

NISTread For R&S®ZVA/B/T or R&S®ZNB/C Quick Start Guide



1175.6584.02 – 01

The Quick Start Guide describes the usage of the NIST read software with the following R&S Vector Network Analyzer models:

- R&S®ZVA8, order no. 1145.1110.08/10
- R&S®ZVA24, order no. 1145.1110.24/26
- R&S®ZVA40, order no. 1145.1110.40/42
- R&S®ZVA50, order no. 1145.1110.50/52
- R&S®ZVA67, order no. 1305.7002.02/04
- R&S®ZVA80, order no. 1312.6750.02/03/04
- R&S®ZVA110, order no. 1312.7004.08/10
- R&S® ZVB4, order no. 1145.1010.04/06
- R&S® ZVB8, order no. 1145.1010.08/10
- R&S® ZVB14, order no. 1145.1010.14
- R&S® ZVB14, order no. 1145.1010.17/19
- R&S® ZVB20, order no. 1145.1010.20
- R&S® ZVB20, order no. 1145.1010.23/25
- R&S® ZVT8, order no. 1300.0000.08
- R&S® ZVT20, order no. 1300.0000.20
- R&S® ZNB4, order no. 1311.6010.22
- R&S® ZNB4, order no. 1311.6010.24
- R&S® ZNB8, order no. 1311.6010.42
- R&S® ZNB8, order no. 1311.6010.44
- R&S® ZNC3, order no. 1311.6004.12

Rohde&Schwarz would like to thank the open source community for their valuable contribution to embedded computing.

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1 Introduction

NISTread is a software program that provides an interface between the R&S ZVA/B/T or ZNB/C Vector network analyzers and NIST software programs such as MultilineTRL.

The user may define various filenames for calibration standards to be measured in an appropriate order as to input them into the desired software. The software may be installed on the network analyzer or on any PC running a Microsoft Windows operating system (XP or later).

If installed on a separate PC NISTread will establish a connection to the VNA by means of VXI11, either GPIB or LAN. If the software is installed on the VNA itself it can be fully remote-controlled. This includes setting the parameters and taking measurements.

Installation of the software

You may choose to install the software either on the VNA or on a separate PC. For the installation procedure, please refer to the appropriate section. The software is using the .NET framework V2.0 and requires this framework to be installed as a prerequisite. Hence we provide two different types of installers either with or without the .NET framework package installed. The version not including the *.NET Framework is named “_NoNET_” whereas the full installer has no additional information in the filename. However, it is safe to start with the “_NoNET_” installer as the installer will check whether all requirements are met during the installation process. It will also list the .NET package found on the target machine for reference and request a later package to be installed if necessary (s. figure 1). In the latter case, please choose the full installer or download the .NET framework from the Microsoft website.

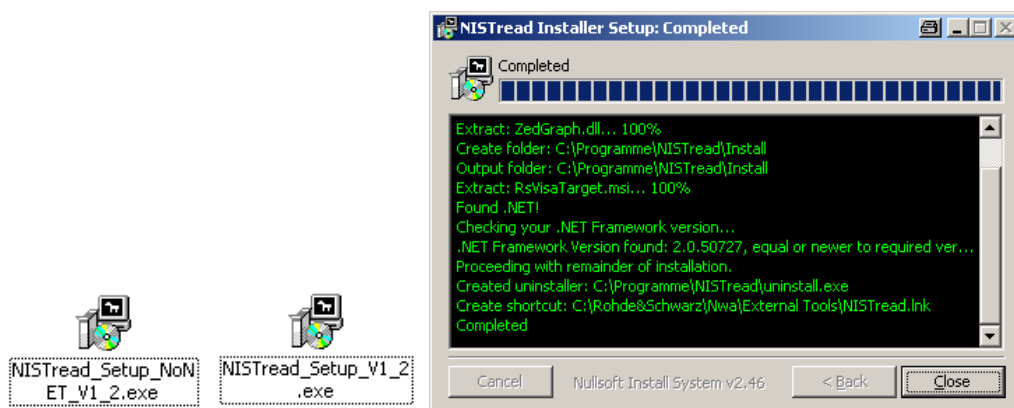


Fig. 1 Installer types and .NET version check during installation.

