

R&S®VTS

Compact Video Tester

Getting Started



2116.1234.02 – 02

The firmware of the instrument makes use of several valuable open source software packages. For information see the release notes, included in the firmware package.

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®XYZ is abbreviated as R&S XYZ.

Basic Safety Instructions

Always read through and comply with the following safety instructions!

All plants and locations of the Rohde & Schwarz group of companies make every effort to keep the safety standards of our products up to date and to offer our customers the highest possible degree of safety. Our products and the auxiliary equipment they require are designed, built and tested in accordance with the safety standards that apply in each case. Compliance with these standards is continuously monitored by our quality assurance system. The product described here has been designed, built and tested in accordance with the attached EC Certificate of Conformity and has left the manufacturer's plant in a condition fully complying with safety standards. To maintain this condition and to ensure safe operation, you must observe all instructions and warnings provided in this manual. If you have any questions regarding these safety instructions, the Rohde & Schwarz group of companies will be happy to answer them.

Furthermore, it is your responsibility to use the product in an appropriate manner. This product is designed for use solely in industrial and laboratory environments or, if expressly permitted, also in the field and must not be used in any way that may cause personal injury or property damage. You are responsible if the product is used for any purpose other than its designated purpose or in disregard of the manufacturer's instructions. The manufacturer shall assume no responsibility for such use of the product.








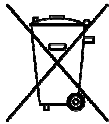

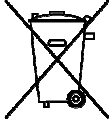

The product is used for its designated purpose if it is used in accordance with its product documentation and within its performance limits (see data sheet, documentation, the following safety instructions). Using the product requires technical skills and, in some cases, a basic knowledge of English. It is therefore essential that only skilled and specialized staff or thoroughly trained personnel with the required skills be allowed to use the product. If personal safety gear is required for using Rohde & Schwarz products, this will be indicated at the appropriate place in the product documentation. Keep the basic safety instructions and the product documentation in a safe place and pass them on to the subsequent users.

Observing the safety instructions will help prevent personal injury or damage of any kind caused by dangerous situations. Therefore, carefully read through and adhere to the following safety instructions before and when using the product. It is also absolutely essential to observe the additional safety instructions on personal safety, for example, that appear in relevant parts of the product documentation. In these safety instructions, the word "product" refers to all merchandise sold and distributed by the Rohde & Schwarz group of companies, including instruments, systems and all accessories. For product-specific information, see the data sheet and the product documentation.

Symbols and safety labels

| Symbol | Meaning | Symbol | Meaning |
|---|--|--------|-----------------------|
|  | Notice, general danger location Observe product documentation | ○ | ON/OFF supply voltage |
|  | Caution when handling heavy equipment | ⏻ | Standby indication |
|  | Danger of electric shock | — — — | Direct current (DC) |

Basic Safety Instructions

| Symbol | Meaning | Symbol | Meaning |
|--|--|---|--|
|  | Warning! Hot surface |  | Alternating current (AC) |
|  | Protective conductor terminal |  | Direct/alternating current (DC/AC) |
|  | Ground |  | Device fully protected by double (reinforced) insulation |
|  | Ground terminal |  | EU labeling for batteries and accumulators For additional information, see section "Waste disposal/Environmental protection", item 1. |
|  | Be careful when handling electrostatic sensitive devices |  | EU labeling for separate collection of electrical and electronic devices For additional information, see section "Waste disposal/Environmental protection", item 2. |
|  | Warning! Laser radiation For additional information, see section "Operation", item 7. | | |

Signal words and their meaning

The following signal words are used in the product documentation in order to warn the reader about risks and dangers.



Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.



Indicates the possibility of incorrect operation which can result in damage to the product.

In the product documentation, the word ATTENTION is used synonymously.

These signal words are in accordance with the standard definition for civil applications in the European Economic Area. Definitions that deviate from the standard definition may also exist in other economic areas or military applications. It is therefore essential to make sure that the signal words described here are always used only in connection with the related product documentation and the related product. The use of signal words in connection with unrelated products or documentation can result in misinterpretation and in personal injury or material damage.

Basic Safety Instructions

Operating states and operating positions

The product may be operated only under the operating conditions and in the positions specified by the manufacturer, without the product's ventilation being obstructed. If the manufacturer's specifications are not observed, this can result in electric shock, fire and/or serious personal injury or death. Applicable local or national safety regulations and rules for the prevention of accidents must be observed in all work performed.

1. Unless otherwise specified, the following requirements apply to Rohde & Schwarz products: predefined operating position is always with the housing floor facing down, IP protection 2X, use only indoors, max. operating altitude 2000 m above sea level, max. transport altitude 4500 m above sea level. A tolerance of $\pm 10\%$ shall apply to the nominal voltage and $\pm 5\%$ to the nominal frequency, overvoltage category 2, pollution severity 2.
2. Do not place the product on surfaces, vehicles, cabinets or tables that for reasons of weight or stability are unsuitable for this purpose. Always follow the manufacturer's installation instructions when installing the product and fastening it to objects or structures (e.g. walls and shelves). An installation that is not carried out as described in the product documentation could result in personal injury or even death.
3. Do not place the product on heat-generating devices such as radiators or fan heaters. The ambient temperature must not exceed the maximum temperature specified in the product documentation or in the data sheet. Product overheating can cause electric shock, fire and/or serious personal injury or even death.

Electrical safety

If the information on electrical safety is not observed either at all or to the extent necessary, electric shock, fire and/or serious personal injury or death may occur.

1. Prior to switching on the product, always ensure that the nominal voltage setting on the product matches the nominal voltage of the AC supply network. If a different voltage is to be set, the power fuse of the product may have to be changed accordingly.
2. In the case of products of safety class I with movable power cord and connector, operation is permitted only on sockets with a protective conductor contact and protective conductor.
3. Intentionally breaking the protective conductor either in the feed line or in the product itself is not permitted. Doing so can result in the danger of an electric shock from the product. If extension cords or connector strips are implemented, they must be checked on a regular basis to ensure that they are safe to use.
4. If there is no power switch for disconnecting the product from the AC supply network, or if the power switch is not suitable for this purpose, use the plug of the connecting cable to disconnect the product from the AC supply network. In such cases, always ensure that the power plug is easily reachable and accessible at all times. For example, if the power plug is the disconnecting device, the length of the connecting cable must not exceed 3 m. Functional or electronic switches are not suitable for providing disconnection from the AC supply network. If products without power switches are integrated into racks or systems, the disconnecting device must be provided at the system level.
5. Never use the product if the power cable is damaged. Check the power cables on a regular basis to ensure that they are in proper operating condition. By taking appropriate safety measures and carefully laying the power cable, ensure that the cable cannot be damaged and that no one can be hurt by, for example, tripping over the cable or suffering an electric shock.

Basic Safety Instructions

6. The product may be operated only from TN/TT supply networks fuse-protected with max. 16 A (higher fuse only after consulting with the Rohde & Schwarz group of companies).
7. Do not insert the plug into sockets that are dusty or dirty. Insert the plug firmly and all the way into the socket provided for this purpose. Otherwise, sparks that result in fire and/or injuries may occur.
8. Do not overload any sockets, extension cords or connector strips; doing so can cause fire or electric shocks.
9. For measurements in circuits with voltages $V_{rms} > 30$ V, suitable measures (e.g. appropriate measuring equipment, fuse protection, current limiting, electrical separation, insulation) should be taken to avoid any hazards.
10. Ensure that the connections with information technology equipment, e.g. PCs or other industrial computers, comply with the IEC60950-1/EN60950-1 or IEC61010-1/EN 61010-1 standards that apply in each case.
11. Unless expressly permitted, never remove the cover or any part of the housing while the product is in operation. Doing so will expose circuits and components and can lead to injuries, fire or damage to the product.
12. If a product is to be permanently installed, the connection between the protective conductor terminal on site and the product's protective conductor must be made first before any other connection is made. The product may be installed and connected only by a licensed electrician.
13. For permanently installed equipment without built-in fuses, circuit breakers or similar protective devices, the supply circuit must be fuse-protected in such a way that anyone who has access to the product, as well as the product itself, is adequately protected from injury or damage.
14. Use suitable overvoltage protection to ensure that no overvoltage (such as that caused by a bolt of lightning) can reach the product. Otherwise, the person operating the product will be exposed to the danger of an electric shock.
15. Any object that is not designed to be placed in the openings of the housing must not be used for this purpose. Doing so can cause short circuits inside the product and/or electric shocks, fire or injuries.
16. Unless specified otherwise, products are not liquid-proof (see also section "Operating states and operating positions", item 1). Therefore, the equipment must be protected against penetration by liquids. If the necessary precautions are not taken, the user may suffer electric shock or the product itself may be damaged, which can also lead to personal injury.
17. Never use the product under conditions in which condensation has formed or can form in or on the product, e.g. if the product has been moved from a cold to a warm environment. Penetration by water increases the risk of electric shock.
18. Prior to cleaning the product, disconnect it completely from the power supply (e.g. AC supply network or battery). Use a soft, non-linting cloth to clean the product. Never use chemical cleaning agents such as alcohol, acetone or diluents for cellulose lacquers.

