

Products: Rohde & Schwarz measuring instruments with their VXIPnP drivers, VEE software

Rohde & Schwarz Device Drivers under VEE Installation and Troubleshooting

Application Note

The use of Rohde & Schwarz device drivers under VEE software is not complicated. However, a number of factors are involved, the errors that occur are often difficult to diagnose. This application provides easy and detailed support for installation and troubleshooting using National Instruments or Agilent GPIB boards.



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1 Overview

Why device drivers from Rohde & Schwarz?

Controlling a sophisticated measuring instrument can be a complex matter. The description of the command set alone comprises a few dozen to several hundred pages. Writing even the commands for a simple application takes up considerable time. Drivers relieve the developer to a great extent of these efforts. Searching the manual for commands is no longer necessary, as it has already been done while developing the drivers and is therefore no longer required.

As a service, Rohde & Schwarz device drivers are provided free of charge.

For the current Rohde & Schwarz device drivers and demo programs see:

<http://www.rohde-schwarz.com>

Click on the [Drivers](#) under Shortcuts on this WEB page.

VISA

All Rohde & Schwarz device drivers use Virtual Instrument Software Architecture (VISA) to avoid having to provide an individual driver for every device interface. VISA is a standardized software interface library providing input and output functions to communicate with measuring instruments. This standard is defined by the VXIplug&play Systems Alliance, with National Instruments and Hewlett Packard among others being represented in this consortium. These I/O functions are usually independent of the device interface used; VXI, GPIB and RS-232 are currently supported.

VEE and Device Drivers

Although both the Rohde & Schwarz device drivers and the graphic programming language VEE are simple to handle on their own, when used in combination the errors that occur are often difficult to diagnose, due to a number of factors are involved.

In contrast to the alternative products LabWindows/CVI or LabVIEW, VEE has no stand alone initialization routine. The first call to the device causes its implicit initialization, errors which then occur are difficult to identify. They may be due, for instance, to missing or incorrect VISA installation, or incorrect settings of addresses or names in VEE.

To make both the device driver installation and possible troubleshooting easy, this application provides user-friendly and detailed support.

2 Installing and Testing VISA

VISA is a standardized software interface library providing input and output functions to communicate with measuring instruments. An initialization function in the relevant application program defines which device interface (VXI, GPIB or RS-232) to use. The subsequent program routine is completely independent of the interface used.

The Rohde & Schwarz device drivers require VISA revision 2.0.1 or higher. The current Agilent VISA (Revision J02, effective May 2001) does not meet the requirement above, thus making VISA from National Instruments (NI) an absolute necessity.

Depending on the GPIB card used (National Instruments or Agilent), the release procedure varies.

Using National Instruments GPIB Cards or RS-232

As of May 2001, we recommend National Instruments VISA 2.0.1 to VEE users.

Download VISA from National Instruments using ftp:

<ftp://ftp.ni.com/support/visa/drivers/win32/2.01/>

Using Agilent GPIB Cards

Agilent GPIB cards cannot be operated automatically with the National Instrument VISA. This is possible only with National Instruments VISA 2.5 and Agilent IO Library J01.02 or later. As of May 2001, National Instruments does not provide a separate and complete installation routine for National Instruments VISA 2.5 to download. LabVIEW 6i users can use Agilent GPIB cards, since the LabVIEW6i program package includes VISA 2.5. An application note from National Instruments (see Link compilation) describes the installation process. You will also get VISA 2.5 with a National Instruments GPIB board. We strongly recommend all other users to use National Instruments GPIB cards. If this is not possible, please contact our Support Center

Rohde & Schwarz Support Center

e-mail: CustomerSupport@rsd.rohde-schwarz.com

Installing VISA

Problems occur when different VISA versions from different manufacturers are installed on the same computer. This can occur as VISA might have been installed automatically along with application programs. We therefore recommend the following procedure:

Prior to installation:

1. Uninstall your previous VISA versions.
2. Check whether any previous VISA files remain on your computer. Search for VISA32.dll.
3. As a precaution, write down the settings of the GPIB card. These settings are stored under:
Settings/Control Panel/GPIB

Installing National Instruments VISA

- Install National Instruments VISA. Observe the installation instructions and particularly those about rebooting the computer.

