



The Vector Network Analyzer function of Bode 100 offers essential support to professional users during the design, manufacturing, testing and quality control of active and passive electronic circuits.

The vector network analyzer combines the Gain phase meter and Impedance meter functions and displays the measured values as functions of frequency (sweep measurement). Due to the high resolution DDS source even extremely small frequency spans are possible. Therefore even measurements of high-Q devices are fully supported.

The frequency sweep may be undertaken using a linear or logarithmic method to produce Bode plots in the whole frequency range. The results may be displayed in different formats as magnitude, phase, real part, imaginary part, group delay.

Also polar plots for gain and impedance measurements as well as Smith charts for reflection measurements are available.

- Set can do as : Vector Network Analyzer ,Gain Phase Meter ,Impedance Meter ,Sine Wave Generator
- The frequency range 10 Hz - 40 MHz is ideal for NF, audio, video and RF application.
- The accuracy makes it perfect for R&D labs, manufacturing and training.
- The compact lightweight design is perfect for service and maintenance purposes.
- The automation interface fits the needs of production fields.
- The price / performance value benefits professionals such as engineers, scientists and teachers engaged in the field of electronics.

#### **Bode Analyzer Suite**

Bode 100 is based on a flexible hardware design, and comes with software which allows the unit to perform the job of multiple devices: Gain Phase Meter, Vector Network Analyzer, Impedance Meter and Sine Wave Generator. Furthermore, the software provides an OLE Automation interface which enables the possibility to control Bode with OLE compatible controllers.

### The Bode Analyzer Suite

- Controls Bode 100,
- Calibrates,
- Reads the measured values,
- Calculates results,
- Presents them and
- Stores the data.

### Control

The software controls the configuration of the entire Bode 100 hardware like attenuators and oscillators.

For example, you can selectively

- Switch the input impedance between 1 MOhm and 50 Ohm,
- Set generator/source values,
- Choose attenuators (0, 10, 20, 30, 40 dB)
- Select internal or external reference

### Calibrate

Calibration of gain/phase to compensate test cables and probes by a through connection

Calibration of Impedance/Reflection to compensate test cables by

- Open-circuit
- Short-circuit
- Load

### Measured values

The measured values are gain, phase and frequencies triples and are graphically represented in various diagram formats.

### Calculates

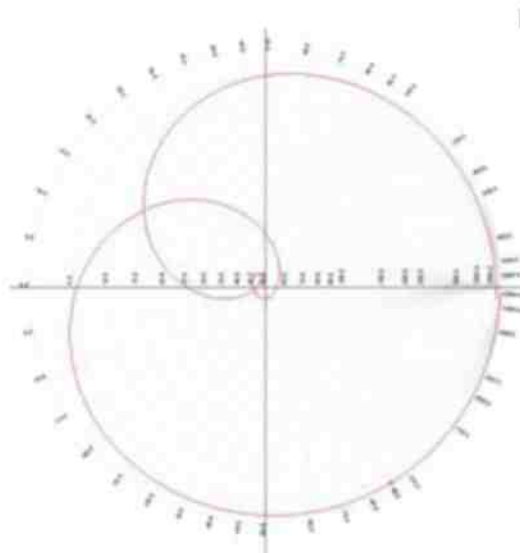
From the measured values the result can be calculated. For example, amplitude and phase can be converted and represented in different ways - Mag, Mag(dB), Phase(Degree), Phase (Rad), Tg, Polar, Real, Imag.

### Represent results

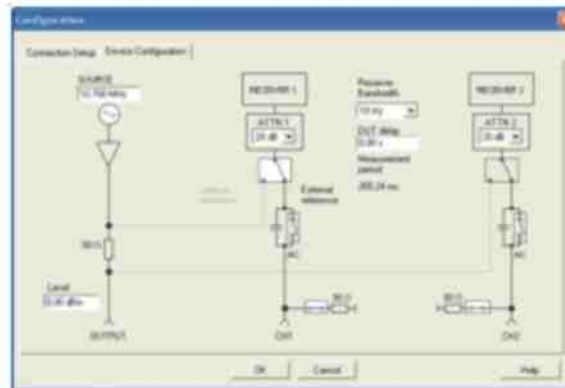
The results can be viewed in different diagram formats, printed out or easily copied into other software applications.

### Stores the data

Frequency sweep data can be exported to software such as Microsoft Excel™ using the CSV-Export format. Alternatively all Bode 100 settings including measurement values can be stored and re-loaded as \*.Bode (XML) files.



