OMICRON LAB

Bode 100

Quick Start Guide

Smart Measurement Solutions®

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Contents

1 About this Quick Start Guide

This Quick Start Guide was written for professional specialists in electronics and electrical engineering. Its purpose is to familiarize you with the *Bode 100* vector network analyzer and its various application fields. It contains helpful instructions on how to use *Bode 100* safely, properly, and efficiently.

This *Bode 100* Quick Start Guide provides you short information on how to install the *Bode Analyzer Suite* and how to connect *Bode 100* to your PC . It is intended as an aid for you to take *Bode 100* into operation quickly and easily. Thus, this Quick Start Guide only provides a small subset of information available for *Bode 100*.

Therefore, we recommend to read the *Bode 100* User Manual, which is available in PDF format on the DVD delivered with *Bode 100*.

Furthermore, the *Bode 100* User Manual can be viewed by clicking the icon at the top right corner of the *Bode Analyzer Suite* screen.

In addition, the latest version of this Quick Start Guide and the *Bode 100* User Manual can be downloaded from www.omicron-lab.com.

Safety symbols used in this document

DANGER

Death or severe injury will occur if the appropriate safety instructions are not observed.

WARNING

Death or severe injury can occur if the appropriate safety instructions are not observed.

CAUTION

Minor or moderate injury may occur if the appropriate safety instructions are not observed.

NOTICE

Equipment damage or loss of data possible

2 Safety instructions

Before operating *Bode 100* and its accessories, read the following safety instructions carefully. If you do not understand some safety instructions, contact OMICRON Lab before proceeding. When working with *Bode 100*, observe all safety instructions in this document. You are responsible for every application that makes use of an OMICRON or OMICRON Lab product. Any miss-operation can result in damage to property or persons. Maintenance and repair of *Bode 100* and its accessories is only permitted by qualified experts either at OMICRON Lab or at certified repair centers.

Following these instructions will help you to prevent danger, repair costs and possible down time due to incorrect operation. Furthermore, it ensures the reliability and life-cycle of *Bode 100*.

Use *Bode 100* in observance of all existing safety requirements from national standards for accident prevention and environmental protection.

Reading the *Bode 100* manual alone does not release you from the duty of complying with all national and international safety regulations relevant for working with *Bode 100*, for example, the regulation EN50191 "Erection and Operation of Electrical Test Equipment".

WARNING

***Bode 100* is a SELV device (SELV = Safety Extra Low Voltage according to IEC 60950).**

- ► Do not apply hazardous voltage levels >50 VDC or >25 VAC to the inputs of *Bode 100*.
- ► Ensure that voltage and current probes used with *Bode 100* are properly grounded in accordance with their manufacturer's guidelines.
- ► When working with voltage or current probes, always connect the *Bode 100*'s ground terminal (available for HW Rev. 2 or higher) with a solid connection of at least 3.6 mm² cross-section and not longer than 10 m to the ground terminal in the laboratory.
- ► Be aware that no indication on *Bode 100* shows that the output is active. This could be especially critical if amplifiers are connected to *Bode 100*.

2.1 Operator qualifications

- Testing with *Bode 100* must only be carried out by qualified, skilled and authorized personnel.
- Personnel receiving training, instructions, directions, or education on *Bode 100* must be under constant supervision of an experienced operator while working with the equipment.
- Testing with *Bode 100* must comply with the internal safety instructions as well as additional relevant documents.

2.2 Rules for use

- *Bode 100* is exclusively intended for the application area specified in this document. The manufacturer/distributors are not liable for damage resulting from a use other than the specified operation. The user alone assumes all responsibility and risk.
- Use *Bode 100* only when it is in a technically sound condition.
- Do not open *Bode 100* or remove any of its housing components.
- Do not carry out any modifications, extensions or adaptations to *Bode 100*.
- Use *Bode 100* in observance of all existing safety requirements from national and international standards for accident prevention and environmental protection.
- Always keep the manual either printed or as PDF file at the site where *Bode 100* is used. The manual must be read by all people working with *Bode 100*. In addition to the manual and the applicable regulations for accident prevention in the country and at the site of operation, heed the accepted technical procedures for safe and competent work.

