



E300 Enabler ThinkRF - Keysight Vector Signal Analyzer

User Guide
Version 2.1

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Preface

This section describes the audience for, the organization of, and conventions used in this document. It also identifies related documentation and explains how to access electronic documentation.

Audience

This document is written for technical people who have basic understanding, familiarity and experience with network test and measurement equipment.

Conventions

The following conventions and notations are used in this document:



Note: This symbol means **take note**. Notes contain helpful suggestions or references to additional information and material.



Caution: This symbol means **be careful**. In this situation, you might do something that could result in equipment damage or loss of data.



Warning: This symbol means **danger**. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with the standard practices for preventing accidents.

Obtaining the Latest Documentation and Software

For ThinkRF R5500 and its connectivity to the VSA, please visit the ThinkRF website at <http://www.thinkrf.com/documentation> to obtain the latest documentation. Latest software and firmware releases are also available on the ThinkRF website at <http://www.thinkrf.com/download>.

For Keysight VSA, please visit the relevant page at <https://www.keysight.com>.

Document Feedback

Please send your comments about this document or any ThinkRF documentation to support@thinkrf.com. We appreciate your feedback.

Obtaining Technical Assistance

For all customers who hold a valid end-user license, ThinkRF provides technical assistance 9 AM to 5 PM Eastern Time, Monday to Friday. Contact us at support@thinkrf.com or by calling **+1.613.369.5104**.

Before contacting support, please have the following information available:

- R5500 serial number (located on the identification label on the R5500's underside, or from the hardware configuration profile in the VSA application (**Utilities > Hardware > Configurations ...**))
- The firmware version running on the R5500 (available from the hardware configuration profile in the VSA application (**Utilities > Hardware > Configurations ...**))
- Version of the Keysight software (and its options)
- Version of the Keysight Connection Expert (IO Libraries Suite)
- Version of the ThinkRF E300 Enabler
- Operating system and version on your PC

Overview of the ThinkRF E300 Enabler

This document describes the ThinkRF E300 Enabler that allows the R5500 Real-Time Spectrum Analyzer (RTSA) to work with Keysight 89600 VSA spectrum monitoring and analysis solutions.

The ThinkRF real-time spectrum analyzer is a spectrum monitoring and analysis platform that provides wide bandwidth, deep dynamic range, and up to 27 GHz frequency range in a small one-box platform designed for distributed deployment.

The Keysight 89600 Vector Spectrum Analysis (VSA) software reaches deeper into signals in time, frequency, and modulation domains, letting you view multiple signals at once, and isolate unexpected interactions with powerful vector signal analysis.

The E300 Enabler extends the Keysight VSA application to support detection and management of R5500 devices, through specific configuration parameters.

The integrated solution of the ThinkRF R5500 and the Keysight 89600 VSA software allows you to perform robust and powerful analysis for all forms of signals. You can expand your measurement capabilities and perform consistent signal analysis across applications and deployments, including portable, remote and distributed.

System requirements

Before installing the Keysight 89600 VSA and the ThinkRF E300 Enabler, ensure that your PC meets the following minimum system requirements:

- Operating System: Windows 10 Professional, Enterprise or Educational edition (64-bit)
- .NET Framework 4.6.2
- CPU: 1 GHz (>2 GHz recommended)
- RAM: 2 GB (16 GB recommended)
- Video AM: 128 MB (1 GB recommended)
- Hard Disk: 3 GB available



Note: You must have an Internet connection to download the Keysight 89600 VSA software and the ThinkRF E300 Enabler from the Keysight and ThinkRF websites.

Using This Document

This document describes the instructions for installing the Keysight 89600 VSA software. It does not describe how to use the Keysight 89600 VSA software itself. For detailed instructions on how to use the application, consult the Keysight Online Help embedded in the product or contact Keysight.

For detailed instructions on the ThinkRF R5500 Real-Time Spectrum Analyzer, you can download the latest User Guide from www.thinkrf.com/documentation.

