Operating Manual

R&S® EDS 300

DME / PULSE Analyzer

5202.7006.02

ROHDE&SCHWARZ

5202.8831.02

Printed in the Federal
Republic of Germany

Rohde & Schwarz GmbH & Co. KG
Mühldorfstraße 15
D-81671 München
www.rohde-schwarz.com

5202.8831.02

ROHDE&SCHWARZ

EC Certificate of Conformity

CE

Certificate No.: **1101**

This is to certify that:

Equipment Type	Identifiation No.:	Designation
EDS 300	**5202.7006.02**	**DMD/PULSE ANALYZER**

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

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

Conformity is proven by compliance with the following standards:

EN61010-1:2001	EN55011:2007 + A2:2007, Class A
EN61326-1:2006	EN61000-3-2:2006 + A1:2009 + A2:2009
EN61326-2-1:2006	EN61000-3-3:2008

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

Affixing the CE Conformity Mark as from : 2011

ROHDE & SCHWARZ GmbH & Co. KG
Dienstleistungszentrum Köln
Graf-Zeppelin-Str. 18, D-51147 Köln

Cologne, 22.03.2011

Quality Management 5C-Q / Zorenböhmer

Content

Figures

1 General Information

1.1 General

The making of all connections necessary for operation must only be done by authorized persons; otherwise damage may be caused to the equipment!

During a thunderstorm, the device must not be operated using a hand held antenna.

This device is equipped with a firmly installed battery containing hazardous substances. Once the service life of the device has expired, it may be disposed of only via the Rohde & Schwarz Customer Service or at an appropriate collecting point!

Lithium/NiMH batteries are suitable for environmentally friendly disposal or specialized recycling. They may only be disposed of in designated containers. Do not short-circuit the battery, fire hazard!

This device is classified as a device of the class A (EN 55011). Class A equipment is intended for use in an industrial environment. It may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.

1.2 Unpacking the R&S® EDS 300 DME / PULSE Analyzer

1. Unpack the **R&S® EDS 300 DME / PULSE Analyzer**.

2. Examine the equipment for obvious damages.

3. Test the accessories supplied!
   - **Table Power pack with cable**
   - **Operating Manual**

We recommend that you recycle the packaging material. If you have questions regarding service or other problems with the equipment, you can contact us by telephone or fax.

ROHDE&SCHWARZ
Service Center Cologne

☎	(49) / 2203 / 49-51**406** (49) / 2203 / 49-51**402**
FAX	(49) / 2203 / 49-51**642**

1.3 Application and Features of the R&S® EDS 300 DME / PULSE Analyzer

1.3.1 Applications of the R&S® EDS 300 DME / PULSE Analyzer

The **R&S® EDS 300 DME / PULSE Analyzer** is used to test terrestrial DME radio navigation equipment. Due to its extremely high input sensitivity and its receive bandwidth of 960 MHz … 1215 MHz, ground-based DME systems at airports as well as airborne DME equipment in the aircraft can be tested based on the N/P DME standards.

The **R&S® EDS 300 DME / PULSE Analyzer** facilitates accurate level measurements, pulse form analysis and the identification of DME stations. Measuring functions for other terrestrial navigation signals (e.g TACAN analysis) can be integrated as an optional expansion.

- Main characteristics:
  - Compatible with ICAO Doc. 8071 and ICAO Annex 10
  - High input sensitivity of -90 dBm
  - Excellent protection against interference (inside and outside the band being used)
  - Very precise level measurement
  - Pulse form analysis
  - Measurement of DME/N and DME/P systems
  - Analysis of stationary and mobile TACAN stations
  - Various synchronization options (GPS, trigger and remote control options)

Examples of metrological fields of application:
- Verification of terrestrial radio navigation equipment (DME-P/N systems)
  - Ground-based DME equipment
  - Airborne DME equipment
- Measurement and evaluation of all the parameters in the case of high interference field strengths

1.3.2 Features of the R&S® EDS 300 DME / PULSE Analyzer

The **R&S® EDS 300 DME / PULSE Analyzer** is characterized by the following features:

- Compact housing design and lightweight construction
- High-resolution 6.4" TFT display (VGA, 640x480), can also be read easily in direct sunlight
- Remote control of the device via the LAN interface
- Measurement data transfer via the interfaces (LAN, USB, eSATA)
- High long-term stability and reproducibility due to digital signal processing
- All measurement data of a mode:
  DME,
  TACAN (Option EDS-K1),
  PULSE View (Option EDS-K2),
  GPS (Option EDS-K3),
  are shown simultaneously on the display.
- Expandable to up to four receive channels, option EDS-B1 / EDS B2
- Scanning mode (option) of multiple DME stations when multiple receive channels are available (Option EDS-B1 / EDS B2)

- ❑ Measurement of the carrier frequency and the modulation frequencies with the accuracy of the reference oscillator
- ❑ Automatic allocation of the receive channels in compliance with ICAO Annex 10
- ❑ High level measurement accuracy
- ❑ Position data recording (GPS, Option EDS-K3) via NMEA-0183 and customer-specific protocols
- ❑ Built-in speaker and headphone output
- ❑ Interfaces:
  Trigger IN / OUT,
  Analog IN / OUT,
  Suppressor input,
  4 x USB 2,0, 1 x eSATA*, 1 x LAN, 1 x RS232
  1 x DVI-D (24+1)
  * Option

1.4 Views of the Device

1.4.1 Front View

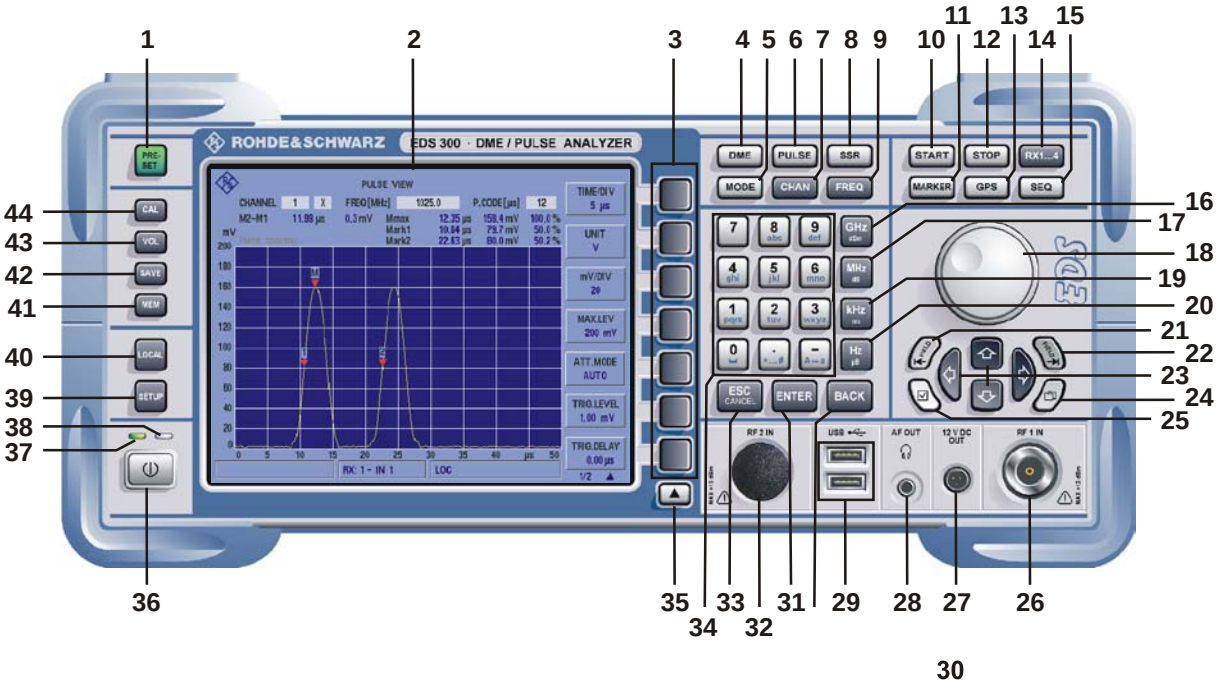


Fig. 1-1 shows the front view of the R&S® EDS 300 DME / PULSE Analyzer

1	PRESET button
2	TFT Colour Display (640 x 480 Pixels)
3	Softkeys (Program-dependent function keys)
4	DME mode button (selection of DME mode)
5	MODE button
6	PULSE mode button (selection of Pulse view mode, option)
7	CHAN editor button (Channel input)
8	SSR mode button (no function)
9	FREQ editor button (Frequency input)
10	START button (no function)
11	Marker button (Marker function)
12	STOP button (no function)
13	GPS button (selection of GPS function, option)
14	RX1…4 (selection of Receiving Unit, RX 2…4 option)
15	SEQ (no function)
16	GHz button (Frequency input in GHz)
17	MHz button (Frequency input in MHz)

18	Rollkey with ENTER function
19	kHz button (Frequency input in kHz)
20	Hz button (Frequency input in Hz)
21	Not set
22	Not set
23	Arrow (cursor) buttons
24	Screenshot button (Stored image of a current display)
25	Not set
26	RF 1 IN (Antenna input 1, N plug)
27	12 V DC OUT (DC output for active receiving antenna)
28	AF OUT (Headphone output)
29	USB (2x USB 2.0 ports)
30	BACK button (Backspace button)
31	ENTER button (Confirmation button)
32	RF 2 IN (no function)
33	ESC button (Cancel input)
34	Numeric keypad (numerical input)
35	Softkey extension (active in several menu windows, indication in the display 1/2▲ resp. 2/2▲)
36	POWER button (ON / OFF switch)
37	Operating LED, green (Power “ON”)
38	Standby LED, orange
39	SETUP button (selection of SETUP menu)
40	LOCAL button (Switch between Local / Remote)
41	MEM button (no function)
42	SAVE button (no function)
43	VOL button (Volume setting)
44	CAL button (no function)

1.4.2 Rear View

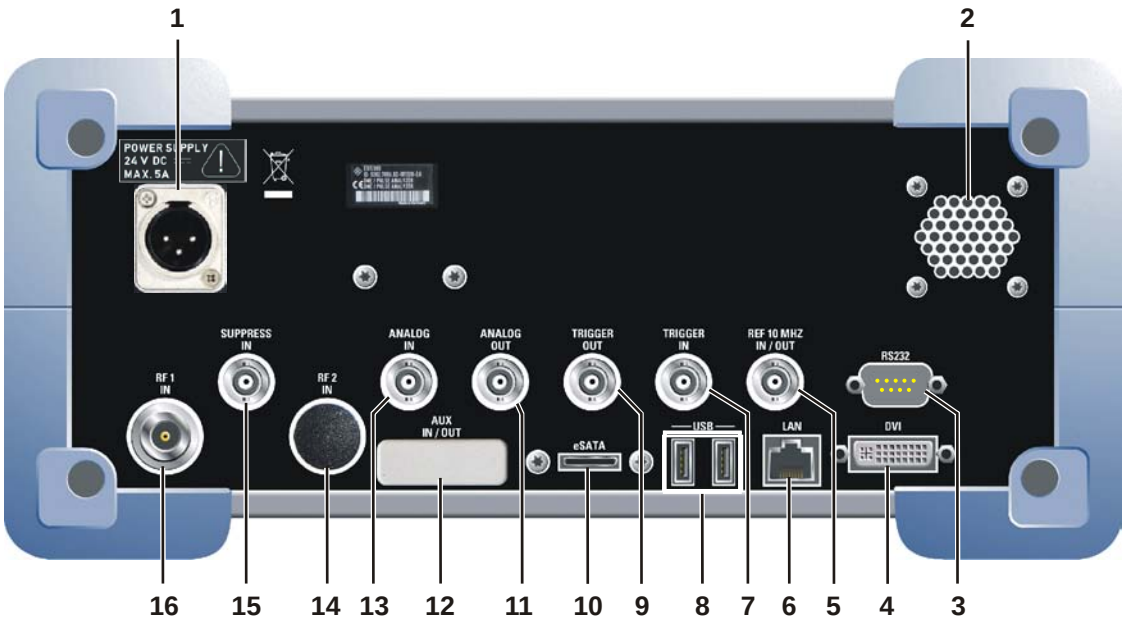


Fig. 1-2 shows the rack view of the R&S® EDS 300 DME / PULSE Analyzer

1	POWER SUPPLY (24 VDC) power supply connection for table power pack/external feed
2	Speaker
3	RS232 interface
4	DVI-D interface (Interface connection of an external monitor)
5	REF 10 MHZ IN/OUT (10 MHz Reference Frequency IN / Out)
6	NETWORK 100 BASE-T (LAN interface)
7	TRIGGER IN, 100 k Ω
8	USB (2x USB 2.0 ports)
9	TRIGGER OUT, 50 Ω
10	eSATA connection (for external hard disk, option)
11	ANALOG OUT, 50 Ω (Output for the analog signal, selection through setup)
12	AUX IN/OUT (no function)
13	ANALOG IN, 50 Ω (Input for the analog signal, selection through setup)
14	RF 2 IN (no function)
15	SUPRESS IN, (Input fort he “Suppressor Line“)
16	RF 1 IN (Antenna input 1 (option), N plug)

2 Preparation

2.1 Setting up the Equipment

The **R&S® EDS 300 DME / PULSE Analyzer** can be operated in a variety of places without detrimental effects on its features. Even the movement caused by transportation or mobile use will not impair its functioning.

Ensure sufficient circulation of the ambient air so as not to impair the device functions!

The device operates at ambient temperatures between +5 ... +40 °C. Storage temperature range -20 ... +70 °C.

2.1.1 Power Supply connection

2.1.1.1 General

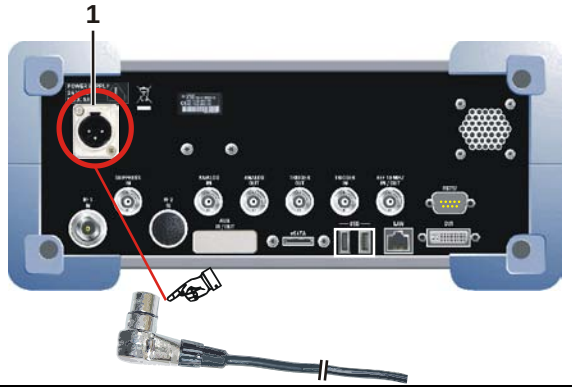
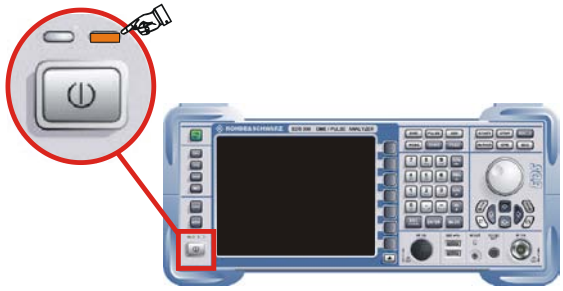
To ensure high mobility and flexibility in the use of the **R&S® EDS 300 DME / PULSE Analyzer** the device must be operated only on DC power (24 VDC). This can be supplied from the table power pack or from external DC power sources (with the corresponding technical data (24 VDC, 5.0 A).

The power connection plug (table power pack) must only be plugged into a two-pin grounded socket! The length of the DC cable must be <3 m. The device must not be connected to available direct voltage networks.

2.1.1.2 Table Power Pack connection

When operating on the 230 V AC power supply only the supplied table power pack must be used!

The **R&S® EDS 300 DME / PULSE Analyzer** is to be connected to the table power pack as follows:

1. Connect the power cable to the table power pack and to a main power socket.	
2. The green operating LED of the table power pack will light up.	
3. Connect the DC connector of the table power pack to the POWER supply connection (1) on the back of the device.	
4. The orange standby LED of the device will light up.	

2.1.1.3 12 / 24-DC / DC-Converter

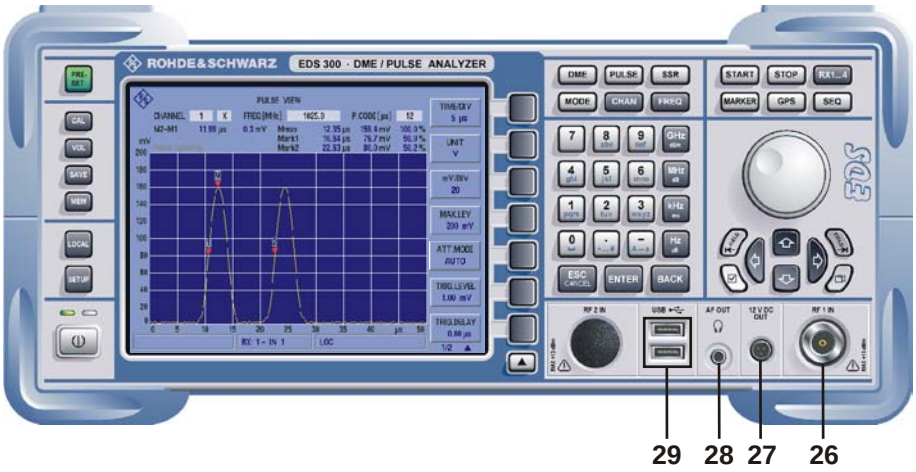
To facilitate mobile operation, a 12-V to 24-Volt converter can be interconnected.

This converter is available as an accessories.

2.1.1.4 Internal clock r

The **R&S® EDS 300 DME / PULSE Analyzer** contains an internal clock. A Lithium battery supplies this clock with the necessary voltage when the unit is switched off. If the Lithium battery is empty (life-span is approximately 5 years), the time and date will be lost. To exchange the Lithium battery the unit has to be opened, which may only be done by a competent service authority.

2.1.2 Connection of the Signal / Control-In / Outputs on the front of the device



2.1.2.1 Receiving antenna connection (26)

On the **RF-input (RF1 IN (26)** the **R&S® EDS 300 DME / PULSE Analyzer** is connected with one of the receiving antennae (max. +13 dBm) corresponding to the frequency range.

2.1.2.2 Voltage supply for external consumers (27)

Via the port 12 V DC OUT (27), DC voltage (12 VDC, 300 mA) to supply an active receiving antenna with power, for example, is output permanently.

2.1.2.3 Headphone connection (28)

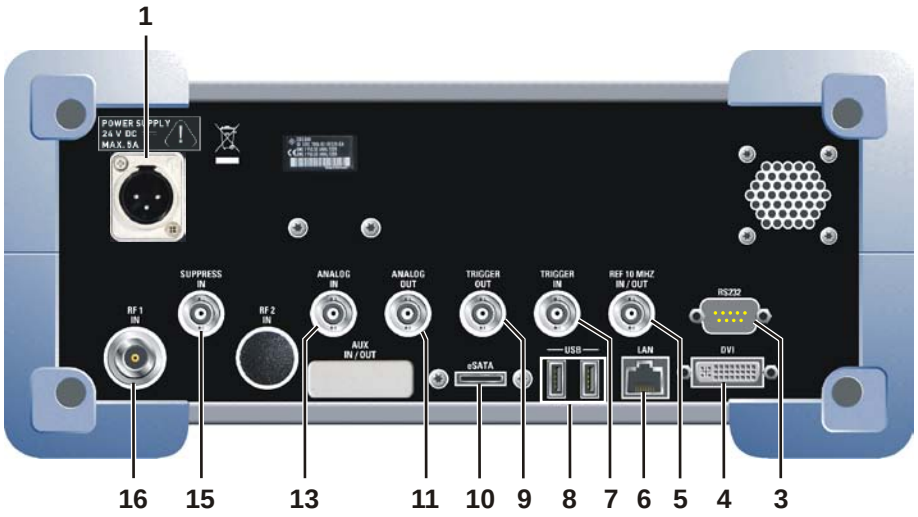
Connection of a headphone with a 3.5 mm jack plug into AF OUT plug (28).

2.1.2.4 USB port connection (Twin-Port, 29)

USB 2.0 ports for measurement data transfer for storage media, e.g. USB memory stick, USB hard disks.

Only USB sticks with the FAT / FAT32 file system are supported!

2.1.3 Connection of the Signal/Control-In/Outputs on the back of the device



2.1.3.1 Power Supply connection (1)

Through the power supply connection (POWER SUPPLY, 1), the table power pack or an external DC power source (24 VDC) is connected.

When connecting the device to an external direct voltage source, a 5-A fuse protection must be provided! The length of the DC cable must be <3 m. The device must not be connected to available direct voltage networks.

2.1.3.2 RS232 interface(3)

Through the RS232 interface (3), a GPS receiver is connected. The NMEA protocol data is read in and displayed in GPS mode (option EDS-K3). The baud rate is adjustable over the GPS menu.

2.1.3.3 DVI interface (4)

An external monitor (TFT) can be operated via the **DVI (1*) interface** (4).
*1 DVI (Digital Visual Interface)

2.1.3.4 10-MHz Reference frequency IN / Out (5)

Via the port **REF 10 MHZ IN/OUT** (5) an internal reference frequency can be output for synchronization, or 10 MHz can be supplied externally. The setting is made in the setup.

2.1.3.5 LAN connection (6)

Through the **LAN connection (Fast Ethernet) (9)**, all functions of the device and the data transfer of the measurement data of the **R&S® EDS 300 DME / PULSE Analyzer** can be remotely operated from a PC / network. IP Addresses and subnet mask identifier are set in the setup menu. The data transfer rate is 100 Mbit/s.

2.1.3.6 Trigger input (7)

Via the **TRIGGER IN** (7) input, digital trigger signals, e.g. from the DME transmission system. can be fed in PULSE View mode for external triggering.

2.1.3.7 USB Ports (Twin-Port, 8)

USB 2.0 ports for measurement data transfer for storage media, e.g. USB memory stick or USB hard disks.

2.1.3.8 Trigger output (9)

Via the output **TRIGGER OUT** (9), digital trigger signals can be output, e.g. pulse triggers for controlling the DME transmission system. The corresponding settings of the trigger output are made in the setup.

2.1.3.9 eSATA interface (10, Option)

For connecting a SATA hard disk (3.0 Gb/s) via hot plugging for backing up measured data. The external hard disk can be supplied with voltage via a USB port (8).

2.1.3.10 Signal output ANALOG OUT (11)

The analog signal output **ANALOG OUT** (11) can be used as an output for the analog baseband signal, the 15-Hz / 135-Hz signals or the audio signal. The corresponding setting of the signal type is made in the setup.

2.1.3.11 Signal input ANALOG IN (13)

Via the **ANALOG IN** (6) input, an analog baseband signal can be fed to the **R&S® EDS 300 DME / PULSE Analyzer** for analysis. The selection as well as settings for the input are made in the setup.

2.1.3.12 Receiving antenna connection (16, Option)

On the **RF-input (RF1 IN (16)** the **R&S® EDS 300 DME / PULSE Analyzer** is connected with one of the receiving antennae (max. +13 dBm) corresponding to the frequency range.

