Service manual

EK 300 IEM G2

SA 051013

Short description

The EK 300 IEM G2 stereo receiver has 8 frequency banks with up to 12 factory-preset frequencies (presets) and one frequency bank with freely selectable frequencies. A switching bandwith of 36MHz makes 1440 UHF frequencies available.

Features

- HDX compander system
- Pilot tone squelch for interference-free operation
- Scan function searches for available receiving frequencies
- Backlight display (lights up when a button is pushed)
- Battery status display
- The stereo channel can be separated in two mono channels
- Via balance controller the volume of both mono channels can be adjusted
- Switchable frequency boost in the high frequency range (HiBoost)

Safety requirements

Observe safety regulations.

Observe ESD instructions while handling electrostatically endangered components.

Only skilled persons are allowed to alter and repair. For repairs and exchanges only approved components according to the current spare parts list are allowed.

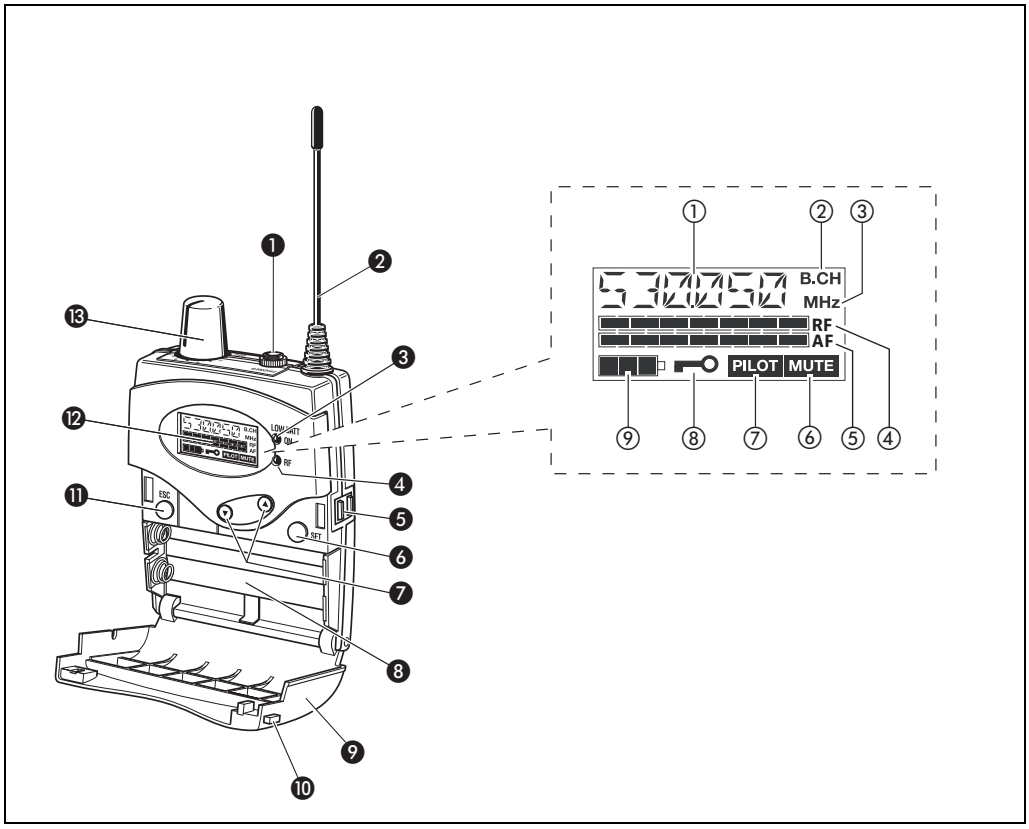
For safety and certification reasons it is forbidden to alter the product without authorisation. Otherwise, the person who has altered the product is liable for any consequential damage.

repairs/exchanges

The following instructions for overhaul and testing must be followed.
In case of unusual problems please contact your Sennheiser distributor.

Content

1 Controls and indicators



Receiver elements

❶ Headphone output (PHONES)

❷ Antenna

❸ Red LED for battery and status indication (ON/LOW BAT)

❹ Green LED for RF signal indication (RF)

❺ Charging contacts (on both sides)

❻ SET button (also SAVE function)

❼ Rocker button ▲/▼ (UP/DOWN)

❽ Battery compartment

❾ Battery compartment cover

❿ Unlocking button

⓫ ESC button

⓬ LC display

⓭ ON/ OFF button with volume control

Display elements

① Alphanumeric display of the receiving frequency

② Symbol for channel bank and channel number

③ Receiving frequency unit

④ 7-step level display for received RF signal (RF)

⑤ 7-step level display for audio level (AF)

⑥ "MUTE" symbol (if displayed the audio output is muted)

⑦ "PILOT" symbol (if displayed the pilot tone is activated)

⑧ Lock mode icon (if displayed the lock mode is activated)

⑨ Battery status indication

2 Technical data

2.1 General

Power supply	2 batteries, type mignon AA; 1.5 V or battery pack BA 2015; 2.4 V
Nominal voltage	+2.4 V_{DC}
Operating voltage	+1.8 V_{DC} to +3.0 V_{DC}
Switch-off threshold	
with batteries	+1.8 V_{DC}
with battery pack BA 2015	+2.0 V_{DC}
Switch-on threshold	
with batteries	+1.8 V_{DC}
with battery pack BA 2015	+2.2 V_{DC}
Current consumption	
at nominal voltage without modulation	129 mA
when receiver is switched off	≤250 µA
Operating time at 2.4 V_{DC} and 2 x 32 Ω	6 to 10 hours (volume depended)
Battery status display	100%, 70%, 30%, low battery
Programming interface	internal infrared interface
Temperature range	-10°C to +55°C
Dimensions in mm	82 x 64 x 24
Weight incl. batteries	approx. 200 g
Authorization/ certification to ETSI 300422/301489	
Europe	CE 0682
USA	FCC ID: DMOB2EUVL
Canada	IC: 2099A-G2SK

2.2 AF characteristics

Compander	HDX
Deemphasis	HDX depended
Nominal deviation	±24 kHz
Peak deviation (at 1 kHz)	±48 kHz
THD (at nominal deviation, 1 kHz)	≤ 1%
Signal to noise ratio referring to peak deviation	100 dB(A)
MPX pilot tone	
Frequency	19 kHz
Deviation	±5 kHz

Monitor output

Type	3.5 mm stereo jack socket
Volume controller	Potentiometer/ adjusting knob
Output power at 2.4 V_{DC} and 2 x 32 Ω	2 x 100 mW
Internal resistance	≤ 20 Ω
Nominal impedance	32 Ω
Frequency range at nominal impedance (deviation ±4 kHz, HDX)	100 Hz bis 14 kHz (±3 dB)
Range of the volume controller	18 dB
Range of the balance adjuster	L/R ≥ –50 dB
Level difference L/R	≤ 2 dB
Stereo/Focus operating	adjustable via menu
Focus switching	Forced mono switching after the balance controller, add on switchable via menu)
HiBoost	Increase of the treble frequencies up to +7.5 dB (at 10 kHz), add on switchable via menu

2.3 RF characteristics

Receiver principle	Non-Diversity
Modulation	Wideband FM stereo (MPX pilot tone mode), F8W
Number of receiving frequencies (tunable in steps of 25 kHz)	1440
Frequency ranges	518 to 554 MHz 626 to 662 MHz 740 to 776 MHz 786 to 822 MHz 830 to 866 MHz
Number of frequency banks with factory-preset channels (presets)	8 with 12 channels each
Frequency bank with freely selectable frequencies (tuneable in steps of 25 kHz)	1 bank, 12 channels selectable
Switching bandwidth	36 MHz
Channel grid	n x 25 kHz
Min. channel spacing	> 400 kHz
Frequency stability within temperature range	≤ ±20 ppm
Intermodulation attenuation (400 kHz/800 kHz)	≥ 74 dB/ ≥ 78 dB
Adjacent channel rejection (400 kHz/800 kHz)	≥ 75 dB / ≥ 80 dB
Blocking (Δf≥±1 MHz)	≥ 88 dB

Squelch

Criteria	RF level and pilot tone
Switch-off time	≤ 2 ms
Adjustable in	4 steps: OFF, LO (5 dBµV), MID (15 dBµV), HI (25 dBµV)
1. Oscillator frequency	f_e + 241 MHz
1. Intermediate frequency	241 MHz
2. Oscillator frequency	230.3 MHz
2. Intermediate frequency	10.7 MHz
Intermediate frequency stability (241 MHz/10.7 MHz)	≥ 60 dB / ≥ 80 dB
Sensitivity (with HDX at peak deviation)	
S/N=52 dBA_{eff}	≤ 2.5 µV
S/N=80 dBA_{eff}	≤ 10 µV
Image rejection	
∆f = 482 MHz	≥ 40 dB
∆f = +21.4 MHz	≥ 60 dB
Spurious signal rejection	≥ 50 dB
Antenna input	
Antenna impedance	50 Ω
Receiver interference power at antenna input (30 MHz to 50 GHz)	< 1 GHz: < -57 dBm (2 nW) 1 GHz to 5 GHz: ≥ -47 dBm (20 nW)
Free field interference radiation	< 1 GHz: < -57 dBm (2 nW) 1 GHz to 5 GHz: ≥ -47 dBm (20 nW)

3 Description

3.1 General remarks

The EK 300 IEM G2 receiver is a small portable receiver of the evolution wireless G2 series. The receiver has a modular structure and consists of two modules equipped on both sides:

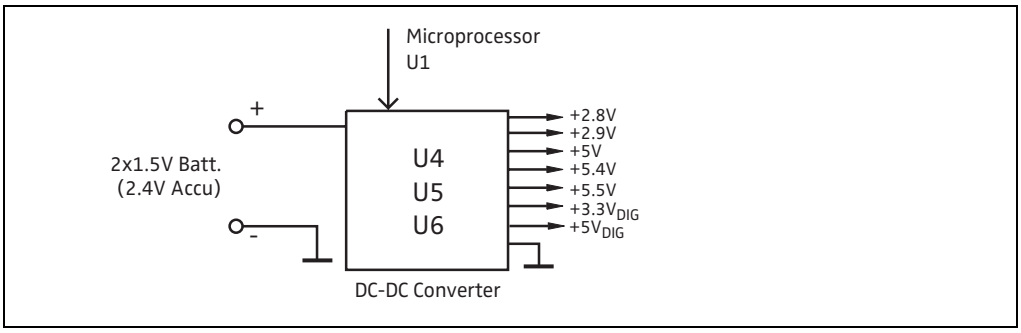
- Mainboard
- RF module: five frequency ranges are available for the RF module (see the options for equipping the RF module, page 24/25)

