Sailor

Sailor

INSTRUKTIONSBOG FOR SAILOR S1302

INSTRUCTION BOOK FOR SAILOR S1302

A/S S. P. RADIO · AALBORG · DENMARK

INSTRUCTION BOOK FOR EXCITER S1302

Valid from serial No. 261239

GENERAL DESCRIPTION

SAILOR S1302 is a telephony exciter for use in conjunction with the transmitter T1130.

SAILOR S1302 can be programmed for 240 channels free selected in the frequency range 1.6 - 8.5 MHz, 12, 16, 22 and 25 MHz maritime HF bands.

SAILOR S1302 can as option be supplied with two extra frequency bands in the frequency range 8.5 - 10.0 MHz and 11.5 - 28.0 MHz.

SAILOR S1302 channel programming is extremely easy and can be carried out with normal handtools.

SAILOR S1302 uses a digital synthesizer for frequency generation. The frequency stability depends on a 10 MHz TCXO.

SAILOR S1302 is capable of producing emission of classes A3H (H3E); A3A (R3E) and A3J (J3E).

SAILOR S1302 is provided with a built-in alarm signal generator for distress calls.

TECHNICAL DATA

The exciter S1302 produces USB signals on the channel frequency.

<u>Number of channels</u>: 240 channels free selected in the maritime MF and HF bands (resolution 100 Hz).

<u>Frequency range</u>: MF: 1.6 - 4.0 MHz
HF: 4.0 - 8.5 MHz and the maritime bands 12, 16, 22 and 25 MHz.

As option the frequency range can be extended by two extra frequency bands.

<u>Frequency stability</u>:

Temperature range $0^{o}C$ to $+40^{o}C$:	less than ± 1 ppm (± 25 Hz)
Long term stability:	less than ± 1 ppm (± 25 Hz) per year.
Short term stability:	less than ± 2 Hz.

A better frequency stability can be obtained as option.

<u>Mode of operation</u>: A3H (H3E), A3A (R3E) and A3J (J3E).

<u>Distress call</u>: Automatic A3H (H3E) on 2182 kHz.
Two-tone-alarm: 1300 and 2200 Hz with a duration of 45 secs.

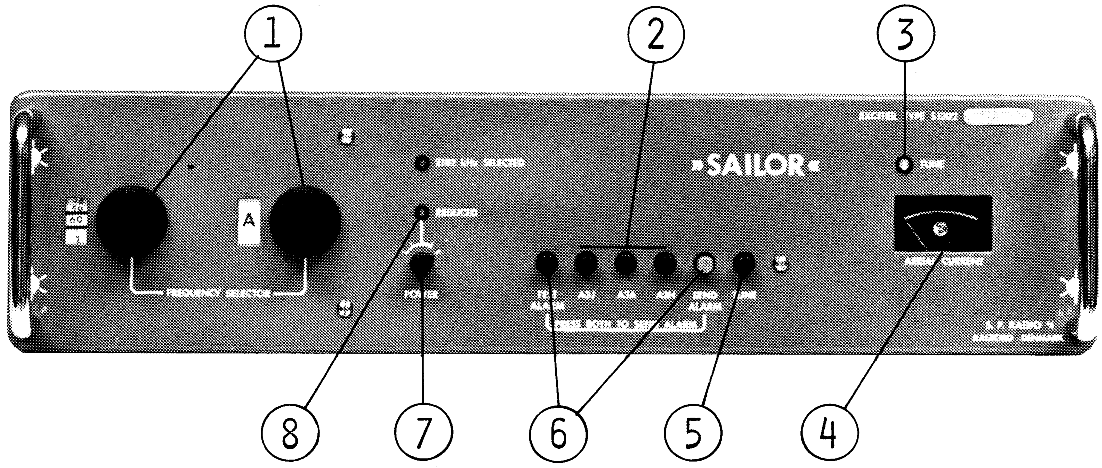
<u>Output power</u>: 50 mW PEP/50 ohm.

<u>Output power reduction</u>: four 5 dB steps.

<u>Modulation</u>: 350 - 2700 Hz with compressor.

<u>Operation temperature range</u>: $-15^{o}C$ to $+55^{o}C$.

CONTROLS



① FREQUENCY SELECTORS

By means of the frequency selectors, 240 pre-programmed frequencies can be selected in four groups A-B-C-D with 60 positions in each group.

② A3J (J3E), A3A (R3E) and A3H (H3E)

Select transmission mode A3J (J3E), A3A (R3E) or A3H (H3E).

③ TUNE *

During tune procedure a fixed light is seen. When the lamp turns off the transmitter is ready for use.
Is the lamp flashing at a slow regular rate the transmitter can be ready for use but with a SWR above 2, or the transmitter can be blocked.

④ AERIAL CURRENT

Shows the current at the aerial insulator of AT1500.

⑤ TUNE

Starts the automatic tune system of T1130 and AT1500.

⑥ TEST ALARM

Starts the two-tone-alarm signal generator. The signal can be heard in the microtelephone.

SEND ALARM/TEST ALARM

When SEND ALARM and TEST ALARM are activated simultaneously. The transmitter is keyed and transmits the two-tone-alarm signal.

⑦ POWER

Reduces the RF output in four 5 dB steps.

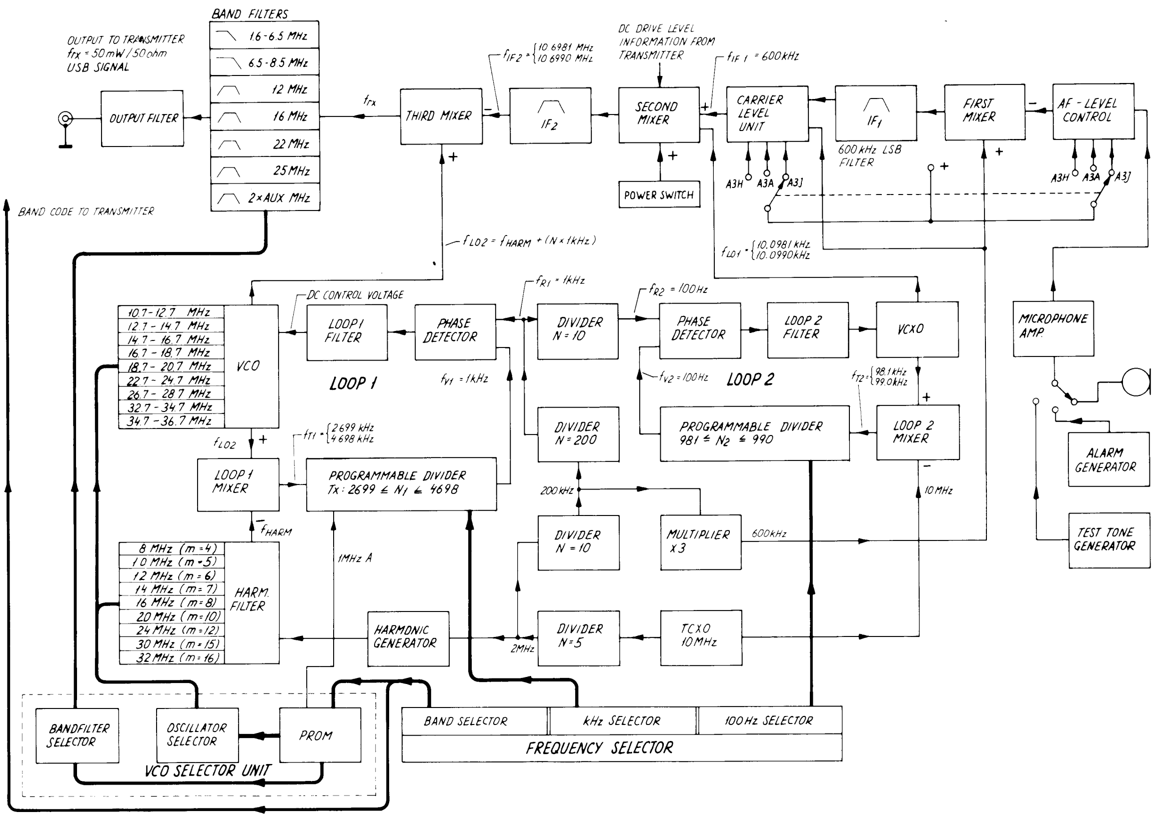
⑧ REDUCED

Is alight when the output power is reduced by the power switch.

* For further instruction see OPERATING INSTRUCTIONS FOR SAILOR PROGRAMME 1000/B

S1302 A3/1

PRINCIPLE OF OPERATION



EXCITER S1302

The SAILOR exciter S1302 is fully synthesized and delivers USB signals on the carrier frequency.

The signal from the microphone, the alarm generator or the test-tone generator is fed to the microphone amplifier, where the necessary amplification, amplitude limitation and filtering take place. The amplitude limitation is performed by a compressor stage, which regulates the amplification, so that the amplitude will always be kept below a certain max. level. The AF signal is fed via AF level control to the first mixer. The AF level control is determining the right AF level in the modes A3J (J3E), A3A (R3E) and A3H (H3E). The first mixer is a balanced modulator where a 600 kHz double sideband signal is generated. The DSB signal is then fed through the 600 kHz LSB crystal filter. The resulting lower sideband signal is fed to the carrier level unit.

In the carrier level unit reinsertion of 600 kHz carrier for A3A (R3E) and A3H (H3E) takes place. The 600 kHz signal is then passed on to the second mixer which also receives the local oscillator signal f_{LO1} from loop 2. The second mixer also receives a DC drive level information from T1130 which attenuate the output from the mixer to the wanted drive level. The output from the second mixer is an LSB signal f_{IF2} and it is passed through a crystal filter to the third mixer.

Third mixer is a double balanced mixer where both the local oscillator signal f_{LO2} and 2nd IF-signal f_{IF2} is suppressed. The output from the mixer is the carrier frequency f_{TX}, with the upper sideband. The band filter section serves the purpose of removing all undesired mixing products. The band filter output amplifier amplifies the signal to the wanted output level 50 mW PEP/50 ohm. From the amplifier the signal is fed through the output filter to the output terminal. The output filter removes the remnant of the 10.7 MHz IF signal in the output signal.

FREQUENCY GENERATION

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

Local oscillator signal f_{LO2} to third mixer is generated in the phase-locked loop 1 and has a resolution of 1 kHz.

Local oscillator signal f_{LO1} 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 frequencies in nine 2 MHz bands electronically selected by the band selector via the VCO selector unit. Inside each 2 MHz band the VCO frequency f_{LO2} can be varied by means of a DC control voltage from the phase-detector. The DC control voltage is filtered in the Loop 1 filter.

The phase-detector receives two signals, one variable frequency f_{V1} and one reference frequency f_{R1}. The reference frequency f_{R1} is a result of the 10 MHz TCXO frequency being divided down to 1 kHz.

The variable frequency f_{V1} is generated from the VCO frequency f_{LO2} in the following way:

In the Loop 1 mixer the counter frequency f_{T1} is produced from the VCO frequency f_{LO2} and the frequency f_{HARM} which is a multiple of 2 MHz. The 2 MHz signal is generated from the 10 MHz TCXO.

$$f_{T1} = f_{LO2} - f_{HARM} = f_{LO2} - (m \times 2\text{ MHz}) = N_1 \times 1\text{ kHz}$$

For every 2 MHz band a new f_{HARM} is selected of the band selector and it always results in a variation of 2 MHz of the frequency f_{T1} to the programmable divider.

The frequency f_{T1} is divided by the 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:

If there is a phase error between the variable frequency f_{V1} and the reference frequency f_{R1}, the regulation system has the characteristic that the DC control voltage will correct the VCO frequency and consequently the variable frequency f_{V1}, so that f_{V1} will always follow the reference frequency f_{R1} in phase

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

The VCO frequency f_{LO2} 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_{LO2} by e.g. 1 kHz can be performed by changing the dividing figure N_1 in the programmable divider by one.

$$f_{LO2} = f_{HARM} + (N_1 \times 1 \text{ kHz})$$

Principle of programming is as follows:

The programmable divider contains a counter circuit, which is 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 given to the phase detector, and the counter will start counting down again from the start figure $2000 + P_1$. Division of f_{T1} by N_1 has now been achieved

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

A special code from the band selector to the VCO selector unit selects the right 2 MHz band for the VCO and harmonic filter.

Inside each 2 MHz band the programmable figure P_1, is encoded by the MHz information from the VCO selector unit and the kHz frequency information in BCD-code representing the direct frequency reading of the 2 MHz band.

Start-figure: $2000 + P_1; \; 0 \leqq P_1 \leqq 1999$

Stop-figure: $S1 = -699$

$N_1 = 2000 + P_1 - S_1 = P_1 + 2699$

Output frequency from Loop 1:

$$f_{LO2} = m \times 2 \text{ MHz} + (P_1 + 2699) \times 1 \text{ kHz} \qquad 4 \leqq m \leqq 16$$

LOOP 2

Phase-locked Loop 2 has a frequency variation of 1 kHz with a resolution of 100 Hz and the working principle is the same as for phase-locked Loop 1.

Principle of programming is as follows:

The frequency shift in Loop 2 is controlled from the 100 Hz selector.

The programmable divider is counting up from the start-figure P_2 to the stop figure S_2.

The 100 Hz selector is encoding the start-figure P_2 in BCD-code to the programmable divider.

Start-figure : $0 \leqq P_2 \leqq 9$

Stop-figure : $S_2 = 990$

Dividing figure : $N_2 = S_2 - P_2 = 990 - P_2$

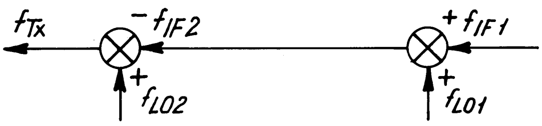
PRINCIPLE OF OPERATION cont.:

Output frequency from Loop 2:

f_{LO1} = 10 MHz + (N_2 x 0.1 kHz) = 10 MHz + ((990 - P_2) x 0.1 kHz);

f_{LO1} = 10,099 MHz - (P_2 x 0.1 kHz);

CARRIER FREQUENCY f_{TX} FROM EXCITER S130X (USB)



f_{IF1} = 0.600 MHz;

f_{LO1} = 10.099 MHz - (P_2 x 0.1 kHz);

f_{IF2} = f_{IF1} + f_{LO2} = 10.699 MHz - (P_2 x 0.1 kHz)

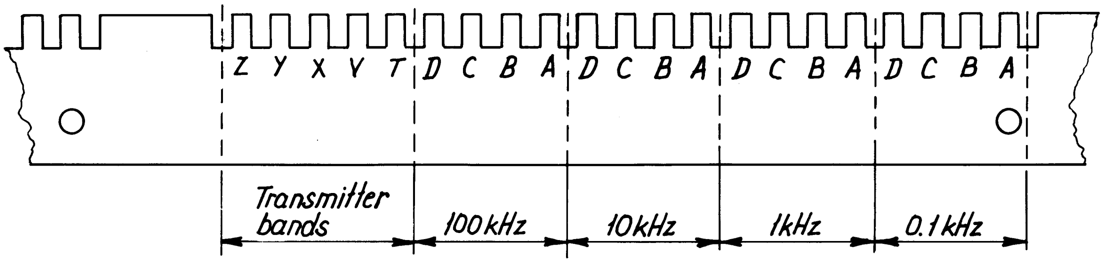
f_{LO2} = m x 2 MHz + (P_1 + 2699) x 1 kHz $4 \leqq m \leqq 16$

f_{TX} = f_{LO2} - f_{IF2} = (m - 4) x 2 MHz + (P_1 + (0.1 x P_2)) x 1 kHz

FREQUENCY PROGRAMMING

PROGRAMMING OF CARRIER FREQUENCIES

The programming strip is carrying the information for the frequency synthesizer and for selecting one of the 30 transmitter bands.



The programming strip has 21 bits. The drawing of the programming strip shows where the information for the transmitter bands, 100 kHz, 10 kHz, 1 kHz and 0.1 kHz are located.

HOW TO PROGRAMME A CARRIER FREQUENCY

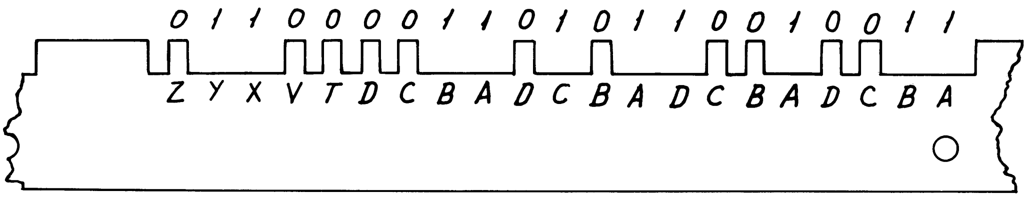
Find the frequency range in the programming table and read directly the programming of the transmitter band code. For 100 kHz, 10 kHz, 1 kHz and 0.1 kHz the decimal number for each decade must be converted to a 4-bit BCD code. Use convertion table from decimal to BCD.

Convertion table

Decimal	BCD DCBA
0	0000
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000
9	1001

Programming example: Binary "1": Cut the bit off with a nipper.

Carrier frequency 12359.3 kHz.



FREQUENCY PROGRAMMING cont.:

PROGRAMMING TABLE

Carrier Frequencies kHz	Programming code				
	ZYXVT	100 kHz DCBA	10 kHz DCDA	1 kHz DCDA	0.1 kHz DCBA
1600.0 to 1799.9	10110				
1800.0 to 1999.9	10001				
2000.0 to 2199.9	01000				
2200.0 to 2399.9	00001				
2400.0 to 2599.9	00011				
2600.0 to 2799.9	00100				
2800.0 to 2999.9	00101				
3000.0 to 3099.9	10010				
3100.0 to 3399.9	10011				
3400.0 to 3699.9	10100				
3700.0 to 3999.9	10101				
4000.0 to 4299.9	00110				
4300.0 to 4599.9	00111				
4600.0 to 4999.9	00010				
5000.0 to 5499.9	11011				
5500.0 to 5999.9	10111				
6000.0 to 6399.9	01001				
6400.0 to 6999.9	01010				
7000.0 to 7599.9	11000				
7600.0 to 7999.9	11001				
8000.0 to 8499.9	01011				
12300.0 to 12699.9	01100				
16400.0 to 16899.9	01101				
22000.0 to 22399.9	01110				
25000.0 to 25199.9	11010				
2182 kHz	10000	0001	1000	0010	0000
Extra	01111				
Extra	11100				
Extra	11101				
Extra	11110				
Block	00000				
Block	11111				

S1302 A5/2

SERVICE

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

1. MAINTENANCE

1.1.
When the SAILOR SHORT WAVE PROGRAMME 1000/B has been correctly installed, the maintenance can, depending on the environment and working hours, be reduced to a performance check at the service workshop at intervals not exceding 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.

51 302/03/04 A//1

2. NECESSARY TEST EQUIPMENT

TX: T1127, T1127L, T1130
EXC: S1300, S1301, S1302, S1303, S1304
RX: R1119, R1120
PS: N1400, N1401, N1407, N1409

TX	EXC	RX	PS	Equipment	Specification	Value
X	X	X	X	OSCILLOSCOPE:		
					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		PASSIVE PROBE:		
					Attenuation	20 dB (10X)
					Input resistance	10 Mohm
					Input capacitance	15 pF
					Compensation range	10 - 30 pF
					E.g. PHILIPS type	PM8925
	X	X		MULTIMETER:		
					Sensitivity DC (f.s.d.)	1V
					Input impedance	10 Mohm
					Accuracy (f.s.d.)	±2%
					E.g. PHILIPS type	PM2505
X			X	MULTIMETER:		
					Sensitivity DC (f.s.d.)	0.3V & 3A
					Input impedance	30 kohm/V
					Accuracy (f.s.d.)	±1%
					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		TONE GENERATOR:		
					Frequency range	200 - 3000 Hz
					Output voltage	1V RMS
					Output impedance	600 ohm
					E.g. PHILIPS type	PM5107

S1302/03/04 A7/2

NECESSARY TEST EQUIPMENT cont.:

TX	EXC	RX	PS	Equipment	
		X		**AF VOLTMETER:**	
				Sensitivity (f.s.d.)	300 mV
				Input impedance	4 ohm
				Accuracy (f.s.d.)	±5%
				Frequency range	100 - 3000 Hz
				E.g. PHILIPS type	PM2505
	X	X		**FREQUENCY COUNTER:**	
				Frequency range	100 Hz - 30 MHz
				Resolution	0.1 Hz at f 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		**SIGNAL GENERATOR:**	
				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	PM5326
X			X	**POWER SUPPLIES:**	
				N1400/T1127, N1407/T1130	
				V_{out}	26.5V DC
				I_{out} N1400/T1127	70A DC
				I_{out} N1407/T1130	35A DC
				E.g. 2 pcs. LAMBDA type (N1400/T1127)	LXS-G-24-OV-R
				1 pc. LAMBDA type (N1407/T1130)	LXS-G-24-OV-R
	X			**POWER SUPPLIES:**	
				S1300, S1301	
				V_{out} 1	22V
				I_{out} 1	1.5A
				V_{out} 2	-45V
				I_{out} 2	-0.1A
				E.g. SAILOR types	N1402 N1402 spec. N1405

NECESSARY TEST EQUIPMENT cont.:

TX	EXC	RX	PS		
	X	X		R1119, R1120; S1302, S1303, S1304	
				Vout 1	22V
				Iout 1	1A
				Vout 2	8V
				Iout 2	1A
				Vout 3	-45V
				Iout 3	-0.1A
				E.g. SAILOR types	N1402 spec. N1405
	X			TEST BOX S1300/S1301:	
				S.P. type	S1300/01 Test box
	X			ARTIFICIAL KEY S1300TT/S1301:	
				S.P. type	Artificial key
	X			TEST BOX S1302/S1303/S1304:	
				S.P. type	S1302/03/04 Test box
	X			ARTIFICIAL KEY S1303/04:	
				S. P. type	Artificial key S1303/S1304
X				POWER METER:	
				Power range T1127	500W
				Power range T1130	250W
				Impedance	50 ohm
				E.g. Bird Thruline Wattmeter	Model 43
				Plug-in element T1127	500W 2-30 MHz
				Plug-in element T1130	250W 2-30 MHz
X				RF AMMETER (Thermocross):	
				Current range	5A
				E.g. Helweg Mikkelsen & Co. Copenhagen, Denmark type	TR-68x71, 5A
	X			DUMMY LOAD:	
				Impedance	50 ohm
				Frequency range	0-30 MHz
				Power range	
				E.g. Fixed resistor 2 pcs. in parallel PHILIPS type	2322 212 13101

S1302/03/04 A7/4

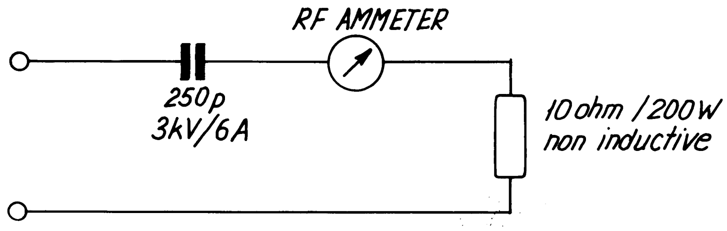
NECESSARY TEST EQUIPMENT cont.:

TX	EXC	RX	PS	Equipment
X	X			DUMMY LOAD for HF bands, 4 - 25 MHz
X				DUMMY LOAD for C.T. band 1.6 - 4 MHz

DUMMY LOAD for HF bands, 4 - 25 MHz:

Impedance	50 ohm
Frequency range	4 - 25 MHz
Power range	400W
SWR	1:1.2
E.g. Bird Termaline Coaxial Resistor	Model 8401

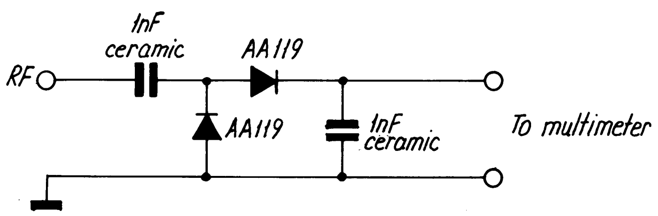
DUMMY LOAD for C.T. band 1.6 - 4 MHz:



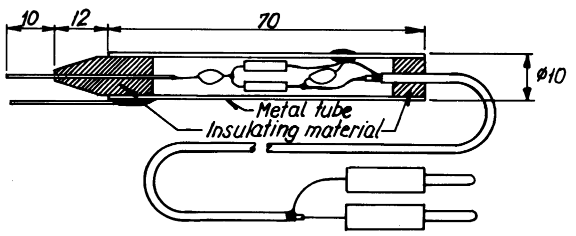
E.g. Draloric type 06-1291TD 20x50L 8KVs 250 pF ±20% R85

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

DIODE PROBE

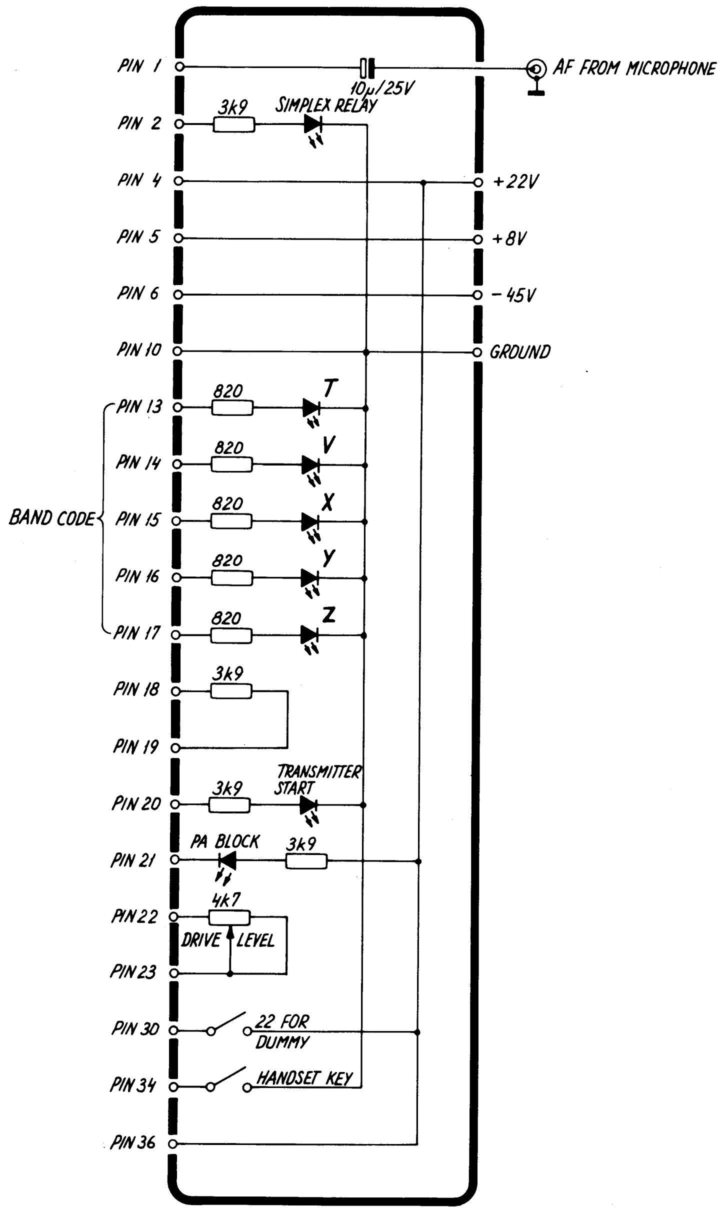


LAYOUT OF THE PROBE



NECESSARY TEST EQUIPMENT cont.:

SCEMATIC DIAGRAM FOR TESTBOX S1302/03/04



S 13o2

TVXYZ: The diodes are alight according to the chosen bandcode.

TRANSMITTER START: The diode is alight when handset key is activated, when TUNE and in SEND ALARM.
In S1303/04 the diode is alight in TELEX and in TELEGRAPHY.

PA BLOCK: The diode is alight when dummy and 2182 kHz is chosen at the same time and the diode will flash once when dummy load is chosen.

SIMPLEX RELAY: The diode is alight when TUNE is activated in 2182 kHz + handset key is on, and in SEND ALARM.

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.

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. This section contains schematic diagrams, description of the modules and pictures showing the location of the 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 a module look up the section NECESSARY ADJUSTMENTS AFTER REPAIR to see, whether the unit has to be adjusted or not.

The unit has to have a complete FUNCTION CHECK after repair.

S1302/03/04 A8/1

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".
   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 IC106, pin 1 is 1 kHz.

3. Check the Loop 1 programmable divider.
   a. If the frequency on the input terminal "Loop 1 in" is approx. 2 MHz and the frequency on the phase/frequency detector IC106, pin 3 is lower than 1 kHz, the programmable divider is apparently ok.
   b. If the frequency on the input terminal "Loop 1 in" is approx. 5 MHz and the frequency on the phase/frequency detector IC106, pin 3 is higher than 1 kHz, the programmable divider is apparently ok.

4. Check the phase/frequency detector IC106.
   a. Measure 1.5V DC on the terminal "PD1 (1.5V) out" on divider unit.
   b. If the input frequency on IC106, pin 3 is higher than 1 kHz and the DC voltage on the terminal "PD1 out" on divider unit is approx. 0.7V, the phase/frequency detector is apparently ok.
   c. If the input frequency on IC106, pin 3 is lower than 1 kHz and the DC voltage on the terminal "PD1 out" on divider unit is approx. 2.3V, the phase/frequency detector is apparently ok.

5. Check the integrator IC202 on Loop 1 filter & ±18V supply unit.
   a. If the DC voltage on the terminal "PD1 in" is approx. 0.7V and the DC voltage on output terminal of IC202, pin 6 is approx. -4V, the integrator IC202 is apparently ok.
   b. If the DC voltage on the terminal "PD1" is approx. 2.3V and the DC voltage on the output terminal of IC202, pin 6 is approx. -17V, the integrator IC202 is apparently ok.

6. If the failure has not been found yet the 1 kHz loop filter IC201 and the wirings to the VCO must be checked.

SI 302/03/04 A8/2

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 VCXO and Loop 2 filter on the terminal "VCXO out", the failure has to be found in the VCXO.

If the output frequency from the VCXO and Loop 2 filter on the terminal "VCXO out" is lower than 10.098 MHz or higher than 10.099 MHz, the phase-locked Loop 2 is out of lock.

1. Check the output signal on VCXO and Loop 2 filter terminal "Loop 2 out".
   a. If there is no output signal, the failure is in the Loop 2 mixer or the 10 MHz injection signal is missing.
   b. If the output frequency is slightly lower than 98 kHz or slightly higher than 99 kHz, the VCXO, Loop 2 mixer and the 10 MHz injection signal are apparently ok.

2. Check that the frequency on the phase/frequency detector IC113, pin 1 is 100 Hz.

3. Check the Loop 2 programmable divider.
   a. If the frequency on the input terminal "Loop 2 in" is approx. 97 kHz and the frequency on the phase/frequency detector IC113, pin 3 is slightly lower than 100 Hz, the programmable divider is apparently ok.
   b. If the frequency on the input terminal "Loop 2 in" is approx. 100 kHz and the frequency on the phase/frequency detector IC113, pin 3 is slightly higher than 100 Hz, the programmable divider is apparently ok.

4. Check the phase/frequency detector IC113.
   a. Measure 1.5V DC on the terminal "PD2 (1.5V)" on the divider unit.
   b. If the input frequency on IC113, pin 3 is lower than 100 Hz and the DC voltage on the terminal "PD2 out" on divider unit is approx. 0.7V, the phase/frequency detector is apparently ok.
   c. If the input voltage on IC113 is higher than 100 Hz and the DC voltage on the terminal "PD2 out" on divider unit is approx. 2.3V the phase/frequency is apparently ok.

5. Check the integrator IC601 on VCXO and Loop 2 filter.
   a. If the DC voltage on the terminal "PD2 in" is approx. 0.7V and the DC voltage on output terminal of IC601, pin 6 is approx. 17V, the integrator IC601 is apparently ok.
   b. If the DC voltage on the terminal "PD2 in" is approx. 2.3V and the DC voltage on the output terminal of IC601, pin 6 is approx. 1V, the integrator IC601 is apparently ok.

6. If the failure has not yet been found the 100 Hz loop filter must be checked.

ST302/03/04 A8/3

4. PERFORMANCE CHECK FOR S1302

Before executing a performance check the exciter must be connected to power supplies +22V, +8V and -45V via the testbox S1302/03/04. The RF output connector shall be loaded with 50 ohm.

For the necessary frequency codes the supplied set of programming strips for test purpose must be mounted in the frequency selector, in position 1 to 18 corresponding to the numbers printed on the programming strips.

It is necessary to change the PROM IC702 with the supplied test prom.

4.1.
DC CONTROL

4.1.1.
Connect voltmeter to TP1.

4.1.2.
Check the voltage to be within 18V ±0.2V.

4.1.3.
Connect voltmeter to TP2.

4.1.4.
Check the voltage to be within -18V ±0.2V.

4.1.5.
Connect voltmeter between TP1 and TP3.

4.1.6.
Check the voltage to be less than 100 mV.

4.1.7.
Connect voltmeter to TP31.

4.1.8.
Check the voltage to be within 5V ±0.2V.

4.1.9.
Connect frequency counter to TP4.

4.1.10.
Check the frequency to be within 10 000 000 Hz ±1 Hz.

4.2.
VCO SELECTOR:
The band select output code is controlled.

4.2.1.
Set the frequency selector to 1A.

4.2.2.
Check that the diodes on the testbox indicate the code

X Y X V Z
0 1 0 1 0

where a "1" represents a lighting diode.

4.2.3.
Set the frequency selector to 9A.

4.2.3.
Check that the diodes on the testbox indicate the code

Z Y X V Z
1 0 1 0 1

where a "1" represents a lighting diode.

4.2.4.
Set the frequency selector to 5D.

4.2.5.
Check that the 2182 kHz lamp is alight.

4.2.6.
Activate the 22V for dummy switch on the testbox.

4.2.7.
Check that the 2182 kHz lamp is not alight

4.2.8.
Release the 22V for dummy switch again.

4.3.
HARMONIC FILTER AND VCO
Load TP26 with 68 ohm.

4.3.1.
Connect frequency counter to TP30.

4.3.2.
Connect voltmeter to TP6.

4.3.3.
Connect voltmeter to TP7.

In the positions 6A to 10B (both incl.) check the above mentioned test points.

ad. 4.3.1. In the positions A and C: 4698 kHz and in the positions B and D: 2699 kHz.

ad. 4.3.2. In all positions below 3.5V.

ad. 4.3.3. In the positions A and C: 15V ±1V and in the positions B and D: above 5V.

Disconnect 68 ohm load on TP26.

4.4.
STEP RESPONSE

4.4.1.
Connect oscilloscope to TP7.

4.4.2.
In position 2D short-circuit black/yellow control wire on divider board to ground. Step response is seen on oscilloscope, compare to fig. 2.

4.4.3.
Connect oscilloscope to TP8.

4.4.4.
In position 2D short-circuit grey control wire on divider board to ground. Step response is seen on oscilloscope compare to fig. 3.

