

SHIPMATE

RS 6000

SBB RECEIVER SERVICE MANUAL

NO: 9003

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1. INTRODUCTION

RS 6000 is an universal bridgehouse receiver for weather broadcasting, direction finding, communication and music/news.

The receiver matches the VHF radiotelephone SHIP-MATE RS 7000.

RS 6000 consists of:

- A single conversion superheterodyne receiver with AM and SSB-crystal filter.
- A diode detector for AM receiving and a product detector for SSB receiving.
- An injection oscillator using PLL technique to provide high frequency stability.
- A broadcasting FM receiver with high fidelity.
- A digital counter for exact tuning.
- A voltage regulator which allows the receiver to work on either 12 or 24 Vdc.

2. SPECIFICATIONS

2.1. SSB-AM RECEIVER

Frequency range:	LW 140 - 260 KHz NW 250 - 600 KHz MW 0,6 - 1,6 MHz SW I 1,6 - 2,6 MHz SW II 2,6-3,6 MHz SW III 3,6 - 4,6 MHz
Tuning errors	NW $< \pm 100$ Hz LN-SW $< \pm 1$ KHz
Fine tune (clarifier)	app. ± 500 Hz
Frequency inconstancy in any 5 min. period with constant ambient temperature. (After warm up)	< 40 Hz
Types of transmission to be received	A3, A3H, A3A, A3J
Sensitivity:	LW, NW A3 - $30 \mu V$ A3J - $10 \mu V$ MW A3 - $20 \mu V$ A3J - $5 \mu V$ SW A3 - $10 \mu V$ A3J - $2 \mu V$
Selectivity:	A3, A3H: 7,5 KHz band with at - 6 dB 25 KHz at - 60 dB A3J, A3A: 2,7 KHz band with at - 6 dB 4,0 KHz at - 60 dB
Crossmodulation:	Interference of unwanted carrier 20 KHz off-tune 80 dB above $1 \mu V$ is more than 30 dB below standard AF-output
Obstruction:	Unwanted carrier 20 KHz off-tune, 90 dB above $1 \mu V$ effects AF output less than 3 dB (wanted signal 60 dB above $1 \mu V$)
Intermodulation:	Standard output power for two spurious signals each of 70 dB above $1 \mu V$
Image rejection:	> 90 dB
IF rejection:	> 80 dB
Rejection of other secondary receiving stations:	> 80 dB
Audio response:	
A3A, A3J:	200 Hz - 2,4 KHz at - 6 dB
A3, A3H:	40 Hz - 3,0 KHz at - 6 dB
Radiation:	$< 1 \times 10^9 W$
Antenna input:	10 ohms/250 pF (standard)

(All measurements according to FTZ 171 R41).

Def. of transmission types:

A3:	Double side-band with full carrier (AM)
A3A:	Single side-band with a carrier reduction of $16 dB \pm 2 dB$
A3H:	Single side-band with full carrier
A3J:	Single side-band with a carrier suppression of at best 40 dB

(carrier suppression in relation to peak performance)

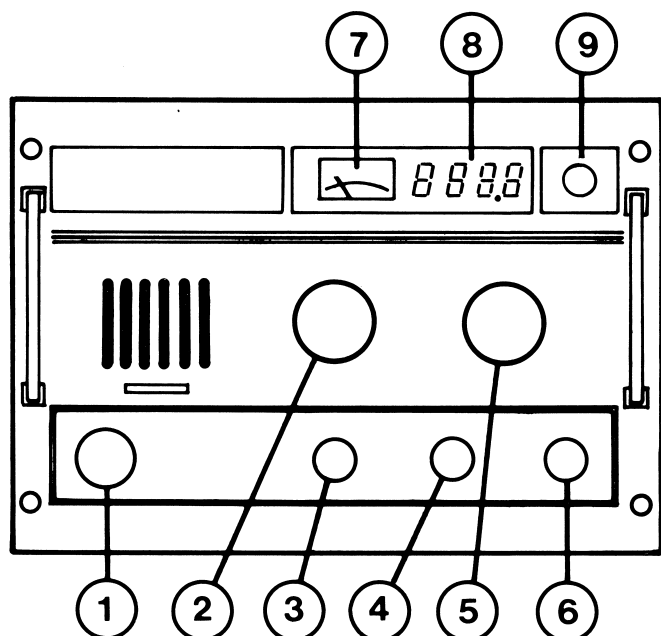
2.2. FM-RECEIVER

Frequency range:	88 - 108 MHz
Tuning errors:	$\pm 0,1$ MHz
Temperature drift:	$< 0,3$ MHz (temp. -20 to + 60°C)
Type of transmission to be received:	FM
Sensitivity:	Typ. $1 \mu V/20$ dB SINAD
Selectivity:	< 230 KHz bandwidth at - 3dB
Image rejection:	> 65 dB
IF rejection:	> 80 dB
Antenna:	75 ohms unbalanced
Audio response:	50 Hz - 10 KHz at - 6 dB

2.3. GENEREL

Supply voltage:	12/24 Vdc
Temperature range:	-20 to + 55°C
Audio output	
External speaker:	$> 2W$ into 8 ohms
Internal speaker:	$> 2W$
Head-phones:	$> 1mW$ into 600 ohms
Current drain:	0,45 - 1A (depending on audio put)
Weight:	6 kg
Size:	H 207, W 298, D 153
External connections:	Power, Antennas, loudspeaker, headset, direction finder

3. OPERATION



1. Mode switch with 5 positions:
OFF.
AM: The receiver is ready for receiving AM-signals, the clarifier/BFO control (6) is out of use.
SSB: The receiver is ready for receiving SSB-signals.
DF: The power is switched on to the DF-head, the ship's wire antenna is disconnected and the receiver is operating in the SSB mode.
FM: The receiver is ready for receiving FM-signals, controls 2, 4 and 6 are out of use.
2. Band selector. Selects the band for operation, except the FM-band.
3. Volume control for headphones, internal and external loudspeaker.
4. RF gain. Regulates the RF and IF gain, and must be used to prevent strong signals from overloading the receiver when the AGC is not in use.
The AGC can be turned off by pulling out the knob.
5. Tuning. Variable tuning control.
6. Clarifier/BFO. Fine tunes the BFO-frequency, can be used to fine tune on a SSB or CW station should normally be in the middle position.
7. Signal Level meter. Indicates the field strength of the signal.
8. Display for digital receiver frequency read out.
9. Dimmer control. Regulates light intensity in LED display.

3.1. SSB-RECEPTION

1. Turn the mode switch (1) to SSB.
2. Turn the RF gain control (4) fully clockwise.
3. Push AGC (4) to ON position.
4. Select the desired band with band selector (2).
5. Tune to the desired frequency by the tuning knob (5).
6. Adjust to a comfortable listening level with volume (3).
7. Adjust to the most natural voice quality with clarifier (6) and tuning knob (5).
8. In some cases it can be advantageous to switch out the automatic gain control (AGC). This is done by pulling AGC (4) to OFF position and then adjusting the RF-gain (4) to a point where the receiver is not overloaded.

3.2. AM-RECEPTION

Use the same procedure as for SSB reception except for the following: Turn mode switch (1) to AM instead of SSB. Delete point 7.

3.3. DIRECTION FINDING

Connect the Direction finding head to the RS 6000.

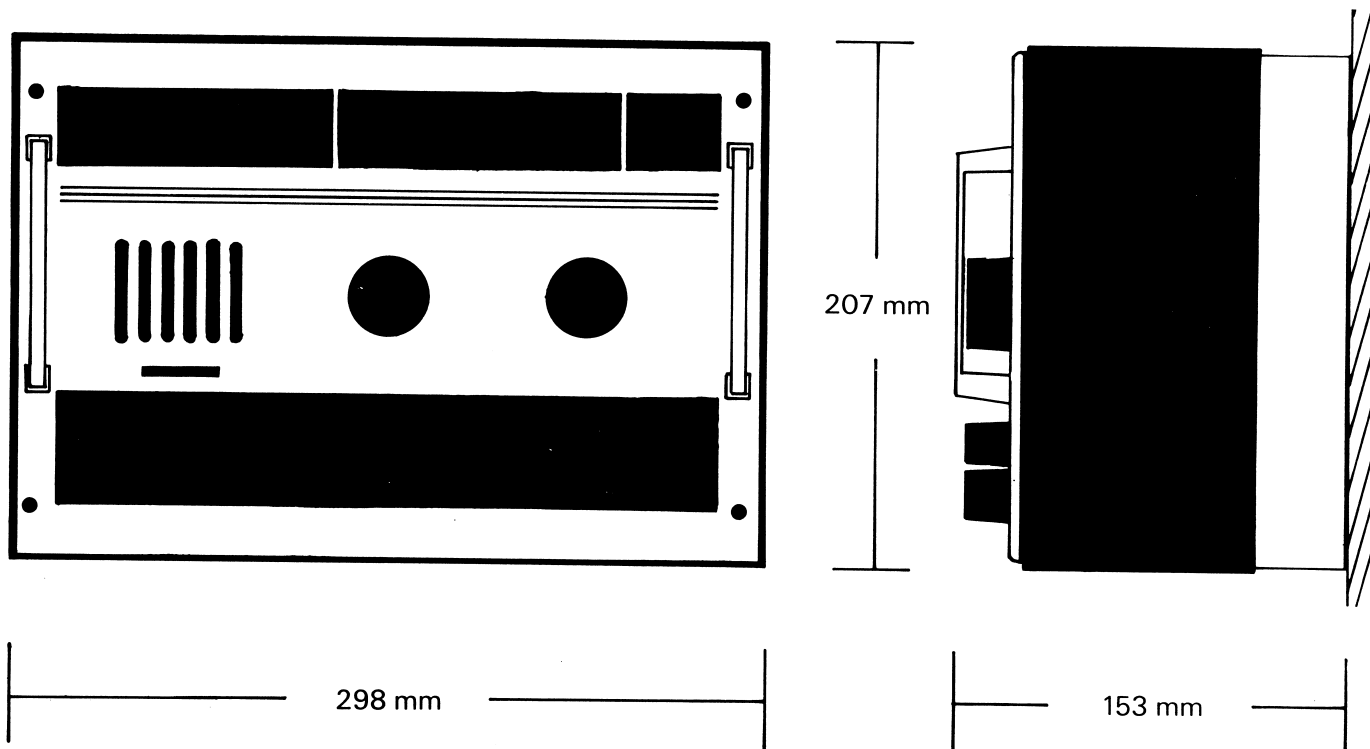
Determine frequency of required beacon and tune RS 6000 receiver for best signal with »Mode« Switch set to »A.M.« (i.e. with ship's wire antenna in use). Sensitivity of RS 6000 should be set to maximum.

Switch »Mode« to D.F. position and peak tuning of RS 6010. D.F. Head to maximum signal, optimise tuning by reducing gain of D.F. Head with »Gain« control so that meters read less than full scale deflection when maximum signal is being received.

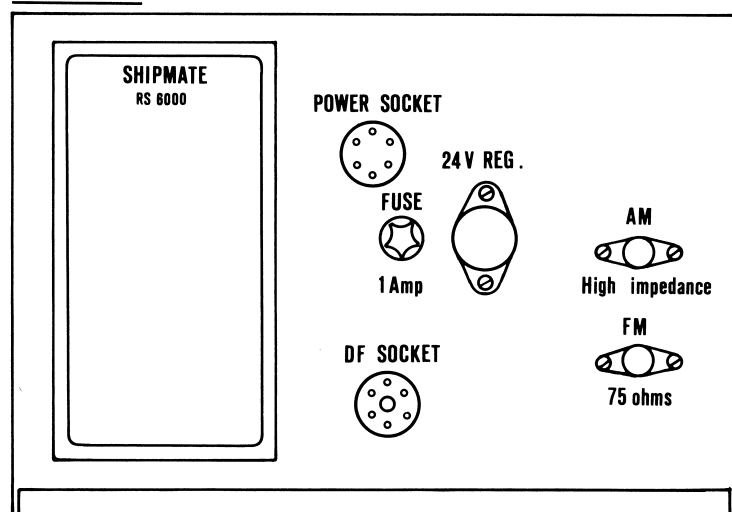
Rotate RS 6000 or turn body with D.F. held at arm's length until minimum signal is obtained. Read off compass bearing. To sense, turn D.F. Head for maximum signal, reduce gain at maximum signal with the »gain« control so that meter shows half full scale deflection. Press sense button on back of instrument, direction of beacon is then indicated by movement of meter pointer.