3.2 Functional description

The receiver is divided up into the following functional blocks (see also the circuit diagrams from page 21 onwards):

- DC/DC converter
- RF module with PLL
- AF section with pilot tone evaluation and squelch

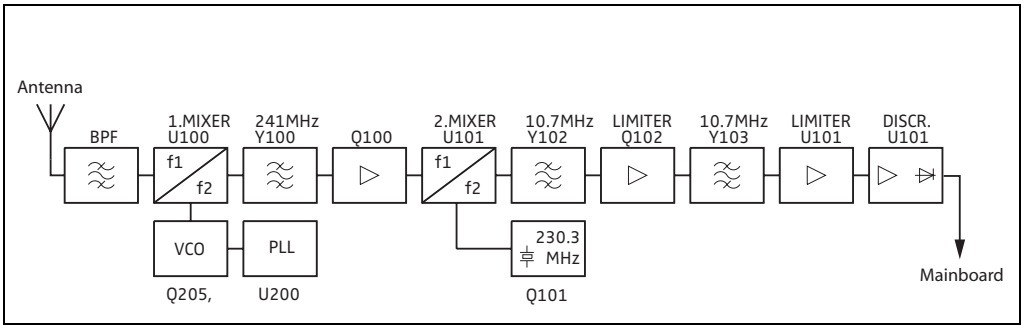
3.2.1 DC/DC converter



The receiver can be powered by either two batteries or the BA 2015 battery pack. The operating time can be increased via the following partial voltages produced by the U200 DC/DC converter from the rated voltage of 2.4 V_{DC}:

- +2.8 V Voltage for the operational amplifier NJM064V of the mainboard
- +2.9 V Supply of the RF module
- +5 V Analog sections of the mainboard
- +5.4 V Supply of the headphone amplifier
- +5.5 V Supply for other receiver components on the mainboard
- +3.3 V Infrared module RPM873
- +5 V_{DIG} Digital sections of the mainboard

3.2.2 RF module with PLL



The tuner works on the principle of direct intermediate frequency generation: after passive pre-selection, the antenna signal is short-circuited in the clock rate of the LO1 frequency via a GaAs switch. This directly generates the first intermediate frequency of 241 MHz. The first mixer U100 amplifies this first intermediate frequency. In conjunction with the insertion loss of 3 dB caused by pre-selection, the typical total S/N ratio is 12 dB. The power consumption of the signal path from the antenna input to the demodulator output is 16 mA / 2.7 V. The pre-selection of the tuner is realized via a four-element resonator tuned via C126. The first intermediate frequency is selected via a SAW filter.

The amplifier stage Q100 of the first intermediate frequency is equipped with the 20 GHz transistor BFP 405. The signal then goes to the second mixer U101.

The adjacent channel selectivity is carried out via the two ceramic filters Y102 and Y103. The 10.7 MHz amplifier stage Q102 provides an amplification of 11 dB, thus compensating for the insertion losses of the two ceramic filters.

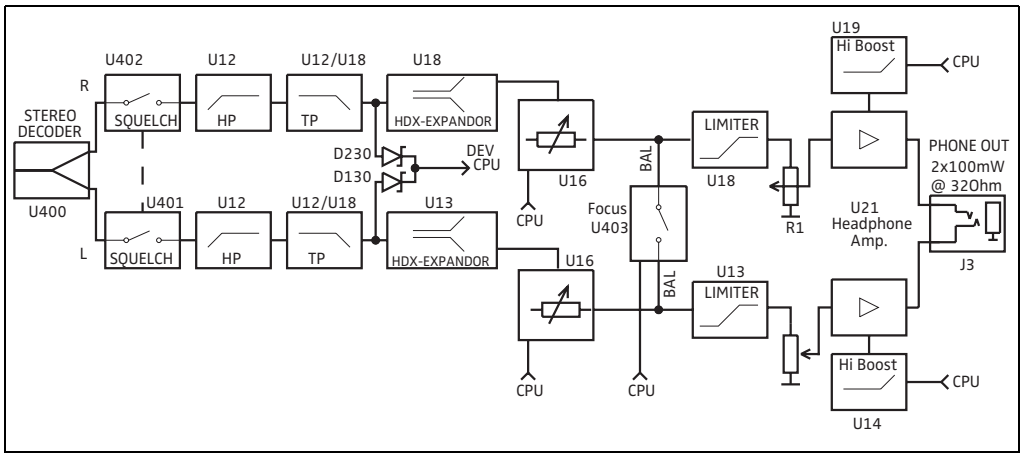
PLL and tuning master oscillator
The quartz oscillator with Q101 and Y101 oscillates at 230.300 MHz. The tuning master oscillator Q204 generates a low-noise oscillator frequency of between 759 MHz and 1107 MHz.

The linear separator stage with Q206 supplies the first mixer U100 with an LO1 power of -5 dBm.

The PLL U200 works according to the dual modulus method and has an integrated 32/33 prescaler. Phase comparison is carried out at a comparison frequency of 5kHz. The characteristic frequency of the PLL is 10 Hz and the loss resistance R232 and the amplification are selected via C221 in such a way as to ensure maximum phase reserve and rapid ocillating into stabil function.

The operating voltage for the VCO is pre-stabilized with temperature compensation and is filtered via Q200 to Q202.

3.3 AF module

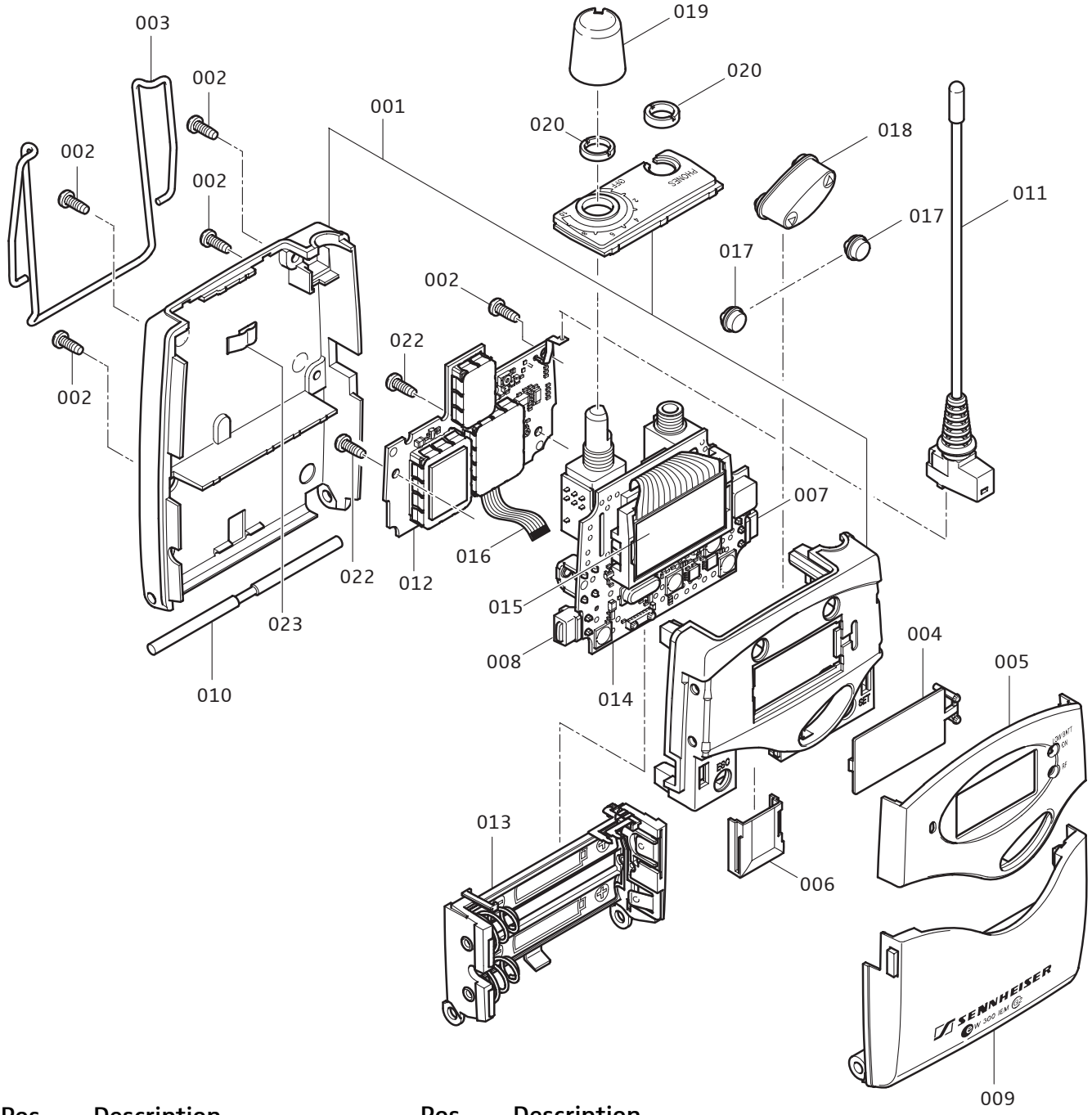


The AF module of the EK 300 IEM G2 receiver has a controlled limiter, a high boost (is adjustable via menu) and a digital balance controller. At first the tuner signal is send to the U400 stereo decoder. This decoder uses the multiplex method with a auxiliary frequency of 38 kHz and a pilot tone of 19 kHz. The input circuit U400 is optimized at the maximal channel separation via C400. In place the level and the phase of the L-R difference spectrum (23 - 53 kHz) is adjusted to the range of the decoder. The operating voltage of the decoder is stabilized at 3 V via Q400. The output signal of the decoder is applied to the U12/U13 stereo bandpass via squelch switch U401 and U402. In this case the high-pass filter is identical to the mono high-pass filter. But this mono chip has a 15 kHz bandwidth and a 19 kHz pilot tone. The EK 300 IEM G2 receiver has a digital balance potentiometer U16, this potentiometer is layouted in negative feedback by U13. The U403 mono/focus switch and the controlled U13 limiter are connected with the U18.