1.1 Installation on a R&S VNA

If installed on a R&S Network Analyzer directly you may choose to put a link to the software in the “External Tools” menu of the analyzer’s firmware to easily access the software during measurements. If you want this, please make sure that the checkmark “External Tools Shortcut” is set in the second installer page (s. figure 2). The installer will put no other shortcuts to the desktop or start menu. Hence the alternative way to start the software is to go to the specified installation directory (s. figure 2) and launch the application by doubleclicking on “NISTread_.exe”.

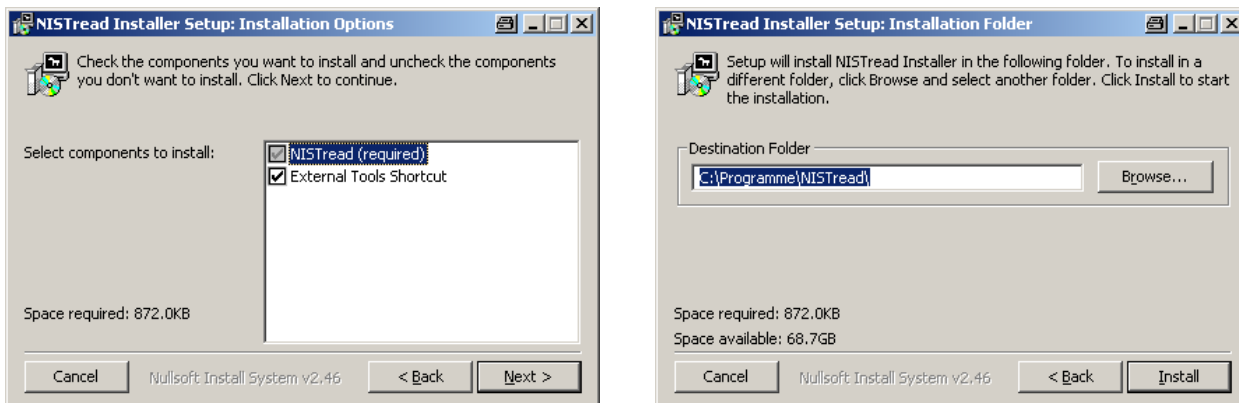


Fig. 2 NISTread installerpage 2 and 3.

After installation including the external tools link you may access the software by choosing “System>External Tools” from the ZVA/B/T firmware (s. figure 3).

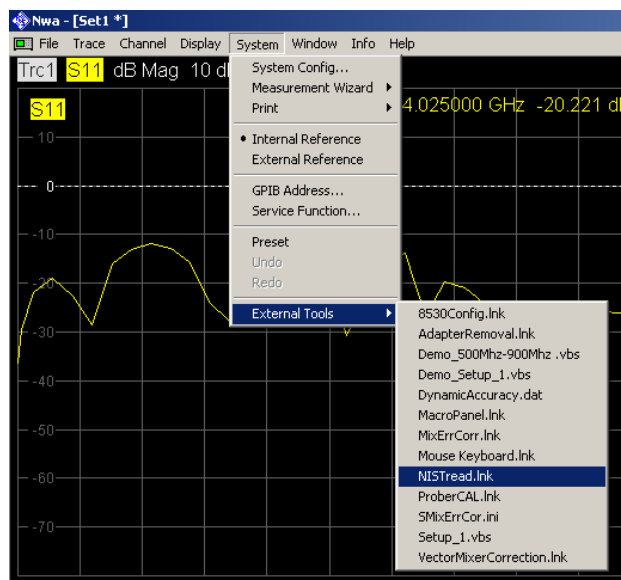


Fig. 3 System/External Tools menu within ZVA/B/T firmware.

Choosing either start method the software will connect to the ZVA automatically so no additional action is required to link the software to the instrument’s firmware. You have, however, to make sure that the instrument’s firmware is started before running the additional software.

1.2 Installation and setting up the software on any external PC

If installed on an external PC make sure that the checkmark “External Tools Shortcut” is not checked in the second installer page (s. figure 2) as this is only helpful if the software is installed in combination with the network analyzer firmware. The installer will put no other shortcuts to the desktop or start menu. Hence the software has to be started from the specified installation directory (s. figure 2) by double clicking on "NISTread.exe".

