

4130A Impedance Adaptor

apparateq

Electronics for Research and Science

PRELIMINARY INFORMATION



- Turns network or signal analyzers into impedance analyzers
- BNC interface, supporting third-party test fixtures
- Wide frequency range
- Wide impedance range
- Ideal for impedance spectroscopy
- Precision design
- Simple setup
- Optional sample code available

The 4130A facilitates impedance analysis using network analyzers, signal analyzers or general signal acquisition equipment. If your analyzer has one generator output, and two signal inputs, you are good to go.

The 4130A acts as an interface between an impedance test fixture and your analyzer. The voltage across the DUT and the current through the DUT are converted into voltages presented to your analyzer. The ratio and phase between the voltage channel and the current channel represents the magnitude and the phase of the impedance.

Practically all impedance measurements can now be carried out by your analyzer, limited only by its user and programming interface.

The optional sample code provides means for open and short corrections, for calibration, for data presentation, and data storage. You may modify the code to suit your analyzer and specific requirements. Contact Apparateq for details.

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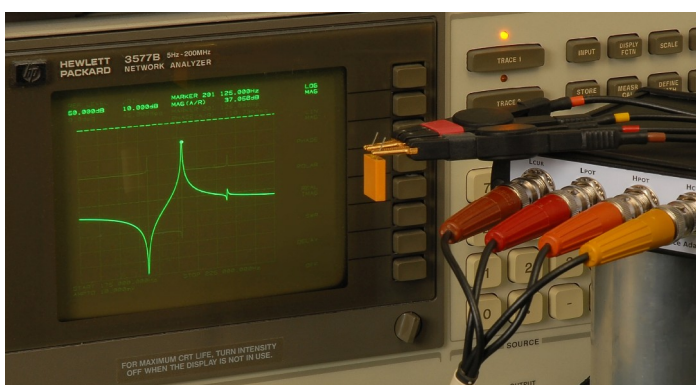
Specifications and characteristics

Frequency range	DC – 500 kHz, typ., magnitude and phase uncertainty limits apply *)
Control	Manual, or externally programmable: Conversion range (transimpedance scaling factor) Filtering (see below) Current/voltage channel swap
Analyzer input	1 x BNC, 1 M Ω input impedance, DC-coupled
Analyzer outputs	2 x BNC, 2 V _p (AC + DC) max., 50 Ω \pm 1 % output impedance
Test fixture interface	4 x BNC: Voltage sense inputs (HV and LV), drive output (HC, with switchable output impedance), and transimpedance input (LC, protected)
Filtering	Bypassed, or one of the following: Filter A) For $f_s \geq 95$ kHz, test frequency ≤ 20 kHz recommended. Filter B) For $f_s \geq 450$ kHz, test frequency ≤ 100 kHz recommended Filter C) For $f_s \geq 2.5$ MHz, test frequency ≤ 500 kHz recommended
Supply	9 – 30 V DC, ≤ 5 W, reverse voltage protected
Measures	109 mm (W) x 129 mm (D) x 35 mm (H)

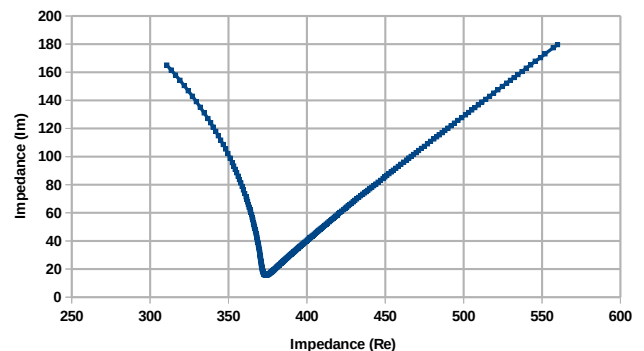
*) Preliminary specifications; The parameters are yet to be fully characterized

The 4130A enables you to measure impedances over a wide frequency range. Typical applications include impedance spectroscopy within electrochemistry, characterization of passive components, loudspeaker testing, among others.

The input and outputs of the 4130A are DC-coupled to carry out measurements at ultra-low frequencies, only limited by your analyzer's capabilities. Also, the DC-coupling allows biasing of polarized components or semiconductors under control by your analyzer.



Above: A network analyzer now in use as an impedance analyzer. The analyzer's display of the ratio between its channels A and R (and multiplied by the transimpedance scaling factor of the 4130A) now represents the measured impedance. In this case, the display shows the magnitude of the impedance of a 200 kHz ceramic resonator.



Above: An impedance plot of electrolytic conductivity made by the 4130A and a general purpose data acquisition module.

Traditionally, measurements of impedances are done at discrete frequencies or over swept spectrum. However, the 4130A is essentially signal-independent, and you may even apply complex waveforms or multi-tone signals, if needed and supported by your analyzer.

The 4130A supports channel swapping so that differences between the two channels of your analyzer can be suppressed. Also, the 4130A includes programmable filters to put general-purpose data acquisition gear into use as impedance analyzers.

For further information on how to put the 4130A into use consult our application note "Turning network and signal analyzers into impedance analyzers".

Need impedance measurements at higher frequencies? Consider the coming 4140A which provides an APC-7 interface to be used for RF test fixtures, and which is specifically designed to turn RF network analyzers into impedance analyzers.