3.3.1 Pilot tone evaluation and squelch

The squelch of the receivers is controlled via the antenna voltage. Between antenna voltages of 1 µV and 200 µV, the output of the tuner provides an output voltage proportional to the logarithmic level. The tuning data of this curve are stored in the EEPROM U201 of HF part. The squelch can be adjusted to Lo / Mid / Hi, corresponding to a threshold of 5 / 15 / 25 dBµV respectively. In addition to the RSSI squelch, the receiver has a pilot tone squelch.

4 Exploded view



Pos	Description	Pos	Description
001	Housing complete	012	RF board
002	Lens screw	013	Battery case
003	Clamp	014	Mainboard
004	LCD cover	015	LC display
005	Housing cover	016	Flat cable, 15 pin
006	Infrared cover	017	Knob
007	Double charging contact	018	Rocker button
008	Single charging contact	019	Knob
009	Battery cover	020	Slotted nut
010	Axle	022	Lens screw
011	Antenna*	023	Clip

***Antenna lengths:**

Frequency range A
518 to 554 MHz: 120 mm
Frequency range B
626 to 662 MHz: 105 mm
Frequency ranges C/D/E
740 to 866 MHz: 82 mm

5 Test and alignment instructions

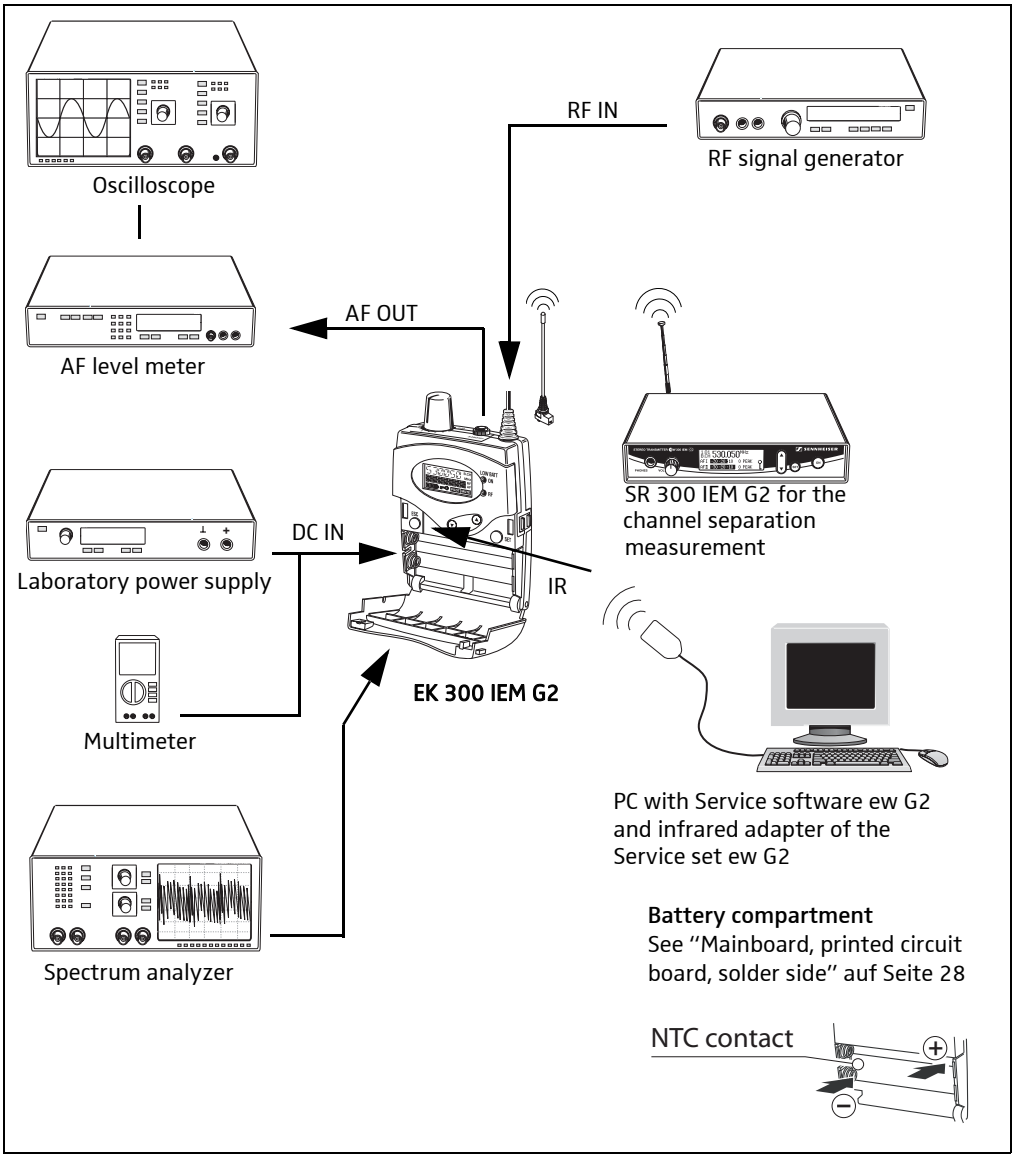
5.1 Measuring and test equipment

- 1 Spectrum Analyzer, at least 3GHz, e.g. Rohde & Schwarz FSP 7
- 1 RF signal generator, at least 3GHz, z. B. Rohde & Schwarz SMT 03
- 1 AF level meter, e.g. Rohde & Schwarz UPL audio analyzer
- 1 Oszilloskop, at least 100MHz, e.g. HAMEG
- 1 Multimeter, e.g. FLUKE 177
- 1 Laboratory power supply, 0 to $30V_{DC}$ / 1A, e.g. HAMEG 8142
- 1 PC with service software ew G2

Note
Make sure that your measurement and test equipment is regularly calibrated

See also
Read out/ modified the unit data via infrared adapter. See also chapter ''Reading out / Changing of device data via infrared adapter'' , page 19.

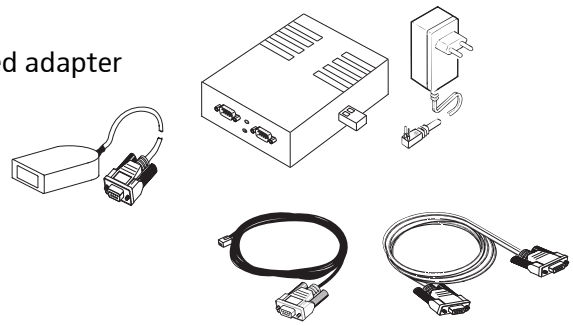
5.2 Measuring set-up



5.3 Special service tools

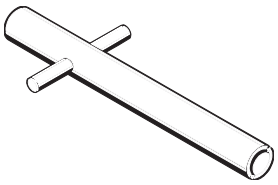
Service set for software ew G2 (Order number 094739)

Infrared adapter



Usage in chapter
''Reading out / Changing of device data via infrared adapter'' , page 19

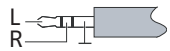
Special tool for slotted nut (see pos. 020, exploded view)
(Order number 514099)



5.4 Test table

Se-quence	Type of measure-ment	Signal input	Settings	Measuring point / test point	Required value	Remarks
1	**Visual inspection**					
1.1	Jack socket "PHONES"	–	–	–	Contacts are not twisted, no hairline cracks at the solder points, no mechanical damage	
1.2	Buttons ▲ / ▼ (S2 /S3), SET (S1), ESC (S4)	–	–	–	See 1.1; The buttons on the mainboard spring back (for pushing the buttons use rounded objects only)	
1.3	Volume controller	–	–	–	See 1.1	
1.4	Contacts of battery compartment	–	–	–	See 1.1	
1.5	Charging contacts	–	–	–	No mechanical damage; No oxidation or contamination	
1.6	Flat ribbon cables and connectors	–	–	–	See 1.1; Connectors are locked	
1.7	Antenna contacts to RF board	–	–	–	See 1.1	
2	**Current and voltage measurement** **Attention** The buttons S1, S2, S3 and S4 on the mainboard can be damaged if you operate them with sharp or sharp-edged objects (for example the tip of a ballpoint pen). For pushing the buttons only use roundetd objects to avoid damaging the buttons.					
2.1	Current consumption with switched-off receiver	Supply +3,0 V_{DC} directly via battery contacts or -BK/+BK, see page 12	Volume controller = OFF	Amperemeter in series with current supply +BK	typ. 250 µA	Current limitation of laboratory power supply unit: I_{ON} = 500 mA
2.2	Current consumption during operation	See 2.1	Volume controller = On	See 2.1	typ. 129 mA	With RF signal without modulation, display illumination is switched off
2.3	Operating voltage	See 2.1	See 2.2	-BK / +BK see page 27	+1.8 V_{DC} to +3.0 V_{DC}	Uninterrupted operation possible
2.4	DC/DC-converter voltage	See 2.1	See 2.2	TP21/ GND	+5.25 V_{DC} to +5.75 V_{DC}	–
2.5	**Supply voltage of the DC/DC converter**					
2.5.1	+5.4 V_{DC}	See 2.1	See 2.2	R200	+5.4 V_{DC}	See page 27
2.5.2	+2.8 V_{DC}			R136	+2.8 V_{DC}	
2.5.3	+2.9 V_{DC}			TP1	+2.9 V_{DC}	See page 30
2.5.4	+5 V_{DC}			TP11	+5 V_{DC}	
2.5.5	+5.5 V_{DC}			TP8	+5.5 V_{DC}	
2.5.6	+3.3 V_{DC}			U3 (IRDA)	+3.3 V_{DC}	See page 28
2.5.7	+5 $VDIG_{DC}$			C28	+5 V_{DC}	

