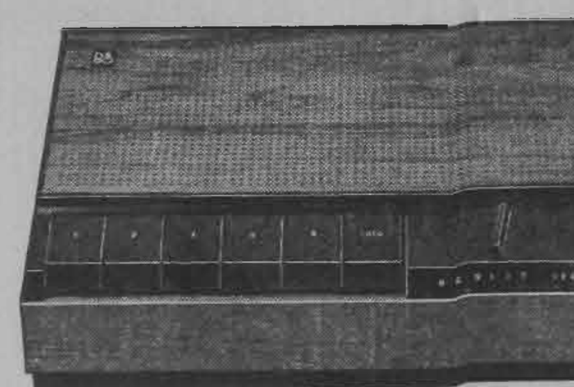
beolit 500
type 1101

SERVICE MANUAL



A/S BANG & OLUFSEN PRODUKTIONSSELSKAB
STRUER-DENMARK Telephone (0 78) 5 11 22* · Telex 4289 · Cable Address Bangoluf

9-66
PRINTED IN DENMARK

TECHNICAL DATA

Aerial: One telescopic whip.

Automatic Control Circuit: FM AFC.

Current Drain: Approx. (9 volt) 26 mA at low volume; approx. 80 mA at 50 mW output. Approx. (22.5 volt): 15 µA.

Dimensions: 264 mm wide, 76 mm high, 191 mm deep ($10\,^3/_8 \times 3 \times 7\,^1/_2$ inches).

Dry Cells: Six 1.5-volt standard dry cells (American standard: Type D). One 22.5-volt battery.

Extension Speaker: Switching feature provided in DIN connector socket for choice of:
(1) Extension speaker connected to radio and intercommunication system.
(2) Extension speaker connected to intercommunication system only.

Gramophone Connection: 5-contact DIN connector socket. Also used as tape recorder connection.
Sensitivity: 500 mV at 1000 c/s (60 mV at 50 mW output).

Power Output: 1.4 watts max.

Radiation suppressed as required by present standards.

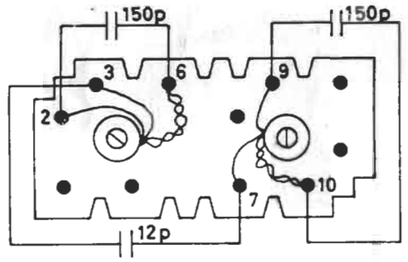
Tape Recorder Connection: 5-contact DIN connector socket. Also used as gramophone connection. Playback through separate push-buttons.
Diode output: 90 mV at 1000 c/s
Playback: 500 mV at 1000 c/s (60 mV at 50 mW output).

Tuning: FM tuner with diode tuning.

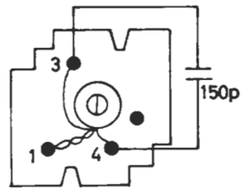
Wave Band: 87.5 - 108 Mc/s.

Weight: 2.65 kg (5.83 lbs) inclusive of batteries.

