

R&S® DVMS1

DTV Monitoring System

Getting Started



2113761902

The software contained in this product uses several valuable open source software packages. For information, see the "Open Source Acknowledgment" document, which is available for download from the R&S DVMS product page at www.rohde-schwarz.com/product/dvms.html > "Downloads" > "Firmware".

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

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The following abbreviations are used throughout this manual: R&S®DVMS is abbreviated as R&S DVMS, R&S®DVMS1 is abbreviated as R&S DVMS1.

Safety Instructions

Instrucciones de seguridad

Sicherheitshinweise

Consignes de sécurité

WARNING

Risk of injury and instrument damage

The instrument must be used in an appropriate manner to prevent electric shock, fire, personal injury or instrument damage.

- Do not open the instrument casing.
 - Read and observe the "Basic Safety Instructions" delivered as printed brochure with the instrument.
 - Read and observe the safety instructions in the following sections. Note that the data sheet may specify additional operating conditions.
 - Keep the "Basic Safety Instructions" and the product documentation in a safe place and pass them on to the subsequent users.
-

ADVERTENCIA

Riesgo de lesiones y daños en el instrumento

El instrumento se debe usar de manera adecuada para prevenir descargas eléctricas, incendios, lesiones o daños materiales.

- No abrir la carcasa del instrumento.
 - Lea y cumpla las "Instrucciones de seguridad elementales" suministradas con el instrumento como folleto impreso.
 - Lea y cumpla las instrucciones de seguridad incluidas en las siguientes secciones. Se debe tener en cuenta que las especificaciones técnicas pueden contener condiciones adicionales para su uso.
 - Guarde bien las instrucciones de seguridad elementales, así como la documentación del producto, y entréguelas a usuarios posteriores.
-

⚠️ WARNUNG**Gefahr von Verletzungen und Schäden am Gerät**

Betreiben Sie das Gerät immer ordnungsgemäß, um elektrischen Schlag, Brand, Verletzungen von Personen oder Geräteschäden zu verhindern.

- Öffnen Sie das Gerätegehäuse nicht.
 - Lesen und beachten Sie die "Grundlegenden Sicherheitshinweise", die als gedruckte Broschüre dem Gerät beiliegen.
 - Lesen und beachten Sie die Sicherheitshinweise in den folgenden Abschnitten; möglicherweise enthält das Datenblatt weitere Hinweise zu speziellen Betriebsbedingungen.
 - Bewahren Sie die "Grundlegenden Sicherheitshinweise" und die Produktdokumentation gut auf und geben Sie diese an weitere Benutzer des Produkts weiter.
-

⚠️ AVERTISSEMENT**Risque de blessures et d'endommagement de l'appareil**

L'appareil doit être utilisé conformément aux prescriptions afin d'éviter les électrocutions, incendies, dommages corporels et matériels.

- N'ouvrez pas le boîtier de l'appareil.
 - Lisez et respectez les "consignes de sécurité fondamentales" fournies avec l'appareil sous forme de brochure imprimée.
 - Lisez et respectez les instructions de sécurité dans les sections suivantes. Il ne faut pas oublier que la fiche technique peut indiquer des conditions d'exploitation supplémentaires.
 - Gardez les consignes de sécurité fondamentales et la documentation produit dans un lieu sûr et transmettez ces documents aux autres utilisateurs.
-

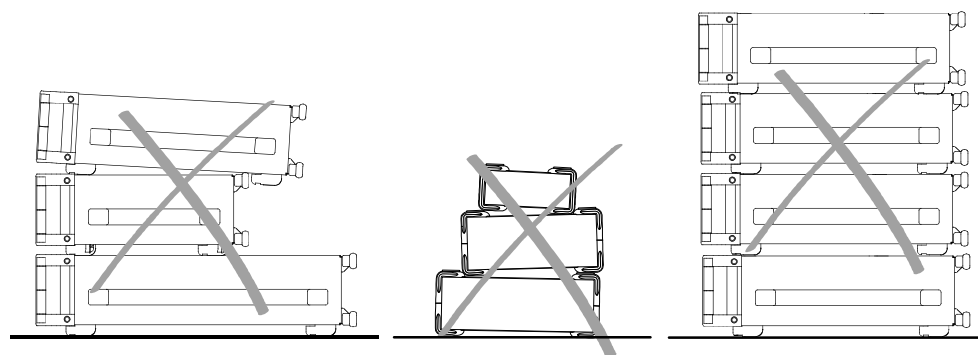
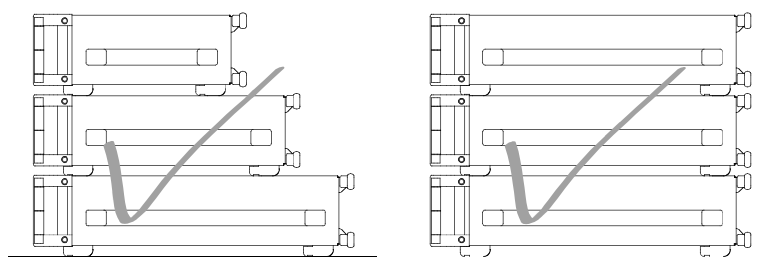
Safety Instructions for Stacking Instruments

⚠ WARNING

Danger of injury

Instruments may slip if they are stacked on top of each other.

Place the instrument on a stable, even surface. Stack the instruments according to their size, with the largest instrument on the bottom. Do not stack more than three instruments directly on top of each other. Instruments may only be stacked if their feet and housing allow horizontal stacking. If these conditions are not met, the instruments must be installed in a rack in order to avoid the risk of personal injury and material damage.



Incorrect order

Incompatible feet

Too many instruments stacked

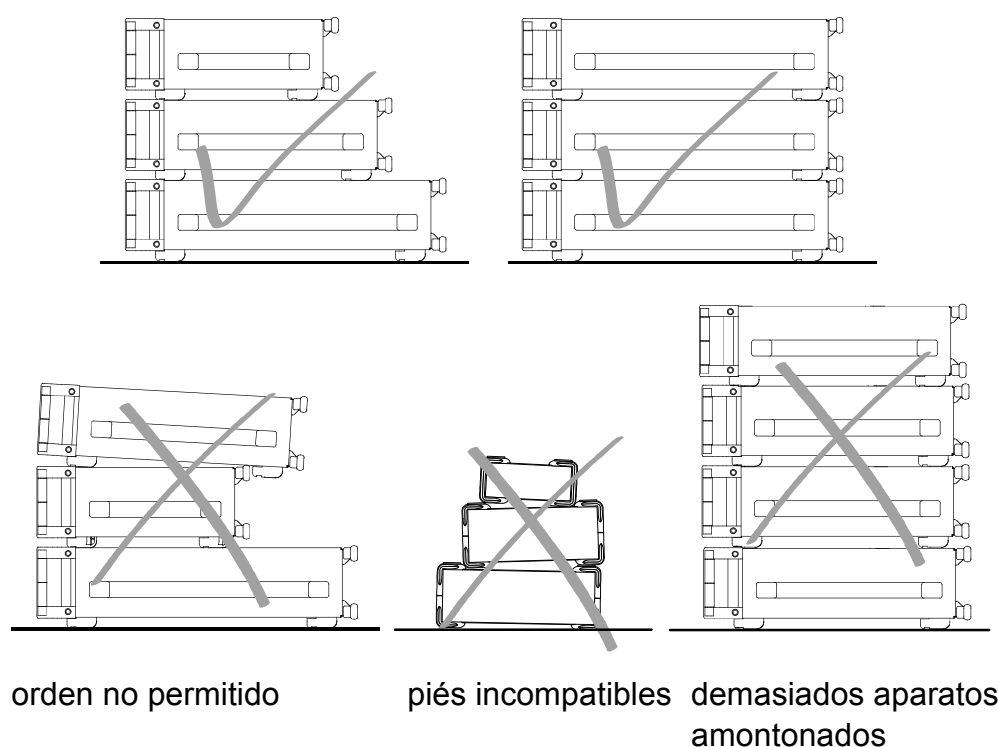
Informaciones de seguridad para el amontonamiento de aparatos

⚠ ADVERTENCIA

Peligro de heridas

Los aparatos pueden desplazarse al ser amontonados.

Posicionar los aparatos sobre una superficie estable y lisa. Amontonar los aparatos por orden de su tamaño. No amontonar nunca más de tres aparatos uno sobre el otro. Los aparatos solamente deberán ser amontonados, si los piés y la caja del aparato correspondiente hacen posible amontonarlos de forma horizontal. Si no se cumplen estas condiciones, deberán ser montados los aparatos en una caja apta para este propósito. De esta manera evitarán el riesgo de daños en personas y daños en el aparato.



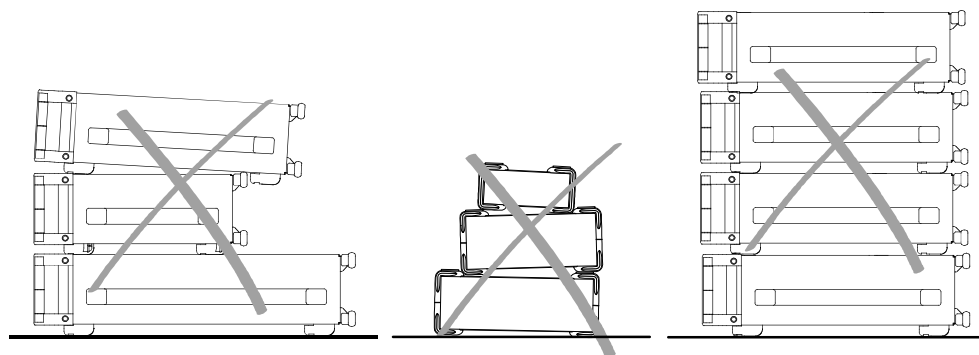
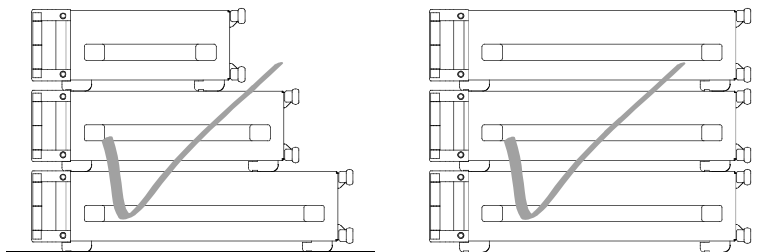
Sicherheitshinweise für das Stapeln von Geräten

⚠️ WARNUNG

Verletzungsgefahr

Geräte können beim Aufeinanderstapeln verrutschen.

Gerät auf stabile, gerade Unterlage stellen. Die Geräte der Größe nach stapeln. Nicht mehr als drei Geräte direkt übereinander stellen. Geräte dürfen nur gestapelt werden, wenn Gerätefüße und Gehäuseteile waagerechtes Stapeln ermöglichen. Wenn diese Bedingungen nicht erfüllt sind, müssen die Geräte in ein Gestell eingebaut werden. So vermeiden Sie das Risiko von Personenschäden und Schäden am Gerät.



falsche Reihenfolge

inkompatible FüÙe

zu viele Geräte gestapelt

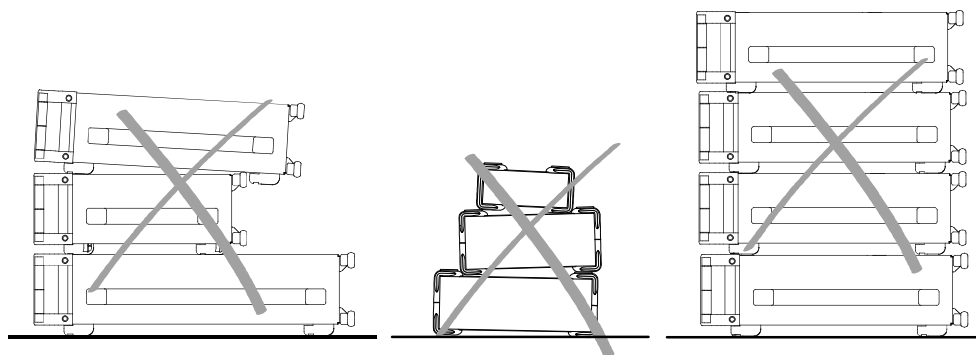
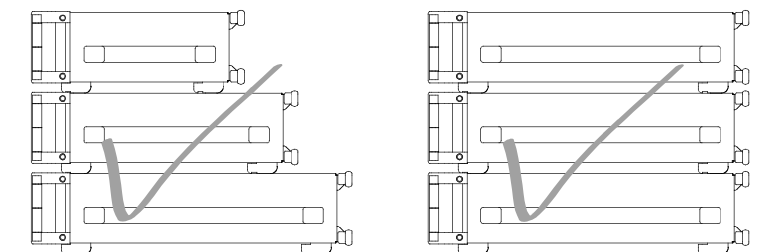
Consignes de sécurité pour l'empilage des appareils

⚠ AVERTISSEMENT

Risque de blessures

Les appareils peuvent se décaler lorsqu'ils sont empilés.

