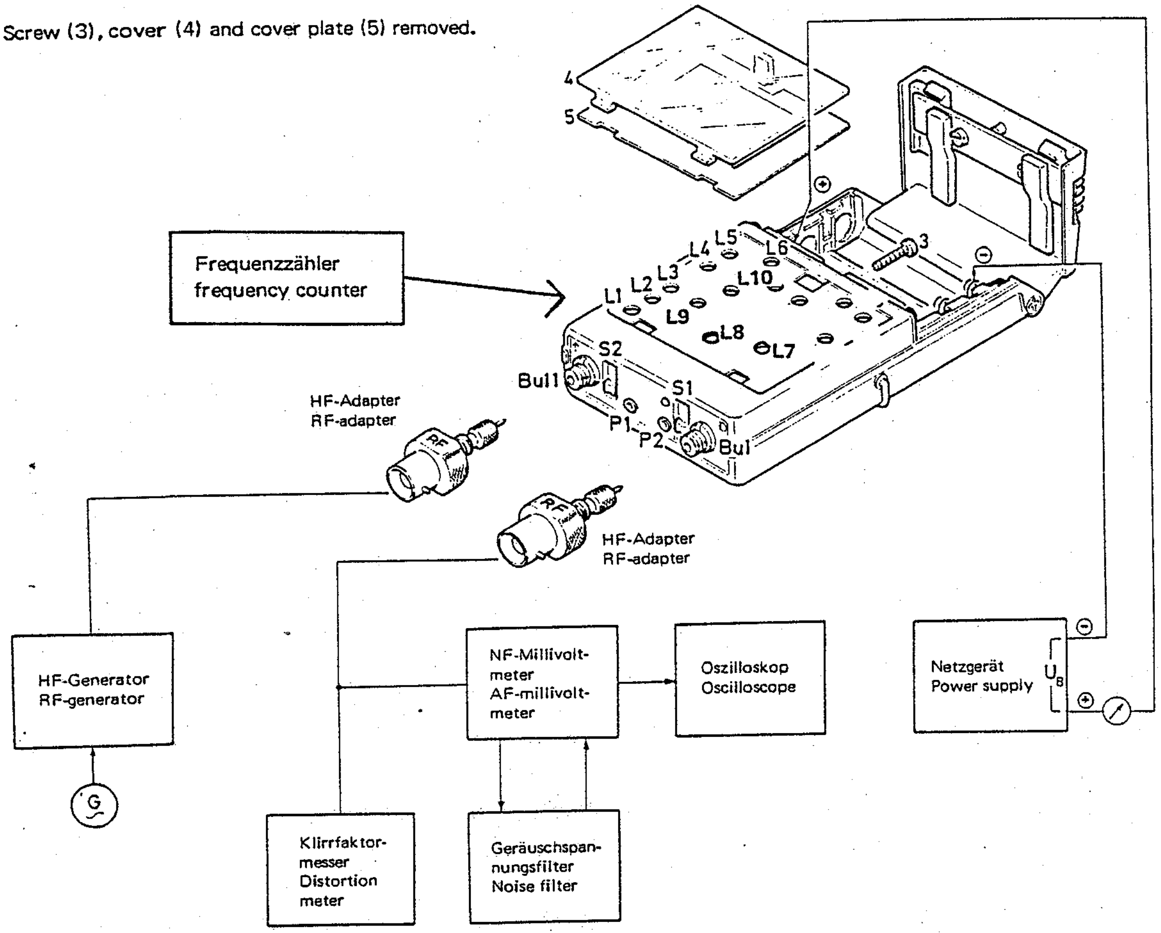
Alignment Instructions EK 2012 - 90

Adjustment Measurement	Signal input	Unit setting Preparation	Measuring point	Nom. value	Tuning element	Adjust to ...	Remarks
Measurement current consumption	$U_B = 2$ V $U_B = 4.5$ V $U_B = 5$ V	a) Test set-up b) S 1 ON		220-300 mA 65-80 mA 60-75 mA			
Measurement output voltage of DC/DC converter	like 1	like 1	Ⓨ	7.4 V			
Oscilator alignment	$f = f_e$ (CH 2) swing = ± 40 kHz $f_m = 1$ kHz $V_{RF} = 100$ mV	a) Test set-up b) P 1 ↺ min c) P 2 ↻ max d) S 2 CH 2 e) S 1 ON	emitter T 8		L 8	f_{Q2}	Loose coupling of frequency counter Adjust to $f_Q = \frac{f_e - 10.7 \text{ MHz}}{3}$ (see crystal) and current maximum
Tripler alignment	like 2	like 2	emitter T 7		L 9, L 10	f_o	Adjust to $f_o = f_e - 10.7$ MHz and current maximum
Phase shifter alignment	like 2	like 2	Bu 1		L 7	max. V_{AF}	
