



SARX-110

Vector Impedance Antenna Analyzer

Cumulative Release Notes

Firmware Revision 0.10.9



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1 Release series 0.10.x

v0.10.9 - Release date: Jan 3rd, 2017

Enhancements:

- Layout re-arrangements in Smith chart mode for increasing the size of the chart.
- Improves interpolation algorithm for OSL cal.

Bug fixes:

- Not possible to change between START/STOP and FREQ/SPAN in Field mode. Also, **File** + Press Navigator A shortcut (data file save) not working in this mode.
- Transmission line length and Signal Generator level changes not automatically saved.

v0.10.8 - Release date: Dec 29th, 2017

Enhancements:

- Improves response time after selecting Main menu option
- Increases the Main menu time from two to five seconds

v0.10.7 - Release date: Dec 28th, 2017

Enhancements:

- Save Conf. [▲] button can be used to open Mode menu – this button will no longer be used to save the configuration as it will be done automatically.
- Save Screen [●] button can be used to open Setup Menu; you must press the button for a few seconds.
- State and settings are all now automatically saved, without the need of pressing Save Conf. [▲] button. Notice that the saving of some user actions such as changing marker positions are delayed for 10-seconds.
- Sweep scan interrupted by user action will continue from previous position –in previous versions the scan was restarted.
- Smoother movement of markers while in run mode.
- Main menu active option is now independent for each mode.
- New x4 MEAS_RX command in remote mode

Bug fixes:

- Omitted line in sweep modes when two consecutive data points are located in opposed out-of-chart areas.

v0.10.6 - Release date: July 24th, 2017**Enhancements:**

- Added <Marker n> <Data>, which allows selecting the shown data values at the marker position from the following choices: plotted values, Z rectangular form, Z polar form, Rho rectangular form or Rho polar form.

v0.10.5 - Release date: June 15th, 2017**New features:**

- Added “RX Mode” to Signal generator

Enhancements:

- OSL Profile menu shows the profile names (when set)

v0.10.4 - Release date: May 30th, 2017**New features:**

- Added “Save Data File” operation in Single Frequency mode for saving measured data at a user specified time interval.

Enhancements:

- Slight speed improvement in the main menu display

v0.10.3 - Release date: May 26th, 2017**Enhancements:**

- Increases the Main menu time from one to two seconds

v0.10.2 - Release date: May 19th, 2017**Enhancements:**

- Added display of main menu. Main menu automatically pops up when pressing Navigator A (left or right). This feature can be enabled or disabled from the Setup menu
- Band Scan frequency and marker settings independent of other sweep modes
- Smith Chart displays START/STOP or FREQ/SPAN depending on selected frequency enter mode
- More selective display of sampling and filter settings on the status windows for the different modes

Bug fixes:

- Smith Chart markers window cleared after selecting a menu, only if presenting the plot of a saved file –it did not happen in run mode.

v0.10.1 - Release date: May 14th, 2017**Enhancements:**

- Reverted back Field mode
- Bigger Smith Chart
- Changed markers shapes to icon type
- <Setup><Sampling>: additional fast low resolution modes: 1/4 and 1/8 resolution
- Use bigger fonts for Circuit Model results
- Cable Test mode:
 - Markers preserve position when zooming
 - Added Max and Min automatic marker tracking modes
 - Automatic scale
 - Increased the Y scale range limits for the fixed scale

Bug fixes:

- Disabling marker tracking still show previous tracking mode on markers window
- Residues of the Setup menu if exiting without selecting an option in Cable test mode
- Screenshot bitmap file not deleted if cancelled the operation
- X axis deleted when changing Y scale (when not using the menu) in Scalar Chart mode
- Spurious Disabled option in tracking marker menu.
- Missing Frequency legend in Matching Networks mode

v0.10.0 - Release date: May 7th, 2017 (Beta)**Enhancements:**

- Major redesign of the display elements for improved legibility

Removed features:

- Removed Field Mode

2 Release series 0.9.x

v0.9.3 - Release date: March 3rd, 2017

Bug fixes:

- Signal Generator mode: Some residual of the Setup or Preset menus remain on the screen
- Shift of the frequency readout and Z values by one row when reading .CSV files

v0.9.2 - Release date: Feb 5th, 2017

New features:

- Added aid for stub tuning

Enhancements:

- Markers info:
 - Markers frequency delta show as positive or negative value
 - Add separators for legibility
 - Corrects location in cable test mode

v0.9.1 - Release date: Dec 22nd, 2016

New features:

- Signal generator: new CW modulation modes (experimental)

Enhancements:

- Circuit models, loop/inductor: allow setting a scan frequency upper limit, for inductors with multiple resonance frequencies within the analyzer range
- Signal generator: reduces harmonics in AM/FM modulation modes

Bug fixes:

- Signal generator: AM/FM modulation stops when pressing navigator keys
- Circuit models: make Q readings positive regardless Rs sign
- Reseting to factory defaults from modes different to Scalar Chart cause wrong main menu display

v0.9.0 - Release date: Nov 17th, 2016

New features:

- Single Frequency: new "Data" display mode

Enhancements:

- Several user interface enhancements
- Settings stored automatically when changing mode

Other:

- Simplified version numbering scheme

3 Release series 0.8.7.x

v0.8.7.10 - Release date: Nov 1st, 2016

Enhancements:

- Smith Chart: updates previous modification, plotted values with $|\text{Rho}| > 1$, so that readings out of range do not overlap outer circle.

v0.8.7.9 - Release date: Oct 22nd, 2016

Enhancements:

- Band Scan: improved sweep speed and quicker button response.
- Smith Chart: plot values with $|\text{Rho}| > 1$ on the outer circle –before they were not plotted.

Bug fixes:

- Wrong Voltage and Current values when invoking detector calibration from Band Scan mode.

v0.8.7.8 - Release date: Oct 9th, 2016

Enhancements:

- Measured reflection coefficients $> 0\text{dB}$ no longer forced to zero –same for negative resistance values.
- Enhancements in auto scale operation.

v0.8.7.7 - Release date: Aug 31st, 2016

Bug fixes:

- OSL Profile naming: blank space can only be accessed in forward direction.

v0.8.7.6 - Release date: Aug 18th, 2016

Bug fixes:

- Left over green dots above grid lines in some rare conditions.

v0.8.7.5 - Release date: July 5th, 2016

Bug fixes:

- Wrong Z equivalent calculation for Circuit Model capacitor.

v0.8.7.4 - Release date: June 25th, 2016**Enhancements:**

- Smith Chart trace display in two colors to allowing differentiating center frequency.
- Allow editing an optional name to calibration profiles.
- Added the calculation of the impedance at the operating frequency from the mode for Circuit Model inductor and capacitor. Also, it checks the consistence with the measured value and display a warning message if there is a high deviation.
- New remote control command to get the disk volume name.
- Display disk volume name in About dialog.

v0.8.7.3 - Release date: May 24th, 2016**Bug fixes:**

- Buzzer always enabled after power on regardless setting

v0.8.7.2 - Release date: May 16th, 2016**Bug fixes:**

- Removed unnecessary indicators in status line in Band Scan mode

v0.8.7.1 - Release date: May 9th, 2016**Bug fixes:**

- Signals at certain frequencies not detected in Band Scan mode
- Garbage in plot when switching from Band Scan to Scalar or Smith Chart mode

v0.8.7.0 - Release date: May 8th, 2016**New features:**

- Band Scan mode
- Added AM and FM modulation to Signal Generator Mode

4 Release series 0.8.6.x

v0.8.6.19 - Release date: March 13th, 2016

Enhancements:

- Circuit Model crystal function now requires the input of the estimated bandwidth, so it can work both with crystals and ceramic resonators.
- Field mode: larger display of the reading at the centre frequency and swaps position with Max/Min values.
- VSWR reading shown in red if value is > 2.0 in Field and Single Frequency modes.

v0.8.6.18 - Release date: February 21st, 2016

Enhancements:

- Improvements in Circuit Model crystal function. Tested to work with crystals of frequency down to 1MHz.

v0.8.6.17 - Release date: January 26th, 2016

Bug fixes:

- Differences when plotting $|Z_s|$ in Sark Plots compared with the device when measuring high-Q components (e.g. crystal measurements at the resonant frequency) due to the clipping of impedance values greater than 100k. This difference is observed on the device as well, when saving and then loading the data.