To establish a connection the VXI11 protocol layer has to be installed on the PC as well. This is automatically the case if you are using a National Instruments GPIB interface card on this PC already. If this is not the case, please refer to the installation manual of any National Instruments control software to install this software on the PC correctly. It is a prerequisite to run the software properly.

Please make sure that the firmware of the instrument you want to connect to is already running.

Start the software by double clicking it in the installation directory (see above). Go to the menu “Device Config” and choose an appropriate connection (i.e. GPIB or LAN) to the instrument.

Click connect. If the connection is established successfully, the button will turn green while changing its caption to “initialized”. The ID-string of the instrument is also shown in the dialogue (s. figure 4). The software is now ready to use.

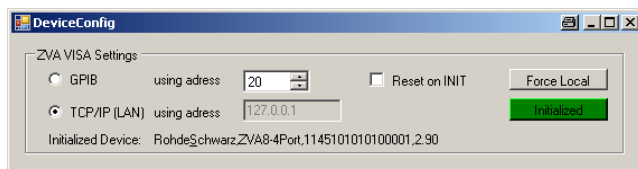


Fig. 4 Device Config dialogue used to connect to a network analyzer.

2 Configuring the software

The purpose of this software is to connect to the network analyzer as to retrieve raw waves and store them in touchstone files. The filename will be composed of two parts. The “path” is to be set up in the Options tab (s. figure 5) while the name of the file to be output has to be set in the main page.

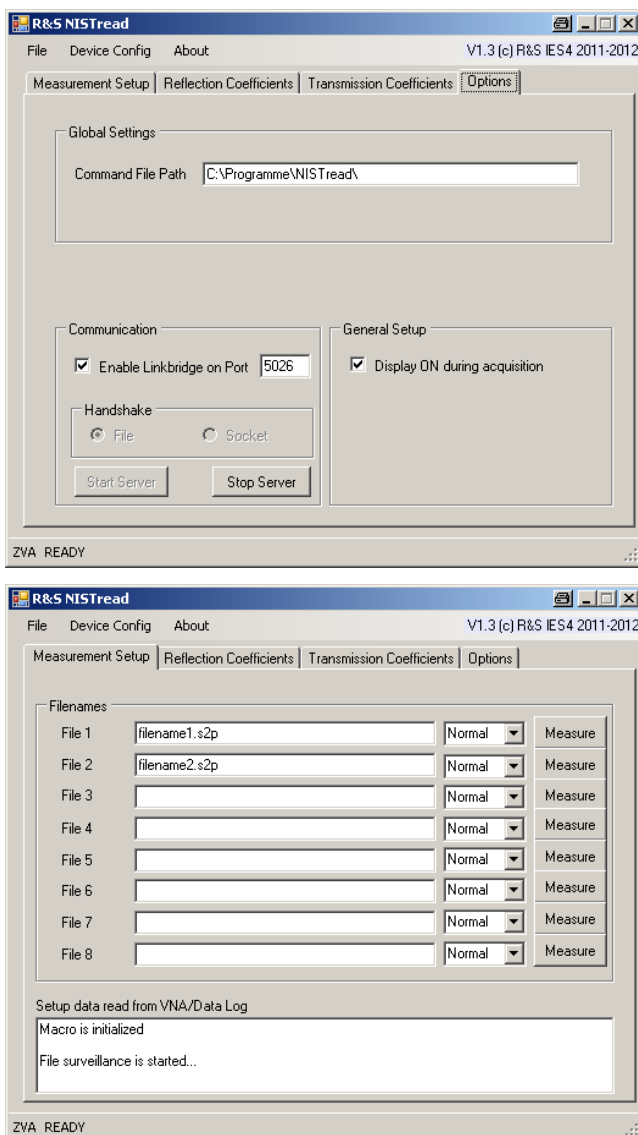


Fig. 5 Dialogues to enter path (above) and filename (below) for data-dump.

In addition you may choose this measurement to be “Normal” or “Through” by selecting the appropriate action from the combobox next to the filename.

In the configuration “Normal” the software will export a touchstone (S2P) file that consist of all four S-parameters without any correction applied to the results.

Choosing the configuration “Through” will additionally save a touchstone file that includes the switch-terms of the analyzer. The additional file is denoted by an

preceding “G” in the filename that is added automatically.