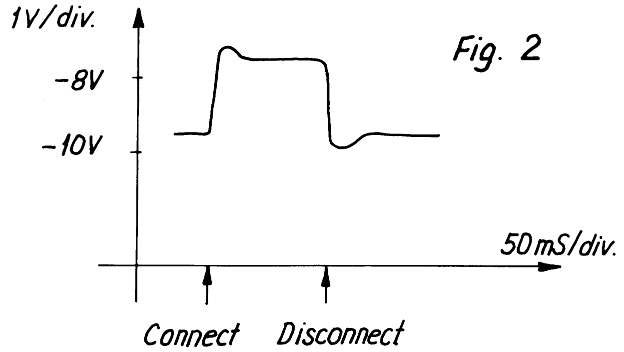


Fig. 2

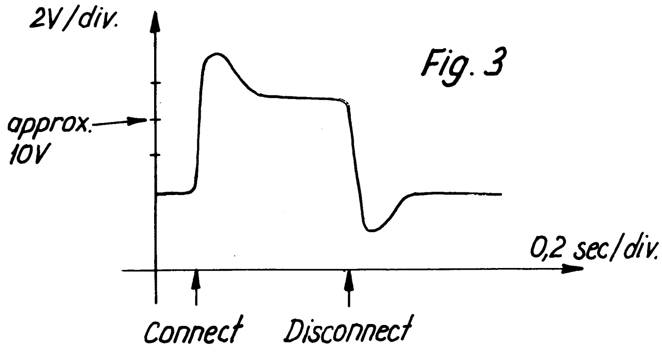


Fig. 3

4.5.
LEVEL CHECK

4.5.1.
Connect oscilloscope to TP29 via 1:10 probe.

4.5.2.
Check the voltage to be above 1.7V pp. in position 1A.

4.5.3.
Connect oscilloscope to TP27 via 1:10 probe.

4.5.4.
Check the voltage to be above 1.6V pp. in position 1A.

4.5.5.
Connect oscilloscope to TP28 via 1:10 probe.

4.5.6.
Check the voltage to be above 2.5V pp. in position 1A.

4.5.7.
Connect voltmeter to TP8.

4.5.8.
Check the voltage to be within 6V to 11V in position 1A.

4.5.9.
Check the voltages to be below 14.5V in position 1B.

4.5.10.
Check the voltage to be above 4V in position 1C.

4.6.
MICROPHONE AMPLIFIER

4.6.1.
Connect oscilloscope to TP12.

4.6.2.
Set the frequency selector to 1A and the mode switch to A3J (J3E), connect the tone generator (1000 Hz) to the testbox.

4.6.3.
Adjust the tone generator output voltage from a minimum, until the level at TP12 is just constant. This limitation shall happen at approx. 300 mVpp measured at TP25.

4.6.4.
Add 10 dB to tone generator (1 Vpp) and check that the measured signal is approx. symmetrical clipped.

4.6.5.
The attack- and decay time of the microphone amplifier is measured on TP24, connect the oscilloscope to this TP.

4.6.6.
By connection and disconnection of the tone generator signal the measured voltage shall be as shown on fig. 4a and b.

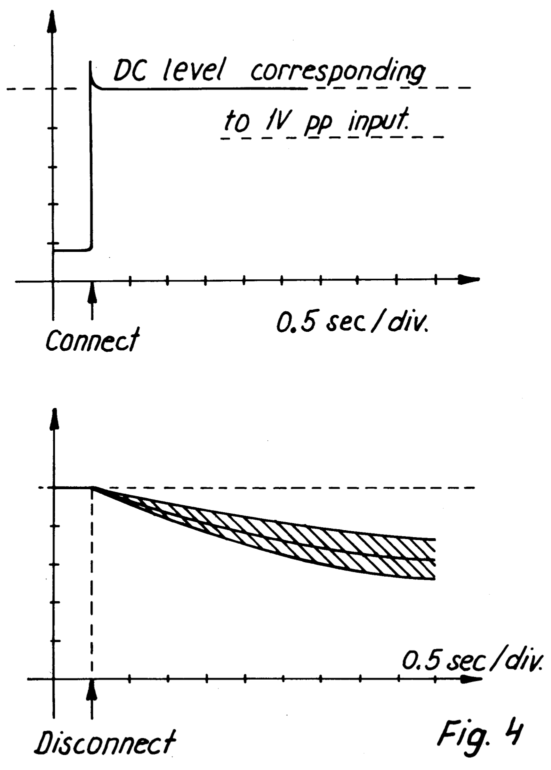


Fig. 4

4.7.
OUTPUT LEVEL

4.7.1.
Connect oscilloscope to TP21 via 1:10 probe.

4.7.2.
With frequency selector in position 1A, TUNE, full power and power level potentiometer fully clockwise.
Measure the output voltage to be within 4.2V pp. and 4.8V pp.

4.7.3.
With the TUNE button activated, control that the tune lamp on the frontplate is alight, and that the SIMPLEX RELAY lamp on the testbox is alight.

4.8.
POWER REDUCTION

4.8.1.
Connect diode probe to TP21.

4.8.2.
With frequency selector in position 1A, A3H (H3E), full power, and activated key, check that the power level potentiometer on the testbox can change the output RF level between 10 and 13 dB.

4.8.3.
With power level potentiometer on the testbox fully clockwise, check the first power reduction step to be between 4 dB and 6 dB below full power, the second step 8 dB to 12 dB, the third step 12 dB to 18 dB and the fourth step 17 dB to 23 dB below full power.

4.8.4.
Check that the power reduction lamp is alight when the output power is reduced.

4.9.
A3H (H3E) and A3A (R3E).

4.9.1.
Connect oscilloscope to TP21 via 1:10 probe.

4.9.2.
With the frequency select in position 1A, tune and full power, adjust power level potentiometer until there is full deflection (8 cm) on oscilloscope screen.

4.9.3.
Change to A3H (H3E) without modulation. Check A3H (H3E) carrier, now seen, to be within 4 cm and 5 cm.

4.9.4.
Change to A3A (R3E), without modulation. Check A3A (R3E) carrier now seen, to be within 1.0 cm and 1.4 cm.

4.9.5.
Connect tone generator, 1000 Hz and 1V pp. to the testbox.

4.9.6.
Check the output in A3H (H3E), A3A (R3E) and A3J (J3E) to be within 7 cm pp. and 8 cm pp. on oscilloscope. Control in the A3J (J3E) mode that the RF signal seen on the oscilloscope is without modulation.

4.10.
BANDPASS FILTER UNIT
Lowpass filters and bandpass filters are checked as described in adjustment procedure 5.10.

4.11.
ALARMTONE GENERATOR

4.11.1.
Connect oscilloscope to TP22 via 1:10 probe.

4.11.2.
Activate the alarm test button. On the oscilloscope is a 5.0 Vpp square wave seen. Control that the frequency is 2.0 Hz (500 msec).

4.11.3.
Connect oscilloscope to TP11 via a 1:10 probe.

4.11.4.
Activate the alarm test button.
Control that a voltage of 22V DC with a 1.2 Vpp square wave is seen on the scope.

4.11.5.
Connect the counter to TP11 via 1:10 probe.

4.11.6.
Connect TP22 to ground (pin 8 of IC1308). Check the frequency to be 1300 Hz ±10 Hz.

4.11.7.
Connect TP22 to +5V DC (pin 14 of IC1304) Check the frequency to be 2200 Hz ±15 Hz.

Under the performance check the alarmtone generator will stop after 45 secs. For restart, release test alarm push button and activate it again.

4.12.
FREQUENCY RESPONSE
Frequency responses from LF input (on testbox) to the RF output is measured as described in adjustment procedure 5.8.1. and 5.8.3.

4.13.
DISTRESS

4.13.1.
Connect the oscilloscope to TP21. Switch the frequency selector to 5D.

4.13.2.
Press alarm and test alarm at the same time.

4.13.3.
The distress signal can now be seen on the oscilloscope.
The time from start of alarm signal until it automatically disappears is checked by a watch to be approx. 45 secs. Control that the modulation index is at least 0.7

4.13.4.
When the alarm tone signal is seen on the oscilloscope press the tune button and check that the peak to peak voltage now seen is approx. the same as that of the alarm tone signal.

4.14.
FREQUENCY SELECTION

4.14.1.
Change the PROM IC702 from the TEST PROM to the PROM supplied with the exciter.

4.14.2.
Press the A3H (H3E) button and disconnect the AF tone generator on the testbox.

4.14.3.
Connect the frequency counter to TP21 via a 1:10 probe.

4.14.4.
With the frequency selector in the positions shown below control the frequencies.

FREQ.SELECT	FREQ. (MHz)
3A	2,888.8
3B	4,444.4
3C	12,222.2
3D	22,300.0
4A	2,300.0
4D	1,111.1
5A	7,300.0
5C	25,400.0
6A	5,999.0
7A	16,999.0

4.14.5.
Connect the oscilloscope to TP21 and switch the frequency selector to 4A.

4.14.6.
Control that the diode 2182 kHz SELECTED is alight.

4.14.7.
Turn the POWER REDUCTION button counter clockwise and control by the oscilloscope that the power is not reduced and that the power reduction lamp is not alight.

S1302 A9/5

5. ADJUSTMENT PROCEDURE FOR S1302

Before executing adjustment procedure the exciter must be connected to power supplies +22V, +8V and -45V via the testbox S1302/03/04. The RF output connector shall be loaded with 50 ohm.

For the necessary frequency codes the supplied set of programming strips for test purpose must be mounted in the frequency selector, in position 1 to 18 corresponding to the numbers printed on the programming strips.

It is necessary to change the PROM IC702 with the supplied test prom.

The following adjustment steps starts with the selected channel (Frequency) and the selected operation mode of the exciter, e.g. 1A, tune.

The trimming cores are factory sealed. In order to break the seal, use normal cellulose thinner.

5.1.
DC ADJUSTMENTS

5.1.1.
Connect voltmeter to TP1.

5.1.2.
Adjust R902 to +18V.

5.1.3.
Connect voltmeter to TP2.

5.1.4.
Adjust R209 to -18V.

5.1.5.
Connect voltmeter between TP1 and TP3.

5.1.6.
Adjust R214 to less than 100 mV.

5.2.
TCXO

5.2.1.
Connect frequency counter to TP4.

5.2.2.
Adjust R112 to 10 000 000 ±1 Hz.

5.3.
HARMONIC FILTERS

5.3.1.
Load TP26 with 68 ohm.

5.3.2.
Connect voltmeter to TP7.

5.3.3.
Turn core of each coil to the level of the coilformer.

5.3.4.
Select each harmonic filter by turning the frequency selectors to the positions specified in 5.3.11.

5.3.5.
The harmonic filters are adjusted by turning the core of the selected coil until the voltage reaches the value -15V ±1V.

5.3.6.
Connect voltmeter to TP6.

5.3.7.
Execute 5.11.4. and adjust each selected coil to minimum voltage (AGC-voltage). This voltage shall be 1.5V ±0.5V.

5.3.8.
Connect voltmeter to TP7.

5.3.9.
Execute 5.11.4. and check that the voltage is -15V ±1V.

5.3.10.
Disconnect 68 ohm load.

5.3.11.

f_{TX}(MHz)	Pos.	Selected harmonic filter (MHz)	
1.999	6A	8	L403
3.999	6C	10	L402
5.999	7A	12	L401
7.999	7C	14	L404
9.999	8A	16	L405
13.999	8C	20	L406
17.999	9A	24	L407
23.999	9C	30	L409
25.999	10A	32	L408

5.4.
MICROPHONE AMPLIFIER

5.4.1.
1A, A3J (J3E). Connect tone generator, 1000 Hz and 300 mV pp. measured on TP25.

5.4.2.
Connect oscilloscope to TP12.

5.4.3.
Turn R1201 fully counter clockwise, and then clockwise until the measured level is just constant.

5.4.4.
Add 10 dB to tone generator output 1V pp.

5.4.5.
Adjust R1224 for symmetrical clipping.

5.4.6.
Connect oscilloscope to TP13.

5.4.7.
Change to tune position.

5.4.8.
Adjust R1232 to 80 mV pp.

5.5.
SIGNAL PATH

5.5.1.
1A, A3J (J3E), handset key on, with no input from tone generator. Connect oscilloscope to TP9 via 1:10 probe.

5.5.2.
Adjust L101, L1101 and L1102 for max.

5.5.3.
Adjust R1125 and C1123 for min. This adjustment shall be repeated until the measured signal is almost a 1.2 MHz Sine.

5.5.4.
Turn power level potentiometer fully clockwise.

5.5.5.
Connect oscilloscope to TP23 via 1:10 probe.

5.5.6.
Adjust R1625 to min.

5.5.7.
1A, tune full power. Connect oscilloscope to TP21 via 1:10 probe. If the signal is clipped reduce output until it is undistorted.

5.5.8.
Adjust L1106, L601, L1603 and L1604 for max.

5.5.9.
Connect oscilloscope to TP6 via 1:10 probe.

5.5.10.
Turn R1149 fully clockwise.

5.5.11.
Adjust R1158 until there is full deflection (8 cm) on oscilloscope screen. The signal seen on the oscilloscope is symmetrical clipped.

5.5.12.
Adjust R1149 until the deflection seen on the oscilloscope is 7 cm. The signal seen is not clipped.

5.5.13.
Connect oscilloscope to TP17 via 1:10 probe and set the output to max. by turning the power level meter fully clockwise.

5.5.14.
Adjust R1158 to 350 mVpp.

5.5.15.
Connect oscilloscope to TP20 via 1:10 probe.

5.5.16.
Adjust R1631 to 2.8 Vpp.

S1302 A10/2

5.5.17.
Connect oscilloscope to TP21 via 1:10 probe.

5.5.18.
Adjust R1534 to 4.5 Vpp.

5.5.19 USA version only.
Connect oscilloscope to TP20 via 1:10 probe.

5.5.20. USA version only.
Adjust R1631 to 1.4 Vpp.

5.5.21. USA version only.
Connect oscilloscope to TP21 via 1:10 probe.

5.5.22. USA version only.
Adjust R1534 to 4.5 Vpp.

5.6.
A3H CARRIER

5.6.1.
1A, tune and full power. Connect oscilloscope to TP21 via 1:10 probe.

5.6.2.
Adjust power level potentiometer to full screen (8 cm).

5.6.3.
Change to A3H (H3E) without modulation. Adjust the A3H (H3E) carrier now seen to 4.4 cm with R1109.

5.7.
ALARM GENERATOR
No adjustments to be executed. For a performance check execute point 4.11. and 4.13.

——— " ———

The following filter adjustments shall only be carried out when some repair is done around a filter.

5.8.
600 kHz SSB FILTER

5.8.1.
1A, tune. Connect oscilloscope to TP21 via 1:10 probe.

5.8.2.
Adjust L1104 and L1105 for max.

5.8.3.
Control of filter response is carried out in mode A3J (J3E), with tone generator connected to the test box, output 1V pp measured on TP25.

Frequency response is measured with diode probe on TP21. Max. permissible ripple is 2 dB in the frequency range 500 Hz - 2500 Hz, -6 dB frequencies is approx. 350 Hz and 2700 Hz.

5.8.4.
1A, TUNE. Turn the power level potentiometer fully clockwise. Go through 5.5.9. 5.5.22. and 5.6.1. - 5.6.3.

5.9.
10.7 MHz FILTER

5.9.1.
18B, A3H (H3E) without modulation. Disconnect innercore of coaxial cable W1/6-16. (1)

5.9.2.
Connect point (1) to point (5) on mixerboard with an external wire.

5.9.3.
Connect oscilloscope to TP19 via 1:10 probe.

5.9.4.
Adjust L1601 and L1602 to max.

5.9.5.
Adjust slightly L1601 and/or L1602 until the amplitude is the same within ± 0.25 dB, in the positions 18A, 18B and 18C.

5.9.6.
Remove wire between (1) and (5), reconnect W1/6-16.

5.9.7.
1A, tune. Turn the power level potentiometer fully clockwise. Go through 5.5.7. to 5.5.8. without the adjustment of L1106 and L601, and go through 5.5.13. - 5.5.22.

5.10.
LOWPASS FILTER AND BANDPASS FILTER UNIT

5.10.1.
7B, A3H (H3E) without modulation. Disconnect the 50 ohm load at the RF output terminal and connect an oscilloscope to TP21 via a 1:1 probe.

5.10.2.
Disconnect the innercore of coaxial cable W1/15-16. Connect the innercore of coaxial cable W1/3-16 (the VCO-signal) to the point where the innercore W1/15-16 was connected.

5.10.3.
Disconnect the yellow/black and the brown/black wire on the divider unit.

5.10.4.
With max. sensitivity on the oscilloscope adjust L1501 to min. output voltage.

5.10.5.
Set the frequency selector to 8A and reconnect the brown/black and the yellow/black wires on the divider unit.

5.10.6.
Connect on bandfilter board point (3) to point (4), by an external wire.

5.10.7.
Adjust L1502 to min. output voltage.

5.10.8.
Remove wire between point (3) and (4) and reconnect the wires W1/15-16 and W1/3-16.

5.10.9.
12C, A3H (H3E) without modulation.

5.10.10.
Adjust L1503 to max. output voltage.

5.10.11.
13C, A3H (H3E) without modulation.

5.10.12.
Adjust L1504 to max. output voltage.

5.10.13.
Reconnect the 50 ohm load at the RF output terminal.

5.10.14.
2C, A3H (H3E) without modulation, connect diode probe to TP21.

5.10.15.
Adjust power level potentiometer until 0.775V, corresponding to 0 dB on the decibel scale, is attained.
Set the frequency selector to 2D, 3A, B,C and D and control that the output difference does not exceed 0.6 dB.

5.10.16.
8B, A3H (H3E) without modulation. Connect on bandfilter unit point (3) and (4) with a wire.

5.10.17.
Control that the output voltage is position 8B is between -1 dB and +0.5 dB with reference to the adjustment in 5.10.15.

5.10.18.
Set the frequency selector to 8A and ground the yellow/brown wire on the divider board. Control that the output difference does not exceed 0.5 dB with reference to position 8B.

5.10.19.
Disconnect the wire between point (3) and (4) on the bandfilter board and remove the ground of the yellow/brown wire on the divider board.

5.10.20.
14A/B/C, 15A/B/C, 16A/B/C and 17A/B/C, A3H (H3E) without modulation.

5.10.21.
The frequencies for the bandpass filter adjustments is chosen so that the center frequency is in position B, and band limits in position A and C.
Every single bandpass filter shall be adjusted to max. output. The output must be within ±0.25 dB in A and C relative to B and the deflection on the centerfrequency position B, shall be between -1.0 dB and +0.5 dB with reference to the adjustment in 5.10.15.
The test frequencies for the bandpass filters is arranged as follows pos. 14 is 12 MHz, pos. 15 is 16 MHz, pos. 16 is 22 MHz and pos. 17 is 25 MHz.

5.10.22.
1A TUNE. Turn the power level potentiometer fully clockwise. Go through 5.5.15. 5.5.22.

5.11.
OUTPUT FILTER

5.11.1.
6B, A3H (H3E) without modulation. Connect oscilloscope to TP21 via 1:1 probe (wire).

5.11.2.
Disconnect the innercore of coaxial cable (2) W1/15-16. Connect the innercore of coaxial cable (5) W1/3-16 (the VCO signal) to the point where the innercore (2) W1/16-15 was connected.

5.11.3.
Connect the (6) brown/black to the (4) red/black wire on the bandfilter board.

5.11.4.
Turn the potentiometer R1534 fully counter clockwise.

5.11.5.
Adjust L1404, L1403 and L1401 to min. output voltage. This adjustment shall be repeated until the measured signal is almost a 21.4 MHz sine signal.

5.11.6.
Reconnect the wires of point 5.11.2. at their proper place.

5.11.7.
1A, TUNE. Turn the power level potentiometer fully clockwise. Go through 5.5.17. - 5.5.22.

6. NECESSARY ADJUSTMENTS AFTER REPAIR FOR S1302

In the following paragraphs is referred to the necessary adjustment - and performance check paragraphs in chapter 4 and 5.

6.1.
DIVIDER UNIT

Execute 4.1.7. - 4.1.8., 5.2. and adjust L101 as described in 5.5.1. and 5.5.2.
Check 4.4., 4.7., 4.13. and 4.14.1. - 4.14.4.

6.2.
LOOP 1 FILTER & ±18V POWER SUPPLY

Execute 5.1.
Check 4.3., 4.4.1. and 4.4.2.

6.3.
VCO UNIT OR LOOP 1 MIXER

Check 4.3., 4.4.1. - 4.4.2. and 4.14.1. - 4.14.4.

6.4.
HARMONIC FILTER

Execute 5.3.
Check 4.3. and 4.14.1. - 4.14.4.

6.5.
VCXO AND LOOP 2 FILTER

Execute 5.5.7. - 5.5.8. without adjusting L1106, L1603 and L1604.
Execute 5.5.15. - 5.5.22.
Check 4.4.3. - 4.4.4.
Check 4.5.5. - 4.5.10.

6.6.
VCO SELECTOR

Check 4.2. and 4.14.1. - 4.14.4.

6.7.
FILTER BOARD

Execute 5.1.1., 5.1.2., 5.1.5. and 5.1.6.

6.8.
MODE SWITCH

Perform a FUNCTION CHECK 7.

6.9.
SSB GENERATOR

Execute 5.5. without adjusting L101, L601, L1603 and L1604.
Execute 5.6.

6.10.
MICROPHONE AMPLIFIER

Execute 5.4., 5.5.9. - 5.5.22., and 5.6.
Check 4.6.

6.11.
ALARM SIGNAL GENERATOR

Check 4.11. and 4.13.

6.12.
OUTPUT FILTER

Execute 5.11.

6.13.
LP- AND BP FILTER

Execute 5.10.
Check 4.14.1. - 4.14.4.

6.14.
MIXER UNIT

Execute 5.5.4. - 5.5.22. without adjusting L1106 and L601.

7. FUNCTION CHECK FOR S1302

7.1.1.
Connect the TESTBOX S1302/03/04 to the exciter. Connect the power supplies and an AF tone generator to the TEST BOX. The RF output connector shall be loaded with 50 ohm.

7.1.2.
Connect the frequency counter to the RF output connector via 1:10 probe.

7.1.3.
Set exciter to A3H (H3E) full power, power level potentiometer on TEST BOX fully clockwise and no modulation. Set the handset key placed on the test box in position on.

7.1.4.
Measure the RF output carrier frequency one in each band but in the CT band one frequency below and one frequency above 2 MHz.
Compare the measured frequencies to the frequency table, placed beside the short wave set or in the operating instruction manual.
The frequency accuracy shall be within 1.0 ppm.

7.2.1.
Connect a diode probe to the RF output connector.

7.2.2.
Change to TUNE position and set the handset key on the test box in off position.

7.2.3.
Go through the above mentioned channels and check the RF output voltage to be 3.7V ±0.3V.

7.2.4.
In TUNE position the tune lamp shall be alight. The transmitter start- and simplex relay lamp on the test box shall be alight.

7.2.5.
Check that the power level potentiometer on the test box has a control range of approx. 12 dB.

7.2.6.
Change to A3H (H3E).
With the power level potentiometer on the test box fully clockwise.
Check the first power reduction step to be between 4 dB and 6 dB below full power, the second step 8 dB to 12 dB, the third step 12 dB to 18 dB and the fourth step 17 dB to 23 dB below full power.

7.2.7.
Check that the power reduced lamp is alight when the power is reduced.

7.2.8.
Check that the power reduced switch is disabled when tune is activated.

7.3.1.
Change to A3J (J3E). Choose a channel in the CT band.

7.3.2.
Supply 1500 Hz and 1V RMS to the AF input plug on the test box S1302/03/04.

7.3.3.
Adjust the power level potentiometer on the test box until the meter deflection is 2.45V corresponding to 0.0 dB.

7.3.4.
Change the AF tone generator frequency between 500 Hz and 2500 Hz, and check that the output amplitude ripple is below 2 dB.
Check that -6 dB frequencies are approx. 300 Hz and 2700 Hz.

7.3.5.
Set AF tone generator to 1500 Hz.

7.3.6.
Disconnect the diode probe and connect the oscilloscope to the RF output connector.

7.3.7.
Change to tune position.

7.3.8.
Adjust the power level potentiometer on the test box until there is full deflection seen on the oscilloscope screen (8 cm pp.).

7.3.9.
Check that the amplitude is within 7 cm pp. and 8 cm pp. in the positions A3J (J3E), A3H (H3E) and A3A (R3E).

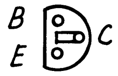
7.4.1.
Change the frequency selector to position 1 (distress).

7.4.2.
Press SEND ALARM and TEST ALARM at the same time. The distress signal can now be seen on the oscilloscope. The time from start of alarm signal until it automatically disappears shall be 45 sec.

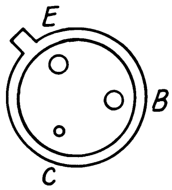
7.4.3.
Check that the power reduced switch is disabled under alarm transmission.

7.4.4.
Check that the 2182 kHz SELECTED lamp is alight when the frequency selector is in position 1.

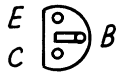
BOTTOM VIEW



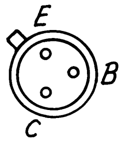
BC639
BC640



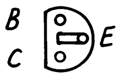
BFW 17A



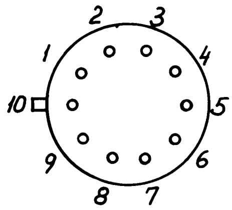
BC 328-25
BC 338
BC 547
BC 548 A, B, C
BC 556 A.
BC 558 A, B, C.



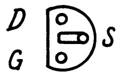
2N 2368



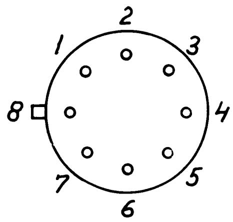
BF 199
BF 494



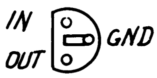
CA 3019



BF 256 A, B, C



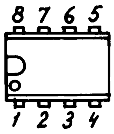
LM 3053



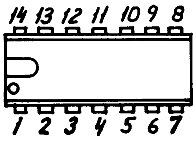
MC 78 L05 ACP

S1 302/03/04 A1 3/1

TOP VIEW

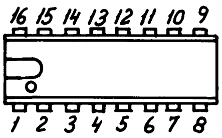


LM 308 N
LM 358



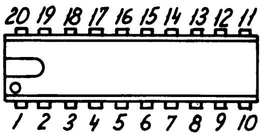
LM 329
MC 4044
MC 14081 B CP
SN 7407 N
SN 7410 N
SN 7472 N
SN 74 LS 20N
SN 74 LS 27N
SN 74 LS 290N
SN 74 LS 197N
SN 74 LS 32 N

