

Products: R&S<sup>®</sup> SMU, R&S<sup>®</sup> SMJ, R&S<sup>®</sup> SMATE, R&S<sup>®</sup> SFU, R&S<sup>®</sup> FSP, R&S<sup>®</sup> FSQ, R&S<sup>®</sup> FSU, R&S<sup>®</sup> FSL, R&S<sup>®</sup> FSUP, R&S<sup>®</sup> FSMR, R&S<sup>®</sup> ESU, R&S<sup>®</sup> ESCI, R&S<sup>®</sup> ESPI, R&S<sup>®</sup> UPV, R&S<sup>®</sup> ZVA, R&S<sup>®</sup> ZVB, R&S<sup>®</sup> ZVT, R&S<sup>®</sup> ZVL

## Remote Operation of R&S Instruments Using Remote Desktop Connection via LAN

### Application Note

Rohde & Schwarz instruments can be shared when users wish to use the same instrument. This can be done quite easily with the LAN interface, which comes as a standard option. Through this interface, Rohde & Schwarz instruments can be connected directly to a network, and users with access to the network can manually operate the instrument from a remote computer. This Application Note lists all instruments that support these features and describes the steps necessary to set up and configure the network connection to operate these instruments remotely.



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## 1 Overview

Rohde & Schwarz instruments allow a company to share its instruments when more than one user wishes to use the same instrument. They can be remote-controlled from a desk that is part of a test assembly located in another area in the same building. This can be easily done by operating the instrument like a conventional network device (e.g. network printers, fax machines, etc.) via the LAN interface. Together with the “Remote Desktop Connection” program included free of charge in Windows® OS, no additional hardware is required.

This Application Note describes how to connect and configure various kinds of networks (DHCP, Fixed IP address, Direct) and how to use the “Remote Desktop Connection” program to control Rohde & Schwarz instruments.

## 2 List of Instruments

The following Rohde & Schwarz instruments support the feature described in the Application Note:

<b>Signal generation</b>	R&S SMU family, R&S SFU
<b>Spectrum analysis</b>	R&S FSQ, R&S FSP, R&S FSL, R&S FSU, R&S FSMR, R&S FSUP, R&S ESU, R&S ESCI, R&S ESPI
<b>Network analysis</b>	R&S ZVA, R&S ZVT, R&S ZVB, R&S ZVL
<b>Audio analysis</b>	R&S UPV

## 3 Basic Requirements

### PC Hardware Requirements

	Minimum	Recommended
<b>Interface</b>	Ethernet card (LAN card)	---

### PC Software Requirements


	Minimum	Recommended
<b>OS</b>	Windows® 95 / 98 / NT 4.0 / 2000 / Me / XP / VISTA	Windows® 98 / 2000 / Me / XP
<b>Programs</b>	Remote Desktop Connection	---

## 4. DHCP Networks

Under this protocol an IP address is assigned to the instrument automatically after it has been configured for DHCP network (see Fig. 4.1) and connected to the network. Simply enter the *unique computer name* or the *IP address* of the instrument into the Remote Desktop program and the instrument will be in remote operation. The following section describes step-by-step how this is done.

### Access to Windows OS

In the following explanations, access to the Windows OS is required. Depending from the instrument type, it can be achieved in different ways:

**Network Analyzers ZVA, ZVB, ZVT, ZVL:** Press the Windows-hardkey at the frontpanel , or close the firmware via MENU > File > Exit (e.g. ZVL).

**Otherwise** connect a keyboard and a mouse to the instrument before turning it on <sup>1)</sup>. Press the **Windows** key or **CTRL-ESC** to display the Windows menu.

### Instrument unique computer name

Switch to Windows OS: *Start > Control Panel > System > Computer Name*  
In the *Full computer name* field, the instrument's unique computer name will appear, for example RSSMU200A101119 (see Fig. 4.2).

