# TorVergata Visual Analyser Project (Coming soon 2012 version **BETA available** )

## Visual Analyser

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Detailed Features about:

1. Oscilloscope (dual channel, xy, time division, trigger);
2. Spectrum Analyzer with amplitude and phase display (linear, log, lines, bar, octaves band analysis 1/3, 1/6, 1/9, 1/12, 1/24);
3. Wave-form generator with "custom functions", triangular, square, sinus, white noise and pulse generation (NO ALIASING);
4. Frequency meter (in time and frequency domain) and counter; in time domain by means of a real time zero crossing algorithm;
5. Volt meter with DC, true RMS, peak to peak and mean display;
6. Filtering (low pass, hi pass, band pass, band reject, notch, "diode", DC removal);
7. Memo windows (data log) for analysis and storage of time series, spectrum and phase with "triggering" events; possibility to save in various formats and display them with a viewer;
8. A TRUE software digital analog conversion (for complete signal reconstruction using Nyquist theorem) ;
9. Frequency compensation: one can create/edit a custom frequency response and add it to the spectrum analyzer spectrum ; added standard weighting curves A,B,C in parallel with custom frequency response;
10. Support for 8/16/24 bit soundcard by means of API calls;
11. Unlimited frequency sampling (depend from the capabilities of your soundcard);
12. Cepstrum analysis;
13. Cross Correlation;
14. Extended THD measurements, with automatic sweep and compensation.
15. ZRLC-meter with Vector scope, automatic sweep in time and frequency for automatic measurement.

VA main form (version 8.x.x)

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ZRLC
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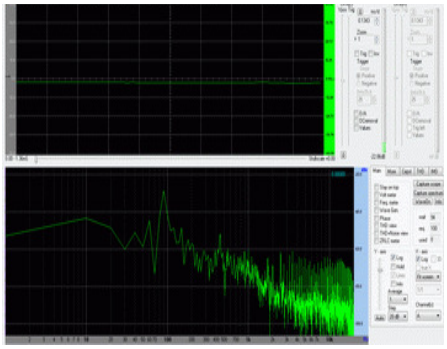
Latest VA reviews, articles:

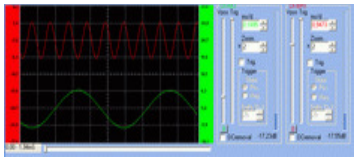


IMEKO





(1) - Oscilloscope




a. Dual channel

b. Bandwith : depends from your soundcard (typical 20 Khz) up to 96 Khz (192 Khz sampling frequency)

c. Resolution from 8 bit (S/N 46 dB) up to 24 bit (S/N >120 dB)

d. Time division adjust according the sampling frequency and sample resolution

e. Trigger (positive/negative slope) independent for both channels

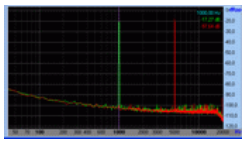
f. Complete software D/A of digital samples : the Nyquist theorem allows reconstructing exactly the input signal

g. Utilities for quick frequency determination (hold left mouse button down and move mouse to get frequency/amplitude)

h. Y-axis in Volt and percent full scale

i. Auto calibration of scope (and spectrum) in volts (need an input signal of known amplitude)

(2) - Spectrum Analyzer



a. Dual channel

b. Bandwidth : same as point (1) (oscilloscope function): is the half of the sampling frequency. Typical for 44100 Hz is 22050 Hz (up to 96 Khz or ore depending of the acquisition board)

c. Resolution from 8 bit (S/N 46 dB) up to 24 bit (S/N >120 dB)

d. X-axis in Hz, logarithmic and linear; zoom x1..x16

e. Y-axis in dB or Volt (calibration needed); linear/logarithmic; zoom

f. Average on spectrum up to 200 buffer

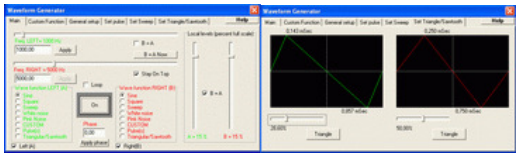
g. Direct window for amplitude with mouse

h. Auto-scale

i. Capacity to modify the zero dB level (manually/automatically)

j. Octave band analysis (1/1, 1/3, 1/6, 1/9, 1/12, 1/24)