RF alignment	like 2 V_{RF} (see remarks)	like 2	Bu 1		L 6, L 9, L 10 L 5, L 4, L 3, L 2, L 1	max V_{AF}	1. Reduce V_{RF} till AF-output level decreases. 2. Ensure that the receiver does not operate within limitation. If necessary, reduce RF-input level.
Alignment max. S/N ratio	like 2 $V_{RF} = 2{,}5$ µV swing = ± 56 kHz	like 2					
	Modulation OFF		Bu 1	≥ 60 dBA	like 4	min. noise	
	S 2:CH 1		Bu 1	≥ 60 dB A		min. noise	S/N ratio CH 2 : CH 1 < 2 dB
	$V_{RF} = 10$ µV swing = ± 56 kHz		Bu 1	≥ 88 dB A			
Adjustment min. THD	like 2 $V_{RF} = 100$ µV swing = ± 40 kHz	like 2	Bu 1	≤ 1%	L 7		
Adjustment output voltage	like 2	like 2	Bu 1	0 dB_m	P 3		
Test of squelch function	like 2 $V_{RF} = 1$ µV	like 2 P 1 (see remarks)					Turn P 1 till AF-output is switched off. Increase V_{RF} till the AF-signal is switched through. Then V_{RF} should be approx. 1.5 µV.

Test set-up EK 2012-90

Screw (3), cover (4) and cover plate (5) removed.



Erforderliche Meßgeräte und Prüfmittel:

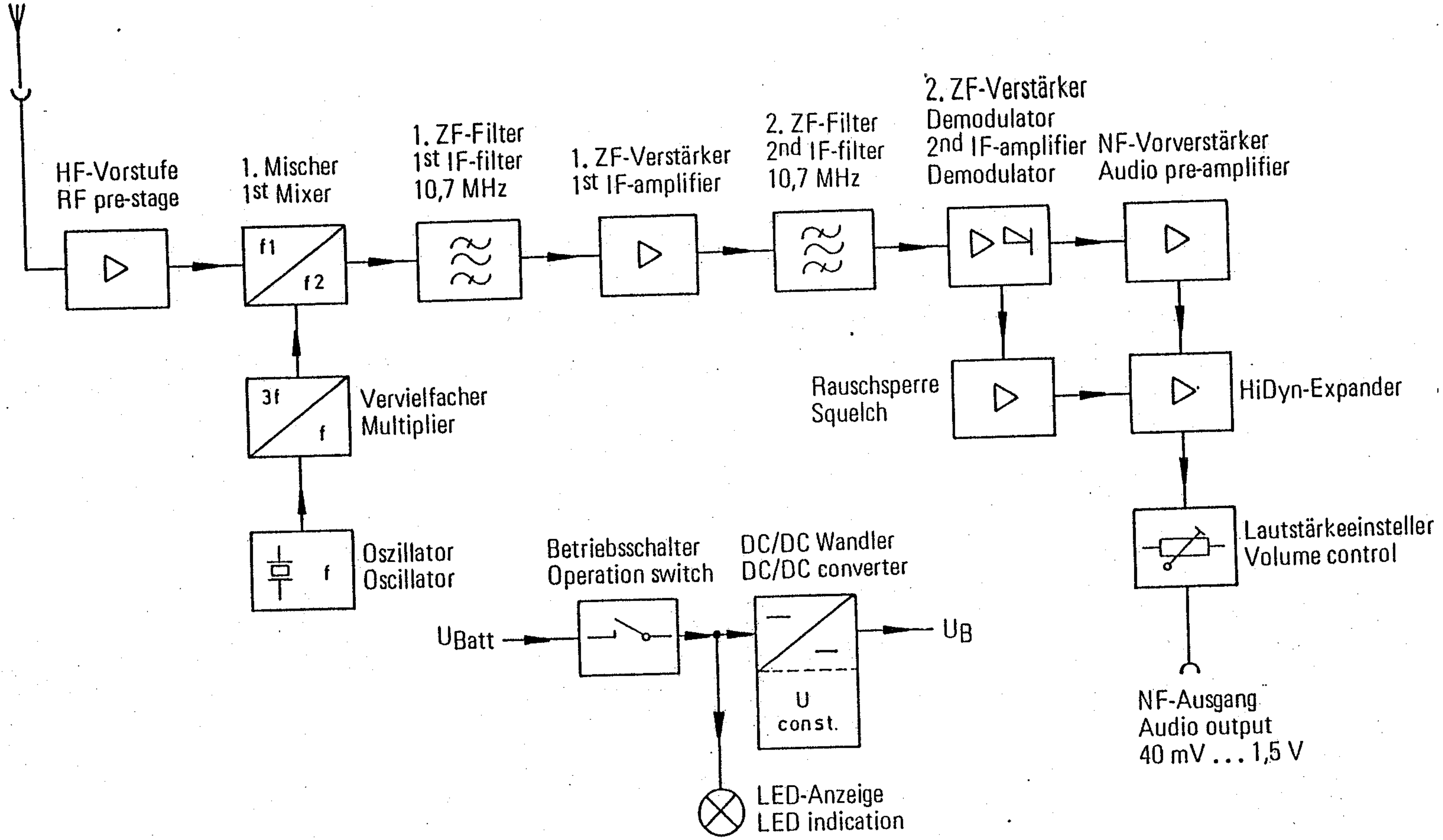
1 FM-Meßsender (z. B. Hewlett Packard 8640 B)
1 NF-Generator
1 Netzgerät, regelbar
1 Milliamperemeter
1 Multimeter
1 Frequenzzähler (z. B. Kontron 401 A)
1 NF-Voltmeter (z. B. UPM 550-1, Sennheiser)
1 Klirrfaktormesser (z. B. UPM 550-1, Sennheiser)
1 Geräuschspannungsfilter (z. B. UPM 550-1, Sennheiser)
1 Oszilloskop
2 HF-Meßadapter (Sennheiser) Bestell-Nr. 29058
1 Spezialwerkzeug für Bu 1/ Bu 11
Sennheiser Best. Nr. 29065

Measuring instruments and test equipment needed:

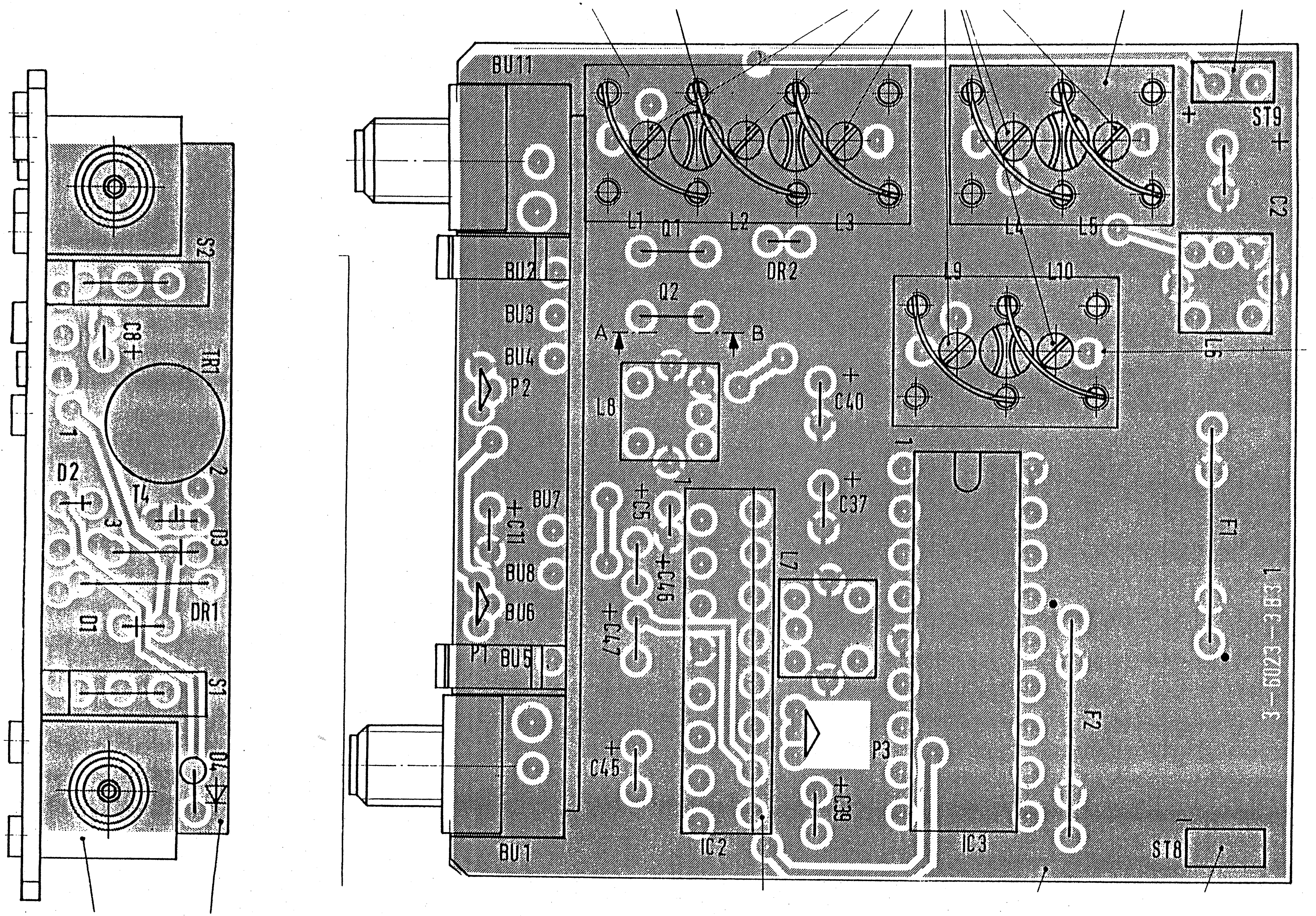
1 FM-signal generator (e. g. Hewlett Packard 8640 B)
1 AF-generator
1 Power supply, adjustable
1 Milliamperemeter
1 Multimeter
1 Frequency counter (e. g. Kontron 401 A)
1 AF-voltmeter (e. g. UPM 550-1, Sennheiser)
1 Distortion meter (e. g. UPM 550-1, Sennheiser)
1 Weighted noise voltage filter (e. g. UPM 550-1, Sennheiser)
1 Oscilloscope
2 RF-measuring adapter (Sennheiser) Part-No. 29058
1 special tool for Bu 1/ Bu 11
Sennheiser Part-No. 29065