Les appareils doivent toujours être placés sur une surface stable et plane et empilés en fonction de leur taille sans jamais dépasser trois appareils. Empiler uniquement des appareils dont les pieds et boîtiers permettent un positionnement horizontal. En cas d'impossibilité, les appareils doivent être intégrés dans une baie afin d'éviter des dommages corporels et matériels.



mauvaise séquence

pieds incompatibles

trop d'appareils empilés

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1 Preface

This chapter provides safety-related information, an overview of the user documentation and the conventions used in the documentation.

1.1 For Your Safety

The R&S DVMS is designed for use solely in industrial and laboratory environments. As a solution for monitoring digital TV networks, typical fields of applications are signal monitoring at the transmitter site, the satellite uplink or the headend. Use the R&S DVMS only in its designated purpose. Observe the performance limits and operating conditions stated in the specifications (data sheet).

The product documentation helps you to use the R&S DVMS safely and efficiently. Keep the product documentation in a safe place and pass it on to the subsequent users.

Safety information is part of the product documentation. It warns you about the potential dangers and gives instructions how to prevent personal injury or damage caused by dangerous situations. Safety information is provided as follows:

- In the "Basic Safety Instructions", safety issues are grouped according to subjects. For example, one subject is electrical safety. The "Basic Safety Instructions" are delivered with the R&S DVMS in different languages.
- Throughout the documentation, safety instructions are provided when you need to take care during setup or operation.

Always read the safety instructions carefully. Make sure to comply fully with them. Do not take risks and do not underestimate the potential danger of small details such as a damaged power cable.

1.2 Information Provided on the R&S Homepage

For information on your R&S DVMS, visit the product site at:

<https://www.rohde-schwarz.com/product/dvms>



As a registered customer, you benefit from a wider range of information.

Downloads are available for:

- Firmware (including release notes and open source acknowledgements)
- Drivers
- Brochures and data sheets
- Manuals (product documentation)

- Applications

1.3 Information Provided on the R&S DVMS

The context-sensitive online help provides quick user assistance, see also "[Online help](#)" on page 8.

The user manual and the open source acknowledgment are stored in PDF format under `C:\Program Files\Rohde-Schwarz\DVMS\Host\Help`. You can display the PDFs using the Adobe Reader that is already installed.

You can access the user manual using the "Help" menu. For further details, see the chapter "Options and Versions".

To update the PDFs

The PDFs provided on the R&S DVMS originate from the date of delivery.

- ▶ For up-to-date downloads, visit the product site described under [Chapter 1.2, "Information Provided on the R&S Homepage"](#), on page 7.
- ▶ If you install a new firmware version, the content of the `Help` directory is also updated.

1.4 Product Documentation

Getting started

This manual is delivered with the R&S DVMS in printed form. It is an excerpt from the user manual (see below) and provides the information needed to set up the R&S DVMS and start working with it. Also a sample application is described. For instructions on installation, see the release notes. The printed getting started manual also includes general information, e.g. the basic safety instructions. In PDF format, it is included in the user manual to allow quick access to the information needed.

User manual

This manual is part of the firmware ("Help" menu). It provides the necessary information to work with the R&S DVMS. For additional information on default settings and parameters, see the data sheet.

Online help

The online help is part of the firmware ("Help" menu). It is context-sensitive and provides quick access to the complete description. To avoid crowding the screen, the screenshots are omitted.

For detailed information on how to use the help, see the chapter "Operating Concepts".

1.5 Conventions Used in the Documentation

The following conventions are used throughout this documentation.

Typographical conventions

Convention	Description
"Graphical user interface elements"	All names of graphical user interface elements on the screen, such as dialogs, menus, options, buttons, and softkeys are enclosed by parentheses.
[keys]	Key names are written in capital letters.
File names, commands, program code	File names, commands, coding samples and screen output are distinguished by their font.
<i>Input</i>	Input to be entered by the user is displayed in italics.
Links	Links are displayed in blue font.
"References"	References to other parts of the documentation are enclosed by parentheses.

Conventions for procedure descriptions

When describing how to operate the R&S DVMS, several alternative methods may be available to perform the same task. If possible, the procedure using an additionally connected mouse and an external keyboard is described.

The terms "select" and "press" may refer to any of the described methods, i.e. using a key on the R&S DVMS or on a keyboard, or a mouse pointer in the display.

2 Setting Up the Instrument

WARNING

Risk of injuries

To avoid injuries to yourself or others, always follow the instructions provided in the following chapters. Furthermore, observe the general safety instructions at the beginning of this manual.

2.1 Unpacking the Instrument

The R&S DVMS is shipped together with its mandatory accessories in a cardboard box.

2.1.1 Inspecting for Shipping Damage

Check the following. If anything is damaged, immediately notify the carrier.

1. Check the shipping container and cushioning material for damage.
2. Unpack the cardboard box, see [Chapter 2.1.2, "Unpacking the Cardboard Box"](#), on page 10.
3. Check the housing and handle for visible damages or loose parts.

2.1.2 Unpacking the Cardboard Box

Proceed as follows:

1. Open the cardboard box.
2. Remove the accessories packed into the box.
3. Take the instrument out of the packaging.
4. Remove the shock protectors attached to the instrument.



Retain the original packing material. If the instrument needs to be transported or shipped later, you can use the material to prevent control elements and connectors from being damaged. Rohde & Schwarz only accepts claims of warranty if the instrument is shipped with sufficient packaging.

2.1.3 Checking the Accessories

The instrument comes with the following accessories:

- Power cable
- Getting started manual

2.1.4 Warranty Conditions

For information on warranty conditions for the R&S DVMS, see the terms of the delivery documents.

2.2 Putting Up the Instrument

The instrument can be used in standalone operation or can be installed in a rack.

NOTICE

Risk of material damage

Make sure that the following conditions are met at the operation site:

- The ambient temperature does not exceed the range specified in the data sheet.
- All fan openings are unobstructed and the airflow perforations are unimpeded. The minimum distance from the wall is at least 10 cm.

Failure to meet these conditions can damage the instrument or other devices in the test setup.

If necessary, use proper protective equipment to protect DUTs against electrostatic discharge in the event of human contact.

2.2.1 Placing the Instrument on a Bench Top

The R&S DVMS is designed for use under general laboratory conditions.

WARNING

Risk of injuries

If the instrument is not set up securely, you or others can be injured.

Place the instrument on a stable and level surface. Do not place anything on top of the instrument, if the instrument is not in a level position.

Before folding out the feet at the instrument bottom, read the safety instructions for instruments with fold-out feet at the beginning of this manual carefully.

2.2.2 Mounting the Instrument in a Rack

The R&S DVMS can be installed in a 19" rack mount by using a rack adapter kit (for order no. see data sheet). Follow the installation instructions that are part of the adapter kit.

3 Interfaces and Connectors

This chapter describes the front panel and the rear panel of the instrument, including all status displays and connectors.



Some connectors warm up slightly when high voltages are applied. As long as maximum input levels are not exceeded, warm-up does not affect normal operation.

3.1 Front Panel

This chapter gives a short overview of the status displays and connectors on the front panel.

The inscriptions on your R&S DVMS match the captions of the connector descriptions.



Figure 3-1: Front panel view

3.1.1 Status Display LEDs

The basic status is indicated by LEDs.

3.1.1.1 POWER

Displays the power supply status.

- LED off: No power is supplied. R&S DVMS is switched off.
- LED blue: Power is supplied.
- LED red (flashing): Failure of fan.
To rectify this failure, switch the R&S DVMS off and on again. If the fan still does not work, shut down the R&S DVMS to prevent overheating of the R&S DVMS and contact one of our customer support centers.

Further information:

- [Chapter 3.2.1, "AC Power Supply Connector"](#), on page 15

3.1.1.2 INSTRUMENT READY

Displays the status of the R&S DVMS.

- LED off: R&S DVMS is not ready for operation.
For example, after powering up until the startup process is completed; the LED status display changes thereafter.
- LED green: R&S DVMS is ready for operation.
- LED yellow: R&S DVMS is not ready for operation because the main application, TS analyzer, is not running (e.g. has been stopped).

3.1.1.3 REMOTE

Displays the remote control status within the last second.

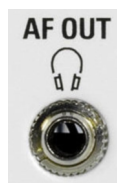
- LED off: R&S DVMS is not used for remote control.
- LED green: R&S DVMS is remote controlled.
- LED yellow: R&S DVMS is sending SNMP traps.

3.1.2 Connectors

3.1.2.1 AF OUT (Headphones)

The jack socket for the L/R analog audio output provides the decoded audio stream of the VLC software decoder as a stereo signal.

The socket is intended for connecting headphones or an active loudspeaker.



3.2 Rear Panel

This chapter gives a short overview of the connectors on the rear panel.

The option module depends on your choice. In this chapter, all available option modules are described.



Figure 3-2: Rear panel view (example)

3.2.1 AC Power Supply Connector

The AC power supply connector and the AC power switch are combined.



Switch positions:

- [I]: Depending on the setting of the On/Standby function key on the front panel, the instrument is either in standby mode or in operation.
- [O]: The entire instrument is disconnected from the AC power supply.

Further information:

- [Chapter 4.1, "Connecting to the AC Power Supply"](#), on page 26
- [Chapter 5, "Switching On or Off the Instrument"](#), on page 28
- [Chapter 9.2, "Replacing the Fuses"](#), on page 51

3.2.2 10 MHz REF IN

This BNC jack is used as input for the 10 MHz reference frequency. The reference frequency input of the R&S DVMS is used for high accuracy measurements such as RF frequency offset, TS bit rate or PCR drift/offset. To activate this input, use the "Setup" menu.

For details, refer to the user manual or help system.



3.2.3 1 PPS REF IN

This BNC jack is used as input for the 1PPS (1 pulse per second) reference pulse. The 1PPS reference pulse input of the R&S DVMS is used for measuring the network delay in DVB-T distribution networks. Use a signal derived from an external GPS receiver that provides short pulses at exactly 1 second distance. This input is activated, if one of the SFN synchronization monitoring subparameters "SFN Sync Network Delay" is activated.

For details, refer to the user manual or help system.



3.2.4 DVI-D

The DVI-D socket provides the monitor output signal of the built-in computer. Use a computer monitor that provides a resolution of 1024x768 pixels or higher.



You can use a DVI-I cable for connecting R&S DVMS and display, but the analog video interface (pins C1 to C4) is not provided by the R&S DVMS.

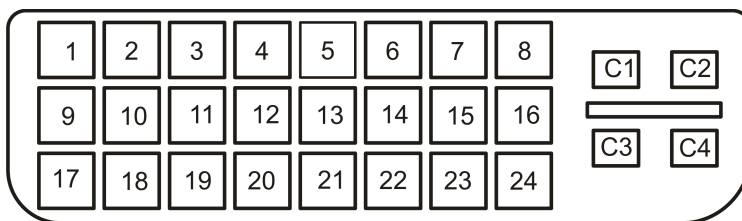


Table 3-1: Pin assignment

Pin	Signal	Pin	Signal
1	TMDS data 2-	15	Ground (for +5V)
2	TMDS data 2+	16	Hot plug detect (HPD)
3	TMDS data 2 shield	17	TMDS data 0-
4	Not used	18	TMDS data 0+
5	Not used	19	TMDS data 0 shield
6	DDC clock	20	Not used

Pin	Signal	Pin	Signal
7	DDC data	21	Not used
8	Analog vertical sync	22	TMDS clock shield
9	TMDS data 1-	23	TMDS clock+
10	TMDS data 1+	24	TMDS Clock-
11	TMDS data 1 shield	C1	Not used
12	Not used	C2	Not used
13	Not used	C3	Not used
14	+5V power	C4	Not used

3.2.5 LAN Interface

The 1 gigabit LAN interface (1000 Base-T) can be used to connect the R&S DVMS to a local network for remote control, printouts and data transfer. The assignment of the RJ45 connector supports twisted-pair category 7 STP cables in a star configuration (STP for shielded twisted pair).



