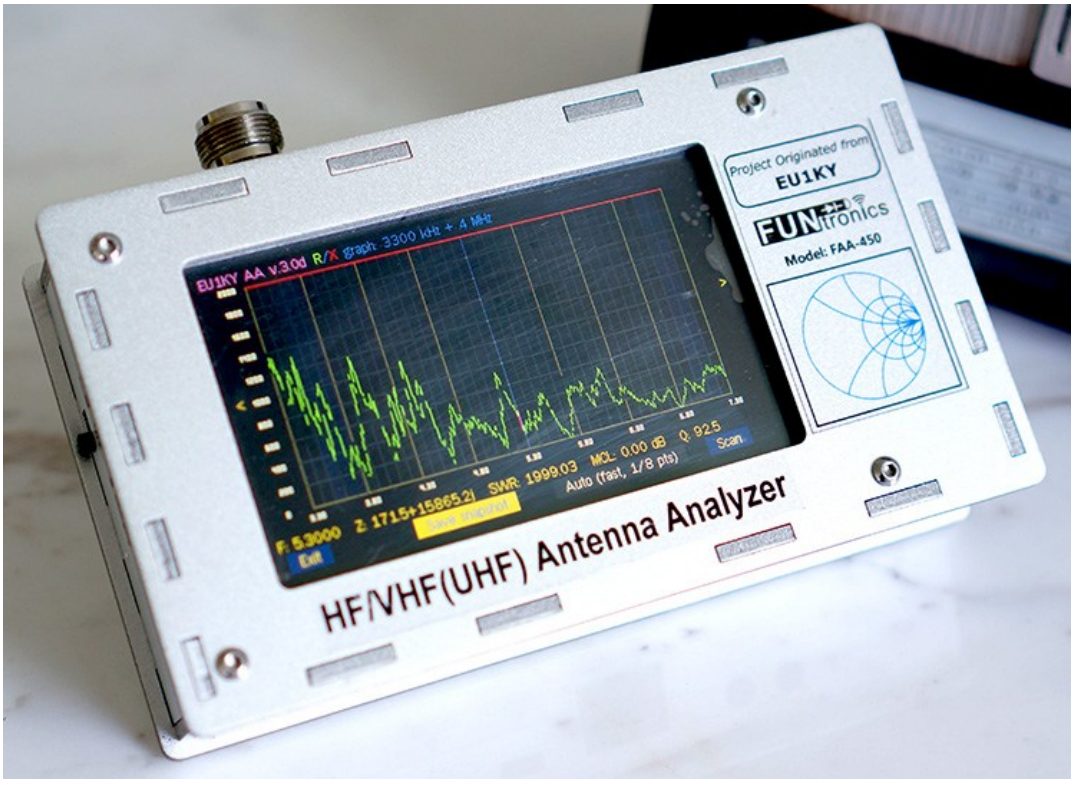
Sep 2018

EU1KY Antenna Analyzer



This page is a description of the modifications made to the EU1KY antenna analyzer project.
The FAA-450 Antenna Analyzer is an open source project built from STM32-F7 Discovery board. It has the following features:

- Colour TFT LCD with capacitive touch.
- HF/VHF(UHF) frequency coverage (500KHz-500MHz.
- Built-in TDR function.
- Multiple scanning curves including SWR.

The analyzer uses DSP technology to analyze the sampled signal and derive the their magnitude ratio and phase difference.

