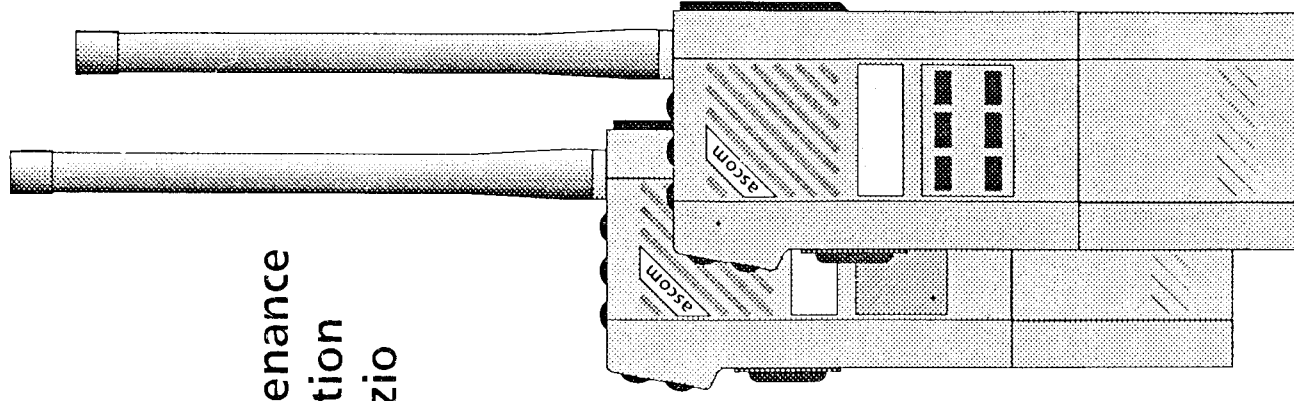


asccon. Radio equipment for professionals

SE 110/140

Serviceanleitung
 Documentation de maintenance
 Maintenance documentation
 Documentazione di servizio

80 MHz
 160 MHz
 430/460 MHz



Empfängerdaten	Receiver data
Frequenzbereich	Unter(lower)-band 400...440 MHz Ober(upper)-band 430...470 MHz
Schaltbandbreite	30 MHz
Empfindlichkeit (12 dB SINAD)	PM : 0.4 µV (-115 dBm) FM : 0.5 µV (-113 dBm)
Nachbarkanalselektivität	12.5 kHz : ≥ 60 dB 20 / 25 kHz : ≥ 70 dB
Nebenempfangsdämpfung	≥ 70 dB
Intermodulationsfestigkeit	≥ 70 dBµV (EMK/EMF)
Blocking	≥ 90 dBµV (EMK/EMF)
Störstrahlung	100 kHz ... 1 GHz : ≤ 2 nW 1 GHz ... 4 GHz : ≤ 20 nW
Gleichkanalunterdrückung	12.5 kHz : ≥ -12 dB 20 / 25 kHz : ≥ -8 dB
NF-Bereich	12.5 kHz : 300 ... 2550 Hz 20 / 25 kHz : 300 ... 3000 Hz
NF-Frequenzgang	-3 ... +1 dB
NF-Ausgangsleistung (max)	≥ 500 mW / 8 Ohm
Klirrfaktor (1kHz/60% Δf)	≤ 7 %
Geräuschabstand	≥ 40 dB psoph.

Caractéristiques récepteur	Caratteristiche di ricezione
Plage des fréquences	Bande(a) inf. 400...440 MHz Bande(a) sup. 430...470 MHz
Plage de commutation	30 MHz
Sensibilité (12 dB SINAD)	PM : 0.4 µV (-115 dBm) FM : 0.5 µV (-113 dBm)
Sélectivité du canal adjacent	12.5 kHz : ≥ 60 dB 20 / 25 kHz : ≥ 70 dB
Réponses parasites	≥ 70 dB
Prot. contre l'intermodulation	≥ 70 dBµV (FEM)
Désensibilisation	≥ 90 dBµV (FEM)
Rayonnements non essentiels	100 kHz ... 1 GHz : ≤ 2 nW 1 GHz ... 4 GHz : ≤ 20 nW
Protection sur la voie utile	12.5 kHz : ≥ -12 dB 20 / 25 kHz : ≥ -8 dB
Plage AF	12.5 kHz : 300 ... 2550 Hz 20 / 25 kHz : 300 ... 3000 Hz
Réponse AF	-3 ... +1 dB
Puissance de sortie AF (max)	≥ 500 mW / 8 Ohm
Distorsion (1kHz/60% Δf)	≤ 7 %
Geräuschabstand	≥ 40 dB psoph.

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Art. 50245463

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Senderdaten	Transmitter data
Frequenzbereich	Unter(lower)-band Ober(upper)-band 400...440 MHz 430...470 MHz
Schaltbandbreite	30 MHz
Sendeleistung	1.0 / 2.5 W
Frequenzstabilität	12.5/20/25 kHz : ± 2.5 kHz 12.5 kHz/0...+30°C : ± 1.5 kHz
Nachbarkanalleistung	12.5 kHz : ≤ -60 dBc 20 / 25 kHz : ≤ -70 dBc
Unerwünschte Ausstrahlungen	100 kHz ... 1 GHz : ≤ 0.25 µW 1 GHz ... 4 GHz : ≤ 1 µW
NF-Bereich	12.5 kHz : 300 ... 2550 Hz 20 / 25 kHz : 300 ... 3000 Hz
NF-Frequenzgang	-3 ... +1 dB
Modulationsempfindlichkeit	ca 8 mV / 60 % Δf
Klirrfaktor (1kHz/60% Δf)	≤ 7 %
Geräuschabstand	≥ 40 dB psoph.

