Empfängerdaten		Receiver data		
Empfindlichkeit für		Sensitivity for		
12 dB SINAD	20/25 kHz PM	12 dB SINAD	20/25 kHz PM	-115 dBm → 0.4 µV
	20/25 kHz FM		20/25 kHz FM	-113 dBm → 0.5 µV
	12.5 kHz PM		12.5 kHz PM	-115 dBm → 0.4 µV
	12.5 kHz FM		12.5 kHz FM	-113 dBm → 0.5 µV
Nachbarkanalselektivität		Adjacent channel selectivity		
12.5 kHz		12.5 kHz		≥ 60 dB
20/25 kHz		20/25 kHz		≥ 70 dB
Nebenempfangsdämpfung		Spurious responses		≥ 70 dBµV EMK/EMF
IM-Festigkeit		IM stability		≥ 70 dBµV EMK/EMF
Blocking		Blocking		≥ 90 dBµV EMK/EMF
Störstrahlung		Spurious radiation		≤ 2 nW
Gleichkanalunterdrückung		Capture ratio		
12.5 kHz		12.5 kHz		≤-12 dB
20/25 kHz		20/25 kHz		≤- 8 dB
NF-Bereich		AF response		
12.5 kHz		12.5 kHz		300-2550 Hz
20/25 kHz		20/25 kHz		300-3000 Hz
NF-Ausgangsleistung max.		Max. AF output power		0.5 W/8 Ω
Klirrfaktor		Distortion factor		≤ 7 %
Geräuschabstand		Signal to noise ratio		≥ 40 dB

Caractéristiques récepteur		Caratteristiche di ricezione		
Sensibilité pour		Sensibilità		
12dB SINAD	20/25 kHz MP	12 dB SINAD	20/25 kHz MP	-115 dBm → 0.4 µV
	20/25 kHz MF		20/25 kHz MF	-113 dBm → 0.5 µV
	12.5 kHz MF		12.5 kHz MP	-115 dBm → 0.4 µV
	12.5 kHz MF		12.5 kHz MF	-113 dBm → 0.5 µV
Sélectivité du canal adjacent		Selettività di canali adiacenti		
12.5 kHz		12.5 kHz		≥ 60 dB
20/25 kHz		20/25 kHz		≥ 70 dB
Réponses parasites		Risposte parasite		≥ 70 dBµV FEM
Prot. contre l'intermodulation		Protezione contro l'intermod.		≥ 70 dBµV FEM
Désensibilisation		Desensibilisazione		≥ 90 dBµV FEM
Rayonnements non essentiels				≤ 2 nW
Protection sur voie utile		Soppr. del canale isofrequente		
12.5 kHz		12.5 kHz		≤-12 dB
20/25 kHz		20/25 kHz		≤- 8 dB
Réponse AF		Risposta AF		
12.5 kHz		12.5 kHz		300-2550 Hz
20/25 kHz		20/25 kHz		300-3000 Hz
Puissance de sortie AF max.		Potenza massima AF		0.5 W/8 Ω
Facteur de distorsion		Fattore di distorsione		≤ 7 %
Rapport signal sur bruit		Rapporto segnale/rumore		≥ 40 dB

ascom

Serviceanleitung SE 140
Documentation de maintenance SE 140
Maintenance documentation SE 140
Documentazione di servizio SE 140

80MHz
160MHz
460MHz

Ascom Radiocom AG
Ziegelmattstr. 1-15
CH-4503 Solothurn/Soleure
Tel. 065 24 26 26
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DK 119510 Art. 245462
E.061 Gedruckt in der Schweiz

Senderdaten	Transmitter data	
Frequenzbereich	Frequency range	146-174 MHz
Sendeleistung (progr.)	Transmission power (progr.)	1/2.5 W
Frequenzstabilität	Frequency stability	
12.5kHz	12.5kHz	+/-1.5 kHz
20kHz/25kHz	20kHz/25kHz	+/-2.0 kHz
Nachbarkanalleistung	Adjacent channel power	
12.5kHz	12.5kHz	≤-60 dBc
20kHz/25kHz	20kHz/25kHz	≤-70 dBc
Neben-, Oberwellen	Spurious emissions	≤0.25 µW
NF-Frequenzgang	AF frequency response	+1... -3 dB
Klirrfaktor bei	Distortion factor at	
60%Δfmax/1000Hz	60%Δfmax/1000Hz	≤ 7 %
Geräuschabstand	Signal to noise ratio	≥ 40 dB

Caractéristiques d'émission	Caratteristiche di trasmissione	
Plage des fréquences	Banda di frequenza	146-174 MHz
Puissance d'émission (prog.)	Potenza di trasmissione (prog.)	1/2.5 W
Stabilité en fréquence	Stabilità in frequenza	
12.5kHz	12.5kHz	+/-1.5 kHz
20kHz/25kHz	20kHz/25kHz	+/-2.0 kHz
Puissance dans voie adj.	Potenza nel canale adiacente	
12.5kHz	12.5kHz	≤-60 dBc
20kHz/25kHz	20kHz/25kHz	≤-70 dBc
Fréquences parasites/harm.	Frequenze parasite/armoniche	≤0.25 µW
Réponse AF	Risposta AF	+1...-3 dB
Facteur de distorsion à	Fattore di distorsione	
60%Δfmax/1000Hz	60%Δfmass/1000Hz	≤ 7 %
Rapport signal sur bruit	Rapporto segnale/rumore	≥ 40 dB

