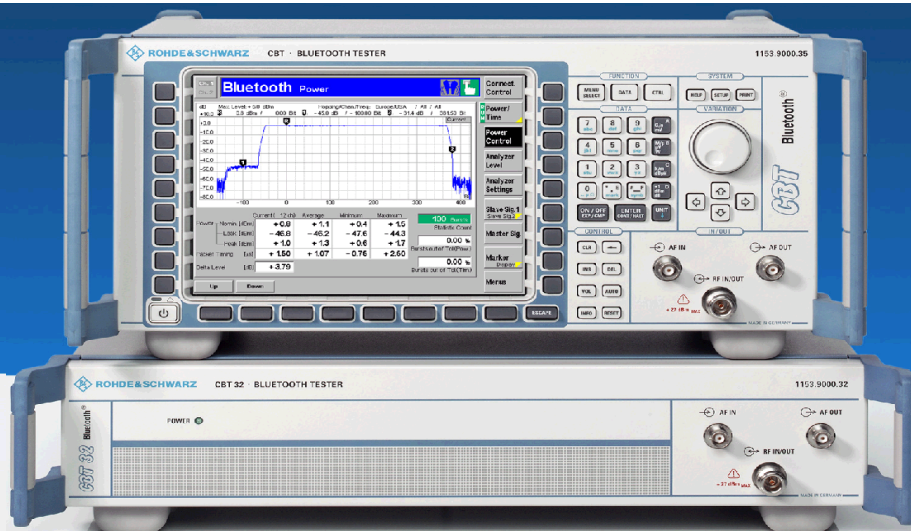


Service Manual Instrument



Bluetooth™ Tester

R&S® CBT
1153.9000.35

R&S® CBT 32
1153.9000.32

Printed in Germany



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Bluetooth is a trademark and used by Rohde & Schwarz under license.

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Contents of Manuals for R&S CBT Bluetooth Tester

Note: *In this document the R&S® CBT is abbreviated as R&S® CBT 35.
The R&S® CBT VAR 32 is abbreviated as R&S® CBT 32.
The R&S® CBT and R&S® CBT VAR 32 are abbreviated as R&S® CBT.*

Service Manual Instrument

This service manual for the R&S® CBT Bluetooth Tester provides information on checking the instrument for compliance with rated specifications, as well as on adjustment, repair and troubleshooting. It further contains all the information that is necessary for repairing the instrument by replacing modules.

- | | |
|------------------|--|
| Chapter 1 | Provides information on checking the R&S® CBT for compliance with rated specifications. A performance test for an R&S® CBT without an ACS System is not possible. |
| Chapter 2 | Describes the adjustment of the 10-MHz reference frequency. |
| Chapter 3 | Describes the design of the R&S® CBT as well as simple measures for repair and fault diagnosis, in particular the replacement of modules and access to hardware settings by means of service commands. |
| Chapter 4 | Contains information on software restoration of the R&S® CBT. |
| Chapter 5 | Contains spare parts lists and exploded views of the R&S® CBT. |

Data Sheet

The data sheet for the R&S® CBT Bluetooth Tester informs about the technical specifications of the unit. The data sheet is included in the operating manual.

Quick Start Guide

The quick start guide describes everything that is needed to put the instrument into operation and helps you to get familiar with the Bluetooth tester. In particular, the quick start guide describes the safety-related aspects to be observed when setting up or operating the instrument.

Operating Manual

The operating manual for the R&S® CBT Bluetooth Tester provides everything that is necessary to put the instrument into operation and make full use of its functionality. This includes information about the controls and connectors on the front and rear panel of the R&S® CBT and their technical specifications, necessary steps for putting the instrument into operation, startup of the instrument, and the basic operating concept. The operating provides detailed reference information on manual and remote control of the instrument. Typical measurement tasks are explained in detail using the functions of the user interface.

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 EC Certificate of Conformity and has left the manufacturer's plant in a condition fully complying with safety standards. To maintain this condition and to ensure safe operation, you must observe all instructions and warnings provided in this manual. If you have any questions regarding these safety instructions, the Rohde & Schwarz group of companies will be happy to answer them.

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

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

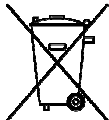
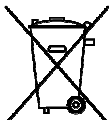
Observing the safety instructions will help prevent personal injury or damage of any kind caused by dangerous situations. Therefore, carefully read through and adhere to the following safety instructions before and when using the product. It is also absolutely essential to observe the additional safety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

Safety labels on products

The following safety labels are used on products to warn against risks and dangers.

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

Basic Safety Instructions

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

Signal words and their meaning

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



Indicates 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 information considered important, but not hazard-related, e.g. messages relating to property damage.
In the product documentation, the word ATTENTION is used synonymously.

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

Basic Safety Instructions

Operating states and operating positions

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

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

Electrical safety

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

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

Basic Safety Instructions

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

Operation

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

Basic Safety Instructions

2. Before you move or transport the product, read and observe the section titled "Transport".
3. As with all industrially manufactured goods, the use of substances that induce an allergic reaction (allergens) such as nickel cannot be generally excluded. If you develop an allergic reaction (such as a skin rash, frequent sneezing, red eyes or respiratory difficulties) when using a Rohde & Schwarz product, consult a physician immediately to determine the cause and to prevent health problems or stress.
4. Before you start processing the product mechanically and/or thermally, or before you take it apart, be sure to read and pay special attention to the section titled "Waste disposal/Environmental protection", item 1.
5. Depending on the function, certain products such as RF radio equipment can produce an elevated level of electromagnetic radiation. Considering that unborn babies require increased protection, pregnant women must be protected by appropriate measures. Persons with pacemakers may also be exposed to risks from electromagnetic radiation. The employer/operator must evaluate workplaces where there is a special risk of exposure to radiation and, if necessary, take measures to avert the potential danger.
6. Should a fire occur, the product may release hazardous substances (gases, fluids, etc.) that can cause health problems. Therefore, suitable measures must be taken, e.g. protective masks and protective clothing must be worn.
7. Laser products are given warning labels that are standardized according to their laser class. Lasers can cause biological harm due to the properties of their radiation and due to their extremely concentrated electromagnetic power. If a laser product (e.g. a CD/DVD drive) is integrated into a Rohde & Schwarz product, absolutely no other settings or functions may be used as described in the product documentation. The objective is to prevent personal injury (e.g. due to laser beams).
8. EMC classes (in line with EN 55011/CISPR 11, and analogously with EN 55022/CISPR 22, EN 55032/CISPR 32)
 - Class A equipment:
Equipment suitable for use in all environments except residential environments and environments that are directly connected to a low-voltage supply network that supplies residential buildings
Note: Class A equipment is intended for use in an industrial environment. This equipment may cause radio disturbances in residential environments, due to possible conducted as well as radiated disturbances. In this case, the operator may be required to take appropriate measures to eliminate these disturbances.
 - Class B equipment:
Equipment suitable for use in residential environments and environments that are directly connected to a low-voltage supply network that supplies residential buildings

Repair and service

1. The product may be opened only by authorized, specially trained personnel. Before any work is performed on the product or before the product is opened, it must be disconnected from the AC supply network. Otherwise, personnel will be exposed to the risk of an electric shock.

Basic Safety Instructions

2. Adjustments, replacement of parts, maintenance and repair may be performed only by electrical experts authorized by Rohde & Schwarz. Only original parts may be used for replacing parts relevant to safety (e.g. power switches, power transformers, fuses). A safety test must always be performed after parts relevant to safety have been replaced (visual inspection, protective conductor test, insulation resistance measurement, leakage current measurement, functional test). This helps ensure the continued safety of the product.

Batteries and rechargeable batteries/cells

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

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

Transport

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

Instrucciones de seguridad elementales

Waste disposal/Environmental protection

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

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

Instrucciones de seguridad elementales

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

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

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

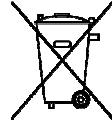
Instrucciones de seguridad elementales

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

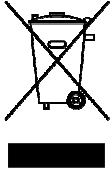
Tener en cuenta las informaciones de seguridad sirve para evitar en lo posible lesiones o daños por peligros de toda clase. Por eso es imprescindible leer detalladamente y comprender por completo las siguientes informaciones de seguridad antes de usar el producto, y respetarlas durante el uso del producto.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

Señalización de seguridad de los productos

Las siguientes señales de seguridad se utilizan en los productos para advertir sobre riesgos y peligros.

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

Instrucciones de seguridad elementales

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

Palabras de señal y su significado

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



Indica una situación de peligro que, si no se evita, causa lesiones graves o incluso la muerte.



Indica una situación de peligro que, si no se evita, puede causar lesiones graves o incluso la muerte.



Indica una situación de peligro que, si no se evita, puede causar lesiones leves o moderadas.



Indica información que se considera importante, pero no en relación con situaciones de peligro; p. ej., avisos sobre posibles daños materiales.

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

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

Estados operativos y posiciones de funcionamiento

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

Instrucciones de seguridad elementales

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

Seguridad eléctrica

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

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

Instrucciones de seguridad elementales

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

Funcionamiento

1. El uso del producto requiere instrucciones especiales y una alta concentración durante el manejo. Debe asegurarse que las personas que manejen el producto estén a la altura de los requerimientos necesarios en cuanto a aptitudes físicas, psíquicas y emocionales, ya que de otra manera no se pueden excluir lesiones o daños de objetos. El empresario u operador es responsable de seleccionar el personal usuario apto para el manejo del producto.
2. Antes de desplazar o transportar el producto, lea y tenga en cuenta el capítulo "Transporte".
3. Como con todo producto de fabricación industrial no puede quedar excluida en general la posibilidad de que se produzcan alergias provocadas por algunos materiales empleados —los llamados alérgenos (p. ej. el níquel)—. Si durante el manejo de productos Rohde & Schwarz se producen reacciones alérgicas, como p. ej. irritaciones cutáneas, estornudos continuos, enrojecimiento de la conjuntiva o dificultades respiratorias, debe avisarse inmediatamente a un médico para investigar las causas y evitar cualquier molestia o daño a la salud.
4. Antes de la manipulación mecánica y/o térmica o el desmontaje del producto, debe tenerse en cuenta imprescindiblemente el capítulo "Eliminación/protección del medio ambiente", punto 1.
5. Ciertos productos, como p. ej. las instalaciones de radiocomunicación RF, pueden a causa de su función natural, emitir una radiación electromagnética aumentada. Deben tomarse todas las medidas necesarias para la protección de las mujeres embarazadas. También las personas con marcapasos pueden correr peligro a causa de la radiación electromagnética. El empresario/operador tiene la obligación de evaluar y señalizar las áreas de trabajo en las que exista un riesgo elevado de exposición a radiaciones.
6. Tenga en cuenta que en caso de incendio pueden desprenderse del producto sustancias tóxicas (gases, líquidos etc.) que pueden generar daños a la salud. Por eso, en caso de incendio deben usarse medidas adecuadas, como p. ej. máscaras antigás e indumentaria de protección.
7. Los productos con láser están provistos de indicaciones de advertencia normalizadas en función de la clase de láser del que se trate. Los rayos láser pueden provocar daños de tipo biológico a causa de las propiedades de su radiación y debido a su concentración extrema de potencia electromagnética. En caso de que un producto Rohde & Schwarz contenga un producto láser (p. ej. un lector de CD/DVD), no debe usarse ninguna otra configuración o función aparte de las descritas en la documentación del producto, a fin de evitar lesiones (p. ej. debidas a irradiación láser).
8. Clases de compatibilidad electromagnética (conforme a EN 55011 / CISPR 11; y en analogía con EN 55022 / CISPR 22, EN 55032 / CISPR 32)
 - Aparato de clase A:
Aparato adecuado para su uso en todos los entornos excepto en los residenciales y en aquellos conectados directamente a una red de distribución de baja tensión que suministra corriente a edificios residenciales.
Nota: Los aparatos de clase A están destinados al uso en entornos industriales. Estos aparatos pueden causar perturbaciones radioeléctricas en entornos residenciales debido a posibles perturbaciones guiadas o radiadas. En este caso, se le podrá solicitar al operador que tome las medidas adecuadas para eliminar estas perturbaciones.
 - Aparato de clase B:
Aparato adecuado para su uso en entornos residenciales, así como en aquellos conectados directamente a una red de distribución de baja tensión que suministra corriente a edificios residenciales.

Instrucciones de seguridad elementales

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

Transporte

1. El producto puede tener un peso elevado. Por eso es necesario desplazarlo o transportarlo con precaución y, si es necesario, usando un sistema de elevación adecuado (p. ej. una carretilla elevadora), a fin de evitar lesiones en la espalda u otros daños personales.

