



System Manual

R&S[®] SCV8000E/R Compact Transmitter

Transmitter Series SCx8000

Only skilled personnel may perform the operations of the described instrument that are necessary for installing and putting it into operation as well as maintaining, troubleshooting and servicing it.

Printed in Germany

System Manual
Transmitter Series SCx8000
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Certified Quality System

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

DQS REG. NO 001954 QM UM

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Sie haben sich für den Kauf eines Rohde & Schwarz-Produktes entschieden. Hiermit erhalten Sie ein nach modernsten Fertigungsverfahren 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

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DIN EN ISO 14001:2004



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**Für Betrieb im Europäischen Wirtschaftsraum (EWR)
und zivilem Einsatz.**

Hinweis gemäß dem Gesetz über "Funkanlagen und Telekommunikationsend-einrichtungen" (FTEG) und der Europäischen Richtlinie 1999/5/EG:

Dieses Produkt darf innerhalb des EWR nicht uneingeschränkt betrieben werden, da der verwendete Frequenzbereich auf nicht harmonisierten Bändern erfolgt. Nationale Vorschriften / Genehmigungen sind zu beachten.

Das Gerät ist 4 Wochen vor Inverkehrbringen bei der jeweils zuständigen nationalen Behörde für die Frequenzhoheit zu notifizieren. Informationen hierzu im Internet unter folgender Adresse: <http://europa.eu.int/comm/enterprise/rtte/spectr.htm>

**For operation in the European Economic Area (EEA)
and civil use.**

Note pursuant to the German Radio and Telecommunications Terminal Equipment Directive (FTEG) and the European R&TTE Directive 1999/5/EC:

Operation of this product within the EEA is subject to restrictions since the frequency bands used are not harmonised. National provisions / authorizations shall be complied with.

The product shall be notified to the competent national frequency management authority four weeks before the product is put on the market.

For more information refer to: <http://europa.eu.int/comm/enterprise/rtte/spectr.htm>

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CHAPTER 1

SAFETY INSTRUCTIONS

Kundeninformation zur Batterieverordnung (BattV)

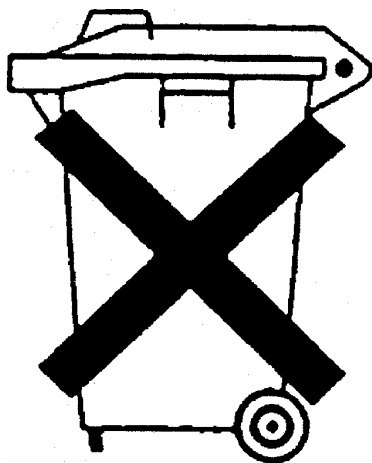
Dieses Gerät enthält eine schadstoffhaltige Batterie. Diese darf nicht mit dem Hausmüll entsorgt werden.

Nach Ende der Lebensdauer darf die Entsorgung nur über eine Rohde&Schwarz-Kundendienststelle oder eine geeignete Sammelstelle erfolgen.

Safety Regulations for Batteries (according to BattV)

This equipment houses a battery containing harmful substances that must not be disposed of as normal household waste.

After its useful life, the battery may only be disposed of at a Rohde & Schwarz service center or at a suitable depot.



Normas de Seguridad para Baterías (Según BattV)

Este equipo lleva una batería que contiene sustancias perjudiciales, que no se debe desechar en los contenedores de basura domésticos.

Después de la vida útil, la batería sólo se podrá eliminar en un centro de servicio de Rohde & Schwarz o en un depósito apropiado.

Consignes de sécurité pour batteries (selon BattV)

Cet appareil est équipé d'une pile comprenant des substances nocives. Ne jamais la jeter dans une poubelle pour ordures ménagères.

Une pile usagée doit uniquement être éliminée par un centre de service client de Rohde & Schwarz ou peut être collectée pour être traitée spécialement comme déchets dangereux.

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1 About this Manual

This manual is part of the documentation for the SCV8000 family of transmitters from Rohde & Schwarz. The individual manuals of the family of transmitters are modular in structure and complement each other.

Structure

Each transmitter component is described in a separate manual and can thus be used as an individual component (where practical). The transmitter manual is the main document for the entire set of documentation. It describes all steps that are necessary to install a transmitter, put it into operation, operate and maintain it. Where applicable, the transmitter manual refers to the individual manuals for the various components. The component manuals, in turn, also refer to the transmitter manual whenever the component is to be used as a transmitter module.

Contents

The manuals for the family of transmitters describe all steps required to install the transmitter or one of its components, put them into operation, operate and maintain them, troubleshoot and service them. The Annex includes interface descriptions plus technical documents.

For convenience, all manuals are structured identically. Sections that are not relevant to the manual at hand are also included but are left blank.

Safety

All skilled personnel working with a transmitter or its components must read all relevant manuals and comply with the safety measures that are detailed in the chapter about safety and in the applicable sections in the manual. The transmitter and the individual transmitter components must be used only for their intended purpose. All operations involving the transmitter or individual transmitter components must be performed by skilled personnel. The manual will point out specifically if additional qualifications are required.

Symbols and Layout

The triangular warning symbol indicates danger. In addition to the triangular warning symbol, different key words indicate the level of potential danger.

Instructions are given in numbered steps or indicated by an "index finger" symbol to the left of the instruction text. The results of the performed instructions are indented.

The key word "Note" precedes notes. Notes contain additional information and tips to help facilitate the work at hand.

All other formatting options add structure to the text and are self-explanatory.

2 Safety Instructions for Transmitter Systems and Instruments



ATTENTION!

The safety instructions provided in this manual must be complied with!

Pay special attention to the following points:

- Only skilled personnel may perform electrical installation and electrical connection tasks.
- Always follow the relevant national and international safety rules and regulations when equipping operating areas and when setting up and operating electrical equipment.
These rules and regulations include for example:
 - Protective measures to prevent accidents
 - Protective measures to prevent overvoltage
 - Insulation status of electrical equipment
 - Grounding of electrical equipment
 - Physical properties and laying of electric lines and cables
 - Regulations applying to industrial premises and areas as well as to special facilities.
- When setting up the rack, observe the country-specific rules for accident prevention, for example with regard to:
 - Risk of getting crushed when working with loads suspended in the air
 - Risk of falling off ladders
 - Risk of injury when lifting heavy objects.
- Use your personal protective equipment for installation and repair work, i.e. wear protective clothing such as helmets, safety gloves and eye protection, depending on the task at hand.
- Operate the equipment and systems only when the cabinet is closed. If you have to open the cabinet for maintenance and repair work, comply with the applicable safety instructions.
- If the equipment and systems are removed from the AC power supply, all poles must be disconnected. Check for and remove any external power supply, i.e. all measuring cables, extension cables, multiple socket outlets (except for special service sockets). Wait for five minutes to ensure that any and all capacitors are sufficiently discharged.
- Additionally with liquid-cooled transmitters: When filling and installing the cooling system (pump unit and heat-exchanger unit), observe the rules for handling hazardous substances (cooling agents); see section "safety data sheets about hazardous substances" under "EU safety data sheet in accordance with 2001/58/EC Antifrogen".

3 General Safety Instructions

This section contains general safety instructions that apply to all products manufactured or distributed by Rohde & Schwarz.

In accordance with IEC 215 and EN 60215, transmitters and their auxiliary equipment must be operated only under the responsibility of skilled personnel. The EN 60215 standard ("Safety requirements for radio transmitting equipment") defines the minimum requirements for skilled electrical personnel.

Complying with all statutory provisions is a precondition for operating radiocommunications systems and equipment. The operator or the operator's authorized representative is responsible for ensuring compliance with these guidelines. They must also ensure that the operating personnel meets the applicable country-specific training requirements. These requirements also include any periodic training that is necessary.

4 Special Danger Warnings

4.1 Hazards due to AC Supply Voltage

There is a risk of electric shock with any $V_{\text{rms}} > 30 \text{ V AC}$ or $V > 60 \text{ V DC}$ voltage. Appropriate measures must be taken to prevent exposure to any danger when working with voltages that bear the risk of electric shock. Never work on live parts unless specifically required and only if the special safety precautions are complied with.

4.1.1 AC Power Supply

- Before connecting the equipment to the AC power supply, make sure that the AC supply data specified on the system or equipment matches the rated data of the local AC supply. The supply circuit must be protected by fuses against overloading and short circuits at all times.
- Miniature modules have neutral conductor fuses. As a result, the power supply may still be connected even after interruption of the circuit by a fuse.

4.1.2 Replacing Fuses

- Replace the safety fuses accessible in the operator area only if no voltage is being applied to the instruments. The safety fuses may be replaced only by fuses with identical electric data, identical switching characteristics and identical switch-off capacity.
- Motor and line circuit breakers accessible in the transmitter's operator area may be operated. If their response range is selectable, do not change the settings made by the manufacturer. If the settings are accidentally changed, reset them by using the correct values specified in this documentation.

4.2 Hazards due to High-Energy Circuits

The instruments include low-voltage circuits which can be fed from an extremely low-impedance voltage source (e.g. amplifier operating voltage). These circuits conduct dangerously large amounts of energy. We handle these circuits in the same manner as circuits with voltages that bear the risk of electric shock. They are usually covered and thus protected against accidental contact. The cover comes with a warning label.

Practical experience has repeatedly shown that a short circuit caused by metal tools can cause severe burns. For safety reasons, high-energy circuits are protected by covers and are thus not accessible within the operator area of the instruments.

- If you need to measure low-impedance voltages, during repair work for example, exercise the same caution as when measuring operating voltages that bear the risk of electric shock.
Wear protective clothing if necessary.
- Before you open an instrument or remove its cover, switch off the operating voltage and wait for five minutes to ensure that any and all capacitors are sufficiently discharged.
- Do not short-circuit capacitors to discharge them.

4.3 RF Hazards

4.3.1 Mandatory Training

- Operators must instruct their personnel on how to use this transmitter or instrument in accordance with EN 60215 and IEC 215. This periodic training must cover the radio-frequency hazards of the individual transmitter or instrument. Only after such training has been provided and documented may the operating personnel handle switching and operating tasks.

High-energy RF circuits within the transmitter or the instrument are routed via conventional detachable RF connectors (e.g. N). Depending on the output power, the transmitter or instrument outputs come with screw-in or pluggable RF lines or ducts.

If RF lines or modules conduct high power, the connection point or the entire module is marked with the standard warning symbol (yellow triangle with black exclamation mark).

4.3.2 RF Shielding

Transmitters and instruments from Rohde & Schwarz are shielded in such a manner that RF radiation does not pose any danger even in the immediate vicinity if all RF lines are closed. This statement is based on the ordinance for electromagnetic fields as defined in German law:

The 26th ordinance for the Federal Emission Protection Law dated December 16, 1996 defines limit values for radio-frequency equipment for electric and magnetic field strengths.

4.3.3 Rules for Operating an Amplifier

Opening RF lines during operation may cause electric arcs. This can cause burns and eye injuries.

- Operate the amplifier only if an antenna or dummy antenna is connected.
- Never undo RF lines during amplifier operation.
- Never open amplifiers or modules during amplifier operation.
- Never put amplifiers into operation if RF lines are open.

4.3.4 Rules for Working with an Open Amplifier

Operating the instrument with RF power is not permitted if the instrument has been opened or its covers removed.

Basic Safety Instructions

Always read through and comply with the following safety instructions!

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

Furthermore, it is your responsibility to use the product in an appropriate manner. This product is designed for use solely in industrial and laboratory environments or, if expressly permitted, also in the field and must not be used in any way that may cause personal injury or property damage. You are responsible if the product is used for any 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.

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

Symbols and safety labels

							
Notice, general danger location Observe product documentation	Caution when handling heavy equipment	Danger of electric shock	Warning! Hot surface	PE terminal	Ground	Ground terminal	Be careful when handling electrostatic sensitive devices

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

Tags and their meaning

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



indicates a hazardous situation which, if not avoided, will result in death or serious injury.



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



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



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

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

These 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 in personal injury or material damage.

Operating states and operating positions

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

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

Electrical safety

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

1. Prior to switching on the product, always ensure that the nominal voltage setting on the product matches the nominal voltage of the AC supply network. If a different voltage is to be set, the power fuse of the product may have to be changed accordingly.
2. In the case of products of safety class I with movable power cord and connector, operation is permitted only on sockets with an earthing contact and protective earth connection.
3. 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.
4. If the product does not have a power switch for disconnection from the AC supply network, the plug of the connecting cable is regarded as the disconnecting device. In such cases, always ensure 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 network. If products without power switches are integrated into racks or systems, a disconnecting device must be provided at the system level.
5. 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, you can ensure that the cable will not be damaged and that no one can be hurt by, for example, tripping over the cable or suffering an electric shock.
6. 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).
7. Do not insert the plug into sockets that are dusty or dirty. Insert the plug firmly and all the way into the socket. Otherwise, sparks that result in fire and/or injuries may occur.
8. Do not overload any sockets, extension cords or connector strips; doing so can cause fire or electric shocks.
9. For measurements in circuits with voltages $V_{rms} > 30 \text{ V}$, suitable measures (e.g. appropriate measuring equipment, fusing, current limiting, electrical separation, insulation) should be taken to avoid any hazards.
10. Ensure that the connections with information technology equipment, e.g. PCs or other industrial computers, comply with the IEC60950-1/EN60950-1 or IEC61010-1/EN 61010-1 standards that apply in each case.
11. Unless expressly permitted, never remove the cover or any part of the housing while the product is in operation. Doing so will expose circuits and components and can lead to injuries, fire or damage to the product.
12. If a product is to be permanently installed, the connection between the 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 licensed electrician.
13. 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 anyone who has access to the product, as well as the product itself, is adequately protected from injury or damage.

Basic Safety Instructions

14. Use suitable overvoltage protection to ensure that no overvoltage (such as that caused by a bolt of lightning) can reach the product. Otherwise, the person operating the product will be exposed to the danger of an electric shock.
15. Any object that is not designed to be placed in the openings of the housing must not be used for this purpose. Doing so can cause short circuits inside the product and/or electric shocks, fire or injuries.
16. Unless specified otherwise, products are not liquid-proof (see also section "Operating states and operating positions", item 1. Therefore, the equipment must be protected against penetration by liquids. If the necessary precautions are not taken, the user may suffer electric shock or the product itself may be damaged, which can also lead to personal injury.
17. Never use the product under conditions in which condensation has formed or can form in or on the product, e.g. if the product has been moved from a cold to a warm environment. Penetration by water increases the risk of electric shock.
18. Prior to cleaning the product, disconnect it completely from the power supply (e.g. AC supply network or battery). Use a soft, non-linting cloth to clean the product. Never use chemical cleaning agents such as alcohol, acetone or diluents for cellulose lacquers.

Operation

1. Operating the products requires special training and intense concentration. Make sure that persons who use the products are physically, mentally and emotionally fit enough to do so; otherwise, injuries or material damage may occur. It is the responsibility of the employer/operator to select suitable personnel for operating the products.
2. Before you move or transport the product, read and observe the section titled "Transport".
3. As with all industrially manufactured goods, the use of substances that induce an allergic reaction (allergens) such as nickel cannot be generally excluded. If you develop an allergic reaction (such as a skin rash, frequent sneezing, red eyes or respiratory difficulties) when using a Rohde & Schwarz product, consult a physician immediately to determine the cause and to prevent health problems or stress.
4. Before you start processing the product mechanically and/or thermally, or before you take it apart, be sure to read and pay special attention to the section titled "Waste disposal", item 1.
5. Depending on the function, certain products such as RF radio equipment can produce an elevated level of electromagnetic radiation. Considering that unborn babies require increased protection, pregnant women must be protected by appropriate measures. Persons with pacemakers may also be exposed to risks from electromagnetic radiation. The employer/operator must evaluate workplaces where there is a special risk of exposure to radiation and, if necessary, take measures to avert the potential danger.
6. Should a fire occur, the product may release hazardous substances (gases, fluids, etc.) that can cause health problems. Therefore, suitable measures must be taken, e.g. protective masks and protective clothing must be worn.
7. If a laser product (e.g. a CD/DVD drive) is integrated into a Rohde & Schwarz product, absolutely no other settings or functions may be used as described in the product documentation. The objective is to prevent personal injury (e.g. due to laser beams).

Repair and service

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

Batteries and rechargeable batteries/cells

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

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

Transport

1. The product may be very heavy. Therefore, the product must be handled with care. In some cases, the user may require a suitable means of lifting or moving the product (e.g. with a lift-truck) to avoid back or other physical injuries.

Informaciones elementales de seguridad

2. Handles on the products are designed exclusively to enable personnel to transport the product. It is therefore not permissible to use handles to fasten the product to or on transport equipment such as cranes, fork lifts, wagons, etc. The user is responsible for securely fastening the products to or on the means of transport or lifting. Observe the safety regulations of the manufacturer of the means of transport or lifting. Noncompliance can result in personal injury or material damage.
3. If you use the product in a vehicle, it is the sole responsibility of the driver to drive the vehicle safely and properly. The manufacturer assumes no responsibility for accidents or collisions. Never use the product in a moving vehicle if doing so could distract the driver of the vehicle. Adequately secure the product in the vehicle to prevent injuries or other damage in the event of an accident.

Waste disposal

1. If products or their components are mechanically and/or thermally processed in a manner that goes beyond their intended use, hazardous substances (heavy-metal dust such as lead, beryllium, nickel) may be released. For this reason, the product may only be disassembled by specially trained personnel. Improper disassembly may be hazardous to your health. National waste disposal regulations must be observed.
2. If handling the product releases hazardous substances or fuels that must be disposed of in a special way, e.g. coolants or engine oils that must be replenished regularly, the safety instructions of the manufacturer of the hazardous substances or fuels and the applicable regional waste disposal regulations must be observed. Also observe the relevant safety instructions in the product documentation. The improper disposal of hazardous substances or fuels can cause health problems and lead to environmental damage.

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. Nuestro sistema de garantía de calidad controla constantemente que sean cumplidas estas normas. El presente producto ha sido fabricado y examinado según el certificado de conformidad adjunto de la UE y ha salido de nuestra planta en estado impecable según los estándares técnicos de seguridad. Para poder preservar este estado y garantizar un funcionamiento libre de peligros, el usuario deberá atenerse a todas las indicaciones, informaciones de seguridad y notas de alerta. El grupo de empresas Rohde & Schwarz está siempre a su disposición en caso de que tengan preguntas referentes a estas informaciones de seguridad.

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

Informaciones elementales de seguridad

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

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

Símbolos y definiciones de seguridad

							
Aviso: punto de peligro general Observar la documentación del producto	Atención en el manejo de dispositivos de peso elevado	Peligro de choque eléctrico	Advertencia: superficie caliente	Conexión a conductor de protección	Conexión a tierra	Conexión a masa	Aviso: Cuidado en el manejo de dispositivos sensibles a la electrostática (ESD)

					
Tensión de alimentación de PUESTA EN MARCHA / PARADA	Indicación de estado de espera (Standby)	Corriente continua (DC)	Corriente alterna (AC)	Corriente continua / Corriente alterna (DC/AC)	El aparato está protegido en su totalidad por un aislamiento doble (reforzado)

Palabras de señal y su significado

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



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



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



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



AVISO indica la posibilidad de utilizar mal el producto y, como consecuencia, dañarlo.

En la documentación del producto se emplea de forma sinónima el término CUIDADO.

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

Estados operativos y posiciones de funcionamiento

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

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

Seguridad eléctrica

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

1. Antes de la puesta en marcha del producto se deberá comprobar siempre que la tensión preseleccionada en el producto coincida con la de la red de alimentación eléctrica. Si es necesario modificar el ajuste de tensión, también se deberán cambiar en caso dado los fusibles correspondientes del producto.
2. Los productos de la clase de protección I con alimentación móvil y enchufe individual solamente podrán enchufarse a tomas de corriente con contacto de seguridad y con conductor de protección conectado.
3. Queda prohibida la interrupción intencionada del conductor de protección, tanto en la toma de corriente como en el mismo producto. La interrupción puede tener como consecuencia el riesgo de que el producto sea fuente de choques eléctricos. Si se utilizan cables alargadores o regletas de enchufe, deberá garantizarse la realización de un examen regular de los mismos en cuanto a su estado técnico de seguridad.
4. Si el producto no está equipado con un interruptor para desconectarlo de la red, se deberá considerar el enchufe del cable de conexión como interruptor. En estos casos se deberá asegurar que el enchufe siempre sea de fácil acceso (de acuerdo con la longitud del cable de conexión, 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 colocar el interruptor en el nivel de la instalación.
5. No utilice nunca el producto si está dañado el cable de conexión a red. Compruebe regularmente el correcto estado de los cables de conexión a red. Asegúrese, mediante las medidas de protección y de instalación adecuadas, de que el cable de conexión a red no pueda ser dañado o de que nadie pueda ser dañado por él, p. ej. al tropezar o por un choque eléctrico.
6. Solamente está permitido el funcionamiento en redes de alimentación TN/TT aseguradas con fusibles de 16 A como máximo (utilización de fusibles de mayor amperaje solo previa consulta con el grupo de empresas Rohde & Schwarz).
7. Nunca conecte el enchufe en tomas de corriente sucias o llenas de polvo. Introduzca el enchufe por completo y fuertemente en la toma de corriente. La no observación de estas medidas puede provocar chispas, fuego y/o lesiones.
8. No sobrecargue las tomas de corriente, los cables alargadores o las regletas de enchufe ya que esto podría causar fuego o choques eléctricos.
9. En las mediciones en circuitos de corriente con una tensión $U_{\text{eff}} > 30 \text{ V}$ se deberán tomar las medidas apropiadas para impedir cualquier peligro (p. ej. medios de medición adecuados, seguros, limitación de tensión, corte protector, aislamiento etc.).
10. Para la conexión con dispositivos informáticos como un PC o un ordenador industrial, debe comprobarse que éstos cumplan los estándares IEC60950-1/EN60950-1 o IEC61010-1/EN 61010-1 válidos en cada caso.
11. A menos que esté permitido expresamente, no retire nunca la tapa ni componentes de la carcasa mientras el producto esté en servicio. Esto pone a descubierto los cables y componentes eléctricos y puede causar lesiones, fuego o daños en el producto.

Informaciones elementales de seguridad

12. Si un producto se instala en un lugar fijo, se deberá primero conectar el conductor de protección fijo con el conductor de protección del producto antes de hacer cualquier otra conexión. La instalación y la conexión deberán ser efectuadas por un electricista especializado.
13. En el caso de dispositivos fijos que no estén provistos de fusibles, interruptor automático ni otros mecanismos de seguridad similares, el circuito de alimentación debe estar protegido de modo que todas las personas que puedan acceder al producto, así como el producto mismo, estén a salvo de posibles daños.
14. Todo producto debe estar protegido contra sobretensión (debida p. ej. a una caída del rayo) mediante los correspondientes sistemas de protección. Si no, el personal que lo utilice quedará expuesto al peligro de choque eléctrico.
15. No debe introducirse en los orificios de la caja del aparato ningún objeto que no esté destinado a ello. Esto puede producir cortocircuitos en el producto y/o puede causar choques eléctricos, fuego o lesiones.
16. Salvo indicación contraria, los productos no están impermeabilizados (ver también el capítulo "Estados operativos y posiciones de funcionamiento", punto 1). Por eso es necesario tomar las medidas necesarias para evitar la entrada de líquidos. En caso contrario, existe peligro de choque eléctrico para el usuario o de daños en el producto, que también pueden redundar en peligro para las personas.
17. No utilice el producto en condiciones en las que pueda producirse o ya se hayan producido condensaciones sobre el producto o en el interior de éste, como p. ej. al desplazarlo de un lugar frío a otro caliente. La entrada de agua aumenta el riesgo de choque eléctrico.
18. Antes de la limpieza, desconecte por completo el producto de la alimentación de tensión (p. ej. red de alimentación o batería). Realice la limpieza de los aparatos con un paño suave, que no se deshilache. No utilice bajo ningún concepto productos de limpieza químicos como alcohol, acetona o diluyentes para lacas nitrocelulósicas.

Funcionamiento

1. El uso del producto requiere instrucciones especiales y una alta concentración durante el manejo. Debe asegurarse que las personas que manejen el producto estén a la altura de los requerimientos necesarios en cuanto a aptitudes físicas, psíquicas y emocionales, ya que de otra manera no se pueden excluir lesiones o daños de objetos. El empresario u operador es responsable de seleccionar el personal usuario apto para el manejo del producto.
2. Antes de desplazar o transportar el producto, lea y tenga en cuenta el capítulo "Transporte".
3. Como con todo producto de fabricación industrial no puede quedar excluida en general la posibilidad de que se produzcan alergias provocadas por algunos materiales empleados, los llamados alérgenos (p. ej. el níquel). Si durante el manejo de productos Rohde & Schwarz se producen reacciones alérgicas, como p. ej. irritaciones cutáneas, estornudos continuos, enrojecimiento de la conjuntiva o dificultades respiratorias, debe avisarse inmediatamente a un médico para investigar las causas y evitar cualquier molestia o daño a la salud.
4. Antes de la manipulación mecánica y/o térmica o el desmontaje del producto, debe tenerse en cuenta imprescindiblemente el capítulo "Eliminación", punto 1.

5. Ciertos productos, como p. ej. las instalaciones de radiocomunicación RF, pueden a causa de su función natural, emitir una radiación electromagnética aumentada. Deben tomarse todas las medidas necesarias para la protección de las mujeres embarazadas. También las personas con marcapasos pueden correr peligro a causa de la radiación electromagnética. El empresario/operador tiene la obligación de evaluar y señalar las áreas de trabajo en las que exista un riesgo elevado de exposición a radiaciones.
6. Tenga en cuenta que en caso de incendio pueden desprenderse del producto sustancias tóxicas (gases, líquidos etc.) que pueden generar daños a la salud. Por eso, en caso de incendio deben usarse medidas adecuadas, como p. ej. máscaras antigás e indumentaria de protección.
7. En caso de que un producto Rohde & Schwarz contenga un producto láser (p. ej. un lector de CD/DVD), no debe usarse ninguna otra configuración o función aparte de las descritas en la documentación del producto, a fin de evitar lesiones (p. ej. debidas a irradiación láser).

Reparación y mantenimiento

1. El producto solamente debe ser abierto por personal especializado con autorización para ello. Antes de manipular el producto o abrirlo, es obligatorio desconectarlo de la tensión de alimentación, para evitar toda posibilidad de choque eléctrico.
2. El ajuste, el cambio de partes, el mantenimiento y la reparación deberán ser efectuadas solamente por electricistas autorizados por Rohde & Schwarz. Si se reponen partes con importancia para los aspectos de seguridad (p. ej. el enchufe, los transformadores o los fusibles), solamente podrán ser sustituidos por partes originales. Después de cada cambio de partes relevantes para la seguridad deberá realizarse un control de seguridad (control a primera vista, control del conductor de protección, medición de resistencia de aislamiento, medición de la corriente de fuga, control de funcionamiento). Con esto queda garantizada la seguridad del producto.

Baterías y acumuladores o celdas

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

1. No deben desmontarse, abrirse ni triturarse las celdas.
2. Las celdas o baterías no deben someterse a calor ni fuego. Debe evitarse el almacenamiento a la luz directa del sol. Las celdas y baterías deben mantenerse limpias y secas. Limpiar las conexiones sucias con un paño seco y limpio.
3. Las celdas o baterías no deben cortocircuitarse. Es peligroso almacenar las celdas o baterías en estuches o cajones en cuyo interior puedan cortocircuitarse por contacto recíproco o por contacto con otros materiales conductores. No deben extraerse las celdas o baterías de sus embalajes originales hasta el momento en que vayan a utilizarse.
4. Mantener baterías y celdas fuera del alcance de los niños. En caso de ingestión de una celda o batería, avisar inmediatamente a un médico.
5. Las celdas o baterías no deben someterse a impactos mecánicos fuertes indebidos.

Informaciones elementales de seguridad

6. En caso de falta de estanqueidad de una celda, el líquido vertido no debe entrar en contacto con la piel ni los ojos. Si se produce contacto, lavar con agua abundante la zona afectada y avisar a un médico.
7. En caso de cambio o recarga inadecuados, las celdas o baterías que contienen electrolitos alcalinos (p. ej. las celdas de litio) pueden explotar. Para garantizar la seguridad del producto, las celdas o baterías solo deben ser sustituidas por el tipo Rohde & Schwarz correspondiente (ver lista de recambios).
8. Las baterías y celdas deben reciclarse y no deben tirarse a la basura doméstica. Las baterías o acumuladores que contienen plomo, mercurio o cadmio deben tratarse como residuos especiales. Respete en esta relación las normas nacionales de eliminación y reciclaje.

Transporte

1. El producto puede tener un peso elevado. Por eso es necesario desplazarlo o transportarlo con precaución y, si es necesario, usando un sistema de elevación adecuado (p. ej. una carretilla elevadora), a fin de evitar lesiones en la espalda u otros daños personales.
2. Las asas instaladas en los productos sirven solamente de ayuda para el transporte del producto por personas. Por eso no está permitido utilizar las asas para la sujeción en o sobre medios de transporte como p. ej. grúas, carretillas elevadoras de horquilla, carros etc. Es responsabilidad suya fijar los productos de manera segura a los medios de transporte o elevación. Para evitar daños personales o daños en el producto, siga las instrucciones de seguridad del fabricante del medio de transporte o elevación utilizado.
3. Si se utiliza el producto dentro de un vehículo, recae de manera exclusiva en el conductor la responsabilidad de conducir el vehículo de manera segura y adecuada. El fabricante no asumirá ninguna responsabilidad por accidentes o colisiones. No utilice nunca el producto dentro de un vehículo en movimiento si esto pudiera distraer al conductor. Asegure el producto dentro del vehículo debidamente para evitar, en caso de un accidente, lesiones u otra clase de daños.

Eliminación

1. Si se trabaja de manera mecánica y/o térmica cualquier producto o componente más allá del funcionamiento previsto, pueden liberarse sustancias peligrosas (polvos con contenido de metales pesados como p. ej. plomo, berilio o níquel). Por eso el producto solo debe ser desmontado por personal especializado con formación adecuada. Un desmontaje inadecuado puede ocasionar daños para la salud. Se deben tener en cuenta las directivas nacionales referentes a la eliminación de residuos.
2. En caso de que durante el trato del producto se formen sustancias peligrosas o combustibles que deban tratarse como residuos especiales (p. ej. refrigerantes o aceites de motor con intervalos de cambio definidos), deben tenerse en cuenta las indicaciones de seguridad del fabricante de dichas sustancias y las normas regionales de eliminación de residuos. Tenga en cuenta también en caso necesario las indicaciones de seguridad especiales contenidas en la documentación del producto. La eliminación incorrecta de sustancias peligrosas o combustibles puede causar daños a la salud o daños al medio ambiente.

CHAPTER 2

DESIGN AND CHARACTERISTICS

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1 System Purpose and Overview

The series of the R&S SCV8000 compact transmitter (Compact Tx) combines all modules of a TV transmitter, with the exception of the channel filter, in two to four 19" rackmounts – 1 or 2 exciters, 1 base amplifier and, if necessary, 1 extended amplifier.

The transmission is carried out according to international modulation standards for digital and analog terrestrial television in the UHF frequency range. With respect to power, it covers the lower medium power segment.

The supported standards and modulation parameters are listed in the "Technical Data" section.

Note *The transmitter characteristics comply with the relevant standard specifications and EN standards thus meeting international requirements.*

About this Manual

The present system manual describes the transmitter types R&S SCV8000E (single transmitter) and R&S SCV8000R (transmitter with standby exciter). Due to the variety of possible variants, the illustrations are limited to an exemplary representation. However, any special features of the individual transmitter types are described separately.