EK 2012-90 Schaltungsbeschreibung

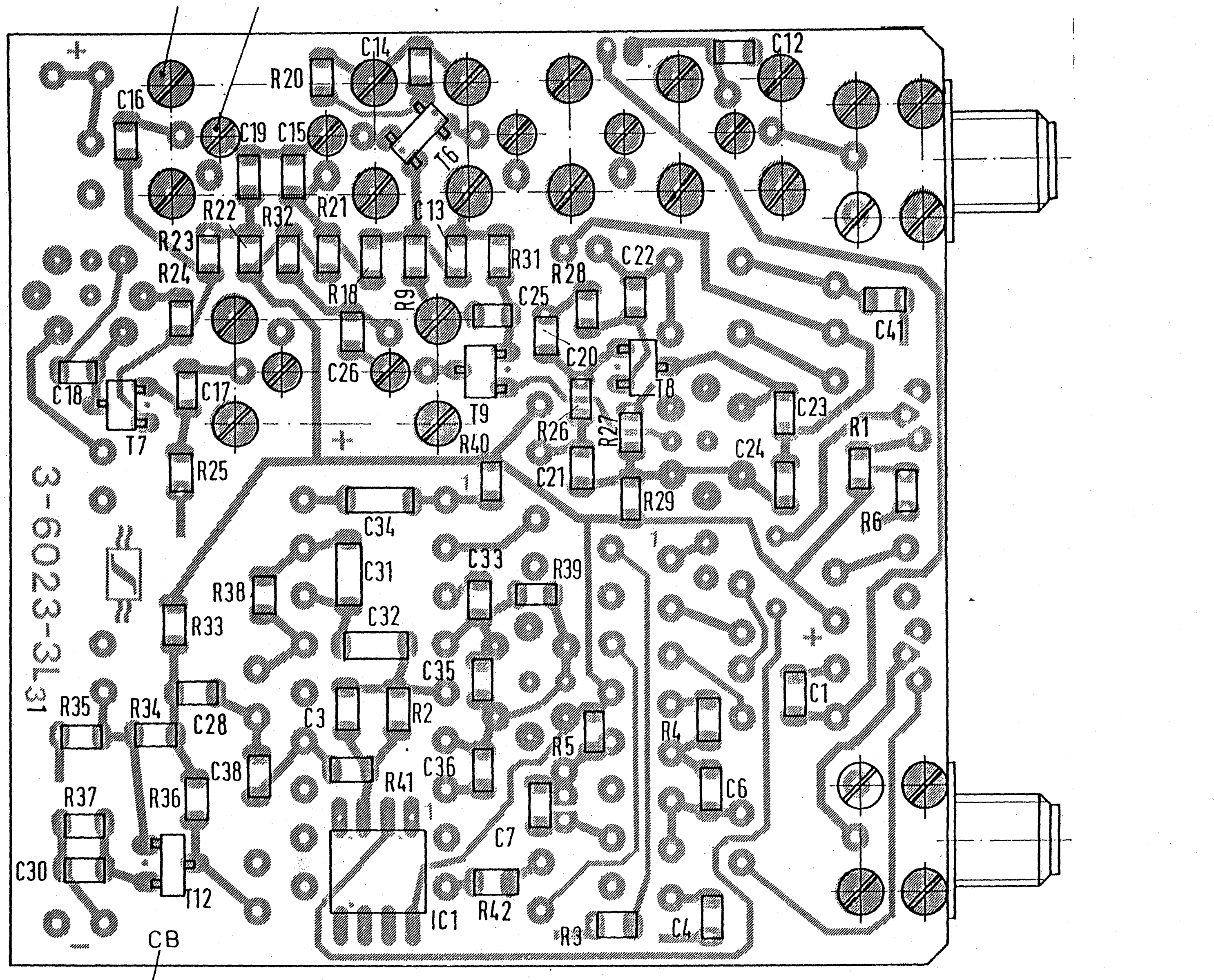
S 1	ON - OFF switch
S 2	channel selctor
BU 11	antenna socket 50 Ohm-input, can also be used for external supply (4.5 Volt)
BU 1	AF-output 40 mV - 1,55 V max. deviation
P 2	output voltage adustment
P 1	squelch adjustment (0 - 5 uV)
L 1, L 2, L 3	three circuit helix-input filter
T 6	RF-prestage transistor (MOS-FET)
L 4, L 5	two circuit helix filter
T 7	mixing transistor, emitter directly coupled to oscillator
T 8	oscillator transistor with quartz in the feed back cicuit
C 41, C 23, C 24, L 8	oscillating circuit
Q 1, Q 2	Quartz $f_Q = (f_e - 10.7\ \mathrm{MHz}) / 3$, $f_{Q1} < f_{Q2}$
Dr 2	internal compensation of quartz mounting
T 9, L 9, L 10	tripler with helix filter selection to avoid parallel recieving
L 6, C 18	oscillating circuit 10.7 MHz and inductive coupling mixer to ceramic filter F 1
F 1, F 2	ceramic filter 10.7 MHz
T 12	1. i.f. amplifier
IC 3	2. i.f. amplifier, limiting amplifier, demodulator, control voltage generation
L 7, C 35	phaseshifter, align to max. output voltage and min. THD
C 7, P 3, interner Widerstand IC 3	deemphasis 50 us
IC 2, C 39, P 3	RF-amplifier and expandor with capacitve coupling and amplifier adjustment
IC 1	squelch comperator,schaltet IC 2 quiet
T 1, T 2, T 3	reference voltage generation for multi vibrator 4.5 to 7.4 V
T 4, T 5, Tr 1	multi vibrator, converting frequency 50 KHz
C 9	avoids harmonics in the 10 MHz range
D 3, C 11, Dr 1, C 40	rectifier plus filter
D 2	dynamic stabilization of operating point, ensures defined switching of converter
D 4	reference voltage zener diode
D 1	operation control diode



