

STAMPFL **STARTER RX** 0.04-30 MHz

AM DSB - RECEIVER (**PARTIAL KIT**)



Key features

Type: Low-cost receiver kit for shortwave listeners

Components: 3 individual circuit boards, software, pin diodes, 30 MHz clock oscillator

Technical specifications: Double superheterodyne receiver (21.4 MHz and 455 kHz IF)

Reception: AM and DSB (broadcast and amateur radio)

Alignment: Simple, with a receiver with a digital frequency display.

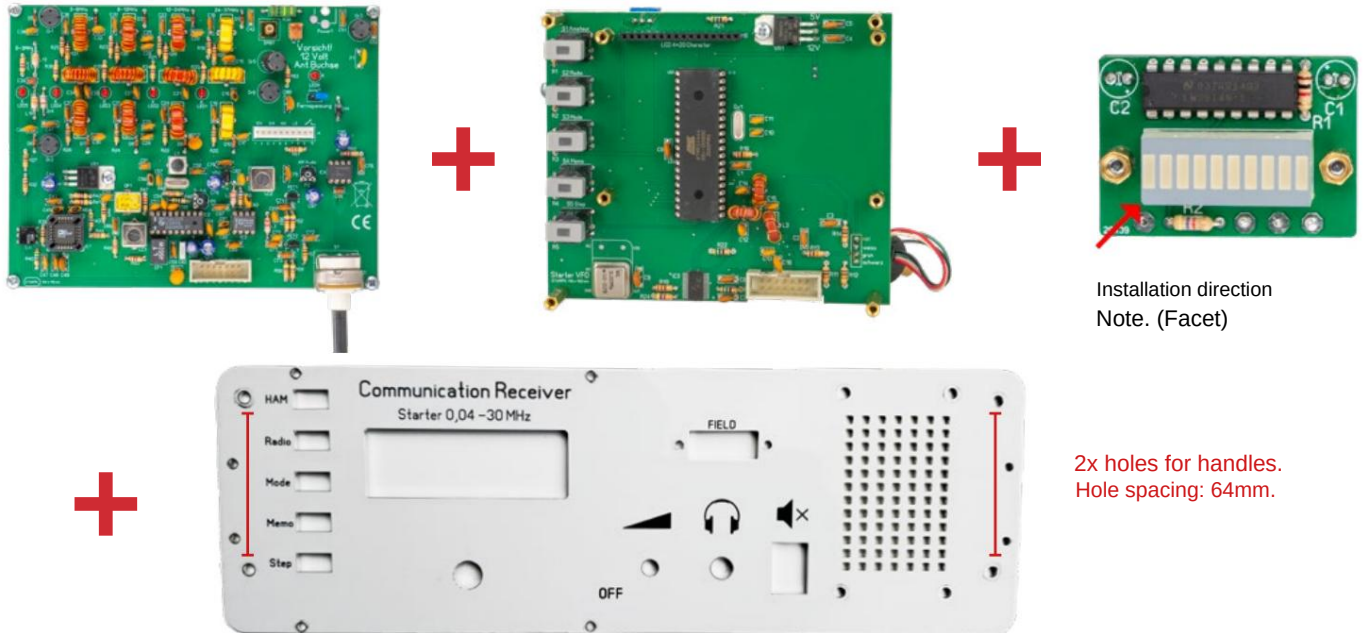
Special feature: Up to 50 storage locations via the software

Hardware: Heinz Stampfl HB9KOC

Software: Ernst Kirschbaum DL2EBV

STARTER RX

0.04-30 MHz AM DSB - RECEIVER (PARTIAL KIT)



The **Starter RX** is an easy-to-assemble, low-cost receiver aimed at hobbyist shortwave listeners. It is not a complete kit, but rather consists of four individual circuit boards: the **receiver board**, **VFO board**, **front panel board**, and **signal strength board**.

In addition to the circuit boards, the package includes the **software (in the ATmega 644)**, **11-pin diodes (BA283)**, and the **30 MHz clock oscillator**. For the remaining components, priority was given to ensuring they were readily available. The corresponding suppliers can be found in the parts list.

Technical details and construction

The receiver is a double superheterodyne receiver with intermediate frequencies of 21.4 MHz and 455 kHz. It can receive AM and DSB signals and is therefore suitable for broadcast and amateur radio use. The preselector is 5-stage and requires no adjustment.

Using a 1:4 or 1:9 transformer can be an alternative to the transformer (Tr1) suggested in the construction manual.

In this case, resistor R39 (220 ohms or 470 ohms, respectively) is omitted. Since the receiver uses the same filter for AM and SSB, the 4 kHz narrowband CFW455IT or the alternative LTW455IT should be used if possible. However, the more readily available CFW455H or LT455EW (6 kHz) will also work.

Only one SMD component was unavoidable. (AD9851)

Receiver verification

A receiver with a digital frequency display is sufficient for alignment. Proceed as follows:

After a warm-up period of 20 minutes, we calibrate the BFO oscillator. Set the measuring temperature

Set the receiver to 455 kHz and the modulation to SSB. Place a short piece of stranded wire near LC2 as an antenna and rotate the core until a clear "beat" is observed.

We do the same with L1 at a frequency of 20.945 MHz. We adjust trimmer P1 (S.Adj) as follows:

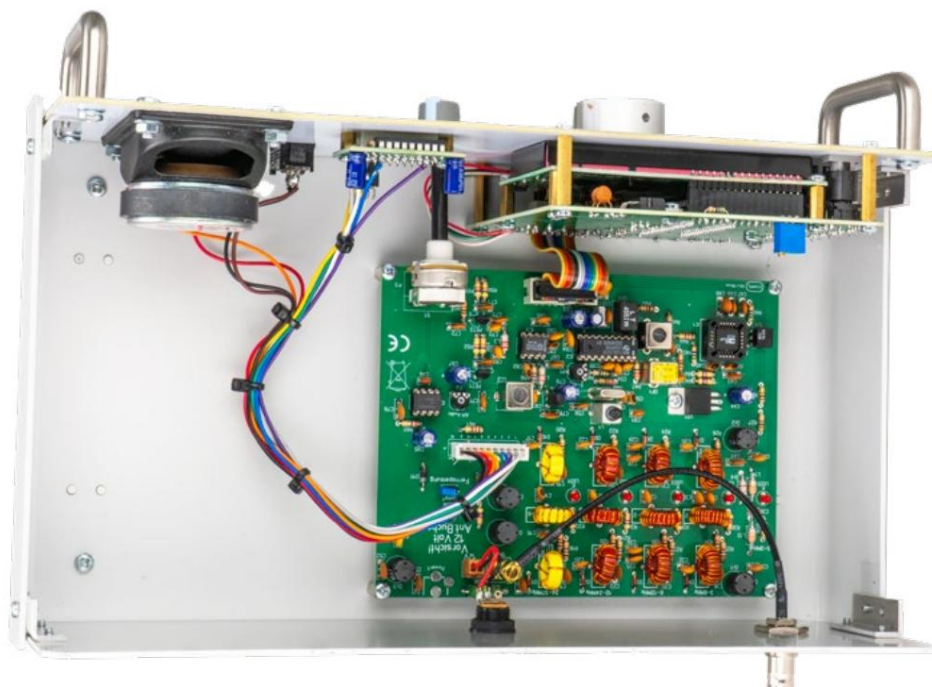
that the first LED is just barely not lit when the antenna is disconnected. Each LED then corresponds to approximately 10 dB.