Getting Started with the ThinkRF E300 Enabler

You must install the following Keysight software on your PC before installing the ThinkRF E300 Enabler:

- Keysight 89600 VSA software, **Version 22.21** or later
- Keysight Connection Expert (part of the IO Libraries suite), **Version 2018 Update 1** or later
- Keysight Multi-vendor Hardware Connectivity (Option 301)

Installing the Keysight VSA 89600 Software

You can download and install the Keysight 89600 VSA software and the Multi-vendor Hardware Connectivity (Option 301) from the Keysight Technologies website.

For detailed instructions, including licensing requirements, visit the [Keysight VSA 89600 software](#) page.

Make sure your local PC account has administrative privileges before installing the software.

Installing the Keysight Connection Expert

The Keysight Connection Expert is one of the utilities included in the Keysight IO Libraries suite, and is used to discover devices on the local network.

You can download and install the IO Libraries suite from the [Keysight IO Libraries](#) page.

Installing the ThinkRF E300 Enabler

If you do not already have a copy of the ThinkRF E300 Enabler, you can obtain the software from ThinkRF, by sending an email to support@thinkrf.com or by downloading the software from the ThinkRF website.

The Setup wizard installs the ThinkRF E300 Enabler on your PC.

1. Double-click on the `thinkRF E300-2.0.exe` file to launch the Setup Wizard.
2. Review the End User License Agreement (EULA) and click **Next**.
3. In the **Ready to Install** window, click **Install**.
4. When installation is complete, click **Finish**.



Note: If the Setup Wizard detects that you do not have the .NET Framework installed, you are prompted to install it. Follow the instructions in the Wizard.

Note: If the Setup Wizard detects that you do not have the Keysight 89600 VSA software installed, the Wizard displays an error message and aborts the installation.

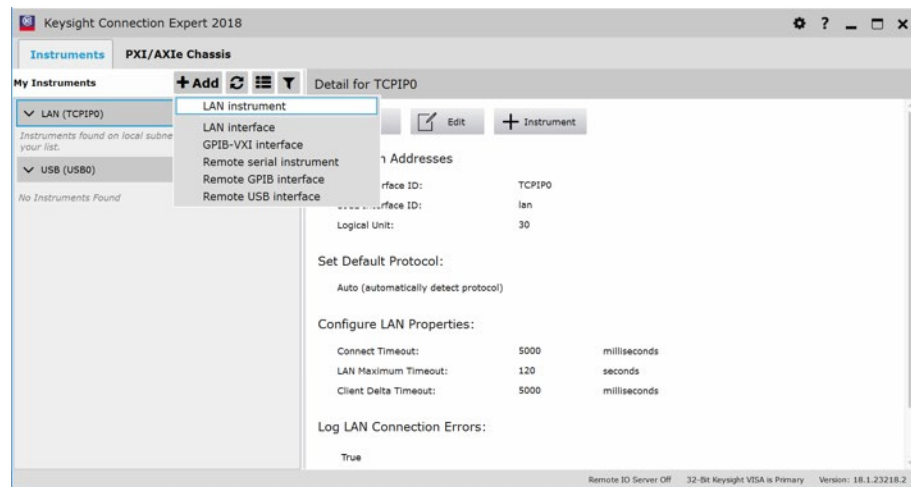
Discovering ThinkRF R5500 Devices

When you have installed the Keysight software and the ThinkRF E300 Enabler, you must use the Keysight Connection Expert to discover the ThinkRF R5500 device(s) on the local subnet.