Two LEDs indicate the status of the LAN connection.

- Green LED
 - LED off: No connection
 - LED on (steady): Connection is established.
 - LED blinking: Connection is established, communication line is in a busy state.
- Yellow LED
 - LED off: Connection speed is 10 Mbit/s or 100 Mbit/s.
 - LED on (steady): Connection speed is 1000 Mbit/s.



Do not connect or disconnect the network cable until the instrument is switched off. Otherwise, the network connection cannot be reliably detected.

Electromagnetic interference (EMI) can affect the measurement results. To avoid any impact, use category 7 cables.

Further information:

- [Chapter 7, "Operating the R&S DVMS in a LAN"](#), on page 38

3.2.6 USB Interfaces

Two USB 3.0 interfaces of the type A (host USB) are provided (USB = universal serial bus). Use the interfaces to connect external devices like a keyboard, mouse, printer, or memory stick.

On demand, a USB 3.0 interface supplies up to 900 mA.

Further information:

- [Chapter 4.2, "Connecting External Devices"](#), on page 26



Electromagnetic interference (EMI) can affect the measurement results. To avoid any impact, make sure that the following conditions are met:

- Use suitable double-shielded cables.
- Do not use USB connecting cables exceeding 1 m.
- Use only USB devices that remain within the permissible EMI limits.

3.2.7 DVB-T/H Receiver Module (R&S DVMS-B53)

The DVB-T/H receiver module (R&S DVMS-B53) is an option module.

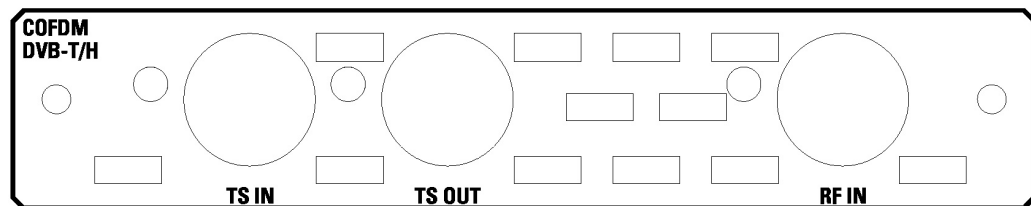


Figure 3-3: DVB-T/H receiver module

The status of the connectors is indicated by LEDs. Before showing a new state, each LED holds the current state for at least one second, if the current state is not "off" or "flashing".

To select the input, in the toolbar, click "Instrument Configuration" and then select "Signal Interface". See the user manual or help system.



To help locating a connector socket, you can let its status LED flash blue ("Instrument Configuration" dialog, "Signal Interfaces" tab, see the user manual or help system).

RF IN

This BNC socket (female connector @DVMS) is used to feed in an RF signal conforming to the DVB-T (EN 300 744) or DVB-H (EN 302 304) standards.

An LED indicates the RF IN status:

- LED off: Input is not used for monitoring.

- LED green: Input is used for monitoring. Synchronization state is valid for both RF signal and related transport stream.
- LED yellow: Input is used for monitoring but synchronization cannot be achieved.

TS IN

This BNC socket is used to feed in an MPEG2 transport stream signal conforming to the DVB-ASI (EN 50083-9 (2002)) or SMPTE (SMPTE 310M) interface standards.

An LED indicates the TS IN status:

- LED off: Input is not used for monitoring.
- LED green: Input is used for monitoring. Synchronization state is valid for the transport stream signal.
- LED yellow: Input is used for monitoring but synchronization cannot be achieved.

TS OUT

This BNC socket provides an MPEG2 transport stream signal conforming to the DVB-ASI (EN 50083-9 (2002)) interface standard.

The interface is used as a loop output for a transport stream signal from the [RF In] or [TS In] input (see above).

An LED indicates the TS OUT status:

- LED off: Output is not used.
- LED blue: Output is used as loop output.

3.2.8 DVB-T/DVB-T2 Receiver Module (R&S DVMS-B55)

The T/T2 receiver module (R&S DVMS-B55) is an option module.

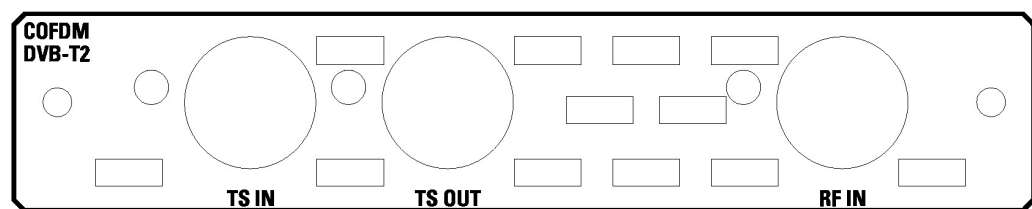


Figure 3-4: DVB-T/T2 receiver module

The status of the connectors is indicated by LEDs. Before showing a new state, each LED holds the current state for at least one second, if the current state is not "off" or "flashing".

To select the input, in the toolbar, click "Instrument Configuration" and then select "Signal Interface". See the user manual or help system.



To help locating a connector socket, you can let its status LED flash blue ("Instrument Configuration" dialog, "Signal Interfaces" tab, see the user manual or help system).

RF IN

This BNC socket (female connector @DVMS) is used to feed in an RF signal conforming to the DVB-T2 (ETSI EN 302 755) standard.

An LED indicates the RF IN status:

- LED off: Input is not used for monitoring.
- LED green: Input is used for monitoring. Synchronization state is valid for both RF signal and related transport stream.
- LED yellow: Input is used for monitoring but synchronization cannot be achieved.

TS IN

This BNC socket is used to feed in an MPEG2 transport stream signal conforming to the DVB-ASI (EN 50083-9 (2002)) or SMPTE (SMPTE 310M) interface standards.

An LED indicates the TS IN status:

- LED off: Input is not used for monitoring.
- LED green: Input is used for monitoring. Synchronization state is valid for the transport stream signal.
- LED yellow: Input is used for monitoring but synchronization cannot be achieved.

TS OUT

This BNC socket provides an MPEG2 transport stream signal conforming to the DVB-ASI (EN 50083-9 (2002)) interface standard.

The interface is used as a loop output for a transport stream signal from the [RF In] or [TS In] input (see above).

An LED indicates the TS OUT status:

- LED off: Output is not used.
- LED blue: Output is used as loop output.

3.2.9 DVB-T2 Receiver Module (R&S DVMS-B54)

The T2 receiver module (R&S DVMS-B54) is an option module.

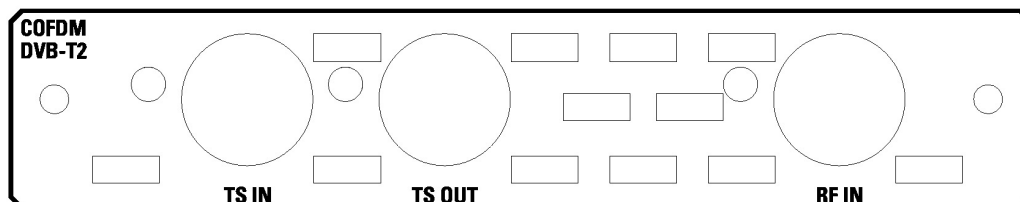


Figure 3-5: DVB-T2 receiver module

The status of the connectors is indicated by LEDs. Before showing a new state, each LED holds the current state for at least one second, if the current state is not "off" or "flashing".

To select the input, in the toolbar, click "Instrument Configuration" and then select "Signal Interface". See the user manual or help system.



To help locating a connector socket, you can let its status LED flash blue ("Instrument Configuration" dialog, "Signal Interfaces" tab, see the user manual or help system).

RF IN

This BNC socket (female connector @DVMS) is used to feed in an RF signal conforming to the DVB-T2 (ETSI EN 302 755) standard.

An LED indicates the RF IN status:

- LED off: Input is not used for monitoring.
- LED green: Input is used for monitoring. Synchronization state is valid for both RF signal and related transport stream.
- LED yellow: Input is used for monitoring but synchronization cannot be achieved.

TS IN

This BNC socket is used to feed in an MPEG2 transport stream signal conforming to the DVB-ASI (EN 50083-9 (2002)) or SMPTE (SMPTE 310M) interface standards.

An LED indicates the TS IN status:

- LED off: Input is not used for monitoring.
- LED green: Input is used for monitoring. Synchronization state is valid for the transport stream signal.
- LED yellow: Input is used for monitoring but synchronization cannot be achieved.

TS OUT

This BNC socket provides an MPEG2 transport stream signal conforming to the DVB-ASI (EN 50083-9 (2002)) interface standard.

The interface is used as a loop output for a transport stream signal from the [RF In] or [TS In] input (see above).

An LED indicates the TS OUT status:

- LED off: Output is not used.
- LED blue: Output is used as loop output.

3.2.10 Single TS Input Module (R&S DVMS-B11)

The single TS input module (R&S DVMS-B11) is an option module.

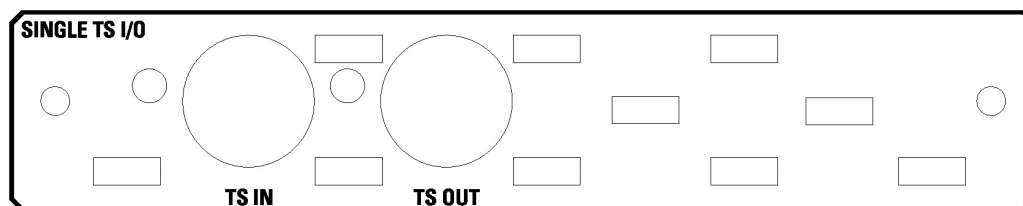


Figure 3-6: Single TS input module

The status of the connectors is indicated by LEDs. Before showing a new state, each LED holds the current state for at least one second, if the current state is not "off" or "flashing".



To help locating a connector socket, you can let its status LED flash blue ("Instrument Configuration" dialog, "Signal Interfaces" tab, see the user manual or help system).

TS IN

This BNC socket is used to feed in an MPEG2 transport stream signal conforming to the DVB-ASI (EN 50083-9 (2002)) or SMPTE (SMPTE 310M) interface standards.

An LED indicates the TS IN status:

- LED off: Input is not used for monitoring.
- LED green: Input is used for monitoring. Synchronization state is valid for the transport stream signal.
- LED yellow: Input is used for monitoring but synchronization cannot be achieved.

TS OUT

This BNC socket provides an MPEG2 transport stream signal conforming to the DVB-ASI (EN 50083-9 (2002)) interface standard. The interface is used as a loop output for a transport stream signal from the [TS In] input (see above).

To select the input, in the toolbar, click "Instrument Configuration" and then select "Signal Interface". See the user manual or help system.

An LED indicates the TS OUT status:

- LED off: Output is not used.
- LED blue: Output is used as loop output.

3.2.11 S/S2 Receiver Module (R&S DVMS-B51)

The S/S2 receiver module (R&S DVMS-B51) is an option module.

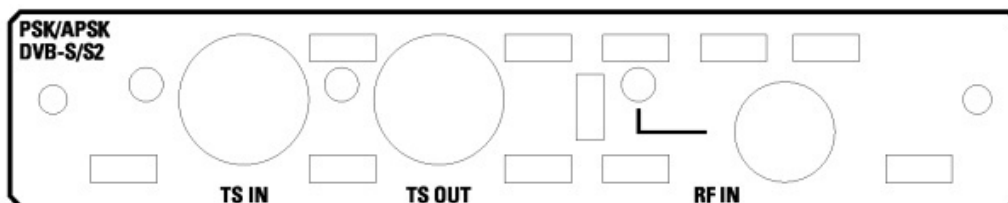


Figure 3-7: S/S2 receiver module

The status of the connectors is indicated by LEDs. Before showing a new state, each LED holds the current state for at least one second, if the current state is not "off" or "flashing".



To help locating a connector socket, you can let its status LED flash blue ("Instrument Configuration" dialog, "Signal Interfaces" tab, see the user manual or help system).

RF IN

This F socket (female connector @DVMS) is used to feed in an RF signal conforming to the DVB-S (EN 300421), DVB-S2 (EN 302307) or DIRECTV legacy modulation standards.