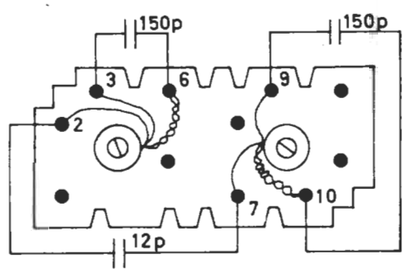
WIRING DIAGRAM FOR IF TRANSFORMERS



1' MF-IF 8010001

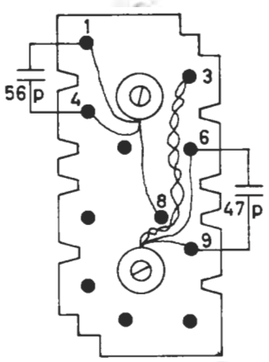


10,7 MHz spole
10,7 Mc/s Coil
8020007

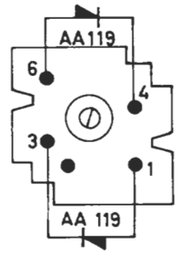


2' MF-IF 8010002

0680753



Det. 8010003



Balance 8020006

CIRCUIT DIAGRAM OF BEOLIT 500, TYPE 1101-1

De angivne spændinger er negative i forhold til stel og målt uden signal.
Modstande uden angivelse : SBT 1/2 Watt.
Kondensatorer mærket BL : Barrier-layer.
——— " ——— K : "High-K".
——— " ——— MK : Metalliseret kunststof.
——— " ——— MP : Metalliseret papir.
——— " ——— Pe1 : 125 V polyester.
——— " ——— Pe4 : 400 V polyester.
——— " ——— St : 125 V styroflex.
Afstemningspotentiometre : 1 MΩ 5320000
Følsomheder er målt ved 50 mW output med max. diskant og 22,5 KHz frekvenssving.
MF : 10,7 MHz
Max. output 1,4 W

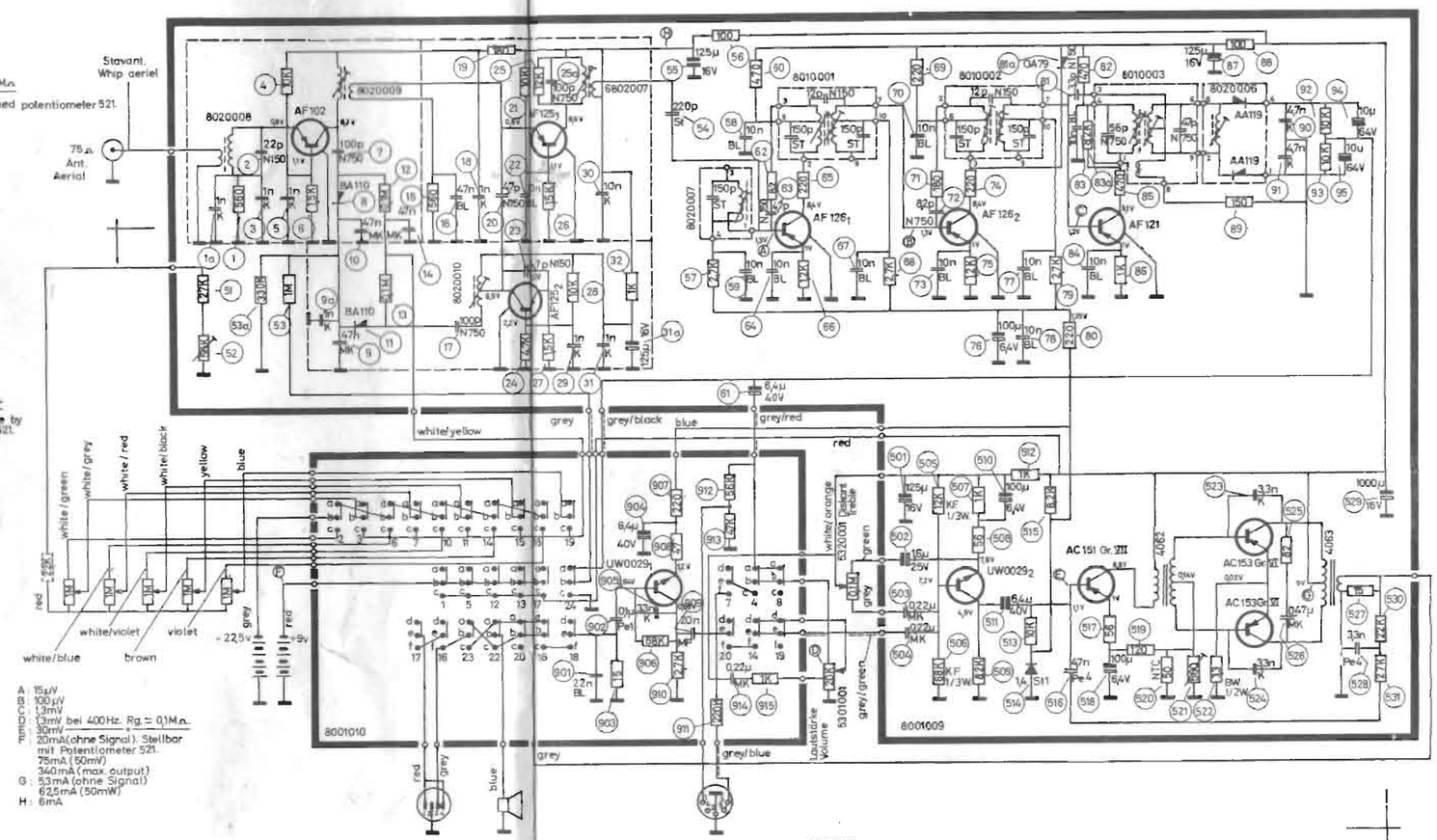
A : 15 µV
B : 100 µV
C : 1,3 mV
D : 13 mV ved 400 Hz Rg = 0,1 MΩ
E : 30 mV
F : 20 mA (tomgang) justeres med potentiometer 521.
75 mA (50 mW)
340 mA (max. output)
G : 5,3 mA (tomgang)
62,5 mA (50 mW)
H : 6 mA