After installation:

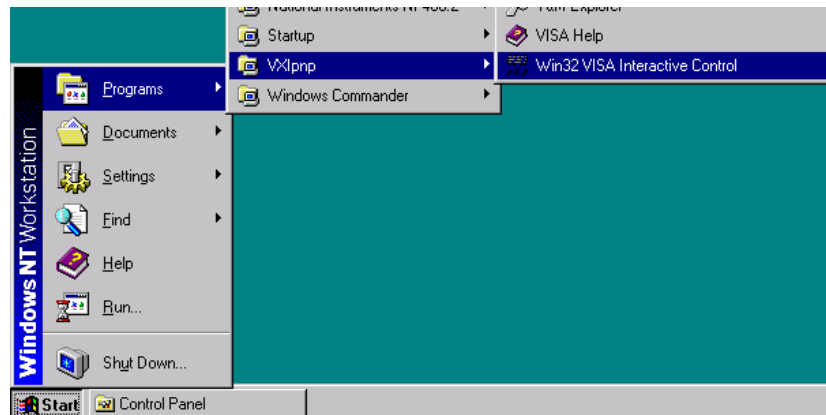
- Check whether the GPIB card is still installed correctly. If not, reinstall the GPIB card with the previous settings. Use
Settings/Control Panel/GPIB

Testing the VISA Installation

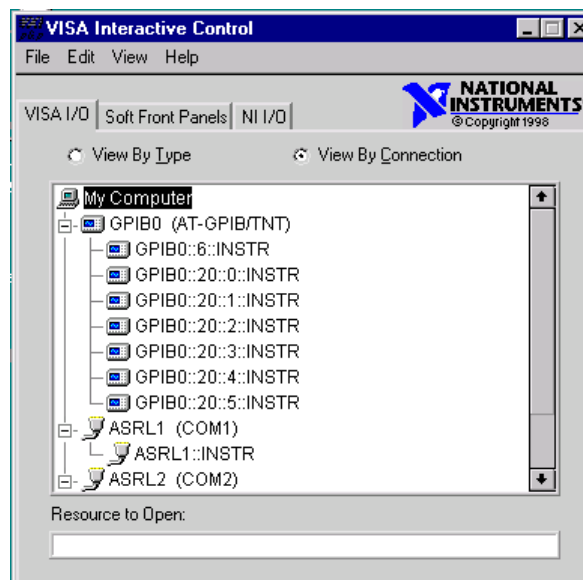
The easiest way to test VISA is by using the VISA Interactive Control program.

- Connect one or more devices to the GPIB Bus and start the program.

Programs/VXIPnP/Win 32 VISA Interactive Control



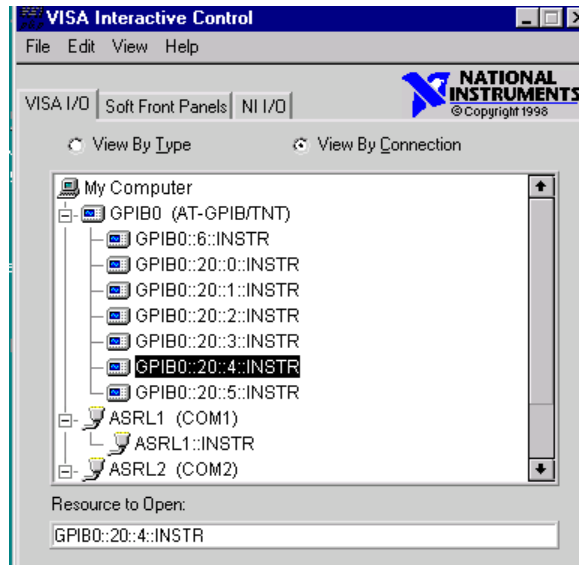
All connected devices must be recognized and displayed.