Fig. 1 R&S SCV8301E – compact transmitter with one amplifier

1.1 Transmitter Types and Power Classes

The R&S SCV8000E/R compact transmitters are combinations of the following devices:

- R&S SX801 exciter (1 or 2)
- Base amplifier R&S VH8201C1 or R&S VH8301C1
- Extended amplifier R&S VH8201C2 or R&S VH8301C2



Fig. 2 R&S SCV8302E – compact transmitter with base and extended amplifier

Combining the exciter(s) with 1 or 2 amplifiers results in the following transmitter types and power classes:

	R&S SX801	R&S VH8201C1	R&S VH8301C1	R&S VH8201C2	R&S VH8301C2	SCX/XCX 8301 Transmitter kit 300 W	SCX/XCX 8302 Transmitter kit 600 W	DVB-T/H power
R&S SCV8201E	1x	1x	–	–	–	1x	–	200 W
R&S SCV8201R	2x	1x	–	–	–	1x	–	200 W
R&S SCV8301E	1x	–	1x	–	–	1x	–	300 W

	R&S SX801	R&S VH8201C1	R&S VH8301C1	R&S VH8201C2	R&S VH8301C2	SCX/XCX 8301 Transmitter kit 300 W	SCX/XCX 8302 Transmitter kit 600 W	DVB-T/H power
R&S SCV8301R	2x	–	1x	–	–	1x	–	300 W
R&S SCV8202E	1x	1x	–	1x	–	–	1x	400 W
R&S SCV8202R	2x	1x	–	1x	–	–	1x	400 W
R&S SCV8302E	1x	–	1x	–	1x	–	1x	600 W
R&S SCV8302R	2x	–	1x	–	1x	–	1x	600 W

2 Devices and Options

2.1 R&S SX801 exciter



Fig. 3 R&S SX801 – front panel



Fig. 4 R&S SX801 – rear panel

The R&S SX801 (1 HU) exciter contains the modulation and frequency processing, the transmitter control unit and the remote control interfaces.

As the user interface in the compact transmitter, the R&S SX801 also features all the elements and interfaces for operating the transmitter.

User interface

The instrument is operated locally by means of a keypad and display. Important operating states are also signaled by LEDs in the front panel. The integrated Ethernet interfaces also allow the transmitter to be operated using a PC and web browser both locally and remotely by means of access over the Internet.

Note Additional information about the exciter is located in the R&S SX801 device manual which is part of the transmitter documentation.

2.2 R&S VH8001Cx base and extended amplifier

The amplifiers of the series R&S VH8001Cx are available as base and extended amplifiers with 2 power classes each.



Fig. 5 R&S VH8001Cx amplifier series

Overview of amplifier types

This manual covers the following amplifier types:

	DVB-T/H power	Version
R&S VH8201C1	200 W	Base amplifier
R&S VH8201C2	200 W	Extended amplifier
R&S VH8301C1	300 W	Base amplifier
R&S VH8301C2	300 W	Extended amplifier

Base amplifier

The base amplifier (3 HU) contains the power amplifier with two power supplies and the fans required for cooling. It also contains the necessary equipment for connecting a second exciter in passive reserve and the RF splitter for feeding the extended amplifier.

Extended amplifier

The use of the extended amplifier (3 HU) allows doubling the output power. It essentially corresponds to the base amplifier without RF splitter, but it also contains the combiner that is required for connecting the base and extended amplifier in parallel.

Operating Modes and Achievable Transmitter Powers

	Nominal output power		
	DVB-T/H	ATSC	Analog TV
R&S SX801 + R&S VH8201C1 = R&S SCV8201	200 W 200 W	300 W 300 W	450 W sync peak 450 W sync peak
R&S SX801 + R&S VH8201C1 + R&S VH8201C2 = R&S SCV8202	200 W 200 W 400 W	300 W 300 W 600 W	450 W sync peak 450 W sync peak 900 W sync peak
R&S SX801 + R&S VH8301C1 = R&S SCV8301	300 W 300 W	450 W 450 W	700 W sync peak 700 W sync peak
R&S SX801 + R&S VH8301C1 + R&S VH8301C2 = R&S SCV8302	300 W 300 W 600 W	450 W 450 W 900 W	700 W sync peak 700 W sync peak 1400 W sync peak

Special features

Every amplifier of the series features two power supplies in active reserve which, like the two fans, can be replaced in operation. Installing a third power supply in the respective amplifier achieves a 100% power supply reserve for the systems R&S SCV8201E and R&S SCV8301E.

Note *Additional information about base and extended amplifiers is located in the R&S VH8001Cx device manual which is part of the transmitter documentation.*

3 Specifications

3.1 R&S SCV8000 Transmitter Types

Transmitter type	SCV8201E	SCV8301E	SCV8202E	SCV8302E
DVB-T output power for a shoulder distance of ≥ 37 dB at $f_o \pm 4.2$ MHz (without output bandpass filter)	200 W	300 W	400 W	600 W
DVB-T power consumption				
$P_{\text{consumption, max}}$	1.4 kW	1.8 kW	2.7 kW	3.5 kW
$P_{\text{consumption, type}}$	1.2 kW	1.6 kW	2.3 kW	3.1 kW
AC supply voltage	230 V 100 V / 120 V	230 V 100 V / 120 V	230 V 100 V / 120 V	230 V 100 V / 120 V
Protection (VDE/UL) ^{a)}				
AC supply voltage 230 V	16 A / 15 A	16 A / 15 A	32 A / 30 A	32 A / 30 A
AC supply voltage 100 V / 120 V ^{b)}	– / 30 A	– / 30 A	– / 60 A	– / 60 A
Recommended line cross-section in the network (VDE/UL)				
AC supply voltage 230 V	2.5 mm ² / AWG = 14	2.5 mm ² / AWG = 14	6 mm ² / AWG = 10	6 mm ² / AWG = 10
AC supply voltage 100 V / 120 V	AWG = 10	AWG = 10	AWG = 6	AWG = 6
Maximum power dissipation at DVB-T	1.2 kW	1.5 kW	2.3 kW	2.9 kW
RF output	N	N	7/16	7/16

a) Special protection R&S SCV8202E (400 W) and R&S SCV8302E (600 W): In case only 16 A fused circuits are available, base and extended amplifier must be supplied separate from each other (separate 16 A / 15 A fused circuits).

b) only with option 2104.9570

3.2 R&S SCV8000 Transmitter Series

3.2.1 General Data

TV standards

Digital TV	DVB-T/H, ATSC
Analog TV	B/G, D/K, M, M1 (standard M + FM dual sound), N, I, I1

Frequency ranges..... 470 MHz to 862 MHz (band IV/V)

Step size for frequency adjustment 1 Hz

Environmental conditions

Operating temperature range +1 °C to +45 °C
(device complies with specifications)

Permissible temperature range 0 °C to +50 °C (data not guaranteed)

Max. permissible humidity 95%, non-condensing

Power supply

AC

Input voltage	100 V to 240 V AC, ± 10 %
Power frequency	47 Hz to 63 Hz, single-phase
Power factor correction.....	In line with EN 61000-3-2

DC

Input voltage (R&S SX801)	38 V to 76 V, 48 V nominal
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Mechanical resistance

Vibration, sinusoidal 5 Hz to 150 Hz, max. 2 g at 55 Hz,
max. 0.5 g from 55 Hz to 150 Hz,
meets DIN EN 60068-2-6

Vibration, random 10 Hz to 300 Hz,
acceleration 1.2 g (rms),
meets DIN EN 60068-2-64

Shock..... 20 g shock spectrum,
meets DIN EN 60068-2-27
and MIL-STD-810E

EMC ETSI EN 301489-1 / -14
ETSI EN 302296 / 302297
Rec. 1999/519/EC

Immunity to radiated interference Up to 10 V/m

Reliability	EN 60950-1:2001, CSA C22.2 No. 60950-1:2003, UL60950-1:2003
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Dimensions and Weight

Basic system

Dimensions (without feet)	19", 4 (1 + 3) HU, 550 mm deep
Weight (air-cooled)	28 (5 + 23) kg

Extended system

Dimensions (without feet)	19", 7 (1 + 3 + 3) HU, 550 mm deep
Weight (air-cooled)	51 (5 + 23 + 23) kg

3.2.2 Specific data: Digital TV

3.2.2.1 Supported modulation parameters (DVB)

DVB Encoding and Modulation

Encoding and modulation	To EN 300744 with following parameters:
IFFT length	2 k or 8 k (plus 4 k for DVB-H)
Modulation	QPSK, 16QAM or 64QAM
Guard interval	1/4, 1/8, 1/16 or 1/32 of useful symbol period
Inner code rate	1/2, 2/3, 3/4, 5/6 or 7/8
Hierarchy	$\alpha = 1, 2$ or 4
Channel bandwidth	6, 7, 8 MHz
SFN function	To TS 101 191
TPS and TX automatic	To TS 101 191 (MIP) with MFN and SFN

Input Processing

- All ASI modes (continuous, packet, burst) in line with DIN EN 500083-9
- Input FIFO: 8 k $\rightarrow$ $\pm$ 20 transport packet burst
- Input switchover, manual and automatic
- Seamless input switching
- Input monitoring by means of Packet Lock, MIP Detect / CRC and PAT
- MFN with stuffing and PCR correction
- FIFOs can be disabled as buffers for dynamic delay changes (0.5 – 2 ms depending on data rate)
- MIP analysis to TS 101191
- Duration of output signal interrupt after return of input signal in SFN: < 5 s

SFN

To TS 101191

- Delay adjustment 1000 ms (automatic and manual)
- Adjustment step size 100 ns
- Accuracy better than ± 350 ns (with 1 pps buffering; otherwise 150 ns)
- 1 pps buffering and monitoring
- Buffering and monitoring of an external reference frequency
- Floating time of transmission tracking by means of processing clock control

3.2.2.2 Transmission properties (DVB)

Transmission parameters to ETS 300 744

Frequency response $f_0 \pm 3.805$ MHz ≤ 1 dB

Shoulder distance

DVB bandwidth 8 MHz at $f_0 \pm 4.2$ MHz

(without output bandpass filter) ≥ 37 dB (with precorrection)

DVB bandwidth 7 MHz at $f_0 \pm 3.7$ MHz

(without output bandpass filter) ≥ 37 dB (with precorrection)

Compliance with spectrum mask to ETS 300 744 with output bandpass filter
(6 circuits for uncritical mass, 8 circuits with
suitable tuning for critical mass)

3.2.2.3 Supported modulation parameters (ATSC)

ATSC Encoding and Modulation

Encoding and modulation To ATSC Doc. A/53 with following parameters:

Channel bandwidth 6, 7, 8 MHz

Input Processing

- All ASI modes (continuous, packet, burst) in line with DIN EN 500083-9
- Input FIFO: 8 k $\rightarrow \pm 20$ transport packet burst
- Input switchover, manual and automatic
- Seamless input switching
- Input monitoring by means of Packet Lock
- MFN with stuffing and PCR correction
- FIFOs can be disabled as buffers for dynamic delay changes (0.5 – 2 ms depending on data rate)

3.2.2.4 Precorrection

- Manual linear precorrection (up to 350 ns group delay, up to 2 dB frequency response)
- Manual nonlinear precorrection
- Nonlinear frequency response
- Limiter function
- Precorrection of amplifier asymmetry

3.2.2.5 Quality Data

SNR	> 37 dB, typ. 40 dB
MER	> 33 dB, typ. 35 dB
Shoulder distance	
corrected	> 37 dB, typ. 40 dB
uncorrected	> 26 dB, typ. 30 dB
Frequency response	< ± 0.5 dB
Group delay	< 10 ns
Sideband suppression	< -50 dBc referenced to transmitter average power

Phase noise (f < 1 GHz)

Frequency/carrier offset	dBc/Hz:
10 Hz	< -65
100 Hz	< -90
1 kHz	< -95
10 kHz	< -103
100 kHz	< -115
1 MHz	< -135
Frequency stability	10^{-7} / year

Spurious emissions

Harmonics	≤ -40 dBc with output bandpass filter
Nonharmonics	≤ -70 dBc with output bandpass filter
Parasitic emissions	not detectable

3.2.3 Specific data: Analog TV

3.2.3.1 Supported Video and Audio Standards

TV standards	B/G, M, M1 (standard M + FM dual sound), N, I, I1, D/K
Audio coding	Mono, IRT dual sound, BTSC, optional NICAM

3.2.3.2 Baseband Video

- Input monitoring (sync-pulse width, period and amplitude)
- Black-level retention
- Evaluation of data line (audio mode)
- Amplitude control (using white pulse)
- Sync-pulse regeneration
- Receiver pre-equalization
- Vestigial sideband filtering

3.2.3.3 RF Video

- Output level monitoring
- Output level control
- Antenna power display (via external amplifier)

3.2.3.4 Baseband Audio

- Input level adaptation
- Matrixing (only for dual-sound technique)
- FM modulation
- Precorrection of audio phase (only with FM carrier, depending on video signal)

3.2.3.5 NICAM Model

- Encoding and modulation to EN 300 163
- Group delay precorrection for the NICAM sound subcarrier
- Single sideband filtering

3.2.3.6 Precorrection

- Manual linear precorrection (up to 250 ns group delay, up to ± 2 dB frequency response)
- Manual nonlinear precorrection
- Nonlinear frequency response

- Dynamic adjustment of nonlinear precorrection depending on video content
- Precorrection of amplifier asymmetry

3.2.3.7 Video Performance Data

S/N ratio	≥ 56 dB (> 200 kHz, < 5 MHz, CCIR non-weighted); typ. ≥ 63 dB (> 200 kHz, < 5 MHz, CCIR weighted)
Differential phase	$\leq \pm 3^\circ$
Differential gain	$\leq \pm 5$ %
VF frequency response	$\leq \pm 0.5$ dB
VF group delay	$\leq \pm 25$ ns

3.2.3.8 Audio Performance Data

FM S/N ratio	≥ 56 dB (CCIR non-weighted), typ. ≥ 60 dB (CCIR weighted)
AF frequency response	< 0.3 dB (preemphasis and deemphasis AUS)
AF total harmonic distortion	< 0.5% (at ± 30 kHz deviation)

3.2.3.9 General Performance Data

Phase noise (f < 1 GHz)

Frequency/carrier offset	dBc/Hz:
10 Hz	< -65
100 Hz	< -90
1 kHz	< -95
10 kHz	< -103
100 kHz	< -115
1 MHz	< -135
Frequency stability	10^{-7} / year

CHAPTER 3

INSTALLATION

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1 Unpacking and Setting Up

1.1 Equipment Supplied

The following equipment is included normally:

- An R&S SX801 exciter (including options)
- An R&S VH8201C1 or R&S VH8301C1 amplifier
- In some cases, a suitable R&S VH8201C1 or R&S VH8301C1 extended amplifier
- Power cable for each instrument
- Transmitter kit for the appropriate transmitter type
- An R&S SCV8000E/R system manual
- Manuals for the R&S SX801 and R&S VH8001Cx

1.2 Unpacking the Instruments

- ☞ Carefully unpack the instruments and make sure that everything is present based on the delivery documentation.

1.3 Setting Up the Instruments

The instruments can be set up to stand on their feet or they can be mounted in a 19" rack. If the instruments are arranged on top of one another, the exciter must be on top due to weight considerations.

Note *Make sure that the installation is stable and has sufficient ventilation. In particular, make sure that the flow of air through the intake openings on the front panel and through the outlet openings on the rear panel (fans) is not obstructed.*

2 Connecting the Cables



WARNING!

Always make sure that the power supply is disconnected before connecting any devices. This will prevent injuries and damage to the devices.

2.1 Overview of the Connections

2.1.1 Connections on the Exciter



Fig. 1 Connections on rear panel of R&S SX801

Rear panel connectors

No.	Labeling (Name)	Type	Connector
X1		Low-temperature connector	Power feed (VAC or VDC)
X2	REMOTE (Ethernet remote)	RJ45, female connector, 8-pin	Network connection for remote access; preset address at X2: – IP address: 192.168.58.253 – Subnet mask: 255.255.255.0
X3	LOCAL (Ethernet local)	RJ45, female connector, 8-pin	Connector to a PC for local operation; preset address at X3: – IP address: 192.168.57.253 – Subnet mask: 255.255.255.0
X4	RS485	D-Sub, female, 9-pin	RS485 serial connector

No.	Labeling (Name)	Type	Connector
X5	AMP	D-Sub, male connector, 15-pin	Amplifier control unit
X6	TX (Tx control)	D-Sub, female, 9-pin	RF loop and CAN bus; connector for parallel remote control interface or N+1 system; power reduction on the external amplifier
X8	PAR I/O	D-Sub, female, 9-pin	Parallel connector for signaling contacts and control inputs
X9	RS232	D-Sub, male, 9-pin	RS232 serial connector
X20	TS1 ETI1	BNC, female, 75 Ω (DAB: also > 10 k Ω)	– DTV: Transport stream input 1 (with hierarchy: HP stream) – DAB/T-DMB: Transport stream input 1
X21	TS2 ETI2	BNC, female, 75 Ω (DAB: also > 10 k Ω)	– DTV: Transport stream input 2 (with hierarchy: LP stream) – DAB/T-DMB: Transport stream input 2
X22	VF	BNC, female, 75 Ω	ATV: Analog video input
X23	PPS IN (1PPS EXT IN)	BNC, female, 50 Ω	Input for seconds pulse from external reference
X24	REF OUT	BNC, female, 50 Ω	TV/DAB monitor interface: Monitoring output for internal 1 pps or 10 MHz signal
X25	AUDIO	D-Sub, male connector, 15-pin	ATV: Analog audio AF input
X26	BTSC (ATV: BTSC; DAB: ETI OUT)	BNC, female, 75 Ω	– ATV: Analog audio input to BTSC standard (M, N) – DAB: Optional output of ETI signal on exciter input or downstream of delay memory
X27	NICAM (ATV: NICAM Data; DAB: COFDM SYNC)	BNC, female, 50 Ω	– ATV: Digital data input for NICAM 728 – DAB: DAB monitor interface: Start of COFDM frame on exciter output
X50	FAN1	Molex, male connector (4-contact)	Fan supply 1
X52	FAN2	Molex, male connector (4-contact)	Fan supply 2
X60	RF OUT	SMA female	Output from internal amplifier
X64	REF IN	BNC, female, 50 Ω	Reference input, 5 MHz or 10 MHz, -5 dBm to 20 dBm or TTL

No.	Labeling (Name)	Type	Connector
X66	GPS (GPS antenna)	SMA, female, 50 Ω	Connection for optional GPS antenna
X67	Rx (Receiver)	SMA, female, 50 Ω	Retransmitter option: Antenna input for receiver module
X68	Rx AUX (Receiver auxiliary)	SMA, female, 50 Ω	Retransmitter option: AUX antenna input for receiver module



Fig. 2 Test outputs on front panel of R&S SX801

Connector on front panel

No.	Labeling (name)	Type	Connector
X61	RF (RF monitor)	SMA, female, 50 Ω	RF test output

2.1.2 Connections on the Amplifiers



Fig. 3 Rear-panel amplifier connections (here: extended amplifier)

- 1) MAINS (X1, AC supply input)
- 2) RF IN 1 (X10, RF input, exciter A)
- 3) RF IN 2 (X110, RF input, exciter B, for passive dual drive; base amplifier only)
- 4) BASE AMP IN (X34, combiner RF input 1 for signal from base amplifier; extended amplifier only)
- 5) EXT AMP IN (X36, combiner RF input 2 for signal from extended amplifier; extended amplifier only)
- 6) EXT AMP OUT (X15, RF output to extended amplifier; base amplifier only)
- 7) POWER OUT (X2, RF power output 300 W)

- 8) COMBINER POWER OUT (X35, RF power output 600 W after combiner; extended amplifier only)
 9) AMPL CONTROL (X11, amplifier control with connection to the CAN bus)
 10) AUX DET 1 (X6, input auxiliary detector 1; base amplifier only)
 11) AUX DET 2 (X7, input auxiliary detector 2; base amplifier only)
 12) FAN 1 (X22, connection for fan 1)
 13) FAN 2 (X23, connection for fan 2)
 14) EXT FAN SUPPLY (X24, emergency power supply for fans; extended amplifier)
 15) Grounding pin

Designation	No.	Type	Connector / function
MAINS	X1	M3E+6X+PE; connector from Schaltbau	AC supply input, optionally DC
POWER OUT	X2	N, female	RF power output to filter or combiner in extended amplifier, depending on configuration
AUX DET 1	X6	SMA, female	RF input from auxiliary detector 1; for signal from external directional coupler test point, e.g. forward power downstream of channel filter; base amplifier only
AUX DET 2	X7	SMA, female	RF input from auxiliary detector 2; for signal from external directional coupler test point, e.g. reflected power downstream of channel filter; base amplifier only
RF IN 1	X10	SMA, female	Standard RF input for signal from exciter A
AMPL CONTROL	X11	D-Sub, 15-pin, male connector	Interface for controlling the amplifier using built-in CAN bus
EXT AMP OUT	X15	SMA, female	RF output for controlling the extended amplifier; base amplifier only
FAN 1	X22	Molex, 4-pin, male connector	Power supply, fan 1
FAN 2	X23	Molex, 4-pin, male connector	Power supply, fan 2
EXT FAN SUPPLY	X24	Molex, 4-pin, male connector	Emergency power supply from base amplifier to extended amplifier fan in event of power failure in extended amplifier ^{a)}
BASE AMP IN	X34	N, female	Combiner RF input 1, for signal from base amplifier; in extended amplifier only
COMBINER POWER OUT	X35	7/16, female connector	RF power output after combiner; in extended amplifier only
EXT AMP IN	X36	N, female	Combiner RF input 2, for signal from extended amplifier; in extended amplifier only

Designation	No.	Type	Connector / function
RF IN 2	X110	SMA, female	RF input for signal from exciter B, for passive dual drive; in base amplifier only
–	–	Grounding bolt	Grounding bolt for system ground

- a) The fans in the extended amplifier receive their power supply from the base amplifier if the AC power supply to the extended amplifier drops out, unless the base amplifier supply drops out. This protects the combiner's load-balancing resistor from overheating.

Front-panel outputs

Name	No.	Type	Function
MAIN RF MON.	X37	SMA, RF female	RF test output, no frequency-response compensation; Frequency response: -6 dB / octave, only in extended amplifier
AMP RF MON.	X3	SMA, RF female	RF test output, no frequency-response compensation; Frequency response: -6 dB / octave

2.2 Cabling the R&S SX801 Exciter for Digital TV

Inputs for digital TV

The input signals can be fed in ASI or SMPTE format.

1. Connect the first transport stream to **X20 (TS1)**. With hierarchical coding (DVB only), **X20** is the input for the HP stream.
2. If signal standby is required, connect a second transport stream to **X21 (TS2)**. With hierarchical coding, **X21** is the input for the LP stream.

Reference signals

1. To increase frequency accuracy, connect an external reference source (5 MHz or 10 MHz) to **X64 (EXT REF)**.

Note

*Alternatively, the seconds pulse from an external 1PPS signal (on **X23**) or the optional internal GPS receiver (GPS antenna on **X66**) can be used as a frequency reference.*

2. For SFN operation, also supply a 1PPS signal for timing synchronization:
 - a) If the optional internal GPS receiver is used, connect the GPS antenna to **X66 (GPS ANTENNA)**.

- b) Alternatively, supply the 1PPS signal from an external reference source via **X23 (EXT 1 PPS)**.

2.3 Cabling the R&S SX801 Exciter for Analog TV

Inputs for analog TV

1. Connect the video signal to **X22 (VF)**.
2. Feed audio signals according to signal type:
 - a) Connect the AF signals to **X25 (AUDIO 1 and AUDIO 2)**.
 - b) NICAM: If an external NICAM coder is used, additionally connect the NICAM 728 data stream to **X27 (NICAM DATA)**.
Separate feed of the NICAM 728 data stream is unnecessary if the NICAM coder integrated in the transmitter is used.
 - c) BTSC: As an alternative to a) and b), connect a multiplex signal to **X26 (BTSC)**.

Reference signal

1. To increase frequency accuracy, connect an external reference source (5 MHz or 10 MHz) to **X64 (EXT REF)**.

Note *Alternatively, the seconds pulse from an external 1PPS signal (on **X23**) or the optional internal GPS receiver (GPS antenna on **X66**) can be used as a frequency reference.*

2.4 Internally Cabling the R&S SCV8000 Transmitter

2.4.1 Systems with One Amplifier

Amplifier controller and signal connections

1. Connect **X5 (AMP)** on the exciter (and any existing standby exciter) and **X11 (AMPL CONTROL)** on the amplifier using the included 15-pin ribbon cable.
2. Connect the RF output of the exciter **X60 (RF OUT)** to the RF input of the amplifier **X10 (RF IN 1)**.
3. In a system with a standby exciter, also connect its RF output **X60 (RF OUT)** to the second RF input **X110 (RF IN 2)** of the amplifier.

2.4.2 Systems with a Base and Extended Amplifier

Amplifier controller and signal connections

1. Connect **X5 (AMP)** on the exciter (and any existing standby exciter) and **X11 (AMPL CONTROL)** on the base and extended amplifiers using the included 15-pin ribbon cable.
2. Connect the RF output of the exciter **X60 (RF OUT)** to the RF input of the base amplifier **X10 (RF IN 1)**.
3. In a system with a standby exciter, also connect its RF output **X60 (RF OUT)** to the second RF input **X110 (RF IN 2)** of the base amplifier.
4. Connect the splitter output **X15 (EXT AMP OUT)** on the base amplifier to the RF input **X10 (RF IN 1)** on the extended amplifier.

RF power connections

1. Connect the RF output **X2 (POWER OUT)** on the base amplifier to the combiner input **X34 (BASE AMP IN)** on the extended amplifier.
2. On the extended amplifier, jumper **X2 (POWER OUT)** and **X36 (EXT AMP IN)** using the included conduit clamp.

2.5 Connecting the Antenna System



WARNING!

Risk of RF burns. Before connecting the antenna cable, make sure that the instrument cannot produce any RF at the output.

- ☞ In systems with one amplifier, connect the antenna system to the RF power output of the amplifier **X2 (POWER OUT)**.
- ☞ In systems with two amplifiers, connect the antenna system to the RF power output of the extended amplifier **X2 (POWER OUT)**.

2.6 Preparing the RF Loop



WARNING!

Risk of RF burns. Before putting the instrument into operation, make sure that the available interlock loop systems are in use.

- ☞ Prepare the interlock loop system (if available) for connection to **X6 (TX CONTROL)**.
- ☞ If no interlock loop devices are available in the transmitter system (only permissible with low power), have the supplied short-circuit connector at the ready.

Note The interlock loop is only closed after (!) startup (see chapter "Commissioning" in the R&S SCV8000x system manual) via **X6 (TX CONTROL)**, after which the instrument can then produce RF.

2.7 Connecting the User Interface

A PC/laptop can be connected to the exciter to allow convenient startup of the transmitter on site.

Rohde & Schwarz recommends the use of an RJ-45 cable which complies with the CAT 7 specification.

1. Configure the network address for the PC as follows:

- a) IP address = 192.168.057.xxx where xxx = 001 to 252
- b) Subnet mask = 255.255.255.000

This means that the PC and R&S SX801 are on the same IP subnet (preset IP address on R&S SX801 = 192.168.057.253).

2. On the PC, configure the browser so that JavaScript and Java are enabled.

Communication via PC requires the Java Runtime Environment (JRE) from SUN. As the minimum requirement for the PC, Java Platform Standard Edition in version 1.5 or higher must be installed.

Note The "Operating" chapter describes how to go about configuring Microsoft Internet Explorer.

3. Connect the PC's network interface to **X3 (ETHERNET LOCAL)** on the exciter.

2.8 Notes on the AC Power Connection

Note Since the instruments do not have their own power switches for disconnection from the power source, the connector in the connecting cable is considered as a disconnecting device. You should therefore make sure that the connector is within reach and easily accessible at all times (length of connecting cable approx. 2 m). Function or electronic switches are not suitable for disconnecting the AC supply. If the transmitter is integrated into racks or systems, the power should be switched off at system level.

Please heed the connection data found in the following table.

Transmitter type	SCV8201E	SCV8301E	SCV8202E	SCV8302E
System voltage	230 V 100 V / 120 V	230 V 100 V / 120 V	230 V 100 V / 120 V	230 V 100 V / 120 V
Fuse (VDE/UL) ^{a)}				
AC supply voltage 230 V	16 A / 15 A	16 A / 15 A	32 A / 30 A	32 A / 30 A

Transmitter type	SCV8201E	SCV8301E	SCV8202E	SCV8302E
AC supply voltage 100 V / 120 V ^{b)}	– / 30 A	– / 30 A	– / 60 A	– / 60 A
Recommend line cross-section in power system (VDE/UL)				
System voltage 230 V	2.5 mm ² / AWG = 14	2.5 mm ² / AWG = 14	6 mm ² / AWG = 10	6 mm ² / AWG = 10
System voltage 100 V / 120 V	AWG = 10	AWG = 10	AWG = 6	AWG = 6
Power dissipation output maximum for DVB-T	1.2 kW	1.5 kW	2.3 kW	2.9 kW
RF output	N	N	7/16	7/16

- a) Special note for fuses R&S SCV8202E (400 W) and R&S SCV8302E (600 W): In case only 16 A fused circuits are available, the base and extended amplifiers must be supplied independently (separate 16 A / 15 A fused circuits).
- b) only with option 2104.9570

CHAPTER 4

COMMISSIONING

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1 Quick Start


ATTENTION!

The exciter can be damaged by overvoltage. Make sure that the AC supply voltage in your power system complies with the specifications for the AC power supply option in your exciter.

- Option B9: 90–264 V AC, 100 W (24 V secondary)
- Option B10: -48 V DC (-38 to -76 V DC), 100 W (24 V secondary)

Check the power cable for any possible damage.

1. Connect the AC supply voltage to the exciter(s) (interface **X1**).
The exciter should boot up. The boot procedure is complete once the system overview appears on the display.
2. On the exciter, press the Local key so that the associated LED lights up.
The transmitter is now in local mode and can be operated via the display or a PC connected to **X3**.
3. On the display, switch to the menu **System > Tx Type > Transmitter** and make (or verify) the following settings:
 - a) The TV standard with **Tx Type**
 - b) The proper system configuration with one or two amplifiers with **Number of Amplifiers**
 - c) The transmitter mode **Single Tx** with **Tx Mode**

Note

The "Operating" chapter contains a detailed description of local operation of the transmitter using the display and keyboard.

4. Reboot the exciter.



Fig. 1 System overview after making settings in the Transmitter menu

5. On the display, check whether input signals are present and can be properly processed.
There should not be any faults (**F**), warnings (**W**) or new log entries (**Log**) displayed. The signal processing in the exciter should also not mute the RF signal (the muting display **M** should not light up).

However, the transmitter will not yet emit power. The **F**(orward Power) display should show 0 W.

Note

If any problems are indicated, read the "Troubleshooting" chapter and correct the problems.

6. Using the previously connected PC (see the "Installation" chapter) and an up-to-date Java-enabled browser, log on to the exciter. Proceed as follows:

- a) Enter the network address for the exciter. The default setting is as follows: http://192.168.057.253).

The login screen appears.

- b) Log on using the username **Configuration** and password (default setting: **1234**).

The opening screen for the transmitter should appear in the browser.

Note

The "Operating" chapter contains a detailed description of how to operate the transmitter via a browser.

7. In the menu **Exciter > RF Out > Synthesizer**, set the transmit frequency under **Frequency**.



ATTENTION!

Overvoltage can damage the amplifiers. Make sure that the AC supply voltage in your power system complies with the specifications for the AC power supply option in your amplifiers.

Check the power cables for any possible damage.

8. Connect the power cable to the amplifiers (interface **X1**) and apply power.

The fans in the amplifiers should start up quickly.

9. On the amplifiers, monitor the **STATUS** LED and the **AC AND DC** power supply LEDs.

The LEDs should light up as follows:

Sequence	Signaling	Meaning
1.	LED STATUS : flashing green-red LED AC : green LED DC : red	An attempt is underway to establish a CAN bus connection to the amplifiers. Voltage supply is present RF output on exciter not yet enabled (RF OFF)
2.	LED STATUS : green	CAN bus connection established

Note

*If the **STATUS** LED on the amplifiers does not indicate OK after some time, read the "Troubleshooting" chapter and fix the problem.*

10. In the menu **Amplifier > Setup > Output Power** under **Output Power**, set the desired output power.

11. On the exciter, close the RF loop via **X6 (TX CONTROL)**. If no RF loop system is present (permitted only for the lowest power), insert the supplied protective connector instead.