Caractéristiques d'émission	Caratteristiche di trasmissione
Plage des fréquences	Bande(a) inf. Bande(a) sup 400...440 MHz 430...470 MHz
Plage de commutation	30 MHz
Puissance d'émission	1.0 / 2.5 W
Stabilité en fréquence	12.5/20/25 kHz : ± 2.5 kHz 12.5 kHz/0...+30°C : ± 1.5 kHz
Puissance dans voie adjacente	12.5 kHz : ≤ -60 dBc 20 / 25 kHz : ≤ -70 dBc
Fréquences parasites/harm.	100 kHz ... 1 GHz : ≤ 0.25 µW 1 GHz ... 4 GHz : ≤ 1 µW
Plage AF	20 / 25 kHz : 300 ... 2550 Hz 20 / 25 kHz : 300 ... 3000 Hz
Réponse AF	-3 ... +1 dB
Sensibilité de modulation	ca 8 mV / 60 % Δf
Distortion (1kHz/60% Δf)	≤ 7 %
Rapport signal sur bruit	≥ 40 dB psoph.

Typische Werte. Die Daten entsprechen den Vorschriften CEPT TR 24 / ETSI. Wo Daten durch die CEPT/ETSI-Vorschriften bestimmt sind, werden auch die jeweils vorgeschriebenen Messmethoden und Toleranzen angewendet. Ascom Radiocom AG behält sich das Recht vor, jederzeit und ohne Voranmeldung Änderungen, die dem technischen Fortschritt dienen, vorzunehmen.

Valeurs typiques. Les caractéristiques correspondent aux prescriptions CEPT TR 24 / ETSI. Lorsque les données sont fixées par la CEPT/ETSI, les méthodes de mesure et les tolérances prescrites en l'occurrence sont utilisées. Ascom Radiocom AG se réserve le droit d'adapter sans préavis ses produits aux améliorations techniques.

Valori tipici. I dati corrispondono alle normative CEPT TR 24 / ETSI. Laddove i dati sono stabiliti da normative CEPT/ETSI, vengono utilizzati ogni volta anche i metodi di misura e le tolleranze prescritti. Ascom Radiocom AG si riserva il diritto di eseguire in qualsiasi momento e senza preavviso le modifiche necessarie per miglioramenti tecnici.

Typical values. The above listed data conforms to CEPT TR 24/ETSI regulations. In all cases where CEPT/ETSI data applies, the prescribed test methods and tolerances were employed. Ascom Radiocom AG reserves the right of applying changes and modifications at any time without prior notice

Allgemeine Daten	Technical data
Gerätebezeichnung	Designation SE 110 - 432 Ober(upper)-band SE 140 - 432 SE 110 - 462 SE 140 - 432 SE 140 - 462 400...440 MHz 430...470 MHz SE XXX - XXX - 1 : 12.5 kHz SE XXX - XXX - 2 : 20 / 25 kHz SE 110 : 6 SE 140 : 100
Frequenzbereich	Frequency range
Kanalabstand	Channel spacing
Kanalzahl	Number of channels
Betriebsarten	Operation modes
Modulationsart	Type of modulation FM / PM
Frequenzaufbereitung	Synthesizer (PLL)
Frequenzauflösung	Frequency resolution 5.0 / 6.25 kHz
Parameterprogrammierung	kanalabhängig / channel dependent
Temperaturbereich	Temperature range - within specs - operational -20 C ... +55 C -25 C ... +60 C
- datenhaltig	
- funktionstüchtig	
Speisespannung	Supply voltage 7.5 V nom. (6.5 ... 9.0 V)
Antennenanschluss	Antenna connector M5 (optional TNC)
Gehäuseabmessungen (H/B/T)	Dimensions (h/w/d) 600 mAh : 175 x 65 x 28 mm 1000 mAh : 190 x 65 x 31 mm
Gewicht	Weight 600 mAh : 460 gr 1000 mAh : 530 gr
Farbe	Color grau / grey
Selektivruf	Selective call ZVEI I+II / CCIR
Tonsquelch	CTCSS EIA
Wasserfestigkeit	Water protection ≥ IP 54

Caractéristiques techniques	Caratteristiche tecniche
Désignation	Designazione Bande(a) inf. Bande(a) sup. SE 110 - 432 SE 110 - 462 SE 140 - 432 SE 140 - 462 400...440 MHz 430...470 MHz SE XXX - XXX - 1 : 12.5 kHz SE XXX - XXX - 2 : 20 / 25 kHz SE 110 : 6 SE 140 : 100
Plage de fréquences	Banda di frequenza
Espacement des canaux	Spaziatura dei canali
Nombre de canaux	Numero di canali
Modes de fonctionnement	Tipi di servizio
Type de modulation	Tipi di modulazione FM / PM
Génération des fréquences	Generazione delle frequenze Synthésiseur/Sintetizzatore (PLL)
Résolution de fréquence	Resoluzione di frequenza 5.0 / 6.25 kHz
Programmation des paramètres	Programmazione parametri Dép. du canal/Dip. del canale
Plage de température	Gamma di temperatura - caractéristique maintenue - opérationnelle -20 C ... +55 C -25 C ... +60 C
- spécifications maintenues	
- opérationnel	
Tension d'alimentation	Tensione di alimentazione 7.5 V nom. (6.5 ... 9.0 V)
Prise d'antenne	Connettore d'antenna M5 (TNC en option/in opzione))
Dimensions du boîtier (h/l/p)	Dimensione (a//p) 600 mAh : 175 x 65 x 28 mm 1000 mAh : 190 x 65 x 31 mm
Poids	Peso 600 mAh : 460 gr 1000 mAh : 530 gr
Couleur	Colore gris/ grigio
Appel sélectif	Chiamata selettiva ZVEI I+II / CCIR
Squelch à tonalité CTCSS	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 effective forward power is held constant.
- Frequency synthesis - Synthesizer with separate VCO's for transmitter and receiver. The reference frequency of 12.8 MHz is generated by a TCXO. 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 +5.8 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 converter 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 the 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 accessories plug
 Audio interface towards DSP
 Interface between MC, DSP and RF board
 Port expander of the MC for control of external peripherals
 Generation of the 307 kHz clock for the DC/DC converter
 Generation of the modulation pulse width