Instrucciones de seguridad elementales

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/protección del medio ambiente

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

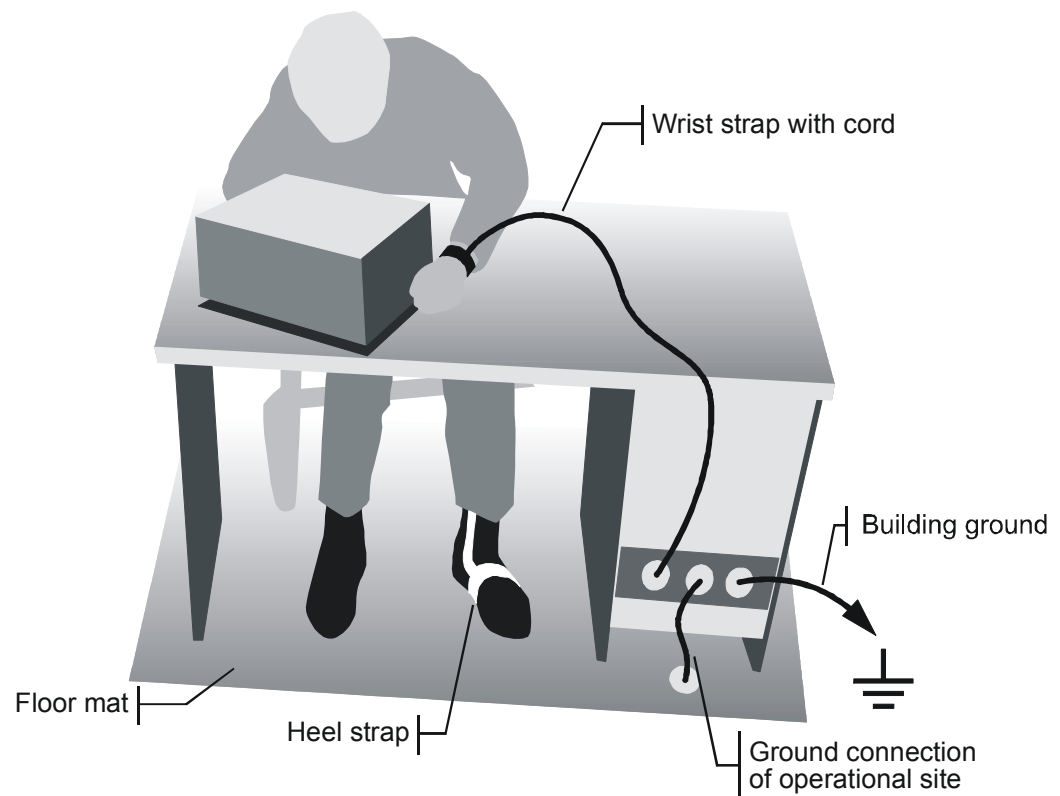
Se puede encontrar más información sobre la protección del medio ambiente en la página web de Rohde & Schwarz.

Instructions for Electrostatic Discharge Protection

NOTICE

Risk of damaging electronic components

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



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

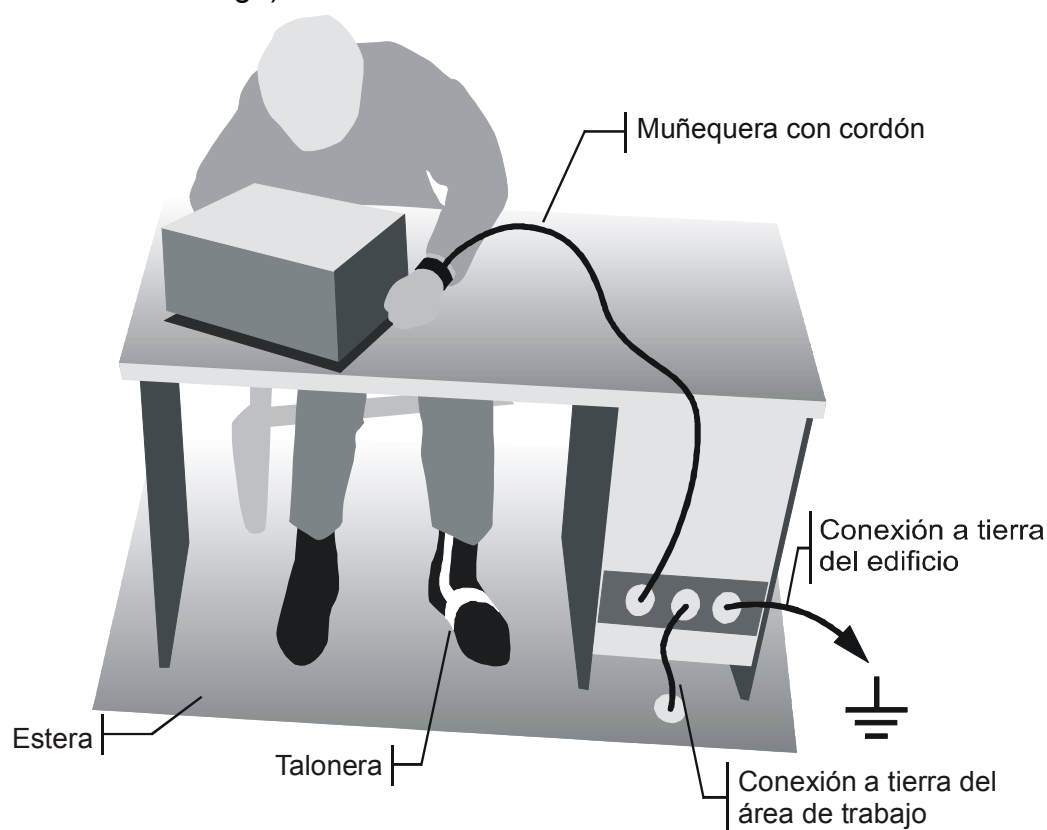
- Wrist strap with cord to ground connection
 - Conductive floor mat and heel strap combination
-

Instrucciones para la protección contra descargas electroestáticas

AVISO

Riesgo de avería de los componentes electrónicos

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



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

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

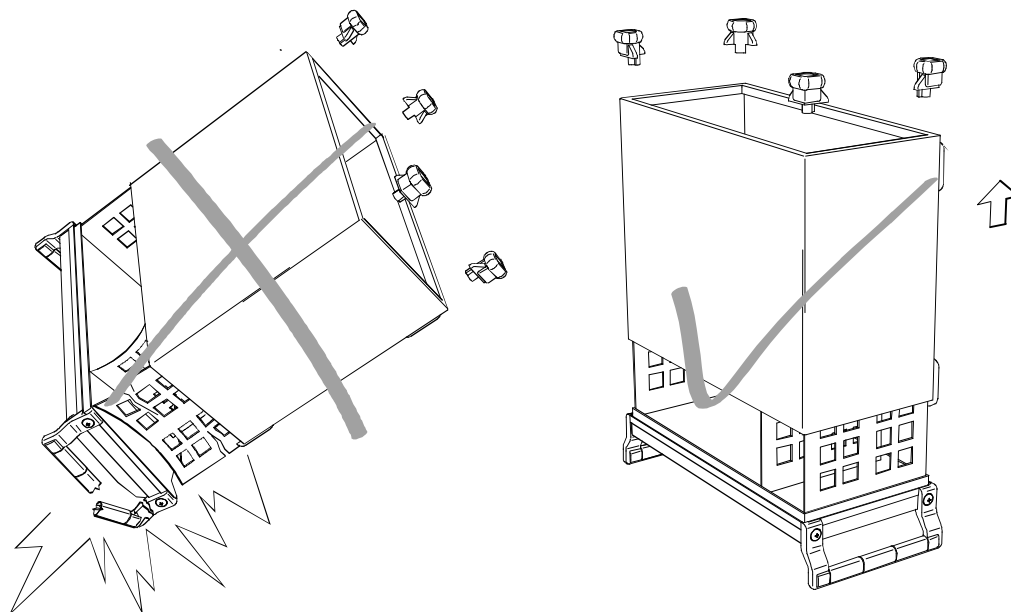
Safety Instructions for Units with Removable Cabinet

WARNING

Danger of injuries

When removing the rear feet, the unit can slip out of the cabinet.

Put the unit onto the front handles, before removing the rear feet and taking off the cabinet. Thus the risk of personal injuries and damages to the unit is avoided.



When mounting the cabinet take care not to pen in the fingers. Also pay attention not to damage or pull off cables. Screw the rear feet back on immediately after mounting the cabinet. Do not move the unit with the rear feet missing.

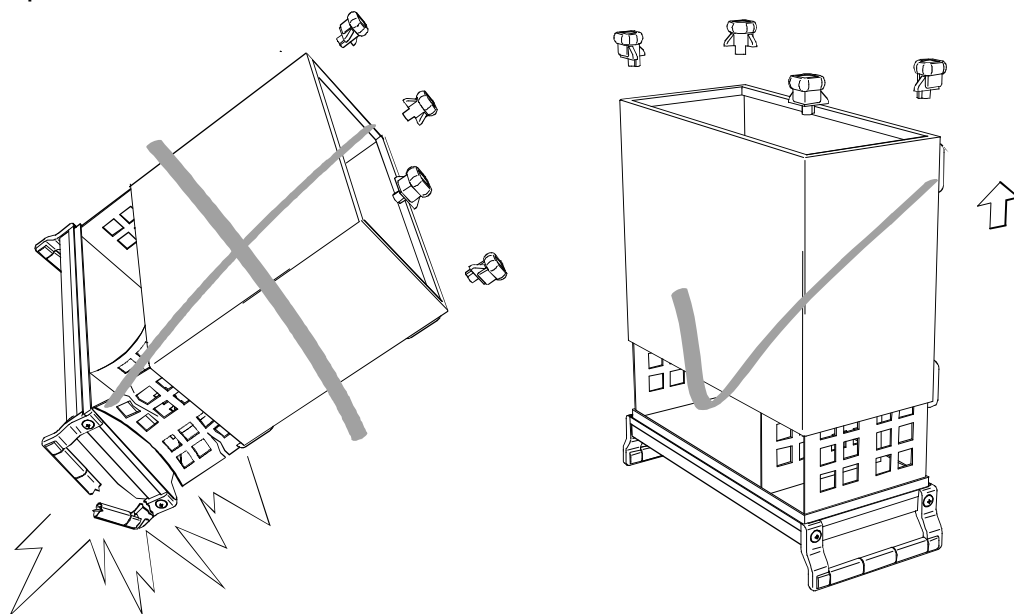
Informaciones de seguridad para aparatos con tubo de quita y pon

⚠ ADVERTENCIA

Peligro de heridas

Al sacar los pies de la pared posterior puede deslizarse el aparato fuera de la caja.

Posicionar el aparato de manera segura sobre las asas delanteras, antes de sacar los pies de la pared posterior y entonces sacar la caja. De esta manera evitarán el riesgo de daños en personas y daños en el aparato.



Existe el riesgo de heridas en el momento de poner otra vez la caja, como por ejemplo posiblemente engancharse los dedos. Por favor tengan además en cuenta de que no se enganchen o desconecten cables. Por favor atornillen los pies de la pared posterior directamente despues de poner la caja. No muevan el aparato nunca sin que los pies de la pared posterior estén atornillados.

Procedure in Case of Service and Ordering of Spare Parts

This section contains information on shipping an instrument to your service center and ordering spare parts.

Please contact your local Rohde & Schwarz service center if you need service or repair work of your equipment or to order spare parts. You can find the current address of your representative on our homepage www.rohde-schwarz.com.

Shipping the Instrument

We require the following information in order to answer your inquiry fast and correctly and to determine whether the warranty is still valid for your instrument:

- Instrument model
- Serial number
- Firmware version
- Must the instrument be returned with this firmware?
- Detailed error description in case of repair
- Indication of desired calibration
- Contact person for possible questions

In some countries, an RMA process is available for the return shipment of the instrument. For details, contact your local representative.

When shipping the instrument, be careful to provide for sufficient mechanical and antistatic protection.

- Use the original packaging for transporting or shipping the instrument. The protective caps for the front and rear prevent damage to the operating elements and the connectors.
- If you do not use the original packaging, provide for sufficient padding to prevent the instrument from slipping inside the box. Wrap antistatic packing foil around the instrument to protect it from electrostatic charging.

Rohde & Schwarz offers repair and calibrations of the test systems it produces. The calibration documentation fulfills ISO 17025 requirements.

Shipping Defective Modules

Also when shipping a module, be careful to provide for sufficient mechanical and antistatic protection.

- Ship the module in a sturdy, padded box.
- Wrap the module in antistatic foil.

If the packaging is only antistatic but not conductive, additional conductive packaging is required. The additional packaging is not required if the tightly fitting packaging is conductive.

