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After enjoying the [Simple man's Spectrum Analyser] so much, here's some real insanity. The Mk2 spectrum analyser is an attempt to resolve some of the shortcomings of the original simple analyser, improve performance, and add hosts of features. The display uses an ex-TV tube, with digital storage. Purely for the fun of it, the digital circuits are built using discrete logic rather than a microprocessor.

The new analyser has the following target feature list (some of which may or may not be attained):

o Frequency coverage 0 to 1000 MHz
o 95dB dynamic range
o Built in tracking generator
o Selectable resolution filters
o Selectable sweep speeds (very slow sweeps possible)
o Digital storage, up to 8 storage channels
o Dual channel CRT display
o Ability to display addition or subtraction of 2 channels
o Frequency measurement with on-screen digital display
o Amplitude measurement with on-screen digital display
o Computer interface to PC parallel port for screen dumps

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The original thoughts on the new analyser were written in [this .pdf document] . Since then I decided to greatly simplify front panel layout and make a neater display by using the CRT itself for digital frequency and amplitude readout rather than separate 7-segment LED displays. Most of the rest of that document remains valid, although several new features have been added later.

The display format uses the standard European PAL timing, i.e. 50 frames per second and 625-line interlaced (15625 Hz horizontal frequency). I use the central 40uS section of the 64uS horizontal scan line, divided into 320 pixels. The analyser trace therefore occupies 320 x 256 pixels of display area. Below that 16 scan lines will be used as a 320 x 16 pixel block for textual display, comprising 2 rows of 40 characters. That's plenty of space to display frequency and amplitude information, as well as other settings e.g. db/div, sweep rate etc.

The character generator uses a 128KByte FLASH chip. A completely excessive storage capability considering that minimalistically an 8 x 8 pixel grid would require only 80 bytes for the digits 0-9 (but more would be nice for text capability). However FLASH is considerably cheaper than EEPROM, so the cheapest available chip is used. In practice the large size results in other simplifications, since a different character map can be used for each of the 80 displayed characters, therefore text settings information can be displayed easily by selection of only one or two digital address lines.

This project is still under construction and likely to take a **long** time. Below are some brief details on the design, and pictures of progress to date (click the pictures for bigger versions). The screenshots from the new digitised display are at the bottom of this page.

We start with a small black {gallery}spectrumanalyser2/1{/gallery} bought at a car boot sale a few yea

Here's the result of my TV conversion to a miniature 4.5-inch diagonal computer monitor taking TTL-l

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Pictured left you can see click here for datasheet. On the right ... Click here for the TV circuit

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The digital sections of the Simple man's Spectrum Analyser (currently) circuit boards ... 8-way DIP switch (functio

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The first board built is the middle one in the above assembly. It contains the timing generator (all timin

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The analogue board (left) contains a 10-bit digital to analogue converter (DAC) which generates the s

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Nightmare alert! Unknown to me in advance, the ADC chip (left) turned out to be a tiny surface mount

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Test setup. At present I am using the existing Mk1 Analyser as the RF section. The ADC and DAC circuits both use the vo

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The logarithmic Y output still feeds the oscilloscope (left), but now also the ADC. Notice the beaded a

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Here I proudly show off the digitally generated 10 by 8 graticule (left). Further attention to the video dr

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Here's the 2-channel mode with the graticule switched off (one of the DIP switches controls the gratic

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Up close and personal with {gallery}spectrumanalyser2/13{/gallery} 12MHz ... calibration oscillator. This shows the

Get me out of this insane place!

Take me back to the [Simple man's Spectrum Analyser!]

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