Operation

1. Operating the products requires special training and intense concentration. Make sure that persons who use the products are physically, mentally and emotionally fit enough to do so; otherwise, injuries or material damage may occur. It is the responsibility of the employer/operator to select suitable personnel for operating the products.

Basic Safety Instructions

2. Before you move or transport the product, read and observe the section titled "Transport".
3. As with all industrially manufactured goods, the use of substances that induce an allergic reaction (allergens) such as nickel cannot be generally excluded. If you develop an allergic reaction (such as a skin rash, frequent sneezing, red eyes or respiratory difficulties) when using a Rohde & Schwarz product, consult a physician immediately to determine the cause and to prevent health problems or stress.
4. Before you start processing the product mechanically and/or thermally, or before you take it apart, be sure to read and pay special attention to the section titled "Waste disposal/Environmental protection", item 1.
5. Depending on the function, certain products such as RF radio equipment can produce an elevated level of electromagnetic radiation. Considering that unborn babies require increased protection, pregnant women must be protected by appropriate measures. Persons with pacemakers may also be exposed to risks from electromagnetic radiation. The employer/operator must evaluate workplaces where there is a special risk of exposure to radiation and, if necessary, take measures to avert the potential danger.
6. Should a fire occur, the product may release hazardous substances (gases, fluids, etc.) that can cause health problems. Therefore, suitable measures must be taken, e.g. protective masks and protective clothing must be worn.
7. Laser products are given warning labels that are standardized according to their laser class. Lasers can cause biological harm due to the properties of their radiation and due to their extremely concentrated electromagnetic power. If a laser product (e.g. a CD/DVD drive) is integrated into a Rohde & Schwarz product, absolutely no other settings or functions may be used as described in the product documentation. The objective is to prevent personal injury (e.g. due to laser beams).
8. EMC classes (in line with CISPR 11)
Class A: Equipment suitable for use in all environments except residential environments and environments that are directly connected to a low-voltage supply network that supplies residential buildings.
Class B: Equipment suitable for use in residential environments and environments that are directly connected to a low-voltage supply network that supplies residential buildings.

Repair and service

1. The product may be opened only by authorized, specially trained personnel. Before any work is performed on the product or before the product is opened, it must be disconnected from the AC supply network. Otherwise, personnel will be exposed to the risk of an electric shock.
2. Adjustments, replacement of parts, maintenance and repair may be performed only by electrical experts authorized by Rohde & Schwarz. Only original parts may be used for replacing parts relevant to safety (e.g. power switches, power transformers, fuses). A safety test must always be performed after parts relevant to safety have been replaced (visual inspection, protective conductor test, insulation resistance measurement, leakage current measurement, functional test). This helps ensure the continued safety of the product.

Basic Safety Instructions

Batteries and rechargeable batteries/cells

If the information regarding batteries and rechargeable batteries/cells is not observed either at all or to the extent necessary, product users may be exposed to the risk of explosions, fire and/or serious personal injury, and, in some cases, death. Batteries and rechargeable batteries with alkaline electrolytes (e.g. lithium cells) must be handled in accordance with the EN 62133 standard.

1. Cells must not be taken apart or crushed.
2. Cells or batteries must not be exposed to heat or fire. Storage in direct sunlight must be avoided. Keep cells and batteries clean and dry. Clean soiled connectors using a dry, clean cloth.
3. Cells or batteries must not be short-circuited. Cells or batteries must not be stored in a box or in a drawer where they can short-circuit each other, or where they can be short-circuited by other conductive materials. Cells and batteries must not be removed from their original packaging until they are ready to be used.
4. Cells and batteries must not be exposed to any mechanical shocks that are stronger than permitted.
5. If a cell develops a leak, the fluid must not be allowed to come into contact with the skin or eyes. If contact occurs, wash the affected area with plenty of water and seek medical aid.
6. Improperly replacing or charging cells or batteries that contain alkaline electrolytes (e.g. lithium cells) can cause explosions. Replace cells or batteries only with the matching Rohde & Schwarz type (see parts list) in order to ensure the safety of the product.
7. Cells and batteries must be recycled and kept separate from residual waste. Rechargeable batteries and normal batteries that contain lead, mercury or cadmium are hazardous waste. Observe the national regulations regarding waste disposal and recycling.

Transport

1. The product may be very heavy. Therefore, the product must be handled with care. In some cases, the user may require a suitable means of lifting or moving the product (e.g. with a lift-truck) to avoid back or other physical injuries.
2. Handles on the products are designed exclusively to enable personnel to transport the product. It is therefore not permissible to use handles to fasten the product to or on transport equipment such as cranes, fork lifts, wagons, etc. The user is responsible for securely fastening the products to or on the means of transport or lifting. Observe the safety regulations of the manufacturer of the means of transport or lifting. Noncompliance can result in personal injury or material damage.
3. If you use the product in a vehicle, it is the sole responsibility of the driver to drive the vehicle safely and properly. The manufacturer assumes no responsibility for accidents or collisions. Never use the product in a moving vehicle if doing so could distract the driver of the vehicle. Adequately secure the product in the vehicle to prevent injuries or other damage in the event of an accident.

Waste disposal/Environmental protection

1. Specially marked equipment has a battery or accumulator that must not be disposed of with unsorted municipal waste, but must be collected separately. It may only be disposed of at a suitable collection point or via a Rohde & Schwarz customer service center.

Instrucciones de seguridad elementales

2. Waste electrical and electronic equipment must not be disposed of with unsorted municipal waste, but must be collected separately.
Rohde & Schwarz GmbH & Co. KG has developed a disposal concept and takes full responsibility for take-back obligations and disposal obligations for manufacturers within the EU. Contact your Rohde & Schwarz customer service center for environmentally responsible disposal of the product.
3. If products or their components are mechanically and/or thermally processed in a manner that goes beyond their intended use, hazardous substances (heavy-metal dust such as lead, beryllium, nickel) may be released. For this reason, the product may only be disassembled by specially trained personnel. Improper disassembly may be hazardous to your health. National waste disposal regulations must be observed.
4. If handling the product releases hazardous substances or fuels that must be disposed of in a special way, e.g. coolants or engine oils that must be replenished regularly, the safety instructions of the manufacturer of the hazardous substances or fuels and the applicable regional waste disposal regulations must be observed. Also observe the relevant safety instructions in the product documentation. The improper disposal of hazardous substances or fuels can cause health problems and lead to environmental damage.

For additional information about environmental protection, visit the Rohde & Schwarz website.

Instrucciones de seguridad elementales

¡Es imprescindible leer y cumplir las siguientes instrucciones e informaciones de seguridad!

El principio del grupo de empresas Rohde & Schwarz consiste en tener nuestros productos siempre al día con los estándares de seguridad y de ofrecer a nuestros clientes el máximo grado de seguridad. Nuestros productos y todos los equipos adicionales son siempre fabricados y examinados según las normas de seguridad vigentes. Nuestro sistema de garantía de calidad controla constantemente que sean cumplidas estas normas. El presente producto ha sido fabricado y examinado según el certificado de conformidad adjunto de la UE y ha salido de nuestra planta en estado impecable según los estándares técnicos de seguridad. Para poder preservar este estado y garantizar un funcionamiento libre de peligros, el usuario deberá atenerse a todas las indicaciones, informaciones de seguridad y notas de alerta. El grupo de empresas Rohde & Schwarz está siempre a su disposición en caso de que tengan preguntas referentes a estas informaciones de seguridad.














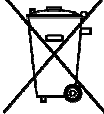
Además queda en la responsabilidad del usuario utilizar el producto en la forma debida. Este producto está destinado exclusivamente al uso en la industria y el laboratorio o, si ha sido expresamente autorizado, para aplicaciones de campo y de ninguna manera deberá ser utilizado de modo que alguna persona/cosa pueda sufrir daño. El uso del producto fuera de sus fines definidos o sin tener en cuenta las instrucciones del fabricante queda en la responsabilidad del usuario. El fabricante no se hace en ninguna forma responsable de consecuencias a causa del mal uso del producto.

Instrucciones de seguridad elementales


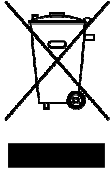

Se parte del uso correcto del producto para los fines definidos si el producto es utilizado conforme a las indicaciones de la correspondiente documentación del producto y dentro del margen de rendimiento definido (ver hoja de datos, documentación, informaciones de seguridad que siguen). El uso del producto hace necesarios conocimientos técnicos y ciertos conocimientos del idioma inglés. Por eso se debe tener en cuenta que el producto solo pueda ser operado por personal especializado o personas instruidas en profundidad con las capacidades correspondientes. Si fuera necesaria indumentaria de seguridad para el uso de productos de Rohde & Schwarz, encontraría la información debida en la documentación del producto en el capítulo correspondiente. Guarde bien las informaciones de seguridad elementales, así como la documentación del producto, y entréguelas a usuarios posteriores.

Tener en cuenta las informaciones de seguridad sirve para evitar en lo posible lesiones o daños por peligros de toda clase. Por eso es imprescindible leer detalladamente y comprender por completo las siguientes informaciones de seguridad antes de usar el producto, y respetarlas durante el uso del producto. Deberán tenerse en cuenta todas las demás informaciones de seguridad, como p. ej. las referentes a la protección de personas, que encontrarán en el capítulo correspondiente de la documentación del producto y que también son de obligado cumplimiento. En las presentes informaciones de seguridad se recogen todos los objetos que distribuye el grupo de empresas Rohde & Schwarz bajo la denominación de "producto", entre ellos también aparatos, instalaciones así como toda clase de accesorios. Los datos específicos del producto figuran en la hoja de datos y en la documentación del producto.