2.3 Designated use

Bode 100 and its accessories are especially designed for swept frequency measurements of electronic circuits in laboratory and manufacturing environments.
Examples for typical applications are:

- Measurement of the complex transfer function of amplifiers, filters and attenuators
- S-Parameter measurement in the 50 Ohm domain
- Stability assessment of control loops
- Determination of resonance frequencies of piezo elements and quartz crystals
- Impedance measurement of inductors, capacitors and resistors

2.4 Disclaimer

The advisory procedures and information contained within this document have been compiled as a guide to the safe and effective operation of *Bode 100*. It has been prepared in conjunction with application engineers and the collective experience of the manufacturer.

The in-service conditions for the use of *Bode 100* may vary between customers and end-users.

Consequently, this document is offered as a guide only. It shall be used in conjunction with the customers own safety procedures, maintenance program, engineering judgment, and training qualifications.

Using *Bode 100* or its accessories in a manner not specified by the manufacturer may result in damage to property or persons.

2.5 Cleaning

Use a cloth dampened with isopropanol alcohol to clean *Bode 100* and its accessories.

3 Compliance statements and recycling

3.1 Compliance statement

Declaration of Conformity (EU)

The equipment adheres to the guidelines of the council of the European Community for meeting the requirements of the member states regarding the electromagnetic compatibility (EMC) directive and the RoHS directive.

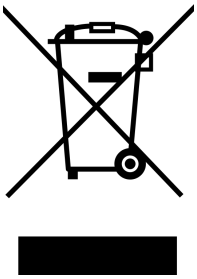
FCC compliance (USA)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Declaration of compliance (Canada)

This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

3.2 Information for disposal and recycling



Bode 100 and all of its accessories are not intended for household use. At the end of its service life, do not dispose of the test set with household waste!

For customers in EU countries (incl. European Economic Area)

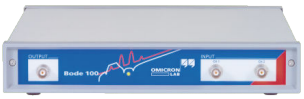
OMICRON test sets are subject to the EU Waste Electrical and Electronic Equipment Directive (WEEE directive). As part of our legal obligations under this legislation, OMICRON offers to take back the test set and to ensure that it is disposed of by an authorized recycling facility.

For customers outside the European Economic Area

Please contact the authorities in charge for the relevant environmental regulations in your country and dispose *Bode 100* and all of its accessories only in accordance with your local legal requirements.

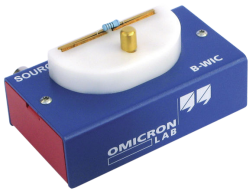
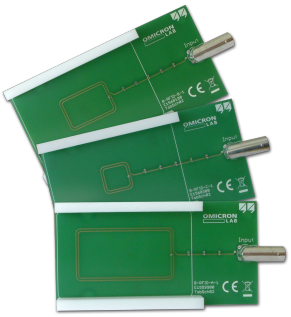
4 Bode 100 and accessories

4.1 Delivered items

 *Bode 100* multi functional test set	 *Bode Analyzer Suite* on DVD	 Wide-range AC power supply including mains input plugs for different national standards
 Test objects (Quartz filter and IF filter) on PCB	 USB Cable	 4 pc. BNC 50 Ω cable (m-m)
 BNC straight adapter (f-f)	 BNC T adapter (f-f-f)	 BNC short circuit (m)
 BNC 50 Ω load (m)	 *Bode 100* Quick Start Guide	 Multilingual safety instructions

The delivered items may vary a bit from the look shown above. Please refer to the packing list received with the *Bode 100* for further information