Se-quence	Type of measure-ment	Signal input	Settings	Measuring point / test point	Required value	Remarks
2.6	**Switch-on/switch-off threshold**					
2.6.1	Switch-on threshold with battery operation	See 2.1	See 2.2	See 2.3	+1.8 V_{DC}	–
2.6.2	Switch-on threshold with battery pack operation	See 2.1; EK OFF: Connect the NTC contact with the isolated strand to the ground (-), then switch on the receiver	See 2.2	See 2.3	+2.2 V_{DC}	See page 28
2.6.3	Switch-off threshold with battery operation	See 2.1	See 2.2	See 2.3	+1.8 V_{DC}	Red LED flash
2.6.4	Switch-off threshold with battery pack operation	See 2.6.2	See 2.2	See 2.3	+2.0 V_{DC}	Red LED flash
3	**RF module**					
	Removing the RF module: 1. Loosen the lens head screws of the RF circuit board (see exploded view, pos. 22). 2. Remove the RF module (the connection to the mainboard via the flat ribbon cable remains as it is). **Restoring the ground connection between the RF module and the mainboard:** Establish a connection between the point MH3 on the component side of the RF board and point P4 on the component side of the mainboard. For this use a strand with a length of about 10 cm and solder it in between points MH3 and P4.					
3.1	**Measuring and aligning the PLL voltage**					
3.1.1	Center range limit	See 2.1	Set the center receiving frequency via "TUNE"	TP210	+2.5 V_{DC} to +2.6 V_{DC}	Please measure the center range above the whole frequency range. Alignment via C239, see page 29
3.1.2	Lowest range limit	See 2.1	Set the lowest receiving frequency via "TUNE"	TP210	+0.6 V_{DC} to +2.2 V_{DC}	
3.1.3	Uppermost range limit	See 2.1	Set the uppermost receiving frequency via "TUNE"	TP210	+3.0 V_{DC} to +4.2 V_{DC}	
3.2	**Measuring the oscillator**					
3.2.1	1. Oscillator frequency	See 2.1	Adjust the center range limit with the "SET" button and "DOWN" button, then spectrum analyzer	TP215/ TP106 (GND)	f_e + 241 MHz ±2.5 kHz	–
3.2.2	1. Oscillator level	See 2.1	See 3.2.1	Voltage drop via R100	50 mV to 110 mV	If the oscillator level is too low the mixer´s current consumption increases from 8 mA to approx. 16 mA
3.2.3	2. Oscillator frequency	See 2.1	See 3.2.1	TP105/ TP106 (GND)	230.3 MHz ±6 kHz	Alignment via C147
3.2.4	2. Oscillator level	See 2.1	See 3.2.1	TP105/ TP106 (GND)	-25 dBm to -40 dBm	–
3.3	AF output voltage RF part	See 2.1; Mod: On; Deviation: 48 kHz	Measurement with AF level meter	TP2	540 mV_{eff} to 560 mV_{eff}	Alignment via R141

Se-quence	Type of measure-ment	Signal input	Settings	Measuring point / test point	Required value	Remarks
4	**Measurement entire device**					
4.1	AF output voltage L/R	See 4.1; RF signal generator at TP "ANTENNA" RF: 1 mV; Deviation: 8.55 kHz; Mod: 1 kHz	"HI-BOOST" = OFF; "PILOT" = OFF; "LTD" = OFF "BALANCE" = 0 Volume Controller = MAX; Switch to the left/ right channel with the ▲ / ▼ buttons Observe the connector assignment of the jack connectors:  	AF output "PHONES"	0 dBu ±2 dBu	Measure the AF output voltage of the left and right channel
4.2	Sensitivity	See 2.1: Receiving frequency at RF signal generator via TP "Antenna" RF: 2.5 µV; Deviation: 48 kHz; Mod: AUS	Center frequency; "SQUELCH" = LOW; AF level meter	See 4.1	> 52 dB(A) (= 20 dB external voltage at tuner output; TP2)	With unsoldered antenna and direct ground MH3. The output voltage of the AF module is limited above typical deviation of 45 kHz.
4.3	THD	See 2.1; Receiving frequency at TP "Antenna" via signal generator RF: 1mV; Deviation: 8.55 kHz; Mod: 1 kHz	–	See 4.1	< 1%, typ. 0.3%	–
4.4	Signal to noise ratio (referring to peak deviation)	See 4.1; Mod: Aus	"HI-BOOST" = OFF	See 4.1	100 dB(A)	–
4.5	Squelch level	See 2.1; Receiving frequency at RF signal generator via TP "Antenna" Deviation: 8.55 kHz; Mod: 1 kHz RF: +5 dBµV RF: +15 dBµV RF: +25 dBµV	"PILOT" = ON; Volume controller = MIN. "SQELCH" = LOW "SQELCH" = MID "SQELCH" = HIGH	See 4.1	No AF signal at the AF output "MUTE" icon is displayed	–
4.6	**Pilot tone measurement**					
4.6.1	Pilot tone	See 2.1; RF signal generator at TP "ANTENNA"; RF-Level: 1 mV **FM 1** Deviation: 8.55 kHz Mod: 1 kHz **FM2** Deviation: 5 kHz Mod: 19 kHz	"PILOT" = OFF; Volume controller = MAX	See 4.1	8dBu/ 1.94 V_{eff}	Instead of the FM2 the transmitter SR 300 IEM G2 can be used.

Se-quence	Type of measure-ment	Signal input	Settings	Measuring point / test point	Required value	Remarks
4.6.2	Pilot tone OFF	See 2.1; RF signal generator at TP "ANTENNA"; RF: 1mV **FM 1** Deviation: 8.55 kHz Mod: 1kHz **FM2** OFF	"PILOT" = OFF	See 4.1	No signal	–
4.7	**Limiter**					
4.7.1	Limiter off	See 4.1	Focus operation; "LTD" = OFF "HI BOOST" = ON "BALANCE" = 0 Lautstärkesteller = MAX	See 4.1	0dBu	–
4.7.2	Limiter on	See 4.1	See 4.7.1	See 4.1	-5dBu	–
4.8	**High boost threshold**					
4.9	High Boost OFF	See 2.1; RF signal generator at TP "ANTENNA" RF: 1 mV; Deviation: 8.55 kHz; Mod: 10 kHz	Focus operation; "LTD" = OFF; "HI BOOST" = OFF	See 4.1	At 10 kHz: -15 dBu	–
4.10	High Boost ON	Siehe 2.1; HF-Signalgenerator an TP "ANTENNA" HF: 1 mV; Hub: 8.55 kHz; Mod: 10 kHz	Focus operation; "LTD" = OFF; "HI BOOST" = ON	See 4.1	At 10 kHz: -7 dBu	–
4.11	**Channel separation**					
4.11.1	Stereo channel separation of right channel	Adjust the SR 300 IEM G2 transmitter and the EK 300 IEM G2 receiver to center frequency "MODE"= Stereo; "SENSITIVITY" = 0 dB RF: 1 kHz Hub: 8.55 kHz; Mod: 1 kHz RF: 1 mV Supply left AF signal in SR 300 IEM G2	"ST-FOC" = STEREO; Volume controller = MAX; "PILOT" = ON "LTD" = OFF	See 4.1	≥ 40dB right	The receiver operates in stereo mode Level diffe-rence: L/R: ≤ 2 dB
4.11.2	Stereo channel separation of left channel	See 4.10.1; Supply right AF signal in SR 300 IEM G2	See 4.10.1	See 4.1	≥ 40 dB left	
5	**Display module**					
5.1	Visual inspection of all segments of the frequence display	See 2.1	See 2.2	–	All segments are visible	–
5.2	Automatic switch-off of display backlighting	See 2.2	See 2.2	–	Backlighting switches off after approx. 15 seconds after last activity	–

Se-quence	Type of measure-ment	Signal input	Settings	Measuring point / test point	Required value	Remarks
5.3	Battery status display	1.8 V_{DC} to 2.0 V_{DC} 2.0 V_{DC} to 2.3 V_{DC} 2.3 V_{DC} to 2.6 V_{DC} 2.6 V_{DC} to 3.0 V_{DC}	See 2.2	–	0 segments 1 segment 2 segments 3 segments	Low battery 30% 70% 100% The battery recovery is only displayed +2 segments
5.4	lock-off display	See 2.1	See 2.2; Turn on the lock-off function via "SET" button	–	key symbol is visible	–
5.5	"PILOT" display	See 2.1	See 2.2; Turn on the pilot tone via "SET"	–	"PILOT" is visible	–
5.6	"MUTE" display	See 2.2	See 2.2	–	"MUTE" is visible; writing is accurate	AF OUT is muted
5.7	**Audi level display**					
5.7.1	AF display at nominal deviation	Siehe 2.1; 24 kHz; Mod: aus	See 2.2	All AF segments	AF display = "0"	
5.7.2	AF display at peak deviation	Siehe 2.1; 48 kHz; Mod: ein	See 2.2	All AF segments	AF display: full deviation	
5.8	RF display	See 2.1; RF: 40 dBµV ±5 dB	See 2.2	All RF segments	RF display: full deviation	
5.9	RF display	Siehe 2.1; RF: 26 dBµV ±5 dB	See 2.2	4 segments	–	

5.5 Reading out / Changing of device data via infrared adapter

5.5.1 Overview

You may read out and change data via the infrared adapter. The Sennheiser service software supports the following tasks you may want to perform:

- Reading out the current software version and, if necessary, carrying out of a software update (file "*.s19").
- Commissioning the receiver after a hardware replacement (e. g. replacing of a board).
- Changing the current frequency table.
- Changing / resetting the receivers's factory settings.

5.5.2 Required hardware

You will need the Sennheiser service package for reading in and out of device data:

The service set includes

for portable devices:
- Infrared adapter for reading out / in data

For stationary devices:
- RS232/RS485 converter with mains adapter
- RS232 cable for connection of PC and converter
- RS485 cable for connection of receiver and converter

You may order the service package directly from Sennheiser:
Service package for ew G2 software, ID no. 094739

5.5.3 Required software

You may download the service software free of charge:

http://www.se-iparts.de

Operating instructions for these service software are available in PDF format. These operating instructions contain information on commissioning of the service
pakkage and reading out and in of device data.

In order for you to use the software, you will need the operating system Microsoft® Windows 98™ or higher and a free COM port (RS232).