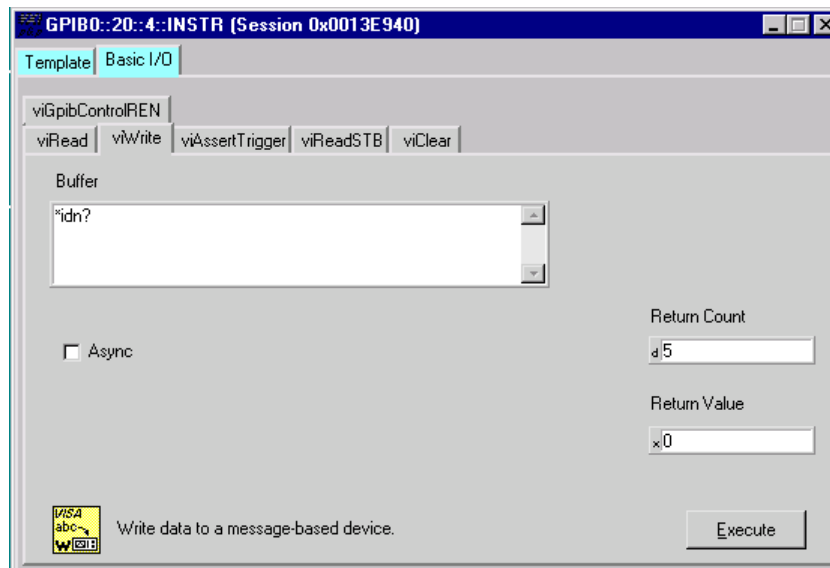
If not all devices are displayed correctly, either VISA has been installed incorrectly or there are connection problems.

In this example the I/Q Modulation Generator AMIQ is found at address 6. The Universal Radio Communication Tester CMU is displayed at address 20 with the secondary addresses 0 and 1 for the basic unit and additionally with the secondary address 2 to 5 for the GSM option.

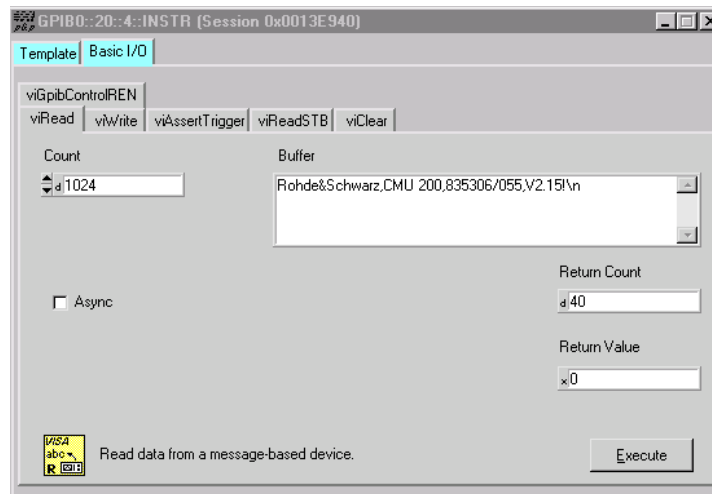
After double-clicking on the device addresses you can directly communicate with the devices via **Basic I/O** as the following screenshots show.



Send *idn? to the device with viWrite:



Read the device response with viRead:



3 Installing Rohde & Schwarz Device Drivers

The Rohde & Schwarz device drivers are available as EXE files.

1. Download the device driver.
2. Start the EXE file.
The installation routine installs the driver according to the VXIPnP specification.

4 Settings and Tests in VEE

Before using the device driver from VEE, set the device addresses, the device names and the Plug&Play driver name in VEE.

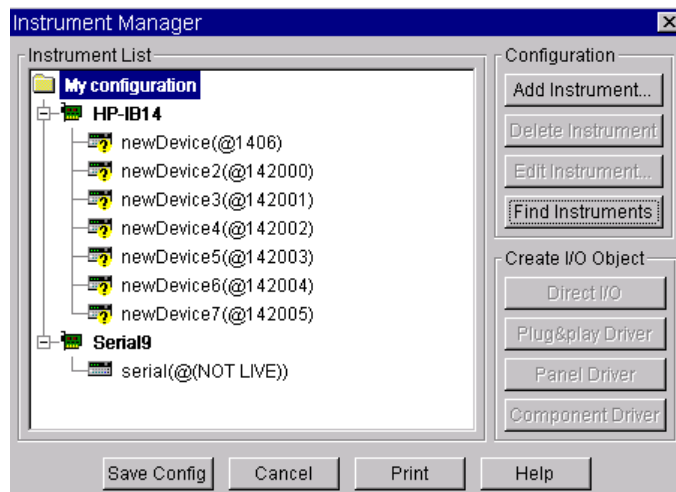
The device addresses and device names can be set:

- Using settings via "Find Instrument"
- Setting with the aid of demo programs for measuring instruments with secondary addresses are explained below.