Símbolos y definiciones de seguridad

| Símbolo | Significado | Símbolo | Significado |
|---|---|---|---|
|  | Aviso: punto de peligro general Observar la documentación del producto |  | Tensión de alimentación de PUESTA EN MARCHA / PARADA |
|  | Atención en el manejo de dispositivos de peso elevado |  | Indicación de estado de espera (standby) |
|  | Peligro de choque eléctrico |  | Corriente continua (DC) |
|  | Advertencia: superficie caliente |  | Corriente alterna (AC) |
|  | Conexión a conductor de protección |  | Corriente continua / Corriente alterna (DC/AC) |
|  | Conexión a tierra |  | El aparato está protegido en su totalidad por un aislamiento doble (reforzado) |
|  | Conexión a masa |  | Distintivo de la UE para baterías y acumuladores Más información en la sección "Eliminación/protección del medio ambiente", punto 1. |

Instrucciones de seguridad elementales

| Símbolo | Significado | Símbolo | Significado |
|---|---|---|---|
|  | Aviso: Cuidado en el manejo de dispositivos sensibles a la electrostática (ESD) |  | Distintivo de la UE para la eliminación por separado de dispositivos eléctricos y electrónicos Más información en la sección "Eliminación/protección del medio ambiente", punto 2. |
|  | Advertencia: rayo láser Más información en la sección "Funcionamiento", punto 7. | | |

Palabras de señal y su significado

En la documentación del producto se utilizan las siguientes palabras de señal con el fin de advertir contra riesgos y peligros.



PELIGRO identifica un peligro inminente con riesgo elevado que provocará muerte o lesiones graves si no se evita.



ADVERTENCIA identifica un posible peligro con riesgo medio de provocar muerte o lesiones (graves) si no se evita.



ATENCIÓN identifica un peligro con riesgo reducido de provocar lesiones leves o moderadas si no se evita.



AVISO indica la posibilidad de utilizar mal el producto y, como consecuencia, dañarlo.
En la documentación del producto se emplea de forma sinónima el término CUIDADO.

Las palabras de señal corresponden a la definición habitual para aplicaciones civiles en el área económica europea. Pueden existir definiciones diferentes a esta definición en otras áreas económicas o en aplicaciones militares. Por eso se deberá tener en cuenta que las palabras de señal aquí descritas sean utilizadas siempre solamente en combinación con la correspondiente documentación del producto y solamente en combinación con el producto correspondiente. La utilización de las palabras de señal en combinación con productos o documentaciones que no les correspondan puede llevar a interpretaciones equivocadas y tener por consecuencia daños en personas u objetos.

Estados operativos y posiciones de funcionamiento

El producto solamente debe ser utilizado según lo indicado por el fabricante respecto a los estados operativos y posiciones de funcionamiento sin que se obstruya la ventilación. Si no se siguen las indicaciones del fabricante, pueden producirse choques eléctricos, incendios y/o lesiones graves con posible consecuencia de muerte. En todos los trabajos deberán ser tenidas en cuenta las normas nacionales y locales de seguridad del trabajo y de prevención de accidentes.

Instrucciones de seguridad elementales

1. Si no se convino de otra manera, es para los productos Rohde & Schwarz válido lo que sigue: como posición de funcionamiento se define por principio la posición con el suelo de la caja para abajo, modo de protección IP 2X, uso solamente en estancias interiores, utilización hasta 2000 m sobre el nivel del mar, transporte hasta 4500 m sobre el nivel del mar. Se aplicará una tolerancia de $\pm 10\%$ sobre el voltaje nominal y de $\pm 5\%$ sobre la frecuencia nominal. Categoría de sobrecarga eléctrica 2, índice de suciedad 2.
2. No sitúe el producto encima de superficies, vehículos, estantes o mesas, que por sus características de peso o de estabilidad no sean aptos para él. Siga siempre las instrucciones de instalación del fabricante cuando instale y asegure el producto en objetos o estructuras (p. ej. paredes y estantes). Si se realiza la instalación de modo distinto al indicado en la documentación del producto, se pueden causar lesiones o, en determinadas circunstancias, incluso la muerte.
3. No ponga el producto sobre aparatos que generen calor (p. ej. radiadores o calefactores). La temperatura ambiente no debe superar la temperatura máxima especificada en la documentación del producto o en la hoja de datos. En caso de sobrecalentamiento del producto, pueden producirse choques eléctricos, incendios y/o lesiones graves con posible consecuencia de muerte.

Seguridad eléctrica

Si no se siguen (o se siguen de modo insuficiente) las indicaciones del fabricante en cuanto a seguridad eléctrica, pueden producirse choques eléctricos, incendios y/o lesiones graves con posible consecuencia de muerte.

1. Antes de la puesta en marcha del producto se deberá comprobar siempre que la tensión preseleccionada en el producto coincida con la de la red de alimentación eléctrica. Si es necesario modificar el ajuste de tensión, también se deberán cambiar en caso dado los fusibles correspondientes del producto.
2. Los productos de la clase de protección I con alimentación móvil y enchufe individual solamente podrán enchufarse a tomas de corriente con contacto de seguridad y con conductor de protección conectado.
3. Queda prohibida la interrupción intencionada del conductor de protección, tanto en la toma de corriente como en el mismo producto. La interrupción puede tener como consecuencia el riesgo de que el producto sea fuente de choques eléctricos. Si se utilizan cables alargadores o regletas de enchufe, deberá garantizarse la realización de un examen regular de los mismos en cuanto a su estado técnico de seguridad.
4. Si el producto no está equipado con un interruptor para desconectarlo de la red, o bien si el interruptor existente no resulta apropiado para la desconexión de la red, el enchufe del cable de conexión se deberá considerar como un dispositivo de desconexión. El dispositivo de desconexión se debe poder alcanzar fácilmente y debe estar siempre bien accesible. Si, p. ej., el enchufe de conexión a la red es el dispositivo de desconexión, la longitud del cable de conexión no debe superar 3 m). Los interruptores selectores o electrónicos no son aptos para el corte de la red eléctrica. Si se integran productos sin interruptor en bastidores o instalaciones, se deberá colocar el interruptor en el nivel de la instalación.
5. No utilice nunca el producto si está dañado el cable de conexión a red. Compruebe regularmente el correcto estado de los cables de conexión a red. Asegúrese, mediante las medidas de protección y de instalación adecuadas, de que el cable de conexión a red no pueda ser dañado o de que nadie pueda ser dañado por él, p. ej. al tropezar o por un choque eléctrico.

Instrucciones de seguridad elementales

6. Solamente está permitido el funcionamiento en redes de alimentación TN/TT aseguradas con fusibles de 16 A como máximo (utilización de fusibles de mayor amperaje solo previa consulta con el grupo de empresas Rohde & Schwarz).
7. Nunca conecte el enchufe en tomas de corriente sucias o llenas de polvo. Introduzca el enchufe por completo y fuertemente en la toma de corriente. La no observación de estas medidas puede provocar chispas, fuego y/o lesiones.
8. No sobrecargue las tomas de corriente, los cables alargadores o las regletas de enchufe ya que esto podría causar fuego o choques eléctricos.
9. En las mediciones en circuitos de corriente con una tensión $U_{\text{eff}} > 30 \text{ V}$ se deberán tomar las medidas apropiadas para impedir cualquier peligro (p. ej. medios de medición adecuados, seguros, limitación de tensión, corte protector, aislamiento etc.).
10. Para la conexión con dispositivos informáticos como un PC o un ordenador industrial, debe comprobarse que éstos cumplan los estándares IEC60950-1/EN60950-1 o IEC61010-1/EN 61010-1 válidos en cada caso.
11. A menos que esté permitido expresamente, no retire nunca la tapa ni componentes de la carcasa mientras el producto esté en servicio. Esto pone a descubierto los cables y componentes eléctricos y puede causar lesiones, fuego o daños en el producto.
12. Si un producto se instala en un lugar fijo, se deberá primero conectar el conductor de protección fijo con el conductor de protección del producto antes de hacer cualquier otra conexión. La instalación y la conexión deberán ser efectuadas por un electricista especializado.
13. En el caso de dispositivos fijos que no estén provistos de fusibles, interruptor automático ni otros mecanismos de seguridad similares, el circuito de alimentación debe estar protegido de modo que todas las personas que puedan acceder al producto, así como el producto mismo, estén a salvo de posibles daños.
14. Todo producto debe estar protegido contra sobretensión (debida p. ej. a una caída del rayo) mediante los correspondientes sistemas de protección. Si no, el personal que lo utilice quedará expuesto al peligro de choque eléctrico.
15. No debe introducirse en los orificios de la caja del aparato ningún objeto que no esté destinado a ello. Esto puede producir cortocircuitos en el producto y/o puede causar choques eléctricos, fuego o lesiones.
16. Salvo indicación contraria, los productos no están impermeabilizados (ver también el capítulo "Estados operativos y posiciones de funcionamiento", punto 1). Por eso es necesario tomar las medidas necesarias para evitar la entrada de líquidos. En caso contrario, existe peligro de choque eléctrico para el usuario o de daños en el producto, que también pueden redundar en peligro para las personas.
17. No utilice el producto en condiciones en las que pueda producirse o ya se hayan producido condensaciones sobre el producto o en el interior de éste, como p. ej. al desplazarlo de un lugar frío a otro caliente. La entrada de agua aumenta el riesgo de choque eléctrico.
18. Antes de la limpieza, desconecte por completo el producto de la alimentación de tensión (p. ej. red de alimentación o batería). Realice la limpieza de los aparatos con un paño suave, que no se deshilache. No utilice bajo ningún concepto productos de limpieza químicos como alcohol, acetona o diluyentes para lacas nitrocelulósicas.