Finally, find a radio station, ideally in the higher shortwave bands, and tune in.

Adjust L1 until the pitch sounds the same in AM and SSB. Use P2 to fine-tune the volume by feel. The alignment is now complete.

Case and software

A cost-effective Feltron Zeissler shell enclosure was chosen for the housing. The software allows for up to 50 memory locations. The user can customize the operation during setup. Detailed instructions on how to do this are provided at the end of the manual.



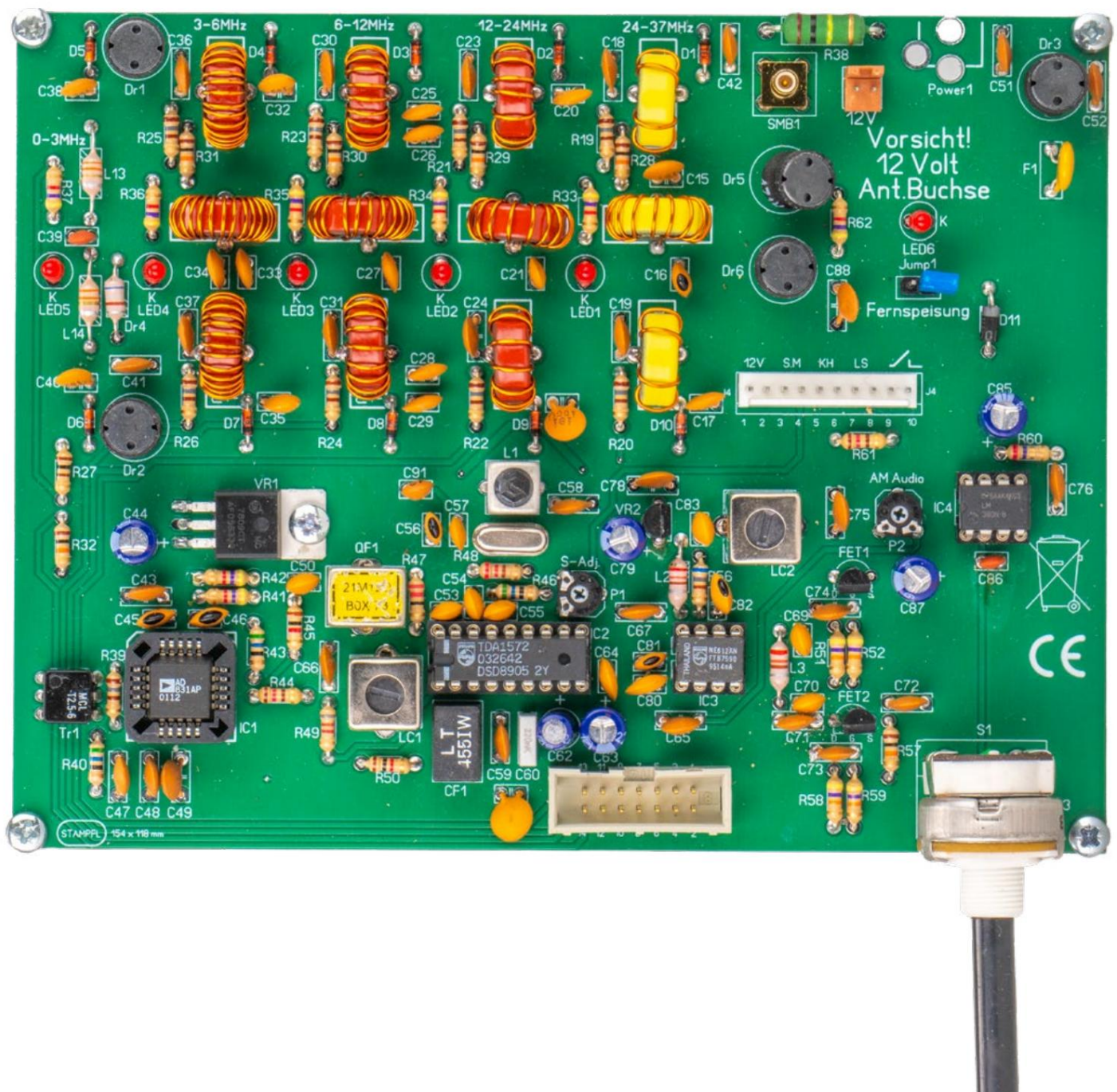
RX board

Before soldering in all components, it is important to make sure exactly:

Is the value correct?

Is the polarization correct (electrolytic capacitors)?

Is the location of the ICs correct?



Bill of materials RX board 1/6

Crowd	Component- Designation	Position on circuit board	Color code / Value	Reichelt article no.	Other Notes
Resistors					
1x	100 Ω	R27	brown- black- brown-gold	1/4W 100	
6x	10 k Ω	R28, R29, R30, R31, R32, R57	brown- black-or-ange- gold	1/4W 10K	
4x	47 k Ω	R51, R52, R58, R59	yellow- violet-or- ange-gold	1/4W 47K	
1x	680 Ω	R56	blue-grey- brown-gold	1/4W 680	
8x	4.7 k Ω	R33, R34, R35, R36, R37, R41, R42, R62	yellow-violet- red-gold	1/4W 4.7K	
3x	56 Ω	R40, R43, R46 green	blue-black- gold	1/4W 56	
2x	120 Ω	R44, R61	brown-red- brown-gold	1/4W 120	
1x	2.7 Ω	R60	red-violet- gold-gold	1/4W 2.7	
2x	1 k Ω	R45, R50	brown- black-red-gold	1/4W 1.0K	
1x	220 Ω	R48	red-red-brown- gold	1/4W 220	
10x	180 Ω	R19, R20, R21, R22, R23, R24, R25, R26, R39	brown-grey- brown-gold	1/4W 180	
1x	22 Ω	R47	red-red- black-gold	1/4W 22	
1x	8.2 k Ω	R49	grey-red-red- gold	1/4W 8.2K	
1x	100 k Ω	R38		2W METAL 100K	

Bill of materials RX board 2/6

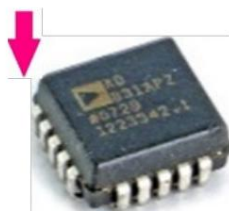
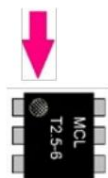
Crowd	Component- Designation	Position on circuit board	Color code / Value	Reichelt article no.	Other Notes
Inductors					
2x	3.3 μ H	L13, L14	orange- orange-gold- silver	L-MICC 3.3 μ	
2x	220 μ H	L2, L3	red-orange- brown-silver	L-MICC 220 μ	
Diodes					
10x	BA283	D1-10		BA283/BA282 A spare part is included	
1x	1N 4001	D11		1N 4001	
Thrushes					
1x	680 μ H	Dr4	blue-grey- brown-silver	L-MICC 680 μ	
5x	470 μ H	Dr1, Dr2, Dr3, Dr5, Dr6		09P 470 μ	
RF transformer					
1x T2.5-6-X65		Tr1		https://www. box73.de/	Pay attention to the position! Note the point on the circuit board!
IC					
1x	AD831 (Socket)	IC1		PLCC 20	Pay attention to the location!
1x	TDA1572 (Base)	IC2		MPE 001-2- 018-3	
1x	NE612 (socket) IC3			GS 8P	
1x	LM 380 DIP (Base)	IC4		GS 8P	
LED					
6x	LED 1-6	RX		LED 3MM ST RT	Positive pole, longer leg.