After installation of the software, you will find the instruction manual in the Windows menu [Start].

5.5.4 Commissioning after reprogramming or replacing a RF board

After you have fitted a new board into the device, you have to write the new data (e. g. a new frequency table) to the device.

Requirements

- You have replaced the defective board (the RF board or the mainboard)
- You have arrange a connection betwenn the PC and the receiver
- You have switch-on all units
- You have installed and launched the service software

Writing of device data

Perform the following steps:

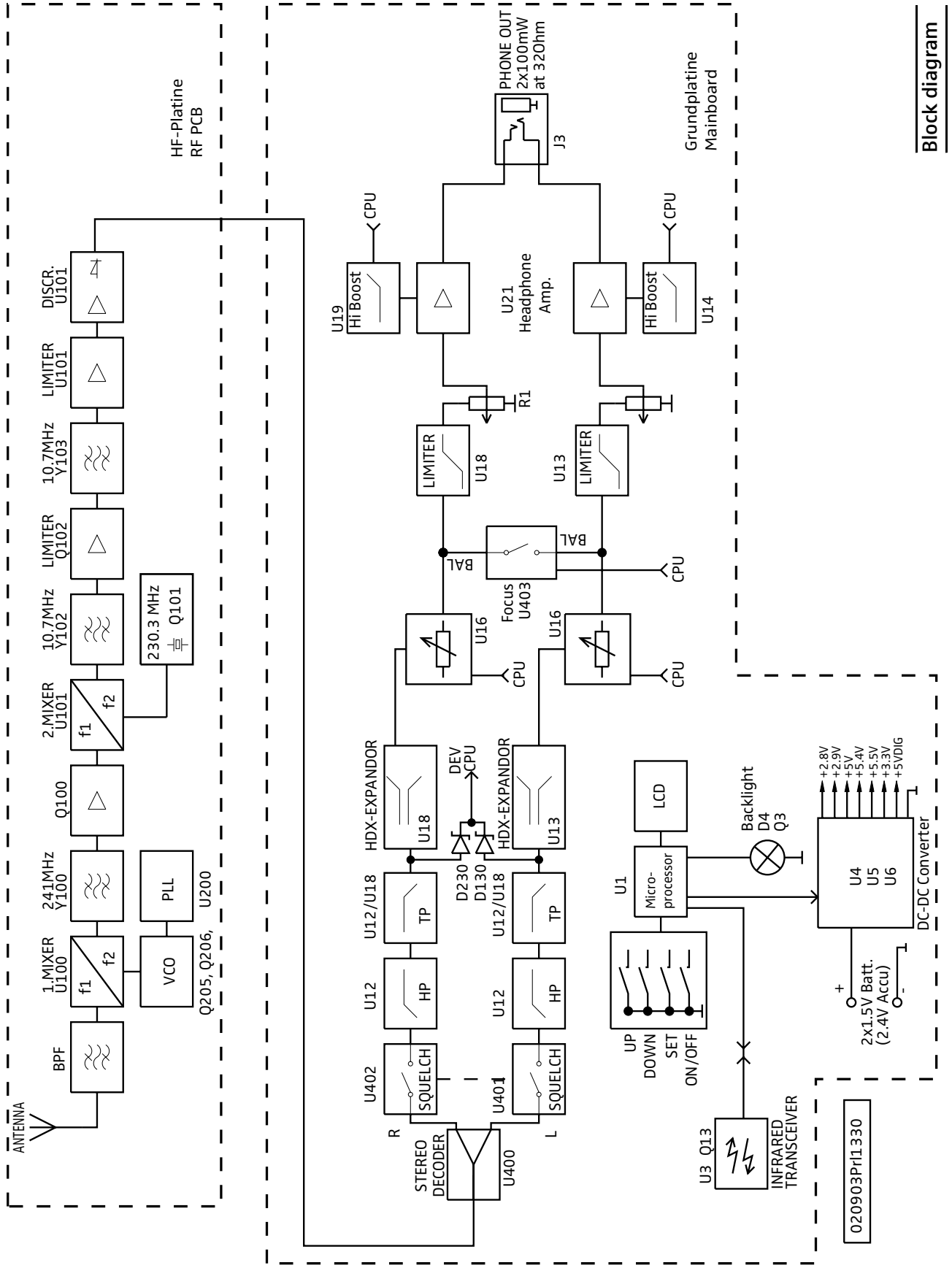
1. Click the [Auto Detect] button.
   Result: Your connected device has been detected.
2. In the "Info" register, click the [EXECUTE ALL] button.
   Result: All device data are read out. If all the data have been read out successfully, the message "Success" is displayed.
   Note: If you perform individual actions in the "Info" or "Service" registers, you have to return the device into the operational status afterwards. For this reason, finally click the [Close Device] button.
3. Go to the "Service" register.
4. Click the [EXECUTE ALL] button.
   Result: The new device data are written. If all the data have been written successfully, the message "Success" is displayed.

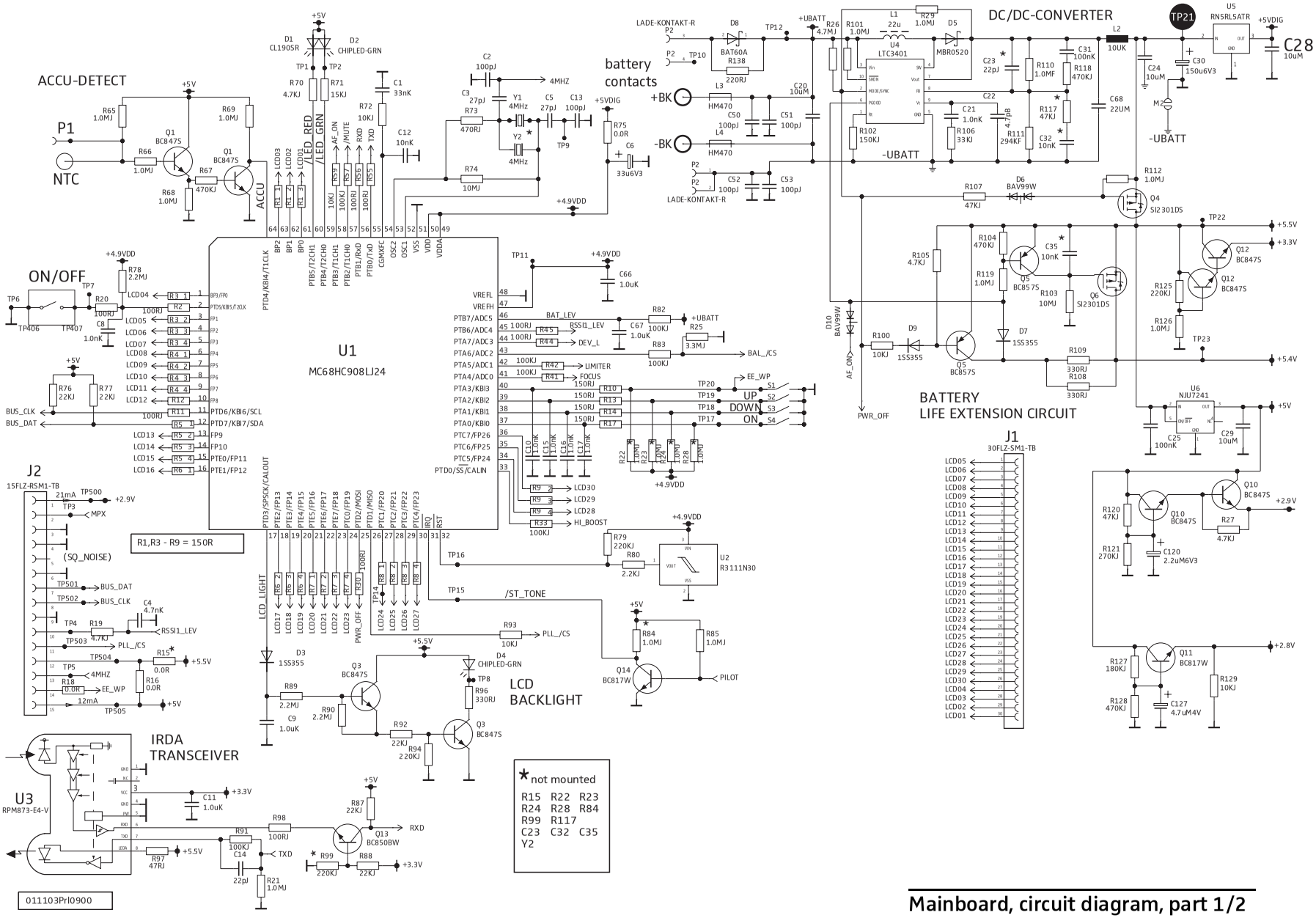
Result

You have successfully written the new data to the device. These new data now correspond to the new factory settings for you device. You will find these data in the directory "D:\Sennheiser\ew G2 service package" in the files "Defaults.dat" and "FreqTable.dat" or "FreqTableIEM.dat".