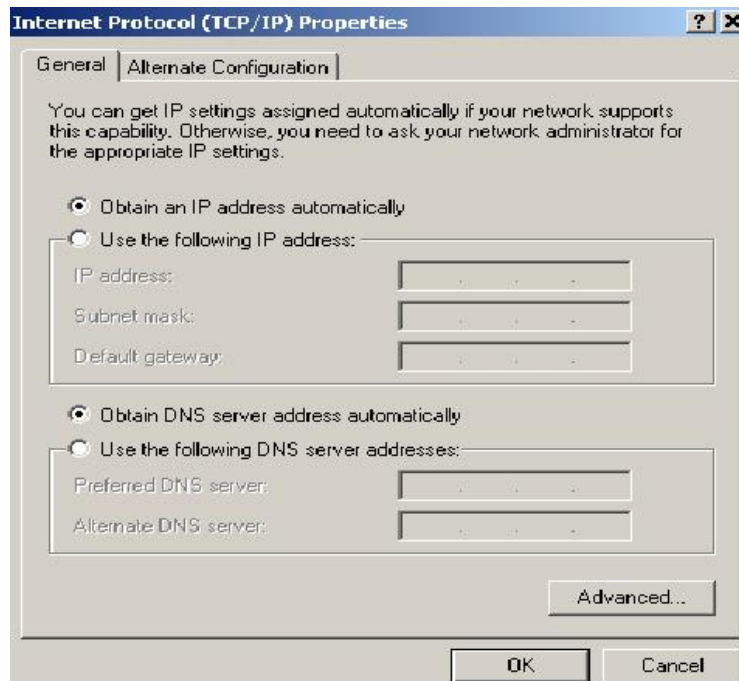


Fig. 4.1 Instrument TCP/IP protocol settings

<sup>1)</sup> For instruments that have  on their front panel.

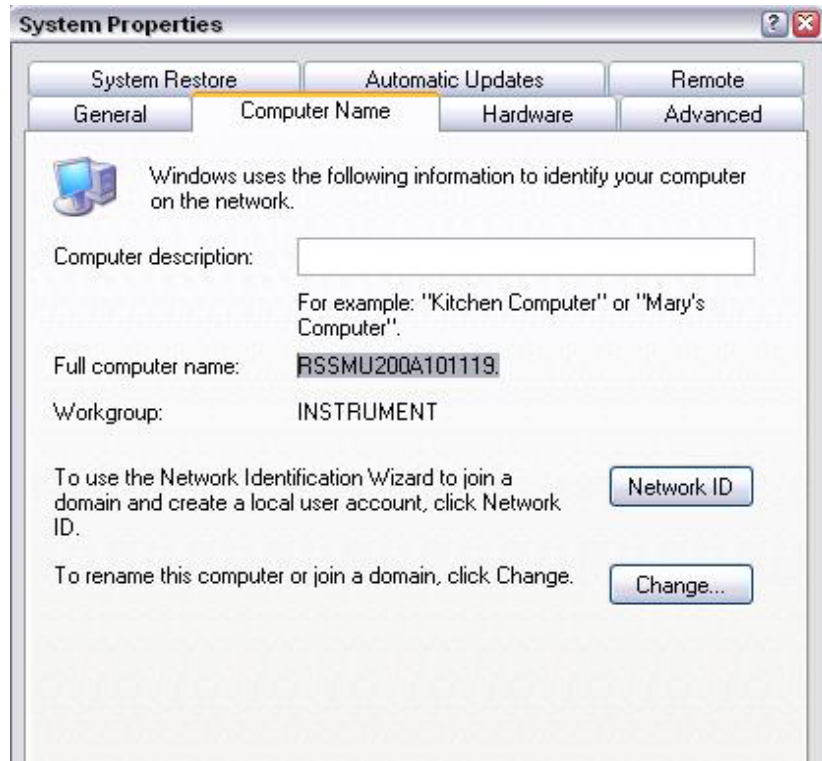


Fig. 4.2 Display of the instrument's unique computer name

### Instrument IP address

Find the **network connection** icon  on the instruments toolbar and double-click it. Select the folder "Support" (see Fig. 4.3).

