R&S®CMW
Radio Communication Tester
Service Manual

1202.3986.32 – 04

Test & Measurement

Service Manual

ROHDE&SCHWARZ

The Service Manual describes the following R&S®CMW models:

- R&S®CMW500 1201.0002K50 (without display, selection R&S®CMW-S600A)
- R&S®CMW500 1201.0002K50 (with display, selection R&S®CMW-S600B)
- R&S®CMW270 1201.0002K75 (without display, selection R&S®CMW-S600C)
- R&S®CMW270 1201.0002K75 (with display, selection R&S®CMW-S600D)

The following abbreviations are used throughout this manual:
R&S®CMW500 is abbreviated as R&S CMW500, R&S®CMW270 as R&S CMW270.

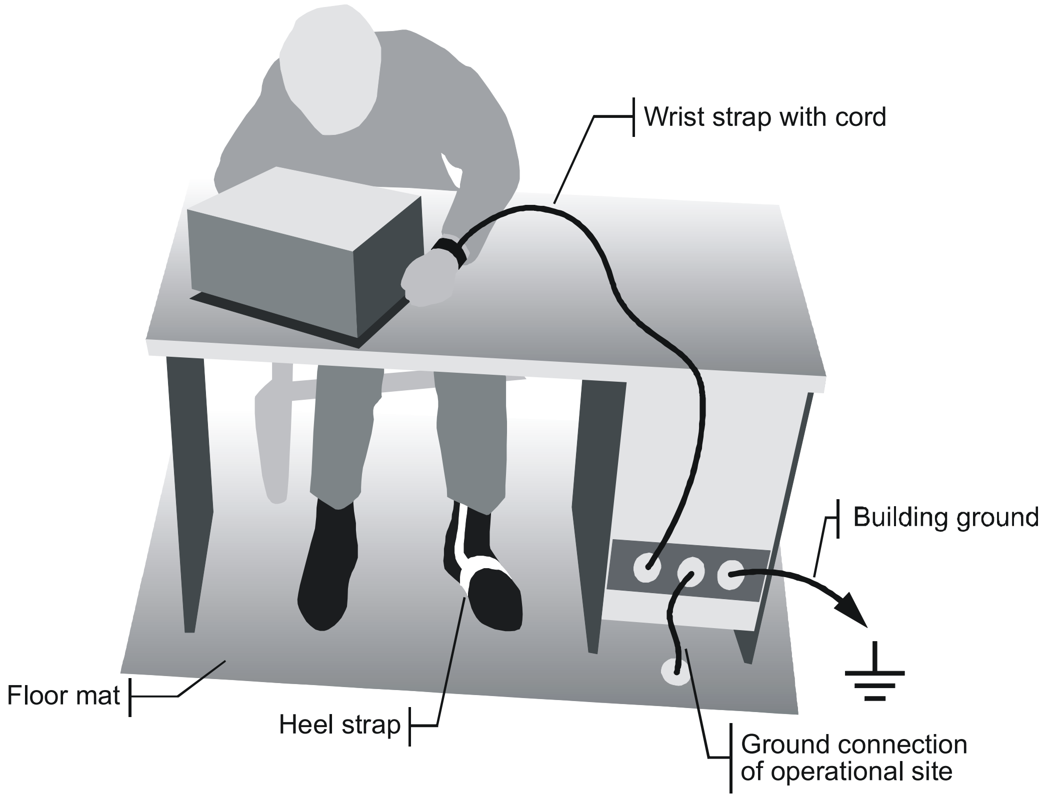
Chapter Overview

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:

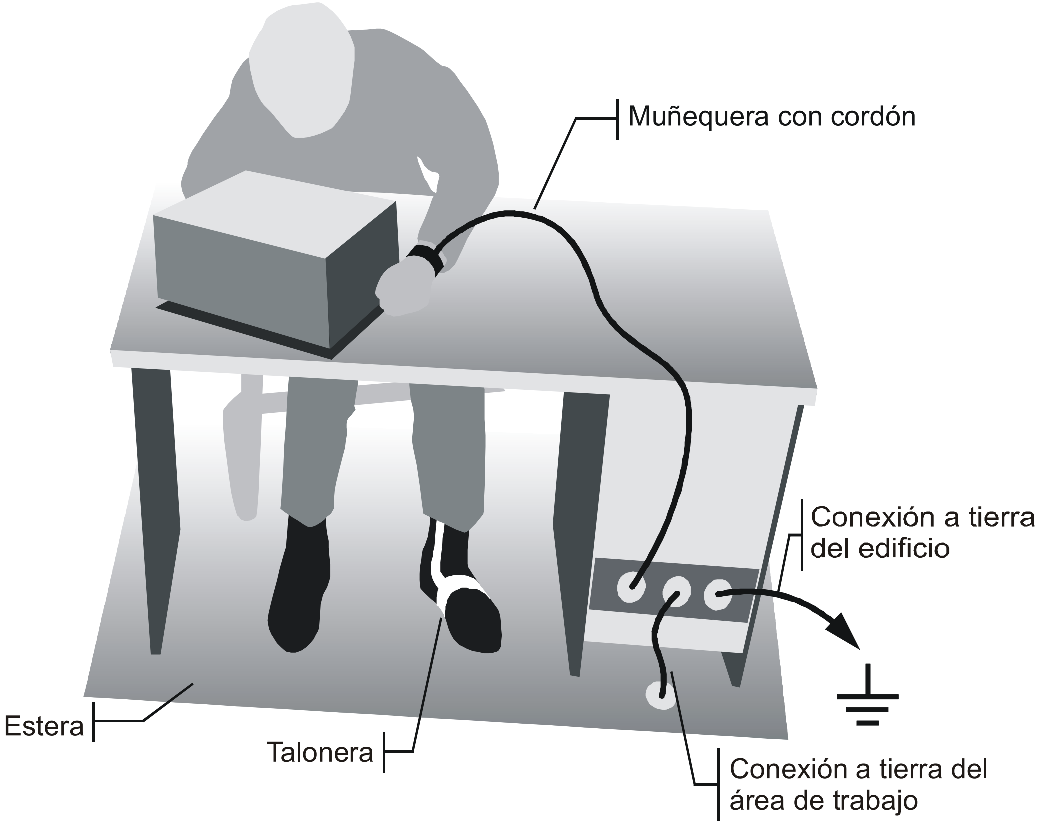
- Wrist strap with cord to ground connection
- Conductive floor mat and heel strap combination

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

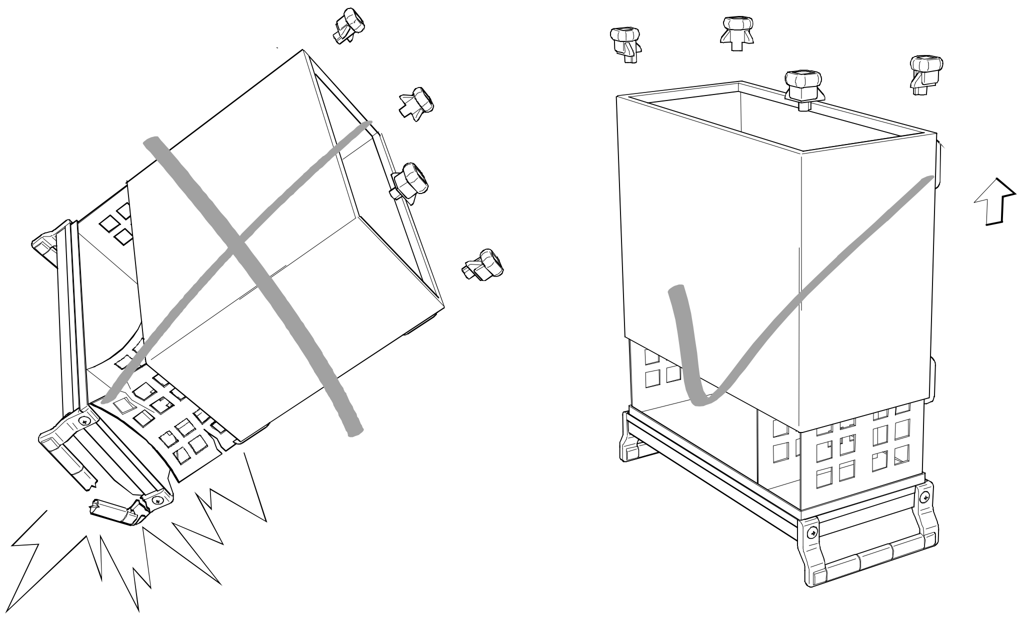
Safety Instructions for Units with Removable Cabinet

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.

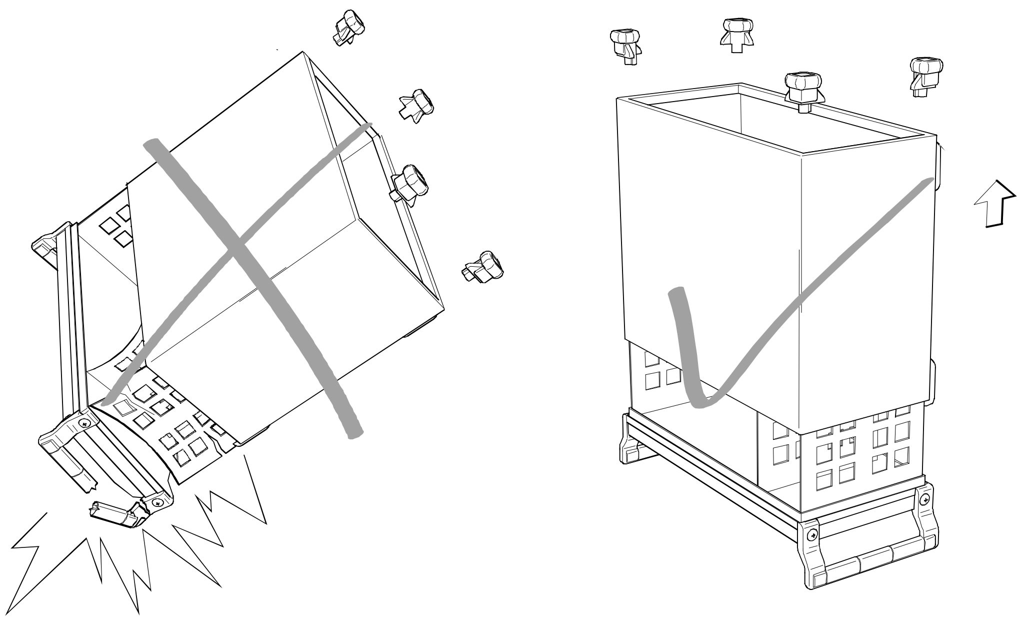
Informaciones de seguridad para aparatos con tubo de quita y pon

⚠ ADVERTENCIA

Peligro de heridas

Al sacar los piés 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 piés 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 piés de la pared posterior directamente despues de poner la caja. No muevan el aparato nunca sin que los piés 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. The list of the Rohde & Schwarz representatives is provided at the beginning of this service manual. You can find the current address of your representative on our homepage www.rohde-schwarz.com. Navigate to Service & Support / Service Locations.

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 electro-static 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)

Contents Chapter 1

1 Functional Check

This chapter provides the necessary information for checking the technical data of the R&S CMW.

The adjustment of the instrument for restoring the data integrity and the measuring equipment required for this purpose is described in chapter 2 of this Service Manual.

1.1 General

The technical data of an R&S CMW can be checked in the following way:

Calibration by an R&S Representative with a UCS Calibration System

Advantages:

- Automatic procedure
- Small measurement uncertainties
- Calibration and readjustment
- In most cases the instrument does not have to leave the country

1.2 Necessary Documents

Operating manual R&S CMW500 / R&S CMW270

Specifications R&S CMW500 / R&S CMW270

It is recommended to read the following journal on the subjects "measurement uncertainty" and "tolerance analysis":
ETSI Technical Report ETR 028, June 1997

1.3 Selftest Measurements (FC)

The R&S CMW offers various selftest options for checking the functioning and for troubleshooting. Before carrying out the functional test, the *Maintenance* menu in the *SETUP* menu (Hardkey: SETUP) should be called up and the following selftests should be performed.

Preparation:	Start user SW of the R&S CMW (switch on instrument).
Test:	Select the individual test in the SETUP (MAINTENANCE) menu and check the results.

From all tests log files will be created (D:\Rohde-Schwarz\CMW\Log\<version>\selftest\date#time_selftest_logfile.txt).

In case of errors, an error file is created in addition (D:\Rohde-Schwarz\CMW\Log\<version>\selftest\selftest _error_logfile.txt).

Unit Test: Selftest of the internal LOOPs in the unit:

RFLoop Test:

RF1COM, RF2COM

Note: due to internal remote control the testresults of this test are only created in the logfiles.

Samplebus Test:

RFCOR XXX --> BB MEAS XXXX

BB MEAS XXXX --> RFCOR XXX

All measured values are indicated with passed/failed message

To obtain more detailed information start the following selftests too:

PS_Slot:XXXX Selftest of the POWER SUPPLY H054A at SlotXXXX:

- Temperature Test

All measured values are indicated with passed/failed message.

MB_Slot:XXXX Selftest of the MOTHERBOARD H055A at SlotXXXX:

- Diagnosis Test
- EEprom Test
- Temperature Test

All measured values are indicated with passed/failed message.

SB_Slot:XXXX Selftest of the BB FIXED LINK H0550A at SlotXXXX:

- Diagnosis Test
- EEprom Test

All measured values are indicated with passed/failed message.

FE_Slot:XXXX Selftest of the RF FRONTEND(BASIC) H0590A at SlotXXXX:

- Diagnosis Test
- EEprom Test
- Temperature Test

All measured values are indicated with passed/failed message.

BB MEAS_Slot: XXXX

Selftest of the BB MEASUREMENT H0100A: at SlotXXXX

- Diagnosis Test
- Download Test
- EEprom Test
- RAM Test
- Temperature Test

All measured values are indicated with passed/failed message.

BB GEN_Slot: XXXX

Selftest of the BB GENERATOR H0110A at SlotXXXX

- Detailed Test
- Diagnosis Test
- Download Test
- EEprom Test
- RAM Test
- Temperature Test

All measured values are indicated with passed/failed message.

COR_Slot:XXXX

Selftest of the COR MODULE of TRX H0570A at SlotXXXX:

- Diagnosis Test
- Download Test
- EEprom Test
- RAM Test
- Temperature Test

All measured values are indicated with passed/failed message.

RX_Slot:XXXX

Selftest of the RX MODULE of TRX H0570A at SlotXXXX:

- Diagnosis Test
- EEprom Test

- Temperature Test

All measured values are indicated with passed/failed message.

TX_Slot:XXXX — Selftest of the TX MODULE of TRX H0570A at SlotXXXX:

- Diagnosis Test
- EEprom Test
- Temperature Test

All measured values are indicated with passed/failed message.

REF_Slot:XXXX — Selftest of the REFERENCE H090A at SlotXXXX:

- Diagnosis Test
- EEprom Test
- Temperature Test

All measured values are indicated with passed/failed message.

OCXO_Slot:XXXX — Selftest of the OCXO (STANDARD) H0690A or OCXO (HIGHSTABLE) H0690B:

- Diagnosis Test
- EEprom Test

All measured values are indicated with passed/failed message.

Contents Chapter 2

2 Adjustment

This chapter describes the manual adjustment of reference sources, the software-controlled adjustment of individual module data and the firmware update of programmable devices after module replacement and/or software update.

The manual adjustment of the 10 MHz reference frequency source which determines the frequency accuracy of the R&S CMW is described. The adjustment permits to maintain and restore the data integrity of the instrument.

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

The manual adjustments at the service can be done automatically with the UCS measuring system, in the adjustment menu item: Frequency Accuracy TX, or also manually with the help of a frequency counter.

After software-controlled adjustment (softkey *Firmware Update* in startup dialog) has been performed, the R&S CMW is ready for use and offers full data integrity except for the level accuracy in case of module replacement of RF TRX or RF Frontend. In order to attain the level accuracy specified in the Specifications, it is necessary to record the path error data. To this end, the R&S CMW must be tested using the path error recording system (see Chapter 1, “Calibration by an R&S Representative”).

2.1 Manual Adjustment

In the following, the measuring instruments and auxiliary means required for the manual adjustment of the R&S CMW, the appropriate preparations of the instrument as well as the individual adjustments will be explained.

2.1.1 Measuring Instruments and Auxiliary Equipment

Item	Type of instrument	Required characteristics	Appropriate device	R&S order number
	Spectrum analyzer with frequency counter	Frequency measurement up to 1 GHz	R&S FSQ3	1155.5001.03

Table 2-1 Measuring instruments and auxiliary equipment for manual adjustment of the R&S CMW

2.1.2 Preparing the Instrument

It is not necessary to open the complete tube of the R&S CMW. The adjustment can be made from outside through the ventilation holes using a small screwdriver (see chapter 5).

1. Locate the adjustment devices (see chapter 5).

2.1.3 Adjusting the 10 MHz Reference Frequency

Preparation: The measurement can be performed either at connector REF OUT1 (rear of R&S CMW) at 10 MHz or at connector RF1 OUT (front) at 1 GHz using a frequency counter.

1. For the measurement at connector RF1 OUT set the generator to 1 GHz and 8 dBm without modulation in the RF menu.
2. For the adjustment, the R&S CMW must be set to internal reference source. This setting is to be selected in the *Setup* menu of the respective application.

Note: *The measurement at 1 GHz can be performed with a lower frequency counter resolution (1 Hz) in order to achieve a faster adjustment.*

2.1.3.1 TCXO

Adjustment: Use potentiometer R400 on the REFERENCE BOARD to adjust the measured value at the frequency counter to

10.000 000 0 MHz ± 0.5 Hz (at REF OUT1) or

1.000 000 000 GHz ± 50 Hz (at RF3 OUT).

Note: *This adjustment is only required if none of the options R&S CMW-B690A or B690B is installed.*

2.1.3.2 Basic OCXO R&S CMW-B690A

(if the option is installed)

Adjustment: Use potentiometer R23 on the OCXO BOARD to adjust the measured value at the frequency counter to

10.000 000 00 MHz –0.1/ +0.05 Hz (at REF OUT1) or

1.000 000 000 GHz –10 Hz/ +5 Hz (at RF1 OUT)

(a lead of at least –2 to –5 Hz at 1 GHz is desired because of aging).

Note: *The R&S CMW must have been switched on for at least 10 minutes so that the OCXO has warmed up.*

If it is not possible to adjust the frequency into this range then R28 and R29 are to be rescaled. This is done the following way.

1. Use for measurement the R&S CMW output RF1 OUT.
2. Adjust R23 to Minimum frequency.
3. Measure and record the frequency (Fmin) and the OCXO_VCtrl voltage (Vmin). The OCXO_VCtrl voltage can be measured with the Maintenance selftest system in the unit.
4. Adjust R23 to Maximum frequency.

5. Measure and record the frequency (Fmax) and the OCXO_VCtrl voltage (Vmax).
6. Find R28 and R29 by using the formula below.
7. Replace R28 and R29 with the new values.
8. Let the instrument warm up again and adjust R23.

For R&S CMW-B690A the formula are as follows

Fd = (Fmax - Fmin)/(Vmax - Vmin) Hz/V

K = Fd/FGen*1E6 ppm   (FGen = 1.0 GHz = generator frequency at RF1 OUT)

If 0,05 < K <= 0,83 Table = 1

If 0,83 < K <= 1,16 Table = 2

If 1,16 < K <= 1,50 Table = 3

Fo = Fmin + Fd*(2,5 - Vmin)

Offset = Fo - FGen

If 750 < Offset   Table Offset = 1000

If 250 < Offset <=   750   Table Offset = 500

If -250 < Offset <=   250   Table Offset = 0

If -250 < Offset <= - 750   Table Offset = -500

If   Offset <   - 750   Table Offset = -1000

Ex.

Vmin = 2,000V, Fmin =   999999999,3 Hz

Vmax = 3,000V, Fmax = 1000001064,4 Hz

Fd = (1000001064,4 - 999999999,3) / (3,000 - 2,000)

Fd = 1065 Hz/V

K = 1065/1000000000*1E6 = 1,06

-> Table 2 is to be used.

Fo = 999999999,3 + 1065*(2,5 - 2,000) = 1000000531.8

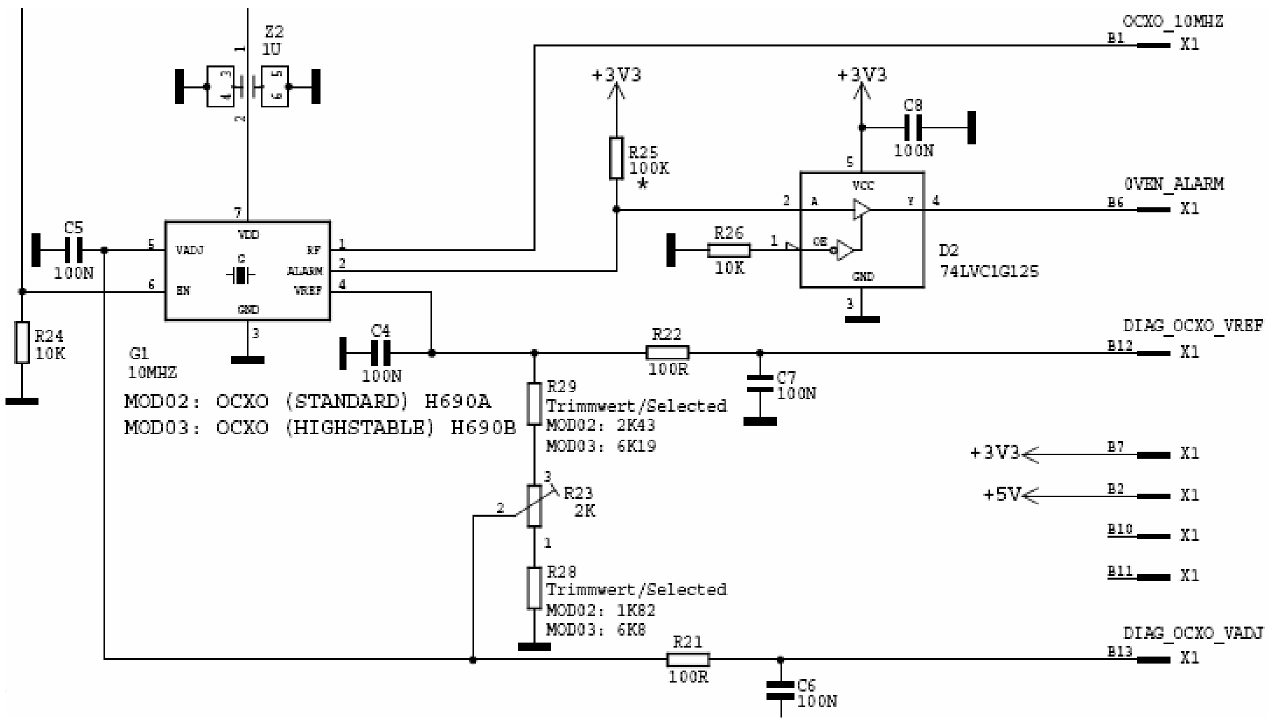
Offset = 1000000531.8 - 1000000000 = 531,8

Offset Table 500 is to be used

Result: R28 = 2K43 and R29 = 5K05

	1		2		3	
Offset	R29	R28	R29	R28	R29	R28
1000	4K32	0	5K62	1K5	6K8	3K3
500	3K57	825	5K05	2K43	6K19	4K32
0	2K43	1K82	3K92	3K57	5K11	5K6
-500	1K82	3K01	3K01	4K7	4K32	6K8
-1000	698	4K02	2K0	5K62	3K3	8K25

R&S CMW-B690A Table



R&S CMW-B690A, part of circuit diagram

2.1.3.3 HIGHLY STABLE OCXO R&S CMW-B690B

(if the option is installed)

Adjustment: Use potentiometer R23 on the OCXO BOARD to adjust the measured value at the frequency counter to

10.000 000 00 MHz –0.03/ +0.02 Hz or (at REFOUT1) or

1.000 000 000 GHz –3 Hz/ +2 Hz (at RF1 OUT)

(a lead of at least –2 to –3 Hz at 1 GHz is desired because of aging).

Notes: *The R&S CMW must have been switched on for at least 10 minutes so that the OCXO has warmed up.*

During the adjustment, operate the R&S CMW in the horizontal position!

If it is not possible to adjust the frequency into this range then R28 and R29 are to be rescaled. This is done the following way.

1. Use for measurement the R&S CMW output RF1 OUT.
2. Adjust R23 to Minimum frequency.
3. Measure and record the frequency (Fmin) and the OCXO_VCtrl voltage (Vmin). The OCXO_VCtrl voltage can be measured with the Maintenance selftest system in the unit.
4. Adjust R23 to Maximum frequency.
5. Measure and record the frequency (Fmax) and the OCXO_VCtrl voltage (Vmax).
6. Find R28 and R29 by using the formula below.
7. Replace R28 and R29 with the new values.
8. Let the instrument warm up again and adjust R23.

For R&S CMW-B690B the formula are as follows.

For example see above.

Fd = (Fmax - Fmin)/(Vmax - Vmin) Hz/V

K = Fd/FGen*1E6 ppm (FGen = 1.0 GHz = generator frequency at RF1 OUT)

If 0,20 < K <= 0,33 Table = 1

If 0,33 < K <= 0,46 Table = 2

If 0,46 < K <= 0,60 Table = 3

Fo = Fmin + Fd*(2,5 - Vmin)

Offset = Fo - FGen

If 250	< Offset	Table Offset = 333
If 83	< Offset <= 250	Table Offset = 167
If -83	< Offset <= 83	Table Offset = 0
If -250	< Offset <= -83	Table Offset = -167
If	Offset <= - 250	Table Offset = -333

	1		2		3	
Offset	R29	R28	R29	R28	R29	R28
333	5K11	499	6K8	2K43	8K25	4K7
167	4K02	1K5	5K62	3K57	6K8	6K19
0	3K16	2K43	4K7	4K7	6K19	6K8
-167	2K2	3K57	3K92	6K19	5K11	8K25
-333	1K21	4K7	2K8	6K8	4K32	10K

R&S CMW-B690B Table

2.2 Automatic Adjustment of Module Data and Firmware Update of Programmable Devices

In order to match the corresponding firmware versions of programmable devices to the current unit software and in order to match the data stored in EEPROMs on the respective modules to the complete instrument, a Firmware update and automatic adjustment of module data is always necessary after replacing a module.

In addition to some standard information such as module name, serial number, hardware status and date of manufacture, these stored data items contain important pieces of information within value tables from module pre-testing, e.g. frequency responses for module error data.

This information permits to make the complete instrument ready for operation again (see also chapter 1, “Calibration by an R&S Representative”).

In the following, the preparations and the procedure of the automatic module data adjustment and Firmware update is explained.

2.2.1 Preparing the Adjustment

Replacement of module(s):

1. Replace the faulty module(s) (see chapter 3, “Module Replacement”).
2. Close the R&S CMW casing (see chapter 3, “Module Replacement”).
3. Connect the R&S CMW to the mains and switch on.

2.2.2 Performing the Adjustment

Starting the R&S CMW:

1. Note the startup menu in the display.
2. The display includes the softkey *Firmware Update*.

Procedure:

3. Press the *Firmware Update* softkey.
   The automatic adjustment of module data is started under software control.

It may take a few minutes to additionally perform firmware updates for programmable devices.

After the adjustment has been terminated, the R&S CMW performs a reboot. Afterwards the operating software starts and the R&S CMW is ready for use and can be operated in the usual way.

If no firmware update for programmable devices is necessary, the R&S CMW starts the operating software directly without reboot.

Contents Chapter 3

3 Repair

This chapter describes the design and the functional description of the R&S CMW, including simple measures for repair and troubleshooting. Also the replacement of modules will be described in this chapter. For troubleshooting and diagnosis, a maintenance menu is available, which permits to poll diagnostic voltages of the modules and to indicate limit violations.

The installation of options and software updates is explained in chapter 4 of this manual.

3.1 Instrument Design and Function Description

For a detailed overview of the R&S CMW instrument design refer to the block diagram below (and to the exploded views in chapter 5). The following functional description of the instrument refers to the block diagram.

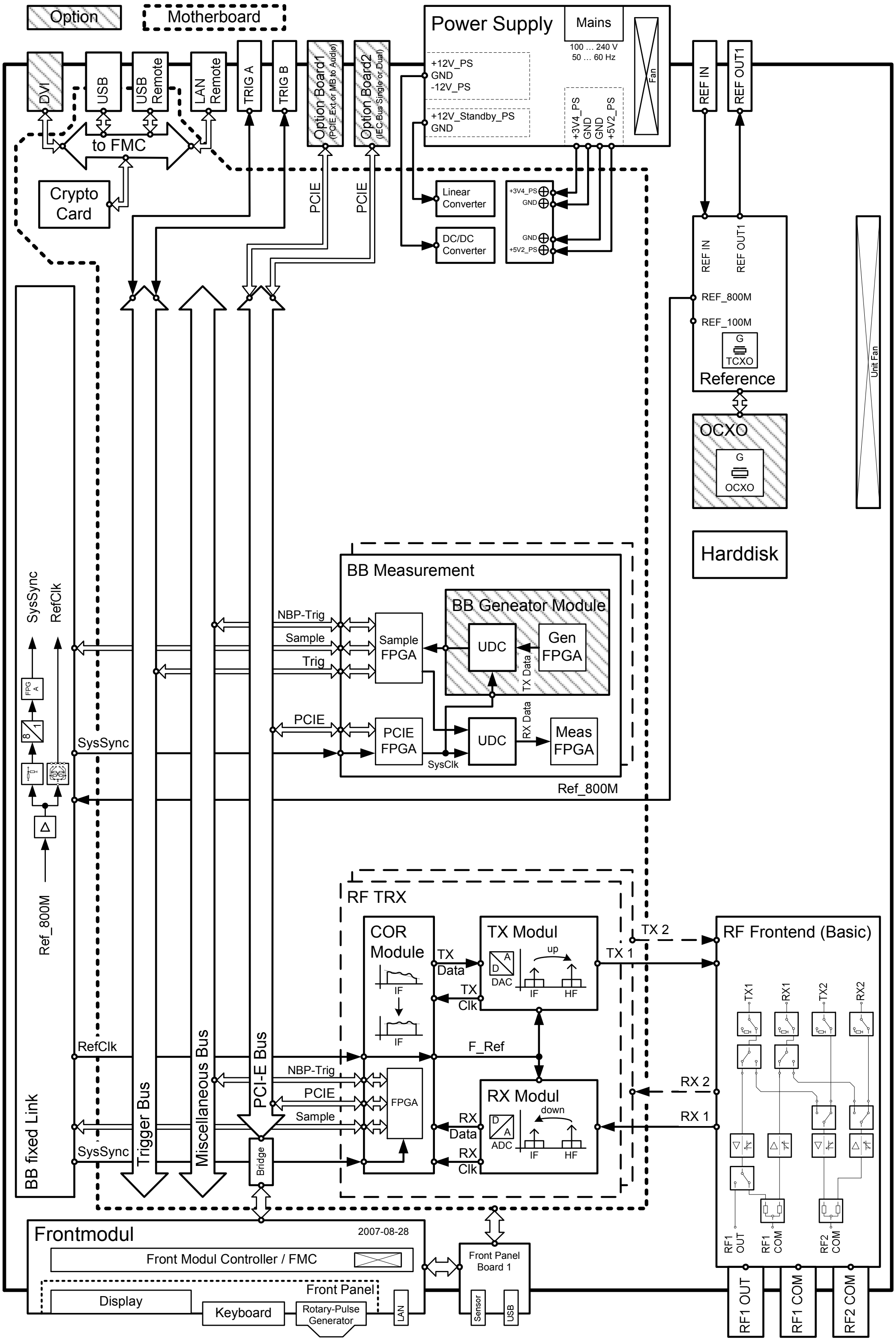
Cabinet design
The casing of the R&S CMW is a robust, gray-blue Rohde & Schwarz standard casing according to BW 2000.
It consists of a frame with integrated rear panel and a labeling panel at the front. The frame is covered by a one-piece tube and screwed with four rear-panel feet. Two front handles are screwed to the frame and one additional handle on the left side is screwed to the one-piece tube.

The dimensions are as follows:
Overall (W x H x L): 465.1 mm x 197.3 mm x 517 mm
Rackmount: 19” 1/1, 4HU, 450

Note:

- *The terms "left" and "right" in the manual always refer to the front view of the instrument.*
- *All the Item-No. in the manual refer to the Spare Parts List of the R&S CMW in chapter 5.*

3.1.1 Block Diagram



3.1.2 Instrument Frame

The instrument frame (Item-No. 100) consists of front frame, module support, partition, cage and air duct. The module support is screwed to the front frame. It incorporates the partition, the cage and the air duct and provides all mechanical connectors and slots for modules. The Motherboard for electrical connection of the modules as well as the fan unit (Item-No. 110) for cooling the modules are screwed to the instrument frame.

3.1.3 Rear of Instrument Frame

At the rear of the R&S CMW, several external connectors of the Front Module Controller, additional electrical connectors and the Power Supply Unit are fitted. Unused openings reserved for optional connectors are covered by steel sheet pieces.

Below the standard connectors are listed. Additional optional connectors may be installed.

External connectors of the Front Module Controller
The following rear connectors are connected to the Front Module Controller, either directly or via the Motherboard.

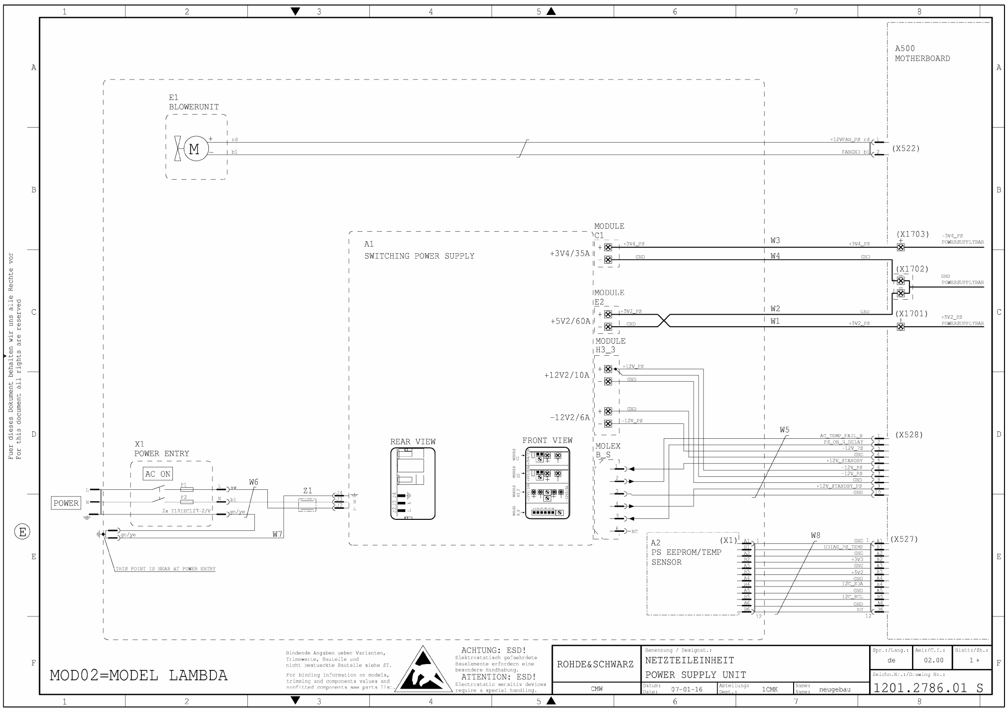
USB Remote:	USB-Device Socket Type B for Remote Control (USB 2.0)
USB (2x):	USB-Host Socket Type A • Connector Top USB 1.1 • Connector Bottom USB 2.0
LAN Remote:	1000MBit/s

Other electrical connectors

TRIG A:	IN or OUTPUT depending on application
TRIG B:	IN or OUTPUT depending on application
REF IN:	Reference Signal Input Frequency 1MHz to 80MHz sine and squarewave 0.5 to 2Vrms Input voltage 50 Ω Input resistance
REF OUT 1:	Reference Signal Output Frequency 10MHz from internal reference or frequency at REF IN >1.4Vpeak-peak Output voltage 50 Ω Output resistance

3.1.4 Power Supply Unit CMW-H054A (Item-No. 600)

The Power Supply Unit (Var02) of the R&S CMW consists of an aluminum case with the Power Entry, Switching Power Supply and Blower Unit. Also the EEPROM/Temp Sensor unit is included.



3.1.4.1 Power Entry

- with additional shielding
- IEC power line connector
- Power switch (double pole single throw)
- Primary power supply
  - 100 to 240V (AC)
  - 50 to 60Hz
- Double fuse holder
  - Time-lag Fuse T10 / IEC 60127-2 (Item No. 610)
- the mains cable W6 is two times feed through the axial ferrite bend Z1

3.1.4.2 Switching Power Supply (Var02)

Overview function of the Primary Side

The mains is fed to a power factor correction (PFC) circuit via an input filter. The Power factor correction (boost converter) reduces the harmonic distortion of the mains supply. Current is drawn sinusoidally, rather than in a sudden burst at the peak of each mains cycle as it would be if simple rectification was used. The boost converter and bulk capacitors provide rectified and smoothed DC to the forward converter. The forward converter chops the DC at 200kHz using a power switching device controlled by a Pulse width modulator. The waveform is then applied to the primary of a transformer. The primary converter is protected against current limit and has thermal protection.

Overview function of the Secondary Side

The secondary of each module fits within the primary windings of the forward converter transformer. Each output module rectifies, smoothes the secondary waveform and regulates the voltage using a Magnetic-Amplifier (saturable reactor). Smooth, stable, safety isolated, DC voltage at the required current level is thus provided.
The modules monitor their output current via a current transformer and in event of current exceeding a set point keep the current to a safe level via the control circuit. The modules also monitor their output voltage level and in event of an overvoltage being detected feed the information to the primary converter which is shut down

Standby Voltage

- This is available for powering auxiliary circuits and is present when AC input is applied regardless of enable state (PS_ON_N_DELAY) of the PSU outputs.
- The availability indication of this standby voltage is possible with the LED H302 on the Motherboard
- +12V_Standby_PS from Molex B_S Pin 4 via connection cable W5 to Pin 9 of X528 on Motherboard
- GND of +12V_Standby_PS from Molex B_S Pin 3 via connection cable W5 to Pin 10 of X528 on Motherboard

Overtemperature protection or indication of primary power supply

- This provides an opto-isolated output which provides a short warning before loss of output power due to either loss of AC input or overtemperature of the converter.
- AC_TEMP_FAIL_N from Molex B_S Pin 2 via connection cable W5 to Pin 1 of X528 on Motherboard
- +12V_STANDBY is used to supply the control circuit from Pin 5 of X528 on Motherboard via connection cable W5 to Molex B_S Pin 1.
- OK State:
  The signal is equal to „+12V_Standby_PS“

- Fail State
  The open emitter output is tied via pull down resistors on the Motherboard to ground and the Output Voltages switched off

State of the Output Voltages

- The State of the Output Voltages of the PSU can be switched with the PS_ON_N_DELAY control signal from Pin 2 of X528 on the Motherboard via connection cable W5 to Molex B_S Pin 5
- PS_ON_N_DELAY is generated with a small delay from the PS_ON_N Signal from the Front Module Controller (FMC).
  The PS_ON_N Signal depends on the operating key „STANDBY/ON“ on the front of the instrument frame and the settings in the FMC BIOS.
- Output Voltage ON:
  The signal PS_ON_N_DELAY and PS_ON_N are logic Low
- Output Voltage OFF:
  The signal PS_ON_N_DELAY and PS_ON_N are logic High

Output Voltages to the Powersupply Bars on the Motherboard (MB)

- The availability indication of these voltages is possible with LEDs on the Motherboard
- +3V4_PS (typ. +3,4V/35A) from Module C1 via connection cable W3 to X1703 (Powersupply Bar) on Motherboard
  LED H300 on Motherboard
- GND of +3V4_ from Module C1 via connection cable W4 to X1702 (Powersupply Bar) on Motherboard
- +5V2_PS (typ. +5,2V/60A) from Module E2 via connection cable W1 to X1701 (Powersupply Bar) on Motherboard)
  LED H301 on Motherboard
- GND of +5V2_PS from Module E2 via connection cable W2 to X1702 (Powersupply Bar) on Motherboard

Output Voltages to the Connector X528 on the Motherboard (MB)

- The availability indication of these voltages is possible with LEDs on the Motherboard
- All these voltages are connected from Module H3_3 via connection cable W5 to the connector X528 on Motherboard
- +12V_PS (typ. +12,2V/10A) to Pin 6 and Pin 7 of X528 on Motherboard
  LED H303 on Motherboard
- GND of +12V_PS to Pin 8 of X528 on Motherboard
- -12V_PS (typ. -12,2V/6A) to Pin 3 of X528 on Motherboard
  LED H304 on Motherboard
- GND of -12V_PS to Pin 4 of X528 on Motherboard

3.1.4.3 PS EEPROM/Temp Sensor

Temperature sensor

- Power supply TEMP sensor via connection cable W8 from Pin B3 of X527 on Motherboard
- Output Temp Diag 10mV/°C via connection cable W8 to Pin B1 of X527 on Motherboard

EEPROM

There is also an EEPROM on board containing R&S internal data.
The I2C Signals from the EEPROMs are connected to the Motherboard.

3.1.5 Blower Unit

An axial fan (on the side of the Power Entry) produces an air flow through the Power Supply Unit, cooling it with cold ambient air.
The voltage for the fan is provided by a temperature controlled DC/DC converter on the Motherboard.
The fan is connected with two cables to X522 on Motherboard.

3.1.6 Front of Instrument Frame

The front of the instrument frame incorporates the FRONT MODULE and the RF INTERFACES.

The R&S CMW FRONT MODULE consists of the Front Module Controller (FMC), the Front Panel Board 1P and the Front Panel (FP).

3.1.6.1 Front Module Controller CMW-H051A (Item-No. 1000)

The Front Module Controller (FMR7/5) contains all the necessary components on a board such as processor, memory chips, I/O devices, lithium battery, internal LVDS (LCD graphics) controller and an external DVI graphics interface (available as option). In addition a SATA hard disk controller is integrated on the controller board. The hard disk is mounted above the unit fan of the R&S CMW and is screwed to the main case of the instrument.

USB Ports

Two USB 2.0 High-Speed Host Controller Ports directly connected to the Front Panel Board 1. A further USB 2.0 High-Speed Host Controller Ports is directly routed through the Motherboard to the Rear of Instrument Frame. The FMC has also two additional USB 1.1 Full-Speed Host Controller Ports which are routed to the Motherboard. One of this Ports is used for the Smart Card Reader on the Motherboard and the other one is routed via the Motherboard to the Rear of Instrument Frame.
On the FMC there is also a USB 2.0 High-Speed Device Controller Port which is used for the USB Remote connection on the Rear of the Instrument Frame. This signal is routed via the Motherboard.

Ethernet

The FMC contains also two Ethernet Controllers. The 1st Controller (10/100 Base-T) is connected via a cable to the Front of the Instrument. The 2nd Controller (10/100/1000 Base-T) is connected via a cable to the Rear of the Instrument Frame and used for LAN-Remote.

Fan

The CPU on the Front Module Controller has an active cooling with a small fan.

Connection

The Front Module Controller is directly plugged to the Motherboard via a 123-pin PCI connector and a 60-pin High-Speed Differential PCI-E connector.

3.1.6.2 Front Panel Board 1P (Item-No. 895)

The Front Panel Board 1P is connected to the FMC and the Motherboard and on the other side it has a connection to the Front Panel Board 2(s). This board contains a USB 2.0 High Speed Hub and an EEPROM. The Front Panel Board 1P serves also 3 USB connections to the front of the R&S CMW and a Sensor connector.

Interfaces

USB (1x): right USB-Host Socket Type A from FMC
- Connector Top is hidden and not connected
- Connector Bottom USB 2.0

USB (2x): left USB-Host Socket Type A via High Speed Hub from FMC
- Double Connector Top and Bottom USB2.0

Lemosa 6 pin Socket SENSOR for NRP Powersensor with Triggersignals

EEPROM

There is also an EEPROM on board containing R&S internal data
The I2C Signals from the EEPROMs are connected to the Motherboard.

3.1.6.3 Front Panel (FP)

The Front Panel is split in two different Variants. One is the Front Panel Blank (Item-No. 300) and the other is the Front Panel with MMI (Item-No. 400). At the first step the common Buttons and Status LEDs are described.

STANDBY/ON Switch with its two LEDs

The “ON/OFF” button switches the instrument from the standby mode to the operating mode provided the power switch on the instrument rear is switched on.

- The yellow LED (right) is on in the standby mode
- The green LED (left) is on when the instrument is in the operating mode

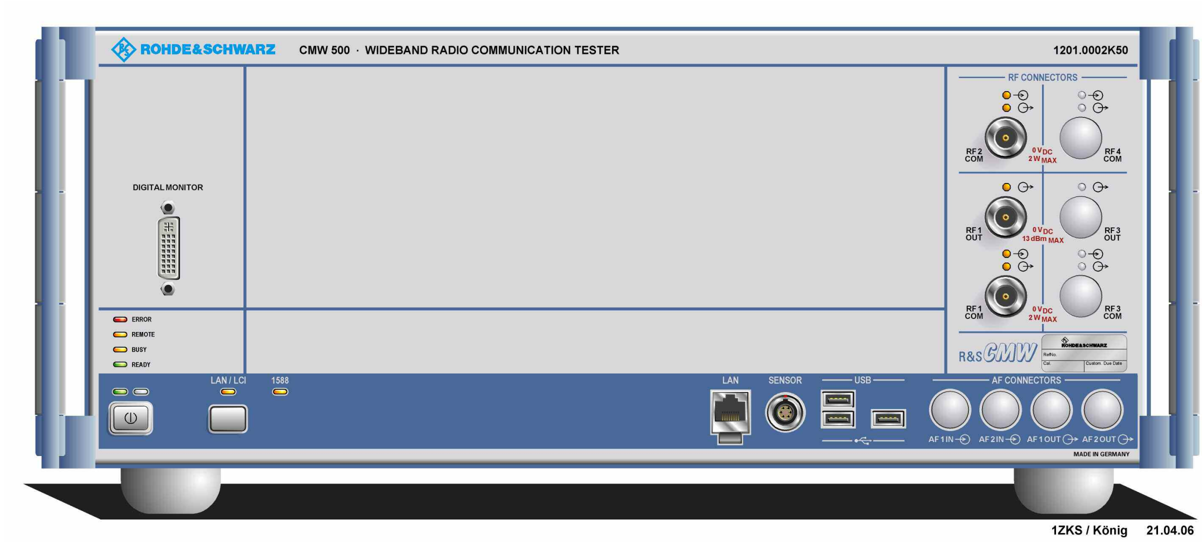
4 Status LED

The initial setting of the output pins for the Status LEDs is "All LED on" (wait for at least 3 sec). After this time all Status LED are switched off.

- **LED “ERROR”- red**
  indicates that an error occurred during operation.
  Only errors are indicated that impair further instrument operation, e.g. a hardware fault. The error must be eliminated before correct instrument operation can be ensured.
- **LED “REMOTE” - yellow**
  currently no user function, reserved for future use
- **LED “BUSY” – yellow**
  currently no user function, reserved for future use
- **LED “READY”- green**
  indicates that the instrument is ready for operation after booting the instrument

3.1.6.4 Front Panel Blank MMI CMW-H600A (Item-No. 300)

This Unit includes the Front Panel Board 2s and a DVI adapter for external Digital Monitor. In this unit the Front Cover Var50 (Item-No. 340) is used.



The Variant FRONT PANEL BLANK CMW-H600A (Item-No. 300) has one additional Button and two additional Status LEDs.

2 LEDs for LXI operation (only CMW Front Panel Blank)

LED “LAN/LCI” – green

- indicates LAN operation
- ON: steady illumination
- Device Identify: Flashing green
- LAN fault: OFF

LED “1588” – green

- indicates IEEE1588 Locked: ON - steady illumination
- Synchronized to Master: Blinking green every second
- Synchronized to GrandMaster: Blinking green every two second
- Not synchronized: OFF

LAN/LCI Reset Pushbutton (only CMW Front Panel Blank)

This button gives the facility to reset the LAN/LCI connection

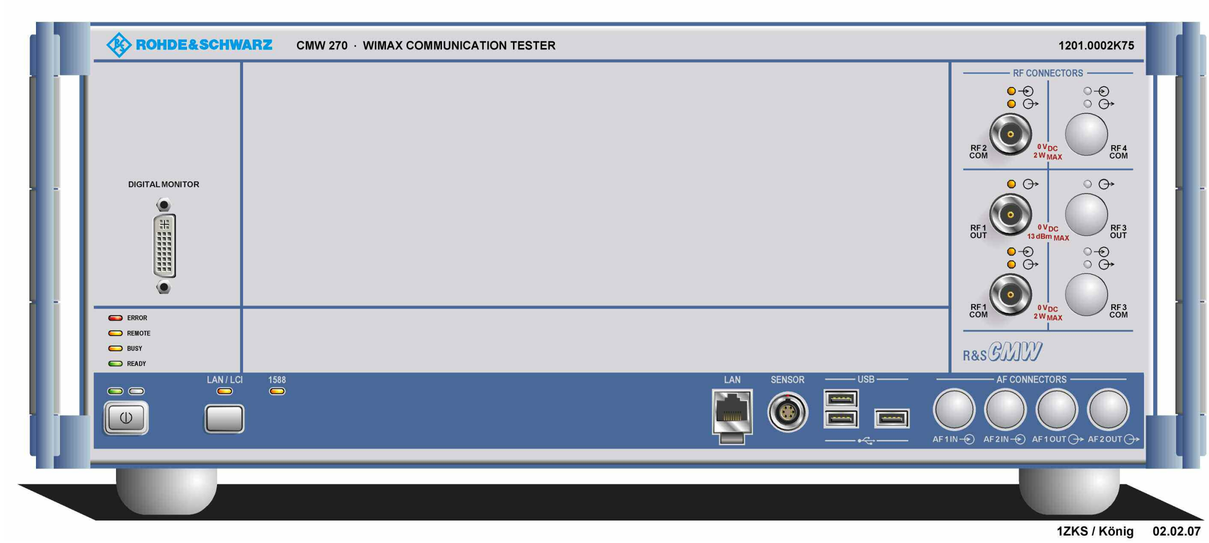
DVI adapter (Item-No. 330)
The DVI adapter is used as a connection for the signals from the FMC to the front of the R&S CMW for using an external Digital Monitor.

Front Panel Board 2s (Item-No. 320)
The Front Panel Board 2s includes 4 status LEDs and an “ON/OFF” button with its two LEDs. There are also two additional LEDs and one additional button on this board. The Front Panel Board 2s is connected via the Front Panel Board 1P to the FMC and the Motherboard. The keyboard controller on the Front Panel Board 2s is used for the handling of keycode generation and is one device of the USB2.0 High Speed Hub on the Front Panel Board 1. Also the LAN/LCI Switch operate via this keyboard controller.

EEPROM
There is also an EEPROM on the board on which R&S internal data is stored
The I2C Signals from the EEPROMs are connected via Front Panel Board 1P to the Motherboard.

3.1.6.5 Front Panel Blank MMI CMW-H600C (Item-No. 300)

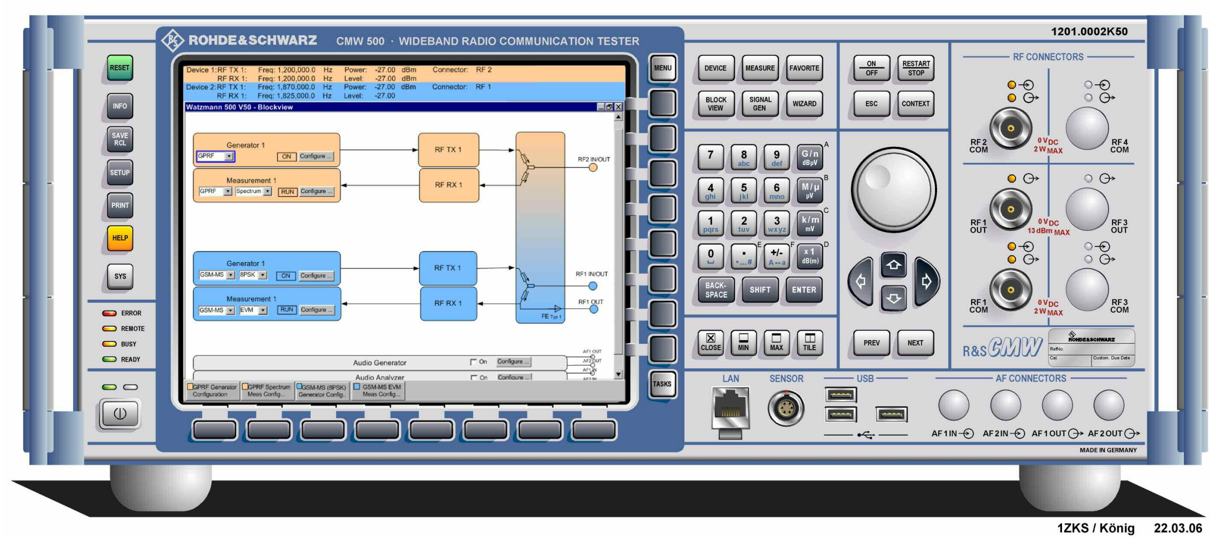
This Unit is comparable with Front Panel Blank MMI CMW-H600A (Item-No. 300) and includes also the Front Panel Board 2s and a DVI adapter for external Digital Monitor. The difference between Front Panel Blank MMI CMW-H600A and CMU-H600C is only the different Front Cover. In this unit the Front Cover Var75 (Item-No. 350) is used.



For more information please have a look at Front Panel Blank MMI CMW-H600A.

3.1.6.6 Front Panel with MMI CMW-H600B (Item-No. 400)

This Unit includes the Front Panel Board 2, a Rotary Puls-Generator, LSNT-LVDS SVGA Display Adapter board and the SVGA LVDS display. The Front Panel Board 2 is connected via the Front Panel Board 1P to the FMC and the Motherboard.



Rotary-Pulse Generator (Item-No. 450)
The Rotary-Pulse Generator consists of a flexible magnetic ring with individual magnets for the lock-in positions. With each turn of the Rotary-Pulse Generator, electrical pulses are released from the LEDs and its optical position detectors and sent via a ribbon cable to the keyboard controller on Front Panel Board 2 for evaluation. The Rotary-Pulse Generator is a alternative manner for data entry and operation.

Front Panel Board 2 (Item-No. 420)
The Front Panel Board 2 includes 4 Status LEDs and a “ON/OFF” button with its two LEDs. There are also 64 additional operating keys on this board. Also the Rotary-Pulse Generator is connected to this board. The operation keys and the Rotary-Pulse Generator handled with the keyboard controller. This keyboard controller is one of the Front Panel Board 1P USB2.0 High Speed Hub devices

- **Operating keys**
  The operating keys located on the Push-Button Board consist of silicone elastomer with a carbon pellet on the footprint of each key. When a key is pressed the carbon pellet closes the contact areas on the Front Panel Board 2.
- **EEPROM**
  There is also an EEPROM on the board on which R&S internal data is stored. The I2C Signals from the EEPROMs are connected via Front Panel Board 1P to the Motherboard.

LSNT-LVDS SVGA Display Adapter (Item-No. 460)

The LSNT-LVDS SVGA Display Adapter board is used to connect the SVGA LVDS display with the FMC via the Low Voltage Differential Signal (LVDS) connector. The LSNT includes an EEPROM, a DC/AC backlight converter, connectors for display and backlight. The Plug-and-Play feature and the Standard Power Management of the display is supported.

- **Backlight**
  The backlight gets connected straight to the DC/AC backlight converter connector.
- **Power**
  The LVDS connector provides power for the LSNT, the display and the onboard backlight converter.
  - The LSNT must adopt the power to the display supply voltage
  - The LSNT must control the power sequencing of the on board devices and of the attached display and onboard backlight converter
- **EEPROM'**
  In the EEPROM the EDID (or E-EDID) information for the display is stored. It also gives the display information to the video BIOS and to the graphic driver. As well as the timings for the display standard resolution and for DOS and BIOS text mode is stored here

SVGA LVDS display (Item-No. 440)

The SVGA Display with a resolution of 800x600 pixel has a CCFL (Cold Cathode Fluorescent Lamp) backlight. The display gets connected to the display adapter board via a 20 pin SMD connector.

3.1.6.7 RF Interfaces

The RF interfaces are components of the RF FRONTEND. (see RF FRONTEND)

3.1.7 Cooling the Instrument

The cooling concept makes sure that all components are optimally cooled so that the complete instrument achieves a high MTBF.

Unit fan in the casing

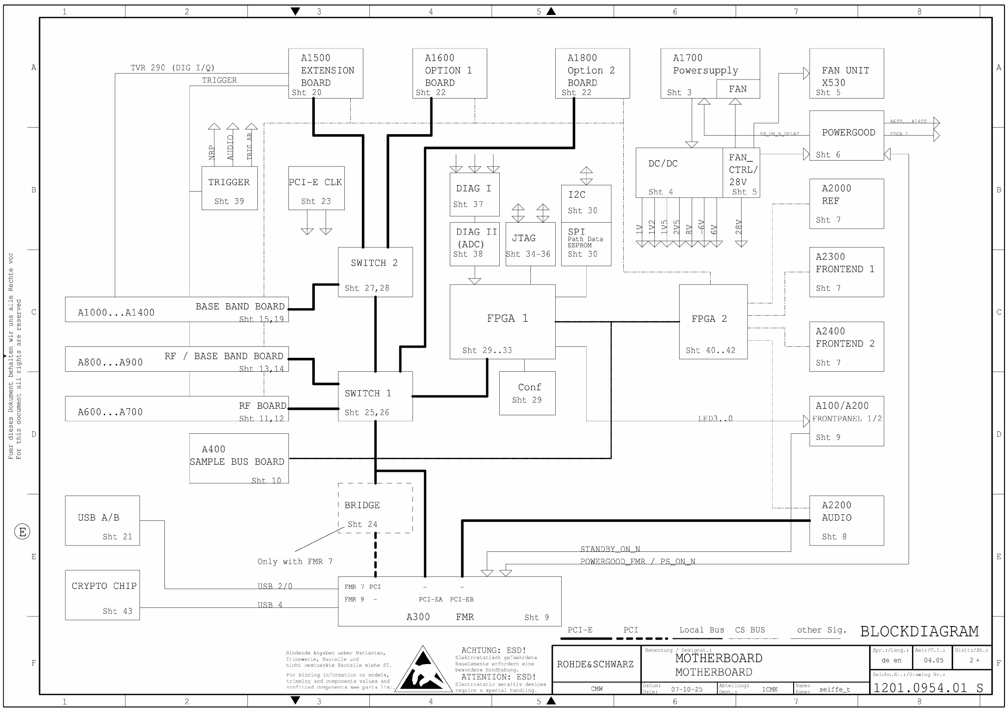
The right side panel contains a temperature-controlled axial fan (127 mm x 127 mm x 38 mm), which sucks in cold ambient air at the right tube of the casing and blows it through the modules via a ventilation duct and further ventilation slots. The amount of air is controlled via the width of the slots depending on the power dissipation of the module.
The modules are cooled by the air flow, and the heated air is then blown out at the left side panel.

Blower Unit of power supply

In addition, the power supply of the R&S CMW is equipped with its own temperature-controlled axial fan (80 mm x 80 mm x 32 mm) with a separate air circulation. The fan sucks in cold air on the right rear side of the power supply casing and blows out the heat produced in the power supply on the left rear side of the power supply casing.

3.1.8 Motherboard CMW-H055A (Item-No. 1020)

3.1.8.1 Block diagram of the Motherboard CMW-H055A



3.1.8.2 Difference between Motherboard Var02 and Motherboard Var03

The Motherboard (MB) is split in two different Variants. The used Variant depends on the Front Module Controller (FMC) generation.
In the Variant 02 (Var02) the Front Module Controller FMR7/5 is used and in the Variant 03 (Var03) is used for Front Module Controller >FMR7/5.

Motherboard Var02 (FMR7/5)

- PCI to PCIe Bridge (D2400) is fitted
  only 1x host PCIe lane (PER0 and PET0) available
- PCIe Clk is generated by a Clk Generator (D2300) on the MB
- Audio PCIe works via connector X504 of the MB with a additional HW board necessary

Motherboard Var03 (>FMR7/5)

- PCI to PCIe Bridge not fitted
- PCIe Clk is generated by the FMC Controller and supplied to
  - the Audio Connector X534
  - the Rear Clock Generator Buffer D2301
  - the Front Clock Generator Buffer D2302
- PCIe works directly from FMC connector X519 of the MB
  - 4x host PCIe lane (PER0…3 and PET0…3) available

Control of the Motherboard

- Front Module Controller FMR7/5
  Var02 is used and controlled mainly over PCI via X516
- Front Module Controller > FMR7/5
  Var03 is used and controlled mainly over PCIe via X519

3.1.8.3 Connection from the Motherboard to the Front Module Controller (FMC)

The Motherboard is controlled over two Connectors (X516, X519) from the Front Module Controller.

Connector X516

- 110-pin PCI Future Bus connector
- for Var02 the PCI Signals from the FMC to the Motherboard and vise versa routed through this connector
- the PCI Signals connected to the PCI to PCIe Bridge D2400
- the power supply for the FMC is routed through this connector
  - +5V2_FMR via the fuse F349
  - +5V_STANDBY_FMR without a dedicated fuse
- the two USB ports on the rear side of the R&S CMW routed in both variant through this connector
- one USB port of the FMC is routed to this connector to the Smartcard Controller (D4300)

Connector X519

- 40-pin High-Speed Differential PCI-E connector with additional ground pins
- the USB-Remote signal on the rear side of the R&S CMW routed in both variant through this connector
- for Var03 the PCIe Signal from the FMC to the Motherboard and vice versa routed through this connector
- The differential PCIe Ref Clk signals routed in Var03 through this connector

3.1.8.4 Further connection on the Motherboard

- one BB Link Connector on X520
  BB Fixed Link CMW-H550A (Item-No. 1100)
- one RF Frontend Connector for RF Frontend No.1 on X531 and the other one for RF Frontend No.2 on X532
  RF Frontend (Basic) H590A (Item-No. 1500)
- one Reference Connector on X529 incl. optional OCXO
  CMW-H090A (Item-No. 1030)
    - Standard OCXO CMW-H690A (Item-No. 2400)
    - Highstable OCXO CMW-H690B (Item-No. 2500)
- X534 and X533 (only Var03: FMC>FMR7/5)
  reserved
- Front Panel Board 1P (Item-No. 895) on X501
- Fan Unit (Item-No. 110) on X530
- Fan for the Power Supply Unit on X522
- Option Board1 on X504:
  reserved
- Option Board2 on X526:
  IEEE Bus CMW-H612A (Item-No. 2100)
- Option Board 3 on X505
  reserved
- Extension Board on X523 and X525
  reserved

3.1.8.5 Diagnosis of voltages and temperature

The diagnosis voltage from the various modules and connectors collected by the analog multiplexer (D3700 to D3702) and then separately switched to diagnosis AD converter (D3801). This diagnosis voltages contain the multiplexed values of the queried temperatures and supply voltages from each modules or connected board. Even the temperature of the Power Supply Unit (PSU) is checked (D3701). It is also possible to query all supply voltages of the Motherboard (D3702 to D3704). Further three temperatures on the Motherboard queried in this way (D3702 and D3704). There are two discrete temperature sensors (B3700 and B3701) on the Motherboard and one sensor is integrated in the FPGA 1 (D4301). In dependency of the various temperatures the speed of the unit fan is controlled. The speed of the Blower Unit in the PSU is controlled with its own temperature sensor.

The query of the different voltages is for control and test purpose.

3.1.8.6 Chipcard programmed of the Instrument

The Chipcard Controller (D4300) reads the Chipcard programmed in the Smartcard Holder X5191 and communicate with the Front Module Controller via USB lines.
On this Chipcard programmed the Serial Number of the R&S CMW and the installed Options (with Keycode) are stored.

Note:

- *In case of damage of this Chipcard programmed please contact the next R&S Service Center.*
- *For replacement the old Chipcard programmed is needed.*

3.1.8.7 Input Voltages from the Power Supply Unit (PSU) on the Motherboard

The input power supply voltages from the Power Supply Unit (PSU) to the Motherboard are as follows

-12V_PS	• X528 Pin3 on Motherboard • via cable W5 from the PSU • availability indication with LED H304 (labelled on MB)
GND of -12V_PS	• X528 Pin4 on Motherboard • via cable W5 from the PSU
+12V_STANDBY_PS	• X528 Pin5 and Pin9 on Motherboard • via cable W5 from the PSU • availability indication with LED H302 (labelled on MB)
GND of +12V_STANDBY_PS	• X528 Pin10 on Motherboard • via cable W5 from the PSU
+12V_PS	• X528 Pin6 & 7 on Motherboard • via cable W5 from the PSU • availability indication with LED H303 (labelled on MB)
GND of +12V_PS	• X528 Pin8 on Motherboard • via cable W5 from the PSU

+5V2_PS	• X1701 on Motherboard • via cable W1 from the PSU • availability indication with LED H301 (labelled on MB)
GND of +5V2_PS & +3V4_PS	• X1702 on Motherboard • W2 & W4 from the PSU
+3V4_PS	• X1703 on Motherboard • via cable W3 from the PSU • availability indication with LED H300 (labelled on MB)

3.1.8.8 Voltages generated with a DC/DC Converter

+6V	• this is a converted voltage from +12V_PS • feed through the fuse F301 (+12V_A) • indication of availability with LED H400 (labelled on MB)
+28V	• this is a converted voltage from +12V_PS • feed through the fuse F302 (+12V_B) • availability indication with LED H500 (labelled on MB) • this output is protected with the resettable fuse F500
-6V	• this is a converted voltage from +12V_PS • feed through the fuse F303 (+12V_C) • availability indication with LED H401 (labelled on MB)
+8V	• this is a converted voltage from +12V_PS • feed through the fuse F331 (+12V_G) • availability indication with LED H403 (labelled on MB)
+1V5	• this is a converted voltage from +5V2_PS • feed through the fuse F328 (+5V2_B)
+1V0	• this is a converted voltage from +5V2_PS • feed through the fuse F329 (+5V2_C)

+12VFAN_PS	• this is a converted variable output voltage from +5V2_PS • feed through the fuse F360 (+5V2_FAN_PS) • the voltage depends on the value of the control signal Fanspeed_PS which is generated with the FPGA D4301. • to connector X522 • this output is protected with the resettable fuse F501
+12VFAN_UNIT	• this is a converted variable output voltage from +5V2_PS • feed through the fuse F332 (+5V2_FAN_UNIT) • the voltage depends on the value of the control signal Fanspeed which is generated with the FPGA D4301 • to connector X530 • this output is protected with the resettable fuse F502

3.1.8.9 Voltages generated with a LDO Regulator

+12V_STANDBY	• this is a regulated voltage from +12V_STANDBY_PS • feed through the fuse F307 • this voltage is provided to the connector X529 Pin B2 & B3 • the OCXO Option Board (H690A or H690B) is supplied with this voltage via the Reference Board (H090A)
+5V_STANDBY_FMC	• this is a regulated voltage from +12V_STANDBY • availability indication with LED H305 (labelled on MB) • this voltage is provided to the connector X519 Pin B1 • supply the FMC with the necessary standby voltage. It is also present when AC input is applied regardless of enable state (PS_ON_N_DELAY) of the Power Supply Unit (PSU) outputs.
+2V5	• this voltage is regulated from +3V4_PS • feed through the fuse F308 (+3V3_A) • availability indication with LED H402 (labelled on MB)
+1V2	• this is a regulated voltage from +2V5

3.1.8.10 Configuration of Main Slots of the Motherboard (A600 to A1400)

The Motherboard (MB) has nine main slots (A600 to A1400). It is possible to fit the following Modules

- one or more TRX
  - TRX consists of COR-Module, TX-Module and RX-Module
  - on A600 … A900
- one or more Baseband Boards
  - Baseband Boards consists of e.g. BB Measurement with or without BB Generator Module
  - on A800 … A1400

3.1.8.11 Description of Main Slots of the Motherboard (A600 to A1400)

The Main Slots consist of connectors for the PCIe-Bus, Miscellaneous Bus, Trigger-Bus and the Power Supply Bus.

Power Supply Bus

- 48-pin Future Bus connector
- the connectors have the part number X606, X706 to X1406
- all the supply voltages of the various modules are feed through this connector
- each supply voltage on this connector is fused with a separate fuse on the Motherboard

PCIe-Bus

- 40-pin High-Speed Differential PCI-E connector with additional ground pins
- the connectors have the part number X604, X704 to X1404
- the POWERGOOD Signal is distributed via this connector from the Motherboard to the module
- the PRESENT_N_xxxx Signal is a sense signal which senses whether a module is plugged or not
- the STARTSYS_xxxx Signal is distributed via this connector from the modules to the Motherboard
- differential PCIe reference frequency which is distributed from the MB to the module
- 4 differential PCIe lanes from the MB to the module (PET0…3)
- 4 differential PCIe lanes from the module to the MB (PER0…3)

Miscellaneous-Bus

- 48-pin Future Bus connector
- the connectors have the part number X605, X705 to X1405
- on this bus common control and status signals are distributed, such as
    - indication of the Slot ID for the connected Board
    - control and sync signals from the Motherboard FPGA2 (D4000) to the connected module and vice versa
    - speech data from reserved application and vice versa
    - audio signals and data from reserved application and vice versa
    - I2C Signals
    - JTAG Signals
    - separate diagnostic Signals from each board
    - single ended narrow band power trigger signals

Trigger-Bus

- 40-pin High-Speed Differential PCI-E connector with additional ground pins
- the connectors have the part number X802, X902 to X1402
- the Trigger-Bus is not distributed to the Main Slots A600 and A700
- there are 19 differential trigger signals are distributed between the various modules
- two differential lines (TRIG0 to TRIG1) are used fix for TRIG IN/OUT A and B
- one differential line (TRIG2) is used fix for the NRP power sensor
- two differential lines (TRIG3 and TRIG 4) are used fix for a reserved application
- the rest of the lines (TRIG5 to19) can be used flexible
- the differential lines TRIG5 to 14 can also be extended to the to the Extension Board (Option Board 3) Connector X523. Therefore the matching resistors at Connector X523 for this lines can be switched to open.

3.1.8.12 Signal to control the startup of the R&S CMW

STANDBY_ON_N

- Signal from the Front Panel Board 2(s) “ON/OFF” button over the Front Panel Board 1P connector X501 to the FMC connector X516
- Signal to FMC which indicates the TURN-ON or SHUTDOWN command of the user
- Signal switches between ON and STANDBY mode of the FMC.
- FMC controls ON and STANDBY mode of the R&S CMW over signal PS_ON_N
- this signal is only routed from the connector X501 to the connector X516 on the motherboard

PS_ON_N

- Signal from FMC which indicates ON or STANDBY status of the R&S CMW
- Signal turns on either ON-LED or STANDBY-LED at Front Panel Board 2
- starts the Power supply Unit with the buffered signal PS_ON_N_DELAY

POWERGOOD

- A powergood circuit which controls many power supply voltages is for generating the POWERGOOD signal
- This is for starting the RF/BASEBAND Boards and further Option Boards
- The status of this signal is indicated with the LED H600 (labelled on MB)
- This signal will go active with a short delay after the main voltages are within a specified tolerance and stable. This voltages are distributed from the Power Supply Unit or generated on the Motherboard.
- It will go inactive immediately
    - when any of these voltages fall below tolerances
    - the Power Supply Unit detects AC fail or over temperature of its own converter (Signal “AC_TEMP_FAIL_N”)
    - the user switches off the R&S CMW with the “ON/OFF” button on the Front Panel
    - in the two latter cases, the power rails are still valid for a short time
- With POWERGOOD active, the FPGAs on the modules necessary for startup will begin with configuration from its device
- With POWERGOOD inactive, the configuration of the FPGAs on the modules will be unloaded
- With POWERGOOD falling inactive, none of the Motherboard signals except STARTSYS and PCIe lines must be driven
- Motherboard signals are activated again by a PCIe command given by software. See also PCIE_PERST_N Generated on Motherboard

POWERGOOD_SW_FPGA

- A special powergood circuit which controls the main power supply voltages (+3V3_A, +1V0 and +1V5_SIG) of the Motherboard FPGA1 (D4301) is for generating the POWERGOOD_SW_FPGA signal
- With this signal it is possible to start the Motherboard FPGA1 (D4301)

STARTSYS_xxxx (xxxx stands for the Main Slot No.)

- the “STARTSYS” signal can only appear, if the “POWERGOOD” signal is available on each module
- every module pulls down this line as long as all necessary power on the module is not stable and the FPGAs necessary is not ready to be used

POWERGOOD_FMR

- the inverted signal “POWERGOOD_FMR_N” is generated in the FPGA1 (D4301) and depends on the status of the signals “STARTSYS_xxxx” and “POWERGOOD_SW_FPGA”
- with the signal “POWERGOOD_FMR” it is possible to start the FMC
- if this signal “STARTSYS_xxxx” will not go high within a timeout period, the FMC may start even with this signal low. The FPGA1 on Motherboard will check which of the lines is permanently driven low and flash a LED on Front Panel to indicate the faulty module.

PCIE_PERST_N

- this is a buffered signal, which is generated on
  - Var02: PCI to PCIe Bridge D2400 on Motherboard
  - Var03: the Front Module Controller FMC (>FMR7/5)
- PCIe reset → Active low
- Will be active during power up
- Will go active when FMC restarts the unit (‘warm reset’) for a short time
- Will cause the FPGAs on the modules necessary to be reconfigured after PCIE_PERST_N going inactive again
- With PCIE_PERST_N falling active, none of the Motherboard signals except STARTSYS and PCIe lines must be driven

3.1.8.13 The PCIe Reference Clock

The PCIe REFCLK comes either from the CLK Generator D2300 (VAR02) or FMC Controller (VAR03).
The differential PCIe REFCLK will be buffered and distributed by two Clock Generator Buffer D2301 and D2302.
The various differential and buffered PCIe Clk Ref Gen signals are distributed from the two buffers as follows

Rear Clock Generator Buffer (D2301)

- to PCIe Bus Connector X604, X704 to X1104
- to Motherboard FPGA 1 (D4301)
- to PCIe Switch 1 (D2500)

Front Clock Generator Buffer (D2302)

- to PCIe Bus Connector X1204, X1304 and X1404
- to PCIe Switch 2 (D2700)
- to PCI to PCIe Bridge (D2400)
- to the Extension Board Connector X523
- only Var03 - to Option Board 1 Connector X504
- to Option Board 2 Connector X526

- only Var02 - to the Audio Connector X534 (in Var03 - supplied by the FMC)

3.1.8.14 The PCIe Switch

The main task of PCIe Switches 1 (D2500) and 2 (D2700) is distributing the differential host PCIe data via four PCIe lanes. The four PCIe lanes consist of the data signals with the data direction from the Motherboard to the corresponding module (PET0..3) and from the various modules to the Motherboard (PER0..3).
The various differential PCIe data signals are distributed from the two switches as follows

PCIe Switch 1 (D2500)

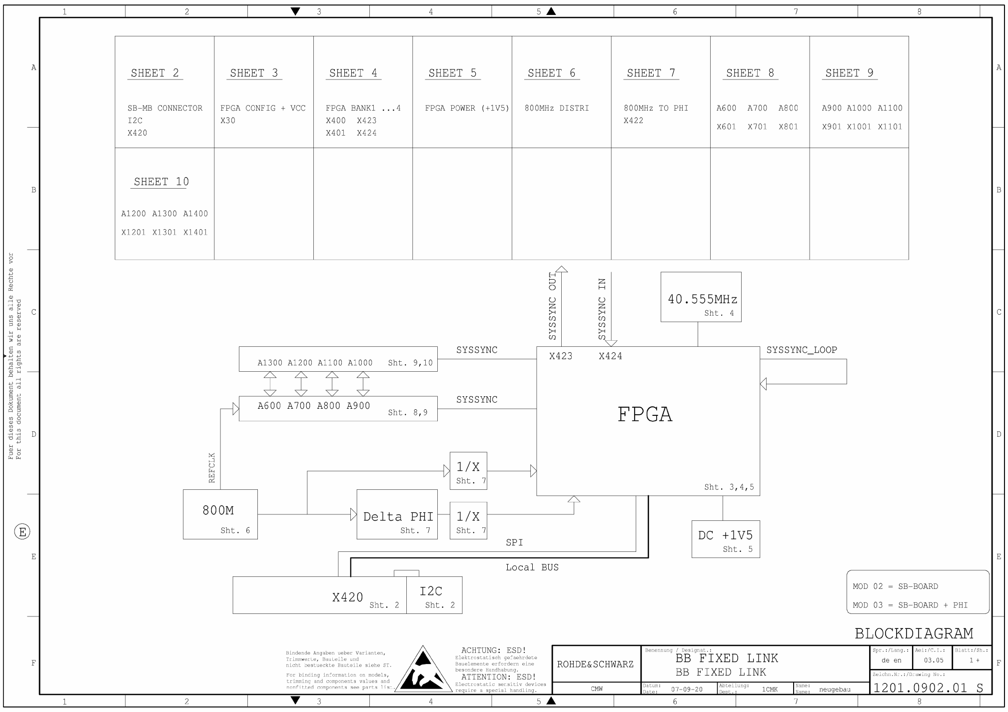
- Host of the PCIe lanes for PCIe Switch 1 is
  - Var02: PCI to PCIe bridge (D2400) / 1x PCIe lane
  - Var03: FMC via X519 / 4x PCIe lane
  - correct function of the four host lanes is indicated with LEDs
    - → host PCIe lane0 with LED H2500
    - → host PCIe lane1 with LED H2501 (no indication in Var02)
    - → host PCIe lane2 with LED H2502 (no indication in Var02)
    - → host PCIe lane3 with LED H2503 (no indication in Var02)
- to PCIe Switch 2 (D2700)
- to PCIe Bus Connector on A600 to A900
- to Motherboard FPGA 1 (D4301)
- to Option Board 2 Connector X526

PCIe Switch 2 (D2700)

- Host of the PCIe lanes for PCIe Switch 2 is
  - PCIe Switch 1 (D2500) / 4x PCIe lane
  - correct function of the four host lanes is indicated with LEDs
    - → host PCIe lane0 with LED H2700
    - → host PCIe lane1 with LED H2701
    - → host PCIe lane2 with LED H2702
    - → host PCIe lane3 with LED H2703
- to PCIe Bus Connector on A1000 to A1400
- to Option Board 1 Connector X504
- to the Extension Board Connector X523

3.1.9 BB Fixed Link CMW-H550A (Item-No. 1100)

3.1.9.1 Block diagram and description of the BB Fixed Link CMW-H550A



The BB Fixed Link is used for data transmission of the differential and digital IF signals between the RF TRX module and the different Baseband modules. On the BB Fixed Link this interconnection is predetermined. For this reason the placement of the various module is fixed by the module function.

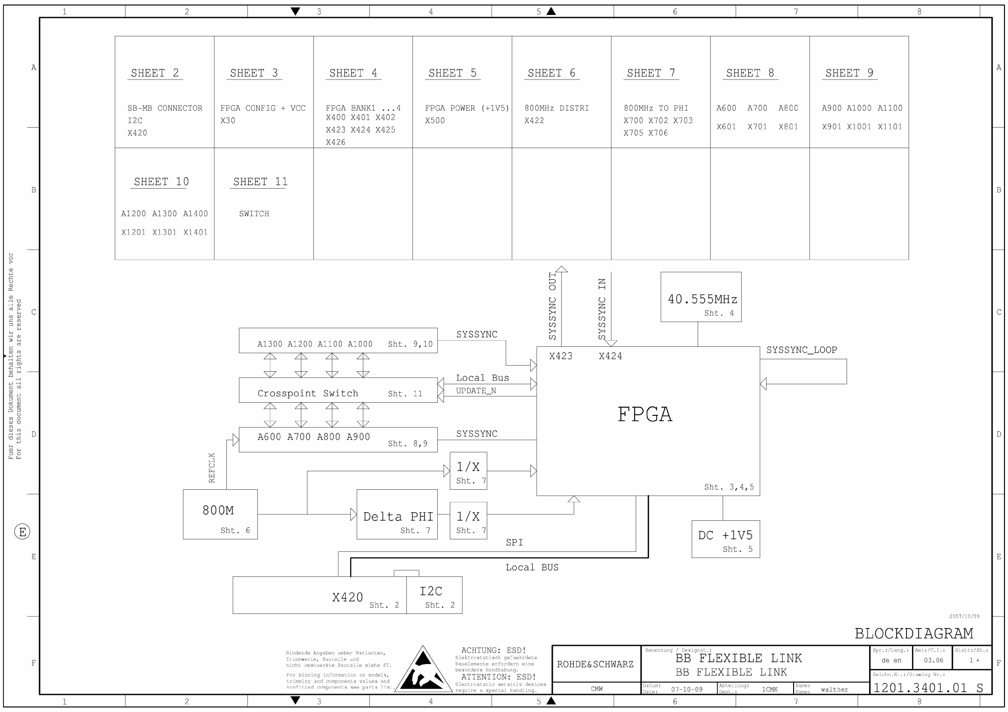
The Reference Frequency (Ref_800M) from the Reference Board is connected via X422 to the BB Fixed Link board. The Reference Frequency is then split in a four-way power splitter and afterwards transformed in a differential signal. This differential reference signal (RefClk) is then distributed to the Slot connectors X601, X701 to X901. This frequency is used as the fundamental frequency for the various local oscillators on the TX- and RX-Module.

Furthermore the synchronization of the various modules is also done via the BB Fixed Link. For this purpose the Reference Frequency is divided by a fixed value and feed in a FGPA on this board. In the FPGA the reference signal (SysSync) is generated. This additional reference signal is used to have time synchronized digital IF signals on the various modules and a reference frequency for the digital units in the R&S® CMW. The differential reference signal (SysSync) is also distributed via the Slot connectors X601, X701 to X1401 to the various modules.

The BB Fixed Link is controlled from the Motherboard FPGA 1 (D4301) and connected via the connector X520 on the Motherboard to the connector X420 on the BB Fixed Link. Also the supply voltage for the BB Fixed Link distributed via this connector.

3.1.10 BB Flexible Link CMW-H550B (Item-No. 1150)

3.1.10.1 Block diagram and description of the BB Flexible Link CMW-H550B



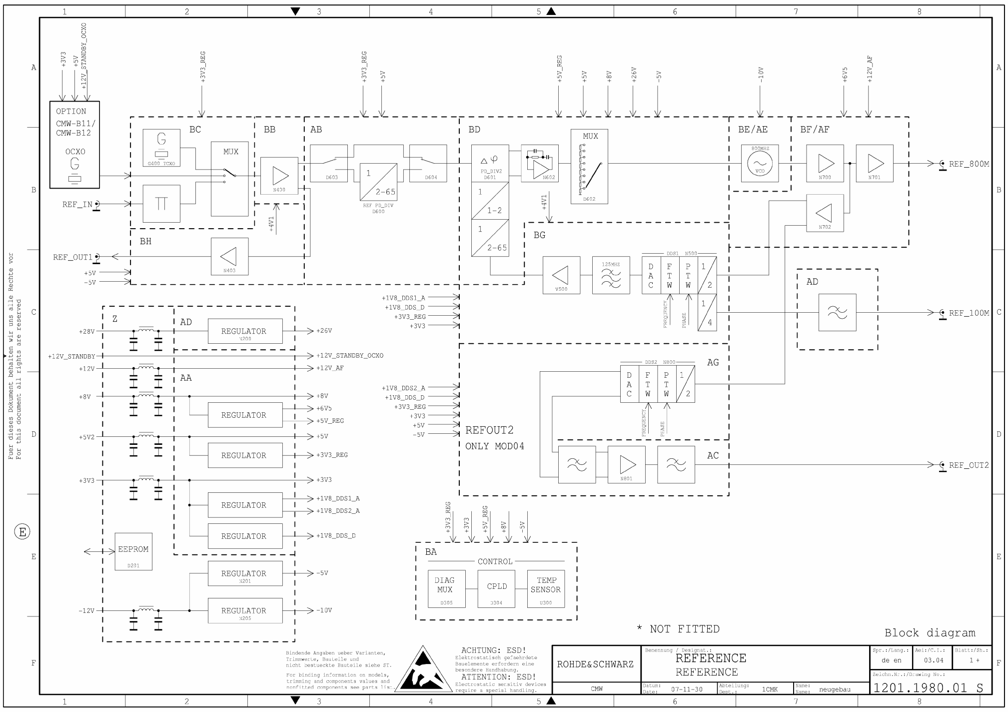
The BB Flexible Link is used for data transmission of the differential and digital IF signals between the RF TRX module and the different Baseband modules. On the BB Flexible Link the interconnection of the various modules is done by a Crosspoint Switch. This switch is controlled from the Motherboard FPGA 1 (D4301) and connected via the connector X520 on the Motherboard to the connector X420 on the BB Flexible Link.

This Cross Point Switch and the resultant variable interconnection is the main difference between the BB Fixed Link CMW-H550A and the BB Flexible Link CMW-H550B. A further difference is the “Delta PHI” circuit on the BB Flexible Link. With this circuit it is possible synchronise two or more R&S CMW in a multibox test environment.

The further description is the same as for the BB Fixed Link CMW-H550A (see BB Fixed Link CMW-H550A).

3.1.11 Reference CMW-H090A (Item-No. 1030)

3.1.11.1 Block diagram and description of the Reference CMW-H090A



The Reference Oscillator is generating a frequency of 800 MHz which is used as an internal reference in the instrument. The signal is distributed from the connector X2 on the Reference board via cable W6 to the connector X422 on BB Link module.
The Reference board is equipped with a 10MHz TCXO as standard internal reference and can optionally be supplied with a 10MHz OCXO (CMW-H690A or CMW-H690B). If one of the option OCXO is installed in the R&S CMW, it is automatically used as reference element and the standard TCXO is switched off.

It is additionally possible to switch over to external synchronization and use the signal fed in at the BNC connector REF IN at the rear side of the R&S CMW as reference signal. The signal is distributed via cable W4 from the rear side BNC REF IN to connector X5 on the reference board.

At the BNC connector REF OUT1 at the rear side of the R&S CMW, either the internal 10-MHz reference frequency or the signal applied at REF IN is available depending on the selected reference element. This REF OUT1 signal is internally buffered and distributed from the reference board connector X4 via cable W3 to the rear side BNC REF OUT1.

The reference board is connected via connector X529 to the connector X532 on the Motherboard. Over this connector the reference board is supplied with all necessary supply voltages. Also the reference board is controlled over the Motherboard FPGA2 (D4000).
The option OCXO board (CMW-H690A / CMW-H690B) is connected via connector X1 to reference board.

3.1.11.2 Option OCXO Reference for Reference CMW-H090A

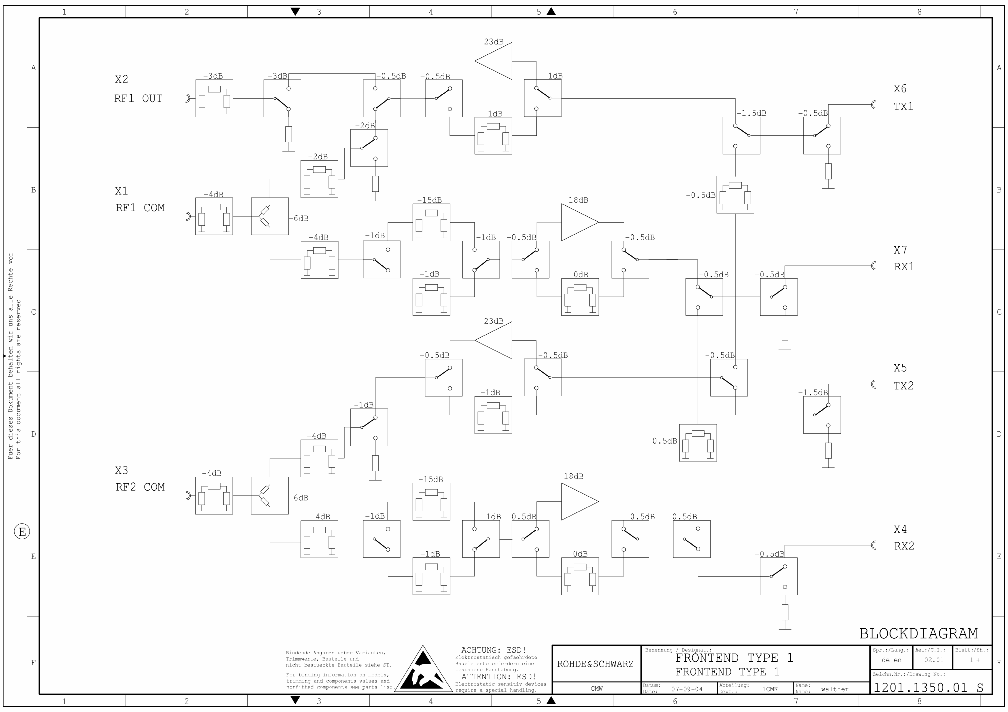
This option consists of a printed circuit board with the reference element OCXO (oven-controlled crystal oscillator), the control circuit and a potentiometer for adjusting the OCXO.
There are two different OCXO Option Boards available

- Standard OCXO CMW-H690A (Item-No. 2400)
- Highstable OCXO CMW-H690B (Item-No. 2500)

The two options CMW-H690A and CMW-H690B are basically of the same design. The two options only differ from each other in the technical data of the OCXO such as aging and frequency drift.

3.1.12 RF Frontend (Basic) H590A (Item-No. 1500)

3.1.12.1 Block diagram and description of the RF Frontend (Basic) H590A



3.1.12.2 RF connectors of the RF Frontend (Basic) H590A

- RF1 COM (X1):
    - this connector is named RF3 COM at the front of the instrument if a second RF Frontend is used
    - bidirectional input/output with a N-type connector
    - used as an external Interface of the R&S CMW to connect a DUT (device under test)
    - an active generator (output) is indicated with a flashed LED at the corresponding symbol
    - an active analyzer (input) is indicated with a flashed LED at the corresponding symbol
- RF1 OUT (X2):
    - this connector is named RF3 OUT at the front of the instrument if a second RF Frontend is used
    - unidirectional output with a N-type connector
    - used as an external Interface of the R&S CMW to connect a DUT (device under test)
    - an active generator (output) is indicated with a luminescent LED at the corresponding symbol
- RF2 COM (X3):
    - this connector is named RF4 COM at the front of the instrument if a second RF Frontend is used
    - has the same properties as RF1 COM
- TX1 (X6):
    - is a internal input of the RF Frontend with a QMA connector
    - is connected via a cable (Item-No. 1350) to the output X1100 of the 1st TX-Module on the 1st TRX
- RX1 (X7):
    - is a internal output of the RF Frontend with a QMA connector
    - is connected via a cable (Item-No. 1250) to the input X700 of the 1st RX-Module on the 1st TRX
- TX2 (X5):
    - reserved for further use
- RX2 (X4):
    - reserved for further use

3.1.12.3 Common connector of the RF Frontend (Basic) H590A

- the 1st RF Frontend is connected from connector X8 on the 1st RF Frontend with the ribbon cable W102 (Item-No. 820) to connector X531 on the motherboard
- over this connector the RF Frontend is supplied with all necessary supply voltages
- the RF Frontend is controlled from this connector over the motherboard FPGA2 (D4000)

3.1.12.4 Common description of the RF Frontend (Basic) H590A

- The basic function of the RF Frontend is to combine a generator and an analyzer at one RF connector (Input or Output)
- One RF Frontend contains the signal path of two separate RF chains
- One RF chain consist of the a analyzer path (Input) and a generator path (Output)
- the two separate RF chains in the RF Frontend are identical
- the RF chain 1 is connected to the external connector X1 (RF1 COM or RF3 COM) and X2 (RF1 OUT or RF3 OUT) of the RF Frontend, but only one of this two connectors can be selected and used as an Output for transmission at the same time
- the RF chain 2 is connected only to the external connector X3 (RF2 COM or RF4 COM)
- it is possible to switch the internal connectors X6 (TX1) and X7 (RX1) of the RF Frontend to RF chain 1 or RF chain 2 and also a cross connection of this internal connectors is possible
- the internal connectors X5 (TX2) and X4 (RX2) of the RF Frontend can only be switched to RF chain 2
- the generator path include a switchable amplifier which is used depending on the transmitted power level at the external connector
- the analyzer path include switchable attenuator and amplifier which are used depending on the received power level at the external connector
- the settings of the RF switches are controlled via the serial control/synch bus from the motherboard FPGA2

3.1.12.5 Diagnosis voltages of the RF Frontend (Basic) H590A

- all diagnosis voltages on the RF Frontend collected by the analog multiplexer (D403 to D405) and then separately switched via the UDIAG Signal of the RF Frontend to diagnosis circuit on the motherboard
- the diagnosis voltages will be used for control and test purpose
- all generated voltages on RF Frontend can be queried via the analog multiplexer
- also the +3V3 supply voltages from the motherboard is queried via the analog multiplexer
- the temperature of the RF chain 1 can be queried and controlled with discrete temperature sensor
    - analyzer path with U600
    - generator path with U701
- the temperature of the RF chain 2 can be queried and controlled with discrete temperature sensor
    - analyzer path with U1000
    - generator path with U1100
- the temperatures will be used for test purpose and the temperature correction is done corresponding to this values
- the correct operating point of an amplifier circuit in the generator path is controlled via the analog multiplexer
- also an indication for the correct current of the various amplifier circuits is queried with a reference circuit

3.1.13 RF TRX H570A

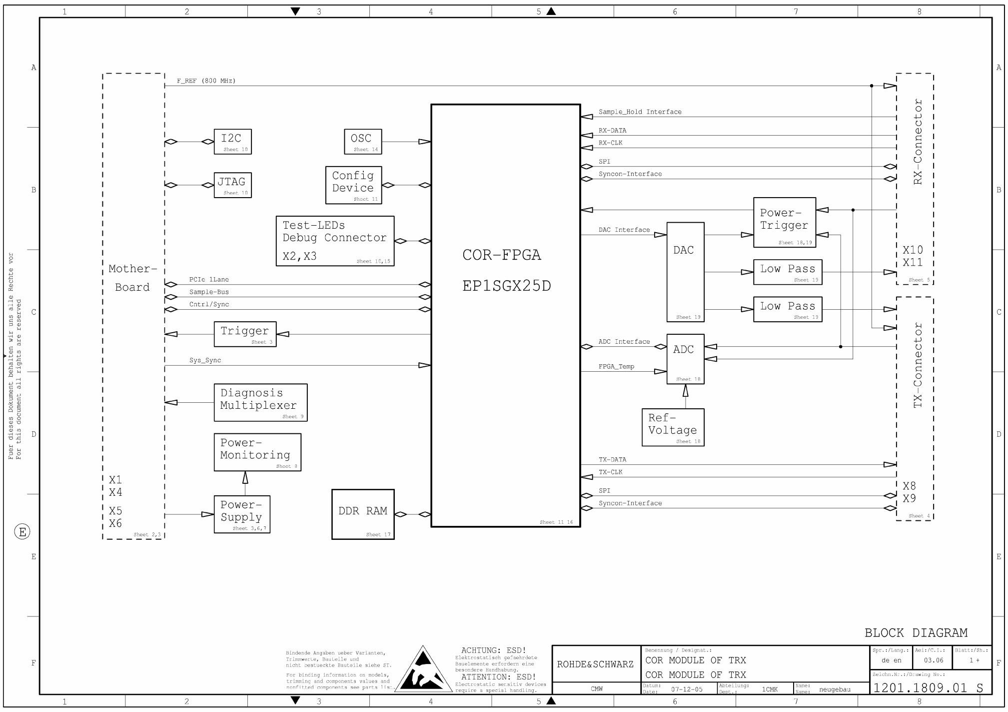
The RF TRX of the R&S CMW consist of the following modules

- COR Module of the TRX (Item-No. 1400)
- RX Module of the TRX (Item-No. 1200)
- TX Module of the TRX (Item-No. 1300)

It is used for the conversion of the RF signal to digital IF signal and vise versa.