Bill of materials RX board 3/6

Crowd	Component- Designation	Position on circuit board	Color code / Value	Reichelt article no.	Other Notes
ceramic capacitors					
29x	100 nF	C18, C19, C23, C24, C30, C31, C36, C37, C41, C42, C43, C47, C48, C49, C51, C52, C58, C59, C65, C66, C67, C71, C72, C73, C74, C75, C76, C78, C88		KERKO 100N	
3x	10nF	C61, C64, C80		KERKO 10N	
1x	33pF	C56		KERKO 33P	
2x	68pF	C45, C46		KERKO 68P	
1x	39pF	C16		KERKO 39P	
2x	12pF	C57, C91		KERKO 12P	
1x	100pF	C21		KERKO 100P	
11x	180pF	C15, C17, C20, C22, C25, C26, C27, C28, C29, C33, C34		KERKO 180P	
4x	680 pF	C32, C35, C38, C40		KERKO 680P	
2x	2.2 nF	C39, C86		KERKO 2.2N	
7x	4.7 nF	C50, C53, C54, C55, C69, C70, C83		KERKO 4.7N	
1x	56 pF	C82		KERKO 56P	
1x	2.2 pF	C81		KERKO 2.2P	
Film capacitors					
1x	220 nF	C60		MMK 220N 63	
RF connectors					
1x	SMB1			SMB EB1-L174	

Bill of materials RX board 4/6

Crowd	Component- Designation	Position on circuit board	Color code / Value	Reichelt article no.	Other Notes
Bathtub plug					
1x	J1			HAN 514 6324	
Quartz filter					
1x	MXF 21.4-12D QF1				FUNKAMA- TEUR: Item No. 21M12D
ceramic filter					
1x	CFW455IT / LTW455IT (alternatively) CFW455H / LT455EW)	CF1			eBay / Minikits.COM. AU
FET					
2x	BS170	FET1, FET2		BS170 ONS	
variable coil					
1x	1.6 μ H	L1			FUNKAMA- TEUR: Item no.: Fi-1.6-7
LC filter 455 kHz					
2x		LC1, LC2			180 pF integrated
quartz					
1x	20.945 MHz Qz1				MOUSER ELECTRONICS: 449-LFXTAL- 013205BULK



Bill of materials RX board 5/6

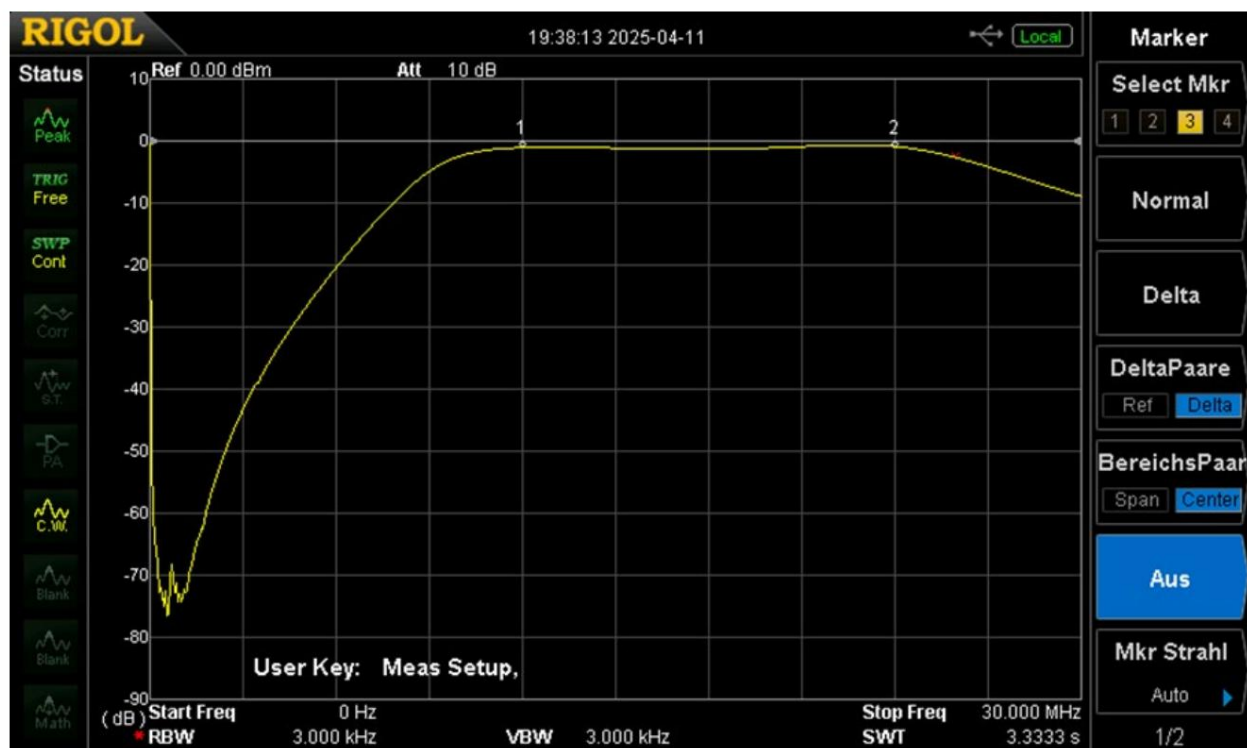
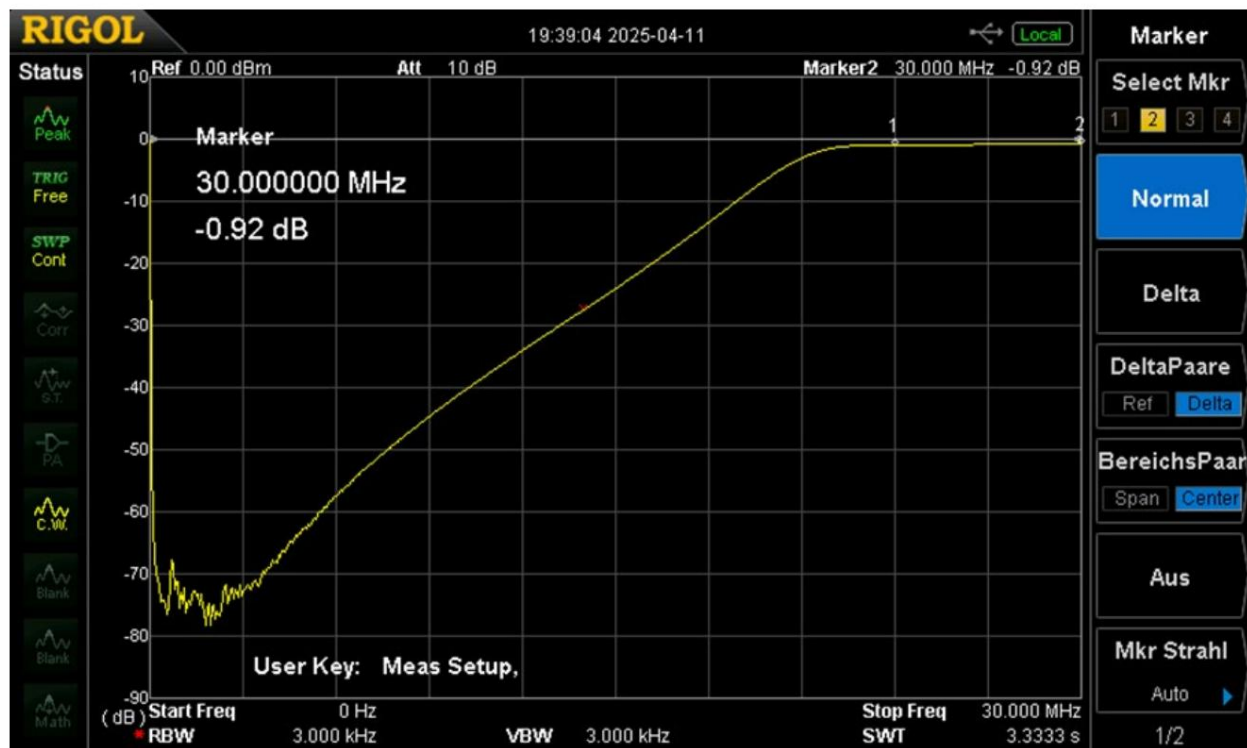
Crowd	Component- Designation	Position on circuit board	Color code / Value	Reichelt article no.	Other Notes
ring cores					
1x	T50-6 (yellow)			T 50-6	13 turns, wire length 0.35 m
2x	T50-6 (yellow)			T 50-6	5 turns, Wire length 0.20 m
1x	T50-2 (red)			T 50-2	12 turns, wire length 0.35 m
2x	T50-2 (red)			T 50-2	10 turns, wire length 0.25 m
1x	T50-2 (red)			T 50-2	18 turns, wire length 0.45 m
2x	T50-2 (red)			T 50-2	13 turns, wire length 0.35 m
1x	T50-2 (red)			T 50-2	25 turns, wire length 0.55 m
2x	T50-2 (red)			T 50-2	19 turns, wire length 0.45 m
Voltage regulator					
1x	MC 7809 CTG VR1			MC 7809 CTG Plus	M3 Phillips head with nut
1x	MC 78L05 ACPG	VR2		MC 78L05 ACPG	
Electrolytic capacitors					
5x 220 µF		C44, C63, C79 C85, C87		MA 220U 16 The	positive pole is the longer leg
1x	2.2 µF	C62		SU-A 2.2U 50 Positive	pole is the longer leg