Enhancements:

- Automatic adjustment of the number format for impedance values (Z_s , R_s , R_p , X_p) in Single Frequency mode.

v0.8.6.16 - Release date: January 16th, 2016

Enhancements:

- Circuit model Crystal:
 - Resonant frequency not detected for crystals of frequency below ≈ 2 MHz
 - Optimized scan by adjusting parameters based on specified frequency
 - Improved transfer of the detected frequencies to the sweep parameters: sets sweep range so F_s and F_p are both seen on the chart. M1 set to F_s and M2 set to F_p .
 - Allows the user cancelling the scan process
 - When the resonance was not found junk data was stored in the file

- Revised implementation of the Automatic Power Off feature
- For circuit models Coil and Capacitor, the minimum scan frequency will be set to the specified operating frequency for optimized scan

Bug fixes:

- Marker to center feature not working consistently with the new markers behaviour
- When saving data in TDR mode, the user is prompted to enter a second file name (.csv)

v0.8.6.15 - Release date: January 5th, 2016**New features:**

- Zoom feature in Smith Chart mode
- Capability to enable or disable individual charts in multiband mode
- Capability to save and load data in multiband mode
- Configurable average samples number in Computer Controlled mode

Enhancements:

- Markers stay at the same frequency when changing frequency or span
- Markers move one step (instead two steps), unless holding navigator key is pressed
- Recall changed file base name when saving files
- Show descriptive text for transmission on/off status in signal generator mode

Other:

- Changed compiler version

v0.8.6.14 - Release date: November 13th, 2015**Enhancements:**

- Smith Chart enhancements:
 - Added constant reactance circles.
 - Added choice of VSWR circle, constant-Q lines or none.
- Added Marker to center feature: «MarkerN»<F. to Center>

v0.8.6.13 - Release date: October 31st, 2015**Enhancements:**

- For sweep modes, added the capability to enter the frequency range as center&span or as start&stop frequencies.

Operation: use Navigator A to highlight **Freq** or **Span** in the main menu and then press this Navigator to change the entry mode. These main menu options will change to display «**Start**» and «**Stop**». Pressing the Navigator again will revert to the «**Freq**» and «**Span**» entry mode.

- Added other shortcuts:
 - **Marker1** + Press Navigator A: equivalent to «**Marker1**» «*Info*»
 - **Marker2** + Press Navigator A: equivalent to «**Marker2**» «*Info*»
 - **File** + Press Navigator A: equivalent to «**File**» «*Save Data File*»
- Removed the center dot in the digit '0' of the fonts and minor enhancements in some displays.
- Automatic saving of the analyzer's state on automatic power-off.

v0.8.6.12 - Release date: September 21st, 2015

Enhancements:

- Added markers info text box: «**MarkerN**»«*Info*».
- Displays complete frequency value in markers bar if automatic tracking is not set.

v0.8.6.11 - Release date: September 7th, 2015

Enhancements:

- Issues a beep at the end of a trace sweep when in single shot mode.
- Single mode: Clarifies the symbols in the diagram to Rs, Cs, Rp, Cp. Separating the expression for parallel Z.

v0.8.6.10 - Release date: September 1st, 2015

Bug fixes:

- When viewing a saved TDR plot and zoomed, the plot disappears five seconds later.

v0.8.6.9 - Release date: August 25th, 2015

Enhancements:

- Reduces ripple in the measurements (but slightly slower sweep speed).

v0.8.6.8 - Release date: July 25th, 2015

Bug fixes:

- Inductance units not display properly in matching networks; e.g. mH instead uH.

v0.8.6.7 - Release date: July 10th, 2015**Bug fixes:**

- Differences in readings after upgrading from version v0.8.4 without performing OSL calibration. Changed so it is not necessary to re-calibrate after the upgrade.
- Single frequency mode - two elements circuit model: C and L values not correctly erased (bug introduced in v0.8.6.5).

v0.8.6.6 - Release date: June 27th, 2015**New features:**

- Added the ability for formatting the disk in «**Setup**»«*Restore Factory Defaults*».

