

R 1121.

30/1-89. VI

(ny)



Sailor

Sailor

IC 2206

700.345

**INSTRUKTIONSBOG FOR
SAILOR R1121**

**INSTRUCTION BOOK FOR
SAILOR R1121**



A/S S. P. RADIO · AALBORG · DENMARK

INSTRUCTION BOOK FOR
SCANNING RECEIVER R1121

The 2nd Version.

VALID FROM S.N. 328182

R1121

GENERAL DESCRIPTION

INTRODUCTION

SAILOR R1121 is a scanning receiver intended for reception of F1 radiotelex signals.

SAILOR R1121 covers the following bands:

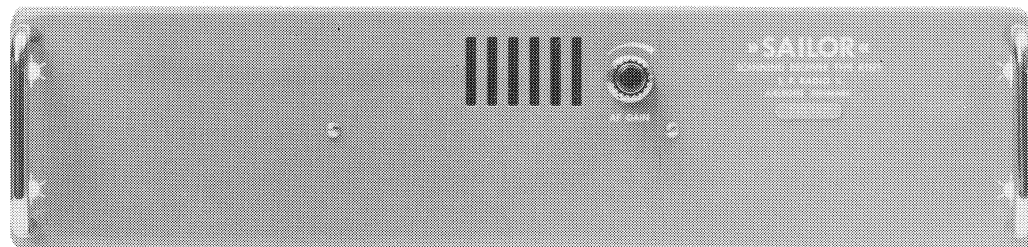
1.60 MHz - 3.80 MHz
4.20 MHz - 4.36 MHz
6.32 MHz - 6.51 MHz
8.43 MHz - 8.72 MHz
12.65 MHz - 13.11 MHz
16.85 MHz - 17.24 MHz
22.31 MHz - 22.60 MHz

SAILOR R1121 uses a digital synthesizer for frequency generation, and thus it can be set to any frequency in the above mentioned frequency ranges. The digital synthesizer is controlled from keyboard of the V.D.U. via a built-in microprocessor. The frequency stability is controlled from one 10 MHz TCXO.

SAILOR R1121 is provided with high order RF band pass filter to ensure good communication performance.

SAILOR R1121 scanning facilities are controlled from V.D.U. keyboard via the ARQ H1240.

SAILOR R1121 can be supplied with a self-contained cabinet H1225 and an AC/DC power supply N1405.



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TECHNICAL DATA

The receiver is fully synthesized and has a frequency resolution of 100 Hz.

The receiver is intended for reception of the following wave types F1 (F1B)

Frequency Ranges: 1.6 - 3.8 MHz and the maritime radiotelex HF bands (4 - 22 MHz)

Frequency Drift, Short Time: less than 5 Hz

Frequency Drift, Long Time: less than 20 Hz per year

Frequency Drift: 0 - 40°C: less than 20 Hz
also possibility for better figures for frequency drift when using another TCXO.

<u>IF Bandwidth:</u>	Min.passband at -6 dB	Max. pass band at -60 dB	Classification of reception	
			old	new
	+150 Hz -150 Hz	-750 Hz +750 Hz	F1	F1B

Sensitivity, 20 dB SN/N: <5 dB/1 uV

Blocking: wanted signal 20 dB/1 uV
blocking level >100 dB/1 uV

Intermodulation: wanted signal 30 dB/1 uV
3rd order intermodulation f = 30 kHz
intermodulation level >90 dB/1 uV

Operation Temperature Range: -15°C to +55°C

Spurious Rejection: 0 - 30 MHz: >80 dB

Spurious Emission: $P_{out} < 0.1 \text{ nW}$ into 50 ohm

Audio Outputs:

Loudspeaker 4W into 8 ohm
Line 0 dBm into 600 ohm

Automatic Gain Control:

$\Delta V_{in} = 40 \text{ dB}$ attack time <2mS
decay time approx. 80 mS

IF Frequencies: 1st IF: 10.6085 MHz & 16.6085 MHz
2nd IF: 600 kHz

R1121 A

SCANNING FACILITIES FOR SAILOR AUTOMATIC RADIOTELEX STATION

Possibility for 15 radio stations with call-code and name.

Each station has 7 receiving and transmitting frequencies.

The scanning table can by the operator be created with up to 21 frequency pairs.

The 15 groups are named A to O.

The first 5 groups from A to E can only be stored with the strap W8 not inserted.

The last 10 groups from F to O can be stored by the operator and later changed if necessary.

The 7 frequency pairs in each group is named from A1 to A7 and O1 to O7 etc.

STATION TABLE CONTROL

To enter call-code and name into the station table.

STN A = (call-code)(name)(return)

STN B = (call-code)(name)(return)

etc.

To erase one group (A) from the station table.

CREATE A (return)

To enter receive and transmit frequencies into the station table.

STN A1 = (receive frequency)(transmit frequency)(return)

STN A2 = (receive frequency)(transmit frequency)(return)

etc.

To erase the frequency in A1.

STN A1 = (∅.∅)(∅.∅)(return)

etc.

Listing of:

STN (return) List all the stored stations, call-code and name.

STN A (return) List station A particulary.

STN A1 (return) List A1 frequency pair.

SCANNING CONTROL

The scanning table can be stored into default (the non-volatile memory).

When power-up and after power failure the default channels will be loaded into the scanning table.

To create a scanning table:

SCAN, A, B1, B7, F (return) for A it is the complete group.

SCANNING FACILITIES FOR SAILOR AUTOMATIC RADIOTELEX STATION cont.

To delete or add channels into the scanning table:

ADD C2, B3 (return)

DELETE A, B1 (return)

To store the scanning table into default.

STORE (return)

To scan the default channels:

SCAN X (return)

or

SCAN A1, X (return)

To stop the scanning.

STOP (return)

SCAN A1 (return). Only one channel.

To stop the scanning when receiving a free-signal.

SEL (return)

DESEL (return) (to annulment).

To list the scanning table:

SCAN (return)

COMMUNICATION CONTROL COMMANDS

FEC and ARQ mode can only be used after a STOP command or when a single channel is scanned.

FEC (return)

ARQ (return) use the call-code and name related to the STATION TABLE.

ARQ 12345 (return)

ARQ A to 0 (return) use the call-code and name related to the STATION TABLE.

ARQ R (return) repeat the call with the last used call-code.

When using the CABLE command the call will first be initiated when receiving a free-signal.

To initiate a call at the first free channel:

CALL (return) call the first free channel in the scanning sequence.

CALL 12345 (return)

CALL A to 0 (return) use the call code and name related to the STATION TABLE.

CALL R (return) repeat the call with the last used call-code.

When the station is waiting for a free-signal from e.g. LYNGBY, all the other channels in the scanning table will be checked for an incoming call.

R1121 A

OPERATING INSTRUCTIONS FOR AUTOMATIC RADIOTELEX STATION

SAILOR R1121 can receive in the maritime telex frequencies.

SAILOR S1303/04 can be set for any frequency in the ranges 1.6 - 8.4 MHz and the 12-16-22-25 MHz maritime HF bands.

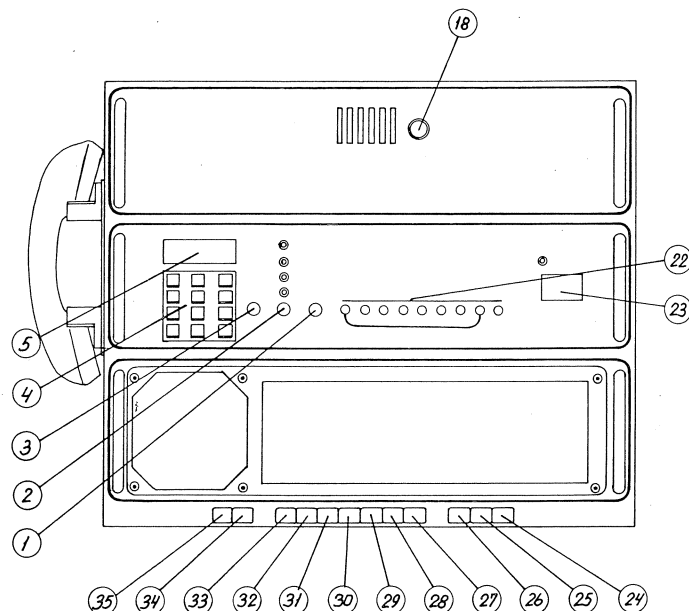
AUTOTELEX

1. Switch on the station by activating the ON (24) button.
2. Turn the AF GAIN (18) to suitable volume.
3. Turn DISTRESS SWITCH (3) to center position. (EXTERNAL FREQUENCY CONTROL).
4. Turn POWER SWITCH (2) fully clockwise.
5. Press the button TELEX (22).
6. Press the button SIMPLEX TWO AERIALS (32).
7. Turn on the ARQ H1240.
8. The station is now ready for operation.
9. For manual communication use Communication Procedure 1.13. Stop the scanner on the station wanted and activate an ARQ Call. E.g. ARQ D Return.
10. For automatic call in MARITEX mode use the soft keys.
E.g.
CALL - AUTOTX (soft keys).

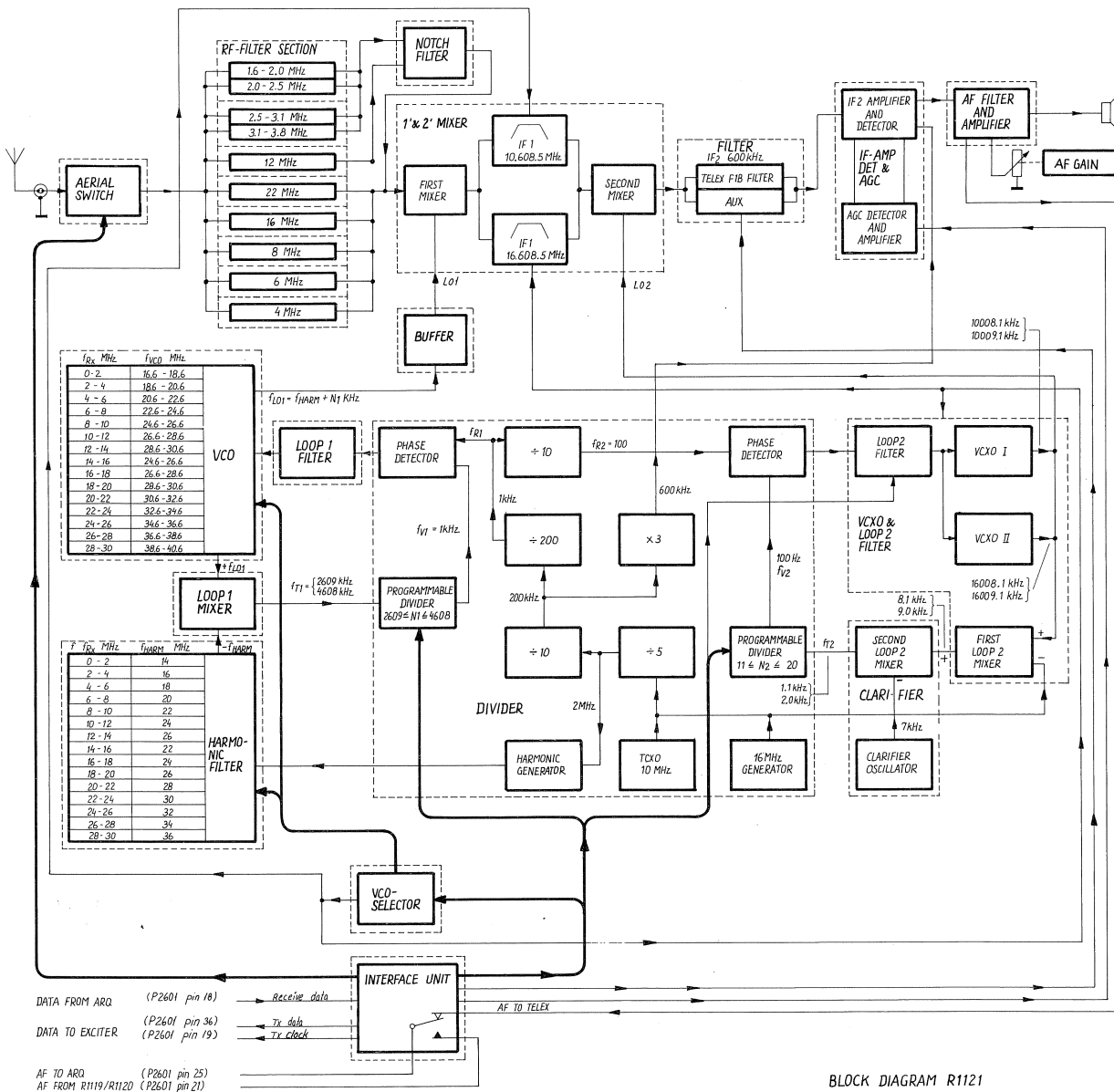
A-Space-TLX1235678+-letter-Return (keyboard)

Important! The working frequency for radiotelex communication is given as assigned frequency (center frequency for the modulation). The frequencies in the quick select register (the STATION TABLE) must be the carrier frequency.

The carrier frequency = assigned frequency - 1700 Hz.



PRINCIPLE OF OPERATION



BLOCK DIAGRAM R1121

R1121 B1/5
4-0-25205

RECEIVER R1121

The SAILOR R1121 is a fully synthesized double superheterodyne receiver with 10.6085 MHz or 16.6085 MHz 1st IF and 600 kHz 2nd IF.

The signal from the aerial is led through the band filter unit to the first mixer where the aerial signal is mixed with the f_{L01} signal having frequency resolution of 1 kHz, and thus giving a 1st IF frequency range from 10.6081 MHz to 10.6090 MHz or 16.6081 MHz to 16.6090 MHz.

PRINCIPLE OF OPERATION cont.

The signal is then led through a double monolithic crystal filter to the second mixer, where the signal is mixed with the f_{L02} signal having a frequency resolution of 100 Hz in the frequency range from 10.0081 MHz to 10.0090 MHz or 16.0081 MHz to 16.0090 MHz, and thus giving a 2nd IF frequency of 600 kHz.

The 16.6085 MHz 1st IF is selected in the frequency range 0.0100 MHz to 13.9999 MHz and 16.6085 MHz in the range 14.0000 MHz to 29.9999 MHz.

The produced 2nd IF signal is led through the standard telex FIB filter or an optional filter. The switching of the filters is controlled through the interface unit.

The signal is then passed on to the IF2 amplifier and detector. The IF amplifier consists of 3 AGC controlled amplifier stages. The detector is an envelope detector, and the carrier is reinjected in such a way that the incoming signal is converted to an A3H signal.

The reinjected carrier in SSB mode is 600 kHz derived from the 10 MHz reference oscillator.

The AGC detector and amplifier consists of a fast telex AGC system and the SSB AGC system. The switching between the two systems is done by the interface unit.

The audio frequency signal is fed from the detector to the AF filter and amplifier, consisting of an audio filter, a preamplifier and an output power amplifier, which delivers signal to the fixed AF output (0 dBm) and the speaker. The fixed AF output is led to relay located on the interface unit PCB and through that further on to plug P2601. Through switching of the relay it can be chosen whether the internal AF-signal in R1121 or an AF-signal coming from external equipment must be led on to the ARQ. The switching of relay is controlled by the interface unit.

The necessary frequencies are generated by two frequency synthesizers according to the phase locked principle.

Local oscillator signal f_{L01} to first mixer is generated in the phase locked loop 1 and has a resolution of 1 kHz.

Local oscillator signal f_{L02} to second mixer is generated in the phase locked loop 2 and has a resolution of 100 Hz.

LOOP 1

The voltage controlled oscillator (VCO) generates the necessary local oscillator signal to first mixer in twelve 2 MHz bands selected by the band control unit. Inside each 2 MHz band the VCO frequency f_{L01} is controlled by a DC controlled voltage derived from the phase detector and filtered out in the LOOP 1 filter.

The phase detector compares two signals, a variable frequency f_{V1} and a reference frequency f_{R1} . The reference frequency f_{R1} is the 10 MHz TCXO frequency divided down to 1 kHz.

The variable frequency f_{V1} is generated from the VCO frequency f_{L01} in the following way:

In the loop 1 mixer the counter frequency f_{T1} is produced as the difference between the VCO frequency f_{L01} and the frequency f_{HARM} which is a multiple of 2 MHz derived from the 10 MHz TCXO.

PRINCIPLE OF OPERATION cont.

$$f_{T1} = f_{L01} - f_{HARM} = f_{L01} - (m \times 2 \text{ MHz}) = N_1 \times 1 \text{ kHz}$$

For each 2 MHz band a new f_{L01} and f_{HARM} is selected by the band control unit, and it always results in a 2 MHz variation of the frequency f_{T1} to programmable divider.

The frequency f_{T1} is divided down by a dividing figure N_1 in the programmable divider to the variable frequency f_{V1} .

$$f_{V1} = f_{T1}/N_1 = 1 \text{ kHz}$$

The working principle in a phase locked loop is as follows:

A frequency error between the variable frequency f_{V1} and the reference frequency f_{R1} will via the phase detector and the loop 1 filter cause a DC control voltage controlling the VCO frequency and consequently the variable frequency f_{V1} so that f_{V1} follows the reference frequency f_{R1} in frequency.

$$f_{R1} = f_{V1} = 1 \text{ kHz}$$

The VCO frequency f_{L01} is now phase locked on a fixed frequency to the reference frequency f_{R1} and has therefore the same accuracy as this.

Changing of the VCO frequency f_{L01} by 1 kHz is carried out by changing the dividing figure N_1 in the programmable divider by one.

$$f_{L01} = f_{HARM} + (N_1 \times 1 \text{ kHz})$$

Principle of programming:

The programmable divider contains a counter circuit counting down from a start figure $2000 + P_1$ and stops at the stop figure S_1 . Each time the counter reaches the stop figure S_1 , a pulse (f_{V1}) is fed to the phase detector, and the counter starts counting down again from the start figure $2000 + P_1$. Division of f_{T1} by N_1 is now achieved.

$$f_{V1} = f_{T1}/N_1; N_1 = 2000 + P_1 - S_1$$

The band control unit selects the correct VCO- and harmonic filter range.

Inside each 2 MHz band the programmable figure P_1 is encoded from the key board control unit in BCD code representing the frequency within the 2 MHz band.

$$\text{Start figure: } 2000 + P_1; 0 \leq P_1 \leq 1999$$

$$\text{Stop figure: } S_1 = -609$$

$$N_1 = 2000 + P_1 - S_1 = P_1 + 2609$$

Output frequency from Loop 1:

$$f_{L01} = m \times 2 \text{ MHz} + (P_1 + 2069) \times 1 \text{ kHz}; 7 \leq m \leq 18$$

PRINCIPLE OF OPERATION cont.

LOOP 2

The voltage controlled crystal oscillator (VCXO) generates the necessary local oscillator signal to second mixer. The VCXO is in the loop 2 system phase locked to the internal 10 MHz reference frequency.

The phase locked loop principle is the same as for the loop 1 system. The only difference is that there are two mixers in the feed-back path, where the one injection signal is a fixed 10 MHz or 16 MHz signal and the other one f_{CL} is the clarifier signal.

The clarifier oscillator is in R1121 adjusted to a fixed frequency of 7 kHz.

Principle of programming:

The frequency shift in loop 2 is controlled from the 0.1 kHz code from the keyboard control unit.

The programmable divider counts up from the start figure P_2 to the stop figure S_2 .

The 0.1 kHz code controls the start figure P_2 to the programmable divider.

$$\text{Start figure: } 0 \leq P_2 \leq 9$$

$$\text{Stop figure: } S_2 = 20$$

$$\text{Dividing figure: } N_2 = S_2 - P_2 = 20 - P_2$$

Output frequency from loop 2:

$$f_{L02} = 10 \text{ MHz} + f_{CL} + (N_2 \times 0.1 \text{ kHz})$$

$$f_{L02} = 10.007 \text{ MHz} + (20 - P_2) \times 0.1 \text{ kHz}$$

$$f_{L02} = 10.009 \text{ MHz} - (P_2 \times 0.1 \text{ kHz})$$

or:

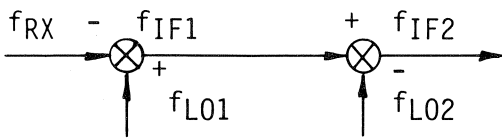
$$f_{L02} = 16 \text{ MHz} + f_{CL} + (N_2 \times 0.1 \text{ kHz})$$

$$f_{L02} = 16.007 \text{ MHz} + (20 - P_2) \times 0.1 \text{ kHz}$$

$$f_{L02} = 16.009 \text{ MHz} - P_2 \times 0.1 \text{ kHz}$$

PRINCIPLE OF OPERATION cont.

RECEIVING FREQUENCY f_{RX} FOR RECEIVER R1121



$$f_{IF2} = 0.600 \text{ MHz}$$

$$f_{L02} = \begin{matrix} 10.009 \text{ MHz} - (P_2 \times 0.1 \text{ kHz}) \\ 16.009 \text{ MHz} - (P_2 \times 0.1 \text{ kHz}) \end{matrix}$$

$$f_{IF1} = f_{IF2} + f_{L02} = \begin{matrix} 10.009 \text{ MHz} - (P_2 \times 0.1 \text{ kHz}) \\ 16.009 \text{ MHz} - (P_2 \times 0.1 \text{ kHz}) \end{matrix}$$

$$f_{L01} = m \times 2 \text{ MHz} + (P_1 + 2609) \times 1 \text{ kHz}, \quad 7 \leq m \leq 18$$

For $0.0100 \text{ MHz} < f_{RX} \leq 13.9999 \text{ MHz}$

$$f_{RX} = f_{L01} - f_{IF1} = (m-4) \times 2 \text{ MHz} + (P_1 + 0.1 P_2) \times 1 \text{ kHz}$$

For $14.0000 \text{ MHz} < f_{RX} \leq 29.9999 \text{ MHz}$

$$f_{RX} = f_{L01} - f_{IF1} = (m-7) \times 2 \text{ MHz} + (P_1 + 0.1 P_2) \times 1 \text{ kHz}$$

R1121 B5/5

AERIAL TUNE-UP PROCEDURE

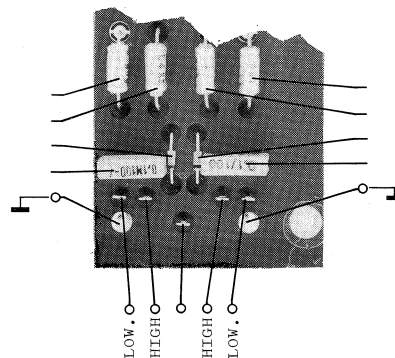
For coaxial cable length from aerial to receiver above 12 m, no tuning is necessary when installing the receiver, since all RF-filter sections are from factory set for 50 ohm input impedance.

In the RF-filter sections covering the CT-band 1.6 - 3.8 MHz there is the possibility of changing the input impedance from 50 ohm to approx. 300 ohm. This may be advantageous for installations with short coaxial cables 1-12 m.

In the RF-filter sections covering the short wave band, the input impedance cannot be changed from 50 ohm.

ADJUSTMENT PROCEDURE CT-BAND

1. Connect the aerial to the input terminal of the receiver.
2. Select a frequency in the range of respectively 1.6 - 2.0 MHz, 2.0 - 2.5 MHz, 2.5 - 3.1 MHz, and 3.1 - 3.8 MHz.
3. Connect a voltmeter to TP19 and notice the voltage.
4. Change the input impedance of the filter used from low to high as shown below, and notice the AGC-voltage again.
5. Choose the strapping of impedance which gives the largest AGC-voltage.
6. Execute this adjustment for all four RF-filter sections covering the CT-band.



SERVICE

1. MAINTENANCE
2. NECESSARY TEST EQUIPMENT
3. TROUBLE-SHOOTING
4. PERFORMANCE CHECK
5. ADJUSTMENT PROCEDURE
6. NECESSARY ADJUSTMENTS AFTER REPAIR
7. FUNCTION CHECK
8. MECHANICAL DISASSEMBLING T1127 ONLY

1. MAINTENANCE

When the SAILOR short wave programme 1000 has been correctly installed, the maintenance can, dependent on the environments and working hours, be reduced to a performance check at the service workshop at intervals not exceeding 5 years. A complete performance check list is enclosed in the PERFORMANCE CHECK section.

Also inspect the antennas, cables and plugs for mechanical defects, salt deposits, corrosion and any foreign bodies.

Along with each set a test sheet is delivered, in which some of the measurings made at the factory are listed. If the performance check does not show the same values as those on the test sheet, the set must be adjusted as described under ADJUSTMENT PROCEDURE.

Any repair of the set should be followed by a FUNCTION CHECK of the unit in question.

2. NECESSARY TEST EQUIPMENT

TX: T1127, T1127L
 EXC: S1300, S1301
 RX: R1119, R1120, R1121
 PS: N1400, N1401

TX	EXC	RX	PS	
X	X	X	X	<u>Oscilloscope:</u> Bandwidth DC - 35 MHz Sensitivity 2 mV/cm Input impedance 1 Mohm//30 pF Triggering EXT-INT-ENVELOPE E.g. Philips type PM3216
X	X	X		<u>Passive Probe:</u> Attenuation 20 dB (10X) Input resistance 10 Mohm Input capacitance 15 pF Compensation range 10 - 30 pF E.g. Philips type PM8925
	X	X		<u>Multimeter:</u> Sensitivity DC (f.s.d.) 1V Input impedance 10 Mohm Accuracy (f.s.d.) <u>+2%</u> E.g. Philips type PM2505
X			X	<u>Multimeter</u> Sensitivity DC (f.s.d.) 0.3V & 3A Input impedance 30 Kohm/V Accuracy (f.s.d.) <u>+1%</u> Current range 100 A Voltage range 500V & 2.5 kV E.g. Unigor type A43 Shunt type GE4277 H.T. probe type GE4196
	X	X		<u>Tone Generator:</u> Frequency range 200 - 3000 Hz Output voltage 1V RMS Output impedance <u>≤600 ohm</u> E.g. Philips type PM5107
		X		<u>AF Voltmeter:</u> Sensitivity (f.s.d.) 300 mV Input impedance <u>≥4 ohm</u> Accuracy (f.s.d.) <u>+5%</u> Frequency range 100 - 3000 Hz E.g. Philips type PM2505

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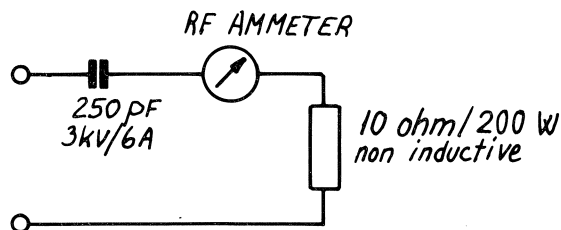
2. NECESSARY TEST EQUIPMENT cont.

TX	EXC	RX	PS	
	X	X		<u>Frequency Counter:</u> Frequency range 100 Hz - 30 MHz Resolution 0.1 Hz at $f \geq 10$ MHz Accuracy 1×10^{-7} Sensitivity 100 mV RMS Input impedance 1 Mohm//25 pF Single period range 1 sec. Resolution 1 msec. E.g. Philips type PM6611 + PM9679
		X		<u>Signal Generator:</u> Frequency range 0.1 - 30 MHz Output impedance 50/75 ohm Output voltage 1 uV - 100 mV EMF Modulation AM, 30%, 1000 Hz Ext. mod. 300 - 2700 Hz Ext. mod. sensitivity 1V for M=0.3 E.g. Philips type PM5326
X		X		<u>Power Supplies:</u> N1400/T1127: V_{out} 26.5V DC I_{out} 70A DC E.g. 2 pcs. Lambda type LXS-G-24-0V-R
	X			<u>Power Supplies:</u> S1300, S1301 V_{out} 1 22V I_{out} 1 1.5A V_{out} 2 -45 V I_{out} 2 -0.1A E.g. SAILOR types N1402 N1402 spec. N1405
	X	X		R1119, R1120, R1121: V_{out} 1 22V I_{out} 1 1A V_{out} 2 8V I_{out} 2 1A V_{out} 3 -45V I_{out} 3 -0.1A E.g. SAILOR types N1402 spec. N1405

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2. NECESSARY TST EQUIPMENT cont.

TX	EXC	RX	PS	
	X			<u>Testbox S1300/S1301:</u> S.P. type S1300/01 testbox
	X			<u>Artificial Key S1300TT/S1301:</u> S.P. type Artificial key
X				<u>Power Meter:</u> Power range 500W Impedance 50 ohm E.g. Bird ThruLine Wattmeter Model 43 Plug-in element 500W 2-30 MHz
X				<u>RF Ammeter (Thermocross):</u> Current range 5A E.g. Helweg Mikkelsen & Co. Copenhagen, Denmark, type TR-68x71, 5A
X	X			<u>Dummy Load for HF Bands, 4-25 MHz:</u> Impedance 50 ohm Frequency range 4-25 MHz Power range 400W SWR 1:1.2 E.g. Bird Termaline Coaxial Resistor Model 8401
X				<u>Dummy Load for C.T. Band 1.6 - 4 MHz:</u>



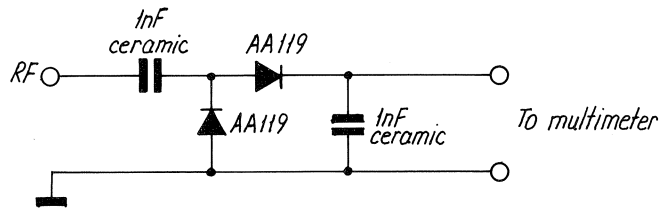
E.g. Draloric type 06-1291TD 20x50L 8KV's 250 pF $\pm 20\%$ R85.

E.g. 10 pcs. Dale type PH-25A-17, 100 ohm, 5%, 25W

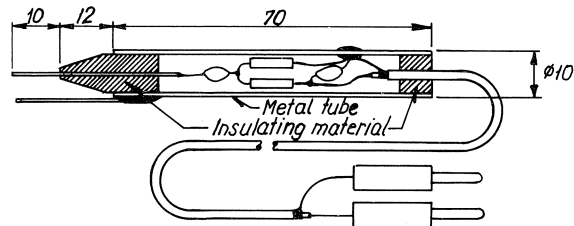
R1121 B3/4

2. NECESSARY TEST EQUIPMENT cont.

Diode Probe
TEST PROBE



Layout of the Probe
LAYOUT OF THE PROBE

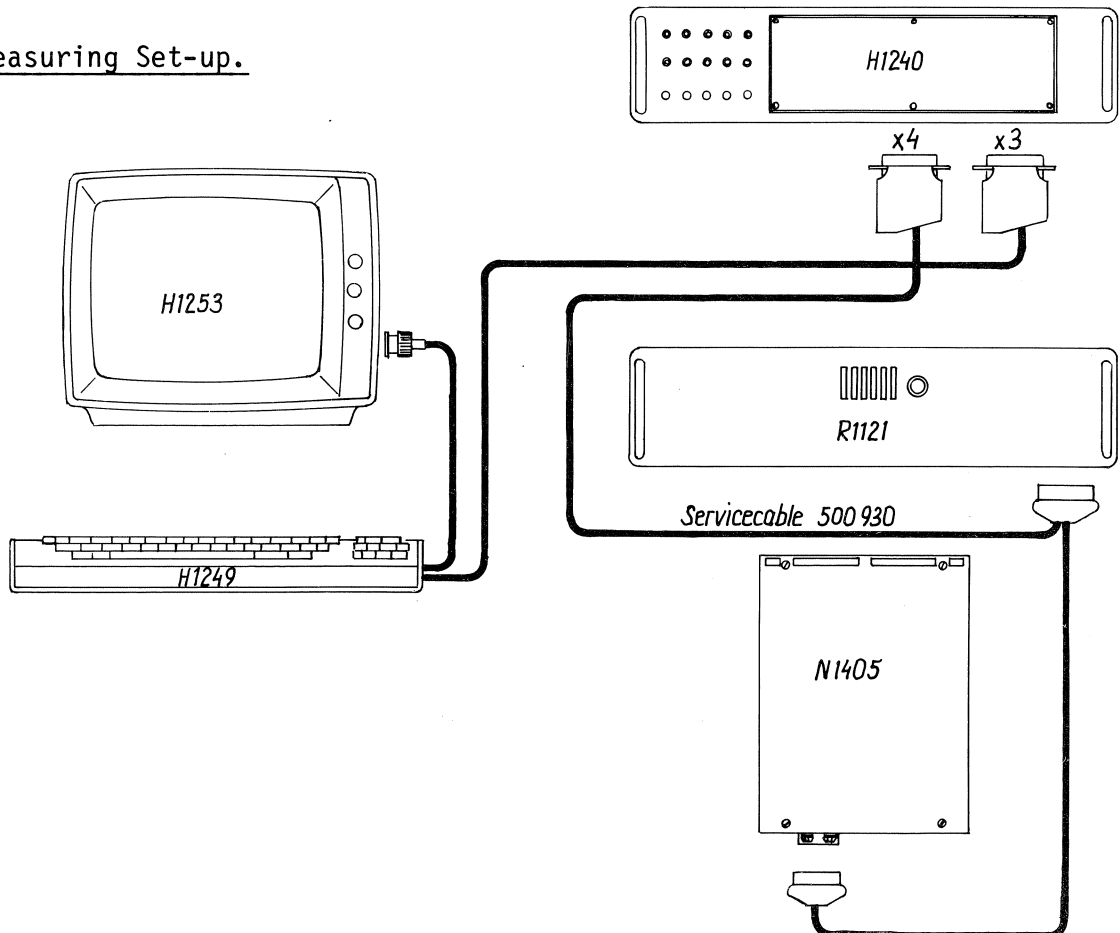


To perform check and adjustment of SAILOR R1121, the radiotelex modem H1240, the keyboard processor H1249, and the video monitor H1253 are required.

The measuring set-up is shown below.

The connections between R1121, H1240, and power supply are made through service cable type No. 500930.

Measuring Set-up.



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2. NECESSARY TEST EQUIPMENT cont.

FREQUENCIES USED WHEN EXECUTING THE PERFORMANCE CHECK/ADJUSTMENT PROCEDURE

Receiver Freq. f_{RX}

10.0 kHz	1800.0 kHz
2000.0 kHz	1600.0 kHz
4000.0 kHz	1999.0 kHz
6000.0 kHz	2250.0 kHz
8000.0 kHz	2000.0 kHz
10000.0 kHz	2499.0 kHz
12000.0 kHz	2800.0 kHz
20000.0 kHz	2500.0 kHz
22000.0 kHz	3099.0 kHz
24000.0 kHz	3450.0 kHz
26000.0 kHz	3100.0 kHz
28000.0 kHz	3799.0 kHz
1999.0 kHz	4280.0 kHz
3999.0 kHz	4200.0 kHz
5999.0 kHz	4360.0 kHz
7999.0 kHz	6410.0 kHz
9999.0 kHz	6320.0 kHz
11999.0 kHz	6510.0 kHz
13999.0 kHz	8570.0 kHz
21999.0 kHz	8430.0 kHz
23999.0 kHz	8720.0 kHz
25999.0 kHz	12880.0 kHz
27999.0 kHz	12650.0 kHz
29999.0 kHz	13110.0 kHz
2000.1 kHz	17000.0 kHz
2000.2 kHz	16850.0 kHz
2000.4 kHz	17240.0 kHz
2000.8 kHz	22460.0 kHz
2000.9 kHz	22310.0 kHz
22500.9 kHz	22599.0 kHz

Transmitter Freq. f_{TX}

7000 kHz

NOTE! For programming frequencies into the radiotelex modem, look up the reference manual for telex modem H1240, section 2, pages 5-2 and 5-3.

R1121

3. TROUBLE-SHOOTING

Trouble-shooting should only be performed by persons with sufficient technical knowledge, who have the necessary test equipment at their disposal, and who have carefully studied the operation principles and structure of the unit in question.

Start to find out whether the fault is somewhere in the antenna circuit, the power source, or in the short wave set.

For help with trouble-shooting in the short wave set there is a built-in test meter and test meter switch, located behind the air filter on the power supply.

When the fault has been located to a certain unit look up the performance check list in the instruction book and make relevant performance check to incircle the fault. Then look-up the CIRCUIT DESCRIPTION section. This section contains schematic components. (ADJUSTMENT LOCATIONS). Typical AC and DC voltages are indicated on the schematic diagrams.

No adjustment must take place unless the service workshop has the necessary test equipment to perform the adjustment procedure in question.

After repair or replacement of the module look-up the section NECESSARY ADJUSTMENTS AFTER REPAIR to see, whether the unit has to be adjusted or not.

Anyway the unit has to have a complete function check after repair.

TROUBLE-SHOOTING IN THE FREQUENCY GENERATING CIRCUIT

LOOP 1

If the fault has been located to Loop 1 the following hints can be used for trouble-shooting.

If there is no output signal from the VCO the fault has to be found in the VCO-unit.

If the output frequency from the VCO is lower than the low frequency limits or higher than the high frequency limits of the 2 MHz band in question, the phase-locked Loop 1 is out of lock. For VCO frequencies look-up the section PRINCIPLE OF OPERATION.

1. Check the Loop 1 mixer output signal on the terminal "Loop 1 out", module 1400.
 - a. If there is no output signal, the failure is on Loop 1 mixer, harmonic filter unit or VCO-unit.
 - b. If the output frequency is approx. 2 MHz or approx. 5 MHz, the VCO-unit, Loop 1 mixer and the harmonic filter unit are apparently ok.
2. Check that the frequency on the phase/frequency detector IC1006, pin 1 is 1 kHz.

3. TROUBLE-SHOOTING cont.

3. Check the Loop 1 programmable divider, module 1000.
 - a. If the frequency on the input terminal "Loop 1 In" is approx. 2 MHz and the frequency on the phase/frequency detector IC1006, pin 3 is lower than 1 kHz, the programmable divider is apparently ok.
 - b. If the frequency on terminal "Loop 1 In" is approx. 5 MHz and the frequency on the phase/frequency detector IC1006, pin 3 is higher than 1 kHz, the programmable divider is apparently ok.
4. Check the phase/frequency detector IC1006.
 - a. Measure 1.5V DC on "PD1 Out" on the divider unit.
 - b. If the input frequency on IC1006, pin 3 is higher than 1 kHz and the DC-voltage on "PD1 Out" is approx. 0.7V, the phase/frequency detector is apparently ok.
 - c. If the input frequency on IC1006, pin 3 is lower than 1 kHz and the DC-voltage on "PD1 Out" is approx. 2.3V, the phase/frequency detector is apparently ok.
5. Check the integrator IC1102 on Loop 1 filter & +-18V supply unit, module 1100.
 - a. IF the DC-voltage on "PD1 In" is approx. 0.7V and the DC-voltage on output terminal of IC1102, pin 6 is approx. -4V, the integrator IC1102 is apparently ok.
 - b. If the DC-voltage on "PD1 In" is approx. 2.3V and the DC-voltage on the output terminal of IC1102, pin 6 is approx. -17V, the integrator IC1102 is apparently ok.
6. If the failure has not been found yet the 1 kHz loop filter IC1101 and the selection circuit for choosing VCO- and harmonic filter must be checked.

LOOP 2

If the fault has been located to Loop 2 the following hints can be used for trouble-shooting.

If there is no output signal from the VCX0, 1st Loop 2 mixer and Loop 2 filter on terminal "LO2 Out", the failure has to be found in the VCX0.

If the output frequency from the VCX0, 1st Loop 2 mixer and Loop 2 filter on terminal "LO2 Out" is lower than 10.008 MHz or higher than 10.009 MHz, respectively 16.008 MHz and 16.009 MHz, the phase-locked Loop 2 is out of lock.

1. Check the output signal from VCX0, 1st Loop 2 mixer and Loop 2 filter on terminal "First Loop 2 Out".
 - a. If there is no output signal, the failure is in the 1st Loop 2 mixer or that the 10 MHz and/or 16 MHz injection signal is missing.
 - b. If the output frequency is slightly lower than 8 kHz or slightly higher than 9 kHz the VCX0, the 1st Loop 2 mixer and the 10 MHz and/or 16 MHz injection signal are apparently ok.

3. TROUBLE-SHOOTING cont.

2. Check the output signal on TP10 on the clarifier and 2nd Loop 2 mixer, module 1700.
 - a. If there is no output signal, the failure is on the clarifier and 2nd Loop 2 mixer circuit board.
 - b. If the output frequency is lower than 1 kHz or higher than 2 kHz, then the clarifier and 2nd Loop 2 mixer are apparently ok.
3. Check that the frequency on the phase/frequency detector IC1013, pin 1 is 100 Hz.
4. Check the Loop 2 programmable divider.
 - a. If the frequency on terminal "Loop 2 In", module 1000 is lower than 1 kHz and the frequency on the phase/frequency detector IC1013, pin 3 is lower than 100 Hz, the programmable divider is apparently ok.
 - b. If the frequency on terminal "Loop 2 In", module 1000 is higher than 2 kHz and the frequency on the phase/frequency detector IC1013, pin 3 is higher than 100 Hz, the programmable divider is apparently ok.
5. Check the phase/frequency detector IC1013.
 - a. Measure 1.5V DC on terminal "PD 2 Out" on the divider unit.
 - b. If the input frequency on IC1013, pin 3 is lower than 100 Hz and the DC voltage on terminal "PD 2 Out" is approx. 0.7V, the phase/frequency detector is apparently ok.
 - c. If the input frequency on IC1013, pin 3 is higher than 100 Hz and the DC voltage on terminal "PD 2 Out" is approx. 2.3V, the phase/frequency detector is apparently ok.
6. Check the integrator IC1601b on VCX0, 1st Loop 2 mixer and Loop 2 filter.
 - a. If the DC voltage on TP9 is approx. 0.7V and the DC voltage on output terminal IC1601b, pin 1 is approx. 17V, the integrator is apparently ok.
 - b. If the DC voltage on TP9 is approx. 2.3V and the DC voltage on the output terminal of IC1601b, pin 1 is approx. 1V, the integrator is apparently ok.
7. If the failure has not yet been found, the summing amplifier IC1601a and the loop filter C1614 and R1616 must be checked.

4. PERFORMANCE CHECK

GENERAL

Before executing the performance check, connect the receiver to power supply and radiotelex modem as described in this manual, section 2. NECESSARY TEST EQUIPMENT.

The selection of receiver frequency f_{RX} is always done by means of the radiotelex modem H1240, the keyboard processor H1249 and the video monitor H1253.

4.1. DEFINITIONS USED - LOCATIONS.

4.1.1. Definitions used, refer to 5.1.

4.1.2. Locations refer to ADJUSTMENT LOCATIONS.

4.2. CHECK OF $\pm 18V$ SUPPLY UNIT.

4.2.1. Connect the voltmeter to TP2.

4.2.2. Check that the voltage is $+18V \pm 0.2V$.

4.2.3. Connect the voltmeter to TP1.

4.2.4. Check that the voltage is $-18V \pm 0.2V$.

4.3. CHECK OF $+5V$ REGULATOR.

4.3.1. Connect the voltmeter to pin 3 of IC2602.

4.3.2. Check that the voltage is $5V \pm 0.2V$.

4.4. CHECK OF TCXO

The receiver must be ON for at least 5 minutes.

4.4.1. Connect the counter to TP3.

4.4.2. Check that the frequency is $10,000,000 \pm 1$ Hz.

4.5. CHECK OF HARMONIC FILTERS.

4.5.1. Connect the voltmeter to TP24.

4.5.2. Select the following frequencies $f_{RX} = 0-2-4-6-8-10-12-20-22-24-26-28$ MHz.

4.5.3. Check the voltage to be $1.9V \pm 0.6V$.

4.6. CHECK OF VCO

4.6.1. Connect the voltmeter to TP11.

4.6.2. Select the following $f_{RX} = 1.999-3.999-5.999-7.999-9.999-11.999-13.999-21.999-23.999-25.999-27.999-29.999$ MHz.

4.6.3. Check the voltage to be $-15V \pm 1V$.

4.6.4. Select the following $f_{RX} = 0-2-4-6-8-10-12-20-22-24-26-28$ MHz.

4.6.5. Check the voltage to be $-7.0V \pm 1.5V$.

4.7. CHECK OF CLARIFIER OSC. & 2ND LOOP 2 MIXER.

4.7.1. Select $f_{RX} = 2$ MHz.

4. PERFORMANCE CHECK cont.:

4.7.2.

Connect the counter to TP4.

4.7.3.

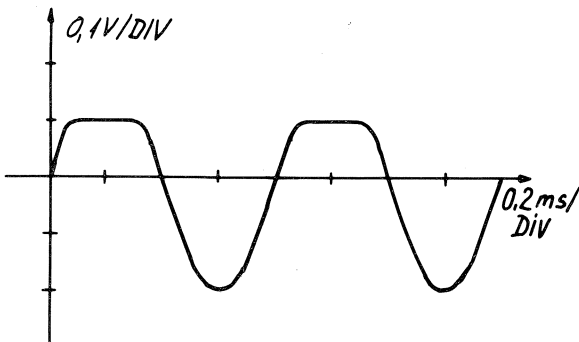
Check the frequency to be 9000 Hz ± 10 Hz.

4.7.4.

Connect TP10 to oscilloscope through passive probe.

4.7.5.

Check that the waveform is as shown below.



4.7.6.

Select $f_{RX} = 20$ MHz.

4.7.7.

Check that the waveform is as shown in 4.7.5.

