



Quick Start Guide

R&S[®] DVSG DIGITAL VIDEO SIGNAL GENERATOR

The Quick Start Guide the following models and options of the DIGITAL VIDEO SIGNAL GENERATOR:

◆ R&S®DVSG 2113.0008.02

The firmware of the instrument makes use of several valuable open source software packages. The most important of them are listed below, together with their corresponding open source license. The verbatim license texts are provided in the release notes.

Package	Link	License
OpenSSL	http://www.openssl.org	OpenSSL/SSLeay
ResizableLib	http://www.geocities.com/ppescher	Artistic License
BOOST Library	http://www.boost.org	Boost Software, v.1
zlib	http://www.zlib.net	zlib, v.1.2.3
Xalan Xerces	http://xalan.apache.org/ http://xerces.apache.org/	Apache, Ver.2
ONC/RPC	http://www.plt.rwth-aachen.de	SUN
VNC	http://www.realvnc.com/	GPL V3

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®DVSG is abbreviated as R&S DVSG.

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Grouped Safety Messages









Make sure to read through and observe the following safety instructions!







All plants and locations of the Rohde & Schwarz group of companies make every effort to keep the safety standard of our products up to date and to offer our customers the highest possible degree of safety. Our products and the auxiliary equipment required for them are designed and tested in accordance with the relevant safety standards. Compliance with these standards is continuously monitored by our quality assurance system. The product described here has been designed and tested in accordance with the 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, 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 an intention 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 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.

Symbols and safety labels

							
Observe product documentation	Weight indication for units >18 kg	Danger of electric shock	Warning! Hot surface	PE terminal	Ground	Ground terminal	Attention! Electrostatic sensitive devices

					
Supply voltage ON/OFF	Standby indication	Direct current (DC)	Alternating current (AC)	Direct/alternating current (DC/AC)	Device fully protected by double/reinforced insulation

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 putting the product into operation. It is also absolutely essential to observe the additional safety instructions on personal safety 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.

Tags and their meaning

DANGER	DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	NOTICE indicates a property damage message. In the product documentation, the word ATTENTION is used synonymously.

These tags 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 tags described here are always used only in connection with the related product documentation and the related product. The use of tags in connection with unrelated products or documentation can result in misinterpretation and thus contribute to personal injury or material damage.

Basic safety instructions

1. The product may be operated only under the operating conditions and in the positions specified by the manufacturer. Its ventilation must not be obstructed during operation. Unless otherwise specified, the following requirements apply to Rohde & Schwarz products: prescribed operating position is always with the housing floor facing down, IP protection 2X, pollution severity 2, overvoltage category 2, use only in enclosed spaces, max. operation 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 of $\pm 5\%$ to the nominal frequency.
2. Applicable local or national safety regulations and rules for the prevention of accidents must be observed in all work performed. The product may be opened only by authorized, specially trained personnel. Prior to performing any work on the product or opening the product, the product must be disconnected from the supply network. Any adjustments, replacements of parts, maintenance or repair must be carried out only by technical personnel 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, PE conductor test, insulation resistance measurement, leakage current measurement, functional test).

Grouped Safety Messages

3. As with all industrially manufactured goods, the use of substances that induce an allergic reaction (allergens, e.g. nickel) such as aluminum cannot be generally excluded. If you develop an allergic reaction (such as a skin rash, frequent sneezing, red eyes or respiratory difficulties), consult a physician immediately to determine the cause.
4. If products/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, e.g. for disposal purposes, by specially trained personnel. Improper disassembly may be hazardous to your health. National waste disposal regulations must be observed.
5. If handling the product yields 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.
6. Depending on the function, certain products such as RF radio equipment can produce an elevated level of electromagnetic radiation. Considering that unborn life requires increased protection, pregnant women should be protected by appropriate measures. Persons with pacemakers may also be endangered by electromagnetic radiation. The employer/operator is required to assess workplaces where there is a special risk of exposure to radiation and, if necessary, take measures to avert the danger.
7. Operating the products requires special training and intense concentration. Make certain that persons who use the products are physically, mentally and emotionally fit enough to handle operating the products; otherwise injuries or material damage may occur. It is the responsibility of the employer to select suitable personnel for operating the products.
8. Prior to switching on the product, it must be ensured 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.
9. In the case of products of safety class I with movable power cord and connector, operation is permitted only on sockets with earthing contact and protective earth connection.
10. Intentionally breaking the protective earth connection 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.
11. If the product has no power switch for disconnection from the AC supply, the plug of the connecting cable is regarded as the disconnecting device. In such cases, it must be ensured that the power plug is easily reachable and accessible at all times (corresponding to the length of connecting cable, approx. 2 m). Functional or electronic switches are not suitable for providing disconnection from the AC supply. If products without power switches are integrated in racks or systems, a disconnecting device must be provided at the system level.

Grouped Safety Messages

12. Never use the product if the power cable is damaged. Check the power cable on a regular basis to ensure that it is 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 e.g. tripping over the cable or suffering an electric shock.
13. The product may be operated only from TN/TT supply networks fused with max. 16 A (higher fuse only after consulting with the Rohde & Schwarz group of companies).
14. Do not insert the plug into sockets that are dusty or dirty. Insert the plug firmly and all the way into the socket. Otherwise, this can result in sparks, fire and/or injuries.
15. Do not overload any sockets, extension cords or connector strips; doing so can cause fire or electric shocks.
16. For measurements in circuits with voltages $V_{\text{rms}} > 30 \text{ V}$, suitable measures (e.g. appropriate measuring equipment, fusing, current limiting, electrical separation, insulation) should be taken to avoid any hazards.
17. Ensure that the connections with information technology equipment comply with IEC 950/EN 60950.
18. 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.
19. If a product is to be permanently installed, the connection between the PE terminal on site and the product's PE conductor must be made first before any other connection is made. The product may be installed and connected only by a license electrician.
20. For permanently installed equipment without built-in fuses, circuit breakers or similar protective devices, the supply circuit must be fused in such a way that suitable protection is provided for users and products.
21. Do not insert any objects into the openings in the housing that are not designed for this purpose. Never pour any liquids onto or into the housing. This can cause short circuits inside the product and/or electric shocks, fire or injuries.
22. Use suitable overvoltage protection to ensure that no overvoltage (such as that caused by a thunderstorm) can reach the product. Otherwise the operating personnel will be endangered by electric shocks.
23. Rohde & Schwarz products are not protected against penetration of liquids, unless otherwise specified (see also safety instruction 1.). If this is not taken into account, there exists the danger of electric shock for the user or damage to the product, which can also lead to personal injury.
24. Never use the product under conditions in which condensation has formed or can form in or on the product, e.g. if the product was moved from a cold to a warm environment.
25. Do not close any slots or openings on the product, since they are necessary for ventilation and prevent the product from overheating. Do not place the product on soft surfaces such as sofas or rugs or inside a closed housing, unless this is well ventilated.
26. Do not place the product on heat-generating devices such as radiators or fan heaters. The temperature of the environment must not exceed the maximum temperature specified in the data sheet.
27. Batteries and storage batteries must not be exposed to high temperatures or fire. Keep batteries and storage batteries away from children. Do not short-circuit batteries and storage batteries. If batteries or storage batteries are improperly replaced, this can cause an explosion (warning: lithium cells).

Grouped Safety Messages

- Replace the battery or storage battery only with the matching Rohde & Schwarz type (see spare parts list). Batteries and storage batteries must be recycled and kept separate from residual waste. Batteries and storage batteries that contain lead, mercury or cadmium are hazardous waste. Observe the national regulations regarding waste disposal and recycling.
28. Please be aware that in the event of a fire, toxic substances (gases, liquids etc.) that may be hazardous to your health may escape from the product.
 29. The product can be very heavy. Be careful when moving it to avoid back or other physical injuries.
 30. 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).
 31. Handles on the products are designed exclusively for personnel to hold or carry the product. It is therefore not permissible to use handles for fastening the product to or on means of transport such as cranes, fork lifts, wagons, etc. The user is responsible for securely fastening the products to or on the means of transport and for observing the safety regulations of the manufacturer of the means of transport. Noncompliance can result in personal injury or material damage.
 32. If you use the product in a vehicle, it is the sole responsibility of the driver to drive the vehicle safely. Adequately secure the product in the vehicle to prevent injuries or other damage in the event of an accident. Never use the product in a moving vehicle if doing so could distract the driver of the vehicle. The driver is always responsible for the safety of the vehicle. The manufacturer assumes no responsibility for accidents or collisions.
 33. If a laser product (e.g. a CD/DVD drive) is integrated in a Rohde & Schwarz product, do not use any other settings or functions than those described in the product documentation. Otherwise this may be hazardous to your health, since the laser beam can cause irreversible damage to your eyes. Never try to take such products apart, and never look into the laser beam.
 34. Prior to cleaning, disconnect the product from the AC supply. Use a soft, non-linting cloth to clean the product. Never use chemical cleaning agents such as alcohol, acetone or diluent for cellulose lacquers.

Informaciones elementales de seguridad

¡Es imprescindible leer y observar 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. Nuestra sección de gestión de la seguridad de calidad controla constantemente que sean cumplidas estas normas. El presente producto ha sido fabricado y examinado según el comprobante de conformidad adjunto según las normas de la CE 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 despreciando las informaciones de seguridad 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.

Se parte del uso correcto del producto para los fines definidos si el producto es utilizado dentro de las instrucciones de la correspondiente documentación de 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 profundos y conocimientos básicas del idioma inglés. Por eso se debe tener en cuenta que el producto sólo pueda ser operado por personal especializado o personas minuciosamente instruidas con las capacidades correspondientes. Si fuera necesaria indumentaria de seguridad para el uso de productos de R&S, encontrará 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 entréguela a usuarios posteriores.

Símbolos y definiciones de seguridad

							
Ver documentación de producto	Informaciones para maquinaria con un peso de > 18kg	Peligro de golpe de corriente	¡Advertencia! Superficie caliente	Conexión a conductor protector	Conexión a tierra	Conexión a masa conductora	¡Cuidado! Elementos de construcción con peligro de carga electroestática

Informaciones elementales de seguridad

					
Potencia EN MARCHA/PARADA	Indicación Stand-by	Corriente continua DC	Corriente alterna AC	Corriente continua/alterna DC/AC	El aparato está protegido en su totalidad por un aislamiento de doble refuerzo

Tener en cuenta las informaciones de seguridad sirve para tratar de evitar daños y peligros de toda clase. Es necesario de que se lean las siguientes informaciones de seguridad concienzudamente y se tengan en cuenta debidamente antes de la puesta en funcionamiento del producto. También deberán ser tenidas en cuenta las informaciones para la protección de personas que encontrarán en el capítulo correspondiente de la documentación de producto y que también son obligatorias de seguir. En las informaciones de seguridad actuales hemos juntado todos los objetos vendidos por el grupo de empresas Rohde & Schwarz bajo la denominación de „producto“, entre ellos también aparatos, instalaciones así como toda clase de accesorios.

Palabras de señal y su significado

PELIGRO	Identifica un peligro directo con riesgo elevado de provocar muerte o lesiones de gravedad si no se toman las medidas oportunas.
ADVERTENCIA	Identifica un posible peligro con riesgo medio de provocar muerte o lesiones (de gravedad) si no se toman las medidas oportunas.
ATENCIÓN	Identifica un peligro con riesgo reducido de provocar lesiones de gravedad media o leve si no se toman las medidas oportunas.
AVISO	Indica la posibilidad de utilizar mal el producto y a 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 de 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 malinterpretaciones y tener por consecuencia daños en personas u objetos.

Informaciones de seguridad elementales

1. El producto solamente debe ser utilizado según lo indicado por el fabricante referente a la situación y posición de funcionamiento sin que se obstruya la ventilación. Si no se convino de otra manera, es para los productos R&S 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, grado de suciedad 2, categoría de sobrecarga eléctrica 2, utilizar solamente en estancias interiores, utilización hasta 2000 m sobre el nivel del mar, transporte hasta 4.500 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.
2. En todos los trabajos deberán ser tenidas en cuenta las normas locales de seguridad de trabajo y de prevención de accidentes. El producto solamente debe de ser abierto por personal especializado autorizado. Antes de efectuar trabajos en el producto o abrirlo deberá este ser desconectado de la corriente. El ajuste, el cambio de partes, la manutención y la reparación deberán ser solamente efectuadas por electricistas autorizados por R&S. Si se reponen partes con importancia para los aspectos de seguridad (por ejemplo el enchufe, los transformadores o los fusibles), solamente podrán ser sustituidos por partes originales. Después de cada recambio de partes elementales para la seguridad deberá ser efectuado un control de seguridad (control a primera vista, control de conductor protector, medición de resistencia de aislamiento, medición de la corriente conductora, control de funcionamiento).
3. Como en todo producto de fabricación industrial no puede ser excluido en general de que se produzcan al usarlo elementos que puedan generar alergias, los llamados elementos alergénicos (por ejemplo el níquel). Si se produjeran en el trato con productos R&S reacciones alérgicas, como por ejemplo urticaria, estornudos frecuentes, irritación de la conjuntiva o dificultades al respirar, se deberá consultar inmediatamente a un médico para averiguar los motivos de estas reacciones.
4. Si productos / elementos de construcción son tratados fuera del funcionamiento definido de forma mecánica o térmica, pueden generarse elementos peligrosos (polvos de sustancia de metales pesados como por ejemplo plomo, berilio, níquel). La partición elemental del producto, como por ejemplo sucede en el tratamiento de materias residuales, debe de ser efectuada solamente por personal especializado para estos tratamientos. La partición elemental efectuada inadecuadamente puede generar daños para la salud. Se deben tener en cuenta las directivas nacionales referentes al tratamiento de materias residuales.
5. En el caso de que se produjeran agentes de peligro o combustibles en la aplicación del producto que debieran de ser transferidos a un tratamiento de materias residuales, como por ejemplo agentes refrigerantes que deben ser repuestos en periodos definidos, o aceites para motores, deberán ser tenidas en cuenta las prescripciones de seguridad del fabricante de estos agentes de peligro o combustibles y las regulaciones regionales para el tratamiento de materias residuales. Cuiden también de tener en cuenta en caso dado las prescripciones de seguridad especiales en la descripción del producto.

6. Ciertos productos, como por ejemplo las instalaciones de radiocomunicación RF, pueden a causa de su función natural, emitir una radiación electromagnética aumentada. En vista a la protección de la vida en desarrollo deberían ser protegidas personas embarazadas debidamente. También las personas con un bypass pueden correr peligro a causa de la radiación electromagnética. El empresario/usuario está comprometido a valorar y señalar áreas de trabajo en las que se corra un riesgo aumentado de exposición a radiaciones para evitar riesgos.
7. La utilización de los productos requiere instrucciones especiales y una alta concentración en el manejo. Debe de ponerse por seguro de que las personas que manejen los productos estén a la altura de los requerimientos necesarios referente a sus aptitudes físicas, psíquicas y emocionales, ya que de otra manera no se pueden excluir lesiones o daños de objetos. El empresario lleva la responsabilidad de seleccionar el personal usuario apto para el manejo de los productos.
8. Antes de la puesta en marcha del producto se deberá tener por seguro de que la tensión preseleccionada en el producto equivalga a la del la red de distribución. Si es necesario cambiar la preselección de la tensión también se deberán en caso dabo cambiar los fusibles correspondientes del producto.
9. Productos de la clase de seguridad I con alimentación móvil y enchufe individual de producto solamente deberán ser conectados para el funcionamiento a tomas de corriente de contacto de seguridad y con conductor protector conectado.
10. Queda prohibida toda clase de interrupción intencionada del conductor protector, tanto en la toma de corriente como en el mismo producto. Puede tener como consecuencia el peligro de golpe de corriente por el producto. Si se utilizaran cables o enchufes de extensión se deberá poner al seguro que es controlado su estado técnico de seguridad.
11. Si el producto no está equipado con un interruptor para desconectarlo de la red, se deberá considerar el enchufe del cable de distribución como interruptor. En estos casos deberá asegurar de que el enchufe sea de fácil acceso y nabejo (según la medida del cable de distribución, aproximadamente 2 m). Los interruptores de función o electrónicos no son aptos para el corte de la red eléctrica. Si los productos sin interruptor están integrados en bastidores o instalaciones, se deberá instalar el interruptor al nivel de la instalación.
12. No utilice nunca el producto si está dañado el cable eléctrico. Compruebe regularmente el correcto estado de los cables de conexión a red. Asegure a través de las medidas de protección y de instalación adecuadas de que el cable de eléctrico no pueda ser dañado o de que nadie pueda ser dañado por él, por ejemplo al tropezar o por un golpe de corriente.
13. Solamente está permitido el funcionamiento en redes de distribución TN/TT aseguradas con fusibles de como máximo 16 A (utilización de fusibles de mayor amperaje sólo previa consulta con el grupo de empresas Rohde & Schwarz).
14. 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. Si no tiene en consideración estas indicaciones se arriesga a que se originen chispas, fuego y/o heridas.
15. No sobrecargue las tomas de corriente, los cables de extensión o los enchufes de extensión ya que esto pudiera causar fuego o golpes de corriente.