Enhancements:

- Frequency calibration did not persist after firmware updates. Frequency calibration setting now stored in file **detcilib.dat**

v0.8.6.5 - Release date: June 21st, 2015**New features:**

- Added “Matching Networks” display to Single Frequency mode.

v0.8.6.4 - Release date: June 7th, 2015**New features:**

- Added “Big VSWR” display to Single Frequency mode.

v0.8.6.3 - Release date: May 31st, 2015**Bug fixes:**

- Transmission line add/subtract not working (from v0.8.6.0).

v0.8.6.2 - Release date: April 6th, 2015**Bug fixes:**

- Incorrect db/100ft calculation in model transmission line.

v0.8.6.1 - Release date: April 3rd, 2015**Bug fixes:**

- Auto scale: scales change based on measured values, but the trace is not redrawn in the new scale. It is necessary to run a second trace.

v0.8.6.0 - Release date: April 1st, 2015**New features:**

- New sampling mode: <Normal / low resolution>. This is the fastest sweep mode, but with lower resolution.
- Added Setup menu option for selecting units in meters or feet.

Enhancements:

- Added 1st octave and 1st sixteenth Zoom options to Cable Test mode.
- Extended the frequency range in signal generator mode down to 1 kHz
- “TL Len” now can be specified in millimetres, so allowing compensating small port extensions
- Improved Detector Calibration:
 - Requires only a short load for the process
 - Improves measurement accuracy (RS and VSWR) when measuring overly reactive loads. Note that OSL calibration should be done afterwards for maximum accuracy
 - Optional Detector Test at the end of calibration.
- Identification of firmware variants (LF, 200 MHz) for SARK Plots
- Adjusted some cable coefficients
- Field mode: added selected parameter and impedance readings at center freq.
- Improves the speed of the Crystal Circuit Model function
- Circuit models: save measurements in tabular format

Bug fixes:

- “custcab.txt” does not accept coefficients with negative values
- Frequency axis not meaningful for frequency steps in the kHz range (LF firmware)
- Multiband mode: selected band highlight overlaps slightly the main menu
- Field mode: points can be plotted above upper graph limit
- Detector Calibration not working properly if Sampling is set to <Double / slow>

5 Version 0.8.4

v0.8.4 - Release date: August 8th, 2014

New features:

- Setup menu:
 - Buzzer enable/disable control: **«Setup»«Buzzer»**
 - Backlight brightness setup: **«Setup»«Backlight»**
 - Programmable run mode: **«Setup»«Run Mode»** continuous or single shot
 - Implemented screen rotation: **«Setup» «Rotate Screen»**
 - Added following cables: URM43, URM67, Westflex 103, Aircell 5, and Aircell 7
 - Saves current selected option in the Setup menu
- Implemented Circuit Models function: **«CModel»** menu option in Single Frequency mode:
 - Determination of equivalent circuit of small loop antennas or coils and capacitors
 - Quartz crystal circuit equivalent circuit
 - Transmission Line circuit model feature: determines automatically Z0, VF and matched losses
- File menu:
 - Added deep sweep save function: **«File»«Deep Sweep Save»**, including self-timed save feature
 - Removes the restriction of 50 files when saving data (only restricted by available memory), and increases from 50 to 100 the maximum number of files in a listing (e.g. Load Data File menu)
 - Changes in the load data file feature to accept files with non-standard number of data points
 - Improvements in the file name generation for file save modes
 - Reduces the disk usage of screenshot bitmaps (by four or by two depending the number of colors)
- OSL calibration:
 - Added the possibility of specifying the frequency range for calibration
 - Increased the number of calibration points from 256 to 400
 - Added ability to select up to eight OSL calibration profiles. Profile can be selected in the Setup menu: **«Setup» «Calibration»«OSL Profile Select»**
 - Display of the calibration profile data

- Allows user cancelation during calibration
- Detector calibration:
 - Added the visualization of the raw voltage and current detector values and load good status. This feature will be useful for diagnosis and for verification of the calibration loads
 - Optimized the execution time
 - Allows user cancelation during calibration
- Status line:
 - Rearranges status line to show full resolution frequency value.
 - New information in status line: OSL profile number, filter and sampling (when selected)
 - Improved visibility of the calibration icon
- Improved legibility of current selected option in the popup menus
- Lowered the minimum span range down to 1 kHz, for better visualization of high Q circuits as crystals
- Fixed minor compatibility issue with hardware supporting 5kHz low-freq limit
- Improved display driver performances
- Colours of values in marker information bar adjusted to match the colour of axis
- More consistent presentation of impedance values in marker information bar in Smith Chart mode
- Increased user wait timeout to 5 minutes.