Blockschaltbild EK 2012-90
Block Diagram EK 2012-90

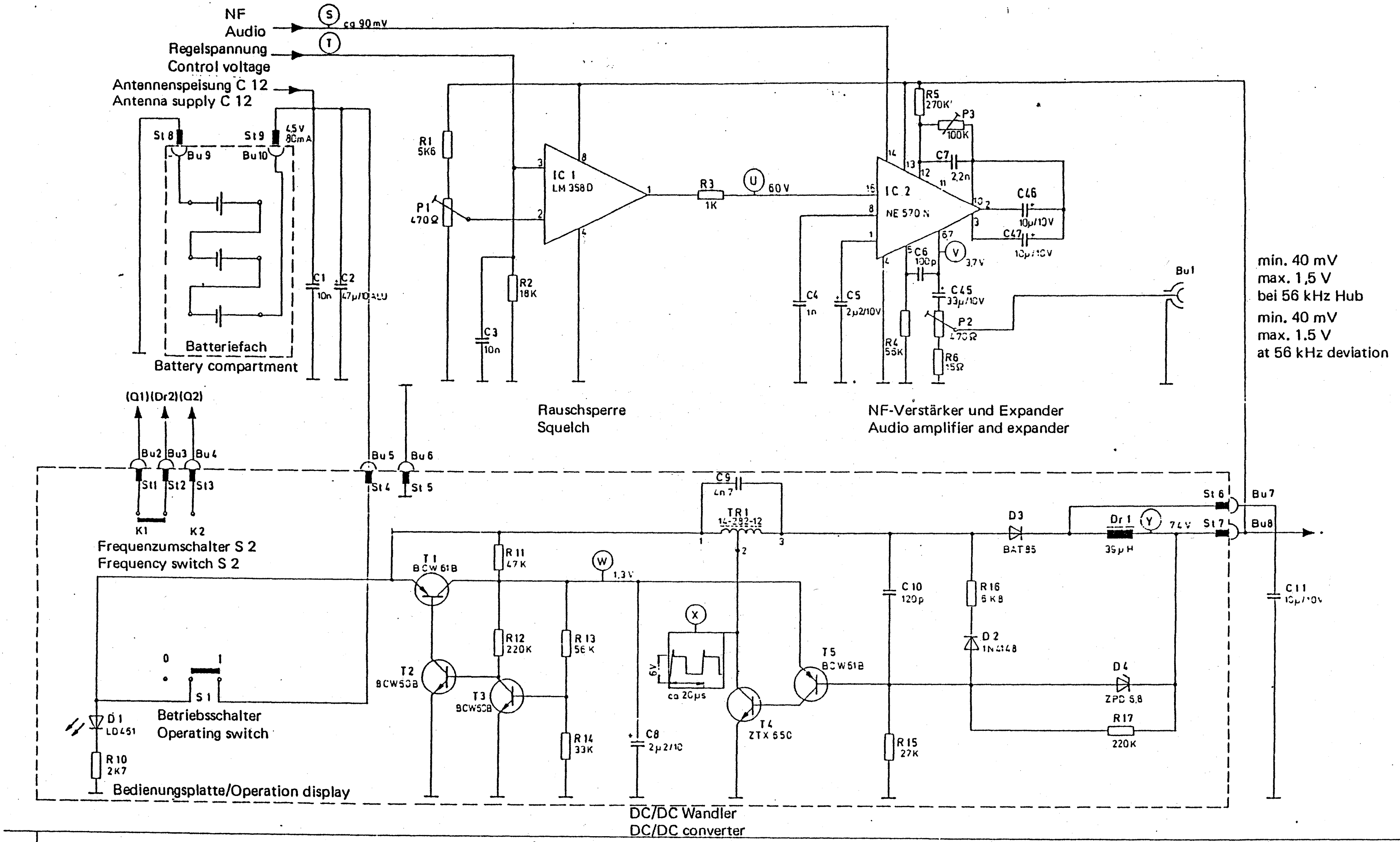


Gedruckte Schaltung 2012-90 (Bestückungsseite)
Printed circuit board EK 2012-90 (equipped side)



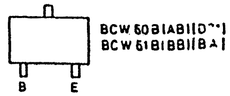
Code-Bezeichnung nach 7-742
ähnl. Mittelschrift 2 DIN 1451 geprägt
(Hier nur Beispiel)

Gedruckte Schaltung 2012-90 (Lötseite)
Printed circuit board EK 2012-90 (foil side)

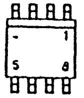


R 10 1 11 12 2 13 14 3 15 4 5 6 16 17 R

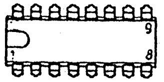
C 1 2 3 8 9 4 5 10 6 45 7 46 47 11 C



BCW 60 B (AB) (D 71)
BCW 61 B (BB) (BA)
(Draufsicht)
(top view)