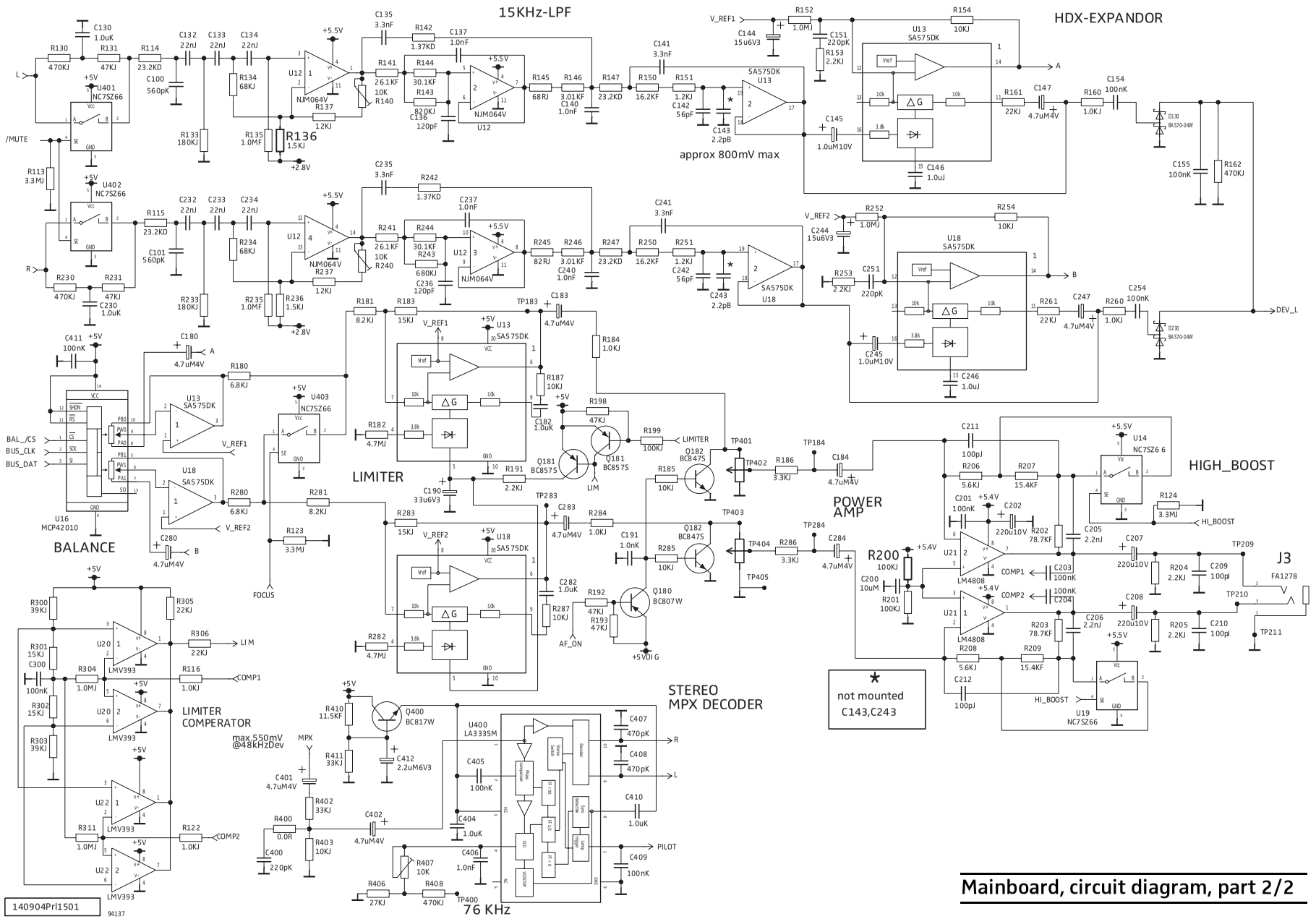
You will find detailed information in the G2 service software's online help. After installation of the software, you will find the online help in the Windows menu [Start].