Bug fixes:

- DDS not powered off in automatic power-off, only in Signal Generator mode
- Right Y axis legend not correctly redrawn when marker overlaps
- Fix some minor issues in right axis legends presentation in the scalar chart, when auto scale is activated

6 Version 0.8.2

v0.8.2 - Release date: Jan 22nd, 2014

New features:

- Added cable loss parameter (CL) for the measurement of cable insertion losses

Enhancements:

- Updated template scale files to support new CL parameter
 - (SARK110_SETTING_FILES_v1.01.zip)
- Reduces RL range for the high scale

Bug fixes:

- Automatic scaling not properly working when opening stored files
- In Scalar Chart mode with automatic scale and one of the traces disabled, the disabled trace was displayed
- In Signal Generator mode the Run/Hold [▶||] button and level selection did not properly work in continuous mode

7 Version 0.8.1

v0.8.1 - Release date: Dec 28th, 2013

New features:

- Transmission line Add and Subtract feature
- Programmable signal generator mode
- Multi-band mode
- Automatic scaling option
- Added ability to modify the default scale settings via special text files stored into the device disk
- Added capability to modify the default band presets via a special text file stored into the device disk
- Setup menu:
 - Added Color Themes
 - Added Plot Thickness
 - Added Sampling
 - Added new cable presets
 - Implemented the ability to add three custom cable settings
 - Implemented the capability to specify a custom value for the reference impedance

Enhancements:

- Different legibility and presentation enhancements
- Added new band presets
- Added automatic display of maximum and minimum values in the graph in Field Mode
- New "Load Bitmap File" option in the «**File**» menu
- Added ability to store or load the measurements in Cable Test mode
- Implemented a basic zoom feature in the Cable Test mode
- Changed Computer Control mode from the «Setup» menu to the «Mode» menu
- Added check of load condition for OSL calibration
- Improvements in the USB HID driver for Windows 8 compatibility

Bug fixes:

- Setting a largely different frequency value in Frequency Calibration causes the Single Frequency mode to crash
- Forbidden characters were allowed for file names

- Colors in the screenshots bitmaps were not accurate when displayed on the PC. Bitmap header did not include the RGB565 masks so they were display as RGB555
- User cancelation in markers menu was not managed properly in nested submenus

Internal Notes:

- Integrated FatFs module R0.10 (previous R0.07e)

8 Version 0.7.5

Release date: June 26th, 2013

Enhancements:

- The device displays different impedance readings if changed Z0: This behaviour is due to that the Z0 parameter is taken both for the OSL calibration and for the post-processing of the impedance data. If the Z0 setting used when calibrating is different as during operation, the OSL algorithm introduces errors that are more noticeable with increased frequencies. Changed the implementation so the Z0 setting used during OSL calibration is stored for further measurements regardless the Z0 setting.
- Added more cable settings.
- Several changes to the Filter functionality:
 - Existing Average filter renamed as Smoothing filter
 - Added a four samples Averaging filter (slower sweep speed)
 - Changed filter default to disabled

9 Version 0.7.4

Release date: March 16th, 2013

New features:

- Implemented the computer controlled mode through USB custom HID mode
- Implemented composite class USB driver: Mass Storage plus custom HID
- Added VSWR audio feedback to the single frequency mode

Enhancements:

- Implemented cycling through submenus
- Added two new presets: “Full HF” and “Full Span”
- Added the ability to configure the size of the constant SWR circle in the Smith Chart. This new setting is accessible at <Setup><SWR Circle>
- Presents information dialog box in case of disk full
- Rearranged the <Setup> menu
- Changed impedance and reactance ranges in the low scale
- Added new VF cable presets

Bug fixes:

- In the cable test mode, the step response was not presented correctly.
- Further improvements in the OSL calibration algorithm implementation

10 Version 0.7.3

Release date: January 25th, 2013

Bug fixes:

- The measurements with high impedance value loads exhibit a significant variation with the frequency. The screen capture below on the left side shows a measurement of the 1000-ohm load at full span in the v0.7.2 release. This was due to calculations in the OSL compensation algorithm, with near limit values that lead to truncation and then amplifying the errors. The screen capture on the right sides shows the measurement with the same load and the corrected firmware.