Alternatively, select *Windows > Start > Control Panel > Network Connections > LAN or High-Speed Internet*. Double-click the interface in use (Ethernet 1 or Ethernet 2), the window with the Ethernet status will pop up. Select the *Support* tab and find the the IP address (see Fig. 4.3).

The IP address can also be shown via the DOS mode <sup>2)</sup>. On the keyboard press **CRTL-ALT-DEL** and select the **TASK MANAGER** command button. In the **TASK MANAGER** windows, select *File > New Task* and enter "CMD" to get into the DOS mode. Type in "ipconfig"; the IP address will be displayed as well. (see Fig. 4.4)

<sup>2)</sup> Does not work with the R&S FSP

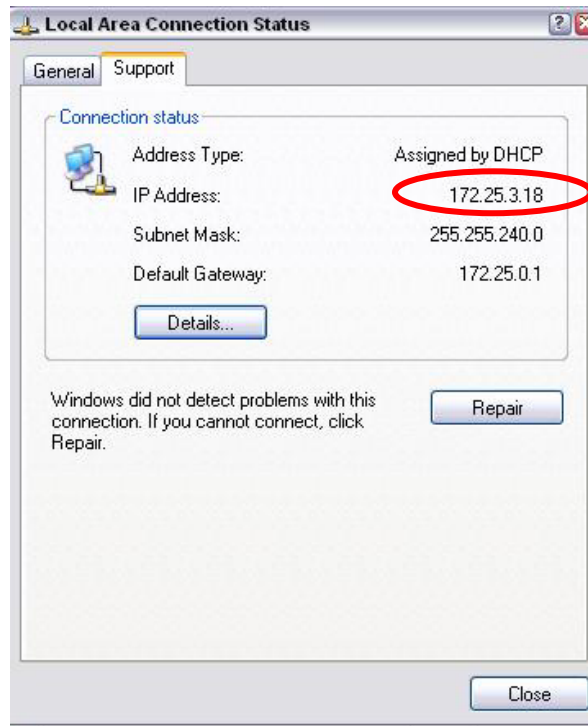


Fig. 4.3 IP address in Windows mode

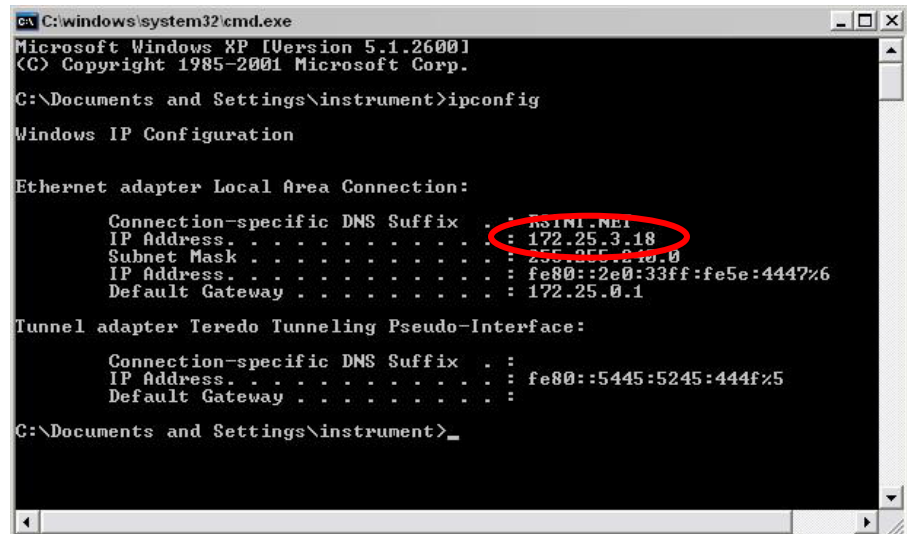


Fig. 4.4 IP address in DOS mode

**Start the Remote Desktop connection program on the PC**

After verifying the IP address, select the Remote Desktop Connection (Fig. 4.5) program on the external PC. In Windows XP, you will find it under *Start > Programs > Accessories > Communications > Remote Desktop Connection*.