16. En las mediciones en circuitos de corriente con una tensión de entrada de $U_{eff} > 30 \text{ V}$ se deberá tomar las precauciones debidas para impedir cualquier peligro (por ejemplo medios de medición adecuados, seguros, limitación de tensión, corte protector, aislamiento etc.).
17. En caso de conexión con aparatos de la técnica informática se deberá tener en cuenta que estos cumplan los requisitos del estándar IEC950/EN60950.
18. 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 heridas, fuego o daños en el producto.
19. Si un producto es instalado fijamente en un lugar, se deberá primero conectar el conductor protector fijo con el conductor protector del aparato antes de hacer cualquier otra conexión. La instalación y la conexión deberán ser efectuadas por un electricista especializado.
20. En caso de que los productos que son instalados fijamente en un lugar sean sin protector implementado, autointerruptor o similares objetos de protección, el circuito de suministro de corriente deberá estar protegido de manera que usuarios y productos estén suficientemente protegidos.
21. Por favor, no introduzca ningún objeto que no esté destinado a ello en los orificios de la caja del aparato. No vierta nunca ninguna clase de líquidos sobre o en la caja. Esto puede producir cortocircuitos en el producto y/o puede causar golpes de corriente, fuego o heridas.
22. Asegúrese con la protección adecuada de que no pueda originarse en el producto una sobrecarga por ejemplo a causa de una tormenta. Si no se verá el personal que lo utilice expuesto al peligro de un golpe de corriente.
23. Los productos R&S no están protegidos contra líquidos si no es que exista otra indicación, ver también punto 1. Si no se tiene en cuenta esto se arriesga el peligro de golpe de corriente para el usuario o de daños en el producto lo cual también puede llevar al peligro de personas.
24. No utilice el producto bajo condiciones en las que pueda producirse y se hayan producido líquidos de condensación en o dentro del producto como por ejemplo cuando se desplaza el producto de un lugar frío a un lugar caliente.
25. Por favor no cierre ninguna ranura u orificio del producto, ya que estas son necesarias para la ventilación e impiden que el producto se caliente demasiado. No pongan el producto encima de materiales blandos como por ejemplo sofás o alfombras o dentro de una caja cerrada, si esta no está suficientemente ventilada.
26. No ponga el producto sobre aparatos que produzcan calor, como por ejemplo radiadores o calentadores. La temperatura ambiental no debe superar la temperatura máxima especificada en la hoja de datos.
27. Baterías y acumuladores no deben de ser expuestos a temperaturas altas o al fuego. Guardar baterías y acumuladores fuera del alcance de los niños. No cortocircuitar baterías ni acumuladores. Si las baterías o los acumuladores no son cambiados con la debida atención existirá peligro de explosión (atención células de litio). Cambiar las baterías o los acumuladores solamente por los del tipo R&S correspondiente (ver lista de piezas de recambio). Las baterías y acumuladores deben reutilizarse y no deben acceder a los vertederos. Las baterías y acumuladores que contienen plomo, mercurio o cadmio deben tratarse como residuos especiales. Respete en esta relación las normas nacionales de evacuación y reciclaje.
28. Por favor tengan en cuenta que en caso de un incendio pueden desprenderse del producto agentes venenosos (gases, líquidos etc.) que pueden generar daños a la salud.

29. El producto puede poseer un peso elevado. Muévelo con cuidado para evitar lesiones en la espalda u otras partes corporales.
30. No sitúe el producto encima de superficies, vehículos, estantes o mesas, que por sus características de peso o de estabilidad no sean aptas para él. Siga siempre las instrucciones de instalación del fabricante cuando instale y asegure el producto en objetos o estructuras (por ejemplo paredes y estantes).
31. Las asas instaladas en los productos sirven solamente de ayuda para el manejo que solamente está previsto para personas. Por eso no está permitido utilizar las asas para la sujeción en o sobre medios de transporte como por ejemplo grúas, carretillas elevadoras de horquilla, carros etc. El usuario es responsable de que los productos sean sujetados de forma segura a los medios de transporte y de que las prescripciones de seguridad del fabricante de los medios de transporte sean observadas. En caso de que no se tengan en cuenta pueden causarse daños en personas y objetos.
32. Si llega a utilizar el producto dentro de un vehículo, queda en la responsabilidad absoluta del conductor que conducir el vehículo de manera segura. Asegure el producto dentro del vehículo debidamente para evitar en caso de un accidente las lesiones u otra clase de daños. No utilice nunca el producto dentro de un vehículo en movimiento si esto pudiera distraer al conductor. Siempre queda en la responsabilidad absoluta del conductor la seguridad del vehículo. El fabricante no asumirá ninguna clase de responsabilidad por accidentes o colisiones.
33. Dado el caso de que esté integrado un producto de láser en un producto R&S (por ejemplo CD/DVD-ROM) no utilice otras instalaciones o funciones que las descritas en la documentación de producto. De otra manera pondrá en peligro su salud, ya que el rayo láser puede dañar irreversiblemente sus ojos. Nunca trate de descomponer estos productos. Nunca mire dentro del rayo láser.
34. Antes de proceder a la limpieza, desconecte el producto de la red. Realice la limpieza con un paño suave, que no se deshilache. No utilice de ninguna manera agentes limpiadores químicos como, por ejemplo, alcohol, acetona o nitrodiluyente.

Safety Instructions for Instruments with Fold-Out Feet

⚠ WARNING

Danger of injury

The feet may fold in if they are not folded out completely or if the instrument is shifted. The feet may break if they are overloaded.

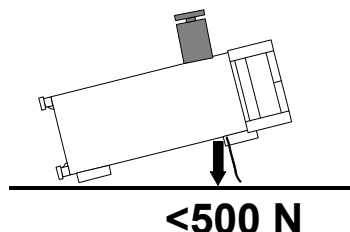
Fold the feet completely in or completely out to ensure stability of the instrument and personal safety.

To avoid injuries, never shift the instrument when its feet are folded out.

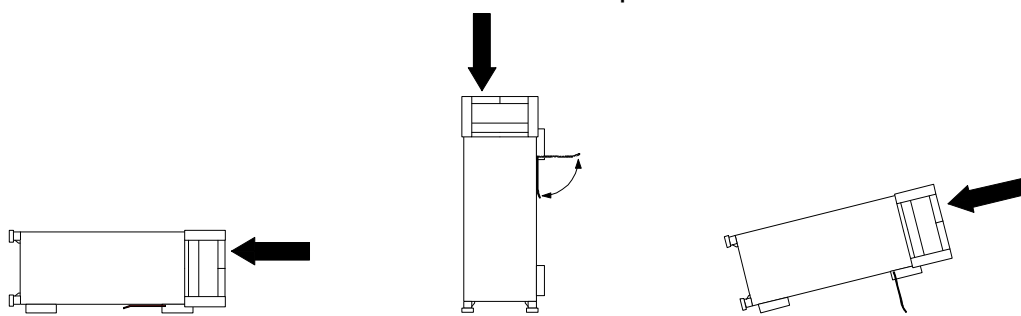
The overall load (the instrument's own weight plus that of the instruments stacked on top of it) on the folded-out feet must not exceed 500 N.

Place the instrument on a stable surface. Secure the instruments stacked on top of it against slipping (e.g. by locking their feet on the top front frame).

When the instrument is standing on its folded-out feet, do not work under the instrument and do not put anything under it, otherwise injuries or material damage could occur.



The instrument can be used in each of the positions shown here.



Informaciones de seguridad para aparatos con telepiés

⚠ ADVERTENCIA

Peligro de heridas

Los telepiés pueden doblarse hacia adentro si no han sido desdoblados por completo o si el aparato es movido. Los telepiés pueden romperse si son sobrecargados.

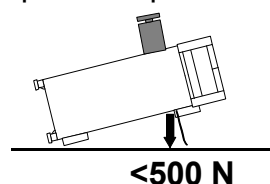
Doblar los telepiés por completo hacia afuera o hacia adentro. De esta manera se puede asegurar la estabilidad del aparato y a la vez la seguridad de las personas.

No mover nunca el aparato con los telepiés desdoblados, para evitar heridas.

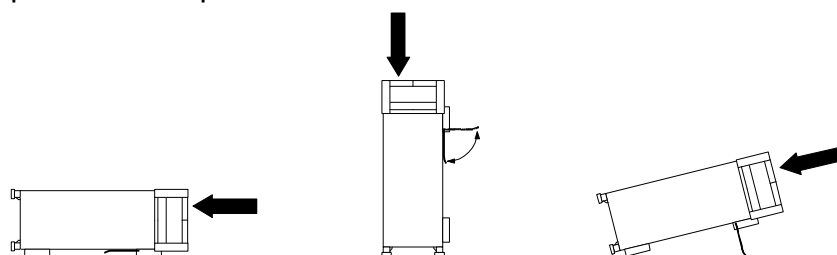
El peso total equilibrado (peso propio más el de los aparatos posicionados sobre este) ejercido sobre los telepiés no deberá exceder a los 500 N.

Posicionar el aparato sobre una superficie estable. Los aparatos puestos encima de éste deben estar asegurados para que no resbalen (por ejemplo fijando los pies del aparato en el listón del marco de delante arriba).

Por favor no manipulen debajo del aparato y no pongan nada debajo de este cuando esté posicionado sobre los telepiés desdoblados, ya que si no pueden originarse heridas o daños en objetos.



El aparato puede ser puesto en funcionamiento en cualquiera de las posiciones aquí descritas.



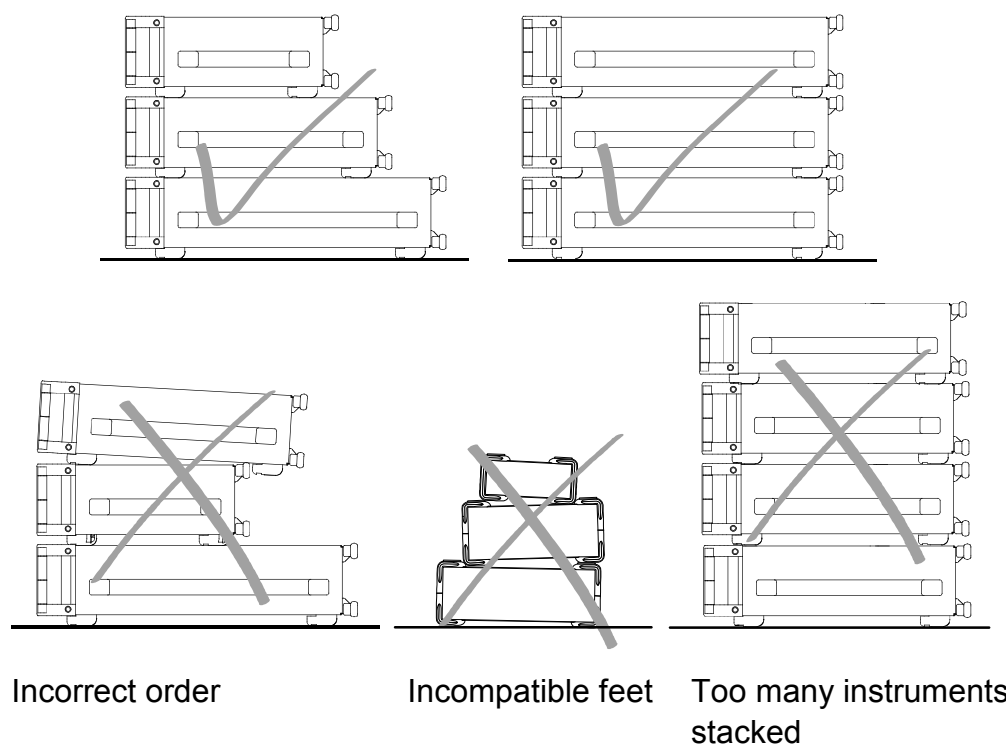
Safety Instructions for Stacking Instruments

⚠ 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.



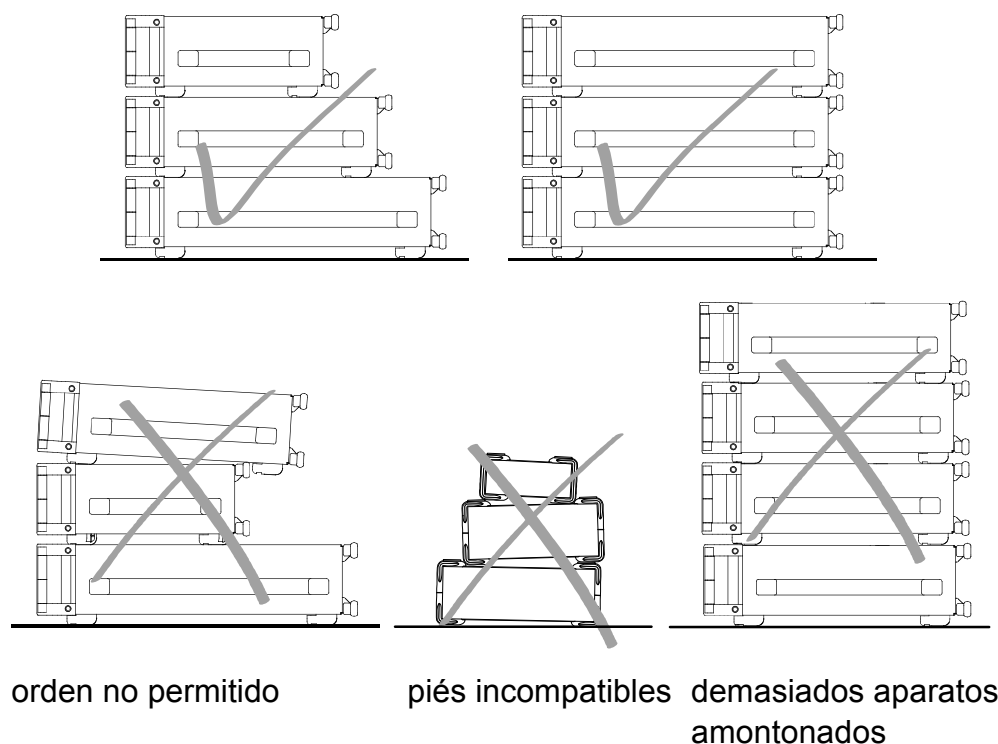
Informaciones de seguridad para el amontonamiento de aparatos

⚠ 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.

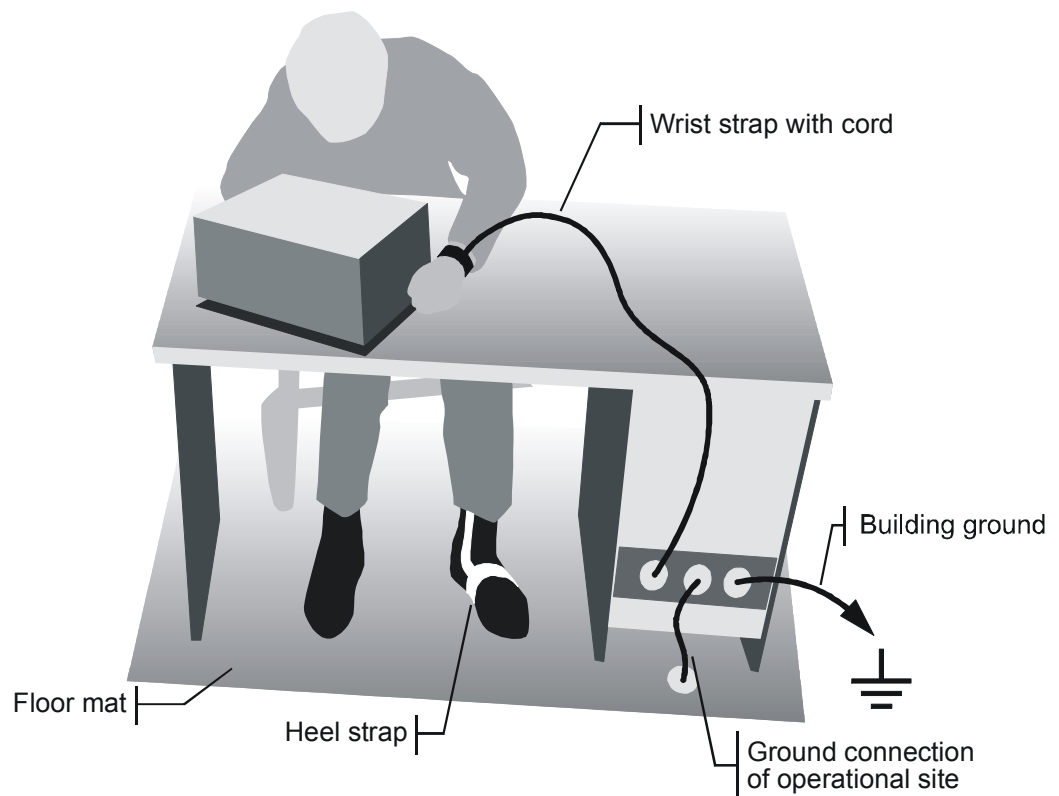


Instructions for Electrostatic Discharge Protection

NOTICE

Risk of damaging electronic components

To avoid damage of electronic components, the operational site must be protected against electrostatic discharge (ESD).



The following two methods of ESD protection may be used together or separately:

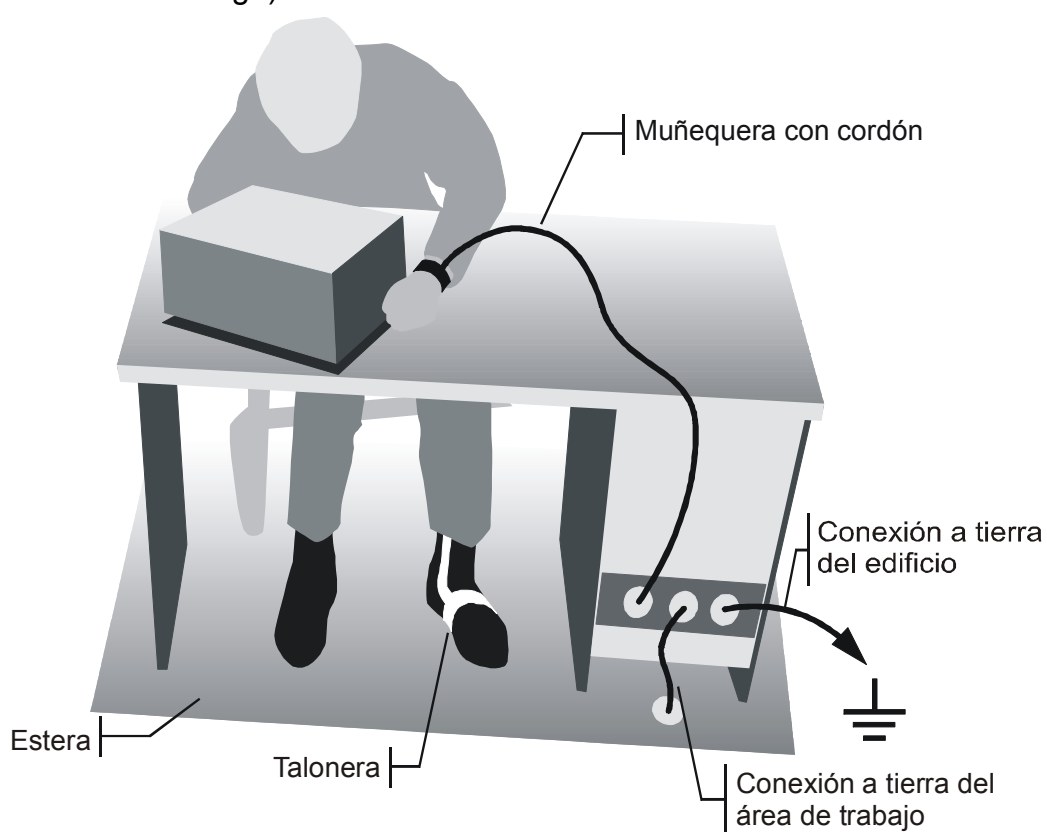
- Wrist strap with cord to ground connection
 - Conductive floor mat and heel strap combination
-

Instrucciones para la protección contra descargas electrostáticas

AVISO

Riesgo de avería de los componentes electrónicos

Para evitar averías en los componentes electrónicos, el área de trabajo tiene que estar protegido contra descargas electrostáticas ESD (electrostatic discharge).