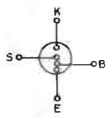
The voltages specified are negative with respect to chassis and they are measured without signal.
Resistors without specification : SBT 1/2 Watt.
Condensers marked BL : Barrier - layer.
——— " ——— K : "High-K".
——— " ——— MK : Metallized film.
——— " ——— MP : Metallized paper.
——— " ——— Pe1 : 125 V Polyester.
——— " ——— Pe4 : 400 V Polyester.
——— " ——— St : 125 V Styroflex.
Tuning potentiometers : 1 MΩ 5320000
Sensitivities are measured at 50 mW output at max. treble and 22,5 kc/s deviation
IF : 10,7 Mc/s.
Max. output 1,4 W.

A : 15 µV
B : 100 µV
C : 1,3 mV
D : 13 mV at 400 c/s Rg = 0,1 MΩ
E : 30 mV
F : 20 mA (no signal) adjustable by means of potentiometer 521.
75 mA (50 mW)
340 mA (max. output)
G : 5,3 mA (no signal)
62,5 mA (50 mW)
H : 6 mA

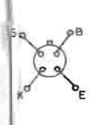
Die angegebenen Spannungen sind negativ im Verhältnis zu Chassis, und ohne Signal gemessen.
Widerstände ohne Angabe : SBT 1/2 Watt.
Kondensatoren, die mit BL markiert sind, entsprechen RNK
——— " ——— K ——— " ——— R 40000
——— " ——— MK ——— " ——— Metallisierter Kunststof
——— " ——— MP ——— " ——— Metallisierter Papier
——— " ——— Pe1 ——— " ——— 125 V Polyester
——— " ——— Pe4 ——— " ——— 400 V Polyester
——— " ——— St ——— " ——— 125 V Styroflex
Abgleichpotentiometer 1 MΩ 5320000
Empfindlichkeiten bei 50 mW ausgangsleistung sind mit max. Diskant und 22,5 KHz Frequenzhub gemessen.
ZF : 10,7 MHz.
Max. ausgangsleistung 1,4 W.

A : 15 µV
B : 100 µV
C : 1,3 mV
D : 13 mV bei 400 Hz. Rg = 0,1 MΩ
E : 30 mV
F : 20 mA (ohne Signal). Stellbar mit Potentiometer 521.
75 mA (50 mV)
340 mA (max. output)
G : 5,3 mA (ohne Signal)
62,5 mA (50 mW)
H : 6 mA