Exception:

If the module contains a battery, the tightly fitting packaging must always consist of antistatic, non-chargeable material to protect the battery from being discharged.

Ordering Spare Parts

To deliver spare parts promptly and correctly, we need the following information:

- Stock number (see list of spare parts in chapter "Documents")
- Designation
- Component number according to list of spare parts
- Number of pieces
- Instrument type for which the spare part is needed
- Instrument stock number
- Instrument serial number
- Contact person for possible questions

Refurbished Modules

Refurbished modules are an economical alternative to original modules. Bear in mind that refurbished modules are not new, but repaired and fully tested parts. They may have traces from use, but they are electrically and mechanically equivalent to new modules.

Your Rohde & Schwarz representative will be happy to inform you about which modules are available as refurbished modules.

Taking Back Defective Replaced Modules

Defective modules of the replacement program which cannot be repaired are taken back within three months following delivery. A repurchasing value is credited.

Excluded are parts which cannot be repaired, e.g. printed boards that are burnt, broken or damaged by attempts to repair them, incomplete modules, and parts with severe mechanical damage.

Please return the defective replacement modules, together with the accompanying document for returned merchandise, which you received with the spare module. We need the following information:

- Stock number, serial number and designation of the removed part
- Detailed error description
- Stock number, serial number and type of instrument from which the module was removed
- Date of removal
- Name of the engineer/technician who replaced the module
- R&S ordering number
- Service reference number (if available)

1 Performance Test

This chapter provides the necessary information for checking the technical data of the R&S® CBT Bluetooth Tester. Then follows a list of the measuring equipment required for the performance test.

General

The technical data of an R&S® CBT Bluetooth Tester can be checked in the following ways:

A) Calibration by an R&S Representative with an ACS Calibration

Advantages

- Automatic procedure
- Small measurement uncertainties
- Readjustment
- In most cases, the instrument does not have to leave the country

B) Sending the Instrument to the Factory (Memmingen, Germany)

Advantages

- Automatic procedure at the final test setup
- Minimum measurement uncertainties
- Readjustment

Necessary Documents

- Operating manual R&S® CBT Bluetooth Tester
- Data sheet R&S® CBT Bluetooth Tester

Measuring Instruments and Auxiliary Equipment

Table 1-1 Measuring instruments and auxiliary equipment for manual performance test

Item	Type of instrument	Required characteristics	Appropriate device	R & S order number	Use
1	ACS		R&S ACS		
2	Service Kit CMU		CMU-Z3		

Test Setup

The quality of the test setup has an effect on the measurement procedures.

Note: *Make sure to use only high-quality coax cables and coax connectors as well as calibrated measuring equipment.*

ACS Tests

Please follow the instructions of the ACS.

Calibration and Adjustment Interval

The recommended calibration and adjustment interval is 12 months.

2 Adjustment

The following chapter describes the adjustment of the reference frequency.

Manual adjustments must be performed at an ambient temperature between +23°C and +26°C after the instrument has warmed up for about 30 min.

Manual Adjustment

Measuring Instruments

Table 2-1 Measuring instruments for manual adjustment of the R&S® CBT

Item	Type of instrument	Required characteristics	Appropriate device	R & S order number	Use page
1	Calibrated Spectrum Analyzer	2398 MHz to 2499 MHz	R&S FSIQ or R&S FSEB	1119.5005.xx 1066.3010.xx	Reference-frequency

Reference frequency

Measurement on RF IN OUT at 2.4 GHz.

TCXO

The 10 MHz ref. frequency is not calibrated in the unit calibration, but at module production of the RF board. The 10 MHz ref. frequency is adjusted by a potentiometer on the RF board, but hopefully adjustments will not be necessary in the unit calibration.

Test Setup:

- Connect R&S® CBT RF IN/OUT and R&S® FSIQ.

R&S® CBT Settings:

- RF Analyzer / Generator
- Modulation = Off
- Generator TX = On
- RF Level = 0 dBm
- Frequency = 2400 MHz
- Frequency Offset = 0 kHz
- Sync. Reference Frequency = Internal

Test Process:

- Use R266 on the right side of the R&S® CBT to adjust the RF frequency at RF IN OUT to 2.400 000 000 GHz $\pm$ 120 Hz.

Info: Adjustment range = -30 kHz +40 kHz
 Turn adjustment left = frequency will be reduced
 One screw turn = 7 kHz

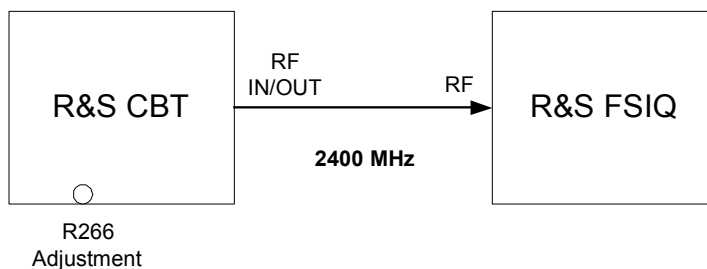


Figure 2-1 Test Setup

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3 Repair

This chapter describes the design of the R&S® CBT Bluetooth Tester, simple measures for repair and troubleshooting and, in particular, the replacement of modules. For troubleshooting and diagnostics, a maintenance menu is available that can be used to poll diagnostic voltages of the modules and to indicate limit violations.

For troubleshooting and diagnosis, a maintenance menu is available, which permits to poll diagnostic voltages of the modules and detect limit violations.

Instrument Design and Function Description

Instrument design

For a detailed overview of the R&S® CBT Bluetooth Tester design refer to the block diagram on p. 3.2.

The following function description of the instrument refers to the block diagram.

Cabinet design

The casing of the R&S® CBT Bluetooth Tester is robust, grey-blue Rohde & Schwarz standard casing in accordance with BW 2000.

It consists of a frame with two integrated rear panels and a labeling panel at the front. The frame is covered by a one-piece tube and held in place with four rear-panel screw-fastened feet and two screws in the middle. Two front handles are screw-fastened to the frame as standard.

Note: *The words “left” and “right” in the manual always refer to the front view of the instrument.*

Block Diagram

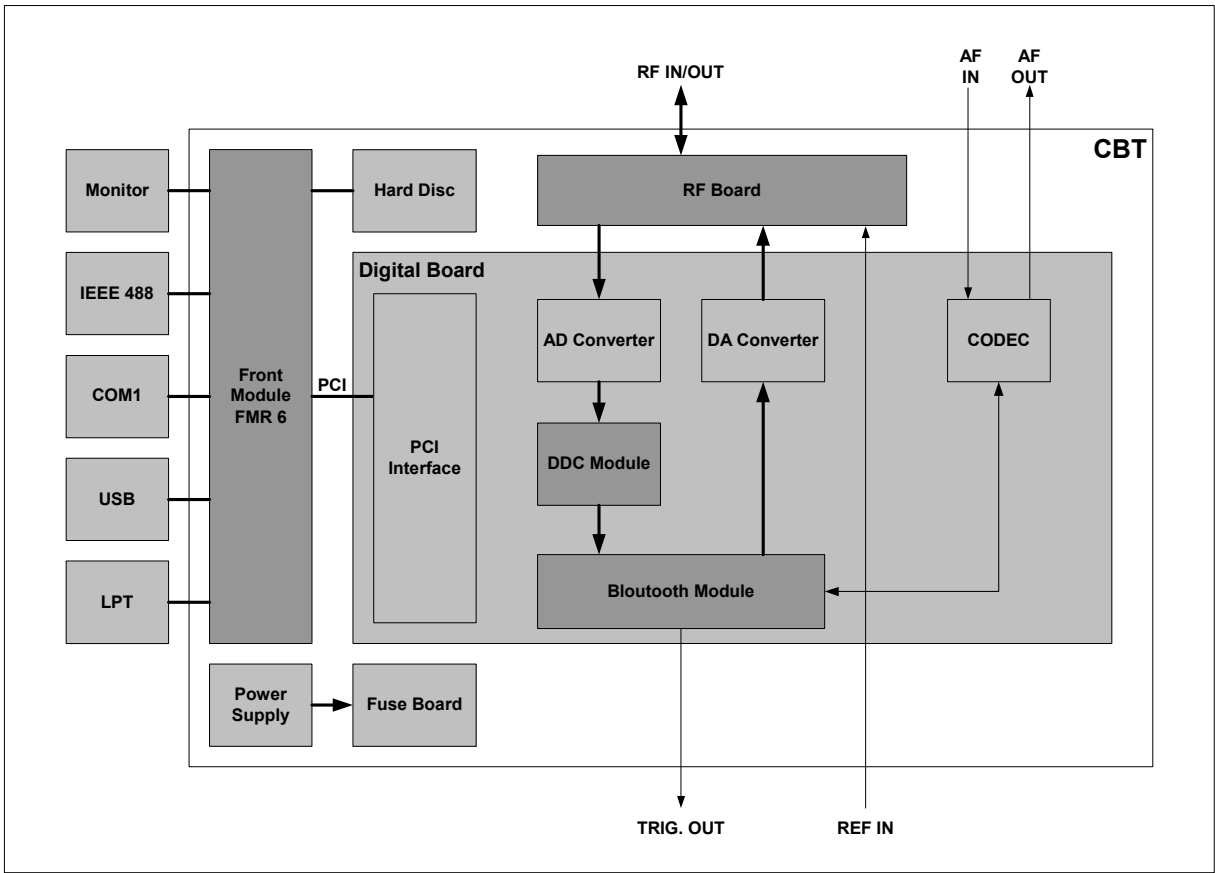


Fig. 3-1 R&S® CBT block diagram

Instrument Frame

R&S® CBT 35 (1153.9000.01 D page 2, item 110)

The instrument frame consists of front frame and the cage. The cage is screwed to the front frame. It incorporates the POWER SUPPLY cover; the RF BOARD REAR COVER, the air diverts and provides all mechanical connectors and slots for modules. The DIGITAL BOARD, the RF BOARD, the POWER SUPPLY and the FAN UNIT are screwed to the cage.

R&S® CBT 32 (1153.9000.01 D page 4, item 115)

The instrument frame consists of front frame and the cage. The board carrier in the middle of the R&S® CBT 32, which carries the DIGITAL BOARD, the POWER SUPPLY, FRONT MODULE PROCESSOR and the HARDDISC, is fitted to the instrument frame. The FAN and the POWER LINE FILTER is also mounted to the frame.

Rear of Instrument Frame

At the rear of the R&S® CBT instrument frame, the POWER SUPPLY, the POWER LINE FILTER and other important electrical interfaces are fitted (see Chapter 1 of the operating manual).

The RF BOARD REAR COVER in the R&S® CBT 35 provides easy access to the RF BOARD.

Front of Instrument Frame

The front of the instrument frame incorporates the FRONT MODULE and the most important electrical interfaces.

FRONT MODULE (R&S® CBT 35)

The components of the FRONT MODULE that are directly arranged at the front of the CBT are the LCD and the operating keys with the rotary knob.

The operating keys consist of a membrane and a mat inserted into the keyboard frame of the FRONT MODULE. The operating keys are colored differently to highlight their function and partly labeled.

This module can be conveniently replaced as a unit.

Electrical interfaces

The electrical interfaces, RF, AF IN and OUT are mounted on an extra mounting plate.

Cooling the instrument

Main Fan (R&S® CBT 35)

The boards are cooled by the internal fans. These fans take in air from the outside of the unit and divert it into the POWER SUPPLY and the DIGITAL BOARD and also the cooling ribs of the RF BOARD. The hot air is then expelled at the right side and at the rear of the unit.

Main Fan (R&S® CBT 32)

The boards are cooled by the internal fans. These fans take in air from the outside of the unit and distribute it to the POWER SUPPLY, the FRONT MODULE and the DIGITAL BOARD. The hot air is then expelled at the right side and at the rear of the unit.

Front Module Fan (R&S® CBT 32)

The FRONT MODULE is cooled by its own fan. An additional fan is provided on the processor.

Front Module (20/25) (FMR)

R&S® CBT 35 (1153.9000.01 D page 2, item 20)

R&S® CBT 32 (1153.9000.01 D page 4, item 25)

In the R&S® CBT 35 the FRONT MODULE consists of an aluminum case panel and a mounting plate which accommodates the LCD, the keyboard mat with the membrane and the rotary knob.

The case panel incorporates the FRONT MODULE CONTROLLER, the fan and the hard disk.

Design (R&S® CBT 35)

The FRONT MODULE has its own EMI shielding. It consists of a base board and optional memory modules. The modules are mechanically fastened to the base board.

Cooling system (R&S® CBT 35)

The FRONT MODULE is supplied with cool air via its own fan.

Cooling system (R&S® CBT 32)

The FRONT MODULE is supplied with cool air via the fan.