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Technische Daten	Technical Data	
Gerätebezeichnung	Designation	SE 140-162
Frequenzbereich	Frequency range	146-174 MHz
Schaltbreite	Switching range	28 MHz
Kanalabstand	Channel spacing	12.5 / 20 / 25 kHz
Kanalzahl	Number of channels	≤ 100
Betriebsarten	Operation modes	Simplex + Semiduplex + gemischt / mixed
Modulationsart	Type of modulation	FM oder/or PM
Frequenzaufbereitung	Frequency elaboration	Synthesizer
Temperaturbereich	Temperature range	
- datenhaltig	- within specifications	-25...+55 °C
- funktionstüchtig	- operational	-30...+60 °C
Speisespannung	Supply voltage	7.5 V (6.5...9 V)
Sendeleistung 1/2.5 W	RF power 1/2.5 W	Kanalabhängig / channel dependent
Parameterprogrammierung	Parameter programming	Kanalabhängig / channel dependent
Antennenanschluss	Antenna connection	M5 (optional TNC)
Gehäuseabmessungen	Casing dimensions	175 · 65 · 28 mm (600 mAh)
Höhe/Breite/Tiefe	Height/width/depth	190 · 65 · 31 mm (1000 mAh)
Gewicht Akku 600mAh	Weight accu 600mAh	460 g
Akku 1000mAh	accu 1000mAh	530 g
Farbe	Colour	grau/grey
Selektivruf	Selective call	ZVEI I/II, CCIR
Subaudio Tonsquelch CTCSS	Subaudio tone squelch CTCSS	EIA
Wasserfestigkeit	Water protection	≥ IP54

Caract. techniques	Caratteristiche tecniche	
Désignation	Designazione	SE 140-162
Plage de fréquences	Banda di frequenza	146-174 MHz
Plage de commutation	Banda di commutazione	28 MHz
Espacement des canaux	Spaziatura dei canali	12.5 / 20 / 25 kHz
Nombre de canaux	Numero di canali	≤ 100
Modes de fonctionnement	Tipi di servizio	Simplex + Semiduplex + comb.
Type de modulation	Tipi di modulazione	FM ou/o PM
Génération de fréquences	Generazione delle frequenze	Synthétiseur / Sintetizzatore
Plage de température	Gamma di temperatura	
- Spécifications maintenues	- Caratteristiche mantenute	-25...+55 °C
- Opérationnel	- Operazionale	-30...+60 °C
Tension d'alimentation	Tensione di alimentazione	7.5 V (6.5...9 V)
Puissance RF: 1W/2.5W	Potenza RF: 1W/2.5W	Dép. du canal / Dipendente dal canale
Programmation des paramètres	Programmazione dei parametri	Dép. du canal / Dipendente dal canale
Prise d'antenne	Connettore d'antenna	M5 (TNC en option / in opzione)
Dim. du boîtier avec accu	Dimensione, cassa con accu	175 · 65 · 28 mm (600 mAh)
Hauteur/largeur/profondeur	Altezza/larghezza/profondità	190 · 65 · 31 mm (1000 mAh)
Poids avec accu 600mAh	Peso con accu 600 mAh	460 g
accu 1000mAh	accu 1000 mAh	530 g
Couleur	Colore	gris / grigio
Appel sélectif	Chiamata selettiva	ZVEI I/II, CCIR
Squelch à tonalité CTCSS	Toni sub-audio CTCSS	EIA
Etanchéité à l'eau	Classe di protezione	≥ IP54

RF section

- Receiver - Double superheterodyne receiver with a 1st IF of 58.1 MHz and a 2nd IF of 455 kHz. The recovered AF signal and the squelch criterion are available behind the discriminator. The 2nd IF amplifier delivers the field strength criterion RSSI and a calibration signal for the squelch switching threshold.

- Transmitter - Controlled 3-stage amplifier. The gain is reduced if transmitter supply current raises above a set value.

- Frequency elaboration - Synthesizer with separate VCO's for transmitter and receiver. The externally generated reference frequency is 12.8 MHz. The modulation signal is applied directly to the transmitter VCO. A second modulation path via the loop filter is provided for low frequencies.

- Power supply - The battery voltage is regulated down to +6 V and +5 V by means of separate regulators. A converter clocked by a 307 kHz signal from the AF board produces +15 V.

AF section

The controller board carries the control processor (MC), the digital signal processor (DSP) and an application specific module (ASIC).

- Signal routing - The analog audio signal (from mike or recovered receiver AF) is led to the signal processor via A/D-converters in the ASIC. After specific processing this signal is routed, via D/A-converter in the ASIC, to the AF amplifier or, as modulation signal, to the transmitter.

Function summary:

MC: Main processor, controls data transfer between ASIC, digital signal processor and display driver. Converts serial data from I/O expander on th RF board into parallel data.

DSP: Tone encoding and decoding. Audio processing: pre-emphasis, de-emphasis.

