**Release Notes**

# Firmware Update  Version 1.90

# R&S® EM510

## HF DIGITAL WIDEBAND RECEIVER

**4065.7728.02**

# R&S® DX200

## IF RECORDER CONVERTER

**4070.2837.02**

Printed in Germany

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Dear Customer,

throughout this manual, EM510 is generally used as an abbreviation for R&S$^{®}$ EM510

and, DX200 is generally used as an abbreviation for R&S$^{®}$ DX200

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# Contents

# 1 General Information

## Manual for EM510

The following manual is supplied with the EM510:         **Manual EM510**

The new firmware   Version 1.90 corresponds with the EM510 Manual 4065.7763.34-03

## Manual for DX200

The following manual is supplied with the DX200:         **Manual DX200**

The new firmware   Version 1.90 corresponds with the DX200 Manual 4070.2850.34-03

### How to get a current version of the manual?

- Order a printed manual at Rohde & Schwarz, order no. 4065.7763.34-03 for EM510 and 4070.2850.34-03 for DX200

- You will also find pdf-files of the current release of the manual in the SALES INFORMATION Board on GLORIS. If you don't have access to this Board, please ask your local support for a manual in pdf format.

## EM510 and DX200

The firmware for EM510 is also used for DX200.

The DX200 is based on EM510 hardware but has reduced functionality:

- The receiver is set to fixed frequency of 10.7 MHz.

- The demodulation bandwidth can be set to maximum 300kHz

- Only the receiver mode FFM (Fixed Frequency Mode) is available.

The DX200 can be upgraded to the full EM510 functionality with the software option DX200EM.

# 2 Firmware Update

The entire firmware (software for the PPC and DSP processors and for the FPGA) of the EM510 can be updated. The CPLD on the mainboard is only programmed in production by JTAG.

The firmware update of EM050 can be done via LAN interface or via VXI.

Update via LAN interface is possible with the update tool UPD32.EXE which runs under WinNT, Win2000, WinXP and WinVista.

## 2.1 System Requirements

- IBM-compatible PC with WinNT, Win2000 , WinXP or WinVista and LAN interface

- LAN crossed over cable with RJ45 connector, for point to point connection

or

- LAN patch cable with RJ45 connector, direct for connection via HUB or network

## 2.2 Preparations before Update

- Use the crossed over LAN cable to connect the Ethernet port of the PC directly to the X11 of the EM510 and switch off the automatic power save mode for the LAN connection of your PC

or

- Use the patch LAN cable to connect the hub or network to the X11 of the EM510

## 2.3 Update Procedure

### 2.3.1 Prepare Update Data

- Create a new directory on your PC by command:
  `md EM510_DX200\V01_90`

- Copy the ZIP archive file to this directory.

- Unpack the ZIP archive file in the directory by command:

  `EM510_DX200_Application_V01_90.zip`

- After unpacking you will find the following files in your directory:

  | | |
  |---|---|
  | `Rel_V01_90e.pdf` | this document |
  | `UPD32.EXE` | update program for, WinNT,  Win2000, WinXP, WinVista |
  | `UPD32.HLP` | help file for update program for WinNT, Win2000, WinXP |
  | `4.1.1-WinPcap.exe` | Ethernet component for update via LAN |
  | `EM510P1P.cfg` | configuration file |
  | `BOOTLOAD.ELF` | boot loader |
  | `EM510P1P.elf` | firmware update code |

### 2.3.2 Installation of WinPcap ©

If you want to update your target via Ethernet you have to install the necessary WinPcap components. If  WinPcap is already installed, you only have to reinstall WinPcap if your version of WinPcap is lower than 4.0.1.

The versions 3.31 and higher of  UPD32.EXE are using WinPcap and its API for its Ethernet capabilities. WinPcap is a free, public system for direct network access under Windows.

The version of WinPcap delivered with EM510 Update has not necessarily to be the newest. To obtain the newest version of WinPcap and for further information about the software kit, see the home page at http://winpcap.polito.it/ .

The version 3.51 of UPD32.EXE is developed and tested with WinPcap 4.1.1.

Install WinPcap simply by double clicking the supplied WinPcap installation file. Read the installation instructions carefully.

Read the following disclaimer as well very carefully and see also the About Box:

Important notes about WinPcap:

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### 2.3.3 Update via Ethernet (LAN)

In this mode one can bring several targets with the same update-software on the new status.

- Switch off the target(s) EM510 before running the update program.