Both methods are explained below.

Settings for Measuring Instruments via "Find Instruments"

1. Open the *IO / Instrument Manager / Find Instruments* menu in VEE.



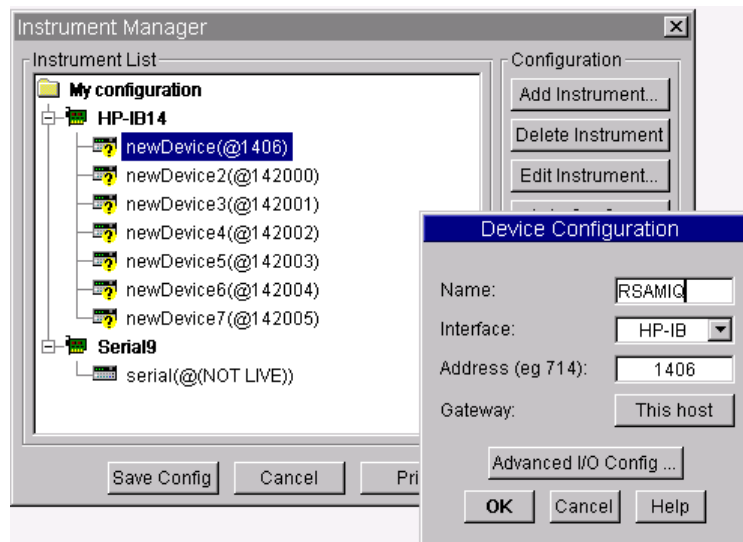
All measuring instruments connected are displayed.

In this example the I/Q Modulation Generator AMIQ connected to the GPIB bus is found at address 6 on the National Instruments GPIB card.

Notes regarding My Configuration Data:

- HP-IB14 and/or @14 corresponds to a National Instruments GPIB card.
- HP-IB7 and/or @7 corresponds to an Agilent GPIB card.
- The RS-232 interfaces are serial.

2. Edit newDevice



Notes regarding Device Configuration:

The first part in *Address* specifies the manufacturer of the GPIB card. As in *My Configuration*, 14 corresponds to a GPIB card from National Instruments and 7 to a GPIB card from Agilent.

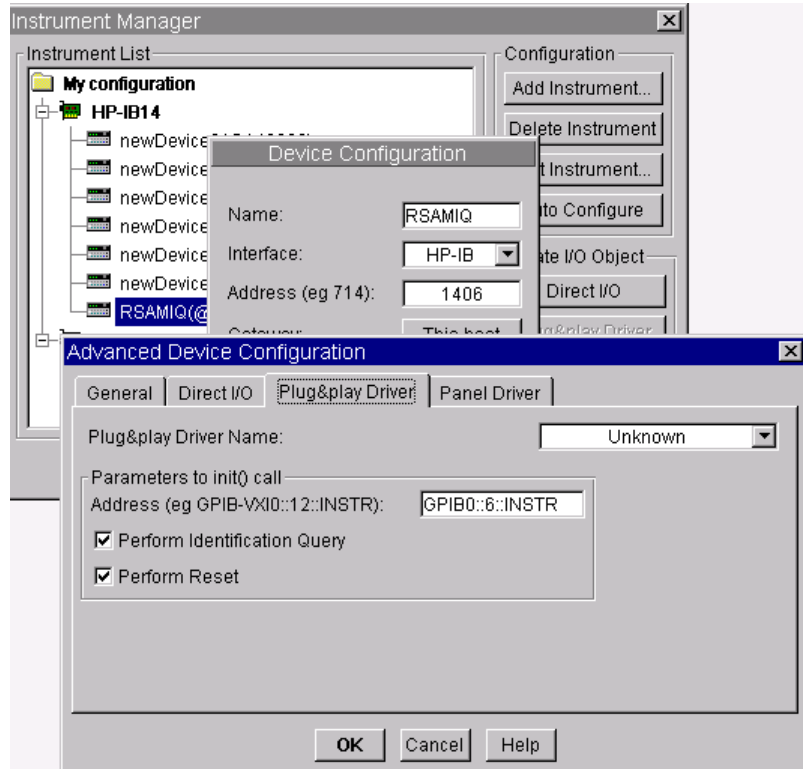
Tips for troubleshooting:

These settings are sufficient only when Direct I/O functions of VEE are used. Please test with the Direct I/O function. The Rohde & Schwarz device drivers, however, require further settings.

If Direct I/O works, but errors occur during driver initialization, the problem is caused by the following settings.

Note: *Be sure that VISA was tested correctly before.*

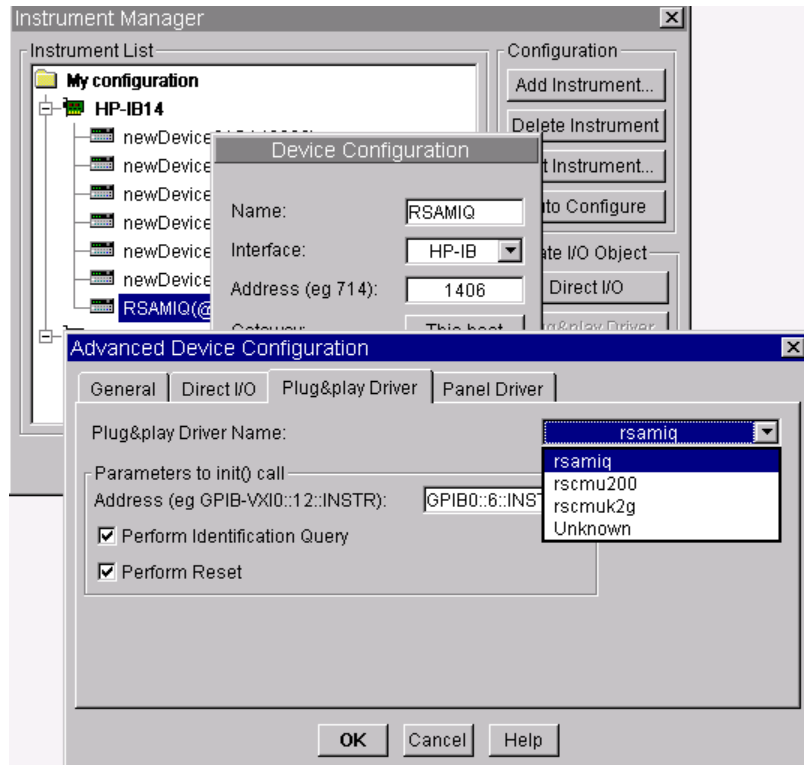
3. Click on the *Advanced I/O Config* button to open the other settings in the *Plug&play Driver* window.



Note: It is possible to use GPIB instead of GPIB0.

The use of a GPIB card number other than 0 requires explicit specification (e.g. GPIB1) otherwise GPIB0 will be accessed.

All of the installed device drivers are listed in a drop down list in *Plug&play Driver Name*. Section 3 describes how to perform the installation.



4. Select the appropriate driver for the AMIQ and click OK.

Via *I/O /Instrument Manager / Plug&play Driver*, you can now use the Rohde & Schwarz driver functions.

Setting with the aid of demo programs for measuring instruments with secondary addresses

Settings can also be made with the aid of demo programs, as explained by using the example of the Universal Radio Communication Tester CMU 200.

Rohde & Schwarz provides detailed demo programs and explanatory texts free of charge, both for the CMU and numerous other Rohde & Schwarz devices. The general handling of CMU drivers is described in the CMU_vxipnp_note.pdf file which can be found at:

<http://www.rohde-schwarz.com>

Click on the [Drivers](#) under Shortcuts on this WEB page then [CMU 200 VXIplug&play](#).