ASIC: Generation of the system clock
Polling of keyboard and accessory connector
Audio interface towards DSP
Interface between MC, DSP and RF board
Port expander of the MC for control of external perpherics
Generation of the 307 kHz clock for the DC/DC converter
Generation of the modulation pulse width

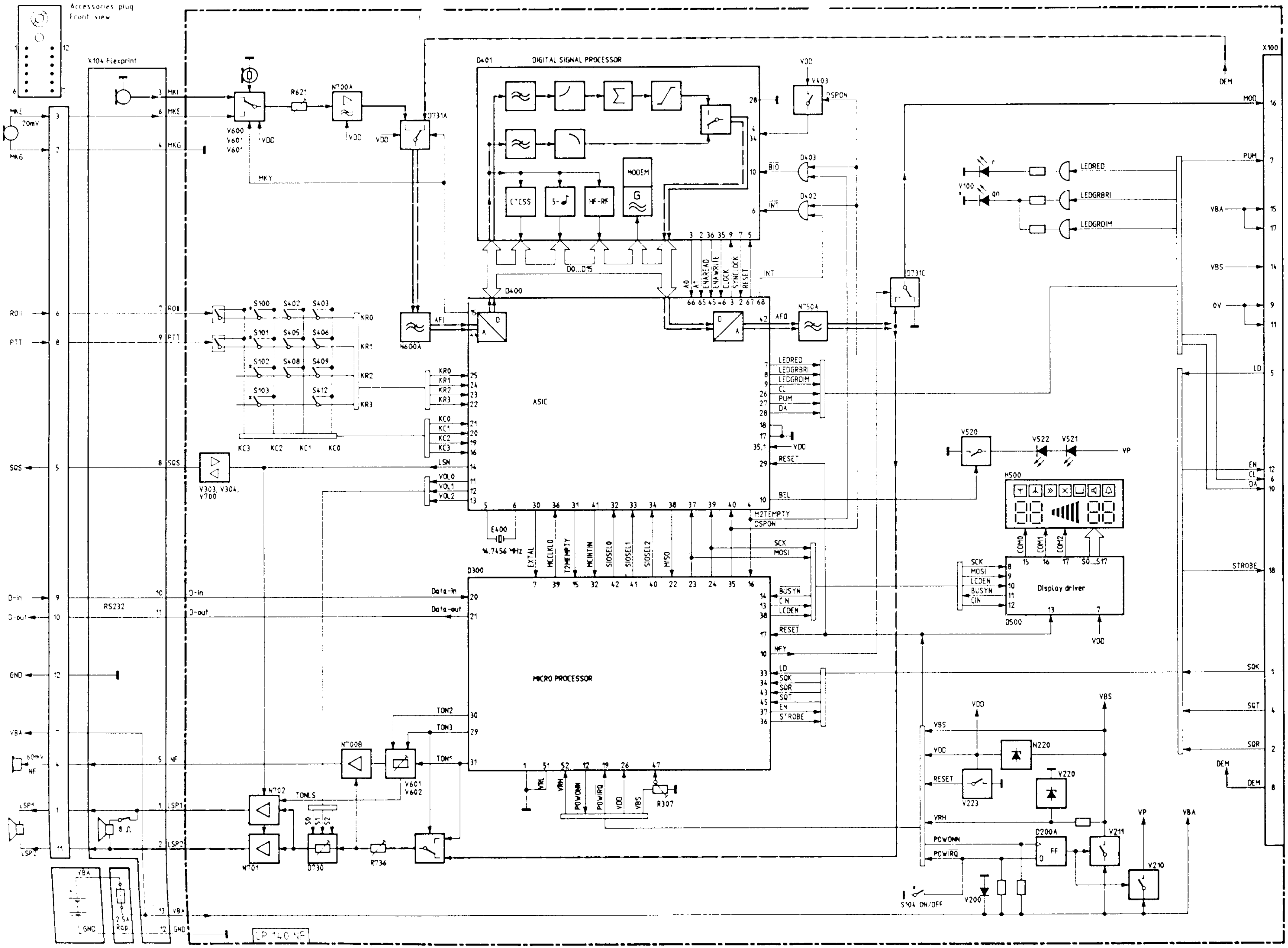
Mean current consumption

Receive, stand-by, DSP in sleep mode:	**approx.**	**45 mA**
Receive, with Δf nominal, volume level 5:	**approx.**	**220 mA**
Transmit, with 2.5 W (1 W) RF power:	**approx.**	**1.2 (0.8) A**