4.2 Optional accessories

	**B-WIT 100 Wideband Injection Transformer** The B-WIT 100 is used to inject signals into control loops. Its main application is in the stability analysis of switched mode power supplies and linear voltage regulators.
	**B-SMC impedance adapter for surface mount components** The B-SMC extends the impedance measurement range of *Bode 100*. It enables you to easily measure components for surface mounting such as ceramic capacitors or chip resistors.
	**B-WIC impedance adapter for thru hole type components** The B-WIC extends the impedance measurement range of *Bode 100*. It enables you to perform impedance measurements for thru hole type components such as inductors or crystal oscillators.
	**B-AMP 12 amplifier** 12 dB amplifier to boost the output signal of *Bode 100* for applications where more than 13 dBm are needed.
	**B-RFID measurement adapters** The B-RFID adapters allow standard compliant measurement of the resonance frequency and Q-factor of RFID antennas.

For more information on the above mentioned *Bode 100* accessories and recommended accessories manufactured by partner companies visit www.omicron-lab.com.

5 Device overview

Bode 100 provides the following connectors on the front panel:

- OUTPUT (signal source output), Type: BNC socket
- INPUT CH 1 (channel 1 input), Type: BNC socket
- INPUT CH 2 (channel 2 input), Type: BNC socket

Further on a green LED is lit at the front panel when the *Bode 100* is powered.

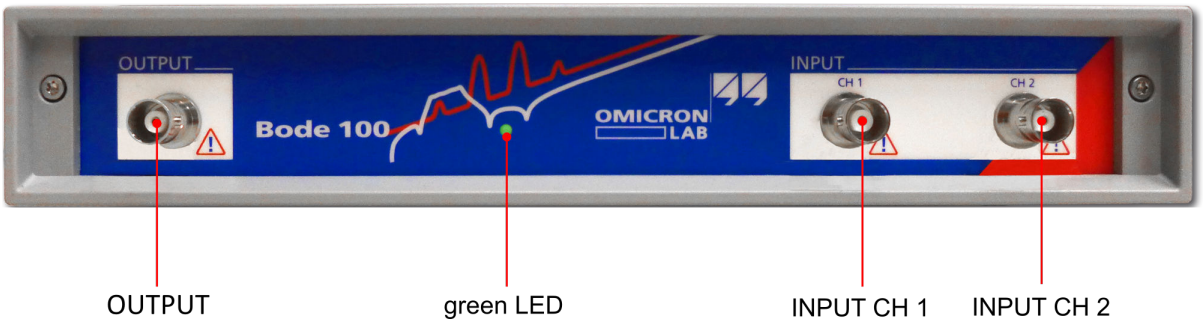


Figure 5-1: *Bode 100* front view

Bode 100 provides the following connectors at the back panel:

- DC power input, Type: 5.0 mm / 2.5 mm DC coaxial socket
- Ground connector, Type: 4.0 mm banana socket (available from hardware revision 2.0)
- USB connector, Type: USB A socket

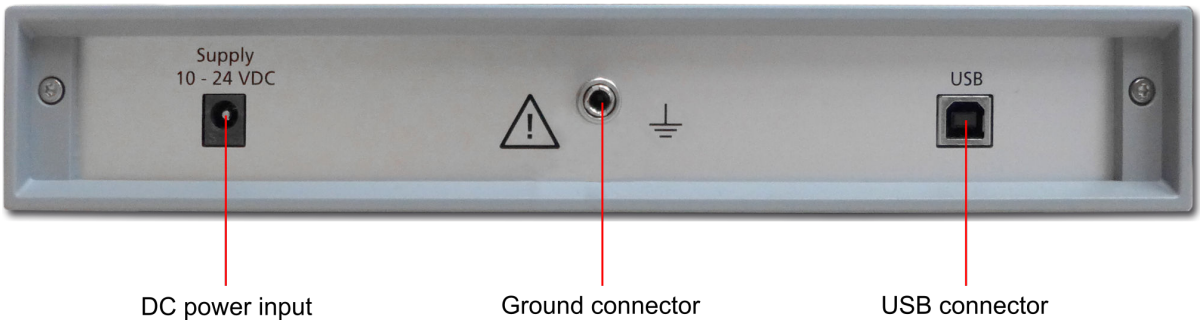


Figure 5-2: *Bode 100* rear view

6 Getting started

This section explains how to connect *Bode 100*, put it into operation and how to perform the first measurement with it.