4. INSTALLATION

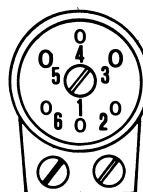
In order to provide effective results, the receiver and antenna system must be installed properly. The paragraphs below outline the requirements for proper installation.



REAR VIEW:

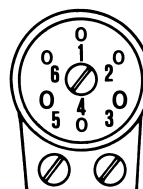


POWER PLUG

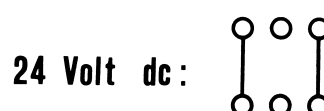
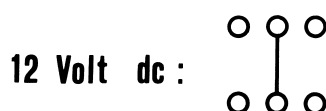


- PIN 1. Loudspeaker
- PIN 2. Loudspeaker
- PIN 3. Battery negative
- PIN 4. Not used
- PIN 5. Battery positive
- PIN 6. Battery positive

DF PLUG

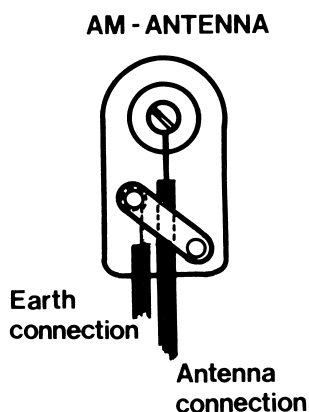


- PIN 1. DF-RF
- PIN 2. AF
- PIN 3. +9 Volt
- PIN 4. RF-Gain
- PIN 5. Meter
- PIN 6. GND



Supply voltage - see section 4.4.

4.1. EARTH CONNECTION



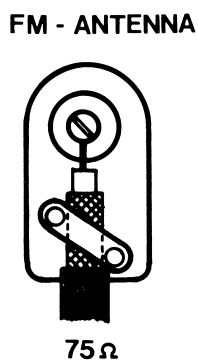
To ensure maximum signal to the receiver input and to suppress noise, the receiver must be equipped with an effective earth connection.

Use the ship keel, the hull of a steel ship, or an earth plate mounted under water line on the hull exterior.

4.2. AM/SSB RECEIVING ANTENNA

Both whip and wire antenna can be used as receiving antenna. Normally a length of e.g. 8 to 10 metres will do very well. Avoid use of coax cable connection between receiver and antenna outlet.

4.3. FM-RECEIVER ANTENNA



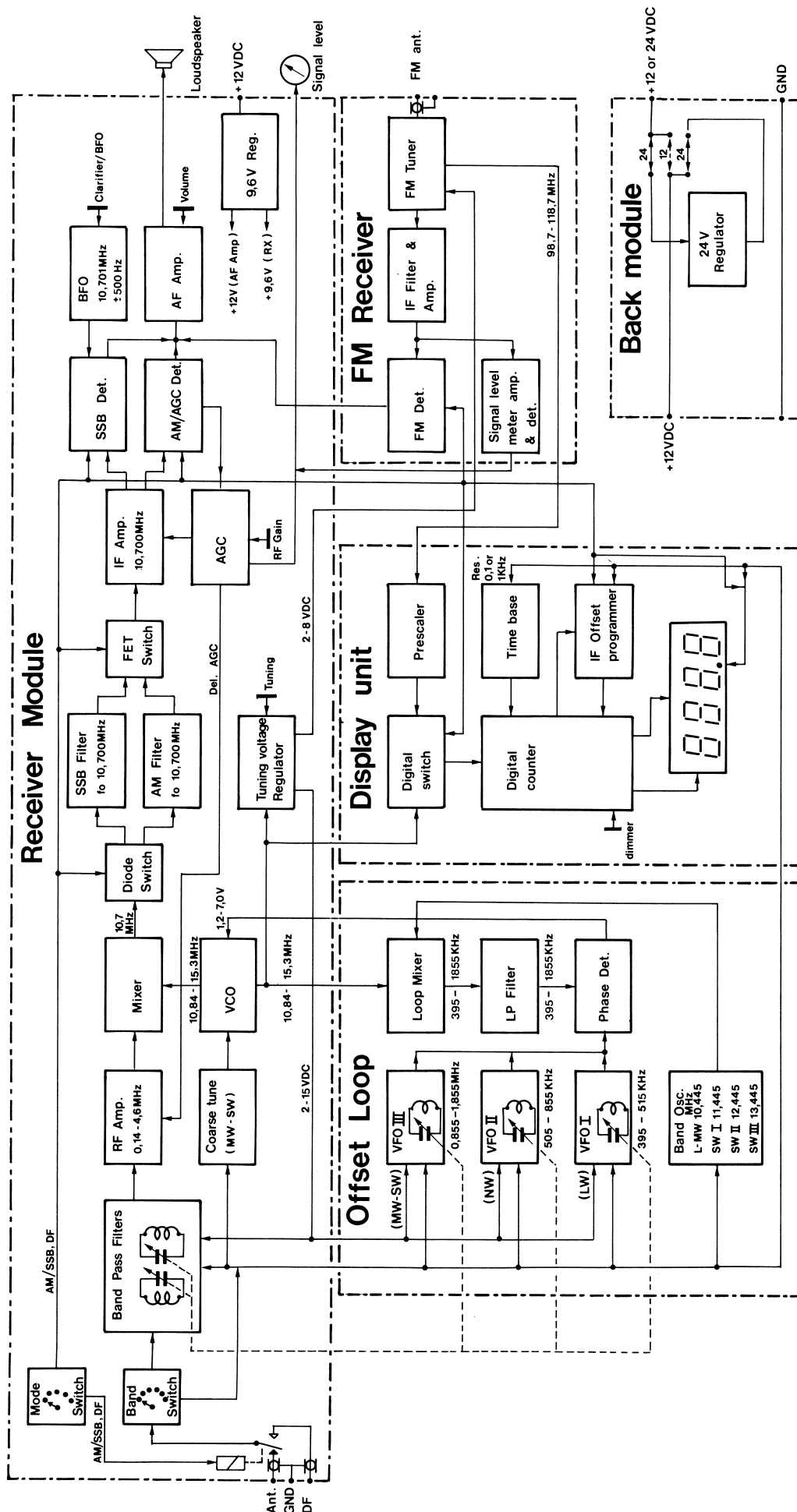
The FM-receiver antenna can be for instance a half wave dipole connected to the receiver with a 75 ohm-coax cable.

4.4. SUPPLY VOLTAGE

From the factory the RS 6000 is normally connected for 12v dc. For 24v dc operation, please open the chassis and change the wiring just below the fuse.

5. CIRCUIT DESCRIPTION

5.1. BLOCK DIAGRAM



BLOCK DIAGRAM FOR RS 6000
DRAWING No. 7020

5.2. GENERAL

RS 6000 is composed of the following modules:

- Receiver
- Offset loop
- FM-receiver
- Display unit
- Back module

5.3. RECEIVER

The receiver is a single superheterodyn receiver with IF at 10,7 MHz.

The mode of operation is apparent from the block diagram which shows the signal path and the process of frequency generation respectively.

The signal from the wire antenna is fed via the DF-relay and the band switch, to one of the tuned band-pass filter, which tracks with the VFO (offset loop modul). From the filter the signal passes by the RF amplifier and reaches the mixer where it is mixed with a signal from the VCO up to the intermediate frequency 10,7 MHz. The IF signal at 10,7 MHz can be diode switched to either a SSB-crystal filter or to an AM-filter. The output from the filters can then be FET switched to the input of the monolithic IF amplifier.

From the amplifier the IF signal splits into two and reach the FET-product detector (SSB-detector) and the AM/AGC-detector. The SSB-detector receives its carrier frequency signal from the Beat Frequency Oscillator (BFO). The BFO frequency is 10,701 MHz and can be varied by ± 500 Hz to satisfy the requirement for a clarifying function.

The audio-frequency signal from the two detectors (AM and SSB) are then by means of a switch-pre-amplifier fed to the volume control and then to the AF-amplifier.

In the AF-amplifier the audio frequency signal is amplified to a level of max. 4W and then brought to the internal loudspeaker and to the power socket for connection of an external loudspeaker.

The AGC system receives a DC voltage from the AM-detector diode. This voltage is amplified in a two stage DC amplifier and through a diode system fed to an emitter follower that delivers a control voltage both to the IF amp. and through a transistor delay network to the RF stage. In both cases it regulates the gain. The system has a fast raise time, and in SSB mode a slow decay time.

On the receiver module is also placed a 9,6V regulator which delivers a stable DC voltage to the whole receiver, except for the AF-amplifier and the Display unit. When switching the receiver to DF, the wire antenna is disconnected and the signal from the DF's ferrite or loop antenna, through its amplifier, is connected to the receiver input.

5.4. OFFSET LOOP

The generation of the injection frequency for the mixer in the receiver is made by the offset loop in connection with the VCO.

The mode of signal generation is apparent from the block diagram where the actual frequencies are printed.

5.5. FM RECEIVER

The FM-receiver is a single superhet receiver.

The front end of the receiver consists of a varactor FM tuner where the incoming broad casting signal is

converted to the intermediate frequency of 10,7 MHz. The IF signal is then fed through a ceramic filter and into the monolithic IF amplifier and quadratur detector, and out comes the AF signal for the AF amplifier. The IF signal is also fed to the »signal level meter« amp. and detector.

The local oscillator signal from the FM-tuner is after a buffer directed to the display unit for digital frequency readout.

5.6. DISPLAY UNIT

To the display unit comes two signals, one from the VCO on the receiver module and one from the local osc. in the FM receiver.

The frequency of the FM receiver osc. is first divided by 100 in the prescaler.

The digital switch will allow one of the two input signals to reach the counter, depending on the position of the »Mode« switch.

The digital counter will now count the incoming frequency with a resolution of 0,1 KHz or 1 KHz, depending on whether the bandswitch is positioned on NW or LW, MW, SW.

To correct the readout for the IF offset the counter is being loaded with a starting number. The starting number is:

LW, MW, SW:	9299
NW:	3000
FM:	9893

5.7. BACK MODULE

The back module is primary a connection module which connects the power and DF socket. In addition to that it contains a 24V to 12V regulator, which allows the RS 6000 to work on either 12V or 24V DC depending on the wiring.

6. ALIGNMENT

6.1. ALIGNMENT OF RECEIVER

Necessary measuring equipment

Frequency counter

RF-signal generator

Oscilloscope

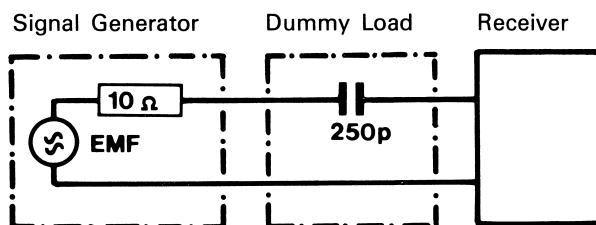
Output meter (LF millivolt meter)

Multimeter

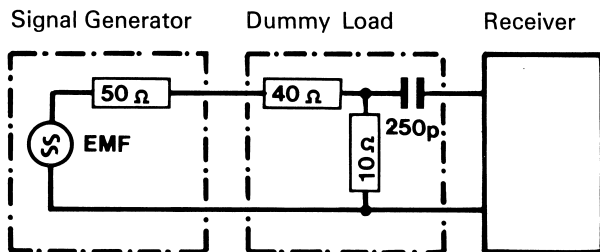
Power supply 24V, 1A

The signal generator is connected to the receiver antenna input by a dummy load of 10 ohms in series with 250 pF.