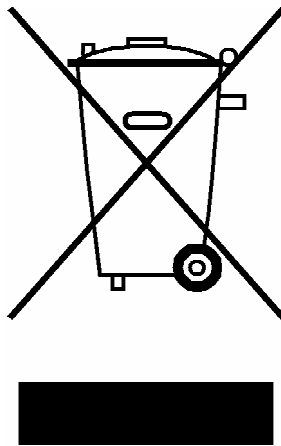
Los siguientes dos métodos de protección ESD pueden ser usados juntos o separados:

- Muñequera con cordón para conexión a tierra
- Combinación de estera antiestática y talonera

Customer Information Regarding Product Disposal

The German Electrical and Electronic Equipment (ElektroG) Act is an implementation of the following EC directives:

- 2002/96/EC on waste electrical and electronic equipment (WEEE) and
- 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).



Product labeling in accordance with EN 50419

Once the lifetime of a product has ended, this product must not be disposed of in the standard domestic refuse. Even disposal via the municipal collection points for waste electrical and electronic equipment is not permitted.

Rohde & Schwarz GmbH & Co. KG has developed a disposal concept for the environmental-friendly disposal or recycling of waste material and fully assumes its obligation as a producer to take back and dispose of electrical and electronic waste in accordance with the ElektroG Act.

Please contact your local service representative to dispose of the product.



Certified Quality System

DIN EN ISO 9001 : 2000
DIN EN 9100 : 2003
DIN EN ISO 14001 : 2004

DQS REG. NO 001954 QM UM

QUALITÄTSZERTIFIKAT

Sehr geehrter Kunde,
Sie haben sich für den Kauf eines Rohde & Schwarz-Produktes entschieden. Hiermit erhalten Sie ein nach modernsten Fertigungsmethoden hergestelltes Produkt. Es wurde nach den Regeln unseres Managementsystems entwickelt, gefertigt und geprüft. Das Rohde & Schwarz Managementsystem ist zertifiziert nach:

DIN EN ISO 9001:2000
DIN EN 9100:2003
DIN EN ISO 14001:2004

CERTIFICATE OF QUALITY

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:

DIN EN ISO 9001:2000
DIN EN 9100:2003
DIN EN ISO 14001:2004

CERTIFICAT DE QUALITÉ

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 conformément aux normes:

DIN EN ISO 9001:2000
DIN EN 9100:2003
DIN EN ISO 14001:2004





ROHDE & SCHWARZ
EC Certificate of Conformity



Certificate No.: 2008-02

This is to certify that:

Equipment type	Stock No.	Designation
DVSG	2113.0008.02	Digital Video Signal Generator
DVSG-B30	2113.0237.02	AV Broadcast Signal Player

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 : 2001
EN 61326 : 1997 + A1 : 1998 + A2 : 2001 + A3 : 2003
EN 55011 : 1998 + A1 : 1999 + A2 : 2002, Klasse A
EN 61000-3-2 : 2000 + A2 : 2005
EN 61000-3-3 : 1995 + A1 : 2001

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

Affixing the EC conformity mark as from 2008

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

Munich, 2008-01-24

Central Quality Management MF-QZ / Radde

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.

USA & Canada

Monday to Friday	(except US public holidays)
8:00 AM – 8:00 PM	Eastern Standard Time (EST)
Tel. from USA	888-test-rsa (888-837-8772) (opt 2)
From outside USA	+1 410 910 7800 (opt 2)
Fax	+1 410 910 7801
E-mail	CustomerSupport@rohde-schwarz.com

East Asia

Monday to Friday	(except Singaporean public holidays)
8:30 AM – 6:00 PM	Singapore Time (SGT)
Tel.	+65 6 513 0488
Fax	+65 6 846 1090
E-mail	CustomerSupport@rohde-schwarz.com

Rest of the World

Monday to Friday	(except German public holidays)
08:00 – 17:00	Central European Time (CET)
Tel. from Europe	+49 (0) 180 512 42 42*
From outside Europe	+49 89 4129 13776
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* 0.14 €/Min within the German fixed-line telephone network, varying prices for the mobile telephone network and in different countries.



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- ◆ Sales Locations
- ◆ Service Locations
- ◆ National Websites

0 Documentation Overview

Quick Start Guide

The printed Quick Start Guide is delivered with the R&S DVSG. On CD-ROM, the Quick Start Guide is provided in the PDF format. It contains the following information:

- ◆ Chapter 1
Describes the instrument's controls and the connectors using front- and rear-panel views. How to prepare the instrument for operation is also described. The procedure for connecting external devices such as a printer, keyboard, mouse, and monitor is also explained. Specifications for the interfaces are contained in the data sheet.
- ◆ Chapter 2
Provides an overview of the instrument's functions and operating concept.
- ◆ Chapter 3
Explains the instrument's individual menus and functions.

Operating Manual

The Operating Manual is provided on the CD-ROM in PDF format. It contains the following information:

- ◆ Chapter 4
Describes the basic principles of remote control.
- ◆ Chapter 5
Describes how to use the remote operation commands.
- ◆ Chapter 6
Describes the instrument's interfaces.
- ◆ Chapter 7
Describes how to maintain the instrument.
- ◆ Chapter 8
Contains an overview of the error messages that the instrument may produce.

Online Help

The Online Help is available on the R&S DVSG and on the CD-ROM. It includes all information provided by the Quick Start Guide and the Operating Manual.

On the R&S DVSG, the Online Help is context-sensitive and is called by means of the HELP hardkey. For detailed information on using the Online Help refer to Chapter "Manual Operation" in the Quick Start Guide or the Online Help.

CD-ROM

The CD-ROM is delivered with the instrument. It provides the manuals in PDF format and the Online Help in CHM format.

1 Putting the Instrument into Operation

1.1 Explanation of the Front Panel

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

Figure 1.1-1 Explanation of the front panel



The ON/OFF button switches the instrument from standby mode to ready mode.

The AC power switch on the back of the instrument must be switched on.

The yellow LED to the right is illuminated in standby mode.

The green LED to the left is illuminated in ready mode (see "[Switching the Instrument On](#)").

WARNING

Shock hazard

In standby mode, the instrument is still power-supplied.

Hardkeys



Sets a defined instrument state. (see Operating Manual, Chapter 4).

(PC keyboard analogy: F4)



Switches from REMOTE mode (remote control) to LOCAL mode (manual operation). (see Operating Manual, Chapter 4).

(PC keyboard analogy: F3)



Used to manage the favorites and the user fields in the information area of the display. (see Operating Manual, Chapter 4).

(PC keyboard analogy: F2)



Button for accessing context-sensitive help. (see Operating Manual, Chapter 4).

(PC keyboard analogy: F1)



Used to save and reload instrument states and manage files.

(PC keyboard analogy: F5)



Used for instrument configuration.

(PC keyboard analogy: F6)



Resets the navigation.

(PC keyboard analogy: F8)



Switches to another application, e.g. TS Player, Native Video Generator, Broadcast Video Generator.

(PC keyboard analogy: F9)

Softkeys



Executes the commands displayed by the softkey labels.

(PC keyboard analogy: CTRL + 1 – 8)

Keypad



Keypad for entering data.



Used to enter zero.



Used to enter a space.



Used to enter a decimal point.



Used to enter a special character.



Used to enter the sign.

Switches between uppercase and lowercase letters.

Multiplier of the input values.



- ◆ Calls up the next menu level.
(PC keyboard analogy: ALT + F9)



- ◆ Activates editing mode for the marked numeric and alphanumeric parameters.
(PC keyboard analogy: ALT + F10)



- ◆ Data entry is completed and the new value is accepted. For numeric parameters, the unit is displayed in the menu next to the value.
(PC keyboard analogy: ALT + F11)



- ◆ Switches the marked status parameters on/off (State On/Off). Confirms (OK) and closes message windows.
(PC keyboard analogy: ENTER)



Deletes the character to the left of the cursor

(PC keyboard analogy: Backspace key)



Changes between the insert and overwrite modes.

(PC keyboard analogy: ESC key)

Rotary Knob



Moving the rotary knob left or right:

- ◆ Varies the input value at the cursor position. You can set and activate a fixed step size for the frequency and the level.
- ◆ Navigates within the tree and the work view.
- ◆ Moves the cursor in the tables and drop-down lists.

(PC keyboard analogy: Tab key corresponds to moving left, Shift + Tab key combination to moving right)



To complete your entry, press the rotary knob (click = Enter). The editing mode is terminated and the value is accepted.

(PC keyboard analogy: Shift + ENTER)

Cursor Keys



- ◆ Moves the cursor in the input fields in editing mode.
- ◆ Marks the parameters in the menus and in the tables (left/right).

(PC keyboard analogy: cursor keys)

Interfaces and Connectors on the Front Panel



USB interfaces

(USB = Universal Serial Bus) type A (host USB).

- ◆ Connection of external devices such as a mouse, keyboard.
- ◆ Connection of the memory stick for transferring files.

Another USB interface type A (host USB) is available on the rear panel.



TS Output

75 Ω BNC output for the serial transport stream according to DVB ASI and SMPTE 310M.

1.2 Explanation of the Rear Panel

This section provides an overview of the connectors on the instrument's rear panel. Each connector is briefly described along with a reference to the chapter(s) containing detailed information about its usage. Specifications for the connectors are contained in the data sheet.

Figure 1.2-1 Rear-panel view



AC power connector

The R&S DVSG is equipped with AC voltage detection. The instrument will automatically set itself to the AC voltage it detects (range: see the type label). No external switching or modification of the fuses is necessary.



AC power switch

The AC power switch is located below the AC power connector.



AC power fuse

See "[AC Power Fuses](#)" and the data sheet.

**LAN interface**

For remote control and FTP file transfer.

**REF CLK IN**

BNC Connector, female, 75 Ω

10 MHz reference clock input for external synchronization of the generator

**ASI / SMPTE IN**

BNC Connector, female, 75 Ω

TS ASI /SMPTE 310M input

**ASI / SMPTE OUT**

BNC Connector, female, 75 Ω

TS ASI /SMPTE 310M output

**SPI OUT / IN**

25pin, female

Parallel transport stream input (LED OFF) / output (LED ON)

**HDMI**

High-Definition Multimedia Interface, 19pin, female

Digital video and audio output



USB

USB interfaces (USB = Universal Serial Bus) type A (host USB).

- ◆ Connection of external devices such as mouse, keyboard, printer.
- ◆ Connection of the memory stick for transferring files.

Further USB interfaces type A (host USB) are located on the front panel of the instrument.



CCVS

BNC Connector, female, 75 Ω

Analog composite video output for PAL / NTSC signals



G/Y; B/Pb; R/Pr

BNC Connector, female, 75 Ω

Analog component video output for GBR / YCBCR signals.

The unlabeled connector at the right is for future use.



VGA

15 pin VGA connector, female

Analog video output for GBR



HD-SDI

BNC Connector, female, 75 Ω

Digital component video output in SDI and HD-SDI format; only available with the AV Signal Player option (R&S DVSG-B30).



SCART

21 pin scart connector (female)

Analog composite and component video output and analog stereo audio output.



D4

14 pin D-video connector (female)

Analog composite and component video output

**S-VIDEO**

4 pin Mini-DIN (female)
Y/C analog video output

**DIG IN / DIG OUT**

TOSLINK connector (female)
Optical Digital audio (stereo) input and output.

**Note:**

The input signal can be looped through as audio content onto the HDMI output.

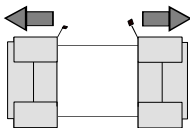
**L OUT / R OUT**

RCA Jack (female)
Stereo output for analog audio;
only available with the SDI/HD-SDI Output option (R&S DVSG-K30).

1.3 Preparing for Operation

The following section describes how to prepare the instrument for operation and how to connect external devices. Please observe the general safety instructions for operating the instrument. For information on installing options and updating the software, refer to the service manual.

1.3.1 Unpacking the Instrument



Remove
protective
covers

- ◆ After unpacking the instrument, check the supplied equipment against the delivery note and the lists of accessories to make sure that everything is present.
- ◆ Remove the two protective covers at the front and the rear of the instrument and carefully check the instrument for possible damage.
- ◆ If you find any damage, inform the carrier immediately. Keep the packaging material to support your claim.
- ◆ The original packaging is also useful for transporting or shipping the instrument later on. Retain at least the two protective covers for the front and rear panel to keep the controls and connectors from being damaged during subsequent shipping..

1.3.2 Positioning the Instrument or Installing It in a 19" Rack

The instrument is designed for interior use only. You can set it up individually or install it in a 19" rack.

To install it in a 19" rack, you must use a rack mounting adapter (see data sheet for order number). Instructions are included with the adapter.

1.3.3 Safety Instructions

1.3.3.1 General Safety Instructions

NOTICE

Prior to putting the instrument into operation, check the following:

- ◆ The instrument cover is in place and screwed on.
- ◆ Vent holes are not obstructed, and air flow is not blocked on the rear panel and the lateral vent. The spacing from the wall should be at least 10 cm.
- ◆ The signal levels at the inputs do not exceed permissible limits.
- ◆ The outputs of the instrument are not overloaded or incorrectly connected.
- ◆ The instrument may be operated only in a horizontal position and the surface on which it is placed must be level.
- ◆ The ambient temperature must be in the range specified in the data sheet.

Any noncompliance with these instructions can damage the instrument.

1.3.3.2 Protective Measures Against Electrostatic Discharge

NOTICE**Risk of damaging electronic components**

To avoid damage to the electronic components of the equipment under test (EUT) due to electrostatic discharge when touched, always use the appropriate protective equipment.

1.3.3.3 Positioning the Instrument

WARNING

Risk of physical injury

Before positioning the instrument, read the safety instructions for instruments with fold-out feet at the beginning of this manual and respectively on the CD-ROM carefully.

1.3.3.4 EMC Safety Precautions

NOTICE

Risk of electromagnetic interference

To prevent electromagnetic interference, the instrument must be operated only when closed and with all shielding covers fitted. Only suitable and shielded signal and control cables may be used.

- ◆ This applies particularly to cables that are connected to the serial transport stream connectors TS ASI/SMPTE 310M inputs and outputs. Regardless of the data rate and the packet timing of the transport stream, high signal levels can occur at individual points in the signal spectrum. To avoid EMC problems, the cables should have at least 80 dB shielding protection up to 1 GHz. This generally requires the use of cables with double shielding.
- ◆ When connecting the USB interfaces, use only peripheral equipment that does not cause limit violations.
- ◆ When wiring the LAN interface (100BaseT), be sure to use a suitable cable (e.g. Category 6).

1.3.4 Connecting the Instrument to AC Power

The R&S DVSG is equipped with AC voltage detection. The instrument will automatically set itself to the AC voltage it detects (see "[Explanation of the Rear Panel](#)"). No external switching or modification of the fuses is necessary. The AC power connector is at the rear of the instrument.

1.3.5 Switching the Instrument On

Instruments with an AC power switch



- ◆ Use the supplied AC power cable to connect the instrument to the AC power mains.
- ◆ Since the instrument is in compliance with safety class EN61010-1, it should only be connected to a socket with a ground contact.
- ◆ Change the AC switch on the rear of the instrument to the I position.

Once the instrument is switched on, it will be in the STANDBY state or in the ON state depending on the position of the ON/STANDBY switch on the front of the instrument (see below).

**Note:**

The AC power switch can be left permanently switched on. You need to switch off the instrument only if it is to be completely disconnected from the AC power line.



- ◆ Press the ON/STANDBY switch on the front of the instrument; the green LED should illuminate.

The instrument is now ready for operation. All of the subassemblies in the instrument are now live.

1.3.6 AC Power Fuses



Before replacing fuses, switch off the instrument and disconnect it from the power supply.

The instrument is equipped with two fuses of type F1/F2: IEC127-T2.0H/250 V. The fuses are located under the AC power switch on the rear panel of the instrument.

Replacing the fuses:

- ◆ Open the cover on the fuse box and remove the fuse holder.
- ◆ Replace defective fuses and put fuse holder back into place.
- ◆ Close the fuse box cover.

1.3.7 Startup Screen and Booting the R&S DVSG

Once the instrument is powered on, the installed BIOS version and some of the computer features are displayed on the screen for a few seconds.

The Windows XP Embedded operating system will then be booted, followed by the instrument firmware. During boot up, the instrument firmware is subjected to a self test. Once boot up is complete, the main screen of the broadcast tester will appear and the instrument can be operated. The settings that were active before the instrument was last switched off are used unless another instrument setting was selected in the **File** menu.



Note:

If the software freezes unexpectedly, you can reboot the instrument by pressing the Standby key for about 5 seconds.

1.3.8 Switching the Instrument Off



- ◆ Press the ON/STANDBY switch on the front of the instrument.

The R&S DVSG saves the current settings to the hard disk and then shuts down the Windows operating system. The power supply is then switched to STANDBY.

Only the power supply has the operating voltage supplied to it, and the crystal oven is maintained at its operating temperature. The yellow LED should be illuminated.

⚠ WARNING**Shock hazard**

In standby mode, the instrument is still power-supplied.

Only in case of complete disconnection from the AC line

- ◆ Change the AC switch on the rear of the instrument to the **O** position. None of the LEDs on the front panel should be illuminated.

**Note:**

Always switch to standby prior to complete disconnection from the AC line. If you set the power switch to the **O** position before the instrument is switched to standby mode, the current settings will be lost.

1.3.9 Functional Check

The generator automatically monitors the main instrument functions during power-on and continuously during operation.