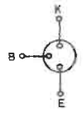




AF 102

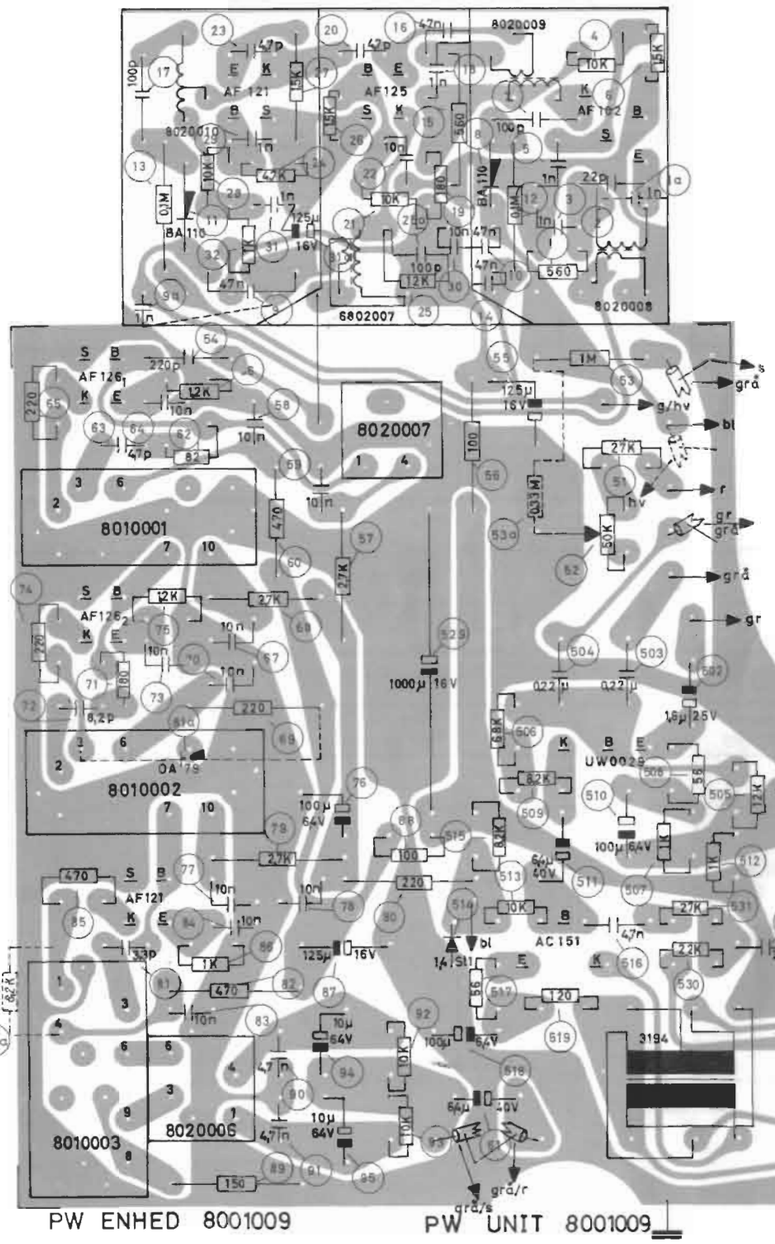


AF 121
AF 125
AF 126



UW 0029
AC 151
AC 153

PW UNITS

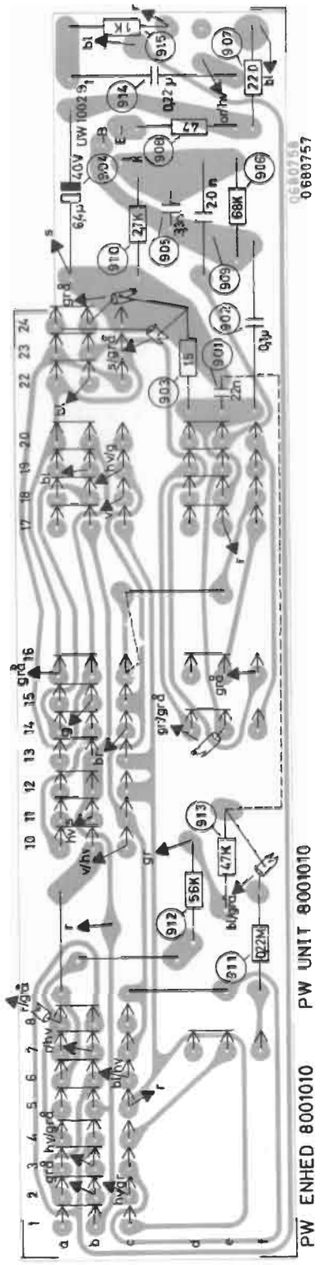


PW ENHED 8001009 PW UNIT 8001009

0680761
0680760
0680759

Ledningsfarver — Colour of wires — Kabelfarben

bl: blå	— blue	— blau
br: brun	— brown	— braun
g: gul	— yellow	— gelb
gr: grøn	— green	— grün
grå: grå	— grey	— grau
hv: hvid	— white	— weiss
or: orange	— orange	— orange
r: rød	— red	— rot
s: sort	— black	— schwarz
v: violet	— violet	— violett