SN 74 LS 86N
SN 74 LS 00N
SN 74 LS 08N
SN 74 LS 74N
SN 74 06
MC 14071 BCP
MC 14082 BCP
MC 14073 BCP
MC 14011 BCP

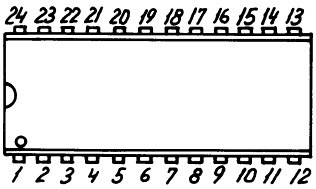


SN 74 LS 109 N
SN 74 LS 192 N
SN 74 LS 390N
SN 74 LS 138N
SN 74 LS 195N
SN 74 LS 83N
SN 74 LS 148N
SN 74 LS 173N

SN 74 LS 151 N
SN 74 LS 123N
SN 74 LS 85N
MC 14040 BCP
MC 14027 BCP
CD 4056 B
MMI 6330-1

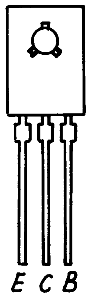


MMI 6308-1

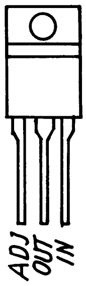


MC 14515 BCB

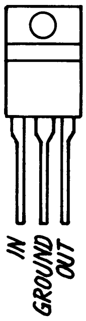
FRONT VIEW



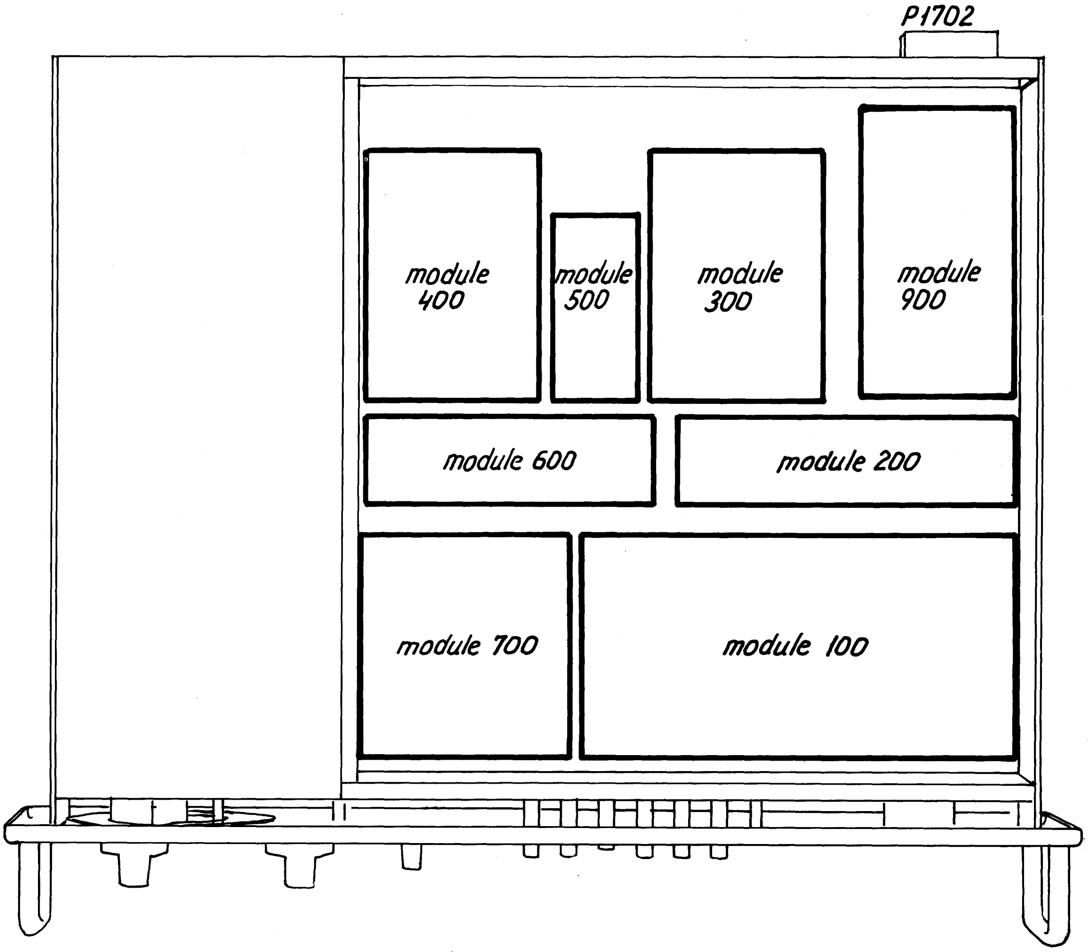
BD 138
BD 139



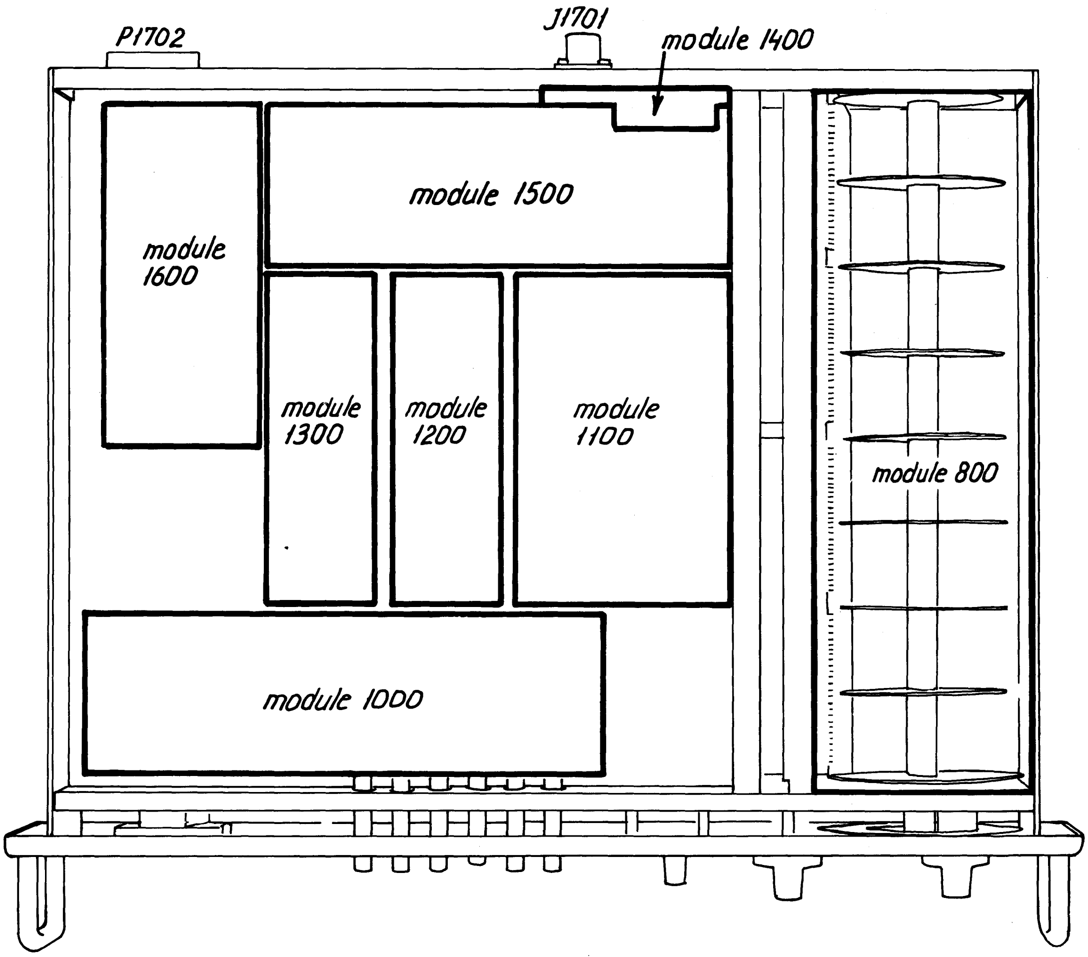
LM 317T



MC 7805 CT

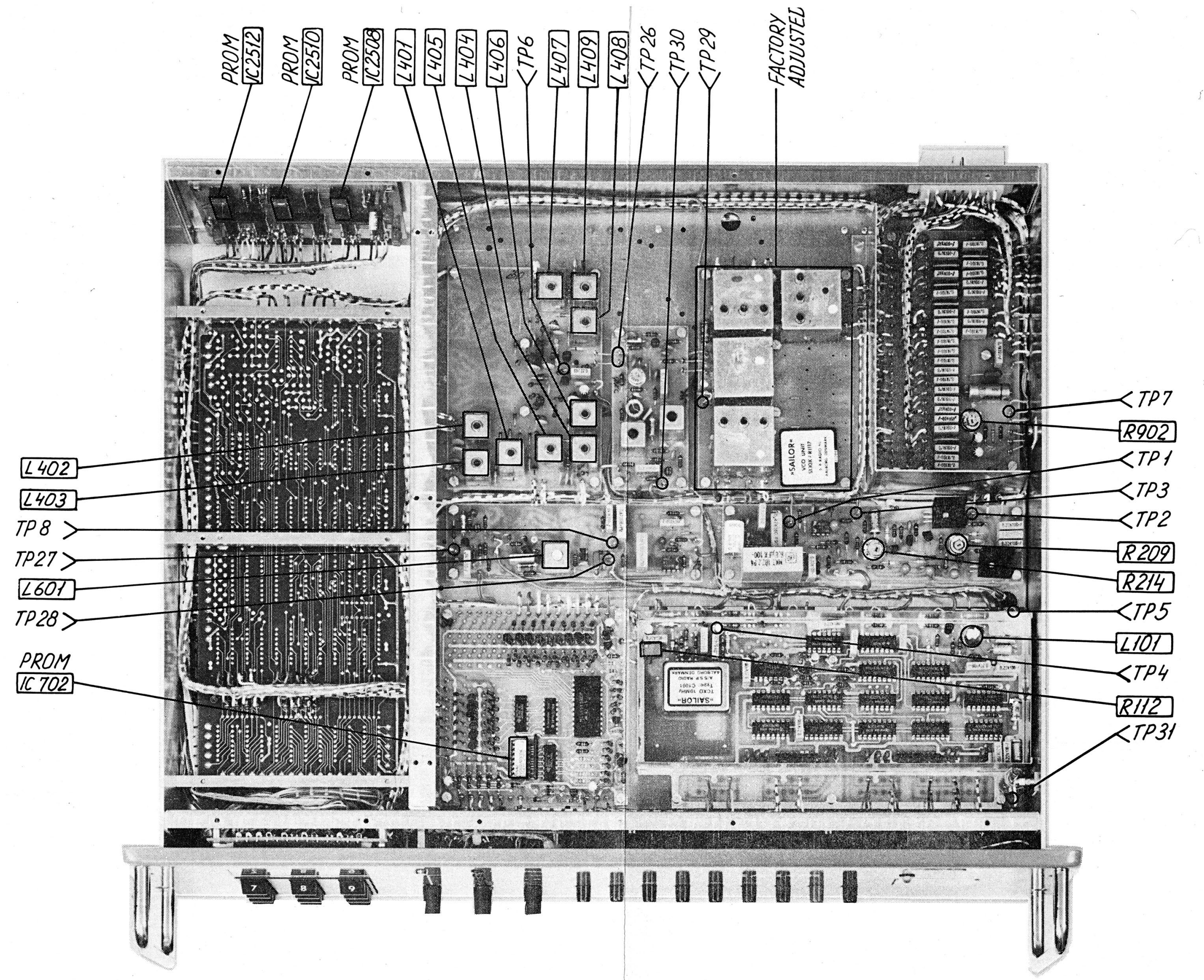


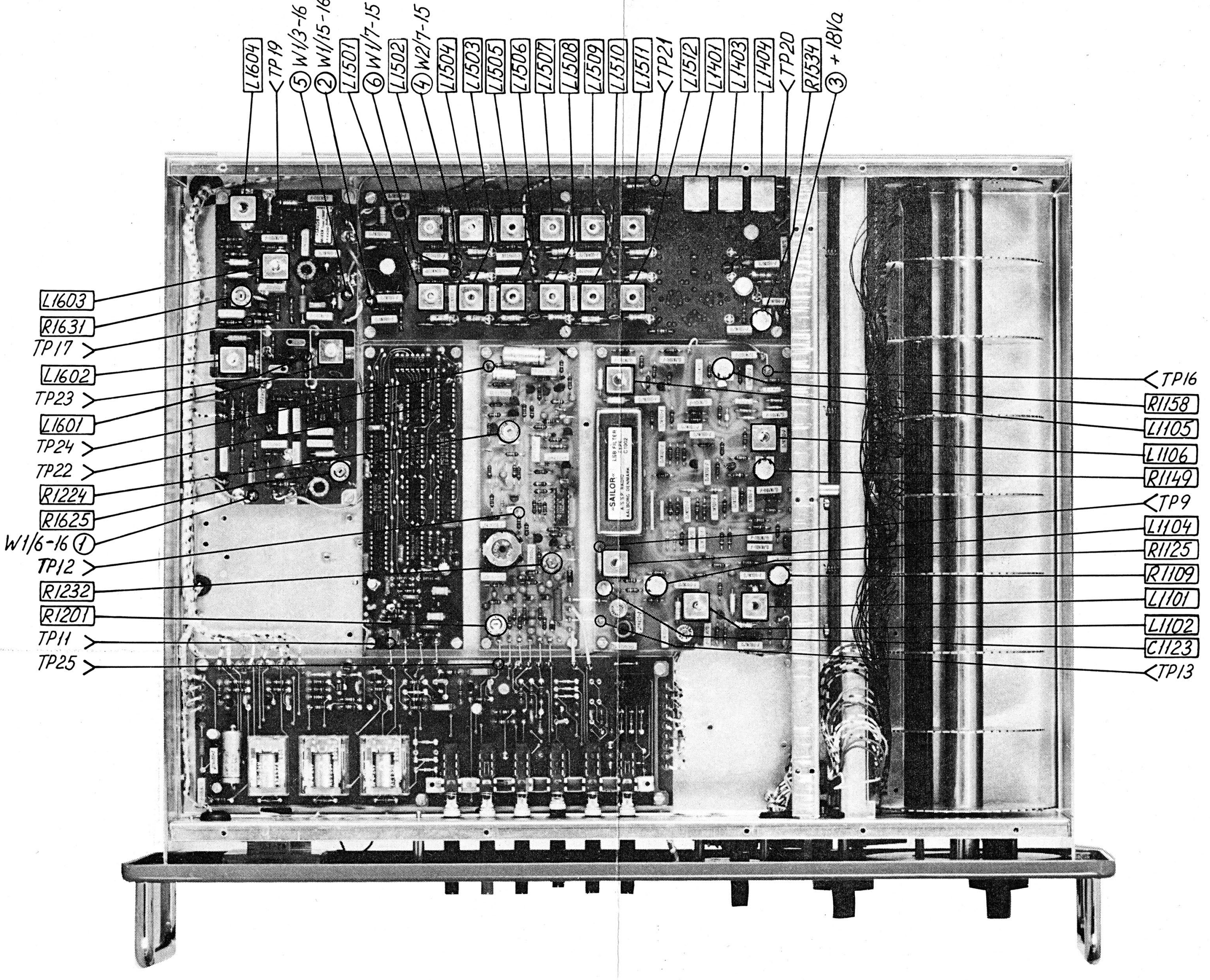
Chassismontage module 1700



S 13a2

MODULE LOCATION S1302





ADJUSTMENT LOCATION S1302

b DIVIDER UNIT S1300/R1117 1/3

Symbol	Description				Manufact.	
R101	Resistor	15Kohm	±5%	0,33W	Philips	2322 211 13153
R102	Resistor	15Kohm	±5%	0,33W	Philips	2322 211 13153
R103	Resistor	560 ohm	±5%	0,33W	Philips	2322 211 13561
R104	Resistor	15Kohm	±5%	0,33W	Philips	2322 211 13153
R105	Resistor	560 ohm	±5%	0,33W	Philips	2322 211 13561
R106	Resistor	5,6Kohm	±5%	0,33W	Philips	2322 211 13562
R107	Resistor	1,8Kohm	±5%	0,33W	Philips	2322 211 13182
R108	Resistor	10Kohm	±5%	0,33W	Philips	2322 211 13103
R109	Resistor	1,8Kohm	±5%	0,33W	Philips	2322 211 13182
R110	Resistor	820 ohm	±5%	0,33W	Philips	2322 211 13821
R111	Resistor	220 ohm	±5%	0,33W	Philips	2322 211 13221
R112	Preset potentiometer	2Kohm	±10%	0,5 W	Bourns	3299 W-1-202
R113	Resistor	820 ohm	±5%	0,33W	Philips	2322 211 13821
R114	Resistor	470 ohm	±5%	0,33W	Philips	2322 211 13471
R115	Resistor	10Kohm	±5%	0,33W	Philips	2322 211 13103
R116	Resistor	1,2Kohm	±5%	0,33W	Philips	2322 211 13122
R117	Resistor	2,2Kohm	±5%	0,33W	Philips	2322 211 13222
R118	Resistor	560 ohm	±5%	0,33W	Philips	2322 211 13561
R119	Resistor	22Kohm	±5%	0,33W	Philips	2322 211 13223
R120	Resistor	270 ohm	±5%	0,33W	Philips	2322 106 33271
R121	Resistor	1,8Kohm	±5%	0,33W	Philips	2322 211 13182
R122	Resistor	10Kohm	±5%	0,33W	Philips	2322 211 13103
R123	Resistor	220 ohm	±5%	0,33W	Philips	2322 106 33221
R124	Resistor	2,2Kohm	±5%	0,33W	Philips	2322 211 13222
R125	Resistor	1Kohm	±5%	0,33W	Philips	2322 211 13102
R126	Resistor	220 ohm	±5%	0,33W	Philips	2322 211 13221
R127	Resistor	680 ohm	±5%	0,33W	Philips	2322 211 13681
R128	Resistor	12Kohm	±5%	0,33W	Philips	2322 211 13123
R129	Resistor	6,8Kohm	±5%	0,33W	Philips	2322 211 13682
R130	Resistor	1Kohm	±5%	0,33W	Philips	2322 211 13102
R131	Resistor	220 ohm	±5%	0,33W	Philips	2322 211 13221
RA101	Resistor array	8x10Kohm	±5%	0,125W	ITT	VR8,10Kohm ±5%
RA102	Resistor array	8x10Kohm	±5%	0,125W	ITT	VR8,10Kohm ±5%

MODULE NO: 100

b	DIVIDER UNIT S1300/R1117		2/3
Symbol	**Description**	**Manufact.**	
C101	Capacitor, polyester 10nF±20% 400V	Philips	2222 344 54103
C102	Capacitor, tantalum 10uF-20/+50% 16V	ERO	ETP 2E
C103	Capacitor, ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C104	Capacitor, ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C105	Capacitor, ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C106	Capacitor, ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C107	Capacitor, ceramic 12pF NPO±5% 400V	Ferroperm	9/0112.9
C108	Capacitor, ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C109	Capacitor, ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C110	Capacitor, ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C111	Capacitor, ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C112	Capacitor, ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C113	Capacitor, ceramis 10nF-20/+80% 32V	Ferroperm	9/0145.9
C114	Capacitor, ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C115	Capacitor, ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C116	Capacitor, ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C117	Capacitor, ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C118	Capacitor, ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C119	Capacitor, ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C120	Capacitor, ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C121	Capacitor, ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C122	Capacitor, ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C123	Capacitor, polyester 220nF±20% 100V	Philips	2222 344 24224
C124	Capacitor, polyester 15nF±20% 400V	Philips	2222 344 54153
C125	Capacitor, polyester 47nF±20% 250V	Philips	2222 344 40473
C126	Capacitor, polyester 220nF±20% 100V	Philips	2222 344 24224
C127	Capacitor, polyester 220nF±20% 100V	Philips	2222 344 24224
C128	Capacitor, electrolytic10uF-10/+100% 40V	Siemens	B41313-A7106-V
C129	Capacitor, electrolytic10uF-10/+100% 40V	Siemens	B41313-A7106-V
C130	Capacitor, polyester 220nF±20% 100V	Philips	2222 344 24224
C131	Capacitor, polyester 47nF±20% 250V	Philips	2222 344 40473
C132	Capacitor, polyester 220nF±20% 100V	Philips	2222 344 24224
C133	Capacitor, polyester 220nF±20% 100V	Philips	2222 344 24224
C134	Capacitor, polyester 220nF±20% 100V	Philips	2222 344 24224
C135	Capacitor, polyester 220nF±20% 100V	Philips	2222 344 24224
C136	Capacitor, polystyrene 1,2nF±5% 63V	Philips	2222 424 21202
C137	Capacitor, polystyrene 6,8nF±5% 63V	Philips	2222 424 26802
L101	Coil	S.P.	TL 235

a DIVIDER UNIT S1300/R1117

Symbol	Description		Manufact.	
D101	Diode, zener 12V ±5%	0,4W	Philips	BZX 79 C12
D102	Diode, silicon		Philips	BAW 62
T101	Transistor		Philips	2N2368
T102	Transistor		Philips	2N2368
T103	Transistor		Philips	BF199
T104	Transistor		Philips	2N2368
T105	Transistor		Philips	BF199
IC101	Integrated circuit		Texas	SN74LS192N
IC102	Integrated circuit		Texas	SN74LS192N
IC103	Integrated circuit		Texas	SN74LS192N
IC104	Integrated circuit		Texas	SN74LS192N
IC105	Integrated circuit		Texas	SN74LS192N
IC106	Integrated circuit		Motorola	MC4044P
IC107	Integrated circuit		Texas	SN74LS390N
IC108	Integrated circuit		Texas	SN74LS20N
IC109	Integrated circuit		Texas	SN74LS27N
IC110	Integrated circuit		Texas	SN74LS109N
IC111	Integrated circuit		Texas	SN74LS390N
IC112	Integrated circuit		Texas	SN74LS390N
IC113	Integrated circuit		Motorola	MC4044P
IC114	Integrated circuit		Texas	SN7410N
IC115	Integrated circuit		Texas	SN74LS290N
X0101	TCXO 10,0 MHz		S.P.	C1001
S101	Switch for 2182 (R1117 only)		Petrick	7-3-21412

MODULE NO: 200

a	LOOP 1 FILTER & ±18V SUPPLY UNIT S1300/R1117		1/2
Symbol	*Description*	*Manufact.*	
R201	Resistor 1Kohm ±5% 0,33W	Philips	2322 211 13102
R202	Resistor 82 ohm ±5% 0,33W	Philips	2322 211 13829
R204	Resistor 820 ohm ±5% 0,33W	Philips	2322 211 13821
R205	Resistor 2,2Kohm ±5% 0,33W	Philips	2322 211 13222
R206	Resistor 12Kohm ±5% 0,33W	Philips	2322 211 13123
R207	Resistor 1,2Kohm ±5% 0,33W	Philips	2322 211 13122
R208	Resistor 3,3Kohm ±5% 0,33W	Philips	2322 211 13332
R209	Preset potmeter cermet 2,2Kohm ±20% 0,5W	Philips	2322 482 20222
R210	Resistor 10Kohm ±5% 0,33W	Philips	2322 211 13103
R212	Resistor 10Kohm ±5% 0,33W	Philips	2322 211 13103
R213	Resistor 10Kohm ±5% 0,33W	Philips	2322 211 13103
R214	Preset potmeter cermet 2,2Kohm ±20% 0,5W	Philips	2322 482 20222
R215	Resistor 3,3Kohm ±5% 0,33W	Philips	2322 211 13332
R216	Resistor 1,5 Kohm +5% 0,33W	Philips	2322 211 13152
R217	Resistor 10Kohm ±5% 0,33W	Philips	2322 211 13103
R218	Resistor 3,3Kohm ±5% 0,33W	Philips	2322 211 13332
R219	Resistor 2,7Kohm ±5% 0,33W	Philips	2322 106 33272
R220	Resistor 560 ohm ±5% 0,33W	Philips	2322 211 13561
R221	Resistor 3,92Kohm ±1% 0,25W	Vitrohm	471-0
R222	Resistor 22Kohm ±5% 0,33W	Philips	2322 211 13223
R223	Resistor 150 ohm ±5% 0,33W	Philips	2322 211 13151
R224	Resistor 2,7Mohm ±5% 0,33W	Philips	2322 211 12275
R225	Resistor 4,7Kohm ±5% 0,33W	Philips	2322 211 13472
R226	Resistor 2,2Kohm ±5% 0,33W	Philips	2322 211 13222
R227	Resistor 3,92Kohm ±1% 0,25W	Vitrohm	471-0
R228	Resistor 3,92Kohm ±1% 0,25W	Vitrohm	471-0
R229	Resistor 36,5Kohm ±1% 0,25W	Vitrohm	471-0
	S1300 only		
R203	Resistor 270Kohm ±5% 0,33W	Philips	2322 211 13274
R211	Resistor 15 ohm ±5% 0,33W	Philips	2322 211 13159
	R1117 only		
R203	Resistor 150Kohm ±5% 0,33W	Philips	2322 211 13154
R211	Resistor 12 ohm ±5% 0,33W	Philips	2322 211 13129

c LOOP 1 FILTER & ±18V SUPPLY UNIT S1300/R1117

Symbol	Description	Manufact.	
C201	Capacitor ceramic 10nF-20/+80% 32V	Ferroperm	9/0145,9
C202	Capacitor tantalum 10uF-20/+50% 25V	Ero	ETP-3F
C203	Capacitor tantalum 10uF-20/+50% 25V	Ero	ETP-3F
C204	Capacitor tantalum 10uF-20/+50% 25V	Ero	ETP-3F
C205	Capacitor electrolytic10uF- 10/+100% 40V	Siemens	B41313-A7106V
C206	Capacitor tantalum 10uF-20/+50% 25V	Ero	ETP-3F
C207	Capacitor polycarbonate 470nF ±10% 100V	Philips	2222 344 21474
C208	Capacitor ceramic 10nF-20/+80% 32V	Ferroperm	9/0145,9
C209	Capacitor polystyrene 39nF ±1,25% 63V	Arco	KS1.39A39000±1,25%
C210	Capacitor tantalum 10uF-20/+50% 25 V	Ero	ETP-3F
C211	Capacitor polyester 6,8uF ±10% 100V	Philips	2222 344 25685
C212	Capacitor ceramic 220pF ±20% 400V	Ferroperm	9/0129,9
C213	Capacitor ceramic 220pF ±20% 400V	Ferroperm	9/0129,9
C214	Capacitor polyester 220nF ±10% 100V	Philips	2222 344 25224
C215	Capacitor polyester 150nF ±10% 100V	Philips	2222 344 25154
C216	Capacitor polyester 220nF ±20% 100V	Philips	2222 344 24224
C217	Capacitor polyester 220nF ±20% 100V	Philips	2222 344 24224
C218	Capacitor polyester 220nF ±20% 100V	Philips	2222 344 24224
T201	Transistor	Philips	BD139
T202	Transistor	Philips	BC548A
T203	Transistor	Philips	BD138
T204	Transistor	Philips	BC558
T205	Transistor	Philips	BC556A
T206	Transistor	Philips	BC548
D201	Diode, zener 4,7V ± 5% 0,4W	Philips	BZX79C4V7
D202	Diode, silicon	Philips	BAW62
D203	Diode, silicon	Philips	BAW62
D204	Diode, silicon	Philips	BAW62
D205	Diode, zener 4,7V ± 5% 0,4W	Philips	BZX79C4V7
D206	Diode, silicon	Philips	BAV21
IC201	Intergrated circuit	National	LM308N
IC202	Intergrated circuit	National	LM308N

a	VCO-UNIT AND HARMONIC FILTER-UNIT S1300/R1117		1/1
Symbol	*Description*	*Manufact.*	
	The units are factory adjusted and sealed and can only be repaired at the factory		
	Module No: 300	S.P.	VCO-UNIT S1300/R1117

b HARMONIC FILTER UNIT S1300, S1301, S1302, S1303, S1304 1/3

Symbol	Description	Manufact.	
C401	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C402	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C403	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C404	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C405	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C406	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C407	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C408	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C409	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C410	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C411	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C412	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C413	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C414	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C415	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C416	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C417	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C418	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C419	Capacitor polystyrene 360 pF ±2% 630V	Philips	2222 427 33601
C420	Capacitor polystyrene 240 pF ±2% 630V	Philips	2222 427 32401
C421	Capacitor polystyrene 220 pF +2% 630V	Philips	2222 427 32201
C422	Capacitor polystyrene 180 pF ±2% 630V	Philips	2222 427 31801
C423	Capacitor polysturene 180 pF ±2% 630V	Philips	2222 427 31801
C424	Capacitor polystyrene 110 pF ±2% 630V	Philips	2222 427 31101
C425	Capacitor polystyrene 100 pF ±2% 630V	Philips	2222 427 31001
C426	Capacitor polystyrene 82 pF ±2% 630V	Philips	2222 427 38209
C427	Capacitor polystyrene 91 pF ±2% 630V	Philips	2222 427 39109
C428	Capacitor ceramic 2.2 pF ±0.25 pF 250V	Ferroperm	9/0112.9
C429	Capacitor ceramic 2.2 pF ±0.25 pF 250V	Ferroperm	9/0112.9
C430	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C431	Capacitor polyester 0.22 uF ±10% 63V	ERO	MKT1818 422 065
C432	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C433	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C434	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C435	Capacitor ceramic 8.2 pF ±0.25 pF 400V	Ferroperm	9/0112.9
C436	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C437	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C438	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C439	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z
C440	Capacitor ceramic 10 nF -20/+80% 50V	KCK	HE70SJYF103Z

MODULE NO: 400

b	HARMONIC FILTER UNIT S1300, S1301, S1302, S1303, S1304		2/3
Symbol	**Description**	**Manufact.**	
C441	Capacitor electrolytic 10 uF ±20% 35V	Roederstein	EKI00AA210F
C442	Capacitor ceramic 2.2 pF ±0.25 pF 250V	Ferroperm	9/0112.9
D401	Diode silicon	Philips	1N4448
D402	Diode silicon	Philips	1N4448
D403	Diode silicon	Philips	1N4448
D404	Diode silicon	Philips	1N4448
D405	Diode silicon	Philips	1N4448
D406	Diode silicon	Philips	1N4448
D407	Diode silicon	Philips	1N4448
D408	Diode silicon	Philips	1N4448
D409	Diode silicon	Philips	1N4448
D410	Diode switch	Telefunken	BA243
D411	Diode switch	Telefunken	BA243
D412	Diode switch	Telefunken	BA243
D413	Diode switch	Telefunken	BA243
D414	Diode switch	Telefunken	BA243
D415	Diode switch	Telefunken	BA243
D416	Diode switch	Telefunken	BA243
D417	Diode switch	Telefunken	BA243
D418	Diode switch	Telefunken	BA243
D419	Diode switch	Telefunken	BA243
D420	Diode switch	Telefunken	BA243
D421	Diode germanium	Philips	AA143
FP401	Ferrite bead 4B1	Philips	4322 020 34420
FP402	Ferrite bead 4B1	Philips	4322 020 34420
FP403	Ferrite bead 4B1	Philips	4322 020 34420
L401	Coil	S.P.	TL346
L402	Coil	S.P.	TL335
L403	Coil	S.P.	TL353
L404	Coil	S.P.	TL350
L405	Coil	S.P.	TL347
L406	Coil	S.P.	TL336
L407	Coil	S.P.	TL338
L408	Coil	S.P.	TL340
L409	Coil	S.P.	TL352
R401	Resistor 470 ohm ±5% 0.33W	Philips	2322 106 33471

b HARMONIC FILTER UNIT S1300, S1301, S1302, S1303, S1304

Symbol	Description				Manufact.	
R402	Resistor	470 ohm	+5%	0.33W	Philips	2322 106 33471
R403	Resistor	470 ohm	+5%	0.33W	Philips	2322 211 23471
R404	Resistor	470 ohm	+5%	0.33W	Philips	2322 106 33471
R405	Resistor	470 ohm	+5%	0.33W	Philips	2322 106 33471
R406	Resistor	470 ohm	+5%	0.33W	Philips	2322 211 23471
R407	Resistor	470 ohm	+5%	0.33W	Philips	2322 106 33471
R408	Resistor	470 ohm	+5%	0.33W	Philips	2322 106 33471
R409	Resistor	470 ohm	+5%	0.33W	Philips	2322 211 23471
R410	Resistor	330 kohm	+5%	0.33W	Philips	2322 106 33334
R411	Resistor	330 kohm	+5%	0.33W	Philips	2322 106 33334
R412	Resistor	10 kohm	+5%	0.33W	Philips	2322 106 33103
R413	Resistor	47 ohm	+5%	0.33W	Philips	2322 106 33479
R414	Resistor	8.2 ohm	+5%	0.33W	Philips	2322 106 33828
R415	Resistor	1.8 kohm	+5%	0.33W	Philips	2322 106 33182
R416	Resistor	390 kohm	+5%	0.33W	Philips	2322 106 33394
R417	Resistor	82 kohm	+5%	0.33W	Philips	2322 106 33823
R418	Resistor	470 kohm	+5%	0.33W	Philips	2322 211 23474
R419	Resistor	39 kohm	+5%	0.33W	Philips	2322 106 33393
R420	Resistor	47 kohm	+5%	0.33W	Philips	2322 106 33473
R421	Resistor	330 ohm	+5%	0.33W	Philips	2322 106 33331
R422	Resistor	120 ohm	+5%	0.33W	Philips	2322 106 33121
R423	Resistor	22 ohm	+5%	0.33W	Philips	2322 106 33229
R424	Resistor	1.2 kohm	+5%	0.33W	Philips	2322 106 33122
R425	Resistor	82 kohm	+5%	0.33W	Philips	2322 106 33823
R426	Resistor	100 ohm	+5%	0.33W	Philips	2322 106 33101
R427	Resistor	47 ohm	+5%	0.33W	Philips	2322 106 33479
T401	Transistor				Philips	BF494
T402	Transistor				Philips	BC548A
T403	Transistor				Philips	BF494
T404	Transistor				Philips	BF494

a	LOOP 1 MIXER S1300/R1117		1/1
Symbol	**Description**	**Manufact.**	
R501	Resistor 3.3 ohm ± 5% 0.33W	Philips	2322 211 13338
R502	Resistor 3.3kohm ± 5% 0.33W	Philips	2322 211 13332
R503	Resistor 15kohm ± 5% 0.33W	Philips	2322 211 13153
R504	Resistor 2.2kohm ± 5% 0.33W	Philips	2322 211 13222
R505	Resistor 270 ohm ± 5% 0.33W	Philips	2322 211 13271
R506	Resistor 100 ohm ± 5% 0.33W	Philips	2322 211 13101
R507	Resistor 10 ohm ± 5% 0.33W	Philips	2322 211 13109
R508	Resistor 330 ohm ± 5% 0.33W	Philips	2322 211 13331
R509	Resistor 2.7kohm ± 5% 0.33W	Philips	2322 211 13272
R510	Resistor 680 ohm ± 5% 0.33W	Philips	2322 211 13681
R511	Resistor 390 ohm ± 5% 0.33W	Philips	2322 211 13391
R512	Resistor 470 ohm ± 5% 0.33W	Philips	2322 211 13471
R513	Resistor 27kohm ± 5% 0.33W	Philips	2322 211 13273
R514	Resistor 2.7kohm ± 5% 0.33W	Philips	2322 211 13272
R515	Resistor 560 ohm ± 5% 0.33W	Philips	2322 211 13479
R516	Resistor 47 ohm ± 5% 0.33W	Philips	2322 211 13479
C501	Capacitor ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C502	Capacitor ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C503	Capacitor ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C504	Capacitor ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C505	Capacitor ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C506	Capacitor ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C507	Capacitor ceramic 47pF±2% 100V	Philips	2222 638 34479
C508	Capacitor polyester 100nF±20% 100V	Philips	2222 344 24104
C509	Capacitor ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C510	Capacitor ceramic 100pF±2% 100V	Philips	2222 638 34101
C511	Capacitor polystyrene 180pF±1% 500V	Philips	2222 427 41801
C512	Capacitor ceramic 33pF±2% 100V	Philips	2222 638 34339
C513	Capacitor ceramic 56pF±2% 100V	Philips	2222 638 34569
C514	Capacitor ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C515	Capacitor ceramic 10nF-20/+80% 32V	Ferroperm	9/0145.9
C516	Capacitor polyester 100nF±20% 100V	Philips	2222 344 24104
L501	Coil	S.P.	TL 059
L502	Coil 12uH±5%	Kaschke	220/5
L503	Coil 12uH±5%	Kaschke	220/5
TR501	Transformer	S.P.	TL198
T501	Transistor	Philips	BF199
T502	Transistor	Philips	BF199
IC501	Integrated circuit	N.S.	LM 3053

MODULE NO: 600

a	VCXO AND LOOP 2 FILTER FOR S1300		1/2
Symbol	*Description*	*Manufact.*	
R601	Resistor 2,7 Kohm ±5% 0,33W	Philips	2322 211 13272
R602	Resistor 22 Kohm ±5% 0,33W	Philips	2322 211 13223
R603	Resistor 220 ohm ±5% 0,33W	Philips	2322 211 13221
R604	Resistor 2,7 Mohm ±5% 0,33W	Philips	2322 211 13275
R605	Resistor 4,7 Kohm ±5% 0,33W	Philips	2322 211 13472
R606	Resistor 220 Kohm ±5% 0,33W	Philips	2322 211 13224
R607	Resistor 18 Kohm ±5% 0,33W	Philips	2322 211 13183
R608	Resistor NTC 4,7Kohm ±5% 0,5 W	Philips	2322 635 02472
R609	Resistor 180 Kohm ±5% 0,33W	Philips	2322 211 13184
R610	Resistor 15 Kohm ±5% 0,33W	Philips	2322 211 13153
R611	Resistor 680 ohm ±5% 0,33W	Philips	2322 211 13681
R612	Resistor 180 ohm ±5% 0,33W	Philips	2322 211 13181
R613	Resistor 33 Kohm ±5% 0,33W	Philips	2322 211 13333
R614	Resistor 1,5 Kohm ±5% 0,33W	Philips	2322 211 13152
R615	Resistor 100 Kohm ±5% 0,33W	Philips	2322 211 13104
R616	Resistor 5,6 Kohm ±5% 0,33W	Philips	2322 211 13562
R617	Resistor 18 Kohm ±5% 0,33W	Philips	2322 211 13183
R618	Resistor 10 Kohm ±5% 0,33W	Philips	2322 211 13103
R619	Resistor 390 ohm ±5% 0,33W	Philips	2322 211 13391
R620	Resistor 39 Kohm ±5% 0,33W	Philips	2322 211 13393
R621	Resistor 5,6 Kohm ±5% 0,33W	Philips	2322 211 13562
R622	Resistor 560 ohm ±5% 0,33W	Philips	2322 211 13561
R623	Resistor 150 ohm ±5% 0,33W	Philips	2322 211 13151
R624	Resistor 560 ohm ±5% 0,33W	Philips	2322 211 13561
C601	Capacitor ceramic 10nF-20/+80% 32V	Ferroperm	9/0145,9
C602	Capacitor tantalum 10uF-20/+50% 25V	ERO	ETP-3F
C603	Capacitor polyester 47nF±10% 100V	Philips	2222 344 25473
C604	Capacitor ceramic 33pF ±2% 100V	Philips	2222 642 34339
C605	Capacitor polyester 680 nF ±10% 100V	Philips	2222 344 25684
C606	Capacitor polyester 47nF ±10% 100V	Philips	2222 344 25473
C607	Capacitor polyester 470nF ±10% 100V	Philips	2222 344 25474
C608	Capacitor polyester 47nF ±20% 100V	Philips	2222 344 24473
C609	Capacitor ceramic 56pF ± 2% 100V	Philips	2222 642 34569
C610	Capacitor polyester 51pF ± 1% 500V	Philips	2222 427 45109
C611	Capacitor ceramic 5,6pF ± 0,25pF63V	Draloric	3x4 N150/1B
C612	Capacitor ceramic 10nF-20/+80% 32V	Ferroperm	9/0145,9
C613	Capacitor tantalum 10uF-20/+50% 25V	Ero	ETP-3F

a	VCXO AND LOOP 2 FILTER S1300		2/2
Symbol	*Description*	*Manufact.*	
C614	Capacitor polyester 47nF ±20% 100V	Philips	2222 344 24473
C615	Capacitor tantalum 10uF -20/+50% 25V	Ero	ETP-3F
C616	Capacitor polystyrene 220pF ±5% 500V	Philips	2222 427 22201
L601	Coil	S.P.	TL 257
T601	Transistor	Philips	BF256B
T602	Transistor	Philips	BF199
T603	Transistor	Philips	BC558
D601	Diode varicap.	Motorola	MV109
D602	Diode varicap.	Motorola	MV109
IC601	Integrated circuit	N.S.	LM 308N
X601	Crystal f=10097.600 kHz	S.P.	C 1010

VCO Selector S1302/S1303/S1304 Module 700 1/4

Symbol	Description				Manufact.	
R701	Resistor	10 kohm	±5%	0,33W	PHILIPS	2322 211 13103
R702	Resistor	10 kohm	±5%	0,33W	PHILIPS	2322 211 13103
R703	Resistor	10 kohm	±5%	0,33W	PHILIPS	2322 211 13103
R704	Resistor	10 kohm	±5%	0,33W	PHILIPS	2322 211 13103
R705	Resistor	10 kohm	±5%	0,33W	PHILIPS	2322 211 13103
R706	Resistor	18 kohm	±5%	0,33W	PHILIPS	2322 211 13183
R707	Resistor	10 kohm	±5%	0,33W	PHILIPS	2322 106 33103
R708	Resistor	820 ohm	±5%	0,33W	PHILIPS	2322 106 33821
R709	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R710	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R711	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R712	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R713	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R714	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R715	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R716	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R717	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R718	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R719	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R720	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R721	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R722	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R723	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R724	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R725	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R726	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R727	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R728	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R729	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R730	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R731	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R732	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R733	Resistor	10 kohm	±5%	0,33W	PHILIPS	2322 106 33103
R734	Resistor	10 kohm	±5%	0,33W	PHILIPS	2322 106 33103
R735	Resistor	10 kohm	±5%	0,33W	PHILIPS	2322 106 33103
R736	Resistor	10 kohm	±5%	0,33W	PHILIPS	2322 106 33103
R737	Resistor	3,9 kohm	±5%	0,33W	PHILIPS	2322 211 13392
R738	Resistor	33 kohm	±5%	0,33W	PHILIPS	2322 106 33333
R739	Resistor	100 kohm	±5%	0,33W	PHILIPS	2322 106 33104
R740	Resistor	100 kohm	±5%	0,33W	PHILIPS	2322 106 33104
R741	Resistor	100 kohm	±5%	0,33W	PHILIPS	2322 211 13104

MODULE NO: 700

VCO Selector S1302/S1303/S1304 Module 700 2/4

Symbol	Description				Manufact.	
R742	Resistor	100 kohm	±5%	0,33W	PHILIPS	2322 211 13104
R743	Resistor	1 kohm	±5%	0,33W	PHILIPS	2322 106 33102
R744	Resistor	5,6 kohm	±5%	0,33W	PHILIPS	2322 106 33562
R745	Resistor	33 kohm	±5%	0,33W	PHILIPS	2322 106 33333
R746	Resistor	33 kohm	±5%	0,33W	PHILIPS	2322 106 33333
R747	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R748	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R749	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R750	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R751	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R752	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R753	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R754	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R755	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R756	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R757	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R758	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R759	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R760	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R761	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R762	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R763	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R764	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R765	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R766	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R767	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R768	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R769	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R770	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R771	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R772	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R773	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R774	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R775	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R776	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R777	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R778	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R779	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R780	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R781	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123
R782	Resistor	12 kohm	±5%	0,33W	PHILIPS	2322 106 33123

VCO Selector S1302/S1303/S1304 Module 700

Symbol	Description		Manufact.	
R783	Resistor 12 kohm ±5%	0,33W	PHILIPS	2322 106 33123
R784	Resistor 12 kohm ±5%	0,33W	PHILIPS	2322 106 33123
R785	Resistor 12 kohm ±5%	0,33W	PHILIPS	2322 106 33123
R786	Resistor 12 kohm ±5%	0,33W	PHILIPS	2322 106 33123
R787	Resistor 12 kohm ±5%	0,33W	PHILIPS	2322 106 33123
R788	Resistor 12 kohm ±5%	0,33W	PHILIPS	2322 106 33123
R789	Resistor 12 kohm ±5%	0,33W	PHILIPS	2322 106 33123
R790	Resistor 12 kohm ±5%	0,33W	PHILIPS	2322 106 33123
R791	Resistor 12 kohm ±5%	0,33W	PHILIPS	2322 106 33123
RA701	Resistor ARRAY8X10 kohm ±5%	0,125W	ITT	VR8 10 kohm ±5%
C701	Capacitor Polyetylehne 0,1uF±10%	100V	SIEMENS	B32510-D1104-K
C702	Capacitor Polyetylehne 0,1uF±10%	100V	SIEMENS	B32510-D1104-K
C703	Capacitor Polyetylehne 0,1uF±10%	100V	SIEMENS	B32510-D1104-K
C704	Capacitor Polyetylehne 0,1uF±10%	100V	SIEMENS	B32510-D1104-K
C705	Capacitor Polyetylehne 0,1uF±10%	100V	SIEMENS	B32510-D1104-K
C706	Capacitor Ceramic 10nF -20/+80%	50V	KCK	HE705JYF103Z
C707	Capacitor Ceramic 10nF -20/+80%	50V	KCK	HE70SJYF103Z
C708	Capacitor Ceramic 10nF -20/+80%	50V	KCK	HE70SJYF103Z
C709	Capacitor Ceramic 10nF -20/+80%	50V	KCK	HE70SJYF103Z
C710	Capacitor Ceramic 10nF -20/+80%	50V	KCK	HE70SJYF103Z
C711	Capacitor Electrolyt 10uF ±20%	35V	ERO	EKI 00AA 210F
C712	Capacitor Ceramic 10nF -20/+80%	50V	KCK	HE70SJYF103Z
C713	Capacitor Electrolyt 10uF ±20%	35V	ERO	EKI 00AA 210F
C714	Capacitor Electrolyt 10uF ±20%	35V	ERO	EKI 00AA 210F
C715	Capacitor Ceramic 10nF -20/+80%	50V	KCK	HE70SJYF103Z
D701	Diode Germanium		ITT	AA143
D702	Diode Germanium		ITT	AA143
D703	Diode Germanium		ITT	AA143
D704	Diode Germanium		ITT	AA143
D705	Diode Germanium		ITT	AA143
D706	Diode Silicon		PHILIPS	IN4148
D707	Diode Silicon		PHILIPS	IN4148
D708	Diode Silicon		PHILIPS	IN4148
D709	Diode Silicon		PHILIPS	IN4148
D710	Diode Silicon		PHILIPS	IN4148
D711	Diode Silicon		PHILIPS	IN4148
D712	Diode Silicon		PHILIPS	IN4148
D713	Diode Silicon		PHILIPS	IN4148