The receiving antenna port is located on the front side of the device by default (RF1 IN (26), it can optionally be located on the rear of the device (RF1 IN (16). Depending on the individual equipment option, the respective port on the front / rear side of the device will be omitted.

2.1.3.13 SUPPRESS signal input (15)

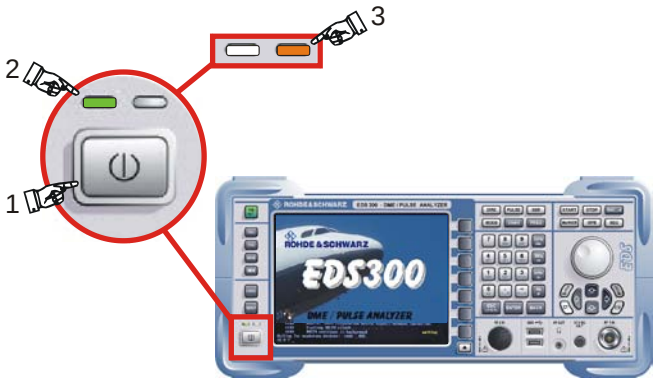
Switch signal input (Suppressor Line, effects temporary switch-off of the on-board receiver in aircraft), also serves as a protection function for receivers when FIS (Flight Inspection Systems) is used.

3 Operation

3.1 Switch ON / OFF the R&S® EDS 300 DME / PULSE Analyzer

To switch on or off the device press the "Power" (1) button.

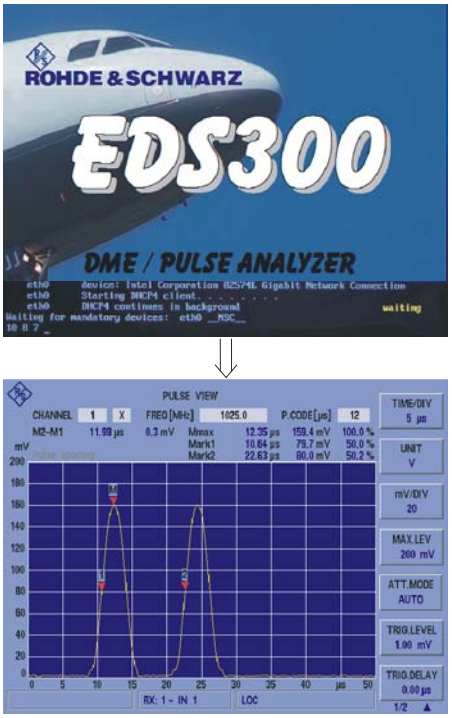
When switching the device on, the operation LED (2, green) lights up instead of the standby LED (3, orange).



3.1.1 Power-Up Process

The boot process of the **R&S® EDS 300 DME / PULSE Analyzer** and its progress is indicated. Then the device switches over automatically into the last using measurement mode.

When switched on, the device is generally in the measurement mode that was active when the device was switched off.

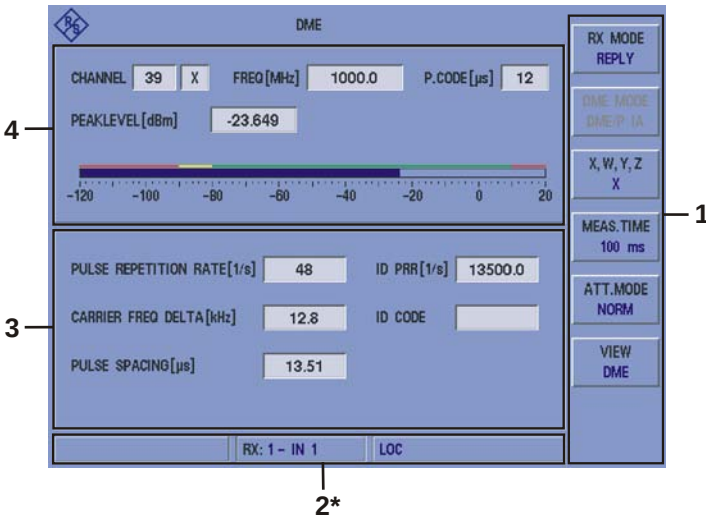


If a failure occurs when booting the device, switch it off and make a restart after a few seconds. If a failure occurs again we recommend to contact Rohde & Schwarz.

3.2 Description oft he Display and the Controls

3.2.1 Display Layout

General example of the display layout in DME mode.



Example: DME mode

Item	Function
1	Softkeys
2*	Status section
3	Measured values section
4	RF Parameter section

3.2.1.1 Status section (2*)

In all modes, the status section shows just general specific device information exception is the mode display.

1 2 3

Item	Display	Function	Indication
1	Options and status section	Display of the Data Logger status, for example.	
2	RX:	Display of the set receiver unit (RX 1 … 4) (RX 2, 3, 4 = option)	RX: 1 … 4
3	LOC / REM / RLC	LOC "LOCAL"= local operation REM "REMOTE"= remote operation (the function can be switched off over the button "LOC") RLC "REMOTELOCK" = the local operation is locked by remote control (also see control command "REMOTELOCK")	LOC / REM / RLC

3.2.2 Controls

Settings on the R&S® EDS 300 DME / PULSE Analyzer can be made as well with the rollkey as with the arrow buttons / Numeric keypad

3.2.2.1 Numeric keypad

The numeric keypad is used for numerical entries into the device. The relating edit windows can be activated either by the softkeys or by the "FREQ" button. An entry can be confirmed with the "Enter" button (e.g. the entered value is accepted) or it can be aborted with the "ESC" button. If the entry is aborted the old value is automatically reactivated. In addition, when using the "BACK" (backspace) button, the last input character can be deleted. If alphanumeric input is required, the numeric keypad can be switch automatically to alpha input. The respective letter of a button is selected via a toggle switch.

A set receiving frequency can be confirmed as well with the "ENTER" button as with the corresponding dimension button (Hz ... GHz)!

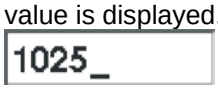
Example: Frequency modification

	Control	Operation	Function
1.	FREQ	Press the "FREQ" (9) button.	Activating the frequency input, the frequency section is activated and behind the last digit the cursor appears. 962.0_
2.	0 ... 9 def	Direct entry of the desired receiving frequency.	The frequency should be entered with the corresponding decimal place. 1025_
3.	MHz dBm / GHz -dBm ENTER	Confirm	Changeover to the new set frequency. 1025.0

3.2.2.2 Rollkey

The rollkey is a universally control element for value changes and to confirm them by its push function. The rollkey can also be used for navigation purposes in the setup or in the scroll listings. To change a value the relating edit function must be active.

Example: Changing a numerical value

	Control	Operation	Function
1.		Press the "FREQ" (9) button.	Activating the frequency input, the frequency section is activated and behind the last digit the cursor appears. 
2.		Turn the rollkey until the right value is displayed. 	**-** = value decreases **+** = value increases
3.		Confirm (push rollkey)	Changeover to the new set frequency. 

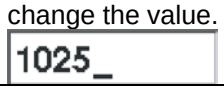
Example: Setup navigation (change setting of the receiver unit RX Board 1)

	Control	Operation	Function
1.		Press the "SETUP" (39) button.	Activates the setup menu.
2.		Press the "SIGNAL IN" softkey	Changeover the menu window "SIGNAL IN" settings.
3.		Selecting the menu point "RX Board 1".	**-** = move ⇑ **+** = move ⇓
4.		Confirm (push rollkey)	Now changes can be concluded.
5.		Select 	**-** = move ⇑ **+** = move ⇓
6.		Confirm (push rollkey)	Acceptance of the new changes.

3.2.2.3 Arrow buttons

The arrow buttons are for changing values or it can for navigation in the setup. To change a value the relating edit function must be active. Always the entry must be confirmed with the "Enter" button or by pushing the rollkey.

Example: Changing a numerical value:

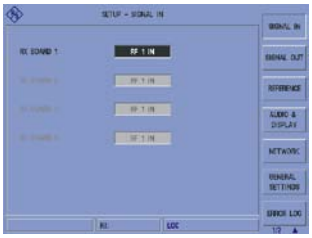
	Control	Operation	Function
1.		Press the "FREQ" (9) button.	Activating the frequency input, the frequency field is highlighted in white and behind the last digit the cursor appears. 
2.		Hold the arrow button depressed until the wanted cursor position is reached. Use the up/down arrows to change the value. 	⇐ = Cursor moves to the left ⇒ = Cursor moves to the right ⇑ = value increases ⇓ = value decreases
3.		Press the Enter button / push rollkey.	Changeover to the new set value. 

Example: Setup navigation (change setting of the receiver unit RX Board 1)

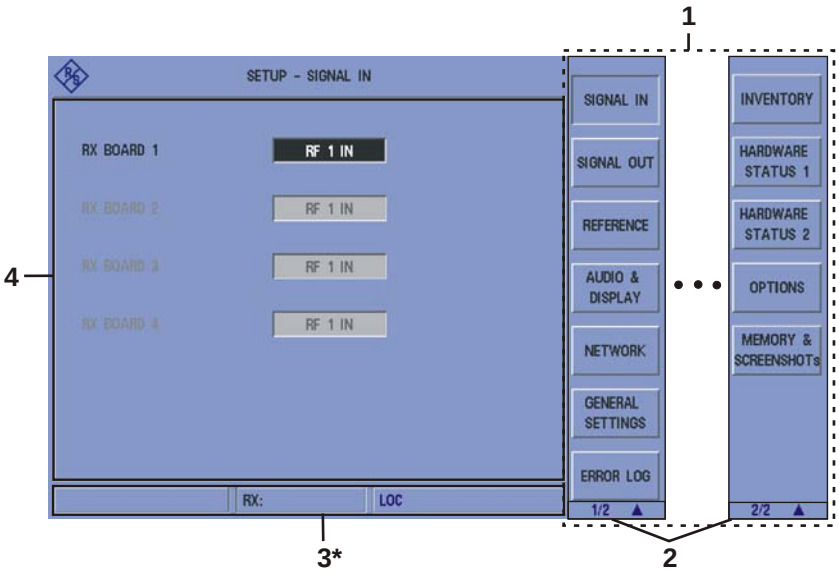
	Control	Operation	Function
1.		Press the "SETUP" (39) button.	Activates the setup menu.
2.		Press the "SIGNAL IN" softkey	Changeover the menu window "SIGNAL IN" settings.
3.		Selecting the menu point "RX Board 1".	⇑ = Move up ⇓ = Move down
4.		Press the Enter button / push rollkey.	Now changes can be concluded.
5.		Select 	⇑ = Move up ⇓ = Move down
6.		Press the Enter button / push rollkey.	Acceptance of the new changes.

3.3 Settings in the Setup menu

Activates the setup menu

	Control	Operation	Function
1.	SETUP	Press the "SETUP" (39) button.	The R&S® EVS 300 switches over into the setup menu. 

3.3.1 General



3* for general description of the status section, refer to 3.2.1.1

Due to the multitude of settings offered, two softkey bars(1) are available. The currently displayed softkey bar (2) will be identified with the 1/2▲ e.g. 2/2▲ -symbol (3). Use the "▲" -button to switch back and forth between the softkey bars.

In the setup menu the following menu windows can be opened by the softkeys:

Softkey bar 1

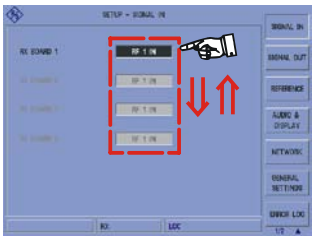
- Menu window; SIGNAL IN (signal input settings),
- Menu window; SIGNAL OUT (signal output settings),
- Menu window; REFERENCE (reference frequency settings)
- Menu window; AUDIO & DISPLAY (Display and audio setting),
- Menu window; NETWORK (LAN-interface setting),
- Menu window; GENERAL SETTINGS (Base setting of the device),
- Menu window; ERROR LOG (Call-up the Error Log).

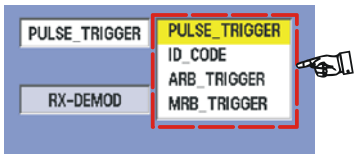
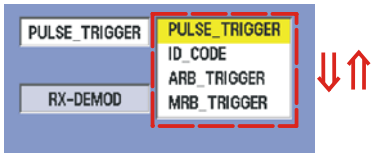
Softkey bar 2

- Menufenster INVENTORY (Call-up the Inventory)
- Menufenster; HARDWARE STATUS 1 (mainboard device operating parameters),
- Menufenster; HARDWARE STATUS 2 (device operating parameters for the receiver units),
- Menufenster; OPTIONS (Call-up the optional upgrading),
- Menufenster; MEMORY & SCREENSHOTs.

3.3.2 General operating steps in the setup menu

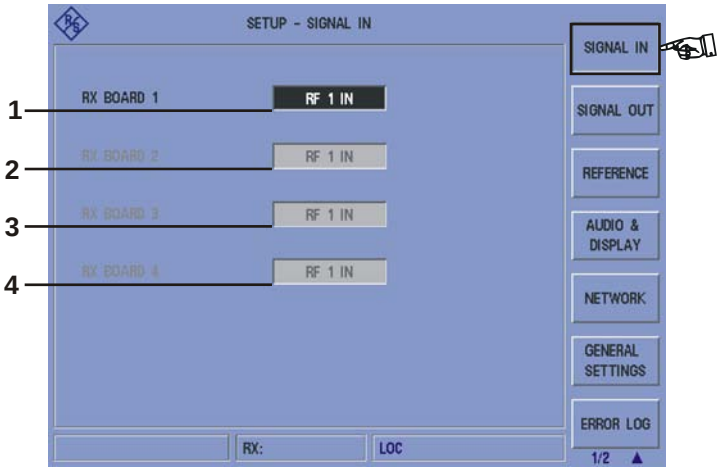
The general operating steps are described below. They explain the repeating operation steps, which are necessary for navigation and setting changes. For further setup operation these steps are required.

	Control	Operation	Function
1.		Press the softkey to open the menu. 	The activated softkey is displayed pressed. 
2.		Navigate to the individual selection window. **-** = move ⇑ **+** = move ⇓	In the active menu window a selection window is always shown black shadowed. From here on you can navigate with the rollkey. 
Selection window with edit function			
3.		Press the Enter button / push rollkey.	Activates the edit function in the selection window. 
4.		Turn the rollkey repeatedly until the required value appears.	**-** = value decreases **+** = value increases 

	Control	Operation	Function
5.		Press the Enter button / push rollkey.	Acceptance of the new set value. The setting is immediately active. 
Selection-list			
6.		Press the Enter button / push rollkey.	Activates the selection-list. 
7.		Turn the rollkey repeatedly until the required value appears.	
8.		Press the Enter button / push rollkey.	Acceptance of the new set value. The setting is immediately active.

3.3.3 Settings for the Signal Inputs

	Control	Operation	Function
1.	SIGNAL IN	Press the softkey "SIGNAL IN".	Changeover into the "SIGNAL IN" menu window.



Item	Display	Function	Indication
1	RX BOARD 1	Selection of the RF input (RF 1) or switch-over to the baseband signal at the analog input to receiving unit RX 1.	RF 1 IN BASE BAND
2	RX BOARD 2 (1*, 2*)	Selection of the antenna input (RF 1) or switchover to the baseband signal at the analog input to receiving unit RX 2.	RF 1 IN BASE BAND
3	RX BOARD 3 (1*, 2*)	Selection of the RF input (RF 1) or switch-over to the baseband signal at the analog input to receiving unit RX 3.	RF 1 IN BASE BAND
4	RX BOARD 4 (1*, 2*)	Selection of the antenna input (RF 1) or switchover to the baseband signal at the analog input to receiving unit RX 4.	RF 1 IN BASE BAND

1* can be set only when equipped with option EDS-B1
2* can be set only when equipped with option EDS-B2

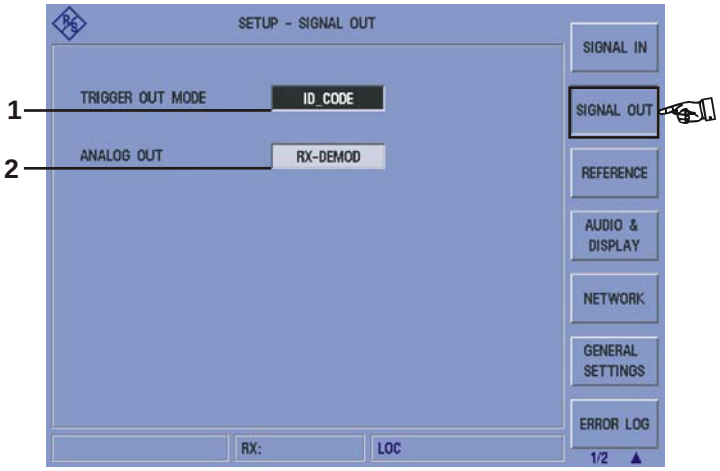
3.3.3.1 Analysis Selection of Receiving Unit RX1 … 4

The following settings can be made individually for any available unit (RX 2 … 3 optional).

	Control	Operation	Function
1.	Selection of the "RX BOARD 1 … 4" selection window according to section 3.3.2.		
2.		Turn the rollkey repeatedly until the required selection appears.	Selection of the RF input signal (RF 1) or switchover to the baseband signal at the analog input for further analysis in the device. Selection: RF 1 IN, BASE BAND
3.		Press the Enter button / push rollkey.	Acceptance of the new set selection.

3.3.4 Settings for the Signal Outputs

	Control	Operation	Function
1.		Press the softkey "SIGNAL OUT".	Changeover into the "SIGNAL OUT" menu window.



Item	Display	Function	Indication
1	TRIGGER OUT MODE	Selection of the trigger type for the trigger output "TRIGGER OUT"	PULSE_TRIGGER ID_CODE, ARB_TRGGER (1*), MRB_TRIGGER (1*)
2	ANALOG OUT	Signal selection for the analog output "ANALOG OUT"	RX_DEMOD, RX1_LOGAMP, 15_HZ (1*),

Item	Display	Function	Indication
			135_HZ (1*)

1* can only be selected for the option EDS-K1 TACAN analysis

3.3.4.1 Setting of the Trigger Type

	Control	Operation	Function
1.	Selection of the "TRIGGER OUT MODE" selection window according to section 3.3.2.		
2.		Turn the rollkey repeatedly until the required selection appears.	Selection of the trigger type for controlling a DME transmission system. Selection: PULSE_TRIGGER, ID_CODE, ARB_TRGGER (1*), MRB_TRIGGER (1*)
3.		Press the Enter button / push rollkey.	Acceptance of the new set selection.

1* can only be selected for the option EDS-K1 TACAN analysis

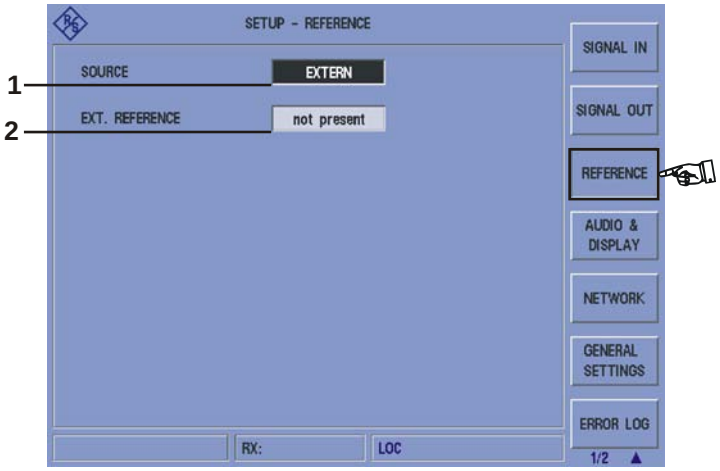
3.3.4.2 Settings for the Analog Signal Output

	Control	Operation	Function
1.	Selection of the "ANALOG OUT" selection window according to section 3.3.2.		
2.		Turn the rollkey repeatedly until the required selection appears.	Selecting a signal from the analog device signals that are output at the analog signal output "ANALOG OUT". Selection: RX-DEMOD, RX1_LOGAMP, 15_HZ (1*), 135_HZ (1*)
3.		Press the Enter button / push rollkey.	Acceptance of the new set selection.

1* can only be selected for the option EDS-K1 TACAN analysis

3.3.5 Settings for the Reference Frequency Output

	Control	Operation	Function
1.		Press the softkey "REFERENCE".	Changeover into the "REFERENCE" menu window.



Item	Display	Function	Indication
1	SOURCE	Assignment as to whether the reference frequency port "REF 10 MHZ IN/OUT" is set as an input or an output.	INTERN, EXTERN
2	EXT. REFERENCE	Indication as to whether an external 10-MHz reference signal is applied or whether the internal 10-MHz reference signal is being output.	Present, not present, output

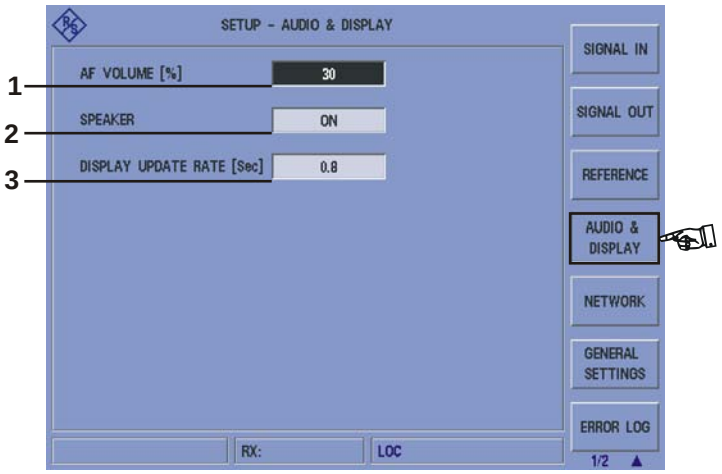
3.3.5.1 Settings for the 10-MHz Reference Frequency Port

	Control	Operation	Function
1.	Selection of the "SOURCE" selection window according to section 3.3.2.		
2.		Turn the rollkey repeatedly until the required selection appears.	Setting defining whether the reference frequency port "REF 10 MHZ IN/OUT" is set as an input or an output. Selection: EXTERN /INTERN
		If "**INTERN**" is set, the reference frequency port acts as an output. In this case, the internal 10-MHz reference frequency signal is applied for synchronizing other devices. In the "EXT. REFERENCE" display, "output" confirms the setting. If "**EXTERN**" is set, the reference frequency port acts as an input. In this case, an external 10-MHz reference frequency signal can be fed for synchronizing the device. In the "EXT. REFERENCE" display, "present" confirms the setting if an external reference signal is applied. If a reference signal is not applied, "not present" will be displayed and the internal reference	

	Control	Operation	Function
		will automatically be selected.	
3.		Press the Enter button / push rollkey.	Acceptance of the new set selection.