3.1.14 COR Module of the TRX (Item-No. 1400)

3.1.14.1 Block diagram of the COR Module of the TRX



3.1.14.2 Common connectors of the COR Module of the TRX

- The connector X1 is connected to the BB Link Bus on the BB Link board
- The connector X4 is connected to the PCIe Bus on the Motherboard
- The connector X5 is connected to the Miscellaneous-Bus on the Motherboard
- The connector X6 is connected to the Power Supply Bus on the Motherboard
- The connectors X10 and X11 are connected to RX Module of the TRX
- The connectors X8 and X9 are connected to TX Module of the TRX

3.1.14.3 Common description of the COR Module of the TRX

The COR Module of the TRX is one of the three modules which are combined to the RF TRX of the R&S CMW. The COR Module is used as a module carrier for the RX Module of TRX (Item-No. 1200) and TX Module of TRX (Item-No. 1300). The COR Module is also the interface for the two RF modules to the Motherboard and the BB Link Board.

The COR FPGA on COR Module receives the differential signal from the digital and parallel IF interface from the RX Module and send it after the digital processing in the COR FPGA via the differential and serial gigabit IQ interfaces to the BB Link Board on the R&S CMW. The data stream is scaled and IQ down converted by the COR FPGA. A digital equalization filter corrects the RF frequency response of the RX path.

On the other hand the COR Module is able to receive two differential TX IQ data streams from the BB Link Board via the differential and serial gigabit IQ interfaces on the COR FPGA of COR Module. For this two separate TX path we can also switch to the additional signal sources (NCO or PN-Sequence generator). On demand the two scaled TX path can be added together. This single TX path with its digital IQ signal is filtered in a digital equalization filter and then parallel streamed to the TX Module of the TRX. The equalization filter corrects the RF frequency response of the TX path.

The COR FPGA also calculate the RF correction data and does the right settings for the RF path on the RF Frontend or the two RF Modules of the TRX. This is done by a soft processor inside the COR FPGA

The COR FPGA on the COR Module is connected via PCIe interface to the Front Module Controller (FMC). Over this connection the COR FPGA is controlled from the FMC. To be ready for the PCIe initialization cycle the FPGA need a boot device (Enhanced Configuration Devices) on board. This device includes a flash memory for the program and a controller to handle the initialization after power has become stable. The FMC also loads the Processor Software to the memory of the COR Module.

The COR FPGA is also used for control and synchronization purpose of the various boards and modules via the Miscellaneous-Bus in the following way

- Uplink control and synchronization signals (CS_UPxxx) from the COR FPGA to the Motherboard FPGA2 (D4000). With this signals the RF Fronted is controlled from the COR FPGA over the Motherboard FPGA2
- Downlink control and synchronization signals (CS_DOWNxxx) from the Motherboard FPGA2 (D4000) to the COR FPGA. With this signals the COR FPGA can controlled from other boards over the Motherboard FPGA2
- Gain control and frequency trigger signals (CS_xxSet1) from the Motherboard FPGA2 (D4000) to the COR FPGA (e.g. from BB Measurement CMW-H100A)
- Gain control and frequency trigger signals (CS_xxSet2) from the COR FPGA to the Motherboard FPGA2 (D4000) (for RF Frontend)
- The four buffered (tristate) narrow band power trigger (TRIGNBPOWx) from the COR FPGA supplied via this connector
- The COR FPGA can read the hardware coded Slot ID from the motherboard via this connector. Each connector on the Motherboard has an unique Slot ID

The multiplexed diagnosis voltages from the TX Module and the RX Module are measured on the COR module. For this purpose the diagnosis voltage (e.g. temperature or power supply voltage) from the COR Module multiplexed with the diagnosis voltages from the two RF Modules and then routed to an analog digital converter (ADC) and then feed into the COR FPGA. This digital diagnosis value then transferred via the PCIe Bus to the FMC and then evaluated for diagnosis and control purpose. But during the runtime the controller inside the COR FPGA uses RX and TX diagnosis to control the setting of the RF .

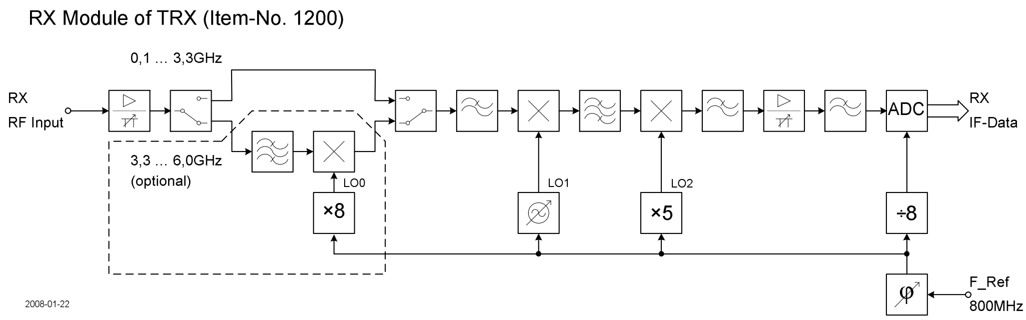
There is a power trigger (RX_POWTRIG_1) available which is used for a RF power over range detection. For this trigger signal the RF detector voltage from the RX Module is compared with a trigger level set by the COR FPGA. This power trigger is used to switch an additional attenuation in the RX path.
A further power trigger (RX_POWTRIG_2) is available. For this trigger signal the RF or IF detector voltage from the RX Module is compared with an internal vale from the COR FPGA. This power trigger can be given to other boards..

The auto ranging of the RX Path is also controlled by the COR FPGA. For this purpose the RF and IF detector voltages sampled on the RX Module and then the digital signal transferred to COR FPGA. On the COR FPGA the digital signals will be evaluated and the settings on the RX Module will be done.

The RX-SPI and the TX-SPI is used for the communication between the COR FPGA and the RX Module or TX Module. The Serial Peripheral Interface (SPI) is used to control the diagnosis multiplexer and the RX path or the TX path. It is also possible to read information (e.g. correction data) from the two RF modules. Furthermore the initialization of the ADC or DAC is done via this signals.

3.1.15 RX Module of the TRX (Item-No. 1200)

3.1.15.1 Block diagram of the RX Module of the TRX



3.1.15.2 Common description of the RX Module of the TRX

The RF RX is divided into two frequency ranges. One covers the standard frequency range from 100 MHz to 3,3 GHz and the other covers the optional frequency range from 3,3 GHz to 6,0 GHz.

The RF Input signal at the QMA connector X700 is feed through various switchable gain amplifier or attenuators and also through a digital controlled step attenuator to match the desired level of the mixer according to the applied level at the Input connector. Depending on the input frequency and the available frequency range the signal is switched between two independent signal paths. In the optional frequency range from 3,3 GHz to 6,0 GHz the RF signal is filtered and then converted with a mixer and its fixed LO frequency (LO0) in the standard frequency range. The signal from the two frequency ranges differs only in the inverted or non-inverted sideband of the RF spectrum. This RF signal is now filtered and then up converted to a higher and fixed IF frequency by mean of a variable local oscillator frequency (LO1). Subsequently, this signal is converted to a low IF frequency by means of a signal conversion with a mixer and its fixed LO frequency (LO2). The signal at a low IF is feed through different filters, various switchable gain amplifier or attenuators and also through a digital controlled step attenuator to match the desired level of the ADC (analog digital converter). This down converted analogue signal is provided after a final filtering to an ADC and processed to a digital IF data. The sideband (inverted or non-inverted) of the digital IF spectrum is corrected and IQ down converted on the COR Board

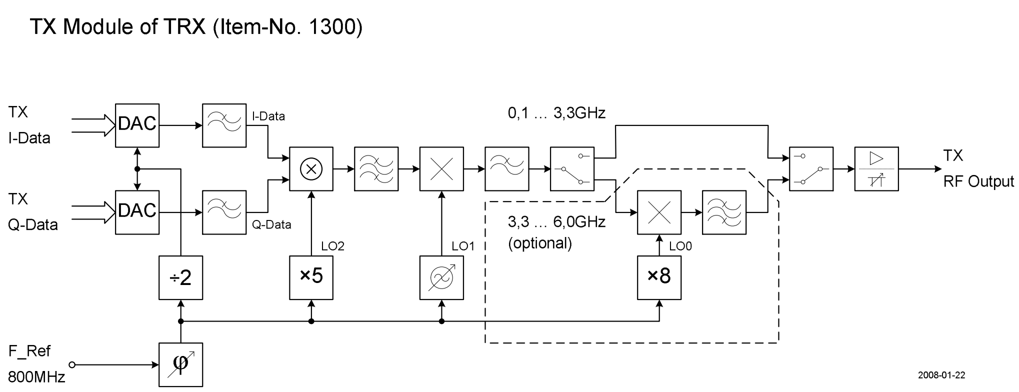
The multiplexed diagnosis voltages from the RX Module will be transferred to the COR module and measured on this board. On the RX Module the most supply voltages from the COR Module, the generated voltages on the RX Module and many diagnosis voltages from various circuits on the RX Module will be multiplexed and feed through the module connector X11 to the COR Module. Also the RF and IF detector voltages transferred via the multiplexer to the COR Module.

The RF and IF detector voltages also processed in an ADC on the RX Module and transferred digitally to the COR Module. This signal will be used on the COR Module in a sample and hold circuit to realize the auto ranging functionality.

The RX-Module is controlled by the COR FPGA on the COR Module.

3.1.16 TX Module of the TRX (Item-No. 1300)

3.1.16.1 Block diagram of the TX Module of the TRX



3.1.16.2 Common description of the TX Module of the TRX

The RF TX is divided into two frequency ranges. One covers the standard frequency range from 100 MHz to 3,3 GHz and the other covers the optional frequency range from 3,3 GHz to 6,0 GHz.

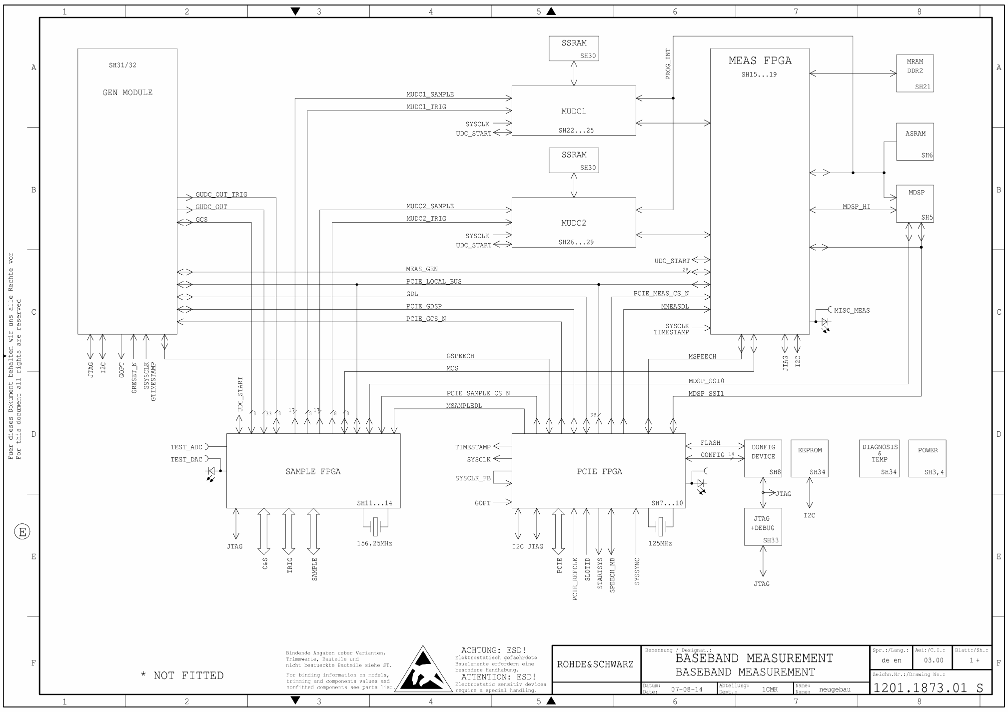
The IQ TX Data from the COR Module is feed in a DAC (digital analog converter).This DAC allows an IQ up conversion and after this the processing from digital to analog IQ data is done. The two analogue TX IQ Data signals feed via separate filters to the IQ modulator where the conversion with the fixed LO frequency (LO2) to the high IF frequency is done. This fixed IF signal is now filtered and then down converted by mean of a variable local oscillator frequency (LO1). Depending on the desired RF output frequency and the available frequency range the TX RF signal is either feed direct to the last RF stage or it is routed to another mixer. The mixer with its fixed LO frequency (LO0) is used, if the optional frequency range from 3,3 GHz to 6,0 GHz is installed. After the mixer the RF TX signal is additionally filtered and then also routed to the last RF stage. The signal from the two frequency ranges differs only in the inverted or non-inverted sideband of the RF spectrum. The sideband (inverted or non-inverted) of the digital RF spectrum is corrected on the COR Board. In the last RF stage of the TX Module the TX RF output signal is feed through various switchable gain amplifier or attenuators and also through a digital controlled step attenuator to match the desired output level at the QMA connector X1100.

The multiplexed diagnosis voltages from the TX Module will be transferred to the COR module and measured on this board. On the TX Module the most supply voltages from the COR Module, the generated voltages on the TX Module and many diagnosis voltages from various circuits on the TX Module will be multiplexed and feed through the module connector X9 to the COR Module.

The TX-Module is controlled by the COR FPGA on the COR Module.

3.1.17 BB Measurement H100A (Item-No. 1040)

3.1.17.1 Block diagram of the BB Measurement Board



3.1.17.2 Common description of the BB Measurement Board

The BB Measurement Board is able to down convert (down sampling and frequency shift) and measure the digital IQ data streams from the SAMPLE FPGA (D1100) simultaneously. The IQ data streams are retimed in the SAMPLE FPGA, sent to the two MUDC (D2200 and D2600) and stored in the MRAM (DDR2 type on X2100). For measurement purposes, the MDSP (D502) may access the data stream in the MRAM, send again through the MUDC for post processing and store again in the SSRAM of the MUDC. MEAS FPGA (D1500) handles the timing and the MRAM. The PCIe FPGA (D700) is the interface of the BB Measurement Board with the Front Module Controller (FMC) via the PCIe Bus. On the module also the optional BB Generator H110A (1201.1921.02 / Item-No. 1050) may be plugged in on connector X100.

On the one side the PCIe FPGA is the interface to the FMC and on the other side it is the bridge between the PCIe Bus and the PCIe Local Bus on the BB Measurement Board. The PCIe FPGA handles the "translation" from PCIe BUS to PCIe Local Bus and vice versa. This PCIe Local Bus is used for data exchange between the FMC (via PCIE FPGA) and MEAS FPGA (as well as BB Generator Board). The Front Module Controller itself has access to the MEAS FPGA through the PCIe FPGA via PCIe bus interface and PCIe local bus. The reference frequency and timestamp regeneration is also done in the PCIe FPGA. The Time Stamp is used to inform the SAMPLE FPGA and the MEAS FPGA (and with it the connected modules as well as the MDSP) about a kind of event.
To be ready for the PCIe initialization cycle the FPGA need a boot device (Enhanced Configuration Devices) on board. This device includes a flash memory for the program and a controller to handle the initialization after power has become stable.

The SAMPLE FPGA is used to receive the data samples via the BB Link Board from the COR Module together with time stamp (from PCIe FPGA) and trigger information and feed them to the MUDC. The Trigger information dedicated to the measurement applications are fed together with the data samples through the MUDC. The MDSP can control which trigger signal has to be fed through the MUDC beside the samples.

On the MEAS FPGA no measurement or evaluation is done. It is used for the interconnection and for control purpose of many components on the BB Measurement Board.
The data stream between the following components is controlled by the MEAS FPGA

- MRAM and MDSP
- MUDC and MEAS RAM (MRAM)
- Front Module Controller (FMC) and MDSP

But the MEAS FPGA connects also the SAMPLE FPGA with MDSP for sample data exchange. Even the support for booting the software to the MDSP is done by the MEAS FPGA.

The FMC initiates and controls the download of the design to the MEAS FPGA and the SAMPLE FPGA. Also the MDSP and the measurement applications running on the MDSP are controlled by the FMC. For this purpose the FMC communicates with the MDSP with aid of MEAS FPGA and through the MRAM

The MDSP is used to perform the measurement applications (sequences of settings, signal processing algorithms …) and has its own ASRAM
For this purpose the MDSP includes the following functionality

- Controls the incoming stream of sample data
    - Modification of MUDC settings
    - Modification of settings concerning the SAMPLE FPGA
    - Modification of the sample data signal path through the MEAS FPGA
        → MUDC to MRAM
        → MRAM to MUDC for post processing

- Modifies and processes the data stream
  - Access to the data captured within MRAM
  - Read / write access to the MUDC and its SSRAM
- Has access to special timing information (trigger signals) in order to process the data samples in context to the timing information
- MDSP has access to MRAM via the MEAS FPGA

There are two MUDCs "Up Down Converters" connected to the MEAS FPGA. Only the down converting part, the filtering part and the spectrum analyzes part from the MUDC is used on the BB Measurement Board.

- The MUDCs are used to process the digital sample data steam coming from Sample FPGA. process means
  - direct pass through with or without down sampling and filtering
  - down converting (frequency shift) with or without down sampling and filtering
  - perform spectrum analysis based on the input samples
- The MUDCs are used to perform the writing of the processed sample data to the MRAM (through the Meas FPGA)
- The MUDCs are used for to post process data fetched from the MRAM
  - The post processed data are written to the SSRAM connected to the MUDC. The MDSP can afterwards read the data
- The MUDC's are directly connected to the MDSP (MDSP bus) by means of the MUDC PROGINT interface . The MDSP controls the MUDC directly. (Without intervention of MEAS FPGA)

The temperature of the MEAS FPGA (D1500), PCIe FPGA (D700) and the SAMPLE FPGA (D1100) is accurately sensed with the temperature sensor (U3400) which has the ability to sense its own temperature and the temperature of up to three further external devices. The diagnosis information from this temperature sensor (U3400) will be sent separately to the motherboard and not via the diagnosis multiplexer (D3400, D3401 and D3403).
On the BB Measurement Board there are further discrete temperature sensors which sense the temperature of the MRAM (under the MRAM Module on the BB Measurement Board) and the temperature of different voltages regulators. This temperature diagnosis voltages will be sent via diagnosis multiplexer (D3401 and D3403) to the motherboard.
Also some supply voltages which feed through the connector X6 from the motherboard to the BB Measurement Board and the generated voltages on the BB Measurement Board will be multiplexed for diagnosis purpose and fed through the board connector X5 to the motherboard.
These analogue diagnosis voltages are then transferred via the Miscellaneous Bus to the diagnosis multiplexer on the motherboard and then evaluated for diagnosis and control purpose.

3.2 MODULE Replacement

CAUTION

Danger of shock hazard

For module replacement, ensure that the instrument is switched off and disconnected from the power supply by removing the plug from the AC and DC power connector.

Read all safety instructions at the beginning of this manual carefully before module replacement!

NOTICE

Danger of damage to the instrument

The product may be opened only by authorized, specially trained personnel.

Any adjustments, replacements of parts, maintenance or repair must be carried out only by technical personnel authorized by Rohde & Schwarz.

NOTICE

Danger of damage to components of the module

Protect the operational site against electrostatic discharge to avoid damage to electronic components of the modules. For details refer to the safety instructions at the beginning of this manual.

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

3.2.1 General Preparation

Explanation of TAZ on the Barcode Label

This figure is an example for the barcode label and shows the included information.

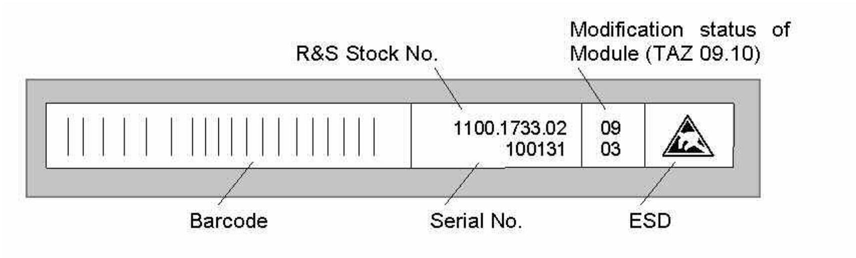


Figure 1 Barcode Label

Hints for handling

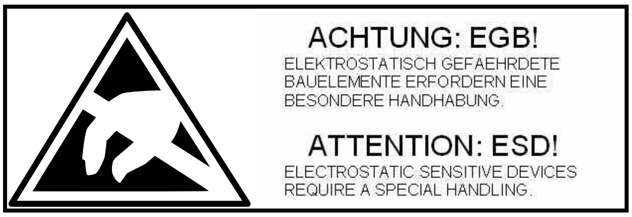
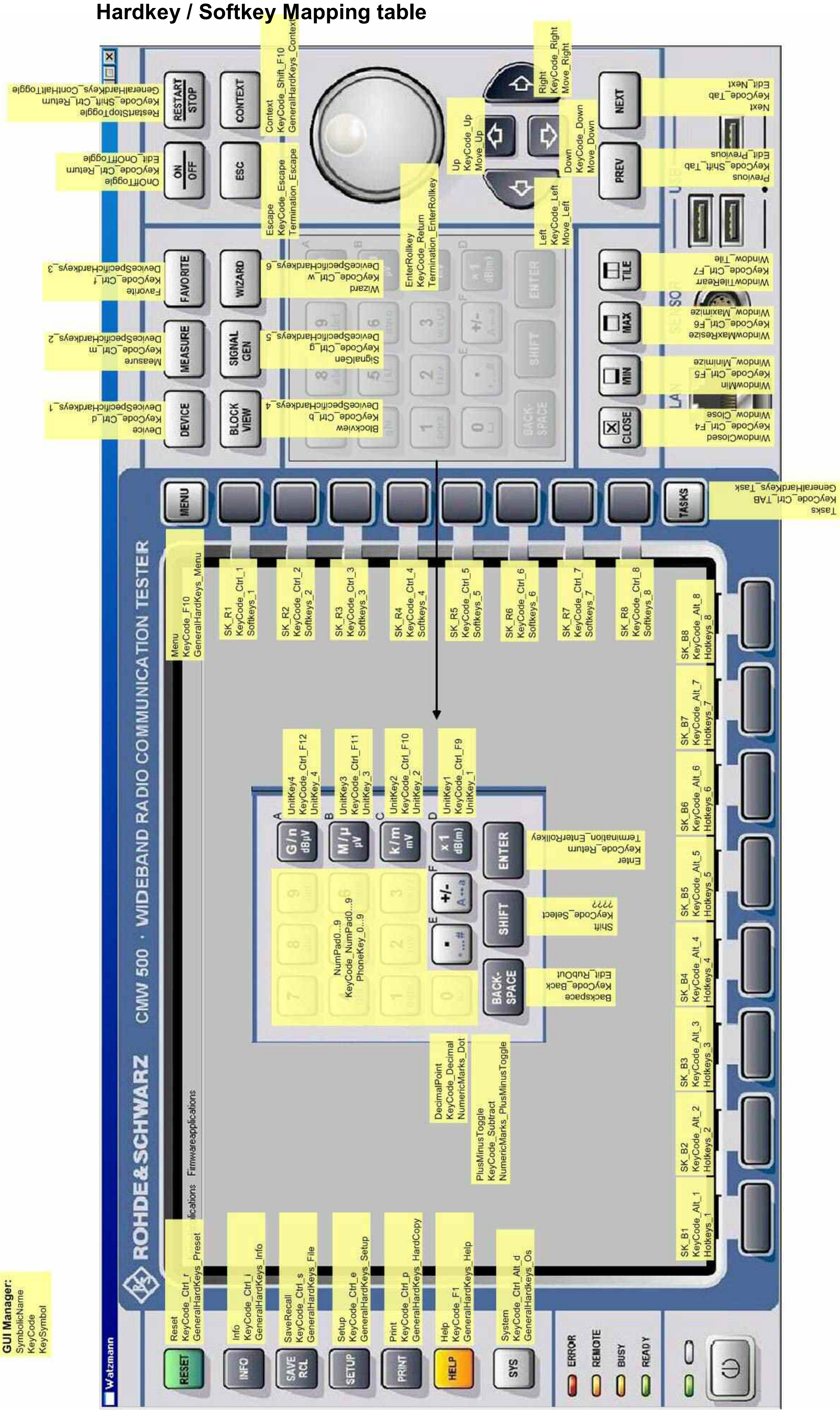


Figure 2 Electrostatics

Installing several options/ modules

It's advised to install options / modules one by one to avoid conflicts and to provide verification of proper function.

Hardkey / Softkey Mapping table

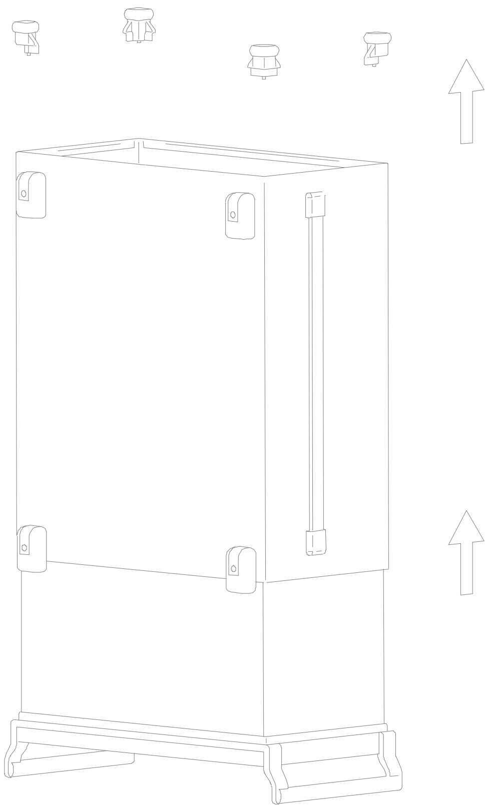


COMPANY RESTRICTED

Open the instrument

Note: It is not necessary to open the instrument as described on this page if the replacement concerns the front of the instrument (FRONTCOVER, FRONTMODUL CONTROLLER, FRONTPANEL, DISPLAY and associated) -> symbolized by the orange highlighted area in Figure 4.

1. Switch off unit and unplug power.
2. Unplug all cables.
3. Place unit on handles at the front.
4. In order to save the yellow sticker - remove concerning blue rubber bumper manually as shown.
5. Screw off cabinet feet.
6. Push casing upwards and remove it (see Figure 3).
7. Undo the screws at the cover and lift it off (see Figure 4).



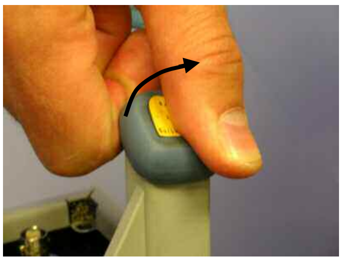


Figure 3 Removing the casing

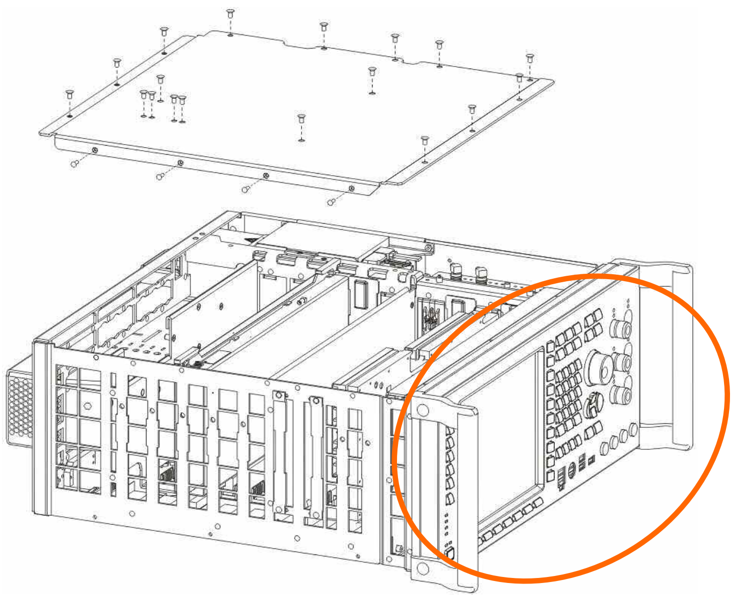


Figure 4 Removing the cover

3.2.2 Replacing the FRONTCOVER

(see chapter 5, *spare part list, Item No. 470/340.*

The FRONTCOVER is the outer casing which carries the labeling of all the parts on the front side of the R&S CMW. For replacement proceed as follows:

1. Unscrew the four screws of the front handles at the instrument frame on both sides and take off the front handles and the FRONT COVER.
2. Place the new FRONTCOVER.
3. Complete the instrument in reverse order.

3.2.3 Replacing the FP WITH MMI H600B

(see chapter 5, spare part list, Item No. 400, and explosion drawing 1201.0025.01 D sheet 1)

For replacement proceed as follows:

1. Unscrew the four screws of the front handles at the instrument frame on both sides and take off the front handles and the FRONT COVER.
2. Unscrew the eight countersunk screws (1) of the FP WITH MMI H600.
3. Unfix (don't remove) the five countersunk screws (2).
   In order to improve the maintenance situation by relaxing the shielding spring.
4. Replace the two countersunk screws (3) by the knurled screws included in the service kit.
5. Take off the FP WITH MMI H600 and replace it by the new one.
6. Complete the instrument in reverse order.

3.2.4 Replacing the PUSH-BUTTON BOARD SET

(see chapter 5, spare part list, Item No. 410/420, and explosion drawing 1201.0025.01 D sheet 4)

For replacement proceed as follows:

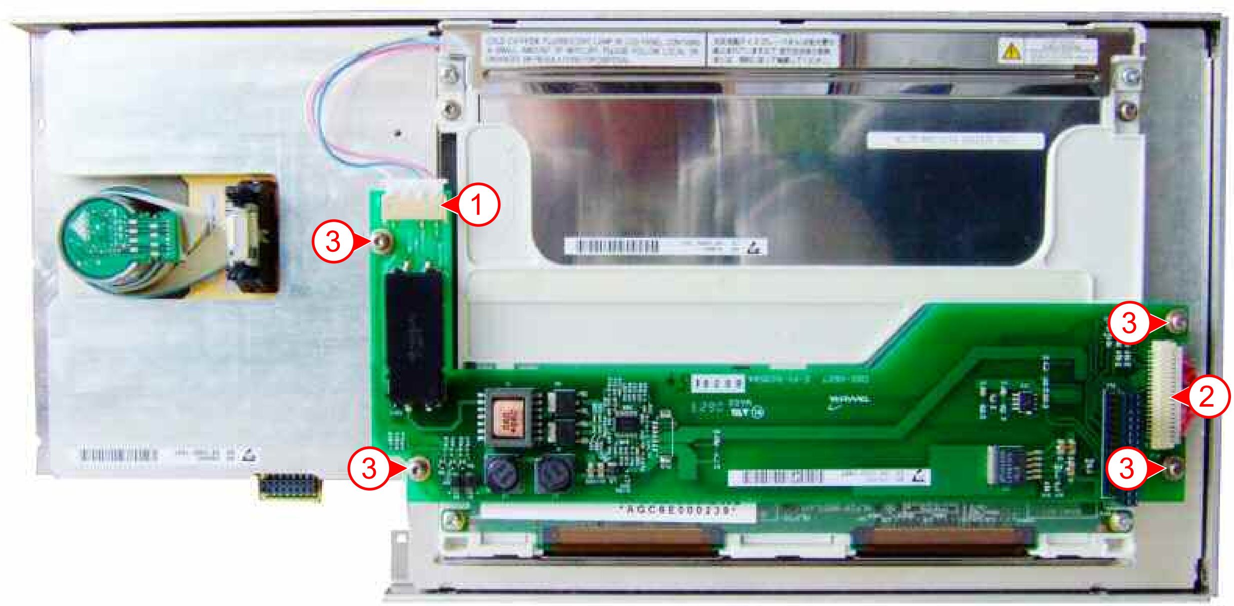
1. Remove the FP WITH MMI H600 as described in its subchapter for replacement.
2. Unscrew the fourteen screws at the FP WITH MMI H600.
3. Take off the front of the FP WITH MMI H600.
4. Take off the PUSH-BUTTON BOARD SET and replace it by the new one.
5. Complete the instrument in reverse order.

3.2.5 Replacing the DISPLAY ADAPTER

(see chapter 5, spare part list, Item No. 460 and explosion drawing 1201.0025.01 D sheet 4)

For replacement proceed as follows:

1. Remove the FP WITH MMI H600 as described in its subchapter for replacement.
2. Unplug connector to the backlight (1) and the connector to the display (2).
3. Unscrew the four screws with captive washers (3).
4. Take off the DISPLAY ADAPTER and mount the new one.
5. Complete the instrument in reverse order without causing damage to the cables.



3.2.6 Replacing the DISPLAY

(see chapter 5, spare part list, Item No. 440 and explosion drawing 1201.0025.01 D sheet 4)

For replacement proceed as follows:

1. Remove the DISPLAY ADAPTER as described in its subchapter for replacement.
2. Unscrew four screws at the DISPLAY.
3. Take off the DISPLAY and replace it by the new one.
4. Complete the instrument in reverse order without causing damage to the cables.

COMPANY RESTRICTED

3.2.7 Replacing the SCREENED FILTER GLAS

(see chapter 5, spare part list, Item No. 430 and explosion drawing 1201.0025.01 D sheet 4)

Note: The RF springs have to be replaced too - Item No. 432/434.

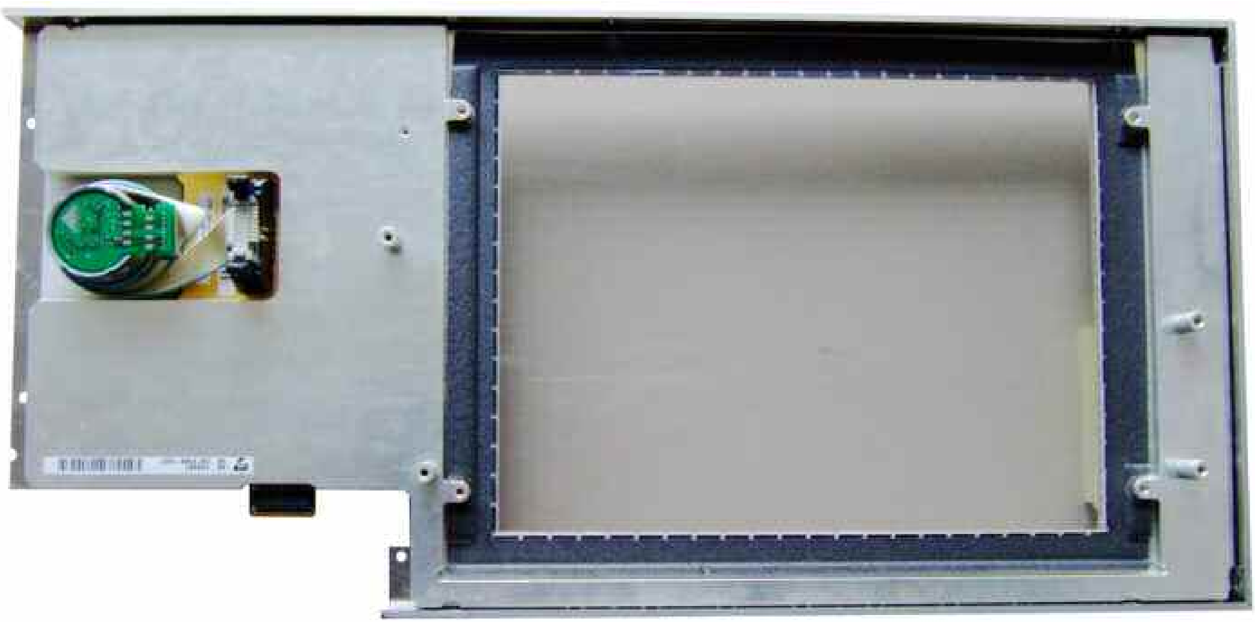
NOTICE

Danger of mechanical damage

To protect the SCREENDED FILTER GLAS leave the protective foil attached until the SCREENED FILTER GLAS has been mounted to the frame.

For replacement proceed as follows:

1. Remove the DISPLAY as described in its subchapter for replacement.
2. Remove the dust proofing.
3. Push the SCREENED FILTER GLAS out of the frame.
4. Place the new RF SPRINGS to the new SCREENED FILTER GLAS. The smaller bars of the spring have to orientated to the transparent foil of the SCREENED FILTER GLAS.
5. Place carefully the new SCREENED FILTER GLAS to the frame. The small bars have to be orientated to the instrument front.
6. Complete the instrument in reverse order without causing damage to the cables.

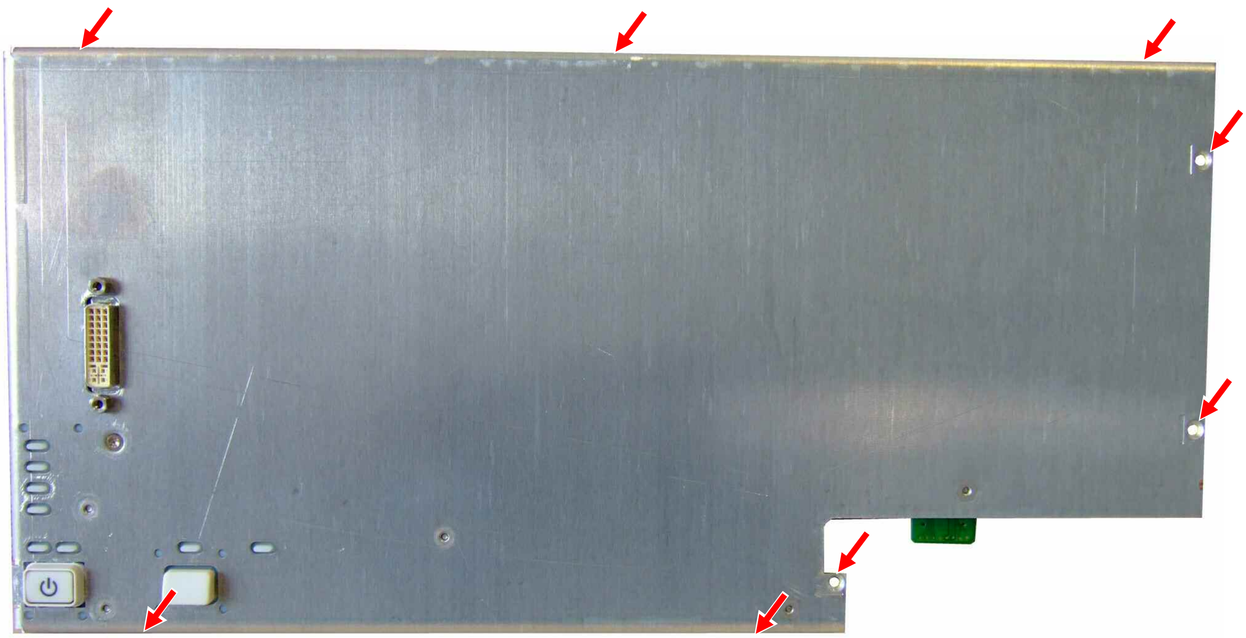


3.2.8 Replacing the FP BLANK H600A/L

(see chapter 5, spare part list, Item No. 300)

For replacement proceed as follows:

1. Unscrew the four screws of the front handles at the instrument frame on both sides and take off the front handles and the FRONT COVER.
2. Unscrew the FP BLANK 600A/L (eight screws) and take it off.
3. Place the new FP BLANK H600A/L.
4. Complete the instrument in reverse order.

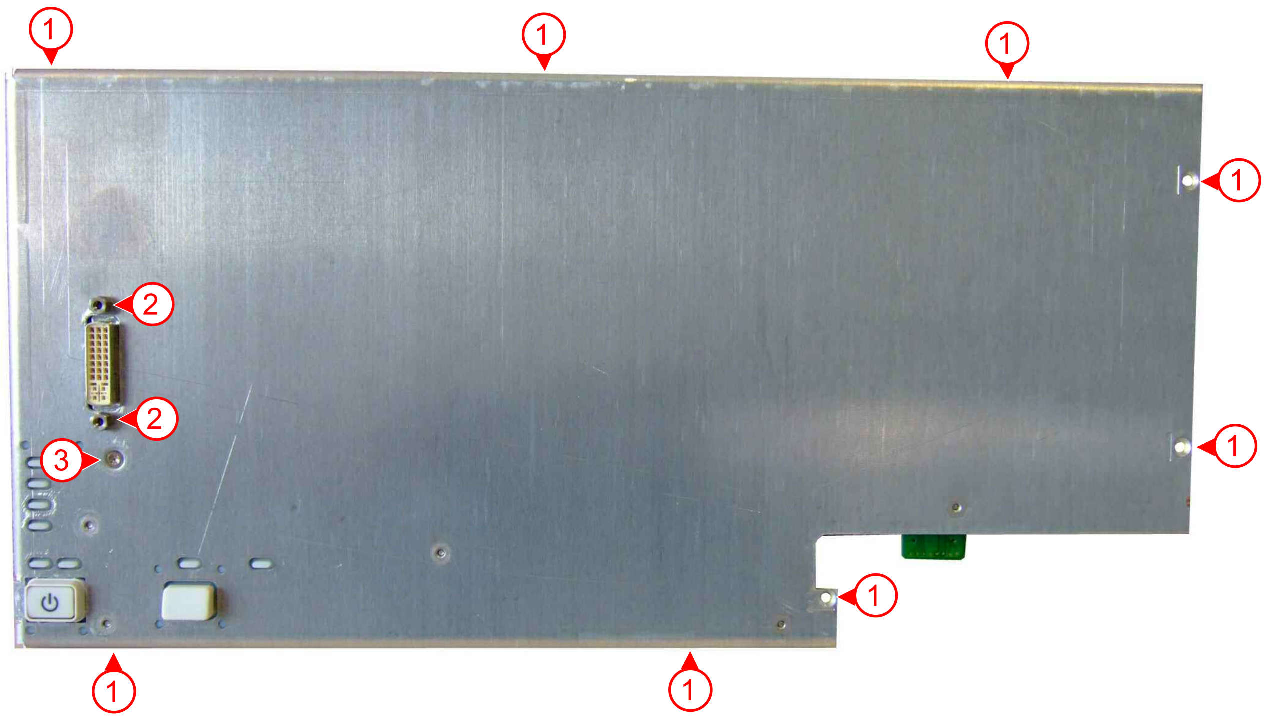


3.2.9 Replacing the DVI_ADAPTER

(see chapter 5, spare part list, Item No. 330)

For replacement proceed as follows:

1. Unscrew the FP BLANK (eight screws) (1) and take it off.
2. Unscrew the DVI_ADAPTER: 2x bolting screw (2) and one screw (3) below the DVI connector.
3. Place the new DVI_ADAPTER.
4. Complete the instrument in reverse order.



3.2.10 Replacing the PUSH-BUTTON BOARD SET II S

(see chapter 5, spare part list, Item No. 310/320)

For replacement proceed as follows:

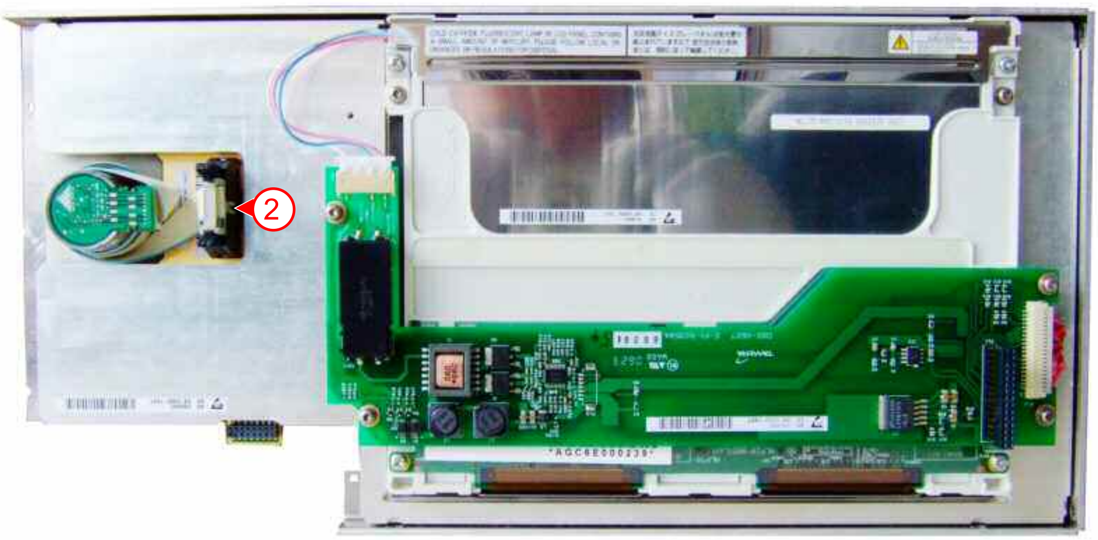
1. Remove the DVI_ADAPTER as described in its subchapter for replacement.
2. Unscrew the FRONT PANEL BOARD II S (five screws).
3. Replace the PUSH-BUTTON BOARD SET.
4. Complete the instrument in reverse order.

3.2.11 Replacing the ROTARY PULSE GENERATOR

(see chapter 5, spare part list, Item No. 450 and explosion drawing 1201.0025.01 D sheet 4)

For replacement proceed as follows:

1. Remove the FP WITH MMI H600B as described in its subchapter.
2. Take off the knob (1) of the ROTARY PULSE GENERATOR.
3. Unfix the nut which is below the knob.
4. Unplug the connector (2) of the ROTARY PULSE GENERATOR.
5. Take off the ROTARY PULSE GENERATOR and mount new one.
6. Complete the instrument in reverse order.



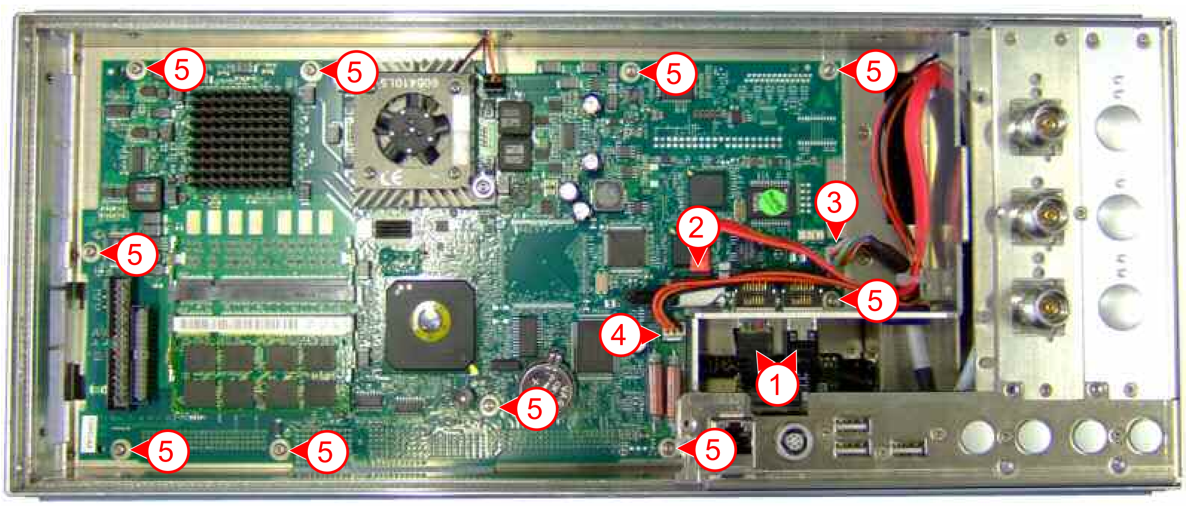
3.2.12 Replacing the FRONT MODULE CONTROLLER

(see chapter 5, spare part list, Item No. 1000 and explosion drawing 1201.0025.01 D sheet 1)

For replacement proceed as follows:

1. Remove the FP WITH MMI H600A/L or FP WITH MMI H600B as described in its subchapter for replacement.
2. Unplug 2x Ethernet (1), SATA (2), USB (3) and HD power (4).
3. Unscrew the FRONT MODULE CONTROLLER (ten screws) (5).
4. Pull out the FRONT MODULE CONTROLLER and replace it by the new one.
5. Complete the instrument in reverse order without causing damage to the cables.

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



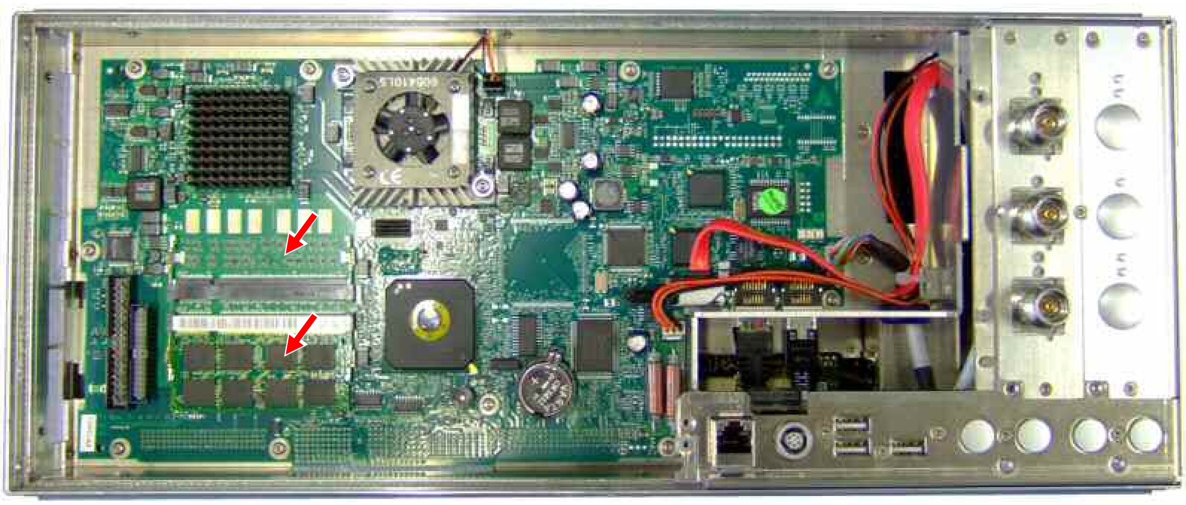
3.2.13 Replacing the Memory Modules in the FRONT MODULE CONTROLLER

(see chapter 5, *spare part list, Item No.1002) and explosion drawing 1201.0025.01 D sheet 1)*

The FRONT MODULE CONTROLLER features two SODIMM-200 slots, in each of which up to 1GB memory can be fitted even of different size. The BIOS automatically detects the size of the memory modules.

For replacement proceed as follows:

1. Remove the FP WITH MMI H600A/L or FP WITH MMI H600B as described in its subchapter.
2. Remove the old module: Carefully bend the lateral brackets towards the outside and pull out the memory module.
3. Insert the new module: insert the memory module into the slot, slightly press towards the rear and engage the brackets on the sides.
4. Complete the instrument in reverse order.



3.2.14 Replacing the Lithium Battery in the FRONT MODULE CONTROLLER

(see chapter 5, spare part list, Item No. 1001 and explosion drawing 1201.0025.01 D sheet 1)

Note: *Data in the CMOS RAM will be lost when replacing the lithium battery. After replacement it has to be set new.*

The lithium battery is accommodated on the FRONT MODULE CONTROLLER board.

CAUTION

Danger of injury

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

Do not short-circuit the battery.

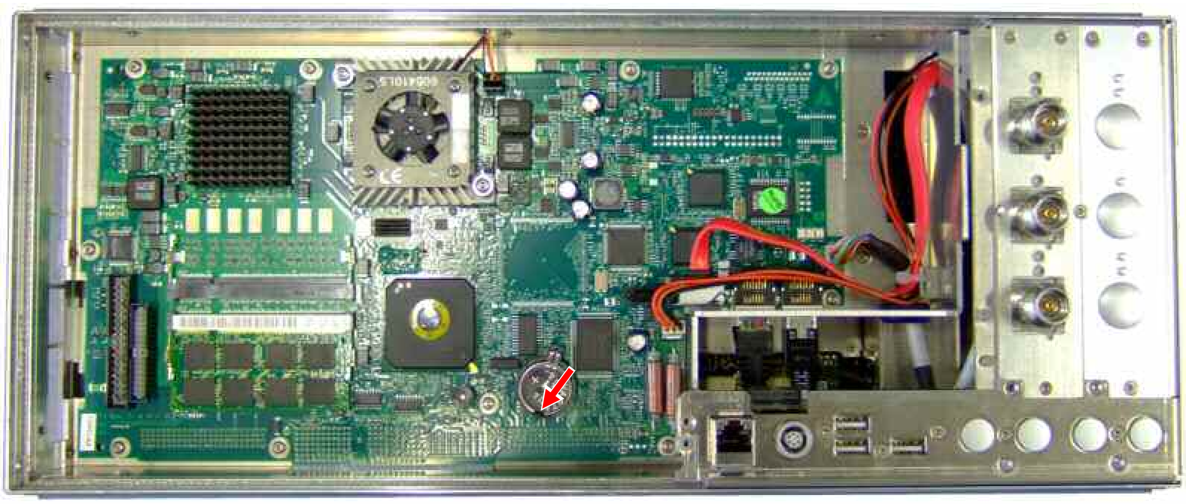
If the battery is replaced improperly, there is danger of explosion. Only replace the battery by R&S type.

Keep away from children.

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

For replacement proceed as follows:

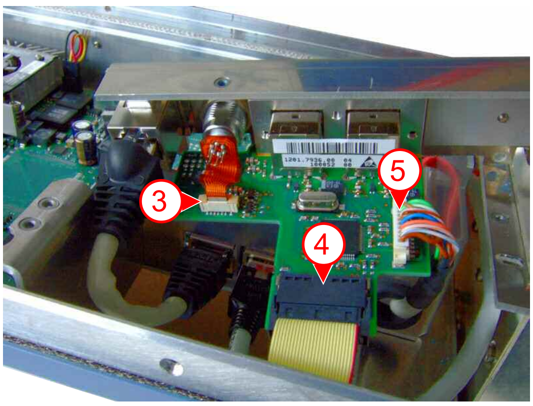
1. Remove the FP WITH MMI H600B or FP BLANK 600A/L as described in its subchapter for replacement.
2. Push the batteries holders lug to the indicated direction and pull out the battery from its holder.
3. Place the new battery with correct polarity.
4. Complete the instrument in reverse order.



3.2.15 Replacing the FRONT PANEL BOARD I PROG.

(see chapter 5, *spare part list, Item No. 895 and explosion drawing 1201.0025.01 D sheet 1*)

1. Remove the FP WITH MMI H600A/L or FP WITH MMI H600B as described in its subchapter.
2. Unscrew the cover of the FRONT PANEL BOARD I PROG. (5 countersunk screws) (1).
3. Unscrew and pull out the FRONTPANEL BOARD I PROG. itself (2).
4. Unplug all cables to the FRONTPANEL BOARD I PROG. (3) (4) (5).
5. Replace the FRONTPANEL BOARD I PROG. by the new one.
6. Complete the instrument in reverse order without causing damage to the cables.

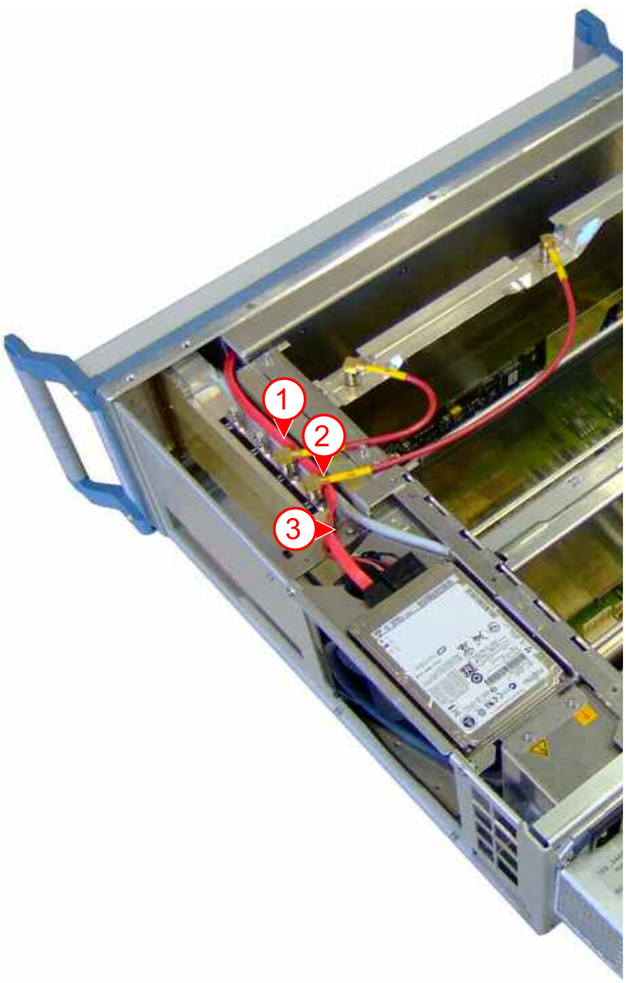


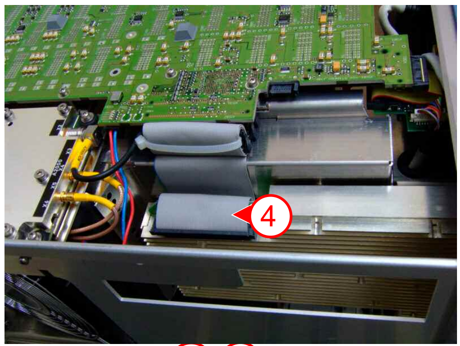
3.2.16 Replacing the RF FRONTEND H590A

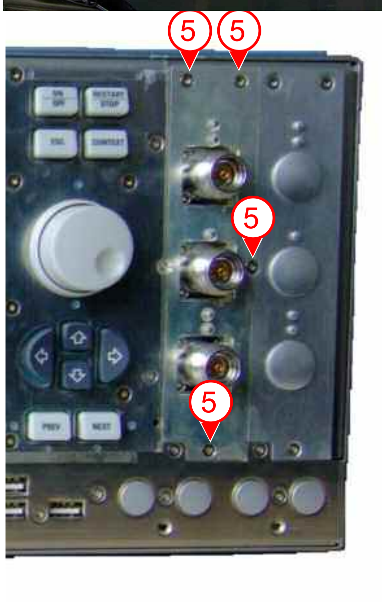
(see chapter 5, *spare part list, Item No. 1500 and explosion drawing 1201.0025.01 D sheet 1*)

The RF FRONTEND H590A is installed at the front right of the R&S CMW. For replacement proceed as follows:

1. Unscrew the four screws of the front handles at the instrument frame on both sides and take off the front handles and the FRONTCOVER.
2. Unplug the cables on the top (1), (2).
3. Unscrew the RF FRONTEND H590A from its fixation at the top (3).
4. Unplug the flat wire at the bottom side of the instrument (4).
5. Unscrew the four countersunk screws at the front (5).
6. Carefully pull out the RF FRONTEND H590A and replace it by the new one.
7. Complete the instrument in reverse order without causing damage to the cables.





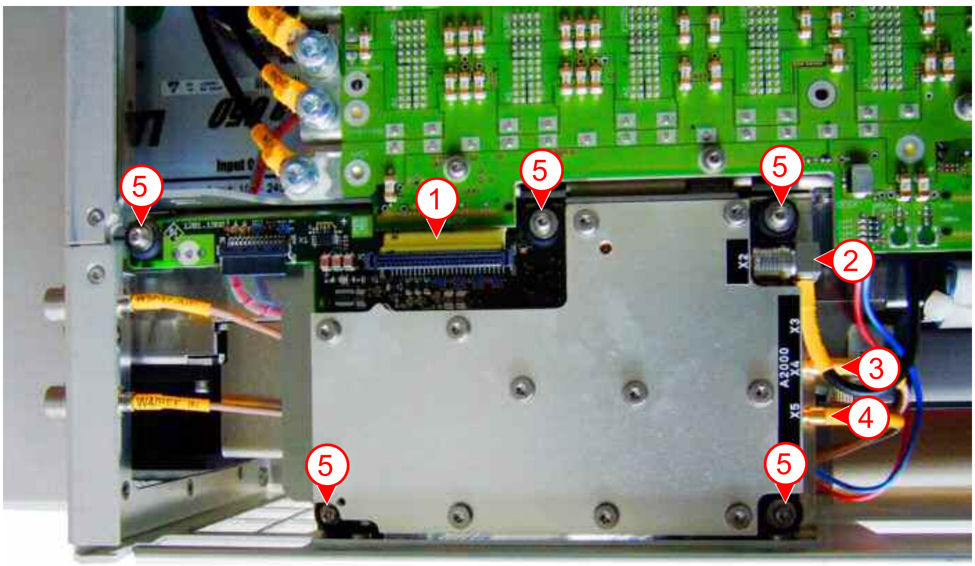


3.2.17 Replacing the REFERENCE H090A

(see chapter 5, *spare part list, Item No. 1030 and explosion drawing 1201.0025.01 D sheet 2*)

The REFERENCE H090A is installed below the UNIT FAN of the R&S CMW. For replacement proceed as follows:

1. Place the instrument upside down.
2. Pull off all cables to the REFERENCE H090A: flat wire (1), RF (2) (3) (4).
3. Unscrew the REFERENCE H090A (five screws) (5) and replace it by the new one.
4. Complete the instrument in reverse order without causing damage to the cables.

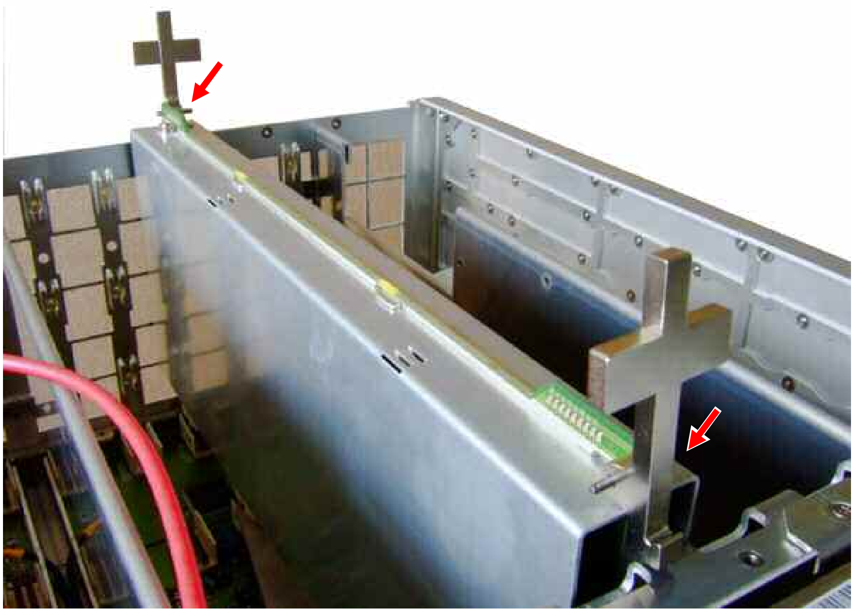


3.2.18 Replacing the BB MEASUREMENT H100A

(see chapter 5, *spare part list, Item No. 1040 and explosion drawing 1201.0025.01 D sheet 1*)

The BB MEASUREMENT H100A is installed in the module support as plug-in module. For replacement proceed as follows:

1. Pull out the board using the two levers included in service kit 1201.0031.02 on both sides.
2. Replace the BB MEASUREMENT H100A by the new one.
3. If BB GENERATOR is fitted to the BB MEASUREMENT H100A then mount it to the new one. Refer to its subchapter for replacement.
4. Complete the instrument in reverse order without causing damage to the cables.

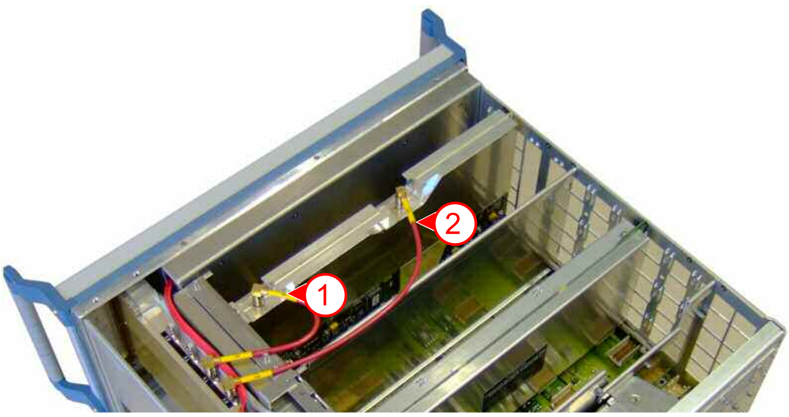


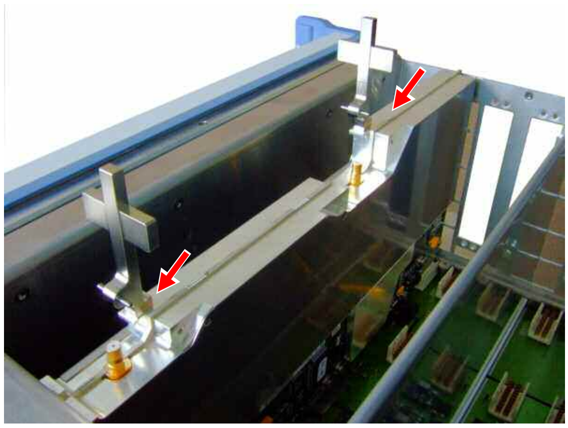
3.2.19 Replacing the COR MODULE OF TRX

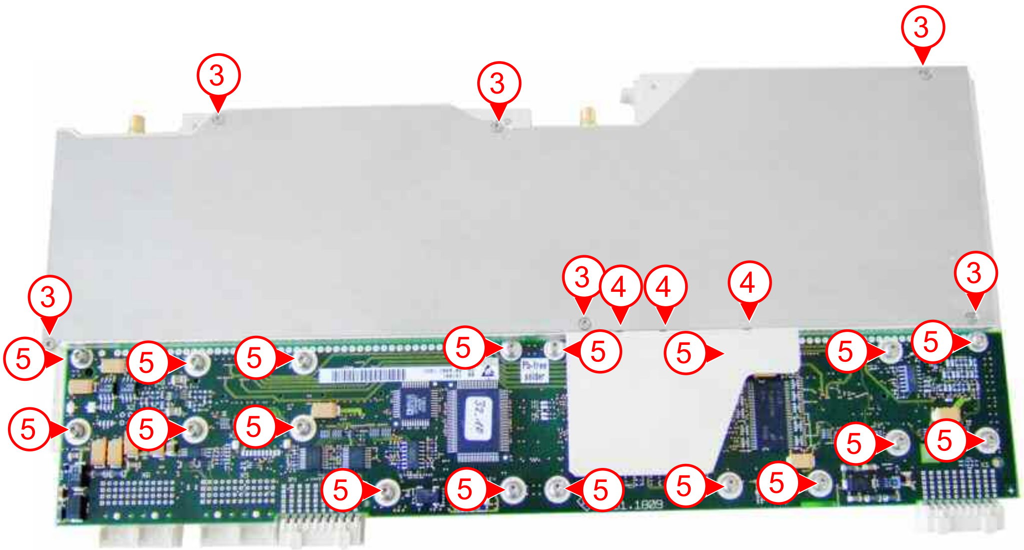
(see chapter 5, *spare part list, Item No. 1400 and explosion drawing 1201.0025.01 D sheet 1*)

The COR MODULE OF TRX is coupled with the RX MODULE OF TRX and the TX MODULE OF TRX and is installed in the module support as plug-in module. For replacement proceed as follows:

1. Pull off all RF cables (1) (2) from the top of the coupled TRX BOARD and pull out the board using the two levers (service kit) on both sides.
2. Unscrew the airshield (six screws) (3).
3. Unscrew the part of the cover which is across the COR MODULE OF TRX (three screws) (4).
4. Unscrew the COR MODULE OF TRX (18 screws) (5).
5. Replace the COR MODULE OF TRX by the new one.
6. Complete the instrument in reverse order without causing damage to the cables.





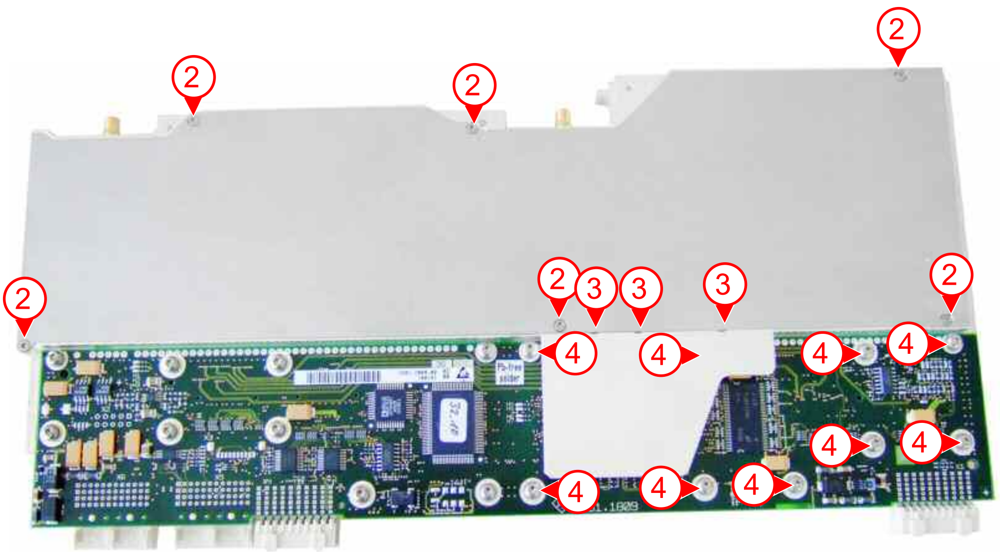


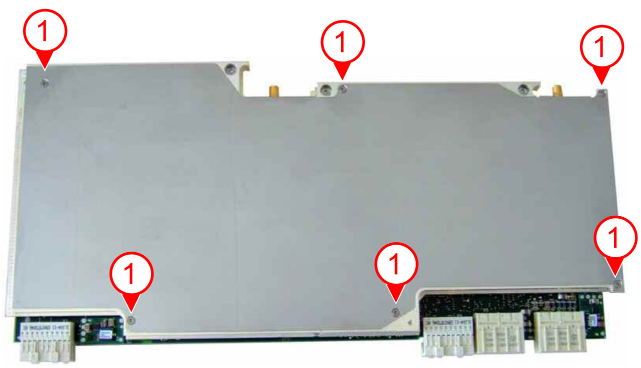
3.2.20 Replacing the RX MODULE OF TRX

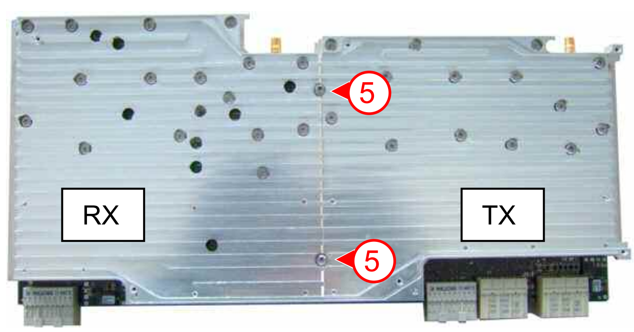
(see chapter 5, *spare part list, Item No. 1200 and explosion drawing 1201.0025.01 D sheet 1*)

The RX MODULE OF TRX is coupled with the TX MODULE OF TRX and the COR MODULE OF TRX and is installed in the module support as plug-in module. For replacement proceed as follows:

1. Remove the coupled TRX BOARD as described in subchapter for replacement the COR MODULE OF TRX.
2. Unscrew the two airshields (six screws each) (1) (2).
3. Unscrew the part of the cover which is across the COR MODULE OF TRX (three screws) (3).
4. COR MODULE OF TRX upside: Unscrew the nine screws at the right side (4).
5. Unscrew two screws (5) at the other side and take of the left cover.
6. Take the RX MODULE OF TRX off and replace it by the new one.
7. Complete the instrument without causing damage to the cables.





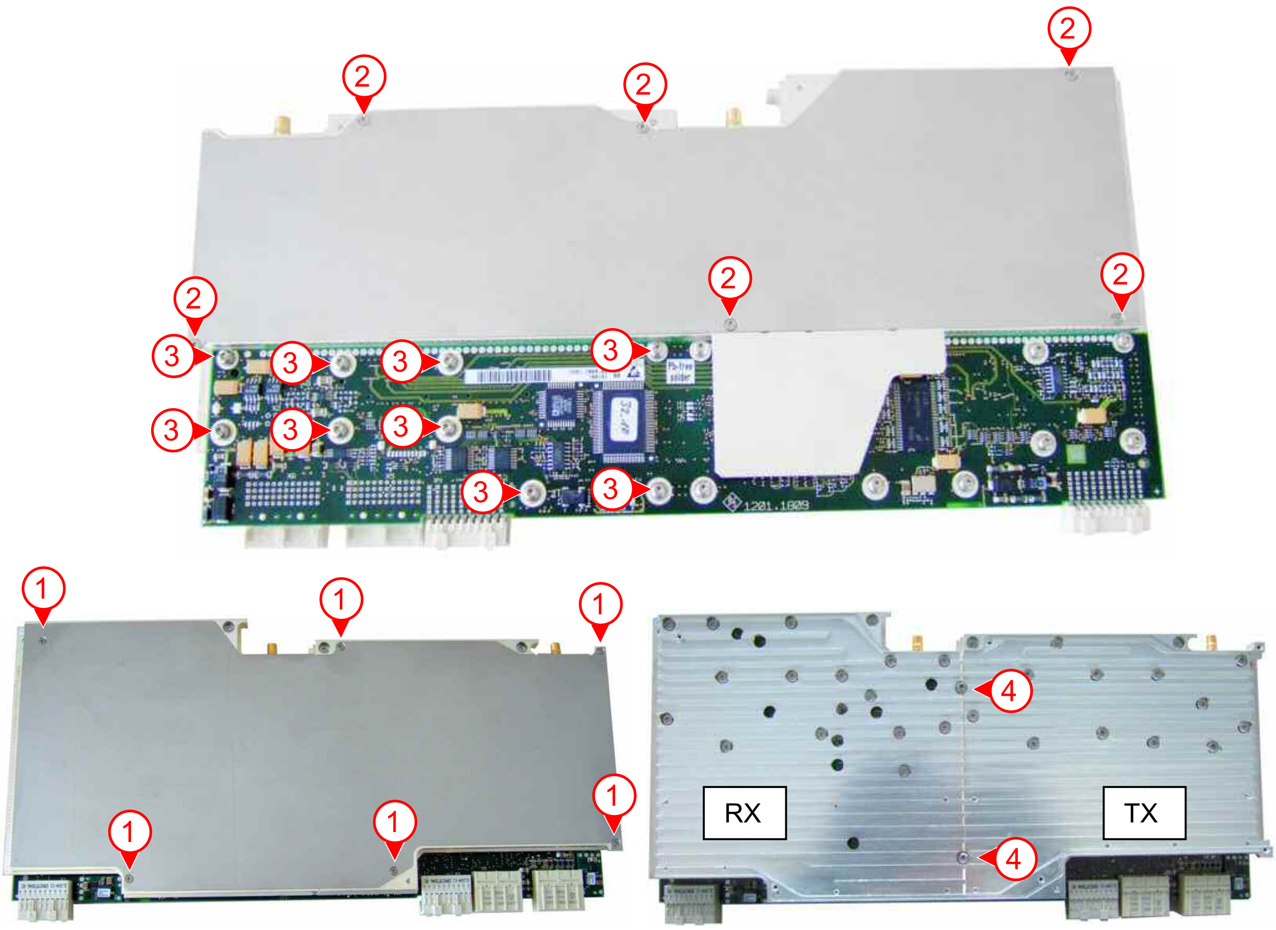


3.2.21 Replacing the TX BOARD OF TRX

(see chapter 5, *spare part list, Item No. 1300 and explosion drawing 1201.0025.01 D sheet 1*)

The TX BOARD OF TRX is coupled with the RX BOARD OF TRX and the COR MODULE OF TRX and is installed in the module support as plug-in module. For replacement proceed as follows:

1. Remove the coupled TRX BOARD as described in subchapter for replacement the COR MODULE OF TRX.
2. Unscrew the two airshields (six screws each) (1) (2).
3. COR MODULE OF TRX upside: Unscrew the nine screws at the left side (3).
4. Unscrew two screws at the other side and take of the right cover.
5. Take the TX BOARD OF TRX off and replace it by the new one.
6. Complete the instrument without causing damage to the cables.

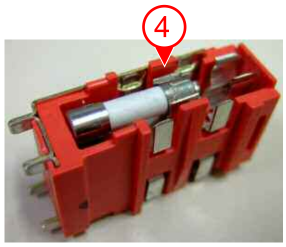


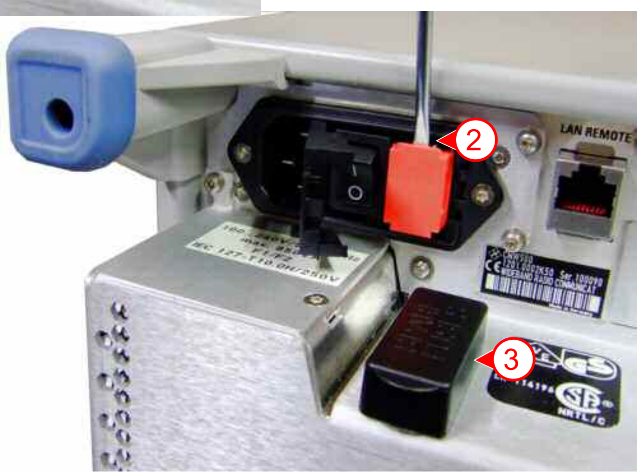
3.2.22 Replacing the main fuses

(see chapter 5, spare part list, Item No. 610 and explosion drawing 1201.0025.01 D sheet 5)

The main fuses are fitted at the rear of the instrument frame of the R&S CMW.
For replacement proceed as follows:

1. Disconnect the power cable.
2. Open the cover of the power entry module (1) with a screw driver size 1 or similar.
3. Pull out the fuse support by using a screwdriver size 3 or similar (2).
4. Replace the two fuses with Item Nr. 610 (4)
   (two spare fuses IEC 127-T10.0H/250V are provided in (3) the spare fuse holder).
5. Be aware that the fuses are in correct position.
6. Complete the instrument in reverse order.



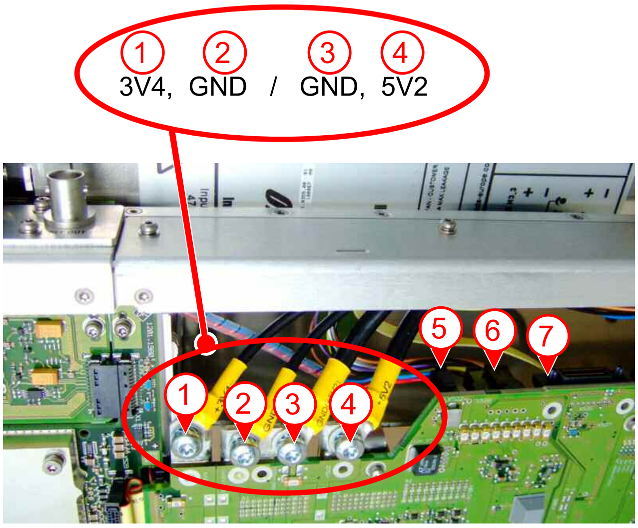


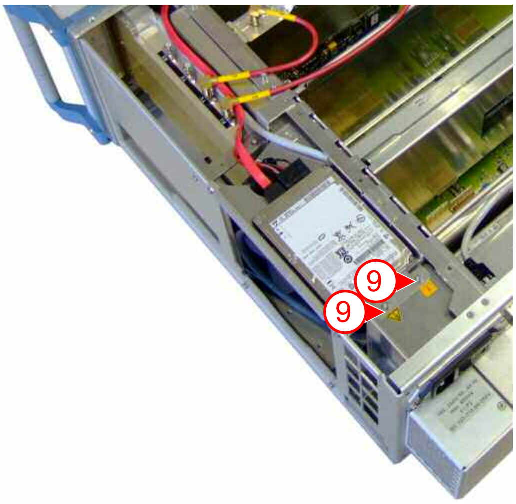
3.2.23 Replacing the POWER SUPPLY H054A

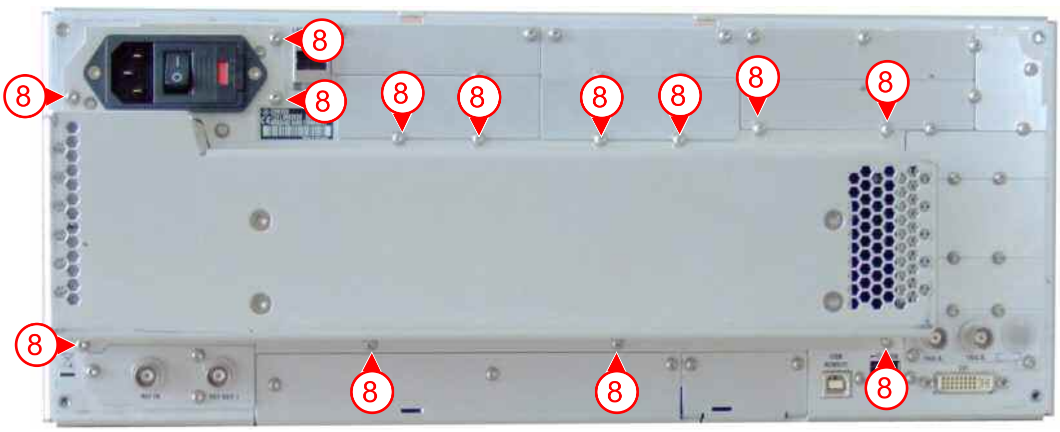
(see chapter 5, spare part list, Item No. 600 and explosion drawing 1201.0025.01 D sheet 1)

The POWER SUPPLY H054A is fitted at the rear of the instrument frame of the R&S CMW. For replacement proceed as follows:

7. Disconnect all cables (1)…(7) between MOTHERBOARD and POWER SUPPLY H054A.
8. Unscrew thirteen screws (8) with captive washers at the rear of the POWER SUPPLY H054A.
9. Unscrew two screws (9) at the harddisk.
10. Pull out the POWER SUPPLY H054A and replace it by the new one. Be careful in order to fit in the new one. See next page.
11. Complete the instrument in reverse order without causing damage to the cables.








USB REMOTE
USB

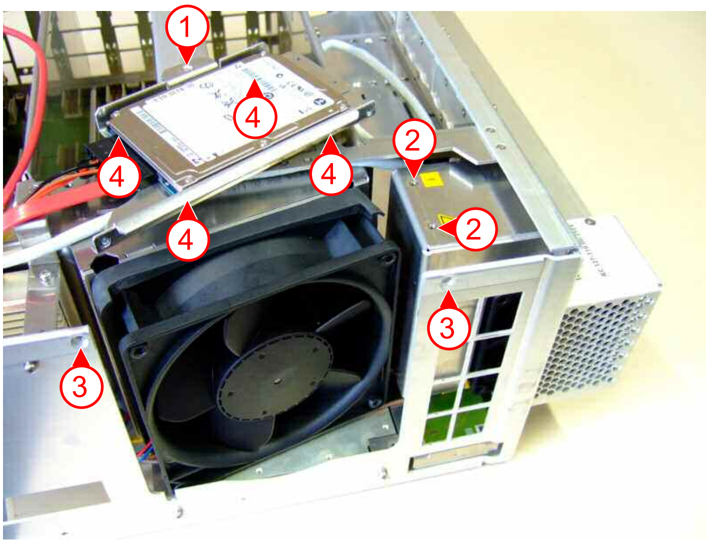
3.2.24 Replacing the HARDDISK H052A

(see chapter 5, *spare part list, Item No. 1010 and explosion drawing 1201.0025.01 D sheet 1*)

Note: The HARDDISK H052A is an SATA hard disk. It is already formatted for the R&S CMW and contains the operating system.

The hard disk is located above the UNIT FAN at the right side. For replacement proceed as follows:

1. Disconnect the data and the power cable from the HARDDISK H052A
2. Place the instrument in normal position and unscrew the holder of the HARDDISK H052A:
   one countersunk screw (1)
   two short screws with captive washers (2)
   two long screws with captive washers (3).
3. Unscrew the HARDDISK H052A from its holder (four countersunk screws) (4).
4. Take off the HARDDISK H052A and replace it by the new one.
5. Complete the instrument in reverse order without causing damage to the cables.



3.2.25 Replacing the UNIT FAN and FAN SLEEVE

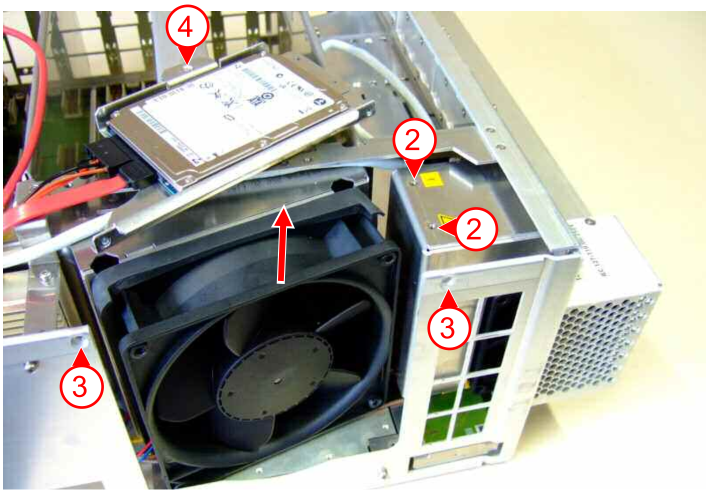
(see chapter 5, spare part list, Item No. 110/120, and explosion drawing 1201.0025.01 D sheet 1)

The fan is fitted at the right side panel of the R&S CMW in an air duct and has to be replaced together with its sleeve. For replacement proceed as follows:

1. Place the instrument upside down and unplug the fan connector (1) next to the REFERENCE BOARD.
2. Place the instrument in normal position and unscrew the holder of the HARD DISC:
   two short screws with captive washers (2)
   two long screws with captive washers (3)
   one countersunk screw (4)
3. Pull out the UNIT FAN together with the FAN SLEEVE to the top and replace them by the new ones.

Note: *Make sure that the air direction of the fan is such that air is sucked in from the right side of the R&S CMW and pressed through the air duct. Note the arrows on the fan casing.*

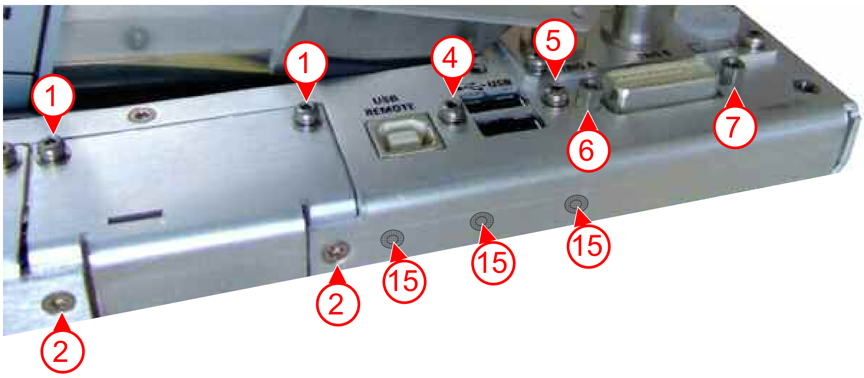
4. Complete the instrument in reverse order without causing damage to the cables.



3.2.26 Replacing the MOTHERBOARD H055A

(see chapter 5, spare part list, *Item No. 1020, and explosion drawing 1201.0025.01 D sheet 1)*

1. Disconnect the FRONT MODUL CONTROLLER as described in its subchapter for replacement (Its not necessary to unplug the cables to this module).
2. Remove all plug-in modules (TRX, BB MEASUREMENT) as described in their subchapter for replacement.
3. Dismount the POWER SUPPLY H055A:
   refer to the subchapter of replacing the POWER SUPPLY H055A.
4. Unscrew seven screws (1)…(5). at the instruments rear.
5. If DVI INTERFACE H620A is present - unscrew (6) and (7) and remove the board from the Instruments Rear. (Refer to the Installation Instruction of DVI INTERFACE H620A).
6. Place the instrument upside down and disconnect the BB FIXED LINK H550A / BB FLEXIBLE LINK H550B as described in its subchapter for replacement.

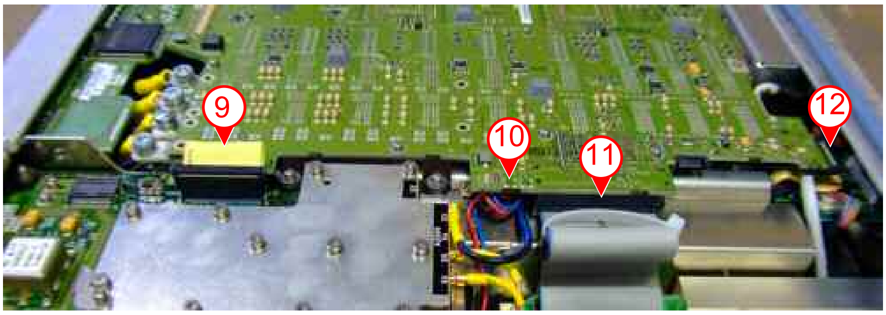


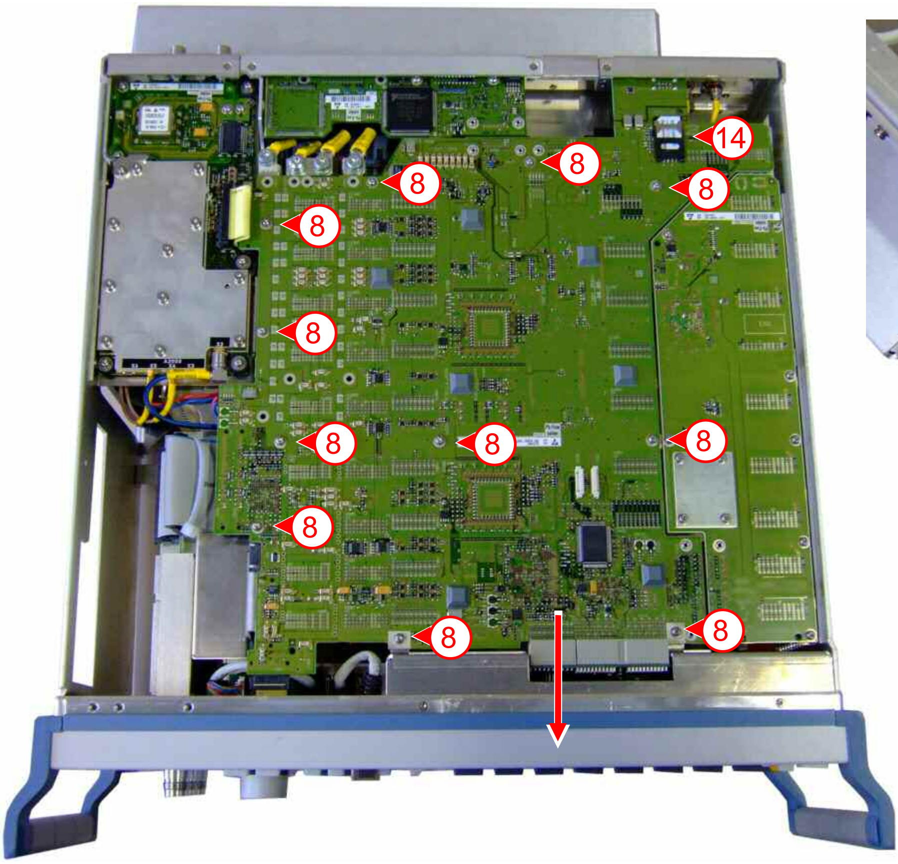
7. Place the CHIPCARD PROG. CMW (14) from the old MOTHERBOARD H055A to the new one
8. Unscrew all eleven screws (8) with captive washers at the MOTHERBOARD H055A.
9. Unplug cables as shown (9) - (13).