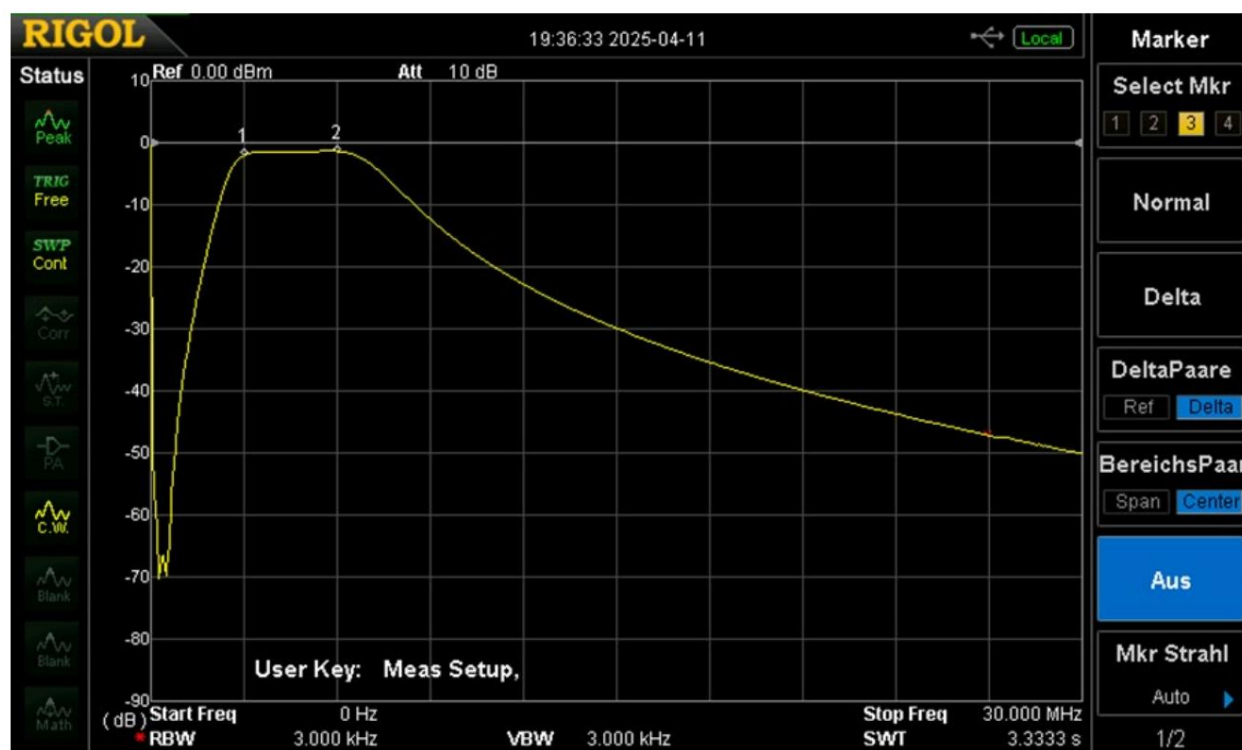
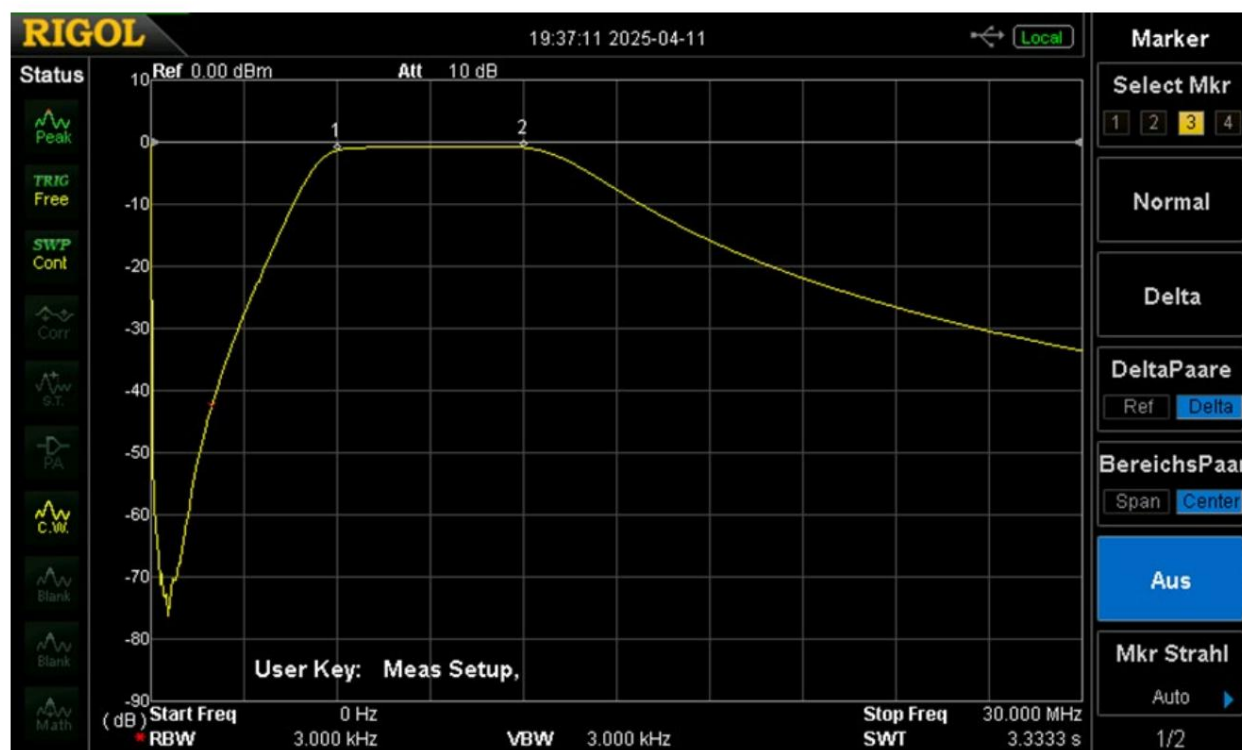
Bill of materials RX board 6/6