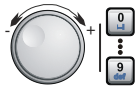
3.3.6 Setting the Audio- und Display characteristics

	Control	Operation	Function
1.		Press the softkey "AUDIO & DISPLAY".	Changeover into the "AUDIO & DISPLAY" menu window.



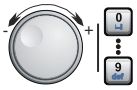
Item	Display	Function	Indication
1	AF VOLUME [%]	Setting of the AF-output level (loudspeaker)	0 … 100 %
2	SPEAKER	Switch ON / OFF the loudspeaker	ON / OFF
3	DISPLAY UPDATE RATE [Sec]	Setting of the display update time	0.1 s ... 2 s

3.3.6.1 Setting the AF Volume

	Control	Operation	Function
1.	Selection of the "AF VOLUME" selection window according to section 3.3.2.		
2.		Setting the corresponding value with rollkey / keyboard.	Setting the AF-volume, this will affect the headset and loudspeaker output volume Setting value: 0 ... 100 %

	Control	Operation	Function
3.		Press the Enter button / push rollkey.	Acceptance of the new set value.

3.3.6.2 Setting the Display Update Rate

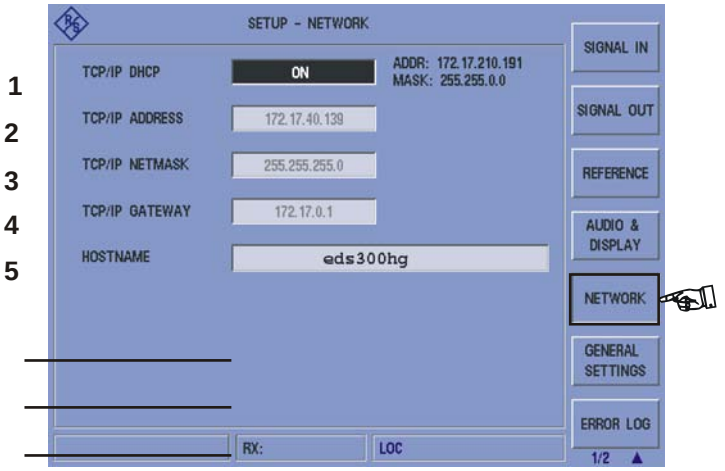
	Control	Operation	Function
1.	Selection of the "DISPLAY UPDATE RATE" selection window according to section 3.3.2.		
2.		Setting the corresponding value with rollkey / keyboard.	Display update rate setting (measurement values DME-, PULSE VIEW-Mode) update in the display. Setting value: 0.1 ... 2 s
3.		Press the Enter button / push rollkey.	Acceptance of the new set value.

3.3.6.3 Setting the Loudspeaker (ON / OFF)

	Control	Operation	Function
1.	Selection of the "SPEAKER" selection window according to section 3.3.2.		
2.		Select	ON / OFF sound of the loudspeaker. Selection: ON / OFF
3.		Press the Enter button / push rollkey.	Acceptance of the new set function.

3.3.7 Setting the Communication interface

	Control	Operation	Function
1.	NETWORK	Press the softkey "NETWORK".	Changeover into the "NETWORK" menu window.



Item	Display	Function	Indication
1	TCP / IP DHCP	Setting of the Dynamic Host Configuration Protocol (DHCP)	ON / OFF
2	TCP / IP ADDRESS	Setting of the device IP-address	xxx.xx.xx.xxx
3	TCP / IP NETMASK	Setting of the IP Netmask	xxx.xxx.xxx.x
4	TCP / IP GATEWAY	Setting of the IP Gateway	xxx.xx.x.x
5	HOSTNAME	Enter any desired device name (host name) "EDS300" (default).	e.g. "EDS300"

3.3.7.1 Setting of the Dynamic Host Configuration Protocol (DHCP)

	Control	Operation	Function
1.	Selection of the "TCP / IP DHCP" selection window according to section 3.3.2.		
2.		Select	Using the Dynamic Host Configuration Protocol (DHCP), the dynamic configuration of the IP address will be initiated. After the activation, the IP address and the submask address will be displayed next to the selection window. ADDR: 172.17.210.191 MASK: 255.255.0.0 Selection: ON / OFF

If the Dynamic Host Configuration Protocol is used, all other protocol settings become inactive!

	Control	Operation	Function
3.		Press the Enter button / push rollkey.	Acceptance of the new set function.

3.3.7.2 IP Address setting

	Control	Operation	Function
1.	Selection of the "TCP / IP ADDRESS" selection window according to section 3.3.2.		
2.		Enter the decimal number	Setting of the IP address to run the device in a LAN-network. e.g. 172.17.40.139
3.		Press the Enter button / push rollkey.	Acceptance of the new set IP address.

3.3.7.3 Netmask ID setting

	Control	Operation	Function
1.	Selection of the "TCP / IP NETMASK" selection window according to section 3.3.2.		
2.		Enter the decimal number	Setting of the netmask ID to run the device in a LAN-network. e.g. 255.255.255.0
3.		Press the Enter button / push rollkey.	Acceptance of the new set Netmask ID.

3.3.7.4 Gateway ID setting

	Control	Operation	Function
1.	Selection of the "TCP / IP GATEWAY" selection window according to section 3.3.2.		
2.		Enter the decimal number	Setting of the Gateway ID to run the device in a LAN-network. e.g. 192.168.1.1

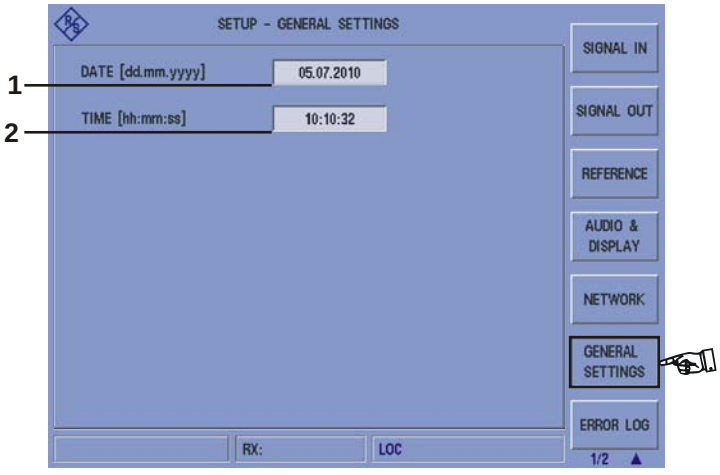
	Control	Operation	Function
3.		Press the Enter button / push rollkey.	Acceptance of the new set Gateway ID.

3.3.7.5 Assigning a Hostname

	Control	Operation	Function
1.	Selection of the "HOSTNAME" selection window according to section 3.3.2.		
2.		Enter the decimal number	Assign a device name (host name). The default name is "EDS300".
3.		Press the Enter button / push rollkey.	Acceptance of the new set device name (host name).

3.3.8 Setting the General features

	Control	Operation	Function
1.		Press the softkey "GENERAL SETTINGS".	Changeover into the "GENERAL SETTINGS" menu window.



Item	Display	Function	Indication
1	DATE [dd.mm.yyyy]	Date setting	dd.mm.yyyy
2	TIME [hh:mm:ss]	Time setting	hh:mm:ss

3.3.8.1 Date setting

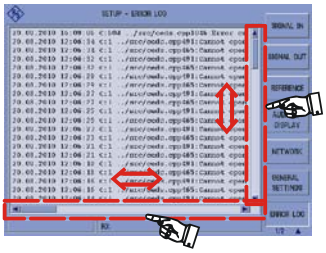
	Control	Operation	Function
1.	Selection of the "DATE" selection window according to section 3.3.2.		
2.	0 ... 9	Enter the date.	Enter the date in the format shown (dd.mm.yyyy). e.g. 01.01.2010
3.		Press the Enter button / push rollkey.	Acceptance of the new set date.

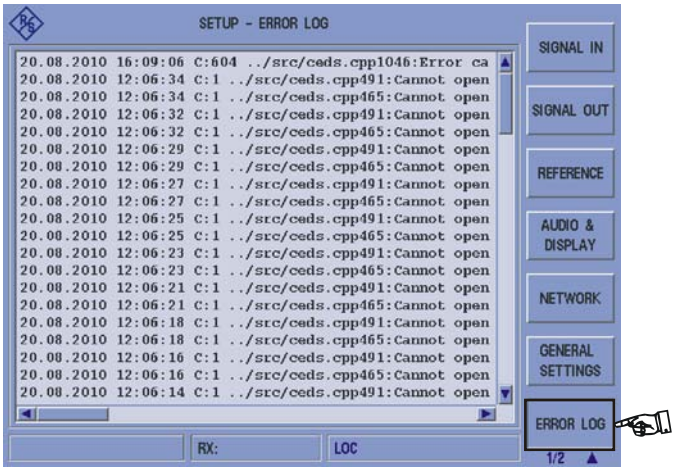
3.3.8.2 Time setting

	Control	Operation	Function
1.	Selection of the "TIME" selection window according to section 3.3.2.		
2.	0 ... 9	Enter the real time.	Enter the time in the format shown (hh:mm:ss). e.g. 08:59:00
3.		Press the Enter button / push rollkey.	Acceptance of the new set time.

3.3.9 Call-up the Error Logbook

The error logbook contains only service information!

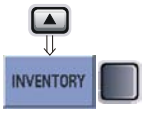
	Control	Operation	Function
1.		Press the Softkey "ERROR LOG".	Changeover to the "ERROR LOG" menu window. General notes pertaining to the status of the device will be entered into the error logbook. In case of a malfunction, the cause of the error can be viewed here.
2.		With the rollkey / arrow buttons can navigate in the Error Logbook.	

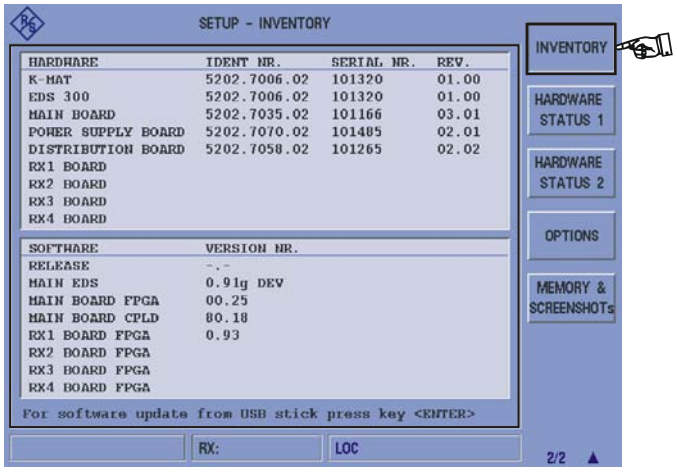


The entries can be deleted irrevocably over the button "ESC / Cancel"! Confirm the dialog "CLEAR ERROR LOG?" with ENTER.

3.3.10 Call-up the Hardware / Software inventory list

The hardware / software inventory list provides information about the hardware version of the device (integrated modules, options etc.) and about the current software versions being used. This information is necessary for service purposes. Furthermore, if using a USB-memory stick (available with current software update), a software update can be processed.

	Control	Operation	Function
1.		Switch to the second menu window of the setup function and press the softkey "INVENTORY".	Changeover to the "INVENTORY" menu window. In this hardware / software inventory list the following information is displayed. **Hardware:** article code., serial number and revision number of the built-in modules **Software:** software version number. for the: Release and the relevant firmware of the built-in modules



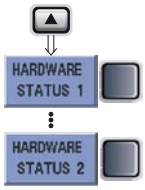
3.3.10.1 Software Update

Click on the following website to receive the latest software update for your R&S® EDS 300 DME / PULSE Analyzer:
http://www.rohde-schwarz.com/product/eds300.html.

Implementation of how to update the software is described in section 5.3!

3.3.11 Call-up the Device operating parameters

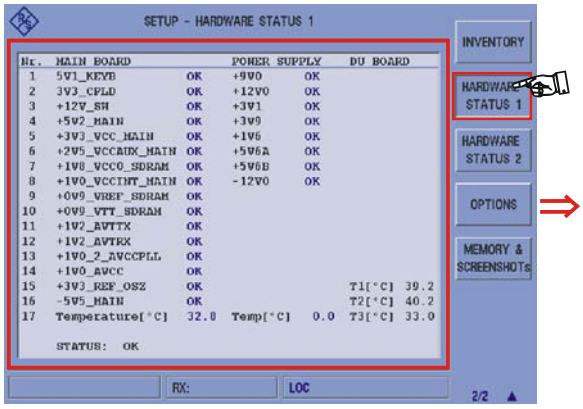
The hardware status includes the most important device operating parameters. This may contain information about possible causes of error!

	Control	Operation	Function
1.		Switch to the second menu window of the setup function and press the softkey "HARDWARE STATUS 1 / 2".	Changeover to the "HARDWARE STATUS 1 / 2" menu window.

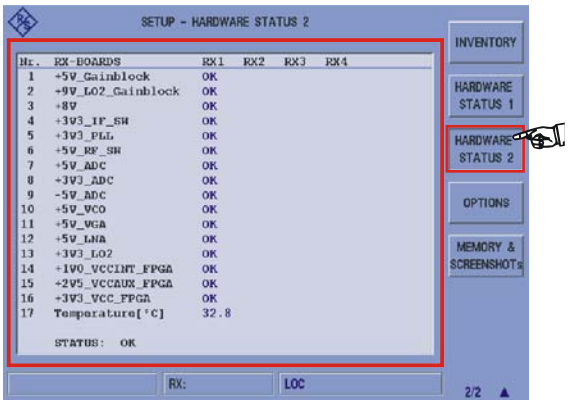
The "HARDWARE STATUS 1" menu window provides information about various test voltages and temperatures of the mainboard, the power pack and the antenna distributing unit (DU board).

The "HARDWARE STATUS 2" menu window provides information about various test voltages and temperatures of the integrated receiver modules.

Display "Status" indicates the sum of all test voltages.



HARDWARE STATUS 1



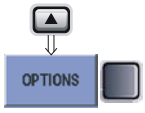
HARDWARE STATUS 2

3.3.12 Software options

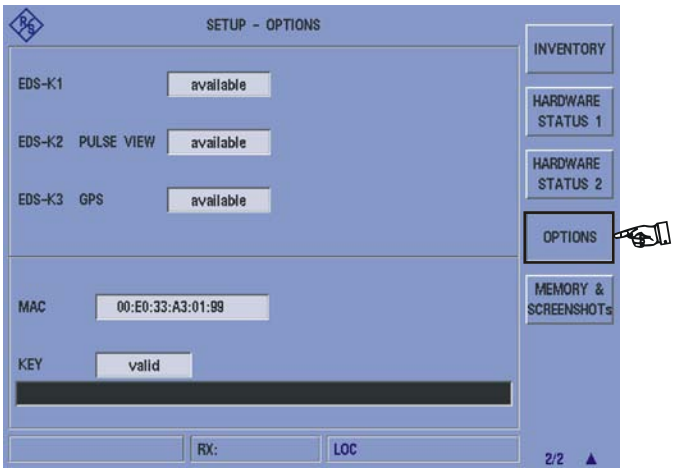
Through the menu window "Options", all software options, which are installed in the device may be displayed. Rohde & Schwarz offers the following software features as an option:

- DME-TACAN (EDS-K1, TACAN Signal Analysis),
- PULSE VIEW (EDS-K2, Pulse Shape Analysis),
- GPS (EDS-K3: GPS mode).

A licence is purchased for each respective option. The options window can be used to activate the option purchased.

	Control	Operation	Function
1.		Switch to the second menu window of the setup function and press the softkey “OPTIONS”.	Changeover to the "OPTIONS" menu window. This function displays the device-specific optional extensions.

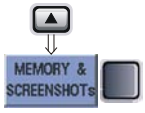
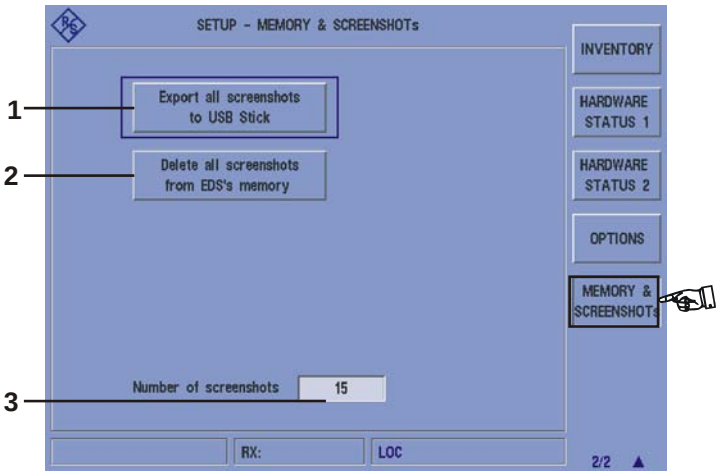
As soon as an option is activated, it will be identified as "available”, otherwise, "not available” will be displayed. In addition, the device-internal MAC address of the network adapter is displayed; this information is required, since the option selection is dependant on the MAC address.



The activation of the software option is described in Section 3.10!

3.3.13 Memory & Screenshots

When using the menu window "Memory & Screenshots", the screenshots of the EVS memory can be deleted or copied to the USB-memory stick. They will be stored in PNG-image format (Portable Network Graphics).

	Control	Operation	Function
1.		Switch to the second menu window of the setup function and press the softkey “MEMORY & SCREENSHOTS”.	Changeover to the "MEMORY & SCREENSHOTS" menu window.
			
	1 - Function button, activates copying of all stored screenshots to a USB-memory stick. 2 - Function button, activates the deletion of all stored screenshots. 3 - Display window, displays the total number of screenshots stored.		
2.		When using the rollkey / arrow buttons, the respective function keys 1 / 2 can be selected, and by using the Enter button / push rollkey, the function can be activated.	Once the appropriate function has been selected, any further process can be controlled via the dialog box.

3.4 Setting of the RF-Signal Adjustment

The RF signal adjustment is available in the modes DME and PULSE VIEW.

	Control	Operation	Function
1.		Press the softkey "ATT MODE" repeatedly until the wanted mode is set.	The set mode will be updated in the softkey and is then immediately active.  The following modes are available: - **LOW NOISE** (+15 dB amplification) - **NORM** (Normal, 0 dB) - **LOW DIST** (Low Distortion, -15 dB attenuation) - **AUTO** (automatic setting, (-15, 0, +15 dB)

By the setting in the ATT mode the RF level can be influenced individually. As shown in the block diagram corresponding signal paths will be switched for the different functions, which effects the RF signal either with an amplification (Preamplifier +15 dB), an attenuation (Attenuator -15 dB) or has no influences to the signal (Bypass). For data safety on measurement the methods of the ATT mode on the following receive levels can be used:

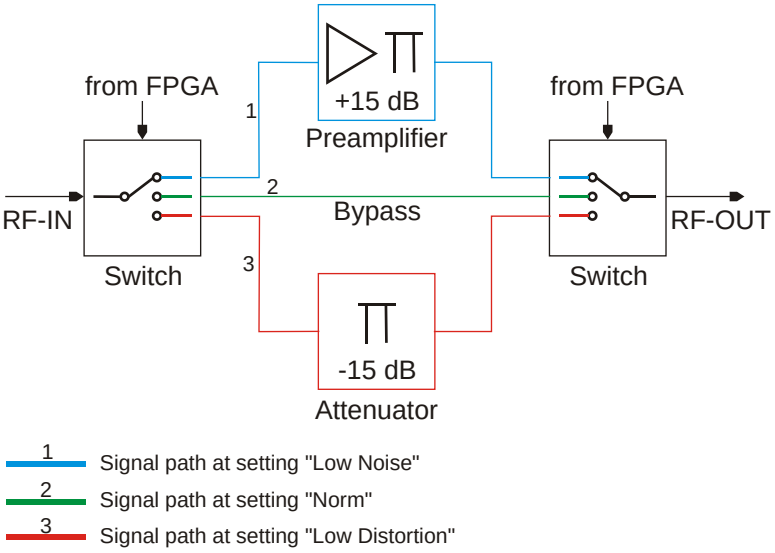
LOW Noise: from <-40 dB, Indicating range: -120 … -20 dBm

NORM: from <-20 dB, Indicating range: -110 … -10 dBm

LOW DISTORTION: from >-20 dB, Indicating range: -100 … 20 dBm

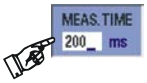
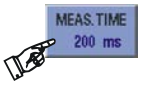
Depending on the signal level in the Auto mode automatically the correct signal path is switched. Indicating range: -120 … 20 dBm.

The max. input level is +13 dBm!

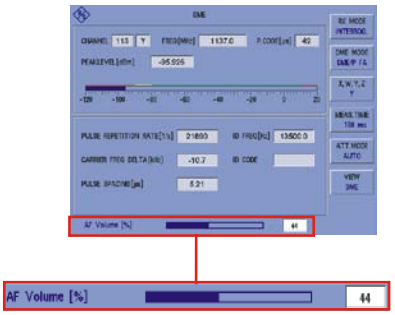


3.5 Setting the Measurement Interval Time

The setting of a measurement time interval is available in DME mode. The measurement time setting defines the time period, for which the measured values are averaged.

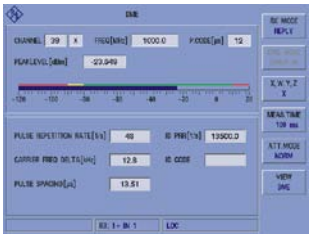
	Control	Operation	Function
1.		Press the softkey "MEAS.TIME".	Change to the editing function for setting the measurement period. The value field in the softkey will be highlighted by a different background. 
2.		Setting the corresponding measurement period using the rollkey.	The current measuring time will be carried along numerically in the softkey. Setting range: 10 … 2000 ms 
3.		Press the Enter button / push rollkey.	Acceptance of the new set measuring time. 

3.6 AF-Volume setting

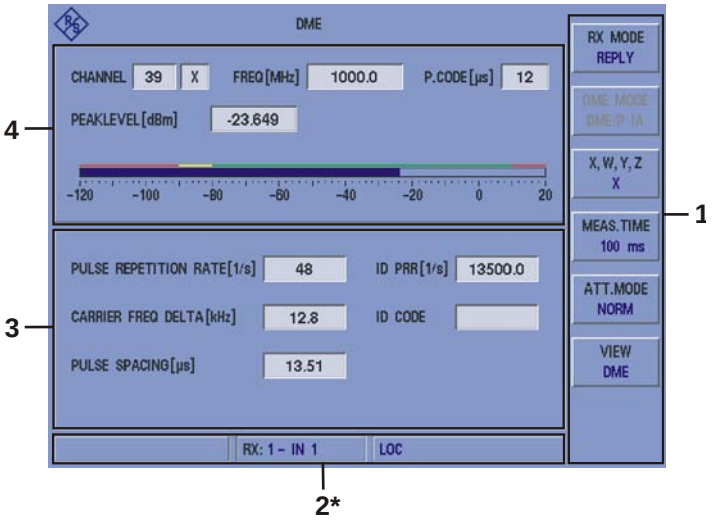
	Control	Operation	Function
1.		Press the "VOL" (43) button.	In the respective mode (e.g. ILS) the status display switches to editing function to enable the volume to be set. The change will be displayed numerically and graphically on the bargraph. Once the setting procedure has been completed, the display will return to the status indication. 
2.		Setting the AF-volume with rollkey.	Setting of the AF-volume level at the speaker. Setting range: 0 … 100 %
3.		Press the Enter button / push rollkey.	Acceptance of the new set AF-volume level.