If an error is detected, an ERROR indication will appear in the error/warnings line of the display along with a brief description of the error.

To obtain more information about the error, press the **Error Details** softkey. A description of the error(s) will be shown in the display (see Operating Manual, Chapter 9).

Besides automatic monitoring of instrument functions, the R&S DVSG also offers other ways of ensuring proper operation:

- ◆ **System error correction (“internal adjustment”)**
Internal adjustment can be carried out in the **Setup Adjustments** menu. This is a way to obtain the best possible level accuracy, for example.
- ◆ **Self checks**
If necessary, self checks can be defined.
- ◆ **Test points**
You can also query certain internal measurement points and display the results (see Operating Manual, Chapter 4).

1.3.10 Presets

Press the PRESET button to reach a defined state for the instrument.

PRESET sets all parameters and switching states to specific values (even for operating modes that are not currently enabled).

The IP address of the instrument is unchanged.

1.3.11 Connecting an External Keyboard



The R&S DVSG allows you to connect a standard external keyboard with a USB interface. A keyboard will make it easier to enter comments, file names, etc. A keyboard is necessary if you want to have easy access to the power of Windows XP.

The keyboard is connected to one of the USB interfaces (type A) on the instrument's front or rear panel.

The keyboard will be automatically detected once you connect it. The default language setting is for a UK keyboard. You can change the language and modify other settings such as the repetition rate in Windows XP under **Start → Control Panel → Keyboard** or **Regional and Language Options**. Access this menu by pressing the Windows key on an external keyboard.

1.3.12 Connecting a Mouse



The R&S DVSG allows you to connect a standard mouse with a USB interface. The mouse will make it easier to use the block diagram with the associated menus. It is necessary if you want to have easy access to the power of Windows XP.

The keyboard is connected to one of the USB interfaces on the instrument's front or rear panel.

The mouse will be automatically detected once you connect it. Some settings such as the speed of the mouse cursor can be modified in the Windows XP menu **Start → Control Panel → Mouse**. You can access this menu by pressing the Windows key on an external keyboard.

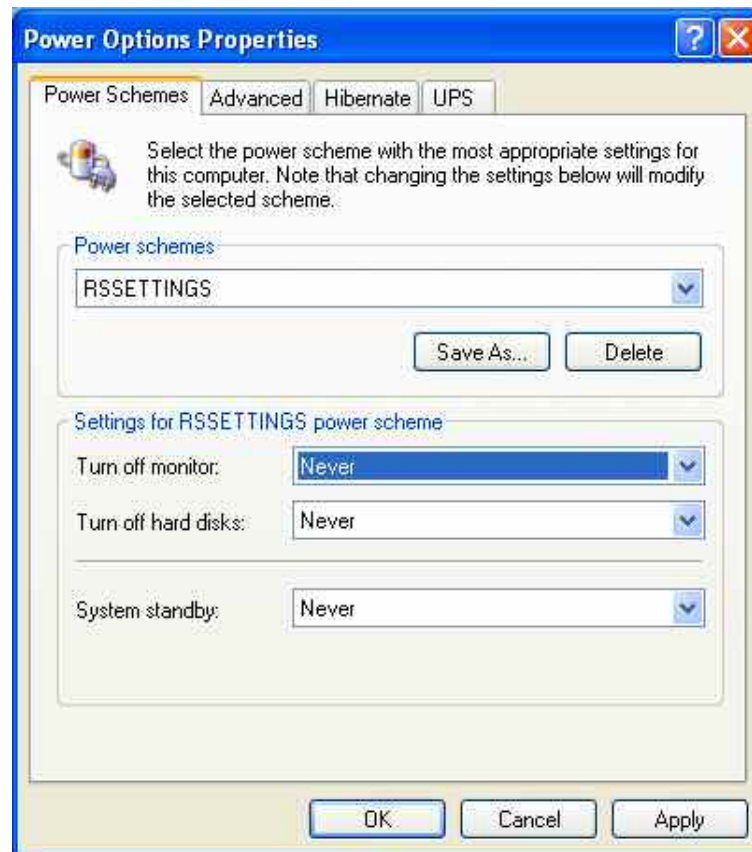
1.3.13 Displaying the Screen on an External Monitor

The R&S DVSG does not have a connector for connecting an external monitor with an analog interface. However, it is possible to display the screen on external monitors by launching manual remote operation on an external computer (using the Windows program Remote Desktop Connection).

1.3.14 Activating Power Saver Mode

Power Saver mode is not set by default for the R&S DVSG.

If the display is not needed, the monitor can be switched off in Windows XP under **Start** → **Control Panel** → **Power Options** after a specific amount of time.



1.4 Notes on Operating System and Firmware Update

1.4.1 Installation of the Software

NOTICE

- ◆ Only software authorized by Rohde & Schwarz for use in the instrument may be installed. In case of doubt, please contact your local Rohde & Schwarz representative.
- ◆ Changes to the system are only permissible in agreement with Rohde & Schwarz.
- ◆ Updating the operating system, e.g. installing a service pack, is not allowed without permission.

Otherwise, the stability and performance of the system may be impaired. Rohde & Schwarz shall not assume any liability for faults caused by impermissible manipulations of the system.

1.1.1 Windows XP Embedded

NOTICE

The drivers and programs that are used with Windows XP have been modified to suit the DIGITAL VIDEO SIGNAL GENERATOR. To avoid disrupting the operation of the instrument, do not change any settings unless they are mentioned in the following section. The existing software may be modified only by using update software approved by Rohde & Schwarz. Likewise, only run programs on the instrument that have been approved by Rohde & Schwarz for such purposes.

The DIGITAL VIDEO SIGNAL GENERATOR is equipped with the Windows XP Embedded operating system. When the instrument is delivered, the configuration of this operating system has been set to permit the optimum operation of the DIGITAL VIDEO SIGNAL GENERATOR and test transmitter. 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 (see the following sections).

When you power on the DIGITAL VIDEO SIGNAL GENERATOR, the operating system will boot up and then automatically launch the instrument firmware without asking for a password (“autologin”).

**Note:**

Auto login uses the user name and the password “Instrument”. This standard user has administrator rights so that it is possible to install printers and networks.

Access to the operating system requires the connection of an external keyboard. Use the **Windows** key on the external keyboard (next to the CTRL key) to open the Windows XP start menu so that you can run Windows XP programs. You should connect a mouse if you want more convenient access to Windows XP.

The instrument screen will be brought to the foreground if you double-click the Windows button DVSG [xxx] in the taskbar.

You can modify the system settings under Windows XP in the **Start - Control Panel** menu (see the documentation for Windows XP and for the hardware for the required settings).

The instrument does not have a disk drive. Data can be exchanged 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.

1.4.2 Firmware Update

Update instructions for the firmware are provided together with the new firmware. Be sure to follow these instructions carefully.

Your instrument is delivered with the latest firmware version available. Firmware updates are provided via Rohde & Schwarz service centers or sales offices.

The installation of a new firmware version can be performed either via the USB or the LAN interface.

The downloaded update files have to be stored on the memory stick for an update via the USB interface or on a network directory for an update via the LAN interface (due to the speed recommended).

1.5 Connecting the R&S DVSG to Network (LAN)

The instrument is equipped with a network connection and can be connected to an Ethernet LAN (local area network).

Provided the appropriate rights have been granted by the network administrator, files can be transferred via the network, and network resources, e.g. network directories, can be used. The instrument can also be remote-controlled and manually operated in the network. Manual remote control allows someone to operate the instrument from an external computer situated anywhere in the world. For example, a user working in one part of a building can operate one or more instrument units that are part of a test setup situated in another part of the building.

Remote control of the instrument via the LAN interface is described in the Operating Manual, Chapter 5.

1.5.1 Connecting to the Network

NOTICE

Always coordinate the connection of the instrument to the network with the network administrator. Any errors that occur during the connection process can affect the entire network.

Make sure that the instrument is switched off (standby mode) when you connect and disconnect the network cable. This is the only way to ensure that the network connection is reliably detected and any disruptions during the operation of the instrument are avoided.



The instrument is connected to the LAN using a standard RJ-45 cable via the LAN interface on the rear of the instrument.

In the Operating Manual, Chapter 7, the connector is described in detail.

Configuring the instrument for network operation

The network interface functions with 100 MHz Ethernet IEEE 802.3u. The TCP/IP network protocol and the associated network services are preconfigured.

To exchange data within a 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. These access authorizations determine which of the available network resources such as file storage systems are available for the instrument, for example.

Networks with DHCP

The instrument is preconfigured for networks using the dynamic host configuration protocol (DHCP). In such networks, the instrument is automatically assigned a free IP address. In this case, 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. You can view and modify this name in the Windows XP **Start - My Computer** menu (see "[Querying the Computer Name](#)").

Networks that assign fixed IP addresses

In networks that assign fixed IP addresses, the network administrator usually handles this process. The fixed IP address must be entered under Windows XP **Start - Control Panel** (see "[Entering the IP address](#)").

Point-to-point connections

To set up a single network (a LAN connection between an instrument and a single computer without integration into a larger network), an IP address needs to be assigned to the instrument and the computer. The IP addresses 192.168.xxx.yyy are available for use here, where xxx and yyy can assume values of 1 to 254, and the value for the subnet mask is 255.255.255.0.

In this case, a standard RJ-45 crossover cable is required for the connection.

User parameters

For the instrument, the standard user name is **Instrument**. The user name is used for auto login when the instrument is started up and for manual remote control. The password is also **Instrument**. The network administrator must grant authorization to this user to determine which network directories and resources can be accessed by the instrument.

Preparations

The instrument is configured for network operation in the menus of the Windows XP Embedded operating system. The operating system can be accessed only when an external keyboard is connected. The use of a mouse makes operation more convenient. Power down the instrument prior to connecting the keyboard and mouse so that the operating system will properly recognize them.

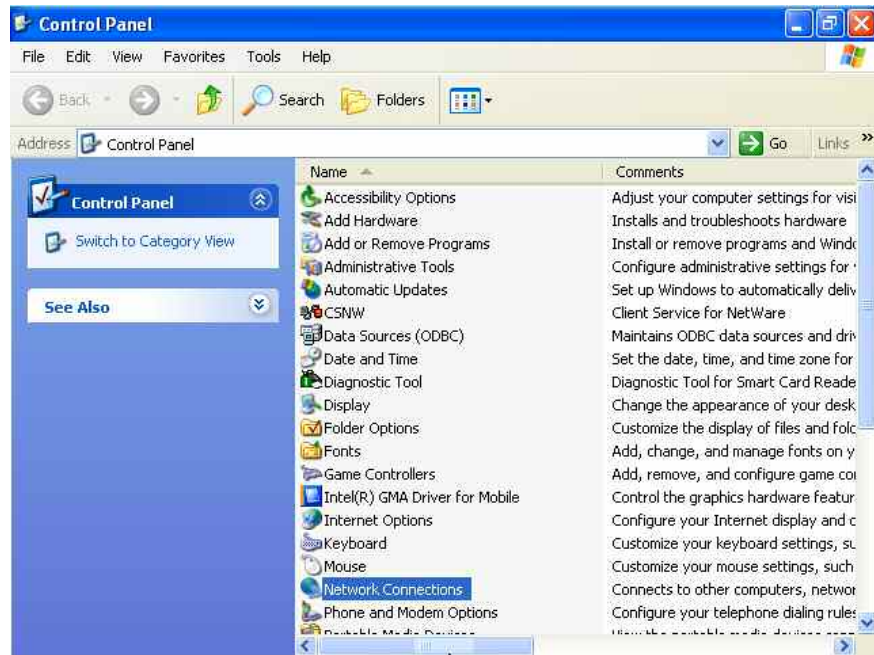
1. Switch off the instrument.
2. Connect the external keyboard and mouse to the USB interface.
3. Switch on the instrument.

Entering the IP address

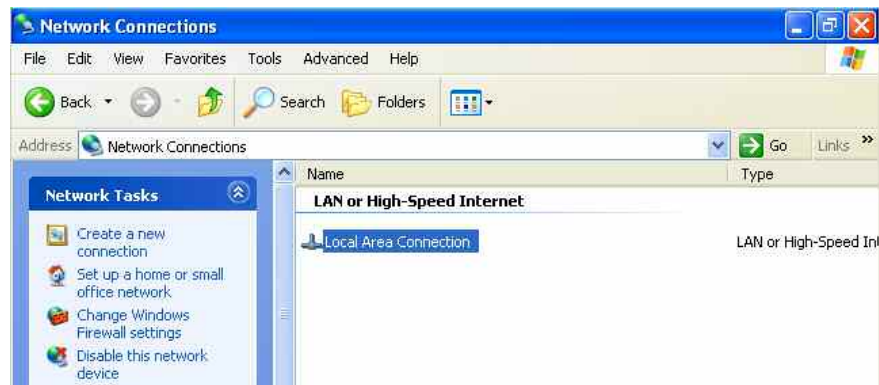
1. Press the **Windows** key on the external keyboard (next to the CTRL key) to call up the start menu.



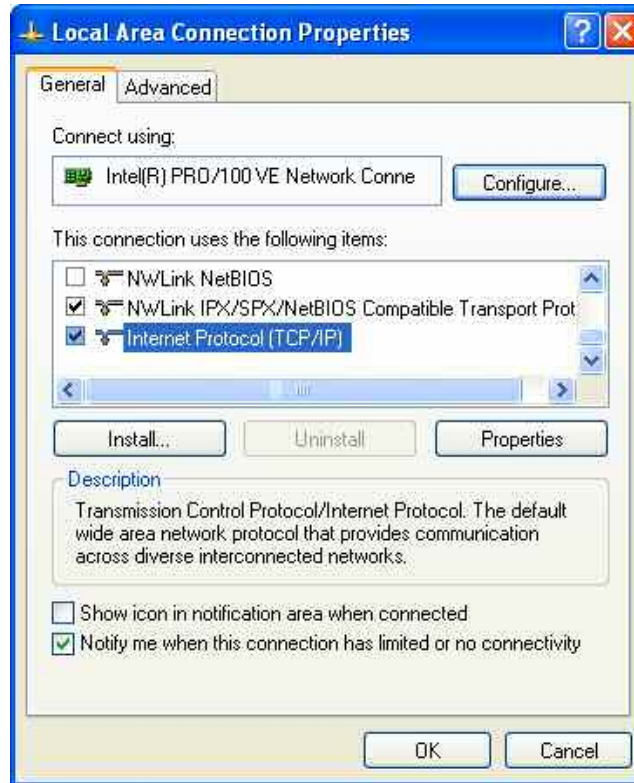
2. Click **Control Panel** and then **Network**



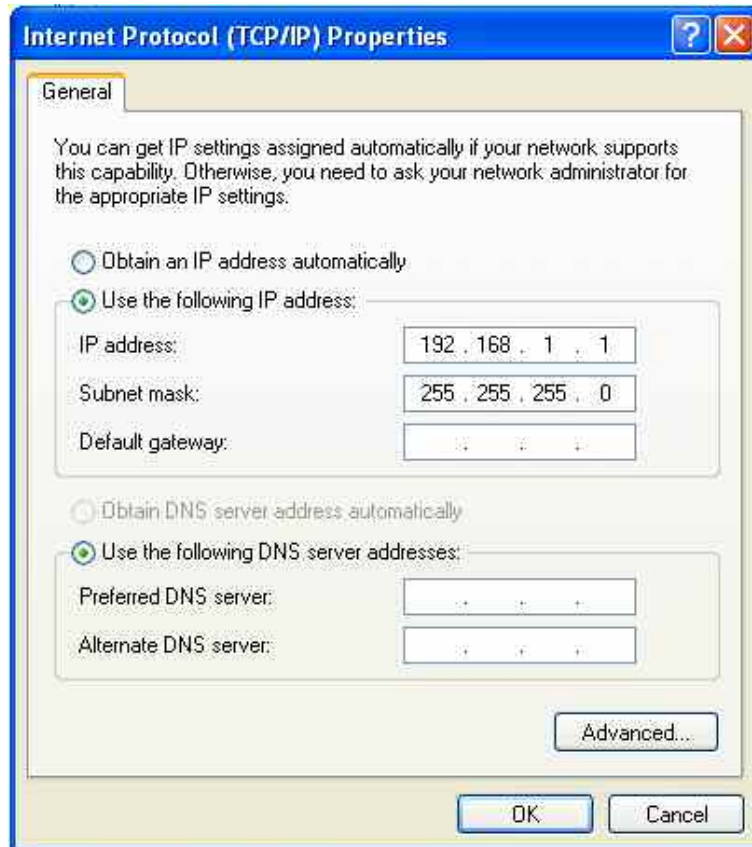
3. In the Network **Connections** menu, click **Local Area Connection** on the right.



4. In the **General** tab, activate Properties. In the field that reads **This connection uses the following items:**, mark the **Internet Protocol (TCP/IP)** item and then click the **Properties** button.

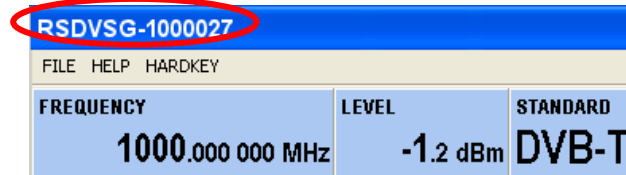


5. In the **Internet Protocol (TCP/IP) Properties** menu, enter the IP address in the field **Use the following IP address** (ask your network administrator if you need more information). Finish by clicking OK in all of the menus.
The default setting will be **Obtain an IP address automatically** (DHCP = Dynamic Host Configuration Protocol).