Instrucciones de seguridad elementales

Funcionamiento

1. El uso del producto requiere instrucciones especiales y una alta concentración durante el manejo. Debe asegurarse que las personas que manejen el producto estén a la altura de los requerimientos necesarios en cuanto a aptitudes físicas, psíquicas y emocionales, ya que de otra manera no se pueden excluir lesiones o daños de objetos. El empresario u operador es responsable de seleccionar el personal usuario apto para el manejo del producto.
2. Antes de desplazar o transportar el producto, lea y tenga en cuenta el capítulo "Transporte".
3. Como con todo producto de fabricación industrial no puede quedar excluida en general la posibilidad de que se produzcan alergias provocadas por algunos materiales empleados —los llamados alérgenos (p. ej. el níquel)—. Si durante el manejo de productos Rohde & Schwarz se producen reacciones alérgicas, como p. ej. irritaciones cutáneas, estornudos continuos, enrojecimiento de la conjuntiva o dificultades respiratorias, debe avisarse inmediatamente a un médico para investigar las causas y evitar cualquier molestia o daño a la salud.
4. Antes de la manipulación mecánica y/o térmica o el desmontaje del producto, debe tenerse en cuenta imprescindiblemente el capítulo "Eliminación/protección del medio ambiente", punto 1.
5. Ciertos productos, como p. ej. las instalaciones de radiocomunicación RF, pueden a causa de su función natural, emitir una radiación electromagnética aumentada. Deben tomarse todas las medidas necesarias para la protección de las mujeres embarazadas. También las personas con marcapasos pueden correr peligro a causa de la radiación electromagnética. El empresario/operador tiene la obligación de evaluar y señalizar las áreas de trabajo en las que exista un riesgo elevado de exposición a radiaciones.
6. Tenga en cuenta que en caso de incendio pueden desprenderse del producto sustancias tóxicas (gases, líquidos etc.) que pueden generar daños a la salud. Por eso, en caso de incendio deben usarse medidas adecuadas, como p. ej. máscaras antigás e indumentaria de protección.
7. Los productos con láser están provistos de indicaciones de advertencia normalizadas en función de la clase de láser del que se trate. Los rayos láser pueden provocar daños de tipo biológico a causa de las propiedades de su radiación y debido a su concentración extrema de potencia electromagnética. En caso de que un producto Rohde & Schwarz contenga un producto láser (p. ej. un lector de CD/DVD), no debe usarse ninguna otra configuración o función aparte de las descritas en la documentación del producto, a fin de evitar lesiones (p. ej. debidas a irradiación láser).
8. Clases CEM (según CISPR 11)
Clase A: dispositivo apropiado para el uso en cualquier zona excepto en áreas residenciales y en aquellas zonas que se encuentran conectadas a una red de suministro de baja tensión que alimenta un edificio de viviendas.
Clase B: dispositivo apropiado para el uso en áreas residenciales y en aquellas zonas que se encuentran conectadas a una red de suministro de baja tensión que alimenta un edificio de viviendas.

Reparación y mantenimiento

1. El producto solamente debe ser abierto por personal especializado con autorización para ello. Antes de manipular el producto o abrirlo, es obligatorio desconectarlo de la tensión de alimentación, para evitar toda posibilidad de choque eléctrico.

Instrucciones de seguridad elementales

2. El ajuste, el cambio de partes, el mantenimiento y la reparación deberán ser efectuadas solamente por electricistas autorizados por Rohde & Schwarz. Si se reponen partes con importancia para los aspectos de seguridad (p. ej. el enchufe, los transformadores o los fusibles), solamente podrán ser sustituidos por partes originales. Después de cada cambio de partes relevantes para la seguridad deberá realizarse un control de seguridad (control a primera vista, control del conductor de protección, medición de resistencia de aislamiento, medición de la corriente de fuga, control de funcionamiento). Con esto queda garantizada la seguridad del producto.

Baterías y acumuladores o celdas

Si no se siguen (o se siguen de modo insuficiente) las indicaciones en cuanto a las baterías y acumuladores o celdas, pueden producirse explosiones, incendios y/o lesiones graves con posible consecuencia de muerte. El manejo de baterías y acumuladores con electrolitos alcalinos (p. ej. celdas de litio) debe seguir el estándar EN 62133.

1. No deben desmontarse, abrirse ni triturarse las celdas.
2. Las celdas o baterías no deben someterse a calor ni fuego. Debe evitarse el almacenamiento a la luz directa del sol. Las celdas y baterías deben mantenerse limpias y secas. Limpiar las conexiones sucias con un paño seco y limpio.
3. Las celdas o baterías no deben cortocircuitarse. Es peligroso almacenar las celdas o baterías en estuches o cajones en cuyo interior puedan cortocircuitarse por contacto recíproco o por contacto con otros materiales conductores. No deben extraerse las celdas o baterías de sus embalajes originales hasta el momento en que vayan a utilizarse.
4. Las celdas o baterías no deben someterse a impactos mecánicos fuertes indebidos.
5. En caso de falta de estanqueidad de una celda, el líquido vertido no debe entrar en contacto con la piel ni los ojos. Si se produce contacto, lavar con agua abundante la zona afectada y avisar a un médico.
6. En caso de cambio o recarga inadecuados, las celdas o baterías que contienen electrolitos alcalinos (p. ej. las celdas de litio) pueden explotar. Para garantizar la seguridad del producto, las celdas o baterías solo deben ser sustituidas por el tipo Rohde & Schwarz correspondiente (ver lista de recambios).
7. Las baterías y celdas deben reciclarse y no deben tirarse a la basura doméstica. Las baterías o acumuladores que contienen plomo, mercurio o cadmio deben tratarse como residuos especiales. Respete en esta relación las normas nacionales de eliminación y reciclaje.

Transporte

1. El producto puede tener un peso elevado. Por eso es necesario desplazarlo o transportarlo con precaución y, si es necesario, usando un sistema de elevación adecuado (p. ej. una carretilla elevadora), a fin de evitar lesiones en la espalda u otros daños personales.
2. Las asas instaladas en los productos sirven solamente de ayuda para el transporte del producto por personas. Por eso no está permitido utilizar las asas para la sujeción en o sobre medios de transporte como p. ej. grúas, carretillas elevadoras de horquilla, carros etc. Es responsabilidad suya fijar los productos de manera segura a los medios de transporte o elevación. Para evitar daños personales o daños en el producto, siga las instrucciones de seguridad del fabricante del medio de transporte o elevación utilizado.

Instrucciones de seguridad elementales

3. Si se utiliza el producto dentro de un vehículo, recae de manera exclusiva en el conductor la responsabilidad de conducir el vehículo de manera segura y adecuada. El fabricante no asumirá ninguna responsabilidad por accidentes o colisiones. No utilice nunca el producto dentro de un vehículo en movimiento si esto pudiera distraer al conductor. Asegure el producto dentro del vehículo debidamente para evitar, en caso de un accidente, lesiones u otra clase de daños.

Eliminación/protección del medio ambiente

1. Los dispositivos marcados contienen una batería o un acumulador que no se debe desechar con los residuos domésticos sin clasificar, sino que debe ser recogido por separado. La eliminación se debe efectuar exclusivamente a través de un punto de recogida apropiado o del servicio de atención al cliente de Rohde & Schwarz.
2. Los dispositivos eléctricos usados no se deben desechar con los residuos domésticos sin clasificar, sino que deben ser recogidos por separado.
Rohde & Schwarz GmbH & Co.KG ha elaborado un concepto de eliminación de residuos y asume plenamente los deberes de recogida y eliminación para los fabricantes dentro de la UE. Para desechar el producto de manera respetuosa con el medio ambiente, diríjase a su servicio de atención al cliente de Rohde & Schwarz.
3. Si se trabaja de manera mecánica y/o térmica cualquier producto o componente más allá del funcionamiento previsto, pueden liberarse sustancias peligrosas (p. ej. plomo, berilio o níquel). Por eso el producto solo debe ser desmontado por personal especializado con formación adecuada. Un desmontaje inadecuado puede ocasionar daños para la salud. Se deben tener en cuenta las directivas nacionales referentes a la eliminación de residuos.
4. En caso de que durante el trato del producto se formen sustancias peligrosas o combustibles que deban tratarse como residuos especiales (p. ej. refrigerantes o aceites de motor con intervalos de cambio definidos), deben tenerse en cuenta las indicaciones de seguridad del fabricante de dichas sustancias y las normas regionales de eliminación de residuos. Tenga en cuenta también en caso necesario las indicaciones de seguridad especiales contenidas en la documentación del producto. La eliminación incorrecta de sustancias peligrosas o combustibles puede causar daños a la salud o daños al medio ambiente.