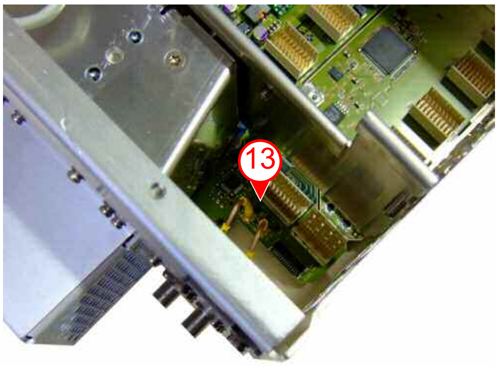
Note: Assure that there's no conflict with additional options and cables.

10. Lift the MOTHERBOARD H055A at the front side and pull it in the direction shown.
11. Replace the MOTHERBOARD H055A by the new one.
12. To fix the MOTHERBOARD H055A to the instruments rear proceed as follow: Loosen the screws (15) and the related USB shielding. Fix the shielding to the instruments rear (3), (4), (5). Tighten the screws (15) again.
13. Complete the instrument in reverse order without causing damage to the cables.

Note: Be aware that all connectors are fitted well.



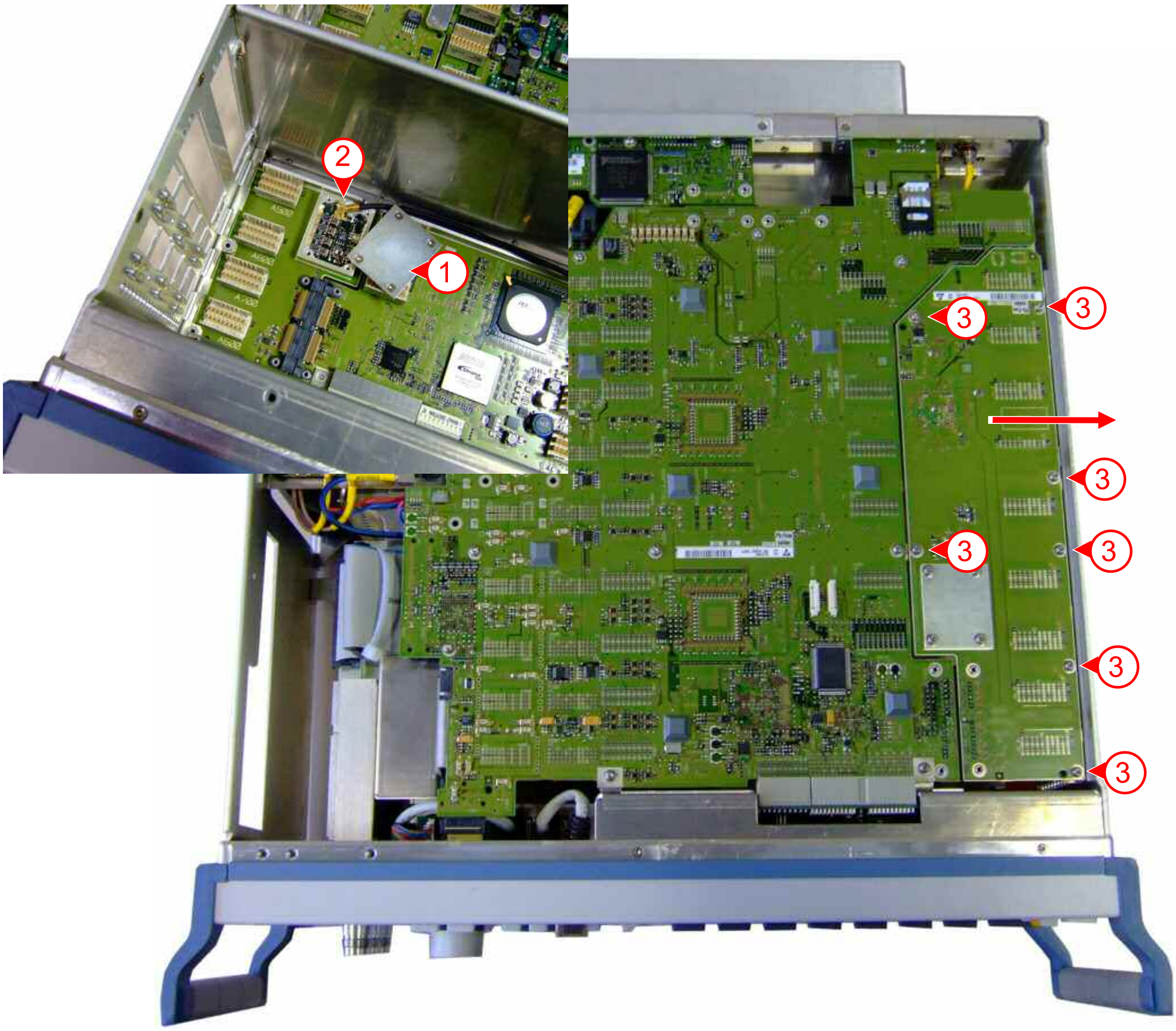




3.2.27 Replacing the BB FIXED LINK H550A / BB FLEXIBLE LINK H550B

(see chapter 5, spare part list, *Item No. 1100 / 1150, and explosion drawing 1201.0025.01 D sheet 1)*

1. Remove all plugin modules (TRX, BB MEASUREMENT etc.) as described in their subchapter for replacement.
2. Undo four screws (1) and take off the cover.
3. Unplug the SMP connector (2).
4. Unscrew all seven screws with captive washers (3) at the BB FIXED LINK H550A / BB FLEXIBLE LINK H550B.
5. Pull the BB FIXED LINK H550A / BB FLEXIBLE LINK H550B in direction to the outside of the instrument (see big arrow) and lift the board at the same time.
6. Replace old BB FIXED LINK H550A / BB FLEXIBLE LINK H550B by the new one.
7. Complete the instrument in reverse order without causing damage to the cables.



3.3 Troubleshooting

The purpose of these troubleshooting instructions is to help to trace down malfunctions to board level. The instrument so can be made ready for use again by means of board replacement.

NOTICE

Danger of damage to the instrument

The product may be opened only by authorized, specially trained personnel.

Any adjustments, replacements of parts, maintenance or repair must be carried out only by technical personnel authorized by Rohde & Schwarz.

If error tracing doesn't show clear results, we recommend that you ship the instrument to our experts in the service centers (see address list) for module replacement and further error elimination.
Some module replacements involve calibration procedures, requiring calibrated equipment and appropriate software.
The following utilities are provided in the Tester for easy diagnosis:

- Internal diagnosis test points
- Various Status LEDs at the bottom side of the motherboard which indicates supply voltages or status signals

The following troubleshooting describes the main errors which can occur on the motherboard and prevent the R&S CMW from booting its software and also the configuration of its devices and modules.
The intention of this troubleshooting is also that the R&S CMW reaches its normal operation mode after software booting to allow the start the self test diagnosis of the installed hardware options.

Note:

- *When problems occur, first check whether any connections (cables, plug-in connections of boards etc.) are damaged or wrongly connected*
- *The various LEDs indicate only the availability of a voltage or a signal*
- *A illuminated LED is no indication for the correct voltage range of the voltage*
- *The instructions for the measurement or check of the various voltages and signal from the flow chart can be found in the following chapter*

3.3.1 Measurement Equipment and Accessories

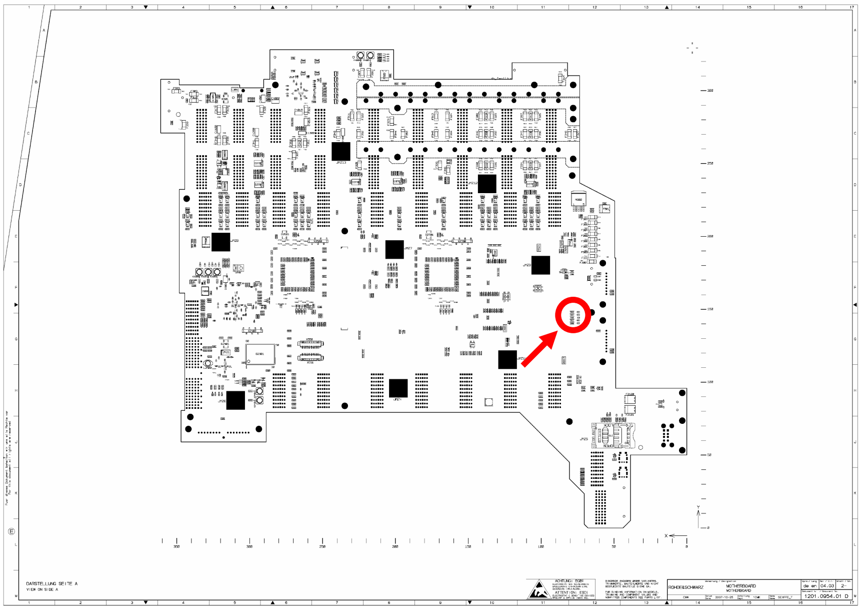
Item	Type of equipment	Specifications recommended	Equipment recommended	R&S Order No.
1	DC meter		R&S URE	0350.5315.02

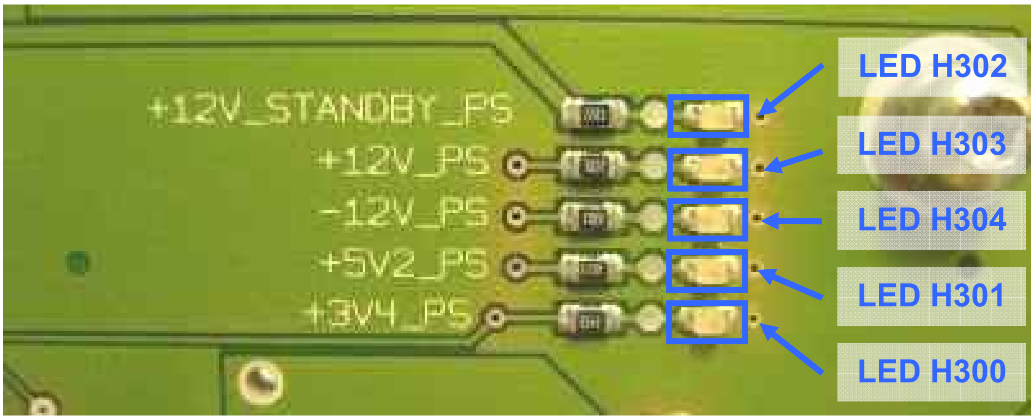
3.3.2 Switch-ON Problems – Use of flow-charts

3.3.2.1 Overview of the Status LEDs from the Power Supply Unit voltages

Note:

- *The Status LEDs indicate only the availability of a voltage*
- *A illuminated LED is no indication for the correct voltage range of the input voltage*
- *There is no fuse in the supply line for this LEDs*

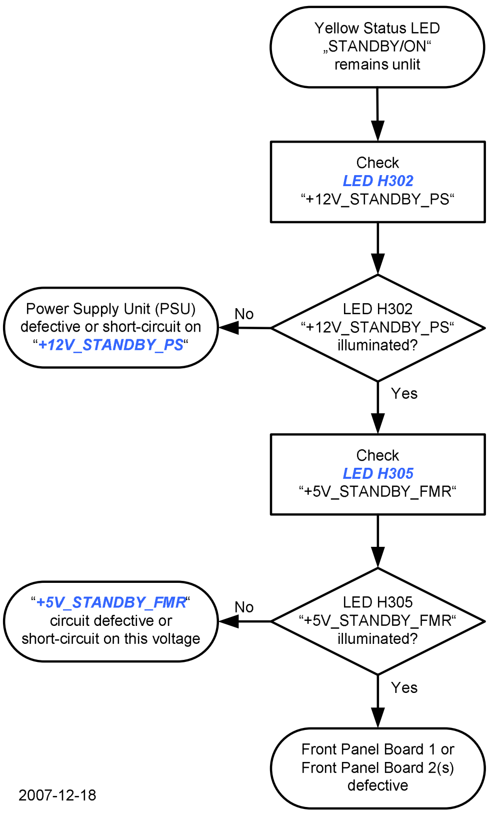




3.3.2.2 Yellow Status LED of "STANDBY/ON" button remains unlit

Note:

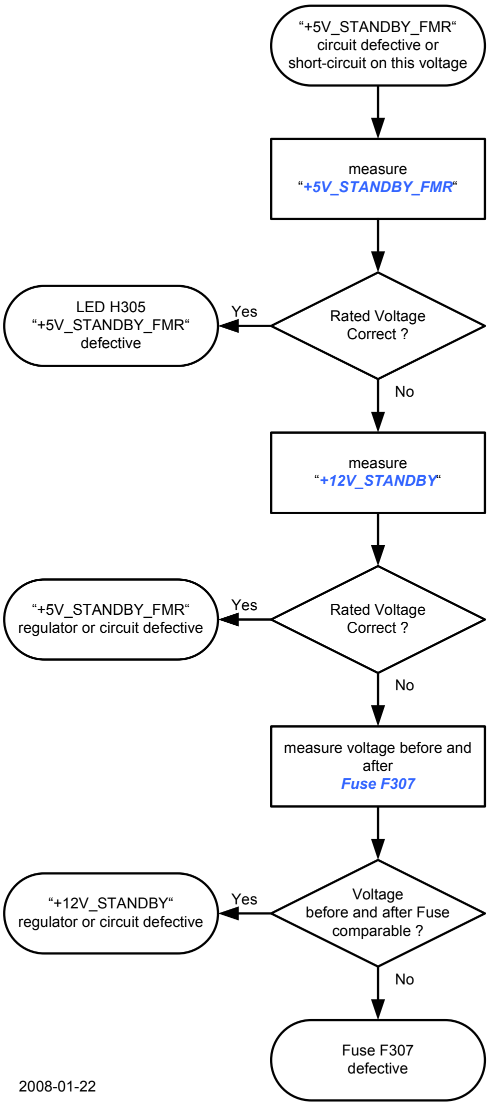
- *The mains cable will be assumed to be plugged in at the power entry on the rear side of the R&S CMW*
- *The power switch at the rear side of the R&S CMW will be assumed in position "1"*
- *The two main fuses on the rear side of the R&S CMW will be assumed as non defective*
- *LEDs will be assumed as non defective*



3.3.2.3 Control of the voltage "+5V_STANDBY_FMR"

Note:

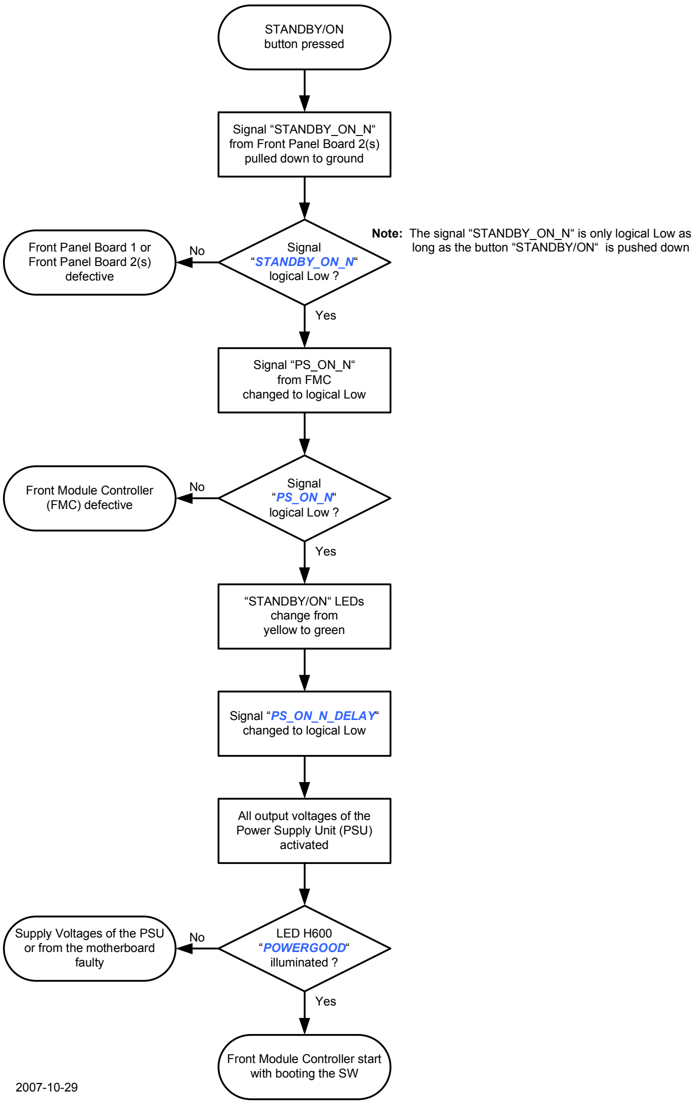
- *LEDs will be assumed as non defective*



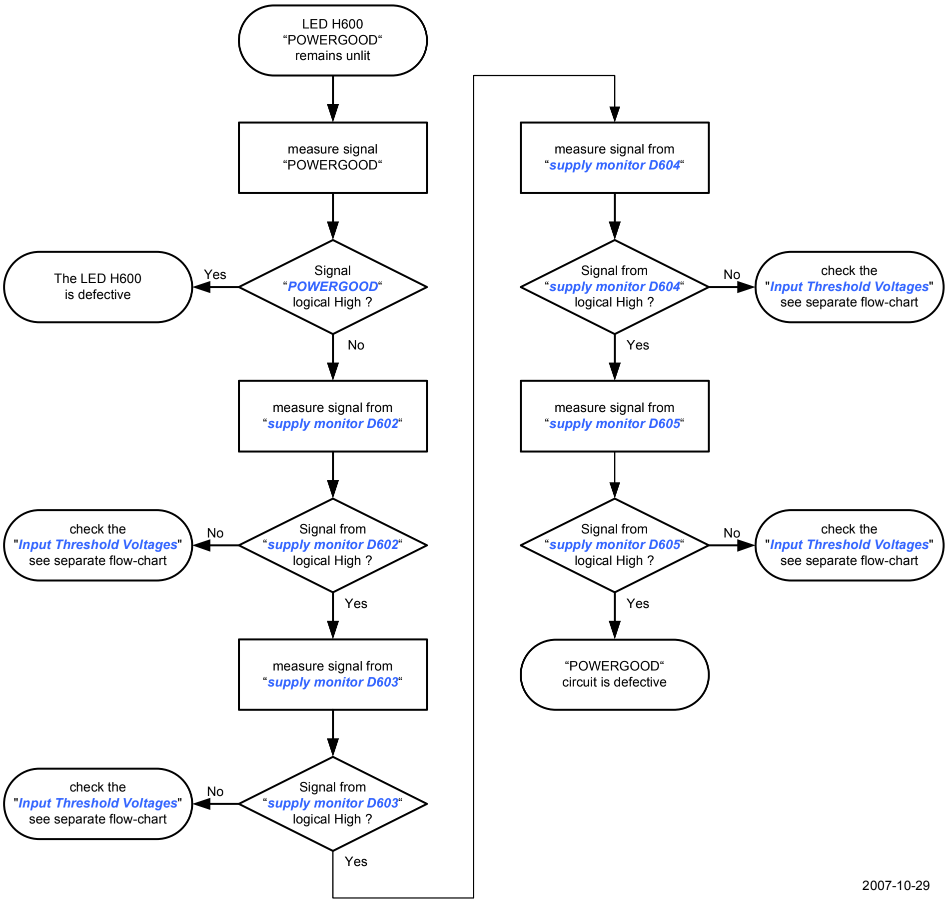
3.3.2.4 "STANDBY/ON" button without function (yellow Status LED illuminated)

Note:

- *At the beginning the R&S CMW is in STANDBY mode*
  → yellow "STANDBY/ON" LED is illuminated
- *LEDs will be assumed as non defective*



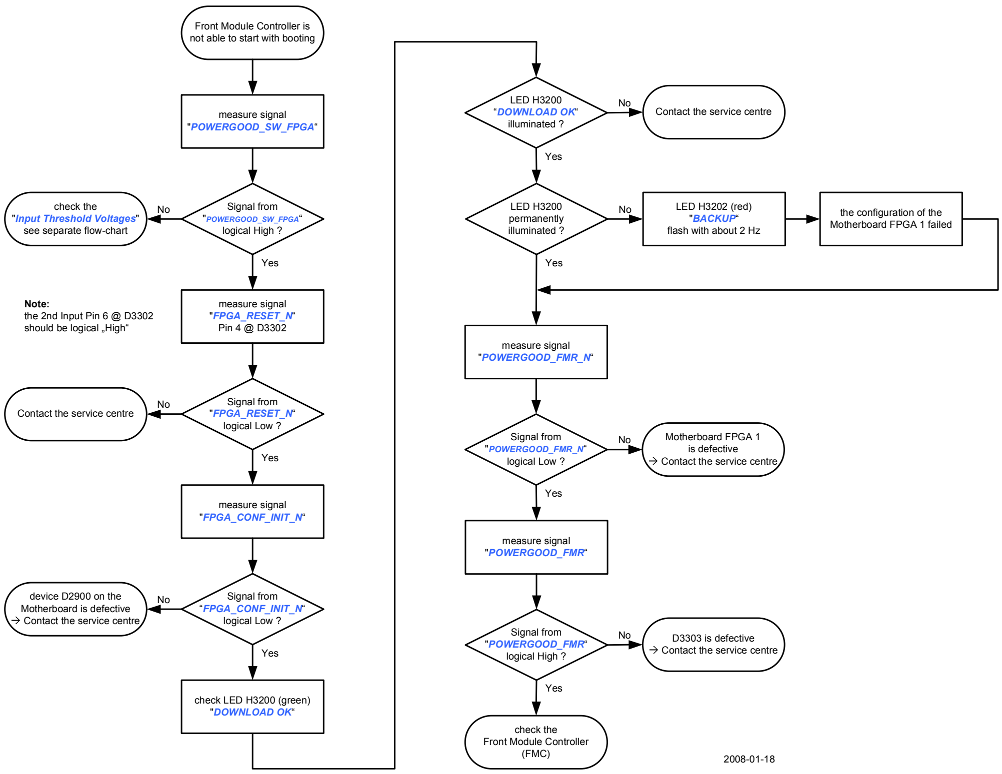
3.3.2.5 Status LED H600 of "POWERGOOD" remains unlit



3.3.2.6 Status LED H600 of “POWERGOOD” illuminated but the Front Module Controller is not able to start with booting

Note:

- *The LED H600 “Powergood” is illuminated*
- *LEDs will be assumed as non defective*
- *This flow chart is only valid for the first change from STANDBY mode to the ON mode of the R&S CMW*

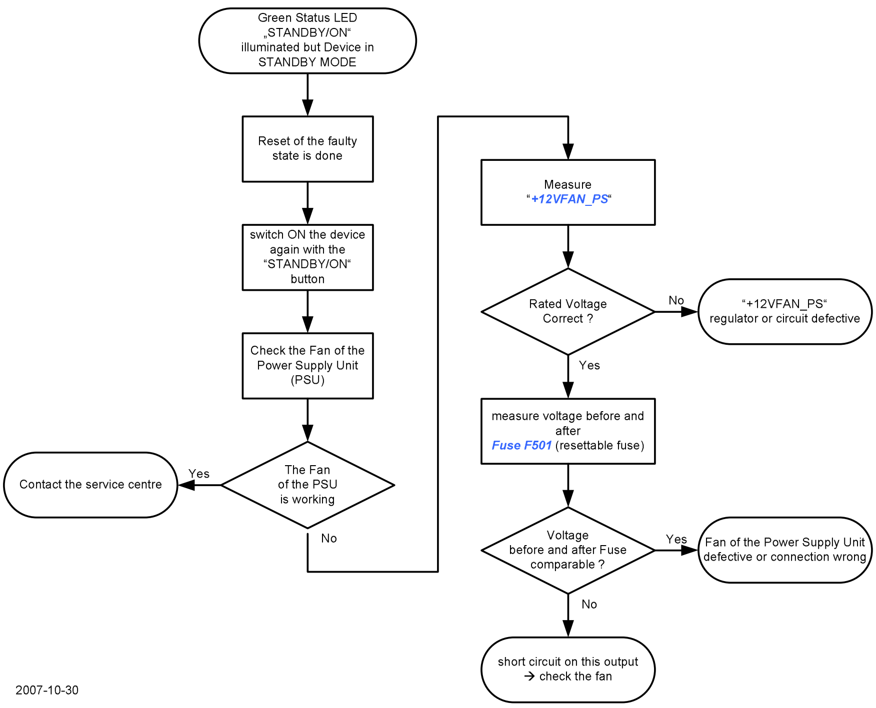


3.3.2.7 The R&S CMW is in Standby Mode but the green Status LED of “STANDBY/ON” button is illuminated

Note:

- *LEDs will be assumed as non defective*
- *In this case the green Status LED instead of the yellow Status LED of “STANDBY/ON” button is illuminated*
- *A correct primary Power Supply of the R&S CMW is assumed*
- *This Error is only valid, if the R&S CMW switch OFF after a few minutes without any action of the user*

- The first steps is to reset the faulty state (for this error) of the R&S CMW and allow the trouble shooting
  - the “STANDBY/ON” button of the R&S CMW should be pressed until the Status LED from the “STANDBY/ON” button changes from green to yellow (Signal “PS_ON_N” change from logical “High” to logical “LOW”)
  - now the R&S CMW is in the regular Standby Mode (yellow Status LED is illuminated)
- Switch on the R&S CMW again and start the following trouble shooting



3.3.3 Overview of the used Fuses on the Motherboard

Ref.Des.	Designation	Item-No.
F300 / F301 / F302 / F303 / F304 / F305 / F306 / F307 / F309 / F310 / F311 / F312 / F313 / F314 / F315 / F316 / F317 / F327 / F328 / F329 / F330 / F331 / F332 / F333 / F334 / F335 / F336 / F337 / F338 / F339 / F340 / F341 / F357 / F358 / F359 / F360	SMD-Fuse 5A T	1026
F308 / F318 / F319 / F320 / F321 / F322 / F323 / F324 / F325 / F326 / F350 / F351 / F352 / F353 / F354 / F355 / F356	SMD-Fuse 10A FF	1027
F342 / F343 / F344 / F345 / F346 / F347 / F348 / F349	SMD-Fuse 15A FF	1028
F500 / F501 / F502 / F2100 / F2101	SMD Resettable Fuse 1.1A / 30V	1029

3.3.4 Measurement of Voltages from the Power Supply Unit

In the following chapter the measurement of the input voltages from the Power Supply Unit is described. All voltages measured before any fuse.
For this purpose an overview of the bottom side of the Motherboard is shown with the position of the photo (red marking) with the detailed view of the measurement points.

- The black circle shows the ground of the voltage probe
- The red circle shows the signal of the voltage probe

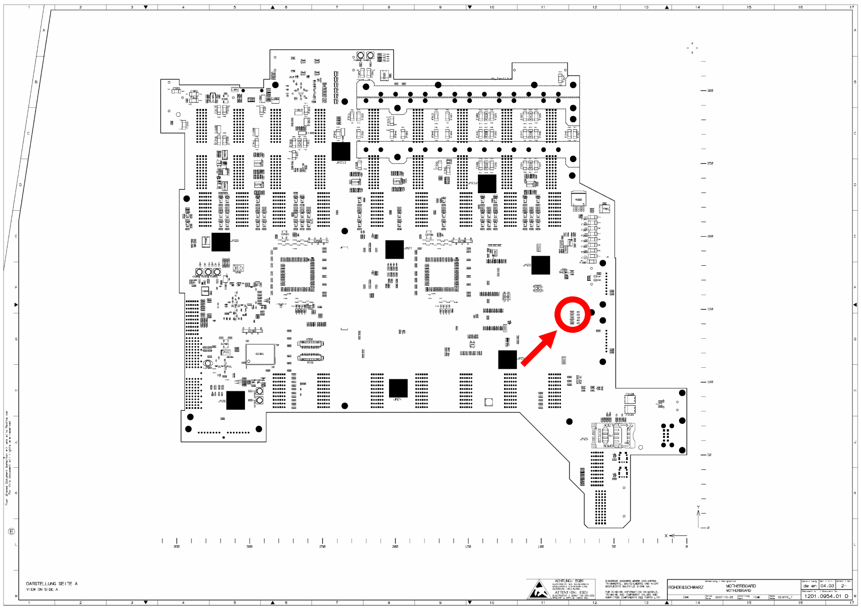
NOTICE

Prevent from short-circuit of measured voltage

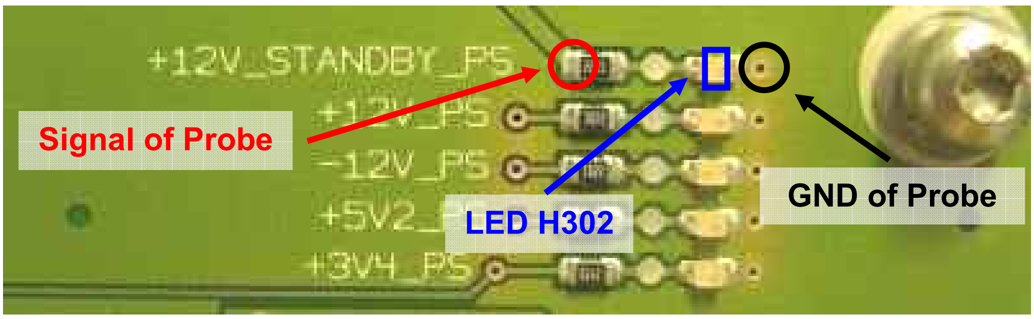
Short-circuit can damage the board or other modules

Be careful while measuring with voltage probes

3.3.4.1 Overview of the Motherboard for the measurement of Voltages from the Power Supply Unit

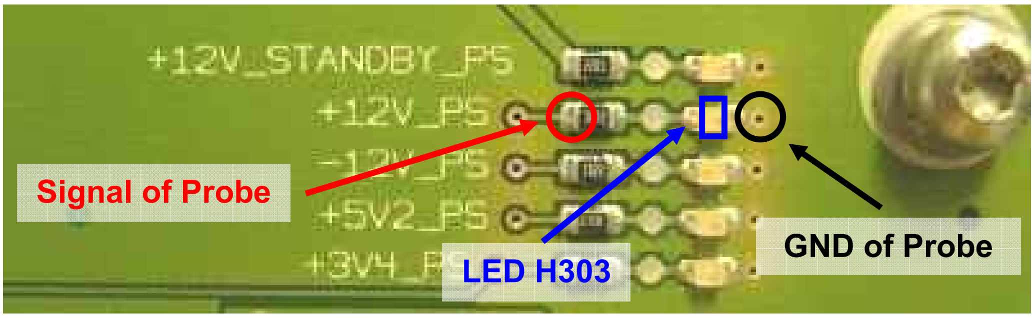


3.3.4.2 Measurement of "+12V_STANDBY_PS" from the Power Supply Unit



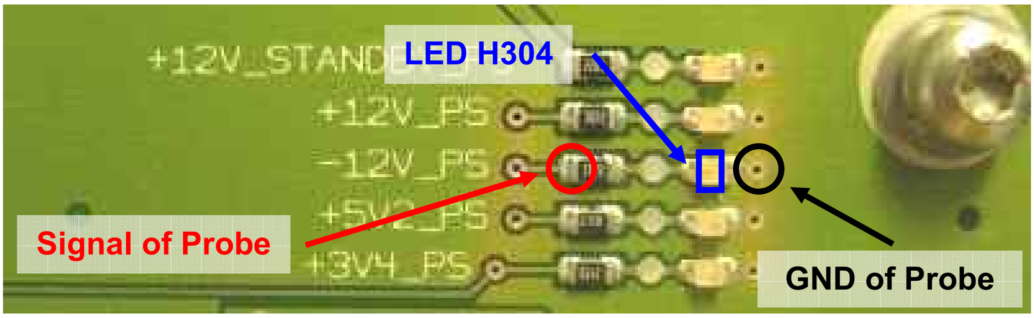
Voltage Name	Rated Value	Rated Tolerance
+12V_STANDBY_PS (Status LED H302)	• + 13,5 V (Var.02 of PSU)	• ± 0,2 V

3.3.4.3 Measurement of “+12V_PS” from the Power Supply



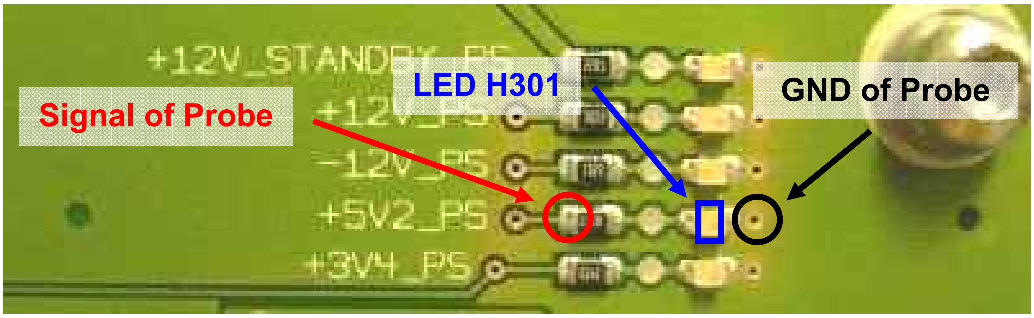
Voltage Name	Rated Value	Rated Tolerance
+12V_PS (Status LED H303)	• + 12,2 V	• ± 0,2 V

3.3.4.4 Measurement of “-12V_ PS” from the Power Supply Unit



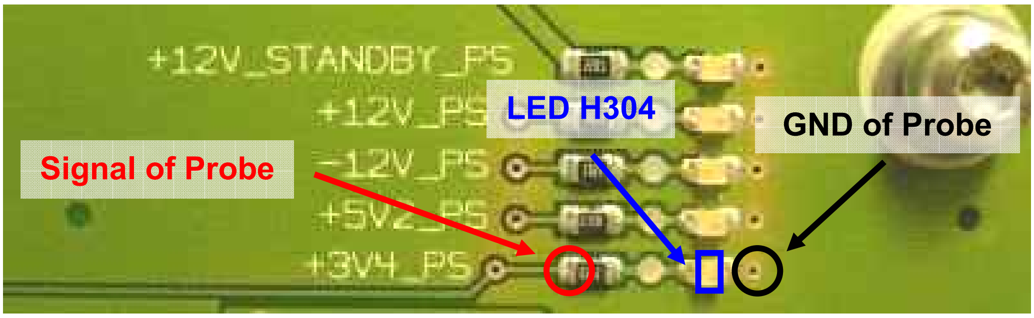
Voltage Name	Rated Value	Rated Tolerance
-12V_PS (Status LED H304)	• - 12,2 V	• ± 0,2 V

3.3.4.5 Measurement of “+5V2_PS” from the Power Supply Unit



Voltage Name	Rated Value	Rated Tolerance
+5V2_PS (Status LED H301)	• + 5,2 V	• ± 0,1 V

3.3.4.6 Measurement of “+3V4_PS” from the Power Supply Unit



Voltage Name	Rated Value	Rated Tolerance
+3V4_PS (Status LED H300)	• + 3,4 V	• ± 0,1 V

3.3.5 Check of the main fuses from the Supply Voltages on the Motherboard

In the following chapter the check of the main fuses for the supply voltages from the various circuits on the Motherboard is described. The source of this supply voltages is the Power Supply Unit. This voltages only feed through a fuse and then derived to the various circuits on the Motherboard.

For this purpose an overview of the bottom side of the Motherboard is shown with the position of the photo (red marking) with the detailed view of the measurement points.

- The black circle shows the ground of the voltage probe
- The red circle shows the signal of the voltage probe

NOTICE

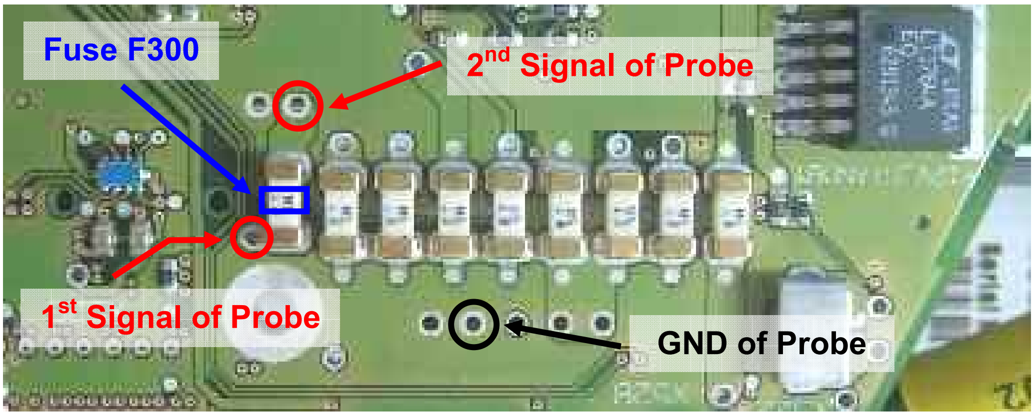
Prevent from short-circuit of measured voltage

Short-circuit can damage the board or other modules

Be careful while measuring with voltage probes

3.3.5.1 Check of Fuse F300 - "-12V" on the Motherboard

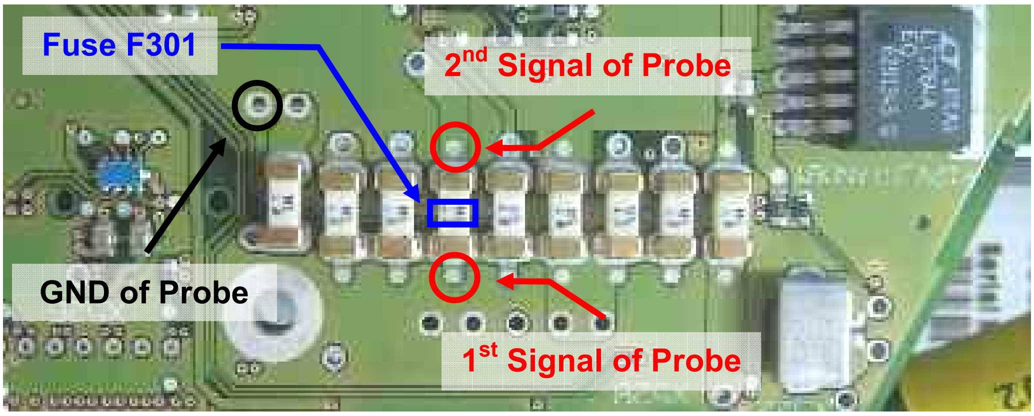
The voltages "-12V" on the motherboard is fused with F300. The source of this voltage is "-12V_PS" from the Power Supply Unit. This voltage is used to supply the various circuits and connector on the motherboard



Checked Fuse	Fuse OK	Fuse defective
F300	• both measurement comparable	• on one side no voltage can be measured

3.3.5.2 Check of Fuse F301 - "+12V_A" on the Motherboard

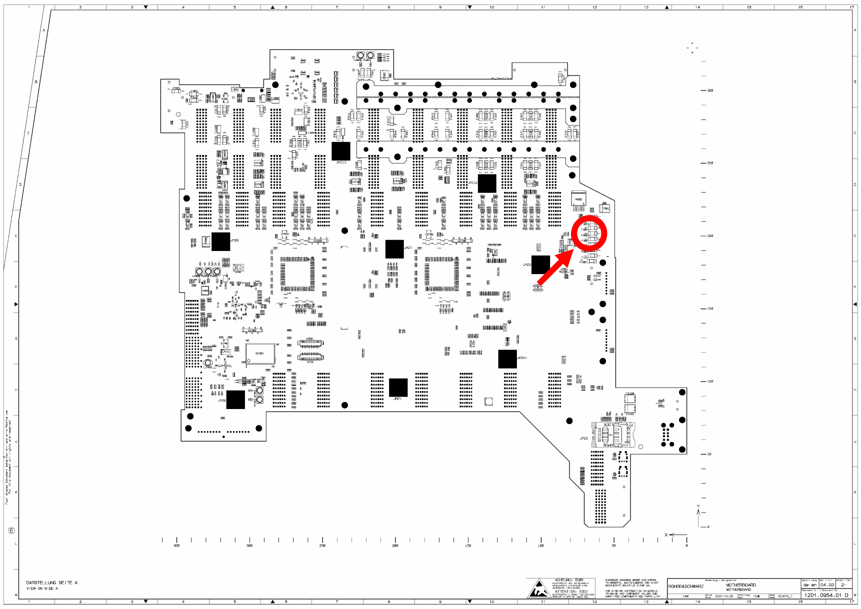
The voltages "+12V_A" on the motherboard is fused with F301. The source of this voltage is "+12V_PS" from the Power Supply Unit. This voltage is used to generate the voltage "+6V".

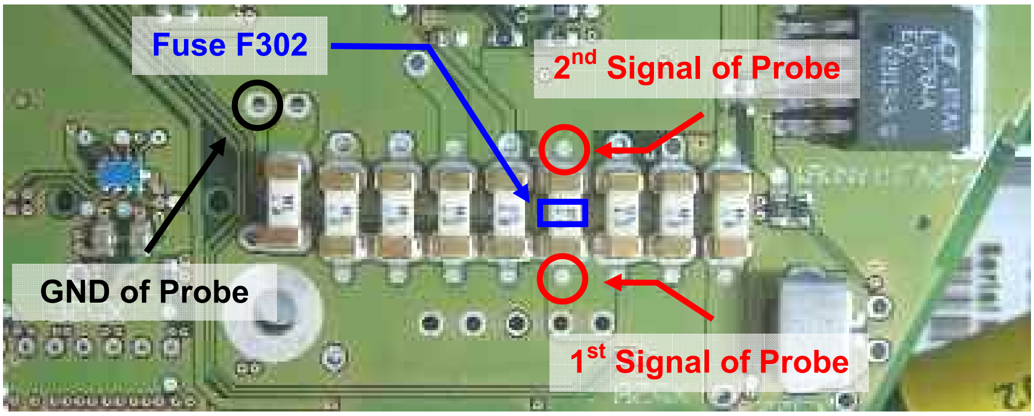


Checked Fuse	Fuse OK	Fuse defective
F301	• both measurement comparable	• on one side no voltage can be measured

3.3.5.3 Check of Fuse F302 - “+12V_B” on the Motherboard

The voltages “+12V_B” on the motherboard is fused with F302. The source of this voltage is “+12V_PS” from the Power Supply Unit. This voltage is used to generate the voltage “+28V”.

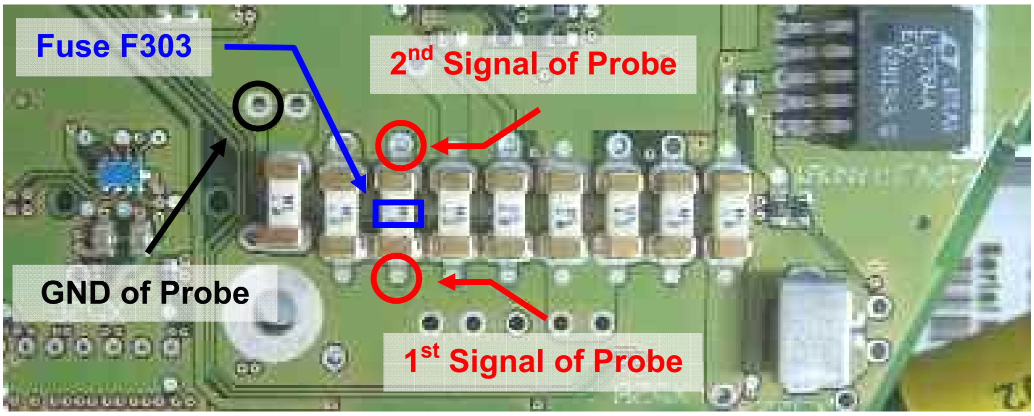




Checked Fuse	Fuse OK	Fuse defective
F302	• both measurement comparable	• on one side no voltage can be measured

3.3.5.4 Check of Fuse F303 - "+12V_C" on the Motherboard

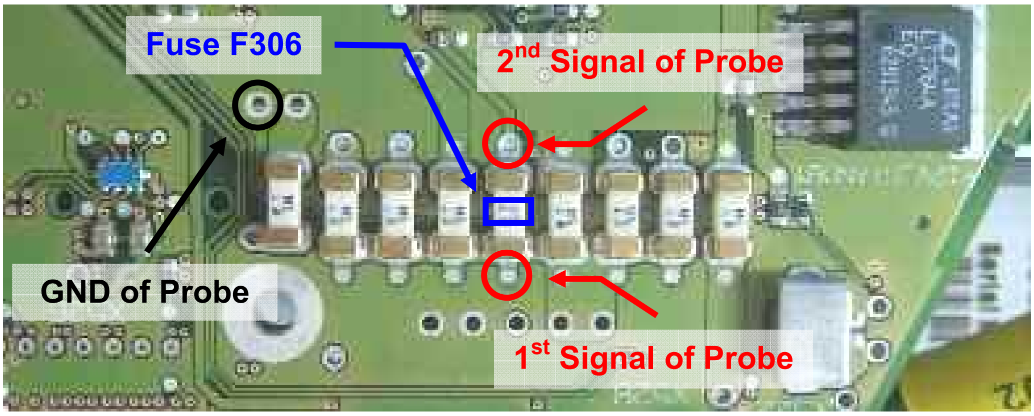
The voltages "+12V_C" on the motherboard is fused with F303. The source of this voltage is "+12V_PS" from the Power Supply Unit. This voltage is used to generate the voltage "-6V".



Checked Fuse	Fuse OK	Fuse defective
F303	• both measurement comparable	• on one side no voltage can be measured

3.3.5.5 Check of Fuse F306 - "+12V_F" on the Motherboard

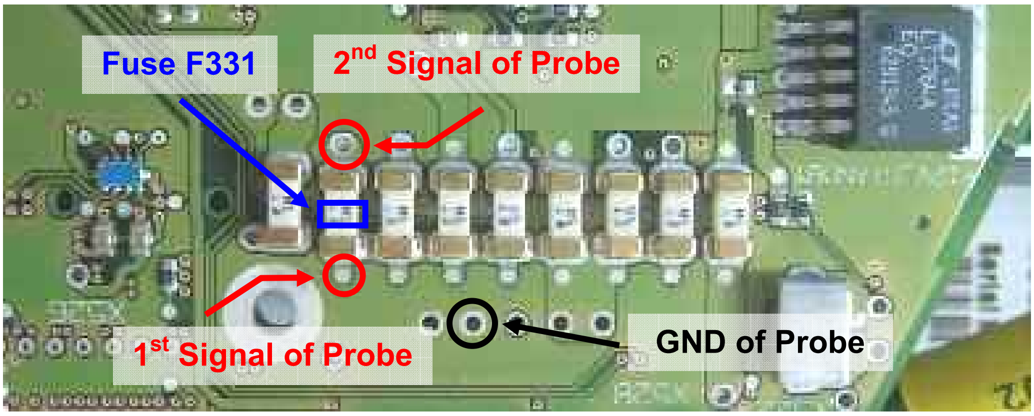
The voltages "+12V_F" on the motherboard is fused with F306. The source of this voltage is "+12V_PS" from the Power Supply Unit. This voltage is used to supply the various circuits on the motherboard



Checked Fuse	Fuse OK	Fuse defective
F306	• both measurement comparable	• on one side no voltage can be measured

3.3.5.6 Check of Fuse F331 - "+12V_G" on the Motherboard

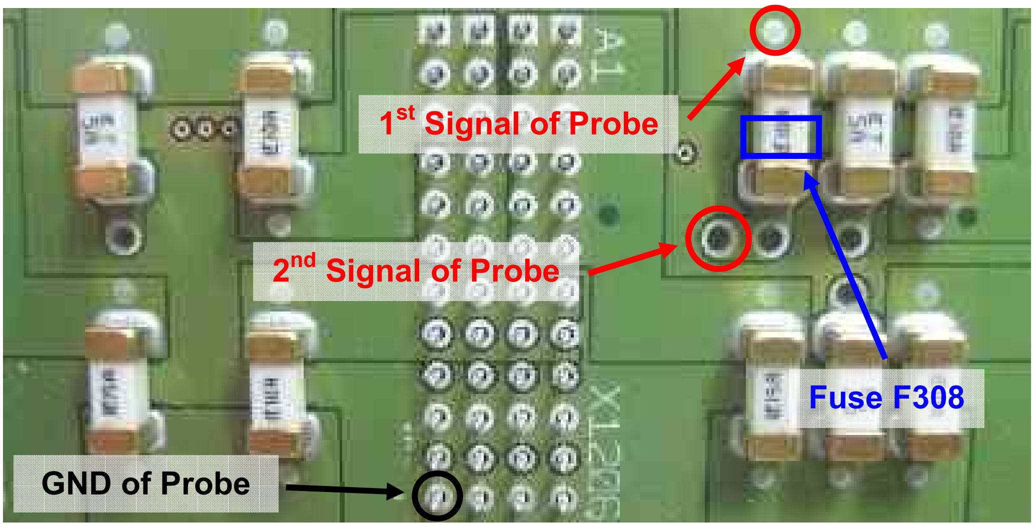
The voltages "+12V_G" on the motherboard is fused with F331. The source of this voltage is "+12V_PS" from the Power Supply Unit. This voltage is used to generate the voltage "+8V".



Checked Fuse	Fuse OK	Fuse defective
F331	• both measurement comparable	• on one side no voltage can be measured

3.3.5.7 Check of Fuse F308 - "+3V3_A" on the Motherboard

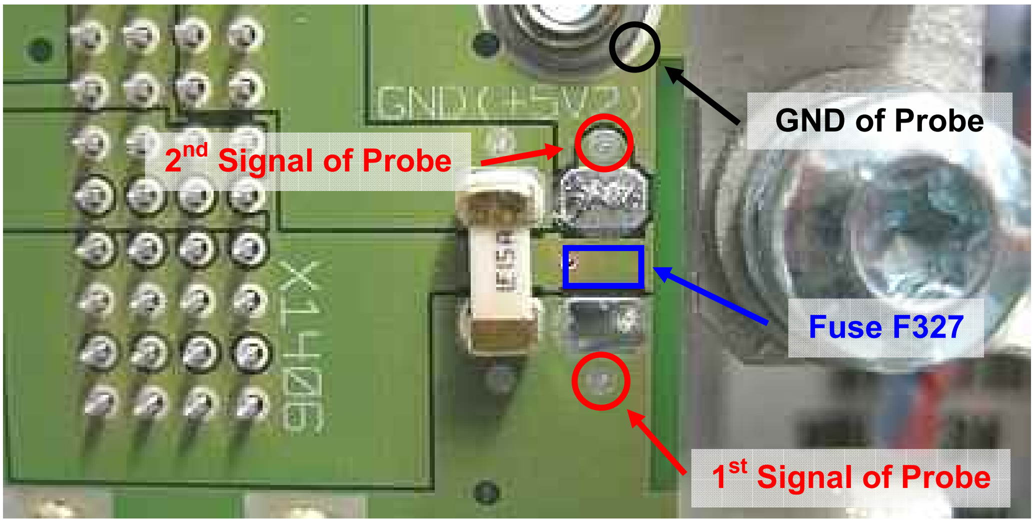
The voltages "+3V3_A" on the motherboard is fused with F308. The source of this voltage is "+3V4_PS" from the Power Supply Unit. This voltage is used to generate the voltage "+2V5". It is also used to supply various circuits on the motherboard.



Checked Fuse	Fuse OK	Fuse defective
F308	• both measurement comparable	• on one side no voltage can be measured

3.3.5.8 Check of Fuse F327 - reserved

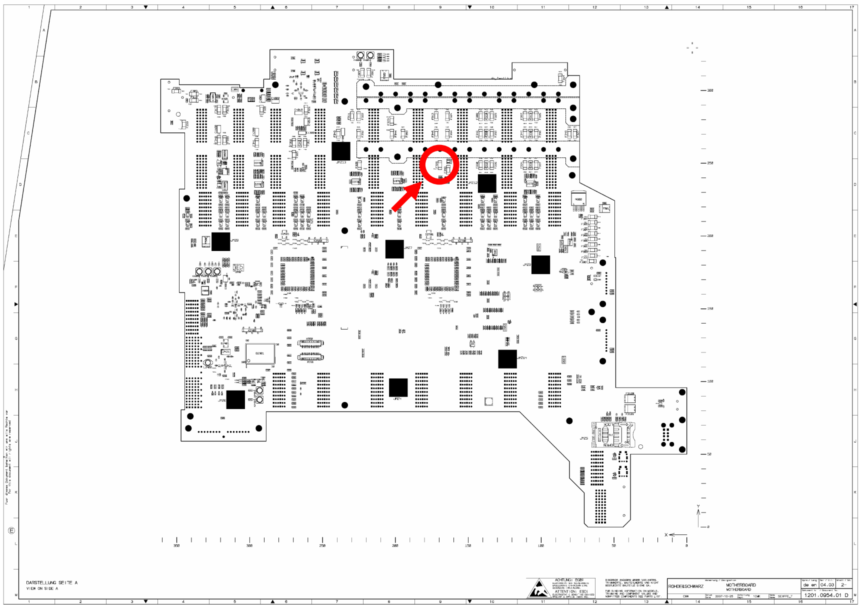
This voltages on the motherboard is fused with F330 and reserved for further use. The source of this voltage is “+5V2_PS” from the Power Supply Unit.

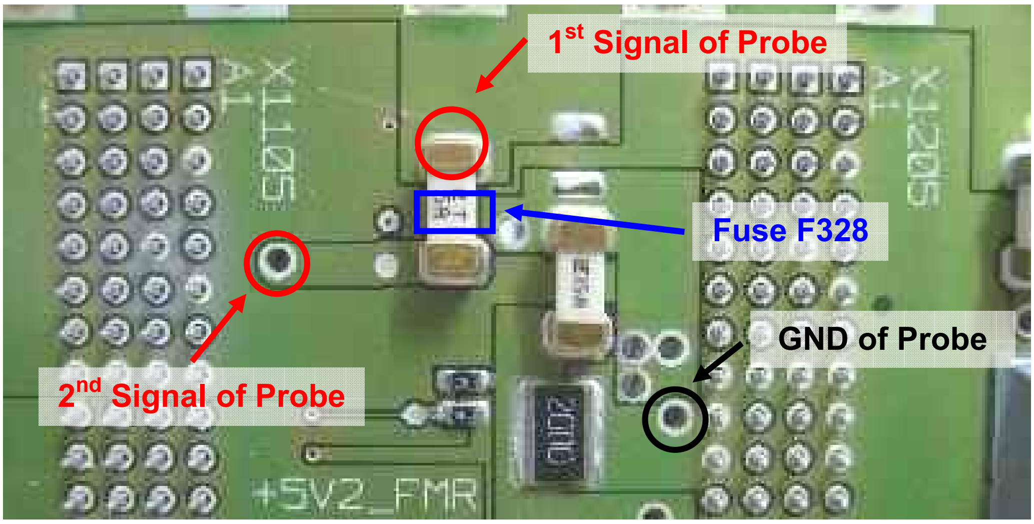


Checked Fuse	Fuse OK	Fuse defective
F330	• both measurement comparable	• on one side no voltage can be measured

3.3.5.9 Check of Fuse F328 - “+5V2_B” on the Motherboard

The voltages “+5V2_B” on the motherboard is fused with F328. The source of this voltage is “+5V2_PS” from the Power Supply Unit. This voltage is used to generate the voltage “+1V5”.

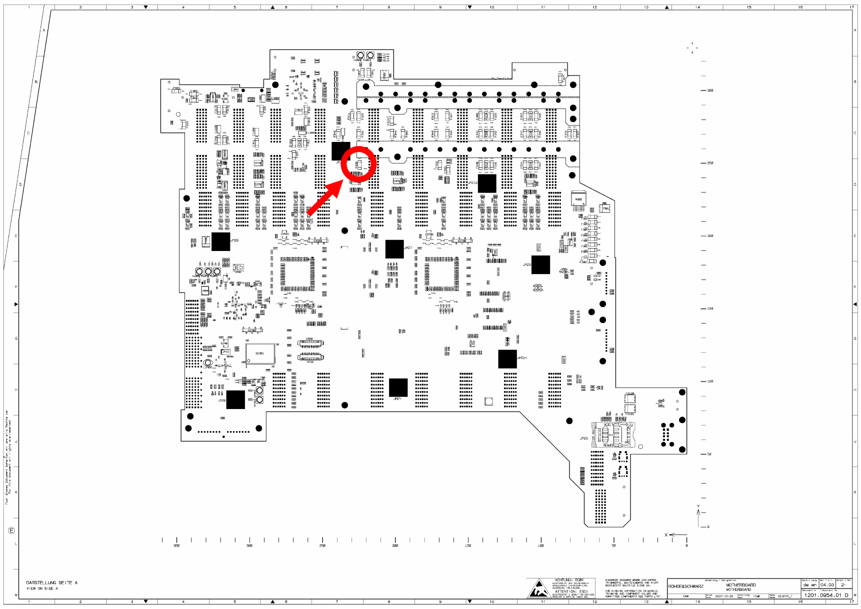


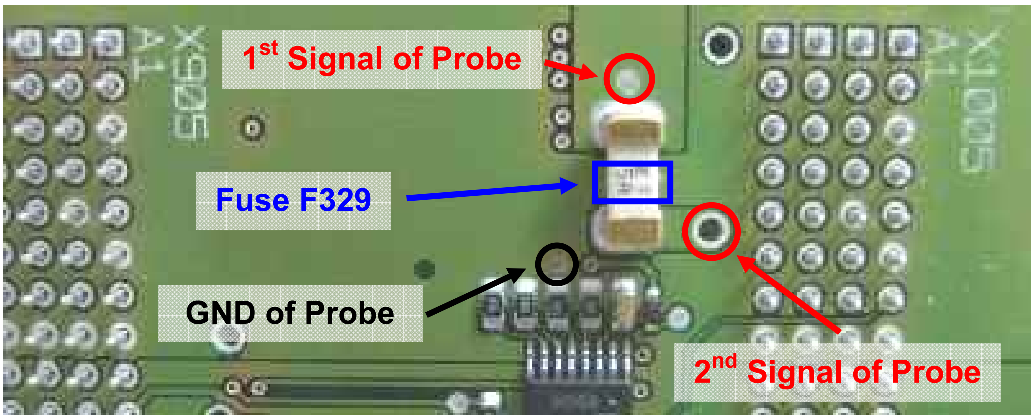


Checked Fuse	Fuse OK	Fuse defective
F328	• both measurement comparable	• on one side no voltage can be measured

3.3.5.10 Check of Fuse F329 - “+5V2_C” on the Motherboard

The voltages “+5V2_C” on the motherboard is fused with F329. The source of this voltage is “+5V2_PS” from the Power Supply Unit. This voltage is used to generate the voltage “+1V0”.

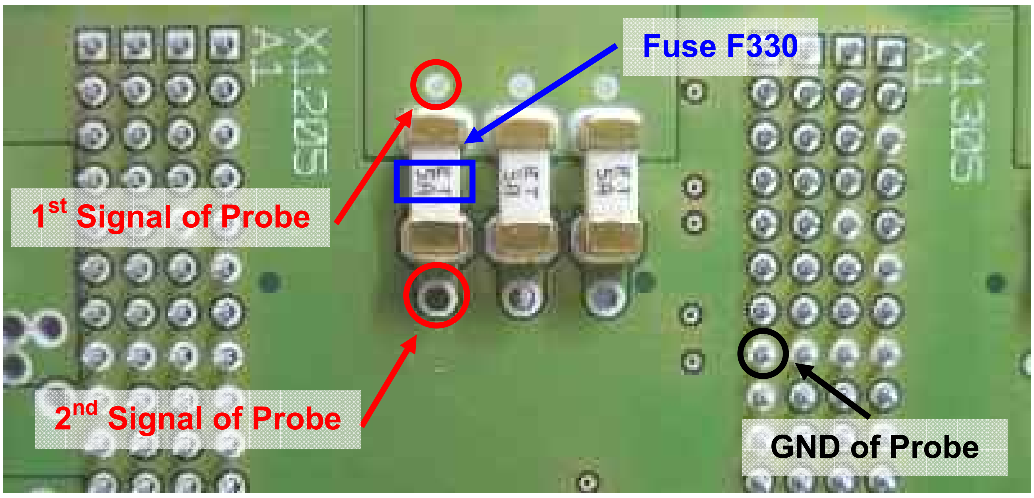




Checked Fuse	Fuse OK	Fuse defective
F329	• both measurement comparable	• on one side no voltage can be measured

3.3.5.11 Check of Fuse F330 - “+5V2_D” on the Motherboard

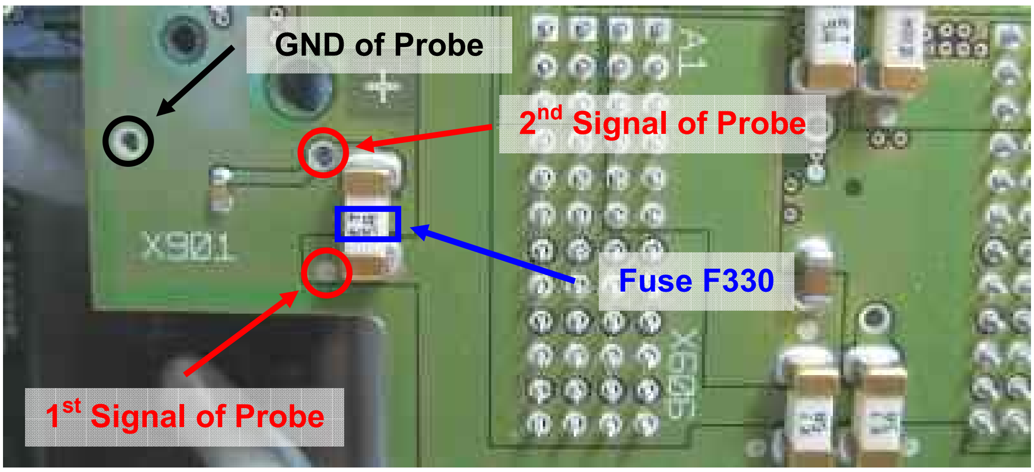
The voltages “+5V2_D” on the motherboard is fused with F330. The source of this voltage is “+5V2_PS” from the Power Supply Unit. This voltage is used to supply various circuits on the motherboard.



Checked Fuse	Fuse OK	Fuse defective
F330	• both measurement comparable	• on one side no voltage can be measured

3.3.5.12 Check of Fuse F359 - "+5V2_HDD" on the Motherboard

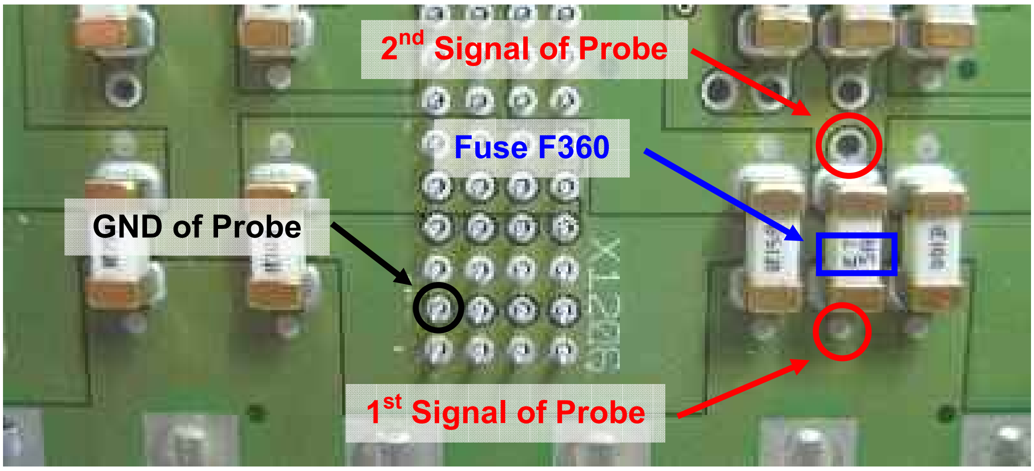
The voltages "+5V2_HDD" on the motherboard is fused with F359. The source of this voltage is "+5V2_PS" from the Power Supply Unit. This voltage is feed to the connector X901 and used to supply the Hard Disc .



Checked Fuse	Fuse OK	Fuse defective
F359	• both measurement comparable	• on one side no voltage can be measured

3.3.5.13 Check of Fuse F360 - “+5V2_FAN_PS” on the Motherboard

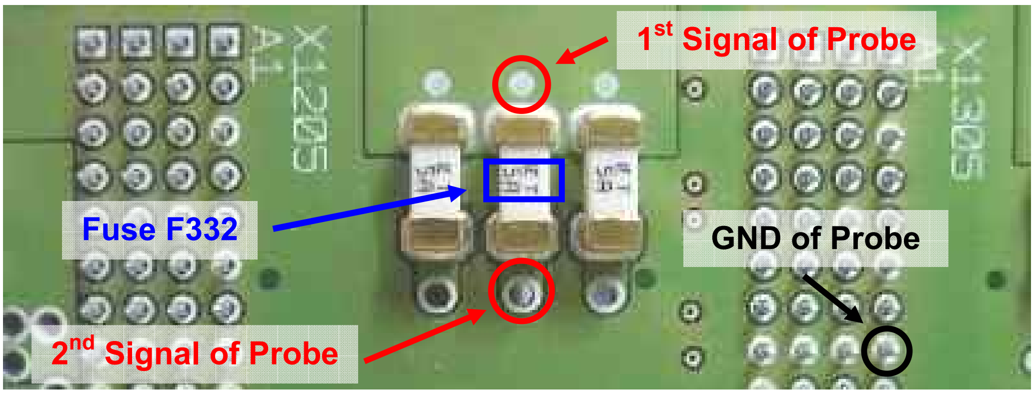
The voltages “+5V2_FAN_PS” on the motherboard is fused with F360. The source of this voltage is “+5V2_PS” from the Power Supply Unit. This voltage is used to supply the variable output voltage converter N504 which is used to generate the control voltage for the Power Supply Unit Fan.



Checked Fuse	Fuse OK	Fuse defective
F360	• both measurement comparable	• on one side no voltage can be measured

3.3.5.14 Check of Fuse F332 - "+5V2_FAN_UNIT" on the Motherboard

The voltages "+5V2_FAN_UNIT" on the motherboard is fused with F332. The source of this voltage is "+5V2_PS" from the Power Supply Unit. This voltage is used to supply the variable output voltage converter N500 which is used to generate the control voltage for the Main Unit Fan.
Further this voltage is used to supply the Switching Power Supply Clock Reference G500 and various further circuits for Main Unit Fan and the Power Supply Fan.



Checked Fuse	Fuse OK	Fuse defective
F360	• both measurement comparable	• on one side no voltage can be measured

3.3.6 Check of the fuses for the module slots on the Motherboard

In the following chapter the check of the fuses for the module slot supply voltages on the Motherboard is described. The source of this supply voltages is the Power Supply Unit. This voltages only feed through a fuse and then derived to the module slots A600 to A1400 on the Motherboard.

For this purpose an overview of the bottom side of the Motherboard is shown with the position of the photo (red marking) with the detailed view of the measurement points.

- The black circle shows the ground of the voltage probe
- The red circle shows the signal of the voltage probe

NOTICE

Prevent from short-circuit of measured voltage

Short-circuit can damage the board or other modules

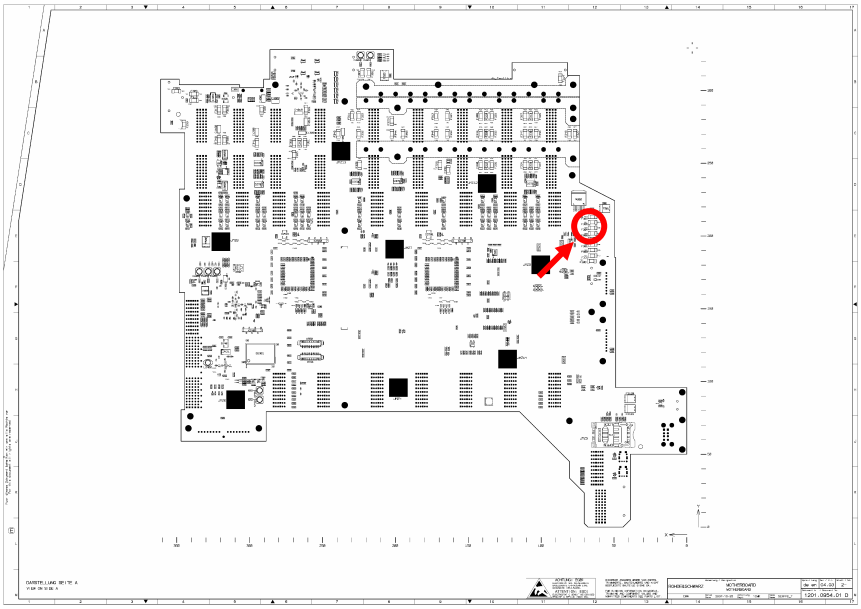
Be careful while measuring with voltage probes

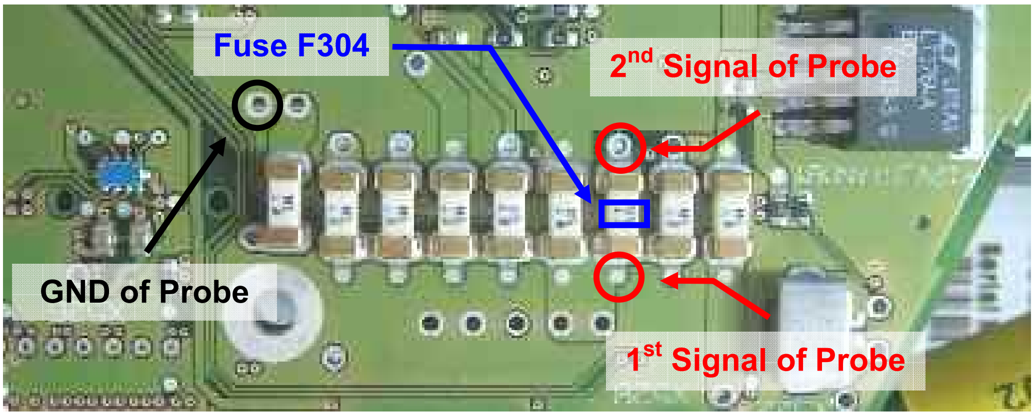
Note:

- *In this chapter only the supply voltages which are directly feed through a fuse and supplied by the Power Supply Unit are described*

3.3.6.1 Check of Main Slot Fuse - F304 "+12V_D" on the Motherboard

The voltages "+12V_D" on the motherboard is fused with F304. The source of this voltage is "+12V_PS" from the Power Supply Unit. This voltage is used to supply the module slots A600 to A1400.

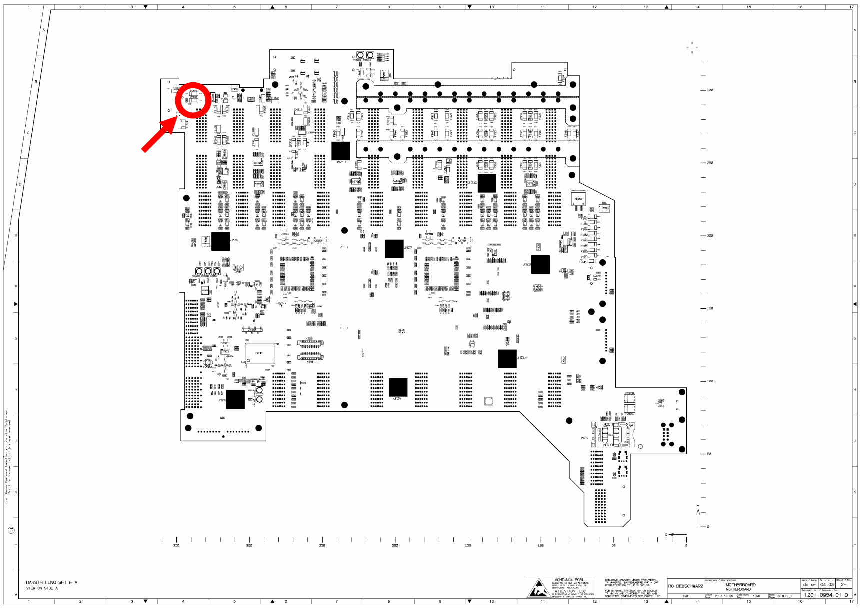


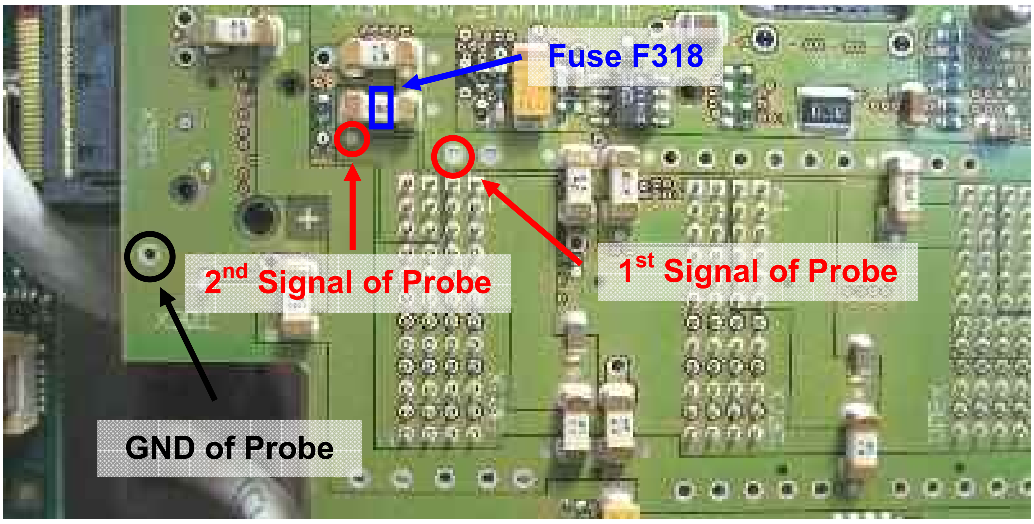


Checked Fuse	Fuse OK	Fuse defective
F304	• both measurement comparable	• on one side no voltage can be measured

3.3.6.2 Check of Main Slot Fuse - F318 “+3V3_600” on the Motherboard

The voltages “+3V3_600” on the motherboard is fused with F318. The source of this voltage is “+3V4_PS” from the Power Supply Unit. This voltage is used to supply the module slots A600.

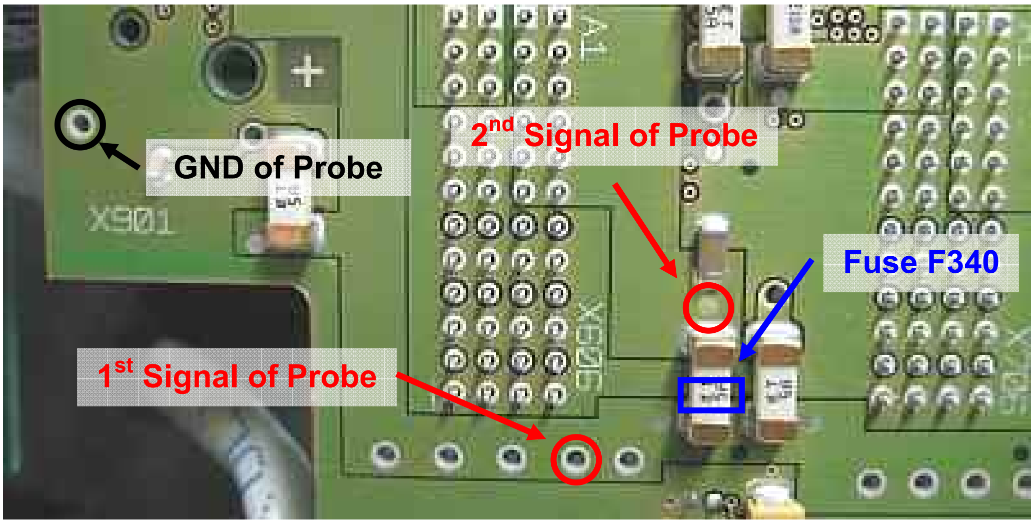




Checked Fuse	Fuse OK	Fuse defective
F318	• both measurement comparable	• on one side no voltage can be measured

3.3.6.3 Check of Main Slot Fuse - F340 “+5V2_600” on the Motherboard

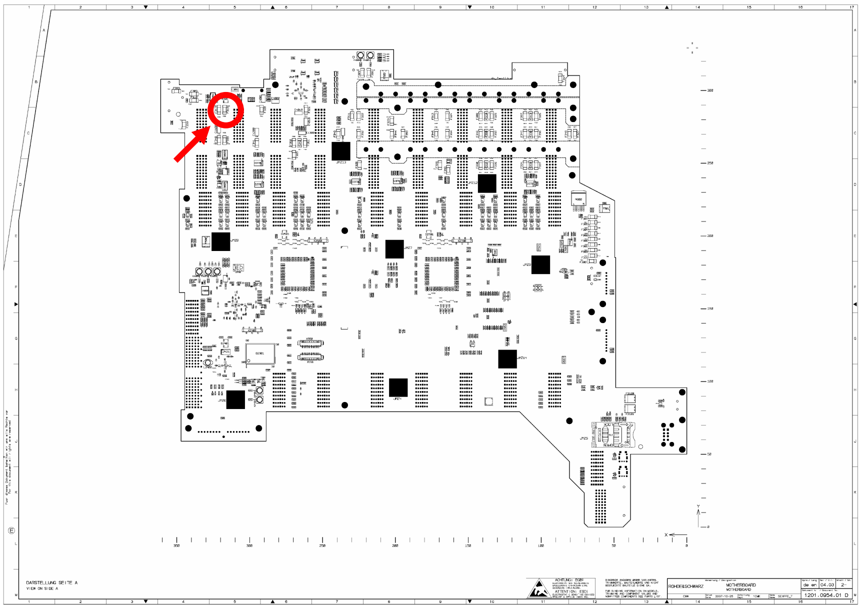
The voltages “+5V2_600” on the motherboard is fused with F340. The source of this voltage is “+5V2_PS” from the Power Supply Unit. This voltage is used to supply the module slots A600.

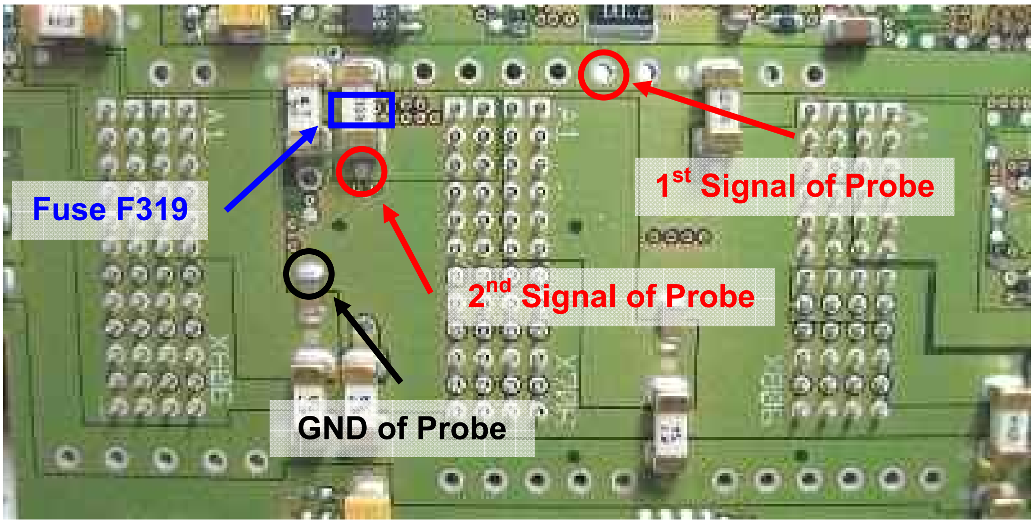


Checked Fuse	Fuse OK	Fuse defective
F340	• both measurement comparable	• on one side no voltage can be measured

3.3.6.4 Check of Main Slot Fuse - F319 “+3V3_700” on the Motherboard

The voltages “+3V3_700” on the motherboard is fused with F319. The source of this voltage is “+3V4_PS” from the Power Supply Unit. This voltage is used to supply the module slots A700.

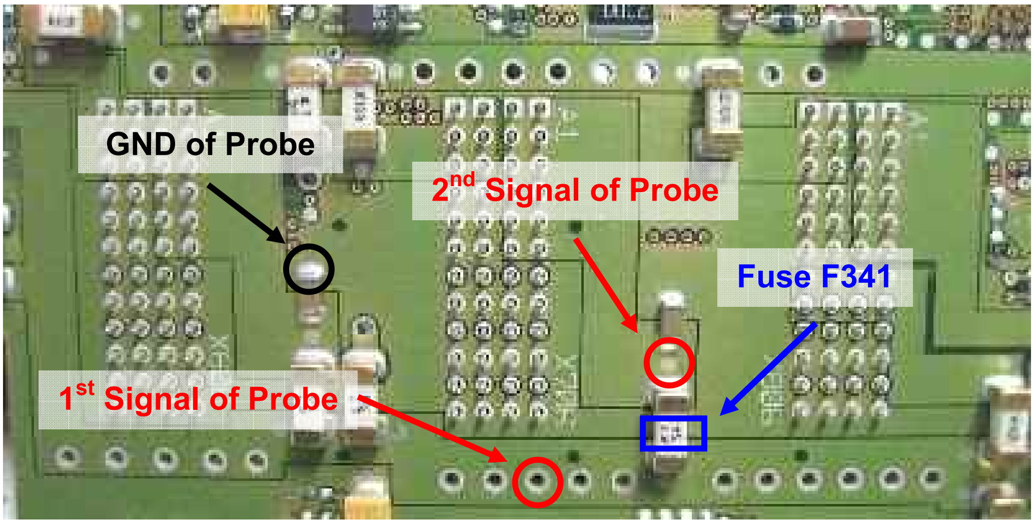




Checked Fuse	Fuse OK	Fuse defective
F319	• both measurement comparable	• on one side no voltage can be measured

3.3.6.5 Check of Main Slot Fuse - F341 “+5V2_700” on the Motherboard

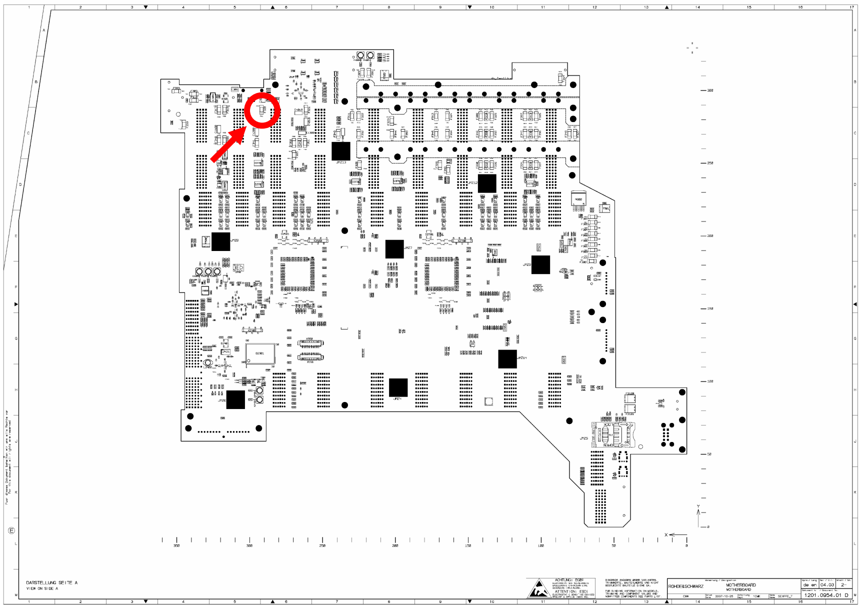
The voltages “+5V2_700” on the motherboard is fused with F341. The source of this voltage is “+5V2_PS” from the Power Supply Unit. This voltage is used to supply the module slots A700.

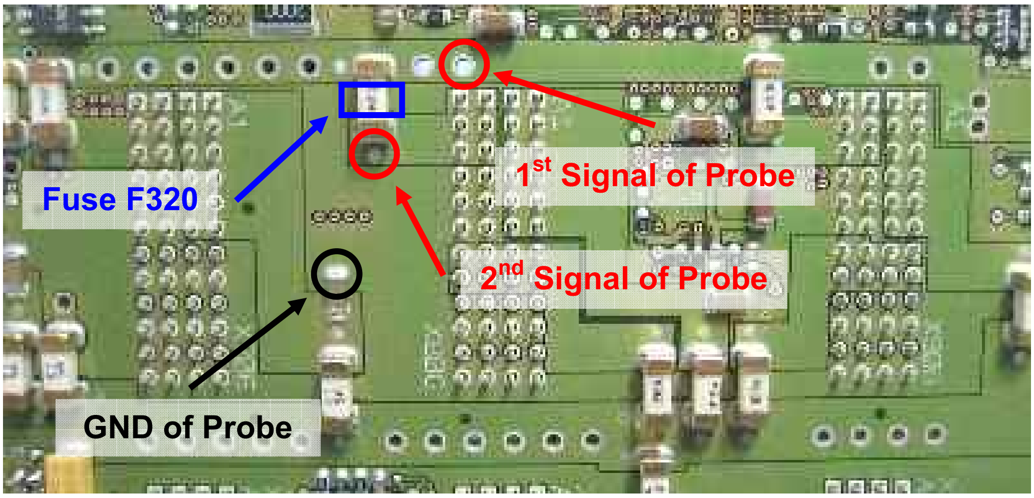


Checked Fuse	Fuse OK	Fuse defective
F341	• both measurement comparable	• on one side no voltage can be measured

3.3.6.6 Check of Main Slot Fuse - F320 “+3V3_800” on the Motherboard

The voltages “+3V3_800” on the motherboard is fused with F320. The source of this voltage is “+3V4_PS” from the Power Supply Unit. This voltage is used to supply the module slots A800.

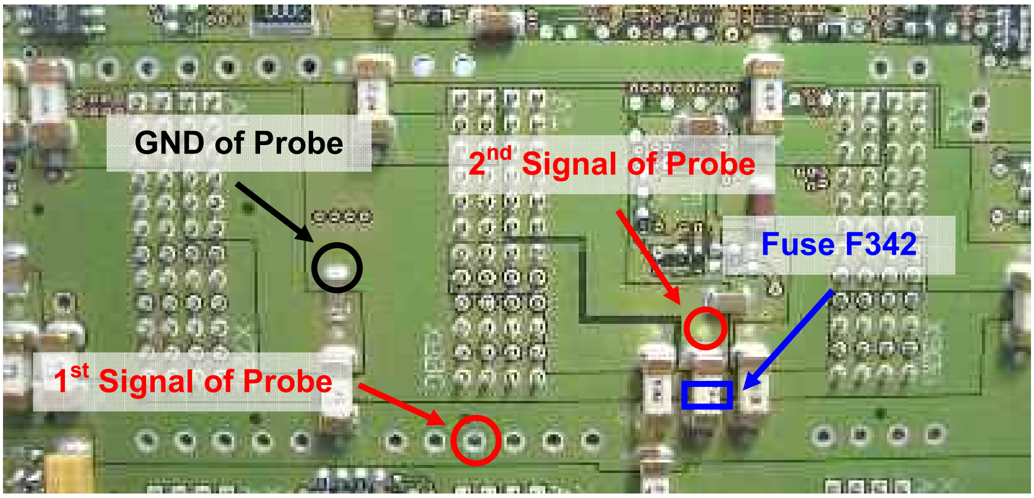




Checked Fuse	Fuse OK	Fuse defective
F320	• both measurement comparable	• on one side no voltage can be measured

3.3.6.7 Check of Main Slot Fuse - F342 “+5V2_800” on the Motherboard

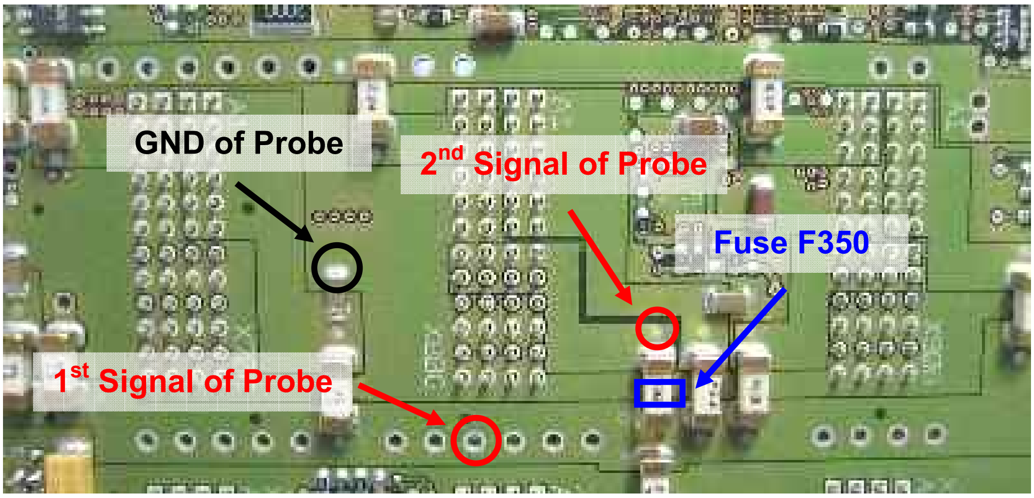
The voltages “+5V2_800” on the motherboard is fused with F342. The source of this voltage is “+5V2_PS” from the Power Supply Unit. This voltage is used to supply the module slots A800.



Checked Fuse	Fuse OK	Fuse defective
F342	• both measurement comparable	• on one side no voltage can be measured

3.3.6.8 Check of Main Slot Fuse - F350 “+5V2_800A” on the Motherboard

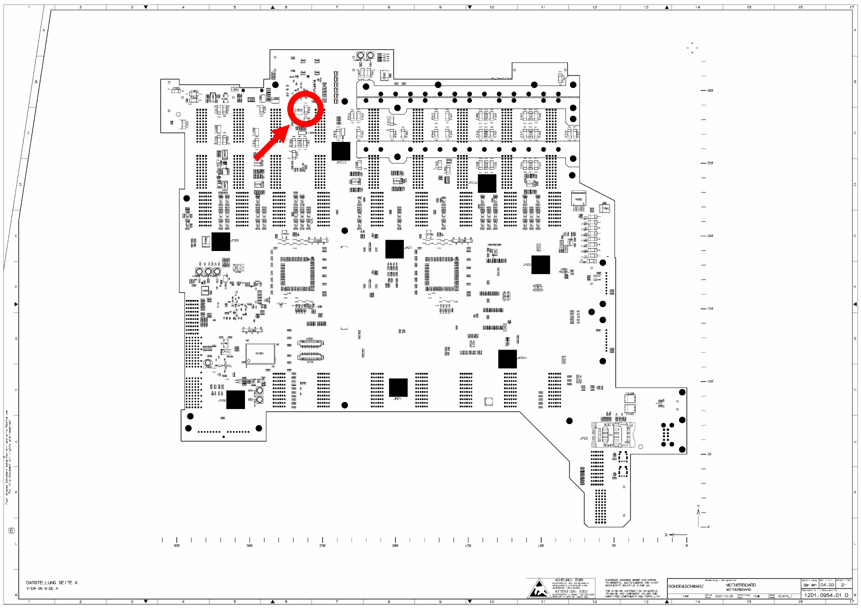
The voltages “+5V2_800A” on the motherboard is fused with F350. The source of this voltage is “+5V2_PS” from the Power Supply Unit. This voltage is used to supply the module slots A800.

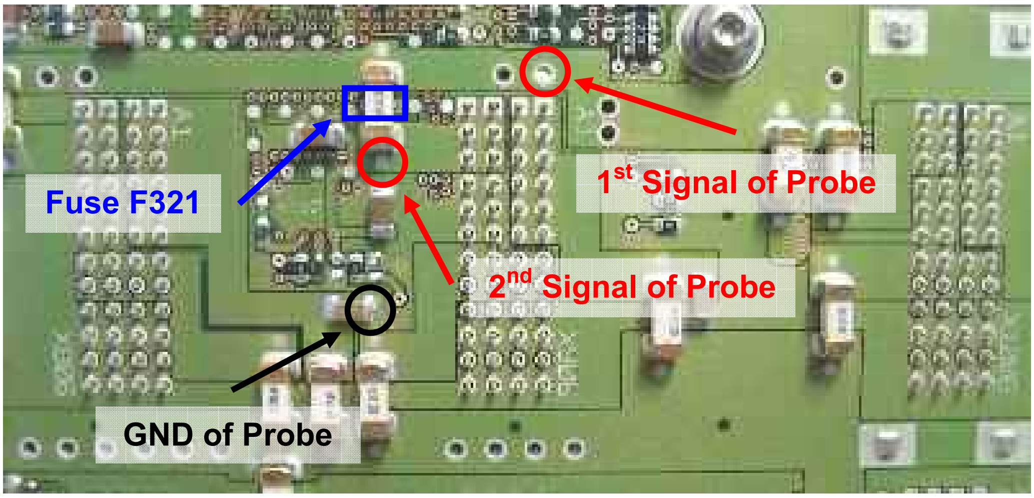


Checked Fuse	Fuse OK	Fuse defective
F350	• both measurement comparable	• on one side no voltage can be measured

3.3.6.9 Check of Main Slot Fuse - F321 “+3V3_900” on the Motherboard

The voltages “+3V3_900” on the motherboard is fused with F321. The source of this voltage is “+3V4_PS” from the Power Supply Unit. This voltage is used to supply the module slots A900.