Mean current consumption

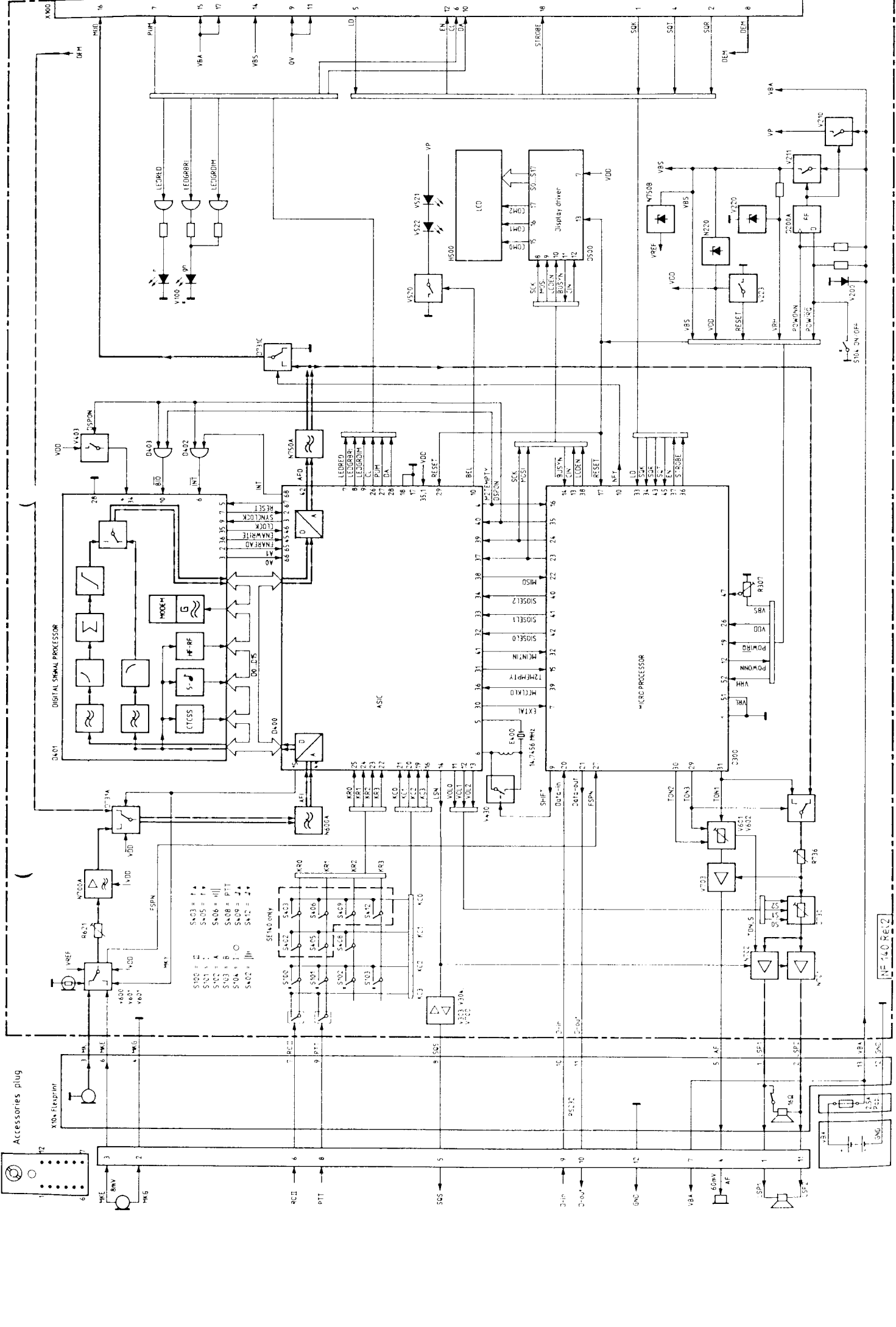
Receive, stand-by, DSP in sleep mode: approx. 48 mA
 Receive, with Af nominal, volume level 5: approx. 220 mA
 Transmit, with 2.5 W (1 W) RF power: approx. 1.2 (0.8) A

Signals to accessories p. 2 and tuning summary

Pin	Signal	Definition	Standard values (typ)
1	LSP1	Ground-free connections of an external speaker	Z = 28 Ω
11	LSP2	A magnet in the connector disables internal speaker DO NOT SHORT SPEAKER CONNECTIONS TO GROUND	U = 2 V _{eff} at 60%Δf _{max} and volume level 6
2	MKG	Mike ground, internally connected to GND	U = 8 mV _{eff} for 60%Δf _{max} / 2.5 to 3.5 VDC
3	MKE	Hot mike line with superposed supply voltage for electret microphones	U = 60 mV _{eff} for 60%Δf _{max} / 4.8 to 5.2 VDC
4	AF	AF output (independent of volume setting) with superposed "power-on" criterion for accessory	Active with ≤100 Ω to GND
5	SQS	Squelch, as input on channels without CTCSS or SC decoder (opens internal speaker)	Active with ≤100 Ω to GND
6	ROI1	External call key II	U = 6.5 to 9 V, fuse 2.5 A
7	VBA	Battery +, as power supply, I ≤200 mA as battery charge input	Charge current ≤2 A
8	PTT	External transmit key	Active with ≤100Ω to GND
9	D-IN	Data input for programming/cloning	RS 232 with 5 V level
10	D-OUT	Data output for programming/cloning	RS 232 with 5 V level
12	GND	Battery -, casing ground	
13	ANT	External antenna connector and switch-over	Z = 50 Ω