Se puede encontrar más información sobre la protección del medio ambiente en la página web de Rohde & Schwarz.

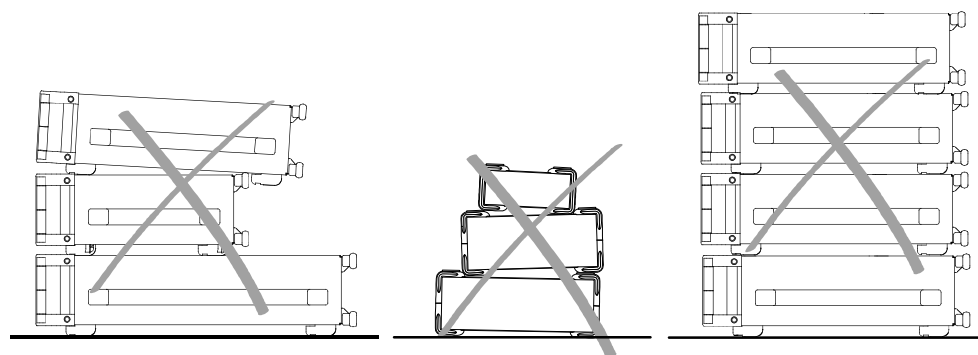
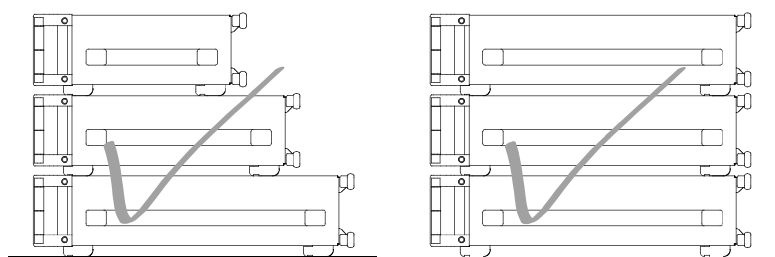
Safety Instructions for Stacking Instruments

⚠ 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

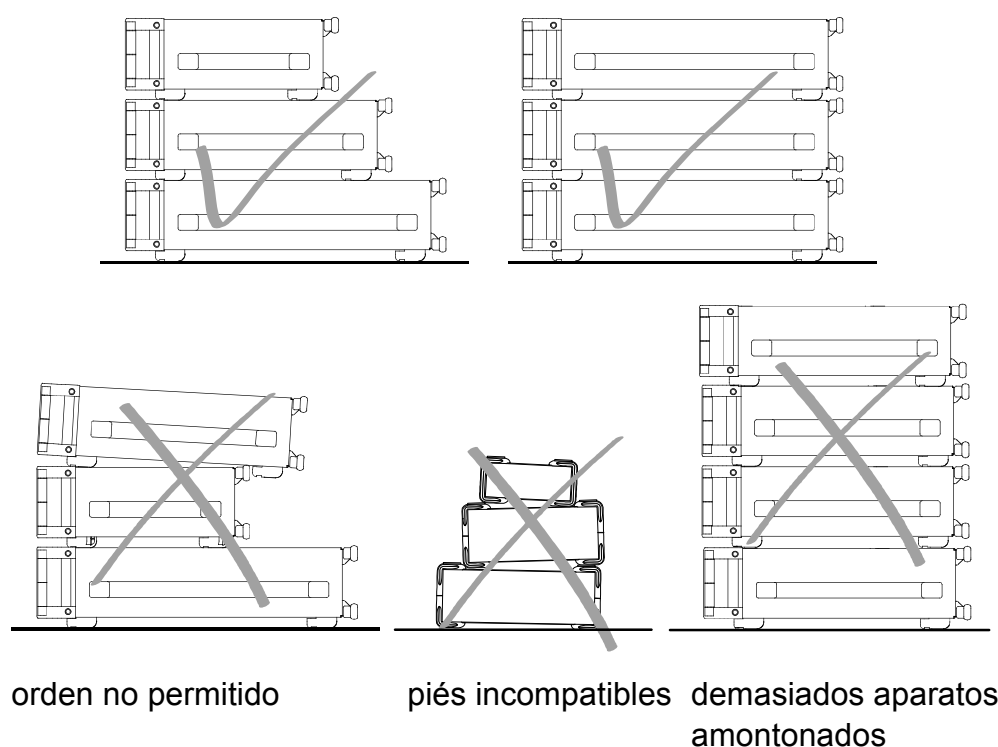
Informaciones de seguridad para el amontonamiento de aparatos

⚠ 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.



Customer Support

Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz equipment, contact one of our Customer Support Centers. A team of highly qualified engineers provides telephone support and will work with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz equipment.

Up-to-date information and upgrades

To keep your instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish. We will take care that you will get the right information.

Europe, Africa, Middle East

Phone +49 89 4129 12345
customersupport@rohde-schwarz.com

North America

Phone 1-888-TEST-RSA (1-888-837-8772)
customer.support@rsa.rohde-schwarz.com

Latin America

Phone +1-410-910-7988
customersupport.la@rohde-schwarz.com

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Phone +65 65 13 04 88
customersupport.asia@rohde-schwarz.com

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Phone +86-800-810-8228 /
+86-400-650-5896
customersupport.china@rohde-schwarz.com



Qualitätszertifikat

Certificate of quality

Certificat de qualité

Certified Quality System
ISO 9001

Certified Environmental System
ISO 14001

Sehr geehrter Kunde,

Sie haben sich für den Kauf eines Rohde&Schwarz-Produktes entschieden. Sie erhalten damit ein nach modernsten Fertigungsmethoden hergestelltes Produkt. Es wurde nach den Regeln unseres Qualitätsmanagementsystems entwickelt, gefertigt und geprüft. Das Rohde&Schwarz-Qualitätsmanagementsystem ist unter anderem nach ISO9001 und ISO14001 zertifiziert.

Der Umwelt verpflichtet

- Energie-effiziente, RoHS-konforme Produkte
- Kontinuierliche Weiterentwicklung nachhaltiger Umweltkonzepte
- ISO14001-zertifiziertes Umweltmanagementsystem

Dear customer,

You have decided to buy a Rohde&Schwarz product. You are thus assured of receiving a product that is manufactured using the most modern methods available. This product was developed, manufactured and tested in compliance with our quality management system standards. The Rohde&Schwarz quality management system is certified according to standards such as ISO9001 and ISO14001.

Environmental commitment

- Energy-efficient products
- Continuous improvement in environmental sustainability
- ISO14001-certified environmental management system

Cher client,

Vous avez choisi d'acheter un produit Rohde&Schwarz. Vous disposez donc d'un produit fabriqué d'après les méthodes les plus avancées. Le développement, la fabrication et les tests respectent nos normes de gestion qualité. Le système de gestion qualité de Rohde&Schwarz a été homologué, entre autres, conformément aux normes ISO9001 et ISO14001.

Engagement écologique

- Produits à efficience énergétique
- Amélioration continue de la durabilité environnementale
- Système de gestion de l'environnement certifié selon ISO14001





ROHDE & SCHWARZ

CE Declaration of Conformity



Certificate No.: 2012-26

This is to certify that:

| Equipment type | Stock No. | Designation |
|----------------|--------------|--------------|
| VTS | 2115.7100.02 | Video Tester |
| VT-B2350 | 2115.7622.06 | MHL RX/TX |

complies with the provisions of the Directive of the Council of the European Union on the approximation of the laws of the Member States

- relating to electrical equipment for use within defined voltage limits (2006/95/EC)
- relating to electromagnetic compatibility (2004/108/EC)

Conformity is proven by compliance with the following standards:

EN 61010-1: 2010
EN 61326-1: 2006
EN 61326-2-1: 2006
EN 55011: 2007 + A2: 2007
EN 61000-3-2: 2006 +A1:2009 +A2:2009
EN 61000-3-3: 2008 / EN 61000-3-3:1995 + A1:2001 + A2:2005

For the assessment of electromagnetic compatibility, the limits of radio interference for Class B equipment as well as the immunity to interference for operation in industry have been used as a basis.

Vorlage: CE_BESCH_B_3573703805.DOT 3573.7038.05. / Äi 01.00

ROHDE & SCHWARZ GmbH & Co. KG
Mühldorfstr. 15, D-81671 München

Munich, 2012-05-30

Central Quality Management GF-QP / Radde

CE

E-1

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1 Preface

This chapter gives an overview of the user documentation and the conventions used in the documentation.

1.1 Documentation Overview

Getting started

This manual is delivered with the instrument in printed form. It is an excerpt from the user manual (see below) and provides the information needed to set up the R&S VTS and start working with it. Also a sample application is described. For instructions on installation, refer to 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 delivered with the instrument on CD-ROM. It provides the necessary information to work with the instrument. For additional information on default settings and parameters, refer to the data sheet.

Help

The help is context-sensitive and provides a quick access to the complete description. To avoid crowding the screen, the screenshots are omitted.