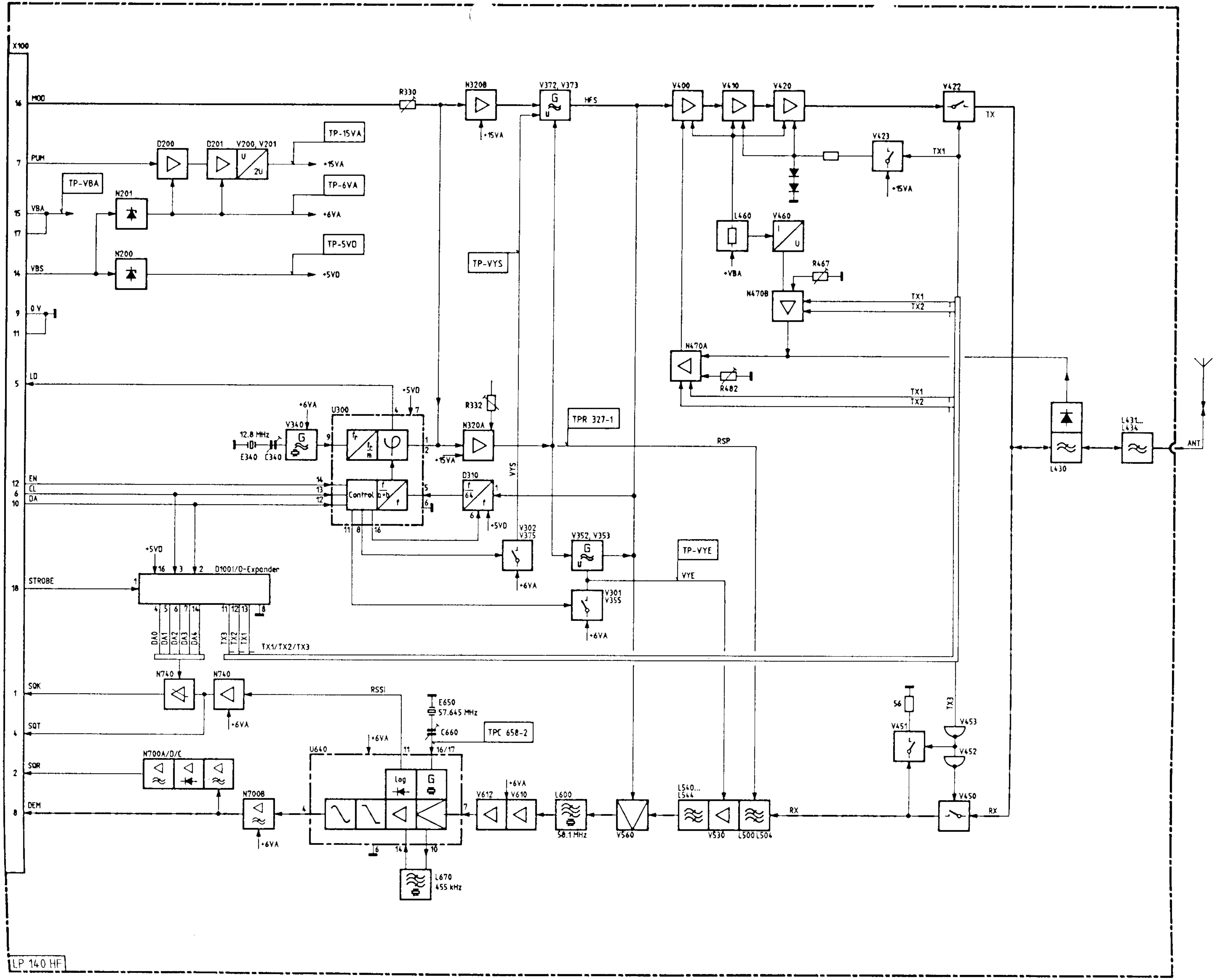
Pin	Signal	Definition	Standard values
1	LSP1	Ground-free connection of an external speaker	Z = ≥ 8 Ω
11	LSP2	A magnet in the connector disables int. speaker	U = 1.55...1.85 V
2	MKG	Mike ground, internally connected to GND	
3	MKE	Hot mike line with superposed supply voltage for electret microphones	U = ≤ 30 mV for Δfmax/ 2.5 to 3.5 VDC
4	NF	AF output (independent of volume setting) with superposed "power-on" criterion for accessory	U = approx. 60 mV/for Δfnom 4.8 to 5.2 VDC
5	SQS	Squelch, as input on channels without CTCSS/SC decoder (opens internal speaker)	Active with ≤100 Ω to GND
		as output (ext. amplifier control)	Mute = 4 to 5 VDC Active = open (open collector)
6	ROII	External call key II	Active with ≤100 Ω to GND
7	VBA	Battery + as power supply I = ≤200 mA	U = 6.5 to 9 V, fuse 2.5 A
		as battery charge input	Charge current = ≤2 A
8	PTT	External transmit key	Active with ≤100 Ω to ground
9	D-IN	Data input/output for programming/cloning	RS 232 with 5 V level
10	D-OUT		
12	GND	Battery - casing ground	
13	ANT	External antenna connector and switch-over	Z = 50 Ω

Criterion	Tuning element	Test signal value	Test signal on point	To be measured value	To be measured on point	Test tool/ Instrument	Remarks
•Frequency deviation	R330	1 kHz/ 200 mV	MKE	2.0...2.3 kHz	ANT	IPP-, PAG-,	12.5 kHz channel
				3.2...3.6 kHz	ANT	PK-, VK-140	20 kHz spacing
				4.0...4.5 kHz	ANT		25 kHz
				3.2...3.6 kHz	ANT		20/25kHz
	R332			10...20%Δfmax	ANT	CTCSS 100Hz	Mike off
•Microphone sensitivity	R621	94 dB/ 1 kHz	at mike	60...90%Δfmax	ANT	Sound gen. B&K 4230	
•Reference frequency	C340			f TX	ANT		
•Control voltage	L352/ L372			>2...<12 V all channels	TPR 327-1	DVM	On transmit and receive
•RF power	R482			2.5 ± 0.5 W (6.5 V)	ANT	Wattmeter	Be sure that setting is not affected by R467
•TX current limiter	R467			set so that RF power is just not reduced			
•Local oscillator	C660			57.645 MHz	TPC 658-2	FET probe	
•AF volume (level 5)	R736	RF mod. 1kHzΔfnom	ANT	1.55...1.85 V		PAG	(8 Ω speaker) Measured on volume level 5 !
•Low battery indicator	R307			set threshold to 6.4...6.6 V	Battery	PAG	Test interval = 10 sec.

Set deviation when using SE 140 in 20 kHz networks; calibrate squelch with IPP after RF board replacements.