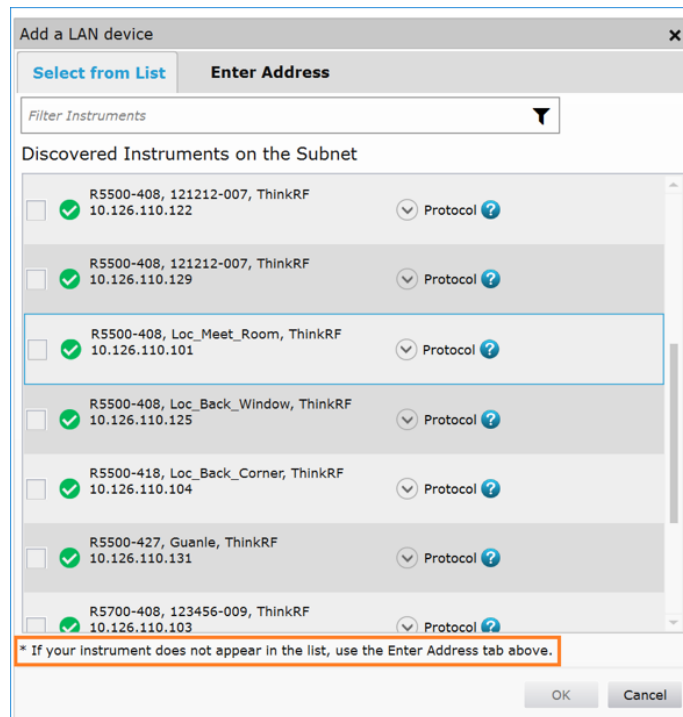


Note: ThinkRF devices use High-Speed LAN Instrument Protocol (HiSLIP), a TCP/IP-based protocol for remote control of LAN-based test and measurement instruments.

1. Launch the Keysight Connection Expert application.
2. In the Keysight Connection Expert dashboard, click on the **Add** button, then select **LAN instrument** from the drop-down menu.



The system opens the **Add a LAN device** window that displays all discovered devices on the local subnet.



3. In the **Add a LAN device** window, select a R5500 device from the list of detected devices and click **OK**.
4. If your device is not listed, is connected wirelessly to the subnet, or has a public IP address, click on the **Enter Address** tab.
5. On the **Enter Address** tab, enter the device IP address and select the HiSlip protocol, then click **OK**.

Add a LAN device

Select from List Enter Address

Set LAN Address:

Hostname or IP Address: 120.340.560.780

TCPIP Interface ID: TCPIP0

Set Protocol:

Instrument (VXI-11) Remote Name: Inst0

HISlip Remote Name: hislip0

Socket Port Number: 5025

Verify Connection:

Allow *IDN Query

Test This VISA Address

View Web Page:

Instrument Web Interface...

OK Cancel

The application displays the connected devices in the **Instruments** tab (under “My Instruments”). When you click on a device in the list, the device details appear in the right-side pane.

Keysight Connection Expert 2018

Instruments PXI/AXIe Chassis

My Instruments + Add

LAN (TCPIP0)

- R5500-408, ThinkRF 10.126.110.125
- R5500-408, ThinkRF 10.126.110.122
- R5500-408, ThinkRF 10.126.110.101
- R5500-418, ThinkRF 10.126.110.104
- R5500-427, ThinkRF 10.126.110.129

USB (USB0)

No Instruments Found

Details for ThinkRF R5500-408

Check Status Edit Remove Interactive IO Monitor IO Monitor Command Expert BenchVue Web UI Soft Front Panel

Manufacturer: ThinkRF

Model: R5500-408

Serial Number: 121212-007

Firmware Version: 1.5.0-dev5

Connection Strings

| VISA Address | Aliases | SICL Address |
|--|---------|---|
| TCPIP0::10.126.110.122::hislip0::INST0 | | lan_4880:hislip[10.126.110.122]:hislip0 |