Additionally, the required settings for VEE for every driver are specified as standard in the Readme.txt file.

VEE initializes the measuring instruments when a driver function is first called. In contrast to other programs (LabWindows/CVI, LabVIEW, Visual C++, Visual Basic etc.) dynamic management of secondary addresses in the program is therefore not possible. The Universal Radio Communication Tester CMU features different functional groups, each with their own secondary addresses. The names of the functional groups and their secondary addresses must be defined before program start.

Make the settings with the aid of Readme.txt or with the demo programs. You can easily check if everything is correct by using the demo programs.

In the following, first the CMU Base Module I/O is configured, then the GSM module, and finally additional modules.

Setting the I/O Configuration for the CMU Base Module

Extract from Readme.txt for CMU200 Base Module

Agilent VEE users:

In order to be able to use the CMU instrument drivers in VEE, each instance of each instrument driver must be defined in the Instrument Manager. The VXIplug&play resource descriptor containing primary and secondary addresses of function groups must be correctly assigned. The table below describes configuration expected by the VEE examples available for CMU.

Device Configuration:

RSCMUBASE

Interface: HP-IB

Address: 142000

Advanced I/O Config/Plug&Play Driver: Address: GPIB::20::0::INSTR

Advanced I/O Config/Plug&Play Driver Driver: rscmu200

RSCMURFNSIG

Interface: HP-IB

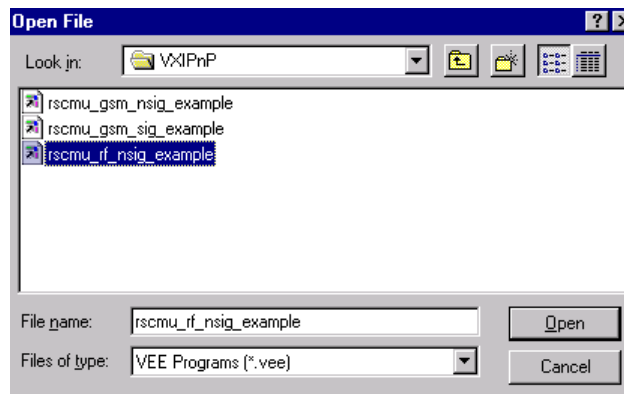
Address: 142001

Advanced I/O Config/Plug&Play Driver: Address: GPIB::20::1::INSTR

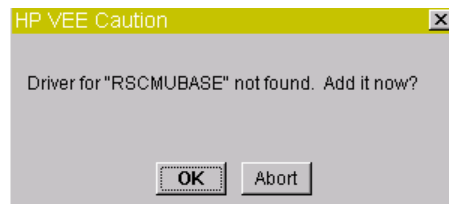
Advanced I/O Config/Plug&Play Driver Driver: rscmu200

The Readme.txt file contains all the relevant information. With the aid of the demo programs you will see how and where to make the necessary settings.

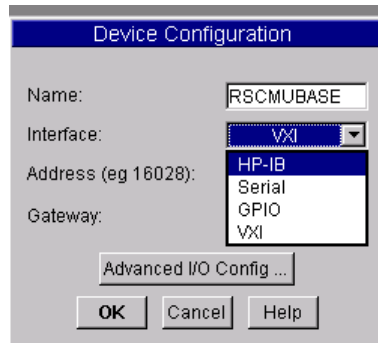
1. Start rscmu_rf_nsig_example.vee:



The following request is displayed:

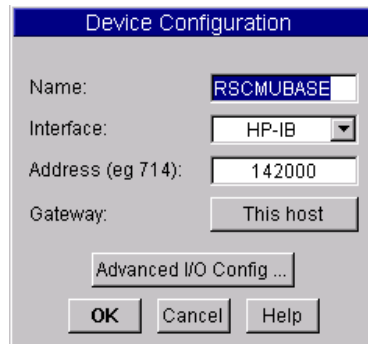


2. Click on OK .
The name is set automatically.
3. Make the following setting in Device Configuration under Interface HP-IB:



HP-IB: The measuring instrument is controlled via a GPIB card.