4.8.

CHECK OF VCXO

4.8.1.

Connect +5V to TP25.

4.8.2.

Select $f_{RX} = 2$ MHz.

4.8.3.

Connect the voltmeter to TP12.

4.8.4.

Check the voltage to be 14V ± 1 V.

4.8.5.

Select $f_{RX} = 2.0001$ MHz and notice a change in meter reading of 0.4V ± 0.1 V compared to the value found in 4.8.4.

4.8.6.

Select $f_{RX} = 2.0002$ MHz and notice a change in meter reading of 0.9V ± 0.2 V compared to the value found in 4.8.4.

4.8.7.

Select $f_{RX} = 2.0004$ MHz and notice a change in meter reading of 1.8V ± 0.4 V compared to the value found in 4.8.4.

4.8.8.

Select $f_{RX} = 2.0008$ MHz and notice a change in meter reading of 3.8V ± 0.8 V compared to the value found in 4.8.4.

4.8.9.

Remove +5V from TP25.

4.8.10.

Select $f_{RX} = 2$ MHz and check the voltage to be below 13V.

4.8.11.

Select $f_{RX} = 22$ MHz and check the voltage to be below 13V.

4.8.12.

Select $f_{RX} = 2.0009$ MHz and check the voltage to be above 5V.

4.8.13.

Select $f_{RX} = 22.5009$ MHz and check the voltage to be above 5V.

4.9.

CHECK OF 600 kHz GENERATOR.

4.9.1.

Connect the diode probe to TP26.

4.9.2.

Check the voltage to be 1V ± 0.2 V.

4.10.

CHECK OF LOOP 1 STEP RESPONSE

4.10.1.

Connect a 68 ohm resistor across harmonic filter output.

4.10.2.

Connect the passive probe and the scope to TP11.

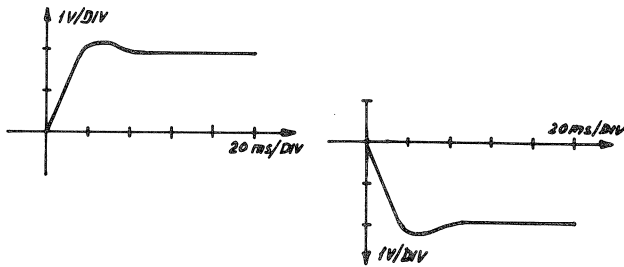
4. PERFORMANCE CHECK cont.:

4.10.3.

Select $f_{RX} = 22,500.9$ kHz.

4.10.4.

Short-circuit the yellow wire on the 100 kHz data input at the divider board to chassis and check the step response on the scope. Typical waveform is shown below.



4.11.

CHECK OF LOOP 2 STEP RESPONSE

4.11.1.

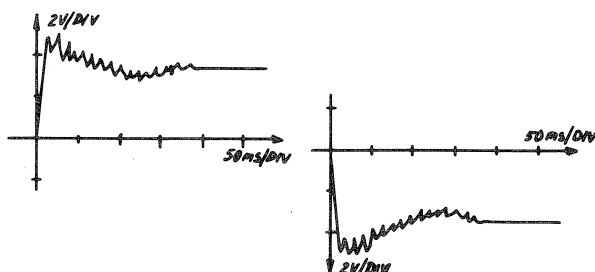
Connect the oscilloscope to TP12 through passive probe.

4.11.2.

Select $f_{RX} = 22,500.9$ kHz.

4.11.3.

Short-circuit the grey wire on the 100 Hz data input at the divider board to chassis and check the step response on the scope. Typical waveform is shown below.



4.12.

CHECK OF +18V SUPPLY VOLTAGE

4.12.1.

Connect the voltmeter to TP13.

4.12.2.

Measure 18V ± 1.5 V DC.

4.13.

CHECK OF +17V SUPPLY VOLTAGE

4.13.1.

Connect the voltmeter to TP14.

4.13.2.

Turn AF-gain fully clockwise.

4.13.3.

Measure 17.3V ± 1.5 V DC.

4.14.

CHECK OF -45V PROTECTION CIRCUIT

4.14.1.

Connect the voltmeter to TP15.

4.14.2.

Measure approx. -45V DC.

4.14.3.

Connect output from exciter S1300/01 to antenna input terminals of the receiver.

4.14.4.

Execute 4.14.5.-7. at the following frequencies: 4.28 MHz, 6.32 MHz, 8.43 MHz, 12.65 MHz, 16.85 MHz and 22.31 MHz.

4.14.5.

Set S1300/01 to FULL POWER, DUPLEX, A3H and turn power level potentiometer fully clockwise.

4.14.6.

Set S1300/01 and the receiver on the same frequency.

4.14.7.

Key S1300/01 by means of the key plug and check that the voltage on TP15 increases.

4. PERFORMANCE CHECK cont.:

4.14.8.

Execute 4.14.9.-11. at one frequency in each of the frequency bands 1.6-2.0 MHz, 2.0-2.5 MHz, 2.5-3.1 MHz, 3.1-3.8 MHz.

4.14.9.

Connect the scope through the passive probe to the anode of the protection diode in the selected RF-filter.

4.14.10.

Execute 4.14.5. and 4.14.6.

4.14.11.

Key S1300/01 by means of the key plug and check by means of the scope that the RF-signal is clipped.

4.15.

CHECK OF LOCAL OSC. INPUTS

4.15.1.

Select $f_{RX} = 2.0$ MHz.

4.15.2.

Connect the diode probe to TP16.

4.15.3.

Measure $0.6V \pm 0.15V$.

4.15.4.

Connect the diode probe to TP17.

4.15.5.

Measure $3.7V \pm 0.7V$.

4.15.6.

Select $f_{RX} = 24$ MHz.

4.15.7.

Execute 4.15.2. - 5.

4.16.

CHECK OF LOOP 1 MIXER

4.16.1.

Select $f_{RX} = 28$ MHz.

4.16.2.

Connect the diode probe to TP28.

4.16.3.

Measure $1.3V \pm 0.5V$.

4.16.4.

Select $f_{RX} = 29.999$ MHz.

4.16.5.

Connect the diode probe to TP28.

4.16.6.

Measure $1.3V \pm 0.5V$.

4.17.

CHECK OF AGC ATTACK- AND DECAY TIME

4.17.1.

Select $f_{RX} = 2000$ kHz.

4.17.2.

Set the signal generator to $f_G = 2001.7$ kHz and $V_G = 1$ mV.

4.17.3.

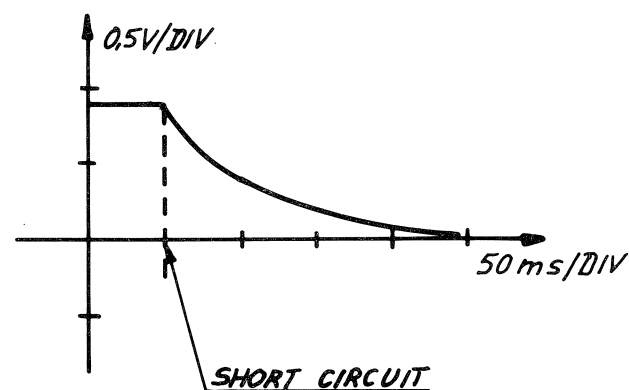
Connect the scope through passive probe to TP19.

4.17.4.

By means of e.g. a trimming tool short-circuit inner and outer conductor on the coax cable leading from IF-filters to IF-amplifier, detector and AGC.

4.17.5.

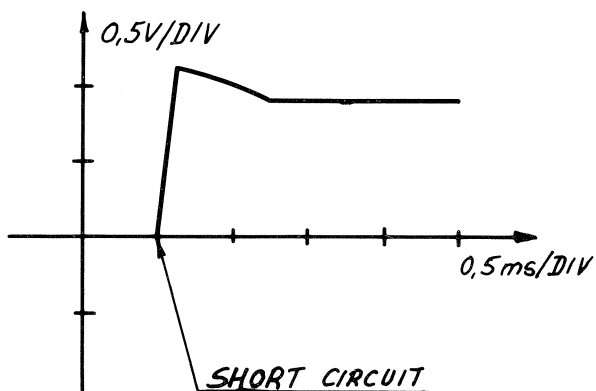
When short-circuiting as mentioned above, no signal will come to the AGC-circuit, which causes the AGC voltage to decay as shown below.



4.17.6.

Removing the short-circuit causes the AGC-voltage to attack as shown below.

4. PERFORMANCE CHECK cont.:



4.18.
CHECK OF 0 dBm OUTPUT

4.18.1.
Select $f_{RX} = 2000$ kHz.

4.18.2.
Set the signal generator to 2001.7 kHz and $V_G = 1$ mV.

4.18.3.
Connect voltmeter and 560 ohm resistor parallel to TP20 and TP21.

4.18.4.
Measure $0.9V \pm 0.2V$.

4.19.
CHECK OF AF-AMPLIFIER

4.19.1.
Perform 4.17.1. - 4.17.2.

4.19.2.
Disconnect the white/green wire leading to TP22.

4.19.3.
Solder a 4 ohm resistor (min. 10W) to TP22 and connect the oscilloscope probe parallel to the resistor.

4.19.4.
Turn the AF-gain control fully clockwise and check the AF-voltage to be at least $15V_{pp}$.

4.19.5.
Reduce AF-gain until AF-voltage is $13V_{pp}$, and check that a sinusoidal signal is seen (distortion approx. 3%).

4.19.6.
Remove the 4 ohm resistor and connect the white/green wire to TP22.

4.20.
CHECK OF SIMPLEX RELAY

4.20.1.
Connect an ohm-meter to the antenna input terminal and ground.

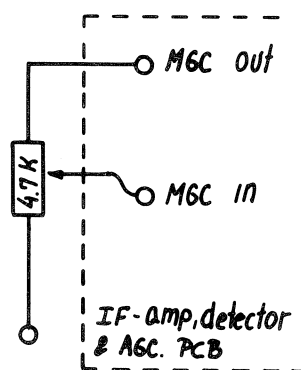
4.20.2.
Connect TP30 to TP29 with a piece of wire and check that RE101 is activated.

4.20.3.
Check that the ohm-meter is showing a short-circuit.

4.21.
SENSITIVITY MEASUREMENT
NOTE! If a distortion meter is at hand, then execute 4.21.5. and check in each case that the signal to noise ratio is at least 20 dB. If no distortion meter is at hand, then execute 4.21.1. - 4.21.8.

4.21.1.
Connect a piece of wire from TP31 (AGC ON/OFF) to ground.

4.21.2.
Mount a 4.7 Kohm potentiometer as shown below.



4.21.3.
Mount a 560 ohm resistor to TP20 and TP21 and connect the voltmeter parallel to the resistor by means of a screened cable.

4. PERFORMANCE CHECK cont.:

4.21.4.

Connect the signal generator to the antenna input terminal and check that RF-filter sections covering the range 1.6 - 3.8 MHz is strapped for low impedance.

4.21.5.

Choose f_{RX} , f_G and V_G according to table 4.21.9.

4.21.6.

Adjust the mounted trimming potentiometer to achieve a meter reading of 0 dB in the 1V range.

4.21.7.

Remove the signal from the antenna input terminal and notice the drop in meter reading.

In any case this must be at least 20 dB.

4.21.8.

Remove the 4.7 kohm trimming potentiometer and the 560 ohm resistor mounted as described in 4.21.2. and 4.21.3.

Table 4.21.9.

f_{RX} kHz	f_G	$V_G(EMF), R_g=50 \text{ ohm}$
1600		
1800		
1999		
2000		
2250		
2499		
2500		
2800		
3099		
3100		
3450		
3799		
4200	$f_{RX}+1700\text{Hz}$	5dB above 1uV
4280		or
4360	CW-mode	1.8uV
6320		
6410		
6510		
8430		
8570		
8720		
12650		
12880		
13110		
16850		
17000		
17240		
22310		
22460		
22599		

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4.22.

CHECK OF INTERFACE UNIT

4.22.1.

Execute 4.6. and 4.21.

4.22.2.

Connect oscilloscope to TP32 through passive probe.

4.22.3.

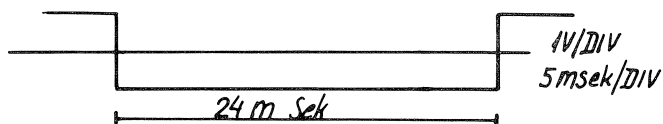
Select exciter frequency $f_{TX} = 7000$ kHz.

4. PERFORMANCE CHECK cont.:

4.22.4.

Check that the signal in TP32 is as shown below.

NOTE! The signal on TP is only present when the exciter frequency information is transmitted from R1121 to the exciter.



4.22.5.

Connect oscilloscope to TP33 through passive probe.

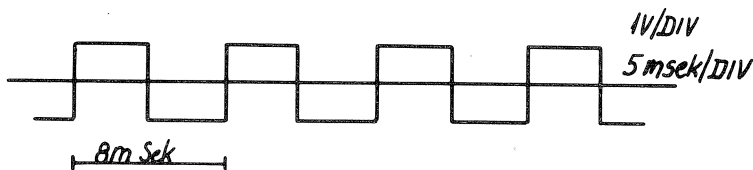
4.22.6.

Execute 4.22.3.

4.22.7.

Check that the signal on TP33 is as shown below.

NOTE! The signal on TP is only present when the exciter frequency information is transmitted from R1121 to the exciter.



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5. ADJUSTMENT PROCEDURE FOR R1121

NOTE! The trimming cores are factory sealed. Use normal cellulose thinner to break the seal.

5.1. DEFINITIONS USED

5.1.1. f_{RX} = frequency to which the receiver is adjusted.

f_G = signal generator frequency, i.e. the input frequency to the receiver.

V_G = EMF of signal generator with proper generator impedance.

f_{AF} = Audio frequency to AF to telex and loudspeaker.

5.2. ADJUSTMENT OF +18V SUPPLY UNIT

5.2.1. Connect the voltmeter to TP1.

5.2.2. Adjust R1110 to -18V $\pm 0.2V$.

5.2.3. Connect the voltmeter to TP2.

5.2.4. Adjust R1114 to 018V ± 0.2 Volt.

5.3. ADJUSTMENT OF TCXO

5.3.1. The receiver must be ON for at least 5 minutes.

5.3.2. Connect the counter to TP3.

5.3.3. Adjust R1013 to 10 000 000 Hz.

5.4. ADJUSTMENT OF CLARIFIER OSC.

5.4.1. Connect the counter to TP4.

5.4.2. Select f_{RX} = 2000 kHz.

5.4.3. Adjust L1701 to 9000 Hz.

5.5. ADJUSTMENT OF 600 kHz GENERATOR

5.5.1. Connect the diode probe to TP5.

5.5.2. Adjust L1002 for max. voltage (approx. 1V).

5.6. ADJUSTMENT OF 16 MHz GENERATOR

5.6.1. Select f_{RX} = 2000 kHz.

5.6.2. Connect the diode probe to TP4.

5.6.3. Adjust L1001 to max. voltage (approx. 2V).

5.7. ADJUSTMENT OF IF AMPLIFIER DETECTOR

5.7.1. Connect the signal generator to TP7 through a 10 nF capacitor and set the signal generator to f_G = 598.3 kHz and V_G = 10 mV.

5.7.2. Slowly reduce V_G until noise starts to dim the AF-tone, then increase V_G 20 dB.

5.7.3. Connect the voltmeter to TP22 by means of a screened cable, and adjust AF-gain until the meter reads 0 dB in the 1V range.

5. ADJUSTMENT PROCEDURE cont.:

5.7.4.

Adjust L805 for max. meter reading and readjust contemporary AF-gain control to maintain a meter reading of 0 dB.

5.7.5.

Connect the voltmeter to TP19 and adjust V_G to achieve a meter reading of approx. 1.0V.

5.7.6.

Adjust L801 for maximum meter reading, and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.8.

ADJUSTMENT OF IF FILTER

5.8.1.

Connect the signal generator to TP7 through a 10 nF capacitor and set the signal generator to $f_G = 598.3$ kHz and V_G 10 mV.

5.8.2.

Connect the voltmeter to TP19 and adjust V_G to achieve a meter reading of approx. 1.0 Volt.

5.8.3.

Adjust L707 for maximum meter reading, and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.9.

ADJUSTMENT OF FIRST AND SECOND MIXER

5.9.1.

Connect the voltmeter to TP19.

5.9.2.

Select $f_{RX} = 10$ kHz and adjust R506 for min. meter reading, and for min. noise coming from loudspeaker.

5.9.3.

Connect the signal generator to TP9 and set $f_G = 16607.3$ kHz

5.9.4.

Select $f_{RX} = 10$ MHz.

5.9.5.

Adjust V_G to achieve approx. 1.0V on TP19.

5.9.6.

Adjust C512 and L503 for maximum meter reading and readjust contemporary V_G to maintain approx. 1.0V.

5.9.7.

Set $f_G = 10607.3$ kHz and select $f_{RX} = 20$ MHz.

5.9.8.

Adjust V_G to achieve approx. 1.0V on TP19.

5.9.9.

Adjust C511 and L501 for maximum meter reading and readjust contemporary V_G to maintain approx. 1.0V.

5.10.

ADJUSTMENT OF 4 MHz RF-FILTER

5.10.1.

Turn the core of each filter coil almost out of the coil former to avoid that the cores are of importance to the coil inductance.

5.10.2.

Connect the signal generator to the antenna input terminal.

5.10.3.

Select $f_{RX} = 4280$ kHz.

5.10.4.

Set the signal generator to $f_G = 4281.7$ kHz.

5.10.5.

Connect the voltmeter to TP19 and readjust V_G to achieve a meter reading of approx. 1.0V.

5.10.6.

Adjust L203 for maximum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.10.7.

Adjust L201 for maximum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5. ADJUSTMENT PROCEDURE cont.:

5.10.8.

Adjust L202 for maximum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.11.

ADJUSTMENT OF 6 MHz RF-FILTER

5.11.1.

Turn the core of each filter coil almost out of the coil former to avoid that the cores are of importance to the coil inductance.

5.11.2.

Connect the signal generator to the antenna input terminal.

5.11.3.

Select $f_{RX} = 6410$ kHz.

5.11.4.

Set the signal generator to $f_G = 6411.7$ kHz.

5.11.5.

Connect the voltmeter to TP19 and adjust V_G to achieve a meter reading of 1.0V.

5.11.6.

Adjust L303 for maximum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.11.7.

Adjust L301 for maximum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.11.8.

Adjust L302 for maximum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.12.

ADJUSTMENT OF 8 MHz RF-FILTER

5.12.1.

Turn the core of each filter coil almost out of the coil former to avoid that the cores are of importance to the coil inductance.

5.12.2.

Connect the signal generator to the antenna input terminal.

5.12.3.

Select $f_{RX} = 8570$ kHz.

5.12.4.

Set the signal generator to $f_G = 8571.7$ kHz.

5.12.5.

Connect the voltmeter to TP19 and adjust V_G to achieve a meter reading of approx. 1.0V.

5.12.6.

Adjust L403 for maximum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.12.7.

Adjust L401 for maximum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.12.8.

Adjust L402 for maximum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.13.

ADJUSTMENT OF 12 MHz RF-FILTER

5.13.1.

Turn the core of each filter coil almost out of the coil former to avoid that the cores are of importance to the coil inductance.

5.13.2.

Connect the signal generator to the antenna input terminal.

5.13.3.

Select $f_{RX} = 12880$ kHz.

5.13.4.

Set the signal generator to $f_G = 12881.7$ kHz.

5.13.5.

Connect the voltmeter to TP19 and adjust V_G to achieve a meter reading of 1.0V.

5. ADJUSTMENT PROCEDURE cont.:

5.13.6.

Adjust L404 for maximum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.13.7.

Adjust L406 for maximum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.13.8.

Adjust L405 for maximum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.14.

ADJUSTMENT OF 16 MHz RF-FILTER

5.14.1.

Turn the core of each filter coil almost out of the coil former to avoid that the cores are of importance to the coil inductance.

5.14.2.

Connect the signal generator to the antenna input terminal.

5.14.3.

Select $f_{RX} = 17000$ kHz.

5.14.4.

Set the signal generator to $f_G = 17001.7$ kHz.

5.14.5.

Connect the voltmeter to TP19 and adjust V_G to achieve a meter reading of approx. 1.0V.

5.14.6.

Adjust L304 for maximum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.14.7.

Adjust L306 for maximum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.14.8.

Adjust L305 for maximum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.15.

ADJUSTMENT OF 22 MHz RF-FILTER

5.15.1.

Turn the core of each filter coil almost out of the coil former to avoid that the cores are of importance to the coil inductance.

5.15.2.

Connect the signal generator to the antenna input terminal.

5.15.3.

Select $f_{RX} = 22460$ kHz.

5.15.4.

Set the signal generator to $f_G = 22461.7$ kHz.

5.15.5.

Connect the voltmeter to TP19 and adjust V_G to achieve a meter reading of approx. 1.0V.

5.15.6.

Adjust L204 for maximum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.15.7.

Adjust L206 for maximum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.15.8.

Adjust L205 for maximum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.16.

ADJUSTMENT OF 16.6 MHz NOTCH FILTER

5.16.1.

Connect the signal generator to the antenna input terminal.

5.16.2.

Select $f_{RX} = 2$ MHz.

5.16.3.

Set the signal generator to $f_G = 16.6073$ MHz.

5. ADJUSTMENT PROCEDURE cont.:

5.16.4.
Connect the voltmeter to TP19 and adjust V_G to achieve a meter reading of approx. 1.0V.

5.16.5.
Adjust L2001 for minimum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.16.6.
Adjust R2002 for minimum meter reading and readjust contemporary V_G to maintain the meter reading of 1.0V.

5.17.
ADJUSTMENT OF HARMONIC FILTERS

5.17.1.
Load the harmonic filters with 68 ohm.

5.17.2.
Connect the voltmeter to TP11.

5.17.3.
Turn the core of each coil to the level of the coil former.

5.17.4.
Select f_{RX} as specified in table 5.17.11.

5.17.5.
The harmonic filters are adjusted by turning the core of the selected coil until the voltage reaches the value of 15V \pm 1V.

5.17.6.
Connect the voltmeter to TP24.

5.17.7.
Execute 5.17.4. and adjust each selected coil to minimum voltage. This voltage must be 2.0V \pm 1V.

5.17.8.
Connect the voltmeter to TP11.

5.17.9.
Execute 5.17.4. and check the voltage to be 15V \pm 1V.

5.17.10.
Disconnect the 68 ohm load.

5.17.11.

f_{RX} (MHz)	Selected harmonic filter (MHz)
1.999	14
3.999	16
5.999	18
7.999	20
9.999	22
11.999	24
13.999	26
21.999	28
23.999	30
25.999	32
27.999	34
29.999	36

R1121 B5/5

6. NECESSARY ADJUSTMENTS AFTER REPAIR FOR R1121

In the following paragraphs reference is made to the ADJUSTMENT PROCEDURE FOR R1121 and PERFORMANCE CHECK FOR R1121.

Definitions used: refer to 5.1.

Locations: refer to ADJUSTMENT LOCATIONS.

6.1.
Module No. 100: AERIAL SWITCH

6.1.1.
Execute 4.20.

6.1.2.
Execute 4.21.

6.2.
Module No. 200: RF-FILTER 4 MHz SECTION

6.2.1.
Execute 5.10.

6.2.2.
Execute 4.21. for the filter section in question.

6.3.
Module No. 200: RF-FILTER 22 MHz SECTION

6.3.1.
Execute 5.15.

6.3.2.
Execute 4.21. for the filter section in question.

6.4.
Module No. 300: RF-FILTER 6 MHz SECTION

6.4.1.
Execute 5.11.

6.4.2.
Execute 4.21. for the filter section in question.

6.5.
Module No. 300: RF-FILTER 16 MHz SECTION

6.5.1.
Execute 5.14.

6.5.2.
Execute 4.21. for the filter section in question.

6.6.
Module No. 400: RF-FILTER 8 MHz SECTION

6.6.1.
Execute 5.12.

6.6.2.
Execute 4.21. for the filter section in question.

6.7.
Module No. 400: RF-FILTER 12 MHz SECTION

6.7.1.
Execute 5.13.

6.7.2.
Execute 4.21. for the filter section in question.

6.8.
Module No. 1900: RF-FILTER 1.6-2.0 MHz & 2.0-2.5 MHz SECTION

6.8.1.
Execute 4.21. for the filter section in question.

6.9.
Module No. 1100: RF-FILTER 2.5-3.1 MHz & 3.1-3.8 MHz SECTION

6.9.1.
Execute 4.21. for the filter section in question.

6. NECESSARY ADJUSTMENTS AFTER REPAIR cont.:

6.10.
Module No. 2000: 16.6 MHz NOTCH FILTER

6.10.1.
Execute 5.16.

6.10.2.
Execute 4.21. for the following filter sections: 12 MHz, 1.6-2.0 MHz & 2.02.5 MHz and 2.5-3.1 MHz & 3.1-3.8 MHz.

6.11.
Module No. 500: 1st & 2nd MIXER

6.11.1.
Execute 5.9. and 4.15.

6.11.2.
Execute 4.21. for $f_{RX} = 4280$ kHz.

6.12.
Module No. 600: IF FILTER

6.12.1.
Execute 5.8.

6.12.2.
Execute 4.21. for $f_{RX} = 4280$ kHz.

6.13.
Module No. 800: IF-AMPLIFIER, AGC AND DETECTOR

6.13.1.
Execute 5.7., 4.17. and 4.18.

6.13.2.
Execute 4.21. for $f_{RX} = 4280$ kHz.

6.14.
Module No. 900: AUDIO AMPLIFIER

6.14.1.
Execute 4.18. and 4.19.

6.15.
Module No. 1000: DIVIDER UNIT

6.15.1.
Execute 4.3., 5.3., 5.5., 5.6., 4.10., 4.11. and 4.21.

6.16.
Module No. 1100: LOOP 1 FILTER AND +18V SUPPLY UNIT

6.16.1.
Execute 5.2., 4.5. with $f_{RX}=10$ MHz, 4.10. and 4.16.

6.17.
Module No. 1200: VCO-UNIT

6.17.1.
Execute 4.6., 4.10. and 4.15.

6.18.
Module No. 1300: HARMONIC FILTER UNIT

6.18.1.
Execute 5.17.

6.19.
Module No. 1400: LOOP 1 MIXER UNIT

6.19.1.
Execute 4.6., 4.16. and 4.10.

6.20.
Module No. 1500: VCO BUFFER UNIT

6.20.1.
Execute 4.15.

6.21.
Module No. 1600: VCXO 1st LOOP 2 MIXER AND LOOP 2 FILTER

6.21.1.
Execute 4.7.1. - 4.7.3., 4.8., 4.11. and 4.15.

6. NECESSARY ADJUSTMENTS AFTER REPAIR cont.:

6.22.

Module No. 1700: CLARIFIER AND 2nd LOOP 2 MIXER

6.22.1.

Execute 5.4. and 4.7.

6.23.

Module No. 2100: VCO-SELECTOR

6.23.1.

Execute 4.6.

6.23.2.

Execute 4.21. for $f_{RX} = 4280$ kHz
and $f_{RX} = 17000$ kHz.

6.24.

Module No. 2200: INTERFACE

6.24.1.

Execute 4.22.

7. FUNCTION CHECK

7.1.

Connect a signal generator to the antenna input terminal.

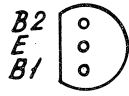
7.2.

Select f_{RX} , f_G and V_G according to table 7.3., and check in each case that a 1700 Hz tone is heard in the loudspeaker.

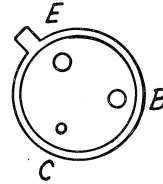
7.3.

f_{RX} (kHz)	f_G, V_G
1800	
2250	
2800	
3450	
4280	$f_{RX} + 1700$ Hz
6410	
8570	$V_G=1mV$ 60 dB/1uV
12880	
17000	
22460	

BOTTOM VIEW



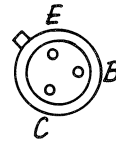
2N 4871



BFW 17A



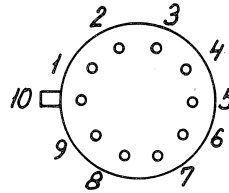
BC 328 - 25
BC 338
BC 547
BC 548 A, B, C
BC 556 A
BC 558 A, B, C



2N 2368



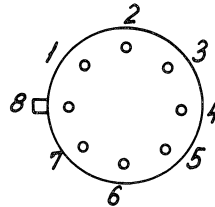
BF 199
BF 494



CA 3019



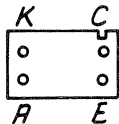
BF 256 A, B, C



LM 3053

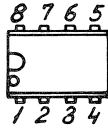


E 310

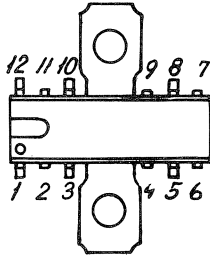


OPB 825

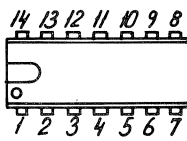
TOP VIEW



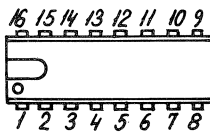
LM 308 N
MC 1455 P1
MC 1458 C



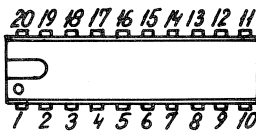
TCA 940



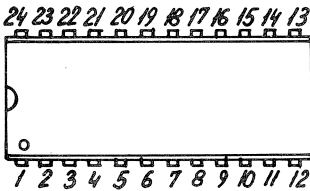
LM 324 N
LM 3086
MC 4044 P
MC 14011 BCP
MC 14077 BCP
MC 14081 BCP
SN 7406 N
SN 7407 N
SN 74010 N
SN 74072 N
SN 74LS 00 N
SN 74LS 04 N
SN 74LS 08 N
SN 74LS 11 N
SN 74LS 20 N
SN 74LS 27 N
SN 74LS 32 N
SN 74LS 74 N
SN 74LS 86 N
SN 74LS 132 N
SN 74LS 290 N



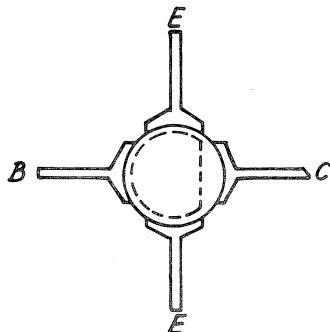
CD 4056 B
MC 14519 BCP
MC 14530 BCP
SN 74LS 42 N
SN 74LS 109 N
SN 74LS 123 N
SN 74LS 138 N
SN 74LS 148 N
SN 74LS 192 N
SN 74LS 390 N
SN 74LS 668 N



6308-1

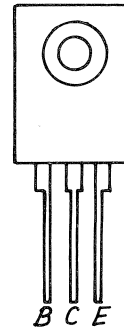


MC 14515 BCP

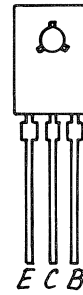


2N 5641

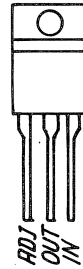
FRONT VIEW



BD 577



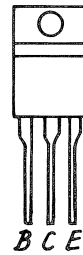
BD 138
BD 139



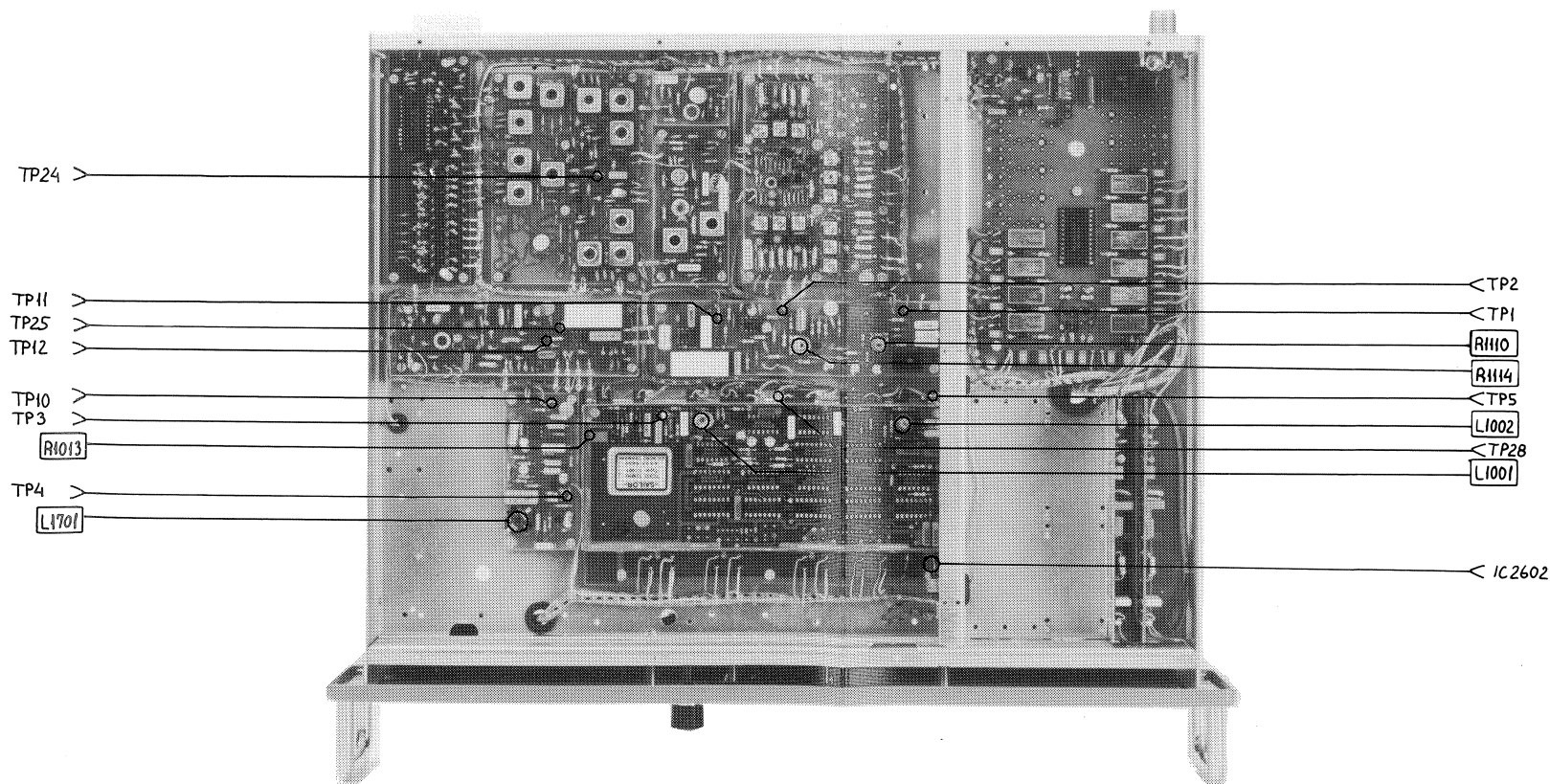
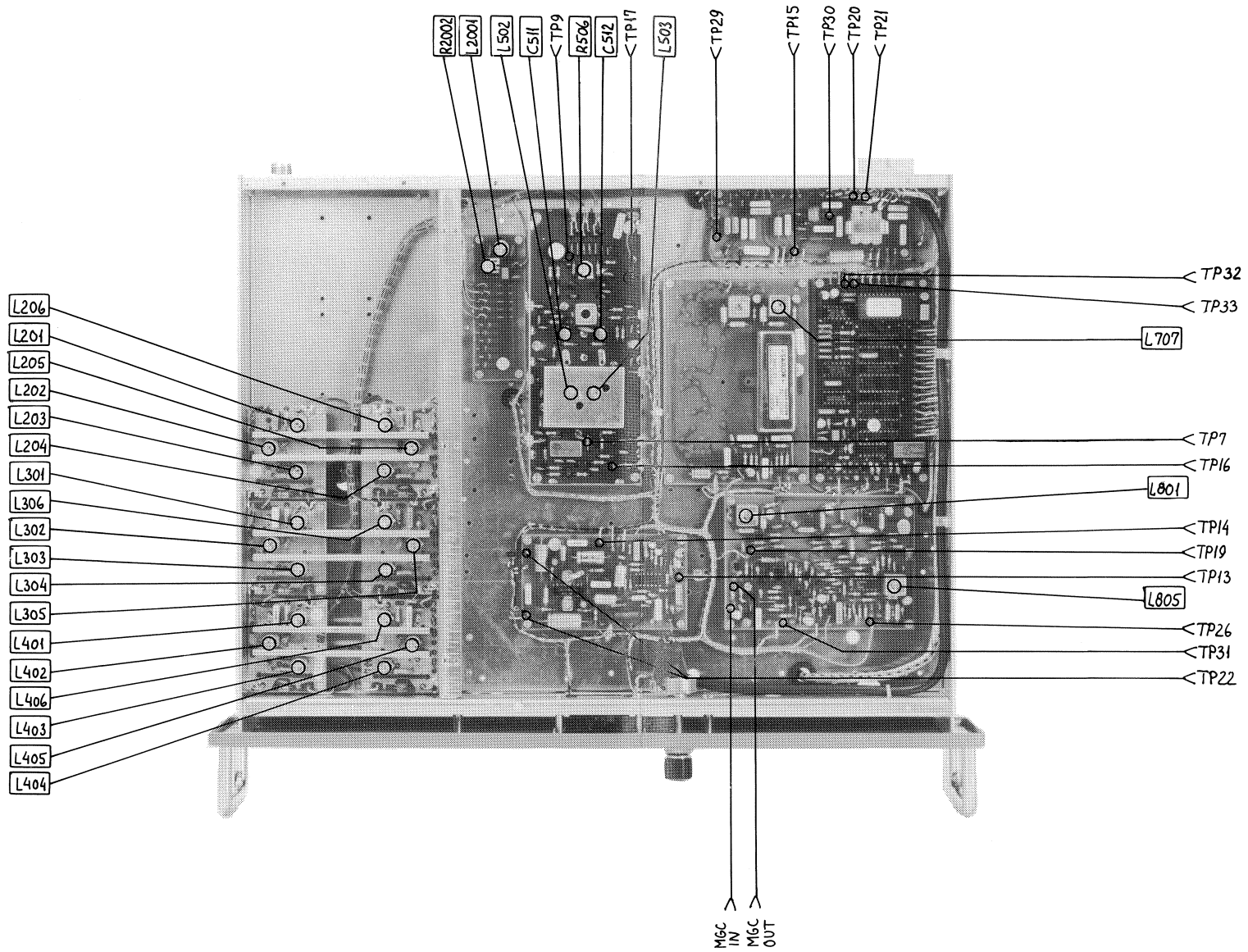
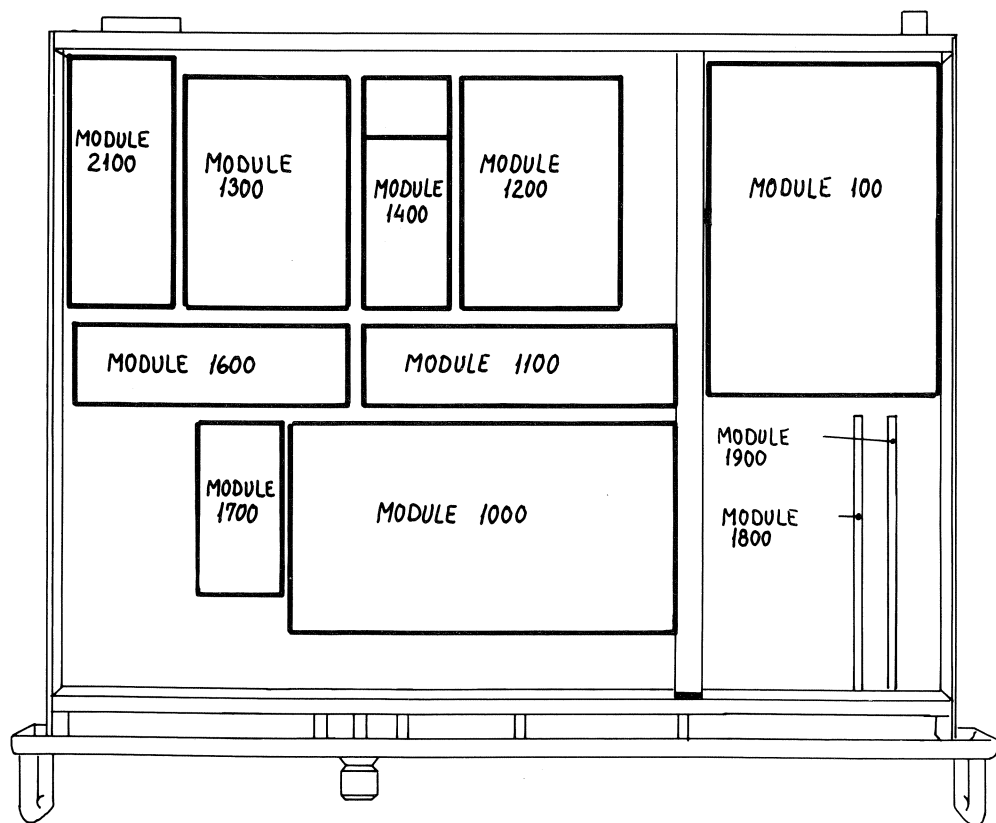
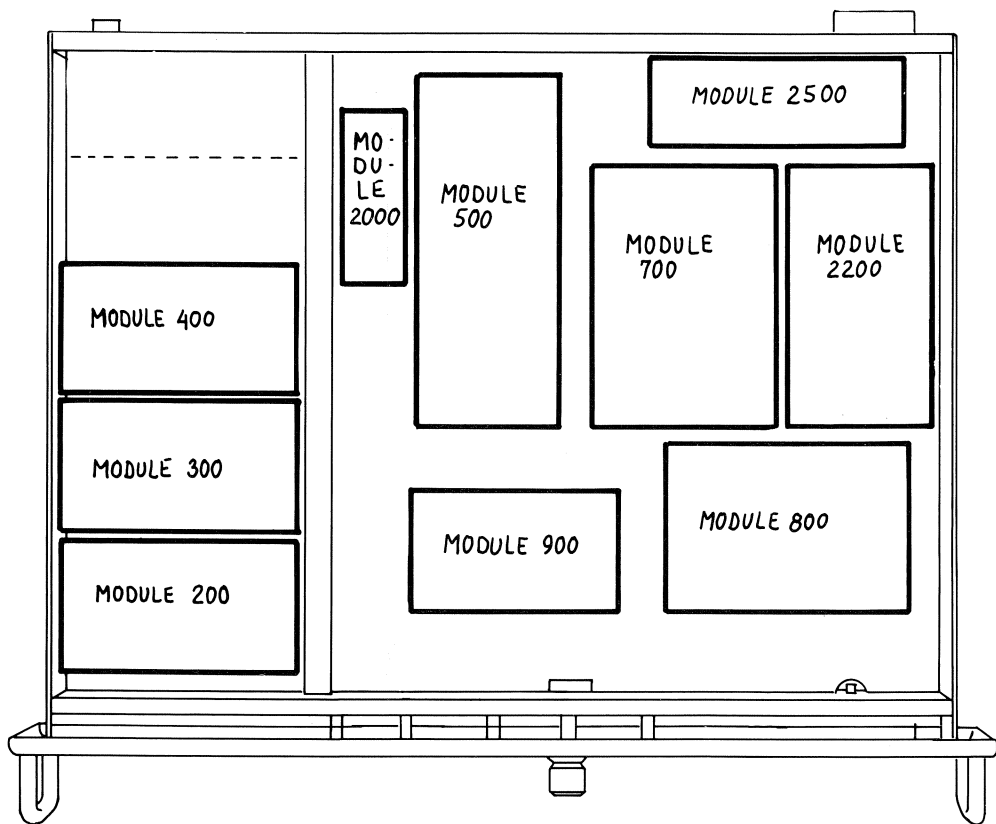
LM 317T



MC 7805 CT
MC 7818 CT



BD 241



R1121 4-0-25526
4-0-25527 4-0-25528

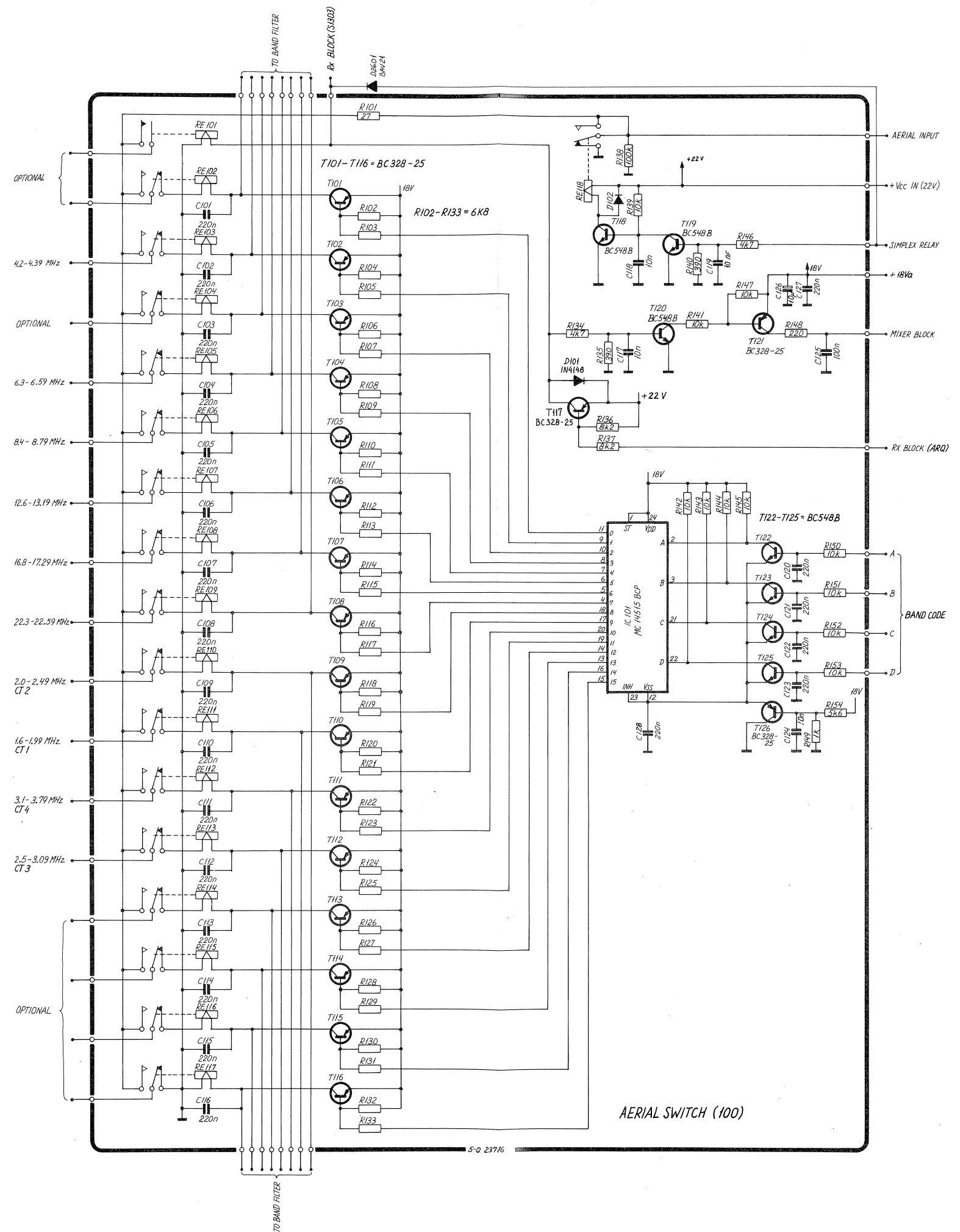
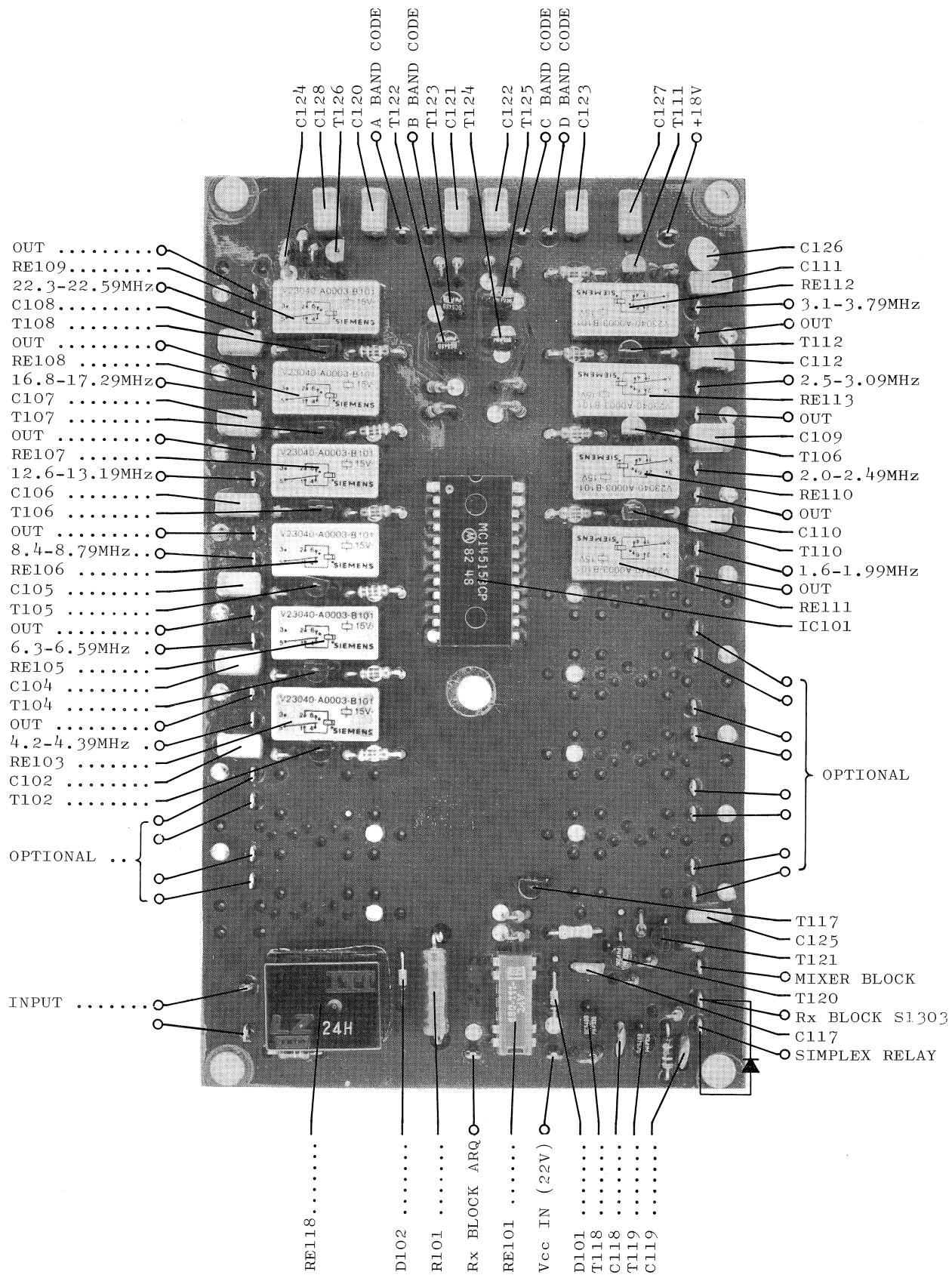
CIRCUIT DESCRIPTION AND SCHEMATIC DIAGRAMS

CIRCUIT DESCRIPTION AERIAL SWITCH R1121

The aerial switch unit selects the proper front-end filter and leads the aerial signal to this. The aerial signal is switched by the relays RE102-RE117 and the actual front-end filter is selected by the relay driver transistors T101-T116. These transistors are turned on by the 4 to 16 line decoder IC101, which turns low the output indicated by the 4-bit code on the inputs (A, B, C, D).