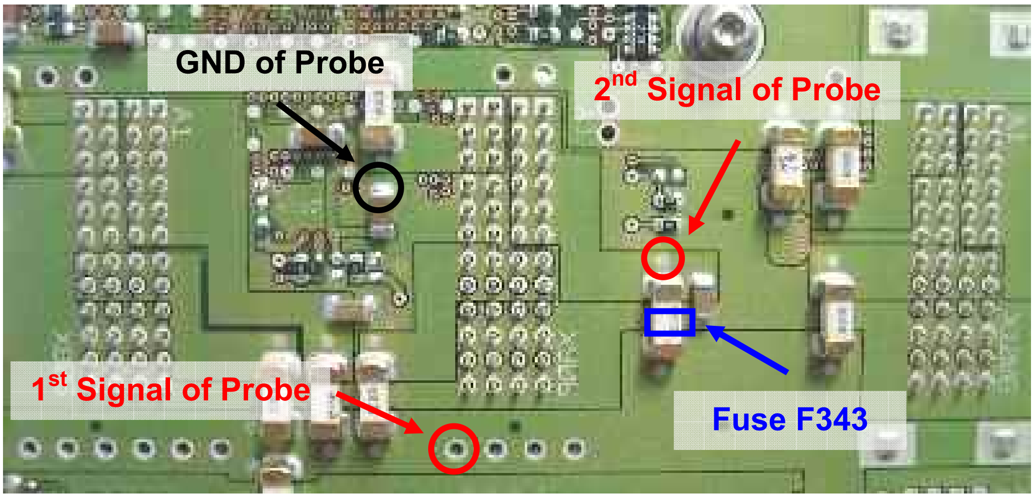




Checked Fuse	Fuse OK	Fuse defective
F321	• both measurement comparable	• on one side no voltage can be measured

3.3.6.10 Check of Main Slot Fuse - F343 "+5V2_900" on the Motherboard

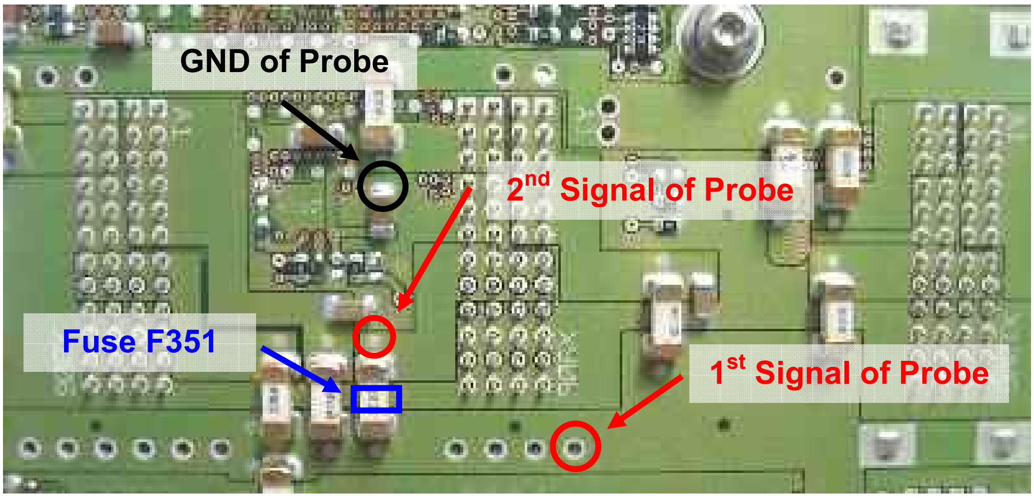
The voltages "+5V2_900" on the motherboard is fused with F343. The source of this voltage is "+5V2_PS" from the Power Supply Unit. This voltage is used to supply the module slots A900.



Checked Fuse	Fuse OK	Fuse defective
F343	• both measurement comparable	• on one side no voltage can be measured

3.3.6.11 Check of Main Slot Fuse - F351 "+5V2_900A" on the Motherboard

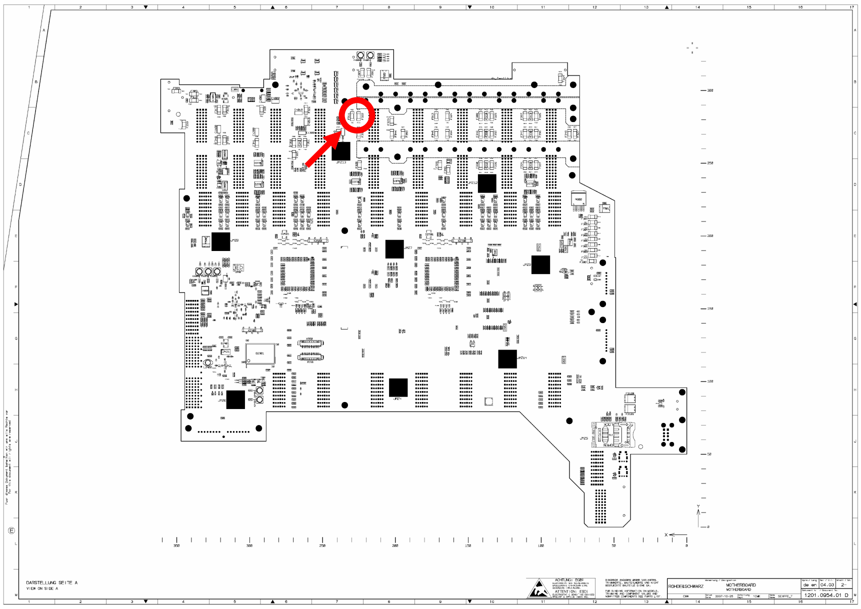
The voltages "+5V2_900A" on the motherboard is fused with F351. The source of this voltage is "+5V2_PS" from the Power Supply Unit. This voltage is used to supply the module slots A900.

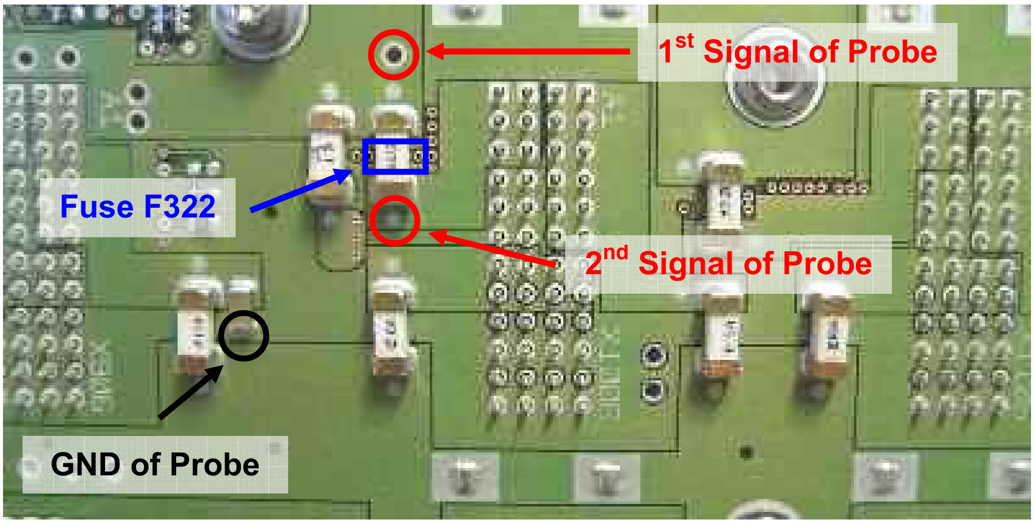


Checked Fuse	Fuse OK	Fuse defective
F351	• both measurement comparable	• on one side no voltage can be measured

3.3.6.12 Check of Main Slot Fuse - F322 “+3V3_1000” on the Motherboard

The voltages “+3V3_1000” on the motherboard is fused with F322. The source of this voltage is “+3V4_PS” from the Power Supply Unit. This voltage is used to supply the module slots A1000.

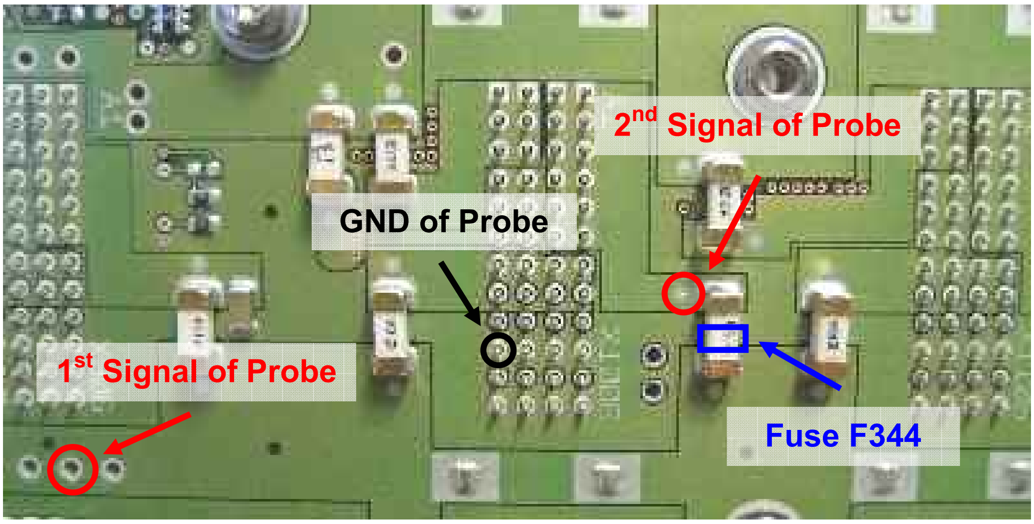




Checked Fuse	Fuse OK	Fuse defective
F322	• both measurement comparable	• on one side no voltage can be measured

3.3.6.13 Check of Main Slot Fuse - F344 “+5V2_1000” on the Motherboard

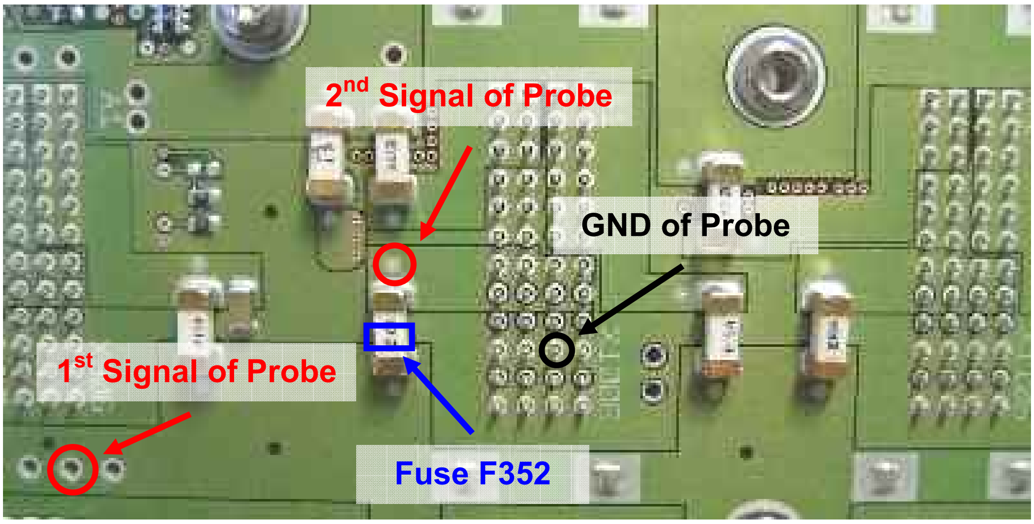
The voltages “+5V2_1000” on the motherboard is fused with F344. The source of this voltage is “+5V2_PS” from the Power Supply Unit. This voltage is used to supply the module slots A1000.



Checked Fuse	Fuse OK	Fuse defective
F344	• both measurement comparable	• on one side no voltage can be measured

3.3.6.14 Check of Main Slot Fuse - F352 "+5V2_1000A" on the Motherboard

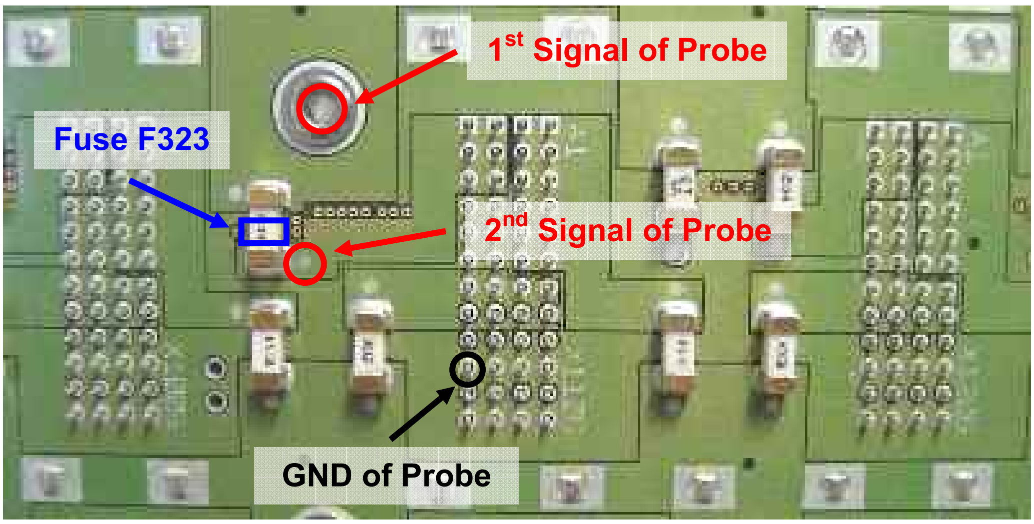
The voltages "+5V2_1000A" on the motherboard is fused with F352. The source of this voltage is "+5V2_PS" from the Power Supply Unit. This voltage is used to supply the module slots A1000.



Checked Fuse	Fuse OK	Fuse defective
F352	• both measurement comparable	• on one side no voltage can be measured

3.3.6.15 Check of Main Slot Fuse - F323 “+3V3_1100” on the Motherboard

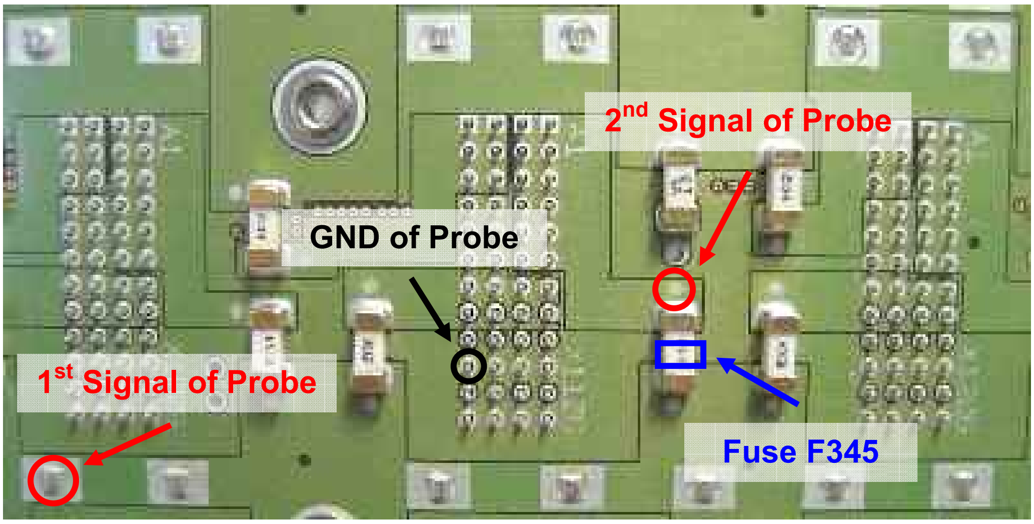
The voltages “+3V3_1100” on the motherboard is fused with F323. The source of this voltage is “+3V4_PS” from the Power Supply Unit. This voltage is used to supply the module slots A1100.



Checked Fuse	Fuse OK	Fuse defective
F323	• both measurement comparable	• on one side no voltage can be measured

3.3.6.16 Check of Main Slot Fuse - F345 “+5V2_1100” on the Motherboard

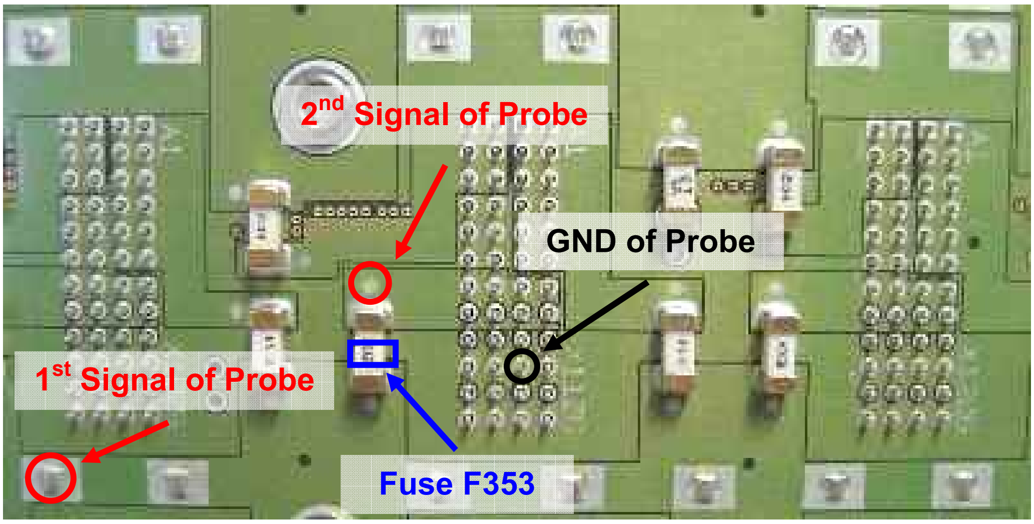
The voltages “+5V2_1100” on the motherboard is fused with F345. The source of this voltage is “+5V2_PS” from the Power Supply Unit. This voltage is used to supply the module slots A1100.



Checked Fuse	Fuse OK	Fuse defective
F345	• both measurement comparable	• on one side no voltage can be measured

3.3.6.17 Check of Main Slot Fuse - F353 “+5V2_1100A” on the Motherboard

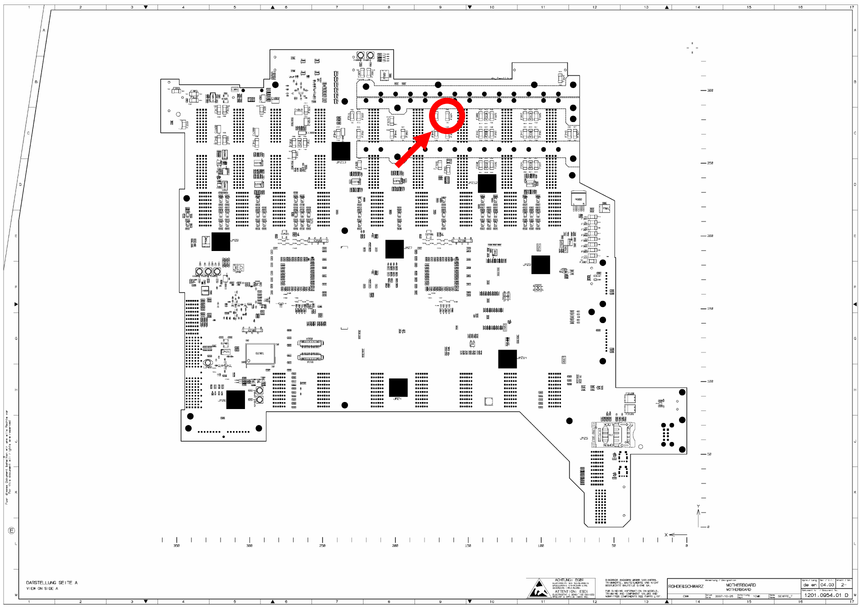
The voltages “+5V2_1100A” on the motherboard is fused with F353. The source of this voltage is “+5V2_PS” from the Power Supply Unit. This voltage is used to supply the module slots A1100.

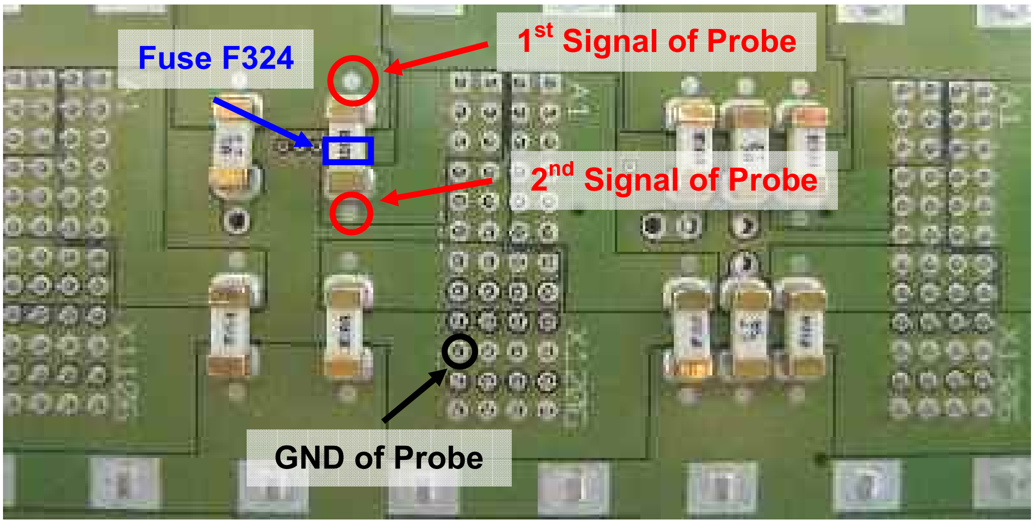


Checked Fuse	Fuse OK	Fuse defective
F353	• both measurement comparable	• on one side no voltage can be measured

3.3.6.18 Check of Main Slot Fuse - F324 “+3V3_1200” on the Motherboard

The voltages “+3V3_1200” on the motherboard is fused with F324. The source of this voltage is “+3V4_PS” from the Power Supply Unit. This voltage is used to supply the module slots A1200.

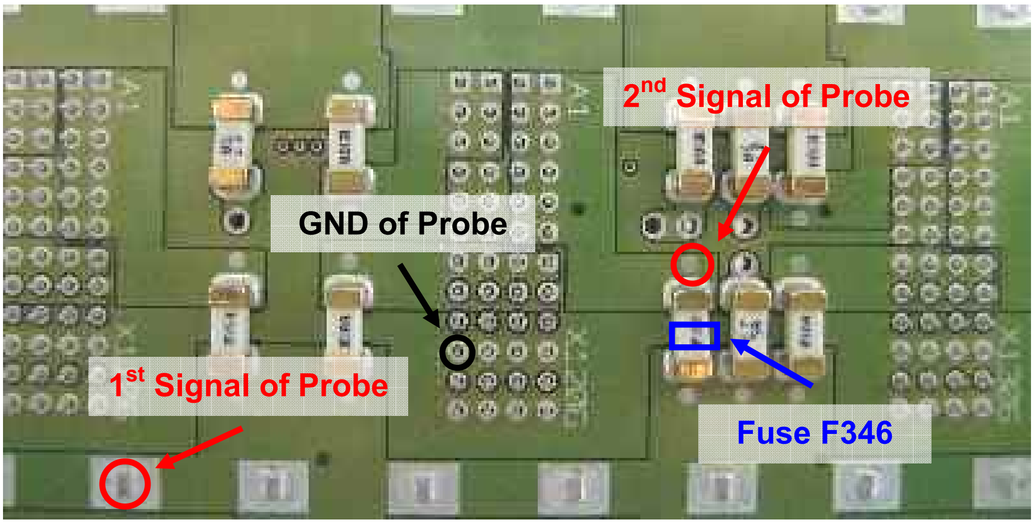




Checked Fuse	Fuse OK	Fuse defective
F324	• both measurement comparable	• on one side no voltage can be measured

3.3.6.19 Check of Main Slot Fuse - F346 “+5V2_1200” on the Motherboard

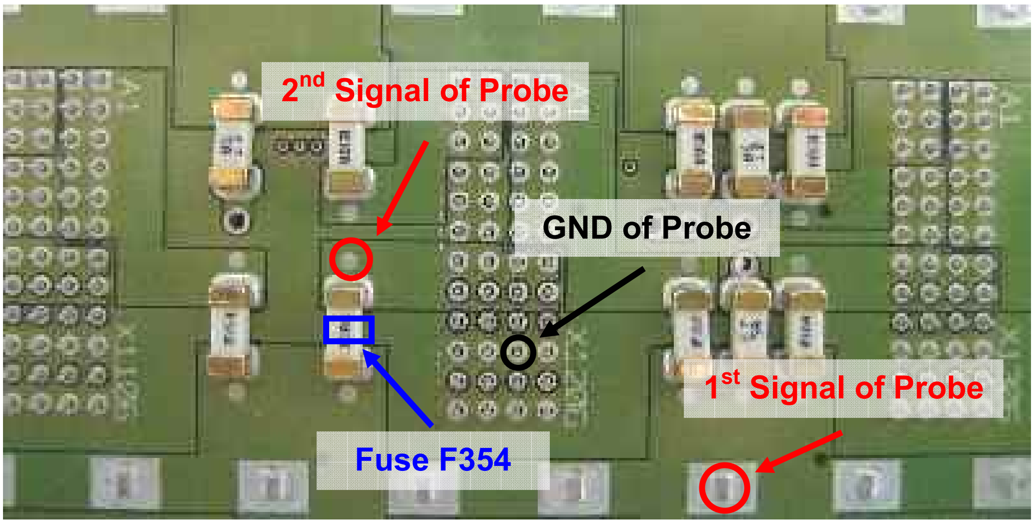
The voltages “+5V2_1200” on the motherboard is fused with F346. The source of this voltage is “+5V2_PS” from the Power Supply Unit. This voltage is used to supply the module slots A1200.



Checked Fuse	Fuse OK	Fuse defective
F346	• both measurement comparable	• on one side no voltage can be measured

3.3.6.20 Check of Main Slot Fuse - F354 “+5V2_1200A” on the Motherboard

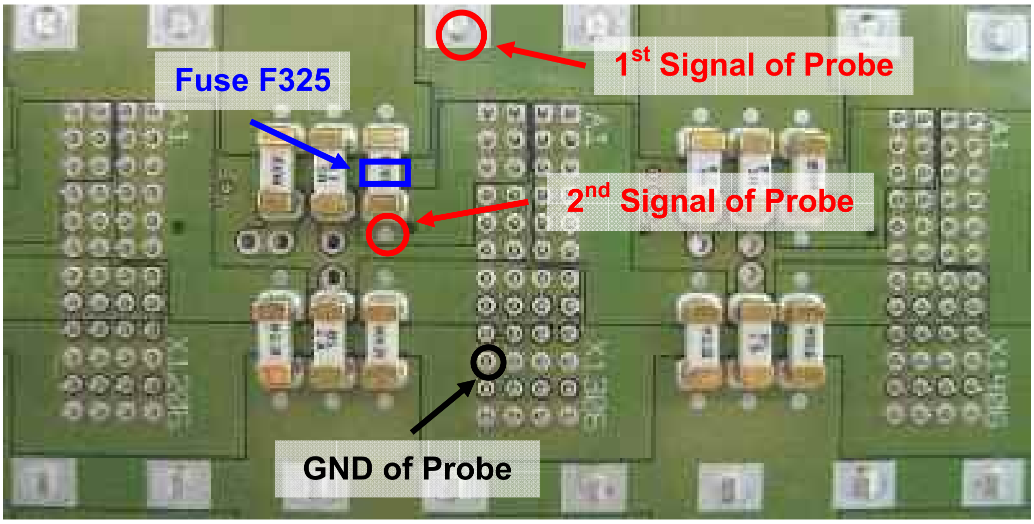
The voltages “+5V2_1200A” on the motherboard is fused with F354. The source of this voltage is “+5V2_PS” from the Power Supply Unit. This voltage is used to supply the module slots A1200.



Checked Fuse	Fuse OK	Fuse defective
F354	• both measurement comparable	• on one side no voltage can be measured

3.3.6.21 Check of Main Slot Fuse - F325 “+3V3_1300” on the Motherboard

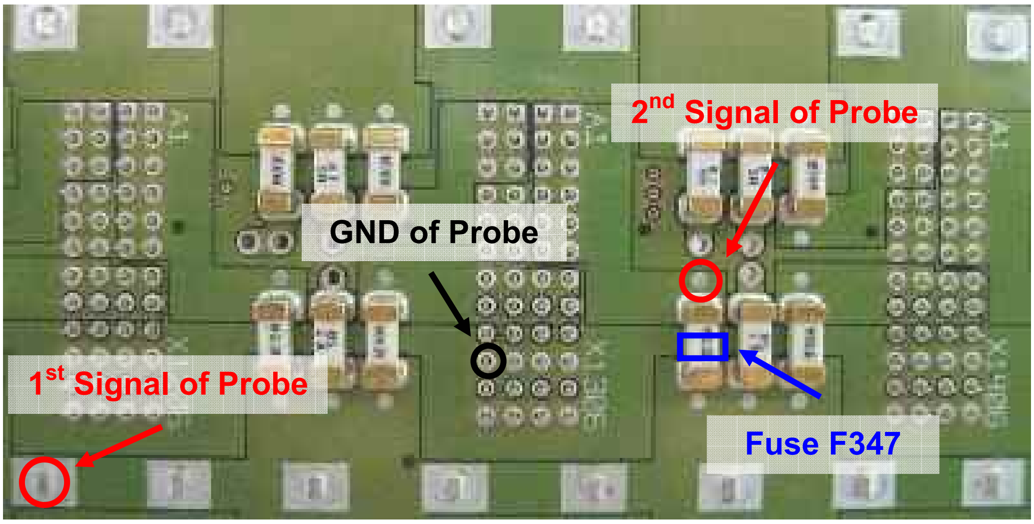
The voltages “+3V3_1300” on the motherboard is fused with F325. The source of this voltage is “+3V4_PS” from the Power Supply Unit. This voltage is used to supply the module slots A1300.



Checked Fuse	Fuse OK	Fuse defective
F325	• both measurement comparable	• on one side no voltage can be measured

3.3.6.22 Check of Main Slot Fuse - F347 “+5V2_1300” on the Motherboard

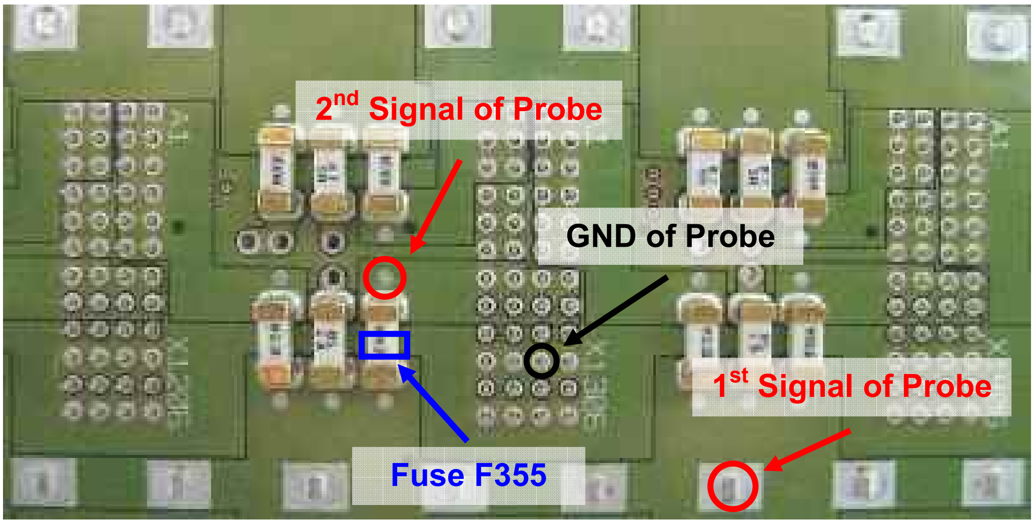
The voltages “+5V2_1300” on the motherboard is fused with F347. The source of this voltage is “+5V2_PS” from the Power Supply Unit. This voltage is used to supply the module slots A1300.



Checked Fuse	Fuse OK	Fuse defective
F347	• both measurement comparable	• on one side no voltage can be measured

3.3.6.23 Check of Main Slot Fuse - F355 “+5V2_1300A” on the Motherboard

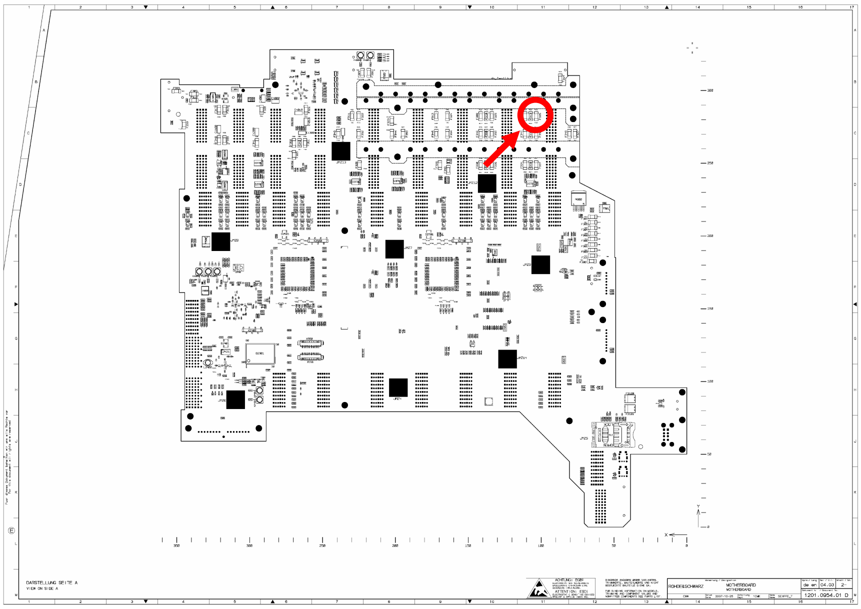
The voltages “+5V2_1300A” on the motherboard is fused with F355. The source of this voltage is “+5V2_PS” from the Power Supply Unit. This voltage is used to supply the module slots A1300.

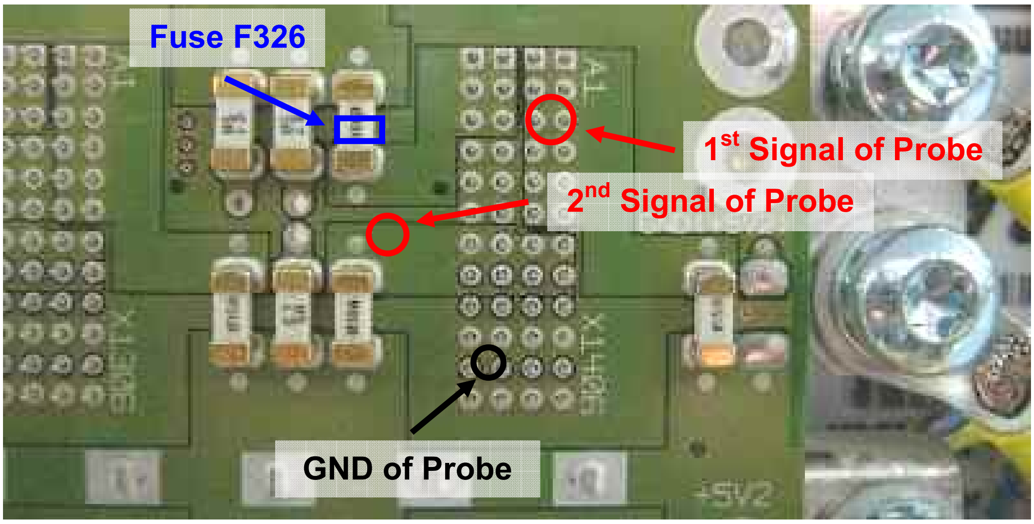


Checked Fuse	Fuse OK	Fuse defective
F355	• both measurement comparable	• on one side no voltage can be measured

3.3.6.24 Check of Main Slot Fuse - F326 "+3V3_1400" on the Motherboard

The voltages "+3V3_1400" on the motherboard is fused with F326. The source of this voltage is "+3V4_PS" from the Power Supply Unit. This voltage is used to supply the module slots A1400.

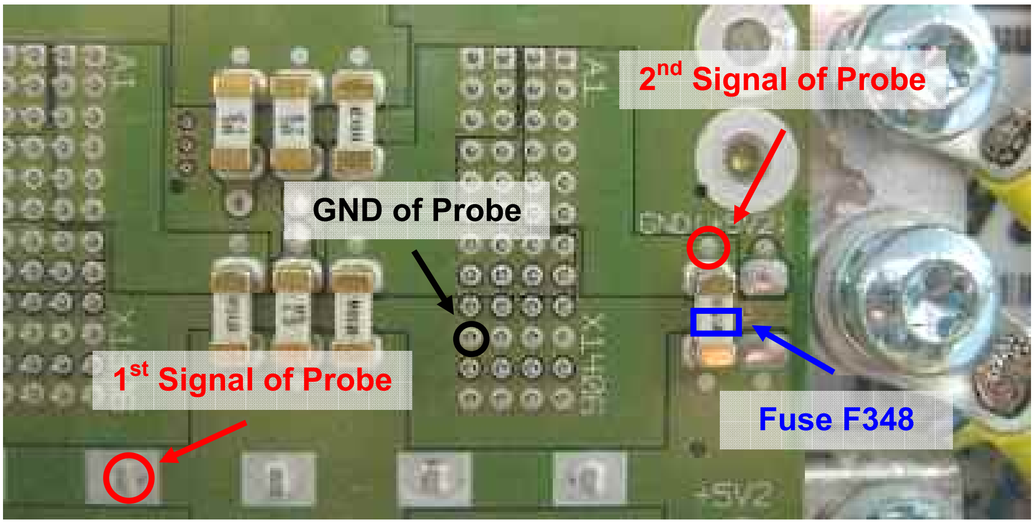




Checked Fuse	Fuse OK	Fuse defective
F326	• both measurement comparable	• on one side no voltage can be measured

3.3.6.25 Check of Main Slot Fuse - F348 “+5V2_1400” on the Motherboard

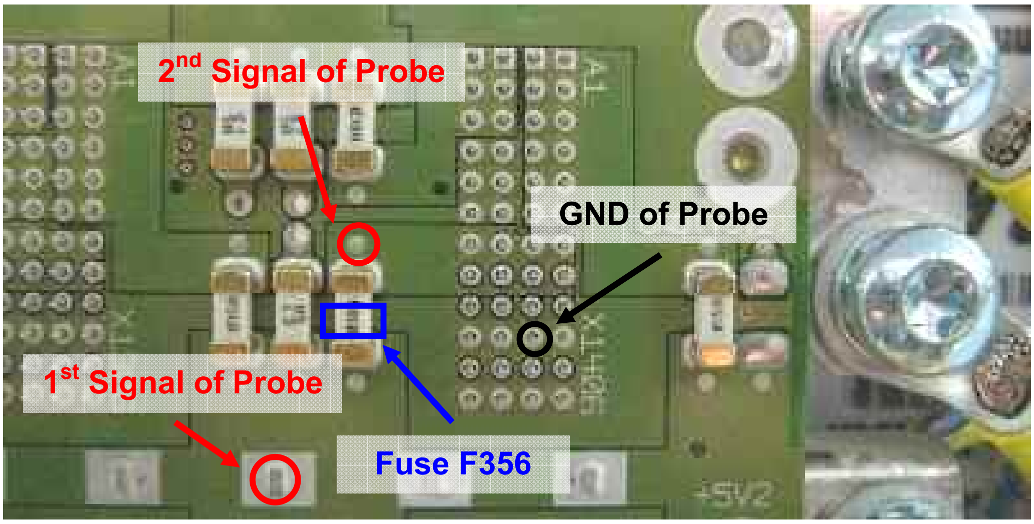
The voltages “+5V2_1400” on the motherboard is fused with F348. The source of this voltage is “+5V2_PS” from the Power Supply Unit. This voltage is used to supply the module slots A1400.



Checked Fuse	Fuse OK	Fuse defective
F348	• both measurement comparable	• on one side no voltage can be measured

3.3.6.26 Check of Main Slot Fuse - F356 “+5V2_1400A” on the Motherboard

The voltages “+5V2_1400A” on the motherboard is fused with F356. The source of this voltage is “+5V2_PS” from the Power Supply Unit. This voltage is used to supply the module slots A1400.



Checked Fuse	Fuse OK	Fuse defective
F356	• both measurement comparable	• on one side no voltage can be measured

3.3.7 Check of the fuses for the further connectors on the Motherboard

In the following chapter the check of the fuses for the further connector on the Motherboard is described. The source of this supply voltages is the Power Supply Unit. This voltages only feed through a fuse and then derived to the various connectors.

For this purpose an overview of the bottom side of the Motherboard is shown with the position of the photo (red marking) with the detailed view of the measurement points.

- The black circle shows the ground of the voltage probe
- The red circle shows the signal of the voltage probe

NOTICE

Prevent from short-circuit of measured voltage

Short-circuit can damage the board or other modules

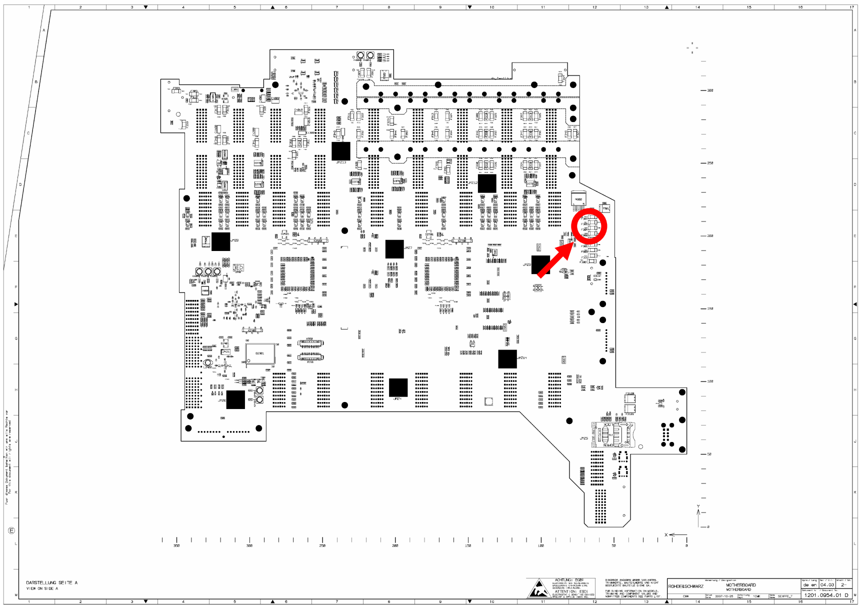
Be careful while measuring with voltage probes

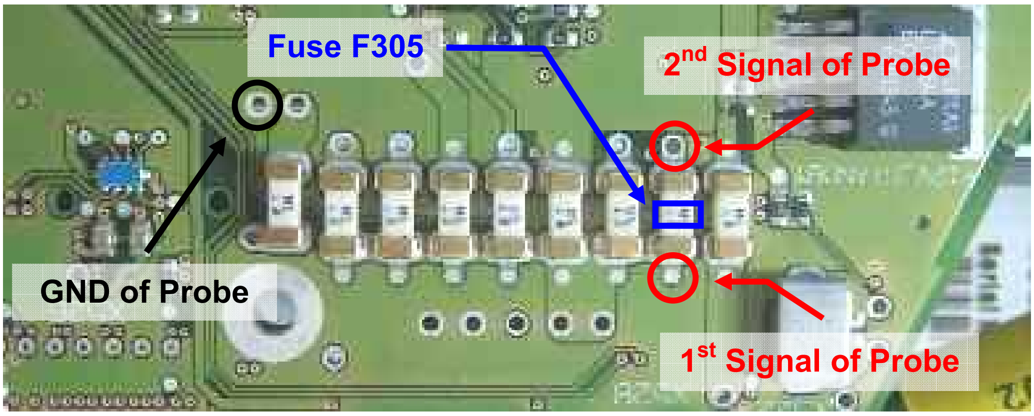
Note:

- *In this chapter only the supply voltages described which are directly feed through a fuse and supplied by the Power Supply Unit*

3.3.7.1 Check of Fuse F305 - "+12V_E" on the Motherboard

The voltages "+12V_E" on the motherboard is fused with F305. The source of this voltage is "+12V_PS" from the Power Supply Unit. This voltage is used to supply the various connectors except the module slots +A600 to A1400.

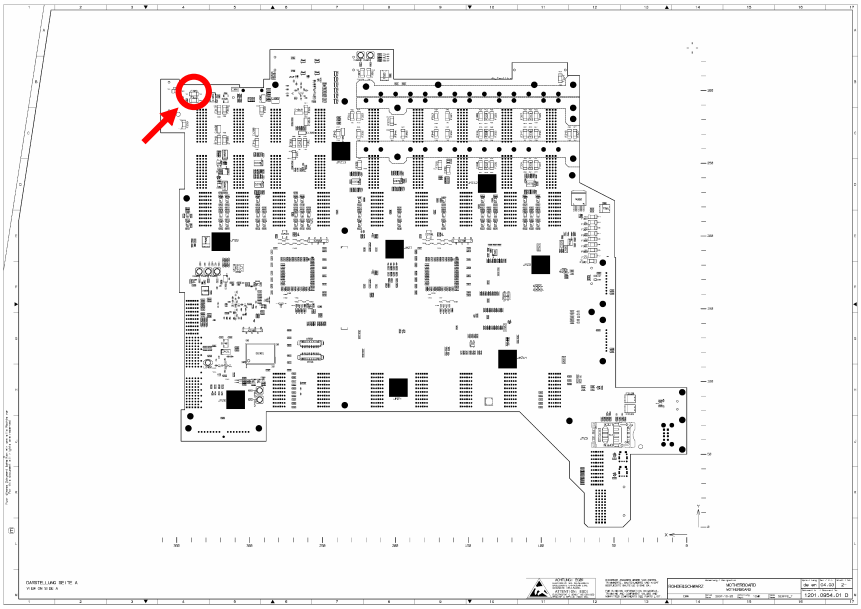


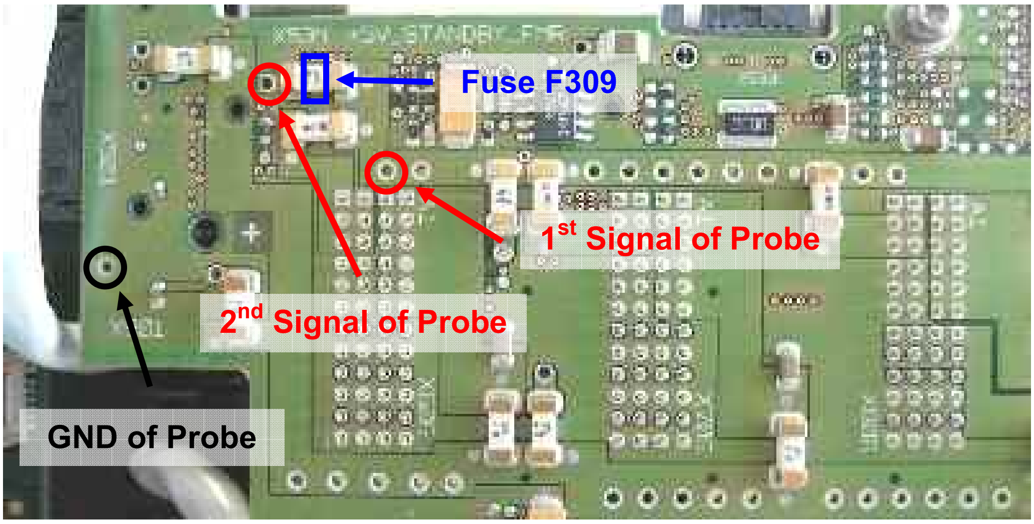


Checked Fuse	Fuse OK	Fuse defective
F305	• both measurement comparable	• on one side no voltage can be measured

3.3.7.2 Check of X501 Fuse – F309 "+3V3_501" on the Motherboard

The voltages "+3V3_501" on the motherboard is fused with F309. The source of this voltage is "+3V4_PS" from the Power Supply Unit. This voltage is used to supply the Front Panel Board 1P on connector X501.

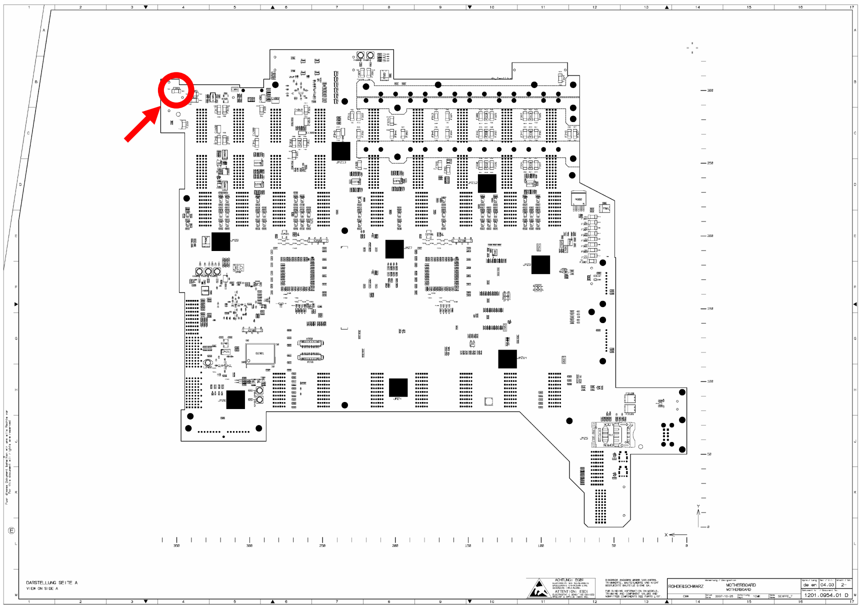


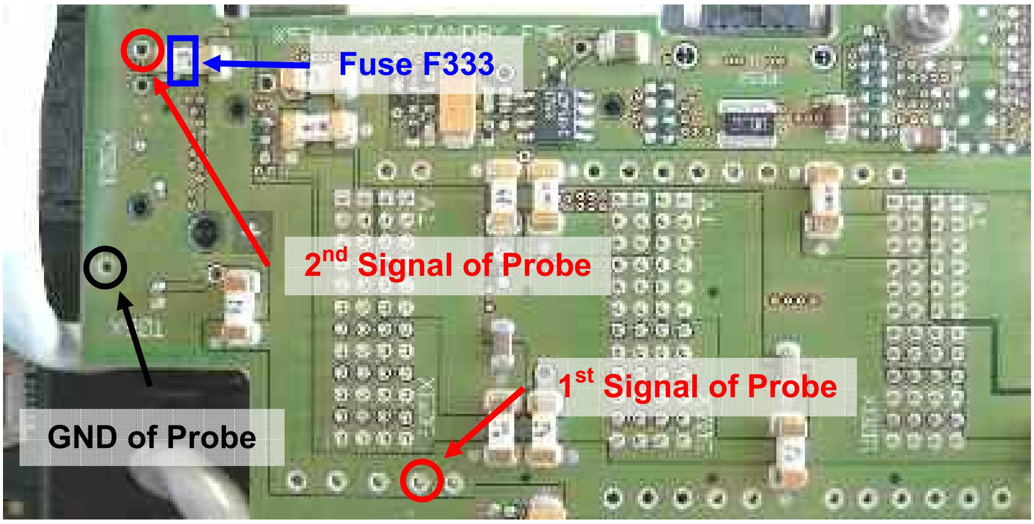


Checked Fuse	Fuse OK	Fuse defective
F309	• both measurement comparable	• on one side no voltage can be measured

3.3.7.3 Check of X501 Fuse – F333 "+5V2_501" on the Motherboard

The voltages "+5V2_501" on the motherboard is fused with F333. The source of this voltage is "+5V2_PS" from the Power Supply Unit. This voltage is used to supply the Front Panel Board 1P on connector X501.

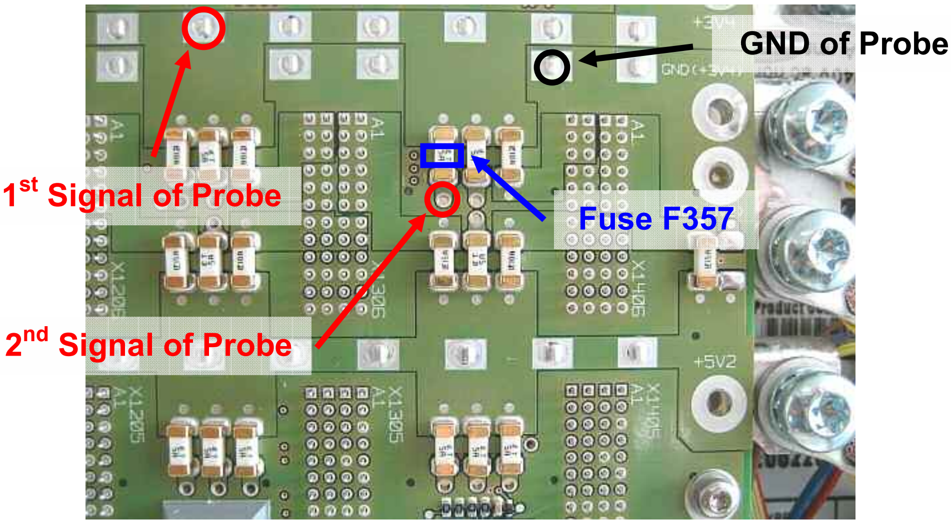




Checked Fuse	Fuse OK	Fuse defective
F333	• both measurement comparable	• on one side no voltage can be measured

3.3.7.4 Check of X504 Fuse – F357 "+3V3_504" on the Motherboard

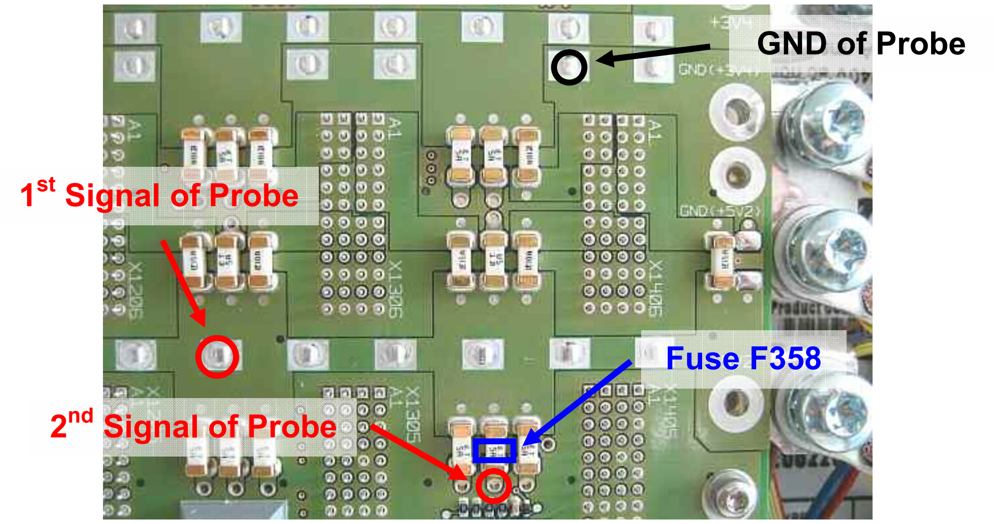
The voltages "+3V3_504" on the motherboard is fused with F357. The source of this voltage is "+3V4_PS" from the Power Supply Unit. This voltage is used to supply the module on connector X504.



Checked Fuse	Fuse OK	Fuse defective
F357	• both measurement comparable	• on one side no voltage can be measured

3.3.7.5 Check of X504 Fuse – F358 "+5V2_504" on the Motherboard

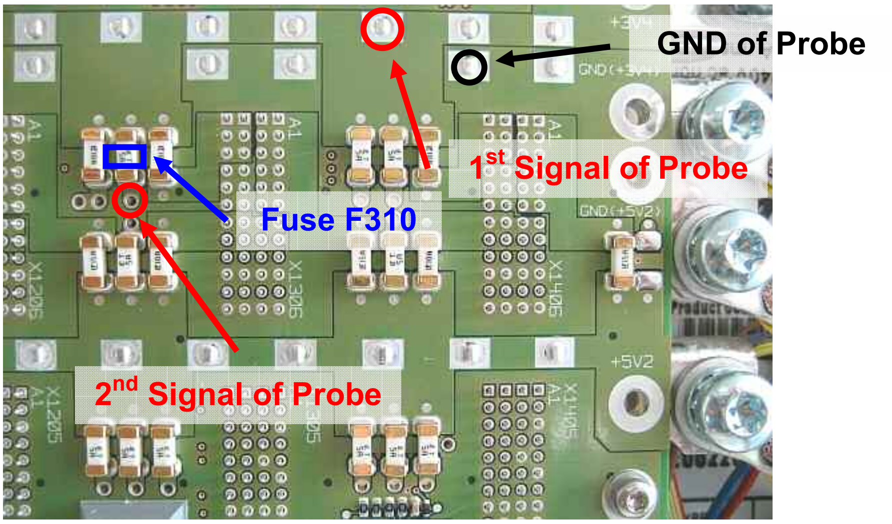
The voltages "+5V2_504" on the motherboard is fused with F358. The source of this voltage is "+5V2_PS" from the Power Supply Unit. This voltage is used to supply the module on connector X504.



Checked Fuse	Fuse OK	Fuse defective
F358	• both measurement comparable	• on one side no voltage can be measured

3.3.7.6 Check of X505 Fuse – F310 "+3V3_505" on the Motherboard

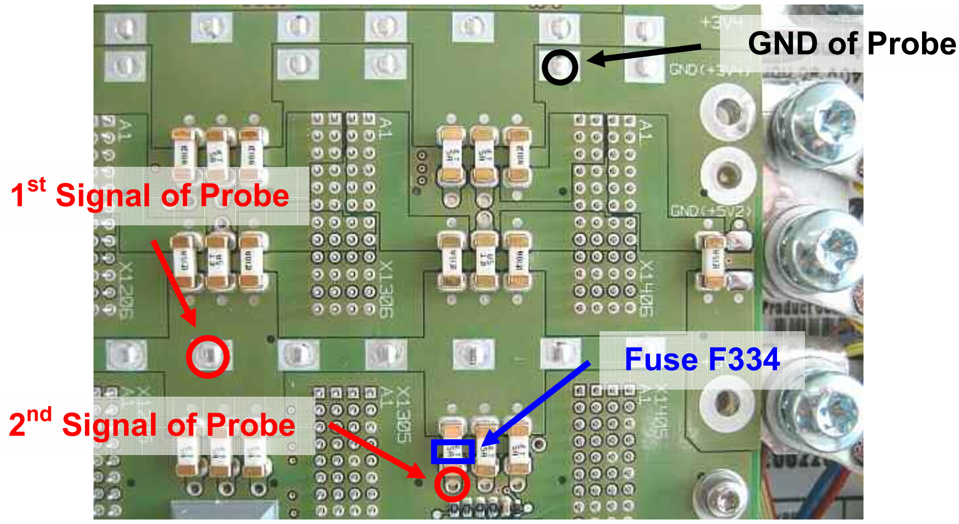
The voltages "+3V3_505" on the motherboard is fused with F310. The source of this voltage is "+3V4_PS" from the Power Supply Unit. This voltage is used to supply the module on connector X505.



Checked Fuse	Fuse OK	Fuse defective
F310	• both measurement comparable	• on one side no voltage can be measured

3.3.7.7 Check of X505 Fuse – F334 “+5V2_505” on the Motherboard

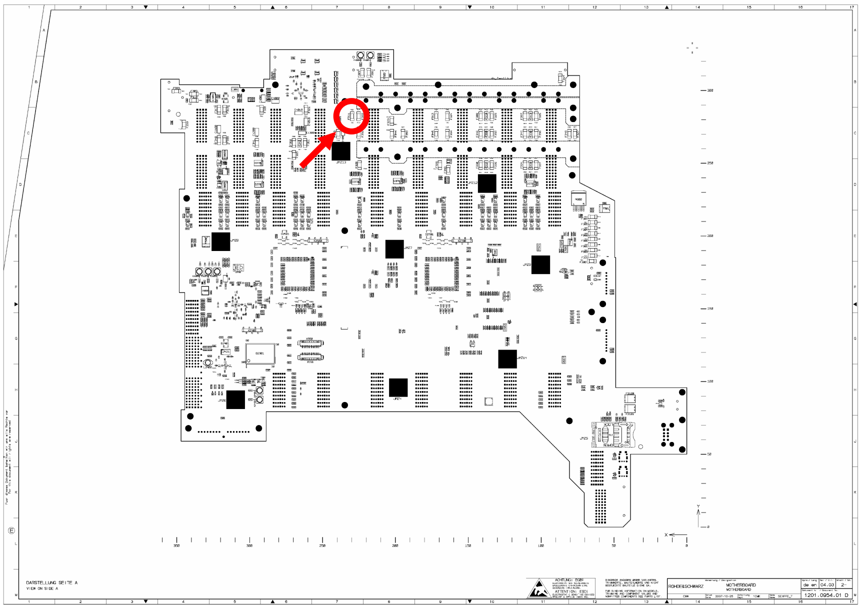
The voltages “+5V2_505” on the motherboard is fused with F334. The source of this voltage is “+5V2_PS” from the Power Supply Unit. This voltage is used to supply the module on connector X505.

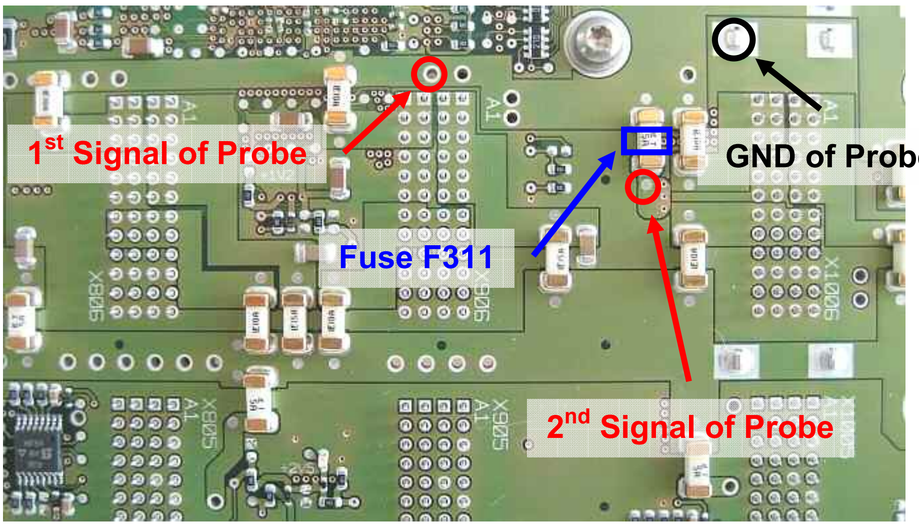


Checked Fuse	Fuse OK	Fuse defective
F334	• both measurement comparable	• on one side no voltage can be measured

3.3.7.8 Check of X520 Fuse – F311 “+3V3_520” on the Motherboard

The voltages “+3V3_520” on the motherboard is fused with F311. The source of this voltage is “+3V4_PS” from the Power Supply Unit. This voltage is used to supply the BB Fixed or Flexible Link CMW-H550A/B on connector X520.

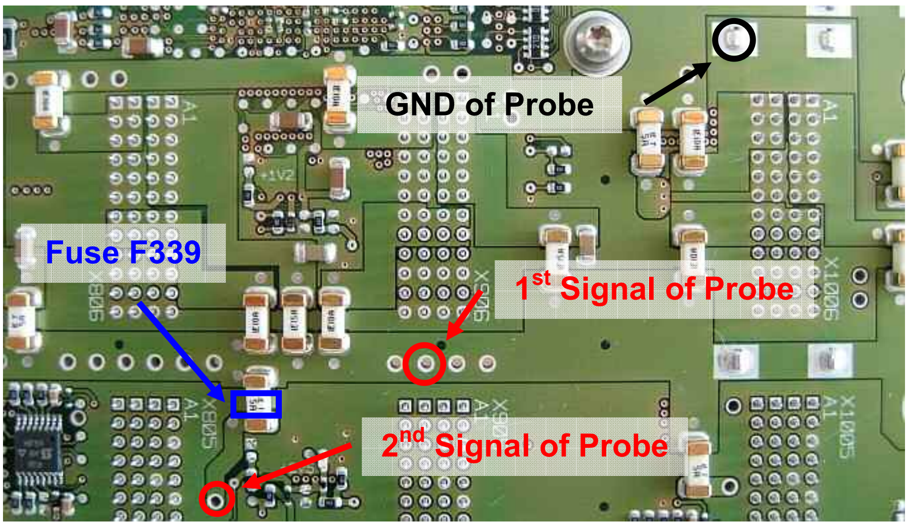




Checked Fuse	Fuse OK	Fuse defective
F311	• both measurement comparable	• on one side no voltage can be measured

3.3.7.9 Check of X520 Fuse – F335 "+5V2_520" on the Motherboard

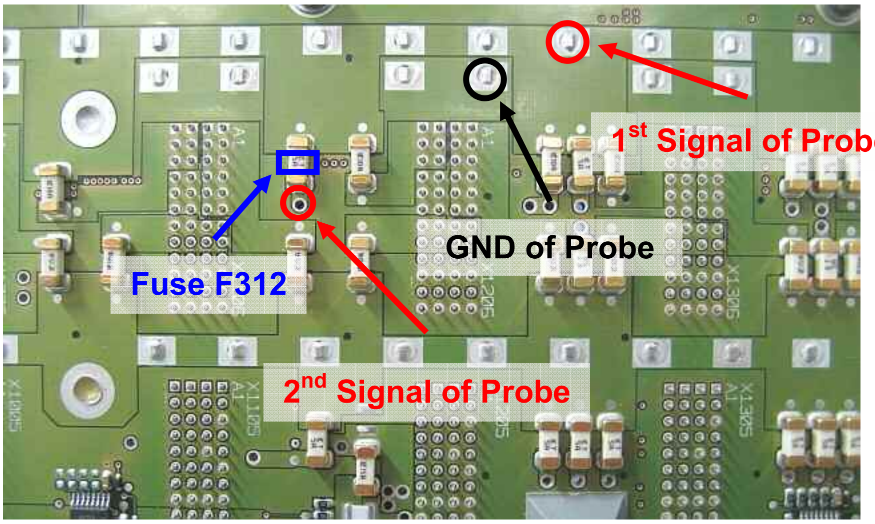
The voltages "+5V2_520" on the motherboard is fused with F335. The source of this voltage is "+5V2_PS" from the Power Supply Unit. This voltage is used to supply the BB Fixed or Flexible Link CMW-H550A/B on connector X520.



Checked Fuse	Fuse OK	Fuse defective
F335	• both measurement comparable	• on one side no voltage can be measured

3.3.7.10 Check of X525 Fuse – F312 “+3V3_525” on the Motherboard

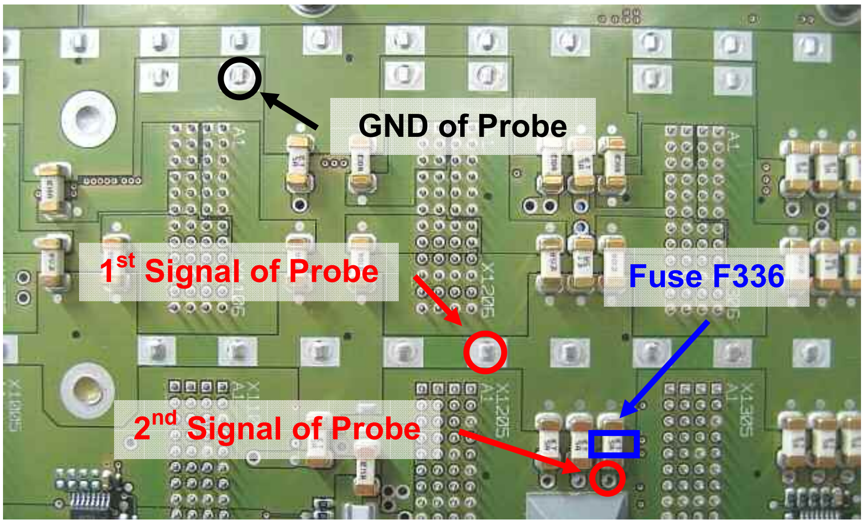
The voltages “+3V3_525” on the motherboard is fused with F312. The source of this voltage is “+3V4_PS” from the Power Supply Unit. This voltage is used to supply the module on connector X525.



Checked Fuse	Fuse OK	Fuse defective
F312	• both measurement comparable	• on one side no voltage can be measured

3.3.7.11 Check of X525 Fuse – F336 "+5V2_525" on the Motherboard

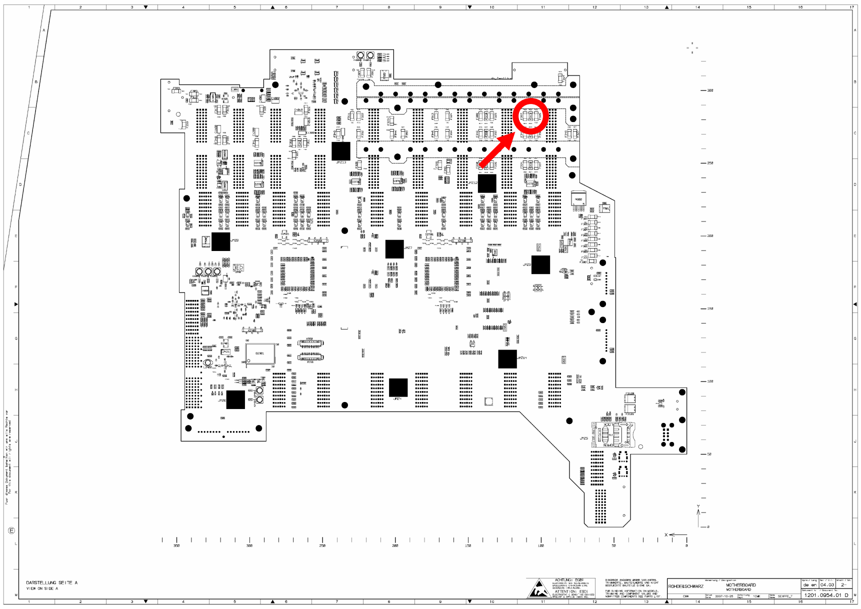
The voltages "+5V2_525" on the motherboard is fused with F336. The source of this voltage is "+5V2_PS" from the Power Supply Unit. This voltage is used to supply the module on connector X525.

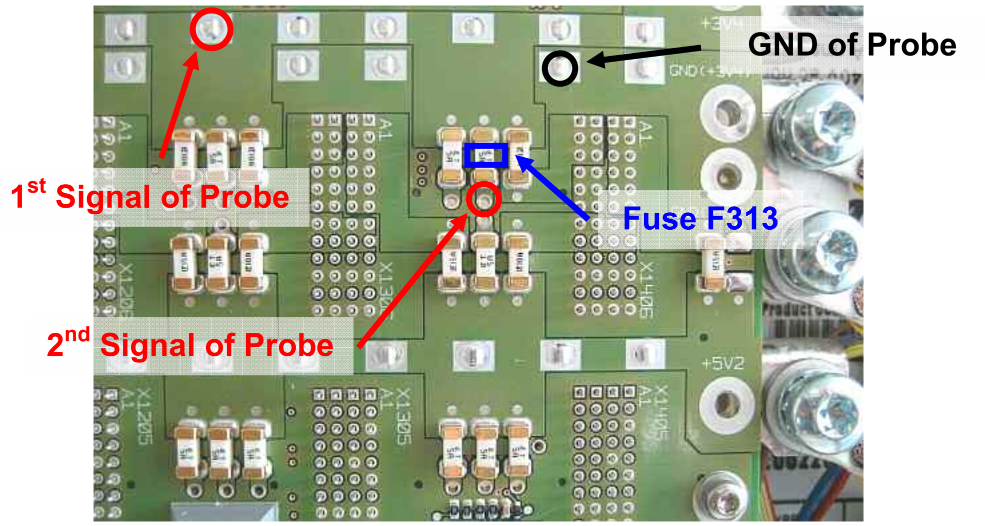


Checked Fuse	Fuse OK	Fuse defective
F336	• both measurement comparable	• on one side no voltage can be measured

3.3.7.12 Check of X526 Fuse – F313 "+3V3_526" on the Motherboard

The voltages "+3V3_526" on the motherboard is fused with F313. The source of this voltage is "+3V4_PS" from the Power Supply Unit. This voltage is used to supply the module on connector X526.

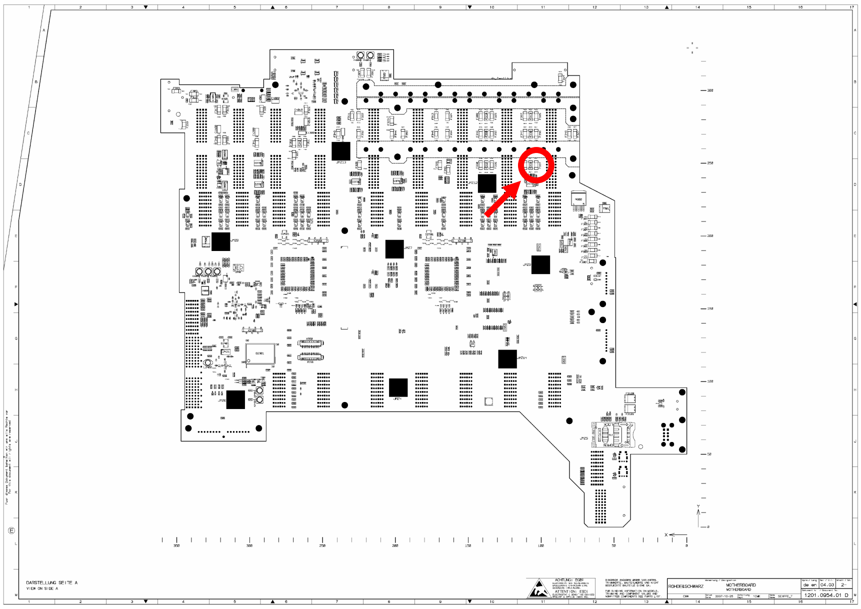


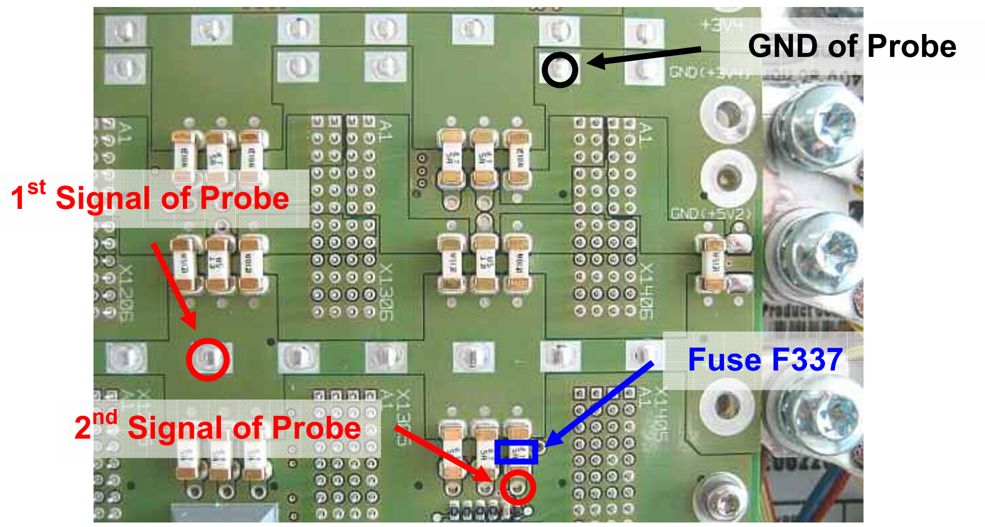


Checked Fuse	Fuse OK	Fuse defective
F313	• both measurement comparable	• on one side no voltage can be measured

3.3.7.13 Check of X526 Fuse – F337 "+5V2_526" on the Motherboard

The voltages "+5V2_526" on the motherboard is fused with F337. The source of this voltage is "+5V2_PS" from the Power Supply Unit. This voltage is used to supply the module on connector X526.

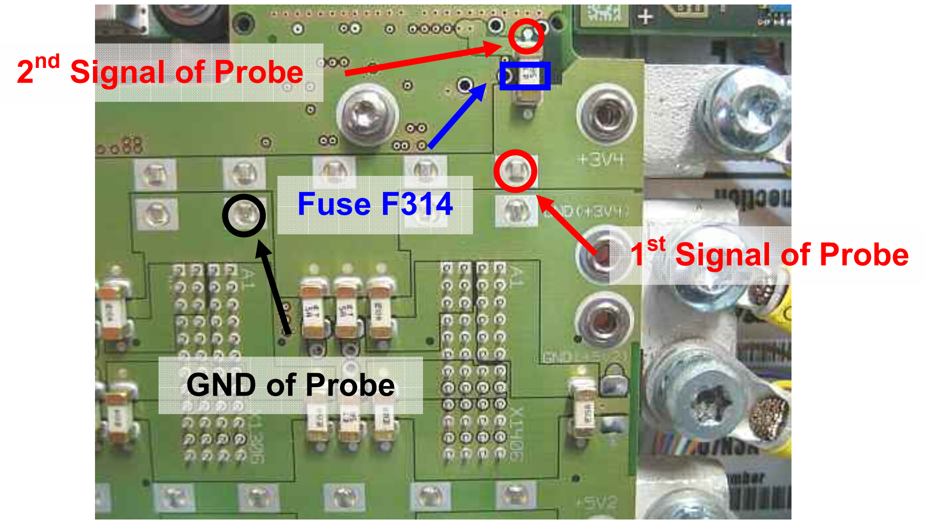




Checked Fuse	Fuse OK	Fuse defective
F337	• both measurement comparable	• on one side no voltage can be measured

3.3.7.14 Check of X529 Fuse – F314 “+3V3_529” on the Motherboard

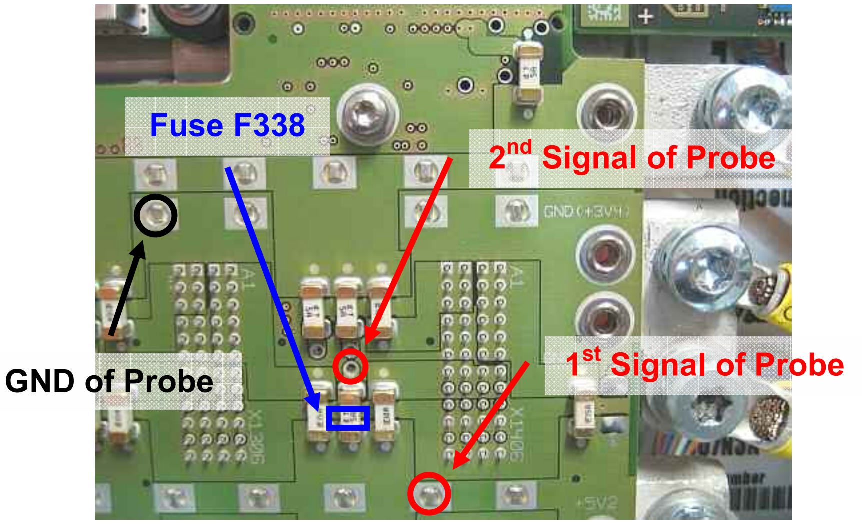
The voltages “+3V3_529” on the motherboard is fused with F314. The source of this voltage is “+3V4_PS” from the Power Supply Unit. This voltage is used to supply the Reference CMW-H090A on connector X529.



Checked Fuse	Fuse OK	Fuse defective
F314	• both measurement comparable	• on one side no voltage can be measured

3.3.7.15 Check of X529 Fuse – F338 “+5V2_529” on the Motherboard

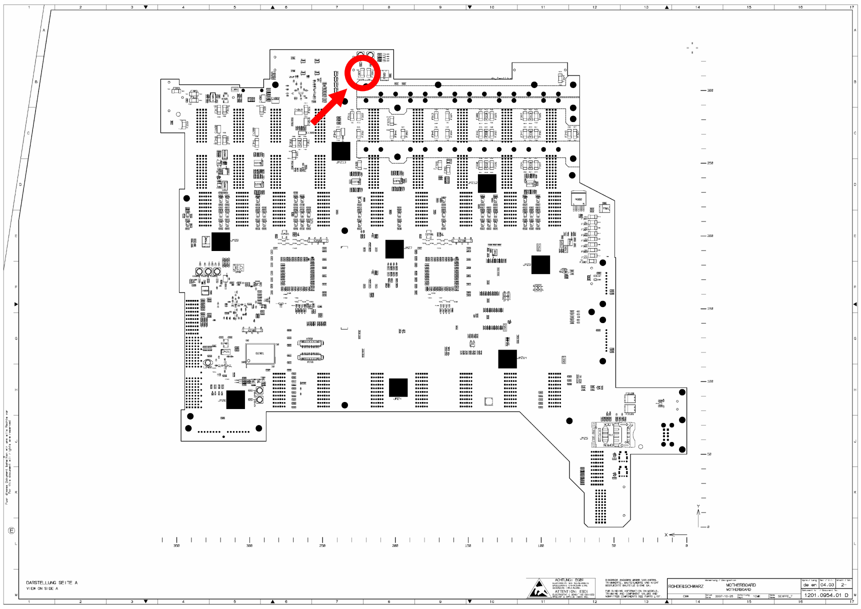
The voltages “+5V2_529” on the motherboard is fused with F338. The source of this voltage is “+5V2_PS” from the Power Supply Unit. This voltage is used to supply the Reference CMW-H090A on connector X529.

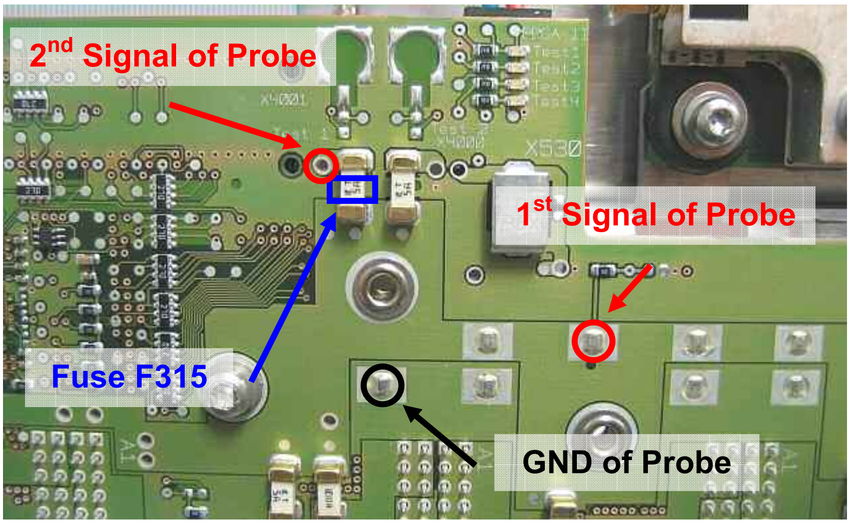


Checked Fuse	Fuse OK	Fuse defective
F338	• both measurement comparable	• on one side no voltage can be measured

3.3.7.16 Check of X531 Fuse – F315 “+3V3_531” on the Motherboard

The voltages “+3V3_531” on the motherboard is fused with F315. The source of this voltage is “+3V4_PS” from the Power Supply Unit. This voltage is used to supply the 1st Frontend on connector X531.

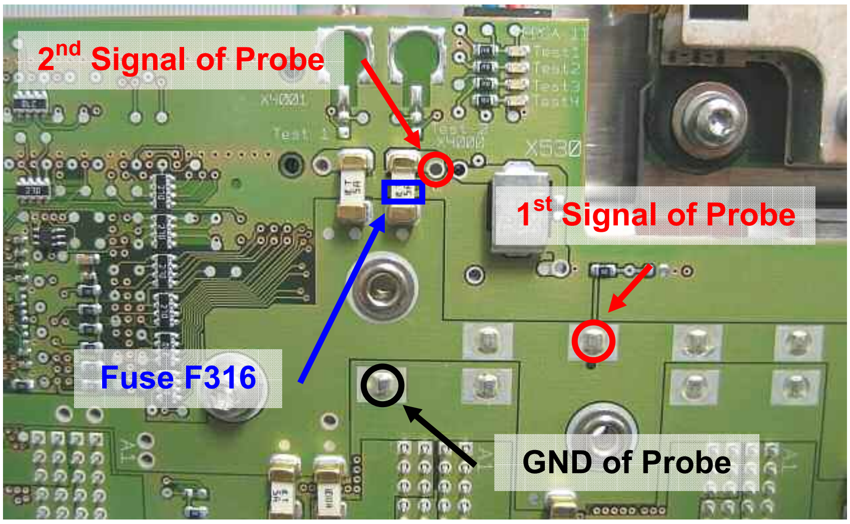




Checked Fuse	Fuse OK	Fuse defective
F315	• both measurement comparable	• on one side no voltage can be measured

3.3.7.17 Check of X532 Fuse – F316 “+3V3_532” on the Motherboard

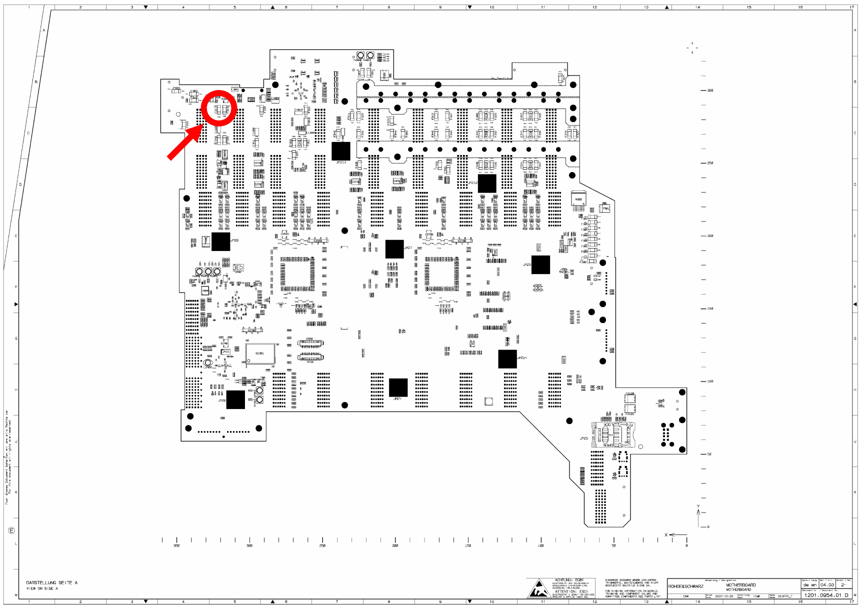
The voltages “+3V3_532” on the motherboard is fused with F316. The source of this voltage is “+3V4_PS” from the Power Supply Unit. This voltage is used to supply the 2nd Fronted on connector X532.

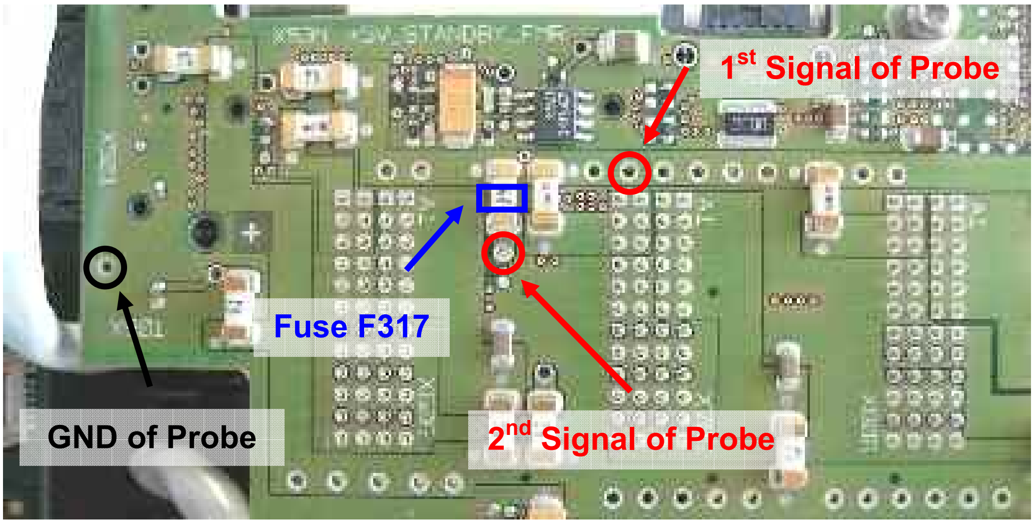


Checked Fuse	Fuse OK	Fuse defective
F316	• both measurement comparable	• on one side no voltage can be measured

3.3.7.18 Check of X534 Fuse – F317 "+3V3_534" on the Motherboard

The voltages "+3V3_534" on the motherboard is fused with F317. The source of this voltage is "+3V4_PS" from the Power Supply Unit. This voltage is used to supply the module on connector X534.

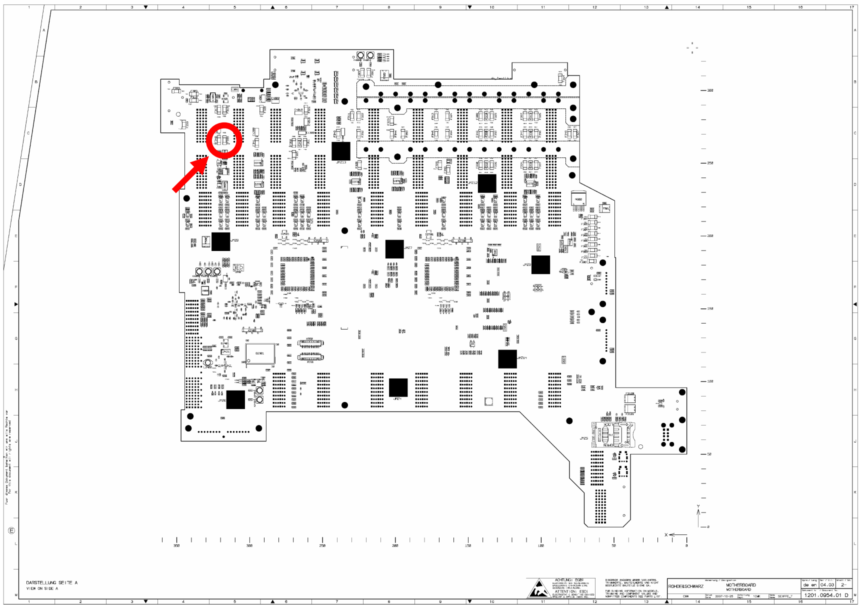


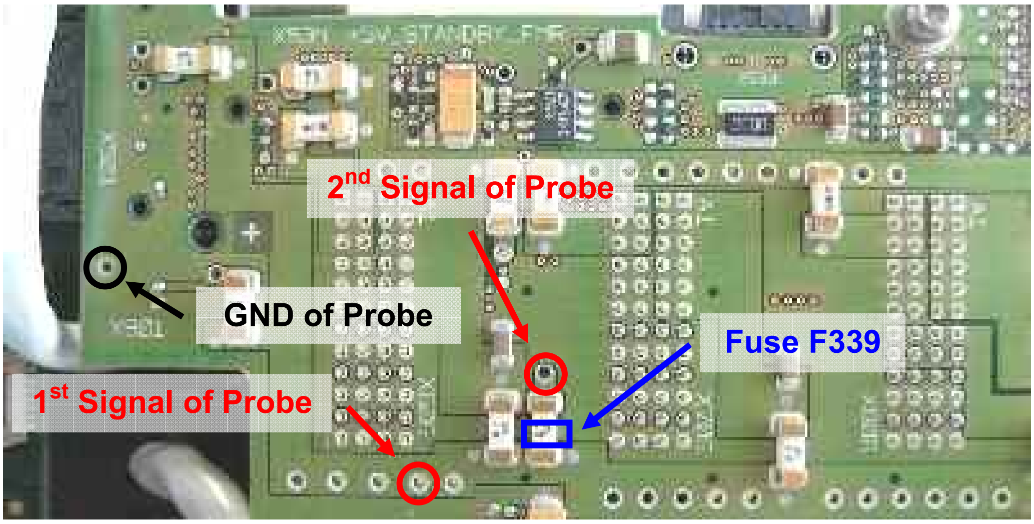


Checked Fuse	Fuse OK	Fuse defective
F317	• both measurement comparable	• on one side no voltage can be measured

3.3.7.19 Check of X534 Fuse – F339 "+5V2_534" on the Motherboard

The voltages "+5V2_534" on the motherboard is fused with F339. The source of this voltage is "+5V2_PS" from the Power Supply Unit. This voltage is used to supply the module on connector X534.





Checked Fuse	Fuse OK	Fuse defective
F339	• both measurement comparable	• on one side no voltage can be measured

3.3.8 Measurement of generated Voltages on the Motherboard

In the following chapter the measurement of the various voltages which will be generated on the Motherboard with DC/DC converter or LDO regulators is described. Also the measurement of the corresponding fuses (if available) is described.

For this purpose an overview of the bottom side of the Motherboard is shown with the position of the photo (red marking) with the detailed view of the measurement points.