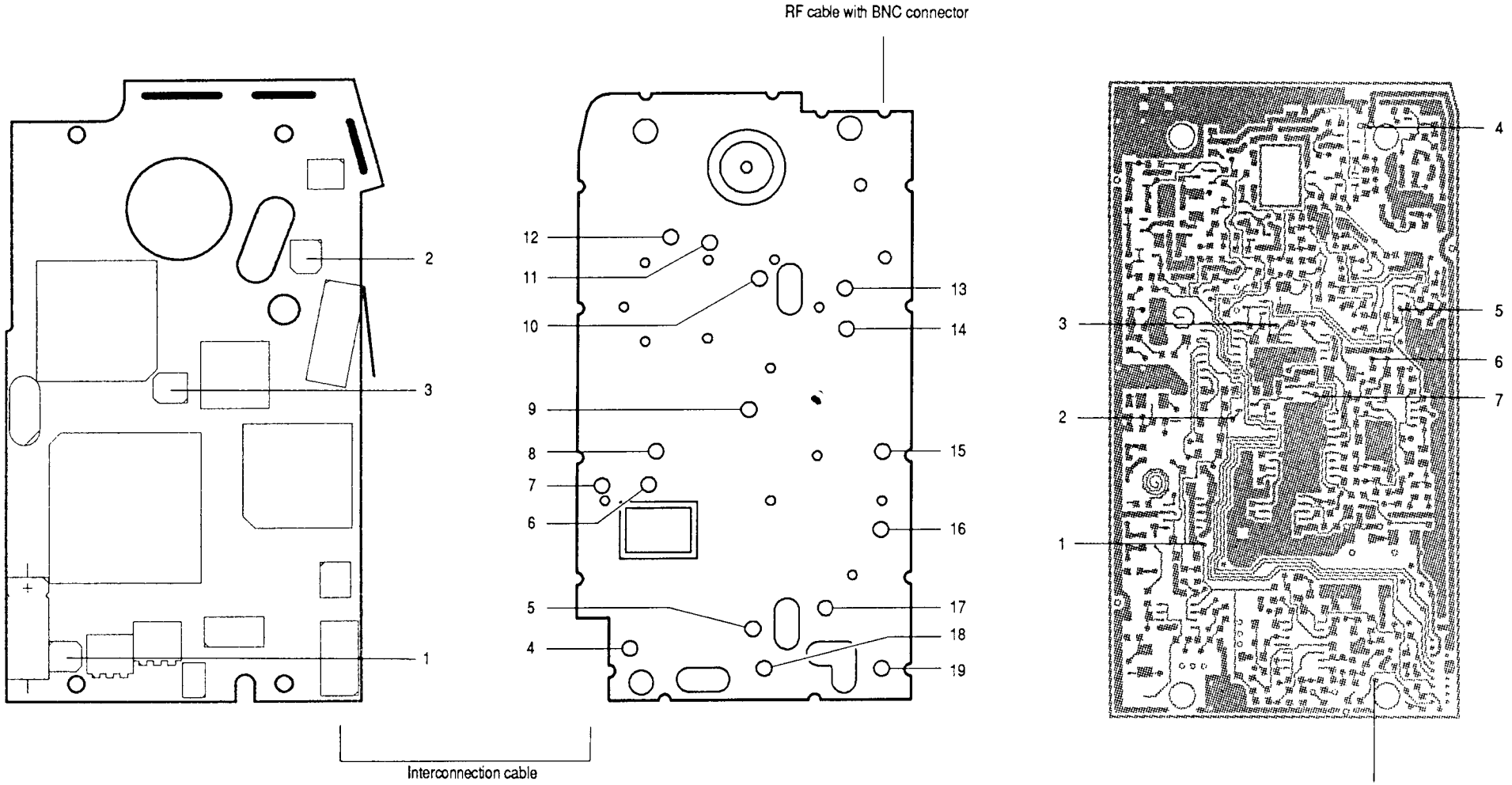


Accessories plug
Front view
X104 Flexprint
X100
DIGITAL SIGNAL PROCESSOR
D401
MODEM
CTCSS
HF-RF
D400
ASIC
MICRO PROCESSOR
D300
Display driver
D500
H500
E400
14.7456 MHz
RS232
S104 ON/OFF
LP 140 NF



X100
MOD
PUM
VBA
VBS
0 V
LD
EN
CL
DA
STROBE
SQK
SQT
SQR
DEM
R330
N320B
V372, V373
HFS
V400
V410
V420
V422
TX
V423
TX1
D200
D201
V200, V201
TP-15VA
+15VA
TP-6VA
+6VA
TP-5VD
+5VD
TP-VBA
N201
N200
TP-VYS
L460
V460
+VBA
R467
N470B
TX2
N470A
R482
L430
L431...
L434
ANT
U300
V340
12.8 MHz
E340
C340
N320A
R332
TPR 327-1
RSP
Control
D310
VYS
V302
V375
V352, V353
TP-VYE
VYE
V301
V355
D100 I/O-Expander
DA0
DA1
DA2
DA3
DA4
TX3
TX1/TX2/TX3
N740
RSSI
E650
57.645 MHz
C660
TPC 658-2
U640
Log
N700A/D/C
N700B
V612
V610
L600
58.1 MHz
V560
L540...
L544
V530
L500 L504
RX
S6
V451
V453
V452
V450
L670
455 kHz