Querying the Computer Name

1. If the instrument has its DEFAULT COMPUTER NAME the computer name is displayed as part of the window title of the application:

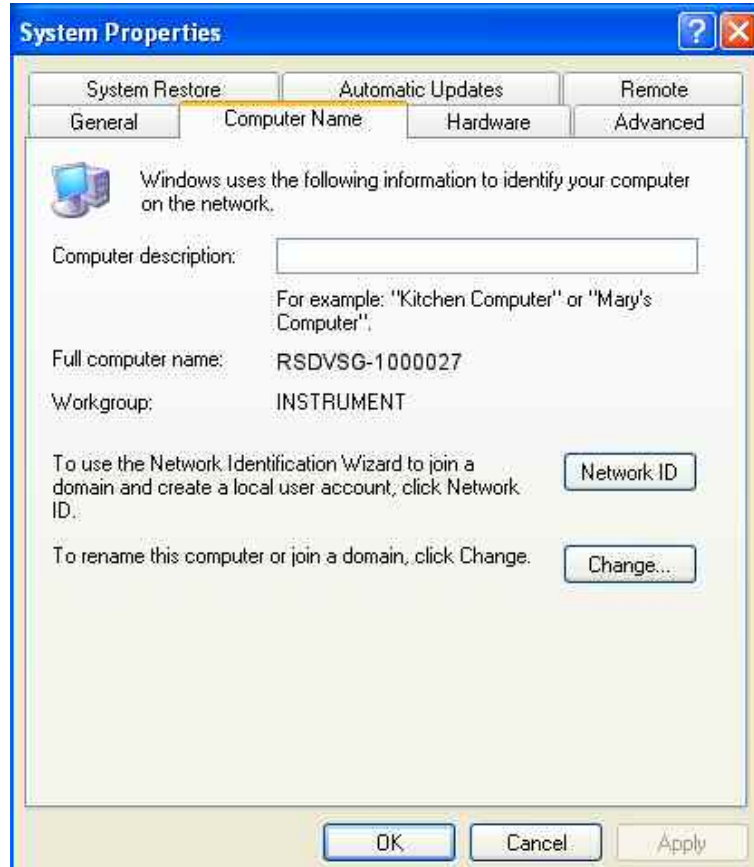


Otherwise follow the next steps:

2. Press the **Windows** key on the external keyboard (next to the CTRL key) to call up the start menu. Select **instrument on RSDVSG-xxxxxx** and call up the context-sensitive menu with the right mouse button



3. Click **Properties** and select the **Computer Name** tab in the menu.
The computer name is shown under **Full computer name**.



2 First Steps

The R&S DVSG is a multiformat video generator platform that supports all common video interfaces and picture resolutions. All types of signals – analog or digital, SDTV or HDTV, uncompressed or compressed – can be generated using only a single instrument. Switching between different standards is quick and easy – a press of a key is enough.

Due to its modular concept, the R&S DVSG can be optimally adapted to the requirements. Its range of functions can also be adapted to new requirements by installing hardware and software options subsequent to purchase.

All generator applications are already equipped with a wide range of signal sets. Optional libraries can be added for special applications.

2.1 Feature Overview

Compact design and convenient operation need not be mutually exclusive: Although the R&S DVSG is only half as wide as the R&S DVRG, it provides the same controls and user interfaces – both locally on the front panel and by means of remote control.

The multistandard capability and the flexible option concept make the R&S DVSG an extremely versatile instrument for many lab applications. Due to its excellent price/performance ratio, the R&S DVSG is also ideally suited for service and quality assurance as well as production applications.

½ 19" × 3 height units

The cabinet of the R&S DVSG, which is only ½ 19" in width, makes it an extremely compact instrument. This is an advantage particularly in production applications, when many instruments have to be installed in racks without much space.

Large VGA color display with 640 × 480 pixels

The R&S DVSG has a 5.7" easy-to-read VGA color display. Together with the straightforward graphical user interface, the display allows quick, easy, and reliable operation of the instrument. The most important operating parameters are always clearly visible.

Intuitive user interface under Windows XP Embedded

The user interface is straightforward, with a tree on the left side and a work view on the right side. The instrument is operated via a keypad and a rotary knob. Additionally, a keyboard and mouse can be connected to the USB interfaces.

Context-sensitive help system

Even during ongoing operation, the R&S DVSG allows you to access the extensive help system, which includes all information from the user manual. The help system always starts with the context-sensitive feature enabled, i.e. with information on the currently selected operating parameter.

User-definable favorites for quick access

Parameters that are often used can be copied to the Favorites menu, which makes operation even quicker and easier. This function is particularly useful when you have to change parameters from different submenus on a frequent basis.

Easy software updates via LAN or USB 2.0

Owing to USB 2.0 and LAN interfaces, software updates for the R&S DVSG can be performed quickly and easily. You merely need to copy the new software to the R&S DVSG by means of a USB memory stick or via FTP and start the fully automatic installation.

Remote operation via Remote Desktop or VNC

The R&S DVSG can be easily remote-operated via an Ethernet connection or in a LAN network over IP and preconfigured for DHCP use by means of the preinstalled Remote Desktop software or the VNC software that comes with the instrument.

Remote control via LAN

Remote control is possible by means of SCPI control commands via LAN (VXI11). The R&S DVSG can thus be integrated into existing test programs very easily.

2.2 Playing AV Signals (R&S DVSG-B30 Option)

Modern TV screens are equipped with complex signal processing to improve the quality of the displayed images and video sequences. This includes de-interlacing, deblocking, noise suppression as well as measures to reduce system-induced motion blur. Development, testing and production therefore require test signals that not only simulate reality but are also suitable for putting image-processing algorithms to the test.

AV player

The AV player provides precisely such test signals. They contain synthetically generated static and dynamic elements as well as real moving pictures with specific characteristics. In addition, real transport streams can be loaded and their video and audio content can be output on the interfaces. This makes it possible to implement even long test sequences and thus demonstrate characteristics of display equipment.

Signal library

The AV player comes with an extensive collection of test signals for a variety of video standards and resolutions. These test signals are indicated by the suffix *.avp. The transport stream generator's test signals and its optional libraries can also be used. These signals have the suffix *.gts.

Customer-specific signals

Owing to the integrated AV decoder, the R&S DVSG can also play signals from the real TV signals. This is done by using transport streams that have been recorded with the integrated transport stream recorder or loaded into the file system of the R&S DVSG via the USB or Ethernet interface. The signals must be present in binary format and the AV elements must not be coded. Such files are typically suffixed with *.trp or *.ts.

Interfaces

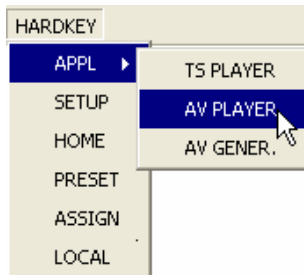
The AV player automatically detects the interfaces on which the signals can be output. These interfaces are marked in the generator tree under "Interface-Settings" with a bright green dot. If a transport stream (*.gts, *.trp or *.ts) serves as a template, then besides the decoded video signal on the AV interfaces the transport stream on the serial and parallel TS interface are available. However, this requires that the instrument is fitted with the R&S DVSG-K20 option.

2.2.1 Selecting the AV Player Application

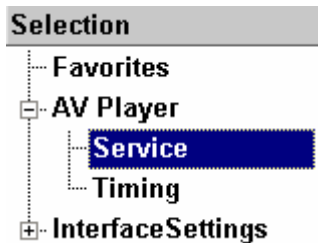
To play an AV signal, the "AV Player" application must be started.



Press the APPL key to choose an application.



Select **AV Player** using the rotary knob or the softkey.



Use the cursor keys to select **Service** in the tree.

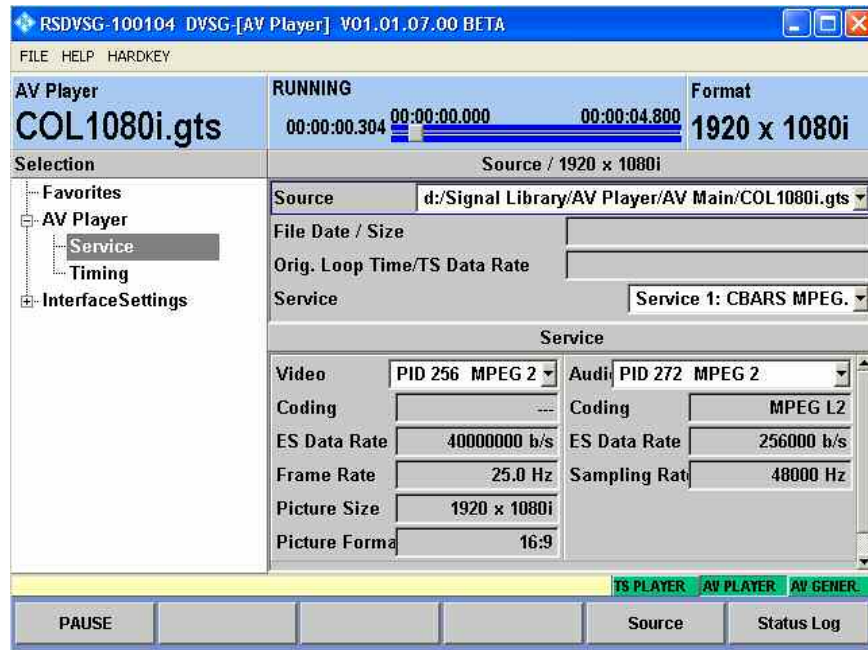


TIP:

The AV Player application can also be selected directly by clicking the desired application in the status field.



Figure 2.2-1 AV Player application



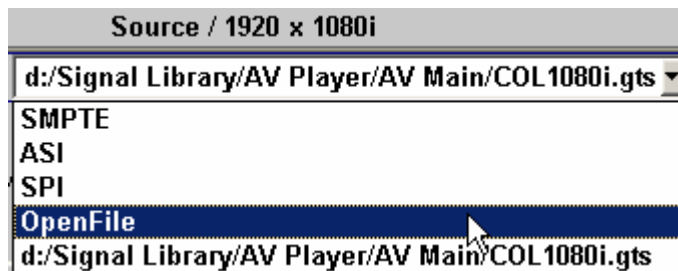
The AV Player application with the information area appears in the upper third of the display, the player tree on the left side of the display and the associated work view.

2.2.2 Selecting a Signal and Starting Replay

The AV player starts automatically with the signal last used. To select a new signal, use the cursor keys to select the **Source** line in the work view and confirm by pressing the ENTER key.

In the following dialog, select a signal that has already been used, or open a file box via **Open File**.

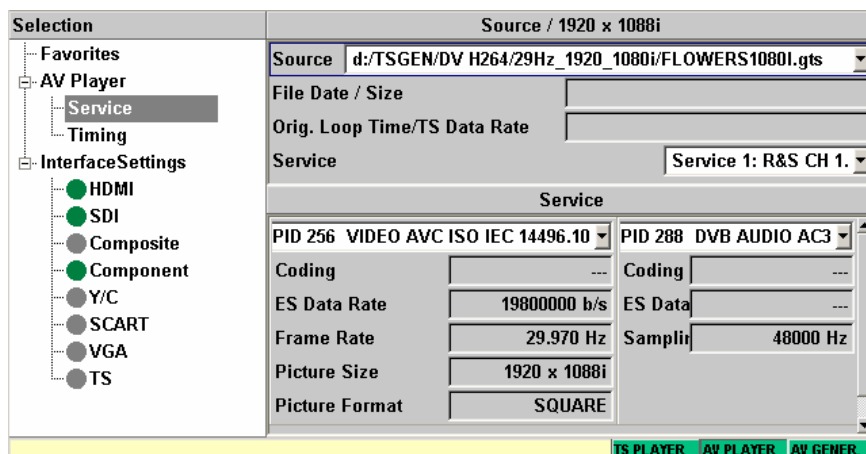
Figure 2.2-2 Selecting an AV signal from internal hard drive



After a signal has been selected, replay starts automatically. In selecting a signal, you also define the video standard with resolution and frame rate. This also determines at which signal outputs the signal is output.

These signal outputs are indicated by a green light field in the navigation tree.

Figure 2.2-3 Green light fields in the navigation tree indicate which signal outputs are active for the selected signal



2.2.3 Selecting a Signal Element in the AV Signal

The signals of the TV player are based on MPEG-2-compatible transport streams. This has the advantage that also real broadcast signals can be played back for test purposes. In addition, different programs can be accommodated in one signal.

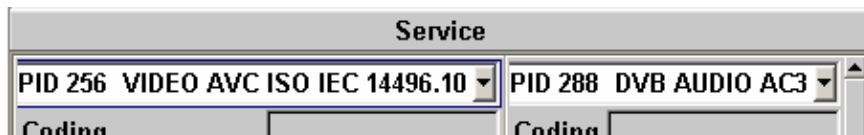
If more than program is contained, the AV player always starts with the program that has the lowest service number. To select another program, open the selection box for service.

Figure 2.2-4 Selection box for a service within a selected signal



If a program contains several video or audio signals, you can select these via the selection boxes under Service. If no selection is made, the player always starts with the AV elements that have the smallest packet identification (PID).

Figure 2.2-5 Selection box for video and audio elements within a selected service



2.3 Generating AV Signals (R&S DVSG-K10 Option)

Modern TV screens are equipped with complex signal processing to improve the quality of the displayed images and video sequences.

AV generator

The AV generator supplies test signals for evaluating and optimizing both the color reproduction and the contrast range. The test signals have a defined bit-level accuracy. They are available for color depths of up to 36 bits.

Signal library

The AV generator comes with an extensive collection of test signals for a variety of video standards and resolutions. These test signals are indicated by the suffix *.avp.

Customer-specific signals

The R&S DVSG is also designed for reproducing customer-specific test patterns. These test patterns must be provided in bitmap format (extension *.bmp).

Interfaces

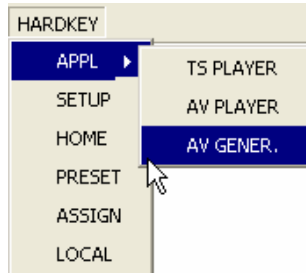
The AV generator automatically detects the interfaces on which the signals can be output. These interfaces are marked in the generator tree under "Interface-Settings" with a bright green dot.

2.3.1 Selecting the AV Generator Application

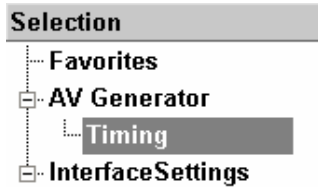
To generate an AV signal, start the AV Generator application.



Press the APPL key to choose an application.



Select **AV Generator** using the rotary knob or the softkey.



Use the cursor keys to select **Timing** in the tree.

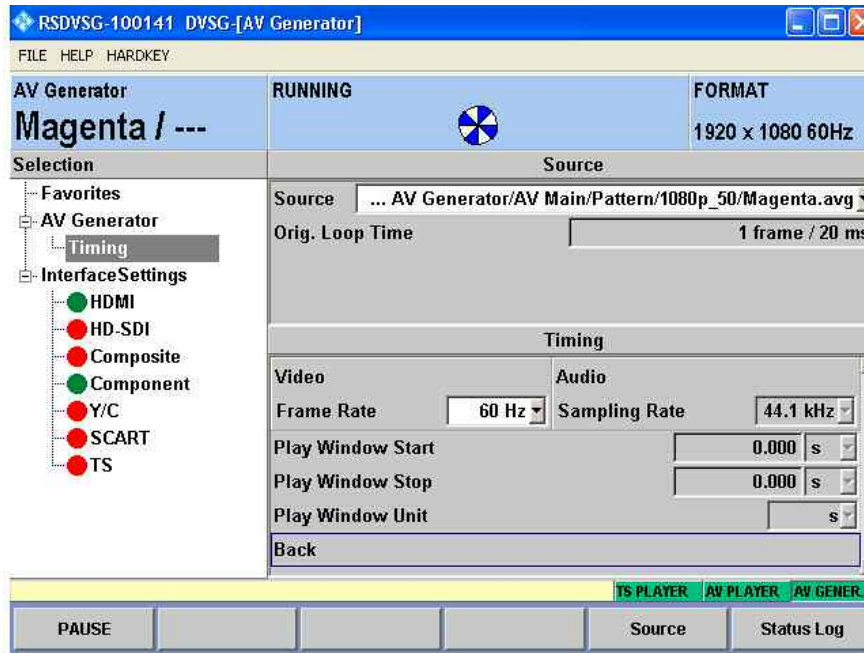


TIP:

The AV Generator application can also be selected directly by clicking the desired application in the status field.



Figure 2.3-1 AV Generator application



The AV Generator application with the information area appears in the upper third of the display, the generator tree on the left side of the display and the associated work view.

2.3.2 Selecting a Signal and Starting Replay

The AV generator starts automatically with the signal last used. To select a new signal, use the cursor keys to select the **Source** line in the work view and confirm by pressing the ENTER key.

In the following dialog, select a signal that has already been used, or open a file box via **Open File**.

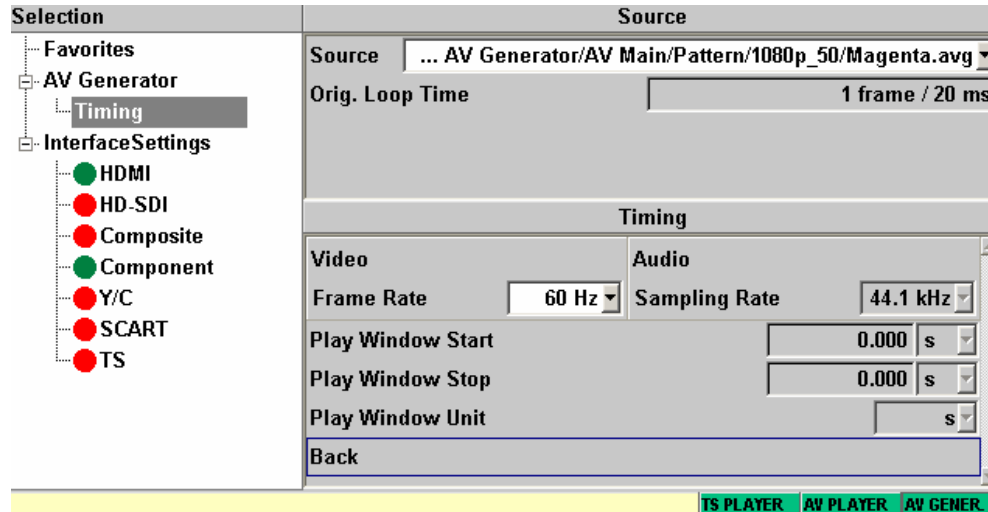
Figure 2.3-2 Selecting an AV signal from internal hard drive



After a signal has been selected, replay starts automatically. In selecting a signal, you also define the video standard with resolution and frame rate. This also determines at which signal outputs the signal is output.

These signal outputs are indicated by a green light field in the navigation tree.