If the signal generator has 10 ohms output impedance:



If the signal generator has 50 ohms output impedance:



The loss in the dummy load is 1:5 or 14dB.

Set mode switch on SSB

Set frequency to 3600 KHz on the display.

Set IF gain to max. (turn clockwise) and turn AGC off. Set Clarifier/BFO in the middle position. Check that the BFO frequency is 10,701 MHz (collector of T17). Turn clarifier/BFO from side to side and check that the variation from the middle position is app. 500 Hz.

Tune frequency to 3600 KHz on the display. Set RF gain to max. (turn clockwise) and turn AGC off. Set Clarifier /BFO in middle position. Check that the BFO frequency is 10,701 MHz (collector of T17), Turn Clarifier /BFO from side to side and check that the variation from the middle position is app. 500 Hz. Now place the clarifier in the middle position. Connect the signal generator through the dummy to the AM-antenna plug and tune it to 3600 KHz (unmodulated).

Connect the LF millivolt meter across the loudspeaker terminals. Connect the oscilloscope to G2 of T3. Use a non-loading test probe. Check that the injection-signal voltage is at least 2,5 Vpp.

Increase the signal generator output until you hear a signal of app. 1 KHz in the loudspeaker. Tune L 30 L 31, L 27 and L 28 to max. signal on the LF-millivolt meter. The RF signal must not be so strong that the IF-amp. is overdriven. Screen the pass band and fine adjust L 30 and L 31 for min. pass band ripple. Tune the RF-generator to 10,700 MHz and increase the signal until you get a read out on the mV-meter. Adjust L 24 to min. signal.

Now tune the RF-generator back to 3600 KHz and decrease the signal level. Adjust L21 and L22 for max. LF-output (don't overload IF-amp.) Tune receiver and RF-generator to 4600 KHz and tune C 121 and C 134 to max. LF-output. Repeat the last two procedures a few times to achieve good tracking between the filter and the VFO.

The other band pass filters can be aligned in a similar way.

Now turn the mode switch to AM and tune receiver to 3600 KHz and fed it with a 3600 KHz signal modulated with 1 KHz, 30%. Adjust L25, L26 and L32 for max. signal (don't overdrive IF-amp.). Connect the oscilloscope to the top of C 109 (2n2).

Screen the pass band with an unmodulated carrier and fine adjust L25 and 26 for min. pass band ripple by means of the DC read out on the oscilloscope screen.

Now turn the AGC on and the mode switch to SSB. Increase the RF-generator output and check that the LF-output is held constant after the RF-level has reached the attacking level of the AGC. Check that the signal level meter indicates the input signal. (Pay attention to the signal level meter that it only works when the AGC is switched on).

This terminates the alignment of the receiver module.

6.2. ALIGNMENT OF OFFSET LOOP

Necessary measuring equipment

Frequency counter

Oscilloscope

Multimeter (min. 50K ohms/V DC).

Check with the multimeter the tuning voltage range (app. 2-15V DC), on R47, R54 or R61.

Connect the frequency counter to R43, C37.

Turn the band switch from LW to SW III and see that the frequency is:

LW, NW, MW: 10,445 MHz

SW I: 11,445 MHz

SW II: 12,445 MHz

SW III: 13,445 MHz

Now connect the frequency counter to collector of T3 and place the band switch on LW. Turn the Tuning knob counter clockwise to min. frequency. Adjust L5 to 390 KHz. Turn tuning knob to max. frequency and Adjust C56 to 520 KHz. Repeat the last steps a few times to get the right VFO frequency range.

The procedure for the adjustment of the other two VFOs are the same, except for: NW: Adjust L4 to 500 KHz and C49 to 860 KHz. MW-SN: Adjust L3 to 850 KHz and C42 to 1875 KHz and repeat. Check the VCO-DC on R27 with the multimeter. If this voltage is less than 1,2V in the lower end of the bands or exceeds 7,5V in the high end of the bands. (Ambient temp. 18-25° C). Then adjust L29 on the receiver module. This completes the alignment of the offset loop.

6.3. ALIGNMENT OF FM-RECEIVER

Necessary measuring equipment

LF-millivoltmeter

VHF-signal generator (88-108 MHz).

Turn R15 until the signal level meter just moves. Connect the VHF-signal generator to the FM-antenna input. The generator should be modulated with 1 KHz and ± 70 KHz deviation. Tune receiver and generator to 98 MHz and adjust the yellow coil in the FM-tuner to max. using the signal level meter. Connect the LF-millivoltmeter across the loudspeaker and adjust L1 to max. AF output. This completes the alignment of the FM-receiver.

6.4. ALIGNMENT OF DISPLAY UNIT

Necessary measuring equipment:

Oscilloscope

Signal generator

Frequency counter

Connect the oscilloscope to the output of the dimmer-osc. IC3 pin 11. Turn the dimmer knob (P1) and see that the duty cycle and the light intensity of the LED display change.

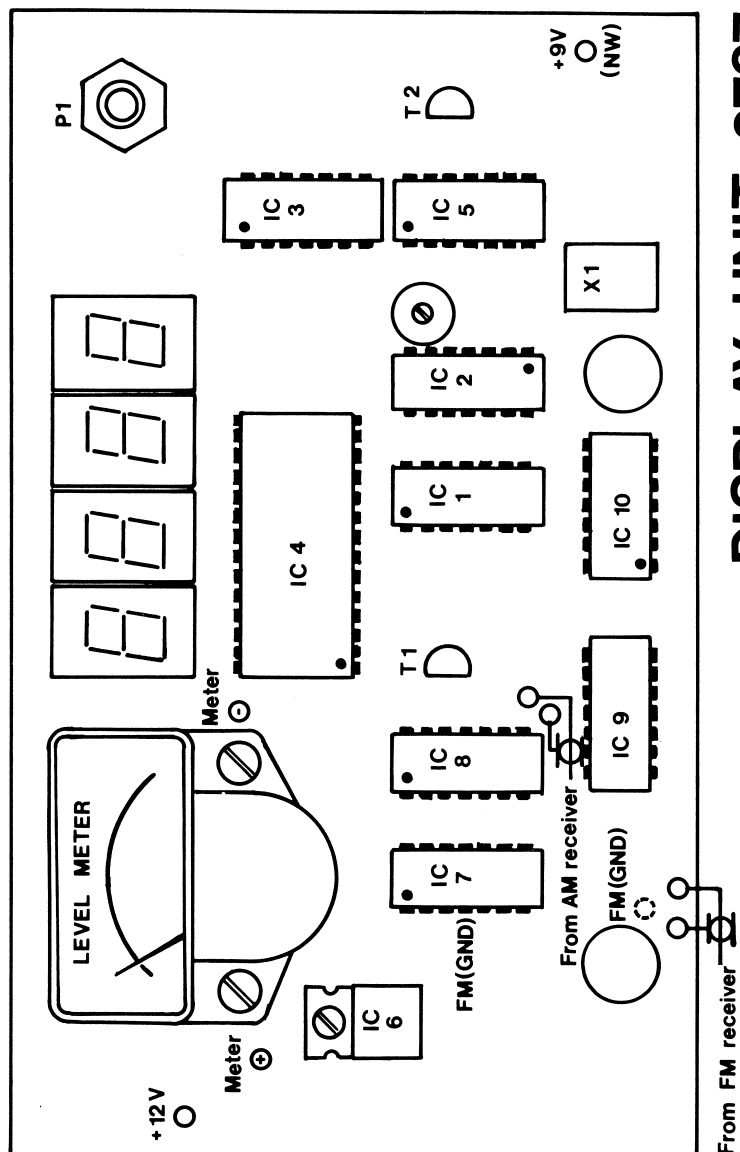
Connect the oscilloscope and the frequency-counter to IC 5 pin 5 and adjust the time base oscillator frequency to 6,5536 MHz. Use a nonloading test probe.

Disconnect or short circuit the VCO and FM-tuner input's. Turn Mode switch to AM, SSB or DF and Band switch to LW, MW or SW and check that the display reads 9299. Turn band switch to NW and see that display now shows 3000. Turn Mode switch to FM and see that display shows 9893. Connect the signal generator tuned to 118.70 MHz and with an output of app. 100mVrms to the FM-tuner input and see that the display reads 108.0 MHz.

Turn mode switch back to SSB or AM and band switch to NW. Connect the signal generator tuner to 15.300,00 MHz and with an output of app. 100mVrms to the VCO-input, the display should now read 600.0 If there is a slight difference from 600.00 then adjust C9 until correct readout is obtained.

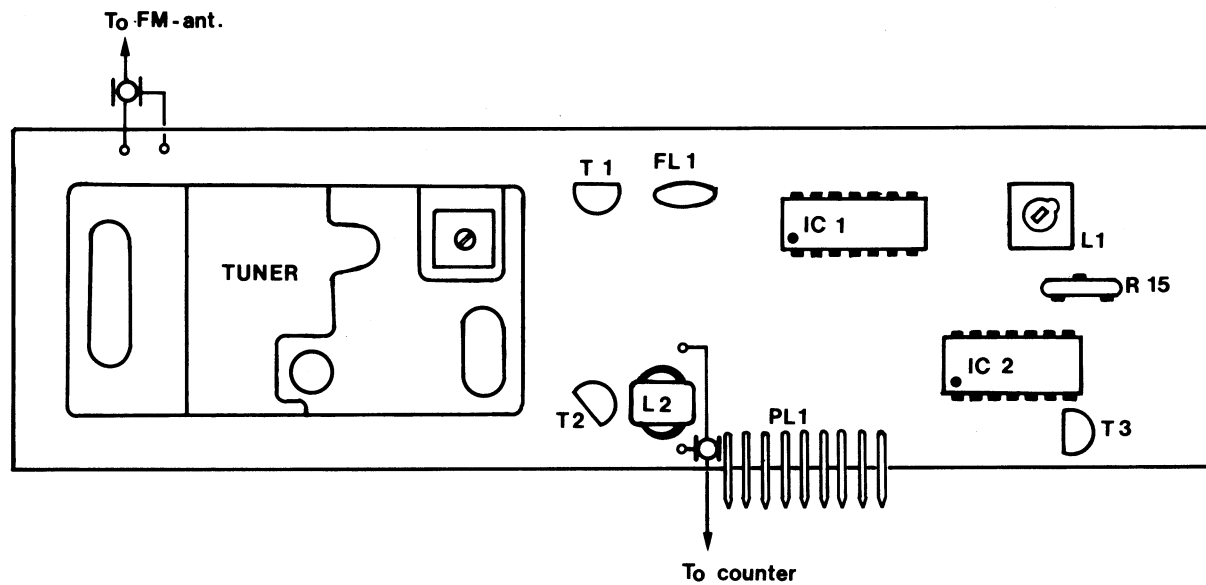
This ends the alignment of the RS 6000.