The 4-bit code is generated on the interface unit and fed to IC101 via the level shift transistors T122-T126.

The aerial switch unit also takes care of the receiver blocking. A fast blocking is obtained by the RX BLOCK input, which turned low will short-circuit the aerial signal to ground by means of T117 and RE101. Additionally, a mixer block signal is generated via T120 and T121. Another and slower blocking is obtained by the input SIMPLEX RELAY, which via T119, T118 and RE118 short-circuits the aerial signal to ground.



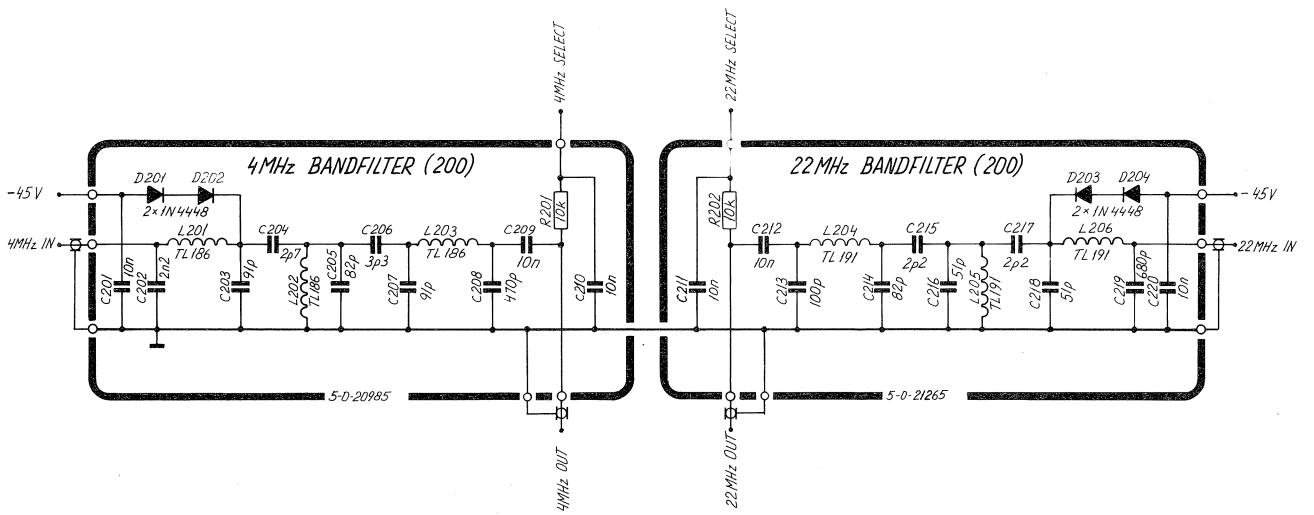
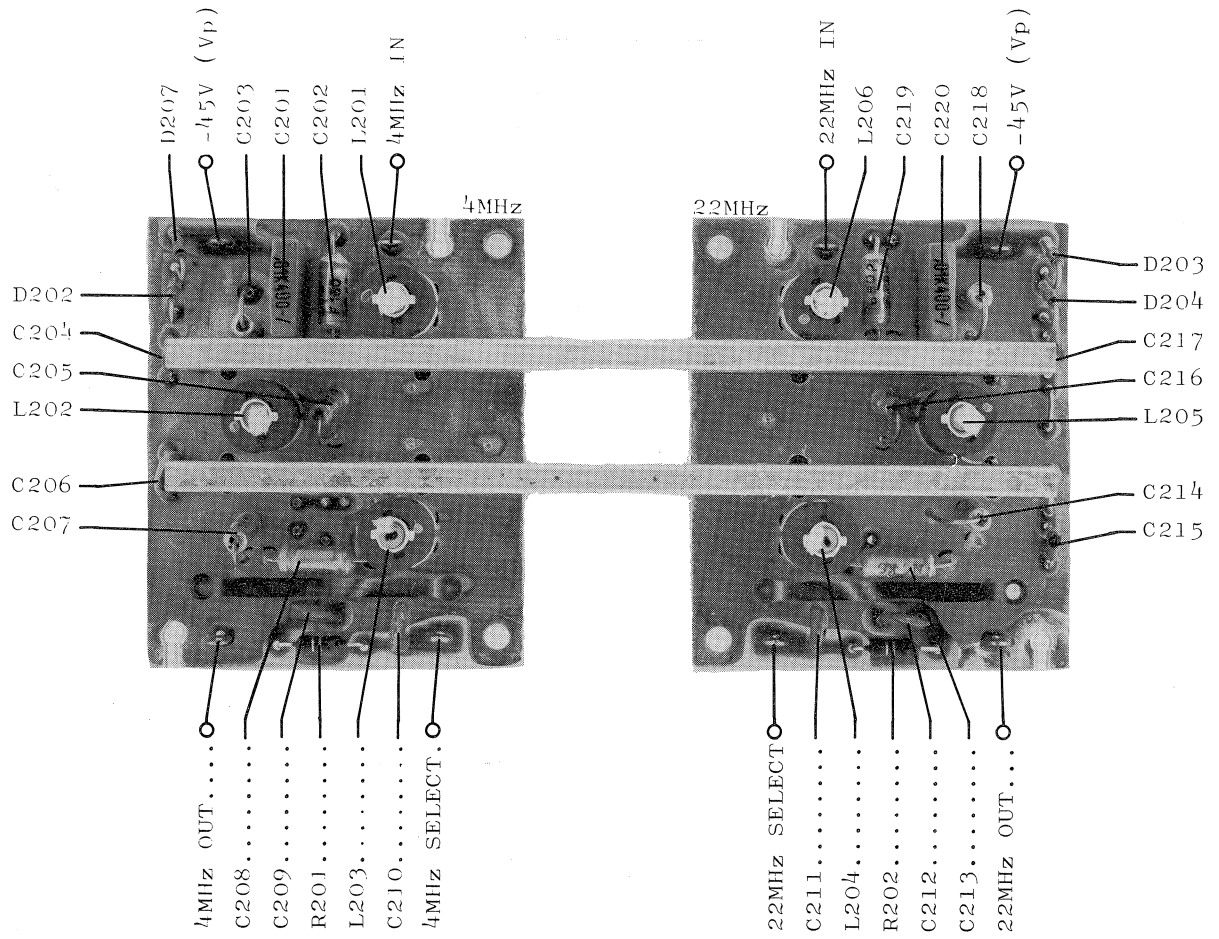
CIRCUIT DESCRIPTION RF FILTERS 4 AND 22 MHZ

The RF filters in R1121 are divided into eight different filter sections namely:

1.6-2.0 MHz & 2.0-2.5 MHz, 2.5-3.1 MHz & 3.1-3.8 MHz, 4 MHz, 6 MHz, 8 MHz, 12 MHz, 16 MHz and 22 MHz. All filters are fixed bandpass filters.

4 MHz Section: The filter is designed with 3 LC-resonant circuits L201/C202/C203, L202/C205 and L203/C207/C208 which are connected through the capacitor coupling C204 and C206. The two reverse biased diodes D201, D202 and the capacitor C201 form together with R101, located on the aerial switch PCB, the aerial protection circuit. The output signal from the filter is led directly to the mixer (module 500).

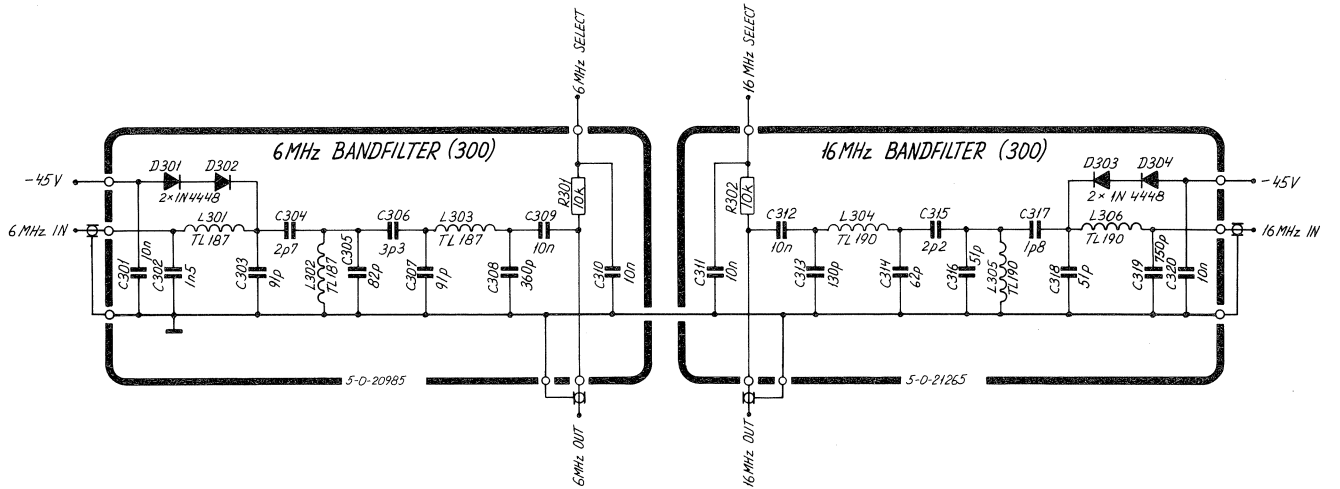
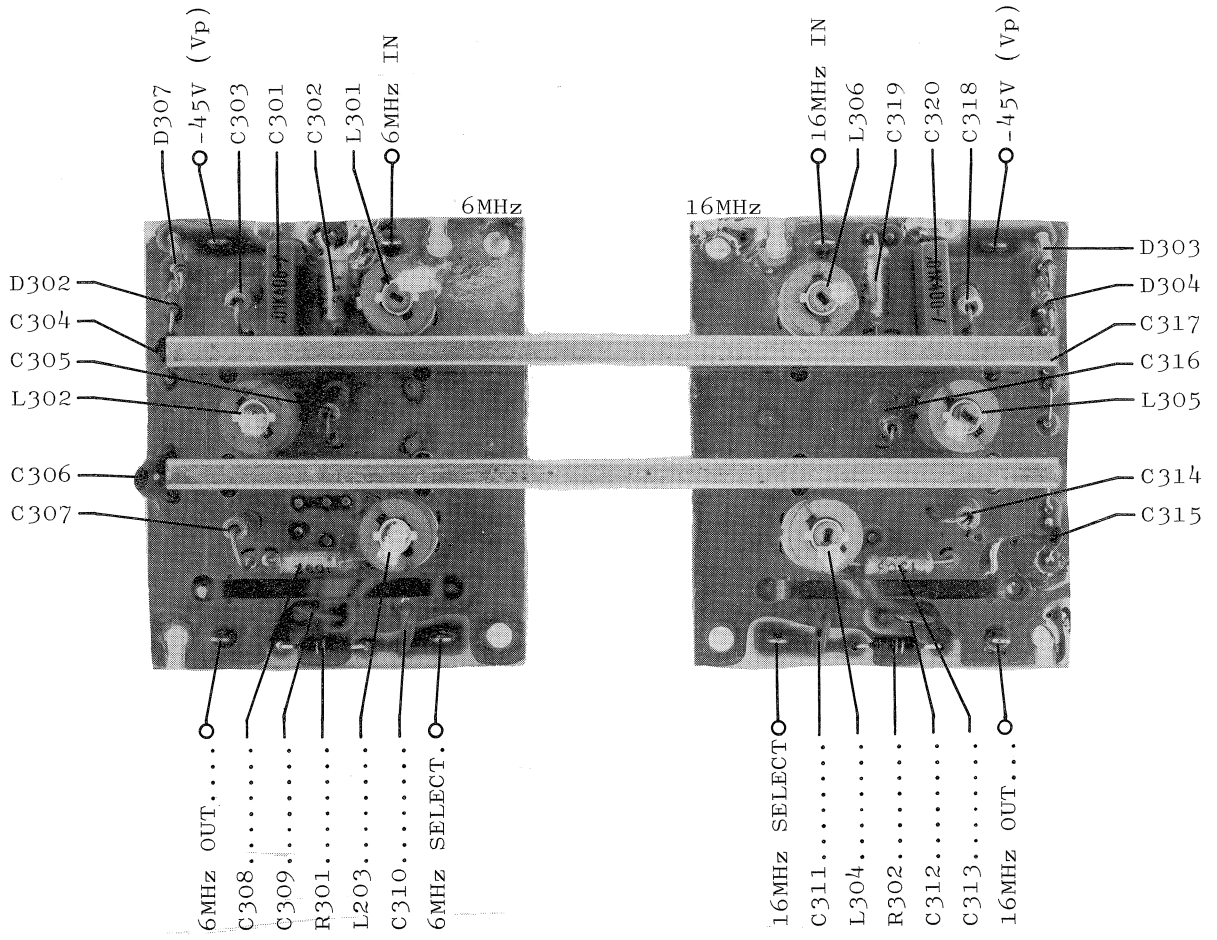
22 MHz Section: The filter is designed with 3 LC-resonant circuits L206/C219/C218, L205/C216 and L204/C214/C213 which are connected through the capacitor coupling C217 and C215. The two reverse biased diodes D203, D204 and the capacitor C220 form together with R101, located on the aerial switch PCB, the aerial protection circuit. The output signal from the filter is led directly to the mixer (module 500).



CIRCUIT DESCRIPTION RF FILTERS 6 AND 16 MHz

6 MHz Section: The filter is designed with 3 LC-resonant circuits L301/C302/C303, L302/C305 and L303/C307/C308 which are connected through the capacitor coupling C304 and C306. The two reverse biased diodes D301, D303 and the capacitor C301 form together with R101, located on the aerial switch PCB, the aerial protection circuit. The output signal from the filter is led directly to the mixer (module 500).

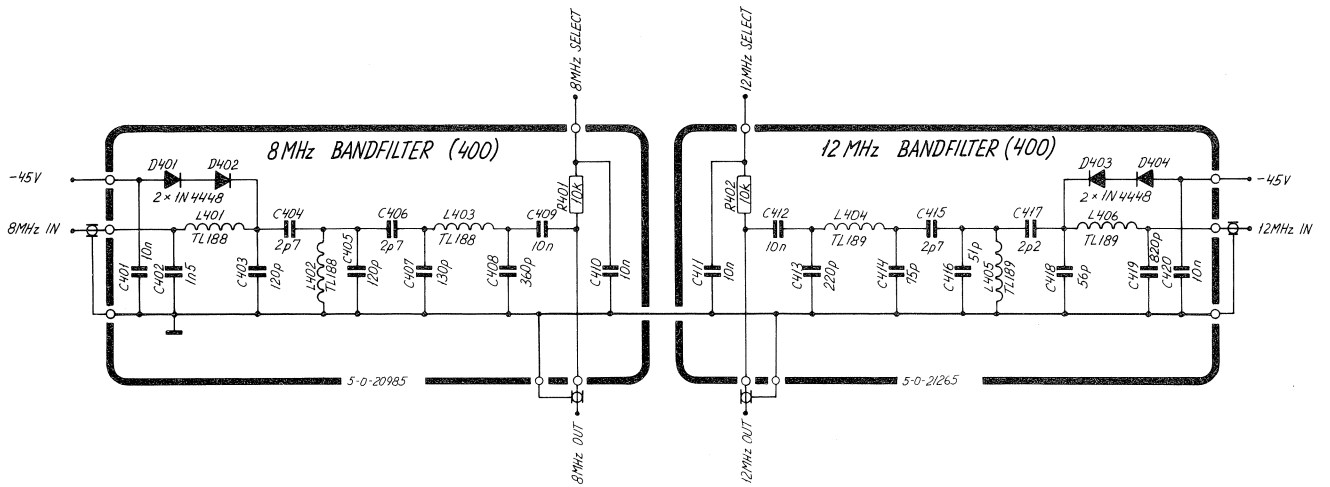
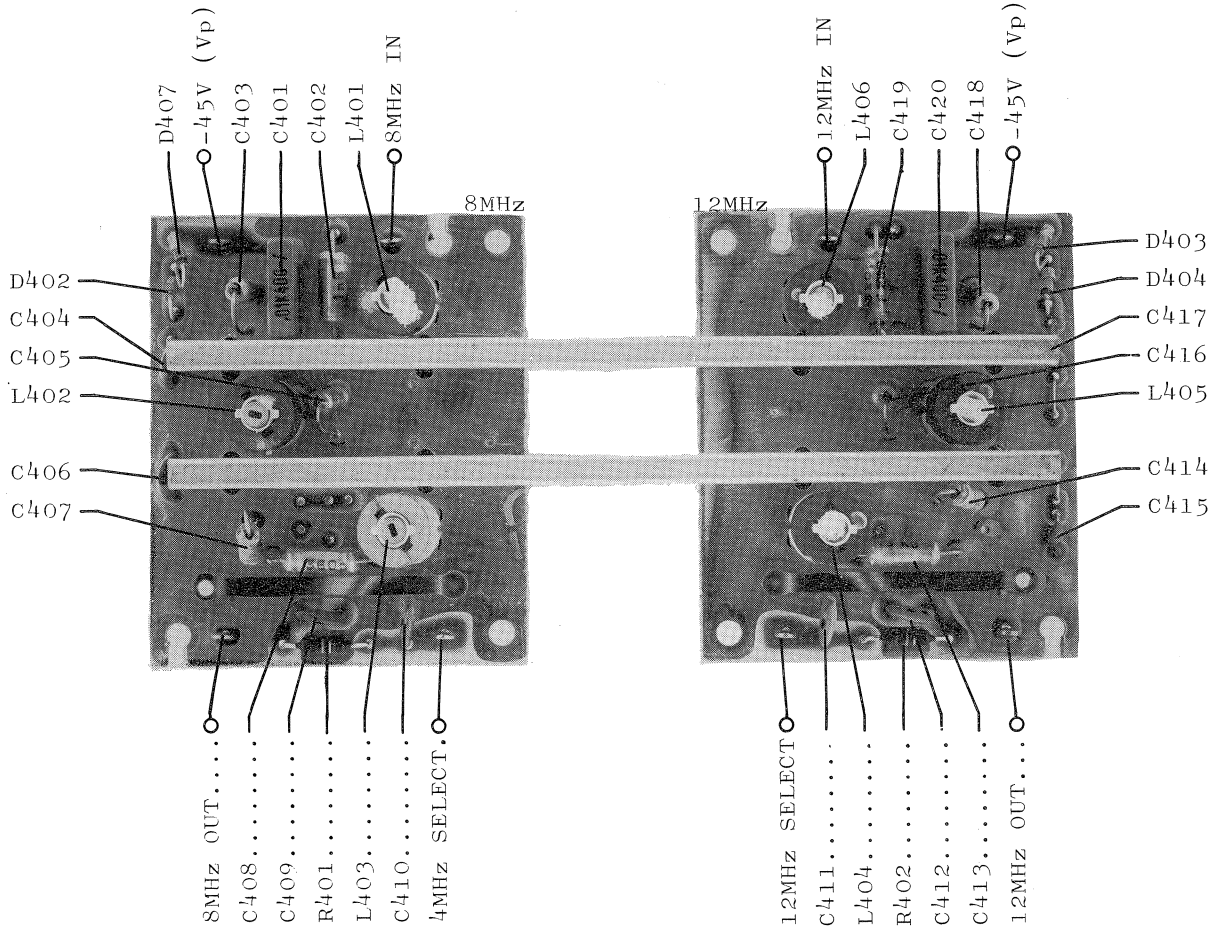
16 MHz Section: The filter is designed with 3 LC-resonant circuits L306/C319/C318, L305/C316 and L304/C314/C313 which are connected through the capacitor coupling C317 and C315. The two reverse biased diodes D303, D304 and the capacitor C320 form together with R101, located on the aerial switch PCB, the aerial protection circuit. The output signal from the filter is led directly to the mixer (module 500).



CIRCUIT DESCRIPTION RF FILTERS 8 AND 12 MHz

8 MHz Section: The filter is designed with 3 LC-resonant circuits L401/C402/C403, L402/C405 and L403/C407/C408 which are connected through the capacitor coupling C404 and C406. The two reverse biased diodes D401, D402 and the capacitor C401 form together with R101, located on the aerial switch PCB, the aerial protection circuit. The output signal from the filter is led directly to the mixer (module 500).

12 MHz Section: The filter is designed with 3 LC-resonant circuits L406/C419/C418, L405/C416 and L404/C414/C413 which are connected through the capacitor coupling C417 and C415. The two reverse biased diodes D403, D404 and the capacitor C420 form together with R101, located on the aerial switch PCB, the aerial protection circuit. The output signal from the 12 MHz filter section is led to the 16.6 MHz Notch filter (module 2000) and through that into the mixer (module 500).



CIRCUIT DESCRIPTION 1ST & 2ND MIXER R1119, R1120 & R1121

This unit contains the aerial input switching diodes, the first mixer, the first IF selectivity and the second mixer.

1st MIXER

From the band filters, the signal is fed to the balanced transformer TR501 and led to the balanced FET mixer T501 and T502. The first local oscillator signal from the VCO buffer is fed into the sources of the FET's. The difference frequency at the drains of the FET's is filtered out in the tuned circuits either TR502 and C512 for receiver frequency settings below 14 MHz, or TR502 and C508 and C511 for frequency settings above 14 MHz.

1st IF SELECTIVITY

For receiver frequency settings below 14 MHz, the tuned transformer TR501 ensures a proper generator impedance for the monolithic crystal filter FL502. The center frequency of the filter is 16.6085 MHz. The tuned circuit L503 and C519 ensures proper load impedance for the filter FL502 and proper generator impedance for the second mixer M501.

For receiver frequency settings above 14 MHz the tuned transformer ensures a proper generator impedance for the monolithic crystal filter FL501, the center frequency of which is 10.6085 MHz. The tuned circuit L502 and C518 ensures proper load impedance for the filter FL501 and proper generator impedance for the second mixer M501.

The switching between the two IF's takes place by means of either R515, D513, R520, R514, R511 and D510 or R517, D514, R520, R513, R512 and D511.

2nd MIXER

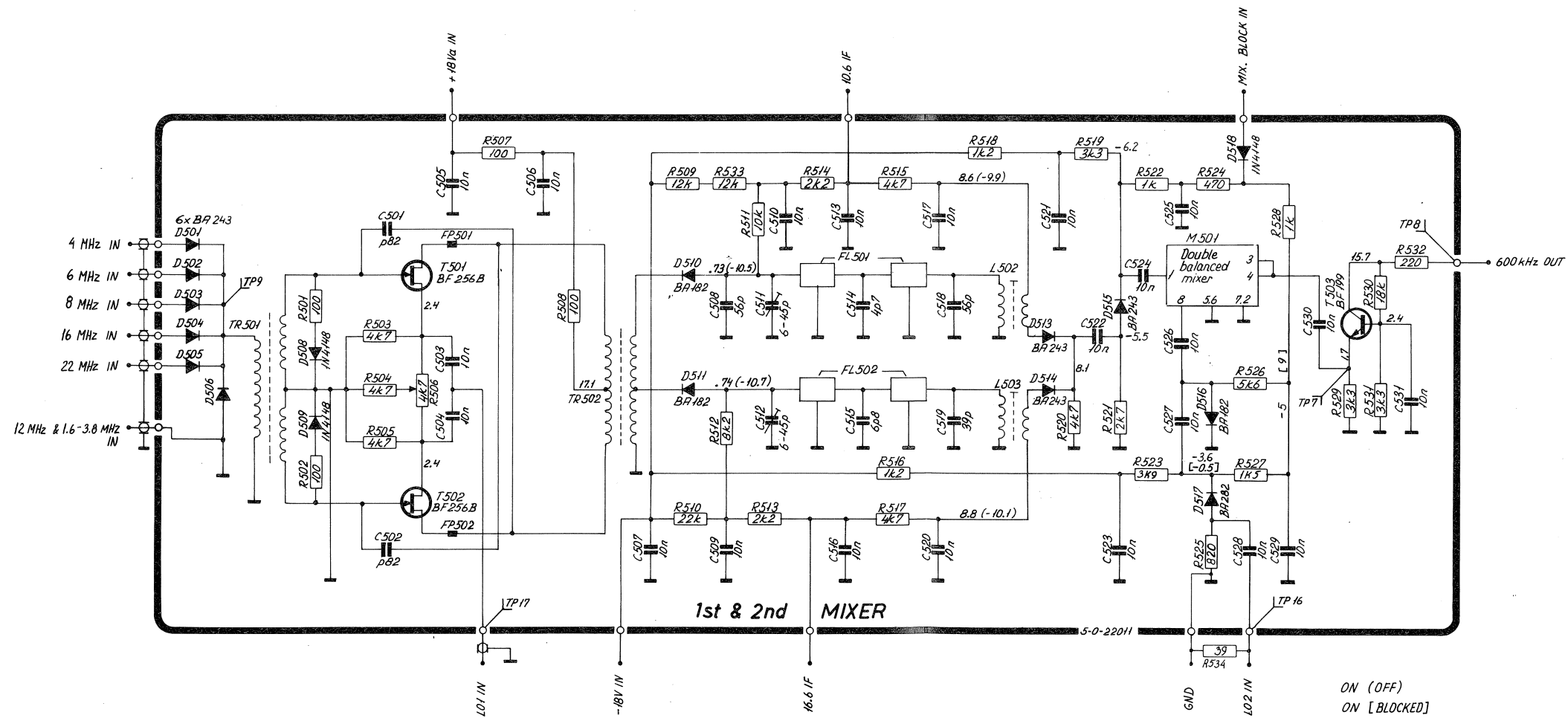
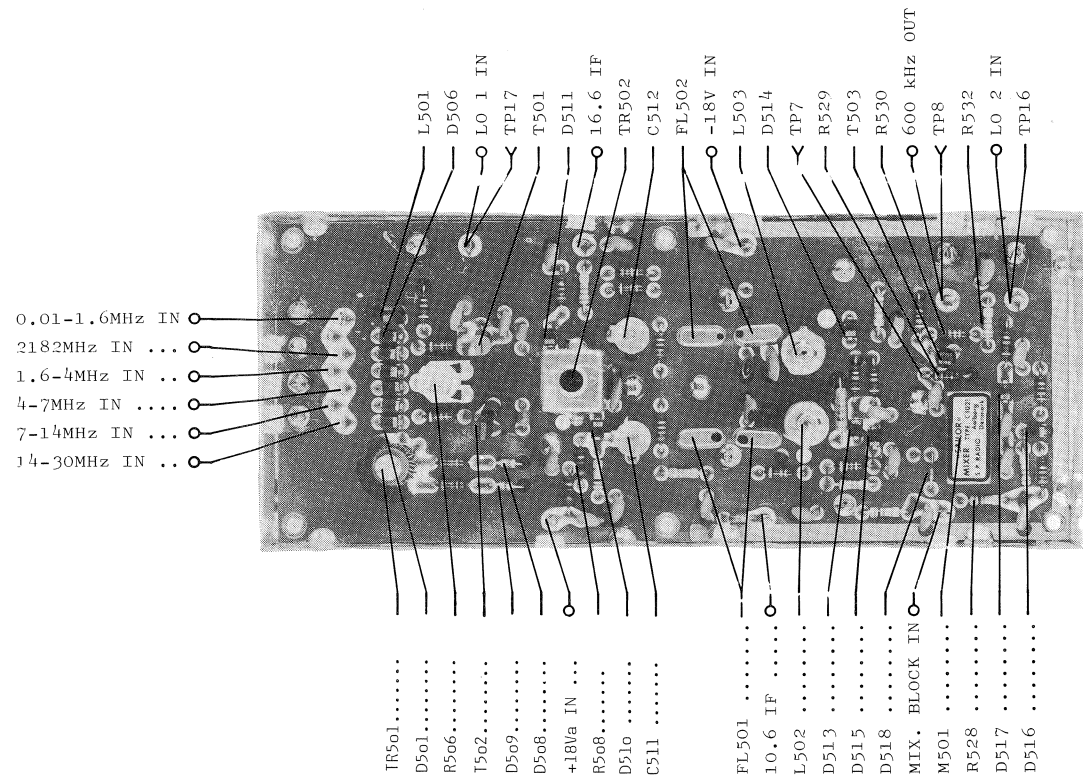
From the coil L502/L503 the signal is fed to the input port of the balanced diode mixer M501. The second local oscillator signal from the VCX0 1st Loop 2 mixer and Loop 2 filter is fed to the L0 port of the mixer.

From the output port of the mixer the signal is led to the common base buffer amplifier T503. The difference frequency at the collector of T503 is filtered out in the IF filters.

The remaining components D518, R524, R522, D515, R521, R528, R526, D516, R525, D517 and R525 is the mixer blocking circuit, which secures that no energy is stored in the IF-filters when the receiver is blocked.

TEST CONDITIONS

Frequency Setting: 2.0005 MHz
 Oscilloscope Input: Passive probe 10:1
 DC Voltmeter Input: 10 Mohm
 ● : Diode probe measurement
 TP: Testpoint
 All voltage statements are typical



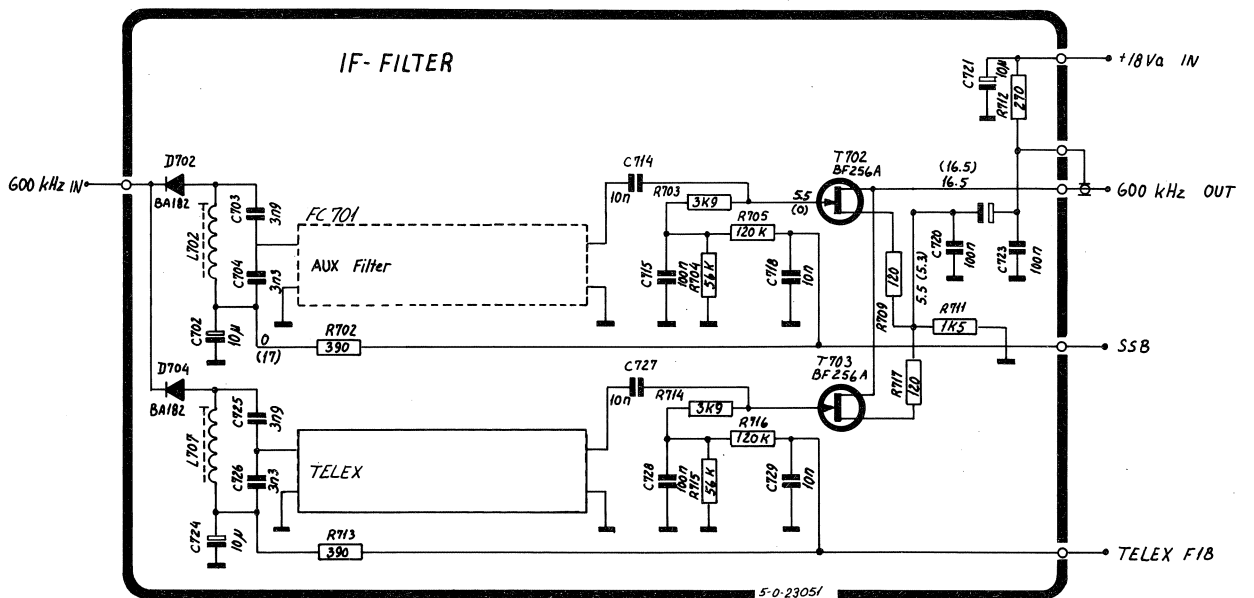
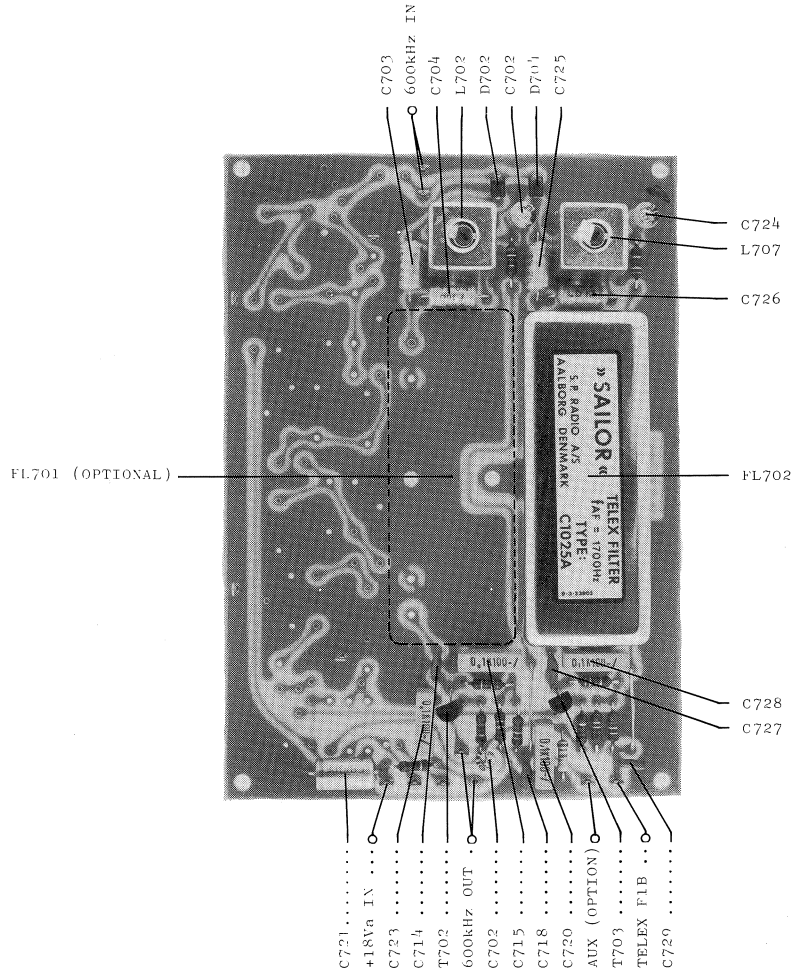
CIRCUIT DESCRIPTION FOR IF FILTER R1121

This unit contains IF selectivity together with external switching circuitry for an optional IF filter.

The high order telex filter ensures the necessary adjacent channel selectivity and far away spurious attenuation.

The switching in and out takes place by means of switch diodes D704 and D703.

The telex filter output signal is fed into a 600 kHz tuned amplifier stage T703. The tuned circuit of the amplifier is located on the IF Amp, Detector and AGC PCB.



CIRCUIT DESCRIPTION OF IF AMPLIFIER, DETECTOR AND AGC R1119, R1120 & R1121

This unit contains the 600 kHz IF amplifier, the AM and SSB detector and the AM and SSB AGC system.

IF AMPLIFIER

The IF signal from the IF filters enters the 600 kHz tuned circuit L801, C802 and C803. From a tap on L801 the signal is fed to the gate of T804 where it is amplified. The load of T804 consists of a 600 kHz fixed tuned circuit L802, C810 and C811.

From the drain of T804 the signal is fed to the gate of T808. The load of T808 consists of a 600 kHz fixed tuned circuit L803, C818 and C819. The diodes D805 and D806 are amplitude limiters to protect T814.

From the drain of T808 the signal is fed to the base of the untuned amplifier T814. From the collector of T814 the signal is fed to the base of the tuned amplifier T817D. The tuned circuit consists of L805, C834 and C837.

The stabistors D814 and D815 are amplitude limiters to limit the output in the AGC OFF mode.

DETECTOR

From L805 the signal is fed to the bases of T817A and T817B, which are an envelope transistor detector suitable for AM signals.

In the SSB mode a carrier reinjection signal is added to the IF signal via T817C and L805 in such a way that the modulation percent is kept low, approx. 11% in the resulting A3H signal to ensure low detector distortion.

R1120 only:

In the A1 mode the BFO signal is added to the IF-signal instead of the fixed 600 kHz carrier reinjection signal.

AGC SYSTEM

The control of the IF amplification is carried out by negative feed-back and decreasing of the load impedance of the three tuned amplifier stages by means of the transistors T801, T806 and T809, i.e. increasing current means decreasing gain. The AGC voltage is fed to T801, T806 and T809 from C813 via the amplifier consisting of T803 and T805.

A3H (AM) MODE

The information to the AGC system is taken at the emitter of T817D and fed to the emitter follower T813 via C825 to a peak detector consisting of D808 and T812.

T812 acts as a DC amplifier with a ripple filter R835 and C820. The signal is then fed to another emitter follower T810. The signal from T811 is grounded through R826. From T810 the signal is fed to the capacitor C813, thus feeding the AGC voltage to transistor T805. C813 is discharged through R820 and R827 which in A3H mode is grounded.

The discharge path through R841 is off because T815 is off.

CIRCUIT DESCRIPTION OF IF AMPLIFIER, DETECTOR AND AGC R1119, R1120 & R1121
cont.

A3J (SSB) MODE

Charge of C813 and C816.

As in the A3H mode, the signal is taken at the emitter of T817D and passed through T813, T812 and R835 to the transistors T811 and T810. Transistor T811 is charging C816 through R826, and T810 is charging C813 through R820. C816 is charged very fast to the AGC voltage, but because of the voltage divider R826 and R824 the voltage on C813 is taking over after a while, meaning that in the steady state condition the AGC voltage is the voltage on C813.

At the same time C832 is charged to 4.2V via T807 and R828, giving a reference voltage for the hang AGC system. When the voltage on C828 is above 1.2V, transistor T816 is on and T815 is off, meaning that the discharge path of C813 through R841 is off.

When the IF signal disappears the only discharge path of C813 is via the base of T805 as T815 is off. C832 is now discharged through R865, T816 and D810. When the voltage across C832 is so low that T816 goes off, T815 goes on and C813 is discharged through R841.

When the AGC switch is in telex mode, R827 is grounded and C813 is discharged through R820 and R827 when the IF signal disappears.

Remaining functions of the unit:

The transistor T802 is the emitter follower for the AGC meter.

The AGC ON/OFF function is performed by grounding the base of T810 and T811.

The MGC function is performed by means of the voltage divider R801, R802, R2604 (RF-GAIN) R2603 and R803.

TEST CONDITIONS

Frequency Setting:	f = 2.0005 MHz
Mode:	A3J (A3H)
Clarifier:	Center position
RF Input:	1 mW EMF/50 ohm
AGC:	ON
RF-Gain:	Maximum
Front end tuned to max. meter reading	
Oscilloscope Input:	Passive probe 10:1
DC Voltmeter Input:	10 Mohm
⊙ : Diode probe measurements	
TP: Testpoints	

All voltage statements are typical

R11XX D2/2 4-0-23082A
4-0-22477B 4-0-22477E

CIRCUIT DESCRIPTION AUDIO AMPLIFIER R1119, R1120 & R1121

This unit contains the AF-preamplifier, the active lowpass filter, the 0 dBm fixed AF output amplifier and the AF power amplifier.