Control and Supply

The FRONT MODULE is directly plugged into the DIGITAL BOARD via one 96-pin FUTURE BUS connectors and one additional 110-pin PCI bus connector.

Module function

The FRONT MODULE contains all the necessary components on a board, e.g. processor, memory chips, I/O devices (PCI bus), lithium battery, IEC bus controller (IEEE), serial interfaces (COM1), a parallel interface (LPT), graphics controller, external VGA graphics interface (monitor), and two external USB interfaces (keyboard).

In addition an IDE hard disk controller is integrated on the controller board.

Hard disk (R&S® CBT 35)

The HARD DISC is screw-fastened to the side of the FMR EMI shielding.

Hard disk (R&S® CBT 32)

The HARD DISC is screw-fastened to the Board Carrier.

LCD (R&S® CBT 35)

The color LCD provides a visible output of any information, measurements etc. to the user. The resolution of the LCD is 640 * 480 pixels (VGA).

The display incorporates two cold cathode tubes for the illumination. The high voltage required for this purpose is generated in an extra DC/AC converter mounted next to the display on the mounting plate and connected both to the display and the controller board via a cable. The liquid crystal display is controlled via a ribbon cable that is plugged in on the controller board.

**Operating keys
(R&S® CBT 35)**

The operating keys consisting of a keyboard mat and a membrane release a contact when the rubber key is pressed. The LED for the STORE SETTINGS key (green for ON) is also accommodated on this membrane.

The rubber keys enable the user to call up all R&S® CBT Functions.

The key evaluation and LED Control are effected via a film cable connector on the controller board. Like the Control of the LED, it is controlled in a special microprocessor on the controller board by means of a matrix technique.

Rotary knob (R&S® CBT 35)

The rotary knob consists of a flexible magnetic ring with individual magnets for the detect positions. With each detect position of the rotary knob, from the LEDs and the optical position detectors electrical pulses are released and sent via a ribbon cable to the microprocessor on the FRONT MODULE for evaluation.

The rotary knob is used for data entry and operation.

Power Supply (50)

R&S® CBT 35 (1153.9000.01 D page 2, item 50)

R&S® CBT 32 (1153.9000.01 D page 4, item 50)

Design (R&S® CBT 35)

The POWER SUPPLY has an aluminum case and partly dissipates the heat produced. The aluminum case also serves as EMI shielding.

Cooling system

The POWER SUPPLY is supplied with cool air by the main fan.

Control

For voltage monitoring, the +5 V voltages is routed back to the POWER SUPPLY via sense line.

Module function

The POWER SUPPLY converts the AC input voltage into the internally used DC voltages. The internal voltages are:

+ 3.3 V / 15 A

+ 5.0 V / 30 A

+ 12 V / 3 A (used also for fan)

- 12 V / 1 A

The internal voltages are provided with over-current protection.

All outputs are disabled when the internal temperature exceeds the safe operating range.

Fuse Board (40)

R&S® CBT 35 (1153.9000.01 D page 2, item 40)

R&S® CBT 32 (1153.9000.01 D page 4, item 40)

Design

The FUSE BOARD is fitted directly to the POWER SUPPLY.
The aluminum case of the POWER SUPPLY also serves as EMI shielding for the R&S® CBT 35.

Cooling system

The FUSE BOARD is supplied with cool air by the main fan.

Module function

The FUSE BOARD limits the current of the secondary side so that it meets the UL requirements.

+ 3.3 V / 15 A
+ 5.0 V / 15 A
+ 12 V / 1,5 A (fan = 1,5A)
- 12 V / 1,5 A

The FUSE BOARD also controls the fan speed.

-30°C = 40% Max Speed

0°C = 52% Max Speed

30°C = 73% Max Speed

45°C = 93% Max Speed

>50°C = 100% Max Speed

(Refer to the data sheet for the temperature limits of the unit.)

Digital Board (130/135)

R&S® CBT 35 (1153.9000.01 D page 2, item 130)

R&S® CBT 32 (1153.9000.01 D page 4, item 135)

The DIGITAL BOARD constitutes the central control and measurement board which contains all circuit parts for conversion and further processing of the IF (receiver side) into digital values.

On the transmitter side, digital values are modulated upon the carrier and provided as analog IF.

Design (R&S® CBT 35) The DIGITAL BOARD is fitted on the base of the R&S® CBT. It carries the DDC and the Bluetooth Module.

Design (R&S® CBT 32) The DIGITAL BOARD is fitted on Board Carrier. It carries the DDC and the Bluetooth Module.

Cooling system The DIGITAL BOARD is supplied with cool air by the main fan.

Function The DIGITAL BOARD performs the following tasks:

It generates and distributes the +1.8 V; +2.5 V; +3.3 V and the +8.8 V voltages.

The FRONT MODULE (FMR) is connected to the DIGITAL BOARD via PCI BUS. Over the PCI BUS, the DIGITAL BOARD supports the download and control of the DDC, Bluetooth and the RF MODULE.

The external interfaces of the R&S® CBT are routed from the FMR via the DIGITAL BOARD to the rear side of the R&S® CBT. e.g. COM1, LPT, GPIB, Analog Monitor, USB.

The RX-IF Signal coming from the RF BOARD is converted from analog to digital on the DIGITAL BOARD.

The TX-IF Signal going to the RF BOARD is converted from digital to analog on the DIGITAL BOARD.

A CODEC which converts the Audio or Handset IN and OUT signals is also implemented on the board.

DDC Module (150)

R&S® CBT 35 (See 1153.9000.01 D page 2, items 150)

R&S® CBT 32 (See 1153.9000.01 D page 4, items 150)

Design	The DDC MODULE is fitted on the DIGITAL BOARD.
Cooling system	The DDC MODULE is supplied with cool air by the main fan.
Module function	The DDC MODULE is directly plugged onto the DIGITAL BOARD via three connectors and processes the digital data stream of the receiver. In a special ASIC chip, the I/Q shaping, the matching of the data rate and the respective filtering (bandwidth shaping) of the digital data stream are produced. Then follows a DSP with further evaluation of the digital I/Q data for measurement purposes.

Bluetooth Module (120)

R&S® CBT 35 (1153.9000.01 D page 2, item 120)

R&S® CBT 32 (1153.9000.01 D page 4, item 120)

Design	The BLUETOOTH MODULE is fitted on the DIGITAL BOARD.
Cooling system	The BLUETOOTH MODULE is supplied with cool air by the main fan. An additional heat sink mounted on the DIGITAL BOARD cools the hot IC's of the BLUETOOTH MODULE.
Module function	The BLUETOOTH MODULE executes the higher layers of the Bluetooth Protocol. The results are transferred to the FMR via PCI BUS.

RF Board (140)

R&S® CBT 35 (1153.9000.01 D page 2, item 140)

R&S® CBT 32 (1153.9000.01 D page 4, item 140)

Design	The RF BOARD has an HVC2000 design. The two aluminum covers are fastened with screws. The module is connected to the DIGITAL BOARD with two flat cables. On the front the RF IN and OUT can be connected.
Cooling system	The RF BOARD is supplied with cool air by the main fan. The two aluminum covers are used as heat sinks.
Control and Supply	The RF BOARD is controlled by the DIGITAL BOARD via one flat cable. The other flat cable of the DIGITAL BOARD supplies the voltage for the RF BOARD.
Module function	The RF BOARD converts the RF signals into IF signals. It also converts the FM or IQ signals into RF signals.

Troubleshooting

Faulty functions may sometimes originate in simple causes, but sometimes they also result from faulty components.

These troubleshooting instructions permit to trace faults down to module level and make the instrument ready for use again by means of module adjustment.

For the module adjustment and further error elimination, we recommend to sending the instrument to our authorized service (see list of addresses at the beginning of this manual).



CAUTION

Live modules must not be removed or plugged in!

Do not produce short-circuits when measuring voltages!

Note: *In the case of problems first check all connections for damage (cables, plug-and-socket connections etc.) or wrong positions.*

Troubleshooting Using the LEDs on the Fuse Board

R&S® CBT 35 (11353.9000.01 D page 2 Pos. 40)

R&S® CBT 32 (11353.9000.01 D page 4 Pos. 40)

There are five LEDs on the Fuse Board which indicate the existence of the four voltages of the power supply and the voltage of the fan.

From the top to the bottom the LEDs indicate the following:

The green LED H4 indicates the +3.3 V voltages after the fuse.

The yellow LED H3 indicates the +5 V voltages after the fuse.

The green LED H2 indicates the +12 V voltages after the fuse.

The yellow LED H1 indicates the +5 V...11.5 V voltage of the fan after the fuse.

The green LED H5 indicates the –12 V voltages after the fuse.

If one or more LEDs don't go on any more the power supply or the fuse is damaged.

Troubleshooting Using the Selftest Menu for Modules

The selftest menu indicates the diagnostic voltages for the individual modules with exactly defined settings. Thus, a specific selftest of the respective module is possible.

This menu additionally provides internal RF power measurements which are designed as RF loops with internal generator and analyzer. This is why a simple RF path is possible.

The selftest menu can be called up via the *MENU SELECT* key on the front panel of the R&S® CBT.

- Use the rotary knob and the arrow keys to select "*Basic Functions -> Base -> Maintenance*" and confirm with *ENTER*.
- Press the *Select* softkey and use the rotary knob to select a test.
- To initiate a selected test, press *ENTER*. Press the *Test* softkey and then *ON/OFF*.

Note: All key functions are also accessible by USB keyboard shortcuts; see section [Allocated Keyboard Function Keys and Shortcuts](#) on p. 3.12.

The following selftests are available:

- | | |
|--------------------------|---|
| • System Info | Shows the FIRMWARE VERSIONS of the FPGA and also the memory size |
| • System Identity | Saves all hardware and software versions into the file:
C:\identity.dat
C:\INTERNAL\LOG\version.log |
| • Continuous Selftest | Continuously reads out all voltages and temperatures of the Digital Board and the RF Board. Terminate the test with the <i>ON/OFF</i> key. |
| • System Selftest | Reads out all voltages and temperatures of the Digital Board and the RF Board. Same as <i>Continuous Selftest</i> but only one test. |
| • Internal RF Loop Test | Generates a CW Signal on 3 different frequencies. On the RF connector the signal is looped back to the TX Path. The measured value is shown in the display.
Attention: The test works only when nothing is connected to the RF IN/OUT connector. |
| • RF Board Self Test | Selftest RF BOARD for diagnostic voltages, in this case all measured values are indicated. |
| • Digital Board Selftest | Selftest DIGITAL BOARD for diagnostic voltages, in this case all measured values are indicated. |

The test results are written into a report which can be scrolled up and down after pressing the *REPORT* softkey.

The instrument displays errors detected by a test with red color and tries to eliminate them on the respective module.

Troubleshooting Using the Info Menu for Modules

The info menu can be called up via the *INFO* key on the front panel of the R&S® CBT 35 irrespective of the current measurement application. Thus, it is possible to obtain diagnostic voltages while a particular measurement application and module is active.

- Press the *Select* softkey and use the rotary knob to select a test.
- To initiate a selected test, press *ENTER*. Press the *Test* softkey and then *ON/OFF*.

Note: All key functions are also accessible by USB keyboard shortcuts; see section [Allocated Keyboard Function Keys and Shortcuts](#) on p. 3.12.

The following info menus are available:

System Info	Shows the FIRMWARE VERSIONS of the FPGA and also the memory size (same as <i>System Info</i> in <i>Maintenance</i>).
RF Board State	Selftest RF BOARD for diagnostic voltages, in this case all measured values are indicated (same as <i>RF Board Self Test</i> in <i>Maintenance</i>).
Digital Board State	Selftest DIGITAL BOARD for diagnostic voltages, in this case all measured values are indicated (same as <i>Digital Board</i> selftest in <i>Maintenance</i>).
Hardware Switches	Shows all hardware switch settings.
Logging Switches	Shows all logging switches.

The test results are written into a report which can be scrolled up and down after pressing the *REPORT* softkey.

Note: Some of the diagnostic voltages called up by the *INFO* key depend on the active measurement application. This is why they may be out of tolerance (red color) while they are not used by the selected application.

Allocated Keyboard Function Keys and Shortcuts

Softkeys and Hotkeys

To execute the softkey and hotkey functions on the R&S® CBT 32 use the following allocated keyboard function keys.