An LED indicates the RF IN status:

- LED off: Input is not used for monitoring.
- LED green: Input is used for monitoring. Synchronization state is valid for both RF signal and related transport stream.
- LED yellow: Input is used for monitoring but synchronization cannot be achieved.

TS IN

This BNC socket is used to feed in an MPEG2 transport stream signal conforming to the DVB-ASI (EN 50083-9 (2002)) or SMPTE (SMPTE 310M) interface standards.

An LED indicates the TS IN status:

- LED off: Input is not used for monitoring.
- LED green: Input is used for monitoring. Synchronization state is valid for the transport stream signal.
- LED yellow: Input is used for monitoring but synchronization cannot be achieved.

TS OUT

This BNC socket provides an MPEG2 transport stream signal conforming to the DVB-ASI (EN 50083-9 (2002)) interface standard.

The interface is used as a loop output for a transport stream signal from the [RF In] or [TS In] input (see above).

To select the input, in the toolbar, click "Instrument Configuration" and then select "Signal Interface". See the user manual or help system.

An LED indicates the TS OUT status:

- LED off: Output is not used.
- LED blue: Output is used as loop output.

3.2.12 TS/IP Interface Module (R&S DVMS-B40)

The TS/IP module (R&S DVMS-B40) is an option module.

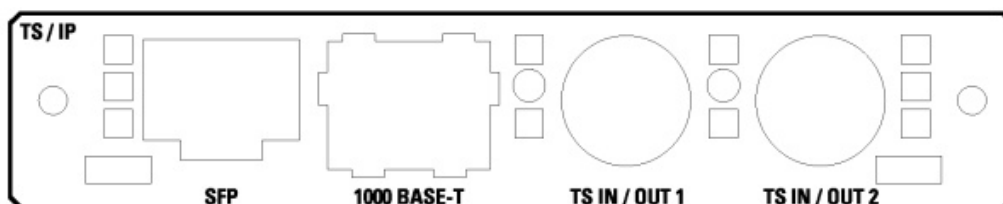


Figure 3-8: TS/IP interface module

TS IN/OUT 1 and TS IN/OUT 2

Each of these two BNC sockets is used either as input or output for MPEG2 transport streams. If used as an input, feed in an MPEG2 transport stream signal conforming to the DVB-ASI (EN 50083-9 (2002)) or SMPTE (SMPTE310M) interface standards. If used as an output, this socket provides an MPEG2 transport stream signal conforming to the DVB-ASI (EN 50083-9 (2002)) interface standard. The output can be used as a loop output for any transport stream input signal available.

To select the input or output, in the toolbar, click "Instrument Configuration" and then select "Signal Interface". See the user manual or help system.

The status of the connectors is indicated by LEDs. Before showing a new status, each LED holds the status for at least one second, if the status is not "off" or "flashing".

- LED off: Connector is not used.
- LED blue: Connector is used as a loop output for any MPEG2 transport stream input signal.
- LED green: Connector is used as an input for monitoring. Synchronization state is valid for the transport stream signal.
- LED yellow: Connector is used as an input for monitoring but synchronization cannot be achieved.



To help locating a connector socket, you can let its status LED flash ("Instrument Configuration" dialog, "Signal Interfaces" tab, see the user manual or help system).

1000 BASE-T

This 1000 Base-T gigabit interface socket is used either as:

- Input for IP and TS monitoring (IP in flow)
- IP loop output (IP out flow) for encapsulated MPEG2 transport streams conforming to the Pro-MPEG code of practice #3 (release 2)

To select and configure the IP in flows and IP out flows, in the toolbar, click "Instrument Configuration" and then select "Signal Interface". See the user manual or help system.

The assignment of the RJ45 connector supports twisted-pair category 7 STP cables in a star configuration (STP for shielded twisted pair).



Two LEDs indicate the status of the LAN connection.

- Yellow LED (left)
 - LED off: Connection speed is 10 Mbit/s or 100 Mbit/s.
 - LED on (steady): Connection speed is 1000 Mbit/s.
- Green LED (right)
 - LED off: No connection
 - LED on (steady): Connection is established.
 - LED blinking: Connection is established, communication line is in a busy state.

SFP

This SFP (small formfactor pluggable) module socket is used to connect an additional IP interface by insertion of an optical gigabit SFP module (1000BASE-X). If inserted, the additional SFP IP connector is used and configured in the same manner as the built-in 1000 BASE-T connector (see "[1000 BASE-T](#)" on page 24).

The SFP module is not part of the R&S DVMS-B40 option.

4 Connecting the Instrument

This chapter describes how to connect the instrument to the power supply and external devices.



Preventing electromagnetic interference

Use only suitable and double-shielded signal/control cables with at least 80 dB to 1 GHz shielding.

In particular cables that are connected to the ASI inputs and outputs can cause EMC problems. Depending on the data rate and the packet timing of the transport stream, high levels can occur sporadically within the signal spectrum.

4.1 Connecting to the AC Power Supply

The R&S DVMS can be used with different AC power voltages and adapts itself automatically to it. Adjusting the instrument to a particular AC supply voltage is therefore not required. See the data sheet for the requirements of voltage and frequency.

WARNING

Shock hazard

Observe the basic safety instructions at the beginning of this manual, especially the instructions on electrical safety.

1. If you use the S/S2 receiver module (R&S DVMS-B51), connect this module before switching on the R&S DVMS (see [Chapter 3.2.11, "S/S2 Receiver Module \(R&S DVMS-B51\)"](#), on page 22).
2. Connect the R&S DVMS to the AC power supply, using the supplied power cable. The AC power connector is on the rear panel of the instrument. Since the R&S DVMS complies with safety class EN61010-1, connect it only to a socket with a ground contact.

4.2 Connecting External Devices

Using the USB interfaces, you can directly connect USB devices to the R&S DVMS. This number can be increased as necessary by using USB hubs.

Due to the large number of available USB devices, there is almost no limit to the possible expansions. In the following, USB devices that can be useful are listed:

- Keyboard for entering comments, filenames, etc.
- Mouse for easy operation of Windows dialogs

- Memory stick for easy transfer of data to/from a computer (e.g. firmware updates)
- CD-ROM drives for installing software
- Printer for printing measurement results

To install a USB device

1. Connect the USB device to the R&S DVMS at any time. All USB devices are Plug & Play.
Windows 7 automatically searches for a suitable device driver.
2. If Windows 7 does not find a suitable driver, it prompts you to specify a directory that contains the driver software. If the driver software is on a CD-ROM, connect a USB CD-ROM drive to the R&S DVMS before proceeding.



Before connecting an external device that is not a USB device, e.g. a monitor, make sure that the R&S DVMS is switched off. Otherwise, correct operation cannot be assured.

To uninstall a USB device

- ▶ Disconnect the USB device from the R&S DVMS at any time.
Windows 7 immediately detects the change in the hardware configuration and deactivates the corresponding driver.

5 Switching On or Off the Instrument

WARNING

Shock hazard

Observe the basic safety instructions at the beginning of this manual, especially the instructions on electrical safety.

5.1 Switching On the Instrument

NOTICE

Risk of instrument damage

Before switching on the instrument, make sure that the following conditions are met:

- The instrument is set up as described in [Chapter 2.2, "Putting Up the Instrument"](#), on page 11.
- Signal levels at the input connectors are all within the specified ranges.
- Signal outputs are correctly connected and are not overloaded.

Failure to meet these conditions can damage the instrument or other devices in the test setup.

To switch on the R&S DVMS

1. Make sure to connect the R&S DVMS to a power supply (for details see [Chapter 4.1, "Connecting to the AC Power Supply"](#), on page 26).
2. Press the AC power switch on the rear panel into [I] position.

The LED under [POWER] changes to blue.

The R&S DVMS starts booting. After booting is completed, the R&S DVMS is ready for operation.

The LED under [INSTRUMENT READY] changes to yellow and then to green.

The configuration settings that were active before the R&S DVMS was last switched off are automatically restored.

5.2 Switching Off the Instrument

NOTICE

Risk of losing data

If you switch off the running instrument using the rear panel switch or by disconnecting the power cord before shutting it down, the instrument loses its current settings. Furthermore, program data can be lost.

Always shut down the R&S DVMS first.

To switch off the R&S DVMS

1. Check the status displays on the front panel of the R&S DVMS. If the [REMOTE] status display on the front panel is on, do not switch off the R&S DVMS. Someone else is using the R&S DVMS by remote operation (see also [Chapter 3.1.1, "Status Display LEDs"](#), on page 13).
2. Shut down the R&S DVMS.
The R&S DVMS stores the current configuration settings automatically.
On the front panel, the LED under [INSTRUMENT READY] changes from green to yellow.
3. Set the AC switch on the rear panel to the [O] position, or disconnect the R&S DVMS from the AC power supply.
All LEDs on the front panel go out.

5.3 Checking the Provided Software Options

The R&S DVMS can be equipped with software options. To check whether the installed options correspond to the options indicated on the delivery note, proceed as follows.

1. In the "Help" menu, select "Option Management".
A list with the software options is displayed.
2. Check the options enabled via license keys as indicated in the delivery note.

For an overview of the all options available for the R&S DVMS, see the Rohde & Schwarz homepage (www.rohde-schwarz.com/product/dvms).

6 Sample Application

Follow the instructions in this chapter to perform your first measurement with the R&S DVMS.

For an expanded selection of measurement examples and background information, refer to the user manual or the help system.

In this measurement, the R&S DVMS is used for basic compliance checks of one single MPEG2 transport stream (TS) signal.

Since each R&S DVMS option module provides at least one baseband transport stream input (TS IN), you can perform the described measurement with every R&S DVMS independently of the option module type.

6.1 Requirements

The DVB TS-ASI input signal used in this measurement is generated by either a TS generator (i.e. R&S DVSG) or by any other DVB-compliant TS-ASI source.

The R&S DVMS is locally operated by using an LCD monitor (DVI input required, at least 1024 x 768 pixels) and a USB mouse.

6.2 Setting Up the R&S DVMS

The required connectors are on the rear panel of the R&S DVMS. For details on the connectors, see [Chapter 3, "Interfaces and Connectors"](#), on page 13.

1. Connect the TS ASI output of the TS generator to the TS IN baseband input (BNC connector) of the R&S DVMS option module.
2. Connect the LCD monitor to the DVI-D monitor output of the R&S DVMS.
3. Plug the USB connector of the USB mouse in one of the two USB interfaces.
4. Switch on the R&S DVMS and wait until the TS analyzer monitoring application is running.

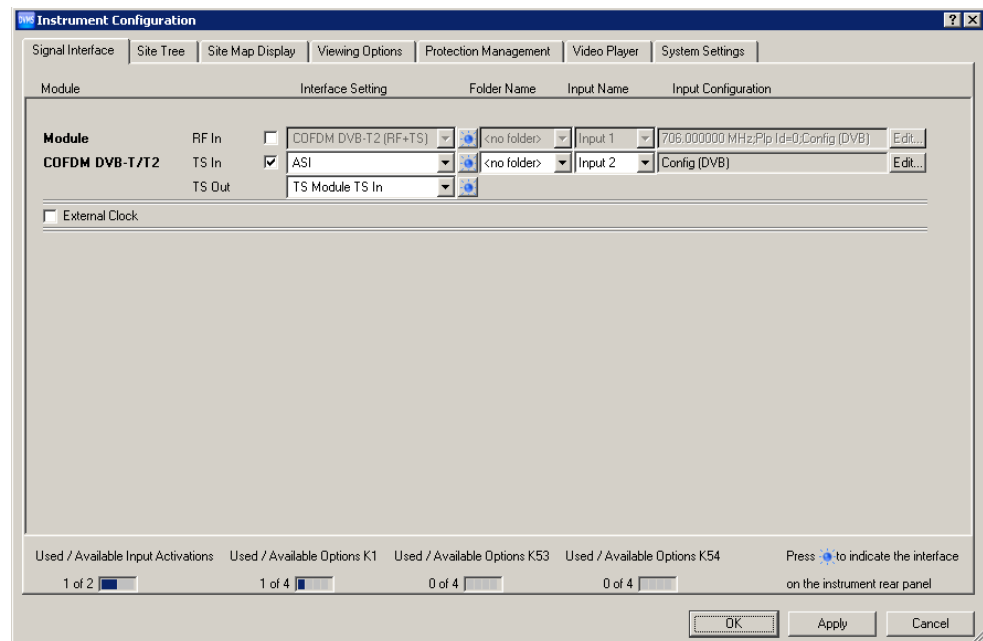
(Green LED [INSTRUMENT READY] at the front panel of R&S DVMS)

The application window showing the default start screen is displayed.