7. DIAGRAMS

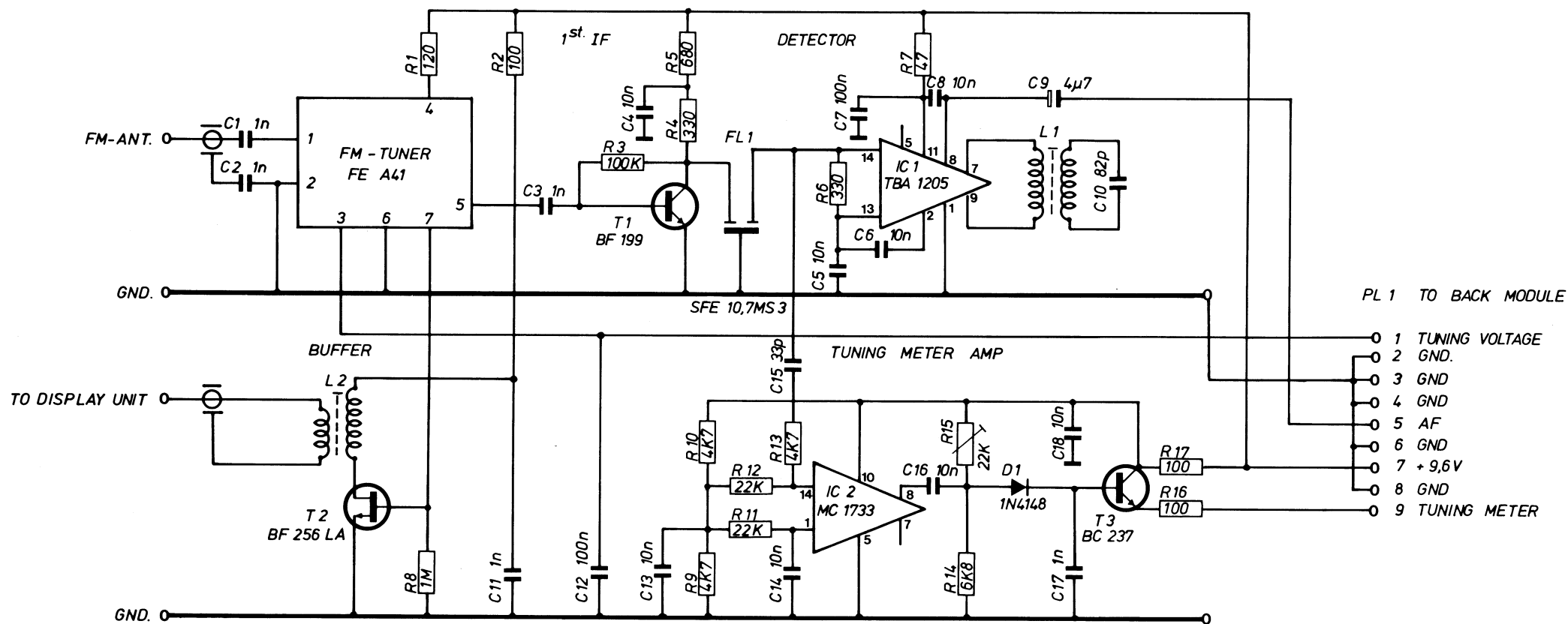


DISPLAY UNIT 2737

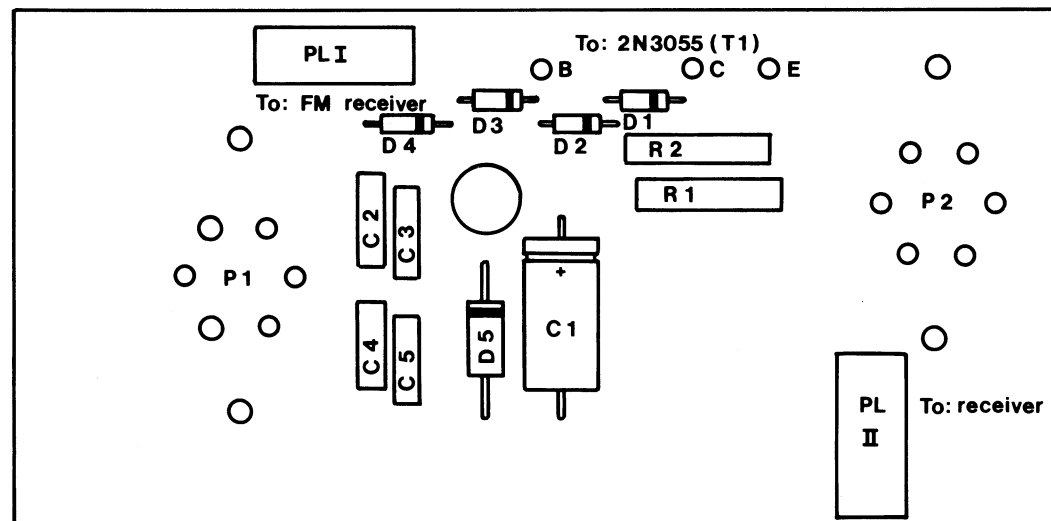
DRAWING No. 8037



FM RECEIVER 2750
DRAWING No. 8050

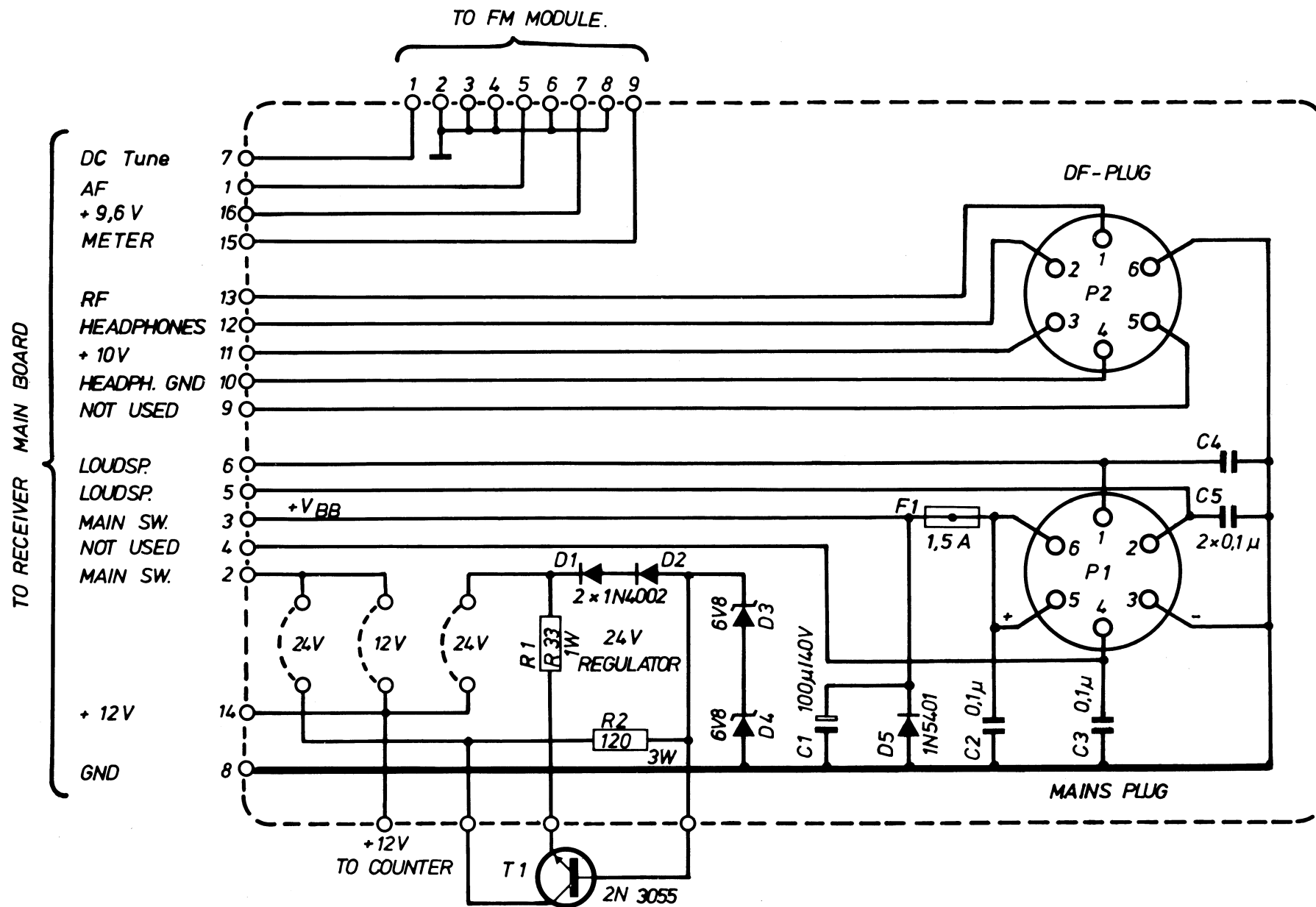


FM RECEIVER 2750
DIAGRAM NO. 7013

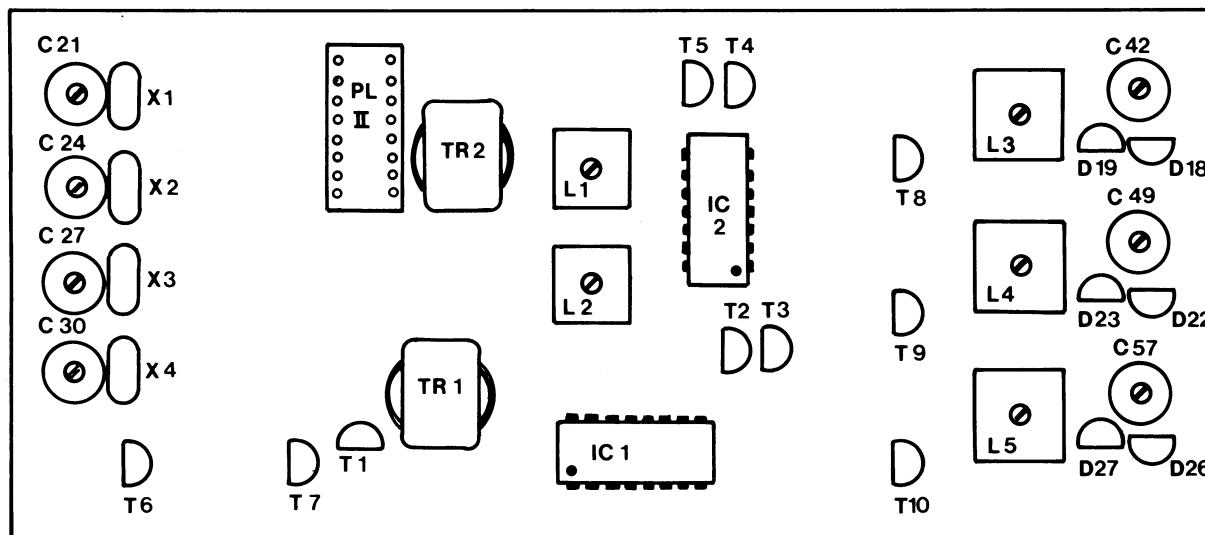


BACK MODULE 2735

DRAWING No. 8035

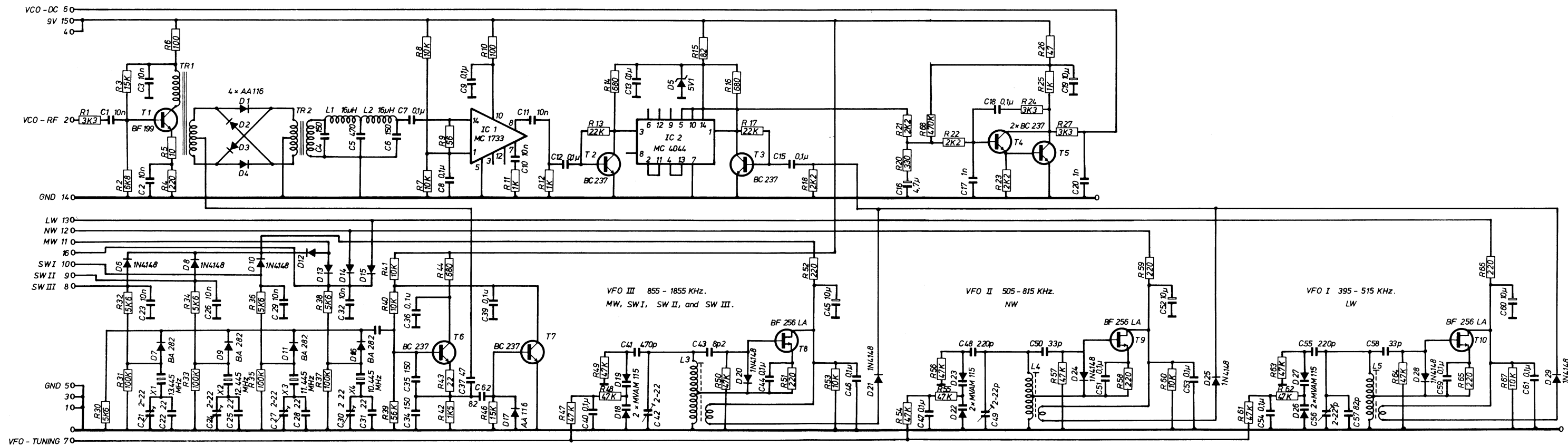


BACK MODULE 2735
DIAGRAM NO. 7014



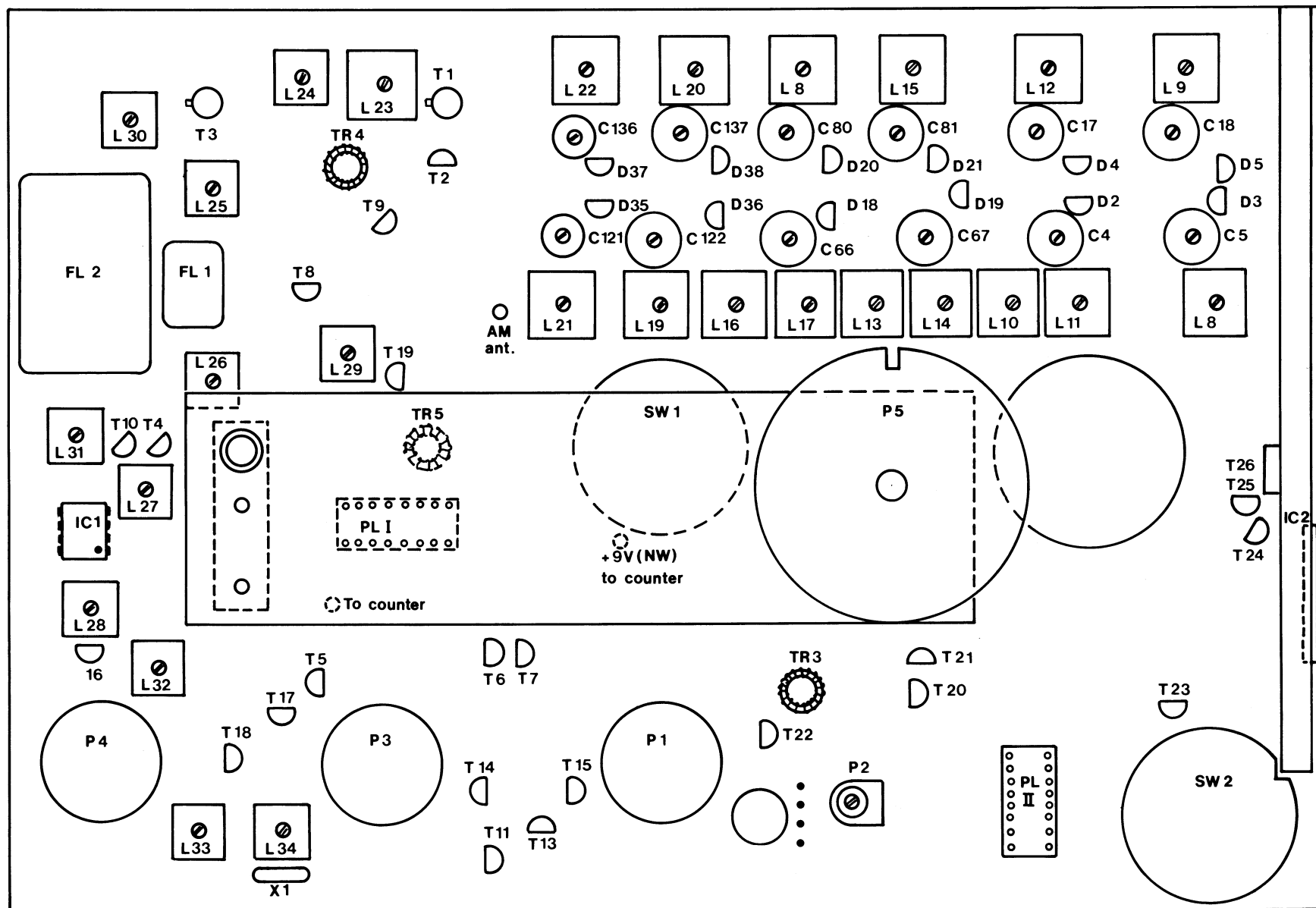
OFFSET LOOP 2749

DRAWING No. 8049



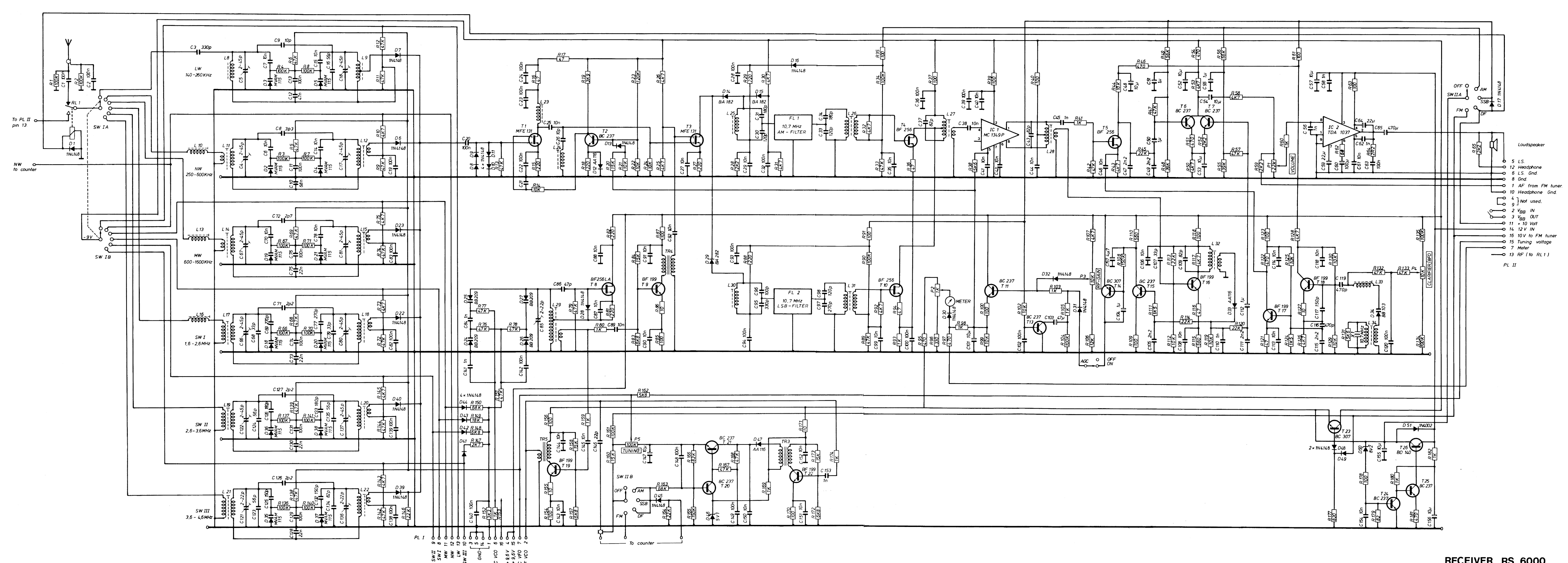
D12-15: 4x1N4148

R45: not used.



RECEIVER 2739

DRAWING No. 8039



RECEIVER RS 6000
DIAGRAM NO. 7016

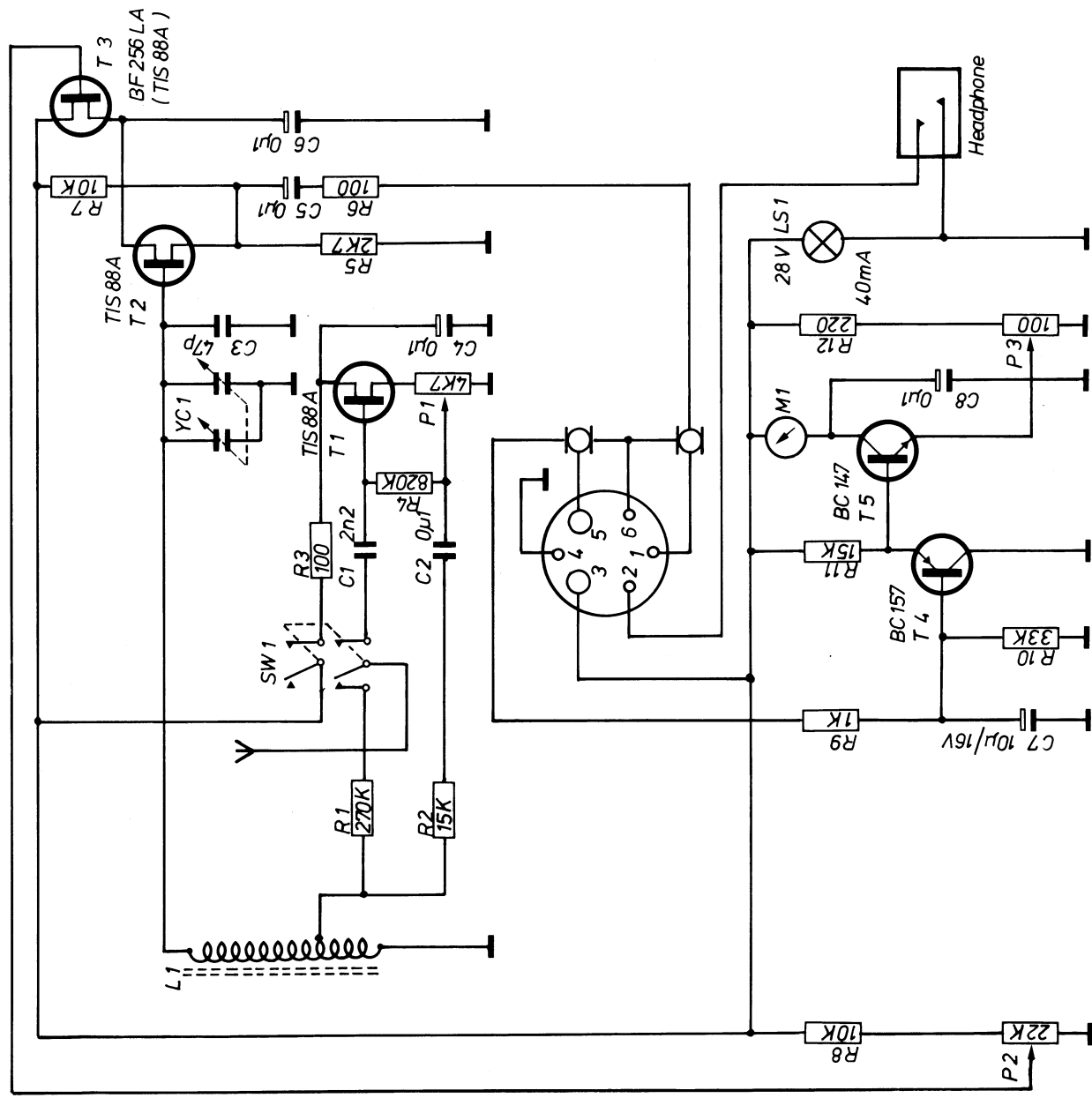


DIAGRAM FOR RS6010

DRAWING No. 7019

DISPLAY UNIT

R 1	Resistor	47	kohm	Philips	2322 211 13473
R 2	-	1	kohm	-	2322 211 13102
R 3	-	1	kohm	-	2322 211 13102