VCO Selector S1302/S1303/S1304 Module 700

Symbol	Description	Manufact.	
D714	Diode Silicon	PHILIPS	IN4148
T701	Transistor	PHILIPS	BC548B
T702	Transistor	PHILIPS	BC639
T703	Transistor	PHILIPS	BC548B
T704	Transistor	PHILIPS	BC548B
T705	Transistor	PHILIPS	BC558B
T706	Transistor	PHILIPS	BC328-25
T707	Transistor	PHILIPS	BC328-25
T708	Transistor	PHILIPS	BC328-25
T709	Transistor	PHILIPS	BC328-25
T710	Transistor	PHILIPS	BC328-25
T711	Transistor	PHILIPS	BC328-25
T712	Transistor	PHILIPS	BC328-25
T713	Transistor	PHILIPS	BC328-25
T714	Transistor	PHILIPS	BC328-25
T715	Transistor	PHILIPS	BC328-25
T716	Transistor	PHILIPS	BC328-25
T717	Transistor	PHILIPS	BC328-25
T718	Transistor	PHILIPS	BC328-25
T719	Transistor	PHILIPS	BC328-25
T720	Transistor	PHILIPS	BC328-25
T721	Transistor	PHILIPS	BC328-25
T722	Transistor	PHILIPS	BC328-25
T723	Transistor	PHILIPS	BC328-25
T724	Transistor	PHILIPS	BC328-25
T725	Transistor	PHILIPS	BC328-25
T726	Transistor	PHILIPS	BC328-25
T727	Transistor	PHILIPS	BC328-25
IC701	Integrated Circuit	TEXAS	SN7407
IC702	Integrated Circuit	MMI	6330-1
IC703	Integrated Circuit	MOTOROLA	MC14515BCP
IC704	Integrated circuit	TEXAS	SN74LS138N
IC705	Integrated circuit	TEXAS	SN7407

INPUT FILTER S1302/S1303/S1304 Module 900 1/2

Symbol	Description	Manufact.	
R901	Trim. Potmeter 1 kohm Cermet	PHILIPS	2322 482 20102
R902	Resistor 2,7 kohm ±5% 0,33W	PHILIPS	2322 211 13272
R903	Resistor 220 ohm ±5% 1,15W	PHILIPS	2322 214 13221
R904	Resistor 220 ohm ±5% 0,33W	PHILIPS	2322 211 13221
C901	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2322 344 24104
C902	Capacitor. Polyester 100nF ±20% 100V	PHILIPS	2322 344 24104
C903	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2322 244 24104
C904	Capacitor Electrolyt 10uF ±20% 35V	ERO	EKI 00AA 210F
C905	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2322 344 24104
C906	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2322 344 24104
C907	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2322 344 24104
C908	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2322 344 24104
C909	Capacitor Polycarbonat 1nF ±20% 630V	ERO	KC1849 21016
C910	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2222 344 24104
C911	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2222 344 24104
C912	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2222 344 24104
C913	Capacitor Polycarbonat 1nF±20% 630V	ERO	KC1849 21016
C914	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2222 344 24104
C915	Capacitor Polyester 10nF ±20% 400V	PHILIPS	2222 344 54103
C916	Capacitor Polyester 10nF ±20% 400V	PHILIPS	2222 344 54103
C917	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2222 344 24104
C918	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2222 344 24104
C919	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2222 344 24104
C920	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2222 344 24104
C921	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2222 344 24104
C922	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2222 344 24104
C923	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2222 344 24104
C924	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2222 344 24104
C925	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2222 344 24104
C926	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2222 344 24104
C927	Capacitor Polycarbonat 1nF ±20% 630V	ERO	KC1849 21016
C928	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2222 344 24104
C929	Capacitor Polycarbonat 1nF ±20% 630V	ERO	KC1849 21016
C930	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2222 344 24104
C931	Capacitor Polycarbonat 1nF±20% 630V	ERO	KC1849 21016
C932	Capacitor Polyester 100nF ±20% 100V	PHILIPS	2222 344 24104
C933	Capacitor Polyester 10nF ±20% 400V	PHILIPS	2222 344 54103
C934	Capacitor Electrolyt 10nF ±20% 35V	ERO	EKI 00AA 210F
C935	Capacitor Electrolyt 47uF -10/+50% 63V	ERO	B41283-C8476-T

MODULE NO: 900

INPUT FILTER S/1302/S1303/S1304 Module 900 2/2

Symbol	Description		Manufact.	
C936	Capacitor Polyester 100nF ±20%	100V	PHILIPS	2222 344 24104
C937	Capacitor Polyester 100nF ±20%	100V	PHILIPS	2222 344 24104
D901	Diode Silkon		PHILIPS	BAV21
	Not In S1302			

MODE SWITCH S1302 Module 1000

Symbol	Description	Manufact.	
R1001	Resistor 10 kohm ±5% 0,33W	PHILIPS	2322 211 13103
R1002	Resistor 3,9 kohm ±5% 0,33W	PHILIPS	2322 211 13392
R1003	Resistor 3,9 kohm ±5% 0,33W	PHILIPS	2322 211 13392
R1004	Resistor 10 kohm ±5% 0,33W	PHILIPS	2322 211 13103
R1005	Resistor 27 kohm ±5% 0,33W	PHILIPS	2322 211 13273
R1006	Resistor 330 ohm ±5% 1,15W	PHILIPS	2322 214 13331
R1007	Resistor 18 kohm ±5% 0,33W	PHILIPS	2322 211 13183
R1008	Resistor 10 kohm ±5% 0,33W	PHILIPS	2322 211 13103
R1009	Resistor 4,7 kohm ±5% 0,33W	PHILIPS	2322 211 13472
R1010	Resistor 68 ohm ±5% 0,33W	PHILIPS	2322 211 13680
R1011	Resistor 10 kohm ±5% 0,33W	PHILIPS	2322 211 13103
R1012	Resistor 10 kohm ±5% 0,33W	PHILIPS	2322 211 13103
R1013	Resistor 10 kohm ±5% 0,33W	PHILIPS	2322 211 13103
R1014	Resistor 18 kohm ±5% 0,33W	PHILIPS	2322 211 13183
R1015	Resistor 15 kohm ±5% 0,33W	PHILIPS	2322 211 13153
R1016	Resistor 10 kohm ±5% 0,33W	PHILIPS	2322 211 13103
R1017	Resistor 18 kohm ±5% 0,33W	PHILIPS	2322 211 13183
R1018	Resistor 22 kohm ±5% 0,33W	PHILIPS	2322 211 13223
R1019	Resistor 22 kohm ±5% 0,33W	PHILIPS	2322 211 13223
R1020	Resistor 10 kohm ±5% 0,33W	PHILIPS	2322 211 13103
R1021	Resistor 10 kohm ±5% 0,33W	PHILIPS	2322 211 13103
R1022	Resistor 270 ohm ±5% 0,33W	PHILIPS	2322 211 13271
R1023	Resistor 3,3 kohm ±5% 0,33W	PHILIPS	2322 211 13332
R1024	Resistor 3,9 kohm ±5% 0,33W	PHILIPS	2322 211 13392
R1025	Resistor 10 kohm ±5% 0,33W	PHILIPS	2322 211 13103
R1026	Resistor 4,7 kohm ±5% 0,33W	PHILIPS	2322 211 13472
R1027	Resistor 15 ohm ±5% 0,33W	PHILIPS	2322 211 13150
R1028	Resistor 820 ohm ±5% 0,33W	PHILIPS	2322 211 13821
C1001	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1002	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1003	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1004	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1005	Capacitor Polyetylene 220nF ±10% 100V	SIEMENS	B32511-D1224-D
C1006	Capacitor Polyester 100nF ±10% 100V	PHILIPS	2222 344 25104
C1007	Capacitor Electrolyt 470uF -10/+50% 25V	ERO	EB00GD347E
C1008	Capacitor Polyethylene 220nF ±10% 100V	SIEMENS	B32511-D1224-D
C1009	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1010	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1011	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1012	Capacitor Electrolyt 4,7uF ±20% 50V	ERO	EKI 00AA 147H

Symbol	Description			Manufact.	
C1013	Capacitor Ceramic	10nF -20/+80%	50V	KCK	HE70SJYF103Z
C1014	Capacitor Ceramic	10nF -20/+80%	50V	KCK	HE70SJYF103Z
C1015	Capacitor Ceramic	10nF -20/+80%	50V	KCK	HE70SJYF103Z
C1016	Capacitor Ceramic	10nF -20/+80%	50V	KCK	HE70SJYF103Z
D1001	Diode Silicon			PHILIPS	BAV21
D1002	Diode Silicon			PHILIPS	BAV21
D1003	Diode Silicon			PHILIPS	BAV21
D1004	Diode Silicon			PHILIPS	BAV21
D1005	Diode Silicon			PHILIPS	BAV21
D1006	Diode Silicon			PHILIPS	BAV21
D1007	Diode Germanium			ITT	AA143
D1008	Diode Silicon			PHILIPS	BAV21
D1009	Diode Silicon			PHILIPS	BAV21
D1010	Diode Silicon			PHILIPS	BAV21
D1011	Diode Silicon			PHILIPS	BAV21
D1012	Diode Silicon			PHILIPS	BAV21
D1013	Diode Silicon			PHILIPS	BAV21
D1014	Diode Silicon			PHILIPS	BAV21
D1015	Diode Silicon			PHILIPS	BAV21
D1016	Diode Silicon			PHILIPS	BAV21
D1017	Diode Silicon			PHILIPS	BAV21
D1018	Diode Silicon			PHILIPS	BAV21
D1019	Diode Silicon			PHILIPS	BAV21
D1020	Diode Silicon			PHILIPS	BAV21
T1001	Transistor			PHILIPS	BC639
T1002	Transistor			PHILIPS	BC558B
T1003	Transistor			PHILIPS	BC558B
T1004	Transistor			PHILIPS	BC558B
T1005	Transistor			PHILIPS	BC558B
T1006	Transistor			PHILIPS	BC558B
T1007	Transistor			PHILIPS	BC548B
T1008	Transistor			PHILIPS	BC548B
T1009	Transistor			PHILIPS	BC640
T1010	Transistor			PHILIPS	BC558B
RE1001	Relay 24V			NATIONAL	NF2-24V
RE1002	Relay 24V			ITT	LZ24H
RE1003	Relay 24V			NATIONAL	NF4-24
RT1004	Relay 24V			NATIONAL	NF4-24

MODE SWITCH S1302 Module 1000

Symbol	Description	Manufact.	
S1001	Switch 6x17,5 60 GR Tast 1 = OA	SHADOW	

SSB GENERATOR S1302/3/4

Symbol	Description				Manufact.	
R1101	Resistor	6K8 ohm	±5%	0.33W	Philips	2322 211 13682
R1102	Resistor	1K0 ohm	±5%	0.33W	Philips	2322 211 13102
R1103	Resistor	220 ohm	±5%	0.33W	Philips	2322 211 13221
R1104	Resistor	1K0 ohm	±5%	0.33W	Philips	2322 211 13102
R1105	Resistor	1K0 ohm	±5%	0.33W	Philips	2322 211 13102
R1106	Resistor	1K0 ohm	±5%	0.33W	Philips	2322 211 13102
R1107	Resistor	1K0 ohm	±5%	0.33W	Philips	2322 211 13102
R1108	Resistor	6K8 ohm	±5%	0.33W	Philips	2322 211 13682
R1109	Potentiometer	22K ohm		cermet	Philips	2322 482 20223
R1110	Resistor	5K6 ohm	±5%	0.33W	Philips	2322 211 13562
R1111	Resistor	12K ohm	±5%	0.33W	Philips	2322 211 13123
R1112	Resistor	2K2 ohm	±5%	0.33W	Philips	2322 211 13222
R1113	Resistor	2K2 ohm	±5%	0.33W	Philips	2322 211 13222
R1114	Resistor	2K2 ohm	±5%	0.33W	Philips	2322 211 13222
R1115	Resistor	2K2 ohm	±5%	0.33W	Philips	2322 211 13222
R1116	Resistor	68 ohm	±5%	0.33W	Philips	2322 211 13689
R1117	Resistor	150 ohm	±5%	0.33W	Philips	2322 211 13151
R1118	Resistor	15K ohm	±5%	0.33W	Philips	2322 211 13153
R1119	Resistor	47K ohm	±5%	0.33W	Philips	2322 211 13473
R1120	Resistor	47K ohm	±5%	0.33W	Philips	2322 211 13473
R1121	Resistor	47 ohm	±5%	0.33W	Philips	2322 211 13479
R1122	Resistor	47 ohm	±5%	0.33W	Philips	2322 211 13479
R1123	Resistor	390 ohm	±5%	0.33W	Philips	2322 211 13391
R1124	Resistor	47K ohm	±5%	0.33W	Philips	2322 211 13473
R1125	Potentiometer	100 ohm		cermet	Philips	2322 482 20101
R1126	Resistor	330 ohm	±5%	0.33W	Philips	2322 211 13331
R1127	Resistor	330 ohm	±5%	0.33W	Philips	2322 211 13331
R1128	Resistor	470 ohm	±5%	0.33W	Philips	2322 211 13471
R1129	Resistor	47K ohm	±5%	0.33W	Philips	2322 211 13473
R1130	Resistor	150 ohm	±5%	0.33W	Philips	2322 211 13151
R1131	Resistor	2K2 ohm	±5%	0.33W	Philips	2322 211 13222
R1132	Resistor	18K ohm	±5%	0.33W	Philips	2322 211 13183
R1133	Resistor	56K ohm	±5%	0.33W	Philips	2322 211 13563
R1134	Resistor	100 ohm	±5%	0.33W	Philips	2322 211 13101
R1135	Resistor	1K0 ohm	±5%	0,33W	Philips	2322 211 13102
R1136	Resistor	1K0 ohm	±5%	0.33W	Philips	2322 211 13102
R1137	Resistor	22K ohm	±5%	0.33W	Philips	2322 211 13223
R1138	Resistor	68K ohm	±5%	0.33W	Philips	2322 211 13683
R1139	Resistor	1K5 ohm	±5%	0.33W	Philips	2322 211 13152
R1140	Resistor NTC	1K0 ohm	±5%	0.5W	Philips	2322 642 12102

SSB GENERATOR S1302/3/4

Symbol	Description				Manufact.	
R1141	Resistor	1K0 ohm	±5%	0.33W	Philips	2322 211 13102
R1142	Resistor	150 ohm	±5%	0.33W	Philips	2322 211 13151
R1143	Resistor	330 ohm	±5%	0.33W	Philips	2322 211 13331
R1144	Resistor	2K7 ohm	±5%	0.33W	Philips	2322 211 13272
R1145	Resistor	1K8 ohm	±5%	0.33W	Philips	2322 211 13182
R1146	Resistor	2K2 ohm	±5%	0.33W	Philips	2322 211 13222
R1147	Resistor	1K5 ohm	±5%	0.33W	Philips	2322 211 13152
R1148	Resistor	15K ohm	±5%	0.33W	Philips	2322 211 13153
R1149	Potentiometer	100 ohm		cermet	Philips	2322 482 20101
R1150	Resistor	47 ohm	±5%	0.33W	Philips	2322 211 13479
R1151	Resistor	220 ohm	±5%	0.33W	Philips	2322 211 13221
R1152	Resistor	270 ohm	±5%	0.33W	Philips	2322 211 13271.
R1153	Resistor	26K7 ohm	±1%	0.4W	Philips	2322 151 52673
R1154	Resistor	26K7 ohm	±1%	0.4W	Philips	2322 151 52673
R1155	Resistor	8K2 ohm	±5%	0.33W	Philips	2322 211 13822
R1156	Resistor	1K8 ohm	±5%	0.33W	Philips	2322 211 13182
R1157	Resistor	560 ohm	±5%	0.33W	Philips	2322 211 13561
R1158	Potentiometer	470 ohm		cermet	Philips	2322 482 20471
R1159	Resistor	560 ohm	±5%	0.33W	Philips	2322 211 13561
R1160	Resistor	120 ohm	±5%	0.33W	Philips	2322 211 13121
R1161	Resistor	150 ohm	±5%	0.33W	Philips	2322 211 13151
R1162	Resistor	150 ohm	±5%	0.33W	Philips	2322 211 13151
R1163	Resistor	150 ohm	±5%	0.33W	Philips	2322 211 13151
C1101	Capacitor tantalum	4u7F	-20/+50%	35V	ERO	ETP 2E
C1102	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1103	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1104	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1105	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1106	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1107	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1108	Capacitor polystyrene	1n2F	± 5%	125V	Philips	2222 425 21202
C1109	Capacitor polystyrene	4n7F	± 5%	63V	Philips	2222 424 24702
C1110	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1111	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1112	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1113	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1114	Capacitor polystyrene	1n0F	± 5%	125V	Philips	2222 425 21002
C1115	Capacitor polyester	100nF	±2P%	100V	Philips	2222 344 24104
C1116	Capacitor electrolyt	100uF	-10/+50%	25V	ROE	EKM00CC310E

SSB GENERATOR S1302/3/4

Symbol	Description				Manufact.	
C1117	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1118	Capacitor polyester	10nF	±20%	250V	Philips	2222 344 40103
C1119	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1120	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1121	Capacitor polyester	10nF	±20%	250V	Philips	2222 344 40103
C1122	If fitted:					
	Capacitor ceramic	27pF	± 5%	400V	Ferroperm	9/0112.9
C1123	Capacitor trimmer teflon 2.5 - 45pF			NPO	DAU	107-5901-045
C1124	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1125	Capacitor polystyrene	1n0F	± 5%	125V	Philips	2222 425 21002
C1126	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1127	Capacitor polystyrene	1n5F	± 5%	125V	Philips	2222 425 21502
C1128	Capacitor polystyrene	3n3F	± 5%	125V	Philips	2222 425 23302
C1129	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1130	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1131	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1132	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1133	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1134	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1135	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1136	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1137	Capacitor polystyrene	560pF	± 2%	250V	Philips	2222 426 35601
C1138	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1139	Capacitor polystyrene	2n2F	± 5%	125V	Philips	2222 425 22202
C1140	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1141	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1142	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
C1143	Capacitor polyester	100nF	±20%	100V	Philips	2222 344 24104
D1101	Diode				Philips	1N4148
D1102	Diode				Philips	1N4148
D1103	Diode				Philips	1N4148
D1104	Diode				Philips	1N4148
D1105	Diode switch				Philips	BAW62
D1106	Diode switch				Philips	BAW62
D1107	Diode Zener	7.5V	± 5%	0.4W	Philips	BZX79C7V5
L1101	Coil	TL 013			S.P.	
L1102	Coil	TL 020			S.P.	
L1103	Coil	TL 076			S.P.	

SSB GENERATOR S1302/3/4

Symbol	Description		Manufact.	
L1104	Coil	TL 026	S.P.	
L1105	Coil	TL 013	S.P.	
L1106	Coil	TL 309	S.P.	6-0-23161
T1101	Transistor		Philips	BC 547
T1102	Transistor		Philips	BC 547
T1103	Transistor		Philips	BC 547
T1104	Transistor		Philips	BC 547
T1105	Transistor		Philips	BF 199
T1106	Transistor		Philips	BC 547
IC1101	Integrated circuit		RCA	CA 3019
T1101	LSB crystal filter 600 kHz		S.P.	C1002

b MICROPHONE AMPLIFIER S1300 1/3

Symbol	Description			Manufact.	
R1201	Preset pot.meter, cermet 1Kohm ±20%0,5W			Philips	2322 482 20102
R1202	Resistor	330 ohm ±5%	1,15W	Philips	2322 214 13331
R1203	Resistor	1Kohm ±5%	0,33W	Philips	2322 211 13102
R1204	Resistor	2,7Kohm ±5%	0,33W	Philips	2322 211 13272
R1205	Resistor	2,7Kohm ±5%	0,33W	Philips	2322 211 13272
R1206	Resistor	180 ohm ±5%	0,33W	Philips	2322 211 13181
R1207	Resistor	100 ohm ±5%	0,33W	Philips	2322 211 13101
R1208	Resistor	4,7Kohm ±5%	0,33W	Philips	2322 211 13472
R1209	Resistor	100Kohm ±5%	0,33W	Philips	2322 211 13104
R1210	Resistor	2,7Kohm ±5%	0,33W	Philips	2322 211 13272
R1211	Resistor	820 ohm ±5%	0,33W	Philips	2322 211 13821
R1212	Resistor	100Kohm ±5%	0,33W	Philips	2322 211 13104
R1213	Resistor	220Kohm ±5%	0,33W	Philips	2322 211 13224
R1214	Resistor	4,7Kohm ±5%	0,33W	Philips	2322 211 13472
R1215	Resistor	4,7Kohm ±5%	0,33W	Philips	2322 211 13472
R1216	Resistor	390 ohm ±5%	0,33W	Philips	2322 211 13391
R1217	Resistor	10Kohm ±5%	0,33W	Philips	2322 211 13103
R1218	Resistor	4,7Kohm ±5%	0,33W	Philips	2322 211 13472
R1219	Resistor	10Kohm ±5%	0,33W	Philips	2322 211 13103
R1220	Resistor	1Kohm ±5%	0,33W	Philips	2322 211 13102
R1221	Resistor	470 ohm ±5%	0,33W	Philips	2322 211 13471
R1222	Resistor	2,2Kohm ±5%	0,33W	Philips	2322 211 13222
R1223	Resistor	220Kohm ±5%	0,33W	Philips	2322 211 13224
R1224	Preset potmeter, cermet 100Kohm±20%0,5W			Philips	2322 482 20104
R1225	Resistor	1Kohm ±5%	0,33W	Philips	2322 211 13102
R1226	Resistor	10Kohm ±5%	0,33W	Philips	2322 211 13103
R1227	Resistor	4,53Kohm ±1%	0,33W	Philips	2322 151 54533
R1228	Resistor	4,53Kohm ±1%	0,33W	Philips	2322 151 54533
R1229	Resistor	100Kohm ±5%	0,33W	Philips	2322 211 13104
R1230	Resistor	1Kohm ±5%	0,33W	Philips	2322 211 13102
R1231	Resistor	2,2Kohm ±5%	0,33W	Philips	2322 211 13222
R1232	Preset potmeter cermet 470 ohm±20% 0,5W			Philips	2322 482 20471
R1233	Resistor	47Kohm ±5%	0,33W	Philips	2322 211 13473
R1234	Resistor	47Kohm ±5%	0,33W	Philips	2322 211 13473
R1235	Resistor	2,2Kohm ±5%	0,33W	Philips	2322 211 13222
R1236	Resistor	1Kohm ±5%	0,33W	Philips	2322 211 13102
R1237	Resistor	1Kohm ±5%	0,33W	Philips	2322 211 13102
R1238	Resistor	3,9Kohm ±5%	0,33W	Philips	2322 211 13392
R1239	Resistor	2,2Kohm ±5%	0,33W	Philips	2322 211 13222
R1240	Resistor	2,2Kohm ±5%	0,33W	Philips	2322 211 13222

c	MICROPHONE AMPLIFIER S1300		2/3
Symbol	*Description*	*Manufact.*	
R1241	Resistor 2.2Kohm +5% 0,33W	Philips	2322 211 13222
R1242	Resistor 390 ohm +5% 0,33W	Philips	2322 211 13391
R1243	Resistor 270 ohm +5% 0,33W	Philips	2322 211 13271
R1244	Resistor 120 Ohm ±5% 0,33W	Philips	2322 211 13121
R1245	Resistor 1Kohm +5% 0,33W	Philips	2322 211 13102
R1246	Resistor 1Kohm +5% 0,33W	Philips	2322 211 13102
R1247	Resistor 1Kohm +5% 0,33W	Philips	2322 211 13102
R1248	Resistor 15Kohm +5% 0,33W	Philips	2422 211 13153
R1249	Resistor 10Kohm +5% 0,33W	Philips	2322 211 13102
R1250	Resistor 1Kohm +5% 0,33W	Philips	2422 211 13102
C1201	Capacitor tantalum 33uF-20/+50% 10V	Ero	ETP 3G
C1202	Capacitor tantalum 4.7uF-20/+50% 35V	Ero	ETP 2E
C1203	Capacitor tantalum 220nF-20/+50% 35V	Ero	ETP 1A
C1204	Capacitor ceramic 1nF-20/+80% 40V	Ferroperm	9/0129,8
C1205	Capacitor ceramic 1nF-20/+80% 40V	Ferroperm	9/0129,8
C1206	Capacitor tantalum 4.7uF-20/+50% 35V	Ero	ETP 2E
C1207	Capacitor tantalum 100nF-20/+50% 35V	Ero	ETP 1A
C1208	Capacitor electrolytic 470uF-10/+50% 10V	Siemens	B41283-A3477-T
C1209	Capacitor polyester 100nF +20% 100V	Philips	2222 344 24104
C1210	Capacitor tantalum 4.7uF-20/+50% 35V	Ero	ETP 2E
C1211	Capacitor ceramic 150pF +10% 25V	Ferroperm	9/0121.8
C1212	Capacitor polyester 68nF + 5% 100V	Philips	2222 344 23684
C1213	Capacitor poly carb. 68nF + 5% 250V	Philips	2222 344 43683
C1214	Capacitor electrolytic 10uF-10/+50% 63V	Siemens	B41283-A8106-T
C1215	Capacitor poly carb. 68nF+ 5% 250V	Philips	2222 344 43683
C1216	Capacitor tantalum 4.7uF-20/+50% 35V	Ero	ETP 2E
C1217	Capacitor tantalum 4.7uF-20/+50% 35V	Ero	ETP 2E
C1218	Capacitor tantalum 10uF-20/+50% 25V	Ero	ETP 3F
C1219	Capacitor polyester 47nF +10% 250V	Philips	2222 344 41473
C1220	Capacitor tantalum 4.7uF-20/+50% 35V	Ero	ETP 2E
C1221	Capacitor tantalum 4.7uF-20/+50% 35V	Ero	ETP 2E
C1222	Capacitor tantalum 4.7uF-20/+50% 35V	Ero	ETP 2E
C1223	Capacitor polyester 68nF +10% 250V	Philips	2222 344 41683
C1224	Capacitor tantalum 4.7uF-20/+50% 35V	Ero	ETP 2E
C1225	Capacitor tantalum 4.7uF-20/+50% 35V	Ero	ETP 2E
C1226	Capacitor tantalum 4.7uF-20/+50% 35V	Ero	ETP 2E
C1227	Capacitor polyester 220nF +20% 100V	Philips	2322 344 24224
L1201	Coil	S.P.	TL 219

a	MICROPHONE AMPLIFIER S1300		3/3
Symbol	*Description*	*Manufact.*	
T1201	Transistor	Philips	BC 338
T1202	Transistor	Philips	BF 256 B
T1203	Transistor	Philips	BC 548B
T1204	Transistor	Philips	BC 548B
T1205	Transistor	Philips	BC 548B
T1206	Transistor	Philips	BC 548B
T1207	Transistor	Philips	BC 558B
T1208	Transistor	Philips	BC 558B
T1209	Transistor	Philips	BC 548B
T1210	Transistor	Philips	BC 548B
T1211	Transistor	Philips	BC 548B
T1212	Transistor	Philips	BC 548B
T1213	Transistor	Philips	BC 548B
D1201	Diode, zener 5.1V ±5% 1W	Motorola	1N4733A
D1202	Diode, zener 5.1V ±5% 0.4W	Philips	BZX79 C5V1
D1203	Diode, silicon	Philips	BAV 21
D1204	Diode, zener 7.5V ±5% 0.4W	Philips	BZX79 C7V5
D1205	Diode, silicon	Philips	BAV 21
D1206	Diode, switch	Philips	BA 182
D1207	Diode, switch	Philips	BA 182
D1208	Diode, switch	Philips	BA 182
D1209	Diode, switch	Philips	BA 182
IC1201	Integrated circuit	Texas	SN7472N

ALARM SIGNAL GENERATOR S1300/01/02/03/04 Module 1300 1/2

Symbol	Description				Manufact.	
R1301	Resistor	270 ohm	±5%	1,6W	PHILIPS	2322 191 50271
R1302	Resistor	150 ohm	±5%	0,33W	PHILIPS	2322 211 13151
R1303	Resistor	4,7 kohm	±5%	0,33W	PHILIPS	2322 211 13472
R1304	Resistor	3,3 kohm	±5%	0,33W	PHILIPS	2322 211 13332
R1305	Resistor	10 kohm	±5%	0,33W	PHILIPS	2322 211 13103
R1306	Resistor	33 kohm	±5%	0,33W	PHILIPS	2322 211 13333
R1307	Resistor	3,3 kohm	±5%	0,33W	PHILIPS	2322 211 13332
R1308	Resistor	1,2 kohm	±5%	0,33W	PHILIPS	2322 211 13122
R1309	Resistor	330 ohm	±5%	0,33W	PHILIPS	2322 211 13331
R1310	Resistor	470 ohm	±5%	0,33W	PHILIPS	2322 211 13471
R1311	Resistor	18 kohm	±5%	0,33W	PHILIPS	2322 211 13183
R1312	Resistor	10 kohm	±5%	0,33W	PHILIPS	2322 211 13103
R1313	Resistor	1,5 kohm	±5%	0,33W	PHILIPS	2322 211 13152
R1314	Resistor	4,7 kohm	±5%	0,33W	PHILIPS	2322 211 13472
R1315	Resistor	10 kohm	±5%	0,33W	PHILIPS	2322 211 13103
R1316	Resistor	10 kohm	±5%	0,33W	PHILIPS	2322 211 13103
C1301	Capacitor Polyester	0,1uF	±10%	100V	SIEMENS	B32510-D1104K
C1302	Capacitor Ceramic	10pF	±0,5pF	50V	KCK	HE40SJPH100D
S1303	Capacitor Electrolyt	22uF	±20%	25V	ERO	EKI00AA222E
S1304	Capacitor Polyester	0,22uF	±10%	100V	SIEMENS	B32560-D1224K
S1305	Capacitor Ceramic	150pF	±5%	50V	KCK	HE40SJPH151J
S1306	Capacitor Ceramic	10nF	-20/+80%	50V	KCK	HE70SJYF103Z
S1307	Capacitor Polyester	0,22uF	±10%	100V	SIEMENS	B32560-D1224K
C1308	Capacitor Polyester	10nF	±10%	400V	SIEMENS	B32510-D6103K
C1309	Capacitor Polyester	10nF	±10%	400V	SIEMENS	B32510-D6103K
C1310	Capacitor Polyester	0,1uF	±10%	100V	SIEMENS	B32510-D1104K
C1311	Capacitor Polyester	0,1uF	±10%	100V	SIEMENS	B32510-D1104K
C1312	Capacitor Polyester	0,1uF	±10%	100V	SIEMENS	B32510-D1104K
C1313	Capacitor Polyester	0,1uF	±10%	100V	SIEMENS	B32510-D1104K

MODULE NO: 1300

ALARM SIGNAL GENERATOR S1300/01/02/03/04 Module 1300

Symbol	Description				Manufact.	
C1314	Capacitor polyester	0,1uF	±10%	100V	SIEMENS	B32510-D1104K
C1315	Capacitor polyester	0,1uF	±10%	100V	SIEMENS	B32510-D1104K
L1301	Coil	6uH	±5%		KASCHKE	Bauform 2205 type 4000
D1301	Diode Ge				ITT	AA143
T1301	Transistor				PHILIPS	BC548B
T1302	Transistor				PHILIPS	BC548B
T1303	Transistor				PHILIPS	BF199
T1304	Transistor				PHILIPS	2N2368
T1305	Transistor				PHILIPS	BC558B
IC1301	Voltage Regulator				MOTOROLA	MC78L05ACP
IC1302	Integrated Circuit				MOTOROLA	MC14081BCP
IC1303	Integrated Circuit				MOTOROLA	MC14071BCP
IC1304	Integrated Circuit				MOTOROLA	MC14082BCP
IC1305	Integrated Circuit				MOTOROLA	MC14040BCP
IC1306	Integrated Circuit				MOTOROLA	MC14040BCP
IC1307	Integrated Circuit				MOTOROLA	MC14040BCP
IC1308	Integrated Circuit				MOTOROLA	MC14027BCP
IC1309	Integrated Circuit				MOTOROLA	MC14073BCP
IC1310	Integrated Circuit				MOTOROLA	MC14040BCP
IC1311	Integrated Circuit				MOTOROLA	MC140027BCP
IC1312	Integrated Circuit				MOTOROLA	MC140073BCP
IC1313	Integrated Circuit				TEXAS	SN74LS197N

OUTPUT FILTER S1302/3/4

Symbol	Description				Manufact.	
C1401	Capacitor polystyrene	160pF	±2%	630V	Philips	2222 427 31601
C1402	Capacitor ceramic	39pF	±5%	50V	K.C.K.	HE50SJPH390J
C1403	Capacitor ceramic	39pF	±5%	50V	K.C.K.	HE50SJPH390J
C1404	Capacitor ceramic	39pF	±5%	50V	K.C.K.	HE50SJPH390J
C1405	Capacitor polystyrene	160pF	±2%	630V	Philips	2222 427 31601
L1401	Coil	TL225			S.P.	6-0-22755
L1402	Coil	TL227			S.P.	6-0-22757
L1403	Coil	TL226			S.P.	6-0-22756
L1404	Coil	TL225			S.P.	6-0-22755

MODULE NO: 1500

BAND-FILTER S1302/3/4 1/4

Symbol	Description	Manufact.	
R1501	Resistor 470 ohm ±5% 0.33W	Philips	2322 211 13471
R1502	Resistor 220 ohm ±5% 0.33W	Philips	2322 211 13221
R1503	Resistor 120 ohm ±5% 0.33W	Philips	2322 211 13121
R1504	Resistor 39 ohm ±5% 0.33W	Philips	2322 211 13399
R1505	Resistor 27 ohm ±5% 0.33W	Philips	2322 211 13279
R1506	Resistor 120 ohm ±5% 0.5W	Philips	2322 212 13121
R1507	Resistor 10 ohm ±5% 0.33W	Philips	2322 211 13109
R1508	Resistor 390 ohm ±5% 0.33W	Philips	2322 211 13391
R1509	Resistor 100Kohm ±5% 0.33W	Philips	2322 211 13104
R1510	Resistor 100Kohm ±5% 0.33W	Philips	2322 211 13104
R1511	Resistor 390 ohm ±5% 0.33W	Philips	2322 211 13391
R1512	Resistor 1K8ohm ±5% 0.33W	Philips	2322 211 13182
R1513	Resistor 1K8 ohm ±5% 0.33W	Philips	2322 211 13182
R1514	Resistor 390 ohm ±5% 0.33W	Philips	2322 211 13391
R1515	Resistor 390 ohm ±5% 0.33W	Philips	2322 211 13391
R1516	Resistor 1K8 ohm ±5% 0.33W	Philips	2322 211 13182
R1517	Resistor 1K8 ohm ±5% 0.33W	Philips	2322 211 13182
R1518	Resistor 390 ohm ±5% 0.33W	Philips	2322 211 13391
R1519	Resistor 390 ohm ±5% 0.33W	Philips	2322 211 13391
R1520	Resistor 1K8 ohm ±5% 0.33W	Philips	2322 211 13182
R1521	Resistor 1K8 ohm ±5% 0.33W	Philips	2322 211 13182
R1522	Resistor 680 ohm ±5% 0.33W	Philips	2322 211 13681
R1523	Resistor 270 ohm ±5% 0.33W	Philips	2322 211 13271
R1524	Resistor 27 ohm ±5% 0.33W	Philips	2322 211 13279
R1525	Resistor 100 ohm Potentiometer 0.3W	Noble	TM8KV2-1S
R1526	Resistor 12 ohm ±5% 0.33W	Philips	2322 211 13129
R1527	Resistor 1K2 ohm ±5% 0.33W	Philips	2322 106 13122
R1528	Resistor 2K2 ohm ±5% 0.33W	Philips	2322 106 13222
R1529	Resistor 470 ohm ±5% 0.33W	Philips	2322 211 13471
R1530	Resistor 39 ohm ±5% 0.33W	Philips	2322 211 13399
R1531 to R1534	Not used		
C1501	Capacitor polyester 100nF ±20% 100V	Philips	2222 344 24104
C1502	Capacitor polyester 100nF ±20% 100V	Philips	2222 344 24104
C1503	Capacitor polyester 100nF ±20% 100V	Philips	2222 344 24104
C1504	Capacitor ceramic 10nF-20/+80% 50V	K.C.K.	HE70SJYF103Z
C1505	Capacitor ceramic 10nF-20/+80% 50V	K.C.K.	HE70SJYF103Z