You can key in the instrument's unique computer name or the IP address.

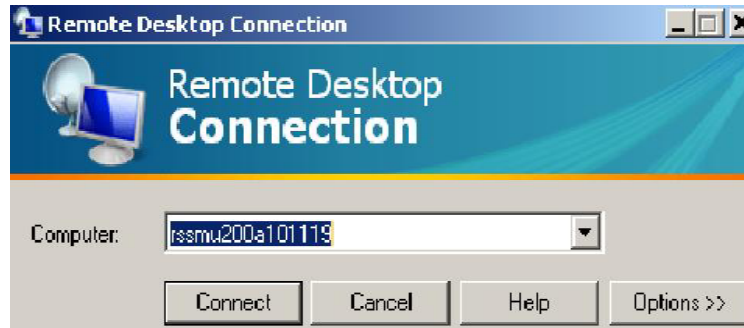


Fig. 4.5 Remote Desktop Connection program

Before the instrument is in remote operation, the instrument ID and password have to be entered. (The instrument ID and password are both “instrument”.)

**Before the connection to the instrument can be established, please take note of the following:**

- The instrument should allow remote connection (see Fig. 4.6).

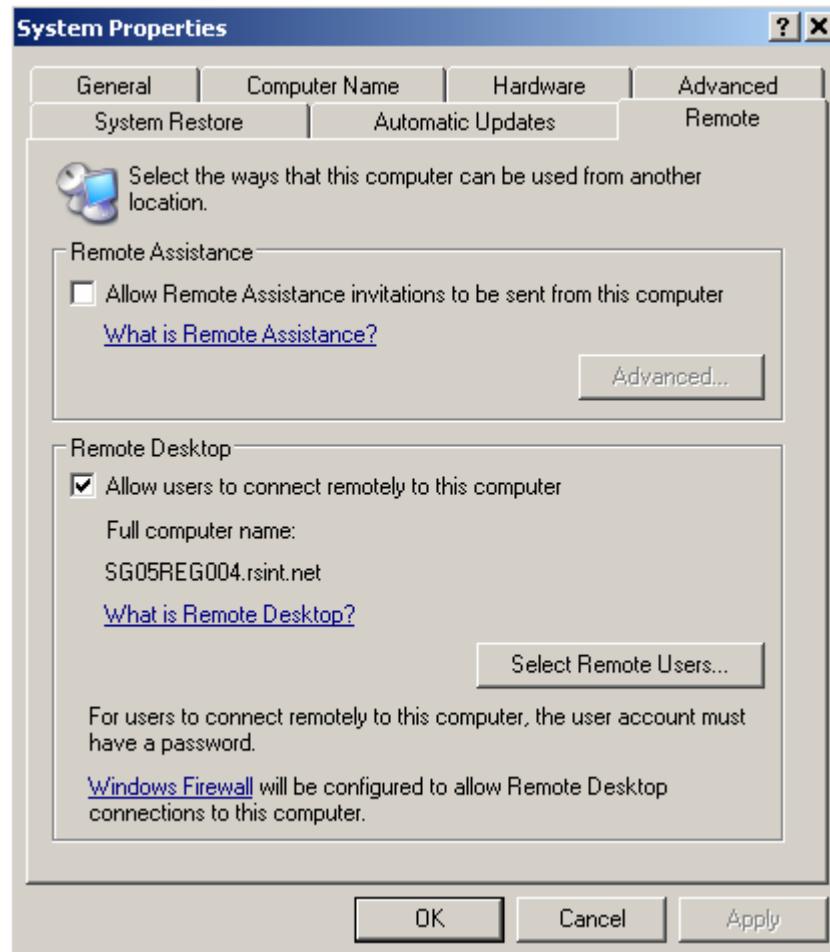


Fig. 4.6 Enable Remote connection

## 5. Networks with Fixed IP Addresses

Normally, the network administrator will maintain and assign IP addresses. Enter the address in the TCP/IP settings of the instrument under *Use the following IP address* as shown in Fig. 4.7.