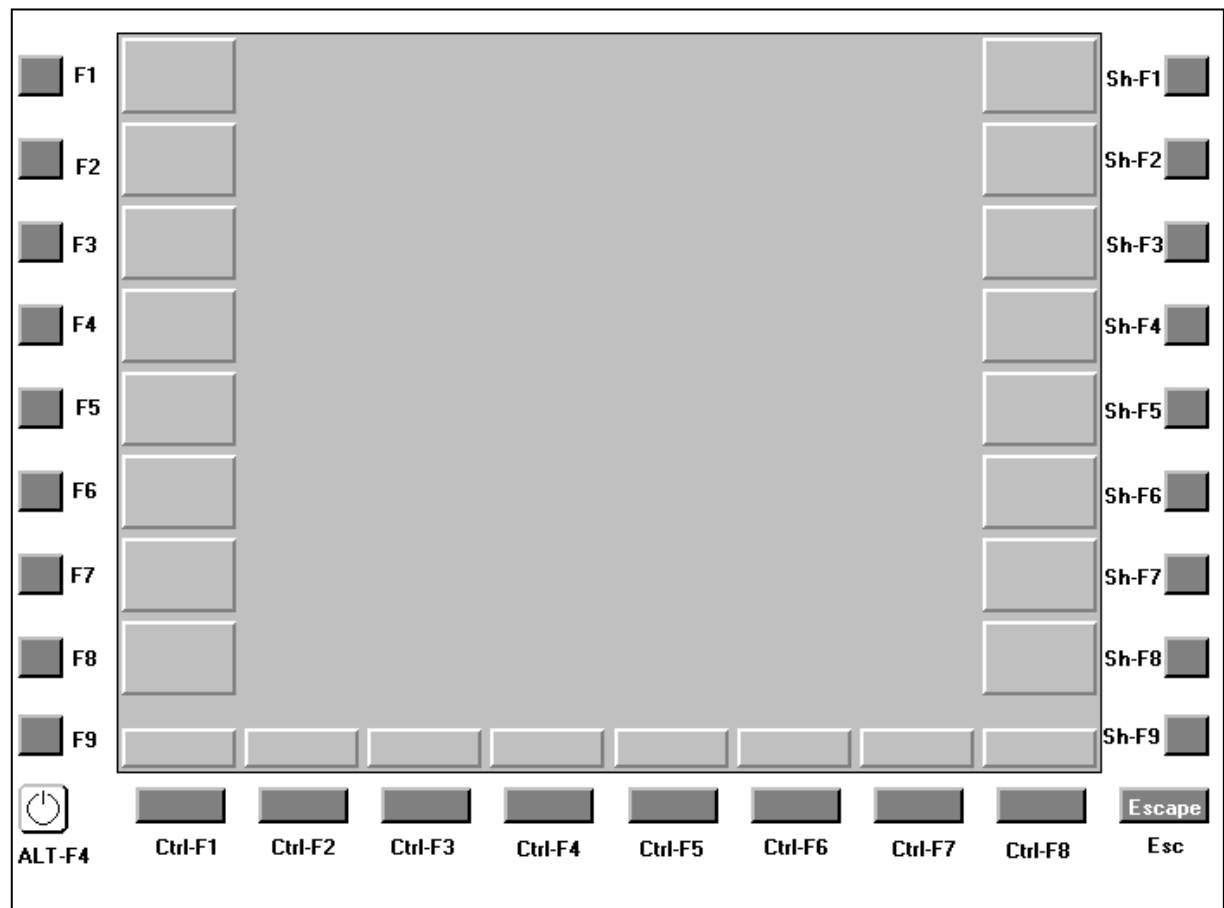


Fig. 3-2 R&S® CBT 32 hotkey and softkey functions

Front Panel Keys

To execute the front panel key functions on the R&S® CBT 32 use the following allocated keyboard shortcuts.

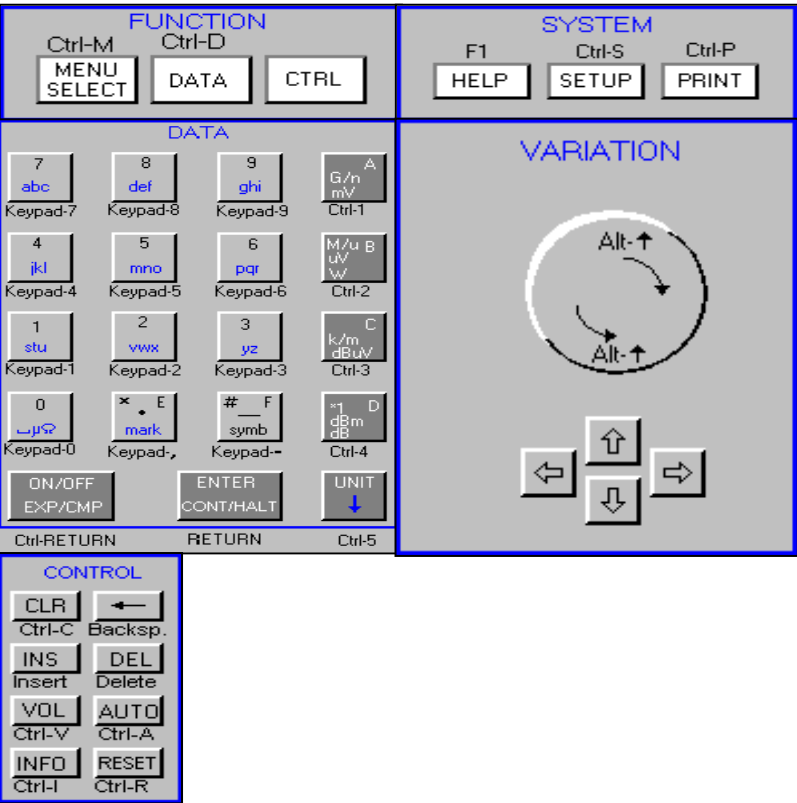
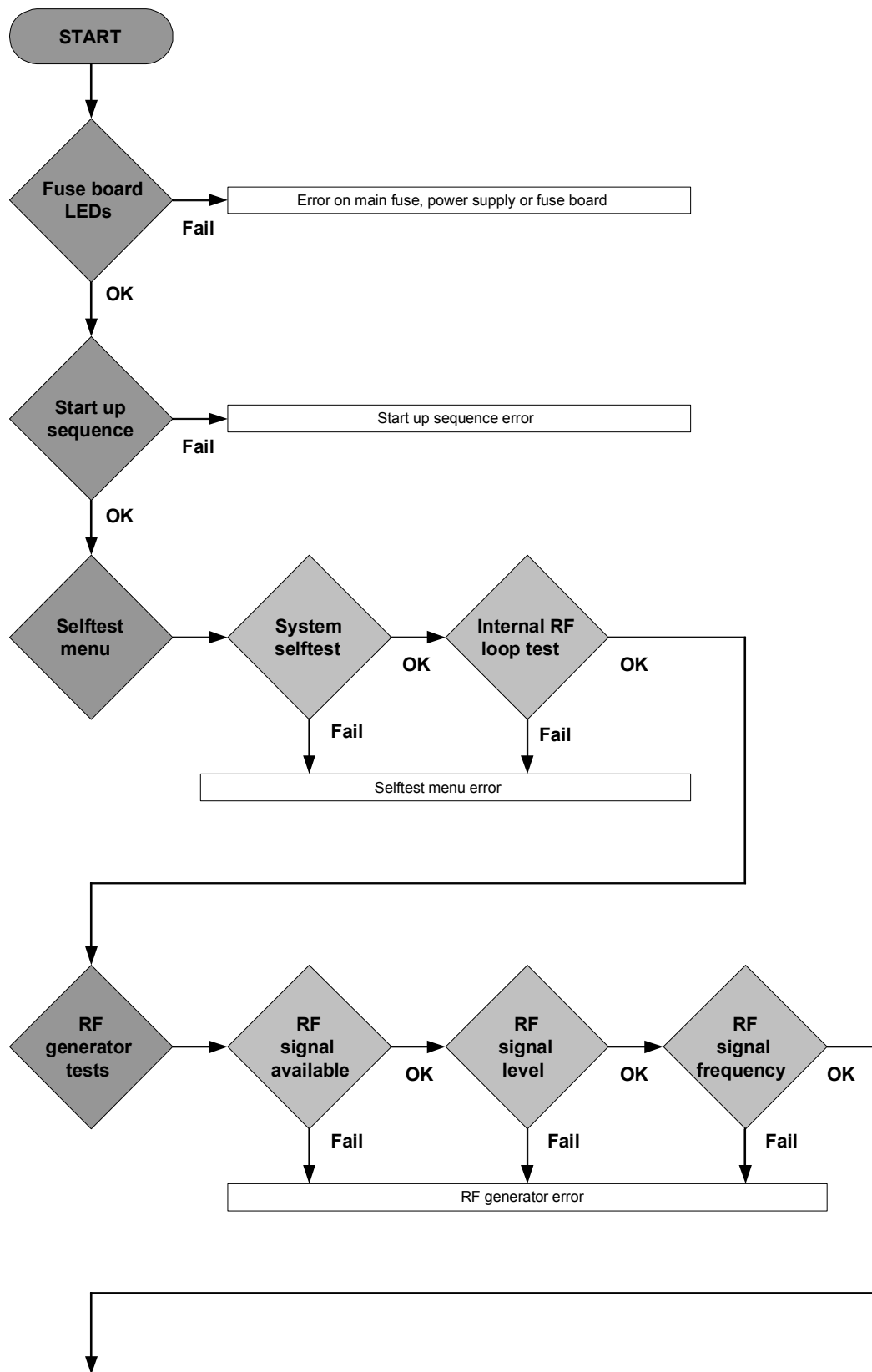
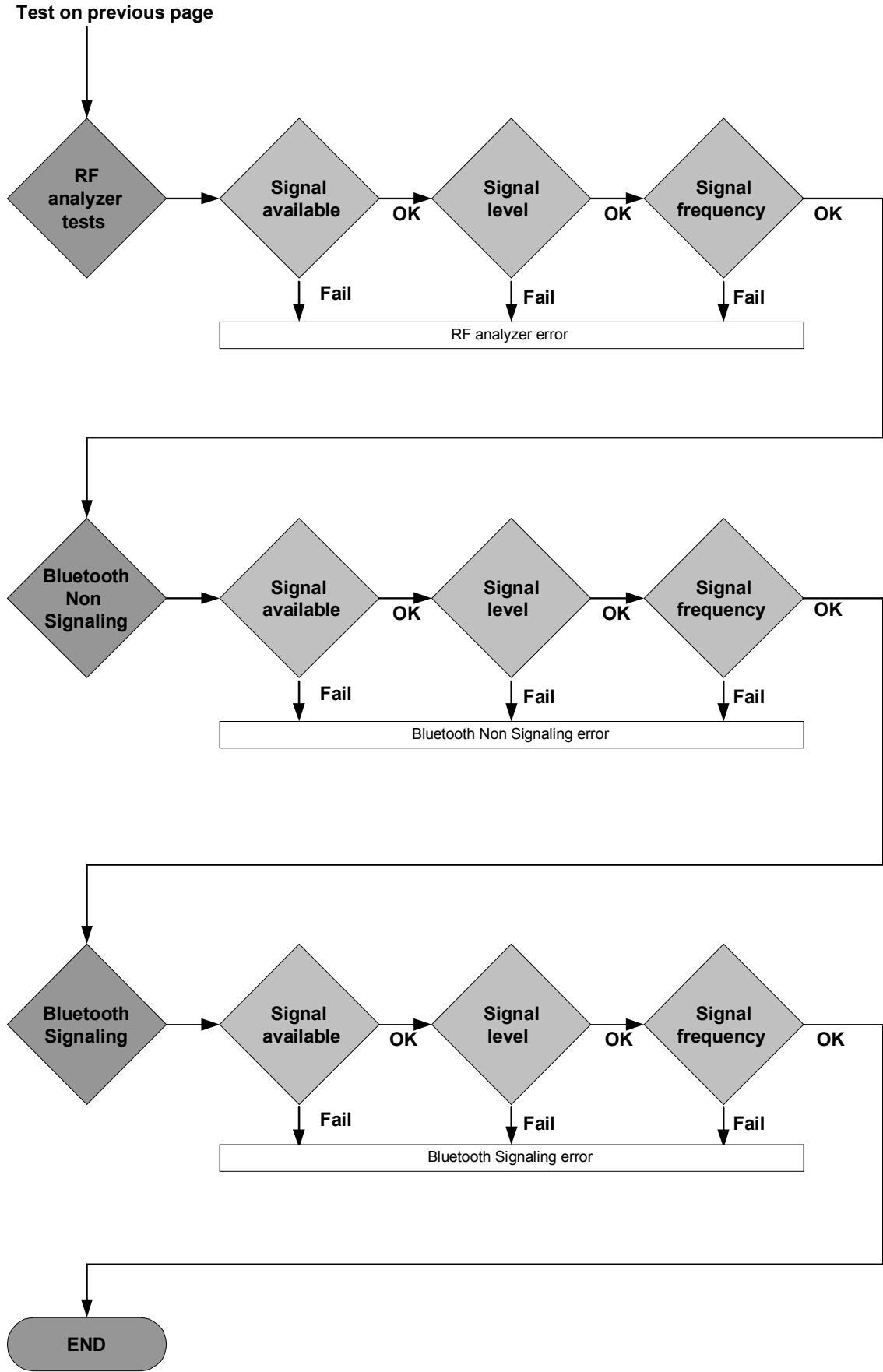


Fig. 3-3 R&S® CBT 32 front panel key functions

Troubleshooting



Test on next page



Module Replacement

DANGER

Disconnect the instrument from the mains before opening the casing. Please note the safety instructions at the beginning of this manual.