AF PREAMPLIFIER AND LOWPASS FILTER

The AF signal from the detector is amplified in the operational amplifier IC901d and fed to the fifth order active LP filter with a cut-off frequency of 2.9 kHz. The active filter is built-up around the operational amplifiers IC901c and IC901b. The signal is then fed to the 0 dBm fixed AF output amplifier IC901a, the output from which enters the output transformer L2502 located on the input filter circuit board.

AF POWER AMPLIFIER

From the output of the active filter, R921 the signal is fed to the AF gain, R2607 and from there to the input of the power amplifier C914.

The integrated power amplifier IC902 has two built-in protection facilities, namely output current limiter and thermal shut-down, which means that the power amplifier cannot be destroyed by overload.

From the output terminal, pin 12, the signal is fed to the loudspeaker and the voltage divider for headphones output, J2602.

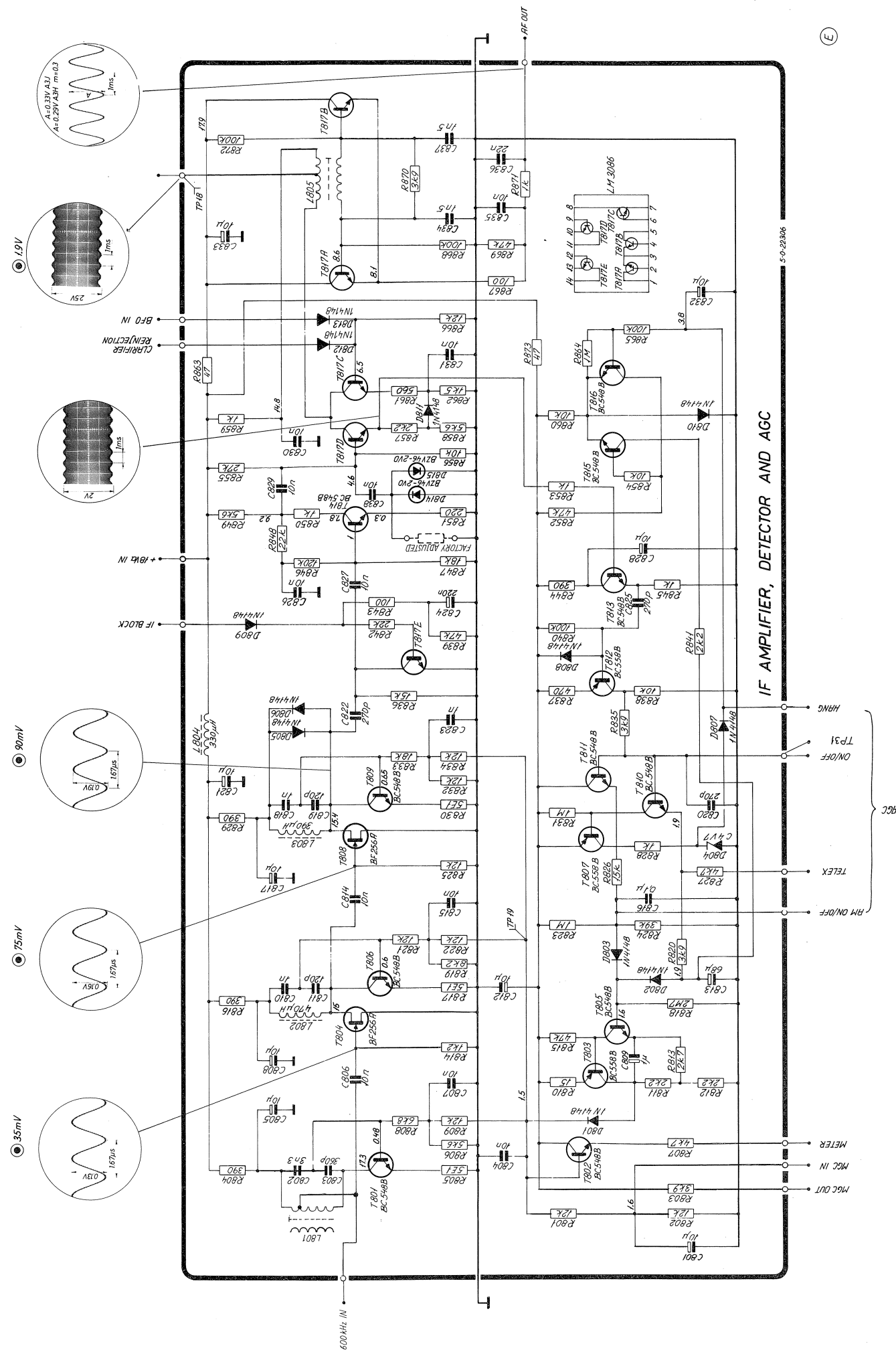
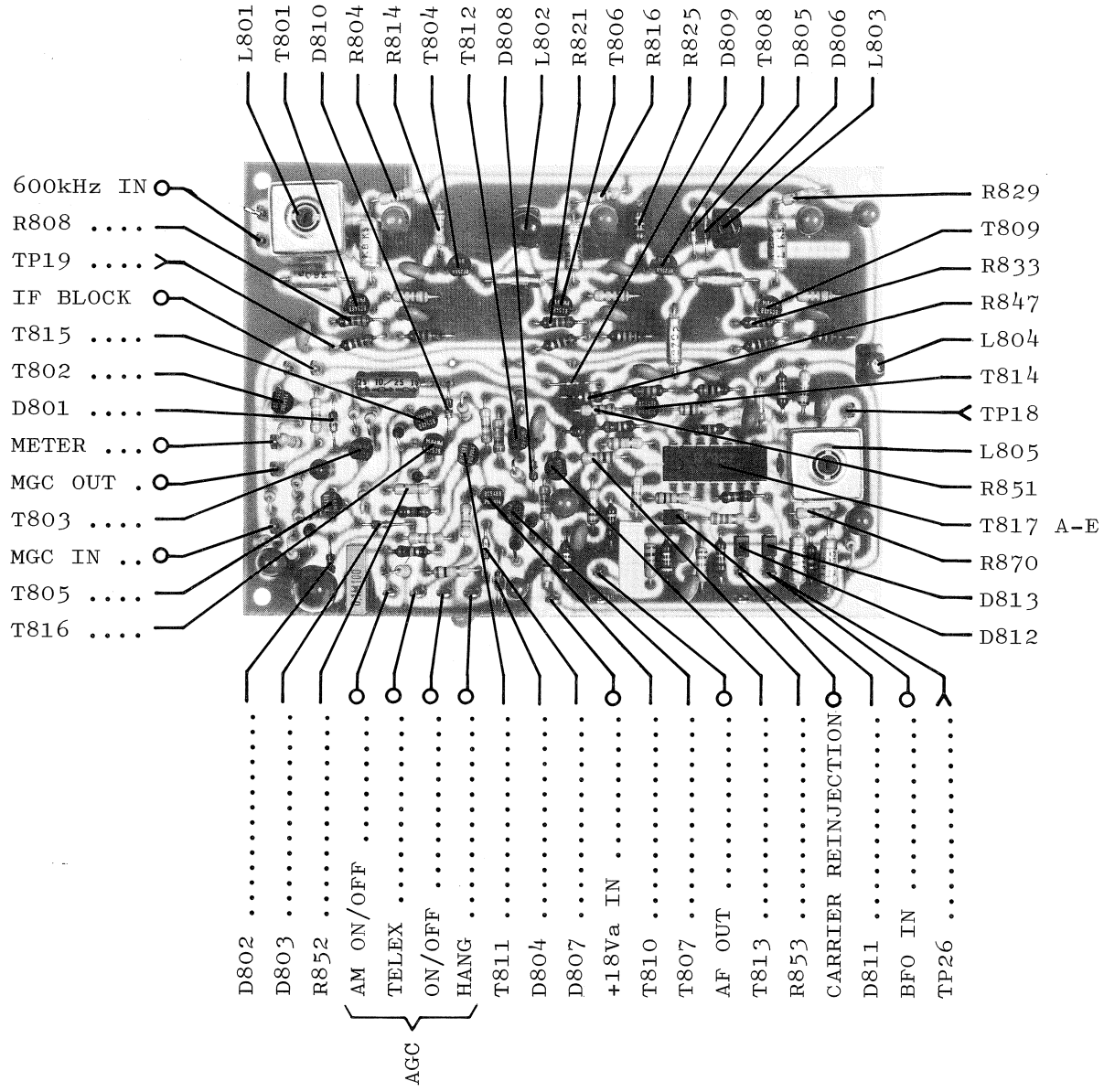
TEST CONDITIONS

Frequency Setting:	f = 2.0005 MHz
Mode:	A3J (A3H)
Clarifier:	Center position
RF Input:	1 mW EMF/50 ohm
AGC:	ON
RF-Gain:	Maximum
Front end tuned to max. meter reading	
Oscilloscope Input:	Passive probe 10:1
DC Voltmeter Input:	10 Mohm

⊙ : Diode probe measurements

TP: Testpoints

All voltage statements are typical



IF AMPLIFIER, DETECTOR AND AGC

5-9-2336

(E)

CIRCUIT D

This unit
dBm fixed

AF PREAMPL

The AF si
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of 2.9 kHz
IC901c and
amplifier
located on

AF POWER A

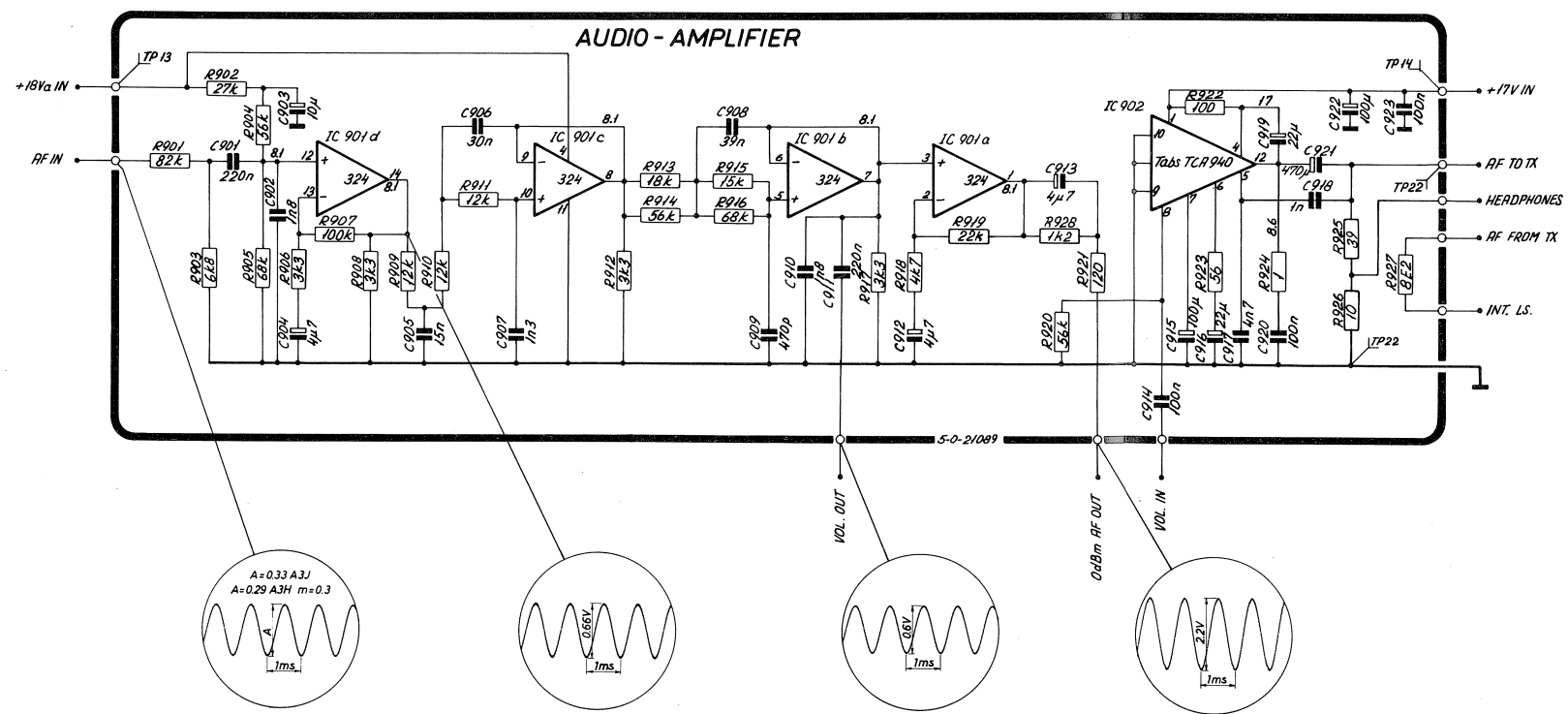
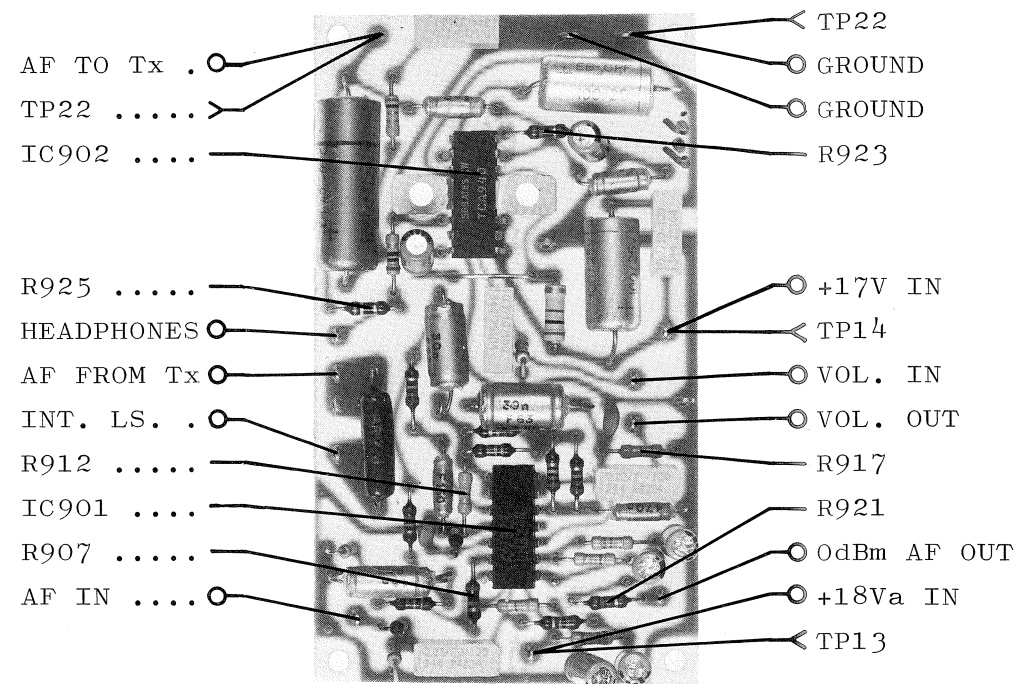
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TEST CONDI

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Clarifier:
RF Input:
AGC:
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TP: Testp
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CIRCUIT DESCRIPTION FOR DIVIDER UNIT R1119, R1120 & R1121

This unit contains the logic part of phase locked Loop 1 and phase locked Loop 2.

The 10 MHz reference oscillator (TCX0), reference divider, 2 MHz spectrum generator, 600 kHz carrier generator, programmable dividers for Loop 1 and Loop 2, the phase/frequency detectors for Loop 1 and Loop 2 and the 10/16 MHz output for the VCX0 1st Loop 2 mixer and Loop 2 filter.

10 MHz REFERENCE

The frequency stability of the receiver is related to the 10 MHz TCX0 X01001. The 10 MHz reference signal is amplified in the transistors T1004 and T1005.

REFERENCE DIVIDER

The counters IC1015, IC1011 and IC1007 divide the 10 MHz reference signal down to respectively $f_{R1} = 1$ kHz and $f_{R2} = 100$ Hz.

2 MHz HARMONIC SPECTRUM GENERATOR

With a repetition frequency of 2 MHz, the output Q_D of IC1015 goes low and the nand-gates in IC1014 will generate a narrow pulse due to the delay-time in the gates.

600 kHz GENERATOR

The output on IC1011, pin 5, Q_B has a high content of 600 kHz, which is amplified in the transistor T1006 and filtered in the tuned circuit L1002, C1021 and C1022.

PROGRAMMABLE DIVIDER FOR LOOP 1

The variable frequency f_{T1} from Loop 1 mixer is amplified and shaped in T1001 and IC1009a. Independent of which 2 MHz band is used, the frequency f_{T1} will vary from 2699 kHz to 4698 kHz as the VCO varies 2 MHz. The programmable divider divides f_{T1} down to 1 kHz (dividing figure N_1). This means that there are 2000 frequencies in each 2 MHz band. The frequency is controlled by the keyboard control, which encodes the start figure P_1 into the BCD counters IC1001, IC1002, IC1003 and IC1004.

The stop figure S_1 is controlled from the gates IC1008b and IC1009c. When the counter outputs Q_A , Q_B ... etc. equal the stop figure $S_1 + 2$ the J-K flip-flop IC1010b uses 2 clock pulses to load the start figure P_1 into the counters IC1001, IC1002, IC1003 and IC1004. The counter counts down from the start figure P_1 to stop figure S_1 and thus the dividing figure $N_1 = P_1 - S_1$.

LOOP 1 PHASE/FREQUENCY DETECTOR

The reference frequency $f_{R1} = 1$ kHz and the variable frequency $f_{V1} = 1$ kHz are fed into the phase/frequency detector IC1006. The phase/frequency detector IC1006 generates an error voltage, which is proportional to frequency or phase difference between the two signals mentioned above. This error voltage is fed into the integrator on the Loop 1 filter & $\pm 18V$ supply unit.

CIRCUIT DESCRIPTION FOR DIVIDER UNIT R1119, R1120 & R1121 cont.

PROGRAMMABLE DIVIDER FOR LOOP 2

The variable frequency f_{T2} from the Loop 2 mixer is amplified and shaped in T1002 and IC1009b. The frequency f_{T2} will vary between 7.85 kHz and 9.25 kHz depending on the 100 Hz programming. The programmable divider divides f_{T1} down to 100 Hz (dividing figure N_2).

From the keyboard control the start figure P_2 encodes into the BCD counter IC1005.

The stop figure S_2 is controlled from the gate IC1008a. When the counter outputs Q_A , Q_B , Q_C ... etc. equal the stop figure $S_2 - 2$, the J-K flip-flop IC1010a uses 2 clock pulses to load the start figure P_2 into the counters IC1005 and IC1012. The counter will count up from the start figure P_2 to the stop figure S_2 , and thus the dividing figure is $N_2 = S_2 - P_2$.

LOOP 2 PHASE/FREQUENCY DETECTOR

The reference frequency $f_{R2} = 100$ Hz and the variable frequency $f_{V1} = 100$ Hz, are fed into the phase/frequency detector IC1013. The phase/frequency detector IC1013 generates an error voltage proportional to the frequency or the phase difference between the two signals mentioned above. This error voltage is fed into the integrator on the VCX0 1st Loop 2 mixer and Loop 2 filter.

10/16 MHz OUTPUT

The 10 MHz and the 16 MHz outputs are taken from the 10 MHz amplifier T1005 and the 16 MHz tuned amplifier T1003 respectively, and these are fed from pin 11 of the reference divider IC1015. This output has a high content of 16 MHz. The signals are added in the resistors R1027, R1025 and T1026 and fed to the VCX0 1st Loop 1 mixer & loop 2 filter.

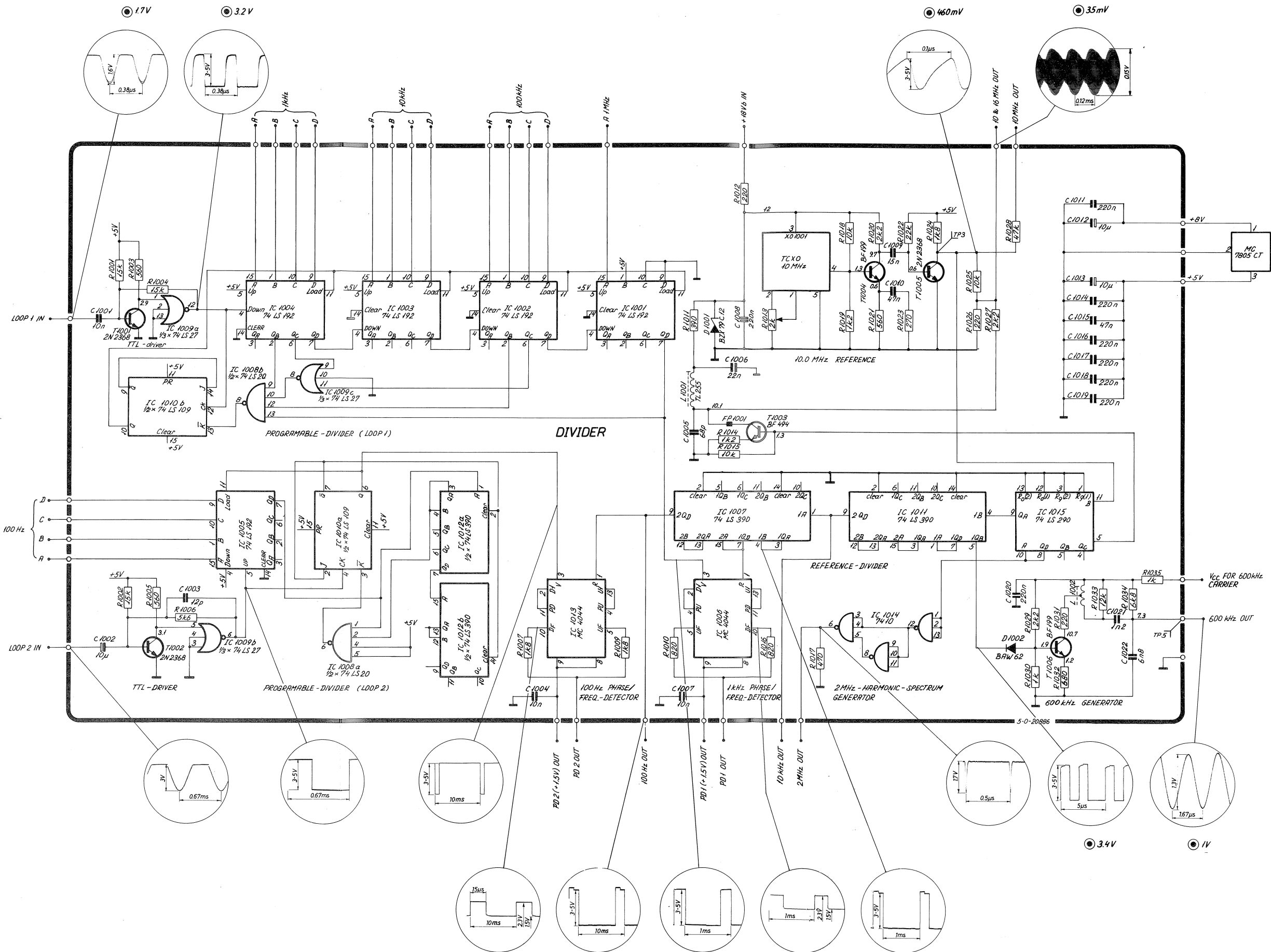
TEST CONDITIONS

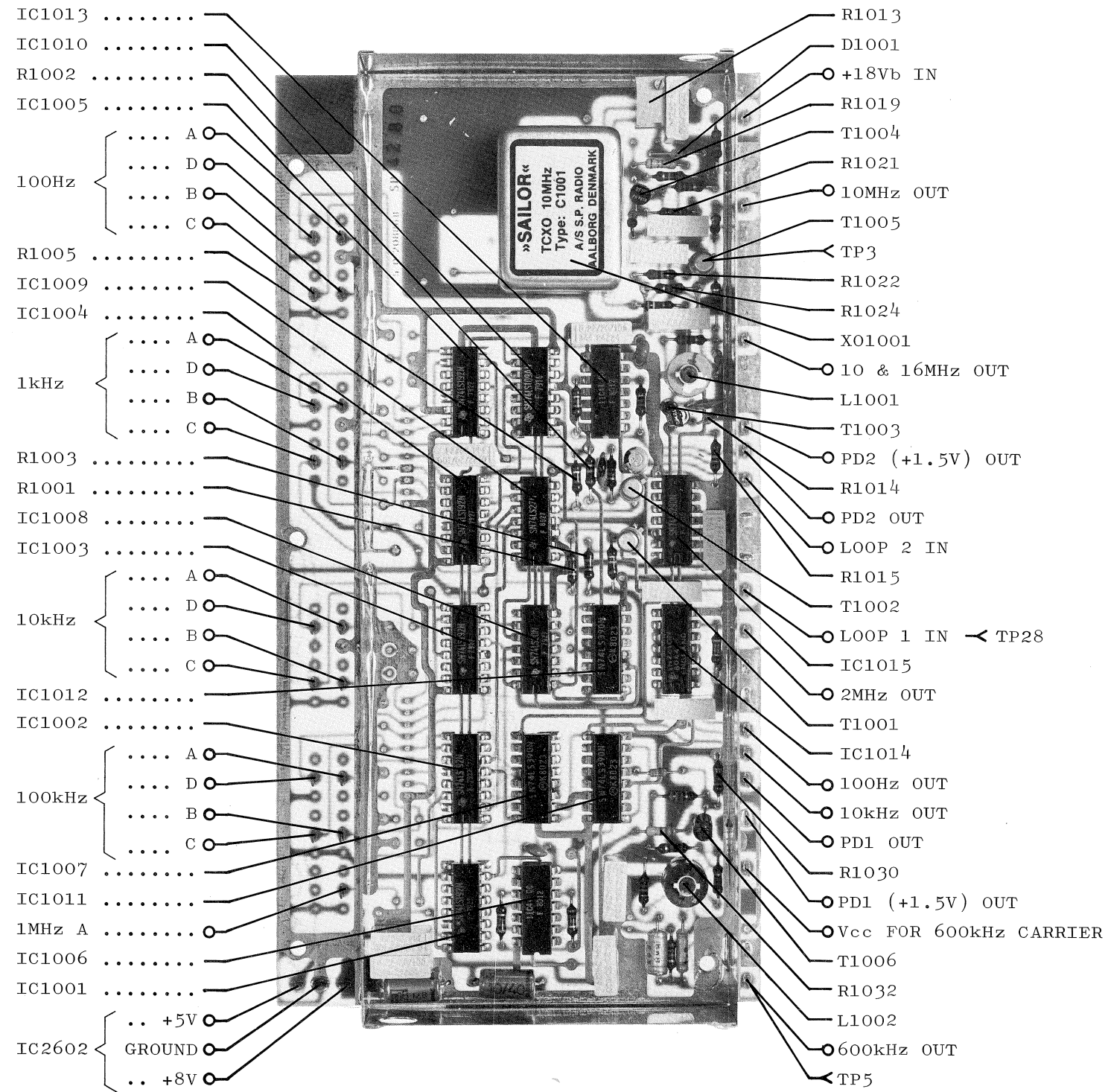
Frequency Setting: $f = 2.0005$ MHz
Mode: A3J
Clarifier: Center position
Oscilloscope Input: Passive probe 10:1
DC Voltmeter Input: 10 Mohm

⊙ : Diode probe measurements

TP: Testpoints

All voltage statements are typical





CIRCUIT DESCRIPTION LOOP 1 FILTER & $\pm 18V$ SUPPLY UNIT R1119, R1120 & R1121

This unit contains two regulated power supplies $\pm 18V$ with fold-back current limiter, the complete integrator and filter for Loop 1.

-18V SUPPLY

The series transistor T1103 supplies a $-18V$ output controlled by the current flow into its base from T1105, where a portion of the output voltage, via a voltage divider containing R1110, is compared to a reference voltage created by R1103, D1102 and D1103. The fold-back is within the circuit. When the output current from the regulator increases, the base current must increase too, but this current is limited by R1103. When the regulator reaches this limit, T1105 stops conducting and so it folds back. To ensure that T1103 starts conducting, R1104 is added.

+18V SUPPLY

The principle of operation for this regulator is exactly as described above, with an additional current limiter containing T1104 and T1106 to ensure the fold-back characteristic is maintained within design limits. To ensure startup, R1112 is added.

INTEGRATOR & LOOP 1 FILTER

The integrator is built-up around IC1102, the integration capacitor is C1113. R1120 feeds current into the diode coupled Darlington pair in the phase comparator MC4044 on the divider board to perform the 1.5V reference. Output from the integrator pin 6 on IC1102 feeds into the active lowpass filter IC1101 to filter out the 1 kHz ripple from the phase comparator. The voltage divider R1118 and R1119 connected to IC1102 via D1106 ensure that the output voltage swing is within approx. $-4V$ to $-17V$.

TEST CONDITIONS

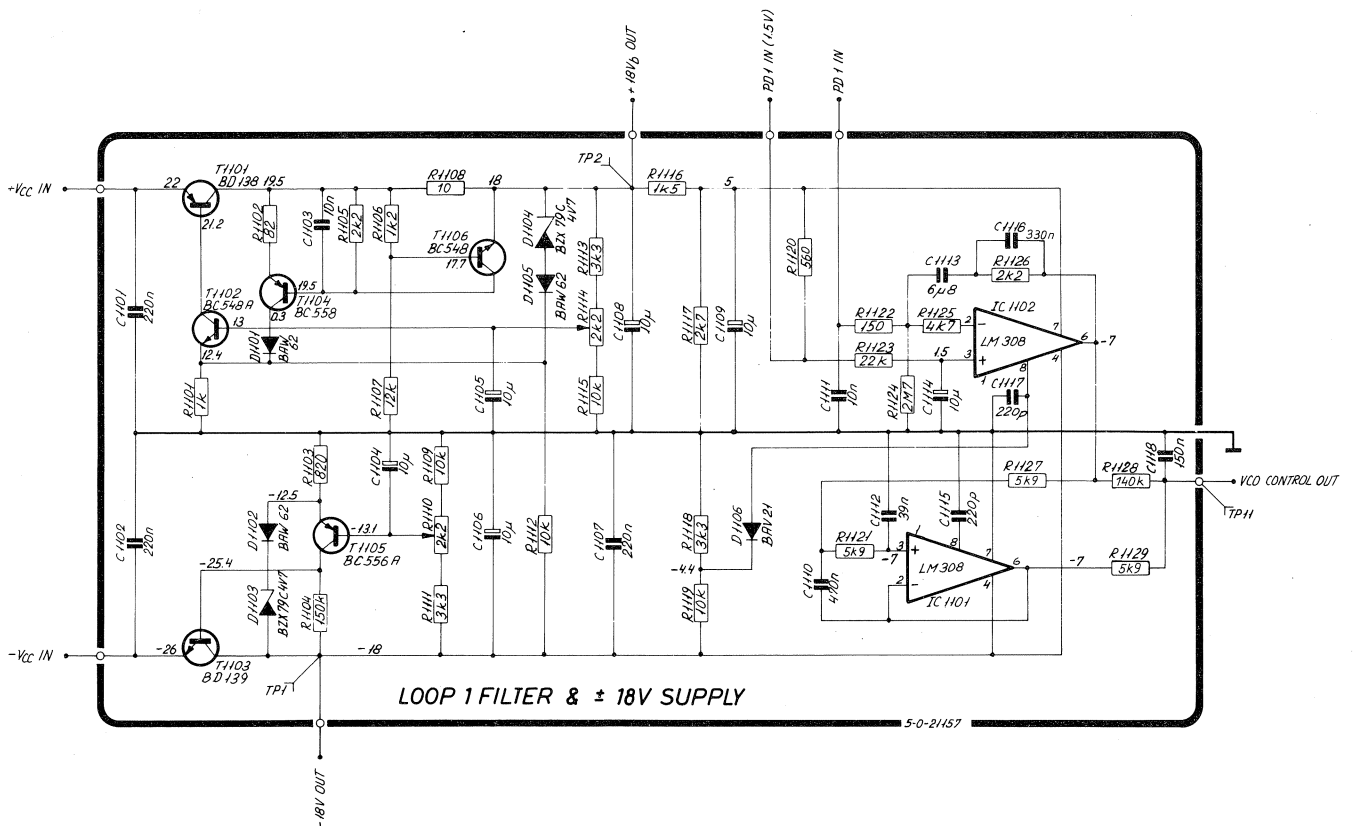
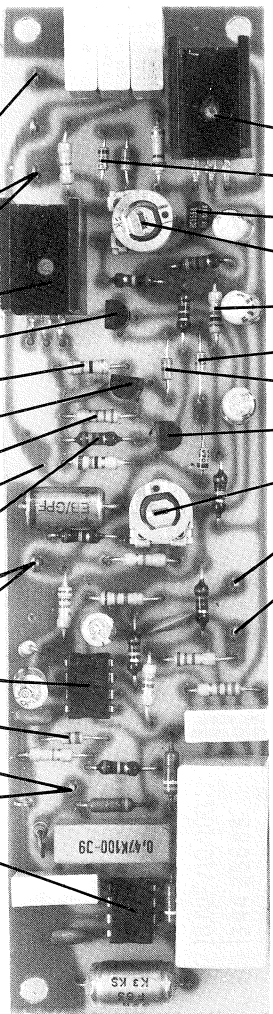
Frequency Setting: 2.0005 MHz
Oscilloscope Input: Passive probe 10:1
DC Voltmeter Input: 10 Mohm

⊙ : Diode probe measurement

TP: Testpoint

All voltage statements are typical

- Vcc IN
- 18V OUT
- TP1
- T1101
- T1102
- R1102
- T1104
- R1105
- +Vcc IN
- R1106
- +18Vb OUT
- TP2
- IC1102
- D1106
- VCO CONTROL OUT
- TP11
- IC1101
- T1103
- D1103
- T1105
- R1110
- R1101
- D1105
- D1101
- T1106
- R1114
- PD1 (+1.5V) IN
- PD1 IN

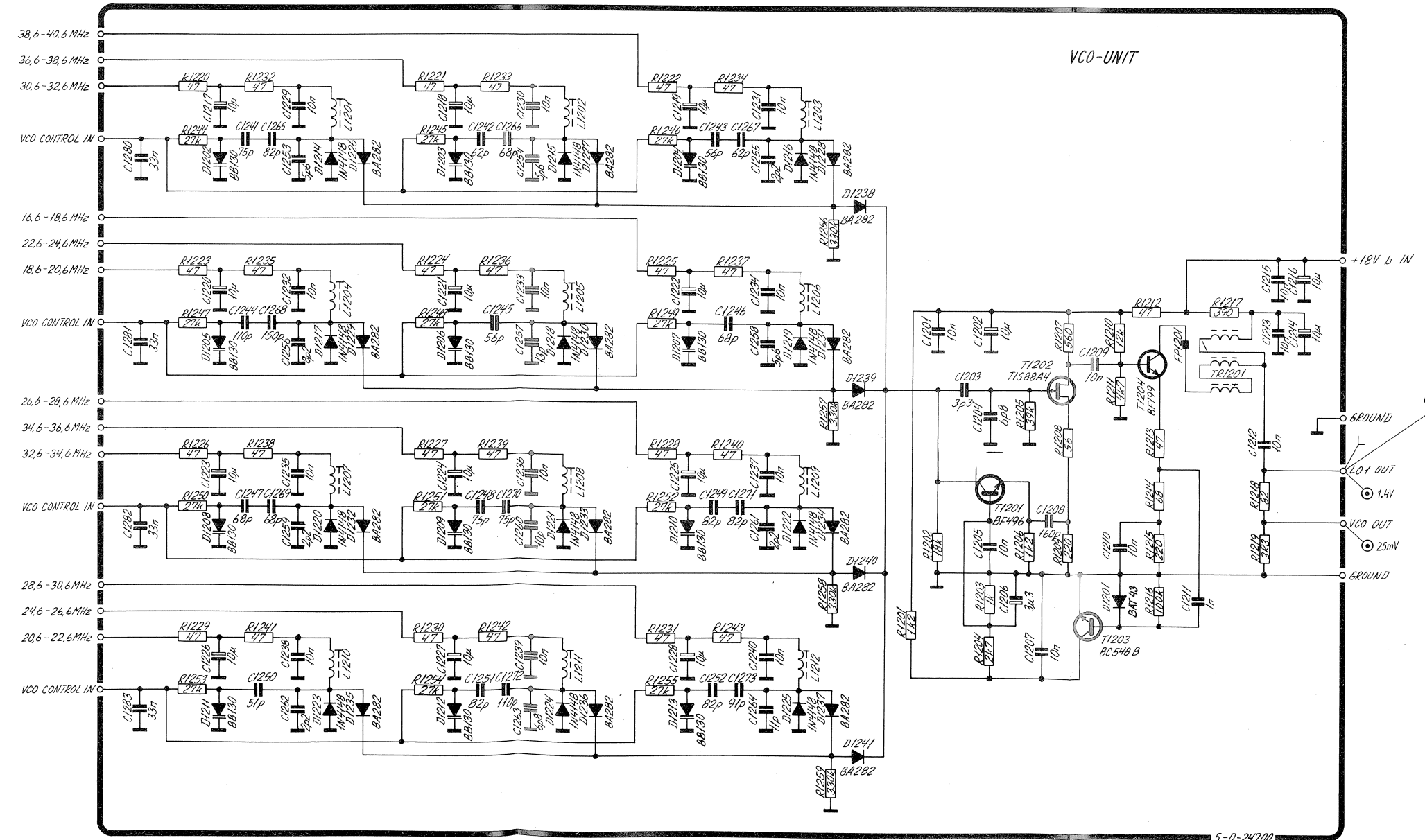
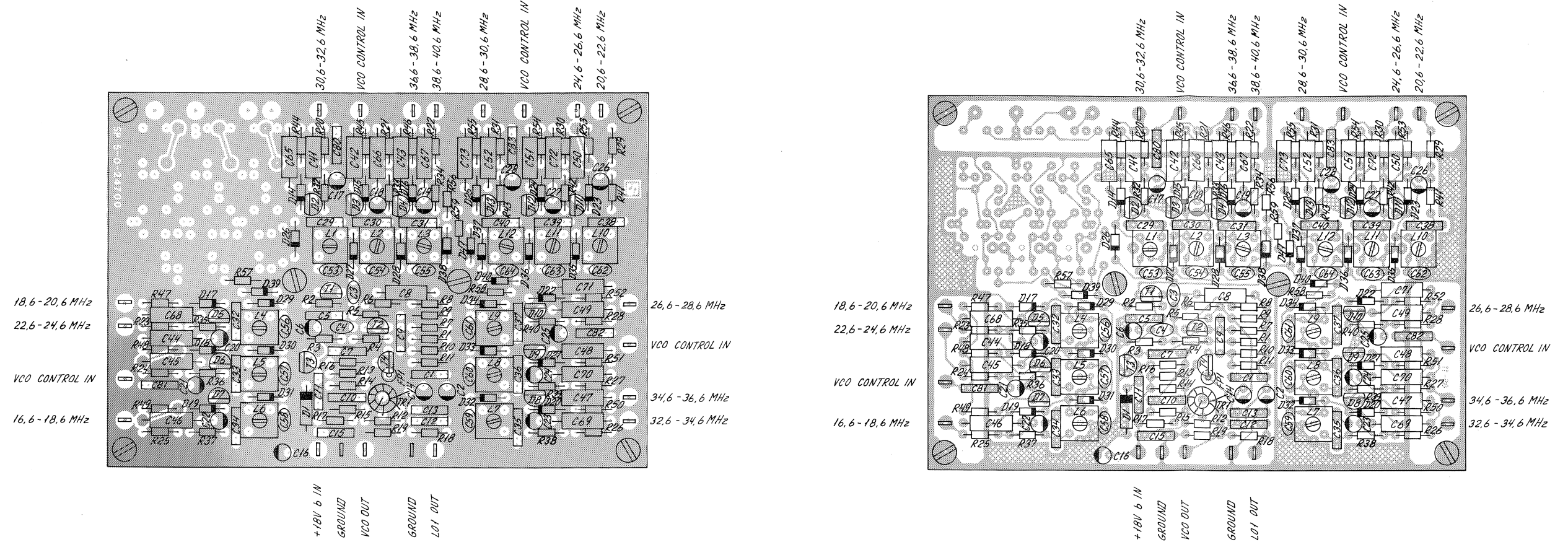


CIRCUIT DESCRIPTION FOR VCO-UNIT R1119, R1120 & R1121

The VCO-unit comprises a common active negative resistance transistor-circuit and 12 parallel tuned circuits, which can be connected to the first mentioned circuit - one at a time - by means of diode switches. The negative resistance is generated by means of the feed-back around T1201 and T1202. When a parallel tuned circuit is connected to the collector of T1201 by means of a pair of band switching diodes D1226 to D1237 and D1238 to D1241, the circuit will oscillate. Each coil section will cover an output frequency range of 2 MHz.

The frequency of oscillation can be varied by means of the VCO-control input via the appropriate variocap. diode D1202 to D1213. The appropriate coil L1201 to L1212 is adjusted to give the maximum output frequency in the selected 2 MHz band for a control voltage of -15V. When the output frequency is varied 2.0 MHz for each coil section, the control voltage will change about 6 to 9.5V.

The AC amplitude level at the tuned circuit, and also at the buffer output port, is kept constant by means of an ALC-circuit. The output level is sensed at R1214 by the level detector C1211, R1216 and D1201. Via T1203 and R1201 the DC-current and so the gain in T1201 are regulated to give a constant output amplitude from the buffer amplifier built around T1204. The DC-level at the collector of T1203 will be able to vary between about 4.5V and 10.5V over the entire frequency range. The output level will be about 1.4V_{pp} at C1212 and about 50 mV_{pp} at the top of R1219.