R 4	-	1	kohm	-	2322 211 13102
R 5	-	1	kohm	-	2322 211 13102
R 6	-	1	kohm	-	2322 211 13102
R 7	-	1	kohm	-	2322 211 13102
R 8	-	1	kohm	-	2322 211 13102
R 9	-	15	ohm 3w	-	2322 211 13102
R 10	-	1,5	kohm	-	2322 211 13152
R 11	-	180	ohm	-	2322 211 13181
R 12	-	470	ohm	-	2322 211 13471
R 13	-	2,2	kohm	-	2322 211 13222
R 14	-	10	kohm	-	2322 211 13103
R 15	-	4,7	kohm	-	2322 211 13472
R 16	-	1	kohm	-	2322 211 13102
R 17	-	6,8	kohm	-	2322 211 13682
R 18	-	3,3	kohm	-	2322 211 13332
R 19	-	10	kohm	-	2322 211 13103
R 20	-	10	kohm	-	2322 211 13103
R 21	-	22	kohm	-	2322 211 13223
R 22	-	10	kohm	-	2322 211 13103
R 23	-	10	kohm	-	2322 211 13103
R 24	-	10	kohm	-	2322 211 13103
R 25	-	10	kohm	-	2322 211 13103
R 26	-	10	kohm	-	2322 211 13103
R 27	-	10	kohm	-	2322 211 13105
R 28	-	1	kohm	-	2322 211 13102
R 29	-	10	ohm	-	2322 211 13109
R 39	-	100	ohm	-	2322 211 13101