Figure 2.3-3 Green light fields in the navigation tree indicate which signal outputs are active for the selected signal



2.4 Playing and Recording MPEG Transport Streams (R&S DVSG-K20 Option)

Digital transmission methods require video or audio transport streams as a baseband signal. The optional integrated transport stream player and recorder enables the R&S DVSG to generate both.

TS player

The stream player provides test streams and allows you to generate endless and seamless high bit-rate MPEG-2 transport streams. The SDTV transport stream library integrated as standard includes ATSC and DVB test streams. The numerous Rohde & Schwarz transport streams cover a wide variety of applications and test scenarios.

Transport stream libraries

A large number of additional libraries can be integrated. They make development faster and easier and allow new products to be tested.

- ◆ SDTV: test streams for DVB and ATSC
(included in the R&S DVSG-K20 option)
- ◆ HDTV: tests of HDTV receivers
- ◆ DVB-H: tests of mobile receivers
- ◆ ISDB-T: test streams
- ◆ H.264: test streams
- ◆ TCM: STB tests

The range of transport stream libraries is constantly being expanded.

TRP player

The TRP player ideally complements the TS generator and permits users to replay their own transport streams in TRP format. The transport streams can be copied via the USB or LAN interface to the R&S DVSG file system and be replayed from there.

Compatible with the advanced stream combiner from Rohde & Schwarz

The R&S DV-ASC advanced stream combiner provides full flexibility when generating your own streams, which can be used with the R&S DVSG TS generator. It allows you to generate your own transport streams, also for DVB-H.

Transport stream recorder

The transport stream recorder allows recording of transport streams on hard disk using a variety of word widths and formats.

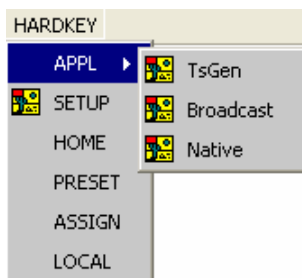
2.4.1 Playing MPEG Transport Streams (R&S DVSG-K20 Option)

2.4.1.1 Selecting the TS Generator Application

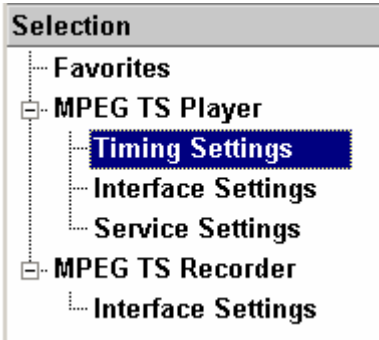
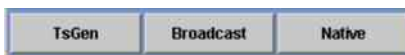
To play a transport stream, the TS Generator application must be started and the Player function selected.



Press the APPL key to choose an application.



Select **TsGen** using the rotary knob or the softkey.



Use the cursor keys to select **Timing Settings** in the tree.

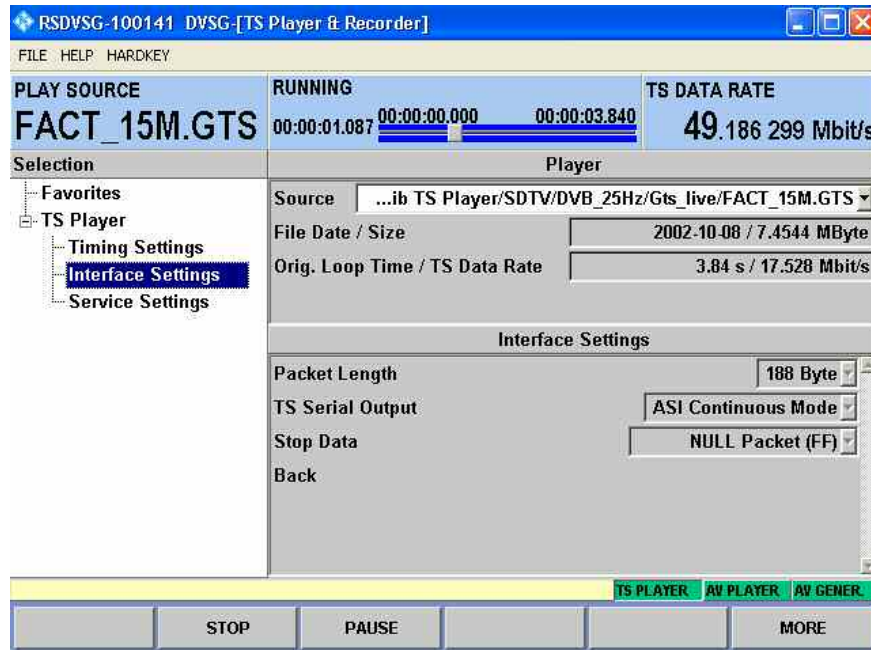


TIP:

The TS Generator application can also be selected directly by clicking the desired application in the status line.



Figure 2.4-1 TS Generator application



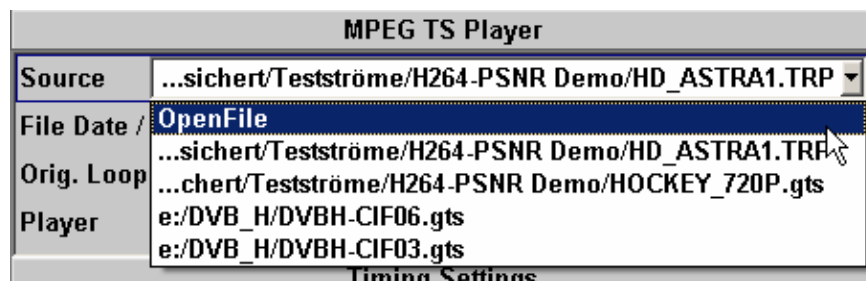
The TS Generator application with the generator information area appears in the upper third of the display, the generator tree on the left side of the display and the associated work view.

2.4.1.2 Selecting a Transport Stream and Starting Replay

The TS generator starts automatically with the transport stream last used. To select a new signal, use the cursor keys to select the **Source** menu item in the work view and confirm by pressing the ENTER key.

In the following dialog, select a signal that has already been used, or open a file dialog via **Open File**.

Figure 2.4-2 Selecting a transport stream



After a signal has been selected, replay starts automatically.

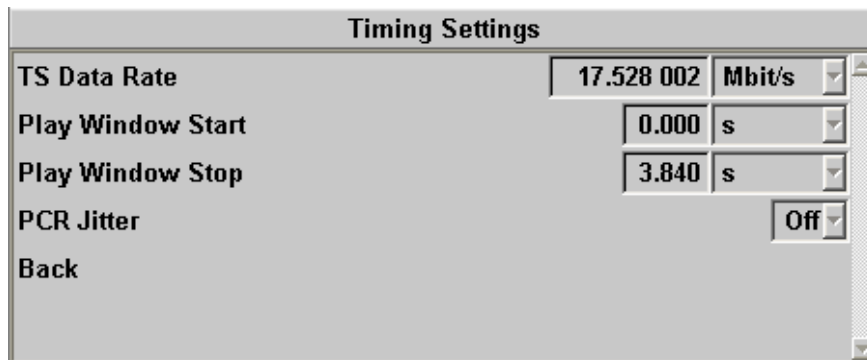
2.4.1.3 Selecting Timing Settings (Optional)

The selected transport stream can be played using changed timing settings. The following features are available:

- ◆ **TS Data Rate**
Changes the transport stream data rate.
- ◆ **Play Window Start/Stop**
Defines the segment of the selected transport stream to be played.
- ◆ **PCR Jitter**
Plays the transport stream with a defined PCR jitter.

To change the interface settings, use the rotary knob in the tree (left side) to select **Timing Settings** and end the replay using the **Stop** softkey.

Figure 2.4-3 Timing Settings dialog



The image shows a dialog box titled "Timing Settings". It contains the following fields and controls:

Setting	Value	Unit
TS Data Rate	17.528 002	Mbit/s
Play Window Start	0.000	s
Play Window Stop	3.840	s
PCR Jitter	Off	

There is also a "Back" button at the bottom left of the dialog.

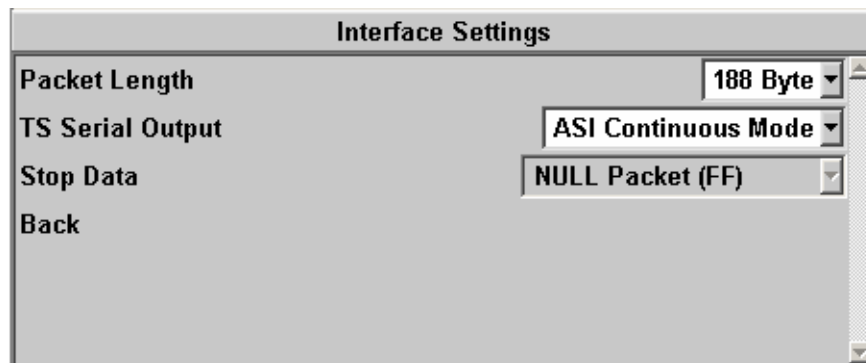
2.4.1.4 Setting the Interface (Optional)

The following interface settings can be changed for the replay:

- ◆ Packet Length
Length of the transport stream packets.
- ◆ TS Serial Output
Playback mode of the serial interface.
- ◆ Stop Data
Contents of the stop data.

To change the interface settings, use the rotary knob in the tree (left side) to select **Interface Settings** and end the replay using the **Stop** softkey.

Figure 2.4-4 Interface Settings dialog



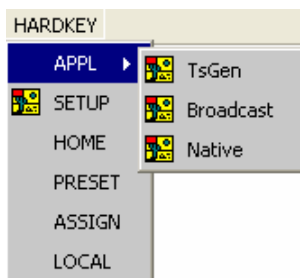
2.4.2 Recording MPEG Transport Streams (R&S DVSG-K20 Option)

2.4.2.1 Selecting the TS Recorder Application

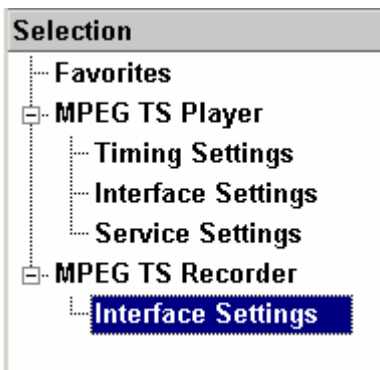
To record a transport stream, the TS Generator application must be started and the Recorder function selected.



Press the APPL key to choose an application.



Select **TsGen** using the rotary knob or the softkey.



Use the cursor keys to select **Interface Settings** under **MPEG TS Recorder**.

If **MPEG TS Recorder** is not visible in the tree, a transport stream is currently being played with the TS player. To be able to record a transport stream, you must first end the replay using the **Stop** softkey.

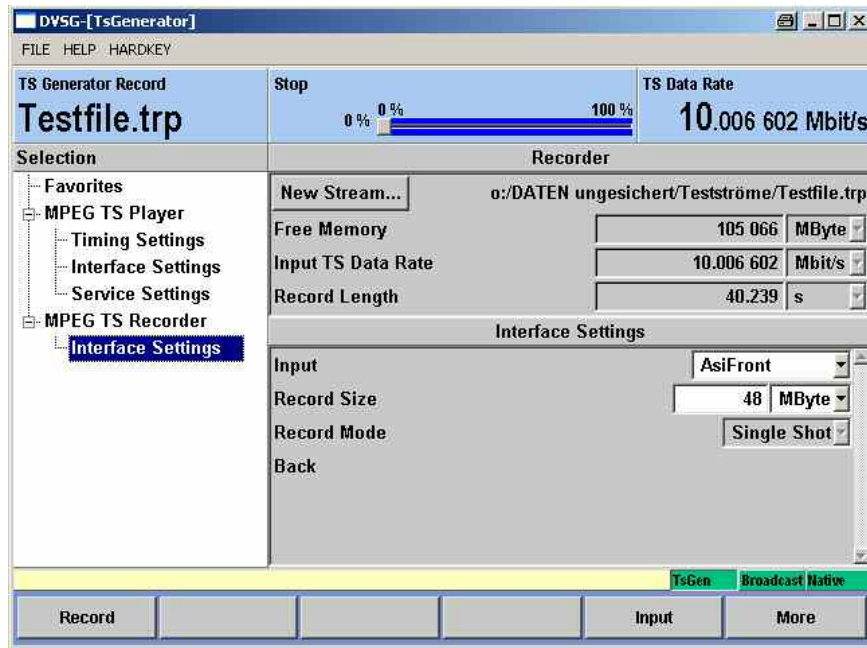


TIP:

The TS Generator application can also be selected directly by clicking the desired application in the status line.



Figure 2.4-5 TS Recorder application



The TS Recorder application with the generator information area appears in the upper third of the display, the generator tree on the left side of the display and the associated work view.

The available memory space, the data rate of the current transport stream and the expected length of the recording are indicated at the top of the work view. The record length is automatically calculated from the transport stream data rate and the set record size selected further below.

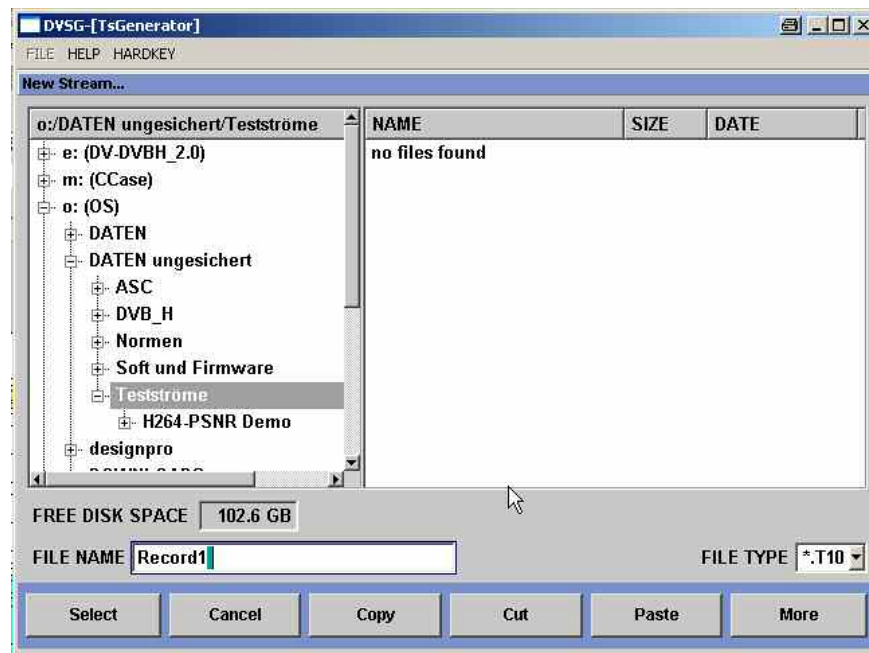
2.4.2.2 Selecting the Memory Location for the Transport Stream

Using the cursor keys, select the **New Stream** menu item in the work

view and confirm by pressing the  key.

In the following dialog, a file dialog opens for selecting the memory location and assigning a file name.

Figure 2.4-6 TS recorder file dialog



Select a memory location using the cursor keys and enter a file name via a keyboard.

Confirm your entries with the  key.

2.4.2.3 Selecting a Signal Input

Using the cursor keys, select the **Input** menu item in the work view and

open the selection dialog with the  key. Select the desired input in the subsequent selection dialog.

2.4.2.4 Defining the Recording Length

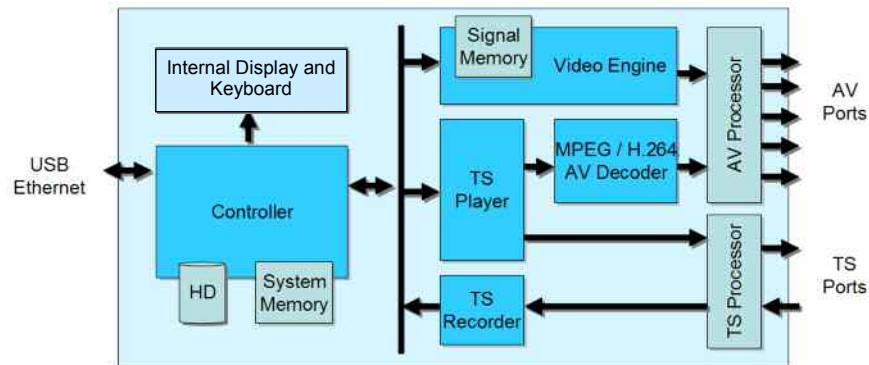
Using the cursor keys, select the **Record Size** menu item in the work view and enter the desired record size via the numeric keypad.

2.4.2.5 Starting the Recording

Start the recording with the **Record** softkey.

2.5 Basic Hardware Concept

Figure 2.5-1 The R&S DVSG functional diagram



The R&S DVSG is based on a flexible hardware platform.

The high-performance **controller** allows fast operation of all instrument functions. Owing to the Windows XP Embedded™ operating system, the instrument can be easily integrated into existing networks.

The **video engine** is used to generate native AV sequences. The fast signal memory makes it possible to create test signals with high resolutions and moving elements. (AV Generator application)

The **TS player** plays MPEG transport streams. In combination with the **MPEG/H.264 AV decoder**, it also generates broadcast AV signals. This makes it possible to assess DUTs using exactly those signals that occur later on in operation. Depending on the operating mode, the transport streams come directly from the **system memory** or from the **hard disk**. (TS and AV Player application)

The **AV processor** operates all audio/video interfaces for uncompressed TV signals. Transport streams are controlled via the **TS processor**.

3 Manual Operation

3.1 Introduction

The instrument can be operated manually in several different ways:

◆ **Controls on the front panel:**

The instrument is operated using the buttons on the front panel and the rotary knob. Pressing the rotary knob has the same function as pressing the ENTER key.

◆ **External keyboard and mouse:**

A USB keyboard and also a USB mouse can be connected to the USB jacks on the front panel or the rear panel.

The hardkeys of the instrument can be selected in the **HARDKEY** menu.




◆ **Remote operation:**

The instrument can be operated if so desired using remote operation (e.g. with Remote Desktop or VNC).

The instrument has to be connected to an Ethernet network. The Ethernet address is used to connect the PC and instrument. The screen of the R&S DVSG is then displayed on the PC monitor. The R&S DVSG can now be operated with the PC keyboard and mouse. The hardkeys of the instrument can be selected in the **HARDKEY** menu.