BAND-FILTER S1302/3/4

Symbol	Description				Manufact.	
C1506	Capacitor polyester	100nF	+20%	100V	Philips	2222 344 24104
C1507	Capacitor polyester	22nF	+20%	400V	Philips	2222 344 54223
C1508	Capacitor polyester	22nF	+20%	400V	Philips	2222 344 54223
C1509	Capacitor polystyrene	75pF	+ 2%	630V	Philips	2222 427 37509
C1510	Capacitor polystyrene	47pF	+2,5%	160V	Siemens	B31063-B1470-H
C1511	Capacitor ceramic	20pF	+ 5%	50V	K.C.K.	HE40SJPH200J
C1512	Capacitor ceramic	15pF	+ 5%	50V	K.C.K.	HE40SJPH150J
C1513	Capacitor polystyrene	220pF	+ 2%	630V	Philips	2222 427 32201
C1514	Capacitor polystyrene	160pF	+ 2%	630V	Philips	2222 427 31601
C1515	Capacitor ceramic	6P8F	+ Op5F	50V	K.C.K.	HE40SJPH068D
C1516	Capacitor ceramic	4p7	+ Op5F	50V	K.C.K.	HE40SJPH047D
C1517	Capacitor polyester	22nF	+20%	400V	Philips	2222 344 54223
C1518	Capacitor polyester	22nF	+20%	400V	Philips	2222 344 54223
C1519	Capacitor polystyrene	130pF	+ 2%	630V	Philips	2222 427 31301
C1520	Capacitor polystyrene	91pF	+ 2%	630V	Philips	2222 427 39109
C1521	Capacitor polyester	22nF	+20%	400V	Philips	2222 344 54223
C1522	Capacitor polyester	22nF	+20%	400V	Philips	2222 344 54223
C1523	Capacitor polyester	22nF	+20%	400V	Philips	2222 344 54223
C1524	Capacitor polyester	22nF	+20%	400V	Philips	2222 344 54223
C1525	Capacitor polystyrene	91pF	+ 2%	630V	Philips	2222 427 39109
C1526	Capacitor polystyrene	120pF	+ 2%	630V	Philips	2222 427 31201
C1527	Capacitor ceramic	8p2F	+0.25pF	500V	K.C.K.	HM60SJCH082G
C1528	Capacitor ceramic	10pF	+0.5pF	500V	K.C.K.	HM60SJCH100G
C1529	Capacitor polystyrene	150pF	+ 2%	630V	Philips	2222 427 31501
C1530	Capacitor polystyrene	180 pF	+ 2%	630V	Philips	2222 427 31801
C1531	Capacitor polystyrene	240pF	+ 2%	630V	Philips	2222 427 32401
C1532	Capacitor polystyrene	360pF	+ 2%	630V	Philips	2222 427 33901
C1533	Capacitor polyester	22nF	+20%	400V	Philips	2222 344 54223
C1534	Capacitor polyester	22nF	+20%	400V	Philips	2222 344 54223
C1535	Capacitor polyester	22nF	+20%	400V	Philips	2222 344 54223
C1536	Capacitor polyester	22nF	+20%	400V	Philips	2222 344 54223
C1537	Capacitor polystyrene	62pF	+ 2%	630V	Philips	2222 427 36209
C1538	Capacitor polystyrene	75pF	+ 2%	630V	Philips	2222 427 37509
C1539	Capacitor ceramic	5p6F	+0.25pF	500V	K.C.K.	HM60SJCH056G
C1540	Capacitor ceramic	6p8F	+0p25F	500V	K.C.K.	HM60SJCH068G
C1541	Capacitor polystyrene	100pF	+ 2%	630V	Philips	2222 427 31001
C1542	Capacitor polystyrene	120pF	+ 2%	630V	Philips	2222 427 31201
C1543	Capacitor polystyrene	160pF	+ 2%	630V	Philips	2222 427 31601
C1544	Capacitor polystyrene	200pF	+ 2%	630V	Philips	2222 427 32001
C1545	Capacitor polystyrene	18pF	+ 5%	500V	K.C.K.	HM60SJCH180J

BAND-FILTER S1302/3/4

Symbol	Description		Manufact.	
C1546	Capacitor polyester	100nF ±20% 100V	Philips	2222 344 24104
C1547	Capacitor ceramic	10nF-20/+80% 50V	K.C.K.	HE70SJYF103Z
C1548	Capacitor polyester	100nF ±20% 100V	Philips	2222 344 24104
C1549	Capacitor ceramic	22pF ± 5% 500V	K.C.K.	HM60SJPH220J
C1550	Capacitor ceramic	10nF-20/+80% 50V	K.C.K.	HE70SJYF103Z
C1551	Capacitor polyester	100nF ±20% 100V	Philips	2222 344 24104
C1552	Capacitor polyester	100nF ±20% 100V	Philips	2222 344 24104
C1553	Capacitor polyathylen	10nF ±10% 400V	Siemens	B32510-D6103-K
C1554 to C1565	Not used			
L1501	Coil	TL145	S.P.	6-0-22759
L1502	Coil	TL147	S.P.	6-0-22761
L1503	Coil	TL146	S.P.	6-0-22760
L1504	Coil	TL148	S.P.	6-0-22762
L1505	Coil	TL243	S.P.	6-0-21566
L1506	Coil	TL241	S.P.	6-0-21564
L1507	Coil	TL244	S.P.	6-0-21567
L1508	Coil	TL242	S.P.	6-0-21565
L1509	Coil	TL247	S.P.	6-0-21570
L1510	Coil	TL245	S.P.	6-0-21568
L1511	Coil	TL248	S.P.	6-0-21571
L1512	Coil	TL246	S.P.	6-0-21569
L1513	Coil	1uH ±10% Type 15	Airco	4425-6K
L1514 to L1517	Not used			
T1501	Transistor		Philips	BFW17A
T1502	Transistor		Philips	BFW17A
T1503	Transistor		Philips	BFW17A
D1501	Diode, switch		Philips	BA243
D1502	Diode, switch		Philips	BA243
D1503	Diode, switch		Philips	BA243
D1504	Diode, switch		Philips	BA243
D1505	Diode, switch		Philips	BA243
D1506	Diode, switch		Philips	BA243
D1507	Diode, switch		Philips	BA243

BAND-FILTER S1302/3/4

Symbol	Description		Manufact.	
D1508	Diode, switch		Philips	BA243
D1509	Diode, switch		Philips	BA243
D1510	Diode, swirch		Philips	BA243
D1511	Diode, switch		Philips	BA243
D1512	Diode, switch		Philips	BA243
D1513	Diode, switch		Philips	BA243
D1514	Diode, switch		Philips	BA243
D1515	Diode, switch		Philips	BA243
D1516	Diode, switch		Philips	BA243
D1517	Diode, switch		Philips	BA243
D1518	Diode, switch		Philips	BA243
D1519	Diode, switch		Philips	BA243
D1520	Diode, switch		Philips	BA243
D1521 to D1526	Not used			
TR1501	Transformer	TL249	S.P.	6-0-21572
TR1502	Transformer	TL285	S.P.	6-0-22758

MODULE NO: 1600

a	MIXER UNIT S1300		1/3
Symbol	*Description*	*Manufact.*	
R1601	Resistor 820 ohm ± 5% 0.33W	Philips	2322 211 13821
R1602	Resistor 1.5kohm ± 5% 0.33W	Philips	2322 211 13152
R1603	Resistor 6.8kohm ± 5% 0.33W	Philips	2322 211 13682
R1604	Resistor 820 ohm ± 5% 0.33W	Philips	2322 211 13821
R1605	Resistor 3.3kohm ± 5% 0.33W	Philips	2322 211 13332
R1606	Resistor 33 ohm ± 5% 0.33W	Philips	2322 211 13339
R1607	Resistor NTC 1kohm±10% 0.5W	Philips	2322 642 12102
R1608	Resistor 330 ohm ± 5% 0.33W	Philips	2322 211 13331
R1609	Resistor 220 ohm ± 5% 0.33W	Philips	2322 211 13221
R1610	Resistor 150 ohm ± 5% 0.33W	Philips	2322 211 13151
R1611	Resistor 15 ohm ± 5% 0.33W	Philips	2322 211 13159
R1612	Resistor 4.7kohm ± 5% 0.33W	Philips	2322 211 13472
R1613	Resistor 3.3kohm ± 5% 0.33W	Philips	2322 211 13332
R1614	Resistor 15 ohm ± 5% 0.33W	Philips	2322 211 13159
R1615	Resistor 68 ohm ± 5% 0.33W	Philips	2322 211 13689
R1616	Resistor 68 ohm ± 5% 0.33W	Philips	2322 211 13689
R1617	Resistor 180 ohm ± 5% 0.33W	Philips	2322 211 13181
R1618	Resistor 1kohm ± 5% 0.33W	Philips	2322 211 13102
R1619	Resistor 12kohm ± 5% 0.33W	Philips	2322 211 13123
R1620	Resistor 1.8kohm ± 5% 0.33W	Philips	2322 211 13182
R1621	Resistor 470 ohm ± 5% 0.33W	Philips	2322 211 13471
R1622	Resistor 4.7kohm ± 5% 0.33W	Philips	2322 211 13472
R1623	Resistor 3.9kohm 0.33W	Philips	2322 211 13392
R1624	Resistor 470 ohm ± 5% 0.33W	Philips	2322 211 13471
R1625	Preset pot.meter cermet 2.2kohm±20% 0.5W	Philips	2322 482 20222
R1626	Resistor 2.2kohm ± 5% 0.33W	Philips	2322 211 13222
R1627	Resistor 2.2kohm ± 5% 0.33W	Philips	2322 211 13222
R1628	Resistor 10kohm ± 5% 0.33W	Philips	2322 211 13103
R1629	Resistor 27kohm ± 5% 0.33W	Philips	2322 211 13273
R1630	Resistor 47 ohm ± 5% 0.33W	Philips	2322 211 13479
R1631	Preset pot.meter cermet 100 ohm±20% 0.5W	Philips	2322 482 20101
R1632	Resistor 220 ohm ± 5% 0.33W	Philips	2322 211 13221
R1633	Resistor 1kohm ± 5% 0.33W	Philips	2322 211 13102
R1634	Resistor 8.2kohm ± 5% 0.33W	Philips	2322 211 13822
R1635	Resistor 680 ohm ± 5% 0.33W	Philips	2322 211 13681
R1636	Resistor 100 ohm ± 5% 0.33W	Philips	2322 211 13101
R1637	Resistor 5.6kohm ± 5% 0.33W	Philips	2322 211 13562
R1638	Resistor 22kohm ± 5% 0.33W	Philips	2322 211 13223
R1639	Resistor 330 ohm ± 5% 0.33W	Philips	2322 211 13331
R1640	Resistor 100 ohm ± 5% 0.33W	Philips	2322 211 13101
R1641	Resistor 47 ohm ± 5% 0.33W	Philips	2322 211 13279

c MIXER UNIT S1300 2/3

Symbol	Description	Manufact.	
R1642	Resistor 220 ohm ± 5% 0.33W	Philips	2322 211 13221
R1643	Resistor 33 ohm ± 5% 0.33W	Philips	2322 211 13339
R1644	Resistor 180 ohm ± 5% 0.5W	Philips	2322 212 13181
R1645	Resistor 22 ohm ± 5% 0.33W	Philips	2322 211 13229
R1646	Resistor 180 ohm ± 5% 0.33W	Philips	2322 106 33181
R1647	Resistor 560 ohm ± 5% 0.33W	Philips	2322 106 33181
	In exciters with 3 pos. power switch only:		
R1619	Resistor 12kohm ± 5%	Philips	2322 211 13123
C1601	Capacitor, tantalum 10uF-20/+50% 25V	Ero	ETP 3F
C1602	Capacitor, polyester 47nF ±20% 250V	Philips	2222 344 40473
C1603	Capacitor, tantalum 10uF-20/+50% 25V	Ero	ETP 3F
C1604	Capacitor, polyester 47nF ±20% 250V	Philips	2222 344 40473
C1605	Capacitor, polyester 22nF ±20% 400V	Philips	2222 344 54223
C1606	Capacitor, polyester 47nF ±20% 250V	Philips	2222 344 40473
C1607	Capacitor, polyester 22nF ±20% 400V	Philips	2222 344 54223
C1608	Capacitor polystyrene 2.2nF ± 5% 160V	Philips	2222 425 22202
C1609	Capacitor, polyester 22nF ±20% 400V	Philips	2222 344 54223
C1610	Capacitor, polyester 47nF ±20% 250V	Philips	2222 344 40473
C1611	Capacitor, polyester 47nF ±20% 250V	Philips	2222 344 40473
C1612	Capacitor, polyester 22nF ±20% 400V	Philips	2222 344 54223
C1613	Capacitor, ceramic 12pF ± 5% 400V	Ferroperm	9/0112.9
C1614	Capacitor, ceramic 15pF ± 5% 400V	Ferroperm	9/0112.9
C1615	Capacitor, polystyrene 270pF± 2% 630V	Philips	2222 427 32701
C1616	Capacitor, polystyrene 680pF± 2% 250V	Philips	2222 426 36801
C1617	Capacitor, polyester 22nF ±20% 400V	Philips	2222 344 54223
C1618	Capacitor, ceramic 22pF ±10% 400V	Ferroperm	9/0112.9
C1619	Capacitor, polyester 22nF ±20% 400V	Philips	2222 344 54223
C1620	Capacitor, polystyrene 330pF± 2% 630V	Philips	2222 426 36801
C1621	Capacitor, polystyrene 820pF± 2% 630V	Philips	2222 426 38201
C1622	Capacitor, polystyrene 180pF± 2% 630V	Philips	2222 427 31801
C1623	Capacitor, polystyrene 1.5nF± 2% 160V	Philips	2222 425 31502
C1624	Capacitor, polyester 100nF±20% 100V	Philips	2222 344 24104
C1625	Capacitor, polyester 100nF±20% 100V	Philips	2222 344 24104
C1626	Capacitor, polyester 100nF±20% 100V	Philips	2222 344 24104
C1627	Capacitor, polyester 100nF±20% 100V	Philips	2222 344 24104
C1628	Capacitor, polyester 100nF±20% 100V	Philips	2222 344 24104

a	MIXER UNIT S1300		3/3
Symbol	**Description**	**Manufact.**	
C1629	Capacitor, polyester 100nF±20% 100V	Philips	2222 344 24104
L1601	Coil	S.P.	TL 264
L1602	Coil	S.P.	TL 265
L1603	Coil	S.P.	TL 254
L1604	Coil	S.P.	TL 255
TR1601	W.B. Trafo	S.P.	TL 266
TR1602	W.B. Trafo	S.P.	TL 256
T1601	Transistor	Philips	BF 199
T1602	Transistor	Philips	BF 494
T1603	Transistor	Philips	BF 494
T1604	Transistor	Philips	BF 494
T1605	Transistor	Philips	BF 199
T1606	Transistor	Philips	BFW 17A
D1601	Diode, silicon	Philips	BAV 21
D1602	Diode, silicon	Philips	BAV 21
FL1601	Crystal filter 10.697 MHz	S.P.	C1012
M1601	Mixer, double balanced	S.P.	C1007

POWER SWITCH S1302 Module 1900 1/1

Symbol	Description				Manufact.	
R1901	Resistor	820 ohm	±5%	0,33W	PHILIPS	2322 211 13821
R1902	Resistor	1 kohm	±5%	0,50W	PHILIPS	2322 211 13102
R1903	Resistor	33 kohm	±5%	0,33W	PHILIPS	2322 211 13333
R1904	Resistor	10 kohm	±5%	0,33W	PHILIPS	2322 211 13103
R1905	Resistor	3,6 kohm	±5%	0,33W	PHILIPS	2322 211 13362
S1901	Switch 2x5				JEAN RENAU	RBP12FA2,5

CIRCUIT DESCRIPTIONS AND SCHEMATIC DIAGRAMS

CIRCUIT DESCRIPTION FOR DIVIDER UNIT S130X

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

The 10 MHz reference oscillator (TCXO), reference divider, 2 MHz spectrum generator, 600 kHz carrier generator, programmable dividers for LOOP 1 and LOOP 2 and the phase/frequency detectors for LOOP 1 and LOOP 2.

10 MHz REFERENCE

The frequency stability of the exciter is related to the 10 MHz TCXO X0101. The 10 MHz reference signal is amplified in the transistors T103 and T104.

REFERENCE DIVIDER

The counters IC115, IC111 and IC107 divides 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 IC115 goes low and the nand-gates in IC114 will generate a narrow pulse due to the delay-time in the gates.

600 kHz GENERATOR

The output on IC111 pin 5, Q_B has a high contents of 600 kHz, which is amplified in the transistor T105 and filter in the tuned circuit L101, C136 and C137.

S 1302/03/04

PROGRAMMABLE DIVIDER FOR LOOP 1

The variable frequency f_{T1} from LOOP 1 MIXER is amplified and shaped in T101 and IC109a. Independent of which 2 MHz band 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 is 2000 frequencies in each 2 MHz band. The frequency is controlled by the FREQUENCY SELECTOR, which encodes the start figure P_1 into the BCD counters IC101, IC102, IC103 and IC104.

The stop figure S_1 is controlled from the gates IC108b and IC109c. When the counter outputs Q_A, Q_B ... etc. equals the stop figure S_1 + 2 the J-K flip-flop IC110b uses 2 clock pulses to load the start figure P_1 into the counters IC101, IC102, IC103 and IC104. 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 IC106. The phase/frequency detector IC106 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 & ± 18V SUPPLY UNIT.

PROGRAMMABLE DIVIDER FOR LOOP 2

The variable frequency f_{T2} from the loop 2 mixer is amplified and shaped in T102 and IC109b. The frequency f_{T2} will vary between 98.1 kHz and 99.0 kHz depending on the 100 Hz programming. The programmable divider divides f_{T1} down to 100 Hz (dividing figure N_2).

From the FREQUENCY SELECTOR the start figure P_2 encodes into the BCD counter IC105.

The stop figure S_2 is controlled from the gate IC108a. When the counter outputs Q_A, Q_B, Q_C ... etc. equals the stop figure S_2 - 2 the J-K flip-flop IC110a uses 2 clock pulses to load the start figure P_2 into the counters IC105 and IC112. 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 IC113. The phase/frequency detector IC113 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 VCXO & LOOP 2 FILTER UNIT.

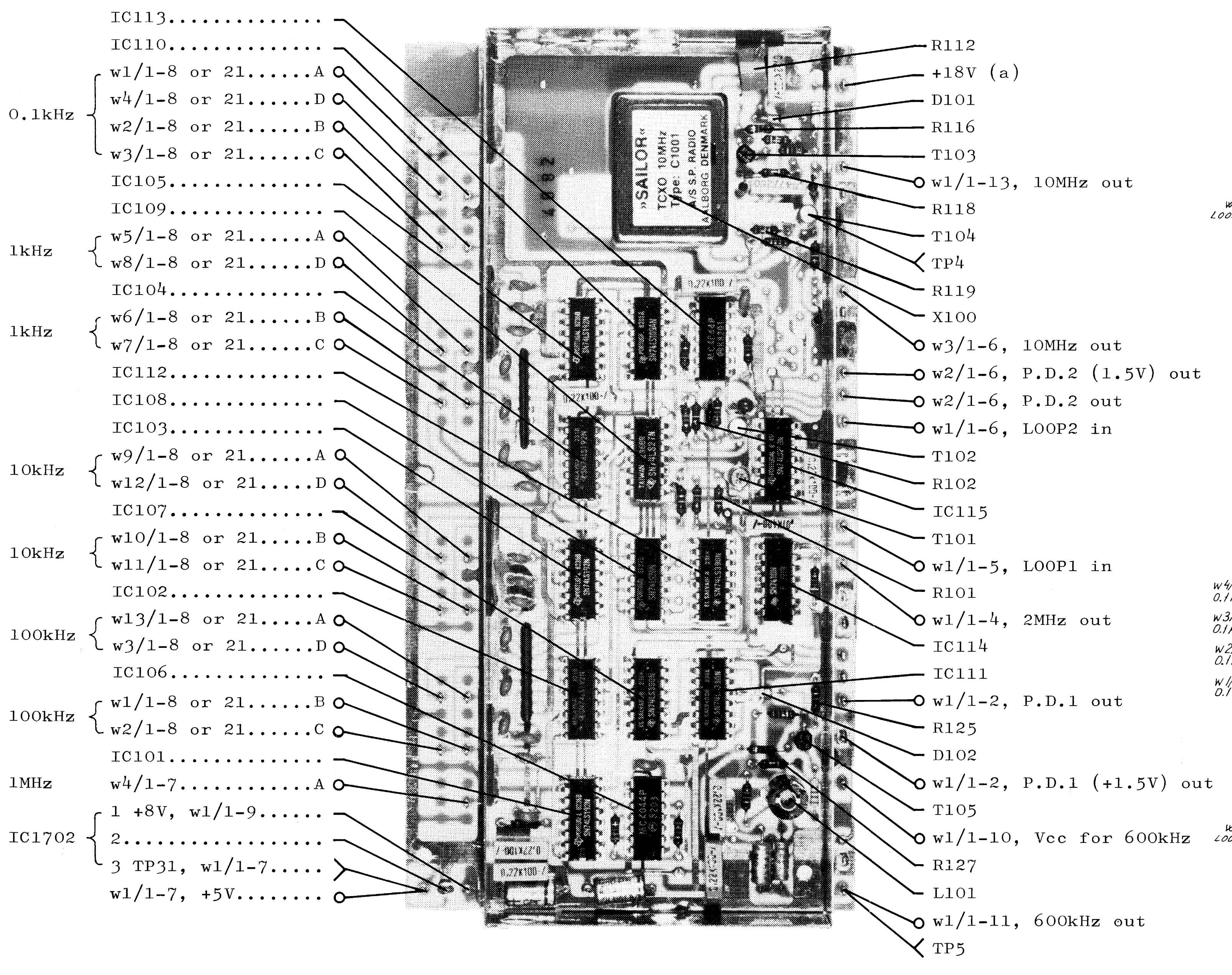
TEST CONDITIONS

Frequency selector	: 1A (f = 2.0005 MHz)
Mode	: A3J
KEY	: ON
Oscilloscope input	: Passive probe 10 Mohm/11pF
DC voltmeter input	: 10 Mohm

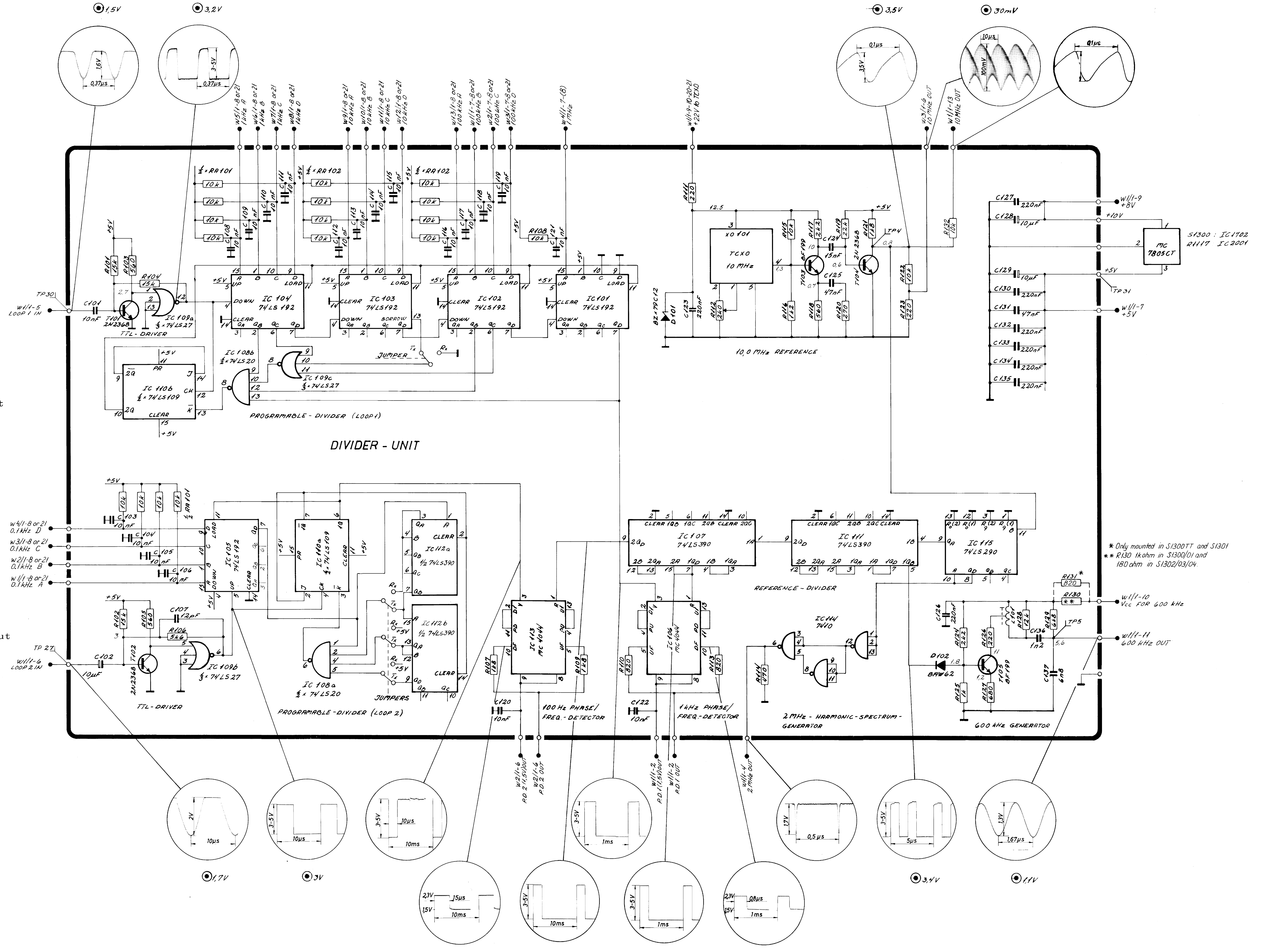
⦿ : Diode probe measurements

TP : Testpoints

All voltage statements are typical



Wire numbers in brackets: S1300, S1301 only.
Module 800 only in S1300, S1300T, S1300TT and S1302
Module 2100 only in S1301, S1303 and S1304



CIRCUIT DESCRIPTION LOOP 1 FILTER & ±18V SUPPLY UNIT S130X

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

-18V SUPPLY

The series transistor T201 supplies a -18V output controlled by the current flow into its base from T202, where a portion of the output voltage, via a voltage divider containing R209, is compared to a reference voltage created by R204, D202 and D201. 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 R204. When the regulator reaches this limit T205 stops conducting and so it folds back. To ensure that T201 starts conducting R203 is added.

+18V SUPPLY

The principle of operation for this regulator is exactly as described above, with an additional current limiter containing T204 and T206 to ensure the fold-back characteristic is maintained within design limits. To ensure start-up R212 is added.

INTEGRATOR & LOOP 1 FILTER

The integrator is built-up around IC202, the integration capacitor is C211. R220 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 IC202 feeds into the active low-pass filter IC201 to filter out the 1 kHz ripple from the phase comparator. The voltage divider R217 and R218 connected to IC202 via D206 ensure that the output voltage swing is within approx. -4V to -17V.

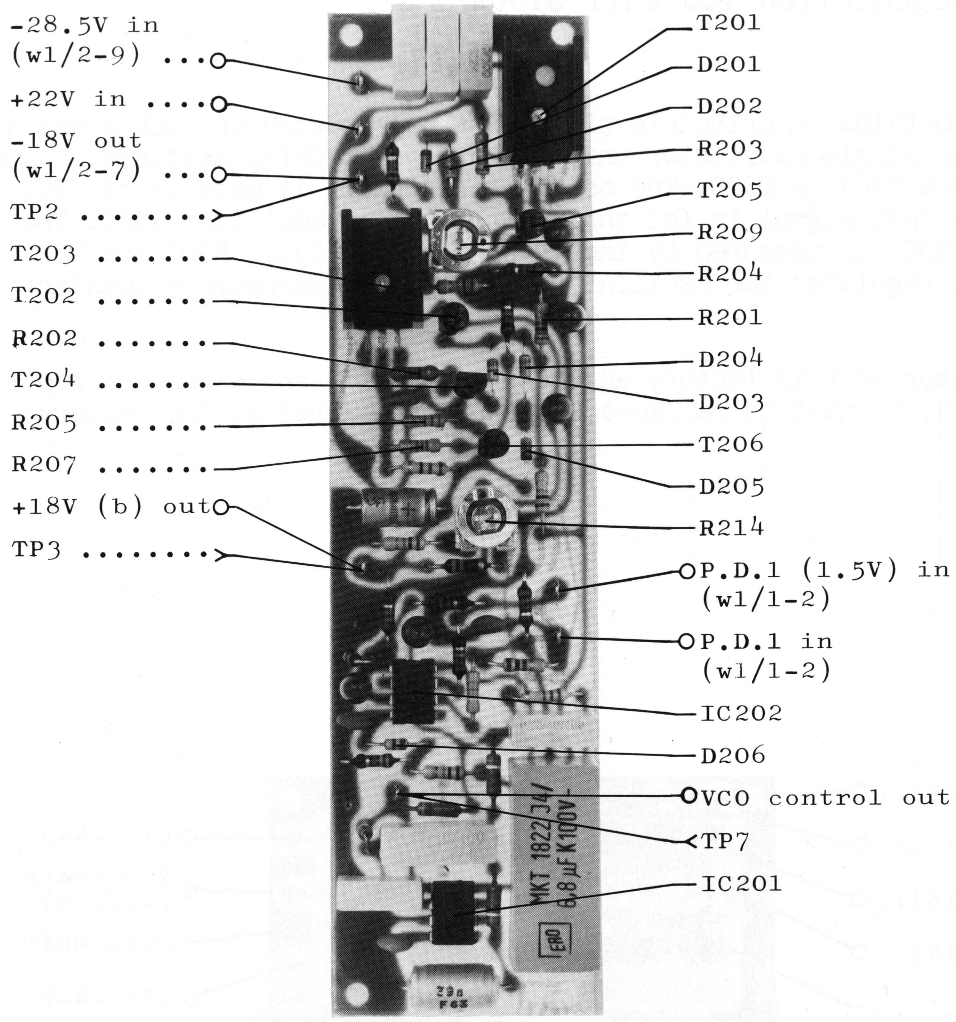
TEST CONDITIONS

Frequency selector	:	1A (f = 2.0005 MHz)
Oscilloscope input	:	Passive probe 10 Mohm/11 pF
DC voltmeter input	:	10 Mohm

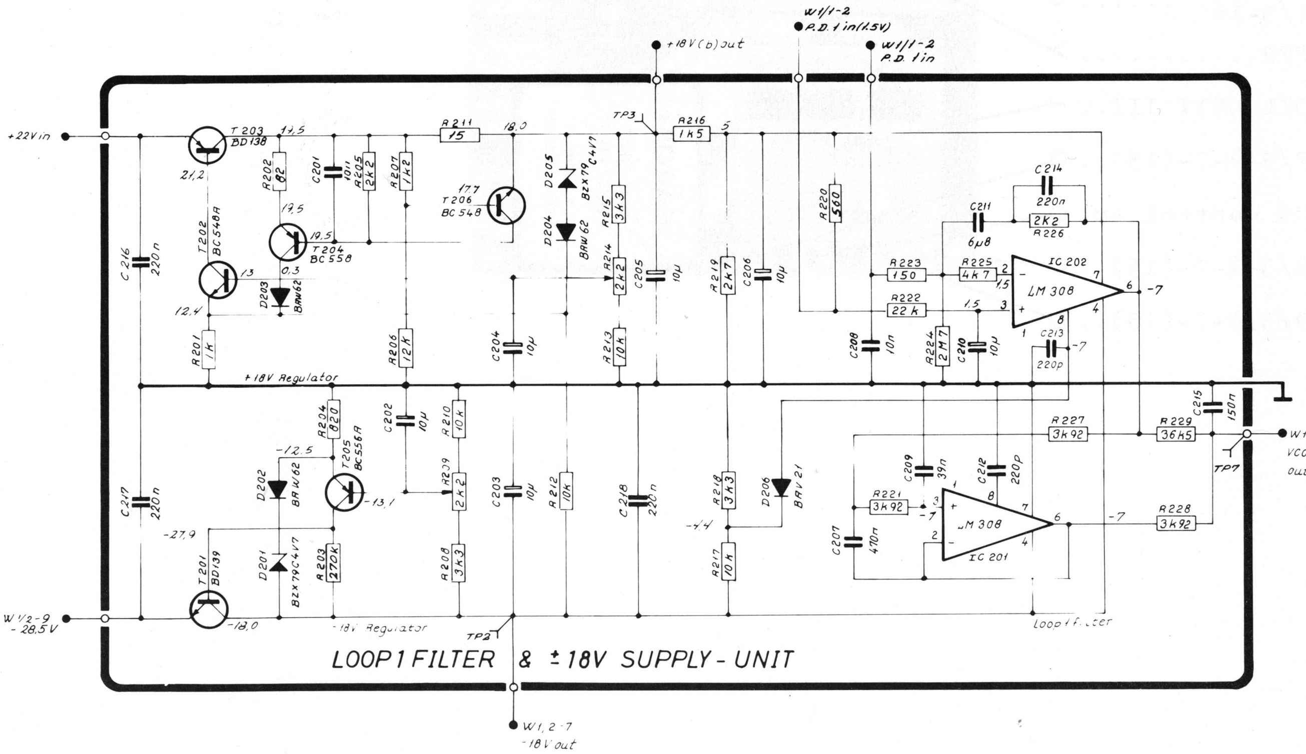
⦿ : Diode probe measurements

TP : Testpoints

All voltage statements are typical



-28.5V in
(w1/2-9)
+22V in
-18V out
(w1/2-7)
TP2
T203
T202
R202
T204
R205
R207
+18V (b) out
TP3
T201
D201
D202
R203
T205
R209
R204
R201
D204
D203
T206
D205
R214
P.D.1 (1.5V) in
(w1/1-2)
P.D.1 in
(w1/1-2)
IC202
D206
VCO control out
TP7
IC201
MKT 1822/J4/
6,8 µF K100V-



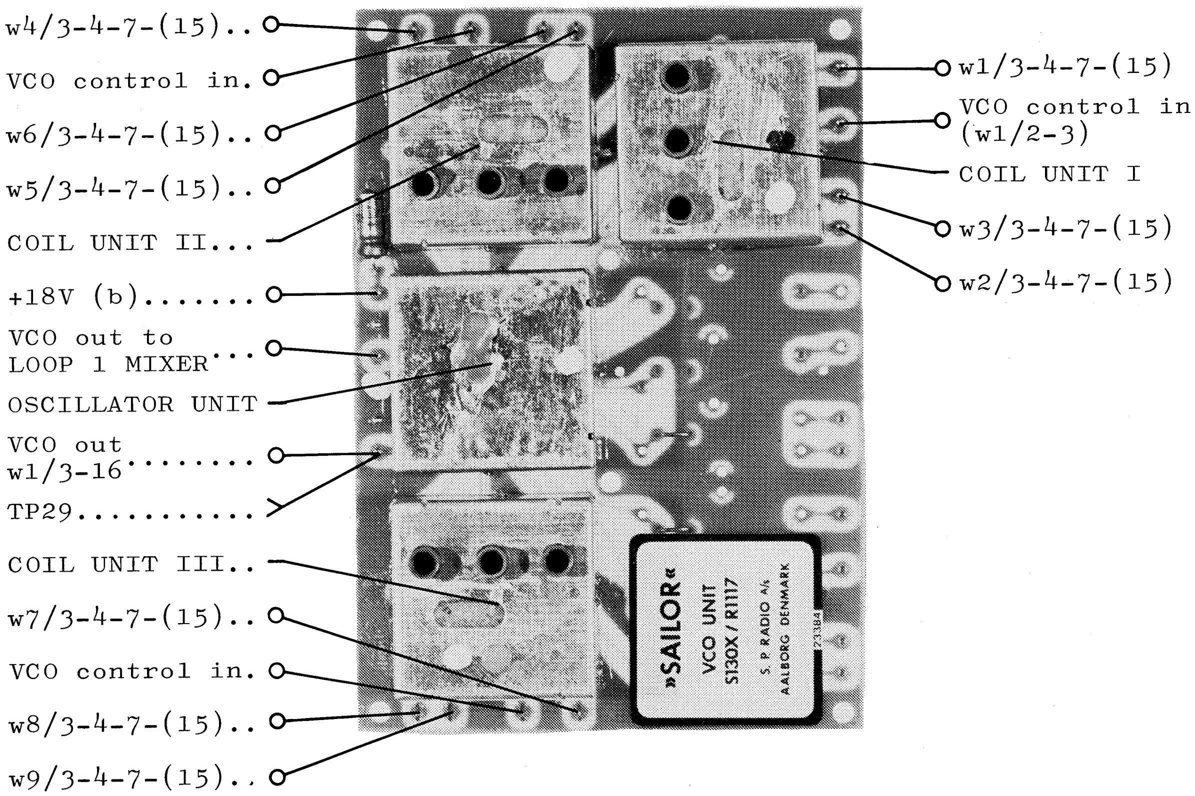
+22V in
W1/2-9
-28.5V
+18V (b) out
W1/1-2
P.D.1 in (1.5V)
W1/1-2
P.D.1 in
W1/2-3
VCO control out
W1/2-7
-18V out
TP2
TP3
TP7
LM 308
IC 202
IC 201
+18V Regulator
-18V Regulator
Loop1 filter
LOOP1 FILTER & ±18V SUPPLY-UNIT

B 2/2 S 13o X

CIRCUIT DESCRIPTION VCO-UNIT S130X

This unit contains in principle nine VCO's constructed in such a way that it contains one single oscillator unit and nine coil units switched in and out by the diodes D301 to D320. The oscillator circuit is made up of T301 and T302, the output signal is fed through the buffer amplifier T303. The signal current in T303 is measured by the level detector C312, R307 and D321, and via T304 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.