LP 140 HF



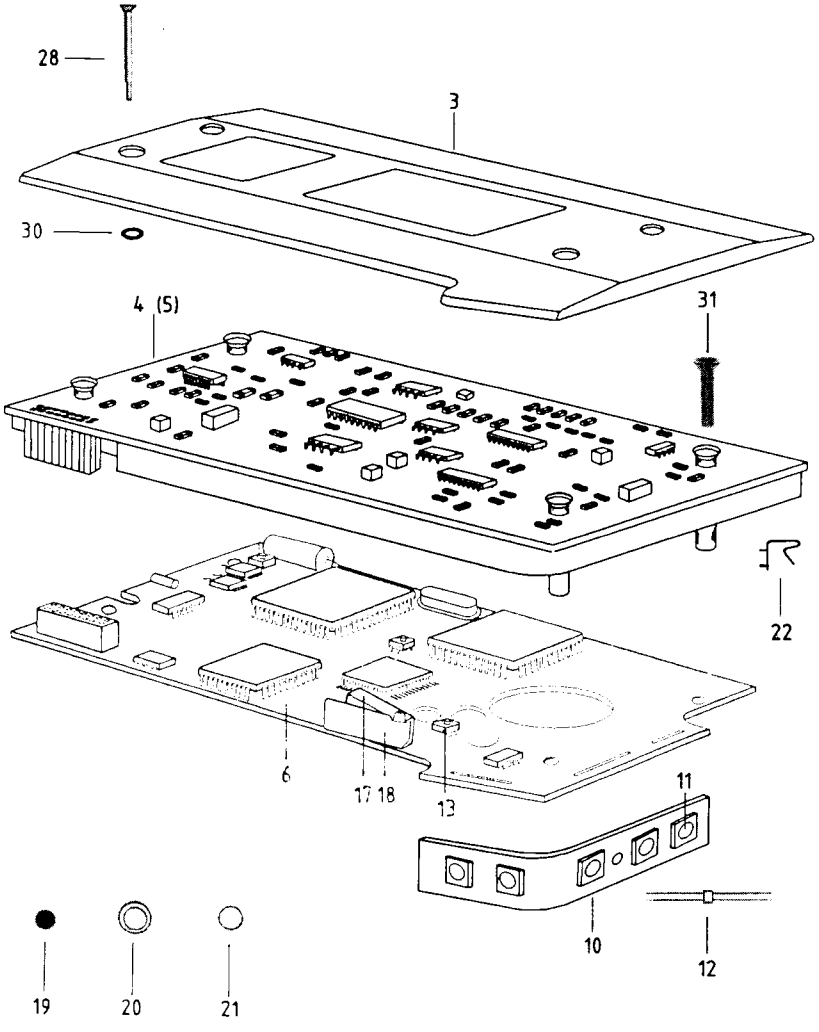
Tuning elements

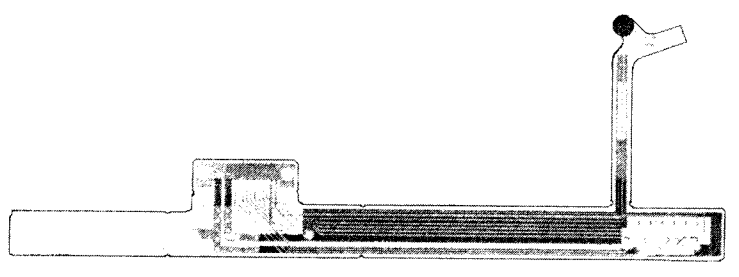
1 - R736 Speaker volume
2 - R621 Mike sensitivity
3 - R307 Low bat. indicator
4 - C660 Local oscillator, 57.645 MHz
5 - L682 Discriminator
6 - R332 Freq. deviation (100 Hz)
7 - R330 Freq. deviation (1000 Hz)
8 - L372 Transmitter VCO
9 - L352 Receiver VCO
10 - C340 Reference oscillator
11 - R482 TX output power
12 - R467 TX current limiter
13 - L500 RX filter
14 - L504 RX filter
15 - L540 RX filter
16 - L544 RX filter
17 - L602 1st IF filter
18 - L601 1st IF filter
19 - L560 Mixer circuit