- The black circle shows the ground of the voltage probe
- The red circle shows the signal of the voltage probe

NOTICE

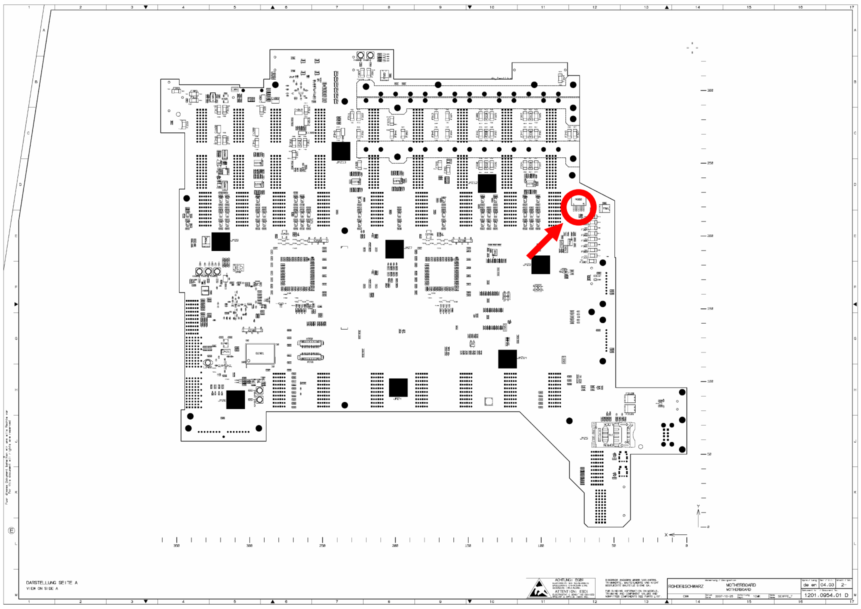
Prevent from short-circuit of measured voltage

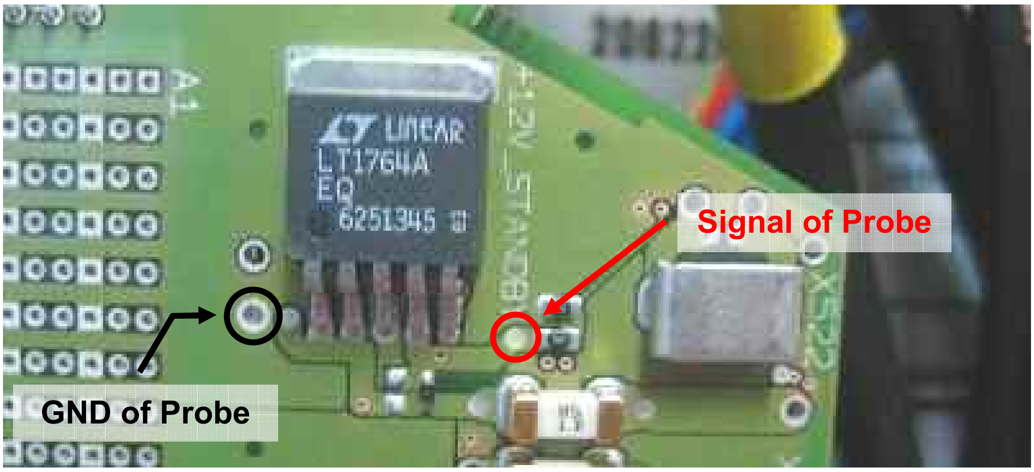
Short-circuit can damage the board or other modules

Be careful while measuring with voltage probes

3.3.8.1 Measurement of “+12V_STANDBY” from the Motherboard

The voltage “+12V_STANDBY” is generated from “+12V_STANDBY_PS” and fused with F307

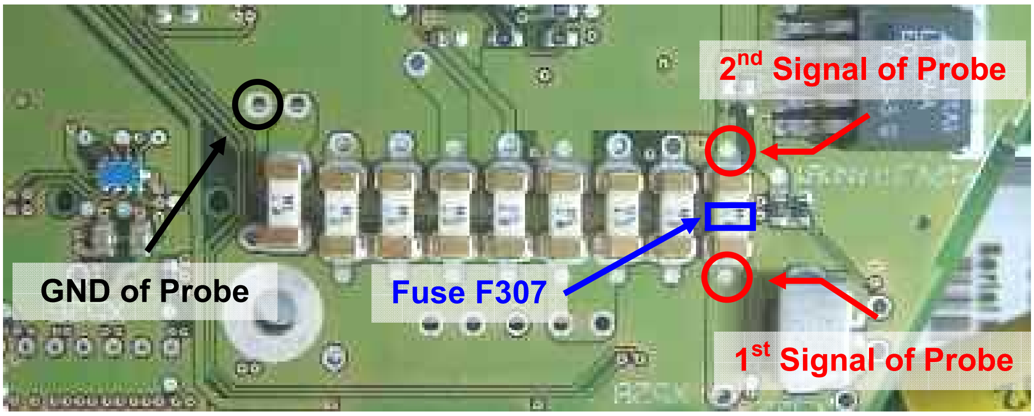




Voltage Name	Rated Value	Rated Tolerance
+12V_STANDBY	• + 12,0 V	• ± 0,6 V

3.3.8.2 Check of Fuse F307 – "+12V_STANDBY" on the Motherboard

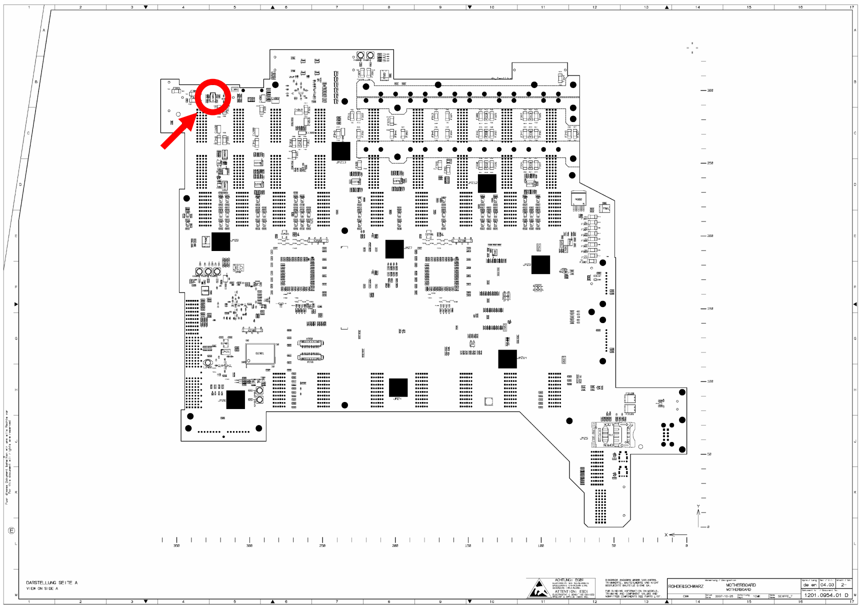
The generated voltage "+12V_STANDBY" on the motherboard is fused with F307. The source of this voltage is "+12V_STANDBY_PS" from the Power Supply Unit.

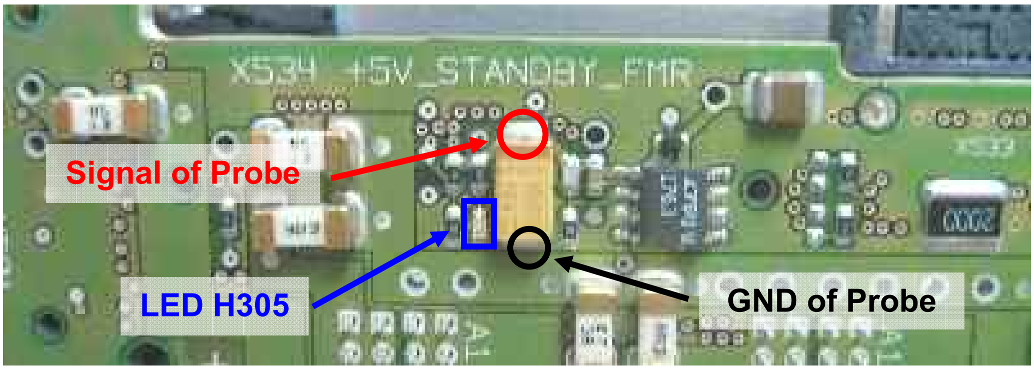


Checked Fuse	Fuse OK	Fuse defective
F307	• both measurement comparable	• on one side no voltage can be measured

3.3.8.3 Measurement of “+5V_STANDBY_FMR” from the Motherboard

The voltage “+5V_STANDBY_FMR” is generated from “+12V_STANDBY” and is not fused separately. An indication for the availability of this voltage can be done with the Status LED H305.

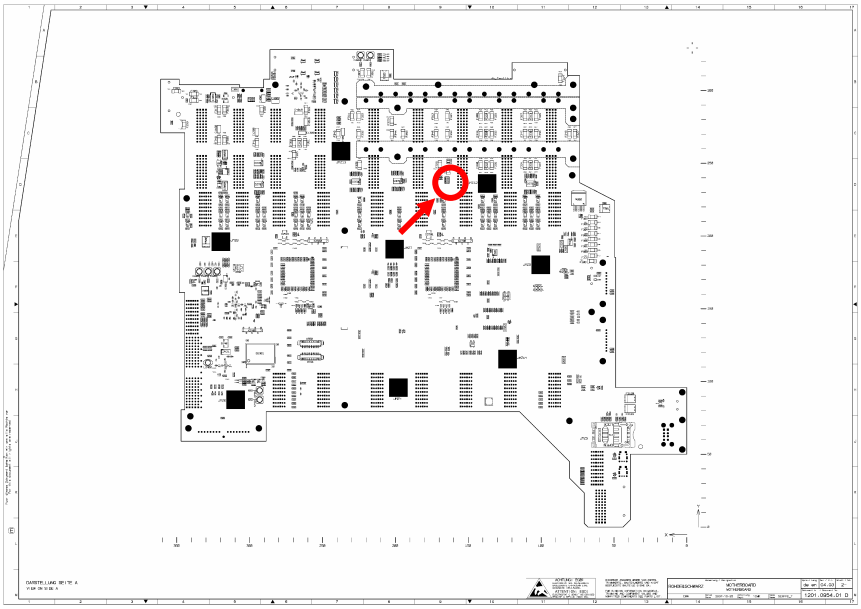


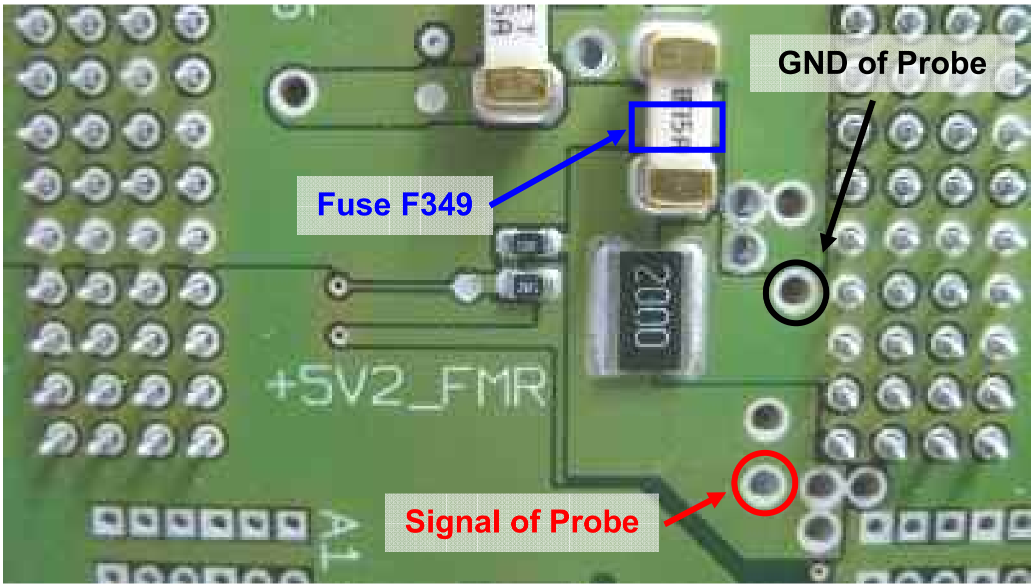


Voltage Name	Rated Value	Rated Tolerance
+5V_STANDBY_FMR (Status LED H305)	• + 5,0 V	• ± 0,25 V

3.3.8.4 Measurement of "+5V2_FMR" from the Motherboard

The generated voltage "+5V2_FMR" on the motherboard is fused with F349. The source of this voltage is "+5V2_PS" from the Power Supply Unit.

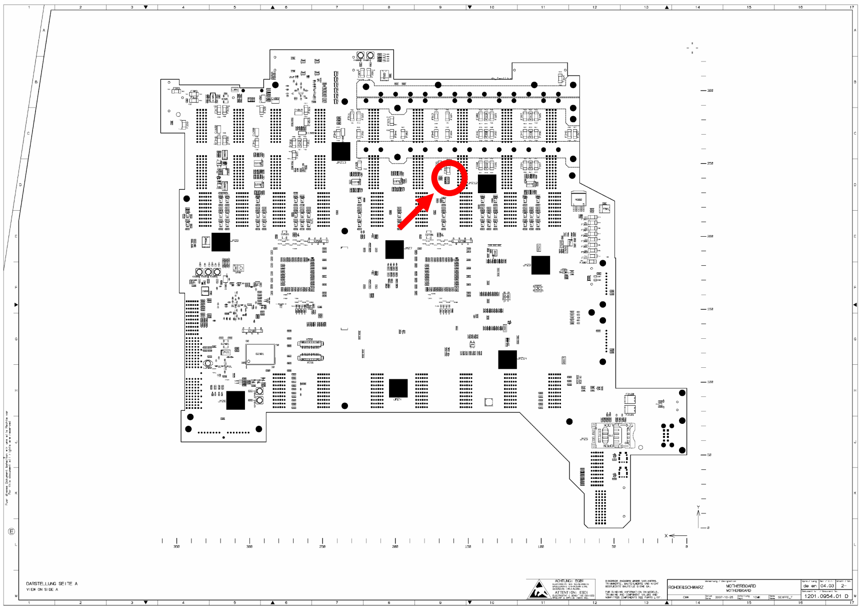


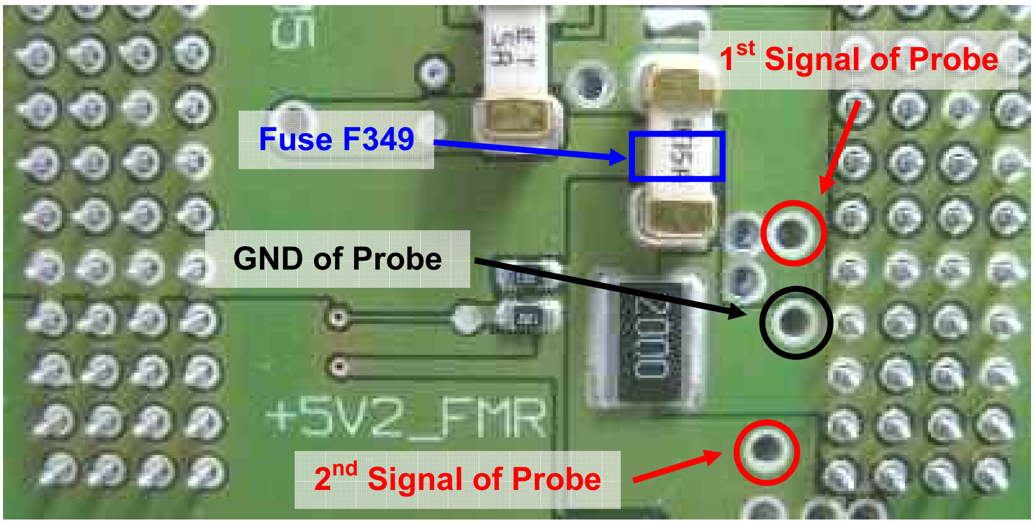


Voltage Name	Rated Value	Rated Tolerance
+5V2_FMR	• + 5,2 V	• ± 0,2 V

3.3.8.5 Check of Fuse F349 – “+5V2_FMR” on the Motherboard

The generated voltage “+5V2_FMR” on the motherboard is fused with F349.

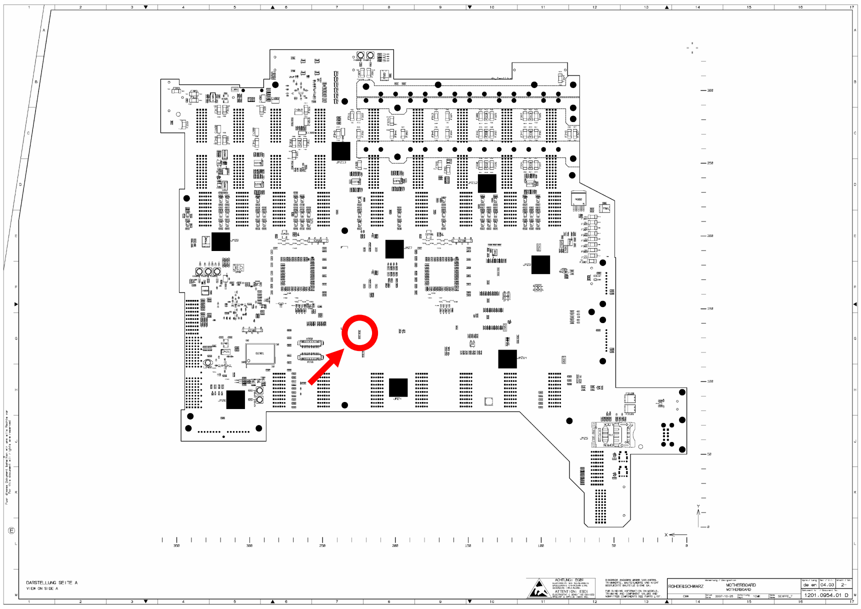


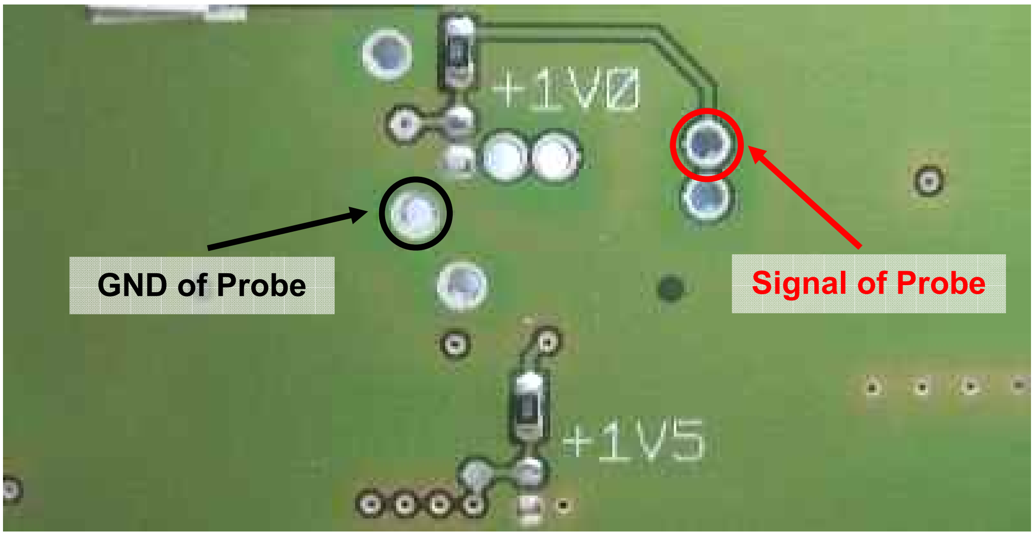


Checked Fuse	Fuse OK	Fuse defective
F349	• both measurement comparable	• on one side no voltage can be measured

3.3.8.6 Measurement of “+1V0” from the Motherboard

The generated voltage “+1V0” on the motherboard is not fused separately. The source of this voltage is “+5V2_C”. Additional the voltage “+3V3_A” is used for tracking purpose.

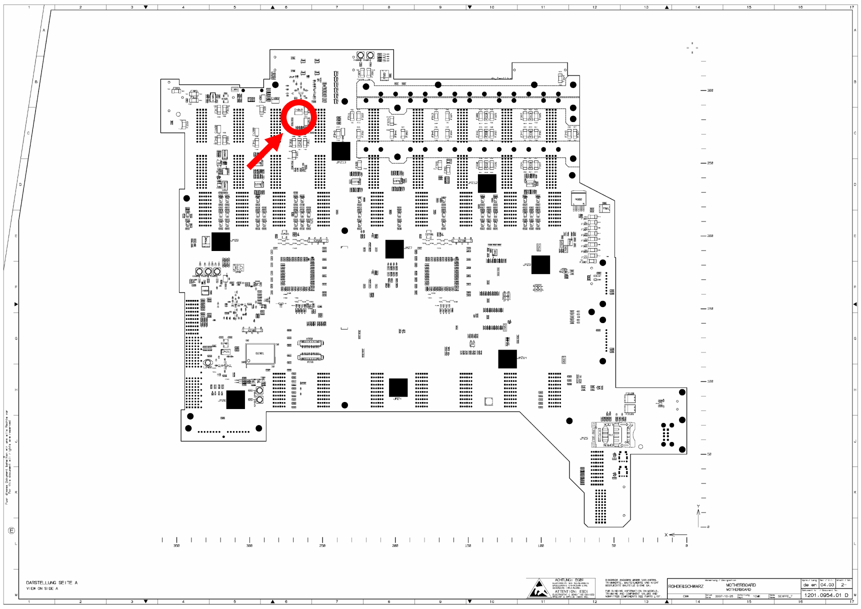


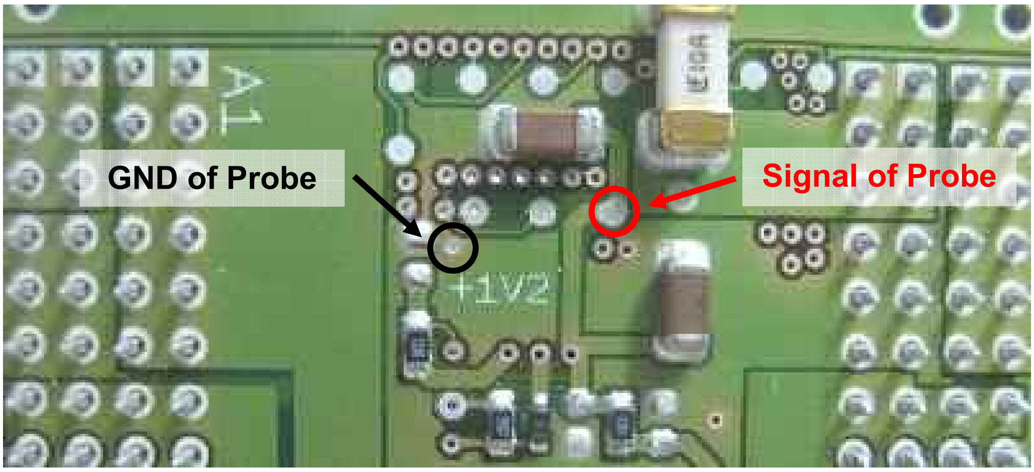


Voltage Name	Rated Value	Rated Tolerance
+1V0	• + 1,0 V	• ± 0,06 V

3.3.8.7 Measurement of "+1V2" from the Motherboard

The generated voltage "+1V2" on the motherboard is not fused separately. The source of this voltage is the generated voltage "+2V5".

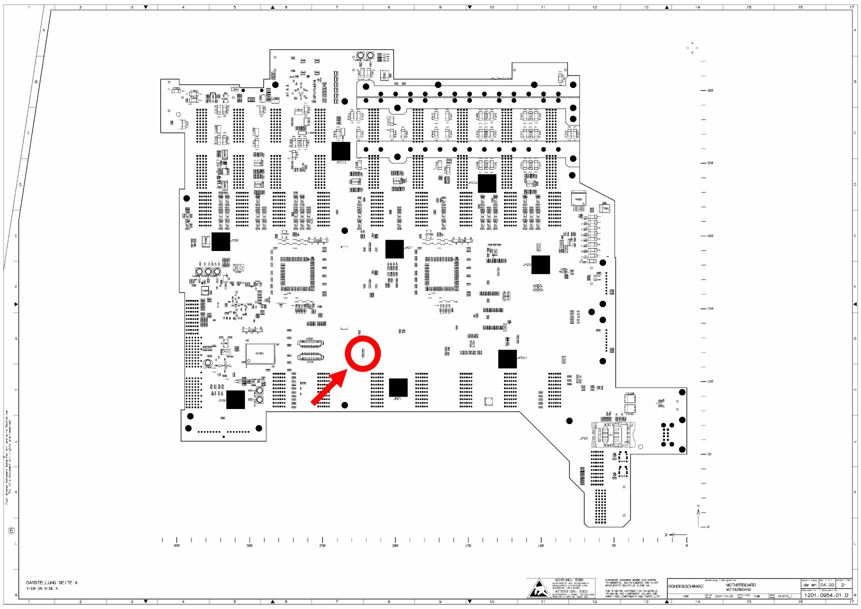


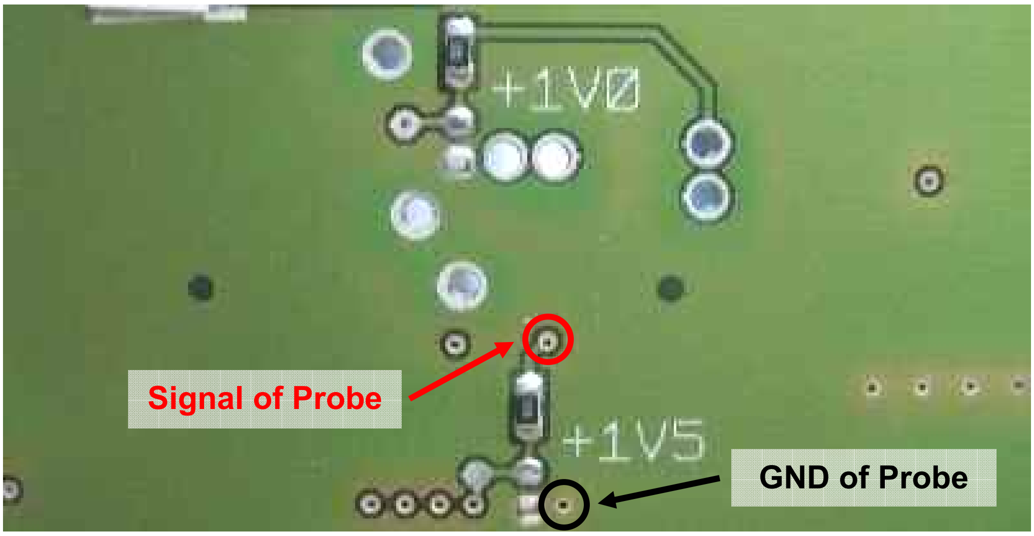


Voltage Name	Rated Value	Rated Tolerance
+1V2	• + 1,2 V	• ± 0,05 V

3.3.8.8 Measurement of "+1V5" from the Motherboard

The generated voltage "+1V5" on the motherboard is not fused separately. The source of this voltage is "+5V2_B". Additional the voltage "+3V3_A" is used for tracking purpose.

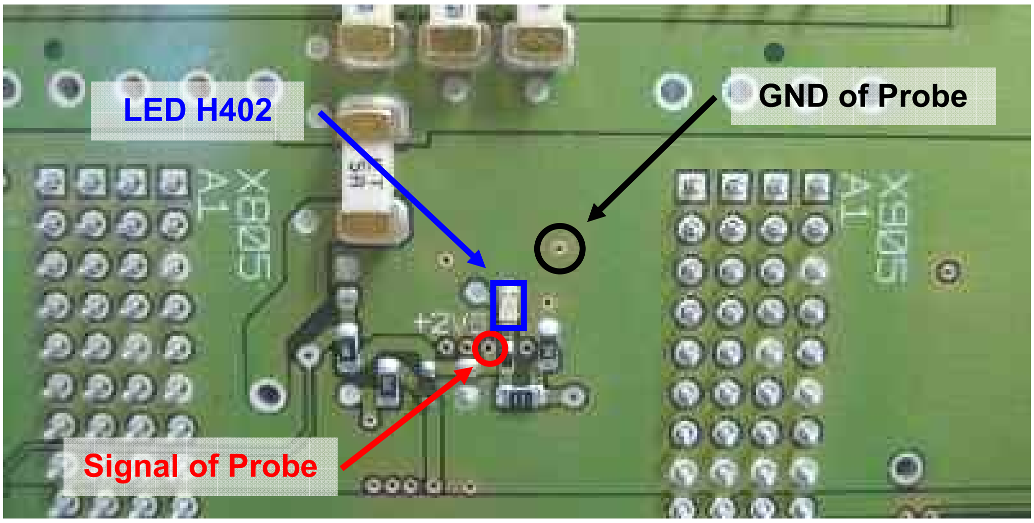




Voltage Name	Rated Value	Rated Tolerance
+1V5	• + 1,5 V	• ± 0,05 V

3.3.8.9 Measurement of “+2V5” from the Motherboard

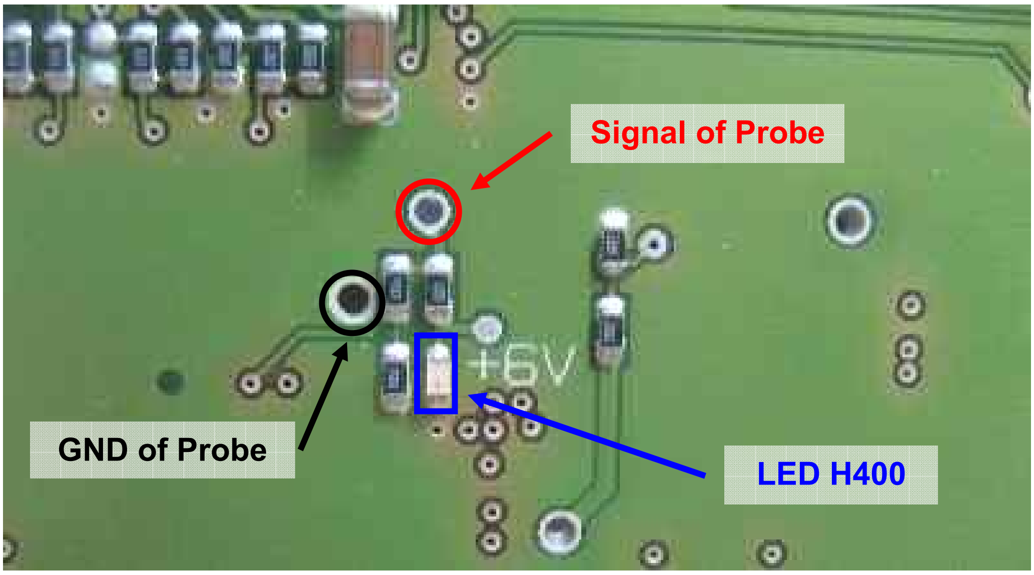
The voltage “+2V5” is generated from “+3V3_A” and is not fused separately. An indication for the availability of this voltage can be done with the Status LED H402.



Voltage Name	Rated Value	Rated Tolerance
+2V5	• + 2,5 V	• ± 0,1 V

3.3.8.10 Measurement of "+6V" from the Motherboard

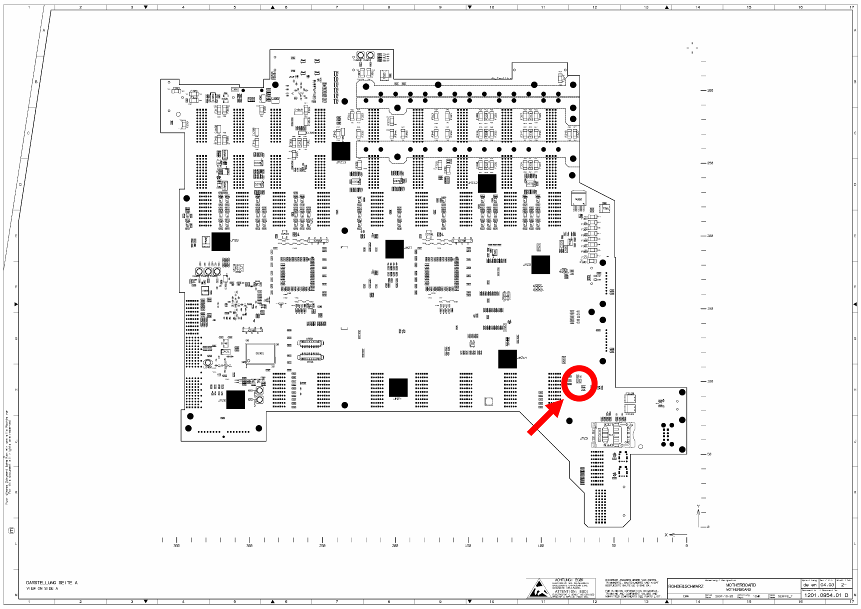
The voltage "+6V" is generated from "+12V_A" and is not fused separately. An indication for the availability of this voltage can be done with the Status LED H400.

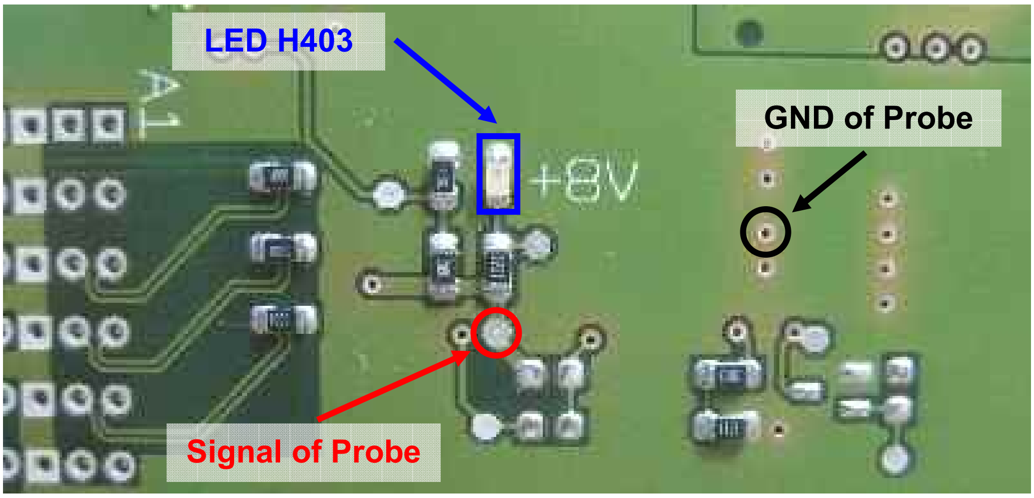


Voltage Name	Rated Value	Rated Tolerance
+6V	• + 6,2 V	• ± 0,18 V

3.3.8.11 Measurement of "+8V" from the Motherboard

The voltage "+8V" is generated from "+12V_G" and is not fused separately. An indication for the availability of this voltage can be done with the Status LED H403.

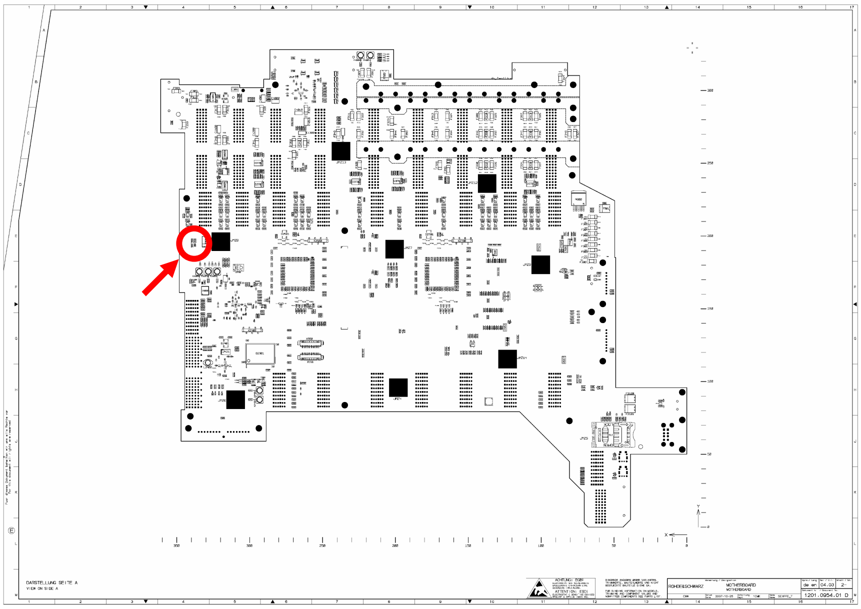


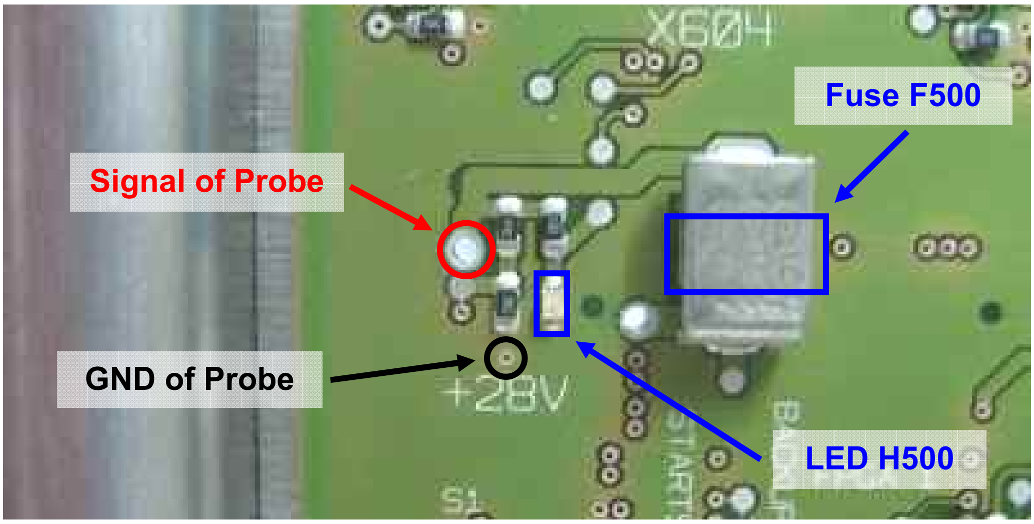


Voltage Name	Rated Value	Rated Tolerance
+8V	• + 8,0 V	• ± 0,24 V

3.3.8.12 Measurement of “+28V” from the Motherboard

The voltage “+28V” is generated from “+12V_B” and is not fused separately. The output of this voltage “+28V” is fused at the output with the resettable fuse F500. An indication for the availability of this voltage can be done with the Status LED H500.

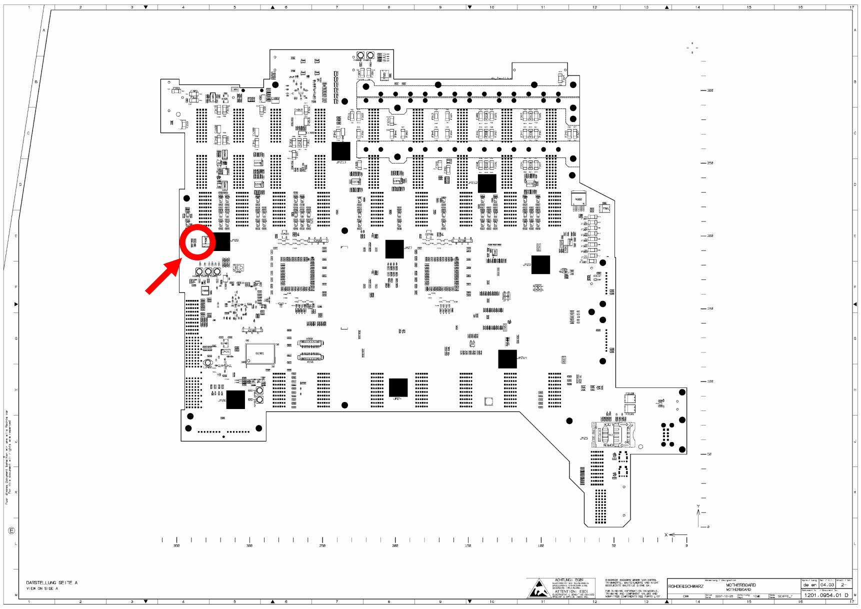


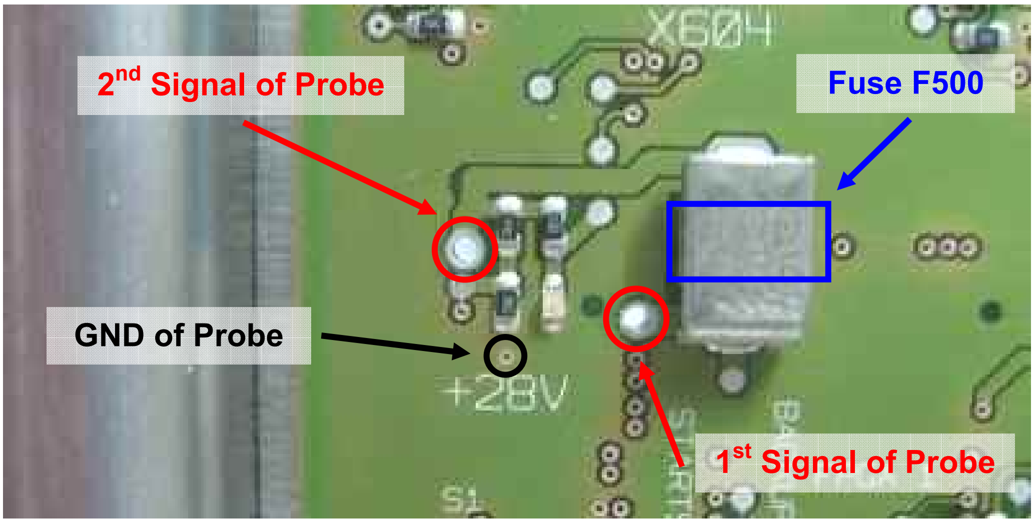


Voltage Name	Rated Value	Rated Tolerance
+28V	• + 28,0 V	• + 1,4 V / - 0,8 V

3.3.8.13 Check of Fuse F500 – “+28V” on the Motherboard

The Fuse F500 is a resettable fuse. This fuse is placed at the output of the voltage “+28V” converter circuit.

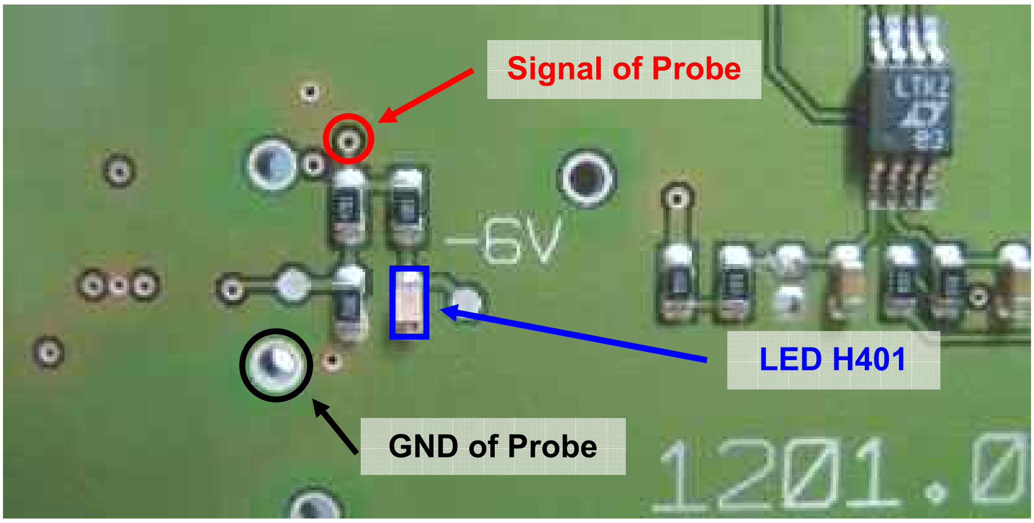




Checked Fuse	Fuse OK	Fuse defective
F500	• both measurement comparable	• on one side no voltage can be measured

3.3.8.14 Measurement of “-6V” from the Motherboard

The voltage “-6V” is generated from “+12V_C” and is not fused separately. An indication for the availability of this voltage can be done with the Status LED H401.



Voltage Name	Rated Value	Rated Tolerance
-6V	• - 6,0 V	• ± 0,18 V

3.3.9 Measurement of the voltages and fuses from the Fan control circuits on the Motherboard

In the following chapter the measurement of the output voltage for the Power Supply Unit Fan and the Main Unit Fan is described. Also the check of the output fuses F501 and F502 from the output voltage is shown. This both fuses are resettable fuses.

The check of the fuses from the supply voltages (e.g. +3V3_A, +12C_F and -12V) is described in the previous chapter and the check of the fuses from the missing voltages (e.g. +5V2_FAN_UNIT and +5V2_FAN_PS) is described in the following chapter.

For this purpose an overview of the bottom side of the Motherboard is shown with the position of the photo (red marking) with the detailed view of the measurement points.

- The black circle shows the ground of the voltage probe
- The red circle shows the signal of the voltage probe

NOTICE

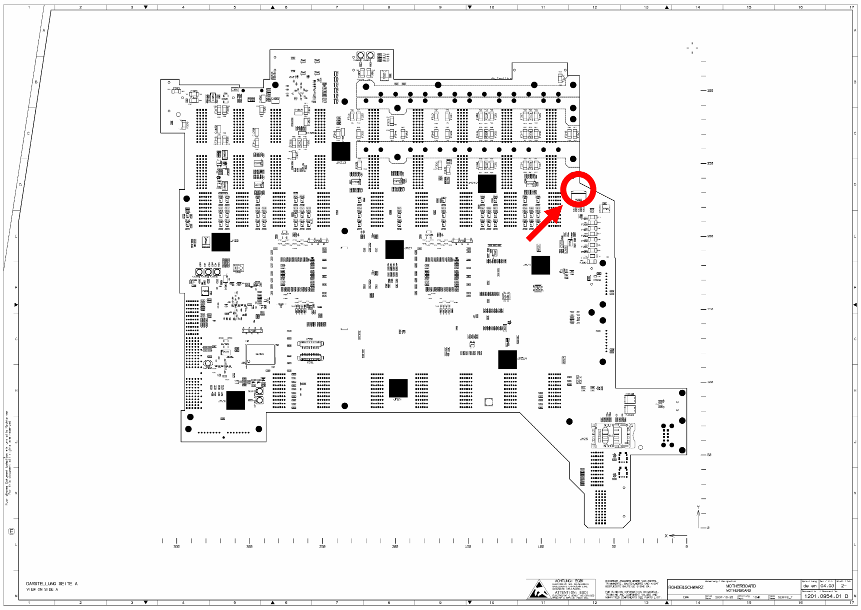
Prevent from short-circuit of measured voltage

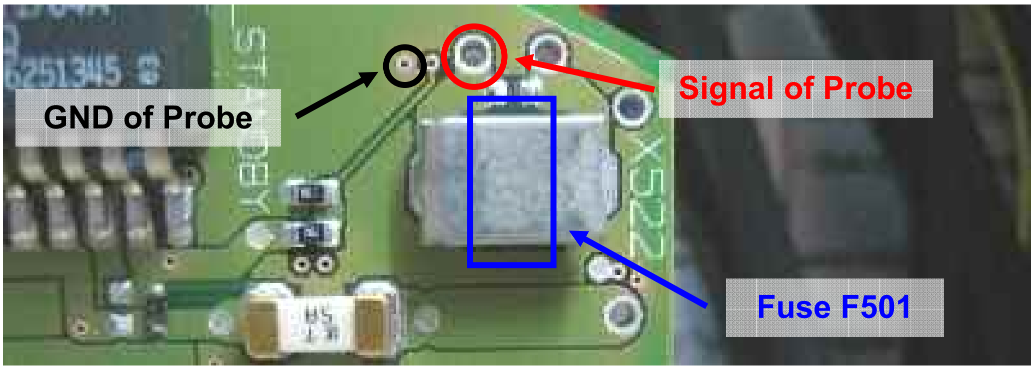
Short-circuit can damage the board or other modules

Be careful while measuring with voltage probes

3.3.9.1 Measurement of "+12VFAN_PS" from the Motherboard

The variable output voltage "+12VFAN_PS" is used to control the speed of the fan in the Power Supply Unit. This output voltage depends on the variable input voltage "FANSPEED_PS" from the FPGA D4301.
The range from "FANSPEED_PS" is + 0,0 V to + 3,3 V

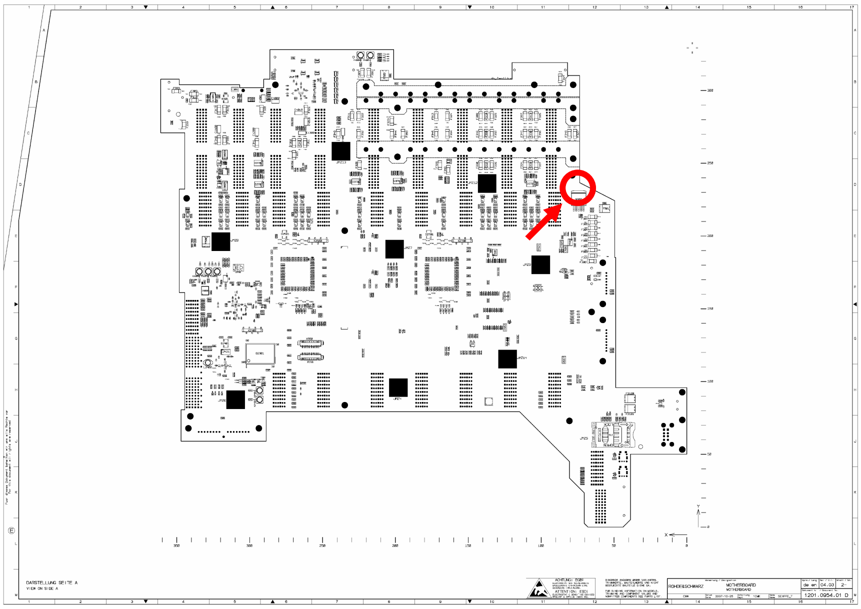


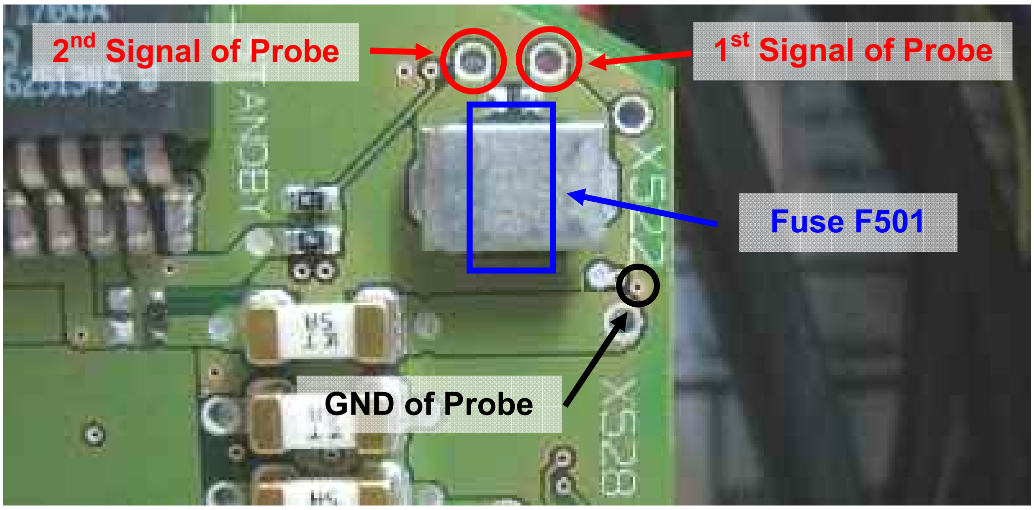


Voltage Name	Rated Value @ FANSPEED_PS	Rated Tolerance
+12VFAN_PS	from + 7,5 V @ + 0,0 V to + 12,6 V @ + 3,3 V	• ± 0,5 V • ± 0,5 V

3.3.9.2 Check of Fuse F501 - “+12VFAN_PS” from the Motherboard

The Fuse F501 is a resettable fuse. This fuse is placed at the output of the fan speed control circuit for the Power Supply Unit fan.

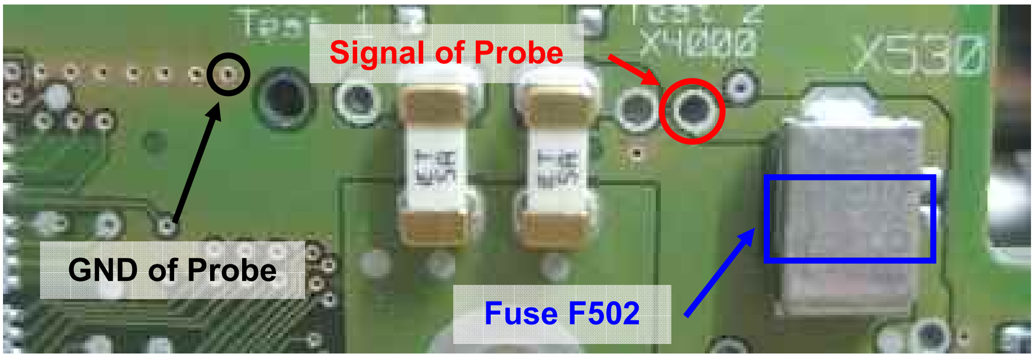




Checked Fuse	Fuse OK	Fuse defective
F501	• both measurement comparable	• on one side no voltage can be measured

3.3.9.3 Measurement of “+12VFAN_UNIT” from the Motherboard

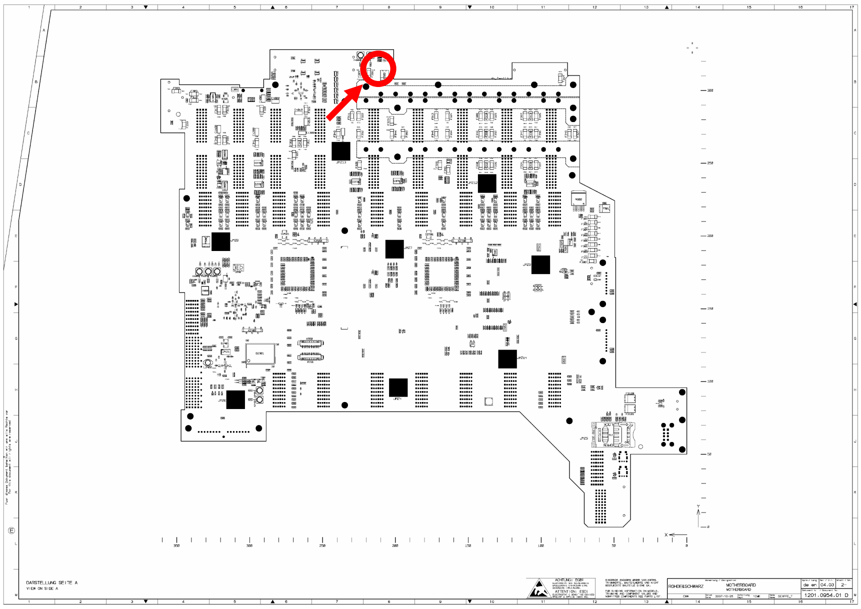
The variable output voltage “+12VFAN_UNIT” is used to control the speed of the fan in the Main Unit. This output voltage depends on the variable input voltage “FANSPEED” from the D4301.
The range from “FANSPEED” is + 0,0 V to + 3,3 V

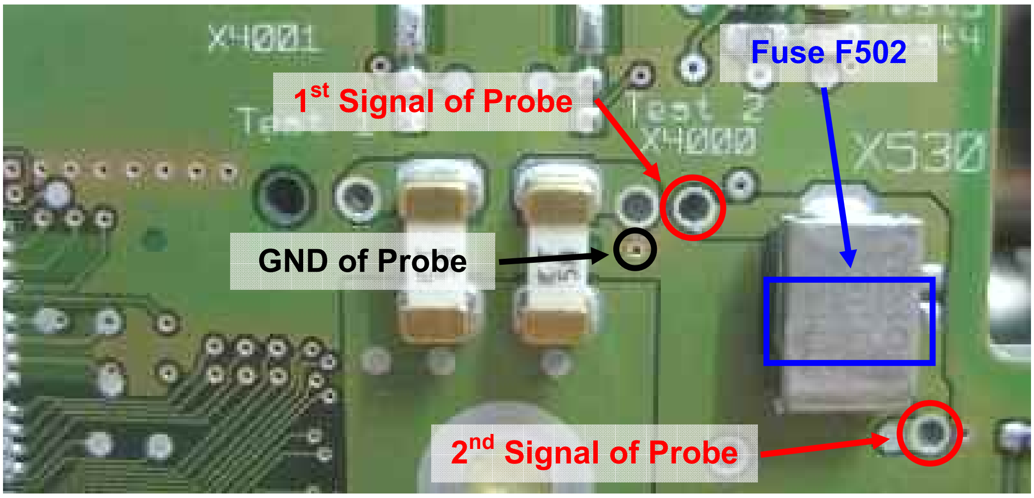


Voltage Name	Rated Value @ FANSPEED	Rated Tolerance
+12VFAN_UNIT	from + 6,5 V @ + 0,0 V to + 14,0 V @ + 3,3 V	• ± 0,5 V • ± 0,5 V

3.3.9.4 Check of Fuse F502 - "+12VFAN_UNIT" from the Motherboard

The Fuse F502 is a resettable fuse. This fuse is placed at the output of the fan speed control circuit for the Main Unit fan.





Checked Fuse	Fuse OK	Fuse defective
F502	• both measurement comparable	• on one side no voltage can be measured

3.3.10 Measurement of various Signals on the Motherboard

In the following chapter the measurement of the various signals on the Motherboard is described. All this signals needed for the ability of the R&S CMW to start with booting the software and to configure its devices. The measurement of the signal “POWERGOOD” is described in a separate chapter.

For this purpose an overview of the bottom side of the Motherboard is shown with the position of the photo (red marking) with the detailed view of the measurement points.

- The black circle shows the ground of the voltage probe
- The red circle shows the signal of the voltage probe

NOTICE

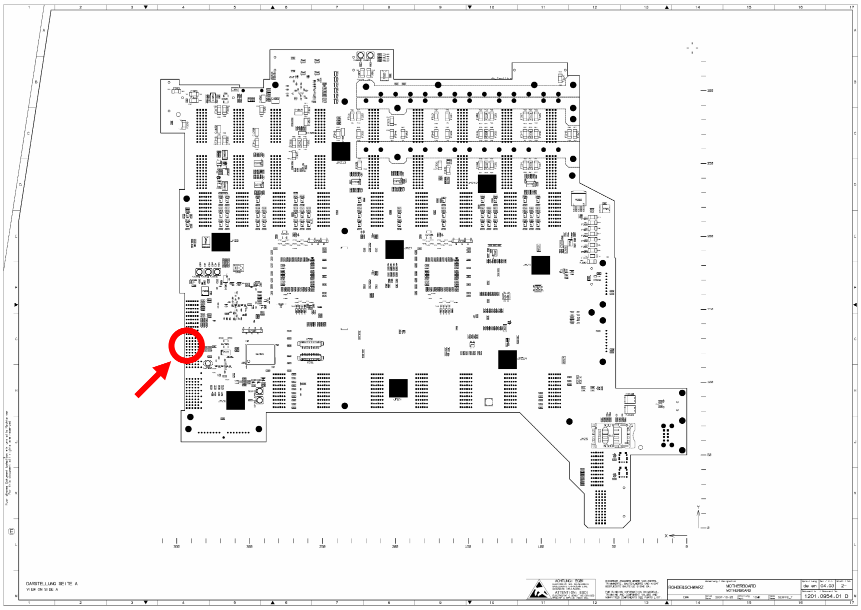
Prevent from short-circuit of measured voltage

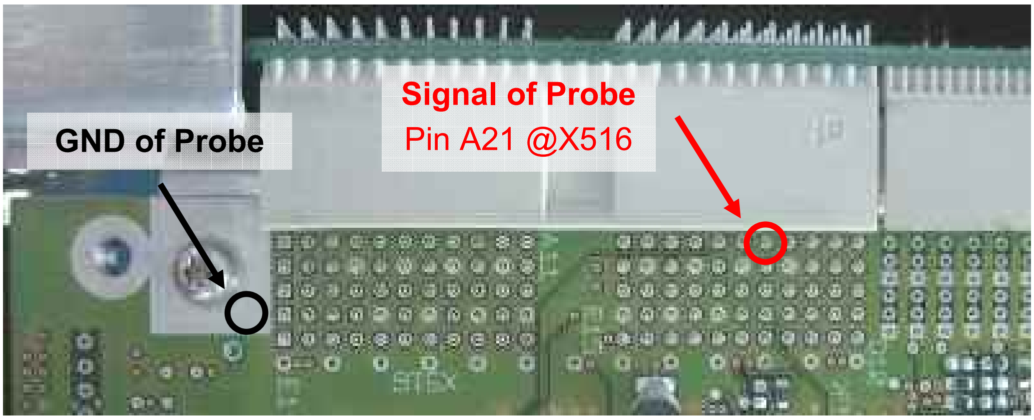
Short-circuit can damage the board or other modules

Be careful while measuring with voltage probes

3.3.10.1 Measurement of signal “STANDBY_ON_N” on the Motherboard

The signal “STANDBY_ON_N” is pulled down to ground as long as the button “STANDBY / ON” is pressed. This signal can be measured at Pin A21 of the connect X516 on the motherboard.
The signal “STANDBY_ON_N” has LVTTL_3.3V level and is active low.

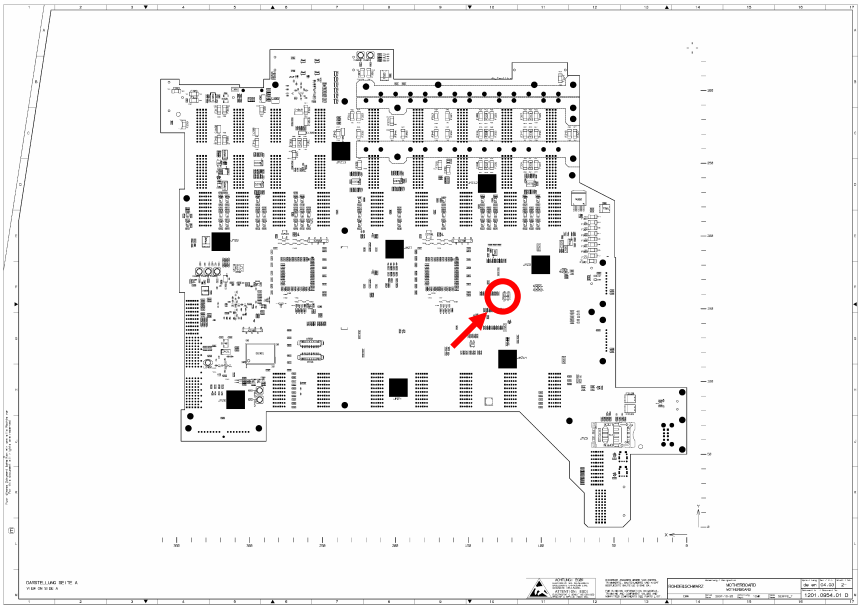


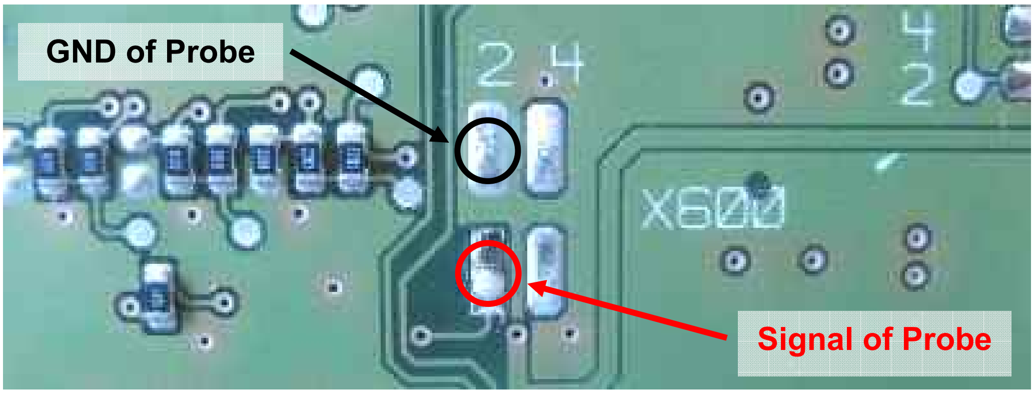


Signal Name	Active	Inactive
STANDBY_ON_N	• Low: ≈ + 0,0 V	• High: ≈ + 3,3 V

3.3.10.2 Measurement of signal “PS_ON_N” on the Motherboard

With the signal “PS_ON_N” the status of the R&S CMW is indicated. When this signal is LOW the yellow status LED of the “STANDBY / ON” button is illuminated. Furthermore, if this signal is HIGH the green status LED of the “STANDBY / ON” button is illuminated.
The signal “PS_ON_N” has LVTTL_3.3V level and is active low.

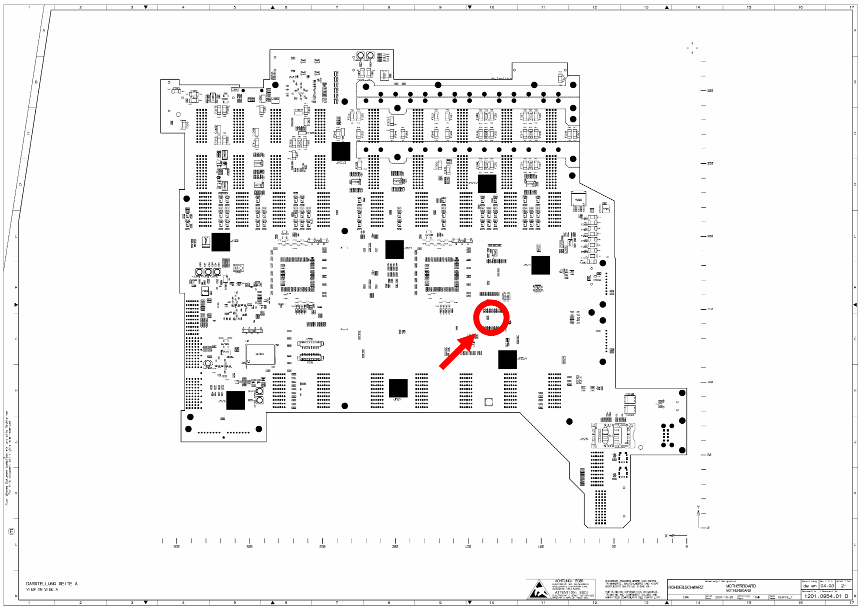


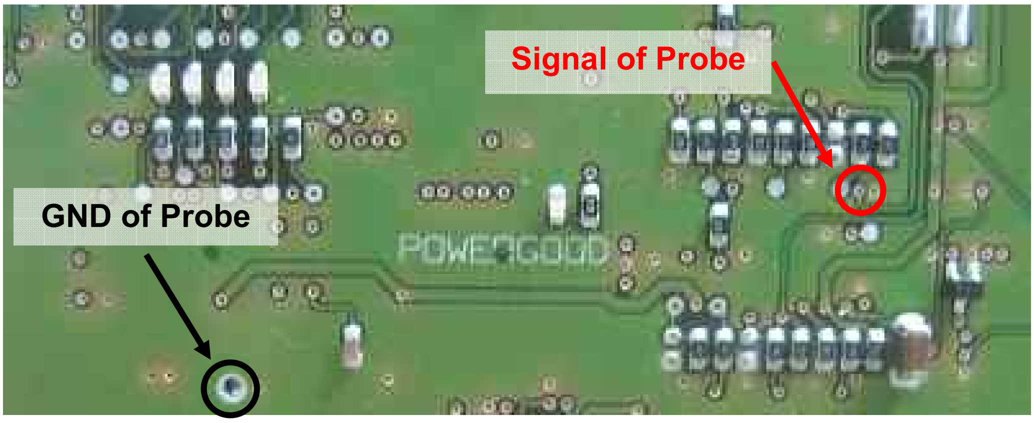


Signal Name	Active	Inactive
PS_ON_N	• Low: ≈ + 0,0 V (yellow LED)	• High: ≈ + 3,3 V (green LED)

3.3.10.3 Measurement of signal “PS_ON_N_DELAY” on the Motherboard

With the signal “PS_ON_N_DELAY” the voltage output of the Power Supply Unit is activated. This is the buffered signal “PS_ON_N” with an additional short delay. This signal can only be measured on a via on the motherboard.
The signal “PS_ON_N” has LVTTL_3.3V level and is active low.

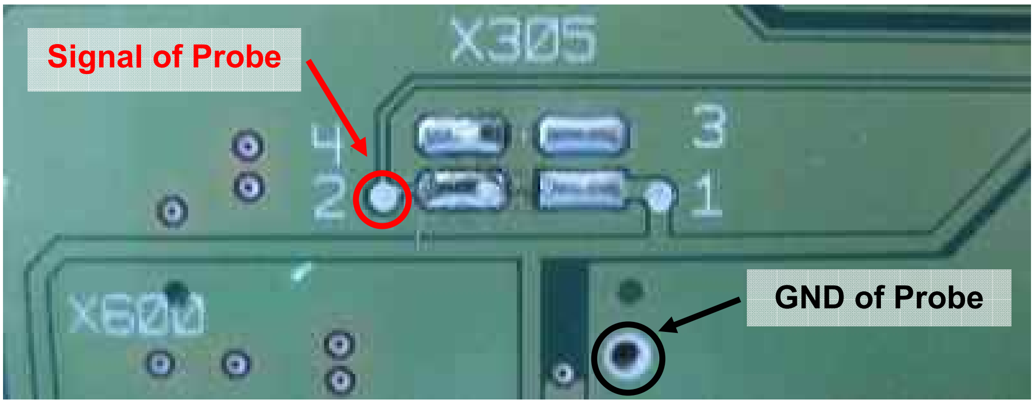




Signal Name	Active	Inactive
PS_ON_N_DELAY	• Low: ≈ + 0,0 V	• High: ≈ + 3,3 V

3.3.10.4 Measurement of signal “AC_TEMP_FAIL_N_PS” on the Motherboard

The signal “AC_TEMP_FAIL_N_PS” of the Power Supply Unit provide a short warning before loss of output power due to either loss of AC input or over temperature of the converter. During a fail state this signal pulled down to ground.
The signal “AC_TEMP_FAIL_N_PS” has +12V_STANDBY_PS level and is active low.



Signal Name	Active	Inactive
AC_TEMP_FAIL_N_PS	• Low: ≈ + 0,0 V	• High: ≈ + 13,5 V (Var.02 of PSU)

3.3.11 Control of signal “POWERGOOD” on the Motherboard

In the following chapter the measurement of the “POWERGOOD” signal is described.

For the “POWERGOOD” signal the output signals of four supply monitors (D602 to D605) will be combined with a “WIRED OR” circuit. The output of the several supply monitors will be low until one or more of the input supply voltages are below the trip thresholds. After all supplies become valid, the reset remains asserted for a short period of time.
In case of a failure of the “POWERGOOD” signal it is recommended to check which of this supply monitors is tied to ground and then to control the input voltages of the corresponding supply monitor.

For this purpose an overview of the bottom side of the Motherboard is shown with the position of the photo (red marking) with the detailed view of the measurement points.

- The black circle shows the ground of the voltage probe
- The red circle shows the signal of the voltage probe
- The blue circle shows additional test point for voltage probe to measure the “Input Threshold Voltages” on the motherboard. The valid voltages ranges of each “Input Threshold Voltage” is shown below the flow-chart.

NOTICE

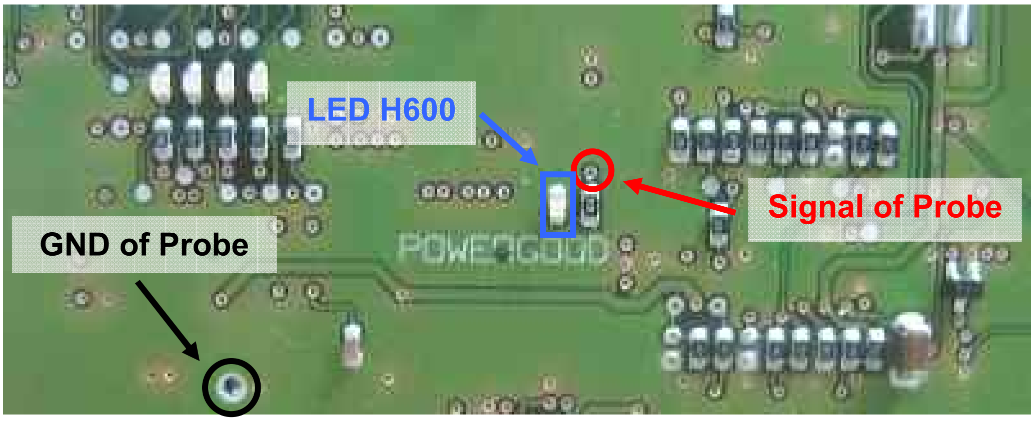
Prevent from short-circuit of measured voltage

Short-circuit can damage the board or other modules

Be careful while measuring with voltage probes

3.3.11.1 Measurement of signal "POWERGOOD" on the Motherboard

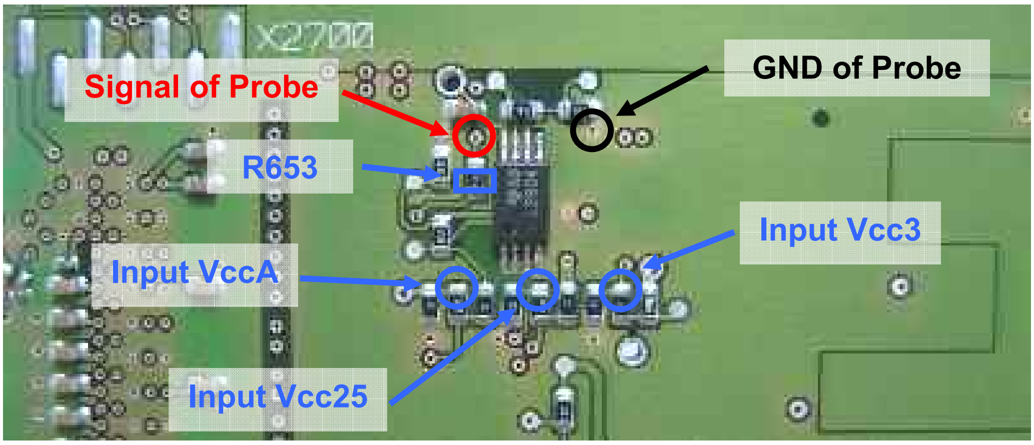
With the signal "POWERGOOD" the R&S CMW start with the configuration of the various modules. This signal can be measured on the motherboard. An indication is also with the LED H600 possible.
The signal "POWERGOOD" has LVTTL_3.3V level and is active high.



Signal Name	OK	Fail
POWERGOOD	• High: ≈ + 3,3 V • LED illuminated (green)	• Low: ≈ + 0,0 V • LED remains unlit

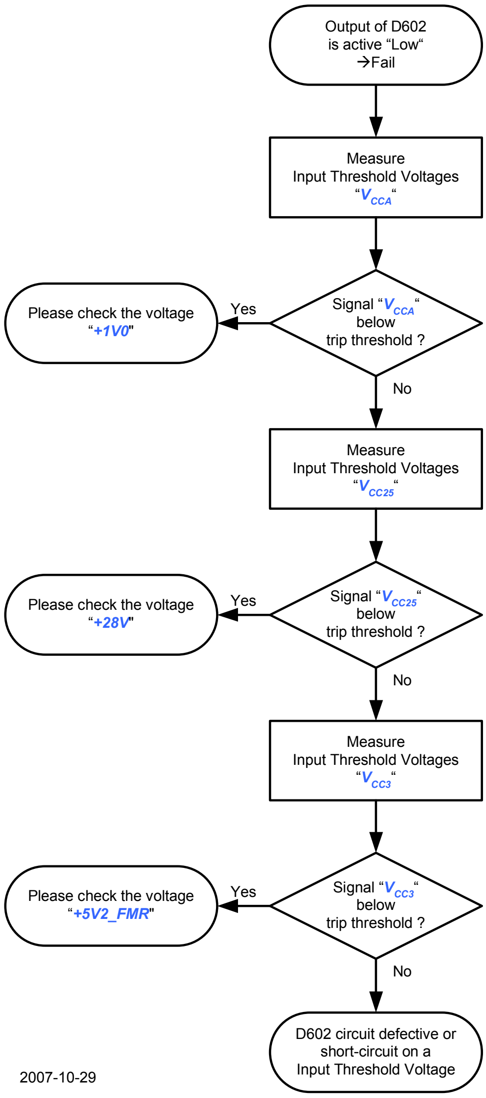
3.3.11.2 Measurement of signal from supply monitor D602 for the “POWERGOOD” signal

The signal from the supply monitor D602 is active low and is pulled up to the voltage “+3V3_A“ with the common resistor R658 from the following “WIRED OR” circuit



Signal Name	OK	Fail
between D602 (Pin 6) and R653 for “POWERGOOD”	• High: ≈ + 3,3 V	• Low: ≈ + 0,0 V → voltage drop on resistor R653

If the output signal of the supply monitor is Active (Fail), please check the "Input Threshold Voltages".



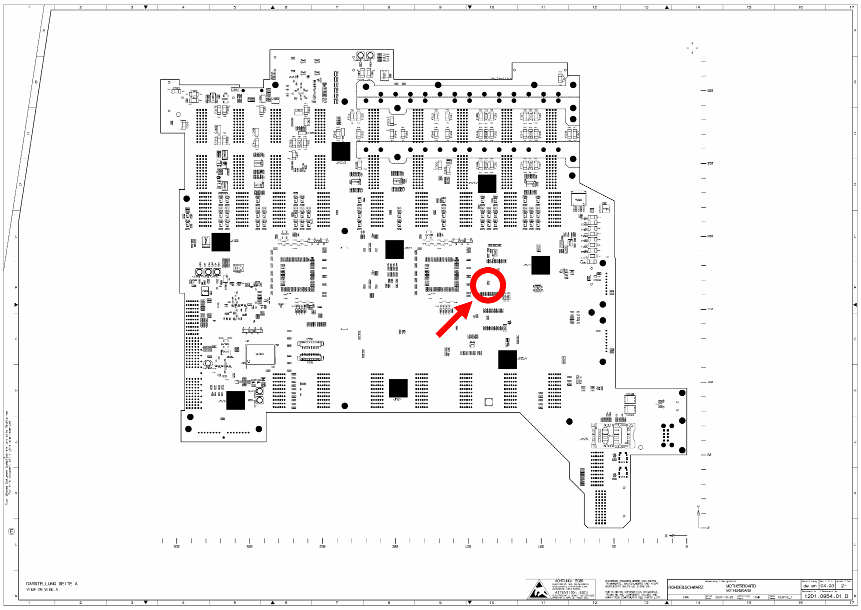
Note:

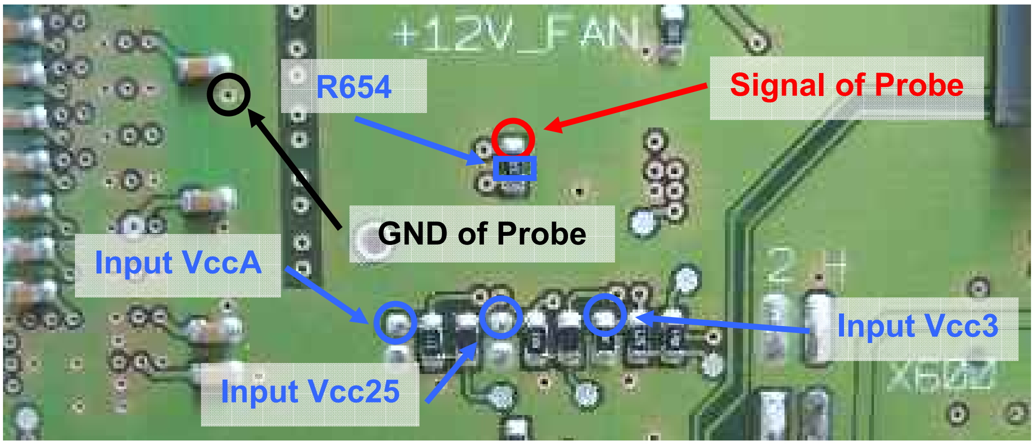
- *The Input threshold voltages above taken from the datasheet of the supply monitor device and specified at $T_{Ambient}$ = 25°C.*

Signal Name	Min.	Typ.	Max.
Input threshold "V_{CCA}"	• + 0,985 V	• + 1,000 V	• + 1,015 V
Input threshold "V_{CC25}"	• + 2,300 V	• + 2,337 V	• + 2,375 V
Input threshold "V_{CC3}"	• + 3,036	• + 3,085 V	• + 3,135 V

Measurement of signal from supply monitor D603 for the “POWERGOOD” signal

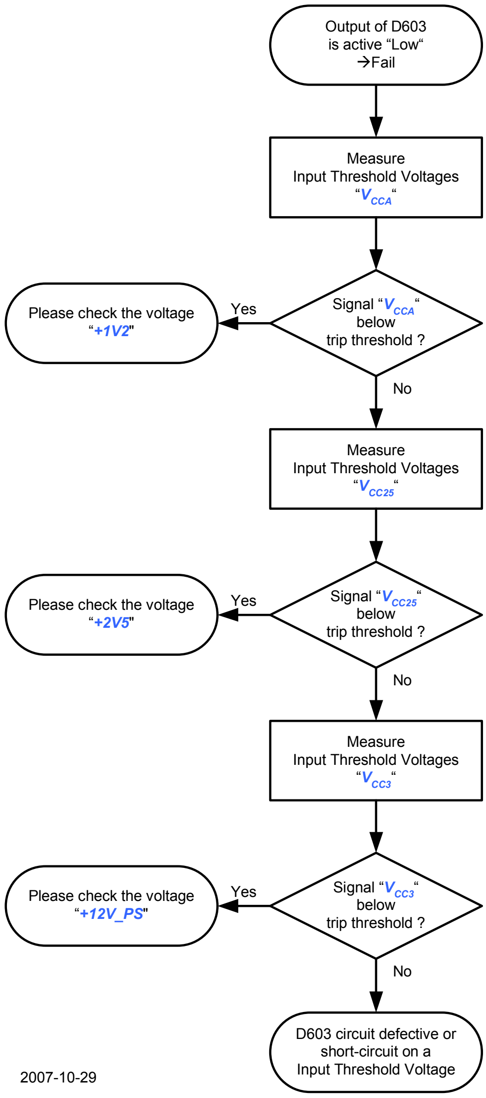
The signal from the supply monitor D603 is active low and is pulled up to the voltage “+3V3_A“ with the common resistor R658 from the following “WIRED OR” circuit





Signal Name	OK	Fail
between D603 (Pin 6) and R654 for “POWERGOOD”	• High: ≈ + 3,3 V	• Low: ≈ + 0,0 V → voltage drop on resistor R654

If the output signal of the supply monitor is Active (Fail), please check the "Input Threshold Voltages".



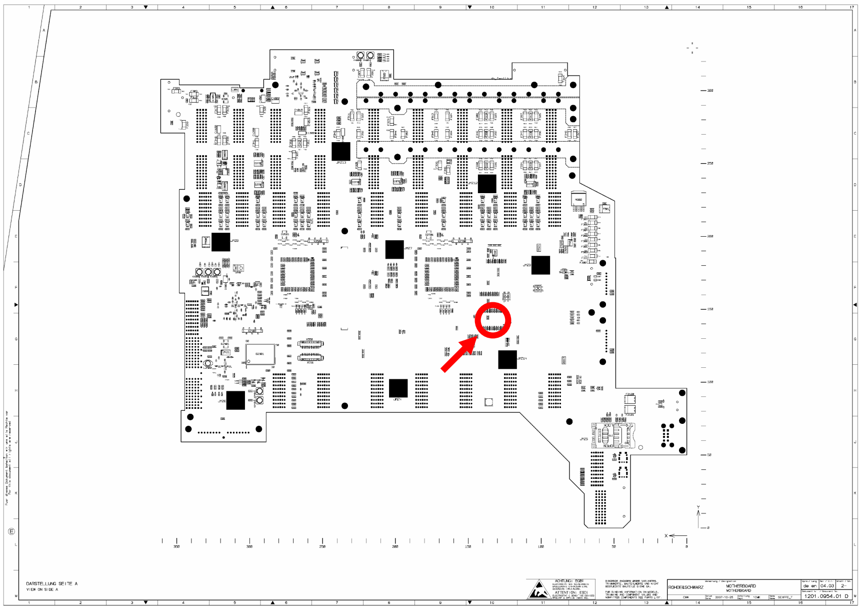
Note:

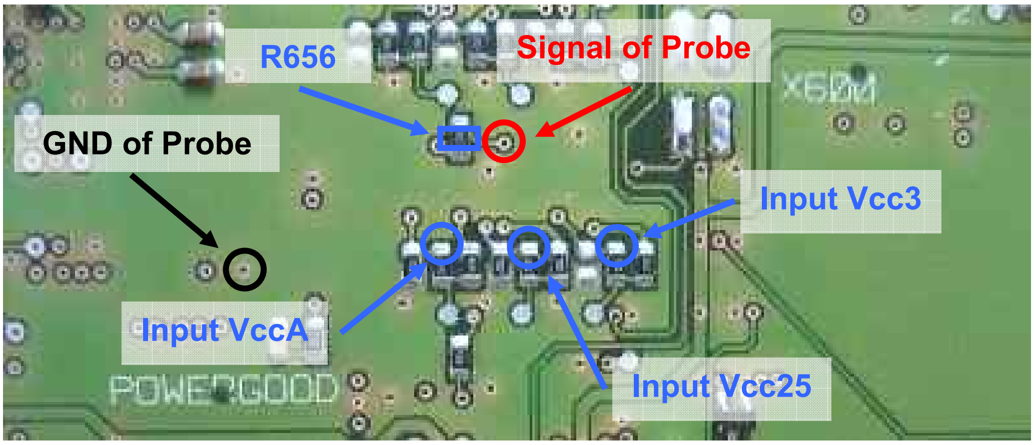
- *The Input threshold voltages above taken from the datasheet of the supply monitor device and specified at $T_{Ambient}$ = 25°C.*

Signal Name	Min.	Typ.	Max.
Input threshold "V_{CCA} "	• + 0,985 V	• + 1,000 V	• + 1,015 V
Input threshold "V_{CC25} "	• + 2,300 V	• + 2,337 V	• + 2,375 V
Input threshold "V_{CC3} "	• + 3,036	• + 3,085 V	• + 3,135 V

3.3.11.3 Measurement of signal from supply monitor D604 for the “POWERGOOD” signal

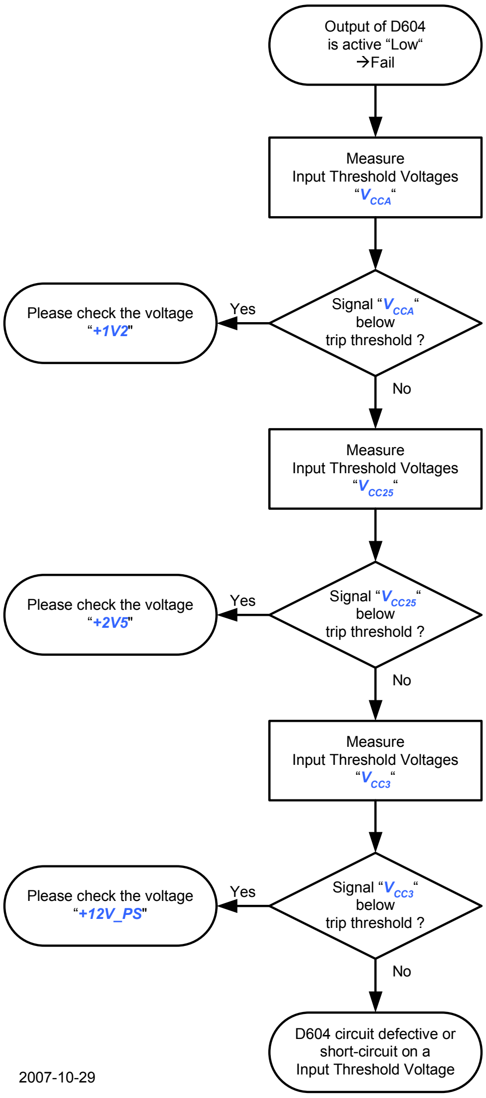
The signal from the supply monitor D604 is active low and is pulled up to the voltage “+3V3_A“ with the common resistor R658 from the following “WIRED OR” circuit





Signal Name	OK	Fail
between D604 (Pin 6) and R656 for “POWERGOOD”	• High: ≈ + 3,3 V	• Low: ≈ + 0,0 V → voltage drop on resistor R656

If the output signal of the supply monitor is Active (Fail), please check the “Input Threshold Voltages”.



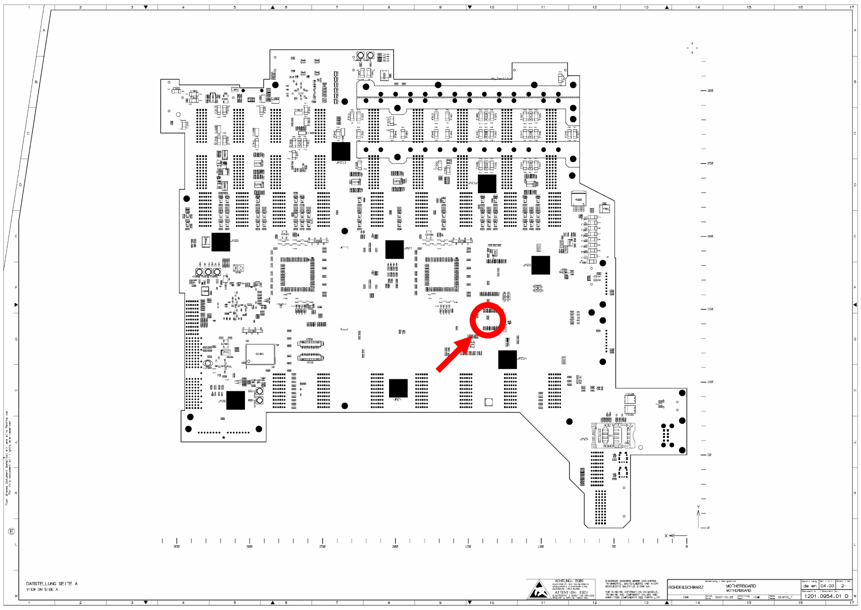
Note:

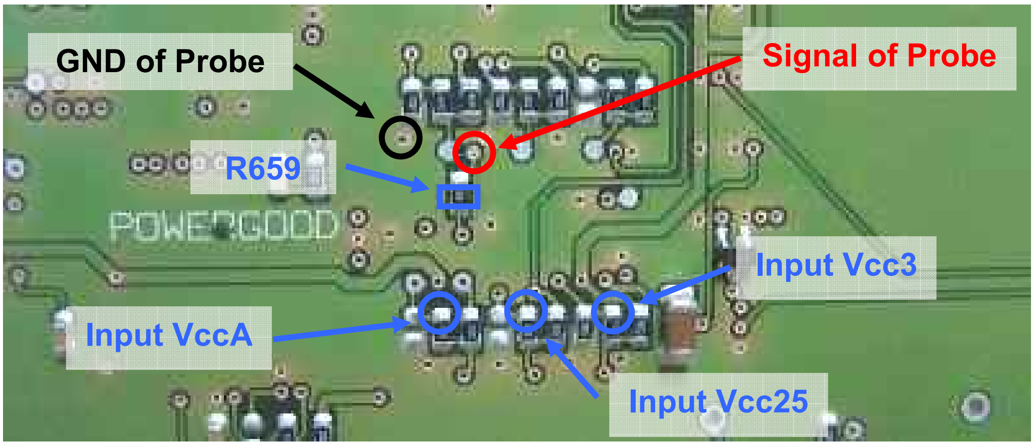
- *The Input threshold voltages above taken from the datasheet of the supply monitor device and specified at $T_{Ambient}$ = 25°C.*

Signal Name	Min.	Typ.	Max.
Input threshold “V_{CCA} ”	• + 0,985 V	• + 1,000 V	• + 1,015 V
Input threshold “V_{CC25} ”	• + 2,300 V	• + 2,337 V	• + 2,375 V
Input threshold “V_{CC3} ”	• + 3,036	• + 3,085 V	• + 3,135 V

3.3.11.4 Measurement of signal from supply monitor D605 for the “POWERGOOD” signal

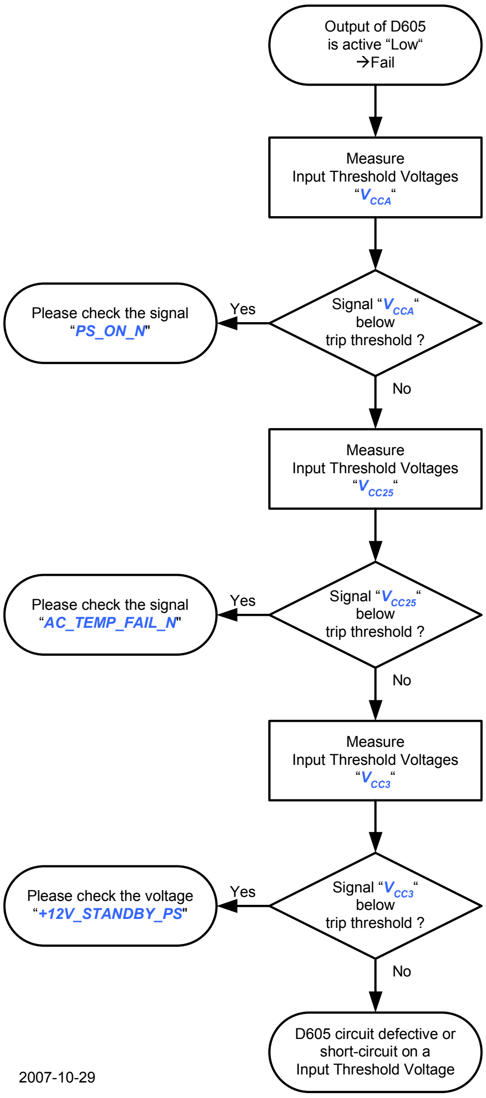
The signal from the supply monitor D605 is active low and is pulled up to the voltage “+3V3_A “ with the common resistor R658 from the following “WIRED OR” circuit





Signal Name	Inactive (OK)	Active (Fail)
between D605 (Pin 6) and R659 for “POWERGOOD”	• High: ≈ + 3,3 V	• Low: ≈ + 0,0 V → voltage drop on resistor R659

If the output signal of the supply monitor is Active (Fail), please check the “Input Threshold Voltages”.



Note:

- *The Input threshold voltages above taken from the datasheet of the supply monitor device and specified at $T_{Ambient}$ = 25°C.*

Signal Name	Min.	Typ.	Max.
Input threshold “V_{CCA} ”	• + 0,985 V	• + 1,000 V	• + 1,015 V
Input threshold “V_{CC25} ”	• + 2,300 V	• + 2,337 V	• + 2,375 V
Input threshold “V_{CC3} ”	• + 3,036	• + 3,085 V	• + 3,135 V

3.3.12 Control of signal “POWERGOOD_FMR” on the Motherboard

In the following chapter the measurement of the “POWERGOOD_FMR” signal is described.