Equal access rights for manual operation

The access rights are the same whether the instrument is operated using the front-panel controls or the keyboard and mouse.

Use the rotary knob and the buttons on the front panel ( ) to navigate in the tree. Each entry is terminated with the  key. The rotary knob and its Enter function (press the rotary knob) can be used for navigation purposes too.


Navigation in the tree is possible using the USB keyboard and the cursor keys (or the USB mouse and the mouse buttons).

Local operation and remote operation also have equal access rights during VNC operation. In “Remote Desktop” mode, remote operation is the only choice.

All operating modes are possible simultaneously

Example:

During VNC operation using a connected PC, a user selects the **Setup** menu item in the menu tree using the USB mouse. At the same time, another user can change the value using the rotary knob and the numerical keys on the instrument's front panel.


The entry can be terminated using the  key on the instrument or the Enter key with the USB mouse that is connected.

3.2 Operation Concept

Different Applications in the R&S DVSG

The R&S DVSG is an instrument platform that is designed for diverse applications (e.g. TS Player & Recorder, AV Broadcast Signal Player, AV Native Sequence Generator). These applications are like separate units and operates independently of the other applications.

Selecting the Application

When you press the  key, the applications available in the instrument will be displayed above the soft keys. Select the application to appear in the foreground.

To change the settings or to read off the measured values, navigate in the application's tree. The main parameters of each application are shown in the INFO area. The softkey assignments will change when you change applications. All of the other applications will be in the background. They are displayed when you switch to them.

Information About the Different Applications


To obtain details about settings or measured values for a specific application, you must select the application in question (i.e. bring it to the foreground). In each application, there is a different number of user fields available in the INFO area. A setting or a measured value from another application can be shown in these user fields.

Navigating in the Tree


The menu tree is used to navigate in the application's menus. The tree consists of main items and sub items (where necessary). The position in the tree of the currently selected application is marked accordingly.

Use the rotary knob to navigate in the vertical direction or place the mouse pointer on a tree element and mark it by means of a mouse click.

The marker will appear at the location where the cursor is currently located. This marker will move appropriately. Any sub items present in the branches of the tree can be opened and closed for a given main item.

Open and close the sub items with the  button or by pressing the rotary knob. Double-clicking the mouse will have the same effect.

When navigating with the rotary knob in the opened tree, you will automatically branch to the subtree. After passing through the subtree, you will reach the next main item in the tree.


Each work view has a corresponding tree element that is always displayed in relation to the marking in the tree. The work view changes dynamically based on how you navigate in the tree. If the marker is on a sub item in the tree or on a main item without any sub items, the work view can be activated by pressing the  key.


Double-clicking the mouse will have the same effect. The tree will stay marked at the place that you switched to in the work view.

Navigating in the Work View

You can use the rotary knob and the cursor keys to navigate in the work view. The marker in the work view will follow the cursor commands. Using the rotary knob, you can mark all of the selectable items in the work view one after the other. When using the mouse, you can place the mouse pointer on a selected item.

Use the  key (ESCAPE) or the  button to exit the work view. The **Back** menu item in the work view has the same function.

If you exit a given work view, you can press the  key to reactivate it.

The  key does not have the same effect.


Actions in the Work View




You can switch a parameter (toggle function), e.g. ON/OFF.


You can make a selection, e.g. 1 out of n selection.

You can enter values, e.g. a frequency value.

However, the relevant parameter must be marked in the work view to perform such actions.

Pressing the  key, pressing the rotary knob, or double-clicking the mouse immediately executes a toggle function. A selection or value input is now activated.

A window will open after you make your selection. Use the cursor or rotary knob to make your selection and terminate your entry with the  key. Use the  key to exit the window without changing the values. The input area is activated in case you need to input values. A value that is already present can be modified using the cursor keys and/or the rotary knob. The change will take effect immediately. Use the digit keys on the front panel or the external keyboard (if present) to enter a new numerical value. Terminate your entry with the  key. When entering frequencies or levels, you can also use the unit keys on the front panel.

If you want to exit the input area without making a change, press the  key.

As soon as the action is terminated in the work view and then executed, the parameter will be updated (assuming it is used in an INFO field).

Fast Access to Commonly Used Menu Items With Favorites

To allow fast access to commonly used menu items, you can add any of the menu items to your favorites. (You can also delete them from the favorites if you need to.)

The list of favorites can be accessed from every application. Menu items can be added to the list of favorites from any application. This allows fast operation that goes beyond individual applications.

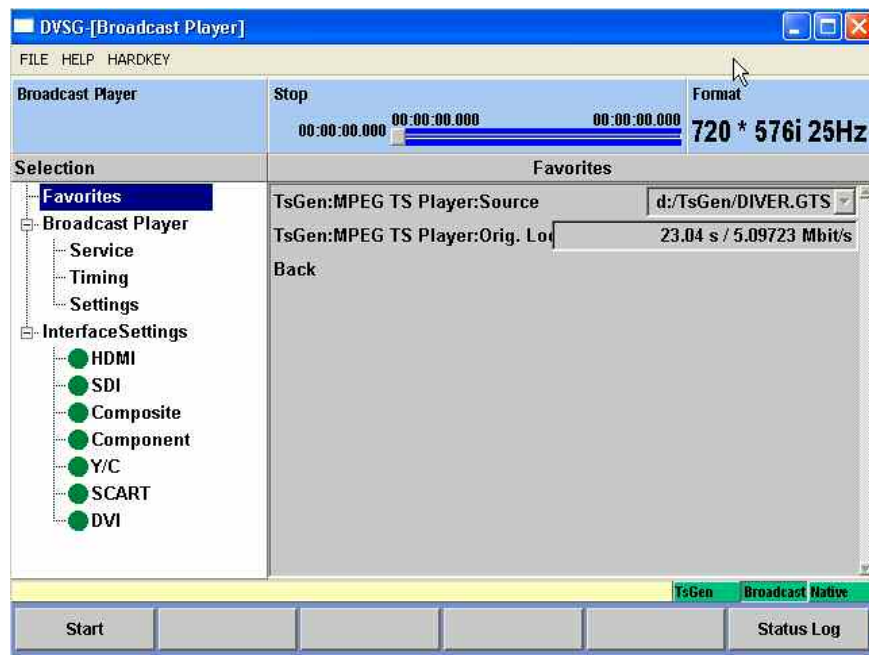
Press the HOME hardkey to call up the **Favorites** in the tree of the application in question. Since the favorites can contain menu items from all of the applications, the operating speed will be significantly higher with the HOME hardkey.

3.3 Display

3.3.1 Graphical User Interface

The display content depends on the current application and the selected operating mode.

Figure 3.3-1 Graphical user interface



Menu bar

Contains the **FILE**, **HELP**, and **HARDKEY** menus. The **HARDKEY** menu provides additional access to the hardkeys on the front panel (used primarily for remote operation).

Information area

Displays the main parameters for the selected application.

Tree

To navigate within the main areas of the active application.

Work view

Displays the parameters for the active application. Parameters can be modified here.

Error / status display

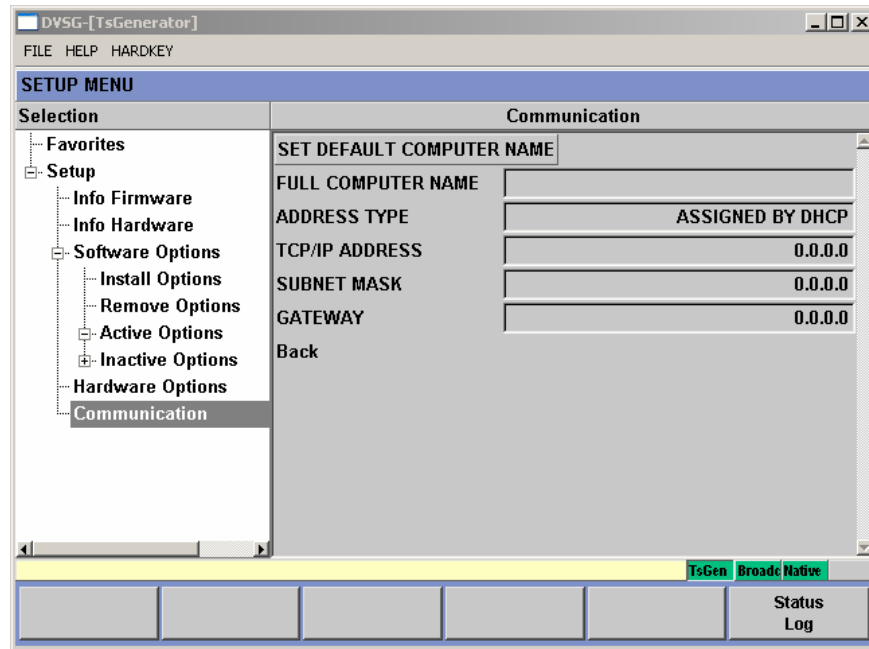
Displays the current error messages and warnings for the application that is running. Shows overview of other active applications.

Softkey labels

Displays the executable commands. The keys for execution of commands, so-called softkeys, are positioned directly below on the front panel.

3.3.2 Setup

Figure 3.3-2 Setup menu



Menu Bar

The menu bar shows all of the information that is relevant for the **Setup** menu.

In this menu bar, you can operate the instrument's front-panel hardkeys from the screen using the mouse. This is also necessary in the case of remote operation (e.g. VNC).

Tree and Work View

The tree is arranged on the left side. You can use the tree to navigate the **Setup** menu items. You can open and close the existing branches of the tree.

Located to the right of the tree is the work view, which corresponds to the selected tree element. In the work view for Setup, you can input data and make settings that apply to the whole instrument (i.e. all applications).

The user can also get information about the software version used in the instrument.

Calibration routines and software updates are also activated here.

Error / Status Display

Error messages for the current application are shown in the upper line. Warnings are displayed in the lower line.

The right part of the two lines contains fields that show all of the active applications.

Softkey Labels

There are six softkeys. The labeling for the softkeys can vary from tree element to tree element.

3.4 Tree Overview

The trees for various applications are shown below:

Figure 3.4-1 The TS Player and Recorder tree

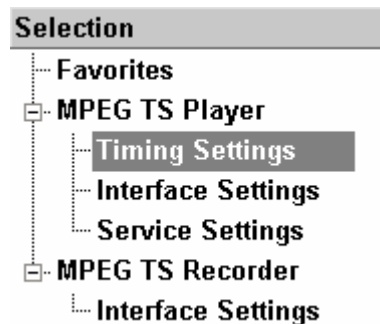
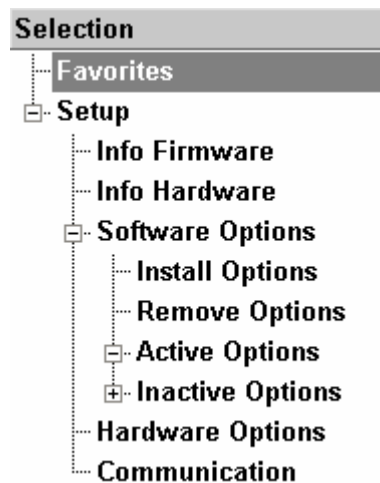


Figure 3.4-2 The Setup tree

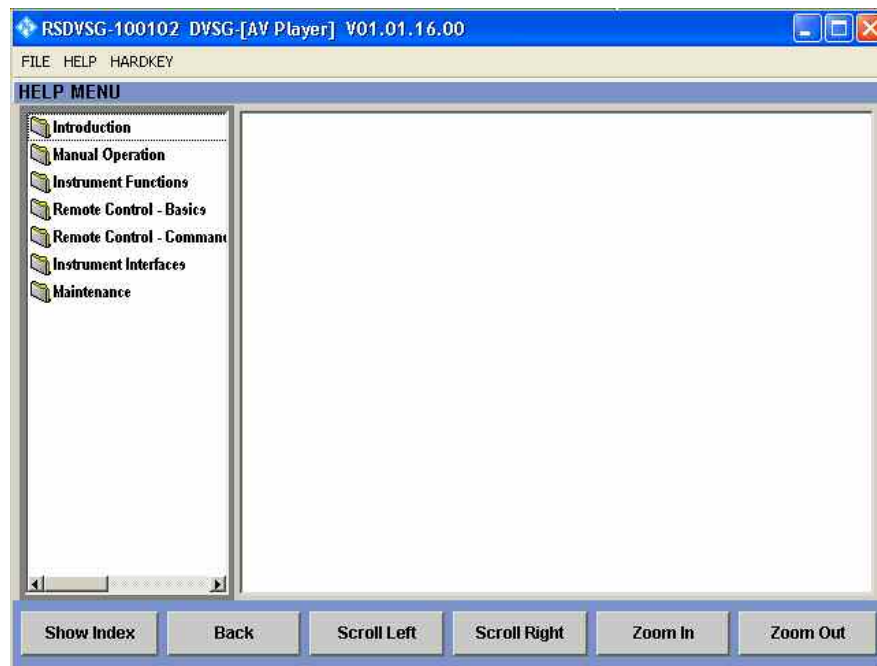


3.5 Help System

The instrument has a context-sensitive help system. The help system provides a help page for every parameter and can be called up at any time while the instrument is being operated.

The help system has a navigation bar, i.e. starting from the context-sensitive page, you can navigate to other help pages by using the contents list, the index, scroll arrows, and page-internal links.

Figure 3.5-1 Help menu



In addition to the context-sensitive help, online help for all functions of the instrument is compiled on the supplied CD-ROM. This help can be called up on any computer using the Internet Explorer (version 4.0 and higher).

Operating the context-sensitive help

Function	Front panel	Mouse
Open help Help page for selected parameter is displayed.	Press HELP key.	Click HELP/CONTENTS
Close help	Press HELP key again.	Click HELP/CONTENTS
Activate link Help opens linked page.	Highlight link using rotary knob or arrow keys and activate with rotary-knob click or ENTER key.	Click the link.
Scroll through help	Highlight Previous or Next in help window using cursor keys and activate with rotary-knob click or ENTER key.	Click Previous or Next .
Select item from contents list Help page for selected item is displayed.	Press Show Contents button below index list. Highlight item you want using rotary knob or cursor keys and then press rotary knob or ENTER key.	Click Show Contents Click the item.
Select index item Help page for selected item is displayed.	Press Show Index button below contents. Type desired term in entry field and then press rotary knob or ENTER key or highlight item using rotary knob or cursor keys and then press rotary knob or ENTER key.	Click Show Index Click the item.

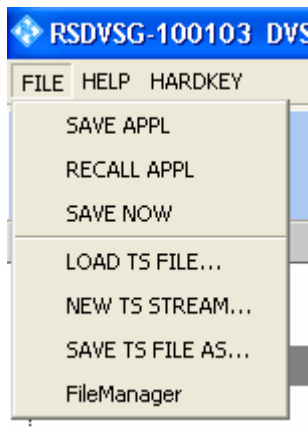
3.6 File Management

The instrument uses files to store all instrument data, i.e. system and user data. User data includes saved instrument settings, fading profiles for the fading option, transport streams for the TS generator option, and curve shapes for the arbitrary waveform generator.

The files are stored on the instrument's hard disk. The D: drive is available for storing user-defined data and can have any number of directory structures. Various default directories are preconfigured; however, you can change them at any time.

The C: drive is a protected system drive. The files on this drive contain data that must not be changed. Therefore, this drive should not be accessed since reconstruction of the system partition will lead to data loss. To prevent system files from being deleted or overwritten inadvertently, the C: drive is not displayed in the **FILE** menu. It can be accessed by disabling a protection level (see **Protection Level** in the **Setup** menu).

Figure 3.6-1 FILE menu



Files can be exchanged either via a memory stick or a connected network.

A memory stick is connected to the USB interface and is assigned the E:\ drive.

When the instrument is connected to a network, you will also see all of the network drives for which you have access rights.

You can access the **FILE** menu via the FILE key or the menu bar.

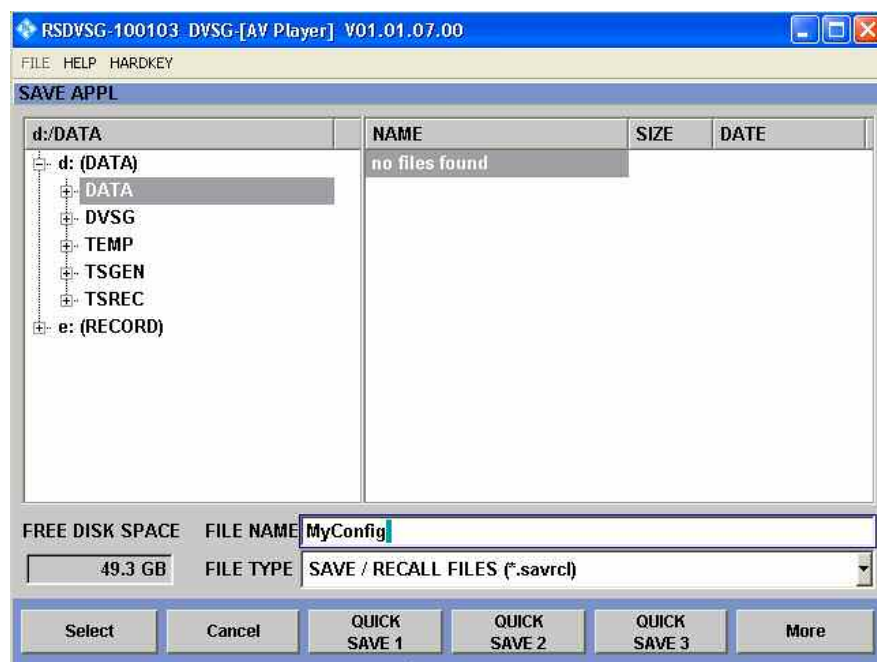
SAVE APPL

The available drives and directories are shown on the left-hand side, and the files in the selected directory are shown on the right-hand side. Only the relevant files (without file extensions) are shown.

Any file name can be used when saving and creating files; the file extension, however, is assigned automatically and cannot be entered. The file is saved on the selected path.

SAVE APPL calls the menu for storing the current instrument setting.

Figure 3.6-2 The **SAVE APPL** menu



The available drives and directories are shown on the left-hand side, and the files in the selected directory are shown on the right-hand side.