Criterion	Tuning point	Test signal		To be measured on point	Test tool/instrument	Remarks
		value	on point			
Reg. 5.8 V voltage	8			5.8±0.1 V	DVM	
Peak freq. deviation Δf _{max}	7	1 kHz/ 200 mV	MKE or MIK on PAG 140	2.0...2.3 kHz 3.2...3.6 kHz 4.0...4.5 kHz	PAG 140 and Δf meter	12.5 kHz 20 kHz 25 kHz
Microphone sensitivity	2	94dB/1kHz	internal at mike	0..20%Δf _{max} 60..90%Δf _{max}		Mike off no AF mod
Reference frequency	4			fTX	Counter	
Tuning voltage	5(TX) 9(RX)			>2...<12 V	DVM	All channels
RF power	12			2.5±0.5 W	Wattmeter	
Local osc.	20			57.645 MHz	FET probe	
AF volume (level 6)	1	RF mod./ 1kHzΔf _{nom}	31/ANT	2 V _{eff} ±5%	PAG and DVM	8Ω load! Vol. level 6
Low battery indicator	3			set threshold to 6.4...6.6 V	Battery PAG and DVM	Test inter- val ≥10 s

Calibrate squelch with IPP after RF board replacement.

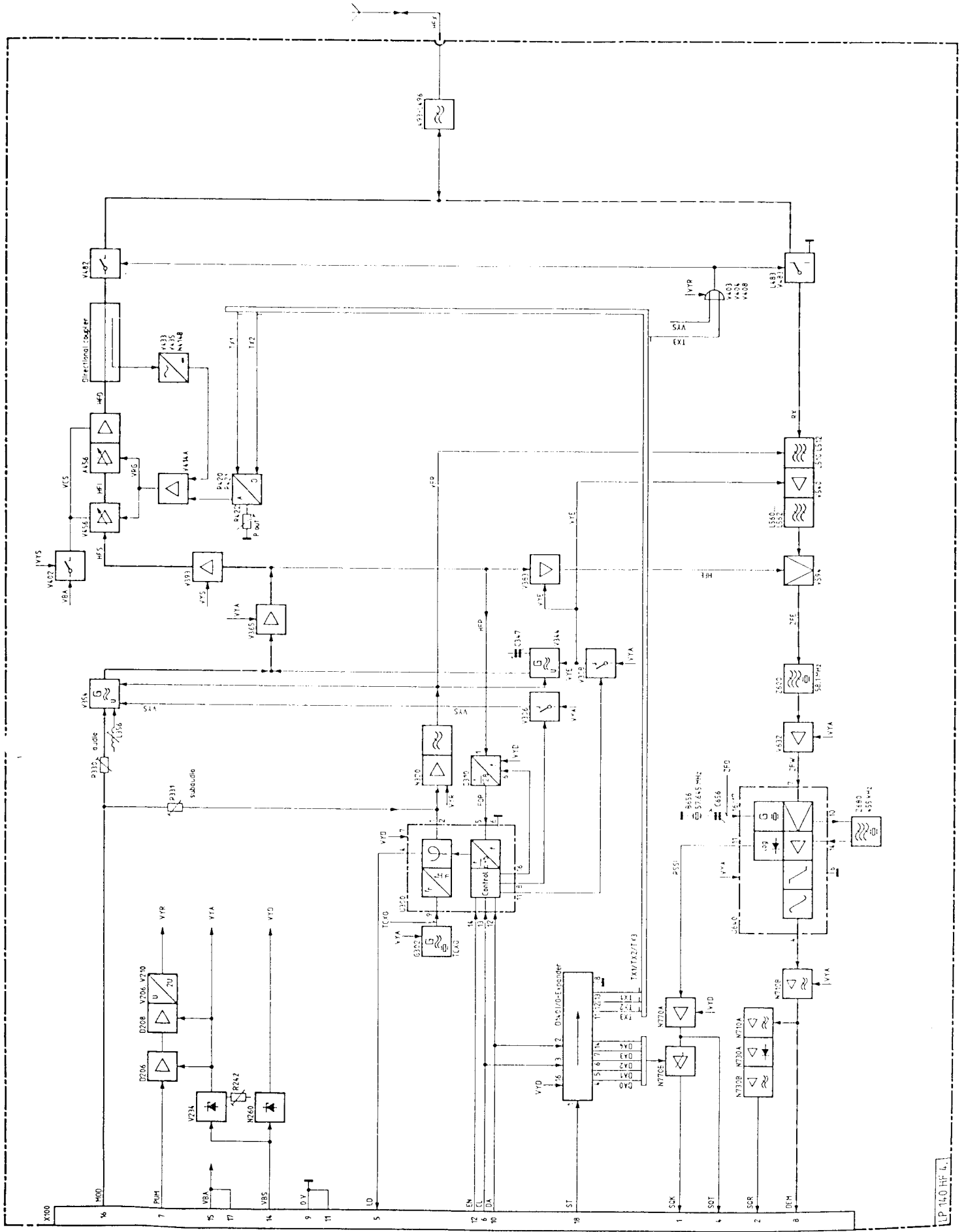


S100 = II
 S101 = I
 S102 = A
 S103 = B
 S104 = I/O
 S105 = II
 S106 = I
 S107 = II
 S108 = BT
 S109 = I
 S110 = II

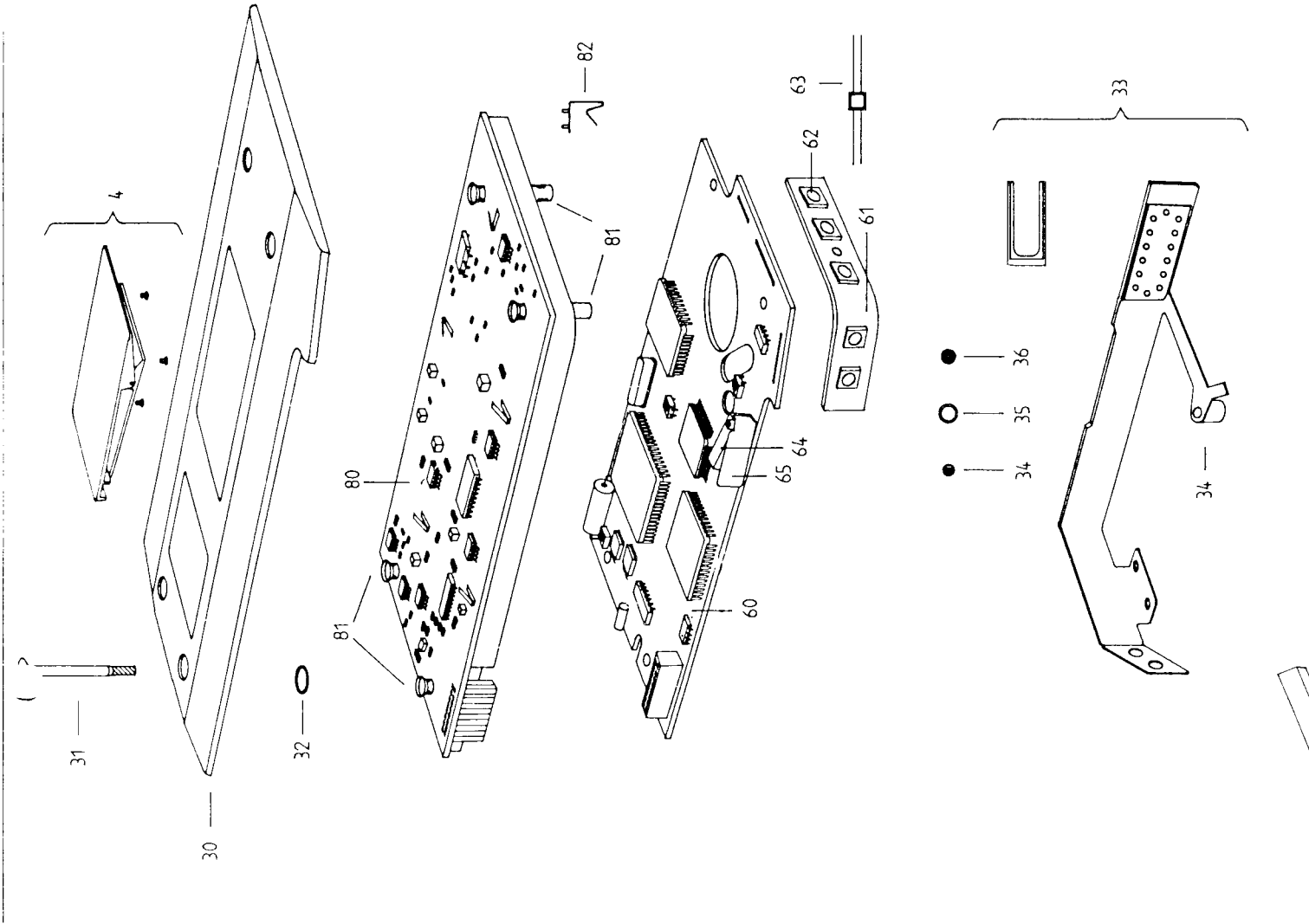
S100 = I
 S101 = I
 S102 = A
 S103 = B
 S104 = I/O
 S105 = II
 S106 = I
 S107 = II
 S108 = BT
 S109 = I
 S110 = II