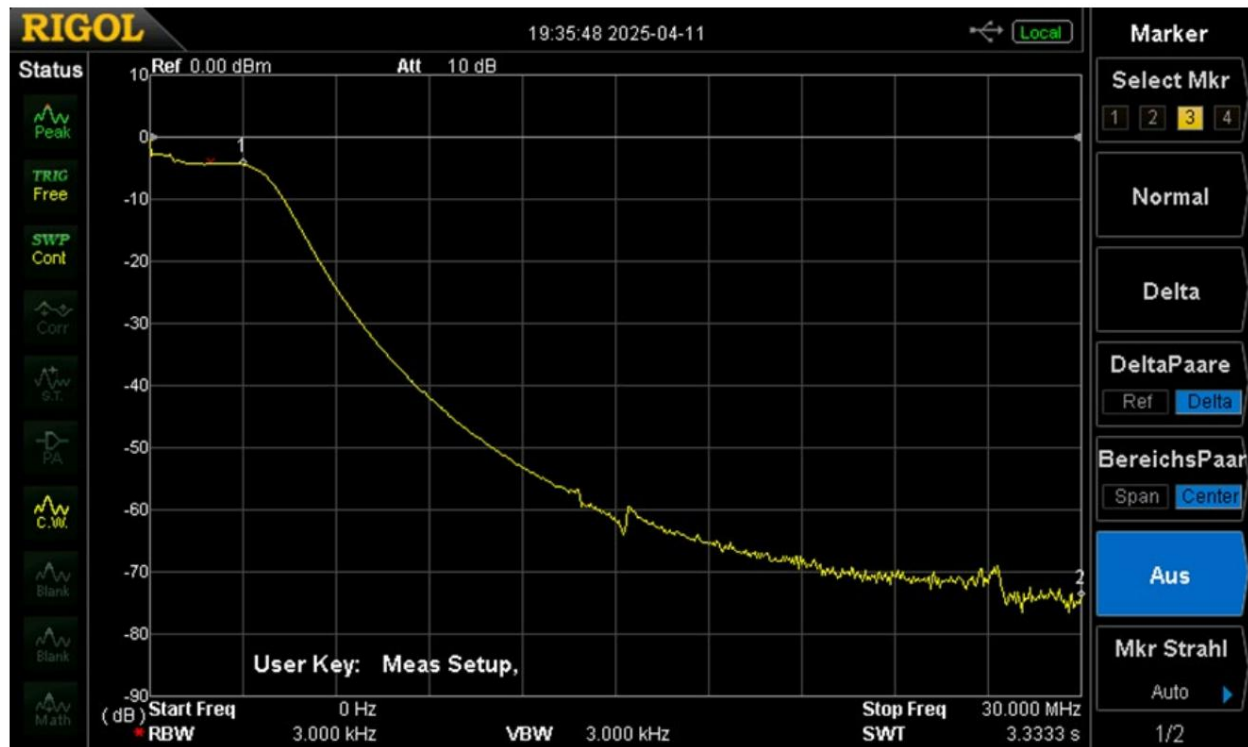
Crowd	Component- Designation	Position on circuit board	Color code / Value	Reichelt article no.	Other Notes
Trimmer Pot					
2x		P1, P2		PIH PT- 6KV103APM	
1x		P3		PO6M+S-LOG 47K	
spacers					
4x	M3 x 10 mm			DI 10MM	
PCB connectors					
1x				PS 25/10G WS	
1x				PS 25/2G BR	
Pin header					
1x	2-pole			BKL 10120909	
jumper					
1x				MPE 149-1- 002-F4	
Miscellaneous					
1x	Resetting Security			PFRA 050	