6.1 System requirements

To ensure optimum performance of *Bode 100* and the *Bode Analyzer Suite* it is recommended to use a computer that fulfills or exceeds the following system requirements:

- Processor: Intel Core-I Dual-Core (or similar)
- Memory: 2 GByte RAM
- Graphics adapter: Super VGA (1024x768) (higher resolution recommended)
- USB interface: USB 2.0 or higher
- Operating system: Microsoft Windows 7 or higher

6.2 Installing the *Bode Analyzer Suite*

To install the *Bode Analyzer Suite* insert the DVD delivered with *Bode 100* and follow the instructions on the screen. In case that you have deactivated the auto run function of your computer's operating system navigate to the root directory of the DVD and start the setup manually.
If you have no DVD drive on your computer you can download the *Bode Analyzer Suite* from www.omicron-lab.com.

It is recommended to disconnect the USB connection between *Bode 100* and your PC during the installation of the *Bode Analyzer Suite*.

6.3 Powering the *Bode 100*

NOTICE

When powering *Bode 100* with a different power adapter than the one delivered with *Bode 100* please make sure that the voltage and polarity comply with the power requirements defined in the *Bode 100* user manual and technical data sheet.

Bode 100 is powered with an external wide-range AC power adapter. Before powering *Bode 100*, select the adapter’s mains input plug fitting your power outlet. Plug the adapter’s DC output connector into the *Bode 100* DC power input on the rear panel and the mains input plug into the power outlet.

6.4 Connecting *Bode 100* to a computer

Bode 100 communicates with the computer via USB. Connect the *Bode 100*'s USB connector on the rear panel to the USB connector of your computer using the USB cable delivered with your Bode 100.

Some USB Hubs can cause problems with the data transfer between *Bode 100* and your computer. In case you are experiencing problems with the USB connection, try to connect your *Bode 100* directly to a USB port of your computer.

6.5 Performing your first measurement

Follow the steps described below to perform your first measurement:
Connect the test object "IF Filter" to *Bode 100* with two BNC cables as shown in the figure below.

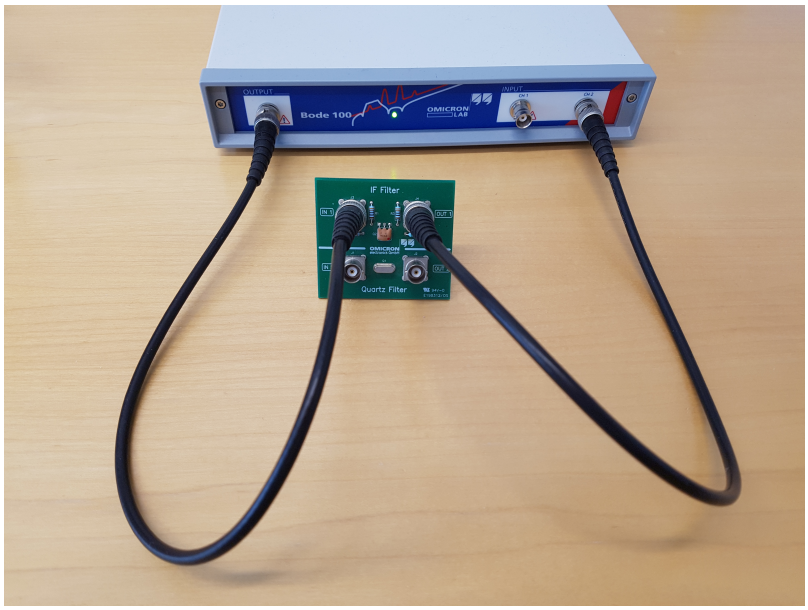
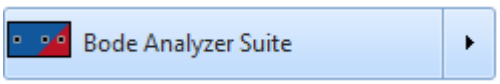