The “POWERGOOD_FMR” is needed for the start of booting of the Front Module Controller (FMC). It is the inverted signal of “POWERGOOD_FMR_N” which is generated in the Motherboard FPGA 1 (D4301). In this chapter only the signal behavior is described after the STANDBY/ON Switch is pressed to switch ON the R&S CMW.

The Motherboard FPGA 1 loads itself from the configuration device if the signal “POWERGOOD_SW_FPGA” is active and the signal “FPGA_RESET_N” is exited. If the Motherboard FPGA 1 is configured correctly the LED H3200 “DL OK” is illuminated permanently. Now the Motherboard FPGA 1 waits for the correct startup of the various modules which is indicated with the permanently illuminated LED H3201 “STARTSYS_OK”. After this signal also the signal “POWERGOOD_FMR_N” will be set to its active “LOW” level and now the FMC can start with booting. If the present modules can not start properly its corresponding signal “STARTSYS_xxxx” (xxxx stands for the Main Slot No. or Connector No.) will not set to the active “HIGH” level and also the LED H3201 “STARTSYS_OK” will not be illuminated. In this case the Motherboard FPGA 1 will set the signal “POWERGOOD_FMR_N” active “LOW” after a defined timeout period and the FMC can start with booting.

For this purpose an overview of the bottom side of the Motherboard is shown with the position of the photo (red marking) with the detailed view of the measurement points.

- The black circle shows the ground of the voltage probe
- The red circle shows the signal of the voltage probe
- The blue circle shows additional test point for voltage probe to measure the “Input Threshold Voltages” on the motherboard. The valid voltages ranges of each “Input Threshold Voltage” is shown below the flow-chart.

NOTICE

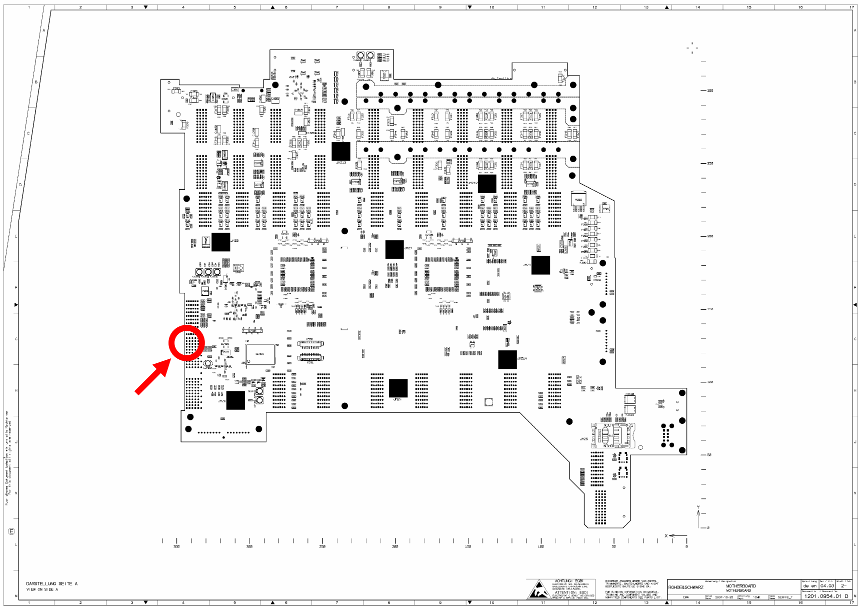
Prevent from short-circuit of measured voltage

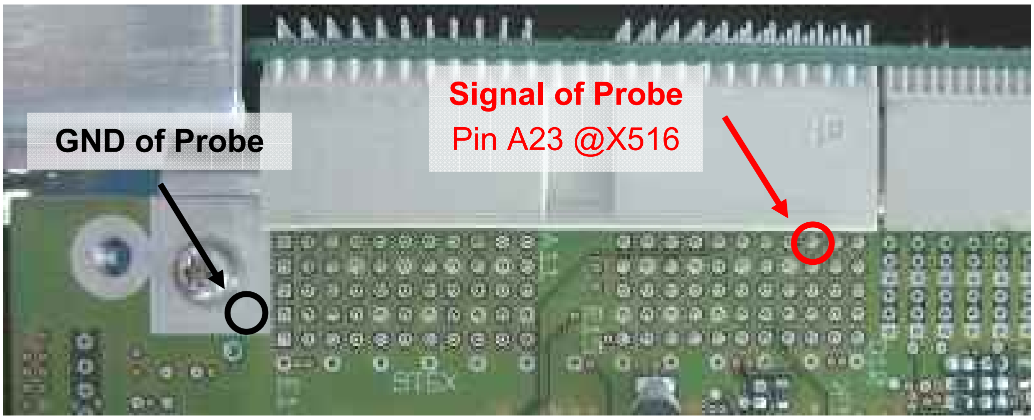
Short-circuit can damage the board or other modules

Be careful while measuring with voltage probes

3.3.12.1 Measurement of signal "POWERGOOD_FMR" on the Motherboard

With the signal "POWERGOOD_MFR" the R&S CMW start with booting of the Front Module Controller. This signal can be measured on the motherboard. An indication with a LED is not possible.
The signal "POWERGOOD" has LVTTL_3.3V level and is active high.

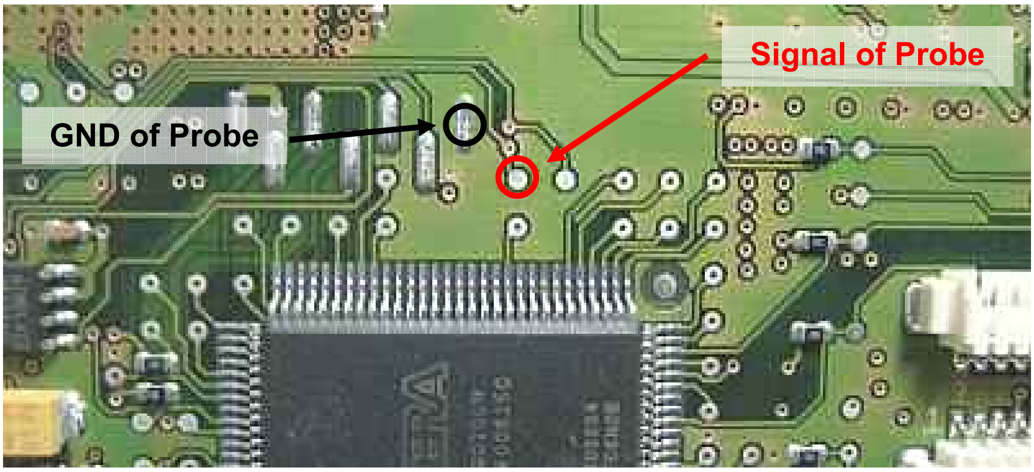




Signal Name	Inactive	Active
POWERGOOD_FMR	• Low: ≈ + 0,0 V	• High: ≈ + 3,3 V

3.3.12.2 Measurement of signal "POWERGOOD_FMR_N" on the Motherboard

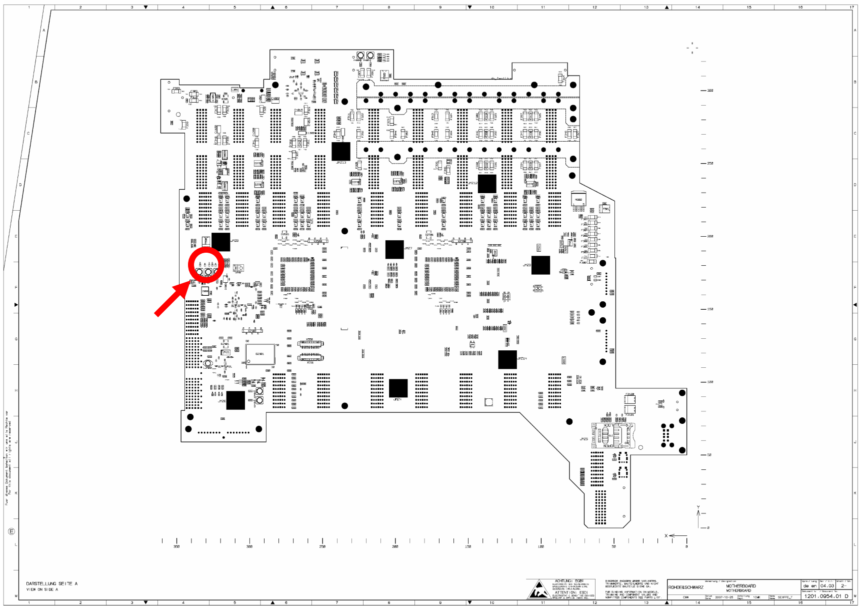
The signal "POWERGOOD_FMR_N" is inverted with D3303 to generate the signal "POWERGOOD_FMR ".
The signal "POWERGOOD_FMR_N" has LVTTL_3.3V level and is active low.

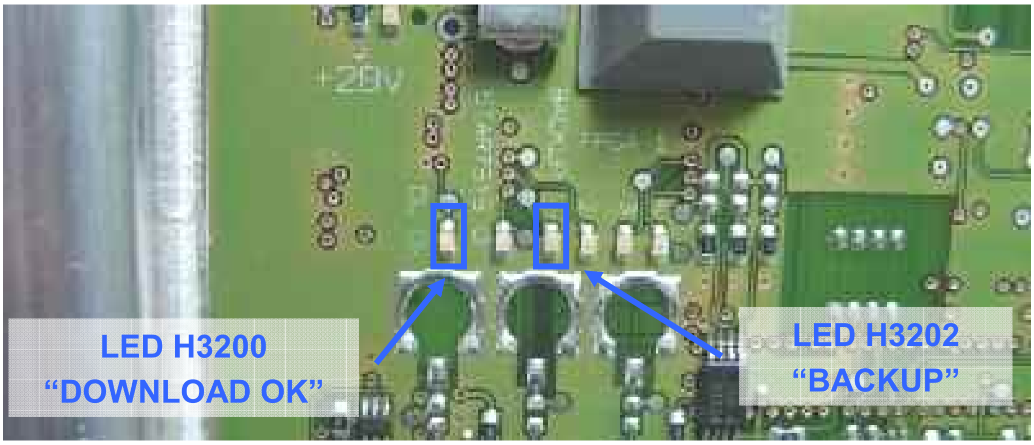


Signal Name	Active	Inactive
POWERGOOD_FMR_N	• Low: ≈ + 0,0 V	• High: ≈ + 3,3 V

3.3.12.3 Control of the LED H3200 “DOWNLOAD OK” on the Motherboard

The green LED H3200 “DOWNLOAD OK” indicates, that the configuration of the Motherboard FPGA 1 is finished correctly. This LED is only named “DL OK” on the motherboard. The red LED H3202 “BACKUP” shows the inverted signal of the LED H3200 “DOWNLOAD OK” and flash with about 2 Hz if the Download is failed .

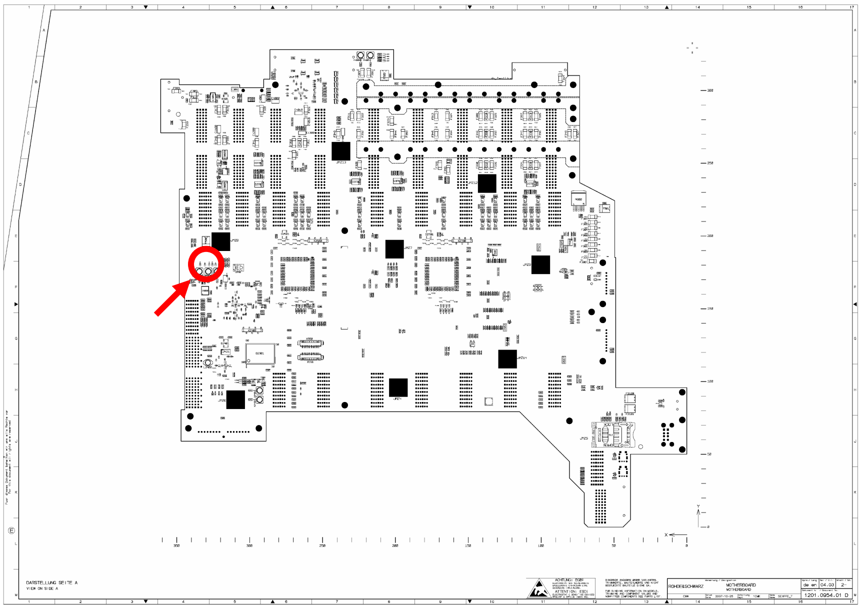


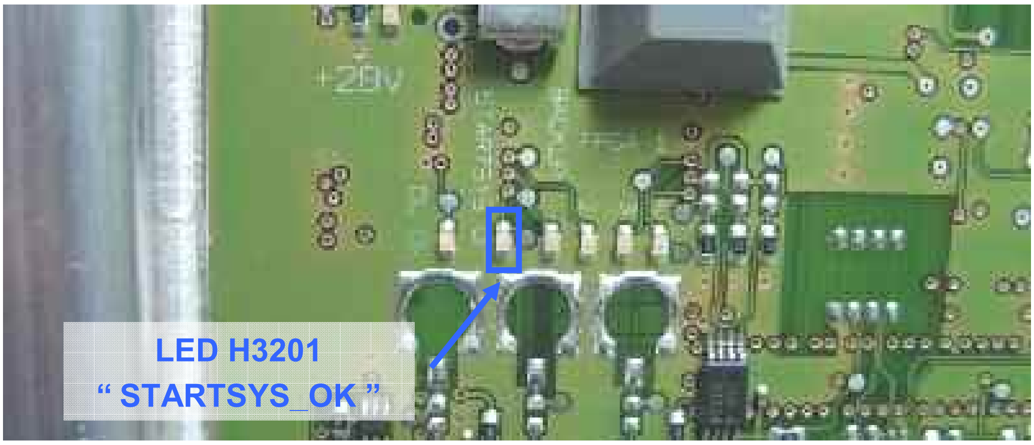


Signal Name	Download OK	Download Fail
“DOWNLOAD OK” → LED 3200 (green)	• LED illuminated	• LED flash with about 2 Hz

3.3.12.4 Control of the LED H3201 “STARTSYS_OK” on the Motherboard

The green LED H3201 “STARTSYS_OK” indicates, that the configuration of the present modules is finished correctly. If the start of one or more modules failed during a defined period of time the LED is not illuminated.

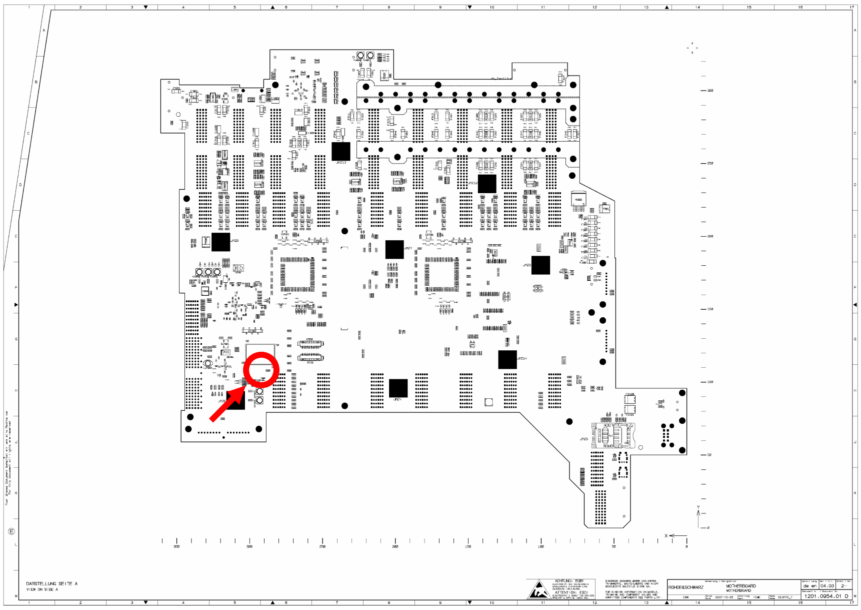


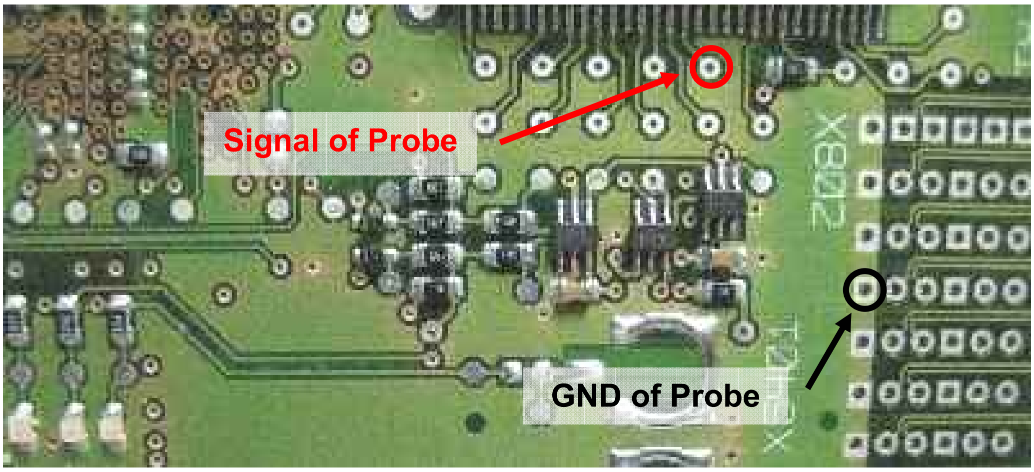


Signal Name	“Start Up” OK	“Start Up” Fail
“STARTSYS_OK” → LED 3201 (green)	• LED illuminated	• LED remains unlit

3.3.12.5 Measurement of the signal "FPGA_CONF_INIT_N" on the Motherboard

The signal "FPGA_CONF_INIT_N" is the buffered signal from "FPGA_RESET_N" and is also active low. This new signal is pulled up to the voltage "+3V3_A". With this signal "Low" the Motherboard FPGA 1 starts its configuration.
The signal "FPGA_CONF_INIT_N" has LVTTL_3.3V level and is active low.

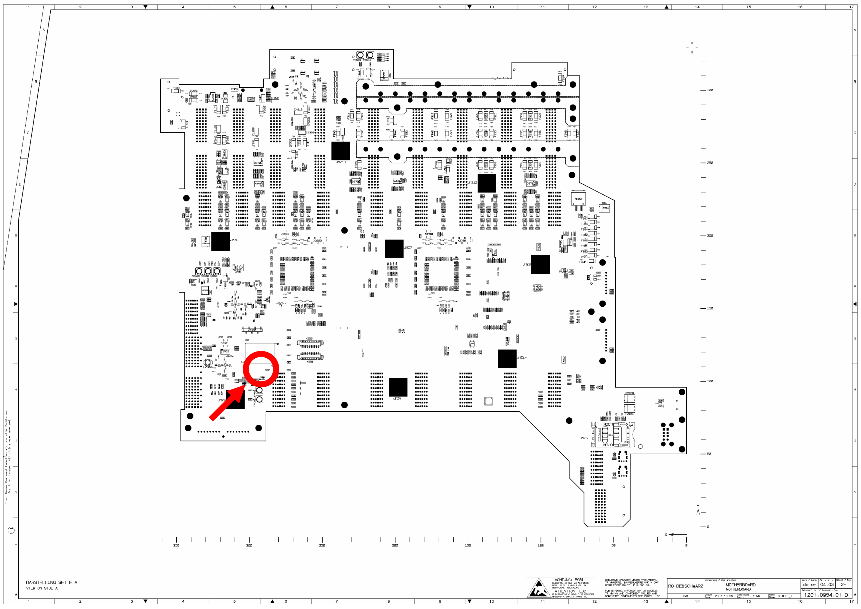


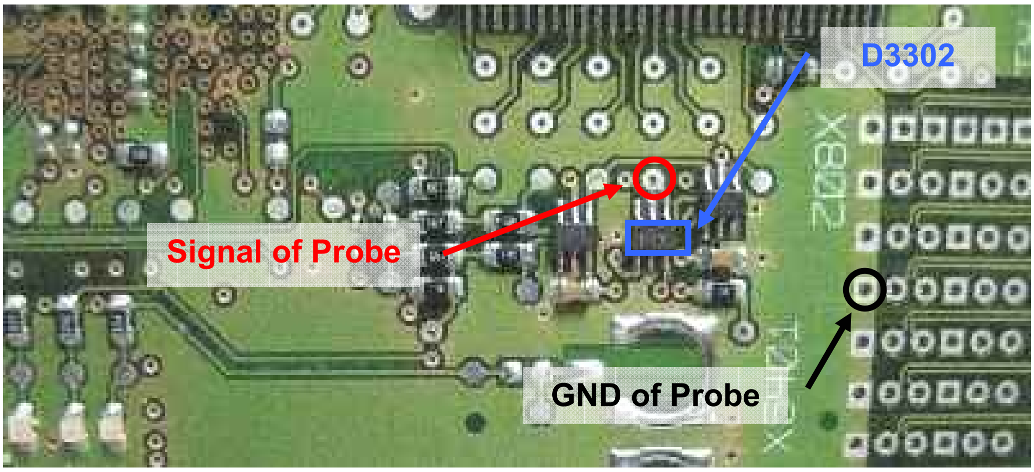


Signal Name	Inactive	Active
FPGA_CONF_INIT_N	• High: ≈ + 3,3 V	• Low: ≈ + 0,0 V

3.3.12.6 Measurement of the signal "FPGA_RESET_N" on the Motherboard

The signal "FPGA_RESET_N" from D3302 is active low. This signal is the input for the buffered Signal "FPGA_CONF_INIT_N".
The signal "FPGA_RESET_N" has LVTTL_3.3V level and is active low.

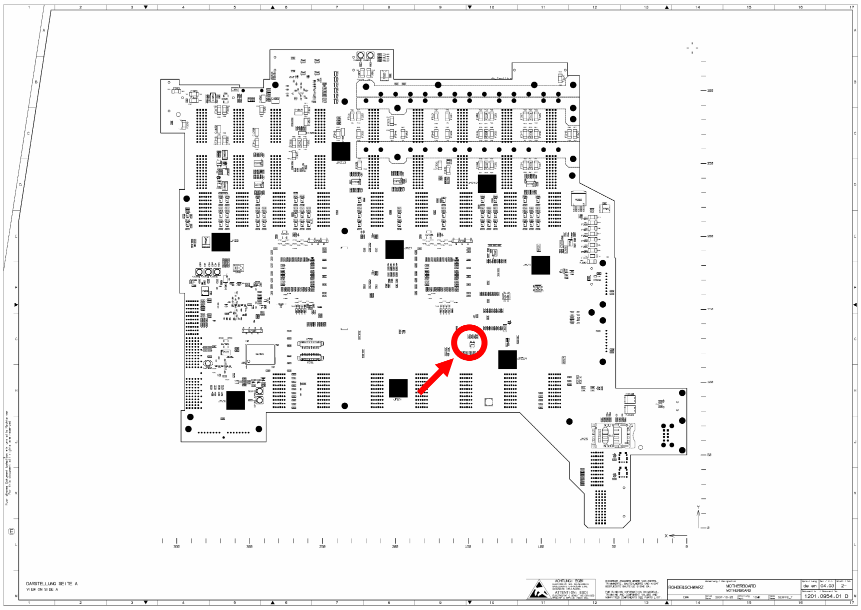


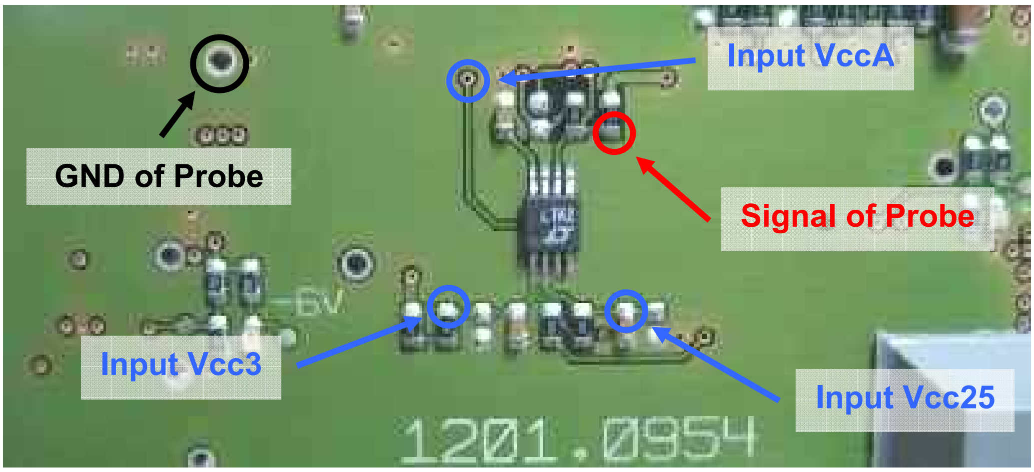


Signal Name	Inactive	Active
FPGA_RESET_N	• High: ≈ + 3,3 V	• Low: ≈ + 0,0 V

3.3.12.7 Measurement of signal from supply monitor D608 for the “POWERGOOD_SW_FPGA” signal

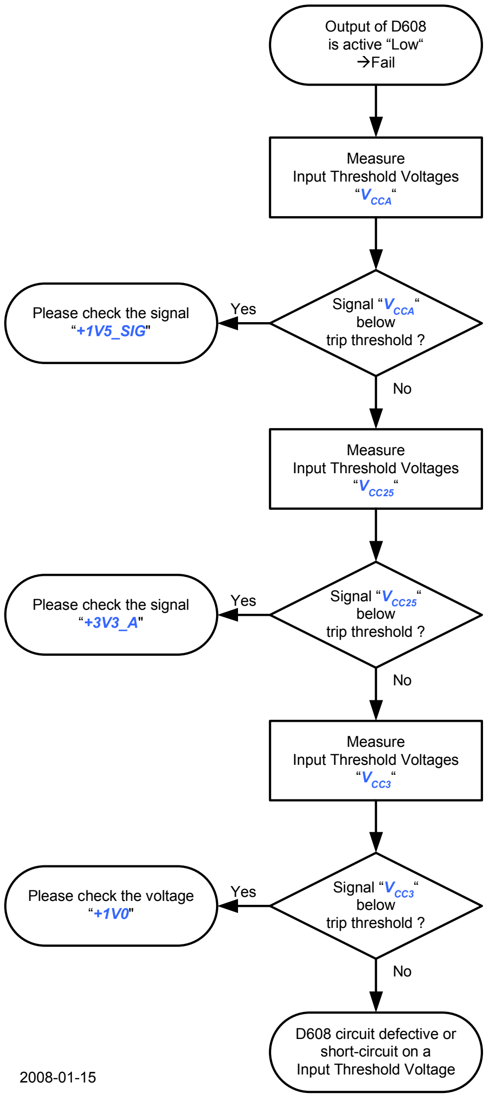
The signal from the supply monitor D608 is active low and is pulled up to the voltage “+3V3_A“ with the resistor R679.





Signal Name	OK	Fail
from D605 (Pin6) for “POWERGOOD_SW_FPGA”	• High: ≈ + 3,3 V	• Low: ≈ + 0,0 V

If the output signal of the supply monitor is Active (Fail), please check the “Input Threshold Voltages”.



Note:

- *The Input threshold voltages above taken from the datasheet of the supply monitor device and specified at $T_{Ambient}$ = 25°C.*

Signal Name	Min.	Typ.	Max.
Input threshold “V_{CCA} ”	• + 0,985 V	• + 1,000 V	• + 1,015 V
Input threshold “V_{CC25} ”	• + 2,300 V	• + 2,337 V	• + 2,375 V
Input threshold “V_{CC3} ”	• + 3,036	• + 3,085 V	• + 3,135 V

Contents Chapter 4

4 Software Update and Installation of Options

4.1 Software Update

The software update procedure is described in the online help and in the Quick Start Guide, section “Preparing for Use”.

The firmware update after board change or after software update is described in Chapter 2 of this Service Manual.

4.2 Installation of Options

Depending on the model ordered and the software configuration, the R&S CMW comes with part of the options installed in the factory.

Most of the options must only be installed by an authorized Rohde & Schwarz service representative. Please refer to the notes on the title page of the installation instructions received with the option.

CAUTION

Danger of shock hazard

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

NOTICE

Risk of damage to the instrument

The components used in the instrument are sensitive to electrostatic discharges which is why they are to be handled in accordance with the ESD regulations.

Below you find installation instructions for the following options:

- R&S CMW-B110A (BB GENERATOR H110A)
- R&S CMW-B200A (SUU H200A)
- R&S CMW-B270A (WIMAX H270A FOR SUU)
- R&S CMW-B510A/B520A (DIGITAL IQ)
- R&S CMW-B612A/B (IEEE-BUS H612A/B)
- R&S CMW-B620A (DVI INTERFACE H620A)
- R&S CMW-B690A/B (OCXO H690A/B)

Installation Instructions

BB GENERATOR H110A

R&S® CMW-B110A

1202.5508.02

Read Security Instruction 1171.0100.42

- [x] **Installation by an authorized Rohde & Schwarz service representative only!**
- [ ] **May be installed at the customer's site.**

Hardware requirements:	BB MEASUREMENT H100x
Software requirements:	$\geq$ 1.0.0.5
Required Equipment:	Service kit 1202.2509.02 screw drivers torx size 8, 20
Path correction required:	None
Verification with UCS:	Recommended

Printed in the Federal
Republic of Germany

ROHDE & SCHWARZ
Test and Measurement Division

Contents

1 History

Date	Editor	Version	Reason for change
04. Apr 2007	ze/1CMK	V 01.00	First version
25. Jan 2008	ze/1CMK	V 02.00	History as chapter 1 added Scope of delivery as chapter 2 added Function Description as chapter 3 added Chapter 4.1-4.4: Graphics update Chapter 7 added: Update of required Software Chapter 8: changed to "Automatic Adjustment of Module Data and Firmware Update of programmable Devices" Chapter 9 added

2 Scope of delivery

R&S® CMW-B110A consists of:


Installation Instructions

BB GENERATOR H110A

R&S® CMW-B110A

1202.5508.02

Read Security Instruction 1171.0100.42

[X] Installation by an authorized Rohde & Schwarz service representative only!

[ ] May be installed at the customer's site.

Hardware requirements:	BB MEASUREMENT H100x
Software requirements:	-
Required Equipment:	Service kit 1202.2509.02
Path correction required:	None
Verification with UCS:	Recommended

Printed in the Federal Republic of Germany

ROHDE & SCHWARZ
Test and Measurement Division

1202.5537.00 Page 1 of 14 Version 02.00

Installation Instruction 1202.5537.00

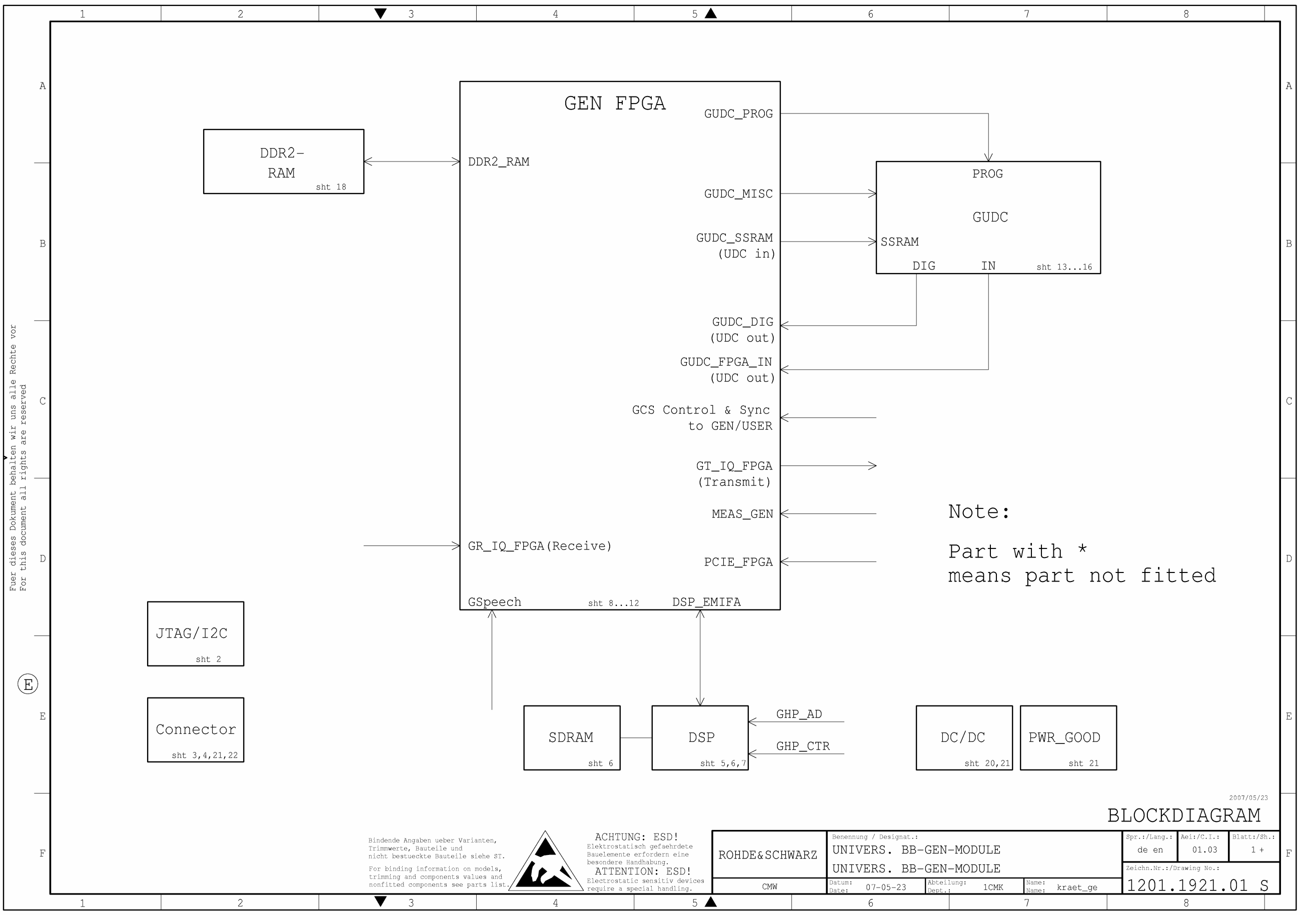
BB GENERATOR H110A 1201.1921.02

Screw M2,5x5

Figure 1 scope of delivery

3 Function Description of BB GENERATOR H110A

3.1 Block diagram



3.2 Common description

a The BBGEN provides arbitrary signal generation.

b In the DATA DDR2 RAM SODIM the raw data will be stored.

c The FPGA routs the data from the FMC to the DDR2 RAM. The FPGA internal DDR2 Controller refreshes the data and transfers them to the FPGA internal signal processing blocks.

d In the signal processing blocks the data will be coded and scrambled.

e The data can also transfer to the DSP. The DSP inserts real time information's into the data stream if necessary. Or it is used as Signal processing in WCDMA Mode.

f The prepared data (I/Q) will be resampled in the UDC.

g The resampled I/Q are transferred to the next board by the BBMEAS Sample FPGA.

3.3 Circuit Description

a X100 connect to BB MEAS.

b The DSP Power supply (VDSP , +2V5) is feed from the +5V.
The DATA DDR RAM SODIM (VDDR, +VTT_DDR) is feed from the +5V.
The FPGA is feed from the +3V3_IN and the +1V2_FPGA which is generated on the BB MEAS.
The UDC is feed from the +3V3_IN and the +1V2_UDC which is generated on the BB MEAS.

c MUX D207, D208 allows diagnosis.

d U200 is a thermometer for diagnosis.

e The JTAG chain allows access from motherboard to all devices. It is also used for production test.

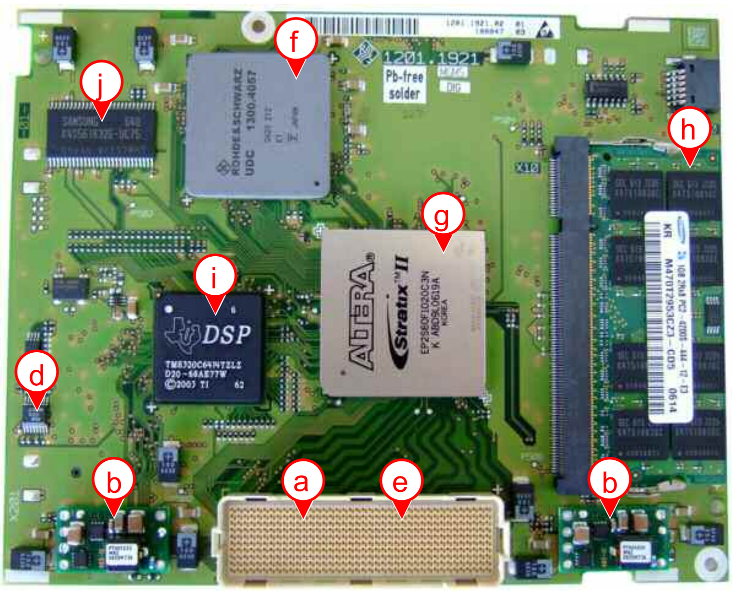
f The UDC D7001 is the ASIC for resampling the IQ data.

g FPGA for signal processing.

h DATA DDR2 RAM SODIM for raw data storage.

i DSP for real time signal processing.

j DSP RAM.



4 Preparation

4.1 Explanation of TAZ on the Barcode Label

This figure is an example for the barcode label and shows the included information.

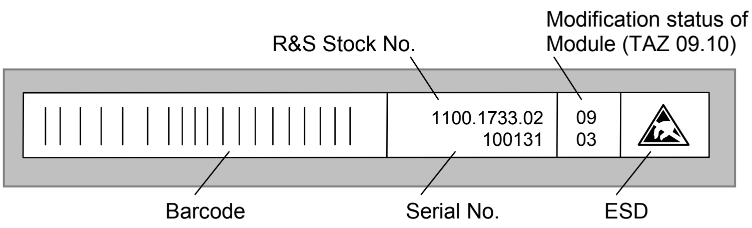


Figure 2 Barcode Label

4.2 Hints for handling

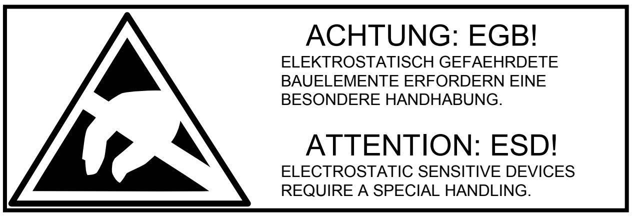


Figure 3 Electrostatics

4.3 Installing several options

It's advised to install options one by one to avoid conflicts and to provide verification of proper function.

4.4 Open the instrument

a Switch off unit and unplug power.

b Unplug all cables.

c Place unit on handles at the front.

d In order to save the yellow sticker - remove concerning blue rubber bumper manually as shown.

e Screw off cabinet feet.

f Push casing upwards and remove it (see Figure 4).

g Undo the screws at the cover and lift it off (see Figure 5).

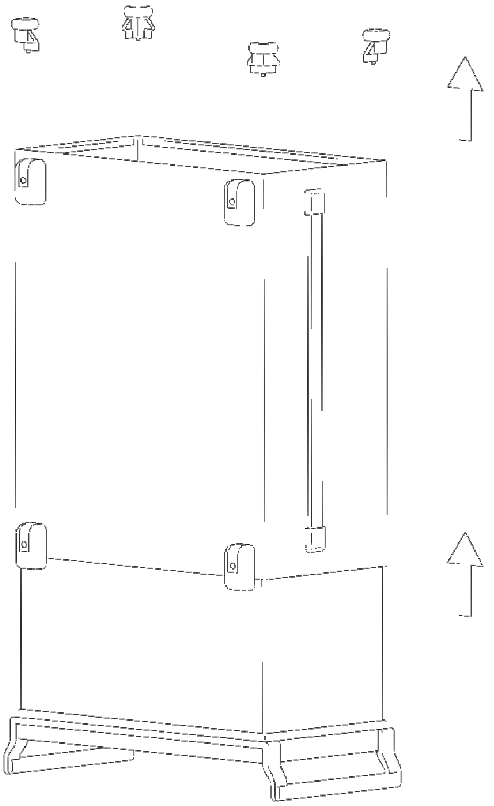
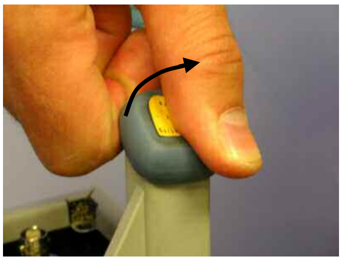


Figure 4 Removing the casing



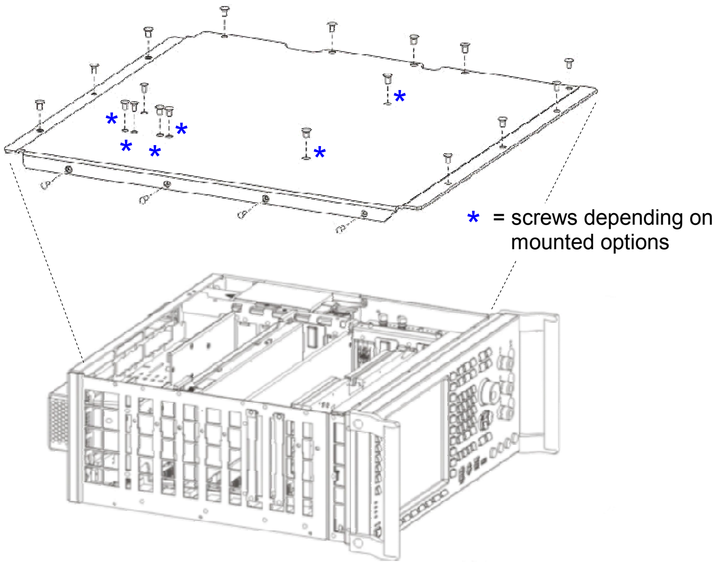


Figure 5 Removing the cover

4.5 Remove BB MEASUREMENT MODULE H100x

BB MEASUREMENT MODULE is located at slot:
A1200 if BB FIXED LINK H550A is mounted
A800 if BB FLEXIBLE LINK H550B is mounted.

a Note down the position the BB MEASUREMENT MODULE H100x was placed at.

b Dismount the BB MEASUREMENT MODULE MODULE H100x using the levers provided by the service kit.

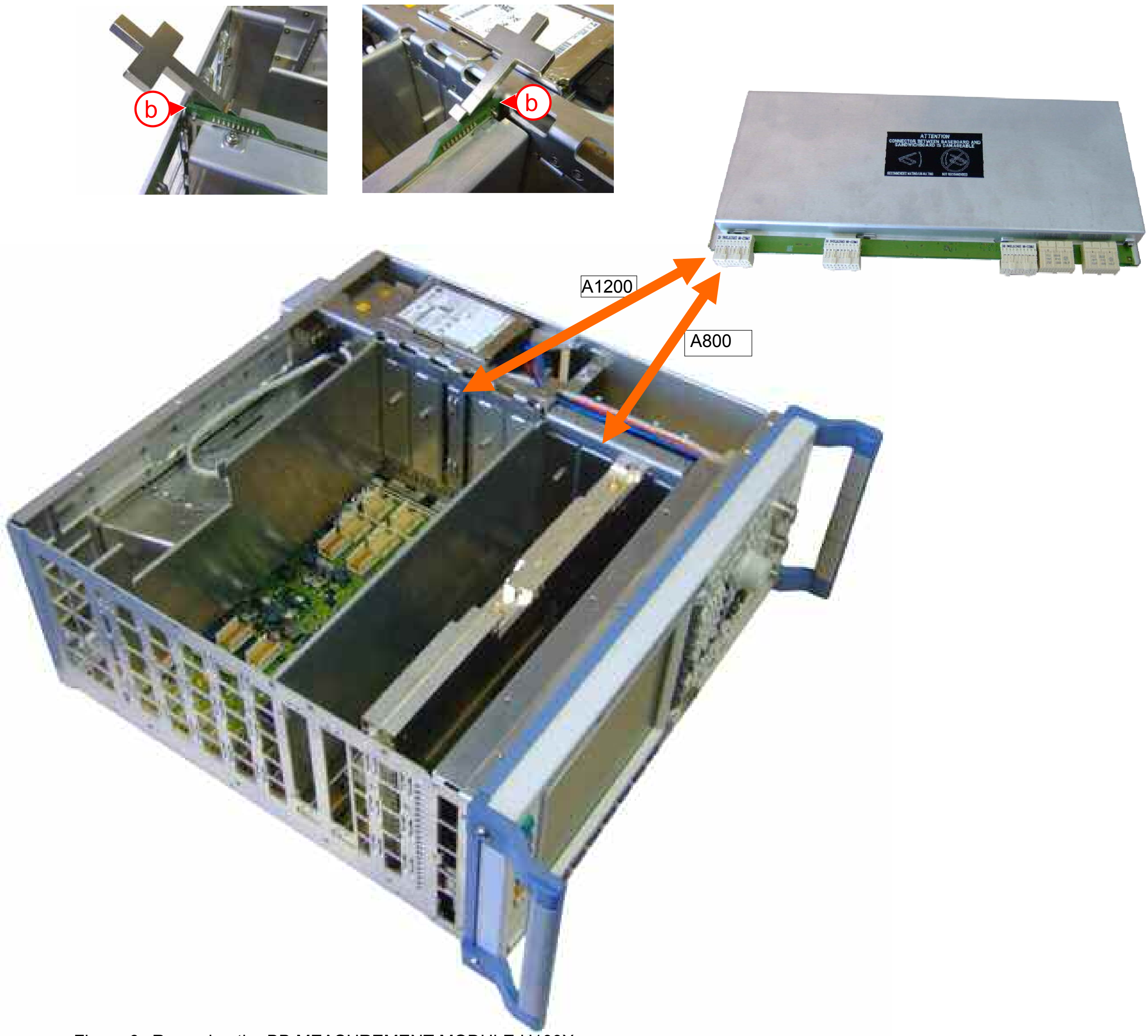


Figure 6 Removing the BB MEASUREMENT MODULE H100X

5 Mounting of BB GENERATOR H110A MODULE

Note: *If handled wrong the connector will be destructed. Make sure to connect/disconnect the module plain or begin/end with a small side. NEVER do connection starting/ending with a long side!*

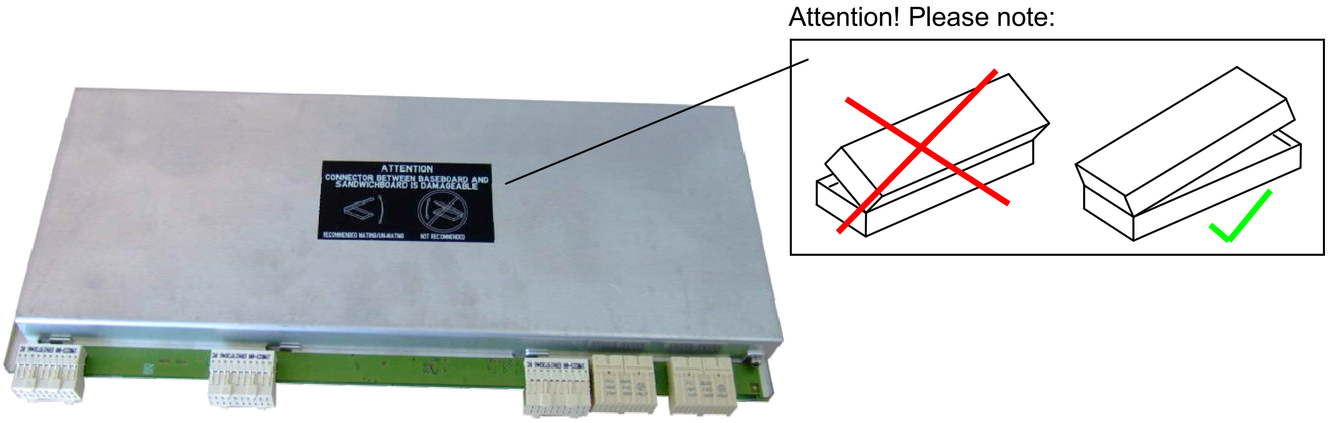


Figure 7 Treatment of connector

a Undo two screws with captive washers (1).

b Slide the upper and lower part of the cover in contrary direction (2) and take off the covers.

c Plug the BB GENERATOR H110A module (3) carefully to the position shown.

d Fix the BB GENERATOR H110A module with a screw with captive washer (4).

e Place back the cover. Assure that the BB GENERATOR MODULE H110A is hold by the brackets (5) of the cover.

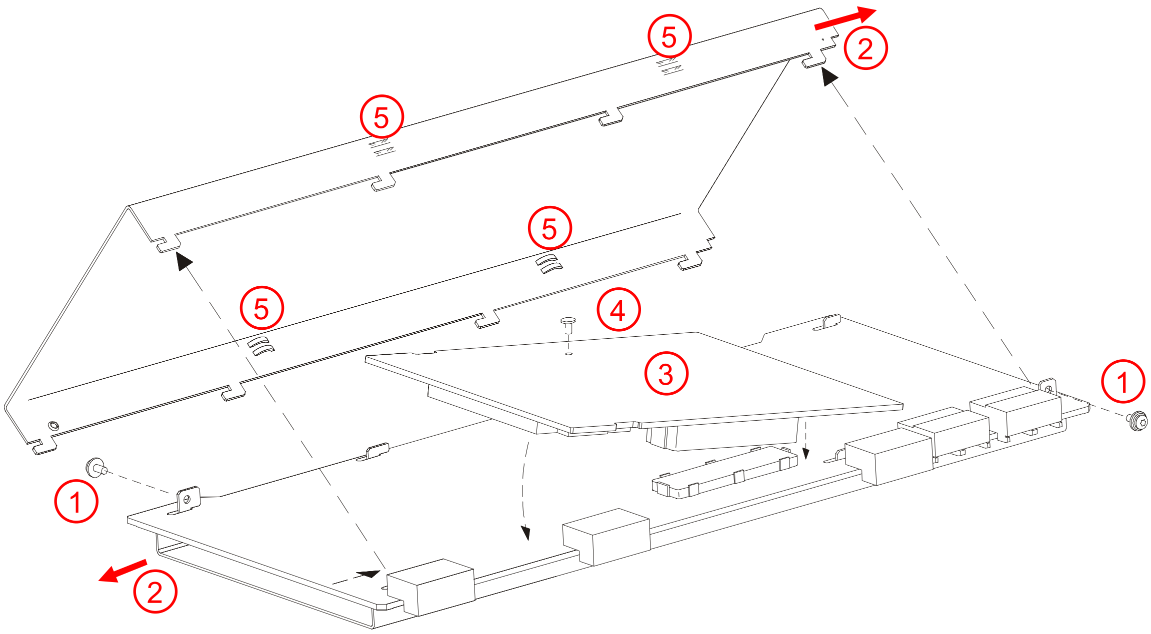


Figure 8 mounting of BB GENERATOR 110A MODULE

6 Assembling the unit

a Remount module and instrument in reverse order.

b Fit cover and cabinet feet back on in the reverse order to that described in section Preparation at page 7, (see Figure 9).

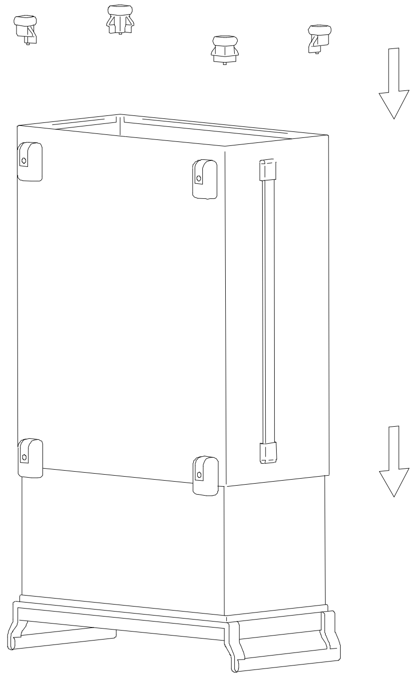


Figure 9 assembling the unit

7 Update of required Software

a Its advised to use at least the required software (see page 1).
To perform the update refer to the Operating Manual.

8 Automatic Adjustment of Module Data and Firmware Update of programmable Devices *

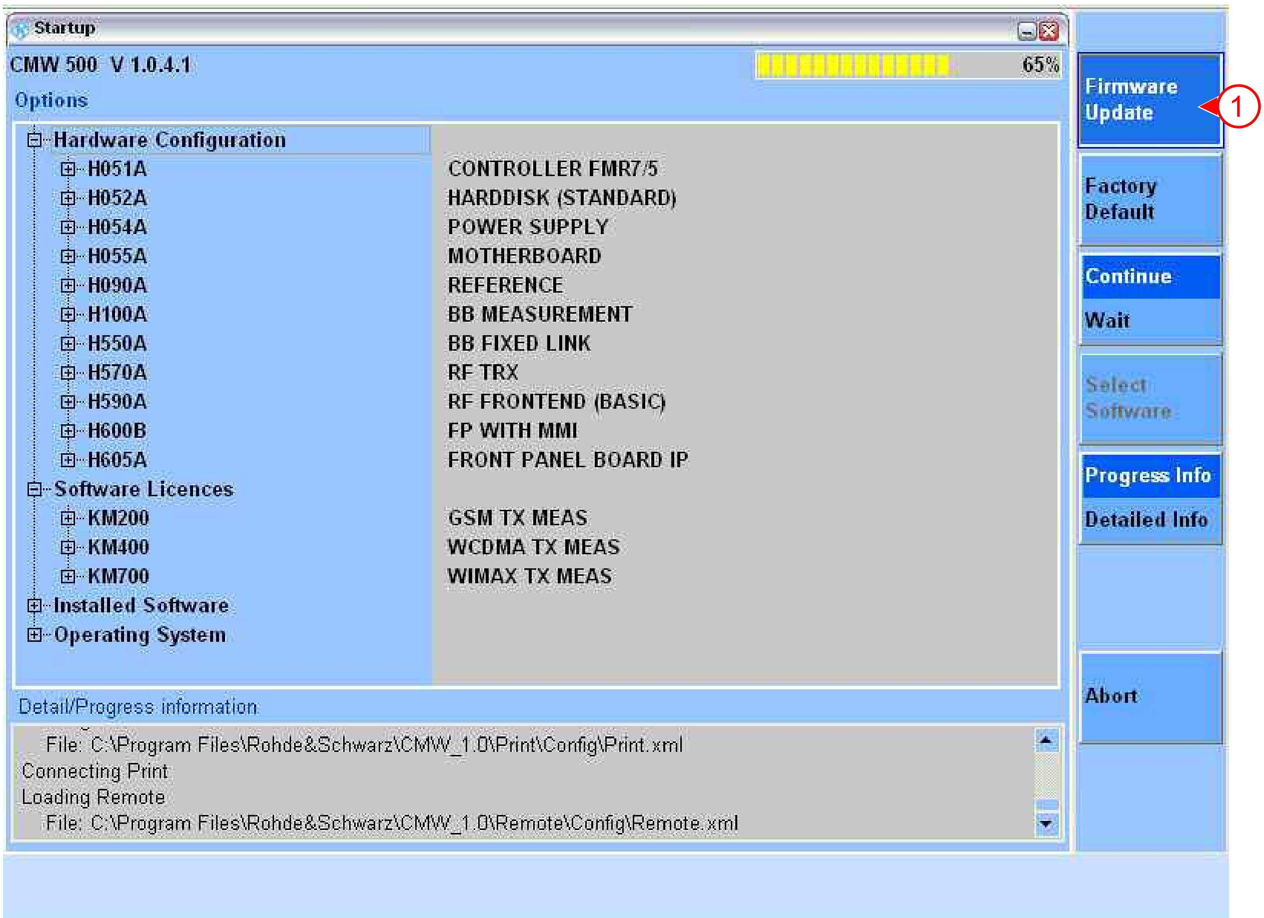
a Connect the instrument to the mains and switch on.

b Press the Firmware Update key (1) at the startup menu in the display.

c The automatic adjustment of module data is started under software control.
It may take a few minutes to perform firmware updates for programmable devices.

d After the software-controlled adjustment has been terminated, the CMW makes an reboot (if no update was necessary there is no reboot) and afterwards the operating software starts and the CMW is ready for use and offers full data integrity.

* For CMW with FP BLANK H600:
Connect external monitor to the DVI Interface at the front and connect external mouse/keyboard. Proceed with mouse/keyboard as described for the instrument with display. For further details see also the hardkey / softkey mapping table in the service manual chapter 3.



9 Checking the hardware option identification *

a Connect the instrument to the mains and switch on.

b Press the hardkey "SETUP" at the left side (with external keyboard: "ctrl"-"e").

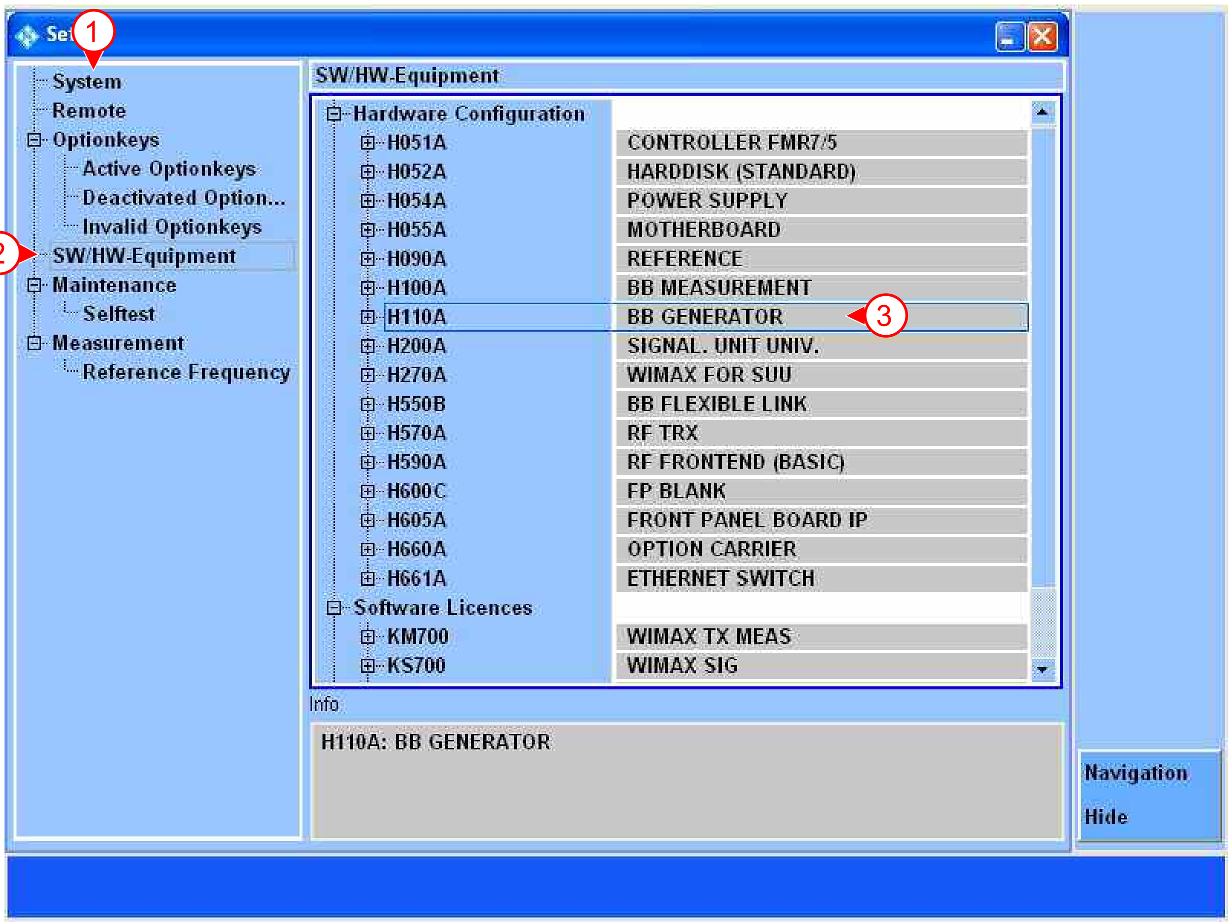
c Select the left column (1) by using the rotary knob (rotate and push).

d Select "SW/HW-Equipment" (2) by using the rotary knob (rotate and push).

e Check if there is BB GENERATOR H110A listed (3).

► Note that the hardware option identification shows the included parts of hardware (Hxxx) but not the complete ordered option (Bxxx).

* For CMW with FP BLANK H600:
Connect external monitor to the DVI Interface at the front and connect external mouse/keyboard. Proceed with mouse/keyboard as described for the instrument with display. For further details see also the hardkey / softkey mapping table in the service manual chapter 3.



10 Verification with UCS

a It is recommended to perform the corresponding verification test with UCS for R&S® CMW-B110A in order to get full data integrity.

Installation Instructions

SIGNAL. UNIT UNIV. H200A

R&SÒ CMW-B200A

1202.6104.02

Read Security Instruction 1171.0100.42

- [X] **Installation by an authorized Rohde & Schwarz service representative only!**
- [ ] **May be installed at the customer's site.**

Hardware requirements:	BB H550B FLEXIBLE LINK
Software requirements:	≥ 1.0.2.7
Required Equipment:	Service kit 1202.2509.02 screw drivers torx size 8, 20
Path correction required:	none
Verification with UCS:	none

Printed in the Federal
Republic of Germany

ROHDE&SCHWARZ
Test and Measurement Division

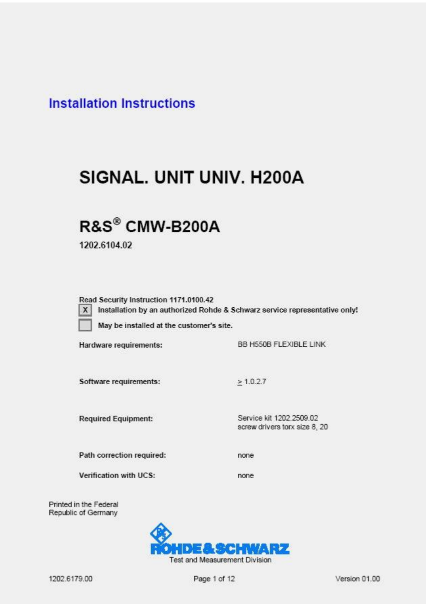
Contents

1 History

Date	Editor	Version	Reason for change
2008-01-25	ze/1CMK	01.00	First version
2008-05-20	ze/1CMK	02.00	Chapter 2: Scope of delivery: removed: screws with captive washers added: countersunk screws Chapter 5: added: picture about correct orientation of the cover.

2 Scope of delivery

R&S® CMW-B200A consists of:



Installation Instructions

SIGNAL. UNIT UNIV. H200A

R&S® CMW-B200A

1202.6104.02

Read Security Instruction 1171.0100.42

[X] Installation by an authorized Rohde & Schwarz service representative only!

[ ] May be installed at the customer's site.

Hardware requirements:	BB H550B FLEXIBLE LINK
Software requirements:	≥ 1.0.2.7
Required Equipment:	Service kit 1202.2509.02 screw drivers torx size 8, 20
Path correction required:	none
Verification with UCS:	none

Printed in the Federal Republic of Germany

ROHDE&SCHWARZ
Test and Measurement Division

1202.6179.00 Page 1 of 12 Version 01.00

Installation Instruction 1202.6179.00

screws 1148.3271.00

SIGNAL. UNIT UNIV. H200A 1201.3101.02

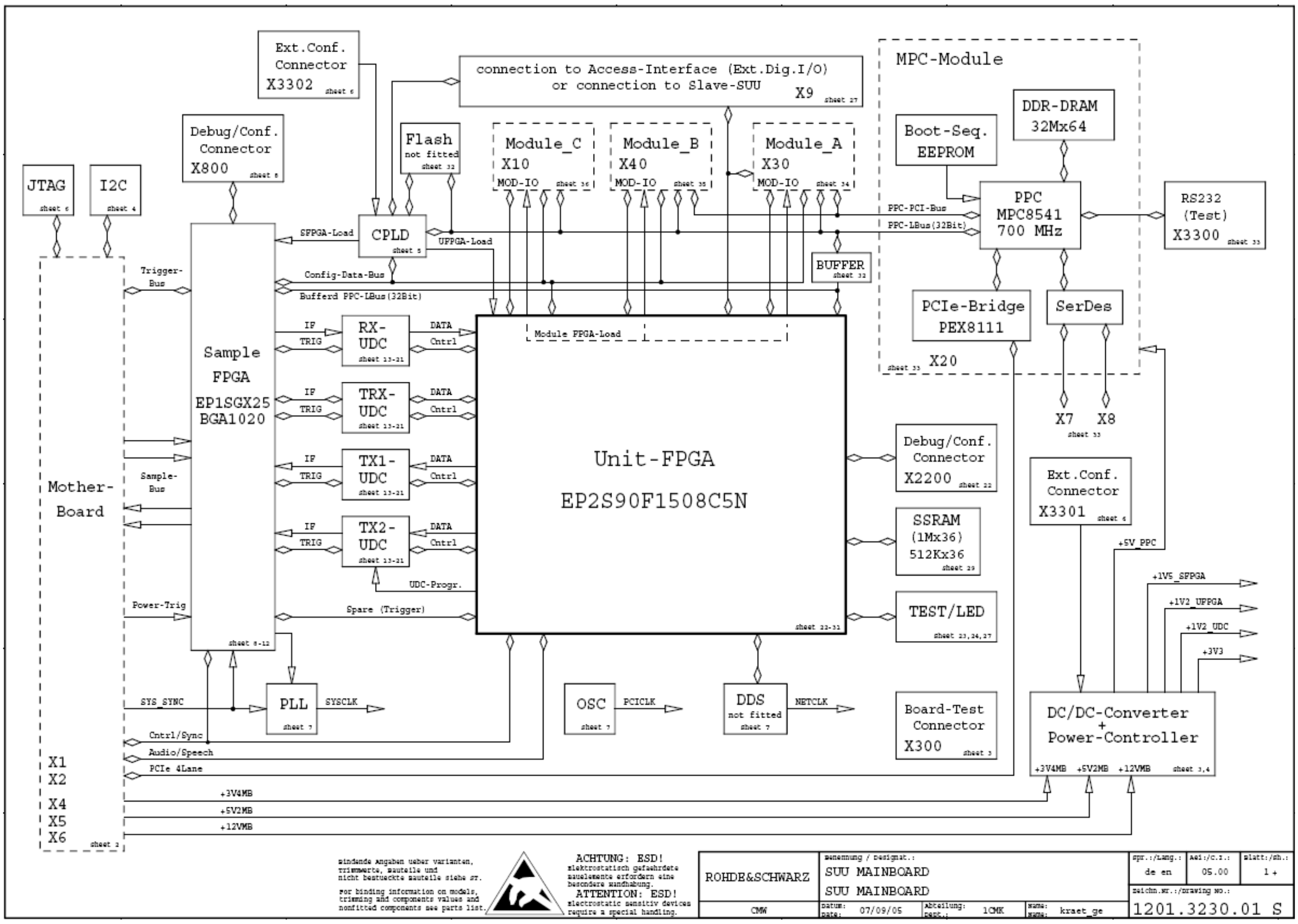
Cover 1201.1544.00

Figure 1 scope of delivery

3 Function Description of SIGNAL. UNIT UNIV. H200A

3.1 Block diagram

(SUU = SIGNAL. UNIT UNIV. H200A)



3.2 Common description

The SUU provides signal processing power to run real time signal processing and protocol stack control tasks.

The central FPGA called Unit FPGA can stream IQ data to/from the UDCs (up-down-converter) simultaneously. Four streams are supported by four UDCs in hardware.

The SAMPLE FPGA is used to receive the data samples via the Sample Bus Board from the COR Module together with time_stamp (from PCIe FPGA) and trigger information and feed them to the Unit FPGA.

The reference frequency and time_stamp regeneration is also done in the Sample FPGA. The time_stamp is used to inform the SAMPLE FPGA and the Unit FPGA about a kind of event.

There is the ability to mount extra modules on the connectors X10, X30, X40 where additional logic and processors can be built on.

The Module MPC0/2 is always mounted on X20, there is no access to the SUU without that module except I2C bus. The MPC0/2 is the PCIe endpoint of the SUU.

The MPC0/2 processor has access to the board and modules FPGAs deploying it's LBUS and also provides a legacy PCI connection to modules on connectors X30 and X40.

To be ready for the PCIe initialization cycle the MPC0/2 has a so called boot sequencer EEPROM on board. This device configures the PCI interface of MPC0/2 how it is needed for initialisation after power has become stable.

3.3 Circuit Description

a X1, X2, X4, X5, X6 connect to the R&S® CMW motherboard

b The board takes its power from the 3,4 V and 5,2 V from the motherboard. There are several DC DC and LDO converters to generate all voltages needed. In combination with the main FETs V300, V301 that circuit affords correct power ramping during switch on/off.

c The diagnosis MUX D301, D302 allows diagnosis.

d The power sequencer D400 controls power ramps, resets and supervises all voltages.

e U400 is a thermometer for diagnosis

f The CPLD D500 (ctrlcpld) interfaces between LBUS from MPC0 and all board control functions like downloading FPGAs and all bit control.

g The JTAG chain allows access from motherboard to all devices. It is also used for production test. It provides the firmware update for the programmable devices D400, D500, D700.

h D700 generates a phase controlled zero delay clock of 100 MHz relative to SYSSYNC from motherboard. The Phase control is needed by the trigger interface.
D704 generates the legacy PCI-clock for MPC0. G800 generates the sample bus clock for the Gigabit transmission. That are the only oscillators on the board.

i D800 is the Sample FPGA. It provides 4 Streams.

j The UDC (D1301,D1302,D1303,D1304) are the ASICs to calculate either RX or TX IQ data stream.

k The Unit FPGA D2200 contains the main logic on the board. It's content is strongly application dependent.

l D2900 is a synchronous SRAM which can be freely used by Unit FPGA.

4 Preparation

4.1 Explanation of TAZ on the Barcode Label

This figure is an example for the barcode label and shows the included information.

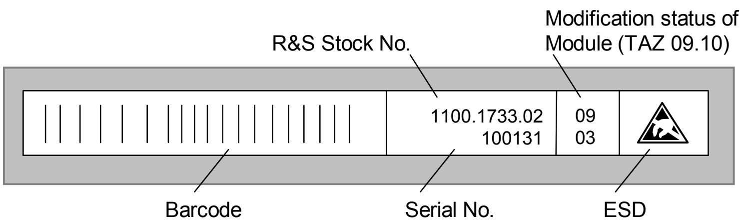


Figure 2 Barcode Label

4.2 Hints for handling

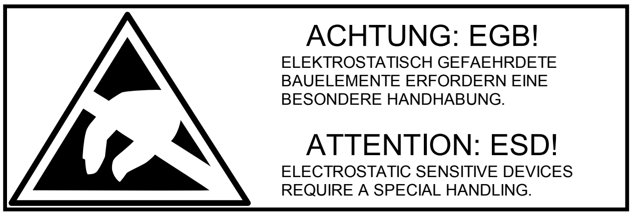


Figure 3 Electrostatics

4.3 Installing several options

It's advised to install options one by one to avoid conflicts and to provide verification of proper function.

4.4 Open the instrument

a Switch off unit and unplug power.

b Unplug all cables.

c Place unit on handles at the front.

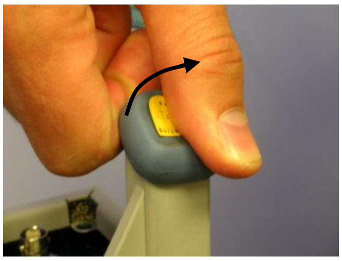
d In order to save the yellow sticker - remove concerning blue rubber bumper manually as shown.

e Screw off cabinet feet.

f Unscrew countersunk screws at the casing.

g Push casing upwards and remove it (see Figure 4).

h Undo the screws as shown at the top of the instrument frame. Lift off the cover (see Figure 5).



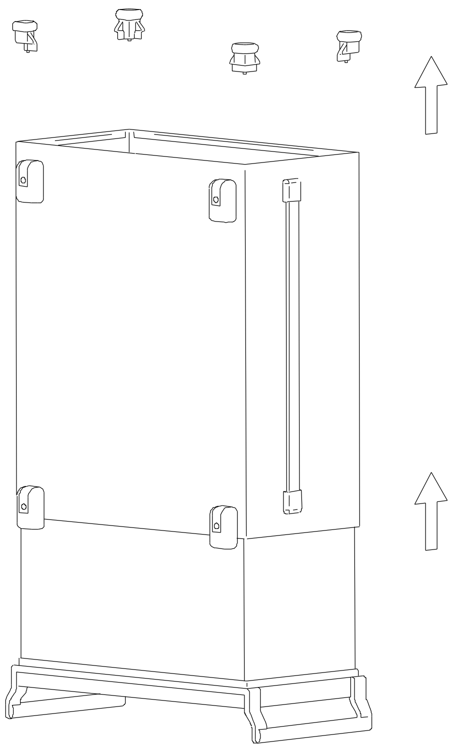


Figure 4 Removing the casing

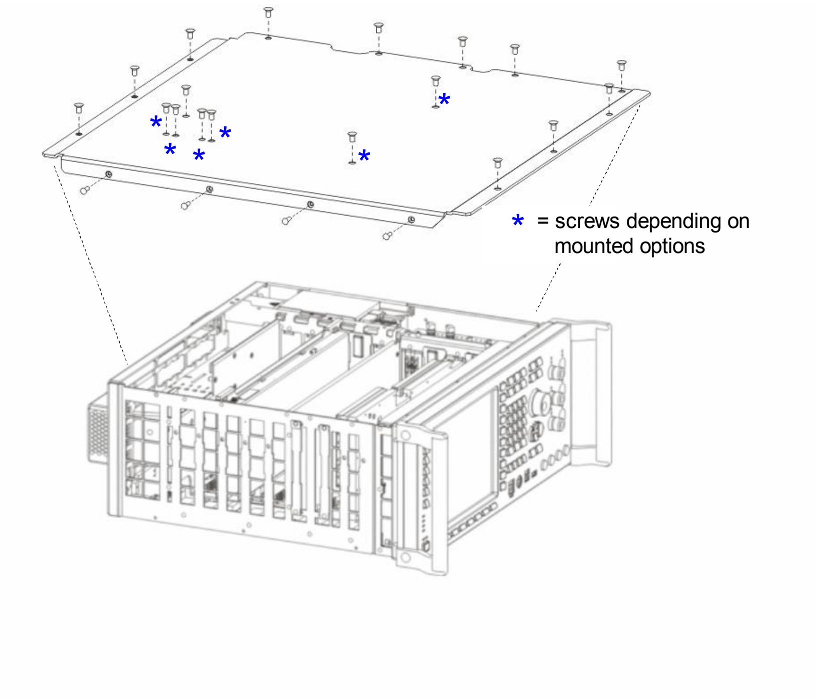


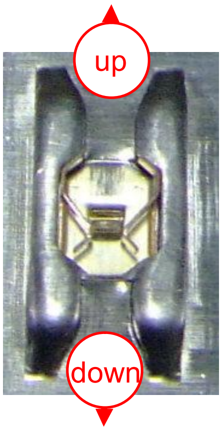
Figure 5 Removing the cover

5 Mounting SIGNAL. UNIT UNIV. H200A

a Remove the old cover and mount the delivered one at slot A1000 (1).
Be aware of the correct orientation.
If necessary remove temporarily the modules which are beside using the levers provided by the service kit.

b Plug SIGNAL. UNIT UNIV. H200A to slot A1000.

c If the ETHERNET SWITCH H661A is fitted connect cables as described in its Installation Instruction.



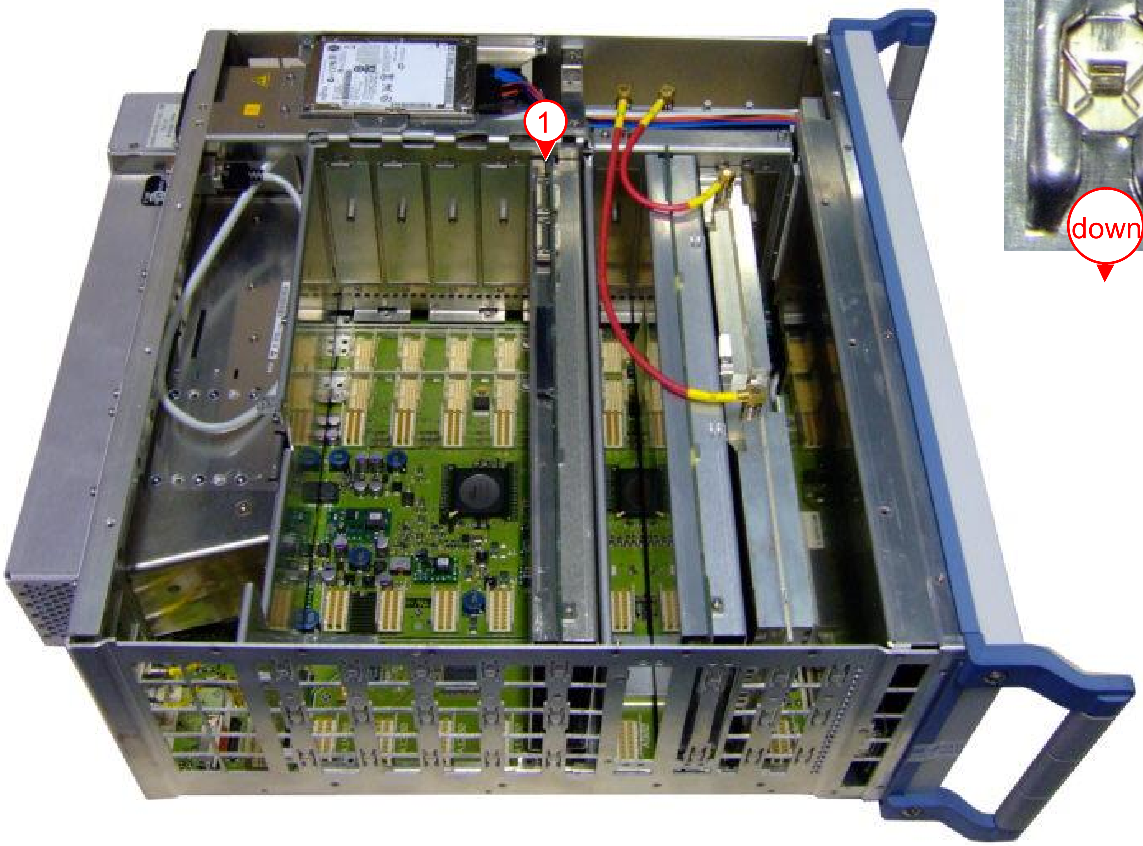


Figure 6 mounting SIGNAL. UNIT UNIV. H200A

6 Assembling the unit

a Remount module and instrument in reverse order.

b Fit cover and cabinet feet back on in the reverse order to that described in section 4.4 at page 7 (see Figure 7).

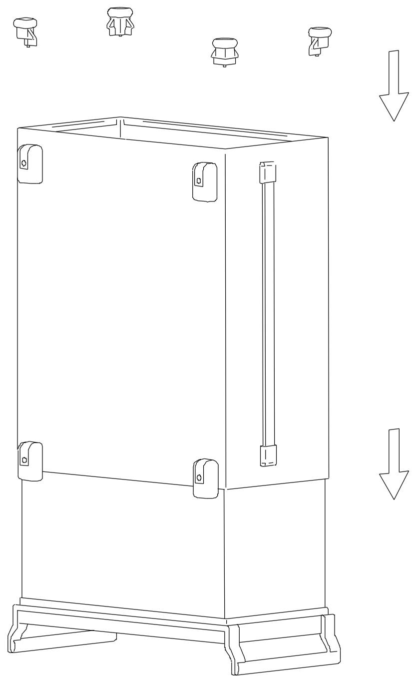


Figure 7 assembling the unit

7 Update of required Software

a Its advised to use at least the required software (see page 1).
To perform the update refer to the Operating Manual.

8 Automatic Adjustment of Module Data and Firmware Update of programmable Devices*

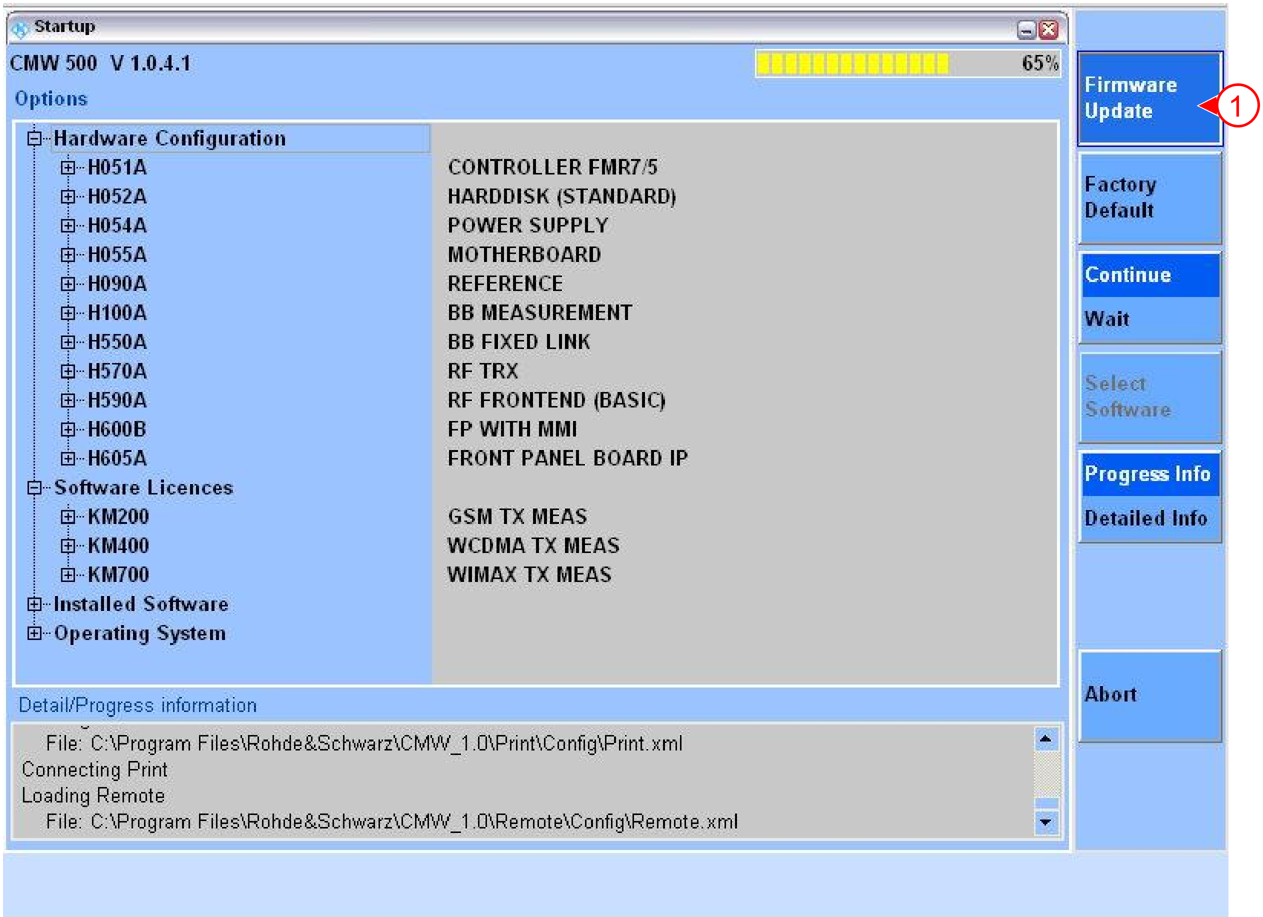
a Connect the instrument to the mains and switch on.

b Press the Firmware Update key (1) at the startup menu in the display.

c The automatic adjustment of module data is started under software control.
It may take a few minutes to perform firmware updates for programmable devices.

d After the software-controlled adjustment has been terminated, the CMW makes an reboot (if no update was necessary there is no reboot) and afterwards the operating software starts and the CMW is ready for use and offers full data integrity.

* For CMW with FP BLANK H600:
Connect external monitor to the DVI Interface at the front and connect external mouse/keyboard. Proceed with mouse/keyboard as described for the instrument with display. For further details see also the hardkey / softkey mapping table in the service manual chapter 3.



9 Checking the hardware option identification*

a Connect the instrument to the mains and switch on.

b Press the hardkey "SETUP" at the left side (external keyboard: "ctrl"-"e").

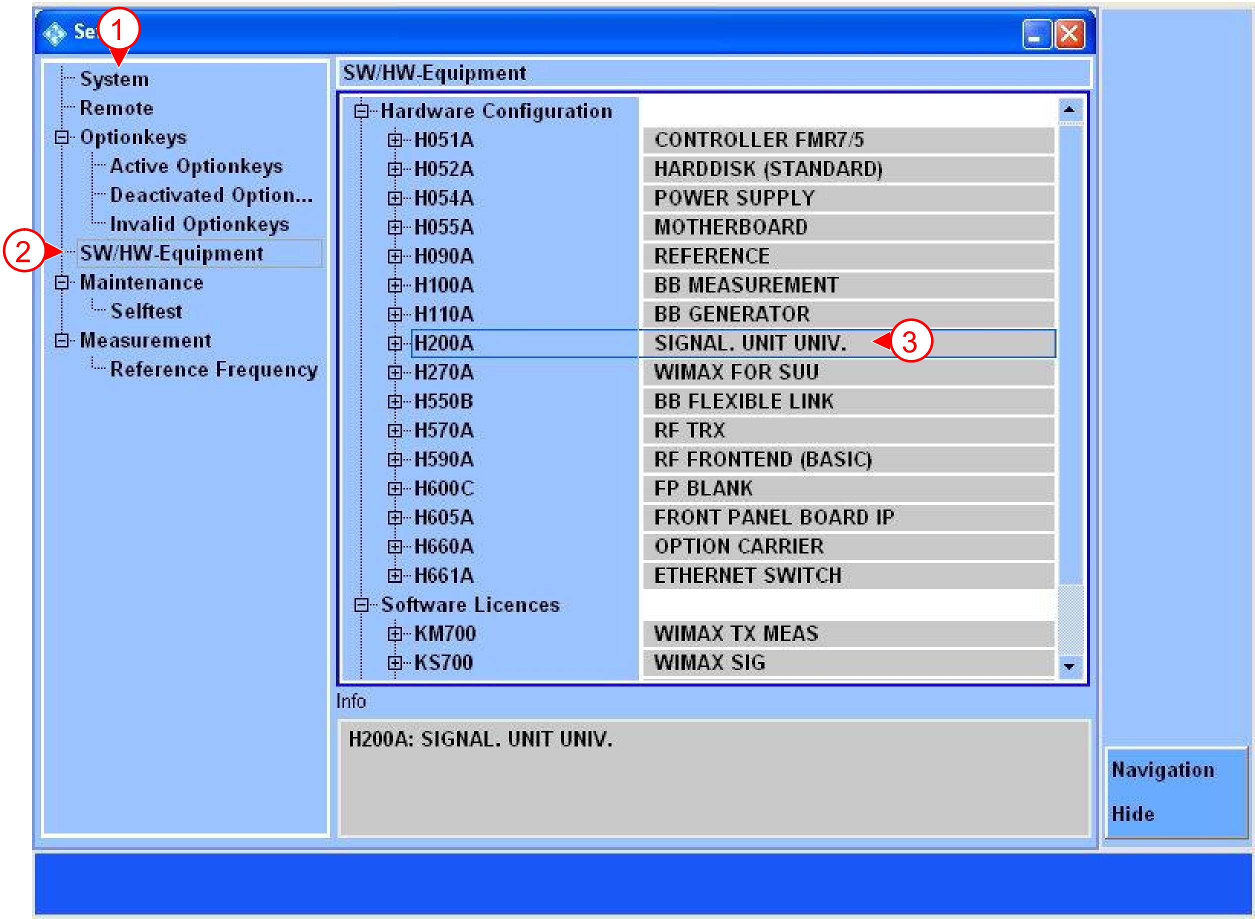
c Select the left column (1) by using the rotary knob (rotate and push).

d Select "SW/HW-Equipment" (2) by using the rotary knob (rotate and push).

e Check if there is SIGNAL. UNIT UNIV. H200A listed (3).

► Note that the hardware option identification shows the included parts of hardware (Hxxx) but not the complete ordered option (Bxxx).

* For CMW with FP BLANK H600:
Connect external monitor to the DVI Interface at the front and connect external mouse/keyboard. Proceed with mouse/keyboard as described for the instrument with display. For further details see also the hardkey / softkey mapping table in the service manual chapter 3.



Installation Instructions

WIMAX H270A FOR SUU

R&S® CMW-B270A

1202.6504.02

Read Security Instruction 1171.0100.42

- [x] **Installation by an authorized Rohde & Schwarz service representative only!**
- [ ] **May be installed at the customer's site.**

Hardware requirements:	SIGNAL. UNIT UNIV. H200A
Software requirements:	≥ 1.0.2.7
Required Equipment:	Service kit 1202.2509.02 screw drivers torx size 8, 20
Path correction required:	none
Verification with UCS:	none

Printed in the Federal
Republic of Germany

ROHDE & SCHWARZ
Test and Measurement Division

Contents

1 History

Date	Editor	Version	Reason for change
25. Jan 2008	ze/1CMK	V 01.00	First version

2 Scope of delivery

R&S® CMW-B270A consists of:

Installation Instructions

WIMAX H270A FOR SUU

R&S® CMW-B270A
1202.6504.02

Read Security Instruction 1171.0100.42
[X] Installation by an authorized Rohde & Schwarz service representative only!
[ ] May be installed at the customer's site.

Hardware requirements:	SIGNAL. UNIT UNIV. H200A
Software requirements:	> 1.0.2.7
Required Equipment:	Service kit 1202.2509.02 screw drivers torx size 8, 20
Path correction required:	none
Verification with UCS:	none

Printed in the Federal Republic of Germany

ROHDE&SCHWARZ
Test and Measurement Division

1202.6510.00 Page 1 of 11 Version 01.00

Installation Instruction 1202.6510.00

1506.4350.02 WIMAX H270A FOR SUU

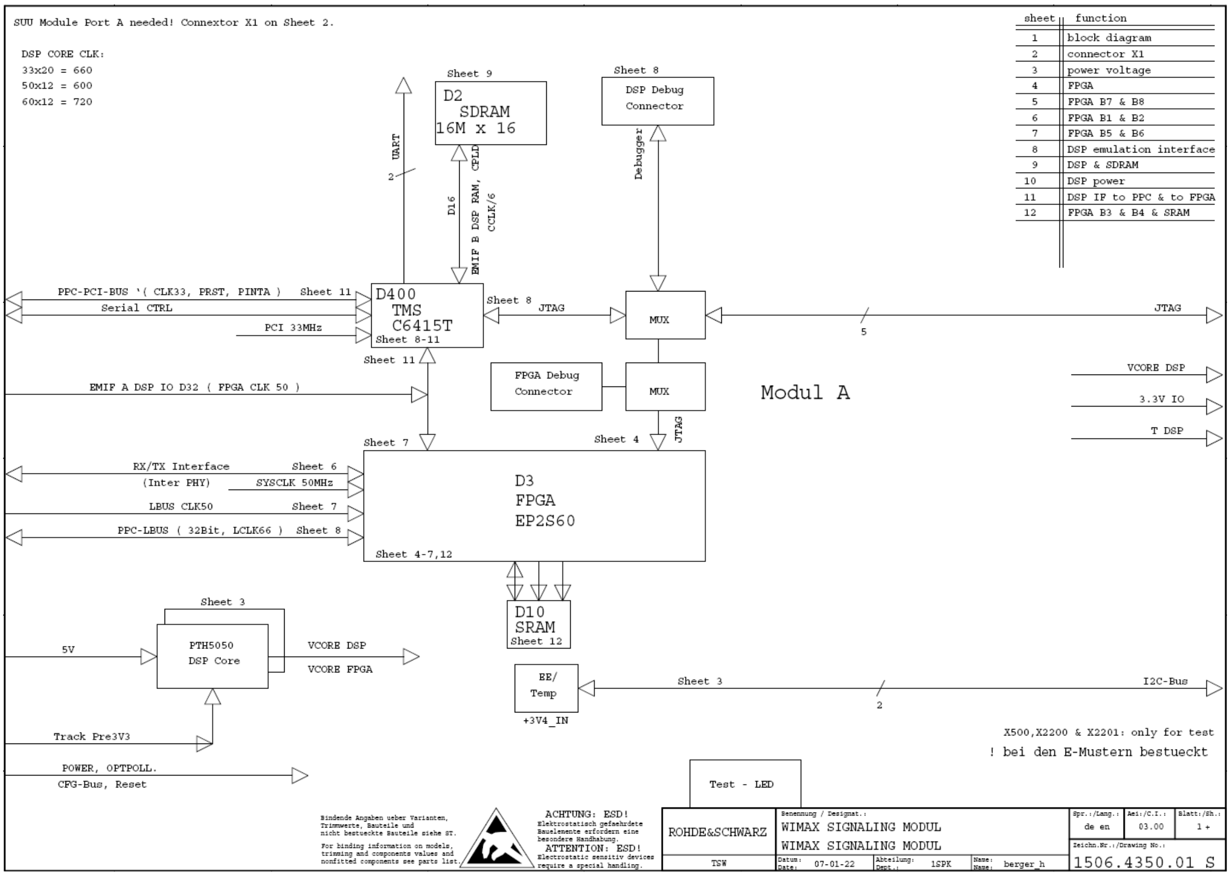
Screws M2,5x5 (4x)

Figure 1 scope of delivery

3 Function Description of WIMAX H270A FOR SUU

3.1 Block diagram

(SUU = SIGNAL. UNIT UNIV. H200A)



3.2 Common description

The WIMAX Module provides additional signal processing power to run real time signal processing tasks.

The FPGA called Wx FPGA D3 can communicate with the Unit FPGA on Main Board SUU via X1.

The digital signal processor D400 has access to the Unit and Wx FPGAs deploying it's EMIFA bus and also has access to the SDRAM D2 via EMIF B memory interface.

The DSP D400 deploys the PCI interface from MPC0/2 for booting, control and general direct communication.