D 7	Diode	ITT	1N 4148
D 8	-	-	1N 4148
D 9	-	-	1N 4148
D 10	-	-	1N 4148
D 11	-	-	1N 4148
D 12	-	-	1N 4148
D 13	-	-	1N 4148
D 14	-	-	1N 4148
D 15	-	-	1N 4148
T 1	Transistor	Siemens	BC 237 B
T 2	-	-	BC 237 B

IC 1	Integrated circuit	Texas	74LS02
IC 2	-	Siemens	74LS90
IC 3	-	Motorola	MC 14011
IC 4	-	Intersil	ICM 7217
IC 5	-	Intersil	ICM 7207
IC 6	-	Texas	7805
IC 7	-	-	74LS125
IC 8	-	-	74LS125
IC 9	-	Plessey	SP 8647 B
IC 10	-	Siemens	7490
Display 1-4	-	H.P.	5082-7751

LA 1	Lamp	12v/20mA
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Level meter	Bertral	366/E975B
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C 1	Capacitor cer	47	nF	Siemens	B37449-C6473-S2
C 2	-	82	pF	Ferroperm	9/ol21,9
C 3	el lyt	100	µF	Philips	2222 ol6 36101
C 4	cer	100	nF	Siemens	B37449-C6104-S2
C 5	-	100	nF	-	B37449-C6104-S2
C 6	-	10	nF	Draloric	EDRU 5
C 7	-	10	nF	-	EDRU 5
C 8	-	10	nF	-	EDRU 5
C 9	trim	2-22	pF	Philips	2222 808 11229
C 10	cer	22	pF	Ferroperm	9/oll6,9
C 11	-	56	pF	-	9/oll6,8
C 12	-	10	nF	Draloric	EDRU 5
C 13	-	10	nF	-	EDRU 5

D 1	Diode	ITT	1N 4148
D 2	-	-	1N 4148
D 3	-	-	1N 4148
D 4	-	-	1N 4148
D 5	-	-	1N 4148
D 6	-	-	1N 4148

FM RECEIVER

R 1	Resistor	12o	ohm	Philips	2322 211 13121				
R 2	-	1oo	ohm	-	2322 211 131ol				
R 3	-	1oo	kohm	-	2322 211 131o4				
R 4	-	33o	ohm	-	2322 211 13331				
R 5	-	68o	ohm	-	2322 211 13681				
R 6	-	33o	ohm	-	2322 211 13331				
R 7	-	47	ohm	-	2322 211 13471				
R 8	-	1	fllohm	-	2322 211 13472				
R 9	-	4,7	kohm	-	2322 211 13472				
R 1o	-	4,7	kohm	-	2322 211 13472				
R 11	-	22	kohm	-	2322 211 13223				
R 12	-	22	kohm	-	2322 211 13223				
R 13	-	4,7	kohm	-	2322 211 13472				
R 14	-	6,8	kohm	-	2322 211 13682				
R 15	Trimmer	22	kohm	-	2322 41o o1158				
R 16	Resistor	1oo	ohm	-	2322 211 131ol				
R 17	-	1oo	ohm	-	2322 211 131ol				

FM-tuner	Mitsumi	FE-A41
FL 1	Cer. filter	Murata
L 1	Coil	Neosid
L 2	-	R&S
		5163
		o4.4741

C 1	Capacitor cer	1	nF	Draloric	EDRU 5				
C 2	-	1	nF	-	EDRU 5				
C 3	-	1	nF	-	EDRU 5				
C 4	-	1o	nF	-	EDRU 5				
C 5	-	1o	nF	-	EDRU 5				
C 6	-	1o	nF	-	EDRU 5				
C 7	-	1oo	nF	Siemens	B37449-C61o4-S2				
C 8	-	1o	nF	Draloric	EDRU 5				
C 9	-	tan	4,7	ITT	IAG 4R7M25 SP				
C 1o	-	cer	82	pF Ferroperm	9/o121,9				
C 11	-	-	1	nF Draloric	EDRU 5				
C 12	-	-	1oo	nF Siemens	B37449-C61o5-S2				
C 13	-	-	1o	nF Draloric	EDRU 5				
C 14	-	-	1o	nF	EDRU 5				
C 15	-	-	33	pF Ferroperm	9/o116,8				
C 16	-	-	1o	nF Draloric	EDRU 5				
C 17	-	-	1	nF	EDRU 5				
C 18	-	-	1o	nF	EDRU 5				

D 1	Diode	ITT	IN 4148
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I 1	Transistor	Siemens	BF 199
I 2	-	Texas	BF 256 LA
I 3	-	Siemens	BC 237 B

IC 1	Integrated circuit	Siemens	TBA 12o S
IC 2	-	Motorola	MC 1733

BACK MODULE

R 1	Resistor	o,33	3w	Diplomatic	211 A
R 2	-	22o	3w	-	211 A
C 1	Capacitor	el	lyt	loo	µF/4ov Philips 2222 ol6 361ol
C 2	-	poly		o,1	µF - 2222 344 211o4
C 3	-	poly		o,1	µF - 2222 344 322o4
C 4	-	-		o,1	µF - 2222 344 211o4
C 5	-	-		o,1	µF - 2222 344 211o4

D 1	Diode	ITT	1N 4oo2
D 2	-	-	1N 4oo2
D 3	-	Siemens	BZY 97 6V8
D 4	-	Siemens	BZY 97 6V8
D 5	-	Siemens	1N 54ol

T 1	Transistor	Siemens	2N3o55
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F 1	Fuse	1,5 A
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OFFSET LOOP

R 1	Resistor	3,3 kohm	Philips	2322 211 13332
R 2	-	6,8 kohm	-	2322 211 13682
R 3	-	15 kohm	-	2322 211 13153
R 4	-	22o ohm	-	2322 211 13221
R 5	-	1o ohm	-	2322 211 131o9
R 6	-	1oo ohm	-	2322 211 131ol
R 7	-	1o kohm	-	2322 211 131o3
R 8	-	1o kohm	-	2322 211 131o3
R 9	-	56 ohm	-	2322 211 13569
R 1o	-	1oo ohm	-	2322 211 131ol
R 11	-	1 kohm	-	2322 211 131o2
R 12	-	1 kohm	-	2322 211 131o2
R 13	-	22 kohm	-	2322 211 13223
R 14	-	68o ohm	-	2322 211 13681
R 15	-	82 ohm	-	2322 211 12829
R 16	-	68o ohm	-	2322 211 13681
R 17	-	22 kohm	-	2322 211 13223
R 18	-	2,2 kohm	-	2322 211 13222
R 2o	-	33o ohm	-	2322 211 13331
R 21	-	2,2 kohm	-	2322 211 13222
R 22	-	2,2 kohm	-	2322 211 13222
R 23	-	2,2 kohm	-	2322 211 13222
R 24	-	3,3 kohm	-	2322 211 13332
R 25	-	1 kohm	-	2322 211 131o2
R 26	-	47 ohm	-	2322 211 13479
R 27	-	3,3 kohm	-	2322 211 13332
R 3o	-	5,6 ohm	-	2322 211 13562
R 31	-	1oo kohm	-	2322 211 131o4
R 32	-	5,6 kohm	-	2322 211 13562
R 33	-	1oo kohm	-	2322 211 131o4
R 34	-	5,6 kohm	-	2322 211 13562
R 35	-	1oo kohm	-	2322 211 131o4
R 36	-	5,6 kohm	-	2322 211 13562
R 37	-	1oo kohm	-	2322 211 131o4
R 38	-	5,6 kohm	-	2322 211 13562
R 39	-	56 kohm	-	2322 211 13563
R 4o	-	1o kohm	-	2322 211 131o3
R 41	-	1o kohm	-	2322 211 131o3
R 42	-	1,5 kohm	-	2322 211 13152
R 43	-	22 ohm	-	2322 211 13229
R 44	-	68o ohm	-	2322 211 13681
R 46	-	15 kohm	-	2322 211 13153
R 47	-	47 kohm	-	2322 211 13473
R 48	-	47 kohm	-	2322 211 13473
R 49	-	47 kohm	-	2322 211 13473
R 5o	-	47 kohm	-	2322 211 13473
R 51	-	22o ohm	-	2322 211 13221
R 52	-	22o ohm	-	2322 211 13221
R 53	-	1o kohm	-	2322 211 131o3
R 54	-	47 kohm	-	2322 211 13473
R 55	-	47 kohm	-	2322 211 13473
R 56	-	47 kohm	-	2322 211 13473
R 57	-	47 kohm	-	2322 211 13473
R 58	-	22o ohm	-	2322 211 13221
R 59	-	22o ohm	-	2322 211 13221
R 6o	-	1o kohm	-	2322 211 131o3

L 1	Coil	R&S	04.4739
L 2	-	-	04.4739
L 3	-	-	04.4737
L 4	-	-	04.4738
L 5	-	-	04.4738

Tr 1	Transformer	R&S	04.4740
Tr 2	-	R&S	04.4740

X 1	Crystal	13.445 MHz	R&S
X 2	-	12.445 MHz	-
X 3	-	11.445 MHz	-
X 4	-	10.445 MHz	-