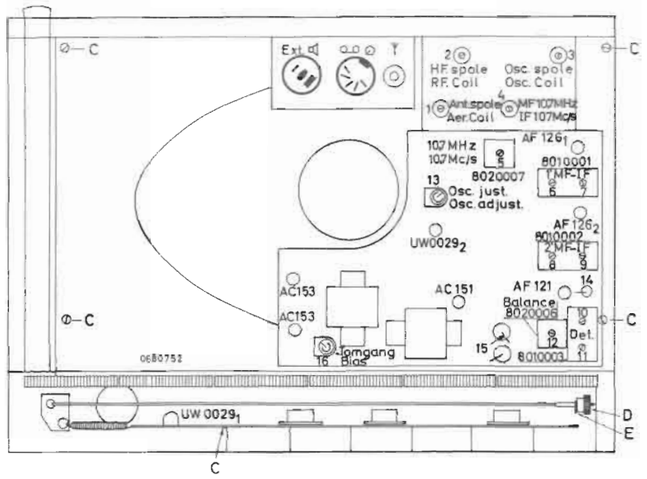


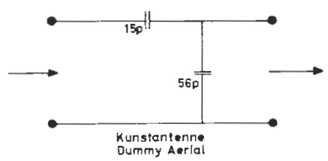
PW ENHED 8001010 PW UNIT 8001010

SENSITIVITY MEASUREMENTS AND ALIGNMENT PROCEDURE

RANGE	POTENTIOMETER SETTING	RF CONNECTION	OSCILLOGRAPH CONNECTION	FREQUENCY	REMARK	SENSITIVITY	OUTPUT	ADJUSTMENTS
IF CIRCUITS								
					AFC out; max. treble			Turn cores 4 and 11 out; remove core 5 from coil.
Button 1		Point A through 0.1 μF	AF 121 collector (14)* (see layout drawing)	10,7 Mc/s	* Through diode probe			Cores, 10, 9, 8, 7, 6 for max. gain and symmetrical curve.
Button 1		Aerial connector socket	as above	10.7 Mc/s	as above			Cores 4, 5 for max. gain and symmetrical curve. Bandwidth 250 kc/s $\pm$30 kc/s at 6 dB.
OSCILLATOR								
Button 1	108 Mc/s	as above	as above	108 Mc/s	as above			Core 3
Button 1	87.5 Mc/s	as above	as above	87.5 Mc/s	as above			Potentiometer 13
RF CIRCUITS								
Button 1	89 Mc/s	as above	as above	89 Mc/s	as above			Core 2 for max. gain.
					Do **not** adjust core 1			
DETECTOR								
Button 1		as above	Point 15 (see layout drawing)	10.7 Mc/s**	** Without diode With noise impulses			Cores 11, 12 for max. gain and symmetrical curve, and best noise suppression.
SENSITIVITIES								
Button 1		Point A through 0.1 μF		10.7 Mc/s	Unsolder tuner (220 pF No. 54 in diagram)	15 μV	50 mW	
Button 1		Point B through 0.1 μF		10.7 Mc/s		100 μV	50 mW	
Button 1		Point C through 0.1 μF		10.7 Mc/s		1.3 mV	50 mW	
Button 1	91 Mc/s	Aerial connector socket		91 Mc/s		2.24 μV	500 mW	
Button 1	91 Mc/s	Aerial connector socket		91 Mc/s		3.55 μV	20 dB signal/noise ratio	

IF Alignment: Sweep Generator: Frequency Swing approx. 1 Mc/s.
Sensitivity Measurements: Sweep Generator: Frequency Swing: 22.5 kc/s – 400 c/s.