3.7 DME mode operation

Activates the DME mode

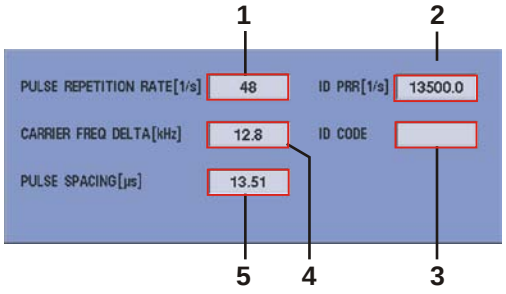
	Control	Operation	Function
1.	DME	Press the "DME" (6) button.	The R&S® EDS 300 switches over into the DME mode. 

3.7.1 Signal Parameters and Display in the DME mode



2* for general description of the status section, refer to 3.2.1.1

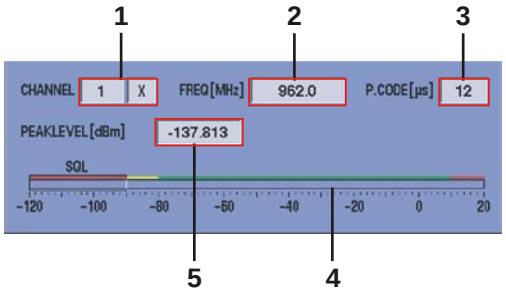
3.7.1.1 Measured Values Section (3)



Item	Display	Function	Indication
1	PULSE REPETITION RATE [1/s]	The measured pulse repetition rate of the DME signal (number of pulse pairs/s)	1/s
2	ID PRR [1/s]	The Pulse repetition rate of the identifier	1/s
3	ID-CODE	The decoded code of the identifier	e.g.“IKOW“
4	CARRIER FREQ DELTA [kHz]	Display of the measured deviation relative to the set channel frequency	kHz
5	PULSE SPACING [µs]	Display of the measured pulse spacing between the pulses of a pulse pair	µs

* Measurement accuracies are given in the Technical Data!

3.7.1.2 RF Parameter Section (4)



Item	Display	Function	Indication
1	CHANNEL	Display and setting of the receiving frequency (receiving frequency setting via the channel setting according to the ICAO frequency list, channel number extension directly selectable)	e.g.1X
2	FREQ. [MHz]	Display and setting of the receiving frequency	MHz
3	P.CODE [µs]	Display of the set pulse code according to the ICAO frequency list	µs
4	LEVEL	Graphics (bargraph) of the measured received signal level. The green line above the bargraph identifies the range valid for the data sheet. In the level range identified by a red or yellow line, the data sheet is not valid or valid to a limited extent only!	dBm
5	PEAKLEVEL [dBm]	Display of the measured peak level of the received signal.	

3.7.1.3 Softkeys (1)

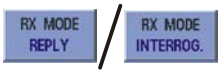
Display	Function
RX MODE REPLY	Changeover between the receive modes "REPLY" and "INTERROGATOR", the mode set is displayed in the softkey: - REPLY (signal measurement of the DME ground station) - INTERROG. (signal measurement of the DME on-board transmitter)
DME MODE DME/N	Changeover to the DME measurement modes (DME/N/P IA/P FA), the mode set is displayed in the softkey: - DME/N (measuring method for the DME standard pulses) - DME/P IA (measuring method for the DME precision pulses IA (1*) - DME/P FA (measuring method for the DME precision pulses FA (2*)
X, W, Y, Z X	Changeover between the channel codes according to the ICAO frequency list
MEAS.TIME 500 ms	Activates the measurement time Setting value: 10 … 2000 ms (10 ms step width) ***Setting of the measurement time is described in section 3.5!***
ATT.MODE AUTO	Changeoverof the RF-attenuation, set range is displayed in the softkey: - **LOW NOISE** (+15 dB), Indicating range: -120 … -20 dBm - **NORM** (Normal, 0dB) Indicating range: -110 … -10 dBm - **LOW DIST** (Low Distortion, -15dB) Indicating range: -100 … 20 dBm - **AUTO** (the most favorable range will be selected automatically) Indicating range: -120 … 20 dBm ***The max. input level is +13 dBm. The Setting of the RF-Signal Adjustment is described in section 3.4!***
VIEW DME	Changeover between the DME and the TACAN (option) analysis, the mode set is displayed in the softkey: - VIEW DME - VIEW TACAN (option)

1* IA = **I**nitial **A**pproach
2* FA = **F**inal **A**pproach

3.7.2 Selection of the Receive Mode (Reply / Interrogator)

Reply (signal measurement of the DME ground station)
Interrogator (signal measurement of the DME on-board transmitter)

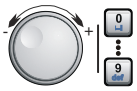
When switching to the receive mode "Reply / Interrogator", the channel/frequency ranges typical for the respective mode according to the ICAO frequency list (section 3.7.4.1) will automatically be switched!

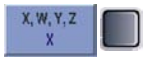
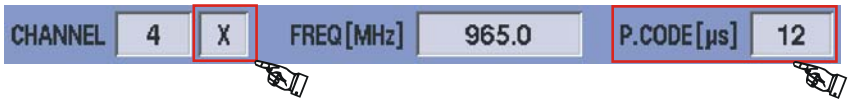
	Control	Operation	Function
1.		Switch the receive mode using the "RX MODE" softkey.	Changeover between the receive modes Reply / Interrogator, the mode set will be displayed in the softkey. 

When switching between the receive modes "Reply / Interrogator", the current channel/frequency settings will be kept.

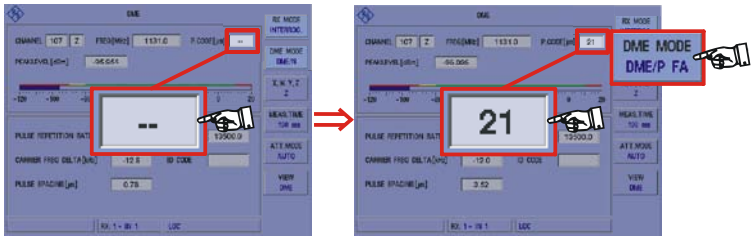
3.7.3 Setting the Receiving Frequency in DME mode

DME frequency range: 960 MHz ... 1215 MHz, observe the ICAO frequency list in section 3.7.4.1!

	Control	Operation	Function
1.		Press the "FREQ" (9) button.	The cursor will be displayed in the frequency section to the right of the last figure. (frequency assignment according to the ICAO frequency list, 3.7.4.1) 
2.		Setting the corresponding frequency with rollkey / keyboard.	Enter the frequency including the corresponding decimal place. If the frequency corresponds to a defined channel (ICAO frequency list, 3.7.4.1), the channel number in the channel display will be updated. 
3.		Confirm with the corresponding unit or press the Enter button / push rollkey.	Changeover to the new receiving frequency set. 

	Control	Operation	Function
4.		Press the softkey repeatedly until the channel code (X, W, Y, Z) assigned to the frequency has been set.	Setting of the corresponding channel code (X, W, Y, Z), the code set will be displayed in the softkey and the related pulse code in the "P.CODE" display section.
			
		The corresponding channel code that can be set is directly dependent on the set frequency and the receive mode (Reply / Interrogator).	

The following setting only applies to the "Interrogator" receive mode. In the "Interrogator" receive mode, lines may be displayed in the pulse code display for various frequencies. In this case, the DME mode typical for the frequency/channel must be set via the "DME MODE" softkey.

5.		Press the softkey repeatedly until the DME mode corresponding to the frequency has been set.	Setting of the DME mode, the mode set will be displayed in the softkey. DME mode: DME/N DME/P-IA DME/P-FA
			

Notes:

1) When the frequency is entered via the keyboard, the channel display will be updated only after the setting procedure has been confirmed.

DME: 960 MHz ... 1215 MHz

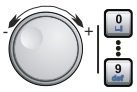
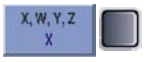
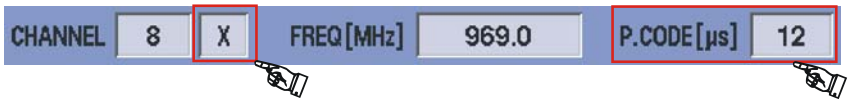
If this frequency range is exceeded/the value drops below this frequency range, the figures in the frequency section will be displayed in red and cannot be stored!

2) The function can be aborted at any time by pressing the "ESC" key. In this case, the value set up to that time will be restored!

3) If the frequency setting is made using the control dial / cursor keys, the corresponding channels hit according to the ICAO frequency list will be displayed in the channel window immediately.

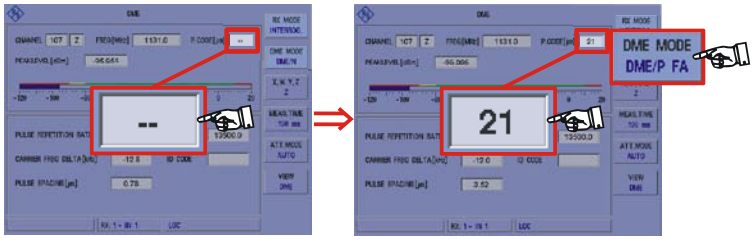
3.7.4 Setting the Receive Channel in DME mode

DME channel range: 1X ... 126Y, observe the ICAO frequency list in section 3.7.4.1!

	Control	Operation	Function
1.		Press the "CHAN" (7) button.	Change to the editing function for entering the channel (frequency assignment according to the ICAO frequency list, 3.7.4.1). The channel section is highlighted by means of a different background and the cursor is displayed to the right of the last digit. 
2.		Setting the corresponding channel using the rollkey / keyboard.	Only enter the numeric parts (also refer to ILS frequency / channel list). The frequency assigned to the cannel (ICAO frequency list, 3.7.4.1) is displayed in the frequency section. 
3.		Press the Enter button / push rollkey.	Changeover to the new receiving channel set. 
4.		Press the softkey repeatedly until the channel code (X, W, Y, Z) assigned to the frequency has been set.	Setting of the corresponding channel code (X, W, Y, Z), the code set will be displayed in the softkey and the related pulse code in the "P.CODE" display section.  The corresponding channel code that can be set is directly dependent on the set frequency and the receive mode (Reply / Interrogator).

The following setting only applies to the "Interrogator" receive mode. In the "Interrogator" receive mode, lines may be displayed in the pulse code display for various frequencies. In this case, the DME mode typical for the frequency/channel must be set via the "DME MODE" softkey.

5.		Press the softkey repeatedly until the DME mode corresponding to the frequency has been set.	Setting of the DME mode, the mode set will be displayed in the softkey. DME mode: DME/N DME/P-IA DME/P-FA

	Control	Operation	Function
			

Notes:

1) ***When entering the channel via the decimal keyboard, the channel range typical for the mode must be complied with:***

   DME: 1X ... 126Y

   If this channel range is exceeded/the value drops below this channel range, the figures in the frequency section will be displayed in red and cannot be stored!

2) ***The function can be aborted at any time by pressing the "ESC" key. In this case, the value set up to that time will be restored!***

3) ***If the channel is set using the control dial / cursor keys, the mode-specific channels will be displayed during the setting procedure!***

3.7.4.1 DME Channel Frequency List

	Interrogation				Reply	
DME channel Number	Frequency MHz	DME/N µs	IA Initial app-roach µs	FA Final approach µs	Frequency MHz	Pulse codes µs
1X	1025	12	-	-	962	12
1Y	1025	36	-	-	1088	30
2X	1026	12	-	-	963	12
2Y	1026	36	-	-	1089	30
3X	1027	12	-	-	964	12
3Y	1027	36	-	-	1090	30
4X	1028	12	-	-	965	12
4Y	1028	36	-	-	1091	30
5X	1029	12	-	-	966	12
5Y	1029	36	-	-	1092	30
6X	1030	12	-	-	967	12
6Y	1030	36	-	-	1093	30
7X	1031	12	-	-	968	12
7Y	1031	36	-	-	1094	30
8X	1032	12	-	-	969	12
8Y	1032	36	-	-	1095	30
9X	1033	12	-	-	970	12
9Y	1033	36	-	-	1096	30
10X	1034	12	-	-	971	12
10Y	1034	36	-	-	1097	30
11X	1035	12	-	-	972	12
11Y	1035	36	-	-	1098	30
12X	1036	12	-	-	973	12
12Y	1036	36	-	-	1099	30

	Interrogation				Reply	
DME channel Number	Frequency MHz	DME/N µs	IA Initial app-roach µs	FA Final approach µs	Frequency MHz	Pulse codes µs
13X	1037	12	-	-	974	12
13Y	1037	36	-	-	1100	30
14X	1038	12	-	-	975	12
14Y	1038	36	-	-	1101	30
15X	1039	12	-	-	976	12
15Y	1039	36	-	-	1102	30
16X	1040	12	-	-	977	12
16Y	1040	36	-	-	1103	30
17X	1041	12	-	-	978	12
17Y	1041	36	36	42	1104	30
17Z	1041	-	21	27	1104	15
18X	1042	12	12	18	979	12
18W	1042	-	24	30	979	24
18Y	1042	36	36	42	1105	30
18Z	1042	-	21	27	1105	15
19X	1043	12	-	-	980	12
19Y	1043	36	36	42	1106	30
19Z	1043	-	21	27	1106	15
20X	1044	12	12	18	981	12
20W	1044	-	24	30	981	24
20Y	1044	36	36	42	1107	30
20Z	1044	-	21	27	1107	15
21X	1045	12	-	-	982	12
21Y	1045	36	36	42	1108	30
21Z	1045	-	21	27	1108	15
22X	1046	12	12	18	983	12
22W	1046	-	24	30	983	24

	Interrogation				Reply	
DME channel Number	Frequency MHz	DME/N µs	IA Initial app-roach µs	FA Final approach µs	Frequency MHz	Pulse codes µs
22Y	1046	36	36	42	1109	30
22Z	1046	-	21	27	1109	15
23X	1047	12	-	-	984	12
23Y	1047	36	36	42	1110	30
23Z	1047	-	21	27	1110	15
24X	1048	12	12	18	985	12
24W	1048	-	24	30	985	24
24Y	1048	36	36	42	1111	30
24Z	1048	-	21	27	1111	15
25X	1049	12	-	-	986	12
25Y	1049	36	36	42	1112	30
25Z	1049	-	21	27	1112	15
26X	1050	12	12	18	987	12
26W	1050	-	24	30	987	24
26Y	1050	36	36	42	1113	30
26Z	1050	-	21	27	1113	15
27X	1051	12	-	-	988	12
27Y	1051	36	36	42	1114	30
27Z	1051	-	21	27	1114	15
28X	1052	12	12	18	989	12
28W	1052	-	24	30	989	24
28Y	1052	36	36	42	1115	30
28Z	1052	-	21	27	1115	15
29X	1053	12	-	-	990	12
29Y	1053	36	36	42	1116	30
29Z	1053	-	21	27	1116	15
30X	1054	12	12	18	991	12
30W	1054	-	24	30	991	24
30Y	1054	36	36	42	1117	30

	Interrogation				Reply	
DME channel Number	Frequency MHz	DME/N µs	IA Initial app-roach µs	FA Final approach µs	Frequency MHz	Pulse codes µs
30Z	1054	-	21	27	1117	15
31X	1055	12	-	-	992	12
31Y	1055	36	36	42	1118	30
31Z	1055	-	21	27	1118	15
32X	1056	12	12	18	993	12
32W	1056	-	24	30	993	24
32Y	1056	36	36	42	1119	30
32Z	1056	-	21	27	1119	15
33X	1057	12	-	-	994	12
33Y	1057	36	36	42	1120	30
33Z	1057	-	21	27	1120	15
34X	1058	12	12	18	995	12
34W	1058	-	24	30	995	24
34Y	1058	36	36	42	1121	30
34Z	1058	-	21	27	1121	15
35X	1059	12	-	-	996	12
35Y	1059	36	36	42	1122	30
35Z	1059	-	21	27	1122	15
36X	1060	12	12	18	997	12
36W	1060	-	24	30	997	24
36Y	1060	36	36	42	1123	30
36Z	1060	-	21	27	1123	15
37X	1061	12	-	-	998	12
37Y	1061	36	36	42	1124	30
37Z	1061	-	21	27	1124	15
38X	1062	12	12	18	999	12
38W	1062	-	24	30	999	24
38Y	1062	36	36	42	1125	30
38Z	1062	-	21	27	1125	15

	Interrogation				Reply	
DME channel Number	Frequency MHz	DME/N µs	IA Initial app-roach µs	FA Final approach µs	Frequency MHz	Pulse codes µs
39X	1063	12	-	-	1000	12
39Y	1063	36	36	42	1126	30
39Z	1063	-	21	27	1126	15
40X	1064	12	12	18	1001	12
40W	1064	-	24	30	1001	24
40Y	1064	36	36	42	1127	30
40Z	1064	-	21	27	1127	15
41X	1065	12	-	-	1002	12
41Y	1065	36	36	42	1128	30
41Z	1065	-	21	27	1128	15
42X	1065	12	12	18	1003	12
42W	1066	-	24	30	1003	24
42Y	1066	36	36	42	1129	30
42Y	1066	-	21	27	1129	15
43X	1067	12	-	-	1004	12
43Y	1067	36	36	42	1130	30
43Z	1067	-	21	27	1130	15
44X	1068	12	12	18	1005	12
44W	1068	-	24	30	1005	24
44Y	1068	36	36	42	1131	30
44Z	1068	-	21	27	1131	15
45X	1069	12	-	-	1006	12
45Y	1069	36	36	42	1132	30
45Z	1069	-	21	27	1132	15
46X	1070	12	12	18	1007	12
46W	1070	-	24	30	1007	24
46Y	1070	36	36	42	1133	30
46Z	1070	-	21	27	1133	15

	Interrogation				Reply	
DME channel Number	Frequency MHz	DME/N µs	IA Initial app-roach µs	FA Final approach µs	Frequency MHz	Pulse codes µs
47X	1071	12	-	-	1008	12
47Y	1071	36	36	42	1134	30
47Z	1071	-	21	27	1134	15
48X	1072	12	12	18	1009	12
48W	1072	-	24	30	1009	24
48Y	1072	36	36	42	1135	30
48Z	1072	-	21	27	1135	15
49X	1073	12	-	-	1010	12
49Y	1073	36	36	42	1136	30
49Z	1073	-	21	27	1136	15
50X	1074	12	12	18	1011	12
50W	1074	-	24	30	1011	24
50Y	1074	36	36	42	1137	30
50Z	1074	-	21	27	1137	15
51X	1075	12	-	-	1012	12
51Y	1075	36	36	42	1138	30
51Z	1075	-	21	27	1138	15
52X	1076	12	12	18	1013	12
52W	1076	-	24	30	1013	24
52Y	1076	36	36	42	1139	30
52Z	1076	-	21	27	1139	15
53X	1077	12	-	-	1014	12
53Y	1077	36	36	42	1140	30
53Z	1077	-	21	27	1140	15
54X	1078	12	12	18	1015	12
54W	1078	-	24	30	1015	24
54Y	1078	36	36	42	1141	30
54Z	1078	-	21	27	1141	15
55X	1079	12	-	-	1016	12

	Interrogation				Reply	
DME channel Number	Frequency MHz	DME/N µs	IA Initial app-roach µs	FA Final approach µs	Frequency MHz	Pulse codes µs
55Y	1079	36	36	42	1142	30
55Z	1079	-	21	27	1142	15
56X	1080	12	12	18	1017	12
56W	1080	-	24	30	1017	24
56Y	1080	36	36	42	1143	30
56Z	1080	-	21	27	1143	15
57X	1081	12	-	-	1018	12
57Y	1081	36	-	-	1144	30
58X	1082	12	-	-	1019	12
58Y	1082	36	-	-	1145	30
59X	1083	12	-	-	1020	12
59Y	1083	36	-	-	1146	30
60X	1084	12	-	-	1021	12
60Y	1084	36	-	-	1147	30
61X	1085	12	-	-	1022	12
61Y	1085	36	-	-	1148	30
62X	1086	12	-	-	1023	12
62Y	1086	36	-	-	1149	30
63X	1087	12	-	-	1024	12
63Y	1087	36	-	-	1150	30
64X	1088	12	-	-	1151	12
64Y	1088	36	-	-	1025	30
65X	1089	12	-	-	1152	12
65Y	1089	36	-	-	1026	30
66X	1090	12	-	-	1153	12
66Y	1090	36	-	-	1027	30

	Interrogation				Reply	
DME channel Number	Frequency MHz	DME/N µs	IA Initial app-roach µs	FA Final approach µs	Frequency MHz	Pulse codes µs
67X	1091	12	-	-	1154	12
67Y	1091	36	-	-	1028	30
68X	1092	12	-	-	1155	12
68Y	1092	36	-	-	1029	30
69X	1093	12	-	-	1156	12
69Y	1093	36	-	-	1030	30
70X	1094	12	-	-	1157	12
70Y	1094	36	-	-	1031	30
71X	1095	12	-	-	1158	12
71Y	1095	36	-	-	1032	30
72X	1096	12	-	-	1159	12
72Y	1096	36	-	-	1033	30
73X	1097	12	-	-	1160	12
73Y	1097	36	-	-	1034	30
74X	1098	12	-	-	1161	12
74Y	1098	36	-	-	1035	30
75X	1099	12	-	-	1162	12
75Y	1099	36	-	-	1036	30
76X	1100	12	-	-	1163	12
76Y	1100	36	-	-	1037	30
77X	1101	12	-	-	1164	12
77Y	1101	36	-	-	1038	30
78X	1102	12	-	-	1165	12
78Y	1102	36	-	-	1039	30

