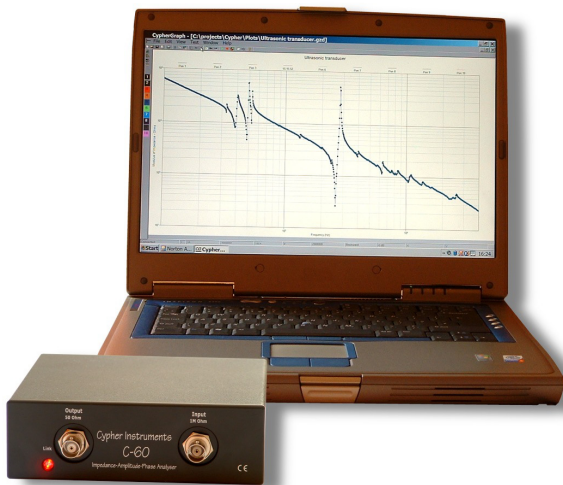
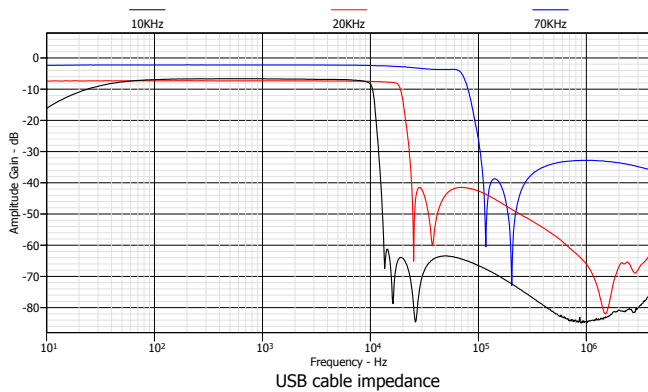


## Impedance/Frequency Response Analyser

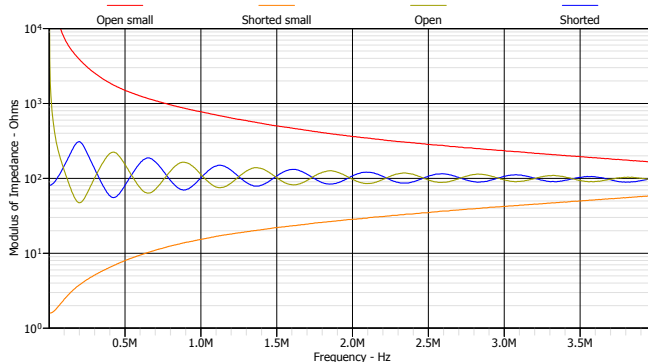


### Example graphs

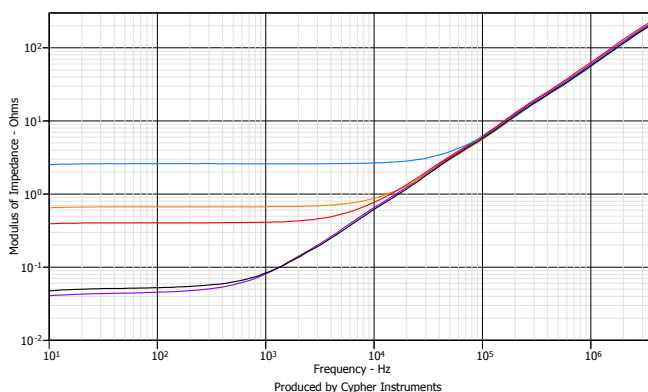
Elliptic low pass filters



USB cable impedance



Five inductors with 10uH marking



Produced by Cypher Instruments

Cypher Instruments have developed the C60, a low cost, portable scientific test and measurement device. This unit measures the **Amplitude, Phase** and **Impedance** responses of electronic, electro-acoustic and other systems. The tests are controlled by a PC and the results are displayed as graphs.