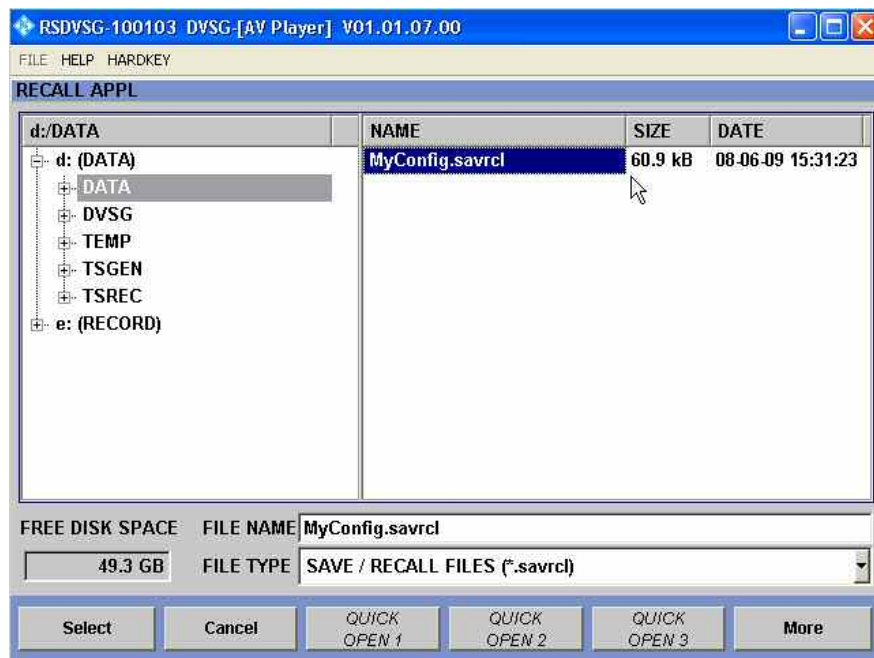
- ◆ **"Directory"** Selects the directory in which the file is to be stored.
- ◆ **DISK FREE SPACE** Displays the available disk space.
- ◆ **FILE NAME** For entering the file name of the file without file extension. This file is then created.
- ◆ **FILE TYPE** For selecting the file extension.
- ◆ **SELECT** Stores the current instrument settings under the specified path.

- ◆ **QUICK SAVE 1-5** Stores the current instrument settings in one of the five intermediate memories. These instrument settings are retained until a different instrument setting is stored in the intermediate memory. When the instrument is switched off, the contents of the intermediate memories are retained.
- ◆ **FILE MANAGER** Calls the **File Management** menu.

RECALL APPL

RECALL APPL calls the menu for calling up a stored instrument setting.

Figure 3.6-3 The **RECALL APPL** menu



The existing modes of operation and listings are indicated on the left side. The files in the selected listing are seen on the right side.

- ◆ **"Directory"** Selects the directory in which the file is to be stored.
- ◆ **DISK FREE SPACE** Displays the available disk space.
- ◆ **FILE NAME** For entering the file name of the file without file extension. This file is then created.
- ◆ **FILE TYPE** For selecting the file extension.
- ◆ **SELECT** Stores the current instrument settings under the specified path.

- ◆ **QUICK SAVE 1-5** Stores the current instrument settings in one of the five intermediate memories. These instrument settings are retained until a different instrument setting is stored in the intermediate memory. When the instrument is switched off, the contents of the intermediate memories are retained.
- ◆ **FILE MANAGER** Calls the **File Management** menu.

Remote control commands:

SAVE APPL

*SAV 1; MMEMemory:STORe:STATe 1, <string>

Example for <string>: "D:\DATA\SaveApplExample.savrcf"

RECALL APPL

MMEMemory:LOAD:STATe 1, <string>; *RCL 1

Example for <string>: "D:\DATA\SaveApplExample.savrcf"

SAVE NOW

No remote command available

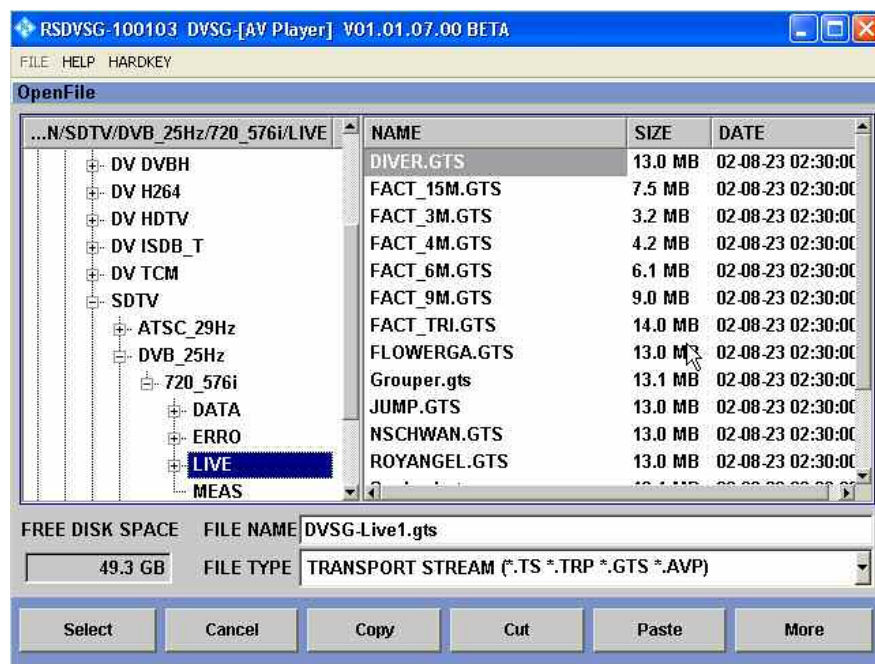
SAVE NOW

For storing the current instrument setting immediately.

FileManager

The **File Management** menu provides all the functions required for file management. Directories can be created, and files copied, deleted, and moved between the directories on the drives (hard disk, memory stick, and network drives).

Figure 3.6-4 FileManager



The available drives and directories are shown on the left-hand side, and the files in the selected directory are shown on the right-hand side.

The buttons/softkeys trigger the assigned action, e.g. copying, moving, or deleting the highlighted file.

In addition, it is possible to create a new directory in the level below the highlighted directory.

◆ **Moving file:**

Highlight the file and then use the **CUT** button/softkey. Highlight the directory to which the file is to be moved and then use the **PASTE** button/softkey. If a file with the same name already exists in the target directory, a confirmation query appears which the user must acknowledge before the file will be overwritten.

◆ **Copying file:**

Highlight the file and then use the **COPY** button/softkey. Highlight the directory to which the file is to be copied and then use the **PASTE** button/softkey. If a file with the same name already exists in the target directory, a confirmation query appears which the user must acknowledge before the file is overwritten.

◆ **Renaming file:**

Highlight the file and then use the **RENAME** button/softkey. A window opens in which the new file name can be entered. Enter the name and press the Enter key. If a file with the same name already exists, a confirmation query appears which the user must acknowledge before the file is overwritten.

◆ **Deleting file:**

Highlight the file and then use the **DELETE** button/softkey. A confirmation query then appears which the user must acknowledge before the file is deleted.

◆ **Creating a new directory:**

Highlight the drive or directory level under which the new directory is to be created, and then use the **NEW FOLDER** button/softkey. A window opens in which the new directory name can be entered. Enter the name and press the Enter key.

Table 3.6-1 List of user-file extensions that are assigned automatically in the instrument

List type	Content	File extension
Instrument state	Instrument settings	*.savrc1
Transport stream	MPEG data files	*.trp *.ts *.gts
AV Player	AV data files	*.avp

Remote control commands:**FILE MANAGER**

MMEMemory:ATTRibute
MMEMemory:CATalog:LENGth?/qonly/
MMEMemory:CATalog?/qonly/
MMEMemory:CDIRectory
MMEMemory:COPI/nquery/
MMEMemory:DATA
MMEMemory:DCATalog:LENGth?/qonly/
MMEMemory:DCATalog?/qonly/
MMEMemory:DELeTe/nquery/
MMEMemory:DRIVes?/qonly/
MMEMemory:LOAD:STATe/nquery/
MMEMemory:MDIRectory/nquery/
MMEMemory:MOVE/nquery/
MMEMemory:MSIS
MMEMemory:RDIRectory/nquery/
MMEMemory:STORe:STATe/nquery/

3.7 Manual Remote Operation

The instrument can be remote-controlled from an external PC. This allows the convenient operation of the instrument from the desktop although the instrument is integrated in a rack in the next room.

Manual remote control (in contrast to **remote control**) does not use remote-control commands but separate Windows software, which is installed on the external PC.

There are two choices: use of VNC or Remote Desktop.

3.7.1 Remote Desktop

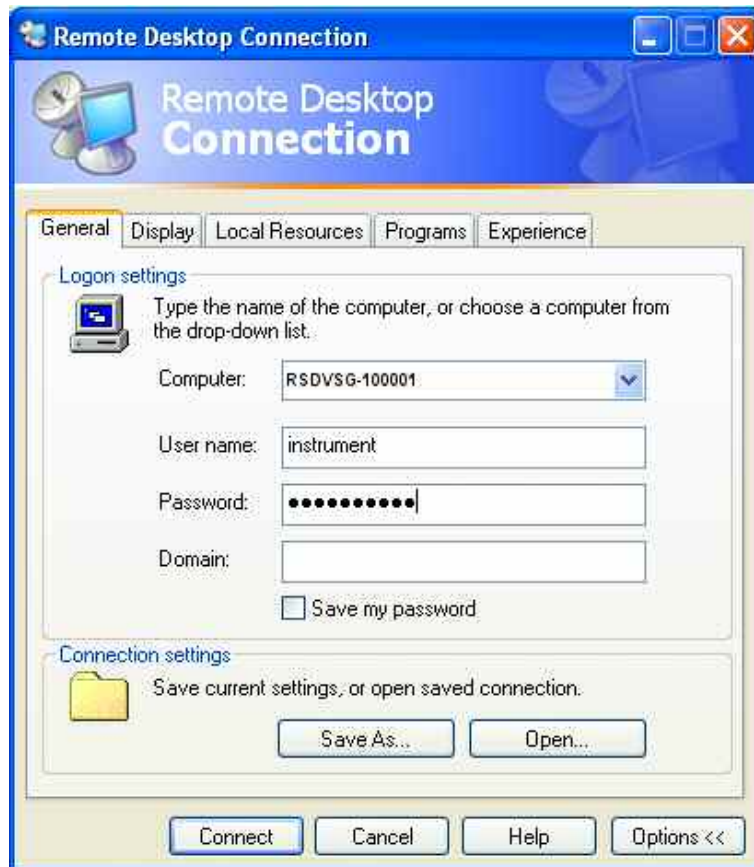
When started, the Windows XP **Remote Desktop Connection** software simulates the instrument user interface. This allows the instrument to be manually operated from the external computer in the same way as from the instrument itself.

Two preconditions for manual control are a connection between the instrument and the PC via a LAN network and the installation of the software on the PC.

The procedures for setting up a connection and installing the remote operation software on the external computer are described in Chapter 1.

Manual remote control is started on the external computer by calling up the **Remote Desktop Connection** program and clicking the **Connect** button. The instrument must be selected for remote control, i.e. its computer name must be displayed in the **Computer:** window.

If the PC is configured for the remote-control of multiple instruments, the instruments are in the list selected with the button. The user ID and password (**instrument** in both cases) can be stored when the software is first installed. The entries are made in the extended dialog displayed by clicking the **Options>>** button.



After login, the instrument firmware of the instrument boots on the external PC. After booting is completed, the instrument's screen appears and the instrument is ready for manual remote control from the external computer. The start settings that were active before the connection was established are used unless another start setting is explicitly selected in the **FILE** menu. The individual functions are operated using the mouse and keyboard. Front-panel keys that are not directly available on the keyboard can be substituted by key combinations (see table in the section below).

The device GUI of the instrument is disabled when the connection is set up. Operation from the instrument itself is not possible during manual remote control. Access by an external computer and the identity of the remote user is indicated on the login display of Windows XP Embedded.

For return to direct operation on the instrument, the external user must be logged off and the local user logged on.

The external user can log off in the **Start** menu on the external controller by clicking **Disconnect** in the lower right-hand corner of the dialog.



This logoff is also possible in the remote-control message window on the instrument.

Login of the local user is possible only in the remote-control display on the instrument. In the instrument, the local user can log in with the name "**instrument**" as standard; the password is also "**instrument**".

After local login, the instrument software starts with the settings made during manual remote control unless another start setup was explicitly selected in the **FILE** menu.

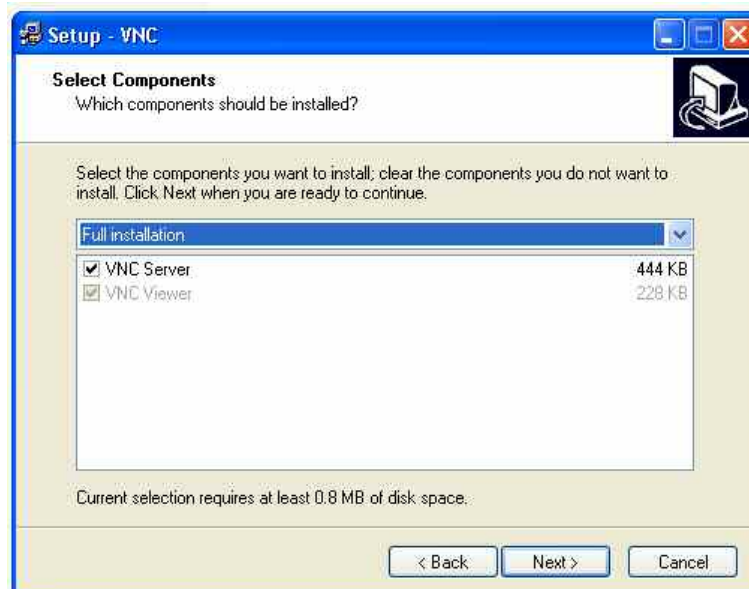
3.7.2 VNC

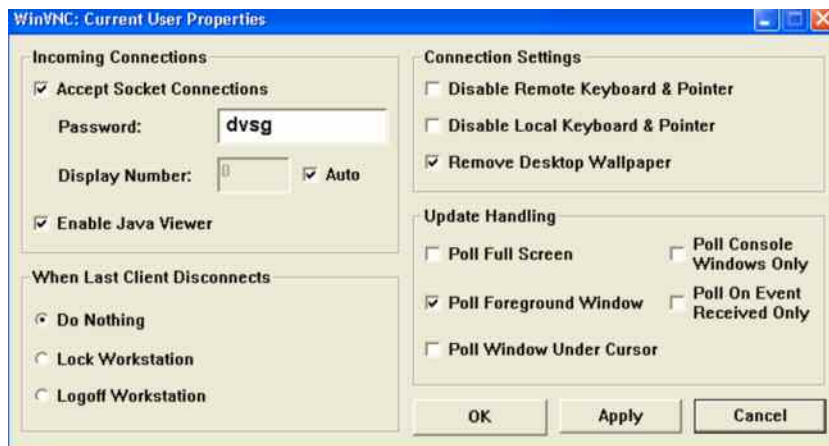
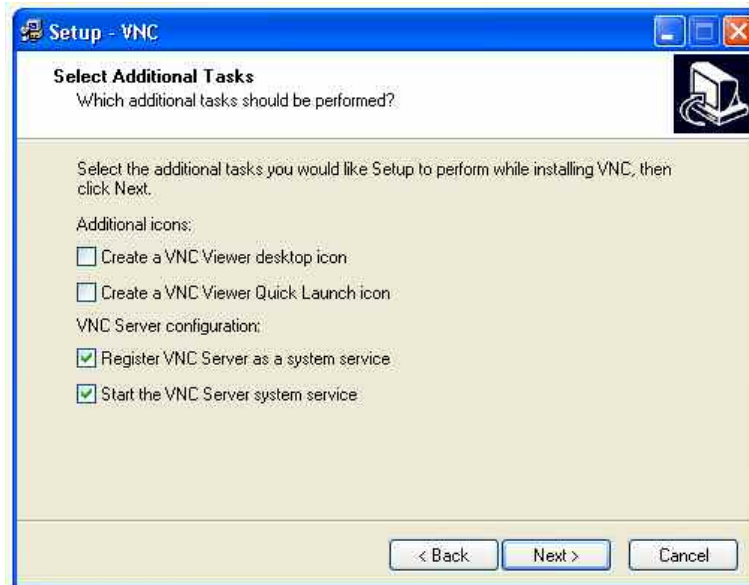
Once VNC is started, VNC simulates the user interface of the instrument. This allows you to operate the instrument manually from an external computer in the same way as from the instrument itself.

Before using VNC for the first time, you have to install it.

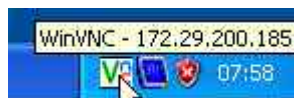
Installing VNC

- ◆ In the **c:\Program Files\VNC** folder, execute the **vnc-3.3-x86_win32.exe** file and follow the instructions using the following settings:





After a successful installation, the VNC icon is displayed in the Notification area.



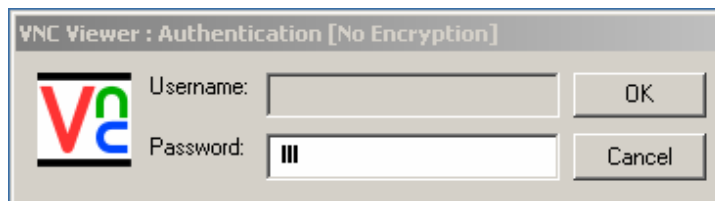
Working with VNC

For manual remote control to work, the following requirements must be met: There must be a connection between the instrument and computer via a LAN, the VNC viewer must be installed on the computer, and the VNC server must be installed on the R&S DVSG.

1. Start manual remote control on the external computer by starting the VNC viewer.
2. Select the instrument as the instrument for remote control, i.e. enter its IP address or computer name in the Connection details dialog.



3. Click **OK** to establish the connection.
You will be prompted for the session password.



4. Enter the password **dvsg** (or as specified above).
The screen of the instrument will appear on the external computer.
5. To end the remote control on the external computer, close the VNC application.

**Note:**

If you need to directly operate the R&S DVSG, it is not necessary to log off the external user.