12. In the **Exciter** menus, set the desired modulation parameters or check to make sure that the factory settings are correct. See the "Operating" chapter for more information.

13. On the exciter, press the **RF ON/OFF** key so that the associated LED lights up.

The transmitter should now be powered on. If an RF signal is generated with no errors, the **RF PRESENT** LED should now light up and the transmitter should emit power.

14. In the system overview, check the measured values for **F**(orward Power) and **R**(eflected Power):

F should indicate the set output power and **R** should indicate a very low value.



Fig. 2 System overview after powering on the R&S SCV8301

15. In the **Logbook** menu, use the **Clear logbook** context function to delete all of the entries.

CHAPTER 5

OPERATING

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1 Introduction to Operation

The R&S SCV8000 compact transmitter can be operated as follows:

- Local operation using the display and menu keys on the front panel of the R&S SX801
- Operation via the web browser
- Monitoring and control via SNMP

In the case of operation via the web browser of a connected PC/client PC, there is the following distinction:

- Remote operation via a directly connected PC
- Remote control via a remote network client

1.1 Local and Remote Operation



Fig. 1 LOCAL key (with LED) for switching between local and remote operation

Local operation

For on-site configuration work, the R&S SX801 must be set to *local*. With the instrument in local mode you can enter parameter settings by using the keys on the instrument or via a PC connected to **X3** (Ethernet Local). When the instrument is in this operating mode, remote access is restricted to the querying of values.

To switch to local operation, press the **LOCAL** key (the associated LED lights up).

Remote operation

For remote control, the R&S SX801 must be set to *remote*. With the instrument in remote mode you can change settings via the **X2** interface (Ethernet Remote). When the instrument is in this operating mode it cannot be configured locally (via the keyboard or via **X3**).

To deactivate local operation, press the **LOCAL** key again (the associated LED goes out).

1.2 Local Operation (via Display and Keyboard)

1.2.1 System Overview



Fig. 2 Possible error indications on the display of the R&S SX801 (front panel)

- 1) Display indicating which input is active
- 2) TV standard
- 3) Status of active input
- 4) Status of reference input
- 5) Sum warning display
- 6) Sum fault display
- 7) Muting display
- 8) Display indicating new logbook entries
- 9) Transmit frequency
- 10) Forward (F) and reverse (R) power
- 11) Display indicating whether transmitter is delivering power

Note In the system overview, the TV standard and transmitter name are displayed in alternation.

Status displays in system overview

Status	Message	Meaning
Active input	Ok	Valid signal is present at the active input
	W	Signal at the active input is invalid or not detected
	F	Signal at the active input is faulty
Reference input	- OFF -	External reference frequency is present and OK – or – External reference frequency is not present but it is also not needed
	Re	External reference frequency is disrupted and the fail delay time set in the Reference menu has expired
Sum warning	W	One or more warnings are active
Sum fault	F	One or more faults have occurred
Muting display	M	RF output signal disabled by signal processing; the RF PRESENT LED also does not light up for RF ON
Logbook entries	LoG	New entries have been made in the logbook since the logbook was last opened

Status	Message	Meaning
Status of transmitter output	RF	Transmitter is delivering power
	- OFF -	RF output deactivated by user (RF OFF)
	F	Transmitter not delivering power but the RF output is enabled (RF ON)

1.2.2 Menu Keys



Fig. 3 Menu operation

Key	Meaning / function
OK / MENU	OK: – Confirms an entry or selection MENU: – In system overview: Starts the menu control function – From a menu: Calls the context menu
BACK / HOME	BACK: – In a setting window: Cancels the entered value, provided that it has not yet been confirmed with OK – In the general menu: Goes back one step to the last selected menu HOME: – Returns from the menu tree to the system overview.
CURSOR KEYS	↔↔↔↔ : Navigation in the menu tree ↔↔ : Navigation to a digit in an entered value ↑↓ : Increments or decrements a number

A number of keys are assigned two functions. The following applies:

- Press the key briefly = The function indicated on the key is executed
- Press the key longer = The function indicated above the key is executed

1.2.3 Operating Structure

1.2.3.1 Activating Local Operation

To make settings locally on the transmitter, activate local operation.

☞ Press the **Local** key so that the associated LED lights up.

Note Various authorization levels protect against unauthorized access to crucial system settings. In local operation via keyboard and display you work by default with the factory preset user ID **Operation** (which authorizes you to make settings that directly affect transmitter operation). The section "Change User ID (Authorization)" shows how you can log on using another user ID.

1.2.3.2 System Overview – Topmost Menu Level

Display the system overview as follows:

☞ Press and hold down the **HOME** key.

1.2.3.3 Navigation in Menu System

Navigate the menu system as follows:

1. Press the **MENU** key (long).

The context menu for the system overview is called.

The context menu for the system overview contains items used to call the **SX801** menu tree, to directly access individual menu paths (shortcuts such as **DVB**, **Logbook** or **System**) as well as the context commands **Reset Fault** for resetting stored error messages and **Change User** for changing the user ID.



Fig. 4 Context menu for system overview

- 1) Resets saved error messages
- 2) Shortcut to the SX801 menu tree
- 3) Too many items to be displayed simultaneously (scroll down using the cursor keys to display other items)

2. In the context menu:

Use the cursor keys $\uparrow \downarrow$ to navigate to the required entry item and confirm with **OK**.

A directory menu with the selected menu tree or menu path is displayed.

Note The single arrow or double arrow in the top right-hand corner of the menu indicates the direction in which you can scroll the list.

3. Within the menu tree:

Use the cursor keys $\uparrow\downarrow$ to select a lower-level menu path or a menu window and confirm with **OK** or $\Rightarrow$.

Note Items **with** an arrow pointing to the right lead to lower-level menu paths. Items **without** an arrow symbol open menu windows for setting or displaying parameters.



Fig. 5 In menu tree

- 1) Path
- 2) Not all available entries are shown on the display (here: scroll direction is down)
- 3) Item opens a menu window
- 4) Item opens a further menu path

4. Within a menu window:

Use the cursor keys $\uparrow\downarrow$ to select a parameter and confirm with **OK** to adjust this parameter.

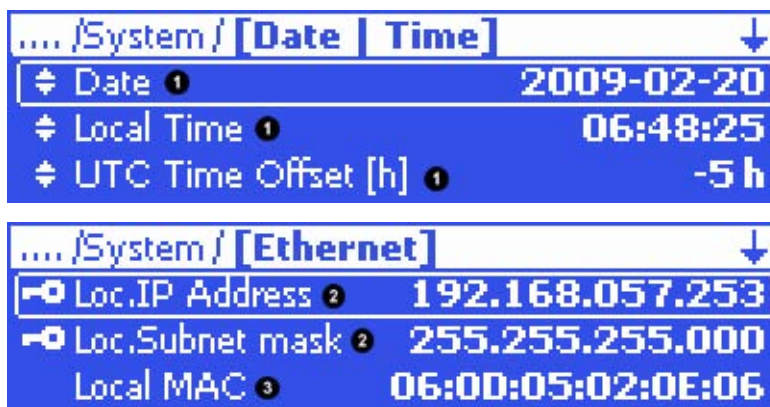


Fig. 6 Menu window (top: Setup > Date/Time, bottom: Setup > Ethernet)

- 1) Parameter with double arrow: Setting can be modified.
- 2) Parameter with key icon: No setting possible, reason: Insufficient authorization or transmitter in remote operation
- 3) Parameter with no icon: Display only, no settings possible

Use the **MENU** key to call a context menu for the currently displayed setting window.

Use the **BACK** key to go back one step in the menu structure (also from the Help windows); you can also use **BACK** to cancel an entered value as long as you have not already confirmed it with **OK**.

Use the **HOME** key to exit the menu structure and return to the system overview.

Alternative method of opening menus

Use the **OK** key (press briefly) to open the **SX801** menu tree straight from the system overview.



Fig. 7 SX801 menu tree

1.2.3.4 Selecting and Editing Settings

Note Only those parameters identified by a double arrow can be adjusted.

Locked and variable settings

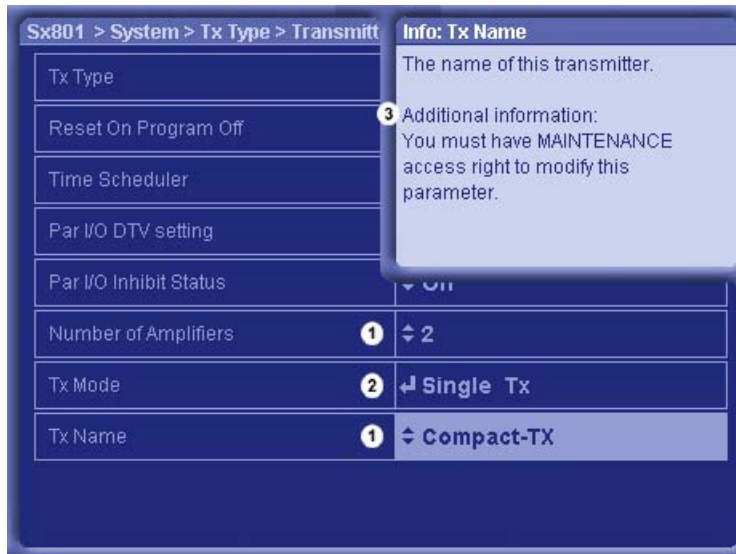
Depending on the user rights concerned and the type of access (local or remote access) some or all processing parameters can be locked. These include restrictions arising from the actual constellation chosen. An appropriate symbol in front of the parameter value shows whether or not a parameter can be changed at this time.

Symbol	Meaning
	The present user can change the setting. A change takes effect straight away.
	The present user can change the setting. For the setting to take effect, a restart ^{a)} is required.
	The setting cannot be changed at the present time. Possible reasons: – The user does not have the necessary rights. ^{b)} – Access is via the remote port whereas the instrument is in local mode. – Access is local whereas the instrument is in remote mode.
	Setting is not possible in this constellation.
- none -	This parameter value is for a display; it cannot be set.

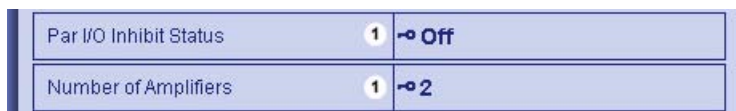
a) Execute the Restart command in the context menu for System > Tx Type > Transmitter to restart.

b) The Info command from the context menu gives information on the necessary user rights among other things.

Examples:



- 1) Setting can be modified; a change takes effect immediately.
- 2) Setting can be changed, but the instrument needs to be restarted.
- 3) Maintenance rights are needed to modify the selected setting.



- 1) The selected parameter cannot be modified at this time (lack of authorization or local/remote state not appropriate).

Making a selection using the Selection Editor



Fig. 8 Selecting value

1. Select the setting using the cursor keys $\uparrow \downarrow$.
2. Confirm the selection with **OK**.
Your setting is saved and displayed in the menu window.
3. Press the **HOME** key to finish menu editing.

Entering data via the Text Editor



Fig. 9 Entering values

- 1) Entry line
- 2) Selectable characters
- 3) Command line

1. Use the cursor keys to move the cursor to the entry position.
2. To enter characters, move to the required character using the cursor keys and then confirm with the **OK** key.

The selected character appears in the entry line at the cursor position.

or

To delete characters, set the cursor after the character you wish to delete, then use the cursor keys to select **Del char** and confirm with the **OK** key.

The character to the left of the cursor position is deleted.

3. To save changes (current entry in the entry line), select **Enter text** using the cursor keys and then confirm with the **OK** key.

This closes the editor, stores the changes and displays them in the menu window.

Note ***Enter text** will work only if the instrument is set to "local" and authorization to change parameters is held. Otherwise the only way to exit from the editor is to use **Discard**.*

or

To close the editor without saving the changes, select **Discard** using the cursor keys and then confirm with the **OK** key.

The editor closes and you return to the menu window. Your changes are not saved.

4. Press the **HOME** key to finish menu editing.

Note *If you select the **Fix Editor** command in the context menu (see section "Context Menu"), the editor will remain open until you close it by pressing the **Back** key.*

1.2.3.5 Context Menu

The context menu contains function- and content-oriented commands which can be applied to the currently displayed menu.

The context menu can be called from any position using the **MENU** key.

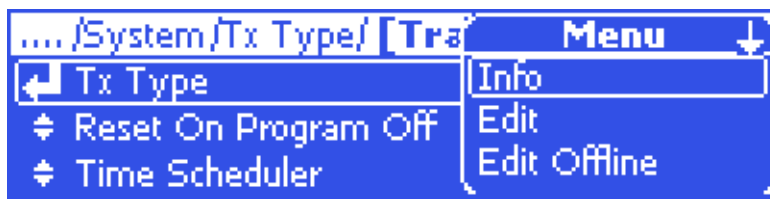


Fig. 10 Context menu

The content-oriented commands are found in the description for the respective menu window. The function-oriented commands are listed and described below:

Command	Explanation
Info	Help texts for the respective menu window/menu item
Open	Opens the editor or the selection window for setting the parameters (same effect as pressing the OK key)
Edit	Used to edit a menu item (alternative to the OK key)
Edit Offline	Used to edit a menu item offline; changes are only saved when Submit Changes (context menu) is selected
Submit Changes	Saves changes made offline
Edit Online	Used to edit a menu item online; standard setting which can only be changed by selecting Edit Offline
Add to Bookmarks	Creates a bookmark for the current menu window; all of the bookmarks are listed in the Bookmarks navigation area.
Change User	Used to change the user profile
Logbook	Calls the logbook
Reset Fault	Resets saved fault messages after the fault has been corrected
Enter Text	In editor only: Used to save entries (alternative to the "Enter text" command in the command line of the editor)
Discard	In editor only: Used to discard entries (alternative to the "Discard" command in the command line of the editor)
Fix Editor	In numerical editor only: The editor remains open after entries have been saved or discarded to allow them to be edited further
Live Mode	In numerical editor only: The numerical value that is set is activated immediately before the OK key is pressed

1.2.4 Change User ID (Authorization)

Various authorization levels protect against unauthorized access to critical system settings. In local operation via keyboard and display you work by default with the factory preset user

ID Operation (which authorizes you to make settings that directly affect transmitter operation).

Note You can change, create or delete user profiles with the aid of the user administration facility, which you call up via the web browser (see section "User Administration").

From the **Change User** context menu, you can log on in any menu under a different user ID. No password is required to change the user ID under local control (according to the factory default). You can also protect access to the display by entering a password.



Fig. 11 Changing user at display in local operation mode

You can select a user profile by clicking Select user from list.

The following factory-default user profiles are available for local operation:

User profile	Description	Password ^{a)}
Configuration	Authorization to set basic transmitter parameters, e.g. Setup	
Maintenance	Authorization to perform maintenance tasks, e.g. software updates	
Operation	Authorization to make settings that directly affect transmitter operation	
Query	Read-only authorization	
Config-Engl	Authorization to set basic transmitter parameters, e.g. setup; this ID also changes the menu language to English (irrespective of the preset language, e.g. Chinese)	

a) By default the password (factory setting 1234) is needed only for browser-based operation. Every user can change his/her own password via the user administration program.

Note In the event of a power failure, the instrument resets to the Operation authorization level.

Changing user at display without entering a password

In the following example a user profile "Schmidt" has been set up in user administration. The user has obtained authorization for local operation.

1. From the context menu, call the **Change User** command.
2. Use **Select user from list** to select the required user, e.g. **Configuration**, and confirm your choice with **OK**.



You are then locked on again with the rights of your chosen user. The Logon menu is automatically closed after a short while and the display once again shows the menu that was open before the change of user.

Change of user via the display by entering a password (example)

In the following example a user profile "Schmidt" has been set up in user administration. The user has obtained authorization for local control, but must enter a password.

1. From the context menu, call the **Change User** command.
2. Go to **Select user from list** and select the user **Schmidt <pw>**.

The "<pw>" in angle brackets tells you that a password is needed.



3. Select the **Type password** command.



4. Enter the password in the editor.
5. Use the **Logon** command from the context menu to log on.



User "Schmidt" is then logged on:



1.3 Remote Operation and Remote Control

Remote operation and remote control take place via a web browser.

Note Depending on their rights, logged-on users can monitor the transmitter or control all of its functions. In terms of this functionality, there is no difference between remote operation and remote control.

The transmitter has by default the network connections needed for remote operation and for remote control.

1.3.1 Installation and Configuration

Connecting a PC/network

☞ For operation by local PC connect a PC by RJ45 cable to the **X3** (Ethernet Local) port on the R&S SX801.

☞ For remote control connect the remote monitoring network by RJ45 cable to the X2 (Ethernet Remote) port on the R&S SX801.

Setting IP addresses at the exciter

For communication between the transmitter and a local PC or a remote network client, the IP address of the Ethernet interface that is used in the R&S SX801 must be in the IP subnet of the PC or the remote monitoring network.

You can directly enter the address data needed for communication via the R&S SX801 display.

Note Alternatively, you can also adapt the IP address of your PC to the subnet of the exciter under Windows and retain the factory setting for the local network interface X30 (IP address = 192.168.57.253, network mask = 255.255.255.0). In this case, configure the network address of your PC to, for example, 192.168.57.100/255.255.255.0.

1. On the display of the R&S SX801, select the **System > Ethernet** menu.



Fig. 12 Enter the IP address data.

2. Enter the address for the X3 local interface under **Loc.IP Address** and **Loc.Subnet mask**.
3. Enter the address for the X2 remote-control interface under **Rem.IP Address** and **Rem.Subnet mask**.

Note If any changes were made to the network settings, the R&S SX801 must be restarted.

Before you can operate the exciter via your browser, the following conditions must be satisfied:

- Javascript must be enabled
- "Java Platform Standard Edition" must be installed and activated.

The next section uses Microsoft Internet Explorer 6 to explain how you can check whether these conditions have been met or what changes you need to make.

Note Please note that the settings described here need not match your current browser version one hundred percent.



ATTENTION!

Please note that the modified settings described here may adversely affect the security of your Internet connections.

All necessary changes and settings can be found in the **Tools > Internet Options** menu on your Internet Explorer.

Checking and adapting the settings for Java Applets

1. Select the **Security** tab.
2. For the Internet zone select the **Custom Level** option.
3. In the tree structure go to **Scripting > Scripting of Java applets** and select the **Enable** option.

Installing Java (Sun) JRE if necessary; checking and adapting the settings

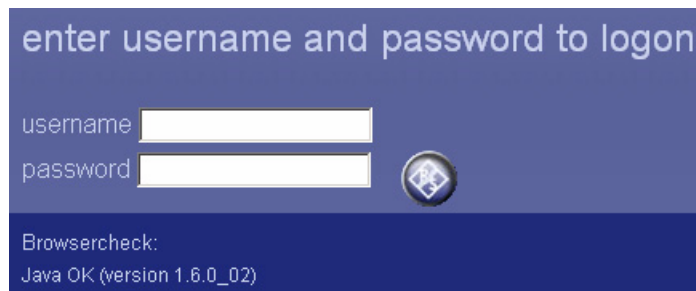
1. Select the **Advanced** tab.
2. Check whether the entry **Java (Sun) JRE ...** is present and enabled.
3. If necessary, download and install (standard installation) the Java Runtime Environment from the Sun website "www.java.com".
4. Then select the Internet Explorer's **Advanced** tab again and check whether the software is installed and enabled.

1.3.2 Login

Note *To be able to operate the transmitter via a PC that is connected locally, the R&S SX801 must be set for local operation (press the **LOCAL** key so that the associated LED lights up).*

1. Start the browser on your PC or network client.
2. Enter the IP address of the Ethernet interface for the R&S SX801 that you are using to make contact.

The login screen appears.



3. Enter the desired identification together with the password (see table) and click the **Logon** button (R&S).

The web GUI opening screen appears.

Note *Logging on in this way starts a new session on the instrument web server.*

Factory-default user information

User ID	Authorization	Password
Configuration	Allows you to set basic transmitter parameters; e.g. setup	1234

User ID	Authorization	Password
Maintenance	Allows you to perform maintenance tasks; e.g. software update	1234
Operation	Allows you to make settings that directly affect transmitter operation	1234
Query	Read-only authorization	1234
Guest	Read-only authorization – see Query	1234
Config-Engl	Same as Configuration authorization; this ID also changes the menu language to English (irrespective of the preset language, e.g. Chinese)	1234
Superuser	For configuring, creating and deleting user profiles, and for displaying and deleting active sessions; no authorization for setting transmitter parameters – see Query	1234

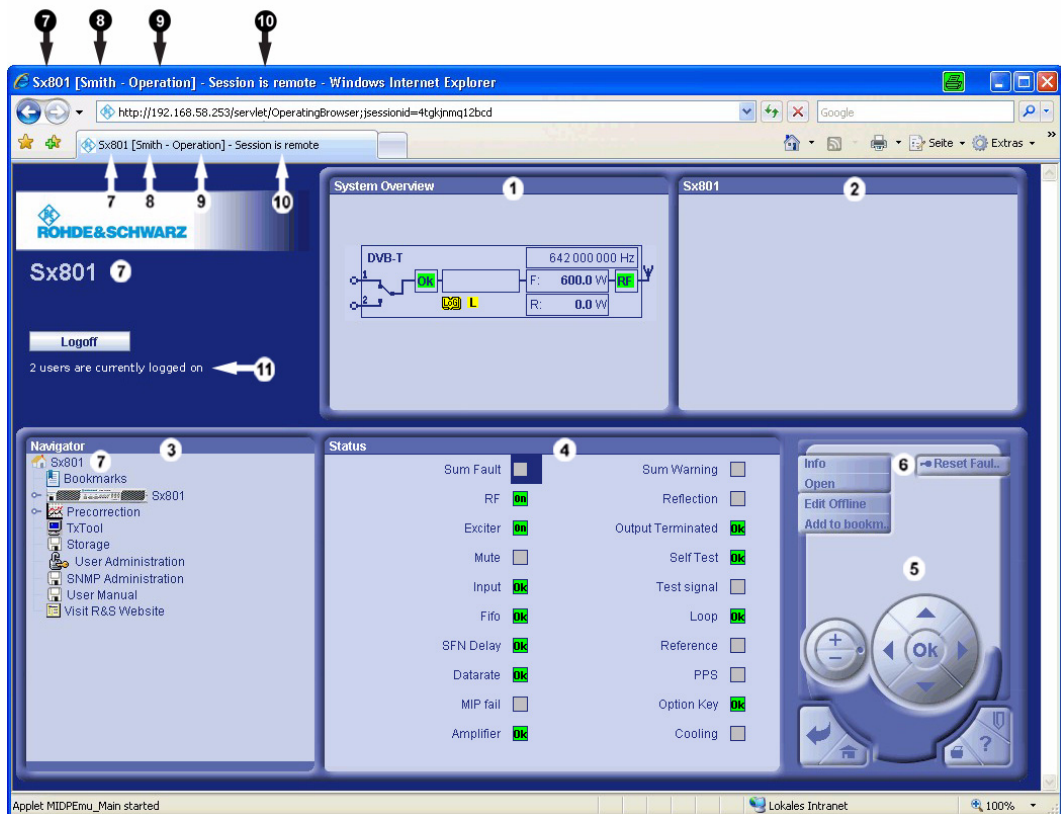
Can't log on?

Logging on can fail for the following reasons:

- Three other users already logged on via the web browser. The maximum permitted number of simultaneous sessions has been reached. On the other hand it is always possible to log on as Superuser.
- Incorrect ID and/or password entered.
After three failed attempts at logging on, the requesting IP address is prevented from logging on for 30 minutes.

1.3.3 Browser-Based Operation

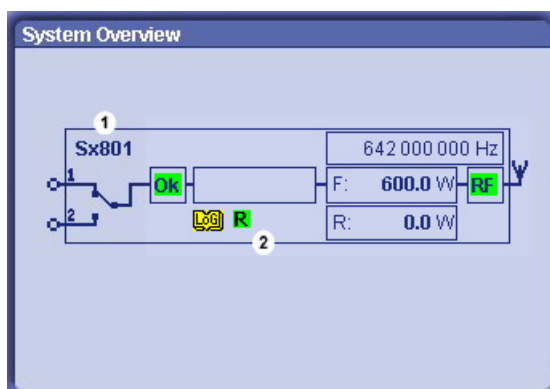
The following opening screen appears after logging on:



- 1) System overview: Current transmitter status
- 2) Not used with this transmitter
- 3) Navigator: Display and navigation through the transmitter menus
- 4) Menu window: Display of the menus selected in the navigator
- 5) Control panel: Elements for navigation in the menu system and for displaying and editing menu entries
- 6) Context menu (in the example, the user logged on remotely cannot execute any commands: key icon since the instrument is set for local operation)
- 7) Display of the transmitter name (default setting: Sx801)
- 8) User name display (according to login details)
- 9) Group membership display (authorization level)
- 10) Display of the session type: For "Session is remote", login takes place via the remote Ethernet interface; for "Session is local", the user arrived via the local Ethernet interface
- 11) Total number of users logged on via web browser

System overview

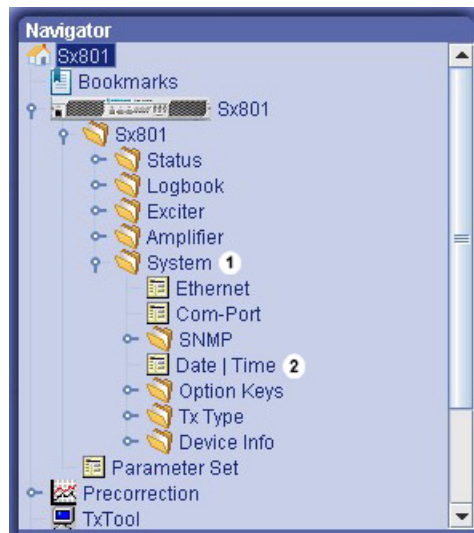
In the **System Overview** window, there is an overview of the current status of the transmitter and its components.



- 1) Alternate display of the transmitter name and TV standard
- 2) L/R = Local/Remote display

Navigator

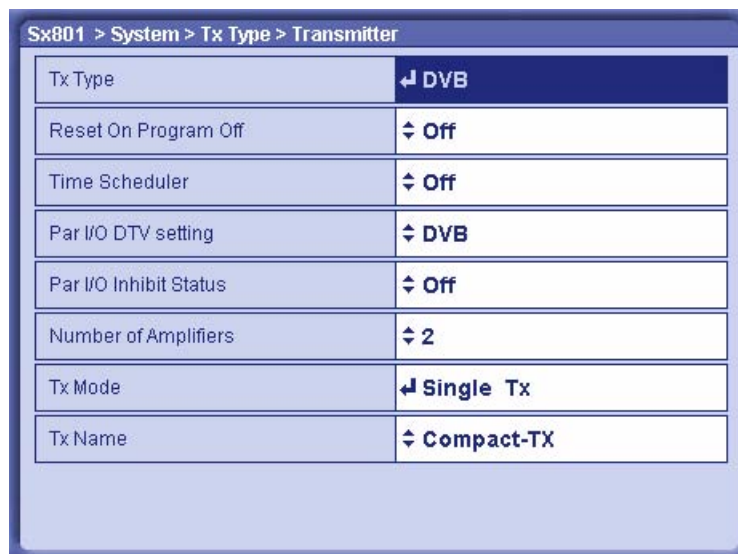
The navigator shows the tree structure of all transmitter menus. The different folders and menus can be opened by double-clicking using the mouse. The selected menus are displayed in the menu window.



- 1) Folder
- 2) Menu

Menu window

In the menu window, the menu selected in the **Navigator** window is displayed.



Control panel

The control panel allows navigation in the menu structure and menus and modification of settings. The individual controls are operated using the mouse or keyboard.



- 1) Used to change between menu entries, control editable values and enter numerical values; each click of the arrow keys (top/bottom) increments or decrements the number (corresponding arrow keys on the keyboard)
- 2) For editing (change to editing mode) and confirming settings (corresponds to the enter key on the keyboard)
- 3) Corresponds to the UP and DOWN cursor keys
- 4) Used to make fast changes between menu entries, quickly control editable values and quickly enter numerical values; can be rotated using the mouse
- 5) One step back to the last menu that was selected; also used to cancel settings that have not yet been confirmed with OK
- 6) Back to Status menu
- 7) Display of the context menu for the current menu window or menu entry (standard context menus: Info: Help texts and (for menu entries) also the information about which user rights are needed for changes; Open: Opens the menu or menu entry; Add to bookmarks: Creates a bookmark for the current menu window; Edit Offline: Entry can be edited without making the change immediately; Reset Fault: Resets saved fault messages after the fault has been corrected see also "Context Menu" under "Local Operation"
- 8) Not enabled in this software version

Locked and variable settings

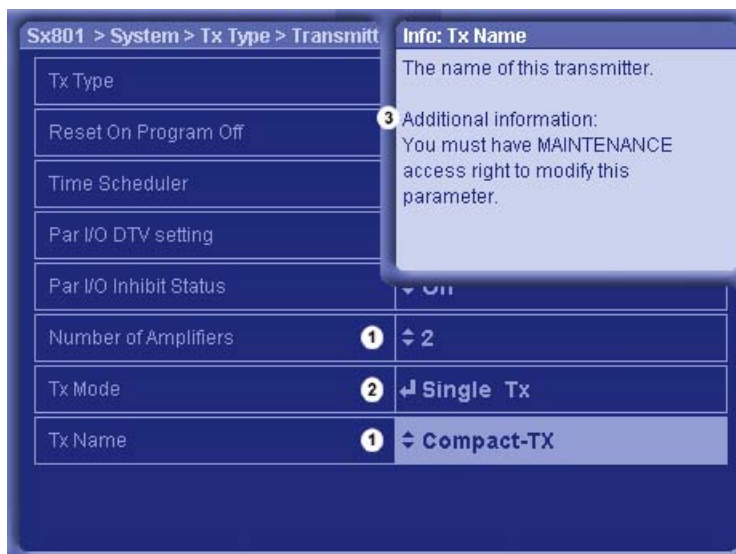
Depending on the user rights concerned and the type of access (local or remote access) some or all processing parameters can be locked. These include restrictions arising from the actual constellation chosen. An appropriate symbol in front of the parameter value shows whether or not a parameter can be changed at this time.

Symbol	Meaning
	The present user can change the setting. A change takes effect straight away.
	The present user can change the setting. For the setting to take effect, a restart ^{a)} is required.
	The setting cannot be changed at the present time. Possible reasons: – The user does not have the necessary rights. ^{b)} – Access is via the remote port whereas the instrument is in local mode. – Access is local whereas the instrument is in remote mode.

Symbol	Meaning
	Setting is not possible in this constellation.
- none -	This parameter value is for a display; it cannot be set.

- a) Execute the Restart command in the context menu for System > Tx Type > Transmitter to restart.
- b) The Info command from the context menu gives information on the necessary user rights among other things.

Examples:



- 1) Setting can be modified; a change takes effect immediately.
- 2) Setting can be changed, but the instrument needs to be restarted
- 3) Maintenance rights are needed to modify the selected setting.

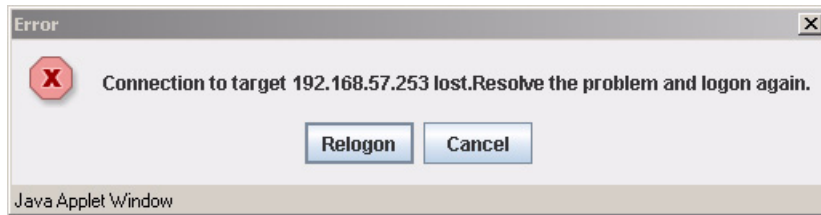
Par I/O Inhibit Status	1	→ Off
Number of Amplifiers	1	→ 2

- 1) The selected parameter cannot be modified at this time (lack of authorization or local/remote state not appropriate).

1.3.3.1 Session End

Use the **Logoff** button to log off from the system correctly. If you close the browser window without logging off, the session is automatically terminated after two minutes at most.

If the present connection was cut (e.g. because the unit was restarted), a popup window tells you that you need to log on again. Logging on again opens a new session.