- Start Update Program UPD32.exe under WinNT, Win2000, WinXP, WinVista

- Select configuration file EM510P1P.CFG through menu "File - Config File"

- If there are more than one network adapters mounted in your computer, UPD32 takes the first as the default adapter which is used for the update. To change the network adapter select "Network Adapter" in the "Config" menu.

- Then select "via Ethernet" within the "Update" menu.
  If the menu item is selected, the system sends out broadcast telegrams.

- Switch on or reset the target(s) EM510
  The targets receive the broadcast telegrams and answer it with the hardware identification telegram. If this ID corresponds to the selected configuration file, the target is listed in the next line.

- Now one can select the desired targets from the list.

- Start the "Update-procedures" with the  "START" button. Now one after another target will be updated with the new software.

## 2.4 Messages and Indication

### 2.4.1 Update Messages

UPD32 displays the following messages while „Load Program Code":

STARTING COMMUNICATION FOR TARGET (ADR: 00 90 B8 10 01 14)

Load boot code....

Erasing...

Loading program code...

Calculating checksum...

UPDATE COMPLETE

### 2.4.2 Indication on EM510 rear panel

The lighted ACCE LED on the rear panel of the EM510 shows, that the update is in progress.

After update the ACCE LED is switched of and the FAIL LED is switched on.

If there is no problem detected, the EM510 application starts automatically and switches the FAIL LED of after approximately 10 seconds.

If a problem appears, the FAIL LED toggles the error codes.

| Error Code | Definition | Note |
|---|---|---|
| 0 | ERROR_NO_ERROR | No error |
| 1 | ERROR_CPLD_NOT_PROGRAMMED | Internal |
| 2 | ERROR_EEPROM_NO_IDENT_BLOCK | Internal |
| 3 | ERROR_EEPROM_NO_SERIAL_NUMBER | Internal |
| 4 | ERROR_EEPROM_NO_ETH_ADDR | Internal |
| 5 | ERROR_WRONG_LOCATED | Internal |
| 6 | ERROR_NO_APPLICATION | There is no application in the Flash EEprom |

# 3 New Features, Improvements and Changes

## 3.1 New Features

- The device's internal time, date and time zone can now be configured with e.g. the commands SYSTem:TIMe 17,5,0 .and SYSTem:DATe 2010,4,15 and SYSTem:TZONe 2,0 . Due to the fact that the internal real time clock is not power supplied when the device is switched off, the clock has to be set after each power on.

- The optional headers of UDP and TCP mass data outputs have been expanded to include time stamps.

- Additional to UDP now also TCP mass data output is available.

- Data output via LAN with IF data format for AMMOS is now available.

## 3.2 Improvements

- None

## 3.3 Changes

- With new SDRAM chips and high temperature a hardware problem occurred in the production. To solve this problem a hardware change was necessary. This firmware V 1.90 is necessary to react to the hardware change.
  The new hardware can be detected via TAZ of the mainboard. If major version is 03 the new hardware has a minor version equal or greater 03.
  New hardware can also be detected with the command diag:info:module? z1 The answer looks like Z1,4060.3553.02,105,02.05,100.347/002,2003,10,02,"IF SECTION" If the third parameter (HW code) is greater or equal 105, then a firmware version equal or greater V 1.90 is necessary. Do not downgrade new hardware to old firmware versions.

- The parameters "CycleCount" and "DwelTime" in the optional header of FSCAN and MSCAN now contain -1 to show the state "infinite".

- The optional header of VDPAN now contains the parameter "DisplayVariants" (AM, FM, IQ, AMSquare, FMSquare, IQSquare) .

- Update via serial is not any more supported.

## 3.4 Version History

### Changes from Version 1.82 to  Version 1.86:

**New Features:**

- A newly implemented LOCK mechanism enables a particular client to attain exclusive use of the device. Within the SYSTem:LOCK  system the following commands are implemented: SYSTem:LOCK:OWNer? returns what session currently has the lock on this device. The return strings are "NONE" or the "<IP address>" of the session which has locked the device. SYSTem:LOCK:REQest? attempts to attain the lock on this device and returns 1 if successful and 0 if it fails. SYSTem:LOCK:RELease releases the lock if owned by this session.

- The mechanism to check the connection to UDP clients by means of periodic pings can now be configured with the remote commands
SYSTem:COMMunicate:LAN|[SOCKet]:PING[:STATe]  ON|OFF switches the periodic ping on or off. For safety reasons surveillance of the connection by periodic ping is switched on after power-on.
SYSTem:COMMunicate:LAN|[SOCKet]:PING:PERiod <numeric value>  sets the period or repetition time of the periodic ping function in seconds. The minimum time is 1 and the maximum time is 20 seconds.