In any case a S2P file will be dumped into this filename.
The result files will be written to the path given in the options tab (s. figure 5).

2.1 Storing an external system error correction to the VNA

Once the calibration is performed using an external software like MultiLineTRL or STATISTICAL this data may be transferred to the VNA using NISTread. This can be done either manually or by means of remote commands.

To transfer the data make sure that NISTread has already established a connection to the VNA. Enter the filename of the system error coefficients using its full path into the “Source Path” Textbox (s. figure 5). Enter the desired power level in dBm as well as the IF-bandwidth settings in the appropriate data fields and click on “Copy to VNA”. Alternatively you may use the remote commands as stated below.

The system error coefficients will be transferred to the VNA and the calibration is instantly activated.

2.2 Remote controlling the software

If installed on a R&S network analyzer the software can also be controlled remotely via the instruments firmware.

To do this you may send a SCPI command to the VNA following this syntax:

```
PROG:INIM '<PathToMacroAndMacroName>', '<Command> "<Parameter> "'
```

The default variable setting of <PathToMacroAndMacroName> is C:\Program Files\NISTread\NISTread.

Please note that this variable has to be set according to the installation directory combined with the macro name neglecting its file extension.

Command may be anything from the following list where a parameter has to be added if necessary:

Command	Parameter	Description
ChangeFN1 (you may choose 1..8 to set the filenames)	Filename 1	Specify the filename to be listed in the first textbox (e.g. Test.s2p)
ChangeMeas1 (you may choose 1..8 to set the measurement procedures)	Normal Through	Whether to measure “Normal” or “Through”
Display	On Off	Toggles the display on/off during the acquisition of data

Command	Parameter	Description
MeasureThrough	Filename	Starts a "Through" measurement and dumps the data to the filename given
MeasureNormal	Filename	Starts a "Normal" measurement and dumps the data to the filename given
SourcePowerLevel	Source Power Level in dBm	Set the current source power level
IFBW	IF-bandwidth in Hz	Set the current IF-bandwidth
SECFilename	Filename (Full path)	Set the full path to the file containing the system error correction coefficients
TransferSEC	No parameter	Transfer the system error correction data to the VNA

The result of any command being sent to the macro can be checked looking at the Debug/Command Windows.

Upon every command that is received by the macro it will list

"A new command has been sent."

You will also receive an information whether this command has been processed correctly or not (s. figure 6).

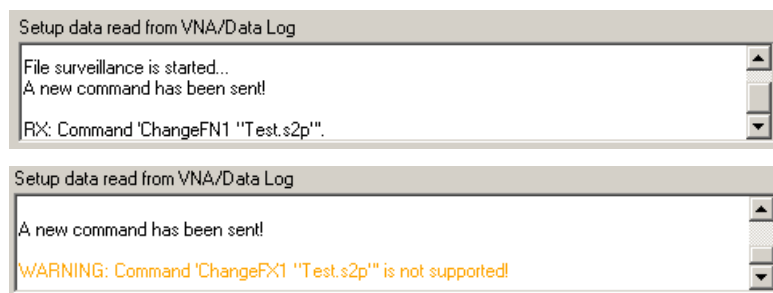


Fig. 6 Response of NISTread's remote engine to a valid (top) and invalid command (bottom).

In case you do not see any response, please check that the following prerequisites are given:

- Option Linkbridge is enabled in the Options tab (s. figure 7)
- The macro states "File surveillance is started..." on the main page
- The filename/macroname is set correctly in the SCPI command

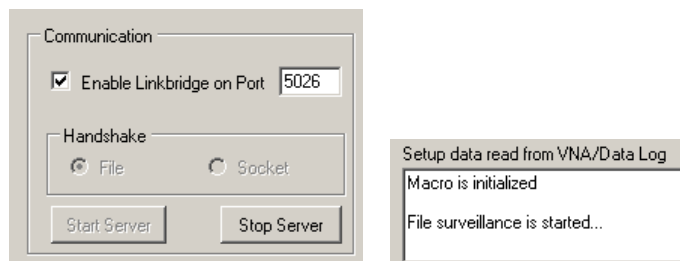


Fig. 7 Troubleshooting information

If the command is not understood, please check the syntax.

For any additional questions, please contact your local R&S representative.