Note *The IP address displayed in the popup window can vary depending on the system and setting.*

1.4 User Administration

The user administration facility is available in conjunction with browser-based operation. The settings that you make in the user administration facility are (provided that no password is required) also valid for menu access via local operation.

You can use the user administration facility to

- change user profiles (users and access rights)
- create new user profiles
- delete user profiles
- close active sessions

The ID **Superuser** with the factory-set password **1234** gives you extensive user administration rights.

1. Log on as Superuser.
2. Select **User Administration** in the **Navigator** window.

The processing options and a list of existing users are displayed.



You are currently logged on as Superuser

[Add new user](#)

[Change selected user](#)

[Delete selected user](#)

[Show session list](#)

Select	Name	Logged on	Web browser	Front panel	Access right	Is admin
☒	Superuser	2 times	Yes	No	Query	Yes
☒	Guest	No	Yes	No	Query	No
☒	Configuration	1 times	Yes	Yes	Configuration	No
☒	Config-Engl	No	Yes	Yes	Configuration	No
☒	Maintenance	No	Yes	Yes	Maintenance	No
☒	Operation	1 times	Yes	Yes	Operation	No
☒	Query	No	Yes	Yes	Query	No
☒	Mueller	No	Yes	Yes	Operation	Yes

Display	Meaning
Select	Selects the user to be processed
Name	User ID
Logged on	The user is not logged on (No) or is logged on once/several times (X times) at the system
Web browser	The user ID and authorization permit operation via the web browser (Yes, No)
Front panel	The user ID and authorization permit local operation (Yes, No)
Access right	Authorization to access transmitter parameters
Is Admin	Additional user administration authorization (configuration, creation and deletion of user profiles)

The following users are factory-set. Only the password can be changed for these users.

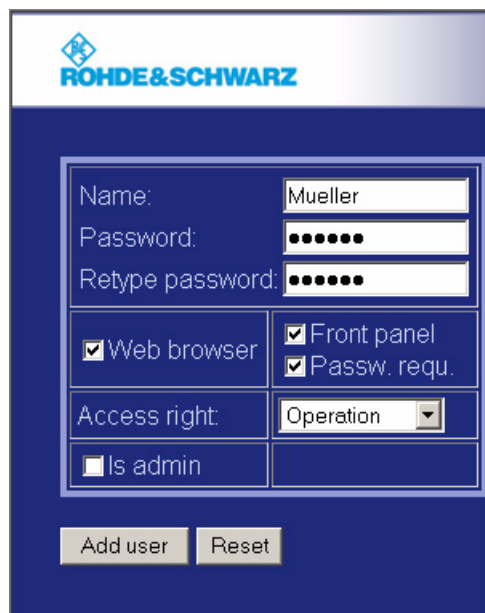
User ID	Authorization	Password
Configuration	Allows you to set basic transmitter parameters; e.g. setup	1234
Maintenance	Allows you to perform maintenance tasks; e.g. software update	1234
Operation	Allows you to make settings that directly affect transmitter operation	1234

User ID	Authorization	Password
Query	Read-only authorization	1234
Guest	Read-only authorization – see Query	1234
Config-Engl	Same as Configuration authorization; this ID also changes the menu language to English (irrespective of the preset language, e.g. Chinese)	1234
Superuser	For configuring, creating and deleting user profiles, and for displaying and deleting active sessions; no authorization for setting transmitter parameters – see Query	1234

1.4.1 Creating, Changing and Deleting Users

Creating users

1. Select **Add new user**.



2. Create the required user profile.

Entry/selection	Explanation
Name:	User ID (case-sensitive)
Password:	Must be at least 6 characters in length (case-sensitive)
Retype password:	Enter the password again (case-sensitive)
Web browser	The user ID permits menu access via the web browser
Front panel	The user ID permits local operation

Entry/selection	Explanation
Access right	Selects a factory-set authorization level
Is admin	The user is also given user administration rights (configuration, creation and deletion of users; no access to the user profiles Super-user and Guest)

3. Confirm your entries with **Add user**; clicking **Reset** discards your entries.

Changing users

Note *All users have the right to change their own password.*

1. Mark the required user.
2. Select **Change selected user**.



3. Change the user profile in the way described under "Creating users".
4. Confirm your changes with **Change User**; clicking **Reset** discards your changes.

Deleting users

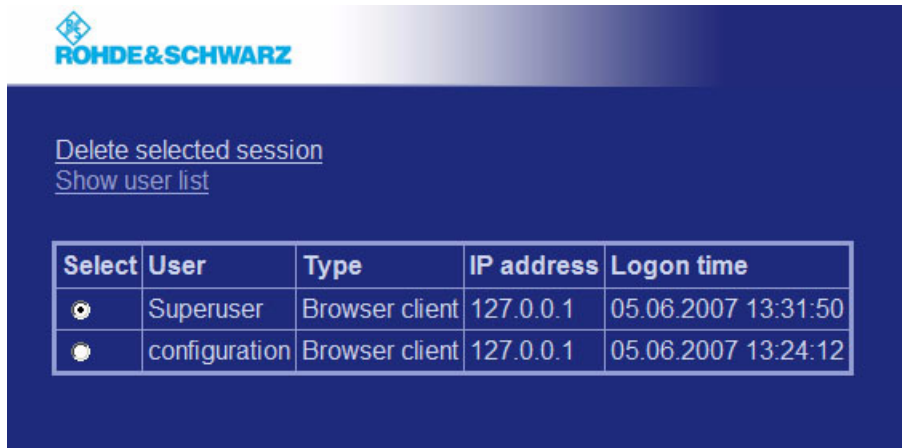
1. Mark the required user.
2. Select **Delete selected user**.

The user is deleted.

1.4.2 Closing Active Sessions

If you are logged on as Superuser, you can view detailed information on logged-on users and close active sessions.

1. After logging on, select **Show session list**.



2. Mark the session (the user) that you want to close.
3. Select **Delete selected session**.
The marked session is closed.
4. Return to the previous browser window by clicking **Show user list**.

1.5 Monitoring and Control via SNMP

SNMP (Simple Network Management Protocol) is used for monitoring and controlling a wide variety of different units in a network. Detailed information about this topic can be found under <http://www.wikipedia.org/>.

A description of the unit - the MIB (Management Information Base) - must be loaded in the central unit ("manager") from which the transmitters are monitored.

A monitored unit contains a program ("agent") which can answer queries from the manager and execute commands. Furthermore, the agent may of its own accord generate a message and send it to the manager. In this way, the central unit can be informed of a fault.

1.5.1 Installation

The MIBs required for monitoring and controlling a transmitter are stored as a ZIP archive in the transmitter control unit, from where they can be downloaded with the aid of any network-capable instrument. All of the information required for configuration is contained in the MIBs themselves.

During startup, both the agent in the exciter and the manager must be configured. Additional steps may be necessary if the exciter is connected via routers, firewalls or similar devices as they may block data packets.

- The XX8000 transmitter family supports versions SNMPv1 and SNMPv2c.
- Alarms can be transmitted as v1 traps or v2 traps.

- You can set multiple targets for error messages (alarm sinks).
- Multiple communities can be set with Read Only authorization and Read/Write authorization.

1.5.1.1 Settings on Transmitter Side

You can make settings yourself via the local display (if available), the web server or SNMP. The menu windows of the **SNMP** menu contain all the settings that are required for accessing a transmitter.

Note *Changes to these settings are adopted immediately. The device does not need to be restarted.*

... /System/SNMP/ [General]	
◆ Port SET/GET	161
◆ Inhibit Status	Off
◆ Max. not transmitted	255

... /System/SNMP/ [Manager] ↓	
◆ 1st Access level	Read Only
◆ 1st Community	
◆ 1st Enable	Off

... /System/SNMP/ [Alarmsinks]	
◆ Alarmsink	1
◆ Enable	Off

Note *Detailed information about the individual parameters can be found in the descriptions of the respective menu windows.*

1.5.1.2 Settings on Manager Side

To be able to monitor and control a transmitter with SNMP, the MIB of the device and a program which can interpret the MIB must be available on the manager side.

You can load all available MIBs from any device using a web browser.

1. Log on using the web browser and select the **SNMP Administration** menu.

MIBs from Rohde&Schwarz and IRT are available. MIBs from IRT allow transmitters to be linked using SNMP irrespective of the manufacturer. They are, however, limited with respect to their functionality. When using IRT MIBs, you can select the "Inhibit Status" for local operation (in the same way as for the parallel contacts). If this function is acti-

vated, no alarms/traps are sent when the transmitter is in local mode. You can activate/deactivate this function using **Inhibit Status** in the **SNMP > General** menu window.

The MIBs have the naming convention RS-XX8000-<TV/Radio Standard>-<Standby Concept/Option>-MIB. An example is RS-XX8000-ATV-TX-MIB for signal transmitters for analog TV.

Examples of MIBs and contents:

MIB	Description
RS-COMMON-MIB	Contains general Rohde&Schwarz definitions
RS-XX8000-COM-MON-MIB	Contains definitions which all XX8000 transmitters fulfill (e.g. type plate, configuration)
RS-XX8000-DVB-TX-MIB	Contains definitions for DVB single transmitters, passive exciter standby, active and passive output-stage standby
RS-XX8000-DVB-NP1-MIB	Contains definitions for DVB n+1 systems
RS-XX8000-DVB-NTX-MIB	Contains definitions that an R&S NetCCU800 provides as access for n different, independent DVB transmitters
RS-XX8000-DVB-TX-REC-MIB	Contains definitions for the optional DVB receiver in a transmitter
RS-XX8000-DVB-NP1-REC-MIB	Contains definitions for the optional DVB receiver(s) in an n+1 system
RS-XX8000-FM-TX-MIB	Contains definitions for FM single transmitters with passive exciter standby and active and passive output-stage standby
RS-XX8000-FM-NP1-MIB	Contains definitions for FM n+1 systems
RS-XX8000-ATV-TX-MIB	Contains definitions for analog TV single transmitters with passive exciter standby and active and passive output-stage standby
RS-XX8000-ATV-NP1-MIB	Contains definitions for analog TV n+1 systems

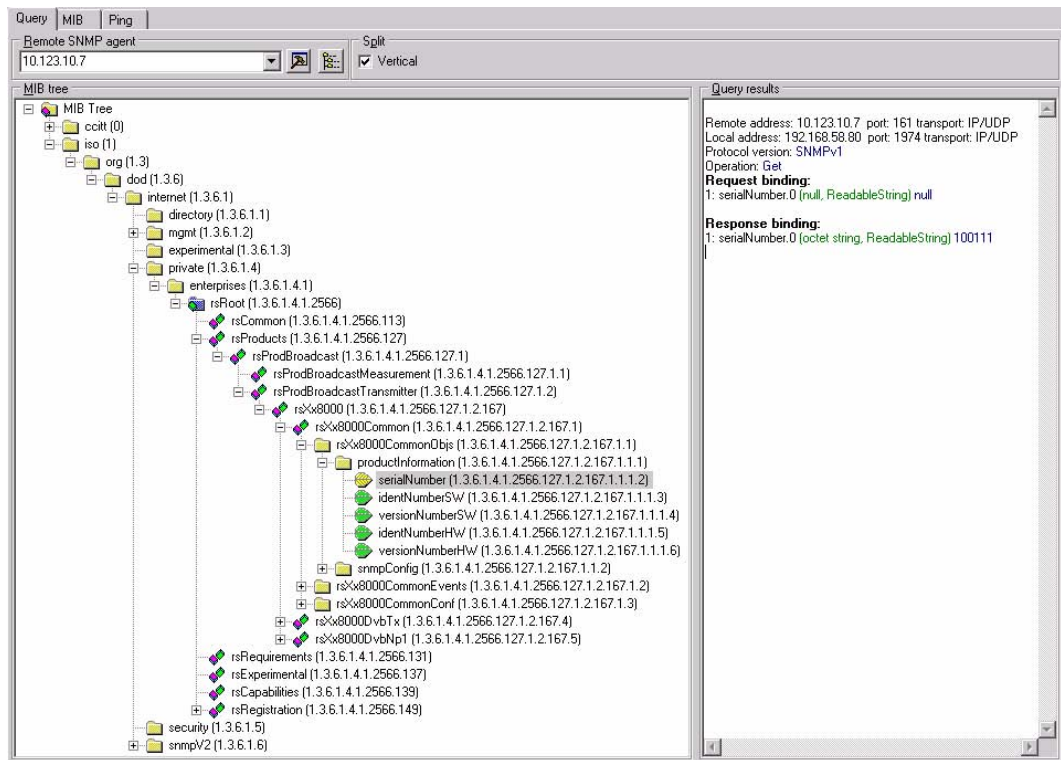
2. Save the required ZIP file to your PC.
3. Load the following MIBs:
 - a) RS-COMMON-MIB
 - b) RS-XX8000-COMMON-MIB
 - c) MIB of the standby concept or option

A detailed description of the MIBs, the information that they contain and the associated options is given below.

1.5.1.3 Testing SNMP Communications

SNMP communications is properly set up if you have loaded the MIBs in your program and you are using the correct IP address of the transmitter and the correct community. For queries and settings you must set the SNMP version in your manager; the transmitters detect the used protocol automatically.

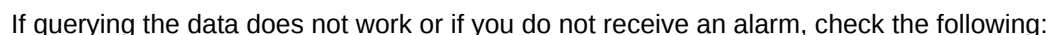
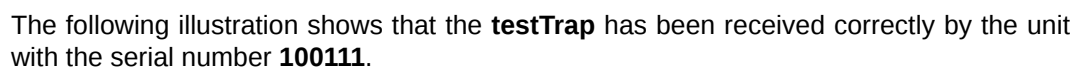
The following query can be used as a simple test:



In the example above, a transmitter with the IP address 10.123.10.7 queries the OID (ObjectIdentifier: unique designation of a data point) **serialNumber** (1.3.6.1.4.1.2566.127.1.2.167.1.1.2). The reply from the agent is **100111**.

Using a further test, you can check whether the transmitter sends an alarm message in the event of an error and whether this message reaches the alarm destinations. To do so, set an OID **sendTestTrap** (1.3.6.1.4.1.2566.127.1.2.167.1.1.2.3) to the value **2**, which triggers a **testTrap** (1.3.6.1.4.1.2566.127.1.2.167.1.2.0.1). This alarm is sent to all receivers which have been entered for the alarms (Trapsinks, see above).

This type of fault message functions in a slightly different way than that used for querying and setting values (default: UDP Port 161 for SET/GET and UDP Port 162 for alarms).



- Has the network been connected correctly? Does the SNMP connection function exclusively via the remote Ethernet interface of the device (R&S NetCCU800: **X5 – NETLINK**, R&S Sx800/SX801: **X2**, R&S xLx8000: **X32 – ETHERNET REMOTE**)?
- Are the network settings (IP address, gateway) correct?
- Has the correct Community been entered for accessing the manager and the transmitter (case-sensitive)?
- Is a PC firewall blocking incoming SNMP packets?

- Has the program which receives alarms been started and correctly configured?
- In large networks: Is a router or firewall blocking the SNMP packets?
- Is message suppression (**Inhibit Status** in the **SNMP > General** menu) activated?

1.5.1.4 Configuration

This chapter provides an overview of the available properties.

RS-XX8000-COMMON-MIB

This MIB contains general data that supports every unit:

- Type plate: serial number, software version, etc
- SNMP configuration: table for alarm destinations and alarm versions
- Triggering of a test trap
- Counter for counting the transmitted traps
- List of the alarm messages last transmitted
- Parameters which are used in several other MIBs

This information always applies to the instrument that is being monitored via SNMP.

RS-XX8000-DVB-TX-MIB

This MIB contains the parameters for:

- the standby concepts "single transmitter", "passive exciter standby", "active output-stage standby" and "passive output-stage standby"
- all power classes (low-power, medium-power and high-power)
- air-cooled and liquid-cooled transmitters

Different parameters are available depending on the system being queried. For example, **cmdTxOpModeExcAutomatic** (.1.3.6.1.4.1.2566.127.1.2.167.4.1.1.1.7) gives the reply **NoSuchName** if you query a single transmitter since this transmitter does not have an automatic exciter function. It is easy to find out which parameters are valid by checking the "module compliances" (e.g. under .1.3.6.1.4.1.2566.127.1.2.167.4.5.2).

Example: DVB configuration, passive exciter standby, medium power, optional DVB receiver module with two inputs.

Valid MIBs:

- RS-COMMON-MIB
- RS-XX8000-COMMON-MIB
- RS-XX8000-DVB-TX-MIB
- RS-XX8000-DVB-TX-REC-MIB

The valid OIDs for the transmitter are contained in the "Module Compliance" path. The OID contains references to the individual groups.

Name:	rsXx8000DVBDualDriveMP
Type:	MODULE-COMPLIANCE
OID:	1.3.6.1.4.1.2566.127.1.2.167.4.5.2.2
Full path:	iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).rsRoot(2566).rsProducts(127).rsProdBroadcast(1).rsProdBroadcastTransmitte
Module:	RS-XX8000-DVB-TX-MIB
Parent:	rsXx8000DvbTxCompl
Prev sibling:	rsXx8000DVBSingleTxMP
Next sibling:	rsXx8000DVBAActiveReserveMP
Status:	current
Modules:	
1. Module name:	RS-XX8000-DVB-TX-MIB
Mand. groups:	1: groupEvents 2: groupDualDriveMP 3: groupAlarmDualDriveMP
Description:	Reserve concept DualDrive for Medium Power consists of groupDualDrive and groupAlarmDualDrive.

Fig. 13 RS-XX8000-DVB-TX-MIB

- 1) Name and OID for DualDrive MediumPower
- 2) Reference to groupEvents - 1.3.6.1.4.1.2566.127.1.2.167.4.5.1.1
- 3) Reference to groupDualDriveMP - 1.3.6.1.4.1.2566.127.1.2.167.4.5.1.4
- 4) Reference to groupAlarmDualDriveMP - 1.3.6.1.4.1.2566.127.1.2.167.4.5.1.5

Name:	groupDualDriveMP
Type:	OBJECT-GROUP
OID:	1.3.6.1.4.1.2566.127.1.2.167.4.5.1.4
Full path:	iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).rsRoot(2566).rsProducts(127).rsProdBroadcast(1).rsProdBroadcastTransm
Module:	RS-XX8000-DVB-TX-MIB
Parent:	rsXx8000DvbTxGroups
Prev sibling:	groupAlarmSingleTxMP
Next sibling:	groupAlarmDualDriveMP
Status:	current
Objects:	1: cmdTxResetSumFault 2: cmdTxParametersetLoad 3: cmdTxParametersetSave 4: cmdTxParametersetReSave 5: cmdTxOperationModeProgram 6: cmdTxOperationModeReserve 7: cmdTxOpModeExcAutomatic 8: cmdTxPreselectExciter 9: cmdExcOpModeInputAutomatic 10: cmdExcPreselectInput

Fig. 14 List of parameters (excerpt) for groupDualDriveMP

- 1) Name and OID for DualTuner
- 2) Reference to groupDualTuner - 1.3.6.1.4.1.2566.127.1.2.167.2.5.1.3
- 3) groupAlarmDualTuner - 1.3.6.1.4.1.2566.127.1.2.167.2.5.1.5

The groups contain all valid OIDs. The valid OIDs for the receiver module are contained in the "Module Compliance" path of the RS-XX8000-DVB-TX-REC-MIB. The OID contains references to the individual groups. The groups contain all valid OIDs.

RS-XX8000-DVB-NP1-MIB

This MIB contains all the parameters required for any DVB n+1 system, irrespective of the following features of the individual transmitter:

- variant
- power class
- cooling system

Once again, unavailable parameters receive the reply **NoSuchName**, e.g. parameters from the transmitter A8 if only a 4+1 system is available (see module compliances under .1.3.6.1.4.1.2566.127.1.2.167.5.5.2).

Setting alarms

The transmitter-specific alarms offer an extensive range of configuration possibilities.

Depending on the available system, it is possible to set detailed alarms: for example, for every item of status information in every amplifier in every rack of every transmitter in a medium-power n+1 system. In addition, it is also possible to assign a freely selectable priority and to check the current status.

Instance	eventTxId(1, IDX)	eventTxBlk(2, IDX)	eventTxRack(3, IDX)	eventTxAmp(4, IDX)	eventTxName(5, IDX)	eventTxName(6)	eventTxMask(7)	eventTxPriority(8)	eventTxEvent(9)
1.1.1.3.91	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible	txAmpTransistorFault(91)	disable(2)	1	inactive(2)
1.1.1.4.82	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible	txAmpSumFault(82)	disable(2)	1	inactive(2)
1.1.1.4.83	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible	txAmpSumWarning(83)	disable(2)	1	inactive(2)
1.1.1.4.84	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible	txAmpPowerOn(84)	disable(2)	1	active(1)
1.1.1.4.85	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible	txAmpDOCK(85)	disable(2)	1	inactive(2)
1.1.1.4.86	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible	txAmpACOK(86)	disable(2)	1	inactive(2)

In the illustration above, the following information is contained in the highlighted row (depending on the used MIB; here: DVB n+1 medium-power system):

Position of code number	Meaning of position	Value	Meaning of value
1	Transmitter	1	Transmitter TxB
2	Output stage	1	Output stage A
3	Transmitter rack	1	Transmitter rack No. 1
4	Amplifier	4	Amplifier No. 4
5	Event	84	Amplifier ON/OFF

Tab. 1 "Instance" column (1.1.1.4.84) in numeric order

Column	Meaning	Value	Explanation
eventTxName(6)	Designation of event	txAmpPowerOn(84)	Amplifier ON/OFF
eventTxMask(7)	Message for event	disable(2)	No alarm is sent
eventTxPriority(8)	Priority for event	Value freely selectable by customer	Default setting when supplied: 1
eventTxEvent(9)	Current status of amplifier	active(1) (inactive(2))	Amplifier ON (Amplifier OFF)

Tab. 2 Meaning of other columns

The columns containing the value **Not accessible** are "index" columns (identified by **IDX**). OIDs of these columns cannot be queried; they are used for internal purposes only.

Example: DVB, N+1, low power

Valid MIBs:

- RS-COMMON-MIB
- RS-XX8000-COMMON-MIB
- RS-XX8000-DVB-NP1-MIB

Valid OIDs in "Module Compliance" path for N+1 low power:

- Name: rsXx8000DVBNplus1LP
- OID: 1.3.6.1.4.1.2566.127.1.2.167.5.5.2.2

Groups:

- groupNsuLP - 1.3.6.1.4.1.2566.127.1.2.167.5.5.1.6
- groupAlarmNsuLP" - 1.3.6.1.4.1.2566.127.1.2.167.5.5.1.7
- groupTxLP - 1.3.6.1.4.1.2566.127.1.2.167.5.5.1.8
- groupAlarmTxLP - 1.3.6.1.4.1.2566.127.1.2.167.5.5.1.9
- groupEvents - 1.3.6.1.4.1.2566.127.1.2.167.5.5.1.5

2 Menu Structure

The exciter software branches to different navigation areas. The Bookmarks and SX801 areas are also accessible via the display of the R&S SX801, but the other areas are available exclusively via the WebGUI.

Navigation areas of transmitter software

- Bookmarks
- Sx801
 - Sx801
 - Parameter Set
- Precorrection
- TxTool
- Storage
- User Administration
- SNMP Administration
- User Manual
- Visit R&S website

Note *Certain menus can only be seen when the software option for the transmission standard concerned is enabled.*

2.1 Bookmarks

The **Bookmarks** menu item leads to a list of bookmarks that you have previously set with the aid of **Add to bookmarks** (context menu).

Each bookmark forms a link to an actual menu window that you can call directly without having to navigate at great length through the menu tree.

2.2 Menu Tree Sx801 > Sx801



Level 1 >	Level 2 >	Level 3 >	Level 4 >	See
Status >				Section 3.1 ff

Level 1 >	Level 2 >	Level 3 >	Level 4 >	See
	Device Status			Section 3.1.2 (DVB)
	Input Status			Section 3.1.3 (DVB)
				Section 3.1.4 (ATV)
				Section 3.1.5 (ATSC)
Logbook >				Section 3.2
	Summary			
	Status			
	Warning			
	Fault			
Exciter ^{a)} >				
	Input >			
	Input Config			Manual R&S SX801
	Receiver/ Receiver AUX			Manual R&S SX801
		Setup		Manual R&S SX801
		TPS		Manual R&S SX801
		Status		Manual R&S SX801
	Input Automatic			Manual R&S SX801
	V _F ^{b)}			Manual R&S SX801
	Sound ^{a)} >			
		Input B G, D K, I, M1		Manual R&S SX801
		Input M, N		Manual R&S SX801
		Input M, N BTSC		Manual R&S SX801
		Input NICAM Mod		Manual R&S SX801
		Input NICAM Cod		Manual R&S SX801
	RF Out >			
	Synthesizer			Manual R&S SX801
	Output			Manual R&S SX801
	I/Q Adjust			Manual R&S SX801
	Precorrection			Manual R&S SX801

Level 1 >	Level 2 >	Level 3 >	Level 4 >	See
	DVB >	Common		Manual R&S SX801
		TPS		Manual R&S SX801
		SFN Delay		Manual R&S SX801
		Test Signals		Manual R&S SX801
		Monitor/ Monitor AUX		Manual R&S SX801
			Setup	
			TPS	
			Status	
	ATSC >	Common		Manual R&S SX801
		Input Config		Manual R&S SX801
	ATV >	Common		Manual R&S SX801
		Vision >	White Control	Manual R&S SX801
			White Limiter	Manual R&S SX801
			Sync Pulse	Manual R&S SX801
			Equalizer	Manual R&S SX801
		Sound >	FM Audio Mode	Manual R&S SX801
			FM Carrier	Manual R&S SX801
			FM Precorrection	Manual R&S SX801
			NICAM Audio Mode	Manual R&S SX801
			NICAM Carrier	Manual R&S SX801
	Reference >	Common		Manual R&S SX801
		GPS >		
			Status	Manual R&S SX801

Level 1 >	Level 2 >	Level 3 >	Level 4 >	See
			Satellites	Manual R&S SX801
Amplifier				
		Status	Section 3.4.1	
		Amp 1		
		Amp 2		
		Setup		
		Output Power		Section 3.4.2
		Trimming		Section 3.4.3
		Service	Section 3.4.4	
		Amp 1		
		Amp 2		
System ^{c)} >				
		Ethernet		Manual R&S SX801
		COM-Port		Manual R&S SX801
		SNMP >		
		General		Manual R&S SX801
		Manager		Manual R&S SX801
		Alarmsinks		Manual R&S SX801
		Date / Time		Manual R&S SX801
		Option Keys > (web browser only)		
		Status		Manual R&S SX801
		Install		Manual R&S SX801
		Deactivations		Manual R&S SX801
		HW Options		
		Tx Type		
		Transmitter		Section 3.3.1
		Configuration		Manual R&S SX801
		Time Scheduler		Manual R&S SX801
		Device Info >		

Level 1 >	Level 2 >	Level 3 >	Level 4 >	See
		Device		Manual R&S SX801
		Boards >		Manual R&S SX801
			Coder	
			RF Board	
			Amplifier	
			GPS Board	
			Receiver/Monitor	
			Receiver AUX/ Monitor AUX	
			Parl/O	

- a) Path changed from previous value of "TV Settings" to "Exciter"
b) Can only be seen when the ATV software option is enabled.
c) Path changed from previous value of "System Setup" to "System"

2.3 Menu Item Sx801 > Parameter Set

Level 1 >	Level 2 >	Level 3 >	Parameter
Parameter Set >			Setting items: – Load settings from – Save settings to – Copy set x to y – Swap set x and y – Parameter Set 1 .. 8 Displays: – Loaded Set – Operation Stat – Current Set Changed

2.4 Further Menu Branches (WebGUI Only)

2.4.1 Menu Branch Precorrection

The navigation area is the interface to the precorrector GUI (integrated software for transmitter precorrection with individual web interface).

Level 1 >	Level 2 >	Level 3 >	Parameter
Precorrection > a)			Setting items: – Start Precorrector-GUI

a) The precorrector GUI starts as a JAVA applet in its own window.

2.4.2 Menu Item TxTool

You can use this menu item to start a separate web application in order to forward logbook or instrument information to the PC. Operation of the TxTool is explained in the section "Saving transmitter information: TxTool menu item".

Level 1 >	Level 2 >	Level 3 >	Parameter
TxTool > a)			Separate web browser interface

a) When you double-click the menu item, depending on the browser used either a new window or a new tab will open.

2.4.3 Menu Item Storage

Level 1 >	Level 2 >	Level 3 >	Parameter
Storage > a)			Setting items: – Save parameter settings into file – Recall parameter settings from file

a) When you double-click the menu item, depending on the browser used either a new window or a new tab will open.

2.4.4 Menu Item User Administration

Level 1 >	Level 2 >	Level 3 >	Parameter
User Administration > a)			Setting items for users with Superuser rights: – Add new user – Change selected user – Delete selected user – Show session list Setting items for all other users: – Change my password Displays: – List of available users

a) When you double-click the menu item, depending on the browser used either a new window or a new tab will open.

2.4.5 Menu Item SNMP Administration

Level 1 >	Level 2 >	Level 3 >	Parameter
SNMP Administration ^{a)}			Setting items: – Please click here to download MIBs (provided by IRT).

- a) When you double-click the menu item, depending on the browser used either a new window or a new tab will open.

2.4.6 Menu Item User Manual

Level 1 >	Level 2 >	Level 3 >	Parameter
User Manual > ^{a)}			Links to PDF download: – Deutsches Benutzerhandbuch – English User Manual

- a) Clicking the menu item opens a new browser window.

2.4.7 Visit R&S Website Menu Item

When you call this menu item the Rohde&Schwarz home page opens in a separate browser window.

3 Sx801 Menus

The "Operating" chapter of the manual for the R&S SX801 contains detailed descriptions of the menus for the exciter. These are also the same menus that the compact transmitter users.

Accordingly, the following sections describe only those menus that differ in terms of the software for the standalone exciter and the SCV8000E/R compact transmitter.

Note Please note that the menu paths were modified as follows after editing of the manual for the R&S SX801 was completed (1st edition):

Manual (1st edition) R&S SX801	Transmitter manual R&S SCV8000E/R
Sx801 > Sx801 > TV Settings	Sx801 > Sx801 > Exciter
Sx801 > Sx801 > System Setup	Sx801 > Sx801 > System

3.1 Transmitter Status: Status Menu

The **Status** contains an overview of faults, warnings and status messages for the individual components and functions of the transmitter.

Depending on the TV standard that is set, the status indications will vary.

The **Status** branches off for DVB to the following menu windows:

- **Device Status:** Status information about the transmitter's current status
- **Input Status:** Status information on configuration and state of input interfaces

For ATV and ATSC there is only one menu window **Status** in each case with status information about the current status of the transmitter as well as about the input interfaces.

3.1.1 Status Indications, Warnings and Fault Messages

When warnings and fault messages occur, this usually means that transmission operation is impaired. Different displays are used to distinguish the severity of an impairment or the "quality" of a defect. The following applies:

	Front panel	Web user interface	
Status display	OK	OK [green]	There is no impairment.
Warning	W	W [yellow]	Although the instrument is functional, it is possible that external influences are disrupting transmission operation.
Error message	F	F [red]	A severe fault has occurred; transmission is usually impossible.

Note This type of "LED" display using abbreviations (OK, W, F, etc.) and color (web browser only) is used throughout the entire menu.