6.3 Creating a Basic Configuration

In the TS analyzer monitoring application, create the basic configuration.

1. In the toolbar, select "Instrument Configuration" to open the "Instrument Configuration" dialog.
2. On the "Signal Interface" tab, select the following:
 - a) In the "Interface Settings" column, activate the "TS In" option.
 - b) Deactivate all other input options.



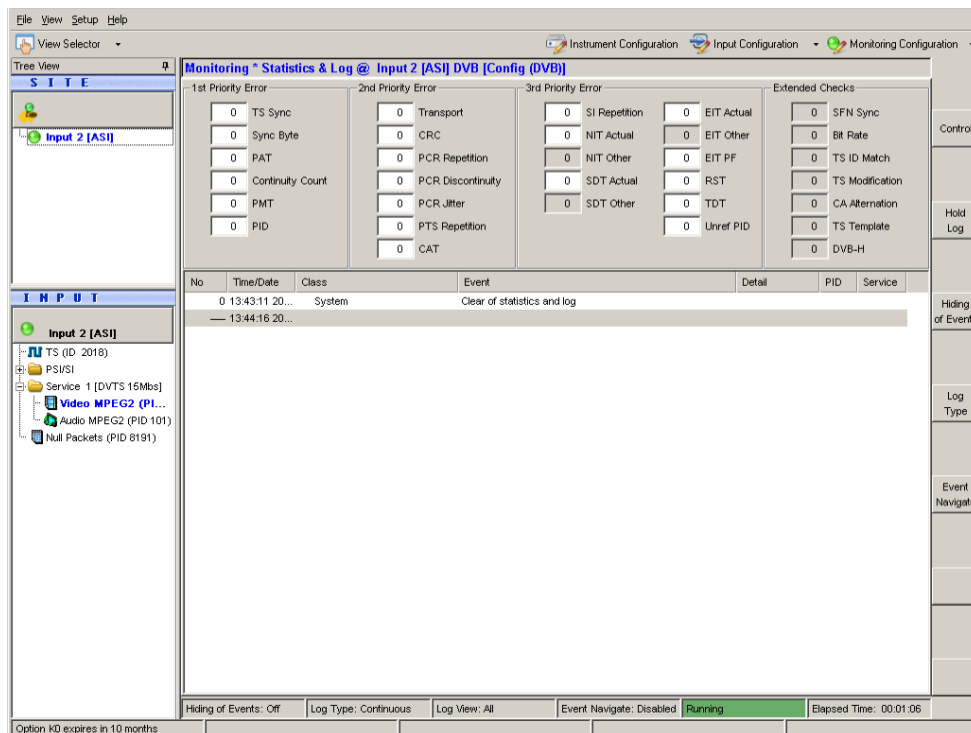
3. Click "OK".
4. In the toolbar, select "Input Configuration" to open the "Input Configuration Assignment" dialog.
5. Under "Monitoring Configuration", select "Config (DVB)".


6.4 Checking the TS Synchronization

Before any measurement can be performed, the TS synchronization within the R&S DVMS TS analyzer must achieve the "Locked" state. To check the current state, perform the following steps.

1. In the toolbar, click "View Selector".
2. In the "View Selector" dialog, click the icon for the statistics & log measurement.
3. Click "Control" and select "Clear Statistics & Log".

- Under "1st Priority Error", check the "TS Sync" statistics counter.



- In the "Locked" state, the value is "0".
Under "SITE", the LED symbol is green. At the rear panel, the LED corresponding to the TS IN input switches to green.
- In the "Unlocked" state, the value is > 0, continuously incrementing (every second).
Under "SITE", the LED symbol shows the  icon for TS synch loss. At the rear panel, the LED corresponding to the TS IN input switches to yellow.



The following measurements can only be performed, if TS synchronization is in the "Locked" state.

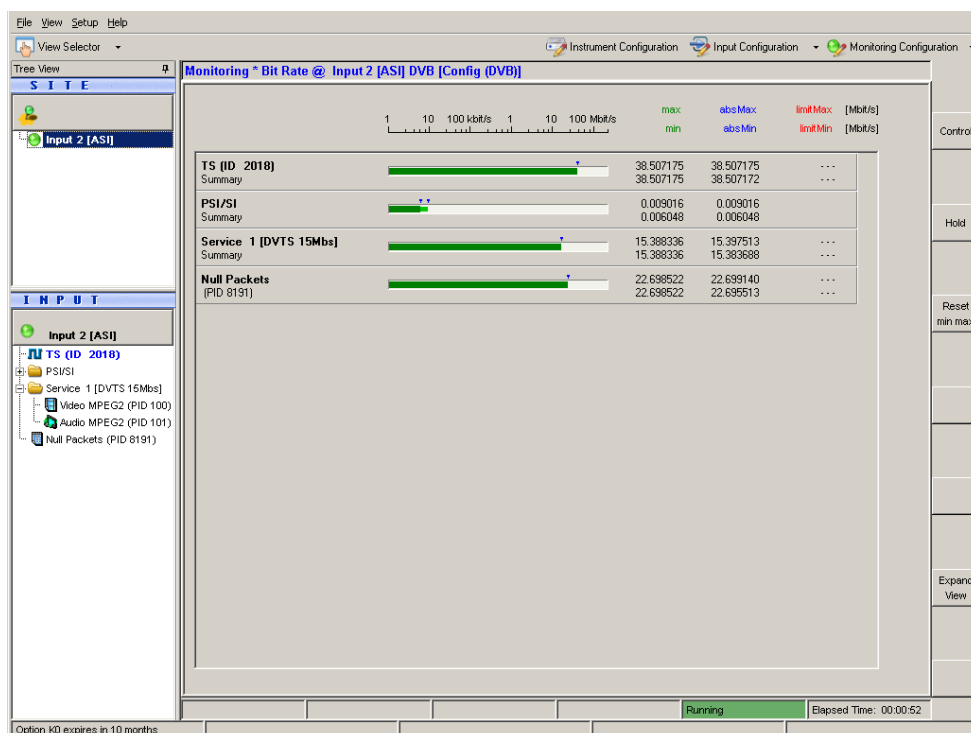
6.5 Performing the Measurement

Since the measurement results strongly depend on the content of the TS input signal, the following examples use basic parameters and measurements valid for all kind of MPEG2 TS signals.

6.5.1 Checking the Gross Bit Rate of the Connected TS

- In the toolbar, click "View Selector".

- In the "View Selector" dialog, click the icon for the bit rate measurement.
- Read the current bit rate of the connected TS from the TS elements table.



The value is given in units of megabits per second (Mbit/s). The value shown is the gross value of all transport stream packets per second, including TS packet header and TS packet payload.

6.5.2 Checking the Net Bit Rate of the Connected TS

To check the net bit rate value of the TS, you have to change the calculation method for the TS bit rate measurement from gross to net values.

- In the toolbar, select "Monitoring Configuration".
- Select the "Extended Checks I" tab.
On this tab, you can see all settings for bit rate measurements.

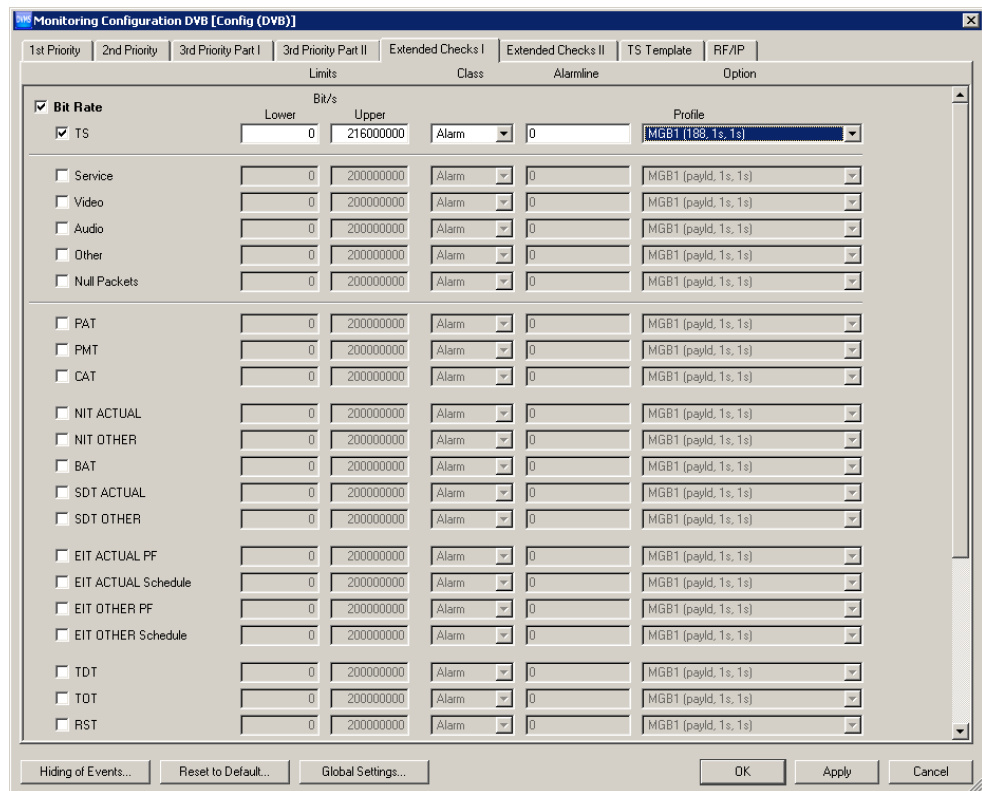


Figure 6-1: Extended Checks I tab

3. In the first line, activate the "Bit Rate" option for overall bit rate limits monitoring.
4. The second line shows the current (default) settings for the monitoring TS bit rate. To modify the calculation method, do the following:
 - a) Activate the "TS" option.
 - b) Open the "Profile" list and select the "MGB1(payload,1,1)" predefined setting.
5. Click "OK" to close the configuration dialog.
The monitoring view is displayed.
6. In the "TS (ID XXXX)" line, "max/min" column, read the current net bit rate of the connected TS (in this example, Figure 6-2, XXXX = 2018).

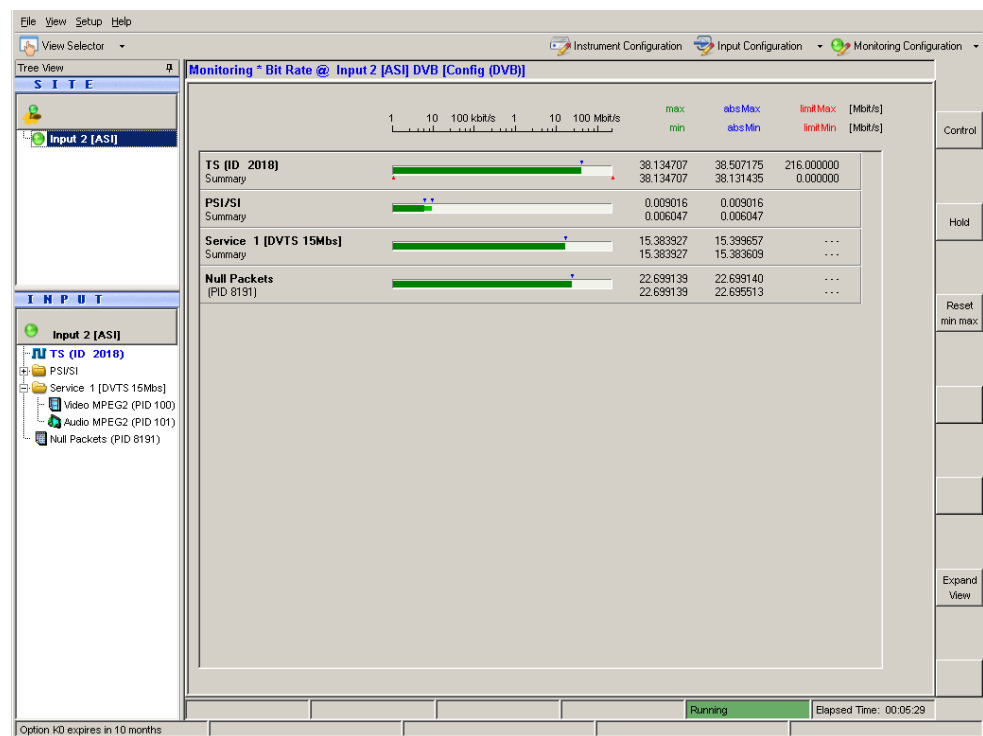


Figure 6-2: Monitoring view

- Compare this value to the gross value from before (see [Chapter 6.5.1, "Checking the Gross Bit Rate of the Connected TS"](#), on page 32).
Since only the packet payload of all TS packets is examined for net bit rate calculation, the net value should be lower by a factor of approximately 184/188.