6 Circuit diagrams

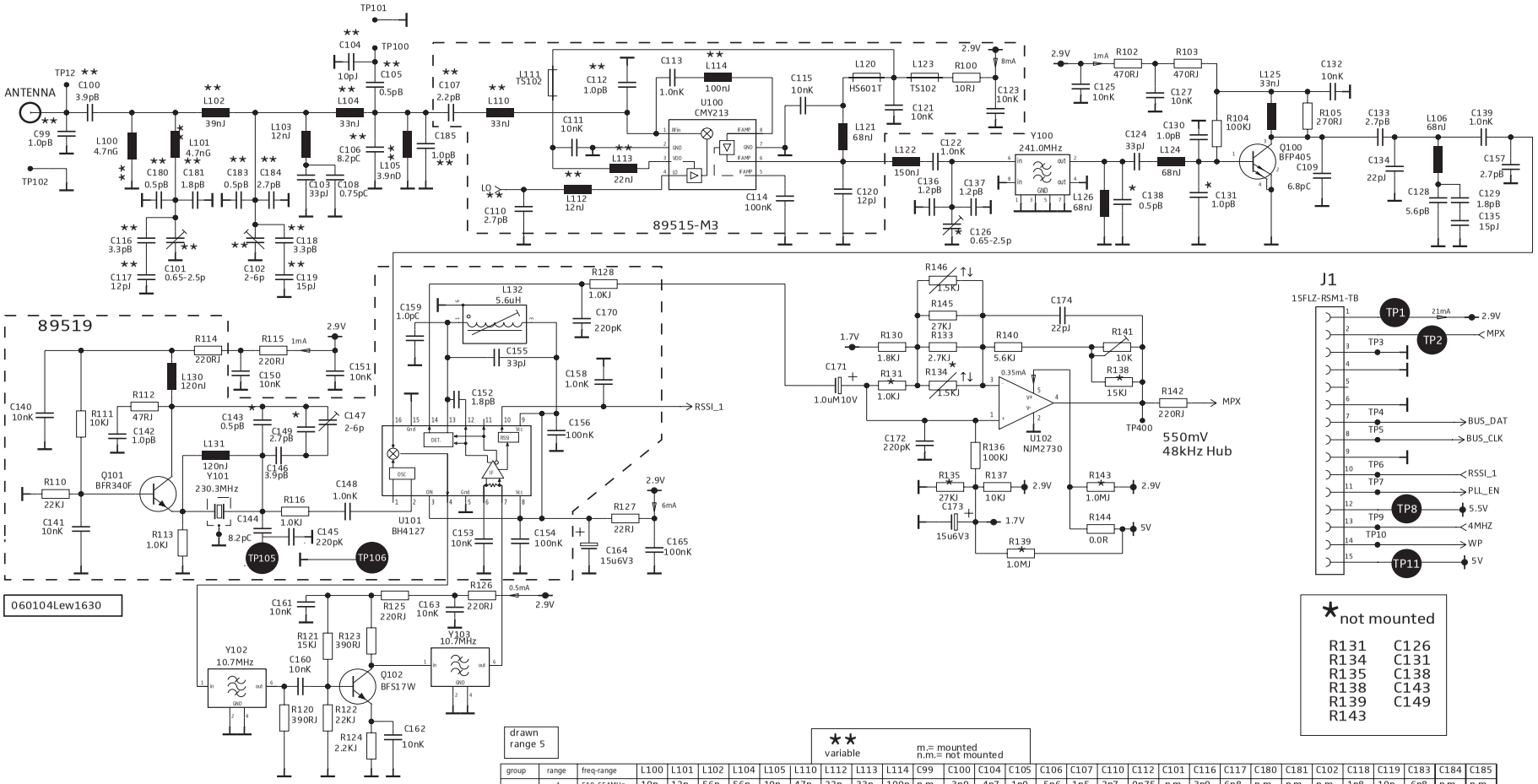




Mainboard, circuit diagram, part 1/2

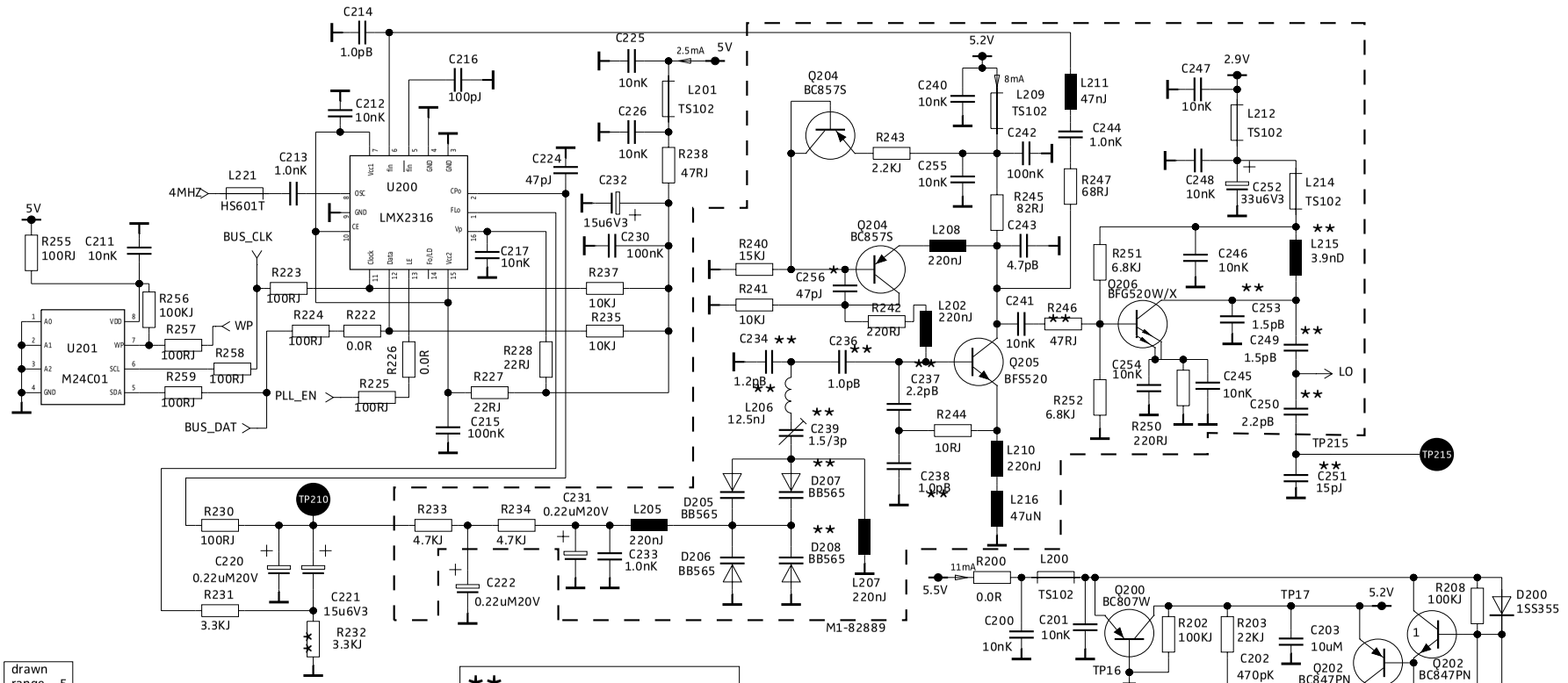


Mainboard, circuit diagram, part 2/2



group	range	freq-range	L100	L101	L102	L104	L105	L110	L112	L113	L114	C99	C100	C104	C105	C106	C107	C110	C112	C101	C116	C117	C180	C181	C102	C118	C119	C183	C184	C185
	1	518-554MHz	10n	12n	56n	56n	10n	47n	22n	33n	100n	n.m.	3p9	4p7	1p0	5p6	1p5	2p7	0p75	n.m.	3p9	6p8	n.m.	n.m.	n.m.	1p8	10p	6p8	n.m.	n.m.
	2	626-662MHz	12n	8n2	39n	56n	5n6	47n	12n	27n	100n	n.m.	4p7	10p	0p5	10p	3p9	3p3	n.m.	n.m.	2p7	10p	n.m.	n.m.	n.m.	4p7	5p6	3p3	n.m.	n.m.
	3	740-776MHz	4n7	6n8	39n	33n	3n9	22n	15n	22n	120n	n.m.	4p7	10p	0p5	8p2	2p7	4p7	n.m.	n.m.	2p7	8p2	n.m.	1p0	n.m.	4p7	6p8	1p5	n.m.	n.m.
	4	786-822MHz	4n7	4n7	39n	33n	3n9	33n	10n	22n	100n	n.m.	3p3	10p	0p5	10p	2p2	2p7	n.m.	n.m.	n.m.	n.m.	1p2	1p8	n.m.	n.m.	n.m.	1p2	2p2	n.m.
	5	830-866MHz	4n7	4n7	39n	33n	3n9	33n	12n	22n	100n	n.m.	3p9	10p	0p5	8p2	2p2	2p7	n.m.	n.m.	3p3	12p	n.m.	n.m.	n.m.	3p3	15p	n.m.	n.m.	1p0

RF board, circuit diagram, part 1/2



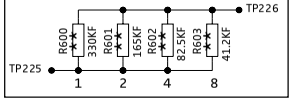
drawn
range 5

** variable m.= mounted n.m.= not mounted

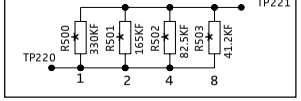
group	range	freq-range	D207 D208	L206	L215	C234	C236	C237	C238	C239	C249	C250	C251	C253	R232	R246	R600	R601	R602	R603
	1	518-554MHz	n.m.	18n5	5n6	2p2	1p5	4p7	1p5	2p/10p	1p5	1p5	15p	2p7	2k2	47R	m.	n.m.	n.m.	n.m.
	2	626-662MHz	n.m.	12n5	4n7	2p2	1p8	3p3	1p2	2p/10p	3p3	n.m.	n.m.	1p2	2k2	68R	n.m.	m.	n.m.	n.m.
	3	740-776MHz	n.m.	12n5	3n9	2p2	1p2	2p2	1p0	1p5/3p0	1p5	2p2	15p	1p8	2k2	47R	m.	m.	n.m.	n.m.
	4	786-822MHz	n.m.	12n5	3n9	1p5	1p0	2p2	1p0	1p5/3p0	1p5	2p2	15p	1p5	2k2	47R	n.m.	n.m.	m.	n.m.
	5	830-866MHz	n.m.	12n5	3n9	1p2	1p0	2p2	1p0	1p5/3p0	1p5	2p2	15p	1p5	3k3	47R	m.	n.m.	m.	n.m.
	6	778-810MHz															n.m.	m.	m.	n.m.
	7																m.	m.	m.	n.m.

Coding

range code



version code is not used



* not mounted
R500
R501
R502
R503
C256

070604Lew1330

Replacing the PCB

The spare part RF board is adjusted to the center frequency of the frequency range of 36 MHz.

After PCB replacing adjust the RF board to your required frequency range.

RF board, circuit diagram, part2/2

Interconnector assignment
041203kre1330
HF-Platine / RF PCB
2.9V
MPX
NC
BUS_DAT
BUS_CLK
RSSI_1
PLL_EN
4MHZ
WP
5V
J1
FLEXIBLE CONNECTOR
Grundplatine / Mainboard
J2
+2.9V
MPX
NC
BUS_DAT
BUS_CLK
RSSIL_LEV
PLL_/CS
+5.5V
4MHZ
EE_WP
+5V
LCD05
LCD06
LCD07
LCD08
LCD09
LCD10
LCD11
LCD12
LCD13
LCD14
LCD15
LCD16
LCD17
LCD18
LCD19
LCD20
LCD21
LCD22
LCD23
LCD24
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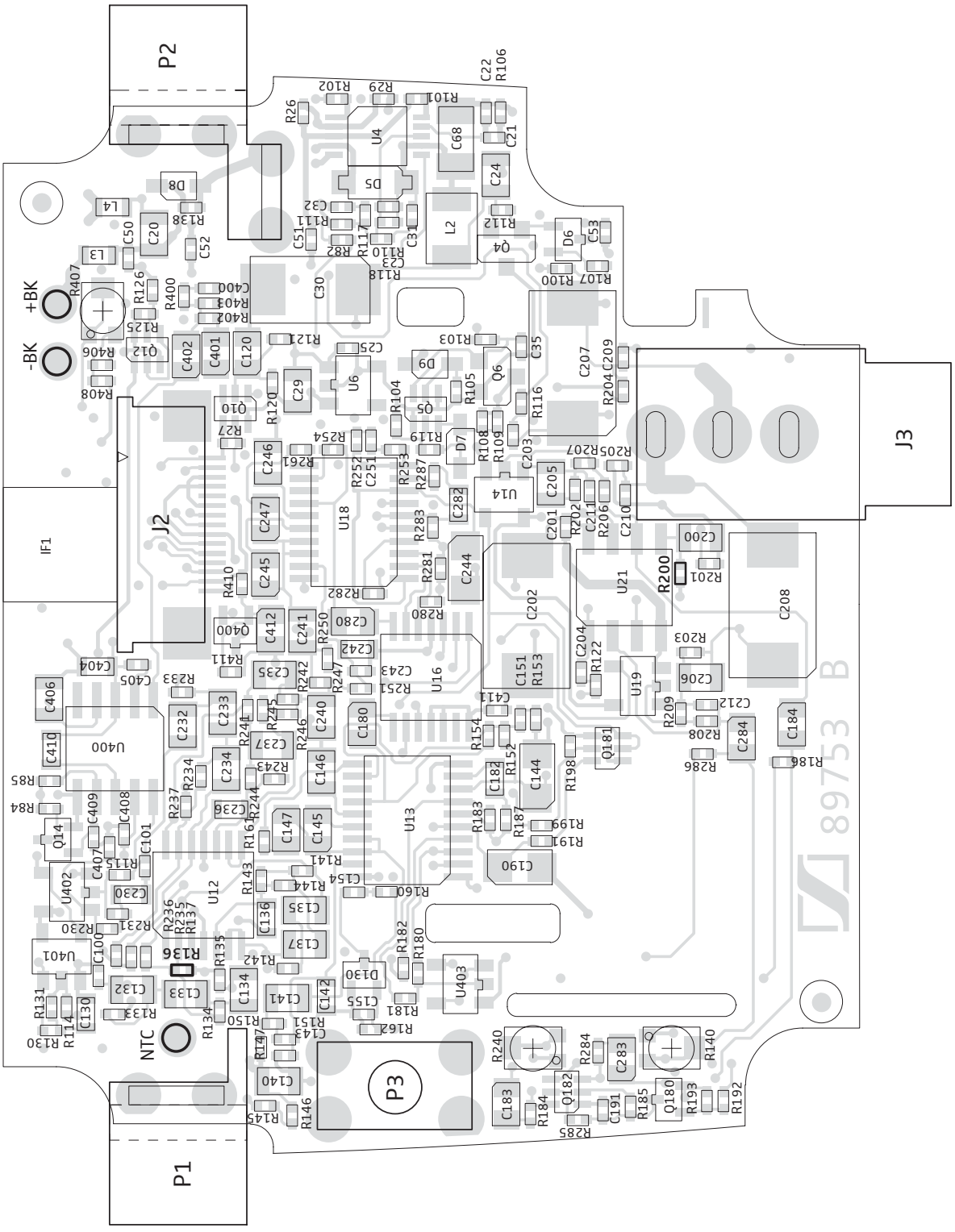
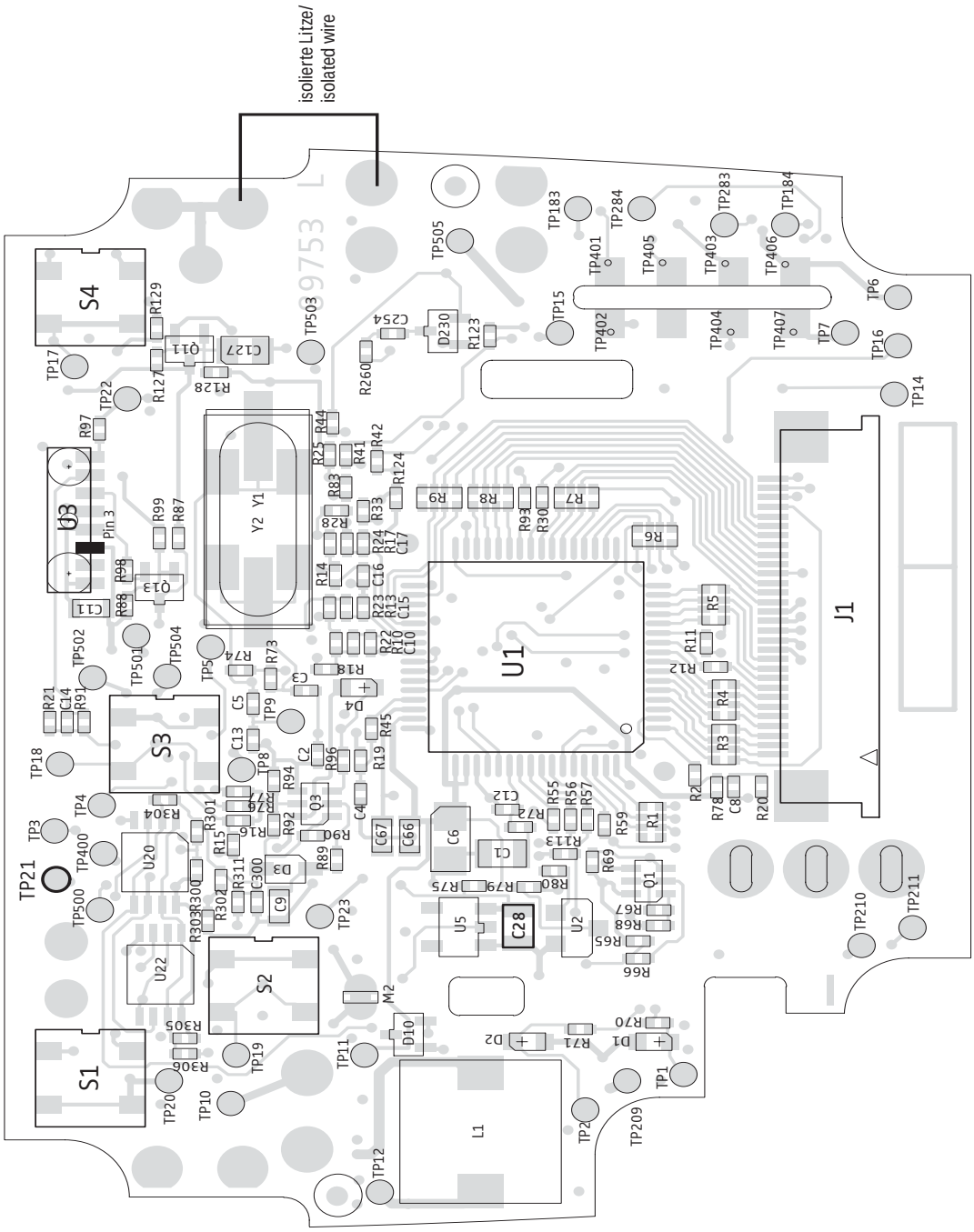
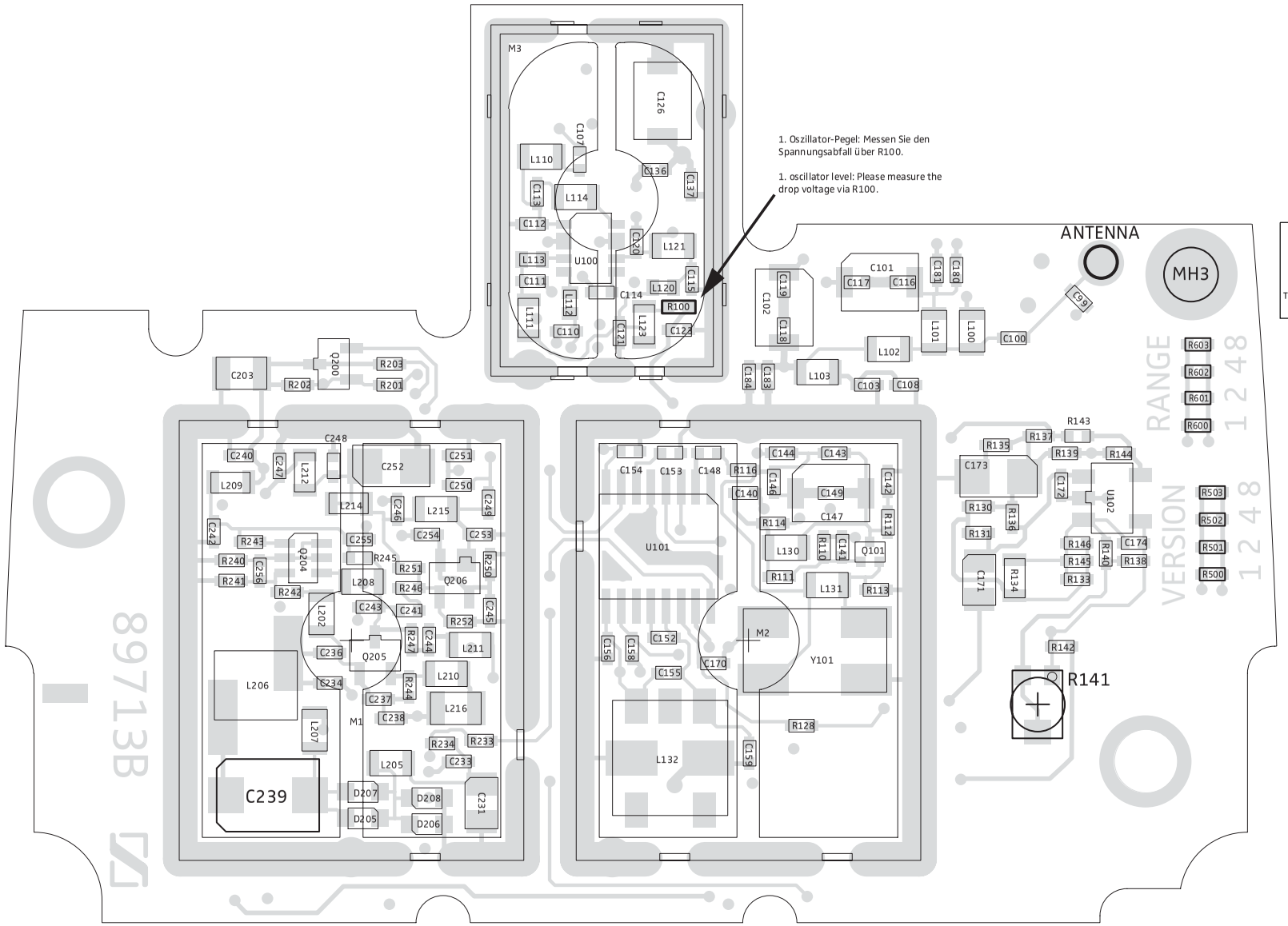
LCD30
LCD04
LCD03
LCD02
LCD01
J1
LC-Display



