Welcome to Ham Radio University 2018!

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2018

PC Based Test Equipment Workshop
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PC-Based Test Equipment

Soundcard Scope – PC Based Oscilloscope and Signal Generator

Spectrogram – Audio Spectrum Analyzer

Spectrum Lab – Newer, more feature-packed spectrum analyzer

There are others out there but we will look at these three

All three have practical uses in the shack

Only difference between these and "real" RF versions is frequency range
Get your feet wet before you invest in a "real" RF version
Evaluate filters
Experimentation

Where to Get . . .

Soundcard Scope: https://www.zeitnitz.eu/scope_en

System Requirements: Windows 2000/XP/Vista/7/8/10 (32bit and 64bit) computers with a sound card, 1 GHz or faster.

Spectrogram: http://w5big.com/spectrogram.htm

System requirements: No longer posted anywhere but I have run Spectrogram on Windows 98, ME, XP, and Windows 10.

http://www.qsl.net/dl4yhf/spectra1.html

System Requirements: Windows 98, 2000, ME, XP (home and professional), Windows 10, Linux/WINE. Will not run under Windows Vista, but there are workarounds.

I have copies of all three of these here at HRU on a thumb drive if you want a copy
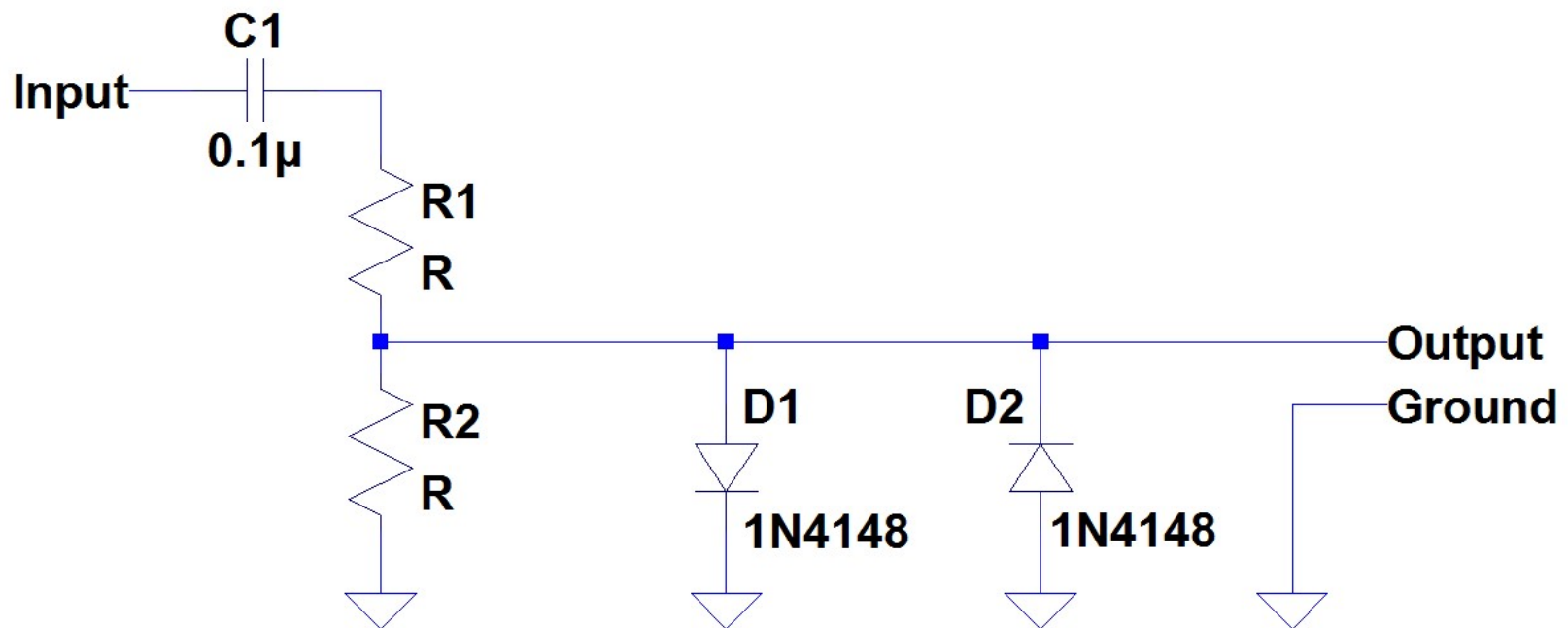
Suggested protection circuit