Test points

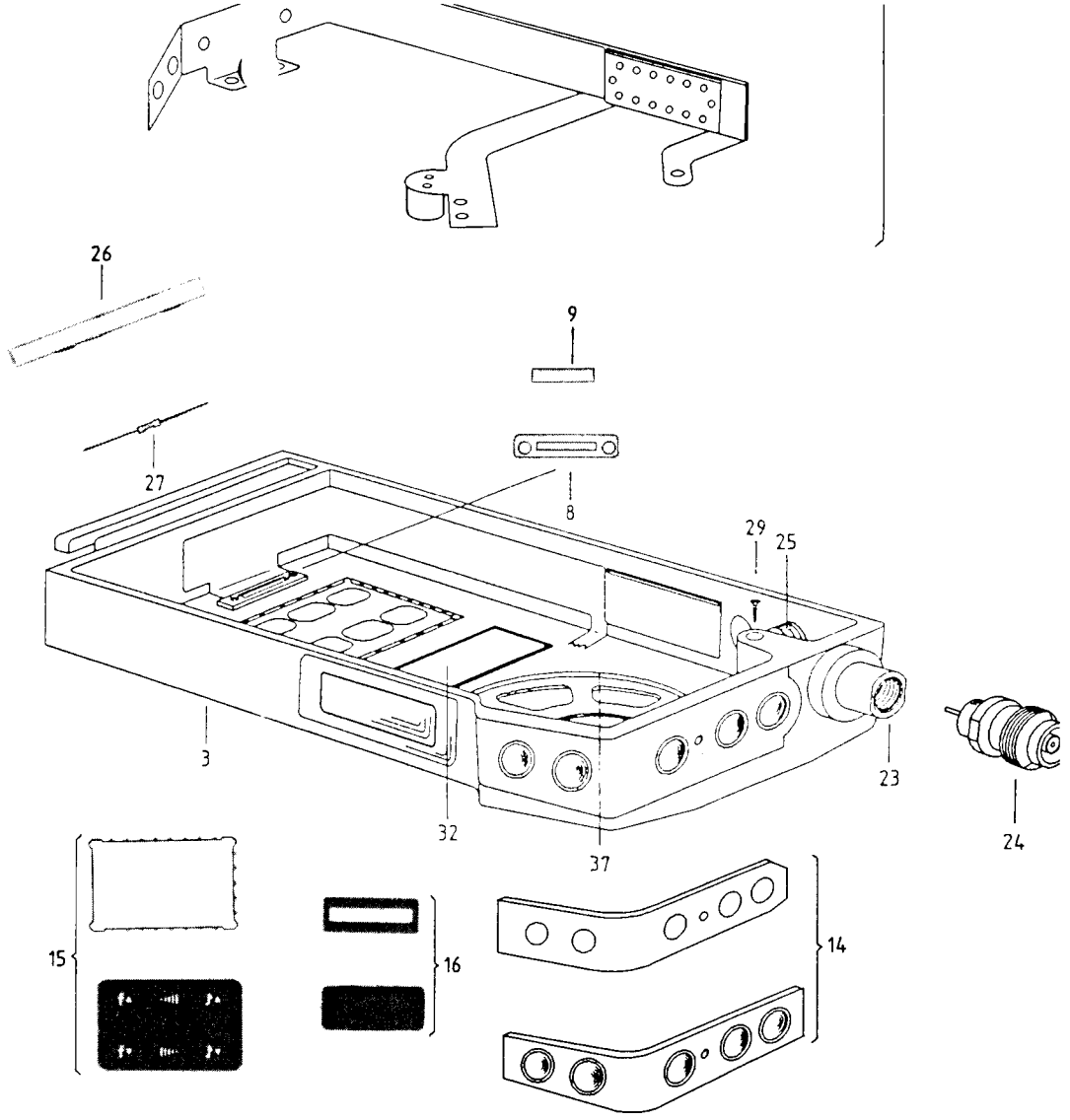
1 - TP-6VA (6.0 V ±5%)
2 - TP VYE (5.8 V ±10%)
3 - TP-5VD (5.0 V ±5%)
4 - TP-VBA (battery voltage)
5 - TP-15VA (15 V ±10%)
6 - TPR 327-1 (>2...<12 V)
7 - TP-VYS (5.8 V ±10%)
8 - TPC 658-2 (57.645 MHz)

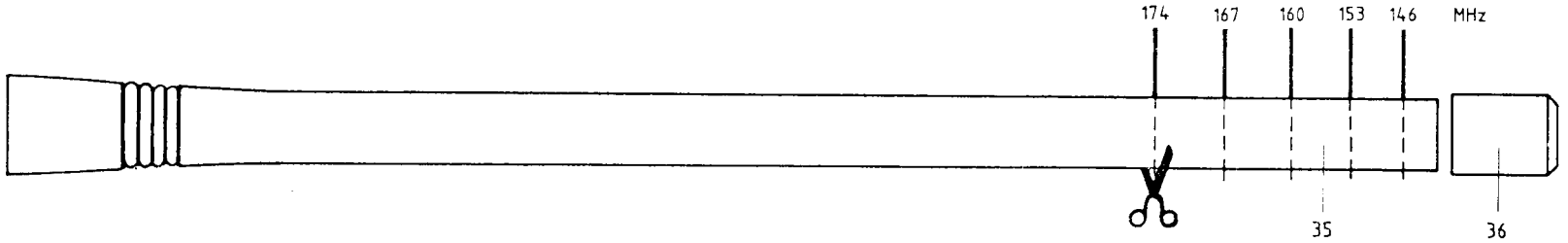
Pos.	Bezeichnung	Description	Art. No
1	SE 140 komplett (20/25 kHz)	SE 140 complete (20/25 kHz)	243804
2	SE 140 komplett (12.5 kHz)	SE 140 complete (12.5 kHz)	244845
3	Gehäuse vormontiert (inkl. Deckel und Lautsprecher)	Casing preassembled (with cover + speaker)	243551
4	HF-Platine VHF-20/25 kHz	RF board VHF-20/25 kHz	242152
5	HF-Platine VHF-12.5 kHz	RF board VHF-12.5 kHz	243057
6	NF-Platine	AF board	243127
7	Flexprint komplett inkl. Mikrofon	Flexprint assembled with microphone	245349
8	Halter zu Verbinder	Clip for connecting element	243471
9	Verbinder	Connecting element	243794
10	Schalterplatte komplett zu Kopftastatur	Switch board, head keys	243684
11	Schalter einzeln	Single switch	243683
12	LED einzeln	Single LED	243425
13	Potentiometer	Potentiometer	242521
14	Kopftastatur (Gummikappe und Halter)	Head keyboard with insert	243790
15	Fronttastatur (Gummikappe und Halter)	Front keyboard with insert	245350
16	Sendetaste (Gummikappe und Halter)	PTT key with insert	243789
17	Microswitch	Microswitch	243404
18	Bügel zu Microswitch	Switch lever	244316
19	Mikrofon	Microphone	243544
20	Mikrofonhalter	Microphone holder	243470
21	Sieb ø 6,8 mm zu Mikrofon	Dust filter for microphone	243418
22	Antennenkontakt (auf HF-Platine)	Antenna contact (on RF board)	241820
23	Antennenbuchse M5	Antenna connector M5	241822
24	Antennenbuchse TNC 50 Ω (Option)	Antenna connector TNC 50 Ω (optional)	244843
25	Antennenumschalter	Antenna switch-over	243777
26	Akkukontaktplatte komplett	Battery contact board complete	243791
27	Sicherung 2.5 A flink	Fuse 2.5 A quick blow	243932
28	Gehäuseschraube M2.5x25 Torx	Casing screw M2.5x25 Torx	243658
29	Kombi-Torx-Schraube M2.5x5	Combi-Torx screw M2.5x5	210287
30	O-Ring 1.78x2.57mm	O-ring 1.78x2.57mm	244354
31	Distanzhalter	Spacer	241825
32	LCD-Fenster	Display window	241791
33	Silikon RTV3140 (Tube, Lagerzeit 6 Monate)	Silicone RTV3140 (storage time 6 month)	171663
34	Gysocolle für Antennenkappe	Gysocolle glue for antenna cap	114246
35	Antenne A 140-W16	Antenna A 140-W16	243901
36	Antennenkappe	Antenna cap	246470
37	Lautsprecher	Loudspeaker	243545
38	Akkumulator AK 140S600	Accumulator AK 140S600	243823-1
39	Akkumulator AK 140S1000	Accumulator AK 140S1000	244836
40	Clip zu Gehäusedeckel	Clip for casing cover	190552