	Interrogation				Reply	
DME channel Number	Frequency MHz	DME/N µs	IA Initial app-roach µs	FA Final approach µs	Frequency MHz	Pulse codes µs
79X	1103	12	-	-	1166	12
79Y	1103	36	-	-	1040	30
80X	1104	12	-	-	1167	12
80Y	1104	36	36	42	1041	30
80Z	1104	-	21	27	1041	15
81X	1105	12	-	-	1168	12
81Y	1105	36	36	42	1042	30
81Z	1105	-	21	27	1042	15
82X	1106	12	-	-	1169	12
82Y	1106	36	36	42	1043	30
82Z	1106	-	21	27	1043	15
83X	1107	12	-	-	1170	12
83Y	1107	36	36	42	1044	30
83Z	1107	-	21	27	1044	15
84X	1108	12	-	-	1171	12
84Y	1108	36	36	42	1045	30
84Z	1108	-	21	27	1045	15
85X	1109	12	-	-	1172	12
85Y	1109	36	36	42	1046	30
85Z	1109		21	27	1046	15
86X	1110	12	-	-	1173	12
86Y	1110	36	36	42	1047	30
86Z	1110	-	21	27	1047	15
87X	1111	12	-	-	1174	12
87Y	1111	36	36	42	1048	30
87Z	1111	-	21	27	1048	15
88X	1112	12	-	-	1175	12
88Y	1112	36	36	42	1049	30

	Interrogation				Reply	
DME channel Number	Frequency MHz	DME/N µs	IA Initial app-roach µs	FA Final approach µs	Frequency MHz	Pulse codes µs
88Z	1112	-	21	27	1049	15
89X	1113	12	-	-	1176	12
89Y	1113	36	36	42	1050	30
89Z	1113	-	21	27	1050	15
90X	1114	12	-	-	1177	12
90Y	1114	36	36	42	1051	30
90Z	1114	-	21	27	1051	15
91X	1115	12	-	-	1178	12
91Y	1115	36	36	42	1052	30
91Z	1115	-	21	27	1052	15
92X	1116	12	-	-	1179	12
92Y	1116	36	36	42	1053	30
92Z	1116	-	21	27	1053	15
93X	1117	12	-	-	1180	12
93Y	1117	36	36	42	1054	30
93Z	1117	-	21	27	1054	15
94X	1118	12	-	-	1181	12
94Y	1118	36	36	42	1055	30
94Z	1118	-	21	27	1055	15
95X	1119	12	-	-	1182	12
95Y	1119	36	36	42	1056	30
95Z	1119	-	21	27	1056	15
96X	1120	12	-	-	1183	12
96Y	1120	36	36	42	1057	30
96Z	1120	-	21	27	1057	15
97X	1121	12	-	-	1184	12
97Y	1121	36	36	42	1058	30
97Z	1121	-	21	27	1058	15

	Interrogation				Reply	
DME channel Number	Frequency MHz	DME/N µs	IA Initial app-roach µs	FA Final approach µs	Frequency MHz	Pulse codes µs
98X	1122	12	-	-	1185	12
98Y	1122	36	36	42	1059	30
98Z	1122	-	21	27	1059	15
99X	1123	12	-	-	1186	12
99Y	1123	36	36	42	1060	30
99Z	1123	-	21	27	1060	15
100X	1124	12	-	-	1187	12
100Y	1124	36	36	42	1061	30
100Z	1124	-	21	27	1061	15
101X	1125	12	-	-	1188	12
101Y	1125	36	36	42	1062	30
101Z	1125	-	21	27	1062	15
102X	1126	12	-	-	1189	12
102Y	1126	36	36	42	1063	30
102Z	1126	-	21	27	1063	15
103X	1127	12	-	-	1190	12
103Y	1127	36	36	42	1064	30
103Z	1127	-	21	27	1064	15
104X	1128	12	-	-	1191	12
104Y	1128	36	36	42	1065	30
104Z	1128	-	21	27	1065	15
105X	1129	12	-	-	1192	12
105Y	1129	36	36	42	1066	30
105Z	1129	-	21	27	1066	15
106X	1130	12	-	-	1193	12
106Y	1130	36	36	42	1067	30
106Z	1130	-	21	27	1067	15

	Interrogation				Reply	
DME channel Number	Frequency MHz	DME/N µs	IA Initial app-roach µs	FA Final approach µs	Frequency MHz	Pulse codes µs
107X	1131	12	-	-	1194	12
107Y	1131	36	36	42	1068	30
107Z	1131	-	21	27	1068	15
108X	1132	12	-	-	1195	12
108Y	1132	36	36	42	1069	30
108Z	1132	-	21	27	1069	15
109X	1133	12	-	-	1196	12
109Y	1133	36	36	42	1070	30
109Z	1133	-	21	27	1070	15
110X	1134	12	-	-	1197	12
110Y	1134	36	36	42	1071	30
110Z	1134	-	21	27	1071	15
111X	1135	12	-	-	1198	12
111Y	1135	36	36	42	1072	30
111Z	1135	-	21	27	1072	15
112X	1136	12	-	-	1199	12
112Y	1136	36	36	42	1073	30
112Z	1136	-	21	27	1073	15
113X	1137	12	-	-	1200	12
113Y	1137	36	36	42	1074	30
113Z	1137	-	21	27	1074	15
114X	1138	12	-	-	1201	12
114Y	1138	36	36	42	1075	30
114Z	1138	-	21	27	1075	15
115X	1139	12	-	-	1202	12
115Y	1139	36	36	42	1076	30
115Z	1139	-	21	27	1076	15
116X	1140	12	-	-	1203	12

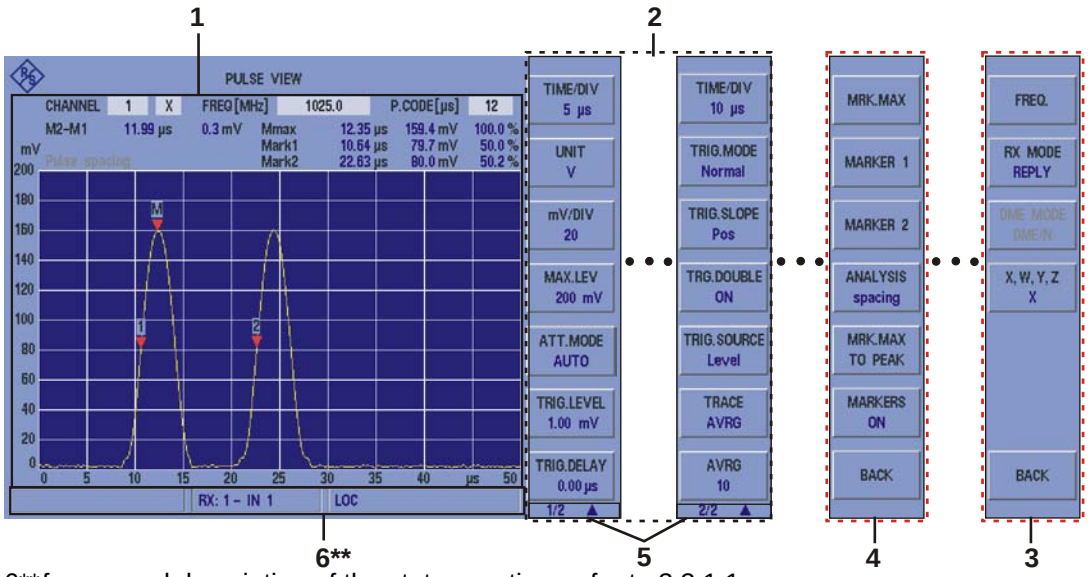
	Interrogation				Reply	
DME channel Number	Frequency MHz	DME/N µs	IA Initial app-roach µs	FA Final approach µs	Frequency MHz	Pulse codes µs
116Y	1140	36	36	42	1077	30
116Z	1140	-	21	27	1077	15
117X	1141	12	-	-	1204	12
117Y	1141	36	36	42	1078	30
117Z	1141	-	21	27	1078	15
118X	1142	12	-	-	1205	12
118Y	1142	36	36	42	1079	30
118Z	1142	-	21	27	1079	15
119X	1143	12	-	-	1206	12
119Y	1143	36	36	42	1080	30
119Z	1143	-	21	27	1080	15
120X	1144	12	-	-	1207	12
120Y	1144	36	-	-	1081	30
121X	1145	12	-	-	1208	12
121Y	1145	36	-	-	1082	30
122X	1146	12	-	-	1209	12
122Y	1146	36	-	-	1083	30
123X	1147	12	-	-	1210	12
123Y	1147	36	-	-	1084	30
124X	1148	12	-	-	1211	12
124Y	1148	36	-	-	1085	30
125X	1149	12	-	-	1212	12
125Y	1149	36	-	-	1086	30
126X	1150	12	-	-	1213	12
126Y	1150	36	-	-	1087	30

3.7.5 DME Pulse Analysis "PULSE VIEW" (Option, EDS-K2)

The DME pulse analysis is used for testing the RF output signal of DME transponders.

- Pulse amplitude of the transmission pulse
- Pulse form (rise time, fall time and pulse duration)
- Pulse spacing

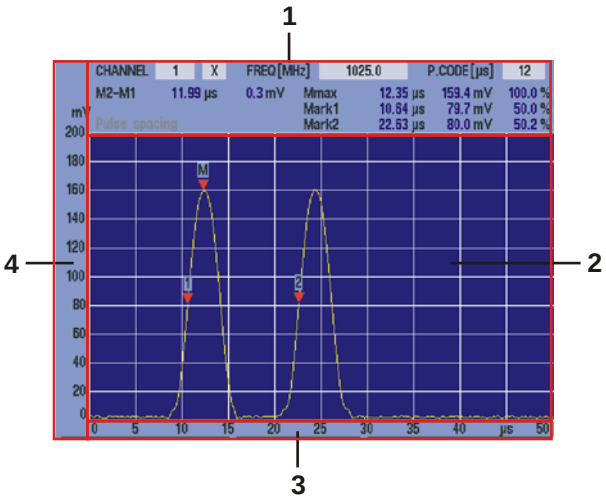
3.7.6 Signal Parameters and Displays in PULSE VIEW mode



6**for general description of the status section, refer to 3.2.1.1

Due to the multitude of settings offered, two softkey bars are available. The currently displayed softkey bar will be identified with the 1/2▲ e.g. 2/2 ▲ - symbol (5). Use the "▲" -button to switch back and forth between the softkey bars. The softkey bar (3) for the PULSE VIEW Frequency function is called via the "FREQ" device button. The frequency function is described in Section 3.7.6.3. The softkey bar (4) for the PULSE VIEW Marker function is called via the "FREQ" device button. The marker function is described in Section 3.7.11.

3.7.6.1 Parameter and Measured Value section (1)



Item	Display	Function	Indication
1	Parameter display	Display and setting of general parameters such as: - Channel, frequency and pulse code Display and setting of the following parameters as a factor of the unit set for "UNIT": **Mmax** Display and setting of the Marker Max position, i.e. the marker is automatically set to the peak (Peak 100%) of a pulse in the function (MRK.MAX TO PEAK) or positioned manually. Display of the chronological position in µs and of the pulse amplitude in V (V, mV, µV, mW, µW, nW, pW, dBm) and %. **Mark1** Display and setting of the position of Marker 1. Display of the chronological position in µs and of the pulse amplitude in V (V, mV, µV, mW, µW, nW, pW, dBm) and %. **Mark2** Display and setting of the position of Marker 2. Display of the chronological position in µs and of the pulse amplitude in V (V, mV, µV, mW, µW, nW, pW, dBm) and %. **M2-M1** Display of the difference between Marker 1 and Marker 2 in µs and V (V, mV, µV, mW, µW, nW, pW, dBm).	
2	Display	Graphic display of the frequency spectrum, display of the level over time. Y-axis = amplitude X-axis = time axis	

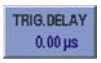
Item	Display	Function	Indication
3	X-axis	Time axis	µs
4	Y-axis	Amplitude scale	dBm, mW, µW, nW, pW, V, mV, µV

3.7.6.2 Softkeys (5) of the PULSE VIEW Mode

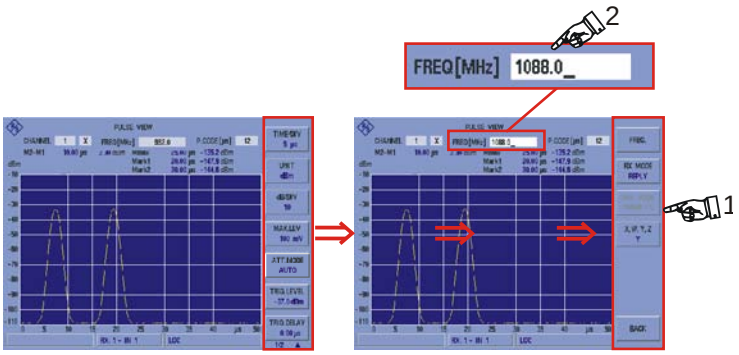
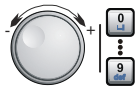
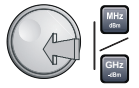
The softkeys (3, frequency function) and (4, marker function) are described in section 3.7.11.1 .

Display	Function
Softkey bar 1	
TIME/DIV 5 µs	Setting of the time base (X-axis): Setting range: 0.5 µs … 50 µs
UNIT dBm	Dimension setting of the level axis (Y-axis) of the graphic display. Choose between a linear (V), quadratic (W) and logarithmic (dBm) display. Selection: dBm, W, V
dB/DIV 10	Scaling of the Y-axis selectable in fixed steps, the setting range depends on the unit set for "UNIT": Selection: bei "UNIT, dBm" = 1, 2 ,5 ,10 dB / DIV bei "UNIT, W" = 0,1 pW … 20 mW / DIV bei "UNIT, V" = 1 µV … 1 V / DIV
MAX.LEV -10 dBm	Setting of the Y-axis maximum value; the setting range and the softkey depend on the unit set for "UNIT": Selection: for "UNIT, dBm" = -70 dBm … 30 dBm for "UNIT, W" = 1 pW … 200 mW for"UNIT, V" = 10 µV … 10 V
ATT.MODE AUTO	Changeover of the RF-attenuation, set range is displayed in the softkey: - **LOW NOISE** (+15 dB), Indicating range: -120 … -20 dBm - **NORM** (Normal, 0dB) Indicating range: -110 … -10 dBm - **LOW DIST** (Low Distortion, -15dB) Indicating range: -100 … 20 dBm - **AUTO** (the most favorable range will be selected automatically) Indicating range: -120 … 20 dBm ***The max. input level is +13 dBm. The Setting of the RF-Signal Adjustment is described in section 3.4!***
TRIG.LEVEL -37.0 dBm	Setting of the trigger level; the setting range depends on the unit set for "UNIT" and the selected "MAX. Level": Range for unit V: 0.0 µV … 2.0 V Range for unit W: 0 … 80 mW Range for unit dBm:

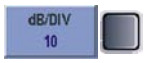
	-121 … 19 dBm

Display	Function
	Setting for Trigger Delay Time (time delay after trigger event, trigger circuit will be locked for the set time). The setting range depends on the time unit set for "TIME/DIV": Setting range: -500 µs … 8192.00 µs
Softkey bar 2	
	Selection of the trigger function: **Normal**: permanent refreshing of a value set with a valid trigger **Single shot**: after manual confirmation with the "Enter" - button, this is confirmed with "ACQUIRE…" and with the occurrence of a valid trigger a value set is taken up. **Auto**: continuous recording of measurement values
	Setting of the trigger slope: Selection: Positive / Negative
	Settings for the Trigger Double function; when the function is enabled, triggering for double pulses is always performed on the first pulse: Selection: ON / OFF
	Selection of the trigger source; the following trigger sources can be set: **Level**: Triggering is made when the trigger threshold set for "TR.LEVEL" has been reached **Extern**: external trigger source (trigger level setting not possible)
	Changeover of the Trace functions, set function is displayed in the softkey : - AVRG (Average) - MAX HOLD - CLR / WR (Clear / Write)
	Setting of after how many measuring events a message will be displayed (only active at TRACE “AVRG“): Selection: 1 … 100

3.7.6.3 Setting the Receiving Frequency

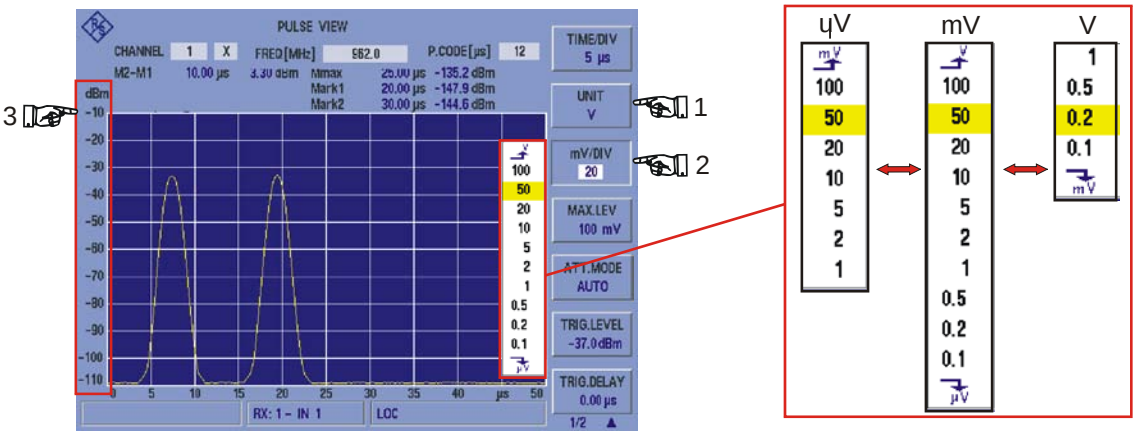
	Control	Operation	Function
1.		Press the "FREQ" (9) button.	Softkey bar (1) for the frequency function is displayed and in the cursor is displayed to the right of the last digit in the frequency field (2).
	 Frequency setting view		
	Apart from setting the frequency, the typical DME settings for the RX / DME mode can be made according to section 3.7.		
2.		Setting the corresponding frequency using the rollkey / keyboard.	Enter the frequency including the corresponding decimal place.
3.		Confirm in the corresponding unit or press the Enter button / push rollkey.	Changeover to the new receiving frequency set.
4.		Press the softkey "BACK".	Return to the softkey bar of the PULSE VIEW mode used last.

3.7.7 Setting the Resolution (Y-Axis)

	Control	Operation	Function
1.		Press the softkey "XX/DIV". The display of the unit in the softkey depends on the unit set for "UNIT" and the setting range.	The selection list for changing the resolution of the Y-axis according to the set unit will be displayed.
2.		Turn the rollkey until the required value is set.	Changes the resolution of the Y-axis by the value entered.
3.		Press the Enter button / push rollkey.	Acceptance of the actually set new resolution.

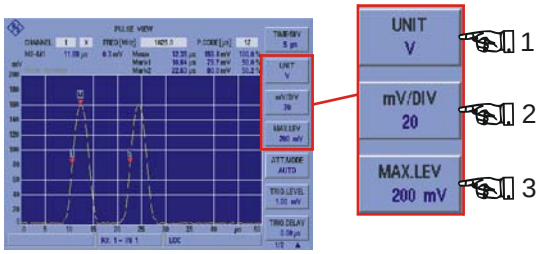
Scaling of the Y-axis (3) is selectable in fixed steps, the setting range depends on the unit set for "UNIT" (1). Cross-unit scrolling in the selection lists is possible.

Selection (2): for "UNIT, dBm" = 1, 2, 5, 10 dB / DIV
for "UNIT, W" = 0,1 pW … 20 mW / DIV
for "UNIT, V" = 1 µV … 1 V / DIV



Example of a selection list ("UNIT, V"), ranges µV … V

3.7.8 Setting the Maximum Level (Y-Axis)

	Control	Operation	Function
1.		Press the Softkey "MAX.LEV".	Activation of the edit function for changing the maximum level or the reference level. 
	The selection of the unit (1) as well as the resolution setting (xx/Div, 2) influence the setting range of the maximum level (3) as follows: Selection: for "UNIT, dBm" = -70 ... 30 dBm for "UNIT, W" = 1 pW … 200 mW / DIV for "UNIT, V" = 10 µV … 10 V / DIV  ***The setting ranges for the maximum level and the reference level are listed in the following table.***		
2.		Turn the rollkey until the required value is set.	Changes the resolution of the Y-axis by the value entered.
3.		Press the Enter button / push rollkey.	Acceptance of the actually set new resolution.

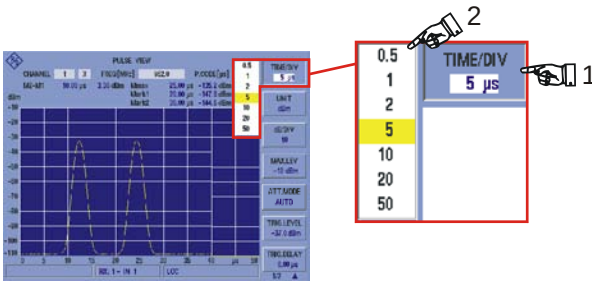
Unit "W"	Setting range Max. Level	Unit "V"	Setting range Max. Level	Unit "dBm"	Setting range Max. Level
	mW / Div		V / Div		dB / Div
20 mW	200 mW	1 V	10 V	10 dB	-70 … 30 dBm
10 mW	100 … 200 mW	0.5 V	5 … 10 V	5 dB	-70 … 30 dBm
5 mW	50 … 200 mW	0.2 V	2 … 10 V	2 dB	-70 … 30 dBm
2 mW	20 … 200 mW	0.1 V	1 … 10 V	1 dB	-70 … 30 dBm
1 mW	10 … 100 mW		mV / Div		
0.5 mW	5 … 50 mW	100 mV	1000 mV		
0.2 mW	2 … 20 mW	50 mV	500 … 1000 mV		
0.1 mW	1 … 10 mW	20 mV	200 … 1000 mV		
	µW / Div	10 mV	100 … 1000 mV		
100 µW	1000 µW	5 mV	50 … 500 mV		
50 µW	500 … 1000 µW	2 mV	20 … 200 mV		
20 µW	200 … 1000 µW	1 mV	10 … 100 mV		
10 µW	100 … 1000 µW	0.5 mV	5 … 50 mV		
5 µW	50 … 500 µW	0.2 mV	2 … 20 mV		
2 µW	20 … 200 µW	0.1 mV	1 … 10 mV		
1 µW	10 … 100 µW		µV / Div		
0.5 µW	5 … 50 µW	100 µV	1000 µV		
0.2 µW	2 … 20 µW	50 µV	500 … 1000 µV		

Unit "W"	Setting range Max. Level	Unit "V"	Setting range Max. Level	Unit "dBm"	Setting range Max. Level
0.1 µW	1 … 10 µW	20 µV	200 … 1000 µV		
	nW / Div	10 µV	100 … 1000 µV		
100 nW	1000 nW	5 µV	50 … 500 µV		
50 nW	500 … 1000 nW	2 µV	20 … 200 µV		
20 nW	200 … 1000 nW	1 µV	10 … 100 µV		
10 nW	100 … 1000 nW				
5 nW	50 … 500 nW				
2 nW	20 … 200 nW				
1 nW	10 … 100 nW				
0.5 nW	5 … 50 nW				
0.2 nW	2 … 20 nW				
0.1 nW	1 … 10 nW				
	pW / Div				
100 pW	1000 pW				
50 pW	500 … 1000 pW				
20 pW	200 … 1000 pW				
10 pW	100 … 1000 pW				
5 pW	50 … 500 pW				
2 pW	20 … 200 pW				
1 pW	10 … 100 pW				
0.5 pW	5 … 50 pW				
0.2 pW	2 … 20 pW				
0.1 pW	1 … 10 pW				

Table: Setting ranges for the maximum level

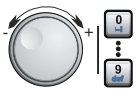
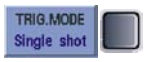
3.7.9 Setting the Time base

To analyze very small portions of a signal, the scaling of the X-axis (time base) can be set in increments.