Most sound cards don't want to see more than 0.7 V peak

C1 blocks DC from getting into your sound card

R1 and R2 attenuate the input signal of interest to a level your sound card can handle

D1 and D2 limit voltage to +/- 0.7 volts in case the resistors don't attenuate enough

Soundcard Scope
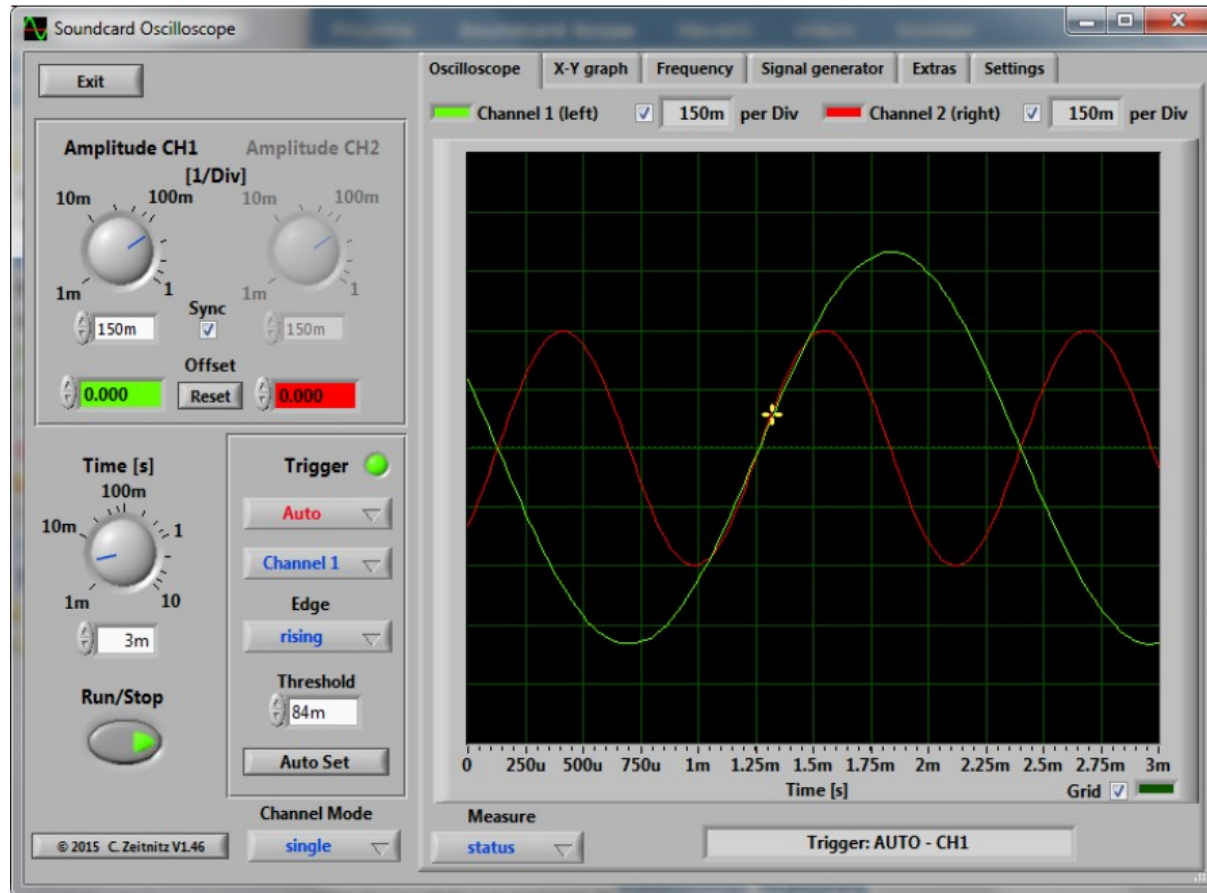
Basic dual-trace scope

Built-in Signal Generator

Rudimentary spectrum analyzer function

X-Y mode

Supports multiple sound cards

Soundcard Scope Screen Shot

Let's Try It !