STARTER RX

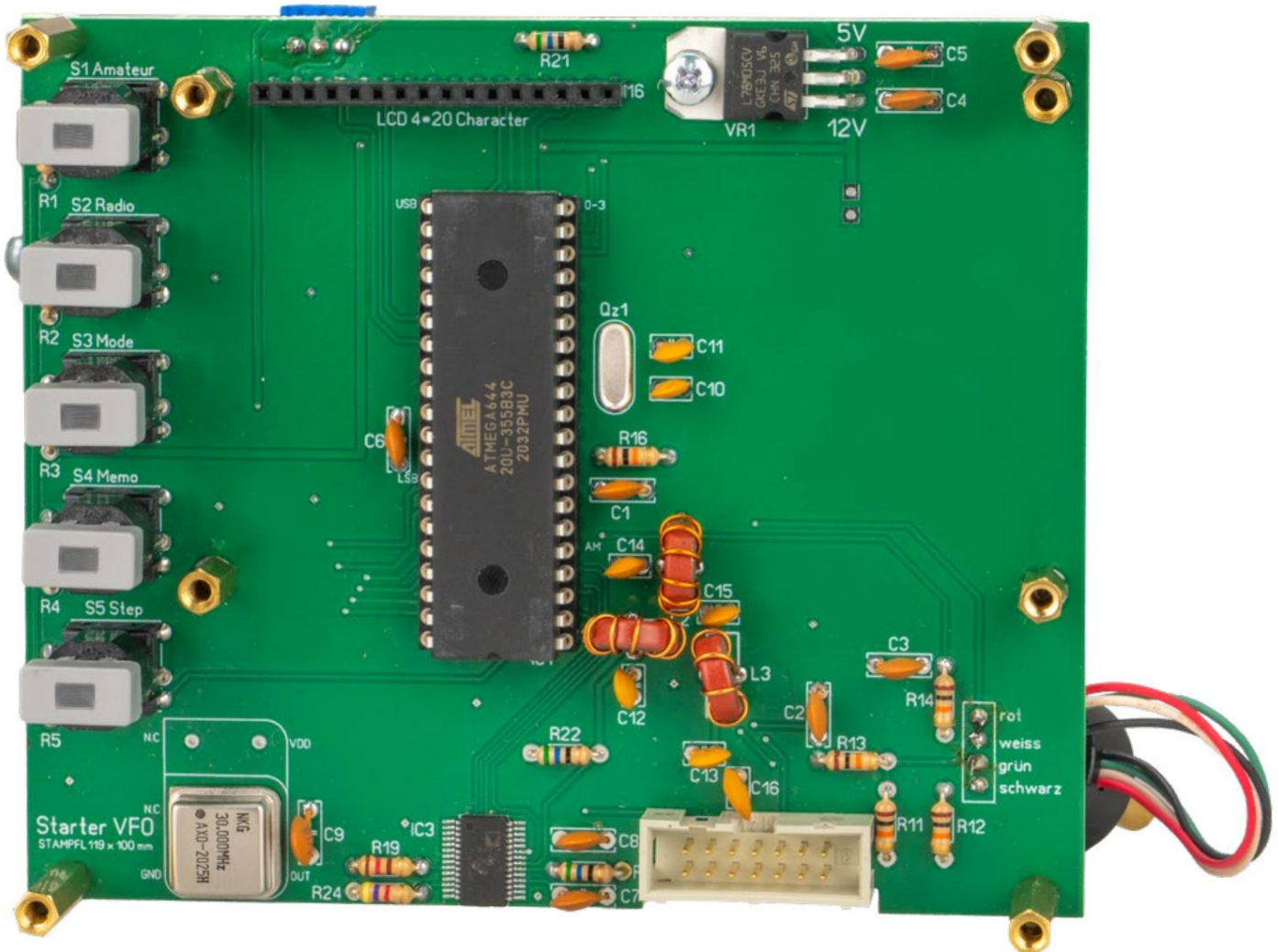
0.04-30 MHz AM DSB - RECEIVER (PARTIAL KIT)







VFO board



Bill of materials VFO board 1/5

Crowd	Component- Designation	position	Notes	Reichelt article number / source
Resistors				
5x	1 k Ω	R1-R5	brown-black-red-gold	1/4W 1.0K
5x	10 k Ω	R11-R14, R16	brown-black-orange-gold	1/4W 10K
1x	120 Ω	R19	brown-red-brown-gold	1/4W 120
3x	56 Ω	R21-R23	orange-orange-black-gold-brown	1/4W 56
1x	4.7 k Ω	R24	yellow-violet-red-gold	1/4W 4.7K
IC				
1x	AT644 + socket	IC1	DIP-40	MPE 001-2-040-6 (Base), STAMPFL
1x	AD9851	IC3		eBay
Quartz oscillator (XO)				
1x	30 MHz	XO	Included in the kit	STAMPFL
Voltage regulator				
1x	L78M05CV STM VR1			L78M05CV STM
ceramic capacitors				
9x 100 nF 2x 22 pF 2x 10 pF 2x		C1-C9		KERKO 100N
100 pF 1x 10 nF		C10, C11		KERKO 22P
		C12, C13		KERKO 18P
		C14, C15		KERKO 100P
		C16		KERKO 10N
quartz				
1x	20,000 MHz	Qz1		20,0000-HC49U-S

Bill of materials VFO board 2/5

Crowd	Component- Designation	position	Notes	Reichelt article number / source
25-speed trimmer				
1x	10 k Ω		For LCD contrast 64W-10K	
Toroidal coils				
2x	T 37-2	L1, L3	6 turns, 0.5 mm Cu	T 37-2
1x	T 37-2	L2	8 turns, 0.5 mm Cu	T 37-2
Bathtub plug				
1x	J1			HAN 514 6324
Socket strip				
1x				MPE 094-1-016
Display				
1x	LCD 20x4			DEBO LCD 20X4
Pin header				
1x				BKL 10120918
spacers				
4x	M3 x 12 mm			DI 12MM
4x	M3 x 22 mm			eBay
Encoder				
1x				DigiKey part number. 563-2074-ND, Mouser Art.
push button				
5x	3FTH940		Yellow	CONRAD Best.- No. 3305347-62
Button extension				
5x	Extender			Mouser Art.-No. 2S09-10.0

Bill of materials VFO board 3/5

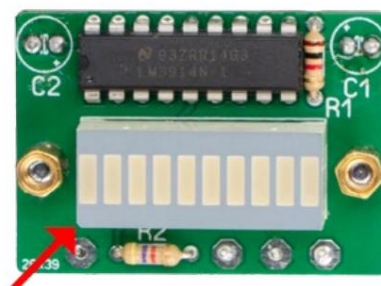
Crowd	Component- Designation	position	Notes	Reichelt Article No. / Source
Button caps				
				Bürkin Order No. 12G8949, SOS el. Order no. 116666, Mouser item no. 1QS031
front panel				
2x	M4 x 10 mm	handles		
1x	Potentiometer knob			OKW TK-16-6 GR
1x	Marking part			OKW TK-PIN BL
cable ties				
				DIY store
Switch				
1x	rocker switch			WIPPE 1801.6102
Speakers				
1x	VISATON SC 5.9 OM			VIS 8003
jack socket				
1x	Stereo			CLIFF FC681374V
Tune button				
1x	Solid Aluminum		32x13mm, 6mm Hole	eBay
DC jack				
1x				LUM NEBJ 21C

Bill of materials VFO board 4/5

Crowd	Component- Designation	position	Notes	Reichelt article number / source
Housing				
1x	Aluminium housing 2010		3/180	Feltron Zeissler item no. 2010- 0605
DC cable				
1x	2m			HS AK 21
Flat ribbon cable				
1x	14-pin		100 mm	eBay

Field strength board, board 5/5

Installation direction
Note. (Facet)



Crowd	Component- Designation	position	Notes	Reichelt article number / source
Display driver				
1x	DIL-18			LM 3914 DIL
Resistors				
1x	1 k Ω	R1	brown-black-red- gold	1/4W 1.0K
1x	4.7 k Ω	R2	yellow-violet-red- gold	1/4W 4.7K
electrolytic capacitor				
2x	C1,C2	C1,C2		NHG-A 10U 100
Bargraph display				
1x	10 elements		Yellow, pay attention to the location!	YBG 1000

Memory operation (MEMO)

The receiver offers up to **50 memory locations** for frequency, mode, and frequency step size. In the setup menu, you can choose whether the settings are saved via a push button or the rotary encoder.