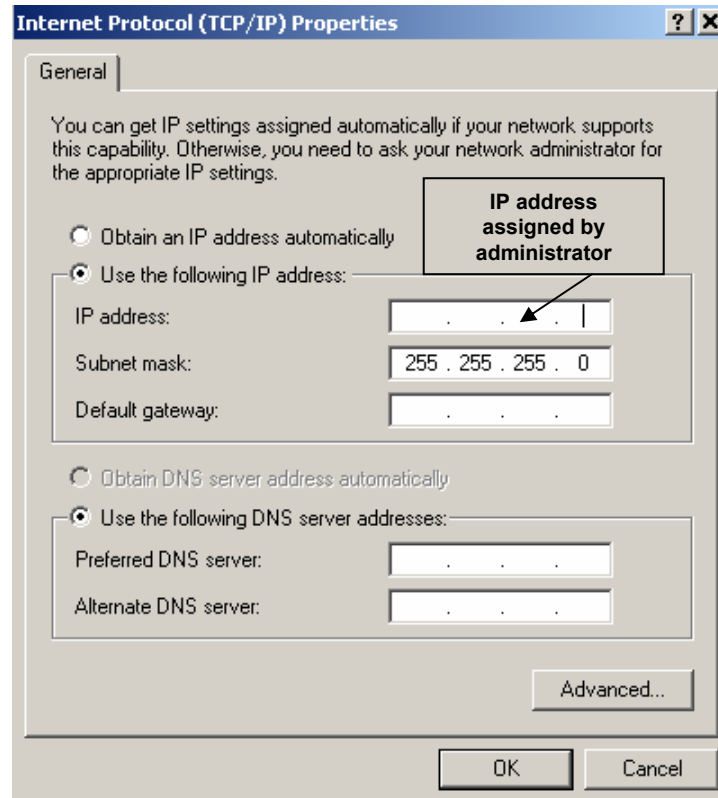


Fig. 4.7 TCP/IP settings

### Connect the instrument to the network

Connect the instrument to the network via the LAN interface.

### Enter the IP address

Open the TCP/IP properties setting in the instrument. Enable the *Use the following IP address* radio button and enter the IP address as received from your network administrator.

### Start the Remote Desktop Connection program

Start the Remote Desktop program on the external PC; enter the instrument IP address and press **Connect**. Before the instrument is in remote operation, the instrument ID and password have to be entered. (The instrument ID and password are both **"instrument"**.)



## 6. Point to Point Network

This is a simple direct connection from the instrument to the PC via the LAN interface. A cross-over cable is required. If "AUTO-MDIX" functionality is supported, no cross-over cable is necessary.

**Connect the cross-over cable from the LAN interface of the external PC to the instrument.**

**Assign an IP address to the instrument and the external PC.**

The IP address of 192.168.xxx.yyy should be used. xxx and yyy can be any values from 1 to 254, the value of the subnet mask is 255.255.255.0

For example, set the IP address of the instrument as shown in Fig. 4.8.

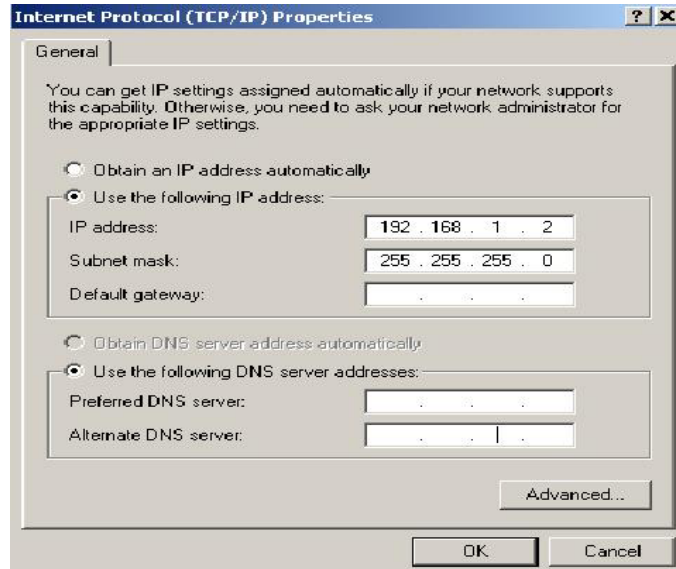


Fig. 4.8 IP address of instrument

Then set the same IP address of the external PC as shown in Fig. 4.9.