Installed IVI Drivers Update

<No installed drivers>

Remote IO Server Off 32-Bit Keysight VISA is Primary Version: 18.1.23218.2

Configuring the ThinkRF E300 Enabler

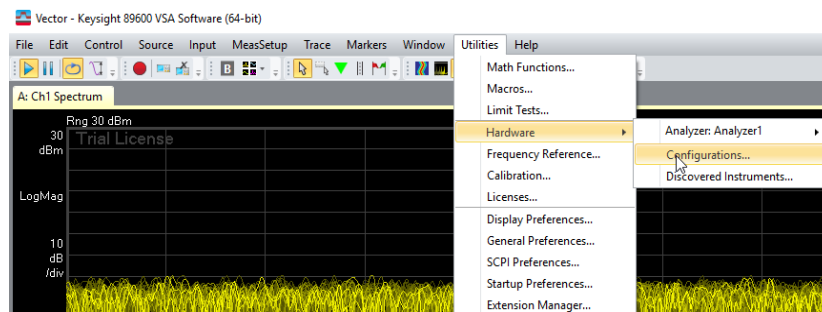
The Keysight VSA has a default Analyzer configuration profile that is enabled when you launch the application.

The first time you use the Keysight VSA application with a R5500 device, you must create a configuration profile for the R5500 device you are using, as described in the following section.

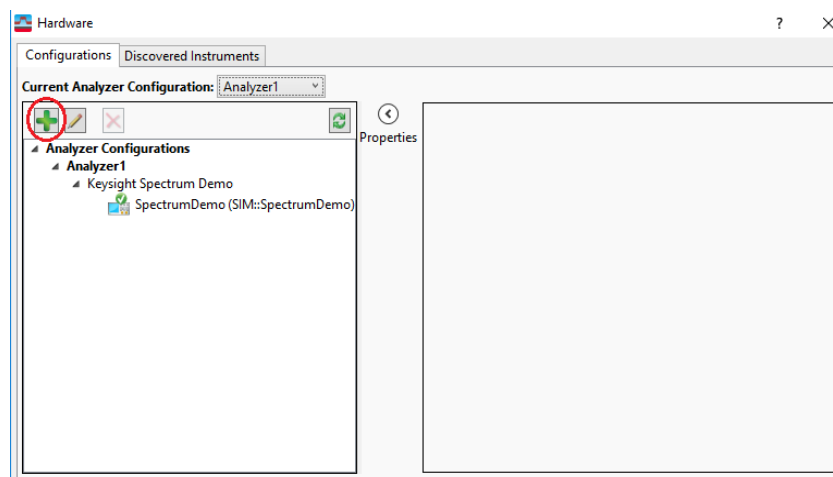
Creating the ThinkRF Analyzer Configuration

Before you can monitor signal data from the R5500 device, you must add a hardware configuration profile for this device.

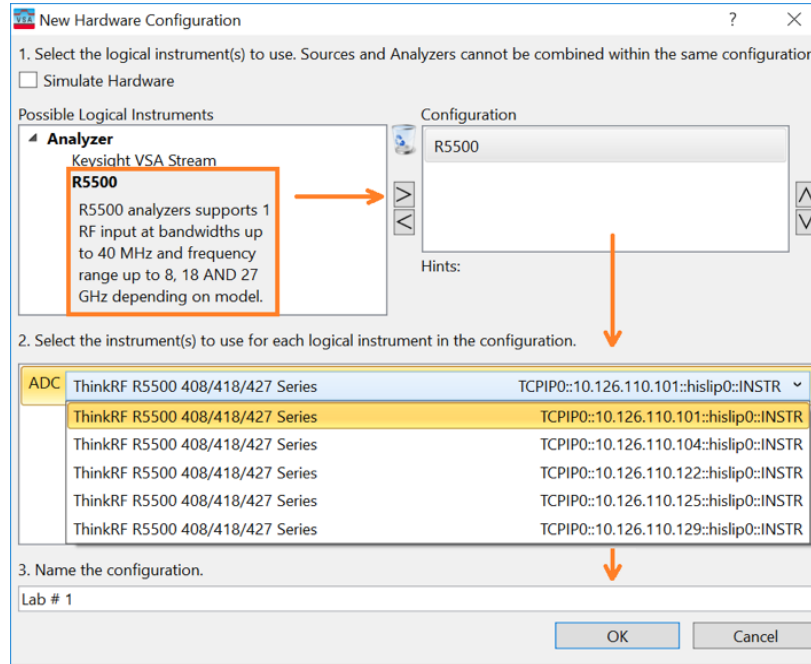
1. In the VSA application menu bar, open the **Utilities** menu, and select the **Hardware > Configurations ...** option from the drop-down menu.