Push-button operation: A single press of the **MEMO button** saves the current frequency, mode, and step size. Saved data is used as the initial values when the device is switched on. For frequencies in amateur radio or broadcast bands, you can choose whether the settings should be saved for the entire band or only for a single channel. Set **Memo** to Push-button operation in the setup menu.

Rotary encoder operation: 50 memory locations are available. After pressing the MEMO button, you can choose between **Frequency <= Memo** (read memory contents) and **Frequency => Memo** (save current data). The display shows "**Frequency => Memo**" for saving, and you can select the desired memory location (1-50) using the main tuning knob [TUNE]. Empty memory locations are displayed as "Memory free". An already occupied memory location can be overwritten or deleted. To read the memory channels, select "**Frequency <= Memo**".



Frequency change and step size

The step size for frequency changes is selected using the **[STEP] button** . The lowest digits of the frequency are set to zero.

Pushbutton operation: The step size is scanned in a fixed sequence: 0.01 kHz, 0.10 kHz, 1.00 kHz, 5.00 kHz, 9.00 kHz, 10.00 kHz and 100.00 kHz.

Rotary encoder operation: Select the frequency step size by turning the main tuning knob [TUNE] and confirm the selection by pressing the [STEP] button again. The input mode will then be...
Exit automatically after approximately 4 seconds of inactivity.

A **rapid frequency change** of 100 kHz is possible in both operating modes by holding down the [STEP] button and simultaneously turning the main tuning knob.

Configuration via the setup

The setup menu allows you to customize many operating functions. To access the setup menu, press and hold the **[MODE] button** while switching on the receiver. After the startup message appears, a notification will appear indicating that you can release the button.

In the setup you can configure the following settings:

Reset to default settings: Resets all settings to factory defaults.

Language selection: German / English

Operating the functions: Configure whether the band selection, mode, step, and memo functions are controlled via pushbuttons or the rotary encoder. Sixteen combinations are possible.

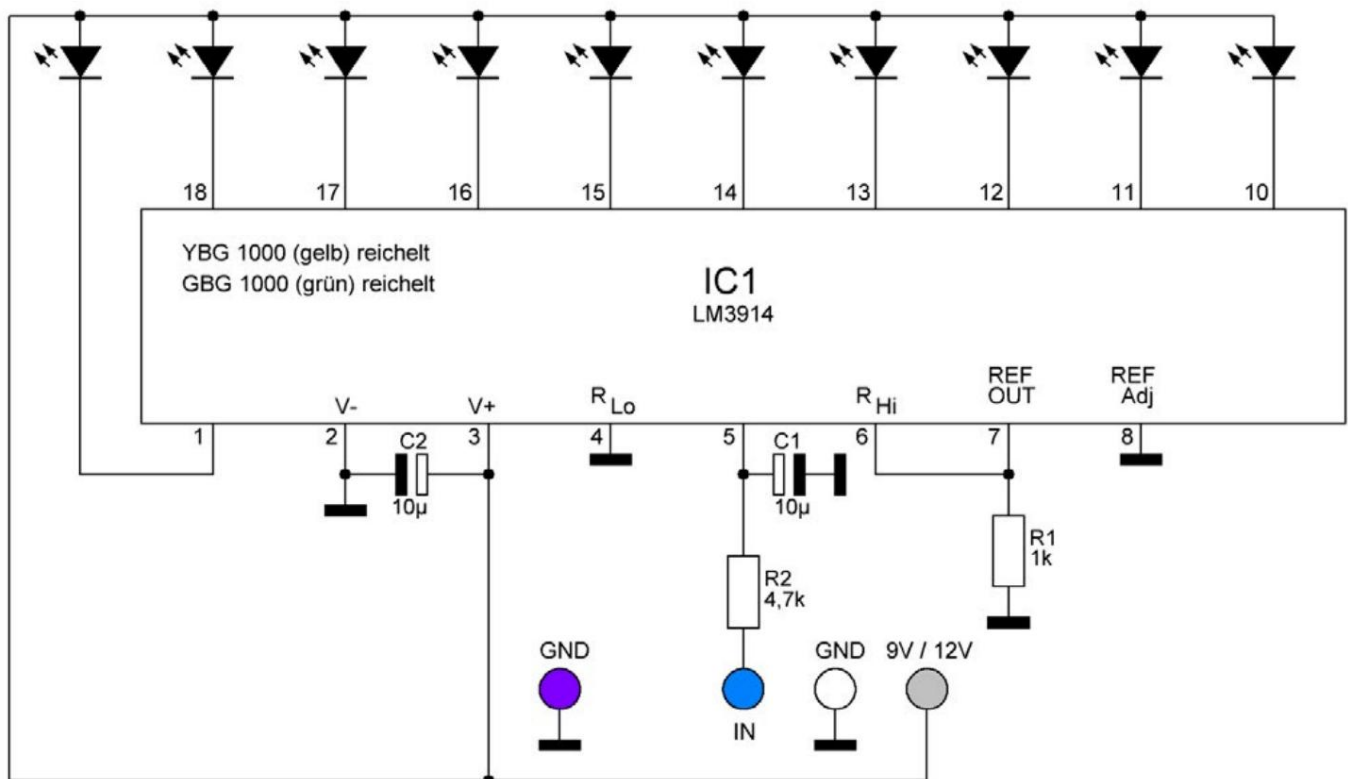
Encoder pulses per revolution: Select between 50 and 100 frequency step changes per revolution of the main tuning knob.

Coupling of Step and Mode: Determine whether the frequency step size is automatically changed when you adjust the demodulator mode (AM, SSB, etc.).