	Control	Operation	Function
1.		Press the Softkey "TIME/DIV".	The selection list for changing the time base of the X-axis will be enabled. 
2.		Select	Select the corresponding time base according to the selection list (2). The current selection will be carried along numerically in the softkey (1). 

	Control	Operation	Function
3.		Press the Enter button / push rollkey.	Acceptance of the actually set new time base.

3.7.10 Settings for triggering in DME mode

	Control	Operation	Function
Set the Trigger Source as follows (Softkey bar 2):			
1.		Press the softkey "TR.SOURC" repeatedly until the wanted trigger source is set.	Selection of the trigger source, set value is displayed in the softkey.  Selection: Level, Extern
	Level: Triggering is made when the trigger threshold set for "TR.LEVEL" has been reached **Extern:** external trigger source (trigger level setting not possible)		
Set the Trigger Delay Time as follows:			
2.		Press the softkey "TR.DELAY".	Activation of the edit function for changing the Trigger Delay Time, set value is displayed in the softkey. 
3.		Setting the corresponding value with rollkey / keyboard..	Setting the Trigger Delay Time. Setting range: -20 µs … 8192.00 µs
	The setting range depends on the time unit set for "TIME/DIV". **TIME/DIV — TRIG. DELAY** 0,5 µs: -20 µs … 327.68 µs 1 µs: -20 µs … 327.68 µs 2 µs: -20 µs … 327.68 µs 5 µs: -50 µs … 819.20 µs 10 µs: -100 µs … 1638.40 µs 20 µs: -500 µs … 8192.00 µs 50 µs: -500 µs … 8192.00 µs		
4.		Press the Enter button / push rollkey.	Acceptance of the actually set new Trigger Delay Time.
Set the Trigger mode as follows (Softkey bar 2):			
5.		Press the softkey "TRIG.Mode".	Changeover between the trigger modes. The set mode will be displayed in the softkey.

	Control	Operation	Function
			 Selection: Normal, Single shot, Auto
	Normal: permanent refreshing of a value set with a valid trigger **Single shot**: after manual confirmation with the "Enter" - button, this is confirmed with "ACQUIRE…" and with the occurrence of a valid trigger a value set is taken up. **Auto**: continuous recording of measurement values. If with the current trigger level can be triggered, the signal will be triggered. If no triggering exists the non triggered puls process will be displayed.		
Set the Trigger Slope as follows (Softkey bar 2):			
6.		Press the softkey "TRIG.SLOPE".	Switching to the signal slope to be triggered. The set property will be displayed in the softkey.  Selection: Pos (positive) / Neg (negative)
Set the Trigger Double as follows (Softkey bar 2):			
7.		Press the softkey "TRIG.DOUBLE".	Switch on / off theTrigger Double function. The set property will be displayed in the softkey.  Selection: ON / OFF
	When the function is enabled, triggering for double pulses is always performed on the first pulse.		
Set the Trigger Level as follows:			
		 ***The trigger level can only be set when "Level" has been selected as the trigger source.***	
8.		Press the softkey "TRIG.LEVEL".	Activation of the edit function for changing the Trigger Level, set value is displayed in the softkey. 
9.		Setting the corresponding value with rollkey / keyboard.	Enter the trigger level including the corresponding decimal place. Range for unit V: 0.0 µV … 2.0 V Range for unit W: 0 … 80 mW

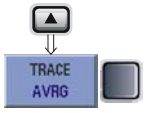
	Control	Operation	Function
			Range for unit dBm: -121 … 19 dBm
	The setting range depends on the unit set for "UNIT" and the selected "MAX. Level". The range is independent for the unit dBm only. ***The setting ranges for the trigger level are listed in the following table.***		
10.		Press the Enter button / push rollkey.	Acceptance of the actually set new Trigger Level.

Range Max. level Unit "W"	Setting range TRIGGER level Unit "W"	Range Max. level Unit "V"	Setting range TRIGGER level Unit "V"
mW		V	
200 mW	80 mW	10 V	0 … 2 V
100 … 200 mW	0 … 80 mW	5 … 10 V	0 … 2 V
50 … 200 mW	0 … 80 mW	2 … 10 V	0 … 2 V
20 … 200 mW	0 … 80 mW	1 … 10 V	0 … 2 V
10 … 100 mW	0 … 80 mW	mV	
5 … 50 mW	0 … 50 mW	1000 mV	0 … 2000 mV
2 … 20 mW	0 … 20 mW	500 … 1000 mV	0 … 2000 mV
1 … 10 mW	0 … 10 mW	200 … 1000 mV	0 … 2000 mV
		100 … 1000 mV	0 … 1000 mV
µW		50 … 500 mV	0 … 500 mV
1000 µW	0 … 10000 µW	20 … 200 mV	0 … 200 mV
500 … 1000 µW	0 … 5000 µW	10 … 100 mV	0 … 100 mV
200 … 1000 µW	0 … 2000 µW	5 … 50 mV	0 … 50 mV
100 … 1000 µW	0 … 1000 µW	2 … 20 mV	0 … 20 mV
50 … 500 µW	0 … 500 µW	1 … 10 mV	0 … 10 mV
20 … 200 µW	0 … 200 µW	µV	
10 … 100 µW	0 … 100 µW	1000 µV	0 … 10000 µV
5 … 50 µW	0 … 50 µW	500 … 1000 µV	0 … 5000 µV
2 … 20 µW	0 … 20 µW	200 … 1000 µV	0 … 2000 µV
1 … 10 µW	0 … 10 µW	100 … 1000 µV	0 … 1000 µV
nW		50 … 500 µV	0 … 500 µV
1000 nW	0 … 10000 nW	20 … 200 µV	0 … 200 µV
500 … 1000 nW	0 … 5000 nW	10 … 100 µV	0 … 100 µV
200 … 1000 nW	0 … 2000 nW		
100 … 1000 nW	0 … 1000 nW		
50 … 500 nW	0 … 500 nW		
20 … 200 nW	0 … 200 nW		
10 … 100 nW	0 … 100 nW		
5 … 50 nW	0 … 50 nW		
2 … 20 nW	0 … 20 nW		
1 … 10 nW	0 … 10 nW		
pW			
1000 pW	0 … 10000 pW		
500 … 1000 pW	0 … 5000 pW		
200 … 1000 pW	0 … 2000 pW		
100 … 1000 pW	0 … 1000 pW		
50 … 500 pW	0 … 500 pW		

Range Max. level Unit "W"	Setting range TRIGGER level Unit "W"	Range Max. level Unit "V"	Setting range TRIGGER level Unit "V"
20 … 200 pW	0 … 200 pW		
10 … 100 pW	0 … 100 pW		
5 … 50 pW	0 … 50 pW		
2 … 20 pW	0 … 20 pW		
1 … 10 pW	0 … 10 pW		

Table: Setting ranges for the trigger level

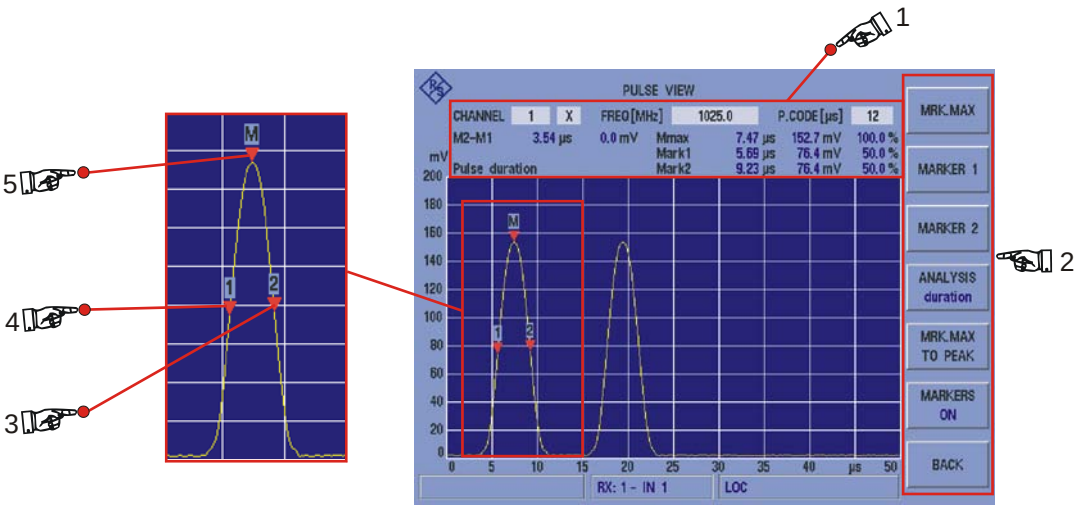
3.7.10.1 Setting Trace function

	Control	Operation	Function
1.		Switch to the second menu window and select with the softkey "TRACE".	Setting at Trace function, set function is displayed in the softkey.  Selection: AVRG MAX HOLD, CLR / WR (Clear / Write)
	Explanation of the "Trace" functions: **Average:** In the Average function, the mean value of several sweeps will be calculated and displayed. This is a floating message, i.e. after each sweep, the display is updated, showing the mean value of a number of previous sweeps. The number of these sweeps can be set via the "Samples" softkey. When starting the "Average" function, or when changing the number of samples, all available sweeps are determined first, until a sufficient number of test samples are available in the memory and a floating message can be used. **Max Hold:** When using the "Max Hold" function, the peak values of the captured spectrum can be stored automatically. With each sweep, the display is being updated. However, the displayed curve will only be overwritten in those areas, where the currently captured data is larger than the previously displayed value in the same location. **Clear / Write:** In the Clear / Write function, the display of the measured spectrum is continuously updated, i.e. the Trace memory is rewritten with each sweep.		
2.		Press the softkey "AVRG".	Setting the number of samples to the Trace "Average" function, set number of samples is displayed in the softkey.  Setting range: 1 … 100 (samples)
			The "AVRG" softkey is only activated during the "Average" function!

3.7.11 Calling the Marker functions in DME mode

The different marker functions are an important part of the DME pulse analysis. Apart from the marker functions (M1, M2, Mmax), the Pulse rise time, Pulse duration, Pulse decay time and Pulse spacing time analysis functions can be used.

	Control	Operation	Function
1.	MARKER	Press the "Marker" (11) button.	The softkeys (2) for marker settings in DME mode will be displayed.



Parameter display (1): **Mmax**: Display and setting of the position of Marker Max, display of the chronological position in µs and of the pulse amplitude in V (V, mV, µV, mW, µW, nW, pW, dBm) und %.

Mark1 Display and setting of the position of Marker 1, display of the chronological position in µs and of the pulse amplitude in V (V, mV, µV, mW, µW, nW, pW, dBm) und %.

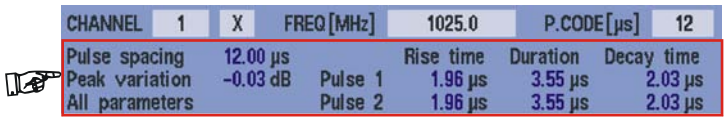
Mark2 Display and setting of the position of Marker 2, display of the chronological position in µs and of the pulse amplitude in V (V, mV, µV, mW, µW, nW, pW, dBm) und %.

M2-M1 Display of the difference between Marker 1 and Marker 2 in µs and V (V, mV, µV, mW, µW, nW, pW, dBm).

Softkeys (2):
Marker (4): Example, set marker M1
Marker (3): Example, set marker M2
Marker (5): Example, set marker Mmax

3.7.11.1 Softkeys (2) of the Marker function

Display	Function
MRK.MAX	This function facilitates manual positioning of the marker Mmax to the peak of a pulse. Automatic positioning can be selected via the "MRK.MAX TO PEAK" function. Setting and display in the parameter display.
MARKER 1	This function facilitates manual positioning of marker 1. Setting and display in the parameter display.

Display	Function
MARKER 2	This function facilitates manual positioning of marker 2. Setting and display in the parameter display.
ANALYSIS spacing	Selection of the analysis function for DME pulses (DME single pulse, DME double pulse). This function can only be selected for the unit (UNIT = V) and the scaling (µV / DIV … V / DIV). The actual selected analysis function is indicated in the soft key. Selection: **Pulse rise time** (M1 auf 10% aufsteigend, M2 auf 90% aufsteigend, M2-M1 = Rise time) **Pulse duration** (M1 to 50 % ascending, M2 to 50 % descending, M2-M1 = Duration) **Pulse decay time** (M1 to 90 % descending M2 to 10 % descending, M2-M1 = Decay time) **Pulse spacing time** (M1 to 50 % ascending first pulse, M2 to 50 % ascending second pulse, M2-M1 = Spacing time) "**All parameters**" represents in the parameter display (1) the characteristic numbers of all analysis functions described above at the same time: 
MRK-MAX TO PEAK	Automatic positioning of Marker Max to the first (Peak 1) or second (Peak 2) pulse in the display area.
MARKERS ON	Showing/hiding of the markers. Selection: ON / OFF
BACK	Return to the softkey bar of the PULSE VIEW mode used last.

3.7.11.2 Different Marker functions

In the following, the different marker functions are described in an example sequence. These are:

- Marker Max with Peak marker function,
- Marker 1 and Marker 2.

	Control	Operation	Function
Marker Max with peak marker function:			
1.		Press the softkey "MRK.MAX".	The setting (2) for manual positioning of the marker (3) is enabled.

The marker position can be set manually via the rollkey / keyboard. Another actuation of the "MRK.MAX" (1) softkey will save the settings (level values will be updated). Via the Peak marker function (softkey "MRK.MAX TO PEAK, 4), Marker Max can automatically be set to the peak (Peak 100%) of a DME pulse. In the case of a DME double pulse, e.g. it is thus possible to select one of the two pulse peaks (Peak1 / Peak2) to which the marker is to be set.

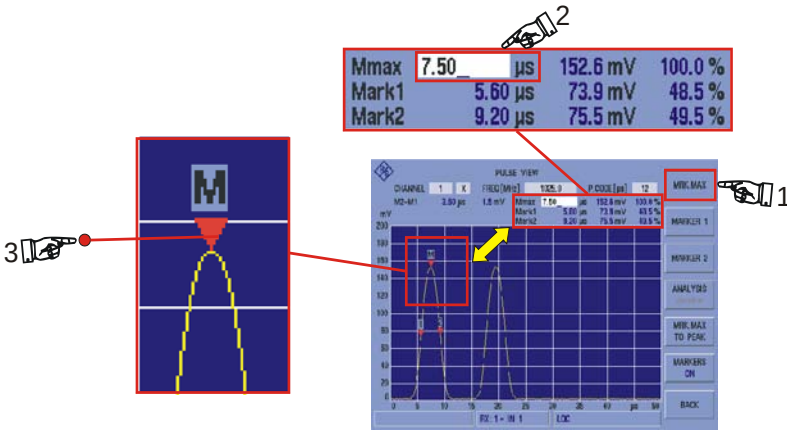


Figure shows the manual positioning of marker "Max".

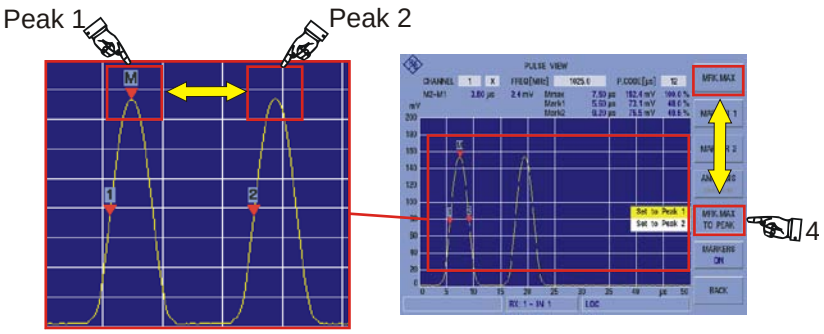
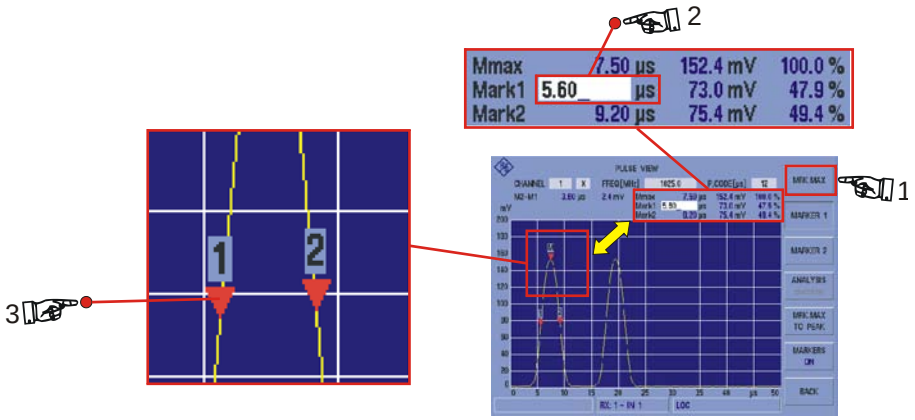


Figure shows the automatic positioning of marker "Max" via the Peak marker function by selecting Peak 1 or Peak 2.

Marker 1 and Marker 2 function: Since the operation of this marker function is identical for the two marker functions, it will only be described with the example of Marker 1.			
2.		Press the softkey "Marker 1".	The setting (2) for manual positioning of the marker 1 (3) is enabled. The marker position can be set manually via the rollkey / keyboard. Another actuation of the "Marker

	Control	Operation	Function
			1" (1) softkey will save the settings (level values will be updated).



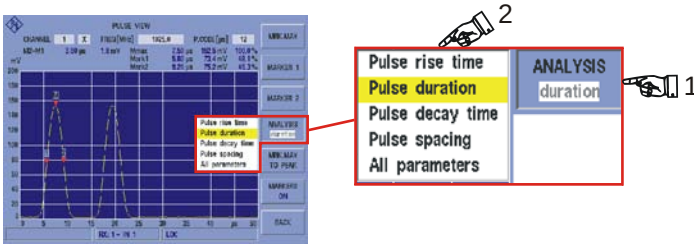
The figure shows the manual positioning Marker 1.

3.7.11.3 DME Analysis function

In the DME analysis, the data visible on the display area (DME single or double pulse) will automatically be analyzed. Following the analysis, the markers will be set to exactly 10 %, 50 % or 90 % according to the analysis function selected. The parameters corresponding to the marker position (time, level) are interpolated. The following analysis functions can be selected:

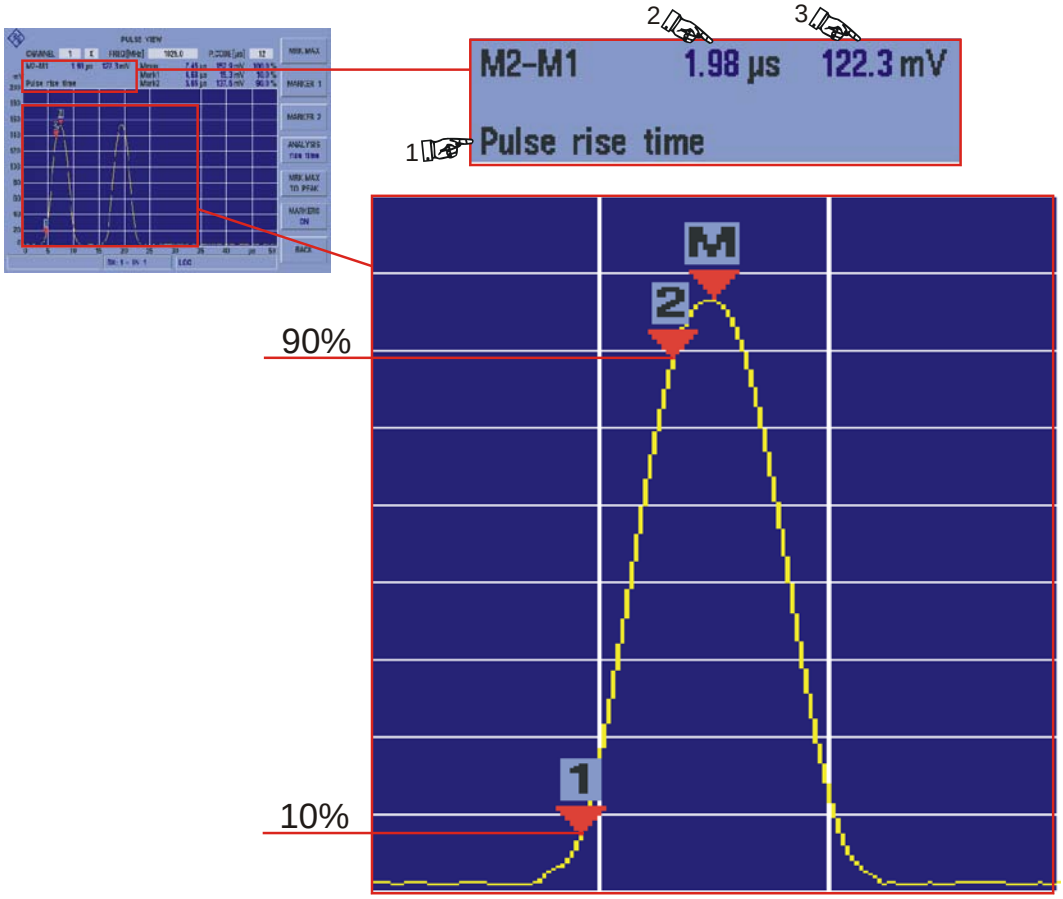
- Pulse rise time (analysis of the rising pulse slope)
- Pulse decay time (analysis of the falling pulse slope)
- Pulse duration (analysis of the pulse width)
- Pulse spacing time (analysis of the pulse spacing for a DME double pulse)
- "All parameters" (Summary of all characteristic numbers of the functions described above)

	Control	Operation	Function
		Before a pulse analysis is started, the marker "Max" must be set to the peak of a pulse. In addition, the unit (UNIT = V) and the scaling (µV / DIV … V / DIV) must be set.	
Select and start an analysis function as follows:			
1.		Press the softkey "ANALYSIS".	The selection list (2) of the analysis function will is opened.
2.		Select an analysis function using the rollkey and enable it by pressing the Enter button or pushing the rollkey.	The analysis will be started. The current selection will be carried along in the softkey (1).