Figure 6-1: Connecting the test object IF Filter to *Bode 100*

Now start the *Bode Analyzer Suite*:

- either by clicking its desktop icon: 
- or by using the Microsoft Windows start menu: 

After the *Bode Analyzer Suite* has started, you will see a start screen as shown below:

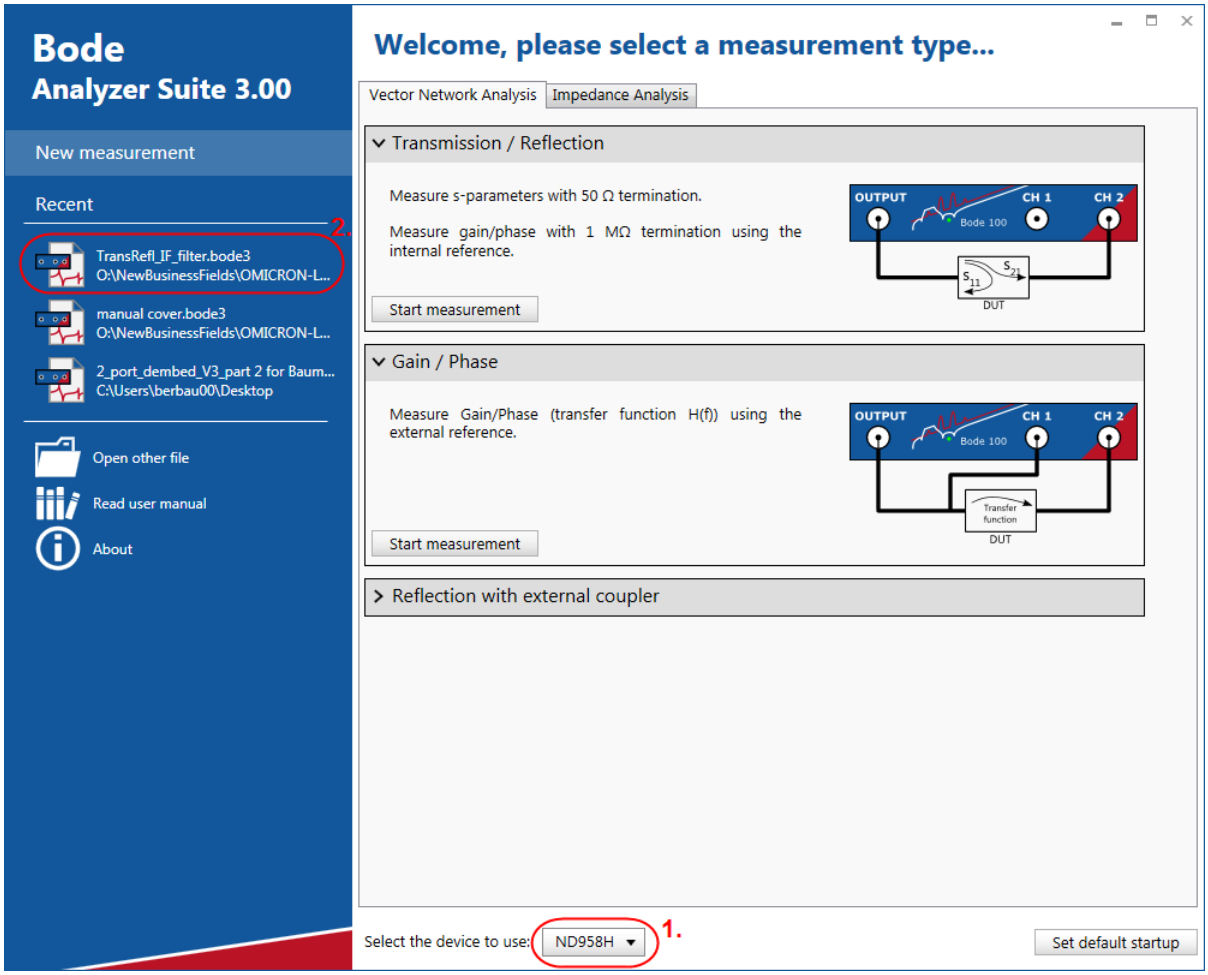
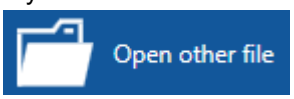