11 Version 0.7.2

Release date: January 6th, 2013

New features:

- Added the Field Mode: in this mode, the measurement results are plotted in a chart similar to the standard “Rectangular Chart” mode but with a more visible presentation aimed for the operation on the field.

Enhancements:

- Improved the look and field of the menus: implemented rounded rectangles with a shadow effect for most of the GUI controls, added a title for the submenus, and improved the look of the edit controls.
- Improved the visibility of the plot in Smith Chart mode

Bug fixes:

- In Smith Chart mode and plotting a stored file, when moving the markers over the central circle, the central circle was not correctly refreshed.

12 Version 0.7.1

Release date: December 14th, 2012

Enhancements:

- Extended the frequency upper range to 230 MHz

Warning:

- **It is required performing Detector Calibration and OSL calibration when upgrading to this release from previous versions. Do not upgrade to this version if you don't have the proper calibration loads**

13 Version 0.7.0

Release date: December 14th, 2012

Enhancements:

- Reorganized the traces menu and added new traces. The available traces are the following: Rs, Xs, Rp, Xp, |Zs|, <Zs, VSWR, RL, |Rho|, <Rho, %Ref Pwr, Q, Cs, Ls, Cp, and Lp
- Changed the measurement representation in the Detailed Measurements window to a more consistent format, displaying the VSWR, the impedance in rectangular and in polar form, and the reflection coefficient in polar form. Example:
 - Swr:10.09 Z:504.5+j2.1 |Z|=504.6<0.2 |Rho|:0.82<0.0
- Added ability to disable the traces in the rectangular chart. This option is available in the LeftY and RightY menu.
- Navigation keys center (push) actuator functional
- Added a moving average filter for the rectangular and Smith chart diagrams. The filter could be enabled or disabled by accessing to the <Setup><Average Filter> menu option.
- Improved the values range limits checking
- Adjusted slightly the Scale limits presets
- In Single Frequency mode the inductance or capacitance graph will be shown only if the reactance (X) is higher than 2.0.
- Improved values range checking when reading ZPlots files
- Renamed “Antenna Test” in the mode menu by “Rectangular Chart”
- Renamed “Single” in the mode menu by “Single Frequency”

Bug fixes:

- The calculated inductance values in the Single Frequency mode were incorrect; the actual value was 1000 times less than the presented value.

14 Version 0.6.6

Release date: July 26th, 2012

Initial production release

15 Upgrading the Firmware

The SARK-110's firmware may be upgraded via USB as described in the following steps. This procedure assumes you have downloaded the appropriate update file from: <http://www.sark110.com/files/firmware>

The downloaded file has the following format:

SARK110-APP-x.y.z.dfu.zip Where x.y.z is the incremental version number.

The downloaded file has to be unzipped to produce an update file in the format:

SARK110-APP-x.y.z.dfu

Procedure:

1. Connect the SARK-110 to the PC with a USB cable
2. Locate the SARK's USB flash drive unit using the File Explorer of your PC
3. Copy the firmware file, e.g. SARK110-APP.x.y.z.dfu to the SARK's USB flash drive unit
4. Do a safe eject of the SARK's USB flash drive unit from your computer
5. Power off the SARK-110 and power it on again while simultaneously holding down the Run/Hold [**?**] button
6. The Device Firmware Upgrade screen prompts you to install the firmware file
7. If several firmware files are on the SARK's USB flash drive unit, use Navigator B to select the file to load
8. The firmware upgrade will commence after pressing the Select [**■**] button
9. Once complete, press the "Save Conf" [**▲**] button, which will reset the analyzer and run the upgraded firmware
10. Select **«SETUP»«About»** and check if the firmware version shown on the screen agrees with the installed one

16 License Agreement

By downloading, installing, or using the firmware, you agree to be bound by the terms and conditions of the following license agreement. Please read this agreement carefully.

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