

APPLICATION GUIDE

LCR 4 wire to 2 wire conversion

Introduction

The integrity of any LCR measurement will depend first upon the nature and quality of electrical connection between the measurement instrument and the device under test (DUT).

Conventional thinking with respect to electrical connection is that optimum LCR measurement accuracy will always be achieved when using 4 wire (often called Kelvin) termination. In practice however, there are many circumstances where the electrical simplicity of 2 wire termination will result in superior measurements.

This brief document illustrates how a simple connection technique applied to the 4 wire BNC connection terminals of an N4L Impedance Analysis Interface (IAI or IAI2), will provide an effective 2 wire coaxial cable connection.

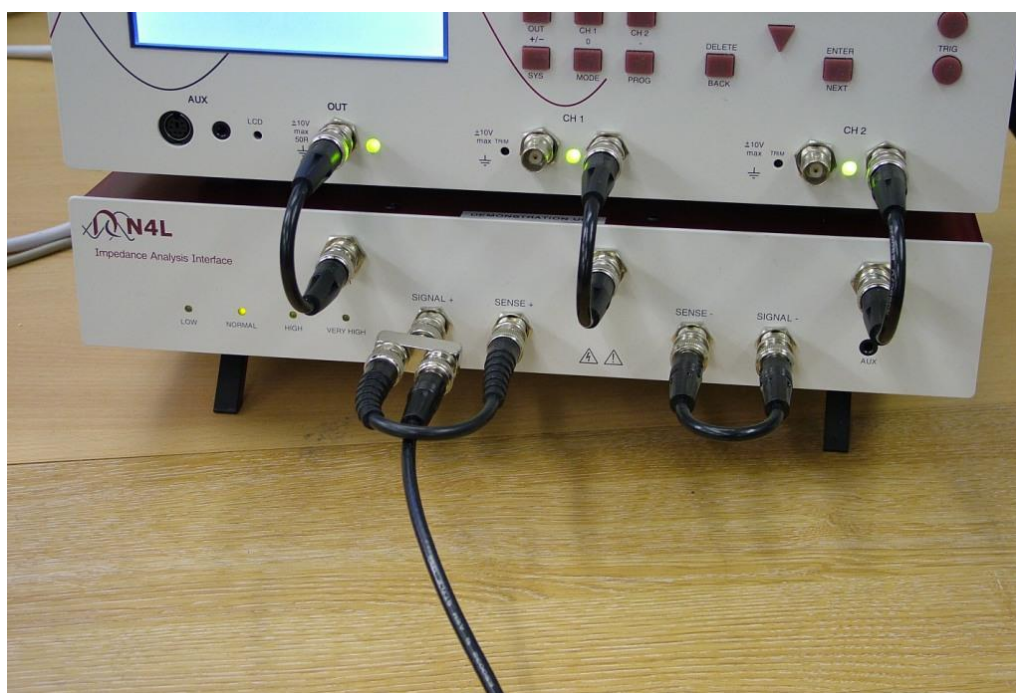
Considerations

4 wire termination uses independent conductors for the signal source (power \pm) and measurement (sense \pm) circuits of a measurement instrument. This ensures that the measured signal represents only the voltage across the device under test, excluding any volt drop across the supply cable.

The maximum benefit of this connection technique is usually apparent where the DUT impedance is low and measured frequency range is $\leq 1\text{MHz}$.

As the DUT impedance and measurement frequency increase, the impact of parasitic components associated with 4 wire cable connection can begin to dominate measurement error. Under these conditions, converting to a 2 wire connection technique will commonly achieve more accurate and repeatable measurement results.

4 wire to 2 wire conversion

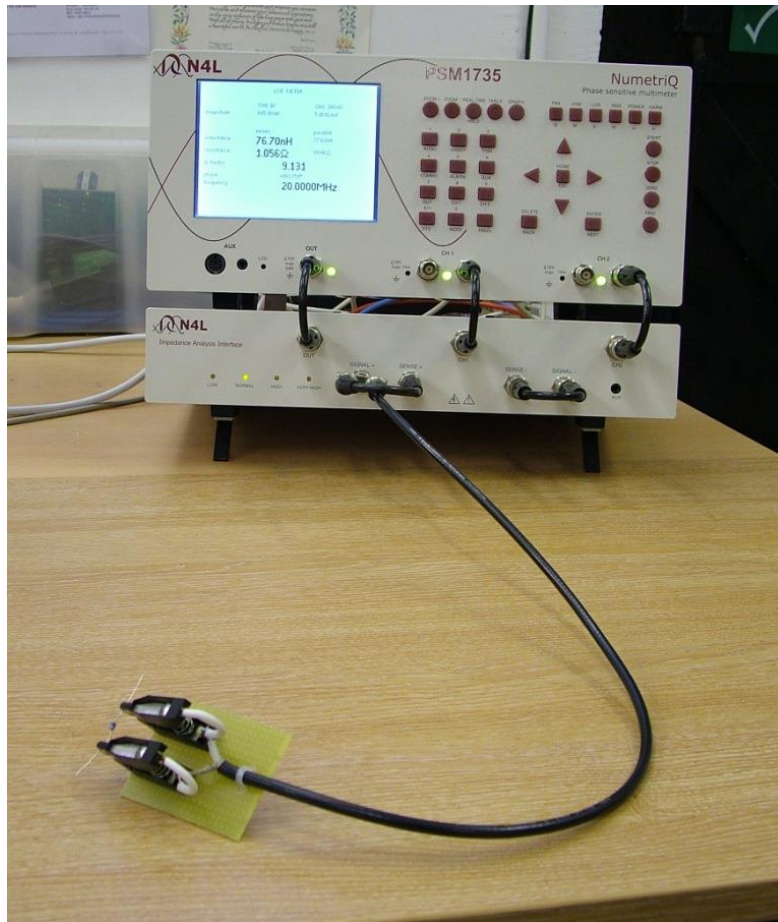


Parts required:

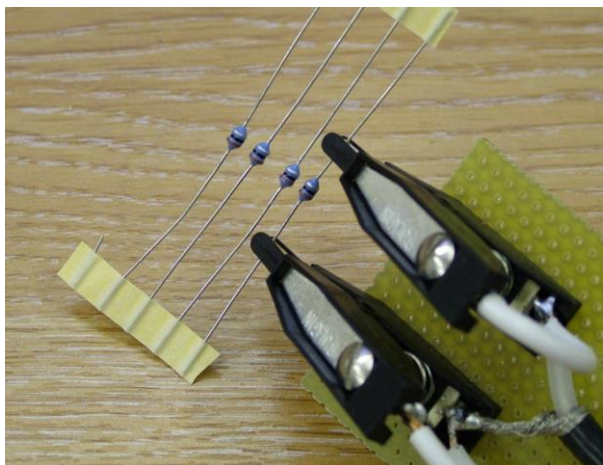
Short BNC-BNC x2
BNC 'T' Piece x1
BNC to coax cable x1

Suitable connector(s)

(Examples on following page)



When the test environment or DUT is unsuitable for our standard 4 wire accessories, the constrained conductor geometry associated with coaxial cable permits more effective compensation and greater measurement repeatability.



Adjacent crocodile clips for axial components



Kelvin clip for plate components

APP GUIDE – LCR 4 wire to 2 wire conversion	Nov 2020	Doc ref: D000288-1
Newtons4th Ltd 1 Bede Island Road Leicester LE2 7EA UK	Tel: +44 (0)116 2301066	