3.3 Circuit Description

a X1 connects to the SUU mainboard.

b The board takes its power from the 3,4 V and 5,2 V via X1.

c There are two DC DC converters to generate all voltages needed.

d In combination with the SUU ramping signals on X1 that circuit affords correct power ramping during switch on/off.

e A diagnosis MUX D4 allows diagnosis.

f U1 is a thermometer for diagnosis.

g The JTAG chain allows access from motherboard to all devices. It is also used for production test.

h The module does not contain any non volatile memory like flash memory. So nothing can be programmed permanently by JTAG interface.

i The WIMAX FPGA D3 is the main logic unit on the board. It's content is strongly application dependent.

j D400 is a DSP (TI TMS320C64) for more flexible DSP tasks like channel estimation. It can directly communicate with Unit- and WIMAX-FPGA and the MPC0/2.

k D10 is a synchronous SRAM which can be freely used by the modules FPGA D3.

4 Preparation

4.1 Explanation of TAZ on the Barcode Label

This figure is an example for the barcode label and shows the included information.

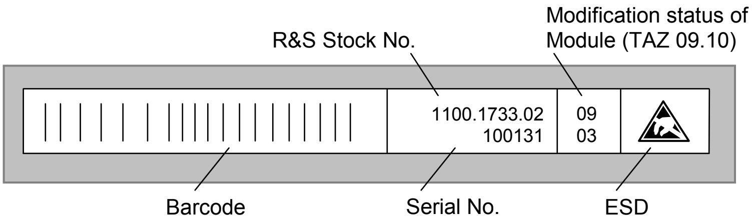


Figure 2 Barcode Label

4.2 Hints for handling

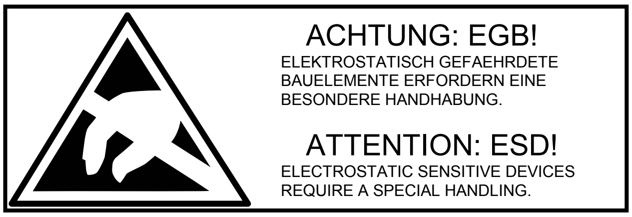


Figure 3 Electrostatics

4.3 Installing several options

It's advised to install options one by one to avoid conflicts and to provide verification of proper function.

4.4 Open the instrument

a Switch off unit and unplug power.

b Unplug all cables.

c Place unit on handles at the front.

d In order to save the yellow sticker - remove concerning blue rubber bumper manually as shown.

e Screw off cabinet feet.

f Push casing upwards and remove it (see Figure 4).

g Undo the screws as shown at the top of the instrument frame. Lift off the cover (see Figure 5).

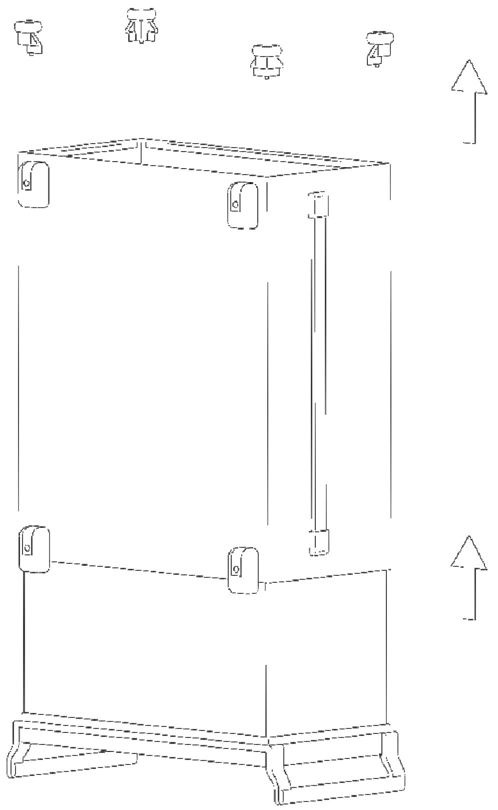
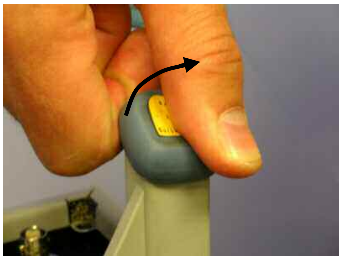


Figure 4 Removing the casing



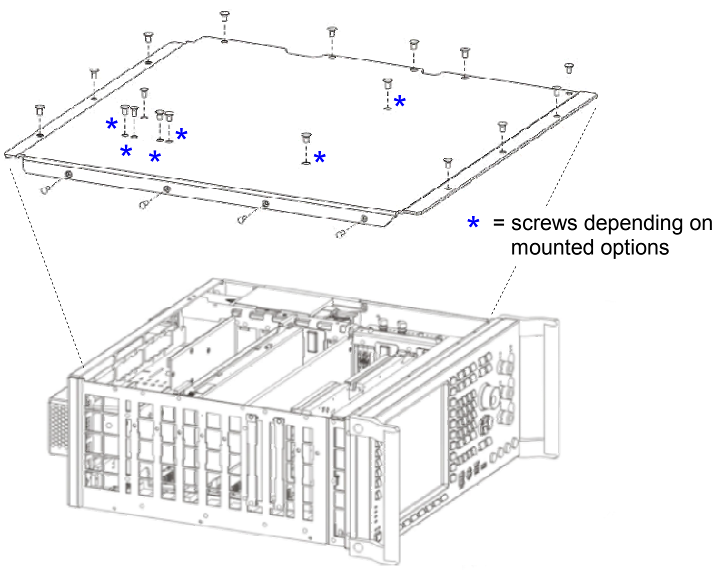
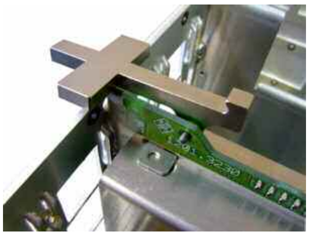


Figure 5 Removing the cover

4.5 Remove SIGNAL. UNIT UNIV. H200A

a If fitted: Unplug cables from/across the SIGNAL. UNIT UNIV. H200A at slot A1000.

b Pull out the SIGNAL. UNIT UNIV. H200A from slot A1000 using the levers provided by the service kit (1).



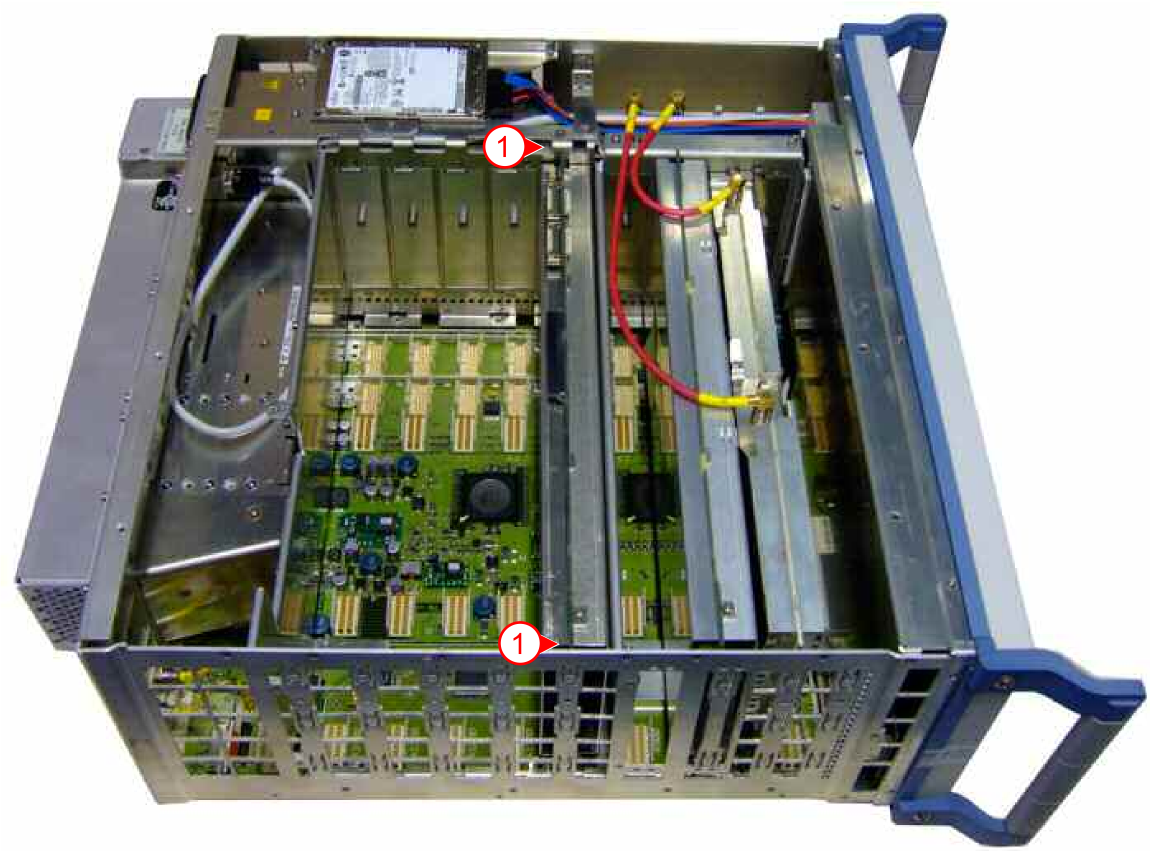


Figure 6 remove SIGNALING UNIT UNIVERSAL H200A

5 Mounting WIMAX H270A FOR SUU

a Undo two screws with captive washers (1).

b Slide the upper and lower part of the cover in contrary direction.

c Take off the covers.

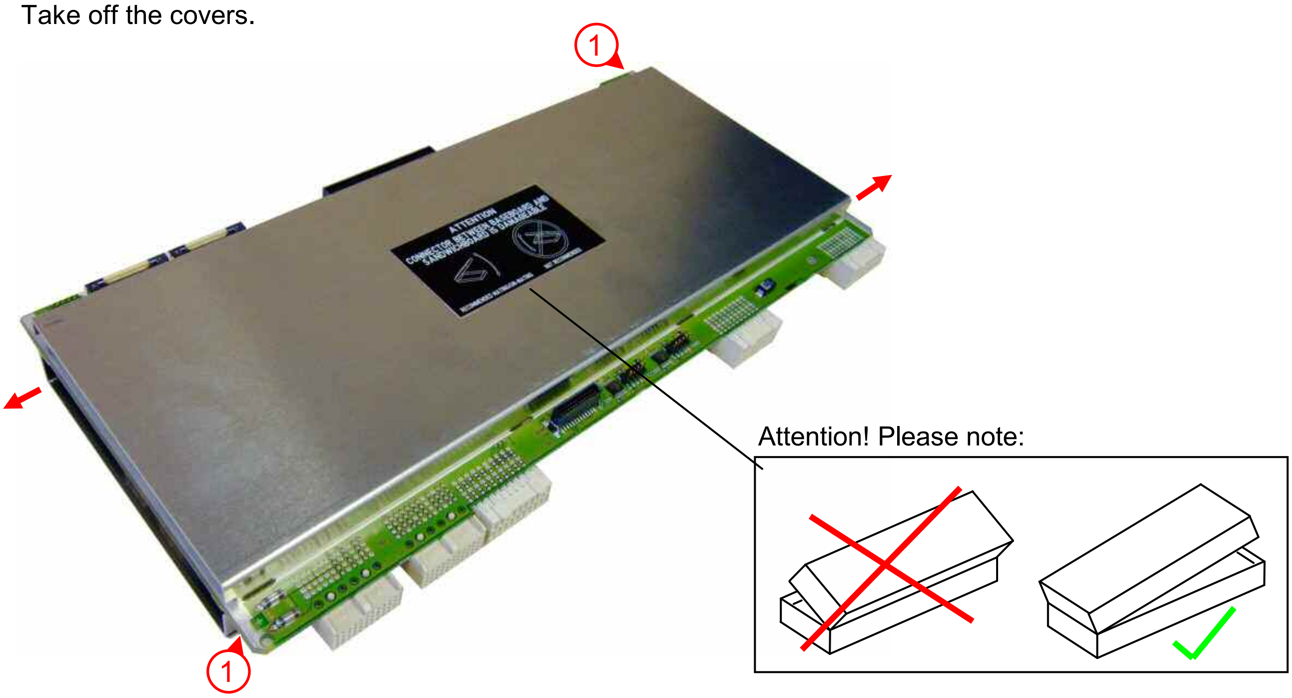


Figure 7 removing covers

d Plug the WIMAX H270A FOR SUU at position shown (2).

e Fix module with four screws with captive washers (3).

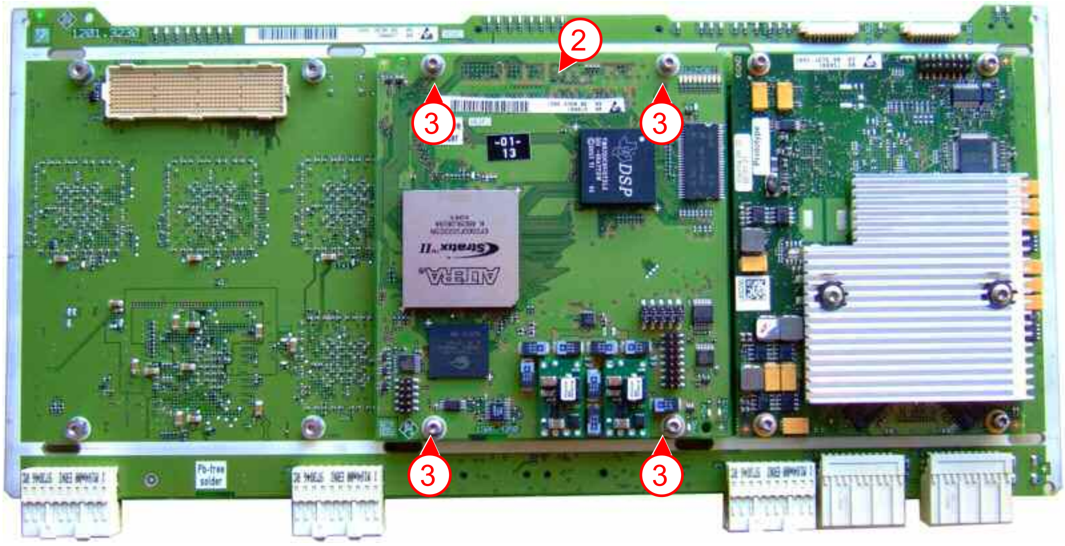


Figure 8 mounting WIMAX H270A FOR SUU

6 Assembling the unit

a Remount module and instrument in reverse order.

b Fit cover and cabinet feet back on in the reverse order to that described in section Preparation at page 7, (see Figure 9).

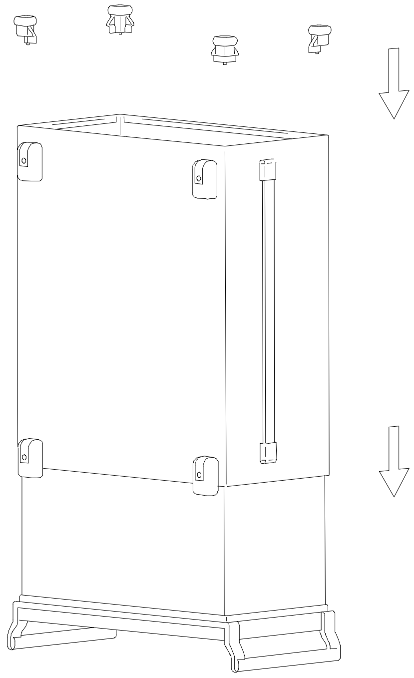


Figure 9 assembling the unit

7 Update of required Software

a Its advised to use at least the required software (see page 1).
To perform the update refer to the Operating Manual.

8 Automatic Adjustment of Module Data and Firmware Update of programmable Devices *

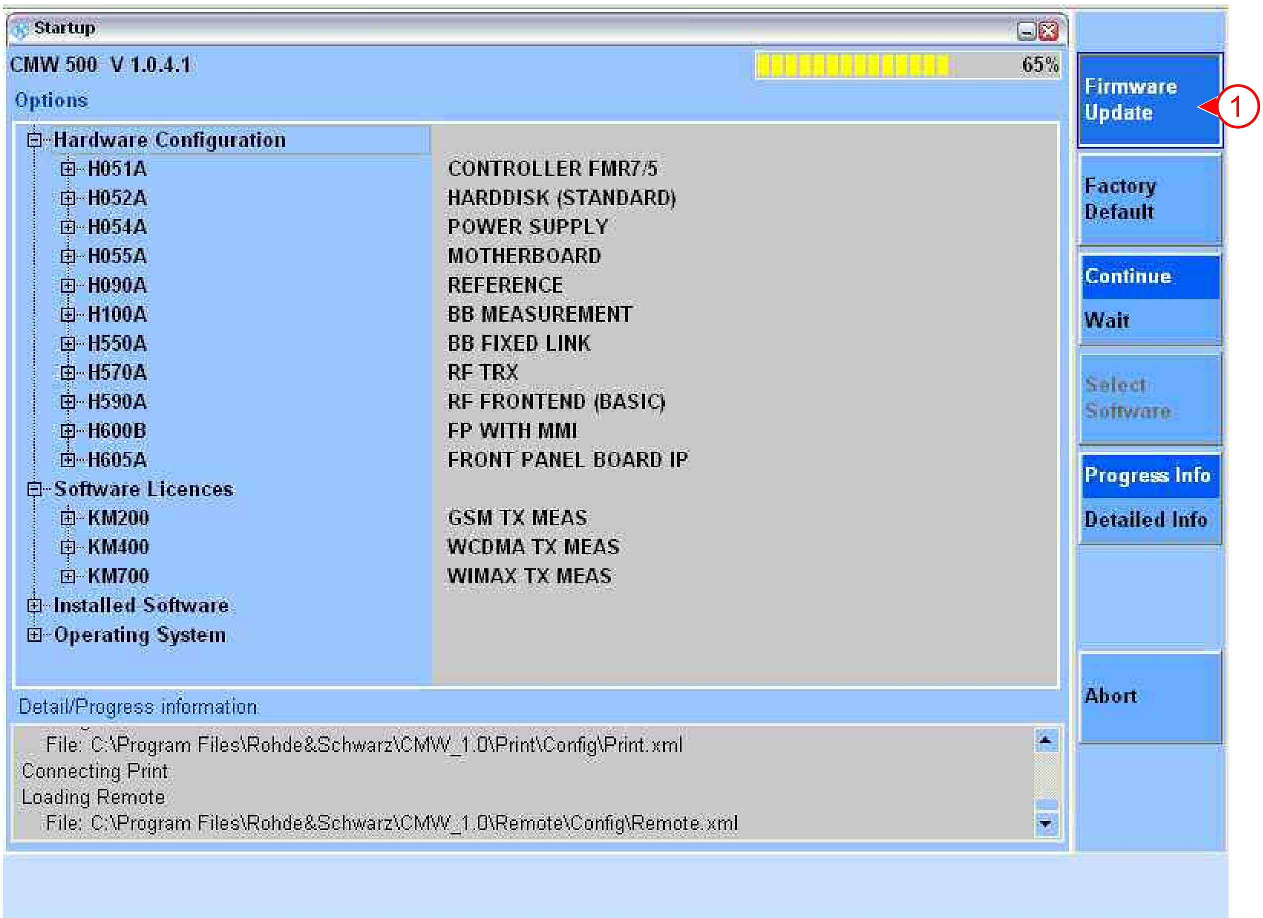
a Connect the instrument to the mains and switch on.

b Press the Firmware Update key (1) at the startup menu in the display.

c The automatic adjustment of module data is started under software control.
It may take a few minutes to perform firmware updates for programmable devices.

d After the software-controlled adjustment has been terminated, the CMW makes an reboot (if no update was necessary there is no reboot) and afterwards the operating software starts and the CMW is ready for use and offers full data integrity.

* For CMW with FP BLANK H600:
Connect external monitor to the DVI Interface at the front and connect external mouse/keyboard. Proceed with mouse/keyboard as described for the instrument with display. For further details see also the hardkey / softkey mapping table in the service manual chapter 3.



9 Checking the hardware option identification *

a Connect the instrument to the mains and switch on.

b Press the hardkey "SETUP" at the left side (with external keyboard: "ctrl"-"e").

c Select the left column (1) by using the rotary knob (rotate and push).

d Select "SW/HW-Equipment" (2) by using the rotary knob (rotate and push).

e Check if there is WIMAX H270A FOR SUU listed (3).

► Note that the hardware option identification shows the included parts of hardware (Hxxx) but not the complete ordered option (Bxxx).

* For CMW with FP BLANK H600:
Connect external monitor to the DVI Interface at the front and connect external mouse/keyboard. Proceed with mouse/keyboard as described for the instrument with display. For further details see also the hardkey / softkey mapping table in the service manual chapter 3.

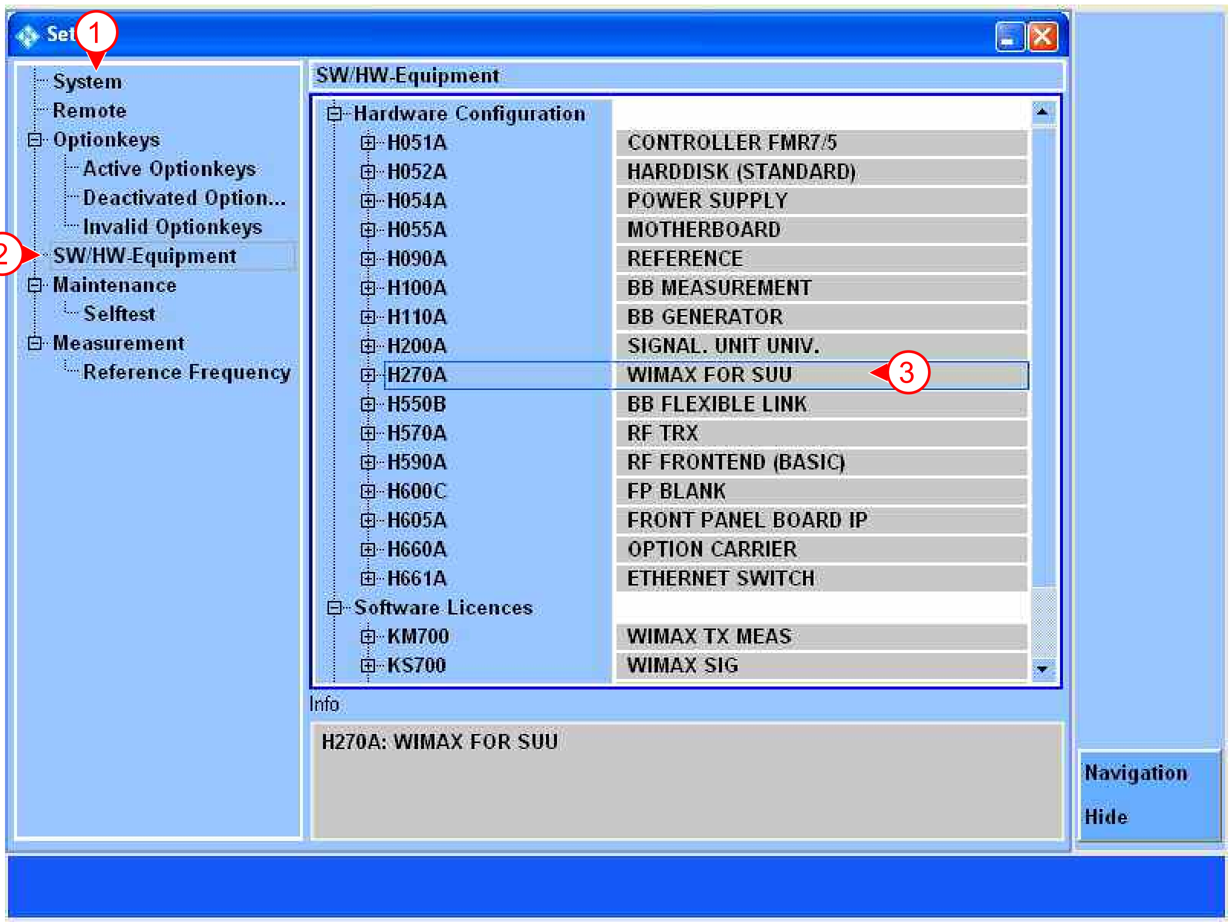


Figure 10 Checking the hardware option identification

Installation Instructions

DIGITAL IQ 1 TO 4 H510A
DIGITAL IQ 5 TO 8 H520A

R&S® CMW-B510A/CMW-B520A

1202.8007.02/1202.8107.02

Read Security Instruction 1171.0100.42

- [X] **Installation by an authorized Rohde & Schwarz service representative only!**
- [ ] **May be installed at the customer's site.**

Hardware requirements:	BB H550B FLEXIBLE LINK
Software requirements:	≥ 1.0.5
Required Equipment:	Service kit 1202.2509.02 screw drivers torx size 8, 20
Path correction required:	none
Verification with UCS:	none

Printed in the Federal
Republic of Germany

ROHDE & SCHWARZ
Test and Measurement Division

Contents

1 History

Date	Editor	Version	Reason for change
2008-05-20	ze/1CMK	01.00	First version
2008-07-10	ze/1CMK	02.00	Chapter 2: Removed: cables 1402.4990.00

2 Scope of delivery

R&S® CMW-B510A/ R&S® CMW-B520A consists of:


Installation Instructions

DIGITAL IQ 1 TO 4 H510A
DIGITAL IQ 5 TO 8 H520A
R&S® CMW-B510A/CMW-B520A
1202.8007.02/1202.8107.02

Read Security Instruction 1171.0100.42
[X] Installation by an authorized Rohde & Schwarz service representative only!
[ ] May be installed at the customer's site.

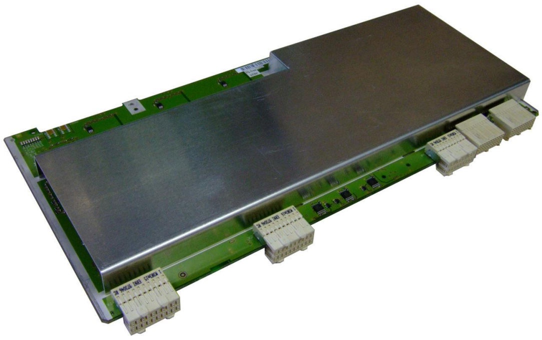
Hardware requirements:	BB H550B FLEXIBLE LINK
Software requirements:	≥ 1.0.5.0
Required Equipment:	Service kit 1202.2509.02 screw drivers torx size 8, 20
Path correction required:	none
Verification with UCS:	none

Printed in the Federal Republic of Germany

ROHDE&SCHWARZ
Test and Measurement Division

1202.8036.00 Page 1 of 15 Version 01.00

Installation Instruction 1202.6179.00



IQ BOARD H500A 1202.0070.02

Screws M2.5x4 1148.3271.00

RAIL IQ 1202.0806.00

R&S® CMW-B510A:

YFLEX CABLE 70
1202.0729.00 (4x)

ASSEMBLY UNIT DIG. 1 TO 4
1202.8042.00

R&S® CMW-B520A:

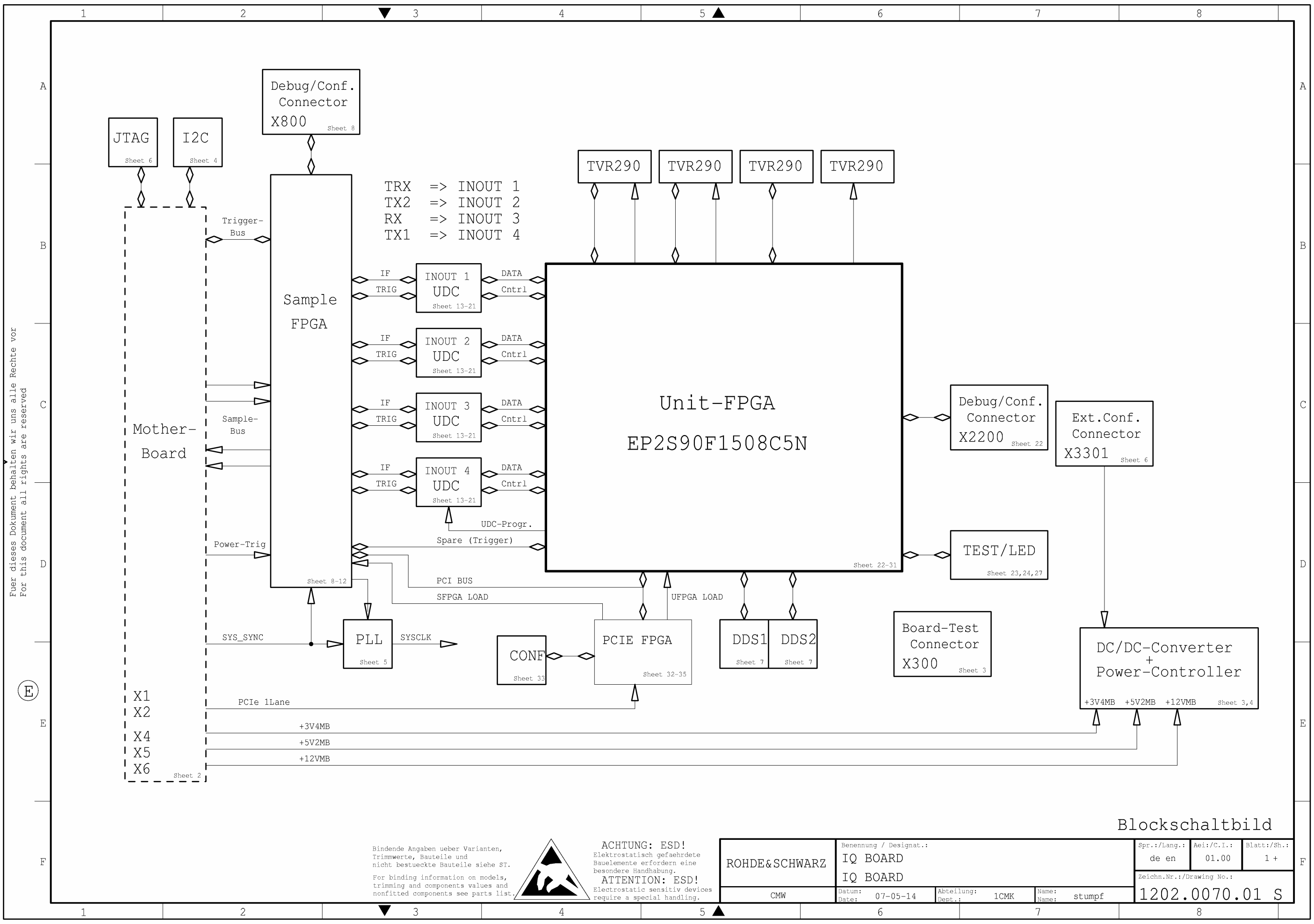
CABLE HARNESS DIG. IQ 5 TO 8
1202.8136.00

ASSEMBLY UNIT DIG. 5 TO 8
1202.8142.00

Figure 1 scope of delivery

3 Function Description of IQ BOARD H500A

3.1 Block diagram



3.2 General description

a The IQ BOARD H500A provides interfaces from the internal IQ data stream to an external device.

b It is possible to send 2 independent data streams and receive 2 independent data streams.

c The data streams can also be monitored by an additional data stream.

d The central FPGA called Unit FPGA can stream IQ data to/from the UDCs (up-down-converter) simultaneously. Four streams are supported by four UDCs in hardware.

e The SAMPLE FPGA is used to receive the data samples via the sample bus board from the other module together with time_stamp (from PCIe FPGA) and trigger information and feed them to the Unit FPGA.

f The reference frequency and time_stamp regeneration is done in the PCIE FPGA. The time_stamp is used to inform the SAMPLE FPGA and the Unit FPGA about a kind of event.

3.3 Circuit Description

a X1, X2, X4, X5, X6 connect to the R&S® CMW motherboard.

b The board takes its power from the 3,4 V and 5,2 V from the motherboard. There are several DC DC and LDO converters to generate all voltages needed. In combination with the main FETs that circuit affords correct power ramping during switch on/off.

c The diagnosis MUX D301, D302 allows diagnosis.

d The power sequencer D400 controls power ramps, resets and supervises all voltages.

e U400 is a thermometer for diagnosis.

f The JTAG chain allows access from motherboard to all devices. It is also used for production test. It provides the firmware update for the programmable devices D400, D700, D3303.

g D700 generates a phase controlled zero delay clock of 100 MHz relative to SYSSYNC from motherboard. The phase control is needed by the trigger interface.

h G800 generates the sample bus clock for the Gigabit transmission. That are the only oscillators on the board.

i D800 is the Sample FPGA. It provides 2 up and 2 down streams.

j The UDC (D1301, D1302, D1303, D1304) are the ASICs to calculate either IN or OUT IQ data stream.

k The Unit FPGA D2200 contains the main logic on the board. It’s content is strongly application dependent.

4 Preparation

4.1 Explanation of TAZ on the Barcode Label

This figure is an example for the barcode label and shows the included information.

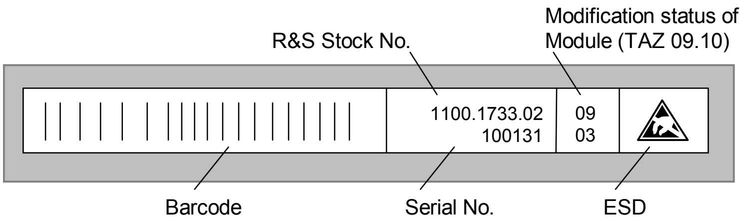


Figure 2 Barcode Label

4.2 Hints for handling

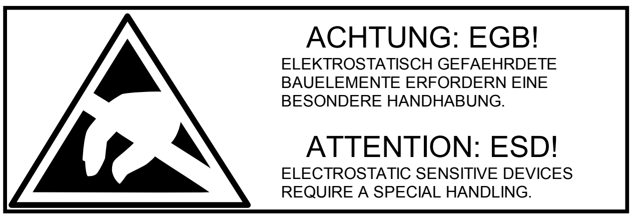


Figure 3 Electrostatics

4.3 Installing several options

It's advised to install options one by one to avoid conflicts and to provide verification of proper function.

4.4 Open the instrument

a Switch off unit and unplug power.

b Unplug all cables.

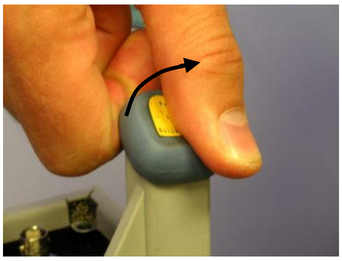
c Place unit on handles at the front.

d In order to save the yellow sticker - remove concerning blue rubber bumper manually as shown.

e Screw off cabinet feet.

f Push casing upwards and remove it (see Figure 4).

g Undo the screws as shown at the top of the instrument frame. Lift off the cover (see Figure 5).



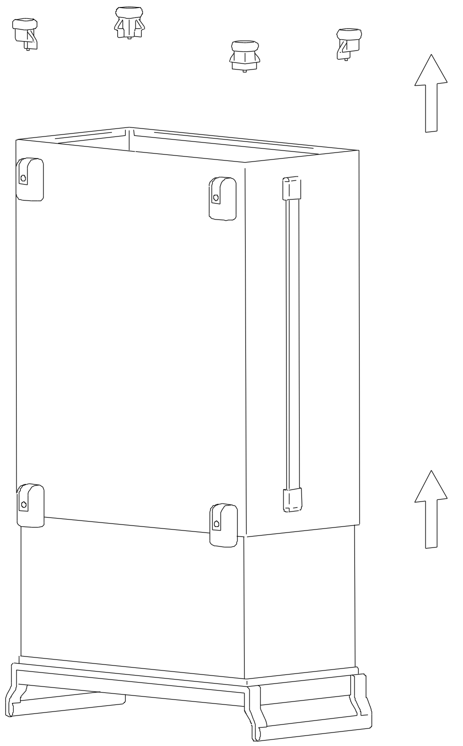


Figure 4 Removing the casing

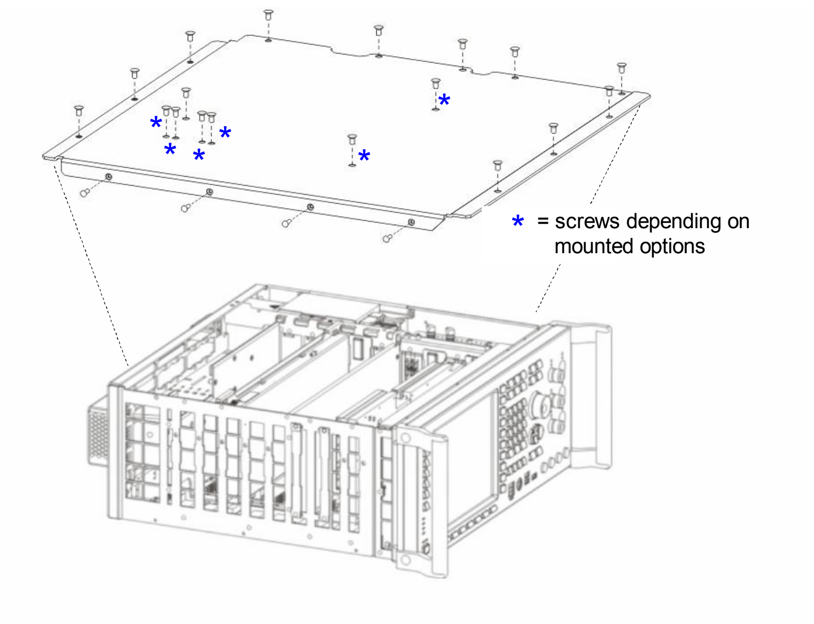


Figure 5 Removing the cover

5 Mounting DIGITAL IQ BOARD 1 TO 4 H510A

a Remove the old cover and mount the delivered one at slot A1400 (1).
If necessary remove temporarily the modules which are beside
using the levers provided by the service kit.

b Plug in IQ BOARD H500A to slot A1400 (2).

c Unscrew cover plates by unscrewing screws with captive washers (3).

d Place new Rearpanel and fix it with screws with captive washers (3).

e Plug Flat Wires as shown (4).

f Plug RF cables as labeled (5).

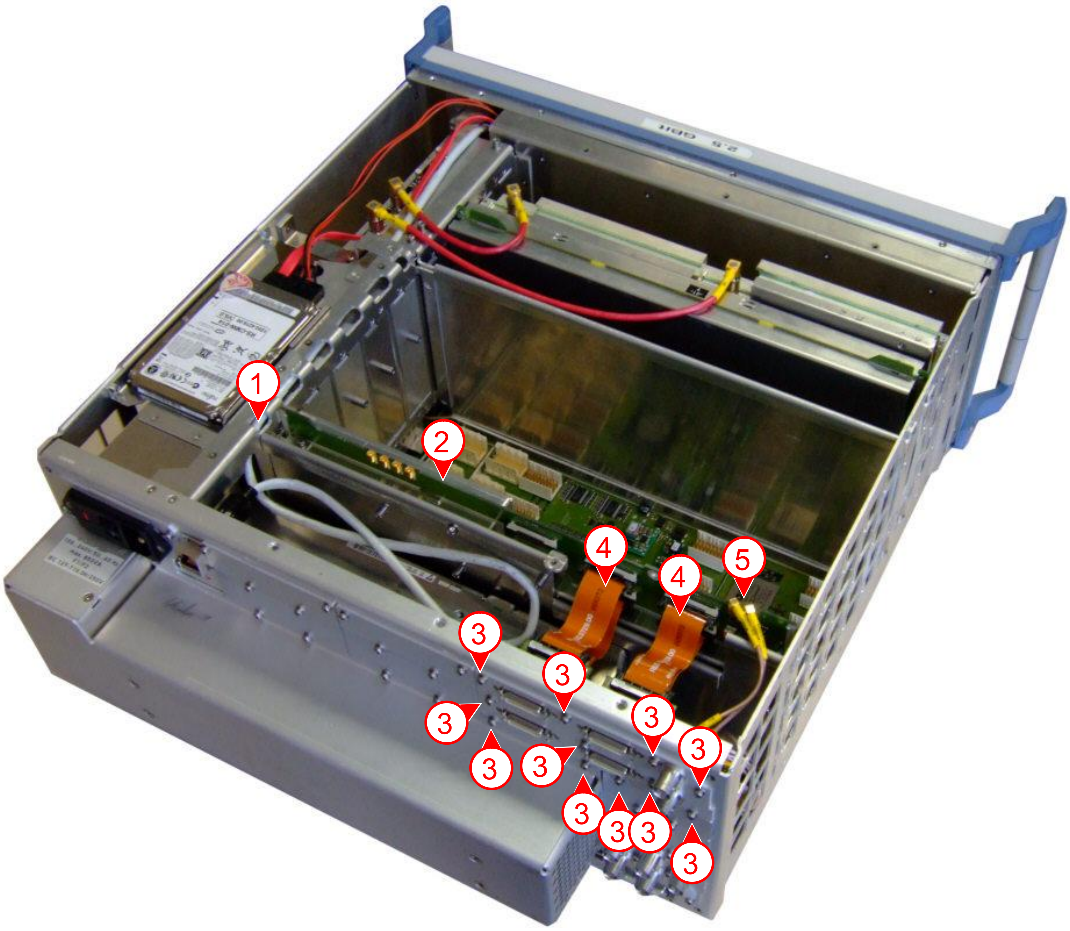


Figure 6 mounting IQ BOARD H510A

6 Mounting DIGITAL IQ BOARD 5 TO 8 H520A

a Remove the old cover and mount the delivered one at slot A1300 (1).
If necessary remove temporarily the modules which are beside using the levers provided by the service kit.

b Plug in IQ BOARD H500A to slot A1300 (2).

c Unscrew cover plates by unscrewing screws with captive washers (3).

d Place new Rearpanel and fix it with screws with captive washers (3).

e Plug Flat Wires as shown (4).

f Plug RF cables as labeled (5).

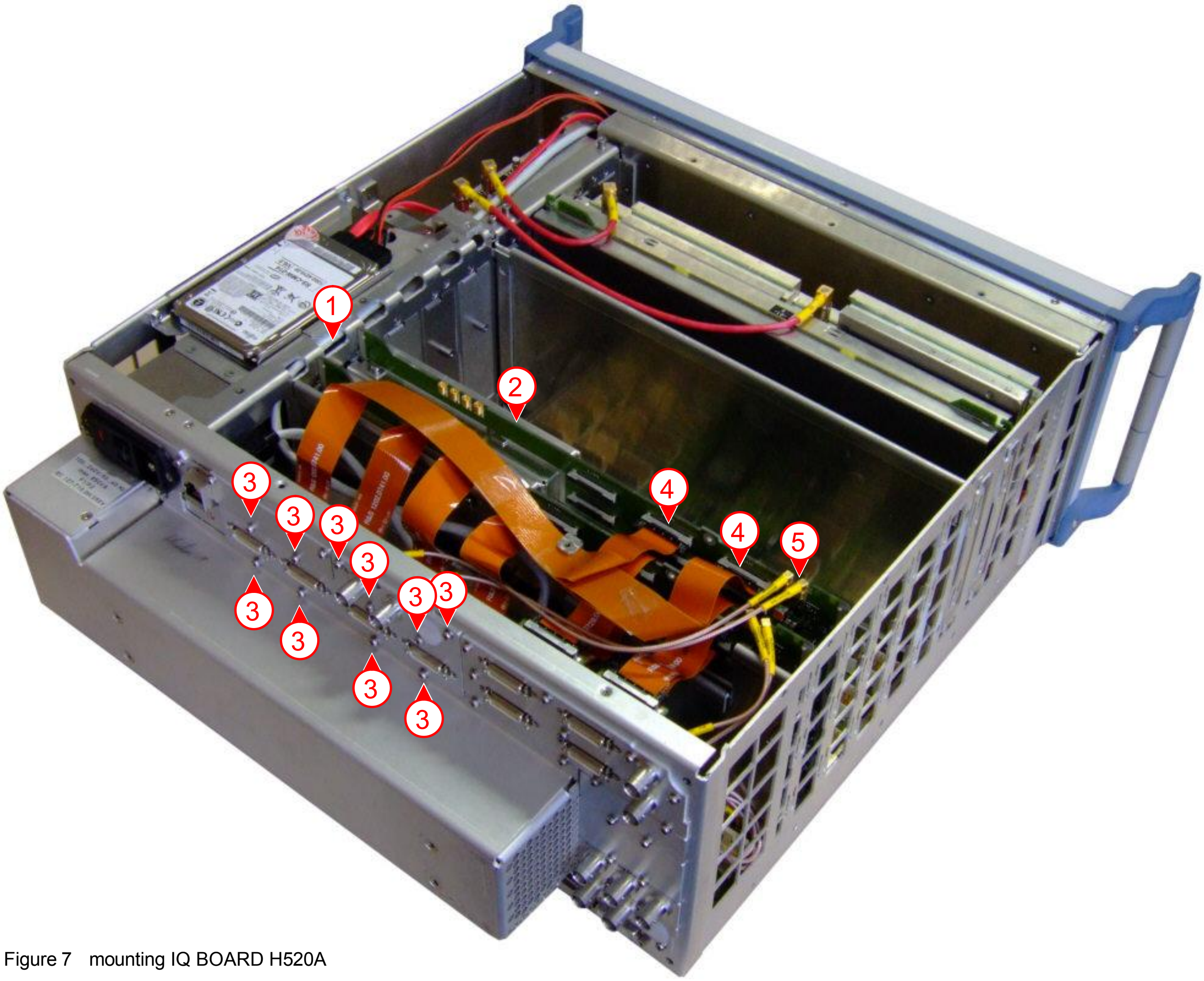


Figure 7 mounting IQ BOARD H520A

7 Assembling the unit

a instrument in reverse order.

b Fit cover and cabinet feet back on in the reverse order to that described in section 4.4 at page 7 (see Figure 8).

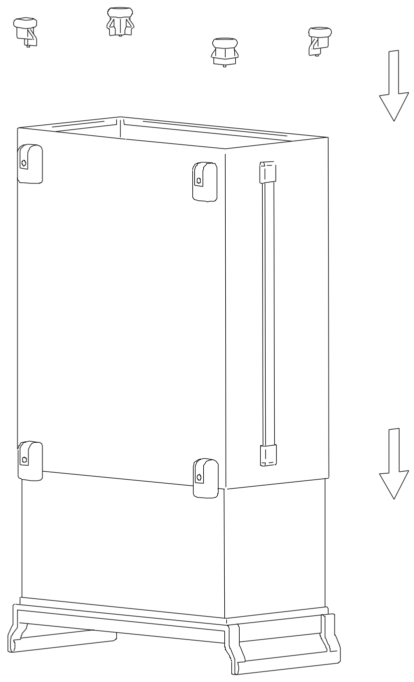


Figure 8 assembling the unit

8 Update of required Software

a Its advised to use at least the required software (see page 1).
To perform the update refer to the Operating Manual.

9 Automatic Adjustment of Module Data and Firmware Update of programmable Devices*

a Connect the instrument to the mains and switch on.

b Press the Firmware Update key (1) at the startup menu in the display.

c The automatic adjustment of module data is started under software control.
It may take a few minutes to perform firmware updates for programmable devices.

d After the software-controlled adjustment has been terminated, the CMW makes an reboot (if no update was necessary there is no reboot) and afterwards the operating software starts and the CMW is ready for use and offers full data integrity.

* For CMW with FP BLANK H600:
Connect external monitor to the DVI Interface at the front and connect external mouse/keyboard. Proceed with mouse/keyboard as described for the instrument with display. For further details see also the hardkey / softkey mapping table in the service manual chapter 3.

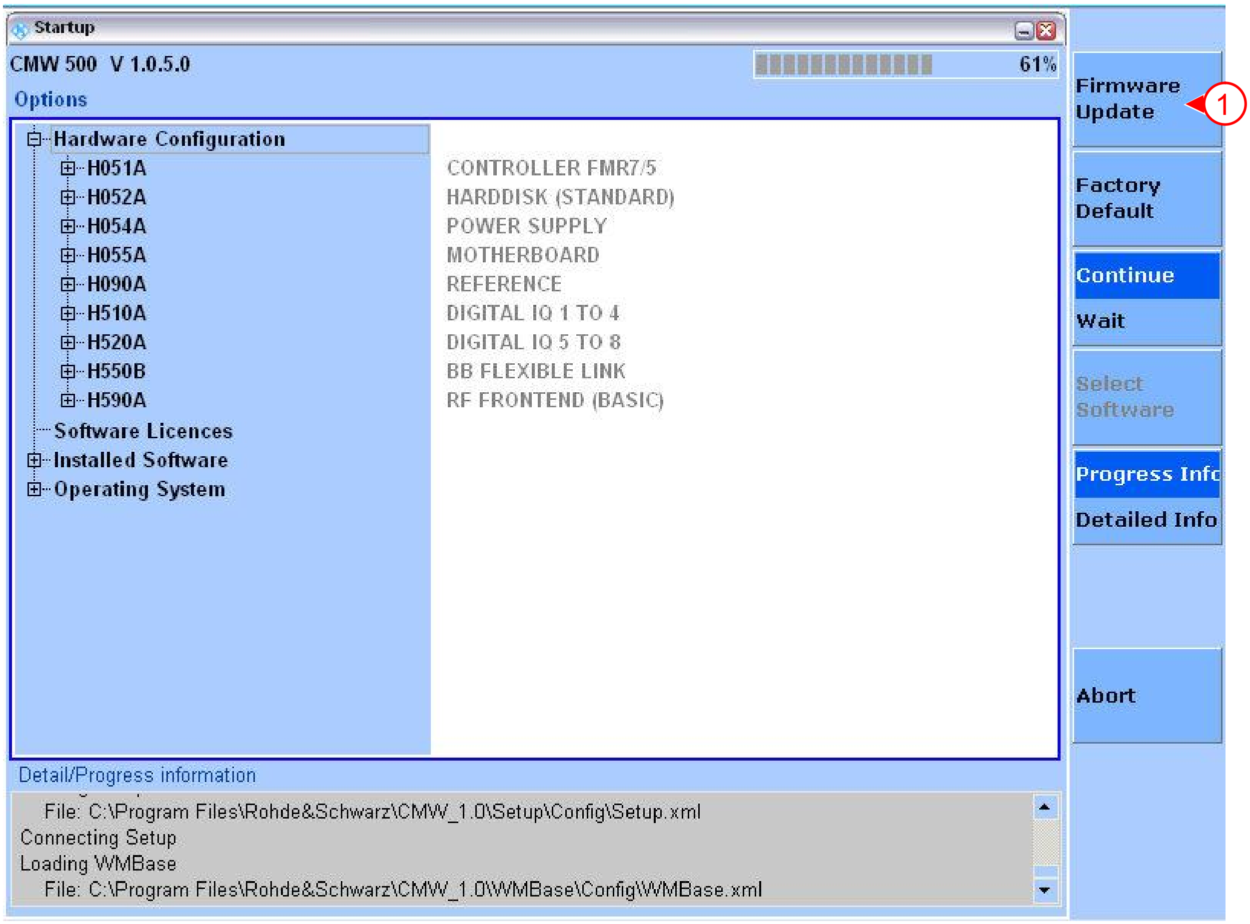


Figure 9 Firmware update

10 Checking the hardware option identification*

a Connect the instrument to the mains and switch on.

b Press the hardkey "SETUP" at the left side (external keyboard: "ctrl"-"e").

c Select the left column (1) by using the rotary knob (rotate and push).

d Select "SW/HW-Equipment" (2) by using the rotary knob (rotate and push).

e Check if there is H510A IQ BOARD / H520A IQ BOARD listed (3).

► Note that the hardware option identification shows the included parts of hardware (Hxxx) but not the complete ordered option (Bxxx).

* For CMW with FP BLANK H600:
Connect external monitor to the DVI Interface at the front and connect external mouse/keyboard. Proceed with mouse/keyboard as described for the instrument with display. For further details see also the hardkey / softkey mapping table in the service manual chapter 3.

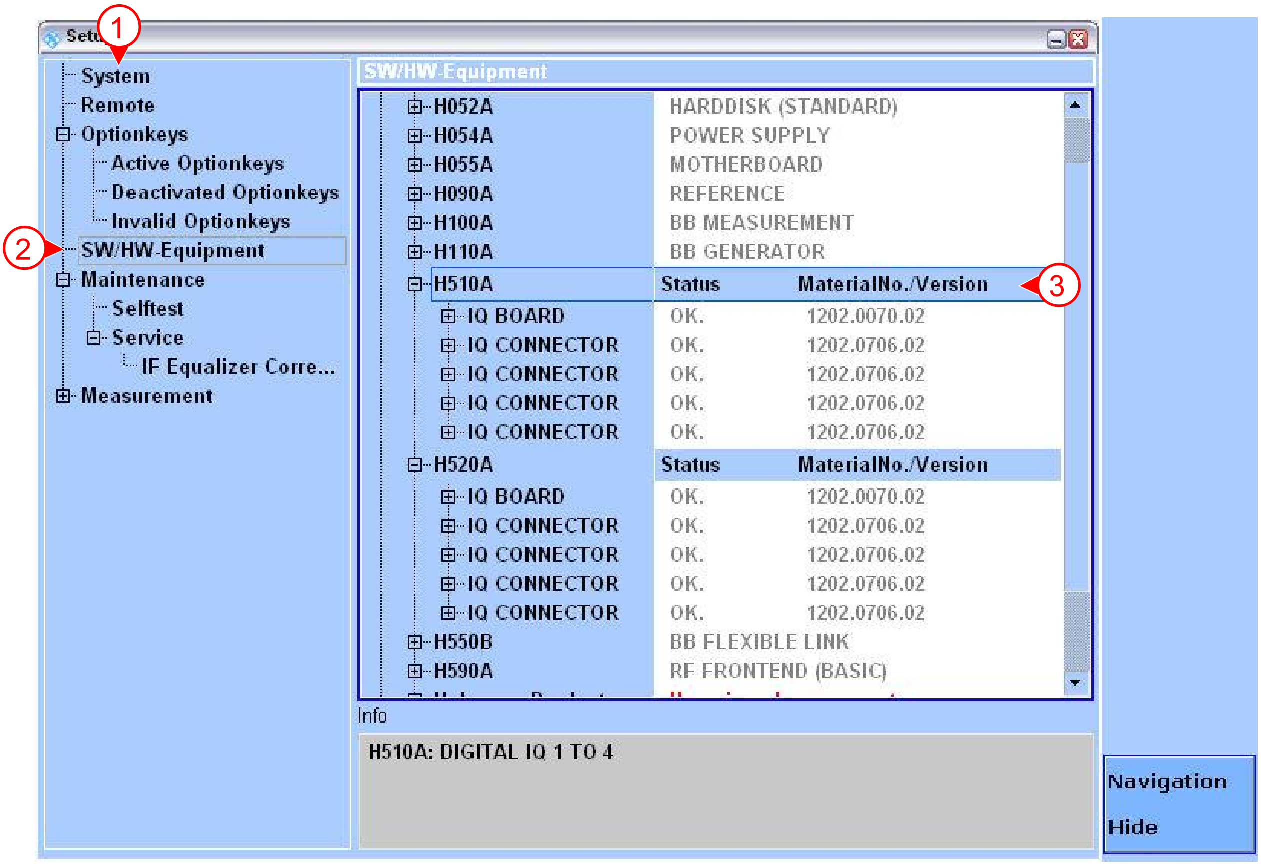


Figure 10 Checking the hardware option identification

11 Selftest *

a Press "SETUP".

b Select the left column (1) by using the rotary knob (rotate and push).

c Select "Selftest" (2) by using the rotary knob (rotate and push).

d Select "SingleShot" (3) as Repetition Mode.

e Enable H510A IQ BOARD / H520A IQ BOARD by marking it (4) and push "Select subtree" (5).

f Start the Selftest by pushing the 

- hardkey.

g Check if all all tests are marked as "passed" (6).

* For CMW with FP BLANK H600:
Connect external monitor to the DVI Interface at the front and connect external mouse/keyboard.
Proceed with mouse/keyboard as described for the instrument with display.

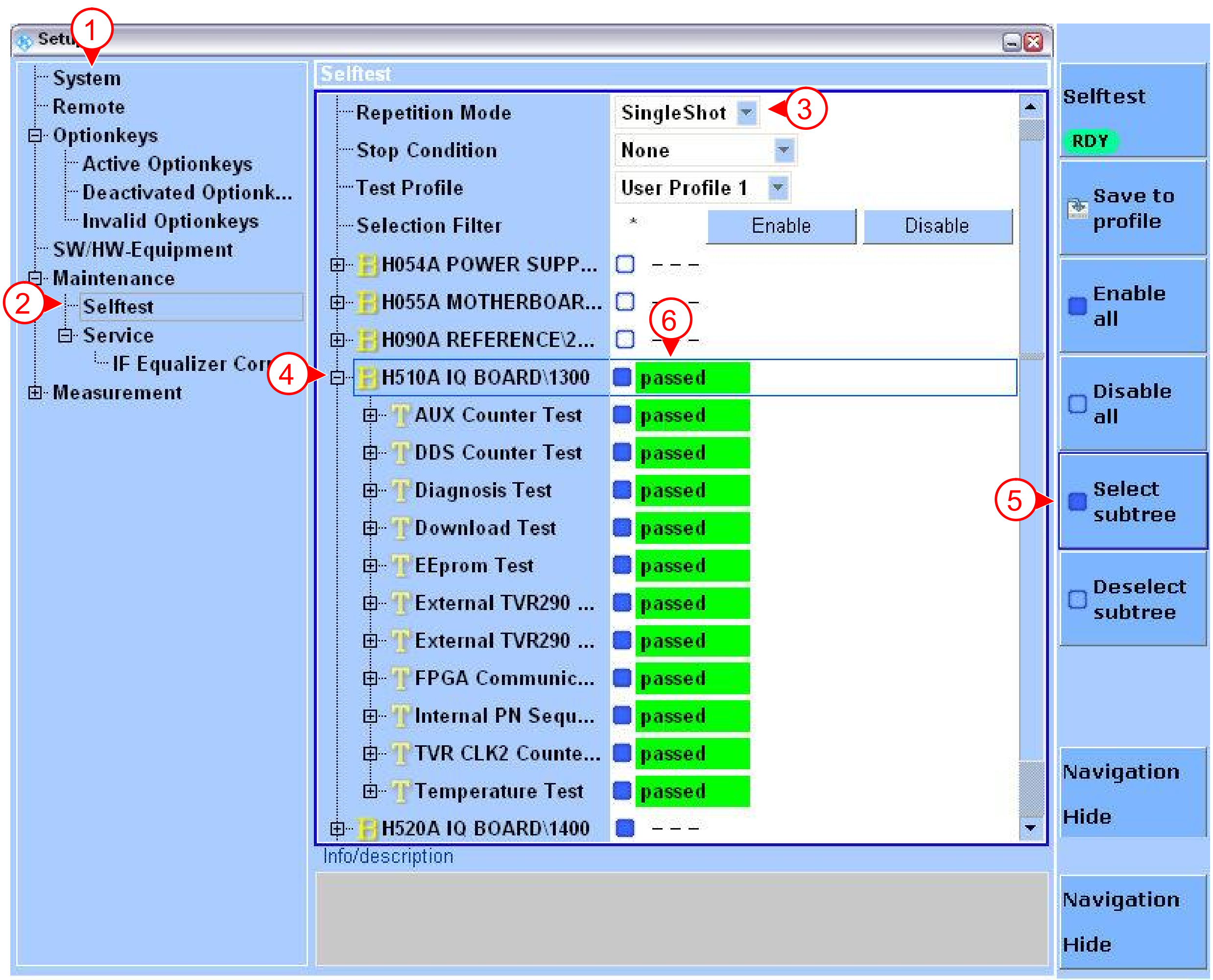


Figure 11 executing the Selftest

Installation Instructions

IEEE-BUS (SINGLE) H612A
IEEE-BUS (DUAL) H612B

R&S® CMW-B612A/CMW-B612B

1202.5608.02/1202.5708.02

Read Security Instruction 1171.0100.42

- [x] **Installation by an authorized Rohde & Schwarz service representative only!**
- [ ] **May be installed at the customer's site.**

Hardware requirements:	none
Software requirements:	none
Required Equipment:	screw drivers torx size 8, 20
Path correction required:	none
Verification with UCS:	none

Printed in the Federal
Republic of Germany

ROHDE & SCHWARZ
Test and Measurement Division

Contents

History:

Date	Editor	Version	Reason for change
02. Oct 2007	ze/1CMK	V 01.00	First version

1 Preparation

1.1 Explanation of TAZ on the Barcode Label

This figure is an example for the barcode label and shows the included information.

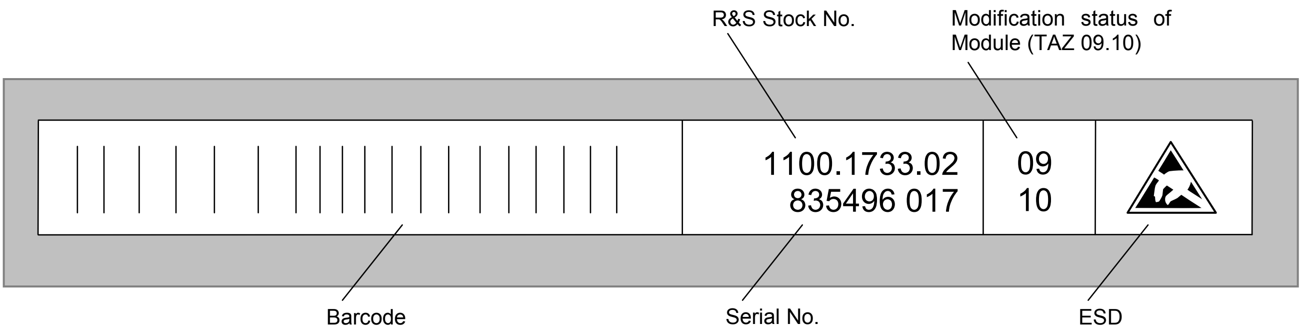


Figure 1 Barcode Label

1.2 Warning

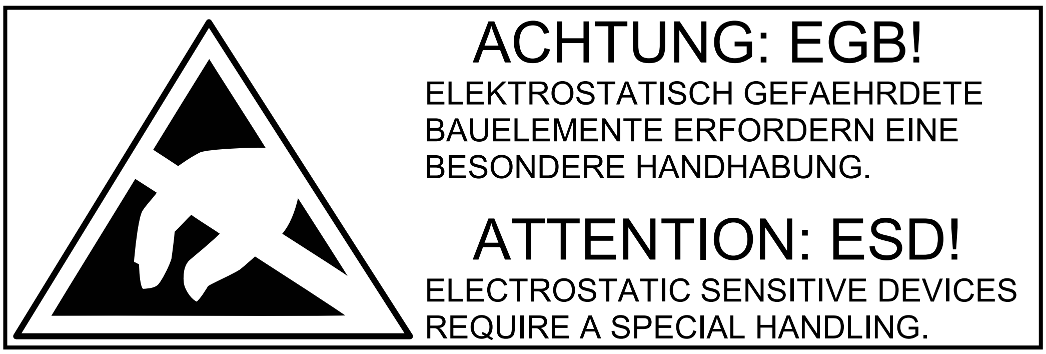


Figure 2 Electrostatics

1.3 Open the instrument

a Switch off unit and unplug power.

b Unplug all cables.

c Place unit on handles at the front.

d In order to save the yellow sticker - remove concerning blue rubber bumper manually as shown.

e Screw off cabinet feet.

f Push casing upwards and remove it (see Figure 3).

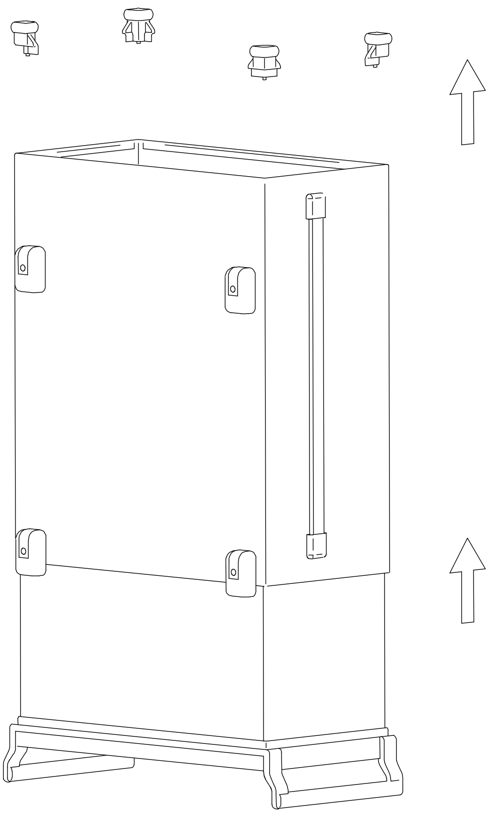


Figure 3 Removing the casing

2 Mounting IEEE-BUS

Important Note:
Avoid collision with the power supply cables! The board could be damaged!

a Check if there is enough space, if the cables are bended (1) soon after the connection.
If necessary bend them that they don't touch the IEE-BUS module.

b Remove dummy plate: Undo two countersunk screws (2) and three screws with captive washers (3).

c Plug carefully the IEEE-BUS module to the MOTHERBOARD connector (4).

d Fix the IEEE-BUS with two countersunk screws (2) and three screws with captive washers (3).

e Remount the instrument in reverse order.

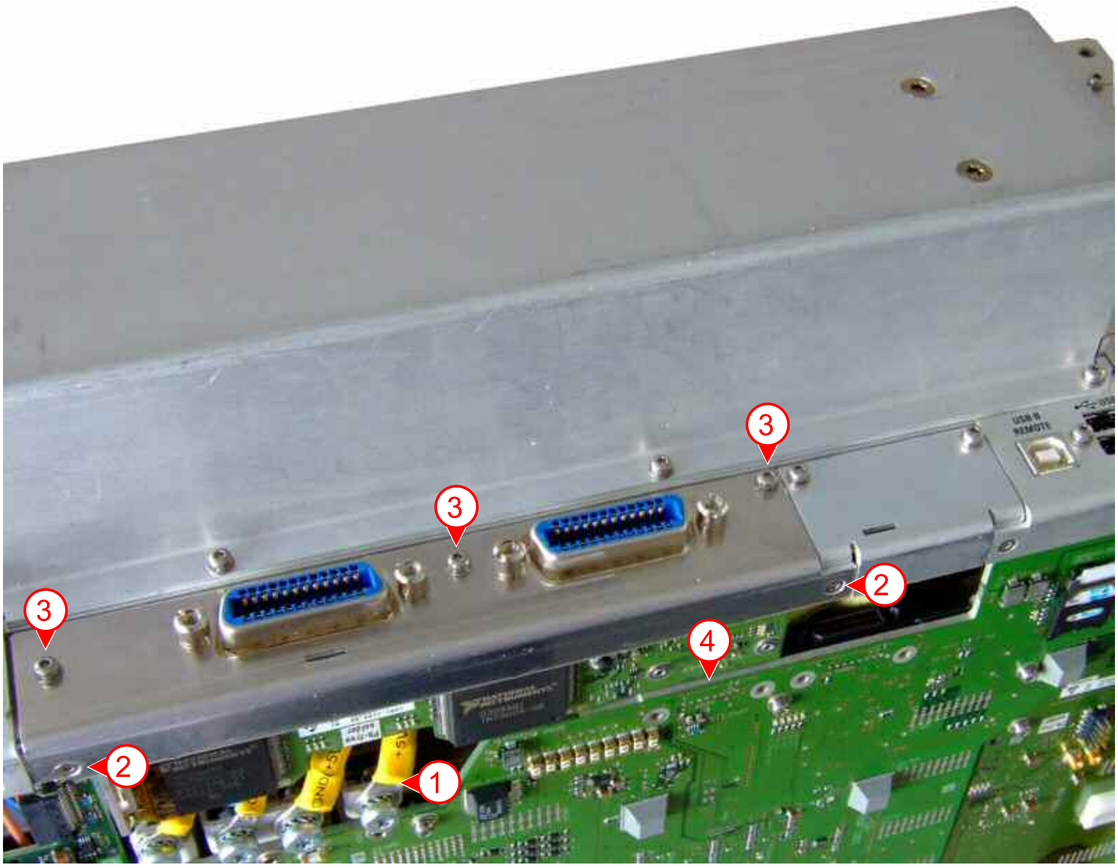


Figure 4 mounting IEEE-BUS

3 Checking the hardware option identification *

a Connect the instrument to the mains and switch on.

b Press "SETUP".

c Select the left column (1) by using the rotary knob (rotate and push).

d Select "SW/HW-Equipment" (2) by using the rotary knob (rotate and push).

e Check if there is IEEE-BUS listed (3).

* For CMW with FP BLANK H600:
Connect external monitor to the DVI Interface at the front and connect external mouse/keyboard.
Proceed with mouse/keyboard as described for the instrument with display.

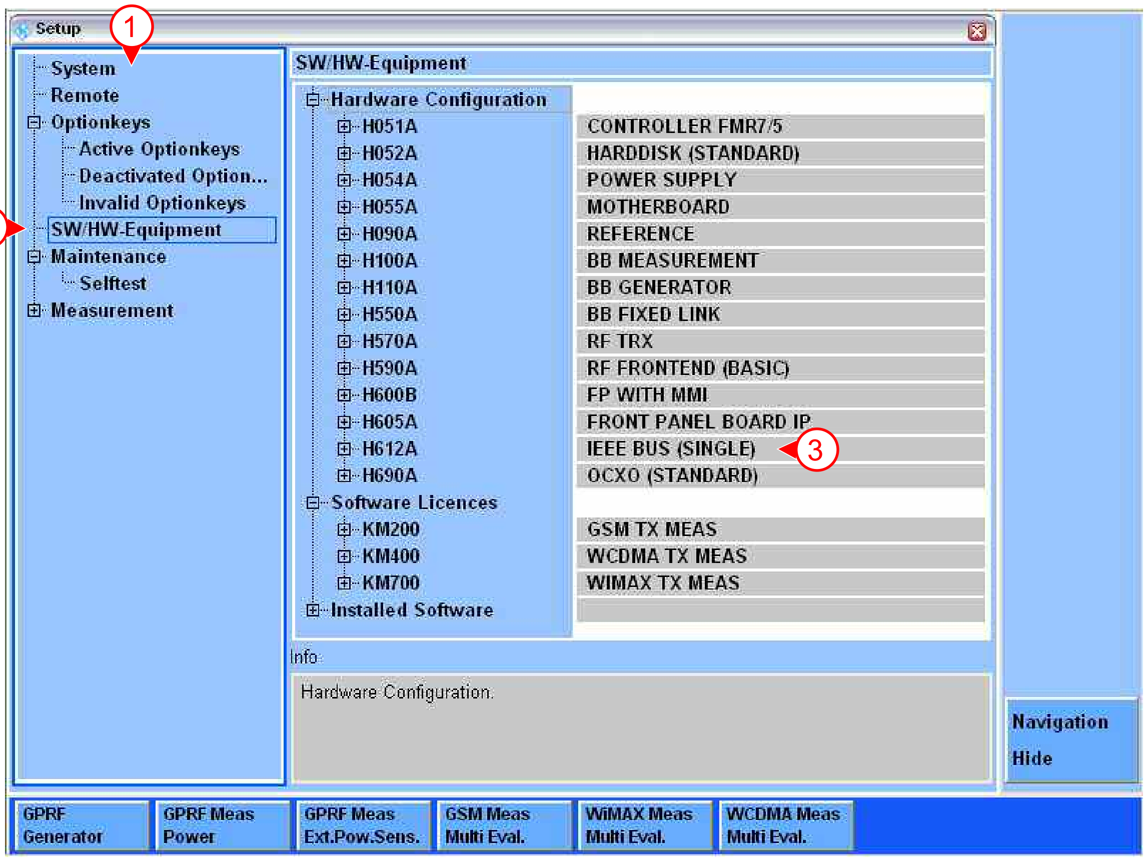


Figure 5 Checking the hardware option identification

Installation Instructions

DVI INTERFACE H620A

R&S® CMW-B620A

1202.5808.02

Read Security Instruction 1171.0100.42

X	**Installation by an authorized Rohde & Schwarz service representative only!**
	May be installed at the customer's site.

Hardware requirements:	none
Software requirements:	none
Required Equipment:	service kit 1201.0031.02 screwdrivers Torx size 8, 20 socket spanner size 5
Path correction required:	none
Verification with UCS:	none

Printed in the Federal
Republic of Germany

ROHDE & SCHWARZ
Test and Measurement Division

Contents

History:

Date	Editor	Version	Reason for change
02. Oct. 2007	ze/1CMK	V 01.00	First version

1 Preparation

1.1 Explanation of TAZ on the Barcode Label

This figure is an example for the barcode label and shows the included information.

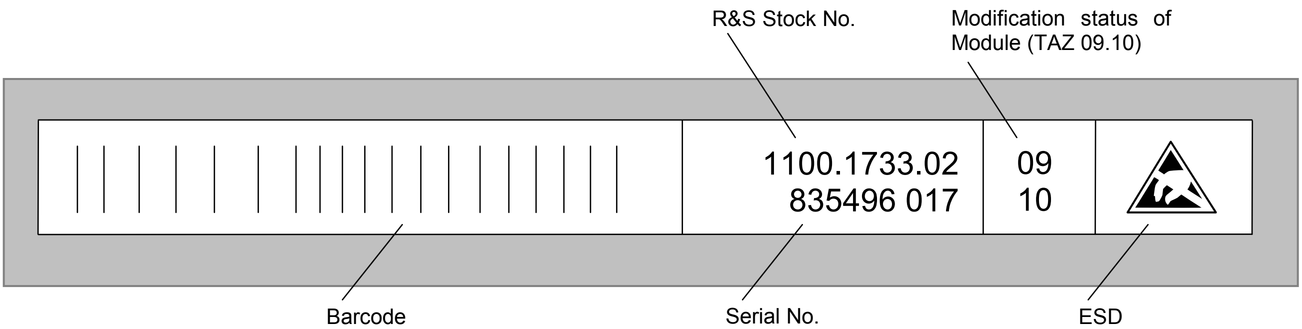


Figure 1 Barcode Label

1.2 Warning

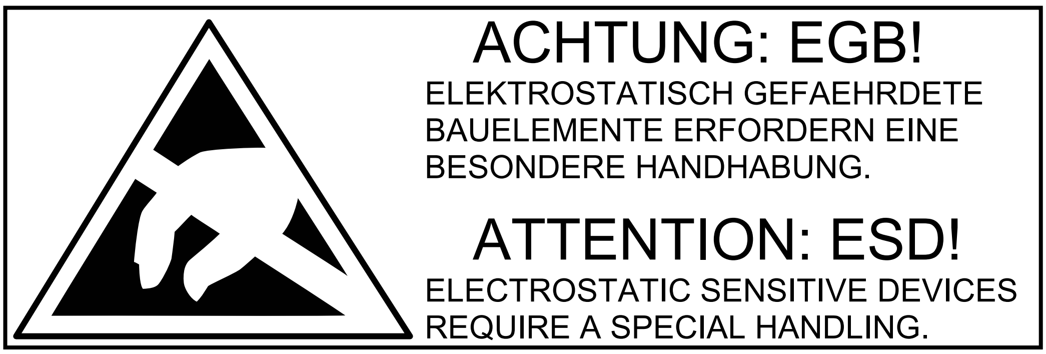


Figure 2 Electrostatics

1.3 Open the instrument

a Switch off unit and unplug power.

b Unplug all cables.

c Place unit on handles at the front.

d In order to save the yellow sticker - remove concerning blue rubber bumper manually as shown.

e Screw off cabinet feet.

f Push casing upwards and remove it (see Figure 3).

g Undo the screws at the cover and lift it off (see Figure 4).

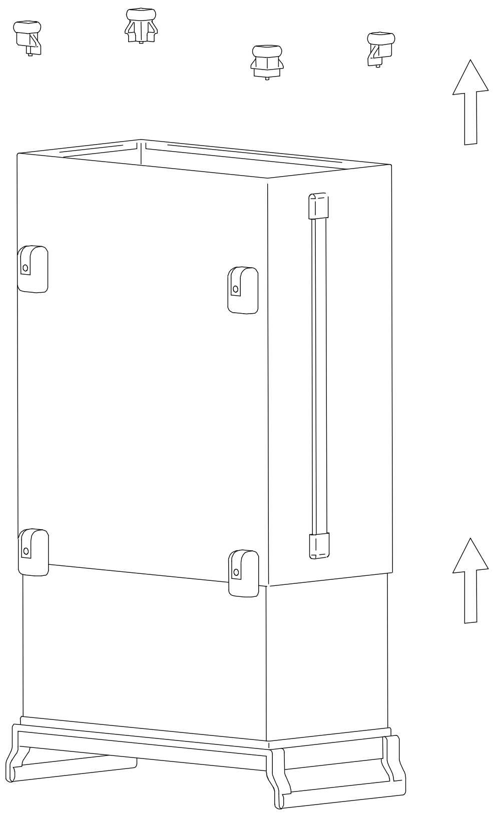


Figure 3 Removing the casing

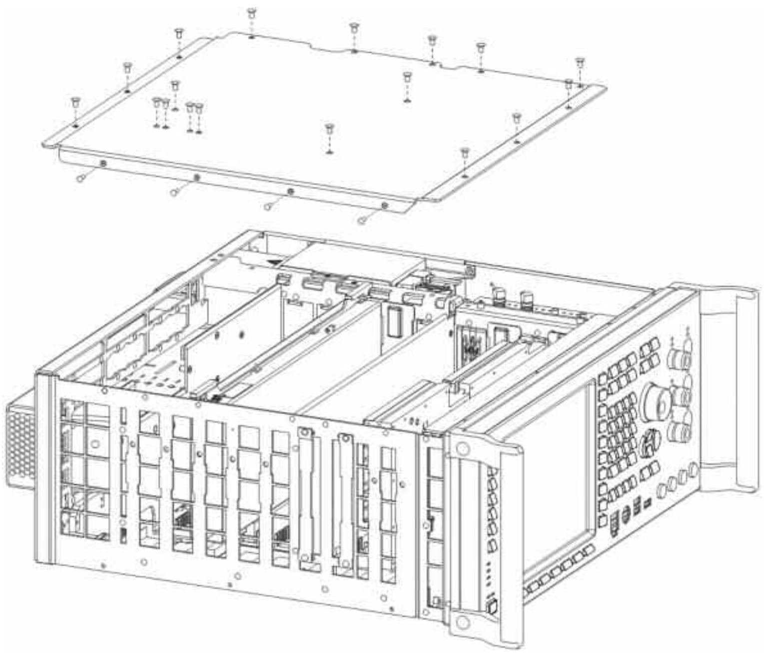


Figure 4 Removing the cover

1.4 Removing the FP WITH MMI H600

a Unscrew the four screws of the front handles at the instrument frame on both sides and take off the front handles and the FRONT COVER.

b Unscrew the eight countersunk screws of the FP WITH MMI H600 (1).

c Unfix (don't remove) the five countersunk screws (2).
In order to improve the maintenance situation by relaxing the shielding spring.

d Replace the two countersunk screws (3) by the knurled screws included in the service kit.

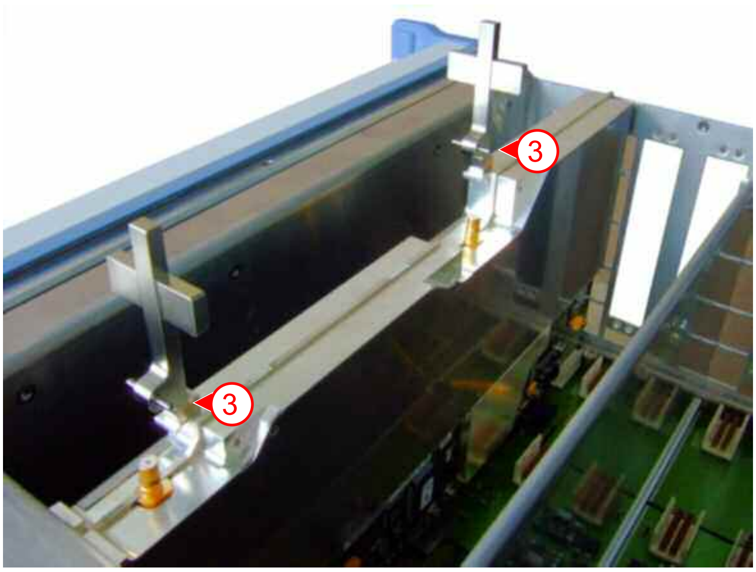
e Take off the FP WITH MMI H600.

Figure 5 Removing the FP WITH MMI H600

1.5 Removing RF TRX MODULE

a Pull off all RF cables (1) (2) from the top of the RF TRX module.

b Pull out the module (3) using the two levers (service kit) on both sides.



2 Mounting the DVI_ADAPTER

a Plug the cable to the board with the double-row connector (1).

b Push the cable through the opening (2) at the left side to the instruments center.

c Plug the double-row connector to the FRONT MODULE CONTROLLER (3).

d Route the cable in a slope to the bottom of the instrument (4).

e Turn the instrument upside down.

f Place the cable holder as shown (5).

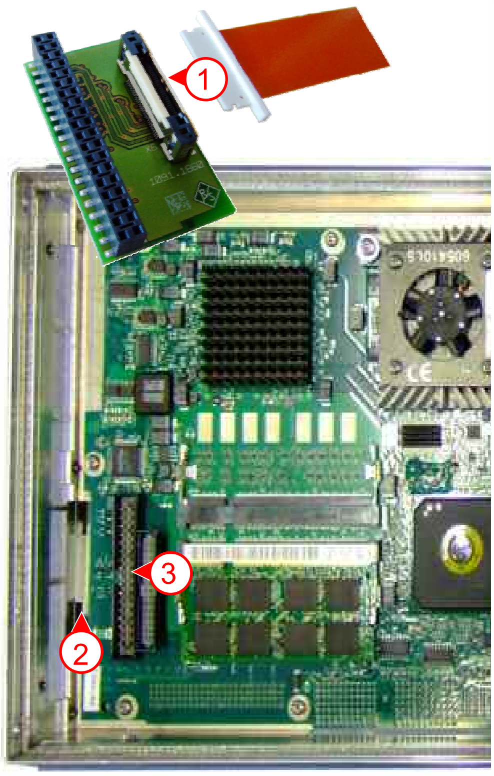
g Dismount the dummy plate (6).

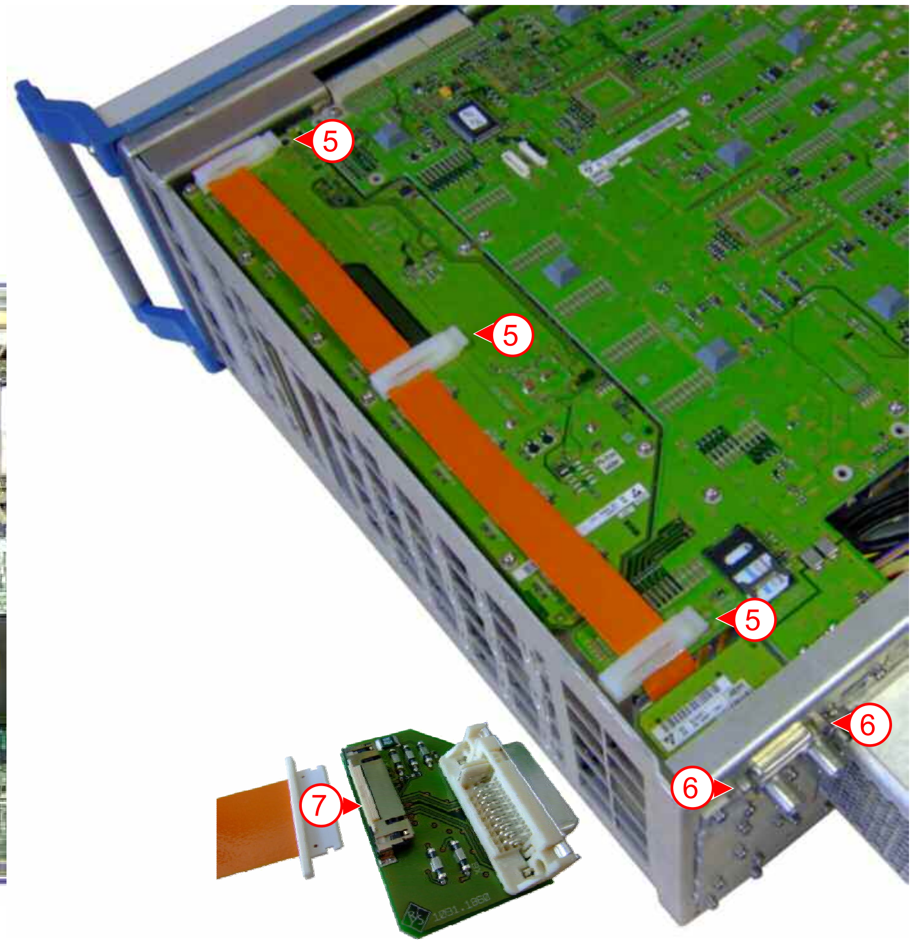
h Plug in the cable to the board with the DVI-connector (7).

i Fix the DVI-connector to the rear panel (6).

j Slide the slope of the cable under the fishplate (4).

k Remount the instrument in reverse order.





3 Check the hardware option

a Connect an external monitor with DVI input (e.g. TFT) to the DVI connector at the REARPANEL.

b Connect the instrument to the mains and switch on.

c Check if the external DVI monitor shows the startup picture.

Installation Instructions

OCXO(STANDARD) H690A
OCXO(HIGHSTABLE) H690B

R&S® CMW-B690A/CMW-B690B

1202.5908.02/1202.6004.02

Read Security Instruction 1171.0100.42

- [X] **Installation by an authorized Rohde & Schwarz service representative only!**
- [ ] **May be installed at the customer's site.**

Hardware requirements:	none
Software requirements:	none
Required Equipment:	screw drivers Torx size 8, 20 screw driver small Ø1,0mm
Path correction required:	none
Verification with UCS:	Yes (Verification is also possible with a frequency counter)

Printed in the Federal
Republic of Germany

ROHDE & SCHWARZ
Test and Measurement Division

Contents

History:

Date	Editor	Version	Reason for change
02. Oct 2007	ze/1CMK	V 01.00	First version

1 Preparation

1.1 Explanation of TAZ on the Barcode Label

This figure is an example for the barcode label and shows the included information.

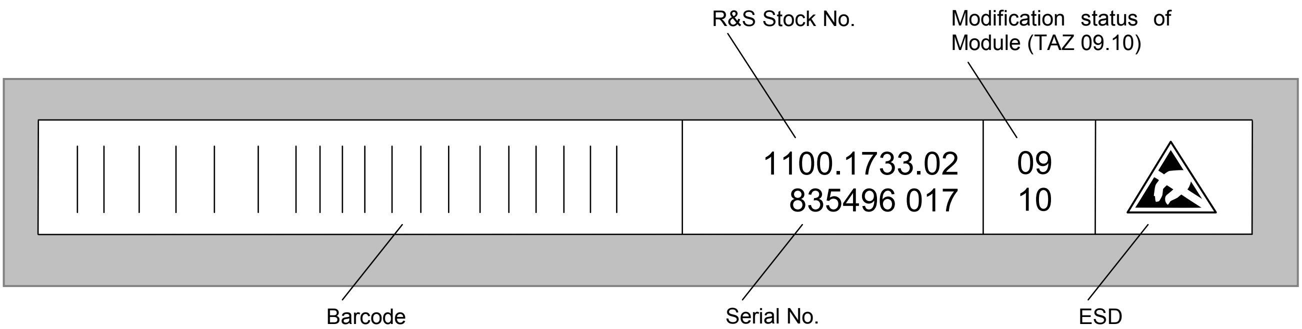


Figure 1 Barcode Label

1.2 Warning

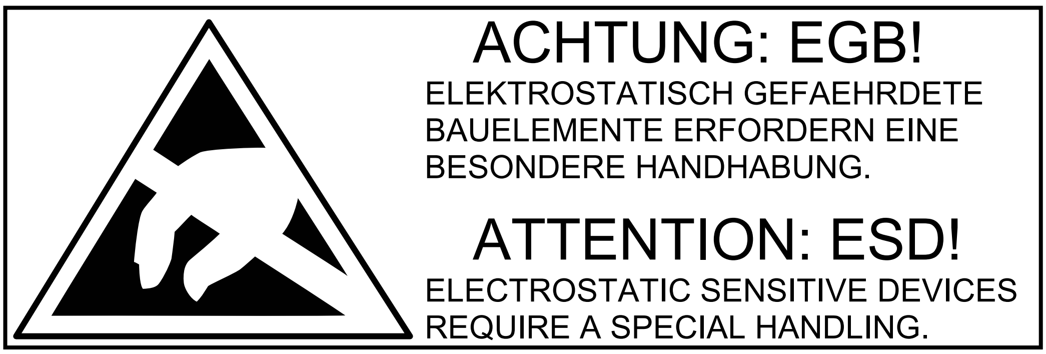


Figure 2 Electrostatics

1.3 Open the instrument

a Switch off unit and unplug power.

b Unplug all cables.

c Place unit on handles at the front.

d In order to save the yellow sticker - remove concerning blue rubber bumper manually as shown.

e Screw off cabinet feet.

f Push casing upwards and remove it (see Figure 3).

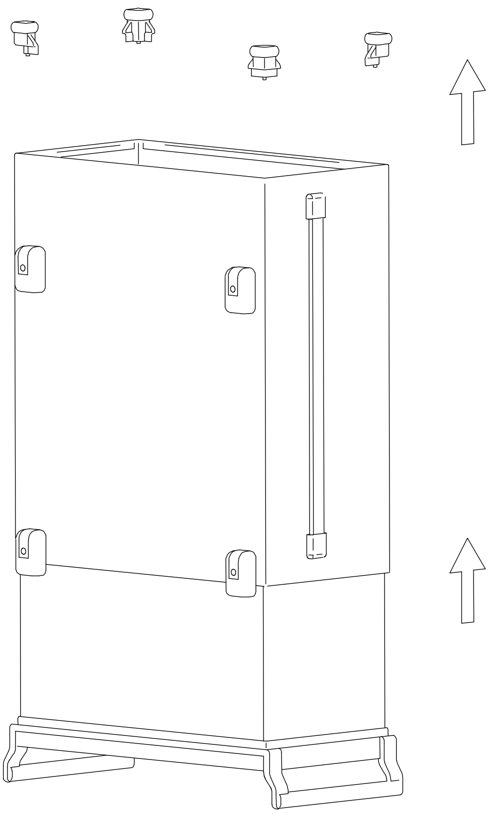


Figure 3 Removing the casing

2 Mounting OCXO MODULE

a Insert OCXO module (see Figure 4):
Move the board from inside in direction to the opening in the instrument frame (long arrow) and move the board down (short arrow).

b Plug the OCXO module to the REFERENCE connector (1).

c Fix the module with two screws (2).

d Remount the Instrument in reverse order.

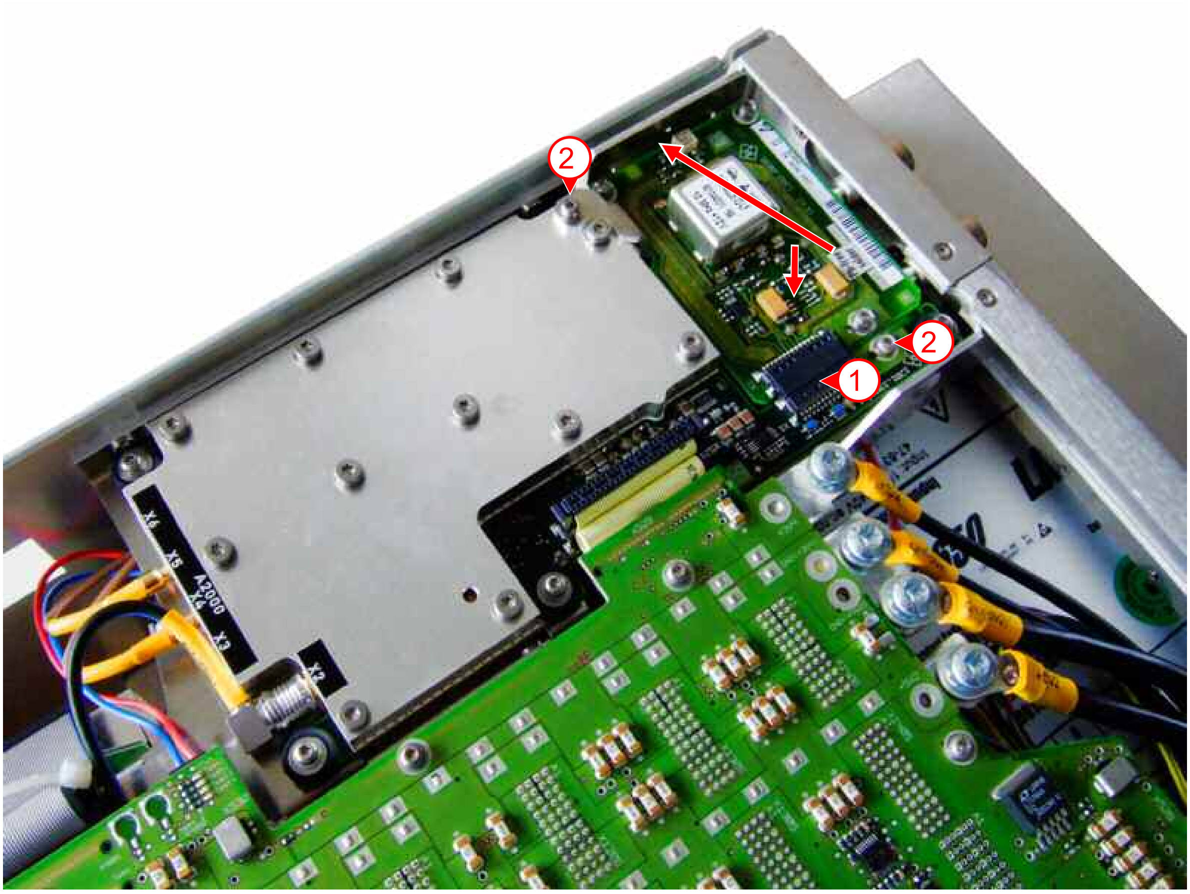


Figure 4 Mounting the OCXO MODULE

3 Checking the hardware option identification *

a Connect the instrument to the mains and switch on.

b Press "SETUP".

c Select the left column (1) by using the rotary knob (rotate and push).

d Select "SW/HW-Equipment" (2) by using the rotary knob (rotate and push).

e Check if there is OCXO (STANDARD) H690A or OCXO (HIGH STABLE) H690B listed (3).