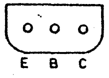


HSO 393 D



NE 570 N

ETU
Tantal

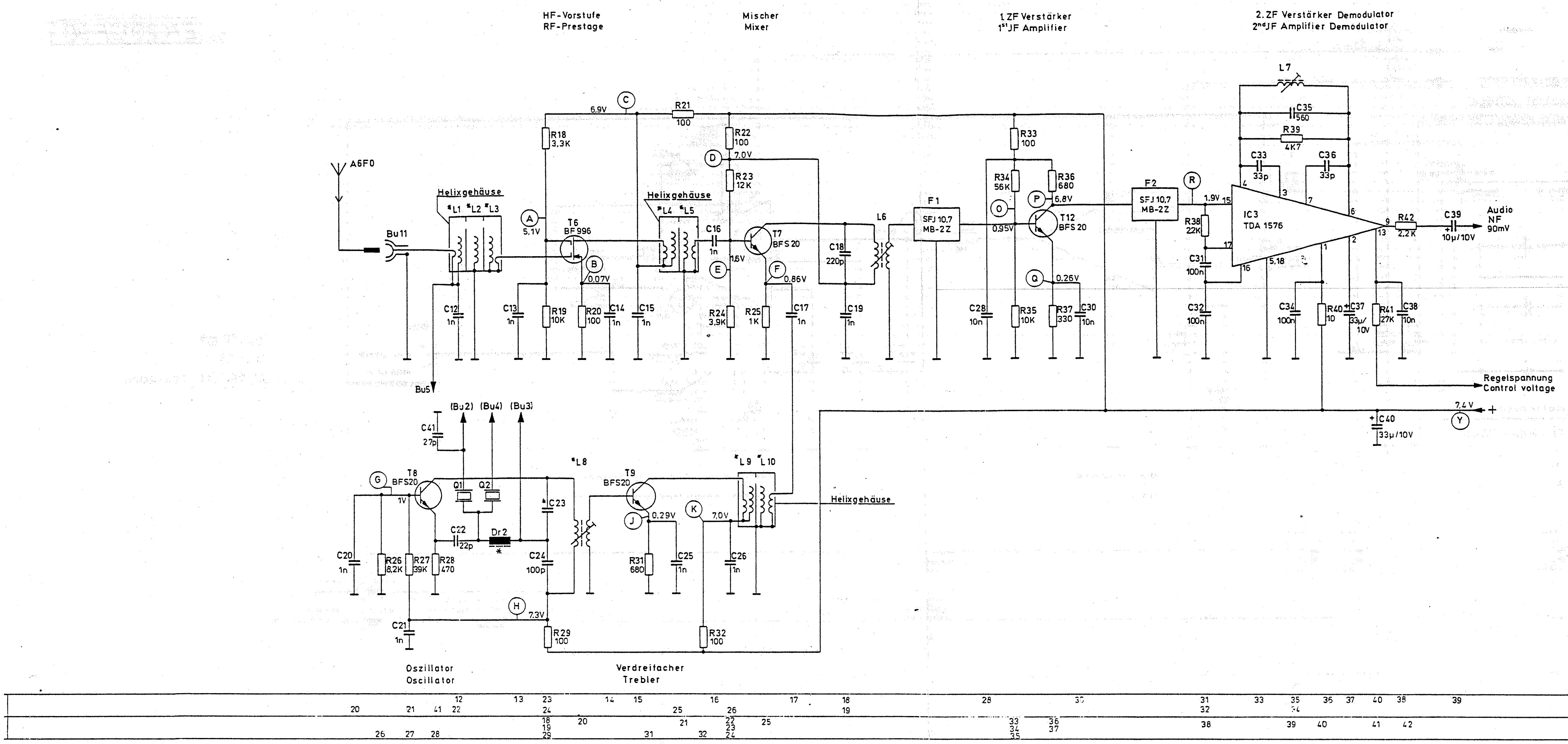


ZTX 650

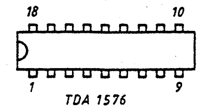
Alle Spannungen gemessen gegen Masse.
Gleichspannungen mit µA Multizet (R_i = 100 kΩ/V).
All voltages measured against ground.
DC-voltages with µA Multizet (R_i = 100 kΩ/V).

Stromlaufplan EK 2012-90 NF-Teil und Stromversorgung
Circuit diagram EK 2012-90 AF-section and power supply

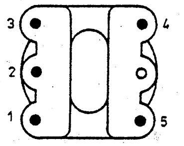
Typ EK 2012 F



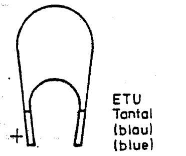
Bauteile * Components	Frequenzbereiche / Frequency ranges						
Frequenzbereich (MHz)	138 - 145	145 - 150	150 - 165	165 - 180	180 - 190	190 - 215	215 - 250
C 23	27p	33p	27p	27p	22p	15p	10p
L 1 ; L 3	14-327-11 G	14-327-11 G	14-327-11 F	14-327-11 E	14-327-11 D	14-327-11 C	14-327-11 A
L 2	14-327-1 W	14-327-1 W	14-327-1 V	14-327-1 U	14-327-1 T	14-327-1 S	14-327-1 R
