

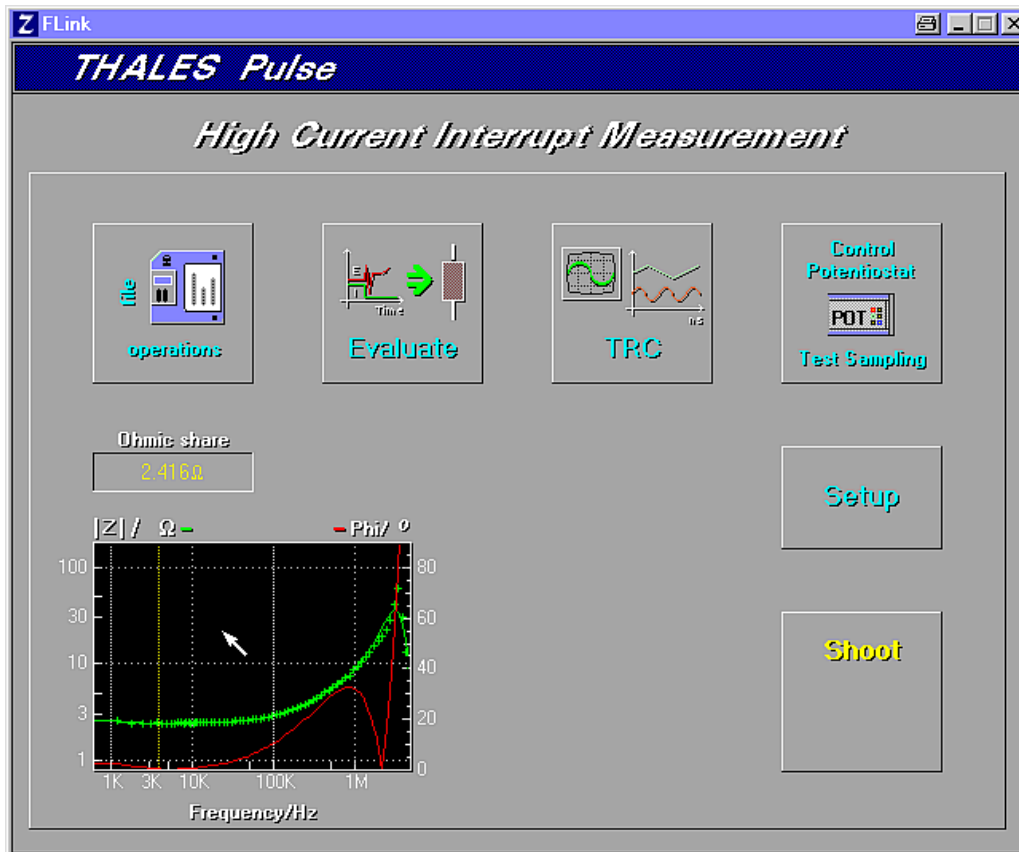
PULSE

'High Current Interrupt Measurement'

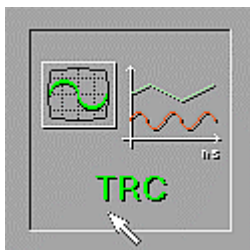


1. Main Menu

All settings of the hardware and the measurement are controlled by the main menu. A set of icons allow the direct jumping to related program parts such as TRC (Transient Recording) and EIS (Electrochemical Impedance Spectroscopy).



2. Configuring the transient recorder TR8M



Clicking on the **TRC** button leads to the main menu of the **Transient Recording** program part. There you have access to all parameters of the TR8M.

3. The IM interface

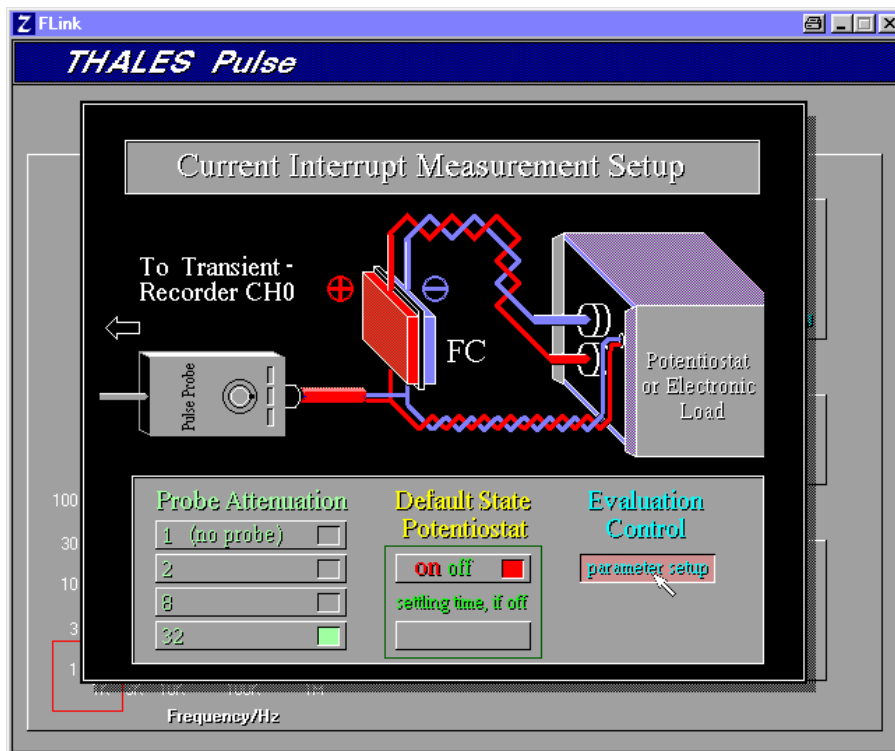


Clicking on the **Control Potentiostat** button leads to the program part **Test Sampling**. There you have access to the DC parameters you need for an interrupt measurement.