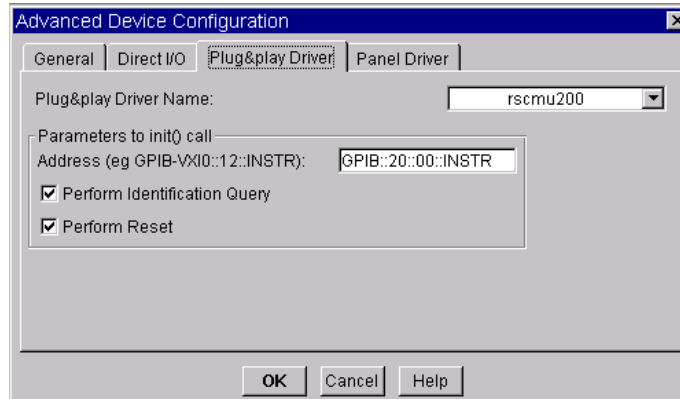
4. Set the address as follows:



142000: 14 corresponds to a National Instruments GPIB card
20 is the primary address of the CMU 200
00 is the secondary address

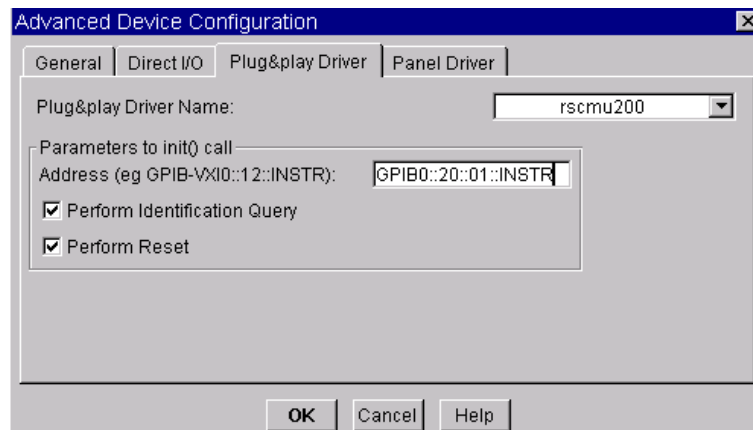
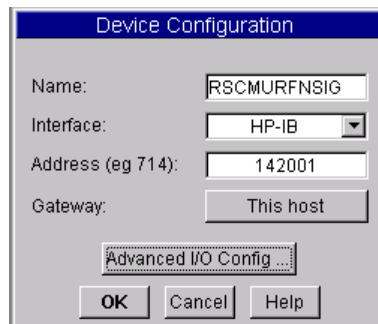
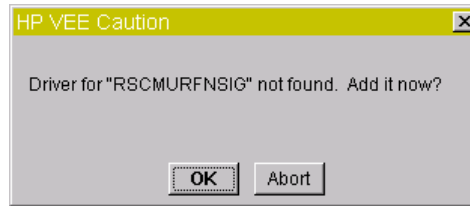
You have to select 72000 for an Agilent GPIB card

5. Set the address and the *Plug&play Driver Name* in *Advanced IO Config*:



Note: *Precise settings are essential! Pay particular attention to the correct instrument address. GPIB corresponds to GPIB0. The use of a different GPIB card number requires its specification (e.g. GPIB). Otherwise GPIB0 is accessed. Use :: to separate primary and secondary addresses.*

6. Set RSCMURFSIG with secondary address 01:



7. Start the demo program `rscmu_rf_nsig_example`.

Note: *If errors occur, please check the I/O configuration.*

Setting the I/O Configuration for the CMU GSM Module

The setting is similar to the base module.

Extract from `Readme.txt` for CMU200 GSM Module

Agilent VEE users:

In order to be able to use the CMU instrument drivers in VEE, each instance of each instrument driver must be defined in the Instrument Manager. The VXIplug&play resource descriptor containing primary and secondary addresses of function groups must be correctly assigned. The VEE examples available for CMU.

Device Configuration:

RSCMUBASE

Interface: HP-IB

Address: 142000

Advanced I/O Config/Plug&Play Driver: Address: GPIB::20::0::INSTR

Advanced I/O Config/Plug&Play Driver Driver: rscmu200

.....