- With the new command SYSTem:COMMunicate:CLIents?  a list of IP addresses of all connected is reported. For example the answer could be "10.8.10.230","172.16.2.10" ,"0.0.0.0".  The string "0.0.0.0" represents the permanent available serial connection. Maximum 10 clients can be connect to the device at the same time.

**Improvements:**

- During a running PSCAN to receiver frequency is not any more changed and can now be used as a marker frequency in external GUIs. After stopping the PSCAN the receiver is set to this marker frequency.

- Changing the FSCAN parameters start frequency, step frequency and stop frequency during running scan and during dwell time is now possible. The FSCAN is then restarted automatically.

**Changes:**

- The hold time of SSB and PULS control characteristic has been shortened.

**Faults Remedied:**

- Since V01.80 the IF-Panorama via TCP did not work correctly. The command TRACE? IFPAN delivered only two measurement points. This problem has been solved. The commonly used IFPAN data output via UDP worked always correctly.

- If UDP path was configured with FREQ:RX and CHANNEL flags to output frequencies and channel numbers during FSCAN or MSCAN no frequencies were put out but double channel numbers. This problem has been solved.

- Due to compatibility reasons to newer receivers with enhanced frequency range a FREQ:HIGH:RX flag has been implemented. If UDP path was configured with FREQ:HIGH:RX flag the upper 32 Bits of the 64 Bit frequency were not 0. This problem has been solved.

### Changes from Version 1.81 to  Version 1.82:

**New Features:**

- With the new command SYSTEM:ERROR:ALL?  the whole error queue can be read out.

- With the new command SYSTEM:ERROR:COUNT?   the error count of the error queue can be read out.

-

**Improvements:**

- The amount of possible udp paths has changed from 3 to 7.

**Changes:**

- Due to a necessary hardware change in the HF preselection module from TAZ 1.04 the switch delay for the preamplifier had to be extended. Without this change the long test sometimes failed.

- The default udp path can not be deleted with the command TRACE:UDP:DELETE ALL but with the command TRACE:UDP:DEFAULT:DELETE ALL

**Faults Remedied:**

- None

## Changes from Version 1.75 to  Version 1.81:

**New Features:**

- Supported TV Standards: B,G,D,I,K,L,M,N

**Improvements:**

- If a client configures the device to send UDP data, the connection to this client is now continuously checked with a ping every second. In case of no response for five times, the UDP data output to this client is stopped. The device goes on to check with ping, if the client is risen from the dead again. If so the UDP data output is switched on again.
  Implementation of  this behavior was necessary, because some switches in a network react to a disconnection of a client with broadcasting the UDP data to all their outputs. This could lead to a network collapse.

**Changes:**

- With elder main boards  up to revision 2.30 the test point limits for "+3.3V" and "V_CORE_PPC" were to narrow. This firmware checks the main board revision and expands the limit range of these test points if necessary.

- The number of samples within the IFPAN has been increased by 2 points. Control software which uses the IFPAN data output via UDP and is programmed properly analyses the "number_of_trace_values" in the IFPanAttribute  and therefore should not have a compatibility problem with this change.

- The additional IF bandwidth 8 MHz has been integrated.

**Faults Remedied:**

- After setting  the receiver to a new frequency it could happen that one sample of the IQ data stream got lost. This problem has been solved now.

- With RARP switched off and 32 bit IQ data output via LAN sometimes packets got lost. This problem has been solved now.

- If an internal temperature test point was out of range, the error message "Mainboard defective" was generated instead of "Temperature too high" or "Temperature too low". This problem has been solved now.

- With RDS statistics data there was a overflow of the packet counter after a few hours. This problem has been solved now.

## Changes from Version 1.72 to  Version 1.75:

**Changes:**

- With new SDRAM chips and high temperature a hardware problem occurred in the production To solve this problem a hardware change was necessary. This firmware V1.75 is necessary to react to the hardware change.

**Faults Remedied:**

- The command clear memory channels caused also to copy the flags of memory channel 0 to all the cleared memory channels. This problem has been solved.

- It was possible to copy a memory channel with frequency set to zero to the receiver. This is no more possible.

- The test output on the left corner of the video panorama is now eliminated.

- Due to a bug in the firmware V01.72 after 121 continuous open-close cycles of the TCP/IP socket the firmware hang. This problem has been solved.