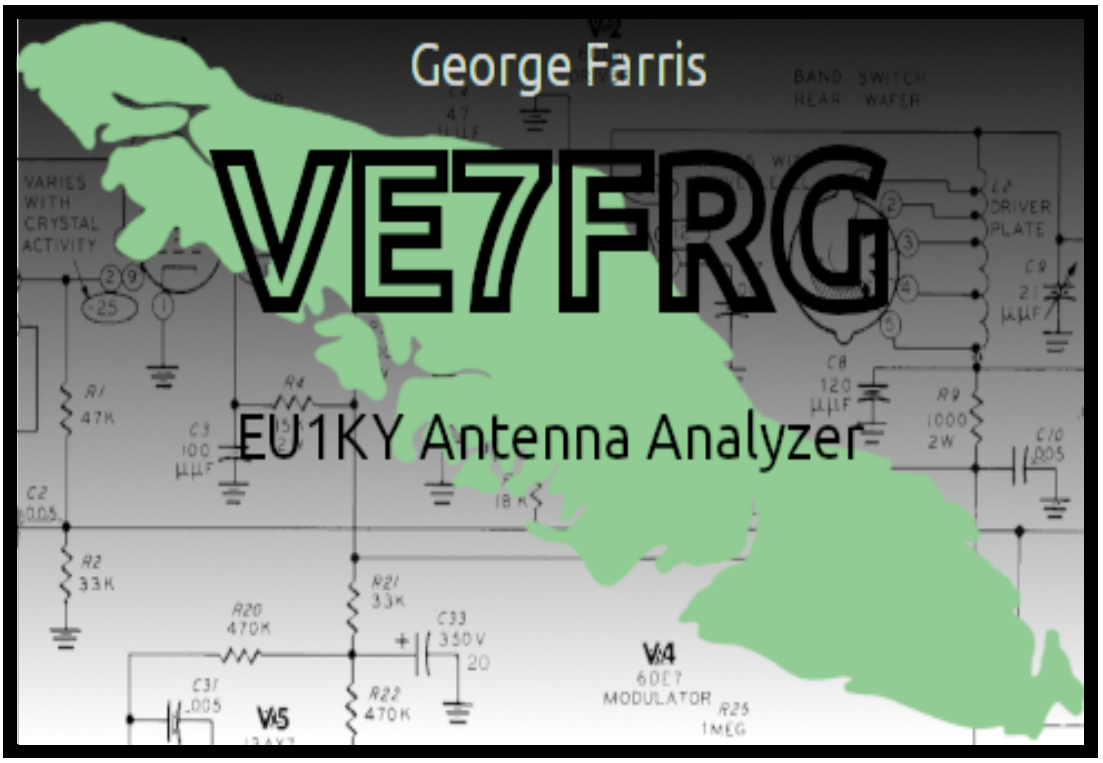
Full open source software is available at bitbucket.org/kuchura/eu1ky_aa_v3.

Development is done by cross compiling for the STM32F746 board on windows (Embitz IDE) or linux (makefile with arm-none-eabi-gcc). The generated **F7Discovery.bin** file is uploaded to the device using ST-Link loader.

ST-Link loader is available from STMicroelectronics. For windows, you will also need to get the STSW-LINK004 utility and STSW-LINK007 drivers.

List of Custom Software Modifications by VE7IT

Modify splash screen to display QSL card.



Splash screen

To replace the splash screen, create a BMP file exactly 480x272 pixels in size.
Place it in the Src/analyzer/lcd/bitmaps folder.
Make sure it is the only BMP file in the folder, then run the **bmp2h.py** python script.
This will create a logo.h file which will be included in the project when it compiles.

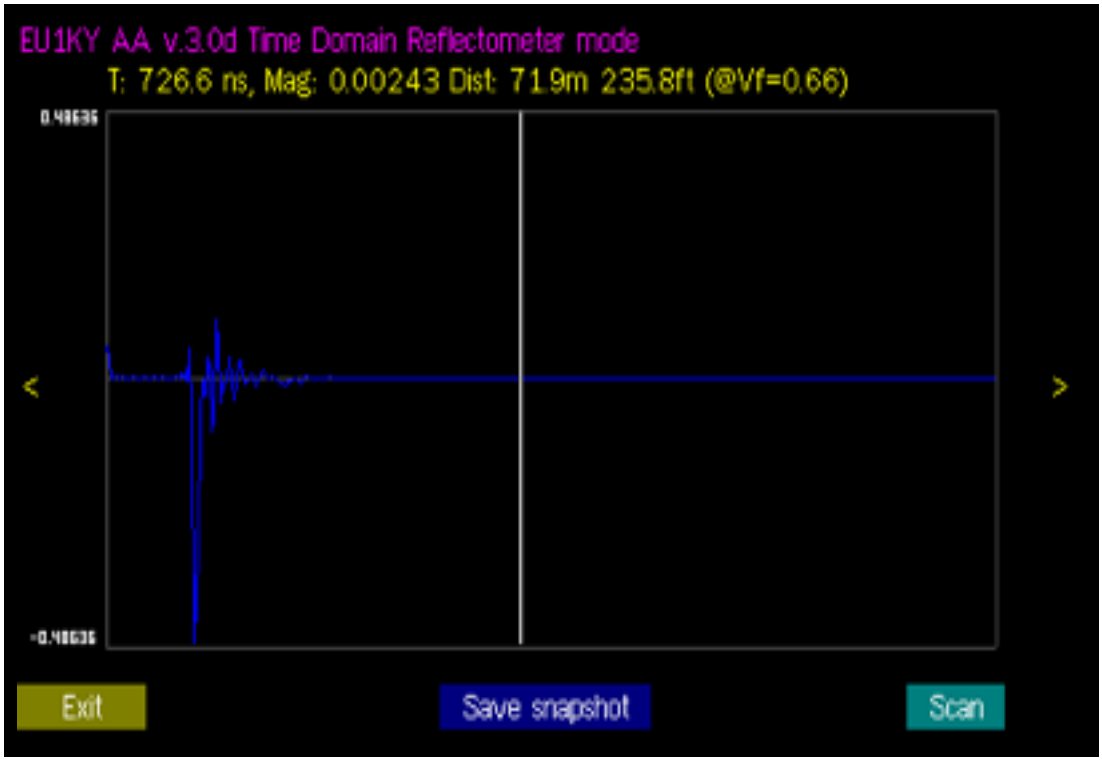
Modify the signal generator screen.
The analyzer can function as a continuous wave signal generator over a frequency range of 500kHz to 450MHz. Signals above 150MHz are actually using the 3rd harmonic of the internal source.