RSCUGSMSIGN900:

Interface: HP-IB

Address: 142002

Advanced I/O Config/Plug&Play Driver: Address: GPIB::20::2::INSTR

Advanced I/O Config/Plug&Play Driver Driver: rscmuk2g

RSCUGSMNSIGN900:

Interface: HP-IB

Address: 142003

Advanced I/O Config/Plug&Play Driver: Address: GPIB::20::3::INSTR

Advanced I/O Config/Plug&Play Driver Driver: rscmuk2g

RSCUGSMSIGN1800:

Interface: HP-IB

Address: 142004

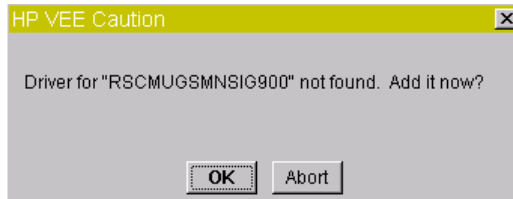
Advanced I/O Config/Plug&Play Driver: Address: GPIB::20::4::INSTR

Advanced I/O Config/Plug&Play Driver Driver: rscmuk2g

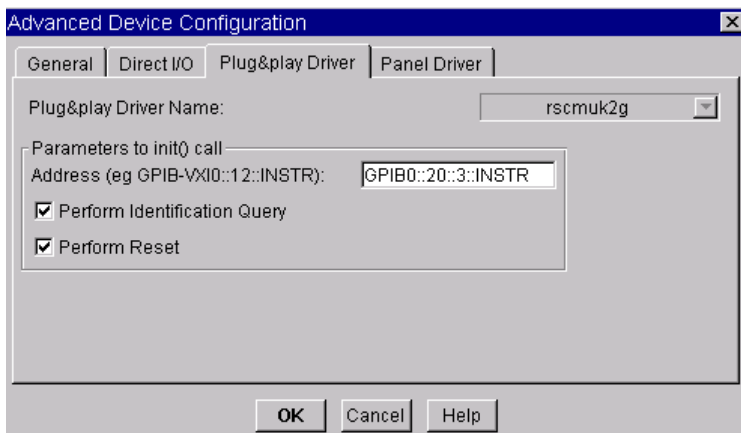
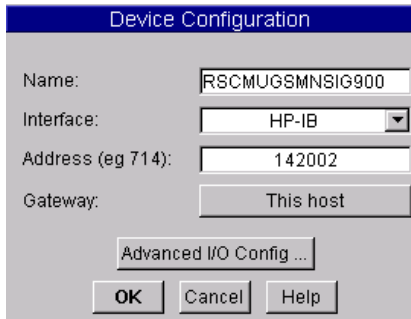
Note: *Set up the base module before using the GSM module.*

1. Start *rscmu_gsm_nsig_example*:

The following dialog is displayed:



2. Set *Interface and Address* and *Plug&play Driver* as follows.



3. Start the demo program.

Note: *If an error occurs, please check the I/O configuration.*

Setting the I/O Configuration for other CMU Modules

The settings for the other modules are configured as explained above.

The *cmu200_vxipnp_note.pdf* file explains the names of all of the functional groups. The applications require these names and definition of the secondary addresses at program start. The name and the secondary addresses have to be identical to the setting in the Instrument Manager for VEE.

5 Download Information

For the current Rohde & Schwarz device drivers see:

<http://www.rohde-schwarz.com/www/download.nsf/drivers?Openview&Count=500&Expandview>

Download National Instruments VISA 2.01 from National Instruments ftp:

<ftp://ftp.ni.com/support/visa/drivers/win32/2.01/>

National Instruments KnowledgeBase - How Can I Use an HPIB Board with LabVIEW? -

<http://digital.ni.com/public.nsf/3efedde4322fef19862567740067f3cc/e56d3d4866be0a8a86256942006626f0?OpenDocument>

6 Additional Information

Please contact TM-Applications@rsd.rohde-schwarz.com for comments and further suggestions.



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This application note and the supplied programs may only be used subject to the conditions of use set forth in the download area of the Rohde & Schwarz website.