6.5.3 Activating the Monitoring Error for TS Bit Rate Monitoring

Now you activate monitoring errors by changing the monitoring limit of the parameter TS bit rate.

- In the toolbar, select "Monitoring Configuration".
- Select the "Extended Checks I" tab (see [Figure 6-1](#)).
In the second line, in the "Upper Bit Rate" field, set the limit to a value of approx. 1 Mbit/s below the current TS bit rate as checked in [Chapter 6.5.2, "Checking the Net Bit Rate of the Connected TS"](#), on page 33.
- Click "OK" to close the configuration dialog.
- In the toolbar, click "View Selector".
- In the "View Selector" dialog, click the icon for the statistics & log measurement.
- Click "Control" and select "Clear Statistics & Log".
- Check the monitoring log.

Every second, "Bite Rate - TS bit rate higher than specified limit" log entries are inserted at the end of the log. In addition, the "Bit Rate" statistics counter is incremented every second. Also, under "INPUT", a red LED symbol at the selected input indicates an active monitoring fault.

8. To simplify the monitoring log, click "Log Type" and then select "Transition" to change the log type.

Only at the moment when the monitoring error is detected, one single entry is inserted. As long as the error is present, no new log entries are added, but the "Statistics Counter" is incremented. When the monitoring error disappears, a new log entry is inserted informing you that the error has disappeared and how long the error has lasted.

For further details, see the user manual or help system.

9. Stop reporting the monitoring faults by deactivating the TS bit rate monitoring:
 - a) In the toolbar, select "Monitoring Configuration".
 - b) Select the "Extended Checks I" tab.
 - c) In the second line, deactivate the "TS" option for TS bit rate monitoring.
10. Click "OK" to close the configuration dialog.
11. Click "Control" and select "Clear Statistics & Log".

6.5.4 Checking the Content of the PSI Table PAT

PAT is used as abbreviation for program association table as specified in the associated MPEG2 standard ISO/IEC13818-1.

1. In the toolbar, click "View Selector".
2. In the "View Selector" dialog, click the icon for the Table/PES/T2-MI interpreter.
3. Under "INPUT", expand the PSI/SI node and select the PAT element.

The screenshot shows the 'View Selector' dialog in the R&S DVMS1 software. The 'INPUT' tree on the left is expanded to show the 'PAT (PID 0)' element. The main pane displays the 'Program Association Section' in a tabular format. The table shows fields like 'Table id', 'Section syntax indicator', 'Section length', 'Transport Stream Id', 'Version number', 'Current/next indicator', 'Section number', and 'Last section number'. Below this, the 'Reference Loop' is shown, including '1st Reference' and '2nd Reference' with their respective fields and values. A 'Snapshot' button is visible at the bottom right of the main pane.

Program Association Section		
Table id	8 bit	0x00
Section syntax indicator	1 bit	1
Section length	12 bit	17
Transport Stream Id	16 bit	0x07E2 (2018)
Version number	5 bit	1
Current/next indicator	1 bit	1
Section number	8 bit	0
Last section number	8 bit	0

Reference Loop		
1st Reference		
Program number	16 bit	0x0000 (0)
reserved	3 bit	0x7
Network PID	13 bit	0x0010 (16)
2nd Reference		
Program number	16 bit	0x0001 (1)
reserved	3 bit	0x7
Program map PID	13 bit	0x0080 (128)
CRC 32	32 bit	0xB958F29E CRC ok

- 1 = Network PID (NIT) referenced by program number = 0
 2 = Program map PID (PMT) referenced by program number ≥ 1

The results pane shows the content of the PAT in tabular form.
 For details, see user manual or help system, "program association table (PAT)".

7 Operating the R&S DVMS in a LAN

The R&S DVMS is equipped with a network interface and can be connected to an Ethernet LAN (local area network). The network card operates with 10/100/1000 Base-T Ethernet. The TCP/IP network protocol and the associated network services are preconfigured.

To be able to exchange data within a local area network (LAN), every computer or instrument that is connected must have a unique IP address or a unique computer name. Access between different users is managed with access authorizations.

If the appropriate rights have been assigned and the Windows 7 firewall configuration is adapted accordingly, you can use the interface for example for:

- Transferring data
- Printing on network printers
- Operating/controlling the R&S DVMS from a remote computer

To use network resources, access must be granted. To share files on the R&S DVMS with other network users, access to instrument resources, e.g. the hard drives, must also be granted. All these administration tasks are normally performed by a network administrator using the Windows 7 "Start" menu (for details, see the Windows 7 documentation). Contact your network administrator for access authorizations.

User name and password of the R&S DVMS are factory-set. The user name is used for auto login, access authorization and remote operation.

Further information:

- [Chapter 8.1.1, "Login"](#), on page 42
- [Chapter 3.2.5, "LAN Interface"](#), on page 17
- Remote operation: see the user manual or help system.

7.1 Connecting the R&S DVMS to the Network

NOTICE

Risk of network failure/virus infection

Before connecting the R&S DVMS to the network or configuring the network, do the following:

- Consult your network administrator.
- If your network does not support DHCP or if you choose to disable dynamic TCP/IP configuration, you must assign valid address information before connecting the R&S DVMS to the LAN.

Errors can affect the entire network.

Efficient virus protection is a prerequisite for secure operation in the network. Never connect the R&S DVMS to a network without proper protection against a virus infection, as doing so can damage the instrument software.

To connect the R&S DVMS to the network

1. Fulfill all prerequisites mentioned above.
2. Make sure to switch off the R&S DVMS. This way you ensure that the R&S DVMS detects the network connection reliably and works without any disruptions.
3. Connect the R&S DVMS to the network using a CAT-7 RJ.45 cable.

To disconnect the R&S DVMS from the network

1. Make sure to switch off the R&S DVMS.
2. Disconnect the R&S DVMS from the network.

7.2 Connecting the R&S DVMS to a Computer

How to set up a LAN connection between an R&S DVMS and a single computer without integration into a larger network depends on the operating system installed on the computer.

7.2.1 Windows 7 Operating System

If Windows 7 is installed on the computer, you can set up a LAN connection fast.

1. Activate DHCP on both the computer and the R&S DVMS.

2. Connect the computer and the R&S DVMS with a standard RJ.45 cross-over cable (LAN cable).
After approx. 16 seconds, the connection is established.
3. To address the R&S DVMS, use the computer name.

Further information:

- "[Querying the computer name using the firmware](#)" on page 41

7.2.2 Other Operating Systems

If Windows 7 is not installed on the computer, you need to assign IP addresses.

1. Assign an IP address to the R&S DVMS and the computer.
The IP addresses *192.168.xxx.yyy* are available for use here. *xxx* and *yyy* can assume values of *1* to *255*. The value for the subnet mask is *255.255.255.0*.
2. Connect the R&S DVMS and the computer with a standard RJ.45 cross-over cable (LAN cable).
3. To address the R&S DVMS, use the assigned IP address.

7.3 Configuring the Network Card

Under Windows 7, network card drivers do not need to be installed separately. If the R&S DVMS is connected to the LAN, Windows 7 automatically detects the network connection and activates the required drivers.

The configuration tasks depend on whether your network has a DHCP server or not. If necessary, ask your network administrator.



If you are not familiar with LAN configurations, ask your network administrator.

Networks with DHCP server

The R&S DVMS is preconfigured for networks using the dynamic host configuration protocol (DHCP). In such networks, the R&S DVMS is automatically assigned a free IP address. Identification in the network is based on the use of a unique computer name.

Every instrument is assigned an individual computer name at the factory. It is displayed as part of the window title of the application.

If necessary, you can change the computer name using the Windows 7 "Start" menu. For details, see the Windows 7 documentation.

Querying the computer name using the firmware

In the firmware, "host name" is used as synonym for "computer name".

1. In the "Help" menu, click "About DVMS".
2. Under "Computer Name", read out the name.

Naming rule for the default computer name

The default computer name is composed as follows:

<instrument short name>-<serial number>

Example: RS-DVMS1-100104

The serial number consists of 6 digits and is printed on the cabinet of the R&S DVMS.

Networks without DHCP server

In networks that assign fixed IP addresses, the network administrator usually configures the network card. Contact your network administrator. The IP address is set using the Windows 7 "Start" menu. For details, see the Windows 7 help system.

7.4 Firewall Settings

By default, the Windows firewall is activated to protect the R&S DVMS from an attack of hostile users and programs. The Windows firewall suppresses all network communication which is not initialized by the R&S DVMS itself or which is not defined as an exception.

To enable data transfer or to allow access to the R&S DVMS, define exceptions using the Windows 7 "Start" menu. For details, see the Windows 7 documentation or contact your network administrator for support.

7.5 Configuring the Simple Network Management (SNMP) Agent

The "Instrument Configuration" dialog, "System Settings" tab gives access to the SNMP configuration settings.

For details, see the user manual or help system, chapter "Configurations".

8 Installed Software

The firmware and the operating system are already installed on the R&S DVMS.

For further information:

- Performing a firmware update: see the release notes.
- Installing software options: see the user manual or the help system.

8.1 Operating System

The R&S DVMS is equipped with the Windows 7 Embedded operating system in the 32-bit version. When the R&S DVMS is delivered, the operating system is configured for optimum operation. Changes to the system settings are required only if you install peripherals such as a keyboard and printer or if you configure the network and the settings do not conform to the default settings.

NOTICE

Risk of causing instrument unusability

To prevent malfunctions and to avoid instrument repair, only install service packs approved by Rohde & Schwarz.

In particular, do not use service packs for other Windows 7 editions.

8.1.1 Login

Windows 7 requires that you identify yourself by entering a user name and password in a login window. The R&S DVMS provides a factory-installed auto login function, i.e. login is carried out automatically in the background. The ID used for auto login has administrator rights.



User name and password are factory-set as follows.

- User name = *instrument*
- Password = *894129*

If the R&S DVMS is connected to a network and if the user name and the password are identical under Windows 7 and on the network, you log on to operating system and the network at the same time.

8.1.2 Windows 7 Start Menu

The Windows 7 Start menu provides access to the Windows 7 functionality and the installed programs. Under "Control Panel", the system settings are grouped. For details, see the Windows 7 documentation.

8.2 Additional Software

NOTICE

Risk of causing instrument unusability

The instrument is equipped with the Windows 7 operating system. Additional software can therefore be installed on the instrument. The use and installation of additional software may impair instrument function. Thus, run only programs that Rohde & Schwarz has tested for compatibility with the instrument software.

The drivers and programs used on the instrument under Windows 7 have been adapted to the instrument. Existing instrument software must always be modified using only update software released by Rohde & Schwarz.

8.3 Backup and Restore of the System Partition



Before you start a backup or restore of the system partition, make sure that the hardware watchdog is disabled. See [Chapter 8.3.1, "Prerequisite for Backup and Restore"](#), on page 43.