RECEIVER

R 1	Resistor	100 kohm	Philips	2322 211 13104
R 2	-	100 kohm	-	2322 211 13104
R 3	-	100 kohm	-	2322 211 13104
R 4	-	100 kohm	-	2322 211 13104
R 5	-	47 kohm	-	2322 211 13473
R 6	-	47 kohm	-	2322 211 13473
R 7	-	100 kohm	-	2322 211 13104
R 8	-	100 kohm	-	2322 211 13104
R 9	-	47 kohm	-	2322 211 13473
R 10	-	4,7 kohm	-	2322 211 13472
R 11	-	47 kohm	-	2322 211 13473
R 12	-	4,7 kohm	-	2322 211 13472
R 13	-	47 kohm	-	2322 211 13473
R 14	-	10 kohm	-	2322 211 13103
R 15	-	220 ohm	-	2322 211 13224
R 16	-	47 ohm	-	2322 211 13479
R 17	-	47 ohm	-	2322 211 13479
R 18	-	220 ohm	-	2322 211 13221
R 19	-	3,9 kohm	-	2322 211 13392
R 20	-	15 kohm	-	2322 211 13153
R 21	-	10 kohm	-	2322 211 13103
R 22	-	10 kohm	-	2322 211 13103
R 23	-	120 kohm	-	2322 211 13124
R 24	-	10 kohm	-	2322 211 13103
R 25	-	4,7 kohm	-	2322 211 13472
R 26	-	4,7 kohm	-	2322 211 13472
R 27	-	220 ohm	-	2322 211 13221
R 28	-	2,2 kohm	-	2322 211 13222
R 29	-	220 ohm	-	2322 211 13221
R 30	-	4,7 kohm	-	2322 211 13472
R 31	-	4,7 kohm	-	2322 211 13472
R 32	-	4,7 kohm	-	2322 211 13472
R 33	-	47 kohm	-	2322 211 13473
R 34	-	100 kohm	-	2322 211 13104
R 35	-	100 ohm	-	2322 211 13101
R 36	-	47 ohm	-	2322 211 13479
R 37	-	100 ohm	-	2322 211 13101
R 38	-	5,6 kohm	-	2322 211 13562
R 39	-	100 ohm	-	2322 211 13101
R 40	-	100 ohm	-	2322 211 13101
R 41	-	1 kohm	-	2322 211 13102
R 42	-	47 kohm	-	2322 211 13473
R 43	-	4,7 kohm	-	2322 211 13472
R 44	-	10 kohm	-	2322 211 13103
R 45	-	22 kohm	-	2322 211 13223
R 46	-	470 ohm	-	2322 211 13471
R 47	-	47 kohm	-	2322 211 13473
R 48	-	39 kohm	-	2322 211 13393
R 49	-	56 kohm	-	2322 211 13563
R 50	-	4,7 kohm	-	2322 211 13472
R 51	-	470 ohm	-	2322 211 13471
R 52	-	2,2 kohm	-	2322 211 13222
R 53	-	4,7 kohm	-	2322 211 13472
R 54	-	470 ohm	-	2322 211 13471
R 55	-	39 kohm	-	2322 211 13393
R 56	-	56 kohm	-	2322 211 13563
R 57	-	47 kohm	-	2322 211 13473

R 58	Resistor	4,7 kohm	Philips	2322 211 13472	R116	Resistor	47 ohm	Philips	2322 211 13479
R 59	-	2,2 kohm	-	2322 211 13222	R117	-	4,7 kohm	-	2322 211 13472
R 60	-	1 kohm	-	2322 211 13102	R118	-	100 ohm	-	2322 211 13101
R 61	-	100 ohm	-	2322 211 13101	R119	-	10 kohm	-	2322 211 13103
R 62	-	68 ohm	-	2322 211 13689	R120	-	22 kohm	-	2322 211 13223
R 63	-	100 ohm	-	2322 211 13101	R121	-	47 ohm	-	2322 211 13479
R 64	-	2,2 ohm	-	2322 211 13228	R122	-	470 ohm	-	2322 211 13471
R 65	-	2,2 kohm	-	2322 211 13222	R123	-	100 ohm	-	2322 211 13101
R 66	-	100 kohm	-	2322 211 13104	R124	-	1,5 kohm	-	2322 211 13152
R 67	-	100 kohm	-	2322 211 13104	R125	-	10 kohm	-	2322 211 13103
R 68	-	47 kohm	-	2322 211 13473	R126	-	4,7 kohm	-	2322 211 13472
R 69	-	47 kohm	-	2322 211 13473	R127	-	10 ohm	-	2322 211 13109
R 70	-	100 kohm	-	2322 211 13104	R128	-	4,7 kohm	-	2322 211 13472
R 71	-	100 kohm	-	2322 211 13104	R129	-	10 kohm	-	2322 211 13103
R 72	-	47 kohm	-	2322 211 13473	R130	-	10 kohm	-	2322 211 13103
R 73	-	4,7 kohm	-	2322 211 13472	R131	-	5,6 kohm	-	2322 211 24562
R 74	-	47 kohm	-	2322 211 13473	R132	-	47 kohm	-	2322 211 13473
R 75	-	4,7 kohm	-	2322 211 13472	R133	-	47 kohm	-	2322 211 13473
R 76	-	47 kohm	-	2322 211 13473	R134	-	100 kohm	-	2322 211 13104
R 77	-	47 kohm	-	2322 211 13473	R135	-	100 kohm	-	2322 211 13104
R 78	-	47 kohm	-	2322 211 13473	R136	-	100 kohm	-	2322 211 13104
R 79	-	47 kohm	-	2322 211 13473	R137	-	100 kohm	-	2322 211 13104
R 80	-	1 kohm	-	2322 211 13102	R138	-	47 kohm	-	2322 211 13473
R 81	-	220 ohm	-	2322 211 13221	R139	-	47 kohm	-	2322 211 13473
R 82	-	220 ohm	-	2322 211 13221	R140	-	100 kohm	-	2322 211 13104
R 83	-	6,8 kohm	-	2322 211 13682	R141	-	100 kohm	-	2322 211 13104
R 84	-	15 kohm	-	2322 211 13153	R142	-	47 kohm	-	2322 211 13473
R 85	-	100 ohm	-	2322 211 13101	R143	-	4,7 kohm	-	2322 211 13472
R 86	-	10 ohm	-	2322 211 13109	R144	-	47 kohm	-	2322 211 13473
R 87	-	100 ohm	-	2322 211 13101	R145	-	4,7 kohm	-	2322 211 13472
R 88	-	220 ohm	-	2322 211 13221	R146	-	22 kohm	-	2322 211 13223
R 89	-	47 kohm	-	2322 211 13473	R147	-	2,7 kohm	-	2322 211 13272
R 90	-	100 kohm	-	2322 211 13104	R148	-	6,8 kohm	-	2322 211 13682
R 91	-	100 ohm	-	2322 211 13101	R149	-	18 kohm	-	2322 211 13183
R 92	-	4,7 kohm	-	2322 211 13472	R150	-	68 kohm	-	2322 211 13683
R 93	-	1 kohm	-	2322 211 13102	R151	-	47 kohm	-	2322 211 13473
R 94	-	47 ohm	-	2322 211 13479	R152	-	3,3 kohm	-	2322 211 13332
R 95	-	470 ohm	-	2322 211 13471	R153	-	1 kohm	-	2322 211 13102
R 96	-	330 ohm	-	2322 211 13331	R154	-	100 ohm	-	2322 211 13101
R 97	-	470 ohm	-	2322 211 13471	R155	-	10 ohm	-	2322 211 13109
R 98	-	1 kohm	-	2322 211 13102	R156	-	100 ohm	-	2322 211 13101
R 99	-	10 kohm	-	2322 211 13102	R157	-	6,8 kohm	-	2322 211 13682
R100	-	100 ohm	-	2322 211 13101	R158	-	15 kohm	-	2322 211 13153
R102	-	10 kohm	-	2322 211 13103	R159	-	1 kohm	-	2322 211 13102
R103	-	1 kohm	-	2322 211 13102	R160	-	15 kohm	-	2322 211 13153
R104	-	100 kohm	-	2322 211 13104	R161	-	100 kohm	-	2322 211 13104
R105	-	1 kohm	-	2322 211 13102	R162	-	6,8 kohm	-	2322 211 13682
R106	-	12 kohm	-	2322 211 13123	R163	-	68 kohm	-	2322 211 13683
R107	-	4,7 kohm	-	2322 211 13472	R164	-	22 kohm	-	2322 211 13223
R108	-	150 kohm	-	2322 211 13154	R165	-	150 kohm	-	2322 211 13154
R109	-	100 ohm	-	2322 211 13101	R166	-	82 kohm	-	2322 211 13823
R110	-	560 ohm	-	2322 211 13561	R167	-	47 kohm	-	2322 211 13473
R111	-	1,5 kohm	-	2322 211 13152	R168	-	47 kohm	-	2322 211 13473
R112	-	10 kohm	-	2322 211 13103	R169	-	1 kohm	-	2322 211 13102
R113	-	22 kohm	-	2322 211 13223	R170	-	100 ohm	-	2322 211 13101
R114	-	22 kohm	-	2322 211 13223	R171	-	10 ohm	-	2322 211 13109
R115	-	560 ohm	-	2322 211 13561	R172	-	6,8 kohm	-	2322 211 13682
					R 173	-	15 kohm	-	2322 211 13153

R174	Resistor	1	kohm	Philips	2322 211 131o2	
R177	-	82o	ohm	-	2322 211 13821	
R178	-	1oo	ohm	-	2322 211 131o1	
R179	-	82	ohm	-	2322 211 13829	
R18o	-	1	kohm	-	2322 211 131o2	
R181	-	47o	ohm	-	2322 211 13471	
R182	-	1	kohm	-	2322 211 131o1	
P 1	Pot.meter	22	kohm	Philips	2322 381 7o728	
P 2	Trimmer	1	kohm	-	2322 41o o33o4	
P 3	Pot.meter	1o	kohm	Rowido	813 342 SPEC	
P 4	-	1o	kohm	Philips	2322 35o 7o7o7	
P 5	Multi turn					
	pot.meter	1oo	kohm	Karl Hept	PTI-o1	
C 1	Capacitor	cer.	1oo	nF	Siemens	B37449-C61o4-52
C 2	-	-	1oo	nF	-	B37449-C61o4-52
C 3	-	sty	33o	pF	Philips	2222 427 433o1
C 4	-	trim	2-45	pF	DAU	1o92821.o4o
C 5	-	-	2-45	pF	-	1o92821.o4o
C 6	-	cer.	1o	nF	Draloric	EDRU 5
C 7	-	-	1o	nF	-	EDRU 5
C 8	-	-	3,3	pF	Ferroperm	9/o116,9
C 9	-	-	1o	pF	-	9/o116,9
C 1o	-	poly	68	nF	Philips	2222 344 55683
C 11	-	cer	1oo	nF	Siemens	B37449-C61o4-52
C 12	-	poly	47	nF	Philips	2222 344 55473
C 13	-	cer	1oo	nF	Siemens	B37449-C61o4-52
C 14	-	-	1o	nF	Draloric	EDRU 5
C 15	-	-	1o	nF	-	EDRU 5
C 16	-	-	56	pF	Ferroperm	9/o116,8
C 17	-	trim	2-45	pF	DAU	1o92821.o4o
C 18	-	-	2-45	pF	DAU	1o92821.o4o
C 19	-	cer	1oo	nF	Siemens	B37449-C61o4-52
C 2o	-	-	1oo	nF	-	B37449-C61o4-52
C 21	-	-	1	nF	Draloric	EDRU 5
C 22	-	-	1oo	nF	Siemens	B37449-C61o4-52
C 23	-	-	1oo	nF	Siemens	B37449-C61o4-52
C 24	-	-	1oo	nF	-	B27449-C61o4-52
C 25	-	-	1o	nF	Draloric	EDRU 5
C 26	-	-	1o	pF	Ferroperm	9/o116,9
C 27	-	-	1o	nF	Draloric	EDRU 5
C 28	-	-	1oo	nF	Siemens	B37449-C61o4-52
C 29	-	-	1o	nF	Draloric	EDRU 5
C 3o	-	sty	12o	pF	Philips	2222 427 412o1
C 31	-	-	18o	pF	-	222 427 418o1
C 32	-	-	1oo	nF	Siemens	B37449-C61o4-52
C 33	-	cer	12o	pF	Philips	2222 427 412o1
C 34	-	sty	18o	pF	Philips	2222 427 412o1
C 35	-	cer	1o	nF	Draloric	EDRU 5
C 36	-	-	1oo	nF	Siemens	B37449-C61o4-52
C 37	-	-	82	pF	Ferroperm	9/o121,9
C 38	-	-	1o	nF	Draloric	EDRU 5
C 39	-	-	1oo	nF	Siemens	B37449-C61o4-52
C 4o	-	-	1o	nF	Draloric	EDRU 5