4. Setup menu for interrupt measurements



Clicking on the Setup button leads to a page where you can setup the parameters of the interrupt measurement.



4.1. Attenuation of the dynamic range Probe Attenuation

The input of the transient recorder allows a dynamic range of $\pm 2V$. The Pulse Probe provides a galvanic isolation of the input of the TR8M and the investigated object. Furthermore, a **Snubber** (= transformer) protects the input amplifier from high pulse power. The signal amplitude is attenuated to the dynamic range of the TR8M by the Pulse Probe.

1 (no probe) <input type="checkbox"/>	Direct input to TR8M, no attenuation Dynamic range: ± 2 V, no galvanic isolation	1 (no probe) <input checked="" type="checkbox"/>
2 <input type="checkbox"/>	Input through Pulse Probe, divisor 2 Dynamic range: ± 4 V, galvanic isolation	2 <input checked="" type="checkbox"/>
8 <input type="checkbox"/>	Input through Pulse Probe, divisor 8 Dynamic range: ± 16 V, galvanic isolation	8 <input checked="" type="checkbox"/>
32 <input type="checkbox"/>	Input through Pulse Probe, divisor 32 Dynamic range: ± 64 V, galvanic isolation	32 <input checked="" type="checkbox"/>

4.2. State of the potentiostat during an interrupt measurement

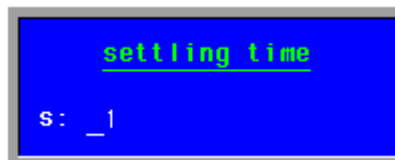
Default State
Potentiostat

Default State describes the state of the potentiostat before and after a measurement. That means:

- ON** on off The potentiostat is off only for the time period of the interrupt measurement. Before and after the pulse it is on.
- OFF** on off The potentiostat is on during the interrupt measurement and is switched off after the measurement.

Toggle between these modes by clicking on the **on/off** button. In case that the real state does not match with the actually selected one, a message is displayed. The potentiostat has to be toggled then in the **Test Sampling** menu of the **EIS** program part.

settling time, if off
2s Before a interrupt measurement is performed, the system to be investigated should be in a stationary state. The parameter **Settling Time** allows to define a pause before each measurement during which switching-on processes can settle. This option is active only in the **Default State = OFF**. To input the settling time click on the **Settling Time** button.



5. Starting an interrupt measurement

If all conditions of an interrupt measurement are set correctly, the **SHOOT** button is activated. Start an interrupt measurement by clicking on this button, now.

Starting conditions not met



Starting conditions met

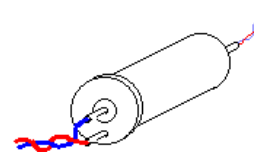
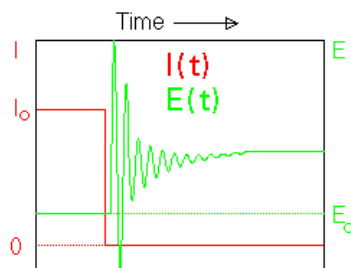


Start interrupt measurement



6. Analysis

The acquired time domain data are folded by a Hanning-Window and transformed to the frequency domain by a Zoom-FFT. By the resulting frequency spectrum and a reference spectrum a pseudo-impedance spectrum is calculated.



Hanning-Window

$$f(t) = E(t) \circ H(t)$$

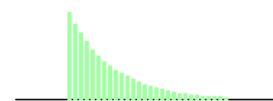
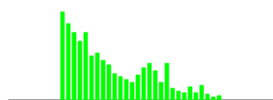
Zoom-FFT

$$G(j\omega) = F(f(t))$$

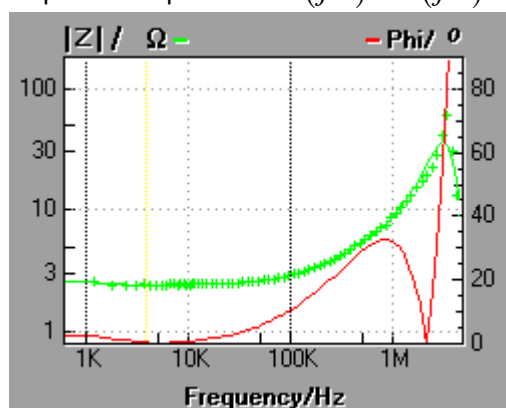
Calibration with a coaxial
precision-reference resistor

Amplitude Spectrum $G(j\omega)$

Reference spectrum $R(j\omega)$



Scalar impedance spectrum $Z(j\omega) = G(j\omega) \div R(j\omega)$



7. **File Operations**



By clicking this button you call the Thales file manager. The calculated pseudo-impedance spectrum data can be saved. Later on they can be loaded into the SIM software for analysis.