8.3.1 Prerequisite for Backup and Restore

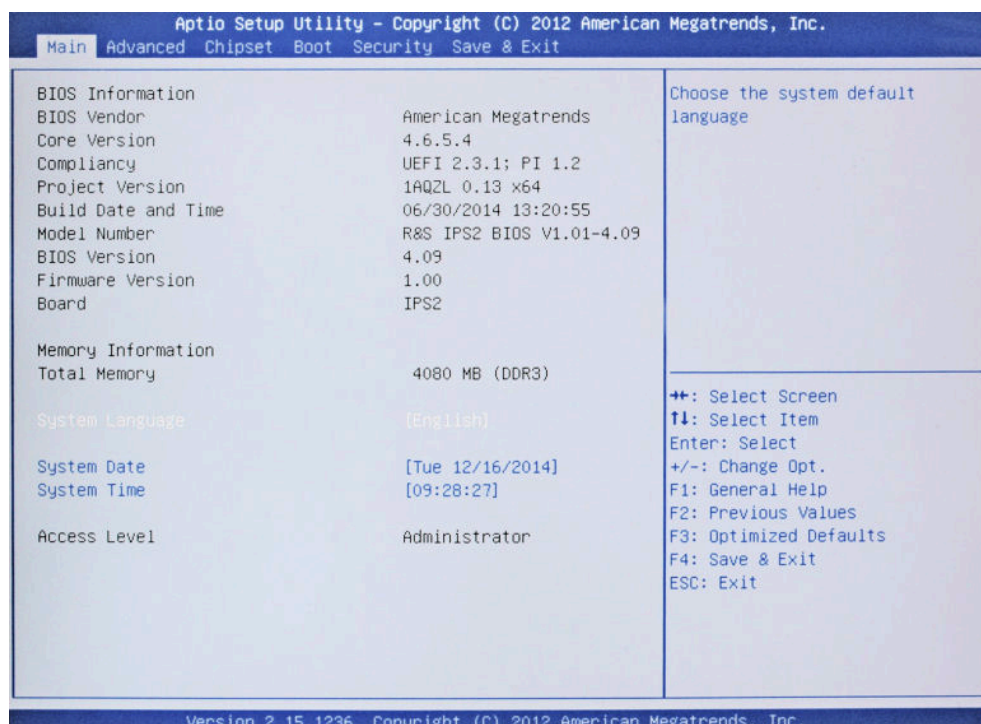
As a prerequisite for the backup/restore process, in the BIOS settings, the hardware watchdog must be disabled. Otherwise the backup/restore process (which normally lasts about 10 to 15 minutes) will be terminated and fail due to a reboot issued by the watchdog after about 4 minutes.

To disable the hardware watchdog

1. Connect an external keyboard to the USB interface.
2. Switch the R&S DVMS off and on again.
3. In the early boot phase when prompted at the bottom of the screen, press the DEL key of the external keyboard.

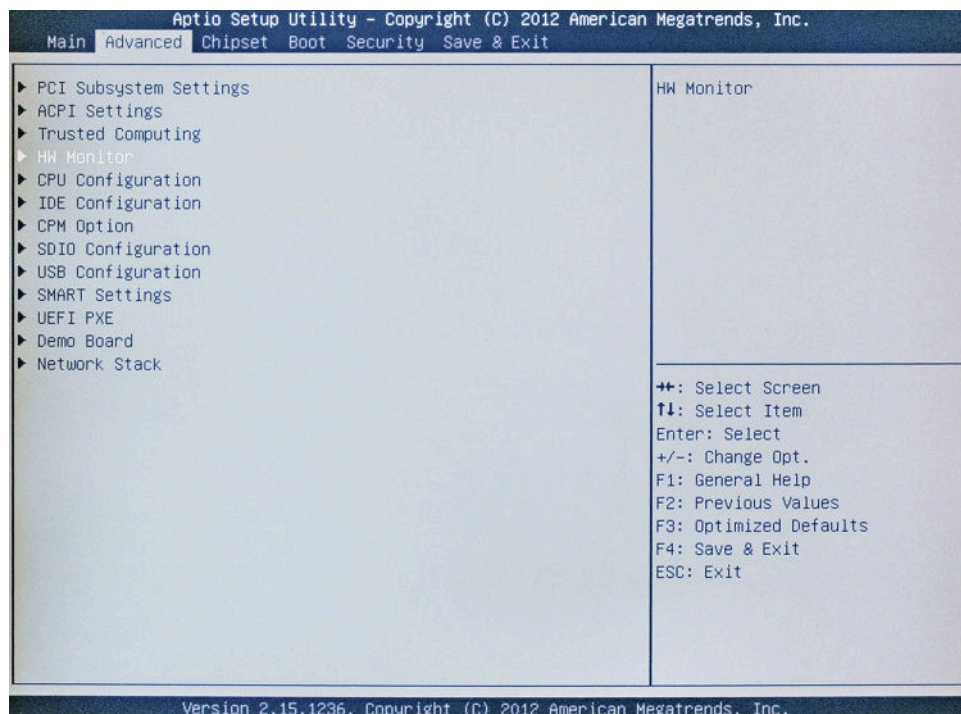
The BIOS settings are displayed.

Backup and Restore of the System Partition



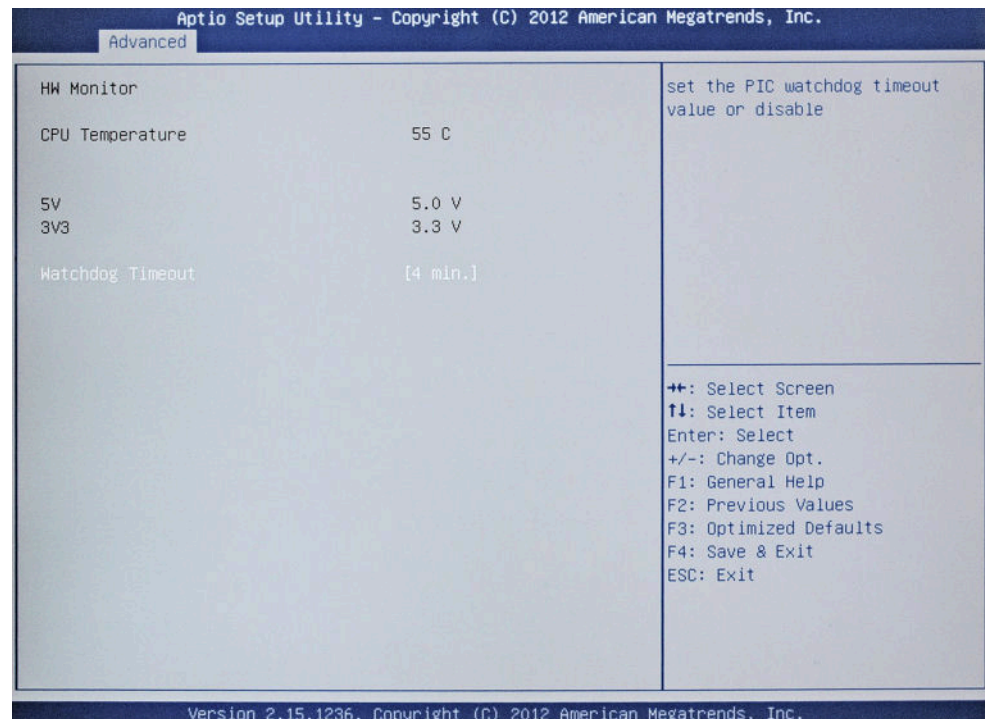
Tip: The navigation in the BIOS settings is explained in the lower right pane.

4. Select the "Advanced" tab.
5. Select "HW Monitor".

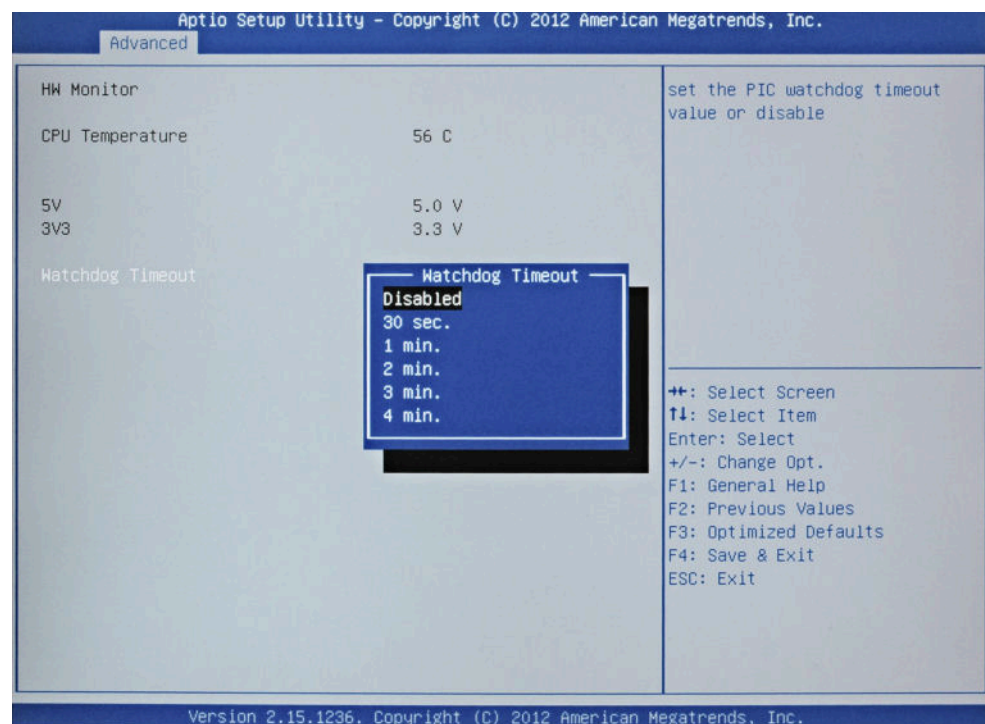


6. Press ENTER.

"Watchdog Timeout" is already selected.

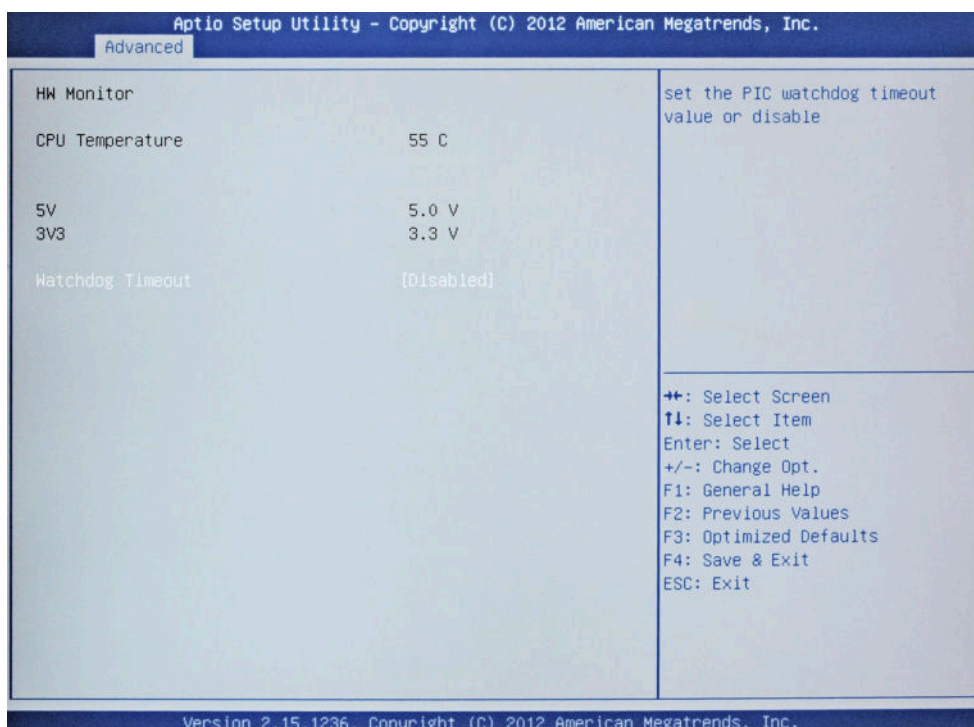


7. Press ENTER to open the "Watchdog Timeout" dialog.
8. Select "Disabled".



9. Press ENTER.

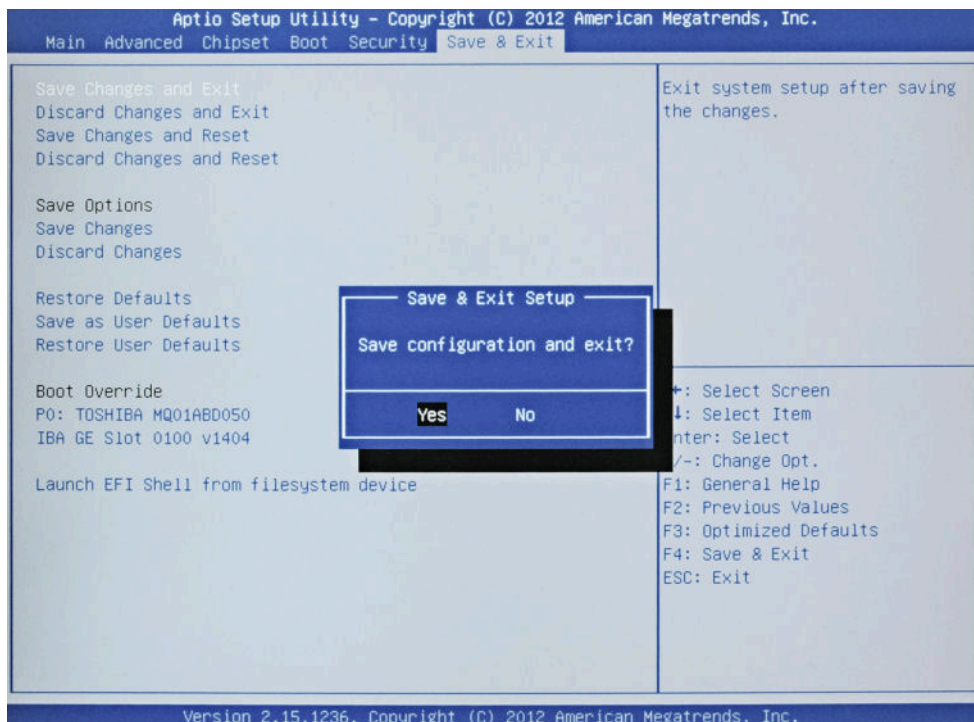
Backup and Restore of the System Partition



10. Select the "Save & Exit" tab.

"Save Changes and Exit" is already selected.