When mounting the tube take care not to damage or pull off cables.

Replacing the Front Module R&S® CBT 35 (20)

R&S® CBT 35 (1153.9000.01 D page 2, item 20)

The FRONT MODULE is plugged on the DIGITAL BOARD at the instrument front side. For replacement proceed as follows:

Opening the R&S® CBT 35 and Removing the Front Module Controller

- Switch off the instrument and pull the mains plug.
- Remove all external lines.
- Unscrew the FRONT HANDLES and remove the FRONT COVER.
- Unscrew the screws which fasten the front module controller and carefully pull out the FRONT MODULE.
- Remove the HARD DISC PROGR. CBT.

Installing the New Front Module R&S® CBT 35

- Install the new front module controller in the R&S® CBT 35 in the reverse order.

Replacing the Front Module R&S® CBT 32 (25)

R&S® CBT 32 (1153.9000.01 D page 4, item 20)

The FRONT MODULE is fitted on the board carrier in middle of the instrument. For replacement proceed as follows:

Opening the R&S® CBT 32 and Removing the Front Module

- Switch off the instrument and pull the mains plug.
- Remove all external lines.
- Unscrew the rear-panel feet and push the tube backwards and take it off.
- Remove all cables which are connected to the FRONT MODULE.
- Unscrew the FRONT MODULE and pull it carefully out.

Installing the New Front Module

- Install the new front module controller in the R&S® CBT 32 in the reverse order.

Replacing the Battery in the Front Module Controller R&S® CBT

R&S® CBT 35 (1153.9000.01 D Page 2 item 180)

R&S® CBT 32 (1153.9000.01 D Page 4 item 180)

- **Note:** R&S® CBT Bios settings will be lost when replacing the lithium battery.

The battery is mounted on the FRONT MODULE board. For replacement proceed as follows:

Opening the Unit and Removing the Front Module Controller (R&S® CBT 35)

- Switch off the instrument and pull the mains plug.
- Remove all external lines.
- Unscrew the REAR PANEL feet and remove the TUBE.
- Unscrew the FRONT HANDLES and remove the FRONT COVER.
- Unscrew the screws which fasten the front module controller and carefully pull out the FRONT MODULE.

Opening the Unit and Removing the Front Module Controller (R&S® CBT 32)

- Switch off the instrument and pull the mains plug.
- Remove all external lines.
- Unscrew the rear-panel feet and push the tube backwards and take it off.
- Remove all cables which are connected to the FRONT MODULE.
- Unscrew the Front Module and pull it carefully out.

Removing the Lithium Battery

- Place the FRONT MODULE onto a clean surface with the aluminum panel pointing downwards.
- Unscrew the four screws on the mounting plate at the top, bottom and right and carefully swing away the mounting plate towards the rear.
- Pull off the connecting cables to the LCD, DC/AC illumination converter, keyboard membrane and rotary knob.

Note: *When pulling off the connecting cables be careful with the cable connecting to the keyboard. It is a film cable which can only be disconnected after sliding up the lock of the film cable plug. Besides, be careful with the ribbon cable connecting to the rotary knob. First loosen the locking brackets of the plug.*

- Locate the lithium battery on the FRONT MODULE board.

CAUTION



Lithium batteries must not be exposed to high temperatures or fire.

Keep away from children.

If the battery is replaced improperly, there is danger of explosion. Only replace the battery by R&S type (spare part list, Current No. 180).

Lithium batteries are hazardous waste and must be disposed of in dedicated containers.

Do not short-circuit the battery!

Installing the new battery and completing the instrument

- Fit the new battery into position. Watch the polarity.
- Carefully plug the cable connectors to the controller board without reversing the polarities and replace the mounting plate in the reverse order.
- Install the FRONT MODULE in the R&S® CBT in the reverse order.
- Complete the instrument without causing damage to the cables.

Putting into Operation

- Connect the instrument to the mains.
- Connect the external keyboard to the USB.
- Switch on the R&S® CBT.
- Press the key DEL (Delete) on the external keyboard in order to access the *Setup* menu
- Choose the item LOAD CBT-DEFAULTS and press *ENTER*; quit with y and *ENTER*.
- Choose the item *Setup Standard* and set date and time. Exit with *ESC* key.
- Exit BIOS Setup with the key *ESC* and quit with y (save changes and exit) and *ENTER*.

The R&S® CBT starts the operating software automatically, it is ready for use and can be operated as usual.

Replacing the Hard Disk (30)

R&S® CBT 35 (1153.9000.01 D page 2, item 30)

R&S® CBT 32 (1153.9000.01 D page 4, item 30)

The hard disk is mounted on the rear of the FMR. For replacement proceed as follows:

Opening the Instrument and Removing the Hard Disk (R&S® CBT 35)

- Switch off the instrument and pull the mains plug.
- Remove all external lines.
- Unscrew the rear-panel feet and push the tube backwards and take it off.
- Disconnect the IDE connector from the hard disk.
- Unscrew the two screws which fasten the hard disk.
- Take off the hard disk.

Opening the Instrument and Removing the Hard Disk (R&S® CBT 32)

- Switch off the instrument and pull the mains plug.
- Remove all external lines.
- Unscrew the rear-panel feet and push the tube backwards and take it off.
- Disconnect the IDE connector from the hard disk.
- Unscrew the three screws which fasten the hard disk (torque 0.6 Nm).
- Take off the hard disk.

Installing the New Hard Disk

- Carefully fit the new hard disk, fasten with the screws.
- Connect the IDE connector.
- Complete the instrument.

Putting into Operation

- Connect the instrument to the mains and switch on.
- If necessary install new software.

Automatic Module Adjustment

- Start the R&S® CBT and press MENU SELECT when shown in the startup screen.
- Select „Firmware update after board change“.
- Restart the instrument.

Replacing the Power Supply (50)

R&S® CBT 35 (1153.9000.01 D page 2, item 50)

R&S® CBT 32 (1153.9000.01 D page 4, item 50)

Note: *The POWER SUPPLY (50) is no longer available for Service purpose and has to be replaced as follows*

- by the POWER UNIT II CBT35 (55) for R&S® CBT 35

- by POWER UNIT CBT32 (55) for R&S® CBT 32

For more details please have a look at the corresponding Service Circular

The power supply is fitted at rear of the instrument frame of the R&S® CBT 35 and on the board carrier in the R&S® CBT 32. For replacement proceed as follows:

Opening the Instrument and Removing of the complete and old Power Unit (R&S® CBT 35)

- Switch off the instrument and remove the mains plug.
- Remove all external cables.
- Unscrew the rear-panel feet and push the tube backwards and take it off.
- Remove the cable between the POWER SUPPLY from POWER UNIT CBT35 and the POWER LINE FILTER.
- Unscrew the screw at the side of the R&S® CBT frame which is fixing the AIR DIVERTER.
- Unscrew the screws at the top of the AIR DIVERTER.
- Remove the AIR DIVERTER.
- Unscrew the four FAN UNIT screws at side of the R&S® CBT frame.
- Remove the FAN UNIT carefully (the FAN UNIT is still connected to the FUSE BOARD).
- Unscrew the three POWER SUPPLY COVER screws at the rear of the R&S® CBT frame
- Unscrew the three POWER SUPPLY COVER screws at the top of the R&S® CBT frame
- Remove the old POWER UNIT 35
- Unplug the two connectors from cable W94(A) between the FUSE BOARD from POWER UNIT CBT35 and the DIGITAL BOARD. Unplug the connector from the FAN UNIT.
- Remove the old POWER UNIT CBT35
- Reassemble the new POWER UNIT II CBT35 (55) in the reverse order.
- Use the following torque for various screws
 - M3 screws: 1.0 Nm
 - M2.5 screw: 0.6 Nm

Opening the Instrument and Removing the Power Supply (R&S® CBT 32)

Note: *In case of the R&S® CBT 32 the POWER SUPPLY (50), the FUSE BOARD (40) and the POWER SUPPLY SHIELD have to be replaced by the POWER UNIT CBT32 (55).*

- Switch off the instrument and remove the mains plug!
- Remove all external cables.
- Unscrew the rear-panel feet and push the tube backwards and take it off.
- Remove the POWER SUPPLY SHIELD.
- Remove the cables between the POWER SUPPLY and the POWER LINE FILTER.
- Unplug the two connectors from cable W94(B) between the FUSE BOARD and the DIGITAL BOARD. Please unplug also the connector from the Fan-Unit which is included in cable W94(B)
- Remove the lines between the POWER SUPPLY (50) and the FUSE BOARD (40).
- Remove the FUSE BOARD.
- Unscrew the POWER SUPPLY from the MOUNTING FRAME.
- Remove the POWER SUPPLY.
- The various self-clinching standoff and the insulating foil can remain in the R&S® CBT 32. Plug the three connector from cable W94(B) to the Fuse Board from the POWER UNIT CBT32 (55).
- Connect the three cables from the Power Supply from the POWER UNIT CBT32 (55) to the correct position on POWER LINE FILTER and the protective ground wire connector. Reassemble the new POWER UNIT CBT32 (55) in the reverse order starting with the removal of the old POWER SUPPLY SHIELD.
- Use the following torque for various screws
 - M3 screws 1.0 Nm
 - M2.5 screw 0.6 Nm

Installing the New Power Supply

- Install the new POWER SUPPLY and refit the R&S® CBT in the reverse order.

Putting Into Operation

- Connect the instrument to the mains and switch on.

Replacing the FAN UNIT (160/165)

R&S® CBT 35 (1153.9000.01 D page 2, item 160)

R&S® CBT 32 (1153.9000.01 D page 4, item 165)

The fan is fitted on the right side off the R&S® CBT. For replacement proceed as follows:

Opening the Instrument and Removing the Fan (R&S® CBT 35)

- Switch off the instrument and pull the mains plug.
- Remove all external lines.
- Unscrew the rear-panel feet of the tube, push the tube backwards and take it off.
- Remove the lines between the POWER SUPPLY and the POWER LINE FILTER.
- Remove the lines between the POWER SUPPLY and the DIGITAL BOARD.
- Unscrew the screw at the side of the frame R&S® CBT which is fixing the AIR DIVERTER (torque 0.6 Nm).
- Unscrew the screws at the top of the AIR DIVERTER (torque 0.6 Nm).
- Remove the AIR DIVERTER.
- Unscrew the four FAN UNIT screws at side of the R&S® CBT frame.
- Remove the FAN UNIT.
- Unscrew the three POWER SUPPLY COVER screws at the rear of the R&S® CBT frame (torque 0.6 Nm).
- Unscrew the three POWER SUPPLY COVER screws at the top of the R&S® CBT frame (torque 0.6 Nm).
- Remove the POWER SUPPLY COVER.
- Remove lines to the fan.

Opening the Instrument and Removing the Fan (R&S® CBT 32)

- Switch off the instrument and pull the mains plug!
- Remove all external lines.
- Unscrew the rear-panel feet of the tube, push the tube backwards and take it off.
- Remove the POWER SUPPLY SHIELD.
- Remove lines to the fan.
- Unscrew the four FAN UNIT screws at side of the R&S® CBT frame.
- Remove the FAN UNIT.

Installing the New Fan and Completing the Instrument

- Replace the new fan in the reverse order.

NOTICE



Make sure that the air direction of the fan is such that air is sucked in from the right side of the R&S® CBT and pressed through the air into the R&S® CBT. Note the arrows on the fan casing.