(3) - Wave-form generator



- Dual channel
- Independent sampling frequency/resolution from scope/spectrum (up to 192 Khz/24 bit)
- Phase between channels (degree)
- Direct real time generation/ loop with predefined buffer
- Waveform CUSTOM, built with harmonics (with save/load in file ".fun" of defined waveform)
- Modulation of custom waveform with sinus/square/triangular
- Predefined waveform : sinus, square, triangular (parametric), white noise, pink noise, pulse, sinusoidal sweep
- Local volume levels
- Real time parameters variation (amplitude, frequency, phase between channels, type of waveform)

(4) - Frequency meter

- Dual channel
- Frequency meter in Hz/Time/Counter of the input signal being visualized in spectrum/scope
- Read the frequency of the harmonic of maximum amplitude
- Counter with threshold level

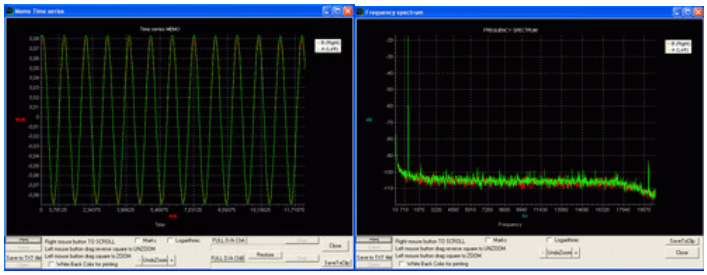
(5) - Volt meter (calibration needed)


- Dual channel
- Vpp, True Rms
- Hold function

(6) - Filtering

- FIR low pass cut-off frequency user defined
- FIR high pass cut-off frequency user defined
- FIR band pass cut-off frequencies user defined
- FIR band reject cut-off frequencies user defined
- IIR notch cut-off frequency user defined
- IIR notch-inverted cut-off frequency user defined
- "Diode" function
- DC removal
- Dual filter (one for each channel)

(7) - Memo windows



- Aquiring of spectrum with average
- Edit offline (while VA running) of aquired spectrum: zoom, navigate
- Saving of spectrum in TXT format
- Clipboard for aquired spectrum
- Print of aquired spectrum
- Mark points for each valid point (harmonic) of spectrum
- Aquiring of scope points (points aquired in time domain)
- Edit offline (while VA running) of aquired time series: zoom, navigate
- Saving of samples in TXT format
- Clipboard for aquired samples
- Print of aquired samples
- D/A conversion: the points aquired may be converted using Nyquist theorem for full reconstruction of signal in time domain (see point 8 for D/A in real time)

(8) - real time DIGITAL/ANALOG conversion

- D/A in real time
- Dual channel
- Allows visualizing each aquired harmonic

Points (8) need a clairification:

VA has the unbeatable feature to perform a full real time Digital-Analog conversion for the oscilloscope function.

Consider using a frequency sampling of (standard) 44100 Hz, with a 16 bit resolution (resolution is not relevant for the purpose of the discussion below...)

Other programs similar to VA simply plot the raw points on the screen, which means you can't easily analyze signals with a frequency higher than 3000/5000 Hz (there are limited points to plot). Even worse, think a

sinusoidal signal of 20 KHz. You would have only 2 points (more or less) per cycle! ... The Nyquist theorem says that it is sufficient to RECONSTRUCT the original signal...try to see what happens if you draw a sine with only two points ...it will appear like a triangular waveform...

Try the power of VA enabling the function "full D/A", apply a sinusoidal signal of 15-20 KHz (for example using the Waveform generator included in VA) finally use the "Time division" control for the selected channel (mS/d) to display the signal at the desired detail level. You will see a perfect waveform with all the points of the original signal (not only two).

(9) Frequency compensation

Visual Analyser allows you to apply a predefined frequency response to compensate (for instance) the frequency response of a microphone. You should know the frequency response of your microphone; normally professional microphone should be shipped with the typical frequency response. You can add a limited number of points in VA, and apply. VA will interpolate a continues curve by means of cubic spline interpolation algorithm. You can do it through the windows below.

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Send an e-mail to va@sillanumsoft.org for questions and/or suggestions about the web site. The webmaster is Alfredo Accattatis.
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