11. Press ENTER.



12. Press ENTER to save the changes and proceed with the system boot.

13. Continue as described in [Chapter 8.3.2, "Backup and Restore Application"](#), on page 47.



After a successful boot with the default option "Firmware" in the boot dialog or a restored backup, the hardware watchdog will automatically be re-enabled by the R&S DVMS system software. Make sure that the required sequence as described above is not interrupted for some reason. Otherwise restart at step [step 2](#).

8.3.2 Backup and Restore Application

Using the backup and restore application, you can back up the instrument installations and their configuration so that they can be restored if necessary. When restoring, you can choose between various states.

- Factory default state
If, for example, the system crashes, you can restore the factory default state.
- Intermediate states that you have saved
For example, you can back up the current system partition before a firmware update or provide different system configurations for different environments.

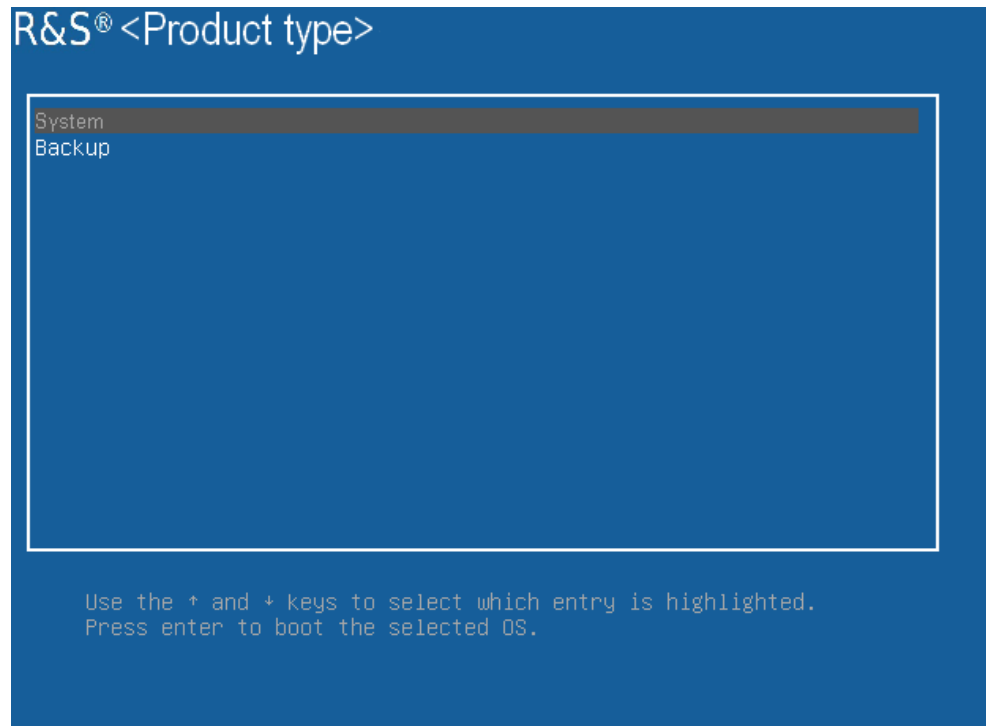
In the restore process, the system partition is deleted, formatted and written newly. The data partition is not affected.



Connect an external keyboard.
If the instrument does not have a monitor, connect also an external monitor.

To display the main dialog for backup and restore

1. Restart the R&S DVMS.
The boot screen is displayed. By default, "System" is selected. If you do not perform the next step within 4 seconds, the dialog vanishes and the booting process continues.
2. Select the "Backup" partition and press [ENTER].



The main dialog is displayed. It provides access to all functions of the backup and restore application.

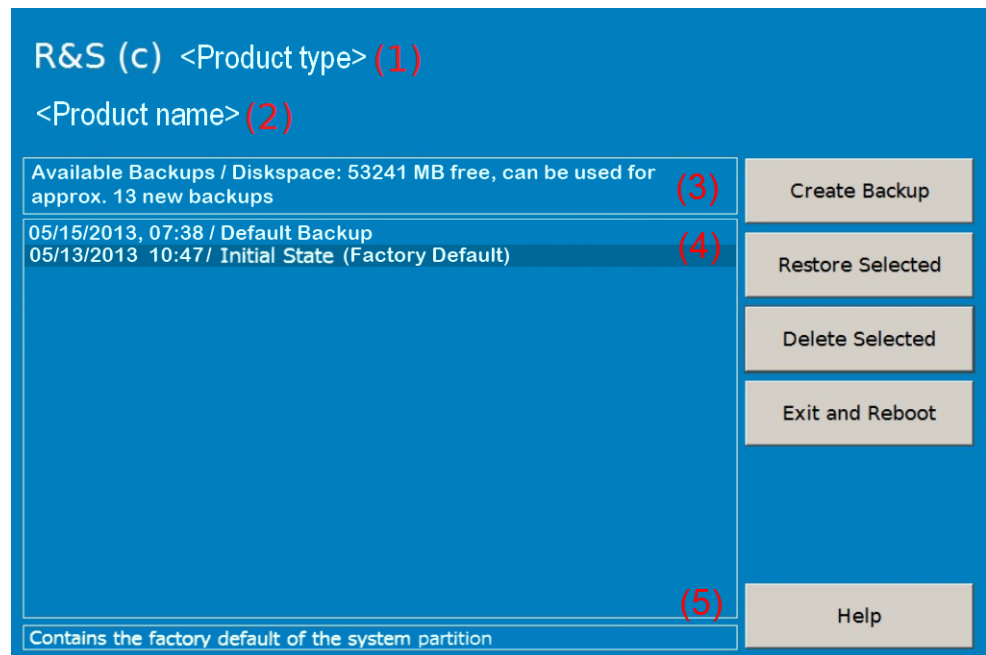


Figure 8-1: Main dialog (example)

- (1) = Header showing instrument type
- (2) = Header showing instrument name
- (3) = Free memory space on backup partition
- (4) = List of backups already created
- (5) = Description of currently selected backup

To continue, see one of the following chapters:

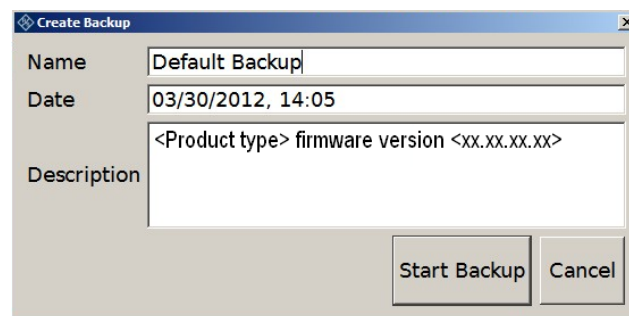
- [Chapter 8.3.2.1, "Creating a Backup"](#), on page 49
- [Chapter 8.3.2.2, "Restoring a Selected Backup Version"](#), on page 50
- [Chapter 8.3.2.3, "Deleting a Backup"](#), on page 50

8.3.2.1 Creating a Backup

Using this function, you can create a backup of the current instrument installation and its configuration.

1. In the main dialog (see [Figure 8-1](#)), select "Create Backup".

The "Create Backup" dialog is displayed. Under "Description", the current version of the firmware is displayed.



2. Enter a name for the backup and the date. If necessary, you can add information to the description.
3. Select "Start Backup".

During the backup process, a progress information dialog is displayed. You can terminate at any time ("Cancel").

After the process has been finished, the dialog is closed automatically, and the main dialog is displayed again.

Note: If you activate "Keep open when finished", the progress information dialog remains open until you close it.

4. In the main dialog, select "Exit and Reboot".

The backup and restore application is closed, and the R&S DVMS is restarted.

8.3.2.2 Restoring a Selected Backup Version

Using this function, you can restore the selected instrument installation and its configuration.



Malware protection

When restoring a backup, the Windows operating system and installed anti-malware software are probably outdated. To minimize the risk of malware threats after restoring a backup, verify and adjust the "Windows Update" settings. Follow the recommendations from Rohde & Schwarz applicable to your instrument. Also, install all Windows security updates that have been published in the meanwhile.

1. In the main dialog (see [Figure 8-1](#)), select the backup you want to restore.
2. Select "Restore Selected".
3. In the "Restore Selected" dialog, select "Yes".

During the restoring process, a progress information dialog is displayed. You can terminate at any time ("Cancel").

After the process has been finished, the application is closed automatically, and the R&S DVMS is restarted.

Note: If you activate "Keep open when finished", the progress information dialog remains open until you close it.

8.3.2.3 Deleting a Backup

Using this function, you can delete the selected instrument installation and its configuration.

To provide space for new backups, you can remove older backups. The factory default cannot be deleted.

1. In the main dialog (see [Figure 8-1](#)), select the backup you want to delete.
2. Select "Delete Selected".
3. In the "Delete Selected" dialog, select "Yes".

Note: You are not authorized to delete a factory default backup. If you have selected one, an error message is displayed and the backup is not deleted.

4. In the main dialog, select "Exit and Reboot", or continue with [Chapter 8.3.2.1, "Creating a Backup"](#), on page 49.

9 Maintenance

The R&S DVMS does not need periodic maintenance. Clean the outside of the instrument when necessary and check the rated data from time to time.

If any problem arises, contact one of our customer support centers. The addresses of our customer support centers are provided at the beginning of this manual.

9.1 Cleaning the Instrument

WARNING

Shock hazard

Before cleaning the R&S DVMS, make sure that the R&S DVMS is switched off and disconnected from all power supplies.

1. Clean the outside of the R&S DVMS using a soft, lint-free dust cloth.
2. Make sure that vents are unobstructed.

NOTICE

Instrument damage caused by cleaning agents

Cleaning agents contain substances that can damage the R&S DVMS, e.g. cleaning agents that contain a solvent can damage the front panel labeling or plastic parts.

Never use cleaning agents such as solvents (thinners, acetone, etc.), acids, bases, or other substances.

9.2 Replacing the Fuses

The R&S DVMS is protected by two fuses (IEC 127 – T 2.0 H/250 V) on the rear panel next to the AC power switch.

WARNING

Shock hazard

Before replacing a fuse, make sure that the R&S DVMS is switched off and disconnected from all power supplies.

Always use fuses supplied by Rohde & Schwarz as spare parts, or fuses of the same type and rating.

To replace the fuses

1. Open the lid of the AC power connector.
2. Lift the fuse holder out of its slot.
3. Exchange the two fuses.
4. Put the fuse holder back in its slot.
5. Close the lid.

9.3 Storing the Instrument

The storage temperature range of the R&S DVMS is given in the data sheet. If the R&S DVMS is to be stored for a longer period of time, it must be protected against dust.

Repack the R&S DVMS as it was originally packed when transporting or shipping. The two protective foam plastic parts prevent the control elements and connectors from being damaged. The antistatic packing foil avoids any undesired electrostatic charging to occur.

If you do not use the original packaging, provide for sufficient padding to prevent the R&S DVMS from slipping inside the package. Wrap antistatic packing foil around the R&S DVMS to protect it from electrostatic charging.

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