PicoVNA®

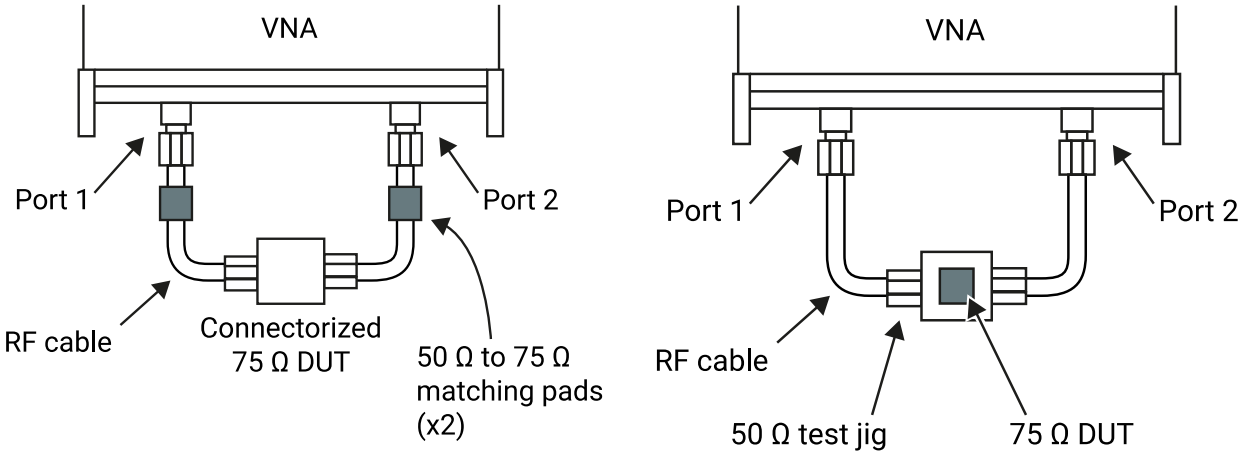
Vector Network Analyzers

System Z0 Conversion Guide

1 System Z0 conversion

The **System Z_0 Conversion** facility allows measurements, which are always taken in 50 Ω, to be converted to another impedance that you select. This feature can be useful, for example, for measuring 75 Ω devices. The value of Z_0 entered must be real (purely resistive) and must be within the range of 10 Ω to 200 Ω. Whenever this facility is selected, an indicator is displayed on the top right corner of the graphics display as shown in the second figure below. **Note** that when requested, impedance conversion will performed on the **live measurement** and any stored **memory trace**.

There are two possible ways of using the **System Z_0 Conversion** facility. For example, 75 Ω devices can be measured using the techniques illustrated below.



Impedance matching pads can be used to measure a connectorized device. Use external matching pads and calibrate with a 75 Ω calibration kit.

A discrete device mounted on a 50 Ω test jig is simpler to measure. Calibrate with a 50 Ω calibration kit, use de-embedding to remove the test jig and allow mathematical conversion to 75 Ω impedance.

Possible techniques for measuring 75 Ω devices

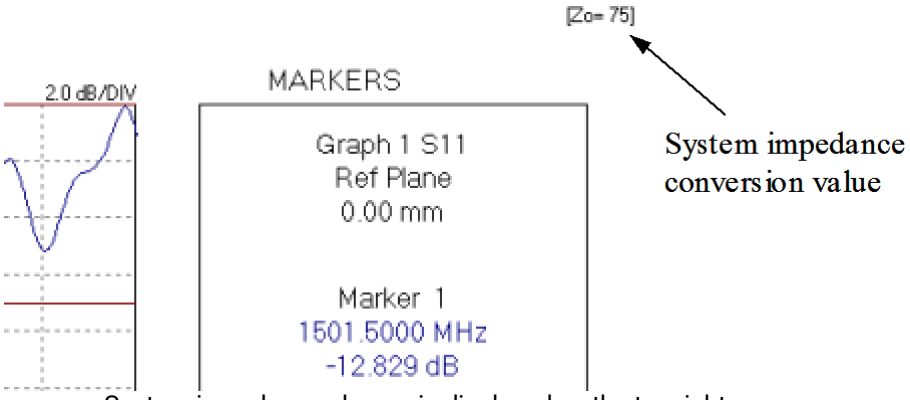
The steps necessary for each of the two techniques illustrated in the figure above are as follows:

75 Ω device with connectors

i. Connect **50 Ω to 75 Ω impedance matching networks** (e.g. matching pads) at the ends of the cables connected to ports 1 and 2.
ii. In the **Enhancement** window, check the **Convert System Zo** box
iii. Check **External Zo match** to indicate external matching networks in use
iv. Enter **75** in the **Convert System Zo** value box and click **Apply**
v. Proceed to calibrate using a **75 Ω calibration kit**
vi. Connect the DUT and **start the measurement**

75 Ω device mounted on 50 Ω test jig

i. In the **Enhancement** window, uncheck the **Convert System Zo** box
ii. Calibrate at the ends of the test cables using a 50 Ω calibration kit
iii. Apply de-embedding to remove test jig effects. See Calibration kit for some suggestions.
iv. In the **Enhancement** window, check the **Convert System Zo** box
v. Uncheck the **External Zo match** box (in this case mathematical impedance conversion is done by the software)
vi. Enter 75 in the **Convert System Zo value** box and click **Apply**
vii. Connect the DUT and start the measurement



System impedance chosen is displayed on the top right corner

Note: S-parameters are interrelated, so, when using the Z_0 conversion facility (and no external impedance matching networks) without a full set of S-parameters available (e.g. only an S_{11} calibration) the program will assume values for the unavailable parameters as shown in the following table. A warning will be displayed in such cases.

S_{11}	S_{12}	S_{21}	S_{22}
10^{-6}, j0.0	10^{-6}, j0.0	10^{-6}, j0.0	10^{-6}, j0.0

Values assumed for parameters not available during Z_0 conversion

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