	Control	Operation	Function
			

"Pulse rise time" analysis function:

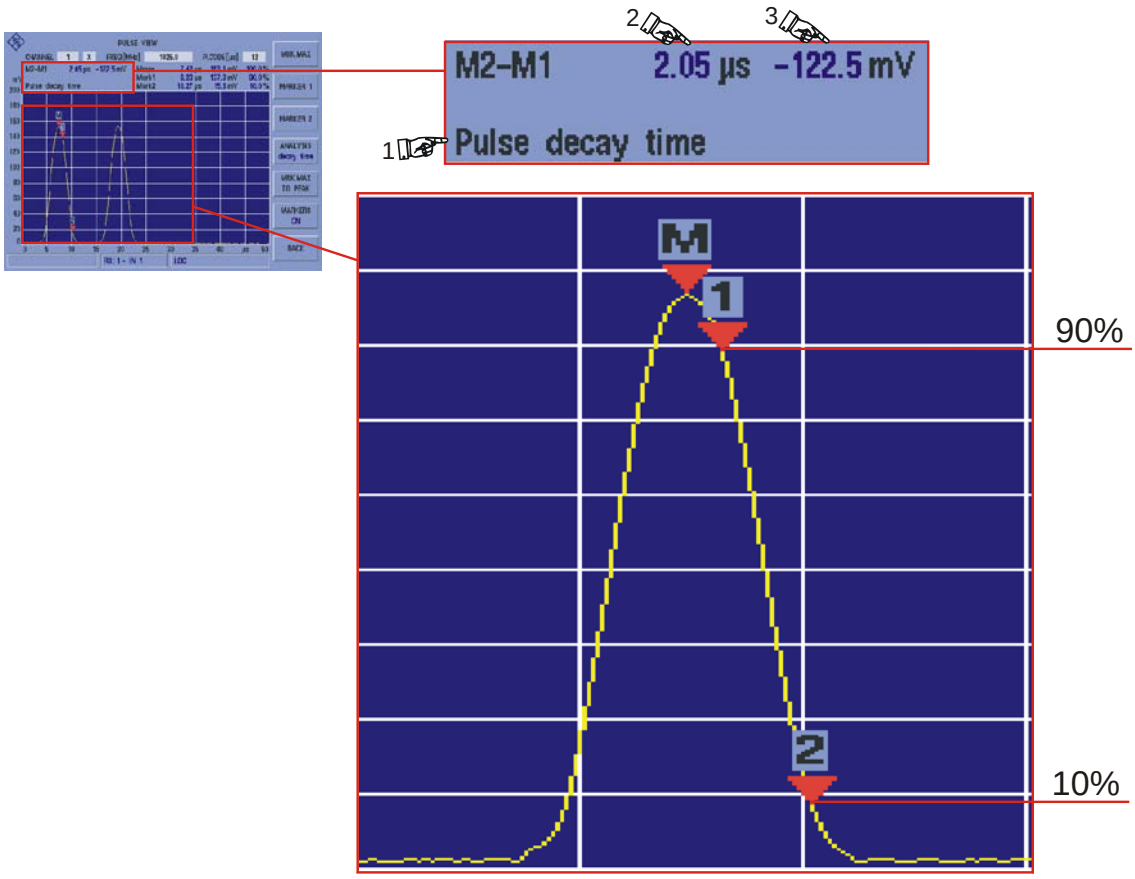
In the "Pulse rise time" analysis function, marker 1 is set to exactly 10 % of the rising pulse slope and marker 2 to exactly 90 % of the rising pulse slope. The resulting difference (M2-M1) between the two marker positions is output in the parameter field in time (2) and level (3). Provided the analysis was successful, "Pulse rise time" (1) will be shown in **black**. If it is shown in **grey**, the marker positions must be checked.



Example of the "Pulse rise time" analysis function

	Control	Operation	Function
"Pulse decay time" analysis function:			

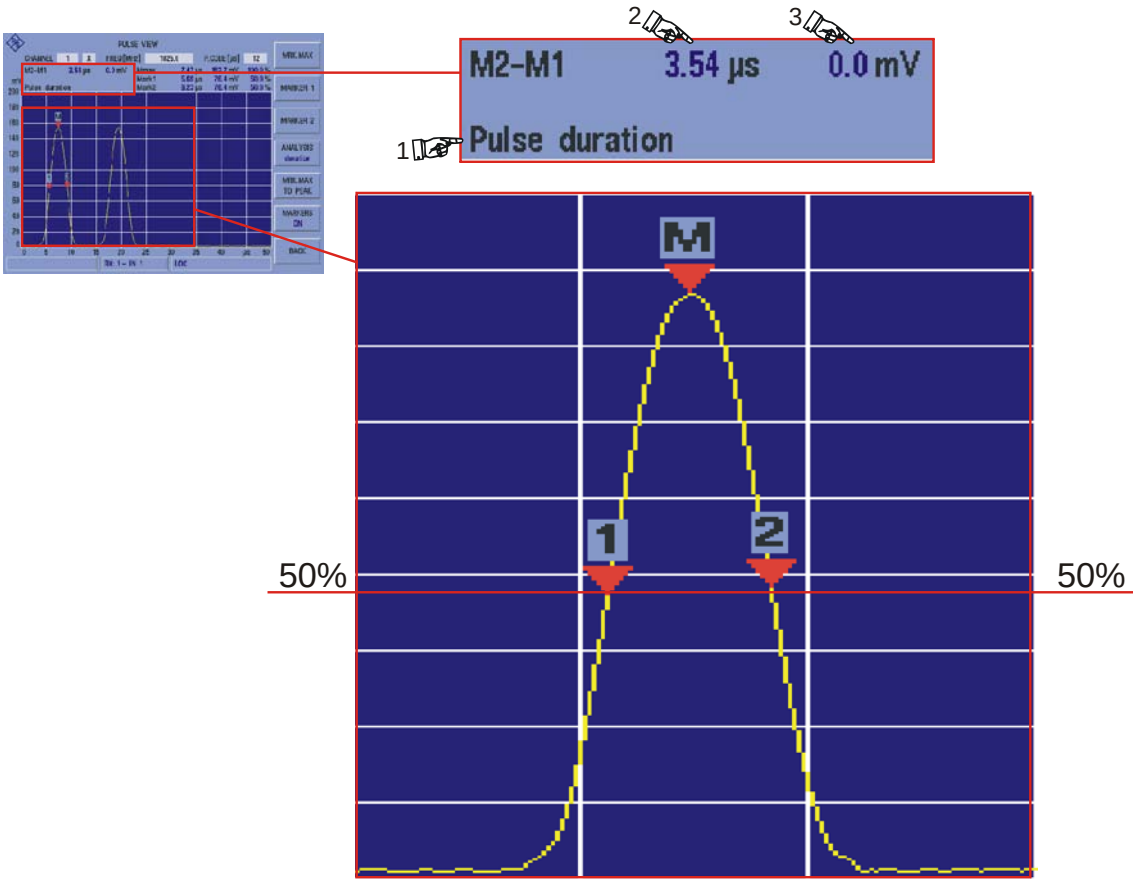
In the "Pulse decay time" analysis function, marker 1 is set to exactly 90 % of the falling pulse slope and marker 2 to exactly 10 % of the falling pulse slope. The resulting difference (M2-M1) between the two marker positions is output in the parameter field in time (2) and level (3). Provided the analysis was successful, "Pulse decay time" (1) will be shown in **black**. If it is shown in **grey**, the marker positions must be checked.



Example of the "Pulse decay time" analysis function

	Control	Operation	Function
"Pulse duration" analysis function:			

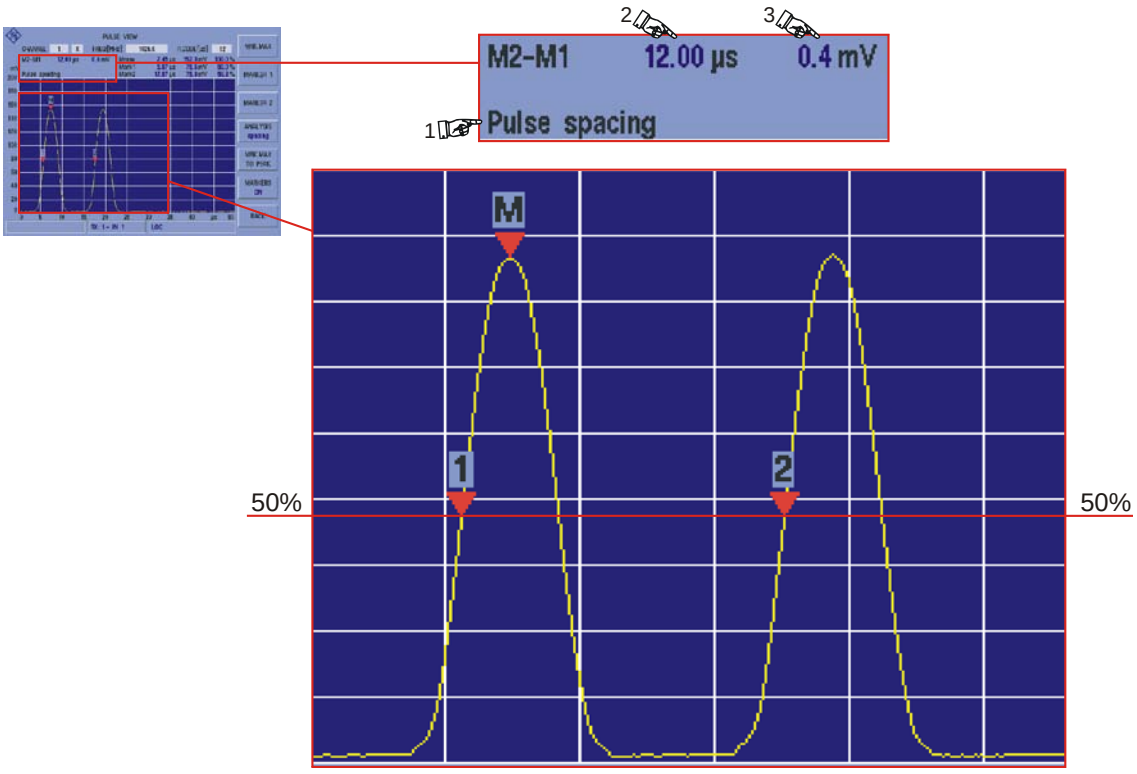
In the "Pulse duration" analysis function, marker 1 is set to exactly 50 % of the rising pulse slope and marker 2 to exactly 50 % of the falling pulse slope. The resulting difference (M2-M1) between the two marker positions is output in the parameter field in time (2) and level (3). Provided the analysis was successful, "Pulse duration" (1) will be shown in **black**. If it is shown in **grey**, the marker positions must be checked.



Example of the "Pulse duration" analysis function

	Control	Operation	Function
"Pulse spacing time" analysis function:			

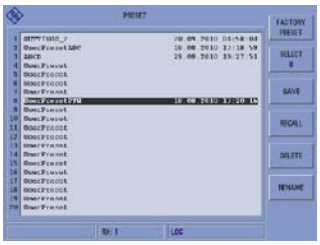
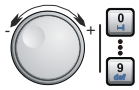
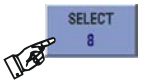
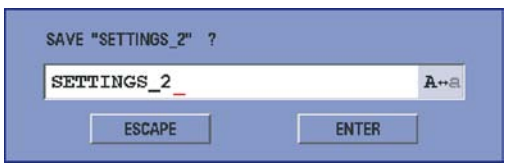
In the "Pulse spacing time" analysis function, marker 1 is set to exactly 50 % of the rising pulse slope and marker 2 to exactly 50 % of the rising pulse slope of the second pulse. The resulting difference (M2-M1) between the two marker positions is output in the parameter field in time (2) and level (3). Provided the analysis was successful, "Pulse spacing" (1) will be shown in **black**. If it is shown in **grey**, the marker positions must be checked.

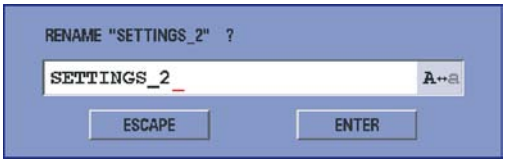


Example of the "Pulse spacing time" analysis function

3.8 Preset mode operation

The preset function enables 20 different individual device settings to be saved and used. This pre - settings includes operational settings for a mode (such as frequency, channel etc.) and the most important set up settings. If a particular device setting is stored, date and time are automatically assigned to the list's element. Each element of a list may be named individually.

	Control	Operation	Function
1.		Press the "PRESET" (1) button.	The display changes to the window of the Preset function. 
Creating a Presetting			
2.		Press the softkey "SELECT".	Switch to the editing function for selecting a "UserPreset no". The value field in the softkey will be displayed on a different background. 
3.		Set a "UserPreset no." using the rollkey / keyboard.	The selection will be carried along numerically in the softkey. 
4.		Press the Enter button / push rollkey.	Acceptance of the new set selection. 
5.		Press the softkey "SAVE".	Following selection, a dialog box will display the name up to that time by default. This name, however, can be changed as desired. After confirming a security prompt, the topical device settings will be saved with the topical date and time. 
		Assignment of a saved presetting is indicated by a date / time entry. Available memory has no date / time entry. Assigned memory can be rewritten any number of times!	

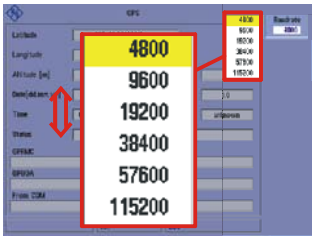
	Control	Operation	Function
6.		Press the Enter button / push rollkey.	The current settings will be stored. The process can be aborted at any time by pressing the "ESC" button.
Recalling a Presetting			
7.		Press the softkey "SELECT".	Select a "UserPreset no." according to steps 2 … 4.
8.		Press the softkey "RECALL".	The current device settings will be rewritten with the pre-settings of the selected "User-Preset-No." after the security question has been confirmed. The process can be aborted at any time by pressing the "ESCAPE" button. 
Deleting a Presetting			
9.		Press the softkey "SELECT".	Select a "UserPreset no." according to steps 2 … 4.
10.		Press the softkey "DELETE".	The name and the settings stored for this "UserPreset no." will be deleted after the security prompt has been confirmed. The process can be aborted at any time by pressing the "ESCAPE" button. 
Renaming a list element			
11.		Press the softkey "SELECT".	Select a "UserPreset no." according to steps 2 … 4.
12.		Press the softkey "RENAME".	Following selection, a dialog box will display the name up to that time by default. This name, however, can be changed as desired. 
13.		Press the Enter button / push rollkey.	The active list element is saved with a new name. The process can be aborted at any time by pressing the "ESCAPE" button.

	Control	Operation	Function
Calling the factory defaults			
14.		Press the softkey "FACTORY PRESET".	The current device settings will be overwritten with the default settings after the security question has been confirmed. 

3.9 GPS function (Option, EDS-K3)

The GPS function enables the indication of the current position and corresponding parameters, which were gained from the dataset of the NMEA protocol. A GPS receiver needs to be connected to the RS232 interface (3) for this purpose.

3.9.1 GPS operating (Option, EDS-K3)

	Control	Operation	Function
1.		Press the "GPS" (13) button.	The device changeover into the GPS function window. 
Setting the baud rate of the RS 232 interface:			
2.		Press the softkey "Baudrate".	The selection list for setting the baud rate will be displayed. 
3.		Turn the rollkey until the desired baud rate is marked in the selection list.	The softkey will be updated with the set baud rate.  Setting value: 4800 ... 115200 Baud
4.		Press the Enter button / push rollkey.	Acceptance of the new set baud rate. 

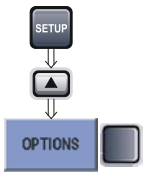
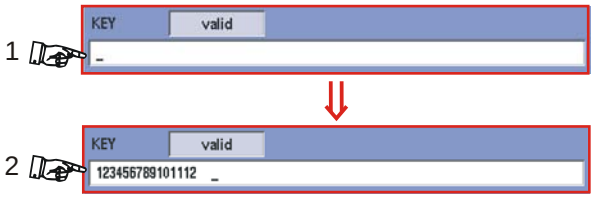
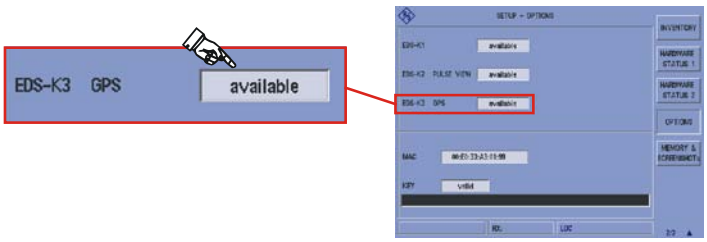
3.9.2 Displays in the GPS menu

Item	Display	Function	Indication
1	Speed [knots]	Indication of speed (knots)	knots / h
2	Speed [km/h]	Indication of speed (km/h)	km/h
3	Protocol	Indication of the GPS protocol, e.g. NMEA (National Marine Electronics Association)	
4	From COM	Arriving data from the serial interface (GPS RS 232, 3).	
5	GPGGA	GPGGA (Global Positioning System Fix Dat) dataset containing the most important information of the GPS position and accuracy. They will be displayed as ASCII character set with 4.800 baud and in the following format: $GPGGA,hhmmss.ss, IIII.II,a,yyyyy.yy,b,q,nn,d.d,a.a,M,g.g,M,h.h, rrrr*hh a. hhmmss.ss = current time (UTC) b. IIII.II = Latitude detail c. a = Hemisphere of latitude N (north) / S (south) d. YYYYY.YY = Longitude detail e. a = Hemisphere of longitude E (east) / W (west) f. q = GPS-quality g. nn = Number of used satellites (0 ... 12) h. d.d = Horizontal deterioration of the position i. a.a = Height of the antenna j. M = Unity of the antenna height in meter (m) k. h.h = Age of the DGPS data l. rrrr = DGPS-reference station (0000 ... 1023) m. hh = Checksum	
6	GPRMC	GPRMC (Global Positioning Recommended Minimum Specific) means, a GPS receiver with NMEA protocol should display a dataset with the least amount of information. This dataset will be displayed as ASCII character set with 4.800 baud and in the following format. $GPRMC,hhmmss.ss,A,IIII.II,a,yyyyy.yy,a,x.x,x.x,ddmmyy,x.x,a*hh	

Item	Display	Function	Indication
		n. hhmmss.ss = current time (UTC) o. A = Status (A=ok, V=warning) p. IIII.II = Latitude detail q. a = Hemisphere of latitude N (north) / S (south) r. YYYYY.YY = Longitude detail s. a = Hemisphere of longitude E (east) / W (west) t. x.x = Speed into knots u. x.x = Direction in degree v. ddmmyy = Date w. x.x = magnetic deviation x. a = E (east) / W (west) y. hh = Checksum	
7	Status	GPS status and number of satellites detected	
8	Time	Indication of the current Time	hh.mm.ss
9	Date	Indication of the current Date	dd.mm.yyyy
10	Altitude [m]	Indication of the current altitude	m
11	Longitude	Indication of the Longitude	[°] Degree
12	Latitude	Indication of the Latitude	[°] Degree

3.10 Release of Software options

A license key for the purchased options can be entered via the options window. Once the option has been purchased, Rohde & Schwarz will provide you with the necessary key number in writing.

	Control	Operation	Function
1.		Switch to the second menu window of the setup function and press the softkey "OPTIONS".	Changeover into the "OPTIONS" menu window. 
2.		Press the Enter button / push rollkey.	The editing function (1) for the entry of the key number is activated and the key number (2) received can be entered. 
3.		Press the Enter button / push rollkey.	Transfer of the key number, the purchased option will be enabled and identified as "available". 
	If an incorrect key number is entered, the entered key will be shown in red. The option will not be enabled, repeat the entry using the correct key. 		

3.11 Remote Control of the R&S® EDS 300 DME / PULSE Analyzer

3.11.1 Operation via LAN interface

Through the LAN interface (6), all functions of the device and the data transfer of the measurement data of the R&S® EDS 300 DME / PULSE Analyzer can be remotely operated from a PC / network. IP Addresses and subnet mask identifier are set in the setup menu.

3.11.2 Remote Control Commands

There are two categories of control commands.

- super commands (mode related)
- Mode mode dependant commands (specified mode must first be selected)

The following table makes clear the control commands structure:

Mode related control commands	Mode dependant control commands		
	DME mode	PULSE VIEW mode	Setup mode

3.11.2.1 Mode related Control Commands

Command	Parameter	Response	Function
*IDN?		Rohde&Schwarz, EDS300,	Query of the device ID
VER?		<sw-version>	Query of the software version
HELP?	<COMMAND_NAME>|ALL|ALL2		Query of the command HELP
LOCAL		READY.	Resets the device to local control if local control was previously locked by the "REMOTELOCK" command.
REMOTELOCK?		ON, OFF	Query of the remote lock status
REMOTELOCK	ON, OFF	READY.	If the function is set to "ON", local control of the device is not possible, the "LOCAL" button on the device is also locked. The local control lock is switched off by setting the function to "OFF" or by restarting the device.
FACTORY_PRESET		READY.	Reset of the R&S® EDS 300 to the basic settings.

Command	Parameter	Response	Function
KEY	<key code decimal>	e.g. KEY_SK6 READY.	Sends the key number via the remote control, for enabling SW options.
RX?		RX:1	Query of the standard RX board no.
MEASMODE?		MODE_DMETAC, MODE_PULSE, MODE_PULSE_INACTIV,	Query of the currently set measurement mode
MEASMODE_DME		READY.	Switchover to the DME mode.
MEASMODE_PULSE		READY.	Switchover to the PULSE VIEW mode.

3.11.2.2 Remote Control Commands of the DME mode

Command	Parameter	Response	Function
DME:RFCH?		e.g. 1X	Query of the currently set DME receive channel.
DME:RFCH e.g. DME:RFCH_2,Y	chnr, chchar	READY.	Setting of a DME receive channel.
DME:FREQ?		<MHz> e.g. 1089.000	Query of the currently set DME receiving frequency.
DME:FREQ e.g. DME:FREQ_962	<MHz>	READY.	Setting of the DME receiving frequency; in this process, all the frequency settings (channel number, XYWZ etc.) will be overwritten.
DME:PEAKLEVEL?		<dBm> e.g. -96.780	Query of the measured DME peak level in dBm.
DME:MEASTIME?		<ms> e.g. 100	Query of the measured DME measurement time in ms.
DME:MEASTIME e.g. DME:MEASTIME_200	<ms>	READY.	Setting of the DME measurement time in ms.
DME:ATTMODE?		LOW_NOISE, NORM, LOW_DIST, AUTO	Query of the currently set DME mode for RF signal matching.