S100 = I
 S101 = I
 S102 = A
 S103 = B
 S104 = I/O
 S105 = II
 S106 = I
 S107 = II
 S108 = BT
 S109 = I
 S110 = II

MF 140 Rev 2

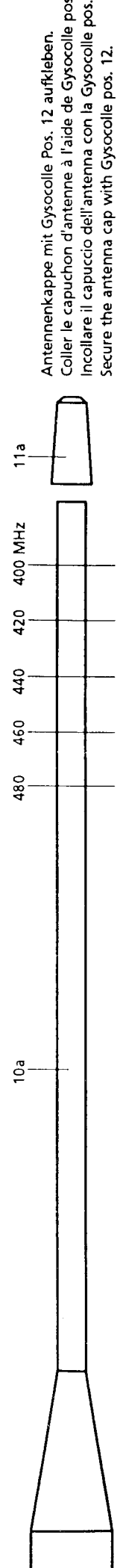


Pos.	Bauteilbezeichnung	Component description	Art./Part no.	
			SE 110	SE 140
1	VHF 70 cm Geräte komplett	VHF 70cm radios, complete		
1a	Unterband 12.5 kHz (...432-1)	lower band 12.5 kHz (...432-1)	249724	244847
1b	Unterband 20/25 kHz (...432-2)	lower band 20/25 kHz (...432-2)	249725	244846
1c	Oberband 12.5 kHz (...462-1)	upper band 12.5 kHz (...462-1)	249726	244849
1d	Oberband 20/25 kHz (...462-2)	upper band 20/25 kHz (...462-2)	249727	244848
2	Schraube, M2.5x5 Torx	Screw, M2.5x5 Torx	210287	
3	Abdeckkappe für Zubehörstecker	Cover for accessories plug	244844	
4*	Clip-Set zu Gehäusedeckel	Clip set for casing cover	249319	
10	Antennen	Antennas		
10a	A140-V46 (λ/4) mit Kappe	A140-V46 (λ/4) incl. cap	243904	
10b*	A140-W46 (Wendel) mit Kappe	A140-W46 (Helix) incl. cap	243903	
11a	Kappe zu A140-V46	Cap for A140-V46	246471	
11b	Kappe zu A140-W46	Cap for A140-W46	246470	
12	Gysocolle-Kleber zu Kappe	Gysocolle glue for cap	114246	
20	Akkumulatoren	Accumulators		
20a	AK140-S600 (600mAh)	AK140-S600 (600mAh)	243823-1	
20b	AK140-S1000 (1000mAh)	AK140-S1000 (1000 mAh)	244836	
30	Gehäuse vormontiert	Casing preassembled	249728	243551
31	Schraube, M2.5x25 Torx	Screw, M2.5x25 Torx	243658	
32	O-Dichtungsring	O-Seal	244354	
33	Flexprint, inkl. Mikro	Flexprint, incl. mike	245349	
34	Mikrofon	Microphone	243544	
35	Mikrofonhalter	Microphone holder	243470	
36	Straubsieb zu Mikrofon	Dust filter for microphone	243418	
37	Akkukontakte, komplett	Accu contacts, complete	243791	
38	Sicherung 2.5 A flink	Fuse 2.5 A fast	243932	
39	Verbinder	Connector	243794	
40	Halter zu Verbinder	Clip for connector	243471	
41a	Antennenbuchse M5	Antenna connector M5	241822	
41b*	Antennenbuchse TNC 50 Ohm	Antenna connector TNC 50 ohms	244843	
42	Antennenumschalter	Antenna switch-over	243777	
43	Lautsprecher	Loudspeaker	243545	
44	Anzeige-Fenster	Display window	241791	
45	Silikon RTV3140	Silicone RTV3140	1-1663	245350
46	Fronttasten mit Halter	Front keys with insert	243789	
47	Sendetaste mit Halter	PTT key with insert	243790	
48	Kopftasten mit Halter	Head keys with insert	243790	
60	NF Baugruppe	AF board	243127-3	243127-1
61	Kopftastatur	Head keyboard	243684	
62	Drucktaste	Single switch	243683	
63	LED, zweifarbig	LED, bi-color	243425	
64	PTT-Taste (Microswitch)	PTT switch (microswitch)	243404	
65	Bügel zu PTT-Taste	Lever for PTT switch	244316	
80	HF Baugruppen UHF 70 cm	RF boards UHF 70 cm		
80a	Unterband, 12.5 kHz (...432-1)	lower band, 12.5 kHz (...432-1)	246142	
80b	Unterband, 20/25 kHz (...432-2)	lower band, 20/25 kHz (...432-2)	246141	
80c	Oberband, 12.5 kHz (...462-1)	upper band, 12.5 kHz (...462-1)	245921	
80d	Oberband, 20/25 kHz (...462-2)	upper band, 20/25 kHz (...462-2)	245881	
81	Distanzhalter	Spacer	241825	
82	Antennenfeder	Antenna contact	241820	
*	Option	Option		