Figure 6-2: *Bode Analyzer Suite* start screen

To find out if your *Bode 100* is recognized by the *Bode Analyzer Suite*, check if the serial number of your *Bode 100* is displayed like shown in the figure above (see **1.**). If no serial number is displayed, refer to the section Troubleshooting for further information.

To start your first measurement click the file name **TransRefl_IF-filter.bode3** in recent (see **2.**)

If you cannot see the file **TransRefl_IF-filter.bode3** in Recent, use the



function and enter the path *"%APPDATA%\OMICRON Lab\Bode Analyzer Suite\Demo Files \"* to navigate to the demo files.

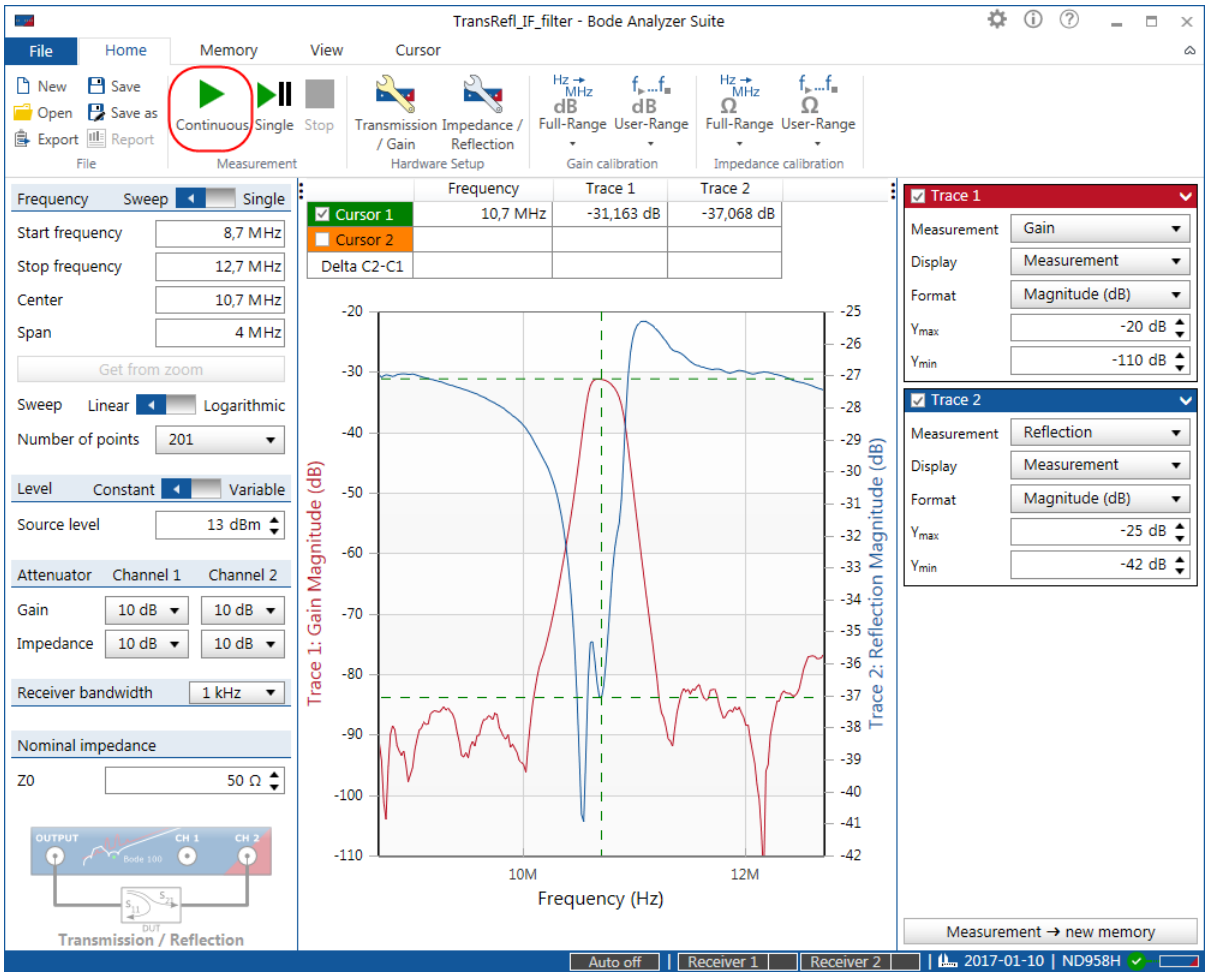


Figure 6-3: Your First Measurement

To start your first measurement, simply press the button marked with a red frame in the figure above.

Congratulations! You have just performed the your first measurement with the *Bode 100*

The red curve shows the transmission characteristic (S21) of the IF filter, while the blue curve shows the reflection (S11) of the IF filter.

Please refer to the *Bode 100* User Manual for more information on the *Bode 100* and its measurement capabilities. You can view the user manual by clicking **Read user manual** in the start screen or by clicking the help icon that is available at the top right corner of the *Bode Analyzer Suite* window.

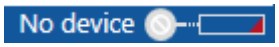
Alternatively, you can download the *Bode 100* User Manual as well as the Technical Data from www.omicron-lab.com.

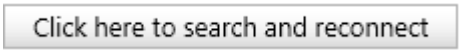
7 Troubleshooting

In case you are not able to start a measurement with *Bode 100*, please perform the following steps:

1. Check if the green power LED at the front panel is on.
   In case that the LED is not lit execute the following steps:
   a. Check if the Wide-range AC power supply is plugged correctly into the mains socket.