3.1.2 Status > Device Status (for DVB)



Display	LED	Explanation
Sum Fault	F	Sum Fault: One or more errors occurred
RF	On	RF level at the exciter output is OK
	F	There is no RF level at the exciter output even though the RF output is enabled
	- OFF -	No RF level at output of exciter since the RF output is not enabled (manual disabling)
Exciter	On	RF output of the exciter is enabled There are several ways of enabling the RF output: – using the setting item RF Output in the RF Out > Output menu – on the front panel of the instrument via the RF ON/OFF key
Mute	W	RF signal is disabled by the signal processing unit in the exciter
Input	Ok	Valid transport stream present at active input <i>In the case of hierarchical coding, the input is OK if valid transport streams are present at both inputs (for HP stream and LP stream).</i>
	W	Invalid transport stream at active input (combined with the setting Type of Loss of Input = <i>Warning</i> , see section "Exciter > Input > Input Automatic")
	F	Invalid transport stream at active input (combined with the setting Type of Loss of Input = <i>Fault</i> , see section "Exciter > Input > Input Automatic")
Fifo	W	Overflow or underflow of the input buffer due to incorrectly configured DVB transmission parameters. Possible reasons: – incorrect data rate of the input data stream – excessive fluctuations in the input data rate (bursts)

Display	LED	Explanation
SFN Delay	W	Desired time of transmission in the SFN cannot be complied with. Possible reasons: – the maximum delay set at the MIP inserter is too small for the (current) transmission link – faulty reference signal (GPS)
Data rate	W	Wrong data rate on the active input <i>In the case of hierarchical coding, a warning is output if an incorrect data rate is present at one or both inputs.</i>
MIP fail	W	No MIP at active input. Possible reasons: – in the SFN: no MIP in input data stream – in MFN: No MIP in input data stream and in the menu window Exciter > DVB > TPS the setting TPS Source > MIP is selected <i>In the case of hierarchical coding, the LED lights up if both inputs (for the HP stream and LP stream) are affected.</i>
Amplifier	Ok	All amplifiers are working properly
	W	Sum warning for amplifiers
	F	Sum fault for amplifiers
Sum Warning	W	One or more warnings are active
Reflection	W	Reflection at transmitter output in VSWR range from 1.5 to 1.35
	F	Reflection at transmitter output
	- OFF -	No reflection at transmitter output, VSWR < 1.2
Output Terminated	Ok	Exciter output terminated
	F	Exciter output open
Self Test	Ok	No hardware faults have been detected
	F	A hardware fault has occurred in one or more modules; for further information on errors see logbook
Test signal	W	Transmitter has been switched to test mode
Loop	Ok	RF loop closed
	- OFF -	RF loop not closed
Reference	Ok	External reference frequency is present and OK
	W	External reference frequency is not OK
	F	External reference frequency is not OK and the Fail Delay Time set in the Exciter > Reference > Common menu has expired

Display	LED	Explanation
	- OFF -	External reference frequency is not present but it is also not needed
PPS	Ok	External 1PPS source is present and the reference frequency is synchronized to the 1PPS
	W	External 1PPS source is not present or the reference frequency is not synchronized to the 1PPS
	F	External 1PPS source is not present or the reference frequency is not synchronized to the 1PPS and the Fail Delay Time set in the Exciter > Reference > Common menu has expired
	- off	External 1PPS source is not present but it is not needed
Option Key	Ok	All necessary software options are enabled
	W	A temporary license code for a software option will expire shortly
	F	One or more necessary software options are not enabled
ExcTemperature	Ok	Exciter temperature is acceptable
	F	Exciter is too hot

3.1.3 Status > Input Status (for DVB)



Display	LED	Explanation
Automatic Ready		Input signal automatic status reporting
	Ok	Automatic system is switched on and ready to switch over from the preselected input to the standby input as soon as the signal on the preselected input is disrupted
	- OFF -	Automatic system is switched off or is not ready since a change over to the standby input took place and automatic ready is not desired (in the Exciter > Input > Input Automatic menu, the setting Automatic Ready After Change Over > OFF is selected)
Automatic changed over	W	The automatic system has switched over to the standby input
	- OFF -	Change over did not take place

Display	LED	Explanation
HP1 Connect	Ok	Input signal is present at TS 1
	- OFF -	No input signal present at TS 1
HP1 Seamless		Indicates the status of seamless input switchover for TS 1 (seamless switching) <i>Seamless switching is activated and deactivated in the menu window Exciter > Input > Input Automatic using the Seamless Switching switch.</i>
	On	Operating input and standby input are synchronized
	- OFF -	Inputs cannot be synchronized
HP1 Preselect	Ok	TS 1 is the preselected operating input
	- OFF -	TS 1 is the standby input
HP1 Active	Ok	TS 1 is currently the active input
	- OFF -	TS 1 is currently the inactive input
HP1 MIP fail	W	No MIP at input TS 1. Possible reasons: – in the SFN: no MIP in input data stream – in MFN: No MIP in input data stream and in the menu window Exciter > DVB > TPS the setting TPS Source > MIP is selected
	- OFF -	MIP is present
LP1 Connect	Ok	Input signal is present at TS 2
	- OFF -	No input signal present at TS 2
LP1 Seamless		Indicates the status of seamless input switchover for TS 2 (seamless switching) <i>Seamless switching is activated and deactivated in the menu window Exciter > Input > Input Automatic using the Seamless Switching switch.</i>
	On	Operating input and standby input are synchronized
	- OFF -	Inputs cannot be synchronized
LP1 Preselect	Ok	TS 2 is the preselected operating input
	- OFF -	TS 2 is the standby input
LP1 Active	Ok	TS 2 is currently the active input
	- OFF -	TS 2 is currently the inactive input

Display	LED	Explanation
LP1 MIP fail	W	No MIP at input TS 2. Possible reasons: – in the SFN: no MIP in input data stream – in MFN: No MIP in the input data stream and in the menu window TV Settings > DVB > TPS , the setting TPS Source > MIP is selected
	- OFF -	MIP is present

3.1.4 Status (for ATV)



Display	LED	Explanation
Sum Fault	F	Sum Fault: One or more errors occurred
RF	On	RF level at the exciter output is OK
	F	There is no RF level at the exciter output even though the RF output is enabled
	- OFF -	No RF level at output of exciter since the RF output is not enabled (manual disabling)
Exciter	On	RF output of the exciter is enabled There are several ways of enabling the RF output: – using the setting item RF Output in the RF Out > Output menu – on the front panel of the instrument via the RF ON/OFF key
	- OFF -	RF output of the exciter is disabled
Loop	Ok	RF loop closed
	- OFF -	RF loop not closed
	- OFF -	RF loop not closed
Video In	Ok	Valid video signal is present at the input
	W	Invalid video signal at input
	F	No video signal at input
Option Key	Ok	All necessary software options are enabled
	W	A temporary license code for a software option will expire shortly
	F	One or more necessary software options are not enabled

Display	LED	Explanation
Sum Warning	W	One or more warnings are active
Test Mode	W	Transmitter has been switched to test mode
HW Error	F	A hardware fault has occurred in one or more modules; for further information on errors see logbook
Temperature	Ok	Temperature of the modules is OK
	F	At least one module is overheating
Fan	Ok	Fan is OK
	W	A fan has failed; there is a possibility of overheating
	F	The fan(s) failed; there is a high risk of overheating
Output Terminated	Ok	Exciter output terminated
	F	Exciter output open

Display	Status	Explanation
		Displays the set audio mode:
Audio Mode	Mono	Mono
	Stereo	Stereo
	Dual	Dual sound
Carrier 1	Off	Sound carrier 1 is not present in the RF output signal
	Mod Off	Modulation for sound carrier 1 has been switched off in the ATV > Sound > FM Carrier menu
	AF1+2	Carrier is modulated with the signals AF1 and AF2
	AF3	Additional mono sound carrier for BTSC operation on sound carrier 1
	BTSC	Carrier is modulated with BTSC
	AF1	Carrier is modulated with the signal AF1
Carrier 2	Off	Sound carrier 2 is not present in the RF output signal
	Mod Off	Modulation for sound carrier 2 has been switched off in the ATV > Sound > FM Carrier menu
	AF1+2	Carrier is modulated with the signals AF1 and AF2
	AF1	Carrier is modulated with the signal AF1
	AF1-2	Carrier is modulated with the signals AF1 and AF2

Display	Status	Explanation
	AF2	Carrier is modulated with the signal AF2
	AF1/P	Carrier is modulated with signal AF1 as well as the pilot tone
	AF1-2/P	Carrier is modulated with the signals AF1 and AF2 as well as the pilot tone
	AF2/P	Carrier is modulated with signal AF2 as well as the pilot tone
	N:AF1+0	NICAM carrier is modulated with the signal AF1 only
	N:AF1+2	NICAM carrier is modulated with the signals AF1 and AF2
	N:Digital	Carrier is modulated with a NICAM 728 data stream
	N:PRBS	Carrier is modulated with PRBS
	N.Ext.Carrier	External supply of a NICAM data stream

3.1.5 Status (for ATSC)



Display	LED	Explanation
Sum Fault	F	Sum fault: One or more errors occurred
RF	On	RF level at the exciter output is OK
	F	There is no RF level at the exciter output even though the RF output is enabled
	- OFF -	No RF level at output of exciter since the RF output is not enabled (manual disabling)
Exciter	On	RF output of the exciter is enabled There are several ways of enabling the RF output: – using the setting item RF Output in the RF Out > Output menu – on the front panel of the instrument via the RF ON/OFF key
	- OFF -	RF loop not closed

Display	LED	Explanation
Input	Ok	Valid transport stream present at active input <i>In the case of hierarchical coding, the input is OK if valid transport streams are present at both inputs (for HP stream and LP stream).</i>
	W	Invalid transport stream at active input (combined with the setting Type of Loss of Input = <i>Warning</i> , see section "Exciter > Input > Input Automatic")
	F	Invalid transport stream at active input (combined with the setting Type of Loss of Input = <i>Fault</i> , see section "Exciter > Input > Input Automatic")
Input [1/2] Connect	Ok	Input signal is present at the input TS 1/TS 2
	W	Input signal has not been detected
	- OFF -	Input is not present at the input TS 1/TS 2
Reference	Ok	External reference frequency is present and OK
	W	External reference frequency is not OK
	F	External reference frequency is not OK and the Fail Delay Time set in the Exciter > Reference > Common menu has expired
	- OFF -	External reference frequency is not present but it is also not needed
Option Key	Ok	All necessary software options are enabled
	W	A temporary license code for a software option will expire shortly
	F	One or more necessary software options are not enabled
Sum Warning	W	One or more warnings are active
Output Terminated	Ok	Exciter output terminated
	F	Exciter output open
Self Test	F	A hardware fault has occurred in one or more modules; for further information on errors see logbook
	Ok	Self test passed
Temperature	Ok	Temperature of the modules is OK
	F	At least one module is overheating
Fan	Ok	Fan is OK
	W	A fan has failed; there is a possibility of overheating

Display	LED	Explanation
	F	The fan(s) failed; there is a high risk of overheating
Active Input	1	TS 1 is currently the active input
	2	TS 2 is currently the active input
	no	No active input selected; test generator is activated
Data rate	Ok	Correct data rate on the active input
	W	Wrong data rate on the active input
Mute	W	RF signal is disabled by the signal processing unit in the exciter
Test signal	Ok	Transmitter has been switched to test mode
	- OFF -	Transmitter is in normal mode

3.2 Event Memory: Logbook Menu

The logbook is used to record changes in state (events) of the transmitter.

Menu windows

The **Logbook** menu branches to the following menu windows:

- **Summary**: Complete logbook with all recorded data
- **Status**: Partial logbook with recorded status changes
- **Warning**: Partial logbook with recorded occurrences of warnings
- **Fault**: Partial logbook with recorded occurrences of error messages

3.2.1 Logbook > Summary/Status/Warning/Fault



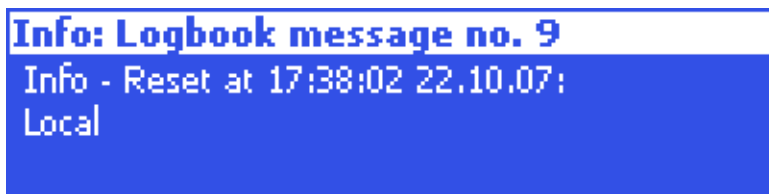
The complete logbook and the partial logbooks are uniformly structured. The messages are numbered sequentially and contain the following information:

- Identification for occurrence ↑ or disappearance ↓ of an event
- Message: Brief description of the event

- Time: Time of day of the event
- Date: Date of the event

Date and time of an event in the instrument display

1. To display the date and time, select a message and call the info window by pressing **OK**.



2. Press **Back** to close the info window and to return to the normal logbook view.

Note *The logbooks are sorted according to UTC.*

3.2.2 Logbook Context Menu

Additional context functions are available in the menu windows for the complete logbook and the partial logbooks:

Function	Explanation
Clear logbook	Clears all entries in the current logbook; clearing individual logbook entries is not possible. <i>When you clear the complete logbook, the partial logbooks are also cleared. A Reset Fault is triggered at the same time.</i>
Restore logbook	Restores the cleared entries in the current logbook. <i>When you restore the complete logbook, the partial logbooks are also restored.</i>

3.3 Submenu System > Tx Type

The **System > Tx Type** submenu is used to set the TV standard. It also includes a time scheduler for time-controlled transmission using different TV standards (multi-standard operating mode) and further settings that affect the behavior of the parallel remote control interface and the whole system.

Menu windows

The **Tx Type** menu branches to the following menu windows:

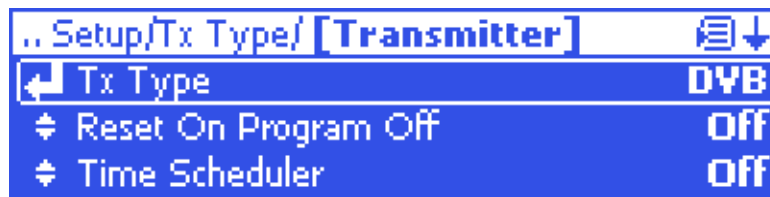
- **Transmitter:** Used to select the TV standard, to activate message suppression for the parallel remote interface, to determine the behavior of the parallel remote interface when switching between analog TV and digital TV, to activate the time scheduler for multistandard operation and to enter the transmitter name
- **Configuration:** Used to select and configure the TV standards for time-controlled switchover
- **Time Scheduler:** Used to define switching times for time-controlled switchover of the standards

Compared to the standalone exciter, the menu window **System > Tx Type > Transmitter** has been extended to include two transmitter-specific parameters.

The other menu windows in the submenu are the same as those in the standalone exciter (see the manual for the R&S SX801, "Operating" chapter).

3.3.1 System > Tx Type > Transmitter

The menu window **System > Tx Type > Transmitter** is used, for example, to set the input interfaces and the signal processing to the relevant TV standard. You can also activate a time scheduler for multi-standard operating mode and enter special settings for the parallel remote control interface.



Setting item	Explanation
Tx Type	Select the TV standard: ATV, DVB or ATSC The instrument reboots automatically when the TV standard is switched over. Signal processing is also switched over.
Reset On Program Off	In the ON switch position, a Reset Fault is automatically triggered when the RF output is locked.
Time Scheduler	Enable or disable time-controlled tasks with the aid of the time scheduler
Par I/O DTV setting	It is possible to switch over from ATV to DTV via the parallel remote control interface. The switch defines which DTV standard will be used.
Par I/O Inhibit Status	Switches to message suppression for the parallel remote control interface – OFF: Message suppression is not activated; messages via the parallel remote interface are also output during local operation – ON: Message suppression is activated; during local operation, no messages are output via the parallel remote interface

Setting item	Explanation
Number of Amplifiers	Selects the system configuration with 1 or 2 amplifiers – 1: System with a base amplifier – 2: System with base and extended amplifiers
Tx Mode	Sets the transmitter operating mode The options are as follows: – Dual Drive + NetCCU: Standby system with 2 exciters and automatic switchover – Single Tx + NetCCU: Single transmitter with R&S NetCCU800 – 1+1: Standby system with 1 standby transmitter for 1 active transmitter – N+1: Standby system with 1 standby transmitter for n active transmitters – Single Tx: Single transmitter – xx7000: Upgrade for older transmitter generations
Tx Name	Inputs a transmitter name for easier identification

3.4 Output Stage: Amplifier Menu

The menu windows in the Amplifier menu are used to make settings for the amplifiers.

The menu windows

The **Amplifier** menu branches to the following menu windows:

- **Status > AMP 1/2**: Status indications for the base amplifier (AMP 1) and possibly the extended amplifier (AMP 2)
- **Setup > Output Power**: Used to set the transmitter output power
- **Setup > Trimming**: Improves the efficiency and balance in case of very different output power levels for the individual amplifiers
- **Service > AMP 1/2**: Parameter indications for the amplifier modules

3.4.1 Amplifier > Status > AMP 1/AMP 2



Display	LED	Explanation
RF OUT	- OFF -	RF deactivated (transmitter switched off) To switch on the transmitter, press the RF ON/OFF key.
	On	RF activated, transmitter output power acceptable
	W	RF activated, but transmitter output power below RF warning threshold
	F	RF activated, but transmitter output power below RF fault threshold
RF IN	- OFF -	RF deactivated (transmitter switched off)
	Ok	RF activated, input signal to amplifier correct
	W	RF activated, but input level to amplifier too low Check the settings for the output power of the exciter in the Exciter > RF Out > Output menu.
Reflection	Ok	No reflection
	W	Ratio between forward and reflected power critical
	F	Reflection detected, transmitter deactivated RF Fault indication remains activated and can only be reset (after cause is eliminated) via the Reset Fault command.
Amplifier	Off	Amplifier switched off Press the RF ON/OFF key to switch it on.
	On	Amplifier switched on
AC	Ok	Amplifier power supply (power supplies) in acceptable condition
	F	Amplifier power supply (power supplies) not in acceptable condition or not installed
Communication	Ok	Communication between amplifier and exciter (or R&S NetCCU800) in acceptable condition
	F	Communication between amplifier and exciter (or R&S NetCCU800) interrupted Check cables.
Temperature supply 1	Ok	Temperature of amplifier power supply 1 in acceptable condition
	F	Temperature of amplifier power supply 1 too high
Temperature supply 2	Ok	Temperature of amplifier power supply 2 in acceptable condition
	F	Temperature of amplifier power supply 2 too high

Display	LED	Explanation
Temperature supply R	Ok	Temperature of standby amplifier power supply in acceptable condition
	F	Temperature of standby amplifier power supply too high
Transistor	Ok	All output stage transistors in amplifier working properly
	F	One or more output stage transistors defective For more Information, see Amplifier > Service > AMP 1 / AMP 2 menu.
Driver	Ok	All driver transistors in amplifier working properly
	F	One or more driver transistors defective For more Information, see Amplifier > Service > AMP 1 / AMP 2 menu.
Amp Temperature	Ok	Temperature of power amplifier module in acceptable condition
	F	Temperature of power amplifier module too high
Blower	Ok	The two fans in the amplifier are working properly
	F	One or both fans have failed
Regulation	Ok	Power regulation is working properly
	F	Power regulation faulty Please contact your local service representative.
DC Supply 1	Ok	Amplifier power supply 1 working properly
	F	Amplifier power supply 1 defective
DC Supply 2	Ok	Amplifier power supply 2 working properly
	F	Amplifier power supply 2 defective
DC Supply R	Ok	Standby amplifier power supply working properly
	F	Standby amplifier power supply defective

3.4.2 Amplifier > Setup > Output Power

Sx801/Amplifier/Setup/ [Output Power] ↓	
◆ Output Power	600.0 W
◆ Power Reduction	0.0 W
◆ Warning Limit	-1 dB

Setting item	Explanation
Output Power	Sets the forward power
Power Reduction	Tests the warning and fault threshold Setting a power level reduces the output power of the transmitter although the actual nominal power (output power) remains the same. A reduction in the output power is simulated to test the warning and fault threshold.
Warning Limit	Selection of a dB value referenced to the nominal power setting for the forward power which, if exceeded, causes a warning to be output
Fail Limit	Selection of a dB value referenced to the nominal power setting for the forward power which, if exceeded, causes a fault message to be output

Display	Explanation
Power Indicator	Indication of the currently emitted power
RF Monitor Att.	Indication of the attenuation value at the RF test output of the transmitter, calibrated at the relevant transmit frequency The transmitter's RF test output is located at the last amplifier in the system and corresponds to the following connector: – AMP RF MON For transmitters with one amplifier – MAIN RF MON For transmitters with two amplifiers

3.4.3 Amplifier > Setup > Trimming

Sx801/Amplifier/Setup/ [Trimming] ↓	
⚙ Supply Voltage	32.00 V
⚙ Delta Bias PA1	2.50 V
⚙ Delta Bias PA2	2.50 V

Setting item	Explanation
Supply Voltage	Changes the supply voltage to improve the efficiency of the amplifiers
Supply Automatic	Automatic regulation (On) or manual setting of the supply voltage (Off)
Delta Bias PA1/PA2	Balancing of the base and extended amplifiers for the same output power
Automatic PA1/PA2	Activates (On) or deactivates (Off) balancing

3.4.4 Amplifier > Service > AMP 1/AMP 2

Sx801/Amplifier/Service/ [Amp 1] ↓	
I 1	0.00 A
I 2	0.00 A
I 3	0.00 A

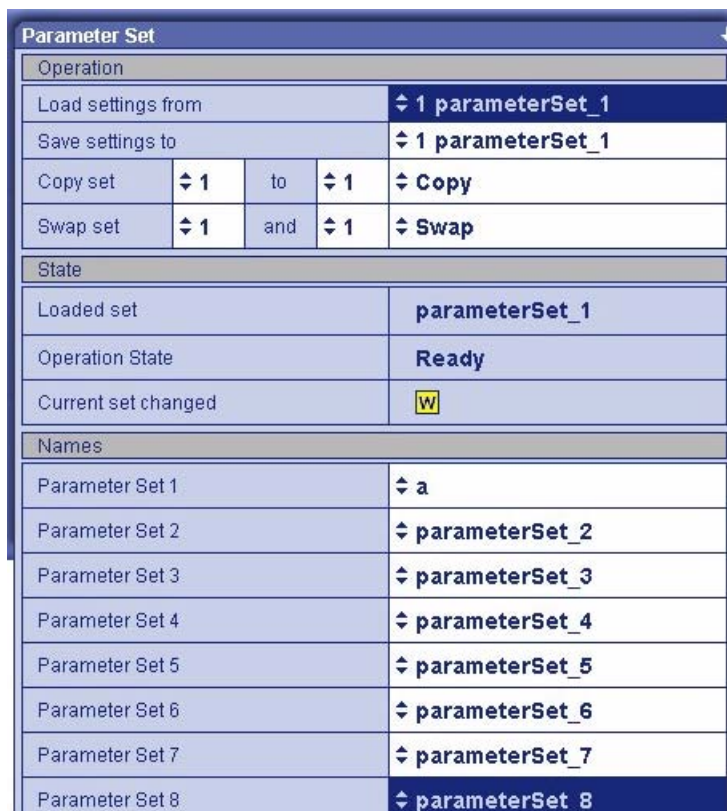
Display	Explanation
Ix	Module current of an output stage module, x = 1 to 4 ^{a)}
I Pre	Preamplifier current
I Drv x	Module current of a driver module, x = 1 to 2
Temperature	Heat sink temperature on the amplifier
Amp Mon Att	Attenuation value on the AMP RF MON connector of the respective amplifier
Power Out	Total forward power of the amplifier
Reflection	Total reflected power at the amplifier
V Ref	Reference voltage of the amplifier
V Reg	AGC voltage of the amplifier
PWR A/PWR B	Detector voltage for forward detector A or B
V Aux 1/V Aux 2	Detector voltage for auxiliary detector Aux 1 or Aux 2

a) With the amplifiers in the R&S VH8001Cx family, no current measured value I4 is displayed.

4 Further Menus

4.1 Multiple Parameter Sets: Parameter Set Menu

You can use the **Parameter Set** menu window to create, load and save parameter sets for a number of different overall configurations. If the operating environment changes (e.g. change of frequency) you can access complete parameter sets instead of having to set each individual value. You have eight memory locations available in addition to the active memory location (for the parameter set loaded).



Parameter Set			
Operation			
Load settings from		1 parameterSet_1	
Save settings to		1 parameterSet_1	
Copy set	1	to	1 Copy
Swap set	1	and	1 Swap
State			
Loaded set		parameterSet_1	
Operation State		Ready	
Current set changed		W	
Names			
Parameter Set 1		a	
Parameter Set 2		parameterSet_2	
Parameter Set 3		parameterSet_3	
Parameter Set 4		parameterSet_4	
Parameter Set 5		parameterSet_5	
Parameter Set 6		parameterSet_6	
Parameter Set 7		parameterSet_7	
Parameter Set 8		parameterSet_8	

Function	Description
Parameter Set	
Load settings from	For selecting a parameter set as the current parameter set; the currently loaded parameter set acts as an independent copy of the stored parameter set.
Save settings to	For saving the currently active settings to the chosen memory location.
Copy set x to y	For selecting a parameter set x, the content of which you wish to save to another memory location y. To start the copying procedure, select Copy and confirm with OK.
Swap set x and y	For selecting two parameter sets x and y, the content of which you wish to swap. To start the swap procedure, select Swap and confirm with OK.

Function	Description
State	
Loaded Set	Displays the active (i.e. loaded) parameter set
Operation State	Display showing the status of the action that is being carried out (Ready, Loading, Saving, Copying)
Current Set Changed	Yellow: The device settings have been changed and no longer match the settings of the loaded parameter set.
Names	
Parameter Set 1	Name to describe the parameter set (e.g. intended use)
Parameter Set 2	See above
Parameter Set 3	See above
Parameter Set 4	See above
Parameter Set 5	See above
Parameter Set 6	See above
Parameter Set 7	See above
Parameter Set 8	See above

Settings that are not saved in parameter sets

Certain parameter settings that are valid only for the individual device, and a few other settings, are not saved. This includes:

- Instrument-specific parameters, such as **OCXO Adjust**
- Test mode settings, such as **I/Q-Testsignal** or **Test Mode**
- Limiter settings
- Port settings, such as in the **Ethernet** menu window

These settings remain valid regardless of which parameter set is currently loaded.

4.2 Saving Transmitter Information: Menu Item TxTool

In order to improve clarity and for archiving purposes, you can save transmitter data selected via the web browser (such as logbook or device information, measurement values or parameters) to an ASCII or HTML file. You can also delete and restore logbook entries of the transmitter components.

1. Select **TxTool** in the browser window.

A security query appears first of all.

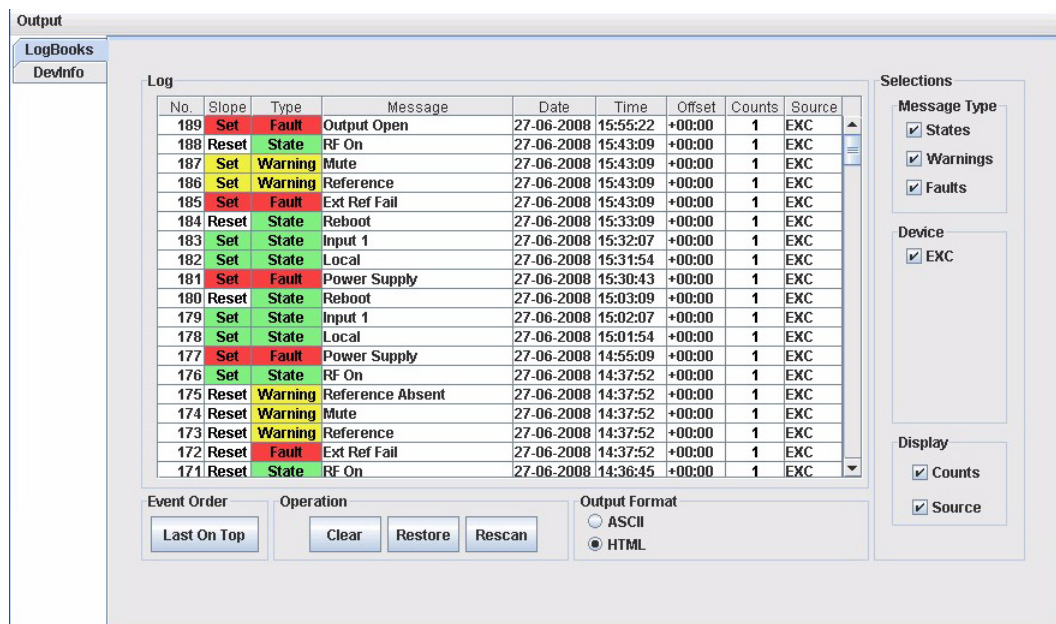
Note Execution of the TxTool requires write rights to the file system of the computer. To grant these rights you must confirm the security query.

If you select **Always trust content from this author**, the security query will not be displayed the next time the TxTool is called.



2. Confirm the security query with **Run**.

The **TxTool** window used to display and save transmitter data appears.



The window is initially empty when opened. The required settings must be selected before the data is read out.

Reading out data

1. Select (top left) the data that is to be displayed.

Different windows containing additional functions are displayed depending on the type of data you select. Depending on the selected tab, the window will still be empty (e.g. **LogBooks**) or the appropriate data will be displayed (e.g. **DeviceInfo**).

2. Select (depending on the window) which data is to be displayed (see the table under "Functions in Logbooks Window").
3. Start readout of the data with **Rescan** (if this function is available in the window).

Saving data

Different options and formats are available for saving the data.

1. Under **Output Format**, select the file format in which the data is to be saved.
2. In the **Output** menu, select whether the data is to be saved as a file (**Write to File**) or copied to the clipboard (**Copy to Clipboard**).

Depending on your selection, you can save the data in a file using the Windows **Save** command or copy it to the clipboard and then use it in other applications.

Note *If the data is to be evaluated in a spreadsheet application (e.g. Microsoft Excel) it is advisable to copy the data to the clipboard in HTML format. If the clipboard is then copied to an (empty) worksheet, the values are separated in tabular form.*

4.2.1 Functions in LogBooks Window

The following additional functions are available in the **Logbooks** window:

Function	Explanation
Message Type	Used to select the type of messages which are to be listed (more than one option can be selected)
Device	Used to select the transmitter components for which message data is to be displayed (more than one option can be selected)
Display	Used to show and hide the columns Counts (shows the number of messages of this message type) and Source (shows the transmitter component to which the message is assigned)
Last/First On Top	Sorts the displayed messages according to the time at which they occurred
Clear	(Real) deletion of the logbook entries (identical to deleting the logbook entries using the context menu of the Logbook menu window)
Restore	(Real) restoration of the logbook entries (identical to restoring the logbook entries using the context menu of the Logbook menu window)
Rescan	Updates the displayed messages

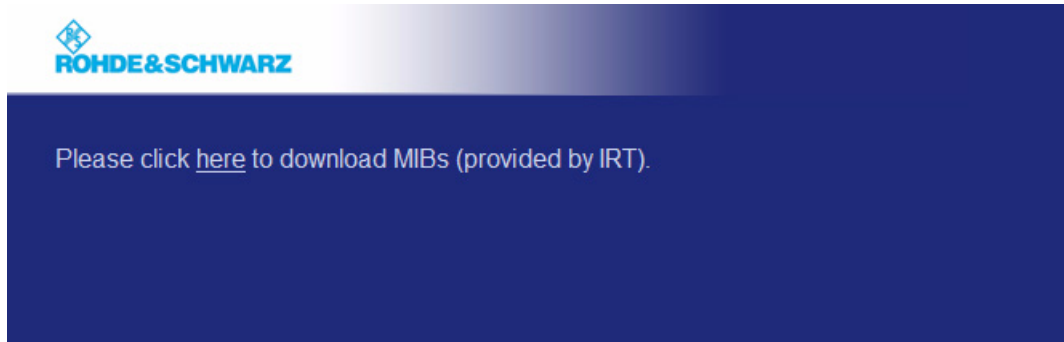
4.3 Backup of Parameter Data: Menu Item Storage

See chapter "Maintenance" (exciter manual).

4.4 Menu Item SNMP Administration

With the menu item **SNMP Administration**, you can download the Management Information Base (MIB) of the SNMP agent to configure the management station by means of this information.

After calling up the menu item, a further browser window will be opened inviting you to download data:



5 Introduction to Manual Precorrection

Factory set precorrection curves v. manual precorrection

The transmitter equipment includes factory preset precorrection curves covering every frequency range and all dynamic ranges. The appropriate precorrection curve is automatically loaded in each case, so as a rule manual precorrection is not needed.

In certain cases the precorrection can be further optimized by manual precorrection. Precorrection can then be carried out for different frequencies and output powers. Since manual precorrection does not overwrite any factory set precorrection curves, the factory defaults can be restored at any time (see section "Characteristic Curves" in "Loading an existing characteristic curve").