- Due to a DSP firmware problem the lower range of BFO variation was limited to -4kHz. This problem has been solved.

- There were level variations up to 3 dB when running PSCAN with step width lower than 3.125 kHz. This problem has been solved.


## Changes from Version 1.69 to  Version 1.72:

**Faults Remedied:**

- During the warm up time of the OCXO the test point TUNE_76.8M is out of his permissible working limits. This sometimes lead to the error message `10,"Component failure; Mainboard defective"` after power on of the cold device. The test point limits are now valid after one minute warm up time.
- The service tool works now also on a raw main board and on DX200.

**New Features:**

- This is the first firmware version to run also on a DX200.

**Improvements:**

- The accuracy of AFC has been improved.


## Changes from Version 1.68 to  Version 1.69:

**Faults Remedied:**

- The timing problem with environment temperature higher than 45 degree Celsius is solved now. The new  FPGA image works on old FPGA SG4 (BF 2085.4138.00) and new FPGA SG5 (BF 2110.8289.00) as well.


## Changes from Beta Version 1.68 to  Version 1.68:

**New Features:**

- The dynamic IP address configuration is now possible via RARP or DHCP. The configuration can be done via UPD32 "CONFIG"-"LAN Settings via Ethernet" or via remote command "SYST:COMM:LAN:AUTO RARP | DHCP
If DHCP is used and a name server is present in the network the EM510 can be addressed with his name. The name is put together for example like RS-EM510-100016-002 if serial number is 100016 and the variant is 002.

**Improvements:**

- The speed of PSCAN in the instantaneous window with step width 100kHz has been improved by factor 2. Thus the speed up to 34 GHz/s can be reached.

**Faults Remedied:**

- The network subnet mask and the gateway are now handled correctly. Thus communication via router is possible.

- There were level variations up to 3 dB when running PSCAN with step width lower than 3.125 kHz. This problem has been solved.


## Changes from Beta Version 1.61 to  Beta Version 1.68:

**New Features:**

- The number of memory location has been raised from 1000 to 10 000.

- The audio filter mode can now be configured to notch, noise reduction or speech filter.

- A new command defines a hold time for attenuation changes.

- With a new command the BFO frequency for CW can be changed.

- A new command specifies the timing behavior of the gain control.

- The new audio mute function can be activated by setting low level to X12.B5 of the AUX connector. While  being activated the audio outputs AF_HEADPONE on X10 and AF_MONO on X12A.2 are muted.

**Improvements:**

- The squelch function is now activated immediately after the signal has disappeared.

- The following PSCAN step widths have been added: 2.5 kHz, 1.25 kHz, 625 Hz, 500 Hz, 250 Hz and 125 Hz.

- With all LAN configuration SCPI commands the syntax 'SOCKet' is also possible instead of 'LAN'.

- The short form BYT and BIT of the commands BYTaux and BITaux are also accepted.

# 4 Faults Remedied in Firmware  Version  1.90

- If the device has been controlled via serial once after power on the unfounded error message 1,"Device dependent error; OCXO not calibrated" has been reported. This problem has been solved.

- The measurement time in the optional header of IFPAN trace has always been 0. This problem has been solved.

- UDP Ports greater 32767 are now available.

- Due to a hardware change in the preselection module in some cases a timing problem occurred during long test and a unfounded error message resulted. This problem has been solved.

# 5 Restrictions - Known Problems - Workarounds

## 5.1 Restrictions

This new firmware version can be run on every EM510 or DX200 hardware. Until now there is no problem known which causes incompatibility to higher firmware versions. After a firmware downgrade, the device may not function anymore because the older software will not recognize the new hardware.

### 5.1.1 Boot Program Version

The boot program is the root boot loader located at a secure section of the flash memory. It is not changed with the normal flash update procedure. You can read out the boot program version with the command: "DIAG:INFO:SVER5?"

The current version is 2.70. Please contact R&S  if you need to change the boot program.

### 5.1.2 Main Board Version

You can read out the main board version with the command:  "DIAG:INFO:MOD? MB″.

### 5.1.3 Main Board CPLD Version

You can read out the main board CPLD version with the command: "DIAG:INFO:SVER4?"

The current version is 2.15. Please contact R&S  if you need to change the boot program.

## 5.2  Known Problems

For UDP data output if for example audio tag and audio flag are set within one command string the first setting is ignored.

Work around: Use separate strings for setting UDP configurations.

## Hotline

Should you have any questions or suggestions, please use the hotline:

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E-mail: CustomerSupport@rsd.rohde-schwarz.com