   b. Check if the DC connector of the power supply is properly plugged into *Bode 100*.
   c. Check the output voltage of the DC connector with a volt-meter.

2. Check if the communication between the *Bode Analyzer Suite* and the *Bode 100* has been successfully established. To do so, check if the serial number of your *Bode 100* is displayed in the start screen (see 6-2 on page 13, or in the right bottom corner of the measurement screen 

(see 6-3 on page 14).
   a. Check if the USB cable is properly plugged into the computer and the *Bode 100*.
   b. Try disconnecting and re-connecting the USB cable.
   c. If this does not help, avoid USB hubs and plug *Bode 100* directly into an USB port of your computer.
   d. Try to connect *Bode 100* to a different USB port of your computer. Some USB 3 ports are known to have problems with *Bode 100 R1*.
   e. Move the mouse over the icon 

in the bottom right corner of the status bar and then click 

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In case you are still experiencing problems do not hesitate to contact us. We are looking forward to support you. Check out the section Support for further information on how to contact us.

Support

When you are working with our products we want to provide you with the greatest possible benefits. If you need any support, we are here to assist you!

Technical Support - Get Support

www.omicron-lab.com/support

support@omicron-lab.com

At our technical support hotline, you can reach well-educated technicians for all of your questions. Competent and free of charge.

Make use of our technical support hotlines:

Americas:	+1 713 830-4660 or +1 800-OMICRON
Asia-Pacific:	+852 3767 5500
Europe / Middle East / Africa:	+43 59495 4444

Additionally, you can find the OMICRON Lab Service Center or Sales Partner closest to you at www.omicron-lab.com → Contact.

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