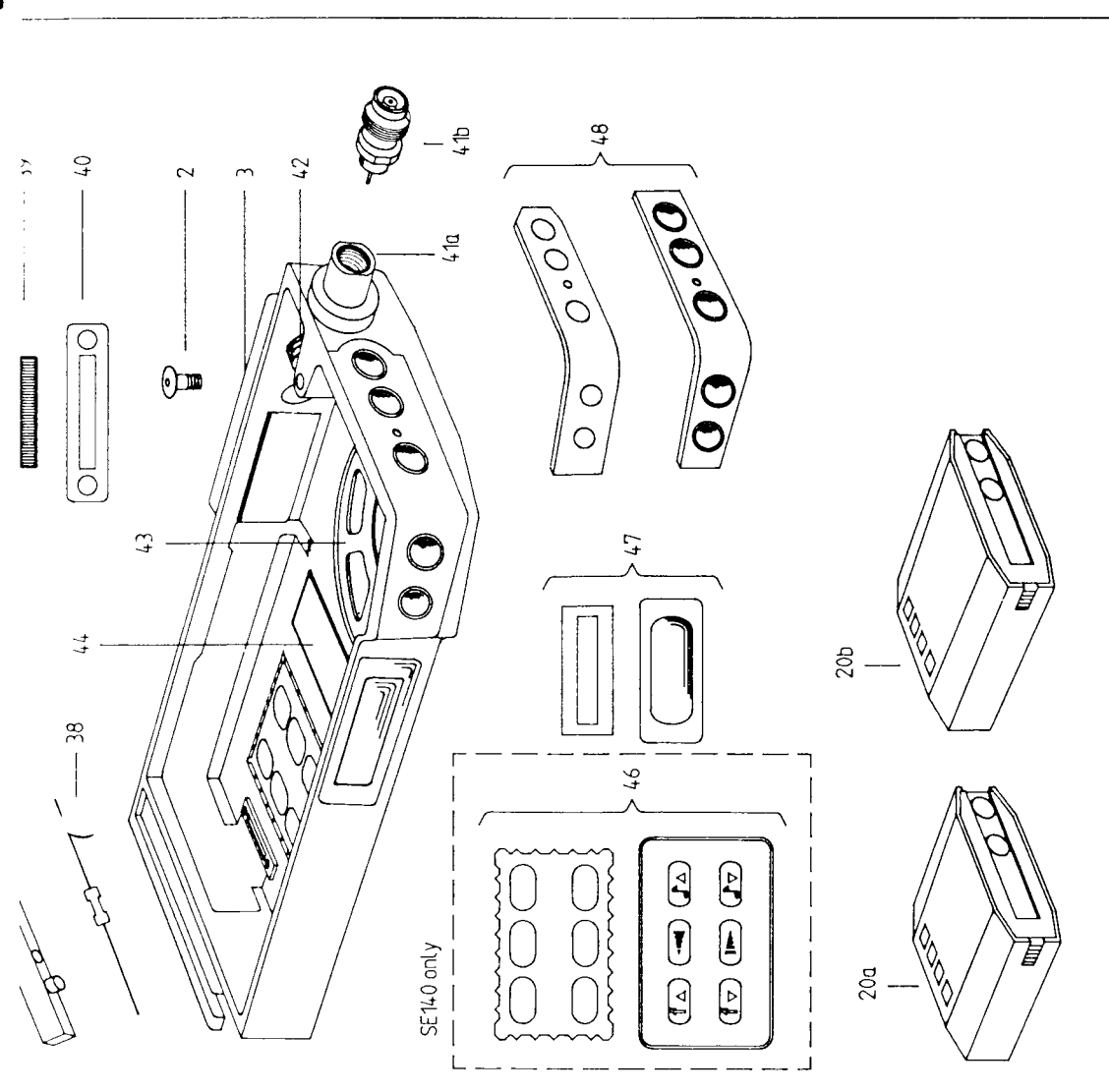


1	UHF / U cm appareil complet	UHF / U cm apparecchio completo	
1a	Bande inf. 12.5 kHz (...432-1)	Banda inf. 12.5 kHz (...432-1)	244847
1b	Bande inf. 20/25 kHz (...432-2)	Banda inf. 20/25 kHz (...432-2)	244846
1c	Bande sup. 12.5 kHz (...462-1)	Banda sup. 12.5 kHz (...462-1)	244849
1d	Bande sup. 20/25 kHz (...462-2)	Banda sup. 20/25 kHz (...462-2)	244848
2	Vis, M2.5x5 Torx	Vita, M2.5x5 Torx	210287
3	Couvercle, prise d'accessoires	Protezione, presa accessori	244844
4*	Clip pour couvercle du boîtier	Clip per coperta della cassa	249319
10	Antennes	Antenne	
10a	A140-V46 (3/4) avec coiffe	A140-V46 con cappuccio	243904
10b*	A140-W46 (hélic.) avec coiffe	A140-W46 con cappuccio	243903
11a	Coiffe pour A140-V46	Cappuccio per A140-V46	246471
11b	Coiffe pour A140-W46	Cappuccio per A140-W46	246470
12	Gysocolle pour coiffe	Gysocolle per cappuccio	114246
20	Accumulateurs	Accumulatori	
20a	AK140-S600 (600mAh)	AK140-S600 (600mAh)	243823-1
20b	AK140-S1000 (1000mAh)	AK140-S1000 (1000 mAh)	244836
30	Boîtier pré-monté	Cassa montaggio	249728
31	Vis, M2.5x25 Torx	Vita, M2.5x25 Torx	243658
32	Joint O	Guarnizione	244354
33	Circuit souple avec micro	Circ. flessibile completo	245349
34	Microphone	Microfono	243544
35	Support du microphone	Incastrò del microfono	243470
36	Filtre pour microphone	Filtro per microfono	243418
37	Contact d'accu complet	Collegamento del accu	243791
38	Fusible 2.5 A rapide	Fusibile 2.5 A rapido	243932
39	Element de connexion	Elemento di collegamento	243794
40	Support pour pos. 39	Sostegno per pos. 39	243471
41a	Prise d'antenne M5	Presa antenna M5	241822
41b*	Prise d'antenne TNC 50 Ω	Presa antenna TNC 50 Ω	244843
42	Commutateur d'antenne	Commutatore dell'antenna	243777
43	Haut-parleur	Altoparlante	243545
44	Fenêtre pour LCD	Apertura per LCD	241791
45	Silicone RTV3140	Silicone RTV3140	171663
46	Clavier frontal complet	Tastiera frontale completa	----- 245350
47	Touche d'émission complète	Tasto di trasm. completo	243789
48	Clavier supérieur complet	Tastiera superiore completa	243790
60	Circuit AF	Circuito stampato AF	243127-3 243127-1
61	Platine des commutateurs	Circuito dei commutatori	243684
62	Commutateur seul	Commutatore	243683
63	LED bicouleur pour clavier	LED, bicolore per tastiera sup.	243425
64	Commutateur	Commutatore (tasto trasm.)	243404
65	Langouette pour pos. 64	Linguetta per tasto trasm.	244316
80	Circuits HF, UHF 70 cm	Circuiti stampati RF, UHF 70 cm	
80a	Bande inf. 2.5 kHz (...432-1)	Banda inf. 12.5 kHz (...432-1)	246142
80b	Bande inf. 20/25 kHz (...432-2)	Banda inf. 20/25 kHz (...432-2)	246141
80c	Bande sup. 12.5 kHz (...462-1)	Banda sup. 12.5 kHz (...462-1)	245921
80d	Bande sup. 20/25 kHz (...462-2)	Banda sup. 20/25 kHz (...462-2)	245881
81	Entretoise	Spaziatore	241825
82	Contact d'antenne	Contacto antenna	241820