2. In the **Hardware** window, click on the **Add** button to add a new hardware configuration.



3. In the **New Hardware Configuration** window:
 - a) Select the ThinkRF R5500 entry in the **Possible Logical Instruments** pane, and click the “>” arrow to add it to the **Configuration** pane.
 - b) Leave the default values in the **Select the instrument(s) to use** field.
 - c) Specify a name for your analyzer in the **Name the configuration** field.



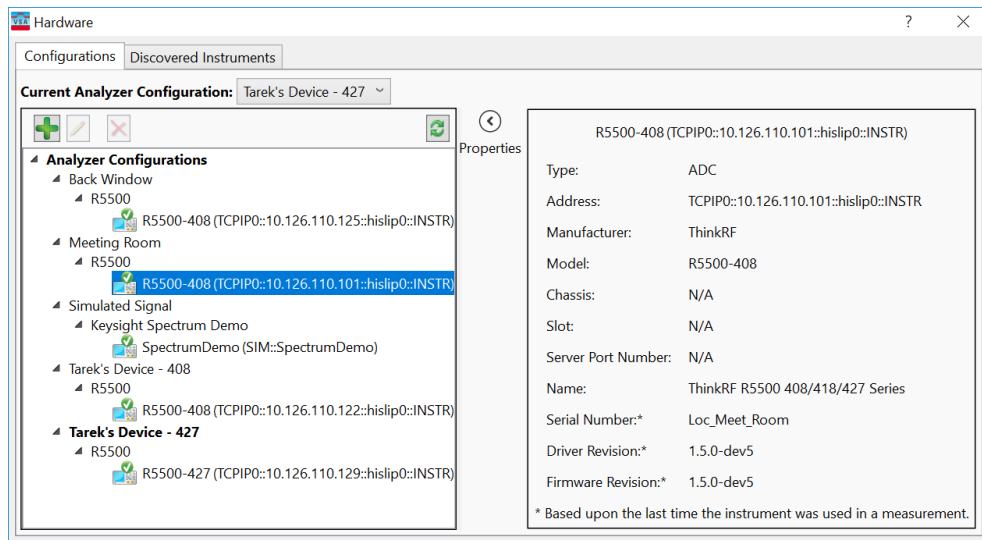
5. Click **OK** to create the hardware configuration.
The ThinkRF Analyzer configuration appears in the **Configurations** tab.
6. In the **Current Analyzer Configuration** field, select the new ThinkRF R5500 device from the drop-down menu.
7. Close the **Hardware** window.
The VSA spectrum display shows signal data from the R5500 device.

Viewing Device Information

You can obtain device-specific information for your ThinkRF R5500 device from the VSA application.

1. In the VSA application menu bar, open the **Utilities** menu, and select the **Hardware > Configurations ...** option from the drop-down menu.
2. In the **Hardware** window, click on the ThinkRF analyzer configuration profile for your R5500 device.
3. Click the arrow (>) above the **Properties** label to expand the window and display the **Properties** pane.

Device information (including model, serial number and firmware revision) appears in the **Properties** pane on the right.



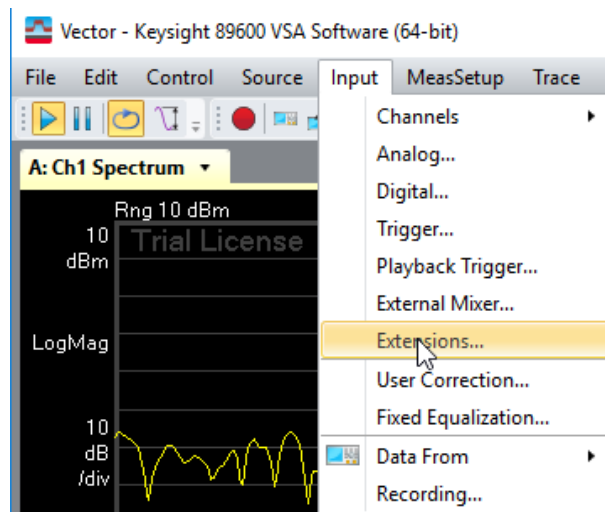
Configuring R5500 Device Settings

You can configure device-specific settings for the R5500, including signal attenuation, gain, and reference clock, from the VSA application, as described below.