S 1302/03/04

TEST CONDITIONS

Frequency selector : 1A (f = 2.0005 MHz)

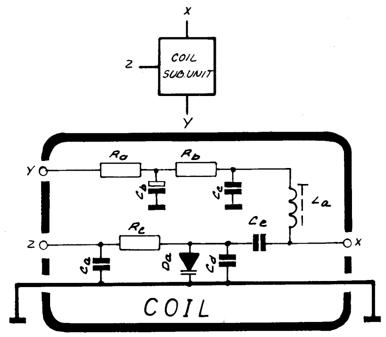
Oscilloscope input : Passive probe 10 Mohm//11 pF

DC voltmeter input : 10 Mohm

⦿ : Diode probe measurements

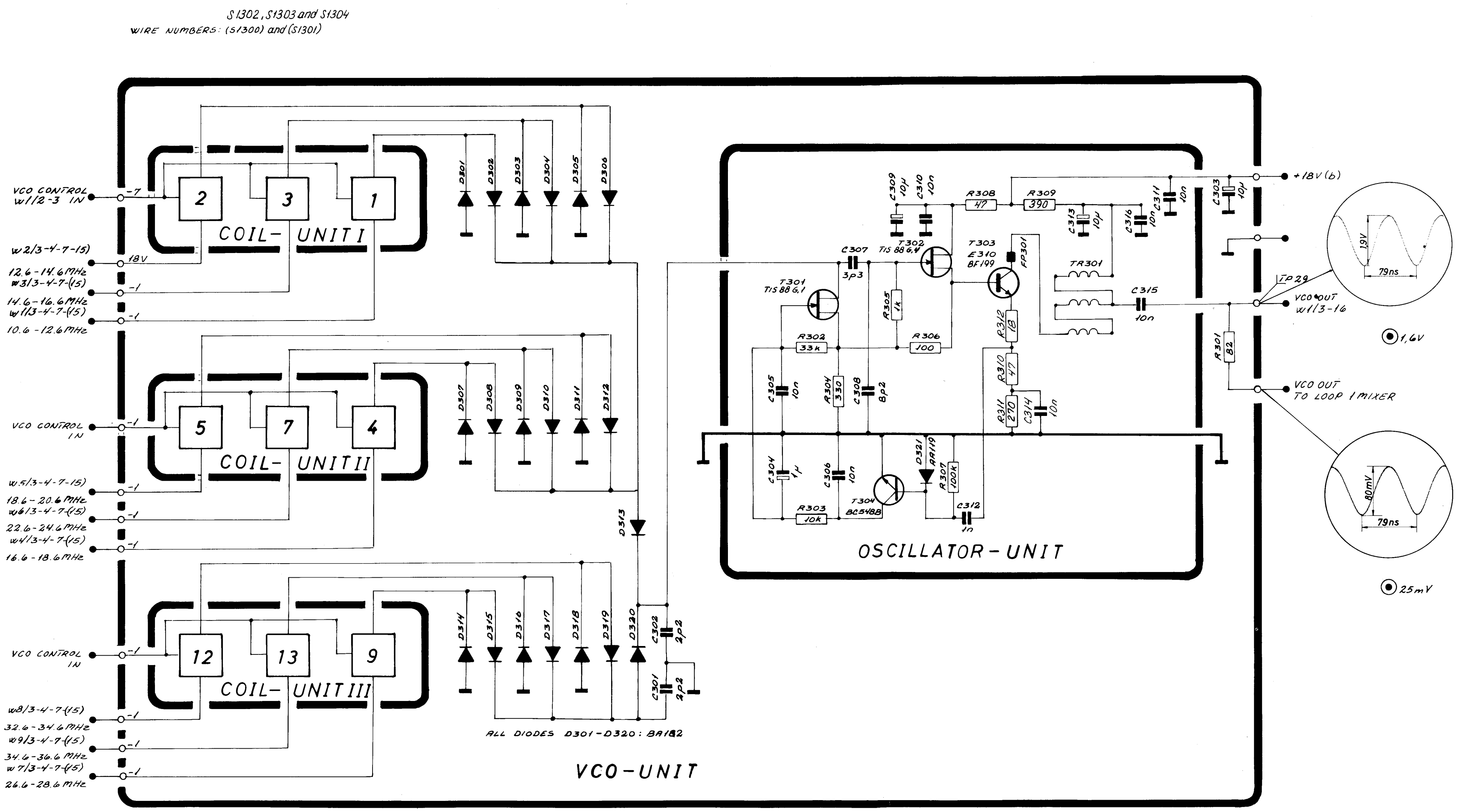
TP : Testpoints

All voltage statements are typical



COIL UNIT	COIL	R_a (Ω)	R_b (Ω)	R_c (Ω)	C_a (nF)	C_b (μF)	C_c (nF)	C_d (pF)	C_e (pF)	L_a	D_a
I	1	R312 470	R321 47	R330 5k6	C317 10n	C320 10μ	C329 10n	C338	C347 120	L301 TL208	D322 BB113
	2	R313 470	R322 47	R331 5k6		C321 10μ	C330 10n	C339 4p7	C348 100	L302 TL209	D323 BB113
	3	R314 470	R323 47	R332 4k7		C322 10μ	C331 10n	C340 8p2	C349 82	L303 TL210	D324 BB113
II	4	R315 470	R324 47	R333 3k9	C318 10n	C323 10μ	C332 10n	C341 10p	C350 68	L304 TL211	D325 BB113
	5	R316 470	R325 47	R334 3k3		C324 10μ	C333 10n	C342 8p2	C351 56	L305 TL212	D326 BB113
	7	R317 470	R326 47	R335 3k3		C325 10μ	C334 10n	C343 10p	C352 47	L306 TL213	D327 BB113
III	9	R318 470	R327 47	R336 3k3	C319 10n	C326 10μ	C335 10n	C344 5p6	C353 39	L307 TL214	D328 BB113
	12	R319 470	R328 47	R337 4k7		C327 10μ	C336 10n	C345 8p2	C354 33	L308 TL216	D329 BB113
	13	R320 470	R329 47	R338 6k8		C328 10μ	C337 10n	C346 5p6	C355 31	L309 TL215	D330 BB113

TABLE FOR COMPONENTVALUES OF COILS



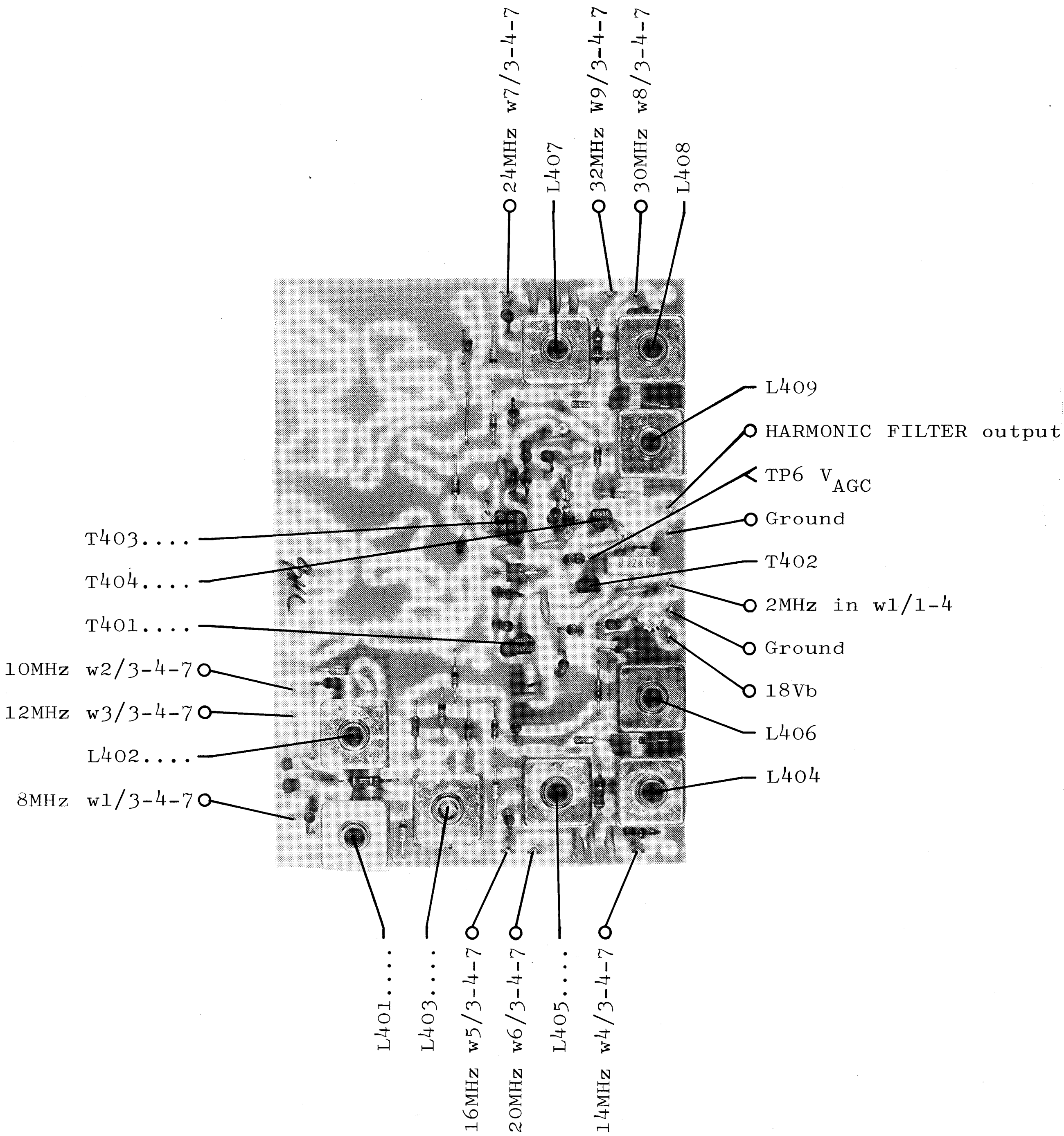
B 2/2 S 13o X

CIRCUIT DESCRIPTION HARMONIC FILTERS S130X

This unit consists of nine tuned LC-circuits which are switched in and out by the diodes D410-D420, and an automatic gain controlled amplifier.

The circuit receives signal fron the 2 MHz spectrum generator located on the divider board, and the selected LC-circuit together with T401 filters out and amplifies the wanted harmonic of the input signal. The collector signal of T401 is then fed to the emitter follower T403.

The output voltage of the emitter follower is detected by D421, T404 and C437. Through T404, R416, R418, R421 and C431 the AGC-voltage is generated via T402 this voltage regulates the gain in T401 to maintain constant output voltage of the filter.



CIRCUIT DESCRIPTION LOOP 1 MIXER S130X

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 to the top of R501 which is part of a voltage divider. From here it is fed into a buffer amplifier T501 and after that to the integrated balanced mixer IC501. To this the harmonic filter signal is applied via C505. Output from the mixer is fed into the combiner transformer TR501 feeding into the low-pass filter containing L502 and L503. This low-pass 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 T502.

TEST CONDITIONS

Frequency selector : 1A (f = 2.0005 MHz)

Oscilloscope input : Passive probe 10 Mohm//11 pF

DC voltmeter input : 10 Mohm

⦿ : Diode probe measurements

TP : Testpoints

All voltage statements are typical

TEST CONDITIONS

Frequency selector : 1A (f = 2.0005 MHz)

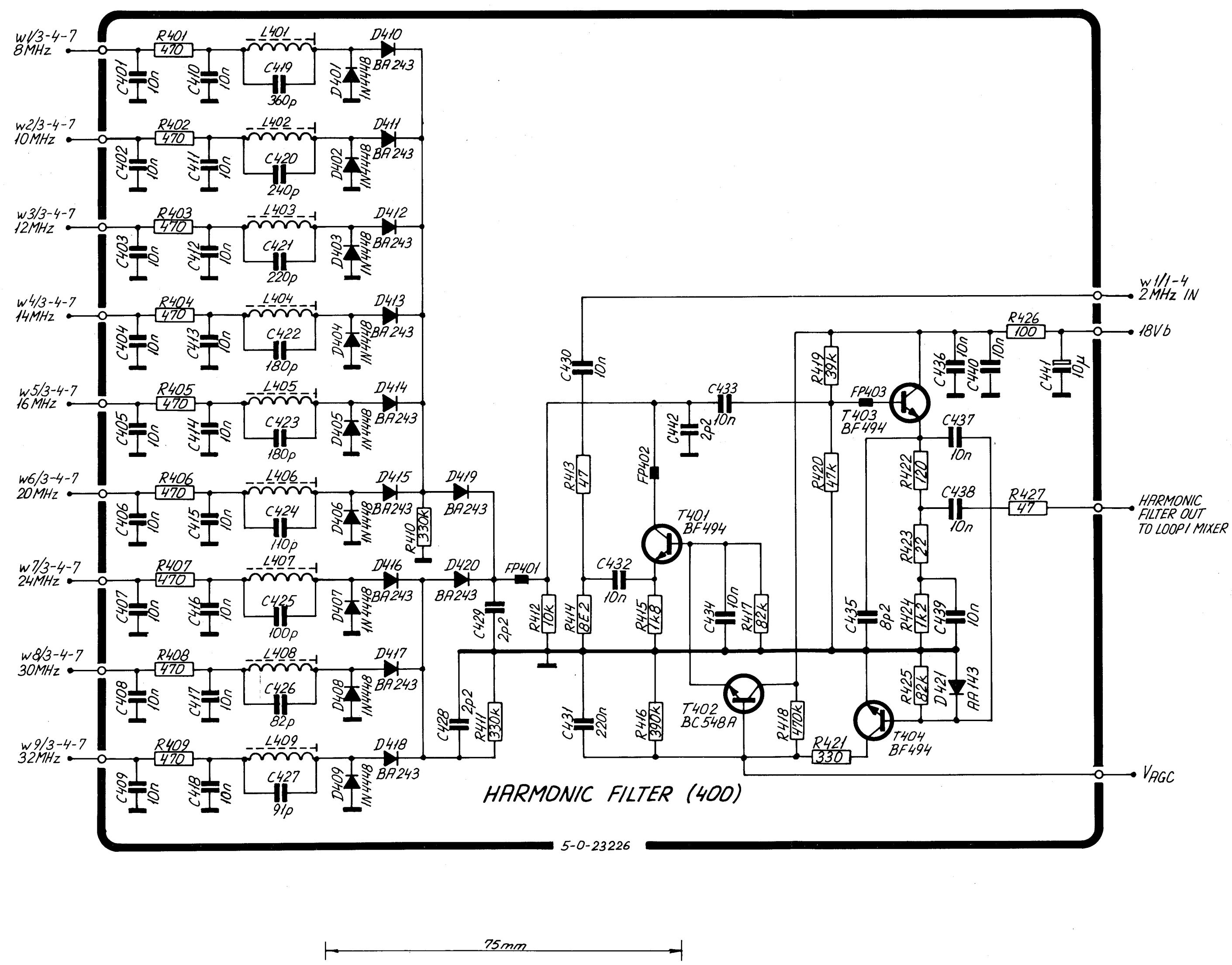
Oscilloscope input : passive probe 10 Mohm//11 pF

DC voltmeter input : 10 Mohm

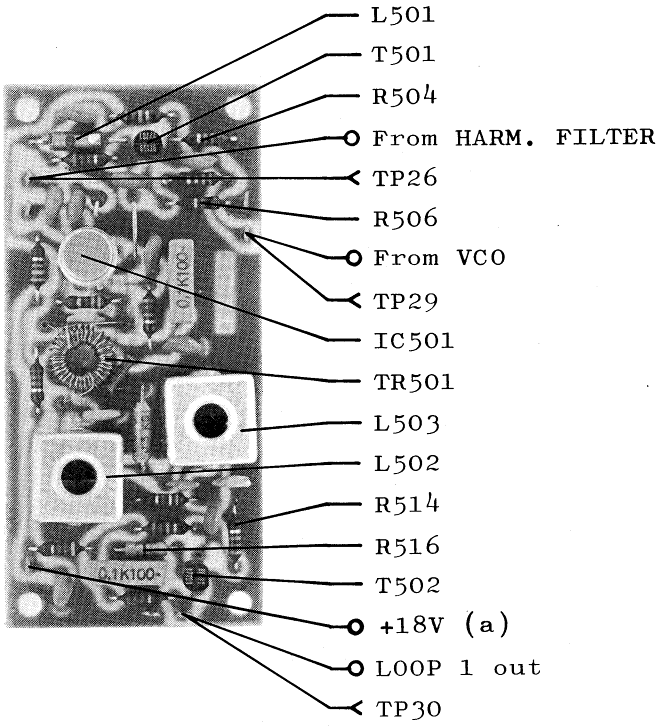
⦿ : Diode probe measurements

TP : Testpoints

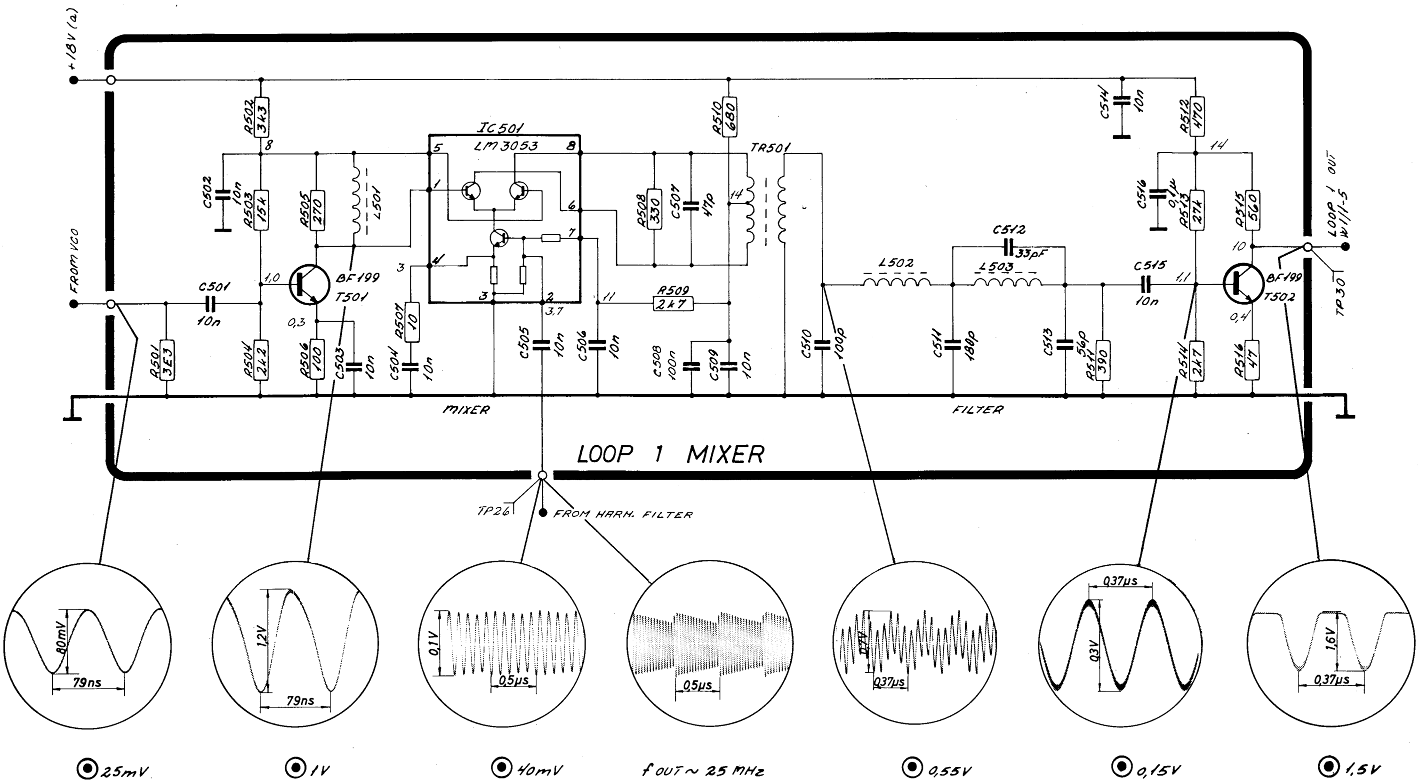
All voltage are typical



B 2/2 S 13o X



L501
T501
R504
From HARM. FILTER
TP26
R506
From VCO
TP29
IC501
TR501
L503
L502
R514
R516
T502
+18V (a)
LOOP 1 out
TP30



+18V (a)
FROM VCO
IC501
LM3053
TR501
BF199
T501
T502
MIXER
FILTER
LOOP 1 MIXER
LOOP 1 OUT
TP30
TP26
FROM HARM. FILTER
80mV
79ns
12V
0,1V
0,5µs
0,37µs
0,3V
1,6V
25mV
1V
40mV
f OUT ~ 25 MHz
0,55V
0,15V
1,5V

CIRCUIT DESCRIPTION VCXO & LOOP 2 FILTER S130X

This unit contains the integrator and loop filter for loop 2, the voltage controlled crystal oscillator (VCXO) and the loop 2 mixer.

LOOP 2 FILTER

The integrator is built up around IC601 the integration capacitor is C605. R601 feeds current into the diode coupled Darlington pair in the phase comparator MC4044 on the divider board to make the 1.5V reference. Output from the integrator pin 6 on IC601 is fed into the low-pass filters R607, C607, R609 and C606 to filter out the 100 Hz ripple from the phase comparator. From the low-pass filter the control voltage is fed via R615 into the VCXO.

VCXO

The VCXO is built up around the FET T601. The oscillator is an ordinary Hartley oscillator with a crystal in the feed-back path. The crystal is tuned with the varicaps D601 and D602 to carry out the voltage control of the frequency. The output from the VCXO to first mixer is taken from the tap on the coil L601. From the source a portion of the oscillator signal is taken to the loop 2 mixer.

LOOP 2 MIXER

As mentioned above the VCXO signal is fed into the base of mixer transistor T602 via R610. 10 MHz from the TCXO are applied to the same base via R619. Because of the big difference between the two oscillator frequencies and the wanted output frequency the only filtering needed to filter out the wanted frequency product is R621 and C616. The mixer transistor feeds into the output amplifier T603.

TEST CONDITIONS

Frequency selector : 1A (f = 2.0005 MHz)

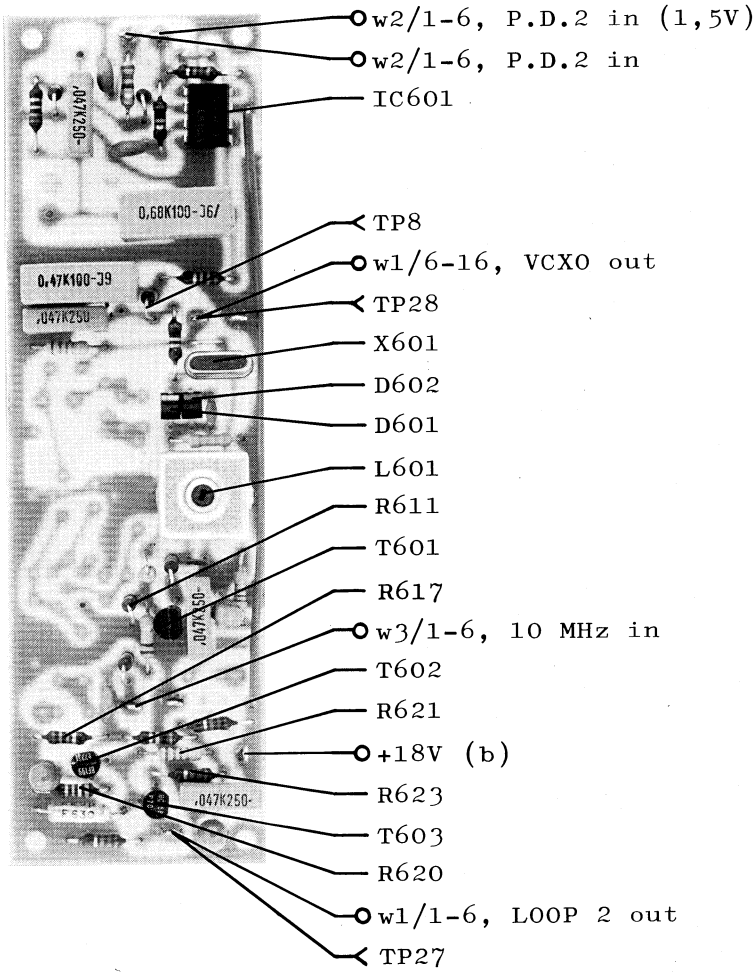
Oscilloscope input : Passive probe 10 Mohm/11 pF

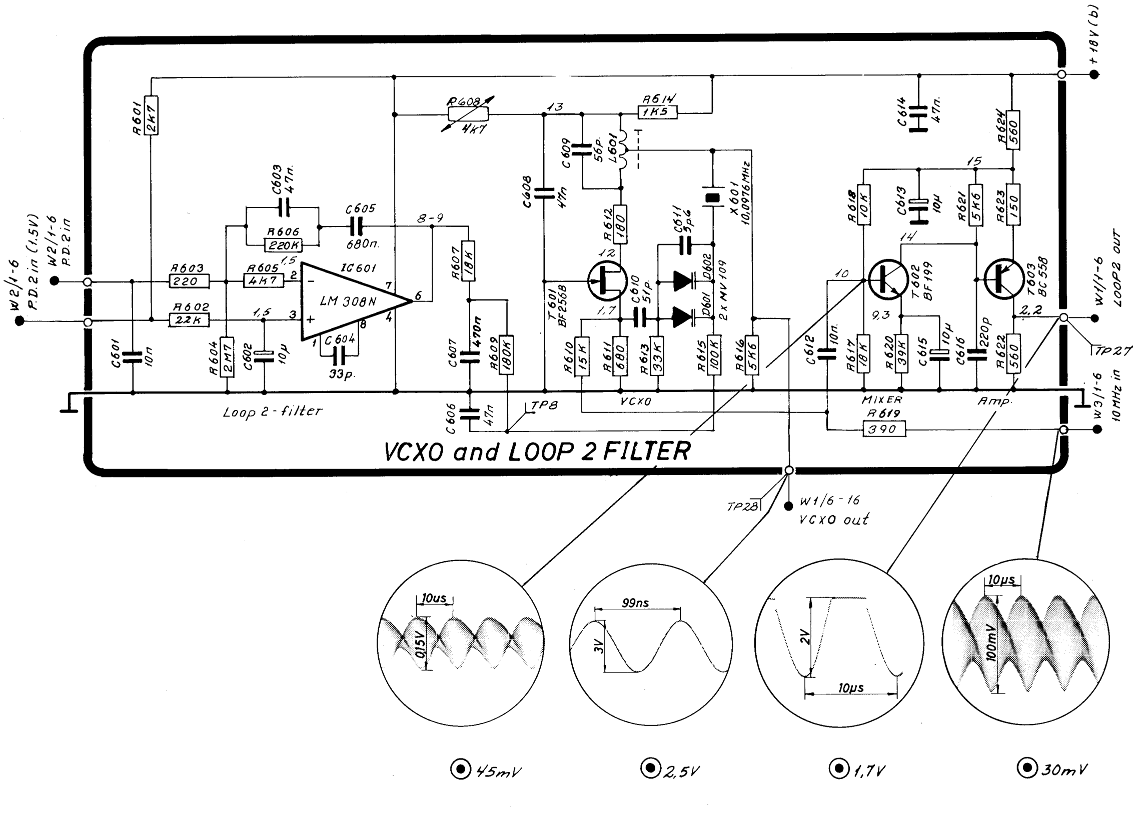
DC voltmeter input : 10 Mohm

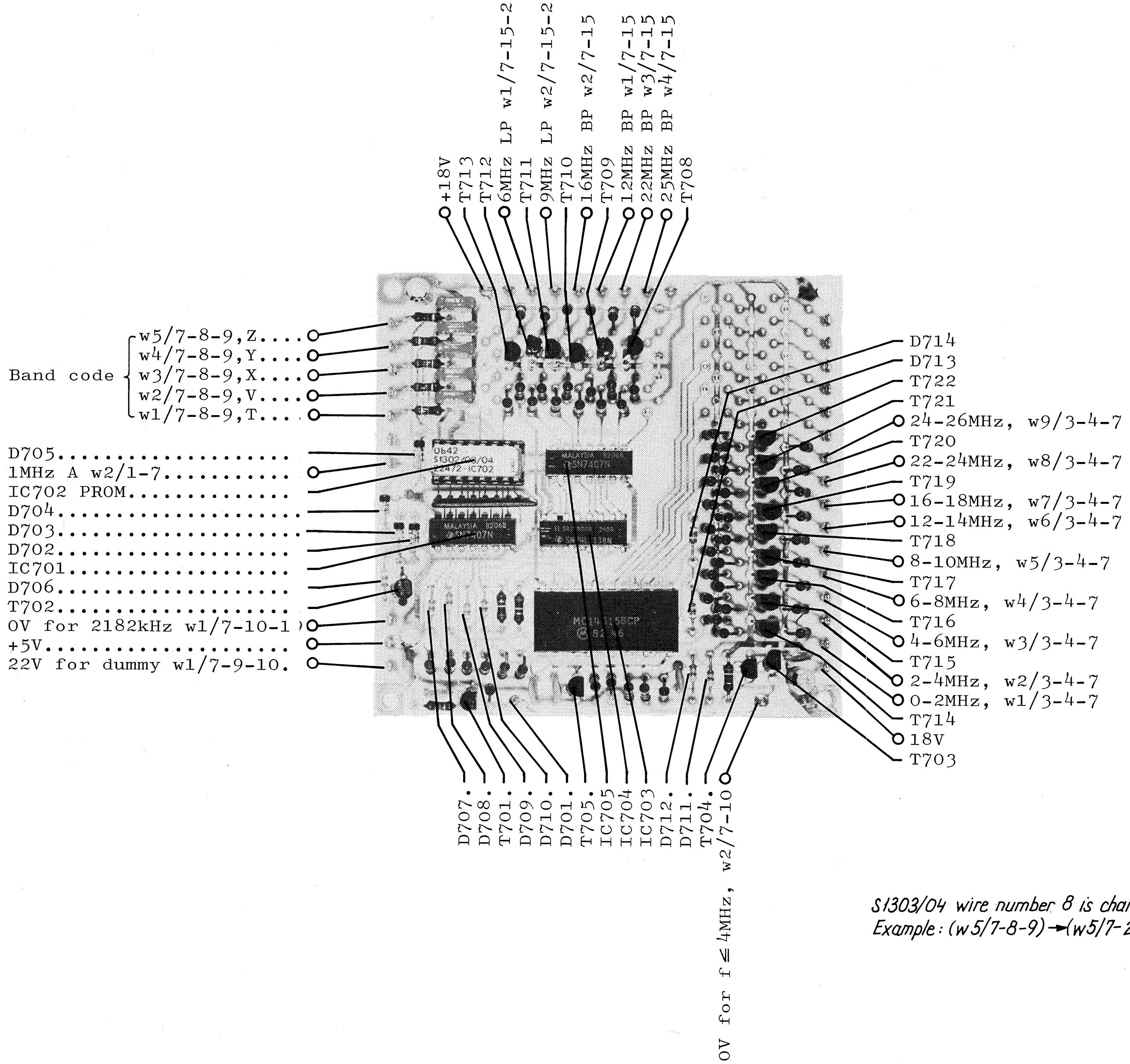
⊙ : Diode probe measurements

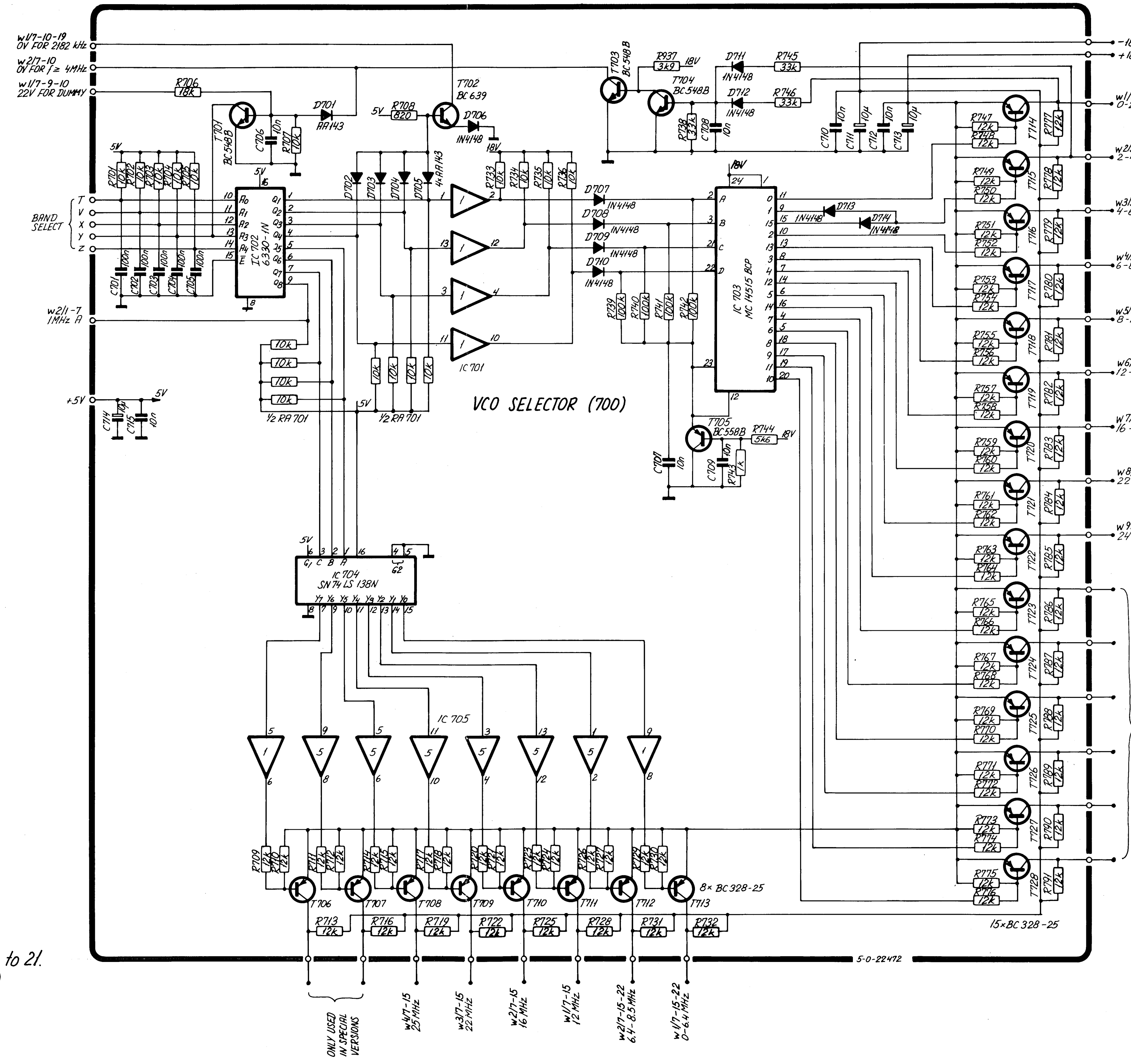
TP : Testpoints

All voltage statements are typical


w2/1-6, P.D.2 in (1,5V)
w2/1-6, P.D.2 in
IC601
TP8
w1/6-16, VCXO out
TP28
X601
D602
D601
L601
R611
T601
R617
w3/1-6, 10 MHz in
T602
R621
+18V (b)
R623
T603
R620
w1/1-6, LOOP 2 out
TP27