L 4	14-327-12 G	14-327-12 G	14-327-12 F	14-327-12 E	14-327-12 D	14-327-12 C	14-327-12 A
L 5	14-327-11 G	14-327-11 H	14-327-11 F	14-327-11 E	14-327-11 D	14-327-11 C	14-327-11 A
L 8	14-283-48 A	14-283-48 A	14-283-48 A	14-283-48 B	14-283-48 B	14-283-48 B	14-283-48 B
L 9	14-327-11 H	14-327-11 H	14-327-11 G	14-327-11 F	14-327-11 E	14-327-11 D	14-327-11 B
L 10	14-327-12 H	14-327-12 J	14-327-12 G	14-327-12 F	14-327-12 E	14-327-12 D	14-327-12 B
Dr 2	1,8µ	1,8µ	1,5µ	1,2µ	1,0µ	0,82µ -	0,56µ



TDA 1576

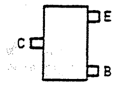


L6-L8
(Sockelseite)
(Baseview)

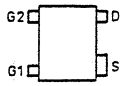


ETU
Tantal
(blau)
(blue)

Alle Spannungen gemessen gegen Masse..
Gleichspannungen mit µA Multizet [Ri=100KΩ
All voltages measured against ground
DC voltages with µA Multizet [R=100 KΩ/V]



BFS 20 (G1)
(Draufsicht)
(Topview)



BF996
(Draufsicht)
(Topview)

Stromlaufplan EK 2012 F 90 (HF-Teil)
Circuit diagram EK 2012 F 90 (RF-section)