Ext.
HF spole
RF Coil
Osc. spole
Osc. Coil
Ant.spole
Aer.Coil
MF 107MHz
IF 107Mc/s
107 MHz
107 Mc/s
AF 126 1
8010001
1.MF-IF
13
8020007
Osc. just.
Osc. adjust.
UW0029 2
AF 126 2
8010002
2.MF-IF
AC153
AC153
AC 151
AF 121
Balance
14
8020006
Det.
15
8010003
Tomgang
T6 Bias
UW 0029 1
0680752
C
D
E

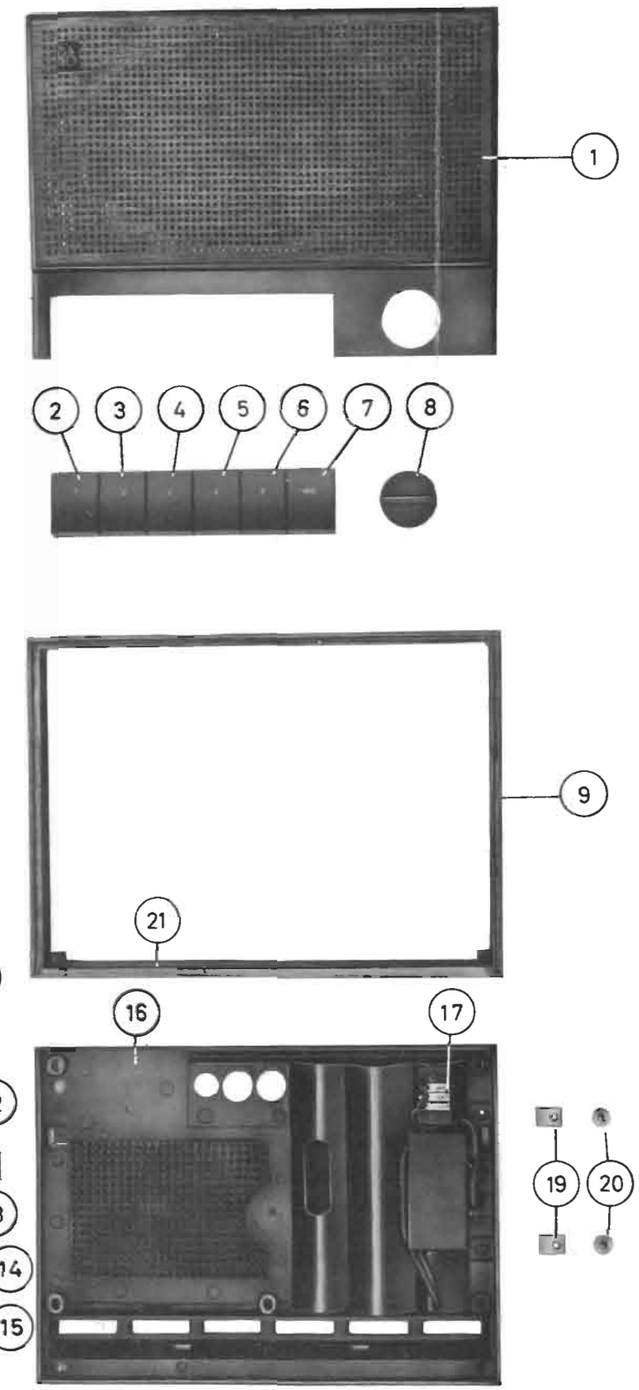

15p
56p
Kunstantenne
Dummy Aerial

NOTES

PARTS LIST , BEOLIT 500 , Type 1101

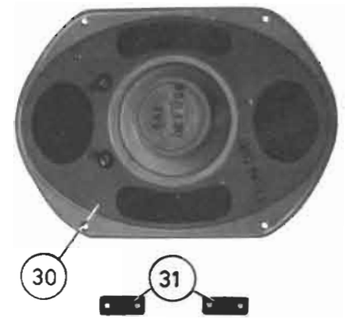
* 1	Cabinet top section, teak	0542001
	- - - Brazilian rosewood	0542002
	- - - oak	0542003
* 2	Push-button, 1	0322261
* 3	- - 2	0322262
* 4	- - 3	0322263
* 5	- - 4	0322264
* 6	- - 5	0322265
* 7	- - AFC	0322266
* 8	Knob, volume	0928173
* 9	Cabinet frame, teak	0542031
	- - Brazilian rosewood	0542032
	- - oak	0542033
*10	Cover plate for potentiometers	0521193
*11	Spring	0335186
12	Nut	M 3 DIN 562
*13	Relief strap	0240324
14	Screw	2038003
15	Spring	0335186
*16	Bottom section, battery box complete	0508174
17	Contact piece	8001011
*18	Battery cover plate	0521192
*19	Clamps	0285087
*20	Screws	0104092
21	Insulating piece	0530592
*	Felt washers for bottom	0376461