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

1.2 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. |

| Convention | Description |
|-----------------------|---|
| 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 VTS, several alternative methods may be available to perform the same task.

The following table gives an overview how the terms for different operating methods are related.

For more information on operation refer to the user manual, chapter "Operating Concepts".

Table 1-1: Terms used in the documentation

| Term used in documentation | Control in focus | Used method and its common term | |
|----------------------------|---|---------------------------------|------------------------------|
| | | Mouse pointer in the display | Keyboard |
| To click | Icon, button | To click | To press |
| To double-click | Directory, file | To double-click | To focus and press ENTER key |
| To select | Menu, command, tab, list entry, parameter value | To click | To focus and press ENTER key |
| To activate/deactivate | Option | To click | To focus and press ENTER key |
| To scroll | Scroll bar (vertical or horizontal) | To scroll | To press PGUP or PGDN key |
| To drag & drop | Graphical elements, files | To drag & drop | - |

2 Setting Up the R&S VTS

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 R&S VTS

The R&S VTS 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, "Unpacking the R&S VTS"](#), on page 7) and 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 R&S VTS out of the packaging.
4. Remove the shock protectors attached to the R&S VTS.



Retain the original packing material. If the R&S VTS needs to be transported or shipped at a later date, you can use the material to prevent control elements and connectors from being damaged. Rohde & Schwarz will only accept claims of warranty if the R&S VTS is shipped with sufficient packaging.

2.1.3 Checking the Accessories

The R&S VTS comes with the following accessories:

- Power cable
- Getting started manual
- CD-ROM containing the complete user documentation and firmware

2.1.4 Warranty Conditions

For information on warranty conditions for the R&S VTS refer to the terms of the delivery documents.

2.2 Putting Up the R&S VTS

The R&S VTS is designed for interior use only. The R&S VTS 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 may cause damage to the R&S VTS 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 R&S VTS on a Bench Top

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

⚠ WARNING**Risk of injuries**

If the R&S VTS is not set up securely, you or others can be injured.

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

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

2.2.2 Mounting the R&S VTS in a Rack

The R&S VTS may 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

In this manual, the front and rear panel of the base unit are described. In the user manual, this chapter also includes the description of the modules that you can optionally install.

For information on permissible input and output levels, see the data sheet.



When using the interfaces and connectors, take care to avoid electromagnetic interference. For details see [chapter 4.1, "Preventing Electromagnetic Interference"](#), on page 15.

3.1 Front Panel

This chapter provides an overview of the controls and connectors on the front panel. Each control or connector is briefly described along with a reference to the chapter(s) containing detailed information about its usage.



Fig. 3-1: Front panel view

- 1 = Headphones
- 2 = Reference frequency input
- 3 = Status LEDs
- 4 = Module (example)

3.1.1 Status LEDs

See (3) in [figure 3-1](#).

The basic state is indicated by LEDs.

POWER ON

Displays the power supply status.

- LED off: No power is supplied. R&S VTS is switched off.
- LED green: Power is supplied.

REMOTE

Displays the remote control status.

- LED off: R&S VTS is not used for remote control.
- LED green: R&S VTS is connected to the LAN host.

STATUS

Displays the error status.

- LED green: no warning or error is present.
- LED yellow: a warning is present, but no error.
- LED red: an error is present.

3.1.2 Headphones

See (1) in [figure 3-1](#).

CAUTION

Risk of injuries

Check the volume setting carefully before putting on the headphones in order to protect your hearing.

The jack socket for the L/R analog audio output provides the Windows system sound. The socket is intended for connecting headphones or an active loudspeaker.

3.1.3 10 MHz REF IN

See (2) in [figure 3-1](#).

BNC connector. Used to input the reference frequency.

For further details see user manual or the help system.

3.2 Rear Panel

This chapter provides an overview of the controls and connectors on the rear panel. Each control or connector is briefly described along with a reference to the chapter(s) containing detailed information about its usage.



Fig. 3-2: Rear panel view

- 1 = AC power supply connector and switch
- 2 = Port to connect a monitor
- 3 = LAN interface
- 4 = USB interfaces type A

3.2.1 AC Power Supply Connector and Switch

See (1) in [figure 3-2](#).

The IEC 320 / EN 60320 AC power supply connector and the AC power switch are combined (type C14).

The AC power switch is located on the right of the AC power connector.

Switch positions:

- I: The R&S VTS is in operation.
- O: The entire instrument is disconnected from the AC power supply.

For further information:

- See [chapter 4.2, "Connecting to the AC Power Supply"](#), on page 15
- See [chapter 5, "Switching On or Off the R&S VTS"](#), on page 17

3.2.2 DVI-D Port

See (2) in [figure 3-2](#).

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



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

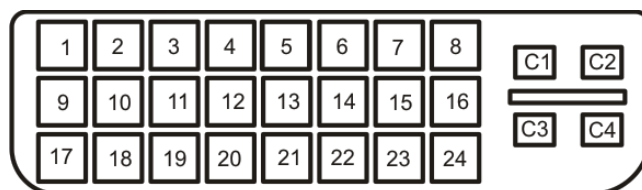


Table 3-1: Pin assignment

| 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 |
| 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 |

3.2.3 1000 BASE-T

See (3) in [figure 3-2](#).

1 Gigabit LAN interface (1000 Base-T). Used to connect the R&S VTS to a local network for remote control, remote operation, printouts and data transfer. The assignment of the RJ.45 CAT5 connector supports twisted pair category 7 UTP/STP cables in a star configuration (UTP stands for "unshielded twisted pair", and STP for "shielded twisted pair").



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.

For further information:

- See [chapter 6, "Operating the R&S VTS in a LAN"](#), on page 20
- See user manual or the help system for remote control using the Ethernet.

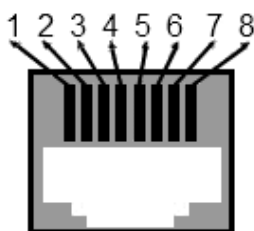


Table 3-2: Pin assignment

| Pin | Name | Description |
|------|--------|--------------------------|
| 1 | TX+_D1 | Transmit data, positive |
| 2 | TX-_D1 | Transmit data, negative |
| 3 | RX+_D2 | Receive data, positive |
| 4 | BI+_D3 | Bi-directional, positive |
| 5 | BI-_D3 | Bi-directional, negative |
| 6 | RX-_D2 | Receive data |
| 7 | BI+_D4 | Bi-directional, positive |
| 8 | BI-_D4 | Bi-directional, negative |
| Case | GND | Ground |

3.2.4 USB Interfaces

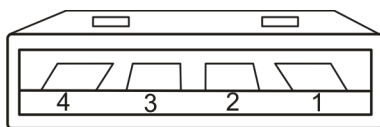
See (4) in [figure 3-2](#).

USB 2.0 (universal serial bus) interfaces of the type A (host USB) are provided. Use the interfaces to connect external devices like a keyboard, mouse, printer, memory stick ([chapter 4.3, "Connecting External USB Devices"](#), on page 16), or to perform a firmware update.



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 in length.
- Use only USB devices that remain within the permissible EMI limits.

**Table 3-3: Pin assignment**

| Pin | Abbreviation | Signal |
|-----|--------------|----------------------|
| 1 | PWR | + 5 V / + 0.5 A max! |
| 2 | D- | Data - |
| 3 | D+ | Data + |
| 4 | GND SHIELD | Ground |

4 Connecting the R&S VTS

This chapter describes how to connect the R&S VTS to the power supply and external devices.

Further information:

- [chapter 6.1, "Connecting the R&S VTS to a Network"](#), on page 20
- [chapter 6.2, "Connecting the R&S VTS to a Computer"](#), on page 21

4.1 Preventing Electromagnetic Interference

To prevent electromagnetic interference, the R&S VTS must be operated with all shielding covers fitted. Only suitable and shielded signal and control cables may be used.

USB interfaces

To connect the USB interfaces, only use peripheral equipment that does not cause limit violations. For details on the interface see [chapter 3.2.4, "USB Interfaces"](#), on page 14.

DVI-D

To connect the DVI-D interface, use a cable shielded with ferrite cores. All other cables can be single shielded. The AC cable is unshielded. For details on the interface see [chapter 3.2.2, "DVI-D Port"](#), on page 12.

LAN interface (1000 BASE-T)

To connect the LAN interface (1000 BASE-T), use a suitable cable. For details on the interface see [chapter 3.2.3, "1000 BASE-T"](#), on page 13.

4.2 Connecting to the AC Power Supply

The R&S VTS can be used with different AC power voltages and adapts itself automatically to it. Adjusting the R&S VTS to a particular AC supply voltage is therefore not required. Refer to 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.

Take care that the AC voltage lies within the limits printed on the AC power connector of the R&S VTS and listed in the data sheet.

- ▶ Connect the R&S VTS to the AC power supply, using the power cable that is supplied. The AC power connector is located on the rear panel of the R&S VTS. The R&S VTS complies with safety class EN61010-1. The R&S VTS's power supply must be connected to a socket with protective conductor.

For further information see [chapter 3.2.1, "AC Power Supply Connector and Switch"](#), on page 12.

4.3 Connecting External USB Devices

Using the USB interfaces, you can directly connect USB devices to the R&S VTS. 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.