Replacing the Digital Board (130/135)

R&S® CBT 35 (1153.9000.01 D page 2, item 130)

R&S® CBT 32 (1153.9000.01 D page 4, item 135)

The Digital Board is fitted on the bottom of the R&S® CBT 35 and on the Board Carrier of the R&S® CBT 32. For replacement proceed as follows:

Opening the Instrument and Removing the Digital Board (R&S® CBT 35)

- Switch off the instrument and pull the mains plug.
- Remove all external lines.
- Unscrew the rear-panel feet of the tube and push the tube backwards and take it off.
- Unscrew the FRONT HANDLES and remove the FRONTCOVER.
- Unscrew a countersunk screw (if present) at the front on the labeling panel next to the rotary knob (torque 0.6 Nm).
- Unscrew the screws which fasten the FRONT MODULE and carefully pull out the FRONT MODULE (torque 0.6 Nm).
- Remove the lines between the POWER SUPPLY and the DIGITAL BOARD.
- Remove the lines between the DIGITAL BOARD and the RF BOARD.
- Remove the lines between the DIGITAL BOARD and the rear side of the R&S® CBT.
- Unscrew the screws which fasten the DIGITAL BOARD to the R&S® CBT frame (torque 0.6 Nm).
- Unscrew the screws at the rear side of the R&S® CBT (GPIB, COM, LPT, USB (torque 0.6Nm), Analog Monitor).
- Remove the DIGITAL BOARD.

Opening the Instrument and Removing the Digital Board (R&S® CBT 32)

- Switch off the instrument and pull the mains plug.
- Remove all external lines.
- Unscrew the rear-panel feet of the tube and push the tube backwards and take it off.
- Remove all Cables which are connected to the FRONT MODULE.
- Unscrew the Front Module and pull it carefully out.
- Remove the lines between the POWER SUPPLY and the DIGITAL BOARD.
- Remove the lines between the DIGITAL BOARD and the RF BOARD.
- Remove the lines between the DIGITAL BOARD and the rear side of the R&S® CBT.
- Unscrew the screws which fasten the DIGITAL BOARD to the MOUNTING SHEET (torque 0.6 Nm).
- Unscrew the screws at the rear side of the R&S® CBT (GPIB, COM, LPT, USB (torque 0.6 Nm), Analog Monitor).
- Remove the DIGITAL BOARD.

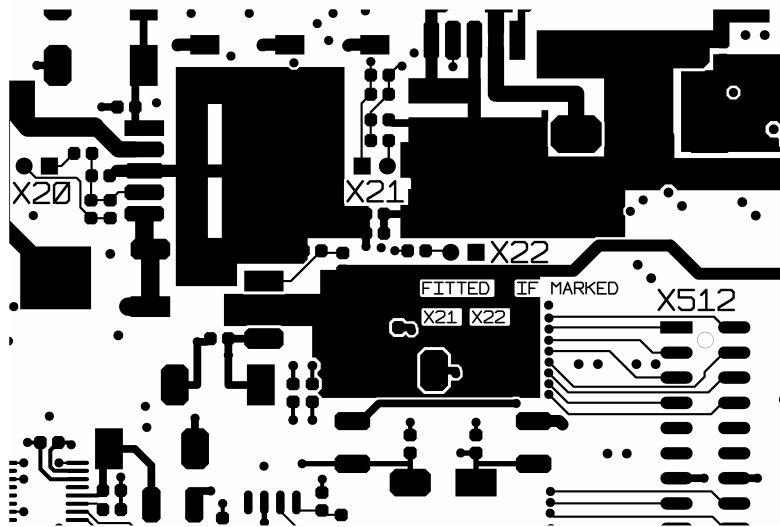
Installing the new Digital Board and Completing the Instrument

- Replace the new Digital Board in the reverse order. Do not change the position of the jumpers which can be mounted on the Digital Board.
- Complete the instrument.
- Connect the instrument to the mains and switch on.

Automatic Module Adjustment

- Start the R&S® CBT and press MENU SELECT when shown in the startup screen.
- Select „Firmware update after board change“.
- Restart the instrument.

Note: The jumpers X21 and X22 on the Digital Board are used for adjustment of the +8.8 V voltage. Do not remove any jumper or insert jumpers. If one or two jumpers are fitted the labeling is marked with an color.



Replacing the DDC Module (150)

R&S® CBT 35 (1153.9000.01 D page 2, item 150)

R&S® CBT 32 (1153.9000.01 D page 4, item 150)

The DDC Module is fitted on the Digital Board on the bottom of the R&S® CBT. For replacement proceed as follows:

Opening the Instrument and Removing the DDC Module

- Switch off the instrument and pull the mains plug.
- Remove all external lines.
- Unscrew the rear-panel feet of the tube, push the tube backwards and take it off.
- Remove in the R&S® CBT 35 the AIR DIVERTER (torque 0.6 Nm).
- Remove the DDC MODULE Heat sink (torque 0.6 Nm).
- Remove the DDC MODULE carefully.

Installing the DDC Module and Completing the Instrument

- Insert the DDC MODULE.
- Place the heat sink mat on the ICs.
- Complete the instrument in the reverse order.
- Connect the instrument to the mains and switch on.

Automatic Module Adjustment

- Start the R&S® CBT and press MENU SELECT when shown in the startup screen.
- Select „*Firmware update after board change*“.
- Restart the instrument.

Replacing the Bluetooth Module (130)

Drawing: R&S® CBT 35 (1153.9000.01 D page 2, item 130)

Drawing: R&S® CBT 32 (1153.9000.01 D page 4, item 130)

The Bluetooth Module is fitted on the Digital Board. For replacement proceed as follows:

Opening the Instrument and Removing the Bluetooth Module

- Switch off the instrument and pull the mains plug.
- Remove all external lines.
- Unscrew the rear-panel feet of the tube, push the tube backwards and take it off.
- Unscrew the BLUETOOTH MODULE screws. **Attention: (torque 0.25 Nm !!)**
- Remove the BLUETOOTH MODULE.

Installing the New Bluetooth Module and Completing the Instrument

- Replace the new BLUETOOTH MODULE in the reverse order. **Attention: (torque 0.25 Nm !!)**
- Complete the instrument.
- Connect the instrument to the mains and switch on.

Automatic Module Adjustment

- Start the R&S® CBT and press MENU SELECT when shown in the startup screen.
- Select „*Firmware update after board change*“.
- Restart the instrument.

Replacing the RF Board (140)

Drawing: R&S® CBT 35 (1153.9000.01 D page 2, item 140)

Drawing: R&S® CBT 32 (1153.9000.01 D page 4, item 140)

The RF BOARD is fitted directly to the R&S® CBT Frame. For replacement proceed as follows:

Opening the instrument and removing the RF BOARD

- Switch off the instrument and pull the mains plug.
- Remove all external lines.
- Unscrew the rear-panel feet, push the tube backwards and take it off.
- Remove the coax lines and the two flat cables to the RF BOARD.
- Unscrew the FRONT HANDLES and remove the FRONT COVER.
- Unscrew the two screws at the front bottom of the RF BOARD (torque 0.6 Nm).
- Unscrew the four screws of the RF BOARD back side panel (torque 0.6 Nm).
- Unscrew the screw on the side of the RF BOARD (torque 0.6 Nm).
- Remove the RF BOARD carefully.

Installing the new RF BOARD and Completing the Instrument

- Replace the new RF BOARD in the reverse order.
- Complete the instrument.
- Connect the instrument to the mains and switch on.

Module Adjustment with ACS

- Start the R&S® CBT and press MENU SELECT when shown in the startup screen.
- Perform function „*Firmware update after board change*“.
- Restart the instrument.
- The R&S® CBT must be completely adjusted with the ACS!

4 Software Update/Installing Options

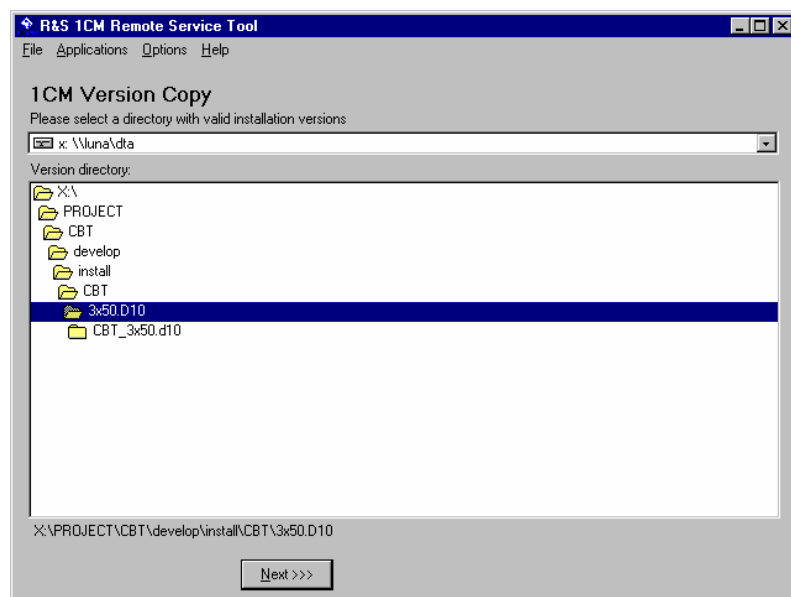
This chapter contains information on software restoration of the R&S® CBT, on handling the R&S® CBT BASE Software and Bluetooth Software.

Software Update

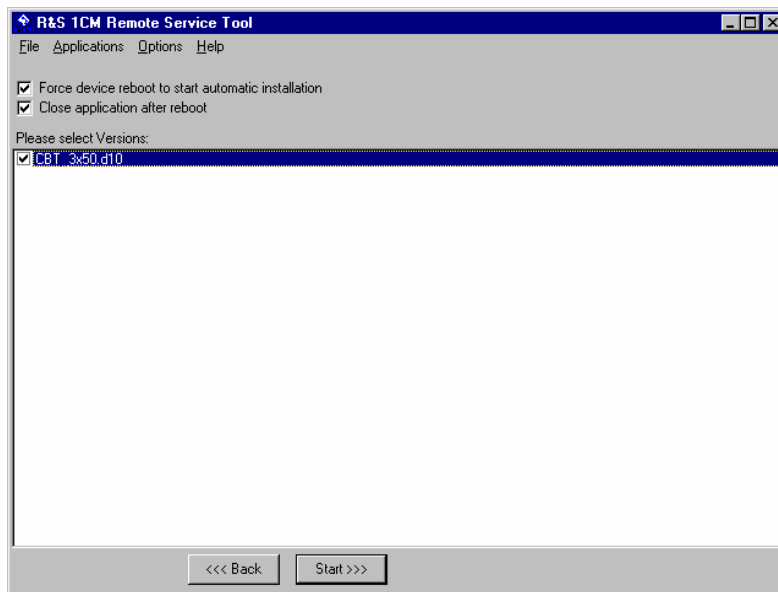
The software update is described in the release notes provided with each software update.

Software Update over GPIB or RS232

- Connect the R&S® CBT to a PC via GPIB or RS232.
- Start the *1CM Remote Service Tool* application.
- Change connection type to RS232 or GPIB, if necessary.
- Select *Application -> Version Copy*.
- Select folder with new version.



- Click *Next >>>*.



➤ Select version to be installed. And click *Start >>>*.

The software will be automatically installed.

Installing Software Options

The installation of the software options is described in the documentation provided with the software options.

Keyboard Shortcuts for the VersionManager

To control the *VersionManager* on the R&S® CBT 32 use the following allocated keyboard shortcuts.