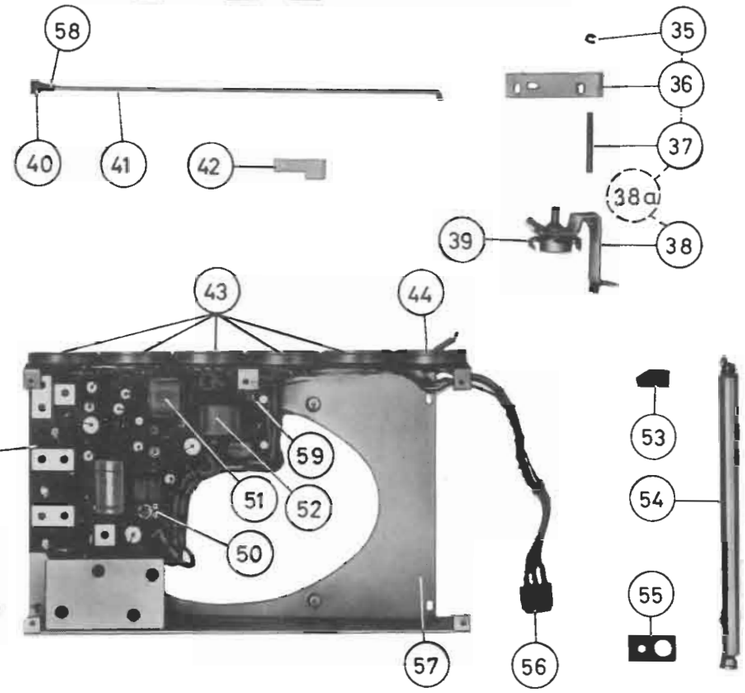
PARTS marked with an * are preferred spare parts



*30	Speaker	8480016
31	Clamps	0287155
32	Bracket	0238031
33	Push-button switch assembly and PW unit complete	8001010
*34	Spring	0330263
35	Seeger circlip	UG 3 × 0,6
36	Bracket	0238040
37	Shaft	0340259
38	Bracket	0249290
38 A	Bracket for potentiometer, complete	0249292
*39	Potentiometer, volume	5301001
40	Nut	0145033
41	Shaft	2850000
42	Bracket	0245688
*43	Potentiometers, tuning	5320000
*44	Potentiometer, tone	5320001
45	PW unit, RF, IF, AF, and output	8001009
*	Diodes	(Two) AA 119
*	-	(Two) BA 110
*	-	(One) OA 79
*	-	(One) 1,4 St. 1
	Socket for electrolytic capacitor	0506101
	IF transformer, 1st IF	8010001
	- - 2nd IF	8010002
	- - FM det.	8010003
	- - FM det. balance	8020006
	Coil, coupling, 10.7 Mc/s	8020007
*	Transistors	(One) AC 151
*	- pair	(Two) AC 153
*	-	(One) AF 102
*	-	(One) AF 121
*	-	(Two) AF 125
*	-	(Two) AF 126
*	-	(One) UW 0029
46	Connector socket, aerial	0840331
47	- - tape recorder, gram.	7212006
48	- - speaker	7211021
49	Bracket	0245670
50	Potentiometer	5370022
*51	Transformer, driver	ST 4062
*52	Transformer, output	ST 4063
53	Holder for aerial	0212001
*	Bushing for holder	0412270
*54	Whip aerial	8720003
55	Insulating piece	0530593
*56	Plug, battery	7222006
57	Chassis	0504312
58	Bushing	2365045
59	Potentiometer	5370044
*	Wall mounting plate	0240313
*	Carrying bag	3390020