VCO UNIT (MODULE 1200)

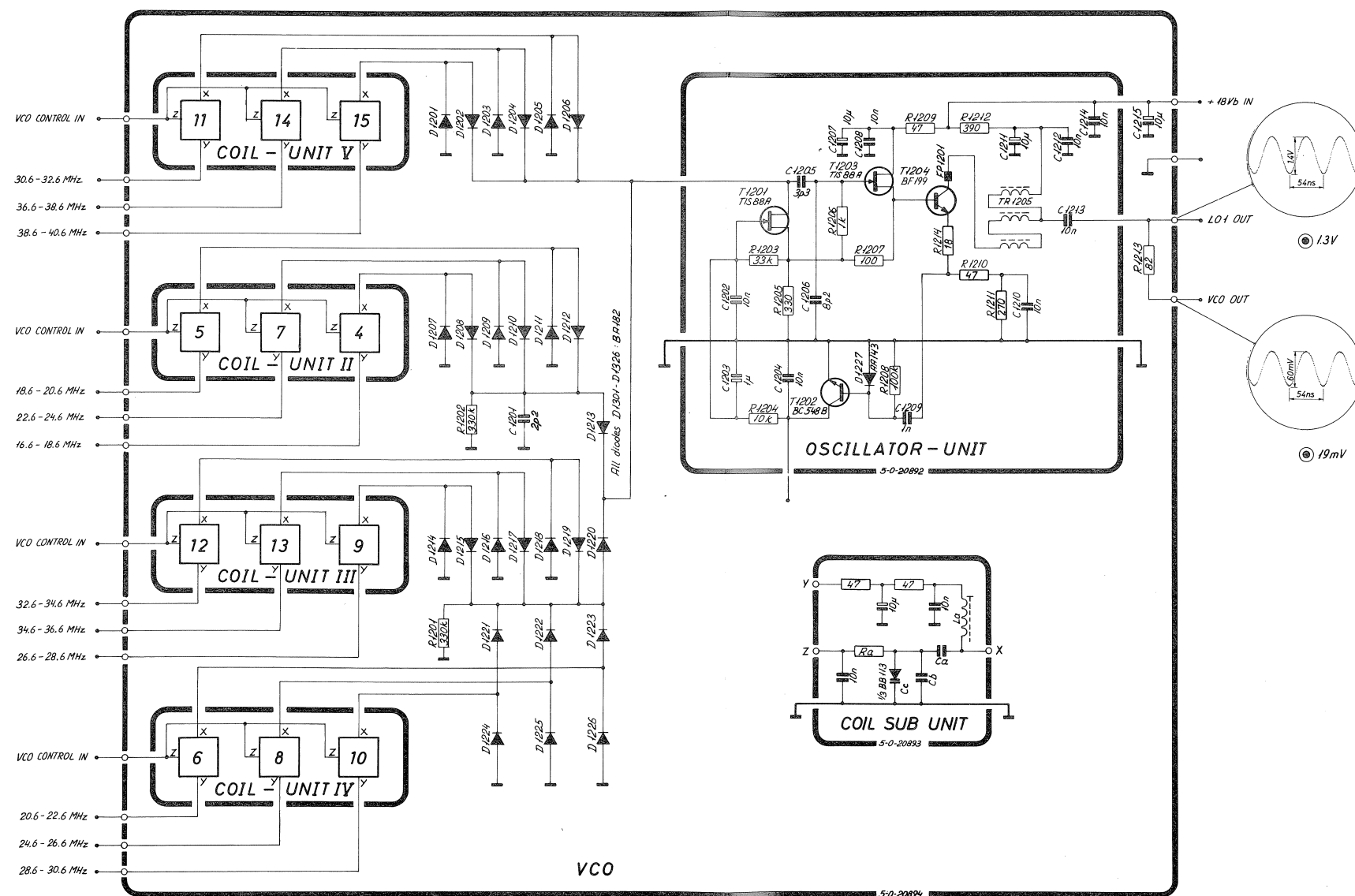
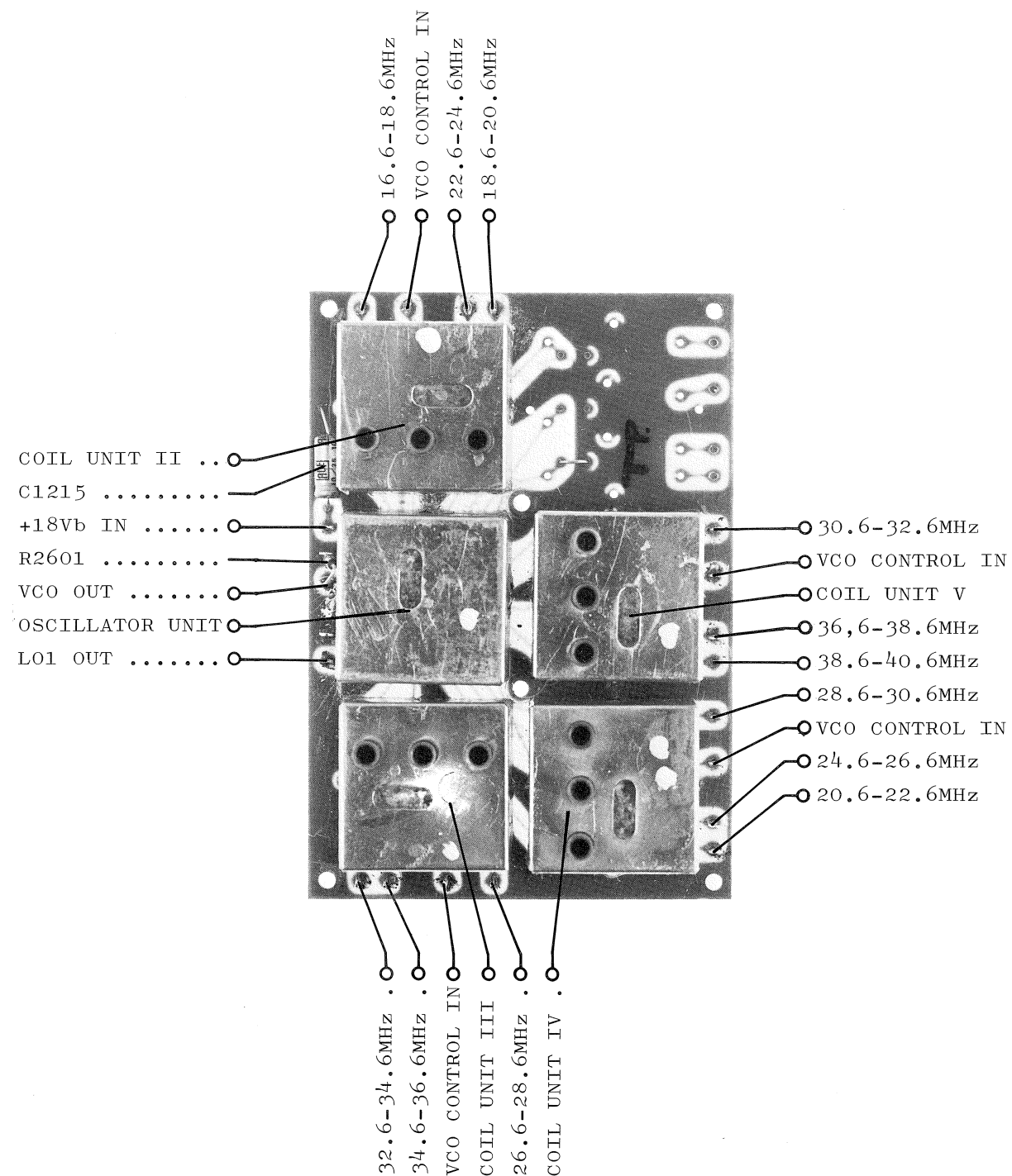
CIRCUIT DESCRIPTION VCO-UNIT R1119, R1120 & R1121

This unit contains in principle twelve VCO's, and is constructed in such a way that it contains one single oscillator unit and twelve coil units switched in and out by the diodes D1201 to D1226. The oscillator circuit is made up of T1201 and T1203, the output signal is fed through the buffer amplifier T1204. The signal current in T1204 is measured by the level detector C1209, R1208 and D1227 and T1202. It regulates the oscillator amplitude to maintain a constant output voltage.

The oscillator unit is factory adjusted and sealed and cannot be repaired in the field, it must be replaced and can be repaired at the factory.

TEST CONDITIONS

Frequency Setting: 2.0005 MHz
 Oscilloscope Input: Passive probe 10:1
 DC Voltmeter Input: 10 Mohm
 ⊙ : Diode probe measurement
 TP: Testpoint
 All voltage statements are typical



CIRCUIT DESCRIPTION HARMONIC FILTERS R1119, R1120 & R1121

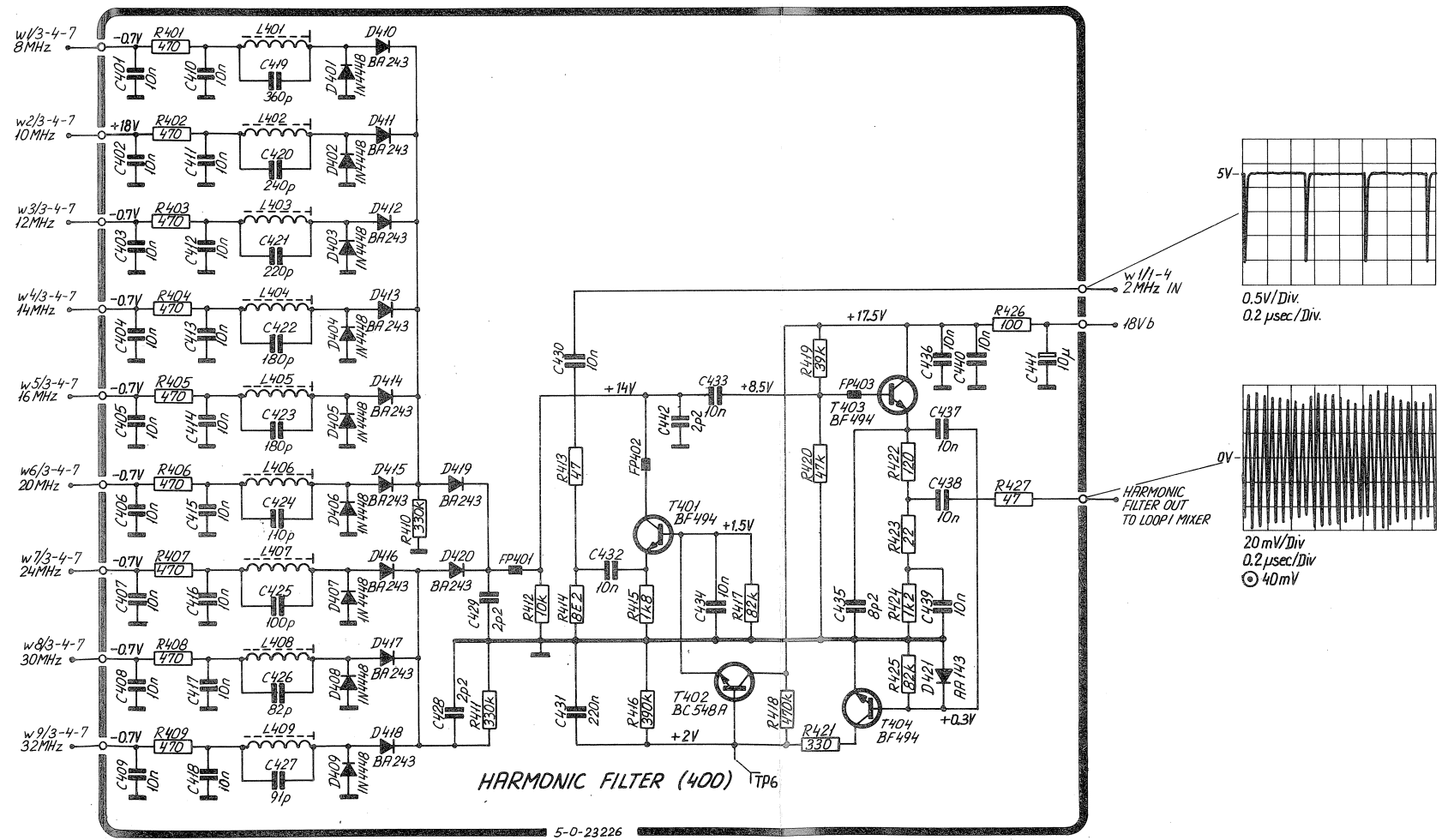
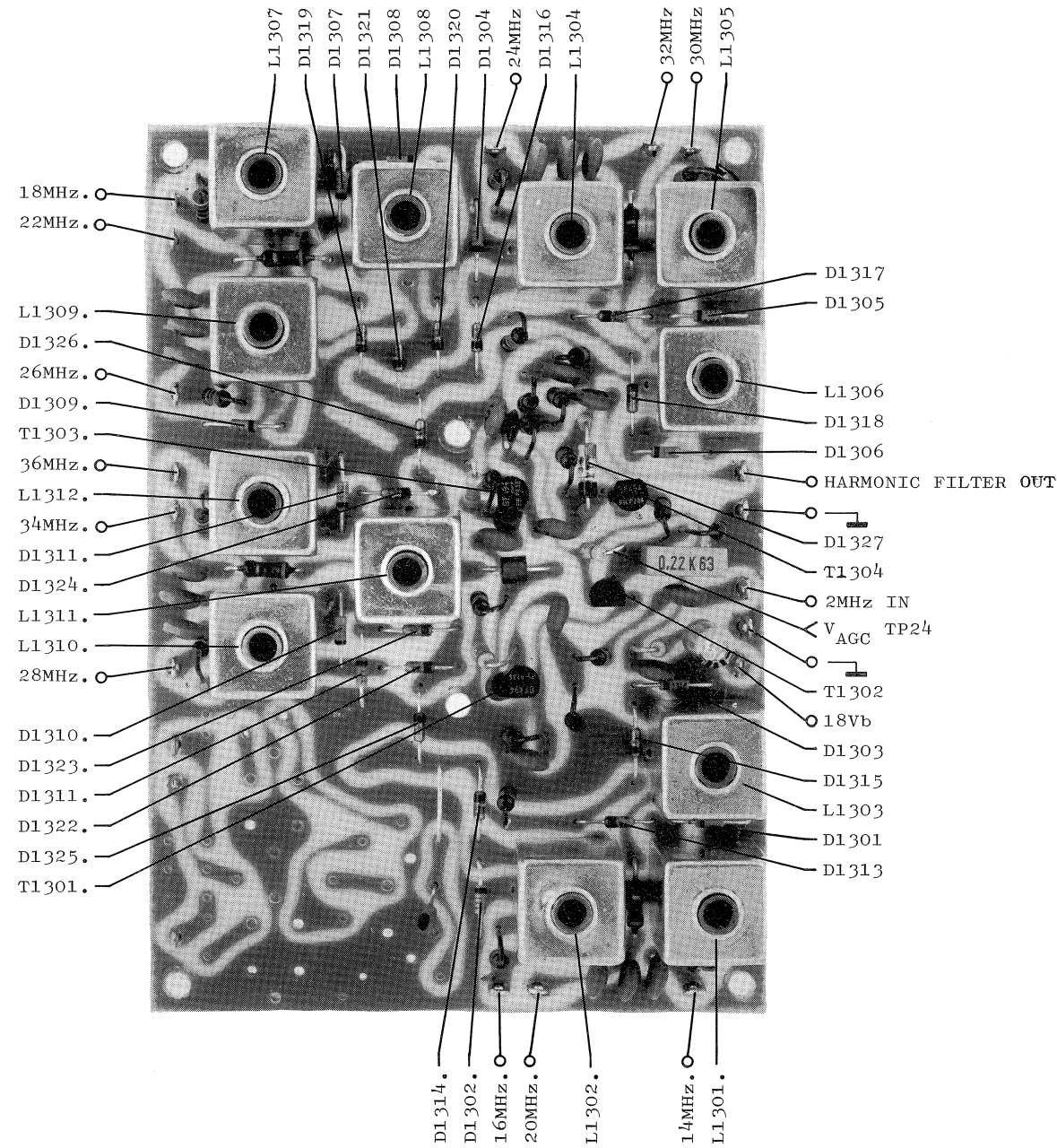
This unit consists of twelve tuned LC-circuit, which are switched in and out by the diodes D1313 to D1326 and an automatic gain controlled amplifier.

The circuit receives signal from the 2 MHz spectrum generator located on the divider board, and the selected LC-circuit together with T1301 filters out and amplifies the wanted harmonic of the input signal. The collector signal of T1301 is then fed to the emitter follower T1303.

The output voltage of the emitter follower is detected by D1327, T1304 and C1345. Through T1304, R1328, R1321, R1318 and C1339, the AGC voltage is generated, and via T1302 this voltage regulates the gain in T1301 to maintain constant output voltage of the filter.

TEST CONDITIONS

Frequency Setting: 2.0005 MHz
 Oscilloscope Input: Passive probe 10:1
 DC Voltmeter Input: 10 Mohm
 ⊙ : Diode probe measurement
 TP: Testpoint
 All voltage statements are typical



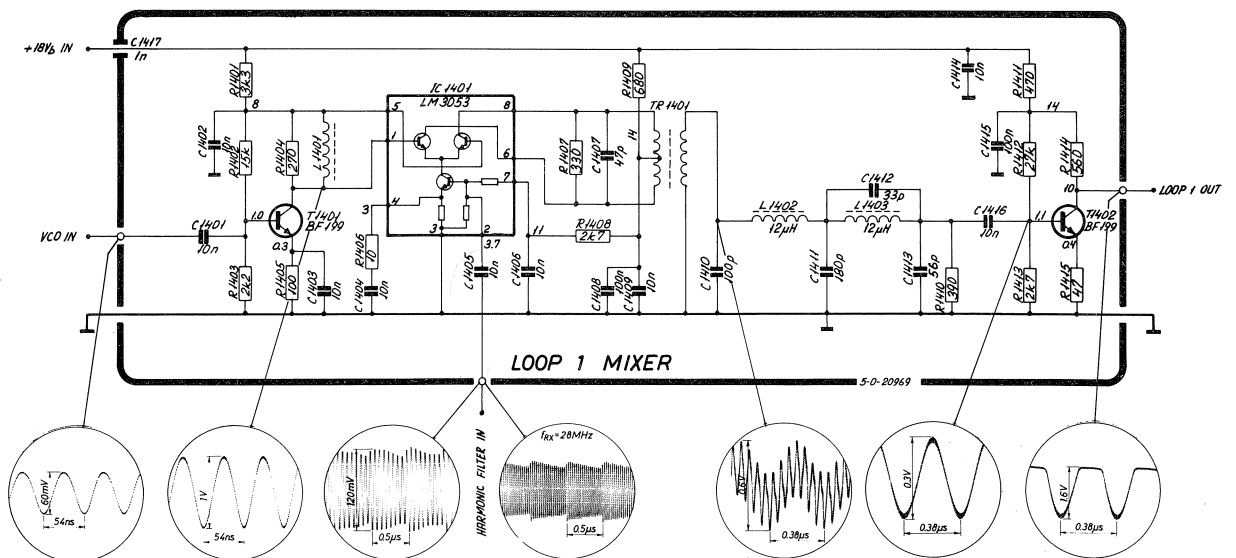
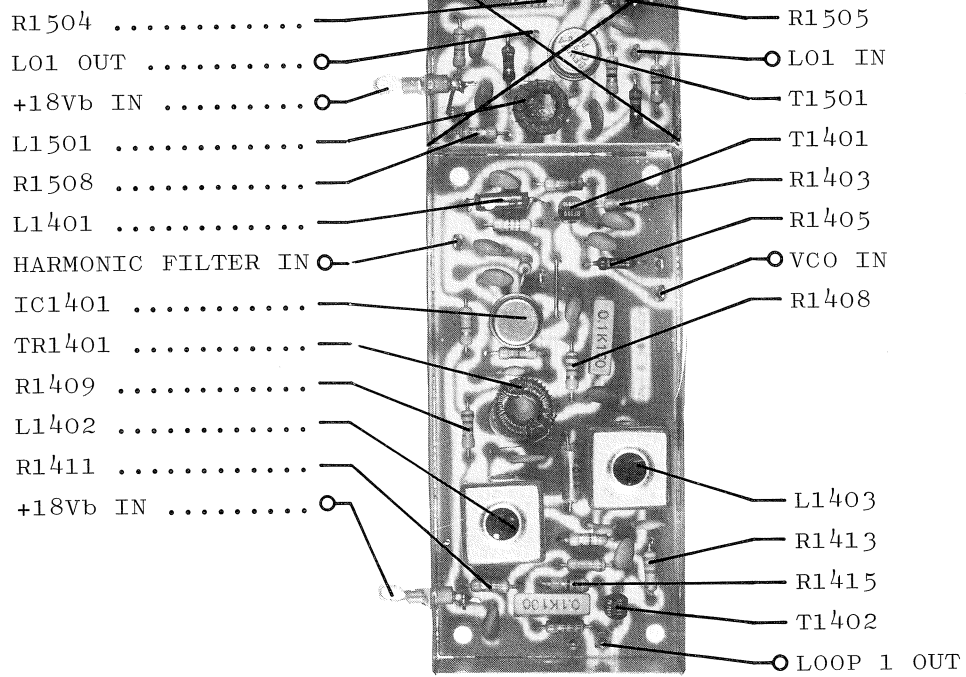
CIRCUIT DESCRIPTION LOOP 1 MIXER R1119, R1120 & R1121

This unit mixes together the VCO signal and the signal from the harmonic filter and filters out the difference frequency to supply the variable divider.

The VCO signal is fed via C1401 to the buffer amplifier T1401, and after that to the integrated balanced mixer IC1401. To this, the harmonic filter signal is applied via C1405. Output from the mixer is fed into the combiner transformer TR1401 feeding into the lowpass filter containing L1402, L1493, C1410, C1411, C1412 and C1413. This lowpass filter filters out the wanted mixing product and prevents the two local oscillator signals from reaching the variable divider. The filtered signal is amplified in the output amplifier T1402.

TEST CONDITIONS

Frequency Setting: 2.0005 MHz
Oscilloscope Input: Passive probe 10:1
DC Voltmeter Input: 10 Mohm
⊙ : Diode probe measurement
TP: Testpoint
All voltage statements are typical



CIRCUIT DESCRIPTION VCO-BUFFER R1119, R1120 & R1121

This unit contains the VCO buffer amplifier.

The signal from the VCO unit enters the base of T1501 via the frequency compensating capacitor C1502. Capacitor C1503 and resistor R1506 are part of the frequency compensating circuit.

From the collector of T1501 the signal is fed to the 1st and 2nd mixer circuit board via the impedance step down transformer L1501.

TEST CONDITIONS

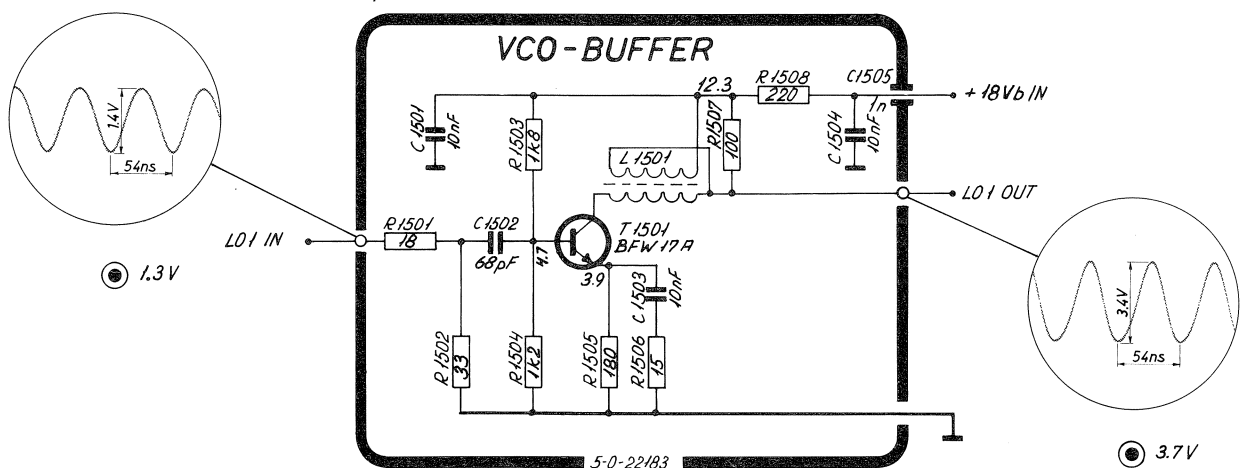
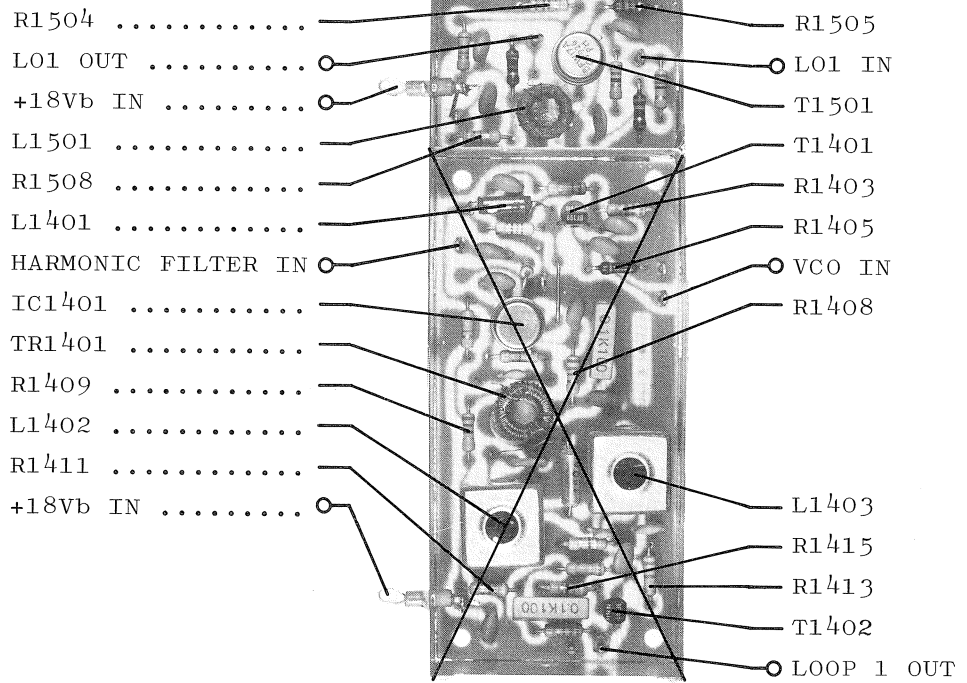
Frequency Setting: 2.0005 MHz
Oscilloscope Input: Passive probe 10:1
DC Voltmeter Input: 10 Mohm

⊙ : Diode probe measurement

TP: Testpoint

All voltage statements are typical

R11XX B2/2 4-0-23088
 4-0-22466B 4-6-22183



CIRCUIT DESCRIPTION VCXO 1ST LOOP 2 MIXER & LOOP 2 FILTER R1119, R1120 & R1121

This unit contains the Loop 2 integrator, the summing amplifier, the voltage controlled crystal oscillators (VCXO's) and the first Loop 2 mixer.

LOOP 2 INTEGRATOR

The integrator is built-up around IC1601a, the integration capacitor is C1609. R1628 feeds current into the diode coupled Darlington pair in the phase comparator IC1013 on the divider board in order to perform the 1.5V reference voltage. The output from the integrator pin 1 feeds into pin 5 of the summing amplifier.

SUMMING AMPLIFIER

The IC1601b sums up two signals namely the output from the integrator and the information from the 100 Hz setting. This information is weighed by means of the resistors R1617, R1618, R1619, R1620 and R1621. This summing is done to speed up the Loop 2 system in the continuous tuning mode.

The output, pin 7 of IC1601b, is fed to the VCXO's via a ripple filter consisting of R1616 and C1614.

VCXO's

The VCXO's are crystal controlled Pierce Collpits oscillators, the frequency of which are tuned of variocap.'s D1601, D1605 and D1606.

For receiver frequencies below 14 MHz, the 16 MHz oscillator is working and for frequencies above 14 MHz, the 10 MHz one is working.

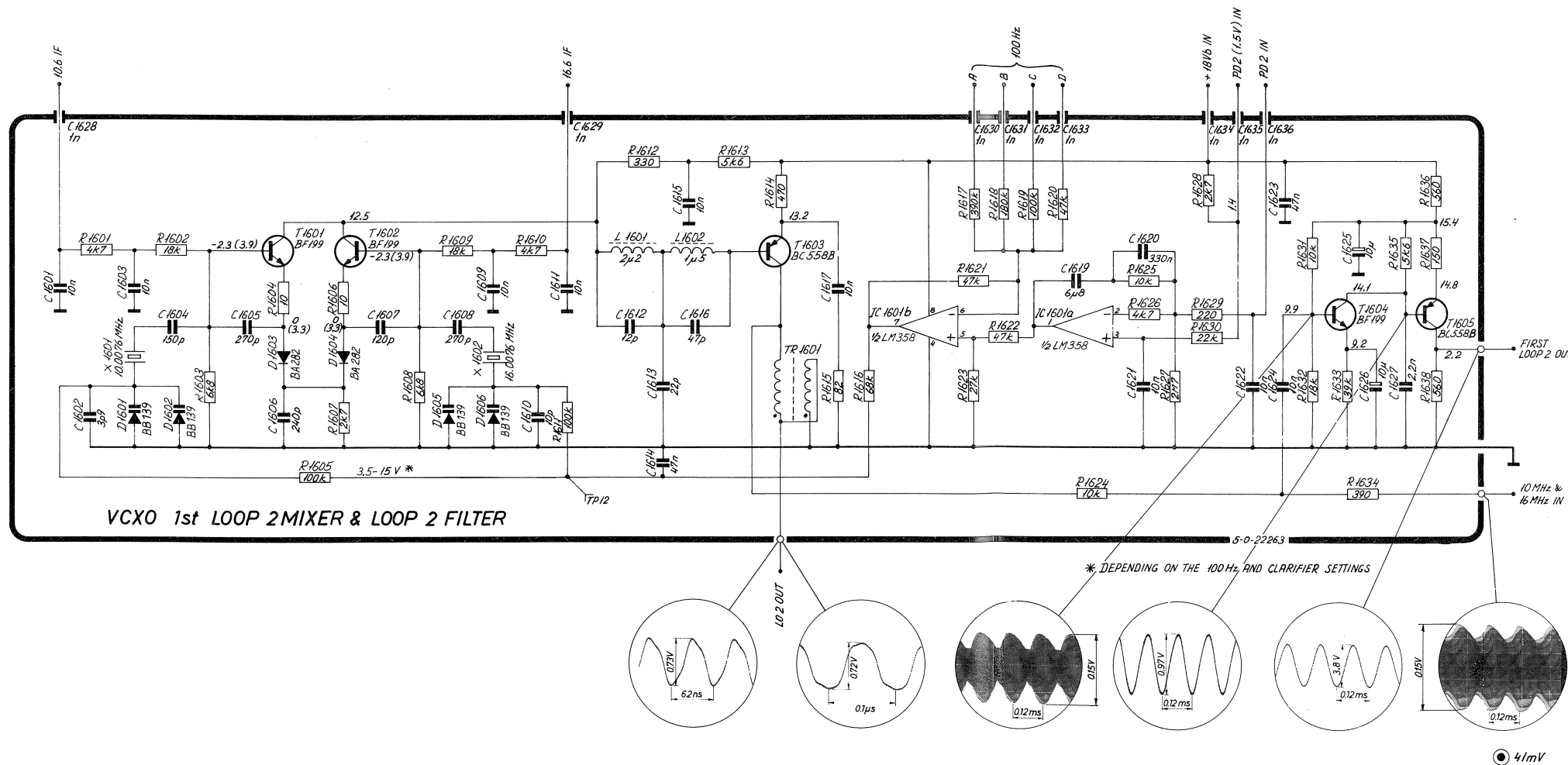
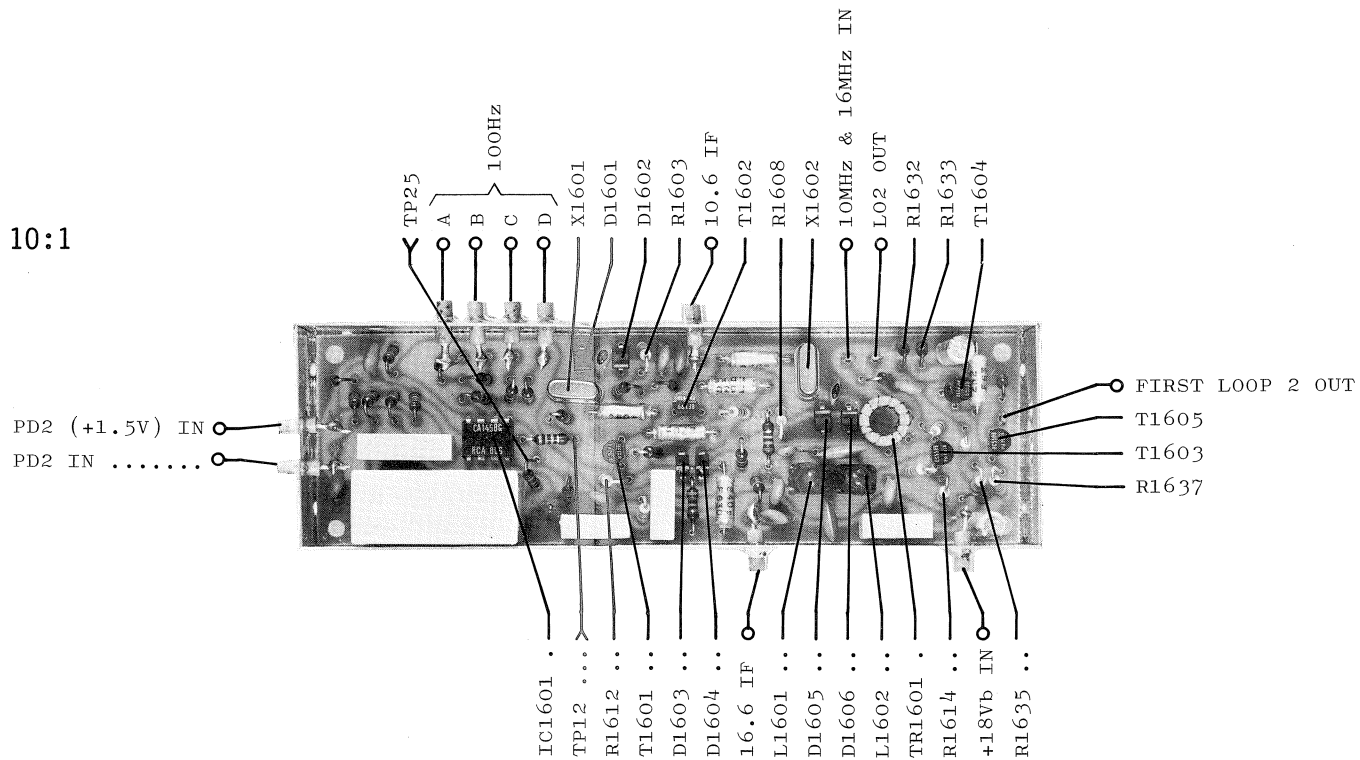
The outputs from the VCXO's are fed to the lowpass filter consisting of L1609, L1610, C1612, C1613 and C1616, and then to the buffer amplifier T1603 and out via the impedance step down transformer TR1601 to the 2nd mixer located at the 1st and 2nd mixer circuit board. A portion of the oscillator signal is fed to the first Loop 2 mixer via R1624.

FIRST LOOP 2 MIXER

As mentioned above the VCXO signal is fed into the base of mixer transistor T1604, together with the 10 MHz and 16 MHz signals from the divider unit. Because of the big difference between the mixer frequencies and the output frequency, the only filtering needed to filter out the wanted mixing product is R1635 and C1627. The mixer transistor is feeding into the output amplifier T1605.

TEST CONDITIONS

Frequency Setting: 2.0005 MHz
 Oscilloscope Input: Passive probe 10:1
 DC Voltmeter Input: 10 Mohm
 ● : Diode probe measurement
 TP: Testpoint
 All voltage statements are typical



CIRCUIT DESCRIPTION CLARIFIER AND 2ND LOOP 2 MIXER R1119, R1120 & R1121

This unit contains the clarifier AF oscillator, 2nd Loop 2 mixer and a lowpass filter.

AF OSCILLATOR

The AF oscillator consists of the transistor T1701 and the tuned circuit L1701, C1702, C1703 and the clarifier control capacitors C2601, C2602 and C2603. The nominal frequency is 7 kHz (clarifier to center pos.).

2nd LOOP 2 MIXER

From the collector of T1701 the signal is fed to the base of the 2nd Loop 2 mixer T1702, where it is subtracted from the other injection signal, having a nominal frequency range from 3.1 kHz to 9.0 kHz (clarifier to center pos.).

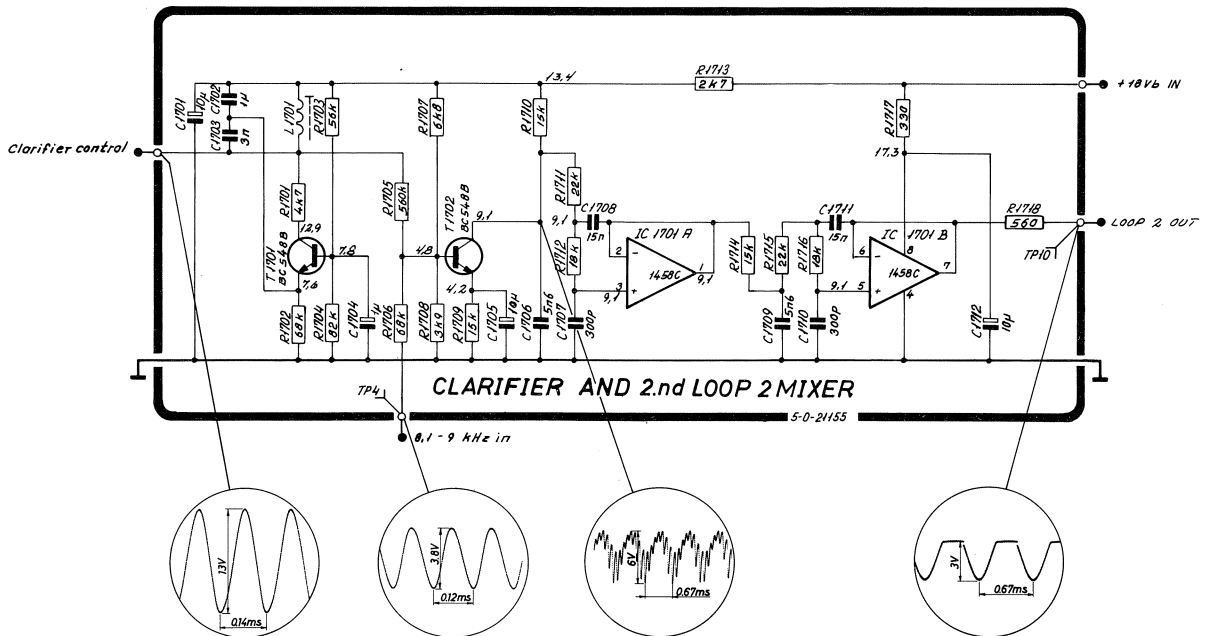
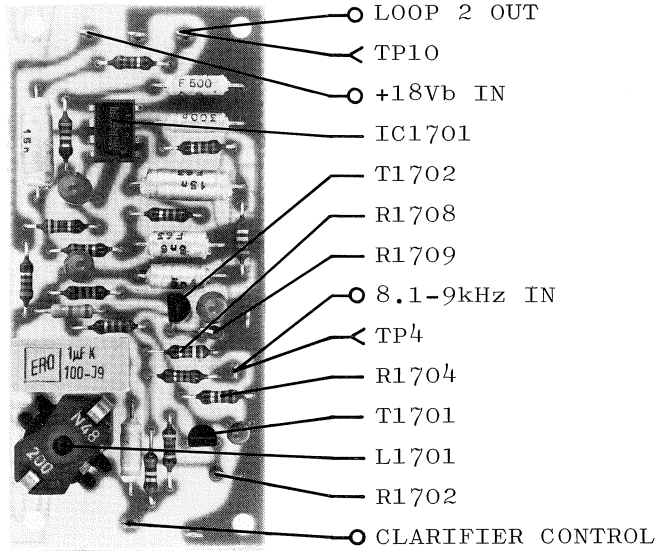
LOWPASS FILTER

The mixed signal on the collector of T1702 is fed to a sixth order active lowpass filter with a cut-off frequency of 3.5 kHz, thus allowing the difference frequency to pass through. The nominal output frequency range is 1.1 kHz - 2.0 kHz. The filter is built-up around IC1701a and IC1701b. The output frequency is fed to the programmable divider on the divider unit.

TEST CONDITIONS

Frequency Setting: 2.0005 MHz
Oscilloscope Input: Passive probe 10:1
DC Voltmeter Input: 10 Mohm
⊙ : Diode probe measurement
TP: Testpoint
All voltage statements are typical

R11XX B2/2 4-0-23091
 4-0-21646C 4-0-21155

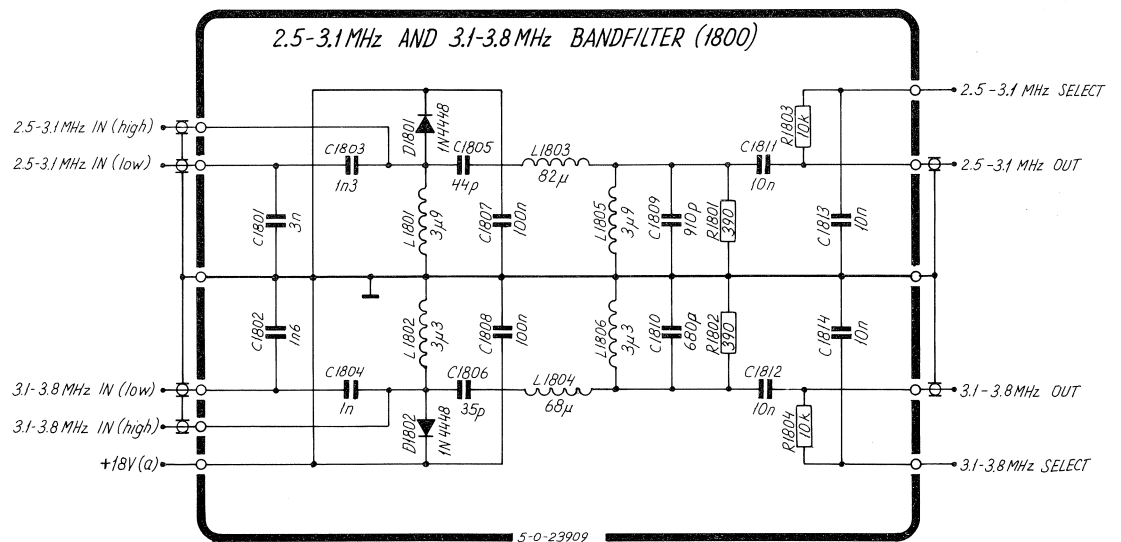
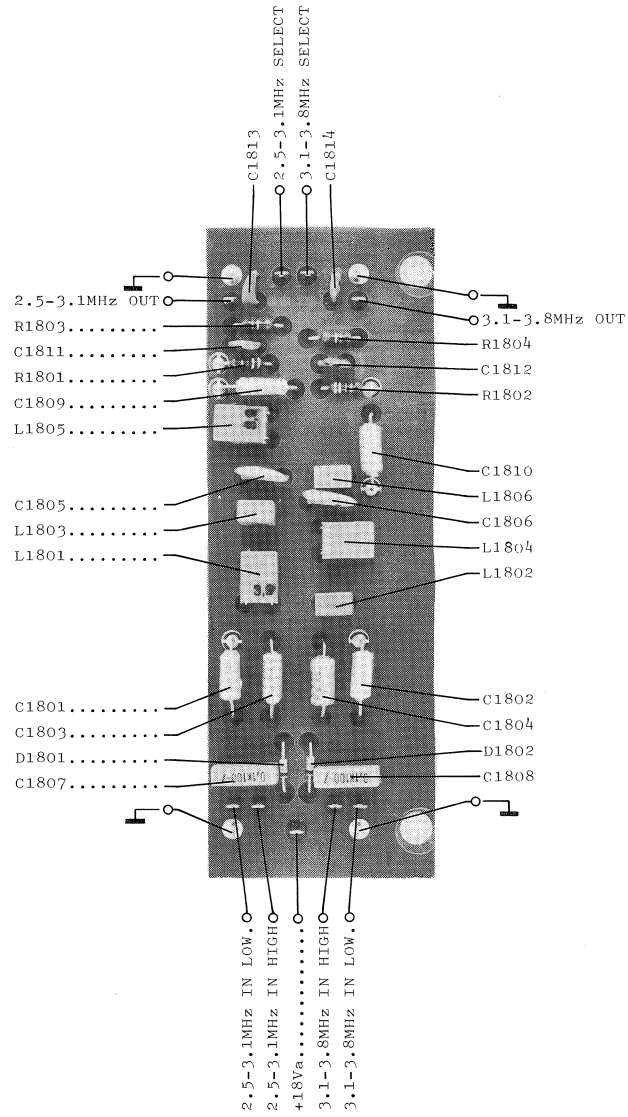


CIRCUIT DESCRIPTION RF FILTERS 2.5-3.1 MHz AND 3.1-3.8 MHz

The PCB contains two filters. Both are designed as third order filters of the bilinear type.

The protection of the filters are done through the reverse biased diodes D1801, D1802, the capacitors C1807, C1808 and the resistor R101 located on the aerial switch PCB. The output of the filters is led through the switch diodes D2009 and D2010, respectively, located on 16.6 MHz notch filter PCB (module 2000) into the mixer (module 500).

The capacitors C1801, C1803 and C1802, C1804 provide the impedance transformation from low to high.



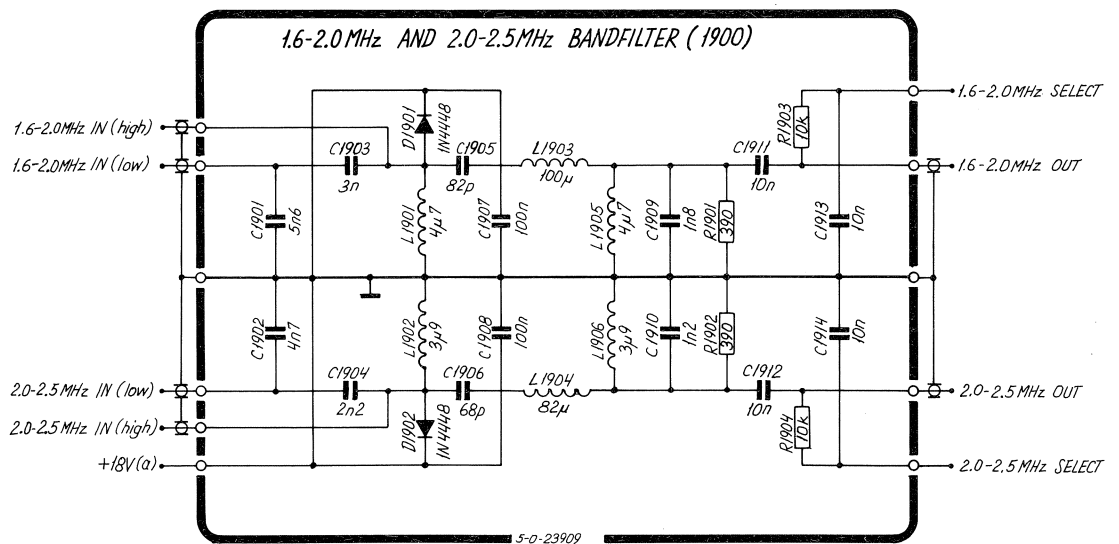
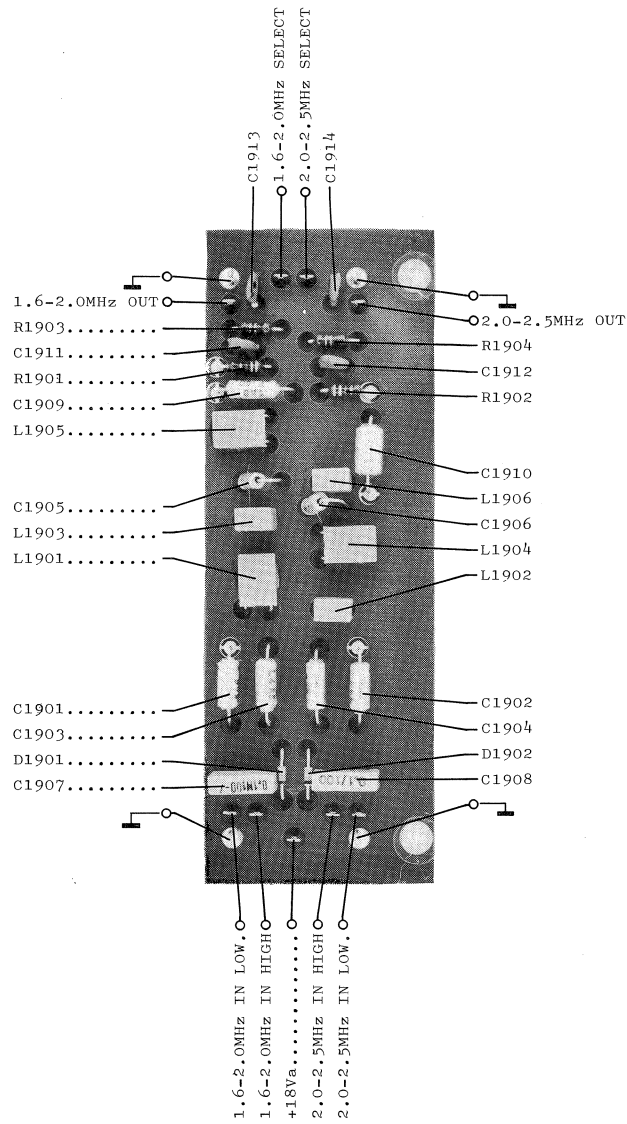
CIRCUIT DESCRIPTION RF FILTERS 1.6-2.0 MHz AND 2.0-2.5 MHz

The PCB contains two filters. Both are designed as third order filters of the bilinear type.