- Memory stick for easy transfer of data to/from a computer (e.g. firmware updates). See [chapter 4.3.1, "Memory Stick"](#), on page 16.
- CD-ROM drives for easy installation of firmware applications.
- Printer for printing out measurement results.

To install a USB device

1. Connect the USB device to the R&S VTS. You can do this during operation because all USB devices are Plug and Play.
Windows 7 automatically searches for a suitable device driver.
2. If Windows 7 does not find a suitable driver, it will prompt 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 VTS before proceeding.

To uninstall a USB device

- ▶ Disconnect the USB device from the R&S VTS. You can do this during operation. Windows 7 immediately detects the change in the hardware configuration and deactivates the corresponding driver.

4.3.1 Memory Stick

The R&S VTS has a disk drive. You can exchange data by using a memory stick which you plug into one of the USB interfaces. The memory stick is automatically assigned a free drive letter and you can use Windows Explorer to transfer data.

5 Switching On or Off the R&S VTS

⚠ 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 R&S VTS

NOTICE

Risk of instrument damage

Before switching on the R&S VTS, make sure that the following conditions are met:

- The R&S VTS is set up as described in [chapter 2, "Setting Up the R&S VTS"](#), on page 7.
- Signal levels at the input connectors are all within the specified ranges.
- Signal outputs are correctly connected and are not overloaded. In particular, do not exceed the maximum permissible reverse power allowed at the RF output.

The values are specified in the data sheet. Failure to meet these conditions may cause damage to the R&S VTS or other devices in the test setup.

To switch on the R&S VTS

1. Make sure that the R&S VTS is connected to a power supply (for details see [chapter 4.2, "Connecting to the AC Power Supply"](#), on page 15).
2. Press the AC power switch on the rear panel into I position (for details see [chapter 3.2.1, "AC Power Supply Connector and Switch"](#), on page 12).

The R&S VTS starts booting:

- The installed BIOS version and some of the computer features are displayed on the screen for a few seconds.
- The Windows 7 operating system is booted, followed by the R&S VTS firmware.
- A self-test is performed.

After booting is completed, the main screen of the R&S VTS is displayed, and the R&S VTS is ready for operation.

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

Use the "File" dialog to load another instrument setting. For details see the user manual or the help system.

5.2 Switching Off the R&S VTS

NOTICE

Risk of losing data

If you set the power switch to the O position before the R&S VTS settings have been saved, the current settings will be lost.


To switch off the R&S VTS

1. Check the status displays on the front panel of the R&S VTS. If the REMOTE status display on the front panel is on, do not switch off the R&S VTS. Someone else is using the R&S VTS by means of remote control (see also [chapter 3.1.1, "Status LEDs"](#), on page 10).
2. Set the AC switch on the rear panel of the R&S VTS to the O position.
None of the LEDs on the front panel should be lit.

5.3 Checking the Provided Options

The R&S VTS may be equipped with options. In order to check whether the installed options correspond to the options indicated on the delivery note, proceed as follows.

Connect an external monitor or use remote operation (for details see user manual).

1. In the toolbar, tap .
2. Select the "SW/HW Equipment" tab.
3. Under "Hardware Configuration", check the availability of the hardware options as indicated in the delivery note.
4. Under "Installed Software", check the availability of the software options as indicated in the delivery note.

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

For an overview of the all options available for the R&S VTS refer to the Rohde & Schwarz Homepage.

5.4 Turn-On Tests

During power-on and on an ongoing basis during operation, the R&S VTS automatically monitors the main instrument functions. If an error is detected, a message is displayed. Read the description of the error or warning carefully.

Besides automatic monitoring of instrument functions, the R&S VTS also offers the following way of ensuring proper operation.

6 Operating the R&S VTS in a LAN

The R&S VTS is equipped with a network interface and can be connected to an Ethernet LAN (local area network). The network card operates with 1000 Mbit Ethernet IEEE 802.3ab. 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.

Provided the appropriate rights have been assigned and the Windows 7 firewall configuration is adapted accordingly, the interface can be used e.g. for transferring data, printing on network printers, operating/controlling the R&S VTS from a remote computer.

To use network resources, access must be granted. To share files on the R&S VTS 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 refer to the Windows 7 documentation). Contact your network administrator for access authorizations.

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

For further information:

- See [chapter 7.1.1, "Login"](#), on page 25
- See [chapter 3.2.3, "1000 BASE-T"](#), on page 13
- See the user manual or help system for details on remote operation and remote control.

6.1 Connecting the R&S VTS to a Network

NOTICE

Risk of network failure/virus infection

Before connecting the R&S VTS to a network or configuring a 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 VTS to the LAN.

Errors may affect the entire network.

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

To connect the R&S VTS to a network

1. Fulfill all prerequisites mentioned above.
2. Make sure that the R&S VTS is switched off. This is the only way to ensure that the network connection is reliably detected and any disruptions during the operation of the R&S VTS are avoided.
3. Connect the R&S VTS to the network using a CAT-5e cable or better.
4. Switch on the R&S VTS.

To disconnect the R&S VTS from a network

1. Make sure that the R&S VTS is switched off.
2. Disconnect the R&S VTS from the network.

6.2 Connecting the R&S VTS to a Computer

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

6.2.1 Windows 7 Operating System

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

1. Activate DHCP on both the computer and the R&S VTS.
2. Connect the computer and the R&S VTS with a standard RJ.45 cross-over cable (LAN cable).

After approx. 16 seconds, the connection is established.

3. To address the R&S VTS, use the computer name.

Further information:

- [" Querying the computer name using the firmware"](#) on page 22

6.2.2 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 VTS and the computer.
The IP addresses *192.168.xxx.yyy* are available for use here. *xxx* and *yyy* can assume values of *1* to *254*. The value for the subnet mask is *255.255.255.0*.

2. Connect the R&S VTS and the computer with a standard RJ.45 cross-over cable (LAN cable).
3. To address the R&S VTS, use the assigned IP address.

6.3 Zero Configuration Networking

The R&S mDNS service is installed with the firmware. Using this service, you can connect to a network automatically. You do not need to set up services, such as dynamic host configuration protocol (DHCP) and domain name system (DNS), or configure the network settings manually (see [chapter 6.4, "Configuring the Network Card"](#), on page 22).

6.4 Configuring the Network Card

Under Windows 7, network card drivers do not need to be installed separately. If the R&S VTS 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. They are performed in the "Setup" dialog.

For detailed information see the user manual or the help system.



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

If you use the R&S mDNS Service, you do not need to configure at all. For details see [chapter 6.3, "Zero Configuration Networking"](#), on page 22.

Networks with DHCP Server


The R&S VTS is preconfigured for networks using the dynamic host configuration protocol (DHCP). In such networks, the instrument 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 firmware or the Windows 7 Start menu (for details refer to the Windows 7 documentation).

Querying the computer name using the firmware

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


1. If the R&S VTS has a default computer name, the computer name is displayed as part of the window title of the application.
2. If no default computer name is displayed, do the following.
 - a) Tap .

- b) On the "System" tab, under "LAN services", select the "Host name" field.
3. Read out the name.

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 firmware or the Windows 7 Start menu (for details refer to the Windows 7 documentation).

Entering the IP address using the firmware

1. Tap .
2. On the "System" tab, under "LAN services", select the "IP addresses" field.
3. Enter the IP address.

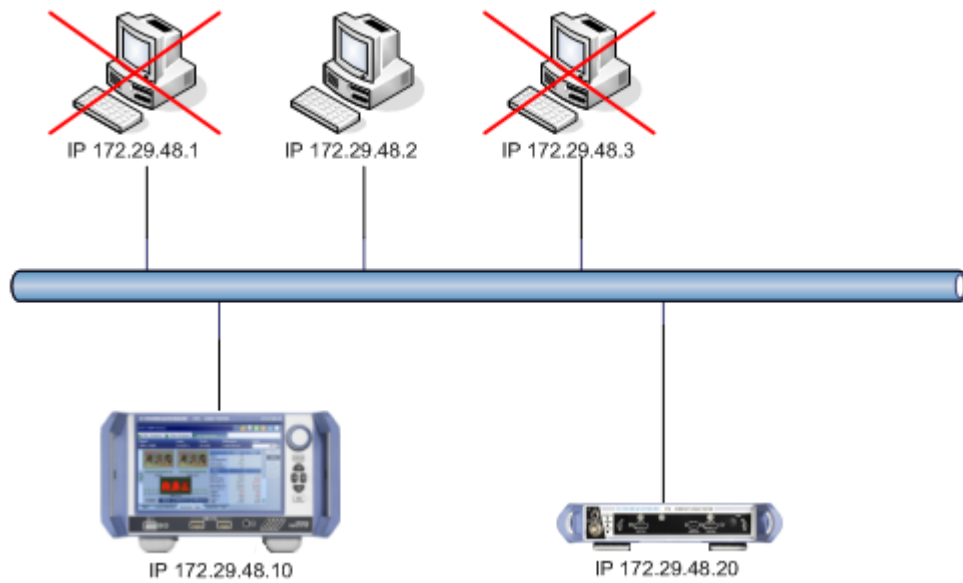
6.5 Firewall Settings

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

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

Restricting the LAN access

If you want to prevent other computers from remotely configuring your R&S VTS, you have to adjust the firewall settings. In the following example, only the host with IP address 172.29.48.2 is allowed to control the R&S VTS.