Pos.	Désignation	Designazione	Art. No
1	SE 140 complet (20/25 kHz)	SE 140 completo (20/25 kHz)	243804
2	SE 140 complet (12.5 kHz)	SE 140 completo (12.5 kHz)	244845
3	Boîtier prémonté (incl. couvercle et haut-parleur)	Cassa montaggio (con coperta e altoparlante)	243551
4	Circuit imprimé RF (VHF-20/25 kHz)	Circuito stampato RF VHF-20/25 kHz	242152
5	Circuit imprimé RF (VHF-12.5 kHz)	Circuito stampato RF VHF-12.5 kHz	243057
6	Circuit imprimé AF	Circuito stampato AF	243127
7	Circuit souple monté, complet avec microphone	Circuito flessibile completo con microfono	245349
8	Support pour élément de connexion	Sostegno por pos. 9	243471
9	Elément de connexion	Elemento di collegamento	243794
10	Platine des commutateurs	Circuito dei commutatori	243684
11	Commutateur seul	Commutatore	243683
12	LED pour clavier face sup.	LED (tastiera faccia superiore)	243425
13	Potentiomètre	Potenziometro	242521
14	Clavier face sup. complet	Tastiera faccia superiore	243790
15	Clavier frontal complet	Tastiera frontale completa	245350
16	Touche d'émission complète	Tasto di trasmissione completo	243789
17	Microcommutateur	Microcommutatore	243404
18	Languette pour microcommutateur	Linguetta per microcomm.	244316
19	Microphone	Microfono	243544
20	Support du microphone	Incastro del microfono	243470
21	Filtre ø 6,8 mm pour microphone	Filtro per microfono	243418
22	Contact d'antenne (sur platine RF)	Contatto antenna (su circuito RF)	241820
23	Connecteur d'antenne M5	Connettore d'antenna M5	241822
24	Connecteur d'antenne TNC 50 Ω (option)	Connettore d'antenna TNC 50 Ω (opzione)	244843
25	Commutateur d'antenne	Commutatore dell'antenna	243777
26	Contact d'accumulateur complet	Collegamento dell'accumulatore	243791
27	Fusible 2.5 A rapide	Fusibile 2.5 A rapido	243932
28	Vis Torx M2.5x25 pour boîtier	Vite Torx M2.5x25 per cassa	243658
29	Vis Kombi-Torx M2.5x5mm	Vite Kombi-Torx M2.5x5mm	210287
30	Joint O 1.78x2.57mm	Guarnizione O 1.78x2.57mm	244354
31	Entretoise	Spaziatore	241825
32	Fenêtre pour LCD	Apertura per LCD	241791
33	Silicone RTV3140 (conservation: 6 mois)	Silicone RTV3140 (cons. 6 mesi)	171663
34	Gysocolle pour coiffe d'antenne	Gysocolle per cappuccio d'antenna	114246
35	Antenne A 140-W16	Antenna A 140-W16	243901
36	Coiffe d'antenne	Cappuccio d'antenna	246470
37	Haut-parleur	Altoparlante	243545
38	Accumulateur AK 140S600	Accumulatore AK 140S600	243823-1
39	Accumulateur AK 140S1000	Accumulatore AK 140S1000	244836
40	Clip pour couvercle du boîtier	Clip per coperta della cassa	190552





Antennkappe mit Gysocolle Pos. 34 aufkleben.
Coller le capuchon d'antenne à l'aide de Gysocolle pos. 34.
Incollare il cappuccio dell'antennna con la Gysocolle pos. 34.
Secure the antenna cap with Gysocolle glue pos. 34.