User interface for manual precorrection

The corrector is operated with the aid of a web browser. The transmitter makes a Java applet (precorrector GUI) available for this purpose. This applet is launched in the web browser and contains all the elements for operating the corrector.

The following section is a brief introduction to the configuration and use of this software. This is followed by a description of the individual menus for setting the corrector.

5.1 Launching the Precorrector GUI

The precorrector GUI is integrated in the transmitter web browser interface. Before the precorrector GUI is launched, therefore, the conditions must be created for remote operation from a locally connected PC or remote control via a distant network client.

Note *For further information on installing and configuring remote operation from a local PC or remote control via a distant network client, refer to the section "Remote Operation and Remote Control" earlier in this chapter.*

1. From your browser, call the web GUI and log on with *Configuration* rights.
2. Launch the precorrector GUI by going to the **Navigator** window in the web GUI, below the **Precorrection** entry, and double-clicking on **Start Precorrector-GUI**.

While the program is starting up, the message Starting ADE GUI will be displayed. After a brief time, the initial operating window for the precorrector should appear.

Note *An additional empty browser window will appear. If this window is closed, the Precorrector GUI will also be terminated.*

Note *If the browser supports tabs (e.g. Internet Explorer 7), a new window is not created. The precorrector GUI opens in a new tab instead.*

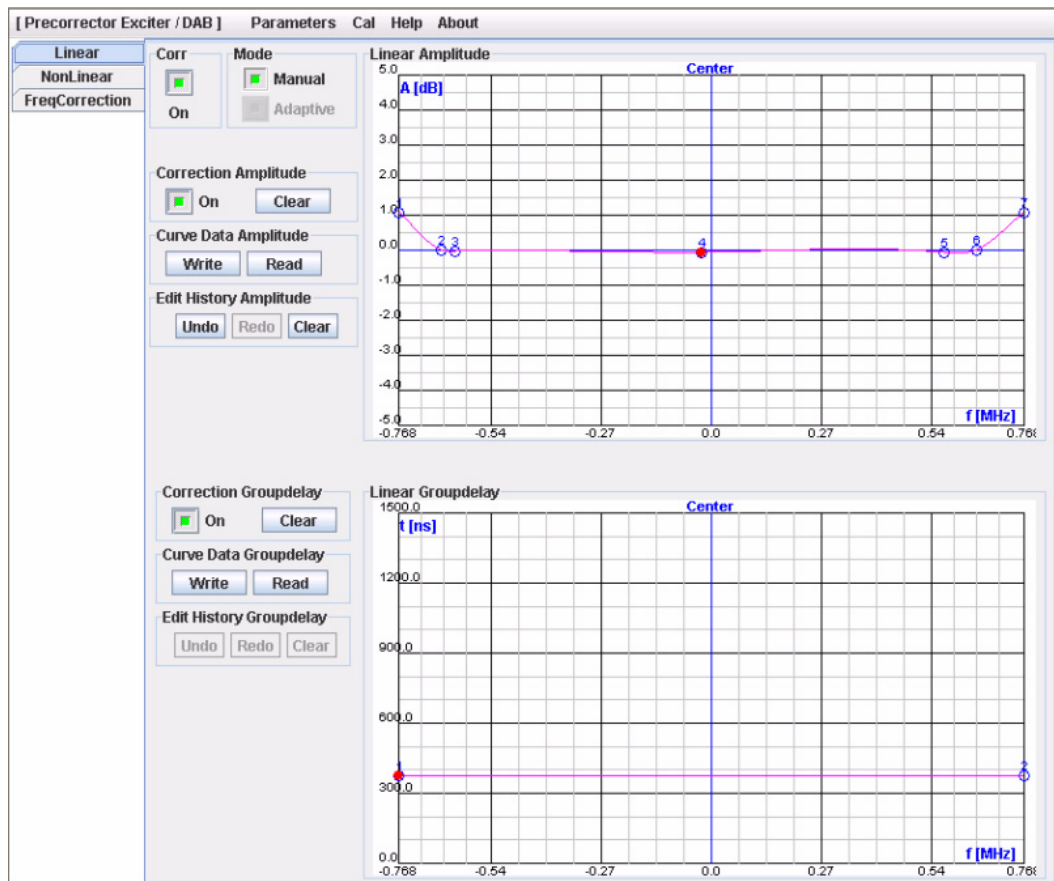


Fig. 15 Initial operating window in the precorrector GUI

The operating windows of the precorrector GUI are divided into the following areas:

- Title bar (for separately opened window only)
- Menu bar
- Selection column with tabs
- Work area

The menu bar and selection column are the same for all of the windows in the precorrector GUI.

Title bar

The title bar contains the following information:

- Name of the exciter that is currently being operated
- Transmitter type

Menu bar

The menu bar comprises the following program commands:

- **Parameters > Rescan**
Refresh to show all parameters that can be displayed in the GUI
- **Cal > Calibration**
Access to the alignment parameters – for production staff only
- **Help > Help**
Access to help information
- **About > About this**
Information about the software version

Selection column

The selection column contains the following tabs:

- **Linear**
Opens the operating window for the linear corrector.
- **Nonlinear**
Opens the operating window for the nonlinear corrector.
- **FreqCorrection**
Opens the operating window for nonlinear frequency response correction.

Work area

The work area contains the fields required by the different operating windows. Use the fields to perform precorrection.

5.2 Operating Functions

5.2.1 Operating Fields

The precorrection settings can be entered using three operating fields. Besides the characteristic field, the operating fields contain different operating elements such as buttons, input fields and checkboxes.

Depending on your system configuration, the following operating fields will be present:

- Linear Precorrection
- Nonlinear Precorrection
- Nonlinear frequency response precorrection

The following figure provides a basic view of how an operating field is structured:

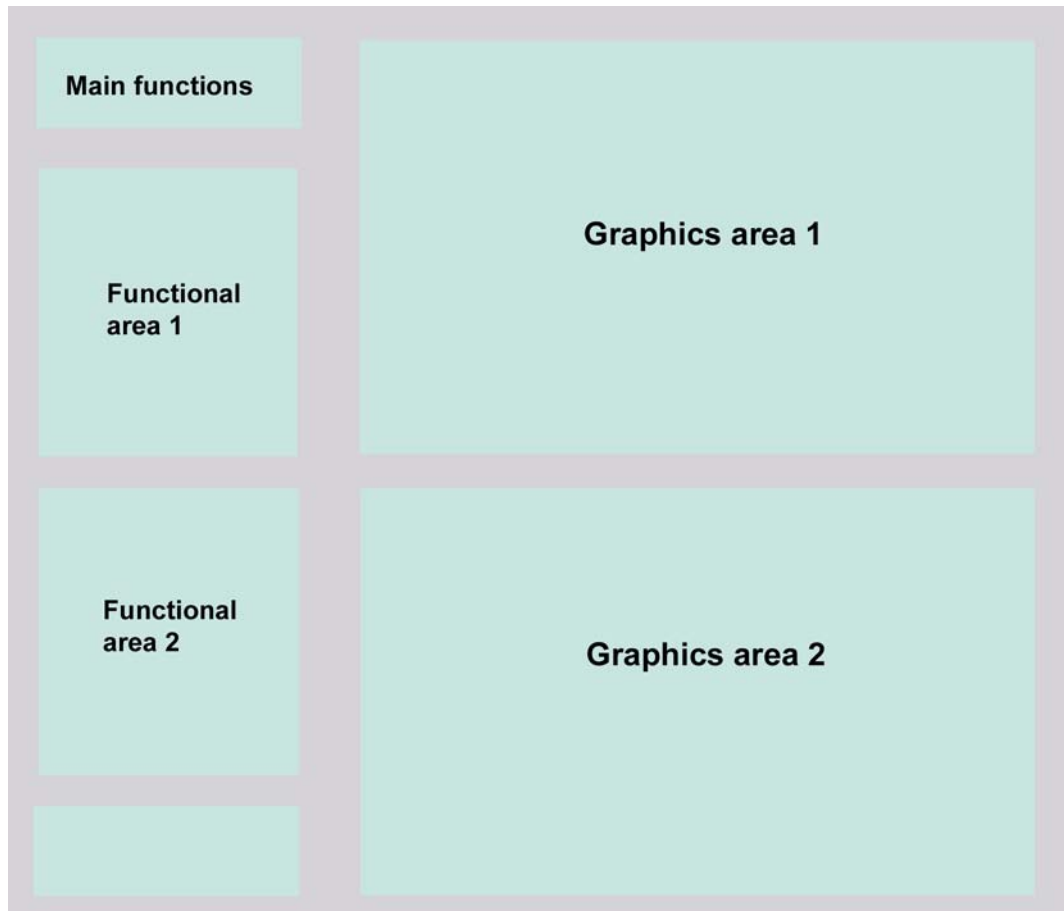


Fig. 16 Basic structure of an operating field

Each operating field consists of graphics areas and functional areas.

The graphics areas are used to display the set characteristics. Here, you can interactively modify, reset or redraw the characteristics. You can also set a default characteristic. Using a contextual menu, you can access additional functions as well as a navigator for fine adjustment.

There are two graphics areas per operating field. The upper *graphics area 1* is used to display amplitude precorrections. The lower *graphics area 2* is used to display phase or group delay precorrections.

The functional area contains buttons, input field, checkboxes and message windows that are used to manage the precorrection process. It is divided into the following areas:

- *Main functions*
This area contains functions that apply to all of the displayed precorrection (ON/OFF, choice of manual or automatic mode).
- *Function area 1*
This area contains functions referring to the curve in graphics area 1.
- *Function area 2*
This area contains functions referring to the curve in graphics area 2.

Note *In certain operating windows, some of these areas will not be present.*

5.2.2 Graphic Areas

The graphics area basically consists of display and drawing levels. In many operating fields, the drawing level is not necessary.

Display level (blue characteristic)

In the *display level*, the characteristic that is currently set in the precorrector is displayed. If the precorrector function is switched off, a note to this effect will appear in the diagram.

To display the characteristic, the database is read from the precorrector and the curve is computed with the same function as forms the basis of computation for the setting parameters and the FPGA. This ensures that the display and the effect are exactly matched.

In addition, the display level also contains additional functions such as the position of the carrier frequency or center frequency, notable drive level of the signal or the position of thresholds relative to the display range.

Drawing level (red characteristic)

In the *drawing level*, you can create a new characteristic or edit an existing one.

You can access the database data for the characteristic for further processing from the display level. The curve is edited directly on the data from the database. The remainder of the curve is computed with the same function as in the display level.

A *contextual menu* provides support in the process of editing curves. A *navigator window* can be used to make a fine setting.

Note *The drawing levels are supported only in the operating fields for linear precorrection and nonlinear precorrection. Only the display level supports nonlinear frequency response precorrection. At this level it is not possible to edit characteristic curves.*

5.2.3 Characteristics

The following settings are necessary in the functional area to create characteristic curves manually or edit them:

- **Corr > On** (precorrection active)
- **Correction Amplitude > On** (upper characteristic active) or
- **Correction Groupdelay / Phase > On** (lower characteristic active)

There are two ways of modeling a characteristic:

- Draw a new characteristic and edit the points.
- Load an existing characteristic (predefined characteristic or a characteristic saved on the hard drive) and edit the points.

Modeling a characteristic involves use of the mouse, contextual menu and navigator window.

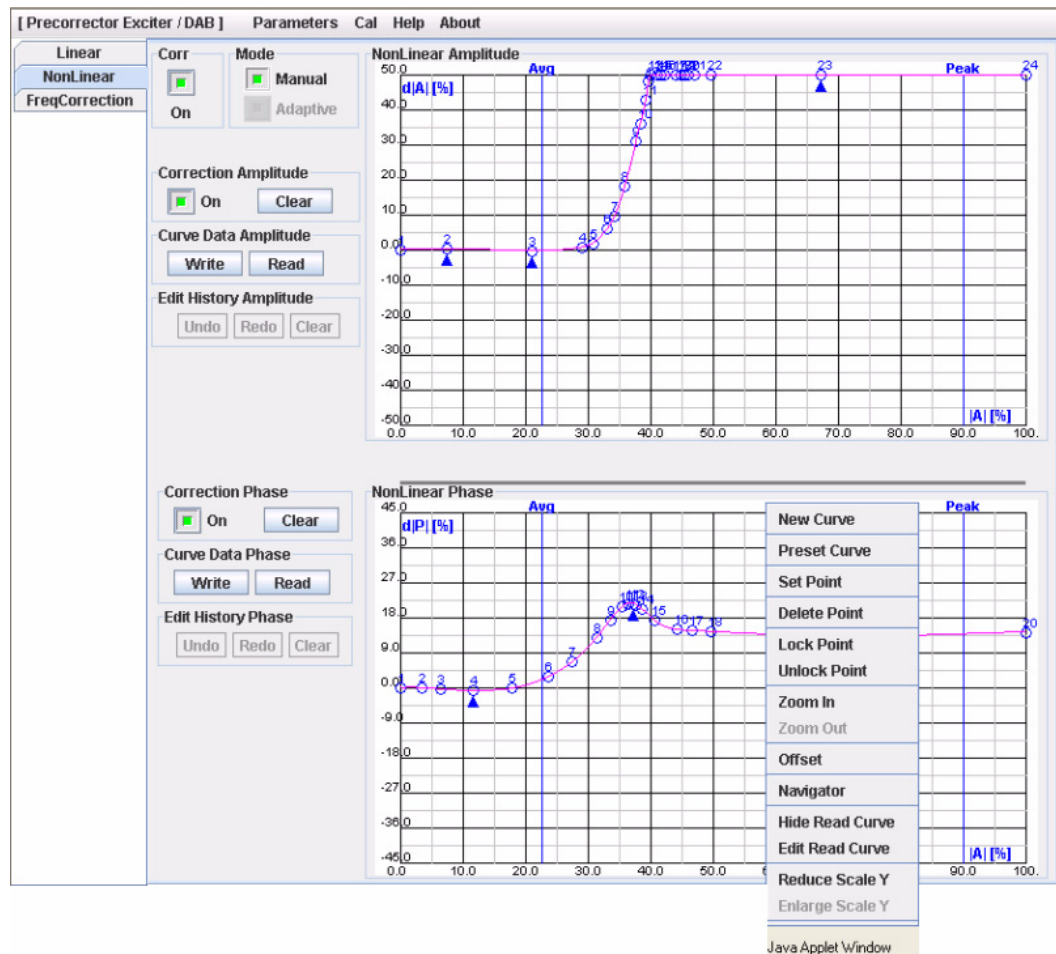


Fig. 17 Contextual menu for the precorrector GUI

The contextual menu appears if you click on a vacant point of the drawing plane with the right mouse button. You can use the contextual menu to call up the navigator window for making fine settings.

Note A precorrection curve is always modeled locally in the drawing plane (red curve) and then written to the precorrection memory by the menu function **Curve Data xxx Write**.

Creating a new characteristic

To create a new characteristic, you must place the relevant points with the mouse into the chart in order from left to right. First, a point is set at the minimum unit on the x axis. The end is formed by a final point at the maximum unit on the x axis.

1. Click on the right mouse button to show the context menu and select the **New Curve** menu item. When you are asked if you want to delete the curve already displayed, answer with **OK**.
2. Follow the prompting "Click to set curve points ..." and set the points one after the other with the left mouse button.

The points are automatically joined to a curve.

3. Point to the right margin of the diagram with the mouse and set the last point.

Input mode will be terminated and you can now edit the curve as required (see the section "Editing the characteristic").

Loading an existing characteristic curve

Instead of creating a characteristic curve from scratch, you can load existing curves into the drawing level and edit them as required. There are three possibilities:

- Select **Preset Curve** in the contextual menu. A preset curve highlighted in the program is loaded into the display level (*blue curve*). Now, using the **Edit Read Curve** contextual entry, transfer the characteristic curve into the drawing level (*red curve*).
- Use the **Curve Data xxx Read** function to load the current characteristic curve from the precorrection memory straight into the drawing level (*red curve*).
- Load an existing precorrection from a file using the **Storage** function from the Navigator window for transmitter operation.
- In the **RF Out > Precorrection** menu window use the **Restore Current Setting** or **Restore All Settings** parameter to reactivate the original precorrection curve (factory set precorrection) in the instrument. Then in the precorrector GUI use **Parameters > Rescan** to update the display. The original precorrection curve is displayed.

Note

*You may have to fetch the read precorrection curve with the **Show Read Curve** contextual function into the foreground so it can be viewed.*

Editing a characteristic

Characteristics are edited based on the points they contain. Each point in the database contains the following information: x value, y value, slope and locking of the slope. The number of points is variable.

The characteristic is computed using one or more sectionally defined spline functions with a specified start-point and end-point slope on the edges. The edges are considered to be the right or left edge of the graphics as well as fixed points. A fixed point (recognizable by a triangular symbol) "freezes" the slope of the curve. Like normal points, fixed points can also be moved later on, but the slope due to the fixed point stays unchanged.

Existing points are *edited directly*. You can shift them with the mouse in the x and y directions (click and drag). Double-click to lock them (or to unlock them).

You can use the *contextual menu* to add and delete points and to lock and unlock their slope. The procedure is as follows:

- *Set Point:*
 1. Select the **Set Point** function.
 2. Using the mouse, set a new point on the curve.
- *Delete Point, Lock Point and Unlock Point:*
 1. Select the desired function.
 2. Click on an existing point.

For fine setting of the characteristic, there is a *navigator window* available which can be called up from the contextual menu. The navigator window can be used to set the point coordinates and the slope (fixed points only) as numerical values. The procedure is as follows:

1. Call up the navigator window.

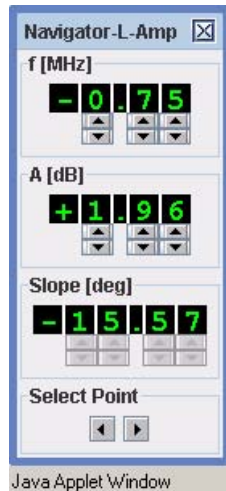


Fig. 18 The navigator window

2. Click on the desired point with the mouse, or select it in the navigator window with the arrow keys at **Select Point**.

The selected point is highlighted in red.

3. Set the coordinates and/or the slope with the input register in the navigator window.

By locking characteristic points, it is also possible to *define ranges* which can be edited without modifying the curve sections outside of the given range.

Note When unlocking a locked point, more or less significant changes can arise in the characteristic between the two locked points that are closest to the point that was unlocked.

Setting characteristics in the precorrector

Basically, the edited curves are written using the **Curve Data xxx > Write** buttons individually for each characteristic type into the precorrector and set there.

In the case of nonlinear precorrection, writing of the edited curve is carried out immediately during setting using the navigator window. Hysteresis becomes active which suppresses immediate setting of the curve for a permanent change. Only the last value is set when exiting.

Clearing a characteristic in the precorrector

Using the **Correction xxx Clear** button, you can clear the characteristic set in the precorrector (and displayed in the display level).

Using the editing history

While editing a characteristic, the editing steps are recorded. You can undo the steps using the **Edit History xxx Undo** button or redo them using the **Edit History xxx Redo** button. Use the **Edit History xxx Clear** button to clear the editing history.

5.3 Setting Linear Precorrection

The **Linear** operating field is for setting linear precorrection defaults which can be used to compensate amplitude frequency response and group delay errors at the channel filter below the transmitter.

In the default setting this corrector is switched off.

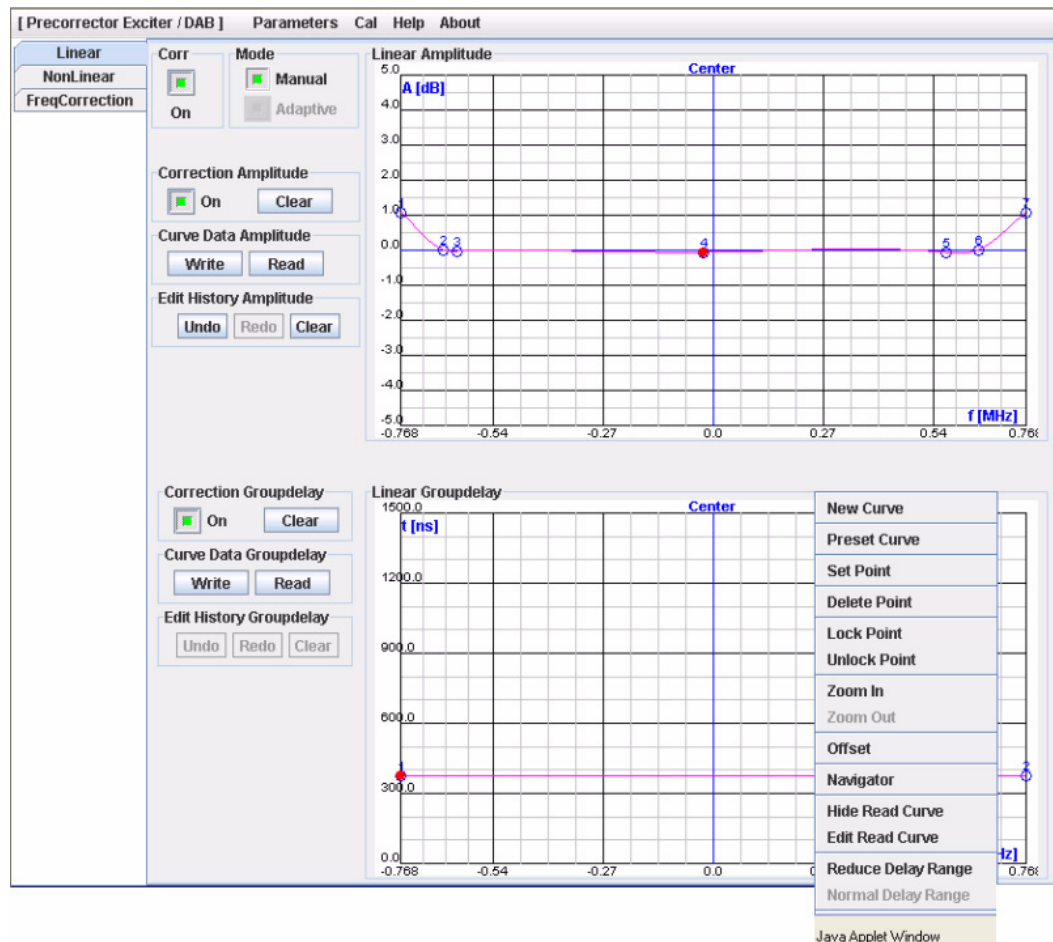


Fig. 19 The Linear operating window

5.3.1 Main Function

The **Corr > On/Off** switch can be used to turn the entire linear precorrection on or off.

5.3.2 Linear Precorrection

During precorrection the characteristics for the amplitude-frequency response and group delay are modeled in the drawing level and then written to the precorrection memory.

Functions, area 1

The following settings are possible:

- **Correction Amplitude > On/Off:** Switches amplitude frequency response pre-correction on or off.
- **Correction Amplitude Clear:** Clears the data in the precorrector for the amplitude frequency response pre-correction; you will be asked if you are sure you want to do this.
- **Curve Data Amplitude Write:** Writes the linear precorrector with the amplitude frequency response modeled in the drawing level.
- **Curve Data Amplitude Read:** Reads out the amplitude frequency response set in the linear precorrector and shows it in the display level.
- **Edit History Amplitude Undo / Redo / Clear:** History memory; settings in the drawing level can be undone step by step and redone. The history memory can also be cleared.

Functions, area 2

The following settings are possible:

- **Correction Groupdelay > On/Off:** Switches group delay pre-correction on or off.
- **Correction Groupdelay Clear:** Clears the data in the precorrector for the group delay pre-correction; you will be asked if you are sure you want to do this.
- **Curve Data Group Delay Write:** Writes the linear precorrector with the group delay modeled in the drawing level.
- **Curve Data Groupdelay Read:** Reads out the group delay set in the linear precorrector and shows it in the display level.
- **Edit History Groupdelay Undo / Redo / Clear:** History memory; settings in the drawing level can be undone step by step and redone. The history memory can also be cleared.

Graphics area 1: Modeling of the amplitude frequency response

The **Linear Amplitude** diagram (in graphics area 1) has a coordinate system for displaying and editing the characteristic for the amplitude frequency response. The x axis is used to show the frequency f in MHz relative to the carrier or to the center frequency. The y axis shows the amplitude A in dB. The scaling on both axes is system-dependent.

The diagram has a drawing level and a display level.

In the *drawing level*, you can model the amplitude frequency response (red curve) locally. With the mouse, the contextual menu and the navigator window, you can draw a new curve or load and edit an existing curve. The characteristic data are then written into the precorrector using **Curve Data Amplitude Write**.

A curve read from the precorrector (**Curve Data Amplitude Read**) is shown in the *display level* (blue curve). The Edit Read Curve contextual function allows you to transfer this curve to the drawing level for editing. The contextual menu also lets you hide the display level.

The diagram indicates if amplitude frequency response pre-correction is switched off. The display and drawing levels still remain active, however.

For further details, please see the "Characteristic Curves" section.

Graphics area 2: Modeling of the group delay

The **Linear Groupdelay** diagram (in graphics area 2) has a coordinate system for displaying and editing the characteristic for the amplitude frequency response. The x axis is used to display the frequency f in MHz relative to the carrier or to the center frequency. The y axis shows the group delay time t in ns. The scaling on both axes is system-dependent.

Otherwise, this works analogously to graphics area 1 except that the corresponding functions (e.g. for Read/Write) are found in area 2.

The diagram indicates if group delay precorrection is switched off. The display and drawing levels still remain active, however.

In the contextual menu for the group delay precorrection, you can use the **Reduce Delay Range** and **Enlarge Delay Range** commands to select between the two scalings for the y axis. It is possible to display the following ranges of values:

	Linear Precorrection
Reduced	0 ns to 750 ns
Enlarged	0 ns to 1500 ns

For further details, please see the "Characteristic Curves" section.

5.4 Setting Nonlinear Precorrection

The **Nonlinear** operating field is for setting nonlinear precorrection defaults to equalize nonlinearities in the output stage.

Nonlinear precorrection is a significant factor in the shoulder distance that is achieved.

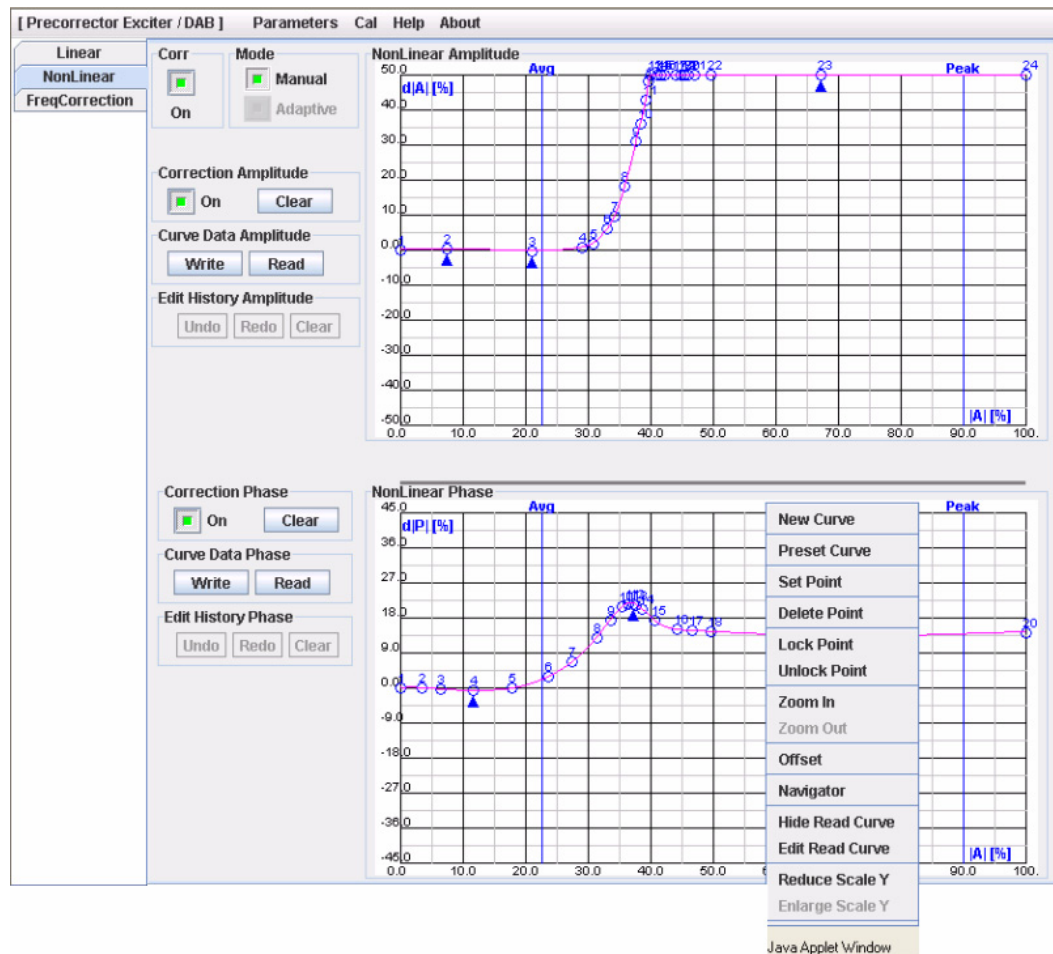


Fig. 20 The Nonlinear operating window

5.4.1 Main Function

The **Corr > On/Off** switch can be used to turn the entire nonlinear precorrection on or off.

5.4.2 Nonlinear Precorrection

For manual precorrection, you model the amplitude and phase characteristics in the drawing level and then write them to the precorrection memory.

Functions, area 1

The following settings are possible:

- **Correction Amplitude > On/Off:** Switches the amplitude precorrection on or off.
- **Correction Amplitude Clear:** Clears the data in the precorrection memory for the nonlinear amplitude precorrection; you will be asked if you are sure you want to do this.
- **Curve Data Amplitude Write:** Writes the nonlinear precorrection with the amplitude characteristic modeled in the drawing level.

- **Curve Data Amplitude Read:** Reads out the amplitude characteristic set in the nonlinear precorrector and shows it in the display level.
- **Edit History Amplitude Undo / Redo / Clear:** History memory; settings in the drawing level can be undone step by step and redone. The history memory can also be cleared.

Functions, area 2

The following settings are possible:

- **Correction Phase > On/Off:** Switches the phase precorrection on or off.
- **Correction Phase Clear:** Clears the data in the precorrector for the nonlinear phase precorrection; you will be asked if you are sure you want to do this.
- **Curve Data Phase Write:** Writes the nonlinear precorrector with the phase characteristic modeled in the drawing level.
- **Curve Data Phase Read:** Reads out the phase characteristic set in the nonlinear precorrector and shows it in the display level.
- **Edit History Phase Undo / Redo / Clear:** History memory; settings in the drawing level can be undone step by step and redone. The history memory can also be cleared.

Graphics area 1: Modeling of the amplitude characteristic

The **NonLinear Amplitude** diagram (in graphics area 1) has a coordinate system for displaying and editing the amplitude characteristic.

The x axis is used to display the drive level A in %. Note that 100% corresponds to the maximum system drive level. The y axis is used to display the delta drive level dA in % relative to the maximum drive level. The scale ranges from -50% to +50%.

The diagram has a drawing level and a display level.

In the *drawing level*, you can model the amplitude characteristic (red curve) locally. With the mouse, the contextual menu and the navigator window, you can draw a new curve or load and edit an existing curve. The characteristic data are then written into the precorrector using **Curve Data Amplitude Write**.

A curve read from the precorrector (**Curve Data Amplitude Read**) is shown in the *display level* (blue curve). The **Edit Read Curve** contextual function you to transfer this curve to the drawing level for editing. The contextual menu also lets you hide the display level.

The diagram indicates if nonlinear amplitude precorrection is switched off. The display and drawing levels still remain active, however.

For further details, please see the "Characteristic Curves" section.

Graphics area 2: Modeling of the phase characteristic

The **NonLinear Phase** diagram (in graphics area 2) has a coordinate system for displaying and editing the phase characteristic.

The x axis is used to display the drive level A in %. Note that 100% corresponds to the maximum system drive level. The y axis is used to display the delta phase dP in angular degrees [°]. The scale ranges from -45° to +45°.