Mainboard, printed circuit board, component side



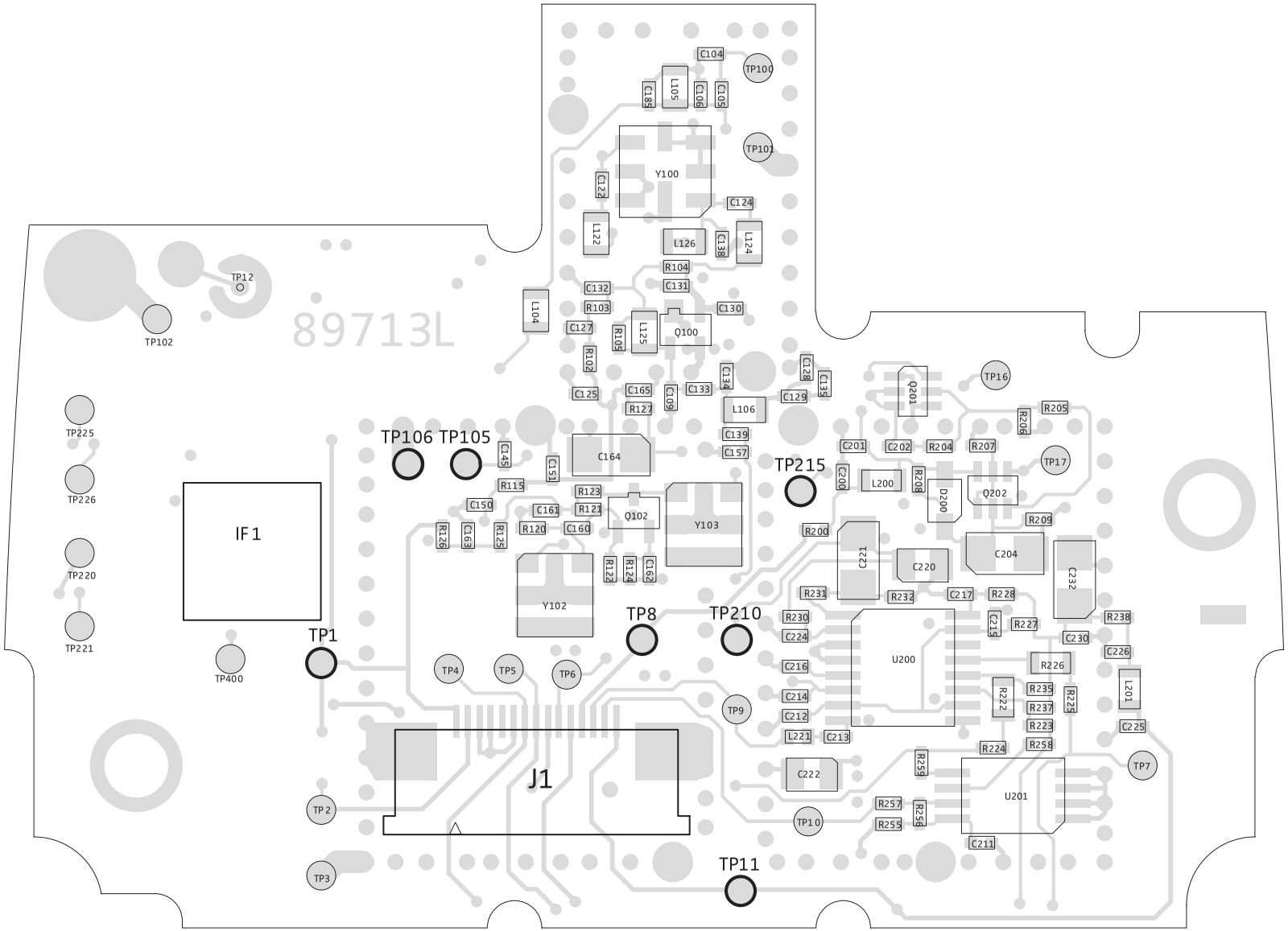
Mainboard, printed circuit board, solder side



m.= mounted
n.m.= not mounted

range	freq-range	R600	R601	R602	R603
1	518-554MHz	m.	n.m.	n.m.	n.m.
2	626-662MHz	n.m.	m.	n.m.	n.m.
3	740-776MHz	m.	m.	n.m.	n.m.
4	786-822MHz	n.m.	n.m.	m.	n.m.
5	830-866MHz	m.	n.m.	m.	n.m.

RF module, printed circuit board, component side



RF module, printed circuit board, solder side