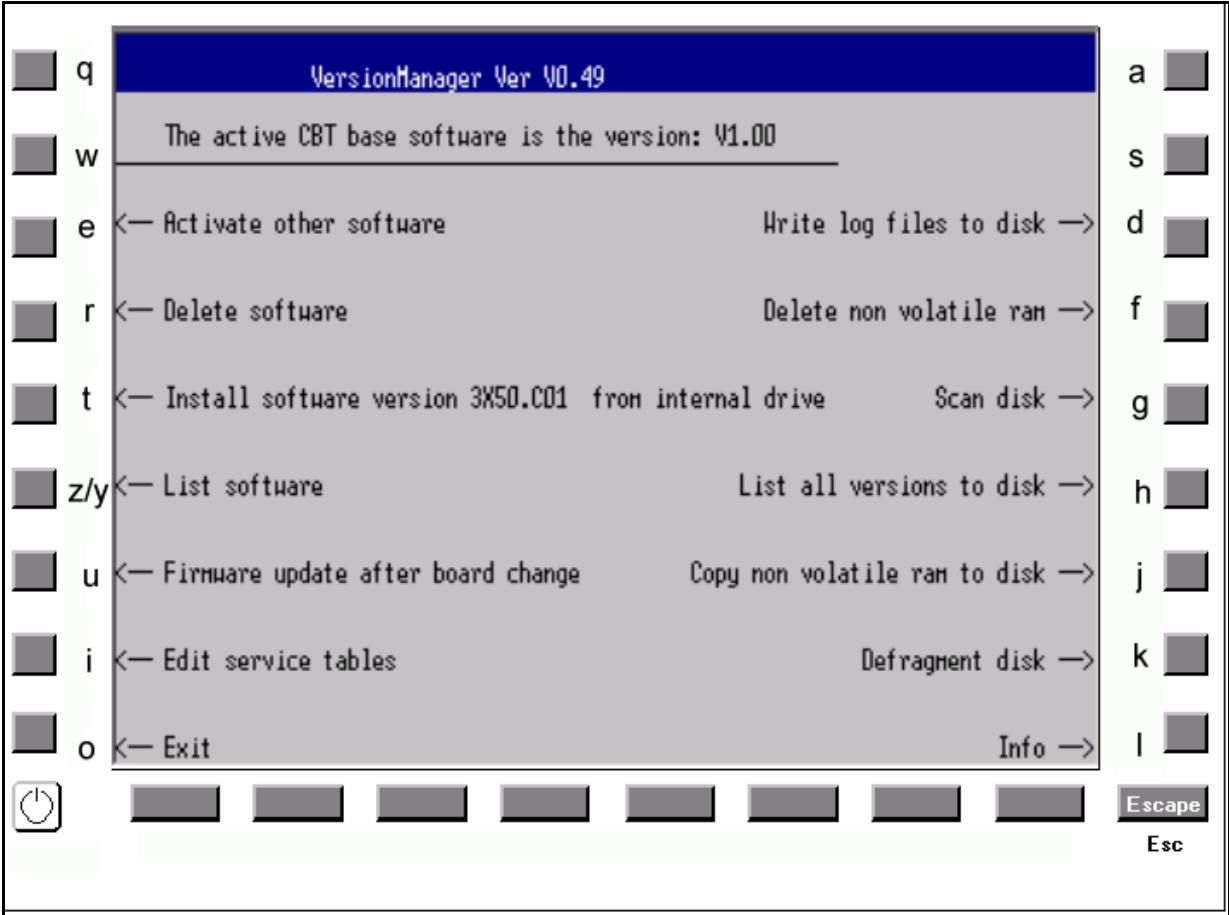


Fig. 4-4 R&S® CBT 32 VersionManager

5 Documents

This chapter contains the documents for the R&S® CBT unit. For general information about spare parts for our products please refer to the sheet "Procedure in Case of Service and Ordering of Spare Parts" at the beginning of this manual.

Spare Parts

The stock numbers necessary for ordering replacement parts and modules can be found in the component lists further down.

DANGER



Risk of shock hazard and instrument damage

When replacing a module please note the safety instructions and the repair instructions given in chapter 3 and at the beginning of this service manual

When shipping a module be careful to provide for sufficient mechanical and antistatic protection.

Available Power Cables

Table 5-2 List of power cables available

Stock No.	Earthed-contact connector	Preferably used in
DS 0006.7013.00	BS1363: 1967* 10 A 250 V complying with IEC 83: 1975 standard B2	Great Britain
DS 0006.7020.00	Type 12 , 10 A 250 V complying with SEV-regulation 1011.1059, standard sheet S 24 507	Switzerland
DS 0006.7036.00	Type 498/13 10 A 250 V complying with US-regulation UL 498, or with IEC 83	USA/Canada
DS 0041.4752.00	GB2099 , GB1002 10 A 250 V approvals CCC	China
DS 0041.6232.00	JIS C 8303 7A 125V AC approvals PSE (JET)	Japan
DS 0006.7107.00	Type SAA3 10 A, 250 V, complying with AS C112-1964 Ap.	Australia
DS 0025.2365.00	DIN 49 441, 10 A, 250 V, straight approvals VDE,ÖVE,CEBEC,KEMA,S,D,N,FI,LCIE,IMQ,UCIEE	Europe (except Switzerland)
DS 0086.4400.00	DIN 49 441, 10 A, 250 V, angular approvals VDE,ÖVE,CEBEC,KEMA,S,D,N,FI,LCIE,IMQ,UCIEE	

List of R&S® CBT (VAR 35) Spare Parts

The R&S® CBT is constructed in accordance with R&S design 2000.

Overall dimension: W x H x L, 411 mm x 193 mm x 517 mm

Rack mount: 4E 7/8 T250

Note:

- The parts listed with a Current No. can be ordered as spare parts.
- For more detail please have a look in the separate spare part list with the Material-Number 1153.9351.35
- regarding the replacement of POWER SUPPLY A900 please have a look at the corresponding Service Circular

Current No.	Designation	Stock No.	Electr. No
10	FRONTCOVER	1153.9145.00	
20	FRONT MODUL (with FMR6/2)	1090.9244.30	A100 (A)
30	HARD DISC PROGR. CBT (for FMR6)	1153.9300.00	A200
40	FUSE BOARD (for use with A900 only)	1153.9400.02	A950
50	AC/DC POWER SUPPLY (replaced by Current No. 55 - POWER UNIT II CBT35)	---	A900
55	POWER UNIT II CBT35	1154.0635.00	A965
60	POWER LINE FILTER	4015.9010.00	Z1
70	TUBE	1153.9045.00	
80	REAR PANEL FOOT	1096.2493.00	
90	INSTRUMENT FOOT	1096.2506.00	
100	HANGER	1096.2535.00	
110	INSTRUMENT FRAME	1153.9068.00	
120	BLUETOOTH MODULE (replaced by Current No. 125 - BT EDR MODULE)	---	A700
125	BT EDR MODULE	1153.9622.02	A705
130	CBT DIGITAL BOARD	1153.9500.02	A800 (A)
140	RF BOARD	1153.9700.02	A300
150	DDC MODULE	1100.2300.03	A600
160	FAN UNIT included in Current No. 110 - Instrument Frame	1153.9951.00	E1 (A)
170	FRONT HANDLE	1096.1480.00	
180	BATTERY	0858.2049.00	
	RF CABLE	1153.9851.00	W1
	RF CABLE	1153.9868.00	W2
	RF CABLE	1153.9874.00	W3
	RF CABLE	1153.9880.00	W4
	RF CABLE	1153.9897.00	W5
	RF CABLE	1153.9900.00	W6
	CABLE (for FMR6 HDD)	1091.0734.00	W11
	CABLE	1153.9816.00	W12
	CABLE	1153.9822.00	W13
	CABLE (primary: for use with A900 only)	1153.9922.00	W91
	CABLE (primary: for use with A900 only)	1161.5497.00	W92
	CABLE (secondary: for use with A900 only)	1153.9945.00	W93
	CABLE	1153.9939.00	W94 (A)

List of R&S® CBT 32 Spare Parts

The R&S® CBT is constructed in accordance with R&S design BW 2000.

Overall dimension: W x H x L, 465,3 mm x 92,5 mm x 416,8 mm

Rack mount: 2E 1/1 T350

Note:

- The parts listed with a Current No. can be ordered as spare parts.
- For more detail please have a look in the separate spare part list with the Material-Number 1153.9351.32
- regarding the replacement of POWER SUPPLY A900 please have a look at the corresponding Service Circular

Current No.	Designation	Stock No.	Electr. No
15	FRONTCOVER	1154.0235.00	
25	FRONT CONTROLLER (FMR6/5)	1091.2520.30	A100 (B)
30	HARD DISC PROGR. CBT (for FMR6)	1153.9300.00	A200
40	FUSE BOARD (for use with A900 only)	1153.9400.02	A950
50	AC/DC POWER SUPPLY (replaced by Current No. 55 - POWER UNIT CBT32)	---	A900
55	POWER UNIT CBT32	1154.0658.00	A970
60	POWER LINE FILTER	4015.9010.00	Z1
75	TUBE	1096.6753.00	
80	REAR PANEL FOOT	1096.2493.00	
90	INSTRUMENT FOOT	1096.2506.00	
105	HANGER	1096.2529.00	
115	INSTRUMENT FRAME	1154.0170.00	
120	BLUETOOTH MODULE (replaced by Current No. 125 - BT EDR MODULE)	---	A700
125	BT EDR MODULE	1153.9622.02	A705
135	CBT DIGITAL BOARD (VAR 03)	1153.9500.03	A800 (B)
140	RF BOARD	1153.9700.02	A300
150	DDC MODULE	1100.2300.03	A600
165	FAN UNIT (included in W94)	1154.0441.00	E1 (B)
175	FRONT HANDLE	1096.1468.00	
180	BATTERY	0858.2049.00	
	RF CABLE	1154.0412.00	W1
	RF CABLE	1154.0429.00	W2
	RF CABLE	1154.0387.00	W3
	RF CABLE	1154.0370.00	W4
	RF CABLE	1154.0393.00	W5
	RF CABLE	1154.0406.00	W6
	CABLE (for FMR6 HDD)	1091.0734.00	W11
	CABLE	1154.0358.00	W12
	CABLE	1154.0364.00	W13
	CABLE (primary: for use with A900 only)	1154.0464.00	W91
	CABLE (included in W91)	---	W92
	CABLE (secondary: for use with A900 only)	1153.9945.00	W93
	CABLE	1154.0458.00	W94 (B)

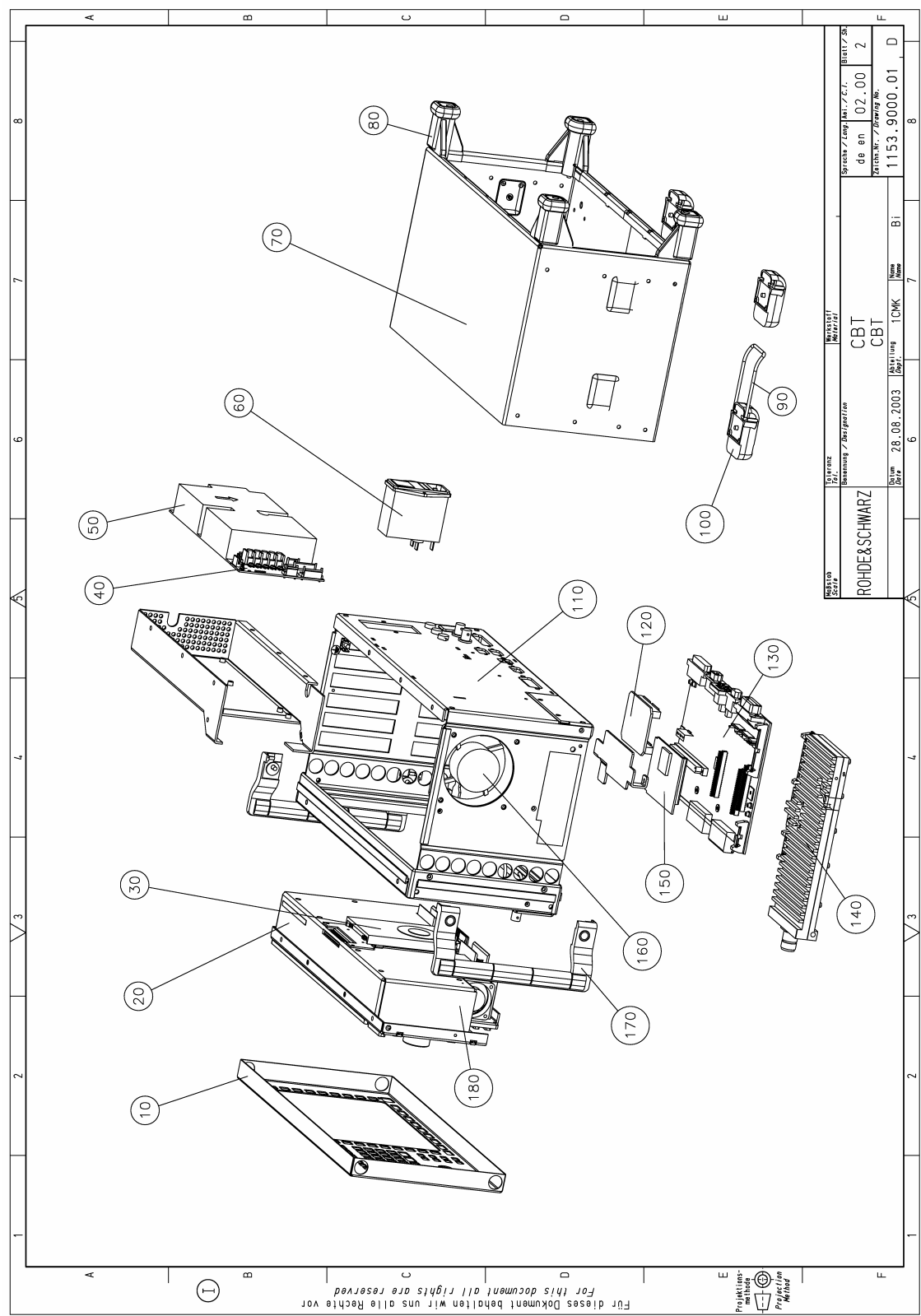


Fig. 5-1 R&S® CBT 35 modules

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