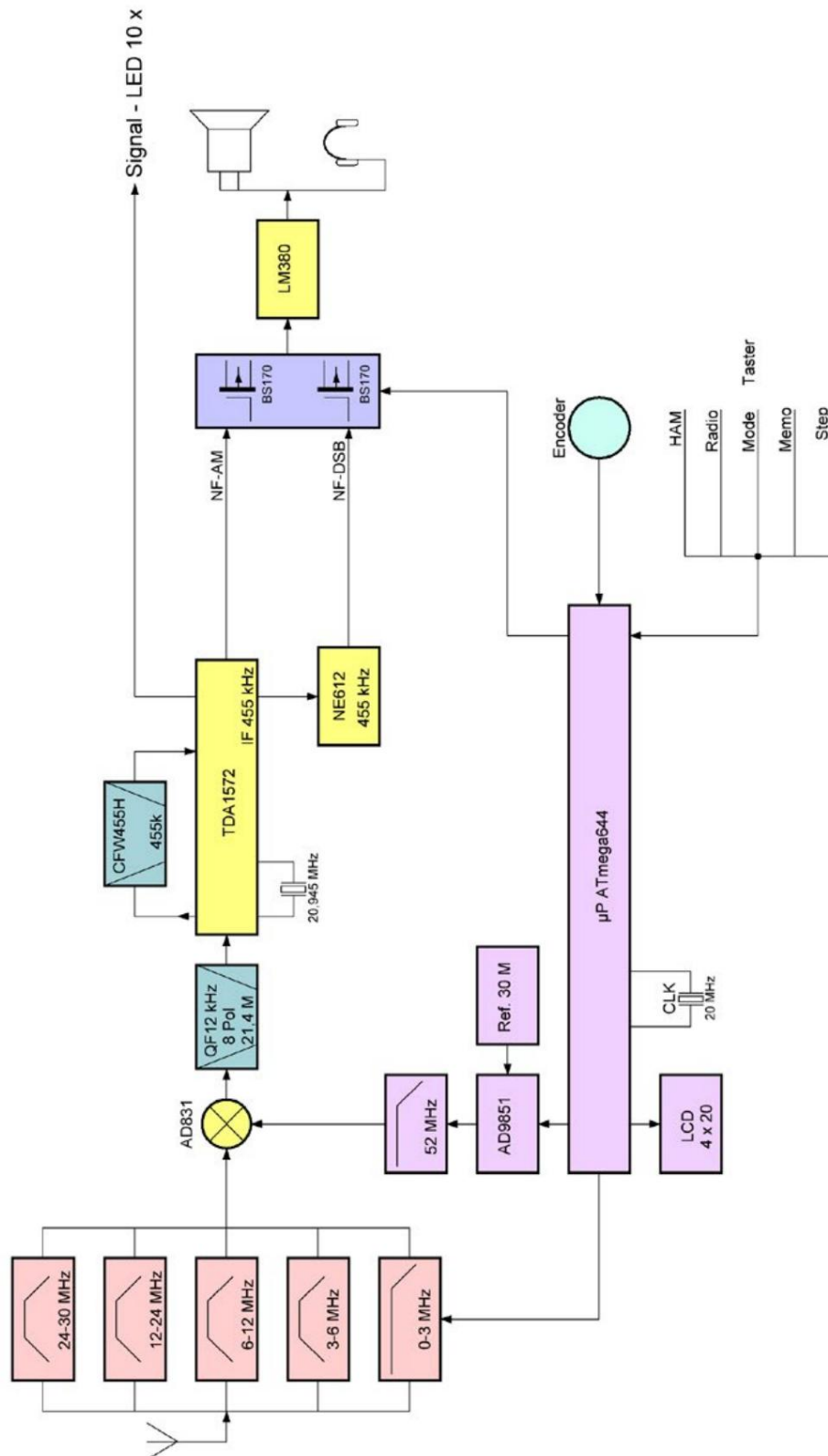
Behavior after memory read: Specify whether the last used memory frequency or the frequency set before the memory was accessed should be active after exiting memory operation.

The setup routine ends after the last selection, and the settings are permanently stored in the receiver.

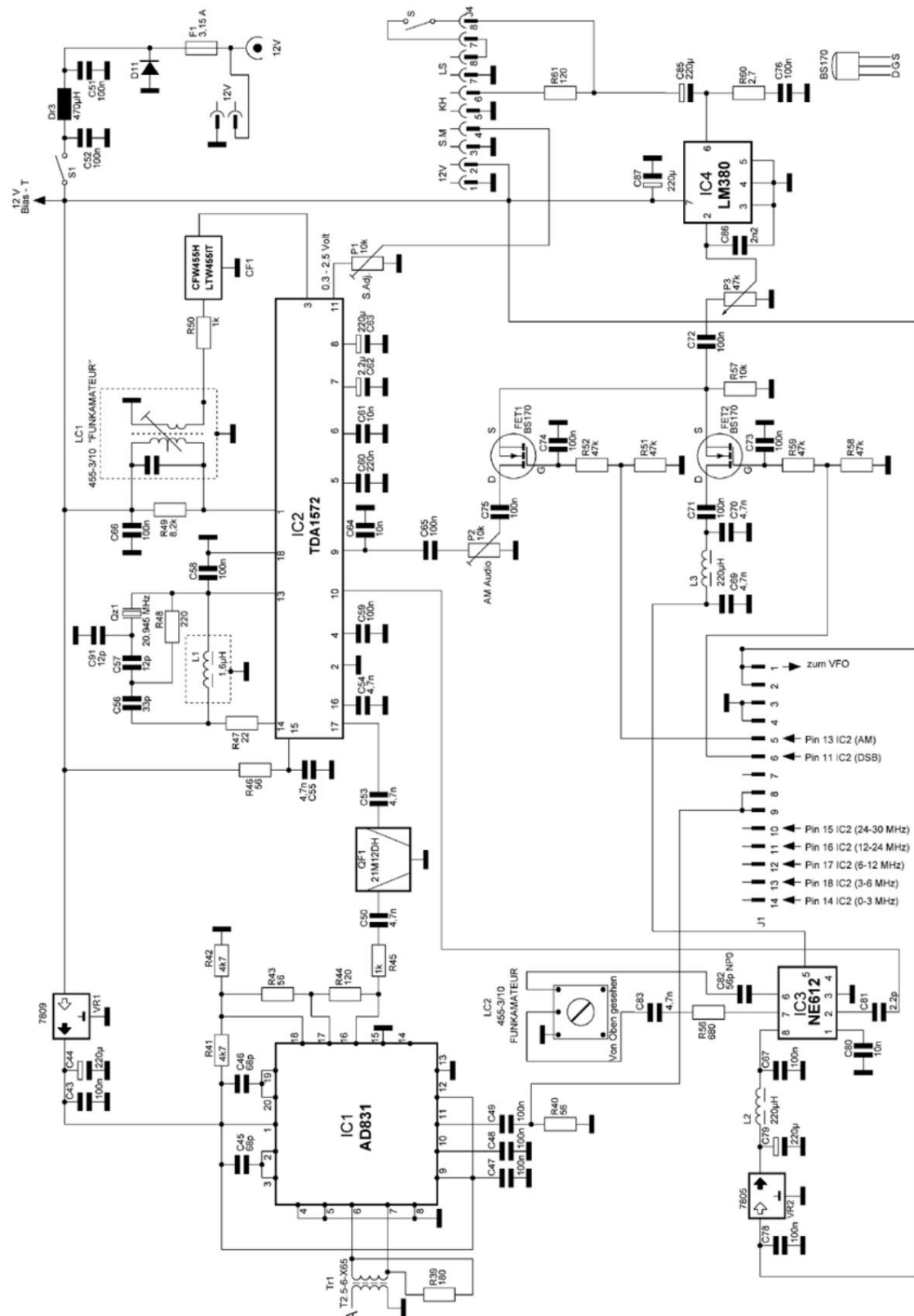
Field



Block diagram Starter RX



Starter-Frontend-TDA 1572



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[illegible]

Starter preselector