Command	Parameter	Response	Function
DME:ATTMODE e.g. DME:ATTMODE_AUTO	<LOW_NOISE, NORM, LOW_DIST, AUTO>	READY.	Setting of the DME mode for RF signal matching. Setting : LOW NOISE, NORM, LOW DIST, AUTO
DME:PULSE_REPETITION_RATE?		<Wert> e.g. 3895.000	Query of the measured DME pulse repetition rate.
DME:CARRIER_FREQ_DELTA?		<kHz> -1.128	Query of the measured carrier frequency deviation in kHz.
DME:PULSE_SPACING?		< µs> e.g. 14.422	Query of the measured pulse interval in µs.
DME:ID_FREQ?		<Hz> e.g. 13500.000	Query of the measured identifier frequency in Hz.
DME:ID_CODE?		<CODE>	Query of the identifier code.
DME:RXMODE?		REPLY, INTERROG	Query of the set DME receive mode.
DME:RXMODE e.g. DME:RXMODE_REPLY	<REPLY, INTERROG>	READY.	Setting of the DME receive mode. Setting : REPLY / INTERROG
DME:NP_MODE?		NORMAL, PRECISION	Query of the set DME measurement mode.
DME:NP_MODE e.g. DME:NP_MODE_NORMAL	<NORMAL, PRECISION>	READY.	Setting of the DME measurement mode. Setting : NORMAL, PRECISION
DME:IA_FA_MODE?		INITIAL, FINAL	Query of the set DME measuring method.
DME:IA_FA_MODE e.g. DME:IA_FA_MODE_INITIAL	<INITIAL, FINAL>	READY.	Setting of the DME measuring method. Setting : INITIAL, FINAL
TACAN:MOD_DEPTH_15HZ?		<%> e.g. 7.2	Query of the modulation factor of the 15-Hz Tacan signal in %.
TACAN:FREQ_15HZ?		<Hz> e.g. 15.0	Query of the frequency of the 15-Hz Tacan signal.

Command	Parameter	Response	Function
TACAN:MOD_DEPTH_135HZ?		<%> e.g. 10.0	Query of the modulation factor of the 135-Hz Tacan signal in %.
TACAN:FREQ_135HZ?		<Hz> e.g. 135.0	Query of the frequency of the 135-Hz Tacan signal.
TACAN:PHASE_15HZ?		<DEG>	Query of the phase angle of the 15-Hz Tacan signal in %.
TACAN:PHASE_135HZ?		<DEG>	Query of the phase angle of the 135-Hz Tacan signal in %.
TACAN:BEARING?		<DEG>	Query of the bearing angle in degree.
DME:MEASDATA?	<FULL, SHORT>	RX:1,1,0,15.10.2010,…..	Query of the DME settings. Setting : FULL, SHORT
DME:MEASDEF?	<FULL, SHORT>	Freq[MHz], PeakLevel[dBm],….	Query of the DME measurement values. Setting : FULL, SHORT **FULL:** All possible measurement values of the current mode are output, separated by a comma. **SHORT:** Only the most important measurement values of the current mode are output, separated by a comma.
STREAM:DATASEND_INTERVAL?		<ms> e.g. 1000	Query of the set time for the data transfer interval in ms.
STREAM:DATASEND_INTERVAL e.g. STREAM:DATASEND_INTERVAL_1000	<10 … 1000 ms>	READY.	Setting of the time for the data transfer interval in ms.

Command	Parameter	Response	Function
STREAM e.g. STREAM_FULL	<FULL, SHORT>	Freq[MHz], PeakLevel[dBm],….	Setting of the data transfer mode. Setting : FULL, SHORT **FULL:** All possible measurement values of the current mode are output, separated by a comma. **SHORT:** Only the most important measurement values of the current mode are output, separated by a comma.
STOPSTREAM		READY.	Switch-off of the data transfer mode.

3.11.2.3 Remote Control Commands of the PULSE VIEW mode

Command	Parameter	Response	Function
PULSEVIEW:DATASET?		<Werte> e.g. 0.014323, Unit mV, …. READY.	Query of the PULSE VIEW measurement values.
PULSEVIEW:TIMEDIV?		<µs> e.g. 10.0	Query of the set time base in µs.
PULSEVIEW:TIMEDIV e.g. PULSEVIEW:TIMEDIV_µs	<µs>	READY.	Setting of the time base in µs.
PULSEVIEW:UNIT?		dBm, mW, µW, nW, mV	Query of the set unit.
PULSEVIEW:UNIT e.g. PULSEVIEW:UNIT_dBm	<dBm, mW, µW, nW, mV>	READY.	Setting of the unit. Setting : DBM, MW, UW, NW, MV
PULSEVIEW:TRIGSOURCE?		CONT, LEV, EXT	Query of the set trigger source.

Command	Parameter	Response	Function
PULSEVIEW:TRIGSOURCE e.g. PULSEVIEW:TRIGSOURCE_CONT	<CONT, LEV, EXT>	READY.	Setting of the trigger source. Setting : CONT, LEV, EXT
PULSEVIEW:TRIGRUNMODE?		MEASRUN, ONESHOT	Query of the trigger mode.
PULSEVIEW:TRIGRUNMODE e.g. PULSEVIEW:TRIGRUNMODE_MEASRUN	<MEASRUN, ONESHOT>	READY.	Setting of the trigger mode. Setting : MEASRUN, ONESHOT
PULSEVIEW:TRIGSLOPE?		POS, NEG	Query of the set trigger slope.
PULSEVIEW:TRIGSLOPE e.g. PULSEVIEW:TRIGSLOPE_POS	<POS, NEG>	READY.	Setting of the trigger slope. Setting : POS, NEG
PULSEVIEW:TRIGDOUBLE?		ON, OFF	Query of the set trigger double function.
PULSEVIEW:TRIGDOUBLE e.g. PULSEVIEW:TRIGDOUBLE_ON	<ON, OFF>	READY.	Setting of the trigger double function. Setting : ON, OFF
PULSEVIEW:TRACE?		CLRWR, AVRG, MAXHOLD	Query of the set trace function.
PULSEVIEW:TRACE e.g. PULSEVIEW:TRACE_AVRG	<CLRWR, AVRG, MAXHOLD>	READY.	Setting of the trace function. Setting : CLRWR, AVRG, MAXHOLD
PULSEVIEW:AVRG?		<Wert>	Query of the set AVRG factor.
PULSEVIEW:AVRG z.B.	<Wert>	READY.	Setting of the AVRG factor.
PULSEVIEW:TRIGLEVEL_MILLIVOLT?		<dBm, V, mW>	Query of the set trigger level.

Command	Parameter	Response	Function
PULSEVIEW:TRIGLEVEL_MILLIVOLT e.g. PULSEVIEW:TRIGLEVEL_MILLIVOLT_100	<dBm, V, mW>	READY.	Setting of the trigger level. The setting range depends on the unit set for "UNIT".
PULSEVIEW:TRIGDELAY?		<µs>	Query of the set trigger delay time in µs.
PULSEVIEW:TRIGDELAY e.g. PULSEVIEW:TRIGDELAY_100	<µs>	READY.	Setting of the trigger delay time in µs.

3.11.2.4 Remote Control Commands of the Setup mode

Command	Parameter	Response	Function
SETUP:INPUT?		INPUT_RF1, INPUT_RF2, INPUT_BBAND	Query for the signal selection of the receiver module (RX board).
SETUP:INPUT e.g. SETUP:INPUT_INPUT_RF1	<INPUT_RF1, INPUT_RF2, INPUT_BBAND>	READY.	Signal selection on the receiver module (RX board)
SETUP:BBAND_RANGE?		BBRANGE_LOW, BBRANGE_HIGH	Query of the currently set baseband range of the receiver module (RX board).
SETUP:BBAND_RANGE e.g. SETUP:BBAND_RANGE_BBRANGE_HIGH	<BBRANGE_LOW, BBRANGE_HIGH>	READY.	Setting of the baseband range of the receiver module (RX board).
SETUP:TRIGGER_OUTPUT?		TRIGOUT_RX1, TRIGOUT_RX2, TRIGOUT_RX3, TRIGOUT_RX4	Query of the set trigger output.
SETUP:TRIGGER_OUTPUT e.g. SETUP:TRIGGER_OUTPUT_TRIGOUT_RX1	<TRIGOUT_RX1, TRIGOUT_RX2, TRIGOUT_RX3, TRIGOUT_RX4>	READY.	Setting of the trigger output. Setting : TRIGOUT_RX1, TRIGOUT_RX2, TRIGOUT_RX3, TRIGOUT_RX4

Command	Parameter	Response	Function
SETUP:TRIGGER_OUT_MODE?		PULSE_TRIGGER, ID_CODE,ARB_TRIGGER, MRB_TRIGGER	Query of the set trigger type for the trigger output.
SETUP:TRIGGER_OUT_MODE e.g. SETUP:TRIGGER_OUT_MODE_PULSE_TRIGGER	<PULSE_TRIGGER, ID_CODE,ARB_TRIGGER, MRB_TRIGGER>	READY.	Setting of the trigger type for the trigger output. Setting : PULSE_TRIGGER, ID_CODE, ARB_TRIGGER, MRB_TRIGGER
SETUP:ANALOG_OUT_MODE?		RX-DEMOD, RX1-LOGAMP, 15_HZ,135_HZ	Query of the set signal selection at the analog output.
SETUP:ANALOG_OUT_MODE e.g. SETUP:ANALOG_OUT_MODE_RX-DEMOD	<RX-DEMOD, RX1-LOGAMP, 15_HZ,135_HZ>	READY.	Setting of the signal selection at the analog output. Setting : RX-DEMOD, RX1-LOGAMP, 15_HZ, 135_HZ
SETUP:AUDIO_OUT?		IDENTIFIER, FULL	Query of the set audio mode.
SETUP:AUDIO_OUT e.g. SETUP:AUDIO_OUT_FULL	<IDENTIFIER, FULL>	READY.	Setting of the audio mode. Setting : IDENTIFIER, FULL,
SETUP:UNIT_LEVEL?		<dBm>	Query of the set unit for the level.
SETUP:REFERENCE:SOURCE?		FREF_INTERN, FREF_EXTERN	Query of the source for the reference frequency.
SETUP:REFERENCE:SOURCE e.g. SETUP:REFERENCE:SOURCE_FREF_EXTERN	<FREF_INTERN, FREF_EXTERN>	READY.	Setting of the source for the reference frequency. Setting : FREF_INTERN, FREF_EXTERN,
SETUP:AF_VOLUME?		<%>	Query of the set audio level in %.
SETUP:AF_VOLUME e.g. SETUP:AF_VOLUME_5	<%>	READY.	Setting of the audio level in %.
SETUP:SPEAKER?		ON, OFF	Query of the current speaker level.

Command	Parameter	Response	Function
SETUP:SPEAKER e.g. SETUP:SPEAKER_ON	<ON, OFF>	READY.	Switching the speaker ON/OFF. Setting : ON, OFF,
SETUP:DISPLAY_UPDATE_MS?		<ms>	Query of the set display interval in ms.
SETUP:DISPLAY_UPDATE_MS e.g. SETUP:DISPLAY_UPDATE_MS_200	<ms>	READY.	Setting of the display interval in ms.
GETHWINVENTORY			Output of the hardware / software inventory list.
TEMP?		<DEG>	Output of the temperatures of all the integrated temperature sensors.

4 Service

To guarantee a repair as quick as possible a defective R&S® EDS 300 DME / PULSE Analyzer must be sent to the services as stated below.

To avoid damages on transport the unit should be sent inside its original packing.

Shipping address:
Rohde&Schwarz GmbH & Co. KG.
Service Center Cologne
Graf-Zeppelin-Str. 18
D-51147 Köln

For questions concerning the service or other problems with the unit, please contact us.

ROHDE&SCHWARZ
Service Center Cologne

☎	(49) / 2203 / 49-51**406** (49) / 2203 / 49-51**402**
FAX	(49) / 2203 / 49-51**642**

4.1 Guarantee

See our terms and conditions of trade (sales contract).

During the guarantee a defective internal battery may only be changed by a Rohde & Schwarz-Service Centre, otherwise the right to claim under guarantee get lost!

5 Maintenance

5.1 Calibration

The R&S® EDS 300 DME / PULSE Analyzer needs to be calibrated yearly!

5.2 Cleaning

To clean the **R&S® EDS 300 DME / PULSE Analyzer** we recommend the following utensils:

- brush
- soft, lint free cloth

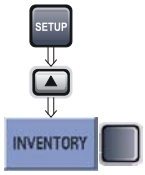
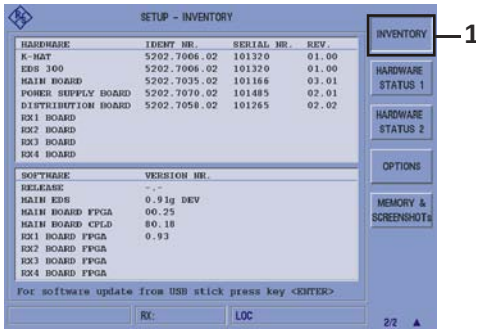
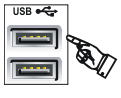
Before cleaning R&S® EDS 300 DME / PULSE Analyzer it must be switched OFF!

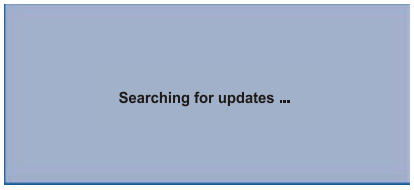
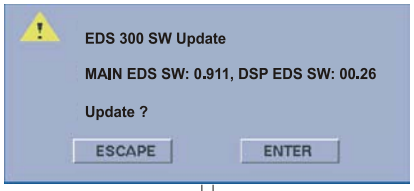
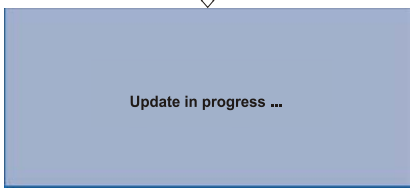
Don't use aggressive cleaner for cleaning the surfaces of the R&S® EDS 300 DME / PULSE Analyzer!

Electric interfaces must not be cleaned with liquid cleanser e.g. contact spray!

5.3 Software Update

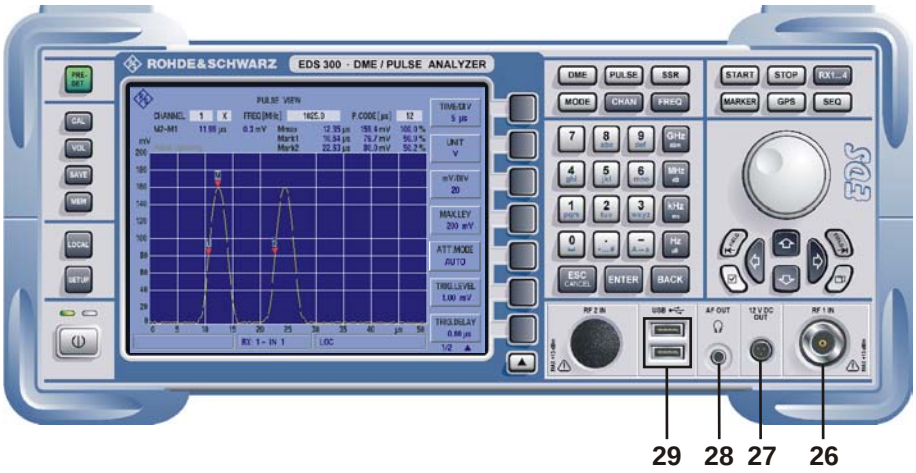
Click on the following website to receive the latest software update for your **R&S® EDS 300 DME / PULSE Analyzer**:
http://www.rohde-schwarz.com/product/eds300.html.

	Control	Operation	Function
1.		Activate setup and switch to the second menu window, press the softkey "INVENTORY".	Changeover to the "INVENTORY" menu window. 
2.		Insert the USB memory stick with the current software update into one of the USB interfaces (29)/(8).	wait about 5 seconds

	Control	Operation	Function
3.	ENTER	Press the "ENTER" (31) button.	Initialisation of the software update is beginning. 
4.	ENTER	Press the "ENTER" (31) button.	The software update will begin after the security question has been confirmed.  
			Never remove the USB memory stick or switch off the device during the software update! ***If the USB memory stick is removed during an update, the following error message will be displayed: "Cannot unpack Update". Use the “ESC” button to acknowledge the message. The update mode will be interrupted, i.e., the device can still be operated.***
5.	ENTER	Press the "ENTER" (31) button.	When the software update is completed, the update programme is ended after confirmation by pressing “Enter”. 
6.		Remove the USB memory stick.	
7.	⏻	Press the button twice	The device needs to be restarted to activate the new software.

6 Interfaces of the Unit

6.1 Front side interfaces



6.1.1 Receiving antenna connection (26)

Item	Designation	Description
26	RF1 IN	RF input for the first receiver unit. Input level: max. +13 dBm Frequency range: 960 MHz ... 1215 MHz VSWR: <1.5 Connector: N-socket, 50 Ω ***The max. input level is +13 dBm, Data stability until 10 dBm guaranteed!***

6.1.2 Voltage supply for external consumers (27)

Item	Designation	Description
27	12 VDC OUT	Supply voltage output for external consumers. Power supply: 12 VDC / 300 mA Connection: 3pol. circular connector

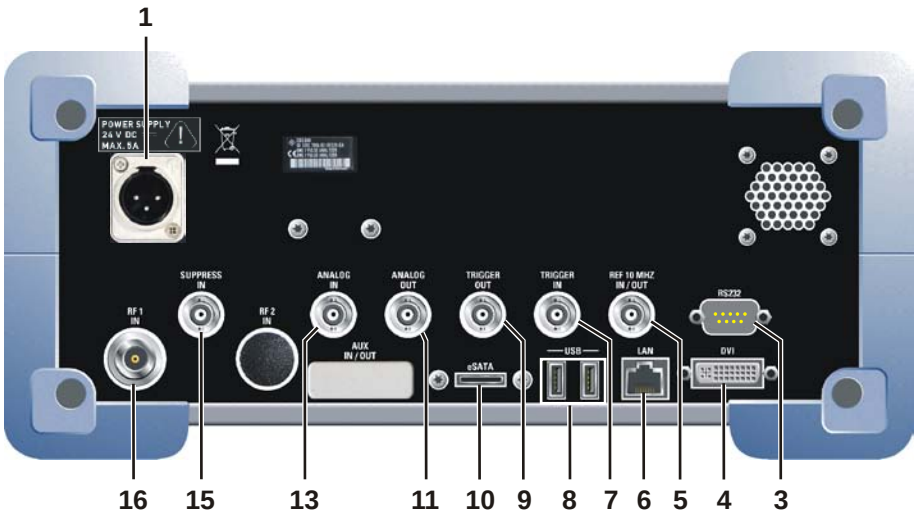
6.1.3 Headphone output (28)

Item	Designation	Description
28	AF OUT	3.5 mm jack plug.

6.1.4 USB interface (29)

Item	Designation	Description
29	USB	USB 2.0 standard twin port. Transmission rate: max. 40 Mbit/s Power supply: 5 VDC / 500 mA at each port (integrated)

6.2 Rear side interfaces



6.2.1 Power Supply connection (1)

Item	Designation	Description
1	POWER SUPPLY 24 VDC	Supply voltage input Input voltage: 24 VDC Connector: DC-socket

When connecting the device to an external direct voltage source, a 5-A fuse protection must be provided! The length of the DC cable must be <3 m. The device must not be connected to available direct voltage networks.

6.2.2 RS232 interface (3)

Item	Designation	Description
3	RS232	Serial interface of the **R&S® EDS 300 DME / PULSE Analyzer** to the connection of an external GPS receiver. COM-parameter: N81 Baud-rate: 4800 … 115200 bit/s Connector: SUB-D-plug (9 pin)

6.2.3 DVI interface (4)

Item	Designation	Description
4	DVI	Digital interface for the connection of a second monitor (TFT). Connector: DVI-D-socket (24+1)

6.2.4 10-MHz Reference frequency IN / Out (5)

Item	Designation	Description
5	REF 10 MHZ IN/OUT	OUT- / INput for the 10-MHz Reference frequency, the setting is made in the setup. Frequency: 10 MHz Input level: 1 $V_{eff.}$ Output level: 1 $V_{eff.}$ Connector: BNC-socket, 50 Ω

6.2.5 LAN interface (6)

Item	Designation	Description
6	LAN	LAN interface (Fast Ethernet Standard) Data transfer rate: 100 Mbit/s Connector: RJ 45

6.2.6 Trigger input (7)

Item	Designation	Description
7	TRIGGER IN	External trigger input for triggering the corresponding analysis modes. Input level: digital, 0 V / 3,3 … 30 V Connector: BNC-socket, 100 kΩ

6.2.7 USB interface (8)

Item	Designation	Description
8	USB	USB 2.0 standard twin port. Transmission rate: max. 40 Mbit/s Power supply: 5 VDC / 500 mA at each port (integrated)

6.2.8 Trigger output (9)

Item	Designation	Description
9	TRIGGER OUT	Trigger output for digital trigger signals, e.g. Pulse, ARB and MRB triggers. The setting is made in the setup. Output level: digital, 0 V / 5 V Connector: BNC-socket, 50 Ω

6.2.9 eSATA interface (10, option)

Item	Designation	Description
10	eSATA	eSATA interface for connecting an external hard disk by means of hot plugging. Transmission rate: ca. 3.0 Gb/s Connector: eSATA-plug

6.2.10 Analog output (11)

Item	Designation	Description
11	ANALOG OUT	Analog output for the baseband signal, the corresponding setting is made in the setup. Analog Out: 4 V_{pp} Audio Out: 4 V_{pp} Connector: BNC-socket, 50 Ω

6.2.11 Analog input (13)

Item	Designation	Description
13	ANALOG IN	AF input for analysing baseband signals, the corresponding setting is made in the setup. Input level: 1 V_{pp} Connector: BNC-socket, 50 Ω

6.2.12 SUPPRESS-Signal input (15)

Item	Designation	Description
15	SUPPRESS IN	Switch signal input for the suppressor signal. Input level: digital, 0 V / 8 … 30 V Connector: BNC-sockete, 30 kΩ

6.2.13 Receiving antenna connection (16, option)

Optional RF input for the first receiver unit; depending on the individual equipment option, the respective port on the front of the device will be omitted.

Item	Designation	Description
16	RF1 IN	RF input for the first receiver unit. Input level: max. +13 dBm Frequency range: 960 MHz ... 1215 MHz VSWR: <1.5 Connector: N-socket, 50 Ω ***The max. input level is +13 dBm, Data stability until 10 dBm guaranteed!***