Basic Scope Controls

-Vertical Scale

-Horizontal scale (Timebase)

-Trigger Source, Level, and Polarity
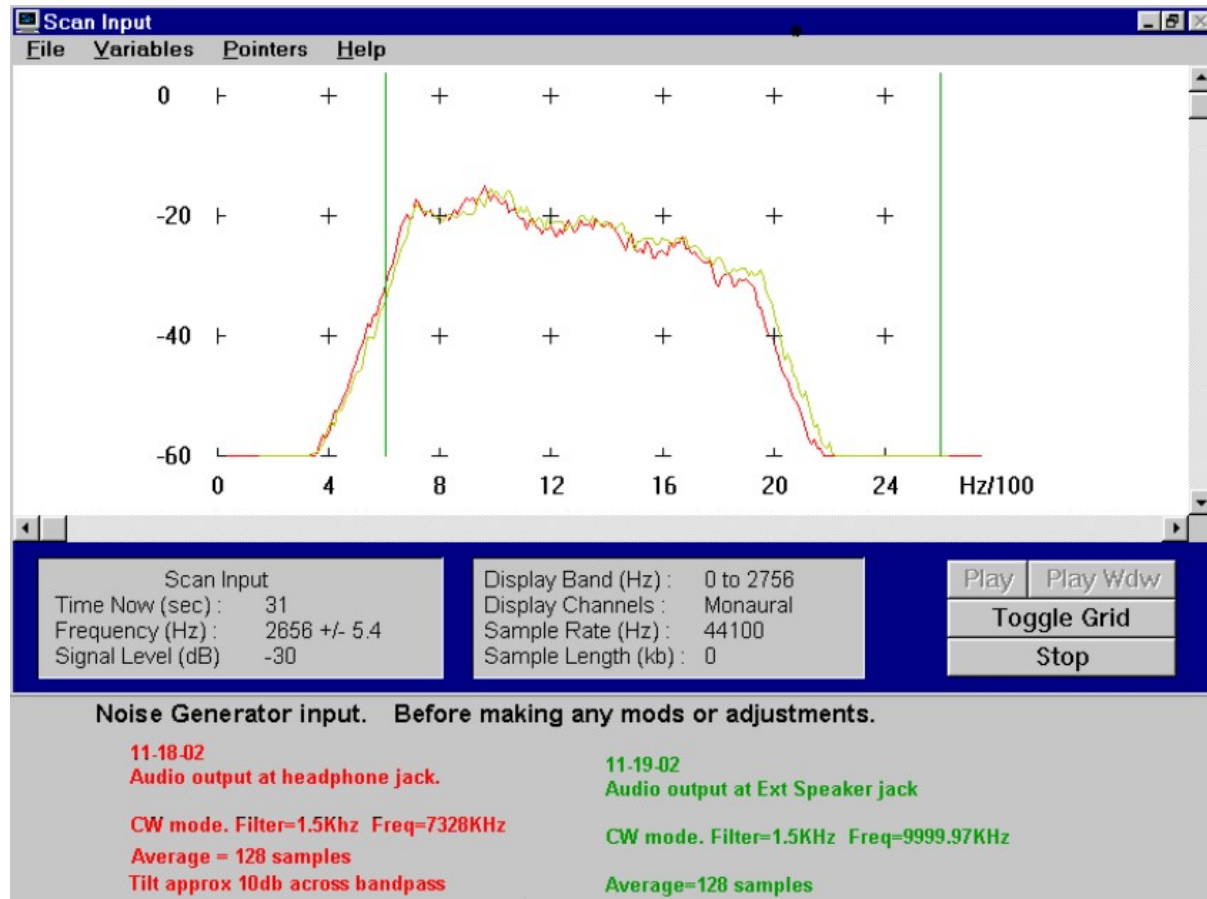

X-Y Lissajous Patterns

Spectrogram

"Old" version (5.17) is free. Current versions are not free.

Version 5.17 is good enough for our purposes. Newer version has more bells and whistles.

Not as easy to select input source as other programs

Spectrogram Screen Shot

Let's Try It !