The protection of the filters are done through the reverse biased diodes D1901, D1902, the capacitors C1907, C1908 and the resistor R101 located on aerial switch PCB.

The output of the filters is led through the switch diodes D2007 and D2008, respectively, located on 16.6 MHz notch filter PCB (module 2000) into the mixer (module 500).

The capacitors C1901, C1903 and C1902, C1904 provide the impedance transformation from low to high.



CIRCUIT DESCRIPTION OF 16.6 MHz NOTCH FILTER

The filter consists of the two resistors R2001, R2002, the two capacitors C2001, C2003 and the series resonant circuit L2001, C2002.

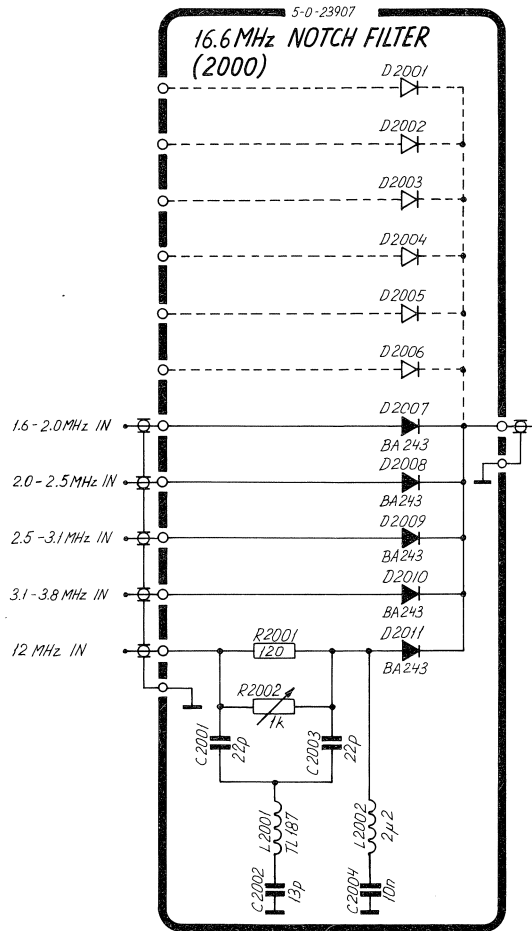
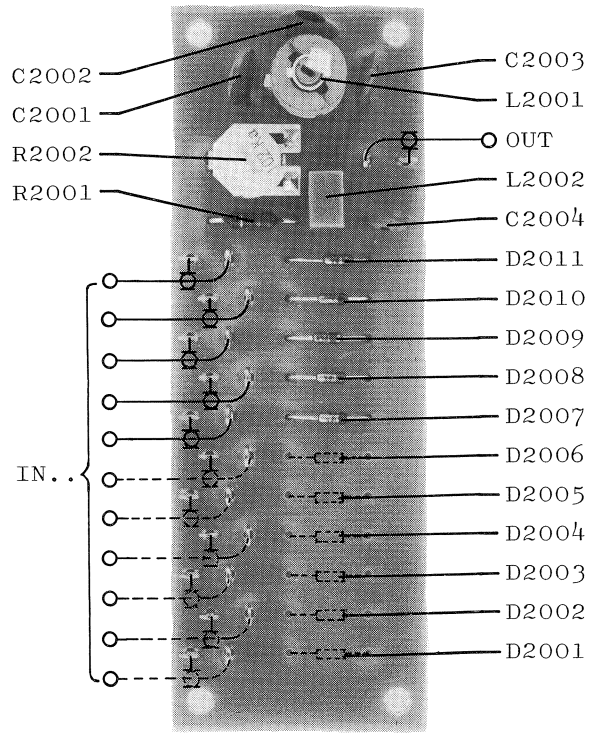
The resonant frequency of L2001 and C2002 determines the notch frequency, which is 16.6 MHz.

The resistors R2001 and R2002 determine the filter attenuation at the notch frequency and R2002 is trimmed to give maximum attenuation.

The inductance L2002 is used to compensate for the capacitive load of the notch filter, and the capacitor C2004 prohibits DC-current to flow in the inductance.

The diodes D2007-D2011 is used to switch in and out the selected RF-filter sections 1.6-2.0 MHz, 2.0-2.5 MHz, 2.5-3.1 MHz, 3.1-3.8 MHz and 12 MHz.

RII21A 4-0-23907
4-6-23907

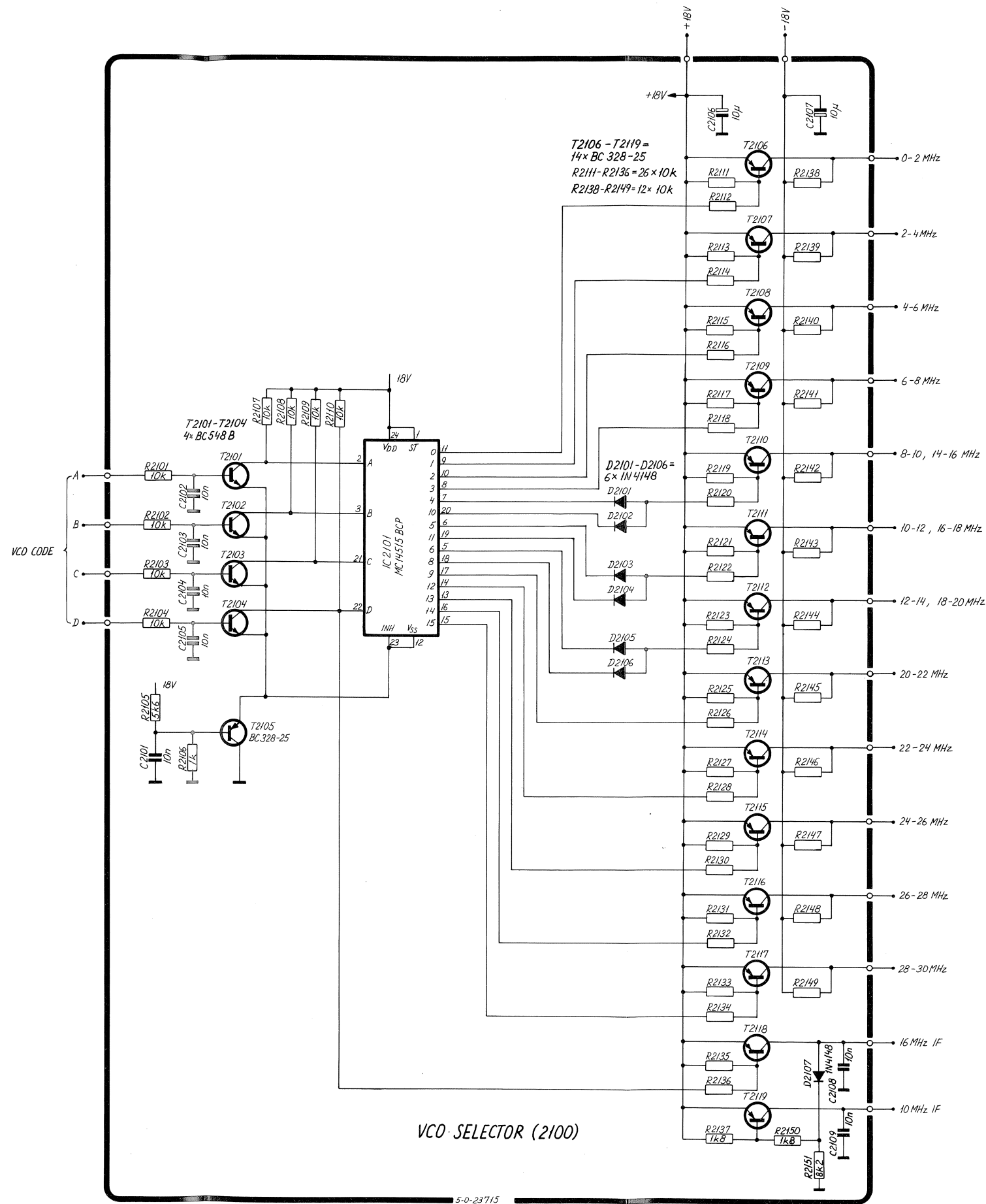
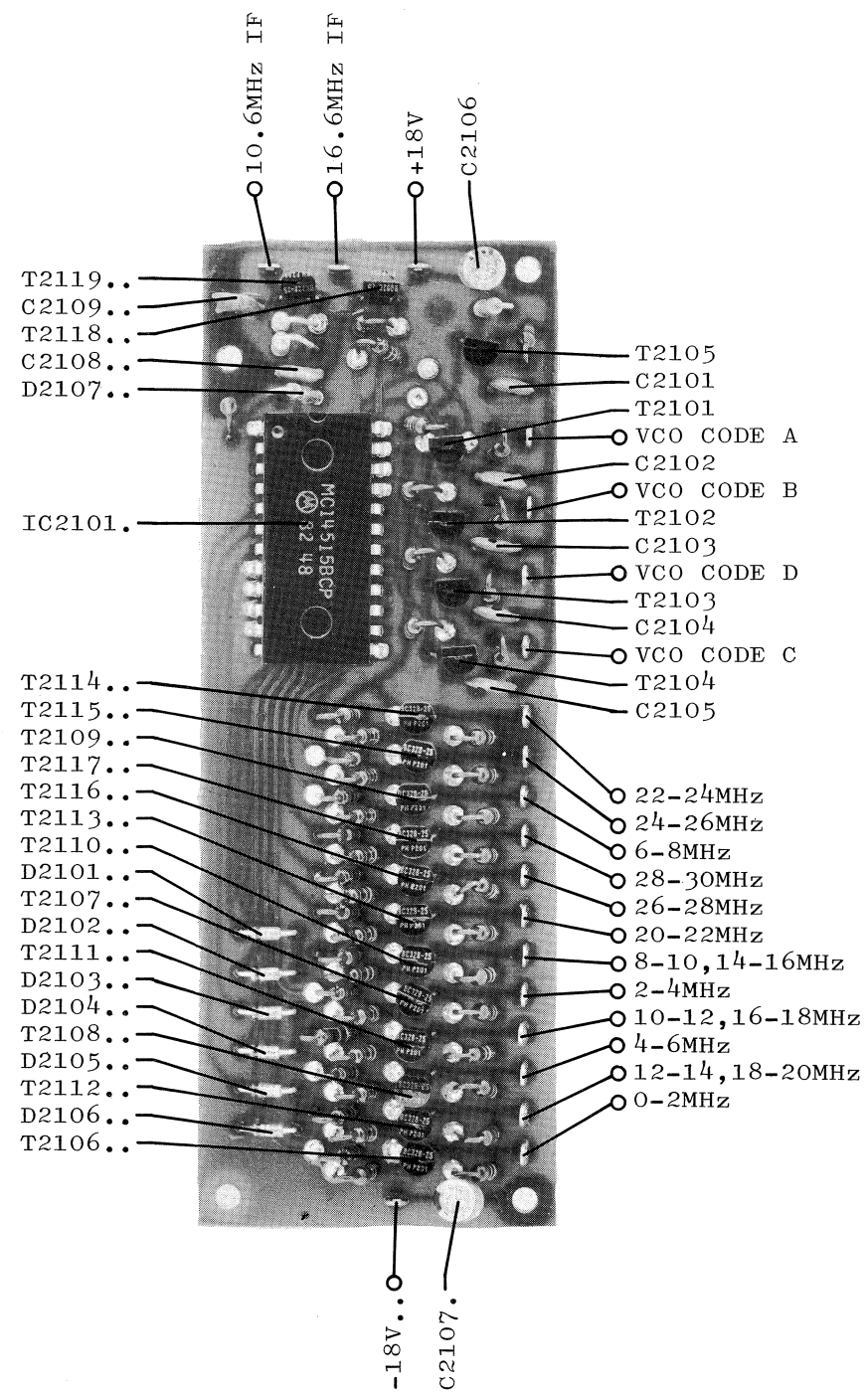


CIRCUIT DESCRIPTION VCO SELECTOR R1121

The actual VCO is selected by one of the driver transistor T2106 - T2117. The transistor in question is selected from the 4 to 16 line decoder IC2101, which pulls low the output indicated by the 4-bit code on the inputs (A, B, C, D).

The 4-bit code is generated on the interface circuit board and is fed to IC2101 via the level shift transistors T2101 - T2104.

The IF selection is controlled by the most significant bit in the 4-bit code. T2118 and T2119 act as drivers for the real IF shift which takes place in the first mixer.



CIRCUIT DESCRIPTION INTERFACE UNIT R1121

The interface unit supervises the serial output from the ARQ unit (H1240). This output provides for the information to the printer and the scanning receiver R1121. With addresses contained in this information, it is possible to control several units on the same line. The interface unit in R1121 handles data addressed to RX1, RX2, RX3, TX1, TX2 and PR1 (these addresses are selected from the keyboard processor H1249). RX data are converted to parallel data which control the frequency of R1121. TX data are by means of two lines transmitted to the exciter S1303/04 and printer data are transmitted serially on one line to the printer.

The interface unit has a single chip microcomputer IC2206 which as clock generator has a 2.5 MHz signal. This is the 10 MHz TCXO signal amplified in two transistors, T2201, T2202, and divided by four in IC2207. The processor receives the data input from the RD input via IC2208b which converts the +12V/-12V level at the RD input to 0V/5V level as the processor demands.

When the data are addressed to RX1 or RX2, the receive frequency is put on the divider via the data registers IC2204 and IC2205 plus the A7 output of the microcomputer. IC2203 holds the code for selection of VCO and front-end filter. The code held by IC2202 controls AGC and IF filter selection.

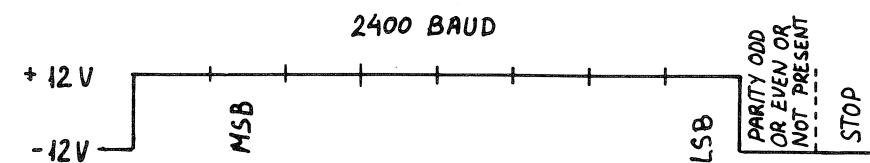
By RX1, telex filter and telex AGC are active. By RX2, SSB filter and SSB AGC are active. When choosing RX3 it is possible to change the condition of RE2201 and thereby lead an AF signal from another receiver than R1121 to the ARQ (H1240).

When the data are addressed to TX1 or TX2 the data format is changed in R1121 from an asynchrone signal to a synchrone signal consisting of 24 clock pulses with corresponding data information which via the buffers IC2209b and IC2209a (TXC, TXD) are fed to an exciter S1303/04.

During the data transmission to S1303/04 from R1121 the busy output is low as the interface processor is not able to receive data from the ARQ when it is transmitting.

If the data are addressed to PR1 the interface unit will cut-out the address in the asynchrone data format from the ARQ and lead the remaining character data to the printer. Output to the printer is the TD connection and the SSD input is a signal which tells if the printer is busy and not able to receive more characters.

The asynchrone data format from ARQ to R1121 and from R1121 to printer is an 8 bit word with start and stop bit. The data from the ARQ may contain a parity bit. The speed is 2400 baud on both lines.



Signal on RD input of the interface unit.

CIRCUIT DESCRIPTION INTERFACE UNIT R1121 cont.:

The information from ARQ to R1121 contains three types of words, i.e. address word, command word and data word.

Address: 110XXXXX where XXXXX indicates the address 0-31.

Command: 0001YYYY where YYYY indicates the amount of following data words.

Data: ZZZZZZZZ 8-bit data

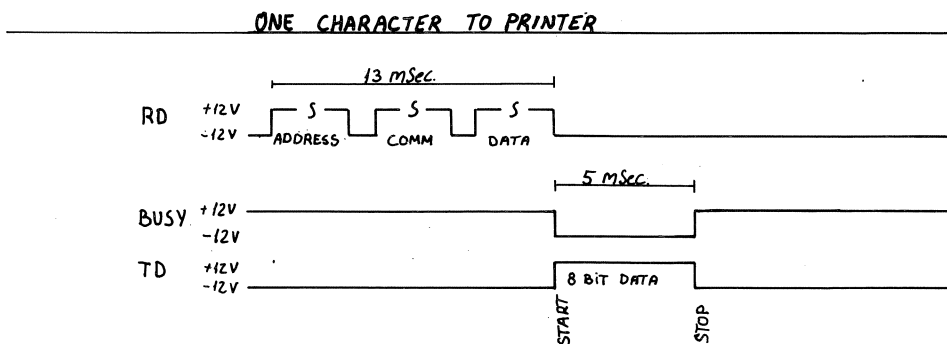
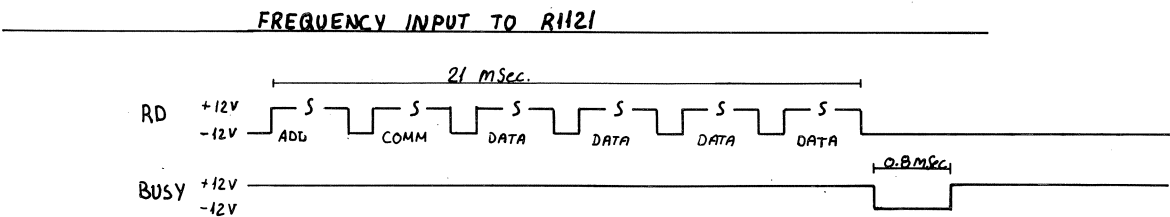
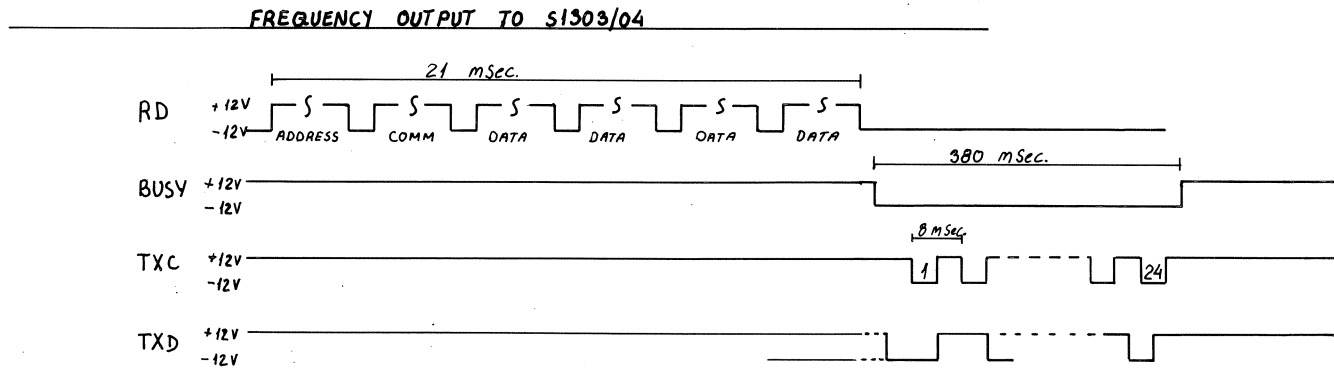
A frequency input looks like this:

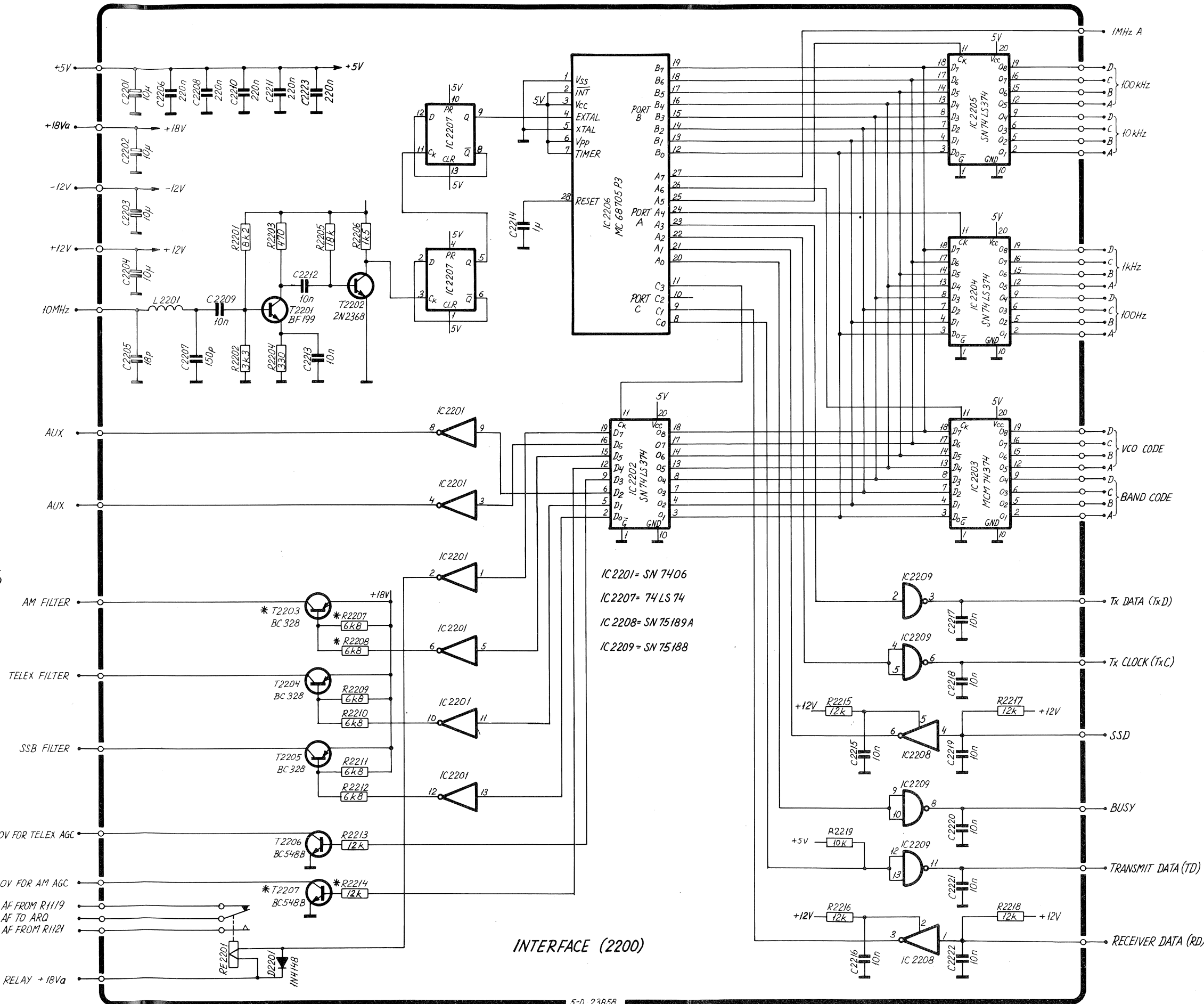
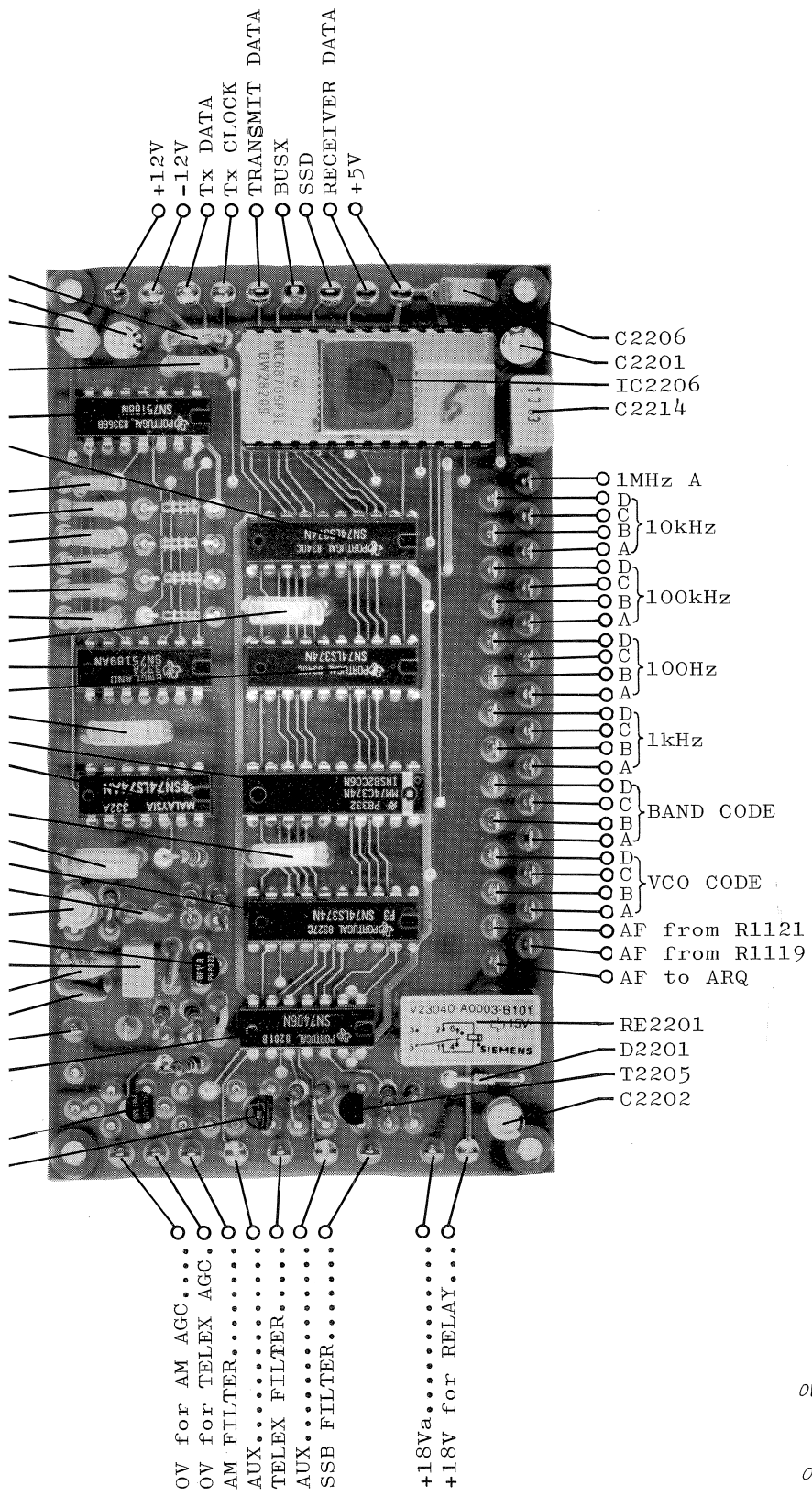
address command 10 MHz 1 MHz 100 kHz 10 kHz 1 kHz 100 Hz 10 Hz 1 Hz

A printer character input looks like this:

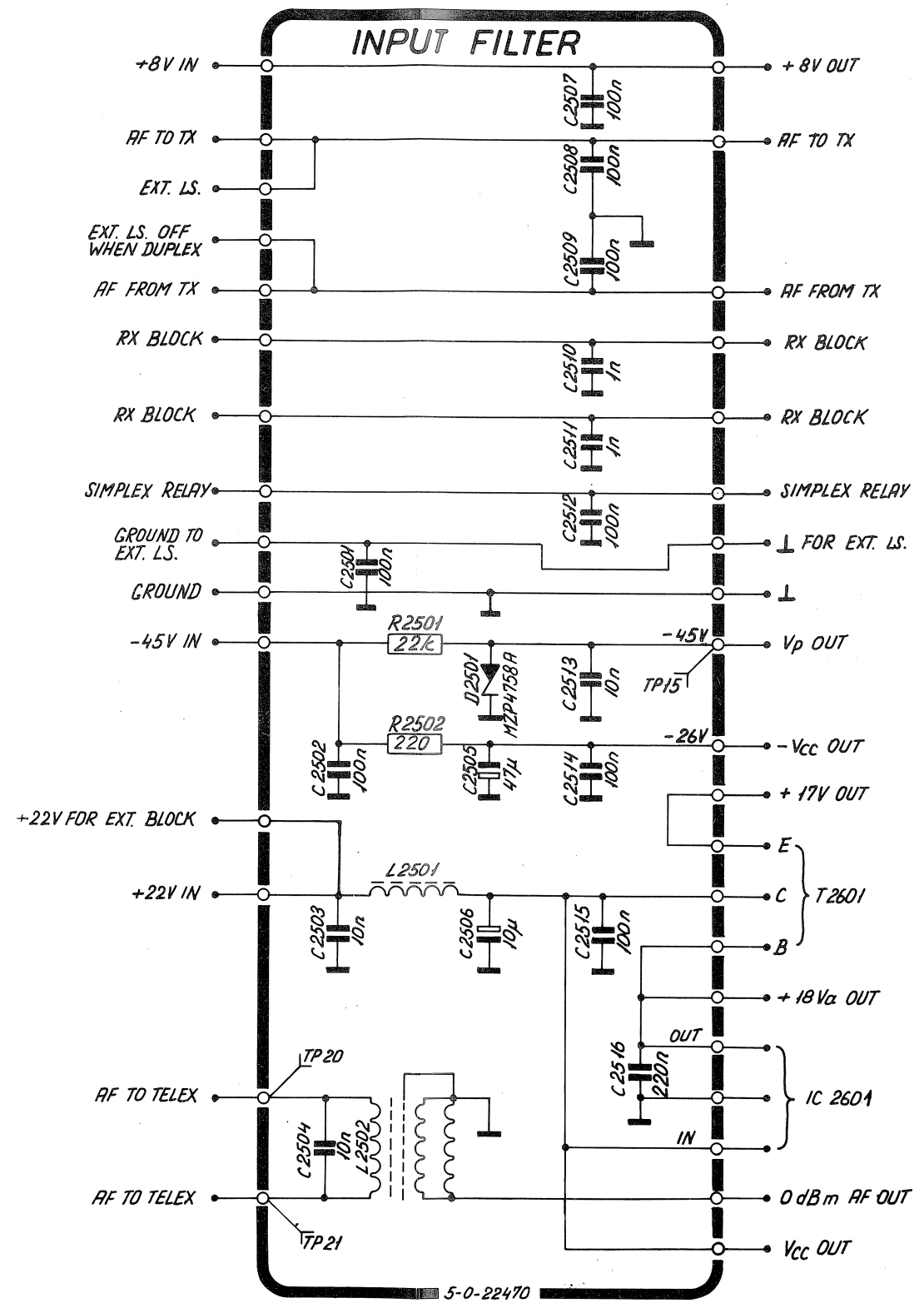
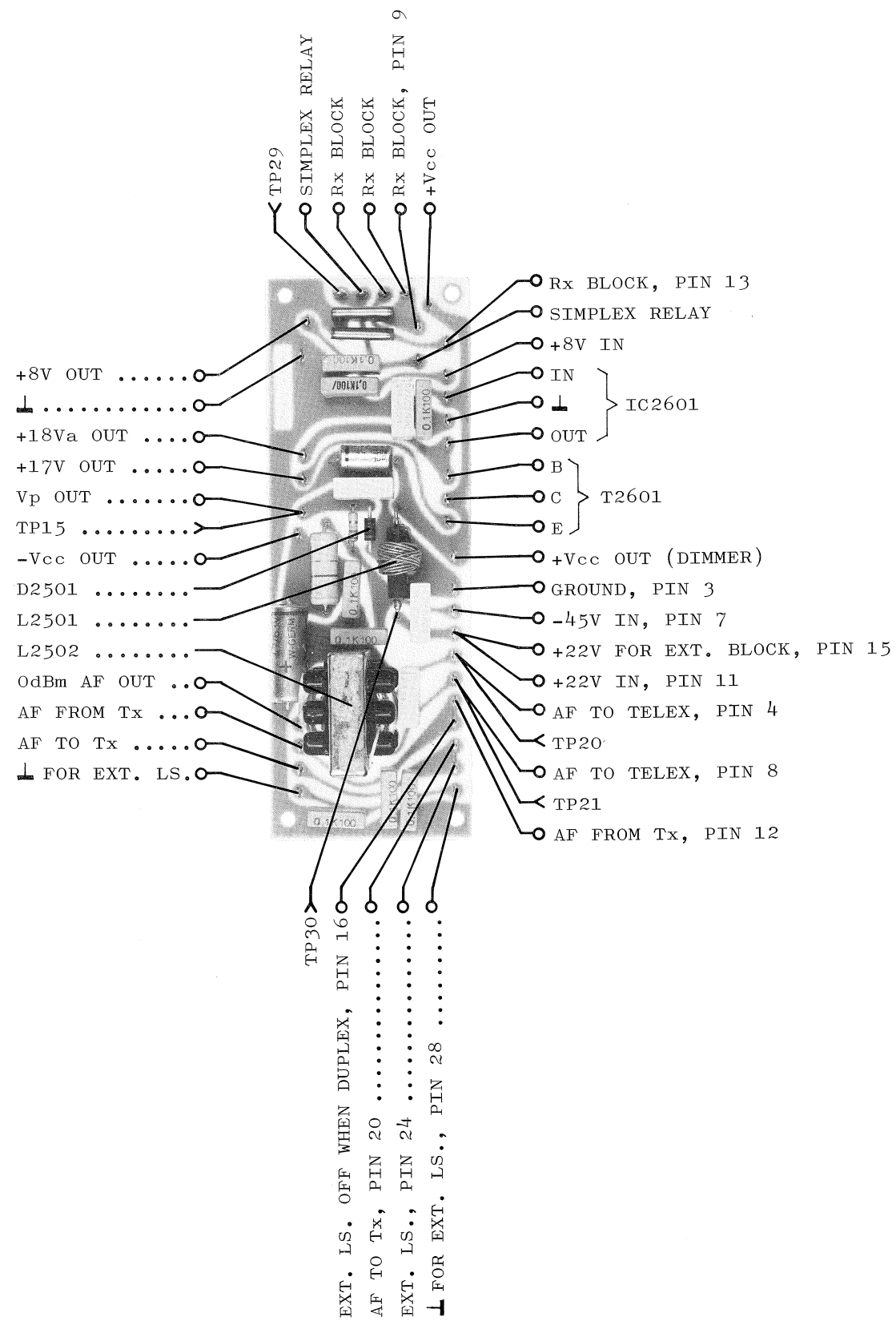
address command character

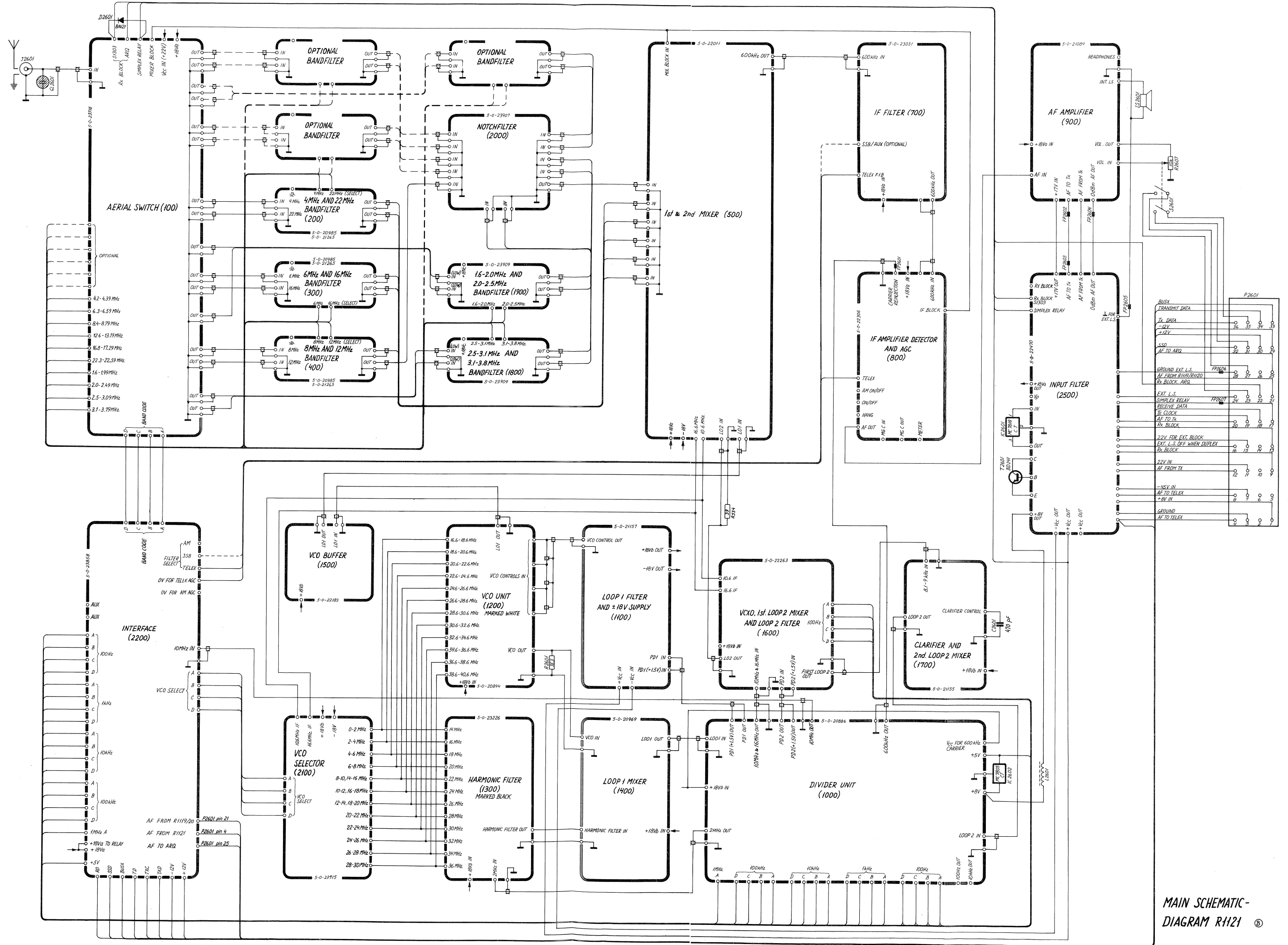
R1121
4-0-25522





INTERFACE (2200)





MAIN SCHEMATIC-DIAGRAM R1121

AERIAL SWITCH R1121

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Symbol	Description	Manufact.	
C101	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C102	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C103	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C104	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C105	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C106	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C107	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C108	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C109	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C110	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C111	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C112	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C113	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C114	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C115	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C116	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C117	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C118	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C119	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C120	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C121	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C122	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C123	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C124	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C125	Capacitor polyester 100nF $\pm 10\%$ 100V	Siemens	B32510-D1104-K
C126	Capacitor electrolyt 10uF $\pm 20\%$ 35V	ERO	EKI 00 AA 210F
C127	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
C128	Capacitor polyester 220nF $\pm 10\%$ 100V	Siemens	B32510-D1224-K
D101	Diode silicon	Philips	1N4148
D102	Diode silicon	Philips	1N4148
IC101	Integrated circuit	Motorola	MC14515BCP

<i>Symbol</i>	<i>Description</i>				<i>Manufact.</i>	
R101	Resistor	27 ohm	$\pm 5\%$	4W	Philips	2322 330 22279
R102	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R103	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R104	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R105	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R106	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R107	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R108	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R109	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R110	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R111	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R112	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R113	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R114	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R115	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R116	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R117	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R118	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R119	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R120	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R121	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R122	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R123	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R124	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R125	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R126	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R127	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R128	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R129	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R130	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R131	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R132	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R133	Resistor	6,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33682
R134	Resistor	4,7 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 13472
R135	Resistor	390 ohm	$\pm 5\%$	0.33W	Philips	2322 181 33391
R136	Resistor	8,2 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33822
R137	Resistor	8,2 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33822
R138	Resistor	100 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 13104
R139	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R140	Resistor	390 ohm	$\pm 5\%$	0.33W	Philips	2322 181 13391

AERIAL SWITCH R1121

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<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>		
R141	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R142	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R143	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R144	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R145	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R146	Resistor	4,7 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33472
R147	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R148	Resistor	220 ohm	$\pm 5\%$	0.33W	Philips	2322 181 33221
R149	Resistor	1 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33102
R150	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R151	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R152	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R153	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R154	Resistor	5,6 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33562
RE101	Relay	15V DC			Siemens	V23040-A0003-B101
RE102	Relay	15V DC			Siemens	V23040-A0003-B101
RE103	Relay	15V DC			Siemens	V23040-A0003-B101
RE104	Relay	15V DC			Siemens	V23040-A0003-B101
RE105	Relay	15V DC			Siemens	V23040-A0003-B101
RE106	Relay	15V DC			Siemens	V23040-A0003-B101
RE107	Relay	15V DC			Siemens	V23040-A0003-B101
RE108	Relay	15V DC			Siemens	V23040-A0003-B101
RE109	Relay	15V DC			Siemens	V23040-A0003-B101
RE110	Relay	15V DC			Siemens	V23040-A0003-B101
RE111	Relay	15V DC			Siemens	V23040-A0003-B101
RE112	Relay	15V DC			Siemens	V23040-A0003-B101
RE113	Relay	15V DC			Siemens	V23040-A0003-B101
RE114	Relay	15V DC			Siemens	V23040-A0003-B101
RE115	Relay	15V DC			Siemens	V23040-A0003-B101
RE116	Relay	15V DC			Siemens	V23040-A0003-B101
RE117	Relay	15V DC			Siemens	V23040-A0003-B101
RE118	Relay	24V			TAKAMISAWA	LZ24H-24V
RE119	Relay	24V			ELFEIN	880-111-24V
T101	Transistor				Philips	BC328-25
T102	Transistor				Philips	BC328-25
T103	Transistor				Philips	BC328-25

<i>Symbol</i>	<i>Description</i>	<i>Manufact.</i>	
T104	Transistor	Philips	BC328-25
T105	Transistor	Philips	BC328-25
T106	Transistor	Philips	BC328-25
T107	Transistor	Philips	BC328-25
T108	Transistor	Philips	BC328-25
T109	Transistor	Philips	BC328-25
T110	Transistor	Philips	BC328-25
T111	Transistor	Philips	BC328-25
T112	Transistor	Philips	BC328-25
T113	Transistor	Philips	BC328-25
T114	Transistor	Philips	BC328-25
T115	Transistor	Philips	BC328-25
T116	Transistor	Philips	BC328-25
T117	Transistor	Philips	BC328-25
T118	Transistor	Philips	BC548B
T119	Transistor	Philips	BC548B
T120	Transistor	Philips	BC548B
T121	Transistor	Philips	BC328-25
T122	Transistor	Philips	BC328-25
T123	Transistor	Philips	BC328-25
T124	Transistor	Philips	BC328-25
T125	Transistor	Philips	BC328-25
T126	Transistor	Philips	BC328-25

Symbol	Description	Manufact.	
C201	Capacitor polyester 10nF $\pm 5\%$ 250V	ERO	MKT1818
C202	Capacitor polystyrene 2,2nF $\pm 1\%$ 63V	Philips	2222 424 42202
C203	Capacitor polystyrene 91pF $\pm 1\%$ 630V	Philips	2222 427 49109
C204	Capacitor ceramic 2,7pF 250V	Ferroperm	9/0112.9
C205	Capacitor polystyrene 82pF $\pm 1\%$ 630V	Philips	2222 427 48209
C206	Capacitor ceramic 3,3pF 400V	Ferroperm	9/0112.9
C207	Capacitor polystyrene 91pF $\pm 1\%$ 630V	Philips	2222 427 49109
C208	Capacitor polystyrene 470pF $\pm 1\%$ 630V	Philips	2222 427 44701
C209	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C210	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C211	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C212	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C213	Capacitor polystyrene 100pF $\pm 1\%$ 630V	Philips	2222 427 41001
C214	Capacitor polystyrene 82pF $\pm 1\%$ 630V	Philips	2222 427 48209
C215	Capacitor ceramic 2,2pF 250V	Ferroperm	9/0112.9
C216	Capacitor polystyrene 51pF $\pm 1\%$ 630V	Philips	2222 427 45109
C217	Capacitor ceramic 2,2pF 400V	Ferroperm	9/0112.9
C218	Capacitor polystyrene 51pF $\pm 1\%$ 630V	Philips	2222 427 45109
C219	Capacitor polystyrene 680pF $\pm 1\%$ 630V	Philips	2222 427 46801
C220	Capacitor polyester 10nF $\pm 5\%$ 250V	ERO	MKT1818
D201	Diode silicon	ITT	1N4148
D202	Diode silicon	ITT	1N4148
D203	Diode silicon	ITT	1N4148
D204	Diode silicon	ITT	1N4148
L201	Coil	S.P.	TL 186
L202	Coil	S.P.	TL 186
L203	Coil	S.P.	TL 186
L204	Coil	S.P.	TL 191
L205	Coil	S.P.	TL 191
L206	Coil	S.P.	TL 191
R201	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 13103
R202	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 13103