### Applications and uses

- Professional / consumer audio
- Ultrasonic products
- Electro-acoustic transducer design
- Component evaluation
- Research and development, education
- Production testing and quality control
- Field service and maintenance

### Features

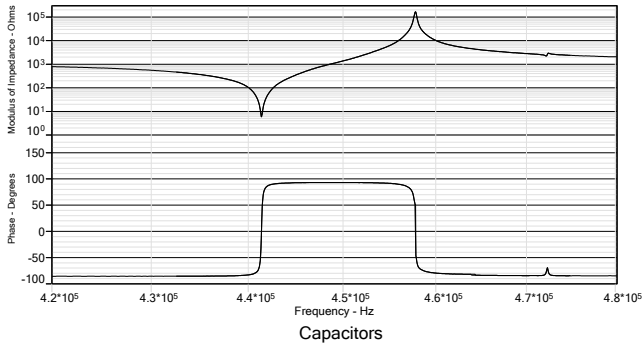
- Measure amplitude, complex impedance and phase responses from 10Hz to 4MHz
- Frequency axis displayed logarithmically or linearly
- Amplitude measured as gain or loss displayed in dBs
- Phase display ranges of 0° to 180° or ± 180°
- Display impedance in Ohms or admittance in Siemens
- Professional graphs with 10 plots per graph
- Intuitive powerful graphing program
- Save graphs as data files and jpg, bmp and meta files
- Export data as ASCII text for MathWorks MATLAB, GNU Gnuplot and Microsoft Excel
- Copy and paste plots from one graph to another
- Automate testing procedures with test scripts
- Pass / Fail testing using graphical masks
- Small, light weight, portable, USB powered device
- Firmware Upgradeable
- Affordable

### Product description

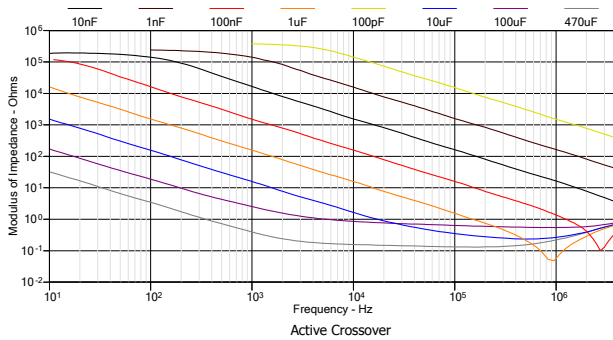
The C60 investigates the opaque world of analog networks. The unit operates in two test modes. It can measure the frequency response of a two port system producing a gain/loss and phase graph. It can also measure the reactive response of a two terminal network producing an impedance/admittance and phase graph. Electronic, electrical, electro-acoustic and other networks can be tested with sine wave excitation and the results displayed on a PC. The C60 is USB powered; it needs no batteries or external power supplies, making it portable. The unit has a USB connector at the rear, an input and output BNC and a USB Link/activity LED. All the functionality of the device is controlled by the PC through an easy to use interface. A scripting language and digital control outputs are provided for test automation.