1. In the toolbar, tap the windows icon to open the "Start" menu.
2. Select "Control Panel" and then "Windows Firewall".
3. Select the "Exceptions" tab.
4. Select "R&S Compass Platform" and tap "Edit".
5. Tap "Change scope".
6. Change from "Any computer" to "Custom list".
7. Enter the IP address of the host that is exclusively granted the right to remote control this instrument. In our example, enter the IP address *172.29.48.2*.
8. Tap "OK" to finish your settings.

The "Windows Firewall" dialog is closed. The new settings are working immediately without restarting the operating system.



These settings will not prevent other users from controlling the R&S VTS via Remote Desktop!

7 Installed Software

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

For further information:

- Performing a firmware update: see the release notes.
- Installing software options: see the installation instructions for options.

7.1 Operating System

The R&S VTS is equipped with the Windows 7 Embedded operating system in the 32-bit version. When the R&S VTS 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.

7.1.1 Login

Windows 7 requires that you identify yourself by entering a user name and password in a login window. The R&S VTS 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 VTS 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.

7.1.2 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 refer to the Windows 7 documentation.



► To open the "Start" menu, tap the windows icon.

7.2 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.

7.3 Backup and Restore Application

Using the backup and restore application, you can backup the instrument installations and their configuration so that they can be restored if required. 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 backup the current system partition prior to a firmware update or provide different system configurations for different environments.

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



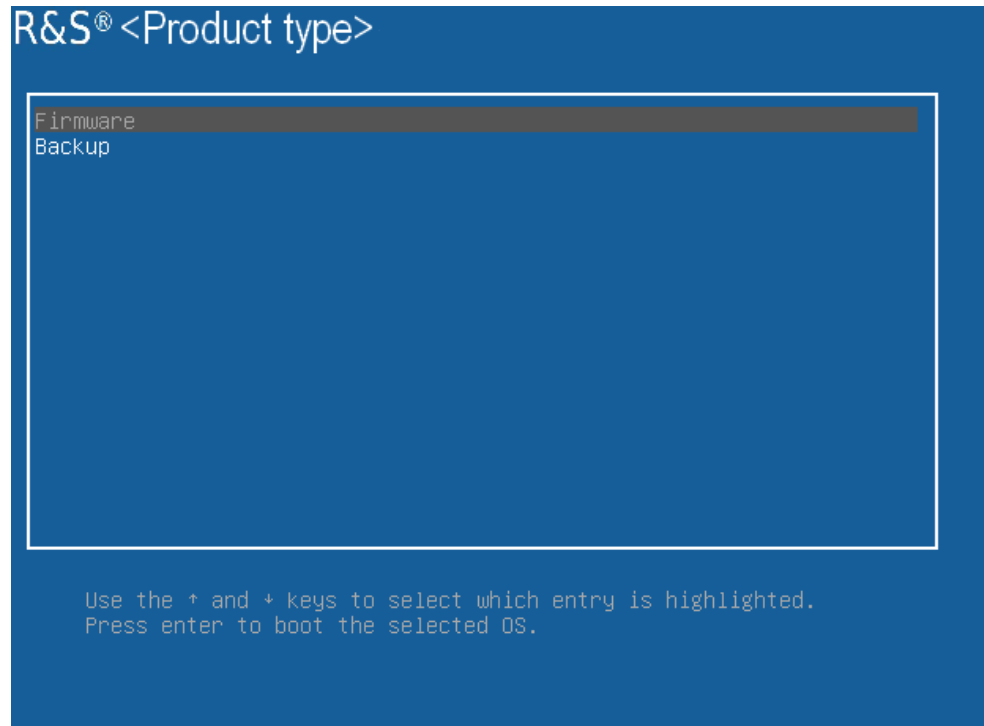
For the following step-by-step instructions, the usage of an external USB keyboard is recommended.

To display the main dialog for backup and recovery

1. Restart the R&S VTS.

The boot screen is displayed. By default, "Firmware" 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.

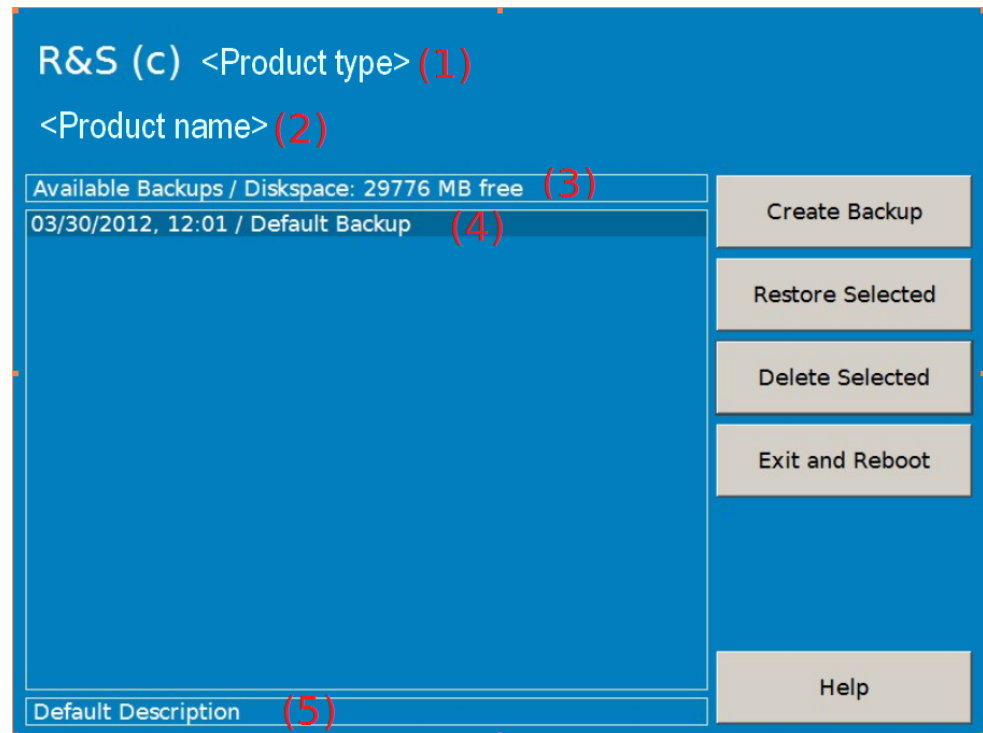


Fig. 7-1: Backup and recovery main dialog (example)

- (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:

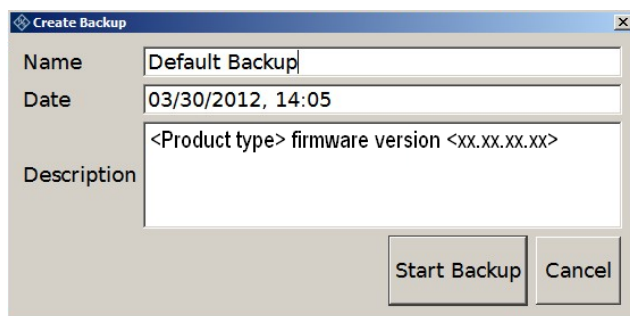
- See [chapter 7.3.1, "Creating a Backup"](#), on page 28
- See [chapter 7.3.2, "Restoring a Selected Backup Version"](#), on page 29
- See [chapter 7.3.3, "Deleting a Backup"](#), on page 29

7.3.1 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 7-1](#)), click "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 required, you can add information to the description.
3. Click "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, click "Exit and Reboot".

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

7.3.2 Restoring a Selected Backup Version

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

1. In the main dialog (see [figure 7-1](#)), select the backup you want to restore.
2. Click "Restore Selected".
3. In the "Restore Selected" dialog, click "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 VTS is restarted.

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

7.3.3 Deleting a Backup

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

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

1. In the main dialog (see [figure 7-1](#)), select the backup you want to delete.
2. Click "Delete Selected".
3. In the "Delete Selected" dialog, click "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, click "Exit and Reboot", or continue with [chapter 7.3.1, "Creating a Backup"](#), on page 28.

8 Maintenance

The R&S VTS does not need a periodic maintenance unless it is operated in dusty areas.

NOTICE

Risk of instrument damage

If the R&S VTS is operated in dusty areas, the fans may become obstructed by dust or other particles in the process of time. Make sure to check and, if necessary, clean the fans regularly to ensure they operate properly at all times. If the R&S VTS is run with obstructed fans for a longer period, it may become overheated which may cause damage.

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.

8.1 Cleaning the Instrument

WARNING

Shock hazard

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

1. Clean the outside of the R&S VTS using a soft, lint-free dust cloth.
2. Make sure that vents are not obstructed.

NOTICE

Instrument damage caused by cleaning agents

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

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

8.2 Storing the Instrument

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

Repack the R&S VTS 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 VTS from slipping inside the package. Wrap antistatic packing foil around the R&S VTS to protect it from electrostatic charging.

Index

Symbols

| | |
|-------------------------------|----|
| 10 MHz REF IN connector | 11 |
| 1000 BASE-T connector | 13 |

A

| | |
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