Symbol	Description	Manufact.	
C301	Capacitor polyester 10nF $\pm 5\%$ 250V	ERO	MKT1818
C302	Capacitor polystyrene 1,5nF $\pm 1\%$ 250V	Philips	2222 426 41502
C303	Capacitor polystyrene 91pF $\pm 1\%$ 630V	Philips	2222 427 49109
C304	Capacitor ceramic 2,7pF $\pm 1\%$ 250V	Ferroperm	9/0112.9
C305	Capacitor polystyrene 82pF $\pm 1\%$ 630V	Philips	2222 427 48209
C306	Capacitor ceramic 3,3pF 400V	Ferroperm	9/0112.9
C307	Capacitor polystyrene 91pF $\pm 1\%$ 630V	Philips	2222 427 49109
C308	Capacitor polystyrene 360pF $\pm 1\%$ 630V	Philips	2222 427 43301
C309	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C310	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C311	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C312	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C313	Capacitor polystyrene 130pF $\pm 1\%$ 630V	Philips	2222 427 41301
C314	Capacitor polystyrene 62pF $\pm 1\%$ 630V	Philips	2222 427 46209
C315	Capacitor ceramic 2,2pF 250V	Ferroperm	9/0112.9
C316	Capacitor polystyrene 51pF $\pm 1\%$ 630V	Philips	2222 427 45109
C317	Capacitor polystyrene 1,8pF $\pm 1\%$ 160V	Philips	2222 425 41802
C318	Capacitor polystyrene 51pF $\pm 1\%$ 630V	Philips	2222 427 45109
C319	Capacitor polystyrene 750pF $\pm 1\%$ 250V	Philips	2222 426 47501
C320	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
D301	Diode silicon	ITT	1N4148
D302	Diode silicon	ITT	1N4148
D303	Diode silicon	ITT	1N4148
D304	Diode silicon	ITT	1N4148
L301	Coil	S.P.	TL 187
L302	Coil	S.P.	TL 187
L303	Coil	S.P.	TL 187
L304	Coil	S.P.	TL 190
L305	Coil	S.P.	TL 190
L306	Coil	S.P.	TL 190
R301	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 13103
R302	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 13103

Symbol	Description	Manufact.	
C401	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C402	Capacitor polystyrene 1,5nF $\pm 1\%$ 250V	Philips	2222 426 41502
C403	Capacitor polystyrene 120pF $\pm 1\%$ 630V	Philips	2222 427 41201
C404	Capacitor ceramic 2,7pF 250V	Ferroperm	9/0112.9
C405	Capacitor polystyrene 120pF $\pm 1\%$ 630V	Philips	2222 427 41201
C406	Capacitor ceramic 2,7pF 250V	Ferroperm	9/0112.9
C407	Capacitor polystyrene 130pF $\pm 1\%$ 630V	Philips	2222 427 41301
C408	Capacitor polystyrene 360pF $\pm 1\%$ 630V	Philips	2222 427 43601
C409	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C410	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C411	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C412	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C413	Capacitor polystyrene 220pF $\pm 1\%$ 630V	Philips	2222 427 42201
C414	Capacitor polystyrene 75pF $\pm 1\%$ 630V	Philips	2222 427 47509
C415	Capacitor ceramic 2,7pF 250V	Ferroperm	9/0112.9
C416	Capacitor polystyrene 51pF $\pm 1\%$ 630V	Philips	2222 427 45109
C417	Capacitor ceramic 2,2pF 250V	Ferroperm	9/0112.9
C418	Capacitor polystyrene 56pF $\pm 1\%$ 630V	Philips	2222 427 45609
C419	Capacitor polystyrene 820pF $\pm 1\%$ 250V	Philips	2222 426 48201
C420	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
D401	Diode silicon	ITT	1N4148
D402	Diode silicon	ITT	1N4148
D403	Diode silicon	ITT	1N4148
D404	Diode silicon	ITT	1N4148
L401	Coil	S.P.	TL 188
L402	Coil	S.P.	TL 188
L403	Coil	S.P.	TL 188
L404	Coil	S.P.	TL 189
L405	Coil	S.P.	TL 189
L406	Coil	S.P.	TL 189
R401	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 13103
R402	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 13103

<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>	
C501	Capacitor ceramic	0.82pF \pm 0.25pF	250V	Ferroperm	9/0110.9
C502	Capacitor ceramic	0.82pF \pm 0.25pF	250V	Ferroperm	9/0110.9
C503	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C504	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C505	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C506	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C507	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C508	Capacitor polystyrene	56pF \pm 2%	630V	Philips	2222 427 35609
C509	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C510	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C511	Capacitor trimmer	6/45 Teflon	100V	DAU	107.5901.045
C512	Capacitor trimmer	6/45 Teflon	100V	DAU	107.5901.045
C513	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C514	Capacitor ceramic	4p7 \pm 0.25pF	400V	Ferroperm	9/0112.9
C515	Capacitor ceramic	6p8 \pm 0.25pF	400V	Ferroperm	9/0112.9
C516	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C517	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C518	Capacitor ceramic	56pF \pm 5%N150	1000V	Ferroperm	9/0116.9
C519	Capacitor ceramic	39pF \pm 5%	400V	Ferroperm	9/0116.9
C520	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C521	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C522	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C523	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C524	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C525	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C526	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C527	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C528	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C529	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C530	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C531	Capacitor ceramic	10nF-20/+80%	50V	KCK	HE70SJYF 103Z
C532	Capacitor ceramic	39pF \pm 5%	400V	Ferroperm	9/0116.9
D501	Diode switch			Philips	BA182
D502	Diode switch			Philips	BA182
D503	Diode switch			Philips	BA182
D504	Diode switch			Philips	BA182
D505	Diode switch			Philips	BA182
D506	Diode switch			Philips	BA182
D507	Diode switch			Philips	BA182

<i>Symbol</i>	<i>Description</i>	<i>Manufact.</i>	
D508	Diode silicon	Philips	1N4148
D509	Diode silicon	Philips	1N4148
D510	Diode switch	Philips	BA182
D511	Diode switch	Philips	BA182
D512	Diode switch	Telefunken	BA243
D513	Diode switch	Telefunken	BA243
D514	Diode switch	Telefunken	BA243
D515	Diode switch	Telefunken	BA243
D516	Diode switch	Philips	BA182
D517	Diode switch	Telefunken	BA243
D518	Diode silicon	Philips	1N4148
FL501	Crystal filter 10.6085 MHz	S.P.	C1008
FL502	Crystal filter 16.6085 MHz	S.P.	C1014
FP501	Ferrite bead 4B1	Philips	4322 020 34420
FP502	Ferrite bead 4B1	Philips	4322 020 34420
L501	Coil 33uH $\pm 5\%$	Kaschke	type 200
L502	Coil	S.P.	TL290
L503	Coil	S.P.	TL273
M501	Mixer	S.P.	C1021
R501	Resistor	100 ohm $\pm 5\%$	0.33W Philips 2322 211 13101
R502	Resistor	100 ohm $\pm 5\%$	0.33W Philips 2322 211 13101
R503	Resistor	4K7 ohm $\pm 5\%$	0.33W Philips 2322 211 13472
R504	Resistor	4K7 ohm $\pm 5\%$	0.33W Philips 2322 211 13472
R505	Resistor	4K7 ohm $\pm 5\%$	0.33W Philips 2322 211 13472
R506	Preset potmeter	4K7 ohm $\pm 20\%$	0.3 W Noble IM8KV2-1S
R507	Resistor	100 ohm $\pm 5\%$	0.33W Philips 2322 211 13101
R508	Resistor	100 ohm $\pm 5\%$	0.33W Philips 2322 211 13101
R509	Resistor	12kohm $\pm 5\%$	0.33W Philips 2322 211 13123
R510	Resistor	22kohm $\pm 5\%$	0.33W Philips 2322 211 13223
R511	Resistor	10kohm $\pm 5\%$	0.33W Philips 2322 211 13103
R512	Resistor	8K2 ohm $\pm 5\%$	0.33W Philips 2322 211 13822
R513	Resistor	2K2 ohm $\pm 5\%$	0.33W Philips 2322 211 13222
R514	Resistor	2K2 ohm $\pm 5\%$	0.33W Philips 2322 211 13222
R515	Resistor	4K7 ohm $\pm 5\%$	0.33W Philips 2322 211 13472
R516	Resistor	1K2 ohm $\pm 5\%$	0.33W Philips 2322 211 13122
R516	Resistor	4K7 ohm $\pm 5\%$	0.33W Philips 2322 211 13472

<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>	
R518	Resistor	1K2 ohm \pm 5%	0.33W	Philips	2322 211 13122
R519	Resistor	3K3 ohm \pm 5%	0.33W	Philips	2322 211 13332
R520	Resistor	4K7 ohm \pm 5%	0.33W	Philips	2322 211 13472
R521	Resistor	4K7 ohm \pm 5%	0.33W	Philips	2322 211 13472
R522	Resistor	1Kohm \pm 5%	0.33W	Philips	2322 211 13102
R523	Resistor	3K3 ohm \pm 5%	0.33W	Philips	2322 211 13332
R524	Resistor	470 ohm \pm 5%	0.33W	Philips	2322 211 13471
R525	Resistor	4K7 ohm \pm 5%	0.33W	Philips	2322 211 13472
R526	Resistor	5K6 ohm \pm 5%	0.33W	Philips	2322 211 13562
R527	Resistor	2K7 ohm \pm 5%	0.33W	Philips	2322 211 13272
R528	Resistor	1Kohm \pm 5%	0.33W	Philips	2322 211 13102
R529	Resistor	3K3 ohm \pm 5%	0.33W	Philips	2322 211 13332
R530	Resistor	18Kohm \pm 5%	0.33W	Philips	2322 211 13183
R531	Resistor	3K3 ohm \pm 5%	0.33W	Philips	2322 211 13332
R532	Resistor	220 ohm \pm 5%	0.33W	Philips	2322 211 13221
R533	Resistor	12Kohm \pm 5%	0.33W	Philips	2322 211 13123
T501	Transistor			Philips	BF256B
T502	Transistor			Philips	BF256B
T503	Transistor			Philips	BF199
TR501	Transformer			S.P.	TL272
TR502	Transformer			S.P.	TL269

Symbol	Description	Manufact.	
C701			
C702	Capacitor electrolytic 10uF 35V	ERO	EKI 00 AA 210F
C703	Capacitor polystyrene 3,9nF $\pm 1\%$ 160V	Philips	2222 425 43902
C704	Capacitor polystyrene 3,3nF $\pm 1\%$ 160V	Philips	2222 425 43302
C705			
C706			
C707			
C708			
C709			
C710			
C711			
C712			
C713			
C714			
C715			
C716			
C717			
C718			
C719			
C720	Capacitor polyester 0,1uF $\pm 10\%$ 100V	ERO	MKT1822
C721	Capacitor electrolytic 10uF 40V	ERO	EB 00 CA 210G
C722			
C723	Capacitor polyester 0,1uF $\pm 10\%$ 100V	ERO	MKT1822
C724	Capacitor electrolytic 10uF 35V	ERO	EKI 00 AA 210F
C725	Capacitor polystyrene 3,9nF $\pm 1\%$ 160V	Philips	2222 425 43902
C726	Capacitor polystyrene 3,3nF $\pm 1\%$ 160V	Philips	2222 425 43302
C727	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C728	Capacitor polyester 0,1uF $\pm 10\%$ 100V	ERO	MKT1822
C729	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
D701	Diode switch	Philips	BA182
D702	Diode switch	Philips	BA182
FL701			
FL702	Crystal filter 598,3KHz	NDK	C1025A

Symbol	Description	Manufact.	
L701			
L702	Coil	S.P.	TL 194
L703			
L704			
L705			
L706			
L707	Coil	S.P.	TL 194
R701			
R702	Resistor	Philips	2322 181 13391
R703	Resistor	Philips	2322 181 13392
R704	Resistor	Philips	2322 181 13563
R705	Resistor	Philips	2322 181 13124
R706			
R707			
R708			
R709	Resistor	Philips	2322 181 13121
R710			
R711	Resistor	Philips	2322 181 13152
R712	Resistor	Philips	2322 181 13271
R713	Resistor	Philips	2322 181 13391
R714	Resistor	Philips	2322 181 13392
R715	Resistor	Philips	2322 181 13563
R716	Resistor	Philips	2322 181 13124
R717	Resistor	Philips	2322 181 13121
T701	Transistor	Motorola	TIS88A
T702	Transistor	Motorola	TIS88A
T703	Transistor	Motorola	TIS88A

<i>Symbol</i>	<i>Description</i>	<i>Manufact.</i>	
C801	Capacitor electrolytic 10uF $\pm 20\%$	35V ERO	EK100AA210F
C802	Capacitor polystyrene 3n3 $\pm 5\%$	160V Philips	2222 425 23302
C803	Capacitor polystyrene 360pF $\pm 2\%$	630V Philips	2222 427 33601
C804	Capacitor ceramic 10nF -20/+80%	50V KCK	HE70SJYF 103Z
C805	Capacitor electrolytic 10uF $\pm 20\%$	35V ERO	EK100AA210F
C806	Capacitor ceramic 10nF -20/+80%	50V KCK	HE70SJYF 103Z
C807	Capacitor ceramic 10nF -20/+80%	50V KCK	HE70SJYF 103Z
C808	Capacitor electrolytic 10uF $\pm 20\%$	35V ERO	EK100AA210F
C809	Capacitor electrolytic 1uF $\pm 20\%$	50V ERO	EK100AA110H
C810	Capacitor polystyrene 1nF $\pm 5\%$	250V Philips	2222 426 21002
C811	Capacitor polystyrene 120pF $\pm 2\%$	630V Philips	2222 427 31201
C812	Capacitor electrolytic 10uF -10/+100%	25V Siemens	B41313 A5106-V
C813	Capacitor tantalum 68uF $\pm 20\%$	16V Siemens	ETQ - 5
C814	Capacitor ceramic 10uF -20/+80%	50V KCK	HE70SJYF 103Z
C815	Capacitor ceramic 10nF -20/+80%	50V KCK	HE70SJYF 103Z
C816	Capacitor polyester 100nF $\pm 20\%$	100V Philips	2222 344 24104
C817	Capacitor electrolytic 10uF $\pm 20\%$	35V ERO	EK100AA210F
C818	Capacitor polystyrene 1nF $\pm 5\%$	250V Philips	2222 426 21002
C819	Capacitor polystyrene 120pF $\pm 2\%$	630V Philips	2222 427 31201
C820	Capacitor polystyrene 270pF $\pm 5\%$	630V Philips	2222 427 22701
C821	Capacitor electrolytic 10uF $\pm 20\%$	35V ERO	EK100AA210F
C822	Capacitor polystyrene 270pF $\pm 10\%$	400V Ferroperm	9/0129.9
C823	Capacitor ceramic 1nF -20/+80%	400V Ferroperm	9/0138.9
C824	Capacitor tantalum 220nF $\pm 20\%$	35V ERO	ETP 1A
C825	Capacitor ceramic 270pF $\pm 10\%$	400V Ferroperm	9/0129.9
C826	Capacitor ceramic 10nF -20/+80%	50V KCK	HE70SJYF 103Z
C827	Capacitor ceramic 10nF -20/+80%	50V KCK	HE70SJYF 103Z
C828	Capacitor electrolytic 10uF $\pm 20\%$	35V ERO	EK100AA210F
C829	Capacitor ceramic 10nF -20/+80%	50V KCK	HE70SJYF 103J
C830	Capacitor ceramic 10nF -20/+80%	50V KCK	HE70SJYF 103J
C831	Capacitor ceramic 10nF -20/+80%	50V KCK	HE70SJYF 103J
C832	Capacitor electrolytic 10uF $\pm 20\%$	35V ERO	EK100AA210F
C833	Capacitor electrolytic 10uF -20/+80%	35V ERO	EK100AA210F
C834	Capacitor polystyrene 1nF $\pm 5\%$	250V Philips	2222 426 21502
C835	Capacitor ceramic 10nF -20/+80%	50V KCK	HE70SJYF 103Z
C836	Capacitor polyester 22nF $\pm 20\%$	250V Philips	2222 344 40223
C837	Capacitor polystyrene 1n5 $\pm 5\%$	250V Philips	2222 426 21502
C838	Capacitor ceramic 10nF -20/+80%	50V KCK	HE70SJYF 103Z
D801	Diode silicon	Philips	1N4148
D802	Diode silicon	Philips	1N4148

<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>	
D803	Diode silicon			Philips	1N4148
D804	Diode zener	4.7V \pm 5%	0.4W	Philips	BZX79C4V7
D805	Diode silicon			Philips	1N4148
D806	Diode silicon			Philips	1N4148
D807	Diode silicon			Philips	1N4148
D808	Diode silicon			Philips	1N4148
D809	Diode silicon			Philips	1N4148
D810	Diode silicon			Philips	1N4148
D811	Diode silicon			Philips	1N4148
D812	Diode silicon			Philips	1N4148
D813	Diode silicon			Philips	1N4148
D814	Diode stabistor			Philips	BZV 46 2V0
D815	Diode stabistor			Philips	BZV 46 2V0
L801	Coil			S.P.	TL195
L802	Coil	470uH \pm 5%		Kaschke	Type 200/5
L803	Coil	390uH \pm 5%		Kaschke	Type 200/5
L804	Coil	330uH \pm 5%		Kaschke	Type 200/5
L805	Coil			S.P.	TL196
R801	Resistor	12Kohm \pm 5%	0.33W	Philips	2322 106 33123
R802	Resistor	12Kohm \pm 5%	0.33W	Philips	2322 106 33123
R803	Resistor	3k9 ohm \pm 5%	0.33W	Philips	2322 211 13392
R804	Resistor	390 ohm \pm 5%	0.33W	Philips	2322 211 13391
R805	Resistor	5E1 Ohm \pm 5%	0.33W	Philips	2322 211 13518
R806	Resistor	5k6 ohm \pm 5%	0.33W	Philips	2322 211 13562
R807	Resistor	4K7 ohm \pm 5%	0.33W	Philips	2322 106 33472
R808	Resistor	6k8 ohm \pm 5%	0.33W	Philips	2322 211 13682
R809	Resistor	12Kohm \pm 5%	0.33W	Philips	2322 211 13123
R810	Resistor	15 ohm \pm 5%	0.33W	Philips	2322 106 33159
R811	Resistor	2K2 ohm \pm 5%	0.33W	Philips	2322 106 33222
R812	Resistor	2K2 ohm \pm 5%	0.33W	Philips	2322 106 33222
R813	Resistor	2k7 ohm \pm 5%	0.33W	Philips	2322 106 33272
R814	Resistor	1k2 ohm \pm 5%	0.33W	Philips	2322 211 13122
R815	Resistor	47Kohm \pm 5%	0.33W	Philips	2322 106 33473
R816	Resistor	390 ohm \pm 5%	0.33W	Philips	2322 211 13391
R817	Resistor	5E1 ohm \pm 5%	0.33W	Philips	2322 211 13518
R818	Resistor	2M7 ohm \pm 5%	0.33W	Philips	2322 106 33275
R819	Resistor	8k2 ohm \pm 5%	0.33W	Philips	2322 211 13822
R820	Resistor	3k9 ohm \pm 5%	0.33W	Philips	2322 211 13392
R821	Resistor	12Kohm \pm 5%	0.33W	Philips	2322 211 13123

<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>		
R822	Resistor	12Kohm	+5%	0.33W	Philips	2322 211 13123
R823	Resistor	1Mohm	+5%	0.33W	Philips	2322 211 13105
R824	Resistor	39Kohm	+5%	0.33W	Philips	2322 106 33393
R825	Resistor	12Kohm	+5%	0.33W	Philips	2322 211 13123
R826	Resistor	15Kohm	+5%	0.33W	Philips	2322 211 13153
R827	Resistor	4k7 ohm	+5%	0.33W	Philips	2322 211 13472
R828	Resistor	1Kohm	+5%	0.33W	Philips	2322 106 33102
R829	Resistor	390 ohm	+5%	0.33W	Philips	2322 211 13391
R830	Resistor	5E1 ohm	+5%	0.33W	Philips	2322 211 13518
R831	Resistor	1Mohm	+5%	0.33W	Philips	2322 106 33105
R832	Resistor	12Kohm	+5%	0.33W	Philips	2322 211 13123
R833	Resistor	18k ohm	+5%	0.33W	Philips	2322 211 13183
R834	Resistor	12Kohm	+5%	0.33W	Philips	2322 211 13123
R835	Resistor	3k9 ohm	+5%	0.33W	Philips	2322 211 13392
R836	Resistor	15Kohm	+5%	0.33W	Philips	2322 211 13153
R837	Resistor	470 ohm	+5%	0.33W	Philips	2322 106 33471
R838	Resistor	10Kohm	+5%	0.33W	Philips	2322 106 33103
R839	Resistor	47Kohm	+5%	0.33W	Philips	2322 211 13473
R840	Resistor	100Kohm	+5%	0.33W	Philips	2322 211 13104
R841	Resistor	2k2 ohm	+5%	0.33W	Philips	2322 106 33222
R842	Resistor	22Kohm	+5%	0.33W	Philips	2322 211 13223
R843	Resistor	100 ohm	+5%	0.33W	Philips	2322 211 13101
R844	Resistor	390 ohm	+5%	0.33W	Philips	2322 211 13391
R845	Resistor	1Kohm	+5%	0.33W	Philips	2322 106 33102
R846	Resistor	120Kohm	+5%	0.33W	Philips	2322 211 13124
R847	Resistor	18Kohm	+5%	0.33W	Philips	2322 211 13183
R848	Resistor	22Kohm	+5%	0.33W	Philips	2322 211 13223
R849	Resistor	5k6 ohm	+5%	0.33W	Philips	2322 211 13562
R850	Resistor	1Kohm	+5%	0.33W	Philips	2322 211 13102
R851	Resistor	220 ohm	+5%	0.33W	Philips	2322 211 13221
R852	Resistor	47Kohm	+5%	0.33W	Philips	2322 211 13473
R853	Resistor	1Kohm	+5%	0.33W	Philips	2322 211 13102
R854	Resistor	10Kohm	+5%	0.33W	Philips	2322 106 33103
R855	Resistor	27Kohm	+5%	0.33W	Philips	2322 211 13273
R856	Resistor	10Kohm	+5%	0.33W	Philips	2322 211 13103
R857	Resistor	2k2 ohm	+5%	0.33W	Philips	2322 211 13222
R858	Resistor	5k6 ohm	+5%	0.33W	Philips	2322 211 13562
R859	Resistor	1Kohm	+5%	0.33W	Philips	2322 211 13102
R860	Resistor	10Kohm	+5%	0.33W	Philips	2322 106 33103
R861	Resistor	560 ohm	+5%	0.33W	Philips	2322 211 13561

<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>	
R862	Resistor	1k5 ohm <u>+5%</u>	0.33W	Philips	2322 211 13152
R863	Resistor	47 ohm <u>+5%</u>	0.33W	Philips	2322 106 33479
R864	Resistor	1Mohm <u>+5%</u>	0.33W	Philips	2322 106 33105
R865	Resistor	100Kohm <u>+5%</u>	0.33W	Philips	2322 211 13104
R866	Resistor	12Kohm <u>+5%</u>	0.33W	Philips	2322 211 13123
R867	Resistor	100 ohm <u>+5%</u>	0.33W	Philips	2322 211 13101
R868	Resistor	100Kohm <u>+5%</u>	0.33W	Philips	2322 211 13104
R869	Resistor	47Kohm <u>+5%</u>	0.33W	Philips	2322 211 13473
R870	Resistor	3k9 ohm <u>+5%</u>	0.33W	Philips	2322 211 13392
R871	Resistor	1Kohm <u>+5%</u>	0.33W	Philips	2322 211 13102
R872	Resistor	100Kohm <u>+5%</u>	0.33W	Philips	2322 211 13104
R873	Resistor	47 ohm <u>+5%</u>	0.33W	Philips	2322 106 33479
T801	Transistor			Philips	BC548B
T802	Transistor			Philips	BC548B
T803	Transistor			Philips	BC558B
T804	Transistor			Philips	BF256A
T805	Transistor			Philips	BC548B
T806	Transistor			Philips	BC548B
T807	Transistor			Philips	BC558B
T808	Transistor			Philips	BF256A
T809	Transistor			Philips	BC548B
T810	Transistor			Philips	BC548B
T811	Transistor			Philips	BC548B
T812	Transistor			Philips	BC558B
T813	Transistor			Philips	BC548B
T814	Transistor			Philips	BC548B
T815	Transistor			Philips	BC548B
T816	Transistor			Philips	BC548B
T817	A - E Transistor array			National	LM3086N

<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>	
C901	Capacitor polyester	220nF $\pm 20\%$	100V	ERO	MKT1822-422/0
C902	Capacitor ceramic	1n8-20/+80%	400V	Ferroperm	9/0141.9
C903	Capacitor electrolytic	10uF $\pm 20\%$	35V	ERO	EKIO0AA210F
C904	Capacitor electrolytic	4u7 $\pm 20\%$	50V	ERO	EKIO0AA147H
C905	Capacitor polystyrene	15nF $\pm 2\%$	63V	Philips	2222 424 31503
C906	Capacitor polystyrene	30nF $\pm 2\%$	63V	Philips	2222 424 33003
C907	Capacitor polystyrene	1n3 $\pm 2\%$	160V	Philips	2222 425 31302
C908	Capacitor polystyrene	39nF $\pm 2\%$	63V	Philips	2222 424 33903
C909	Capacitor polystyrene	470pF $\pm 2\%$	250V	Philips	2222 426 44701
C910	Capacitor ceramic	1n8-20/+80%	400V	Ferroperm	9/0141.9
C911	Capacitor polyester	220nF $\pm 20\%$	100V	ERO	MKT1822-422/0
C912	Capacitor electrolytic	4u7 $\pm 20\%$	50V	ERO	EKIO0AA147H
C913	Capacitor electrolytic	4u7 $\pm 20\%$	50V	ERO	EKIO0AA147H
C914	Capacitor polyester	100nF $\pm 20\%$	100V	ERO	MKT1822-410/0
C915	Capacitor electrolytic	100uF-10/+50	25V	Siemens	B41283-B5107-T
C916	Capacitor electrolytic	22uF $\pm 20\%$	35V	ERO	EKIO0BB222F
C917	Capacitor polystyrene	4n7 $\pm 2\%$	63V	Philips	2222 424 34702
C918	Capacitor polystyrene	1nF $\pm 2\%$	250V	Philips	2222 426 31002
C919	Capacitor electrolytic	22uF $\pm 20\%$	35V	ERO	EKIO0BB222F
C920	Capacitor polyester	100nF $\pm 20\%$	100V	ERO	MKT1822-410/0
C921	Capacitor electrolytic	470uF-10/+50%	16V	Siemens	B41283-A4477-T
C922	Capacitor electrolytic	100uF-10/+50%	25V	Siemens	B41283-B5107-T
C923	Capacitor polyester	100nF $\pm 20\%$	100V	ERO	MKT1822-410/0
IC901	Integrated circuit			National	LM324
IC902	Integrated circuit			SGS/ATES	TCA940
R901	Resistor	82Kohm $\pm 5\%$	0.33W	Philips	2322 211 13823
R902	Resistor	27Kohm $\pm 5\%$	0.33W	Philips	2322 211 13273
R903	Resistor	6k8 ohm $\pm 5\%$	0.33W	Philips	2322 106 33682
R904	Resistor	56Kohm $\pm 5\%$	0.33W	Philips	2222 211 13563
R905	Resistor	68Kohm $\pm 5\%$	0.33W	Philips	2222 106 33683
R906	Resistor	3k3 ohm $\pm 5\%$	0.33W	Philips	2222 211 13332
R907	Resistor	100Kohm $\pm 5\%$	0.33W	Philips	2222 211 13104
R908	Resistor	3k3 ohm $\pm 5\%$	0.33W	Philips	2222 106 33332
R909	Resistor	12Kohm $\pm 5\%$	0.33W	Philips	2222 211 13123
R910	Resistor	12Kohm $\pm 5\%$	0.33W	Philips	2222 211 13123
R911	Resistor	12Kohm $\pm 5\%$	0.33W	Philips	2222 211 13123
R912	Resistor	3k3 ohm $\pm 5\%$	0.33W	Philips	2222 211 13332
R913	Resistor	18Kohm $\pm 5\%$	0.33W	Philips	2222 211 13183

<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>		
R914	Resistor	56Kohm	+5%	0.33W	Philips	2222 211 13563
R915	Resistor	15Kohm	+5%	0.33W	Philips	2222 211 13153
R916	Resistor	68Kohm	+5%	0.33W	Philips	2222 211 13683
R917	Resistor	3k3	ohm +5%	0.33W	Philips	2322 211 13332
R918	Resistor	4k7	ohm +5%	0.33W	Philips	2222 211 13472
R919	Resistor	22Kohm	+5%	0.33W	Philips	2222 211 13223
R920	Resistor	56Kohm	+5%	0.33W	Philips	2222 106 33563
R921	Resistor	120	ohm +5%	0.33W	Philips	2222 211 13121
R922	Resistor	100	ohm +5%	0.5W	Philips	2222 212 13101
R923	Resistor	56	ohm +5%	0.33W	Philips	2222 211 13569
R924	Resistor	1	ohm +5%	0.33W	Philips	2222 211 13108
R925	Resistor	39	ohm +5%	0.33W	Philips	2222 211 13399
R926	Resistor	10	ohm +5%	0.33W	Philips	2222 211 13109
R927	Resistor	8E2	ohm +5%	4.2W	Philips	2222 330 22828
R928	Resistor	1K2	ohm +5%	0.33W	Philips	2222 211 13122

<i>Symbol</i>	<i>Description</i>	<i>Manufact.</i>	
C1001	Capacitor 10 nF $\pm 20\%$ 400V	Philips	2222 344 54103
C1002	Capacitor electrolytic 10 uF $\pm 20\%$ 35V	ERO	EKI 00AA 210F
C1003	Capacitor ceramic 12 pF $\pm 5\%$ NPO 400V	Ferroperm	9/0112.9
C1004	Capacitor ceramic 10 nF $-20/+80\%$ 50V	KCK	HE70SJYF103Z
C1005	Capacitor ceramic 68 pF $\pm 2\%$ N150 100V	KCK	SDPU-6E/N150/68/G/100V
C1006	Capacitor polyester 22 nF $\pm 20\%$ 400V	Philips	2222 344 54223
C1007	Capacitor ceramic 10 nF $-20/+80\%$ 50V	KCK	HE70SJYF103Z
C1008	Capacitor polyester 220 nF $\pm 20\%$ 100V	Philips	2222 344 24224
C1009	Capacitor polyester 15 nF $\pm 20\%$ 400V	Philips	2222 344 54153
C1010	Capacitor polyester 47 nF $\pm 20\%$ 250V	Philips	2222 344 40473
C1011	Capacitor polyester 220 nF $\pm 20\%$ 100V	Philips	2222 344 24224
C1012	Capacitor electrolytic 10 uF $-10/+100\%$ 40V	Siemens	B41313-A7106-V
C1013	Capacitor electrolytic 10 uF $-10/+100\%$ 40V	Siemens	B41313-A7106-V
C1014	Capacitor polyester 220 nF $\pm 20\%$ 100V	Philips	2222 344 24224
C1015	Capacitor polyester 47 nF $\pm 20\%$ 250V	Philips	2222 344 40473
C1016	Capacitor polyester 220 nF $\pm 20\%$ 100V	Philips	2222 344 24224
C1017	Capacitor polyester 220 nF $\pm 20\%$ 100V	Philips	2222 344 24224
C1018	Capacitor polyester 220 nF $\pm 20\%$ 100V	Philips	2222 344 24224
C1019	Capacitor polyester 220 nF $\pm 20\%$ 100V	Philips	2222 344 24224
C1020	Capacitor polyester 220 nF $\pm 20\%$ 100V	Philips	2222 344 24224
C1021	Capacitor polystyrene 1n2F $\pm 5\%$ 63V	Philips	2222 424 21202
C1022	Capacitor polystyrene 6n8F $\pm 5\%$ 63V	Philips	2222 424 26802
D1001	Diode zener 12V $\pm 5\%$ 0.4W	Philips	BZX79C12
D1002	Diode silicon	Philips	BAW62
FP1001	Ferrite bead 4B1	Philips	4322 020 34420
IC1001	Integrated circuit	Texas	SN74LS192N
IC1002	Integrated circuit	Texas	SN74LS192N
IC1003	Integrated circuit	Texas	SN74LS192N
IC1004	Integrated circuit	Texas	SN74LS192N
IC1005	Integrated circuit	Texas	SN74LS192N
IC1006	Integrated circuit	Motorola	MC4044P
IC1007	Integrated circuit	Texas	SN74LS390N
IC1008	Integrated circuit	Texas	SN74LS20N
IC1009	Integrated circuit	Texas	SN74LS27N
IC1010	Integrated circuit	Texas	SN74LS109N AN.
IC1011	Integrated circuit	Texas	SN74LS390N
IC1012	Integrated circuit	Texas	SN74LS390N

<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>	
IC1013	Integrated circuit			Motorola	MC4044P
IC1014	Integrated circuit			Texas	SN74 10N
IC1015	Integrated circuit			Texas	SN74LS290N
L1001	Coil			S.P.	TL255
L1002	Coil			S.P.	TL235
R1001	Resistor	15 Kohm $\pm 5\%$	0.33W	Philips	2322 211 13153
R1002	Resistor	15 Kohm $\pm 5\%$	0.33W	Philips	2322 211 13153
R1003	Resistor	560 ohm $\pm 5\%$	0.33W	Philips	2322 211 13561
R1004	Resistor	15 Kohm $\pm 5\%$	0.33W	Philips	2322 211 13153
R1005	Resistor	560 ohm $\pm 5\%$	0.33W	Philips	2322 211 13561
R1006	Resistor	5K6 ohm $\pm 5\%$	0.33W	Philips	2322 211 13562
R1007	Resistor	1K8 ohm $\pm 5\%$	0.33W	Philips	2322 211 13182
R1008	not used				
R1009	Resistor	1K8 ohm $\pm 5\%$	0.33W	Philips	2322 211 13182
R1010	Resistor	820 ohm $\pm 5\%$	0.33W	Philips	2322 211 13821
R1011	Resistor	390 ohm $\pm 5\%$	0.33W	Philips	2322 211 13391
R1012	Resistor	220 ohm $\pm 5\%$	0.33W	Philips	2322 211 13221
R1013	Preset potmeter	2K ohm $\pm 10\%$	0.5W	Bourns	3299W-1-202
R1014	Resistor	1K2 ohm $\pm 5\%$	0.33W	Philips	2322 106 33122
R1015	Resistor	10K ohm $\pm 5\%$	0.33W	Philips	2322 211 13103
R1016	Resistor	820 ohm $\pm 5\%$	0.33W	Philips	2322 211 13821
R1017	Resistor	470 ohm $\pm 5\%$	0.33W	Philips	2322 211 13471
R1018	Resistor	10 Kohm $\pm 5\%$	0.33W	Philips	2322 211 13103
R1019	Resistor	1K2 ohm $\pm 5\%$	0.33W	Philips	2322 211 13122
R1020	Resistor	2K2 ohm $\pm 5\%$	0.33W	Philips	2322 211 13222
R1021	Resistor	560 ohm $\pm 5\%$	0.33W	Philips	2322 211 13561
R1022	Resistor	22 Kohm $\pm 5\%$	0.33W	Philips	2322 211 13223
R1023	Resistor	270 ohm $\pm 5\%$	0.33W	Philips	2322 106 33271
R1024	Resistor	1K8 ohm $\pm 5\%$	0.33W	Philips	2322 211 13182
R1025	Resistor	10 Kohm $\pm 5\%$	0.33W	Philips	2322 211 13103
R1026	Resistor	220 ohm $\pm 5\%$	0.33W	Philips	2322 106 33221
R1027	Resistor	2K2 ohm $\pm 5\%$	0.33W	Philips	2322 211 13222
R1028	Resistor	47 Kohm $\pm 5\%$	0.33W	Philips	2322 106 33473
R1029	Resistor	2K2 ohm $\pm 5\%$	0.33W	Philips	2322 211 13222
R1030	Resistor	1 Kohm $\pm 5\%$	0.33W	Philips	2322 211 13102
R1031	Resistor	220 ohm $\pm 5\%$	0.33W	Philips	2322 211 13221
R1032	Resistor	680 ohm $\pm 5\%$	0.33W	Philips	2322 211 13681
R1033	Resistor	12 Kohm $\pm 5\%$	0.33W	Philips	2322 211 13123

<i>Symbol</i>	<i>Description</i>	<i>Manufact.</i>	
R1034	Resistor 6K8 ohm <u>+5%</u> 0.33W	Philips	2322 211 13682
R1035	Resistor 1 Kohm <u>+5%</u> 0.33W	Philips	2322 211 13102
T1001	Transistor	Philips	2N2368
T1002	Transistor	Philips	2N2368
T1003	Transistor	Philips	BF494
T1004	Transistor	Philips	BF199
T1005	Transistor	Philips	2N2368
T1006	Transistor	Philips	BF199

Symbol	Description	Manufact.	
C1101	Capacitor polyester 220 nF <u>+20%</u> 100V	Philips	2222 344 24224
C1102	Capacitor polyester 220 nF <u>+20%</u> 100V	Philips	2222 344 24224
C1103	Capacitor ceramic 10 nF <u>-20/+80%</u> 50V	KCK	HE70SJYF103Z
C1104	Capacitor electrolytic 10 uF <u>+20%</u> 35V	ERO	EKI 00AA 210F
C1105	Capacitor electrolytic 10 nF <u>+20%</u> 35V	ERO	EKI 00AA 210F
C1106	Capacitor electrolytic 10 uF <u>+20%</u> 35V	ERO	EKI 00AA 210F
C1107	Capacitor polyester 220 nF <u>+20%</u> 100V	Philips	2222 344 24224
C1108	Capacitor electrolytic 10 uF <u>-10/+100%</u> 40V	Siemens	B41313-A7106-V
C1109	Capacitor electrolytic 10 uF <u>+20%</u> 35V	ERO	EKI 00AA 210F
C1110	Capacitor polycarbonate 470 nF <u>+10%</u> 100V	Philips	2222 344 21474
C1111	Capacitor ceramic 10 nF <u>-20/+80%</u> 50V	KCK	HE70SJYF103Z
C1112	Capacitor polystyrene 39 nF <u>+1%</u> 63V	Philips	2222 424 43903
C1113	Capacitor polyester 6u8F <u>+10%</u> 100V	Philips	2222 344 25685
C1114	Capacitor electrolytic 10 uF <u>+20%</u> 35V	ERO	EKI 00AA 210F
C1115	Capacitor ceramic 220 pF <u>+20%</u> 400V	Ferroperm	9/0129.9
C1116	Capacitor polyester 330 nF <u>+5%</u> 63V	Philips	2222 344 25334
C1117	Capacitor ceramic 220 pF <u>+20%</u> 400V	Ferroperm	9/0129.9
C1118	Capacitor polyester 150 nF <u>+10%</u> 100V	Philips	2222 344 25154
D1101	Diode silicon	Philips	BAW62
D1102	Diode silicon	Philips	BAW62
D1103	Diode zener 4.7V <u>+5%</u> 0.4W	Philips	BZX79C4V7
D1104	Diode zener 4.7V <u>+5%</u> 0.4W	Philips	BZX79C4V7
D1105	Diode silicon	Philips	BAW62
D1106	Diode silicon	Philips	BAV21
IC1101	Integrated circuit	National	LM308
R1101	Resistor 1 Kohm <u>+5%</u> 0.33W	Philips	2322 211 13102
R1102	Resistor 82 ohm <u>+5%</u> 0.33W	Philips	2322 211 13829
R1103	Resistor 820 ohm <u>+5%</u> 0.33W	Philips	2322 211 13821
R1104	Resistor 150 Kohm <u>+5%</u> 0.33W	Philips	2322 211 13154
R1105	Resistor 2K2 ohm <u>+5%</u> 0.33W	Philips	2322 211 13222
R1106	Resistor 1K2 ohm <u>+5%</u> 0.33W	Philips	2322 211 13122
R1107	Resistor 12 Kohm <u>+5%</u> 0.33W	Philips	2322 211 13123
R1108	Resistor 10 ohm <u>+5%</u> 0.33W	Philips	2322 211 13109
R1109	Resistor 10 Kohm <u>+5%</u> 0.33W	Philips	2322 211 13103
R1110	Preset potmeter 2K2 ohm <u>+20%</u> 0.5W	Philips	2322 482 20222
R1111	Resistor 3K3 ohm <u>+5%</u> 0.33W	Philips	2322 211 13332
R1112	Resistor 10 Kohm <u>+5%</u> 0.33W	Philips	2322 211 13103

<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>	
R1113	Resistor	3K3 ohm <u>+5%</u>	0.33W	Philips	2322 211 13332
R1114	Preset potmeter	2K2 ohm <u>+20%</u>	0.5W	Philips	2322 482 20222
R1115	Resistor	10 Kohm <u>+5%</u>	0.33W	Philips	2322 211 13103
R1116	Resistor	1K5 ohm <u>+5%</u>	0.33W	Philips	2322 211 13152
R1117	Resistor	2K7 ohm <u>+5%</u>	0.33W	Philips	2322 106 33272
R1118	Resistor	3K3 ohm <u>+5%</u>	0.33W	Philips	2322 211 13332
R1119	Resistor	10 Kohm <u>+5%</u>	0.33W	Philips	2322 211 13103
R1120	Resistor	560 ohm <u>+5%</u>	0.33W	Philips	2322 211 13561
R1121	Resistor	5.9 Kohm <u>+1%</u>	0.25W	VITROHM	471-0
R1122	Resistor	150 ohm <u>+5%</u>	0.33W	Philips	2322 211 13151
R1123	Resistor	22 Kohm <u>+5%</u>	0.33W	Philips	2322 211 13223
R1124	Resistor	2M7 ohm <u>+5%</u>	0.33W	Philips	2322 211 12275
R1125	Resistor	4K7 ohm <u>+5%</u>	0.33W	Philips	2322 211 13472
R1126	Resistor	2K2 ohm <u>+5%</u>	0.33W	Philips	2322 211 13222
R1127	Resistor	5.9 Kohm <u>+1%</u>	0.25W	VITROHM	471-0
R1128	Resistor	140 Kohm <u>+1%</u>	0.25W	VITROHM	471-0
R1129	Resistor	5.9 Kohm <u>+1%</u>	0.25W	VITROHM	471-0
T1101	Transistor			Philips	BD138
T1102	Transistor			Philips	BC548A
T1103	Transistor			Philips	BD139
T1104	Transistor			Philips	BC558
T1105	Transistor			Philips	BC556A
T1106	Transistor			Philips	BC548

POSITION	DESCRIPTION	MANUFACTOR	TYPE	S.P. NUMBER	
	VCO UNIT R11XX	MODULE 12/1200	ESPERA	PRINT NR 5-0-24700D	605540
C1	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C2	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C3	CAPACITOR CERAMIC	3.3pF +- .25pF NPO 400V	FERROPERM	9/0112,9	15.521
C4	CAPACITOR CERAMIC	3.3pF +- .25pF NPO 400V	FERROPERM	9/0112,9	15.521
C5	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C6	CAPACITOR TANTALUM	3.3uF 20% 35V	ERO	ETP-2D	14.080
C7	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C8	CAPACITOR POLYSTYRENE	160pF 1% 630V	*PHILIPS	2222 431 81601 2222 427 41601	10.406
C9	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C10	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C11	CAPACITOR MKT	1nF 10% 400V	SIEMENS	B32510-D6102-K000	11.360
C12	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C13	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C14	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C15	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C16	CAPACITOR ELECTROLYTIC	10uF 20% 35V	* ERO	EKI 00 AA 210 F	14.512
C17	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C18	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C19	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C20	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C21	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C22	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C23	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C24	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C25	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C26	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C27	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C28	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C29	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C30	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C31	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C32	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C33	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C34	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C35	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C36	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C37	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C38	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C39	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C40	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290