## Example graphs

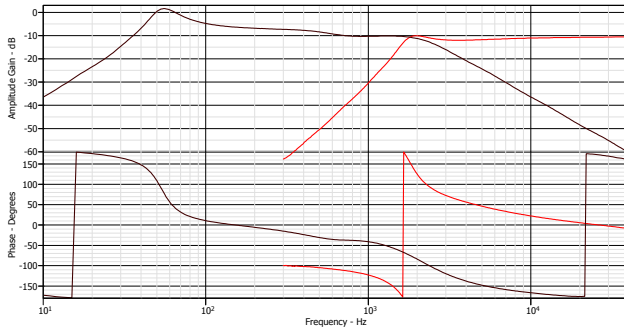
455KHz resonator, complex impedance



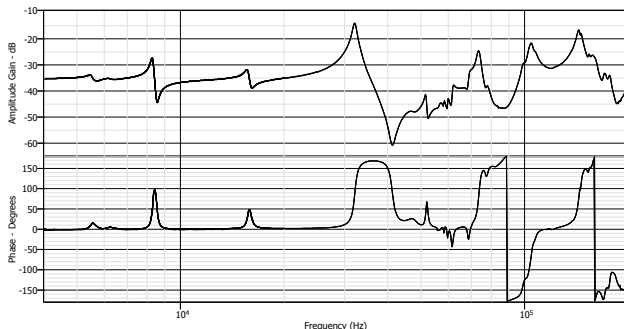
Capacitors



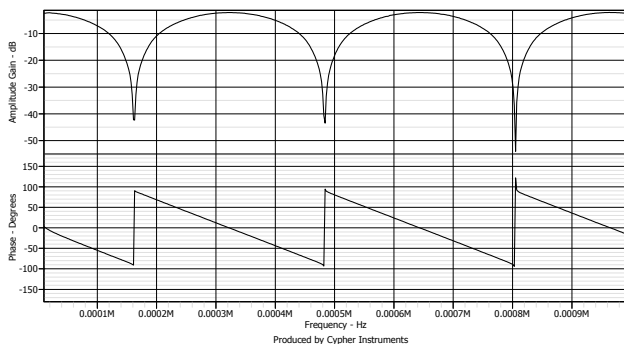
Active Crossover



Two transducer response



Digital Audio latency (21/3380) / 2 = 3.1065mS



Produced by Cypher Instruments

## C60 - Specifications

### DDS Sine wave generator/output

Frequency range of sine wave generator = 10Hz to 4MHz  
 DDS sine wave generator  
 Sine wave quality = 62dB SNAD (nominal)  
 Output voltage = 2Vpp maximum  
 Output attenuator, 0dB to -20.0dB in 2.5dB steps  
 DC offset at output = 0.9mV typical  
 Output impedance = 50 Ohms + parasitics of 23nH and 33pF (Z mode)  
 Frequency accuracy at 1MHz it is  $\pm 100$ ppm  
 BNC output connector  
 \*\*\*\*\* Destructive/Absolute Maximum Limits \*\*\*\*\*  
 Absolute maximum current applied to output = 0.2Arms  
 Absolute maximum voltage applied to output = 9VDC or 22VppAC

### Input channel

Input impedance = 1M ohm in parallel with 14.5pF  
 AC coupled input (0.15Hz HP)  
 Maximum signal input = 3.5Vpp maximum before compression (+5dB)  
 Minimum input signal = 100uVpp (-86dB) with  $R_{source} = 50R$   
 Noise floor = -86dB at 1MHz/input S/C; -73dB at 1MHz/input O/C  
 BNC input connector  
 Absolute maximum voltage applied to input = 50VDC or 50VppAC

### Other hardware features

USB connection for data and power, USB 2.0 full speed (12Mbps)  
 Mode LED indicating Power and USB activity  
 Current consumption = 100mA to 220mA depending on activity  
 Power consumption = 0.5Watt to 1.1Watt depending on activity

### Size and weight

148mm x 132mm x 43mm, 420g

### Software

Advanced graphing program used to display test results  
 Maximum number of test points = 1000 per plot, 2 parameters per plot  
 Multiple plots; 10 plots per graph, with user text fields  
 Logarithmic and linear frequency sweep and stationary frequency  
 Logarithmic and linear frequency axis  
 User controllable test settling time  
 User selectable range of frequency points  
 Logarithmic (dB) Gain/Loss amplitude display  
 Amplitude display range = +5dB to -86dB (0.025dB best resolution)  
 Amplitude detector straight line deviation =  $\pm 0.35$ dB  
 Linear phase accuracy = see user manual graphs  
 Phase range =  $\pm 180^\circ$  and  $0^\circ$  to  $-180^\circ$   
 |Z| The modulus of the impedance of the test device (DUT)  
 Impedance accuracy = from  $\pm 0.5\%$  to  $\pm 4.5\%$  deviation (see user manual)  
 Impedance displayed in Ohms or Admittance in Siemens (log & linear)  
 Impedance display range of 0.01 Ohms to 1M Ohm (450K Ohm)  
 Auto ranging or fixed Impedance and Gain axes  
 Save/Recall as GAD and GZD files  
 Save graphs as JPEG images, BMP images, Meta files and data files  
 Use graphs in documents and emails  
 Graphing Controls; START, STOP, REPEAT, ZOOM, UNDO ZOOM, FULL SCREEN, USER TEXT FIELDS, FREQUENCY LIMITS, SWEEP BACKWARDS, ALTERNATE SWEEP, SWEEP TO ZOOM EXTENTS, PEN COLOURS, PEN LOCK, GRAPH SELECTION COLOUR/BLACK/BLACK PLUS MARKERS, COPY, CUT, PASTE  
 Calibration option for internal amplitude and phase trims  
 Multiple document interface  
 Scripting control of the unit

### Minimum PC specification

Operating systems, Microsoft Windows 98SE, ME, 2000, or XP  
 Pentium II 333MHz  
 64MB RAM, 50MB HDD, Keyboard, mouse and USB  
 Recommended minimum graphics resolution of 1024 by 768