Otherwise, this works analogously to graphics area 1 except that the corresponding functions (e.g. for Read/Write) are found in functional area 2.

The diagram indicates if nonlinear phase precorrection is switched off. The display and drawing levels still remain active, however.

For further details, please see the "Characteristic Curves" section.

5.5 Setting Nonlinear Frequency Response Precorrection

The **FreqCorrection** field is for setting extended nonlinear precorrection. You can specifically influence the effects of the amplitude and phase characteristics for low-frequency and high-frequency signal components (frequency response correction).

All entries are numeric. The **Amplitude** and **Phase** diagrams show the characteristics of nonlinear precorrection and the location of the thresholds (inset points) plus percentages for the effect of the frequency response correction.

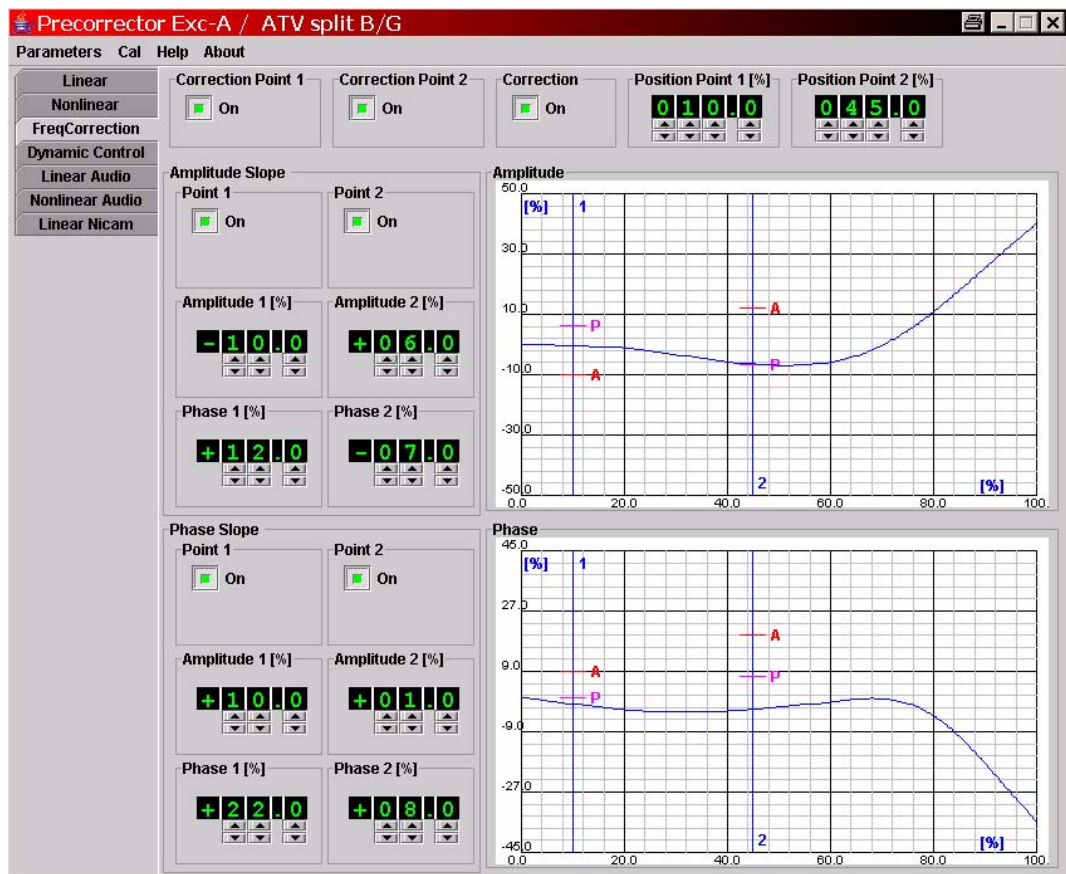


Fig. 21 The FreqCorrection operating window

Main functions

- **Correction > On/Off:** Switches the entire frequency response correction on or off.
- **Correction Point 1 (2) > On/Off:** Switches frequency response correction on branch 1 (or 2) on or off.
- **Position Point 1 (2):** Entry of the threshold for the point of frequency response correction 1 (or 2). Frequency response correction is effective only if the instantaneous drive level exceeds this threshold; setting range: 0 ... 100%

Functions, area 1

- **Amplitude Slope Point 1 (2) > On/Off:** Switches frequency response correction on branch 1 (or 2) for the amplitude characteristic on or off.
- **Amplitude Slope Amplitude 1 (2):** Sets amplitude frequency response correction for the amplitude pre-corrections on branch 1 (or 2); setting range: -50 ... +50%. A positive number increases the frequency response.
- **Amplitude Slope Phase 1 (2):** Sets phase frequency response correction for the amplitude pre-corrections on branch 1 (or 2); setting range: -50 ... +50%. A positive number increases the frequency response.

Functions, area 2

- **Phase Slope Point 1 (2) > On/Off:** Switches frequency response correction on branch 1 (or 2) for the phase characteristic on or off.
- **Phase Slope Amplitude 1 (2):** Sets amplitude frequency response correction for the phase pre-correction on branch 1 (or 2); setting range: -45 ... +45%. A positive number increases the frequency response.
- **Phase Slope Phase 1 (2):** Sets phase frequency response correction for the phase pre-correction on branch 1 (or 2); setting range: -45 ... +45%. A positive number increases the frequency response.

CHAPTER 6

MAINTENANCE

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2	Software Update	2

1 Maintenance Information

1.1 Overview of Maintenance Actions

The transmitter is designed to provide years of operation with little maintenance. Maintenance is restricted to the following actions:

Action	For	Interval/Comment	Described in
Software update	Exciter and amplifier	– When available – Recommended for performance improvement or when adding options	In this chapter
Fan exchange	Exciter	Every 40000 operating hours	R&S SX801 manual, "Maintenance" chapter
Fan exchange	Amplifier	– If $T_{\text{intake air}} = 25\text{ °C}$: Every 60000 operating hours – If $T_{\text{intake air}} = 45\text{ °C}$: Every 35000 operating hours	R&S VH8001Cx manual, "Service" chapter
Replacement of fan mat (option)	Exciter	When required	R&S SX801 manual, "Maintenance" chapter
Backup of parameter data	Exciter	Recommended	R&S SX801 manual, "Maintenance" chapter
Adjustment of I/Q modulator	Exciter	If necessary	R&S SX801 manual, "Maintenance" chapter

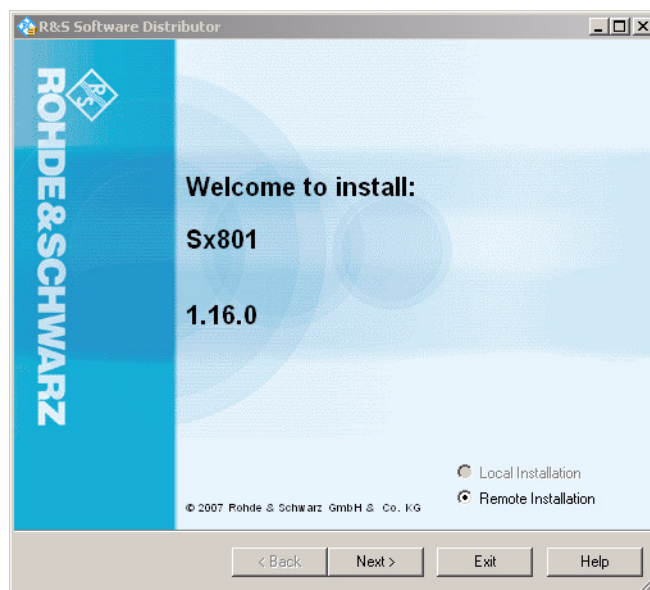
2 Software Update

To perform a software update, you must connect the transmitter to a PC or network client via the Ethernet and make sure that the interface (**X30, ETHERNET LOCAL** or **X31, ETHERNET REMOTE**) is correctly configured.

Proceed as follows to perform a software update:

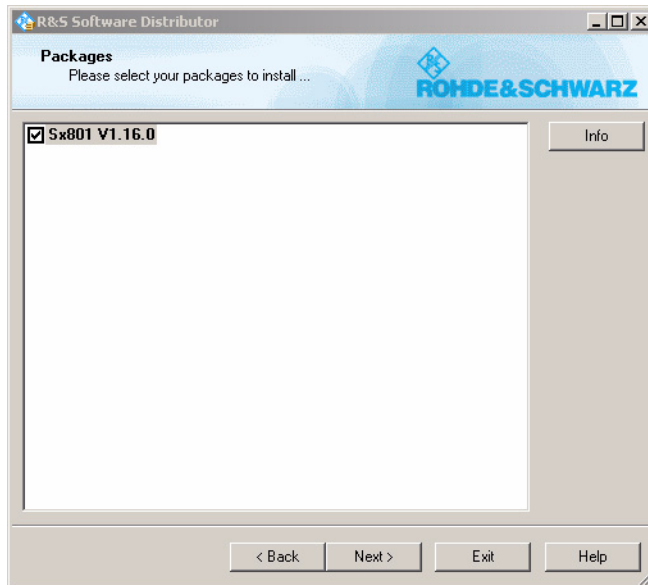
1. Deactivate the energy saving option of the network card in the PC. Proceed as follows:
 - a) Call up the device manager under Windows using **Start > Control Panel > System > Hardware > Device Manager**.
 - b) In the device manager, select the proper network adapter and double-click it to open the associated properties window.
 - c) In the properties window, click the **Energy management** tab and (if necessary) deactivate the option **Computer can switch off device to save power**.
2. Start the installation software on the PC/client.

The start window for the R&S Software Distributor will appear.

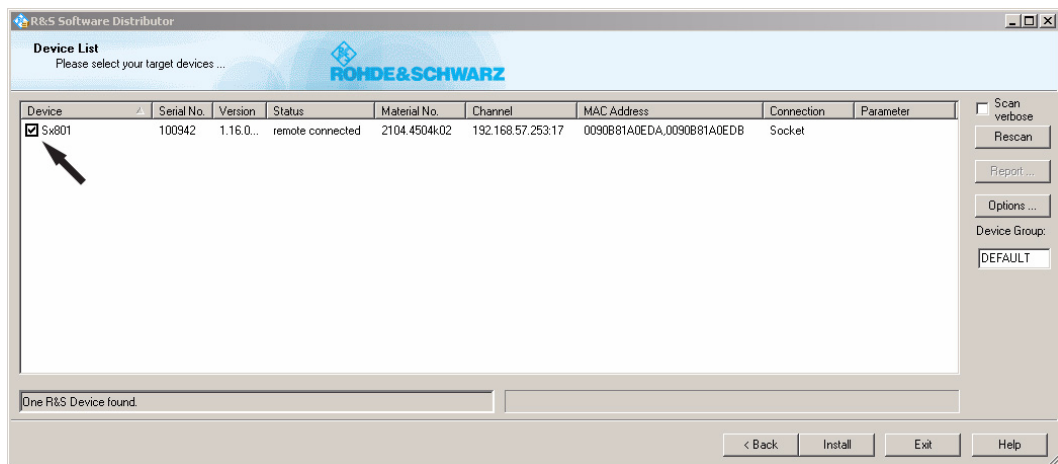


3. Confirm the **Remote Installation** default setting by clicking on **Next**.

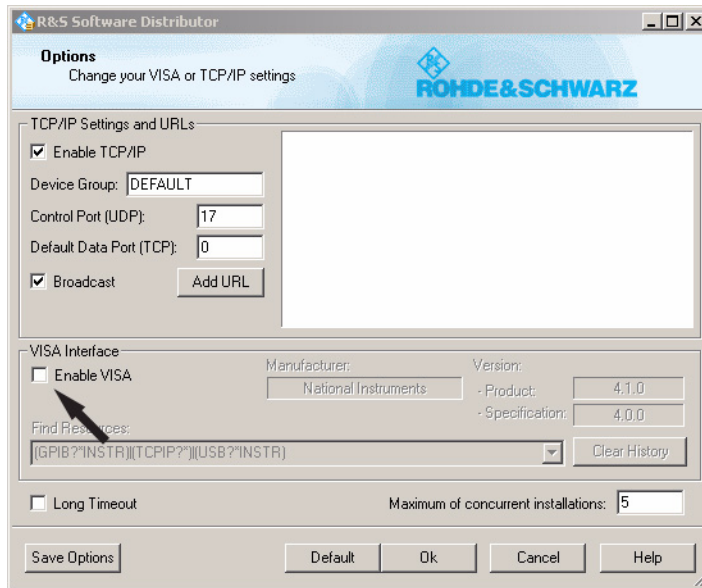
The available software updates will be displayed. Use the **Info** button to obtain additional information about the update that you select with the cursor.



4. In the network, search for updatable devices by clicking **Next**.
The devices that were found will be displayed within a few seconds.



5. If, despite correct network settings, no devices are found, the VISA interface is probably active. In this case:
- Check the settings by clicking **Options** and, if necessary, deactivate **VISA** using the check box.
 - Save the changed settings by clicking **Save Options** and then search for devices again by clicking **Rescan**.



6. In the **Device List**, select the device to be updated by enabling the check box.
7. Click **Install** to start the update.

After performing the update, a corresponding message will be output in the output line at the bottom left of the window. The transmitter is automatically rebooted.

Note

*If the update is interrupted before it has been completed (the message "Copying/Installing ... %" stops before 100 % level is reached), abort the update by clicking **Cancel** and then restart the R&S Software Distributor.*

CHAPTER 7

TROUBLESHOOTING

1 Information

Troubleshooting information will be provided at a later date.

CHAPTER 8

SERVICE

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1 Information

There are no parts inside the instruments that can be repaired by the customer. The local Rohde & Schwarz representative must handle all service cases.

It is recommended to keep one or more replacement instruments on hand in order to be able to continue transmitting if service is required. This chapter describes how to replace an instrument and get the new instrument ready for operation quickly.

Replacing the fans and power supply

You may replace defective fans and the power supply modules for the amplifiers on your own. The instruments were designed to allow replacements during ongoing transmission operation. The associated instrument manual describes how to proceed.

Service or maintenance action	See instrument manual
R&S SX801: Replacing the fan	"Maintenance" chapter
R&S VH8001Cx: Replacing the fan	"Service" chapter
R&S VH8001Cx: Replacing the power supply	"Service" chapter

1.1 Safety



WARNING!

All service work should only be carried out by qualified personnel and only on components that have been disconnected from the power supply.

Note Full information on the subject of safety can be found in the chapter "Safety".

1.2 Cabling the Compact Transmitter

In case of service work, it might be necessary to replace defective instruments. To make it easier to set up the proper cabling between the transmitter instruments, each cable has a yellow sleeve on its ends with the following information:

- Cable number (W...) along with the
- Module number (A...) and
- Connector number (X...) as target designation

This makes it easier to connect the cable in question to the proper slot or connection point.

For easy connection of replacement instruments and devices, proceed as follows:

1. Determine the connector number on the yellow cable sleeve.
2. Find the same number on the instrument to be connected (connector or connection diagram).
3. Insert the plug connector into the corresponding female connector.

1.2.1 Single Transmitter with One Amplifier



Fig. 1 Example: Cabling the R&S SCV8301E

- 1) Power feed
- 2) ASI input
- 3) RF signal from exciter to input of base amplifier
- 4) CAN bus
- 5) Transmitter output

1.2.2 Single Transmitter with Two Amplifiers

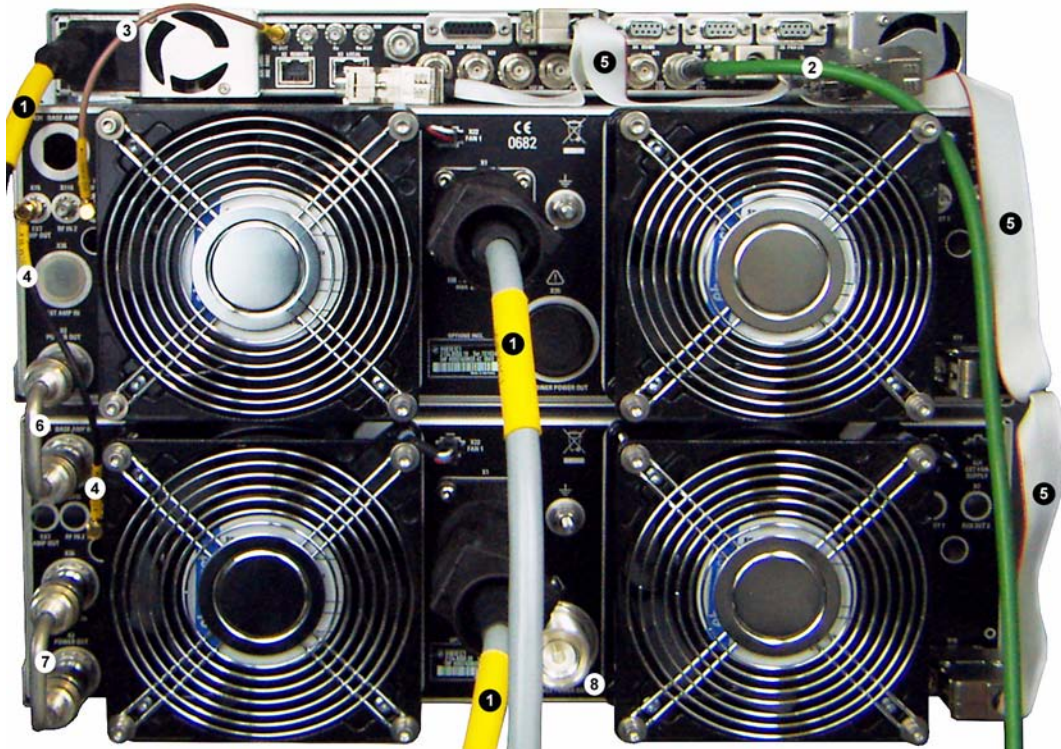


Fig. 2 Example: Cabling the R&S SCV8302E

- 1) Power feed
- 2) ASI input
- 3) RF signal from exciter to input of base amplifier
- 4) RF signal from integrated splitter of base amplifier to input of extended amplifier
- 5) CAN bus
- 6) RF signal from output of base amplifier to input of integrated combiner in extended amplifier
- 7) RF signal from output of extended amplifier to input of integrated combiner in extended amplifier
- 8) Transmitter output (RF signal at output of integrated combiner in extended amplifier)

2 Replacing Instruments

You can remove and replace the following transmitter components in case any faults occur:

- R&S SX801 exciter
- Amplifiers in the R&S VH8001Cx family
- as well as the following instrument components:
 - Fans for the exciter and amplifiers
 - Amplifier power supplies

Note *Replacing the stated instrument components is described in the corresponding instrument manuals (see also the "Information" section in this chapter).*

2.1 Replacing the R&S SX801 Exciter

The following description applies to a single transmitter without a rack.

2.1.1 Removing the Exciter

1. Disconnect the power cable at the rear of the exciter.
2. Remove all of the remaining cables on the rear of the exciter.
3. Carefully remove the exciter from the transmitter system.

2.1.2 Installing the Exciter

To install the exciter, simply reverse the instructions for removing the exciter.

1. Carefully place the instrument back on the transmitter system.
2. Connect the cables to the instrument in accordance with the labeling (yellow cable sleeves).
3. Connect the power cable to the rear of the instrument.

2.2 Replacing Amplifiers in the R&S VH8001Cx Family

The following description applies to a single transmitter without a rack.

2.2.1 Removing the Amplifier

1. Disconnect the power cable at the rear of the amplifier.

2. Remove all of the remaining cables on the rear of the amplifier.
3. Carefully remove the amplifier from the transmitter system.

2.2.2 Installing the Amplifier

To install the exciter, simply reverse the instructions for removing the exciter.

1. Carefully place the instrument back on the transmitter system.
2. Connect the cables to the instrument in accordance with the labeling (yellow cable sleeves).
3. Connect the power cable to the rear of the instrument.

3 Block Diagrams

3.1 RF Block Diagram

An RF block diagram can be found in the circuit diagrams in the annex to this manual.

3.2 Block Diagram, Control Line

A block diagram for the control lines can be found in the circuit diagrams in the annex to this manual.

4 Backing Up and Restoring the Configuration Settings

Prior to replacing the R&S SX801 exciter, all of the configuration settings can be saved on the PC.

If the **All** option is used, all of the settings for the currently selected operating mode will be saved. These settings can be restored once the exciter has been exchanged.

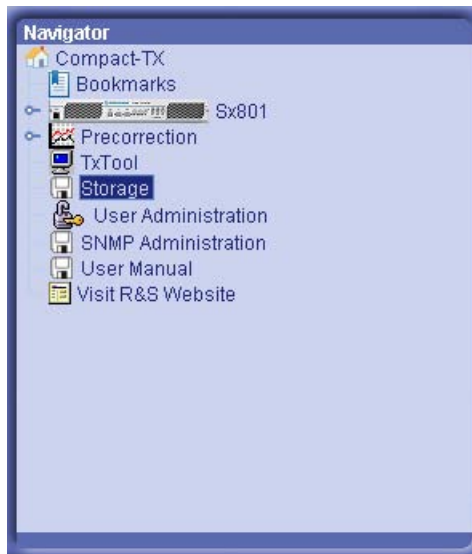


Fig. 3 Calling the "Storage" function

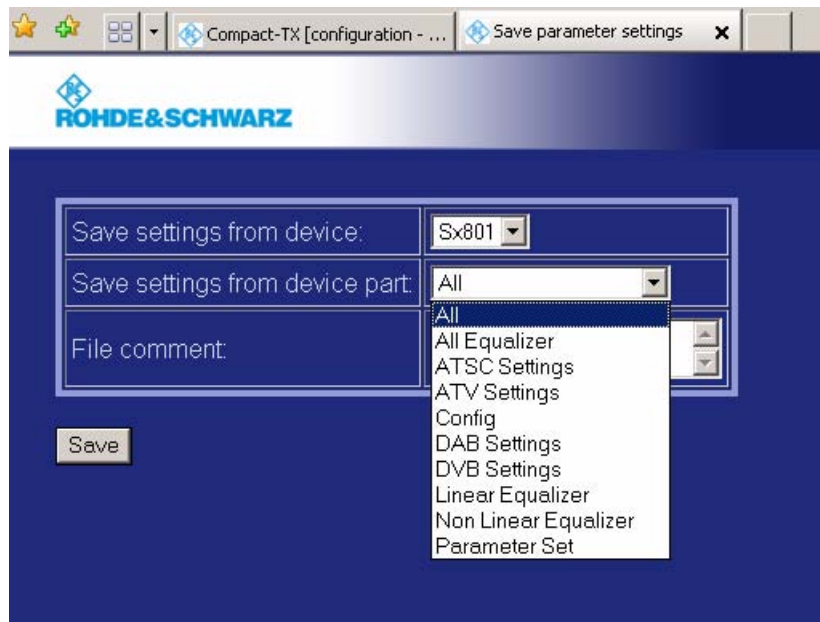


Fig. 4 Backing up all of the configuration settings: "All" option

Note For more detailed information about the **Storage** function, please see the "Maintenance" chapter, section "Backing Up Parameter Data" in the exciter manual.

CHAPTER 9

ANNEX

Interface Description

TRANSMITTER

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1 Interface Description

1.1 Internal Interfaces

1.1.1 CAN Bus Control Line

The CAN bus control line provides the connection between the R&S SX801 exciter (**X5**) and one or two amplifiers (**X11**).

Signal name	Direction	Range of values	Contact	Comment
GND		0 V	X5.1/X11.1	Ground
GND		0 V	X5.9/X11.9	Ground
GND		0 V	X5.2/X11.2	Ground
AMPL_ERR		Internal pull-up $R_i = 1000 \Omega$	X5.10/X11.10	– 1000Ω vs. GND: Sum fault amplifier – Open: No error, referenced to GND
Reset		0 to 5 V, ≤ 5 mA (optocoupler input on amplifier)	X5.3/X11.3	High: Reset
VREF_PWR		0 to 5.5 V, referenced to GND $R_L = 20 \text{ k}\Omega$, 4 V = Nominal value	X5.4/X11.4	Reference voltage for output power, referenced to GND
PEAK_AV		0 to 5 V, ≤ 5 mA (optocoupler input on amplifier)	X5.12/X11.12	Switchover peak/average measurement – High: "PEAK" position – Low: "AV" position, referenced to GND
PWR_OUT		0 to 6 V, $R_i = 6.6 \text{ k}\Omega$, 4 V with P_{nom}	X5.5/X11.5	Detector voltage for output power, referenced to GND
GND_AUX		0 V	X5.13/X11.13	CAN ground
CAN_L		CAN_L	X5.6/X11.6	CAN low
CAN_H		CAN_H	X5.14/X11.14	CAN high
CAN_V+		+12 V ± 1 V, ≤ 500 mA	X5.7/X11.7	Power supply for CAN modules, referenced to GND_AUX, decoupled via diode

Signal name	Direction	Range of values	Contact	Comment
/AC_OK		Internal pull up, $R_i = 1000 \Omega$	X5.15/X11.15	AC voltage phase monitor – 0 V: AC ok – Open: No AC, phase failure, overvoltage and undervoltage
SHUT_DOWN		Internal pull up, $R_i = 1000 \Omega$	X5.8/X11.8	– Closed with respect to GND: Absorber ok – Open: Absorber fail

1.1.2 RF Signals

1.1.2.1 Single Transmitter with Base Amplifier (R&S SCV8x01E)

Signal name	Direction	Range of values	Contact	Comment
W6010		470 MHz to 862 MHz $P_{\text{rms,nom}} = 2$ to 5 dBm	X60/X10	RF signal from exciter to input of base amplifier
W400		470 MHz to 862 MHz Set transmitter output power: max. 55 dBm	X2	RF signal from output of base amplifier to antenna (optional to bandpass filter)

1.1.2.2 Single Transmitter with Base and Extended Amplifier (R&S SCV8x02E)

Signal name	Direction	Range of values	Contact	Comment
W234		470 MHz to 862 MHz Half transmitter output power: max. 55 dBm	X2/X34	RF signal from output of base amplifier to combiner input of extended amplifier
W236		470 MHz to 862 MHz Half transmitter output power: max. 55 dBm	X2/X36	RF signal from output of extended amplifier to combiner input of extended amplifier
W400		470 MHz to 862 MHz Set transmitter output power: max. 57.8 dBm	X35	RF signal from combiner output of extended amplifier to antenna (optional to bandpass filter)
W1015		470 MHz to 862 MHz $P_{\text{rms,nom}} = -2$ to 1 dBm	X15/X10	RF signal from splitter of base amplifier to input of extended amplifier

Signal name	Direction	Range of values	Contact	Comment
W6010		470 MHz to 862 MHz $P_{\text{rms, nom}} = 2 \text{ to } 5 \text{ dBm}$	X60/X10	RF signal from exciter to input of base amplifier

1.2 External Interfaces

1.2.1 R&S SX801 Exciter – Front Panel

1.2.1.1 X61 (RF) – RF MONITOR: RF Test Output

SMA female

Signal name	Direction	Range of values	Contact	Comment
RF MONITOR	Output	Monitoring signal downstream of amplifier: -7 dBm RMS / 0 dBm peak $\pm 2 \text{ dB}$	X61.1	$R_i = 50 \Omega$, for monitoring only
GND	Bidirect.		X61.2	

Note This interface is present only if an internal 10 dB amplifier is installed (option SX801B41).

1.2.2 R&S SX801 Exciter – Rear Panel

1.2.2.1 X1: Power Feed

AC option

Low-temperature connector

Signal name	Direction	Value range	Contact	Comment ¹⁾
L1	Bidirect.	90 VAC to 265 VAC, $I \leq 1.5 \text{ A}$, 50 Hz to 60 Hz, $\pm 10\%$	X1.L	AC power supply
N	Bidirect.		X1.N	AC power supply
PE	Bidirect.		X1.PE	AC power supply

1) Max. 135 VA

DC option

Signal name	Direction	Value range	Contact	Comment ¹⁾
L1	Bidirect.	38 VDC to 76 VDC, $I \leq 4.5 \text{ A}$	X1.L	DC power supply
N	Bidirect.		X1.N	DC power supply
PE	Bidirect.		X1.PE	DC power supply

1) Max. 135 VA

1.2.2.2 X20 (TS1): Signal Input 1 (also HP Stream)

BNC, female, 75 Ω

Signal name	Direction	Value range	Contact	Comment
TS1	Input	ASI/SMPTE310M	X20.1	$R_i = 75 \Omega$
GND	Bidirect.	0 V	X20.2	

1.2.2.3 X21 (TS2): Signal Input 2 (also LP Stream)

BNC, female, 75 Ω

Signal name	Direction	Value range	Contact	Comment
TS2	Input	ASI/SMPTE310M	X21.1	$R_i = 75 \Omega$
GND	Bidirect.	0 V	X21.2	

1.2.2.4 X22 (VF): Analog Video Input

BNC, female, 75 Ω

Signal name	Direction	Value range	Contact	Comment
VF	Input	$0.7 / 1 \text{ V}_{pp} \pm 3 \text{ dB}$	X22.1	$R_i = 75 \Omega$
GND	Bidirect.	0 V	X22.2	

1.2.2.5 X23 (PPS IN) – 1PPS EXT IN: Second Pulse from External GPS

BNC, female, 50 Ω

Signal name	Direction	Value range	Contact	Comment
1 PPS EXT	Input	LVT	X23.1	50 Ω for AC
GND	Bidirect.	0 V	X23.2	

1.2.2.6 X25 (AUDIO): Analog Input Audio AF

D-Sub, male, 15-pin

Signal name	Direction	Value range	Contact	Comment
AF1 IN+	Input	-12 dBu to +12 dBu	X25.14	$R_i = 600 \Omega / > 10 \text{ k}\Omega$
AF1 IN-	Input		X25.7	
AF2 IN+	Input	-12 dBu to +12 dBu	X25.12	$R_i = 600 \Omega / > 10 \text{ k}\Omega$
AF2 IN-	Input		X25.4	
GND	Bidirect.	0 V	X25.1	
n.c.			X25.2	
n.c.			X25.3	
GND	Bidirect.	0 V	X25.5	
GND	Bidirect.	0 V	X25.6	
n.c.			X25.8	
n.c.			X25.9	
n.c.			X25.10	
GND	Bidirect.	0 V	X25.11	
n.c.			X25.13	
GND	Bidirect.	0 V	X25.14	
GND	Bidirect.	0 V	X25.15	

1.2.2.7 X26 (BTSC): Analog Audio Input to BTSC Standard (M, N)

BNC, female, 75 Ω

Signal name	Direction	Value range	Contact	Comment
BTSC	Input	0.25 V _{rms} to 2 V _{rms}	X26.1	R _i = 75 Ω
GND	Bidirect.	0 V	X26.2	

1.2.2.8 X27 (NICAM) – NICAM Data: Digital Data Input for NICAM 728

BNC, female, 50 Ω

Signal name	Direction	Value range	Contact	Comment
NICAM DATA	Input	1 V _{pp} to 10 V _{pp}	X27.1	R _i = 50 Ω for AC
GND	Bidirect.	0 V	X27.2	

1.2.2.9 X60 (RF OUT): RF Output

SMA, female

Signal name	Direction	Value range	Contact	Comment
Power out	Output	– DVB-T/DAB: 13 dBm RMS – ATV Sync Peak: 20 dBm – Without internal amplifier 2104.5052.02: 3 dBm RMS / 10 dBm	X60.1	50 Ω, SMA female
GND	Bidirect.	0 V	X60.2	

1.2.2.10 X64 (REF IN): Input for External Reference

BNC, female, 50 Ω

Signal name	Direction	Value range	Contact	Comment
EXT REF	Input	-5 dBm to +20 dBm or LVT	X64.1	50 Ω for AC, 5 MHz or 10 MHz
GND	Bidirect.	0 V	X64.2	

1.2.2.11 X66 (GPS) – GPS Antenna/Option SX801B13: Antenna Input for GPS Receiver

SMA, female

Signal name	Direction	Value range	Contact	Comment
GPS ANTENNA	Input	Minimum level: -128 dBm	X66.1	50 Ω
GND	Bidirect.	0 V	X66.2	

1.2.3 R&S VH8x01C1 Base Amplifier – Rear Panel

1.2.3.1 X1 (MAINS): Power Feed (AC)

85 V to 265 V AC

M3E+6X+PE connector from Schaltbau

Signal name	Direction	Value range	Contact	Remarks
L	Input	$U_{nom} = 100 \text{ V to } 240 \text{ V AC } (\pm 10 \%)$; 50 Hz to 60 Hz ($\pm 5 \%$); $\cos \varphi \geq 0.9$; $I \leq 10 \text{ A (230 V)}$ $I \leq 21 \text{ A (110 V)}$ $I \leq 26 \text{ A (90 V, base amplifier)}$ $I \leq 27 \text{ A (90 V, extended amplifier)}$	X1.2	AC supply
N	Input	0 V	X1.5	AC supply
PE	Input	0 V	X1.PE	AC supply

Note *The instrument must first be connected to the safety ground. The line filter is built into the Power Adaptor Board.*

1.2.3.2 X2 (POWER OUT): RF Output

N, female

Signal name	Direction	Range of values	Contact	Comment
POWER_OUT	Output	$P_{\text{rms, nom}} = 200/300 \text{ W}$ 470 MHz to 862 MHz at 50 Ω load, $S \leq 1.4$	X2	RF output (base amplifier)

1.2.3.3 X6 (AUX DET 1): Auxiliary Detector 1

Note *In base amplifier only*

SMA, female

Signal name	Direction	Value range	Contact	Remarks
AUX_DET1	Input	Approx. 10 dBm at $P_{\text{rms, nom}}$ and 642 MHz Approx. 14 dBm at $P_{\text{rms, nom}}$ and 642 MHz 470 MHz to 862 MHz Matching > 27 dB	X6	Compensates the frequency response of a short 50 Ω directional coupler (-6 dB/oct.)