C 41	Capacitor	cer.	1o	nF	Draloric	EDRU 5
C 42	-	-	1o	nF	-	EDRU 5
C 43	-	-	82	pF	Ferroperm	9/o121,9
C 44	-	-	1o	nF	Draloric	EDRU 5
C 45	-	-	1	nF	-	EDRU 5
C 46	-	-	1o	nF	-	EDRU 5
C 47	-	sty	2,2	nF	Philips	2222 426 422o2
C 48	-	tan	1o	µF	ITT	TAG 1oM25 SP
C 49	-	sty	2,2	nF	Philips	2222 426 422o2
C 5o	-	tan	1	µF	ITT	TAG 1RoM35 SP
C 51	-	-	1	µF	-	TAG 1RoM35 SP
C 52	-	-	1o	µF	-	TAG 1oM25 SP
C 53	-	-	1o	µF	-	TAG 1oM25 SP
C 54	-	-	1o	µF	-	TAG 1oM25 SP
C 55	-	-	1	µF	-	TAG 1RoM35 SP
C 56	-	cer	1	nF	Draloric	EDRU 5
C 57	-	tan	1o	µF	ITT	TAG 1oM25 SP
C 58	-	cer	1	nF	Draloric	EDRU 5
C 59	-	tan	22	µF	ITT	TAG 2M25 SP
C 6o	-	el.lyt	1oo	µF	Philips	2222 o16 361o1
C 61	-	cer.	1o	nF	Draloric	EDRU 5
C 62	-	cer	1	nF	-	EDRU 5
C 63	-	poly	1oo	nF	Philips	2222 344 211o4
C 64	-	tan	22	µF	ITT	TAG 2M26 SP
C 65	-	el lyt	47o	µF	Philips	2222 o32 16471
C 66	-	trim	2-45	pF	DAU	1o9 2821.o4o
C 67	-	-	2-45	pF	-	1o9 2821.o4o
C 68	-	cer.	33	pF	Ferroperm	9/o116,8
C 69	-	sty	27o	pF	Philips	2222 427 427o1
C 7o	-	cer	1o	nF	Draloric	EDRU 5
C 71	-	-	2,2	pF	Ferroperm	9/o116,9
C 72	-	-	2,7	pF	-	9/o116,9
C 73	-	poly	22	nF	Philips	2222 344 55223
C 74	-	cer.	1oo	nF	Siemens	B 37449-C61o4-52
C 75	-	poly	22	nF	Philips	2222 344 55223
C 76	-	cer.	1oo	nF	Siemens	B37449-C61o5-52
C 77	-	sty	27o	pF	Philips	2222 427 427o1
C 78	-	cer	1o	nF	Draloric	EDRU 5
C 79	-	-	33	pF	Ferroperm	9/o116,8
C 8o	-	trim	2-45	pF	DAU	1o9 2821.o4o
C 81	-	-	2-45	pF	-	1o92821.o4o
C 82	-	cer.	1oo	nF	Siemens	B 37449-C61o4-52
C 83	-	-	1oo	nF	Siemens	B 37449-C61o4-52
C 84	-	-	1	nF	Draloric	EDRU 5
C 85	-	trim	2-22	pF	Philips	2222 8o8 11229
C 86	-	cer.	47	pF	Ferroperm	9/o116,8
C 87	-	-	1o	nF	Draloric	EDRU 5
C 88	-	-	1o	nF	-	EDRU 5
C 89	-	-	1o	nF	-	EDRU 5
C 9o	-	-	1o	nF	-	EDRU 5
C 91	-	-	1o	nF	-	EDRU 5
C 92	-	-	1o	nF	-	EDRU 5
C 93	-	-	1oo	nF	Siemens	B37449-C61o4-52
C 94	-	-	1oo	nF	Siemens	B37499-V61o4-52
C 95	-	sty	33o	pF	Philips	2222 427 433o1
C 96	-	-	1oo	pF	-	2222 427 41oo1
C 97	-	-	27o	pF	-	2222 427 427o1
C 98	-	-	12o	pF	-	2222 427 412o1

C 99	Capacitor	cer.	lo	nF	Draloric	EDRU 5	Capacitor	cer	2,2 pF	Ferroperm	9/oll6,9
C100	-	-	100	nF	Draloric	B 37449-C6104-S2	C157	-	2,2 pF	-	9/oll6,9
C101	-	tan	10	µF	ITT	TAG 10M25 SP	C158	-	2,2 pF	-	9/oll6,9
C102	-	cer	100	nF	Siemens	B 37449-C6104-S2					
C103	-	el.lyt	47	µF	Philips	2222 034 57479					
C104	-	tan	1	µF	ITT	TAG 1RoM35 SP					
C105	-	sty	2,2	nF	Philips	2222 426 42202					
C106	-	cer	10	nF	Draloric	EDRU 5					
C107	-	-	33	pF	Ferroperm	9/oll6,8					
C108	-	-	10	nF	Draloric	EDRU 5					
C109	-	-	82	pF	Ferroperm	9/ol21,9					
C110	-	sty	1	nF	Philips	2222 426 41002					
C111	-	-	2,2	nF	Philips	2222 426 42202					
C112	-	tan	1	µF	ITT	TAG 1RoM35 SP					
C113	-	cer	10	nF	Draloric	EDRU 5					
C114	-	-	10	nF	-	EDRU 5					
C115	-	sty	2,2	nF	Philips	2222 426 42202					
C116	-	-	470	pF	-	2222 427 44701					
C117	-	-	150	pF	-	2222 427 41501					
C118	-	cer	10	nF	Draloric	EDRU 5					
C119	-	sty	470	pF	Philips	2222 427 44701					
C120	-	cer	100	nF	Siemens	B37449-C6104-S2					
C121	-	trim	2-22	pF	Philips	2222 808 11229					
C122	-	-	2-45	pF	DAU	109 2821.040					
C123	-	cer	56	pF	Ferroperm	9/oll6,8					
C124	-	-	56	pF	-	9/oll6,8					
C125	-	sty	150	pF	Philips	2222 427 41501					
C126	-	-	180	pF	-	2222 427 41801					
C126A	-	cer.	2,2	pF	Ferroperm	9/oll6,9					
C127	-	-	2,2	pF	-	9/oll6,9					
C128	-	poly	22	nF	Philips	2222 344 55223					
C129	-	cer.	100	nF	Siemens	B37449-C6104-S2					
C130	-	poly	22	nF	Philips	2222 344 55223					
C131	-	cer	100	nF	Siemens	B37449-C6105-S2					
C132	-	sty	150	pF	Philips	2222 427 41501					
C133	-	-	180	pF	-	2222 427 41801					
C134	-	cer	82	pF	Ferroperm	9/ol21,9					
C135	-	-	56	pF	-	9/oll6,8					
C136	-	trim	2-22	pF	Philips	2222 808 11229					
C137	-	-	2-45	pF	DAU	109 2821.040					
C138	-	cer	100	nF	Siemens	B37449-C6104-S2					
C139	-	-	100	nF	-	B37449-C6104-S2					
C140	-	-	100	nF	-	B37449-C6104-S2					
C141	-	-	1	nF	Draloric	EDRU 5					
C142	-	-	100	nF	Siemens	B37449-C6104-S2					
C143	-	cer	10	nF	Draloric	EDRU 5					
C144	-	-	10	nF	-	EDRU 5					
C145	-	-	10	nF	-	EDRU 5					
C146	-	cer	22	pF	Ferroperm	9/oll6,9					
C147	-	tan	10	µF	ITT	TAG 10M25 SP					
C148	-	cer	100	nF	Siemens	B37449-C6104-S2					
C149	-	-	100	nF	-	B37449-C6104-S2					
C150	-	-	10	nF	Draloric	EDRU 5					
C151	-	-	10	nF	-	EDRU 5					
C152	-	-	10	nF	-	EDRU 5					
C153	-	-	1	nF	-	EDRU 5					
C154	-	-	10	nF	-	DRRU 5					
C155	-	tan.	10	µF	ITT	TAG 10M25 SP					
C156	-	tan	10	µF	ITT	TAG 10M25 SP					

T 1	Transistor	Motorola	MFE 131	Tr 3	Transformer	R&S	04.4707
T 2	-	Siemens	BC 237 B	Tr 4	-	-	04.4707
T 3	-	Motorola	MFE 131	Tr 5	-	-	04.4707
T 4	-	Texas	BF 256 LA				
T 5	-	-	BF 256 LA				
T 6	-	Siemens	BC 237 B				
T 7	-	-	BC 237 B	X 1	Crystal	10.7 MHz	R&S
T 8	-	Texas	BF 256 LA				
T 9	-	Siemens	BF 199				
T 10	-	Texas	BF 256 LA	SW 1	Switch	R&S	N1/20 6005
T 11	-	Siemens	BC 237 B	SW 2	-	-	N1/20 6004
T 12	-						
T 13	-	Siemens	BC 237 B				
T 14	-	-	BC 307				
T 15	-	-	BC 237 B				
T 16	-	-	BF 199				
T 17	-	-	BF 199				
T 18	-	-	BF 199				
T 19	-	-	BF 199				
T 20	-	-	BC 237 B				
T 21	-	-	BC 237 B				
T 22	-	-	BF 199				
T 23	-	-	BC 307				
T 24	-	-	BC 237				
T 25	-	-	BC 237				
T 26	-	-	BD 140				
IC 1		Motorola	MC 1349 P				
IC 2		Siemens	TDA 1037				
L 8	Coil	R&S	04.4742				
L 9	-	-	04.4743				
L 10	-	-	04.4744				
L 11	-	-	04.4745				
L 12	-	-	04.4746				
L 13	-	-	04.4747				
L 14	-	-	04.4748				
L 15	-	-	04.4749				
L 16	-	-	04.4750				
L 17	-	-	04.4751				
L 18	-	-	04.4752				
L 19	-	-	04.4753				
L 20	-	-	04.4754				
L 21	-	-	04.4755				
L 22	-	-	04.4756				
L 23	-	-	04.4757				
L 24	-	-	04.4758				
L 25	-	-	04.4759				
L 26	-	-	04.4760				
L 27	-	-	04.4761				
L 28	-	Siemens	04.4762				
L 29	-	-	04.4763				
L 30	-	-	04.4759				
L 31	-	-	04.4760				
L 32	-	-	04.4764				
L 33	-	-	04.4765				
L 34	-	-	04.4766				

RS 6010

R 1	Resistor	270	kohm	Philips	2322 211 13274
R 2	-	15	kohm	-	2322 211 13153
R 3	-	100	kohm	-	2322 211 13101
R 4	-	820	kohm	-	2322 211 13821
R 5	-	2,7	kohm	-	2322 211 13272
R 6	-	100	kohm	-	2322 211 13101
R 7	-	10	kohm	-	2322 211 13103
R 8	-	10	kohm	-	2322 211 13103
R 9	-	1	kohm	-	2322 211 13102
R 10	-	33	kohm	-	2322 211 13333
R 11	-	15	kohm	-	2322 211 13153
R 12	-	220	kohm	-	2322 211 13224

P 1	Preset	4,7	kohm	Philips	2322 410 o3306
P 2	Pot.meter	22	kohm	-	
P 3	Preset	100	ohm	-	2322 410 o3301

C 1	Capacitor	2,2	nF		
C 2	-	0,1	µF		
C 3	-	47	pF		
C 4	-	0,1	µF		
C 5	-	0,1	µF		
C 6	-	0,1	µF		
C 7	-	10	µF		
C 8	-	0,1	µF		

YC 1 Var. capacitor

T 1	Transistor	TIS 88A	
T 2	-	IIS 88A	
T 3	-	IIS 88A	
T 4	-	BC 157	
T 5	-	BC 147	

L 1 Coil

M 1 Level meter

LS 1	Lamp	24v/40mA
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SW 1 Switch