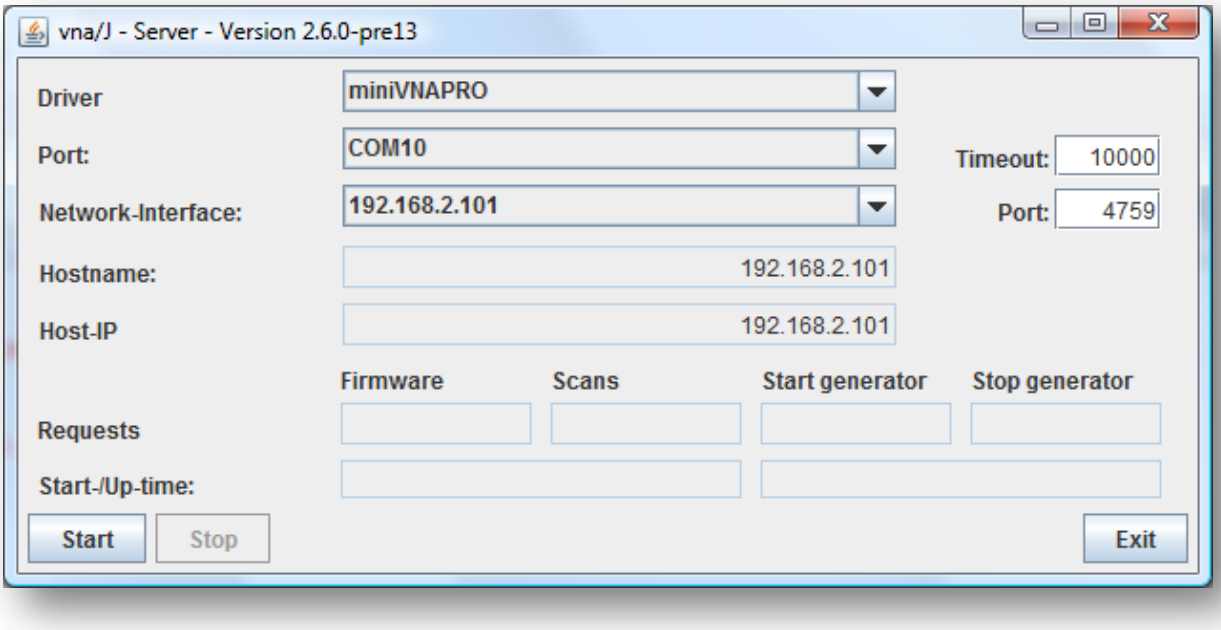
Same as starting the client but simply replace the name of the JAR file:

```
java -jar vnaJ.2.6.0.jar
```

Replace the name of the jar-file with the one, you're using. This should give a display like this:

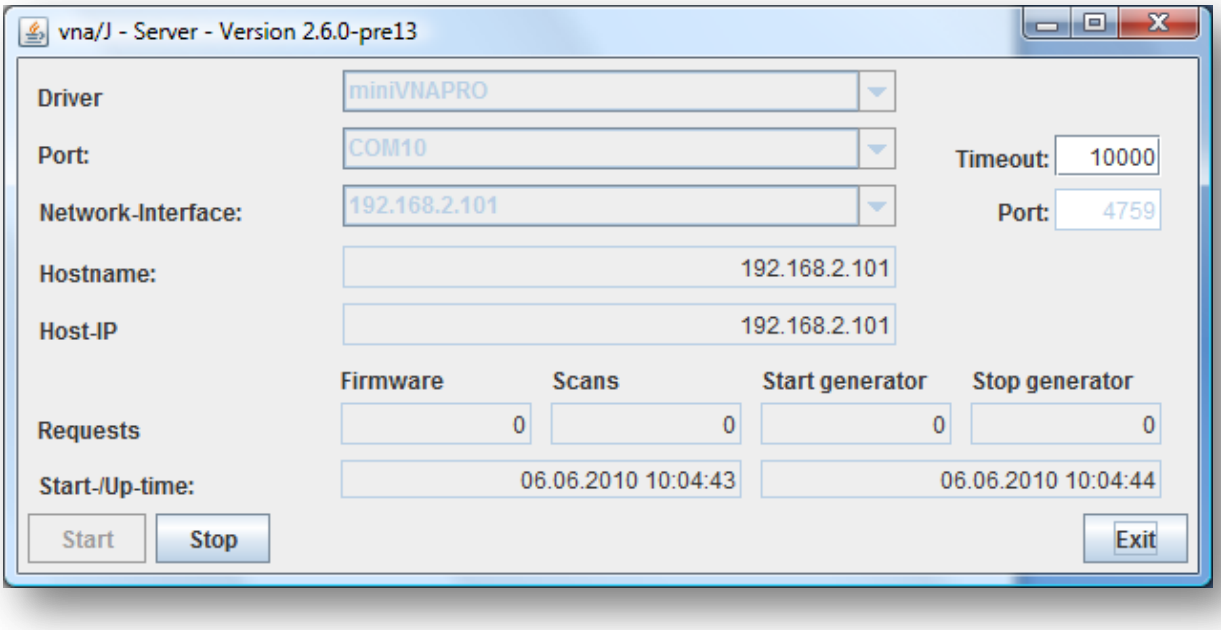


Configure vna/J server:



Remark: Select as network interface the card connected to ROUTER2.

Start the vna/J server to listen on TCP port 4759:



Links

http://groups.yahoo.com/group/analyzer_iw3hev

An active YAHOO group related to the miniVNA as well as the miniVNA PRO.

In the files sections under **Files > Subjects - Off Topic - (Brainstorming) > SUSE Install for DL2SBA app.** find a detailled guide howto install the stuff on UBUNTU as well as SUSES Linux versions.

http://www.miniradiosolutions.com/

Company that produces the miniVNA as well as the miniVNA PRO

Used Java libraries

http://commons.apache.org

Apache Commons - provides support for complex number mathematics

http://poi.apache.org

Apache POI - provides support for Microsoft Office file export

http://itextpdf.com

iText - provides support for PDF export

http://www.jfree.org/jfreechart

JFreeChart - provides charting support calibration and data export

http://www.sauronsoftware.it/projects/cron4j

Cron4J - providing time scheduler support

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English

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Deutsch

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