Example: Smith Chart



Gain/Phase Configuration



Impedance/Reflection Calibration

**The Bode 100 system includes:**

- Bode 100 Vector Network Analyzer
- Bode Analyzer Suite on CD-ROM
- Bode 100 User Manual (English)
- Wide range power supply (with international plug adapters)
- USB cable
- 4 x BNC cable 50 Ohm (m - m)
- 1 x BNC T adapter (f - f - f)
- 1 x BNC straight adapter (f - f)
- 1 x BNC 50 Ohm load (m)
- 1 x BNC short circuit (m)
- Test objects : quartz filter and IF filter on a PCB

### Technical Specification :

#### 1 Signal Source

Wave form:	Sinusoidal signal
Frequency range	10Hz to 40MHz
Signal Level	-27dBm to 13dBm 0.01VRMS to 1VRMS (at 50 Ohm load)
Accuracy of the source level (23°C +/-5°C)	+/-0.3dB (10Hz to 1MHz) +/-0.6dB (1MHz to 40MHz)
Frequency response of the source level 10Hz to 40MHz	+/-0.3dB (referred to 100kHz)
Frequency accuracy (23°C +/-5°C)	+/-15ppm (<1 year after calibration) +/-25ppm (<3 years after calibration)
Source impedance:	50 Ohm
Return loss (10Hz to 40MHz)	> 28dB (VSWR < 1.09)
Spurious signals	< -55dBc (typical)
Harmonics	< -55dBc (typical)
Connector:	BNC

#### 2 Inputs: CH1, CH2

Input Impedance (high):	1MΩ +/-2% (by design)
Input capacitance:	40 to 55pF
Input Impedance (low):	50 Ohm
Return loss for low input impedance (10Hz to 40MHz)	> 25dB (VSWR < 1.12)
Noise floor for the gain measurement Conditions: Resolution bandwidth = 10Hz, select internal reference, PSOURCE = 13dBm, 50Ω load at CH2, 20dB attenuators for CH1 and CH2	10Hz to 5kHz: -100dB (typical) 5kHz to 50kHz: -110dB (typical) 50kHz to 20MHz: -115dB (typical) 20MHz to 40MHz: -110dB (typical)
Connectors	BNC
Receiver bandwidth:	10Hz to 3kHz
Input attenuator:	0 dB, 10 dB, 20 dB, 30 dB, 40 dB
Input sensitivity:	100 mV full scale (for input attenuator 0 dB)
Dynamic range:	> 100 dB (at 10 Hz receiver bandwidth)
Gain error:	< 0.1 dB (calibrated)
Phase error:	< 0.5° (calibrated)

### 3 USB Interface

Connector	Type B
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### 4 PC Requirements

Minimum configuration:	Pentium 500 MHz, 256 MB RAM, CD-ROM drive
Recommended configuration	Pentium 1 GHz, 256 MB RAM, CD-ROM drive
Interface:	USB 1.1 or 2.0
Operating system:	Windows 2000 or Windows XP

### 5 Power Requirements

#### AC power adapter

Input voltage/frequency	100...240 V/47...63 Hz
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#### DC power supply

Input voltage/output power	+10...24 V/10 W
Supply current	at 12V: 450mA (typical) at 18V: 300mA (typical) at 24V: 230mA (typical)
Low supply voltage shut-down	8.25V (typical)
Inrush current for a low impedance source at 12V	15A for 300µs (typical)
Inrush current for a low impedance source at 24V	30A for 300µs (typical)
Inner connector	+10...24 V
Outer connector	Ground
Inner diameter	2.5 mm
Outer diameter	5.0 mm

### 6 Environmental Requirements

Temperature	Storage	-35...+60°C/-31...+140°F
	Operating	+5...+40°C/+41...+104°F
	For specifications	23°C ± 5°C/73°F ± 18°F
Relative humidity	Storage	20...90%, non-condensing
	Operating	20...80%, non-condensing

# Bode 100

## Vector Network Analyzer

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### 7 General

Dimensions (w × h × d):	26 x 5 x 26.5 cm 10.25 x 2 x 10.5 inch
Weight - Bode 100:	< 2kg/4.4 lb
Weight - Accessories:	< 0.5kg/1.1 lb

### 8 Absolute Maximum Ratings

DC supply voltage	+28V
DC supply reverse voltage (device doesn't work)	-28V
Maximum AC input signals at CH1 or CH2 (high impedance)	50V <sub>RMS</sub> up to 1MHz 30V <sub>RMS</sub> 1MHz to 2MHz 15V <sub>RMS</sub> 2MHz to 5MHz 10V <sub>RMS</sub> 5MHz to 10MHz 7V <sub>RMS</sub> 10MHz to 40MHz
Maximum input power at CH1 or CH2 (low impedance)	1W (=7V <sub>RMS</sub> )
Maximum possible return power at the source connector	0.5W

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