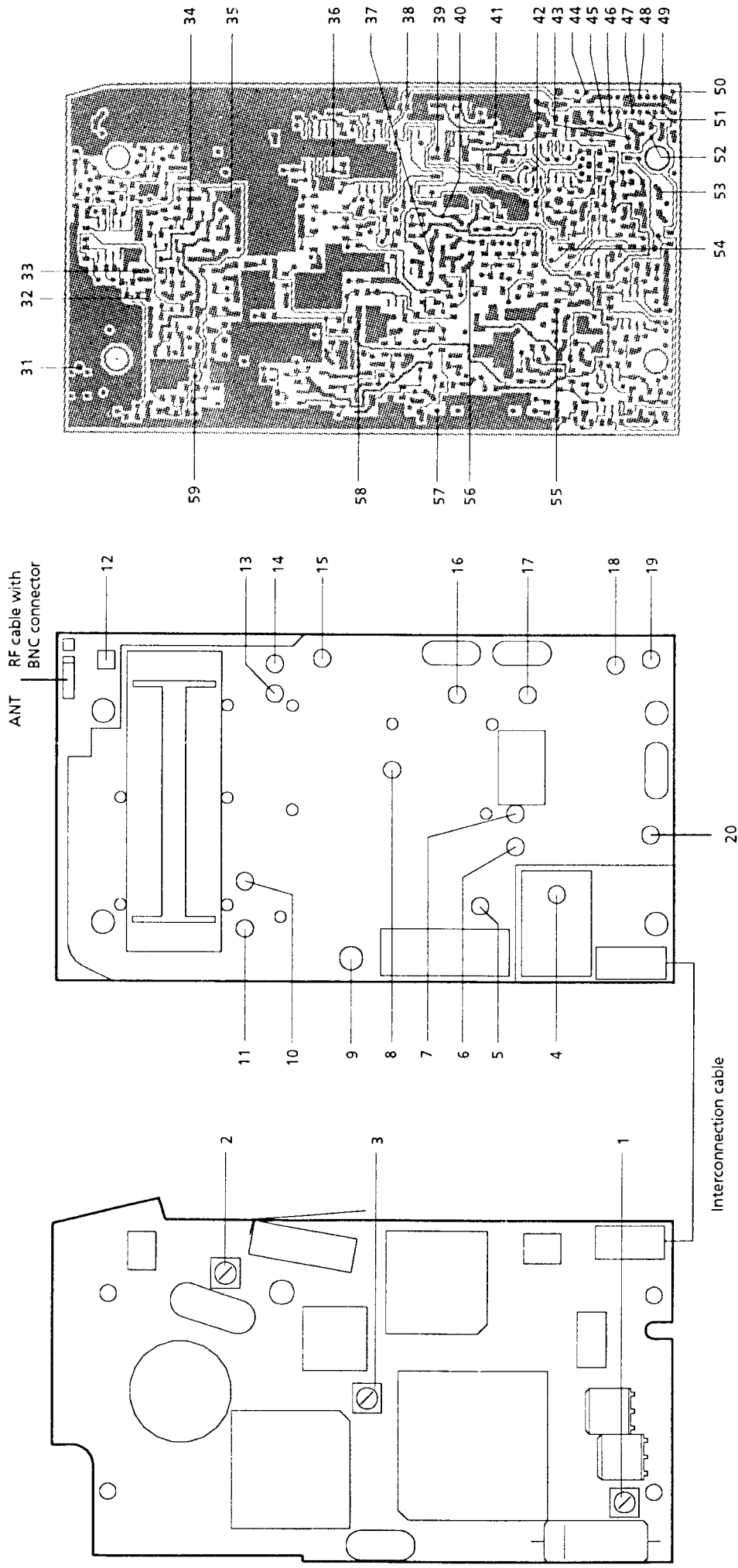
* Option



Antennenkappe mit Gysocolle Pos. 12 aufkleben.
 Coller le capuchon d'antenne à l'aide de Gysocolle pos. 12.
 Incollare il capuccio dell'antenna con la Gysocolle pos. 12.
 Secure the antenna cap with Gysocolle pos. 12.



Tuning elements and test points



Tuning elements

- 1 R736 Speaker volume
- 2 R621 Mike sensitivity
- 3 R307 Low battery indicator
- 4 G302 Reference oscillator
- 5 L356 Transmitter VCO
- 6 R331 Δf subaudio (100 Hz)
- 7 R330 Δf audio (1000 Hz)
- 8 R242 VYA (5.8 V)
- 9 C347 Receiver VCO
- 10 L512 RX filter
- 11 L510 RX filter
- 12 R422 TX output power
- 13 C562 RX filter
- 14 L560 RX filter
- 15 L562 RX filter
- 16 L590 Mixer circuit
- 17 L600 1st IF filter
- 18 L602 1st IF filter
- 19 L646 Discriminator
- 20 C656 2nd LO 57.645 MHz

Test points

- 31 HFV Antenna contact
- 32 TX1 1 W TX select
- 33 TX2 2.5 W TX select
- 34 TX3 RX calibrate select
- 35 VBA + battery voltage
- 36 FOP prescaler output
- 37 VYS 3.4 MHz, 1 Vpp
- 38 EN 5.80 V during TX
- 39 VYD 5.00 V ±5%
- 40 VYE 5.80 V during RX
- 41 VBS + battery behind main switch
- 42 TCXO 12.8 MHz, 1 Vpp
- 43 DEM demodulator output
- 44 LD lock detector (active L)
- 45 ST shift register strobe
- 46 MOD modulator input
- 47 DA serial bus data
- 48 PUM 307 kHz clock
- 49 SQR noise squelch output
- 50 SQK RSSI threshold det. output
- 51 CL serial bus clock
- 52 SQT RSSI output
- 53 VVR +15 V ±10%
- 54 ZFO 2nd LO, 57.645 MHz
- 55 ZPW 1st IF, 58.100 MHz
- 56 VFR tuning voltage
- 57 ZFE mixer output
- 58 VYA 5.80 V ±2%
- 59 VRG TX gain control