R1121

POSITION	DESCRIPTION	MANUFACTOR	TYPE	S.P. NUMBER	
C41	CAPACITOR POLYSTYRENE	82pF 1% 630V	*PHILIPS	2222 431 88209 2222 427 48209	10.398
C42	CAPACITOR POLYSTYRENE	62pF 1% 630V	*PHILIPS	2222 431 85609 2222 427 46209	10.395
C43	CAPACITOR POLYSTYRENE	56pF 1% 630V	PHILIPS	2222 431 85609 2222 427 45609	10.394
C44	CAPACITOR POLYSTYRENE	110pF 1% 630V	*PHILIPS	2222 431 81101 2222 427 41101	10.402
C45	CAPACITOR POLYSTYRENE	56pF 1% 630V	PHILIPS	2222 431 85609 2222 427 45609	10.394
C46	CAPACITOR POLYSTYRENE	68pF 1% 630V	*PHILIPS	2222 431 86809 2222 427 46809	10.396
C47	CAPACITOR POLYSTYRENE	75pF 1% 630V	*PHILIPS	2222 431 87509 2222 427 47509	10.397
C48	CAPACITOR POLYSTYRENE	75pF 1% 630V	*PHILIPS	2222 431 87509 2222 427 47509	10.397
C49	CAPACITOR POLYSTYRENE	75pF 1% 630V	*PHILIPS	2222 431 87509 2222 427 47509	10.397
C50	CAPACITOR POLYSTYRENE	51pF 1% 630V	*PHILIPS	2222 431 85109 2222 427 45109	10.393
C51	CAPACITOR POLYSTYRENE	100pF 1% 630V	*PHILIPS	2222 431 81001 2222 427 41001	10.400
C52	CAPACITOR POLYSTYRENE	91pF 1% 630V	*PHILIPS	2222 431 89109 2222 427 49109	10.399
C53	CAPACITOR CERAMIC	5.6 pF +- .5pF NPO 400V	FERROPERM	9/0112,9	15.545
C54	CAPACITOR CERAMIC	5.6 pF +- .5pF NPO 400V	FERROPERM	9/0112,9	15.545
C55	CAPACITOR CERAMIC	2.2 pF +- .25pF NPO 250V	FERROPERM	9/0112,9	15.512
C56	CAPACITOR CERAMIC	8.2pF +-0.5pF NPO 400V	FERROPERM	9/0112,9	15.563
C57	CAPACITOR CERAMIC	8.2pF +-0.5pF NPO 400V	FERROPERM	9/0112,9	15.563
C58	CAPACITOR CERAMIC	5.6 pF +- .5pF NPO 400V	FERROPERM	9/0112,9	15.545
C60	CAPACITOR CERAMIC	10pF 5% NPO 400V	FERROPERM	9/0112,9	15.565
C62	CAPACITOR CERAMIC	2.2 pF +- .25pF NPO 250V	FERROPERM	9/0112,9	15.512
C63	CAPACITOR CERAMIC	5.6 pF +- .5pF NPO 400V	FERROPERM	9/0112,9	15.545
C64	CAPACITOR CERAMIC	8.2pF +-0.5pF NPO 400V	FERROPERM	9/0112,9	15.563
C65	CAPACITOR POLYSTYRENE	82pF 1% 630V	*PHILIPS	2222 431 88209 2222 427 48209	10.398
C66	CAPACITOR POLYSTYRENE	68pF 1% 630V	*PHILIPS	2222 431 86809 2222 427 46809	10.396
C67	CAPACITOR POLYSTYRENE	62pF 1% 630V	*PHILIPS	2222 431 85609 2222 427 46209	10.395
C68	CAPACITOR POLYSTERENE	150pF 1% 630V	*PHILIPS	2222 431 81501 2222 427 41501	10.405
C69	CAPACITOR POLYSTYRENE	68pF 1% 630V	*PHILIPS	2222 431 86809 2222 427 46809	10.396

POSITION	DESCRIPTION		MANUFACTUR	TYPE	S.P. NUMBER
C70	CAPACITOR POLYSTYRENE	75pF 1% 630V	*PHILIPS	2222 431 87509	10.397
C71	CAPACITOR POLYSTYRENE	100pF 1% 630V	*PHILIPS	2222 427 47509 2222 431 81001	10.400
C72	CAPACITOR POLYSTYRENE	100pF 1% 630V	*PHILIPS	2222 427 41001 2222 431 81001	10.400
C73	CAPACITOR POLYSTYRENE	91pF 1% 630V	*PHILIPS	2222 427 41001 2222 431 89109 2222 427 49109	10.399
C80	CAPACITOR MKT	33nF 10% 250V	SIEMENS	B32510-D3333-K000	11.498
C81	CAPACITOR MKT	33nF 10% 250V	SIEMENS	B32510-D3333-K000	11.498
C82	CAPACITOR MKT	33nF 10% 250V	SIEMENS	B32510-D3333-K000	11.498
C83	CAPACITOR MKT	33nF 10% 250V	SIEMENS	B32510-D3333-K000	11.498
D1	DIODE SCHOTTKY	BAT 43	THOMSON-CSF	BAT43	27.600
D2	DIODE CAP. SELECTED	BB130 RED DOT	00.753	C1067A	700935
D3	DIODE CAP. SELECTED	BB130 YELLOW DOT	00.753	C1067A	700934
D4	DIODE CAP. SELECTED	BB130 YELLOW DOT	00.753	C1067A	700934
D5	DIODE CAP. SELECTED	BB130 YELLOW DOT	00.753	C1067A	700934
D6	DIODE CAP. SELECTED	BB130 RED DOT	00.753	C1067A	700935
D7	DIODE CAP. SELECTED	BB130 YELLOW DOT	00.753	C1067A	700934
D8	DIODE CAP. SELECTED	BB130 RED DOT	00.753	C1067A	700935
D9	DIODE CAP. SELECTED	BB130 YELLOW DOT	00.753	C1067A	700934
D10	DIODE CAP. SELECTED	BB130 RED DOT	00.753	C1067A	700935
D11	DIODE CAP. SELECTED	BB130 YELLOW DOT	00.753	C1067A	700934
D12	DIODE CAP. SELECTED	BB130 RED DOT	00.753	C1067A	700935
D13	DIODE CAP. SELECTED	BB130 RED DOT	00.753	C1067A	700935
D14	DIODE	1N4148	* ITT	1N4148	25.131
D15	DIODE	1N4148	* ITT	1N4148	25.131
D16	DIODE	1N4148	* ITT	1N4148	25.131
D17	DIODE	1N4148	* ITT	1N4148	25.131
D18	DIODE	1N4148	* ITT	1N4148	25.131
D19	DIODE	1N4148	* ITT	1N4148	25.131
D20	DIODE	1N4148	* ITT	1N4148	25.131
D21	DIODE	1N4148	* ITT	1N4148	25.131
D22	DIODE	1N4148	* ITT	1N4148	25.131
D23	DIODE	1N4148	* ITT	1N4148	25.131
D24	DIODE	1N4148	* ITT	1N4148	25.131
D25	DIODE	1N4148	* ITT	1N4148	25.131
D26	DIODE SWITCH	FACTORY SELECTED BA282	00.752	C1064A	700885
D27	DIODE SWITCH	FACTORY SELECTED BA282	00.752	C1064A	700885
D28	DIODE SWITCH	FACTORY SELECTED BA282	00.752	C1064A	700885
D29	DIODE SWITCH	FACTORY SELECTED BA282	00.752	C1064A	700885
D30	DIODE SWITCH	FACTORY SELECTED BA282	00.752	C1064A	700885
D31	DIODE SWITCH	FACTORY SELECTED BA282	00.752	C1064A	700885
D32	DIODE SWITCH	FACTORY SELECTED BA282	00.752	C1064A	700885

POSITION	DESCRIPTION		MANUFACTUR	TYPE	S.P. NUMBER
D33	DIODE SWITCH	FACTORY SELECTED BA282	00.752	C1064A	700885
D34	DIODE SWITCH	FACTORY SELECTED BA282	00.752	C1064A	700885
D35	DIODE SWITCH	FACTORY SELECTED BA282	00.752	C1064A	700885
D36	DIODE SWITCH	FACTORY SELECTED BA282	00.752	C1064A	700885
D37	DIODE SWITCH	FACTORY SELECTED BA282	00.752	C1064A	700885
D38	DIODE SWITCH	FACTORY SELECTED BA282	00.752	C1064A	700885
D39	DIODE SWITCH	FACTORY SELECTED BA282	00.752	C1064A	700885
D40	DIODE SWITCH	FACTORY SELECTED BA282	00.752	C1064A	700885
D41	DIODE SWITCH	FACTORY SELECTED BA282	00.752	C1064A	700885
FP1	FERRITE BEAD	Ø3.7xØ1.2x3.5mm GRADE 4B1	*PHILIPS	4322 020 34420	35.181
L1	COIL	TL448	S.P.RADIO	6-0-24745A	400448
L2	COIL	TL449	S.P.RADIO	6-0-24746A	400449
L3	COIL	TL449	S.P.RADIO	6-0-24746A	400449
L4	COIL	TL446	S.P.RADIO	6-0-24743A	400446
L5	COIL	TL447	S.P.RADIO	6-0-24744A	400447
L6	COIL	TL445	S.P.RADIO	6-0-24742A	400445
L7	COIL	TL448	S.P.RADIO	6-0-24745A	400448
L8	COIL	TL449	S.P.RADIO	6-0-24746A	400449
L9	COIL	TL447	S.P.RADIO	6-0-24744A	400447
L10	COIL	TL446	S.P.RADIO	6-0-24743A	400446
L11	COIL	TL447	S.P.RADIO	6-0-24744A	400447
L12	COIL	TL448	S.P.RADIO	6-0-24745A	400448
R1	RESISTOR	1.2 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-1K2 5%	01.703
R2	RESISTOR	18 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-18K 5%	01.732
R3	RESISTOR	1 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-1K 5%	01.701
R4	RESISTOR	2.7 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-2K7 5%	01.711
R5	RESISTOR	39 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-39K 5%	01.740
R6	RESISTOR	1.2 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-1K2 5%	01.703
R7	RESISTOR	560 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-560R 5%	01.694
R8	RESISTOR	56 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-56R 5%	01.669
R9	RESISTOR	220 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-220R 5%	01.684
R10	RESISTOR	12 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-12K 5%	01.728
R11	RESISTOR	4.7 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-4K7 5%	01.717
R12	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R13	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R14	RESISTOR	68 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-68R 5%	01.671
R15	RESISTOR	220 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-220R 5%	01.684
R16	RESISTOR	100 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-100K 5%	01.751
R17	RESISTOR	390 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-390R 5%	01.690
R18	RESISTOR	82 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-82R 5%	01.673
R19	RESISTOR	3.3 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-3R3 5%	01.638
R20	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R21	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R22	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667

R1121

POSITION	DESCRIPTION		MANUFACTOR	TYPE	S.P.NUMBER
R23	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R24	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R25	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R26	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R27	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R28	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R29	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R30	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R31	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R32	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R33	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R34	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R35	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R36	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R37	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R38	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R39	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R40	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R41	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R42	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R43	RESISTOR	47 OHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-47R 5%	01.667
R44	RESISTOR	27 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-27K 5%	01.736
R45	RESISTOR	27 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-27K 5%	01.736
R46	RESISTOR	27 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-27K 5%	01.736
R47	RESISTOR	27 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-27K 5%	01.736
R48	RESISTOR	27 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-27K 5%	01.736
R49	RESISTOR	27 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-27K 5%	01.736
R50	RESISTOR	27 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-27K 5%	01.736
R51	RESISTOR	27 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-27K 5%	01.736
R52	RESISTOR	27 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-27K 5%	01.736
R53	RESISTOR	27 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-27K 5%	01.736
R54	RESISTOR	27 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-27K 5%	01.736
R55	RESISTOR	27 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-27K 5%	01.736
R56	RESISTOR	330 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-330K 5%	01.763
R57	RESISTOR	330 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-330K 5%	01.763
R58	RESISTOR	330 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-330K 5%	01.763
R59	RESISTOR	330 KOHM 5% 0.33W	BEYSCHLAG	MBA 0204-00-BX-330K 5%	01.763
T1	TRANSISTOR	BF496	PHILIPS	BF496	28.200
T2	TRANSISTOR	FET T1S 88 A4	MOTOROLA	TM00 044-4	29.738
T3	TRANSISTOR	BC548B	* ITT/MOT.	BC548B	28.076
T4	TRANSISTOR	BF199	PHILIPS	BF199	28.179
TR1	TRANSFORMER	TL207	S.P.RADIO	6-0-21360	400207

HARMONIC FILTER UNIT R1119 & R1120

<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>		
C1301	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1302	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1303	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1304	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1305	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1306	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1307	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1308	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1309	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1310	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1311	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1312	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
S1313	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1314	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1315	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1316	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1317	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1318	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1319	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1320	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1321	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1322	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1323	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1324	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1325	Capacitor polystyrene	180 pF	<u>+2%</u>	630V	Philips	2222 427 31801
C1326	Capacitor polystyrene	180 pF	<u>+2%</u>	630V	Philips	2222 427 31801
C1327	Capacitor polystyrene	110 pF	<u>+2%</u>	630V	Philips	2222 427 31101
C1328	Capacitor polystyrene	100 pF	<u>+2%</u>	630V	Philips	2222 427 31001
C1329	Capacitor polystyrene	82 pF	<u>+2%</u>	630V	Philips	2222 427 38209
C1330	Capacitor polystyrene	91 pF	<u>+2%</u>	630V	Philips	2222 427 39109
C1331	Capacitor polystyrene	150 pF	<u>+2%</u>	630V	Philips	2222 427 31501
C1332	Capacitor polystyrene	120 pF	<u>+2%</u>	630V	Philips	2222 427 31201
C1333	Capacitor polystyrene	110 pF	<u>+2%</u>	630V	Philips	2222 427 31101
C1334	Capacitor polystyrene	100 pF	<u>+2%</u>	630V	Philips	2222 427 31001
C1335	Capacitor polystyrene	91 pF	<u>+2%</u>	630V	Philips	2222 427 39109
C1336	Capacitor polystyrene	82 pF	<u>+2%</u>	630V	Philips	2222 427 38209
C1337	Capacitor ceramic	2.2 pF	<u>+0.25 pF</u>	250V	Ferroperm	9/0112.9
C1338	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z
C1339	Capacitor polyester	0.22 uF	<u>+10%</u>	63V	ERO	MKT 1818 42206
C1340	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE 70 SJ YF 103Z

HARMONIC FILTER UNIT R1119 & R1120

<i>Symbol</i>	<i>Description</i>	<i>Manufact.</i>	
C1341	Capacitor ceramic 2.2 pF ± 0.25 pF	250V Ferroperm	9/0112.9
C1342	Capacitor ceramic 10 nF -20/+80%	50V Ferroperm	HE 70 SJ YF 103Z
C1343	Capacitor ceramic 10 nF -20/+80%	50V Ferroperm	HE 70 SJ YF 103Z
C1344	Capacitor ceramic 10 nF -20/+80%	50V Ferroperm	HE 70 SJ YF 103Z
C1345	Capacitor ceramic 10 nF -20/+80%	50V Ferroperm	HE 70 SJ YF 103Z
C1346	Capacitor ceramic 10 nF -20/+80%	50V Ferroperm	HE 70 SJ YF 103Z
C1347	Capacitor ceramic 10 nF -20/+80%	50V Ferroperm	HE 70 SJ YF 103Z
C1348	Capacitor ceramic 10 nF -20/+80%	50V Ferroperm	HE 70 SJ YF 103Z
C1349	Capacitor electrolytic 10 uF $\pm 20\%$	35V Roederstein	EKI 00 AA 210F
C1350	Capacitor ceramic 8.2 pF ± 0.25 pF	400V Ferroperm	9/0112.9
D1301	Diode silicon	Philips	IN4448
D1302	Diode silicon	Philips	IN4448
D1303	Diode silicon	Philips	IN4448
D1304	Diode silicon	Philips	IN4448
D1305	Diode silicon	Philips	IN4448
D1306	Diode silicon	Philips	IN4448
D1307	Diode silicon	Philips	IN4448
D1308	Diode silicon	Philips	IN4448
D1309	Diode silicon	Philips	IN4448
D1310	Diode silicon	Philips	IN4448
D1311	Diode silicon	Philips	IN4448
D1312	Diode silicon	Philips	IN4448
D1313	Diode switch	Telefunken	BA243
D1314	Diode switch	Telefunken	BA243
D1315	Diode switch	Telefunken	BA243
D1316	Diode switch	Telefunken	BA243
D1317	Diode switch	Telefunken	BA243
D1318	Diode switch	Telefunken	BA243
D1319	Diode switch	Telefunken	BA243
D1320	Diode switch	Telefunken	BA243
D1321	Diode switch	Telefunken	BA243
D1322	Diode switch	Telefunken	BA243
D1323	Diode switch	Telefunken	BA243

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HARMONIC FILTER R1119 & R1120

<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>	
D1324	Diode	switch		Telefunken	BA243
D1325	Diode	switch		Telefunken	BA243
D1326	Diode	switch		Telefunken	BA243
D1327	Diode	silicon		Philips	BA281
FP1301	Ferrite Bead	4B1		Kaschke	Hz 4,2/2,1/7A K1201
FP1302	Ferrite Bead	4B1		Philips	4322 020 34420
FP1303	Ferrite Bead	4B1		Philips	4322 020 34420
L1301	Coil			S.P.	TL350
L1302	Coil			S.P.	TL347
L1303	Coil			S.P.	TL336
L1304	Coil			S.P.	TL338
L1305	Coil			S.P.	TL340
L1306	Coil			S.P.	TL352
L1307	Coil			S.P.	TL337
L1308	Coil			S.P.	TL349
L1309	Coil			S.P.	TL348
L1310	Coil			S.P.	TL339
L1311	Coil			S.P.	TL351
L1312	Coil			S.P.	TL341
R1301	Resistor	470 ohm $\pm 5\%$	0.33W	Philips	2322 106 33471
R1302	Resistor	470 ohm $\pm 5\%$	0.33W	Philips	2322 106 33471
R1303	Resistor	470 ohm $\pm 5\%$	0.33W	Philips	2322 211 13471
R1304	Resistor	470 ohm $\pm 5\%$	0.33W	Philips	2322 106 33471
R1305	Resistor	470 ohm $\pm 5\%$	0.33W	Philips	2322 106 33471
R1306	Resistor	470 ohm $\pm 5\%$	0.33W	Philips	2322 211 13471
R1307	Resistor	470 ohm $\pm 5\%$	0.33W	Philips	2322 106 33471
R1308	Resistor	470 ohm $\pm 5\%$	0.33W	Philips	2322 211 13471

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HARMONIC FILTER R1119 & R1120

<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>	
R1309	Resistor	470 ohm $\pm 5\%$	0.33W	Philips	2322 106 33471
R1310	Resistor	470 ohm $\pm 5\%$	0.33W	Philips	2322 106 33471
R1311	Resistor	470 ohm $\pm 5\%$	0.33W	Philips	2322 211 13471
R1312	Resistor	470 ohm $\pm 5\%$	0.33W	Philips	2322 106 33471
R1313	Resistor	330 kohm $\pm 5\%$	0.33W	Philips	2322 106 33334
R1314	Resistor	330 kohm $\pm 5\%$	0.33W	Philips	2322 106 33334
R1315	Resistor	10 kohm $\pm 5\%$	0.33W	Philips	2322 106 33103
R1316	Resistor	39 ohm $\pm 5\%$	0.33W	Philips	2322 106 33399
R1317	Resistor	12 ohm $\pm 5\%$	0.33W	Philips	2322 106 33129
R1318	Resistor	390 kohm $\pm 5\%$	0.33W	Philips	2322 106 33394
R1319	Resistor	1.8 kohm $\pm 5\%$	0.33W	Philips	2322 106 33182
R1320	Resistor	82 kohm $\pm 5\%$	0.33W	Philips	2322 106 33823
R1321	Resistor	470 kohm $\pm 5\%$	0.33W	Philips	2322 211 13474
R1322	Resistor	39 kohm $\pm 5\%$	0.33W	Philips	2322 106 33393
R1323	Resistor	47 kohm $\pm 5\%$	0.33W	Philips	2322 106 33473
R1324	Resistor	120 ohm $\pm 5\%$	0.33W	Philips	2322 106 33121
R1325	Resistor	15 ohm $\pm 5\%$	0.33W	Philips	2322 106 33159
R1326	Resistor	1.2 kohm $\pm 5\%$	0.33W	Philips	2322 106 33122
R1327	Resistor	82 kohm $\pm 5\%$	0.33W	Philips	2322 106 33823
R1328	Resistor	330 ohm $\pm 5\%$	0.33W	Philips	2322 106 33331
R1329	Resistor	100 ohm $\pm 5\%$	0.33W	Philips	2322 106 33101
R1330	Resistor	47 ohm $\pm 5\%$	0.33W	Philips	2322 106 33479
T1301	Transistor			Philips	BF494
T1302	Transistor			Philips	BC548A
T1303	Transistor			Philips	BF494
T1304	Transistor			Philips	BF494

<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>		
C1401	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE70SJYF 103Z
C1402	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE70SJYF 103Z
C1403	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE70SJYF 103Z
C1404	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE70SJYF 103Z
C1405	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE70SJYF 103Z
C1406	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE70SJYF 103Z
C1407	Capacitor ceramic	47 pF	<u>+2%</u> N150	100V	Philips	2222 638 34479
C1408	Capacitor polyester	100 nF	<u>+20%</u>	100V	Philips	2222 344 24104
C1409	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE70SJYF 103Z
C1410	Capacitor ceramic	100 pF	<u>+2%</u> N150	100V	Philips	2222 628 34101
C1411	Capacitor polystyrene	180 pF	<u>+1%</u>	630V	Philips	2222 427 41801
C1412	Capacitor ceramic	33 pF	<u>+2%</u>	100V	Philips	2222 628 34339
C1413	Capacitor ceramic	56 pF	<u>+2%</u>	100V	Philips	2222 628 34569
C1414	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE70SJYF 103Z
C1415	Capacitor polyester	100 nF	<u>+20%</u>	100V	Philips	2222 344 24104
C1416	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE70SJYF 103Z
C1417	Capacitor feed through	1 nF	-20/+80%	250V	Ferroperm	9/0138.58
IC1401	Integrated circuit				National	LM3053
L1401	Coil				S.P.	TL059
L1402	Coil	12 uH	<u>+5%</u>		Kaschke	220/5
L1403	Coil	12 uH	<u>+5%</u>		Kaschke	220/5
R1401	Resistor	3K3 ohm	<u>+5%</u>	0.33W	Philips	2322 211 13332
R1402	Resistor	15 Kohm	<u>+5%</u>	0.33W	Philips	2322 211 13153
R1403	Resistor	2K2 ohm	<u>+5%</u>	0.33W	Philips	2322 211 13222
R1404	Resistor	270 ohm	<u>+5%</u>	0.33W	Philips	2322 211 13271
R1405	Resistor	100 ohm	<u>+5%</u>	0.33W	Philips	2322 211 13101
R1406	Resistor	10 ohm	<u>+5%</u>	0.33W	Philips	2322 106 33109
R1407	Resistor	330 ohm	<u>+5%</u>	0.33W	Philips	2322 211 13331
R1408	Resistor	2K7 ohm	<u>+5%</u>	0.33W	Philips	2322 211 13272
R1409	Resistor	680 ohm	<u>+5%</u>	0.33W	Philips	2322 211 13681
R1410	Resistor	390 ohm	<u>+5%</u>	0.33W	Philips	2322 211 13391
R1411	Resistor	470 ohm	<u>+5%</u>	0.33W	Philips	2322 211 13471
R1412	Resistor	27 Kohm	<u>+5%</u>	0.33W	Philips	2322 211 13273
R1413	Resistor	2K7 ohm	<u>+5%</u>	0.33W	Philips	2322 211 13272
R1414	Resistor	560 ohm	<u>+5%</u>	0.33W	Philips	2322 211 13561
R1415	Resistor	47 ohm	<u>+5%</u>	0.33W	Philips	2322 211 13479

<i>Symbol</i>	<i>Description</i>	<i>Manufact.</i>	
T1401	Transistor	Philips	BF199
T1402	Transistor	Philips	BF199
TR1401	Coil	S.P.	TL198

<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>		
C1501	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE70SJYF 103Z
C1502	Capacitor ceramic	68 pF	+5% N220	50V	KCK	HE60SJRH680
C1503	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE70SJYF 103Z
C1504	Capacitor ceramic	10 nF	-20/+80%	50V	KCK	HE70SJYF 103Z
C1505	Capacitor feed through	1 nF	-20/+80%	250V	Ferroperm	9/0138.58
L1501	Coil				S.P.	TL234
R1501	Resistor	18 ohm	+5%	0.33W	Philips	2322 211 13189
R1502	Resistor	33 ohm	+5%	0.33W	Philips	2322 211 13339
R1503	Resistor	1k8 ohm	+5%	0.33W	Philips	2322 211 13182
R1504	Resistor	1k2 ohm	+5%	0.33W	Philips	2322 211 13122
R1505	Resistor	180 ohm	+5%	0.33W	Philips	2322 211 13181
R1506	Resistor	15 ohm	+5%	0.33W	Philips	2322 211 13159
R1507	Resistor	100 ohm	+5%	0.33W	Philips	2322 211 13101
R1508	Resistor	220 ohm	+5%	0.33W	Philips	2322 211 13221
T1501	Transistor				Philips	BFW17A

<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>		
R1632	Resistor	18 kohm	+5%	0.33W	Philips	2322 106 33183
R1633	Resistor	39 kohm	+5%	0.33W	Philips	2322 106 33393
R1634	Resistor	390 ohm	+5%	0.33W	Philips	2322 106 33391
R1635	Resistor	5k6 ohm	+5%	0.33W	Philips	2322 106 33562
R1636	Resistor	560 ohm	+5%	0.33W	Philips	2322 106 33561
R1637	Resistor	150 ohm	+5%	0.33W	Philips	2322 106 33151
R1638	Resistor	560 ohm	+5%	0.33W	Philips	2322 106 33561
T1601	Transistor				Philips	BF199
T1602	Transistor				Philips	BF199
T1603	Transistor				Philips	BC558B
T1604	Transistor				Philips	BF199
T1605	Transistor				Philips	BC558B
TR1601	Coil				S.P.	TL234
X1601	Crystal	10.0076 MHz			S.P.	C1018
X1602	Crystal	16.0076 MHz			S.P.	C1019

<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>	
C1701	Capacitor electrolytic	10 uF <u>+20%</u>	35V	ERO	EKI 00AA210F
C1702	Capacitor polyester	1 uF <u>+20%</u>	100V	ERO	MKT 1822 - 510/0
C1703	Capacitor polystyrene	3 nF <u>+2%</u>	100V	Philips	2222 424 33002
C1704	Capacitor electrolytic	1 uF <u>+20%</u>	50V	ERO	EKI 00AA110H
C1705	Capacitor electrolytic	10 uF <u>+20%</u>	35V	ERO	EKI 00AA210F
C1706	Capacitor polystyrene	5n6F <u>+2%</u>	100V	Philips	2222 424 35602
C1707	Capacitor polystyrene	300 pF <u>+2%</u>	630V	Philips	2222 427 33001
C1708	Capacitor polystyrene	15 nF <u>+5%</u>	100V	Philips	2222 424 21503
C1709	Capacitor polystyrene	5n6F <u>+2%</u>	100V	Philips	2222 424 35602
C1710	Capacitor polystyrene	300 pF <u>+2%</u>	630V	Philips	2222 427 33001
C1711	Capacitor polystyrene	15 nF <u>+5%</u>	100V	Philips	2322 424 21503
C1712	Capacitor electrolytic	10 uF <u>+20%</u>	35V	ERO	EKI 00AA210F
IC1701	Integrated circuit			Motorola	MC1458CP
L1701	Coil			S.P.	TL223
R1701	Resistor	4k7 ohm <u>+5%</u>	0.33W	Philips	2322 211 13472
R1702	Resistor	68 kohm <u>+5%</u>	0.33W	Philips	2322 106 33683
R1703	Resistor	56 kohm <u>+5%</u>	0.33W	Philips	2322 211 13563
R1704	Resistor	82 kohm <u>+5%</u>	0.33W	Philips	2322 211 13823
R1705	Resistor	560 kohm <u>+5%</u>	0.33W	Philips	2322 211 13564
R1706	Resistor	68 kohm <u>+5%</u>	0.33W	Philips	2322 211 13683
R1707	Resistor	6k8 ohm <u>+5%</u>	0.33W	Philips	2322 211 13682
R1708	Resistor	3k9 ohm <u>+5%</u>	0.33W	Philips	2322 211 13392
R1709	Resistor	15 kohm <u>+5%</u>	0.33W	Philips	2322 106 33153
R1710	Resistor	15 kohm <u>+5%</u>	0.33W	Philips	2322 211 13153
R1711	Resistor	22 kohm <u>+5%</u>	0.33W	Philips	2322 211 13223
R1712	Resistor	18 kohm <u>+5%</u>	0.33W	Philips	2322 211 13183
R1713	Resistor	2k7 ohm <u>+5%</u>	0.33W	Philips	2322 211 13272
R1714	Resistor	15 kohm <u>+5%</u>	0.33W	Philips	2322 211 13153
R1715	Resistor	22 kohm <u>+5%</u>	0.33W	Philips	2322 211 13223
R1716	Resistor	18 kohm <u>+5%</u>	0.33W	Philips	2322 211 13183
R1717	Resistor	330 ohm <u>+5%</u>	0.33W	Philips	2322 211 13331
R1718	Resistor	560 ohm <u>+5%</u>	0.33W	Philips	2322 211 13561
T1701	Transistor			Philips	BC548B
T1702	Transistor			Philips	BC548B

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<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>		
C1801	Capacitor polystyrene	3,0nF	$\pm 1\%$	160V	Philips	2222 425 43002
C1802	Capacitor polystyrene	1,6nF	$\pm 1\%$	630V	Philips	2222 427 41602
C1803	Capacitor polystyrene	1,3nF	$\pm 1\%$	250V	Philips	2222 426 41302
C1804	Capacitor polystyrene	1nF	$\pm 1\%$	630V	Philips	2222 427 41002
C1805	Capacitor ceramic	44pF	$\pm 5\%$	400V	Ferroperm	9/0116.9
C1806	Capacitor ceramic	35pF	$\pm 5\%$	400V	Ferroperm	9/0116.9
C1807	Capacitor polyester	0,1uF	$\pm 10\%$	100V	ERO	MKT1822
C1808	Capacitor polyester	0,1uF	$\pm 10\%$	100V	ERO	MKT1822
C1809	Capacitor polystyrene	910pF	$\pm 1\%$	250V	Philips	2222 426 49101
C1810	Capacitor polystyrene	680pF	$\pm 1\%$	630V	Philips	2222 427 46801
C1811	Capacitor ceramic	10nF	-20/+80%	50V	KCK	HE70SJYF103Z
C1812	Capacitor ceramic	10nF	-20/+80%	50V	KCK	HE70SJYF103Z
C1813	Capacitor ceramic	10nF	-20/+80%	50V	KCK	HE70SJYF103Z
C1814	Capacitor ceramic	10nF	-20/+80%	50V	KCK	HE70SJYF103Z
D1801	Diode silicon				Philips	1N4448
D1802	Diode silicon				Philips	1N4448
L1801	Coil	3,9uH	$\pm 5\%$		NEOSID	006122 81
L1802	Coil	3,3uH	$\pm 5\%$		NEOSID	006122 80
L1803	Coil	82uH	$\pm 5\%$		NEOSID	006122 11
L1804	Coil	68uH	$\pm 5\%$		NEOSID	006122 10
L1805	Coil	3,9uH	$\pm 5\%$		NEOSID	006122 81
L1806	Coil	3,3uH	$\pm 5\%$		NEOSID	006122 80
R1801	Resistor	390 ohm	$\pm 5\%$	0.33W	Philips	2322 181 13391
R1802	Resistor	390 ohm	$\pm 5\%$	0.33W	Philips	2322 181 13391
R1803	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 13103
R1804	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 13103

Symbol	Description	Manufact.	
C1901	Capacitor polystyrene 5,6nF $\pm 1\%$ 63V	Philips	2222 424 45602
C1902	Capacitor polystyrene 4,7nF $\pm 1\%$ 63V	Philips	2222 424 44702
C1903	Capacitor polystyrene 3,0nF $\pm 1\%$ 160V	Philips	2222 425 43002
C1904	Capacitor polystyrene 2,2nF $\pm 1\%$ 250V	Philips	2222 426 42202
C1905	Capacitor polystyrene 82pF $\pm 1\%$ 630V	Philips	2222 427 48209
C1906	Capacitor polystyrene 68pF $\pm 1\%$ 630V	Philips	2222 427 46809
C1907	Capacitor polyester 0,1uF $\pm 10\%$ 100V	ERO	MKT1822
C1908	Capacitor polyester 0,1uF $\pm 10\%$ 100V	ERO	MKT1822
C1909	Capacitor polystyrene 1,8nF $\pm 1\%$ 160V	Philips	2222 425 41802
C1910	Capacitor polystyrene 1,2nF $\pm 1\%$ 630V	Philips	2222 427 41202
C1911	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1912	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1913	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1914	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
D1901	Diode silicon	Philips	1N4448
D1902	Diode silicon	Philips	1N4448
L1901	Coil 4,7uH $\pm 5\%$	NEOSID	006122 82
L1902	Coil 3,9uH $\pm 5\%$	NEOSID	006122 81
L1903	Coil 100uH $\pm 5\%$	NEOSID	006122 12
L1904	Coil 82uH $\pm 5\%$	NEOSID	006122 11
L1905	Coil 4,7uH $\pm 5\%$	NEOSID	006122 82
L1906	Coil 3,9uH $\pm 5\%$	NEOSID	006122 81
R1901	Resistor 390 ohm $\pm 5\%$ 0.33W	Philips	2322 181 13391
R1902	Resistor 390 ohm $\pm 5\%$ 0.33W	Philips	2322 181 13391
R1903	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 13103
R1904	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 13103

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<i>Symbol</i>	<i>Description</i>	<i>Manufact.</i>	
C2001	Capacitor ceramic 22pF $\pm 5\%$ 400V	Ferroperm	9/0116.9
C2002	Capacitor ceramic 13pF $\pm 5\%$ 400V	Ferroperm	9/0112.9
C2003	Capacitor ceramic 22pF $\pm 5\%$ 400V	Ferroperm	9/0116.9
C2004	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
D2001	Diode switch	Philips	BA243
D2002	Diode switch	Philips	BA243
D2003	Diode switch	Philips	BA243
D2004	Diode switch	Philips	BA243
D2005	Diode switch	Philips	BA243
D2006	Diode switch	Philips	BA243
D2007	Diode switch	Philips	BA243
D2008	Diode switch	Philips	BA243
D2009	Diode switch	Philips	BA243
D2010	Diode switch	Philips	BA243
D2011	Diode switch	Philips	BA243
L2001	Coil	S.P.	TL 187
L2002	Coil 2,2uH $\pm 5\%$	NEOSID	006122 78
R2001	Resistor 120 ohm $\pm 5\%$ 0.33W	Philips	2322 181 13121
R2002	Preset potmeter 1 Kohm $\pm 20\%$ 0.3W	NOBLE	TM8-KV2-1S

Symbol	Description	Manufact.	
C2101	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C2102	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C2103	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C2104	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C2105	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C2106	Capacitor electrolytic 10uF 35V	ERO	EKI 00 AA 210F
C2107	Capacitor electrolytic 10uF 35V	ERO	EKI 00 AA 210F
C2108	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C2109	Capacitor ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
D2101	Diode silicon	Philips	1N4148
D2102	Diode silicon	Philips	1N4148
D2103	Diode silicon	Philips	1N4148
D2104	Diode silicon	Philips	1N4148
D2105	Diode silicon	Philips	1N4148
D2106	Diode silicon	Philips	1N4148
D2107	Diode silicon	Philips	1N4448
IC2101	Integrated circuit	Motorola	MC14514BCP
R2101	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33103
R2102	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33103
R2103	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33103
R2104	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33103
R2105	Resistor 5,6 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33562
R2106	Resistor 1 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33102
R2107	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33103
R2108	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33103
R2109	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33103
R2110	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33103
R2111	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33103
R2112	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33103
R2113	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33103
R2114	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33103
R2115	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33103
R2116	Resistor 10 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33103

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<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>		
R2117	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2118	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2119	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2120	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2121	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2122	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2123	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2124	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2125	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2126	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2127	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2128	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2129	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2130	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2131	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2132	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2133	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2134	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2135	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2136	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2137	Resistor	1,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33182
R2138	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2139	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2140	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2141	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2142	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2143	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2144	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2145	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2146	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2147	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2148	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2149	Resistor	10 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33103
R2150	Resistor	1,8 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33182
R2151	Resistor	8,2 Kohm	$\pm 5\%$	0.33W	Philips	2322 181 33822
T2101	Transistor				Philips	BC548B
T2102	Transistor				Philips	BC548B
T2103	Transistor				Philips	BC548B

<i>Symbol</i>	<i>Description</i>	<i>Manufact.</i>	
T2104	Transistor	Philips	BC548B
T2105	Transistor	Philips	BC328-25
T2106	Transistor	Philips	BC328-25
T2107	Transistor	Philips	BC328-25
T2108	Transistor	Philips	BC328-25
T2109	Transistor	Philips	BC328-25
T2110	Transistor	Philips	BC328-25
T2111	Transistor	Philips	BC328-25
T2112	Transistor	Philips	BC328-25
T2113	Transistor	Philips	BC328-25
T2114	Transistor	Philips	BC328-25
T2115	Transistor	Philips	BC328-25
T2116	Transistor	Philips	BC328-25
T2117	Transistor	Philips	BC328-25
T2118	Transistor	Philips	BC328-25
T2119	Transistor	Philips	BC328-25

<i>Symbol</i>	<i>Description</i>		<i>Manufact.</i>	
C2201	Capacitor electrolytic 10uF	35V	ERO	EKI 00 AA 210F
C2202	Capacitor electrolytic 10uF	35V	ERO	EKI 00 AA 210F
C2203	Capacitor electrolytic 10uF	35V	ERO	EKI 00 AA 210F
C2204	Capacitor electrolytic 10uF	35V	ERO	EKI 00 AA 210F
C2205	Capacitor ceramic 18pF	$\pm 5\%$ 50V	KCK	HE40SJPH180J
C2206	Capacitor MKT 220nF	$\pm 10\%$ 100V	Siemens	B32510-D1224-K
C2207	Capacitor ceramic 150pF	$\pm 5\%$ 50V	KCK	HE90SJPH151J
C2208	Capacitor MKT 220nF	$\pm 10\%$ 100V	Siemens	B32511-D1224-K
C2209	Capacitor ceramic 10nF	-20/+80% 50V	KCK	HE70SJYF103Z
C2210	Capacitor MKT 220nF	$\pm 10\%$ 100V	Siemens	B32511-D1224-K
C2211	Capacitor MKT 220nF	$\pm 10\%$ 100V	Siemens	B32511-D1224-K
C2212	Capacitor ceramic 10nF	-20/+80% 50V	KCK	HE70SJYF103Z
C2213	Capacitor ceramic 10nF	-20/+80% 50V	KCK	HE70SJYF103Z
C2214	Capacitor polyester 1uF	$\pm 10\%$ 63V	ERO	MKT1818
C2215	Capacitor MKT 10nF	$\pm 10\%$ 250V	Siemens	B32510-D3103-K
C2216	Capacitor MKT 10nF	$\pm 10\%$ 250V	Siemens	B32510-D3103-K
C2217	Capacitor MKT 10nF	$\pm 10\%$ 250V	Siemens	B32510-D3103-K
C2218	Capacitor MKT 10nF	$\pm 10\%$ 250V	Siemens	B32510-D3103-K
C2219	Capacitor MKT 10nF	$\pm 10\%$ 250V	Siemens	B32510-D3103-K
C2220	Capacitor MKT 10nF	$\pm 10\%$ 250V	Siemens	B32510-D3103-K
C2221	Capacitor MKT 10nF	$\pm 10\%$ 250V	Siemens	B32510-D3103-K
C2222	Capacitor MKT 10nF	$\pm 10\%$ 250V	Siemens	B32510-D3103-K
C2223	Capacitor MKT 220nF	$\pm 10\%$ 100V	Siemens	B32511-D1224-K
D2201	Diode silicon		ITT	1N4148
IC2201	Integrated circuit		Texas	7406N
IC2202	Integrated circuit		Texas	SN74LS374N
IC2203	Integrated circuit		National	MM74C374N
IC2204	Integrated circuit		Texas	SN74LS374N
IC2205	Integrated circuit		Texas	SN74LS374N
IC2206	Integrated circuit		Motorola	MC68705P3L
IC2207	Integrated circuit		Texas	SN74LS74AN
IC2208	Integrated circuit		Texas	SN75189AN
IC2209	Integrated circuit		Texas	SN75188N

Symbol	Description	Manufact.	
L2201	Coil 6,8uH $\pm 5\%$	NEOSID	006122 84
R2201	Resistor 8,2 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33822
R2202	Resistor 3,3 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33332
R2203	Resistor 470 ohm $\pm 5\%$ 0.33W	Philips	2322 181 33471
R2204	Resistor 330 ohm $\pm 5\%$ 0.33W	Philips	2322 181 33331
R2205	Resistor 18 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33183
R2206	Resistor 1,5 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33152
R2207	Resistor 6,8 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33682
R2208	Resistor 6,8 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33682
R2209	Resistor 6,8 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33682
R2210	Resistor 6,8 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33682
R2211	Resistor 6,8 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33682
R2212	Resistor 6,8 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33682
R2213	Resistor 12 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33123
R2214	Resistor 12 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 33123
R2215	Resistor 12 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 13123
R2216	Resistor 12 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 13123
R2217	Resistor 12 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 13123
R2218	Resistor 12 Kohm $\pm 5\%$ 0.33W	Philips	2322 181 13123
RE2201	Relay 15V DC	Siemens	V23040-A0003-B101
T2201	Transistor	Philips	BF199
T2202	Transistor	Motorola	2N2368
T2203	Transistor	Philips	BC328-25
T2204	Transistor	Philips	BC328-25
T2205	Transistor	Philips	BC328-25
T2206	Transistor	Philips	BC548B
T2207	Transistor	Philips	BC548B

<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>		
C2501	Capacitor polyester	100 nF	<u>+20%</u>	100V	Philips	2222 344 24104
C2502	Capacitor polyester	100 nF	<u>+20%</u>	100V	Philips	2222 344 24104
C2503	Capacitor polyester	10 nF	<u>+20%</u>	400V	Philips	2222 344 54103
C2504	Capacitor polyester	10 nF	<u>+20%</u>	400V	Philips	2222 344 54103
C2505	Capacitor electrolytic	47 uF	-10/+50%	63V	ERO	EB 00FC 247J
C2506	Capacitor electrolytic	10 uF	-10/+100%	40V	ERO	EB 00CA 210G
C2507	Capacitor polyester	100 nF	<u>+20%</u>	100V	Philips	2222 344 24104
C2508	Capacitor polyester	100 nF	<u>+20%</u>	100V	Philips	2222 344 24104
C2509	Capacitor polyester	100 nF	<u>+20%</u>	100V	Philips	2222 344 24104
C2510	Capacitor polycarbonate	1 uF	<u>+20%</u>	630V	ERO	KC1849 210/6
C2511	Capacitor polycarbonate	1 uF	<u>+20%</u>	630V	ERO	KC1849 210/6
C2512	Capacitor polyester	100 nF	<u>+20%</u>	100V	Philips	2222 344 24104
C2513	Capacitor polyester	10 nF	<u>+20%</u>	400V	Philips	2222 344 54103
C2514	Capacitor polyester	100 nF	<u>+20%</u>	100V	Philips	2222 344 24104
C2515	Capacitor polyester	100 nF	<u>+20%</u>	100V	Philips	2222 344 24104
C2516	Capacitor polyester	220 nF	<u>+20%</u>	100V	Philips	2222 344 24224
D2501	Diode zener	56V	<u>+5%</u>	1W	Motorola	MZP 4758A
L2501	Coil				S.P.	TL079
L2502	AF transformer				Tradania	2296
R2501	Resistor	22 kohm	<u>+5%</u>	0.33W	Philips	2322 211 13223
R2502	Resistor	220 ohm	<u>+5%</u>	1.6 W	Philips	2322 191 32201

<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>	
C2601	Capacitor polystyrene	470 pF $\pm 1\%$	630V	Philips	2222 427 44701
FP2601	Ferrite bead Grade	4B1		Philips	4322 020 34420
FP2602	Ferrite bead Grade			Kaschke	K3/1200/0.1 Hz 4/2/7A
FP2603	Ferrite bead Grade			Kaschke	K3/1200/0.1 Hz 4/2/7A
FP2604	Ferrite bead Grade			Kaschke	K3/1200/0.1 Hz 4/2/7A
FP2605	Ferrite bead Grade			Kaschke	K3/1200/0.1 Hz 4/2/7A
FP2606	Ferrite bead Grade			Kaschke	K3/1200/0.1 Hz 4/2/7A
FP2607	Ferrite bead Grade			Kaschke	K3/1200/0.1 Hz 4/2/7A
GL2601	Neon lamp			Siemens	B1C90-Q69 X151
IC2601	Integrated circuit	18V 1A		Motorola	MC7818CT
IC2602	Integrated circuit	5V 1A		Mototrla	MC7805CT
J2601	Aerial socket			K.V.Hansen	S0239
L2601	Coil			S.P.	TL294
LS2601	Loudspeaker	8 ohm		Vifa	S 6 FB 02-08
P2601	Power plug			Molex	03-06-2364
R2601	Resistor	3E3 ohm $\pm 5\%$	0.33W	Philips	2322 106 33338
R2607	Resistor Variable	10 kohm LOG		Noble	V24L5 (10x6.5)S (V12DV-S) 10K
T2601	Transistor			Motorola	BD241