1.2.3.4 X7 (AUX DET 2): Auxiliary Detector 2

Note *In base amplifier only*

SMA, female

Signal name	Direction	Value range	Contact	Remarks
AUX_DET2	Input	Approx. 10 dBm at $P_{\text{rms, nom}}$ and 642 MHz Approx. 14 dBm at $P_{\text{rms, nom}}$ and 642 MHz 470 MHz to 862 MHz Matching > 27 dB	X7	Compensates the frequency response of a short 50 Ω directional coupler (-6 dB/oct.)

1.2.4 R&S VH8x01C2 Extended Amplifier – Rear Panel

1.2.4.1 X1 (MAINS): Power Feed (AC)

85 V to 265 V AC

M3E+6X+PE connector from Schaltbau

Signal name	Direction	Value range	Contact	Remarks
L	Input	$U_{\text{nom}} = 100 \text{ V to } 240 \text{ V AC } (\pm 10 \%)$; 50 Hz to 60 Hz ($\pm 5 \%$); $\cos \varphi \geq 0.9$; $I \leq 10 \text{ A (230 V)}$ $I \leq 21 \text{ A (110 V)}$ $I \leq 26 \text{ A (90 V, base amplifier)}$ $I \leq 27 \text{ A (90 V, extended amplifier)}$	X1.2	AC supply
N	Input	0 V	X1.5	AC supply
PE	Input	0 V	X1.PE	AC supply

Note The instrument must first be connected to the safety ground. The line filter is built into the Power Adaptor Board.

1.2.4.2 X2 (POWER OUT): RF Output

N, female

Signal name	Direction	Range of values	Contact	Comment
POWER_OUT	Output	$P_{\text{rms, nom}} = 400/600 \text{ W}$ 470 MHz to 862 MHz at 50Ω load, $\text{VSWR} \leq 1.4$	X2	RF output (extended amplifier)

Drawings and Diagrams

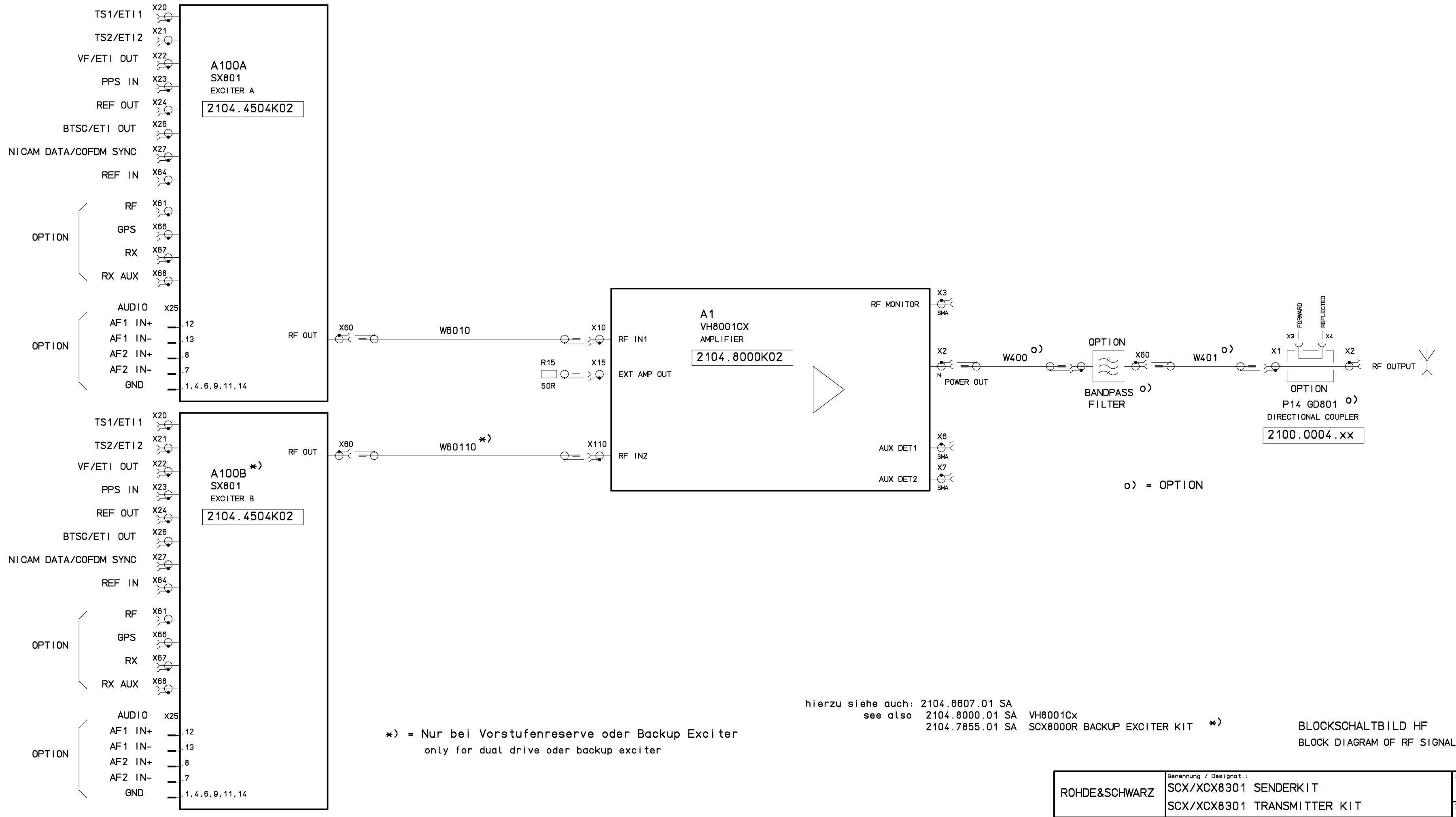
TRANSMITTER

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*) = Nur bei Vorstufenreserve oder Backup Exciter
only for dual drive oder backup exciter

hierzu siehe auch: 2104.6607.01 SA
see also 2104.8000.01 SA VH8001Cx
2104.7855.01 SA SCX8000R BACKUP EXCITER KIT *)

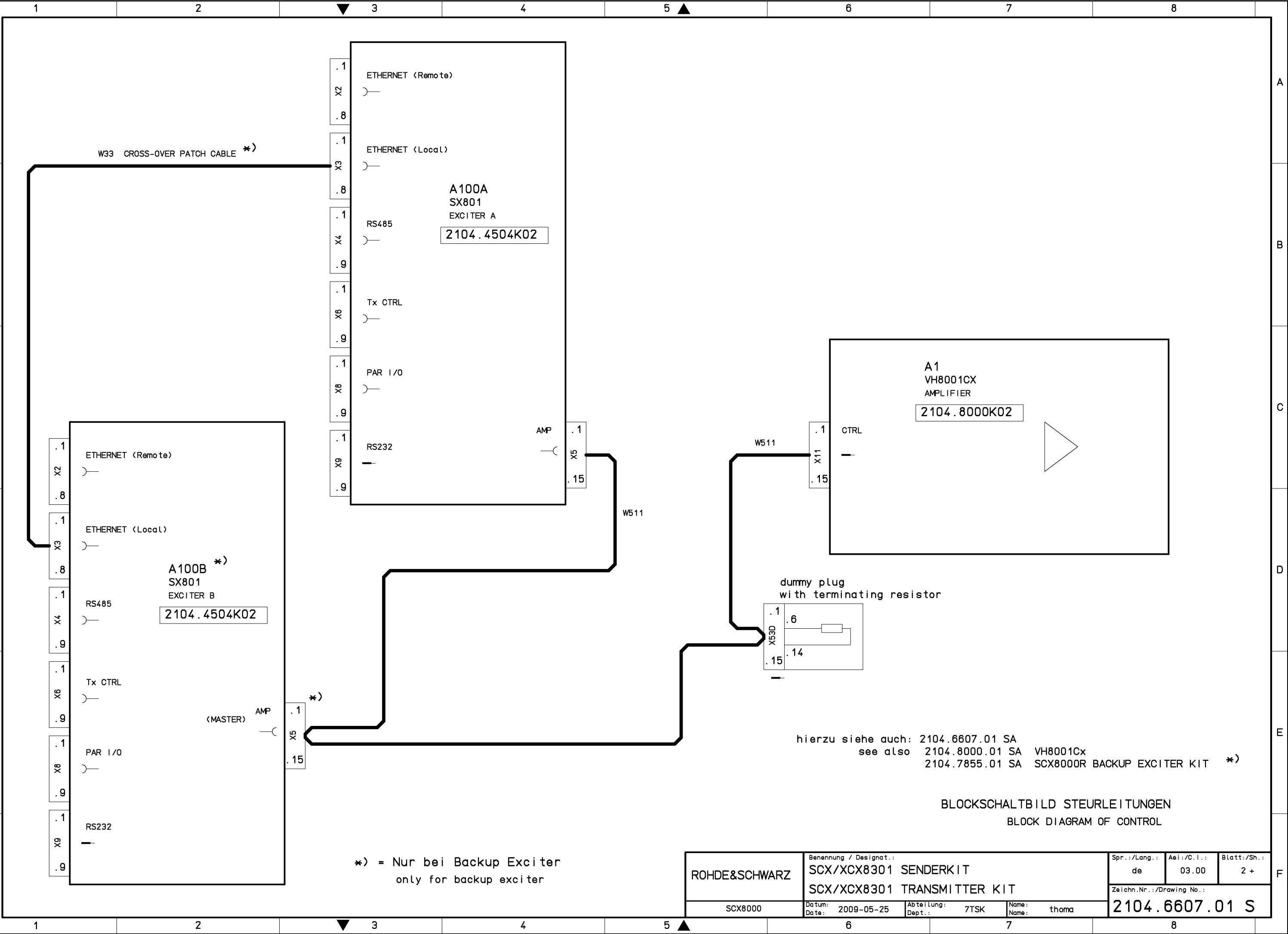
BLOCKSCHALTBIID HF
BLOCK DIAGRAM OF RF SIGNAL

ROHDE&SCHWARZ	Benennung / Designat.: SCX/XCX8301 SENDERKIT SCX/XCX8301 TRANSMITTER KIT			Spr.:/Lang.: de	Ael.:/C.I.: 03.00	Blatt:/Sh.: 1 +
	Datum: Date: 09-05-25			Abteilung: Dept.: 7TSK	Name: Name: thoma	Zeichn.Nr.:/Drawing No.: 2104.6607.01 S

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ROHDE&SCHWARZ	Benennung / Designat.: SCX/XCX8301 SENDERKIT SCX/XCX8301 TRANSMITTER KIT			Spr.:/Lang.: de	Aei:/C.I.: 03.00	Blatt:/Sh.: 2 +
	SCX8000	Datum: Date: 2009-05-25	Abteilung: Dept.: 7TSK	Name: Name: thoma	Zeichn.Nr.:/Drawing No.: 2104.6607.01 S	

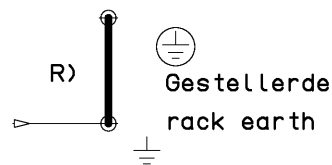
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VORSICHERUNG UND
ANSCHLUSSKABELQUERSCHNITT
SIEHE BESCHREIBUNG

EXT.FUSEING AND
CABLE CROSS-SECTIONS
see instruction book

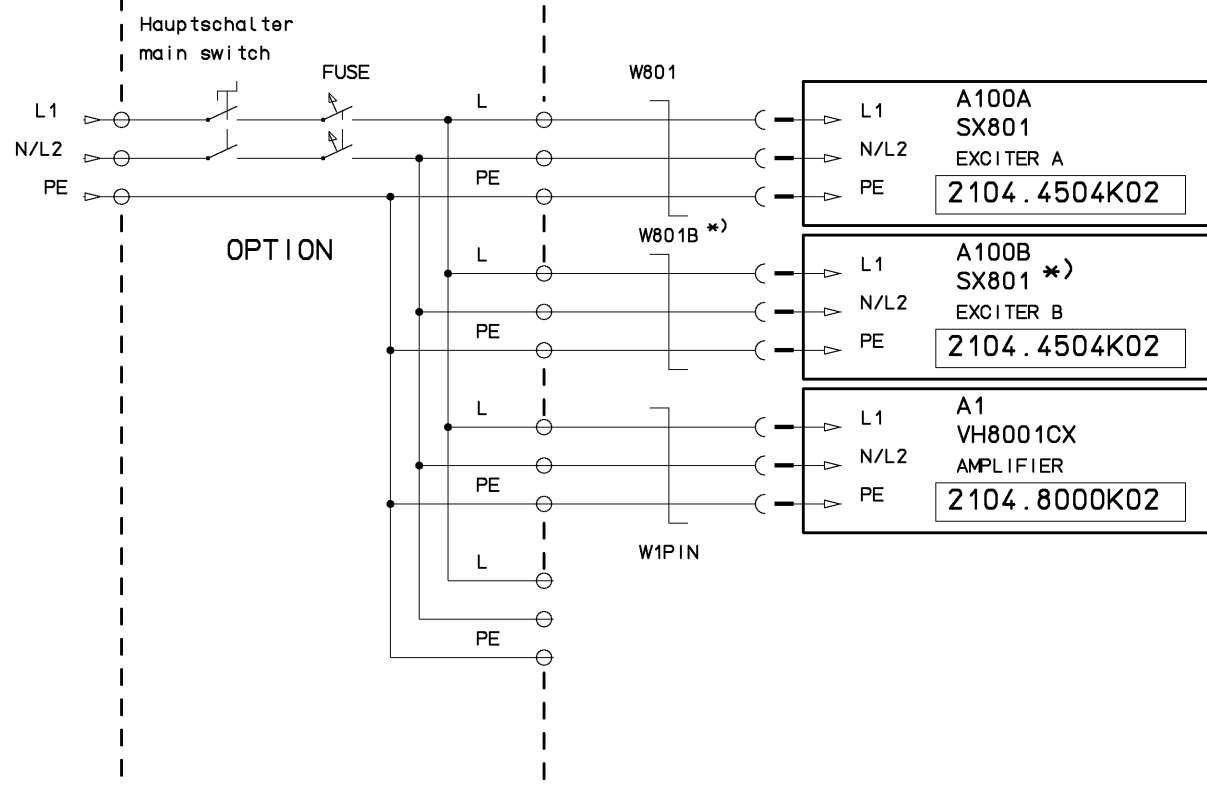
BETRIEBS-
ERDE
system
ground



R) = NUR BEI VERWENDUNG MIT EINEM GESTELL
ONLY IF USED WITH A RACK

OPTION

MIT NETZVERTEILUNG
ZUM BEISPIEL
WITH MAIN DISTRIBUTION
FOR EXAMPLE



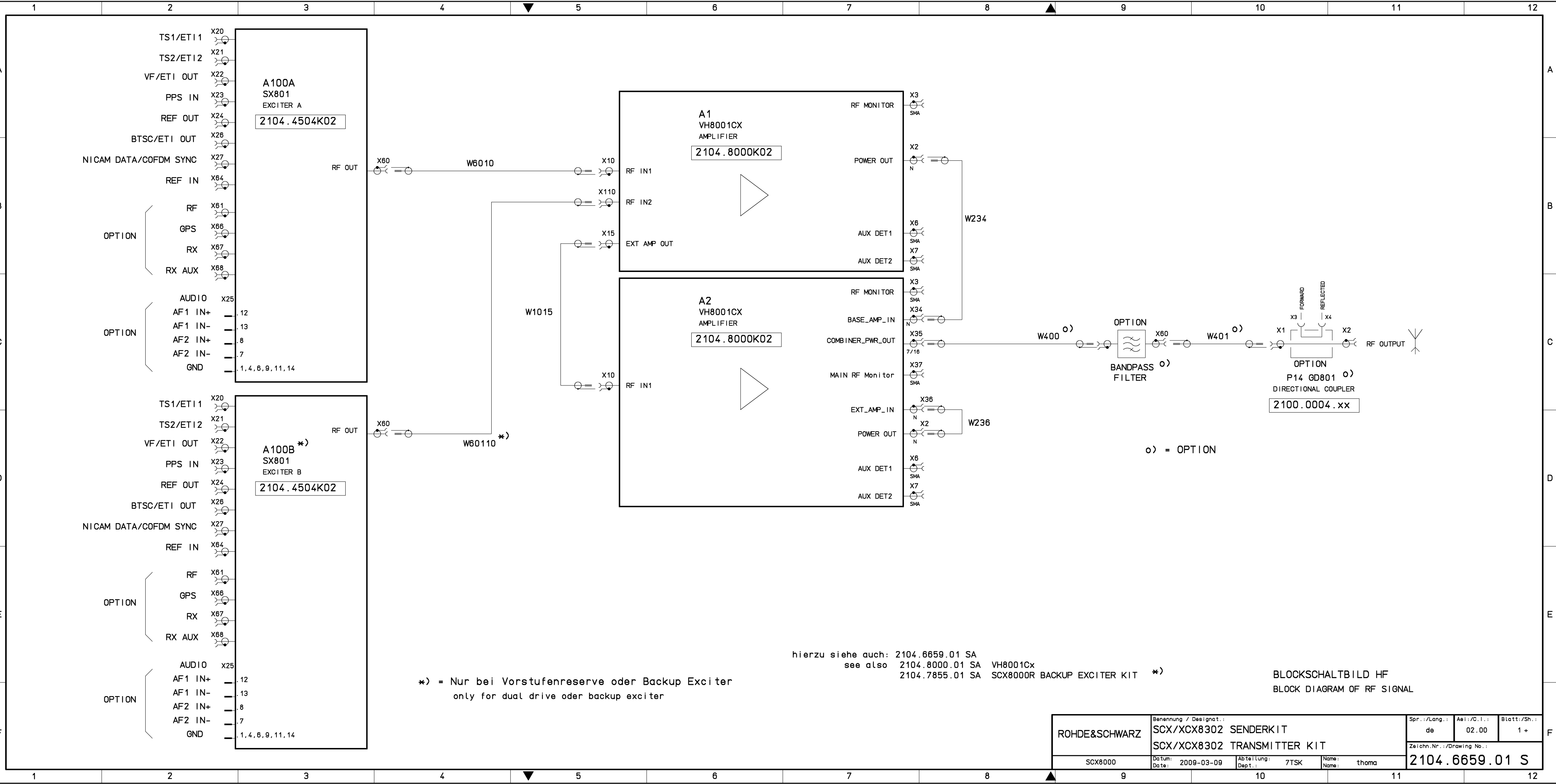
*) = Nur bei Backup Exciter
only for backup exciter

NETZ - STROMLAUF
CIRCUIT DIAGRAM OF RATED VOLTAGE

ROHDE&SCHWARZ	Benennung / Designat.: SCX/XCX8301 SENDERKIT SCX/XCX8301 TRANSMITTER KIT			Spr.:/Lang.: de	Aei:/C.I.: 03.00	Blatt:/Sh.: 3 -
	SCX8000	Datum: Date: 2009-05-25	Abteilung: Dept.: 7TSK	Name: Name: thoma	Zeichn.Nr.:/Drawing No.: 2104.6607.01 S	

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E



BLOCKSCHALTBIID HF
BLOCK DIAGRAM OF RF SIGNAL

ROHDE&SCHWARZ	Benennung / Designat.: SCX/XCX8302 SENDERKIT SCX/XCX8302 TRANSMITTER KIT			Spr.:/Lang.: de	Act./C.I.: 02.00	Blatt:/Sh.: 1 +
	Datum: Date: 2009-03-09			Abteilung: Dept.: 7TSK	Name: Name: thoma	Zeichn.Nr.:/Drawing No.: 2104.6659.01 S

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E

A
B
C
D
E
F

1

2

3

4

5

6

7

8

.1
X2
.8
.1
X3
.8
.1
X4
.9
.1
X6
.9
.1
X8
.9
.1
X9
.9

ETHERNET (Remote)

ETHERNET (Local)

A100B *)
SX801
EXCITER B

RS485

Tx CTRL

PAR I/O

RS232

W33 CROSS-OVER PATCH CABLE *)

.1
X2
.8
.1
X3
.8
.1
X4
.9
.1
X6
.9
.1
X8
.9
.1
X9
.9

ETHERNET (Remote)

ETHERNET (Local)

A100A
SX801
EXCITER A

RS485

Tx CTRL

PAR I/O

RS232

AMP

W51111

(MASTER) AMP

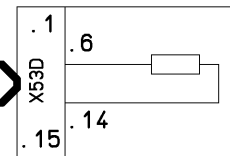
*)

*) = Nur bei Backup Exciter
only for backup exciter

W51111

W2424

dummy plug
with terminating resistor



hierzu siehe auch: 2104.6659.01 SA
see also 2104.8000.01 SA VH8001Cx
2104.7855.01 SA SCX8000R BACKUP EXCITER KIT *)

BLOCKSCHALTBI LD STEURLEITUNGEN
BLOCK DIAGRAM OF CONTROL

ROHDE&SCHWARZ	Benennung / Designat.:			Spr.:/Lang.:	Aei./C.I.:	Blatt:/Sh.:
	SCX/XCX8302 SENDERKIT			de	02.00	2 +
	SCX/XCX8302 TRANSMITTER KIT			Zeichn.Nr.:/Drawing No.:		
SCX8000	Datum: Date:	2009-03-09	Abteilung: Dept.:	7TSK	Name: Name:	thoma
				2104.6659.01 S		

1

2

3

4

5

6

7

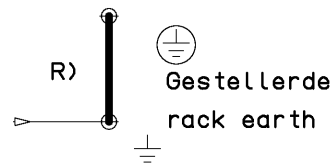
8

A
B
C
D
E
F

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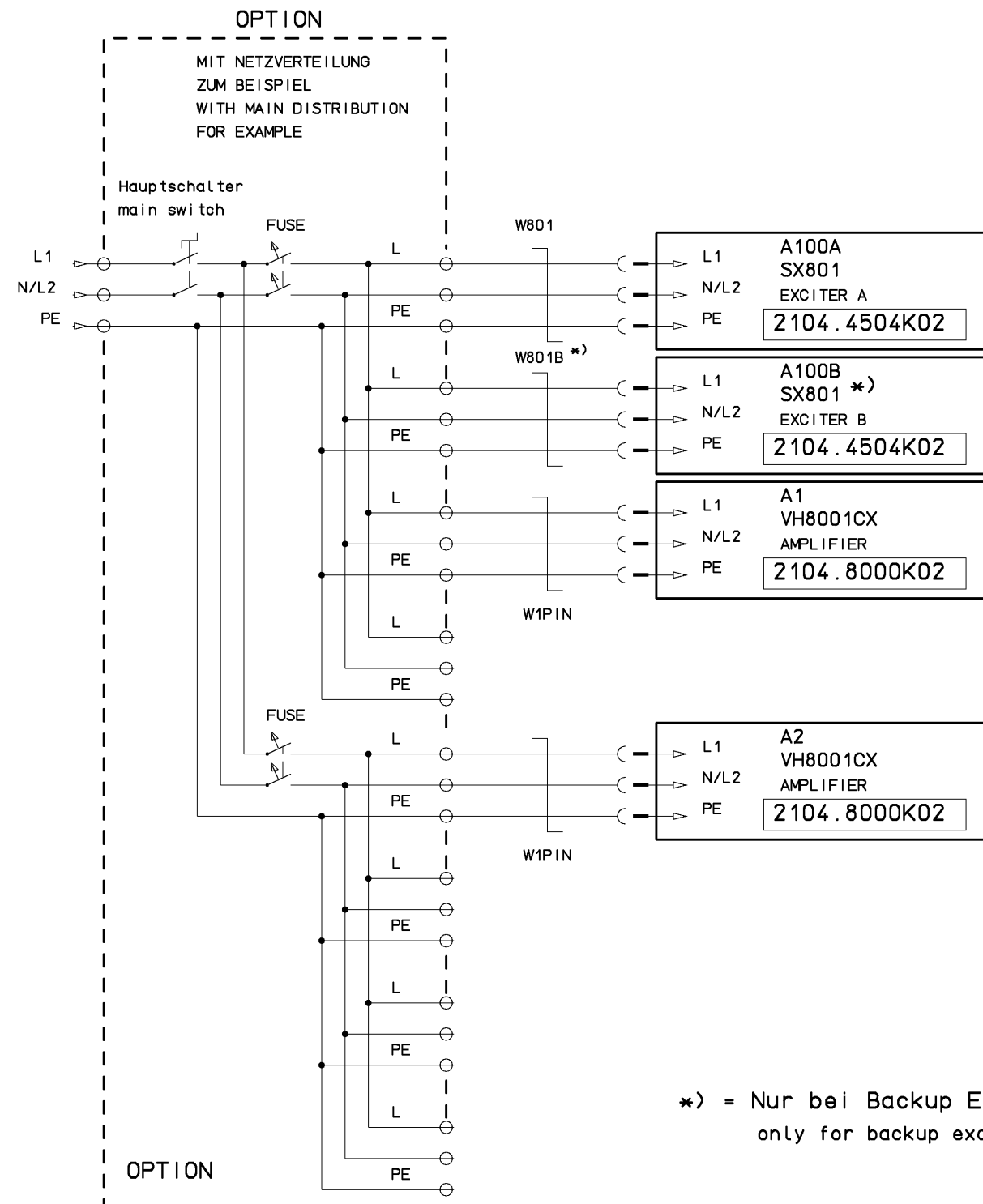
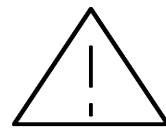
E

BETRIEBS-
ERDE
system
ground



R) = NUR BEI VERWENDUNG MIT EINEM GESTELL
ONLY IF USED WITH A RACK

VORSICHERUNG UND
ANSCHLUSSKABELQUERSCHNITT
SIEHE BESCHREIBUNG
EXT.FUSEING AND
CABLE CROSS-SECTIONS
see instruction book



*) = Nur bei Backup Exciter
only for backup exciter

NETZ - STROMLAUF
CIRCUIT DIAGRAM OF RATED VOLTAGE

ROHDE&SCHWARZ	Benennung / Designat.: SCX/XCX8302 SENDERKIT SCX/XCX8302 TRANSMITTER KIT			Spr.:/Lang.: de	Aei./C.I.: 02.00	Blatt:/Sh.: 3 -
	Datum: Date: 2009-03-09	Abteilung: Dept.: 7TSK	Name: Name: thoma	Zeichn.Nr.:/Drawing No.: 2104.6659.01 S		

el.Kennz Part	Benennung / Hinweise Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bestellbezeichnung Designation	enthalten in contained in
	ACHTUNG EGB /ATTENTION ESD *VARIANTENERKLAERUNG *EXPLANATION OF MODELS VAR02=FUER VERWENDUNG OHNE GESTELL MOD02=FOR USE WITHOUT RACK VAR03=FUER VERWENDUNG MIT GESTELL MOD03=FOR USE WITH RACK				
R53D	RL 0.35W 120 OHM+-0.1% TK25 RESISTOR	0083.7372.00	DRALORIC	SMA0207	2097.5605.00
W511	DY W511 STEUERKABEL CONTROL CABLE	2104.9487.00			2104.6607.01
W801	DX NETZKABEL W801 MAIN CABLE VAR 03 for use SX/XX801 with main distribution	2106.8059.00			2104.6607.01
W6010	DV W6010 RF-KABEL RF CABLE	2104.9493.00			2104.6607.01

el.Kennz Part	Benennung / Hinweise Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bestellbezeichnung Designation	enthalten in contained in
	ACHTUNG EGB /ATTENTION ESD *VARIANTENERKLAERUNG *EXPLANATION OF MODELS VAR02=FUER VERWENDUNG OHNE GESTELL MOD02=FOR USE WITHOUT RACK VAR03=FUER VERWENDUNG MIT GESTELL MOD03=FOR USE WITH RACK				
R53D	RL 0.35W 120 OHM+-0.1% TK25 RESISTOR	0083.7372.00	DRALORIC	SMA0207	2097.5605.00
W801	DX NETZKABEL W801 MAIN CABLE VAR 03 for use SX/XX801 with main distribution	2106.8059.00			2104.6659.01
W6010	DV W6010 RF-KABEL RF CABLE	2104.9493.00			2104.6659.01
W51111	DY W51111 STEUERKABEL CONTROL CABLE	2104.9470.00			2104.6659.01

Spare Parts Lists

TRANSMITTER

Printed in Germany

Pos.-Nr. ItemNo	Menge Quantity	ME Unit	El.Kennz Ref.Des.	Benennung / Bezeichnung Designation	Z	Sachnummer Stock No.	Ersatzteil Subst.part	BA	VH		
				ACHTUNG EGB/ATTENTION ESD *VARIANTENERKLAERUNG *EXPLANATION OF MODELS VAR03=FUER SCX/XCX8301 MOD03=FOR SCX/XCX8301 VAR12=FUER SCX/XCX8302 VERWENDUNG OHNE GESTELL MOD12=FOR SCX/XCX8302 WITHOUT USING A RACK VAR13=FUER SCX/XCX8302 VERWENDUNG MIT GESTELL MOD13=FOR SCX/XCX8302 USING A RACK							
10	1	S	W6010	DV W6010 RF-KABEL RF CABLE VAR 03 ## Verwendet in: ## 2104.6607.01	Z	2104.9493.00		M			
20	1	S	W511	DY W511 STEUERKABEL CONTROL CABLE VAR 03 ## Verwendet in: ## 2104.6607.01	Z	2104.9487.00		M			
30	1	S	W801	DX NETZKABEL W801 MAIN CABLE VAR 03 ## Verwendet in: ## 2104.6607.01	Z	2106.8059.00		M			
100	1	S	W6010	DV W6010 RF-KABEL RF CABLE VAR 12 13 ## Verwendet in: ## 2104.6659.01	Z	2104.9493.00		M			
110	1	S	W51111	DY W51111 STEUERKABEL CONTROL CABLE VAR 12 13 ## Verwendet in: ## 2104.6659.01	Z	2104.9470.00		M			
120	1	S	W801	DX NETZKABEL W801 MAIN CABLE VAR 13 ## Verwendet in: ## 2104.6659.03	Z	2106.8059.00		M			
				Benennung/Designation ERSATZTEILLISTE SCX/XCX8000 SPARE PARTS LISTSCX/XCX8000		Sprach./Lang de en		Ä.I. / C.I 01.00		Blatt/Sheet 1 of 1	
SCV8000				Datum/ Date 2009-02-05		Abt. / Dept. 7TSK		Name / Name TH		Dokument Nr. / Document No. 2104.7955.01 ST	