Sine Wave Spectrum

Square Wave Spectrum

Triangle Wave Spectrum

Sawtooth Wave Spectrum

Typical Filter

Square Wave	
Harmonic	Level (dB|Fundamental)
1 (Fundamental)	0
3	-9.54
5	-13.98
7	-16.90
9	-19.08
11	-20.83
13	-22.28

Triangle Wave	
Harmonic	Level (dB|Fundamental)
1 (Fundamental)	0
3	-19.08
5	-27.96
7	-33.80
9	-38.17
11	-41.66
13	-44.56

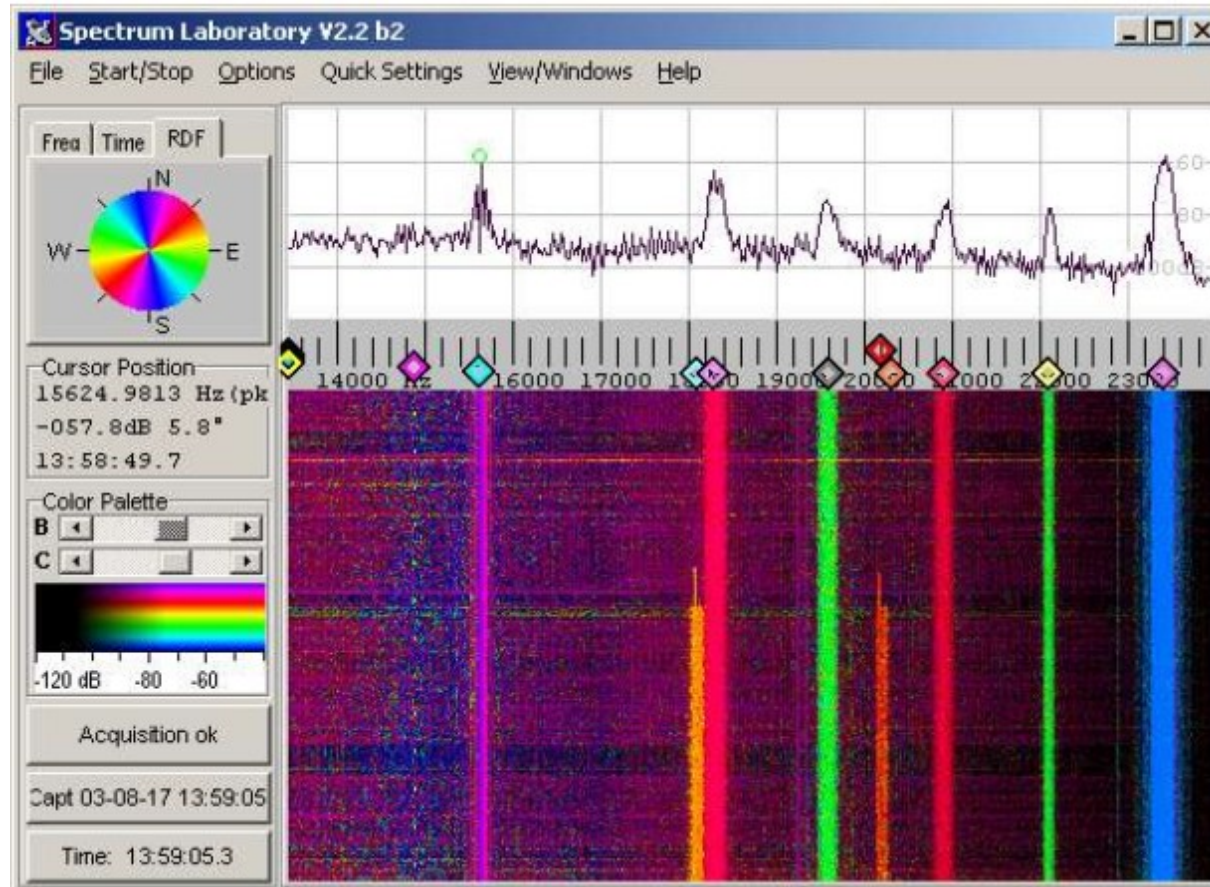| Sawtooth Wave	
Harmonic	Level (dB|Fundamental)
1 (Fundamental)	0
2	-6.02
3	-9.54
4	-12.04
5	-13.98
6	-15.56
7	-16.90

DL4YHF Spectrum Lab

Much more feature-rich than Spectrogram

Developed by hams with ham-friendly features

Includes Software-Defined Radio function

Can make a whole hobby just learning all of the features

DL4YHF Spectrum Lab Screen Shot

Let's Try It !

Rig Filters

       Elecraft K3 vs. Kenwood TS450

Software Defined Radio

       "Canned" over the air data collected with "Soft Rock" SDR kit