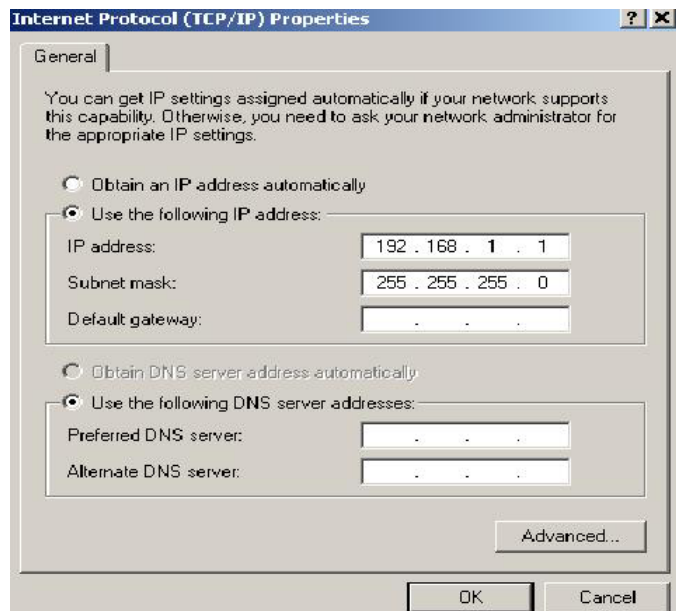


Fig. 4.9 IP address of external PC

**Start the Remote Desktop Connection program on the external PC.**

Start the Remote Desktop program on the external PC; enter the instrument IP address and press **Connect**. Before the instrument is in remote operation the instrument ID and password have to be entered. (The instrument ID and password are both "instrument".)

## 7. References

[1] Rohde & Schwarz manuals

## 8. Ordering Information

### Signal generators

R&S SMU200A	100 kHz to 3/6 GHz	1141.2005.02
R&S SMATE200A	100 kHz to 3/6 GHz	1400.7005.02
R&S SMJ100A	100 kHz to 3/6 GHz	1403.4507.02
R&S SFU	100 kHz to 3 GHz	2110.2500.02
R&S UPV	DC to 250 kHz	1146.2003.02

### Spectrum analyzers

R&S FSPxx	9 kHz to 40 GHz	1164.4391.xx
R&S FSP-B16	LAN interface	1129.8042.03
R&S FSUxx	20 Hz to 26.5 GHz	1129.9003.xx
R&S FSQxx	20 Hz to 40 GHz	1155.5001.xx
R&S FSLx	9 kHz to 6 GHz	1300.2502.xx
R&S FSUPxx	20 Hz to 50.0 GHz	1166.3505.xx
R&S FSMRxx	20 Hz to 50.0 GHz	1166.3311.xx

### Test receivers

R&S ESUxx	20 Hz to 40.0 GHz	1302.6005.xx
R&S ESCI 3	9 kHz to 3 GHz	1166.5950.03
R&S FSP-B16	LAN Interface	1129.8042.03
R&S ESPIx	9 kHz to 7 GHz	1142.8007.0x
R&S FSP-B16	LAN Interface	1129.8042.03

### Network analyzers

R&S ZVAxx	300 kHz to 40 GHz	1145.1110.xx
R&S ZVBxx	300 kHz to 20 GHz	1145.1010.xx
R&S ZVTxx	300 KHZ to 20 GHz	1300.0000.xx
R&S ZVLx	9 kHz to 6 GHz	1303.6509.xx



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