* For CMW with FP BLANK H600:
Connect external monitor to the DVI Interface at the front and connect external mouse/keyboard.
Proceed with mouse/keyboard as described for the instrument with display.

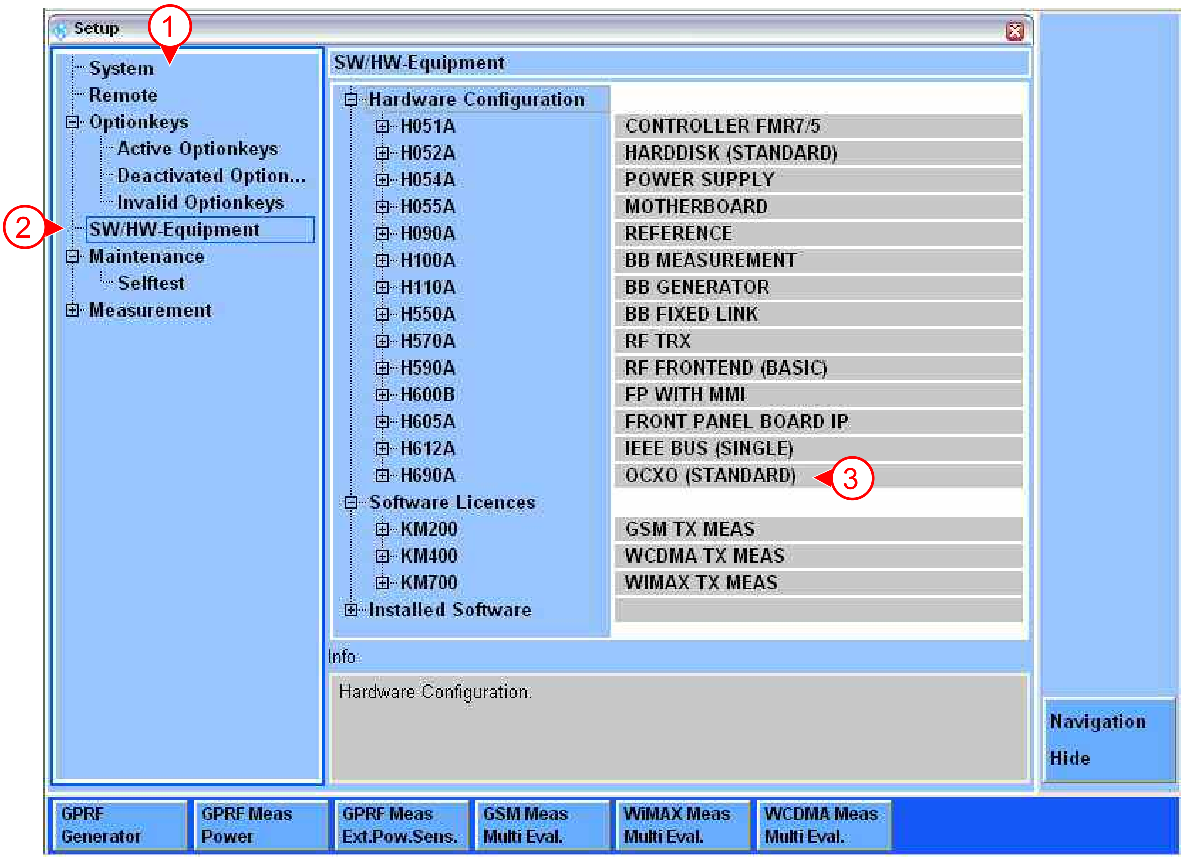


Figure 5 Checking the hardware option identification

4 Adjustment and Verification

The manual adjustment of the 10 MHz reference frequency source which determines the frequency accuracy of the CMW is described. The adjustment permits to maintain and restore the data integrity of the instrument.

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

The adjustment at the service can be done automatically with the UCS measuring system, in the adjustment menu item: Frequency Accuracy TX, or also manually with the help of a frequency counter.

4.1 Manual Adjustment

In the following, the measuring instruments and auxiliary means required for the manual adjustment of the CMW, the appropriate preparations of the instrument as well as the individual adjustments will be explained.

4.1.1 Measuring Instruments and Auxiliary Equipment

Measuring instruments and auxiliary equipment for manual adjustment of the CMW:

Item	Type of instrument	Required characteristics	Appropriate device	R&S order number	Use page
1	Spectrum analyzer with frequency counter	Frequency measurement up to 1 GHz	FSQ3	1155.5001.03	

4.1.2 Preparing the Instrument

It is not necessary to open the complete tube of the CMW. The adjustment can be made from outside through the ventilation holes using a small screwdriver.

► Locate the adjustment devices (1).

4.1.3 Adjusting the 10 MHz Reference Frequency

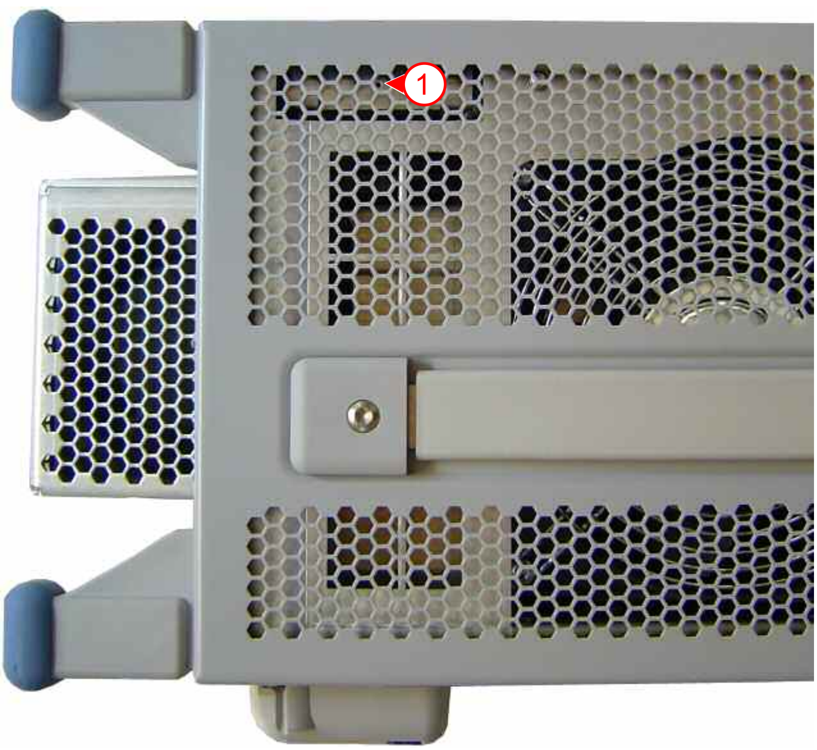
Preparation: The measurement can be performed either at connector REF OUT1 (rear of CMW) at 10 MHz or at connector RF1 OUT (front) at 1 GHz using a frequency counter.

► For the measurement at connector RF1 OUT set the generator to 1 GHz and 8 dBm without modulation in the RF menu.

For the adjustment, the CMW must be set to internal reference source.

► This setting is to be selected in the Setup menu of the respective application.

Note: *The measurement at 1 GHz can be performed with a lower frequency counter resolution (1 Hz) in order to achieve a faster adjustment.*



4.1.4 Adjusting in case of OCXO (STANDARD) CMW-B690A

Adjustment ► Use potentiometer R23 on the OCXO BOARD to adjust the measured value at the frequency counter to

10.000 000 00 MHz –0.1/ +0.05 Hz (at REF OUT1) or
1.000 000 000 GHz –10 Hz/ +5 Hz (at RF1 OUT)

(a lead of at least –2 to –5 Hz at 1 GHz is desired because of aging).

Note: *The CMU must have been switched on for at least 10 minutes so that the OCXO has warmed up.*

Note:

If it is not possible to adjust the frequency into this range then R28 and R29 are to be rescaled.
This is done the following way:

a Adjust R23 to Minimum frequency.

b Measure and record the frequency and the OCXO_VCtrl voltage.
The OCXO_VCtrl voltage can be measured with the Maintenance selftest system in the unit.

c Adjust R23 to Maximum frequency.

d Measure and record the frequency and the OCXO_VCtrl voltage.

e Find R28 and R29 by using the formula bellow.

f Replace R28 and R29 with the new values.

g Let the instrument warm up again and adjust R23.

For CMW-B690A the formula are as follows:

Fd = (Fmax - Fmin)/(Vmax - Vmin) Hz/V

K = Fd/FGen*1E6 ppm   (FGen = 1.0 GHz,This is the generator frequency)

If 0,05 < K <= 0,83 Table = 1
If 0,83 < K <= 1,16 Table = 2
If 1,16 < K <= 1,50 Table = 3

Fo = Fmin + Fd*(2,5 - Vmin)
Offset = Fo - FGen

If	750	<	Offset			Table Offset	=	1000
If	250	<	Offset	<=	750	Table Offset	=	500
If	-250	<	Offset	<=	250	Table Offset	=	0
If	-250	<	Offset	<=	-750	Table Offset	=	-500
If			Offset	<	-750	Table Offset	=	-1000

Ex.
Vmin = 2,000V, Fmin =   999999999,3 Hz
Vmax = 3,000V, Fmax = 1000001064,4 Hz

Fd = (1000001064,4 - 999999999,3) / (3,000 - 2,000)
Fd = 1065 Hz/V

K = 1065/1000000000*1E6 = 1,06
-> Table 2 are to be used.

Fo = 999999999,3 + 1065*(2,5 - 2,000) = 1000000531.8
Offset = 1000000531.8 - 1000000000 = 531,8
Offset Table 500 are to be used

R28 = 2K43 and R29 = 5K62

	1		2		3	
Offset	R29	R28	R29	R28	R29	R28
1000	4K7	0	6K8	1K5	8K25	3K16
500	3K92	825	5K62	2K43	7K5	4K32
0	2K74	1K82	4K32	3K57	6K19	5K11
-500	1K82	2K74	3K57	4K32	5K11	6K19
-1000	825	3K92	2K43	5K62	4K32	7K5

CMW-B690A Table

4.1.5 Adjusting in case of OCXO (HIGHSTABLE) CMW-B690B

Adjustment: ► Use potentiometer R23 on the OCXO BOARD to adjust the measured value at the frequency counter to

10.000 000 00 MHz –0.1/ +0.05 Hz or (at REFOUT1) or
1.000 000 000 GHz –10 Hz/ +5 Hz (at RF1 OUT)

(a lead of at least –2 to –5 Hz at 1 GHz is desired because of aging).

Notes: The CMU must have been switched on for at least 10 minutes so that the OCXO has warmed up.

During the adjustment, operate the CMW in the horizontal position!

Note:
If it is not possible to adjust the frequency into this range then R28 and R29 are to be rescaled.
This is done the following way:

a Adjust R23 to Minimum frequency.

b Measure and record the frequency and the OCXO_VCtrl voltage.
The OCXO_VCtrl voltage can be measured with the Maintenance selftest system in the unit.

c Adjust R23 to Maximum frequency.

d Measure and record the frequency and the OCXO_VCtrl voltage.

e Find R28 and R29 by using the formula bellow.

f Replace R28 and R29 with the new values.

g Let the instrument warm up again and adjust R23.

For CMW-B690B the formula are as follows:

For example see above.

Fd = (Fmax - Fmin)/(Vmax - Vmin) Hz/V

K = Fd/FGen*1E6 ppm (FGen = 1.0 GHz. This is the generator frequency)

If 0,20 < K <= 0,33 Table = 1
If 0,33 < K <= 0,46 Table = 2
If 0,46 < K <= 0,60 Table = 3

Fo = Fmin + Fd*(2,5 - Vmin)
Offset = Fo - FGen

If	250	<	Offset			Table Offset	=	333
If	83	<	Offset	<=	250	Table Offset	=	167
If	-83	<	Offset	<=	83	Table Offset	=	0
If	-250	<	Offset	<=	-83	Table Offset	=	-167
If			Offset	<=	-250	Table Offset	=	-333

	1		2		3	
Offset	R29	R28	R29	R28	R29	R28
333	5K62	511	7K5	2K43	9K09	4K32
167	4K32	1K5	6K8	3K57	8K25	5K62
0	3K57	2K43	5K62	4K32	7K5	6K8
-167	2K43	3K57	4K32	5K62	6K8	7K5
-333	1K5	4K32	3K57	6K8	5K62	8K25

CMW-B690B Table

Contents Chapter 5

Included Documents:

- Spare Part List (9 pages)
- Mechanical Drawings (8 pages)
- Circuit Diagram Instrument (5 pages)

5 Documents

This chapter provides information on the ordering of spare parts and contains the spare part list and the documents for the complete R&S CMW unit.

5.1 Spare Parts

The stock numbers necessary for ordering replacement parts and modules can be found in the spare part list further down.

CAUTION

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 antistatical protection.

5.1.1 Available Power Cables

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, 125 V 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 DS 0099.1456.00	DIN 49 441, 10 A, 250 V, angular DIN 49 441, 10 A, 250 V, straight approvals VDE, ÖVE, CEBEC, KEMA, S, D, N, FI, LCIE, IMQ, UCIEE	Europe (except Switzerland)

Spare Parts:

Spare Part List
Mechanical Drawings

Pos.-Nr. *ItemNo*	Menge *Quantity*	ME *Unit*	El.Kennz *Ref.Des.*	Benennung / Bezeichnung *Designation*	Z	Sachnummer *Stock No.*	Ersatzteil *Subst.part*	BA	VH
				ACHTUNG EGB/ATTENTION ESD *VARIANTENERKLAERUNG *EXPLANATION OF MODELS VAR25=CMW280 MOD25=CMW280 VAR50=CMW500 MOD50=CMW500 VAR75=CMW270 MOD75=CMW270					
100	1	S		ZM RAHMEN FRAME VAR 50 75 Included in CMW-S056A.	Z	1201.0060.00		M	
101	1	S		ZM RAHMEN FRAME VAR 25 Included in CMW-S026A.	Z	1202.1060.00		M	
110	1	S		EV 127X127X38 70L/S 12V BLOWER VAR 50 75 Included in 1201.0060.00.		1201.8190.00		B	O
111	1	S		EV 119X119X25 47L/S 12V FAN 119X119X25 VAR 25 Included in 1202.1060.00.		3584.1607.00		B	O
120	1	S		EV LUEFTERMANS. 119X119X6 T=1.5-2.5 FAN SLEEVE 119X119 Included in 1201.0060.00 , 1202.1060.00. Change always when pos.110, 111 has to be replaced.		2100.1446.00		B	O
130	0	S		DX USB SENSOR KABEL kurz USB SENSOR CABLE VAR 50 75 Included in 1201.0060.00. Replaced by 1146.7363.03.	Z	1146.7363.02		M	
131	1	S		DX USB SENSOR KABEL KURZ USB SENSOR CABLE SHORT Included in 1201.0060.00 , 1202.1060.00.	Z	1146.7363.03		M	
140	1	S		DV HF KABEL W 1 RF CABLE Included in 1201.0060.00 , 1202.1060.00.	Z	1201.2705.00		M	
150	1	S		DV HF KABEL W 2 RF CABLE Included in 1201.0060.00 , 1202.1060.00.	Z	1201.2711.00		M	
160	1	S		DV HF KABEL W 3 RF CABLE VAR 50 75 Included in 1201.0060.00.	Z	1201.2728.00		M	
161	1	S		DV HF KABEL W3 RF CABLE VAR 25 Included in 1202.1060.00.	Z	1202.1248.00		M	
170	1	S		DV HF KABEL W 4 RF CABLE VAR 50 75 Included in 1201.0060.00.	Z	1201.2734.00		M	
171	1	S		DV HF KABEL W4 RF CABLE VAR 25 Included in 1202.1060.00.	Z	1202.1254.00		M	

Pos.-Nr. *ItemNo*	Menge *Quantity*	ME *Unit*	El.Kennz *Ref.Des.*	Benennung / Bezeichnung *Designation*	Z	Sachnummer *Stock No.*	Ersatzteil *Subst.part*	BA	VH
300	1	S		ZE FP BLANK H600 FP BLANK H600 VAR 50 75 Included in CMW-S600A , CMW-S600C.	Z	1201.0054.02		M	
301	1	S		ZE FP BLANK H600 FP BLANK H600 VAR 25 Included in CMW-S600E.	Z	1201.0054.04		M	
310	1	S		SF SILIKONMATTEN OHNE DISPLAY PUSH-BUTTON BOARD Included in 1201.0054.02 , 1201.0054.04.		1201.8078.00		B	O
320	1	S		SF FRONT PANEL BOARD II S FRONT PANEL BOARD II S VAR 50 75 Included in 1201.0054.02.		1201.7994.00		B	B
321	1	S		SF FRONT PANEL BOARD_ IIS250 FRONT PANEL BOARD_IIS250 VAR 25 Included in 1201.0054.04.		1201.7842.00		B	B
330	1	S		EE DVI_ADAPTER DVI_ADAPTER Included in 1201.0054.02 , 1201.0054.04.	Z	1201.7971.02		M	M
340	1	S		KB FRONTHAUBE OHNE DISPLAY COVER VAR 50 Included in CMW-S600A.	Z	1201.0248.00		M	
350	1	S		KB FRONTHAUBE OHNE DISPLAY FRONTCOVER VAR 75 Included in CMW-S600C.	Z	1201.3560.00		M	
360	1	S		KB FRONTHAUBE OHNE DISPLAY COVER VAR 25 Included in CMW-S600E.	Z	1202.1419.00		M	
400	1	S		ZE FP WITH MMI H600 FP WITH MMI H600 VAR 50 75 Included in CMW-S600B , CMW-S600D.	Z	1201.0054.03		M	
401	1	S		ZE FP WITH MMI H600 FP WITH MMI H600 VAR 25 Included in CMW-S600F.	Z	1201.0054.05		M	
410	1	S		SF SILIKONMATTENSATZ CMW PUSH-BUTTON BOARD SET Included in 1201.0054.03 , 1201.0054.05.		1201.8003.00		B	O
420	1	S		SF FRONT PANEL BOARD II CMW FRONT PANEL BOARD II VAR 50 75 Included in 1201.0054.03.		1201.8010.00		B	T
421	1	S		SF FRONT PANEL BOARD_II250 FRONT PANEL BOARD_II250 VAR 25 Included in 1201.0054.05.		1201.7836.00		B	B
430	1	S		OP MESH-SCHEIBE ACRYL 8.4 SCREENED FILTER GLASS Included in 1201.0054.03 , 1201.0054.05. For replacement are required too: Pos.432 2x Pos.434 2x		1201.8561.00		B	V

Pos.-Nr. *ItemNo*	Menge *Quantity*	ME *Unit*	El.Kennz *Ref.Des.*	Benennung / Bezeichnung *Designation*	Z	Sachnummer *Stock No.*	Ersatzteil *Subst.part*	BA	VH
432	1	S		MZ HF-FEDER (177) RF SPRING Has to be replaced (2x) with Pos.430.	Z	1069.3011.00		M	
434	1	S		MZ HF FEDER (129) SPRING has to be replaced (2x) with Pos.430.	Z	1201.3824.00		M	
435	1	S		MZ STAUBDICHTUNG (TOSHIBA) DUST PROOFING (TOSHIBA) Included in 1201.0054.03 , 1201.0054.05 .	Z	0284.1970.00		M	
440	1	S		BP TFT 8.4 SVGA LVDS CCFL SVGA LVSA DISPLAY 8.4 ZOLL Included in 1201.0054.03 , 1201.0054.05.		1201.8403.00		B	V
450	1	S		EM DREHIMP.4 (MIT TASTE) ROTARY PULS-GENERATOR Included in 1201.0054.03 , 1201.0054.05.		0852.2799.00		B	I
460	1	S		GR LSNT - LVDS SVGA DISPLAY ADAPTER LSNT - LVDS SVGA DISPLAY ADAPTER Included in 1201.0054.03 , 1201.0054.05.		1201.8055.00		B	I
470	1	S		KB FRONTHAUBE M. DISPLAY + 2 FRONTEND FRONTCOVER VAR 50 Included in CMW-S600B.	Z	1201.0077.00		M	
471	1	S		KB FRONTHAUBE M. DISPLAY + 2 FRONTEND FRONTCOVER VAR 75 Included in CMW-S600D.	Z	1201.2657.00		M	
472	1	S		KB FRONTHAUBE M. DISPLAY + 1 FRONTEND FRONTCOVER VAR 25 Included in CMW-S600F.	Z	1202.1290.00		M	
600	1	S		ZE POWER SUPPLY H054A POWER SUPPLY H054A Include in CMW-S054A.	Z	1201.2786.02		M	
610	1	S		SS SCHMELZS.T10 IEC60127-2/V TIME LAG FUSE T10 Included in 1201.2786.02.		0606.3136.00		B	O
620	1	S		MM SICHERUNGSHALTER FUSE HOLDER Included in 1201.2786.02.		0852.1770.00		B	O
800	1	S		DY FLACHBANDKABEL W100 FLATCABLE Included in CMW-S050A , CMW-S020A.	Z	1201.2892.00		M	
810	0	S		DY FLACHBANDKABEL W101 FLATCABLE Currently not used (planed for audio option).	Z	1201.2905.00		M	
820	1	S		DY FLACHBANDKABEL W102 FLATCABLE Included in CMW-S050A , CMW-S020A.	Z	1201.2911.00		M	
830	1	S		DY FLACHBANDKABEL W103 FLATCABLE Included in CMW-S050A , CMW-S020A.	Z	1201.2928.00		M	
840	1	S		DY FLACHBANDKABEL W104 FLATCABLE VAR 50 75 Included in CMW-S050A.	Z	1201.2934.00		M	

Pos.-Nr. *ItemNo*	Menge *Quantity*	ME *Unit*	El.Kennz *Ref.Des.*	Benennung / Bezeichnung *Designation*	Z	Sachnummer *Stock No.*	Ersatzteil *Subst.part*	BA	VH
841	1	S		DY FLACHBANDKABEL W104 FLATCABLE VAR 25 Included in CMW-S020A.	Z	1202.1283.00		M	
850	0	S		DV HF-KABEL RF CABLE Included in CMW-S050A. Replaced by 1201.4189.00.	Z	1201.3918.00		M	
851	1	S		DW HF-KABEL RF-KABEL VAR 50 75 Included in CMW-S050A.	Z	1201.4189.00		M	
855	1	S		DH HF KABEL W6 RF CABLE VAR 25 Included in CMW-S020A.	Z	1202.1277.00		M	
860	1	S		DF SATA VERSORGUNGSKABEL 440 SATA POWERCABLE 440 VAR 50 75 Included in CMW-S050A.	Z	1091.3433.00		B	O
865	1	S		DS SATA VERSORGUNGSKABEL 280 SATA POWERCABLE 280 VAR 25 Included in CMW-S020A.		1201.7794.00		B	O
870	1	S		DG SATA DATENKABEL 420 SATA DATACABLE 420 Included in CMW-S050A.		1091.3456.00		B	O
880	1	S		DG KABEL 4X2 SCHIRM 130 CABLE VAR 50 75 Included in CMW-S050A.		1161.5474.00		B	O
881	1	S		DF KAB 10P 1.25MM AWG26 CAB 10P 1.25MM AWG26 VAR 25 Included in CMW-S020A.		1300.4463.00		B	O
885	1	S		DG KABEL 2XRJ45 ST/ST 8P CABLE Included in CMW-S020A , CMW-S050A.		1130.0935.00		B	O
890	1	S		DG PATCHKABEL KAT6. 0.12M PATCHKABEL KAT6. 0.12M VAR 50 75 Included in CMW-S050A.		1201.8303.00		B	O
895	0	S		GR FRONT PANEL BOARD IP H605A FRONT PANEL BOARD IP H605A VAR 50 75 Included in CMW-S050A. Replaced by 1201.7742.00, observe hints !	Z	1201.7936.00		M	
896	1	S		ZE FRONT PANEL BOARD IP H605A FRONT PANEL BOARD IP H605A Included in CMW-S020A , CMW-S050A. Important hint for CMW500/270: If 1201.7936.00 is replace by 1201.7742.00: In case of instrument frame TAZ 21.00 or lower it is necessary to replace the mountingplate by 1202.1331.00.	Z	1201.7742.00		M	
897	1	S		MF TEILMONTAGEPLATTE MOUNTINGPLATE VAR 50 75 Necessary for CMW500/270 if 1201.7936.00 is replace by 1201.7742.00 and instrument frame TAZ is 21.00 or lower.	Z	1202.1331.00		M	

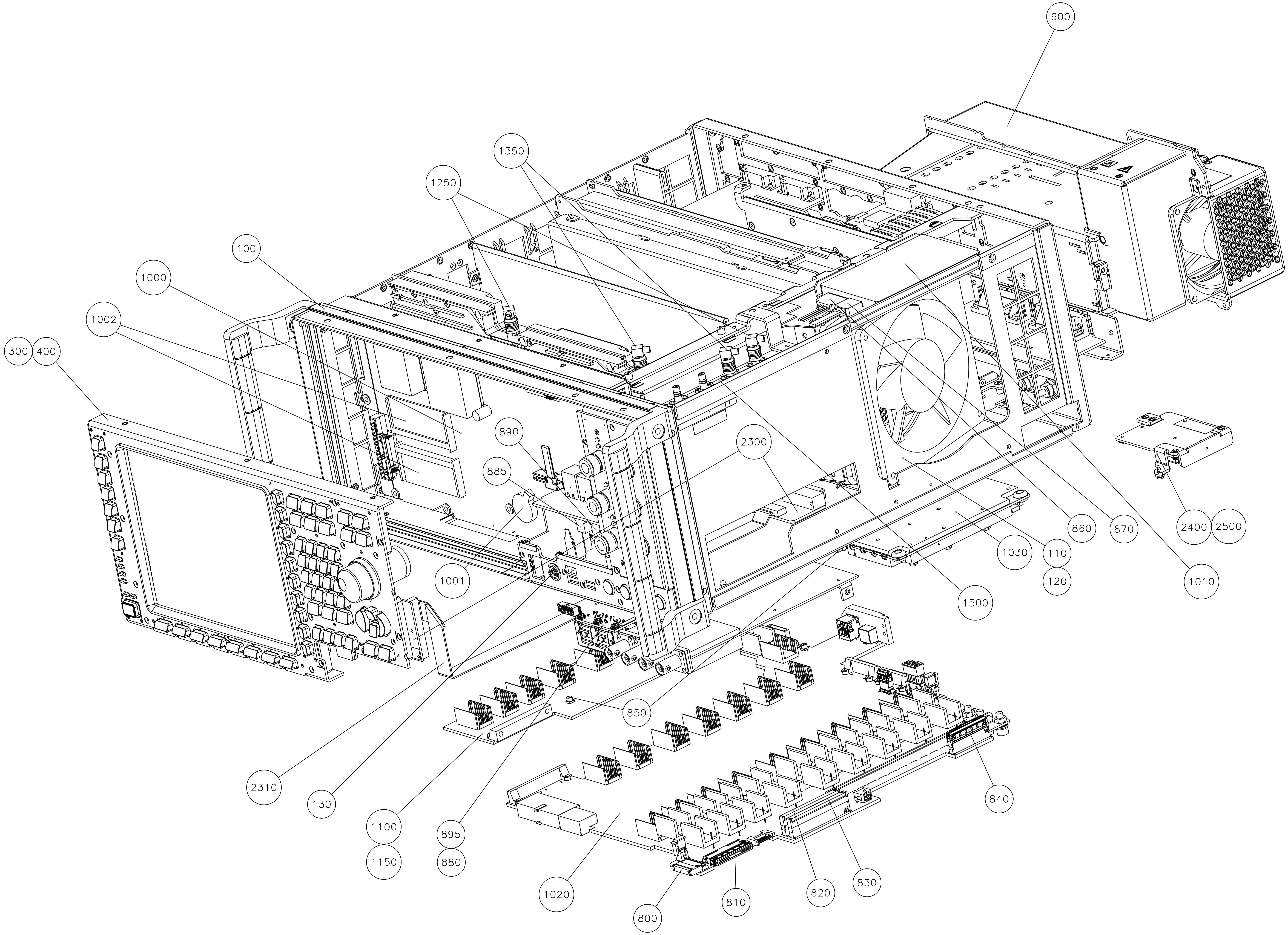
Pos.-Nr. *ItemNo*	Menge *Quantity*	ME *Unit*	El.Kennz *Ref.Des.*	Benennung / Bezeichnung *Designation*	Z	Sachnummer *Stock No.*	Ersatzteil *Subst.part*	BA	VH
950	1	S		FT EINBAUADAPTER 8P.GER 2XRJ45 COUPLER JACK STRAIGHT Included in 1201.0060.00 , 1202.1060.00.		1093.9122.00		B	O
951	1	S		MZ SILIKONSCHNUR RD4X8MM SILICONE CORD RD4X8MM Included in 1201.0060.00 , 1202.1060.00.		1130.0164.00		M	
1000	0	S		GR FMR7/5 FRONTMODUL CONTR. 7/5 VAR 50 75 Included in CMW-S051A. Replaced by 1206.0600.00.		1091.3140.00		B	G
1001	1	S		GE 3.0V 230MAH LI-MNO2 CR2032 LITHIUM BATTERY CR2032 Included in 1091.3140.00 , 1206.0600.00 , 1206.0700.00.		0858.2049.00		B	V
1002	0	S		GR 1GB DDR RAM MODUL FÜR FMR7 1GB DDR RAM MODUL FOR FMR7 VAR 50 Sparepart only for CMW500. Mounted only in combination with 1091.3140.00.		1091.3210.00		B	V
1003	1	S		GR FMR7/7 FMR 7/7 VAR 50 75 Included in CMW-S051B.		1206.0600.00		B	A
1005	1	S		GR LPC8/6 CONTROLLER LPC 8/6 VAR 25 Included in CMW-S021A.		1206.0700.00		B	B
1010	1	S		ZE HARDDISK (STANDARD) H052A HARDDISK (STANDARD) H052A VAR 50 75 Included in CMW-S052A.	Z	1202.4218.00		M	
1011	1	S		ZE HARDDISK (STANDARD) H022A HARDDISK (STANDARD) H022A VAR 25 Included in CMW-S022A.	Z	1202.8313.00		M	
1020	1	S		ED MOTHERBOARD H055A MOTHERBOARD H055A VAR 50 75 Included in CMW-S055A. Without chipcard progr. CMW.	Z	1201.0954.02		M	O
1021	1	S		ED MOTHERBOARD H025A MOTHERBOARD H025A VAR 25 Included in CMW-S025A. Without chipcard progr. CMW280.	Z	1201.1080.02		M	
1026	1	S		SS SMD-SICHERUNG 5A T FUSE Included in 1201.0954.02 , 1201.1080.02.		1090.4442.00		B	T
1027	1	S		SS SMD-SICHERUNG 10A FF FUSE 10A FF Included in 1201.0954.02 , 1201.1080.02.		6104.9199.00		B	T
1028	1	S		SS SMD-SICHERUNG 15A FF SMD-FUSE Included in 1201.0954.02 , 1201.1080.02.		2081.7103.00		B	O
1029	1	S		RK 1.1A FUSE PTC 30V SMD RESETTABLE FUSE Included in 1201.0954.02 , 1201.1080.02.		1058.2777.00		B	T

Pos.-Nr. *ItemNo*	Menge *Quantity*	ME *Unit*	El.Kennz *Ref.Des.*	Benennung / Bezeichnung *Designation*	Z	Sachnummer *Stock No.*	Ersatzteil *Subst.part*	BA	VH
1030	0	S		ED REFERENCE H090A REFERENCE H090A VAR 50 75 Included in CMW-S090A. Replaced by 1201.1980.03. 1201.1980.02/1201.1980A02 is only suitable in instrument frames (1201.0060.00) with TAZ up to 19.00.	Z	1201.1980.02		M	
1031	1	S		ED REFERENCE H090A REFERENCE H090A VAR 50 75 Included in CMW-S090A. In case of mounting 1201.1980.03 / 1201.1980A03 in instrument frames (1201.0060.00) with TAZ up to 19.00: Reference holder has to be replaced by 1202.3805.00.	Z	1201.1980.03		M	
1032	1	S		MZ REFERENZHALTER HOLDER VAR 50 75 Necessary if 1201.1980.03/1201.1980A03 is to be mounted in instrument frames (1201.0060.00) with TAZ up to 19.00.	Z	1202.3805.00		M	
1035	1	S		ED REFERENCE H090A REFERENCE H090A VAR 25 Included in CMW-S090A.	Z	1201.1980.03		M	
1040	1	S		EE BB MEASUREMENT H100A BB MEASUREMENT H100A Included in CMW-S100A , CMW-B100A. Without CMW-B110A.	Z	1201.1873.02		M	
1050	1	S		EE BB GENERATOR H110A BB GENERATOR H110A Included in CMW-B110A.	Z	1201.1921.02		M	
1100	1	S		ED BB FIXED LINK H550A BB FIXED LINK H550A VAR 50 75 Included in CMW-S550A.	Z	1201.0902.02		M	O
1150	1	S		EE BB FLEXIBLE LINK H550B BB FLEXIBLE LINK H550B VAR 50 75 Included in CMW-S550B.	Z	1201.3401.02		M	
1200	0	S		EE RX MODULE OF TRX RX MODULE OF TRX VAR 50 75 Included in CMW-S570A. Replaced by 1201.4220.02.	Z	1201.4020.02		M	
1201	1	S		EE RX MODULE OF TRX RX MODULE OF TRX Included in CMW-S570A , CMW-S570B.	Z	1201.4220.02		M	
1250	1	S		DW HF KABEL RX AF CABLE Included in CMW-S570A , CMW-S570B , CMW-B570A , CMW-B570B.	Z	1201.2634.00		M	
1300	0	S		EE TX MODULE OF TRX TX MODULE OF TRX VAR 50 75 Included in CMW-S570A. Replaced by 1201.4320.02.	Z	1201.4120.02		M	
1301	1	S		EE TX MODULE OF TRX TX MODULE OF TRX Included in CMW-S570A , CMW-S570B.	Z	1201.4320.02		M	

Pos.-Nr. *ItemNo*	Menge *Quantity*	ME *Unit*	El.Kennz *Ref.Des.*	Benennung / Bezeichnung *Designation*	Z	Sachnummer *Stock No.*	Ersatzteil *Subst.part*	BA	VH
1350	1	S		DW HF KABEL TX AF CABLE Included in CMW-S570A , CMW-S570B , CMW-B570A , CMW-B570B.	Z	1201.2640.00		M	
1400	0	S		EE COR MODULE OF TRX COR MODULE OF TRX VAR 50 75 Included in CMW-S570A. Replaced by 1201.4620.02.	Z	1201.1809.02		M	O
1401	1	S		EE COR MODULE OF TRX COR MODULE OF TRX Included in CMW-S570B.	Z	1201.4620.02		M	
1450	0	S		ZE RF TRX H570A RF TRX H570A VAR 50 75 Complete RF TRX Module. Included in CMW-B570A. Replaced by 1201.4308.03.	Z	1201.4308.02		M	
1451	1	S		ZE RF TRX H570B RF TRX H570B Complete RF TRX Module. Included in CMW-B570B.	Z	1201.4308.03		M	
1500	1	S		ED RF FRONTEND (BASIC) H590A RF FRONTEND (BASIC) H590A Included in CMW-S590A , CMW-B590A.	Z	1201.1350.02		M	
1505	1	S		ED RF FRONTEND (ADV.) H590D RF FRONTEND (ADV.) H590D Included in CMW-S590D , CMW-B590D.	Z	1201.4208.02		M	
2100	1	S		ED IEEE BUS (SINGLE) H612A IEEE BUS (SINGLE) H612A Included in CMW-B612A.	Z	1201.1144.03		M	M
2105	1	S		ED IEEE BUS (DUAL) H612B IEEE BUS (DUAL) H612B Included in CMW-B612B.	Z	1201.1144.02		M	M
2300	1	S		ED DVI INTERFACE DVI INTERFACE Included in CMW-B620A.	Z	1091.1860.02		M	
2310	1	S		DF YFB KABEL L=410 YFB CABLE L=410 Included in CMW-B620A.		1091.1901.00		B	O
2400	1	S		ED BASIC OCXO H690A BASIC OCXO H690A Included in CMW-B690A.	Z	1202.0035.02		M	P
2500	1	S		ED HIGHLY STABLE OCXO H690B HIGHLY STABLE OCXO H690B Included in CMW-B690B.	Z	1202.0035.03		M	P
2900	1	S		ZE SIGNAL. UNIT UNIV. H200A SIGNAL. UNIT UNIV. H200A Included in CMW-B200A.	Z	1201.3101.02		M	
2910	1	S		EE SUU MAINBOARD SUU MAINBOARD Included in 1201.3101.02.	Z	1201.3230.02		M	
2920	1	S		GR MPC0/2 MPC0/2 Included in 1201.3101.02.		1091.1676.00		B	B
2930	1	S		EE WIMAX H270A FOR SUU WIMAX H270A FOR SUU Included in CMW-B270A.	Z	1506.4350.02		M	

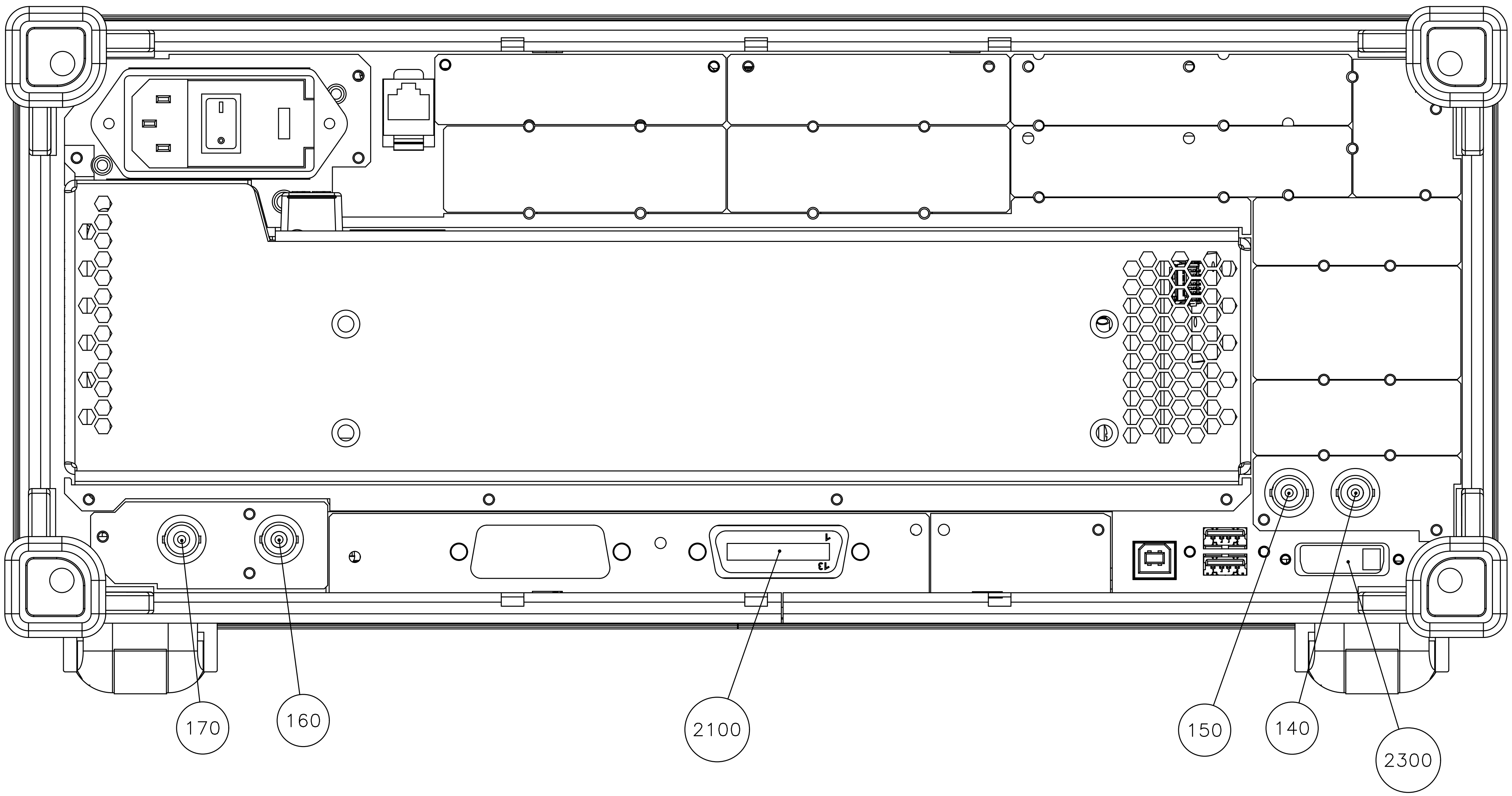
Pos.-Nr. *ItemNo*	Menge *Quantity*	ME *Unit*	El.Kennz *Ref.Des.*	Benennung / Bezeichnung *Designation*	Z	Sachnummer *Stock No.*	Ersatzteil *Subst.part*	BA	VH
2935	1	S		EE WIMAX H270B FOR SUU WIMAX H270B FOR SUU Included in CMW-B270B.	Z	1506.4350.03		M	
2940	1	S		EE GSM H210A FOR SUU GSM H210A FOR SUU Included in CMW-B210A.	Z	1201.3347.02		M	
3000	1	S		ZE SIGNAL. UNIT WIDEB. H300A SIGNAL. UNIT WIDEB. H300A Included in CMW-B300A.	Z	1201.5004.02		M	
3010	1	S		EE SUW MAINBOARD SUW MAINBOARD Included in 1201.5004.02.	Z	1201.5310.02		M	
3020	1	S		GR MPC0/5 MPC0/5 Included in 1201.5004.02.		1091.1682.00		B	B
3030	1	S		EE SUW DSP MODULE SUW DSP MODULE Included in 1201.5004.02.	Z	1201.5033.02		M	
3100	1	S		ZE ETHERNET SWITCH ETHERNET SWITCH Included in CMW-B661A.	Z	1202.7117.00		M	
3110	1	S		DG YFB KABEL L=70 CABLE Included in CMW-B661A.		1206.0230.00		B	B
3111	1	S		DG YFB KABEL L=110 CABLE Included in CMW-B661A.		1206.0246.00		B	B
3112	1	S		DG YFB KABEL L=150 CABLE Included in CMW-B661A.		1206.0252.00		B	O
3113	1	S		DG YFB KABEL L=190 CABLE Included in CMW-B661A.		1206.0269.00		B	B
3120	1	S		DG PATCHKABEL KAT6. 0.25M PATCHKABEL KAT6. 0.25M Included in CMW-B661A - accessory.		3033.9264.00		B	O
3200	1	S		EE OPTION CARRIER H660A OPTION CARRIER H660A Included in CMW-B660A.	Z	1201.1109.02		M	
3300	1	S		EE IQ BOARD IQ BOARD Included in CMW-B510A , CMW-B520A.	Z	1202.0070.02		M	
3310	1	S		EE IQ CONNECTOR IQ CONNECTOR Included in CMW-B510A , CMW-B520A.	Z	1202.0706.02		M	
3320	1	S		DG YFLEX KABEL 70 YFLEX CABLE 70 Included in CMW-B510A .		1202.0729.00		B	B
3330	1	S		DV HF KABEL RF CABLE Included in CMW-B510A .	Z	1202.0812.00		M	
3331	1	S		DV HF KABEL RF CABLE Included in CMW-B510A.	Z	1202.0829.00		M	
3340	1	S		DY KABELBAUM DIG. IQ 5 BIS 8 CABLE HARNESS DIG. IQ 5 TO 8	Z	1202.8136.00		M	

Pos.-Nr. *ItemNo*	Menge *Quantity*	ME *Unit*	El.Kennz *Ref.Des.*	Benennung / Bezeichnung *Designation*	Z	Sachnummer *Stock No.*	Ersatzteil *Subst.part*	BA	VH
				Included in CMW-B520A.					
3350	1	S		DV HF KABEL RF CABLE Included in CMW-B520A.	Z	1202.0835.00		M	
3351	1	S		DV HF KABEL RF CABLE Included in CMW-B520A.	Z	1202.0841.00		M	
3360	1	S		DX DIGITAL I/Q-KABEL DIGITAL I/Q CABLE Included in CMW-B510A - accessory. Included in CMW-B520A - accessory.	Z	1402.4990.00		M	
6000	1	S		MZ BW2-TUBUS CMW BW2-TUBUS CMW VAR 50 75 Included in CMW-S057A.	Z	1201.3501.00		M	
6010	1	S		ZM BW2-TUBUS CMW TUBE VAR 25 Included in CMW-S027A.	Z	1202.1348.00		M	
6020	1	S		KR BW2-FRONTGRIFF 4E FRONT HANDLE Included in CMW-S027A , CMW-S057A.		1096.1480.00		B	T
6025	1	S		VS SCHR. M4X14-ISR-PA SCREW M4X14-ISR-PA Included in CMW-S027A , CMW-S057A.		1096.4896.00		B	T
6030	1	S		KR BW2-RUECKWANDFUSS 50MM REAR WALL FOOT Included in CMW-S027A , CMW-S057A.		1096.2493.00		B	O



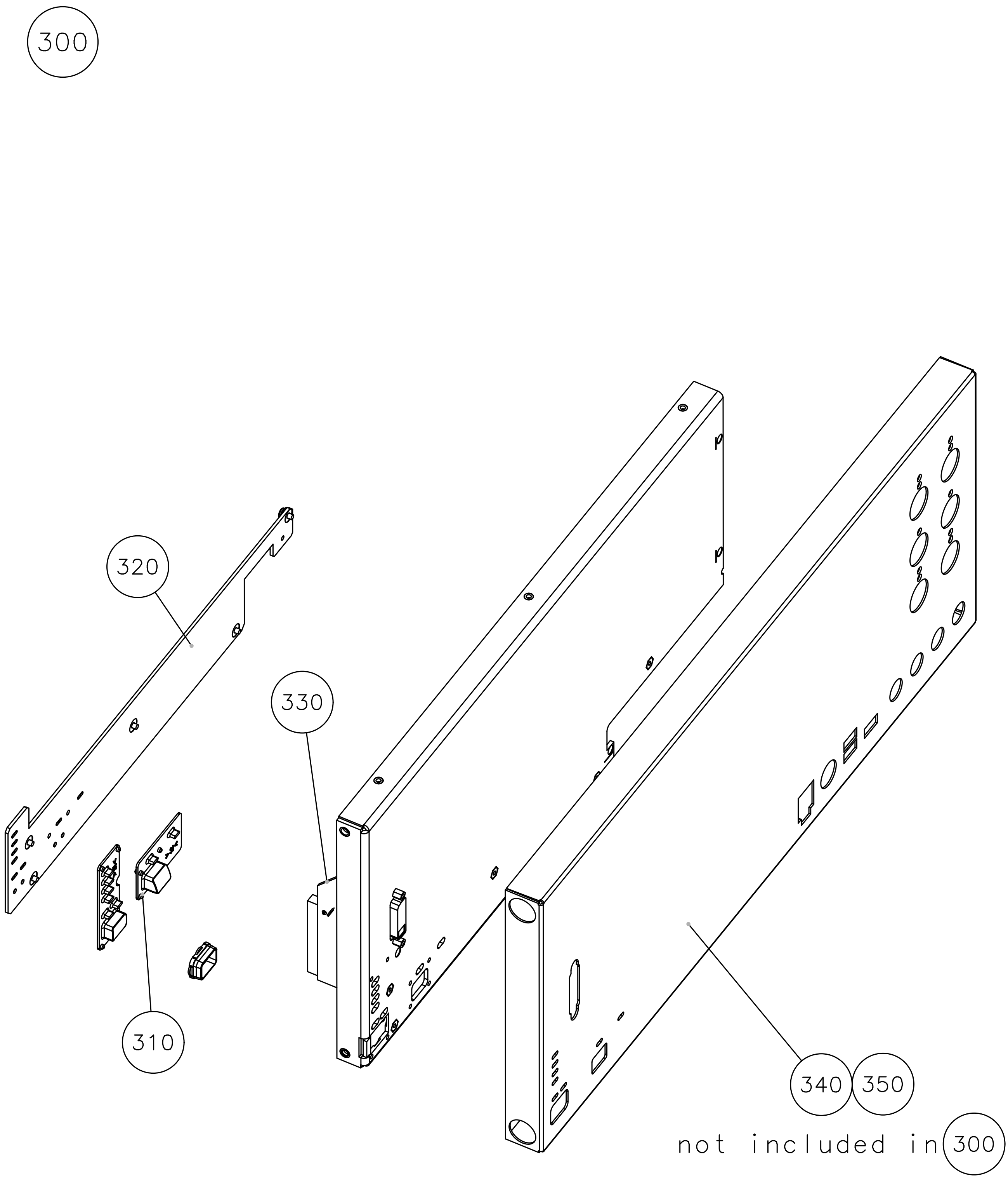
Projektions-methode
Projection Method

Maßstab *Scale*	Toleranz *Tol.*	Werkstoff *Material*	
ROHDE&SCHWARZ	Benennung / *Designation* ERSATZTEILE CMW SPARE PARTS CMW		Sprache / *Lang.* de en; Änd. / *C.I.* 03.00; Blatt / *Sh.* 1
CMW	Datum *Date* 2007-05-07	Abteilung *Dept.* 1CMK; Name *Name* bi	Zeichn.Nr. / *Drawing No.* 1201.0025.01 D



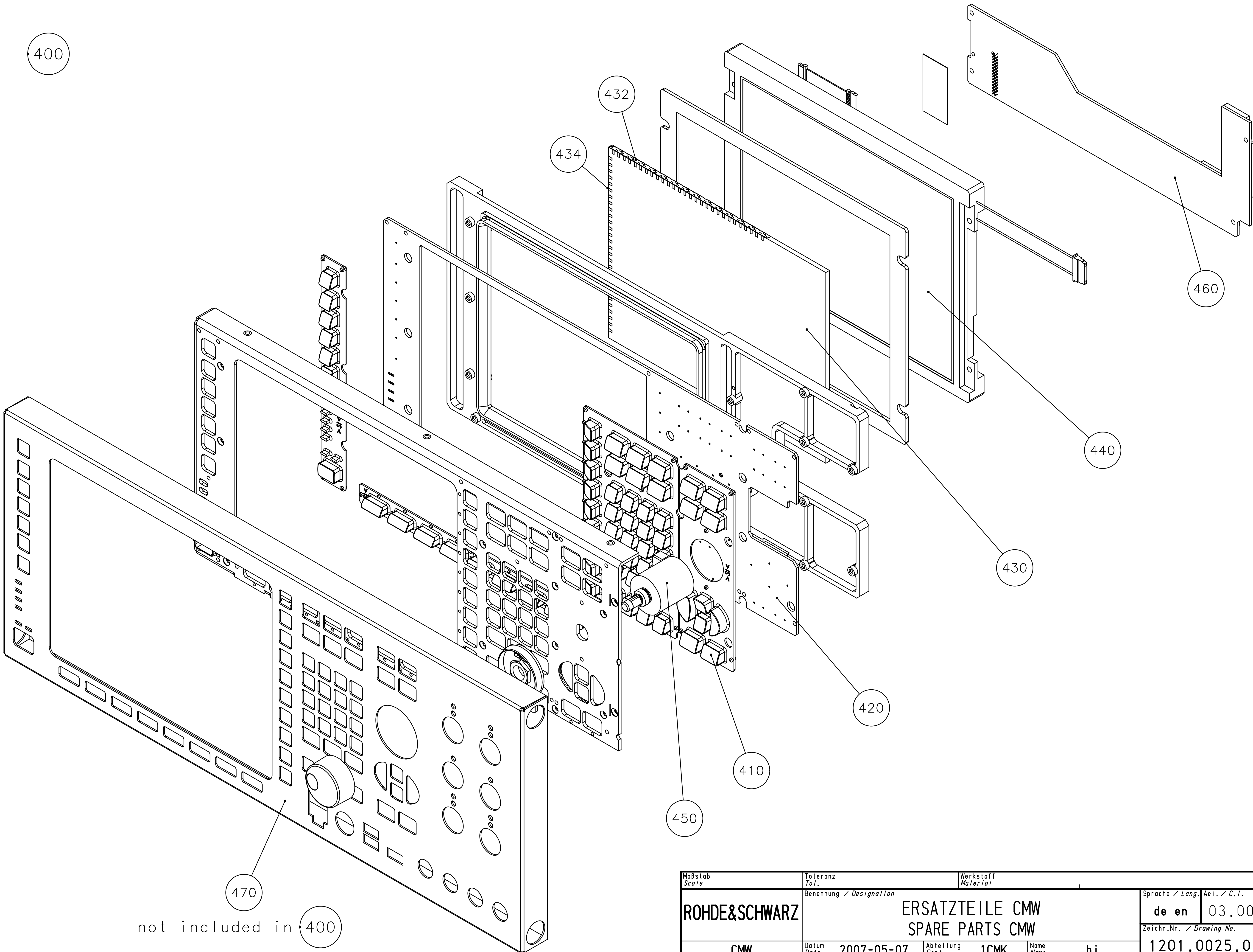
Projektions-methode
Projection Method

Maßstab Scale	Toleranz Tol.	Werkstoff Material	
ROHDE&SCHWARZ	Benennung / Designation ERSATZTEILE CMW SPARE PARTS CMW		Sprache / Lang. de en · Aei. / C.I. 03.00 · Blatt / Sh. 2
CMW	Datum Date 2007-05-08 · Abteilung Dept. 1CMK · Name bi		Zeichn.Nr. / Drawing No. 1201.0025.01 D



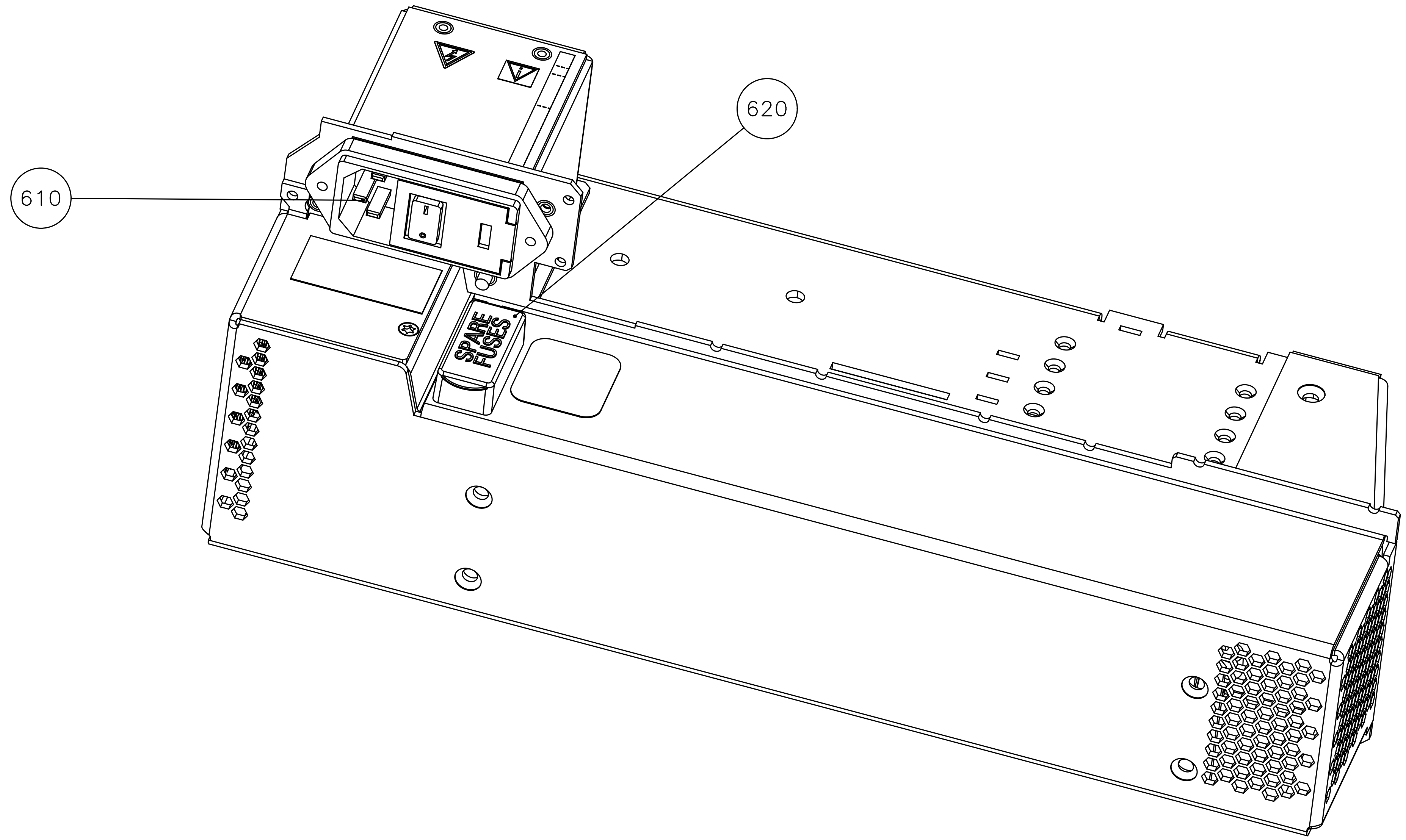
Projektions-methode
Projection Method

Maßstab *Scale*	Toleranz *Tol.*		Werkstoff *Material*				
ROHDE&SCHWARZ	Benennung / *Designation* ERSATZTEILE CMW SPARE PARTS CMW				Sprache / *Lang.* de en	Aei. / *C.I.* 03.00	Blatt / *Sh.* 3
CMW	Datum *Date* 2007-05-07	Abteilung *Dept.* 1CMK	Name *Name* bi		Zeichn.Nr. / *Drawing No.* 1201.0025.01 D		



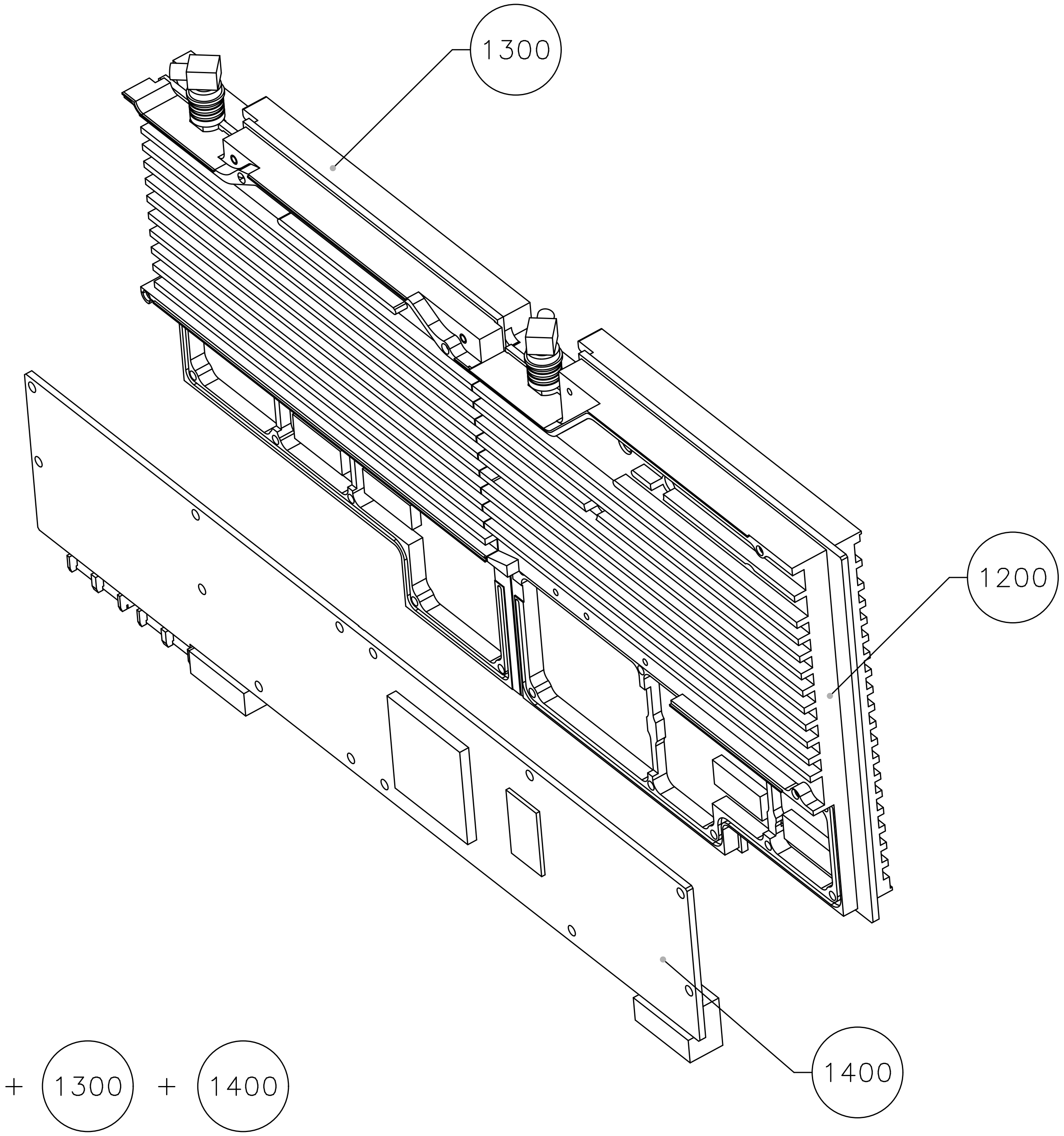
Projektionsmethode / Projection Method

Maßstab / Scale	Toleranz / Tol.	Werkstoff / Material		
ROHDE&SCHWARZ	Benennung / Designation: ERSATZTEILE CMW / SPARE PARTS CMW	Sprache / Lang.: de en	Aei. / C.I.: 03.00	Blatt / Sh.: 4
		Zeichn.Nr. / Drawing No.: 1201.0025.01 D		
CMW	Datum / Date: 2007-05-07	Abteilung / Dept.: 1CMK	Name / Name: bi	



Projektionsmethode
Projection Method

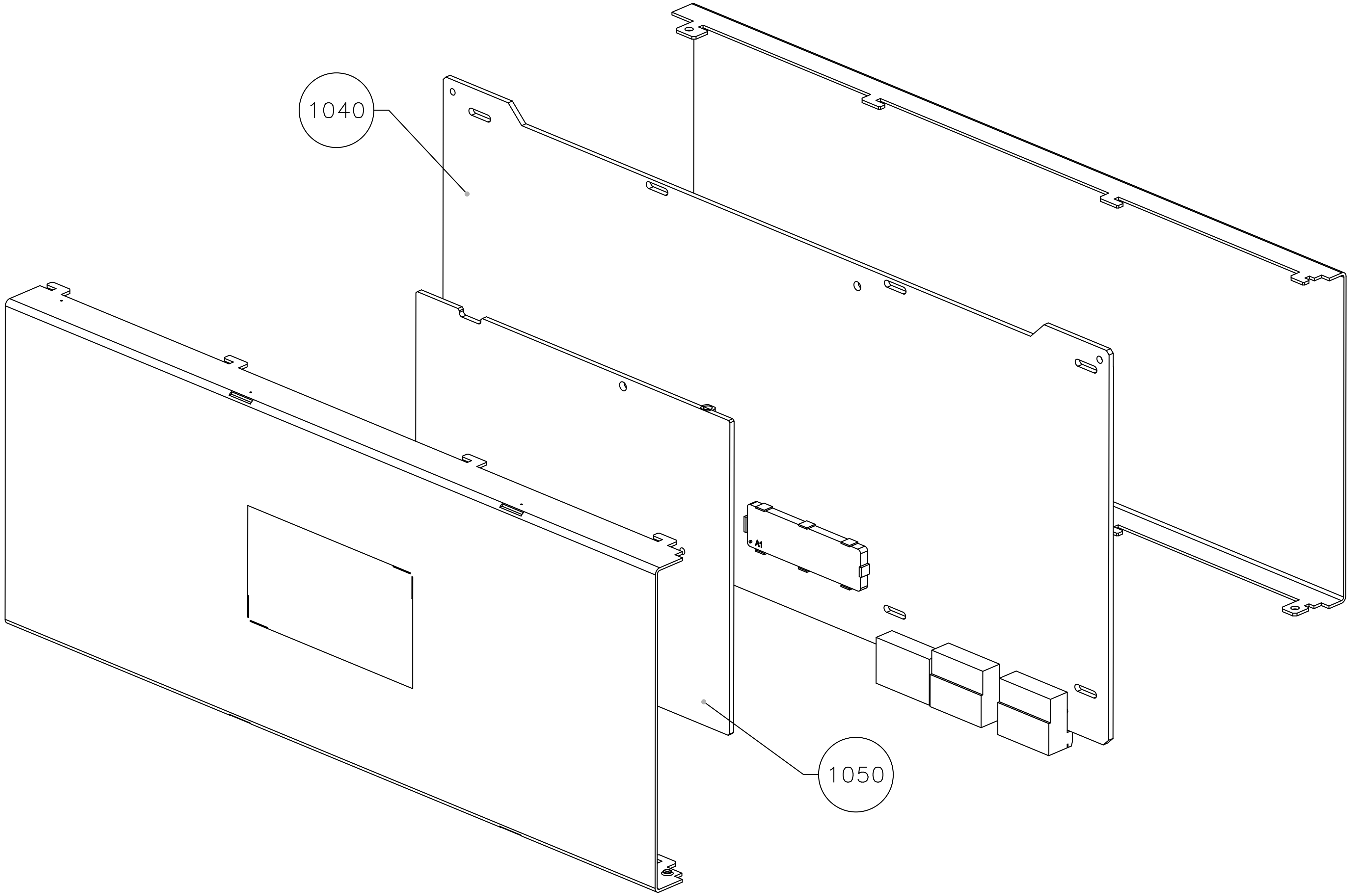
Maßstab Scale	Toleranz Tol.	Werkstoff Material			
ROHDE&SCHWARZ	Benennung / Designation: ERSATZTEILE CMW SPARE PARTS CMW		Sprache / Lang.: de en	Aei. / C.I.: 03.00	Blatt / Sh.: 5
CMW	Datum Date: 2007-05-07	Abteilung Dept.: 1CMK	Name: bi	Zeichn.Nr. / Drawing No.: 1201.0025.01	D



1450 = 1200 + 1300 + 1400

Projektions-methode
Projection Method

Maßstab *Scale*	Toleranz *Tol.*	Werkstoff *Material*	Sprache / *Lang.*	Aei. / *C.I.*	Blatt / *Sh.*
ROHDE&SCHWARZ	Benennung / *Designation* ERSATZTEILE CMW SPARE PARTS CMW		de en	02.00	6
CMW	Datum *Date* 2006-11-28	Abteilung *Dept.* 1CMK / Name *Name* ze	Zeichn.Nr. / *Drawing No.* 1201.0025.01 D		

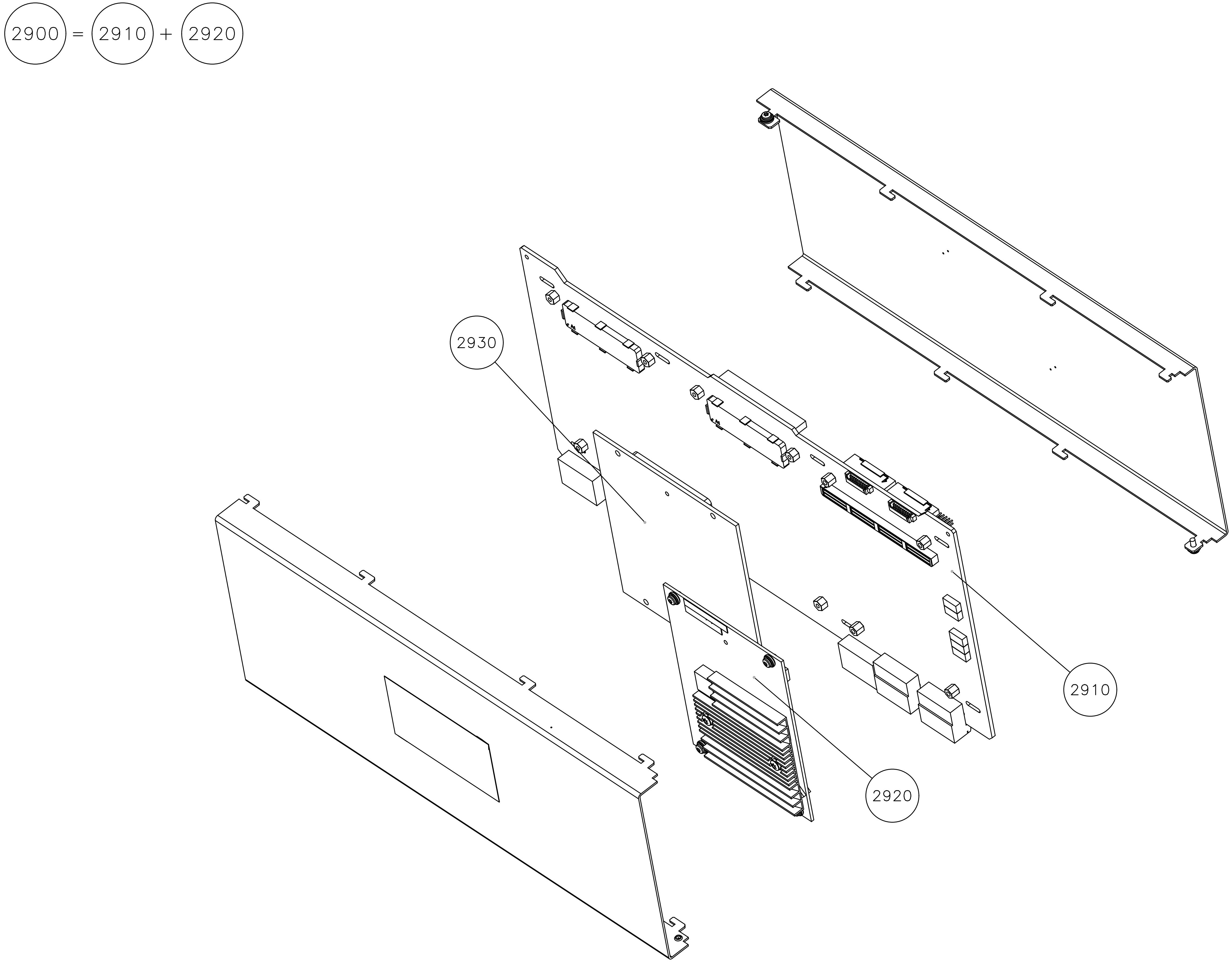


Projektions-methode
Projection Method

Maßstab *Scale*	Toleranz *Tol.*	Werkstoff *Material*	
ROHDE&SCHWARZ	Benennung / *Designation* ERSATZTEILE CMW SPARE PARTS CMW	Sprache / *Lang.* de en	Aei. / *C.I.* 03.00
CMW	Datum *Date*	Abteilung *Dept.* 1CMK	Name *Name* ze

Blatt / *Sh.* 7

Zeichn.Nr. / *Drawing No.* 1201.0025.01 D

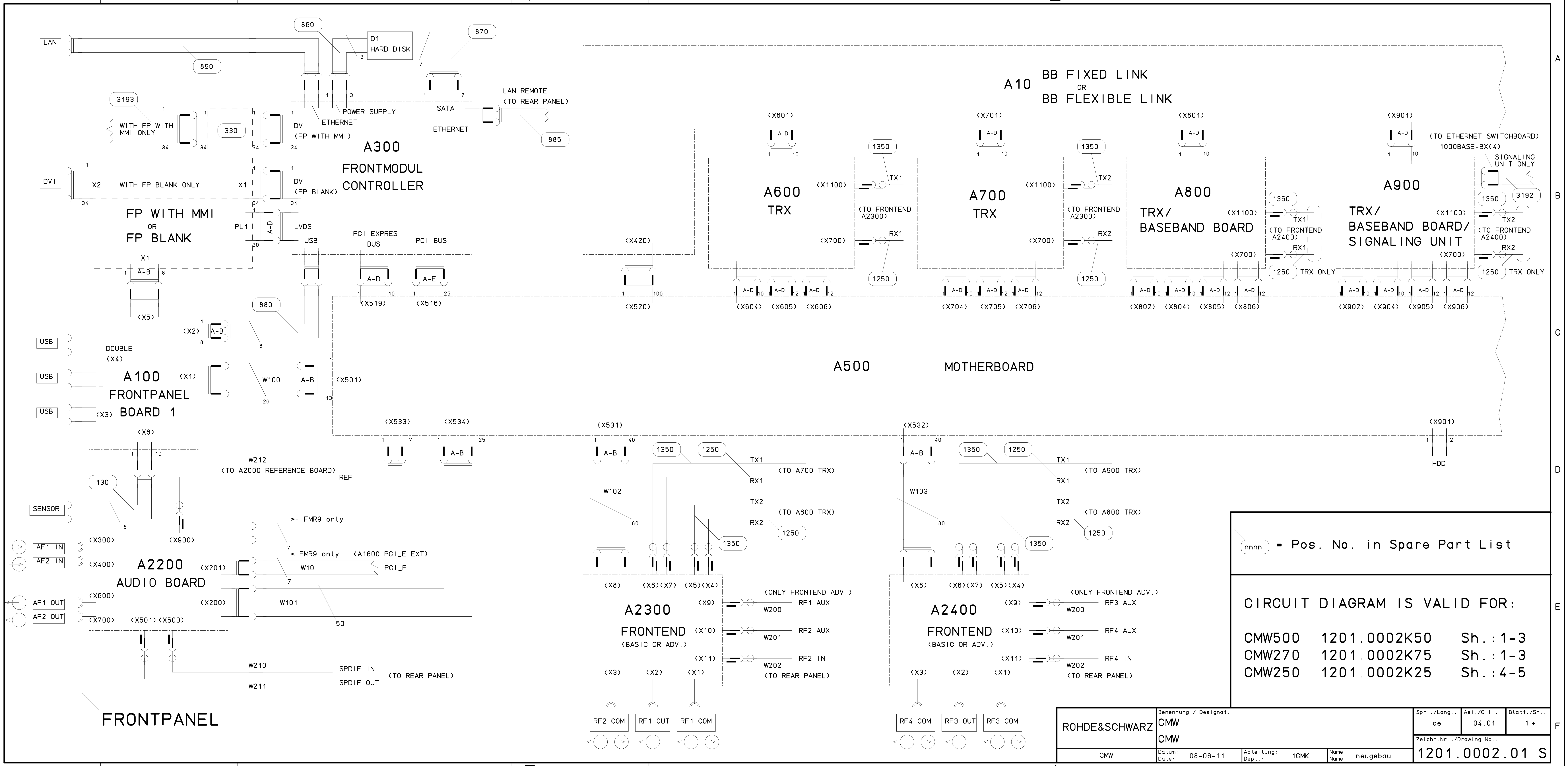


Projektionsmethode / Projection Method

Maßstab / Scale	Toleranz / Tol.	Werkstoff / Material	
ROHDE&SCHWARZ	Benennung / Designation: ERSATZTEILE CMW / SPARE PARTS CMW	Sprache / Lang.: de en	Aei. / C.I.: 01.00
		Blatt / Sh.: 8	
CMW	Datum / Date: 2008-01-23	Abteilung / Dept.: 1CMK	Name / Name: ze
Zeichn.Nr. / Drawing No.: 1201.0025.01 D			

Circuit Diagram Instrument

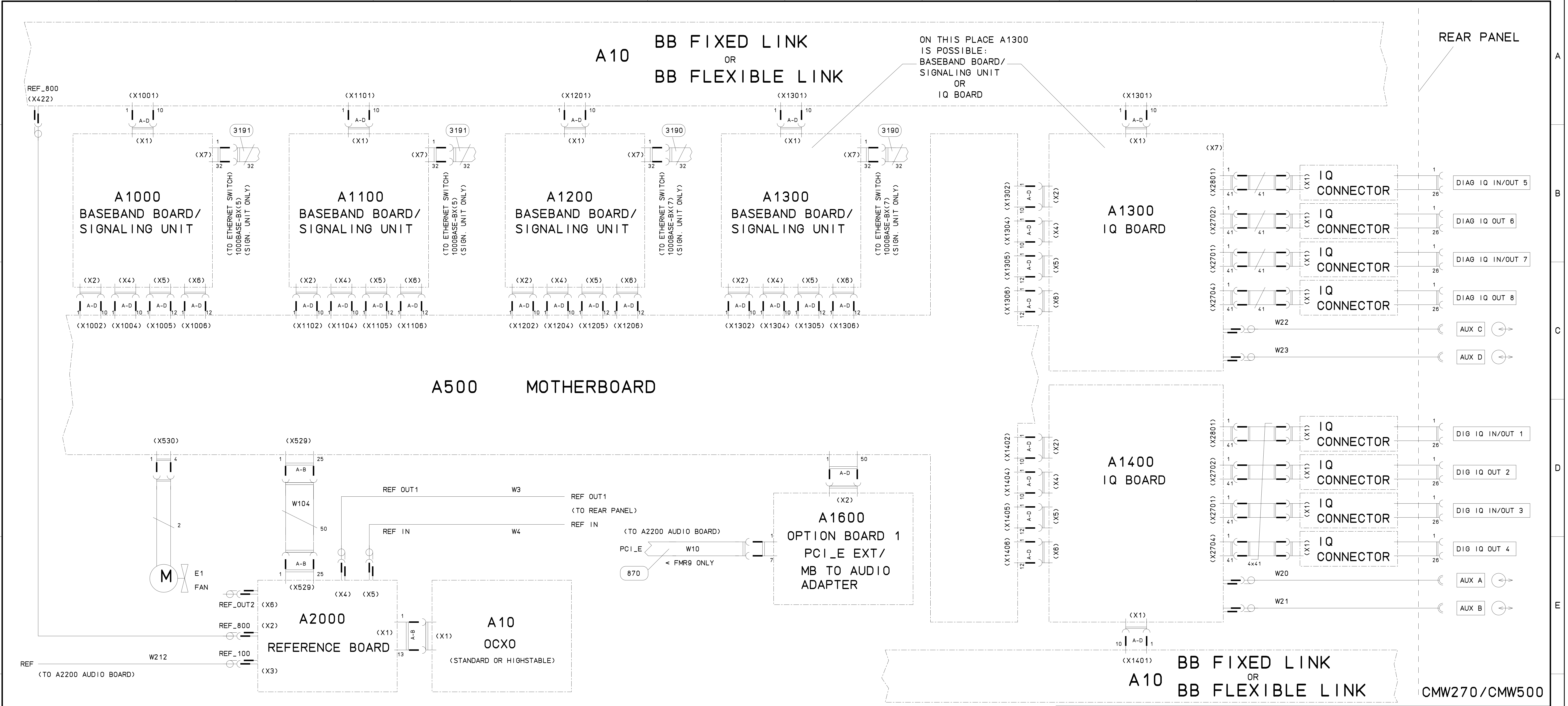
ROHDE&SCHWARZ



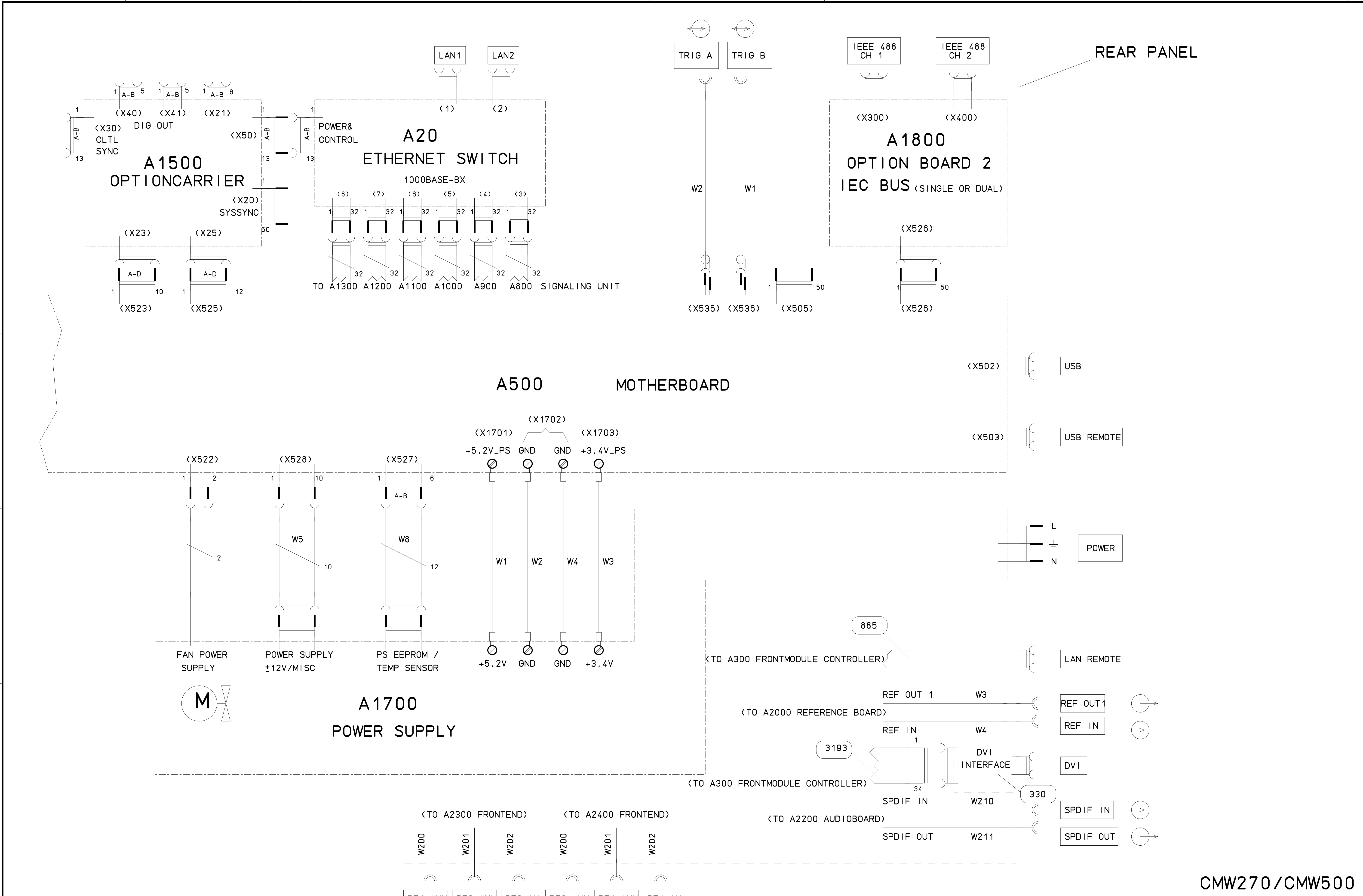
CIRCUIT DIAGRAM IS VALID FOR:

CMW500	1201.0002K50	Sh.:1-3
CMW270	1201.0002K75	Sh.:1-3
CMW250	1201.0002K25	Sh.:4-5

ROHDE&SCHWARZ	Benennung / Designat.: CMW CMW	Spr.:/Lang.: de	Aei:/C.I.: 04.01	Blatt:/Sh.: 1+
CMW	Datum: / Date: 08-06-11	Abteilung: / Dept.: 1CMK	Name: / Name: neugebau	Zeichn.Nr.:/Drawing No.: 1201.0002.01 S

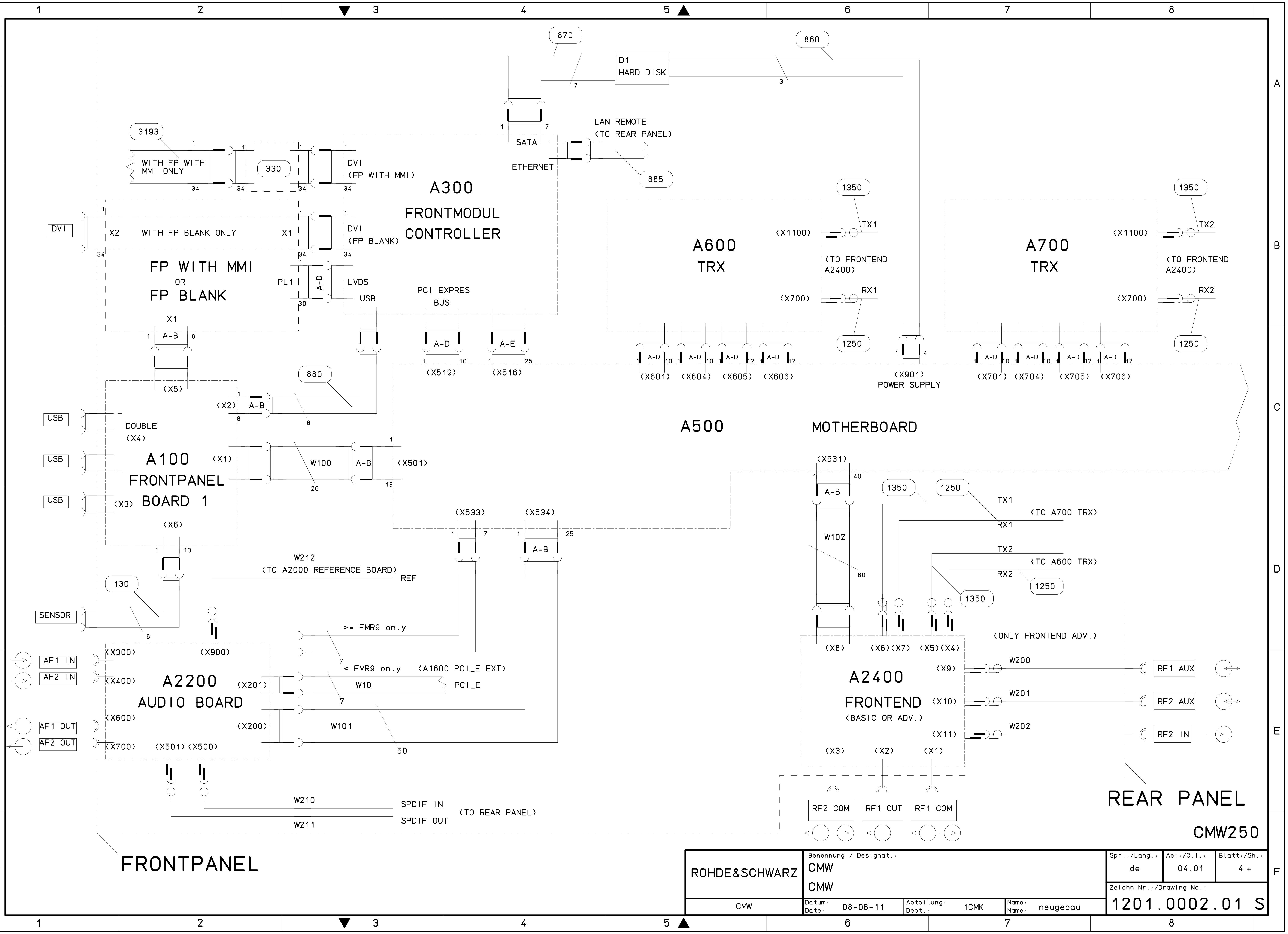


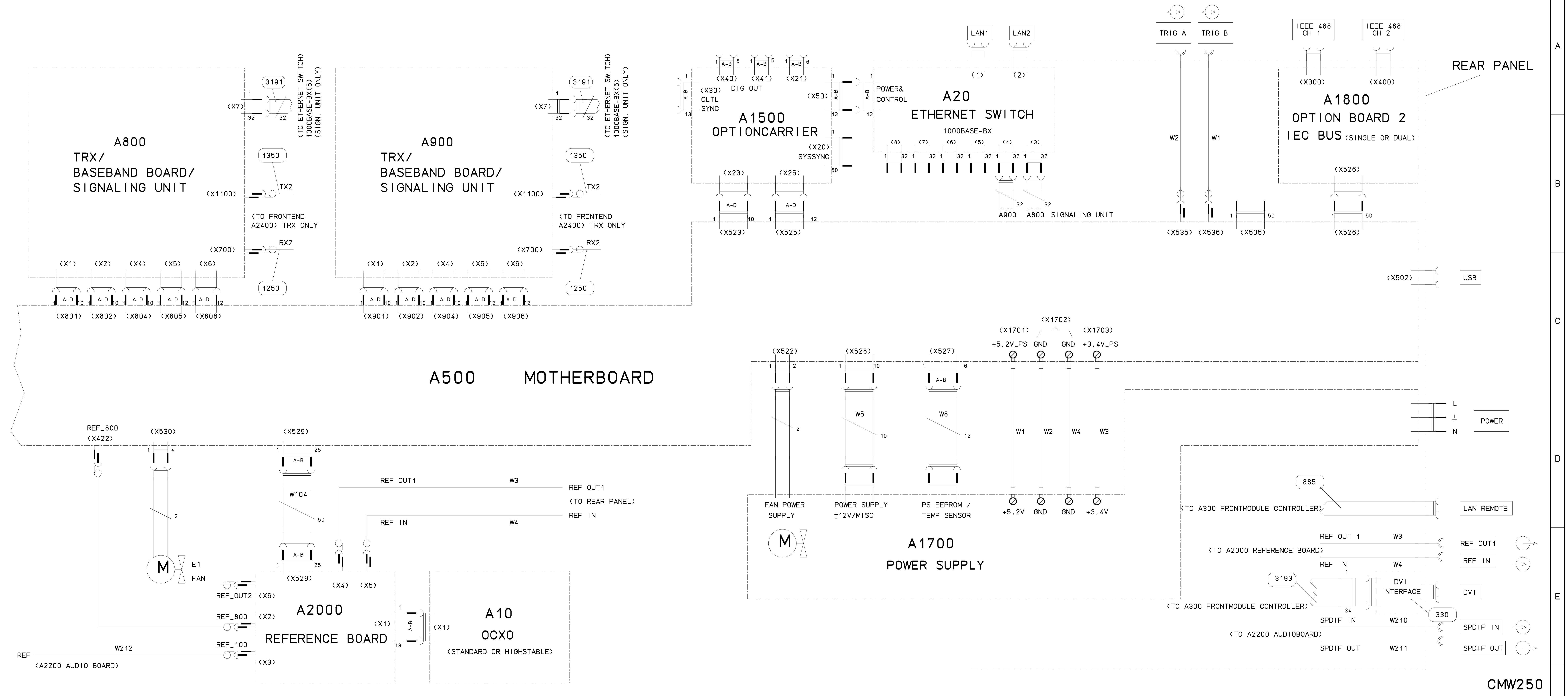
ROHDE&SCHWARZ	Benennung / Designat.: CMW CMW	Spr.:/Lang.: de	Aei:/C.I.: 04.01
		Blatt:/Sh.: 2+	
CMW	Datum: Date: 08-06-11	Abteilung: Dept.: 1CMK	Name: neugebau
	Zeichn.Nr.:/Drawing No.: 1201.0002.01 S		



CMW270/CMW500

ROHDE&SCHWARZ	Benennung / Designat.: CMW CMW	Spr.:/Lang.: de	Aei:/C.I.: 04.01	Blatt:/Sh.: 3 +
CMW	Datum: / Date: 08-06-11 — Abteilung: / Dept.: 1CMK — Name: / Name: neugebau	Zeichn.Nr.:/Drawing No.: 1201.0002.01 S		


870
D1
HARD DISK
860
3193
WITH FP WITH MMI ONLY
330
DVI (FP WITH MMI)
SATA
ETHERNET
LAN REMOTE (TO REAR PANEL)
885
A300
FRONTMODUL CONTROLLER
DVI
X2 WITH FP BLANK ONLY X1
DVI (FP BLANK)
FP WITH MMI
OR
FP BLANK
PL1
LVDS
USB
PCI EXPRES BUS
A600
TRX
A700
TRX
(X1100)
TX1
(TO FRONTEND A2400)
(X700)
RX1
TX2
RX2
1350
1250
(X519) (X516)
(X601) (X604) (X605) (X606)
(X901) POWER SUPPLY
(X701) (X704) (X705) (X706)
X1
(X5)
880
USB
DOUBLE (X4)
A100
FRONTPANEL
BOARD 1
(X1)
(X2)
(X3)
(X6)
W100
(X501)
A500
MOTHERBOARD
(X531)
W102
TX1 (TO A700 TRX) RX1
TX2 (TO A600 TRX) RX2
(X533) (X534)
W212 (TO A2000 REFERENCE BOARD)
REF
130
SENSOR
>= FMR9 only
< FMR9 only
(A1600 PCI_E EXT)
W10
PCI_E
W101
AF1 IN
AF2 IN
AF1 OUT
AF2 OUT
(X300) (X900)
(X400)
A2200
AUDIO BOARD
(X201)
(X600)
(X200)
(X700)
(X501) (X500)
W210
SPDIF IN
W211
SPDIF OUT
(TO REAR PANEL)
(ONLY FRONTEND ADV.)
(X8) (X6) (X7) (X5) (X4)
A2400
FRONTEND
(BASIC OR ADV.)
(X9) W200 RF1 AUX
(X10) W201 RF2 AUX
(X11) W202 RF2 IN
(X3) (X2) (X1)
RF2 COM
RF1 OUT
RF1 COM
REAR PANEL
FRONTPANEL
CMW250
ROHDE&SCHWARZ
Benennung / Designat.:
CMW
CMW
Datum: 08-06-11
Abteilung: 1CMK
Name: neugebau
Spr.:/Lang.: de
Aei:/C.I.: 04.01
Blatt:/Sh.: 4 +
Zeichn.Nr.:/Drawing No.:
1201.0002.01 S



ROHDE&SCHWARZ	Benennung / Designat.: CMW CMW	Spr.:/Lang.: de	Aei:/C.I.: 04.01
		Blatt:/Sh.: 5 -	
CMW	Datum: Date: 08-06-11	Abteilung: Dept.: 1CMK	Name: Name: neugebau
	Zeichn.Nr.:/Drawing No.: 1201.0002.01 S		