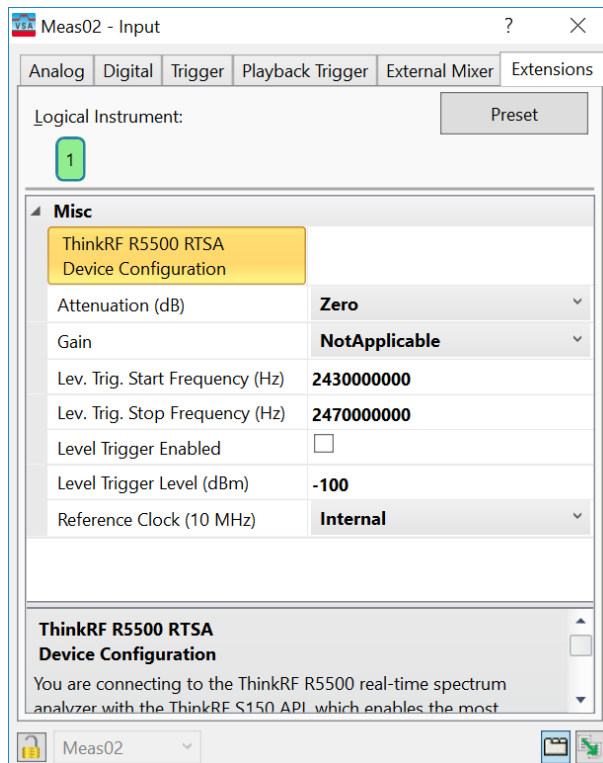


Note: Gain and attenuation settings allow the R5500-VSA application to accommodate very weak signals as well as strong signals. You must remain within the signal strength levels specified in the R5500 data sheet to avoid saturating or damaging the device.

1. In the VSA application menu bar, open the **Input** menu, and select the **Extensions ...** option from the drop-down menu.



The **Input** dialog window opens and displays the **Extensions** tab.



2. On the **Extensions** tab, set values for the following parameters:

- **Attenuation (db)**: sets the attenuation of the input signal to one of four attenuation levels (0, 10, 20, or 30 dB).
- **Gain**: controls the gain blocks inside the Front-End of the R5500 device, where three gain levels are available (low, medium, or high).



Note: The ThinkRF R5500-408 device and its variants have no controllable gain stage. Therefore, gain setting is set to “NotApplicable”

- **Level Trigger**: specifies the trigger configuration, where four parameters are available:
 - **Lev. Trig. Start Frequency (Hz)**: specifies start frequency for the triggering window in Hz.
 - **Lev. Trig. Stop Frequency (Hz)**: specifies stop frequency for the triggering window in Hz.
 - **Level Trigger Enabled**: enables/disables level triggering.
 - **Level Trigger Level (dBm)**: specifies the triggering threshold value in dBm.

Configuring the ThinkRF E300 Enabler

- **Reference Clock (10 MHz):** specifies the source of the 10 MHz reference clock. You can select the internal (built-in) 10 MHz source, or an external source.

If you are using an external source for the reference clock, you must connect it via the associated port on the rear panel of the R5500 device (10 Mhz/IN), and carefully consider input damage levels.

The LED associated with the external reference source has the following states:

- Solid green: Internal reference frequency is selected.
- Blinking green: External reference frequency is selected, and an input source is connected.
- Blinking red: External reference frequency is selected, and no input source is connected.



Note: When you add a new measurement to a R5500 device in the VSA application (**MeasSetup > New Measurement**), you must close the **Input** dialog window first.