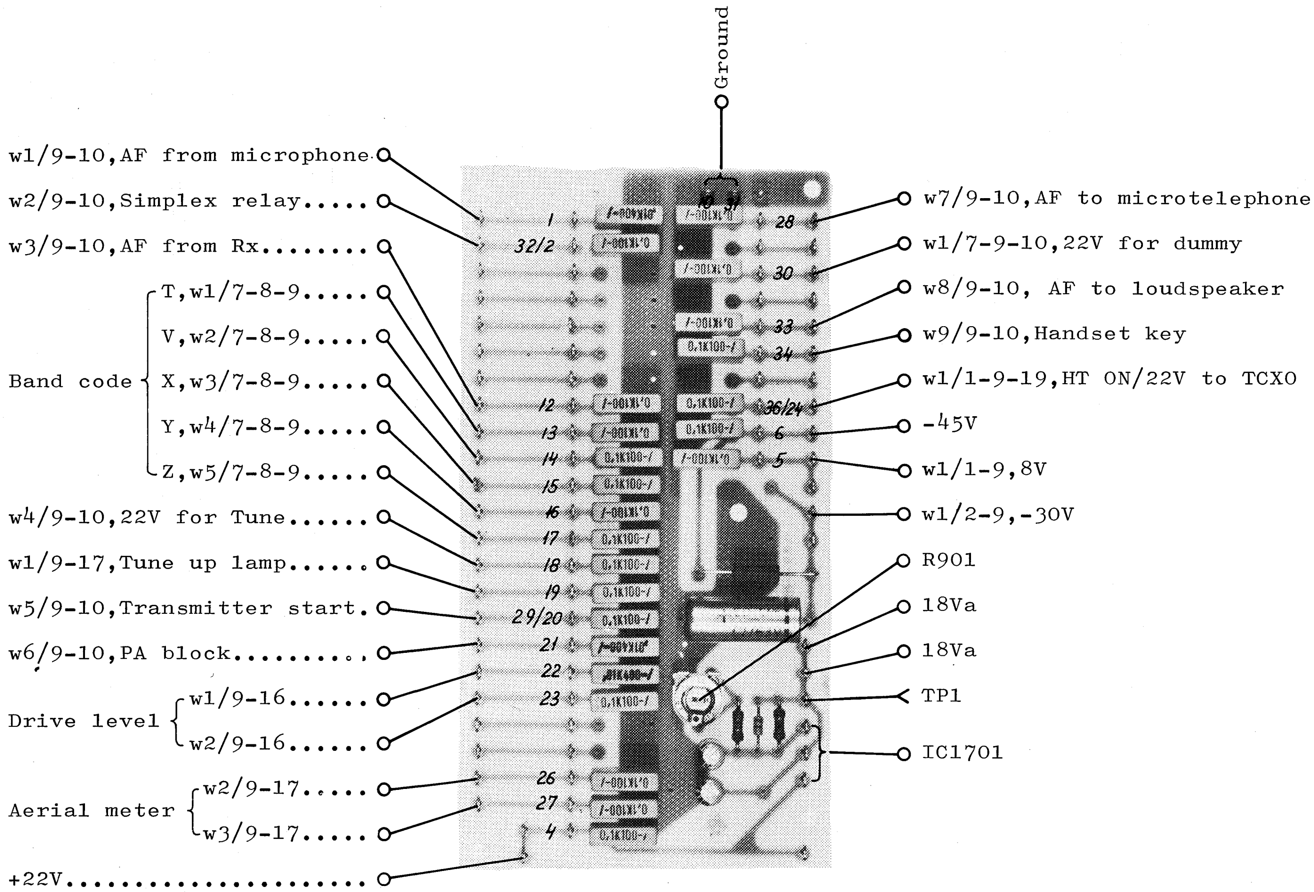

VCXO and LOOP 2 FILTER
+18V (b)
w2/1-6 P.D.2 in (1,5V)
w2/1-6 P.D.2 in
w1/1-6 LOOP 2 out
TP27
w3/1-6 10 MHz in
TP28
w1/6-16 VCXO out
TP8
Loop 2 - filter
VCXO
MIXER
Amp
IC601
LM 308N
R601 2K7
R602 22K
R603 220
R604 2M7
R605 4K7
R606 220K
R607 18K
R608 4K7
R609 180K
R610 15K
R611 680
R612 180
R613 33K
R614 1K5
R615 100K
R616 5K6
R617 18K
R618 10K
R619 390
R620 39K
R621 5K6
R622 560
R623 150
R624 560
C601 10n
C602 10µ
C603 47n
C604 33p
C605 680n
C606 47n
C607 470n
C608 47n
C609 56p
C610 5,1p
C611 3p6
C612 10n
C613 10µ
C614 47n
C615 10µ
C616 220p
L601
X601 10,0976 MHz
D601 D602 2x MV 109
T601 BF256B
T602 BF199
T603 BC558
10µs
0,15V
99ns
3V
2V
10µs
10µs
100mV
45mV
2,5V
1,7V
30mV



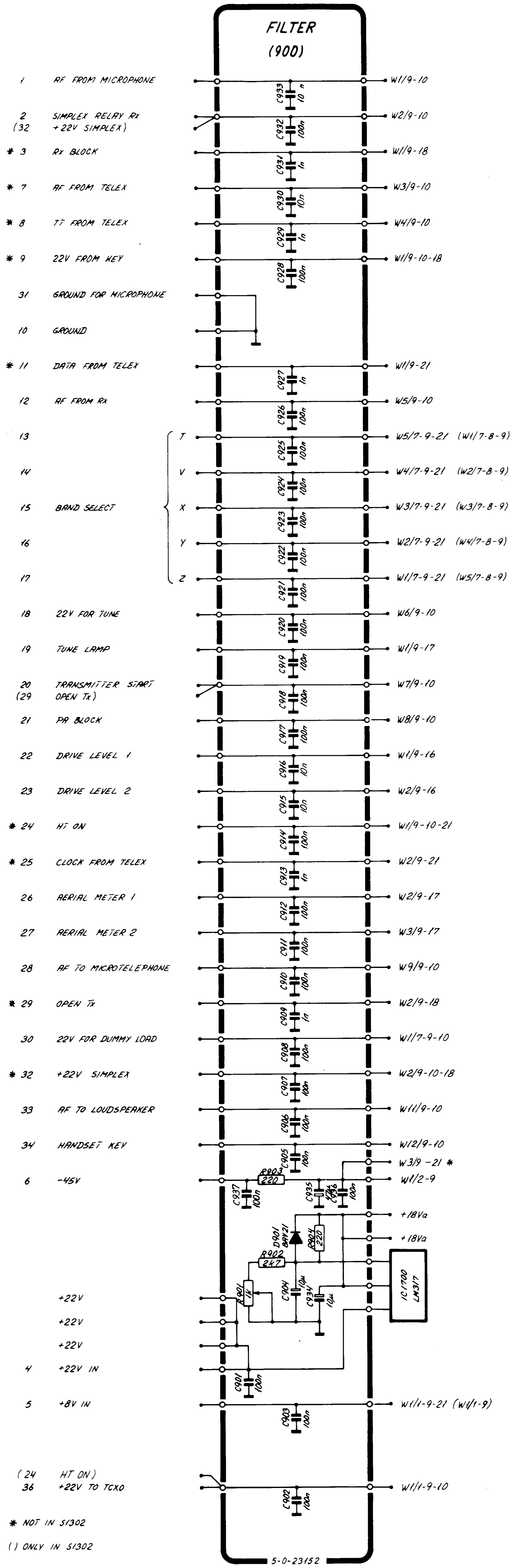


S1303/04 wire number 8 is changed to 21.
Example: (w5/7-8-9) → (w5/7-21-9)

FILTER PRINT S1302



A 1/1 S 13o2/o3/o4



* NOT IN S1302

( ) ONLY IN S1302

CIRCUIT DESCRIPTION SSB GENERATOR S130X

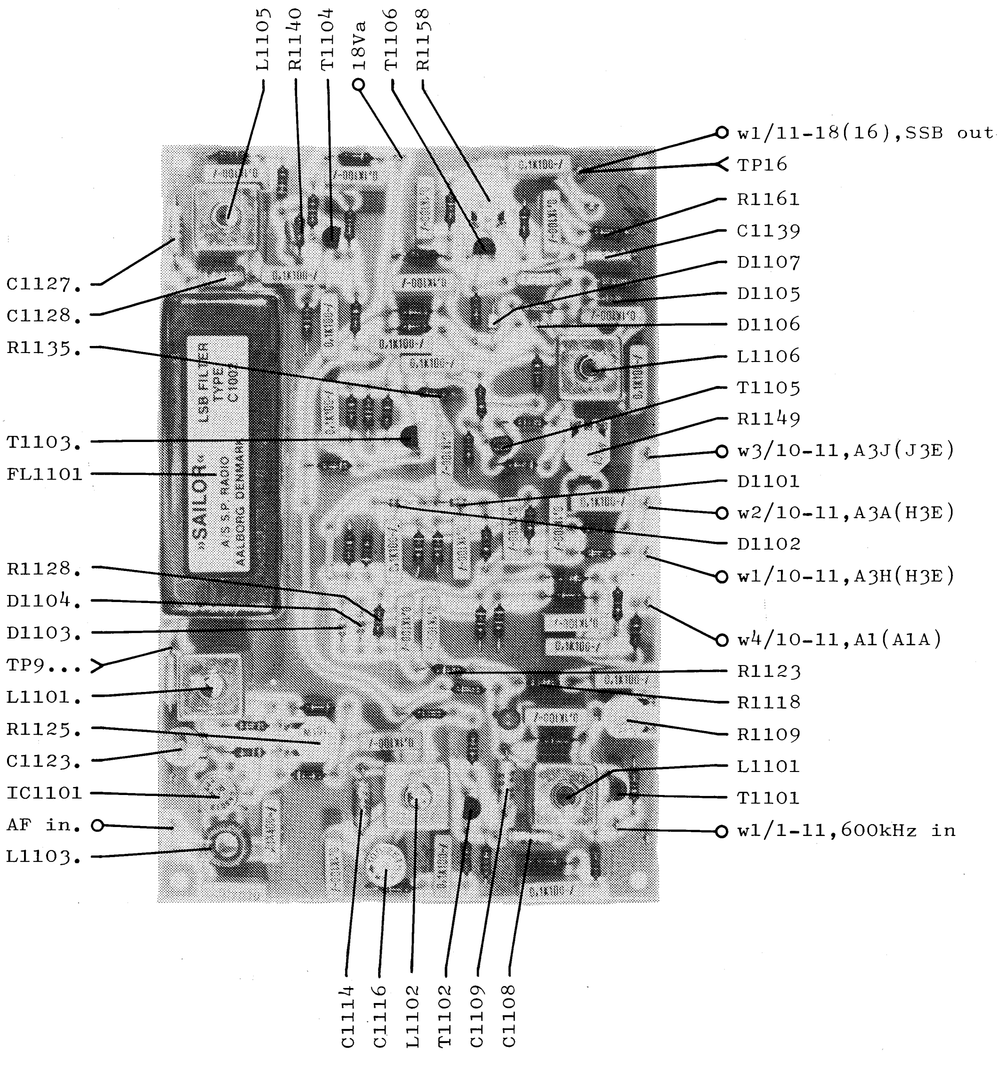
In this unit the required types of signals are generated A3A (R3E), A3H (H3E), A3J (J3E) and A1 (A1A).

SSB GENERATOR

The 600 kHz carrier signal from the divider unit is fed to the tuned amplifiers T1101 and T1102. From the collector of T1101 the 600 kHz signal is fed to the carrier reinsertion circuit. From the collector of T1102 the carrier signal is fed to the double balanced modulator IC1101, which also receives the AF signal from the microphone amplifier. The output from IC1101 is a double sideband signal, which is fed through the single sideband crystal filter for removing of the carrier and the upper sideband. The resulting lower sideband signal is fed through the impedance matching coil L1105 to the basis of transistor T1104, where the lower sideband signal and the wanted carrier voltage is added. The signal is now fed through the output amplifier consisting of T1105 and T1106 to the SSB output terminal. The amplifier T1105 and T1106 are working as a signal limit amplifier, where the maximum output voltage is controlled of the zener diode D1107 and the diodes D1106, D1105.

CARRIER INSERTION

The 600 kHz carrier signal from the collector of T1101 is fed to the voltage divider R1109, R1118, R1123, R1128 and R1130. The wanted carrier level is controlled by a DC voltage fed to one of the diodes D1101, D1102, D1103 and D1104.



TEST CONDITIONS

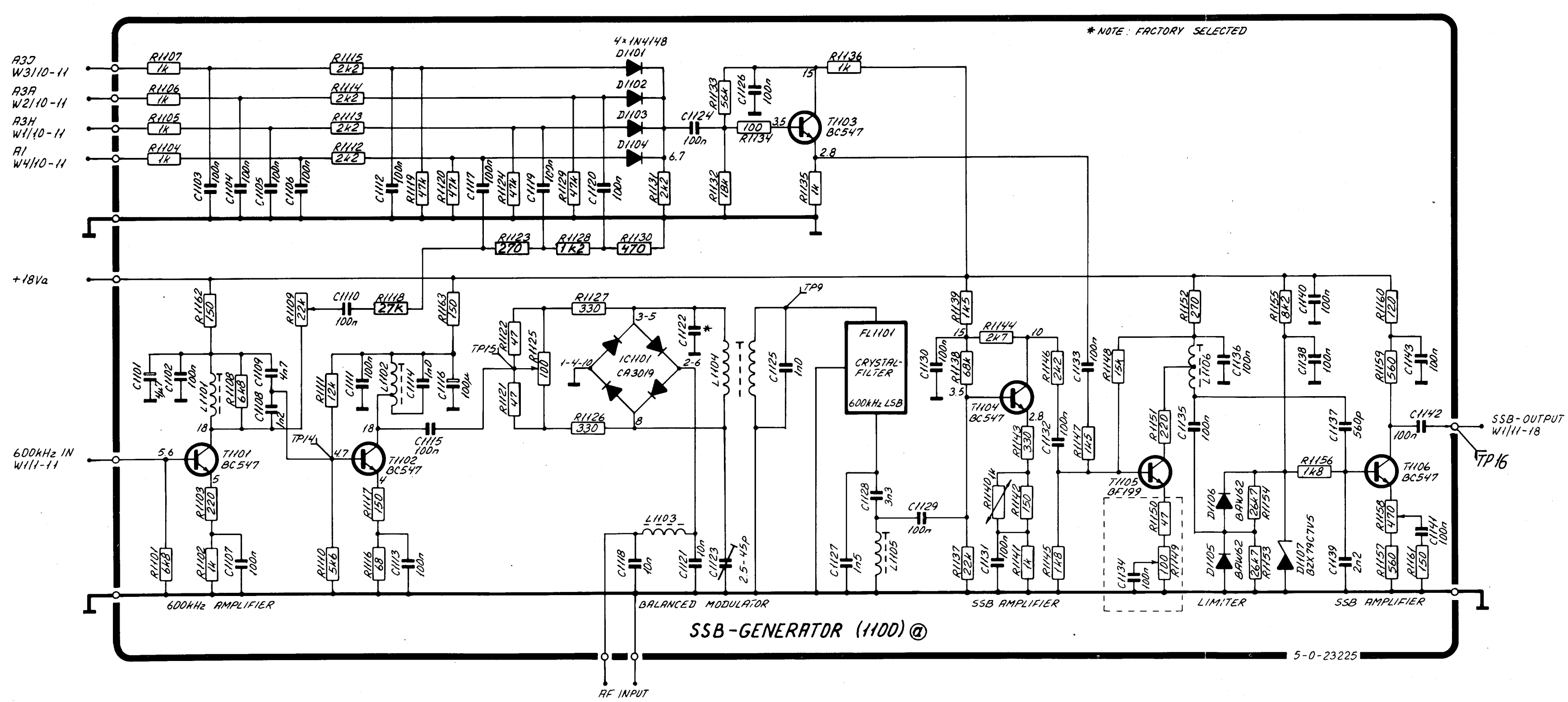
Frequency selector : 1A (f = 2.0005 MHz)
MODE : A3H
AF input 1KHz : 1Vpp (serial condensator } Via microphone plug
KEY : on } Via microphone plug
Oscilloscope input : Passive probe 10 Mohm//11 pF
DC voltmeter input : 10 Mohm

◉ : Diode probe measurements

TP : Testpoints

All voltage are typical

B 2/2 S 13o X



CIRCUIT DESCRIPTION MICROPHONE AMPLIFIER S130X

This unit generates and processes all the AF signals used in normal operation.

COMPRESSOR

The AF signal is after level regulation in R1201 fed into a voltage divider R1204, R1205 and then the FET T1202 acts as an electronically variable attenuator. The amount of attenuation is controlled by the voltage applied to the gate of the FET T1202.

The FET T1202 is biased in the off condition by 5.1V from zenerdiode D1202, with no control voltage applied to the gate. Under these conditions no attenuation takes place. With a control voltage of 5.1V applied to the gate, max. attenuation is obtained.

The electronically controlled attenuator is used to keep the output across the FET T1202 constant independent of speech volume, so performing a compressor action.

The control voltage already mentioned is derived from the very same signal, across the FET T1202 after amplification by T1203 and T1205. The output is taken across R1219 and fed to the level detector system consisting of T1210 and D1205.

As soon as the applied voltage to the base of T1210 becomes sufficiently low (about 4.7V) the collector current in transistor T1210 cuts off. This means that transistor T1208 normally saturated by the collector current of T1210 cuts off, leading to saturation of T1207 with the result that capacitor C1214 is charged very quickly.
The voltage across C1214 is slowly discharged via R1218 and the filter circuit R1218 and C1208 and is applied to the gate of the previously mentioned FET T1202 via R1212.

Presence of the control voltage causes the attenuation to increase until the collector current in transistor T1210 is not cut off any more, and a balanced condition is established. The amplified and compressed microphone signal then passes through to an AF filter driven by T1212 and T1213 removing signals insignificant for clarity. The AF signal from the filter is carried to the fixed voltage divider R1238, R1244, R1243 and R1242. The AF voltages from this voltage divider is chosen with the diode D1206, D1207, D1208 or D1209 feeding into the output amplifier.

TEST TONE GENERATOR

The test tone generator is a two-tone generator operating at the frequencies 2400 Hz and 1200 Hz. The multivibrator, composed of T1206, T1209 is oscillating at 2400 Hz, and in the integrated circuit IC1201 this frequency is divided to 1200 Hz, which can be measured on pin 8.

T1204 functions as emitter follower, and the 2400 Hz signal is fed from here via R1214 to the output transistor T1201. The 1200 Hz signal is also fed to T1201 via R1208 and is mixed with the 2400 Hz signal. The mixed signal is supplied to the compressor input during tuning of the transmitter and owing to the presence of the AF filter. Sinewave shaped tones are produced, as the two-tone generator itself delivers square wave voltages.

TEST CONDITIONS

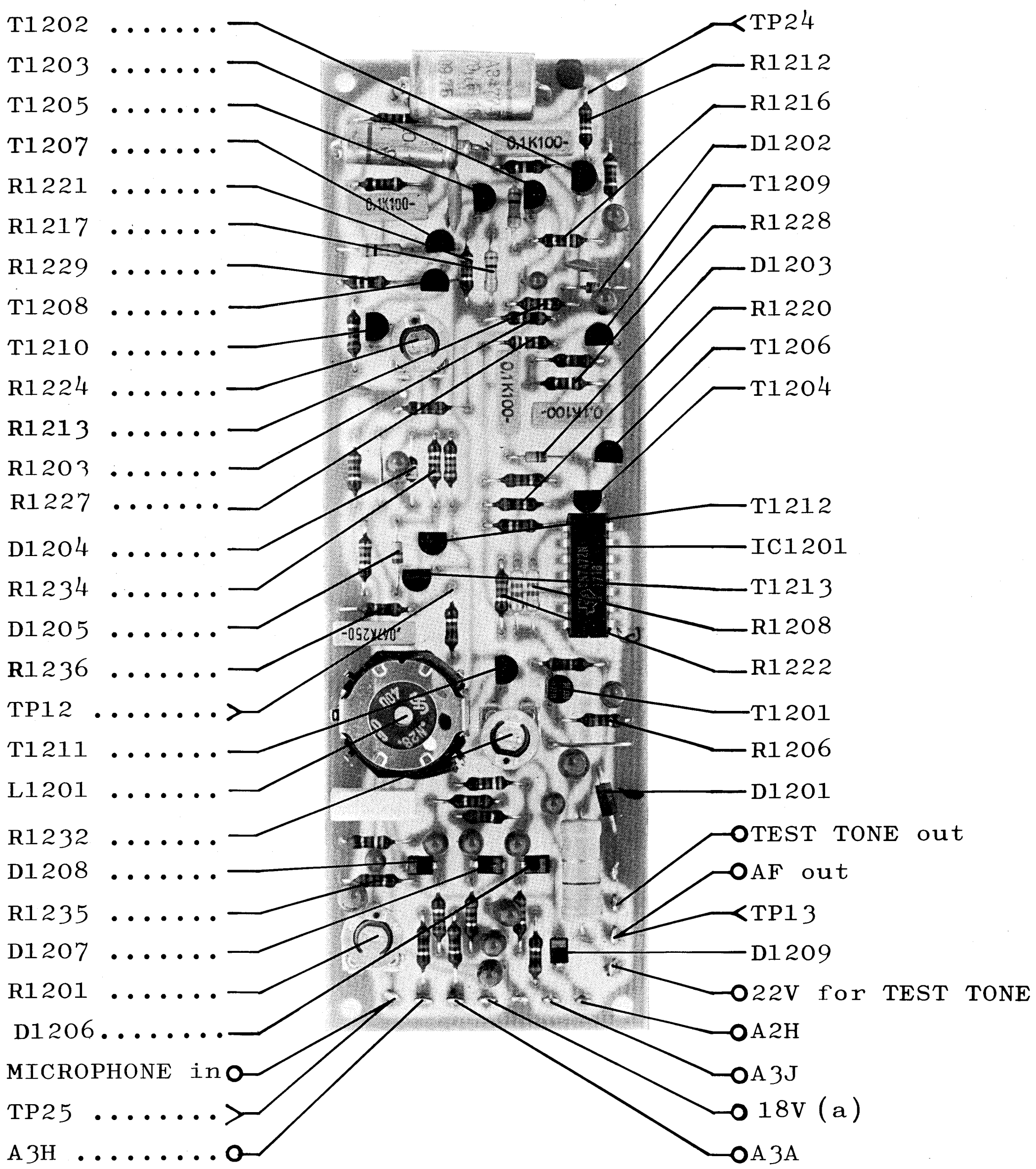
Mode : TUNE

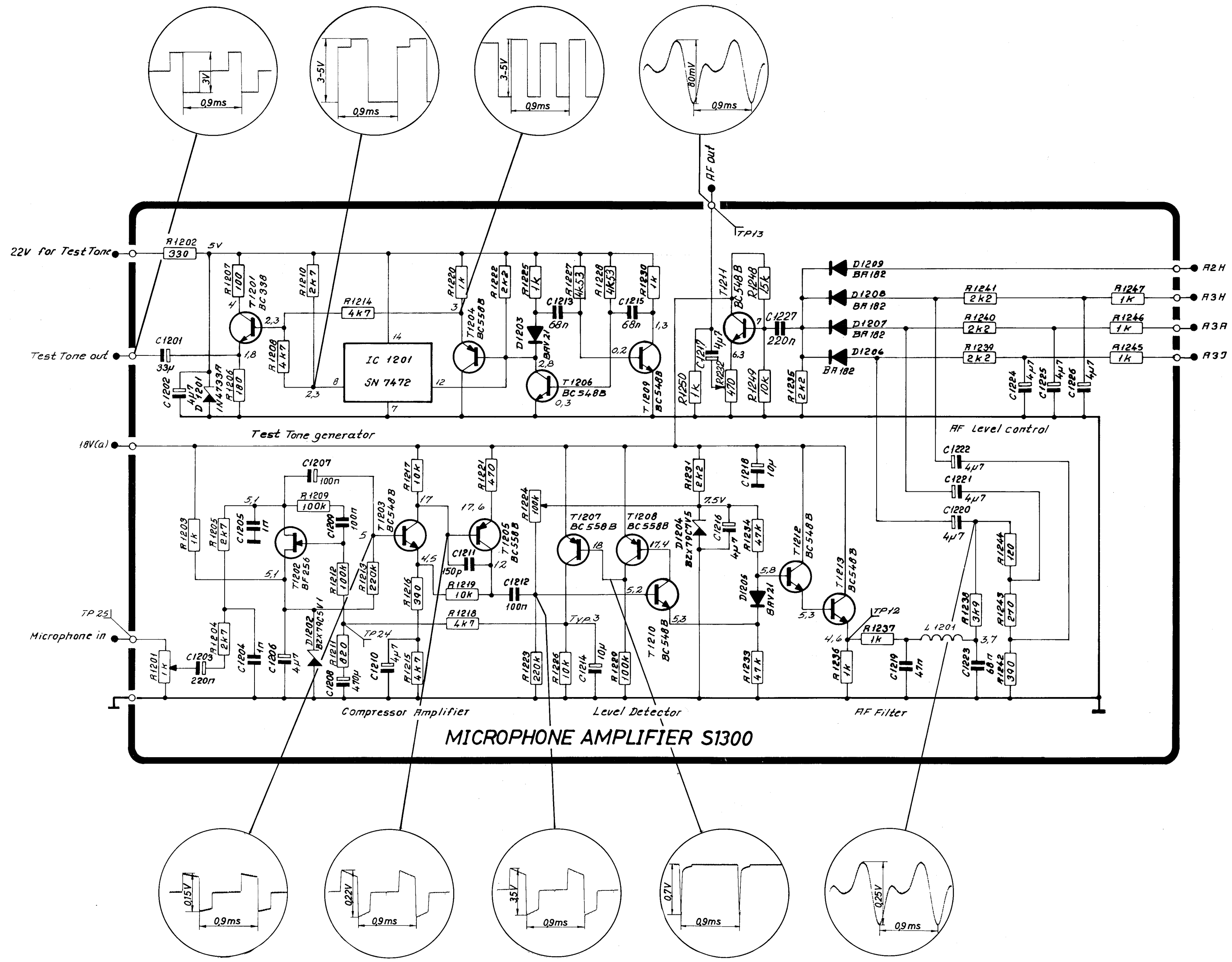
Oscilloscope input : Passive probe 10 Mohm//11 pF

DC voltmeter input : 10 Mohm

TP: Testpoints

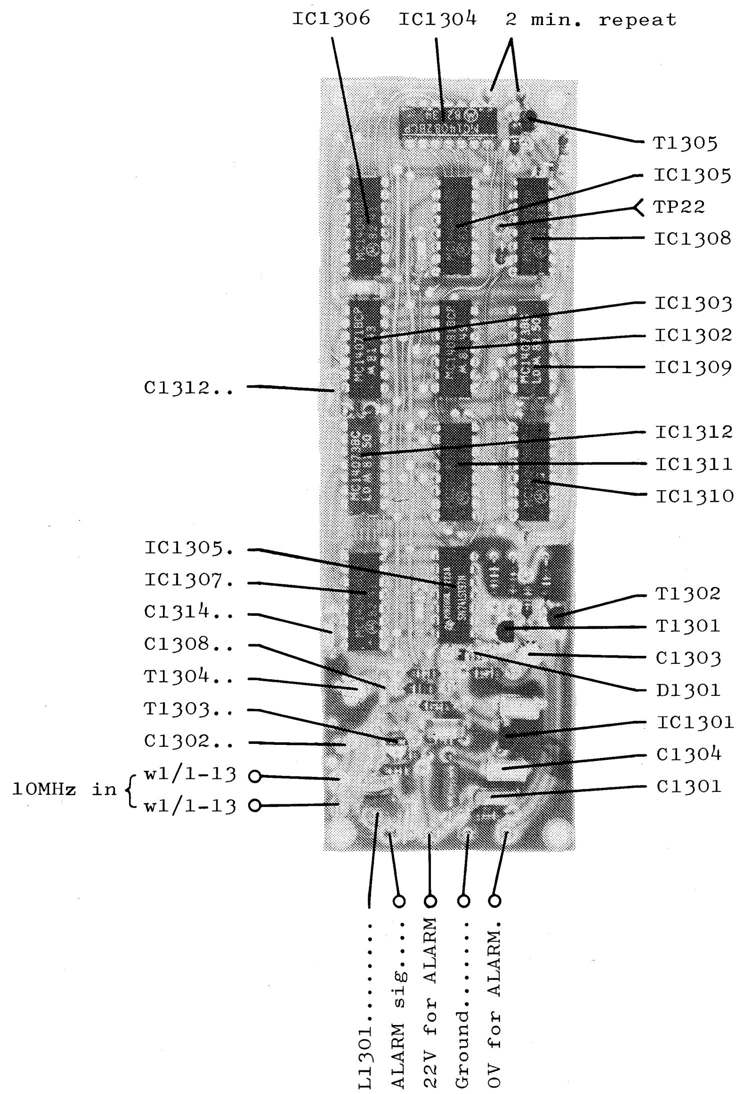
All voltage statements are typical



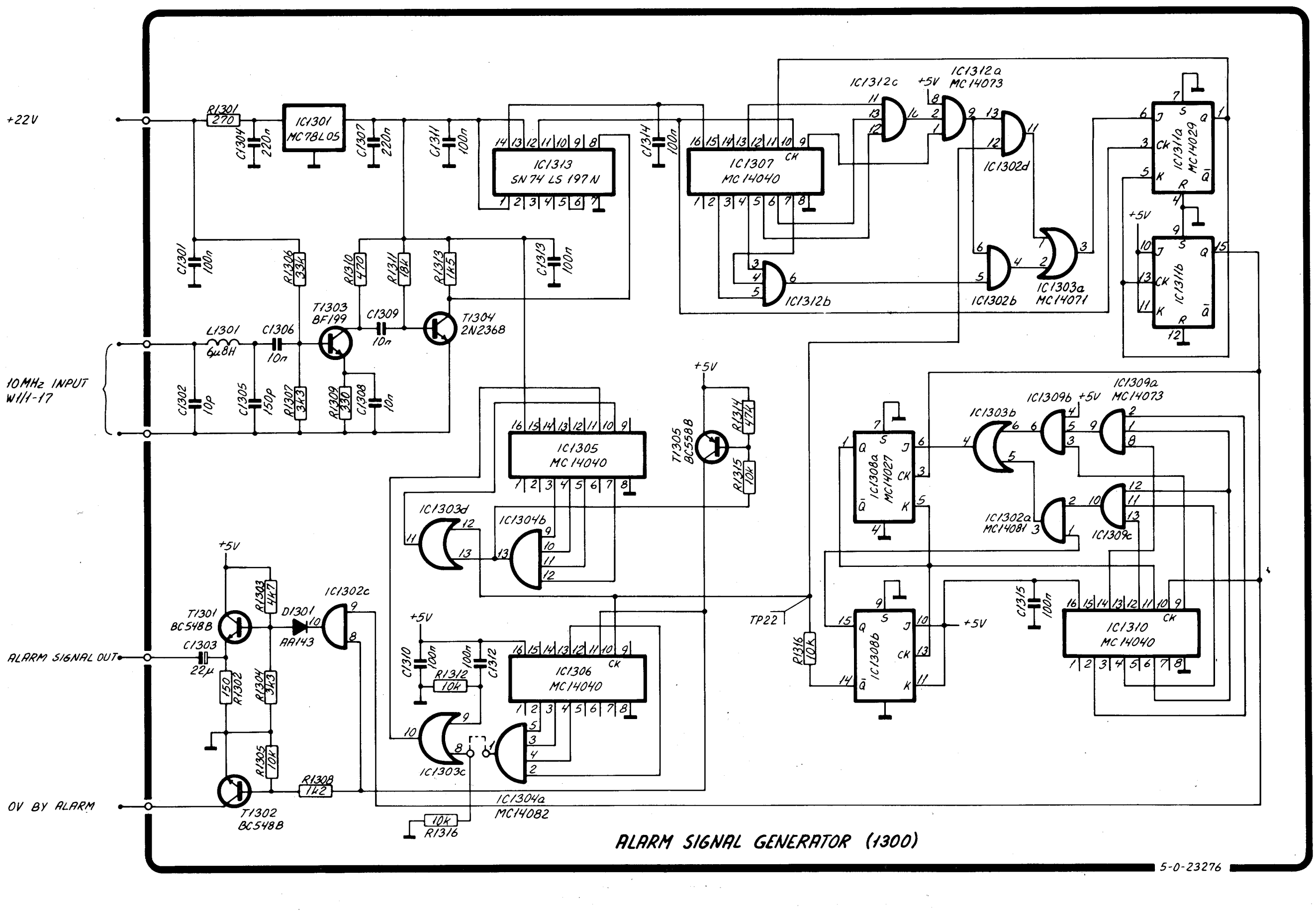


B 2/2 S 13o X

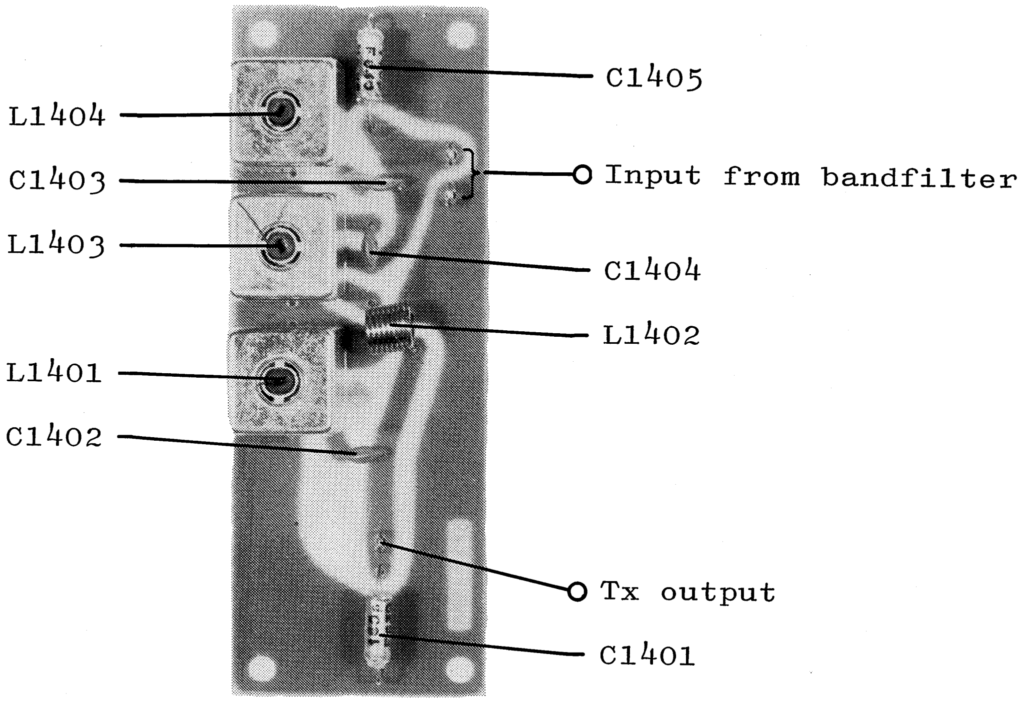
B 2/2 S 13o X

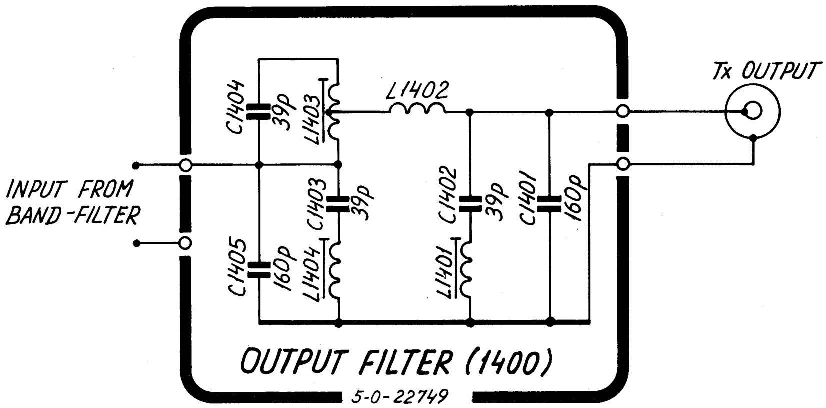


IC1306
IC1304
2 min. repeat
T1305
IC1305
TP22
IC1308
IC1303
IC1302
IC1309
C1312..
IC1312
IC1311
IC1310
IC1305.
IC1307.
C1314..
C1308..
T1304..
T1303..
C1302..
10MHz in
w1/1-13
w1/1-13
T1302
T1301
C1303
D1301
IC1301
C1304
C1301
L1301........
ALARM sig.....
22V for ALARM
Ground.......
OV for ALARM.