PARTS marked with an * are preferred spare parts





Extra Accessories

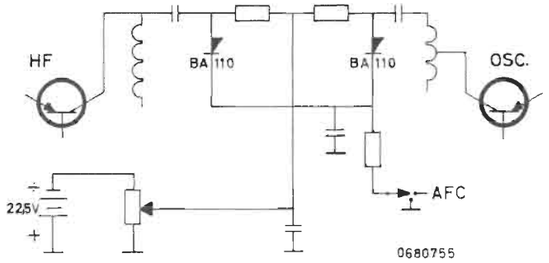
*	Plug, Aerial	7221001
*	- Gramophone	7222011
*	- Speaker	7221005
*	- Tape Recorder	7222011

DESCRIPTION

The BEOLIT 500, Type 1101, is a transistorized FM receiver. It is composed of the following units:
PW unit 8001009, screened FM tuner, IF and AF section.
PW unit 8001010, push-button switch assembly and AF amplifier for intercommunication system.

FM Tuner

The conventional three-gang capacitor has been replaced by two BA 110 capacitance diodes and five separate tuning potentiometers, all of which cover the entire FM band from 87.5 to 108 Mc/s.



Only one of the potentiometers is shown in the circuit diagram. Control voltage, 22.5 volts, is obtained from a separate battery in order to avoid interaction with the other stages of the receiver. Both the oscillator and the RF collector circuits are tuned, and the same diodes receive AFC bias from the detector.

IF

Three AF 126's operate as IF amplifiers. There is no AVC action except that provided by an OA 79 limiter diode.

AF

UW 0029 $_2$ is followed by a 1,4 St. 1 diode which stabilizes the voltage applied to the AC 151, and this stabilization is applied via the emitter circuit to the AC 153 output transistors, with the result that the current drain will be maintained at decreasing battery voltage, thus minimizing distortion on loud passages.

Intercom

An additional AF amplifier stage, UW 0029 $_1$, is inserted in order to provide adequate sensitivity, and the signal is taken around the volume control to UW 0029 $_2$. Switching between speaking and listening is carried out by simply exchanging the connections to the built-in speaker and an extension speaker. Calls can not be originated from the extension speaker.

Speaker Switching

The contacts of the speaker connector socket are utilized as follows: When the plug is inserted so that its pins plug into socket holes 1 and 2, the extension speaker will operate on both FM radio and on intercommunication; when the plug is turned over 180 degrees the extension speaker will operate on intercommunication only.
The built-in speaker will not be cut out.

Tape Recorder and Gramophone

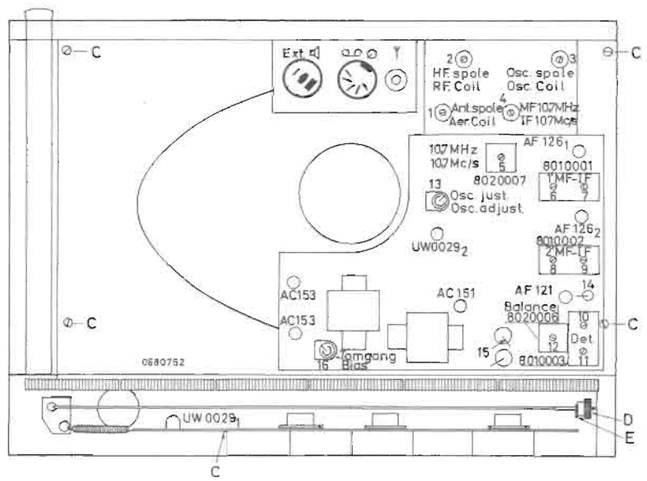
plug into a common DIN connector socket. Pin 1 is used for recording, and pin 3 may be used for playback. A BEOGRAM 1000 VF Type 5202 record player may be used, or a record player using a crystal pick-up.

AF

no-signal current, point F, should be adjusted for 20 mA, using potentiometer 16 (see layout drawing).

Push-button Release Mechanism

The push-button release mechanism is adjusted with the nut D so that it only just touches the bracket E. The push-buttons should be released while making this adjustment (see layout drawing).



Batteries

are replaced by first loosening screws A and then pushing the screws in the direction of the arrow, when the battery cover may be removed.

Disassembling the Cabinet

On removal of screws B the cabinet bottom section may be taken off and hence also the wooden frame. The cabinet top section may be taken off after removal of screws C (see page 12).