Reformated Signal Generator screen

The signal levels are low (0.1 to 0.2vpp), but do radiate when attached to an antenna!. Using the generator mode and a frequency counter, one can adjust the internal crystal calibration factor to get the generator accurate within a PPM or so.

Tapping on the frequency display opens an onscreen keypad where a new frequency in kHz may be entered. Steps of plus and minus 500kHz, 100kHz or 5kHz may be activated by pressing the onscreen row of 6 keys under the frequency display. Several lines of diagnostic information are displayed that can be used to troubleshoot the hardware receivers, the OSL calibration and the VSWR calculation code. One can also perform a screen save to aid in debugging.

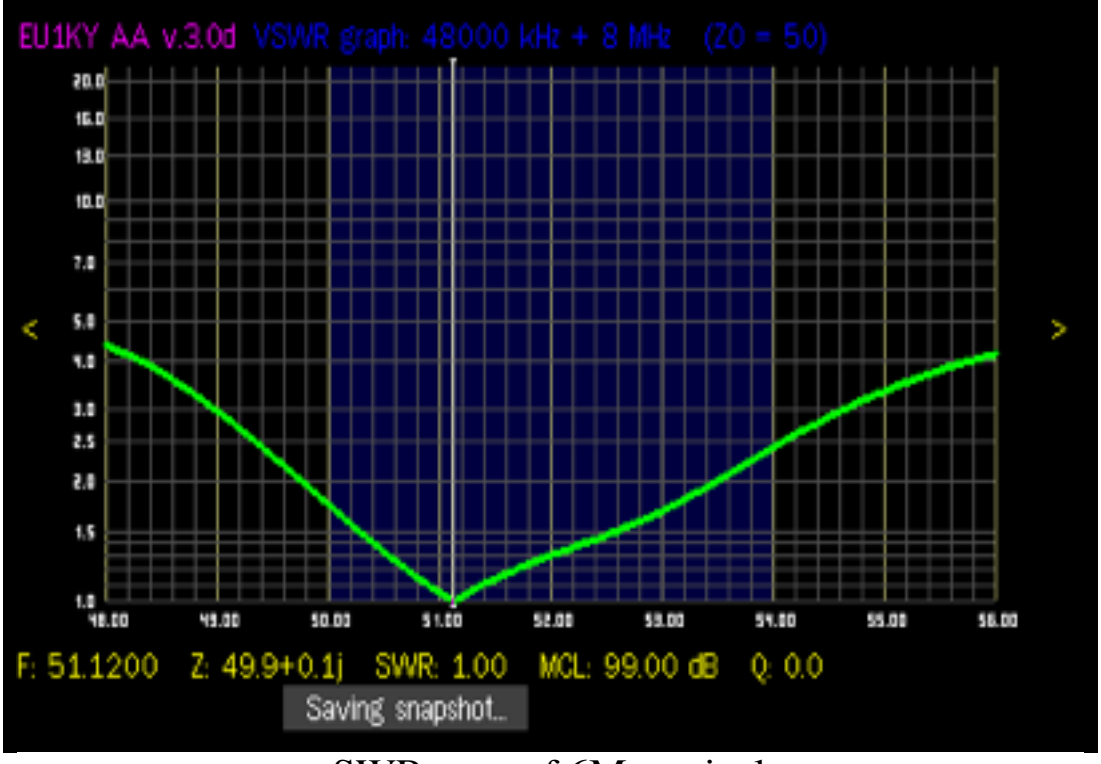
Modify the TDR screen to display coax length in metric and imperial units.



TDR scan showing both metric and imperial lengths

Modify the highlighted ham bands to represent the North American frequency ranges available.

See panvswr2.c. Also, modify the SWR panoramic display to position the cursor bar on the point of lowest SWR on the displayed graph.



SWR scan of 6M vertical

Files / Downloads / Links

Free windows IDE for ARM: https://www.embitz.org/.
STMicroelectronics ST-Link software: https://www.st.com/en/development-tools/st-link-v2.html.
Modified project source files: eu1ky_aa_v3.zip (10.0Mb).
You can download John Coppens ON6JC/LW3HAZ excellent Linsmith program from http://jcoppens.com/soft/linsmith/index.en.php
VE7IT linsmith remote control patch: linsmith-remote.patch for linsmith-0.99.28 (19.2kB).
Analyzer kit/assembled supplier: www.elekitsorparts.com

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