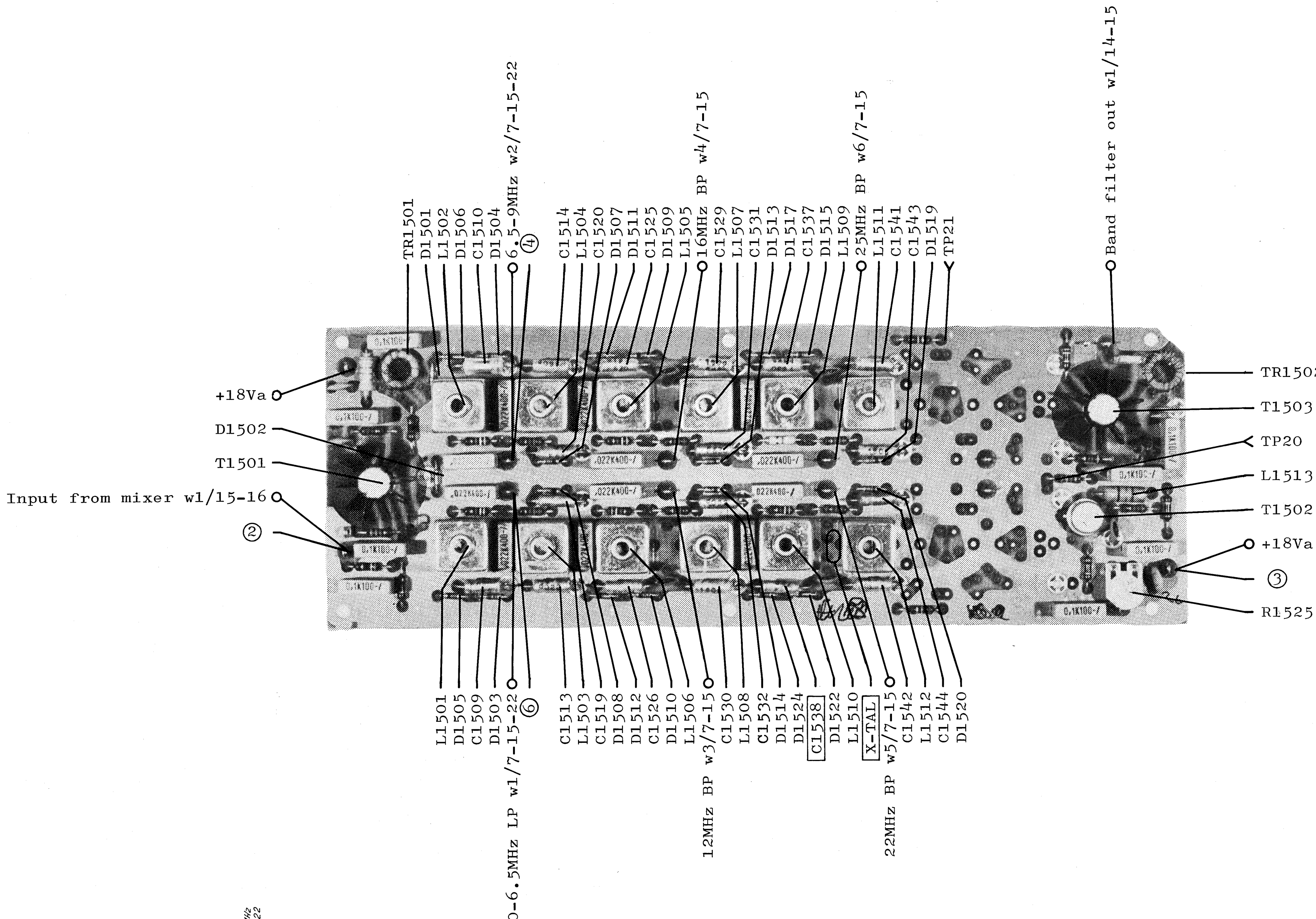


+22V
10MHz INPUT W1/1-17
ALARM SIGNAL OUT
OV BY ALARM
IC1301 MC78L05
IC1313 SN74 LS 197 N
IC1307 MC14040
IC1305 MC14040
IC1306 MC14040
IC1310 MC14040
IC1312a MC14073
IC1303a MC14071
IC1311a MC14029
IC1308a MC14027
IC1302a MC14081
IC1309a MC14073
IC1304a MC14082
T1301 BC548B
T1302 BC548B
T1303 BF199
T1304 2N2368
T1305 BC558B
D1301 AA143
TP22
ALARM SIGNAL GENERATOR (1300)
5-0-23276

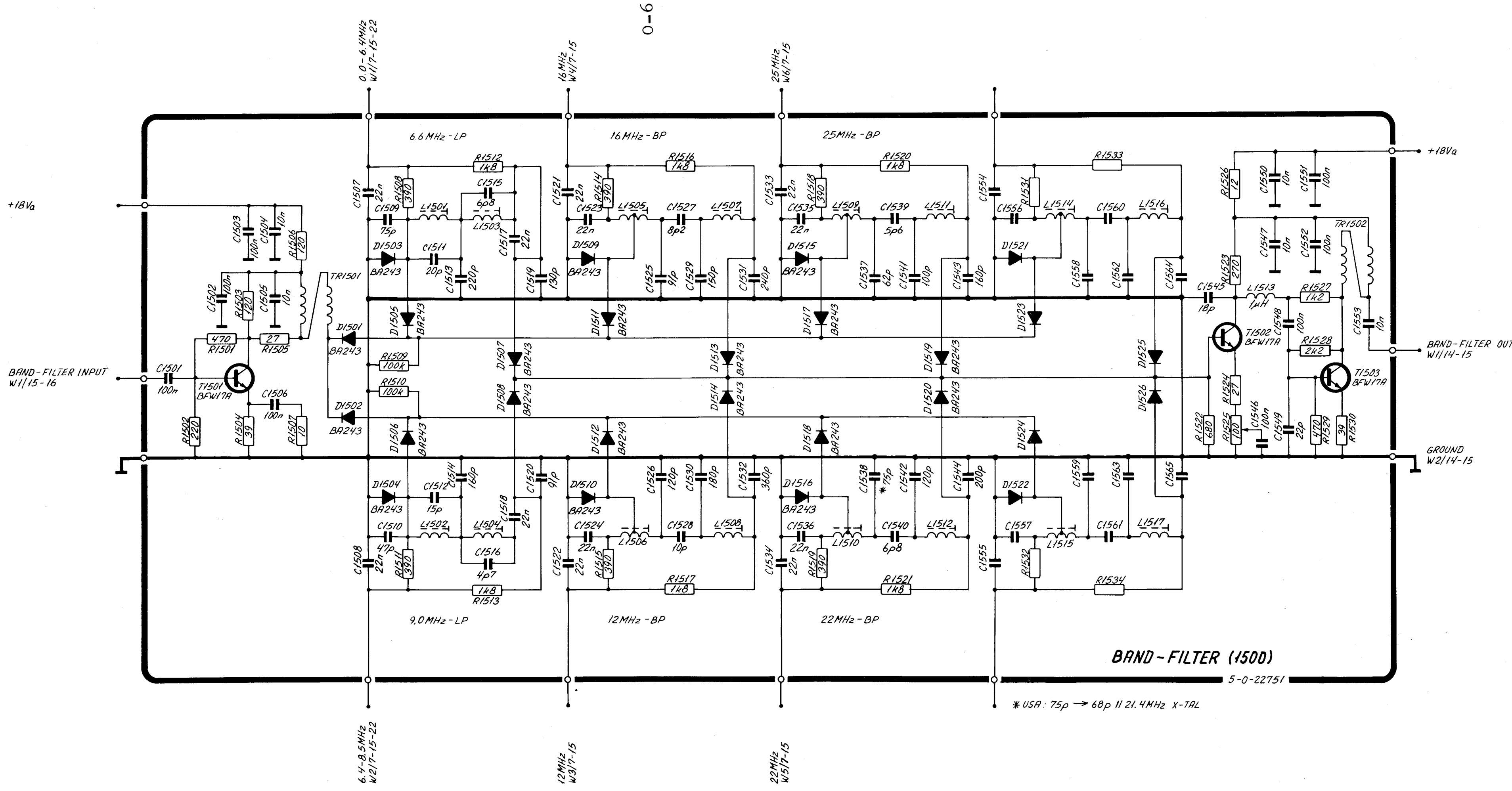

C1405
L1404
C1403
Input from bandfilter
L1403
C1404
L1402
L1401
C1402
Tx output
C1401


C1404
39p
L1403
L1402
Tx OUTPUT
INPUT FROM
BAND-FILTER
C1403
39p
C1402
39p
C1401
160p
C1405
160p
L1404
L1401
OUTPUT FILTER (1400)
5-0-22749

B 2/2 S 13o X


TR1501
D1501
L1502
D1506
C1510
D1504
6.5-9MHz w2/7-15-22
C1514
L1504
C1520
D1507
D1511
C1525
D1509
L1505
16MHz BP w4/7-15
C1529
L1507
C1531
D1513
D1517
C1537
D1515
L1509
25MHz BP w6/7-15
L1511
C1541
C1543
D1519
TP21
Band filter out w1/14-15
+18Va
D1502
T1501
Input from mixer w1/15-16
TR1502
T1503
TP20
L1513
T1502
R1525
L1501
D1505
C1509
D1503
0-6.5MHz LP w1/7-15-22
C1513
L1503
C1519
D1508
D1512
C1526
D1510
L1506
12MHz BP w3/7-15
C1530
L1508
C1532
D1514
D1524
C1538
D1522
L1510
X-TAL
22MHz BP w5/7-15
C1542
L1512
C1544
D1520

B 2/2 S 13o X


0.0-6.4MHz W1/7-15-22
16MHz W4/7-15
25MHz W6/7-15
6.6MHz-LP
16MHz-BP
25MHz-BP
+18Va
BAND-FILTER INPUT W1/15-16
BAND-FILTER OUT W1/14-15
GROUND W2/14-15
9.0MHz-LP
12MHz-BP
22MHz-BP
BAND-FILTER (1500)
5-0-22751
* USA: 75p → 68p // 21.4MHz X-TAL
6.4-8.5MHz W2/7-15-22
12MHz W3/7-15
22MHz W5/7-15

CIRCUIT DESCRIPTION MIXER UNIT S130X

In this unit the 600 kHz signal from the SSB generator is mixed together with the VCXO and VCO signals in two steps to produce the wanted output frequency. In addition the necessary power level regulation is controlled in this unit.

FIRST MIXER

The transistors T1602 and T1603 form a balanced mixer. The 600 kHz signal is fed into the mixer via the phase splitting transformer TR1601. The VCXO signal is fed into the emitters via the buffer amplifier T1601. In this transistor it is possible to regulate the DC working point in two ways. One: changing the emitter resistor at the point "fixed power regulation". Two: changing the base current via a potentiometer between the two points "drive level potmeter". This DC working point regulation will control the amplitude of the VCXO signal to the mixer and in that way the output power is regulated.

FILTER AND AMPLIFIER

The first mixer feeds into the crystal filter FL1601. The tuned circuits containing L1601 and L1602 around the filter carry out proper impedance-matching to the filter. T1604 and T1605 are two buffer amplifiers, the circuit C1622, L1604, C1623 and R1643 carries out correct generator impedance for the mixer M1601.

SECOND MIXER

The secons mixer M1601 is a double balanced hotcarrier diode mixer which mixes the 10.7 MHz signal together with the chosen VCO signal. The transistor T1606 is a wideband power amplifier supplying the mixer with the necessary power for proper operation. Output from the mixer is fed into the band filter unit.

TEST CONDITIONS

Frequency selector : 1A (f = 2.0005 MHz)

Power level : FULL

Mode : TUNE

Maximum drive, 50 ohm connected to TX out, J1702

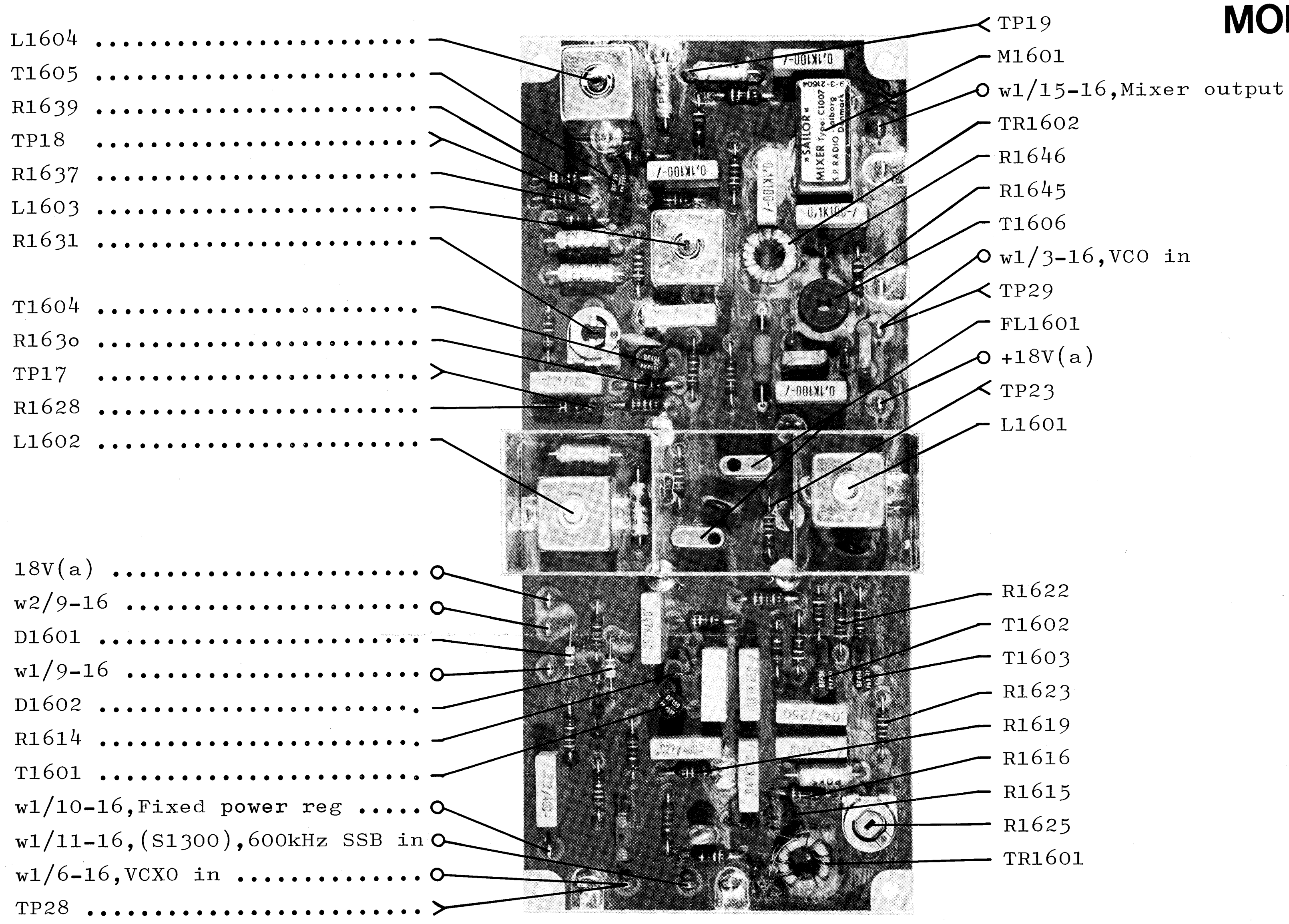
Oscilloscope input : Passive probe 10 Mohm/11 pF

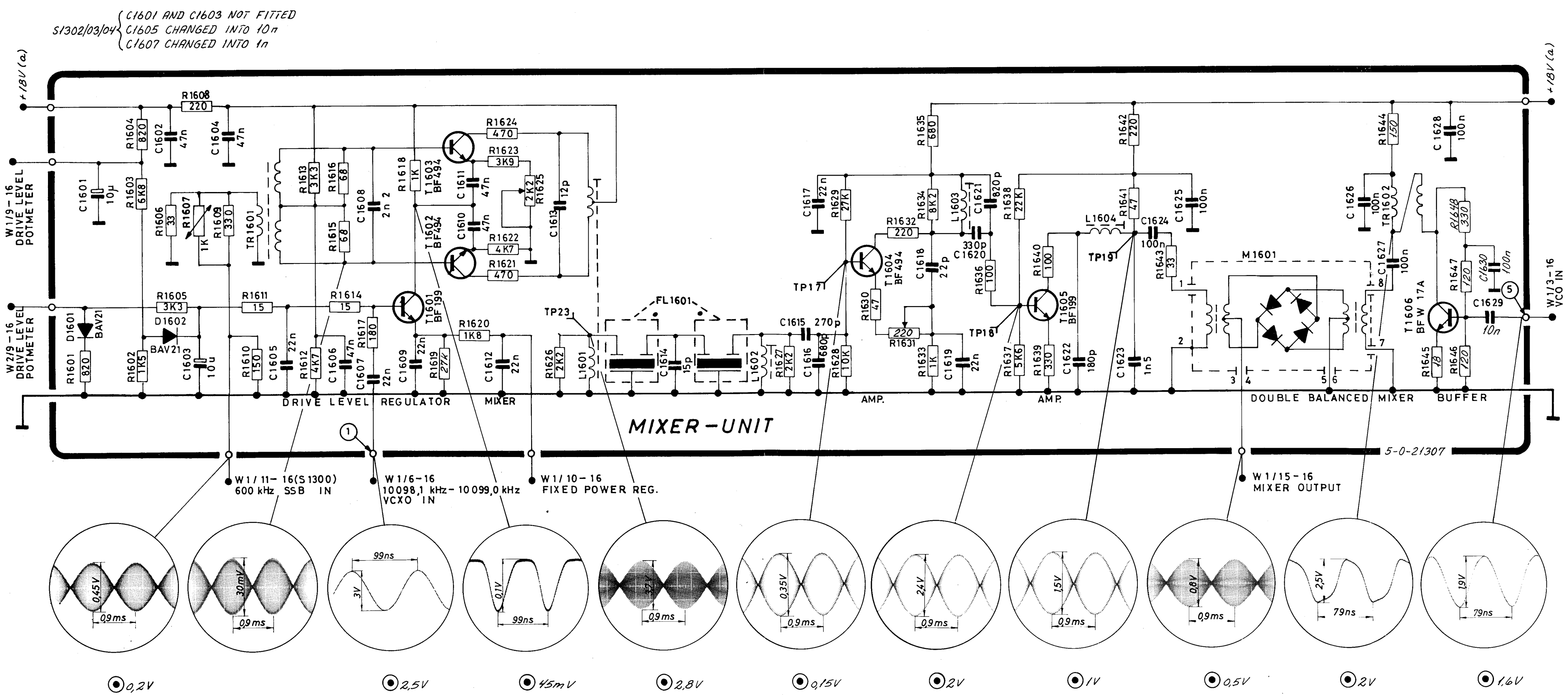
DC voltmeter input : 10 Mohm

⦿ : Diode probe measurements

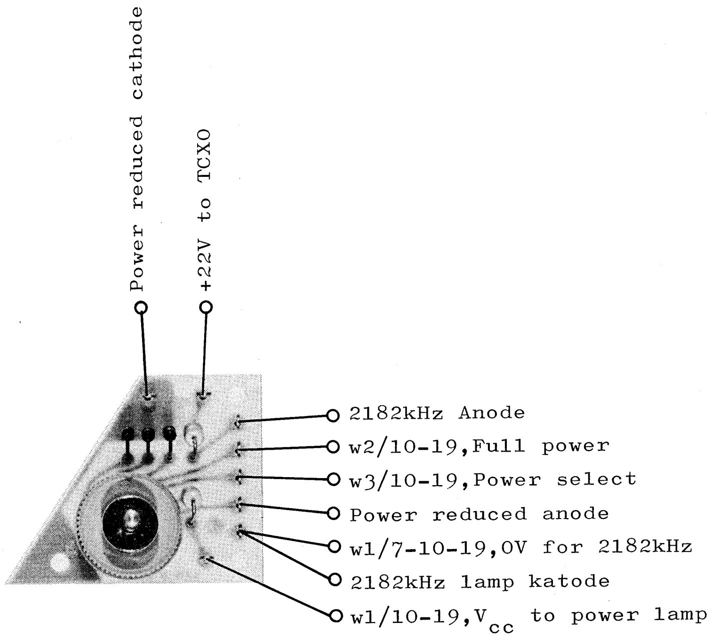
TP : Testpoints

ALL voltage statements are typical

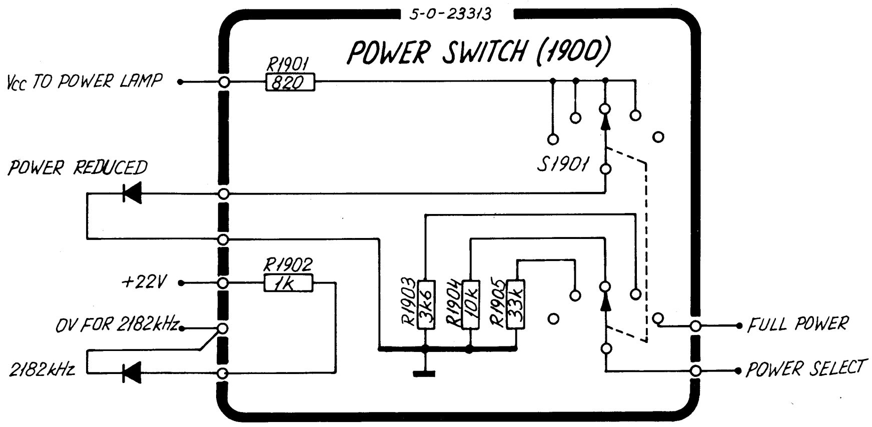

L1604
T1605
R1639
TP18
R1637
L1603
R1631
T1604
R1630
TP17
R1628
L1602
18V(a)
w2/9-16
D1601
w1/9-16
D1602
R1614
T1601
w1/10-16,Fixed power reg
w1/11-16,(S1300),600kHz SSB in
w1/6-16,VCXO in
TP28
TP19
M1601
w1/15-16,Mixer output
TR1602
R1646
R1645
T1606
w1/3-16,VCO in
TP29
FL1601
+18V(a)
TP23
L1601
R1622
T1602
T1603
R1623
R1619
R1616
R1615
R1625
TR1601


S1302/03/04 C1601 AND C1603 NOT FITTED
C1605 CHANGED INTO 10n
C1607 CHANGED INTO 1n
+18V (a)
W1/9-16 DRIVE LEVEL POTMETER
W2/9-16 DRIVE LEVEL POTMETER
DRIVE LEVEL REGULATOR
MIXER
MIXER-UNIT
AMP.
DOUBLE BALANCED MIXER
BUFFER
W1/3-16 VCO IN
5-0-21307
W1/11-16(S1300) 600 kHz SSB IN
W1/6-16 10098,1 kHz-10099,0 kHz VCXO IN
W1/10-16 FIXED POWER REG.
W1/15-16 MIXER OUTPUT
0,2V
2,5V
45mV
2,8V
0,15V
2V
1V
0,5V
2V
1,6V

S130X

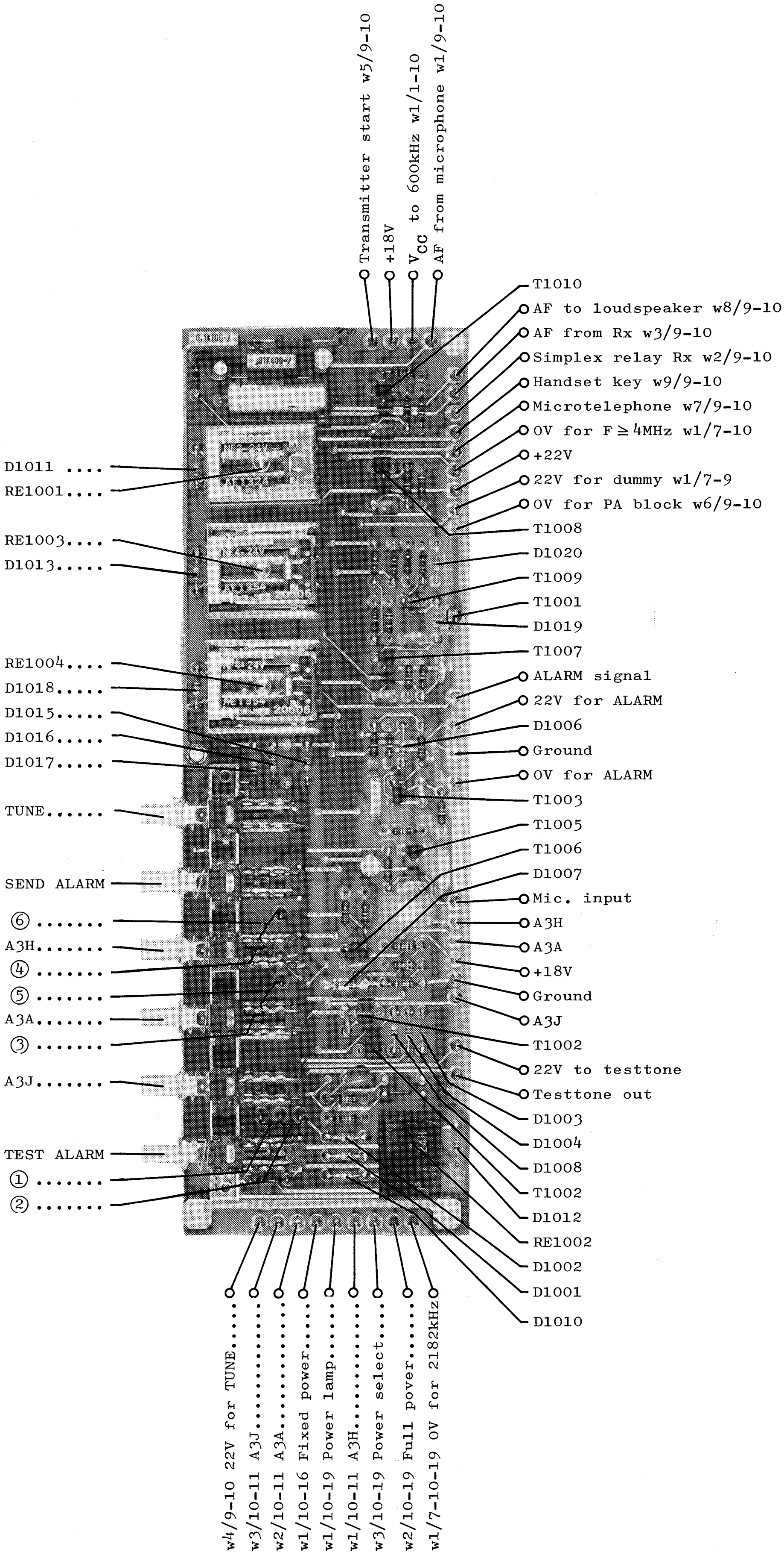


S1302

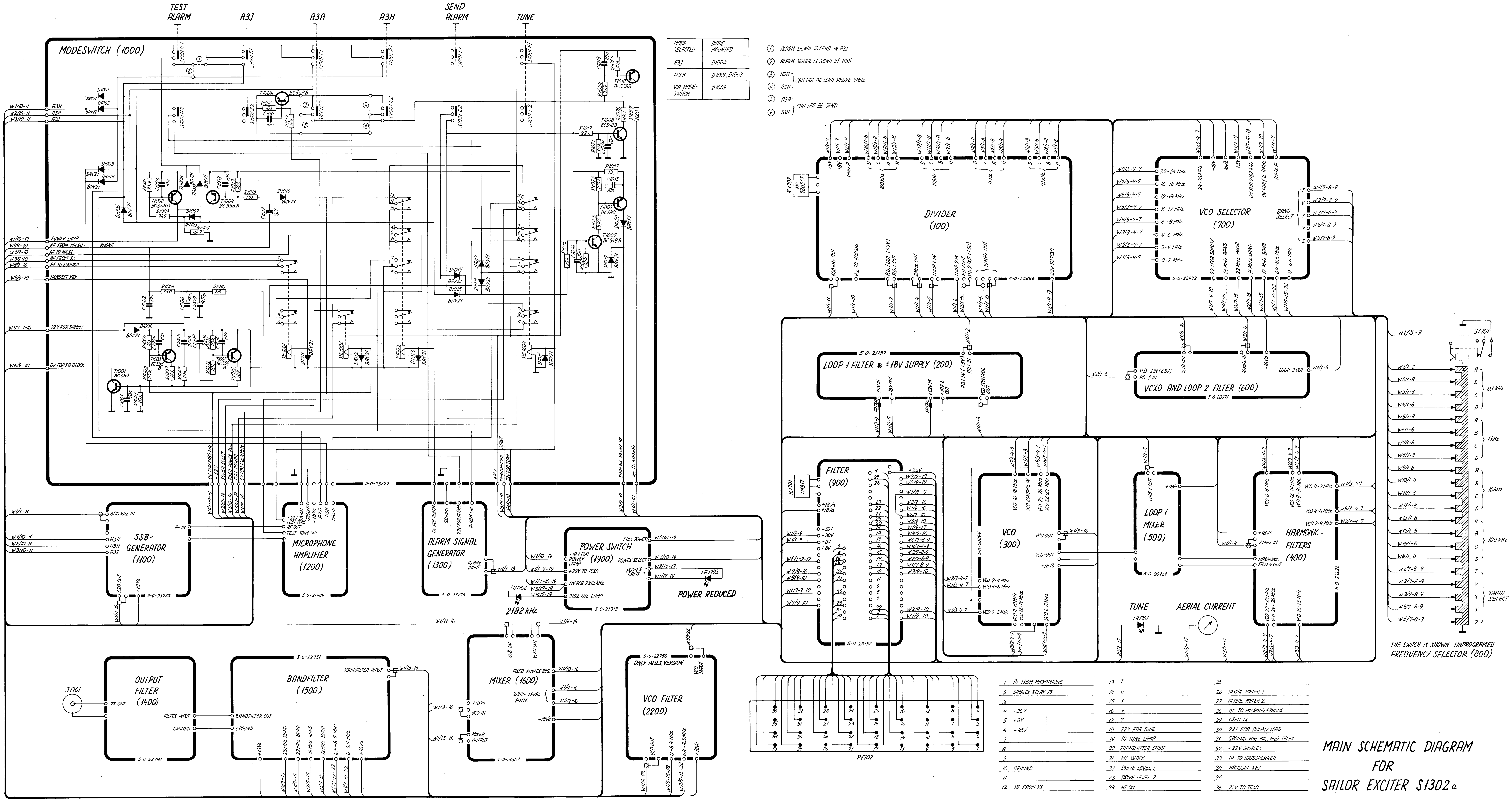


POWER SWITCH S1302

MODULE 1000



S1302



MODE SELECTED	DIODE MOUNTED
A3J	D1005
A3H	D1001, D1003
VIA MODE-SWITCH	D1009

1. ALARM SIGNAL IS SEND IN A3J
2. ALARM SIGNAL IS SEND IN A3H
3. A3A } CAN NOT BE SEND ABOVE 4MHz
4. A3H }
5. A3A } CAN NOT BE SEND
6. A3H }

1	AF FROM MICROPHONE	13	T	25	
2	SIMPLEX RELAY RX	14	V	26	AERIAL METER 1.
3		15	X	27	AERIAL METER 2.
4	+22V	16	Y	28	AF TO MICROTELEPHONE
5	+8V	17	Z	29	OPEN TX
6	–45V	18	22V FOR TUNE	30	22V FOR DUMMY LOAD
7		19	TO TUNE LAMP	31	GROUND FOR MIC. AND TELEX
8		20	TRANSMITTER START	32	+22V SIMPLEX
9		21	PA BLOCK	33	AF TO LOUDSPEAKER
10	GROUND	22	DRIVE LEVEL 1	34	HANDSET KEY
11		23	DRIVE LEVEL 2	35	
12	AF FROM RX	24	HT ON	36	22V TO TCXO

MAIN SCHEMATIC DIAGRAM FOR SAILOR EXCITER S1302a